

BS 8595:2013



BSI Standards Publication

Code of practice for the selection of water reuse systems

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Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 September 2013. It was prepared by Technical Committee CB/506, *Water reuse*. A list of organizations represented on this committee can be obtained on request to its secretary.

The initial drafting of this British Standard was produced in association with BIS as part of their ongoing programme of support for standardization.

Use of this document

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

Particular attention is drawn to the following regulations:

- The Private Water Supplies Regulations [1], comprising The Private Water Supplies Regulations 2009; The Private Water Supplies (Wales) Regulations 2010 as amended; The Private Water Supplies (Scotland) Regulations 2006 as amended; The Private Water Supplies Regulations (Northern Ireland) 2009 as amended;
- The Workplace (Health, Safety and Welfare) Regulations 1992 [2];
- The Confined Spaces Regulations 1997 [3];
- The Work at Height Regulations 2005 [4].

In this document, the following national regulations, which apply to plumbing systems in premises to which a supply of public mains water has been provided, are referred to collectively as the “Water Fittings Regulations [5]”:

- The Water Supply (Water Fittings) Regulations 1999, in England and Wales;
- The Water Byelaws 2004 (Scotland), in Scotland;
- The Water Supply (Water Fittings) Regulations (Northern Ireland) 2009, in Northern Ireland.

Introduction

Water reuse refers to the collection and utilization of previously used water and rainwater. The collection and reuse of water is an alternative or supplement to the public mains water supply for a variety of non-potable water uses. In addition, for rainwater harvesting systems, it may also provide benefits for the attenuation of surface water run-off.

The term “water reuse systems” is not to be confused with the more comprehensive term “alternative water supply systems”, which applies to all non-potable water supply, sanitation and sustainable drainage systems (SuDS). For example, private borehole water supplies are an alternative water supply system but are not considered to be water reuse.

The suitability of water reuse systems at any particular location is in part dependent on the needs and constraints of the local environment and infrastructure. For example, rainwater harvesting systems could be selected to help manage the surface water run-off with the additional benefit of reducing mains water use. Similarly, water reuse systems might not be deemed appropriate in areas where water scarcity, pollution from combined sewer overflows or other such environmental constraints are not of concern.

This British Standard has been written:

- to assist developers, designers and specifiers in taking into account local needs and constraints when evaluating the suitability of specific water reuse systems;
- to aid the development of evidence-based policies on water reuse by water and wastewater service suppliers, lead local flood authorities (LLFAs), local planning authorities (LPAs), internal drainage boards (IDBs) and the Environment Agency;
- to complement BS 8515, BS 8525-1 and BS 8525-2, which deal in detail with rainwater harvesting systems and greywater systems.

1 Scope

This British Standard gives recommendations on how to select water reuse system(s), taking into account water resources, surface water management, water supply and sewage infrastructure. It applies to both new and existing developments in residential and non-residential premises.

This British Standard covers the following water reuse systems: rainwater harvesting, stormwater harvesting and greywater reuse. It covers the supply of water for domestic water uses that do not require potable water quality, such as laundry, toilet flushing and garden watering. It does not cover systems supplying potable water for drinking, food preparation and cooking, dishwashing and personal hygiene.

This British Standard does not cover other sources of non-potable water, such as treated effluent, reclaimed industrial process water and water abstracted from wells and boreholes.

NOTE 1 Although this British Standard does not give specific recommendations relating to the use of rainwater, stormwater or greywater for fire suppression or commercial irrigation, these applications are not excluded.

It does not cover water butts or direct reuse systems for external use. It also does not cover product design for specific system components or the design and installation of water reuse systems.

NOTE 2 Further information on the design and installation of water reuse systems can be found in BS 8515, BS 8525-1 and BS 8525-2.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Standards publications

BS 8515:2009, *Rainwater harvesting systems – Code of practice*

BS 8525-1:2010, *Greywater systems – Part 1: Code of practice*

BS 8525-2, *Greywater systems – Part 2: Domestic greywater treatment equipment – Requirements and test methods*

BS 8542:2011, *Calculating domestic water consumption in non-domestic buildings – Code of practice*

BS ISO 15686-5, *Buildings and constructed assets – Service-life planning – Part 5: Life-cycle costing*

Other publications

[N1]WATER REGULATIONS ADVISORY SCHEME. *Information and Guidance Note No. 9-02-05, Issue 3. Marking and identification of pipework for water reuse systems*. Newport: WRAS, 2011.

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1 carbon footprint

measure of the emissions of greenhouse gases (GHG) used over the whole life of a product (goods or services), from the extraction of raw materials and manufacturing right through to its use and final reuse, recycling or disposal

3.2 embodied carbon

greenhouse gases released during resource extraction, transport, manufacturing of a product and its final disposal

NOTE The SI units are kgCO₂/kg.

3.3 greywater

domestic wastewater excluding faecal matter and urine

[SOURCE: BS EN 1085:2007, 2190]

NOTE 1 This British Standard covers systems using bathroom greywater. For ease of reference, where the standard refers to “greywater”, this is assumed to be “bathroom greywater”.

NOTE 2 For the purposes of this British Standard, greywater excludes kitchen wastewater.

3.4 harvested rainwater

rainwater collected from roof catchments

3.5 harvested stormwater

rainwater run-off collected from impermeable surfaces other than roofs

NOTE Impermeable surfaces might include paved surfaces, pedestrian pathways, roads and water collected by permeable pavements. Rainwater run-off is likely to contain a higher level of contamination from urban pollutants in comparison to harvested rainwater.

3.6 life cycle analysis (LCA)

method to assess impacts associated with all stages of a product's life, focusing on an economic assessment using profiles of current and future costs and benefits to calculate a discounted net present value of the life cycle costs, including capital costs, operating costs and end of life costs

3.7 multi-user system

residential and commercial rainwater/greywater reuse systems designed to serve multiple properties and users, such as flats, residential and/or housing associations, hotels, offices and other commercial applications

3.8 operational carbon

emissions of carbon and other greenhouse gases during operation of a system

3.9 potable water

water suitable for human consumption

NOTE 1 Attention is drawn to Section 67 of the Water Industry Act 1991 [6], Section 76J of the Water (Scotland) Act 1980 [7] and Article 107 of the Water and Sewerage Services (2006 Order) (Commencement No. 3) Order (Northern Ireland) 2010 [8].

NOTE 2 Potable water can also be referred to as "wholesome" water.

3.10 rainwater

water arising from atmospheric precipitation

[SOURCE: BS 8515:2009, 3.23]

3.11 reclaimed water

greywater, or harvested rainwater or stormwater

3.12 single user system

rainwater and greywater system designed for a single user

3.13 sustainable drainage systems (SuDS)

surface water drainage systems developed in line with the principles of sustainable development

3.14 water reuse

systematic collection and utilization of non-mains water or previously used water for non-potable purposes only

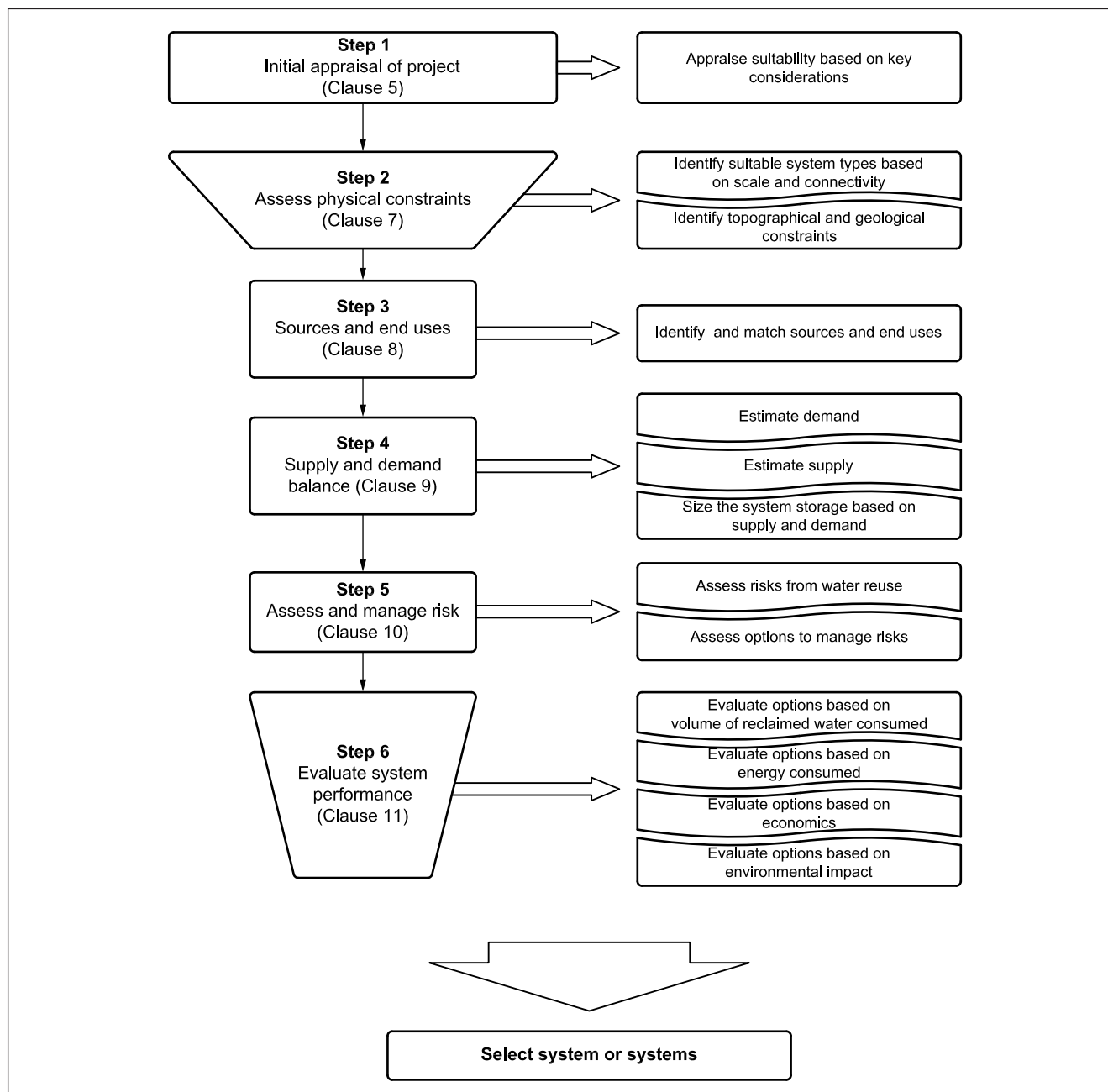
3.15 water safety plan

plan to ensure the safety of treated water using risk assessment and risk management approaches

4 Assessment process

The steps shown in Figure 1 should be followed to select a water reuse system.

Figure 1 Steps in the selection of a water reuse system



5 Step 1: Initial appraisal of project

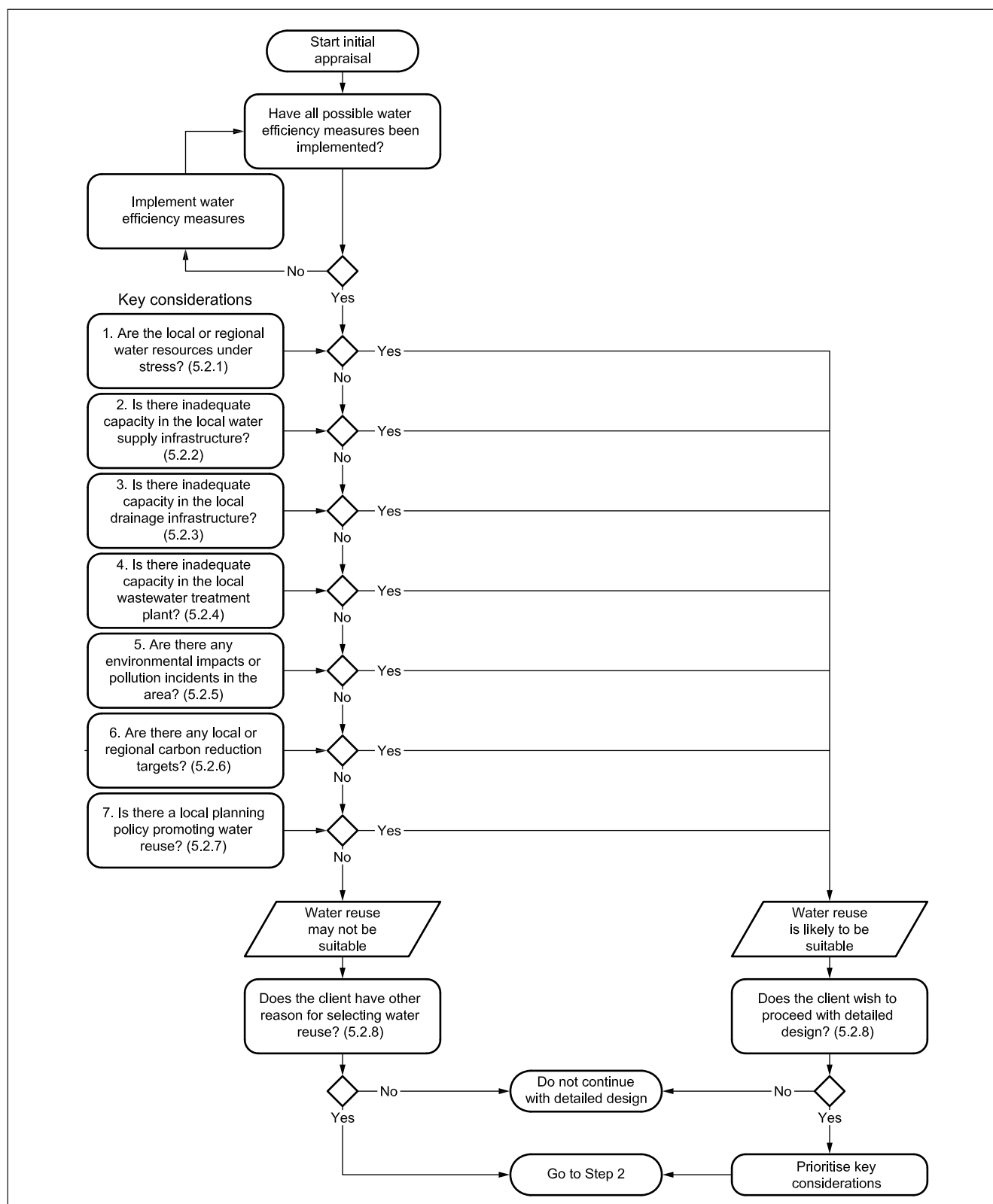
5.1 General

Water efficiency measures should be taken into account and implemented where possible before proceeding with the selection of a water reuse system.

NOTE Examples of water efficiency measures include low flow taps and dual flush toilets.

An initial appraisal should be carried out in accordance with Figure 2 to determine the project's key considerations and constraints.

Figure 2 Initial appraisal



5.2 Key considerations

5.2.1 Levels of stress on water resources (local and regional)

The long-term availability of water supplies should be determined when scoping, evaluating, planning and selecting any water reuse systems.

NOTE 1 Climate change might affect the long-term availability of water supplies within the catchment.

If the site in question lies within a water-stressed catchment, water reuse systems should be designed to help reduce the amount of water abstracted and help reduce the level of water stress in the local area.

NOTE 2 The water stress level for the local catchment for the UK can be obtained from Figure 3. Detailed information about availability of water and whether the location of interest lies in a water-stressed zone can be obtained from the local Environment Agency office, water service providers or from the local water resource management plan.

NOTE 3 Attention is drawn to the EU Water Framework Directive [9].

5.2.2 Water supply infrastructure capacity

The capacity of the local water supply infrastructure to meet current and projected future demands should be assessed; if there is a lack of capacity, a water reuse system may be used to help meet future needs by reducing the overall water demand.

NOTE Information about the capacity of the water supply infrastructure to meet current and future demand can be obtained from local water service providers.

5.2.3 Drainage network infrastructure capacity

The capacity of the local drainage network infrastructure to meet current and projected future demands should be assessed; if there is a lack of capacity in an area to meet current or projected future drainage requirements (e.g. due to new development, urban creep or observed increases in rainfall due to climate change), a water reuse system may be used to help minimize, or be a component part of a SuDS which prevents discharges of surface water run-off.

NOTE 1 Information about the capacity of the drainage system to meet current and future demand can be obtained from local drainage and sewerage undertakers.

NOTE 2 National or local criteria for new surface water drainage systems are likely to set requirements for development site run-off volumes to be controlled to pre-development equivalents, for the 1 in 100 year event, when discharging either to sewerage or directly to water bodies. In many cases, meeting this criterion might require water harvesting and reuse systems for attenuation.

5.2.4 Wastewater treatment works infrastructure capacity

The capacity of the local wastewater treatment works to meet current and projected future demands should be assessed; if existing wastewater treatment works are unable to meet projected future requirements, a water reuse system may be used to help reduce the volume of wastewater entering the foul drainage system and reduce the demand on existing wastewater treatment works.

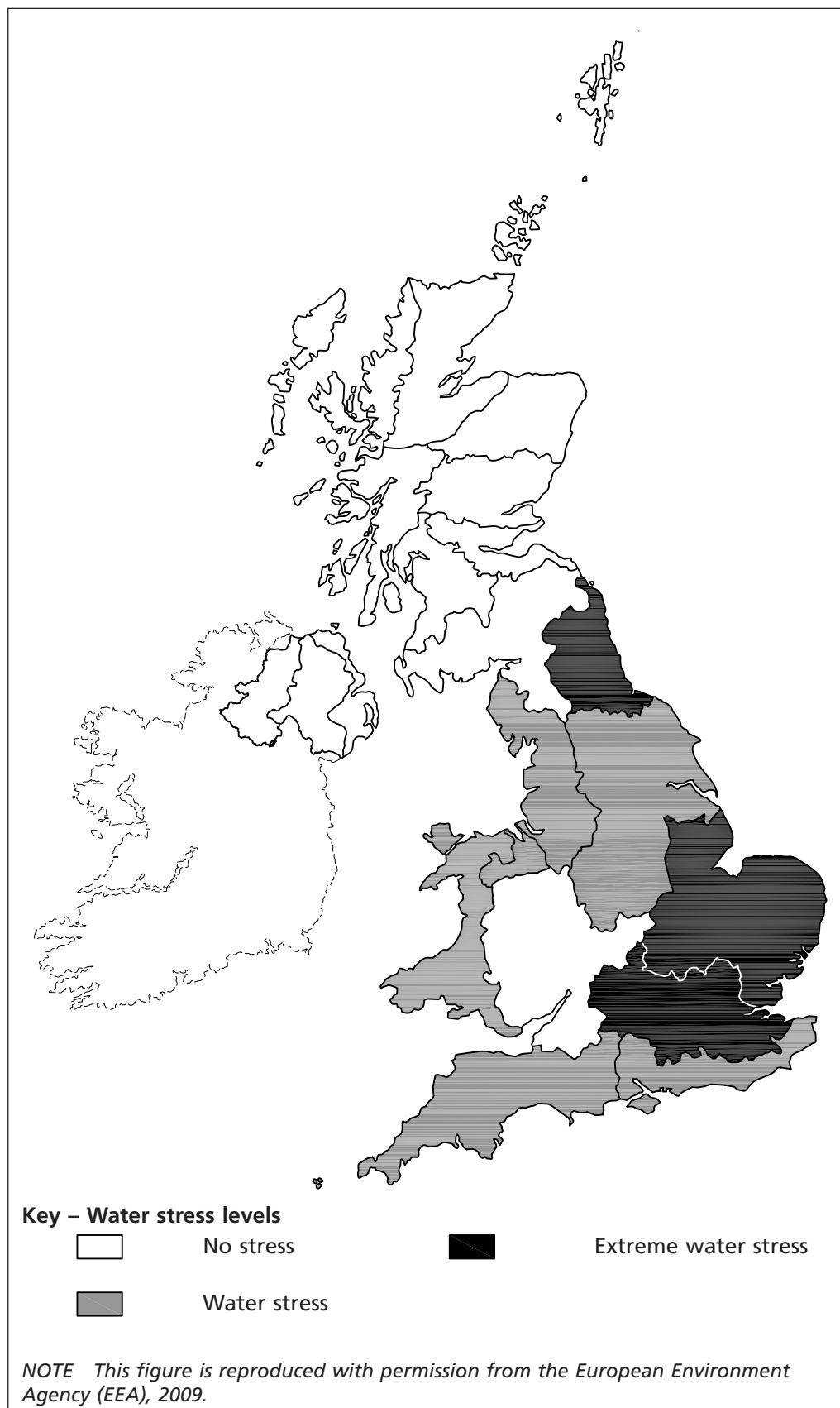
NOTE Information about capacity requirements of wastewater treatment works can be sourced from the local sewerage undertakers.

5.2.5 Environmental impact

Information about the risk of pollution, pollution incidents and the quality of the relevant local water bodies should be taken into account during scoping, evaluation, planning and selecting water reuse systems.

NOTE Information about the risk of pollution can be obtained from the local sewerage undertaker, the Environment Agency for England and Wales, the Northern Ireland Environment Agency or the Scottish Environment Protection Agency (SEPA).

Figure 3 Water stress at abstraction catchment scale for the UK



5.2.6 Carbon reduction targets

Information about the carbon footprint of local water supply, wastewater treatment and water reuse systems should be taken into account during scoping, evaluation, planning and selecting the water reuse systems, as water reuse systems might help to reduce the amount of operational carbon consumed in the abstraction, treatment and conveyance of municipal water supply.

NOTE Information about local carbon reduction targets can be obtained from the local water service providers.

5.2.7 Local planning policies

Any policies adopted by the local planning authority promoting water reuse systems should be taken into account during scoping, evaluation, planning and selecting the water reuse systems.

NOTE Information about local planning policies can be obtained from the local planning authority.

5.2.8 Client requirements

The client's own reasons for selecting water reuse systems, such as a reduction in water bills, should be taken into account during scoping, evaluation, planning and selecting the water reuse systems.

5.3 Project objectives: prioritization of key considerations

Once the key considerations have been determined, the priority or priorities of the project should be identified.

Where local availability of water or lack of capacity in the local water supply infrastructure are identified as the primary design considerations, a water reuse system should be installed to minimize consumption of mains water supply.

Where lack of capacity in the stormwater drainage infrastructure is identified as the primary design consideration, priority should be given to an integrated design of rainwater and stormwater harvesting as a method of reducing the volume of rainfall run-off.

Where lack of capacity in the wastewater and foul drainage infrastructure is identified as the primary design consideration, priority should be given to greywater reuse as it might help to reduce the volume of discharge of wastewater into the foul drainage system.

NOTE There might be a need for increased storage and increased retention times, which might require increased treatment to maintain the quality of treated reclaimed water for the longer period.

5.4 Results of initial appraisal

The results of the initial appraisal should be discussed with the client and a decision should be made as to whether to proceed with the project and, if so, what the priority considerations are.

6 System selection

A water reuse system should be selected based on the following criteria:

- a) physical constraints (see Clause 7);
- b) sources and end uses (see Clause 8);
- c) supply and demand balance (see Clause 9);