

APPROVED DOCUMENT W: WATER POSITIVE NET ZERO DEVELOPMENTS

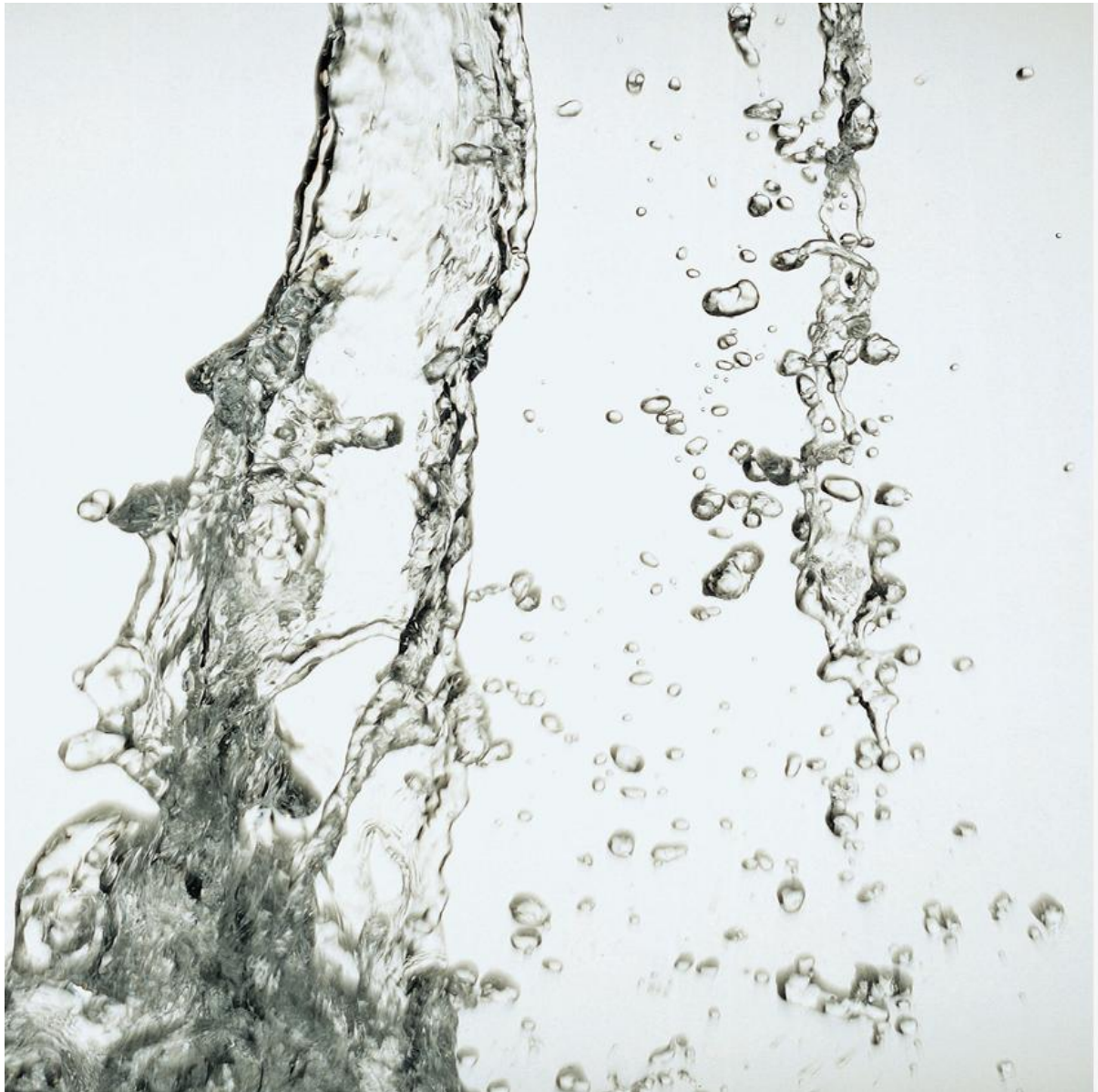
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GUIDANCE SUPPORTING A PROPOSED NEW WELSH BUILDING REGULATION STANDARD FOR WATER, DRAINAGE AND VERIFIED NET ZERO PERFORMANCE

0.1 INTRODUCTION

The Welsh Building Regulations provide minimum standards for the design and construction of buildings, covering matters such as structure, fire safety, sanitation, drainage, ventilation, energy efficiency and accessibility. However, while existing Approved Documents address individual aspects of water efficiency and drainage, they do not fully require new developments to demonstrate water-positive or water-neutral performance as part of a verified net zero outcome.

This proposed Approved Document W introduces a new regulatory standard for **Water Positive Net Zero Developments**. The purpose of the standard is to ensure that new developments in Wales reduce potable water demand, reduce foul-water discharge, manage surface water at source, protect drainage infrastructure, and provide post-occupancy evidence of actual water performance.

Existing Welsh Approved Document G already provides guidance on sanitation, hot water safety and water efficiency, while Approved Document H covers drainage and waste disposal (Welsh Government, 2023; Welsh Government, 2017). Wales also has statutory Sustainable Drainage Systems standards for new developments, including standards for runoff destination, hydraulic control, water quality, amenity, biodiversity and long-term maintenance (Welsh Government, 2018). However, the current regulatory framework does not sufficiently connect water efficiency, wastewater loading, surface-water management and operational verification into one net zero building performance standard.

The need for a stronger standard is demonstrated by evidence from WRc's review of water efficiency compliance in Wales. The review found that the calculated average per capita consumption of sampled Welsh homes was 135 litres per person per day, above the 110 litres per person per day requirement, with no properties achieving full compliance under the reviewed approach (WRc, 2024). This suggests that design-stage calculations alone are not enough. A stronger Welsh Building Regulation standard should therefore require measurable evidence, physical inspection and in-use verification.

Water is directly linked to net zero because every litre of potable water must be abstracted, treated, pumped, heated, collected and treated again as wastewater. Water UK's Net Zero 2030 Routemap identifies demand reduction as part of the water sector's transition to net zero operational emissions (Water UK, 2020). Similarly, the UK Green Building Council's net zero framework and the UK Net Zero Carbon Buildings Standard both emphasise the need for clear performance standards, verification and whole-building outcomes rather than unverified sustainability claims (UKGBC, 2019; UK Net Zero Carbon Buildings Standard, 2026).

This Approved Document therefore proposes a new Part W to support the Welsh Government's wider net zero aims and to ensure that new developments contribute positively to water efficiency, drainage resilience and carbon reduction.

THE REQUIREMENTS

REQUIREMENT W1: POTABLE WATER DEMAND

New developments shall be designed and constructed so that potable water demand is limited to a level consistent with net zero water performance.

Reasonable provision shall be made to:

- a. reduce potable water consumption through efficient fittings and appliances;
- b. reduce hot water wastage through efficient pipework design and reduced dead-leg lengths;
- c. provide water meters and sub-meters to allow ongoing monitoring; and
- d. demonstrate, after occupation, that water use is consistent with the design target.

PERFORMANCE STANDARD W1

For new dwellings, the calculated potable water demand should not exceed:

95 litres per person per day, excluding any allowance for external water use.

For non-domestic buildings, a water demand assessment should be carried out using the building type, occupancy, process uses and sanitary provision. The design should demonstrate a minimum 25% reduction against a recognised baseline for the same building type.

Where a lower target is technically achievable, the lower target should be adopted.

REQUIREMENT W2: ALTERNATIVE NON-POTABLE WATER SUPPLY

New developments shall reduce demand on mains potable water by using alternative water supplies where practical.

Reasonable provision shall be made for one or more of the following:

- a. rainwater harvesting;
- b. greywater recycling;
- c. treated process-water reuse;
- d. communal non-potable water networks; or
- e. another approved method that reduces potable water demand.

PERFORMANCE STANDARD W2

For developments of 10 or more dwellings, or non-domestic buildings with a gross internal floor area above 1,000m², an alternative water supply assessment shall be provided.

Where technically feasible, non-potable water should be used for:

- a. WC flushing;
- b. urinal flushing;

- c. irrigation;
- d. external washdown;
- e. plant and maintenance use; and
- f. other uses that do not require potable water quality.

Rainwater harvesting systems should be designed, installed, commissioned and maintained in accordance with recognised good practice, including BS EN 16941-1:2024 where applicable (BSI, 2024).

REQUIREMENT W3: FOUL-WATER AND WASTEWATER IMPACT

New developments shall be designed so that foul-water discharge to the public sewerage network is minimised and does not place avoidable additional pressure on existing wastewater infrastructure.

Reasonable provision shall be made to:

- a. reduce foul-water discharge by reducing water consumption;
- b. separate surface water from foul water;
- c. prevent unnecessary inflow and infiltration into foul drainage systems;
- d. provide accessible inspection and maintenance points; and
- e. demonstrate that the proposed development will not worsen known local sewer capacity issues.

PERFORMANCE STANDARD W3

Where a development connects to a public sewer, the applicant should submit a wastewater impact statement. This should include:

- a. estimated daily foul-water discharge;
- b. estimated peak foul-water discharge;
- c. confirmation that surface water will not be connected to the foul sewer unless no other lawful option exists;
- d. confirmation from the sewerage undertaker where required; and
- e. mitigation where local foul or combined sewer capacity is constrained.

This requirement is intended to support, not replace, the drainage principles in Approved Document H (Welsh Government, 2017).

REQUIREMENT W4: SURFACE-WATER AND SUDS INTEGRATION

New developments shall manage surface water at source and shall not increase flood risk, surface-water runoff or combined sewer loading.

Reasonable provision shall be made to:

- a. prioritise infiltration, reuse and controlled discharge in accordance with the surface-water hierarchy;
- b. integrate SuDS into the development layout;
- c. improve water quality before discharge;
- d. provide amenity and biodiversity benefits; and
- e. secure long-term maintenance.

PERFORMANCE STANDARD W4

The development should meet the Welsh statutory SuDS standards and demonstrate performance against the following principles:

Matter	Guidance
Runoff destination	Surface water should be managed as close to source as possible.
Hydraulic control	Peak runoff and runoff volume should be controlled to prevent worsening flood risk.
Water quality	Surface water should be treated before discharge using suitable SuDS components.
Amenity	SuDS should contribute positively to the development layout and public realm.
Biodiversity	SuDS should support habitat creation and ecological value.
Maintenance	A maintenance plan must be provided before completion.

The SuDS strategy should be coordinated with the building design, landscape design, highway design and drainage design from the earliest stage.

REQUIREMENT W5: SMART WATER MONITORING AND LEAK DETECTION

New developments shall include metering, sub-metering and leak detection systems suitable for the scale and use of the building.

Reasonable provision shall be made for:

- a. a main water meter to each dwelling or building;
- b. sub-metering of major water-consuming systems;
- c. leak detection on incoming water supplies;
- d. isolation valves that are accessible for maintenance; and
- e. handover information explaining how the system should be used.

PERFORMANCE STANDARD W5

All new dwellings should be provided with a water meter and an accessible internal stop valve.

Non-domestic buildings should include sub-metering where a water-consuming system or building area is expected to account for more than 10% of total water demand. This reflects the principle used in BREEAM-style sustainability assessment, where monitoring is used to support water management and reduction.

For larger residential developments, communal plant, irrigation systems, rainwater systems, greywater systems and landlord water uses should be separately metered.

Leak detection should be capable of identifying continuous abnormal flow outside normal usage patterns.

REQUIREMENT W6: POST-OCCUPANCY VERIFICATION

A development shall not be classed as fully compliant with Approved Document W until its actual water performance has been verified after occupation.

Reasonable provision shall be made for:

- a. collection of water meter data;
- b. comparison of actual use against the design target;
- c. reporting of rainwater or greywater system performance;
- d. reporting of significant leaks or defects; and
- e. completion of corrective action where the development fails to meet the required target.

PERFORMANCE STANDARD W6

For dwellings, the developer or building owner should submit 12 months of water consumption data following occupation. Where full 12-month data is not available because of staged occupation, data should be submitted for the first complete reporting period agreed with Building Control.

For non-domestic buildings, the building owner should submit a water performance report after 12 months of normal operation.

Where the actual performance exceeds the design target by more than 15%, the applicant should provide:

- a. an explanation of the cause;
- b. evidence of investigation;
- c. proposed corrective measures; and
- d. a revised monitoring period where required.

This approach follows the principle that net zero performance should be verified using actual operational evidence rather than design intent alone. LETI identifies data disclosure as a key part of climate emergency design, and the UK Net Zero Carbon Buildings Standard requires robust evidence and verification as part of net zero carbon alignment (LETI, 2020; UK Net Zero Carbon Buildings Standard, 2026).

1.0 APPLICATION

This Approved Document applies to:

- a. new dwellings;
- b. new non-domestic buildings;
- c. major mixed-use developments;
- d. new public sector buildings; and
- e. major extensions where the extension significantly increases water demand or drainage load.

This Approved Document does not apply to minor domestic alterations unless the works include new sanitary provision, new drainage connections or significant changes to water demand.

Where this Approved Document overlaps with Approved Document G, Approved Document H or the Welsh SuDS statutory standards, the higher or more specific performance requirement should be applied.

2.0 DEFINITIONS

For the purpose of this Approved Document:

Alternative water supply means a non-potable water source used to reduce potable mains water demand, including rainwater, greywater or treated process water.

Drainage neutrality means that a development does not increase peak surface-water runoff, surface-water volume or foul-water pressure on existing drainage systems when compared with the agreed pre-development position.

Greywater means lightly contaminated wastewater from showers, baths and wash hand basins that may be treated and reused for non-potable purposes.

Potable water means water suitable for drinking and food preparation.

Water-positive development means a development that reduces potable water demand, reduces foul-water discharge, manages surface water at source and verifies actual water performance after occupation.

Water performance report means a post-occupancy report comparing actual water use against the approved design target.

3.0 GUIDANCE ON COMPLIANCE

3.1 DESIGN-STAGE EVIDENCE

At design stage, the applicant should provide:

- a. a water demand calculation;
- b. a fittings specification;
- c. a hot water distribution strategy;
- d. a rainwater or greywater feasibility assessment;
- e. a foul-water discharge assessment;
- f. a SuDS strategy;
- g. a metering and leak detection strategy; and
- h. a post-occupancy verification plan.

The water demand calculation should not rely only on generic manufacturer information. Where possible, fittings should be selected based on verified flow rates and flush volumes.

3.2 CONSTRUCTION-STAGE EVIDENCE

Before completion, the applicant should provide:

- a. photographs of installed water fittings;
- b. commissioning certificates for rainwater or greywater systems;
- c. meter installation records;
- d. leak detection test records;
- e. as-built drainage drawings;
- f. SuDS completion evidence; and
- g. homeowner or building-user guidance.

The purpose of construction-stage evidence is to close the gap between design specification and actual installed performance. This is necessary because evidence from Welsh housing has shown that calculated design compliance does not always result in compliant real-world water use (WRC, 2024).

3.3 POST-OCCUPANCY EVIDENCE

After occupation, the applicant or building owner should provide:

- a. 12 months of water meter data;
- b. occupancy assumptions;
- c. evidence of abnormal leaks or defects;
- d. rainwater or greywater system yield data where installed;
- e. maintenance records for SuDS and non-potable systems; and
- f. confirmation of corrective works where required.

Post-occupancy verification is essential because water-positive performance cannot be proven at design stage alone.

4.0 GUIDANCE FOR DWELLINGS

4.1 WATER FITTINGS

The following fittings should be selected unless a specific user need requires otherwise:

Fitting	Recommended maximum performance
WC full flush	4.5 litres
WC reduced flush	3 litres
Wash hand basin tap	4 litres/minute
Kitchen tap	6 litres/minute
Shower	7 litres/minute
Bath	170 litres to overflow
Dishwasher	Efficient labelled appliance
Washing machine	Efficient labelled appliance

Fittings should be checked after installation. Flow restrictors should not be easily removable by occupants without tools.

4.2 HOT WATER EFFICIENCY

In low-energy buildings, domestic hot water can become a larger proportion of total energy demand. AECB guidance recognises the importance of hot water efficiency in highly insulated homes (AECB, 2024). Therefore, the design should reduce both water waste and heat waste.

Reasonable provision should include:

- a. short pipe runs between hot water generation and outlets;
- b. insulated hot water pipework;
- c. reduced dead-leg lengths;
- d. efficient showers and taps; and
- e. clear user guidance.

5.0 GUIDANCE FOR NON-DOMESTIC BUILDINGS

Non-domestic buildings should include a water management plan appropriate to the building type. The plan should identify:

- a. sanitary water demand;
- b. catering demand;
- c. cleaning and washdown demand;
- d. process water demand;
- e. irrigation demand;
- f. plant and cooling demand; and
- g. opportunities for reuse.

For schools, offices, healthcare buildings, leisure buildings and industrial buildings, the applicant should demonstrate how the water strategy responds to the actual operating pattern of the building.

For buildings with high process-water demand, the applicant should consider water recycling, closed-loop systems and sub-metering.

6.0 RELATIONSHIP WITH NET ZERO

Approved Document W supports net zero in four ways.

First, it reduces the operational energy needed to abstract, treat, pump and heat water. Secondly, it reduces wastewater flows, helping wastewater undertakers reduce treatment energy and process emissions. Thirdly, it reduces pressure on combined sewers and surface-water systems, lowering the risk of carbon-intensive remedial infrastructure works. Finally, it uses post-occupancy evidence to prevent unverified net zero claims.

The UKGBC framework identifies net zero carbon buildings as requiring a clear approach to both construction and operational performance (UKGBC, 2019). Water should be treated as part of that operational performance because water use affects energy demand, infrastructure demand and climate resilience.

This standard is not intended to replace operational energy or embodied carbon standards. Instead, it adds a missing water-performance layer to the wider net zero building framework.

7.0 LIMITING THE RISK OF BYPASS

A common weakness of Building Regulations is that compliance may be treated as a design-stage exercise. Approved Document W reduces this risk by requiring evidence at four stages:

Stage	Evidence
Design	Calculations, specifications, drainage strategy and water reuse assessment
Construction	Installed fittings, meter records, commissioning certificates and as-built drawings
Completion	Handover pack, maintenance plan and initial compliance certificate
Occupation	12 months of actual water data and corrective action where required

This staged approach makes the standard harder to bypass because the development cannot rely only on drawings or assumptions. Real performance must be measured and compared with the target.

8.0 EXAMPLE COMPLIANCE ROUTE

A new housing development of 50 dwellings should comply by providing:

- a. a calculated potable water demand of no more than 95 litres per person per day;
- b. efficient fittings installed and physically checked;
- c. short hot water distribution routes to reduce wastage;
- d. rainwater harvesting for communal landscape irrigation or WC flushing where feasible;
- e. separate foul and surface-water drainage;
- f. SuDS designed to meet the Welsh statutory standards;
- g. individual water meters to each dwelling;
- h. leak detection on communal water supplies;
- i. a homeowner water-use guide; and
- j. 12 months of post-occupancy water data.

Where the development fails to meet the target after occupation, the developer should investigate the cause and carry out reasonable corrective works, such as replacing high-flow fittings, repairing leaks, recommissioning rainwater systems or improving user information.

9.0 CONCLUSION

Approved Document W would create a practical and measurable Welsh Building Regulation standard for water-positive net zero developments. It would strengthen the current approach by connecting water efficiency, alternative water supply, foul-water reduction, SuDS, smart metering and post-occupancy verification into one regulatory document.

This standard is stronger than a simple water efficiency requirement because it does not rely only on design calculations. It requires evidence at design, construction, completion and occupation. This responds directly to the problem that buildings can appear compliant on paper but fail to perform as intended in real use.

The proposed standard would also support Welsh net zero ambitions by reducing water demand, reducing wastewater treatment loads, reducing flood and drainage pressure, and improving long-term resilience. It would sit logically alongside Approved Document G, Approved Document H and the Welsh SuDS statutory standards, while filling the current gap between water regulation and verified net zero building performance.

REFERENCE LIST

AECB (2024) *AECB Water Standard*. Association for Environment Conscious Building. Available at: <https://aecb.net/aecb-water-standard/> (Accessed: 22 June 2026).

BSI (2024) *BS EN 16941-1:2024 On-site non-potable water systems. Systems for the use of rainwater*. London: British Standards Institution. Available at: <https://knowledge.bsigroup.com/> (Accessed: 22 June 2026).

LETI (2020) *Climate Emergency Design Guide*. London Energy Transformation Initiative. Available at: <https://www.leti.uk/cedg> (Accessed: 22 June 2026).

UK Green Building Council (2019) *Net Zero Carbon Buildings: A Framework Definition*. London: UKGBC. Available at: <https://ukgbc.org/resources/net-zero-carbon-buildings-framework/> (Accessed: 23 June 2026).

UK Net Zero Carbon Buildings Standard (2026) *The UK Net Zero Carbon Buildings Standard: Version 1*. Available at: <https://www.nzcbbuildings.co.uk/> (Accessed: 23 June 2026).

Water UK (2020) *Net Zero 2030 Routemap*. London: Water UK. Available at: <https://www.water.org.uk/> (Accessed: 26 June 2026).

Welsh Government (2017) *Approved Document H: Drainage and Waste Disposal*. Cardiff: Welsh Government. Available at: <https://www.gov.wales/approved-document-h-drainage-and-waste-disposal> (Accessed: 26 June 2026).

Welsh Government (2018) *Statutory National Standards for Sustainable Drainage Systems*. Cardiff: Welsh Government. Available at: <https://www.gov.wales/national-standards-sustainable-drainage-systems-suds> (Accessed: 26 June 2026).

Welsh Government (2023) *Approved Document G: Sanitation, Hot Water Safety and Water Efficiency*. Cardiff: Welsh Government. Available at: <https://www.gov.wales/approved-document-g-sanitation-hot-water-safety-and-water-efficiency> (Accessed: 26 June 2026).

WRc (2024) *Building Regulations Water Efficiency Review*. Swindon: WRc. Available at: <https://www.wrcgroup.com/resources/case-studies/building-regulations-water-efficiency-review/> (Accessed: 26 June 2026).