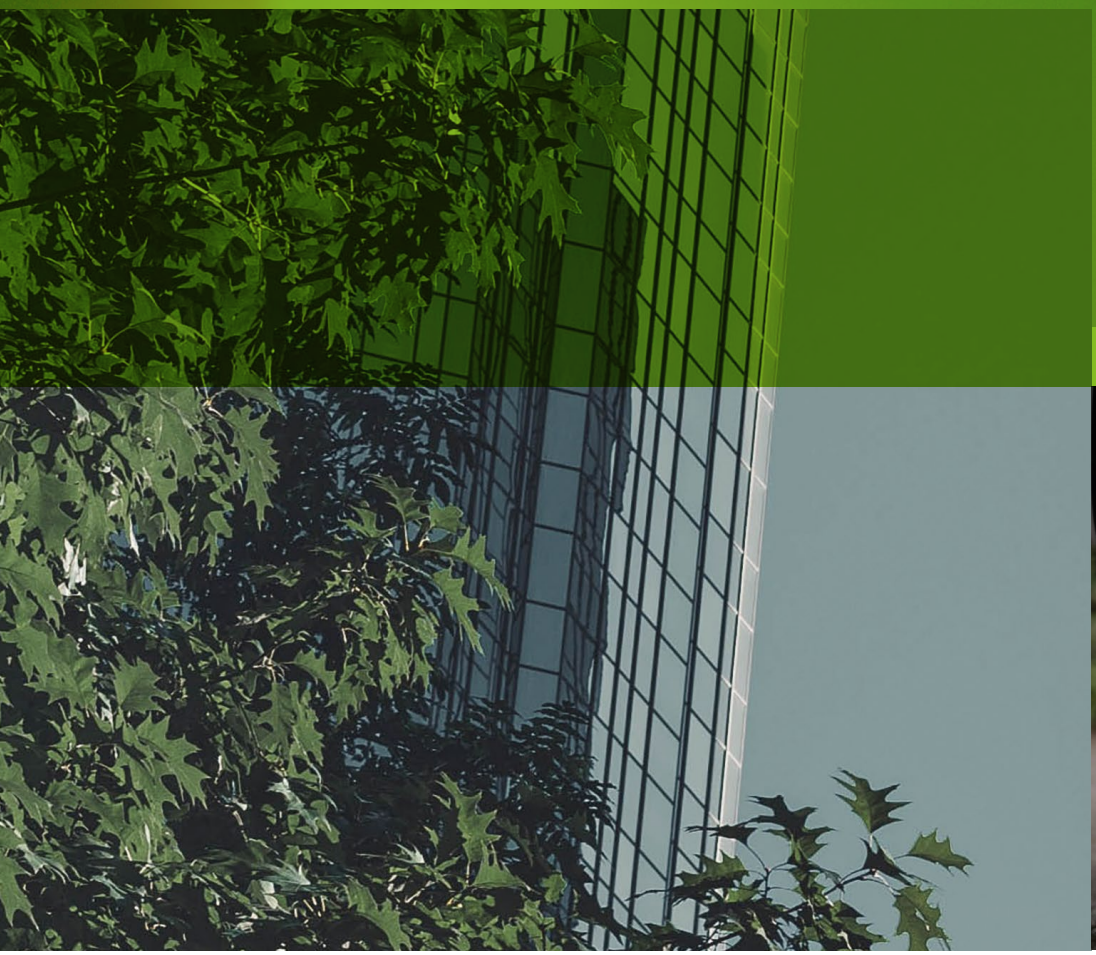
PAS 115:2021

Road sweeping and gully waste (non-hazardous) – Materials derived for future use in soils or soil amendments – Specification



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Foreword

This PAS was sponsored by UBU Environmental. Its development was facilitated by BSI Standards Limited and it was published under licence from The British Standards Institution. It came into effect on 31 October 2021.

Acknowledgement is given to Dr David Hackett, as the technical author, and the following organizations that were involved in the development of this PAS as members of the steering group:

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- GreenBlue Urban Ltd
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- Peak Associates
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- Renewable Energy Assurance Ltd (REAL)
- SUEZ
- UBU Environmental Ltd

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Presentational conventions

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

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

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

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0 Introduction

0.1 Soils – a diminishing resource

Soil is vital to most terrestrial life in providing support, nutrition and irrigation of plants, as a biodiverse ecosystem and in the recycling of nutrients, gasses and organic matter.

Highlighting the importance of this natural resource, the Chair of the Environment Agency recently stated [1]:

"Soil holds three times as much carbon as the atmosphere, it reduces the risk of flooding by absorbing water, it is a wildlife habitat, and it delivers 95% of global food supplies. Unfortunately, it is a limited resource under pressure from climate change, population growth, urban development, waste, pollution, and the demand for more (and cheaper) food."

The Defra publication, Safeguarding our Soils: A Strategy for England (2009) [2], sets out the Government's strategy to protect our soils. Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services [3], provides a comprehensive picture of how the UK Government intends to meet international and EU commitments to maintaining soil biodiversity and ecosystem function.

The quantity [4] of natural soils in the UK is rapidly declining through degradation, involving both the physical loss (erosion) and the reduction in quality of topsoil, associated with nutrient decline and contamination leading to increased susceptibility to erosion. The eroded soil can be deposited in water courses and on roads and other infrastructure, leading to significant clean-up costs and a loss of agricultural soils to landfill. To reduce further loss and degradation of soils, the UK Government's 25 Year Environment Plan [5], states that England's soils should be managed sustainably by 2030 and that steps should be taken towards restoring the UK's soils. In addition to slowing or preventing further loss, and subsequent environmental impacts, the waste hierarchy dictates that steps are to be taken to reuse and recycle the captured eroded soils.

NOTE 1 *In 2004, 2.2 million tonnes of topsoil were being eroded annually in the UK and over 17% of arable land showed signs of erosion [6].*

In comparison to rural soils, the multifunctional role that urban soils contribute to healthy environments has been relatively underestimated and undervalued, and consequently, less effort to protect and conserve urban soils has historically been made. The quality of urban soils can be affected by building waste, and urban soils might become contaminated by heavy metals, hydrocarbons and pathogens associated with urban activity. Construction also effectively seals the soil surface and reduces its capacity to store water, which can exacerbate flooding.

Diffuse pollutants – contamination that comes from many individually minor, dispersed sources – can be washed by rainfall into the soil and watercourses, creating significant impacts on our rivers, lakes, lochs and coastal waters. These pollutants, which can include nutrients, fuel, oil, metals, tyre wear, particulates from exhausts and eroded soil, can also be deposited on roads and other infrastructure, leading to significant clean-up costs.

NOTE 2 *Every year in the UK, approximately one million tonnes (half a million cubic metres) of road sweepings and gully waste ends up at landfill.*[1)]

The UK Government stated [6] its commitment to the sustainable use and protection of urban soils, supporting several schemes which aim to replace some functions lost from degraded soils, such as maximising the use of construction, demolition and excavation waste through screening to separate aggregates and soils that can be recycled. It is UK policy to seek to prevent further urban soil loss and to recover and gainfully-reuse soils and other potential soils and soil amendments that are currently being buried, polluted or lost within drainage systems.

[1)] Available at https://www.thisiseco.co.uk/news_and_blog/everything-you-need-to-know-about-gullies.html

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0.2 Waste recovery for soils and soil amendments

The decline in soil resource creates increasing demand for alternative sources of soils that have the same essential qualities in supporting plant life, though not perhaps the same intrinsic ecosystem function. The demands of growing-media usage in urban areas can be particularly complex, in the provision of adequate drainage and water storage under extremes of environmental conditions and compaction, which inhibits root growth and function [7].

The collection, transport, storage and treatment of road sweepings (also known as street cleansing materials) and gully (and other silt-trap) waste is subject to waste management controls and pollution-prevention regulations in the UK. While the stone, gravel and sand fractions of street sweepings are often reclaimed, most materials arising, including leaves and the silts and clays, currently go to landfill. Recovery of street sweepings and inert gully waste through screening, cleaning and separation of the solid fractions provides the opportunity to create soils and soil amendments to address the very specific characteristics required of soils, tree soils and structural soils in particular, which can be used in conjunction with structural soil cells in public open spaces in urban or built-up environments. While this does not preclude use elsewhere, these materials exhibit characteristics that lend themselves to this end and there are advantages, including minimising transportation, in reemploying such materials close to their source.

NOTE 1 *Composition of soils can be distinguished by the ability to provide structural support for hard surfacing, e.g., footpaths, where no other supporting mechanism is to be provided. In this instance, the medium is often referred to as a "structural soil". The primary distinguishing feature of structural soil is a uniformly-sized, highly-angular stone or gravel typically ranging from 20 mm to 40 mm in diameter. If this single-sized stone is compacted, the stone matrix would form an open structure with about a 40% porosity. For a similar single-sized spherical stone, a structure with 33% percent porosity would be produced. Friction between the stones at contact points would lock, forming the load-bearing structure of the mixture. The second component of this mixture is a soil which fills the stone voids. The medium within the voids can remain largely non-compacted and root penetrable where the volume of the soil does not exceed that of the interstices.*

This PAS sets out the processes by which soils and soil amendments may be derived from street sweepings and inert gully waste. Where these treatment processes are applied, the materials might still be regarded as waste by the regulatory authorities where End of Waste criteria are not satisfied. A Resource Framework (RF) approved by the regulatory authorities could be used to demonstrate that soils were fully recovered according to agreed criteria, and that these soils may be used without harm to human health or the environment and without the need for further waste management controls.

NOTE 2 *Where waste-derived compost is blended with material that complies with PAS 115, the blend is a waste material regardless of whether the compost is certified compliant with the Compost Quality Protocol [8], or SEPA's Guidance on Regulation of Outputs from Composting Processes [9]. Similarly, where compost made from non-waste materials is blended with material that complies with PAS 115, the blend is a waste material.*

If PAS 115 compliant materials are blended with other materials that have contaminant levels below the relevant standards of the end material, any blend might be compliant with a subsequent site-specific risk assessment (that an end user or supplier should undertake that is not covered by PAS 115). This subsequent risk assessment can be used for a final blended material which might be considered end of waste (refer to Figure 1).

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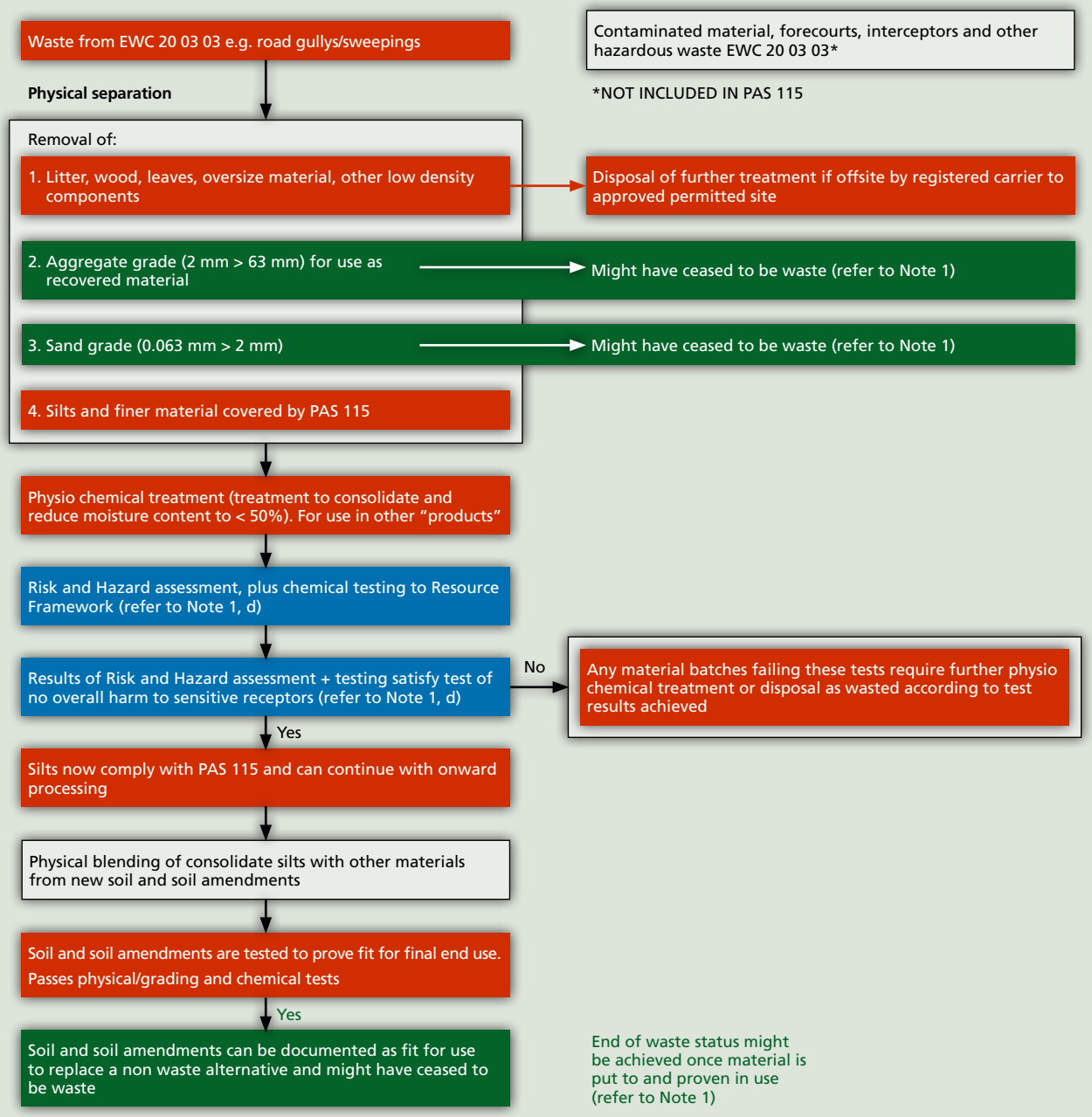
Figure 1 – Process flowchart



NOTE 1 *To achieve end of waste status, all four recommendations should be identified:*

a) substance or object is to be used for specific purposes;

b) a market or demand exists for such a substance or object;

c) substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products; and

d) use of the substance or object is not expected to lead to overall adverse environmental or human health impacts.

NOTE 2 *For the legal definition of waste, and how to decide if a material is waste or not, refer to the guidance created by Defra (https://www.gov.uk/government/publications/legal-definition-of-waste-guidance).*

Key

Red = waste Black = process Green = might be non waste Blue = test

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1 Scope

This PAS specifies requirements for the generation of soils and soil amendments through treatment of road sweepings and inert gully waste [10]. It covers requirements for the sorting of material type, size, and quality, including levels of fertility, for the purpose of future use as soils.

The PAS defines requirements for a Quality Management System (QMS) for the generation of soils and soil amendments. It also requires a Safety and Quality Control System, including Hazard Analysis and Critical Control Point (HACCP) assessment, which the user takes into account when developing, implementing and reviewing the QMS.

NOTE 1 *HACCP assessment identifies relevant hazards and establishes critical control points (CCP) and critical limits (CL) for ensuring that any risks associated with material use are controlled within acceptable limits. HACCP therefore sets a precautionary barrier to gully and road sweepings being 'blended' to dilute pollutants by ensuring the contamination levels in the end material from the PAS being below the relevant standards for the critical pollutants in their own right.*

The PAS adopts a process of Hazard Assessment for the types of pollutant that is encountered in road gully and road sweepings. The PAS process defines CCP to maximize the possibility that the levels of the specified pollutants if used as the sole component for a soil, present no significant risk linked to the specified pollutants on the types of plants or users of the land in which they are grown.

NOTE 2 *The soil and soil amendments are intended principally, but not exclusively, for use as soils in providing physical support, drainage and nutrients to trees and shrubs in challenging built-up environments, where requirements for growth can be very demanding. The use of such soils in, for instance, the support of street trees, would help meet street tree planting programmes and reduce the demand for virgin materials.*

This PAS does not:

a) demonstrate a material has achieved End of Waste;
b) stipulate the means of collection;
c) cover the process of extraction where washing is not used;
d) guarantee "performance" of the soils or soil amendment;
e) exempt the materials from waste management regulations; and
f) specify soils or soil amendments suitable for the growth of plants intended for animal or human consumption or for use on agricultural land.

This PAS is for use by waste recycling/management companies but also benefits product-sorting companies and end users such as Local Authorities, highways authorities, landscape architects and landscape contractors.

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2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this PAS. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Standard publications

BS 3882, *Specification for topsoil*

BS 8601, *Specification for subsoil and requirements for use*

BS ISO 10390, *Soil quality – Determination of pH*

BS ISO 16729, *Soil quality – Digestion of nitric acid soluble fractions of elements*

BS ISO 16772, *Soil quality – Determination of mercury in aqua regia soil extracts with cold-vapour atomic spectrometry or cold-vapour atomic fluorescence spectrometry*

BS ISO 17318, *Fertilizers and soil conditioners – Determination of arsenic, cadmium, chromium, lead and mercury contents*

ISO 11261, *Soil quality – Determination of total nitrogen – Modified Kjeldahl method*

PAS 100, *Specification for composted materials*

Other publications

[N1] DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS (Defra). *Sewage sludge in agriculture: code of practice for England, Wales and Northern Ireland*. London: Defra, 2018. Available at: https://www.gov.uk/government/publications/sewage-sludge-in-agriculture-code-of-practice

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