

Guidance on the use of BSI PAS 100 compost in topsoil manufacturing



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Introduction

The purpose of topsoil manufacturing is to create an effective soil for the establishment of vegetation. The term topsoil manufacturing, as used in this technical document, refers to the blending of soils available on site along with potentially other organic or inorganic materials with BSI PAS 100 compost to produce a soil that suits the requirements of a specific site.

Topsoil manufacture can be applicable in various land end uses, such as in woodland and grassland establishment, energy crop production, general landscaping, housing and mixed use development, and recreation and sports turf. Topsoil manufacturing can take place either in situ, where topsoil is produced at its final location, or ex situ, where the manufacturing process takes place in a designated area of the site. Within this document it is assumed that both applications are completed at the landscaping or reclamation site¹.

The procedural specification on topsoil manufacturing suggests that the ex situ manufacturing process is preferred, as it allows for the production of a more uniform product¹. This is only possible where there is sufficient space on site. Manufactured topsoil or soil-forming materials should meet a specific BS 3882² topsoil grade, or one that has been outlined by the landscape architect or project engineer.

Topsoil manufacturing using BSI PAS 100 compost and site won soil-forming materials can be scheduled to meet construction deadlines. It can be produced easily as and when needed and project timescales do not need to be adapted or delayed due to material sourcing and delivery issues³.



Figure 1: Former Lambton Cokeworks

Review of the Soil Development Strategy at the former Lambton Cokeworks

Re-development of the former Lambton Cokeworks site in County Durham was conducted using a mixture of site won materials, BSI PAS 100 compost and paper mill crumb. The new soil profile successfully supported tree and grass growth whilst offering savings of around £1.2m over more conventional restoration approaches.



Figure 2: A dumper truck unloads compost at the former Lambton Cokeworks

The Greenoakhill Trailblazer project

This project is assessing the benefits of using BSI PAS 100 compost and site won soil-forming materials to create replacement topsoil at a former sand and gravel quarry. It has been found that the use of compost at a rate of 15-20% by volume, mixed with soil-forming materials will effectively facilitate the restoration of the site to form a mixture of woodland and meadow.



Figure 3: Replacement topsoil

Compost standards and specifications

BSI PAS 100 sets the minimum requirements for compost to be used in topsoil manufacturing. Additional requirements can be added by the specifier to meet the specific requirements of the site.

Trials for the restoration of Broughton Craggs former landfill site

The objective of this project is to establish a field trial at the Broughton Craggs former landfill site which tests the value of composts for improvement of soil quality and to support the growth of trees and meadow grassland. Topsoil was manufactured on site using subsoil which is stored at the site and blended with compost.



Figure 4: Broughton Craggs former landfill site

BSI PAS 100 compost is an appropriate and safe product for use within topsoil manufacturing. Further information on the feedstock materials, the composting process, the testing requirements for compost and the quality of the end products can be found in the [BSI PAS 100 specification](#)⁴ and in the [Quality Protocol for Compost](#)⁵. Further requirements for the use of compost in topsoil manufacturing are given in the Compost Specification for the Landscape Industry¹. These are summarised in Table 1.

A procedural specification has also been developed for landscape architects, which provides specification clauses and guidance notes for the use of compost in topsoil manufacturing⁴.



Figure 5: Ebbw Vale steelworks regeneration programme

The compost should meet the requirements of the BSI PAS 100 including the specification limits on toxic elements, physical contaminants and stone concentrations and stability⁴. A summary of recommended and required tests for compost in topsoil manufacture is presented in Table 2.

Table 1: Compost specification for use in topsoil manufacturing¹

Horticultural parameters	Reported as (units of measure)	Recommended range
pH	pH units	6.5 – 8.7
Electrical conductivity	µS/cm	3000 µS/cm
Moisture content	% m/m of fresh weight	35 – 55
Organic matter content	% dry weight basis	> 25
Particle size	% m/m of air-dried sample passing selected mesh aperture size	95% pass through 25 mm screen 90% pass through 10 mm screen
C:N ratio		20:1 maximum
Contaminant parameters	Various	Meet PAS 100 criteria

Table 2: Required and recommended tests and declarations for the use of compost in soil manufacture

Parameter	Test method	Test
Pathogens (human and animal) <i>Escherichia coli</i> , <i>Salmonella spp</i>	ABPR 2003, Schedule 2, Part II or BS EN ISO 6579	✓✓
Potentially toxic elements * ¹	BS EN 13650	✓✓
Physical contaminants and stones * ²	PAS 100:2005, Annex E	✓✓
Stability / maturity (microbial respiration rate)	ORG 0020	✓✓
Plant response * ³	PAS 100:2005, Annex D	✓✓
Weed propagules	PAS 100:2005, Annex D	✓✓
Particle size distribution * ⁴	PAS 100:2005, Annex E	✓ EO
Moisture or dry matter content	BS EN 13040	✓ EO
Organic matter content	BS EN 13039	✓ EO
Electrical conductivity	BS EN 13038	✓ EO
pH	BS EN 13037	✓ EO
"Total" nitrogen [N]	BS EN 13654-1 (Kjeldahl) or BS EN 13654-2 (Dumas), as appropriate	✓
"Total other" nutrients and sodium salts: * ⁷	BS EN 13650	✓
Primary; phosphorus [P], potassium [K]		✓
Secondary; calcium [Ca], magnesium [Mg], sulphur [S]		✓
Trace; boron [B], copper [Cu], iron [Fe], manganese [Mn], zinc [Zn]		✓
Sodium [Na]		✓
Calcium chloride and DTPA ("CAT") soluble nutrients and sodium salts * ⁵	BS EN 13651	✓
Primary; phosphorus [P], potassium [K]		✓
Secondary; magnesium [Mg], sulphur [S]		✓
Trace; boron [B], copper [Cu], iron [Fe], manganese [Mn], zinc [Zn]		✓
Sodium [Na]		✓
Water soluble nutrients and sodium salts * ⁶	BS EN 13652	✓
Primary; ammoniacal-N, nitrate-N, phosphorus [P], potassium [K]		✓
Secondary; calcium [Ca], magnesium [Mg], sulphur [S]		✓
Trace: boron [B], chloride [Cl], copper [Cu], iron [Fe], manganese [Mn], zinc [Zn]		✓
Sodium [Na]		✓
Quantity of growing media and soil improvers in bulk	BS EN 12580	✓
Input material types to the composting process	N/A	✓
Key ✓✓: test is obligatory; ✓: test is strongly recommended ; EO: test effectively obligatory as results used in other obligatory tests * ¹ For the use of compost in restoration of contaminated land, additional PTEs and substances in compost may need to be tested. * ² The method includes determination of "sharps". * ³ Plants show no symptoms of herbicide damage when tested in plant bioassay. * ⁴ Results provide more detailed information and evidence relevant to any "nominal grading" declared. * ⁵ This method uses the extractants calcium chloride and diethylenetriaminepentaacetic acid (commonly abbreviated as 'CAT'). * ⁶ Test results from this method indicate the likely amount of each element that is immediately available for uptake by plants. * ⁷ This method uses hydrochloric- and nitric-acid ("aqua-regia") extractants and approximates "total" rather than "bioavailable" element concentrations in the compost.		

Soil-forming materials

Soil manufacture with compost and steel furnace slag for landscaping the former Ravenscraig steelworks.

Ravenscraig is a former steelworks site in Scotland and is one of the largest brownfield sites in the UK. Locally sourced BSI PAS 100 compost and chipped bark were mixed in varying proportions with indigenous material to produce seven topsoil mixtures for small scale trials. The best performing mix has since been manufactured on a greater scale and applied to develop two hectares of woodland.



Figure 6: Trial block at the Ravenscraig site, shortly after the topsoil had been laid.

Biofuel crop production on a former coal washing site in Kinglassie, Fife

This feasibility study and trial investigated remediating a derelict five hectare coal washing site in West Fife using manufactured topsoil consisting of a mix of coal washings material, recycled aggregate and quality compost with the aim of running energy crop trials.

The physical properties of soil-forming materials determine how they will behave and give an indication of how they will perform when they are mixed with other materials. Physical properties can be split into structural and behavioural properties. Structural properties include: texture and stoniness, bulk density, porosity, air permeability, particle size distribution and material consistency. Behavioural properties include infiltration, hydraulic conductivity, heat capacity and strength⁶. The physical limitations of commonly used soil-forming materials are presented in Table 3. These limitations should be considered during project planning and design.

The texture of a soil can be defined using the classification triangle in Figure 7. Identifying the texture of the soil and the content of clay, sand and silt is essential in determining fit-for use mixing ratios for the soil-forming materials. Further guidance can be found in [Compost specifications for the landscape industry](#)¹.

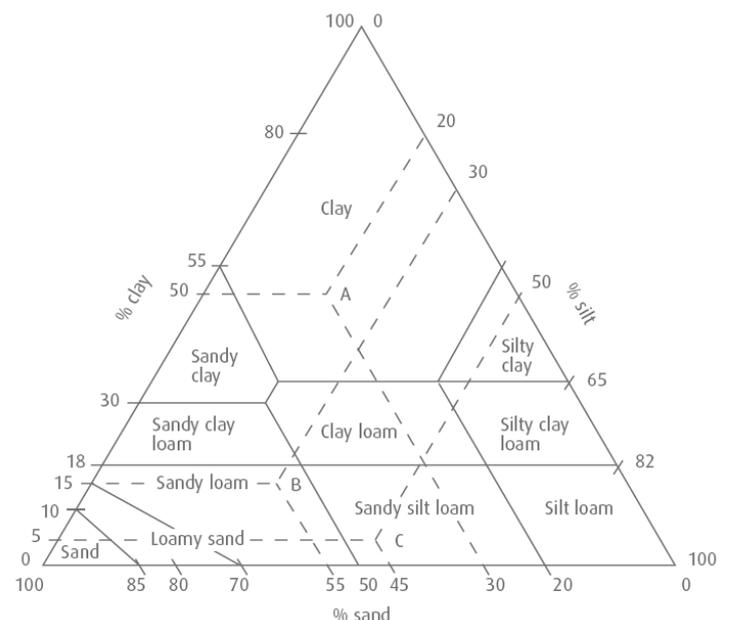


Figure 7: Soil textural classification triangle showing limiting percentage of sand, silt and clay sized particles for the mineral texture class¹

Table 3: Physical limitations of soil-forming materials ^{6,7}

Material	Light texture	Heavy texture	Low AWC	Poor drainage	Stones	Boulders	High surface temp
Clay	0	+++	+	+++	0	0	+/0
Sand and gravel quarry waste	+++	0	+++	+/0	+++/0	0	0
Limestone and chalk	+	0	++	0	+++/0	+++/0	0
Dolomite	+	0	++	0	+++/0	+++/0	0
Acid hard rock	++	0	++	0	+++/0	+++/0	0
China clay waste	++	0	+++	0	++/0	++/0	0
Colliery shale	+	0	++	++	+++/0	+++/0	+++/0
Open cast coal spoil	0	0	0	++	+++/0	+++/0	0
Drift deposits	+++/0	+++/0	+++/0	+++/0	+++/0	+++/0	0
Dredgings	0	++	0	+++	0	0	0
Silt bed / tailing pond material	++/0	++/0	++/0	+++	0	0	0
Civil engineering waste	+++/0	+++/0	+++/0	+++/0	+++/0	+++/0	0

Key: +++ Severe limitations, ++ moderate limitations, + slight limitation, 0 no limitation

Chemical limitations of commonly used soil-forming materials are shown in Table 4. These limitations should also be considered during project planning and design.

Table 4: Chemical limitations likely to be encountered in soil-forming materials⁶

Material	N	P	K	Ca	Mg	pH	CEC	Na	Toxicities
Clay	↓↓↓	↓/∗	∗/↑	↓↓/↑	↓/↑	↓↓/↑	∗	∗	∗
Sand and gravel quarry waste	↓/∗	↓/∗	↓/∗	↓/∗	↓/∗	↓/∗	↓	∗	∗
Limestone and chalk	↓↓↓	↓↓↓	↓	↑	↓	↑	↓↓	∗	∗
Dolomite	↓↓↓	↓↓↓	↓	↑	↑	↑	↓↓	∗	∗
Acid hard rock	↓↓↓	↓↓↓	∗	↓↓	↓	↓↓	↓↓	∗	∗
China clay waste	↓↓↓	↓↓↓	↓	↓	↓	↓	↓↓↓	∗	∗
Colliery shale	↓↓↓	↓↓↓	∗	↓↓↓/∗	∗/↑↑	↓↓↓/∗	↓↓	↑	↑↑
Open cast coal spoil	↓↓↓	↓↓↓	∗	↓↓↓/∗	∗/↑↑	↓↓↓/∗	↓↓	↑	∗
Drift deposits	↓↓↓	↓/∗	↓/∗	↓↓/∗	∗	↓↓/∗	↓/∗	∗	∗
Dredgings	↓	↓	↓	↓/↑	∗	∗/↑	∗	↑↑↑	∗
Silt bed / tailing pond material	↓↓↓	↓	↓	↓/↑	∗	∗/↑	∗	↑	∗/↑↑↑
Civil engineering waste	↓↓↓	↓/∗	∗	↓↓/∗	∗	↓↓/∗	↓/∗	∗	∗

Key: ↓↓↓ severe deficiency, ↓↓ moderate deficiency, ↓ slight deficiency, ∗ adequate, ↑ slight excess, ↑↑ moderate excess, ↑↑↑ severe excess

Soil/ site investigation and testing

Polkemmet-Heartlands Topsoil Recycling Scheme

The Polkemmet-Heartlands Project is a major land regeneration scheme that is transforming 120 ha of derelict land that was previously used for open cast mining, into two championship golf courses, hotel and leisure facilities and 2,000 new homes. Topsoil made from BSI PAS 100 compost and crushed colliery spoil has been manufactured and used to construct the golf course.



Figure 8: Polkemmet-Heartlands

Soil and site characteristics should be determined prior to soil preparation and application. Detailed site investigation should take place to¹:

- understand the type and composition of existing soils and soil-forming materials on site. A soil survey should be conducted by a suitably qualified individual or organisation. This will help to identify the presence and quality of existing suitable site material that can be used with the compost to create a useable soil⁸. If soil-forming materials are present, and required for the development, the site should be sampled according to standard methods, such as the BS EN 12579⁹ and BS ISO 10381-1¹⁰;
- identify potential locations for stockpiling and blending in the case of on site topsoil manufacturing; and
- identify and assess any contamination on site and identify any necessary action to be taken. For instance, if the project takes place on a brownfield site, then a risk assessment of contamination will be required.

The [Forestry Commission](#) (FC) has produced guidance on the minimum standards for soil-forming materials acceptable for woodland establishment¹¹. These are presented in Table 5. The soil characteristics should be tested directly after the compost amendments or the manufacturing of soil and in set intervals after that to ensure adequate monitoring of the conditions on site.

Table 5: Minimum standards for soil-forming materials acceptable for woodland establishment

Parameter	Standard	Comments on method
Texture	No limitations; however, the placement location of materials of different texture on site should be related to site factors, such as topography	Texture (% sand, silt and clay) should be determined by pipette method. Preferred textures include materials with >25% clay
Bulk density (after placement)	<1.5 g cm ⁻³ to at least 50cm depth <1.7 g cm ⁻³ to below 1m depth	
Stoniness	<40 % by volume of material greater than 2mm in diameter and <10% by volume of material greater than 100mm in diameter	Measure mass of stone >2mm and >100mm in a known mass / volume of soil; divide each value by 1.65 to calculate the volume
Clay or loam		
Sand	<25 % by volume of material greater than 2mm in diameter and <10% by volume of material greater than 100mm in diameter	
pH	Must be within the range 4.0 to 8.0	Based on a 1:2.5 soil: CaCl ₂ (0.01 M) suspension
Electrical conductivity	<0.2 S m ⁻¹	Based on a 1:1 soil:water suspension
Iron pyrite content	<0.05%	British Standard 1016 method
Topsoil nutrient and organic content	N >200kg N ha ⁻¹ P >16 mg l ⁻¹ (ADAS Index 2) K >121 mg l ⁻¹ (ADAS Index 2) Mg >51 mg l ⁻¹ (ADAS Index 1) Organic matter content >10%	N determination using the Dumas method P and organic matter determination K and Mg determination

Soil preparation

During soil preparation, the cultivation of soil is required and depending on the soil characteristics, deep tillage or ripping might be essential. It is recommended that the soil is cultivated to a minimum depth of 300mm (300mm to 900mm) in two directions obliquely and this should be conducted when ground conditions are reasonably dry.

Prior to in situ soil manufacturing, excess site soil should be used to grade the soil to smooth contours that are within 25 – 75mm from the specified finished soil level. Any large stones (above 25mm) should be removed at this stage¹.

In ex situ topsoil manufacturing, loosened soil produced from cultivation should be stripped to obtain adequate quantities of subsoil required for the blending process. The stripped subsoil should be stockpiled and subsequently blended with the compost and other organic or inorganic materials to be included in the mixture^{1, 6, 12}.

When using ex situ manufactured soil, the subsoil may require additional ripping prior to the application of the soil-forming mixture, or before the full quantity of the manufactured topsoil is applied.

Thorough blending should be conducted to ensure a homogeneous mixture is achieved, without destroying the structure of the soil. For both in situ and ex situ topsoil manufacturing, compliance with BS3882:2007 and other soil grade and textural requirements are desirable.

Going 'green' with compost reaps rewards for Scottish housing developer

Topsoil, made from BSI PAS 100 compost mixed with sandy loam was used at this housing development in North Lanarkshire. It was spread at 150mm thickness across the six acre development to promote long-lasting plant and turf growth in gardens and public areas.

Manufactured soils using canal dredgings (sediment) and green compost

This project is aiming to provide the information required to develop a protocol for the manufacture of BS 3882:2007 quality soils from dredgings and compost materials. The trial will take place at a former landfill site.

The use of compost to manufacture topsoil for brownfield regeneration at Raploch

Raploch is a typical re-development site on brownfield land in Stirling, formerly occupied by a housing estate with associated infrastructure, gardens and backyards.

A trial took place to demonstrate the beneficial effects of using locally produced quality compost together with on-site soil-forming materials to manufacture replacement topsoil.



Figure 9: Compost being incorporated into a trial plot, Raploch

Royal Ordnance Munitions Factory, Chorley transformed into the village of Buckshaw

A 265 ha former munitions factory site was transformed into a village, including light industry, residential housing and large areas of public space. Application of quality compost supported rapid plant establishment and therefore increased infiltration and reduced runoff. The use of compost in the wider regeneration of the site highlighted massive economic advantages, leading to savings of around £300,000.

Application of compost/ manufactured soil

Development of vegetation communities on manufactured soils at Royal Ordnance Chorley (Buckshaw Village) and Cross Lane, Wallasey, Wirral

The main focus of this trailblazer project was to demonstrate the economic, environmental and ecological benefits of using BSI PAS 100 compost to manufacture soil at two sites in northwest England.

At Cross Lane Tip the soil requirement for reclamation was approximately 23,000m³. The blend used consisted of 5:7:5 for silt, sand and compost respectively. A 360° tracked excavator and a tractor and trailer were used to blend the soil-forming materials. Accurate mixing was achieved by layering subsoil and compost over a dewatered silt windrow, before mixing thoroughly.

The mix was checked by random sampling of the windrow to ensure incorporation of the three layers and homogeneity. Manufactured soil was loose tipped to different depths according to the vegetation types shown in Table 6.

During in situ topsoil manufacturing, compost should be applied uniformly at suitable rates. The application rate will be governed by the current soil conditions and the land end use. Some general guideline rates are provided in Table 7. The [Good Practice Guide](#) also provides exemplar mixing ratios from various case studies.

For areas to be seeded or turfed the minimum depth of incorporation should be 150mm, and for areas to be planted the minimum depth should be 300mm. The application of compost and manufactured soil should be analysed prior to seeding and monitored after seeding/planting.

Two methods of emplacement are commonly used during compost/topsoil application; loose tipping, with limited or no traffic during emplacement and the bulldozer method with traffic during emplacement. Loose tipping is the preferred method for engineering soil as it retains low bulk densities, and enhances root penetration potential, aeration, drainage and moisture holding capacity^{3, 12}.

Table 6: Depth of manufactured soil

Vegetation type	Depth of manufactured soil
Woodland tree planting	1.0m
Shrub species	0.75m
Meadow grassland	0.5m

Table 7: Typical rates of BSI PAS 100 compost application for different end uses of land

Goal of reclamation	Sub categories	Typical maximum application rate* (t/ha of dry solids)	Notes
Habitat establishment		50-100	Plant growth trials are recommended to ensure nutrient levels are not excessive for the intended purpose
Soil formation	Non-food crop production	100-500**	The maximum application rate will vary depending on the condition of the land and contaminant concentration in both the organic amendment and the soil
	Landfill cap		
	Colliery spoil restoration		

* The application rate of organic materials with low dry solids content (<25%) should be at the lower end of the range shown depending on site-specific conditions.

** Depending on the site-specific conditions, particularly in the case of colliery spoil, the maximum application rate may need to be considerably higher than 500 tonnes per hectare, depending on the condition of the land, soil pH and the quality of the organic material(s) used. Application rates in excess of 500 tonnes per hectare would need to be justified to the environmental regulator and approved in advance.

Monitoring and aftercare

Ongoing monitoring and aftercare are essential to maximise the long-term benefits of compost application and to identify any potential problems as soon as possible. The monitoring and aftercare programme should be defined at the start of the project and should be developed to suit the requirements of the site.

Typical aftercare programmes include:

- checking soil properties and contaminants and comparing results to the baseline values recorded during site investigation;
- assessing vegetation establishment, species variability, growth and health; and
- assessing the overall state of the environment at the site, including watercourses and amenities (if relevant).

Monitoring and aftercare surveys should take place at set intervals: for example at 6 months, 1 year, 2 years and 5 years, with an additional optional survey after 10 years. Surveys should be undertaken by qualified individuals or organisations⁸.

Transforming Ebbw Vale – from steelworks to green space

The 90 hectare Corus Tinsplate Works site in Ebbw Vale in Gwent, South Wales, is one of the largest regeneration schemes in the UK.

BSI PAS 100 compost has been mixed with existing colliery shale, steel slag and gritstone fines to produce a medium for vegetation establishment and growth, erosion control and also decontamination of the site.

Sources of further information and case studies

WRAP's Compost Calculator allows potential compost users to quantify the financial values of the key nutrients (nitrogen, phosphorus and potassium) present in compost, when compared with inorganic fertilisers. The values presented in the calculator are based on the typical total nutrient contents of composts, and current market prices for fertilisers.

WRAP's Compost Calculator is available at:

http://www.wrap.org.uk/farming_growing_and_landscaping/compost_calculator.html

WRAP also provide a '[Find a compost supplier near you](#)' search tool to help potential users find a local supplier who is able to provide compost that meets the specific requirements of the intended application.

Case study	Description
Packington, West Midlands Manufactured soils using canal dredgings (sediment) and green compost	This project is aiming to provide the information required to develop a protocol for the manufacture of BS 3882: 2007 quality soils from dredgings and compost materials.
Dunbar, SE Scotland The effect of green compost on the establishment of rough grazing, arable grazing & amenity trees on a restored limestone quarry in South East Scotland	Lafarge's Dunbar quarry is the first in the UK to test the potential for using BSI PAS 100 quality compost in its ongoing land restoration programme. This project aimed to determine the economic viability of using BSI PAS 100 quality compost in restoring land for amenity and agricultural purposes.
Ebbw Vale From steelworks to green space	The 90 hectare Corus Tinsplate Works site in Ebbw Vale in Gwent, South Wales, is one of the largest regeneration schemes in the UK. The land is being transformed into a mixed use development consisting of new rail infrastructure, education and healthcare facilities. BSI PAS 100 compost was mixed with the existing colliery shale, steel slag and gritstone fines to produce a medium for vegetation establishment and growth, erosion control and also decontamination of the site.
Forgemasters , Sheffield Award winning landscaping in Sheffield's Forgemasters steel works using PAS100 compost	A landscape scheme in an area within Forgemasters River Don works (steel works). The scheme included the planting of young, 'standard' trees of mixed species and the planting of ground cover plants. Subsoil imported from another area within the River Don works was used to create the contoured design. The topsoil was mixed with compost to provide a planting medium.
Greenoakhill, Scotland The Greenoakhill Trailblazer project	This project is assessing the benefits of using BSI PAS 100 compost and site won soil forming materials to create replacement topsoil at a former sand and gravel quarry. It has been found that the use of compost at a rate of 15-20% by volume, mixed with soil forming materials will most effectively facilitate the restoration of the site to form a mixture of woodland and meadow.
Kinglassie, Fife The potential for biomass crop production on a former coal washing site	This feasibility study and trial investigated remediating a derelict five hectare coal washing site in West Fife using manufactured topsoil consisting of a mix of coal washings material, recycled aggregate and quality compost with the aim of running energy crop trials.
Lambton, County Durham Establishment of woodland in former coke works using BSI PAS 100 compost and paper mill crumb	Redevelopment of the former Lambton Cokeworks site in County Durham was conducted using a mixture of site won materials, BSI PAS 100 compost and paper mill crumb. The new soil profile successfully supported tree and grass growth whilst offering savings of around £1.2m over more conventional restoration approaches.

Case study	Description
Eden Project, Cornwall Making the garden of Eden with recycled products	Compost produced from garden trimmings such as grass cuttings, prunings and leaves, and mulch made from recycled woodchip was mixed with existing mine wastes to manufacture 85,000 tonnes of soil during the development of the Eden Project on a 15 hectare former china clay quarry site in Cornwall.
Newtownhamilton, Northern Ireland MOD and Defence Estates demonstrate the benefits of using quality compost to improve soils in Northern Ireland	The MOD and Defence Estates worked with WRAP to investigate and demonstrate the use of quality compost to improve soils in Northern Ireland. BSI PAS 100 quality compost was spread and incorporated into the soil. Early results showed that the seed germinated well and grass was established quickly.
North Lanarkshire Going 'green' with compost reaps rewards for Scottish housing developer	Topsoil, made from quality compost mixed with sandy loam was used at this housing development in North Lanarkshire. It was spread at 150mm thickness across the six acre development to promote long-lasting plant and turf growth in gardens and public areas.
Polkemmet-Heartlands project From coal mine to golf course	The Polkemmet-Heartlands Project near Whitburn, West Lothian is a major land regeneration scheme that is transforming 120 ha of derelict land that was previously used for open cast mining, into two championship golf courses, hotel and leisure facilities and 2,000 new homes. Manufactured topsoil made from BSI PAS 100 compost and crushed colliery spoil has been developed and tested to assess its suitability for application within golf course establishment and mixed used developments.
Ravenscraig, Scotland Soil manufacture with compost and steel furnace slag for landscaping the former Ravenscraig steelworks.	Ravenscraig is a former steelworks site in Scotland and is one of the largest brownfield sites in the UK. Locally sourced BSI PAS 100 compost and chipped bark were mixed in varying amounts with indigenous material to produce seven topsoil mixtures for small scale trials. The best performing mix has since been manufactured on a greater scale and applied to develop a 2 ha woodland.
Raploch, Scotland The use of compost to manufacture topsoils for brownfield regeneration at Raploch	Raploch is a typical re-development site on brownfield land in Stirling, formerly occupied by a housing estate with associated infrastructure, gardens and backyards. A trial is taking place to demonstrate the beneficial effects of using locally produced quality compost together with site won soil forming materials to manufacture replacement topsoil.
Wirral and Chorley Development of vegetation communities on manufactured soils at Royal Ordnance Chorley (Buckshaw Village) and Cross Lane, Wallasey, Wirral	A partnership was formed to deliver the joint Trailblazer projects at Cross Lane Tip, Wirral and at the former Royal Ordnance Facility, Chorley, Lancashire. The aim of this work was to assess the beneficial use of BSI PAS 100 green compost as a component of soil manufacture in the creation of sustainable grassland landscapes.
Whitehaven, Cumbria Creating wildflower meadows on the Rhodia chemical works site	This trial at a former chemical production site in Cumbria examines various mixes of topsoil, green and food derived compost, wool rich shred, quarry waste and screened brick waste have been applied to measure their effect on wildflower establishment and growth.

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- ¹¹ Herwijnen R, Hutchings T (2006), Laboratory analysis of soils and spoils. Best Practice Guidance for Land Regeneration, BPG Note 2. Forestry Commission.
- ¹² WRAP (2009), Cross Lane & Chorley former Royal Ordnance Facility.

This document was developed by:



With the assistance of:

The green roof centre
Recycle-To-Land Research Limited
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Front cover photography: Habitat restoration Cronton Colliery

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