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SAFESPUR Forum

Options for recycled concrete aggregates and WRAP tools

John Barritt

WRAP Special Advisor

ciria

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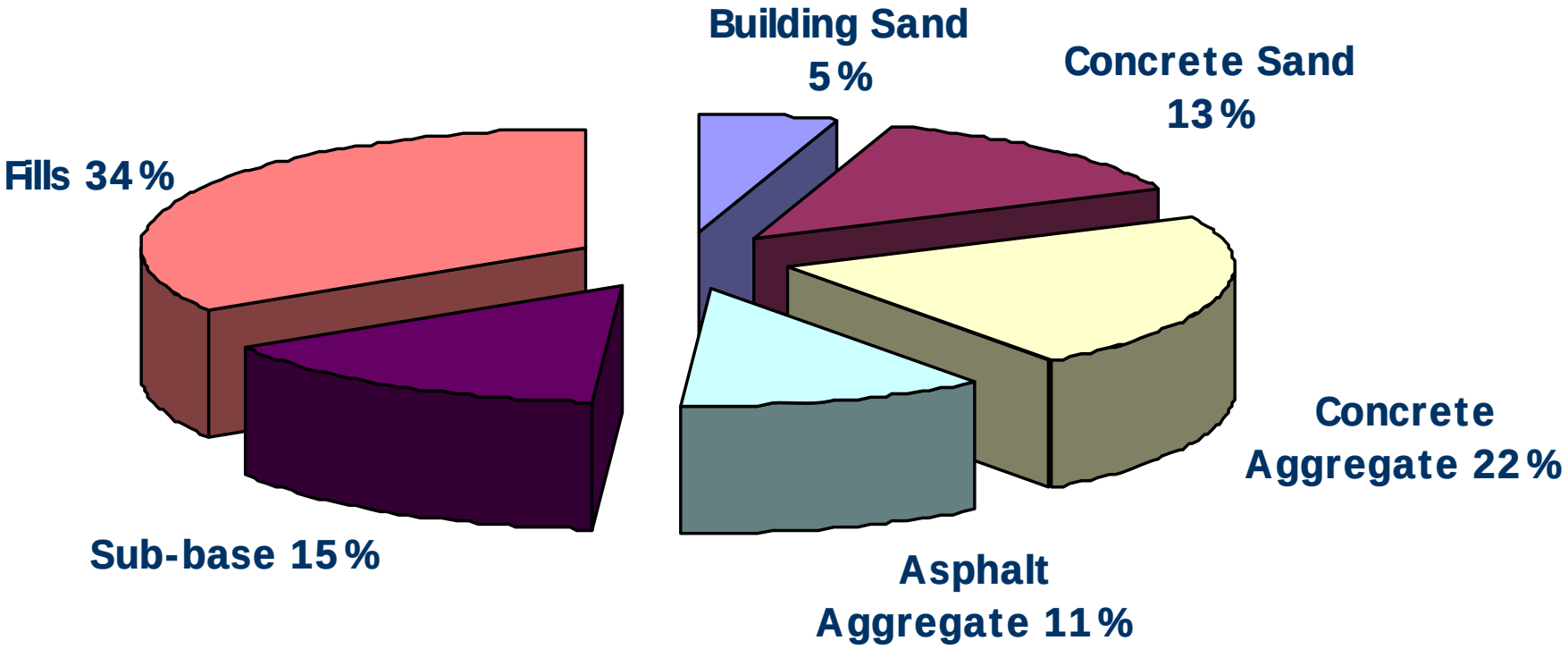
Construction aggregate market

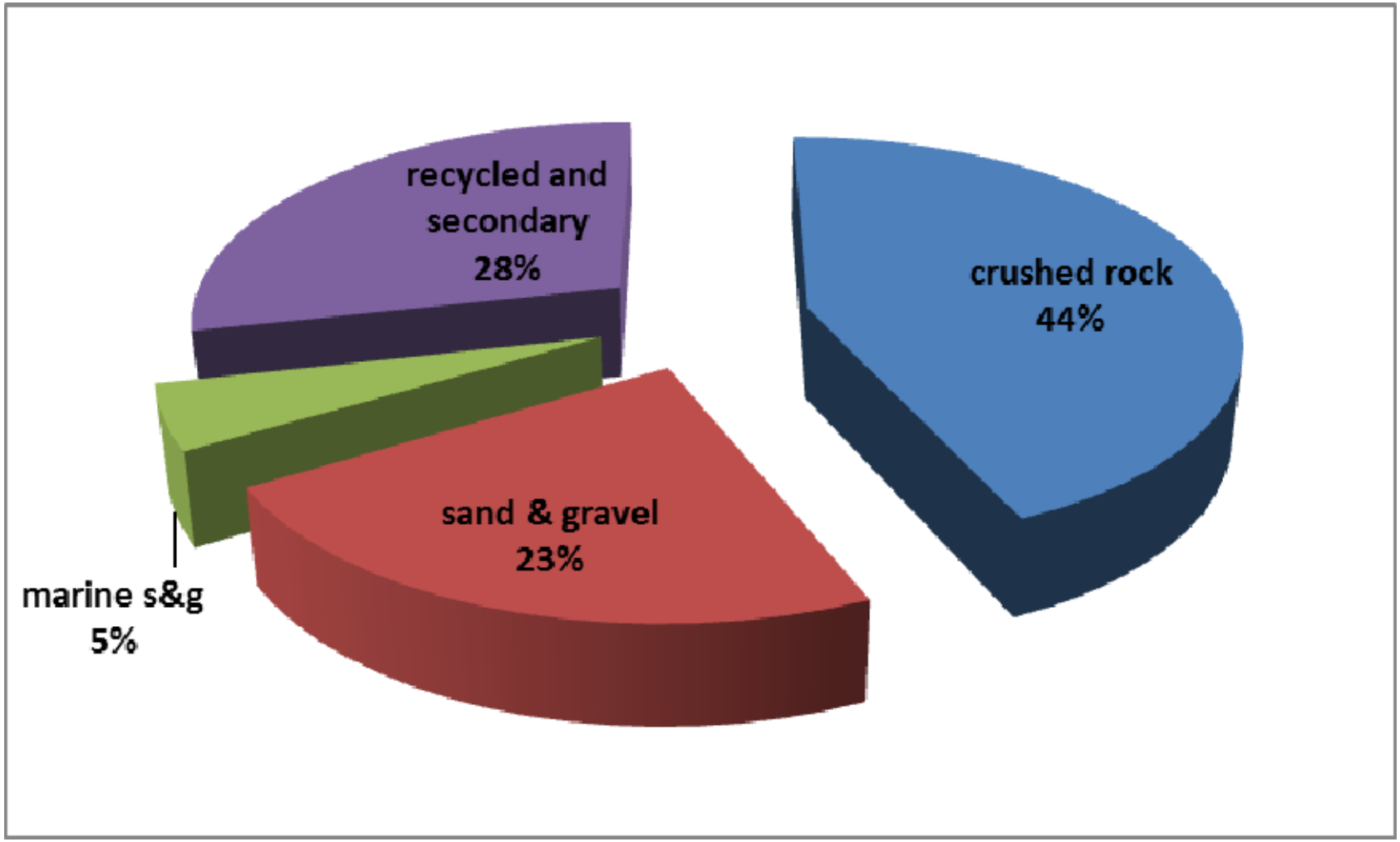
Recycled aggregates in unbound and bound applications

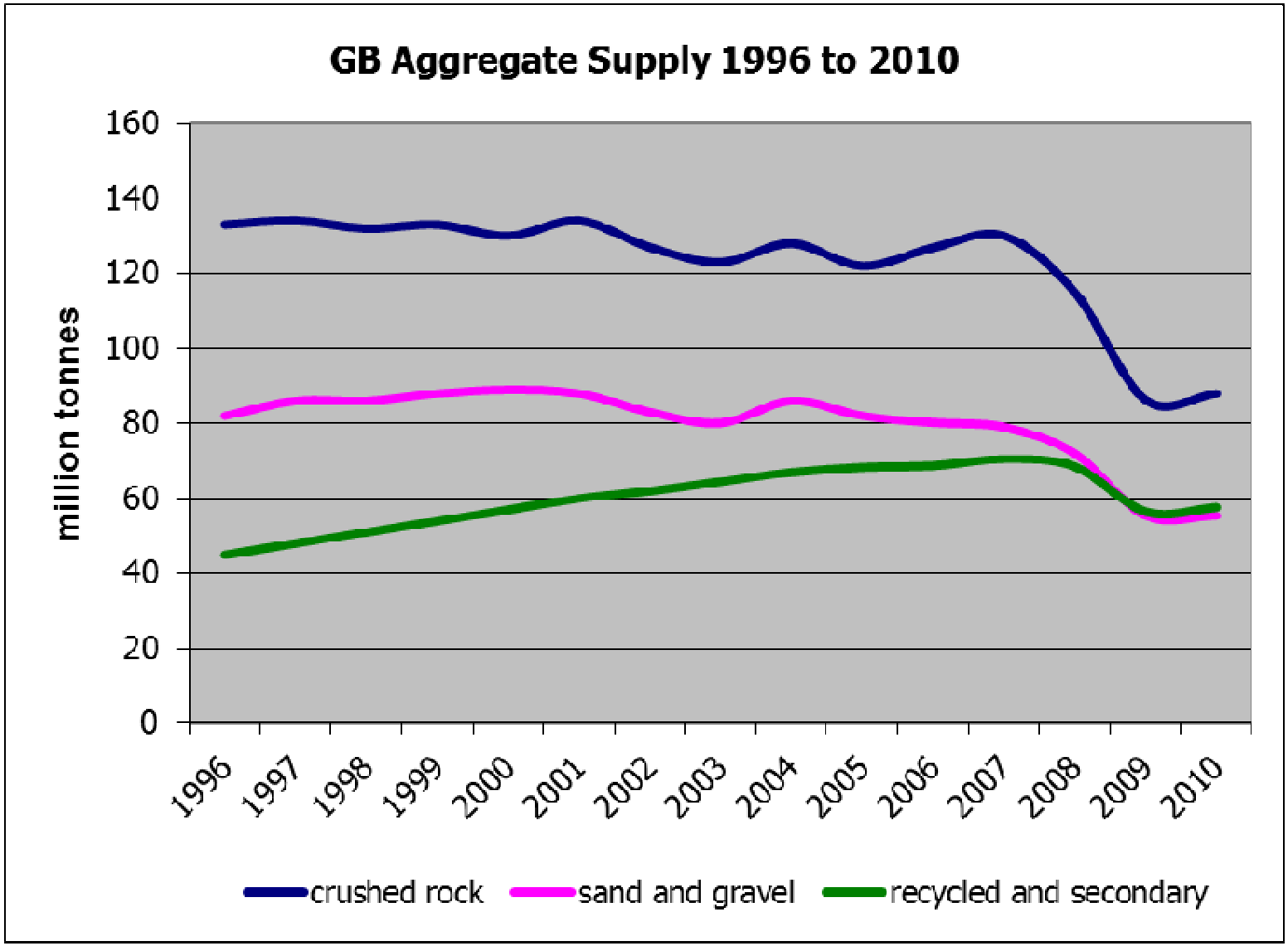
WRAP and resource efficiency in construction

End use of all construction aggregates



UK Aggregates Market 2010




GB Aggregate Supply 1996 to 2010
million tonnes
160
140
120
100
80
60
40
20
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
crushed rock
sand and gravel
recycled and secondary

British/European Aggregate Standards


BRITISH STANDARD

BS EN 13242:2002 +A1:2007 Incorporating corrigendum May 2008

Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction

BSi British Standards

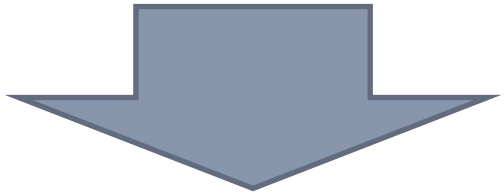
BS EN 13242 – Aggregates for Unbound & Hydraulically bound mixtures

BS EN 13043 – Aggregates for Bituminous Mixtures and surface treatments

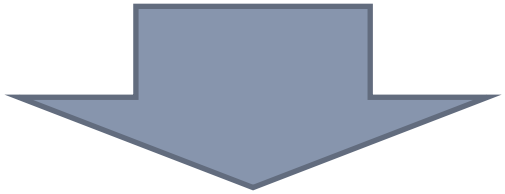
BS EN 12620 – Aggregates for Concrete

Aggregates may be produced from natural, recycled or manufactured materials

BS EN 12620 – Aggregates for Concrete



BS EN 206-1 Specification for constituent materials and concrete



BS 8500-2:2006 Concrete. Complementary British Standard to BS EN 206-1.

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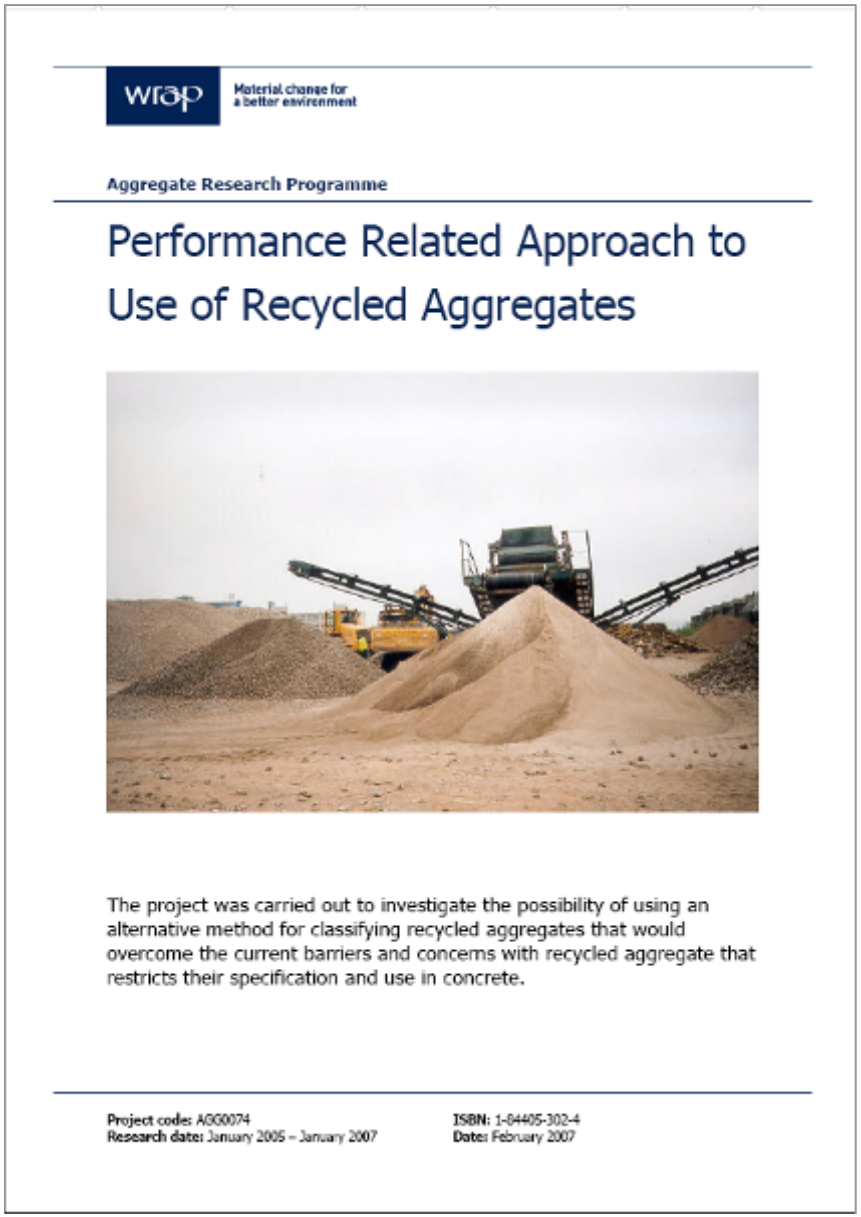

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Aggregate Research Programme

Performance Related Approach to Use of Recycled Aggregates

The project was carried out to investigate the possibility of using an alternative method for classifying recycled aggregates that would overcome the current barriers and concerns with recycled aggregate that restricts their specification and use in concrete.

Project code: AGG0074
Research date: January 2005 – January 2007

ISBN: 1-84405-302-4
Date: February 2007

Recycled aggregates as **coarse** aggregate for concrete:

Limitations within concrete standard restrict use

Viable technical options for non structural concrete

>20% in structural concrete increases water demand, cement content and carbon

Use should be close to crushing operation to prevent high transport carbon

Department for Transport

http://**www.dft.gov.uk/ha/standards/mchw/vol1/**

Safe roads, Reliable journeys, Informed travellers

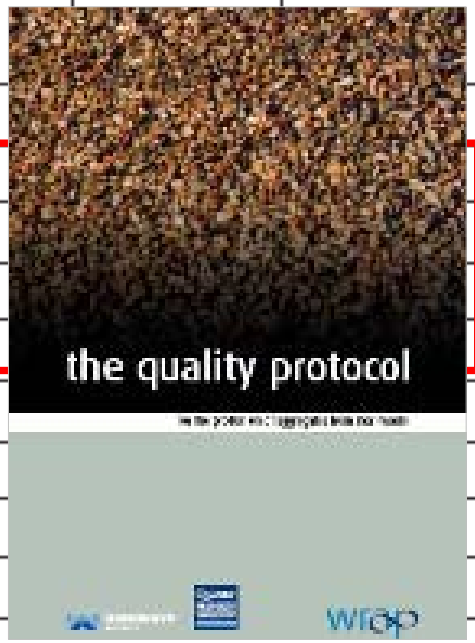
9 | May | 2011

Manual of Contract Documents for Highway Works

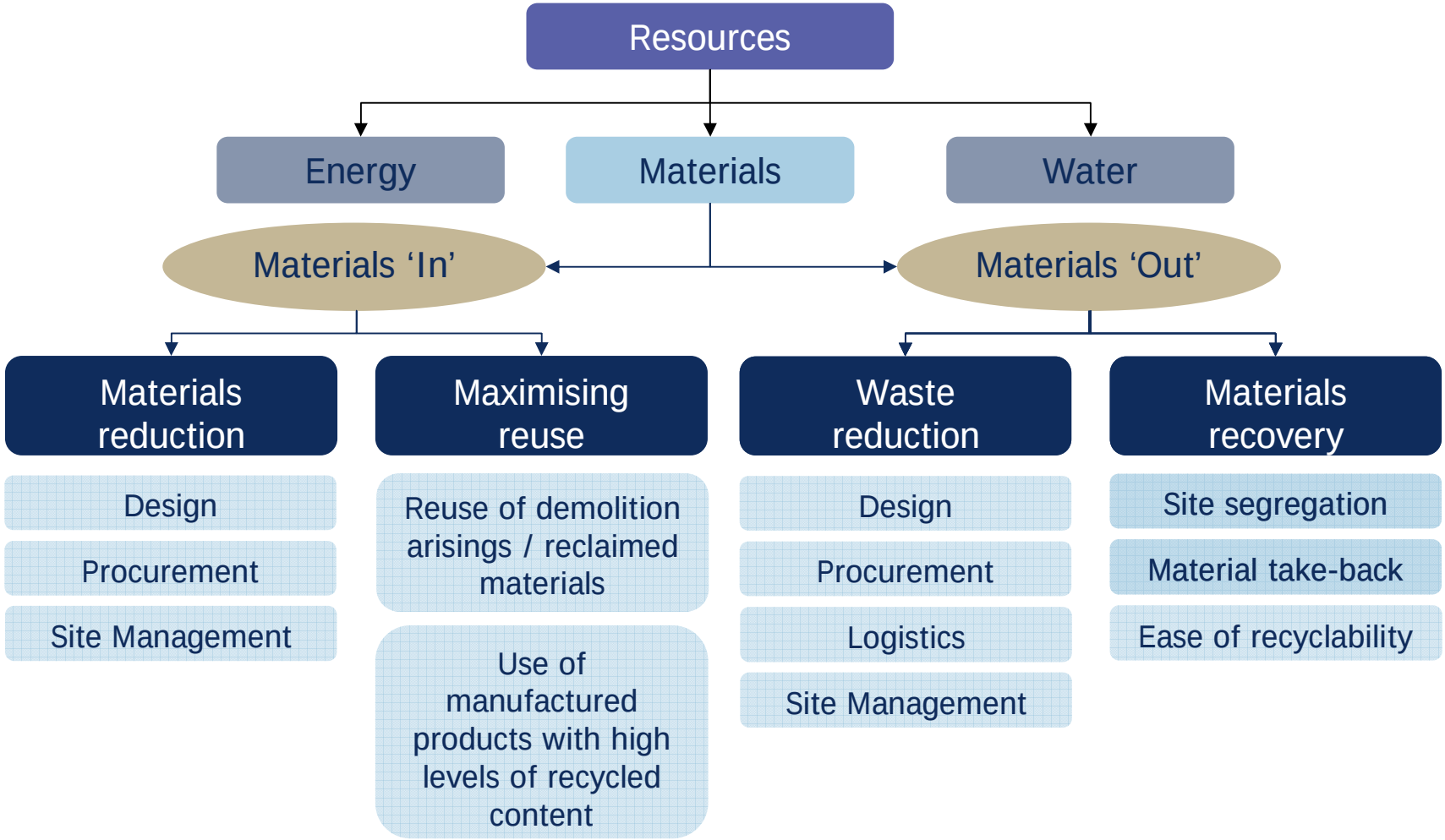
Volume 1 - Specification for Highway Works

Document Number	Document Name
November 2009 amendments	
Series 0000	Introduction
Series 0100	Preliminaries
Series 0200	Site Clearance
Series 0300	Fencing
Series 0400	Road Restraint System (Vehicle and Pedestrian)
Series 0500	Drainage and Service Ducts
Series 0600	Earthworks
Series 0700	Road Pavements General
Series 0800	Road Pavements - Unbound, Cement and Other Hydraulically Bound Mixtures
Series 0900	Road Pavements - Bituminous Bound Materials
Series 1000	Road Pavements - Concrete Materials

Application and Series ▶	Pipe Bedding	Embank-ment and Fill	Capping	Unbound Mixtures for Sub-base	Hydraulically Bound Mixtures for Sub-base and Base	Bitumen Bound Layers	PQ Concrete
Material ▼	500	600	600	800	800	900	1000
Blast furnace Slag	✓	✓	✓	✓	✓	✓	✓
Burnt Colliery Spoil	x	✓	✓	✓	✓	x	x
China Clay Sand/Stent	✓	✓	✓	✓	✓	✓	✓
Coal Fly Ash/Pulverised Fuel Ash (CFA/PFA)	✓	✓	✓	x	✓	✓	✓
Foundry Sand	✓	✓	✓	✓	✓	✓	✓
Furnace Bottom Ash (FBA)	✓	✓	✓	x	✓	x	x
Incinerator Bottom Ash Aggregate (IBAA)	✓	✓	✓	✓	✓		
Phosphoric Slag	✓	✓	✓	✓	✓		
Recycled Aggregate	✓	✓	✓	✓	✓		
Recycled Asphalt	✓	✓	✓	✓	✓		
Recycled Concrete	✓	✓	✓	✓	✓		
Recycled Glass	✓	✓	✓	✓	✓		
Slate Aggregate	✓	✓	✓	✓	✓		
Spent Oil Shale/Blaise	x	✓	✓	✓	✓		
Steel Slag	✓	✓	✓	✓	✓		
Unburnt Colliery Spoil	x	✓	x	x	✓		



Resource efficiency in construction



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Uniclass
A42: N462
CI/SfB
(Ajp) (T6)

Designing out Waste: A design team guide for buildings

LESS WASTE, SHARPER DESIGN

Halving Waste to Landfill

Contents

Written by: Davis Langdon LLP

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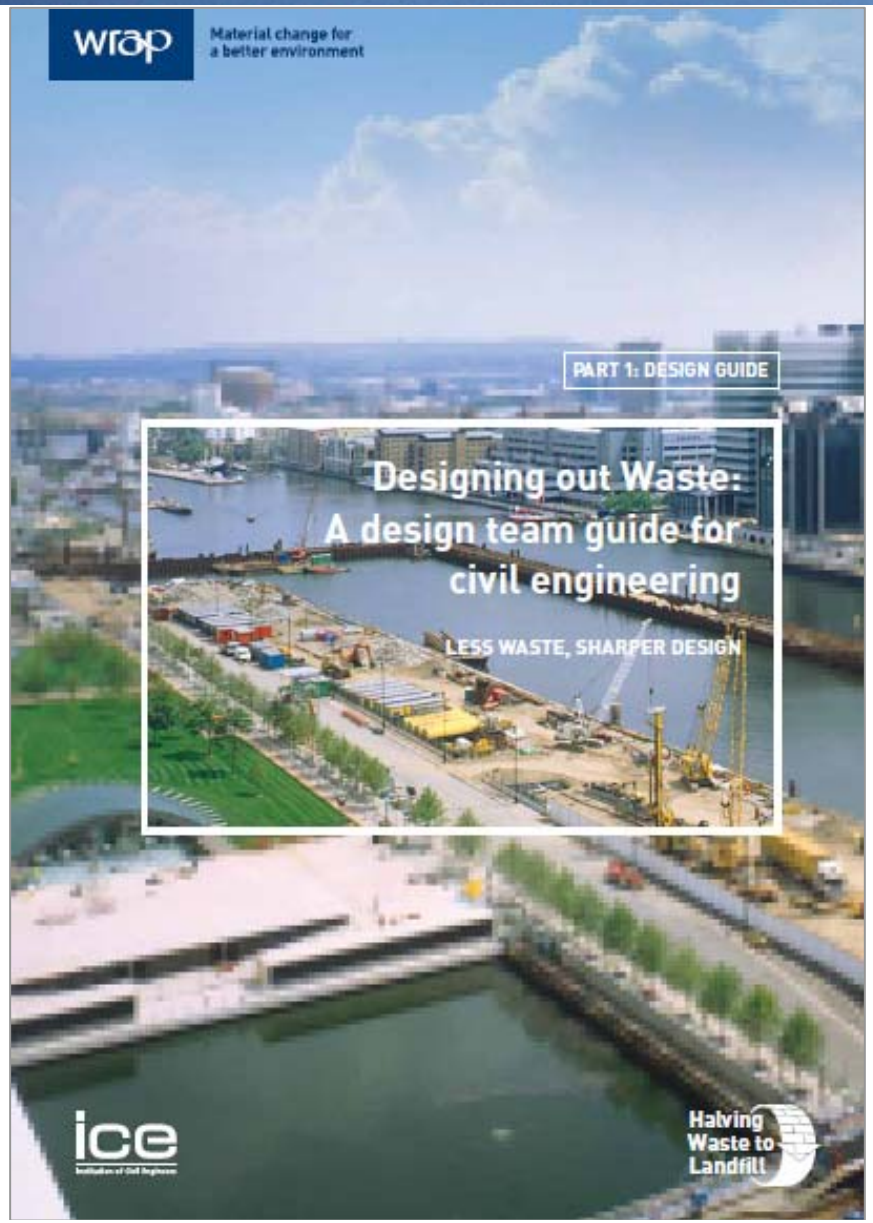

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Part 1: Design Guide

Design for:

Reuse and Recovery

Offsite Construction

Materials Optimisation

Waste Efficient Procurement

Deconstruction and Flexibility

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Demolition and site clearance

Fencing and safety barriers

Drainage

Earthworks including landscaping

Subbase and hydraulically bound materials (HBM)

Pavements and footways – bituminous

Pavements – concrete

Railways – ballast, sleepers and track

Piling, retaining walls and tunnels

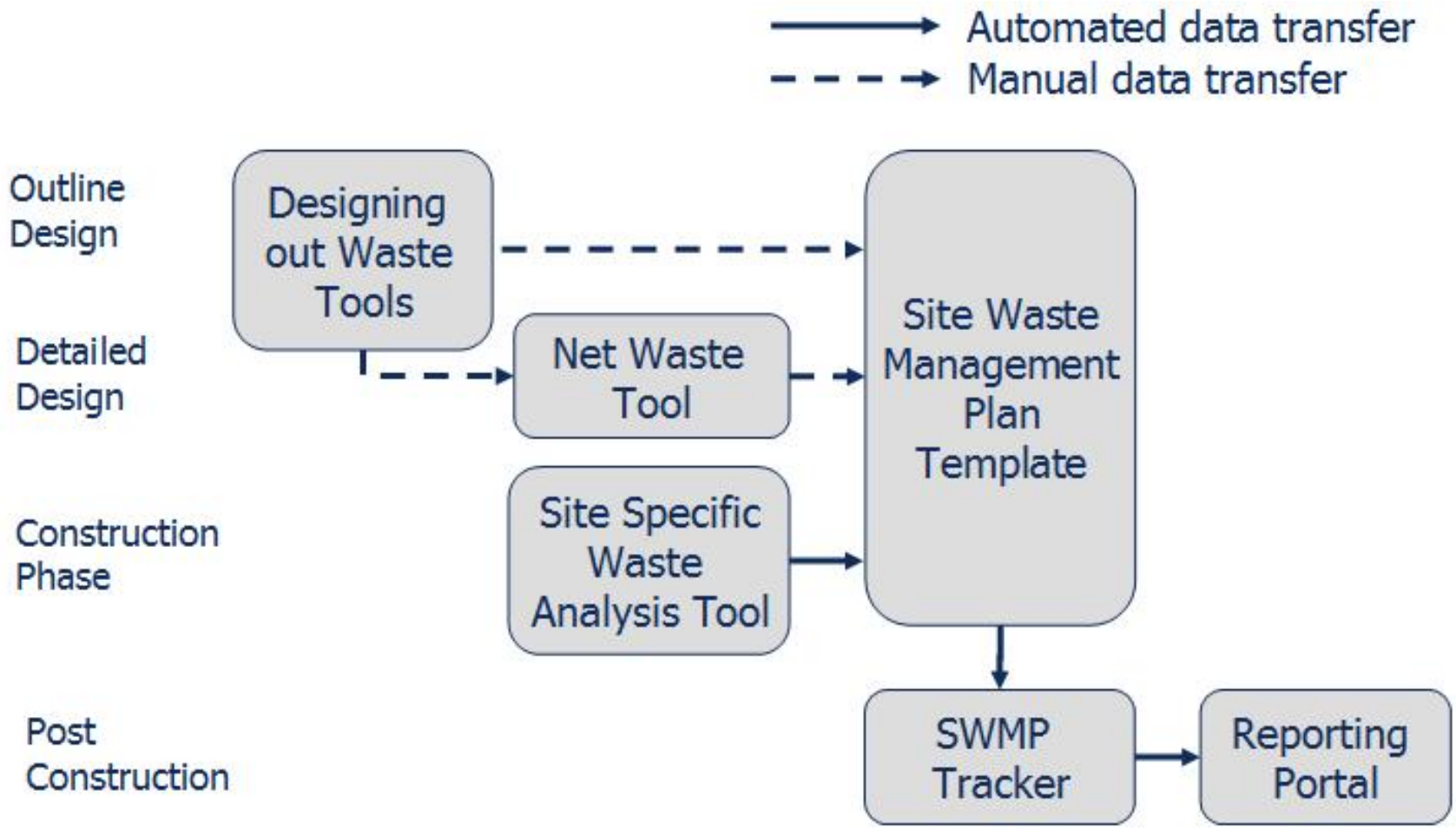
Structures – concrete

Structures – steel

Ancillary structures

Technical solution	Development site infrastructure	Flood defence	Coastal protection
Earthworks including landscaping			
Balance cut/fill quantities	✓	✓	✓
Lime or cement to dry out wet fill	✓	✓	✓
Geosystems to enable steeper side slopes	✓	✓	✓
Treat unsuitable materials for landscaping and soils manufacture	✓	✓	✓
Manufacture topsoil using PAS100 compost	✓	✓	✓
Remediation of contaminated soils	✓	✗	✗
Stabilise or isolate contaminated soils	✓	✗	✗
Geosystems to enable soft foundation soils to remain in-situ	~	✓	~
Ground improvement techniques to enable soft foundation soils to remain in-situ	✓	✓	~
Tyre bales or other lightweight fill to enable soft foundation soils to remain in-situ	✓	✓	✓
Recycled aggregates and/or HBM for working platforms	✓	✓	✓
Incorporate working platform into permanent works	✓	✓	~
Lime or cement to stabilise soils in-situ for use as capping	✓	✓	✓
Recycled aggregates for capping, structural backfill and slope repairs	✓	✓	✓
Geosynthetic and lime/cement with original soil for slope repairs	✗	✗	✗
Tyre bales for slope repairs	✗	✗	✗
Vegetation to improve slope stability	✓	✓	~

WRAP Tools


Automated data transfer
Manual data transfer
Outline Design
Detailed Design
Construction Phase
Post Construction
Designing out Waste Tools
Net Waste Tool
Site Specific Waste Analysis Tool
Site Waste Management Plan Template
SWMP Tracker
Reporting Portal

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› Events › Jobs › Tenders

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Construction materials

WRAP's guidance to getting the most from your materials.

Discover the opportunities »

Case
A selection
See ob

What's new | Halving Waste | Tools & guidance | Waste reduction | Construction materials | Case studies | Events & training

ABOUT WRAP

- WRAP & Construction
- Scotland
- Wales
- Northern Ireland
- Contacts and useful links

TOOLBOX

Designing out Waste Tools

Quantify benefits from addressing waste at the design stage in Buildings and Civil Engineering projects.

The Net Waste Tool

Quantify cost savings through waste reduction & recycling

WHAT'S NEW

Early contractor procurement guides

Guidance documents for clients on the benefits of procuring contractors early in the process; and how to work within European Union procurement

LATEST NEWS

- 23 Aug 10
  Building firms set to benefit as BRE's SMARTWaste tool and WRAP's Waste to Landfill Reporting Portal join forces
- 16 Aug 10
  Cutting the costs of waste in NHS construction: Advice for NHS

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SEARCH Enter keywords

AggRegain All WRAP

WRAP Home | A-Z | About WRAP

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- Opportunities
- Specifier
- Supplier Directory
- Case Studies
- Planning
- Recycling Infrastructure
- Quality
- Waste Management Regulations
- Demolition
- Procurement
- Sustainability

the quality protocol

AggRegain

Welcome to AggRegain..

Your complete online guide to sustainable aggregates ...

Sustainable Aggregates

What are they and why use them...?

Opportunities

Find out where recycled and secondary aggregates can be used in a variety of construction applications...

CO_2 Emissions Estimator Tool

Find out more and download the tool..

Feedback

Let us know what you think...

recycled roads Find out more...

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Opportunities to Use Recycled and Second Aggregates (RSA)

Applications

Indentify the potent RSA in different cor projects...

Materials

Indentify the potent RSA in different cor material groupings.

Halcrow

Content prepared by: Halcrow

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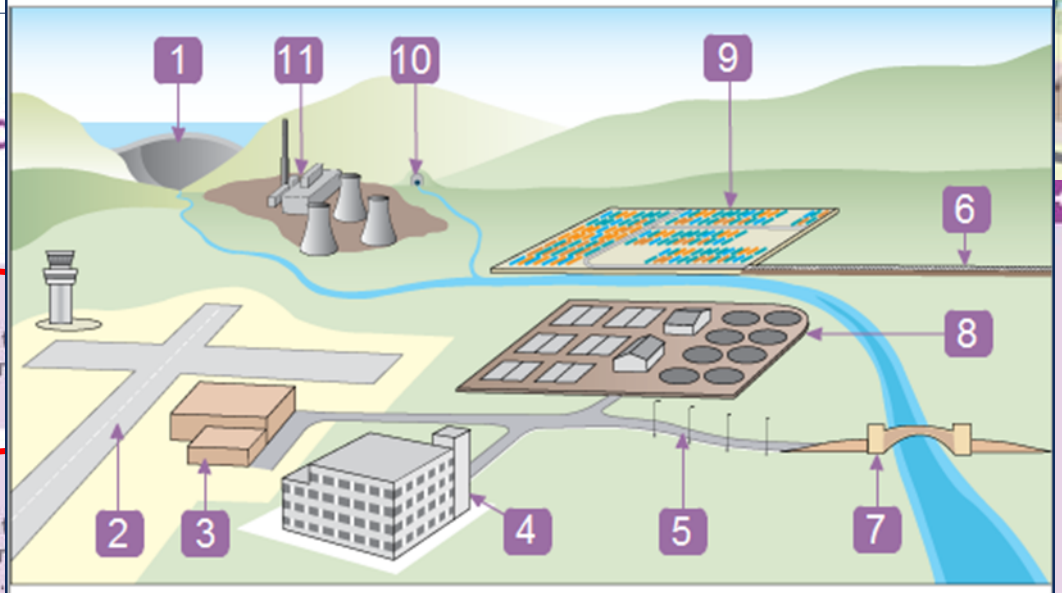
Concrete Structures



11. POWER STATION

Recycled concrete aggregate (RCA) may be used to replace 20% of the coarse aggregate.

Application: Structural concrete for slabs

Product: Reinforced concrete

Examples: Designated Concrete RC40/50

Standards: BS EN 1992-1-1, BS 8500-2, BS EN 12620

Notes: Use of RCA from certain approved sources may be extended beyond 20% where the specification allows. Recycled and secondary materials can also form parts of the fine aggregate and cementitious components of the concrete.

Recycled material allowed in the coarse aggregate

- Quality
  - Quality Management Tool
  - Introduction to the Quality Management System
  - Quality Protocols
  - Aggregates Standards
  - Locate a Test House
- Opportunities
- Specifier
- Supplier Directory
- Case Studies
- Planning
- Recycling Infrastructure
- Waste Management Regulations
- Demolition
- Procurement
- Sustainability

The Quality Module

Quality Management Tool

A step-by-step guide to establishing a Quality Management System...

Introduction to the Quality Management System (QMS)

Why introduce a QMS and what is involved...

Quality Protocols

Overview and downloads of the Quality Protocols...

Aggregates Standards

Want to know more about the European & British standards...

UKAS

Locate a Test House

Locate a test house offering aggregate testing services near you...

C4S

Content prepared by:
C4S (incorporating Viridis)

Quality Protocols

Download WRAP's Quality Protocols

Feedback

Tell us what you think of this module...

Waste Management Regulations

Information on waste and recovery.


www.wrap.org.uk
www.wrap.org.uk/construction
http://aggregain.wrap.org.uk