Soils in the SW Workshop 1 - Exeter

Soil Treatment & Materials Recovery in the South West

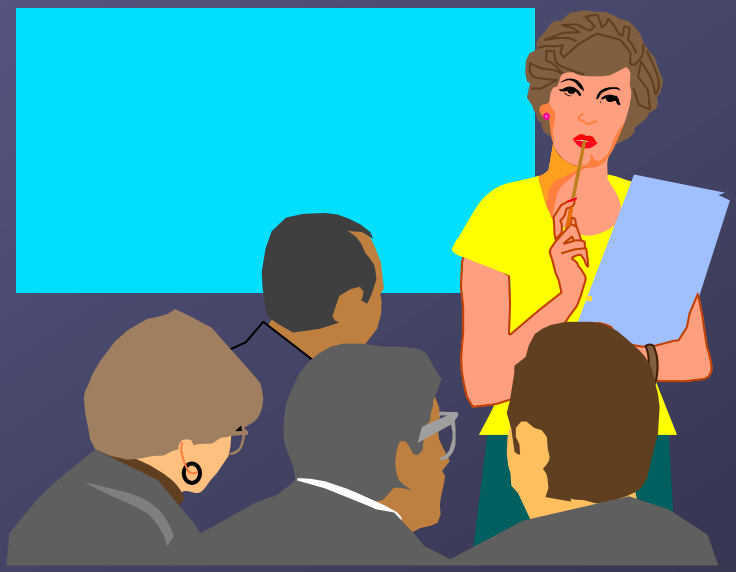
5th July 2017

Re-developing Landfill: Pitfalls and Potentials

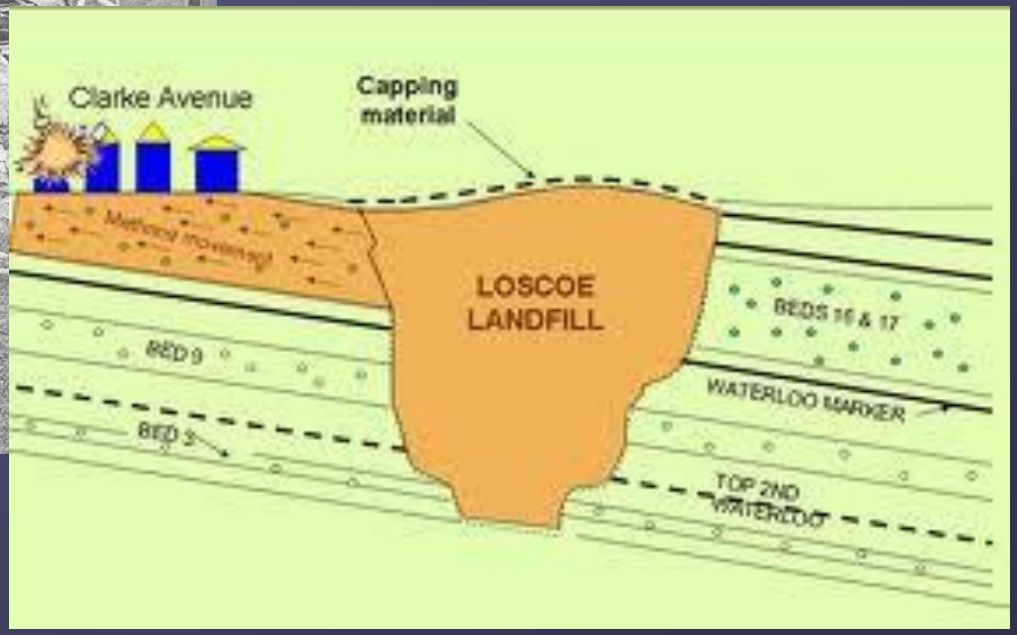
Dr Geoff Card
GB Card
& Partners

Workshop

- Development issues
- Landfill characteristics
- Managing risk
- Case studies

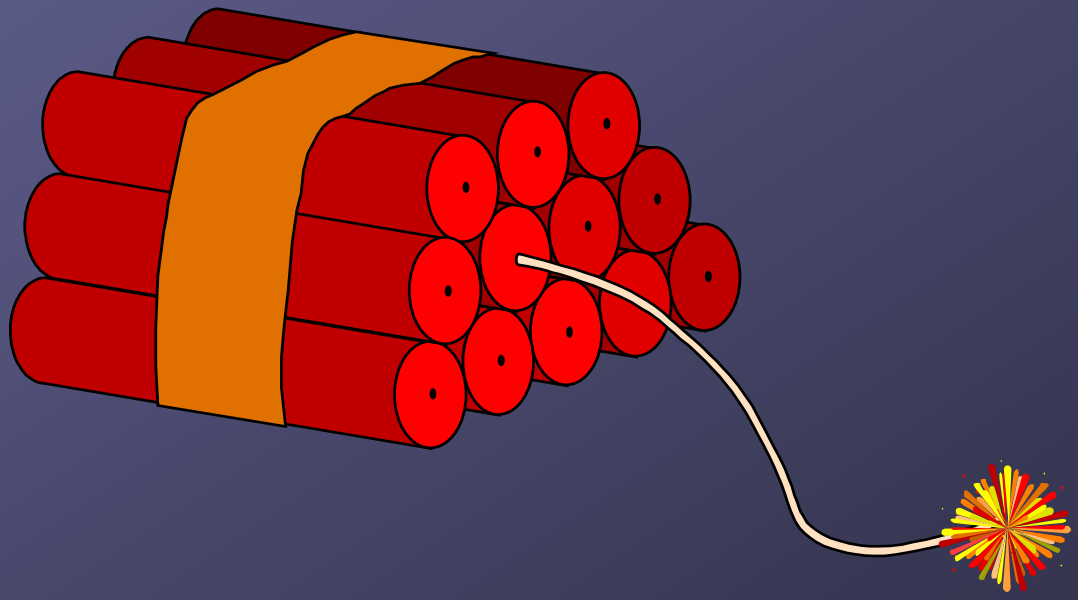


Loscoe Derbyshire



40 years on - -is landfill a problem?

- Awareness
- Measurement
- Risk management
- Control techniques



Development Issues

- Landfill gas generation and migration
- Contaminated ground
- Ground settlement and stabilisation
- Recycling and management of soils
- Sustainable remediation and control

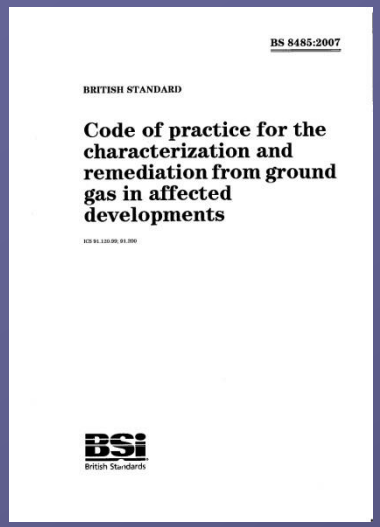
Landfill – Can we build on this material?

- Nature and particle size
- Organic content
- Soil quality- chemistry
- Variability- vertical and horizontal
- Groundwater/leachate

Segregation of materials and compaction

Landfill gas production – particle size and organic content

Ground gas - which guidance to use?

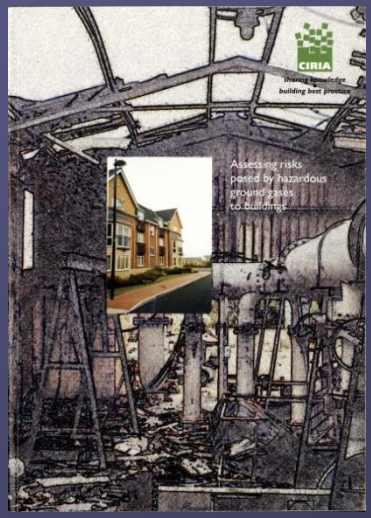


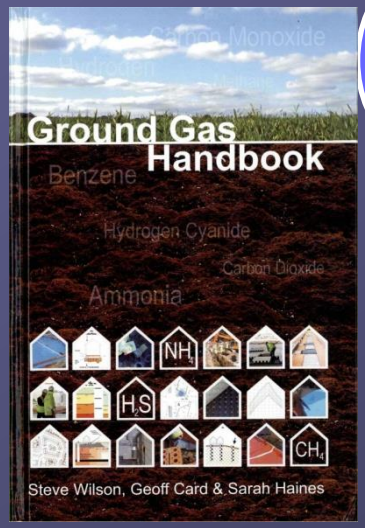
BS 8485

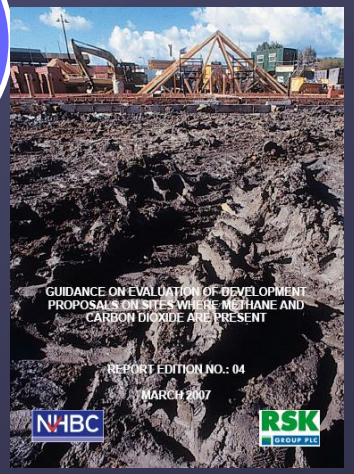
CIRIA 665

CIEH

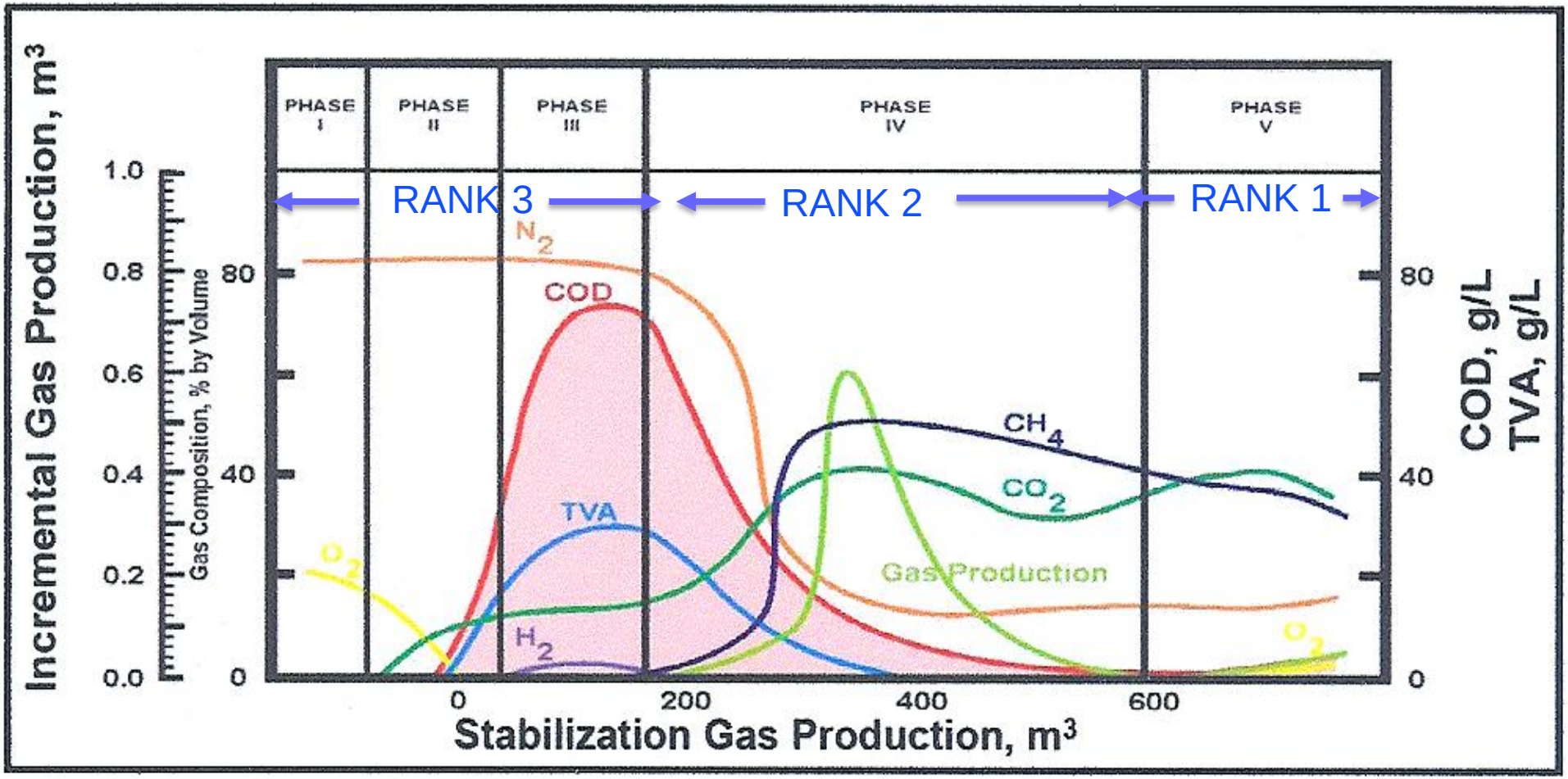
NHBC







Landfill gas production



Development Ranking

Traffic light code	Ranking	Development timing	Description
	1	Current	Site characteristics indicate inert or aged waste. Low gas regime and leachate production. It is considered site can be engineered currently to allow residential/commercial development.
	2	2 to 5 years	Site characteristics indicate aged waste or waste with low to moderate gassing potential. Needs further assessment of gassing regime and settlement characteristics. Ground improvement likely prior to residential development. Might be acceptable currently for commercial or warehousing development.
	3	5 to 10 years	Site characteristics indicate recent waste or waste with high proportion of biodegradability still being generated. Not suitable at present for any form of development and requires pre-treatment.

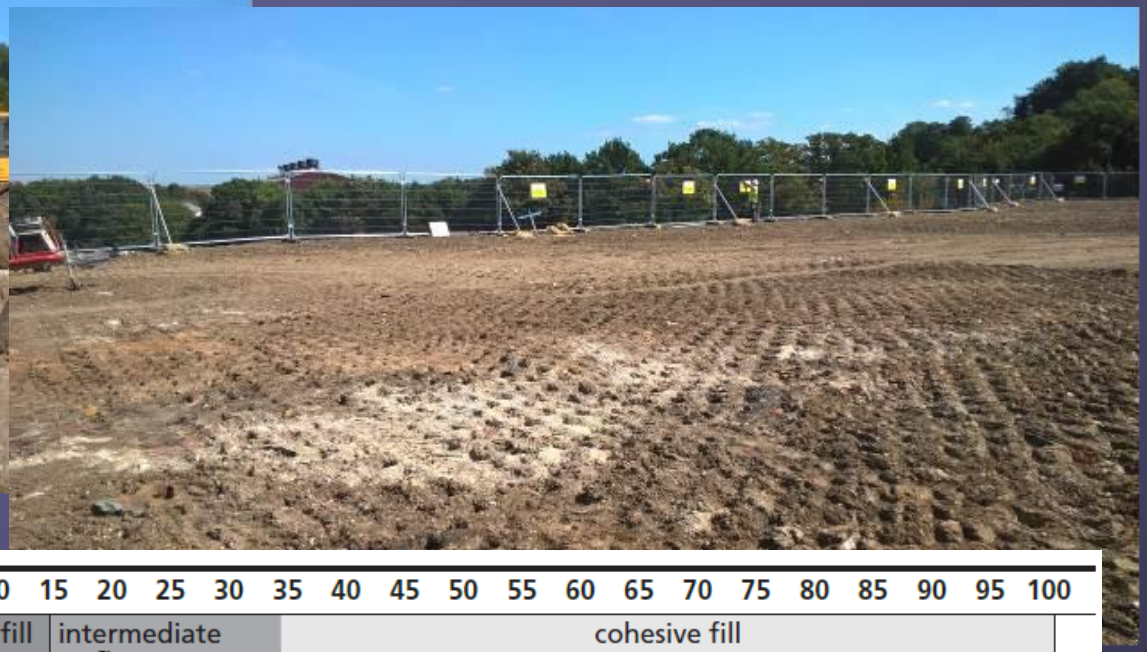
Development Criteria

Parameter	1	2	3
TOC	<10%	10% to 20%	>20%
BOD/COD ratio	<0.4	<0.4	>0.4
Gas Characteristic Situation	CS 2 to 3	CS <4	CS 5 to 6
Settlement	<100mm	100mm to 500mm	>500mm

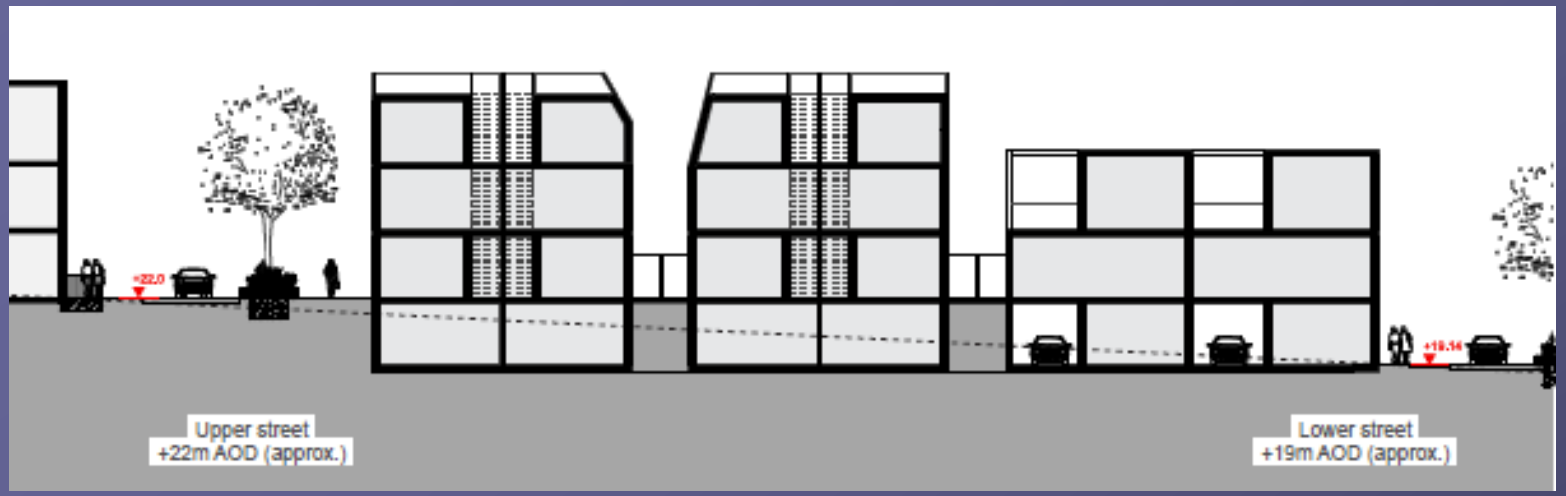
Suitable end-use

Case study – SE London

Earthworks



% passing a 63 µm sieve		0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
UK standard approach to earthworks material classification by grading (after SHW [A), B)])	fill behaviour	granular fill / intermediate fill [C)], classified as cohesive fill / cohesive fill
UK traditional approach to classification for geotechnical design (after BS 5930:1999+A1 [D)])	soil parameters	coarse/granular / intermediate zone [C)] / cohesive/fine grained
BS EN 1997-1:2004 geotechnical design approach, (after BS EN ISO 14688-1:2002 [E)])	simplified interpretation for comparison purposes	coarse soil / composite coarse soil / composite fine soil / fine soil
		BS EN 1997-1:2004 approach does not set any fixed boundary but generally > 10% of the secondary fraction is likely to be needed in most soil types to constitute a composite soil.



Appropriate design

1. Using undercrofts for ventilation

2. Lightweight structures

Landfill development, Surrey

500 new homes and village centre on 40ha of former waste filled sand quarry.

Lakes and water courses incorporated into development – now a Wildlife Reserve

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