



NJUG CASE STUDY

CASE STUDY 33: Recycling Our Earth – Sheepscar

The National Joint Utilities Group (NJUG) is the UK industry association representing utilities on street works issues. The 37 companies¹ we represent work to deliver gas, electricity, water and telecommunications to both individual consumers and UK plc.

NJUG members need to continue to drive forward further improvements. We have therefore developed the NJUG Vision for Street Works, which revolves around six main principles:

1. Safety is the number one priority
2. Damage to underground assets is avoided
3. Utilities work together and in partnership with local authorities to minimise disruption
4. Utilities deliver consistent high quality
5. Utilities maximize use of sustainable methods and materials
6. Street works in the UK are regarded as world class

This case study is an example of NJUG delivering on these principles and turning the vision into reality.

Overview:

- **CBEM3**

Every year around 250,000 tonnes of waste is generated through Northern Gas Networks' (NGN) street works, making it the biggest waste stream within the company's gas network. This is despite the extensive use of 'no-dig' technologies, which currently account for 93% of NGN's gas mains replacement work. Sending this material to landfill is costly and wasteful as the trenches from which it has been excavated must be back-filled with a bought-in material, often incorporating virgin aggregate.

As a result, NGN has developed a formula for recycling this spoil and processing it into a high quality material, CBEM3, for back-filling the trenches from which it has been excavated. CBEM3 is an innovative backfill material as it is self-leveling, requires no compaction, and even allows some difficult waste materials, including clay, to be put back into excavations by encapsulating them in a cement matrix. NGN have been using the material within West Yorkshire since 2004, and around 86% of the company's excavations in West Yorkshire are now filled with CBEM3.

- **Sheepscar**

NGN's plant in Sheepscar, Leeds, recycles up to 2,000 tonnes of spoil per month. The amount of spoil being recycled at this facility equates to more than 80% of the spoil NGN generate in West Yorkshire and means Sheepscar has generated more than 50,000 tonnes of CBEM3 and fine fill since its launch. In four years, almost 100,000 tonnes of waste, which would have otherwise gone to landfill, has been recycled.

The Sheepscar site takes excavated spoil from United Utilities' (NGN's operating partner) direct labour and other contract operations across West Yorkshire, and manufactures it into CBEM3. The material is then used to re-instate highways in Leeds, Bradford, Wakefield, Kirklees and Doncaster council areas.

¹ NJUG's current members are Energy Networks Association (representing electricity and gas), Water UK (representing all water and wastewater companies), National Grid, Openreach, and Virgin Media. Our associate members are Clancy Docwra, Skanska McNicholas, Balfour Beatty, Morrison Utility Services, Morgan Est, NACAP, PJ Keary, First Intervention, Carillion, Enterprise, Laing O'Rourke and AMEC. Including members through trade associations, NJUG represents thirty-seven utility companies, and twelve utility contractors.

Case Study:

The Sheepscair production process:

1 Spoil is brought in from site

Excavated waste from street works is delivered from site using grab wagons. Combining the different soil types at a central processing plant ensures mix consistency. The incoming material is stored on site.



2 The material is screened

The spoil is passed, screened and separated into three parts: fine sandy material for fine fill packing around pipes, larger pieces suitable to be used as a concrete aggregate, and oversized pieces.



3 The oversized pieces are crushed and re-screened

The oversized pieces are passed through an industrial crusher to reduce them to a useable grade.

4 The material is combined into CBEM3

The processed finefill and aggregate material are loaded onto the mixer wagon, which also contains a cement reservoir and water tank. The CBEM3 is mixed and produced on site to precise quantities, meaning there is no waste or unnecessary transport costs.



5 The roadway is reinstated

Fine fill material is used to pack around the pipes, preventing damage. The CBEM3 is placed on top. There is no need for compaction. The material is delivered at a rate of 1m³/minute, meaning that a 100m trench in a public carriageway can be backfilled in less than a quarter of an hour.



6 Quality assurance

The mixer is calibrated regularly. Cube samples of CBEM3 are taken for independent testing each week and are validated by core samples every six months.



Recycling road spoil is not new – many companies crush and screen excavated waste. What makes NGN's process unique is its ability to use every part of the waste – even clays – so that practically nothing is sent to landfill. CBEM3 takes the environmental agenda to the next level by creating a recycled material that is superior in quality to most traditional backfills and also cheaper. In the third quarter of 2008, typical costs for foamed concrete reinstatement were up to £67 per cubic metre compared to £45 for CBEM3. This financial benefit not only makes the material marketable to other utilities, but is also key to ensuring this innovative product is economically as well as environmentally sustainable.