British Gypsum take-back scheme:

- Battersea Reach, London - St George South London
- Queen Elizabeth Hospital, Gateshead - AMEC Design & Project Services

Project type 1
Battersea Reach, mixed use development
Location
Wandsworth, London
Date
Phase 1: 2003 – mid 2005
Phase 2: 2005 – complete end 2006

Project type 2
Queen Elizabeth Hospital Gateshead, construction of NHS Surgical Treatment Centre
Location region
Gateshead, Tyne & Wear
Date
2004 - 2005
Overview

The Landfill Directive of 1999 has been progressively adopted into UK law over a period of years. One result has been that, with effect from the 16th July 2005, high sulphate bearing waste, which includes plasterboard, is now classified as non-hazardous non-inert waste and can only be disposed of in separately engineered mono-cells in non-hazardous landfill sites. With the UK construction industry producing in the region of 300 000 tonnes of plasterboard waste annually, and the cost of landfill disposal increasing each year due to factors such as increases in landfill tax, alternatives to disposal to landfill needed to be identified.

British Gypsum is one of the UK’s three plasterboard manufacturers. To respond to legislation, and the needs of the construction industry to find alternatives to landfill for plasterboard disposal, British Gypsum set up a plasterboard take-back scheme. In summary, the scheme operates by British Gypsum and a construction client entering into an agreement whereby British Gypsum supply plasterboard and 1m³ waste bags or skips to the construction contractor at an agreed price, the contractor fills them with the plasterboard waste, British Gypsum collects the bags or skips and the waste is recycled.

Two companies, St George South London and AMEC Design & Project Services, entered into take-back agreements with British Gypsum. St George South London is one of three companies operating within St George Plc - one of the Berkeley group subsidiaries and involved mainly in the construction of luxury flats in London. AMEC Design & Project Services is part of AMEC Plc, an international project management and services company employing around 44,000 people in 40 countries around the world. The drivers for both companies to enter into the take-back scheme were requirements to fulfil company targets to reduce the quantity of waste being disposed to landfill and to improve environmental performance.

St George South London pioneered the original take-back scheme with British Gypsum on their St George Wharf development at Vauxhall in the year 2000 and have worked with British Gypsum to refine the system to its current form now in use at their Battersea Reach development at Wandsworth. Battersea Reach is a mixed use development of flats, commercial units and a gymnasium sited on a 13 acre brownfield site on the banks of the River Thames. St George realised they needed to find an alternative to landfill when they identified that the nearest site that could take plasterboard waste was approximately 100 miles away.

AMEC Design & Project Services implemented the scheme on the Treatment Centre Project at Queen Elizabeth Hospital, Gateshead. Construction of the new build specialist treatment centre included four new operating theatre suites, two single en-suite wards each with 60 beds in total, a reception area, consultation areas, associated staff and plant room areas, and a breakthrough into the existing hospital building. To achieve a company target to reduce the amount of waste to landfill by 10% year on year, AMEC realised that the British Gypsum take back scheme was an initiative that could help them divert waste from landfill.
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The take-back scheme developed by British Gypsum offered a real solution to the problems of landfilling plasterboard waste. St George South London and AMEC Design & Project Services both found the scheme easy to implement and resulted in real business and environmental benefits being realised. The success of the scheme means that both companies have rolled it out on more of their projects.

British Gypsum

British Gypsum is the UK's leading supplier of internal wall and ceiling systems, with a century long history and a proven record of providing effective dry-lining solutions for many projects. With its headquarters at East Leake in Leicestershire, the company currently has five major manufacturing plants in the UK. It also provides the industry with technical support and training through its Drywall Academy support function and via its East Leake based Building Test Centre, which has access to one of Europe's leading suites of fire, acoustics and structural test laboratories.

British Gypsum take-back scheme

A schematic of the British Gypsum take-back scheme is illustrated in Figure 1 below:

British Gypsum operates a very simple closed loop take-back scheme for waste plasterboard.

1. Following the manufacture of plasterboard, the plasterboard is supplied to the client’s contractor on site. To ensure British Gypsum offer the best service to their
clients, they visit site and offer advice on the most suitable containers e.g. 1m³ bags or skips (typically 40yd skips) and the best way of filling them to ensure maximum capacity. This service is offered at an agreed price which includes collection and haulage costs from the construction site to a British Gypsum production facility.

2. Although many companies try to minimise waste, there is invariably some plasterboard waste created, predominantly from offcuts but also boards damaged on site. As part of the take-back scheme, British Gypsum helps companies monitor their waste by providing a data management system. This system records the total tonnage of waste for a project, average weight per bag or skip and percentage contamination, and therefore allows them to record their preventative waste efforts.

3. The waste plasterboard is segregated onsite by the contractor and collected by one of two waste management companies. Bywaters collect the waste in London and the south and sort it before sending it to Robertsbridge production facility in East Sussex. In other parts of the country Wastecycle collects and sorts the waste before sending it to East Leake production facility in Leicestershire.

4. On delivery to the production facility the contents of the bag are emptied and any foreign material, including loose paper, removed. The plasterboard is broken into pieces smaller than 75mm which are then passed through magnets to remove any further metal (such as nails) and any remaining timber or other contaminants are hand picked out.

5. The remaining gypsum product is crushed and the resulting granular recycled gypsum product is fed back into the British Gypsum plasterboard manufacturing plants. British Gypsum state that their plasterboard can contain up to 15% recycled gypsum.

The plasterboard paper is collected by Envar who combine it with other waste products for use as animal bedding and to create compost used in land reclamation.
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Project 1: Battersea Reach, London
St George South London Limited

Company overview

Battersea Reach is a mixed use development situated on a 13 acre brownfield site on the banks of the River Thames in Wandsworth London SW18. It is being developed by St George South London Limited (SGSL), which is one of three companies operating within St George PLC. St George PLC is a subsidiary of the Berkeley Group Holdings PLC and is mainly involved in the construction of high value apartments within mixed use developments around London. The Berkeley Group companies are shown in Figure 2 below.

![Berkeley Group Holdings PLC structure](image)

St George Plc has its own Environmental Governance Committee which meets regularly to ensure they are implementing their own sustainability strategies as well as those implemented by the Berkeley Group. These strategies have maintained St George at the pinnacle of sustainable performance reflected in the achievement of The Queen’s Award for Enterprise: Sustainable Development 2002 – the only property developer to have been granted this prestigious award.

Berkeley Group Waste Management Review

In light of continuing increase in landfill tax, changes in waste acceptance criteria and the environmental impacts associated with waste disposal, the Berkeley Group commissioned an independent consultant to undertake a review of the company’s waste management practices. The consultants remit was to review existing waste management practices,
highlight and recommend good practice, and instigate high-level waste policy and strategy for the Berkeley Group. The review made over 50 detailed recommendations concerning waste policy, collection of waste data, implementation of initiatives on site and specific waste streams generated by the Berkeley Group.

The waste management review highlighted the Battersea Reach project as an example of best practice in the collection of waste data. The Battersea Reach project team had been working with a specialist waste contractor to implement an integrated waste management strategy. Initial findings showed that 20% of all site waste was being sent directly for recycling, with a further 65% being sent to a Materials Recovery Facility (MRF), of which 80% of the waste is recycled and 20% is disposed of at landfill. These levels of recycling were only achieved by setting up a robust on-site waste management system that segregated waste at source and sent appropriate materials for recycling.

An output of the waste management review has been that the Berkeley Group has developed its own waste tool called Berkeley Group Waste Data Tool, which is being run on a trial basis at Battersea Reach.

Project overview

Battersea Reach is a mixed use development of apartments, gymnasium, office accommodation and commercial units situated within five residential apartments, which are being built in four phases over a six year construction period and will include affordable homes. It is regenerating a 13 acre redundant brownfield site on the banks of the River Thames in Wandsworth, London SW18.
Phase I was constructed between 2003 – mid 2005 and involved the construction of blocks C & D that contained 101 units per block, with the ground floor containing commercial units. Phase I is now complete and scored an Eco-homes rating of Good.

Phase II involves the construction of Block B and is currently (June 2006) under construction. Block B is a 14 storey development containing 124 units. Phase II is due for completion by the end of 2006 with the first units occupied by June 2006. A target has been set to segregate all plasterboard waste arising from Phase II and recycle it through the British Gypsum take-back scheme.

Quality control is of the utmost importance to SGSL as their product is required to meet the highest standards while ensuring acoustic and fire integrity. To ensure these standards are met, SGSL has implemented a stringent quality control system with each stage of the works being inspected and signed off as complete and to the required standard.

SGSL first became involved with the British Gypsum take-back scheme in the year 2000 on their development at St George Wharf followed by a second major development at Riverside West, Wandsworth. SGSL recognised that plasterboard was one of their major waste streams. With the rising cost of haulage and landfill tax, SGSL identified the need to find an alternative to landfilling plasterboard waste that would provide a better environmental and business solution. SGSL took the initiative and approached British Gypsum to implement a take-back scheme.

Implementation of the take-back scheme

1. SGSL and British Gypsum began working together in 2001. The contract agreed between the two companies stipulated that British Gypsum would take back their own plasterboard in the 1m³ bags they supplied. There is a minimum order of 20 bags at a time, but on a project of this scale SGSL generally order 100 bags at a time.

2. Within each unit the drylining is installed over three stages of work:
   - Stage 1 lasts five days and involves metal studwork being erected and boarding on one side.
   - Stage 2 lasts five days and involves the insulation and fitting of the second board.
   - Stage 3 lasts five days and involves tape and jointing and completion of the sealing coat.

   After each stage is complete a Quality Control check is undertaken, and the work signed off if it is of a satisfactory standard.

3. As the drylining work is carried out, there are a number of wheelie bins readily available on each level in the block. The bins vary in size, including 240 litre, 660 litre and 1000 litre bins, but the 660 litre containers are normally used for...
Plasterboard waste (Figure 4). The total number and size of bins available on each level is dependent on the stage of work the level is at and its specific waste requirements.

![Figure 4 660 litre wheelie bin containing plasterboard waste]

4. MPG is the plasterboard contractor on Battersea Reach and they manage all plasterboard waste the project generates. When a waste bin is full MPG staff take the bin down to the designated waste compound on site and place the plasterboard into the bags supplied by British Gypsum (Figure 5).

![Figure 5 British Gypsum take-back bag]

5. The success of the take back scheme is dependent upon the plasterboard being segregated and not mixed with other waste materials. Contract requirements stipulate that if there is consistently more than 10% of other materials mixed with
the plasterboard British Gypsum will refuse to take the bags. To ensure maximum utilisation of the bags, MPG tags them and only allows them to be removed from site when they are full.

6. On collection of the bags by British Gypsum each tag is noted on a log sheet by the SGSL waste manager and the vehicle driver before being loaded onto the lorry. SGSL’s waste management company, ICWM, check and photograph the vehicle as it leaves site. SGSL’s waste manager then confirms the removal of the stipulated amount of plasterboard from site and signs off the log sheet (Figure 6)

![British Gypsum plasterboard log sheet](image-url)
Benefits

In utilising the plasterboard take back scheme during the construction of phase one (Blocks C and D) SGSL achieved the following:

- **1363 bags** of plasterboard waste were collected by British Gypsum for recycling which would otherwise have gone to landfill.

- At an average of 247 kg per bag this equates to approximately **333 tonnes** of plasterboard waste.

- It is envisaged that a further **205 tonnes** of plasterboard will be reprocessed from phase two (Block B) of the development.

Although the scheme was cost neutral while it was being trialled on Phase 1 in 2004, for later phases of the project significant cost savings are likely to be achieved due to the increasing costs of landfill disposal.

Waste Minimisation

Early communication between SGSL, MPG and British Gypsum ensured other Plasterboard Waste Reduction Methods were able to be implemented including:

- The use of pre-cut boards to minimise waste;

- Plasterboard off-cuts were used where possible to limit the amount of waste created; and

- Waste disposal costs were built into tenders. Therefore, if a SGSL subcontractor generated less waste than what was stipulated in the initial contract they saved money on waste disposal. This financial incentive was of great importance in getting all subcontractors to adhere to the process

Following the success of the scheme on Phase I, SGSL have set a target to segregate all plasterboard waste arising from Phase II and recycle it through the take-back scheme. SGSL have also negotiated an agreement with British Gypsum to use the take-back scheme on all of their developments.
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Project 2: Queen Elizabeth Hospital, Gateshead
AMEC Design & Project Services

Company overview

AMEC Design & Project Services is part of AMEC PLC, an international project management and services company, employing around 44,000 people in some 40 countries around the world.

AMEC has set a number of guiding principles as shown below which give their obligations in the area of corporate social responsibility or sustainability. For AMEC, this means a balance between Society, Environment and Economy, or the 3P’s of People, Planet and Profit.

- Ethical Conduct
- Environment
- Health and Safety
- Employment Rights
- Diversity of Employees
- Community Involvement
- Training and Investment
- Risk Management
- Accountability
- Customer Service

Agenda 21 Action plan

To aid with achieving these obligations, AMEC Design & Project Services’ Agenda 21 Action Plan identifies sustainability targets and objectives for both the short term and longer term priorities. Part of AMEC’s Sustainability Programme and Agenda 21 documents includes a commitment to minimise waste and reduce the quantity of waste to landfill by 10 per cent year on year. With this in mind, AMEC is constantly looking for new initiatives to divert waste from landfill using the waste management hierarchy (Eliminate - Reduce - Reuse - Recycle)

Project overview

The Surgical Treatment Centre Project at Queen Elizabeth Hospital, Gateshead was one of the first ProCure 21 contracts, the national partnership framework for NHS projects. Construction of the new build specialist treatment centre included four new operating theatre suites, two single en-suite wards each with 60 beds in total, a reception area, consultation areas, associated staff and plant room areas, and a breakthrough into the existing hospital building. The total cost of the project was circa £11m with completion in 69 weeks.
Due to the space restrictions related to works within a live hospital campus, AMEC soon realised that the principles of the AMEC waste minimisation strategy had the potential to introduce massive improvements in both productivity and quality. The only access to the site was from a busy one-way hospital road used by ambulances, patients and staff alike, and the footprint of the new building filled the majority of the site. When considering waste minimisation/management for the project, AMEC therefore had to look for new initiatives and alternatives especially for recycling.

Prior to the start of this project, AMEC had completed construction of the adjacent Jubilee Wing at the hospital, so was able to benchmark its performance on a similar project both in specification and location. These indicators highlighted waste plasterboard as a major waste stream, and as part of AMEC’s sustainability target to minimise waste by 10 per cent year on year, AMEC looked for alternatives to the traditional disposal routes.

AMEC employed the specialist dry-walling contractor GT Contracts, and jointly they were able to engage British Gypsum early on in the project. An agreement was reached to carry out a trial of a plasterboard recycling scheme for Queen Elizabeth Hospital Project, the first British Gypsum recycling project in the North of England for non-residential construction.

**Implementation of the take-back scheme**

The take-back scheme agreed between AMEC and British Gypsum was very similar to the scheme agreed between SGSL and British Gypsum. The details and third parties specific to the Queen Elizabeth Hospital are illustrated in Figure 8 below.
AMEC purchased 1m³ pre-marked bags from British Gypsum

British Gypsum gave advice on filling the bags to achieve the maximum weight in each bag

GT Contracts carried out toolbox talks to all their operatives on how to fill the bags

British Gypsum picked up a minimum of 6 and maximum of 24 filled bags. A record of loads removed from site was recorded on Plasterboard waste transfer notes.

Following sorting, the waste plasterboard is transported to East Leake production facility for recycling

AMEC was sent monthly reports from British Gypsum on volumes and weights of plasterboard removed
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Benefits

320 bags of plasterboard were recycled as part of this scheme which would otherwise have gone to landfill. At an average of 247kg/bag, this equates to approximately 80 tonnes.

Waste Minimisation

By adding plasterboard recycling to AMEC’s already well developed waste minimisation scheme, the project achieved a recycling/reuse rate for all wastes on the project of 89 per cent.

By carrying out early discussions between AMEC, GT Contracts and British Gypsum, other Plasterboard Waste Reduction Methods were able to be implemented including:

- Plasterboards pre-cut by manufacturer to required size;
- Door centres adjusted where possible to avoid plasterboard off-cuts; and
- Co-ordination with other activities including Mechanical and Electrical Installations to avoid the need to cut away plasterboard.

In addition to the above, the scheme encouraged AMEC and GT Contracts to think about reducing the waste generated through dry-walling by, for instance, re-using off-cuts instead of cutting a new board. AMEC was able to supply a dry area near to the workplace for storage of plasterboard off-cuts which were then re-used by GT Contracts.

Health and Safety

The success of the waste minimisation scheme on the project, of which the plasterboard recycling scheme was an element, was also reflected in a reduction in AMEC’s accident figures for slips, trips and falls - a result of improved housekeeping on site. Figure 9 below shows the accident frequency rate (AFR) for slips, trips and falls on the Treatment Centre at the Queen Elizabeth Hospital Gateshead compared to the previous Jubilee Wing project where the recycling scheme was not applied.
While this scheme was carried out prior to the restrictions in plasterboard disposal, and hence before any increase in the cost of disposal, AMEC found economic benefit of this scheme due to the more efficient use of the plasterboard. In addition, AMEC is well aware of the probable increase in the cost of plasterboard disposal due to the legislative restrictions, and therefore expects to see increased economic benefits of plasterboard recycling in the future.

Through using British Gypsum’s plasterboard recycling scheme, AMEC has realised Environmental, Social and Economic benefits - fulfilling all 3 areas of its sustainability agenda.

AMEC has since successfully negotiated an agreement with British Gypsum to be able to use the take-back scheme at preferential rates on all future projects to continue the success of this initiative.

**Conclusions**

The case study illustrates that an initiative like the British Gypsum take-back scheme can be easily and effectively implemented on two very different construction projects in different geographical locations. The two companies involved in this case study, St George South London Limited and AMEC Design & Project Services, wanted to improve their environmental performance by reducing the quantity of waste sent to landfill. To achieve this objective both companies took a holistic approach to site waste management by examining ways to
design out waste, reuse waste materials on site as resources, and ultimately find the best practicable environmental option to manage waste.

Successful implementation of the take back scheme on both projects was dependent on a number of factors:

- A corporate commitment to reduce the volume of waste sent to landfill and improve the company's environmental performance resulted in both companies analysing their waste streams and identifying plasterboard as yielding high volumes of waste that was being sent to landfill for disposal. This initial analysis enabled both companies to explore alternatives to landfill disposal.

- The service that British Gypsum supplied was flexible enough to be implemented on a mixed use development with a ten-year construction programme, like Battersea Reach in London, or a 69-week development to extend Queen Elizabeth Hospital in Gateshead. British Gypsum ensured the scheme was a success by offering advice on how to fill the bags to ensure maximum volumes were achieved, and supplied each company with data on volumes and weight of plasterboard recycled so they could accurately monitor their waste.

- AMEC and St George South London realised that for the successful segregation of one waste stream on site, key personnel had to be employed to ensure site operatives were aware of the requirements of the scheme. The plasterboard contractor on both projects took ownership for ensuring plasterboard was segregated into the bags supplied by British Gypsum and that their staff were fully briefed.

British Gypsum have responded to the construction industry's need to find a better environmental alternative to landfilling their product by developing a scheme that is easy for construction projects of varying sizes and in different geographical locations to implement. Although the take-back scheme was cost neutral, both companies recognise that as landfill tax increases real economic benefits will be realised by using the take-back scheme, which will help the industry respond to the problem of disposing of waste plasterboard without recourse to landfill.
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