CASE STUDY

Lovell Homes - Hogganfield Park

ZERO WASTE SCOTLAND

Lovell Homes - Hogganfield Park

Project background

This four-acre residential development in the north-east of Glasgow is composed of 24 detached and semi-detached houses of two, three and four bedrooms. As well as 15 terraced houses with three bedrooms each, and eight flats with two bedrooms a piece. The total floor space planned is 4,523 m², with a project value of £10.5m.

The main contractor, Lovell, is a residential house builder, employing subcontracted trades to undertake most of the site works. Their site management team is coordinating the trades, providing skips, and buying most of the materials. A basic Site Waste Management Plan is held within the contractor's electronic document management system.

This site was chosen to trial use of the Construction Waste Indicative Cost (CWIC) Calculator. The CWIC Calculator was created to analyse individual skips on construction sites, to estimate the full cost of materials purchased, labour costs, including indirect costs associated with any rework and replacement of wasted materials, in addition to the more obvious skip-hire costs.

William Lindsay, the Health, Safety and Environment Manager at Lovell spoke of the efficiency and importance of the calculator:

"We are always looking for initiatives to help us become more efficient as a business. The CWIC Calculator will allow us to focus on the true cost of waste at an operational level and allow us to identify appropriate waste reduction measures both now and for future developments".

Skip layout

Three 14-yard skips are located to the south end of the site; two for segregated waste (plasterboard and timber) and one mixed waste skip. These are mainly filled from a mini-skip mounted to a telescopic forklift (tele-handler). When the research team arrived on site, waste was being carried from the main work areas about 20m to the mini skips, and around 55m by tele-handler along a temporary road to the skip compound.

Figure 1: Skip compound on south side of the site

Figure 2: Tele-handler filling a timber skip

Figure 3: Site layout drawing marked up with route of tele-handler

A researcher collected waste data for the CWIC Calculator, assisted by Lovell Assistant Site Manager, over the course of three days. This began with an assessment of the travel distances (Figures 3&4), which allowed the CWIC 'Set-up' page to be completed using a hand-held tablet using Excel (Figure 6). After this, waste data was logged on the main spreadsheet. (Figure 7).

Figure 4: Assessing travel distances

Figure 7 shows a screenshot of the completed Data input sheet. The rows, from left to right, show the categories of waste that were logged. The volume column automatically calculates how much waste has been logged. The right side of the volume column shows categories for 'Condition' of the waste (as judged by the user), and two final columns to check 'yes' or 'no', depending on whether the waste materials had been installed then removed, or replaced by new materials. If these are checked with a 'yes', then extra costs are added.

Figure 5: Measuring length of material before going into the skip

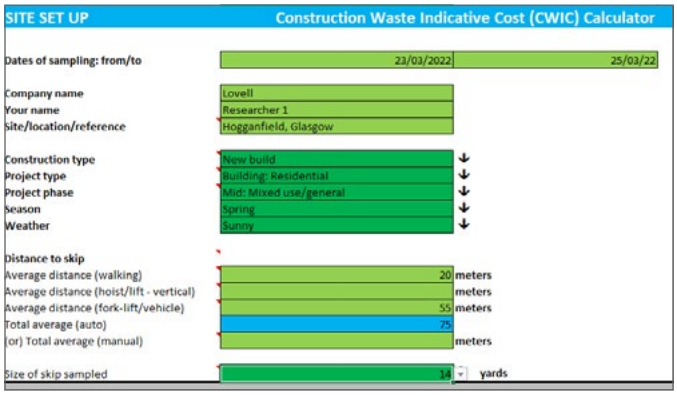

Figure 6: CWIC Calculator Set up page

Seq No.	Type of waste	Waste code (auto fill)	Description of waste	Notes on waste	Source of waste	No. of similar objects (enter 1 if only one)	Length (mm)	Width (mm)	Thickness (mm)	Total volume (auto fill). Aim for 5m3:	Condition	Waste material was installed then removed	New material needed to replace material
	↓Drop-Down List		↓Drop-Down List		↓Drop-Down List					5.019	↓Drop-Down List	↓List Yes/No	↓List Yes/No
1	Insulation	17-06-04	Insulation: board or slab insulation over 75mm	Insulation materials with foil	Cutting waste	15	1200	270	100	0.032	Potentially reusable	Yes	No
2	Bricks	17-01-02	Bricks: common (no mortar)	Damaged Bricks	Damaged: Transport and delivery	85	215	103	65	0.122	Suitable for recycling	No	Yes
3	Other_Each	0	Other (Zero Cost)	Office Chair (Black)	Canteen and office waste	2	950	620	500	0.589	Slight damage/Reparable	No	Yes
4	Other_Each	0	Other (Zero Cost)	Side Chairs (Brown)	Canteen and office waste	3	920	450	450	0.559	Slight damage/Reparable	No	Yes
5	Treated_wood_glass_plastic_including_wood_plastic_window_frames	17-02-04	Treated wood/glass/plastic: timber - plywood, marine quality	Water Proofs and Construction	Cutting waste	2	3700	1800	125	1.665	Landfill	No	No
6	Tiles_and_ceramics	17-01-03	Tiles and ceramics: general	Tiles	Over ordering	15	450	450	5	0.015	Potentially reusable	No	No
7	Packaging_Paint_cans_Metal_Plastic	15-01-10	Packaging: Paint cans (Metal/Plastic)	Paint Buckets	Not recovered by supplier (packaging)	5	270	270	200	0.073	Potentially reusable	No	No
8	Insulation	17-06-04	Insulation: sheepswool	wool insulation	Damaged: Site storage and internal site transit	3	700	500	500	0.525	Suitable for recycling	Yes	No
9	Packaging_wooden	15-01-03	Packaging: Wood	wooden pallet	Not recovered by supplier (packaging)	1	900	870	100	0.078	Slight damage/Reparable	No	No

Set up | Data input | Dashboard Costs | Dash Volume | Dash Weight | Dash Source | Dash C ...

Figure 7: CWIC Calculator 'Data input' tab

Table 1 shows an overview of the waste costs, automatically analysed by the CWIC Calculator. The CWIC Calculator also produces charts showing various aspects of the waste sample. Figure 8 shows a breakdown of the material costs. Table 1 also shows how much this cost is per cubic meter and extrapolates the figures for the size of skip.

Table 1: Overview of waste costs

Overview of costs Volume (m^3) of sample:	5.019	Per 1m^3	For skip: (14 Yards)
Total Materials Costs	£1,599.26	£18.66	£2,788.23
Total Labour Costs	£201.59	£40.17	£301.00
Skip Hire Cost (mixed)	£261.56	£9.89	£261.56
Total (excl. VAT)	£2,062.40	£388.71	£3,350.79
VAT	£412.48	£77.74	£670.16
Total	**£2,474.88**	**£466.46**	**£4,020.95**

The CWIC Calculator also produces charts showing various aspects of the waste sample. Figure 10 shows a breakdown of the material costs. This shows where the money is being lost, mainly via gypsum materials and insulation. Even though there were separate skips for timber and plasterboard, the mixed skip included a wooden pallet and sheets of plasterboard that were too contaminated for the segregated skips. The 'gypsum materials' also included excess plaster, mixed on site.

Figures 11 and 12 show the amount of waste (including packaging and others with no cost) in the sample, by volume and weight respectively. These show that 33% by volume, and 31% by weight, of waste material in the sample is treated wood and plastic waste. 'Other' is the second largest type of waste, which includes office furniture.

Figure 13 shows the waste sources by volume. Besides the expected 'cutting' (off-cuts) wastes and packaging, the analysis shows some waste materials are due to damage, either on site or during delivery.

Figure 14 shows that 52% of the sampled waste would need to go to landfill. Whilst this is a subjective estimate, the analysis also shows that just under 50% of the waste could be suitable for recycling.

Figure 8: Timber pallet in waste skip

Figure 9: Plasterboard in mixed skip

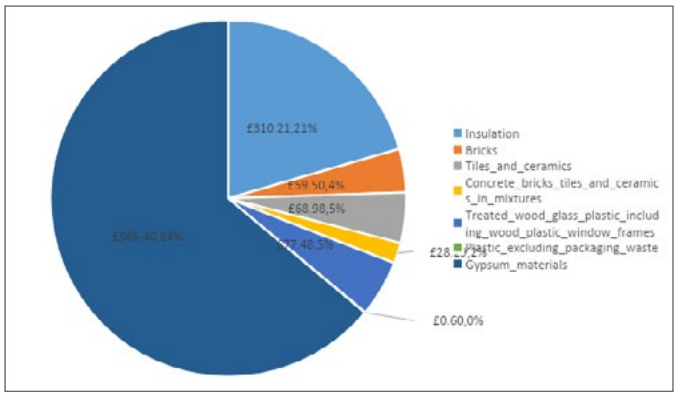

Figure 10: Material cost pie chart

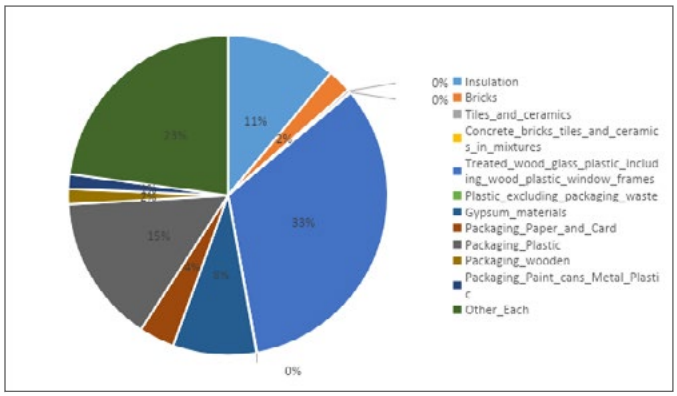

Figure 11: Volume of waste

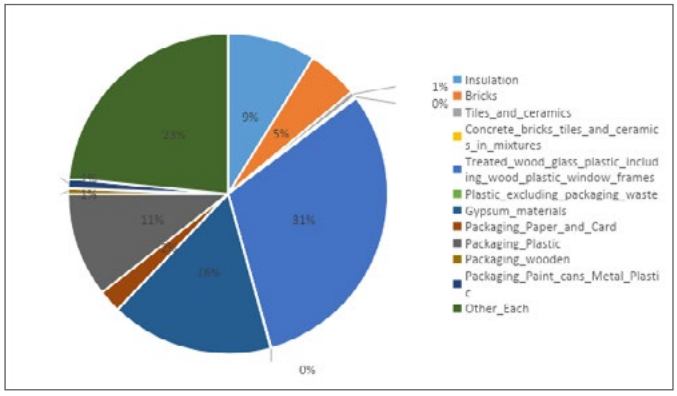

Figure 12: Weight of waste

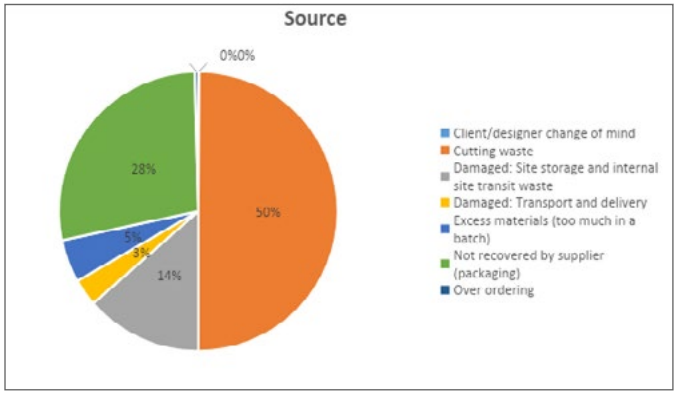

Figure 13: Source of waste

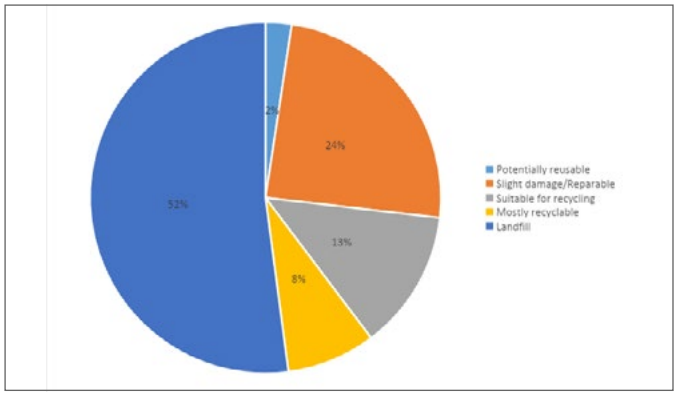

Figure 14: Condition of waste