



RESOURCE EFFICIENT CONSTRUCTION



Merlin College Schools

Project location: Dougishka, Galway

Floor area: 8,300m²

As part of a research initiative, audits were carried out to develop best practice for resource efficiency on Irish construction sites. The project was part of the Irish Government's Schools Bundle 3 project and consisted of a Post Primary Community College and Primary School constructed on a shared site with a total floor area of 8,300m². The structure of the buildings was primarily masonry walls and precast concrete floor slabs and stairs with a structural steel frame roof. The schools were built to accommodate a total of 1,100 students.

RESEARCH ACTIVITIES ON SITE

59 site visits

25 **Resource Efficiency** initiatives implemented on site

54 **Resource Efficiency** audits

RESOURCE EFFICIENCY SAVINGS	11% savings*	€16,697 cost savings	13 tonnes CO ₂ reduced energy	21,410 kWhrs energy saved
28 tonnes waste prevented	316.5 tonnes diverted from landfill	€86 implementation costs	wrap Good practice waste/100m ² floor area	BREEAM® Exemplary waste diversion from landfill

RESOURCE USE

DIESEL 708,247 kWhrs 194 tonnes CO ₂	ELECTRICITY 215,991 kWhrs 138 tonnes CO ₂	WASTE SKIPS 98 tonnes 107 tonnes CO ₂	GAS 286,978 kWhrs 57 tonnes CO ₂	CARBON DIOXIDE 506 tonnes Energy use CO ₂ emissions
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* This is calculated based on a hypothetical profit margin of 1.5%. This case study is based on the outputs of a Green Enterprise project carried out by GMIT in co-operation with BAM Ireland and Carey Developments and funded by the EPA's National Waste Prevention Programme.



RESOURCE EFFICIENT CONSTRUCTION



Merlin Schools SNU

Project location	Dougishka, Galway
Floor area	547m ²

As part of a research initiative, audits were carried out to develop best practice for resource efficiency on Irish construction sites. The project involved the construction of two single storey extensions to the recently completed primary and secondary level schools to house two new SNUs with a total floor area of 547m². The extensions were constructed on the campus of two fully functioning primary and secondary schools. The structure of the buildings was generally masonry walls and precast concrete floor slabs with a structural steel frame roof.

RESEARCH ACTIVITIES ON SITE

23 site visits

28 **Resource Efficiency** initiatives implemented on site

21 **Resource Efficiency audits**

RESOURCE EFFICIENCY SAVINGS	132% savings*	€16,174 cost savings	4.8 tonnes CO ₂ reduced energy	7,513 kWhrs energy saved
	19.4 tonnes waste prevented	107.5 tonnes diverted from landfill	€10 implementation costs	wrap Standard practice waste/100m ² floor area
			BREEAM® Exemplary waste diversion from landfill	

RESOURCE USE

DIESEL 49,991 kWhrs 14 tonnes CO ₂	ELECTRICITY 2,461 kWhrs 2 tonnes CO ₂	WASTE SKIPS 21 tonnes 108 tonnes CO ₂	CARBON DIOXIDE 53 tonnes Energy use CO ₂ emissions
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RESOURCE EFFICIENT CONSTRUCTION



Lambe Institute for Translational Research

Project location UCH, Galway

Floor area 5,125m²

As part of a research initiative, audits were carried out to develop best practice for resource efficiency on Irish construction sites. The combined facility of the CRF TRF project covered an area of 5,125m² and is a new four storey building with direct linkages into the existing hospital building. The works comprised of the shell, core and fit-out of the new building. The building was constructed from precast concrete, manufactured off site, with pad foundations with the building fabric made up of external insulation and a pre-coloured polyciliate render.

RESEARCH ACTIVITIES ON SITE

122 site visits

31 Resource Efficiency initiatives implemented on site

114 Resource Efficiency audits

RESOURCE EFFICIENCY SAVINGS	9% savings*	€22,568 cost savings	42 tonnes CO ₂ reduced energy	66,021 kWhrs energy saved
	35 tonnes waste prevented	410 tonnes diverted from landfill	€105 implementation costs	BREEAM® Exemplary waste diversion from landfill
		wrap Good practice waste/100m ² floor area		

RESOURCE USE

DIESEL 382,283 kWhrs 105 tonnes CO ₂	ELECTRICITY 127,886 kWhrs 82 tonnes CO ₂	WASTE SKIPS 183 tonnes 410 tonnes CO ₂	WATER 1,028 m ³ 0.4 tonnes CO ₂	CARBON DIOXIDE 308 tonnes Energy use CO ₂ emissions
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Multi-storey Car Park

Project location UCH, Galway

Floor area 7,052m²

As part of a research initiative, audits were carried out to develop best practice for resource efficiency on Irish construction sites. The project consisted of the construction of a two storey car park consisting of 238 number spaces together with associated site works. This car park was constructed on the site of an existing car park to the north east of an existing helipad and comprised of four phases of work which included; a temporary ambulance bay, road widening, the car park structure, which was comprised of a precast concrete frame, and the resurfacing of an existing car park.

RESEARCH ACTIVITIES ON SITE

61 site visits

34 **Resource Efficiency** initiatives implemented on site

57 **Resource Efficiency** audits

RESOURCE EFFICIENCY SAVINGS

26% savings*

€9,275 cost savings

5 tonnes CO₂ reduced energy

9,469 kWhrs energy saved

34 tonnes waste prevented

24 tonnes diverted from landfill

€224 implementation costs

wrap Best practice waste/100m² floor area

BREEAM® Exemplary waste diversion from landfill

RESOURCE USE

DIESEL **139,668** kWhrs **39** tonnes CO₂

WATER **874** m³ **0.3** tonnes CO₂

WASTE SKIPS **15** tonnes **24** tonnes CO₂

CARBON DIOXIDE **56** tonnes Energy use CO₂ emissions

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Human Biology Building (HBB)

Project location NUI, Galway

Floor area 8,200m²

As part of a research initiative, audits were carried out to develop best practice for resource efficiency on Irish construction sites. The HBB was a new research and teaching facility for the three NUI Galway departments of Anatomy, Physiology and Pharmacology and Therapeutics. The development was a five storey building with a rooftop level plant enclosure and an exterior envelope of aluminium, limestone and glass. The HBB has a floor area of 8,200m² with a precast concrete structure and significant mechanical and electrical services installations.

RESEARCH ACTIVITIES ON SITE

154 site visits

33 Resource Efficiency initiatives implemented on site

124 Resource Efficiency audits

RESOURCE EFFICIENCY SAVINGS	13% savings*	€43,910 cost savings	93 tonnes CO ₂ reduced energy	146,134 kWhrs energy saved
52 tonnes waste prevented	219 tonnes diverted from landfill	€294 implementation costs	wrap Best practice waste/100m ² floor area	BREEAM® Exemplary waste diversion from landfill

RESOURCE USE

DIESEL 197,605 kWhrs 54 tonnes CO ₂	ELECTRICITY 178,006 kWhrs 114 tonnes CO ₂	WASTE SKIPS 103 tonnes 219 tonnes CO ₂	WATER 2,131 m ³ 0.6 tonnes CO ₂	CARBON DIOXIDE 275 tonnes Energy use CO ₂ emissions
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Cystic Fibrosis Unit

Project location	UCH, Galway
Floor area	223.8m ²

As part of a research initiative, audits were carried out to develop best practice for resource efficiency on Irish construction sites. The Cystic Fibrosis Unit project in University College Hospital consisted of the construction of a new outpatient unit for children with cystic fibrosis. The new unit included four examination rooms, a treatment room for procedures, two offices and a gym for assessment and physiotherapy. The works comprised of the shell, core and fit-out of a new single storey building with a structure of raft foundations, concrete block walls, metal and plasterboard stud partitions and a timber flat roof.

RESEARCH ACTIVITIES ON SITE

31



site visits

12 Resource Efficiency



initiatives implemented on site

25

Resource Efficiency audits

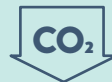


RESOURCE EFFICIENCY SAVINGS



22% savings*

€1,961 cost savings



1.22 tonnes CO₂ reduced energy



1,908 kWhrs energy saved



4.7 tonnes waste prevented



11.3 tonnes diverted from landfill



Zero implementation costs

wrap

Good practice

waste/100m² floor area

BREEAM®

Exemplary waste diversion from landfill

RESOURCE USE

WASTE SKIPS



7 tonnes (47.3m³)

CARBON DIOXIDE



7 tonnes** CO₂ emissions

CO₂ EQUIVALENT



17,429 miles driven by an average passenger vehicle CO₂ equivalent

* This is calculated based on a hypothetical profit margin of 1.5%.

** This calculation is based on waste production only.

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Demolition of 'Block M'

Project location	NUI, Galway
Floor area	199.5m ²

As part of a research initiative, audits were carried out to develop best practice for resource efficiency on Irish construction sites. The Block M project consisted of the demolition of an existing one storey timber clad 'Block M' building on the grounds of NUIG with a total floor area of 199.5m². The works included demolition, diversion of services, removal of asbestos materials, waste management and all remedial landscaping and associated site works.

RESEARCH ACTIVITIES ON SITE

6

site visits



3

Resource Efficiency

initiatives implemented on site



6

Resource Efficiency audits



RESOURCE EFFICIENCY SAVINGS



48% savings*

€680.36 cost savings



Waste Quantities

identified using a pre-demolition audit



99.7%

waste diverted from landfill



12

tonnes diverted from landfill



Zero

implementation costs

wrap

Standard practice

waste/100m² floor area

BREEAM®

Exemplary

waste diversion from landfill

RESOURCE USE

WASTE SKIPS



3

tonnes

13

tonnes CO₂

ASBESTOS



2

tonnes

0.3

tonnes CO₂

TRANSPORT EMISSIONS



0.6

tonnes CO₂

CARBON DIOXIDE



12

tonnes

Energy use CO₂ emissions

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Podiatry Unit

Project location Merlin Park Hospital, Galway

Floor area 401.3m²

As part of a research initiative, audits were carried out to develop best practice for resource efficiency on Irish construction sites. The project consisted of the construction of an extension to the existing Podiatry Suite in Merlin Park Hospital. The building was a two storey building with a link formed between the existing building and the new building. The works comprised of the shell, core and fit-out of the new two storey podiatry unit building and the structure of the building was raft foundations, concrete block walls, metal and plasterboard stud partitions and a timber flat roof.

RESEARCH ACTIVITIES ON SITE

31 site visits

23 **Resource Efficiency** initiatives implemented on site

29 **Resource Efficiency** audits

RESOURCE EFFICIENCY SAVINGS

37% savings*

€8,835 cost savings

4 tonnes CO₂ reduced energy

6,028 kWhrs energy saved

164 tonnes waste prevented

27 tonnes diverted from landfill

Zero implementation costs

wrap **Good practice** waste/100m² floor area

BREEAM[®] **Exemplary** waste diversion from landfill

RESOURCE USE

WASTE SKIPS **18** tonnes **28** tonnes CO₂

CARBON DIOXIDE **14** tonnes Energy use CO₂ emissions

CO₂ EQUIVALENT **32,106** miles driven by an average passenger vehicle CO₂ equivalent

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High Dependency Unit

Project location Bon Secours Hospital, Galway

Floor area 212m²

As part of a research initiative, audits were carried out to develop best practice for resource efficiency on Irish construction sites. The High Dependency Unit project consisted of the demolition and strip out and fit-out of a number of existing rooms in the Bon Secours Hospital in Galway. The works included the merging of four single bedrooms into a six-bed high dependency ward. All works were completed within a live hospital environment with external access available through the use of scaffolding.

RESEARCH ACTIVITIES ON SITE

16 site visits

17 **Resource Efficiency** initiatives implemented on site

15 **Resource Efficiency** audits

RESOURCE EFFICIENCY SAVINGS	27% savings*	€3,092 cost savings	2 tonnes CO ₂ reduced energy	3,436 kWhrs energy saved
8 tonnes waste prevented	37 tonnes diverted from landfill	€38 implementation costs	wrap Standard practice waste/100m ² floor area	BREEAM® Exemplary waste diversion from landfill

RESOURCE USE

DIESEL 6,059 kWhrs 2 tonnes CO ₂	WASTE SKIPS 14 tonnes 31 tonnes CO ₂	CARBON DIOXIDE 20 tonnes Energy use CO ₂ emissions	CO₂ EQUIVALENT 47,051 miles driven by an average passenger vehicle CO ₂ equivalent
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