NATIONAL WASTE PREVENTION PROGRAMME

Preventing Waste
Driving the Circular Economy

epa Environmental Protection Agency

Rialtas na hÉireann
Government of Ireland

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/100m² floor area

BREEAM® **Exemplary** waste diversion from landfill

RESOURCE USE

DIESEL	ELECTRICITY	WASTE SKIPS	GAS	CARBON DIOXIDE
708,247 kWhrs	**215,991** kWhrs	**98** tonnes	**286,978** kWhrs	**506** tonnes
194 tonnes CO_2	**138** tonnes CO_2	**107** tonnes CO_2	**57** tonnes CO_2	Energy use CO_2 emissions

* 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.

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RESOURCE EFFICIENT CONSTRUCTION

Merlin Schools SNU

Project location	Dougishka, Galway
Floor area	547m²

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/100m² floor area

BREEAM® **Exemplary** waste diversion from landfill

RESOURCE USE

DIESEL	ELECTRICITY	WASTE SKIPS	CARBON DIOXIDE
49,991 kWhrs	**2,461** kWhrs	**21** tonnes	**53** tonnes
14 tonnes CO_2	**2** tonnes CO_2	**108** tonnes CO_2	Energy use CO_2 emissions

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

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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

Good practice waste/100m² floor area

Exemplary waste diversion from landfill

RESOURCE USE

DIESEL	ELECTRICITY	WASTE SKIPS	WATER	CARBON DIOXIDE
382,283 kWhrs	**127,886** kWhrs	**183** tonnes	**1,028** m³	**308** tonnes
105 tonnes CO_2	**82** tonnes CO_2	**410** tonnes CO_2	**0.4** tonnes CO_2	Energy use CO_2 emissions

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

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RESOURCE EFFICIENT CONSTRUCTION

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 CO_2 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 CO_2

WATER

874 m^3

0.3 tonnes CO_2

WASTE SKIPS

15 tonnes

24 tonnes CO_2

CARBON DIOXIDE

56 tonnes

Energy use CO_2 emissions

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

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RESOURCE EFFICIENT CONSTRUCTION

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 NUIG 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

Best practice waste/100m² floor area

Exemplary waste diversion from landfill

RESOURCE USE

DIESEL	ELECTRICITY	WASTE SKIPS	WATER	CARBON DIOXIDE
197,605 kWhrs	**178,006** kWhrs	**103** tonnes	**2,131** m³	**275** tonnes
54 tonnes CO_2	**114** tonnes CO_2	**219** tonnes CO_2	**0.6** tonnes CO_2	Energy use CO_2 emissions

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

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RESOURCE EFFICIENT CONSTRUCTION

Cystic Fibrosis Unit

Project location	UCH, Galway
Floor area	223.8m²

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 CO_2 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** CO_2 emissions

CO_2 EQUIVALENT

17,429 miles driven by an average passenger vehicle CO_2 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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RESOURCE EFFICIENT CONSTRUCTION

Demolition of 'Block M'

Project location	NUI, Galway
Floor area	199.5m²

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 CO_2

ASBESTOS

2 tonnes

0.3 tonnes CO_2

TRANSPORT EMISSIONS

0.6 tonnes CO_2

CARBON DIOXIDE

12 tonnes

Energy use CO_2 emissions

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

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RESOURCE EFFICIENT CONSTRUCTION

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 CO_2 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 CO_2

CARBON DIOXIDE

14 tonnes

Energy use CO_2 emissions

CO_2 EQUIVALENT

32,106 miles driven by an average passenger vehicle

CO_2 equivalent

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

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RESOURCE EFFICIENT CONSTRUCTION

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/100m² 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

CO_2 EQUIVALENT

47,051 miles driven by an average passenger vehicle

CO_2 equivalent

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

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