

Constructing Excellence in Wales: Aberystwyth Fire Station



Background

WRW, Lawray Architects and Mid and West Wales Fire and Rescue Service worked with the Enabling Zero Waste (EZW) team to minimise waste during the demolition and new build of Aberystwyth Fire Station.



Aberystwyth Fire Station, was a £1.7m 47week contract undertaken by WRW Construction Ltd on behalf of Mid and West Wales Fire Service. It involved the demolition of the

former fire station, and the construction of a new modern fire station which includes three fire appliance bays, office accommodation and a community café open to the public.





The project presented an excellent opportunity to apply lessons learnt from the previous collaboration with WRW at Millbank Primary school.

The demolition phase achieved a 91% diversion of waste from landfill achieving Welsh Government's current target of 70% of all waste, by weight, shall be prepared for reuse, recycled, or recovered by 2015/16. The project success also exceeds Welsh Government targets of 90% waste diverted from landfill by 2019/20.

The demolition programme recorded 100% recycling rates for the segregated skips (wood, inert and metal). Four segregated skips were contaminated with mixed waste which led to a lower recycling rate of 67.5% (average) due to their mixed nature. If these skips had not been contaminated with mixed materials, it is likely the demolition phase would have achieved 100% recycling rates for all waste produced and hence achieved the zero waste to landfill target.

The construction phase achieved 99.6% diversion of waste from landfill. Although diversion rates from landfill are high, 46.6% of waste was recycled with 53% of the waste produced (the majority of which was mixed waste) sent for energy recovery.

The landfill diversion rate for both the demolition and construction phases is recorded as 95%.

Aberystwyth Fire Station Demolition Phase	Volume of waste per 100 m ²
SMARTWaste Average	26.6m ³
Aberystwyth Fire Station Demolition	38.7m ³
Difference	12.1m ³

SMARTWaste average benchmark based on BRE's SMARTWaste system from twenty-nine demolition projects in Wales.

The Scheme

All parties involved in the project from the contractor, client, architect, supply chain and waste management company were all committed to the initiative and successes were achieved as a result of this.

The programme of the demolition was extended to allow time to segregate waste on site and to allow for reuse opportunities. This meant that the cost and timescale of demolition was greater than usual but led to the increased recovery of material due to its segregated nature and reduced waste costs.

Highlights

Pre-demolition Survey

Given the large amount of material anticipated from the demolition, CEW commissioned BRE to undertake a pre-demolition survey to identify opportunities for reuse and recycling. The following items were reused;

- Desks to local subcontractors
- Internal doors used in sub-contractor's offices
- Window frames used in new allotment sheds
- Benches from the mechanical workshop used at sub-contractor's yard
- The fire station's old steel lockers were utilised in the site's drying room in line with Considerate Constructors recommendations
- A stainless steel cooker was donated to a member of the public that was starting a catering business
- Mesh fence given to a fireman for use in his garden
- The diesel generator was reused in the new warehouse/stores.

Manufacturer Take back schemes

Through engaging with the supply chain CEW set up accounts with three separate take back schemes, two of which were recycled back into product. Creating a closed loop economy is the best economic, social and environmental outcome achievable. A total of 14% of the overall waste produced was saved using these schemes. The supply chain take back schemes introduced to the project are as follows:

- Vinyl flooring by Recofloor (Closed Loop)
- Siniat weather board (Closed Loop)
- Kingspan Insulation.

Food Waste

Food waste is frequently reported as an issue for site teams and is often placed in the skips contaminating segregated loads. In order to reduce the volume of mixed waste produced and ensure a high quality recyclate and ensure a 100% recovery for the material an arrangement was made with Ceredigion Council to collect the site's canteen waste. This initiative worked well increasing landfill diversion rates for recyclates and food waste; contributing towards an increased throughput at digestion facilities and reducing in the number of mixed waste skips produced resulting in associated cost savings.

Site Waste Management

WRW's site waste compounds have demonstrated best practice, only two mixed waste skips left the project within a seven month period. The segregation measures put in place encouraged all site operatives to segregate waste into allocated skips. Towards the end of the project space for segregated skips was limited. The site team remained committed by segregating the waste within a mixed skip reusing tonne bags for the individual waste streams, once again showing commitment and enthusiasm to achieving zero waste.

Waste Data Analysis:

Data Capture

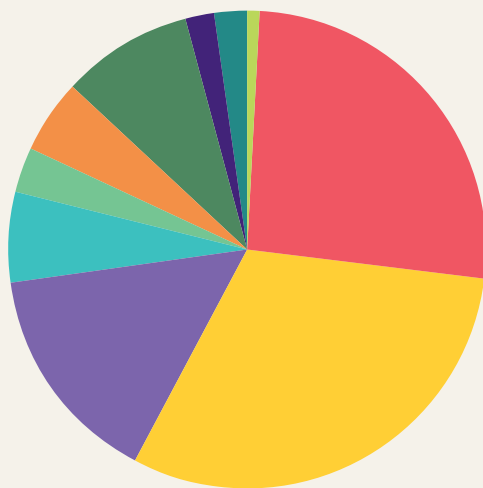
The data examined in this report has been provided by WRW's SMARTWaste management plan and validated with actual tonnages from the waste management companies LAS Recycling and CB Environmental.

Data Discussion

Waste increased as the project progressed, this correlated with an increase in numbers of trades on site. For example, the project produced twice the amount of waste in May than in April (5 trades on site) with waste in June (8 trades on site) reaching the highest amount to date at 8 tonnes. The project monthly average of waste produced is just under 4 tonnes.

A full case study report will be published at project completion which will identify, and discuss, the barriers, solutions and opportunities when trying to achieve zero waste.

Aberystwyth Fire Station



(Pie chart shows percentages of construction waste only)

If you would like to find out more about Enabling Zero Waste please visit

www.cewales.org.uk/current-programme/enabling-zero-waste



follow @EZWaste_Wales or call a member of the team on

02920 493322.

Adeiladu Arbenigrwydd yng Nghymru (CEW): Gorsaf Dân Aberystwyth



Cefndir

Bu WRW, Penseiri Lawray a Gwasanaeth Tân ac Achub Canolbarth a Gorllewin Cymru yn gweithio gyda'r tîm Galluogi Dyfodol Diwastraff (EZW) i gynhyrchu cyn lleied o wastraff â phosibl wrth ddymchwel hen adeilad a chodi adeilad newydd Gorsaf Dân Aberystwyth.



Roedd Gorsaf Dân Aberystwyth yn contract 47 wythnos gwerth £1.7m a ddyfarnwyd i WRW Construction Ltd gan Wasanaeth Tân ac Achub Canolbarth a Gorllewin Cymru. Golygai

ddymchwel yr hen adeilad a chodi gorsaf newydd fodern gyda lle i dair injan dân, swyddfeydd a chaffi cymunedol ar agor i'r cyhoedd.





Roedd hwn yn gyfle ardderchog i ddefnyddio'r gwersi a ddysgwyd wrth gydweithredu o'r blaen gyda WRW ym mhrosiect Ysgol Gynradd Millbank.

Yn ystod y cyfnod dymchwel arbedwyd 91% o'r gwastraff rhag cael ei anfon i safle tirlenwi gan gyrraedd targed presennol Llywodraeth Cymru o baratoi 70% o bob gwastraff, o ran pwysau, i'w aildddefnyddio, ailgylchu neu adfer erbyn 2015-16. Mae hefyd wedi curo targed Llywodraeth Cymru o arbed 90% o wastraff rhag cael ei anfon i safle tirlenwi erbyn 2020.

Cofnododd y rhaglen ddymchwel gydymffurfiant o 100% yn eu cyfaraddau ailgylchu ar gyfer sgipiau wedi eu didoli (pren inert a metel). Llygrwyd pedair sgip gyda deunydd cymysg a arweiniodd ar gyfradd ailgylchu is o 67.5% oherwydd eu natur gymysg. Pe na byddai'r sgipiau hyn wedi cael eu llygru gan wastraff cymysg, mae'n debygol y byddai'r cyfnod dymchwel wedi cyrraedd cyfraddau ailgylchu o 100% ar gyfer yr holl wastraff a gynhyrchwyd gan lwyddo felly i yrru dim gwastraff i safle tirlenwi.

Llwyddodd y cyfnod adeiladu i beidio a gyrru 99.6% o'r gwastraff i safleoedd tirlenwi. Er fod ffigyrau dargyfeirio yma'n uchel, llwyddwyd i ailgylchu 46.6%, gyda gweddill y gwastraff o 53% a gynhyrchwyd (y rhan fwyaf yn wastraff cymysg) yn cael ei yrru ar gyfer adfer trwy ynni.

Mae'r raddfa ddargyfeirio ar gyfer y cyfnod dymchwel ac adeiladu ar y cyd wedi ei gofnodi fel 95%.

Gorsaf Dân Aberystwyth Cyfnod Dymchwel	Foliwm o wastraff am bob 100 m ²
Cyfartaledd SMARTWaste	26.6m ³
Dymchwel Gorsaf Dân Aberystwyth	38.7m ³
Gwahaniaeth	12.1m ³

Seiliwyd cyfartaledd meincnod SMARTWaste ar system SMARTWaste BRE lle casglwyd gwybodaeth o 29 o brosiectau dymchwel yng Nghymru.

Y Cynllun

Roedd pawb cysylltiedig â'r prosiect – y contractwr, y cleient, y pensaer, y gadwyn gyflenwi a'r cwmni ailgylchu - wedi ymrwymo i'r ymgyrch. Dyna pam y llwyddwyd mor dda.

Cafodd y rhaglen ddymchwel ei hymestyn er mwyn caniatáu amser ar gyfer didoli gwastraff ar y safle ac er mwyn caniatáu cyfleoedd i aildddefnyddio. Roedd cost ac amserlen y dymchwel o ganlyniad yn fwy nag arfer. Ar y llaw arall, llwyddwyd i adennill mwy o ddeunyddiau oherwydd ei fod wedi ei ddidoli, gan leihau'r costau gwaredu gwastraff.

Crynodeb

Arolwg Cyn Dymchwel

Gan sylweddoli y byddai llawer iawn o ddeunydd yn cael ei gynhyrchu yn ystod y cyfnod dymchwel, comisiynwyd BRE gan CEW i gynnal arolwg cyn dymchwel er mwyn adnabod y cyfleoedd ar gyfer aildddefnyddio ac ailgylchu. Aildddefnyddiwyd yr eitemau a ganlyn:

- Drysau mewnol i swyddfeydd isgcontractwr,
- Fframiau ffenestri i siediau rhandir,
- Meinciau o'r gweithdy mecanyddol i iard is-gontractwr.
- Defnyddiwyd hen loceri dur yr orsaf dân yn ystafell sychu'r safle yn unol ag argymhellion Considerate Constructors.
- Cyflwynwyd cwcer dur di-staen i aelod o'r cyhoedd oedd yn dechrau busnes arlwy.
- Cyflwynwyd ffens rwylllog (mesh) i ddiffoddwr tân ar gyfer ei ardd.
- Aildddefnyddiwyd y generadur diesel yn y warws/storfa newydd.

Cynlluniau "Derbyn-yn-Ôl" gan Gynhyrchwyr

Drwy gysylltu â'r gadwyn gyflenwi, sefydlodd CEW gyfrifon gyda thri chynllun derbyn-yn-ôl gwahanol - dau ohonynt yn ailgylchu'r defnydd i ffurfio cynnyrch newydd. Ceir y canlyniadau economaidd, cymdeithasol ac amgylcheddol gorau drwy greu economi cylch caeedig (closed loop economy). Arbedwyd 14% o gyfanswm y gwastraff a gynhyrchwyd drwy ddefnyddio'r cynlluniau hyn. Y cynlluniau derbyn-yn-ôl gan y gadwyn gyflenwi oedd:

- Lloriau finyl gan Recofloor (cylch caeedig),
- Byrddau hindraul (weatherboards) Siniat (cylch caeedig)
- Deunydd insiweiddio Kingspan.

Gwastraff Bwyd

Yn aml iawn dywed timau safle fod delio â'r gwastraff bwyd a gynhyrchir ar safle adeiladu yn heriol. Yn aml caiff ei daflu mewn i sgipiau gan lygru'r llwythi didoledig sydd ynddynt. Er mwyn lleihau cyfanswm y gwastraff cymysg a gwarantu deunydd ailgylchu safon uchel y gellir ei adfer 100%, gwnaed trefniant gyda Chyngor Sir Ceredigion i gasglu gwastraff cantin y safle. Gweithiodd y trefniant yn dda gan gynyddu'r raddfa arbed rhag tirlenwi ar gyfer deunydd ailgylchadwy a gwastraff bwyd. Gwnaed defnydd helaethach o gyfleusterau treulio bwyd a gostyngwyd nifer y sgipiau gwastraff cymysg, ac arbed costau o ganlyniad.

Rheoli Gwastraff ar y Safle

Roedd yr ardaloedd derbyn gwastraff ar safle WRW yn dilyn arferion gorau. Ac felly, dim ond dwy sgip o wastraff cymysg a adawodd y safle dros gyfnod o saith mis. Roedd y mesurau didoli yn annog pawb a weithiai ar y safle i ddosbarthu gwastraff i'r sgipiau cywir. Erbyn diwedd y prosiect roedd lle'n brin ar gyfer sgipiau didoli gwastraff. Arhosodd tîm y safle'n benderfynol o wneud hynny gan ddefnyddio bagiau tunnell mewn sgipiau cymysg ar gyfer y gwahanol ffrydiau gwastraff. Roedd hyn yn dangos unwaith eto eu hymrwymiad a'u brwdfrydedd.

Dadansoddi Data Gwastraff:

Casglu Data

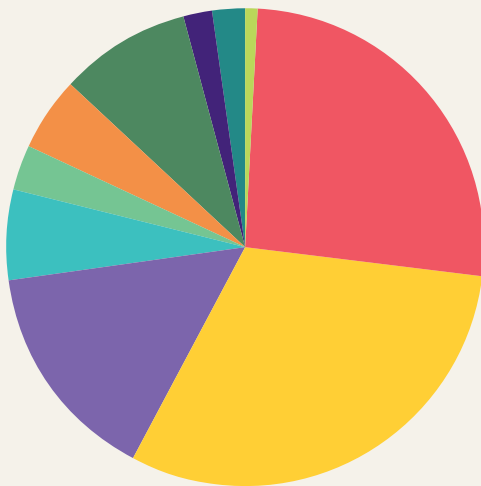
Darparwyd y data a drafodir yn yr adroddiad hwn gan gynllun rheoli SMARTWaste WRW. Cadarnhawyd yr union nifer o dunelli gan gwmnïau rheoli gwastraff LAS Recycling a CB Environmental.

Trafod y Data

Bu cynnydd ym maint y gwastraff a gynhyrchwyd wrth i'r prosiect fynd yn ei flaen. Digwyddodd hyn law yn llaw â'r cynnydd yn nifer y crefftau a oedd yn gweithio ar y safle. Er enghraifft, cynhyrchwyd dwywaith gymaint o wastraff ym Mai nag yn Ebrill (5 crefft ar y safle) gyda'r gwastraff a gynhyrchwyd ar ei uchaf hyd yma - sef 8 tunnell - ym Mehefin (pan oedd 8 crefft ar y safle). Cyfartaledd misol y gwastraff a gynhyrchwyd yw ychydig dan 4 tunnell.

Bydd adroddiad achos llawn yn cael ei baratoi ar diwedd y cynllun. Bydd yr adroddiad hwnnw'n adnabod a thrafod y rhwystrau, yr atebion a'r cyfleoedd wrth geisio galluogi dyfodol diwastraff.

Gorsaf Dân Aberystwyth



3% Cardfwrdd	1% Gwastraff Cantin
5% Gypswm	26% Sgrap
9% Siniat	31% Cyffredinol
2% Kingspan	15% Coed
2% Lloriau Finyl	6% Plastig

(Mae'r siart cylch yn dangos gwastraff adeiladu'n unig)

I wybod rhagor am Galluogi Dyfodol Diwastraff ewch i'r wefan

www.cewales.org.uk/current-programme/enabling-zero-waste



dilynwch @EZWaste_Wales neu ffoniwch aelod o'r tîm ar **02920 493322.**