Construction case study

Raploch: urban regeneration

This case study describes how the WRAP Regeneration Guide principles have been applied to the tendering and procurement stage of the Raploch regeneration project in Stirling.

Material recovery practices identified could potentially lead to significant savings: cost savings up to £60,000 and 500 fewer vehicle movements with the associated reduction in the carbon footprint of the development.
WRAP helps individuals, businesses and local authorities to reduce waste and recycle more, making better use of resources and helping to tackle climate change.

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Executive summary

This case study outlines how the Raploch Urban Regeneration Company (Raploch URC) and Stirling Council have been able to apply the principles of the WRAP Regeneration Guide during the feasibility, design and tendering stages of work related to the demolition of a number of school buildings across the site. The scope of work included how the materials from these demolitions can be best assessed, recovered and reused appropriately on the Raploch Regeneration site.

Key outcomes of the case study were:

- The Materials Resource Efficiency (MRE) approaches advocated in the WRAP Regeneration Guide are estimated to produce cost savings of between £37,500 and £60,000 in the recovery of demolition materials on site, for use as recycled aggregates. This translates to potential cost savings of between £7.50 and £12 per tonne.
- Clauses have been built into the demolition specification and tenders to require contractors to adopt the WRAP Regeneration Guide, which includes the need to carry out pre-demolition audits and produce recycled aggregates.
- Tenders were developed with an assessment approach following a Price:Quality split of 60:40, with the quality evaluation heavily weighted towards use of the Regeneration Guide.
- A Demolition Recovery Index (DRI) of 90% has been written into the Demolition Specification.
- Environmental benefits could be realised through the on site reprocessing of demolition arisings, resulting in an estimated 500 fewer vehicle trips and their associated nuisance (noise, vibration and dust) impacts.
- In terms of climate change, the carbon footprint of the development is improved by approximately 15 tonnes of carbon dioxide, as a result of the reduced number of vehicle movements.
1.0 Introduction ........................................................................................................................................ 3
   1.1 The WRAP Regeneration Guide ........................................................................................................ 3
   1.2 The Raploch urban regeneration programme .............................................................................. 3
2.0 Implementation .................................................................................................................................. 5
   2.1 Tendering/procurement stage ........................................................................................................... 5
      2.1.1 Programme Objectives ........................................................................................................ 6
      2.1.2 Key Performance Indicators (KPIs) .................................................................................. 6
   2.2 Designing for Materials Resource Efficiency .................................................................................. 6
      2.2.1 Policy and Tender process ................................................................................................ 7
      2.2.2 Pre-demolition audit and outputs .................................................................................... 7
3.0 Benefits of linking demolition and new build phase ...................................................................... 8
   3.1 Description of assumptions and underpinning data ..................................................................... 8
   3.2 Cost model scenario: reuse of site-won, reprocessed demolition material as sub-base in road and parking schemes .............................................................................................................. 9
   3.3 Environmental savings .................................................................................................................. 9
4.0 Material Resource Efficiency context ............................................................................................... 9
   4.1 Fiscal drivers for materials resource efficiency in construction ................................................ 9
   4.2 MRE practice in the public sector ............................................................................................... 10
5.0 Conclusions .................................................................................................................................... 10
6.0 Recommendations .......................................................................................................................... 10
7.0 References ....................................................................................................................................... 11
Appendix A Overview of the WRAP Regeneration Guide ...................................................................... 12
Appendix B Draft Clauses For Inclusion in the Raploch Demolition Tender .......................................... 13
Appendix C Drawings of schools to be demolished .............................................................................. 14
Appendix D Extract from Stirling Council Tender Quality Evaluation Document .................................. 17
Appendix E Drawing showing stockpile location, with specification, for demolition arisings ............. 18
1.0 Introduction

This case study describes how the WRAP Regeneration Guide principles have been applied to the tendering and procurement stage of the Raploch regeneration project in Stirling. It describes the early design considerations for the schools demolition project which could result in the use of recovered materials in a range of construction applications at the Raploch site. Clauses were included in the demolition specifications and tenders to require high levels of recovery, with careful consideration given to how material should be owned and managed to provide the most sustainable and cost effective outcomes.

The potential for significant cost savings, of up to £60,000 were identified. This was coupled with the potential for material recovery practices which would result in 500 fewer vehicle movements, with the associated reduction in the carbon footprint of the development.

This case study is one in a series focusing on the issues and opportunities resulting from the implementation of the Guide in relation to demolition waste arisings. This includes the recovery and retention of materials on site for use as recycled aggregates and recycled concrete aggregate, as well as the management of all non-inert wastes including timber, steel, and plastics etc.

It includes an overview of the various site issues, barriers and opportunities at the site for forward innovative planning to improve MRE practices, and best practice implementation of the guide's principles with consideration of financial, environmental and social benefits.

1.1 The WRAP Regeneration Guide

This case study describes the implementation of the principles contained within the WRAP Guide: 'The efficient use of materials in regeneration projects' at the Raploch regeneration site in Stirling. Referred to as the 'Regeneration Guide' for brevity in this case study, it describes how MRE practices can provide more environmentally sustainable outcomes as well as cost benefits. It draws upon the Institution of Civil Engineers (ICE) Demolition Protocol, Site Waste Management Plans (SWMP) and the WRAP Recycled Contents Quick Wins approach and integrates them into a clear and common framework.

This guide is a resource for all parties interested in implementing requirements for the efficient use of materials in regeneration projects. A brief overview of the Guide can be found in Appendix A, with the full document downloadable from WRAP’s website: www.wrap.org.uk/construction.

1.2 The Raploch urban regeneration programme

The Raploch URC has been established to regenerate the Raploch community in Stirling. Overall, it is a £120 million initiative with the stated aim of ‘bringing the area back to life’. The five strategic objectives are Property, Place, Partnership, Prospects and People to create new housing, a health centre, urban design projects, community initiatives as well as training and employment opportunities. The aim is to have approximately 900
new houses by 2011/12, with socially rented and private housing situated side by side to promote an inclusive community.

The following partners are involved in the delivery of the project:

- **Client (Site Development role):** The Raploch URC (see company structure in the flowchart of Figure 1).
- **Client (current owner of site and URC partner):** Stirling Council.
- **Chartered Surveyors:** Brownriggs.
- **Implementation support:** EnviroCentre.

The flowchart in Figure 1 sets out the management structure for the Raploch URC, this involving a combination of public and private partners.

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**Figure 1** Flowchart showing the roles of different partners within the Raploch URC.

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The development is split into a number of work packages and sites, as illustrated in Figure 2. The case study implementing the Regeneration Guide includes the demolition works associated with Site 8 where a number of school buildings are being demolished, with a holistic approach being taken to look at ownership and reuse models which will lead to the most environmentally and cost effective use of this material on other sites. This includes the recovery and retention of materials on site for use as recycled aggregates and recycled concrete aggregate, and the approaches for the management of these and all other materials arising (e.g. timber, steel, plastics etc). These approaches, as required by the WRAP Regeneration Guide, are built into the tender documents as shown in Appendix B.

Potential opportunities for the reuse of material may include sites 7 to 10 to be available for housing (2008 – 2010). Site 8 will eventually be developed for more than 100 private houses and approximately 60 social houses.

The scope of works for demolition involves:

- Raploch primary school;
- St Mary’s primary school;
- Kildean primary school; and
- Nursery block.

Drawings and photographs of these school buildings are shown in Appendix C. The scope of works for this case study involved establishing tender and procurement practices which incorporate the Regeneration Guide and deliver the preferred outcomes for the client. This mainly involved working together to find a flexible, but pragmatic approach to the demolition process. An approach which was part of a holistic view of the Raploch regeneration site, where the potential to recover material cost effectively was maximised, and with a view to the client retaining ownership of material which could then be used instead of primary materials on subsequent construction activities within the site.
2.0 Implementation

The tendering/procurement stage, through the provision of relevant information, allows objectives and requirements to be set for the programme of works - providing a framework for project delivery.

2.1 Tendering/procurement stage

An initial meeting with the project team discussed the potential for the schools demolition project to supply materials for development platforms to be built within Work Package 7. An apparent need had been identified through discussions with the water utility company to raise ground levels for future house builds to assist in having a gravity (rather than pumped) sewage system. At the meeting there were questions about this necessarily being the best option for using material, with options for this work package to be reassessed at a later date when the desired development footprint was understood in more detail.

Alternative aspects of forthcoming demolition and construction were therefore discussed, where the following actions were seen as being likely to produce more tangible, useful outputs and support the objective of delivering MRE.

To support the process of influencing demolition through tendering/contracts, Pre-Qualification Questionnaires (PQQs) were issued to contractors. These PQQs contained questions referencing the Regeneration Guide which, following their submissions could then be built on to require more tangible outcomes through the tender documentation. Tenders would then be issued with “user friendly” clauses to require the use of the Regeneration Guide. Tender returns, showing the potential for contractors to implement the Regeneration Guide, would then provide the client team with the information which allows decisions to be made on the preferred approaches to material ownership. This would in turn indicate the potential for demolition arisings from the schools to be reprocessed, stockpiled and used to supply material to preferred construction sites at Raploch (still to be identified at time of writing).
2.1.1 Programme Objectives

Ownership of material was an important consideration in the discussions about how to manage the demolition contracts to most effectively deliver value for money and materials resource efficiency. If a contract was awarded where the demolition contractor could take the preferred commercial, short term approach then the demolition materials would likely be exported from site, unless there was an immediate market opportunity at Raploch.

Although this may result in a sustainable, reprocessed material being produced and used elsewhere, it may still not represent the optimal cost effective outcome for the client and could result in more vehicle movements than would otherwise be necessary. The preferred approach would be one where the client owned the material, the material was retained on site and reprocessed as an engineering fill material (e.g. 6F1, 6F2), and would deliver cost and environmental benefits from:

- avoided import of aggregates; and
- avoided export of demolition arisings.

2.1.2 Key Performance Indicators (KPIs)

One of the fundamental drivers to ensuring that MRE is delivered in regeneration projects is the use of KPIs. These provide information and data which can be measured, providing targets and a focus for the various actions that need to be taken during the programme of works. As a result the progress and effectiveness of the programme of works can be monitored and reported transparently. Without transparency there can be little confidence that what has been set out to be achieved has actually been achieved.

There are three main KPIs used at the various stages of a regeneration project:

- **Demolition Recovery Index (DRI)**
  This describes the efficiency of material recovery from demolition (as defined through the use of the Demolition Protocol).

- **Retained Material (RM)**
  This is a measure of the extent of the reuse of demolition materials on site.

- **Recycled (and reclaimed) Content (RC)**
  This measures the proportion of the recycled (and reclaimed) materials in the new build (based on value of the material).

This case study focuses on the use of the first two KPIs (the DRI and RM) as the specific work packages and end uses to benefit from using recovered materials had not been established at time of writing. Although the recycled (and reclaimed) content KPI cannot be included at this stage, it should be noted that the Raploch URC has set a 10% recycled content target for the whole development.

2.2 Designing for Materials Resource Efficiency

Opportunities for the delivery of MRE on the Raploch regeneration project for Site 8 are heavily influenced by the following factors:

- the policy framework was supportive to the delivery of MRE (for example, the URC is working with WRAP on using quality compost in soils manufacture for landscaping, is implementing the 10% recycled content target etc);
- tenders have been devised which assess technical competence for managing materials, including how these could be recycled both on and off site;
- the practicalities of the recovery process on site e.g. availability of land, proximity of sensitive receptors to noise / dust;
- there are adequate timescales to ensure MRE principles can be implemented;
- perceived availability of virgin materials / quality of recycled materials; and
- there is potential end use for recovered materials on sites 7 to 10 (for housing).

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1 The setting of a 10% recycled content target in this development is a result of previous work undertaken by WRAP.
2.2.1 Policy and Tender process

Discussions about the preferred approach, to implement the Regeneration Guide, resulted in an approach where tenderers were asked to provide submissions for two options:

- the contractor demolishes and removes all materials from site; and
- the contractor crushes, segregates & stores on site for the client to use suitable materials for aggregate.

It was a condition of tendering that the tenderers must price both options. Tenders would be assessed in accordance with a Tender Quality Evaluation document provided with the tender documentation. Tenders would be evaluated on a Price:Quality ratio of 60:40, with the elements to be assessed in the quality evaluation as summarised below.

- Health & Safety Practices (20% of the quality score).
- Technical/Management Ability (20% of the quality score).
- Recycling Materials (40% of the quality score).
- Previous Contract Performance (20% of the quality score).

The key clauses in the Quality Evaluation, in terms of implementation of the Regeneration Guide are shown in Appendix D.

The specification for demolition is: ‘CAM01355A Demolition of surplus educational premises at Raploch, Stirling’. Under the ‘General Requirements’ heading at the beginning of the document, there is the following clause:

Special requirements: Pre-demolition audit to assess the quantity of materials prior to demolition. Materials should be classified following the approaches outlined in the ICE Demolition Protocol (a key part of the WRAP Regeneration Guide). Quantities should be identified and reported to the client – for those materials to be stored on site and those to be exported either for subsequent recovery or disposal.

To support storage of materials the drawing shown in Appendix E indicates the location for stockpiled materials, on the site of Raploch Primary, main building.

The likely end-use for the reprocessed demolition material has not been established at time of writing the case study report. However, tenderers are expected to indicate the type/standard of materials they are capable of achieving as apart of their ‘quality’ submission.

2.2.2 Pre-demolition audit and outputs

D-BOQ (Demolition Bill Of Quantities)

As mentioned previously, the Demolition Specification, reflected through tender documents, states that contractors are required to provide estimates of arisings by undertaking pre-demolition audits.

Various organisations across the UK will undertake a pre-demolition audit, charging between £2,000 - £3,000 for buildings significantly larger than those at Raploch. An indicative cost of £1,250 per school (£5,000 total) allows the cost-benefit of undertaking a pre-demolition audit to be factored into the project management approach. If the total quantity of demolition arisings produced were 5,000 tonnes (estimate) then the cost would be approximately £1/tonne. If this provided information which then influenced the management of the site and materials to avoid importing 5,000 tonnes of aggregates (for example at £8/tonne), then the cost benefits of an informed approach are realised.

There was consideration about taking an alternative approach, in which a D-BOQ would be prepared as a separate exercise, involving an up-front cost to the client, and would then be provided to each tenderer to inform their bid. However, it was decided that an approach which made a requirement of the contractors to base their prices on their own pre-demolition audit was preferred, in the knowledge that a number of contractors will do this as a normal part of their pricing approach, and was also seen as a way of encouraging good practice.
**Demolition Recovery Index**

The Tender Quality Evaluation Document describes how contractors should be aiming to recover the maximum amount of materials from the demolition contract. They should do so by describing how they will ‘measure the quantity of materials prior to demolition (a pre-demolition audit) and verify the actual quantities produced’. More information on these requirements are shown in Appendix D.

**Retained Materials**

The quantity of materials to be retained on site will be indicated following tender submissions from the demolition contractors. Tenderers will be required to list the materials which will be retained on site for recycling and to describe the recycling performances to be achieved for all materials. An example of the level of performance required is given where it is stated that it is ‘expected that a minimum of 90% recovery of materials such as concrete and non-masonry concrete would be achieved’.

**3.0 Benefits of linking demolition and new build phase**

The outcomes from the tendering process at Raploch have still to be determined at the time of writing. The potential benefits of MRE practices can still be described through a number of scenarios which could be applicable to almost any of the new work packages.

At the time of writing, the demolition programme is scheduled to begin in March/April 2008 and complete in early summer. The requirements and approaches detailed in the tender and contract documentation will be reported after completion of this case study report. There will be no new build on the site of the demolition activity for some time, which meant that a forward planning approach, looking at the wider extent of activities forming the Raploch Regeneration programme, had to be taken, with activity on other work packages considered. The potential benefits have been described for a number of scenarios involving the reuse of the site-won demolition material as sub base in road and parking schemes - infrastructure applications, such as roads/parking, will form a part of a number of the work package redevelopment requirements.

**3.1 Description of assumptions and underpinning data**

The following pricing structure (derived from an aggregates reprocessor in Glasgow) is used to indicate the extent of cost savings potentially realisable through the ownership, reprocessing and retention of materials on site.

- Imported aggregates: including haulage – £8 / tonne.

It is assumed, until the contractors undertake the pre-demolition audits, that 5,000 tonnes of hard materials will become available from the demolition process for use as recycled aggregate. By retaining this material on site, this equates to 500 avoided vehicle movements. This is calculated from the scenario where 20 tonne payload vehicles are used, resulting in 250 round trips to remove demolition arisings and 250 round trips to bring the same quantity of aggregate to the site. It has been assumed that a round trip consists of 20 miles (an average of 10 miles to a landfill/ exempt site and/or aggregate supplier).

Environmental savings for avoided transportation movements were calculated as CO₂ savings using Defra data (Guidelines for Company Reporting on Greenhouse Gas Emissions). WRAP’s CO₂ Estimator Tool can equally be used, as well as for calculating a wider range of impacts beyond transportation, but for simplicity in this case study the Defra data is sufficient. The approach used determines the impacts of vehicle movement on CO₂ emissions for different options. It was assumed that 20 tonne payload vehicles could be expected to deliver a performance of around 8 miles per gallon of diesel or 1.7 miles per litre. With 2.63 kg of CO₂ produced per litre of diesel, this then translates to 1.55 kg CO₂ emissions per mile travelled.
3.2 Cost model scenario: reuse of site-won, reprocessed demolition material as sub-base in road and parking schemes

A summary of indicative cost savings associated with this use is presented below in Table 1, on the basis that 5,000 tonnes of reprocessed material could be used, or exported from site.

<table>
<thead>
<tr>
<th>Description</th>
<th>Use of site-won aggregates</th>
<th>Haulage and use of imported aggregate</th>
<th>Demolition material landfilled, haulage and use of imported aggregate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landfill cost</td>
<td>None</td>
<td>None</td>
<td>£4.50/tonne* = £22,500</td>
</tr>
<tr>
<td>Haulage cost of demolition arisings from site</td>
<td>None</td>
<td>£2.50/tonne</td>
<td>£2.50/tonne = £12,500</td>
</tr>
<tr>
<td>Cost of producing/buying aggregate</td>
<td>£3/tonne = £15,000</td>
<td>£8/tonne** = £40,000</td>
<td>£8/tonne** = £40,000</td>
</tr>
<tr>
<td><strong>Total cost</strong></td>
<td><strong>£15,000</strong></td>
<td><strong>£52,500</strong></td>
<td><strong>£75,000</strong></td>
</tr>
</tbody>
</table>

*Landfill Tax of £2.50 and waste gate fee of £40/load = £2/tonne. TOTAL = £4.50/tonne
**Assumption: ex quarry/reprocessor price £5.50/tonne; haul (20 mile round trip) £2.50. TOTAL = £8.00/tonne

Table 1 shows that an overall cost saving of between £60,000 (£12/tonne) and £37,500 (£7.50/tonne) could be achieved by reprocessing demolition arisings to recycled aggregates, instead of hauling material off site and importing aggregates.

3.3 Environmental savings

Using site won recycled aggregates instead of imported primary aggregate results in less CO\(_2\) emissions being generated because of the avoided haulage movements. A summary of the scale of the emissions saved is summarised in Table 2, and indicates that based on 5,000 tonnes of aggregate the resulting CO\(_2\) saving is 15.5 tonnes.

<table>
<thead>
<tr>
<th>Description</th>
<th>Use of site-won aggregates</th>
<th>Demolition material exported and primary aggregate imported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haulage from site</td>
<td>N/A</td>
<td>7,750 kg CO(_2)</td>
</tr>
<tr>
<td>Haulage of aggregates to site</td>
<td>N/A</td>
<td>7,750 kg CO(_2)</td>
</tr>
<tr>
<td><strong>Total Emissions</strong></td>
<td>0</td>
<td><strong>15,500 kg CO(_2)</strong></td>
</tr>
</tbody>
</table>

4.0 Material Resource Efficiency context

4.1 Fiscal drivers for materials resource efficiency in construction

The Raploch URC has signed up to working with WRAP and other organisations to deliver more sustainable development options where possible during the regeneration of the area. This includes adopting good practice such as the WRAP Regeneration Guide, where these can inform how to deliver more sustainable practices.

The URC is working with East of Scotland European partnership to develop a sustainable economic development programme for Raploch which also meets social and environmental objectives and serves as an example of best practice for Scotland. With increasing landfill tax costs and the existence of the aggregates levy on primary aggregates there is likely to be greater incentive for client teams to adopt more sustainable approaches to managing demolition contracts, in particular with respect to how material ownership models can lead to cost savings for clients, as well as environmental benefits.
As well as impacting on the demand for aggregate the landfill tax will increase the cost of disposal considerably, particularly if demolition and construction waste is mixed (both inert and active). The landfill tax for active waste is £32/tonne (an increase of £8/tonne over 2007-2008) with inert landfill tax set at £2.50/tonne (an increase of £0.50 over the previous year). The increase in tax for active waste provides additional incentives for the segregation of arisings from the demolition of the schools. With the increase in the aggregates levy from £1.60 per tonne to £1.95 in 2008, the benefits of additional segregation activities are compounded by making recycled aggregates an even more attractive material stream than primary aggregates.

In common with many parts of the UK there is also an increasingly limited amount of landfill space available across central Scotland and in some areas there is no space remaining. This will also continue to drive costs higher over time.

4.2 MRE practice in the public sector

Public sector procurement operates within a growing range of government policies and guidance aimed at delivering on sustainable development. Targets have been set by the Scottish Government that construction projects over £1 million should include 10% (by value) recycled content. In addition, guidance documents such as ‘Achieving Excellence in Construction Procurement Guide 11: Sustainability’ make reference to WRAP Guidance, the ICE Demolition Protocol and other initiatives.

5.0 Conclusions

At the time of writing the case study the winning tenderer and final approach to managing materials has still to be confirmed. However, the Raploch URC have taken a holistic approach to the management of the site demolition programme, doing so by providing a tendering method which requires contractors to assess likely demolition arisings, by undertaking a pre-demolition audit, as well as to cost approaches which provide the client team with a stockpile of recycled aggregates.

- It has been estimated that the MRE approaches advocated in the WRAP Regeneration Guide could deliver cost benefits in the range £37,500 to £60,000. This translates to potential cost savings of between £7.50 and £12 per tonne.
- A Demolition Recovery Index of at least 90% has been written into the Demolition Specification.
- Environmental benefits associated with reduced numbers of haulage movements could be delivered if materials are reprocessed on site – approximately 500 fewer vehicle movements to remove arisings and import aggregates, with their associated nuisance (noise, vibration and dust) impacts.
- In terms of climate change, it is again estimated that the carbon footprint of the development is improved by approximately 15 tonnes of carbon dioxide, as a result of the reduced number of vehicle movements.

6.0 Recommendations

1. The quantity of materials recovered at the end of project should be verified to inform how accurate pre-demolition audit estimates proved to be, as well as to measure the level of recovery achieved.
2. Future new build specifications should be informed by the potential of the existing stockpile to meet demand. The use of recycled aggregates in a range of high value applications has become mainstream across the UK and the opportunity to continue this process by requiring similar approaches at Raploch should be driven by client teams.
3. Clear linkages should be made in any future redevelopment tenders/contracts to how Materials Resource Efficiency approaches should be further taken forward, for example by requiring the use of all site won material in the new build, where quantities and material demand permit.
7.0 References

1 WRAP: The efficient use of materials in regeneration projects - a step by step guide.
   http://www.wrap.org.uk/construction/construction_waste_minimisation_and_management/mre_guide.html

2 Institution of Civil Engineers (ICE): Demolition Protocol.
   http://www.ice.org.uk/knowledge/specialist_waste.asp

   http://www.ogc.gov.uk/ppm_documents_construction.asp
Appendix A
Overview of the WRAP Regeneration Guide

Introduction

This guide is a resource for all parties interested in implementing requirements for the efficient use of materials in regeneration projects. It incorporates good practice:

- in demolition – through the use of the ICE Demolition Protocol and Site waste Management Plans;
- in new build construction – through WRAP's recycled content, waste minimisation and site waste management guidance; and
- between the demolition and new build phases – through on site reclamation and recycling of materials.

Efficient use of materials in regeneration

Regeneration projects, in the context of this guide, are those where existing buildings and infrastructure contribute materials to the new build stage.

The efficient use of materials can lead to time and cost savings, reductions in material sent to landfill and extraction of primary resources and reduce carbon emissions.

Introducing good practice in the efficient use of materials involves:

- effective design;
- efficient procurement, and
- recycling of site arisings.

Figure A1 Overview of materials resource efficiency in regeneration
Appendix B
Draft Clauses For Inclusion in the Raploch Demolition Tender

Demolition

Demolition works should be carried out in accordance with the WRAP Guide on the Efficient Use of Materials in Regeneration Projects. This describes how demolition should be in line with the methods of the ICE Demolition Protocol. Demolition contractors are required to provide a method statement detailing how they will:

- Through a pre-demolition audit, establish the quantity of materials to arise from demolition. Those materials for recovery and landfill will be clearly identified.
- Recovery targets will be set and agreed with the client for demolition materials. These will be stated for all materials regardless of whether these are reprocessed on site or off site.
- The landfill site(s) for any waste materials being disposed of should be stated. If this is not known at the time of tendering contractors will be required to identify to the client the landfill site, waste streams and tonnages earmarked for disposal prior to being removed from site. Materials can only be removed from site following approval of the client.
- Verification of materials recovered or landfilled will be required. The method for verification will be agreed with the client prior to the commencement of works. This will involve a combination of the following approaches:
  - on site measurements of stockpiles;
  - waste transfer notes; and
  - haulage movement notes.

Tenderers will provide a price against two options, both of which require the methods of the ICE Demolition Protocol described above:

- demolition and removal of all materials from site; and
- demolition, followed by segregation, crushing reprocessing of materials to produce recycled aggregates. These aggregates will be stored on site at the area identified by the client.
Appendix C
Drawings of schools to be demolished

Figure C1  Raploch Primary School
Figure C4  Raploch Nursery School
Appendix D
Extract from Stirling Council Tender Quality Evaluation Document

Technical Management Ability (20%)

Please provide information on how you will approach the segregation of materials to ensure that hard materials recovered for use as recycled aggregates have minimal levels of contamination.

Describe how you will measure the quantity of materials prior to demolition (a pre-demolition audit) and verify the actual quantities produced. Materials should be classified following the approaches outlined in the ICE Demolition Protocol*. Quantities should be identified and reported to the client – for those materials to be stored on site and those to be exported either for subsequent recovery or disposal.

Works to be undertaken following the best practice approaches outlined in the ICE Demolition Protocol and WRAP Regeneration Guide.

Recycling Materials (40%)

Please list the materials you are able to recycle on site and describe how materials taken off site will be managed. Describe the recycling performance for each material and those which you would anticipate will be disposed of to landfill (e.g. it is expected that a minimum of 90% recovery of materials such as concrete and non-masonry concrete would be achieved).

If you have experience of recycling these materials, please provide evidence. Your recycling plan should seek to achieve best practices in accordance with the following:

Waste & Resources Action Programme
the Old Academy
21 Horse Fair
Banbury
Oxon
OX16 0AH ²

Please also state the % of recycling you expect to achieve and supporting information on you have made this calculation.

² This would be in accordance with the WRAP Guide ‘The efficient use of materials in regeneration projects’ which can also be found at www.wrap.org.uk
Appendix E
Drawing showing stockpile location, with specification, for demolition arisings.