The efficient use of materials in regeneration projects

5. Key Performance Indicators
WRAP works in partnership to encourage and enable businesses and consumers to be more efficient in their use of materials and recycle more things more often. This helps to minimise landfill, reduce carbon emissions and improve our environment.
Key Performance Indicators (KPIs) are essential tools in driving forward the efficient use of materials in regeneration. They give focus to the actions that need to be undertaken, and link the phases of the project.

**Actions:**
- develop understanding of KPIs; and
- implement KPIs at relevant phases of project.

**Who needs to act?**
- Policy Makers
- Clients
- Project Managers
- Architects
- Designers
- Contractors
- Demolition Contractors.

**KPIs are used to:**
- set requirements for projects using common measures and procedures;
- provide standard measures to assess performance; and
- encourage performance improvements.

In the context of the guide the KPIs are used to optimise:
- material recovery from demolition for reclamation and recycling, thus reducing the waste sent to landfill;
- on-site reclamation and recycling of recovered material into the new build, which also reduces the transportation of materials; and
- the use of recycled and reclaimed materials in the new build phase of the project - reducing the use of primary materials.
5.1 Demolition Recovery Index

The Demolition Recovery Index (DRI) is a KPI that describes the efficiency of material recovery from demolition (as defined by the DP). It is calculated as the quantity of materials recovered from the demolition process, divided by the total quantity of materials generated by it.

WRAP’s recommended unit of measurement for materials in KPIs is tonnes, which is consistent with the DP. However, if clearly communicated to the parties involved, alternate units could be used, such as cubic metres (m$^3$) or value (£). The advantages and disadvantages of these alternate units are discussed in Section 5.5.

It is suggested that, when a KPI is specified as a project requirement, a minimum requirement should be set, along with a requirement for the contractor to identify, illustrate and deliver the most significant opportunities for improvements on this minimum requirement. While a minimum requirement is in itself not challenging, its aim is to embed the process of considering and measuring recovered material quantities within the project. When coupled with a requirement to achieve ‘good practice’ for the production of recovered materials, this approach necessitates action by the project team, even if the baseline level of practice in the production of recovered material quantities can easily exceed the minimum requirement.

A calculation template for this KPI is provided in section 15, Templates.

5.2 Retained Material

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

RM is calculated as the quantity of recovered materials generated from the demolition phase that are used in the new build, divided by the total quantity of recovered materials created from the demolition.

As stated for the DRI (Section 10.2), it is suggested that a RM requirement is specified as a readily achievable minimum requirement with the implementation of good practice where feasible. Example wording is given opposite and a calculation template for this KPI is provided in section 15, Templates.
5.3 Recycled (and reclaimed) Content

The Recycled (and reclaimed) Content (RC) KPI measures the proportion of recycled (and reclaimed) materials in the new build. It is calculated as the value of reclaimed and recycled materials used in the new build, divided by the total value of all materials used in the new build. It can include recycled and reclaimed materials generated on-site, as well as manufactured products containing a certain percentage of recycled materials and reclaimed elements brought onto site. WRAP has produced extensive guidance and tools to support the use of this KPI including an extensive online ‘RC Toolkit’ (www.wrap.org.uk/rctoolkit).

Value is used as the unit of measure for the RC KPI as it:

- encourages the use of recovered materials in higher value applications and, in turn, encourages higher value markets for recovered materials; and
- is a practical indicator, making best use of commonly available data on material quantities and costs.

WRAP has produced considerable guidance on assessing recycled and reclaimed content and provides an extensive online ‘RC Toolkit’ (www.wrap.org.uk/rctoolkit) to aid project specification. WRAP’s guidance proposes a low requirement as a minimum threshold combined with the requirement to produce a list of the top 10 or so ‘Quick Wins’ (Quick Wins are those elements where adopting good practice would give the most significant increases in recycled content). While a 10% requirement could be considered modest, its aim is to embed the process of considering and measuring RC within the project. When coupled with a requirement to achieve ‘good practice’ performance for the top 10 Quick Wins, this approach necessitates action by the project team even if the baseline level of RC for the selected design is shown to be greater than 10%. This is referred to as the Quick Wins approach in this guide. Example wording is given overleaf:

Example wording when RM is specified as a product requirement:

At least 10% [or other specified requirement amount] of the reclaimed or recycled materials created by the demolition process should be used in the new build. In addition, show that the most significant opportunities to use on-site recovered materials have been considered, and implement good practice where technically and commercially viable.

For calculation of the RC% use the WRAP RC toolkit (www.wrap.org.uk/rctoolkit)
5.4 KPI units of measurement

WRAP’s recommended unit of measure for DRI and RM KPIs is tonnes. However alternate units can be used when more convenient for the project or organisation. For bulk materials this is likely to be cubic metres (m$^3$), for other materials this will be per item (such as number of roof tiles or kerbstones) or other quantities. However, all materials will need to be converted to a common unit prior to summation.

Some care needs to be taken in the choice of summation units as:

- using tonnes or m$^3$ can be good when trying to minimise the amount of transportation, however it may encourage on-site recycling to low value bulk items such as general fill rather than off-site recycling to higher value material such as concreting aggregate;

- using value (£) tends to emphasise the high value items, which is to be encouraged, but might increase the amount of transportation of low value, possibly bulky, items off-site;

- for DRI calculations, assigning a value to the waste materials is difficult;

- establishing reliable conversion factors to enable summation to a common unit may be complicated. For example, consider the difficulty of establishing conversion factors (densities, bulking factors and so on) for converting from m$^2$ of carpet tiles to tonnes;

- individual organisations should select the units of measurement for DRI and RM KPIs that best suit their needs; and

- the RC KPI is always calculated using value.

5.5 KPI calculation

The calculation of the KPI will need to be undertaken when:

- producing or responding to requirements. Estimating KPIs from survey data (such as the pre-demolition audit) or support tools (such as the RC Toolkit), that can be used to set requirements in tender documents, to identify good practice options and to demonstrate that requirements will be exceeded; and

- producing reports of performance. This is the calculation of the KPI from the data obtained on-site. The actual performance on-site is compared to the requirements. An explanation of this is given in the relevant Guidance Notes for demolition and new build phases, see Sections 10 and 11 respectively.

Example wording when RC is specified as a product requirement:

At least 10% [or other specified level] of the total value of materials used should derive from reclaimed and recycled content in the products and materials selected. In addition, show that the most significant opportunities to increase the value of materials derived from reclaimed and recycled content have been considered, such as the top 10 Quick Wins or equivalent, and implement good practice where technically and commercially viable.
### Producing or responding to requirements

#### Demolition Recovery Index (DRI)

The simplest method for estimating or checking the DRI is to produce:

- an estimate of the total amount of materials that will be produced by the demolition; and
- a listing of the type and quantity of recovered materials that can be practically obtained from the demolition.

These data sets can be generated from (a) a pre-demolition audit, or (b) knowledge of materials produced by demolition on similar projects. The data derived at this stage can be incorporated into the project SWMP.

The calculation of the DRI is illustrated in Section 9 Assessing tender KPI requirements. Further information can be found in WRAP's guidance: The Demolition Protocol: Aggregates Resource Efficiency in Demolition and Construction, Volumes 1-4.

#### Retained Material (RM)

To estimate or check the RM, two sets of data are required.

- A listing of the type and quantity of recovered materials that can be practically obtained from the demolition. This is the same data set used in the DRI.
- A listing of the type and quantity of the recovered materials to be used in the new build that can be supplied from the demolition. This can be rapidly assembled by examining the Quick Wins listing from the new build RC assessment identified (utilising the RC Toolkit).

Once these data sets have been established, the RM can be calculated. An illustration of the calculation of the RM is shown in Section 9, Assessing tender KPI requirements.

#### Recycled (and reclaimed) Content (RC)

Estimates can easily be produced or checked using the WRAP RC Toolkit [www.wrap.org.uk/rctoolkit](http://www.wrap.org.uk/rctoolkit). This has the additional advantage of identifying Quick Win elements that offer the greatest potential to increase RC. These elements can be a good starting point for identifying materials that the on-site reclamation and recycling can supply.
This is one of a series of booklets which together form WRAP’s guide: The efficient use of materials in regeneration projects. While this booklet is designed to be used separately it may refer to sections in the main guide.