

LEED Credits for RAP/ RAS in HMA

MRc4 - Yes:

- RAP and RAS from roofing tear-offs count as post-consumer recycled-content
- RAS from manufacturing scrap counts as pre-consumer recycled-content
- Enter percentage of total recycled material in mix design by weight

MRc5 – Yes, if Collected and processed within 500 miles:

- Asphalt shingles and pavement collected and recycled within 500 miles count as regional materials
- Enter percentage of total regional material in mix design by weight

Background

Over the last decade, King County has led local and regional efforts to evaluate and promote the use of reclaimed asphalt pavement (RAP) and recycled asphalt shingles (RAS) in hot-mix asphalt (HMA) pavement. RAP has been used regularly by local agencies for many years at 15-20 percent of the mix by weight. About 20 states have also developed specifications or procedures for the use of RAS ranging between 3-8 percent by weight in HMA, alone or in combination with RAP. In 2009, King County conducted an HMA paving demonstration using RAS, sourced from roofing tear-offs at 3 percent by weight, in combination with 15 percent RAP by weight. Learn more about King County's Shingles in Paving Demonstration Project here: your.kingcounty.gov/solidwaste/linkup/shingles/paving-project.asp

The National Asphalt Pavement Association (NAPA) says use of RAS is a win-win for all parties, including the environment. The high asphalt content of shingles allows significant quantities of virgin asphalt binder to be replaced in HMA, which conserves

resources and lowers costs. Recycling asphalt shingles that otherwise would be landfilled or incinerated reduces impacts from transportation, manufacturing energy, and resource extraction.

National Guidelines and State Examples

Sources for recycled asphalt shingles include both manufacturing scrap and roofing tear-offs. Nationally, tests have been completed on a variety of mix designs with both sources of RAS, as well as RAP. Guidelines published by NAPA in 2009 indicate that RAS from manufacturing scrap and roofing tear-offs can work in all asphalt mixes at percentages where 30-40 percent of the asphalt binder in the mix is from the RAS (this equates to roughly 3-5 percent RAS in the mixture by weight). At these percentages, RAS actually strengthens pavement resistance to rutting by stiffening the asphalt, without affecting the flexibility properties required for cold temperature performance.

You can order the NAPA report here: store.hotmix.org/index.php?productID=702

A King County road near Enumclaw is paved in 2009 with HMA containing RAS and RAP.



Asphalt paving projects can earn LEED points in other ways:

- Base materials may have recycled-content
- If existing asphalt paving is recycled on-site for base materials or RAP it also counts for MRc2: Construction Waste Recycling
- Conducting further testing/demonstration projects of RAS may count as an Innovation in Design credit.

State Examples

A number of states and local governments have either developed specifications or are testing and evaluating specifications. Examples include

- King County's 2010 Recycled Asphalt Shingles (RAS) Specification Guidelines and the HMA specification used in its 2009 paving demonstration.
- 12 Eastern states allow RAS from manufacturing scrap for up to 5 percent of mixture weight and 11 other states allow RAS from both manufacturing scrap and roofing tear-offs.
- Texas DOT allows the use of RAS from manufactured shingles and tear off roofing for up to 5 percent of mixture weight which can be combined with RAP up to 10-30 percent of the total mixture weight depending on the application.
- Oregon DOT issued a preliminary investigations report this year showing positive results from using 5 percent by weight of RAS from roof tear-offs and up to 30 percent total mixture weight of RAS and RAP.
- Vancouver, BC is testing several mixes that include RAS from tear-offs, virgin asphalt, and RAP.

What does this mean for LEED or Sustainable Infrastructure Scorecard projects?

The use of both RAP and RAS in paving contributes to earning points in both LEED

certification and Scorecard rating evaluation systems. For LEED certification, points can be earned in Materials and Resources Credit 4 (MRc4): Recycled Content and may contribute to Materials and Resources Credit 5 (MRc5): Regional Materials.

MRc4: The percentage of RAP and RAS from roofing tear-offs in the HMA mix by weight can be listed as post-consumer recycled-content. RAS from manufacturing scrap can be listed as pre-consumer recycled-content.

MRc5: If the pavement or shingles are collected from the region and processed locally (ALL locations must be within 500 miles of the site), the percentage of recycled-content also counts as regional materials.

Documentation:

To document the use of RAP and RAS in paving as contributing to LEED credits MRc4 & MRc5, you need the following information:

- Total cost of the hot mix asphalt
- Asphalt mix design and percent by weight of RAP, RAS from roofing tear-offs, and RAS from manufacturing scrap
- Documentation from the supplier and recycler showing that the source of the recycled materials, the location of processing shingles or pavement into RAS or RAP, and the plant where the HMA was manufactured are ALL within 500 miles of the site.

The data is entered into a form on LEED Online like this:

Table. CSI Divisions 03-10, 31 (section 31.60.00 Foundations) and 32 (sections 32.10.00 Paving, 32.30.00 Site Improvements, and 32.90.00 Planting) materials

Total CSI Divisions 03-10, 31.60.00, 32.10.00, 32.20.00, and 32.90.00 materials cost: (this total may include items not listed in the rows below)				45,000												
General				MRc3.1		MRc4		MRc5			MRc6		MRc7		20%	
Name/description of material/product	Cost per item (\$)*	Number of product / items purchased	Manufacturer/ Vendor name	% Salv (%)	% Post (%)	% Pre (%)	% Reg (%)	Extc Dist (miles) **	Mtc Dist (miles) **	Location Info Source (s)	% Salv (%)	Renewable Material Type	% Wood (%)	% FSC (%)	Cut ?	
Asphalt Pavement	10,000	1	Woodworth		20	0	20	499		20 Supplier						X
Total (\$):	10,000			0		2,000				2,000			0			0
Sustainable criteria percentage (%):				0		4.44				4.44			0			0

Total cost of hot mix asphalt

Distance to furthest source, or processing location of recycled paving or shingles

Distance to HMA plant

Percent of manufacturing scrap

Percent of RAP and RAS from roofing tear-offs

Sustainable Infrastructure Scorecard Credits for RAP/ RAS in HMA

SMc3.1 – Yes, if 10% of materials are sourced within 500 miles and complete at least 10% of building material:

- Asphalt shingles and pavement collected and recycled within 500 miles count as regional materials

SMc3.2 – Yes, if collected and processed within 500 miles:

- Asphalt shingles and pavement collected and recycled within 50 miles count as heavy materials sourced regionally

SMc4 – Yes, if project includes at least 10% recycled materials of total project materials:

- RAP and RAS counts as recycled-content.

SMc8 – Yes, if salvaged materials are used for 5% of the projects’ materials cost:

- Materials may be salvaged from or outside the project.

The Green Building Certification Institute (GBCI) now requires back-up documentation for 20 percent of the materials contributing to a credit. Since use of RAP and RAS may not be familiar to the reviewers, it is recommended the documentation from the supplier be uploaded to help the reviewers understand the use of these materials.

Most often the Contractor is responsible for collecting this information and entering it into the LEED form. King County project managers should ensure that the product specification contains requirements for RAP and RAS and that the information above is a required submittal. See the Resources section of this fact sheet for more on specifications.

Get credit in the King County Sustainable Infrastructure Scorecard

Use of RAP and RAS can also earn points in the King County Sustainable Infrastructure Scorecard for Sustainable Materials credits 3.1, 3.2, and 4.0 (1 point each).

Documentation:

To document the use of RAP and RAS in paving as contributing to the Sustainable Infrastructure Scorecard credits SMc3.1, SMc3.2, SMc4, and SMc8, you need the following information:

- Documentation of materials and procurement location
- List of recycled-content materials
- Documentation of salvaged materials



Sustainable Infrastructure Scorecard

Use of Sustainable Materials			Possible Points
Y	N	N/A	10
			SM credit 1.0 Use low-emitting materials, 100% of adhesives & sealants used
			SM credit 2.0 Use low-emitting materials, 100% of paints used
			SM credit 3.1 10% materials sourced from within 500 miles
			SM credit 3.2 Heavy materials sourced from within 500 miles
			SM credit 3.3 Plants sourced within 250 miles
			SM Credit 4.0 Use high recycled-content materials
			SM credit 5.0 Use FSC certified sustainable wood
			SM credit 6.0 Use renewable materials
			SM credit 7.0 Use cement substitutes

RAS product is produced by Tacoma-based Woodworth & Company to be used in HMA.



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www.greentools.us

Resources

- Shingles in Paving Project: Paving Demonstration, King County LinkUp, February 2010. your.kingcounty.gov/solidwaste/linkup/shingles/paving-project.asp
- 2010 Recycled Asphalt Shingles (RAS) Specification Guidelines, King County LinkUp, October 2010. HMA Specifications used in King County Paving Demonstration. Contact: Kris Beatty, 206-296-3740 or kris.beatty@kingcounty.gov
- Guidelines for the Use of Reclaimed Asphalt Shingles in Asphalt Pavements, NAPA – October 2009. Available for purchase at store.hotmix.org/index.php?productID=702
- Shingle Recycling.org – State Experience and Contacts www.shinglerecycling.org/content/state-experience-recycling-asphalt-shingles
- LEED Online www.leedonline.com
- Build It LEED, Cascadia Green Building Council and O'Brien & Company, 2008 Toolkit and webinar resources on managing and documenting LEED during construction cascadiagbc.org/store/leed-materials
- King County Sustainable Infrastructure Scorecard and Guidelines your.kingcounty.gov/solidwaste/greenbuilding/scorecard.asp



King County

Department of
Natural Resources and Parks
Solid Waste Division

Alternative Formats On Request:

206-296-4466

TTY Relay: 711

1-800-325-6165 ext. 6-4466