THE USE OF RECLAIMED ASPHALT, IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT

Screening Report

July 2014

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VERIFICATION PAGE

Form 403.1

Rev 10/06

TITLE :
THE USE OF RECLAIMED ASPHALT, IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT - SCREENING REPORT

JGI NO. :	**DATE:**	**REPORT STATUS:**
3617	30 July 2014	Final

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SYNOPSIS:

The Southern African Bitumen Association of Southern Africa (SABITA) requires the undertaking of a Screening Assessment of the use of Reclaimed Asphalt for road building, in terms of the National Environmental Management: Waste Act (Act 59 of 2008), as Amended.

KEY WORDS:
Waste, Due diligence, Durban

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No of Copies Made:	**Print Date:**	**No of Reprints:**	**Date:**

Copies sent to:	**Delivery Method:**
1. Southern African Bitumen Association of Southern Africa	Electronic

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1. INTRODUCTION

The Southern African Bitumen Association (SABITA) is a non-profit organization that represents producers and applicators of bituminous products, consulting engineers and educational institutions. Its main activities are in the fields of advancing best practice in Southern Africa in the:

- use and application of bituminous materials;
- in worker safety and environmental conservation;
- education and training; and
- contact with government on the value of road provision and preservation.

This is done by undertaking research and producing guideline documents and manuals (Southern African Bitumen Association, 2014).

The reclamation of used asphalt is the process whereby the asphalt portion of the road is removed (usually during the repair and maintenance of the road) and then reused for the purpose of road building.

Since the 1970's, "*reclaimed asphalt*"[1] (RA) has been reused with virgin material to rebuild, maintain and construct roads within South Africa and globally (Southern African Bitumen Association, 2009). However, although the use of RA is standard practice for road building, South Africa's waste legislation may propose additional legislative requirements before the material can be reused.

Jeffares & Green (Pty) Ltd, Engineering & Environmental Consultants, have been appointed to undertake a screening assessment to evaluate potential legislative requirements associated with the use of RA for the purpose of road building in terms of the National Environmental Management: Waste Act (Act 59 of 2008) (NEM:WA) and associated legislation.

1.1. METHODOLOGY

The screening assessment is a useful approach in identifying environmental legislative obligations that may impose licencing and regulatory requirements for the use of RA. This screening assessment was based on both primary and secondary information.

It should be noted that a legal opinion was not required for this assessment and therefore not obtained. However, this report will be submitted to the Department of Environmental Affairs and Development Planning (DEA&DP) for their review and comment.

[1] RA is intrinsically a high quality crushed stone with a bituminous coating

The following was undertaken:

- Review of existing reports on the history, composition and uses of RA as well as international and local standards.
- A review of applicable environmental legislation, where relevant to the activity.
- A site visit to the Much Asphalt (Pty) Ltd asphalt plant, located in Eerste River, was undertaken on 27 May 2014.

2. THE ACTIVITY

Asphalt is a mixture of aggregates, sand, filler (95%), and bitumen binder (5%) that is mainly used for the purpose of road building. When used for road building, the asphalt forms the top two tiers of the road; i.e. a surface (wearing) course and an asphalt base course, together these constitute the top layer of the road structure (EAPA, 2005). Although these layers are comprised of different sizes of aggregate and bitumen content all three layers can be recovered for reuse. Refer to **Figure 1** for a cross section of a typical asphalt road (Eurobitume, 2009).

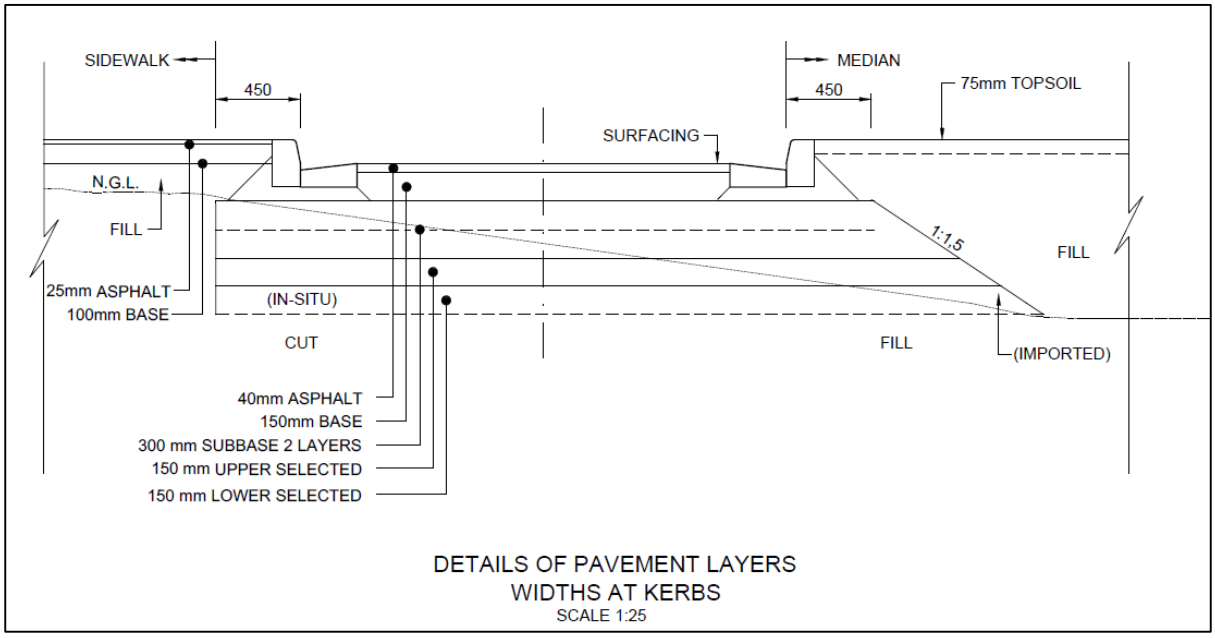

Figure 1: Profile of a Typical Asphalt Road (courtesy of Eurobitume, 2009)

Over time the road surface either deteriorates or the road is upgraded requiring the road to be demolished. At this stage the asphalt is removed where after it is determined if the asphalt can either be reused or if it should be disposed of. Prior to reclamation the asphalt is tested to determine if the asphalt meets the standard for reuse. The following factors limit the reclamation of asphalt:

- extremely variable asphalt mix, where the existing asphalt mix varies over short distances, such as severely distressed roads with frequent patches;
- asphalt that is contaminated with diesel or oil;
- modified asphalt, particularly asphalt modified with bitumen rubber;
- areas where the asphalt has a very high binder content; and
- asphalt contaminated with tar – its use is prohibited for environmental and health reasons.

Once it is determined that the asphalt is suitable for reuse, it is removed using machinery, either via excavation or milling. Unsuitable material that does not meet the required standard is classed as general waste and is disposed of at a licenced waste management facility.

Demolishing a road utilising an excavator results in large chunks of asphalt that requires further processing. However, most often the asphalt is removed using milling machines, which mill out the asphalt layers in the existing road. The milling machines can be referred to as "mining machines" due to the way in which they recover and granulate the asphalt from existing road pavements which is similar to the way that quarrying is carried out to mine and crush rock sources (Southern African Bitumen Association, 2009). Both processes produce no waste and one hundred percent of the RA can be reused.

Once the asphalt has been reclaimed from the road it is either reused on site or transported to an asphalt mixing plant.

2.1. SITE VISIT

A site visit of the Much Asphalt plant was undertaken on 27 May 2014, to obtain insight into how the RA is stored and the processes involved in its reuse. Located in Eerste River, the Much Asphalt plant is one of the largest commercial suppliers of asphalt products for road construction.

In required, the Much Asphalt plant can add up to 25% of RA in their asphalt mixes, thus RA is a key resource for their operations. The plant receives both excavated and milled RA. Both are stored in a single large stockpile (refer to **Figure 2** and **Figure 3**).

Figure 2: Stockpile of RA – mainly milled RA

Figure 3: Excavated chunks of RA located on top of the stockpile

When required, the RA from the stockpile is placed into a screen/crusher that further granulates the RA into the specified size required to be added into the asphalt mix. Any tailings (oversized material) not suitability processed is returned to the stockpile to be processed at a later stage, thus ensuring that 100% of the RA is utilised. Once the RA has been processed it is stockpiled separately before it is included into the asphalt mix.

It should be noted that the RA is only crushed and screened as and when needed to meet the daily requirements. This to ensure that the processed RA is not stockpiled for too long as this may result in it becoming wet from rain water or the stockpile consolidating which would affect the quality (moisture content) when added to the asphalt mix (Southern African Bitumen Association, 2011). Refer to **Figure 4** and **Figure 5** for images of the processed RA stockpiles.

Figure 4: Processed RA stockpile

Figure 5: A closer look at the Processed RA

RA from the processed stockpile is then added into the asphalt mix where it is further screened (larger RA is returned to the initial stockpile) before it is added to the virgin aggregate and bitumen. Refer to **Figure 6** for an image of the asphalt mixing plant.

Figure 6: RA feed bins

It should be noted that the same quality standard (SANS 3001-AS1:2009) applies to asphalt mixes using RA as for new mixes using only virgin material. This indicates that the use of RA does not lower the quality of the final product.

Furthermore, to retain these standards SABITA produces guideline documents to ensure that RA is suitably processed (screened/crushed/stockpiled).

2.2. BENEFITS OF RECLAIMED ASPHALT

The use of RA provides numerous environmental and economic benefits. RA reduces the quantity per ton of virgin aggregate required in the asphalt mix. If required, the Much Asphalt plant can add up to 25% of RA, however internationally (e.g. Germany) there are claims that asphalt mixes consist of up to 100% of RA (Southern African Bitumen Association, 2011).

RA also already contains bitumen[2], and by using RA, the bitumen content of the mix can be reduced by approximately 0.5% (Southern African Bitumen Association, 2009).

RA is cheaper than virgin materials and its continued use will place less stress on quarries/refineries to produce the required volumes of virgin material required by industry. Furthermore, the use of RA prevents it being sent to landfill and taking up much needed landfill airspace.

[2]RA contains approximately 95% of high quality aggregate and 5% of aged bitumen.

3. LEGISLATIVE REVIEW

The Constitution of South Africa contains the Bill of Rights where Section 24 states that everyone has the right to an environment which is not harmful to one's health and to have the environment protected from degradation for both current and future generations. This is given effect in the host of legislation in South Africa and for the purpose of this Screening, the following is most pertinent:

- National Environmental Management: Waste Act (NEM:WA) (No. 59 of 2008)[3]
    - List of Waste Management Activities that may have a detrimental effect on the Environment (GN 921 of 2013), and
- National Environmental Management Act (NEMA) (No 107 of 1998) EIA Regulations, 2010

The following sections review the requirements of NEM:WA and NEMA with regards to the reclamation and reuse/recycling of a waste material.

3.1. NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT (NO. 59 OF 2008)

The NEM:WA sets out the requirements to ensure that all waste within South Africa is suitably managed without having an adverse effect on the environment. The NEM:WA gives legal effect to the waste management hierarchy set out in the National Waste Management Strategy.

The NEM:WA allows for the protection of health, well-being and the environment by providing reasonable measures for:

1. Minimisation of the consumption of natural resources;
2. Avoidance and minimisation of the generation of waste;
3. Recovery, re-use and recycling of waste;
4. Treatment and safe disposal of waste as a last resort;
5. Prevention of pollution and ecological degradation;
6. Securing ecologically sustainable development while;
7. Promoting justifiable economic and social development;
8. Promoting and ensuring the effective delivery of waste services;
9. Remediating land where contamination presents, or may present, a significant risk of harm; and
10. Achieving integrated waste management reporting and planning.

[3] As amended by the National Environmental Management: Waste Amendment Act, 2014 (No. 26 of 2014)

The NEM:WA also provides very specific waste related definitions that provide guidance when implementing the Act. The definitions of Waste, Recovery, Reuse, Recycle and Treatment are applicable for this screening assessment.

"Waste" means—

(a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or
(b) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette, but any waste or portion of waste, referred to in paragraphs (a) and (b), ceases to be a waste—
  (i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered;
  (ii) where approval is not required, once a waste is, or has been re-used, recycled or recovered;
  (iii) where the Minister has, in terms of section 74, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or
  (iv) where the Minister has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste.

"Recovery" means the controlled extraction or retrieval of any substance, material or object from waste;

"Recycle" means a process where waste is reclaimed for further use, which process involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material;

"Re-use" means to utilise the whole, a portion of or a specific part of any substance, material or object from the waste stream for a similar or different purpose without changing the form or properties of such substance, material or object;

"Treatment" means any method, technique or process that is designed to—

(a) change the physical, biological or chemical character or composition of a waste; or
(b) remove, separate, concentrate or recover a hazardous or toxic component of a waste; or
(c) destroy or reduce the toxicity of a waste,

in order to minimise the impact of the waste on the environment prior to further use or disposal

The Act further imposes, in terms of Section 16(1), a general waste management duty whereby a holder of waste must, within the holder's power, take all reasonable measures to—

(a) avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;
(b) reduce, re-use, recycle and recover waste;
(c) where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;
(d) manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;
(e) prevent any employee or any person under his or her supervision from contravening this Act; and
(f) prevent the waste from being used for an unauthorised purpose.

Part 4 of the NEM:WA discusses Waste Management Activities and identifies that the Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. Subsection 20(b) of the NEM:WA states that no person may commence, undertake or conduct a waste management activity, except in accordance with:

(a) the requirements or standards determined in terms of section 19(3) for that activity; or
(b) a waste management licence issued in respect of that activity, if a licence is required.

3.1.1. LIST OF WASTE MANAGEMENT ACTIVITIES THAT MAY HAVE A DETRIMENTAL EFFECT ON THE ENVIRONMENT (GN 921 OF 2013)

General Notice 921 of 2013 provides an amended list of waste management activities that may have a detrimental effect on the environment. There are three Categories of Waste Management Activities; namely Categories A, B and C.

Activities listed under Category A and B will require a Waste Management Licence prior to the activity being undertaken. The WML process for activities listed under Category A are equivalent to those that require a Basic Assessment (BA) process and the process required for Category B listed activities are equivalent to those that require an Environmental Impact Assessment (EIA) process, as stipulated in the EIA Regulations (refer to Section 3.2).

Category C activities must comply with the relevant requirements or standards determined by the Minister, including:

(a) Norms and Standards for the Storage of Waste, 2013

(b) Standards for Extraction, Flaring or Recovery of Landfill Gas, 2013, or
(c) Standards for Scrapping or Recovery of Motor Vehicles, 2013.

3.2. NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NO 107 OF 1998) AND EIA REGULATIONS, 2010

The NEMA provides for co-operative governance by establishing principles and procedures for decision-makers on matters affecting the environment. An important function of the Act is to serve as an enabling Act for the promulgation of legislation to effectively address integrated environmental management.

Section 24 (5) of NEMA was enacted through the promulgation of the EIA Regulations in 2010. In terms of the EIA Regulations, a Basic Assessment or Scoping/EIA process is required should developments fall within GN R. 544, R. 546, R. 545 and listed activities in terms of the NEM:WA; Category A and Category B.

A WML application that requires a scoping/EIA process can take 14 months or more before a decision is made by the competent authority. In comparison, a WML application that follows a BA Process is a shorter process that takes approximately 7 to 9 months before a decision is made by the competent authority.

4. ASSESSMENT

This section provides an assessment and interpretation of the use of RA, in terms of the definitions associated with the NEM:WA, based on the following activities:

1. Road surface to be replaced / upgraded / rehabilitated is tested to determine the quality of the asphalt (i.e. top 2 layers of the road, see **Figure 1**).
2. Asphalt that meets the stipulated standards and technical specifications for reuse is classified as RA and is either stored on site for later use or taken to an asphalt plant, where the RA resized according to specific requirements for mixing with virgin material.
3. It is important to note that asphalt that does not meet the stipulated standard and technical specifications is classified as a waste product (general) and is disposed of off-site at a licenced waste management facility.

This assessment section therefore only considers the reuse of RA (step 2 as described above) in determining if any legislation is triggered. In order to ascertain if any listed activities are triggered the waste definitions, in terms of NEM:WA, need to be interrogated. **Table 1** provides an understanding of the activity of reusing RA in terms of the waste related definitions.

Table 1: Definitions Associated with Waste Management

Legislation	Explanatory Note
"Waste" means—	RA is a material that is reclaimed as part of road building activities and as such is not considered to be unwanted, rejected, or abandoned, nor is it discarded, abandoned or does it require disposal. Once the useful and valuable component of the asphalt is reclaimed, then the remainder is regarded as a waste, i.e. unwanted and rejected. The generator of the RA is responsible for the repair and construction of the new road, and still has use of the RA for road building purposes. The RA is either included in the new road asphalt mix on site or at an asphalt plant then returned to site. Road owners (and therefore the RA generators) such as the City of Cape Town and SANRAL) stipulate in their contract documents that a percentage of RA must be reused in the reconstruction of the road.
(a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or	

Legislation	Explanatory Note
(b) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette, but any waste or portion of waste, referred to in paragraphs (a) and (b), ceases to be a waste— (i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered; (ii) where approval is not required, once a waste is, or has been re-used, recycled or recovered; (iii) where the Minister has, in terms of section 74, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or (iv) where the Minister has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste.	RA is the final product and therefore not considered as wastes from bituminous mixtures or any of the discarded wastes, as per Schedule 3. RA does not need to be treated or disposed of. The screening and processing is not a treatment process in terms of the NEM:WA definition, it re-sizes the asphalt to various road building specifications. No waste is generated and 100% of the RA is utilised.
"Recovery" means the controlled extraction of a material or the retrieval of energy from waste to produce a product;	Although the excavation or milling of asphalt could be regarded as a controlled extraction process, it is not extracted from a waste (i.e. road surface). There is also no retrieval of energy.
"Recycle" means a process where waste is reclaimed for further use, which process involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material;	RA is not classified as a waste and is not separated from a waste stream.
"Re-use" means to utilise articles from the waste stream again for a similar or different purpose without changing the form or properties of the articles;	RA is not classified as a waste and never enters the waste stream.
"Treatment" means any method, technique or process that is designed to— (a) change the physical, biological or chemical character or composition	RA is not classified as a waste, thus the definition of treatment is not applicable. The screening/crushing of RA is for the

Legislation	Explanatory Note
of a waste; or (b) remove, separate, concentrate or recover a hazardous or toxic component of a waste; or (c) destroy or reduce the toxicity of a waste, in order to minimise the impact of the waste on the environment prior to further use or disposal	purposes of meeting the asphalt mix specifications and is not for the purposes of minimising the impact on the environment.

Table 1 clearly illustrates that RA is not a waste. RA is retained for further use in road building activities and is never considered to be a waste product and does not ever enter the waste stream. No waste is generated from the further use of RA. Only when road asphalt does not meet the standards and technical specifications (testing is undertaken while the road is still in place), is the asphalt deemed to be a waste and **not** RA. In this instance, the asphalt is disposed of at a licensed landfill site.

As such, the use of RA for activities such as road building does not trigger any Listed Activities in terms of GN 921 of 2013 and no application for a Waste Management License is thus required.

5. CONCLUSIONS AND RECOMMENDATIONS

It is J&G's professional opinion that the use of RA for road building will not trigger any listed activities in terms of the NEM:WA as RA is not considered to be a waste in terms of the waste related definitions. Furthermore, the use of RA and the reduction in need of virgin materials upholds the first two principles of the NEM:WA, which states the following:

1. Minimise the consumption of natural resources; and
2. Avoid and minimise the generation of waste.

By using RA, less natural resources are needed in the production of asphalt for road building purposes and less waste is generated during the rehabilitation / upgrade and construction of roads. Therefore, RA can be regarded as a valuable resource.

J&G's professional opinion is based on our understanding and interpretation of the legislation and its' intended purpose for the protection of the environment. It is therefore recommended that this report is submitted to the Department of Environmental Affairs and Development Planning: Waste Directorate for review and a formal response be obtained as to the correctness of our interpretation and conclusion.

REFERENCES

EAPA. (2005). *Industry Statement on the Recycling of Asphalt Mixes and use of Waste of Asphalt Pavements.* Belgium: Unpublished Technical Report.

Eurobitume. (2009, January 01). *Application - Roads*. Retrieved May 13, 2014, from Eurobitume: http://www.eurobitume.eu/bitumen/applications/roads

Southern African Bitumen Association. (2009). *Hot Mix Recycled Asphalt (TRH21:2009).* Cape Town: Unpublised Technical Document .

Southern African Bitumen Association. (2011). *Manual 32 Best Practice Guideline for Warm Mix Asphalt .* Cape Town: Sabita.

Southern African Bitumen Association. (2014, May 12). *Profile*. Retrieved from Southern African Bitumen Association: http://www.sabita.co.za