REQUEST FOR EXPRESSION OF INTEREST

From small, medium and micro enterprises with the capability to validate, implement, market and commercialise plastic modified asphalt technology

EoI No. BDC/Smart Mobility/

Date of issue:	20/10/2025	
Closing date and time:	25/11/2025	
Expression of Interest submission:	Only electronic submissions will be accepted	
Enquiries:	Sipho Dikweni	Email: sdikweni@csir.co.za
CSIR business hours:	08:00 – 16:30	
Category:	Road construction, asphalt and bitumen	

1 Introduction

The Council for Scientific and Industrial Research (CSIR) is an entity of the Department of Science, Technology and Innovation in South Africa. The CSIR is one of Africa's leading scientific research and technology development organisations. Established under the Scientific Research Council Act, 1988 (Act 46 of 1988) (as amended by Act 71 of 1990), the CSIR focuses on multi-disciplinary research, development and innovation. The CSIR has developed a plastic modified asphalt technology for road and pavement construction. This innovation introduces a modified bitumen composition that enhances road performance and durability while reducing maintenance costs. It improves high-temperature stiffness, ageing and fatigue resistance, making it well-suited to local climates. The technology is compatible with existing asphalt plants, requires minimal adjustments and enables the upcycling of plastic waste – supporting environmental sustainability.

2 Purpose

The objective of this invitation process is to identify suitable South African SMMEs to establish a mutually beneficial partnership for the validation and commercialisation of the technology. Selected SMMEs will enter into a licensing agreement and collaborate with the CSIR to validate and commercialise the technology.

3 Background

South African roads are in a dire state due to a massive maintenance backlog, underfunding and infrastructure neglect. Approximately 40% of provincial roads and 80% of national roads are nearing the end of their design life. Pavements across the country are deteriorating rapidly, suffering from rutting, cracking and potholes caused by heavier loads, extreme temperatures and insufficient durable binder solutions. Conventional bitumen struggles under high temperatures, heavy loads and moisture cycles, leading to frequent maintenance requirements. Polymer-modified binders exist but often face challenges such as storage instability, phase separation and high costs, making them unreliable for large-scale construction. Additionally, bitumen price volatility – driven by fluctuations in crude oil prices, refinery output and exchange rates – increases the lifecycle costs for road authorities. With domestic refining capacity having declined, South Africa now imports large volumes of

bitumen (approximately 275 000 tonnes in 2023, valued at USD $155 million), exposing projects to crude oil, freight and rand/USD volatility that inflate project budgets. Repeated repairs, lane closures and short service lives force municipalities and road agencies to spend more on maintenance, disrupt commerce and burden road users with higher operating costs. At the same time, South Africa faces growing plastic-waste challenges. Waste polyethylene (PE) streams (packaging, bags, film) present a disposal and environmental problem but also an untapped resource for circular-materials innovation. South Africa generates approximately 2.5 million tonnes of plastic waste annually, with majority landfilled. These issues can be addressed through the development of alternative bitumen binders.

4 Plastic modified asphalt technology

A process and method of modifying bitumen with waste PE to achieve storage stability and avoid phase separation, thereby improving road pavement performance when constructed using controlled conditions of the wet method and as per a customised criteria.

- Two plastic-modified asphalt innovations were developed:
    - **Dry method**: Waste plastic is added directly to heated aggregates before mixing with bitumen.
    - **Wet method**: Waste plastic is chemically blended with bitumen before asphalt mixing.
    - The addition of plastic waste was found to reduce reliance on virgin materials and improve performance under high-temperature conditions.

Wet method

7.2 mm rutting versus 10.4 mm (reference) after 2.9M E80s.

Hamburg Wheel-Tracking Test (HWTT) was conducted in accordance with American Association of State Highway and Transportation Officials (AASHTO) T324. Both mixes performed significantly well after 20 000 passes. It was noted that the plastic mix performed better (0.73 mm rut) than the reference mix (1.76 mm rut).

Dry method

A test section using the dry method for waste plastic asphalt modification has been successfully paved on road P159/1 in the City of Tshwane. This test section has been used to demonstrate the applicability of the technology using a long-term performance evaluation conducted with the CSIR's Heavy Vehicle Simulator

(HVS). The HVS evaluation indicated that the dry method asphalt mix containing waste plastic performed better than a standard asphalt mix (without waste plastic) in terms of permanent deformation/rutting (4.63 mm rutting versus 6.69 mm reference).

5 Invitation for the Expressions of Interest

Expressions of Interest (EoI) are hereby solicited from relevant entities to form partnership agreements for the commercialisation of the technology. The ideal partner should have strong software development and integration capabilities and should specifically meet the following requirements:

1. Technical development skills: The partner should have experience with and knowledge of bituminous road construction materials.
2. Market access and distribution networks: The partner should have established networks and relationships with key stakeholders in the construction sector, asphalt and bitumen value chain.
3. Proven track record: The partner should have a demonstrated history of successful project delivery, particularly in developing and deploying new technology solutions.
4. Collaborative mindset: The partner must be willing to work closely with the CSIR, sharing knowledge, resources and expertise to co-develop and refine the technology for maximum impact.
5. Financial stability and resource availability: The partner should have financial stability and resource capacity to invest in the development, deployment and commercialisation of the technology.
6. Commercial capabilities: The partner should demonstrate strong business acumen and the ability to develop and execute a viable commercialisation strategy. This includes identifying revenue streams, pricing models and marketing strategies to ensure full-scale deployment and widespread adoption, as well as experience in negotiating partnerships, securing funding and driving sales within the sector.

Scope of work:

- Seek market opportunities for the deployment of the technology;

- Market validation, development of a go-to-market strategy and commercialisation;
- Business model development, validation and refinement; and
- Implementation and validation of the technology.

6 Expressions of Interest submission

All EoI submissions must be submitted using this email address:
plasticmodifiedasphalt@csir.co.za

The CSIR requires that all EoI submissions be submitted electronically using the link mentioned above. Should the file size exceed 30 MB, interested parties may submit EoIs in multiple emails. **Use the EoI number and the description of the EoI as the subject of your email.**

7 Expressions of Interest programme

One or more bid windows are envisaged. The current EoI programme incorporates the following key dates:

- Issue of EoI document:
- Closing/submission date: 25 November 2025 at 16:30

8 Submission of Expressions of Interest

Interested parties are required to submit a detailed business case clearly demonstrating a viable plan for commercialising the technology. The business case must include three-year financial projections, a clear revenue model, technology deployment plan, market analysis (including segmentation, targeting and positioning, as well as Total Addressable Market (TAM), Serviceable Available Market (SAM) and Serviceable Obtainable Market (SOM) and identification of risk areas along with proposed risk mitigation strategies.

The following documentation must be included:

- Proof of SMME status as per the National Small Enterprise Act (e.g., Central Supplier Database reports); and
- Company profile indicating experience and knowledge of bituminous road construction materials.

The EoI submitted by companies must be signed by a person or persons duly authorised thereto.

9 Evaluation process and criteria

All proposals will be evaluated by an evaluation committee against the following criteria:

- Confirmation of SMME status;
- Registration as a South African company;
- Clear business case; and
- Demonstratable ability to carry out the scope of work as outlined in Section Five of this EoI document.

Short-listed applicants may be required to present to the CSIR and will be notified no later than seven days prior to the presentation date.

Please note: If you have not heard from us within 12 weeks of applying, please consider your application unsuccessful.

10 Elimination criteria

EoI submissions will be eliminated under the following conditions:

- Submission after the deadline;
- Submitted to an incorrect address; and/or
- EoI submissions that do not include the mandatory documentation listed above.

11 Deadline for submission

EoI must be submitted via the link provided above no later than 16:30 on 25 November 2025.

12 Cost of submission

Organisations submitting an EoI assume all risks for resource commitment and expenses, direct or indirect, related to proposal preparation and participation throughout the EoI process. The CSIR is not responsible, directly or indirectly, for any costs incurred by the organisation.

13 Process for shortlisted applicants

- The shortlisted applicant(s) shall proceed to the application phase, during which a partnership agreement will be signed to define the responsibilities of both parties during commercialisation.

14 CSIR reserves the right to:

- Extend the closing date;
- Request documentary evidence regarding any issue;
- Appoint one or more entities, separately or jointly (whether or not they submitted a joint EoI);
- Award this EoI in whole or in part or not at all; and
- Cancel or withdraw this EoI in whole or in part.

15 DISCLAIMERS

The CSIR has produced this EoI in good faith. However, the CSIR, its agents and its employees do not warrant its accuracy or completeness. To the extent permitted by law, the CSIR will not be liable for any claim whatsoever and howsoever arising (including, without limitation, any claim in contract, negligence or otherwise) for any incorrect or misleading information contained in this EoI due to any misinterpretation thereof. This EoI is a request for expressions of interest only and is not an offer document. Responses to it must not be construed as acceptance of an offer or imply the existence of a contract between the parties. By submitting their information, organisations shall be deemed to have satisfied themselves with and accepted all terms and conditions of this EoI. The CSIR makes no representation, warranty, assurance, guarantee or endorsement to any party concerning the EoI, whether with regards to its accuracy, completeness or otherwise and the CSIR shall have no liability to any party in connection therewith.