Asian Development Bank

Green Roads Webinar Series

Turning Plastic Waste into Infrastructure Value in Papua New Guinea

19th FEB 2026

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Scale of Plastic Waste

285,100 tonnes of plastic waste generated, 57% (~161,400 tonnes) escapes into the environment

Around 126,000 tonnes/yr of plastic enters the **marine** environment

Projected 2.3 million tonnes of mismanaged plastic (2024→2035)

Recycling & Waste Systems

Near absence of domestic plastic recycling

Only ~455 tonnes exported for recycling

Waste collection coverage is only ~13% of households

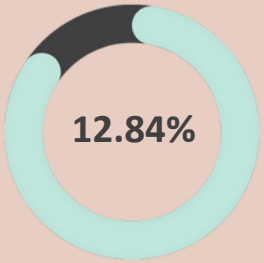
Over 25 unregulated disposal sites and limited formal facilities

Majority of waste is open dumped, burned, or unmanaged

References:
2024, Secreteriat of the Pacific Regional Environment Programme – SPREP
2025, PAPUA NEW GUINEA Waste Data Profile, European Union/SPREP/PacWastePlus


GIVE
WAY

Waste Management in Papua New Guinea



PLASTIC WASTE

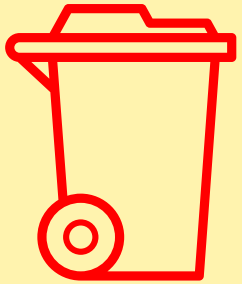
Plastics make up 12.84% by weight of the waste produced in PNG.

PER CAPITA

With a total population of approximately 10 million people, the estimated per capita rate is 134 kg/capita/year.

POPULATION IMPACT

With a 3.1% annual population growth, waste generation is projected to surge by one-third over the next decade.



WASTE MANAGEMENT

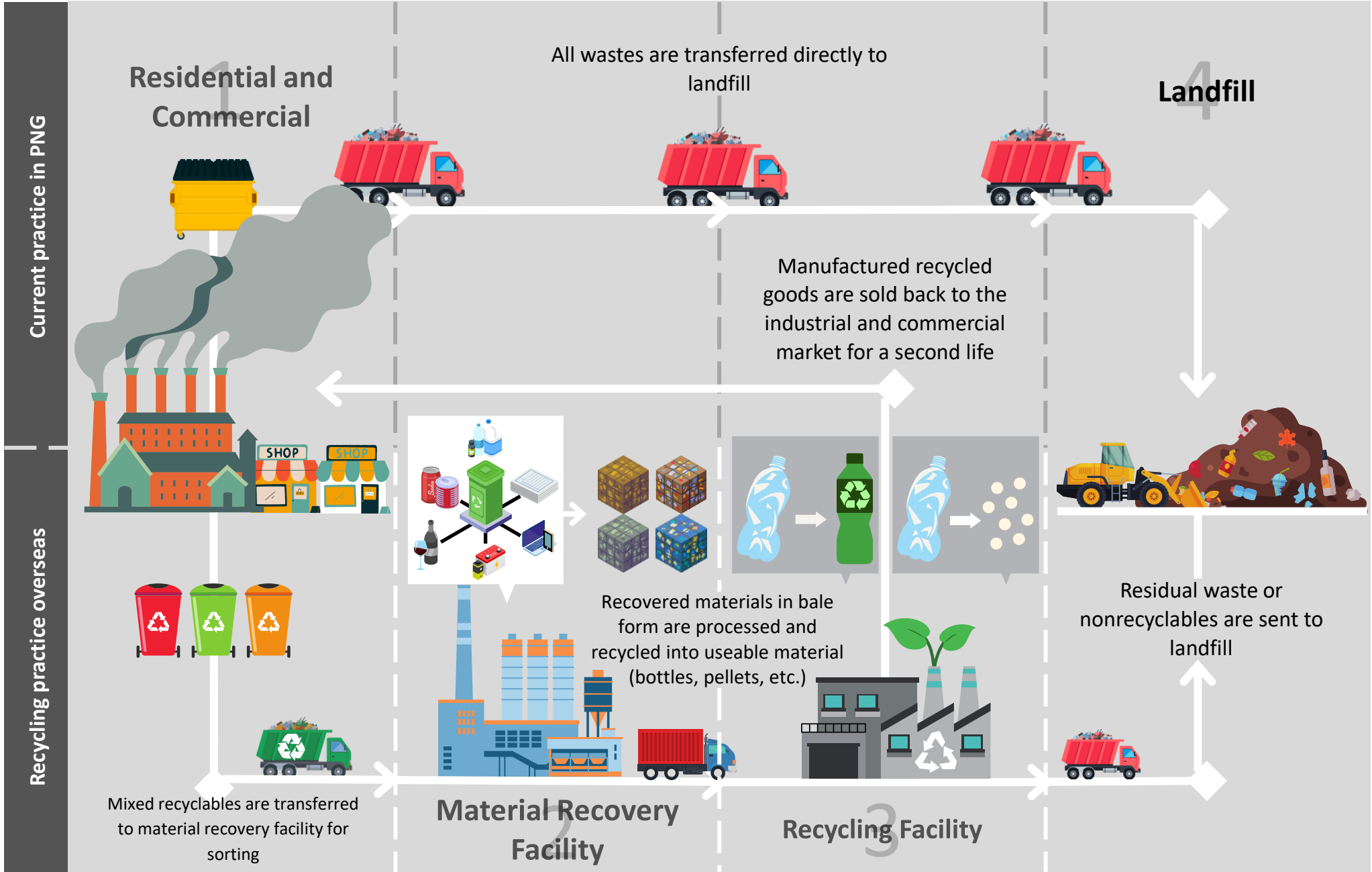
All waste goes to landfill with no segregation.

RECYCLING EFFORTS

Recycling is limited, primarily done by scavengers and private companies

1. Secretariat of the Pacific Regional Environment Programme (SPREP). Waste Audit Report. 2021
2. United Nation Populations Fund. Population dynamics. 2024
3. Worldometer. Papua New Guinea Population. 2024
4. Secretariat of the Pacific Regional Environment Programme (SPREP). Papua New Guinea National Waste Audit Analysis Report. 2023

Current Recycling Practice in Papua New Guinea



Waste Plastic in landfills: high volume, low mass

Waste Management in Papua New Guinea: key insights

Insight #1: PNG faces **very high leakage rates**, meaning waste is not captured for reuse in infrastructure.

Insight #2: Significant opportunity to **divert plastic into construction materials** instead of oceans.

Insight #3: Infrastructure sector is emerging as a **key end-user of recycled plastic and waste materials**.

Insight #4: Growing waste volumes increase the **potential supply of recyclable materials for construction**.

Waste-to-Infrastructure link

New recovery facility (2026) will:

Process 10,000-40,000 tonnes/yr of waste

Produce ~7,000 tonnes of recycled materials annually for infrastructure use

Road Network Scale & Condition

National road network: approx. 8,740-11,535 km (expanding)

Only 1/3 of roads are in good condition

>70% of national roads are unpaved

Only ~2,647 km are sealed roads

Infrastructure Demand & Expansion

“Connect PNG” Programme:

Build 16,000 km of roads over 20 years

Upgrade 9,000 km of sub-national roads

Maintenance & Cost Pressures

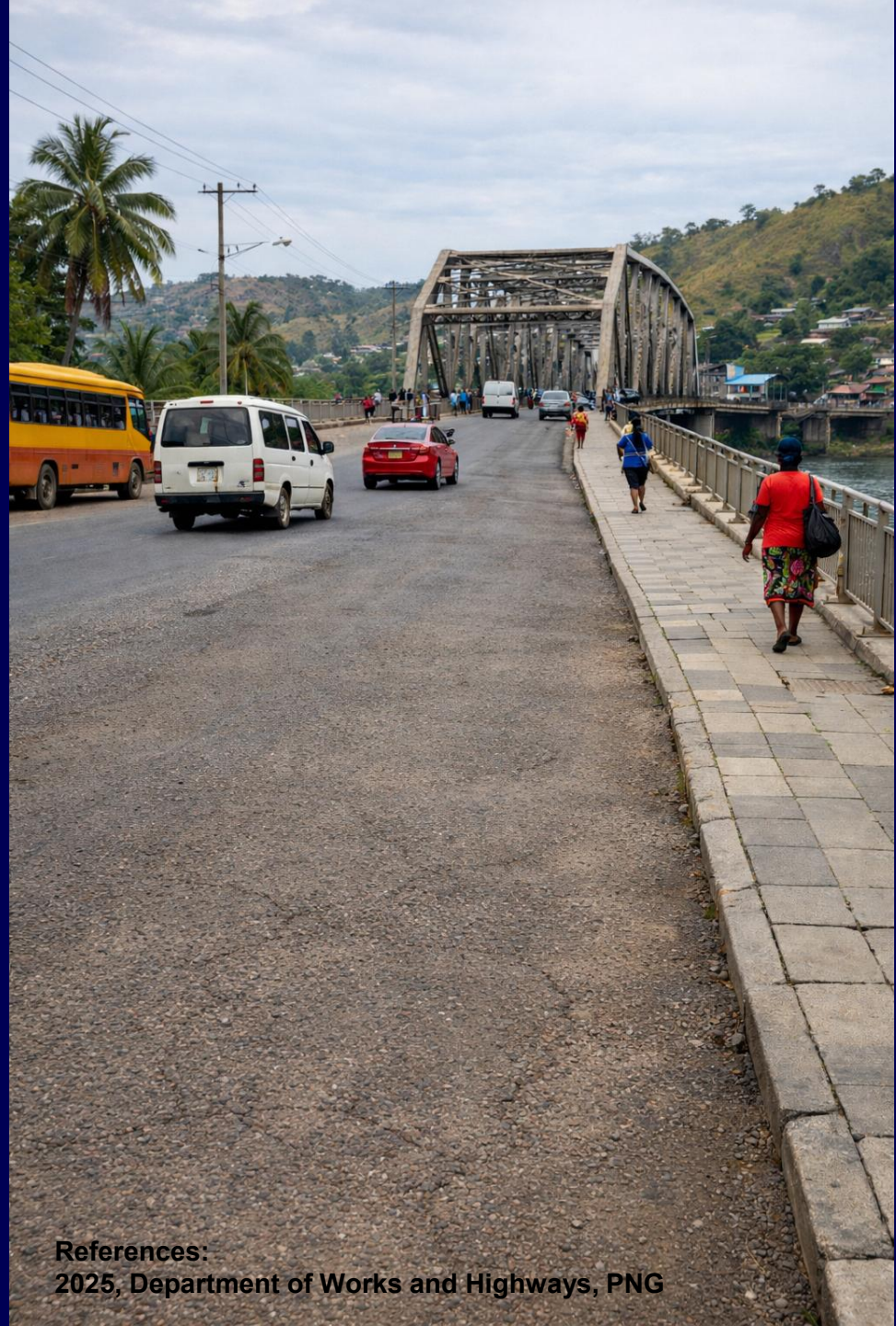
Roads carry ~80% of freight and passenger transport

Annual maintenance backlog: ~K3 billion (approx. USD 0.8B)

Poor maintenance historically: only 25-30% of required funding met

Road Quality Challenges

Landslides and erosion, Heavy rainfall and washouts, Poor subgrade and drainage conditions



References:
2025, Department of Works and Highways, PNG

Footpaths & Urban Infrastructure

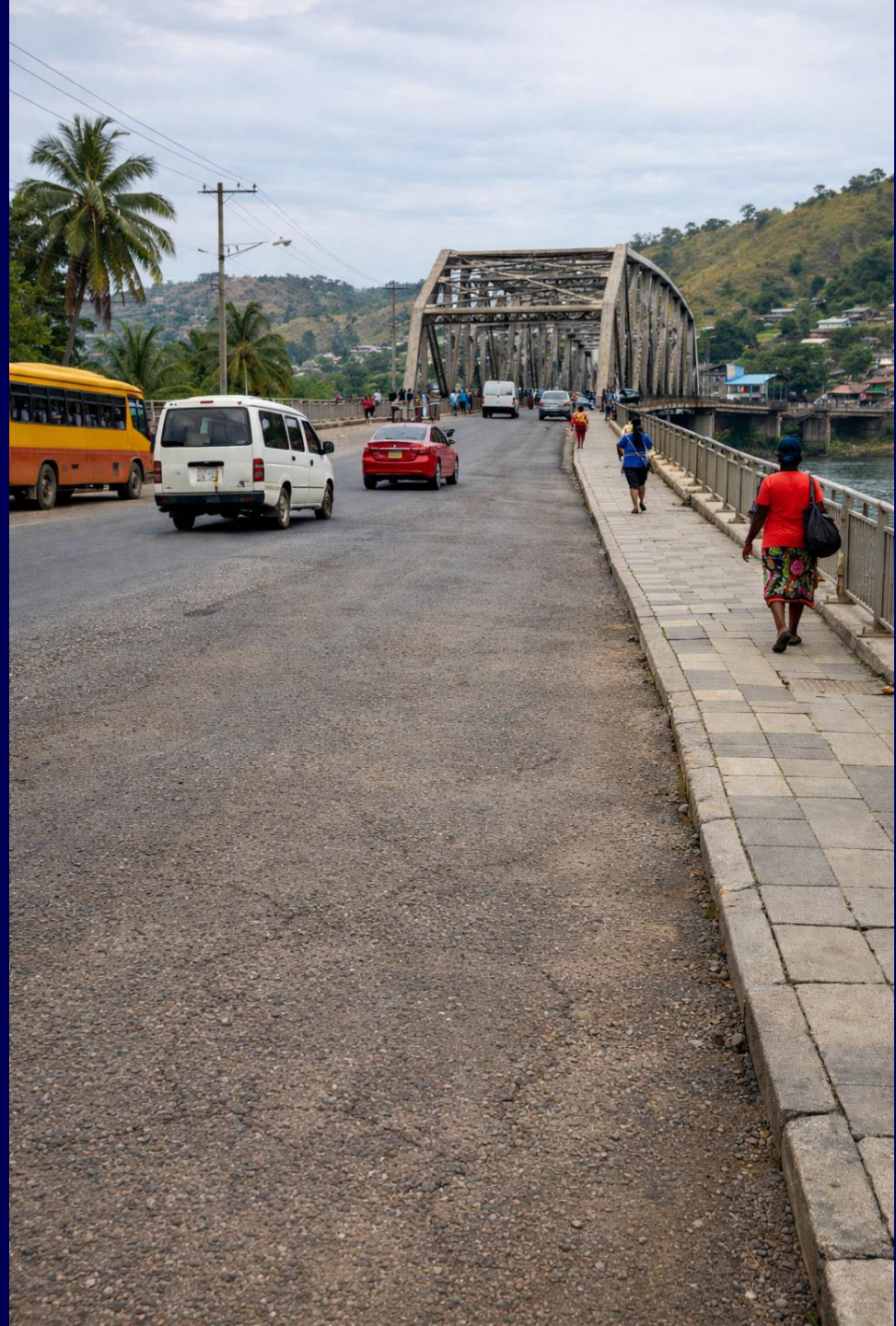
Urban road upgrades underway in: Port Moresby, Lae, Mount Hagen, Kokopo

Rapid urbanisation increasing demand for: footpaths and pedestrian infrastructure, drainage systems and pavements

Bridges, Drainage & Ancillary Infrastructure

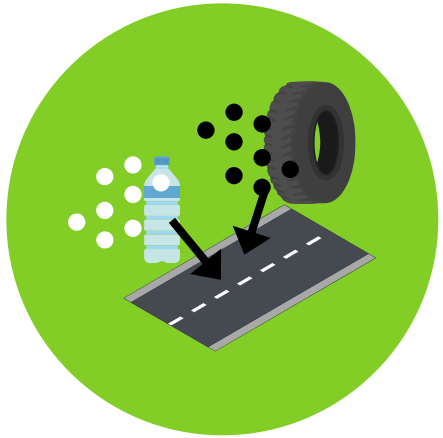
Over 2,000 drainage structures (bridges/culverts)

Approx. 800 bridges, many in poor condition



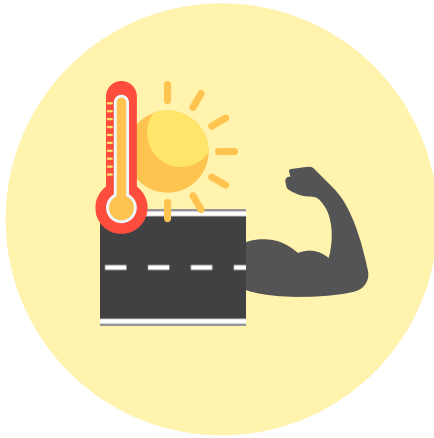
Transport Infrastructure in Papua New Guinea: key insights

- *Insight #1:* infrastructure expansion creates **high demand for construction materials**, opening opportunities for recycled plastic integration at scale.
- *Insight #2:* PNG needs **longer-lasting, lower-maintenance infrastructure** → plastic-modified roads can: reduce potholes, extend lifespan, lower lifecycle costs
- *Insight #3:* **Several products for various applications**: plastic-modified asphalt, geosynthetics from recycled plastics for slope stabilisation, plastic pavers/tiles, drainage components (pipes, culverts), street furniture (benches, noise barriers), composite bridge elements, etc.



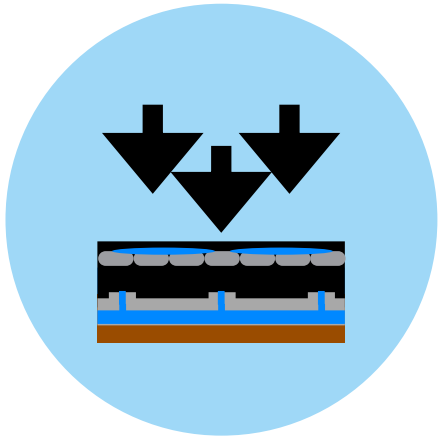
Incorporate recycled materials

Improve infrastructure surrounding environment (embankments, etc.)

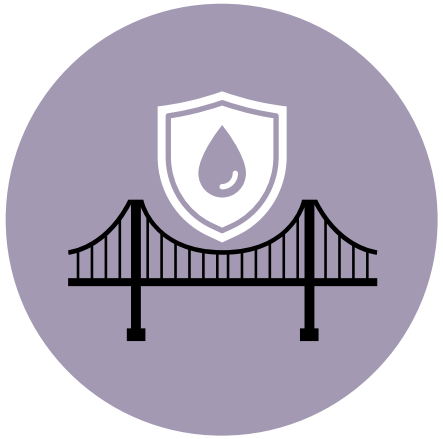


Extreme temperature-resistant pavements

Use of innovative materials



Flood-resilient technologies



Use of climate-responsive materials

Recycled plastic in Transport Infrastructure

Product development and applications in Australia

Piping for utilities, drainage systems, stormwater collection

RPM Pipes – recycled plastic pipes

Noise barriers for high traffic roads

Pact group - Rotationally Moulded Plastic (RMP) Noise Walls

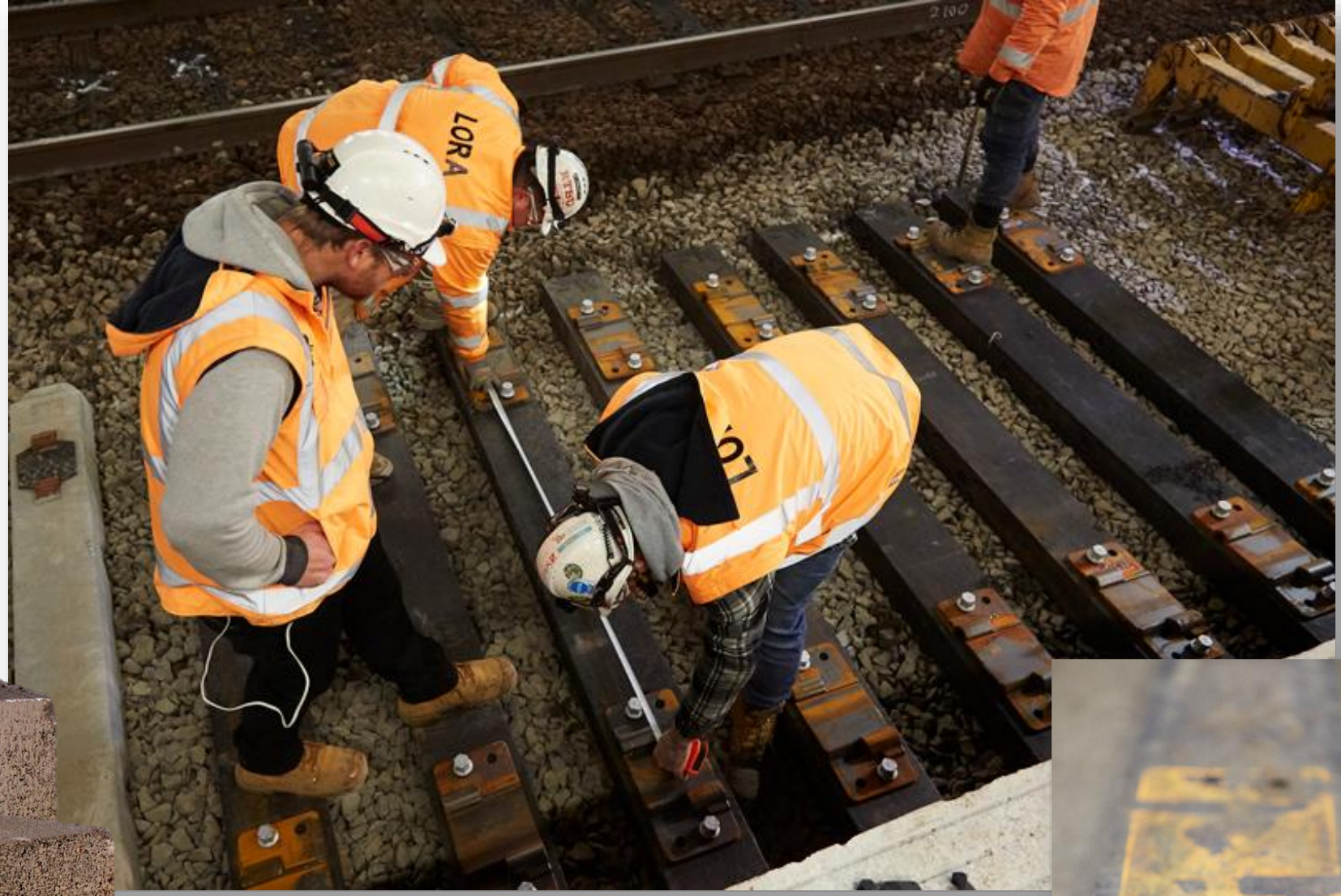
Integrated Recycling – recycled plastic noise barrier walls

Road furniture and lighting

Plasgain – recycled plastic light pole

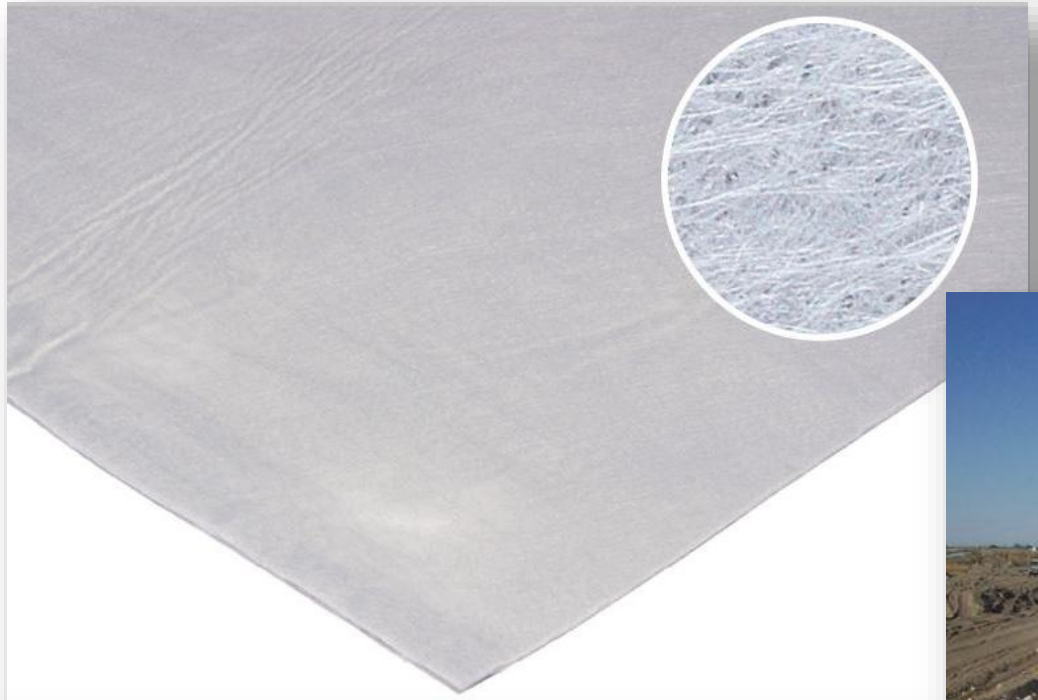
Replas – recycled plastic bench and fence

Railway sleepers and building blocks



Integrated Recycling - Duratrack

Geotextiles (moisture barrier, erosion control, etc.)



Geofabrics – Bidim Green

Material Demand vs Waste Opportunity

Massive material demand

Simultaneously:

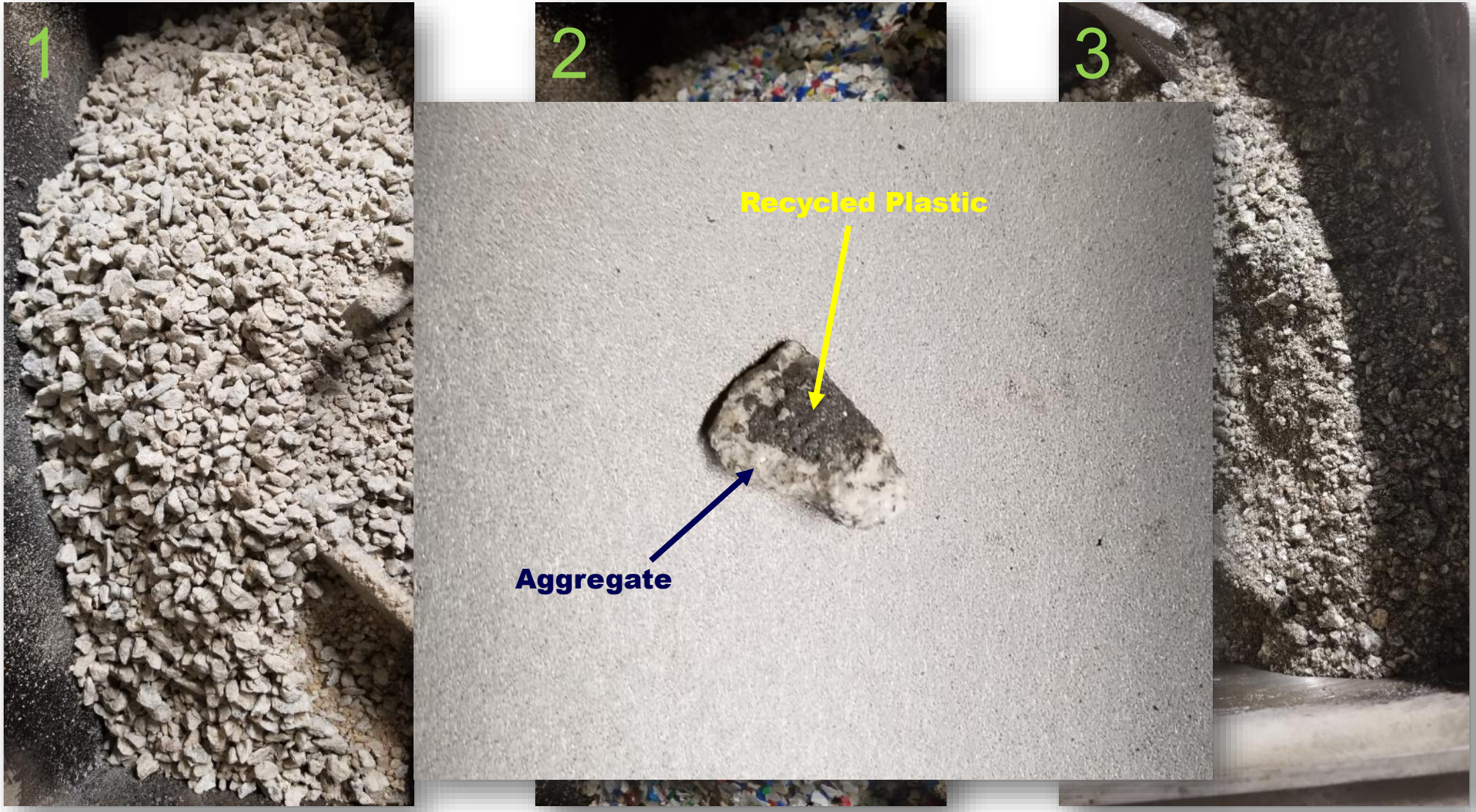
Roads + infrastructure expansion

High plastic leakage rates into the environment (57%)

Plastic in asphalt?

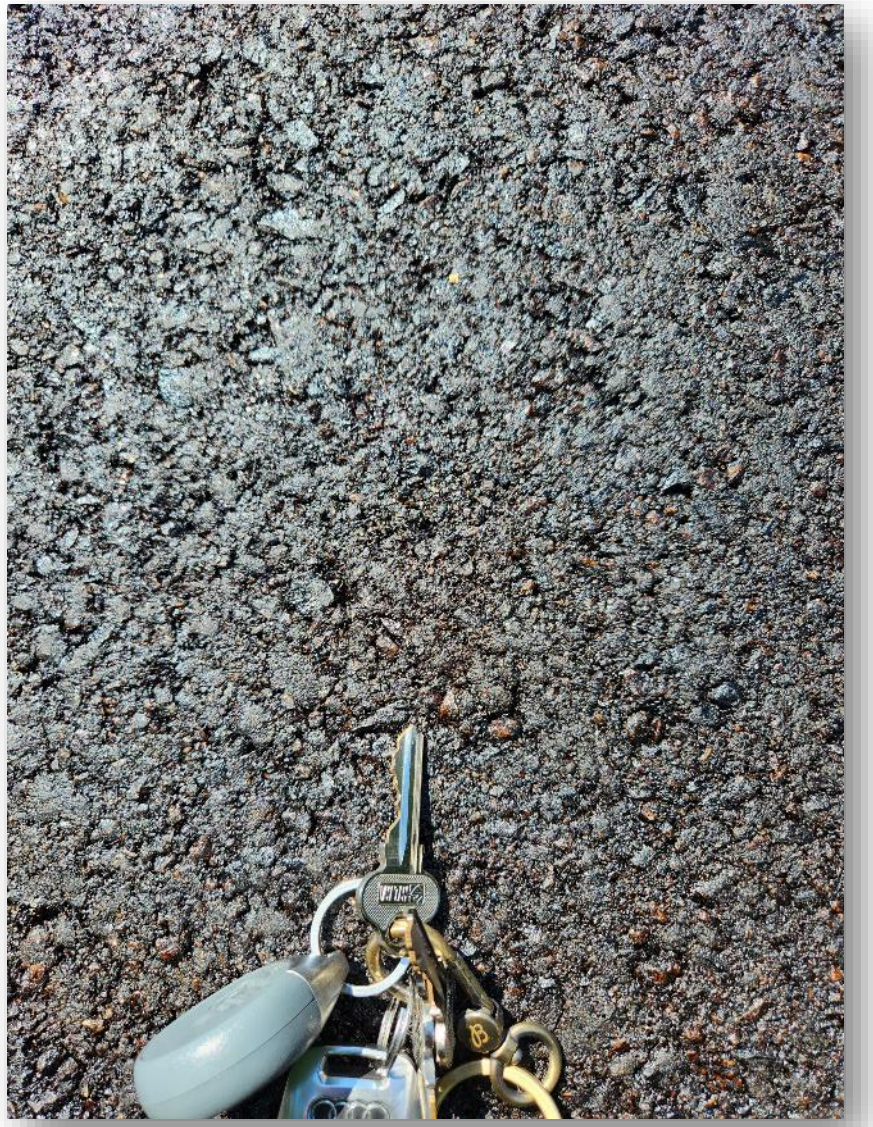
Preparation of Plastic-modified Asphalt

Preparation of Plastic-modified Asphalt



1. Aggregates in the mixer
2. Plastics added to the aggregates
3. Plastic and aggregates after mixing

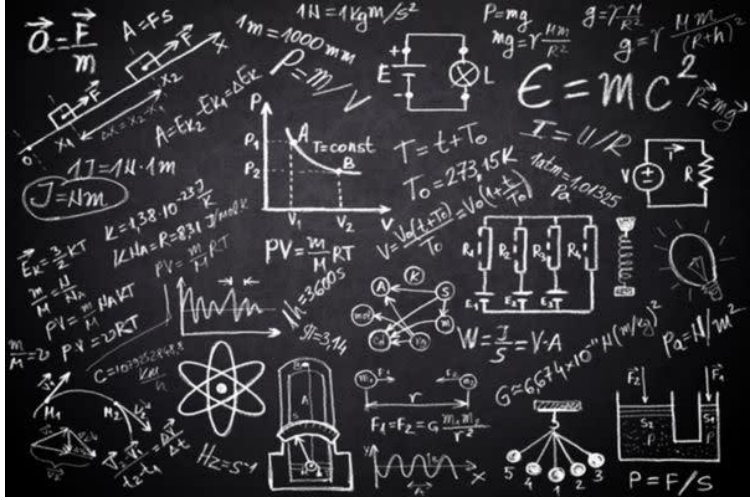
Recycled Plastic in road projects: Australia



Up to 7,500 kg of recycled plastic for every km of road

Recycled Plastic in road projects: worldwide

References to each of those applications can be found in “Recycled Plastic Waste in Papua New Guinea’s Road Infrastructure”, ADB (2025)



It has been proved by many studies all around the world that the use of <u>selected</u> recycled plastic in asphalt roads:

- Improves the road resistance to high temperature
- Enhances resistance to cracking
- Increases asphalt stiffness
- Reduces fuming and emissions at high temperature
- Does not cause additional microplastic problems
- Does not affect the future recyclability of the road material

Technical Specifications in Australia

Austroads

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Test Methods and Specifications

Suitability of Recycled Plastics as Road Construction Materials

Publication no: ATM-458-25 Edition: 1.1

Published: 21 May 2025

PDF (free)

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Home → Publications → Test Methods and Specifications → ATM-457

Test Methods and Specifications

Release of Microplastics from Plastic-Modified Bituminous Mixes (Asphalt Abrasion Test)

Publication no: ATM-457-25 Edition: 1.0

Published: 9 May 2025

PDF (free)

Download

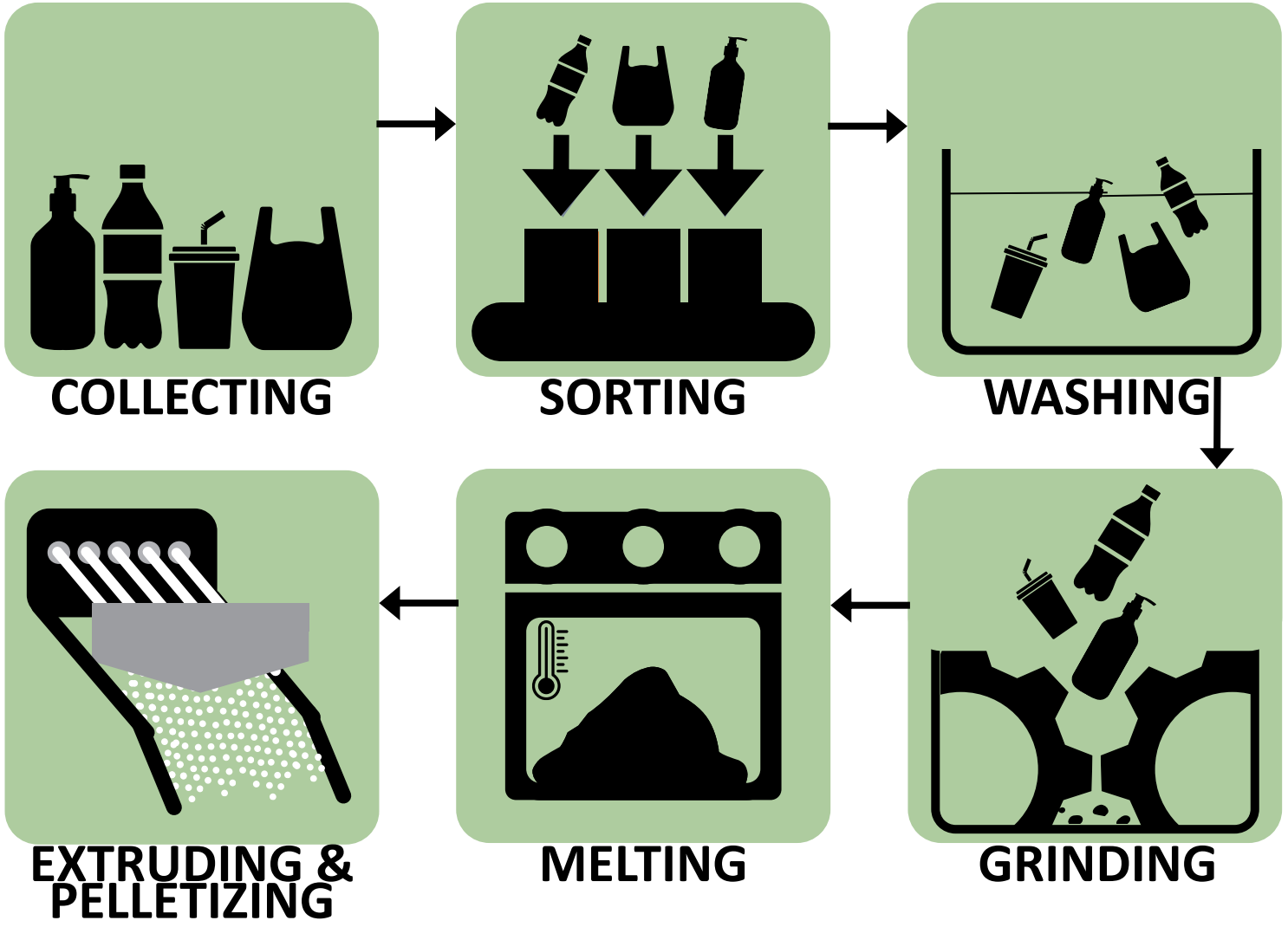
Guideline for the Submission and Registration of Asphalt Mixes Containing Recycled Plastic in Victoria

September 2024

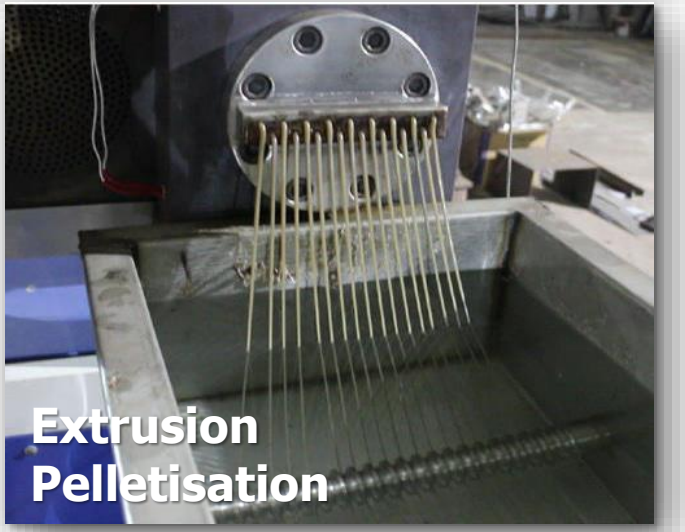
VICTORIA State Government | Department of Transport

Waste Plastic in asphalt ≠ Recycled Plastic in asphalt

What recycling plastic actually means:



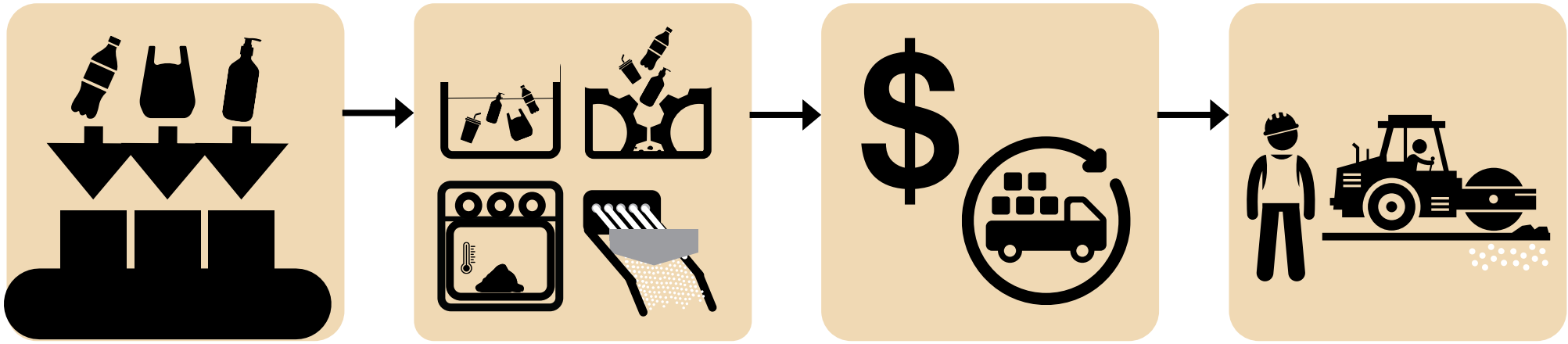
What recycling plastic actually means:



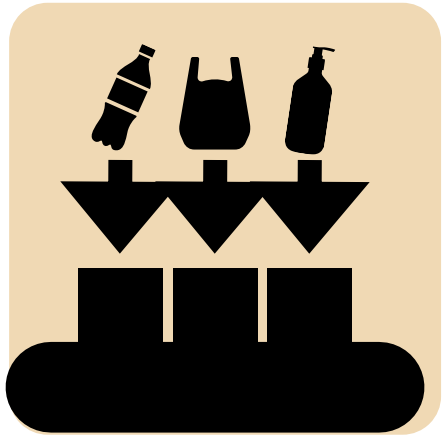
→ Highly Variable Waste → Processing is Critical

Pilot Project in Port Moresby: use of local recycled plastics to implement climate mitigation strategies

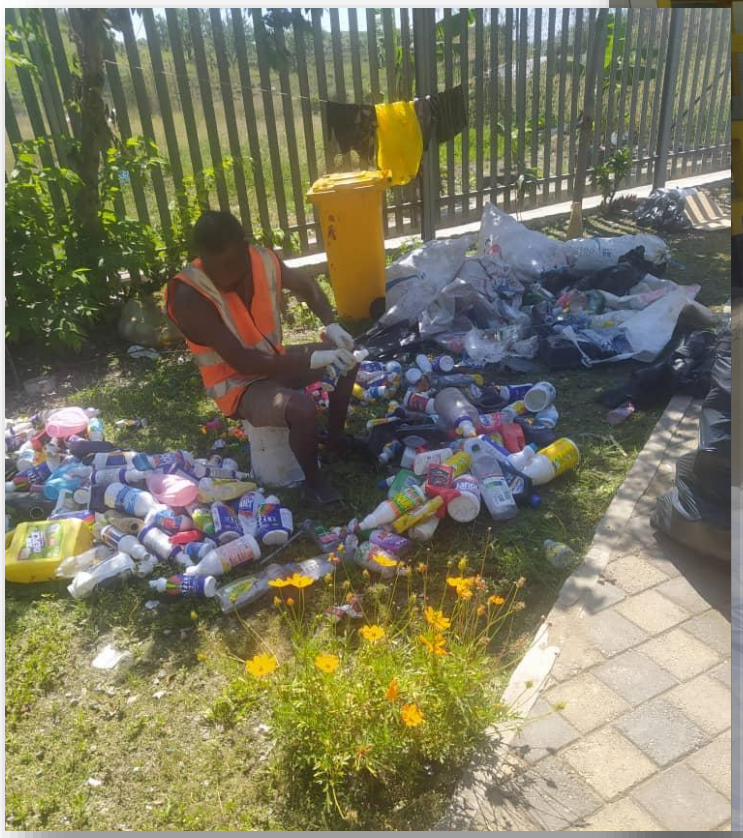
Pilot plastic project in Port Moresby:

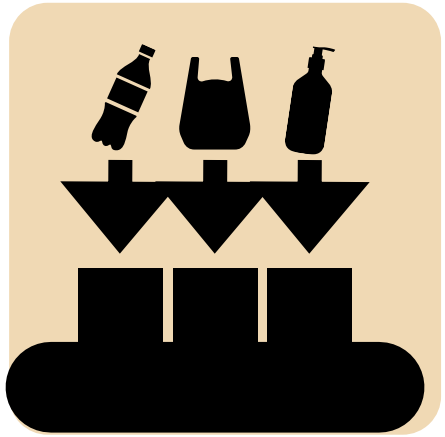


National Capital District Commission



SEGREGATION



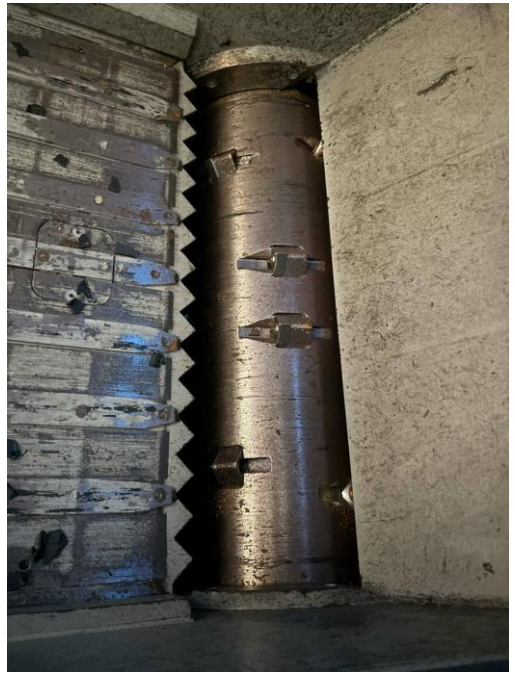


SEGREGATION

National Capital District Commission

PROCESSING

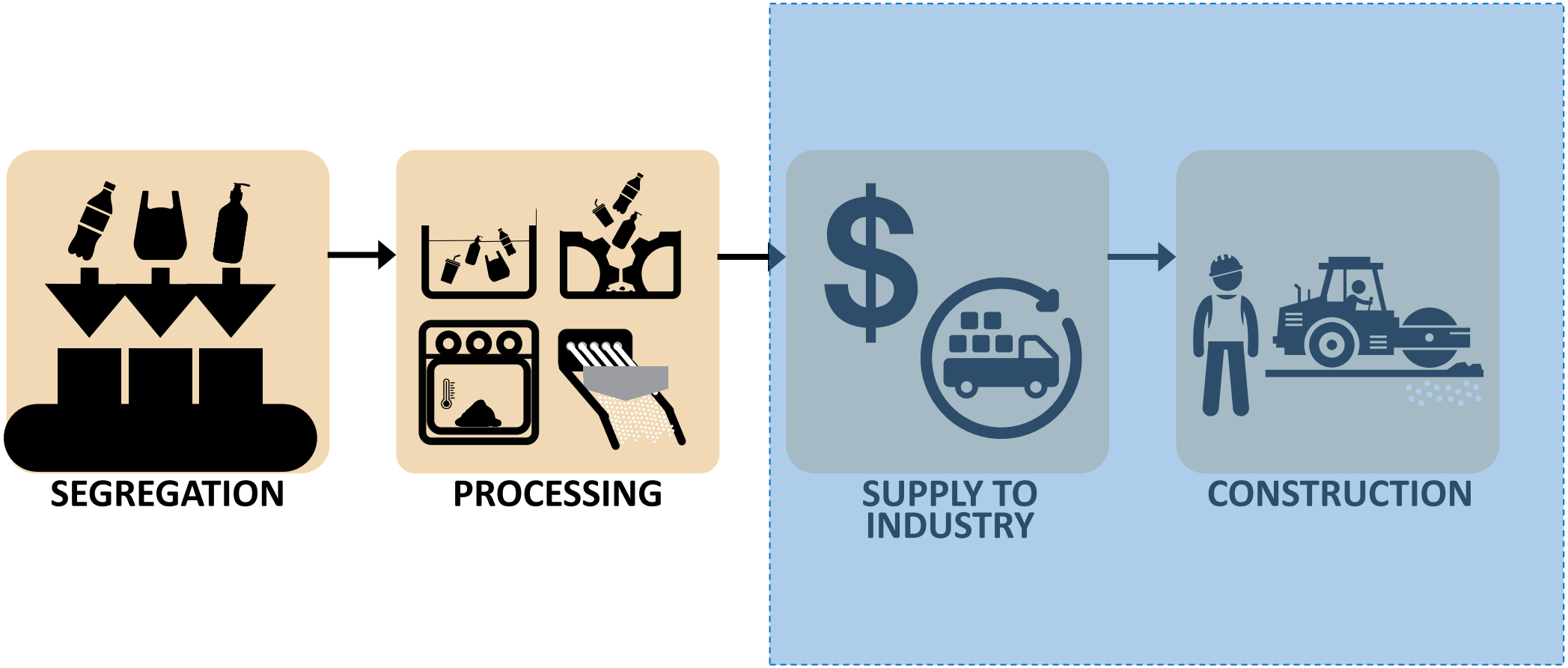
- First of its kind in PNG
- Up to 0.25 ton/hr
- 5-8 mm output size



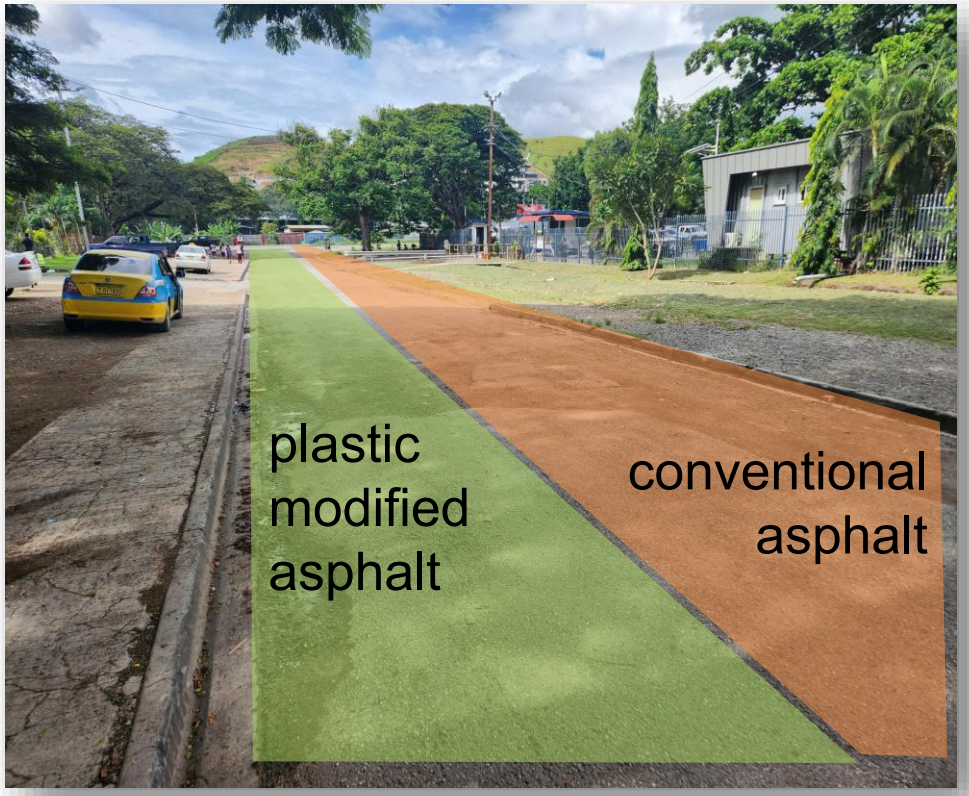
PROCESSING

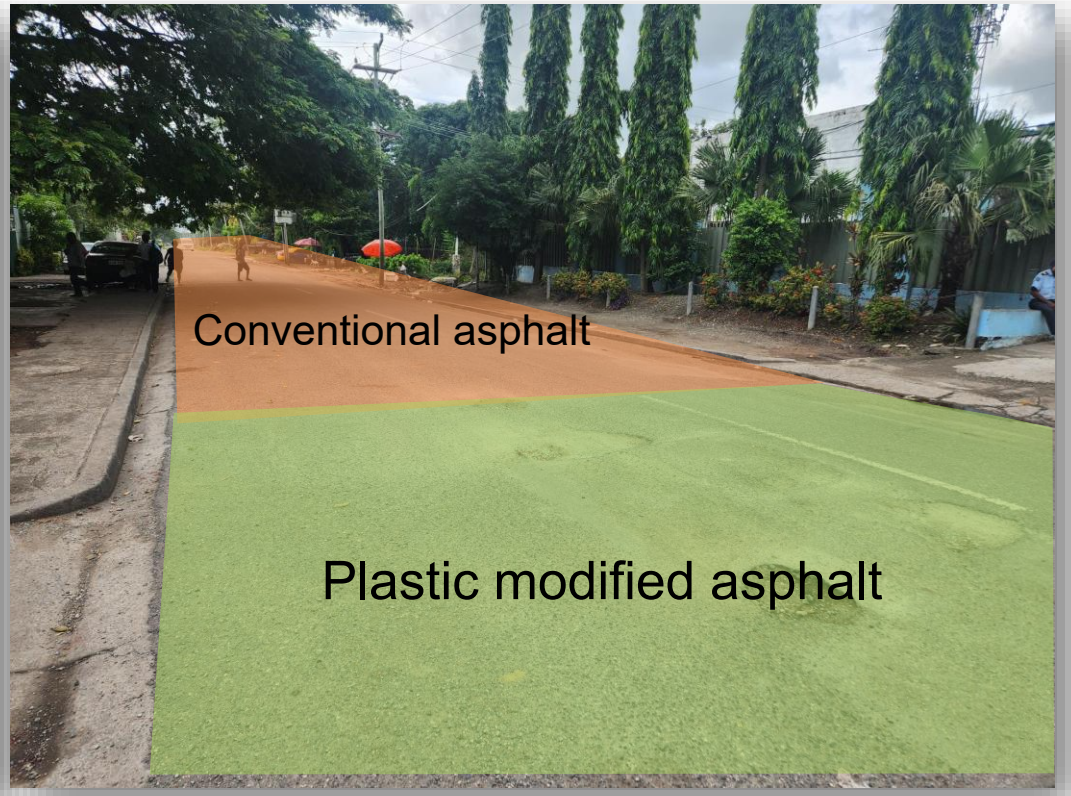
TWM Group

Pilot plastic project in Port Moresby:



CONSTRUCTION





- Waste & Sustainability team (collection of waste, sorting, delivery to TWM)
- Engineering team (procurement - road construction works)

Waste plastic cleaning, reprocessing and conversion to suitable form

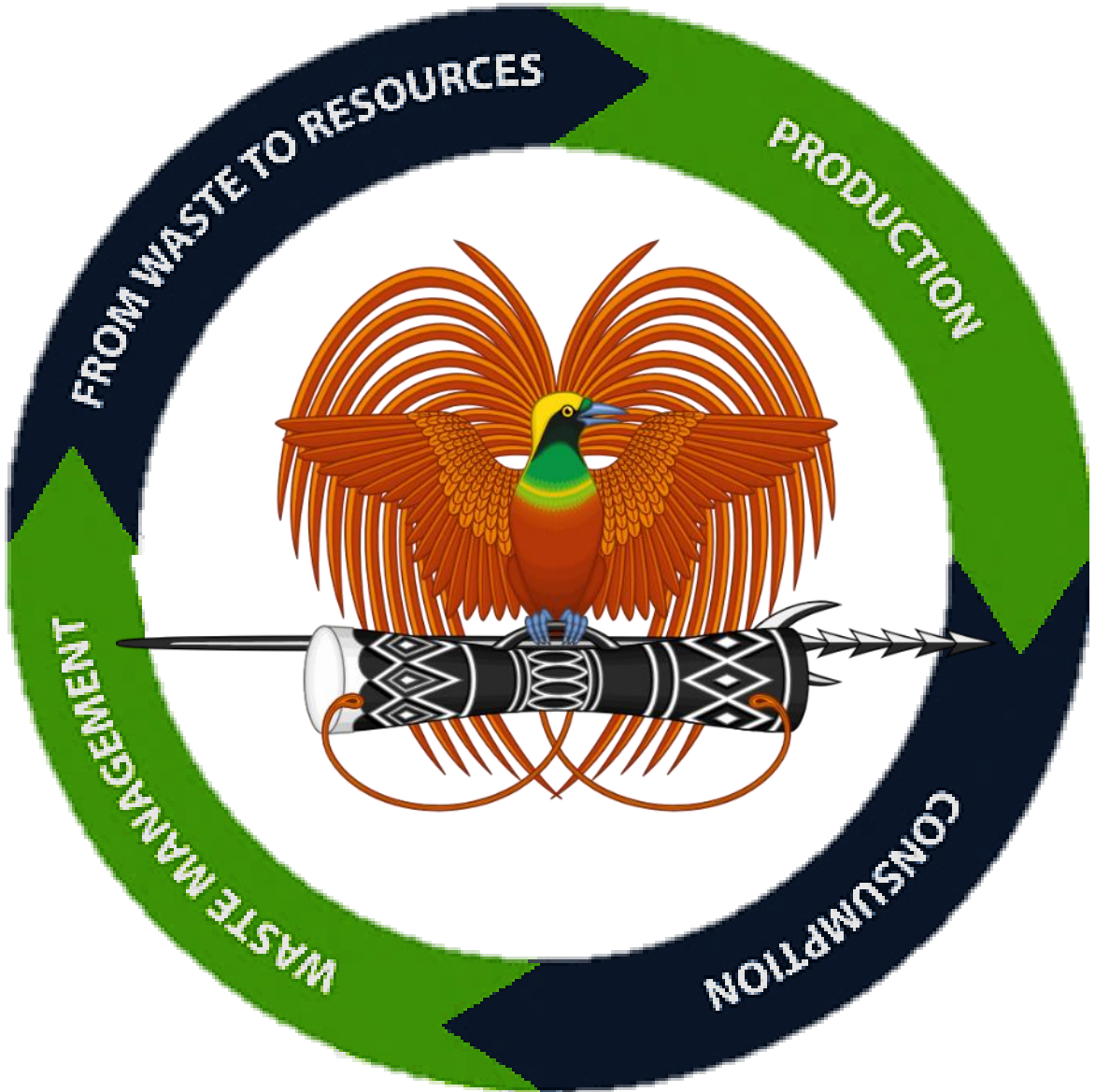
Road construction

Conversion of findings into national specifications for greater uptake

ADB

Technical assistance

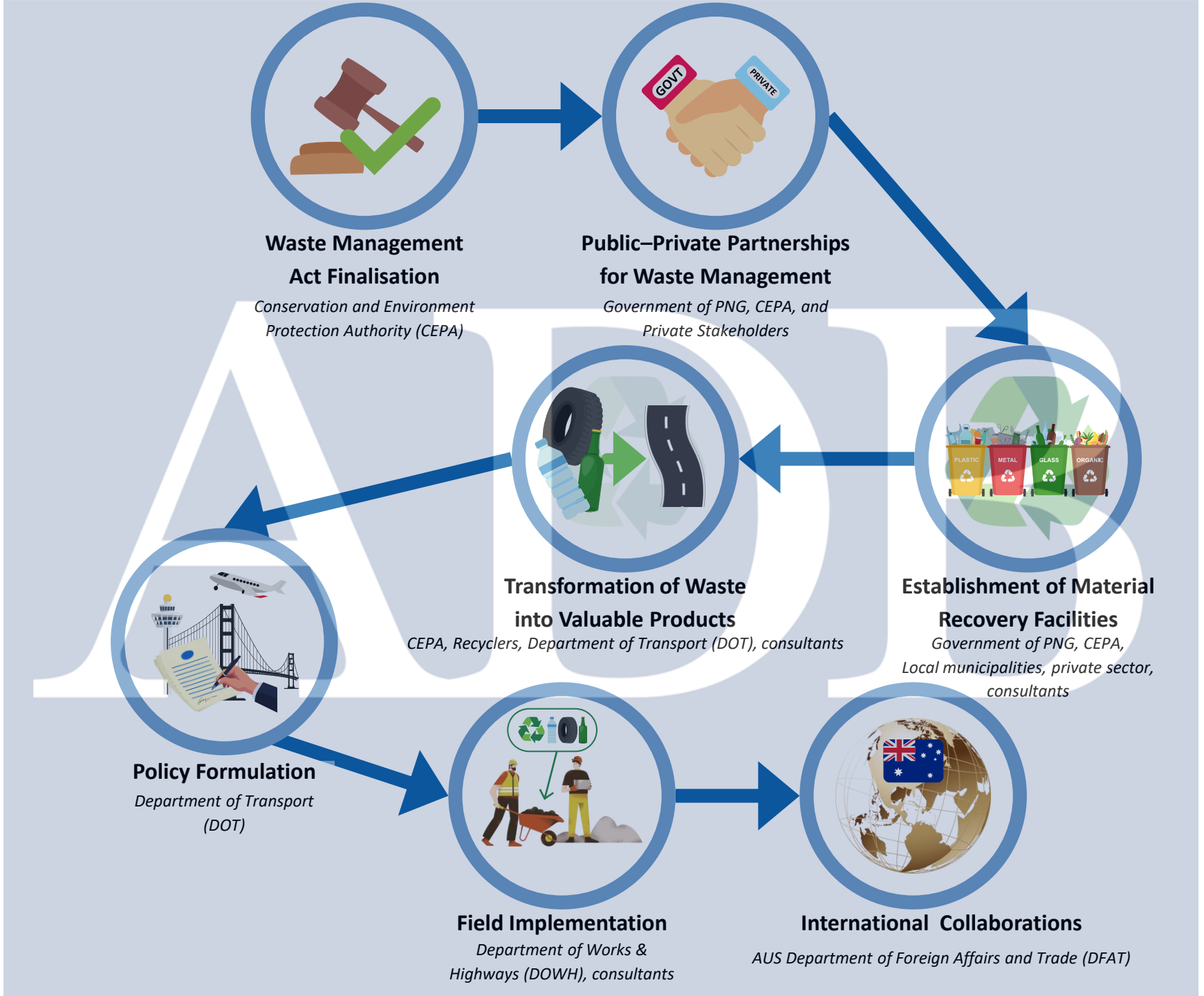
Pilot Project in Port Moresby: recycled plastics in road infrastructure



From ‘linear’ to circular economy

The 1st ADB report on the current plastic waste situation and proposal to reduce the environmental damage in PNG has already been published.

https://www.adb.org/sites/default/files/publication/1062616/sdwp-106-plastic-waste-png-road-infrastructure.pdf


GOVT
PRIVATE
PLASTIC
METAL
GLASS
ORGANIC
Waste Management Act Finalisation
Conservation and Environment Protection Authority (CEPA)
Public–Private Partnerships for Waste Management
Government of PNG, CEPA, and Private Stakeholders
Transformation of Waste into Valuable Products
CEPA, Recyclers, Department of Transport (DOT), consultants
Establishment of Material Recovery Facilities
Government of PNG, CEPA, Local municipalities, private sector, consultants
Policy Formulation
Department of Transport (DOT)
Field Implementation
Department of Works & Highways (DOWH), consultants
International Collaborations
AUS Department of Foreign Affairs and Trade (DFAT)

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Hussain Haider

Masayoshi Ono

NATIONAL CAPITAL DISTRICT COMMISSION

TWM Group

ADB

THANK YOU FOR LISTENING

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