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Infrastructure

Recycled First Summary Report

Progress from 2020 to 2023

An initiative of Victoria's Big Build

VICTORIA'S BIG BUILD

VICTORIA State Government

Contents

1. Introduction

In 2023, ecologiQ undertook a review of the major transport infrastructure projects procured under the Recycled First Policy to assess the effectiveness of the policy and ecologiQ program in driving greater use of recycled and reused materials.

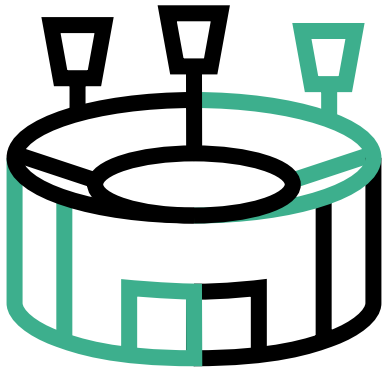
Under the Recycled First Policy, contractors are required to produce a Recycled First Plan, including recycled material commitments, and report on these commitments during delivery and at completion. The data collected from contractors by ecologiQ has enabled the team to understand recycled material usage rates across projects, barriers to greater adoption and opportunities to drive greater use of recycled materials.

The key insights and performance of the policy and program are encouraging and have helped the ecologiQ team identify priorities to improve the adoption and implementation of priority recycled and reused materials across Victoria's major transport infrastructure projects.

1.1 Data sources

The data used was obtained from multiple sources, including Recycled First Plans and close out reports, tender schedules, standards and specifications, interviews with recycled material suppliers, the ecologiQ Demand Model and the Recycling Victoria Data Hub. The data relates to major transport infrastructure projects procured under the Recycled First Policy.

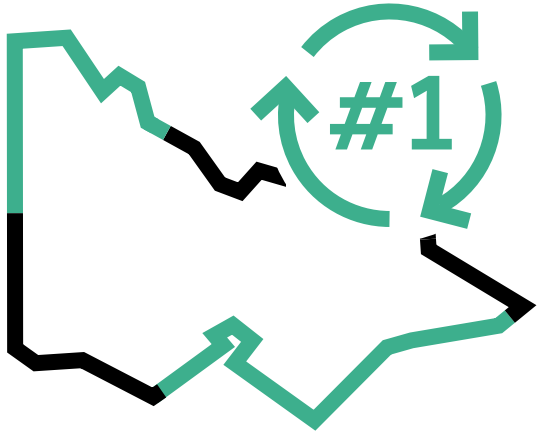
1.2 The highlights



3.4M+

Tonnes of recycled materials have been committed, which is enough to fill the MCG.

The uptake of permitted opportunities* to use recycled materials has almost **DOUBLED** on road projects since the policy was introduced in March 2020.



Victoria is leading the way, with Recycled First road projects exceeding Infrastructure Australia's estimate for using recycled and reused materials allowed under current standards and specifications.

Figure 1 – Highlights

**The maximum recycled content allowed under current standards and specifications*

2. Adoption of recycled and reused materials

2.1 All projects

This section outlines the usage of recycled and reused materials across major road and rail projects procured under the Recycled First Policy. The majority of projects procured during this period were road projects, with only a small number in the rail sector. This is reflected in the data on this page.

Figure 2 represents the total amount of recycled and reused material (by weight) that has been used or planned to be used in the state's road and rail projects procured under the Recycled First Policy. At the same time, the use or planned use of this amount of recycled and reused material is diverting tonnes of otherwise waste from Victorian landfills.

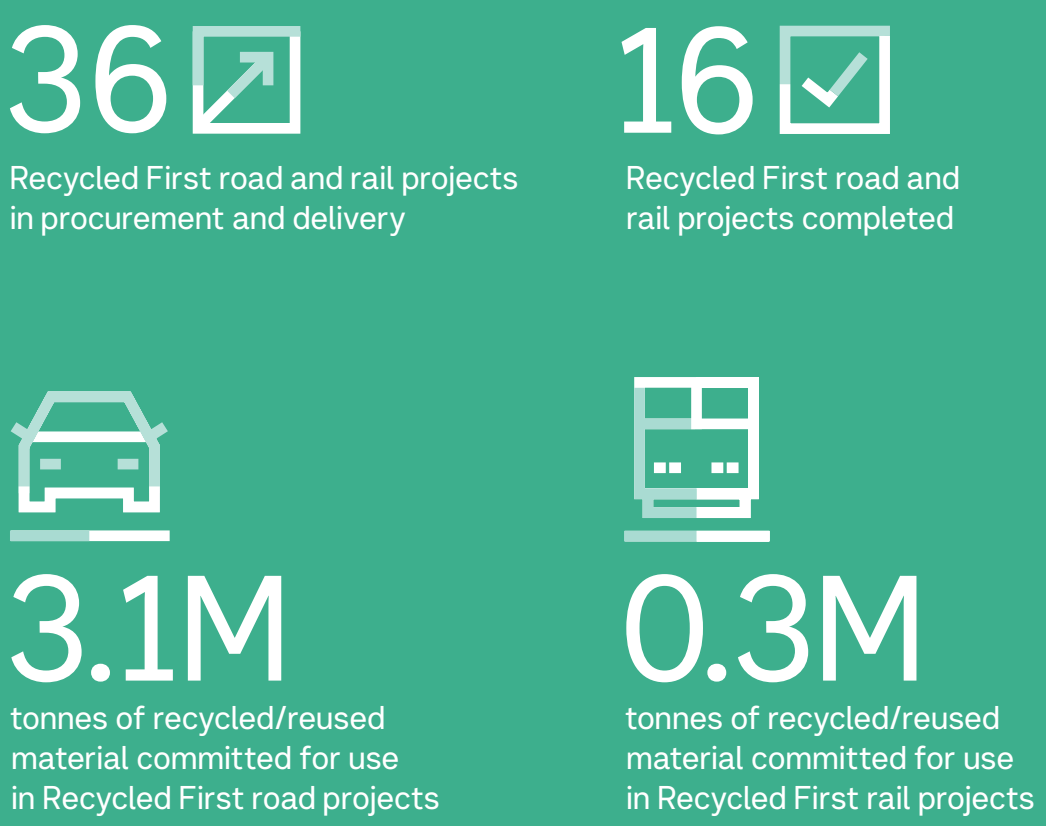


Figure 2 – Total amount of recycled / reused material by weight (all projects)

2.2 Road projects

2.2.1 Key insights

- Metropolitan road projects have a 2 to 3 times higher recycled material adoption rate than regional projects. This is primarily due to local product availability and transport constraints on regional projects.
- The main reasons raised by regional projects for using lower quantities of recycled and reused materials relate to:
  - Supporting local suppliers, who may not supply recycled options
  - Transport costs, carbon emissions and inefficiencies associated with transporting recycled or reused materials from distant suppliers.
- Our data shows there is an ongoing upward trend in using recycled and reused materials on metropolitan road projects.

Since the introduction of the Recycled First Policy, the uptake of permitted opportunities to use recycled and reused material has almost doubled on major road projects.

Table 1 – Recycled material adoption rates (metropolitan vs regional Recycled First road projects)

We have compared the adoption rates* of recycled and reused materials across different material / product categories in metropolitan (17) and regional (9) road projects. For most products, metropolitan road projects adopted higher recycled or reused content.

Material / product category	Metro MRPV projects	Regional MRPV projects	Metro vs regional
Wearing course asphalt	64%	34%	Metro 1.9x higher
Base/intermediate course asphalt	65%	40%	Metro 1.6x higher
Crushed rock and cement treated crushed rock (CTCR)	94%	20%	Metro 4.6x higher
Fill	47%	22%	Metro 2.2x higher
Non-structural concrete	18%	6%	Metro 3.3x higher
Structural concrete	28%	23%	Metro 1.2x higher
Granular filter material	65%	0%	No regional use
Topsoil	6%	11%	Regional 1.6x higher

**The uptake of recycled and reused materials, measured as a percentage of the maximum potential recycled content as permitted by current standards and specifications.*

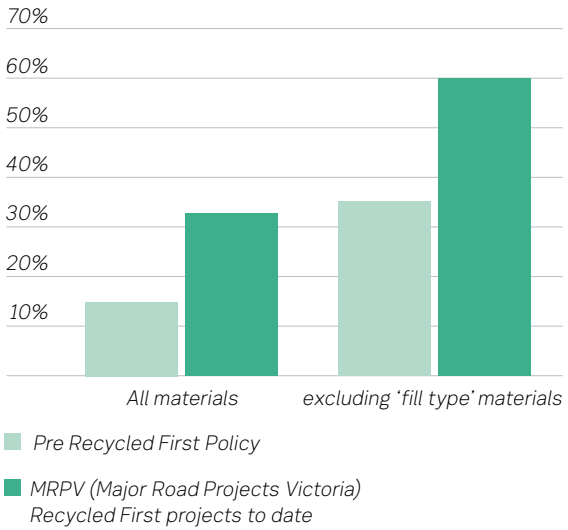
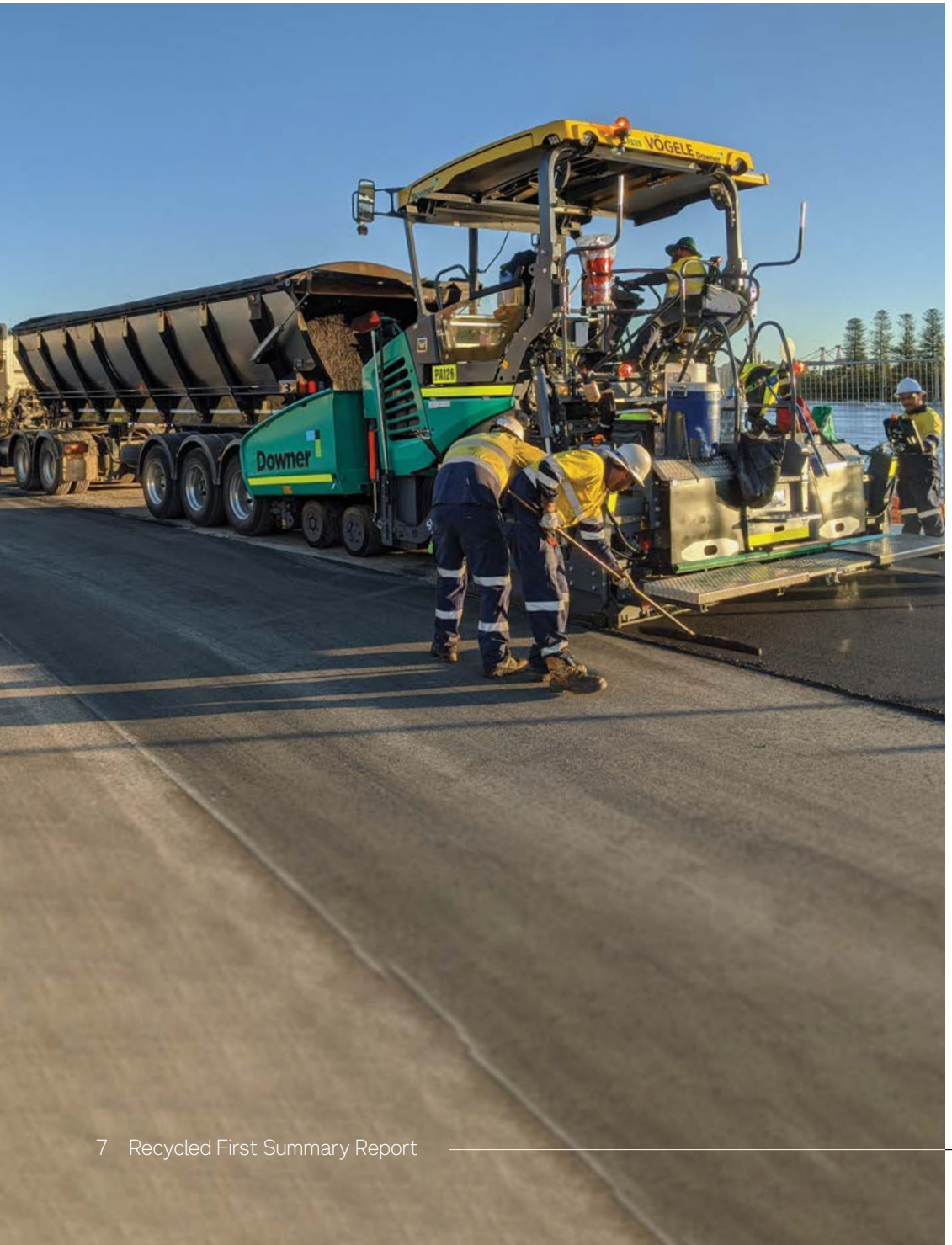


Figure 3 – % Adoption of possible recycled / reused material opportunities (all road projects)



Reviewing projects that have reached practical completion, the following product types and/or materials were reported as having higher or lower recycled material use than contractors had anticipated in their initial Recycled First Plans.

↑ **Higher**

Fill

In-situ stabilised pavement

Spray seal

Recycled plastic drainage pipes

Granular filter material

Conduits

↓ **Lower**

Figure 4 – Application / product types with higher and lower than planned usage (completed road projects)

Contractors typically cited design changes and tender phase estimate accuracy for lower than anticipated product use. Design changes and supplier / product availability were often cited where product use was higher than anticipated. Notwithstanding the lower use of some products, the overall program of Recycled First projects is on track to deliver in excess of the total commitments for recycled and reused material

2.2.2 Future opportunities

When looking towards the future our data shows:

- The biggest opportunities for increasing the use of recycled or reused materials are within crushed rock and intermediate course asphalt, due in part to their high volume of use on projects and high potential recycled content
- Priority (but low adoption) waste streams such as plastic and rubber needs to have a greater focus over lower value materials like bulk fill
- Due to its size and scale, North East Link provides an opportunity to deliver a very significant quantity of recycled and reused materials over coming years.

2.3 Rail projects

2.3.1 Key insights

- The adoption of recycled and reused materials on rail projects has been slower and therefore more challenging compared to road projects.
- Despite this, we are starting to see Recycled First rail projects adopt a range of innovative recycled material products, especially those which contain recycled plastic content. Recycled plastic composite sleepers, recycled plastic conduits, recycled plastic drainage pipes, recycled plastic permanent bollards and recycled plastic temporary safety barriers.
- Recycled and reused material adoption has been broken down by material type across Victoria's Recycled First rail projects. Table 2 shows the amount (in tonnes) of recycled and reused material that has been used or committed for use on these projects.

2.3.2 Future opportunities

The procurement of Suburban Rail Loop East presents an opportunity to integrate notable volumes of recycled and reused materials.

Early works commitments and delivery for Melbourne Airport Rail have been included in the results to date. Future opportunities will be dependent on timing of future works which is unknown at the time of this report.

Table 2 – Recycled material quantities (Recycled First rail projects)

Recycled or reused material	Committed or planned use (tonnes)	Delivered as of end of October 2023 (tonnes)
Crumb rubber	3	–
Crushed brick	6,926	–
Crushed concrete	59,713	28,247
Crushed rock (recycled)	5,381	2,603
Fill (recycled)	16,046	6,129
Glass / Glass fines	11,962	1,124
Plastic (recycled)	4,146	287
RAP	4,944	843
Recycled ballast	41,601	–
Sand (recycled)	489	149
SCMs	48,694	11,983
Site won (reuse)*	110,835	62,247
Steel (recycled)	9,267	8,512
Textiles	0.01	0.02
Timber (reuse) and mulch	44	–
Topsoil / soil (site won)	26,984	910
Total	347,034	123,046

Across rail projects completed, procured or in delivery under the Recycled First Policy, we are seeing:

- High quantities of crushed concrete and site-won materials have been adopted in rail projects – this is consistent with road projects.
- Only small quantities of emerging waste materials such as plastics and crumb rubber have been delivered so far.

**Site won material is sourced from within the boundaries of the project, including reusing excavation or demolition materials*

3. Feedback and lessons

3.1 What has worked well

The Recycled First close out reports provide an opportunity for contractors to give feedback on the Recycled First Policy and its implementation.

The key themes that emerged from the feedback given by contractors to date have been summarised below:

- The policy is driving a culture of sustainability across transport infrastructure
- The Recycled First Plans and reporting tools assist with implementing the policy
- Contractors who consider Recycled First early are more likely use more recycled materials and reach successful outcomes

The majority of feedback was positive and the comments relate to ways in which the Policy and ecologiQ's tools helped contractors achieve better Recycled First outcomes on their projects.

Recycled First Policy helped us to think out of the box and set a right culture leading the charge to change infrastructure practices, minimising waste, and promoting circular economy.

The Project was able to exceed some of the Recycled First quantities by identifying opportunities early, implementing in design, procuring, and securing contracts early.

3.2 What we have learned

3.2.1 Delivery quantity differences

As part of a project's Recycled First close out report, contractors are required to provide reasons for using more or less of the recycled materials committed to in the Recycled First Plan. The main reasons raised by contractors relate to:

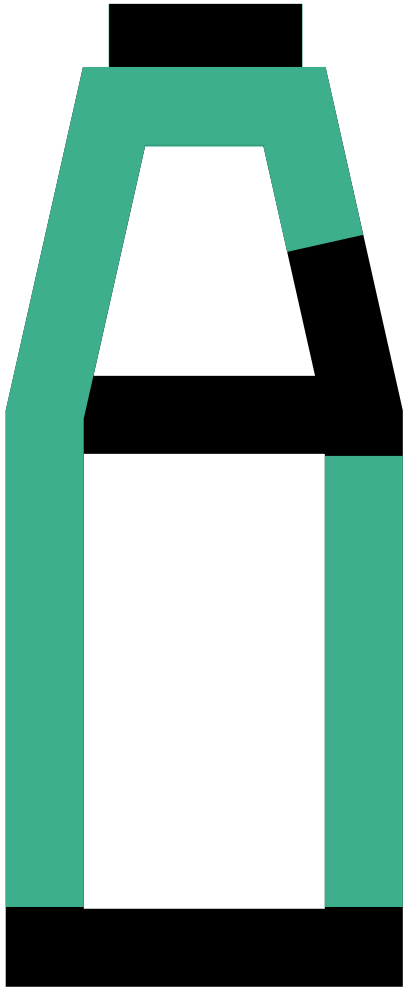
- Design changes
- Supplier / product availability
- Tender phase quantity estimate accuracy
- Quality of site-won materials
- Re-work (due to defects or weather)
- Product quality
- Approvals.

3.3 Challenges and improvement opportunities

In assessing all the Recycled First Close Out Reports, contractors highlighted the following challenges and opportunities for improvement in the implementation of Recycled First Plans– shown in *Table 3*.

Table 3 – Challenges and opportunities noted by contractors

Challenge	Detail	ecologiQ response
Application of the Recycled First KPI (MRPV)	Road projects among the first to be completed under the Recycled First Policy didn't originally contain KPI clauses and/or specifics of assessment in the contract.	Recommend KPI relating to Recycled First developed prior to procurement. ecologiQ is available to support delivery offices with the development of KPIs as required from lessons learned to date from Recycled First implementation.
Tender phase time constraints	During the tender phase and shortly after contract award there remains uncertainty with regard to approval of mix designs and material quantities and limited time to explore options for use of recycled materials.	We have seen better outcomes when recycled material opportunities are considered at this early stage. Further initiatives to optimise recycled content can be implemented by projects during delivery.
Education and guidance	Contractors noted a need for support in the areas of using the reporting table and recycled first plan development and reporting requirements.	ecologiQ has developed a series of training videos and user guides to support contractors to complete Recycled First Plans and reporting table and close-out reports. These are now available on our Knowledge Hub.
Record-keeping	Contractors noted the challenges associated with monitoring and recording the amount of recycled material content/use in materials delivered to site.	Note the challenge of monitoring and recording recycled materials data including from subcontractors. Some contractors have suggested this could be addressed by allocating dedicated resources responsible for recording recycled content in site diaries and tracking systems.



3.4 Materials in focus

A key part of ecologiQ's role is to work with key stakeholders and contractors to remove barriers to using recycled and reused materials.

Feedback from projects which have completed their Recycled First Plans has helped ecologiQ identify the following materials as facing various adoption barriers. They are:

- Crushed brick in crushed rock mixes
- Recycled plastic drainage pipes
- Recycled content in non-structural concrete
- Recycled plastic conduits
- Recycled plastic SSD (Agi Pipes)
- Higher RAP content in asphalt
- Recycled Glass in Asphalt
- SCMs in Concrete Drainage Pipes
- Recycled content in Type A fill.

The above materials are broadly consistent with those targeted by other Victorian Government Departments and Authorities.

4. Targeted actions and next steps

The review of projects procured under the Recycled First Policy has helped us identify priority actions for the ecologiQ program to address barriers and challenges to increase the adoption of recycled and reused materials on future projects.

The key actions mostly relate to materials in focus and their various applications. There are also general actions for the ecologiQ team to help improve the administration of the program.

Key actions for the program include:

- Targeted engagement with suppliers, contractors and asset owners to address barriers to increasing the use of recycled and reused materials
- Improving supply chain issues such as market capacity to manufacture materials and contractor accessibility to these materials
- Promoting the use and features of recycled and reused materials through a range of communication channels
- Investigating technical issues and influencing standards.

5. Future demand and trends

ecologiQ has developed a Demand Model to understand the future demand for recycled and reused materials across Recycled First major transport infrastructure projects between 2023 and 2027.

The model shows that between 2023 and 2027, more than 15 million tonnes of materials will be needed to construct our major infrastructure transport projects.

Additionally, ecologiQ is working with the following projects, which are not covered by the Recycled First Policy, to ensure progressive recycled and reused material outcomes are reached.

- North East Link Early Works
- North East Link Tunnels Package
- Metro Tunnel Project
- Level Crossing Removals.

If all opportunities to use recycled or reused materials are adopted, as allowed under current standards and specifications, then approximately two-thirds of the material can be replaced by recycled or reused alternatives (around 10 million tonnes).

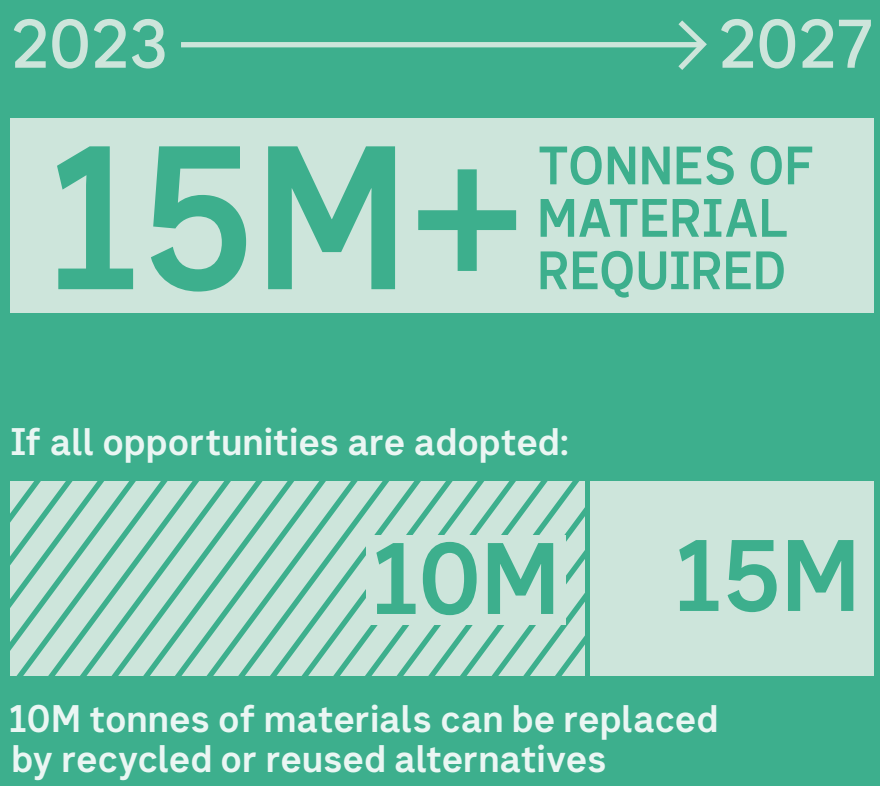


Figure 5 – The ecologiQ demand model forecasting future demand for materials across major transport projects.

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Contact us

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