



# Waste 2 Resource - Annual Status Report 2021/2022

October 2022

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## Departmental approvals

Refer to the appropriate Risk Assessment Tool for relevant reviewer and approver

Date	Name	Position	Action required (Review/endorse/approve)	Due
27/09/2022	Carmen Garbe	Manager (Environment)	Review	27/09/2022
28/09/2022	Nicola Boyd	A/Director (Environment)	Endorse	28/09/2022
4/10/2022	Neil Scales	Director-General (TMR)	Approve	4/10/2022

## Risk level

- GACC major       GACC minor       High risk (but not GACC)       Medium risk

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# Contents

<b>Tables</b>	<b>5</b>
<b>Figures</b>	<b>5</b>
<b>Executive summary</b>	<b>6</b>
<b>1. Introduction</b>	<b>8</b>
1.1 Key Terms	8
1.2 Waste Data Collection	9
<b>2. Waste Reporting</b>	<b>10</b>
2.1 Overall Departmental Waste	10
2.2 Contract Waste	12
2.3 RoadTek Waste	14
2.4 TMR Owned Facility and Secure Waste	16
2.5 Litter and Illegal Dumping	18
<b>3. TMR's Waste Reduction and Recovery Actions</b>	<b>20</b>
3.1 Waste Reduction Initiatives	20
3.1.1 Waste 2 Resource Plan – Tender Schedule S12	20
3.2 Waste Re-use and Recycling Initiatives	21
3.2.1 NACOE Project P106 – Sustainability assessment of innovative pavements (Update 2021/2022)	21
3.2.2 NACOE Project P120 – Optimising the use of recycled and reclaimed plastic in safe, sustainable future road infrastructure	21
3.2.3 NACOE Project P135 – Optimisation of Quarried/Recycled pavement material blends	21
3.2.4 NACOE Project P162 – Binder content determination of crumb rubber asphalt mixes (New)	21
3.2.5 NACOE Project P167 – Use of Off-The-Road (OTR) tyres in crumb rubber modified binders (New)	21
3.2.6 NACOE Project O24 – Optimisation of stabilised recycled host materials blends	21
3.2.7 NACOE Project O25 – Use of Recycled Materials in Earthworks and Drainage (New)	22
3.2.8 NACOE Project S67 – Future availability of fly ash for concrete production in Queensland (New)	22
3.2.9 NACOE Project P94 – Optimising the Use of Recycled Materials in Queensland for Unbound and Stabilised Products (Completed)	22
3.2.10 NACOE Project P111 – Improved Crumb Rubber Modified Binder Sprayed Sealing Practices	22
3.2.11 NACOE Project P117 – Sustainability Assessment Tool	22
3.2.12 NACOE Project O20 – Recycled material Assessment Framework (2021/2022 Update)	23
3.2.13 NACOE Project O28 – Recycled materials supplier database (New)	23
<b>4. Future Challenges</b>	<b>23</b>
<b>Appendix A: Department of Environment and Science State Entity Reporting Template</b>	<b>24</b>
<b>Appendix B: Leased building waste data</b>	<b>25</b>
<b>Appendix C: TMR Waste 2 Resource Progress</b>	<b>27</b>
<b>Appendix D: Waste classification alignment</b>	<b>28</b>



## Tables

Table 1: Waste Diversion from Landfill Targets – Queensland's <i>Waste Management and Resource Recovery Strategy</i>	8
Table 2: Recycling Rates Targets (as a percentage of total waste generated) – Queensland's <i>Waste Management and Resource Recovery Strategy</i>	8
Table 3: Annual Departmental Waste Data Summary for 2021/2022	10
Table 4: Annual Contract Waste Data Summary for 2021/2022	12
Table 5: Annual RoadTek Waste Data Summary for 2021/2022	14
Table 6: Annual TMR Owned Facilities Waste Summary for 2021/2022	16
Table 7: Five-year Trend - Litter and Illegally Dumped Waste collected by TMR Roadside Litter Collection	18
Table 8: TMR Sample Buildings Set	25
Table 9: 2021-22 FY TMR Statistics - based on agency's share of Total Leasable Area of the 'All Buildings Sample Set' as listed in <i>Appendix 2</i> of the TMR Annual Agency Office Waste Report 2022	26

## Figures

Figure 1: Data Sources	9
Figure 2: Annual Departmental Waste Management Quantities by Destination	11
Figure 3: Departmental Waste Generated and Diversion Rate by Waste Stream	11
Figure 4: Contract Waste Generated and Diversion Rate by Waste Stream	13
Figure 5: Contract Waste Trends	13
Figure 6: RoadTek Waste Generated and Diversion Rate by Waste Stream	15
Figure 7: RoadTek Annual Waste Quantity Generated and Diversion rates	15
Figure 8: TMR Owned Facility and Secure Waste Generated and Diversion Rate by Waste Stream	17
Figure 9: TMR Owned Facility and Secure Waste Trends	17
Figure 10: Litter and Illegal Dumping Waste Quantities Managed and Costs Incurred as part of Roadside Litter Collection	19
Figure 11: Waste and Resource Context	27

# Executive summary

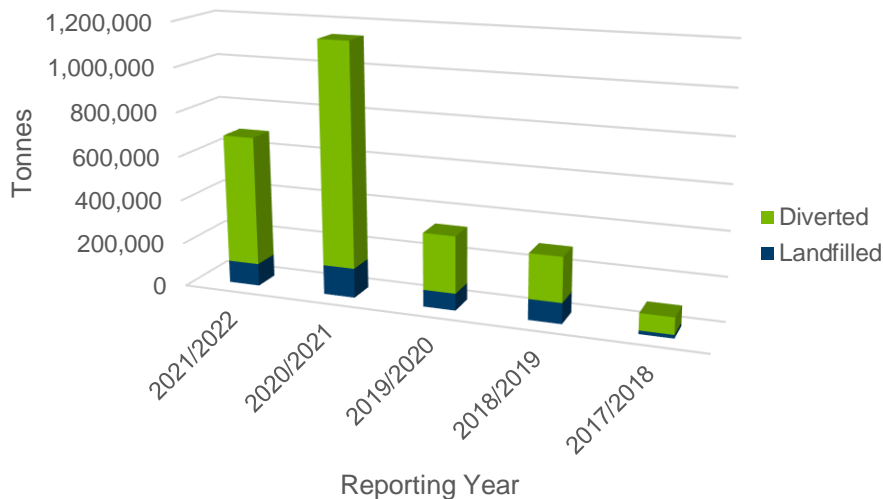
The Department of Transport and Main Roads (TMR) is a large, complex, diverse, and decentralised organisation, responsible for the management of different modes of transport including motor vehicle, rail, bus, bike, pedestrian and boating. TMR operations include the construction and maintenance of linear transport infrastructure, transport and office facilities, general public rest areas and customer service centres all of which generate a wide variety of waste streams, due to the diversity and scale of operations.


Queensland's *Waste Reduction and Recycling Act 2011* imposes a requirement on each Queensland Government department to develop a Waste Reduction and Recycling Plan and to report on waste management achievements.

TMR's current Waste Reduction and Recycling Plan, the *Waste 2 Resource Strategy*<sup>1</sup> was published in 2022 and sets out the strategy for TMR to reduce waste and to monitor waste amounts.

COVID 19 restrictions continue to have an impact on waste generation and management, primarily in relation to impacts to TMR facilities from work-from-home arrangements. The leased facility data, which is not included in the figures below, has been provided in Appendix B: Leased building waste data.

## TMR Annual Waste Trends

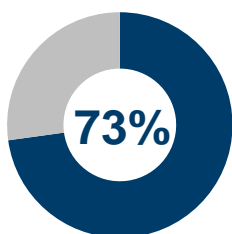


**85%**   
overall diversion rate

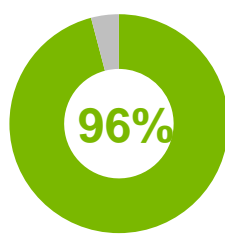
 **73%**  
of all TMR waste was excess earthworks/embankment/fill

**\$4.5M**   
spent on litter and illegal dumping collection

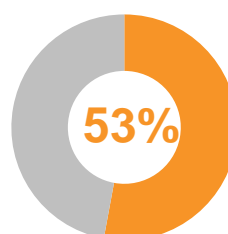
## Diversion Rates by Source



Contracts



RoadTek



Facilities

 **13**  
infrastructure delivery contracts reported

<sup>1</sup> <https://www.tmr.qld.gov.au/-/media/communityandenvironment/Environmental-Management/Waste-management/Waste-2-Resource-Strategy.pdf?la=en>

## Quick Statistics

- **The total waste generated by TMR in 2021/2022 is 685,309 tonnes,**
  - of which **85%** was diverted (reused or recycled) and
  - **15%** was disposed to landfill.
  - This diversion rate is **above** the 75% target for all waste by 2025 in the Queensland Government 2020 Waste Management and Resource Recovery Strategy (WMRRS) released by the Department of Environment and Science (DES).
  - There was a substantial **decrease of 456,961 tonnes of waste generated** in 2021/2022 from that generated in 2020/2021.
  - These rates focus on departmental waste consisting of infrastructure delivery contract work, RoadTek work, TMR owned facility use and management, and litter and illegal dumping management.
- **13 Infrastructure Delivery Contracts reported in 2021/2022.**
  - This is a decrease from the 33 contracts that reported in 2020/2022.
  - **No conclusions can be drawn regarding the decrease in diversion rate**, due to the difference in scope between contracts and the **lower number of contracts reported**.
- **Waste generated from infrastructure delivery contract work accounts for 45% of TMR's annual reported waste in 2021/2022.**
  - Excess earthworks/ embankment/ fill accounts for 55% of infrastructure delivery contract waste generated in 2021/2022.
- **RoadTek continues to excel at waste management with a diversion rate of 96% of its generated waste.**
  - RoadTek continues to progress their Resource Efficiency and Sustainability Action Plan to divert waste from landfill and increase recycling.
  - The high diversion of rate for waste from Council landfill is due to the majority of waste generated being excess spoil and pavement materials. These can generally be reused on site for embankment, subgrade pavement layers, or off site by adjacent landowners to maintain access roads, establish hardstands, or rehabilitation of degraded areas.
- **TMR Owned Facilities reported a diversion rate of 53% which is up from 26% last financial year.**
  - A combination of the changes to waste data collection and reporting as well as a decrease in facilities reporting is thought to have led to this change.
  - 30 facilities reported in 2021/2022, down from 40 in 2020/2021.
- **Litter and illegally dumped waste cost TMR \$4,479,020 to collect, transport and dispose of to landfill in 2021/2022.**
  - Management and disposal of litter and illegal dumping incurs significant costs for the department each annum.
  - This cost figure does not include an estimated 821 tonnes of vessel weight based on length of vessels removed by contractors and salvors engaged by MSQ or compliance partners under the War on Wrecks program.

# 1. Introduction

The Queensland Government is committed to influencing the waste management practices across Queensland to deliver sustainability and circular economy benefits. The 2020 *Waste Management and Resource Recovery Strategy* (WMRRS) released by the Department of Environment and Science (DES) identifies strategic targets for waste reduction and resource recovery in Queensland. The WMRRS waste diversion and recovery targets are outlined in Table 1 and Table 2 below.

**Table 1: Waste Diversion from Landfill Targets – Queensland's *Waste Management and Resource Recovery Strategy***

Stream	2018 (baseline)	2025	2030	2040	2050
<b>Municipal Solid Waste</b>	32.4%	55%	70%	90%	95%
<b>Commercial and Industrial Waste</b>	47.3%	65%	80%	90%	95%
<b>Construction and Demolition Waste</b>	50.9%	75%	85%	85%	85%
<b>Overall</b>	45.4%	65%	80%	85%	<b>90%</b>

**Table 2: Recycling Rates Targets (as a percentage of total waste generated) – Queensland's *Waste Management and Resource Recovery Strategy***

Stream	2018 (baseline)	2025	2030	2040	2050
<b>Municipal Solid Waste</b>	31.1%	50%	60%	65%	70%
<b>Commercial and Industrial Waste</b>	46.5%	55%	60%	65%	>65%
<b>Construction and Demolition Waste</b>	50.9%	75%	80%	>80%	>80%
<b>Overall</b>	44.9%	60%	65%	70%	<b>75%</b>

Transport and Main Roads (TMR), as a Queensland Government entity, is committed to contributing to the Queensland Government waste reduction and recovery targets. Further to this commitment, TMR also has obligations under the *Waste Reduction and Recycling Act 2011* to develop and implement a waste reduction and recycling plan, report on waste and to enact continuous improvement to reduce waste and divert from landfill. TMR's *Waste 2 Resource Strategy*<sup>2</sup>, published in 2022, sets out the strategy for TMR to reduce waste and to monitor waste amounts. TMR has developed and implemented reporting systems to collect and collate waste data from across the organisation.

This Waste 2 Resource – Annual Status Report has been compiled to collate and report TMR's waste data and waste recovery performance over the 2021/2022 financial year as well as review and evaluate progress made in implementing the TMR *Waste 2 Resource Strategy*.

The official 'Department of Environment and Science State Entity Report – TMR' is attached to this Annual Status Report in Appendix A: Department of Environment and Science State Entity Reporting Template.

## 1.1 Key Terms

The following key terms will be used consistently throughout this report:

***Diversion/Diverted*** – waste that is either reused, recycled.

***Recovered*** – waste from which energy or fuel can be recovered.

***Diversion rate*** – the amount of waste diverted divided by the amount of waste generated

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<sup>2</sup> <https://www.tmr.qld.gov.au/-/media/communityandenvironment/Environmental-Management/Waste-management/Waste-2-Resource-Strategy.pdf?la=en>



## 1.2 Waste Data Collection

Due to the breadth of TMR as an organisation, the waste data that makes up this report comes from a variety of different sources as shown in Figure 1. Except for infrastructure delivery contract work, all data is for waste generated, diverted and disposed of to landfill in 2021/2022.



**Figure 1: Data Sources**

Further details on these sources are provided below:

- Infrastructure Delivery Contract Work (Contracts):
  - For most contracted works, it is a requirement for the Contractor to report waste generated, recovered and disposed to landfill on behalf of TMR. These works range from the construction of new infrastructure to regular maintenance or upgrade of existing infrastructure. Where the contracted works are delivered by RoadTek, they are reported as RoadTek Waste and not as Infrastructure Delivery Contract Waste.
  - This report details the amounts of waste generated by TMR infrastructure delivery contracts that have achieved practical completion in 2021/2022:
    - 13 contracts submitted waste data for 2021/2022, down from 33 contracts in 2020/2021.
    - Although waste data submitted by contractors is reported in the year the contract reaches practical completion, the waste can be generated over different time spans ranging from a few months to several years.
- RoadTek Work (RoadTek):
  - RoadTek, TMR's operational branch, reports on the waste generated by the variety of maintenance and infrastructure work they do, including any infrastructure delivery contract work.
  - RoadTek works are captured locally, entered monthly, and then aggregated centrally in the Resource Efficiency report.
- TMR Owned and Leased Facility Use and Management (Facilities):
  - TMR owned facilities include office buildings, customer service centres and depots throughout the state.
    - For 2021/2022, 30 TMR owned facilities completed a waste register.
  - Additionally, there are facilities which are not owned by TMR but which TMR operates from. TMR generally leases these facilities directly from the third parties or via the Department of Energy and Public Works (DEPW). Information for those sites managed by DEPW is presented in Appendix B: Leased building waste data.
  - Where TMR shares a site with another entity, reporting may not be available.
- Secure Waste (Facilities):
  - For this 2021/2022 report, Secure Waste is included under TMR Owned Facility Waste.
    - It should be noted that Secure Waste can include waste from facilities leased by TMR.
- Litter and Illegal Dumping Management (Litter and Illegal Dumping):
  - Roadside Litter Collection: Maintenance contractors and RoadTek report on the litter and illegally dumped waste that they collect as part of their works under the activity of Roadside Litter Collection (Rural and Urban). This is waste that is generated and dumped by a third party on to the State-controlled road network.
  - MSQ War on Wrecks: Maritime and Safety Queensland (MSQ) division of TMR in collaboration with its compliance partners, remove wrecked vessels under the War on Wrecks program. An estimated total tonnes of wrecked vessels disposed of under this program is recorded in the litter and illegal dumping data.

## 2. Waste Reporting

### 2.1 Overall Departmental Waste

A summary of the combined Departmental waste amounts from all sources is provided in Table 3: Annual Departmental Waste Data Summary for 2021/2022. The table identifies the amounts generated, diverted (reused and recycled combined) and disposed to landfill. The summarising diversion rate is the amount diverted from landfill as a percentage of the amount generated by waste stream.

**The overall waste diversion rate for TMR is 85% for 2021/2022, above the 75% target for 2025.**

TMR's waste recovery performance for 2021/2022 was good, surpassing the 2025 waste recovery target set by the Queensland Government WMRRS.

Comparison of the 2021/2022 annual waste data with previous years identifies that the amounts of waste generated can vary largely year on year depending on the scope of works and the quantity of reports received.

Within the summarised Departmental waste figures, 45% of the waste is generated by infrastructure delivery contract work. This is further analysed in Section 2.2.

RoadTek generated 55% of the waste in 2021/2022. This is further analysed in Section 2.3.

Analysis of the waste by waste stream, identifies that 73% of the Department's waste was Excess earthworks/Embankment/Fill. Since 94% of this stream was diverted, this had a significant influence on the overall diversion rate of the Department. The next largest waste stream, Asphalt & Profiles (RAP), also has a very high diversion rate due to its ability to be reused within the road asset.

**Table 3: Annual Departmental Waste Data Summary for 2021/2022**

Waste Stream	Generated (t)	Diverted (t)	Landfilled (t)	Diversion Rate
Excess Earthworks / Embankment / Fill	499,853	469,039	30,813	94%
Vegetation	17,618	11,125	6,493	63%
Acid Sulphate Soil	0	0	0	0%
Other Contaminated Earthworks	1,527	0	1,527	0%
Regulated Waste Cat 1	0	0	0	0%
Regulated Waste Cat 2	388	60	328	15%
Septic General	41,980	76	41,904	0%
Asphalt & Profiles (RAP)	86,101	82,943	3,158	96%
Other Recovered Pavement Materials	3,258	837	2,421	26%
Concrete	7,815	4,856	2,959	62%
Metal	14,499	14,252	247	98%
Other Construction Waste (Timber, glass, plastic, bricks)	183	4	179	2%
Tyres & Rubber	65	50	15	78%
Illegally Dumped Refuse	2,797	0	2,797	0%
General Refuse	8,432	77	8,355	1%
Office - Paper	372	357	15	96%
Office - Recyclables	44	38	6	87%
Office - General & Food waste	378	1	376	0%
<b>Grand Total</b>	<b>685,309</b>	<b>583,716</b>	<b>101,593</b>	<b>85%</b>

## Annual Departmental Waste Management Quantities by Destination

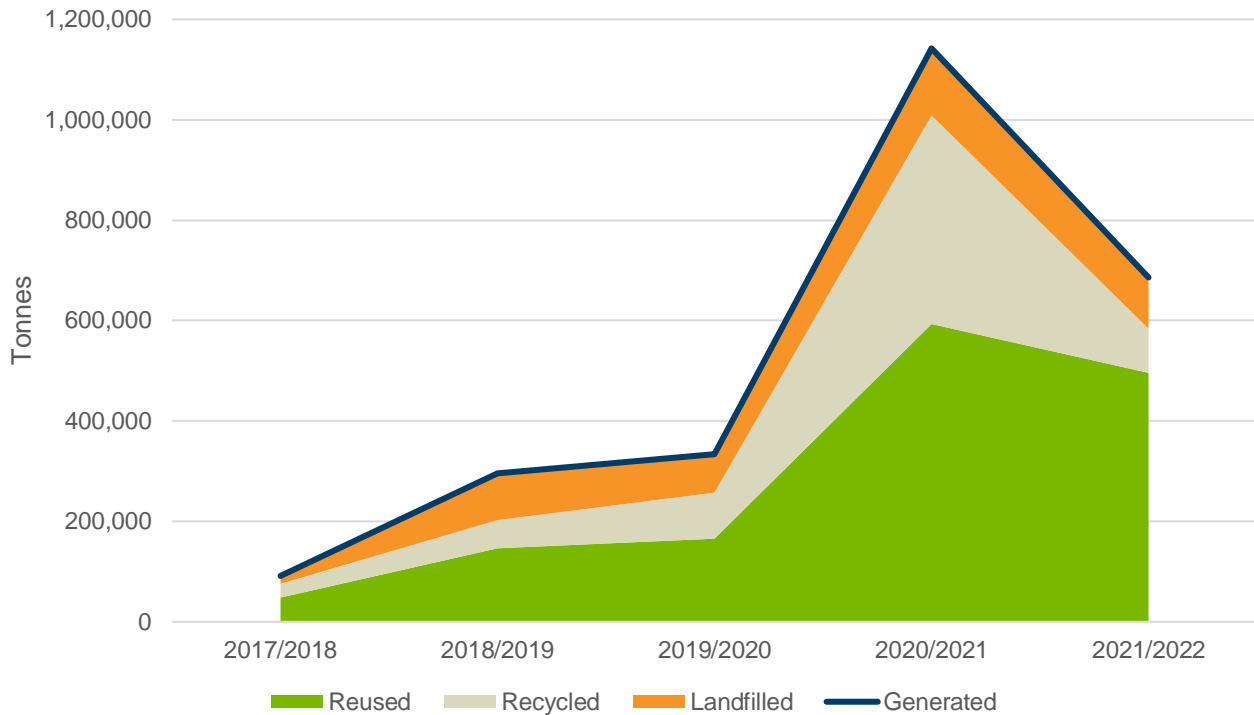


Figure 2: Annual Departmental Waste Management Quantities by Destination

## Departmental Waste - Quantities Generated and Diversion Rate by Waste Stream

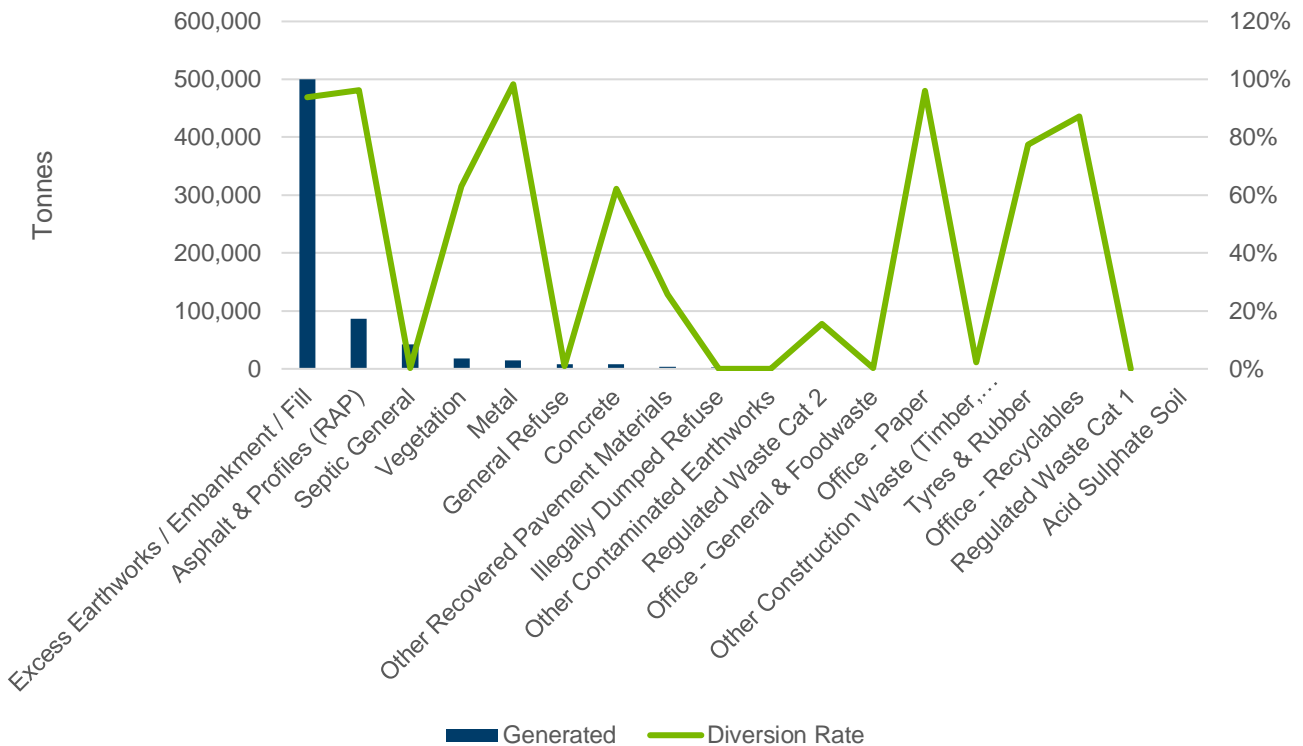


Figure 3: Departmental Waste Generated and Diversion Rate by Waste Stream

## 2.2 Contract Waste

TMR delivers new infrastructure and maintenance works throughout the state via the use of contracts for work. The requirement to report waste via the TMR Waste and Recycling Calculator is sent out with each contract and each contractor (except for RoadTek) is required to report all of the waste generated by the contract once the contract has reached practical completion. Previously, reporting has referred to projects instead of contracts, but contracts is the most accurate way of looking at the work as a project may be made up of multiple contracts and may have multiple stages, some of which do not produce significant waste (i.e. concept or design). In the case of a major project, it is often the principal contractor that reports on behalf of the whole project.

TMR continues to struggle with the low compliance with contract waste reporting requirements as there were 20 fewer contracts reporting in 2021/2022(13) than in 2020/2021(33) as shown in **Figure 5**. TMR expects increased compliance with reporting requirements as contractors become more familiar with the new process and the requirements are enforced by contract administrators.

**TMR infrastructure delivery contract work achieved a diversion rate of 73% for 2021/2022, this is down from 86% in 2020/2021.**

**Table 4: Annual Contract Waste Data Summary for 2021/2022**

Waste Stream	Generated (t)	Diverted (t)	Landfilled (t)	Diversion Rate
Excess Earthworks / Embankment / Fill	167,797	141,636	26,160	84%
Vegetation	11,159	5,374	5,785	48%
Acid Sulphate Soil	0	0	0	0%
Other Contaminated Earthworks	1,527	0	1,527	0%
Regulated Waste Cat 1	0	0	0	0%
Regulated Waste Cat 2	0	0	0	0%
Septic General	41,523	69	41,454	0%
Asphalt & Profiles (RAP)	73,204	73,184	20	100%
Other Recovered Pavement Materials	3,246	837	2,409	26%
Concrete	1,687	882	805	52%
Metal	153	152	1	99%
Other Construction Waste (Timber, glass, plastic, bricks)	174	3	171	2%
Tyres & Rubber	1	0	1	0%
Illegally Dumped Refuse	1	0	1	0%
General Refuse	4,571	0	4,571	0%
Office - Paper	3	2	1	76%
Office - Recyclables	8	5	3	63%
Office - General & Food waste	18	0	18	0%
<b>Grand Total</b>	<b>305,071</b>	<b>222,144</b>	<b>82,928</b>	<b>73%</b>

Comparison of annual trends identifies that the diversion rate of 73% is lower for the 2021/2022 financial year, down from 86% in 2020/2021. No conclusions can be drawn regarding the decrease in diversion rate, due to the difference in scope between contracts and the lower number of contracts reported.

The large majority of the waste generated for these contracts (as shown in **Figure 4**) was Excess Earthworks / Embankment / Fill, a highly reused waste. In 2021/2022, those contracts that were fulfilled by RoadTek were continued to be excluded from the Infrastructure Delivery Contract Waste data. These contracts were included in the RoadTek data in order to reflect the source of reporting more accurately and to prevent duplication of the data.

## Contract Waste - Quantities Generated and Diversion Rate by Waste Stream

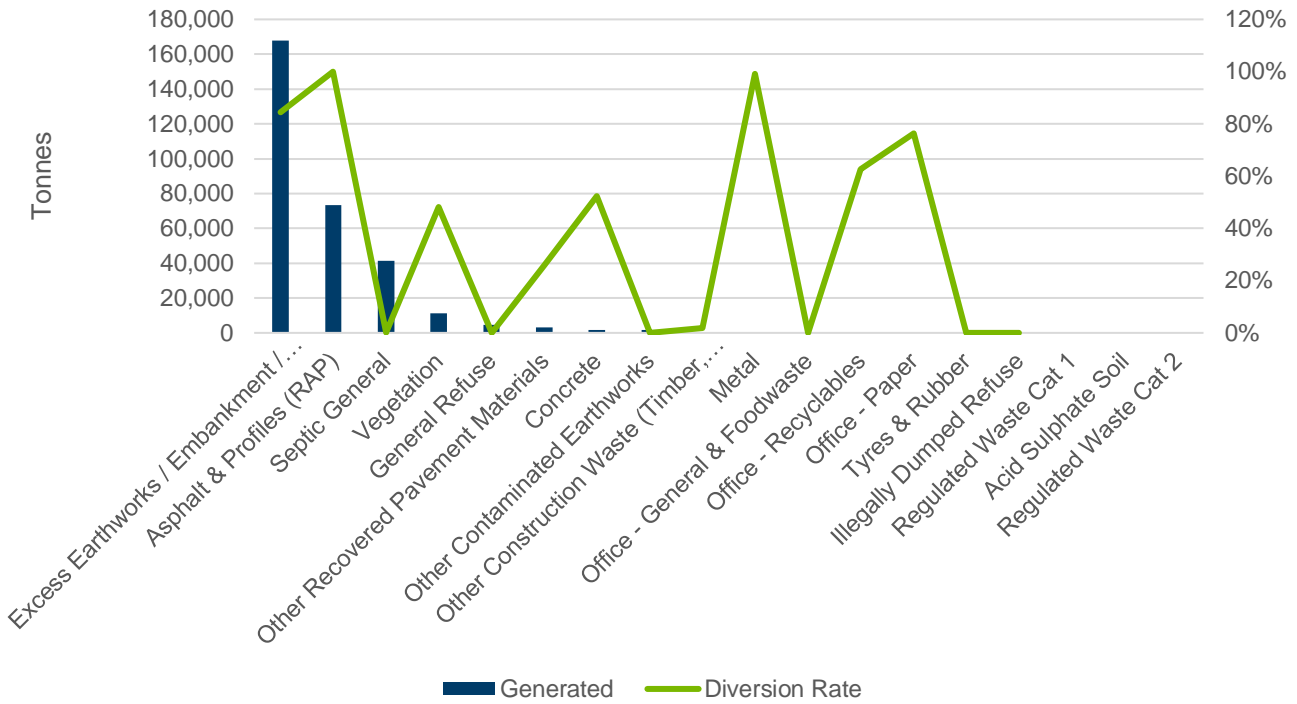


Figure 4: Contract Waste Generated and Diversion Rate by Waste Stream

## Annual Trends in Contract Waste Management

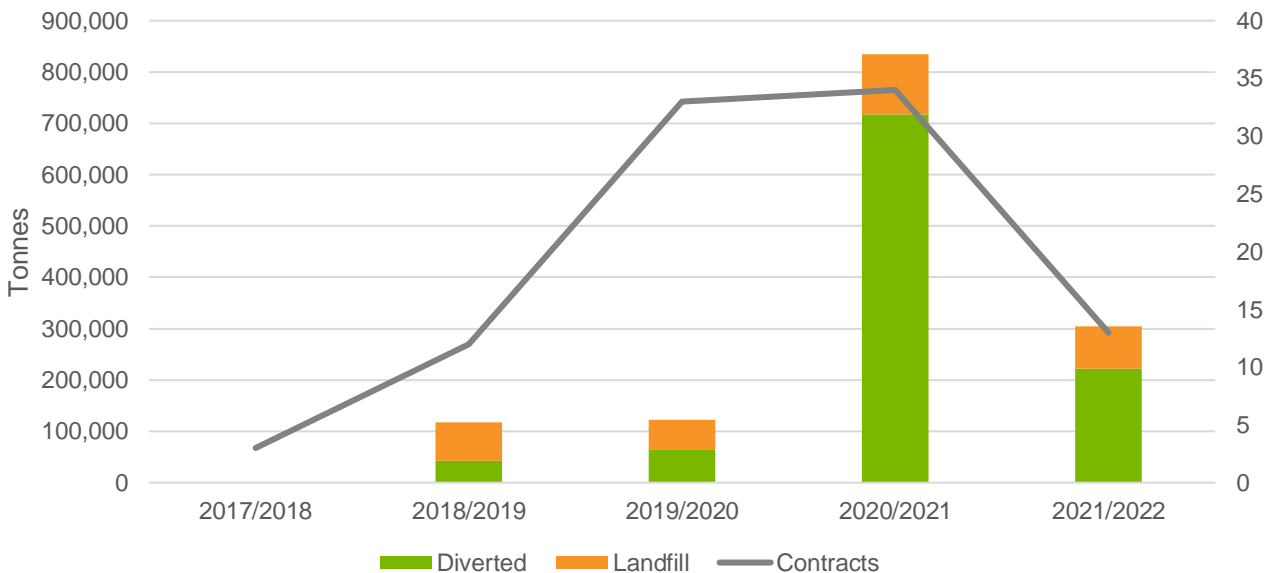


Figure 5: Contract Waste Trends

Note 1: the summary above includes data provided by 13 contracted construction and maintenance projects that reached practical completion in 2021/2022.

Note 2: waste data is limited to the records received from TMR's contractors and may not provide a full and complete record of waste generated from the Queensland Transport and Road Infrastructure Program for 2021/2022.



## 2.3 RoadTek Waste

RoadTek is TMR's operational branch with work crews involved in infrastructure asset construction, maintenance and electrical system operations. RoadTek also delivers Infrastructure Delivery Contracts on behalf of TMR and for 2021/2022 the waste from these activities continues to be separated from those contracts delivered by external contractors and is reported as part of RoadTek waste. The total waste diverted by RoadTek for 2021/2022 was 96%. The rate of diversion exceeded the 2020 WMRRS target of 90% for waste diversion from landfill in 2050, as noted in Table 1. RoadTek has successfully maintained a high rate of diversion across the last 5 years, as shown in Figure 7, despite an increase in waste generated. This has been achieved through improved reuse on site, stockpiling for future reuse, and opportunities for local reuse under local waste to resource agreements.

**Table 5: Annual RoadTek Waste Data Summary for 2021/2022**

Waste Stream	Generated (t)	Diverted (t)	Landfilled (t)	Diversion Rate
Excess Earthworks / Embankment / Fill	332,050	327,403	4,647	99%
Vegetation	6,433	5,751	682	89%
Acid Sulphate Soil	0	0	0	0%
Other Contaminated Earthworks	0	0	0	0%
Regulated Waste Category 1	0	0	0	0%
Regulated Waste Category 2	388	60	328	15%
Septic General	457	7	450	2%
Asphalt & Profiles (RAP)	12,897	9,759	3,138	76%
Other Recovered Pavement Materials	0	0	0	0%
Concrete	6,128	3,974	2,154	65%
Metal	14,085	13,840	245	98%
Other Construction Waste (Timber, glass, plastic, bricks)	1	1	0	100%
Tyres & Rubber	64	50	14	78%
General Refuse	94	0	94	0%
Litter and Illegal Dumping	3,766	77	3,689	2%
Office - Paper	67	65	2	97%
Office - Recyclables	0	0	0	0%
Office - General & Food waste	0	0	0	0%
<b>Grand Total</b>	<b>376,429</b>	<b>360,987</b>	<b>15,442</b>	<b>96%</b>

## RoadTek Waste - Quantities Generated and Diversion Rate by Waste Stream

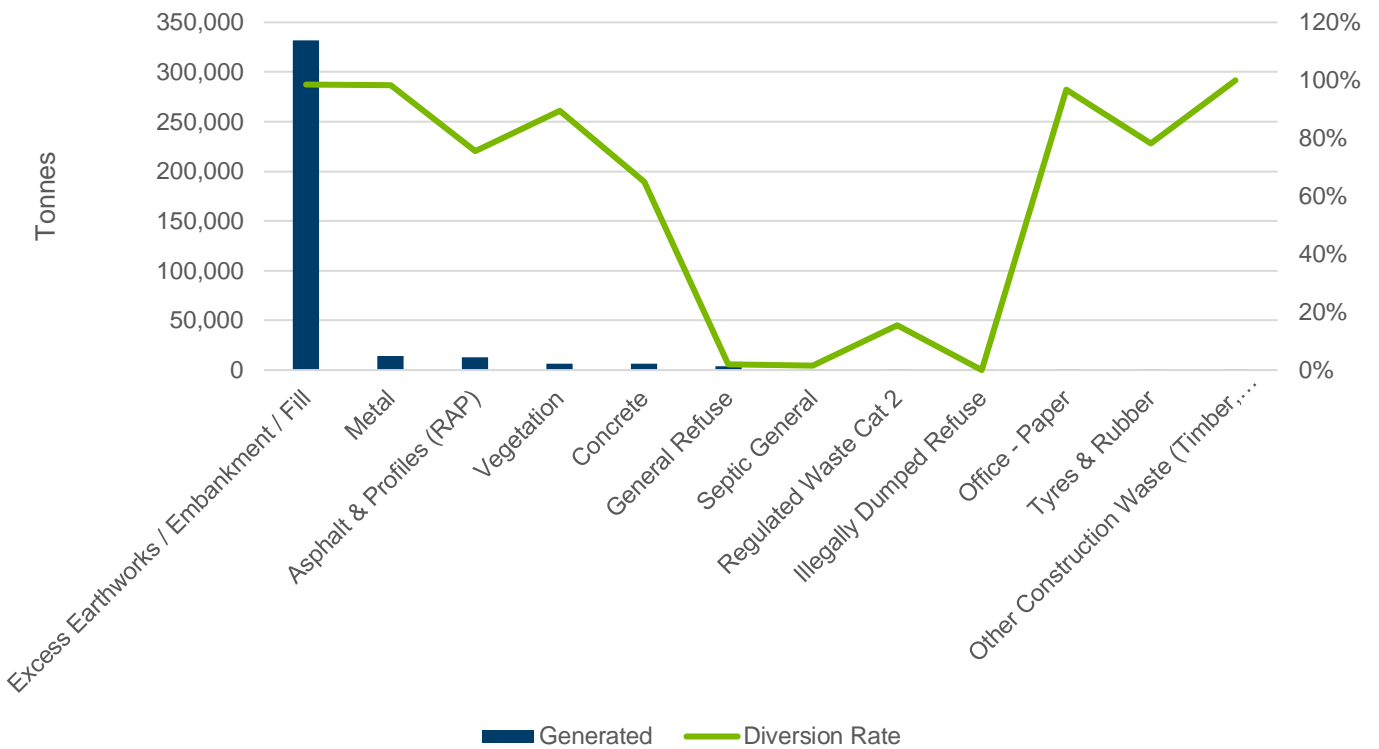


Figure 6: RoadTek Waste Generated and Diversion Rate by Waste Stream

## Annual Trends in RoadTek Waste Management

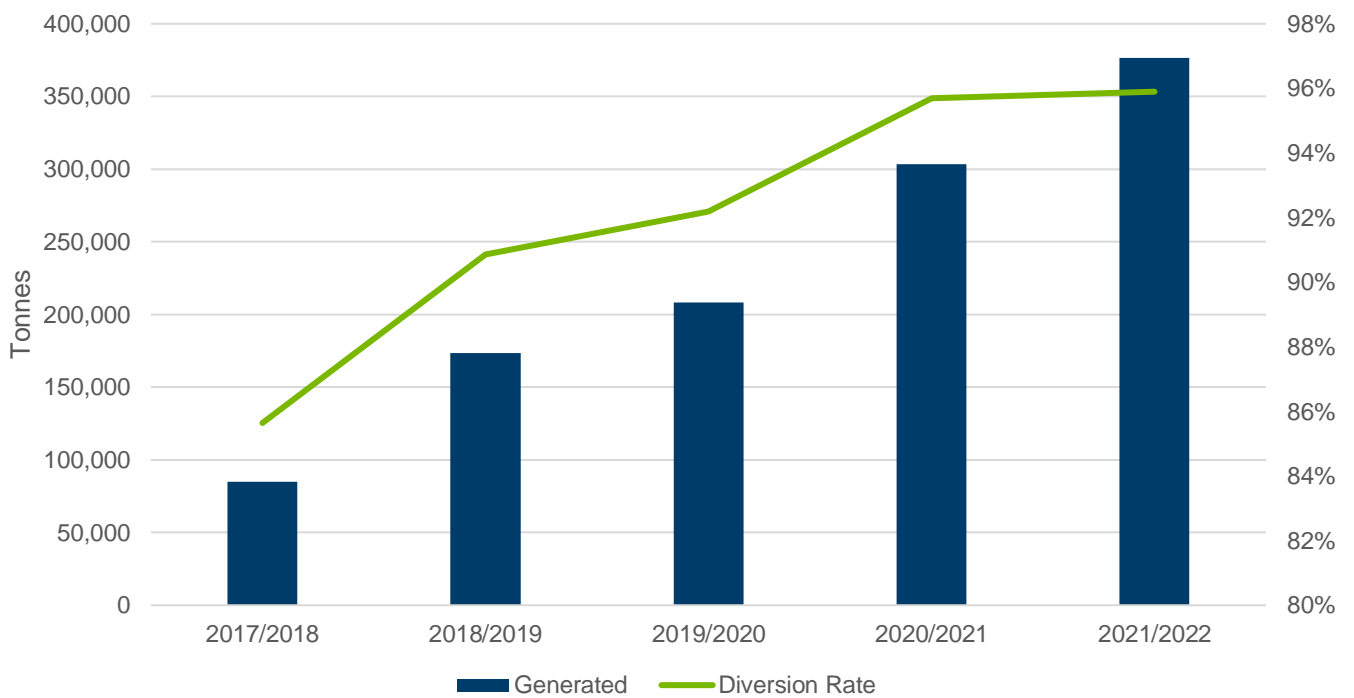


Figure 7: RoadTek Annual Waste Quantity Generated and Diversion rates

## 2.4 TMR Owned Facility and Secure Waste

Waste data was obtained from 30 TMR owned facilities across Queensland is provided in Table 6. Waste data for TMR owned facilities was obtained from responsive officers who reported their usage for this financial year. Data for leased facilities was obtained from the Department of Housing and Public Works and is provided in Appendix B: Leased building waste data.

Due to the decreased numbers of facilities reporting, there has been a subsequent decrease in the amounts of wastes generated. However, there has been an increase in the waste diversion rate from 26% in 2020/2021 to 53% for 2021/2022 as presented in Figure 8. When assessed by waste stream as presented in Table 6 below, the diversion rate is strongly linked to the recovery of metal from TMR facilities; the recycling of metal number plates.

TMR has included data on secure waste generated and recycled with the TMR Owned Facilities data. Secure waste is managed differently to regular facility waste and the secure waste contractors were contacted for data. Most of this waste is reflected in the 'Office - Paper' waste stream. Secure waste contractors advise that the waste is recycled as much as possible.

**Table 6: Annual TMR Owned Facilities Waste Summary for 2021/2022**

Waste Stream	Generated (t)	Diverted (t)	Landfilled (t)	Diversion Rate
Excess Earthworks / Embankment / Fill	6	0	6	0%
Vegetation	26	0	26	1%
Acid Sulphate Soil	0	0	0	0%
Other Contaminated Earthworks	0	0	0	0%
Regulated Waste Category 1	0	0	0	0%
Regulated Waste Category 2	0	0	0	4%
Septic General	0	0	0	0%
Asphalt & Profiles (RAP)	0	0	0	0%
Other Recovered Pavement Materials	12	0	12	0%
Concrete	0	0	0	0%
Metal	261	261	0	100%
Other Construction Waste (Timber, glass, plastic, bricks)	8	0	8	0%
Tyres & Rubber	0	0	0	0%
General Refuse	96	0	96	0%
Litter and Illegal Dumping	0	0	0	0%
Office - Paper	302	290	12	96%
Office - Recyclables	36	33	3	93%
Office - General & Food waste	360	1	358	0%
<b>Grand Total</b>	<b>1,107</b>	<b>585</b>	<b>521</b>	<b>53%</b>

The summary above includes:

- data provided by TMR facilities across a 12-month period. Now includes secure waste managed by separate waste contractors. Secure waste is mostly composed of paper that is then recycled. A small minority is other solid media such as Compact Discs.

### TMR Owned Facility and Secure Waste - Quantities Generated and Diversion Rate by Waste Stream

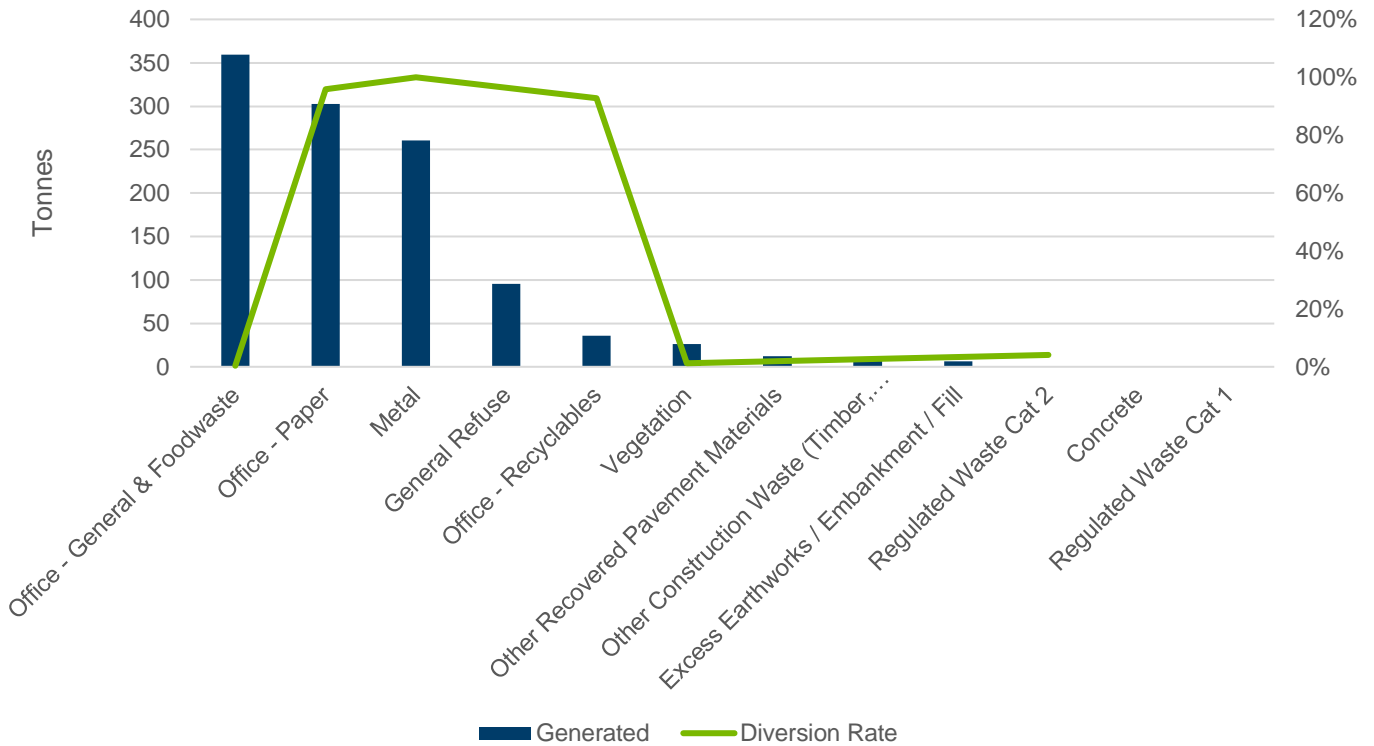


Figure 8: TMR Owned Facility and Secure Waste Generated and Diversion Rate by Waste Stream

### Annual Trends in TMR Owned Facility and Secure Waste Management

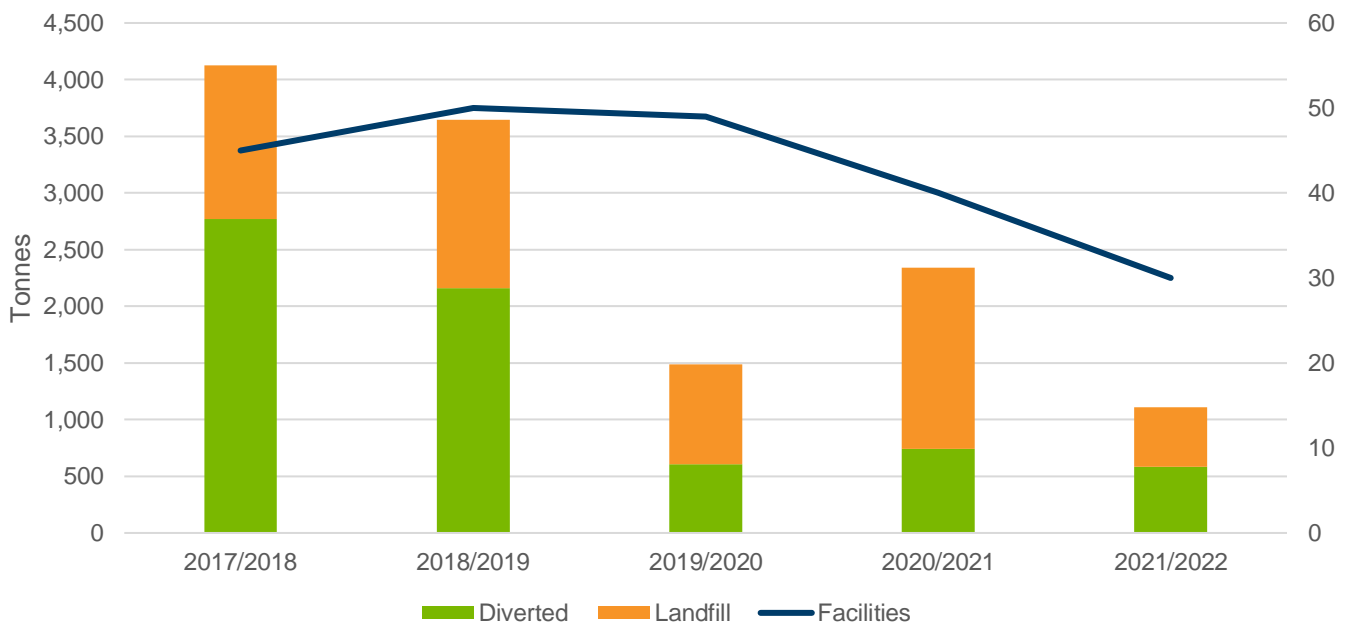


Figure 9: TMR Owned Facility and Secure Waste Trends

## 2.5 Litter and Illegal Dumping

TMR regularly removes litter and illegally dumped items from the State-controlled road network. Included in this report are the following:

- The cost and amounts of Roadside Litter Collection (Urban and Rural): The collection and disposal of litter and rubbish, whether from bins located along the right of way or from the right of way itself. Includes the repair and maintenance of receptacles.
- Estimated weight of vessels removed from Queensland waterways by Maritime Safety Queensland (MSQ) or its compliance partners as part of the War on Wrecks Program<sup>3</sup>. Estimates are based on the length of the vessel.
  - o Cost not included as not comparable with those of roadside litter collection.

TMR collected approximately 1,881 tonnes of litter and illegally dumped waste from the State-controlled road network at a cost of \$4,479,020 during 2021/2022. The amount of litter and illegally dumped waste has increased in comparison to prior financial years as depicted in Table 7 and Figure 10. The increase in the volume of roadside litter and illegal dumping could be, in part, due to a return to pre-COVID 19 vehicle movements on roads and use of roadside rest areas and other facilities.

Some assumptions have been applied to the raw data sourced from TMR's Road Asset Data and Road Maintenance Performance Contractors who undertake roadside litter collection. These assumptions are explained in the caveat below and have been applied using the same methodology as prior years for consistency.

**Table 7: Five-year Trend - Litter and Illegally Dumped Waste collected by TMR Roadside Litter Collection**

	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022
<b>Cost (\$)</b>	\$5,670,602	\$5,770,248	\$4,636,566	\$4,116,861	\$4,479,020
<b>Volume (m<sup>3</sup>)</b>	11,950	11,636	10,531	9,185	12,885
<b>Mass (tonnes)</b>	1,743	1,697	1,538	1,341	1,881

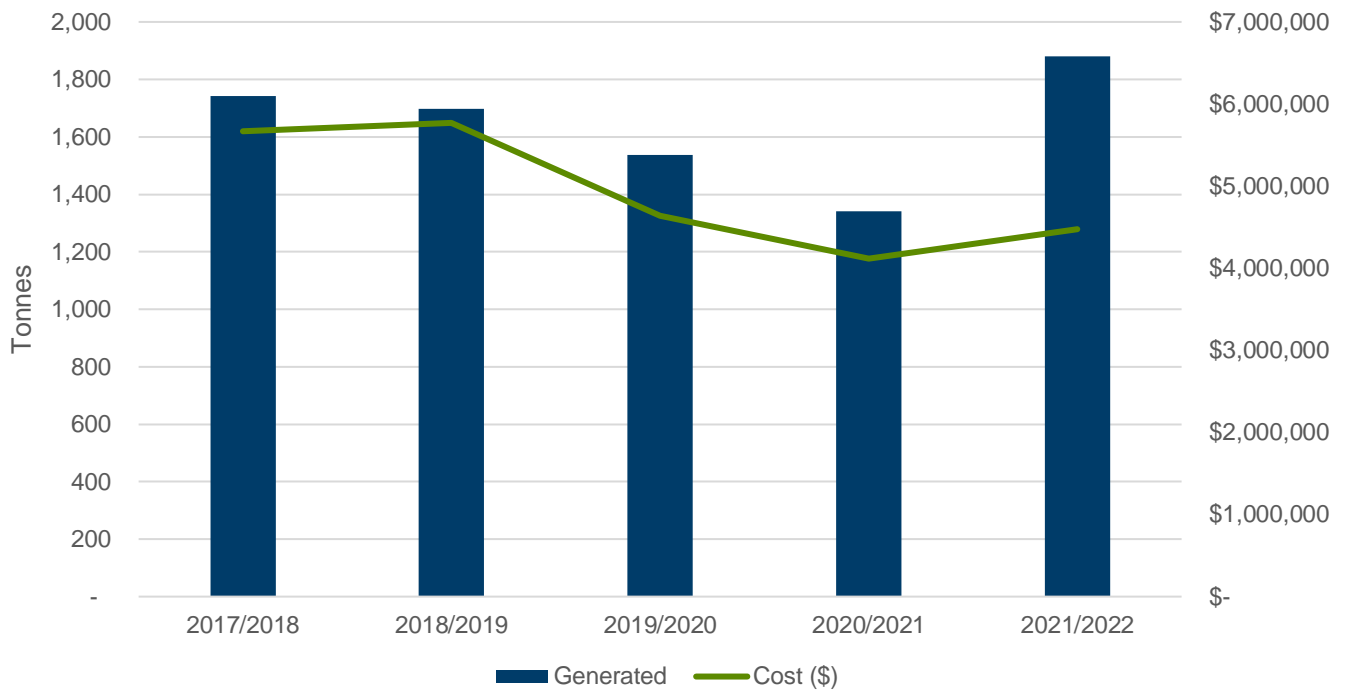
**^^ Caveat** – Litter and illegally dumped waste is sourced from TMR's Road Asset Data, Road Maintenance Performance Contractors. The data output is calculated as either fixed (m<sup>3</sup>) or lump sum quantity (single unit measure or duplication of amount in dollars) and therefore exact figures are unable to provided. To determine an approximated total fix and lump sum quantity of waste collected the following process was undertaken -

- All lump sum quantities were removed with only fixed and unit quantities calculated, this equalled a total fixed and unit quantity of 2,947.2 m<sup>3</sup>.
- The total fixed and unit quantity 2,947.2 m<sup>3</sup> was used to divide the total amount in dollars \$1,024,527.90 by this volume, providing a cost rate of \$347.63/m<sup>3</sup>
- The total cost value of \$4,479,019.89 was then divided by the cost rate of \$347.63/m<sup>3</sup> to provide the overall estimated volume of, 12,884.54 m<sup>3</sup> collected, transported and disposed to landfill.
- To convert the volume to tonnes a conversion factor of 0.146t/m<sup>3</sup> was utilised. The quantity in tonnes = 1,881.14 tonnes.

<sup>3</sup> MSQ War on Wrecks: <https://www.msq.qld.gov.au/About-us/News-and-stories/Taskforce-continues-gaining-ground-in-war-on-wrecks>



## Litter and Illegal Dumping Annual Quantities and Costs



**Figure 10: Litter and Illegal Dumping Waste Quantities Managed and Costs Incurred as part of Roadside Litter Collection**

In 2021/2022, MSQ reported an estimated 821 tonnes of vessel weight removed from Queensland's waterways. For the purposes of this report, the vessels are all assumed to be disposed to landfill. Costs and tonnage have not been included as part of **Table 7** or **Figure 10** as MSQ functions as a regulator for Queensland's waterways and incurs significant additional costs to proactively identify, investigate, establish ownership of, manage, and recover costs from the owners of derelict and illegally dumped vessels.

These are costs that are not incurred by TMR's Roadside Litter Collection as that activity only includes the cost of waste removal, disposal and repair and maintenance of receptacles.

## 3. TMR's Waste Reduction and Recovery Actions

TMR's *Waste 2 Resource Strategy* addresses both the "waste out" challenges as well as the "waste in" opportunities in relation to greater uptake of recycled materials and circular economy principles. The *Waste 2 Resource Strategy* fulfils TMR's obligations under the *Waste Reduction and Recycling Act 2011* as well as aligns TMR's actions and objectives with the Queensland Government's WMRSS.

The *Waste 2 Resource Strategy* does not mandate the use of recycled materials but instead clearly states that:

*TMR prefers the use of recycled materials on transport infrastructure projects where they are:*

- *permitted in accordance with TMR's technical specifications*
- *cost competitive with conventional materials*
- *available in quantities applicable to the specific project.*

As part of the actions under the current *Waste 2 Resource Strategy*, TMR has been very active over the 2021/2022 financial year in delivering waste management and recycled materials initiatives. These initiatives are outlined in the sections below and include TMR's projects in the National Asset Centre of Excellence (NACOE) Program. Considerable work has been undertaken in research and development to:

- test and verify the feasible use of alternative recycled materials within pavements structures and earthworks,
- understand emissions profiles of the use of innovative pavement materials and
- quantify the sustainability of pavement materials.

### 3.1 Waste Reduction Initiatives

#### 3.1.1 Waste 2 Resource Plan – Tender Schedule S12

Following on from the release of the Waste and Recycling Calculator in July 2020, TMR published and began implementing the Waste 2 Resource Plan - Tender Schedule S12<sup>4</sup> (the Tender Schedule) to transport infrastructure contract (TIC) tenders. The Tender Schedule is an initiative to increase awareness across industry of the opportunities for utilising recycled materials in accordance with the specifications on TMR infrastructure construction contracts. The tender schedule shifts TMR's approach to the use of recycled materials from facilitating to optimising – where the question isn't 'where can these materials be used?' but rather 'why aren't they being used?'. This approach aligns with TMR's preference to use recycled materials as set out in the *Waste 2 Resource Strategy*. The tender schedule identifies where recycled materials may be used and requires that the tender includes an indicative proportion and quantity of recycled materials that would be intended to be used for the works. The Tender Schedule also requires that where the tenderer is not intending to utilise recycled materials where the specifications allow, that they justify that decision with an explanation.

The Tender Schedule also links to the Waste and Recycling Calculator by requesting that the tenderer provide an estimate of waste they would expect to be generated from the scope of works and suggests that the tenderer may use the Waste and Recycling Calculator to both generate and record this estimate. The intent of this is to embed the consideration of waste management, reduction and recycling as early as possible by being included as part of the tender preparation for infrastructure construction contracts.

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<sup>4</sup> W2R Tender Schedule: <https://www.tmr.qld.gov.au/-/media/busind/techstdpubs/Contract/Infrastructure-Contract/Transport-Infrastructure-Contract/Part-3/C7810S12.docx?la=en>

## **3.2 Waste Re-use and Recycling Initiatives**

### **3.2.1 NACOE Project P106 – Sustainability assessment of innovative pavements (Update 2021/2022)**

This project has now been integrated in to P117 below.

### **3.2.2 NACOE Project P120 – Optimising the use of recycled and reclaimed plastic in safe, sustainable future road infrastructure**

This project aims to explore the beneficial use of recycled plastics in road infrastructure and the anticipated benefits include: a better understanding of local plastic waste streams, identification of potential uses for waste plastics, and assessment of potential environmental and safety risks from the use of plastics in roads. An infographic<sup>5</sup> has been prepared to give an overview of current status and priority areas.

### **3.2.3 NACOE Project P135 – Optimisation of Quarried/Recycled pavement material blends**

As a result of industry interest in the use of crushed rock/recycled material blends in pavement engineering applications, this project was set up to undertake research to determine the possible blending proportions for crushed rock and recycled materials such as crushed concrete, concrete washout and reclaimed asphalt pavement. The anticipated benefits of this project include: reducing the use of raw materials, optimising the blending proportions to maximise the use of recycled materials, and providing a pathway for new suppliers to develop new blends.

### **3.2.4 NACOE Project P162 – Binder content determination of crumb rubber asphalt mixes (New)**

The use of crumb rubber asphalt is becoming more popular on TMR projects. Due to the presence of discrete rubber particles in crumb rubber modified binders, it is not possible to accurately determine the total binder content of these asphalt mixes using the standard reflux method (Q308A). As a result of this issue, contractors are unable to provide NATA accredited test results for compliance assessment of these mixes and to facilitate payment on projects. The project will investigate what modifications need to be made to existing test methods (reflux and ignition oven) so that accurate binder content test results can be obtained for mixes containing crumb rubber modified binders. Updated test methods will be prepared and published in the Materials Testing Manual following completion of the research.

### **3.2.5 NACOE Project P167 – Use of Off-The-Road (OTR) tyres in crumb rubber modified binders (New)**

While on-the-road tyres make up about 77% of the end-of-life tyres generated in Australia, off-the-road (OTR) tyres still make up a significant proportion (about 23%). OTR tyres include specialist mining, agricultural, construction, manufacturing and aviation tyres; the mining and agricultural sectors generated approximately 95% of the total 113,000 tonnes in 2019/2020 (Tyre Stewardship Australia (TSA), 2020). The aim of this project is to investigate and compare OTR crumbed rubber modified (CRM) bituminous binders with the properties of on road tyre CRM binders with an emphasis on meeting current specification requirements and binder grades.

### **3.2.6 NACOE Project O24 – Optimisation of stabilised recycled host materials blends**

The project will improve understanding of the performance of recycled host material blends stabilised with techniques such as foamed bitumen stabilisation and cement stabilisation. Recycled crushed concrete, recycled asphalt pavement, recycled crushed brick and other recycled materials will be investigated and tested.

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<sup>5</sup> <https://www.nacoe.com.au/wp-content/uploads/2022/05/WARRIP-NACOE-Infographic-FA.pdf>

### **3.2.7 NACOE Project O25 – Use of Recycled Materials in Earthworks and Drainage (New)**

The purpose of this project is to look at ways to reutilise waste materials as road embankment and drainage materials, and to provide the specification framework to ensure quality and durability requirements of infrastructure are also achieved. The waste materials to be considered for use in earthworks and drainage are (including but not limited to):

- Construction and Demolition Waste/Rubble such as concrete, brick, tiles and concrete washout
- Recycled Glass
- Recovered Pavements materials (including granular and stabilised material as well as asphalt that is not suitable for reuse into those applications)
- Railway Ballast
- Bottom Ash

### **3.2.8 NACOE Project S67 – Future availability of fly ash for concrete production in Queensland (New)**

Fly ash is an essential supplementary cementitious material which is added to concrete during manufacture to mitigate alkali-silica reaction (ASR). It is generally not possible to economically manufacture durable concrete without fly ash in QLD. Currently fly ash is drawn from operating coal fired power stations in QLD. In the future, this supply source will become less viable as coal fired power stations begin to close as part of the toward zero emission strategy. This project will look at some alternative fly ash sources for concrete including reclaiming and or re-processing fly ash from waste fly ash dams and other fly ash storage repositories at power stations, imported sources, and any other alternative sources or alternative supplementary cementitious materials (SCMs) that are available.

### **3.2.9 NACOE Project P94 – Optimising the Use of Recycled Materials in Queensland for Unbound and Stabilised Products (Completed)**

The third and final year of this project aims to disseminate the learnings from the project's first and second years, with a focus on describing the specification updates in MRTS05. This included a webinar<sup>6</sup>, infographic<sup>7</sup> and final report<sup>8</sup> being produced to summarise the findings and feedback from the webinars.

### **3.2.10 NACOE Project P111 – Improved Crumb Rubber Modified Binder Sprayed Sealing Practices**

This project aims to improve and refine how crumb rubber modified binders (binders that use recycled materials to replace the use of polymer modified binders made from raw materials) are used and it is hoped that it will minimise the amount of waste generated from sprayed sealing practices.

### **3.2.11 NACOE Project P117 – Sustainability Assessment Tool**

The project is nearing completion and will then start phased implementation. It is expected that the tool will have a public launch and have an awareness campaign along with establishing a pilot program for the tool using a variety of current projects at different stages to conduct this pilot.

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<sup>6</sup> <https://vimeo.com/718977183>

<sup>7</sup> <https://www.tmr.qld.gov.au/-/media/busind/techstdpubs/Specifications-and-drawings/Specifications/5-Pavements-Subgrade-and-Surfacing/MRTS05-Factsheet.pdf?la=en>

<sup>8</sup> [https://www.nacoe.com.au/wp-content/uploads/2022/03/P94\\_Year-3-Final-Report-20-21-Recycled-Pavement-Materials-QLD.pdf](https://www.nacoe.com.au/wp-content/uploads/2022/03/P94_Year-3-Final-Report-20-21-Recycled-Pavement-Materials-QLD.pdf)

### **3.2.12 NACOE Project O20 – Recycled material Assessment Framework (2021/2022 Update)**

In order to meet sustainability commitments, TMR look to identify and evaluate emerging materials and waste re-use opportunities. But, it is imperative that a robust, fit-for-purpose evaluation methodology is in place to provide clear guidance to TMR, industry and manufacturers to ensure that workplace health, safety and environmental risks are assessed. This NACOE project is aimed at the development of a consistent, science-based assessment framework for evaluating risks associated with emerging and recycled materials.

The final framework is intended to be utilised by TMR to evaluate innovative and emerging materials or technologies in future to ensure risks are lower or at least equivalent to those of existing materials and technologies. This evaluation methodology and process will provide TMR and our agents with a robust method for applying due diligence in preventing environmental harm and ensuring the health and safety of workers and the public.

Work to develop this framework at a national level, through Austroads is proposed and TMR will rescope this project depending on the outcome of that proposal.

### **3.2.13 NACOE Project O28 – Recycled materials supplier database (New)**

The aim of this project is to develop an interactive online database of state-wide recycled and reused material suppliers to support the use of local recycled and reused materials in road projects across the state. The database will be accessible by internal and external stakeholders.

As part of the recently released *Waste 2 Resource Strategy*, contractors are required to report what recycled materials will be used on a project through the Tender Schedule. This database will align with the Tender Schedule and give an understanding of where recycled materials are located around the state to enable project teams and contractors to identify and connect with recycled materials suppliers at all stages of the project.

## **4. Future Challenges**

From the 2021/2022 waste data collated, it appears that there are starting to be variations in TMR's performance against the Queensland Government's WMRRS targets for waste diverted from landfill. No conclusions can be drawn regarding the decrease in diversion rate due to the difference in scope between contracts and the lower number of contracts reported.

The key continuing challenge for TMR is to drive the uptake of recycled materials across the transport infrastructure sector. Substantial work has been done to modernise specifications to enable the use of recycled materials however, uptake by the supply chain and market for recycled material remains in its infancy. TMR, as a prominent government procurer of goods and services, looks to set objectives and direction for the sector through conscious procurement strategies and supply chain engagement. Finding the right mix of procurement incentive and specification facilitation will be critical to ensure the right outcomes for sustainability and value for money. A procurement strategy that addresses both the use of recycled materials and emissions will be a key enabler.

Another area of focus for TMR will be the management of reuse of excess earthworks/fill to try and maximise reuse and appropriately characterise any reuse risks to the environment.

TMR is continuing to try to improve data collection and analysis to ensure that all TMR operations are accurately reflected in the data and so that performance can be tracked and managed.



# Appendix A: Department of Environment and Science State Entity Reporting Template

## State Entity Waste Reporting 2022

### 1. Name of the State Entity

*Department of Transport and Main Roads*

### 2. Please list the types and amounts of waste generated, recycled or disposed of by your department/agency in carrying out its activities during 2021-22.

*Details are provided in **Section 2.1** of the **Waste 2 Resource Strategy – Annual Status Report**.*

### 3. Please list actions taken by your department/agency to reduce the amount of waste generated during 2021-22.

*Details are provided in **Section 3.1** of the **Waste 2 Resource Strategy – Annual Status Report**.*

### 4. Please discuss actions taken by your department/service to recover, and re-use or recycle waste during 2021-22.

*Details are provided in **Section 3.2** of the **Waste 2 Resource Strategy – Annual Status Report**.*

### 5. Please discuss actions taken by your department/agency to increase the use of recycled materials during 2021-22.

*Details are provided in **Section 3.2** of the **Waste 2 Resource Strategy – Annual Status Report**.*

### 6. Please discuss progress made by your department/agency in relation to its waste and recycling performance indicators during 2021-22.

*The progress made under the TMR Waste 2 Resource Strategy is provided in **Appendix C: TMR Waste 2 Resource Progress of the Waste 2 Resource Strategy – Annual Status Report**.*

### 7. Please discuss the ways in which your department/agency has contributed towards achieving the goals and targets under Queensland's waste management strategy during 2021-22.

*Analysis of the progress made in relation to meeting the Queensland Government's Waste Reduction and Resource Recovery Strategy targets released in 2020 are provided in **Section 2** of the **Waste 2 Resource Strategy – Annual Status Report**.*

### 8. Please list the amounts and types of litter or illegally dumped waste that were collected by your department/agency during 2021-22.

*Details of the litter and illegally dumped wastes collected by TMR during 2020/2021 are provided in **Section 2.5** of the **Waste 2 Resource Strategy – Annual Status Report**.*

## Appendix B: Leased building waste data

### Scope

Data is sourced to cover the period July 2021 to June 2022. Where a full year's data is not available for a site, data is extrapolated from the months where data is available to cover any missing months.

The report is based on a snapshot of the agency as of June 2022. Any expansions, contractions, or relocations of the agency's footprint are not tracked over time.

This report covers five significant waste streams (landfill, co-mingle, paper/cardboard, confidential and organic) and three secondary waste streams (Containers for Change, batteries, and Simply Cups). For reporting purposes, the three secondary streams have been included as co-mingle waste.

### 2021/2022 TMR Leased Building Waste Data

TMR's leased building waste data has been provided by the Queensland Government Accommodation Office (QGAO) – Department of Energy and Public Works.

TMR data has been collected from 19 sample sites covering 72,308 m<sup>2</sup> of occupied space.

**Table 8: TMR Sample Buildings Set**

Site	2022 Diversion %	Comments
Brisbane, 1 William St	57.65%	Accurate weighed data provides benchmark for reporting. Accurate areas provided for Ministerial/DG floors
Brisbane, Mineral House 41 George St	30.92%	
Brisbane, 61 Mary Street	9.37%	
Brisbane, 313 Adelaide St	16.01%	
Brisbane, 30 Makerston Street	31.92%	No co-mingle data available
Brisbane, 229 Elizabeth Street	27.48%	New site, nil data - Averaged data used
Carseldine, Government Office Precinct	41.19%	
Beaudesert, 1 Telemon Place	0.00%	No recycling data provided.
Wynnum. 139 Tingal Road	45.03%	Paper data only available. Substitute average landfill data used.
Zillmere, TMR MVIC 70 Pineapple Street	19.42%	
Hervey Bay, Brendan Hansen 50-54 Main Street	7.41%	Substitute data from previous year.
AYR 33-34 Little Drysdale Street	0.00%	No recycling data provided.
Maroochydore, Mike Ahern Building 12 First Avenue	50.53%	Questionable data quality based on kerbside collection
Townsville, Verde Tower 435 Flinders Street	21.03%	
Mackay Verde Central 44 Nelson Street	15.53%	
Cairns, Corporate Tower 15 Lake Street	46.98%	Significant improvement
Caboolture, 6 Piper Street	42.45%	No previous data

**Table 9: 2021-22 FY TMR Statistics - based on agency's share of Total Leasable Area of the 'All Buildings Sample Set' as listed in Appendix 2 of the TMR Annual Agency Office Waste Report 2022**

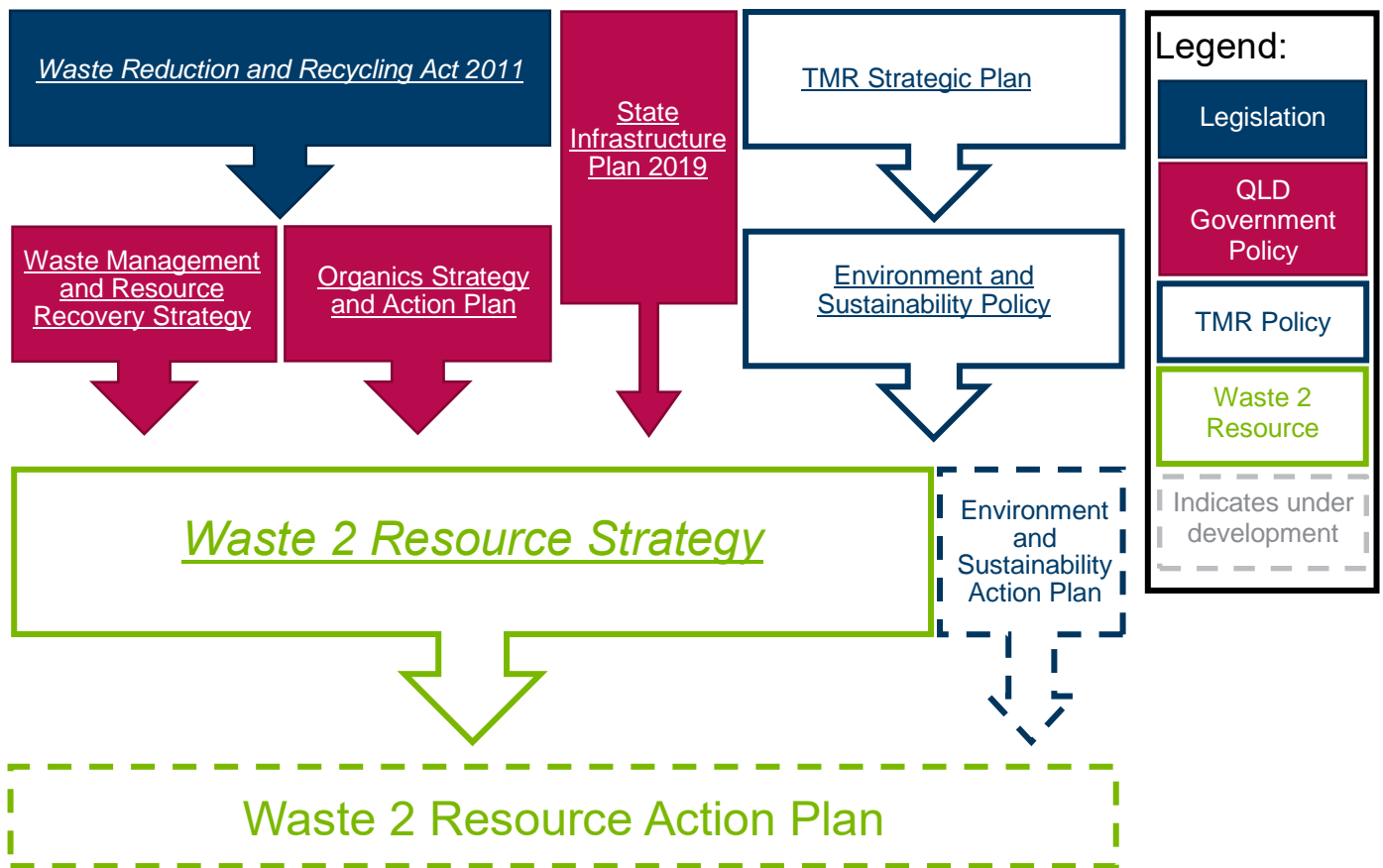
Agency	DTMR	Whole of Government
2020/21 Diverted from Landfill	25.5%	27.62%
2021/22 Diverted from Landfill	<b>26.6%</b>	<b>27.75%</b>
	<b>Tonnes</b>	<b>Tonnes</b>
Annual Co-mingle Waste	32.7	267.2
Annual Paper/cardboard Waste	17.5	303.7
Annual Confidential	0.4	80.6
Annual Organic	9.9	45.4
Annual Landfill Waste	<b>167.0</b>	1814.2
Annual Total Waste (Tonnes)	<b>227.5 Tonnes</b>	<b>2511.1 Tonnes</b>
Waste per square metre	<b>Kilograms</b>	<b>Kilograms</b>
Recyclable 2021	1.06	1.11
<b>Recyclable 2022</b>	<b>0.84</b>	<b>1.10</b>
Landfill 2021	3.11	2.9
<b>Landfill 2022</b>	<b>2.31</b>	<b>2.58</b>
Waste per person	<b>Kilograms</b>	<b>Kilograms</b>
Recyclable 2021	13.29	13.84
<b>Recyclable 2022</b>	<b>10.95</b>	13.81
Landfill 2021	38.87	36.27
<b>Landfill 2022</b>	<b>28.88</b>	32.21

Notes –

- Agency Statistics are 'representative' based on each Agency's 'Sample Buildings Subset' of the 'All Buildings Sample Set' as listed in Appendix 2 of QGOA's TMR Annual Office Waste Report 2022.
- Statistics do not represent an agency's total office waste volumes or weights.
- WOG statistics are 'representative' based on the 'All Buildings Sample Set' as listed in Appendix 2 – not all Queensland Government Office Accommodation. These figures do not represent total QG waste volumes or weights.
- Above figures therefore are only provided for Agencies in their current form in 2021-22 FY. The figures represent a snapshot of the agency as located in June 2022 and do not account for any relocations, expansions or contractions during the 2021-22 FY.
- QGOA can provide copies of last year's reports to Agencies for any of the Agencies they would like to use for comparisons between the current FY statistics and the 2020-21 FY.
- Kilograms/person is based on the Qld Government's Occupancy SDS Measure of 12.5 sqm per person. Partial occupancy due to work-from-home arrangements are not factored into the occupancy density.

# Appendix C: TMR Waste 2 Resource Progress

The *Waste 2 Resource Strategy* fulfills multiple requirements as shown below in Figure 11.



**Figure 11: Waste and Resource Context**

While specific actions, progress and performance objectives are still being developed, all to be further detailed under the *Waste 2 Resource Action Plan*, TMR have been undertaking a number of specific actions to start to progress the *Waste 2 Resource Strategy*, they are as follows:

- Aligning the Environment and Sustainability Action Plan with the *Waste 2 Resource Strategy* and Action Plan to ensure that there is visibility and clear division of scope and accountability.
- Establishing framework for the *Waste 2 Resource Action Plan* with the intention of driving the individual areas responsible for waste and resource management to develop their own actions via workshops.
- Drafting of a communications plan for *Waste 2 Resource* and alignment with an overall Environment and Sustainability communications plan.
- Mapping of sustainability, circular economy and other related waste and resource management actions already being undertaken or planned across all of TMR to ensure visibility and clarity.
- Establishment of the internal *Waste 2 Resource Dashboard* to visualise TMR's waste reporting data.
- Integrating waste and resource management measures in to TMR's Collaborative Transport Infrastructure Program for major projects (those above \$100M in value).
- Continuing to support NACOE projects as described in Section 3 in order to increase uptake of recycled materials, establish frameworks and fill data gaps.

## Appendix D: Waste classification alignment

TMR's collected waste stream alignment with the Department of Environment and Science waste classification.

General Waste	2021/2022 TMR Waste Streams	Description
Office Waste	Office – Recyclables	Mixed recyclables including plastic plates, bottles, aluminium cans etc.
	Office – Paper	Paper and cardboard recyclable waste.
Construction and demolition waste	Excess Earthworks / Embankment / Fill	Any excess earthworks, embankment or fill generated by a project which is then exported outside the project boundary for either reuse, recycle or landfill beyond the project boundary.
	Other Contaminated Earthworks	Any other contaminated earthworks, but not acid sulphate soils.
	Asphalt and Profiles (RAP)	Asphalt only (not chip seals and other pavements)
	Other Recovered Pavement Materials	Spray seal pavements, stabilised pavements (not asphalt)
	Concrete	Structural concrete, shotcrete, hardened grout, concrete washout
	Metal	Sign posts, guardrails etc.
	Other Construction Waste (Timber, glass, plastic, bricks)	Any construction waste not accounted for in other construction waste categories, such as uncontaminated timber, glass, plastic and bricks).
	Acid Sulphate Soil	Acid Sulphate Soils.
	General Refuse	Cardboard, plastic packaging.
Green waste (land clearance, parks and gardens)	Vegetation	Timber vegetation, stripped grasses etc.
Food waste (kitchen waste)	Office – General and Food waste	Putrescibles, kitchen waste, non-recyclable packaging.
Mechanical/workshop waste	Tyres and Rubber	Waste tyres.
E-waste	Regulated Waste Cat 2	N/A
Clinical wastes	N/A	N/A
Chemical wastes	Regulated Waste Cat 1	Regulated waste is category 1 regulated waste if it meets the requirements of section 43 of the EP Regulation.
	Regulated Waste Cat 2	Regulated waste is category 2 regulated waste if it is not category 1 regulated waste.
Sewage	Septic General	Septic waste generated by projects.
Litter or illegally dumped waste	Illegally Dumped Refuse	Waste collected from road reserve.



