Western Sydney Regional Waste Avoidance and Resource Recovery Strategy 2014-2017



WSROC
Advocating for the people of Western Sydney























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Executive summary

The NSW Environment Protection Authority through its Waste Less, Recycle More initiative has funded Regional Organisations of Councils to develop regional waste strategies to outline future directions for resource recovery practices across the region. Ten councils have come together to develop this strategy, which explores options for addressing waste management challenges into the future and seeks to maximise funding opportunities for the region under this initiative.

A total of 699,887 tonnes of domestic waste was collected from Western Sydney households in 2011/2012 through the kerbside bin services, kerbside bulky waste collections and council drop off facilities. Just over half of this waste was diverted from landfill and recovered with the region achieving an overall domestic waste landfill diversion rate of 53%, which is higher than the NSW rate of 47%. Diversion rates in the region have improved in recent years, increasing from 44% of waste recovered in 2007/2008.

To ensure that the region is contributing towards achieving State-wide waste objectives, it has developed regional targets under six themes that are in line with the NSW Waste Avoidance and Resource Recovery Strategy's objectives:

- Avoid and reduce waste generation;
- Increase recycling;
- Divert more waste from landfill;
- Manage problem wastes better;
- Reduce litter and illegal dumping; and
- Improve regional governance.

The regional targets identified in the development of this Strategy are to:

- Work towards reducing regional waste generation from current generation of 7.8kg/capita/week to 7.5kg/capita/week by 2021.
- Gradually improve the regional resource recovery rate to 58% by 2017 and 70% by 2021 (currently 53%).
- Work towards achieving the Waste Avoidance and Resource Recovery (WARR) target for diversion of waste from landfill by 2021.
- Build, upgrade or facilitate 10 community recycling centres or innovative solutions for household problem wastes by 2021.
- Partner with the State to establish a litter baseline by 2015 and work towards reducing the incidence of litter by 2017.
- Partner with the State to establish an illegal dumping baseline by 2015 and work towards reducing the incidence of illegal dumping by 10% by 2017.
- Work towards enhancing regional cooperation and governance.

The Strategy details regional actions to contribute to the achievement of the targets. Each action has been analysed to identify priority actions. WSROC will work with participating councils to develop these regional actions towards achievement of these targets and to build future capacity for increased resource recovery for a growing population in the region.

"A planned and collaborative approach to waste management, which is cost effective, supportive of our community and economy and improves resource recovery in line with State Government targets."

Western Sydney Regional Waste Strategy Vision

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Acronyms

Abbreviation	Definition	Abbreviation	Definition
ABS	Australian Bureau of Statistics	MRF	Materials Recovery Facility
AWT	Alternative Waste Treatment	MSW	Municipal solid waste
C&D	Construction and Demolition (waste)	MUDs	Multi-unit dwellings
C&I	Commercial and Industrial (waste)	pa	per annum
CALD	Cultural and linguistically diverse	RID	Regional Illegal Dumping
CRC	Community Recycling Centre	RRA	Regional regulated area
DCP	Development control plan	ROC	Regional Organisation of Councils
EfW	Energy from Waste	SMA	Sydney metropolitan area
EPS	Expanded polystyrene	SME	Small to medium enterprises
ERA	Extended regulated area	SAWT	SITA Advanced Waste Treatment
FOGO	Food organics and garden organics	SUDs	Single unit dwellings
GO	Garden organics	tpa	Tonnes per annum
hhld	Household	WARR	Waste and Resource Recovery
HHW	Household hazardous waste	wk	Week
LGA	Local Government Area	WLRM	Waste Less Recycle More
MGB	Mobile garbage bins	WSROC	Western Sydney Regional Organisation of Councils

1 Introduction

1.1 The region

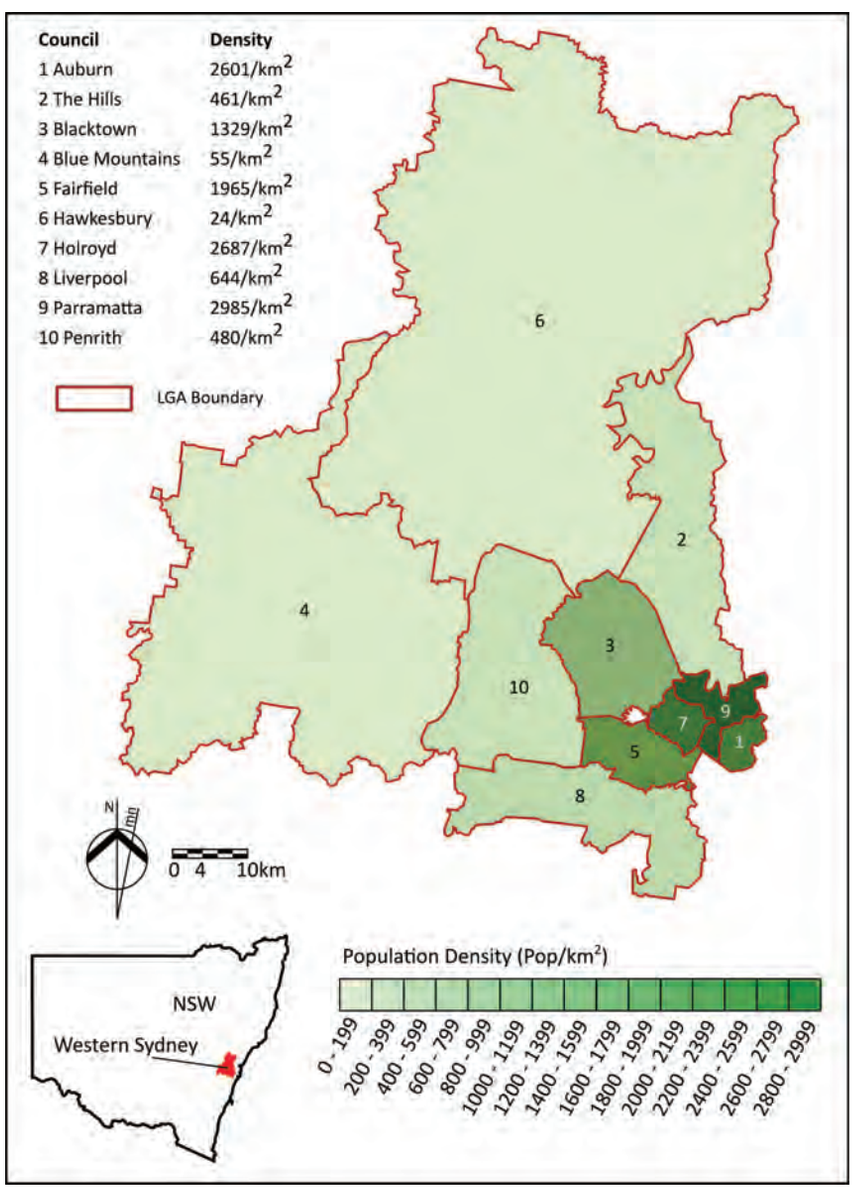
The Western Sydney region as defined by the NSW EPA consists of the LGAs of Auburn, Blacktown, Blue Mountains, Fairfield, Hawkesbury, The Hills, Holroyd, Liverpool, Parramatta and Penrith. The Western Sydney region for this strategy is in line with the Draft Metropolitan Strategy for Sydney 2031 and includes most of the councils in the WSROC region. The Hills Shire is not a member of WSROC and Bankstown City Council is participating in the Southern Sydney regional waste strategy.

These 10 participating councils represent a significant geographical portion of the Sydney metropolitan region, covering over 5000 square kilometres and containing a mix of regional centres and large cities (see Figure 1). It stretches from the heavily urbanised, multicultural areas of Auburn and Parramatta in the east, to the greenfields growth centres around The Hills, Blacktown and Liverpool, the semi-rural areas of Hawkesbury and the World Heritage listed areas of the Blue Mountains.

The region's population contains a diverse cultural and ethnic mix and makes up one third of the total Sydney population. The economy is worth approximately $95 billion annually – making it the third largest regional economy in Australia behind the Sydney and Melbourne CBDs. It also includes areas of great socio-economic disadvantage in pockets around Fairfield, Blacktown and parts of the Blue Mountains, and areas of affluence such as The Hills.

The Western Sydney region sits at the forefront of Sydney's future challenges and opportunities. A Regional Waste Strategy needs to ensure the region's future direction maximises waste avoidance and resource recovery outcomes for the significant and growing population of the region.

Figure 1: Snapshot: The Western Sydney region



1.2 Introduction to the Strategy

The ten participating councils have come together to develop a future strategic direction for improving waste management and resource recovery practices across the region.

Under *NSW 2021: A Plan to make NSW No. 1,* the State Government has identified waste management as a priority area. The *NSW 2021 Western Sydney and Blue Mountains Regional Action Plan* identifies that this regional waste strategy will improve waste and recycling by increasing recycling, combatting illegal dumping and tackling littering, leading to joint activities and better information and cooperation between councils.

This Western Sydney Regional Waste Avoidance and Resource Recovery Strategy (the Strategy) demonstrates the region's commitment to adopting a strategic approach to waste management. Having been developed in accordance with the Environment Protection Authority's (EPA) 2014 guidelines, this Strategy is also consistent with the State Government's NSW Waste Avoidance and Resource Recovery Strategy 2013-21 (WARR Strategy). This Regional Strategy fits within the wider policy context set by the State and Federal governments and seeks to maximise funding opportunities under the Waste Less, Recycle More Initiative.

This regional focus will provide an opportunity to work with other Regional Organisations of Councils (ROCs) to progress the common actions and address shared challenges identified through the regional strategies. There may also be opportunities for councils to participate in regional partnerships with those councils adjoining the Western Sydney region.

This strategic and cooperative approach to the way waste is managed across the region will support individual councils in improving resource recovery, diverting waste away from landfill and to address the increased costs associated with waste management.

Implementation of this Strategy can assist individual councils to:

- Improve recycling and resource recovery rates;
- Reduce contamination of recyclables;
- Divert more waste from landfill;
- Achieve cost savings; and
- Deliver educational campaigns to improve waste management behaviour.

This Strategy explores options for addressing waste management challenges into the future and for introducing effective and sustainable waste and resource recovery practices across the region.



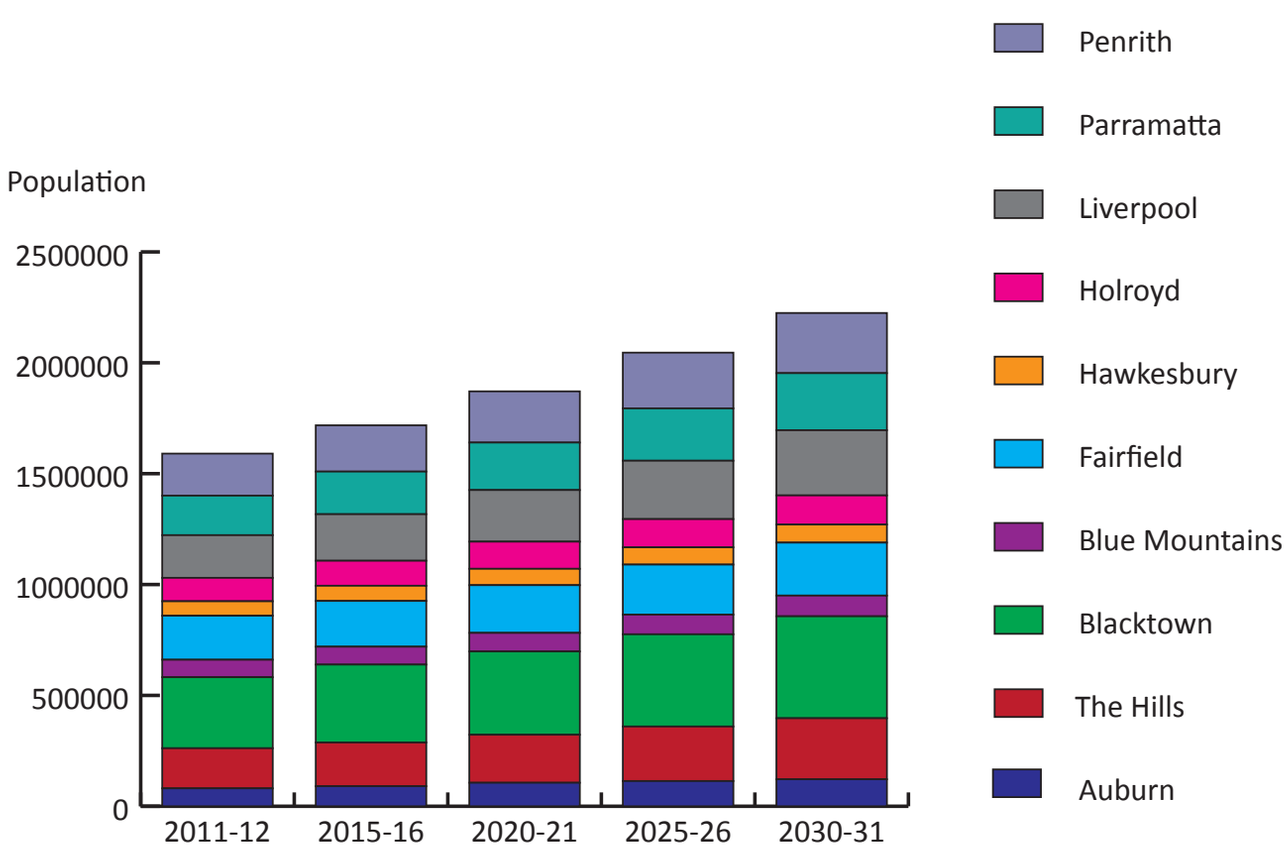
2 Where are we today?

2.1 Population and demographic information

The region has a population of just over 1,600,000 spread across an area of 5,000km^2. Approximately 20% of the region's population lives in the Blacktown LGA. Together the six councils of The Hills, Blacktown, Fairfield, Liverpool, Parramatta and Penrith represent 80% of the region's total population. The least densely populated local government area (LGA) is Hawkesbury, which has the largest area (2,776 km^2) and the smallest population (64,000).

The Draft Metropolitan Strategy for Sydney forecasts that 70% of Sydney's population growth to 2031 will be in Western Sydney, with nearly 1 million people settling in the region over the next 16 years (Figure 2). The North West Growth Centre alone, stretching through The Hills, Blacktown and Hawkesbury, aims to develop 70,000 new dwellings in the region. The South West Growth Centre develops a number of new and existing suburbs within the Liverpool LGA. It is anticipated that additional growth in housing will come from the development of multi-unit dwellings (MUDs), which need to be accounted for when considering waste infrastructure and services.

Figure 2: Future population projections for Western Sydney region



Source: Department of Planning (2009) New South Wales Statistical Local Area Population Projections, 2006-2036.

Table 1: Demographic profile of the region

Council	Number of households [a]	Population [b]	% SUDs	% MUDs	Average persons per hhld	Socio- Economic index (rank) [c]
Auburn	25,118	78,286	64%	36%	3.1	17
The Hills	59,710	176,986	86%	14%	3.0	148
Blacktown	102,292	312,479	85%	15%	3.1	77
Blue Mountains	32,419	78,391	92%	8%	2.4	128
Fairfield	61,204	196,622	84%	16%	3.2	3
Hawkesbury	22,210	64,234	90%	10%	2.9	121
Holroyd	33,816	103,869	61%	39%	3.1	74
Liverpool	55,068	188,083	79%	21%	3.4	51
Parramatta	60,418	174,554	56%	44%	2.9	96
Penrith	65,259	184,681	85%	15%	2.8	110

Source/ Notes:
a) NSW Local Government Data Report 2011- 2012
b) ABS data 30 June 2010
c) All NSW areas are ordered from the lowest to highest score, then the area with the lowest score is given a rank of 1, highest rank is 153.

Most of the councils are located within the Sydney metropolitan area (SMA) for payment of the Section 88 Waste and Environment Levy, with the exception of Hawkesbury City Council (extended regulated area (ERA) and The Blue Mountains City Council (regional regulated area (RRA). The ERA and SMA currently pay the same rate for the Section 88 levy. The rate of payment of the levy in these regions needs to be considered when planning waste management programs.

Overall, 79% of residents live in single-unit dwellings (SUDs), with 21% living in MUDs. However, the proportion of those living in MUDs is expected to increase as population density increases in the future (Table 1). The region has a significant proportion of newly arrived immigrants and a large proportion of culturally and linguistically diverse (CALD) residents.

The population is highly multicultural with residents speaking over 50 different languages. Over 35% of residents were born overseas and up to 20% of residents reported difficulty speaking English in some LGA's such as Auburn and Fairfield. This trend is likely to continue as over 30% of new migrants to NSW settle in Western Sydney.

2.2 Waste and resource recovery collection systems

All councils provide kerbside residual waste and recycling collection services in their urban areas. Five of the ten councils provide a fortnightly garden organics service (GO), while Penrith provides a weekly food and garden organics (FOGO) collection. Table 2 summarises the waste collection services provided by the councils.

Of the region's 517,514 households, 99% (512,597) receive a kerbside residual waste collection service while 500,910 (97% of all households) also receive a kerbside recycling collection service. The 4,917 households that do not receive any waste service are mainly rural properties, who must deliver their waste and recycling to an appropriate facility.



Table 2: Council household bin collection services

	Residual Waste			Co-mingled recycling		Organics	
Council	**Bin size**	**Frequency**	**Disposal/ processing**	**Bin size**	**Frequency**	**Bin size**	**Frequency**
Auburn	120L	weekly	landfilled	240L	fortnightly	240L	Fortnightly GO
The Hills	140L	weekly	landfilled	240L	fortnightly	240L	Fortnightly GO
Blacktown	240L	weekly	UR3R waste processing	240L	fortnightly	no service	
Blue Mountains	240L	weekly	landfilled	140L	weekly	no service	
Fairfield	240L	weekly	UR3R waste processing	240L	fortnightly	no service	
Hawkesbury	240L	weekly	landfilled	240L	fortnightly	240L	Fortnightly[b] GO
Holroyd	240L	weekly	UR3R waste processing	240L	fortnightly	no service	
Liverpool	140L	weekly	SAWT waste processing	240L	fortnightly	240L	Fortnightly GO
Parramatta	140L	weekly	landfilled[a]	240L	fortnightly	240L	Fortnightly GO
Penrith	140L	fortnightly	landfilled[c]	240L	fortnightly	240L	Weekly FOGO

a) 12% of residual waste to UR3R in 2013/14
b) Introduced in 2013, does not yet show up in statistics
c) Organics depleted

Various processes are used for residual waste treatment at the UR3R or SAWT alternative waste treatment (AWT) facilities to separate organic and some recyclable materials from the residual waste stream, thereby reducing the volume of waste sent to landfill. Kerbside recyclables are collected and transported to a Material Recovery Facility (MRF) to be sorted into separated material types and sent for reprocessing into new products. Organic waste is composted at composting facilities to be reused in various applications. Some councils provide kerbside chipping or drop off green waste services in place of organics bin services.

All councils provide residents with a kerbside clean up service, for the disposal of bulky household waste. Some councils provide green waste chipping and/or mulching services to residents, either in place of, or additional to, kerbside organics services. Table 3 details these various services offered by councils. The provision of safe and effective services to MUDs as urban density increases in the future is a challenge to some councils, particularly for bulky waste collection services.

Table 3: Council household clean-up and chipping services

	Kerbside clean-up service			Chipping service		
Council	**Frequency per annum**	**On-call**	**Scheduled**	**Frequency**	**Kerbside service**	**Drop-off**
Auburn	4	✓				
The Hills	2	✓		2/mth		✓
Blacktown	12	✓				
Blue Mountains	2[ab]	✓		2/yr[ab]	✓	
Fairfield	2		✓	Weekly		✓
Hawkesbury	1[b]	✓				
Holroyd	2[b]		✓	2/mth[c]		✓
Liverpool	2	✓				
Parramatta	4		✓			
Penrith	4	✓				

Notes: a) Residents are entitled to two on call services of their choice per year
b) Additional services can be provided to residents for a fee.
c) Service is open every Sunday during daylight saving time, and open twice/month during non daylight saving time.

The councils provide opportunities for households to recycle various materials through their kerbside clean up services and local drop off sites. Table 4 details the resource recovery services offered by each council in addition to kerbside bin services.

Table 4: Resource recovery services offered by councils (2011/2012)

Council	White goods	Paper/card-board	Plastics	Glass	Metals	Batteries	E-waste	Gas bottles	Motor oil	Green waste	Mattresses	C&D	Tyres	DrumMUSTER	Paint
Auburn	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓
The Hills	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓
Blacktown	✓	✓	✓			✓	✓			✓	✓				
Blue Mountains	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Fairfield	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Hawkesbury	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Holroyd	✓	✓	✓	✓	✓		✓			✓	✓				
Liverpool	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓
Parramatta	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓
Penrith	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓

Note: In some council areas, recovery collection points are not available at every site, and collection of some materials is limited to different parts of a council area

2.3 Waste and resource recovery tonnage data

A total of 699,887 tonnes of domestic waste was collected from Western Sydney households in 2011/2012 through the kerbside bin services, kerbside bulky waste collections and council drop off facilities. Just over half of this waste was diverted from landfill and recovered with the region achieving an overall domestic waste landfill diversion rate of 53%, which is higher than the NSW rate of 47%. Diversion rates in the region have improved during the last five years, increasing from only 44% of waste recovered in 2007/2008.

Table 5: Total domestic waste generation, recovery and disposal (2011/2012)

Council	Total recovered (t)	Total disposed (t)	Total domestic generation (t)	Recovery rate (%)
Auburn	10,417	23,237	33,655	31.0%
The Hills	38,772	46,311	85,083	45.6%
Blacktown	79,710	51,744	131,454	60.6%
Blue Mountains	20,278	28,667	48,945	41.4%
Fairfield	50,569	36,481	87,050	58.1%
Hawkesbury	8,663	24,154	32,817	26.4%
Holroyd	26,964	20,436	47,400	56.9%
Liverpool	53,949	24,238	78,187	69.0%
Parramatta	27,368	40,649	68,017	40.2%
Penrith	54,447	32,832	87,280	62.4%
Western Sydney	371,138	328,750	699,887	53%
NSW	1,656,880	1,865,963	3,522,843	47%

Source: NSW Local Government Waste and Resource Recovery Data Report 2011-2012 as reported by councils.

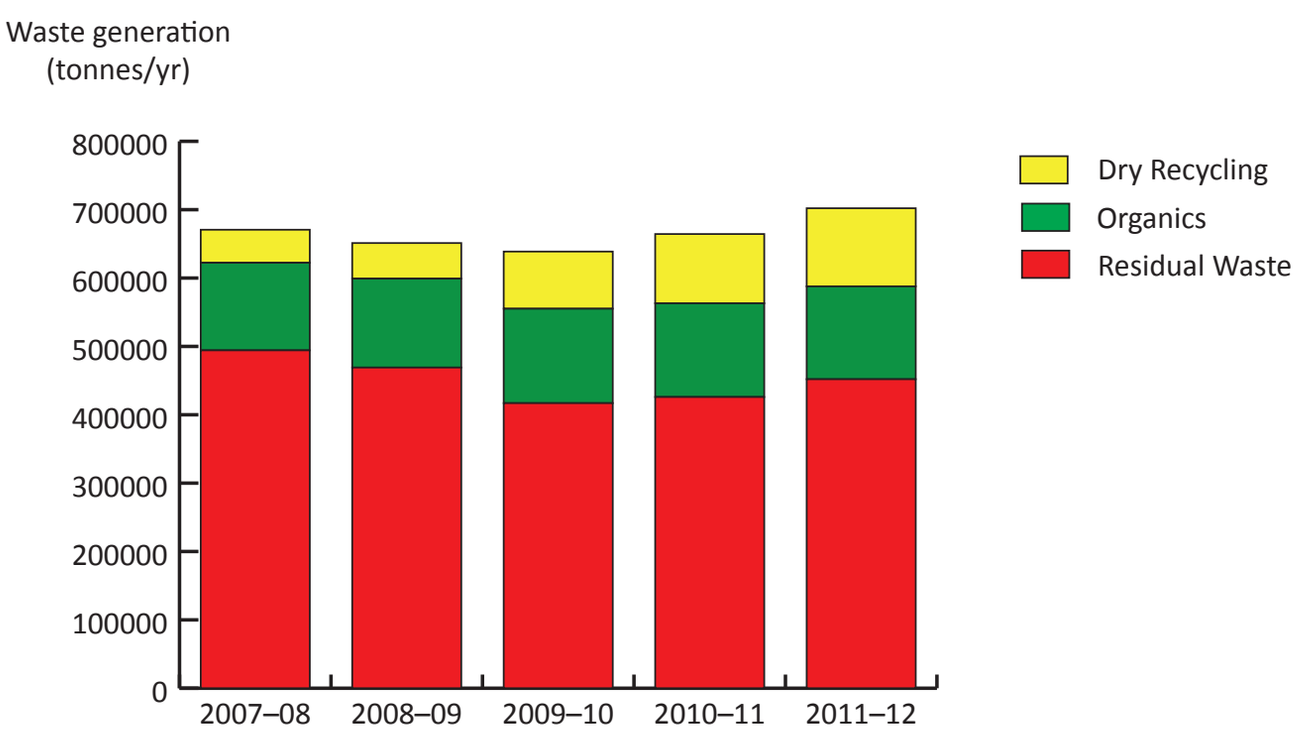
Regional waste data shows that residents generate on average 7.8 kg per person per week of material collected from kerbside waste bins. This is slightly higher than the NSW average of 7.6 kg week (Table 6).

Table 6: Kerbside bin service generation yields (kg/capita/week) 2011/2012

	Generated (kg/capita/week)			
Council	Dry recycling	Organics	Residual	Total
Auburn	0.9	0.8	5.0	6.8
The Hills	1.9	2.4	4.3	8.5
Blacktown	1.6	-	6.1	7.7
Blue Mountains	2.1	-	5.8	7.9
Fairfield	1.2	-	6.4	7.6
Hawkesbury	1.9	-	6.4	8.3
Holroyd	1.5	-	6.2	7.7
Liverpool	1.7	1.8	4.2	7.7
Parramatta	1.5	1.6	3.7	6.8
Penrith	2.1	3.5	3.0	8.7
Western Sydney	1.6	1.1	5.0	7.8*
NSW	1.9	1.4	4.3	7.6
*This figure has been rounded from the actual which is 7.76kg.				

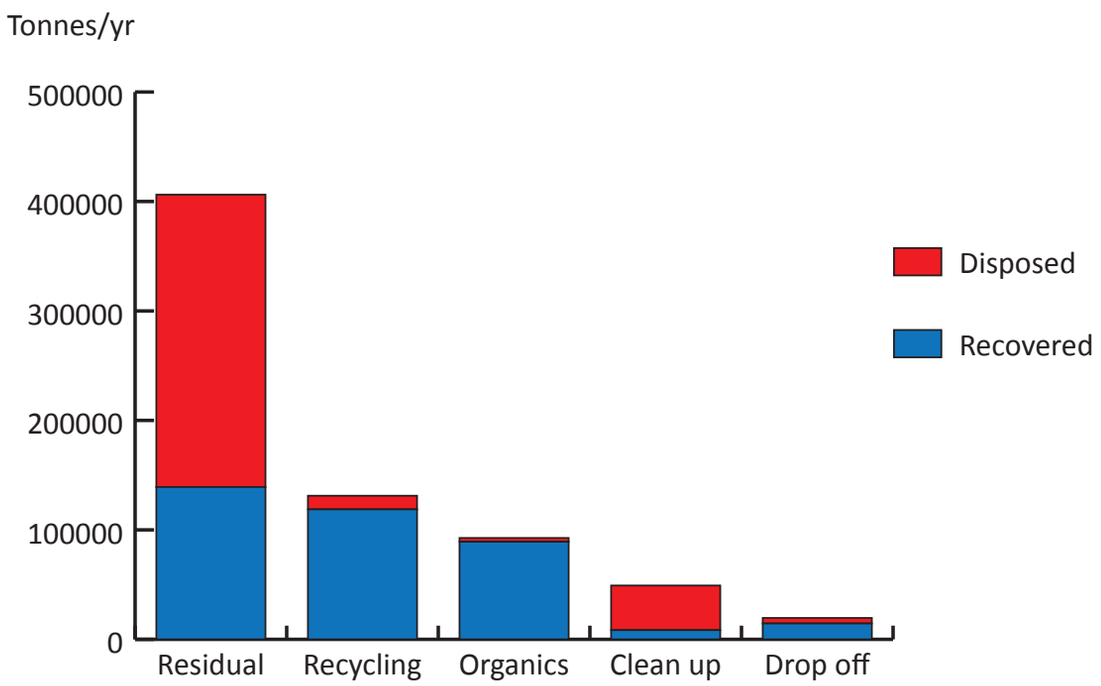
Total generation of waste in the region has increased in the past five years. This is detailed in Figure 3, which shows the tonnage of waste composted, recycled and sent to landfill from domestic waste services between 2007-2012. The introduction of new collection services in two LGAs in 2009 contributed to the decrease in waste sent to landfill in 2009/10, and an increase in organic waste processed at this time. Waste generation levels decreased during the years 2008/09 and 2009/10, and increased again from 2009/10 to 2011/12, resulting in an overall increase in the quantity of waste across the three waste streams. Population growth also contributed to this increase. There has been a marginal increase in waste recycled from 2007/08 to 2011/12 due to improved recycling practices.

Figure 3: Total domestic waste generation from the region 2007-2012



Recovery rates vary among the different waste streams collected by councils as shown in Figure 4. Most waste collected in the recycling and organics streams is recovered, and a substantial quantity of residual waste recovered through AWT processing systems. Some waste is also recovered from kerbside clean up services. Drop off facilities offered by some councils provide the community with further opportunities to recycle waste at specific locations in the region. Drop off centres, particularly those in the Blue Mountains and Hawkesbury, collect significant quantities of waste and recyclable material from residents in these council areas.

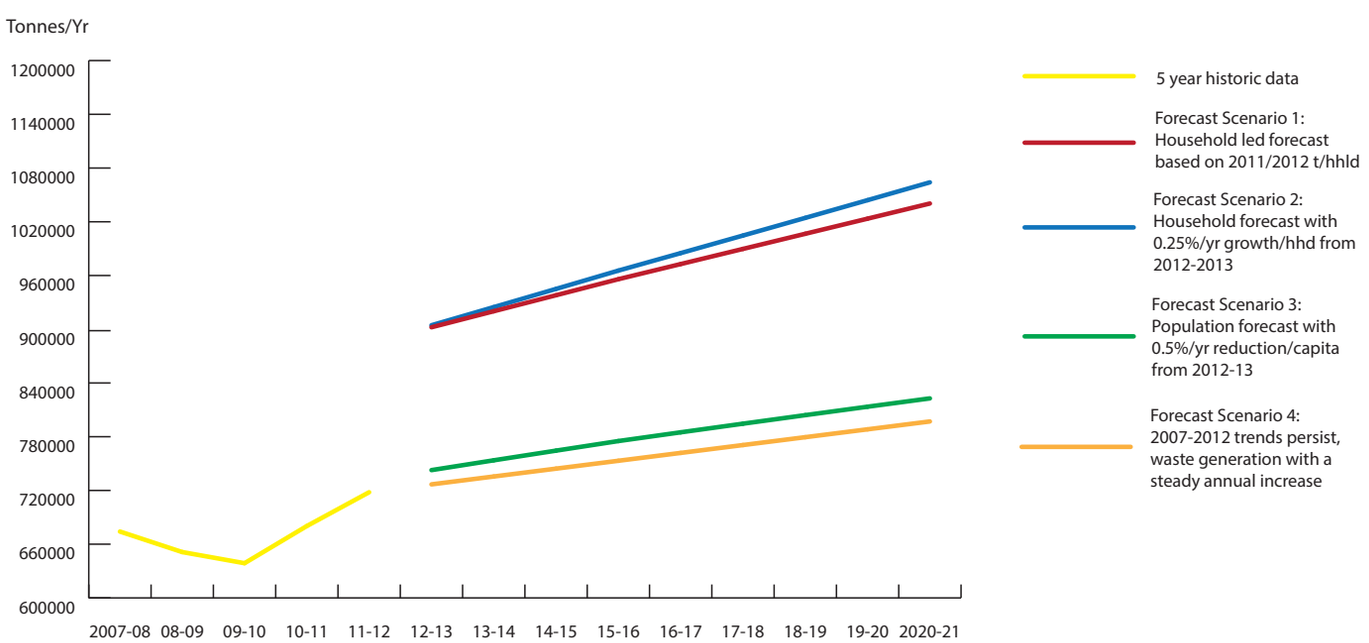
Figure 4: Total recovery across all domestic waste streams 2011-12



2.3.1 Waste trends and projections

Waste generation per capita in Western Sydney has grown on average over the past four years (2010 – 2014). In addition, total waste generation has been proven to have a positive correlation to population levels. As all ten councils are expected to experience a significant increase in population in the future, councils are likely to see a corresponding increase in waste generation, in addition to the per capita generation increases assuming the current rate continues. Figure 5 presents four possible waste generation scenarios modelled on expected population or household growth and increases in per capita or per household waste generation.

Figure 5: Regional waste forecasts 2012-2021



- The projections of Scenario 1 and 2, which are based on the forecasted increase in household numbers, show higher increases in future waste generation rates. It is noted that these two scenarios indicate a steep increase in waste generation during 2012-13. This is due to the transition from using reported household numbers (up to 2011-12) to Department of Planning forecasted household numbers from 2013 onwards. NSW Department of Planning forecasts for households are significantly higher than the reported current number of households. Scenario 2 presents a higher level of waste due to the incorporation of a higher household generation rate.
- Scenario 3 is modelled on expected waste reduction per capita from waste education programs encouraging behaviour change and waste avoidance, yet rises due to greater population growth.
- In Scenario 4, the total waste generation is projected using the most realistic waste generation rate, which follows the historical trend (2007-2012). The projection shows the region's total waste generation is expected to continue growing marginally to 800,000 tonnes per annum in 2020-2021.

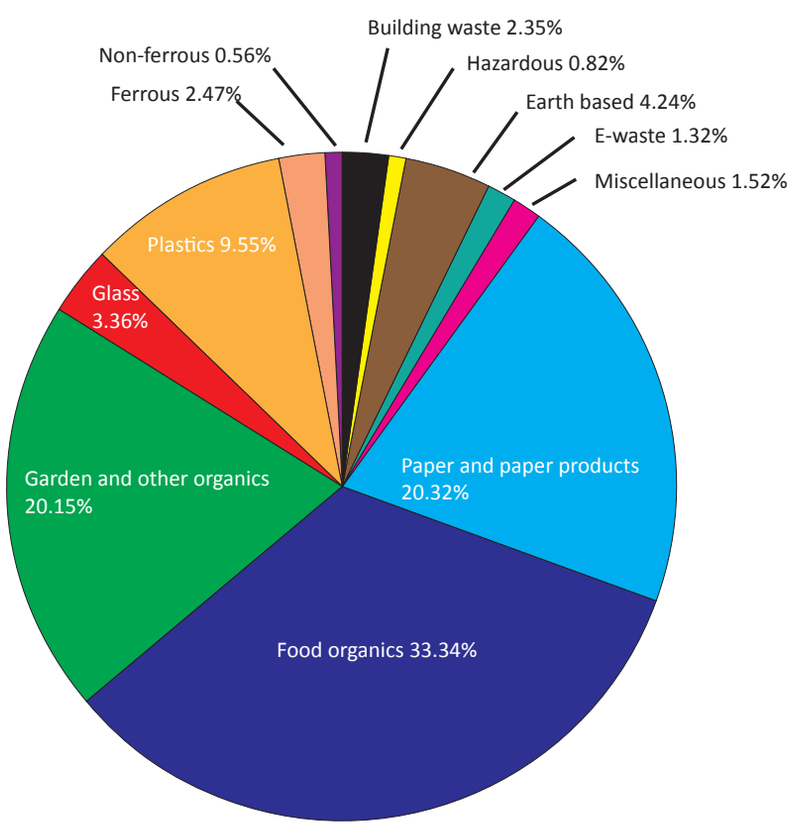
This makes it clear councils will need to consider population and per capita growth when planning future waste services. The region will need to further model this growth to ensure service capacity and infrastructure requirements are adequate to accommodate future growth. Specific modelling for waste generation through to 2021 can be found in Appendix A.

2.3.2 Waste composition

All councils carry out kerbside bin audits and their waste management systems differ significantly as seen in Table 2. Therefore examining the region's waste composition as a whole needs to take into account the different services provided to the community. Figure 6 presents the average regional residual waste kerbside bin composition.

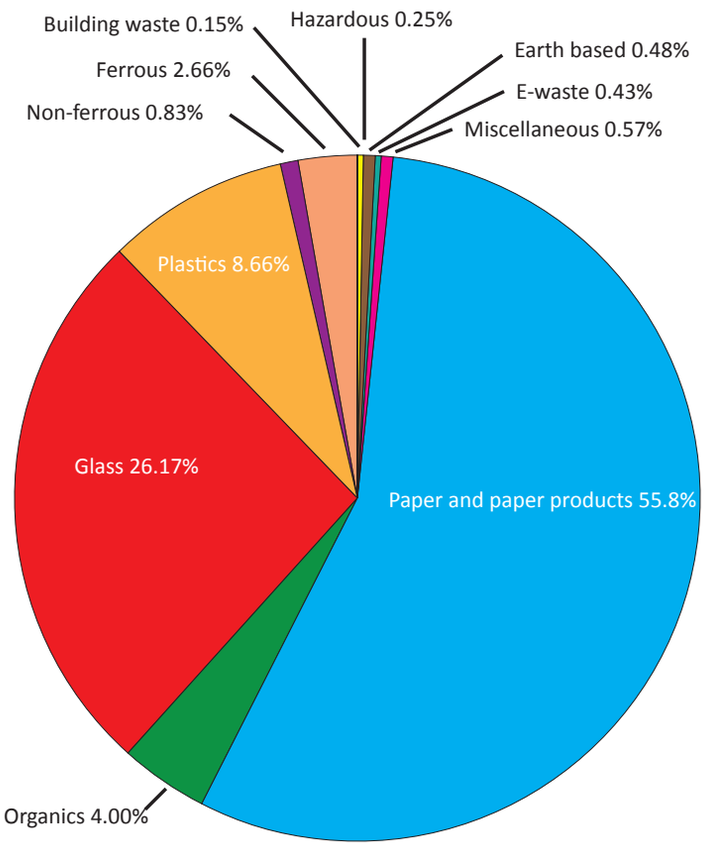
The graph demonstrates a number of potentially recoverable resources contained within this waste stream. It needs to be recognised that councils with a 2-bin AWT system require residents to leave food and garden waste in the residual bin for further processing. As a result, the collaborative audit data demonstrates some portion of food and garden waste could be recovered. The region also loses considerable quantities of recyclables to landfill through inefficient source separation. Up to 33% of the residual waste bin was made up of potentially comingled recyclable material (rigid plastics, paper and cardboard and glass). Paper and cardboard accounted for over half of the dry recyclable material lost to landfill by councils not processing residual waste through an AWT facility. Glass bottles and jars (3.36%) and plastic containers numbers 1-5 (9.55%) represented the majority of the remaining potential recyclables.

Figure 6: Composition by weight of the domestic kerbside residual waste bin – Regional average (2011)



The contamination levels of the comingled recycling bin show the region has a slightly higher rate of contamination (9.30%) than the SMA region (7.94%). Some councils have very low contamination rates while higher rates are found in other areas and require further attention. Organic wastes, earth based materials and E-waste are some of the most common contaminants found in the kerbside recycling bin. Paper and paper products are by far the most common material recycled in Western Sydney (Figure 7).

Figure 7: Composition by weight of the domestic kerbside recycling bin - Regional average (2011)



2.3.3 Kerbside waste systems performance analysis

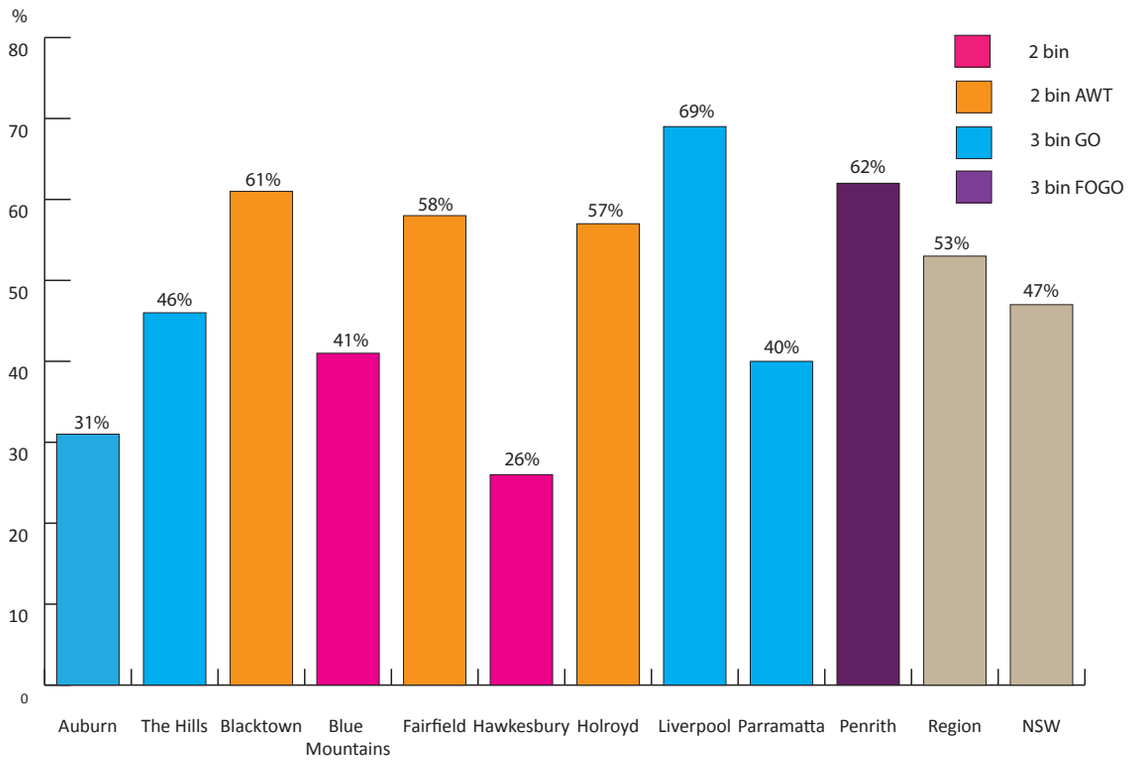
The different councils' domestic waste services result in variable levels of recovery effectiveness due to the different collection systems in place. Figure 8 shows the variation of diversion rates in Western Sydney. The council with the highest resource recovery rate is Liverpool with 69%, who provides a 3 bin service with residual waste processed at SAWT. Penrith has a 3 bin FOGO service resulting in 62% diversion. Blacktown, Fairfield and Holroyd councils are also performing above the State average with 61%, 58% and 57% diversion rates respectively as a result of their 2 bin AWT collection systems. Those councils not utilising an AWT system or a 3-bin FOGO system are performing below the State average regardless of whether they have a 2 or 3-bin garden organics system in place.

Five of the councils offer 120L or 140L mobile garbage bins (MGB) for the residual stream and a 240L MGB for recycling. Remaining councils provide a 240L residual waste MGB and a 240L recycling MGB with the exception of Blue Mountains, which provides a 140L recycling bin collected weekly. No correlation between smaller residual waste bins and resource recovery rate was identified. The main factor influencing diversion rate is AWT processing for either 2 or 3 bin collection systems.

It is noted that the EPA's preferred resource recovery practice for local councils is to use 120L residual waste bins alongside a 240L yellow-top recycling collection bin[1], which aims to encourage and reinforce recycling and waste avoidance behaviour. A range of issues, including factors such as potential for bin contamination, are considered by councils when selecting bins for service.

1 OEH (2011) Domestic Kerbside Waste and Recycling in NSW, Report on the results of waste audits of household kerbside collection systems 2007-2008

Figure 8: Domestic waste diversion rates 2011/2012



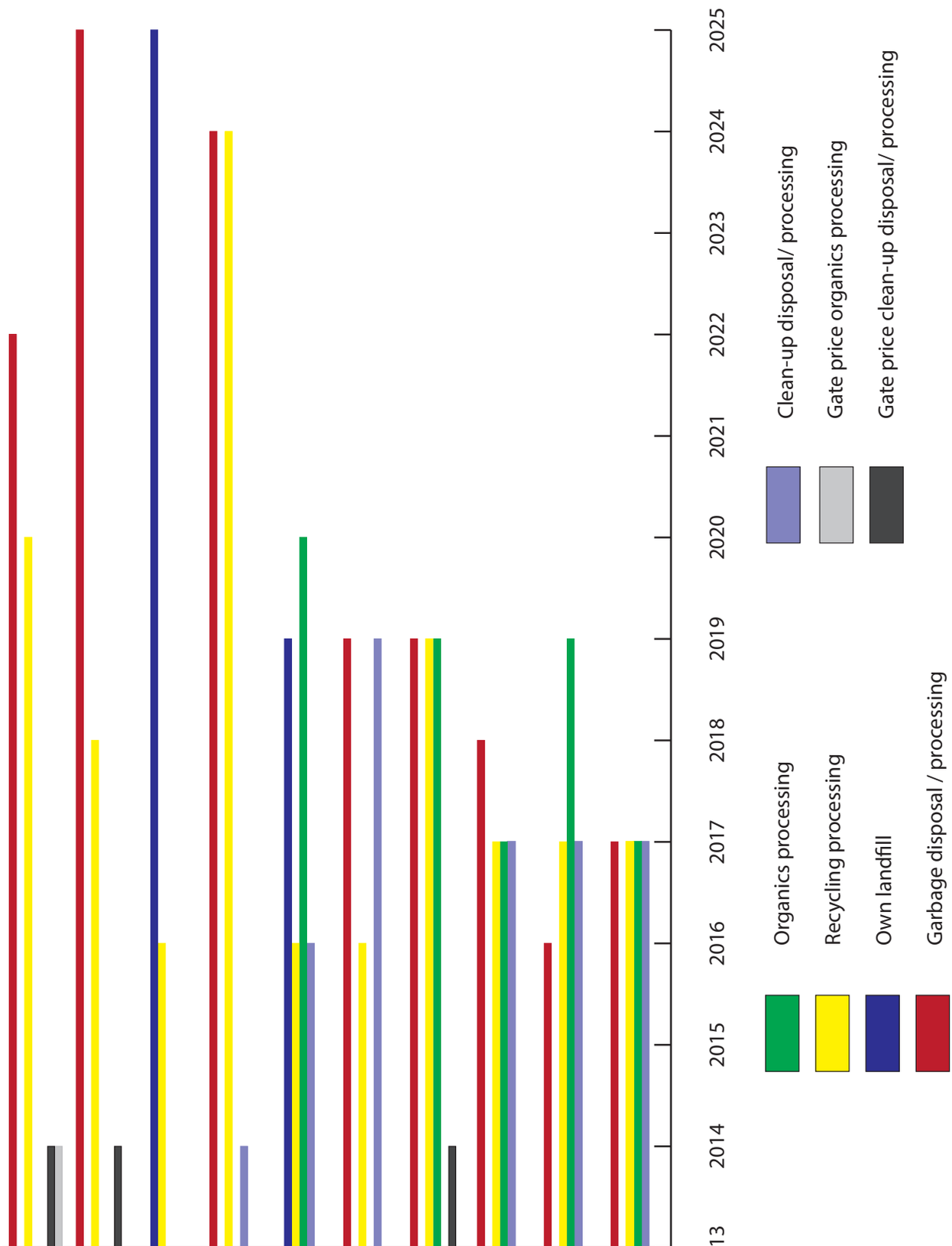
2.4 Waste and resource recovery collection, processing and disposal contracts

Western Sydney councils use a combination of council staff and external contractors to carry out the collection of various waste streams from the household. In-house collection services are most commonly used to collect residual waste and kerbside clean up waste streams, with some councils also using in-house services to collect recycling streams. External contractors are used for the disposal of all waste streams, with the exception of Blue Mountains (residual and clean up) and Hawkesbury (residual) who own their own landfills.

There is currently a joint tender opportunity being explored by some participating councils. Fairfield, Parramatta, Liverpool and Bankstown are currently reviewing tenders for the receipt and processing of household clean up material, to maximize resource recovery opportunities in this waste stream. There is also a joint tender managed by WSROC that provides for mattress recycling across nine councils in the region. Figure 9 shows the expiry of waste disposal contracts of the councils through to 2025. There may be scope to investigate joint tender opportunities for some waste streams in the future. Appendix B lists all the municipal waste collection, disposal and processing contracts of the Western Sydney councils.



Figure 9: Current council contract timeframes



Note: a) Blue Mountains Blaxland Landfill has approval for extensions equivalent to capacity until approx. 2029-30
b) Penrith Council has a separate residual waste processing contract for 2 bin services, which will expire in 2021

2.5 Current and planned waste and recycling infrastructure within the region

2.5.1 Current waste infrastructure

There are a number of waste management facilities within Western Sydney, including landfills, AWT facilities, MRFs and organics processing facilities. Commercial operators manage the majority of these facilities. Council owned landfills are in operation in the Blue Mountains (Blaxland) and Hawkesbury (South Windsor). Collectively, the ten councils send their domestic waste to 15 various waste and recycling facilities for processing or disposal. Most of these facilities are located within the region. Figure 10 and Figure 11 illustrate the location of various waste and recycling facilities within the region. Appendix C details a full list of waste and recycling facilities which may be accessed in Greater Western Sydney and its immediate surrounds.

Most landfills in the region are large sites with disposal capacity in excess of 20,000 tonnes per annum. Resource recovery practices at landfills and transfer stations vary across the region.

Two AWT facilities are used by councils to process residual waste. UR3R and SAWT facilities process residual waste from Blacktown, Fairfield and Holroyd (UR3R), and Liverpool (SAWT). Parramatta's current disposal contract with SITA includes the provision of a new AWT at Lucas Heights. Delivery of the facility has been delayed and as a result, an interim offer of landfilling at Eastern Creek with a percentage processed through UR3R is in place. Penrith also sends a proportion of residual waste to the SAWT facility for processing. Remaining councils send residual waste to landfill. Hawkesbury and Blue Mountains dispose of residual waste at their council-owned landfills. Residual waste from Parramatta and Penrith is sent to Eastern Creek landfill. Residual waste from The Hills and Auburn is sent to Clyde transfer station for disposal at Woodlawn landfill (Goulburn).

Most recyclable material is sent for processing to the VISY Smithfield MRF, with other recyclables processed at Polytrade Rydalmere MRF and SITA Chullora MRF. Source separated food and garden organics (Penrith) is composted at the SAWT facility. Garden organics are sent for processing to SITA Eastern Creek Resource Recovery Park (The Hills, Hawkesbury and Parramatta), Badgerys Creek ANL (Liverpool) or Greenacre Resource Recovery (Auburn). Further details on waste facilities utilised by councils is included in Appendix C.

Figure 10: Waste facilities in the Western Sydney region

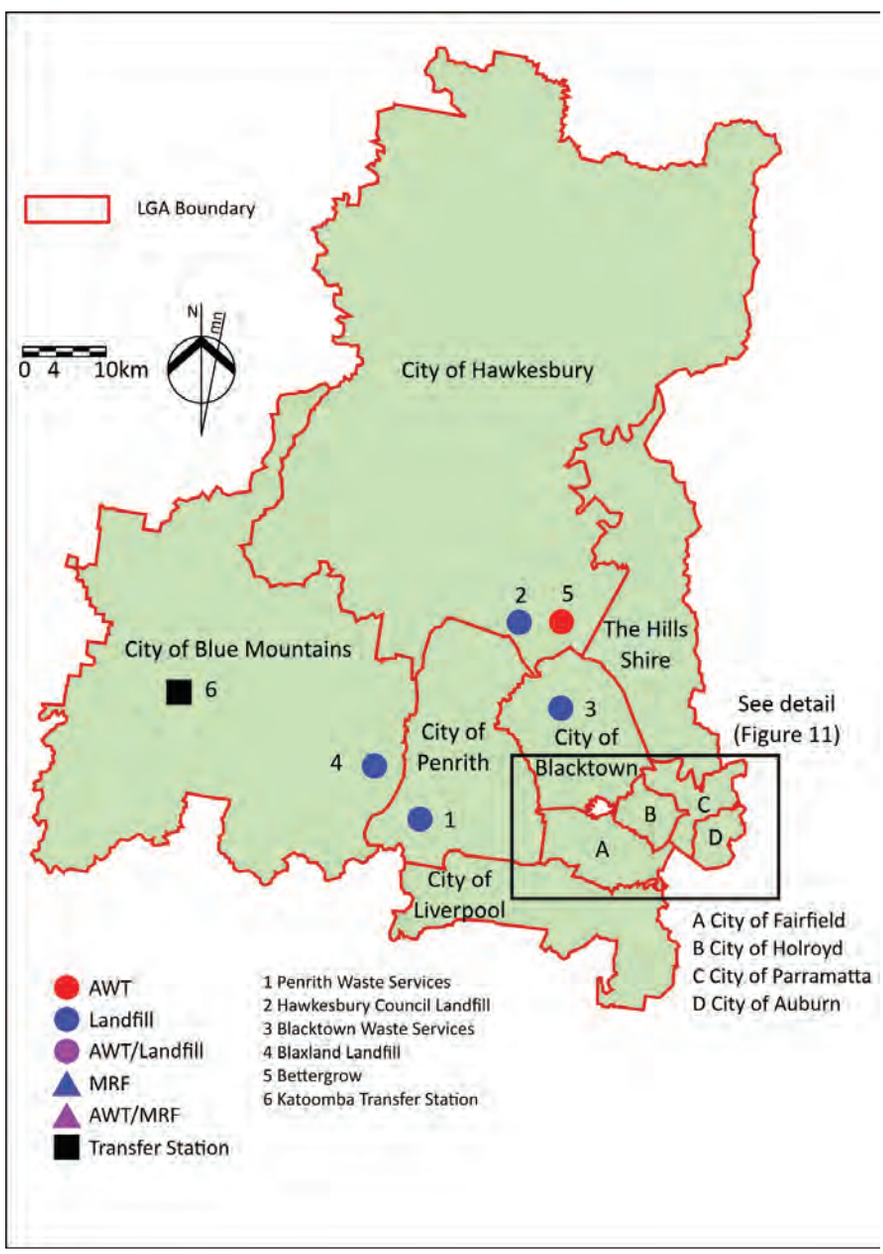
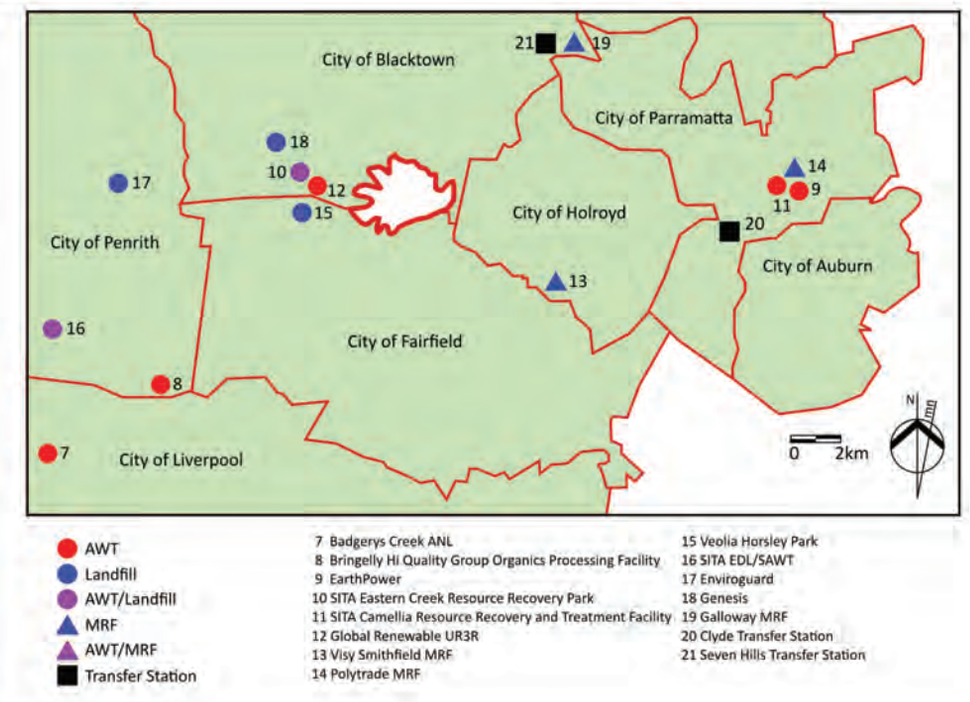


Figure 11: Waste facilities in the Western Sydney region (detail)



2.5.2 Infrastructure Gap Analysis

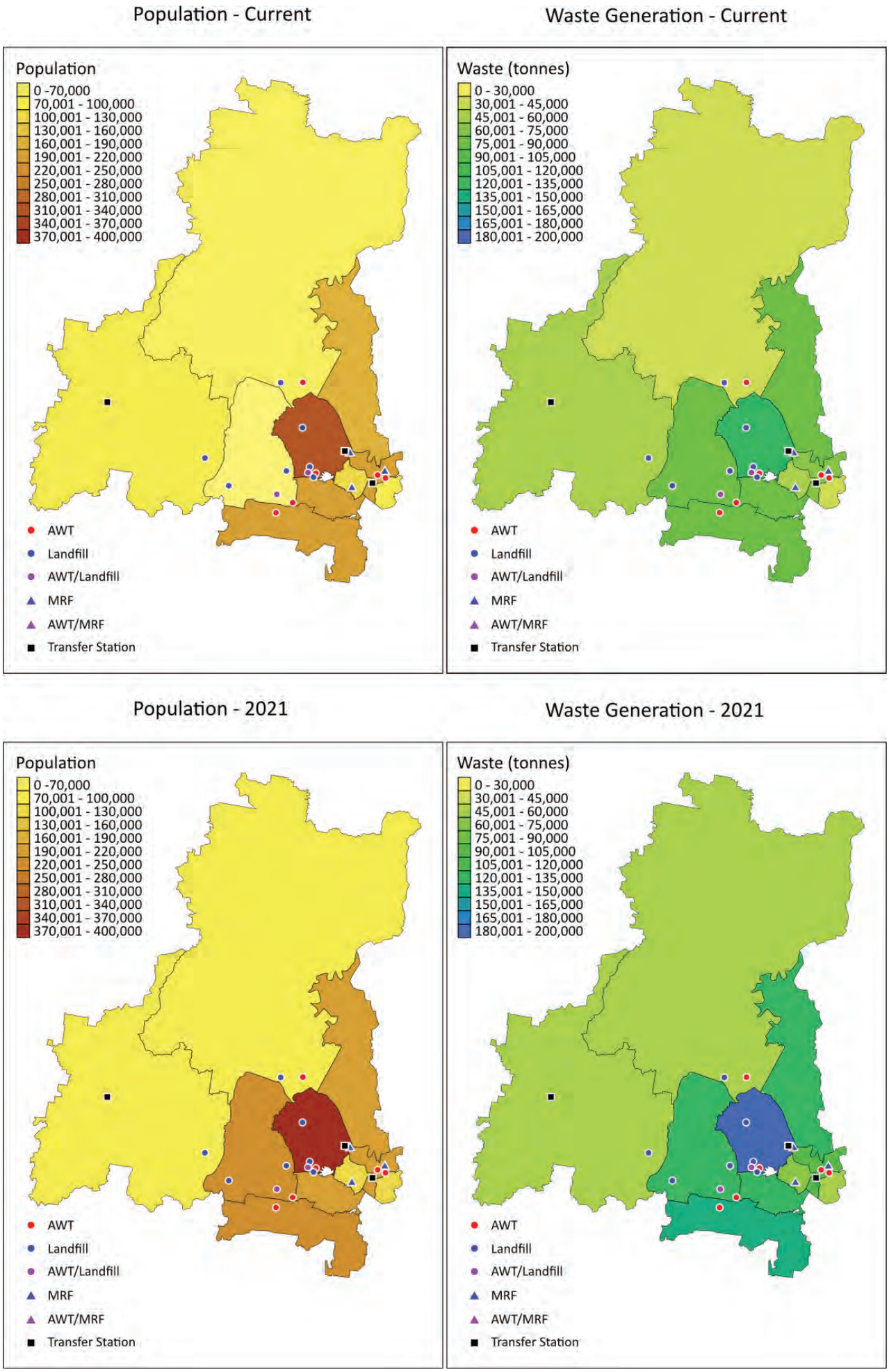
The gap analysis attempts to assess the effectiveness of future waste and resource recovery facilities in light of population growth and increased waste generation, in relation to the location of facilities throughout the region and their capacity to increase diversion from landfill.

The tonnages for the prospective increase in waste generation were chosen from forecast scenario 2, Figure 5 (ie. 0.25% growth in waste generation per household from 2013) as this scenario gives the highest possible figure for future waste generation. This strategy is driven by the need to divert domestic waste from landfill so options for waste management will be structured on the processing and disposal of domestic waste. To deal with the prospective increases in tonnage within the Western Sydney region an appraisal of the potential available AWT/MRF processing capacity to come on line in the next 3-5 years has been undertaken.

Figure 12 shows projected population and waste generation levels relative to existing waste and recycling infrastructure. Specific council projections though to 2021 can be seen in Figure 2 for population and Appendix A for waste generation.



Figure 12: Gap analysis – current and future population and waste generation



Of the available facilities within the region, SITA's Eastern Creek Landfill and their Chullora MRF are likely to close between now and 2021, and the current Hawkesbury City Waste Management Facility (landfill) will run out of space in 2019. To offset the impact of this reduction in recycling capacity, SITA is contracting the processing of their recyclables from the Chullora MRF to the recycler Polytrade. The residual waste volumes from Eastern Creek could be managed through the market place which has potential capacity to accommodate current disposal tonnages through a number of projects including:

- Veolia are bringing on line an additional 240,000 tonnes per annum of processing of residual waste between 2016 and 2018 through their Woodlawn Mechanical Biological Treatment plant (once constructed).
- SITA currently has a development application lodged for receipt of an additional 100,000 tonnes per annum of processing of residual waste at their SAWT facility. This may come online within 2-5 years providing contracts are secured (and after modification to SAWT to increase production capacity).
- Visy is currently scoping an energy from waste (EfW) project to process residual waste. The capacity sought will be several hundred thousand tonnes per annum (no definitive figure given) and their aim is to be operating if approved within the next 3-5 years.
- Dial A Dump Industries will also be offering to receive several hundred thousand tonnes per annum (no definitive figure given) through their Next Generation energy from waste plant within the next 3-5 years subject to approval.
- Polytrade is proposing an increase in their productivity at Rydalmere and Enfield to permit an additional 100,000 tonnes per annum of capacity for receipt and processing of comingled recyclables, subject to contracts being secured.
- Consideration should also be given to the potential processing facility in the Hawkesbury region and the proposed Lucas Heights AWT by SITA to divert waste from landfill.

A key challenge for councils in the region is the availability of facilities within reasonable distance to their LGA. There are several other smaller projects which will increase capacity further. The reporting of these smaller projects at present will have little impact on the strategy as a whole. The figures nominated above are sourced solely from the principal service providers and subject to change. Circumstances such as development applications being rejected or limitations to project funding may render the projects non-viable. Specific tonnages relating to available capacity can only be confirmed on commitment from the contractor.

The results of the gap analysis modelling can be seen in Table 7 below. The assumptions that apply to this gap analysis modelling are:

- Waste generation projection is based on household forecast with 0.25%/yr growth/hhld generation from 2012-2013 onwards (Scenario 2, Figure 5);
- All dry recyclables are recovered in the comingled recycling stream by 2021; and
- All Sydney metropolitan councils have access to AWT capacity and capacity is proportioned accordingly.

As a result of the modelling it can be seen that by 2021, a total of 1,040,000 tonnes of domestic waste will be collected from households in the region. Of this waste approximately 65% will be residual waste. More organic and residual waste processing facilities with additional capacity of 300,000 tonnes per annum will be required to achieve the NSW WARR diversion rate by 2021.

Table 7: Gap analysis

Processing capacity for the region (tonnage as of 2011)	Recyclable MRF*	Organics/residual waste processing capacity*		
	400,000	200,000		Approx. 600,000
Projected waste generation (tonnage as of 2021)	Dry recycling	Organic	Residual	Total
Western Sydney	200,943	168,982	668,609	1,038,535
Target 2021=70% diversion rate				
Tonnage of residual waste and organic matter targeted for recovery by 2021**			**Gap for AWT processing of organic and residual waste approx.**	
526,031 tonnes			**300,000 tonnes**	
*Calculation is based on current processing capacity in SMA from the GHD report and waste generation rate (2011-12) provided by EPA. **Assume all dry recycling will be recovered within existing infrastructures.				

2.6 Review of programs, initiatives and community expectations

2.6.1 Community programs and initiatives

Councils are engaging their communities with a number of waste education programs and services that increase and improve waste and recycling practices in the community. Common programs offered in the region include:

- Contamination management programs, seeking to improve the community's understanding of what can be placed into recycling and organics bins;
- School education programs, informing students about the environmental impacts of waste and the benefits of recycling;
- Food waste avoidance programs, seeking to reduce the volume of avoidable food waste disposed at the household level;
- Managing food and garden organics at home through composting and worm farming; and
- Electronic waste collection services, reducing electronic waste disposed of in kerbside services.

Many councils have noted that contextually based/ targeted education programs and initiatives are generally more successful than high-level mass produced education materials in bringing about behaviour change at the household level. There may be greater scope for successful programs to be replicated across the region.

The councils of Fairfield, Holroyd, Liverpool, Penrith, Parramatta and The Hills are members of the Western Sydney Regional Illegal Dumping (RID) Squad, which has been successful in alleviating pressure on internal council resources when dealing with illegal dumping incidents. Several councils have indicated that they would like to review the performance of the RID Squad and possibly augment its structure and function.

2.6.2 Stakeholder engagement

Stakeholder engagement is an important process in planning for regional waste management and infrastructure into the future. Western Sydney councils, waste industry organisations and community groups (see Appendix D) were engaged during the formulation of this strategy to provide input on the current and future state of the region.

Local councils

Participating councils were engaged during strategy development to ensure that this strategy represented the vision and needs of participating councils. Waste management staff at each council participated in this process which has formed a vision for the Strategy and identified potential synergies and common challenges. Challenges include needs for infrastructure within reasonable distance, communicating effectively with CALD communities, high contamination rates of recycling bins in MUDs and leakage of recyclables into the residual waste stream. The possibility for shared learnings around these issues has been identified as an important Strategy goal. Common synergies identified include small infrastructure sharing arrangements, greater efficiency from regional processing facilities and improved planning advocacy for future waste infrastructure needs.

A workshop was held with all participating councils, WSROC staff, representatives from the EPA and MRA Consulting Group to detail the strategy direction. The workshop canvassed the findings from individual council meetings, the existing regional baseline was presented and the regional vision, themes, targets and regional actions contained within this Strategy were agreed. Individual councils will investigate implementing the council-level options relevant to their LGA once the Regional Strategy has been adopted.

A group of councils in the region's north-west have been working together to facilitate the development of waste processing infrastructure in the area. There is the potential for municipal and/or organic waste processing to be developed on land made available in the Hawkesbury region in the near future.

Current discussion about the provision of a processing facility has developed from concern over the lack of accessible infrastructure in this region. This area has the challenge of significant transport distance to existing facilities elsewhere, as well as proposed landfill closures placing added pressure on existing and proposed processing capacity in the Sydney basin.

Councils within reasonable transport distance of the Hawkesbury facility are working together to develop technical documents to scope the viability of a future facility. It is anticipated that this may assist to provide cost effective resource recovery solutions and increase diversion of waste from landfill in the region.

"Stakeholder engagement is an important process in planning for regional waste management and infrastructure into the future."

Waste and recycling industry
Stakeholders have been interviewed during the course of the Strategy formation to seek their opinions and plans in relation to the WLRM Initiative. The primary stakeholders targeted for discussion were waste and recycling transporters, processors, landfill operators and other ROCs. Discussion centred on infrastructure needs, diversion of material from landfill and education. Details of discussions held and data gathered from stakeholders are considered in the strategy and its implementation, and have assisted greatly, particularly in areas such as calculating future infrastructure requirements.

The most common challenge expressed by service providers in relation to infrastructure was the need for long term contracts to progress construction or expansion of facilities. This group also nominated the importance of further waste and resource recovery education programs and other engagement activities with the community to increase understanding of resource recovery. Stakeholders expressed a commitment to the WLRM initiative providing the targets set are not unrealistic. Engagement with industry stakeholders will continue throughout the life of strategy.

Community sector
Local stakeholders were contacted to provide an opportunity to give feedback and help shape the Strategy. These included community groups, local chambers of commerce, other non-government organisations and local environmental and conservation groups. Feedback from the community included expanding waste education campaigns and encouraging the community to recycle correctly, extending resource recovery services and lack of knowledge about proper disposal of household problem wastes. Options for addressing the issues raised by community stakeholders are addressed in Chapter 4.

Consultation on specific actions and programs will be undertaken to ensure the outcomes of strategy projects also meet community expectations. Ongoing consultation within communities will play an important role to understand the challenges in the region, providing effective and meaningful programs and delivering regional outcomes. Public consultation should also be conducted by individual councils before any specific changes to their waste and resource recovery services are considered.

2.7 Service compliance

A check of all facilities where waste is processed or disposed has been undertaken to ensure all facilities receiving waste are licensed or are in the process of being licensed by the EPA. When considering the direction of the region and councils for resource recovery, councils not already doing so may wish to assess their current contracts against performance frameworks.



3 Where do we want to get to?

3.1 Vision

A planned and collaborative approach to waste management, which is cost effective, supportive of our community and economy and improves resource recovery in line with State Government targets.

3.2 Strategy themes and targets

By working together to create a regional waste strategy, councils are committed to improving regional cooperation and identifying opportunities to improve the economic viability of recycling and resource recovery practices in the region.

To ensure that the region is contributing towards achieving State-wide waste objectives, it has chosen to develop regional targets under six themes that are in line with the NSW WARR Strategy's objectives.

- Avoid and reduce waste generation;
- Increase recycling;
- Divert more waste from landfill;
- Manage problem wastes better;
- Reduce litter and illegal dumping; and
- Improve regional governance.

The key outcomes that councils are aiming to achieve through development of this long term Strategy are to:

- Make a significant contribution towards the achievement of the NSW's 2021 WARR targets;
- Improve and increase current services for household recycling and organics diversion;
- Provide community education on best practice waste avoidance and resource recovery;
- Provide a sustainable and healthy environment through reducing the incidences of litter, illegal dumping; and
- Gain access to WLRM grant funding opportunities.

Table 8: Regional strategy targets

Themes (NSW targets)	Regional target
Avoid and reduce waste generation	Work towards reducing regional waste generation from current generation of 7.8kg/capita/week to 7.5kg/capita/week by 2021.
Increase recycling (to 70% MSW, 70% C&I and 80% C&D by 2021)	Gradually improve the regional resource recovery rate to 58% by 2017 and 70% by 2021 (currently 53%).
Divert more waste from landfill (to 75% by 2021 for all streams)	Work towards achieving the WARR target by 2021.
Manage problem wastes better (Build 86 CRCs – 1 per 50,000 households)	Build, upgrade or facilitate 10 community recycling centres/ innovative solutions for household problem wastes by 2021.
Reduce litter and illegal dumping (Reduce litter by 40%)	Partner with the State to establish a baseline by 2015 and work towards reducing the incidence of litter by 2017. Partner with the State to establish a baseline by 2015 and work towards reducing the incidence of illegal dumping by 10% by 2017.
Improve regional governance	Work towards enhancing regional cooperation and governance.



"Councils are committed to improving regional cooperation and identifying opportunities to improve the economic viability of recycling and resource recovery practices in the region."

4 How will we get there?

4.1 Identifying regional actions

The actions identified for implementation at a regional scale are centred around the 'themes' of avoiding and reducing waste generation, increasing recycling, diverting more waste from landfill, managing problem wastes better, reducing litter and illegal dumping and enhancing regional cooperation. The Strategy focuses on regional actions that will pave the way for council-level actions to be implemented gradually and where appropriate. These actions listed below will be undertaken by WSROC staff on a regional level on behalf of participating councils. Funding has been provided through the Better Waste and Recycling Fund to conduct some regional actions. Further funding will be sought from grants such as the Waste Less, Recycle More grants program, where funding is required to develop and deliver actions.

4.1.1 Avoid and reduce waste generation

Actions:

1. Make use of NSW EPA waste education publications and develop education programs;
2. Facilitate a regional education program; and
3. Identify CALD communities in each LGA and explore options for central publication of waste education materials in these languages.

Promoting waste avoidance and minimisation is notoriously difficult for councils and ROCs. Generation of waste is inherent to an economic system premised on growth and consumerism. However, education is a core tool that can be used by councils and ROCs to promote waste avoidance and minimisation. WSROC will strive to develop and offer waste education material to provide a clear and consistent message across the region, especially where gaps have been identified.

There may also be an opportunity for councils to reduce costs associated with publishing education materials, for example, through WSROC identifying commonalities between respective councils such as the incorrect use of plastic bags in recycling bins. WSROC may identify common CALD communities which may reduce the need for various councils to be individually producing similar bilingual education materials.

4.1.2 Increase recycling

Actions:

1. Conduct an infrastructure needs assessment;
2. Conduct strategic land use planning;
3. Advocate to the State Government for strategic waste asset planning;
4. Facilitate Energy from Waste projects; and
5. Conduct AWT, GO, FOGO options evaluation.

WSROC has an essential role to play in terms of identifying and laying the groundwork to address infrastructure needs and resource recovery program priorities. Identifying the appropriate infrastructure is a top priority for the region. This is both due to the prospective closure of landfill facilities as well as a desire amongst member councils to encourage, develop and utilise AWT and EfW infrastructure.

To build upon the gap analysis undertaken in this Strategy, WSROC will develop a comprehensive infrastructure needs analysis in order to determine where infrastructure is required, the catchment area required for the supply of adequate feedstock and the councils likely to support/participate in the development of each facility. This analysis will then be supported with an options evaluation of various technologies, which would detail the likely cost of infrastructure options and commercial opportunities for the potential establishment of facilities.

A key aspect of securing the required waste processing infrastructure will be strategic land use planning, whereby a coordinated approach to land use and associated planning permits is developed among councils. This will also require action by the State to facilitate appropriate planning approvals adjustments and to develop a favourable context for the establishment of waste infrastructure.

"Generation of waste is inherent to an economic system premised on growth and consumerism."

4.1.3 Divert more waste from landfill

Actions:

1. Assessment of audits of contamination of the recycling bin;
2. Assessment of audits of leakage of recyclables into residual waste bin;
3. Investigate bin capacity issues for households that have high leakage rate, to provide additional recycling capacity; and
4. Facilitate business options for councils' domestic waste streams.

Understanding the composition of both the recycling and residual waste streams is key to increasing landfill diversion. WSROC will try to achieve economies of scale for its members by exploring the possibility of a joint tender for a consultancy to undertake audits in several councils.

An audit report on recyclables leakage to the residual waste stream based on available audits from individual councils will demonstrate across the region where there is a need to supply additional recycling capacity, on an opt-in basis for households that fill up their recycling bins. WSROC will work with councils who are looking for options to provide additional recycling capacity.

To further increase waste diversion from landfill, WSROC will assume a role in identifying potential markets that are sought for common waste products from two or more councils. This involves WSROC further exploring the common challenges shared by participants and identifying ways in which councils can work together.

4.1.4 Manage problem wastes better

Actions:

1. Scope sites for establishment of CRCs;
2. Engage with (public and private) site holders to establish CRCs network;
3. Promote the creation and development of innovative solutions; and
4. Provide assistance with CRC/innovative solution grant applications and coordination between councils.

WSROC and the councils will strive to establish 10 CRCs/innovative solutions by 2021, under the EPA's WLRM Initiative. Funding has been awarded for the development of CRCs to Liverpool and Blue Mountains, and for an innovative solution to Holroyd (partnering with Auburn and Parramatta). However, the region has not yet identified enough sites to accommodate CRCs or enough applicants/innovative solutions to meet the target. On behalf of its members, WSROC will assume a role in assessing and identifying eligible sites as well as engaging with the relevant site owner. To develop innovative solutions applicable to the region, WSROC will engage with councils and explore partnerships with the waste industry and other stakeholders.

4.1.5 Reduce litter and illegal dumping

Actions:

1. Seek funding to augment the RID Squad; and
2. Establish a regional baseline for litter and illegal dumping.

Illegal dumping is an issue that most councils within the region find challenging. The region is particularly vulnerable to large scale illegal dumping in rural areas, with much of the waste originating from more urban areas of Sydney. Illegally dumped waste can often include hazardous wastes such as asbestos.

Some councils are members of the Western Sydney RID Squad however this does not address all illegal dumping incidents within the LGAs. Some councils require additional compliance resources to assist with illegal dumping incidents not investigated by the RID Squad.

The Strategy aims to support RID Squad and council compliance teams by seeking additional funds and resources, and investigating opportunities to assist councils to reduce illegal dumping. As a first step, WSROC will seek funding on behalf of Member Councils to augment the RID Squad and enhance council managed programs. WSROC will also support councils participating in the Regional Household Asbestos Disposal trials to educate residents on asbestos disposal and reduce illegal dumping of the material.

Developing an understanding of littering motives and methods will aid in establishing a baseline for litter and illegal dumping. Programs to address littering, which may include NSW EPA litter campaigns, will ensure that the issue attracts attention throughout the region and that councils will benefit from joint resources. Establishing a baseline for these streams is also key to achieving reductions in litter and illegal dumping.

4.1.6 Improve regional governance

Actions:

1. Maintain a regional waste managers network;
2. Report annually on the progress of the action plan;
3. Review contracts to identify opportunities for joint contracts and collaboration;
4. Aggregate audit reports into regional data report; and
5. Establish a library of best practice waste systems.

"The region is particularly vulnerable to large scale illegal dumping in the rural areas, with much of the waste originating from more urban areas of Sydney."

In addition to addressing issues stemming from the Strategy themes/program areas, several ongoing actions have been identified for WSROC to undertake in order to enhance the region's performance against the Strategy targets. Key among these actions is the maintaining regular regional waste management meetings to ensure open communication with participating councils.

WSROC will report annually on progress against the Strategy action plan. As part of annual reporting activity, WSROC will start collecting waste data from all councils to produce a regional data report. The report will also allow councils to assess their performance relative to other WSROC members and track their contribution to overall progress towards achieving targets. Furthermore, the compilation of a library of best practice waste management initiatives will serve to share learnings, resources and innovations between councils, particularly for trials and niche waste management issues that are already being undertaken by some councils.

WSROC will coordinate, develop and submit grant applications for regional projects to reduce costs to individual councils and assist in identifying regional synergies. A review of waste collection and management contracts can identify potential economies of scale, by facilitating council cooperation and joint contracts. In the long term it can also lead to alignment between council contracts, which may be fundamental to establishing new waste processing facilities throughout the region.

4.2 Options appraisal

An options appraisal for the regional actions was conducted using multi-criteria analysis to identify priority actions. Table 9 details the results of the multi-criteria analysis and corresponding priority results for consideration for the implementation by WSROC. This is based on a series of evaluation criteria and assumptions listed in Appendix E. Highest scoring actions are listed first.

Table 9: Ranked strategy implementation actions

CRITERIA										
ACTIONS	Cost effectiveness		Time frame for implementation		Scope of impact		Achievability		Total score	
	Weighting	2	Weighting	1	Weighting	1.5	Weighting	1.5		
	Score	Weighted score	Score	Weighted score	Score	Weighted score	Score	Weighted score	Score	Weighted score
Aggregate audit reports into regional data report	3	6	3	3	3	4.5	3	4.5	10	18
Make use of NSW EPA waste education publications	3	6	2	2	3	4.5	3	4.5	11	17
Investigate bin capacity issues for households that have high leakage rate, to provide additional recycling capacity	3	6	2	2	3	4.5	3	4.5	11	17
Establish a library of best practice waste systems	3	6	2	2	3	4.5	3	4.5	11	17
Maintain a regional waste managers network	3	6	1	1	3	4.5	3	4.5	10	16
Facilitate business options for council's domestic waste streams	3	6	2	2	2	3	3	4.5	10	15.5
Conduct an infrastructure needs assessment	2	6	2	2	3	4.5	3	4.5	11	15

Table 9 Continued: Ranked strategy implementation actions

CRITERIA										
ACTIONS	Cost effectiveness		Time frame for implementation		Scope of impact		Achievability		Total score	
	Weighting	2	Weighting	1	Weighting	1.5	Weighting	1.5		
	Score	Weighted score	Score	Weighted score	Score	Weighted score	Score	Weighted score	Score	Weighted score
Conduct AWT, GO and FOGO options evaluations	2	4	2	2	3	4.5	3	4.5	10	15
Facilitate regional education programs	2	4	3	3	3	4.5	2	3	10	14.5
Identify CALD communities in each LGA and explore options for joint publication of education materials	3	6	1	1	2	3	3	4.5	9	14.5
Report annually on the progress of the action plan	2	4	1	1	3	4.5	3	4.5	9	14
Seek funding to augment RID Squad	3	6	3	3	3	4.5	1	1.5	8	14
Scope sites for establishment of CRCs	2	4	2	2	2	3	3	4.5	9	13.5
Conduct strategic land use planning	2	4	3	3	2	3	2	3	9	13
Facilitate Energy from Waste projects	2	4	3	3	2	3	2	3	9	13
Review contracts to identify opportunities for joint contracts and collaboration	3	6	1	1	2	3	2	3	8	13
Advocate to State Government for strategic waste asset planning	1	2	3	3	3	4.5	2	3	9	12.5
Provide assistance with CRC/innovative solution grant applications & coordinate between Councils	2	4	2	2	1	1.5	3	4.5	8	12
Establish regional baseline for litter and illegal dumping	1	2	2	2	3	4.5	1	1.5	7	10
Assessment of audits of contamination of recycling bin	1	2	1	1	2	3	2	3	6	9
Assessment of audits of leakage of recyclables into residual waste bin	1	2	1	1	2	3	2	3	6	9
Engage with (public and private) site holders to establish CRCs	1	2	3	3	1	1.5	1	1.5	6	8
Promote the creation and development of innovative solutions	1	2	3	3	1	1.5	1	1.5	6	8

4.3 Identifying actions for councils

To contribute to the targets of this regional strategy, councils may choose to implement specific actions which would benefit their council, based on the priorities identified in their own domestic waste strategies. The actions for consideration are categorised by the six themes of the Strategy, presented below in Table 10. Councils may choose to commence their chosen actions at a later stage, following implementation of the relevant Regional Strategy actions by WSROC.

Table 10: Suggested strategy implementation actions

Theme	Target demographic/ stream	Council options
Avoid and reduce waste generation	Households	Seek WLRM funding for Love Food Hate Waste and/or implement food waste avoidance programs where funded
		Develop waste education themes on consumption and recycling
		Adopt State initiated waste avoidance programs
Increase recycling	Households	**For residual waste streams:** Direct general waste to AWT via 2 bin systems; Introduce 3rd bin FOGO collection; Introduce 3rd bin GO collection; and Supplement programs with home composting
		For recycling: Conduct a bin contamination/leakage education program; Introduce contamination management program; Provide additional recycling capacity to households who need it; Develop MUD recycling programs; and Review C&I kerbside recycling and contracts
Divert more waste from landfill	Households	Investigate options to improve recovery of material from clean up stream
		Facilitate Energy from Waste options and opportunities
	Minor streams	Review CDL report and relevant cost to the region and investigate relevant impacts on kerbside costs/benefits
		Review cost/benefit of public place recycling
		Facilitate negotiations with MRF operators for the inclusion of additional MRF streams such as plastic bags, EPS, all types of plastics
		Ensure Waste Not DCP incorporated into Local Environment Plan to support and drive recycling
		Increase landfill disposal costs for tyres and promote local recyclers
		Facilitate the installation of EPS bailers under WLRM & offer price discount for source separated EPS
		Continue and expand mattress recycling programs
		Expand alliances with co-regulatory organisations under the Product Stewardship Scheme
		Work with facility providers to adjust gate fees to increase the price of mixed loads and decrease the price of sorted loads
		Establish council resource recovery teams to ensure maximum waste diversion from all council operations
	C & I / C & D [2]	Facilitate weight based charging for Front Lift Services
		Recommend businesses that offer recycling services to the C&I sector
		Review place-based and precinct services for waste collection
		Review place-based investment in C&I processing equipment
		Facilitate business waste audits
		Facilitate Waste Not DCP and other planning instruments

[2] C&I and C&D actions are for the consideration of councils offering C&I and C&D services for their communities.

Theme	Target demographic/ stream	Council options
Divert more waste from landfill	C & I / C & D[2]	Facilitate the introduction of GO and FOGO services to SME businesses
		Review of landfill disposal gate fees for C&I
		Engage regional business stakeholders to ensure that they support waste initiatives
		Conduct focus groups for C&I and C&D businesses to discover barriers to recycling
		Explore options for business waste exchange/industrial ecology
		Set up pallet recycling program
Reduce litter/illegal dumping	Households, C&I and C&D	Work to establish a baseline for litter and illegal dumping rates
		Identify illegal dumping hot spots on a per council basis
		Install cameras
		Install illegal dumping signage
		Increase lighting through sensor lights
		Improve public amenity surrounding hot spots
		Introduce community education programs and materials based on forthcoming EPA illegal dumping strategy
		Distribute educational materials to businesses and tradespeople
		Publicise illegal dumping prosecutions
		Promote interactive apps
Manage household problem wastes better	Households	Provide collection points for household hazardous waste through CRCs/innovative solutions under the EPA's WLRM Initiative

[2] C&I and C&D actions are for the consideration of councils offering C&I and C&D services for their communities.



5 How will the Strategy be implemented?

Figure 13 illustrates the way in which the Strategy Actions tie into the overall vision, themes and core areas underlying the Strategy. The Strategy's themes, objectives, targets and actions have been developed into an Action Implementation Plan, detailed in Table 11. This Action Plan also details the timeframe for implementation. The success of achieving the objectives and targets within the Action Implementation Plan will be reported upon by WSROC to the EPA on an annual basis.

Figure 13: Vision, principles and actions

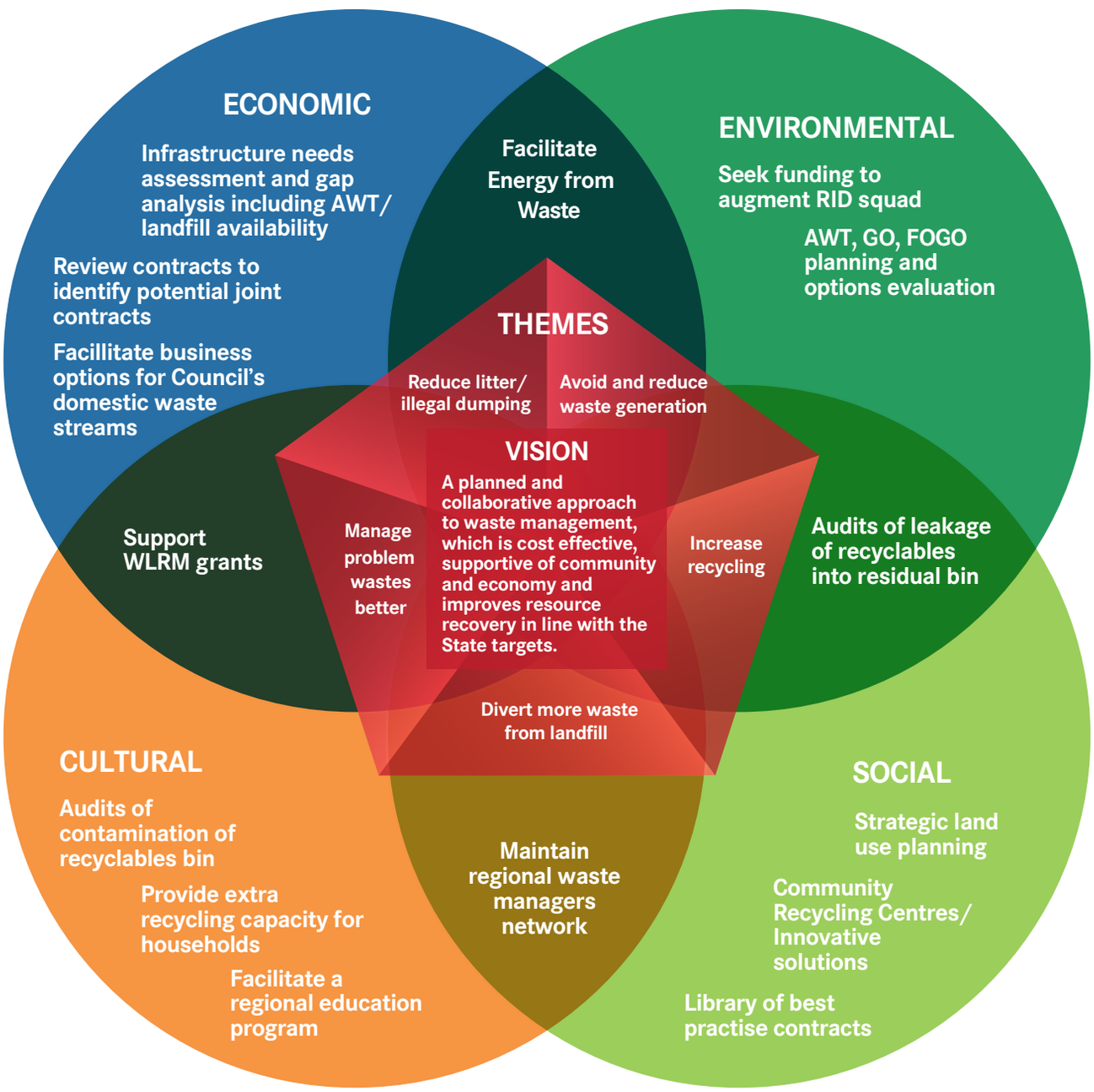


Table 11: Strategy Action Implementation Plan

Theme and Target	Action	Detail of action	Performance measure	Who is responsible?	Timescale for delivery
Theme 1: Avoid and reduce waste generation					
Reduce regional waste generation from current generation of 7.8kg/cap/wk to 7.5kg/cap/wk by 2021	Make use of NSW EPA Waste education publications and develop education programs	Coordinate education materials with a clear and consistent message where gaps identified, which may include EPA waste education publications	Number of councils that use educational resources	WSROC	Ongoing
	Facilitate regional education program	Apply for grant funding under WLRM to facilitate a centrally coordinated Love Food Hate Waste program to promote food waste avoidance	Number of councils acitively participating in the campaign	WSROC	Jun-16
	Identify CALD communities in each LGA and explore options for central publication of waste education materials in these languages	Explore opportunities for councils to reduce costs associated with publishing education materials, for example through WSROC identifying commonalities between respective councils' CALD communities	Increase in available resources for CALD communities across councils	WSROC	Ongoing
Theme 2: Increase recycling					
Lift the regional resource recovery rate to 58% by 2017 and 70% by 2021	Conduct an infrastructure needs assessment	Undertake a comprehensive infrastructure needs analysis that builds on the gap analysis undertaken in this strategy	Review completed	WSROC	June-15
	Conduct strategic land use planning	Work towards a coordinated approach to land use and associated planning permits among councils	Advisory note released to councils	WSROC	Jun-17
	Advocate to State Government for strategic waste asset planning	Advocate on behalf of the region to the State Government to facilitate the appropriate planning approvals adjustments and to develop a favourable content for the establishment of waste infrastructure such as AWT and EfW	Documented advocacy with State Government to discuss waste assets (including submissions, meetings and media)	WSROC	Ongoing
	Facilitate Energy from Waste projects	Investigate diversion of waste to Energy from Waste facilities should they become available	Number of councils conducting options analysis for Energy from Waste should facilities become available	WSROC	Ongoing
	Conduct AWT, GO, FOGO options evaluation	Evaluate options for AWT, GO and FOGO facilities through needs assessment and options modelling	Analysis completed	WSROC	Dec-15
Theme 3: Divert more waste from landfill					
Work towards achieving the WARR target (75%) by 2021	Assessment of the audits of contamination of recycling bins	Collate and report on regional contamination of recycling bins	Contamination reports completed	WSROC	Ongoing
	Assessment of audits of leakage of recyclables into the residual waste bin	Collate and report regionally on leakage of recyclables into the residual waste bins	Leakage reports completed	WSROC	Ongoing
	Investigate bin capacity issues for households that have high leakage rate, to provide additional recycling capacity	Explore options to offer additional capacity to households with a high leakage rate	Number of councils offering extra capacity in kerbside recycling service	WSROC	Jun-16
	Facilitate business options for councils' domestic waste streams	Identifying market opportunities with councils for the management of the waste stream	The number of business opportunities identified and implemented	WSROC	Jun-17

Table 11 continued : Strategy Action Implementation Plan

Theme and Target	Action	Detail of action	Performance measure	Who is responsible?	Timescale for delivery
Theme 4: Reduce litter/illegal dumping					
Partner with the State to establish a baseline by 2015 and reduce the incidence of litter by 2017	Seek funding to augment RID Squad	Seek funding on behalf of Member Councils to augment the RID Squad	At least one grant submission for funding submitted	WSROC	Jun - 16
	Establish regional baseline for litter and illegal dumping	Coordinate and implement audits and an appropriate program	A baseline litter rate and illegal dumping rate established for the region	WSROC	Dec-15
Theme 5: Manage problem wastes better					
Build, upgrade or facilitate 10 community recycling centres/innovative solutions for household problem wastes by 2021	Scope sites for establishment of CRCs	Assessing and identifying eligible sites	All 10 sites (including those currently approved/operating) to have been either scoped or approved	WSROC	Dec-15
	Engage with (public and private) site holders to establish CRC network	Engage with the relevant respective site owners	All site owners for above 10 sites have been engaged	WSROC	Dec-16
	Promote the creation and development of innovative solutions	Engage Member Councils and form partnerships with developers of innovative solutions	The number of councils involved in partnerships	WSROC	Ongoing
	Provide assistance with CRC/ innovative solution grant applications and coordinate between councils	Coordinate and provide assistance with appropriate grant applications to secure funds for the region under WLRM	Provide assistance to all appropriate WLRM grant submissions	WSROC	Jun-16
Theme 6: Improve regional governance					
Work towards enhancing regional cooperation and governance	Maintain a regional waste managers network	Coordinate waste manager meetings that represent the participating councils in this Strategy	Regular meetings established	WSROC	Ongoing
	Report annually on the progress of the action plan	Report annually to the EPA and members on the progress of the action plan	Annual reports delivered in appropriate format to WSROC and EPA	WSROC	Ongoing
	Review contracts to identify opportunities for joint contracts and collaboration	Review contract expiry dates and facilitate discussion about regional tenders and possible joint contracts	Review completed	WSROC	Ongoing
	Aggregate audit reports into regional data report	Aggregate and release an annual data report for the region	Annual data report released in an appropriate format	WSROC	Ongoing
	Establish a library of best practice waste systems	Establish a library of best practice contracts for the region	Library established and updated as appropriate	WSROC	Jun-17



Glossary

Glossary term	Description
Alternative waste treatment (AWT)	Generally a facility that applies a combination of mechanical, biological and (sometimes) thermal processes to separate organic materials from a mixed residual waste stream (usually household waste).
Comingled recycling	A system in which all paper fibres, plastic containers, metals and others are collected together for processing.
Commercial and industrial waste (C&I waste)	Solid waste generated by businesses, industries (including shopping centres, restaurants and offices) and institutions (such as schools, hospitals and government offices) but not C&D waste or MSW.
Construction and demolition waste (C&D waste)	Solid waste sourced from construction and demolition works, including building and demolition waste, asphalt waste and excavated natural material.
Contamination rate	The percentage of the bin which is contaminated by materials not suitable for its stream.
Diversion rate	The proportion of all recycled materials or those otherwise recovered compared with total amount of waste generated.
Earth based materials	A natural material (such as clay, gravel, sand, soil or rock fines) which includes excavated material which meets criteria for virgin excavated natural material.
Energy from Waste	The process of recovering energy from waste materials: the energy is used to produce useable heat, steam, electricity or a combination of these.
E-waste	End-of-life electronic equipment, such as televisions, computers, mobile phones, stereos and small electrical appliances (but not whitegoods).
Feedstock	The raw material used to supply a process.
Gap analysis	An assessment of current performance against required performance (targets) and quantification of the shortfall. As part of gap analysis, there is an identification of what measures need to be implemented to address the gap in performance.

Household problem wastes	Household products and materials in the waste and recycling stream that pose potential harm to the environment and human health and/or make the recovery and recycling of other materials more difficult or uneconomic.
Industrial ecology	Using the byproducts from the production process of one company as a resource in another.
Materials recovery facility (MRF)	A materials recovery facility handles a range of recyclables which typically have already been separated from other waste streams (e.g. by householders or businesses at the collection stage). At the MRF the materials are sorted into individual streams before being sent for recycling. Any components of the incoming material not suitable for recycling will be separated as 'contaminants' at the MRF.
Municipal solid waste (MSW)	Solid waste from households and local government operations, including waste placed at the kerbside for council collection and waste collected by councils from municipal parks and gardens, street sweepings, council engineering works and public council bins.
Recycling rate	Proportion of an overall waste stream which is reprocessed, recycled and put back into the economy.
Reducing waste	Reducing waste generation by avoiding or preventing the creation of waste, where possible, along the various parts of the supply chain. The aim is to use less material to achieve the same or equivalent outcome.
Residual waste	Residual garbage waste disposed of in the red-lidded bin for either disposal at landfill or further processing by an AWT.
Resource recovery	Recycling waste material. Recovery may also include extracting embodied energy from waste through thermal processes.
Solid waste	Unwanted solid materials (does not include liquid waste.)
Waste avoidance	Waste that does not enter the waste-management system.

Appendix A

Waste generation forecasts

		WASTE GENERATION IN TONNES			
COUNCILS	Year	Forecast scenario 1: Household led forecasts based on 2011/12 t/hhld	Forecast scenario 2: Household forecast with 0.25%/yr growth/ hhld from 2012/13	Forecast scenario 3: Population forecast with 0.5%/yr reduction/ capita from 2012-2013	Forecast scenario 4: 2007-12 trends persist, waste generation with a steady annual increase
Auburn	2011-12	34,022	34,022	34,022	34,022
	2015-16	48,924	49,415	38,185	39,712
	2020-21	57,294	58,596	43,611	46,824
The Hills	2011-12	88,231	88,231	88,231	88,231
	2015-16	116,624	117,795	96,545	94,435
	2020-21	128,168	131,081	103,475	102,190
Blacktown	2011-12	134,479	134,479	134,479	134,479
	2015-16	184,134	185,982	148,103	133,881
	2020-21	196,814	201,287	154,384	133,135
Blue Mountains	2011-12	49,323	49,323	49,323	49,323
	2015-16	49,066	49,558	49,832	47,873
	2020-21	50,890	52,046	50,405	46,060
Fairfield	2011–12	88,459	88,459	88,459	88,459
	2015-16	119,654	120,855	90,992	92,496
	2020-21	124,816	127,653	92,568	97,543
Hawkesbury	2011-12	33,450	33,450	33,450	33,450
	2015-16	41,374	41,789	34,913	31,467
	2020-21	44,575	45,588	36,683	28,987
Holroyd	2011-12	48,328	48,328	48,328	48,328
	2015-16	64,522	65,169	51,964	53,210
	2020-21	70,070	71,662	55,035	59,313
Liverpool	2011-12	81,317	81,317	81,317	81,317
	2015-16	124,261	125,508	88,465	87,174
	2020-21	137,758	140,889	95,647	94,494
Parramatta	2011-12	69,100	69,100	69,100	69,100
	2015-16	88,145	89,030	75,785	72,573
	2020-21	97,675	99,895	81,901	76,914
Penrith	2011-12	91,288	91,288	91,288	91,288
	2015-16	116,872	118,045	100,233	100,298
	2020-21	129,304	132,243	108,150	111,562
Region	2011-12	699,887	699,887	699,887	699,887
	2015-16	955,875	965,470	775,134	753,119
	2020-21	1,040,387	1,064,031	822,784	797,021

Notes

- Historical population data is from ABS data (30 June 2010) and projected population data is taken from the Department of Planning
- Historical waste generation data is taken from NSW Local Government Data Report.

Appendix B

Waste management contracts

	Service	Service Provider	Facility	Dates
Auburn	Residual collection	Council staff		
	Residual disposal/ processing	Veolia	Woodlawn, Goulburn	2022
	Recycling collection	Council staff		
	Recycling processing	Visy	Smithfield MRF	2020
	Garden organics collection	Council staff		
	Garden organics processing	Veolia	Greenacre Resource Recovery Centre	no formal contract
	Clean Up service	Council staff		
	Clean Up disposal/ processing	Veolia	Greenacre Resource Recovery Centre	no formal contract
The Hills	Residual collection contract	Transpacific Cleanaway		2014 up to 2017
	Residual disposal/ processing contract	Veolia Environmental Services	Woodlawn, Goulburn	2014 up to 2017
	Recycling collection	Transpacific Cleanaway		2014 up to 2017
	Recycling processing	Visy	Smithfield MRF	2014 up to 2017
	Organics collection	Transpacific Cleanaway		2014 up to 2017
	Organics processing	SITA	Eastern Creek	2014 up to 2017
	Clean Up service - collection contract	Transpacific Cleanaway		2014 up to 2017
	Clean Up service - processing	Veolia Environmental Services	Horsley Park	2014 up to 2017
Blacktown	Residual collection	Council staff		
	Residual disposal/ processing	SITA	Eastern Creek UR3R	2025
	Recycling collection	Transpacific Cleanaway		2018
	Recycling processing	Transpacific Cleanaway	Polytrade MRF	2018
	Clean Up service	Council staff		
	Clean Up disposal/ processing		Genesis, Veolia Horsley Park and Blacktown Waste Services (Marsden Park)	Annually market testing

	Service	Service Provider	Facility	Dates
Blue Mountains	Residual collection	Council staff		
	Residual disposal/ processing	Blaxland landfill operated by Remondis on behalf of BMCC	Blaxland (council) landfill	
	Recycling collection	JJ Richards		2016
	Recycling processing	Visy Recycling	Smithfield MRF	2016
	Clean Up service	Council staff (including chipping)		
	Clean Up disposal/ processing	Council landfill for clean up materials	Blaxland landfill	
Fairfield	Residual collection	Council staff		
	Residual disposal/ processing	SITA	UR-3R Eastern Creek	2024
	Recycling collection	SITA		
	Recycling processing	SITA	Chullora MRF	2024
	Clean Up service	SITA		2014
	Clean Up disposal/ processing	SITA	Eastern Creek Landfill	2014
Hawkesbury	Residual collection	Council Staff		
	Residual disposal/ processing	Council	Hawkesbury City Waste Management Facility	
	Recycling collection	JJ Richards		2016
	Recycling processing	Visy	Smithfield MRF	2016
	Garden organics collection	JJ Richards		2020
	Garden organics processing	SITA	Eastern Creek	2020
	Clean Up service	Cleanaway		2016
	Clean Up disposal/ processing	Blacktown Waste Services	Marsden Park	
Holroyd	Residual collection	Council staff		
	Residual disposal/ processing	SITA	UR-3R Eastern Creek	2019
	Recycling collection	JJ Richards		2016
	Recycling processing	Visy	Smithfield	2016
	Clean Up service	Council staff		
	Clean Up disposal/ processing	Council staff	Dial A Dump Industries, Eastern Creek "Genesis"	2019

	Service	Service Provider	Facility	Dates
Liverpool	Residual collection	JJ Richards		2019
	Residual disposal/ processing	SITA	Kemps Creek SAWT	2019
	Recycling collection	JJ Richards		2019
	Recycling processing	Visy	Smithfield MRF	2019
	Garden organics collection	JJ Richards		2019
	Garden organics processing	SITA	ANL Badgerys Creek	2019
	Clean Up service	Council Staff		
	Clean Up disposal/ processing	SITA	Kemps Creek	No formal contract
Parramatta	Residual collection	Transpacific Cleanaway		2017
	Residual disposal/ processing	SITA	Eastern Creek	2018
	Recycling collection	Transpacific Cleanaway		2017
	Recycling processing	Polytrade as sub-contractor to TPI Cleanaway	Rydalmere MRF	2017
	Garden organics collection	Transpacific Cleanaway		2017
	Garden organics processing	SITA	Eastern Creek	2017
	Clean Up service	Transpacific Cleanaway		2017
	Clean Up disposal/ processing	SITA	Eastern Creek	2017
Penrith	Residual collection	SITA		2017
	Residual disposal (SUDs)	SITA	Eastern Creek Landfill	2016
	Residual processing (MUDs+rural)	SITA	Kemps Creek SAWT	2021
	Recycling collection	Visy		2017
	Recycling processing	Visy	Smithfield MRF	2017
	Food & Garden Organics collection	SITA		2017
	Organics processing	SITA	Kemps Creek SAWT	2019
	Clean Up service	SITA		2017
	Clean Up disposal/ processing	SITA	SITA Davis Rd/ Elizabeth Drive Landfill	2017

Appendix C

Regional waste facilities list

Facility Name	Facility location
Resource recovery facilities	
SITA Camden Organic Resource Recovery Facility	Glenlee Road, Spring Farm
ANL Badgerys Creek Organics Recovery Facility	210 Martin Road, Badgerys Creek
EarthPower Technologies	35 Grand Avenue, Camellia
SITA Eastern Creek Organic Resource Recovery Facility	Wallgrove Road, Eastern Creek
Bettergrow Organics Recycling Facility	Industry Road, Vineyard
Hi-Quality Group Bringelly Organics Processing Facility	Elizabeth Drive, Kemps Creek
Global Renewables UR3R Facility	Wallgrove Road, Eastern Creek
SITA SAWT Facility	1725 Elizabeth Drive, Kemps Creek
SITA Camellia Resource Recovery and Treatment Facility	Grand Avenue, Camellia
Visy Recycling MRF	6 Herbert Place, Smithfield
Polytrade MRF Rydalmere	32 South Street, Rydalmere
SITA Spring Farm Resource Recovery Facility and ARRF	275 Richardson Road, Spring Farm
Galloway MRF	Artisan Road, Seven Hills
Genesis Xero Waste Facility	Honeycomb Drive, Eastern Creek
Landfills	
SITA Eastern Creek Landfill	Wallgrove Road, Eastern Creek
SITA Lucas Heights Landfill	New Illawarra Road, Lucas Heights
SITA Elizabeth Drive Landfill	1725 Elizabeth Drive, Kemps Creek
SITA Spring Farm Landfill	275 Richardson Road, Spring Farm
Penrith Waste Services Landfill	842 Mulgoa Rd, Mulgoa
Blacktown Waste Services Landfill	920 Richmond Road, Marsden Park
Hawkesbury City Waste Management Facility	1 The Driftway, South Windsor
Blaxland Waste Management Facility	Attunga Road, Blaxland
Veolia Horsley Park Landfill	Wallgrove Road, Horsley Park
Enviroguard Landfill	Quarry Road, Erskine Park

Transfer stations	
Veolia Greenacre Resource Recovery Facility	75 Anzac Street, Greenacre
SITA Chullora Resource Recovery Centre	15 Muir Road, Chullora
Katoomba Waste Management Facility	Woodlands Road, Katoomba
Veolia Clyde Transfer Station	322 Parramatta Road, Clyde
SITA Seven Hills Resource Recovery Centre	29 Powers Road, Seven Hills
SITA Auburn Resource Recovery Centre	Old Hill Link, Homebush Bay
SITA Wetherill Park Resource Recovery Park	20 Davis Road, Wetherill Park

Appendix D

Community stakeholder engagement

The Western Sydney Conservation Alliance Inc (WSCA)
Better Planning Network
Blue Mountains Conservation Society
Biznet– Regional Chamber of Commerce for the Blue Mountains
Katoomba Chamber of Commerce & Community
Penrith Valley Chamber of Commerce Inc.
Auburn Community Sector Networking Forum
Auburn Small Community Organisation Network
Western Sydney Community Forum
Auburn Community Development Network
Auburn Chamber of Commerce
Parramatta Chamber of Commerce
Hills Shire Council Bushcare Group
Hawkesbury Environment Network
Blacktown and District Environment Group
North Richmond Community Group
Hawkesbury City Chamber of Commerce
Penrith Progression
Penrith Business Alliance
Penrith Lakes Community Advisory Committee
Cumberland Business Chamber

Appendix E

Multi-criteria analysis assumptions

Defining evaluation criteria and multi-criteria analysis

The recommended regional actions (4.1.1 to 4.1.6 inclusive) were assessed against the following criteria:

- Cost effectiveness;
- Timeframe for implementation;
- Scope of impact; and
- Achievability.

Each criterion was given a weighting of either 1, 1.5 or 2, in order to mark relative importance, with 2 being most important. Each action was then given a score of 1, 2 or 3 against each of these criteria, depending on how well the action satisfies the criterion.

The cost effectiveness of an action was determined through assessing the investment required to undertake that action compared to the savings/improvement in financial position that can be achieved through undertaking the action. A score of 3 marks a strong cost effectiveness where as a score of 1 marks a low cost effectiveness.

The score representing timeframes for implementation signifies whether the action can be achieved in the short term (1 year, marked by a score of 3), medium term (2-3 years marked by a score of 2) or long term (4-7 years marked by a score of 1).

The scope of impact relates to how relevant the action is for all member councils. Some actions are not relevant to all member councils and therefore received a lower score as the priority actions for implementation will be those that affect all or most member councils.

Finally, each action was scored in terms of its achievability, whereby a score of 3 marks a strong achievability and a score of 1 suggests that the action is harder to achieve. The achievability of an action was determined through assessing a number of factors, such as the number of stakeholders required to be engaged and the influence that WSROC has over outcomes (for example, WSROC has little influence over whether innovative solutions are created under the WLRM CRC/innovative solutions grant).

Criteria	Score	Assumptions
Cost effectiveness	3	Action to be funded centrally by WSROC
	2	Action to be funded mainly by WSROC but still some costs will need to be covered externally
	1	High price outsourcing for specialist skills to complete action and see return on investment
Timeframe for implementation	3	< 1 year for completion
	2	2-3 years for completion
	1	4-7 years to completion
Scope of impact	3	All 10 Councils likely to participate
	2	5-9 Councils likely to participate
	1	< 5 Councils likely to participate
Achievability	3	Action to be conducted centrally by WSROC Low reliance on stakeholders Low reliance on state government Low reliance on other factors such as grant funding or political outcomes
	2	Action to be conducted mainly by WSROC but still some reliance on external stakeholders
	1	Action almost entirely dependent on external factors and stakeholders. Low degree of WSROC control High reliance on state government High reliance on commercial operators

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