

# LITERATURE REVIEW

## SSROC Waste and Resource Recovery Strategy Implementation: Regional Communications Campaigns Part Two: Food Waste Avoidance Campaign

26 FEBRUARY 2016

*Supported by the NSW Environment Protection Authority with funding from the waste levy.*

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# SOUTHERN SYDNEY REGIONAL ORGANISATION OF COUNCILS LITERATURE REVIEW – FOOD WASTE AVOIDANCE

## Regional Communications Plan

### Part Two: Food Waste Avoidance Campaign

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<b>Report No</b>	AA006559-05-R03-02	
<b>Date</b>	26/02/2016	
<b>Revision Text</b>	Final Report	

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## REVISIONS

Revision	Date	Description	Prepared by	Approved by
01	11/01/2016	First draft	TR	PC
02	26/02/2016	Final report	TR	RC

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# 1 INTRODUCTION

In July 2014, the Southern Sydney Regional Organisation of Councils (SSROC) publicly released a strategic policy document, the Regional Waste Avoidance and Resource Recovery Strategy (WARR Strategy), which was developed collaboratively with its sixteen member councils. In order to implement recommendations of the Strategy, a Regional Action Plan 2014-17 was developed by the SSROC team that outlined specific actions the organisation and councils will take to achieve strategic outcomes, under four main thematic areas of Reducing Waste (RW), Recovering Resources (RR), Responsible Citizens (RC) and A Healthy Region (HR).

SSROC was subsequently awarded funding under the state government's Better Waste and Recycling Fund to engage an agency that will provide marketing and communications services to prepare and coordinate a set of region-wide campaigns relating to:

- a. improved recycling for multi-unit dwellings (MUDs) and single-unit dwellings (SUDs);
- b. avoidance of food waste;
- c. correct use of clean-up services; and
- d. correct disposal of 'problem wastes'.

In preparation for the development of these region-wide campaigns, SSROC determined that it was necessary to undertake a desktop review of relevant literature relating to its four key waste education campaign areas. The purpose of this literature review report is to:

- Analyse the specifics and extent of behavioural problems within the SSROC region which could be addressed by a region-wide communications campaign;
- Determine the behaviour change outcomes that would achieve improvement of these problems;
- Determine key factors that influence relevant behaviours amongst individuals and households, according to demographic segments of the region's population (such as awareness, attitudes, motivations and barriers);
- Identify the most appropriate audience segments to target for behavioural change; and
- Recommend how to frame communications with these target audiences, to inform the design of subsequent communications in order to achieve effective behaviour change.

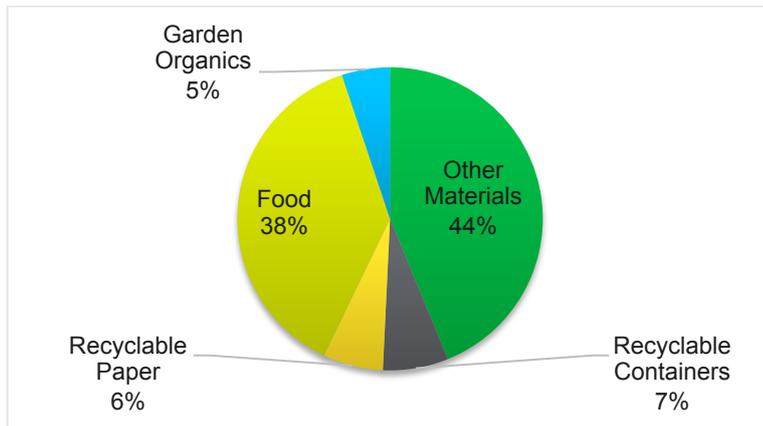
This report is Part Two in the series. It provides a review and analysis of information that is relevant to the development of a region-wide communications campaign to address food waste avoidance.

Part One in the series addresses improving kerbside recycling, while Part Three addresses correct use of clean-up collection services and Part Four addresses disposal of problem wastes.

## 2 EXAMINING THE PROBLEM

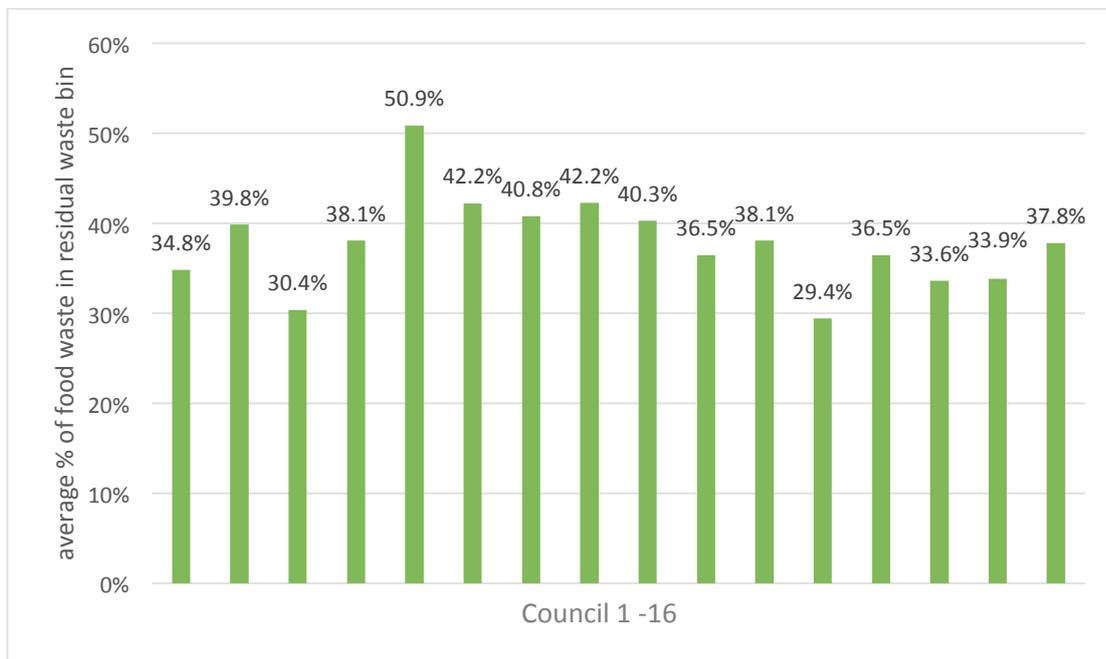
### 2.1 Proportion of food in the household waste stream

The composition of a typical kerbside residual waste bin within the SSROC region is displayed in *Figure 1*. Food waste represents a significant proportion (approximately 38%) of the region's residual waste sent to landfill (APC, 2011).



*Figure 1: Composition of typical residual waste bin in SSROC (weighted average) (APC, 2011)*

The percentage composition of kerbside residual waste varies significantly between the local government areas (LGAs) of the SSROC region, as shown in *Figure 2*. Food waste content ranges between approximately 30% and 50% of typical residual waste bins in each LGA.



*Figure 2: Proportion of food waste in typical residual waste bin, by LGA (APC, 2011)*

In addition to the main component of loose or bagged food waste identified in the above figures, there are also other smaller components of food waste found in the household kerbside waste stream of the SSROC region. According to APC (2011) this consists of:

- Containerised food and drinks in the residual waste stream (on average 3.7% of residual waste bin contents);

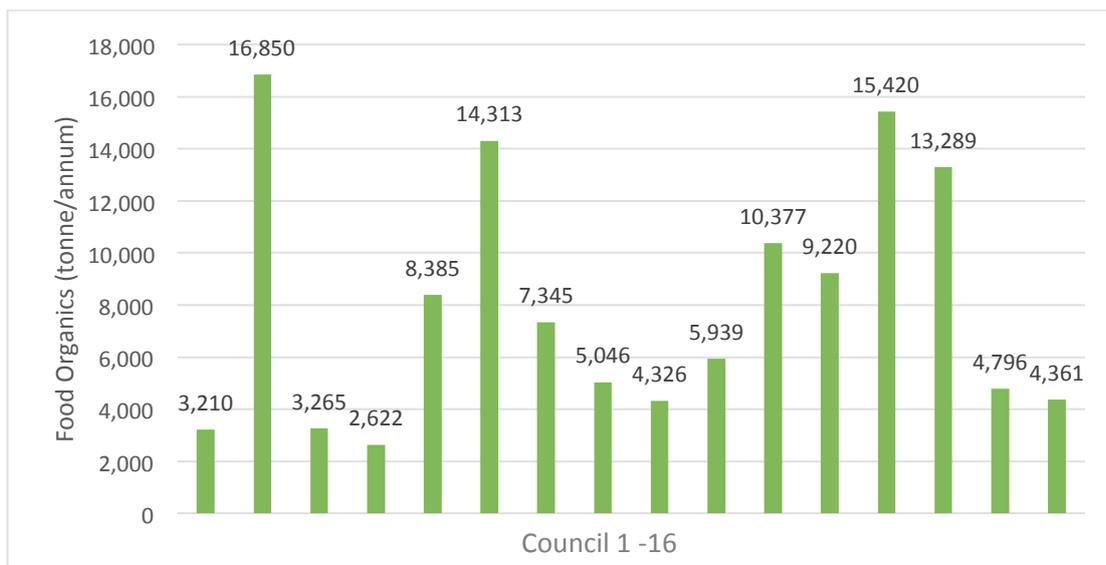
- Containerised food and drinks, found as contamination in the recycling stream (on average 1.0% of recycling bin contents); and
- Loose or bagged food waste, found as contamination in the recycling stream (on average 0.7% of recycling bin contents).

## 2.2 Quantities of food waste disposed

It is estimated that a total of 128,764 tonnes of food waste was disposed through the kerbside residual waste stream by SSROC households in 2012-13<sup>1</sup>. On average, SSROC households place approximately 3.64 kg per household of loose or bagged food waste into residual waste bins per week (APC, 2011). This equates to about 7.1 litres per household per week<sup>2</sup>. In comparison, single dwellings (SUDs) dispose of 4.31 kg per household per week (38% of the average garbage bin) and MUDs dispose of 2.49 kg per household per week (35% of the average garbage bin) (APC, 2011).

In addition, the average household also disposes of an additional 0.5 kg per week of food in recycling bins and containerised food and liquid across the recycling and residual waste streams (including the weight of containers). This suggests that average food wastage for all dwellings in the region may be closer to 4 kg per household per week.

The variation between LGAs in the estimated tonnes of general food waste disposed to residual waste bins each year is displayed in *Figure 3*. It should be noted that these figures do not include the smaller proportion of food in the recycling stream or food disposed inside containers, which is estimated above).



*Figure 3: Estimated quantities (in kilograms) of food waste (loose or bagged) disposed to residual waste annually, by LGA (Based on NSW EPA, 2014 and APC, 2011)*

Social research into food wastage behaviour in Australia often refers to estimates in terms of the volume (in litres) of food wasted generated per household per week. For example, the NSW EPA estimated that the average NSW household in 2009 wasted a total of 6.7 litres (about 3.4 kg) of food per week or almost 350 litres (about 180 kg) per year (NSW EPA, 2012).

*Figure 4* provides an estimate of the total volume of food waste disposed to the residual waste stream each week across SSROC LGAs. Although average household food waste disposal for the SSROC region (7.1

<sup>1</sup> This estimate was calculated on the basis of kerbside waste generation data reported by LGA in the NSW WARR data report (NSW EPA, 2014) and estimated proportions of food waste found in the average residual waste bin, by LGA, reported in APC (2011).

<sup>2</sup> Volumetric estimate based on the assumption that average density of food waste is approximately 514 kg/m<sup>3</sup> (NSW EPA, 2015c).

litres per week, as outlined above) is consistent with the NSW estimate, the figure below shows that households in many LGAs of the region generate larger volumes of food waste than the state average.

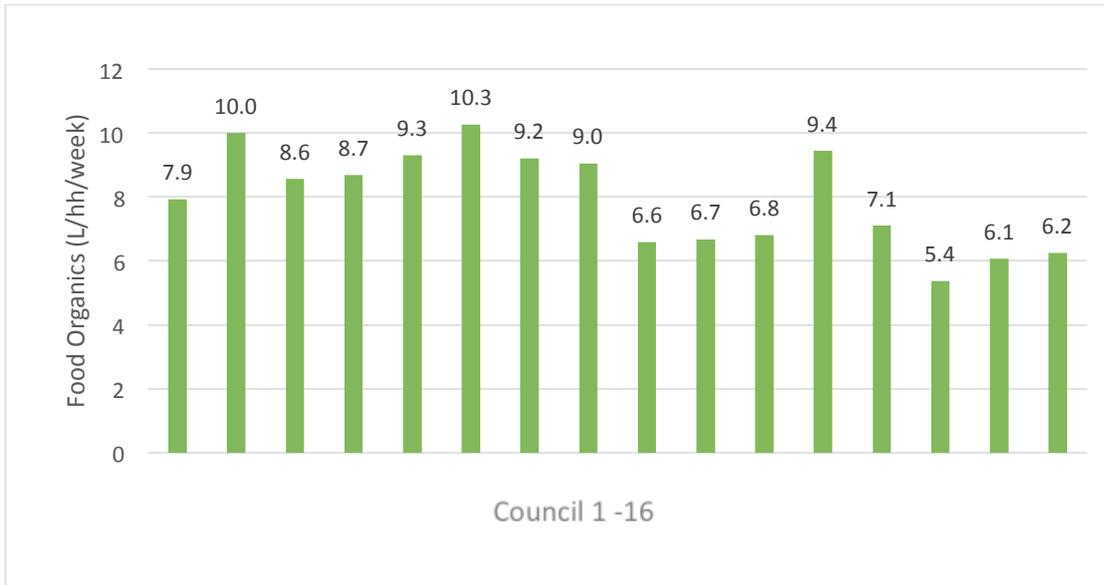


Figure 4: Estimated volume (in litres) of food waste (loose or bagged) disposed by households weekly to residual waste bins, by LGA (assuming the density of food waste is 514kg/m<sup>3</sup>) (Based on NSW EPA, 2014; APC, 2011; NSW EPA, 2015c).

## 2.3 Composition of Food Waste

### 2.3.1 Categories of Food Waste Disposed

Research undertaken by NSW EPA identifies the following categories of food wasted by the average household in NSW, and the estimated amount wasted in 2009 (NSW EPA, 2012):

- Fresh food (2.5 litres/hh/week)
- Leftovers (1.7 litres/hh/week)
- Packaged and long life (1.0 litres/hh/week)
- Frozen food (0.6 litres/hh/week)
- Takeaway or home delivered (0.5 litres/hh/week)
- Drinks (0.4 litres/hh/week)

The estimated breakdown of food waste categories, based on the above findings is shown in Figure 5.

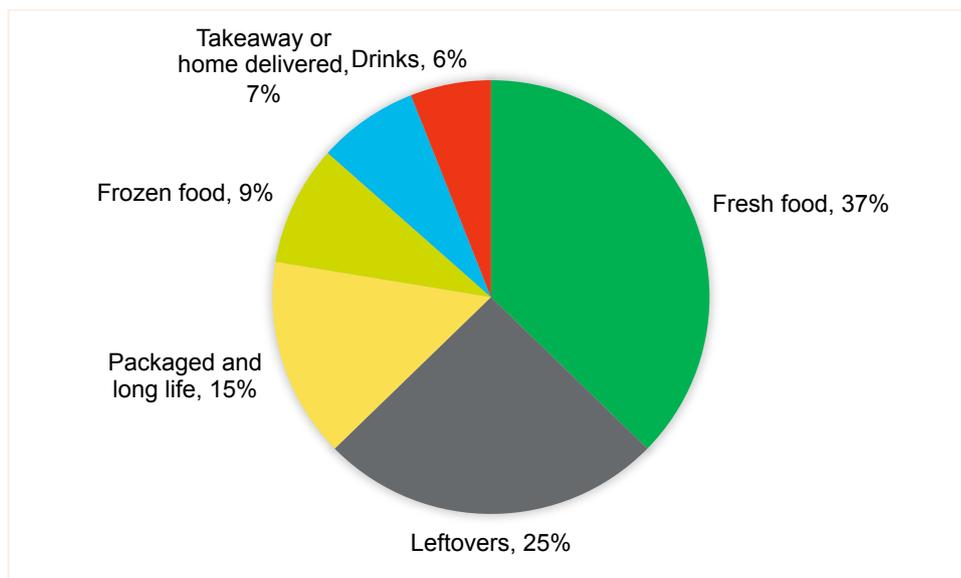


Figure 5: Composition of food waste generated by the average NSW Household in 2009 (NSW EPA, 2012)

The literature also refers to another categorisation of food waste according to characteristics of the wastage behaviour, for example research undertaken by the UK’s Waste and Resources Action Programme (WRAP, 2009) as well as kerbside waste audits undertaken by Sustainability Victoria (SV, 2014) have focused on the following categories which are described in detail below:

- Avoidable food waste
- Possibly avoidable food waste
- Unavoidable food waste

### Avoidable food waste

This can be considered as food and drink that is thrown away because it is no longer wanted or has been allowed to pass its best. Most avoidable food waste is composed of material that was at some point, prior to disposal, edible although at the time of disposal may have been inedible due to deterioration (WRAP, 2009; SV, 2014). This may include mouldy bread, whole fruit and vegetables, spoiled food, uneaten leftovers and food in containers.

Auditing undertaken by Sustainability Victoria across Victoria in 2013 found that 65% (consisting of 0.9% drinks) of food in the residual waste stream was ‘avoidable’ (SV, 2014). The majority of avoidable foods identified in kerbside waste audits were bakery items (such as bread, pastry and biscuits, 16%) and meals (13%), followed by dairy/ eggs (9%), fresh vegetables (8%) and fresh fruit (6%). Auditing criteria used by Sustainability Victoria includes the following materials under the category of ‘Avoidable’:

- 
- |                    |                              |                          |
|--------------------|------------------------------|--------------------------|
| • Fresh salad      | • Meals                      | • Bakery                 |
| • Fresh fruit      | • Processed vegetables/salad | • Cakes / desserts       |
| • Fresh vegetables | • Condiments/sauces etc.     | • Confectionary / snacks |
| • Meat/fish        | • Processed fruits           | • Drinks                 |
| • Dairy/eggs       |                              |                          |
-

### Possibly avoidable food waste

This can be considered as food and drink that some people eat and other people do not (for example bread crusts). It also includes foods that can be eaten when prepared in a certain way but not normally in other ways (for example, potato skins) (WRAP, 2009; SV, 2014). The Victorian audits in 2013 found that 'possibly avoidable' food comprised 23% of the food in the residual waste stream (SV, 2014).

Auditing criteria used by Sustainability Victoria includes the following materials under the category of 'Possibly Avoidable':

- 
- Vegetable peelings (and some fruit peelings)
  - Vegetable stems
  - Outer leaves
- 

### Unavoidable food waste

This can be considered as waste arising from food and drink preparation that is not, and has not ever been, edible under normal circumstances (WRAP, 2009; SV, 2014). The Victorian audits in 2013 found that 'unavoidable' food comprised almost 12% of the food in the residual waste stream (SV, 2014).

Auditing criteria used by Sustainability Victoria includes the following materials under the category of 'Unavoidable':

- 
- Skins (e.g. banana)
  - Bones
  - Tea and coffee grounds
  - Kernels and cobs
  - Egg shells
- 

## 2.4 Avoidance of Food Waste

### 2.4.1 Avoidance Through Improved Purchasing, Storage, Preparation and Use of Food

#### Current Participation in Love Food Hate Waste Program in NSW

Although in recent years many councils in the SSROC region have implemented a range of programs to promote food waste avoidance specific to their LGAs, Love Food Hate Waste branding is the predominant approach across NSW. This program is one of the few for which detailed information was publically-available for the purposes of this research.

The Love Food Hate Waste program was commenced in NSW in 2010, based on licensing of the concept and branding from WRAP in the UK. Love Food Hate Waste aims to raise awareness about the environmental, economic and social impacts of food waste in NSW and to reduce the amount of avoidable food being sent to landfill.

The NSW EPA is delivering the program in partnership with NSW businesses, not-for-profit organisations, local councils and community groups. Over \$1.4 million of funding is currently committed by the NSW government over four years through the Waste Less Recycle More funding initiative and SSROC Councils already delivering Love Food Hate Waste grant projects funded in partnership with the NSW Environmental Trust include Canada Bay Council and Bankstown City Council (OEH, 2015b).

Key target behaviour changes promoted under the program are to 'plan your meals', 'shop to a list', 'store food correctly', 'consider portion sizes' and 'use your leftovers' (NSW EPA, 2015d). Recent research conducted (NSW EPA, 2015b) determined the current prevalence of many key behaviours amongst the general community, as summarised in *Table 1*.

*Table 1: Frequency of key behaviours reported by NSW survey respondents (NSW EPA, 2015b)*

Key behaviours	Percentage of respondents who claim to undertake
----------------	--

	the behaviour 'always' or 'most of the time'
<b>Before Shopping:</b>	
• checked what food was already in the house	81%
• planned their meals	63%
• wrote out a shopping list.	63%
<b>While shopping:</b>	
• checked the use-by dates on products	71%
• managed to stick to their planned budget	45%
• bought specials	40%
• bought in bulk	5%
<b>During food preparation:</b>	
• prepared only what was required	66%
• made extra for their next meal	43%
• made extra just in case.	22%

In late 2009, prior to commencing the Love Food Hate Waste (LFHW) program in NSW, the NSW EPA undertook social research to benchmark food wastage awareness, attitudes and behaviour amongst the NSW community. Since that time, two sets of follow-up research have also been completed (in 2011 and 2012) to track changes in key indicators that may be attributable to the campaign (NSW EPA, 2013 unpublished). Further tracking has been undertaken in late 2015 however findings were not available at the time of this research (Pers. Comm. NSW EPA, 2015)

This tracking research indicates that general concern in the community over food wastage has increased significantly over time across all audience segments between 2009 and 2012, and average awareness that food waste is the largest component of household waste has increased from 13% to 22%.

Awareness of media relating to food wastage in general was reported to be statistically lower in 2012 (11%) than in 2011 (17%), suggesting that media focus on the issue was greater around the time the program was introduced. However the level of awareness of the LFHW program has remained relatively consistent since the launch period at about 5% of respondents and awareness of the LFHW logo increased from 2% to 4%. Television consistently rates as the highest source of information on the topic, followed by the internet (NSW EPA, 2013 unpublished).

A high proportion of respondents who are aware of the program show spontaneous recall of LFHW program key messages, with 40% of these understanding that the key message is 'not to waste food', followed by 'the need to think before shopping, preparing and storing food in order to reduce waste' (23%). Prompted recall of five key messages is highest for those linked to the financial cost of food waste – 64% recalling that '231 million dollars' worth of drinks are wasted in NSW per year', and 55% recalling that 'NSW households waste 2.5 billion dollars' worth of food per year' (NSW EPA, 2013 unpublished).

The program also appears to be successfully engaging households with almost half of people exposed to the program claiming it motivated them to reduce their food wastage. Actions that people are most motivated to adopt are to check use by and best before dates in store (32%), to cook the correct serving sizes (31%), to plan meals in advance (28%), to change shopping habits (28%), and to buy less food more regularly (28%). Behaviour changes appears to be driven equally by a desire to help the environment, and to save money. Higher wasters exposed to the LFHW program claim to have avoided waste to the extent of 2.1 litres, or \$19.50 on average per week, as a direct result of the campaign (NSW EPA, 2013 unpublished).

## Potential Food Waste Avoidance through Love Food Hate Waste

Waste audits undertaken across Victoria estimate that about 65% of the food waste disposed by household is typically 'avoidable' materials (SV, 2014). On this basis, it is estimated that a maximum of about 2.4kg (or 4.6 litres) of food waste could potentially be avoided per household each week in the SSROC region, if all avoidable food waste was diverted from kerbside disposal. In total, this would amount to an estimated 83,696 tonnes of organic waste each year that could potentially be avoided through better household management of food across the region.<sup>3</sup>

However, even those who undertake avoidance behaviours still generate some avoidable food waste. In 2013, the NSW EPA undertook state-wide modelling of several waste generation scenarios during the development of the current *NSW Waste Avoidance and Resource Recovery Strategy*. Within the assumptions of this research, a conservative estimate of food waste avoidance potential was developed for the NSW community. This determined that 15% of households in NSW could be realistically engaged through state and local Love Food Hate Waste program activities and could achieve an average reduction in food waste generation and disposal of 60kg per household per year (1.2kg/hhld/wk or about 2.3 litres/hhld/wk) by 2016/17 from the 2010-11 baseline, as a result of adopting avoidance behaviours (SKM, 2013). This represents about half of the 'avoidable' food waste generated by SSROC households able to be engaged.

It is noted however that Love Food Hate Waste should be co-promoted with composting education in order to maximise potential diversion of waste, given that most households will never achieve avoidance of 100% of avoidable wastes.

## 2.4.2 Avoidance Through Home Composting

### Current Participation in Home Composting

Home composting is complementary to the Love Food Hate Waste program as it has potential to divert from landfill some unavoidable organic wastes in addition to some avoidable food wastes that many households will inevitably continue to generate, even in spite of adopting food waste avoidance behaviours.

There appears to be limited information currently available on the existing level of household participation in home composting within the SSROC region. However recent research by the NSW EPA indicates that within the general NSW community, approximately 28% of people use a compost bin or worm farm to dispose of food waste and 82% of these people also compost garden waste (NSW EPA, 2015b). Participation in composting of food waste is found to be significantly higher for those living in detached terraces (54%) and for those with large gardens (34%), while families and home owners are also slightly more likely than the average to be doing this. People living in apartments (with no garden) are least likely to be composting food waste.

The Compost Revolution is the main composting program currently being delivered by 13 of the 16 SSROC councils. It aims to help residents avoid disposing of food waste to landfill, increase awareness and practices of home organics recovery, and encourage improvements in their day-to-day sustainability practices (Pers. Comm., SSROC, 2015). Although councils in the SSROC region have implemented a wide range of programs to promote composting specific to their LGAs over the years, the Compost Revolution is currently the predominant approach across the region and it is the main program for which detailed information was readily available for the purposes of this research.

Households from each relevant LGA can participate in the Compost Revolution program for the opportunity to purchase, through an online shopping cart, compost bins and/or worm farms (and other related accessories) at a significantly subsidised price, which are then delivered to participants' doors. In order to be

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<sup>3</sup> This estimate assumes that 65% of food waste disposed to the residual waste stream is 'avoidable' and was calculated on the basis of kerbside waste generation data reported by LGA in the NSW WARR data report (NSW EPA, 2014) and estimated proportions of food waste found in the average residual waste bin, by LGA, reported in APC (2011).

eligible for the subsidy however, participants are required to complete an online tutorial on how to start and maintain their compost system.

The project is delivered through a user-friendly website which is consistent across the region, but also provides council-specific information based on the residents' address. The online platform allows each council to customise the tutorials and content, thereby tailoring messaging and training to its local needs (SSROC, unpublished). It is delivered to diverse participants through engaging, interactive and multi-lingual tutorial resources. This unique on-line platform is also supplemented by various forms of face-to-face workshops delivered by individual councils. The program aims to reach 14,500 households across the region over a three-year grant funding period (SSROC, unpublished).

This regional Compost Revolution program is an expanded and modified version of an initial year-long trial project involving 580 households in the LGAs of Waverley, Randwick and Woollahra in 2009. This trial project was delivered through provision of free compost bins or worm farms to participating households, supported by a series of intensive, practical workshop sessions in addition to a number of networking events and the availability of one-on-one troubleshooting advice. Evaluation in 2010 of the trial project in the eastern suburbs found that approximately 2.3 kg per week per household of food waste was diverted from the residual waste stream as a result of participating in the program (Michener, 2011). While the majority of this waste was recycled at home through composting or worm farming, it was found that wasteful behaviours of households also changed and almost 98% of participants reported a shift towards preventing some of the food waste that was previously generated. In addition, half started to grow more food at home and three quarters reported talking to their neighbours or friends about composting (Michener, 2011). Another key finding of the trial was that the cost per household for the intensive model of delivery was too high to scale up for delivery at the council-wide level however a more cost-effective online delivery approach was developed in the later stages of the project, which was still effective and feedback indicated that many participants found the online version more convenient.

Each individual council now involved in the online program has developed a local marketing plan to promote participation. The communication channels that councils are primarily using at present are council websites, local newspapers, rates notice flyers, council events and outdoor advertising (Pers. Comm., SSROC, 2015). Website statistics provide a breakdown of the channels where tutorial participants found out about the program and show that the most effective current methods are council websites, local newspapers, rates notices and referrals from other participants.

*Table 2: Source of information used by participants to find out about Compost Revolution program (Pers. Comm., SSROC, 2015)*

Communication Channels	Percentage of participants who found out through this channel (as self-reported by participants)
Council Website	18.1 %
Local Newspaper	16.6%
Rates Notice	16.2%
Referrals	15.9%
Online Search	8.5%
Email newsletter	6%
Event	3.5%
Outdoor ad	2%
TV	<2%
Radio	<1%

The revised region-wide program has been running for approximately one year and initial results indicate that it is effective in improving adoption of home composting across the region. However it should be noted that it is not reaching initial participation targets, which were to deliver 7,000 units in the first year and 14,500 units (approximately 2% of the region's population) by the end of three years (Pers. Comm., SSROC, 2015) compared to the 2,257 units that have actually been sold.

In approximately one year, and as a result of individual local marketing plans being delivered by each individual council, it is estimated that 11,139 residents (about 0.7% of the region's population) have been engaged through the program, being the number of unique visits to the website where at least one tutorial was completed. Of these people undertaking training, 1,843 households (about 0.3% of the region's households) have been delivered at least one composting unit (with some households purchasing multiple units). A long-term retention rate of at least 90% has been achieved (which has been determined through user survey) and as such the program is estimated to be responsible for an additional 1,138 households adopting composting during 2015 across the SSROC region (Pers. Comm., SSROC, 2015).

The number of composting units (compost bins or worm farms) sold during the first project year has varied between each LGA. However, of the total 2,257 units sold in this period the greatest proportion by far (almost 885 units or 40%) were from Eastern Suburbs councils (Pers. Comm., SSROC, 2015), which equates to approximately 7 units sold for every 1,000 households in these LGAs combined. Given that these LGAs have been promoting the program for several years since the pilot phase, it is likely that communication channels and educational activities have been refined over time to increase the reach of promotions, resulting in greater levels of resident awareness and participation. This result suggests that although the program has so far not performed as well as expected in some other council areas, the effectiveness of marketing may improve as the program becomes more established in each area.

Review of several composting programs delivered by local councils indicates that composting program participation rates in NSW and Australia vary widely and are dependent on a range of contributing factors, such as demographic profiles, predominant dwelling types (e.g. single dwellings with gardens), the level of engagement with residents (e.g. face-to-face workshops) and the provision of free incentives or subsidies (e.g. free or discounted compost bins). For example, a trial program conducted by Lake Macquarie City Council providing free composting units achieved participation of 2.25% of all households within the LGA in less than one year (Lake Macquarie City Council, 2011). Results of intensive, practical composting workshop programs in several other LGAs suggest that in the short-term (i.e. over 2-3 year programs) uptake rates of approximately 1% of total households are achievable, however NSW EPA modelling indicates that new composting uptake of 0.5% of households per year is a more realistic target (SKM, 2013).

Region-wide communications that incorporate messaging about home composting should if possible promote using the resources available through the Compost Revolution website as the primary call-to-action, at least for participating council areas. It is recognised however that not all SSROC councils are participating in the Compost Revolution program. To allow for consistent region-wide messages and calls-to-action to be developed, there may be an opportunity to use a single regional web landing page for food waste avoidance and composting education, which allows residents to then be directed to the relevant program website based on their location.

It is realistic to assume that an effective regional communications strategy could significantly increase traffic to a centralised website and achieve an increase in the rate of composting uptake from 0.3% to at least 0.5% of households per year.

## Potential Food Waste Diversion through Home Composting

Extensive UK research shows that home composting can divert from collections on average 150kg per year per participating household of total organic waste, of which about 30% is food waste (WRAP, 2009). This suggests that typically, composting households recycle approximately 0.9kg of food waste per week on average. Rigorous studies on the impact of home composting are limited in NSW and Australia, however research and modelling undertaken on behalf of the NSW EPA, during the development of the current *NSW WARR Strategy*, found that based on experiences in many NSW LGAs, an average diversion rate of 100kg/hh/year (consisting of about 0.6 kg of food waste per week) is a more realistic NSW home composting rate (SKM, 2013).

This conservative estimate used in NSW EPA modelling is however much lower than estimates of food waste diversion calculated through evaluation of the Compost Revolution trial program, which determined avoidance of approximately 2.3kg per household per week (Michener, 2011). However, in comparison to the trial program, the current on-line delivery model of the SSROC regional Compost Revolution program does not involve practical demonstrations and uses a less intensive (and presumably less engaging) theoretical approach to education. Even assuming a drop-out rate of 10% (as per the results detailed above), it is likely that some households using composting units purchased through the current program may not be recycling food waste to their full potential. Therefore, it is considered that a more realistic average rate of food waste diversion for participants in the Compost Revolution program would be between one and two kilograms per household per week.

## 2.5 Summary of the Problem

This research has made an attempt to examine the specific household behaviours which are at the cause of food wastage issues in the SSROC region. It should however be recognised that waste and recycling data used to determine the proportion and quantities of food waste in the household kerbside waste stream of the SSROC region was not current at the time of this research. Primary data sources for this investigation included the 2012-2013 *Local Government Waste and Resource Recovery data report*, the *Regional Waste Audit for SSROC Participating Councils* (2011) and the NSW EPA's Food Waste Avoidance Benchmark Study, undertaken in late 2009. Although an audit of the kerbside waste streams was commenced in late 2015, this data was not available at the time of this report. Updated social research by the NSW EPA is also expected to be published in early 2016.

Key findings of this section of the report relate to the extent of the food wastage problem in the region and include the following:

- Food waste comprises on average 38% of the region's residual waste stream, but varies between LGAs from about 30% to 50%.
- On average, each household dwelling in the region disposes of 3.64 kg of food waste to landfill per week, with SUDs disposing of more (4.31 kg/hh/wk, 38% of the bin) and MUDs disposing of less (2.49 kg/hh/wk, 35% of the bin).
- Food disposed inside containers or as contamination in the recycling stream may account for an additional 0.5 kg/hh/week of wastage.
- Research in NSW suggests that more than a third of food disposed is fresh food (37%), and the next most common is leftovers (25%), followed by packaged and long-life food (15%).
- Approximately 65% of food wasted has been found to be 'avoidable', meaning that at some stage before it was disposed, this food could have been eaten. The most common foods in this category are bakery items and uneaten meals.
- About 23% of food waste is 'possibly avoidable' (i.e. edible peelings, stems and outer leaves) and only an estimated 12% of food disposed by households is considered to be 'unavoidable' (i.e. inedible food components such as bones etc.).
- If all food was properly managed to avoid unnecessary wastage, it is estimated that SSROC households could potentially avoid on average 2.4kg (or 4.6 litres) of food waste each week, amounting to almost 83,700 tonnes of waste avoidance per year. However, the NSW EPA suggests that it is more realistic that about 15% of NSW households could be engaged by 2016-17 to be less wasteful of food (such as through the Love Food Hate Waste program) and this proportion of households could achieve avoidance of about 1.2 kg/hh/wk (i.e. about half of the average avoidable amount generated).
- Meanwhile, the Compost Revolution program has engaged about 3 out of every 1,000 households in the region in the past year to commence home composting, although new uptake has been significantly higher in council areas where the program already existed previously. It is estimated that improved regional communications could significantly increase uptake of this (or alternative composting programs in some council areas) to at least 0.5% of households region-wide per year. The impact of these new composting households on food waste disposal is not confirmed, however it is estimated that at least one kilogram of food waste per participating household can be diverted from landfill through the program.

## 2.5.1 Target Waste Categories for Communications Campaign

This review of the available literature on food wastage behaviour points to specific waste material categories that should be prioritised for reduced disposal under a region-wide communications campaign for the SSROC region. These material categories include:

- Bakery items (e.g. bread, pastry and biscuits)  
(For example, better shopping planning may prevent the purchase of unused items, while better storage of these items may prevent unnecessary spoilage and ensure that purchased.)
- Fresh food (e.g. fruit, vegetables, dairy, eggs and meat/fish)  
(For example, better shopping and meal planning may prevent the purchase of unused items, while better storage of these items may prevent unnecessary spoilage.)
- Cooked leftovers  
(For example, better portion control may prevent cooking of food in excess of needs and knowledge and meal planning may improve the use of leftovers in new meals.)

In addition, research undertaken for Part One of this report series (the 'Kerbside Recycling Campaign') identified other organic materials which are commonly disposed through the kerbside residual waste and recycling streams. Although these materials do not constitute a large proportion of the residual waste stream, some focus on these within this campaign could simultaneously reduce organic waste to landfill, reduce contamination within the recycling stream and increase capture of recyclables currently being sent to landfill. These materials include:

- Containerised food and drinks  
(For example, better shopping planning may prevent the purchase of unused items, while better storage of these items may prevent unnecessary spoilage and ensure that purchased containers of food and drink are fully consumed.)
- Other compostable organic materials (particularly contaminated and disposable paper products)  
(For example, a shift away from disposable paper products may prevent unnecessary use of some items such as paper towels and paper coffee cups, while starting a home compost will allow some disposable paper such as paper towels and tissues to be diverted from kerbside disposal.)

## 3 AUDIENCE SEGMENTATION

### 3.1 Categorising People Who Waste Food

While all individuals and households waste some food, benchmark research undertaken by the NSW government (NSW EPA, 2009) identified that the community can be segmented according to the level of household food wastage behaviour. The benchmark research surveyed food decision-makers (i.e. people in the household who make the majority of decisions about purchase and/or preparation of food). Food decision-makers responded about the behaviour within their entire household and identified that there are three main categories of households:

#### Lower volume wasters (0.0L to 2.9L per week)

Those estimated to be wasting lesser amounts of food were typically more organised and prepared in relation to food purchasing, preparation and storage, and were already undertaking a number of steps to minimise food wastage. People in this group were more likely to be older people (aged 55 years or more) and single households.

#### Mid volume wasters (3.0L to 6.9L per week)

Those who threw out a medium amount of food appear to exhibit a reasonable level of organisation in relation to food purchasing, preparation and storage, although display many behaviours similar to those in the high wastage group. Demographic characteristics of this group were less defined than for the other groups.

#### Higher volume wasters (7.0L or more per week).

Many of the high wastage group believed that a busy lifestyle made it hard to avoid wasting food. This group is more likely to over-purchase food that is not needed and less likely to plan meals in advance or measure portions. It was also less likely that all members of the household would eat together.

People of the following demographic characteristics were more likely to be in this group:

- those from Culturally and Linguistically Diverse backgrounds (CALD) – waste 9.1L per week – 21% of food decision-makers
- families with dependent children – waste 8.4L per week – 30% of food decision-makers
- younger people aged 18 to 24 years – waste 7.6L per week – 13% of food decision-makers
- people aged 25–39 years – waste 7.7 L per week – 28% of food decision-makers
- higher household income (>\$100,000) – waste 7.5L per week – 9% of food decision-makers
- those who did not complete secondary school – waste 7.8L per week – 16% of food decision-makers
- people living in Sydney – waste 7.1L per week (compared to 5.3L per week for people in regional areas)

Social research on food wastage by NSW EPA also suggests that food decision-makers can be further categorised into two types according to food planning behaviours and that there are statistical differences in the levels of food wastage between these two groups (NSW EPA, 2013 unpublished):

- Planners were defined as those people who “always” or “most times” plan the meals to be cooked in the next few days based on specific survey responses, or “agree” or “strongly agree” to the statement “I plan meals in advance and shop to a strict list”.
- Non-planners were all remaining respondents.

Research by Sustainability Victoria (SV, 2010) delivered findings that suggest larger volumes of food are wasted by households in the state of Victoria than in NSW and that the four highest waste groups differ slightly from those in NSW. This research identified target food wasters as:

- young consumers aged between 18 and 24 (who waste 14.2 litres per household per week on average)
- those in higher income households earning \$130,000 and over (who waste 12.8 litres per week)

- those in moderate income households earning \$65,000-\$80,000 (who waste 11 litres per week)
- families with children (who waste 9.8 litres per week).

### 3.2 Key Target Audiences

Based on waste data available for the SSROC region and research undertaken in Australia, it can be concluded that age, household structure, cultural/linguistic characteristics and household income for food decision-makers are key determinants of household food waste generation behaviour and are useful for identifying target audiences of a region-wide communications campaign.

The research indicates that the highest priority community segments to target for the SSROC region (in terms of their contribution to food wastage and where behaviour-change will have the greatest impact in this campaign) are:

- people from Culturally and Linguistically Diverse (CALD) backgrounds
- families with children
- younger people aged 18 to 39 years.

Households with higher incomes, although being characterised as typically high wasters of food, have been excluded as a priority target audience for SSROC because they are a much smaller subset of the population and many of these households are captured under the 'Families' segment. Singles and couples on high incomes are expected to be less sensitive to the financial value wasted when food is wasted (i.e. the main driver for avoidance behaviour is not as strong). Research also indicates that this audience typically perceives being time poor as a barrier to avoidance behaviour (NSW EPA, 2012), therefore it is reasonable to assume that engagement of this audience may be difficult and the likelihood of behaviour change much lower than for other segments.

Research also suggests that within these groups, individuals who are most likely to make significant efforts in changing their behaviour are:

- mothers and female carers of children (women are still the primary food decision-makers in the majority of households and therefore a higher priority target to engage with the program)
- families with children and on low to moderate household incomes (financial savings are a significant motivation for this group)
- young professionals (this group appear to be in general more highly engaged with food-related issues)

In comparison to the above subgroups, behaviour change may be more difficult to achieve for the following:

- People from CALD communities appear to be somewhat more limited in their willingness or perceived capacity to change food wastage behaviours, primarily due to a range of cultural factors around food and may sometimes be exacerbated by language barriers in understanding specific food storage requirements (Cultural Partners, 2015).
- For people on very low incomes, there is evidence to suggest that the purchase of 'cheap' foods, including bulk buys and specials, as well as lack of in-depth knowledge about specific food storage and hygiene techniques may present significant barriers to behaviour change.

## 4 ANALYSIS

Development of a future region-wide communications campaign, aimed at reaching each of the identified target audiences, may take into consideration a range of factors such as strengths, weaknesses, opportunities and threats of the campaign. This section presents an analysis that has drawn out evidence from relevant literature for differences between the identified key audiences in relation to the campaign topic, including motivations and barriers, which may influence behaviour change and should be used to frame communications.

The factors considered in the analysis are set out in Table 3.

*Table 3: Strengths, weaknesses, opportunities and threats of a communications campaign*

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• Attributes of effective programs and strategies</li> <li>• Key messages to promote</li> <li>• Sub-groups of audiences to target</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Messages, behaviours or strategies to avoid</li> <li>• Least important audiences</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Key motivations, drivers and benefits to target audience</li> <li>• Communications channels/mediums relevant to target audiences</li> <li>• Useful support tools</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>• Problem behaviours and attitudes</li> <li>• Reasons for problem behaviour</li> <li>• Key barriers to behaviour change</li> <li>• Key risks of programs and strategies</li> </ul>

This analysis is presented in the following tables in the form of a high-level communications plan for each key target audience.

## 4.1 CALD communities

Table 4: High-level communications plan for CALD communities

Culturally and linguistically diverse (CALD) communities	
Problem behaviours and attitudes	<ul style="list-style-type: none"> <li>• Research in both NSW and Victoria indicates that people from CALD backgrounds tend to waste more food than the average household. For example, CALD respondents in 2009 disposed of an estimated 9.1 litres of food per week, compared to 6.7 litres for the average (NSW EPA, 2012). In 2012, CALD residents wasted an estimated \$69 worth of food, compared to the average household at \$56/week (NSW EPA, 2013). This behaviour trend may partly explain differences in food waste generation rates between LGAs in the SSROC region, as analysis in Section 2 shows that the average amount of food per household in the residual bin is highest in LGAs where there the population consists of higher proportions of CALD residents.</li> <li>• The type of food wasted by CALD residents also appears to differ from the average household and other community segments. For example, research has found that CALD households dispose of significantly more fresh food (3.7L) and frozen food (1.2L) each week compared to others (NSW EPA, 2012).</li> <li>• Research indicates that the proportion of CALD backgrounds households already undertaking key food waste avoidance behaviours, such as planning for shopping, cooking the right amount and storing foods to prolong their life, is significantly lower than for the rest of the NSW population (NSW EPA, 2013). In particular, evidence suggests that people from CALD backgrounds are less likely overall to undertake 'food planning' behaviours such as writing a shopping list or planning meals in advance (NSW EPA, 2013; Cultural Partners, 2015). Possibly as a consequence, they also appear to be more likely not only to buy more food than needed but also to cook excess food, compared to others (NSW EPA, 2013; Cultural Partners, 2015).</li> <li>• With regard to storage, research suggests that CALD respondents are less likely than others to use the best storage techniques to avoid wastage. For example, this segment is significantly less likely overall than others to store food in the freezer. Furthermore, when they do save leftovers in the freezer, they are more likely to eventually throw them out uneaten (NSW EPA, 2012).</li> <li>• Evidence suggests that CALD residents are also more likely overall than the average to throw away food that is still edible, with a number of factors contributing to this behaviour, particularly concern over potential health consequences (NSW EPA, 2012; NSW EPA, 2013; Cultural Partners, 2015). This indicates a specific knowledge gap for this audience that may be contributing to unnecessary wastage.</li> <li>• Rates of home composting appear to be lower amongst most CALD households than the average household in NSW (OEHL, 2013). There is however some evidence that participation in home composting differs between ethnic groups with, for example, Vietnamese households being more likely to compost at home than Arabic background households (Cultural Partners, 2015).</li> </ul>
Specific sub-groups to target	<ul style="list-style-type: none"> <li>• In most CALD communities, it appears that women are still the primary food decision-maker and responsible for the majority of food shopping and preparation (Cultural Partners, 2015).</li> </ul>
Key influences, benefits, motivations and drivers of target audience	<ul style="list-style-type: none"> <li>• CALD respondents are more likely to indicate their main environmental concerns are the health effects of pollution and their quality of life (NSW EPA, 2013). This differs from the average and from other segments.</li> <li>• One in five CALD respondents indicate that they believe food is the largest type of waste in a typical household garbage bin (compared to just 13% of all respondents) and they were significantly more likely to identify that people throw out more general garbage than they should (22% compared to 16%) (NSW EPA, 2012). However this research suggests a gap between awareness of society's wastefulness and self-awareness of their own wastage, as CALD respondents are typically less willing to</li> </ul>

<b>Culturally and linguistically diverse (CALD) communities</b>	
Key influences, benefits, motivations and drivers of target audience	<p>admit throwing away large quantities of food compared to others. Interestingly, despite considering themselves less wasteful than others, this segment nevertheless tends to express higher levels of concern about the amount of food wasted in their household, when compared to the average (NSW EPA, 2015b). This finding suggests that increasing self-awareness of their actual high levels of food wastage may be a strong driver amongst this audience for adopting desired avoidance behaviours. This appears to be backed up by evidence from several recent projects, where CALD participants reported being shocked at recognising the amount of food wasted in their own households and as a consequence being very motivated to reduce that wastage (Hills Shire, 2015; Cultural Partners, 2015).</p> <ul style="list-style-type: none"> <li>• People from CALD communities appear to be more aware than the average household about the extent of food wastage generally, with greater recognition that food is the largest type of household waste disposed and a more realistic perception of the value of food that gets wasted in households (NSW EPA, 2013). This higher level of awareness may be a result of higher levels of wastage in these households, however it presents a good opportunity for engaging with this audience around the issue and reinforcing the need for behaviour change.</li> <li>• While CALD households on average tend to admit to more overcooking than others, they also appear to display more wasteful storage habits for leftover food than others. People from CALD backgrounds are typically found to be more concerned than the average respondent about the storage life of cooked food. In particular, these respondents were more uncertain than others about the safety of eating cooked food from the fridge after more than one day. They were also more likely to report throwing away food directly from the freezer due to safety concerns (NSW EPA, 2012). Improved knowledge around the safe storage life of foods appears to be beneficial to CALD communities (Cultural Partners, 2015). In particular there appears to be an opportunity to promote better use of freezers amongst this segment to prolong the life of purchased food and to save money on uneaten food.</li> <li>• Research suggests that people from CALD communities are often more willing to give away an oversupply of ingredients or cooked foods to visiting family or friends to take home (Cultural Partners, 2015). Sharing bulk supplies of produce between friends and family also appears to be common amongst some ethnic groups, particularly of Mediterranean origin. This also presents a key opportunity for promoting messages to this segment about better storage of excess ingredients and leftover meals (such as through freezing and clear labelling), for the purpose of sharing with others.</li> <li>• Bankstown area research suggests that a high proportion of traditional Vietnamese families are composting or using a worm farm, even when living in apartments, and many who weren't already composting were very interested in starting. Current practice and interest in composting was found to be much lower for Arabic families in this research, many of whom were living in apartments (Cultural Partners, 2015). Other research indicates that home composting rates are typically lower for CALD communities (OEH, 2013). This suggests that promotion of home composting (including through the Compost Revolution program) may need to be tailored differently to various cultural groups. For some groups, such as people from Arabic backgrounds, there may be need for more focus on food waste prevention messages because uptake of home composting may be less likely. Further research with key ethnic groups, such as through focus groups, may be beneficial to determine the most appropriate prevention and composting messages.</li> </ul>
Reasons for wasting food	<ul style="list-style-type: none"> <li>• In NSW, only 43% of CALD residents report regularly writing a shopping list and sticking to it as much as possible, much lower than 55% for the average household (NSW EPA, 2013). In the Bankstown area, research with several cultural groups confirms that women from CALD households often buy more food than they need (Cultural Partners, 2015). A factor in this trend appears to be the preference for having more food in the house, just in case, rather than the alternative of running out</li> </ul>

Culturally and linguistically diverse (CALD) communities	
Reasons for wasting food	<p>of something.</p> <ul style="list-style-type: none"> <li>• CALD groups appear less likely to plan meals in advance - 34%, compared to 41% of average households (NSW EPA, 2013). Research shows that planning meals in advance leads to less food wastage, attributable to factors such as purchasing the right ingredients and cooking the amount that is needed.</li> <li>• CALD residents are much more likely than other groups to cook extra, just in case it is needed (NSW EPA, 2013). This trait is backed up by research in Bankstown which highlighted that especially when family and friends are visiting, portion sizes are not considered and it is much better to have too much food than the embarrassment of not enough (Cultural Partners, 2015).</li> <li>• CALD residents appear significantly more likely than most households to throw away uneaten leftovers, either immediately after a meal or after storing in the fridge or freezer, regardless of whether the food is still edible (NSW EPA, 2013). Confusion over the length of time to store leftover meals was an issue highlighted in Bankstown area research (Cultural Partners, 2015).</li> <li>• 32% of CALD residents appear to discard food that has passed the best before date regardless of whether it is still edible, due to a misconception that the 'best before' dates means that a food must be eaten or thrown away by this date (NSW EPA, 2013). This is compared to only 20% of average households stating this behaviour.</li> <li>• CALD respondents are significantly more likely to indicate that they think they need more food than they actually do and more than half of CALD respondents claimed the size of their food portions and packages was too large (52% compared to 35% overall) (NSW EPA, 2012).</li> </ul>
Barriers to changing behaviour	<ul style="list-style-type: none"> <li>• Research commissioned by Bankstown City Council concluded that many cultural groupings including East Asian, Middle Eastern and Mediterranean, have a strong affinity with food, as preparing and eating food together as a family is integral to family life (Cultural Partners, 2015). This research suggests that food purchase, preparation and consumption for this segment is particularly influenced by culture, traditions and social expectations. For example, cultural traditions often dictate that large quantities of food and a wide diversity of food types are available at family gatherings and during certain festivities which may present barriers to behaviour change.</li> <li>• Some research suggests that CALD communities in Australia may be more wasteful because food is currently very abundant here and there is wide variety available, whereas in contrast many members of these communities have experienced shortages of food in the past. Abundance and generosity of food seems to be considered an important cultural trait for many migrant and refugee background communities (Cultural Partners, 2015).</li> <li>• Some CALD communities (e.g. Arabic and Greek) appear to often have larger than average families units living in the household, which means catering for a wider range of food preferences. Many communities also have strong ties to extended family, as such unannounced visits from family and friends are very common (Cultural Partners, 2015). This research suggests a common perception amongst these households that excess food needs to be kept in the house at all times, just in case it is needed.</li> <li>• For Arabic and other Muslim people, the month of Ramadan appears to be a period of high food wastage. It is traditional (and therefore considered a social obligation) to prepare a wide selection of specific fresh foods on a daily basis (salads, dips, soups, meat dishes, sweets etc.), however consumption is restricted during much of the day, which reportedly leads to a high volume of food wastage in many households (Cultural Partners, 2015).</li> <li>• Research in Bankstown indicates that taking advantage of special offers and discounts is an important consideration during shopping for many groups, particularly</li> </ul>

<b>Culturally and linguistically diverse (CALD) communities</b>	
	<p>Arabic families, and therefore shopping to a list is very difficult (Cultural Partners, 2015). It is also likely that foods purchased on special will spoil more quickly, or when purchased in excess may be unused.</p> <ul style="list-style-type: none"> <li>• School lunches are often cited as a key barrier, especially for CALD families, because children often have specific preferences for foods at school that are not traditionally eaten at home. If other family members are not also using these ingredients, they often perish before being finished (Cultural Partners, 2015). It also appears that although many families still eat traditional cultural foods together at home, the younger generation (particularly teenagers) have a stronger preference for take-away food which often results in uneaten leftovers in the house.</li> <li>• Pet ownership appears may be lower across CALD communities than other community segments, which reduces option for recycling of food scraps and leftovers as pet food (Cultural Partners, 2015).</li> </ul>
Attributes of effective programs and strategies	<ul style="list-style-type: none"> <li>• NSW EPA program tracking research has found that recognition of the Love Food Hate Waste logo and recall of key program messages appears to be higher for CALD residents than the rate for average households (NSW EPA, 2013). Although program evaluation does not yet show whether this has translated into behavioural changes, it does suggests that this segment appears may be more receptive to the LFHW campaign and messaging.</li> <li>• Research and program evaluation for several grant-funded projects indicates that the most effective way to engage with women from CALD communities about food waste is through existing local community groups and networks, with resources delivered in their own language (Cultural Partners, 2015; WSROC, 2015).</li> <li>• Sharing of culturally appropriate recipes for leftover ingredients (translated into relevant languages if possible) appears to be an effective tool to promote and remind people about using leftovers. Compiling a hard-copy or online Leftover Recipes cook-book is an effective strategy used by a number of local councils and community groups in NSW, for example Holroyd<sup>4</sup> and Wollongong<sup>5</sup> councils. A similar on-line approach has been used effectively by WRAP in the UK.<sup>6</sup> Asking members of the community to submit their own recipes and suggestions (which could include a competition and recognition of the contributor in the published resource) is a very effective tool for actively engaging with the target audience. This approach also improves dissemination as each contributor is likely to use the resource and/or share it amongst their family, friends and networks.</li> </ul>
Key messages to promote to this audience	<p>Examples (based on NSW LFHW resources) may include:</p> <ul style="list-style-type: none"> <li>• We're throwing away \$2.5 billion – on average \$1,000 per household – every year</li> <li>• We're wasting more than \$231 million worth of drinks each year</li> <li>• Every year, NSW households throw away more than 800,000 tonnes of edible food</li> <li>• Less food waste means less pollution – every plate counts</li> <li>• Be a smart shopper – Write a list and stick to it to save money on your bills</li> <li>• Save time and money - Plan your meals in advance</li> <li>• Know how to store food correctly to keep it fresher for longer - Save yourself time and money.</li> </ul> <p>Other messages to consider specifically for this audience may focus on:</p>

<sup>4</sup> Refer to <http://www.loveyourleftovers.nsw.gov.au/>

<sup>5</sup> Refer to <http://www.wollongong.nsw.gov.au/services/sustainability/Documents/Second%20Time%20Round%20Recipe%20Book.pdf>

<sup>6</sup> Refer to [http://www.lovefoodhatewaste.com/recipes?gclid=CM\\_j0aHOyMkCFYNjvAod5qQBvg](http://www.lovefoodhatewaste.com/recipes?gclid=CM_j0aHOyMkCFYNjvAod5qQBvg)

<b>Culturally and linguistically diverse (CALD) communities</b>	
	<ul style="list-style-type: none"> <li>• Better storage techniques for leftover meals, particularly guidance on temperature and length of time foods can be refrigerated or frozen.</li> <li>• Better storage techniques to extend the life of particular fresh foods (perhaps including traditional cultural foods).</li> </ul>
Messages or behaviours to avoid for this audience	<ul style="list-style-type: none"> <li>• Given the cultural significance of the abundance of food for many CALD communities, and the high prevalence of family and friends visiting for meals, messages about cooking correct portions for the family should be avoided. Instead the focus should be on better storage and use of leftovers.</li> <li>• Avoid trying to convey information about environmental impacts to this segment, as these concepts are often too complex to traverse language barriers. Concern for the environment is typically not as prevalent among CALD communities as for the average household (EPA, 2015b; OEH, 2013).</li> </ul>
Communications channels/mediums most relevant to audience	<ul style="list-style-type: none"> <li>• Research and program evaluation reinforces that using existing local groups and networks in participants' own language is the most effective way to engage people of CALD communities around this issue.</li> <li>• CALD respondents are more likely than others to indicate that they would ask family and friends for relevant information about food issues and the majority of CALD respondents (much more than other segments), indicate that they would be willing to ask someone they know for advice on relevant topics (NSW EPA, 2012).</li> <li>• Research suggests this group is also more willing than other segments to attend a kitchen skills workshop or a local event about food (NSW EPA, 2012; Cultural Partners, 2015)</li> <li>• Schools and preschools are also a common medium for communication. School newsletters may be suitable for promotion of events or recruitment of participants for local activities. Meanwhile, communications may include use of posters or other advertising mediums around the school pickup zone.</li> <li>• Ethnic language radio programs (e.g. local and SBS) are commonly listened to by CALD communities for keeping abreast of culturally-specific news and events. Community radio programs also often use voluntary announcers from the local community who may be willing to promote environmental causes during their show.</li> <li>• Multicultural online forums are an emerging space to facilitate meaningful engagement and participation in multicultural societies (OEH, 2015). SBS current affairs program Insight is an example that allows diverse views to be expressed in an inclusive way for people from very diverse backgrounds (McClellan, 2011)</li> <li>• One recent study indicates that some ethnic groups (such as Vietnamese) preference very fresh ingredients and are more likely to shop regularly (i.e. daily) for smaller amounts of food, whereas other ethnic groups (such as Greek households) are more likely to do a large shop less frequently. Furthermore some cultural groups appear to be likely to use more independent, local shops and specialty shops for some food shopping, especially meat, but supermarkets are the primary location for the majority of shopping (Cultural Partners, 2015). Meanwhile it appears that some ethnic groups, particularly Vietnamese families, also often grow some of their own food. Differences between typical shopping habits of different groups should be considered as this has implications for targeting messages, particularly about purchase planning and food storage. This also highlights that local and speciality food shops may serve as communication channels for reaching specific ethnic groups with specific avoidance messages.</li> </ul>
Useful support tools	<ul style="list-style-type: none"> <li>• Everyday prompts are effective for this audience, such as a fridge magnet about what to keep out of recycling, shopping lists or notepads (OEH, 2015).</li> <li>• Recipe books promoting the use of leftover ingredients, contributed to by members of a local community group, are shown to be effective engagement tools. Recipe</li> </ul>

<b>Culturally and linguistically diverse (CALD) communities</b>	
	<p>leaflets in various local languages may also be useful.</p> <ul style="list-style-type: none"> <li>• ‘Pledges’ or written commitments can be an effective tool for this audience. This strategy was tested by Bankstown in the initial stages of Recycle Right program development.</li> <li>• Developing a set of recognisable graphic characters for communications about waste with CALD communities, rather than photographs, may be a better way to depict a wider range of key cultural groups, which can help individuals to personally relate to messages (Mooreland City Council, 2015).</li> </ul>
Key risks of this audience for ineffective programs and strategies	<ul style="list-style-type: none"> <li>• Translating text for region-wide communications is not necessarily a cost-effective strategy because there is such wide diversity in the languages spoken at home across the region. NSW EPA already provides some key information in other languages. Translations in multiple languages combined in one resource can often appear cluttered and make it difficult to convey a clear and simple message. Where possible, text for CALD resources should be limited and images should be preferred over text.</li> <li>• Translated materials are more suitable for localised council resources (particularly online) which may provide information about local food events or promotions.</li> <li>• It can be prohibitively expensive to develop photographic images (such as people engaging in recycling) for use in communications and it can sometimes be difficult to represent people’s characteristics relevant to a diverse community through photographs, therefore there is evidence that pictorial graphics can be more effective for CALD communities (Mooreland City Council, 2013).</li> </ul>

## 4.2 Families with Children

Table 5: High-level communications plan for families with children

Families with children	
Problem behaviours and attitudes	<ul style="list-style-type: none"> <li>• Research in both NSW and Victoria indicates that households with dependent children are amongst the highest wasters of food. For example, tracking research in NSW found that 50% of families with children admit to wasting food in their household, compared to 43% of respondents overall (NSW EPA, 2013). Benchmark research estimated that average weekly food wastage for this household type was 8.3 litres (compared to 6.7 litres on average) (NSW EPA, 2012). More recent research suggests that families with children are wasting on average \$65 each week (compared to \$56 for average NSW households) (NSW EPA, 2013).</li> <li>• Evidence suggests that the types of foods most likely to be wasted by families with children are fresh foods, packaged and long life food, and leftovers in particular (NSW EPA, 2013).</li> <li>• According to various sources of research, food economy and waste avoidance behaviours, such as planning for shopping, cooking the right amount and correct food storage, are behaviours already commonly undertaken amongst 'food decision-makers' within this segment (NSW EPA, 2015b; NSW EPA, 2013; NSW EPA, 2012), however wastage is often more attributable to other members of the household, particularly children and younger people (NE Waste, 2015; NSW EPA, 2015b).</li> <li>• In comparison to other target segments, research suggests that families, particularly those who are home owners, living in detached houses and/or are good recyclers, are much more likely to already compost or worm farm at home (NSW EPA, 2015b). This highlights that reinforcement of behaviour according to the waste hierarchy is particularly important for this segment, where waste prevention is preferable to recycling for avoidable food wastes.</li> <li>• Pet ownership is higher amongst families and households that own pets (such as dogs, guinea pigs or chickens) not only report lower levels of food waste volumes but also appear less likely to think they are wasting food if it is fed to animals (NE Waste, 2015).</li> </ul>
Specific sub-groups to target	<ul style="list-style-type: none"> <li>• Research consistently indicates that mothers and female carers are still the primary food decision-maker for the majority of family households, and therefore women should be prioritised in communications.</li> <li>• Families with younger children tend to admit to wasting more food than older families in general.</li> <li>• Higher income families - recent research in NSW indicates that 59% of higher income households admit to wasting food, compared to 43% of households overall (NSW EPA, 2013).</li> </ul>
Key influences, benefits, motivations and drivers of target audience	<ul style="list-style-type: none"> <li>• One in four families with children (25%) state that concern for future generations is their greatest concern in terms of environmental problems (NSW EPA, 2013). Other research suggests a difference between types of families, with younger families being significantly more likely to be 'concerned for future generations' (42% of young vs 38% of older families) and also more likely to be concerned about the 'amount of waste that society produces' (61% younger vs 48% older) (NSW EPA, 2015b).</li> <li>• Research has found that people with children (of any age) are more likely to be concerned 'a great deal' about environmental problems in general, and for the reason of 'concern for future generations', meanwhile tending to display higher levels of environmental knowledge, and as a result being more likely to undertake more 'everyday' and 'occasional' environmental activities (OEH, 2013). This may have some influence in behaviour change with regard to avoidance of food waste.</li> <li>• Recent research (NSW EPA, 2015b) found that families more typically fall into the</li> </ul>

Families with children	
	<p>'Diligents' segment for waste and recycling behaviour (41% representation among younger families and 39% among older families). This suggests that desirable attitudes and behaviours relating to waste and recycling in general are common amongst this group and therefore may translate into being more easily encouraged to adopt food waste avoidance behaviours than other segments, although only a few major barriers affecting this segment can be overcome.</p> <ul style="list-style-type: none"> <li>• Although on average they waste more food, families are significantly more likely to undertake proper food planning and food economy behaviours compared to the average person in NSW (NSW EPA, 2015b). This indicates that the drivers and willingness towards desired food waste avoidance behaviours are already common.</li> <li>• Older families tend to have higher levels of relevant knowledge, including knowledge about correct recycling behaviours and are more likely to think that food waste was the largest type of waste in the average NSW household bin than younger families (NSW EPA, 2015b).</li> <li>• Program evaluation suggests that families who were not previously aware of the extent of food wastage in their household, appear to be most motivated by messages about the financial value of their wastage (NE Waste, 2015; NSW EPA, 2013). Campaign messages for this audience should therefore incorporate how much money can be saved through overcoming key barriers to preventing wastage.</li> <li>• People in higher income brackets and higher levels of education appear to be more aware than most about the general environmental impacts of wasting food. For example, 71% of high income earners and 66% of tertiary-educated people recognise the loss of energy, water and nutrients when uneaten food is thrown away (NSW EPA, 2015b). If specifically targeting this subgroup, messages about the environmental benefits of food waste prevention may be more effective as a motivator than messages about financial savings. However it should be noted that while key drivers of behaviour change may differ for this subgroup, the barriers to adopting food waste avoidance appear to be similar across subgroups of families.</li> </ul>
Reasons for wasting food	<ul style="list-style-type: none"> <li>• A primary reason cited by families for wasting food is due to a household member not finishing meals, with more than half of families stating this as a contributing factor to their wastage (NSW EPA, 2009; NE Waste, 2015).</li> <li>• Leaving food in the fridge or freezer too long is the other main explanation for wastage by families (NSW EPA, 2009). Families with children are also significantly more likely than the average household to cite cooking too much food as a reason for wastage (NSW EPA, 2013).</li> <li>• Families also commonly report that food doesn't last as long as it should because it is often not stored properly, typically due to a failure to wrap/seal, leaving out of the fridge too long (NE Waste, 2015). Behaviour of other family members (e.g. children) appears to contribute to this issue.</li> <li>• Almost half of families with children (47%) report to normally buy food based on what is on special, which is much higher than the average NSW household (NSW EPA, 2013). This behaviour is more likely to result in buying more food than needed (e.g. through '2 for 1' deals or 'bulk buying' products) and sometimes foods on special are closer to the expiry date and more likely to perish before being eaten. Other research has also found that for families in particular, lower quality 'cheap' foods are more likely to get wasted than quality/expensive foods, due to a perception that wastage of cheaper foods matters less (NE Waste, 2015).</li> <li>• There are also gender differences when it comes to the reasons why people buy too much food (NSW EPA, 2012). In this research, men were more likely to indicate that they do not write lists (36% compared to 23% of women). Women were more likely to identify that they prefer to have more food available rather than not enough (43% compared to 24% of men). Women were also more likely to indicate that they lack the time and organisation to plan ahead (24% compared to 18% of men), that they</li> </ul>

Families with children	
	<p>like fresh ingredients and that they don't keep older ingredients (23% compared to 12% of men).</p>
Barriers to changing behaviour	<ul style="list-style-type: none"> <li>• A key barrier reported by families is having children in the household, particularly young children. Many families struggle to avoid wasting the food of children who have fussy food preferences, unpredictable appetites or regularly don't finish meals (NE Waste, 2015). For example, 25% of families with children (significantly more than the average household) report that some members of the household regularly don't finish meals (NSW EPA, 2013).</li> <li>• A barrier for families with older children in the house appears to be the issue of family members changing plans about whether they will be home for a meal, which leads to an excess of cooking. NSW benchmark research identified this as a significant factor for more than a third of high volume wasters (NSW EPA, 2012). A related barrier cited by families with older children is 'lazy' behaviours of other household members such as or failing to store food correctly after use (NE Waste, 2015)</li> <li>• Perceived lack of time for behaviours such as storing foods correctly or planning meals is a common barrier cited by families (NE Waste, 2015; NSW EPA, 2009).</li> <li>• Lack of knowledge around storage techniques and requirements for specific food items appears to be a particular issue for younger families (e.g. best ways to extend life of fresh food, safe freezing methods and length of time etc.) (NSW EPA, 2009). Evidence suggests that food is often discarded as a precaution because parents are unsure of whether it is still edible or safe for children, often a result of simple issues such as failure to label pre-cooked and frozen foods with contents and date (NE Waste, 2015).</li> <li>• Some research suggests that families feel pressured by the 'consumer culture' to purchase more food than is actually needed (NE Waste, 2015). Advertising and supermarket in-store marketing is designed to increase consumption, often targeting children or using other incentives to try new products or to buy extra.</li> </ul>
Attributes of effective programs and strategies	<ul style="list-style-type: none"> <li>• Conducting focus groups and individual surveys with the target audience has proven to be a very valuable activity for many projects related to food waste avoidance (Cultural Partners, 2015; NE Waste, 2015). For example, NE Waste used this method effectively for detailed planning of messages, advertising and local education resources but also as a community engagement tool to generate interest in desired behaviours amongst the local audience of families with school and preschool children (NE Waste, 2015). This approach appeared to generate discussion of the issue amongst local networks and expand the reach of subsequent education strategies.</li> <li>• Schools, preschools and early childhood services have been effective partners in delivering elements of several successful programs, and are useful in providing support for promotion of key messages, events and activities with parents of young children (NE Waste, 2015; OEH, 2015).</li> <li>• The Hunter Region Bust Your Food Bills Challenge recruited 1,232 households, particularly families, in its project and 88% reported reductions in food wastage by the end of the Challenge. The reported amount of money wasted on uneaten food also reduced significantly, with the average amount wasted per household per week decreasing by 41% from \$26 to \$15 over approximately 3 months. This equates to an average reduction in the cost of food waste across participants of \$553 per year. Participants who signed up to the Challenge received a 'Challenge Kit' of information and tools, and were regularly engaged through a monthly newsletter, workshops and other events.</li> </ul>

Families with children	
Key messages to promote to this audience	<p>Social research suggests that families typically appear to be motivated to reduce food wastage by three main factors, in order of priority a) financial reasons, b) feeling bad and c) environmental concern (NE Waste, 2015), therefore messages should consider addressing these motivations.</p> <p>Examples (based on existing NSW LFHW resources) may include:</p> <ul style="list-style-type: none"> <li>• We're throwing away \$2.5 billion – on average \$1000 per household – every year.</li> <li>• We're wasting more than \$231 million worth of drinks each year.</li> <li>• Every year, NSW households throw away more than 800,000 tonnes of edible food.</li> <li>• Less food waste means less pollution – every plate counts</li> <li>• Be a smart shopper – Write a list and stick to it to save money on your bills</li> <li>• Save time and money - Plan your meals in advance</li> <li>• Know how to store food correctly to keep it fresher for longer - Save yourself time and money.</li> </ul> <p>Other factors to consider in messaging for this audience include:</p> <ul style="list-style-type: none"> <li>• In relation to environmental concerns, families with children display a higher than average concern for the welfare of future generations. Therefore messages incorporating the long-term environmental impacts of food wastage may be influential in engaging this audience.</li> <li>• Families with younger children may be specifically targeted to address food wastage due to fussy eating habits and unpredictable appetites of young children. Particular messages and strategies may include guidance on appropriate food portion sizes for toddlers and pre-schoolers, reducing excess snacking in between meals and recycling uneaten meals through worm-farming or pets.</li> <li>• A high proportion of families appear to be strongly influenced by food discounts and specials, therefore some focus should be placed on raising awareness of the additional costs to the household of uneaten 'specials'.</li> <li>• It may be effective for messaging to relate the dollar value of food typically wasted by a household to a common weekly or annual purchase (e.g. 'the money you save by avoiding food waste could pay for your child's swimming lessons' etc.) (NE Waste, 2015).</li> </ul>
Messages or behaviours to avoid for this audience	<ul style="list-style-type: none"> <li>• It is recommended that communications aimed specifically at males should be avoided. Research indicates that even though many males undertake food shopping for households, females in family households are still the primary food decision-maker and food preparer (Cultural Partners, 2015; NE Waste, 2015).</li> </ul>
Communications channels/mediums most relevant to audience	<ul style="list-style-type: none"> <li>• A project undertaken by NE Waste identified through social research with parents that social media was the preferred method of communication for food-related information, and Facebook was the most popular of these. Instagram and popular bloggers were also identified as useful communications channels used by this audience (NE Waste, 2015).</li> <li>• Several sources have identified school newsletters (for both schools and preschools) as an effective way to engage parents around this issue and disseminate local information (NE Waste, 2015; Lake Macquarie Council, 2015).</li> <li>• Outdoor advertising in the vicinity of school drop-off zones is also effective for reaching parents (particularly mothers) of school-age children in specific geographic locations, such as advertising for a local event.</li> </ul>

Families with children	
Useful support tools	<ul style="list-style-type: none"> <li>Some research indicates that families (particularly women) would make use of everyday prompts such as a fridge magnet outlining correct storage techniques for specific foods, a shopping list notepad with reminders or portion guide measuring tools for the kitchen (NE Waste, 2015; Cultural Partners, 2015).</li> </ul>
Key risks	<ul style="list-style-type: none"> <li>Families are the most significant household type amongst the audience, being 79% overall of respondents surveyed (NSW EPA, 2015b). Meanwhile, families with dependent children under 16 years represent almost a third of all households (NSW EPA, 2012; NSW EPA, 2015b). Therefore, reaching this segment of the audience will be a crucial factor in the success of a food waste avoidance campaign.</li> <li>For families in particular, simply raising awareness about the issue of food wastage is not likely to bring about significant change in behaviour because evidence suggest that a significant proportion of families with children already recognise that food wastage is a problem. For example, 50% of families with children admit that their household wastes food, compared to only 43% of average NSW households, while 20% of families with children admit to wasting much more than they should (compared to 12% of average households) (NSW EPA, 2013). It is clear that addressing the barriers to behaviour change will be crucial to reducing food wastage amongst this segment.</li> </ul>

## 4.3 Younger people

Table 6: High-level communications plan for younger people (approximately 18 to 35 years)

Younger people (18 to 39 years)	
Problem behaviours	<ul style="list-style-type: none"> <li>Younger NSW residents (aged 16 – 24 years) waste a considerably greater amount of food than general NSW households (NSW EPA, 2013). 18 to 24 year olds were found to waste 7.7 litres per week on average (compared to 6.7 litres) in 2009 (NSW EPA, 2012). More recent research estimated the value of food wastage amongst this group at about \$89 per week (compared to \$56 per week average) (NSW EPA, 2013). Meanwhile 25 to 34 year olds also waste more than the average household (about \$63/week) (NSW EPA, 2013).</li> <li>Compared to average households, young people tend to waste more drinks and home delivery or takeaway food (NSW EPA, 2012), probably as a result of purchasing more of these food types than others.</li> <li>Younger people are also more likely to dispose of their food waste to the garbage bin and less likely to be composting or worm-farming or to feed leftovers to pets (NSW EPA, 2012).</li> </ul>
Specific sub-groups to target	<ul style="list-style-type: none"> <li>Share households and students are a sub-group that waste more food than the average household, estimated at 5.8L/week, compared to NSW average of 5L/week (NSW EPA, 2013). Other evidence suggests that on a per person basis, share households are in fact one of the most wasteful of all household types, possibly due to single individuals not sharing food (NSW EPA, 2015b).</li> </ul>
Key influences, benefits, motivations and drivers of target audience	<ul style="list-style-type: none"> <li>Saving money on food bills is a benefit particularly important for young people, and especially share households and students (NSW EPA, 2013).</li> <li>Young people (18–24 year olds) were more likely to shop for fresh produce based on the best value, regardless of whether it is more than they need (20% compared to 15% of respondents of all ages) (NSW EPA, 2012)</li> <li>Research in NSW indicates that young respondents claim to be more concerned than most about food waste (57%, compared to 47% overall). However they are also more likely than the average to acknowledge that they threw away more than they thought they should (24%, compared to 16% overall) (NSW EPA, 2012). Therefore while concern does not necessarily translate into action for this group, self-awareness of wastefulness is a good starting point for behaviour change.</li> </ul>
Reasons for wasting food	<ul style="list-style-type: none"> <li>Young people are more likely than other groups to over-purchase or buy food that never gets used (EPA, 2013).</li> <li>Young people are currently less likely to engage in food waste avoidance behaviours, such as using shopping lists, planning meals, using a budget, controlling portions or cooking the right amount (NSW EPA, 2013).</li> <li>Younger people aged 18–24 and 25–39 years, as well as share households and students are particularly less likely to write a shopping list and plan meals in advance than the average (NSW EPA, 2013; NSW EPA, 2012).</li> <li>Younger people are more likely than the average household to throw away uneaten leftovers. The literature suggests that young people appear to be more precautionary than older people about the longevity and safety of food stored in the fridge or freezer (EPA, 2013). It is also possible that younger people eat fewer meals at home than other types of households.</li> </ul>

<p>Barriers to changing behaviour</p>	<ul style="list-style-type: none"> <li>• Young people appear to have a higher recognition than the average person in NSW that food is a major component of household waste and have more tendency to agree that they waste more than they should (NSW EPA, 2013). Since young people are found to be high wasters, this indicates that there is a clear gap between awareness and behaviour, which may be the result of undesirable attitudes. For example, research indicates that younger age groups have only a moderate level of concern but are less likely to have ‘a great deal of concern’ about the environment in general (NSW EPA, 2015b; OEH, 2013). They also have lower levels of concern about ‘the amount of waste our society produces’ than other age groups.</li> <li>• 51% of young people report the perception that a busy lifestyle makes it hard to avoid wasting food, compared to only 38% of average respondents (NSW EPA, 2013). Overcoming this perception is likely to require conveying that food waste avoidance behaviours can be very simple and may even help to keep a busy person more organised, whilst also saving money.</li> <li>• More than a third of younger people lack confidence in making meals from leftovers and assorted ingredients, a much greater proportion than for older people (NSW EPA, 2013). This is a skills barrier that would need to be overcome in order to improve the reuse of leftovers by these individuals.</li> <li>• Review of the literature indicates that in general, younger people are more likely to report lower knowledge and proficiency in key food management skills, including not checking stocks before shopping, buying too much, not portioning meal sizes correctly, and not knowing appropriate storage methods for foods. This significant skills gap needs to be overcome in order for young people to reduce food wastage, however any skills they do learn are likely to lead to lower wastage in any future family situation they are in.</li> <li>• Evidence suggests that high levels of food waste are generated in share households where individuals purchase and prepare separate meals. This audience may respond well to messages about the financial benefits of sharing food to avoid wastage. Meal planning tools and online shopping also provide simple solutions for this audience to share responsibility for food purchase and management in the household.</li> <li>• Young people are significantly less likely than the average household to recycle food scraps through composting or pets (NSW EPA, 2015b). Barriers to this behaviour may include factors such as the higher likelihood of living in an apartment, a rented dwelling, or moving frequently, resulting in less likelihood of having a garden and lower rates of pet ownership. For this reason, promotion of worm farming should be prioritised for this audience as it is suitable for apartments and is mobile.</li> </ul>
<p>Attributes of effective programs and strategies</p>	<ul style="list-style-type: none"> <li>• The Youth Food Movement (YFM) is currently delivering a LFHW grant project funded by the NSW Environmental Trust, however information on results is not yet available (Pers. Comm., NSW EPA, 2015). The project aims to educate young consumers about food waste avoidance through one-day workshops where participants will learn skills to educate others about food waste avoidance. This train-the-trainer style initiative aims for YFM support workshop attendees to deliver 60 satellite events around Sydney during 2015-16 and create a package of online resources (e-handbook, food skills videos and show-reels) which empower young people to make a difference in their community and share positive stories online through an active and colourful social media presence (OEH, 2015b).</li> <li>• City of Sydney has developed a ‘Clean Streets’ campaign in late 2015 which specifically targets young people 18 – 24 years, particularly students and renters. Key elements include public ‘guerrilla’ or ‘street art-style’ installations and decals. The campaign approach aims to create conversation about the unexpected and comic elements of the campaign. A similar type of approach could be used effectively for a food waste avoidance campaign.</li> </ul>
<p>Key messages to promote to this</p>	<p>Examples of focus areas for young people may include:</p> <ul style="list-style-type: none"> <li>• Promote the amount of money that can be saved through simple, easy habits (e.g. the average young person throws away over \$4,000 worth of uneaten food each year</li> </ul>

## Literature review

audience	<p>– how much money could YOU save by simply using a shopping list?) (NSW EPA, 2013)</p> <ul style="list-style-type: none"> <li>• Only buy the food that you need - shop to a budget and use a shopping list so that you don't buy too much food and then throw it away.</li> <li>• Don't cook too much – use a guide or measuring tool to estimate correct portion sizes for meals</li> <li>• Use recipes ideas to turn leftovers into an easy and cheap new meal</li> <li>• Compare the amount of money that young people waste on unconsumed drinks to the cost of going to a music concert or movie</li> </ul>
Messages, behaviours or strategies to avoid	<ul style="list-style-type: none"> <li>• Tracking research by the NSW EPA in 2012 suggests that young people have more knowledge than other audiences of the meaning of best before and use-by dates</li> </ul>
Communications channels/mediums most relevant to audience	<ul style="list-style-type: none"> <li>• Digital and social media is very effective in engaging with younger audiences about environmental issues. Evaluation of the Victorian 'Get it Right on Bin Night' campaign shows that councils engaged strongly with the social media platforms and this was a factor in resulting behaviour change (SV, 2013).</li> <li>• City of Canada Bay is currently running an Instagram competition, in partnership with several local restaurants, as part of its food waste avoidance program 'Eat Taste Create'. People are encouraged to share a photo on Instagram of their 'low food waste meal' to win a Harris Farm Markets voucher or an 'Eat Taste Create' Kit, promoting tags @canadabay and #EatTasteCreate.</li> <li>• In 2015, the Garage Sale Trail posted a Facebook poll about 'dumping versus donating' that quickly reached 2,500 people and provided a way for Garage Sale Trail to directly engage with participants around a common misconception issue. This approach allowed the team to specifically address incorrect knowledge and perceptions of engaged individuals (Pers. Comm., Garage Sale Trail).</li> <li>• Facebook and Google display advertisements are particularly effective communications channels for younger people to promote environmental causes (Pers. Comm., City of Sydney, 2015; Pers. Comm., Garage Sale Trail, 2015)</li> <li>• Other communications channels that may be suited to younger people and share households include:             <ul style="list-style-type: none"> <li>- Outdoor advertising (e.g. billboards, bus stops and decals) in the vicinity of pubs and clubs and other locations where young people congregate at night</li> <li>- Outdoor advertising (e.g. billboards, bus stops and decals) in high traffic locations such as transport hubs and shopping precincts</li> <li>- Indoor advertising (e.g. in restrooms) in pubs, clubs, sports facilities, entertainment venues and shopping centres</li> </ul> </li> </ul>
Useful support tools	<ul style="list-style-type: none"> <li>• Promoting the use of online supermarket shopping may be a simple and engaging way for young people to learn key skills such as how to develop a shopping list, avoid excess purchasing, stick to a budget and plan meals in advance. The online (and mobile app) interfaces developed for online shopping by the major retailers such as Coles and Woolworths include built-in shopping list functionality, meal plans and a range of other useful tools that could promote waste avoidance behaviours. Woolworths is a major partner of the NSW Love Food Hate Waste program, which may provide an opportunity to work with this retailer on developing a program specifically for young people in the SSROC region.</li> </ul>
Key risks of this audience for ineffective programs and strategies	<ul style="list-style-type: none"> <li>• The Bust Your Food Bills Challenge undertaken in the Hunter region in 2015 identified that the project methods did not reach the key target audience of young people or shared households (Lake Macquarie Council, 2015 unpublished). Methods of promotion included the council website, existing council contact lists, local newsletters, newspaper advertising and community events. It was determined that social media was a crucial tool that would be used in future for engaging younger audiences.</li> </ul>

## 5 DESIRED BEHAVIOURAL OUTCOMES

By examining the state of the 'problem' relating to household kerbside recycling in the SSROC region, and undertaking a SWOT analysis of the campaign in relation to the key target audiences, it is possible to identify a range of outcomes which this communications campaign may aim to achieve.

Behavioural outcomes relate to the key behaviours that SSROC residents should be encouraged to adopt for the reason that these behaviours will have the greatest benefit when adopted and/or will be the easiest to adopt. These can be considered as the ultimate outcomes of the campaign, given that changes in any of these behaviours will have a direct impact on the state of the problem. The ultimate outcomes identified include:

- Reduced overall quantity of food disposed to residual waste at the household level
- Improved food purchasing behaviours (such as meal planning and use of shopping lists) to prevent over-purchase
- Improved food preparation behaviours (such as portion control) to prevent cooking amounts in excess of need
- Improved storage (especially for fresh foods) to prevent unnecessary spoilage and/or disposal
- Improved utilisation of leftovers to prevent disposal of excess food
- Increased participation in home recycling of organic waste through home composting and worm farming and feeding to animals (particularly for unavoidable food waste and contaminated/ disposable paper)
- Reduced disposal of other compostable organic materials (particularly contaminated and disposable paper products)
- Reduced disposal of containerised food and drinks.

Knowledge, awareness and attitudinal outcomes can be considered as intermediate outcomes of the campaign, given that achievement of these will not necessarily have a direct impact on the state of the problem but will be a precursor to adoption of the desired behaviours. These intermediate outcomes include:

- Improved awareness and concern that too much food is wasted
- Improved awareness about the cost to households of avoidable food waste
- Improved awareness that food is the largest component of typical household garbage bins
- Improved awareness about the importance and usefulness of meal planning
- Improved knowledge about the best way to store specific food types
- Increased knowledge of how to use leftover ingredients to make new meals
- Improved awareness about the benefits of home composting
- Improved knowledge about how to access home composting resources
- Increased self-reporting of food wastage avoidance strategies as habits and norms amongst the community.

## 6 CONCLUSIONS AND RECOMMENDATIONS

### 6.1 Summary Findings

In the context of a variety of wastage behaviours at a household level, food wastage is the most significant. Food typically comprises the largest main component of the garbage bin (38% by weight in the SSROC region) and almost half of all households indicate that they buy food that gets thrown away (NSW EPA, 2013).

SSROC households currently dispose of more than 3.6 kg of food per household per week, of which almost two thirds is likely to be 'avoidable' wastage. Effective engagement of households in food waste avoidance behaviours, including buying and cooking the right amounts, storing foods correctly and eating leftovers, could reduce food wastage by about 1.2 kg per household per week. Meanwhile, household adoption of home composting could potentially divert at least a further kilogram of food waste away from landfill per household per week.

Analysis of the available research shows that priority waste materials to address in the SSROC region with regard to food waste avoidance include:

- Bakery items
- Fresh food, including fruit, vegetables, dairy, eggs and meat/fish
- Cooked leftovers
- Containerised food and drinks
- Other compostable organic materials (such as disposable paper kitchen towels)

Key target audiences for the campaign should include:

- people from Culturally and Linguistically Diverse (CALD) backgrounds
- families with children
- younger people aged 18 to 39 years.

Within these groups, individuals who are most likely to make significant efforts in changing their behaviour are:

- mothers and female carers of children (women are still the primary food decision-makers in the majority of households and therefore a higher priority target to engage with the program)
- families with children and on low to moderate household incomes (financial savings are a significant motivation for this group)
- young professionals (this group appear to be in general more highly engaged with food-related issues).

## 6.2 Issues to consider

### Regional communications should be supported by local community engagement strategies

Household-level food waste avoidance behaviours are considerably more complex than many other environmental behaviours, such as recycling. The desired behaviours for avoidance of food wastage require a certain level of knowledge and skill in relation to food management, in addition to effort in planning for food purchase and preparation.

Review of the literature also indicates that, compared to recycling, these desired behaviours are generally less prevalent within the wider community and are not considered social norms at this stage. In order to encourage long-term adoption of more complex behavioural changes, high levels of audience engagement are likely to be required for this campaign.

Successful examples of food waste avoidance projects identified as part of this research have typically involved local community engagement activities, such as workshops and participatory processes, where target audiences are actively involved in learning new skills (for example, cooking classes and demonstrations) or developing support tools suited to their own needs (for example, recipes for using leftovers).

Development of a communications campaign at the regional level should therefore take into consideration that outcomes are likely to be significantly improved if this campaign is supported by implementation of specific community education and engagement strategies for food waste avoidance at the local level, delivered by member councils and/or other local organisations.

### Improved linkages between 'Composting' programs and 'Food Waste Avoidance' programs

As most households will never achieve avoidance of 100% of avoidable food wastes, it is advisable to co-promote both avoidance and home composting messages. This requires clear linkages between the state-wide Love Food Hate Waste program and the regional Compost Revolution program, helping residents to understand the differences between avoidable and unavoidable food wastes and to manage these accordingly through both prevention and home recycling.

Research by WRAP UK has shown that confusion is caused among residents by promoting different methods of dealing with food waste (e.g. should the resident avoid the waste, or is it ok to compost it). Therefore the "joining up" of messaging, in alignment with the 'waste hierarchy' should reduce confusion, acknowledging that not all food waste will be avoided, and that home composting is preferable to disposing.

## GLOSSARY

Term	Definition
Captives	'Captives' are a segment of respondents identified under recent NSW EPA research (NSW EPA, 2015b). They comprised 17% of respondents and are defined as those who recycle even if it requires additional effort, although they are not, or just a little, concerned about environmental problems. They are labelled 'captives' because they indicate that they carry out the desired behaviours, although they do not seem to care much about doing so: they are engaging half-heartedly in the 'correct' behaviour without motivational drive. This indicates that they are at risk of stopping at any time. Captives are slightly more likely to be male, older, living in a rural area and to have achieved a secondary level of education only.
Champions	'Captives' are a segment of respondents identified under recent NSW EPA research (NSW EPA, 2015b). They comprised 26% of respondents and are defined as those who recycle even if it requires additional effort and who are concerned a great deal about environmental problems. They are the most 'environmentally friendly' and are more likely to be older and have a university education.
Culturally and Linguistically Diverse Communities (CALD)	'Culturally and Linguistically Diverse' is a broad descriptor for groups and individuals who differ according to religion, race, language and ethnicity, but excluding those whose ancestry is Anglo-Saxon, Anglo Celtic, Aboriginal or Torres Strait Islander.  Social research which is referenced in this study (particularly NSW EPA, 2015b) reports findings for respondents under the CALD profile. It is understood that this for the purpose of this research, the CALD profile includes people who are not proficient in reading, writing and/or speaking English as well as those who have originated from a non-English speaking background but are now proficient in English.
Diligents	'Diligents' are a segment of respondents identified under recent NSW EPA research (NSW EPA, 2015b). They comprised 39% of respondents and are defined as those who recycle even if it requires additional effort and who are concerned a fair amount about environmental problems. This segment is relatively 'environmentally friendly' and are more likely to be female, living in a metropolitan area, earning a high income and aware of EPA initiatives.
Garage Sale Trail	Garage Sale Trail is a national program that promotes reuse, waste education and community building. It was delivered locally in 2015 by 164 councils and state governments in partnership with Garage Sale Trail.
Good intentions	'Captives' are a segment of respondents identified under recent NSW EPA research (NSW EPA, 2015b). They comprised 10% of respondents and are defined as those who do not recycle or who recycle only if it does not require any additional effort, but are concerned (a great deal or a fair amount) about environmental problems. They are labelled as 'good intentions' because they indicate that they do care about the environment and recycling, but they do not carry out the desired behaviours; there are some barriers stopping them from translating goodwill into action. This leads them to being a risky segment, and one that will benefit from outreach work (to give a better understanding of their motivators, drivers and barriers). Those with good intentions are more likely to be male, aged 16–29 years, living by themselves or in a group scenario, and living in an apartment.
Hard-to-reach	'Captives' are a segment of respondents identified under recent NSW EPA research (NSW EPA, 2015b). They comprised 8% of respondents and are defined as those who do not recycle or recycle only if it does not require any additional effort and are also not, or just a little, concerned about environmental problems. This segment are labelled as 'hard-to-reach', because they indicate that, to a certain extent, they are switched off to waste issues. That is, they indicate that they do not care about the environment and recycling and equally do not carry out the desired behaviours. Those who are 'hard-to-reach' are more likely to be younger (aged 16–29 years), on lower incomes, working in a trade-based profession, and without access to a car.
Kerbside Clean-up Services	Services provided to households whereby residents can place bulky, non-putrescible items which would not normally fit into a kerbside bin onto the kerbside for collection.

Term	Definition
Kerbside Waste Stream	The kerbside waste stream includes domestic residual waste, recyclables, organic and clean-up waste collected on the kerbside.
Mechanical biological treatment (MBT)	A material recovery facility that combines a sorting facility with a form of biological treatment such as composting or anaerobic digestion.
Multi-Unit Dwellings (MUDs)	A number of dwellings (whether attached or detached) on one lot of land. Apartments are defined as dwellings which have one or more dwellings or buildings (excluding a garage or carpark) above or below. Houses are defined as attached or detached with access at ground level.
Performance	Performance refers to the recovery performance of the kerbside recycling system. Key performance indicators specifically considered in this research include the overall rate of waste diversion from landfill (i.e. percentage by weight of materials recovered versus landfilled), the level of gross contaminants (i.e. percentage by weight of non-recyclable materials measured in the recycling stream) and the 'reverse contamination' (percentage weight of recyclable materials measured in the residual waste stream). There are a number of other indicators often used by local and state governments to benchmark recovery performance, however these were not specifically considered in this research.
Single-Unit Dwellings (SUDs)	A single dwelling house is one individual (separate or attached) dwelling house on a separate lot. Examples include separate detached houses, one of a pair of semi-detached houses or a single attached house (townhouse) where each dwelling is separately titled, though they may share common infrastructure.
Waste Less Recycle More	Waste Less Recycle More Initiative is a 5-year \$465.7 million package to transform waste and recycling in NSW. Through hypothecation of the waste levy, WLRM provides funding for business recycling, organics collections, market development, managing problem wastes, new waste infrastructure, local councils and programs to tackle illegal dumping and litter

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