



# Events Recycling

Assessment of solid waste management  
at the 2010 Perth Skyworks



**Waste Authority**

**Regional Funding Program**





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28 May 2010



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## Glossary of Terms and Acronyms

Commingled recycling	Common recyclables, mostly packaging; such as glass, plastics, aluminium, steel, liquid paper board (milk cartons). Commingled recycling may include paper but often, and particularly in offices, paper and cardboard are collected separately.
Compactor	In commercial buildings, industrial compactors are used to literally 'compact' or compress the waste material into a smaller volume to allow for optimal use of space.
Composting	The biological process that turns organic material into a useful soil additive. This process diverts organic material from landfill and so prevents the production of methane (a powerful greenhouse gas).
General Waste	Material that is intended for disposal to landfill (or in some States, incineration).
Inert	Non-hazardous, non-biodegradable (half-life greater than 2 years) wastes containing contaminant concentrations less than Class I landfill acceptance criteria but excluding paper and cardboard (paper and cardboard are biodegradable materials and are therefore considered as putrescible waste)
MGB	Mobile Garbage Bin – A wheeled bin with a lid often used for kerbside collection of waste or recyclables. (Often called a 'wheelie bin').
MRF (Materials Recovery Facility)	Sorting facility where commingled recyclables are sorted into materials streams, baled and sold to market. MRFs in Perth often rely upon a combination of manual sorting (hand-picking) and mechanical sorting using trommels, magnets and screens.
Organic waste	Separated food and/or 'green' material (e.g. grass clippings or vegetation prunings).
Public Place Recycling	Permanent recycling facilities available to the public users of an area. Normally placed near standard litter bins, the recycling bins usually have clear colour-coding and signage indicating the materials accepted in each bin. Public Place Recycling is different to Event Recycling, which is the provision of <i>temporary</i> recycling infrastructure.
Putrescible	The class of waste that contains biodegradable material (including general mixed waste from dwellings or commercial buildings)
Recyclable	Material that can be collected separately from the general waste and sent for recycling. The precise definition will vary, depending upon location (i.e. systems exist for the recycling of some materials in some areas and not in others).
Recycling	The process of diverting materials from landfill and processing the materials into new products.



## Executive Summary

Mindarie Regional Council (MRC), with the cooperation of the City of Perth, commissioned Encycle Consulting to undertake a full solid waste assessment of the 2010 Perth Skyworks event on Australia Day 2010. The assessment was commissioned in response to a commitment from MRC and the City of Perth to improve their waste management practices and to support the preparation of waste management and recycling guidelines for large, public events.

This assessment is part of the Western Australia Waste Authority pilot phase of the Regional Funding Program (RFP) for local government. The RFP is based on the concept of regional collaboration, bringing together two or more local governments who share common goals and objectives for improving waste management and resource recovery practices. The RFP is based on the Strategic Waste Management Plan (SWMP) initiative by using priorities identified within the SWMPs to form the basis of investment through the RFP

MRC and the City of Perth recognise the importance of effective waste management and bin infrastructure for events to ensure litter reduction, prevention of litter pollution into waterways and environmentally sensitive areas, and effective resource recovery.

The methodology for this project involved conducting a visual waste assessment of waste and recycling skips during the day of the Perth Skyworks event (from 3:00pm to 10:00pm) and the following morning (from 5:00am to 7:00 am). Three Encycle auditors patrolled the three event areas (Perth Esplanade/Supreme Court Gardens, Langley Park and South Perth Foreshore). Behaviour associated with skip use and littering was recorded using a standard data sheet. Encycle designed a short face to face attitudinal survey which was conducted by the Mindarie Earth Carers on the day, throughout the event areas.

The key findings from the assessment of the waste systems, behaviour and attitudes were that:

- 🌱 Attendees at the event generally think that recycling is important and would like to see the opportunity to recycle offered
- 🌱 Attendees at the event did not understand the different bin types or the materials that could be recycled
- 🌱 Skip bins are not an effective way of collecting either waste or recyclables from a public event. Skips are not widely used by the public, who still look for wheelie bins or public litter bins. Skips do not encourage good recycling habits, can have health and safety risks and are difficult to place clear signage on
- 🌱 Recycling messages were only verbally communicated by the Keep Australia Beautiful team with the Scouts and the Mindarie Earth Carers; opportunities for clear, consistent messaging about the recycling options at the event were missed



## Introduction

This report describes an assessment of the effectiveness of waste and recycling systems for the 2010 Australia Day Skyworks event on the 26<sup>th</sup> January at the Perth Esplanade (including Supreme Court Gardens), Langley Park and South Perth Foreshore.

Encycle Consulting conducted a visual assessment of all 'waste stations', composed of two skips (one general waste and one recycling) located throughout the event locations, as listed above. A behaviour assessment was also conducted to gauge use of the bins and litter and waste disposal behaviour. This information was collated, along with survey results from the Earth Carers 'face to face' attitudinal survey to create a detailed understanding of the perceptions and attitudes towards event recycling and the Skyworks system in particular. The issues and barriers relating to recycling at the Skyworks events have been noted and collated. A suite of recommendations are provided in this report.

### 1.1 Waste - an environmental issue

General waste generated from the Perth Skyworks event is classified as 'municipal, putrescible waste' and is disposed to a licensed Class II or III landfill in the Perth area. Landfills impact upon the environment in the following ways:

- 🌱 In landfill, as waste decomposes it can produce methane, a potent greenhouse gas. Landfills can also be sources of groundwater contamination, vermin attraction and nuisance to local residents due to noise and odour
- 🌱 Even after completion, landfills continue to decompose and settle. It is not possible to build permanent structures, so the land is generally unavailable for many uses, post-closure.
- 🌱 Once in a landfill, the materials mined, transported, processed or manufactured to create products are lost as a resource. This represents poor efficiency and a lack of sustainability.
- 🌱 The energy required to manufacture a product from 'new' materials is generally substantially higher than when using recycled feedstock. The energy reduction from recycling can reduce the carbon impact of an organisation.

According to the Packaging Stewardship Forum (PSF) Events Recycling Program: *"following the success of more effective and efficient kerbside recycling systems provided to householders over the past decade, there is widespread support for, and interest in, recycling at public places, events and venues. Recycling is an environmental issue that the community are engaged with and generally expect that local government will deliver the opportunity to recycle."*

### 1.2 Waste Management Policy in Western Australia

The Western Australian State Government has committed to a policy of "Towards Zero Waste". This means that activities to promote recycling and waste minimisation are encouraged. New legislation was enacted in 2007: the *Waste Avoidance and Resource Recovery Act 2007*



(WARR Act), which provides State Government with greater powers to require reporting and enforce regulations that will drive the reduction of waste to landfill. The State Government of WA, and most international governments, adopt a hierarchy of preferred waste management options which are: Avoid, Reduce, Reuse, Recycle, Dispose.

Historically, waste management fell under the jurisdiction of the Health Department as it was mainly associated with health and safety risks. The WARR Act (2007) places waste management firmly under the remit of the Department of Environment and Conservation in Western Australia.

As space for landfills around the Perth area decreases, the cost of sending waste to landfill is going to increase rapidly. Finding alternative solutions for large generators of waste will become a high priority. Reducing waste to landfill is not only socially and environmentally responsible, it is economically sensible and forward-thinking.

Current waste disposal costs in Perth are relatively inexpensive compared with other States in Australia. The landfill levy for putrescible waste rose on 1<sup>st</sup> January 2010 from \$8 to \$28/tonne on top of the existing ~\$70/tonne gate fees. The remaining space in Perth's metropolitan landfills continues to decline. The decline in space will place upward pressure on the cost of disposing waste to landfill.

### 1.3 Background

The Perth Australia Day Skyworks Event is held annually, normally attracting upwards of 350,000 people to the Perth Esplanade, Supreme Court Gardens, Langley Park, and South Perth Foreshore. With numerous food stalls available and picnics brought to the event, the generation of waste is significant.

Historically, there has been widespread alcohol consumption during the day of the event. This year the Perth police department acquired special powers to prevent alcohol being consumed at the foreshore area. The banning of alcohol was observed to significantly reduce attendance by at least 50,000 people<sup>1</sup>. With the reduction in people attending the event and the lack of alcohol, the quantity of waste generated would have been significantly lower than in previous years.



Green bin (with yellow writing) for recycling and blue bin for general waste

<sup>1</sup> [www.watoday.com.au/wa-news/booze-crackdown-sees-fewer-people-fewer-arrests-at-australia-day-skyworks-20100127-mxms.html](http://www.watoday.com.au/wa-news/booze-crackdown-sees-fewer-people-fewer-arrests-at-australia-day-skyworks-20100127-mxms.html) cited on 9th February, 2010



The 2010 Australia Day Skyworks event waste management systems consisted of:

- Approximately 160 pairs of 2m<sup>3</sup> skips around the main foreshore areas in the city (a blue one for waste and a green or yellow one for recycling). Skips had spray-painted standard signage (see photo above).
- Biodegradable plastic bags given out to the public by the local Scouts, coordinated by the Keep Australia Beautiful team. Red bags were intended for general waste and yellow bags for recycling. Scouts were briefed on what could and could not be placed in recycling bags.
- Three recycling compounds (one at each of the foreshore locations) where Mindarie Earth Carer volunteers would give out prizes to people who brought back yellow bags filled with recyclables. The recycling compounds had a sealed off area with skips for deposited sorted, clean recyclable material (having removed plastic lids from bottles and other contaminants such as straws/food).
- An Earth Carer volunteer wearing a 3-4 metre 'recycling man' costume which was constructed by the Earth Carers walked around the Esplanade area advertising the recycling systems

## 2 Project objectives

The aim of the project was to provide MRC with an assessment of the effectiveness of the collection systems and public perceptions and behaviours relating to waste and recycling at the 2010 Australia Day Skyworks event, with a view to improving upon the effectiveness of the system in future years.

The objectives of this project were to:

- 🌱 Understand public perception of waste collection services
- 🌱 Understand the problems and opportunities relating to the existing system
- 🌱 Reduce waste to landfill and increase recycling from the event
- 🌱 Decrease litter at the event
- 🌱 Respond to community expectations regarding recycling and waste management

## 3 Methodology

The approach to achieving the aims of this project was to collect all relevant and necessary information on the day of (January 26, 2010) and the day after (January 27, 2010) the Skyworks show. Encycle undertook four main tasks to complete the project aims and objectives. The methodology for designing the survey and conducting the waste and behaviour assessments are detailed below.



- 🌱 **Task 1:** Design a short face to face survey for delivery by the Mindarie Earth Carers to understand attitudes towards waste and recycling collection systems at events like Skyworks
- 🌱 **Task 2:** Undertake a visual assessment of quantities of waste and recycling in the skip bin collection systems both during and after the event and undertake an assessment of common behaviours associated with waste disposal at the event.
- 🌱 **Task 3:** Visit the recycling facility where recyclables from the event were processed and assess the effectiveness of the event recycling systems
- 🌱 **Task 4:** Analyse data and provide recommendations to improve recycling rates and reduce waste to landfill
- 🌱 **Additional Task:** Provide recommendations on the draft 'MRC Guide to WasteWise Community Events'

### 3.1 Task 1: Survey design and implementation

The survey contained 11 short, closed-ended questions regarding event attendees' perception and opinions on the waste and recycling systems. The survey was conducted by the Mindarie Earth Carers. The responses were not prompted but answers were recorded according to the closest option available. The survey was designed to be completed in a couple of minutes and designed so that the responses were easily recordable and analysed. The survey, (see Appendix A) also contained questions to capture broad demographics (age group, sex, nationality) of respondents and their habits about recycling at home.

### 3.2 Task 2a: Visual assessments (audits) and observations - during the event

Visual assessments of the contents of both the recycling and general waste skip bins were conducted during the event on 26<sup>th</sup> January 2010 (between 3:00pm and 10:00pm) and after the event on the morning of 27<sup>th</sup> January 2010 (between 5:00am and 7:00am). The assessments were conducted by three experienced auditors who used consistent techniques to assess bin contents. The event site was segmented into three areas and one auditor was assigned to each area (Perth Esplanade including Supreme Court Gardens, Langley Park and South Perth Foreshore). The data collected by each auditor included the following:

- 🌱 Bin number (and location as marked on a site map)
- 🌱 Time of assessment
- 🌱 Approximate waste quantity (cubic metres estimated as a percentage of total bin)
- 🌱 Approximate percentage (by volume) of general waste
- 🌱 Approximate percentage (by volume) of plastic bottles
- 🌱 Approximate percentage (by volume) of glass



- 🌱 Approximate percentage (by volume) of paper/cardboard
- 🌱 Approximate percentage (by volume) of aluminium cans
- 🌱 Approximate number of yellow bags
- 🌱 Approximate number of red bags
- 🌱 Additional notes regarding unusual items disposed or other observations
- 🌱 The presence of alcohol beverage containers (to monitor the effectiveness of the alcohol and glass bans issued for this event)

Observations of skip bin-use behaviour were made during the event. This information was recorded in a standardised format so that the results could be interpreted to provide a guide as to the behaviour types and broad demographics, rather than simple 'ad hoc' observations. Data that was collected regarding bin-use behaviour included:

- 🌱 Skip bin location and time of bin use
- 🌱 Estimated age (within 3 broad range categories) and gender of bin user
- 🌱 Extent to which bin user seeks to use the correct bin (i.e. obvious attempt made to identify correct bin)
- 🌱 Levels of contamination in the recycling bin and if this appears to impact upon behaviour
- 🌱 Were materials ultimately placed in the correct bin (and if this was intentional or not)

Littering behaviour was also noted, and information relating to broad demographics (age, gender and number/type of other people in the group) and type and quantity of litter was recorded.

During the event, the three auditors made observations of event attendees' behaviours in relation to the use of the three recycling compounds. The operation of the recycling compounds was observed for effectiveness (including condition of the material being collected), efficiency, signage and adequateness of staff/volunteers. The effectiveness of using biodegradable bags for litter collection was also observed.

Observations of general littering behaviour and recycling compound use were recorded as short comments from which some general conclusions could be drawn. The information on demographics and behaviour will be useful in developing a communication strategy for future events.

### 3.3 Task 2b: Visual assessments (audits) and observations – post event

An inspection of the event site was conducted by two Encycle auditors between 5:00am and 7:00am on 27<sup>th</sup> January 2010. The auditors assessed the three defined foreshore areas to make broad observations on the following key aspects:

- 🌱 Level and type of litter
- 🌱 State of the recycling compounds



- 🌱 Quantity of waste and recycling and level of contamination in skip bins
- 🌱 Observed or potential environmental impacts from waste generated as a result of the event (e.g. litter observed in the river, in garden beds and associated hazards to fauna)
- 🌱 Presence of unusual and/or hard-to-deal-with waste materials/items

### 3.4 Task 3: Site visit and assessment of recycling facility

The original scope for this project included a site visit and visual assessment of recyclable material going to the Instant Waste Management facility. Unfortunately, the visual assessment of material could not be completed as access to the recycling facility was not provided at the time when recyclables were being sorted.

### 3.5 Task 4: Analysis of data received from waste disposal and recycling facilities

Data for the visual waste assessments, the behavioural assessments, general observations of littering and bin system design and for attitudinal surveys was recorded on data sheets. Information from the data sheets was transferred into Excel spreadsheets for verification and analysis. The results, as presented in the *Key Findings Section* (section 4) of this document provide the basis for the recommendations for waste and recycling management systems for future Skyworks events.



## 4 Key findings

### 4.1 Solid waste and recycling visual assessment

#### Location and amount of waste and recycling in receptacles

The 2010 Skyworks had a significant reduction in attendance compared to previous events which was likely to be caused by the strict enforcement of alcohol bans throughout the event area. It is probable that the reduced numbers and the lack of alcohol around the foreshore areas resulted in the underutilisation of a large proportion of the bins.

The adjacent photo shows the contents of a typical recycling skip bin during the day of the Skyworks event. Note that there is not much material in the skip bin, there are some recyclables but there is also a fair proportion of contamination, particularly from food and beverage containers and wrapping.

The figures in Table 1 show that on average, the waste and recycling bins were less than half full after the completion of the Skyworks event.

It is interesting that while all skip bins were under-utilised during the event, there was generally more material placed in the waste skips than in the recycling skips.

During the event, the permanent standard public place litter bins were quickly filled with waste. By the end of the event (between 9:00pm and 10:00pm, public litter bins were overflowing, while skips remained relatively under-used (see photo).



Contents of typical skip bin



Overflowing permanent litter bin



Table 1: Average proportion that the general waste and recycling skips were filled, prior to and after the fireworks display and the percentage of the material in the skip that was recyclable (note that red and yellow collection bags make up the remaining percentage of the bin). The percentages are not given as the actual contents of the bags were not assessed.

	General waste bins			Recycling bins		
	Proportion of bin used	Proportion waste	Proportion recyclables	Proportion of bin used	Proportion waste	Proportion recyclables
<b>Before fireworks (&lt;8pm)</b>	5%	70%	14%	3%	48%	34%
<b>After fireworks (8-9pm)</b>	50%	74%	15%	35%	54%	29%



Waste from food vendor placed into recycling skip bin

The results from the visual bin assessments show that areas close to food vendors often had insufficient general waste bins and skips. The food vending areas were not provided with their own bins and this resulted in the vendors themselves using the public bins (see photo).

Many of the skip bins located close to residential areas (e.g. in South Perth) were often filled with general household waste which appeared to have been placed in the bins prior to the event (i.e. on the 4-5 days earlier (including over the weekend prior) when the skips were set out).

**Contamination**

The results of the visual assessments revealed a high contamination rate of general waste in recycling skips and also lost recyclables in general waste skips. The results shown in Table 2 are based on the visual assessments of the total contribution of general waste and recyclables in both skip types. Recycling skips were observed to be filled with equal amounts of recyclables and general waste. On average, general waste skips were found to contain a majority of general waste (72%) but also contained significant amounts of recyclables (28%).



Waste and recycling skips were mostly positioned together (one bin of each type). The placement of bins in pairs is good practice that should be used at events to encourage the separation of recyclables from general waste. When recycling and general waste bins are not paired, or are placed with large distances in between contamination of recycling streams is likely to be much higher. In some areas of the foreshore the bins were not paired and high levels of contamination of lone recycling bins were observed (see photo).



Single general waste bin - not paired with recycling bin

**Table 2: Average proportion of general waste and recycling skips filled with general waste and recyclables**

	General waste skips	Recycling skips
Proportion of bin filled with general waste	72%	50%
Proportion of bin filled with recyclables	28%	50%

General observations of skips in the early morning after the Skyworks event identified two main findings, which are discussed in more detail later in this section:

- Contamination of recycling skips was significantly worse than they had been observed during the day of the Skyworks event (i.e. prior to 8:00pm)
- There was a significant amount of 'non-event' waste likely to have come from local residents or small commercial operators (in both waste and recycling skips)
- Food vendors contributed a significant amount to the public place skip bins



### Disposal of red waste and yellow recycling bags



Recycling bin showing contamination of red (general waste) disposal bags

The data in Table 3 show that yellow and red disposal bags were more commonly disposed after the fireworks display. It is likely that most people used the bags for collection of material during the day and then disposed of the bags into skips upon leaving the event. Between 8:00 – 9:00pm, recycling skips were observed to contain on average 5.6 general waste bags and 6.3 recycling bags (see photo). This finding suggests the public had a low awareness of the correct use and disposal of the yellow and red bags.

Table 3: Average number of yellow and red bags in general waste and recycling skips before and post the fireworks display

Recycling skips	Average number of general waste bags (red colour) observed in recycling skips	Average number of recycling bags (yellow colour) observed in recycling skips
Photo 1: Recycling skip with red (waste) and yellow (recycling) collection bags		
Before the fireworks (<8pm)	1.5 bags	1.6 bags
After the fireworks (8-9pm)	5.6 bags	6.3 bags
General waste skips	Average number of general waste bags (red colour) observed in general waste skips	Average number of recycling bags (yellow colour) observed in general waste skips
Before the fireworks (<8pm)	1.5 bags	7.5 bags
After the fireworks (8-9pm)	4.7 bags	12.1 bags



## Recyclable materials collected

The visual assessments of recyclable material included an assessment of the proportion of each material (paper/cardboard, aluminium, glass and plastic) present in the recycling and waste skips. Table 4 shows the estimated average volume of each recyclable material type present in the skips during the event (note these are broad estimates only – see Data Limitations, Appendix B for more details). Plastic (types 1, PET and 2, HDPE) constituted the highest proportion of recyclable material in the recycling skips, followed by paper/cardboard, aluminium and glass. In the general waste bins paper/cardboard was the most common recyclable material present, followed by plastic, aluminium and glass.

Recyclable plastics were classified as type 1 (PET) and type 2 (HDPE) for the purposes of this study since these are the most commonly recyclable plastics likely to be found at public events. During the visual waste assessments, the auditors observed that the majority of 'recyclable' plastics at the event were type 1 (PET) rather than type 2 (HDPE). Since type 1 plastics are used for soft drink and water bottles, this observation is not surprising. There are no data to support these observations.

It is likely that the low volumes of glass and aluminium were a result of the alcohol ban and the advertising of the event as being 'glass-free'. It is possible that the alcohol ban would have resulted in an increase in the generation of non-alcoholic, plastic beverage containers.

**Table 4: Average volume of recyclables observed in recycling and general waste skips**

	Recyclables observed in general waste skips – volume (L)	Recyclables observed in recycling skips – volume (L)
PET and HDPE Plastics	86	11
Glass	1	0.5
Paper/cardboard	4	18
Aluminium	2	3

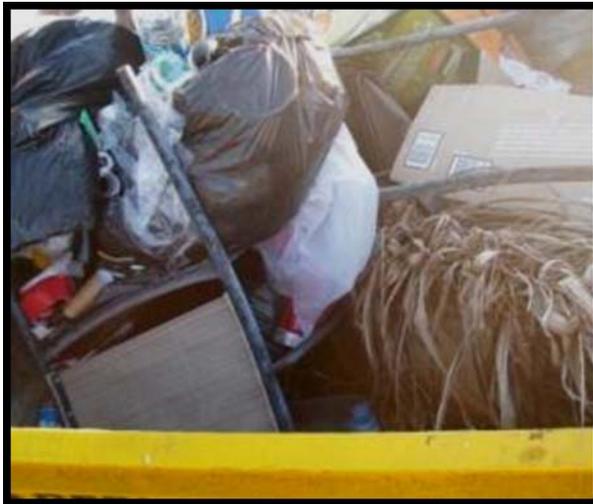
## Unusual items found in the public place skips

Early visual waste assessments during the day of the Skyworks Event identified a number of bins that had been used for residential waste such as electronic goods, clothes, garden prunings and general garbage (see below photos).

The morning following the event, there was a significant number of camp chairs, a few gazebos and a few small dome tents found in the skip bins (see below photos).



It seemed that many of the skips (for both waste and recycling) had previously been used for builders waste. Some of the recycling skips had builder's rubble in the bottom of the skip which was probably not suitable material to be entering a materials recovery facility (MRF).



Skip bin with household waste



Skip bin with tent



Skip bin with electronic waste



Skip bin with household clothes

## Littering

The alcohol ban combined with a reduction in attendees at the 2010 Skyworks event significantly reduced the amount of litter. During the visual waste assessment only three incidents of littering were recorded by the auditors during their



Litter during the afternoon of the Skyworks event

patrols (see photo). The massive reduction in litter volumes was confirmed during discussions with the contractor responsible for litter collection, Path Waste.



Litter located on the foreshore

Relatively small amounts of litter were observed at the site during the morning after the Skyworks event. Path Waste had been collecting litter during the event and were on-site again during the early hours of the following day. The most problematic littering was caused by seagulls and crows pulling material out of skips, particularly on the South Perth foreshore area.

Some small amounts of litter were observed to have entered the river after the Skyworks event although this was not found to be a significant amount (see photo). Only visual observations of litter in the river were possible, so the extent to which litter was thrown from boats during the event could not be evaluated.

#### 4.2 Attitudinal assessment

A total of 443 people were interviewed by the Mindarie Earth Carers for the attitudinal survey. The interviews were conducted with approximately equal proportions of men (44%) and women (56%). A wide range of age groups were interviewed (see table 5), which was felt to be broadly representative of the people attending the Skyworks event. The majority of participants resided in Perth (67%), the remainder were from W.A. (23%), another State (2%) or overseas (8%).

Table5: Age group of participants in the survey

Age group	% of total interviews
<20 years	33%
20-35 years	38%
36-50 years	21%
+50 years	8%

Over 70% of respondents stated that they always recycle at home. The high self-reported rate of recycling suggests the majority of interviewees were engaged and interested in recycling.

79% of respondents stated they thought it was 'very important' that recycling activities were offered at the Skyworks event (figure 1). Under a quarter (24%) of respondents stated they had observed recycling facilities at previous Skyworks events. The majority of respondents (48%) stated they had only noticed recycling facilities this year.



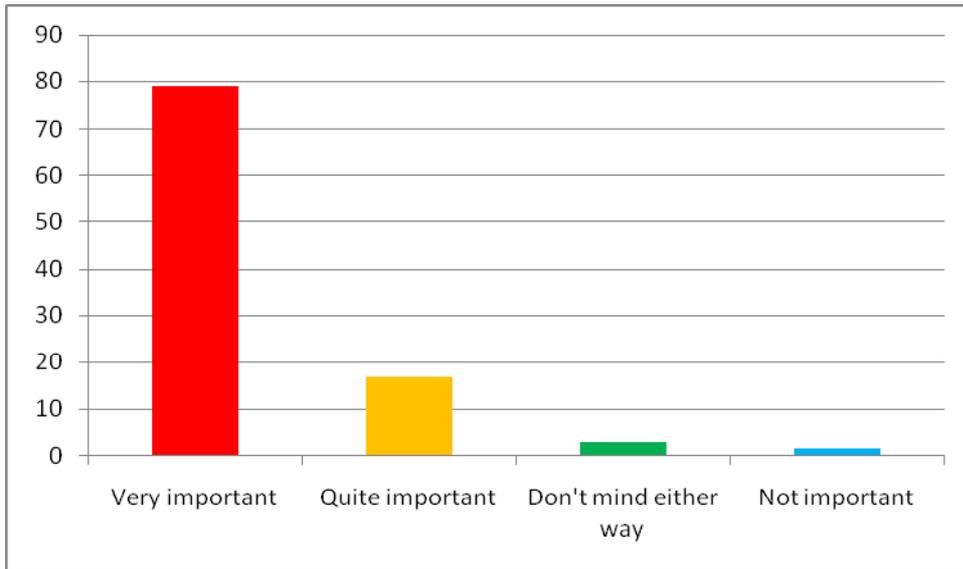


Figure 1: Response to question - "What do you think about being able to recycle at events like Skyworks?"

The awareness of the rewards for collecting recyclables was quite low, only 8% of respondents stated they were aware of the rewards. Should the rewards for recycling be run in future events, greater emphasis on raising awareness will be required. Observations of the use of recycling bags to collect rewards found that children were the keenest participants in the system. Children were observed moving from one picnic group to the next asking people for their cans and other drink containers for collection in the yellow bags. These were then taken to the Recycling Zone and the children enjoyed receiving a reward.



Young boy attempting to reach recyclable in skip to collect 'rewards'

It was anecdotally noted that rewards may have resulted in perverse outcomes, for example children were observed 'diving' into skip bins to collect recyclables (see above photo). Encouraging people to collect recyclable materials at future events will need to be carefully managed to avoid health and safety risks. The concept of rewarding people for recycling (and also for not littering) is a positive one and it is good to engage people in the act of recycling. There are however, various risks that need to be carefully managed. The main potential concerns relating to asking members of the public to collect waste are:

- 🌿 Cuts from sharp objects such as broken glass
- 🌿 Needle-stick injuries with the associated risk of exposure to disease



- 🌿 Falls or other injuries associated with climbing into skips
- 🌿 Contracting diseases from handling potentially contaminated food or other wastes without washing hands afterwards

Professional litter pickers use special 'grab' equipment and would generally wear personal protective equipment (PPE) such as needle-proof gloves when dealing with waste. Encycle believes that there may be an opportunity to use the recycling rewards system to keep litter levels down and increase the collection of 'clean' recyclables. However, the method of collection needs to be considered carefully in the context of the associated risks.

The use of the general waste and recycling bags was found to be low, with only 6% of the survey respondents stating they had used the bags. An additional 54% stated that they intended to use the bags later on in the evening. There was no follow-up survey to confirm if this attitude translated into actual behaviour.

Half (50%) of respondents stated that they found the signage around recycling bins to be very clear and easy to understand. A further 30% of respondents found the signage to be somewhat clear. This suggests greater emphasis on signage should be promoted for future recycling activities at the Skyworks event. It is not obvious from the responses to the questions about signage if the interviewers were likely to have drawn attention to the existence of two different skip types with different signage or not. This question would probably have been improved if it had asked specifically if the signage made it clear which items should have been placed into which bins.

A high majority (86%) of respondents stated they believed that recyclables are sent to recycling facilities for recovery. Only 4% reported that they thought the recyclables would be sent to landfill (see figure 2). This finding shows the public have a high expectation of the City of Perth and MRC ensuring that all recyclables are sent to a recycling facility.

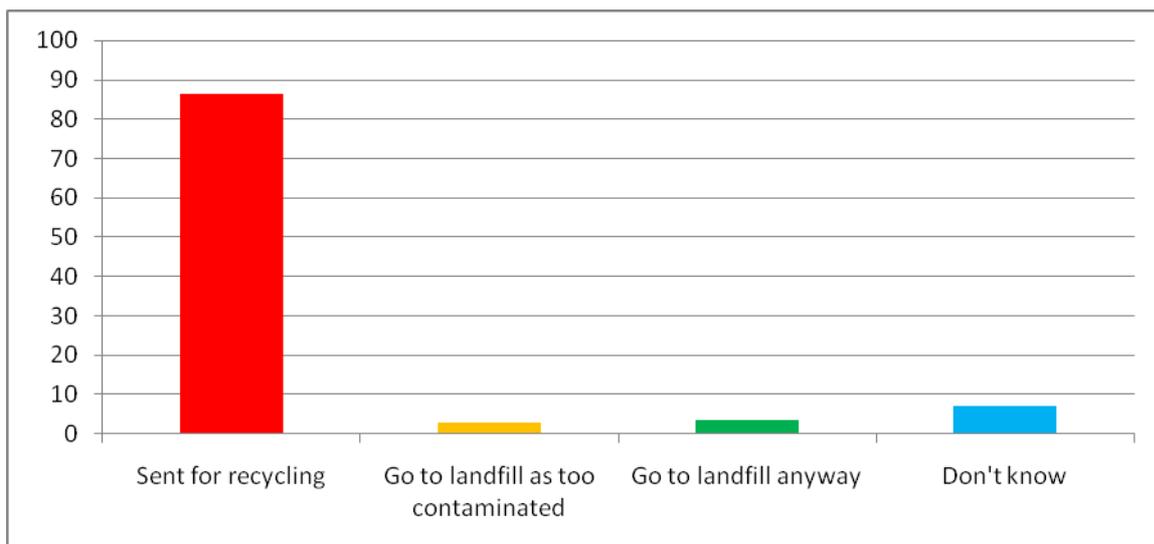


Figure 2 : Responses to the survey question: "What do you think happens to the recyclables after they leave the site?"



### 4.3 Behavioural assessment

The behavioural assessments made during the day at the Skyworks event found that only 3% of the people observed disposing of waste appeared to view the signage before placing their waste into a skip. Rather, people were more likely (31%) to review the contents of a skip bin before making a decision as to which bin to dispose of their waste or recyclable material (see see photo).



**Member of public trying to decide which skip to dispose of his waste**

Under one-third of people (31%) were observed to actively separate waste from recyclables before disposal. However, a proportion of these people (10%) who were observed to separate their materials made the incorrect selection of skip (i.e. putting recyclables into a general waste skip or vice versa). A high proportion of people (38%) appeared to make no attempt to separate or place waste into the correct skip.

The findings are consistent with the high levels of contamination observed during the waste assessment. The patterns of behaviour observed at the event suggest that greater awareness-raising, better signage and careful bin system design could support correct behaviour in recycling at future Skyworks events.

### Anecdotal observations of behaviour and use of bins and bags

#### Recycling Zones

There were three recycling zones set up around the foreshore area (Perth Esplanade, Langley Park and South Perth) (see photo). The Earth Carers have produced a full report for City of Perth and MRC regarding the effectiveness of these areas (Appendix C). Observations made by the Encycle auditors are recorded here as a supplement to the Earth Carers' report.



**One of the three recycling stations**

Different coloured and clearly signed biodegradable bags were handed out to event attendees to collect recyclables and rubbish during the event by Scouts organised by Keep Australia Beautiful. Once filled, the yellow recycling bags could be handed in at the recycling zones to obtain rewards.





Red and yellow bags located after the Skyworks event

In areas close to the Recycling Zones, there was a good level of engagement and people actively used the yellow bags to collect recyclables to earn 'rewards'. In areas that were not within sight of a recycling zone it appeared that people did not know about the rewards option for collection of recyclables (see photo). The Recycling Zone was useful as part of the promotion of the concept of recycling to the public.

In the Langley Park and Esplanade areas, the Earth Carers had a large 'Recycling Man' puppet (see photo) that walked around and advertised the concepts of recycling. The puppet was guided by Earth Carers who were able to answer questions and speak to the public about recycling. Unfortunately, the Encycle auditors did not see the puppet walking around and are not able to pass comment about its effectiveness or public reaction to it.



Recycling Man puppet walking around Skyworks area at the Esplanade

Litter collection staff

Although it was not a specific part of the remit of this project, it was noted by auditors that the use of Path Waste litter pickers on the day appeared to work well. Path Waste staff were clear on their role, were able to assist with sorting material into the correct bins and made a good contribution to the avoidance of litter around the foreshore site.

The adjacent shows Path Waste staff picking out recyclables from the recycling and general waste skips near the food vendor area located within Langley Park. The recyclable material was taken back to skips in the Recycling Zone, where contamination levels was observed to be minimal.



Path waste staff picking out recyclables

However, the visual assessment on the day after the event could not confirm this uncontaminated skips were kept separate from the general recyclables.



## 5 Discussion and recommendations

### 5.1 Waste and recycling service provider engagement

Instant Waste Management was contracted by the City of Perth to provide waste and recycling services for the Skyworks event. The services included in their 3-year contract (2009 – 2011) include:

- ♻️ Provision of waste and recycling receptacles
- ♻️ Collect the waste and recycling separately
- ♻️ Dispose of general waste to landfill
- ♻️ Recycle the material in the recycling bins

In the week leading up to the event, the MRC and City of Perth attempted numerous times to make contact with Instant Waste Management to request a site visit of their sorting facility in Bayswater where it was understood that the recyclables from the event would be taken. The purpose of the site visit was also to understand the Instant Waste Management sorting process more thoroughly and to obtain confirmation of where the recyclables would be taken once sorted. City of Perth understood that recycling materials would be sent to the following recyclers:

- ♻️ Cardboard – Amcor Recycling or Visy Recycling
- ♻️ Plastics – Claw Environmental
- ♻️ Glass – (uncertain)
- ♻️ Aluminium cans – Sims Metals

A few days prior to the event, Instant Waste Management updated the recycling plan and indicated that the mixed recyclables would be taken to the Damien Cole Group recycling facility in South Guildford for sorting and baling before being shipped to reprocessing facilities overseas/interstate. This arrangement appeared to be a late change to the plans and had not been communicated to the City of Perth or MRC previously.

MRC and Encycle Consulting visited the Damien Cole Group recycling facility on 27<sup>th</sup> January 2010 to view the site and the equipment available for sorting the material.

As part of the Instant Waste Management contract with City of Perth, the contractor is committed to providing data (tonnages) on the total waste generated and the proportion sent for recycling and landfill. They are also committed to reporting the proportion of contamination in the recycling stream that went to landfill. In late March some basic numbers were provided to City of Perth (see Section 5.9).

It is unclear where the clean recyclable material that was collected and sorted by the Mindarie Earth Carers at each of the 3 recycling stations went although the staff at Damien Cole Recycling did not report receiving any particularly clean recyclables at their site.



For event recycling to be successful, it requires good communication and cooperation between the event organisers and waste service providers. In this case, communication was lacking from Instant Waste Management in the weeks leading up to the event. This was exacerbated by the last minute arrangement of location for sorting the recyclables.

A Waste Management Plan is a useful tool that can aid in the communication of event recycling programs. For an event as large and as complex as the Australia Day Skyworks, it is essential that a comprehensive Waste Management Plan is developed well prior to the event and circulated to relevant event organisers, cleaning and waste service providers.

Generally speaking, a good waste management plan should be a working document that is accessible to all relevant staff and contractors and provides sufficient detail, without being too technical or overly complex. The key information that a Plan should provide includes:

- 🌱 A summary of the **aim of the plan**, the **broad objectives of the event** that the plan covers and specific **performance targets**
- 🌱 A description of the baseline **quantity and type of waste streams generated** by the event including a plan of the site layout and locations of relevant aspects of the system
- 🌱 A description of the **existing systems in place**, including bin type, colour, size, distribution, quantity and collection locations
- 🌱 A plan for the introduction of additional **waste minimisation and recycling strategies**, including their objectives, responsibilities, tasks and timeframes.
- 🌱 **Responsibilities** for ensuring efficient operation of the system
- 🌱 Methods and responsibilities for **data gathering, management and reporting** (performance evaluation)
- 🌱 **Corrective action** process if waste is disposed of incorrectly or the system fails in any way
- 🌱 Plan for **communication** with event organisers, cleaning and waste service providers for effective operation (signage format, training sessions, incentives or techniques to optimise system efficiency)
- 🌱 **Continuous improvement** mechanisms: ways to review performance and update the systems to work towards the key goals and objectives of the facility



### Recommendations: Waste and recycling service provider engagement

1. Prepare a comprehensive Waste Management Plan in consultation with event organisers, cleaners and waste and recycling service providers
2. Communicate the Waste Management Plan to all relevant event contractors
3. Evaluate and review the effectiveness of the Waste Management Plan at the completion of the event and record lessons learnt and potential solutions to problems for the organisers of future events
4. Ensure clear data reporting responsibilities are included in the waste service provider's contract and require evidence of similar reporting on previous contracts

## 5.2 Waste and recycling systems

The waste assessment in combination with the behavioural and attitudinal surveys indicated that the public were confused by the use of skips for both recyclables and general waste disposal. This confusion may have contributed to the very high levels of contamination of recyclables with general waste and the over-use of public litter bins in preference to skips.

The general waste and recycling skips were identical in size and shape, the only point of difference was the colouring. The colouring was blue for general waste and either green or yellow for recyclables. These colours bear limited association to the common household bins that are green lidded for general waste and yellow-lidded for recyclables.

After the event had finished and event attendees packed up their picnics, many would have used the bins for the first time. As it was dark when the event finished, event attendees are unlikely to have noticed the difference in bin colour, let alone have seen the signage. This is likely to be another factor in high contamination levels in the recycling bins.

Placing one recycling and one waste bin together in pairs is a good idea as there must always be an alternative to the recycling bin. However, in some areas of the foreshore, the bins were not placed in pairs and this resulted in high contamination of the recycling bin.

Using skips does not send a positive message about the destination for recyclables. Skips are associated with collection of bulk waste materials, not valuable recyclable resources.

The skips were not provided with clear signage at eye-level explaining exactly what each bin was for and this may have also contributed to the high levels of contamination.

Skips present a health and safety hazard as they are accessible to the public and local



Example of recycling bins that provide clear guidance to the public



environment. This increases the likelihood of waste being scattered by the wind or birds. Open skips also attract people to 'skip dive' for recyclables. This was observed during the visual audit.

Skips located around the event were observed to attract additional residential and commercial waste during the night, after the completion of the Skyworks event. This finding aligns with the auditor's experience at previous public events, construction sites and educational institutions that open skips 'attract' waste when unattended. The recycling collection vessels shown in the above photo are at Changi Airport in Singapore. The Changi Airport system is not specifically recommended for the Skyworks event as these are permanent collection vessels. The photo is included here as an indication of how recyclables can be collected in vessels that demonstrate the value and use of the material. The Changi Airport bins show that good recycling collection vessels have very different visual exteriors to rubbish bins, are designed to spark interest and communicate that recycling materials have a value.



**Full skip located next to food vendor**

It is appreciated that on a 'by volume' basis, skips are cheaper than smaller bins. With the ban on glass and alcohol at the event, considerably less waste and recycling was

generated and many skips were not filled.

The visual waste assessments showed that the skips that were full were mostly those in the vicinity of food vendors (see photo).



### Recommendations: Waste and recycling systems

5. Replace the use of skips with a greater number of smaller recycling and general waste receptacles which are more appropriate to use by the general public
6. General litter bins could be supplemented by larger bins to act as drop off points for the red and yellow recycling bags
7. Recycling bins should look as different as possible to rubbish bins. Ensure that signage is very clear about what goes in each bin; recycling signage should include clear pictures
8. The collection and sorting contractor(s) are engaged in the process of developing the system to ensure that the materials collected can be adequately dealt with by the sorting facility
9. Always place recycling bins adjacent to a general waste bin and ensure that general waste bins are the most easily accessible option
10. Use bin 'caps' or other technique to make bins very clearly different to rubbish bins
11. Consider the use of 'rosettes' and/or shaped holes in recycling bins to reinforce the message that these bins are for a specific product (i.e. beverage containers)



Photo showing public place recycling bin lids used by the Queensland Government Department of Environment and Resource Management



### 5.3 Food and beverage vendors waste and recycling systems

Take-away food and beverage vendors were situated throughout the 3 areas of the Skyworks event site. Waste from the vendors was disposed into the skip bins nearest to their mobile outlet. In some cases, the vendor was set-up in between pairs of waste and recycling skips (see below photo). This resulted in the vendor using, in this instance, the blue general waste bin for disposing of all material types, including cardboard boxes and failing to use the recycling bin at all.

It is common that waste and recycling systems at events to have two sets of systems: one for vendors (or back of house areas) and the other for the public/event attendees to use (front-of-house). It is important to distinguish between the two because the waste material types and quantities are quite different.

For example, vendors will dispose of a lot of bulk packaging such as cardboard boxes and cooking oil drums, while the public will dispose of individual product packaging such as aluminium cans, plastic bottles, take-away food packaging, wrappers etc. The Back-of-house systems should only be accessible by the vendors and not the public. Vendors should not use bins designed for the public to recycle.



Food vendor located between a recycling skip and a general waste skip

#### Recommendations: Food and beverage vendor waste and recycling systems

12. Vendors should be provided with their own suitable back-of-house bins rather than relying on event recycling receptacles
13. A review of practical and efficient back-of-house receptacle and collection systems should be conducted for future Skyworks events
14. Vendors should be engaged during the review and in the development of a future WMP



## 5.4 Recycling Zones

The three recycling zones located around the foreshore areas appeared to work well in engaging with the event attendees and in collecting very clean recyclable material. Having staffed recycling zones which allow communication with the public and the opportunity to remove contamination from the recyclable material will be a key part of successful recycling at future Skyworks events.



**Skip of uncontaminated recyclables collected and sorted by the Mindarie Earth Carers**

The Mindarie Earth Carer volunteers and the Path Waste litter collectors put in substantial efforts to sort recyclables from the solid waste. This resulted in a large number of skips being filled with very clean recyclables, particularly cardboard and PET plastic bottles (see photo). These skips were observed to be uncontaminated at 9pm on the night of the event. The collection process by Instant Waste Management for this material was not observed and it is unclear how this material was collected, sorted or sent for recycling. Mindarie Earth Carer staff were required to wait until quite late in the evening to ensure that the recycling compounds were locked and the

recyclable material was not contaminated. By using lidded, lockable skips the uncontaminated recyclables could remain uncontaminated overnight.

Having dedicated recycling staff to encourage people to recycle and to help with coordinating the collection also assisted with reinforcing the messages about recycling and was observed to engage the public well. Having staffed recycling stations can help to significantly reduce the contamination of the material collected.

One option might be to deploy a greater number of smaller, staffed recycling centres or bin stations, to maximise the coverage of staff who can assist people with using the correct bin. Using more, smaller stations would be likely to be more effective than having many unstaffed recycling collection bins that are prone to high contamination. Collecting very clean material at fewer points can help to significantly reduce costs and avoid the potential for loads to be turned away from recycling facilities and sent to landfill.



## Recommendations: Recycling Zones

15. Sorted and clean recyclables should be kept separate and secure – possibly using lidded, locked skips to maintain the low contamination after the event
16. Dedicated, small, staffed recycling *stations* should be implemented or staff should be allocated to small 'banks' of recycling bins to assist and inform the public. This would be more effective at collecting uncontaminated recyclables, even if this entailed having fewer recycling bins around the foreshore area

### 5.5 Biodegradable collection bags for recycling and rubbish

Different coloured and clearly signed biodegradable bags were handed out to event attendees to collect recyclables and rubbish during the event. The bags are 'biodegradable' but it is not clear (or likely) that this is necessarily a good environmental outcome as they may or may not break down in landfill and if they do it is likely that they would produce methane. Information from the waste management contractor, Instant Waste Management was that yellow recycling bags could be placed into the recycling skip and would be recycled. This information is not consistent with most sorting facilities in Perth. Ultimately, the handling of the recycling skip material was sub-contracted to another sorting facility, Damien Cole Recyclers. The Damien Cole Group recycling site uses hand sorting that was not set up to open the quantity of bags received. Therefore it is likely that the bagged recyclable material was lost to landfill.

As a litter prevention measure, the bags appeared to be an effective way for people to collect their rubbish in one place for disposal at the end of the event. Unfortunately, the bags did not appear to be separated into different bins according to colour and hence did not prove to be an effective way of collecting general recyclables (see photo).



Recycling skip containing a mixture of red rubbish and yellow recycling bags

It is not clear whether bags were not colour-separated because people did not understand that the bags had different purposes or whether it was because the two skip bin system did not work well. On *ad hoc* observations, there did appear to be some yellow bags containing predominantly recyclables although this is not based upon hard data.

In locations close to a recycling zone, yellow bags were used (particularly by children) for the collection of recyclables in return for rewards. The use of rewards as an incentive for collecting recyclables often works well, particularly as a litter reduction tool. With the significantly reduced numbers attending the Skyworks event in 2010, litter was not a major



issue and unfortunately, the rewards acted to encourage children to remove material from bins which is not the best potential outcome and may present a health and safety risk.

### Recommendations: Biodegradable collection bags for recycling and rubbish

17. Biodegradable bags are maintained as a way of collecting rubbish and preventing litter
18. The collection of recycling in exchange for rewards is reviewed to identify the value and aim of this activity. Since the recyclables collected are clean and valuable, this may be a positive function that engages with attendees. The bag type could be reviewed, possibly switching to re-usable, more durable bags to collect recycling for rewards that reinforces the distinction between waste and recyclables. The provision of rewards from the recycling zone will need to be significantly more widely advertised and have greater number of stations around the foreshore area

## 5.6 Take-away food vendors

### Filling of public waste skips with vendor waste

Mobile food vendor vans were present around the foreshore area of the Skyworks event. Adjacent to food vendors skips were full of material generated by the 'back of house' operations of the food vendors (e.g. cardboard, large plastic food containers, old food etc).

The quantity of material generated by food vendors would make it appropriate for each vendor to have their own bin for general waste and possibly a second collection option for cardboard. The public bin systems close to vendors became very full and could not be used for general rubbish. It was unclear whether food and beverage vendors were provided with information on the waste and recycling system provided and how to use it. From the general observations recorded during the event, it was felt that not all vendor staff were informed of how to recycle correctly.

In Langley Park for instance, the pair of skip bins located near the entertainment area were used by



Cardboard disposed into general waste skip which is located adjacent to recycling skip



vendors who incorrectly disposed of cardboard boxes in the general waste skips (see photo) which show more cardboard in the blue general waste skip than the green recycling skip and a lot of plastic packaging in the recycling skip (contamination). The cardboard boxes in these two bins were subsequently picked out by the Path Waste litter pickers and taken to the recycling skips in the Recycling Zone compound.

### Use of compostable/biodegradable packaging by vendors

Close to food vendors, the recycling and waste skips were both filled with the packaging that was provided by the vendor (e.g. polystyrene burger trays, plastic cutlery, paper plates, beverage bottles etc). Some events have started to require vendors to use compostable packaging for their food service. The requirement to have biodegradable or compostable food packaging is not always a straightforward one. Considerations for implementing a requirement for biodegradable or compostable packaging include:

- The level of control over the type of material that may be placed in the collection bins. At many events, there is a limit on the type of wastes that are generated since food cannot be brought onto the site from outside. At Skyworks, there is no control over the waste materials that are generated which will make effective separation of compostable packaging difficult to control
- "Biodegradable" packaging is not necessarily the same as compostable and it is important that materials will fully breakdown into harmless substances in compost. Vendors would be required to purchase a very specific type of product that would be suitable for the final destination

### Recommendations - Take-away food vendors

19. Food vendors at the Skyworks event are provided with specific bins for their 'back of house' waste including options for cardboard and other key recyclables if appropriate. This will avoid filling up public bins with vendor waste
20. Where vendors sell large quantities of drinks in recyclable packaging, specific recycling stations could be set up in the vicinity of the vendor using appropriate signage and pairing with general waste options as discussed in Section 5.3
21. Requiring biodegradable or compostable packaging from food vendors is given substantial thought before implementation. There would be greater benefits from implementing other recycling systems well and possibly looking at small-scale implementation of separating compostable waste in a few years' time, once other systems are well-established and operating effectively



## 5.7 Recycling messaging and communication

Information relating to recycling at the 2010 Skyworks event was included in the event pull-out flyer in the local West Australian newspaper and on the City of Perth website using the 'Keep Australia Beautiful' branding and messaging ([www.perth.wa.gov.au/skyworks/aust\\_beautiful.html](http://www.perth.wa.gov.au/skyworks/aust_beautiful.html)).

The surveys conducted by the Mindarie Earth Carers showed that respondents had not noticed any information about recycling at the event before attending on the day.

The 'Keep Australia Beautiful' branding has a good level of recognition and would tie in well with a themed event for Australia Day celebrations. Many other opportunities exist for promotion of recycling at the Perth Skyworks event. A coordinated approach that ties in with the broad messages for the day could work well to engage with event attendees.

The use of more standard recycling receptacles (i.e. not skips but bins that are recognisable by the public) with appropriate and adequate signage will increase the awareness of recycling at the event.

Providing feedback to the participants of a recycling program has a direct impact on the likelihood of re-engaging people in future recycling programs. The City of Perth should provide feedback to the public through announcing the recycling rate of the event. This could be provided a week after the event, through a number of media channels including City of Perth's website, newspaper articles, radio broadcasts or television spots.

The Skyworks event is one of Perth's largest public events. Establishing strong awareness programs for event recycling at this annual event would have a significant trickledown effect for other public events held across the Perth metropolitan area.

## 5.8 Recycling signage



Poorly signed bins in foreground, with high visibility recycling station in background

The attitudinal assessment surveys found that 50% of the public found the signage to be 'very clear'. The behavioural survey only supported these findings to a limited extent as less than a third of the public attempted to segregate recyclables from general waste (see photo). These findings suggest the signage and supporting awareness-raising materials were inadequate to encourage correct recycling behaviour.

The signage only indicated *where* materials could be recycled. Signage did not provide information on the skips to indicate *what* materials could be recycled.



### Recommendations: Recycling Communications and Signage

22. Community awareness and marketing of recycling programs should be increased prior, during and after future Skyworks events
23. City of Perth must ensure the post-event recycling meets the public's expectations
24. Research and identify appropriate event recycling signage and message
25. Identify greater opportunities to promote recycling

## 5.9 Data management, monitoring and reporting

The measurement of the success of a recycling system at a large event like Skyworks is a critical part of the project. Reporting back to stakeholders and identifying opportunities for improving the system will provide credibility and continuous improvement mechanisms for your recycling systems.

For the Skyworks event, City of Perth have stipulated contractual requirements for their waste service provider to supply them with relevant data about the amount of total waste collected and the tonnage of material that is recycled. In late March, City of Perth received a brief spreadsheet with the information shown here in the table below. Costings were also provided although have not been included in this report.

### 2010 SKYWORKS

#### Waste & recycle summary

Bins in place	Size	No's	Tonnes
Waste	2m3	156	13.32
Recycling	2m3	153	2.50
General Waste (for compounds)	240 & 120 litre	198	0.00
<b>Total</b>			<b>15.82</b>
Waste to Landfill		84%	13.32
<b>Recycled Product</b>		<b>16%</b>	<b>2.50</b>
<b>Total</b>		<b>100%</b>	<b>15.82</b>



The data provided omit the larger skips (approx 10 m<sup>3</sup>) that were used in the Earth Carer compounds to collect clean, uncontaminated recyclables. The overall recycling rate (as a percentage) is included here. Good reporting of recycling and waste would normally include:

- 🌱 Breakdown of tonnages of recyclables by material
- 🌱 Where the material was sent for sorting or processing
- 🌱 Contamination rates of the recycling bins
- 🌱 Any additional charges relating to the landfilling of recyclables
- 🌱 Ideally, verification of landfill and recycling tonnages reported by 3<sup>rd</sup> party audit of invoices or dockets

During the days immediately prior to the Skyworks event, there was limited and confusing information available about the way that material would be collected, separated, measured (weighed or volume estimation) and sold for recycling. Future contracts could include requirements for the mode of separation and destination of material to be clearly explained and could even request evidence from recyclers upon receipt of material (such as sales dockets). Requiring detailed information from waste service providers enables City of Perth to have greater comfort that the material is being disposed of or recycled appropriately.

### Recommendation: Data management, monitoring and reporting

26. Robust and credible data collection mechanisms are written into contract documentation for the waste service provider to allow reporting of recycling rates for positive publicity and continuous improvement

## 6 Summary of recommendations

- 1 Prepare a comprehensive Waste Management Plan in consultation with event organisers, cleaners and waste and recycling service providers
- 2 Communicate the Waste Management Plan to all relevant event contractors
- 3 Evaluate and review the effectiveness of the Waste Management Plan at the completion of the event and record lessons learnt and potential solutions to problems for the organisers of future events
- 4 Ensure clear data reporting responsibilities are included in the waste service provider's contract and require evidence of similar reporting on previous contracts
- 5 Replace the use of skips with a greater number of smaller recycling and general waste receptacles which are more appropriate to use by the general public
- 6 General litter bins could be supplemented by larger bins to act as drop off points for the red and yellow recycling bags
- 7 Recycling bins should look as different as possible to rubbish bins. Ensure that signage is very clear about what goes in each bin; recycling signage should include clear pictures



- 8 The collection and sorting contractor(s) are engaged in the process of developing the system to ensure that the materials collected can be adequately dealt with by the sorting facility
- 9 Always place recycling bins adjacent to a general waste bin and ensure that general waste bins are the most easily accessible option
- 10 Use bin 'caps' or other technique to make bins very clearly different to rubbish bins
- 11 Consider the use of 'rosettes' and/or shaped holes in recycling bins to reinforce the message that these bins are for a specific product (i.e. beverage containers)
- 12 Vendors should be provided with their own suitable back-of-house bins rather than relying on event recycling receptacles
- 13 A review of practical and efficient back-of-house receptacle and collection systems should be conducted for future Skyworks events
- 14 Vendors should be engaged during the review and in the development of a future WMP
- 15 Sorted and clean recyclables should be kept separate and secure – possibly using lidded, locked skips to maintain the low contamination after the event
- 16 Dedicated, small, staffed recycling *stations* should be implemented or staff should be allocated to small 'banks' of recycling bins to assist and inform the public. This would be more effective at collecting uncontaminated recyclables, even if this entailed having fewer recycling bins around the foreshore area
- 17 Biodegradable bags are maintained as a way of collecting rubbish and preventing litter
- 18 The collection of recycling in exchange for rewards is reviewed to identify the value and aim of this activity. Since the recyclables collected are clean and valuable, this may be a positive function that engages with attendees. The bag type could be reviewed, possibly switching to re-usable, more durable bags to collect recycling for rewards that reinforces the distinction between waste and recyclables. The provision of rewards from the recycling zone will need to be significantly more widely advertised and have greater number of stations around the foreshore area
- 19 Food vendors at the Skyworks event are provided with specific bins for their 'back of house' waste including options for cardboard and other key recyclables if appropriate. This will avoid filling up public bins with vendor waste
- 20 Where vendors sell large quantities of drinks in recyclable packaging, specific recycling stations could be set up in the vicinity of the vendor using appropriate signage and pairing with general waste options as discussed in Section 5.3
- 21 Requiring biodegradable or compostable packaging from food vendors is given substantial thought before implementation. There would be greater benefits from implementing other recycling systems well and possibly looking at small-scale implementation of separating compostable waste in a few years' time, once other systems are well-established and operating effectively
- 22 Community awareness and marketing of recycling programs should be increased prior, during and after future Skyworks events



- |    |                                                                                                                                                                                                               |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 23 | City of Perth must ensure the post-event recycling meets the public's expectations                                                                                                                            |
| 24 | Research and identify appropriate event recycling signage and message                                                                                                                                         |
| 25 | Identify greater opportunities to promote recycling                                                                                                                                                           |
| 26 | Robust and credible data collection mechanisms are written into contract documentation for the waste service provider to allow reporting of recycling rates for positive publicity and continuous improvement |



**Appendix A: Earth Carers Survey: Public attitudes to recycling at Perth Skyworks 2010**

Time of survey:	
Question	Response options:
Where do you normally live	Perth postcode <input type="checkbox"/> Elsewhere in WA <input type="checkbox"/> Australia <input type="checkbox"/> Overseas <input type="checkbox"/>
Age range	Less than 20 <input type="checkbox"/> 20 - 35 <input type="checkbox"/> 36 - 50 <input type="checkbox"/> 50+ <input type="checkbox"/>
Gender	Male <input type="checkbox"/> Female <input type="checkbox"/>
Do you recycle at home?	Always <input type="checkbox"/> often <input type="checkbox"/> from time to time <input type="checkbox"/> never <input type="checkbox"/> live in Stirling <input type="checkbox"/> Don't have recycling bin <input type="checkbox"/>
What do you think about being able to recycle at events like Skyworks?	Very important <input type="checkbox"/> Quite important <input type="checkbox"/> Don't mind either way <input type="checkbox"/> Not important – shouldn't waste time and effort <input type="checkbox"/>
Were you aware that there were recycling bins at this event?	Yes <input type="checkbox"/> No <input type="checkbox"/> Have seen bags but not noticed prizes <input type="checkbox"/>
Have you noticed the rewards for collecting a bag full of recyclables?	Yes <input type="checkbox"/> No <input type="checkbox"/> Have seen bags but not noticed prizes <input type="checkbox"/>
Will you or have you used bags for collecting a prize for recycling?	Have used <input type="checkbox"/> have used more than once <input type="checkbox"/> Intend to use <input type="checkbox"/> no intention of using <input type="checkbox"/> will use bags for convenience but won't bother with prizes <input type="checkbox"/>
Is the signage about recycling and bins clear and easy to understand?	Very clear <input type="checkbox"/> somewhat clear <input type="checkbox"/> somewhat unclear <input type="checkbox"/> very unclear <input type="checkbox"/> Haven't seen any signage <input type="checkbox"/>
What do you think happens to the recyclables after they leave the site?	Sent for recycling <input type="checkbox"/> go to landfill as too contaminated <input type="checkbox"/> go to landfill anyway <input type="checkbox"/> don't know <input type="checkbox"/> Other <input type="checkbox"/>
ONLY ask if think all goes to landfill: does this mean that you don't bother using recycling bins for bottle/cans?	No – never <input type="checkbox"/> Still do sometimes <input type="checkbox"/> Still do always <input type="checkbox"/>



## **Appendix B: Data Limitations**

### **Surveys conducted by Earth Carers**

The number of surveys carried out (443) at the Skyworks event was a fair sample but still below 1% of attendees. There may have been some element of self-selection of the survey respondents as many people interviewed may have been in the vicinity of the Recycling Zones and had an increased interest in recycling.

All interview style surveys are difficult to assess too closely as there is an element of error involved in self-reported behaviour. Many people will tend to give answers that they believe the surveyor would like to hear. The other concern with self-reporting is that different people will have different expectations about their own behaviour. For instance, the question "do you recycle at home" is often one where people often respond 'yes, always'. This is a) a positive response that might be expected to engender positive feedback from the interviewer and b) some people may believe that they 'always' recycle but some studies have shown that when comparing reported behaviour to actual behaviour (i.e. by checking bins of respondents after a survey) there is a significant disparity.

### **Visual Assessments**

Conducting visual assessments of waste composition is obviously inaccurate as it is quick and can only be performed on the observation and estimate of bin contents. Visual assessments at the Skyworks event are only a representation of the bin contents at the time of observation and not at the very end of the evening. Full physical compositional analyses would have been more accurate but are extremely time consuming and expensive to conduct. For the purposes of this study it is felt that visual assessments are probably sufficient but the data should be treated with due caution when extrapolating or interpreting results.



## Appendix C: Final Report from Mindarie Waste Education Staff and Earth Carers

### Report from MRC Waste Education Staff and Earth Carers on Sky Show Waste Initiative 2010

**Background:** The Sky Show in Perth through the City of Perth put out 170 pairs of waste and recycle skip bins throughout the Perth and South Perth foreshores and Kings Park (?). Besides the bins, the public were issued waste (red) and yellow (recycling) degradable bags in which to place their rubbish. There were 3 Recycling Compounds where the public could take recyclable items in exchange for immediate spot prizes.

Additional funding was available through MRC in 2010 to carry out consumer surveys on the day plus audits on the recycling collected. MRC Waste Education Staff together with Earth Carer volunteers assisted with staffing Recycling Compounds, carrying out surveys and performing as a large Recycling Man puppet.

#### Comments and feedback from Staff:

- Public very receptive to recycling, kids especially keen on exchange for gift
- Prize needs to be occasion appropriate eg torches very popular for night time event. Be great to have little waste involved.
- Signage on bins poor and not noticed. At South Perth, bins often not placed in pairs so hard to distinguish between waste and recycling.
- Colour of bins usually did not match colour of bags ie general waste bins all blue and bags red. The recycle bins were green or yellow.
- Vendors used waste bins and did not separate recycling.
- Earth Carers and staff were very enthusiastic about the Recycling compounds and prizes exchange.
- Bins contaminated very early in the day, both waste and recycle skips.
- People (mostly children) getting recycling out of waste skips to obtain prizes.
- Be good to colour code everything, uniforms, recycling bags, compounds etc so the one colour is easily identifiable.
- The Recycling Compound signs were for last year times which gave day-light saving times. This said 4-8.30pm when we closed at 7.30pm
- Path Waste staff gave out bags and great info re Recycling compounds and prizes on south Perth side. Especially the allure of 'a torch for 15 or more pieces of recycling'. Easy information and well remembered by patrons.
- Sometimes needed 3 people at the compound as bags needed to be checked carefully for contamination before prizes were given. This is time consuming and quite task specific.
- Very good idea not allowing strays into recycling compound. Greatly reduced possibility of contamination.
- Not sure if the collection bags were 'bio' degradable or just degradable. Unclear by labeling.
- EC at Langley Park suggested staying open till 8pm as people were still bringing materials to compound after closing time. Generally patrons arrived at the event later



in the day due to the alcohol ban, so less time to get to understand the incentives system and actually find the materials to return.

**Suggestions for future years:**

- Seek sponsorship early in the year for financing prizes and make vouchers to vendor items a prize. This can draw the vendors on side re their own recycling and potential use of compostable or recyclable take-away containers.
- Have a dedicated recycling bin behind vendors' vans for cardboard.
- Use features such as Recycling Man puppet to promote the event. Same needed for South Perth side. Sponsorship from large waste companies such as SITA or Cleanaway appropriate for waste message promotion.
- South Perth needs at least 3 recycling compounds so it is easy to see compounds from wherever the public are sitting. This keeps it safe for children to take recycling to compounds unsupervised.
- Promote message to public that if they bring items not recyclable at the event to take them home, such as food scraps etc
- Through MRC continue to promote involvement by other regional councils as it is a whole of Perth event.

**Peg Davies**  
12/2/10



Photo right: Recycling Man puppet being operated by an Earth Carer volunteer

