

DEPARTMENT OF ENVIRONMENT & HERITAGE

Plastic Retail Carry Bag Use 2002 – 2004 Consumption



INTERIM REPORT

MARCH, 2005

Ref: 3111-06

NOLAN-ITU Pty Ltd ACN 067 785 853 ABN 76 067 785 853

P.O. Box 393 Level 1, 625 High St, East Kew Victoria 3102 ? Telephone: (03) 9859 3344 Facsimile: (03) 9859 3411 **NOLAN-ITU PTY LTD** ACN 067 785 853 ABN 76 067 785 853

Melbourne

PO Box 393 Level 1, 625 High Street East Kew VIC 3102

Tel: (03) 9859 3344 Fax: (03) 9859 3411

Copyright [©] Nolan-ITU Pty Ltd 2005

This document is and shall remain the property of Nolan-ITU Pty Ltd. The document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.[©]

Printed on Recycled Paper

REF: 3111-06

Document Issue and Status

Rev.	Status	Date	Project Manager	Reviewer
1-0	Draft (ver. 1)	18/02/05	Peter Allan	Bruno Schacher
1-1	Interim	8/03/05	Peter Allan	Kyle O'Farrell



1	BACKGROUND	2
	1.1 Bag Use in Australia	2
	1.2 EPHC Objectives	3
	1.3 Project Scope	3
2	DOMESTIC PRODUCTION AND IMPORT OF BAGS	4
	2.1 Domestic Production	4
	2.2 Bag Imports	4
	2.3 Combined Trends in Local Bag Production and Import	6
3	RETAILER USE	7
	3.1 Supermarkets	7
	3.2 Other Retail Sectors	8
4	CONCLUSIONS	10
5	REFERENCES	11
6	REPORT LIMITATIONS	12

APPENDICES

Appendix A: Plastic Bag Consumption Calculations

Appendix B: Sensitivity Analysis on Estimations



1 BACKGROUND

1.1 Bag Use in Australia

The plastic carry bag is an established part of Australian shopping. The carry bags are typically made from High Density Polyethylene (HDPE) plastic and are lightweight and strong, with a carrying capacity of over 1 000 times the weight of the bag. The weight of lightweight HDPE bags varies between 2 and 8 grams with an average supermarket bag weight of 5-7 grams.

In addition to the HDPE carry bags, there is also a much smaller number of Low Density Polyethylene (LDPE) bags used in department store, general merchandise, apparel and other retail outlets. These 'boutique' style bags have a typical weight of 15-20 grams.

Most plastic carry bags are imported into Australia. In 2002, the import of bags was estimated to account for two thirds of total consumption.

In 2002 an estimate of annual bag consumption of 6.91 billion bags was developed. This estimate was based on information from both bag manufacturers and importers and from key retailers. Table 1.1 below outlines total carry bag use by retail sector.

Retail Sector	No. of bags (billions)	
Supermarkets	3.68	
Other Food & Liquor	0.93	
General Merchandise & Apparel	0.96	
Fast Food, Convenience & Service Station	0.35	
Other Retail	0.99	
Total	6.91	

 Table 1.1: Estimated 2002 HDPE & LDPE Bag Consumption

The estimate of HDPE bag use was six billion bags consumed. This is outlined in the table below, showing use by retail sector.

Retail Sector	No. of bags (billions)
Supermarkets	3.68
Other Food & Liquor	0.93
General Merchandise & Apparel	0.59
Fast Food, Convenience & Service Station	0.35
Other Retail	0.46
Total	6.01

 Table 1.2: Estimated 2002 HDPE Bag Consumption



These estimates were made and reported at the end of 2002. The data presented later in this report for 2002 are estimates made from currently available data. The current data incorporates more accurate import information and as a result there is a very minor decrease in the 2002 bag consumption estimate based upon this present information.

There is no government or industry program to measure or record plastic carry bag use in Australia. The Australian Customs Service collects data on bag imports based on weight of bags rather than bag units.

Continued public and government concern led to a study in late 2002 about usage, litter and other environmental impacts; *Plastic Shopping Bags – Analysis of Levies and Environmental Impacts* (Nolan-ITU). Following this report, and public and industry input, Federal and State Government Environment Ministers developed a policy response for the management of lightweight HDPE carry bags plastic carry bags including bag reduction, bag recycling and bag litter abatement.

1.2 EPHC Objectives

In 2003, the Environment Protection and Heritage Council (EPHC) challenged retailers to meet a range of targets relating to the reduction and recycling of retail carry bags. These targets included a 25% reduction in the number of bags issued by end of 2004 against the base of December 2002 and a 50% reduction by the end of 2005. In response to this challenge the Australian Retailers' Association (ARA) developed a Code of Practice for the Management of Plastic Bags. This included a commitment to the EPHC targets. The EPHC targets and the ARA Code adopt a focus on lightweight HDPE carry bags rather than all plastic carry bags. This excludes a focus on LDPE 'boutique' carry bags used predominantly in the clothing and department store sectors. (It was estimated in 2002 that HDPE bags account for over 85% of total carry bags by number.)

The ARA submitted a report to the EPHC in mid-2004. The ARA is presently preparing a report on activity to the end of 2004 (including progress against the target of 25% bag reduction by the end of 2004).

1.3 Project Scope

In December 2004 the Department of Environment and Heritage (DEH) engaged Nolan-ITU to undertake this study to report on bag usage over the period 2002 to 2004. The aim of the study is to identify the level of bag use across all retail sectors and to compare this to data presented in December 2002.

With over thousands of retailers and many companies operating across numerous sites, it is not possible to conduct a comprehensive survey of bag use at a retail level. The methodology utilised in the study is therefore focussed primarily on data obtained at a bag manufacturers' and import level, where possible supporting data has also been obtained from retailers across many retail sectors.



2 DOMESTIC PRODUCTION AND IMPORT OF BAGS

2.1 Domestic Production

Australian manufacturing of retail carry bags is limited to a small number of producers. Many of these manufacture small volumes of LDPE bags. The largest manufacturers of HDPE bags in Australia are Detmark and Andrew Kohn. Both manufacture a range of HDPE and LDPE bags for all retail sectors. Based on information from the leading manufacturers, the total 2004 Australian production of HDPE carry bags is estimated at 1.58 billion bags. A further 280 million LDPE carry bags are estimated to have been produced in Australia in 2004. This total local production of HDPE and LDPE bags during 2004 has been reduced from 2002 production by 0.40 billion bags.

Australian manufacturers have increased the level of recycled content in locally produced bags, including the use of recyclate sourced from recovered plastic carry bags. Their ability to utilise more recyclate is limited by competition for market share with imported bag manufacturers.

Year	No. of bags (billions)		
2002	1.98		
2003	1.75		
2004	1.58		

 Table 2.1: Summary of Domestic HDPE Bag Production 2002 – 2004

2.2 Bag Imports

The majority of the lightweight HDPE bags used in Australia are imported. The Australian Customs Service (ACS) records data on the import of all goods into Australia. Goods are classified under a series of product description codes, see Table 2.2. These codes have six levels of description in order to more accurately identify the import of specific product categories. The reference code 3923.21.00.25 is used to categorise the import of polyethylene shopping bags (excluding low-density polyethylene) not designed for permanent use. Most HDPE lightweight carry bags imported into Australia are classified under this description code. Likewise, reference code 3923.21.00.24 is used to categorise LDPE shopping bags not designed for permanent use.

It is also likely that some other bags are imported into Australia and classified under the code for HDPE shopping bags. Primarily this will include HDPE bags used for wrapping fruit and vegetables (produce bags). While some of these bags may be classified under a different code (3923.21.00.28), a survey of bag importers has shown that some classify produce bags under the same code as carry bags (3923.21.00.25). Therefore the volume of bags recorded under the relevant codes for shopping bags will be inflated due to the inclusion of some other retail packaging.



ACS Reference	Description
3923.21.00.24	Shopping Bags – LDPE
3923.21.00.25	Shopping Bags – HDPE
3923.21.00.26	Shopping Bags – other plastics
3923.21.00.27	Other Sacks – LDPE
3923.21.00.28	Other Sacks – HDPE
3923.21.00.29	Other Sacks – other plastics
3923.29.00.30	Other Sacks & Bags (excluding PE)

 Table 2.2: ACS Plastic Bags Codes and Descriptions

The data recorded by ACS is by weight rather than units. Therefore the data provided is in terms of total tonnes of shopping bags imported for both HDPE and LDPE plastic. The weight of bags varies based on bag size and wall thickness. HDPE bags vary in weight between 1.5 grams for small, very light weight bags (as used in \$2 shops) through to 18 grams for large bags used in department stores for large items. The vast majority of bags are of a medium weight of between 5 and 7 grams. These are widely used in supermarkets and many other retail sectors.

In converting the ACS data from tonnes to bag units, an average weight of 5.5 grams/bag has been used for HDPE bags, this figure was confirmed by industry sources. In converting the LDPE bag data, an average weight of 18 grams has been used.

To allow for bags other than carry bags being classified in the shopping bag category (e.g. produce bags) the total weight of HDPE bags imported and recorded under the relevant code has been reduced by 25%. This is based on information from retailers of the likely usage of produce bags and an estimate of the percentage of these that will be included with shopping bags under the ACS code 3923.21.00.25. This is determined using the same method as used to generate the 2002 figures.

As a result, the estimated number of HDPE retail carry bags imported into Australia in 2004 is 3.16 billion. It is acknowledged that the accuracy of this estimate is closely linked to the bag weights of imported bags and the level of non-retail carry bag material included in the ACS categories. A sensitivity analysis has been carried out on the estimates of the level of non-retail carry bag material in the ACS categories and the results are provided in Appendix B.

Most importantly, the ACS data is recorded on a month by month basis each year. This enables a direct comparison with bag imports from previous years. A comparison of tonnes imported under the code 3923.21.00.25 (HDPE shopping bags) shows a decline in bag imports over the two years from 2002 to 2004 of 15.3%.

Year	No. of bags (billions)		
2002	3.97		
2003	3.49		
2004	3.16		

Table 2.3: Summary of Imported HDPE Bags 2002-2004



2.3 Combined Trends in Local Bag Production and Import

The Australian market for lightweight HDPE retail carry bags is a combination of imported and locally produced bags. As outlined in Section 2.1, the total estimated sales of locally produced HDPE bags in 2004 were 1.58 billion units. This compares to estimated sales of locally manufactured bags in 2002 of 1.98 billion units, this is a decline of 20.4%. There is a view amongst some manufacturers that market share for Australian produced bags have declined recently with some shift in higher weight bags to the import market.

As outlined in Section 2.2, the total estimated sales of imported HDPE bags in 2004 were 3.16 units. This compares to estimated sales of imported HDPE bags in 2002 of 3.97 units.

The estimated 2004 sales of lightweight HDPE bags from both local and imported sources is therefore 4.73 billion bags. This compares to a 2002 estimate of 5.95 billion bags or a reduction of 20.4%.

It is noteworthy that despite the factors that could lead to variations in the estimates, application of the same method in 2002 and 2004 shows a clear downward trend in bag use. Further the similarity in estimated numbers of imported and domestically produced bags give confidence that the national reductions overall are close to 20%.

Year	No. of bags (billions)	Reduction from 2002
2002	5.95	-
2003	5.24	11.9%
2004	4.73	20.4%

Table 2.4: Summary of Estimated HDPE Bag Usage in Australia 2002-2004

The combined Australian usage of HDPE and LDPE bags is presented in Table 2.4 below.

Table 2.5: Summary of Estimated HDPE & LDPE Bag Usage in Australia 2002-2004

Year	No. of bags (billions)	Reduction from 2002
2002	6.92	-
2003	6.21	10.2%
2004	5.58	19.4%

The combined estimated saving in use of HDPE retail carry bags over the two year period is 1.93 billion bags, from 2002 baseline consumption. The total combined estimated saving in use for both HDPE and LDPE retail carry bags over both years is 2.05 billion bags.

Table 2.6: Changes in Average Use of HDPE Carry Bags (Number of Bags)

Year	Per Capita Use	Household Use	
2002	303	789	
2004	235	613	



3 RETAILER USE

3.1 Retail Sector Plastic Bag Consumption

Provided in Table 3.1 below are estimates for HDPE plastic bag consumption on a sector basis. These estimates are based upon the views of bag manufacturers and importers, and are indicative figures only. There is not currently any direct measurement of plastic bag consumption across all sectors on a sector-by-sector basis. The values for 2004 plastic bag consumption have been estimated as based upon 2002 sector consumption figures, and percentage changes in sector consumption values, as provided by industry. As such the 2004 HDPE plastic bag consumption value, and the overall percentage change in consumption, are both slightly different from the values stated in Table 2.4.

Retail Sector	2002 Bag Consumption (billions)	2004 Bag Consumption (billions)	Change (%)
Supermarkets	3.64	2.73	-25%
Other Food & Liquor	0.92	0.81	-12%
General Merchandise & Apparel	0.58	0.53	-10%
Fast Food, Conven. & Serv. Station	0.35	0.31	-10%
Other Retail	0.46	0.39	-15%
Total	5.95	4.77	-21%

 Table 3.1: Estimated 2002 & 2004 HDPE Bag Consumption by Sector

3.2 Supermarkets

There is currently no government or industry body collecting data on retail carry bag use. Therefore it is not possible to accurately measure use across the vast retail sector. The ARA developed a Code for the Management of Plastic Bags in response the EPHC challenge to industry. The ARA Code requires signatories who are Group One retailers (major and smaller supermarket chains) to provide audited data on bag usage to the ARA. This enables the ARA to report on progress in bag usage reduction on a six-monthly basis. The ARA issued reports on the Code in February 2004 and again in mid-2004. It is presently awaiting individual company data in order to develop its report on progress in meeting the EPHC objectives, including the 25% reduction in bag usage by December 2004.

In its previous report, the ARA has indicated that bag usage in major supermarkets has declined over the past two years. The stated decline was a reduction in the annualised rate of HDPE bags issued at 30 June 2004 of 29%. The data currently being audited and aggregated is anticipated to show that the reduction remains at slightly below this interim outcome but above the 25% target. The 29% figure did not take account of some supermarket chains that were unable to provide audited data due to their structure, where stores are managed independently and data is not reported consistently across the group.



Similarly the 29% annualised reduction did not reflect activity in Group Two retailers (all retailers using lightweight HDPE retail carry bags other than major, minor or independent supermarkets), where the code does not require audited data be provided and most signatories have not reported on bag usage. It is likely that the ARA report on activity to December 2004 will cover most Group One retailers but not Group Two retailers.

Under the methodology used by the ARA, the annualised rate of HDPE bags issued takes account of the rate of store growth. Therefore the 29% reduction reflects an adjustment for store growth. This rate of store growth is not published. It is acknowledged that the retail sector is in a state of growth and it could be argued that bag reduction efforts need to be seen in this context. The EPHC objective for 25% reduction by December 2004 does not, however, take account of the growth of stores. It is a target for 25% bag reduction overall.

Retail growth can occur and be measured in several ways:

- *∠* store growth
- *∠* transaction growth
- sales growth (value)
- sales growth (items)

As bag usage is more closely aligned to the number of items purchased, the growth in these is probably a more appropriate factor to be used in bag usage calculations. There are key differences between the objective and the ARA published results on bag usage reduction. These are:

- 1. The ARA data relates to only some retailers (coverage is probably 50-60% of total bag usage).
- 2. The ARA data is adjusted for store growth.
- 3. Some bag usage numbers reported may relate to bag orders rather than bag usage and may be calculated using December month data only. This calculation method may not give an accurate reflection of annual bag usage.

3.3 Other Retail Sectors

In order to gain a perspective on bag usage across all other retail sectors, Nolan-ITU conducted a survey of companies across a range of retail sectors. The survey was conducted in January 2005 and sought information on bag usage by the retailer over the past three years. The survey comprised a sample of 80 leading companies. Many retailers were unable or unwilling to provide information on bag usage. However responses were received from 20 companies in the following sectors.

- Communication
- Discount Stores
- Electrical/Sound
- *«* Furniture



- Z Hardware
- *«* Clothing Menswear
- Clothing Unisex
- Motoring
- ∠ Pharmacies
- Second Hand Goods
- Sports and Outdoor
- Z Take Away Food
- ∠ Video

These companies provided data on bag usage with companies also indicating the reasons for any increase or decrease in bag usage.

The key findings of the survey were:

- While plastic carry bag usage is down, actual reductions in use have occurred with only some retailers, with others stable or experiencing an increase;
- Many companies had experienced a change in market share which impacted on their bag usage;
- Some companies had introduced a charge for bags resulting in substantial reduction in bag usage (over 80%);
- Some companies have switched from plastic bags to paper carry bags despite increased cost; and
- Some had seen a steady decline in bag usage based on increased consumer awareness and change staff practices.

Several retailers and bag suppliers observed that the ability to significantly reduce bag usage is more easily achieved in some retail areas than others. For example video rental outlets, bookshops, newsagents, pharmacies and music shops have a higher degree of one or two item transactions where a bag can more practically be avoided. Conversely, department stores and food outlets have more items per transaction and therefore less ability to eliminate a bag from a transaction. Reductions in these stores can come from more efficient use of bags or consumers supplying their own bag. The survey found the use of reusable bags was stated to be lower in other retail sectors than in supermarkets.

Bag manufacturers and importers reported that some of their retailer customers have achieved a reduction of 50% or more in bag usage while others had experienced no bag reduction. The inability of many retailers to report on bag usage, combined with the low level of signatories by Group Two ARA members to the plastic bag code, indicates many retailers are not actively pursuing bag reduction at the level that the major supermarkets have.

As non-supermarket retail outlets account for an estimated 50% of HDPE bag use, the efforts of all retail sectors will be crucial to achieving a further significant reduction in bag use.



4 CONCLUSIONS

- There is no precise measure of bag usage across retail sectors.
- There is clear evidence from bag import data and Australian bag manufacturers that there has been a reduction in bag usage in Australia.
- The estimated reduction in lightweight **HDPE bags** from 2002 to 2004 is 20.4% or 1.22 billion bags.
- The reduction in the supermarket sector is expected to be higher than this reflecting a higher level of activity by retailers and community organisations in these stores.
- The reduction across the rest of the retail industry is estimated to be lower although there will be individual exceptions such as where retailers have introduced a charge for bags and the reduction is much greater (over 80%).
- The reduction in **LDPE shopping bags** has been less significant. This reflects the lack of a national policy to reduce the use of LDPE bags and as a consequence, the lower level of reduction activity in the non-supermarket sectors. The LDPE bag is heavier and used mostly where the bag is taken directly home. It is therefore less likely to be a feature in the litter stream. On the other hand its heavier bag mass means that it is a significant percentage of resource use (36.8% of total bags in terms of weight).
- Industry observations are that the reductions in bag use over the past two years are the result of increased consumer awareness, better staff training and the more widespread availability and use of heavier duty reusable carry bags. There is a concern among some retailers that this reduction may represent a 'harvesting of the low hanging fruit' and the target of reaching a 50% reduction from 2002 consumption in the next 12 months will be more difficult to achieve. The achievement of the 2005 target is seen as possible only with a more substantial and widespread focus across all retail sectors in the very near future.



5 REFERENCES

- Australian Customs Service, 2005. Importation Data HDPE and LDPE Retail Carry Bags, ACS, January 2005.
- Australian Retailers Association, 2003. Code of Practice for the Management of Plastic Bags, ARA, October 2003.
- National Plastic Bags Working Group, 2002. Plastic Shopping Bags in Australia Report to the National Packaging Covenant Council, December 2002.
- Nolan-ITU/RMIT Centre for Design, 2002. Plastic Shopping Bags Analysis of Levies and Environmental Impacts, December 2002.



6 **REPORT LIMITATIONS**

This report has been prepared in accordance with an agreement between Department of the Environment and Heritage and Nolan-ITU.

The services performed by Nolan-ITU have been conducted in a manner consistent with the level of quality and skill generally exercised by members of its profession and consulting practices.

This report is solely for the use of Department of the Environment and Heritage and any reliance of this report by third parties shall be at such party's sole risk and may not contain sufficient information for purposes of other parties or for other uses. This report shall only be presented in full and may not be used to support any other objectives than those set out in the report, except where written approval with comments are provided by Nolan-ITU.



Appendix A

Plastic Bag Consumption Calculations



HDPE Plastic Bag Usage

Table A1 presents detailed calculations of HDPE plastic bag consumption during 2002, 2003 and 2004. It is estimated that 25% of the HDPE plastic bags imported in 2002 were actually non-carry bag types, such as produce bags used for fruit and vegetables, and this amount (7 271 tonnes) has been subtracted from the total quantity of HDPE bag imports. In addition, it was estimated by industry that local production was 50% of imports during 2002, recent information from industry suggests that this ratio was largely unchanged for 2003 and 2004.

Description	2002	2003	2004
Imported HDPE bags (tonnes):	29 084	26 481	24 629
Non-carry bags (tonnes):	7 271	7 271	7 271
Imported HDPE bags less non-carry bags (tonnes):	21 813	19 210	17 358
Imported HDPE bags less non-carry bags (billions):	3.97	3.49	3.16
Number of locally produced HDPE bags (billions):	1.98	1.75	1.58
Total HDPE bags, including local production (tonnes):	32 720	28 815	26 037
Total HDPE bags, including local production (billions):	5.95	5.24	4.73
% decrease from 2002:	-	11.9%	20.4%

Table A1: Summary of HDPE Plastic Bag Consumption

LDPE Plastic Bag Usage

Table A2 presents detailed calculations of LDPE plastic bag consumption during 2002, 2003 and 2004. It is estimated that 25% of the LDPE plastic bags imported in 2002 were actually non-carry bag types, such as bread bags or garbage bags, and this amount (3 878 tonnes) has been subtracted from the total quantity of LDPE bag imports. In addition, it has been estimated by industry that local production was 50% of imports during 2002, recent information from industry suggests that this ratio was unchanged for 2003 and 2004.

Description	2002	2003	2004
Imported LDPE bags (tonnes):	15 510	15 569	13 992
Non-carry bags (tonnes):	3 878	3 878	3 878
Imported LDPE bags less non-carry bags (tonnes):	11 633	11 692	10 115
Imported LDPE bags less non-carry bags (billions):	0.65	0.65	0.56
Number of locally produced LDPE bags (billions):	0.32	0.32	0.28
Total LDPE bags, including local production (tonnes):	17 449	17 537	15 172
Total LDPE bags, including local production (billions):	0.97	0.97	0.84
% decrease from 2002:	-	-0.5%	13.0%

Table A2:	Summary	of LDPE	Plastic Ba	ag Consumption
-----------	---------	---------	-------------------	----------------



Total Plastic Bag Usage

Table A3 presents the summary of combined HDPE and LDPE plastic bag consumption during 2002, 2003 and 2004.

Description	2002	2003	2004
Imported plastic bags (tonnes):	44 594	42 050	38 621
Non-carry bags (tonnes):	11 149	11 149	11 149
Imported plastic carry bags less non-carry bags (tonnes):	33 446	30 902	27 473
Imported plastic carry bags less non-carry bags (billions):	4.61	4.14	3.72
Number of locally produced plastic carry bags (billions):	2.31	2.07	1.86
Total plastic carry bags, including local production (tonnes):	50 168	46 352	41 209
Total plastic carry bags, including local production (billions):	6.92	6.21	5.58
% decrease from 2002:	-	10.2%	19.4%

 Table A3: Summary of HDPE and LDPE Plastic Bag Consumption



Appendix B

Sensitivity Analysis on Estimations



Introduction

This sensitivity analysis is used to determine the sensitivity of the methodology employed in this study to changes in the principle estimated parameters (variables). If a small change in a variable results in relatively large changes in the outcome, then the outcomes are said to be highly dependent on that variable.

This may suggest either that:

- *z* the estimated variables should be determined very accurately; or
- the methodology should be redesigned to reduce the sensitivity.

In this study it is not possible to verify the accuracy of the baseline variable values provided by industry, nor the possible variability of the values, without significantly increasing the scope of this study. Similarly the methodology employed in the study is believed to be the best available, without again greatly increasing the scope of the project.

As such, the objective of the sensitivity analysis undertaken below is merely to illustrate the general degree of dependence of the calculation outcome to the industry provided estimated variables. It is clear from the calculations below that this dependence is high.

It is not the purpose of the sensitivity analysis, nor is it currently possible, to provide a probability range on the plastic bag consumption estimations.

Impact of Non-Carry Bag Imports Estimation Variation

The majority of the lightweight HDPE bags used in Australia are imported, and a significant minority of LDPE bags are also imported. Data on these imports is provided by the Australian Customs Service (ACS). Goods are classified under a series of product description codes by the ACS. However these codes are not always exactly specific to a particular product, as is the case for HDPE and LDPE shopping bags. Thus it is highly likely that some non-carry bags are imported into Australia and classified under the same ACS codes as retail carry bags.

To adjust for this inflation the total weight of HDPE and LDPE bags imported and recorded under the relevant ACS code has been reduced by 25%. This is based upon discussion with bag importers, an estimate of the likely usage of produce bags, and an estimate of the percentage of these that will be included with shopping bags under the ACS codes. However, some uncertainty does exist as to the accuracy of this important estimation and so an analysis of the impact of varying this estimation by $\pm 20\%$ (or 20% to 30% of imports, from a baseline of 25%) is provided in Table B1 below.

Table D1. Sensitivity Analysis of Non-Carry Dags Estimation					
Estimation Variation	2004 HDPE	2004 LDPE	2004 Total	2002 Total	% Decrease 2002 to 2004
20% (-20%)	5.00	0.89	5.88	6.92	14.9%
25% (baseline)	4.73	0.84	5.58	6.92	19.4%
30% (+20%)	4.47	0.80	5.27	6.92	23.8%

Table B1: Sensitivity Analysis of Non-Carry Bags Estimation



Impact of Local Production / Imports Ratio Estimation Variation

Another major estimation used to establish local HDPE and LDPE retail carry bag numbers, and thus overall plastic retail carry bag use, is the ratio of imports of carry bags to the local production of carry bags.

Local bag manufacturers advised in 2002 that the estimated ratio of local product to imports of plastic bags was approximately 1:2. Further discussions during early 2005 indicated that this ratio was largely unchanged for 2003 and 2004, and so this value has been used to establish local production for 2002, 2003 and 2004. However, uncertainty does exist as to the accuracy of this important estimation and so an analysis of the impact of varying this estimation by $\pm 20\%$ (or 40% to 60% of imports, from a baseline of 50%) is provided in Table B2 below.

Estimation Variation	2004 HDPE	2004 LDPE	2004 Total	2002 Total	% Decrease 2002 to 2004
40% (-20%)	4.42	0.79	5.21	6.92	24.8%
50% (baseline)	4.73	0.84	5.58	6.92	19.4%
60% (+20%)	5.05	0.90	5.95	6.92	14.0%

Table B2: Sensitivity Analysis of Local Production to Imports Ratio Estimation