Final Report

Review: Waste Wise School's Program

Waste Management Board, Department of Environment WA

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Noel Davies (Chairperson, Waste Management Board)
Adrian Price (Member, Waste Management Board)
Lee McIntosh (Member, Waste Management Board)
Sarah Muirhead (South East Metropolitan Regional Council)
Gordon Warren (Business Development Manager, SITA)
Gary Hodge (Consultant)
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Project officer managing the Review for the Waste Management Board

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CONTENTS

EXECUTIVE SUMMARY

The nature and scope of the WA Waste Wise Schools Program

Waste Wise School's Program (WWSP) has been in operation in WA since 2002 when it was adopted by the Department of Environment from the highly successful Victorian EcoRecycle / Gould League model. The Waste Management Board has provided the majority of funding for this program through the Waste and Recycling Fund. In October 2003, SITA Environmental Solutions undertook a partnership with the program and became the principal private sector sponsor. In 2005, Wrigleys also became a sponsor of WWSP.

The program aims to help schools reduce the waste they send to landfill. It does this by assisting schools to minimise waste and litter by adopting the *'Reduce, Reuse and Recycle'* (3R's) philosophy and approach to waste minimisation and through changing behaviour. In its initial professional development workshops, Waste Wise educates teachers how to integrate practical waste minimisation, avoidance and recycling practices into the curriculum to effect behavioural change at an individual and whole of school level. Once teachers and other school representatives have attended workshop sessions, this program also provides schools with a range of educational resources relating to waste and sustainability including practical guidance on ways to reduce solid waste being generated by the school, ongoing professional support for teachers, a mobile display van that visits participating schools, and financial incentives through the Waste Wise Youth Grants..

Purpose of the Review

The purpose of this review has been to consider the ways in which the WWSP has assisted schools and their communities to adopt waste minimisation and prevention behaviours to achieve significant reductions in waste to landfill.

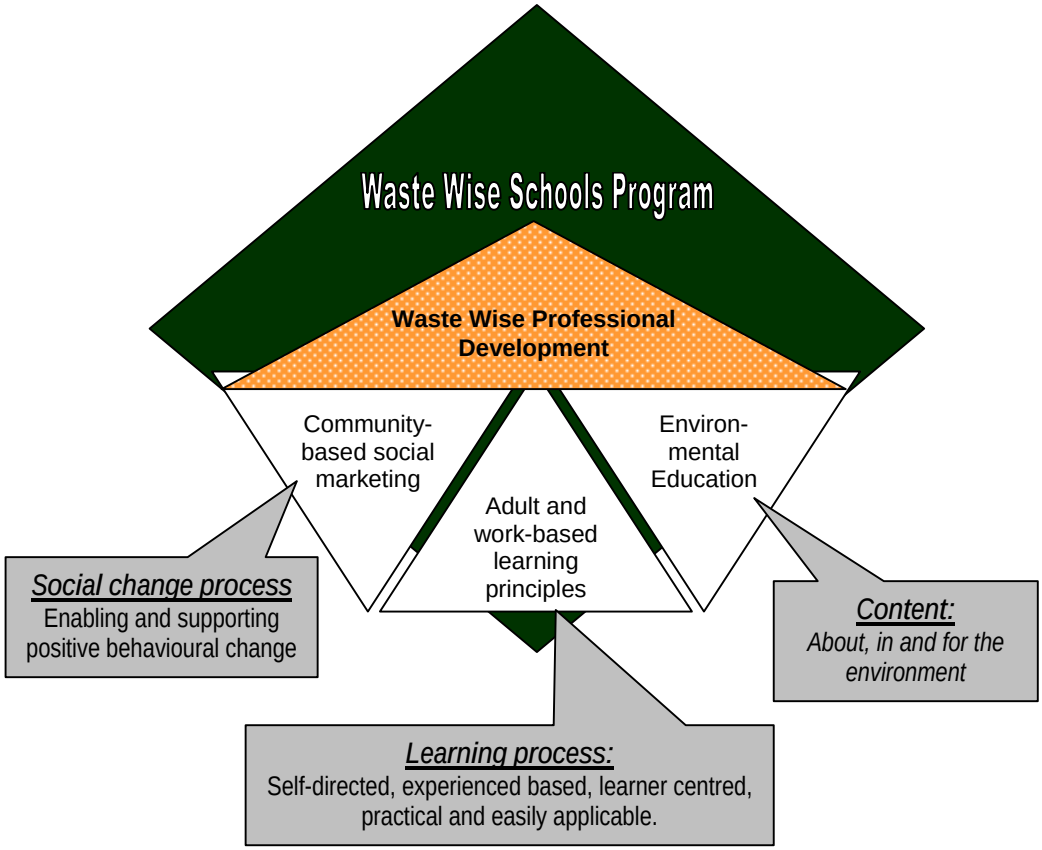
Key findings in relation to the terms of reference

Waste Wise has achieved some significant results. These are summarised in the following tables in relation to the Program's efficiency, effectiveness and value for money.

Overall, Waste Wise is successfully attracting teachers and their colleagues to its workshop sessions. The workshops and general approach to professional development are most useful in enabling teachers to begin undertaking waste prevention and minimisation within their classes through practical activities and curriculum integration. The professional development model works well and draws on essential principles and practices from community based social marketing, adult and work-based

learning principles, and best practice in environmental education. See Diagram 1.

Diagram 1: Theoretical elements underpinning the Waste Wise model



Principals and teachers are prepared to continue with Waste Wise because it promotes a flexible, school-centric and evolutionary approach as well as providing ongoing support.

Evidence shows that schools are having a growing impact on the attitudes and behaviours of parents and the broader community.

Common elements evident in the eight case study schools and likely in other Waste Wise schools were:

- A noticeable passion and energy across the whole school when the Principal is a vocal and energetic promoter of the waste prevention / minimisation behaviours
- Inclusion of the social values underpinning Waste Wise into the school values, ethos, awards and incentives system
- Identification of opportunities for parents and families to support recycling efforts that stimulate enthusiasm and community involvement, and may lead to funds generation e.g. aluminum can collection
- Changing school canteens to provide healthier alternatives that include a reduction of food packaging and contribute to worm farming (by using organic scraps from the Canteen)

- Establishing labeled bin systems for waste stream separating as a first step, and ensuring that students are encouraged in positive ways to sort waste correctly
- Taking an 'evolutionary' (rather than 'revolutionary') approach to changing behaviours amongst both students and staff e.g. by involving students early in the process of establishing waste sorting systems and slowly building on a base of changed behaviours; working with student and staff volunteers initially and promoting their achievements
- Contextualising the approach to the specific school context i.e. including teacher interests, student demographics

Waste Wise School's Program achievement in terms of efficiency, effectiveness and value for money.

Efficiency *maximising output for inputs*	
Measure	**Data and Comment**
Participation rates in teacher professional development workshops	Efficiency has increased Fewer annual workshops have been conducted since 2001 from (11 to 6) with an increase in average participation rates per group (from 9 – 18)
Overall number of schools participating in Waste Wise	Waste Wise has achieved a 'critical mass' level of over just one third of WA schools participating[1] There are now some 384 participating schools this represents 34% of all schools in WA
Potential reach of Students in Waste Wise schools	Over half the students in WA are in Waste Wise schools The equivalent student numbers in Waste Wise schools is 163,870. This represents 52.5% of all equivalent students in WA (not including those in special support school) See Table 19
Waste Wise website activity	This was not possible to include as no useful statistics (such as resources downloaded, unique visitor per month are kept for the Waste Wise site)
Numbers of schools successfully gaining grants	Only 13% of Waste Wise schools have received grants 51 schools since 2001 have been granted funds for Waste Wise projects. The amounts have varied per school per year. A total of $58,320 has been expended. Schools received between $5,000 and $158 and an average of $1,148 per school overall. See Table 20
Schools using their resources to support implementation	Schools are contributing significant amounts of their own resources to support Waste Wise implementation This includes 42.9% who send additional staff to workshops (at a daily rate over $200 provided as a rebate by Waste Wise); and providing weekly release for teachers. See Table 21

[1] The definition of 'critical mass' depends on the type of innovation being adopted. Everett Rogers (in, *The Diffusion of Innovation*, 1962, p 313) defines "critical mass" as the "point at which enough individuals have adopted an innovation so that the innovation's further rate of adoption becomes self-sustaining". The term 'critical mass' is used in this context to describe a significant number of schools (i.e. a third) which represent just over half the students in WA in Waste Wise. It is likely, but not certain that this should probably form the basis of a self-sustaining change.

Effectiveness *Maximising outcomes for output*	
Measure	**Data & comment**
Levels of curriculum integration	Significant increases in curriculum integration For Waste Wise Schools before and currently: +27% increase in integration of waste prevention / minimisation into Science +21% increase in integration of waste prevention / minimisation into Society and environment Between Waste Wise and Non-Waste Wise schools +26% increase in integration of waste prevention / minimisation into Science +15% increase in integration of waste prevention / minimisation into Society and environment
Integration of waste prevention / minimisation behaviours into school values	Significant increases in integration of waste prevention / minimisation behaviours into school values statements For Waste Wise Schools before and currently: +19% Between Waste Wise and Non-Waste Wise schools +28%
Integration of waste prevention / minimisation behaviours into school incentives and awards	Significant increases in integration of waste prevention / minimisation behaviours into school incentives and awards For Waste Wise Schools before and currently: 29% Between Waste Wise and Non-Waste Wise schools 24%
Minimising waste to landfill	Waste Wise schools were more likely to have achieved higher levels of reduction in waste to landfill than Non-Waste Wise schools: +20% of Waste Wise schools reported having reduced waste to landfill by 50% compared to 4% of Non-Waste Wise schools (i.e. a difference of 16%)
Levels of Reuse in schools	Significant increases in Reuse activities For Waste Wise Schools before and currently: +20% Between Waste Wise and Non-Waste Wise schools +10%
Reduction in consumption of resources	Significant reduction in levels of resource usage For Waste Wise Schools before and currently: -31% in relation to paper consumption Between Waste Wise and Non-Waste Wise schools -16% in relation to paper consumption

Effectiveness *Maximising outcomes for output*	
Measure	**Data & comment**
Levels of Recycling in schools	Significant increase in Recycling activities For Waste Wise Schools before and currently: +39% in relation to paper and cardboard recycling Between Waste Wise and Non-Waste Wise schools +10% in relation to paper and cardboard recycling +21% organic food scraps +32% worm farming
Schools sending regular waste prevention and minimisation information out in newsletters to parents	62% of Waste Wise schools regularly highlight school waste activities, encourage parent participation, or promote recycling, reuse, and resource usage reduction in the home through their newsletters.
Schools involving parents and the broader community in waste prevention and minimisation activities	46% of schools involve parents in the activities.
The likelihood of some or most waste prevention and minimisation behaviours enduring beyond 12 months or more	High ratings by a majority of Principals surveyed who considered it was likely that some or most of the waste prevention and minimisation behaviours would endure for 12 months or more. Most enduring behaviours would be in the school (97%) followed by the families of students (89%) and fewer in the broader community generally (79%).

Value for money *maximising outcomes for inputs*	
Measure	**Data & comment**
Overall expenditure since inception	A relatively small budget for the outputs and outcomes achieved. A total of $1,184,698 has been expended over 4.5 financial years i.e. an average of $263,266 per year. For the last 2 financial years this has included a total of $115,000 in sponsorship moneys from SITA ($90,000) and Wrigleys ($25,000).
Average $ per participating school	$3,085.15 (384 participating schools) This figure would need to be compared to similar environmental education programs. Brief research indicated that this data does not currently exist but that it may be possible to identify comparison programs and request this data.
Average $ per student potentially reached	$7.23 (163,870 students in Waste Wise schools) This figure would need to be compared to similar environmental education programs. Brief research indicated that this data does not currently exist but that it may be possible to identify comparison programs and request this data.
Overall cost benefit assessment by schools	99% of Waste wise school Principals felt that the costs of participating in Waste Wise were either outweighed or equal to the benefits. Principals in 67% of Waste Wise schools surveyed felt that the benefits had definitely outweighed any costs. A further 32% felt that the costs and benefits were about equal. Principals provided examples of the social and educational benefits for students; the professional benefits for staff; the benefits for parents and the broader community; as well as economic benefits for their schools.

Summary of Strategic Options and Recommendations

Waste Wise is being strategically linked to the Australian Sustainable Schools Initiative (AuSSI). Under this umbrella framework, Waste Wise becomes part of an integrated set of environmental education programs in schools. In WA the Project Manager, Howard Flinders (Sustainable Schools Initiative, Department of Education & Training) sees Waste Wise as a significant first step for schools. He considers that the Waste Wise focus on reducing consumption, as well as the waste prevention and minimisation behaviours that it develops, are critical basic education for sustainability knowledge, skills and attitudes. Program deliverers of other environmental education have been meeting to discuss how they can streamline their support for schools generally. Waste Wise could use its resources (i.e. funds, personnel, professional development model, existing approach) in a possibility of ways to integrate with AuSSI WA and gain greater recognition for its achievements.

In the light of these developments it seems less important to propose specific recommendations that may refine the current model, rather than taking into account possible emerging adaptations to the current model. The following strategic options are suggested for consideration.

Waste Wise Schools Program possible Strategic Options

1. ***Status quo with continuous improvement linked with AuSSI***
   With the same professional development model, the Waste Wise Team continues providing the current elements of PD and maintains their continuous improvement e.g. they become more efficient through attracting greater numbers of participants to each workshop, following-up on previously trained teachers and encouraging their re-engagement. Waste Wise PD incorporates messages from AuSSI about education for sustainability.
2. ***Accept and encourage diffusion of expertise that has been developed in the schools sector***
   With the same professional development model, the Waste Wise Team conducts 'train the trainer' sessions with 'lighthouse' teachers and creates a group of regional coordinators who they support to deliver workshops and network meetings.
3. ***Accept and encourage diffusion of expertise in the schools sector and begin to refocus Waste Wise from schools to enterprises and the community by leveraging schools experiences***
   This starts with Option 3 and maintains the Waste focus of the Waste Wise Team. With the wealth of experience and practical examples developed the Team could show staff in businesses how to have worm farms on their premises i.e. if a Kindergarten class can have a worm farm, why not your lunchroom; the concept of a school bike club could be taken up by other youth groups such as the Police Citizens Youth Club.
4. ***Re-brand all WA environmental education officers as 'Sustainability Education Officers'***
   Combine all current environmental education specialist officers under the AuSSI umbrella and diffuse the specialist waste, waster, energy and biodiversity skills amongst the staff.

The following recommendations assume that:

- elements of the proposed possible strategic options are accepted, and,
- the linkage with the Australian Sustainable Schools Initiative (AuSSI) is inevitable.

The recommendations are grouped into four main themes:

1. ***Program Focus and relationship to AuSSI WA***
2. ***Program Management***
3. ***Program Promotion***
4. ***Program Funding***

Program focus and relationship with AuSSI WA

Recommendation 1: Formalising the WWSP relationship with AuSSI and providing a sufficient level of support to schools

It is recommended that the Waste Wise in Schools Program (WWSP) take a proactive approach to its relationship with AuSSI and use this opportunity to strategically respond to continuing unmet demand as well as emerging needs of schools.

This could be achieved by:

1.1 WWSP negotiating an explicit commitment in the form of a Memorandum of Understanding from AuSSI that sees WWSP as the initial phase from which schools springboard to broader activity towards education for sustainability. This would provide WWSP with considerable statewide recognition as the mechanism by which schools build their capability to achieve both, waste prevention and minimisation behaviours as well as the requisite change management and whole school improvement skills.

1.2 Establishing a regional network of part-time Waste Wise Education Officers drawn from expert teachers and / or other waste or environmental education experts in regions. There will need to be a sufficient to cover the 14 Department of Education and Training regions (say, between 8 to10). These people would need to be trained and sufficiently resourced to in the WWSP professional development model. They would also need to have a clearly stated work / case load that might include:

- Preparation and delivery of workshops (say, 2 initial and 2 follow-up per year, with a day's preparation per workshop and coordination support from the Waste Wise Team)
- Conducting regional network meetings (say, one per school term)
- Visiting schools to provide support, and incursions (say 5 per term)
- Attending professional development and coordination meetings with the Waste Wise Team (say, one day per school term or equivalent)

1.3 Strengthen the content of workshops and other professional development resources to focus on specific themes not yet fully developed, such as:

- Greater encouragement of waste auditing, data collection, and reporting
- Systems thinking so that students and schools see the connections that link actions to results e.g. introducing a Healthy Canteen generally contributes to litter reduction and less use of plastic and provides a source of organic matter for composting or worm farming
- Collaboration between clusters of feeder primary schools and their high schools to enable them to build on the skills of students from primary schools i.e. extend the learner pathways from primary to high school
- The development of specialist strategies for high schools
- Presentation of change management and leadership models relevant to becoming a Waste Wise / Sustainable School, for School Executive staff
- The role of waste education in engaging students in learning and the social and educational benefits for students
- Using waste prevention and minimisation behaviours to complement school values and behaviour management (awards and incentives) activities
- Strategies for promoting waste prevention and minimisation to parents and the broader community through promotion of school-based activities

❑

Recommendation 2: Recognising school's success in paper and cardboard recycling and encouraging greater focus in other waste prevention and minimisation activities

In the light of high levels of paper and cardboard recycling in both Waste Wise and Non-Waste Wise schools, that the WWSP recognise that schools are managing this well and attempt to encourage all schools to expand their other reduce, reuse and recycle activities. This could be through specific competitions and promotions of other activities.

Program Management

Recommendation 3: Following-up teachers and schools that have participated in initial professional development workshops

That time be allocated to updating records of participating teachers and schools, contact details (including emails). This will enable follow-up of both teachers and schools who may have become inactive or are active but non-communicative. Teachers move schools and may want to be supported in their new school, equally the schools they leave could be offered support.

Recommendation 4: Determine ongoing performance measures for WWSP that can be reported to the Waste Management Board

That WWSP determine acceptable performance measures that can continue to be monitored and reported to the Waste Management Board. These could be based on measures used in the Review i.e. efficiency, effectiveness, value for money. They should include agreed targets for both the program and for schools. Schools will need to be encouraged to provide regular reports to the program managers. This may involve the development of an agreed minimum data set that links with data being collected through AuSSI in all States and Territories. Consideration will need to be given to 'easy-to-use' data collection processes for schools to enable them to generate trend data over time that helps ongoing monitoring.

Recommendation 5: Provide a greater sense of job security to the Waste Wise Team

The current Waste Wise Team are employed on short-term contracts and lack of security was mentioned by both case study schools and team members as an issue for the viability of the Program. It is recommended that the Waste Management Board consider the possibility of two or three year contracts for WWSP staff.

Recommendation 6: Increase availability of grant money to schools

The levels of granted money to schools overall has been minimal. Only 13% of schools have benefited. This highlights a lack of equity and access. Schools become frustrated when they submit and do not hear back for months whether they have been successful. This is counter-productive to the success of the Program. It is recommended that a greater percentage of schools be encouraged to submit for small grants and that the pool of money be increased to meet a greater percentage of the demand.

Recommendation 7: Improve the availability of useful WWSP website statistics

The current WWSP website statistic collected is 'number of hits'. This does not provide useful information about visitor activity and levels of interest in different parts of the site. The following list is suggested:

- Daily Average
  - Average Hits per Day
  - Average Page Views per Day
  - Average Visits per Day
  - Unique Visits per Day
-
- Monthly Totals & Averages
  - Hits
  - Page Views
  - Visits
  - Unique Visits
  - Average Page Views per Unique Visitor
  - Average Visit Length (minutes:seconds)
  - Visitors Who Visited Once in the month
  - Visitors Who Visited More Than Once in the month
  - Most Active Day/s of the Month

- Most Active Day/s of the Week (e.g. for the e-newsletter = Recipient Reading preferences - days of the week)
- Most Active Hours of the Day - considering Visits only
- Top Resources Downloaded
- Top Referrers (i.e. other URLs)
- Top Pages Viewed (pages with the most traffic)

Program Promotion

Recommendation 8: Publicly recognise and promote the achievements of Waste Wise schools as well as Non-Waste Wise schools to further the Waste Management Board's Zero Waste target.

Evidence from the research conducted as part of this Review shows that a majority of schools (both Waste Wise and Non-Waste Wise) are increasingly integrating waste prevention and minimisation behaviours. Not surprisingly, Waste Wise schools are doing more and at a faster rate. It is recommended that these achievements be promoted and celebrated at a community and State level.

Program Funding

Recommendation 9: The cost of meeting the above recommendations be determined and program funding be adjusted accordingly.

The current level of funding for the WWSP will not cover the cost of Recommendations 1.2, 1.3, and 3, 4, and 5. The current level of staffing is minimal and this means that the Waste Wise Team are not able to adequately meet current levels of demand.

Additional Recommendation not within the scope of the review but for consideration by the Waste Management Board:

The Waste Management Board work with local government, in particular local Shires, and recycling removal contractors to identify reasons for school dissatisfaction and develop improvement strategies.

BACKGROUND TO THE REVIEW

The nature and scope of the WA Waste Wise Schools Program

Waste Wise School's Program (WWSP) has been in operation in WA since 2002 when it was adopted by the Department of Environment from the highly successful Victorian EcoRecycle / Gould League model. Funding has been provided by the Waste Management Board through the Waste and Recycling Fund. In October 2003, SITA Environmental Solutions undertook a partnership with the program and became the principal private sector sponsor. In 2005, Wrigleys also became a sponsor of WWSP.

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The program offers its workshops free with payments towards the cost of teacher relief for one teacher from each school. Schools are able to claim $200 for the full-day initial workshop, and $100 for the half-day follow-up workshops[2]. All participating schools receive a free copy of the Waste Wise Schools Kit (value $100), supplementary course notes, a Certificate of Participation, and ongoing support after the workshops. A mobile display van provides 'incursions' to support participating schools.

Terms of reference and scope of the review

Purpose of the Review

The purpose of this review has been to consider the ways in which the WWSP has assisted schools and their communities to adopt waste minimisation and prevention behaviours to achieve significant reductions in waste to landfill.

Review scope and objectives

[2] Note that the $200 per day pro rata reimbursement to schools is less than the current rate for teacher release which is around $250 per full day. Schools are therefore subsidising their involvement in Waste Wise.

The Waste Management Board determined the following objectives and scope for this review:

1. Determining the extent to which the Waste Wise Schools Program is realising:

   - the objectives of the WA State Government's 'Environmental Education Strategy and Action Plan'
   - the objectives of the State Sustainability Strategy
   - the objectives of the Waste Management Board's Business Plan, Communication Strategy and wider vision for Zero Waste in WA
   - best practice in waste and environmental education
   - the program as an agent of positive behavioural change on waste.

2. Determining as a separate program, whether and how the program 'fits' (and could fit better) within broader environmental education at schools and specifically the proposed Sustainable School's initiative and how this program will impact on the Waste Wise School's program.
3. Determining the extent to which the content, objectives and outcomes of the Waste Wise Schools Program Professional Development workshops:

   - reflect best practice in waste/environmental education from a local, national and international perspective
   - support teachers to achieve curriculum outcomes especially in Science and Society and Environment

4. To determine the extent of 'take-up' of desirable waste avoidance/minimisation/resource recovery behaviours by:

   - teachers participating in Professional Development workshops
   - their students
   - the whole school population
   - the families and wider school community

5. To quantify the impact the program is having on waste generation and resource recovery at schools and at a wider community level
6. Providing an assessment of the 'value for money' of the Waste Wise School's Program particularly with regard to points 1 and 2 above.
7. Providing an appraisal of what other resources might become available to the program if it were to be integrated into a broader Environmental Education program e.g. Sustainable Schools
8. Providing recommendations for improvement in the program, if appropriate.

METHODOLOGY

Sources of data for the review

The following types of data were used in the review

- Interviews were conducted with a range of stakeholders concerning their expectations in relation to the WWSP and its review. The analysis of these expectations contributed to the development of the program logic.
- Analysis of Waste Wise Team program monitoring and reporting data, including:
  - Results of 2005 April Waste Wise survey
  - Budget information for 2003 – 2005
  - Mobile display survey results 2005
  - Analysis of Waste Wise schools by sector, region, involvement in other environmental programs, use of SITA
  - Professional Development Workshops feedback data
  - Waste Wise reports and Business Plan provided to the Waste Board
- Interviews with the Waste Wise Team delivering workshops and presentations to schools.
- Case study visits with a small purposive sample of schools (7 WWSP schools and 1 Non-WWSP school). The schools represented an agreed range of variables (e.g. metropolitan / regional; primary / secondary; government / non-government; small school / medium / large).Visits included structured interviews with the school principal, the WWSP coordinator, other teaching staff as appropriate, administrative staff, students and other members of the School Waste Wise or environment committee or equivalent. The visits enabled the reviewer to develop an understanding of contextual factors applying in each school including the physical environment, facilities and local issues etc.
- Online survey to Principals of all Western Australian schools involved in the Waste Wise School's Program (target sample – 361 schools). The survey achieved a 19.7% response rate and was open for almost two weeks with three reminders emailed.
- Online survey to teachers who participated in the Professional Development workshops (target sample – teachers in 387 schools). The survey achieved a 14.4% response rate and was open for almost two weeks with three reminders emailed.
- Online survey to Principals to a sample of Non-Waste Wise schools (target sample – 619 schools). The survey achieved a 22.2% response rate and was open for almost two weeks with three reminders emailed.
- Telephone interviews with a representative sample of community groups and support agencies were considered. The purpose was to gain qualitative data on the impact of Waste Wise activities in relation to the views of parents or other community members regarding school – community relations. This element was attempted but the difficulty of identifying sufficiently representative individuals and then contacting meant that this strategy not viable. There was also sufficient data from Principals and the Waste Wise teachers to gain an impression of their achievements in this regard.

Design and Procedure

Program Logic Matrix

The review was designed around a Program Logic Matrix. This is an evaluation and program management tool that identifies the elements of a program and the way they interrelate. For this review, it included the following three components:

1. the Outcomes Hierarchy

   The Outcomes Hierarchy shows the linkages and interdependencies amongst the intended outcomes. The hierarchy was devised with a focus on school communities and it has been shown to both the Waste Wise Team and some case study schools for their comment. These people agreed that it was a good representation of the logic of the WWSP. See next page.

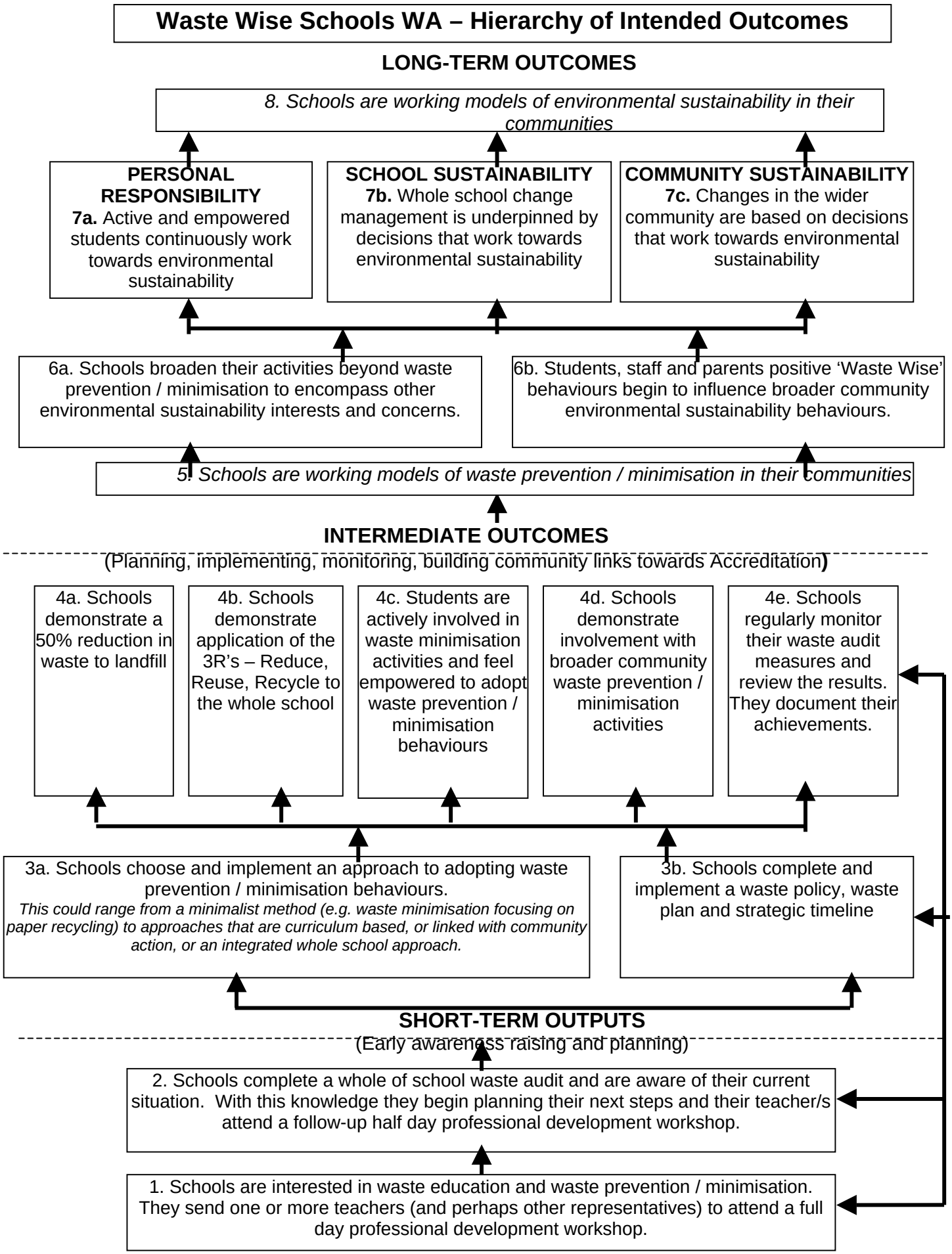
2. the Factors Affecting the Achievement of each Outcome in the Hierarchy

   The factors that are documented in this section have been developed from themes that emerged as concerns for stakeholders, the Review Objectives, and discussion with the Waste Wise Team. They provide valuable insights into an understanding of the effectiveness of the WWSP. These were used as the basis of questions to respondents in answering the review questions. See Appendix 1.

3. the Success Criteria and Explanation of each Outcome

   The explanations of success for each of these levels were developed from information provided by stakeholders and the stated objectives of the WWSP. This was used in formulating focus group and interview questions. See Appendix 1.

Waste Wise Schools WA – Hierarchy of Intended Outcomes



Determining criteria for 'best practice in waste and environmental education'

The WWSP draws on 3 key areas of theory and practice for its processes. These are a combination of *environmental education, community-based social marketing,* and *adult and work-based learning principles*. The professional development model that supports teachers is a combination of each of these 3 areas. See Diagram 1 below. In relation to best practice in first two of these areas, there is (as yet) no clear-cut statement of 'best practice'. There is however, a strong body of theory and practice in relation to understanding adult and work-based learning principles.

Diagram 1: Theoretical elements underpinning the Waste Wise model

The following information has been used as a basis of reflecting on 'best practice in waste and environmental education' through the professional development workshops (i.e. Objective 3 of the Review).

The Australian government through the Department of the Environment and Heritage has recently published, *A national Environmental Education Statement for Australian Schools,* (2005). Box 1 below represents a synthesis of the best available current thinking in relation to a summary of criteria of 'best practice' in this area.

BOX 1: A SUMMARY OF BEST PRACTICE CRITERIA FOR ENVIRONMENTAL EDUCATION

Excerpts Educating for a Sustainable Future

About, in and for the environment

The framework *about*, *in* and *for* the environment is a popular way of organising the experiences within an environmental education program.

- Education ***about*** the environment focuses on students' understanding of important facts, concepts and theories.
- Education ***in*** the environment involves students in direct contact with a beach, forest, street or park to develop awareness and concern for the environment.
- Education ***for*** the environment aims to promote a willingness and ability to adopt lifestyles that are compatible with the wise use of environmental resources.

The 1980s and 1990s also saw a growing understanding that teaching and learning strategies for environmental education needed to emphasise more than knowledge and understanding, as important as they are as a foundation for learning. The clarification of environmental attitudes and commitments, the development of critical thinking skills and learning how to work collaboratively to improve human and environmental wellbeing are also important outcomes of environmental education. Thus, effective environmental education has implications 'not only for what we learn but also how we learn'. This means that effective environmental education requires the regular use of learner-centred, interactive teaching and learning strategies that, in various education systems, are encompassed in terms such as 'new learning' and 'productive pedagogy'.

(see Page 6)

Effective environmental education for sustainability is not just a curriculum issue; it requires the involvement of the whole school.

Environmental education for sustainability pervades all aspects of the school operations, curriculum, teaching and learning, physical surroundings and relationships with the local community.

(see Page 7)

Goals

Environmental education for sustainability involves approaches to teaching and learning that integrate goals for conservation, social justice, cultural diversity, appropriate development and democracy into a vision and a mission of personal and social change. This involves developing the kinds of civic values and skills that empower all citizens to be leaders in the transition to a sustainable future. The long-term goals of environmental education for sustainability include developing the capacities of students to:

- understand and value the interdependence of social, cultural, economic and ecological dimensions at local, national and global levels;
- reflect critically upon how this interdependence affects communities, workplaces, families and individuals and be able to make appropriate decisions;
- develop attitudes and skills which are conducive to the achievement of a sustainable future;
- appreciate and respect the intrinsic value of the
- whole environment and a sense of the sacred;
- develop an ethic of personal responsibility and stewardship towards all aspects of the environment; and
- participate as active and involved citizens in building a sustainable future

(see Page 8)

Department of the Environment and Heritage (DEH) *Educating for a Sustainable Future, A national Environmental Education Statement for Australian Schools,* (2005).

The information in Box 2 below represents a synthesis of the best available summary of criteria of tools in relation to community-based social marketing.

BOX 2: A SUMMARY OF BEST PRACTICE CRITERIA FOR COMMUNITY-BASED SOCIAL MARKETING

Community-based social marketing

Community-based social marketing draws upon research in the social sciences, and particularly psychology that has identified a variety of effective "tools" for promoting behaviour change. These tools have been found to be most effective when used in combination with one another. A summary of the tools are as follows:

Commitment

- Emphasize written over verbal commitments.
- Ask for public commitments
- Seek commitments in groups
- Actively involve the person
- Help people to view themselves as environmentally concerned.
- Don't use coercion

Prompts

- Make the prompt noticeable
- Make the prompt self-explanatory
- Present the prompt in as close proximity as is possible to where the action is to be taken
- Use prompts to encourage people to engage in positive behaviours

Norms

- Norms
- Make the Norm Visible.
- Use Personal Contact to Reinforce Norms

Communication

- Use Captivating Information
- Know your Audience
- Use a Credible Source
- Frame your Message
- Carefully Consider Threatening Messages
- Decide on a One-Sided versus Two-Sided Message
- Make Your Message Easy to Remember
- Provide Personal or Community Goals
- Emphasize Personal Contact
- Provide Feedback

Incentives

- Closely Pair the Incentive and the Behaviour
- Use Incentives to Reward Positive Behaviour
- Make the Incentive Visible
- Be Cautious about Removing Incentives
- Prepare for People's Attempts to Avoid the Incentive
- Carefully Consider the Size of the Incentive
- Use Non-Monetary Incentives

Remove External Barriers

The behaviour change strategies presented above can have a significant influence upon the adoption and maintenance of behaviour. However, they will be ineffectual if significant external barriers exist to the behaviour being promoted. It is important to identify these

barriers and plan strategies to overcome them. An assessment then needs to be made regarding the resources required to overcome the identified external barriers.

Excerpt and summary from Doug McKenzie-Mohr, 2006, Quick Reference, Community Based Social Marketing www.cbsm.com

Box 3 below provides a brief overview of adult and work-based learning principles. These have been applied to current practices in professional development in Australia and internationally. There is a considerable body of literature and practice that links these understandings to organisational learning and development. In Australia, these practices were first adopted in the early 1990's in relation to vocational education and training for staff (e.g. TAFE teachers developing online learning) and students (e.g. trainees and apprentices undertaking work experience as a major part of their training).

BOX 3: AN OVERVIEW OF ADULT AND WORK-BASED LEARNING PRINCIPLES RELEVANT TO CURRENT PRACTICES IN PROFESSIONAL DEVELOPMENT

Definitions of Work-based Learning:

Every day, in the normal course of work, we are learning. We solve problems, encounter new situations, and figure out ways to reapply the things we already know. This learning is often spontaneous and unconscious. However, it is no less valuable than the learning done in formal situations.

Work based learning is the process of making our work related learning both conscious and deliberate.

Work based learning is that which benefits the individual, the work group and the organisation. It is achieved mostly through work related activities and can be directly applied to improve current or future work outcomes.

See http://www.icvet.tafensw.edu.au/resources/workbased_learning.htm

Overview of adult learning theory

There is a significant body of research into the various models of adult learning (or andragogy). Malcolm Knowles (1984 quoted in Welton, p99) stated the following set of five basic assumptions about adult learners:

1. Self-direction - adults strive for autonomy and self-direction
2. Experience based - adults learn through using their own and each others' experience
3. Immediacy of application - adults become ready to learn when they experience a need to know or to do something in order to perform more effectively in some aspect of their lives
4. Learner-centredness - adults have a task-centred or problem-centred orientation to learning
5. Learner responsibility / self determination - for many adults, the internal motivators of self-esteem, increased self-confidence, and recognition are more potent than the external motivators of promotion, salary increase

Welton, M. *Toward development work: The workplace as a learning environment,* Geelong: Deakin University Press, 1991

Marsick and Watkins (1990) stated that people "learn from their experiences when they face a new challenge or problem".

Marsick, V.J. & Watkins, K.E. (1990), *Informal and Incidental Learning in the Workplace*, Routledge, London, UK.

Profile of schools in Waste Wise and respondents to data collection instruments

Profile of schools in Waste Wise and from the surveys to both Waste Wise and Non-Waste Wise schools

For the purposes of this review the information provided by the Waste Wise Team shows that there were a total of 384 schools in the program. These schools were all offered an opportunity to complete an online survey. They were emailed or faxed a pre-survey notice and asked to confirm their email address. The number of Waste Wise schools for which email address contacts were confirmed was 361. Two surveys were sent to Waste Wise schools, one to Principals and the other to teachers who attended the workshops. These surveys generated the following response rates:

- Principals (or their delegates) to comment on their school approach and achievements - 71 respondents (i.e. 19.7% response rate)
- Teachers who attended the professional development - 52 respondents (i.e. 14.4% response rate)

The majority of schools in the group that responded to the survey to Waste Wise Principals (or their delegates) were:

- Primary (58 i.e. 81.7%)
- With a student population of between 100 to 500 (46 i.e. 64.8%)
- Having participated in Waste Wise since 2002 with most having been involved in for around 2 or less years

A further 619 Non-Waste Wise schools (for which current email addresses were provided by the Information Services, Department of Education and Training WA) were sent an email inviting them to respond to a survey about 'Waste Prevention and Minimisation in your school'. There were 136 respondents (i.e. a 22% response rate).

- Primary (85 i.e. 61.6%)
- With a student population of less than 100 up to 500 (124 i.e. 82.6%)

See Tables 1, 2, 3, and 4 following.

TABLE 1: ANALYSIS OF WASTE WISE SCHOOLS AND ALL SURVEY RESPONDENTS BY SECTOR AND LEVEL

Sector and Level of Schools	**All Schools in WA** *(1)*	**All Waste Wise WA Schools – Target Sample for Survey to Schools** *(2)*		**Survey to Schools Response** *(completed by Principal or their delegate)*		**Survey to Teachers who did workshops Response**		**Survey to Non-Waste Wise Schools Response** *(619 were schools sent email invitations)*	
	No.	*No.*	*% of All Schools*	*No.*	*% of Target Sample (3)*	*No.*	*% of Target Sample (3)*	*No.*	*% of Target Sample*
Gov Primary	547	223	40.8%	47	21.1%	31	13.9%	69	21.3%
Non-Gov Primary	159	*n/a*	*n/a*	10	*n/a*	9	*n/a*	14	*n/a*
Total Primary	***706***	*n/a*	*n/a*	***57***	*n/a*	***40***	*n/a*	***83***	*n/a*
Gov Secondary	159	56	35.2%	4	7.1%	4	7.1%	11	10.7%
Non-gov Secondary	42	*n/a*	*n/a*	0	*n/a*	0	*n/a*	4	*n/a*
Total Secondary	***201***	*n/a*	*n/a*	***4***	*n/a*	***4***	*n/a*	***15***	*n/a*
Proportion of Gov Primary to Gov Secondary schools	***3.4***	***4.0***		***11.8***		***7.8***		***6.3***	*n/a*
Proportion of Primary to Secondary schools	*3.5*								0.0%
Other Gov	111	18	16.2%	6	33.3%	6	33.3%	25	26.9%
Other Non-gov	108	*n/a*	*n/a*	4	*n/a*	2	*n/a*	13	*n/a*
Total Gov	***817***	***297***	36.4%	***57***	19.2%	***41***	13.8%	***105***	20.2%
Total Non-Gov	***309***	***87***	28.2%	***14***	16.1%	***11***	12.6%	***31***	14.0%
Total All	***1,126***	***384***	***34%***	***71***	18.5%	***52***	13.5%	***136***	18.3%
Actual Survey Invitees and Respondents *(4)*		***361***		***71***	19.7%	***52***	14.4%	***136***	22.0%

Notes:

1.The "All Schools" statistics were downloaded from the DET WA website - 2005 Semester 2

2. The "All Waste Wise Schools" statistics were derived from Waste Wise schools list provided by the Waste Wise Team and compared with statistics for all schools provided by Information Services, DET WA, 2006.

*3. The **percentage of target sample** is indicative only because it is derived from the Total of All Waste Wise Schools (i.e. 384) rather than the Actual Survey Invitees (i.e. 361). It was not possible to get breakdowns of the schools by sector and level for the Actual Survey Invitees. There is therefore, an error of around ± 2% in the **percentage of target sample** estimates.*

4. Whilst the potential number of Non-Waste Wise schools was 742, email addresses were available for only 619 of these schools. Whilst the total number of details for Waste Wise Schools was 384, there were 23 schools that did not provide email contact addresses for the online survey. Thus the actual number of survey invitees slightly was less than the total number of Waste Wise Schools.

TABLE 2: WASTE WISE SURVEY SCHOOLS BY LEVEL BY SIZE

School Level	< 100	100 – 299	300 – 499	500 – 699	700 - 899	900 +	Totals
Primary only	7	16	24	7	4	0	58 *(81.7%)*
Secondary only	0	1	0	0	1	2	4 *(5.6%)*
both Primary & Secondary	0	2	0	2	0	1	5 *(7.0%)*
Specialist	0	0	0	0	0	0	0 *(0%)*
Other	1	2	1	0	0	0	4 *(5.6%)*
Totals	**8** *(11.3%)*	**21** *(29.6%)*	**25** *(35.2%)*	**9** *(12.7%)*	**5** *(7.0%)*	**3** *(4.2%)*	**71**

TABLE 3: NON-WASTE WISE SURVEY SCHOOLS BY LEVEL BY SIZE

School Level	< 100	100 – 299	300 – 499	500 – 699	700 - 899	900 +	Totals
Primary only	21	32	25	5	2	0	85 *(61.6%)*
Secondary only	2	0	2	3	1	7	15 *(10.9%)*
both Primary & Secondary	4	6	6	1	2	1	20 *(14.5%)*
Specialist	2	1	0	0	0	1	4 *(2.9%)*
Other	10	2	1	0	0	1	14 *(10.1%)*
Totals	39 *(28.3%)*	41 *(29.7%)*	34 *(24.6%)*	9 *(6.5%)*	5 *(3.6%)*	10 *(7.2%)*	**138**

TABLE 4: AVERAGE LENGTH OF TIME IN THE WASTE WISE PROGRAM FOR SCHOOLS THAT WERE SURVEYED

Year	Principals	Teachers	Average
2001	6%	2%	4%
2002	14%	12%	**13%**
2003	18%	12%	**15%**
2004	15%	25%	**20%**
2005	30%	35%	**33%**
2006	17%	15%	**16%**

Case study schools

The purpose of conducting the case study visits was not to evaluate each school's progress in waste prevention / minimisation activities and education, but rather to gain insights into some of the distinctive features that enabled a sample of schools to implement Waste Wise strategies. A brief description of some of the key features evident is provided in this section. The schools have not been directly identified.

Seven of the schools were primary (6 government, 1 non-government, 2 non-metropolitan, ranging in size from less than 100 students to around 800). One of the primary schools not considered to be a Waste Wise school was included as a way of understanding how schools outside Waste Wise but nevertheless active were approaching their waste program. This school had not completed the follow-up half day workshop and had no contact with the program, but had nevertheless undertaken significant waste

prevention and minimisation. One school was a government high school (non-metropolitan).

Common elements for all schools were:

- A noticeable passion and energy across the whole school when the Principal is a vocal and energetic promoter of the waste prevention / minimisation behaviours
- Inclusion of the social values underpinning Waste Wise into the school values, ethos, awards and incentives system
- Identification of opportunities for parents and families to support recycling efforts that stimulate enthusiasm and community involvement, and may lead to funds generation e.g. aluminum can collection
- Changing school canteens to provide healthier alternatives that include a reduction of food packaging and contribute to worm farming (by using organic scraps from the Canteen)
- Establishing labeled bin systems for waste stream separating as a first step, and ensuring that students are encouraged in positive ways to sort waste correctly
- Taking an 'evolutionary' (rather than 'revolutionary') approach to changing behaviours amongst both students and staff e.g. by involving students early in the process of establishing waste sorting systems and slowly building on a base of changed behaviours; working with student and staff volunteers initially and promoting their achievements
- Contextualising the approach to the specific school context i.e. including teacher interests, student demographics

Profile of Waste Wise Teachers who responded to the survey as participants in the Professional Development Workshops

The Waste Wise Team's statistics show that the number of participants in the initial full-day workshop has been 427 since 2001. See Table 5 on the following page.

The number of Waste Wise Schools is 384. Schools are encouraged to send more than one staff representative and this accounts for the difference of 43 people. Schools have sent their grounds person, administrative staff, Principal, or another teacher.

As mentioned earlier, the number of Waste Wise schools with current email addresses was 361. Of these, some 52 (or 14.4%) of teachers who had participated in the professional development workshops responded to the survey. See Table 1 previously. Most of these teachers were from:

- Primary schools – 40 (i.e. 76.9%)
- In particular, Government Primary schools – 31 (i.e. 59.6%)

Some 10 schools replied by email that the teachers who had done the training were no longer at the school; and an additional 4 schools emailed to say their Waste Wise teachers on were on leave.

TABLE 5: WASTE WISE TEAM STATISTICS OF PARTICIPANTS IN FULL-DAY INITIAL PROFESSIONAL DEVELOPMENT WORKSHOPS

Year	**Number of workshops**	**Number of participants**	**Average participants per workshop**
2002	11	96	8.72
2003	10	113	11.3
2004	8	90	9
2005	6	93	17.6
2006	2	35	17.5
Totals	37	427	

Note:
This table does not include numbers for all PD workshops conducted by the Waste Wise Team, only the initial full-day sessions.

Limitations of the methodology and implications for conclusions

Use of self report data

The review is heavily dependent on self-report data from schools. However because the review draws on several sources of data to address each issue there is some opportunity to look at whether the data from different sources are consistent with each other i.e. to triangulate the data.

Issues of attribution – cause-effect

We cannot be sure that the participating schools would have acted differently or progressed at the same rate had they not been part of the Waste Wise. The review did not assess progress made over the same time period by schools that had an interest in waste prevention / minimisation but which have not participated in the WWSP.

The survey to Non-Waste Wise Schools was an attempt to get some comparison. Where useful, this data has been compared with that provided by Waste Wise Principals (or their delegates).

Participating schools were asked to reflect on what they believe happened as a result of being part of WWSP.

There has been some attempt during both the collection of data and the interpretation of results to distinguish between the progress that each Waste Wise school has making towards preventing and minimising waste and the role that the WWSP is playing in assisting the school. Accordingly it cannot be automatically assumed that the progress schools made was due to the WWSP. Therefore consideration has been given to school views about the role of the WWSP in producing changes.

Qualitative and quantitative data

The qualitative data from the case study schools is very useful for developing an understanding of how the program is working in a range of contexts. However the case study data cannot be used to make quantitative statements about what the majority of schools are doing. The case study data contributed to the development of the surveys to schools and these surveys enabled the development of quantitative statements.

The types of rating scales and brief descriptions of achievements that can be used as part of the school surveys cannot possibly capture the complexity and richness of the achievements of the program and the challenges it confronts. It was not within the scope and resources of this review to collect and conduct analysis of extensive qualitative data. Instead illustrative examples of types of achievement are provided rather than a comprehensive account of achievements.

Survey data

The response rates for the 3 online school surveys was ranged from 22% (Non-Waste Wise schools); 19.7% (for Waste Wise schools Principals); and 14.9% (for Teachers who attended the professional development workshops).

A sample size of between 10% and 20% is generally considered sufficiently representative of a group. A group of around 30 or more individuals is the usually accepted minimum for studies. Taking this into account, the response rates are sufficient – as always, a greater rate is preferable!

STRUCTURE OF REPORT

The findings are presented in 4 chapters:

Chapter 1 discusses the progress made by schools in terms of Levels 1 and 2 in the outcomes hierarchy. These relate to initial engagement and commitment to participating in WWSP through the offer of free workshop with some reimbursement for teacher release.

Chapter 2 discusses progress made by schools in relation to Levels 3 and 4 in the outcomes hierarchy. These relate to the development, implementation, ongoing monitoring and review of the school's approach to the incorporation of waste prevention / minimisation activities and education in the whole school community.

Chapter 3 looks at some of the indications of school progress towards the becoming working models of waste prevention and minimisation in their communities, specifically in terms of the likelihood of behaviours enduring in the school, and its broader community.

Chapter 4 comments on the achievements of Waste Wise schools and the program overall – the strengths and weaknesses, efficiency, effectiveness, and value for money.

Chapter 5 provides indications of future directions for the further development of the WWSP in relation to the Sustainable Schools Initiative

in WA and presents the reviewer's perspectives on future directions for the WWSP in broad terms, adding to the specific recommendations that have been included in earlier chapters.

Chapters 1 to 4 follow a format which consists of reporting findings from the various sources of data, and concluding with comments and recommendations relating to the outcomes or aspects of the program that have been discussed.

FINDINGS

1. Outcomes of the early stages of the conceptual model – awareness raising, planning and the impact of the teacher professional development

1.1. Extent to which Waste Wise has engaged teachers and their schools in the first steps of participation

The professional development model that Waste Wise uses involves a short, intense, initial workshop of one day with a gap of at least three months before a follow-up half day session is offered. After that, the teachers have a range of options for needs based ongoing support that are less resource intense (time, cost) and enable a more customised response. These include:

- email and telephone support from a Waste Wise team member
- Waste Wise Website and Newsletter
- access to grant money
- the mobile display as an 'incursion'

The first step in participating in the WWSP program is therefore, for a school to send at least one staff representative to attend a full day workshop. There is an option for regional teachers to complete the workshop module online however, few take up this option preferring a face to face learning experience.

The Waste Wise Team in DOE advertise upcoming workshops through various networks including the Waste Wise website, School Matters Magazine, the Department of Education and Training's (DET) portals and publications, the Independent Schools Association and Catholic Education portals and by faxing schools located in the vicinity of where the workshops are to be held. A majority of Waste Wise schools heard about the workshop by receiving a flyer (59% of Principals). Of the Non-Waste Wise schools only 33% heard about it through the flyer and 22% by word-of-mouth either from a colleague in the school or other schools, some 46% had never heard of Waste Wise. Thus, when schools in a vicinity where the workshop is to be held receive a flyer, they are more likely to respond to that rather than any other form of promotion. See Table 6 below.

TABLE 6: HOW SCHOOLS FOUND OUT ABOUT WASTE WISE

Ways schools found out about Waste Wise	***Non-Waste Wise schools***	***Waste Wise schools***
I have never heard about it	46%	
I have heard about it from colleagues in other schools	15%	

I have heard about it from colleagues in this school	7%	
We received a flyer about the Waste Wise professional development	33%	59%
Other	8%	

The Waste Wise Team members reported that they have unmet demand from their promotions and feel frustrated that they are unable to provide more frequent sessions. Table 5 earlier in this report (see page 16) shows that the Team has become more efficient in delivering fewer workshops with a higher participation rate:

- from 11 workshops in 2002 with an average of around 9 attendees and 96 for the whole year
- to 6 workshops in 2005 with an average of around 18 attendees and 93 for the whole year

It is interesting to note that over half (59%, 29) of the teachers found out about the Waste Wise workshop and requested approval to participate. A majority of the teachers had already been interested in waste or environmental education for some time (73%, 35).

The strategy of promoting the workshop sessions through targeted flyers with use of additional media channels is generating more than sufficient demand. It is also drawing out the 'right people' i.e. teachers with an interest and motivation to take on the challenge of implementing this initiative. In change management terms, outlined by Everett Rogers[3], these are the 'Innovators', 'Early Adopters' and 'Early Majority'.

A requirement of the program before attending a workshop is a signed commitment to the program from the Principal and a completed survey detailing the school's waste and recycling details. Written commitment is considered an important factor in community based social marketing theory. See Box 3 below for the range of ways that the Waste Wise Team uses this theoretical approach to strengthen their program.

BOX 3: A LIST OF THE COMMUNITY-BASED SOCIAL MARKETING TOOLS AND HOW THE WASTE WISE PROGRAM USES THEM[4]

- Commitment – Written commitment from the schools Principal and teachers involved.
- Prompts – participating and accredited schools signs and topic posters.
- Norms – peer influence through newsletters, case studies, inter school visits.
- Communication – delivery of an easy to remember, credible message through using captivating information with a community focus.
- Incentives – positive media, financial gains and fulfilling curriculum requirements.

The Waste Wise Team feel that written commitment from the Principal is an important tool in ensuring the Waste Wise teacher has the support of their school and that the school is committed to implementing a whole school approach to the program. Similarly, having an indication of the current

[3] See Rogers, E.M. (1995). *Diffusion of innovations (4th edition)*. The Free Press. New York.
[4] Waste Wise Report, 2005 provided by the Waste Wise Team to the reviewer.

levels of waste in the school is considered to be a basic first step in awareness raising so that teachers who attend the workshops are more likely to be responsive to the messages and information they receive.

In Chart 1 below, the surveys showed that,

- Knowing that they had the support of their Principal was a very important factor (i.e. applied a lot) for 46% (24) of the teachers, and 'a little' for 27% (14)
- Having done the initial waste survey and knowing what their school's baseline data was not as important and only applied 'a lot' for 24% (12) of the teachers compared to 39% (20) who ticked 'applies a little'

For those teachers who attended the workshops with colleagues from their school, 13 out of 16 said that this was helpful as it gave them additional support back in the school. The following statements were typical of the 15 teachers who added comments to this question in the survey.

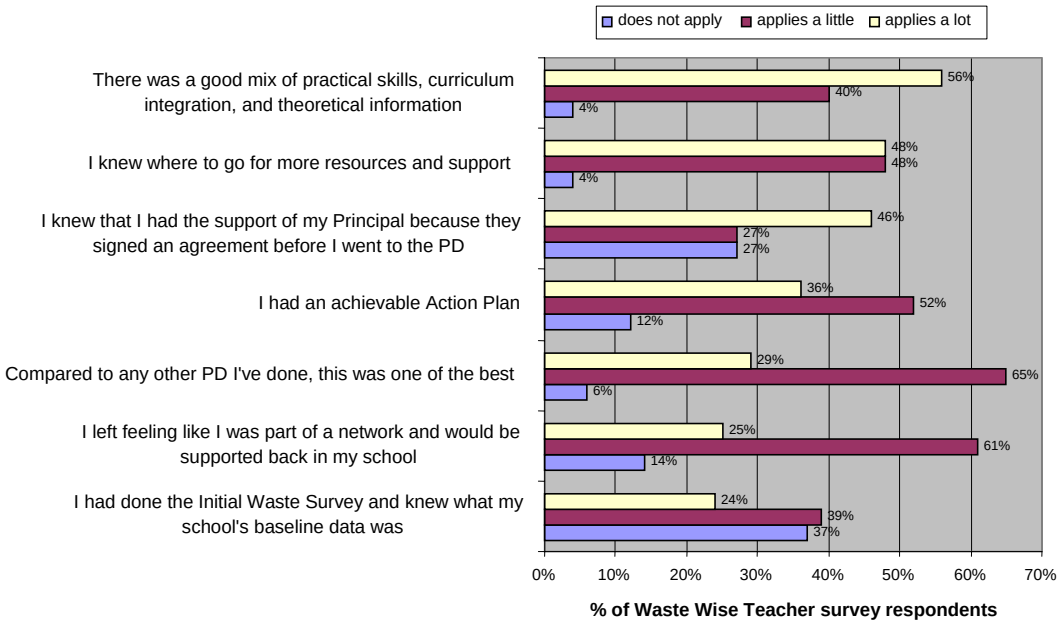
> Provided support for implementing projects
> I would have liked another from this staff as it would have been the beginning of a school-based team rather than a lone individual introducing the program.
> somebody to bounce ideas off, assist in program implementation, and share responsibility
> It meant that Waste wise was encouraged throughout the school

In summary, having the support and commitment of their Principal is likely to be an important enabler for teachers undertaking Waste Wise implementation. Despite the encouragement of Waste Wise, teachers are less likely to do the initial waste audit in the early stages of their involvement with the program. Teachers who were able to have their colleagues with them felt additionally supported.

At the end of the initial workshop, teachers are asked to consider how they intend implementing Waste Wise in their school, the best 'approach', and draft an action plan and timeline. They are asked to then return in approximately 3 months for a half-day follow-up session where the Waste Wise Team encourages them to share their experiences, gain strategies and support from one another and further consolidate their action plan.

Whilst only 36% (18) teachers felt strongly that they had an achievable action plan, a majority (56%, 29) felt that there was a good mix of practical skills, curriculum integration, and theoretical information; and almost half (48%, 25) felt strongly that they knew where to go for more resources and support. Almost a third (29%, 'applies a lot') were enthusiastic in rating the workshop as 'one of the best' they had attended, of the remainder the majority (65%, 'applies a little')) rated the workshops as comparable to the other workshops they had done.

Chart 1: Effectiveness of Waste Wise PD



A significant majority of teachers felt that the workshops were useful and worthwhile to varying degrees (i.e. either 'somewhat' or 'very'). Very few (less than 12%) felt that the workshops were not at all useful. See Chart 2 below. The teachers felt that the workshops were most useful and worthwhile in helping them to:

- undertake waste prevention and minimisation activities with their classes (49% 'very', 45% 'somewhat')
- integrate waste education in their classroom (47% 'very', 47% 'somewhat')

The teachers were less confident that the workshops had helped them to:

- develop and implement a systematic whole school approach to waste prevention and minimisation (22% 'very', 73% 'somewhat')
- integrate waste education into the whole school curriculum (16% 'very', 73% 'somewhat')

Comments by surveyed teachers regarding the strengths, weaknesses, and suggestions for improvements of the professional development workshops are provided in Table 7.

The main strengths identified related well to the criteria for adult and work-based learning listed earlier in this report (see Methodology page 11). They were:

- availability of resources
- informative
- practical
- empowering, reassuring
- the knowledge and expertise of the Waste Wise Team
- raised awareness of waste management issues

- networking with other teachers
- knowledge of what can be achieved

Case study schools also highlighted these strengths and often praised the expertise and enthusiasm of the Waste Wise Team members.

The weaknesses and suggestions for improvement that Waste Wise could consider related to on-going post-workshop support for teachers through local networks, information exchange, more curriculum resources with some attention to the specific needs of high schools.

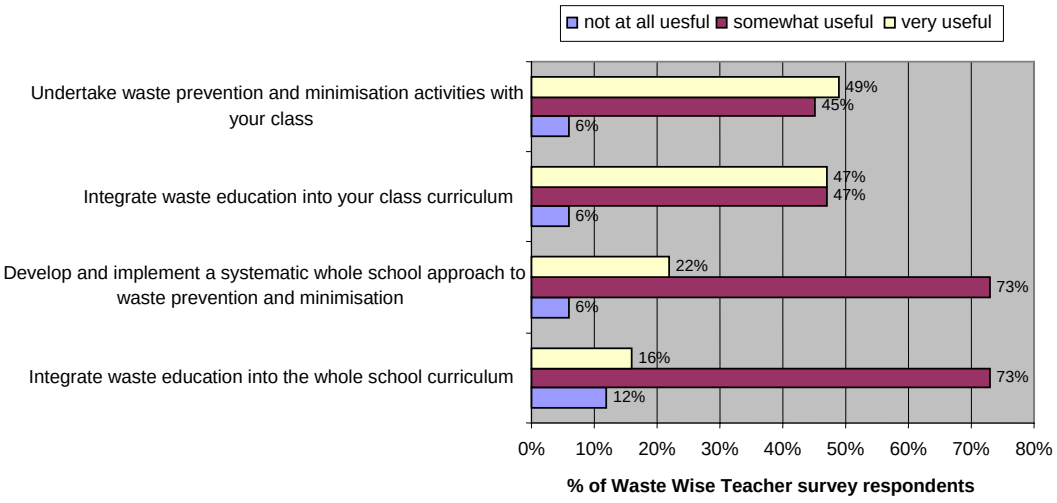
TABLE 7: WASTE WISE PROFESSIONAL DEVELOPMENT - STRENGTHS, WEAKNESSES AND SUGGESTIONS FOR IMPROVEMENT

Strengths of Waste Wise workshops (36 comments)	
Summary	**Typical Quotes**
• availability of resources • informative • practical • empowering, reassuring • the knowledge and expertise of the Waste Wise Team • raised awareness of waste management issues • networking with other teachers • knowledge of what can be achieved	• *Awareness of programs, resources and other teacher support.* • *Information and ideas on how to get started and how to do it.* • *The positive support and availability of resources.* • *The PD is very practical and applies very well to school situations. The team realise the difficulties in implementing such programs and have practical achievable solutions to them. It was great!* • *Waste Wise really helped us to apply some of the waste-saving ideas we were collecting. Their enthusiasm is contagious* • *Practical real life and purpose activities ability to integrate across outcomes and values* • *It was very worthwhile in raising awareness of waste management issues & empowering participants to respond to these issues; opened up all sorts of possibilities* • *It's a fantastic program; reassured us that we were on the right path* • *Waste Wise provides the motivation and support for the school to develop a comprehensive program.* • *Awareness of what is available, what can be achieved and generally what other schools are doing* • *Allowing teachers to see that the Waste Wise program does not have to be a huge effort on your part. Teachers are very busy people and when they want to take part in a program, the amount of work involved plays a huge role in if that program is taken up and implemented or not.* • *The knowledge of the waste wise team when I have a query, they have always been able to help.* • *It enables schools to have a focus with support networks in place* • *Couldn't do it without it.* • *It shows that minimising waste is important enough to have a recognised body to promote and educate about it.* • *Awareness. Reinforced our philosophy.* • *Very informative with a vast amount of ideas to start off small and increase the school's involvement. A valuable resource that unfortunately I haven't tapped into enough.*
Weaknesses of Waste Wise workshops (19 comments)	
Related to Waste Wise	**Related to the School context**
• Grant money not coming through • Other teachers lack of participation • Ongoing follow-up and more workshops for classroom teachers to better support the whole school approach • Lack of secondary school focus and approaches • Linking with more open-ended student activities that also satisfy the curriculum • A stronger connection and network for Waste Wise schools – mentoring and information exchange • Updated website that also connects schools so they can network	• Not enough time to be able to implement • Too many competing projects and priorities back at school • Lack of responsiveness from school • Maintaining ongoing enthusiasm and momentum in the school
Suggestions for improvement (23 responses)	
• Funding for teacher / staff release for workshops, planning, coordination etc (7 comments) • Networking with other schools to share ideas (4 comments) • More specific involvement by Shire / Council (3 comments) • More curriculum resources and comprehensive information (1 comment)	

- Marketing and promotion of successes (1 comment)

This is a reasonable response and highlights the fact that the workshops are intended as a catalyst to create action in the early stages of adoption. Once they have done the one and a half days, the teachers know where to go to for more resources and support and are able to begin making changes in their classrooms. In the limited workshop time it is not reasonable to expect teachers to have learnt the required skills in waste education and change management to achieve systematic whole school change. This occurs on-the-job as work-based learning. Teachers are generally familiar with this approach and if given sufficient knowledge, skills and access to resources, they have sufficient professional capability to adapt and customise. The results of the survey suggest that the Waste Wise workshops are providing the necessary tools for teachers to springboard into action back in their schools. This will be highlighted again in the next section in relation to curriculum integration.

Chart 2: Ways in which teachers felt the Workshop sessions helped



Once schools became engaged with Waste Wise through attending the workshops, what were the reasons they continued? The surveys to Principals and teachers provide some interesting results. These results are compared to a similar list that were presented to the Non-Waste Wise schools as potential 'incentives' for participation, see Table 8.

The flexible, school-centric and evolutionary approach promoted by Waste Wise was of most importance to both Principals and teachers. Both teachers and Principals appreciated knowing that they would be able to get practical information and ongoing support from outside the school. Principals were also concerned to fit Waste Wise with the school's approach to school improvement (both student behaviour and the physical appearance). Non-Waste Wise Principals felt that the most substantial incentive for participating in Waste Wise would be its ease of linkage to curriculum and experiential learning.

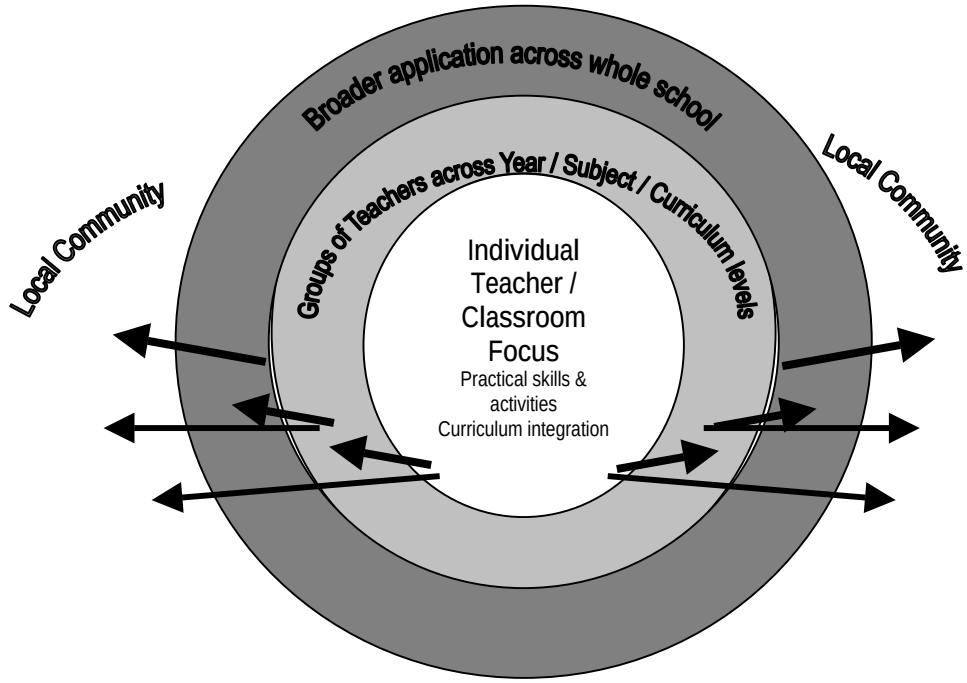
TABLE 8: FACTORS AFFECTING DECISION TO PARTICIPATE IN WASTE WISE FROM THE PERSPECTIVES OF BOTH THE PRINCIPAL AND TEACHER

MOST IMPORTANT FACTORS	
Principal	**Teacher**
• We felt that it was OK to start small and build the program (72% 'applied a lot') • The Waste Wise Team allowed us to be flexible & we were encouraged to find an approach that suited us (61% 'applied a lot') • Waste Wise fitted well with our approach to student behaviour improvement and increasing student commitment to the school (60%'applied a lot') • Practical information and resources were made available to us (59% 'applied a lot') • Waste Wise is a way of systematically improving school appearance (54% 'applied a lot') • Waste Wise provides a mechanism for involving parents and the local community in the school (51% 'applied a lot')	• I was encouraged to start small and build the program (61% 'applied a lot') • The Waste Wise Team allowed us to be flexible & we were encouraged to find an approach that suited us (56% 'applied a lot') • I felt that I could get support from outside the school to undertake waste / environmental activities (55% 'applied a lot') • Practical information and resources were made available to me (50% 'applied a lot')
Non-Waste Wise Principal	
• Waste Wise activities can be easily linked to curriculum and provide experiential learning (53% 'applied a lot') • Waste Wise is a way of systematically improving school appearance through litter reduction strategies (50% 'applied a lot') • Curriculum resources are given to participants (49% 'applied a lot')	
FACTORS OF SOME IMPORTANCE	
Principal	**Teacher**
• The program offered ongoing support to teachers and the school (45% 'applied a lot') • Curriculum resources were made available to us (44% 'applied a lot') • The Waste Wise Team were available to us by 'phone & e-mail (39% 'applied a lot') • We knew that we could have the mobile display visit the school for an incursion (38% 'applied a lot') • We felt that we would be able to save money through waste minimisation (36% 'applied a lot') • There was the likelihood of getting additional funds through grants (31% 'applied a lot')	• The Waste Wise Team were available to us by 'phone & e-mail (43% 'applied a lot') • The school would get recognition for being a Waste Wise school e.g. a certificate, a sign (37% 'applied a lot') • I knew that we could have the mobile display visit the school for an incursion (35% 'applied a lot') • Curriculum resources were made available to me (33% 'applied a lot') • The Principal received a flyer about the PD & thought it would be good for me to go (29% 'applied a lot') • There was the likelihood of getting additional funds through grants (29% 'applied a lot')
Non-Waste Wise Principal	
• Practical information and resources are provided during the workshops and after on request (48% 'applied a lot') • The program offers free ongoing support to teachers and the school (46% 'applied a lot') • The Waste Wise Team encourages schools to find an approach that suits each school context (46% 'applied a lot') • Schools are encouraged to start small and build the program (44% 'applied a lot') • There is the likelihood of getting additional funds through grants (44% 'applied a lot') • The Waste Wise website has resources and information on it (41% 'applied a lot') • Waste Wise provides a mechanism for involving parents and the local community in the school (41% 'applied a lot') • Schools can claim $200 reimbursement towards the cost of sending a representative to the PD (36% 'applied a lot') • Schools are helped to do waste surveys and find ways of saving money (36% 'applied a lot') • The PD is free & schools can send more than one representative (32% 'applied a lot') • There is a follow-up half-day PD after about 3 months, with a $100 reimbursement available (31% 'applied a lot')	
LEAST IMPORTANT FACTORS	
Principal	**Teacher**
• We wrote a Waste Policy for the school that helped us formalise what we were doing (24% 'applied a lot') • We were given a certificate and sign for the school (23% 'applied a lot') • We did an initial waste survey and realised that we could save money (19% 'applied a lot')	• Through Waste Wise I was connected to a network of other teachers involved in waste and/or environmental education (24% 'applied a lot') • I did an initial waste survey and realised that we could save money (17% 'applied a lot') • We wrote a Waste Policy for the school that helped us formalise what we were doing (16% 'applied a lot')
Non-Waste Wise Principal	
• Schools are helped to write a Waste Policy that integrates and formalises its activities (30% 'applied a lot') • The Waste Wise mobile display is available to participating schools for an incursion (29% 'applied a lot') • The Waste Wise Team are available by 'phone & e-mail (27% 'applied a lot')	

- Participating schools are given a certificate and sign (19% 'applied a lot')

There may be an opportunity here for the Waste Wise Team to build on one of its strengths of the professional development and further emphasise classroom-centric skills and curriculum integration training as an important first step. Diagram 2 is an attempt to show this with an initial focus on the individual teacher in their classroom that spreads to groups of teachers, the whole school and potentially the broader community.

Diagram 2: The way Waste Wise Professional Development model places its initial training focus on the individual teacher with support for influencing others in the school and beyond



The development of a formalised waste policy, the possibility of conducting waste audits and achieving savings, as well as formal recognition (a sign or certificate) appear to be amongst the factors of least consideration in participating in Waste Wise for both Waste Wise and Non-Waste Wise schools. This is understandable when these factors are compared to the higher ranking ones related to curriculum, student engagement in learning and student outcomes, ease of integration in a context of competing priorities and limits on time availability. However, this is a concern for the Waste Management Board that schools see waste audits and monitoring as having least importance. This means that schools are less likely to have the data required to show that they may be making significant reductions in waste to landfill. This issue is further discussed in Section 2.2.

Both Waste Wise and Non-Waste Wise schools emphasised student learning and teacher priorities above operational administrative school management.

Overall, Waste Wise is successfully attracting teachers and their colleagues to its workshop sessions. Teachers and Principals respond most to the flyers sent to their school and to the opportunity to do the workshop in the vicinity of their school. The workshops are most useful in enabling teachers to begin undertaking waste prevention and minimisation within their classes through practical activities and curriculum integration. They have some understanding of the need for a whole school approach. Principals and teachers are prepared to continue with Waste Wise because it promotes a flexible, school-centric and evolutionary approach as well as providing ongoing support.

1.2. Extent to which the Waste Wise Schools Professional Development workshops reflect best practice and support teachers to achieve curriculum outcomes

In general, the teachers responded well to the workshops and felt that they were worthwhile and useful in providing the knowledge, skills, information and ongoing support to begin to design and implement Waste Wise primarily in their classrooms and their schools. (See Chart 2 previously page 30)

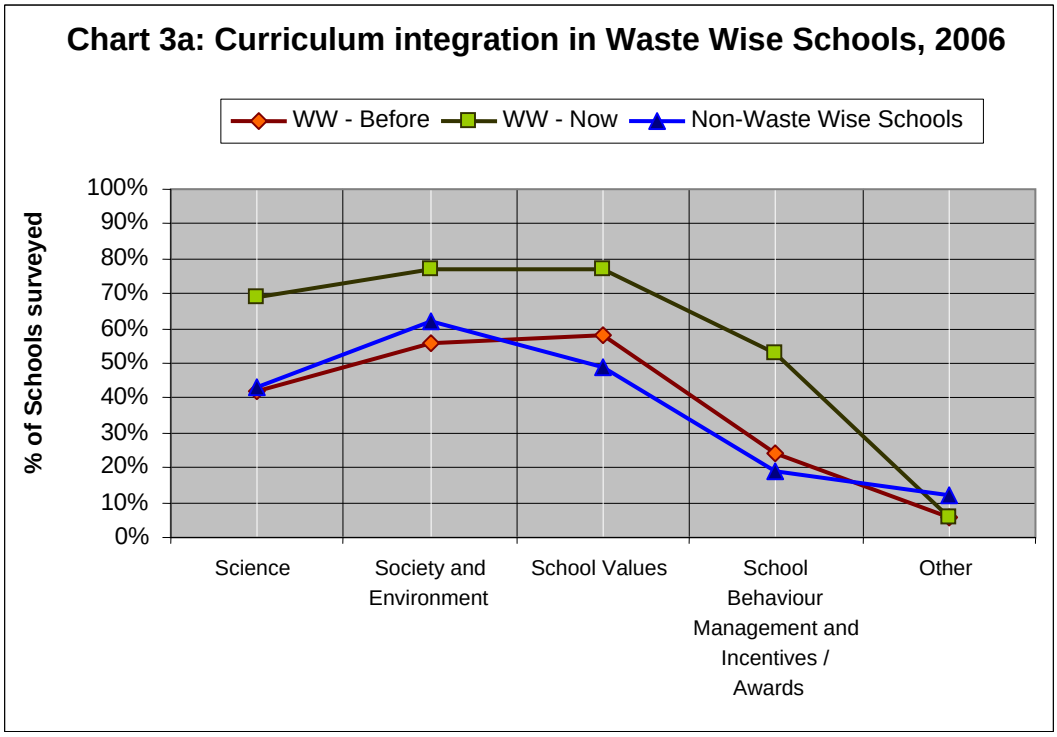
Compared to the levels of integration of waste prevention / minimisation into the curriculum before becoming a Waste Wise school to the present time, schools reported a significant increase for each of the two key curriculum areas of Science (27%) and Society and Environment (21%). They also reported having integrated waste education and behaviours into the school values (19% increase) and the school behaviour management and incentives and awards (29%). See Table 9 and Charts 3a and b. Non-Waste Wise schools remained at similar levels to those reported by Waste Wise schools at the initial stages (i.e. 'Before').

There were also significant differences between current practices in Waste Wise and Non-Waste Wise schools. In general Waste Wise schools had higher curriculum integration levels - 15% higher for Society and Environment and 26% higher for Science. Interestingly, Waste wise schools had a higher rate of use of waste prevention and minimisation behaviours integrated into school values (+28% more than Non-Waste Wise schools) and behaviour management incentives / awards (=34% more than Non-Waste Wise).

These very positive results reflect a strength in the Waste Wise professional development in relation to supporting teachers to achieve curriculum integration and the required curriculum outcomes. Chart 3b shows that Waste Wise schools generally have a higher participation rate in environmental education activities than Non-Waste Wise schools, and may re-prioritise their activities once they become Waste Wise schools (e.g. reduced involvement in Ribbons of Blue, increase in Clean Up Australia).

TABLE 9: LEVELS OF CURRICULUM INTEGRATION WITHIN WASTE WISE SCHOOLS FROM START TO THE PRESENT AND COMPARED TO NON-WASTE WISE SCHOOLS

Curriculum Area / School focus	*% Increase for Waste Wise schools since participating*	*% Difference between Waste Wise and Non-Waste Wise schools*
Science	+ 27%	+ 26%
Society and Environment	+ 21%	+ 15%
School Values	+ 19%	+ 28%
School Behaviour Management and Incentives / Awards	+ 29%	+ 34%



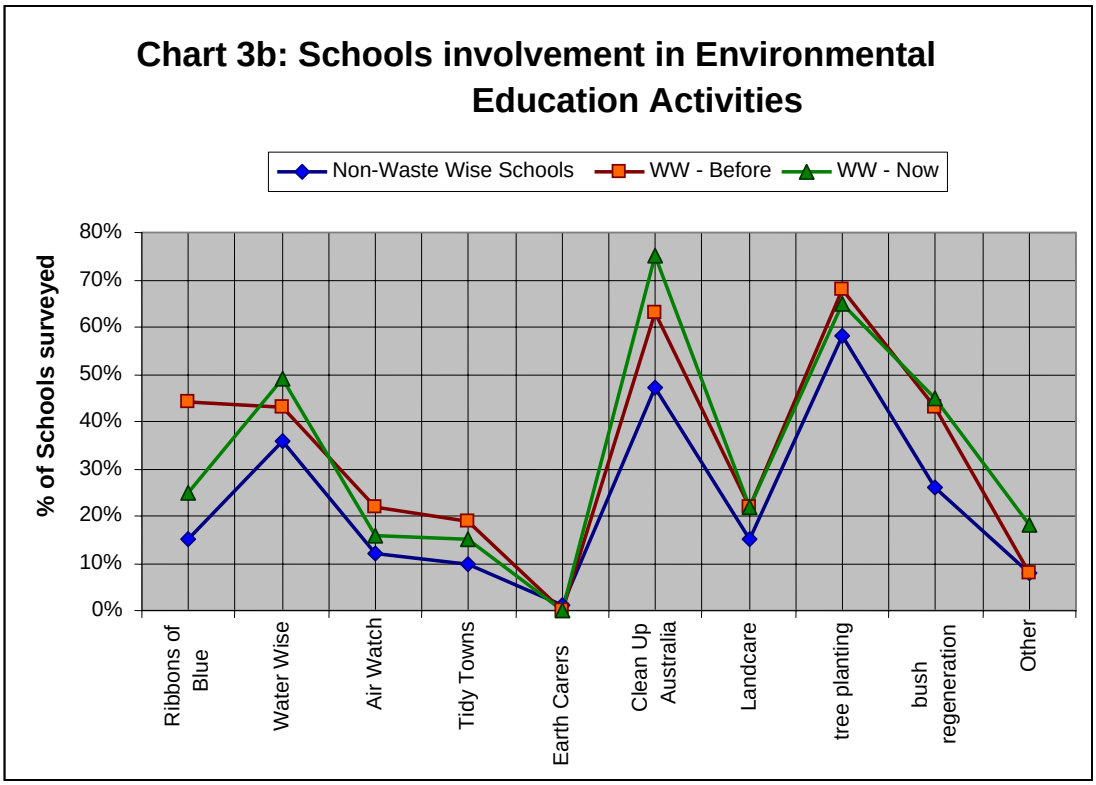


Chart 4 shows the teachers assessment of post-workshop support that was provided to them. Of most use were:

- The Waste Wise Newsletter (77% somewhat or very useful)
- The Waste Wise Website (66% somewhat or very useful)
- E-mail and telephone support from a member of the Waste Wise Team (64% somewhat or very useful)

When it was used, the Mobile display incursion was rated very useful by 37% of the 41% who felt it was somewhat or very useful. Table 10 is an overview of the types of comments about the post-workshop support that teachers added to their survey responses. Most of the comments (16) were positive towards each element, in particular the email and telephone support. A few of the negative comments (7 in all), related to frustrations in waiting for requests to be answered e.g. for a mobile display visit, or a grant approval.

The Waste Wise Team has been proactive in researching and reviewing their activity. In their initial interview, they described ways that they felt they had tried to continually improve and respond to changing circumstances. In 2005, after conducting a survey about the use of the mobile display, the Team realised that a more effective way of supporting schools was to link the mobile display visits to specifically supporting participating Waste Wise schools, rather than visiting any school on request as a stand alone activity. The Team also mentioned the support they give schools by facilitating and brokering relationships between agencies, service providers, and schools.

Whilst it is hard to quantify this sort of effort, the impact of this 'behind the scenes' brokerage cannot be underestimated.

The Waste Wise Team felt that there is a significant level of unmet demand, due to the limitations on their funding, for both the workshop sessions and the mobile display visits. They have waiting list for both and recognise that this is frustrating for schools that are ready to proceed. They mentioned the need for ongoing support of teachers post-workshops and the possibility of establishing local and regional networks. Whilst 'support schools' have been identified, the promotion of networks would require the team to take on this additional task which may be difficult given their current workloads.

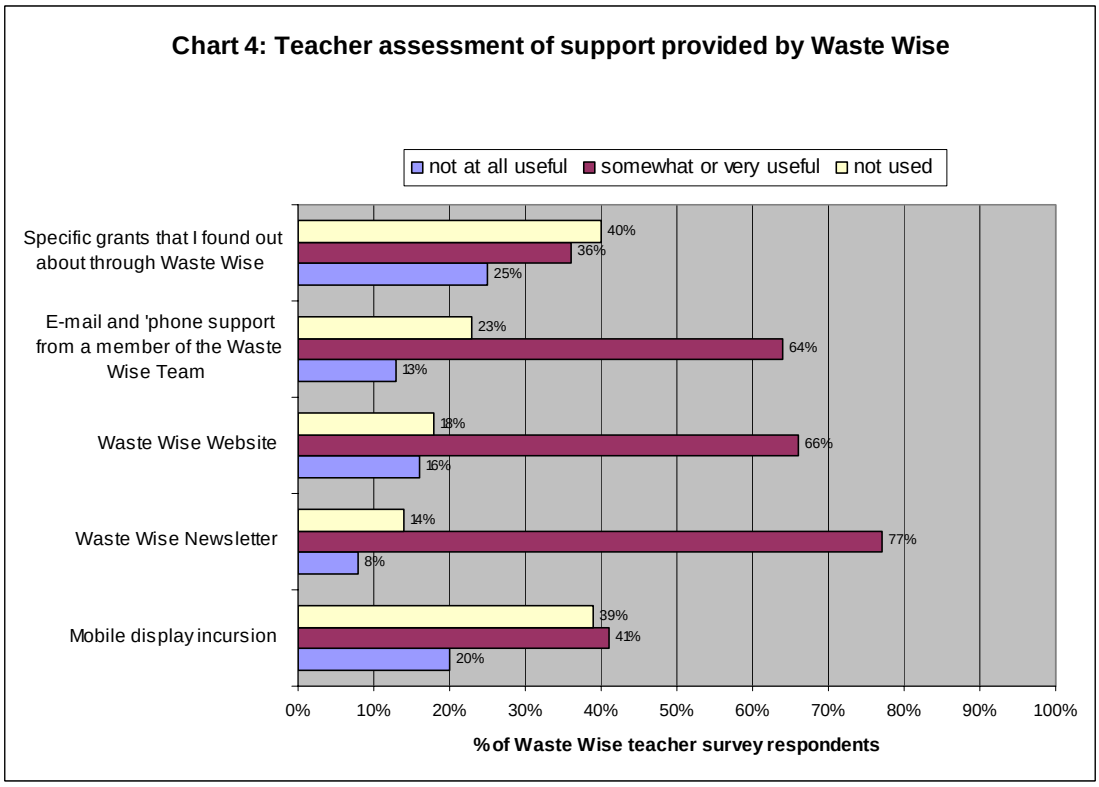


TABLE 10: ANALYSIS OF TEACHER SURVEY COMMENTS ABOUT THE USE OF WASTE WISE POST WORKSHOP SUPPORT

	Positive comments	Suggestions for improvement	Barriers to use from within the school – teacher left, technical IT problems	Waiting for a request to be answered from Waste Wise	Plans to use this support in the future
Mobile display	2	0	1	3	5
Email and telephone	8	0	1	0	0
Newsletter	1	0	2	1	0
Website	4	1	1	2	0
Specific grants	1	0	0	4	2
Total	**16**	**1**	**5**	**9**	**9**

Waste Wise is a significant factor in supporting schools to integrate waste prevention / minimisation into the curriculum. It also offers a model of professional development that includes a range of elements that fit well with the desirable elements of adult and work-based learning. These elements encourage self-directed, experience based, learner centred, practical and easily applicable skills. (See Diagram 1) They are delivered through the following mechanisms:

- Person to person contact through workshops, the mobile display incursions, email and telephone support
- Access to materials, resources, and information through the Waste Wise Kit, newsletter, website, curriculum documents, information fact sheets, links to service providers
- Access to funding through the $200 and $100 payments to schools towards a teacher's release to attend a workshop, the Youth Grants program for small projects related to the school's waste prevention and minimisation activities.

At present the Waste Wise Team members provide the core knowledge and expertise. There is an opportunity to decentralise (i.e. localise or regionalise) and diffuse this role to 'lighthouse' teachers and their schools. This concept is more than providing support schools, it requires a level of resources to conduct 'train the trainer' workshops and mechanisms to fund Waste Wise Regional Trainers / Network Coordinators to plan, promote, conduct, and report on their activities. Their role might be to conduct the initial workshops and also coordinate regular network meetings so that teachers can share and collaborate on curriculum development resources.

2. Outcomes of the intermediate stages of the conceptual model where schools choose and implement a change management approach

2.1. The change management approaches schools choose in relation to the adoption of waste prevention / minimisation behaviours

Waste Wise challenges schools to change their operations in order to implement new systems at all levels (individual, class, and whole school) for both students and staff. It encourages schools to choose an implementation that suits their context. The following possible approaches are suggested[5]:

- a minimalist method (e.g. waste minimisation focusing on paper recycling)
- approaches that are curriculum based
- linked with community action
- an integrated whole school approach

Information from the case study schools suggested that few schools begin with a pre-planned and integrated whole school approach. Only one school of the 8 did this. Survey data mentioned previously highlights the importance to Principals and teacher of promoting a flexible, school-centric

[5] See *The Waste Wase Way: Savings, Benefits and School Operating Practices* (2001), Some approaches to getting started p 13

and evolutionary approach. Below are some details from the case study schools describing the range of their approaches from planned and staged to having a funded coordinator to build awareness and practice to then be able to hand over established systems to other classes and teachers.

BOX 4: INTEGRATED AND PLANNED WHOLE SCHOOL APPROACH – SMALL RURAL PRIMARY SCHOOL

The new Principal in this small rural primary school was required to achieve a dramatic whole school improvement. This school had been deemed to be 'in crisis' by the Department of Education. The Principal was asked to implement projects that engendered care and respect in order to overcome a culture of bullying.

The Principal had prior experience in a remote school using environmental education to build positive values and community cohesion. With staff and some community representatives, they carefully devised an integrated plan that included waste prevention and minimisation (through Waste Wise), water reduction (through Water Wise and Ribbons of Blue), a biodiversity program with a focus on the unique local flora and fauna, and activities to improve relations between community individuals through participation in the school. This formed a coordinated strategy designed to, 'embed sustainable practices in the school that will result in students being committed to values of care and respect for each other and the environment'.

After 2 years, the school has become known for its local environmental activities and this has improved its image and status. Students spoke about the dramatic improvements and having pride in their school because of the recognition they had received through congratulatory letters. In the words of one student, '…then our new Principal came along and everything went whoosh!'

BOX 5: SCHOOLS WHERE A DESIGNATED TEACHER COORDINATOR WORKS TO SLOWLY BUILD THE PROGRAM TO A POINT WHERE IT IS FORMALISED

As part of its strategic planning and community consultation in 2004, a rural high school identified Sustainability and Environmental Education as key concerns. In response to this the Principal allocated 0.2 of their staffing budget to release a teacher to be the 'Sustainability Coordinator'. This person's role has been to slowly build whole school commitment over a 5-year process. A Science teacher with a background in natural resource management, this person is responsible for developing an Action Plan and reporting to the Principal. At the time of interview, an initial plan had been written that incorporated cross-curriculum activities as well as specific Year 8 modules. The main activities so far have related to sorting and recycling waste.

The Principal intends to build awareness and change in becoming a 'Sustainable School' slowly over 5 years using a student-centred approach that ideally involves the whole school. Waste prevention and minimisation is part of this. The Principal is hoping that the Sustainability Coordinator will gain valuable career development skills through this role and is providing strong support and mentoring.

In a similar way, the Principal of a large primary school in a country town allocated funds for 0.2 of a teacher to develop and coordinate the implementation of Waste Wise. The impetus came from the Principal's belief that the positive social values engendered by waste prevention and minimisation fitted well with the school's ethos of encouraging and supporting all students to achieve despite massive social issues in the community. The school motto, 'No child left behind' is visually evident throughout the school. The school

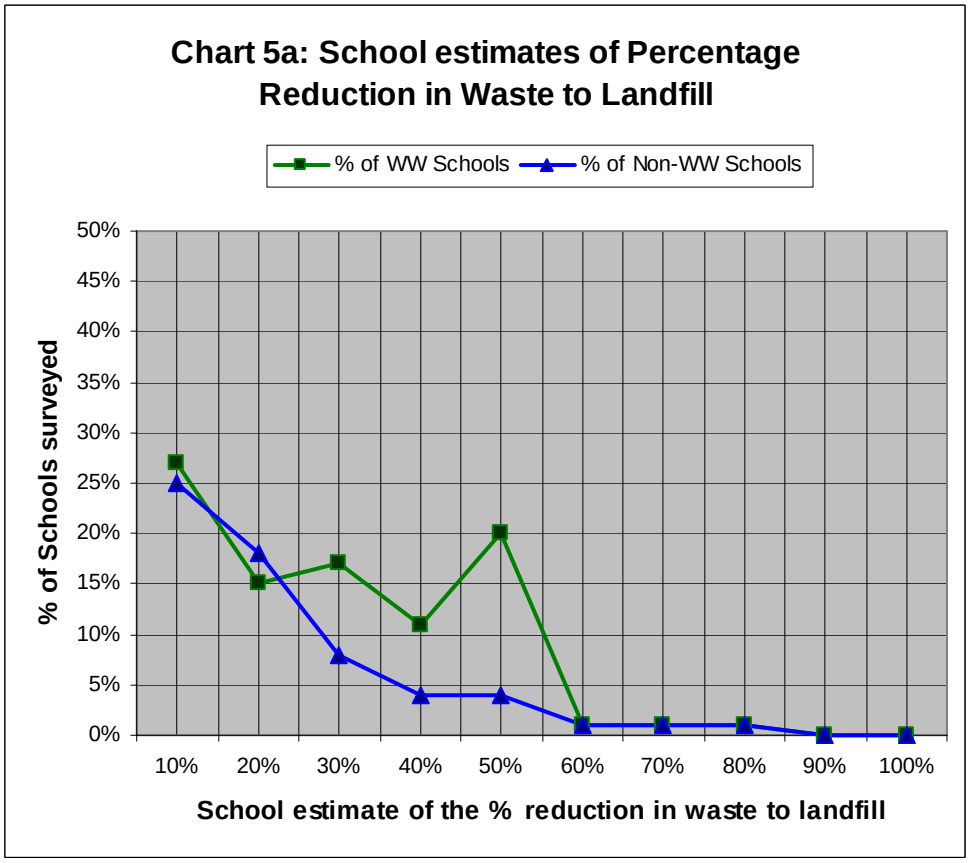
uses Waste Wise activities as another avenue for creating incentives for student successes and having cause for celebration through awards. After a year, the range of activities has grown so that Years 5, 6, and 7 classes with their teachers have responsibility for specific activities (e.g. worm farming and composting – Year 6), and all classes maintain their paper and cardboard recycling systems.

Two other metropolitan medium sized primary schools had similar approaches but the coordinating teachers did not have a regular release time to undertake implementation. This occurred as part of their work with their classes or was occasionally funded.

In the 2 schools where there were funds for a coordinator it was felt that this gave time and credibility to the program. Whilst specific action plans with timelines may not have been formalised the approach was to start small and grow awareness and appropriate behaviours amongst staff and students. Once the coordinators establish a process, the responsibility was then handed over to another staff member and their class to maintain.

From both case study and survey sources it was evident that few schools saw the development of a formalised Waste Policy as important early on. It seems that this may develop later as a description of changed practices in the school and a formal declaration as part of the school values. One school had developed a 'Reduce, Reuse, Recycle' brochure for students, parents and staff as an awareness raising activity and to set a targets for reduction in electricity use, as well as paper reduction and recycling.

2.2. Extent to which schools are reducing waste to landfill – Progress towards achieving 50% reduction in waste to landfill

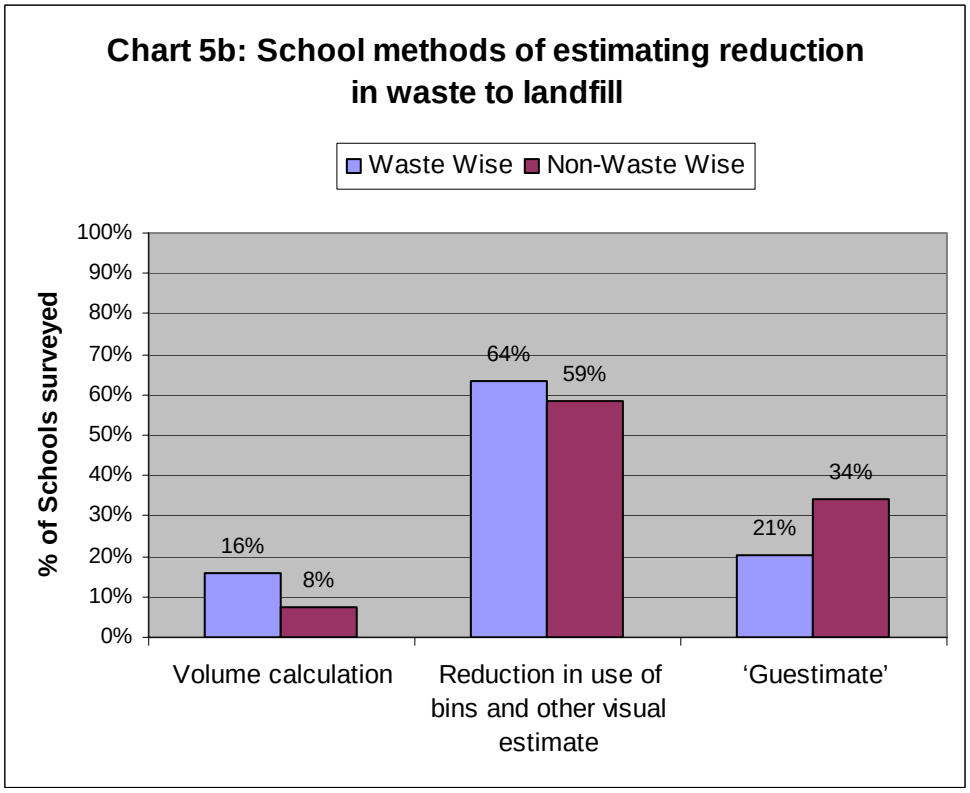


In Chart 5a above it is apparent that Waste Wise schools were more likely to have achieved higher levels of reduction in waste to landfill than Non-Waste Wise schools:

- 20% of Waste Wise schools reported having reduced waste to landfill by 50% compared to 4% of Non-Waste Wise schools (i.e. a difference of 16%)
- 11% of Waste Wise schools reported having reduced waste to landfill by 40% compared to 4% of Non-Waste Wise schools (i.e. a difference of 7%)
- 17% of Waste Wise schools reported having reduced waste to landfill by 50% compared to 8% of Non-Waste Wise schools (i.e. a difference of 9%)

In determining the reduction of waste to landfill, Waste Wise schools are slightly more likely to be specific in their calculations and estimates of reduction of waste to landfill (i.e. 16% compared to 8% for Non-Waste Wise schools). Non-Waste Wise schools are more likely to use very rough 'guesstimates' (i.e. 34% for Non-Waste Wise schools compared to 21%) However, most schools still rely on estimation based on reduction in use of bins and / or visual observation (i.e. 64% compared to 59% for Non-Waste Wise schools).[6]

[6] The descriptions of volume calculations were provided by 44 Waste Wise 53 Non-Waste Wise schools in an open-ended question in the surveys to those schools.



In terms of recycling, schools organise their waste removal in a range of ways. Statistics provided by the Waste Wise Team show that out of a total of 141 schools that SITA services for paper and cardboard recycling (in metropolitan areas) some 95 (or 67%) are Waste Wise schools. SITA services a further 46 Non-Waste Wise schools (33%). See also Chart 5c which shows that a majority of the Waste Wise schools from the survey (58%) use SITA. Waste Wise schools satisfaction levels with their waste removal arrangements are generally quite high (59% of Waste Wise school were 'very satisfied' with their arrangements compared to only 20% of Non-Waste Wise schools). However, there are still around a third of Waste Wise schools and over half (55%) of Non-Waste wise schools that are only 'somewhat satisfied'. Chart 5e shows Waste Wise (41) schools satisfaction levels with their SITA recycling contract for paper and cardboard recycling are similar to those in Chart 5d. The reasons for schools satisfaction (or lack of satisfaction) were not surveyed. A few schools provided additional comments that they had difficulty re-arranging or cancelling pick-ups e.g. during Christmas holidays. It is likely that these issues could be easily solved. This highlights an issue of service provision in relation to all contractors that the Waste Management Board may need to further research. It was not within the scope of this review to undertake an analysis of waste recycling removal services.

Where SITA is not available or the school prefers not to use them[7], schools (whether Waste Wise or not) create ways of removing their recyclables. Rural and regional schools organise various alternatives and local arrangements. Often these local arrangements involve using their grounds

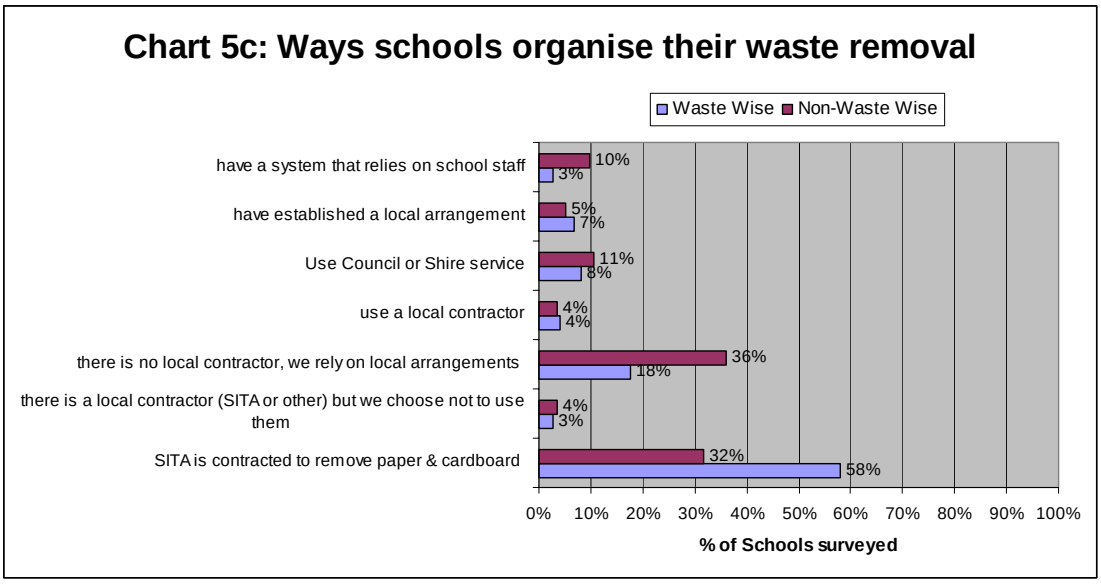
[7] One metropolitan case study school preferred not to use SITA because they felt hat they had a better deal from their pre-existing contractor.

person to transport paper, cardboard, green waste and other recyclables to the local tip as well as relying on voluntary work and community goodwill. Examples of school comments from the survey included:

> *AMCOR takes cardboard Collins Recycling takes cans Toyota Aust takes ring tabs Girl Guides take corks.*
>
> *When the recycling relies totally on community volunteer work it is very difficult to RRR as much as we would like.*

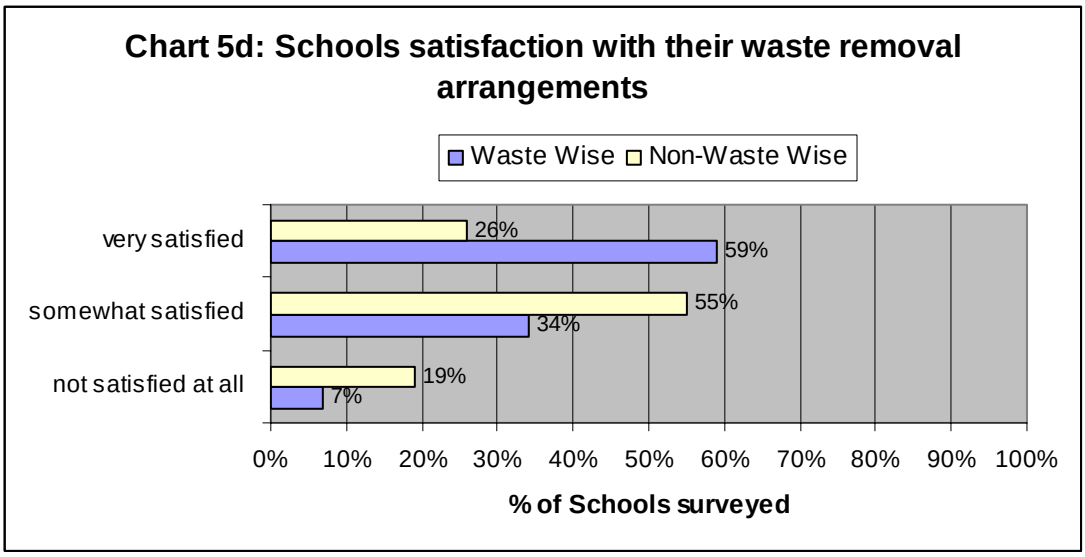
This occurred in 3 of the non-metropolitan case study schools. Each of these schools commented on the lack of support from their local shires and the difficulty in negotiating alternatives. Comments from the surveys support the inconsistencies between Shires and the difficulties for schools:

> *There is no shire policy on kerbside recycling in our town.*
>
> *Very difficult to recycle in country locations*
>
> *When I first approached Busselton Shire in 2004 regarding recycling bins, they informed me they would be free. I am trying to increase the number of bins from 5 to 10 and now they are trying to place a $40/bin fee on them. We have a general large bin for all non-recyclable materials.*
>
> *Shire of Murray pay*

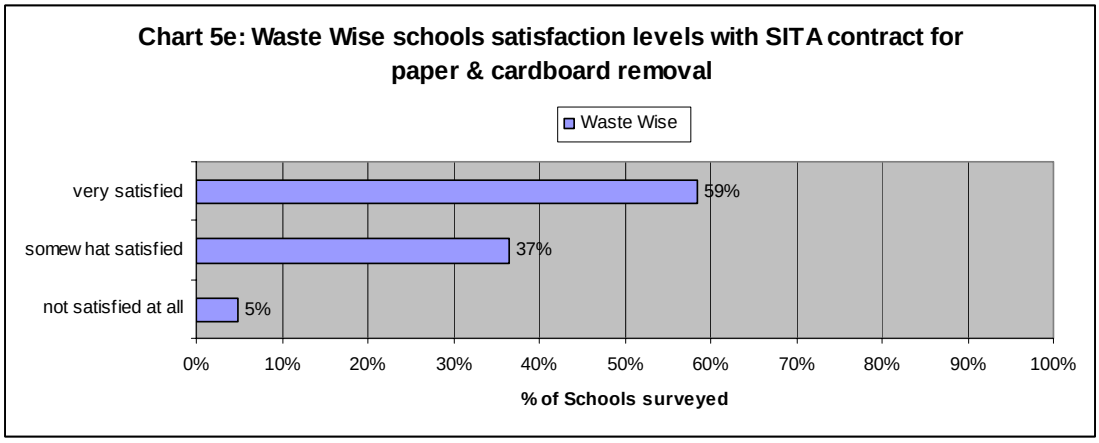


Note: Chart 5c Responses - 74 Waste Wise 114 Non-Waste Wise

The majority of Waste Wise schools (59%) were 'very satisfied' with their waste removal arrangements. Non-Waste Wise schools were far less happy, only 26% were 'very satisfied'.



Note: Chart 5d Responses - 68 Waste Wise 109 Non-Waste Wise



Note: Chart 5e Responses - 41 Waste Wise

2.3. Examples of in the application of the 3R's – Reduce, Reuse, Recycle to the whole school

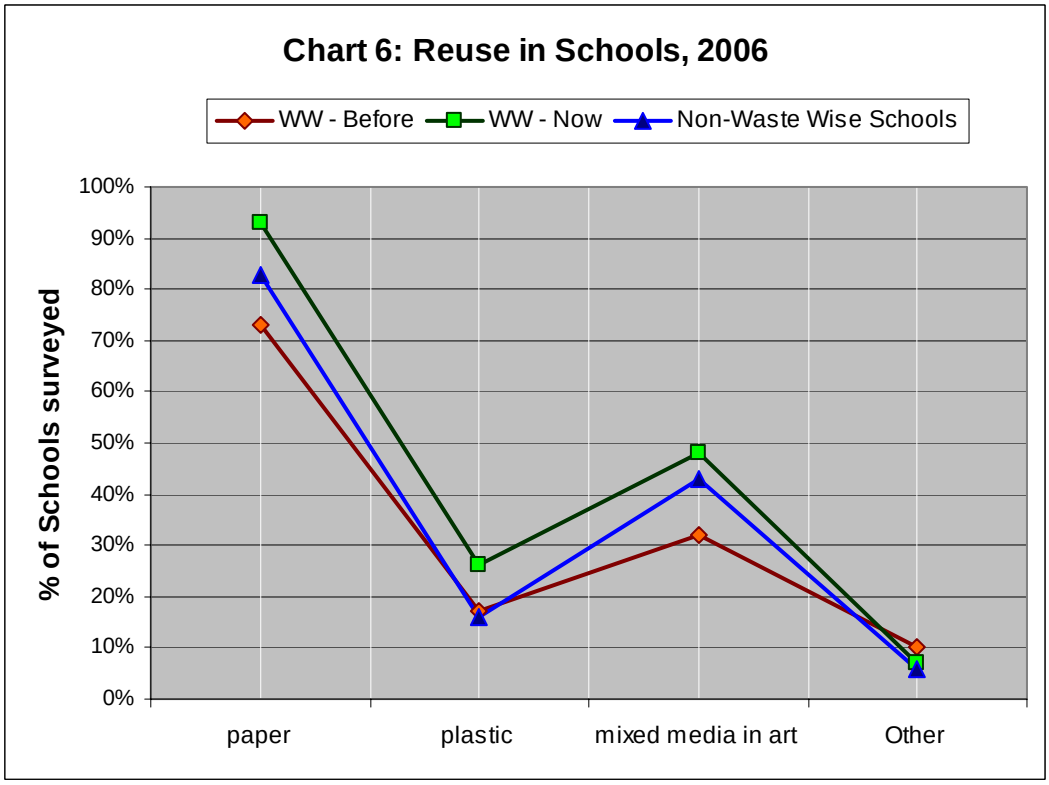


Chart 6 shows that compared to the levels of materials reuse before becoming a Waste Wise school to the present time, schools reported a significant increase for each of the main areas mentioned in the survey:

- Paper reuse +20%
- Plastic reuse +9%
- Reuse of materials in art +16%

There were also significant differences between current practices in Waste Wise and Non-Waste Wise schools. In general Waste Wise schools were more likely to reuse paper and plastic (+10% more than Non-Waste Wise schools). It seems that reuse of materials has become a fairly common practice in art activities across most schools.

In general, schools are actively reusing paper but not yet having an impact on plastic reuse. Box 6 provides examples of Reuse activities from case study schools.

BOX 6: EXAMPLES OF REUSE FROM CASE STUDY SCHOOLS

A medium sized metropolitan primary school has a Bike Club run by the teacher who is also the Waste Wise Coordinator. The club collects thrown away bikes and completely overhauls them. The 'as new' bikes are then sold for $10 to students or at school fetes, or kept in the school as part of the Bike-Ed program.

A large county primary school has an active program of mural decoration to improve the look of the school, with a regular 'Artist-in-residence'. They reuse a range of materials to make their murals with sculptural elements. One wall with the theme of 'recycling' features a sculpture of a local butterfly species made from car body section – doors for wings,

windscreen wipers for antennae, car speakers for eyes; aluminium cans for shellfish and fish.

Many of the case study schools had reused old baths or refrigerators as the shell for their worm farms.

All the case study schools reuse of paper. This includes: double siding for draft written assignments and making into student jotter notepads; soaking of paper towels for preparation as worm food; paper-making; paper-maché in art projects.

Waste Wise is having a positive and significant impact on levels of reuse in schools.

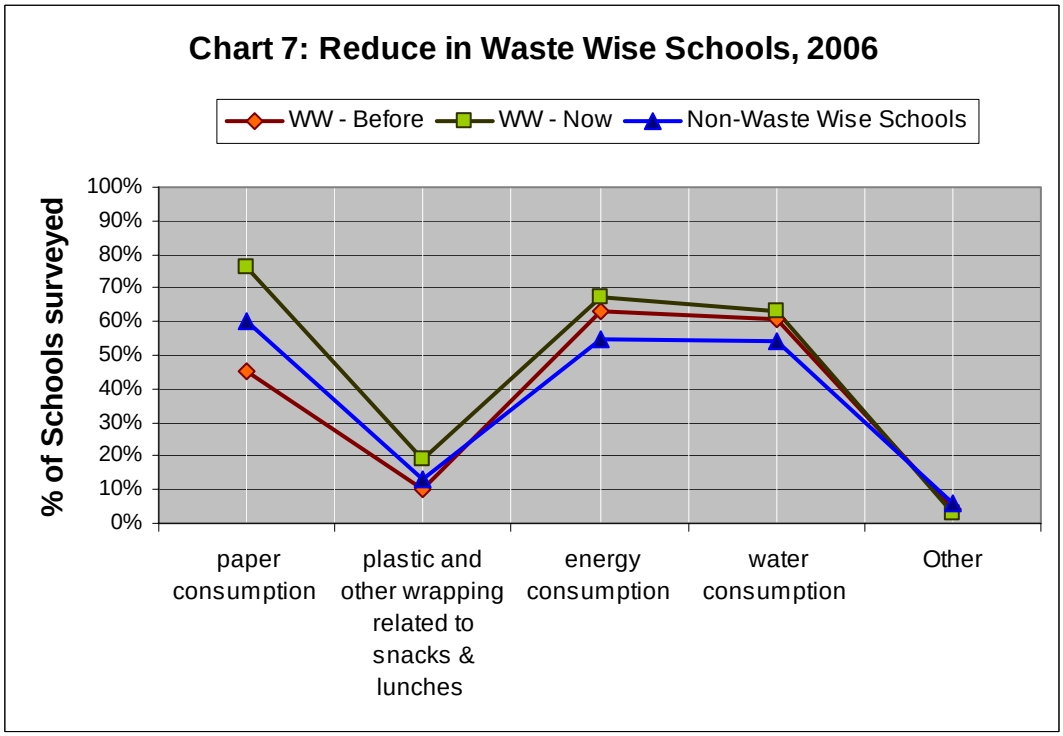


Chart 7 shows that compared to the levels of resource usage before becoming a Waste Wise school to the present time, schools reported a significant reduction in resource usage for each of the main areas mentioned in the survey:

- paper consumption reduced by 31%
- plastic and other wrapping related to snacks & lunches reduced by 9%
- energy consumption reduced by 4%
- water consumption reduced by 2%

There were also significant differences between current practices in Waste Wise and Non-Waste Wise schools. In general Waste Wise schools were more likely to reduce paper consumption (by 16% more than Non-Waste Wise schools), and energy consumption (by 12% more than Non-Waste Wise schools).

In general, schools are actively reducing paper, energy and water consumption but not yet having an impact on the use of plastics. Box 7

provides examples of activities to reduce resource usage from case study schools.

BOX 7: EXAMPLES OF REDUCTIONS IN RESOURCE USAGE FROM CASE STUDY SCHOOLS

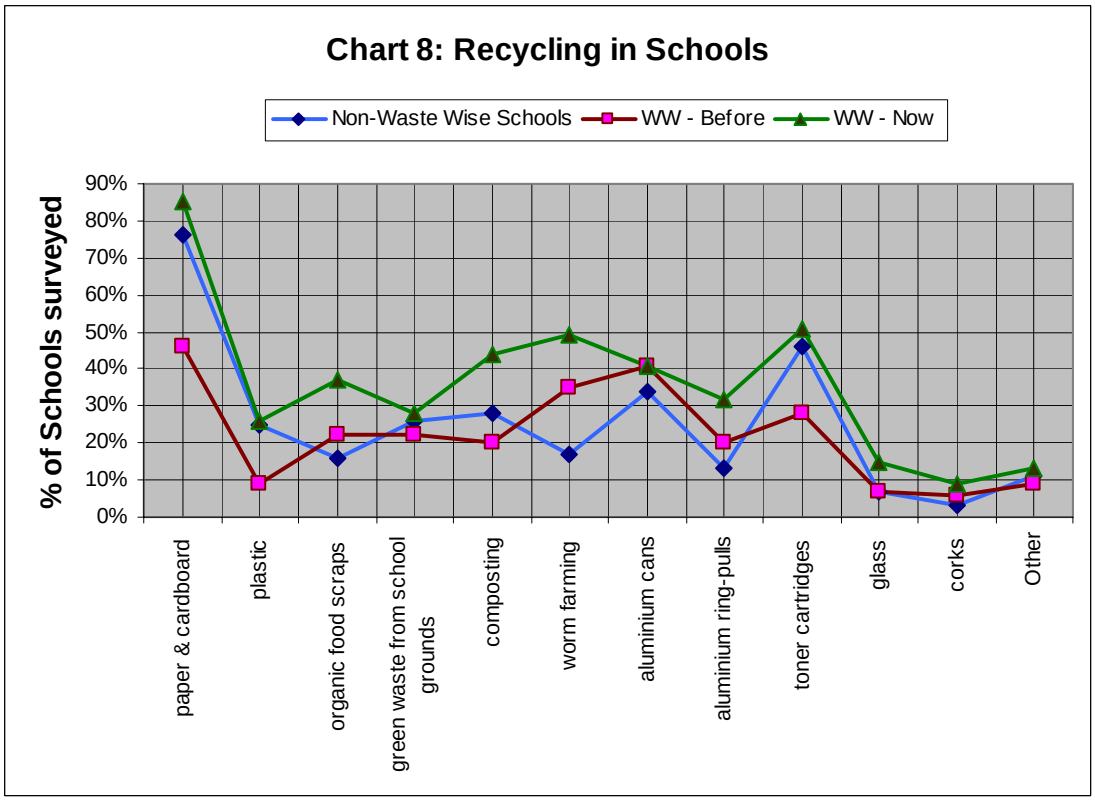
Two country primary schools had significantly reduced water consumption through reticulation of their oval (an estimate of $3,000 saved for the larger school). One of these schools was also planning to install water tanks, and dual flush toilet cisterns.

The Administration sections of all case study schools have been photocopying double-sided in order to reduce paper consumption. Most teachers are also doing this.

A Kindergarten teacher in a medium sized metropolitan primary school socialises her students to turn taps on slowly with a poster of a tiger and tap with the caption, 'Tame Tap Turn On'.

At least half of the case study schools had implemented Healthy Canteens where there is an emphasis on freshly prepared foods. Not only does this benefit students diets but also means that canteens use less pre-packaged foods and there is often a significant reduction in the use of plastic wrappings and aluminium cans. The organic scraps from the canteen are added to the worm farm collection. These schools also hold 'Waste Free Lunches'.

Waste Wise is having a positive and significant impact on levels of resource usage in schools in particular in relation to paper usage.



A significant majority of all schools are active in paper and cardboard recycling (85% Waste Wise, and 75% Non-Waste Wise schools). Schools are also generally active in recycling aluminium cans (41% Waste Wise,

and 34% Non-Waste Wise schools), and toner cartridges (51% Waste Wise, and 46% Non-Waste Wise schools). See chart 8.

Waste Wise schools significantly outstrip Non-Waste Wise schools in the following areas:

- organic food scraps (+21%) and worm farming (32%)

Recycling across all the activities surveyed had increased significantly for all Waste Wise schools as a result of participation in the program. Box 8 provides examples of Recycling activities from case study schools.

Waste Wise is having a positive and significant impact on Positive significant impact / result for Waste Wise

BOX 8: EXAMPLES OF RECYCLING FROM CASE STUDY SCHOOLS

Every afternoon Year 3 students in this large metropolitan primary school spend 20 minutes collecting, weighing and recording paper recycling bins from each classroom. The bins are checked for correct sorting and then emptied into the larger recycling wheelie bins and. Plastics are also collected at this time. Year 7 students collect the organic scraps and prepare them for the worm farms and composting. They have an efficient system that operates like clockwork!

This small country high school began in 2004, by establishing the separate bins to be able to sort waste. A competition was held to design logos for the bins that were built by the students. Year 8 is responsible for paper recycling and 2 students are rostered each end of lunch to remove organic scraps to the worm farm. In 2005, students developed a pamphlet that was sent home about recycling. They made their own waste sorting bins (paper, plastic, food) and worm farm.

Another medium sized metropolitan primary school established the student 'Environment Council' in 2003. Achievements of the Council so far have included the establishment of the worm farm, design and distribution of a 'Reduce, Reuse, Recycle' brochure for students to take home to their families (2004); and the establishment of labelled bins in classrooms and outdoors for sorting of waste streams, implementation of 'Healthy Snax' recess and reduction in packaging through the canteen (2005).

In another medium sized metropolitan primary school students have developed their worm farms sufficiently to be able to regularly fundraise by selling the leachate. They collect used 2 litre plastic bottles put their own label and fill them with 'worm juice' for sale below market rates to parents.

2.4. Ways in which students are actively involved in waste prevention / minimisation and empowered to adopt waste prevention / minimisation activities

The students who were interviewed in each of the case study schools were consistently passionate about their Waste Wise activities and able to explain in detail the broader environmental reasons behind their activities.

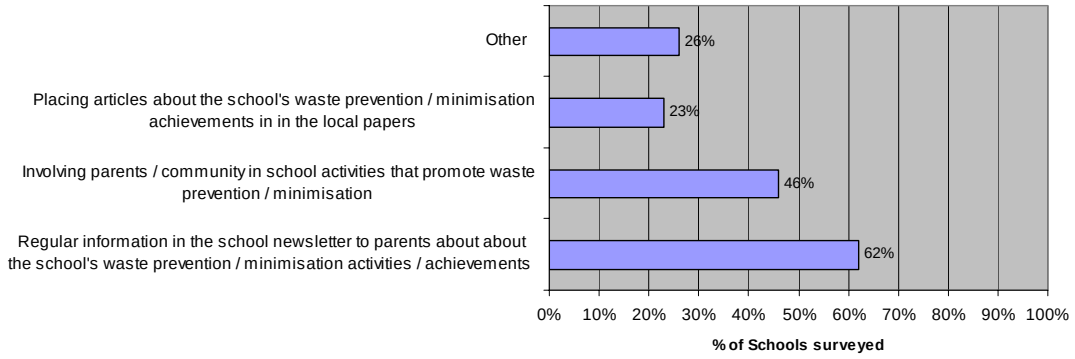
They talked with pride and enthusiasm about their achievements and could cite examples of their involvement in each of the 3Rs. These included:

- voluntary 'club' activities during lunch breaks or afternoon sessions where students crush aluminium cans, repair bikes, check worm farms, check waste bins for correct sorting, make scrap paper notebooks, help the grounds person with gardening and weeding
- Student participation in decision-making through elected or voluntary representation on the school Environmental Committee / Council. Delegation of responsibility to class and teacher levels for specific activities and processes e.g. daily recycling and organic scraps collection
- School and class group competitions and fundraising e.g. designs for labels on recycle bins, worm leachate bottles ('Global Worming', 'Wizard Worm Juice'); sale of worm leachate, aluminium ring-pull and can collections
- School-based awards schemes e.g. 'Faction' points for waste prevention / minimisation behaviours and involvement in activities

2.5. Ways in which the schools demonstrates an involvement with the broader community waste prevention / minimisation activities

The survey results confirm the experience of the case study schools that the main strategy used by schools to involve parents is through regular information in the school newsletter (i.e. 62% of schools surveyed). Schools send out a regular newsletter, mostly weekly. For Waste Wise schools, there is often a section that highlights school activities, encourages parent participation, or promotes recycling, reuse, and resource usage reduction in the home. Some 46% of schools involve parents in the activities. See Chart 9. For case study schools these included the collection of recyclables that lead to fundraising, such as aluminium cans and ring-pulls; and toner cartridges, a local competition run by the shopping centre to see how much local schools could collect in paper and cardboard in one week. In this way, schools become de facto community recycling stations. This may or may not be seen as an appropriate activity for a school. It can be argued that local government is falling down in its waste management role. Equally, it can be argued that schools can only teach these behaviours if they have practical opportunities to train students and involve parents. This may become an issue for the Waste Management Board

Chart 9: Strategies schools use to involve their parents and local community



2.6. Ways that schools regularly monitors and reviews its waste audit measures and communicates its achievements

Case study schools demonstrated varying degrees of regular data collection, monitoring and review. The schools that involved class or year groups in the processing of waste streams often incorporated a maths activity of quantifying and recording amounts. The Teacher Coordinators who had release time were often able to keep and monitor these records. Sometimes achievements in waste reduction were publicised through newsletters.

In Table 11 below, Waste Wise teachers who responded to the survey rated their school's progress towards waste prevention / minimisation and the role of Waste Wise in contributing to that progress.

It shows that the **least progress** has been made in the area of: *regularly monitoring, reviewing, and reporting waste audit results* - only 44% of schools considered that they had progressed in some way. The contribution of Waste Wise was the lowest ranked in comparison to other areas of progress. Teachers felt that **most progress** had been achieved in relation to:

- 3R's in the whole school (94% progress and contribution of Waste Wise)
- active and empowered students who prevent & minimise waste (89% progress made, 90% contribution of Waste Wise)
- 50% reduction in waste to landfill (86% progress made, 90% contribution of Waste Wise)

TABLE 11: WASTE WISE TEACHERS RATINGS OF THEIR SCHOOL'S PROGRESS TOWARDS WASTE PREVENTION / MINIMISATION AND THE CONTRIBUTION TO THE PROGRESS BY WASTE WISE

	none	a little or a lot
Progress towards achieving 50% reduction in waste to landfill	13%	86%
Role of Waste Wise in contributing to progress	10%	90%
Progress towards achieving 3R's in the whole school	6%	94%
Role of Waste Wise in contributing to progress	6%	94%

Progress towards achieving active and empowered students who prevent & minimise waste	12%	89%
Role of Waste Wise in contributing to progress	10%	90%
Progress towards achieving broader community involvement	30%	70%
Role of Waste Wise in contributing to progress	33%	67%
Progress towards regularly monitoring, reviewing, and reporting waste audit results	56%	44%
Role of Waste Wise in contributing to progress	47%	53%

The lack of systematic data collection was highlighted previously in relation to schools estimation of reduction in waste to landfill. See Section 2.2. In this researcher's experience evaluating the Australian Sustainable Schools Initiative Pilots in both NSW and Victoria and visiting numerous case study schools in those states, schools struggle with initial implementation of data collection systems. Once in place and centrally managed, ongoing updating is somewhat easier. It was a challenge for the program environmental education consultants to help schools in making this task easy and to encourage them to regularly monitor their data. Much of the data is available through the Administrative section of schools and if the staff agree, a system can be set up with their support. This is clearly also a challenge for the Waste Wise Team and they may need to develop a more proactive strategy to encouraging their schools in this regard – a series of competitions perhaps?

3. The extent to which schools are becoming working models of waste prevention and minimisation in their communities

3.1. How schools are progressing towards being a working model of waste prevention / minimisation in its community

The majority of Principals who were surveyed considered it was likely that some or most of the waste prevention and minimisation behaviours would endure for 12 months or more. Most enduring behaviours would be in the school (97%) followed by the families of students (89%) and fewer in the broader community generally (79%). These high ratings a very encouraging. The difference between the school and amongst student families is only 8%. See Chart 10.

Some of the factors affecting this were suggested by Principals (see Table 12). Most comments related to:

- Ongoing school commitment that is integrated into school operations
- Strong leadership from the Principal and / or Executive Team
- Ongoing information, time and support of parents
- Improved waste practices within the community so that waste prevention / minimisation is easier to manage and positive peer pressure

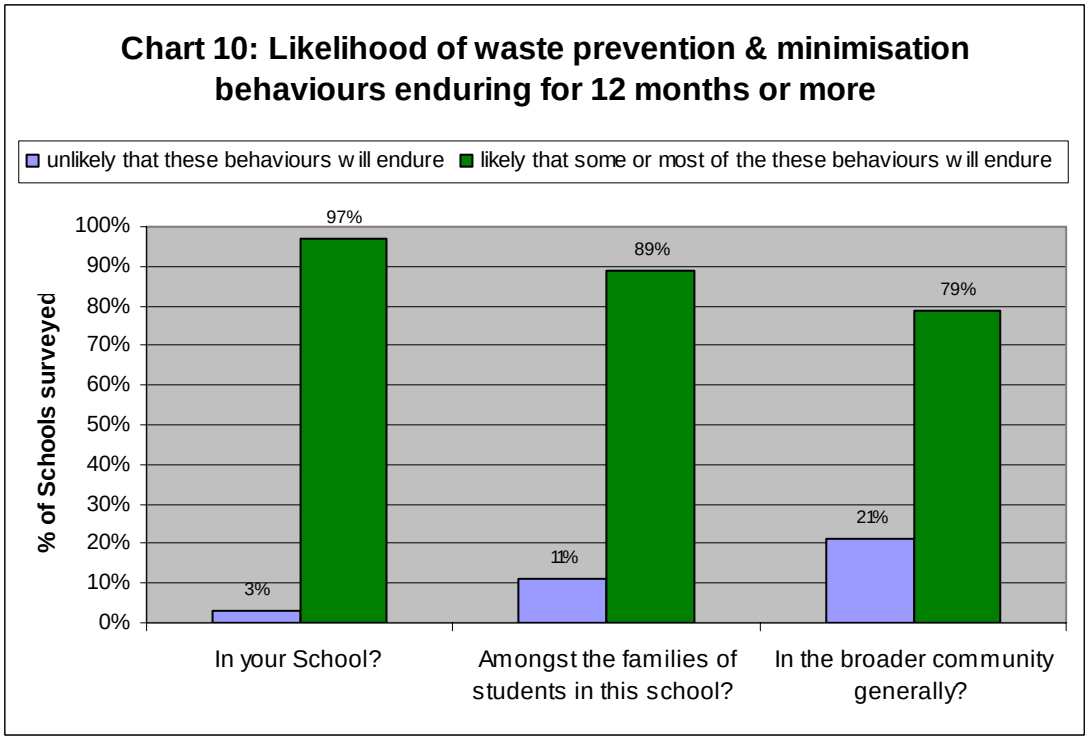


TABLE 12: FACTORS AFFECTING THE LIKELIHOOD OF WASTE PREVENTION AND MINIMISATION BEHAVIOURS ENDURING FOR 12 MONTHS OR MORE

Theme *(37 / 71 Waste Wise Principal comments)*	**Number of responses**
In your school	
❑ Ongoing school commitment that is integrated into school operations	15
❑ Strong leadership from the Principal and / or Executive Team	8
❑ There is a group of committed teachers (rather than only one), this may include a committee, with coordination and delegation of tasks.	6
❑ External support and resourcing is required	3
❑ The activities are driven by one passionate and committed teacher	3
❑ Physical changes such as recycling bins, composting, and edible gardens	3
❑ Funding from within the school is required	1
Amongst families and within the broader community	

❑ Ongoing information, time and support of parents	9
❑ Improved waste practices within the community so that waste prevention / minimisation is easier to manage and positive peer pressure	9
❑ Motivated parents	5
❑ Environmentally aware community committed to waste prevention / minimisation	4

4. Findings in relation to the Waste Wise WA model overall – efficiency, effectiveness, and value for money

4.1. What helped schools to progress and what were the barriers?

The most significant enabler of progress for schools was the motivation and enthusiasm of students generated by staff commitment. This was also evident for Non-Waste Wise schools. On the flip-side of this a critical barrier was lack of staff support due to a range of reasons (apathy, competing school priorities, lack of continuity, school culture generally, and in some cases a large school where coordination is difficult).

The various elements of professional development provided by Waste Wise were also seen as important enablers. Other important barriers were lack of time and lack of resources. See Tables 13 and 14.

TABLE 13: TEACHERS VIEWS ABOUT THINGS THAT HELPED OR WERE BARRIERS TO SCHOOLS' PROGREES IN PREVENTING AND MINIMISING WASTE

Enablers *(37 comments / 52)*	
Theme	**Number of comments**
Motivation and enthusiasm of the students generated by the commitment of staff	19
Information, professional development, practical ways of getting started and seeing how other 'lighthouse' schools have achieved change (including Waste Wise incursion and waste audit)	9
Whole school approach with waste separation systems in place	7
Grants, funding and / or external support agencies and businesses (e.g. Waste Wise, Mitre 10, local council)	5
Starting small and building in small steps	2
Positive community attitudes	1
Barriers *(41 comments / 52)*	
Theme	**Number of comments**
Lack of staff support due to: apathy, competing school priorities, lack of continuity, school culture generally, and in some cases a large school where coordination is difficult	24
Lack of time	13
Lack of funding and / or resources	12
Distance	2
Lack of student support, in one case due to level of disability and understanding	2
Vandalism of projects	1

TABLE 14: NON-WASTE WISE PRINCIPAL'S VIEWS ABOUT THINGS THAT HELPED THEIR SCHOOL'S PROGREES IN PREVENTING AND MINIMISING WASTE

Enablers *(64 comments / 136)*	
Theme	**Number of comments**
Teacher or teachers and other school staff (e.g. grounds person) with expertise and interest who involve students	34
Using existing local infrastructure or innovations e.g. recycling collection through the Shire or Council, independent collection agent such as SITA or other	13
Parents and community support	8
Part of the Sustainable Schools Initiative	2

4.2. Suggestions for improvement of Waste Wise

A small percentage of Principals from both Waste Wise and Non-Waste Wise schools provided suggestions for improvements. These are summarised in Table 15. Apart from resources for teacher release and support, most comments were from Non-Waste Wise schools suggesting that there needs to be:

- More specific involvement by Shire / Council
- Marketing and promotion of successes

TABLE 15: SUGGESTIONS FOR IMPROVEMENTS TO WASTE WISE

Theme	**Waste Wise** *(23 / 71 comments)*	**Non Waste Wise** *(29 / 136 comments)*
Funding for teacher / staff release for workshop, planning, coordination etc	7	7
Networking with other schools to share ideas	4	2
More curriculum resources	1	3
Comprehensive information	1	6
More specific involvement by Shire / Council	3	12
	1	12

4.3. Impacts for schools of being part of Waste Wise – Social, educational, professional, economic, parent / community involvement

Principals and teachers are seeing appreciable benefits for students, staff and their communities. Principals were more likely to be a bit more positive than teachers about the benefits in general. See Charts 11a and 11b. Table 16 provides greater detail about the kinds of benefits that Principals have observed.

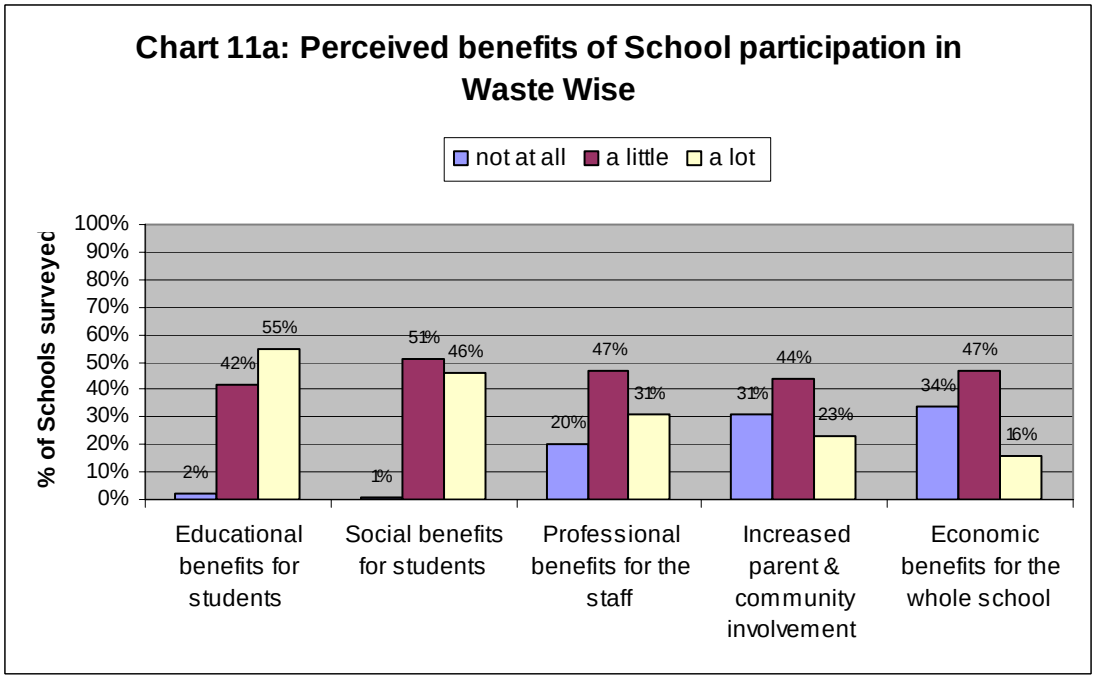


Chart 11a: Perceived benefits of School participation in Waste Wise
not at all
a little
a lot
% of Schools surveyed
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2%
42%
55%
1%
51%
46%
20%
47%
31%
31%
44%
23%
34%
47%
16%
Educational benefits for students
Social benefits for students
Professional benefits for the staff
Increased parent & community involvement
Economic benefits for the whole school

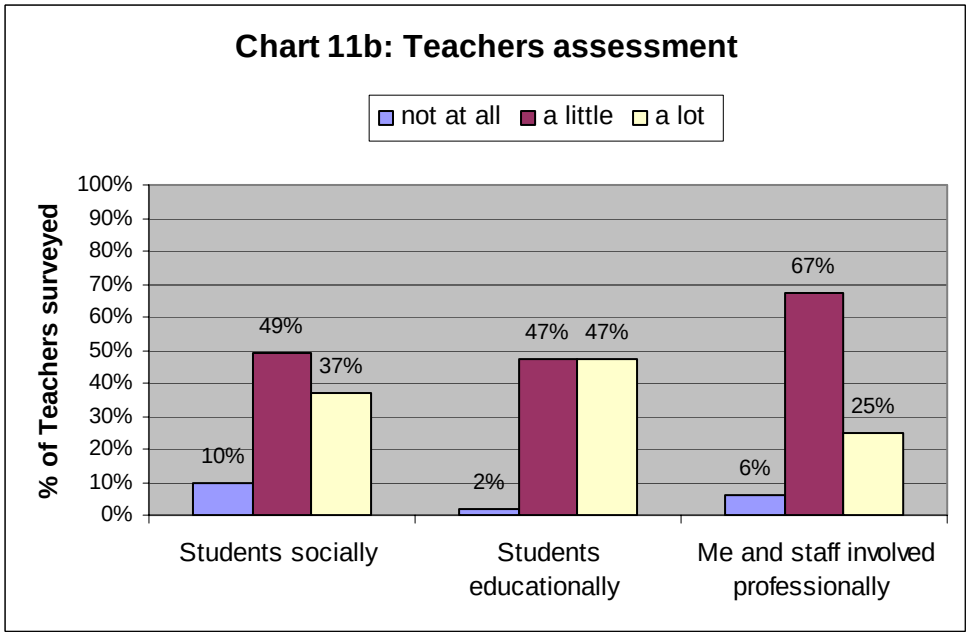


Chart 11b: Teachers assessment
not at all
a little
a lot
% of Teachers surveyed
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
10%
49%
37%
2%
47%
47%
6%
67%
25%
Students socially
Students educationally
Me and staff involved professionally

TABLE 16: PERCEIVED BENEFITS OF PARTICIPATION IN WASTE WISE – PRINCIPALS COMMENTS

Social and educational benefits for students

Comments emphasise behavioural improvements (i.e. greater thoughtfulness) through practical experiential learning that involves collaboration, team work and opportunities for leadership development:

Leadership and empowerment:

- Earthcare Year 7 monitors
- Allowed additional students to undertake a leadership role.
- Taking pride in their school. Emotional / social children – students interact and build self esteem. Behavioural - with assistance from peer or gardener build self esteem. Three of my at risk children became student councillors for 2006 (major, major achievement). They were/are heavily into the 3R's.
- They are more aware of packaging and making sure they sort their paper rubbish and put it in the recycling box. We also have an environmental ministry for year 7s. They help coordinate environmental projects
- It makes them more aware of their environment and more empowered to do something about it.
- Critical consumers
- More awareness of environmental issues. More aware of what they can do to help the environment.
- Being aware of what happens in their own backyard and what they can do to make it better.

Social development:

- Awareness of impact on environment and others. The yard is cleaner. Children are environmentally switched on in relation to recycling
- Huge leap in values.
- This is very compatible with our educational philosophies of environmental responsibility.

Practical experiential learning:

- Kids get to see sustainable environmental practices in person
- Children in my class manage the collection and sorting process. Therefore they have become much more aware of issues such as plastic used in manufacture of packaging and books /magazines. Social skills for collection of materials and working in a group.
- Students have opportunity for practical experience in permaculture garden, chooks, wormery etc
- Creativity in use of recycled materials.
- Maths measurement of volume/capacity(cramming paper into bins most efficiently) and mass (ring pulls) Tech & Enterprise (re Management systems and pollution/contamination of materials) Science and Society/Environ re classification of materials and analysing behaviours. Language - oral discussion structures and appropriate language for collection of bins etc. plus how to manage group work when sorting in a group and small area.
- More meaningful maths, science, art and health.
- My class participates in a worm enterprise raising money for charity, school and class it allows children real life experiences to develop their educational understandings.
- Class room doing daily weigh-in of paper & card board

Professional benefits for the staff

Comments emphasise the opportunity to participate in professional development workshops, find ways of making teaching and learning more relevant, a career development opportunity in taking on the role of Waste Wise coordinator, and build staff cohesion:

- Gives meaningful and practical context for teaching
- Common goal. Higher purpose. Practical, real life experiences for students
- Teachers are now actively looking for resources to teach specific environmental issues.
- Awareness of the need of the 3R's and practical use in the classroom
- Special role to add to CV
- A good way to integrate plans posted on school waste plans det website

Benefits for parents and the broader community

Comments emphasise the growth in environmental awareness amongst parents and the community and the involvement of parents in 3Rs activities by contributing their waste, expertise, or participating in fund raising:

Growth in environmental awareness:

- The children are influencing their parents and bringing them onboard
- Most were already environmentally aware and saw this as a natural process for the school.
- Being a Fremantle school parents really value this approach

Contribution to 3Rs activities:

- Donations received of plants, subsidised items.
- Reuse of unwanted gardening implements and composters
- Link with community recycling of paper and aluminium cans
- Collecting of cans, fliptops and batteries for school. Buying leachate and worms. Local man to explain to children about fliptops. Been in community paper with recycling.
- Many parents are very interested in this type of involvement especially when the new school is built.
- Ring pull and can recycling brought the school community into the process even involving adults who did not have children at the school.
- Significant contribution to Landcare at school in a bush regeneration project
- Community support collection of mobile phones etc.
- Parents are on the committee and it will be linked to the edible garden project

Economic benefits for the whole school

Comments recognise the reduction in resource use, generally, leads to reduction in overall costs[8]. By implementing Wast Wise they often review their water and energy consumption.

As one school put it: LESS RUBBISH LESS COSTS
And another: Rubbish is a precious resource!

The waste minimisation activities often have the potential for fundraising:

- Less need for bin collections, removal and collection of our large bins has reduced from every 4 days to every 13 or so days,
- Reduction in paper use and realisation paper, card, plastic are recyclable by the staff, students and parents.
- Reduction in water use
- Cheaper with the white bin for paper & cardboard recycling.
- As a whole the general waste takes more money to remove. So a saving has taken place. Also the cans collection has aided in fundraising for school equipment.
- Funds raised from selling worm juice / leachate.
- The cost of the recycling is counterbalanced by saving in photocopying we are somewhat in front.
- The most obvious is the reduction in water usage resulting in a large reduction in water costs.
- Save power (bonus in savings), our environment is protected, resources are saved.

[8] Schools often interpret 'waste minimisation' as relating to any resource, not only waste.

4.4. Cost benefit assessment and overall efficiency, effectiveness, and value for money

Tables 17, 18 19 are an attempt to summarise in one place the overall efficiency, effectiveness and value for money represented by the Waste Wise Schools Program.

TABLE 17: EFFICIENCY ASSESSMENT OF THE WASTE WISE IN SCHOOLS PROGRAM

Efficiency *maximising output for inputs*	
Measure	**Data and Comment**
Participation rates in teacher professional development workshops	Efficiency has increased Fewer annual workshops have been conducted since 2001 from (11 to 6) with an increase in average participation rates per group (from 9 – 18)
Overall number of schools participating in Waste Wise	Waste Wise has achieved a 'critical mass' level of over just one third of WA schools participating[9] There are now some 384 participating schools this represents 34% of all schools in WA
Potential reach of Students in Waste Wise schools	Over half the students in WA are in Waste Wise schools The equivalent student numbers in Waste Wise schools is 163,870. This represents 52.5% of all equivalent students in WA (not including those in special support school) See Table 19
Waste Wise website activity	This was not possible to include as no useful statistics (such as resources downloaded, unique visitor per month are kept for the Waste Wise site)
Numbers of schools successfully gaining grants	Only 13% of Waste Wise schools have received grants 51 schools since 2001 have been granted funds for Waste Wise projects. The amounts have varied per school per year. A total of $58,320 has been expended. Schools received between $5,000 and $158 and an average of $1,148 per school overall. See Table 20
Schools using their resources to support implementation	Schools are contributing significant amounts of their own resources to support Waste Wise implementation This includes 42.9% who send additional staff to workshops (at a daily rate over $200 provided as a rebate by Waste Wise); and providing weekly release for teachers. See Table 21

[9] The definition of 'critical mass' depends on the type of innovation being adopted. Everett Rogers (in, *The Diffusion of Innovation*, 1962, p 313) defines "critical mass" as the "point at which enough individuals have adopted an innovation so that the innovation's further rate of adoption becomes self-sustaining". The term 'critical mass' is used in this context to describe a significant number of schools (i.e. a third) which represent just over half the students in WA in Waste Wise. It is likely, but not certain that this should probably form the basis of a self-sustaining change.

TABLE 18: EFFECTIVENESS ASSESSMENT OF THE WASTE WISE IN SCHOOLS PROGRAM

Effectiveness *Maximising outcomes for output*	
Measure	**Data & comment**
Levels of curriculum integration	Significant increases in curriculum integration For Waste Wise Schools before and currently: +27% increase in integration of waste prevention / minimisation into Science +21% increase in integration of waste prevention / minimisation into Society and environment Between Waste Wise and Non-Waste Wise schools +26% increase in integration of waste prevention / minimisation into Science +15% increase in integration of waste prevention / minimisation into Society and environment
Integration of waste prevention / minimisation behaviours into school values	Significant increases in integration of waste prevention / minimisation behaviours into school values statements For Waste Wise Schools before and currently: +19% Between Waste Wise and Non-Waste Wise schools +28%
Integration of waste prevention / minimisation behaviours into school incentives and awards	Significant increases in integration of waste prevention / minimisation behaviours into school incentives and awards For Waste Wise Schools before and currently: 29% Between Waste Wise and Non-Waste Wise schools 24%
Minimising waste to landfill	Waste Wise schools were more likely to have achieved higher levels of reduction in waste to landfill than Non-Waste Wise schools: +20% of Waste Wise schools reported having reduced waste to landfill by 50% compared to 4% of Non-Waste Wise schools (i.e. a difference of 16%)
Levels of Reuse in schools	Significant increases in Reuse activities For Waste Wise Schools before and currently: +20% Between Waste Wise and Non-Waste Wise schools +10%
Reduction in consumption of resources	Significant reduction in levels of resource usage For Waste Wise Schools before and currently: -31% in relation to paper consumption Between Waste Wise and Non-Waste Wise schools -16% in relation to paper consumption
Levels of Recycling in schools	Significant increase in Recycling activities

Effectiveness *Maximising outcomes for output*	
Measure	**Data & comment**
	For Waste Wise Schools before and currently: +39% in relation to paper and cardboard recycling Between Waste Wise and Non-Waste Wise schools +10% in relation to paper and cardboard recycling +21% organic food scraps +32% worm farming
Schools sending regular waste prevention and minimisation information out in newsletters to parents	62% of Waste Wise schools regularly highlight school waste activities, encourage parent participation, or promote recycling, reuse, and resource usage reduction in the home through their newsletters.
Schools involving parents and the broader community in waste prevention and minimisation activities	46% of schools involve parents in the activities.
The likelihood of some or most waste prevention and minimisation behaviours enduring beyond 12 months or more	<u>High ratings by a majority of Principals surveyed who considered it was likely that some or most of the waste prevention and minimisation behaviours would endure for 12 months or more.</u> Most enduring behaviours would be in the school (97%) followed by the families of students (89%) and fewer in the broader community generally (79%).

<u>TABLE 19: VALUE FOR MONEY ASSESSMENT OF THE WASTE WISE IN SCHOOLS PROGRAM</u>

Value for money *maximising outcomes for inputs*	
Measure	**Data & comment**
Overall expenditure since inception	<u>A relatively small budget for the outputs and outcomes achieved.</u> A total of $1,184,698 has been expended over 4.5 financial years i.e. an average of $263,266 per year. For the last 2 financial years this has included a total of $115,000 in sponsorship moneys from SITA ($90,000) and Wrigleys ($25,000).
Average $ per participating school	$3,085.15 (384 participating schools) This figure would need to be compared to similar environmental education programs. Brief research indicated that this data does not currently exist but that it may be possible to identify comparison programs and request this data.
Average $ per student potentially reached	$7.23 (163,870 students in Waste Wise schools) This figure would need to be compared to similar environmental education programs. Brief research indicated that this data does not currently exist but that it may be possible to identify comparison programs and request this data.
Overall cost benefit assessment by schools	<u>99% of Waste wise school Principals felt that the costs of participating in Waste Wise were either outweighed or equal to the benefits.</u> Principals in 67% of Waste Wise schools surveyed felt that the benefits had definitely outweighed any costs. A further 32% felt that the costs and benefits were about equal. Principals provided examples of the social and educational benefits for students; the professional benefits for staff; the benefits for parents and the broader community; as well as economic benefits

Value for money *maximising outcomes for inputs*	
Measure	**Data & comment**
	for their schools.

TABLE 20: NUMBERS OF STUDENTS REACHED BY WASTE WISE SCHOOLS

Sector	Numbers of students in all WA schools	Numbers of students in WA Waste Wise schools	% of WA students in Waste Wise schools
Total Gov	209,589	118,339	56.5%
Total Non-gov	102,564	45,531	44.4%
Total	312,153	163,870	52.5%
Ed Support (Gov)	3,568	888	24.9%

Notes:

The 'numbers of students' statistics were derived from statistics for all schools provided by Information Services, DET WA, 2006.

TABLE 21: LEVELS OF YOUTH GRANTS TO SCHOOLS FOR WASTE WISE PROJECTS

Year	$
2001	7,420
2002	14,300
2003	10,689
2004	17,123
2005	9,000
Total expenditure on Youth Grants through Waste Wise	**58,320**
Average per school (for 51 schools)	1,148

TABLE 22: ADDITIONAL RESOURCES PROVIDED BY WASTE WISE SCHOOLS

Theme	Number of responses *(42 / 71)*	%
sent additional staff to the Waste Wise workshops [1]	18	42.9%
weekly release time for one or more teachers to be the Waste Wise coordinator	15	35.7%
School funds	4	9.5%
Curriculum development	2	4.8%
Staff release to do research	2	4.8%
Student volunteers	1	2.4%
Total	**42**	**100%**

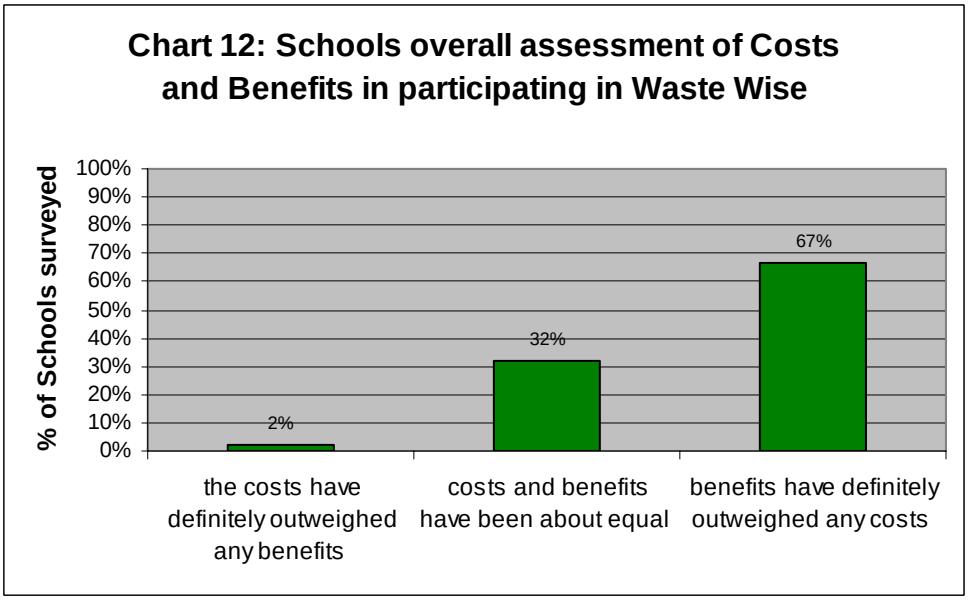
Note:

1. The $200 per day pro rata reimbursement to schools is less than the current rate for teacher release which is around $250 per full day. Schools are therefore subsidising their involvement in Waste Wise.

TABLE 23: WASTE WISE EXPENDITURE FIGURES SINCE 2001 TO PRESENT

Year	Waste Wise Expenditure $
2001/02	265,219
2002/03	249,758
2003/04	131,506
2004/05	352,858
2005/06	185,357
Total	1,184,698
Average $ per school supported (384 schools)	3,085.15
Average dollar per student potentially reached (163,870 students)	7.23

Note: Expenditure figures supplied by Paul Ward (DOE) - Expenditure includes all moneys held in the Waste Wise account, including sponsorship from SITA and Wrigleys.



5. Future directions in relation to a broader Environmental Education program such as the Australian Sustainable Schools Initiative

The scope and purpose of the Australian Sustainable Schools Initiative

The Australian Sustainable Schools Initiative (AuSSI)[10], which commenced in 2002 in New South Wales and Victoria, aims to support approaches to teaching and learning that foster enhanced understandings of sustainability, and encourages a movement towards 'living sustainably'. Western Australia joined the Initiative in 2005. The Initiative is federally funded, and supported by a range of agencies and organisations in broad partnership at the State level.

The initiative supports considered and efficient use of schools' resources (e.g. energy, water, products and materials) and the sustainable management of school grounds (e.g. biodiversity, waste, landscape design and vehicular traffic). In addition, it promotes key concepts and themes such as social justice, participation, human rights and cultural diversity and respect consistent with an holistic, integrated model of sustainability. AuSSI aims to integrate existing environmental and social education programs and activities into a coordinated framework / process, with measurable environmental, economic, socio-cultural, political and curriculum outcomes. In this context, political outcomes relate to issues of school governance and participatory decision-making within school communities.

The initiative is action-learning based, and sees the whole school community involved in integrating Education for Sustainability (EfS) into the existing curriculum and culture of the school.

The relationship of Waste Wise to the Australian Sustainable Schools Initiative

With the development of AuSSI, Waste Wise becomes part of an integrated set of environmental education programs in schools. In WA the Project Manager, Howard Flinders (Sustainable Schools Initiative, Department of Education & Training) sees Waste Wise as a significant first step for schools. He considers that the Waste Wise focus on reducing consumption, as well as the waste prevention and minimisation behaviours that it develops, are critical basic education for sustainability knowledge, skills and attitudes.

WA AuSSI has completed its initial pilot phase and schools are being encouraged to extend their current activities to whole of school sustainability. Program deliverers of other environmental education have been meeting to discuss how they can streamline their support for schools generally.

Implications for the future of Waste Wise under the Australian Sustainable Schools Initiative

[10] This description of the Australian Sustainable Schools Initiative is from the Draft WA 'Education for Sustanability: A practical Guide for WA School Communities', 2006 made available by Howard Flinders, DET

Whilst the longer-term implications for Waste Wise under the AuSSI umbrella are still evolving and therefore not sufficiently clear. However, as the Waste Management Board is aware, strategic collaboration is occurring between AuSSI and Waste Wise. The following is an excerpt from the Report to the Waste Management Board provided by the Waste Wise Team earlier this year.

> By the end of 2006, there will be 100 WA schools involved in the Sustainable Schools Initiative. Schools currently participating in the Waste Wise Schools Program will be offered the opportunity to be involved in Sustainable Schools Initiative. It is expected that Waste Wise Schools will make up the majority of the participants. AuSSI will offer support to assist these schools to further develop their environmental and social programs. To overcome a lack of resources in this area, Waste Wise and AuSSI will continue to work together to develop an integrated approach to offer increased support to schools. Waste Wise will also continue to work with other environmental program providers (including Waterwise, Ribbons of Blue, Airwatch and CALM) as has been the case to date, offering joint professional development workshops and links for schools.

It is clear from interviews with Howard Flinders that it is highly unlikely that DET will provide additional funds for AuSSI beyond his coordinator position. Whatever resources that currently exist in the totality of all environmental education programs form a finite set. This leaves program officers with the only option of collaboration.

Waste Wise could use its resources (i.e. funds, personnel, professional development model, existing approach) in a possibility of ways to integrate with AuSSI WA and gain greater recognition for its achievements. Here are some possible strategic options that could be considered and costed:

1. ***Status quo with continuous improvement linked with AuSSI***
   With the same professional development model, the Waste Wise Team continues providing the current elements of PD and maintains their continuous improvement e.g. they become more efficient through attracting greater numbers of participants to each workshop, following-up on previously trained teachers and encouraging their re-engagement. Waste Wise PD incorporates messages from AuSSI about education for sustainability.
2. ***Accept and encourage diffusion of expertise that has been developed in the schools sector***
   With the same professional development model, the Waste Wise Team conducts 'train the trainer' sessions with 'lighthouse' teachers and creates a group of regional coordinators who they support to deliver workshops and network meetings.
3. ***Accept and encourage diffusion of expertise in the schools sector and begin to refocus Waste Wise from schools to enterprises and the community by leveraging schools experiences***
   This starts with Option 3 and maintains the Waste focus of the Waste Wise Team. With the wealth of experience and practical examples developed the Team could show staff in businesses how to have worm farms on their premises i.e. if a Kindergarten class can have a worm farm, why not your lunchroom; the concept of a school bike club could be taken up by other youth groups such as the Police Citizens Youth Club.

4. ***Re-brand all WA environmental education officers as 'Sustainability Education Officers'***
   Combine all current environmental education specialist officers under the AuSSI umbrella and diffuse the specialist waste, waster, energy and biodiversity skills amongst the staff.

6. Recommendations

The following recommendations assume that:

- elements of the proposed possible strategic options are accepted, and,
- the linkage with the Australian Sustainable Schools Initiative (AuSSI) is inevitable.

The recommendations are grouped into four main themes:

1. ***Program Focus and relationship to AuSSI WA***
2. ***Program Management***
3. ***Program Promotion***
4. ***Program Funding***

Program focus and relationship with AuSSI WA

Recommendation 1: Formalising the WWSP relationship with AuSSI and providing a sufficient level of support to schools

It is recommended that the Waste Wise in Schools Program (WWSP) take a proactive approach to its relationship with AuSSI and use this opportunity to strategically respond to continuing unmet demand as well as emerging needs of schools.

This could be achieved by:

1.1 WWSP negotiating an explicit commitment in the form of a Memorandum of Understanding from AuSSI that sees WWSP as the initial phase from which schools springboard to broader activity towards education for sustainability. This would provide WWSP with considerable statewide recognition as the mechanism by which schools build their capability to achieve both, waste prevention and minimisation behaviours as well as the requisite change management and whole school improvement skills.

1.2 Establishing a regional network of part-time Waste Wise Education Officers drawn from expert teachers and / or other waste or environmental education experts in regions. There will need to be a sufficient to cover the 14 Department of Education and Training regions (say, between 8 to10). These people would need to be trained and sufficiently resourced to in the WWSP professional development model. They would also need to have a clearly stated work / case load that might include:

- Preparation and delivery of workshops (say, 2 initial and 2 follow-up per year, with a day's preparation per workshop and coordination support from the Waste Wise Team)
- Conducting regional network meetings (say, one per school term)
- Visiting schools to provide support, and incursions (say 5 per term)
- Attending professional development and coordination meetings with the Waste Wise Team (say, one day per school term or equivalent)

1.3 Strengthen the content of workshops and other professional development resources to focus on specific themes not yet fully developed, such as:

- Greater encouragement of waste auditing, data collection, and reporting
- Systems thinking so that students and schools see the connections that link actions to results e.g. introducing a Healthy Canteen generally contributes to litter reduction and less use of plastic and provides a source of organic matter for composting or worm farming
- Collaboration between clusters of feeder primary schools and their high schools to enable them to build on the skills of students from primary schools i.e. extend the learner pathways from primary to high school
- The development of specialist strategies for high schools
- Presentation of change management and leadership models relevant to becoming a Waste Wise / Sustainable School, for School Executive staff
- The role of waste education in engaging students in learning and the social and educational benefits for students
- Using waste prevention and minimisation behaviours to complement school values and behaviour management (awards and incentives) activities
- Strategies for promoting waste prevention and minimisation to parents and the broader community through promotion of school-based activities

Recommendation 2: Recognising school's success in paper and cardboard recycling and encouraging greater focus in other waste prevention and minimisation activities

In the light of high levels of paper and cardboard recycling in both Waste Wise and Non-Waste Wise schools, that the WWSP recognise that schools are managing this well and attempt to encourage all schools to expand their other reduce, reuse and recycle activities. This could be through specific competitions and promotions of other activities.

Program Management

Recommendation 3: Following-up teachers and schools that have participated in initial professional development workshops

That time be allocated to updating records of participating teachers and schools, contact details (including emails). This will enable follow-up of both teachers and schools who may have become inactive or are active but non-communicative. Teachers move schools and may want to be supported in their new school, equally the schools they leave could be offered support.

Recommendation 4: Determine ongoing performance measures for WWSP that can be reported to the Waste Management Board

That WWSP determine acceptable performance measures that can continue to be monitored and reported to the Waste Management Board. These could be based on measures used in the Review i.e. efficiency, effectiveness, value for money. They should include agreed targets for both the program and for schools. Schools will need to be encouraged to provide regular reports to the program managers. This may involve the development of an agreed minimum data set that links with data being collected through AuSSI in all States and Territories. Consideration will need to be given to 'easy-to-use' data collection processes for schools to enable them to generate trend data over time that helps ongoing monitoring.

Recommendation 5: Provide a greater sense of job security to the Waste Wise Team

The current Waste Wise Team are employed on short-term contracts and lack of security was mentioned by both case study schools and team members as an issue for the viability of the Program. It is recommended that the Waste Management Board consider the possibility of two or three year contracts for WWSP staff.

Recommendation 6: Increase availability of grant money to schools

The levels of granted money to schools overall has been minimal. Only 13% of schools have benefited. This highlights a lack of equity and access. Schools become frustrated when they submit and do not hear back for months whether they have been successful. This is counter-productive to the success of the Program. It is recommended that a greater percentage of schools be encouraged to submit for small grants and that the pool of money be increased to meet a greater percentage of the demand.

Recommendation 7: Improve the availability of useful WWSP website statistics

The current WWSP website statistic collected is 'number of hits'. This does not provide useful information about visitor activity and levels of interest in different parts of the site. The following list is suggested:

- Daily Average
  - Average Hits per Day
  - Average Page Views per Day
  - Average Visits per Day
  - Unique Visits per Day

- Monthly Totals & Averages

- Hits
- Page Views
- Visits
- Unique Visits
- Average Page Views per Unique Visitor
- Average Visit Length (minutes:seconds)
- Visitors Who Visited Once in the month
- Visitors Who Visited More Than Once in the month
- Most Active Day/s of the Month
- Most Active Day/s of the Week (e.g. for the e-newsletter = Recipient Reading preferences - days of the week)
- Most Active Hours of the Day - considering Visits only
- Top Resources Downloaded
- Top Referrers (i.e. other URLs)
- Top Pages Viewed (pages with the most traffic)

Program Promotion

Recommendation 8: Publicly recognise and promote the achievements of Waste Wise schools as well as Non-Waste Wise schools to further the Waste Management Board's Zero Waste target.

Evidence from the research conducted as part of this Review shows that a majority of schools (both Waste Wise and Non-Waste Wise) are increasingly integrating waste prevention and minimisation behaviours. Not surprisingly, Waste Wise schools are doing more and at a faster rate. It is recommended that these achievements be promoted and celebrated at a community and State level.

Program Funding

Recommendation 9: The cost of meeting the above recommendations be determined and program funding be adjusted accordingly.

The current level of funding for the WWSP will not cover the cost of Recommendations 1.2, 1.3, and 3, 4, and 5. The current level of staffing is minimal and this means that the Waste Wise Team are not able to adequately meet current levels of demand.

Additional Recommendation not within the scope of the review but for consideration by the Waste Management Board:

The Waste Management Board work with local government, in particular local Shires, and recycling removal contractors to identify reasons for school dissatisfaction and develop improvement strategies.

APPENDIX 1: WASTE WISE SCHOOLS PROGRAM LOGIC MATRIX

OUTCOME 1: Schools are interested in waste education and waste prevention / minimisation. They send one or more teachers (and perhaps other representatives) to attend a full day professional development workshop

1. Success criteria, definitions and explanations	2. Factors that affect success that Waste Wise can influence	3. Factors that affect success that Waste Wise can't influence	4. Activities to address factors that affect success
The Principal and / or a teacher sees the Waste Wise flyer or other message promoting the professional development. The Principal: • designates a contact person for the Waste Wise program and sends a representative teacher • agrees to provide support to the teacher when they return from the workshops in order to implement waste prevention and minimisation strategies • may also decide to send another representative from the school – another teacher The Teacher / School Representative	• The Principal, leadership team and school council are initially supportive of the program and its implementation in the school. • The schools are encouraged to be flexible in establishing waste minimisation and prevention practices – to start with achievable actions that will build commitment. • The resistance of schools to release teachers for workshops and to pay for resources and support • There is at least one person, preferably a team of people, in the school who is committed to the program.	• Existing experience and / or expertise in the school regarding environmental education generally and waste prevention / minimisation specifically • The school plans to involve all or some years in waste prevention / minimisation • The climate & culture within the school eg Principal / Executive educational leadership style; approach to change management; degree of support provided by eg Principal / Executive; innovative and entrepreneurial staff, parents & students; teacher morale • The demographics, historical and community context of the school eg disadvantaged students, rural and	• Waste Wise promotes each workshop activity by sending a flyer to schools (fax, email) • Waste Wise offers incentives: Schools that send a teacher to the workshop are reimbursed $200 to pay for their release time; the workshop, resources (practical & curriculum) & ongoing support are free e.g. the *Waste Wise Schools Kit* • Schools qualify as 'participating' when they: send a teacher to both the workshop sessions (initial 1 day & follow-up half day); complete the initial waste survey *How Waste Wise is Your*

attends the workshops and completes the initial waste survey and drafts an Action Plan for implementation of the Waste Wise program in their school.	• The skills and expertise of the Waste Wise Team are sufficient to gain agreement and understanding by the Principal of the requirements of Waste Wise. • The Waste Wise Team is sufficiently resourced and supported to enable them to support teachers – 'phone, email, school visits / incursions, face to face. • Schools ability to access data to be able to complete the waste audit	regional areas • Previous experience and commitment to environmental education and management • Competing priorities in the school's yearly plan and staff daily commitments • Existing school infrastructure, relationship to its immediate physical surroundings, and geographical site context e.g. age and design of buildings, capacity for retrofitting & space availability to address environmental issues, special features or environmental issues of the site.	*School;* the Principal is required to sign an agreement ensuring they support the teacher/s involved and intend to work toward a whole-school approach to waste and litter education and reduction. • Teacher / School Representative who attends workshop drafts an Action Plan during the workshop - regarding their intentions for implementing Waste Wise in their school.

OUTCOME 2: Schools complete a whole of school waste audit and are aware of their current situation. With this knowledge they begin planning their next steps and their teacher/s attend a follow-up half day professional development workshop.

1. Success criteria, definitions and explanations	2. Factors that affect success that Waste Wise can influence	3. Factors that affect success that Waste Wise can't influence	4. Activities to address factors that affect success
The Teacher / School Representative: • attends the workshop and if not done earlier, completes the initial waste survey • further develops their Action Plan for implementation of the Waste Wise program in their school by discussing their situation with other teachers at the workshop • through participation in the second half-day workshop is energised to through interaction with others and support of the Waste Wise Team to continue implementation in their school	• Schools ability to access data to be able to complete the initial survey. • The Principal, leadership team and school council continue to be supportive of the program and its implementation in the school. • The schools are encouraged to be flexible in establishing waste minimisation and prevention practices – to start with achievable actions that will build commitment. • The resistance of schools to release teachers for workshop and to pay for resources and support • There is at least one person, preferably a team of people, in the school who is committed to the program. • The skills and expertise of the Waste Wise Team are sufficient to gain ongoing commitment agreement and understanding by the Principal of the requirements of Waste Wise. • The Waste Wise Team is sufficiently resourced and supported to enable them to support teachers – 'phone, email, school visits / incursions, face to face.	• Existing experience and / or expertise in the school regarding environmental education generally and waste prevention / minimisation specifically • The school plans to involve all or only some years in waste prevention / minimisation • The climate & culture within the school eg Principal / Executive educational leadership style; approach to change management; degree of support provided by eg Principal / Executive; innovative and entrepreneurial staff, parents & students; teacher morale • The demographics, historical and community context of the school eg disadvantaged students, rural and regional areas • Previous experience and commitment to environmental education and management • Competing priorities in the school's yearly plan and staff daily commitments • Existing school infrastructure, relationship to its immediate physical surroundings, and geographical site context e.g. age and design of buildings, capacity for retrofitting & space availability to address environmental issues, special features or environmental issues of the site.	• Waste Wise promotes each workshop activity by sending a flyer to schools (fax, email) • Waste Wise offers incentives: Schools that send a teacher to the workshop are reimbursed $100 to pay for their release time; the workshop, resources (practical & curriculum) & ongoing support are free • Schools qualify as 'participating' when they: send a teacher to both the workshop sessions (initial 1 day & follow-up half day); complete the initial waste survey *How Waste Wise is Your School;* establish an Action Plan • Teacher / School Representative who attends workshop is encouraged to finalise an achievable Action Plan for implementing Waste Wise in their school in the next 12 months. • Schools encouraged to consider applying for the school grants.

OUTCOME 3: 3a. Schools choose and implement an approach to adopting waste prevention / minimisation behaviours.
This could range from a minimalist method (e.g. waste minimisation focusing on paper recycling) to approaches that are curriculum based, or linked with community action, or an integrated whole school approach.
3b. Schools complete and implement a waste policy, waste plan and strategic timeline

1. Success criteria, definitions and explanations	2. Factors that affect success that Waste Wise can influence	3. Factors that affect success that Waste Wise can't influence	4. Activities to address factors that affect success
The School determines their approach and begins implementing some changes. The Waste Wise Team encourages school-based choice depth and scope of approach. This may include: • an emphasis on practical activity initially • being focussed on a very limited set of activities (i.e. starting small) or broad-based • limited to only one or two classes or including all classes • linked to the curriculum informally or formally integrated • a formal Waste Policy, Plan, and Strategic Timeline up-front or this may be developed later on	• identification of the relevance of Waste Education and waste prevention / minimisation behaviours to student outcomes and school improvement • network of support for environmental educators (in schools and externally) • perceived lack of resources • knowledge and skills of teachers & the school community in waste education and environmental education generally • making schools aware of the need to establish support more broadly from other teachers and the broader school community • generation of commitment through external acknowledgement of the school as a participant in Waste Wise	• Lack of time amongst teachers and school staff • Competing priorities in the school • Changes to the curriculum framework and pedagogical emphasis(e.g. Outcomes Based Education) by the Department of Education • Existing experience and / or expertise in the school regarding environmental education generally and waste prevention / minimisation specifically • Executive approach to change management and degree of inclusion of waste education and waste prevention / minimisation behaviours into school processes. • Existing school infrastructure, relationship to its immediate physical surroundings, and geographical site context e.g. age and design of buildings, capacity for retrofitting & space availability to address environmental issues, special features or environmental issues of the site.	Provision of ongoing support from Waste Wise team through: • Mobile display 'incursions' and presentations to local communities • Waste Wise Newsletter • Waste Wise website with resources and network information • E-mail and 'phone support • Linking schools with local and regional support agencies and businesses e.g. Regional Councils, Worm farm experts, SITA waste removal / recycling government contractors • School grants for environmental projects • Enabling schools where possible by providing resources, ideas, examples; being practical and flexible in meeting school's needs (i.e. school-centric), a philosophy of 'making it easy' • Providing incentives – financial and resources

OUTCOME 4: 4a. Schools demonstrate a 50% reduction in waste to landfill
4b. Schools demonstrate application of the 3R's – Reduce, Reuse, Recycle to the whole school
4c. Students are actively involved in waste minimisation activities and feel empowered to adopt waste prevention / minimisation behaviours
4d. Schools demonstrate involvement with broader community waste prevention / minimisation activities
4e. Schools regularly monitor their waste audit measures and review the results. They document their achievements.

1. Success criteria, definitions and explanations	2. Factors that affect success that Waste Wise can influence	3. Factors that affect success that Waste Wise can't influence	4. Activities to address factors that affect success
Schools monitor waste to landfill and demonstrate a 50% reduction. This occurs through establishing a systematic approach to separating and managing waste where students are progressively involved in all aspects of the process. In particular through the 3R's including: • Sorting and separating waste streams • recycling e.g. paper & cardboard products (through having it collected and removed by specialist contractors); • reducing consumption e.g. using paper double-sided, generating less photocopying; students using refillable drink bottles; establishment of 'Healthy Canteens' • using organic and green waste in worm farms, composts, mulch • reducing consumption of pre-packaged foods in the School Canteen and student lunches • effective litter management around the school grounds • aluminium can and ring-pull crushing and recycling • reusing e.g. collecting discarded &	• practical knowledge and skills required for waste prevention / minimisation • support for curriculum integration • information in connecting schools with key support agency people and others in the community • networking Waste Wise schools with one another • Positive publicity regarding school achievements – case studies, statewide & regional media • Gaining support of Regional and Local Councils and the provision by them of specific services to Waste Wise schools	• previous points from earlier outcomes levels • Policy changes and potential confusion in branding in the waste education 'market' e.g. a shift in policy from 3R's to 'Zero Waste' and Prevention, Recovery, Disposal. • Program funding • Positive publicity regarding school achievements – word of mouth and local school community based media • Engendering support of local parents and community groups. Ensuring that these people understand how Waste Wise works (i.e. this is a school responsibility)	Provision of ongoing support from Waste Wise team through: • Mobile display 'incursions' and presentations to local communities • Waste Wise Newsletter • Waste Wise website with resources and network information • E-mail and 'phone support • Linking schools with local and regional support agencies and businesses e.g. Regional Councils, Worm farm experts, SITA waste removal / recycling government contractors • School grants for environmental projects • Enabling schools where possible by providing resources, ideas, examples; being practical and flexible in meeting school's needs (i.e. school-centric), a philosophy of 'making it easy' • Providing incentives – financial and resources Waste Wise Team networks to build relationships and improve liaison and coordination of program delivery with: • other Waste (and environmental)

1. Success criteria, definitions and explanations	2. Factors that affect success that Waste Wise can influence	3. Factors that affect success that Waste Wise can't influence	4. Activities to address factors that affect success
dumped bicycles and renovating them Students initiative and innovation is encouraged and they contribute their inventiveness to significant aspects of the system e.g. by implementing improvements, managing and taking ownership of the process. The activities of the school draw in the support of parents and the local community. Students begin to insist that home practices change to include waste prevention / minimisation parents. Parents, teachers and students describe situations where students have influenced home practices, and/or demonstrated initiative by applying what has been learnt at school to another environment. The school has system of recording and monitoring its waste levels from each of the waste streams. By using statistics it can demonstrate the effectiveness of its system over time.			Education specialists statewide • Regional government and non-government agencies • Statewide & local service providers or both waste management and education

OUTCOME 5: Schools are working models of waste prevention / minimisation in their communities

1. Success criteria, definitions and explanations	2. Factors that affect success that Waste Wise can influence	3. Factors that affect success that Waste Wise can't influence	4. Activities to address factors that affect success
The school has an efficient and effective waste sorting, minimisation and prevention system. Everyone in the school community (students, teachers, parents and the broader community) contributes to the way the system works. They understand and can identify each of the components of the 3R's in the system. The school has become a focus of this sort of activity and is acknowledged in its local area as a 'Waste Wise' school.	• Formal and public recognition of achievement • networking Waste Wise schools with one another • Positive publicity regarding school achievements – case studies, statewide & regional media	• previous points from earlier outcomes levels • Policy changes and potential confusion in branding in the waste education 'market' e.g. a shift in policy from 3R's to 'Zero Waste' and Prevention, Recovery, Disposal. • Program funding • Positive publicity regarding school achievements – word of mouth and local school community based media	The Waste Wise program has a voluntary accreditation process for school that wish to have a formal achievement award. Schools are encouraged to participate in other environmental awards schemes – statewide (e.g. Premier's awards), Australia-wide (e.g.

OUTCOME 6: 6a. Schools broaden their activities beyond waste management to encompass other environmental sustainability interests and concerns.
6b. Students, staff and parents positive 'Waste Wise' behaviours begin to influence broader community environmental sustainability behaviours.

1. Success criteria, definitions and explanations	2. Factors that affect success that Waste Wise can influence	3. Factors that affect success that Waste Wise can't influence	4. Activities to address factors that affect success
These outcomes relate to a linkage with the Sustainable Schools Initiative WA approach where pilot schools are building on their expertise and systems approach to Waste minimisation / prevention to a broader whole school community ecological sustainability approach.			