

Waste Prevention Options Appraisal

Hertfordshire Waste Management Partnership

May 2006



Funded through
the Waste Implementation Programme,
Local Authority Support Unit - Direct Consultancy Support
Programme

Report for:
Hertfordshire Waste Partnership

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INTRODUCTION

Hertfordshire Waste Partnership (HWP) is in the process of preparing a revision to its Municipal Waste Management Strategy (MWMS). This appraisal of the potential options for preventing and minimising waste sits within that process.

1.1 Defra Guidance

Defra have issued 'Guidance on Municipal Waste Management Strategies'¹ which advises that waste must be managed in accordance with the hierarchy. In evaluating options, the Guidance suggests an iterative approach to appraisal of options that first considers measures for prevention and minimisation of waste. Options should be chosen *“to deliver the environmental outcomes that do most to meet the objectives”* of managing waste in accordance with the hierarchy and decoupling economic growth from waste arisings growth. Only once all practical initiatives for preventing and reducing waste have been determined, should consideration move to the next stage in the hierarchy – recycling and composting – and so on, with disposal seen as the last option.

This option appraisal process is therefore being carried out prior to any consideration of measures relating to recycling, composting, treatment and disposal. The impact of options selected in terms of reducing the quantity of total municipal waste arisings will then be taken into account in considering the services and infrastructure that are required for recycling, composting, treatment and disposal.

1.2 Strategic Environmental Assessment (SEA)

The Strategic Environmental Assessment (SEA) Directive requires that the strategy development process is supported by an SEA.² An SEA, which is undertaken concurrently with the development of an MWMS, exposes for external scrutiny the option selection process and ensures that the full range of environmental issues are given due consideration. The first stage of the SEA process, the preparation of the Scoping Report, presented the long list of options that will be considered (at each level of the hierarchy) and the criteria against which each option would be appraised. This options appraisal is based upon the SEA Scoping Report.

1.3 Current Strategy Plans

Plans that are developed will ideally build upon plans laid down in the existing MWMS produced in 2002, and upon other activities currently being undertaken.

¹ Guidance on Municipal Waste Management Strategies, July 2005; must be taken into account by all authorities that have a duty under the Waste and Emissions Trading (WET) Act 2003, to produce a joint strategy. Practice guidance further supports this and can be found at the following location: <http://www.defra.gov.uk/environment/waste/localauth/practice-guidance/index.htm>

² This is also required by the Defra guidance.

Where this report makes projections regarding the performance of waste prevention initiatives, these are built upon the projections of waste arisings detailed in Eunomia's *Hertfordshire Baseline Review* which considers current and possible future waste management performance.

2.0 Waste Prevention Measures

The following waste prevention and waste minimisation categories and options are adapted from those proposed in the SEA Scoping Report, the existing strategy, and measures proposed within the Municipal Waste Management Strategy (MWMS) Practice Guidance and the information sources identified therein. These categories and options will provide a long list of measures for appraisal.³

The appraisal process will then lead to a shorter list of priority measures being taken forward for consideration for adoption and action planning so that the final strategy is practically oriented in its ambitions rather than being exhaustive in its breadth of scope. Subsequent reviews of the MWMS should review the action plan and

- Review the progress made on initiatives being implemented; and
- The prioritisation of initiatives already in the action plan, and to be planned in subsequent years.

2.1 Campaigning and Enabling Activities

Traditionally waste minimisation has involved promotional efforts in an attempt to persuade residents to change consumption and disposal behaviours. These policies are becoming increasingly well developed, and hence, more likely to deliver results and will form a central part of a well rounded waste prevention action plan:

- **General Campaigning Activities:-** Underpinning almost all waste prevention work are attempts to explain to the general public the problem of rapidly growing waste generation and the need for residents to consider their patterns of consumption and disposal.
- **Promotion of Home and Community Composting:-** Clearly material which is dealt with by residents within their own properties, as in the case of home composting, does not need to be transported by WCAs for centralised treatment by WDAs thus saving money, and reducing the environmental impacts of waste haulage. To encourage home composting, authorities can distribute home composters; support master composter schemes which aim to show residents how to compost and answer questions; and publicise the benefits of these activities. To encourage community composting, authorities can support the activities of community groups and community based initiatives (see below) and help in the identification of land suitable for this activity.

³ Much of the content, particularly that which describes the available options, is taken from the Scoping Report. This is to avoid unnecessary duplication of effort whilst recognising that audiences for the two documents may be different but that much which is in one will be of interest to readers of the other.

➤ **Initiatives Addressing Purchasing Behaviour:-** Working to persuade residents to change the things they buy and the way they buy them will lead to waste prevention outcomes. Specifically, the strategy might consider:

- promoting durable/re-usable items over disposable items;
- promoting re-usable shopping bags;
- encouraging the purchase of goods with less / re-usable packaging;
- encouraging the purchase of 'experiences not stuff' generally, but especially at Christmas to reduce materials use and retain economic activity in the region;
- promoting home delivery.

Such promotions can also carry 'buy recycled' messages;

➤ **Minimising unwanted mail:-** Promoting the services of the Mailing Preference Service is cheap and allows residents to stem the flow of unwanted advertising material delivered by mail. The strategy could also consider the printing and distribution of 'no junk mail' stickers;

➤ **Schools/Education measures:-** Programmes of educational outreach aim to teach children about re-use, recycling and waste disposal to change behaviours both at school and at home;

➤ **Partner Supported Waste Prevention:-** Some measures for waste prevention require the existence and support of outside organisations which for either business or ethical motives are dedicated to the achievement of aims which are waste preventing. Because of their ethical position, the impact they can make on public attitudes, and the potential they offer for cost effective support of a waste prevention agenda, it may make sense to support and promote the activity of such community groups. Such groups can be of assistance in a number of ways when considering waste minimisation, re-use and recycling. Frequently such groups' main impact is educative and in helping to shape social attitudes. Sometimes these groups can become considerably more productive and contribute to the re-use of large quantities of material.

- *Community re-use and recycling of bulky waste.* One of the most effective systems for minimising waste requiring disposal is to capture as much as possible of what is collected through bulky waste services for re-use. Many large items of furniture and consumer electronics goods, which are disposed of by residents using these services, can, with the right community group infrastructure, be diverted to clients of social services and others. A further fraction of this material can be usefully and profitably recycled. The best performing schemes of this type achieve diversion from disposal of approximately 50% of material collected

by such services. Such services, once in place, can also be used to maximise the diversion of such materials collected at Household Waste Sites. It is unfortunate that no such well developed groups exist within Hertfordshire of the kind of size necessary to support sustained action in this direction. This is probably, at least in part, a consequence of the area's affluence which means there is little in the way of available labour to set-up and run this type of organisation.

- *Promoting washable nappies.* Promoting and supporting the reuse of washable nappies does not require the support of outside organisations but the existence of nappy laundering schemes can certainly help in this respect and for that reason it seems reasonable to discuss this measure here. Disposable nappies make up 2-3% of the total municipal waste stream, presenting authorities with a clear target for waste minimisation activities. Indeed the HWP already has a policy regarding the provision of cash incentives to residents who can prove that they use washable nappies. It may be desirable to promote the use of washable nappies further, perhaps by emulating the example of Three Rivers DC, as described below, or by introducing further subsidies to parents who use laundry services or wash nappies at home. Additionally, it may be deemed desirable to employ a nappy-outreach worker that seeks to encourage mothers and, more importantly hospitals, of the benefits (including financially) of washable nappies. This work can be supported by promotional activities.

2.2 Council Initiatives – Leading by Example

One area in which action can be taken quickly is with regard to the authorities' own waste – that which is generated in the normal course of Council business. Although this does not necessarily make up a large part of what requires treatment, acting effectively to prevent waste arising can be seen to be leading by example. Furthermore, Council employees – often usually also local residents – see that their employers take the issue seriously, and will often learn the good behaviours that are required of them at work and start acting similarly in the home environment, thus allowing these measures to indirectly impact more widely on municipal waste. A number of different approaches to prevention of waste arising through council activities are available.

1. Council Purchasing Initiatives and Policies;
2. The appointment of Waste Prevention Officers can lead to the necessary level of focus and prioritisation so that projects can be sensibly identified and managed from start to finish without the distraction of other responsibilities.

2.3 Excluding the Consideration of Initiatives Which Disincentivise Waste Generation

Increasingly authorities are seeking to constrain the amount of residual waste that they collect. This is being achieved through a variety of policy tools and waste collection system initiatives. These changes or initiatives are often motivated by a desire to stimulate, at the same time, participation in recycling services. Another, arguably more powerful, motivation is the need to rebalance overall waste expenditure in favour of recycling, rather than to simply increase total service costs.

Although these measures may have some waste prevention impact this, as with all prevention measures, is very difficult to quantify. Furthermore, these initiatives are not principally motivated by waste prevention considerations but relate more closely to the issues of recycling performance and cost described above. For these reasons and because of their relation to waste (and recycling) collection infrastructure and systems considerations, it makes more sense for these initiatives to be appraised as part of the analysis of options for the collection of materials for recycling and composting.

These points notwithstanding, it is worth briefly reprising the discussion originally presented within the SEA Scoping Report, because of the impact that these policies and systems might potentially have in respect of waste prevention and, additionally, to provide reassurance that all such measures will be considered for inclusion within the revised draft MWMS.

Disincentives to waste generation come in a variety of types:

1. **Variable charging.** Although not currently permitted by law, charging residents based on the volume or weight of refuse that they generate is considered by many in the industry to be a policy for the future. Mindful of this, and with an eye of the efficacy of this policy in other countries, HWP may wish to take a position on this issue in the MWMS in anticipation of any legal changes which might be made and as a signal indicating local preference to national policy makers;
2. **Charging for containment.** Watford Borough Council provides residents with a wheeled bin free of charge which is emptied weekly. If this is insufficient, then residents are required to dispose of additional waste using specially marked sacks which are available from the council at a charge of £1 each.
3. **Absolute limits on containment.** Six authorities within the HWP now impose limits on the amount of waste that is collected from householders through the use of bans on the collection of side waste. It may be that the MWMS sets out the position of the HWP regarding whether this policy might be desirable for adoption across all WCAs. An alternative system, which effectively acknowledges the problems faced by households with infants, has already been implemented by Three Rivers DC which does not collect side waste apart from disposable nappies where these are properly presented in specifically marked council provided sacks which are provided for a charge.

4. **Alternate week residual collections.** By collecting waste fortnightly rather than weekly, as is increasingly common, residents are stimulated to use other collection systems provided, to think about their waste generating behaviour and may start to change patterns of consumption or to carry out home composting of certain types of food waste thus diverting material from refuse services.

2.4 Long List of Waste Prevention Measures

Drawing on the ideas in the sections above and also upon that which is contained within the existing strategy and as proposed by the MWMS Practice Guidance from Defra, it is possible to draw up a long list of potential waste prevention measures.

Table 1:- Long List of Possible Waste Prevention Measures

ID	Initiative
1	General Waste Minimisation Awareness Campaign
2	Coordination/integration with recycling programmes and other messages
3	Home Composting Promotion & Education
4	Home Composting – Master Composter
5	Home Composting Bins subsidy
6	Community Composting
7	Engage Retailers in Promotions
8	Reusable Shopping Bags
9	Promotion of Reusable/Refillable Items (eg. batteries)
10	Promote Home Milk Delivery
11	Promote 'Smart Shopping'
12	On-line Materials Exchange
13	No Junk Mail Promotion (MPS)
14	Eco Schools Programme
15	Inclusion of Waste Min Messages In Educational Facilities
16	Intensive Bulky Waste Separation
17	Real Nappies
18	Eco Teams
19	Toy Library
20	Council Purchasing/Internal Policies
21	Inclusion in Tender Evaluations
22	Structure/Waste Minimisation Officer/Responsibilities
23	Establish Waste Minimisation Targets
24	Furniture & Electrical Goods Re-use
25	Paint Reuse
26	Wood Banks
27	Waste Minimisation Directory

3.0 Evaluating Potential Prevention Activities

A two stage process has been adopted to rank the available initiatives against each other. The first stage takes a broad brush approach to select the most promising options. These have then been taken forward for more detailed analysis.

3.1 Long List Evaluation

3.1.1 Evaluation Criteria for Initiative Long List

To evaluate which of the measures merit more detailed business planning, a number of criteria have been drawn up against which initiatives on the long list can be rated. The six criteria that have been selected and the rationale for their use are laid out in the following sections.

3.1.1.1 Council Controlled Waste Streams

Clearly, if the stream that is targeted for activity is within the control of the Hertfordshire WCAs or WDA, then the scope for taking positive action is much increased. Furthermore, it is important that the HWP is seen to lead the way on waste prevention and to set positive examples to residents and businesses within its area. Additionally, because of the quantities of waste in question, there is potential for the creation of opportunities for businesses or groups which work in this area and which may have wider cultural impacts.

3.1.1.2 Focus on Key Materials

Certain materials arise in much greater quantities than others and it is entirely sensible, therefore, that initiatives which target these should be prioritised. A small percentage impact on the amount of green waste that requires handling, for instance, will have a larger effect than an initiative which leads to the reuse of all aluminium foil.

3.1.1.3 Focus on Quick Wins

In order to build momentum with a waste prevention programme by delivering early success, it makes sense to consider how likely a given measure is to have an impact in the short-term.

3.1.1.4 Cost Effectiveness

The more affordable an action, the more likely it will be to be taken forward. Initiatives which are likely to be cost-effective should clearly be prioritised for more detailed consideration.

3.1.1.5 Lay a Foundation for Change

Household waste prevention is ultimately a difficult proposition because it requires us all to change our habits in terms of consuming less, reusing more, and demanding longer life products, less disposable goods, and less packaging. These kinds of changes are not going to happen easily or quickly. It will take time to change consumer attitudes, and therefore, if we are to attain longer-term

waste prevention objectives, a decision must be made to invest *now* in measures that will bring about the process of change required. These measures will include awareness raising and educational programmes.

3.1.1.6 Build on What Already Exists

Money, and effort, have already been invested in waste prevention messages and campaigns and it is important that this work should not be abandoned. Not only does a body of expertise already exist in terms of delivering these types of measure but there is also an agreement developed amongst the partners that these actions are worthwhile (which can be valuable in itself) and public recognition of the messages which should be leveraged by further work focussed on the same, or similar issues.

3.1.2 Evaluation Process and Ranking

The evaluation criteria have been used to develop an evaluation matrix which subjects each initiative to a ranking exercise. Each initiative has been given a score based on how well it fulfils each of the selected criteria. Initiatives score 2 if a criterion is considered to be fulfilled, 1 if a criterion is partially fulfilled and 0 if it is not fulfilled. Scores are awarded on the basis of subjective judgement, and although reference was made to research and information held, no attempt was made at this stage to objectively quantify potential costs or impacts. Nor was any attempt made to weight these criteria relative to each other.

The outcome of the ranking exercise is shown below with initiatives listed in descending order of their summed criteria evaluation score.

Table 2:- Ranking long list of waste prevention measures

ID	Initiative	Council Controlled Stream	Key Materials	Quick Wins	Cost Effectiveness	Foundation for Change	Build on Existing Measures	Total
5	Home Composting Bins Subsidy	0	2	2	2	2	2	10
3	Home Composting Promotion & Education	0	2	1	2	2	2	9
17	Real Nappies	2	0	1	2	2	2	9
13	No Junk Mail Promotion (MPS)	0	2	2	2	1	2	9
6	Community Composting	1	2	1	1	2	1	8
16	Intensive Bulky Waste Separation	2	2	2	2	0	0	8
25	Paint Reuse	2	0	1	2	2	1	8
24	Furniture & Electrical Goods Re-use	2	2	1	0	2	1	8
4	Home Composting – Master Composter	0	2	1	1	2	1	7
23	Establish Waste Minimisation Targets	2	1	0	2	2	0	7
21	Inclusion in Tender Evaluations	2	1	0	2	2	0	7
2	Coordination/Integration with Recycling Programmes and Other Messages	0	1	0	1	2	2	6
14	Eco Schools Programme	0	1	0	1	2	2	6
1	General Waste Minimisation Awareness Campaign	0	2	0	0	2	2	6
22	Structure/Waste Minimisation Officer/Responsibilities	0	0	0	2	2	1	5
26	Wood Banks	2	1	0	1	0	1	5
11	Promote 'Smart Shopping' (less use of disposables, preference for reduced packaging, no to bags etc)	0	1		1	2	1	5
15	Inclusion of Waste Min Messages in Educational Facilities	0	0	0	1	2	2	5
20	Council Purchasing/Internal Policies	2	1	0	0	1	1	5
9	Promotion of Reusable/Refillable Items (eg. batteries)	0	1	0	0	2	1	4
27	Waste Minimisation Directory	0	1	0	0	2	1	4
8	Reusable Shopping Bags	0	1	0	0	2	0	3
12	Online Materials Exchange	0	1	0	0	2	0	3

18	Eco Teams	0	0	0	1	2	0	3
7	Engage Retailers in Promotions	0	1	0	0	1	0	2
10	Promote Home Milk Delivery	0	1	0	0	1	0	2
19	Toy Library	0	0	0	0	2	0	2

3.2 Short Listing for Detailed Evaluation

It was determined that more detailed business case planning should be carried out for ten different measures. Although this number was selected somewhat arbitrarily, it would seem that this number of initiatives, if pursued proactively, could constitute a fairly comprehensive programme of waste prevention measures. It may, of course, be determined at a later stage that it is desirable and possible to consider in more detail the likely impacts of a wider range of activities (and this should, in any case, be carried out during periodic reviews of the action plan).

Logically one would expect that the top ten measures identified in the ranking exercise described and illustrated above would be taken forward. However, because an intensive programme of bulky waste separation and the more intensive promotion of furniture and electrical goods re-use would require the active co-operation of a well organised community sector business where none is currently present in Hertfordshire, it was determined that taking this action forward would not, at this stage, be a profitable use of project resources.⁴

Similarly, there was some concern regarding the number of composting initiatives that were being considered particularly around the possibility that modelling a variety of systems to encourage people to home compost their own (or their community's) green waste would lead to double counting of benefits. The two lower scoring composting initiatives were, therefore, not considered.

The short list of actions that were taken forward for business case analysis were the top fourteen performing initiatives identified in the long list ranking and evaluation process, excluding initiative 16 "Intensive Bulky Waste Separation"; initiative 24 "Furniture & Electrical goods re-use"; initiative 6 "Community Composting; and initiative 4 "Home Composting – Master Composter", to give a total of ten initiatives to be considered in more detail.

⁴ Liverpool CC has benefited from an agreement with an organisation called 'Bulky Bob's' which is contracted to carry out all bulky waste collections city-wide and which is currently managing to achieve recycling rates in this stream of greater than 30%. However, this organisation benefits from a fairly unique operational environment of similarly motivated organisations providing complementary and other supporting services. Bulky Bob's also benefits from Government grant funding which is available to organisations which help certain qualifying unemployed workers back into the labour market. A pool of such cheap (revenue generating) labour is not available in Hertfordshire thus undermining the business case for the development of such an organisation within the County. However, the value of the work that this and related organisations do for LCC suggests that the authorities of Hertfordshire should make every attempt to make the county hospitable to this type of organisation in the hope that this type of social enterprise might take root.

The business case process and outcomes are described in the following Section.

4.0 Making the Business Case for Waste Prevention Initiatives

It has become a cliché amongst waste management professionals that it is impossible to properly determine the impact (and avoided cost savings) of waste prevention measures. The reason that this is so frequently said is because it is true that it cannot be done with precision (partly because where such activities are undertaken, their costs and impacts are not always closely monitored and recorded). Waste that does not enter the waste stream cannot be counted in an easy way and the benefit of activity in this area, therefore, cannot be measured directly. What is needed is one of:

- A measurement of 'difference' against an estimate of 'what would have happened without the measure'; or
- Estimates derived from direct surveys; or
- Other 'secondary', or 'proxy' measures of effect.

Because effectiveness is not so easily measured, and because cost-savings based upon this performance are difficult to illustrate beyond doubt, business planning has not often been widely attempted and this has stymied the development of widespread and well-funded waste prevention activities and programmes.

However, simply because an effect is difficult to measure accurately does not mean either that it is insignificant, or that it cannot be estimated in advance. Indeed, business cases of all types are rarely completely devoid of assumptions which seek to plug gaps in existing knowledge. In such cases, it is necessary to use best (and informed) estimates'. In the most innovative situations, it may be that knowledge is, however, so scant that where such ideas are perceived as potentially promising, their effects are explored through small-scale trials or pilot projects.

Because of the requirement to now prioritise waste prevention (and the potential that waste prevention initiatives offer), the following sections of this document attempt to estimate the likely cost-benefit balance of those initiatives selected as priorities via the process defined in the previous Section.

As with all business case planning, the calculations used here are necessarily based upon assumptions, and estimates of performance may vary from those that are actually experienced. However, it is felt that the work presented here is useful to gain a sense of the likely 'ball-park' figures of the costs and performance that can be expected from the various initiatives discussed. Such estimates are likely to be the minimum deemed sufficient to leverage in the investment necessary to support the proposed programme of initiatives. Equally, exploration of the business case should reveal which initiatives are simply not worth pursuing.

For each initiative, consideration is given to the precise activities involved, the costs of these and the likely tonnage of waste that will be prevented from entering the waste stream. For ease of presentation, the period considered in

detail in the following sections is the period up to and including 2009/10, although the modelling exercise has considered all years to 2020.

The initiatives are arranged according to the score each was awarded in the short-listing process with the highest scoring initiatives described first.

It is perhaps unsurprising that some of the initiatives when examined in this way were revealed to have no separate cost or benefit, for instance the setting of waste minimisation targets. This does not necessarily mean that such measures are not worth considering but points to the fact that a balanced package of activities is likely to be required which are mutually self-supporting and reinforcing. These tend to appear towards the end of the following 'top ten' offering confirmation that the qualitative analysis was broadly accurate in identifying the activities most likely to be most directly valuable.

4.1 Costs and Savings Common to All Initiatives

Certain costs and savings are shared across all systems and are therefore best discussed separately from any one initiative. As noted above, costs are intended to be sufficiently accurate so as to provide a useful indication of the likely range of possible costs and savings but have not been subject to the kind of detailed scrutiny and justification process that would require much greater devotion of project resource. Nevertheless, the costs as shown here are certainly felt to be broadly accurate and to represent what is achievable when discussing purchases and the mid-range of likely disposal and collection costs that are typically experienced by waste authorities.

The only cost which is fixed for all initiatives are those relating to staff employment. Total costs, including on-costs for the employment of a waste minimisation officer, are modelled at £25,000.

Savings relate predominantly to avoided waste collection and disposal costs. The costs of disposing of materials vary depending on the type collection system through which they arise. Costs per tonne of disposal, average prices achieved for recycling and the cost of composting are given in Table 3 below.

Table 3:- Waste Disposal Costs Used for the Purpose of Calculating Waste Prevention Initiative Savings

Marginal cost (£/tonne, incl. haulage and tax)	Disposal	Recycling	Composting
2005	42	-10	42
2006	45	-10	42
2007	48	-10	42
2008	51	-10	42
2009	54	-10	42
2010	57	-10	42

This shows disposal costs rising by £3 / annum (in line with expected landfill tax increases). Materials collected by recycling services are shown as achieving an average income of £10 / tonne (a negative cost). And material collected for composting is assumed, on the basis of current plans, to all be treated via in-

vessel composting, at £42 / tonne. Costs and income for composting and recycling respectively are not modelled as changing as there is no firm information upon which such a prediction can be based at the current time.

Additionally, waste prevention can achieve savings relating to the operation of the LATS scheme. In these cases, if the authority has surplus allowances then additional will be available for sale, likewise if the authority is in a deficit position then fewer will need to be purchased, though Box 1 demonstrates why the working of the system is not quite so simple.

Box 1:- Effect on Landfill Allowances of Waste Reduction Initiatives

A peculiarity of the LATS system is that not all waste reduction generates an improvement in the LATS balance. The best example here (ironically) is home composting. Because the LATS calculations are based upon a mass-balance approach in which the biodegradable composition of MSW is taken to be 68% (irrespective of the real situation), then reducing the amount of waste by 1 tonne always reduces the biodegradable content of MSW by 0.68 tonnes, irrespective of the nature of the material. Home composting an additional tonne of biodegradable waste therefore has this effect. If that home composted material would otherwise have been separately collected for centralised composting, then the effect of home composting the additional tonne is to move from situation where the LATS balance was improved by 1 tonne, to one where it is improved by 0.68 tonnes. In other words, where collections of compostables are in place, perversely, the LATS mass balance calculation disincentivises home composting. This is a clear example of where LATS and the hierarchy come into conflict, but as will be seen below, the net cost to the authority – even accounting for this perverse effect - is likely to favour home composting.

For similar reasons, the mass balance approach implies that even if a waste reduction activity acts to reduce *inert* waste in the municipal stream, the effect is to improve the balance of landfill allowances by 0.68 tonnes, irrespective (in this case) of whether the material would otherwise have been recycled or disposed.

The cost of landfill allowances is clearly unknowable at this point in time. The picture has been further clouded by the market being flooded with allowances by those authorities, which are clear that they are in a position of surplus whilst there is, as yet, little demand to purchase allowances, thus keeping prices low.

It has been postulated in the Baseline Report (developed as part of the same package of work preparatory to Strategy drafting to which this document belongs) that with insufficient non-landfill capacity available nationally and the difficulties created by the planning regime, that prices will eventually rise to approach the cost of the fines: £150 / tonne. In order to take a conservative approach and avoid overstating the potential value of waste prevention activities, the lower of the two permit cost profiles modelled in the Baseline Report has been used here. The modelled cost of LATS permits to 2010 is shown in Table 4.

Table 4:- LATS Permit Market Prices Used for the Purpose of Calculating Waste Prevention Initiative Savings

	2005	2006	2007	2008	2009	2010
Trading Price for Landfill Allowances	£25.00	£25.00	£25.00	£50.00	£100.00	£125.00

Where waste is prevented then some collection savings must also be accounted for. The cost of collection again varies depending on the waste stream in question and the type of service that is operated. Because these calculations relate to the whole of the County approximate average costs have been used as shown in Table 5. It is not assumed that the whole cost of overall collection cost/tonne is saved for each tonne of waste prevented, but that there is a marginal saving of 25% of the per tonne cost of the most likely form of collection which would otherwise have occurred. This may be conservative for initiatives which effect tonnages more significantly.

Table 5:- Waste Collection Savings Used for the Purpose of Calculating Waste Prevention Initiative Savings

Collection System	Collection Cost/Tonne (£)	Marginal (percentage) cost of collection	Marginal saving from prevention / tonne (£)
Disposal	35.00	25%	8.75
Recycling	90.00	25%	22.50
Composting	40.00	25%	10.00

4.2 Costs and Benefits of Each Specific Initiative

In order to fully understand the business case that has been created for each of the initiatives examined at this stage, it will be necessary for the reader to look at the detailed modelling that has been done for these. Screenshots of this work, for each initiative which has real costs and direct outputs (rather than acting to support the others), to 2010 are presented in Appendix 1.

A general overview discussion of what is meant by each initiative and the key inputs and findings of the business case analysis is presented over the following sections.

4.3 Home Composting Bins Subsidy

4.3.1 Initiative Description

Although home composting does not actually avoid or reduce waste it is included as Waste Prevention because it prevents waste from entering the formal system for collecting household waste. By its nature home composting

relies on the initiative of the householder. Increasing the amount home composting taking place therefore focuses on incentivising the householder to engage in home composting and removing barriers to participation.

Subsidised bins are currently supplied through the Waste Aware programme and the modelling described here relates to the continuation of that activity.

4.3.2 Costs

The modelling is based upon a subsidy of £10 per unit with an expected lifespan of 10 years / unit and that across the County around 2,000 can be distributed each year. Additionally a budget of £3,000 is provided for in each year for the promotion of the bins and the waste prevention officer is required to spend 20 days in 2006 working on this initiative, 15 days in 2007 and 5 days in each subsequent year.

Because bin purchase is amortised over the lifespan of the units, annual costs increase as more bins are distributed regardless of the declining officer time commitment required. In 2006 costs are calculated at £7,500, rising, in 2010, to £15,000.⁵

4.3.3 Benefits

Each unit distributed is estimated to lead to the prevention of 75 kilos of green waste. Such units, when properly used, normally lead to the diversion of around 220 kilos of waste, of which 115 kilos would have been collected in the household refuse bin (see Box 2).⁶ The 75 kilos figure, therefore, conservatively allows for a considerable number of the distributed units to remain unused.⁷

Of the waste that is prevented from entering the municipal stream, 25% of this is considered to be avoided kerbside refuse, 25% is avoided kerbside composting and the remaining 50% is CA arising that would have been sent for disposal. These proportions are broadly in line with findings from WRAP's work.

The tonnage of waste additionally prevented by continuing with this scheme rises from 167 tonnes in 2006 to 853 tonnes in 2010. Disposal savings rise more rapidly, reflecting the increasing cost of LATS, from £7,500 to £35,000.

There is a net saving of £177 in 2006, rising to £20,500 in 2010.

⁵ All costs are, in the text rounded to the nearest £500. The exact costs generated are given in the Appendix.

⁶ Based upon work currently being carried out by WRAP.

⁷ A recent news article has highlighted that 40% of residents who purchase home composting bins stop using them because of a lack of advice and support on how to use them effectively. (Source: <http://www.letsrecycle.com/materials/composting/news.jsp?story=4399>). The figures used here, therefore, may be unnecessarily conservative.

Box 2:- Results from WRAP Home Composting Diversion Model

Work undertaken by WRAP has sought to model the effects of home composting from the household perspective.

This work suggests that the quantities of waste being composted by active participants is higher than was previously thought, especially in WCA areas with garden sizes averaging over 200m². Here, an estimated 340kg of material per household per annum is dealt with through home composting. It is thought that 160kg of this might otherwise be collected as dustbin waste, whilst the remainder is material which would otherwise be taken to an HWRC (see Table 6). For WCA areas with smaller gardens (less than 200m²), the figures are 180kg per annum and 100kg respectively. The national average figures suggest home composting households are reducing the input to the residual waste bin by around 115kg per annum on average, and that an additional 105kg per participating household is diverted from HWRC collection.

The important point here is that quite apart from any 'new' arisings from a latent garden waste fraction (i.e. that which households might place into a biowaste container which they do not currently collect for home composting), where people are discouraged from home composting, even if only 'passively', the potential for increased deliveries into the formal collection system clearly exists.

The WRAP research suggests that the distinction between the home composted quantities rests upon the average garden size, which does not necessarily imply a split between 'rural' and 'urban' authorities. The distinction on the basis of average garden size is used later in this work to model the effects, at the household level, of different systems for collection and treatment.

4.4 Home Composting Promotion and Education

4.4.1 Initiative Description

Promoting the environmental and horticultural benefits of home composting is certainly not limited to promoting the availability of subsidised bins although there will be a clear cross-over benefit in the performance of any bins that have been distributed. It is also possible to run demonstration at public events, to distribute leaflets which show how home composters can be home-built instead of using plastic bins that need to be purchased and to run display events at garden centres and any gardening related events that are happening in the County.

4.4.2 Costs

An annual budget of £15,000 is allowed for this activity and 15 days of the waste prevention officer are given over to working on this type of promotion. This gives a total initiative investment of £16,500 / annum across the County.

Table 6: Effects of Home Composting in Terms of Reduction in Biowaste Delivered Through Different Collection Routes (kg/hhld/yr)

Reduction in:	Results based on questionnaires & waste analysis		Results based on district models (based on DEFRA local authority statistics 2003/04)		
			Overall model	Average garden size greater than 200m ²	Average garden size less than 200m ²
Dustbin waste (total)	84		115	160	100
Kitchen waste in dustbin	WRAP bins v Non-participants	42			
	Non WRAP bins v Non-participants	24			
Dustbin waste + CA waste			220	340	180

4.4.3 Benefits

It is assumed that around 1,000 people each year are persuaded by the campaign to start home composting without using the subsidised bins. This is equivalent to 0.25% of the total County population. It is expected that each of these residents will compost 150 kilos of waste each year that would otherwise have entered the residual and other waste streams in the same proportions were used to calculate the cost/benefit of subsidising home composting bins (25% for each of collected residual and collected compost and 50% for CA delivered and recycled waste).

Because the number of people affected by this initiative is half the number taking subsidised bins but with double the impact (because those taking up the bins are more likely to 'give up' than those making the effort to make their own compost container), the tonnage prevented by each of the two schemes is the same, rising from 167 to 853 tonnes between 2006 and 2010.

In 2006 the promotional work has a net cost of £8,500 but in all future years yields net benefits when considering avoided costs of waste collection and disposal, rising to £30,000 in 2010.

4.5 Real Nappies

4.5.1 Initiative Description

The scheme considered in the business case modelling is based on general promotional work, encouraging families with young children of the benefits of washable nappies and also upon the County-wide extension of the scheme currently used by Three Rivers DC. Under this scheme, disposable nappies separately presented alongside domestic refuse can only be accepted if they are contained in sacks that are specifically sold for this purpose. No other side waste is accepted.

This, therefore, incorporates the assumption that a limit on residual waste will be introduced across the County and it is recognised that this is not realistic *in the short term*.

However, because this has been practical for Three Rivers DC and such limits are increasingly common, and also to simply illustrate the potential benefits, this initiative offers, the business case is presented based upon this assumption to inform possible future decision-making.

In order that benefits are not overstated, the business case analysis is restricted to considering the value of encouraging parents to use washable nappies and ignores any income from the sale of sacks specifically for the separate disposal of disposable nappies.

4.5.2 Costs

A subsidy of £30 per participant is modelled and 10 days of waste prevention officer time are shown as being required each year to visit antenatal classes and

units at hospitals to promote the benefits of real nappies. A general promotional budget of £10,000 is provided for and a further £1 per participant is allowed to explain the working of the scheme and for additional administration.

4.5.3 Benefits

In the first year of the Three Rivers DC scheme 54 participants were recruited to the use of real nappies. Scaled up across Hertfordshire this would equate to 450 participants. Babies tend to wear nappies for an average of two years and there will be some additional impact as any new babies born to previously participating families may also be put in washable nappies. It is assumed, therefore, that the scheme impact rises so that 1,100 households take advantage of the £30 subsidy by the third year. Thereafter, no further increase is modelled as new families need to be recruited to the scheme at the same rate as are leaving the scheme because it is no longer applicable to them.

Each baby wearing washable nappies is calculated as leading to a reduction in waste arisings of 400kilos.⁸ 179 tonnes of waste will be prevented in the first year, rising to 550 tonnes from year three onwards.

The costs, net of collection and disposal savings are £12,000 in the first year of the scheme and although this cost falls to £2,500 in 2008 there is no overall net benefit until 2009 when the scheme delivers net savings of £17,500.

4.6 'No Junk Mail' Promotion

4.6.1 Initiative Description

A number of options are available to reduce junk mail. These include:

- **The Mailing Preference Service.** Registering with the MPS will remove a household's name and address from 95% of mailing lists;
- **Stopping non addressed mail sent by Royal Mail.** This can be done by households writing directly to Royal Mail;
- **Avoiding mailing lists.** Householders can request to be removed from specific mailing lists they are on, and can opt not to join new mailing lists; and
- **"No Junk Mail" stickers.** Placing a sticker on the mailbox will stop most flyers, leaflets and free newspapers be posted through a residents letter box.

What has been modelled here, therefore, is a package of initiatives which seek on the one hand to persuade residents to use the techniques that are available to

⁸ According to the Women's Environmental Network using disposable nappies doubles the amount of waste that a family with a single baby generates. (source: http://www.wen.org.uk/nappies/reports/nappy_briefing.pdf)

them, and, on the other, to support residents in their efforts by distributing “no junk mail” stickers.⁹

4.6.2 Costs

The business case calculations envisage a campaign distributing stickers (5p each + 20p for storage and distribution) on a bi-annual basis, to 22,500 residents in the first year of operation and smaller numbers in subsequent years so that 45,000 residents have been provided with stickers by 2010. Additionally ten days of the waste prevention officer’s time are required in each year and a further budget of £7,500 is included for promotion of the scheme. The total costs in the first year are £16,500.

4.6.3 Benefits

It has been calculated that junk mail comprises 3-4% of the domestic waste stream and that an average household, therefore produces around 40 kilos of this type of material each year.¹⁰ For the sake of conservatism this figure has been reduced to 20 kilos per household in the business case calculations that have been carried out here. With 22,500 residents affected by the scheme in the first year and rising to 45,000 in the final year this leads to the prevention of 450 tonnes of waste in year one rising to 905 tonnes in 2010.

It has been estimated that 25% of the avoided waste would have been otherwise recycled with the remainder disposed of as refuse.¹¹ With disposal costs at £57 in 2010 and LATS modelled at £125, this gives eventual net savings of £92,000.

No benefits have been estimated in terms of savings to the marketing companies concerned.

4.7 Paint Re-use

4.7.1 Initiative Description

Paint arises frequently at HWRCs (although in relatively small quantities), is hazardous and has value to the wider community for, for instance, painting

⁹ Since its launch twelve-months ago, the Waste Awareness Wales ‘no junk mail//dim sgrwtsh’ campaign has seen an increase of 52% in people deregistering their details from advertising mailing lists. This means a total of 94,752 households in Wales have now made positive efforts to reduce the quantity of junk mail that they receive. It is estimated that this has resulted in a reduction of approximately 4,000 tonnes in the amount of junk mail received by Welsh households. (source: <http://www.wasteawarenesswales.org.uk/1487.html?diablo.lang=eng>). It should also be recognised that this also generates savings for the organizations involved in direct marketing for the simple reason that a mail-out to someone who is patently uninterested in receiving the mail-out is a waste of resource. Direct marketing companies generally seek response rates of the order 0.5%, so the vast majority of direct marketing literature is simply passing through a letter box *en route* to a (recycling?) bin.

¹⁰ National Resources & Waste Forum (2004), Waste Prevention Toolkit

¹¹ This is based upon research carried out by Recycle for London which shows that people are less likely to recycle this type of material than newspaper and other domestic paper.

schools and other council and community owned buildings. This initiative considers the installation of a network of lockable paint banks at HWRCs which can be used to store paint left by residents and which can then be used by community representative organisations.

4.7.2 Costs

It is projected that a network of twenty paint stores will be required at £4,000 each with purchase costs to be amortised over ten years. Additionally a budget of £5,000 is provided in each year to promote the availability of the resource to community organisations so that demand for the re-usable paint matches supply. In the first year ten days of the waste prevention officer's time are budgeted for to source and procure the bins.

Equally this task could be passed to HWRC site operators. In subsequent years it is envisaged that the scheme will run requiring on two days of the waste prevention officer's time.

In the first year, costs (based on the writing down of the purchase of the bins over ten years) are £5,500 and these then fall slightly in subsequent years.

4.7.3 Benefits

Without accurate data upon which to base performance expectations conservative figures have been used. It is assumed that 9,000 Hertfordshire residents (2.5% of the total population) will redecorate and will have, on average, 7 kilos of left-over paint which needs to be disposed of and which will be diverted through this scheme.

This will lead to the avoided disposal of approximately 80 tonnes of material each year delivering a net saving rising to around £6,000 by 2010. Although the avoided disposal costs of this quantity of material are clearly small, the benefits of this scheme will be promotional with highly visible community serving facilities located at all HWRCs.

4.8 Establish Waste Minimisation Targets

4.8.1 Initiative Description

This is less an initiative than it is the provision of a framework which supports the rest of the initiatives and enables progress to be monitored against targets, whilst also maintaining a momentum to the overall programme.

4.8.2 Costs

Although there will be some costs in setting out and agreeing these targets these are envisaged as being absorbed within the authorities' other business.

4.8.3 Benefits

Clearly, setting targets will not lead directly to the prevention of waste but will, rather, serve as a statement of intent on the part of the authority that responsible waste management is the responsibility of all individuals and organisations. This

measure is part of building credibility with the wider community that local government organisations intend to 'walk the walk'.

4.9 Inclusion in Tender Evaluations

4.9.1 Initiative Description

As with setting waste minimisation targets it is important for the authorities of Hertfordshire to be seen to be 'walking the walk'. An important way in which this can be achieved is by including consideration of potential waste growth effects and possible means of waste prevention in all council procurements. This could include consideration of the following:

- Decreased use of disposable items
- Use of long life items
- Use of reusable items/ reuse/repair of existing items
- Potential waste growth effects of actions

4.9.2 Costs

The costs to the various councils of requesting that tender submissions should include these considerations within proposal documents are likely to be low although different authorities will be motivated to different extents to take the necessary policy decisions. It will be for individual authorities to consider what level of extra cost, if any, they are prepared to incur in order to purchase equipment or systems that are genuinely waste preventing and no costs, therefore have been modelled.

4.9.3 Benefits

As well as being seen to be acting in a way that is consistent with how the public are being asked to behave with respect to their waste, which is important enough on its own, there are other significant benefits from this approach. Supplier organisations will be forced to consider systems for reducing waste and in the process may identify products or processes which are more cost-effective than those they would otherwise have used. They will then take these forward into future work that they do for other clients and the waste prevention approach may start to take root in the wider community. Also, by buying, for instance, long life products authorities will stimulate the market for these items and are likely to contribute to their wider availability and falling prices.

It seems very likely that the rigorous inclusion of these considerations in tender evaluation processes would lead to some waste prevention. However, the extent to which this will happen is impossible to determine and no direct benefits have therefore been projected.

4.10 Co-ordination / Integration with Recycling Programmes and Other Messages

4.10.1 Initiative Description

In presenting a message to residents that starts to make an impact on behaviour and purchasing patterns it will be important that this is consistent and frequently repeated. For the message to be consistent the idea that waste prevention is more important than recycling should be included together with all recycling messages. This will require a certain amount of effort on the part of those most occupied with waste prevention and it may even be felt useful that all recycling communications (leaflets etc) are produced by the WasteAware team to ensure this happens, with the additional benefit of, in some cases, larger print runs and cheaper prices and the sharing of effort across the County. There is, of course, absolutely no reason to think that district specific leaflets would not continue to carry district specific branding, with the intention being only that some of the work in producing these is done at a single point.

If producing all leaflets at a central point is neither convenient nor practical for whatever reason, it remains important that waste prevention messages are communicated repeatedly and certainly alongside all recycling messages

4.10.2 Costs

It is estimated that fifteen days of waste prevention officer time will be required to ensure the proper integration of waste prevention messages with recycling programmes and communication campaigns. The cost of this is £1,600.

4.10.3 Benefits

The benefits of such an approach will be intangible in terms of tonnage waste prevented but are important in promoting to residents the other waste prevention activities, and shoring up their likelihood of success.

4.11 Eco-Schools Programme

4.11.1 Initiative Description

Although schools only directly generate a small fraction of the household waste stream, there are good educational benefits from targeting schools for waste prevention action including that it is an obvious place in which to educate the next generation about Waste Prevention, and that children tend to take what they have learned home and educate other members of their household.

The WasteAware programme already has a well developed schools outreach programme to promote recycling and composting and this initiative relates to the continuation and expansion of that work.

4.11.2 Costs

40 waste prevention officer days have been budgeted to promote and continue with this work and an additional budget of £5,000 has been calculated to support in the work. The total cost of the programme is £9,500 / annum.

4.11.3 Benefits

With 465 schools in Hertfordshire, it is anticipated that 100 schools are targeted in each of the first four years and 65 in the fifth. Schools once targeted will generate 500 kilos less waste – a target they are likely to exceed only by composting which many are already doing and this seems therefore to be conservative. With 465 schools each generating half a tonne less waste each year, this initiative will lead to the prevention of around 230 tonnes of material.

The net cost of the initiative is forecast to be £6,000 in 2006 with a net saving of £9,500 achieved by 2010.

4.12 General Waste Minimisation Awareness Campaign

4.12.1 Initiative Description

It is clearly not sufficient to simply tack on waste prevention messages to those relating to recycling – waste prevention is, after all, a higher hierarchy option and waste authorities of Hertfordshire are required to consider it as a priority area for activity rather than simply as an auxiliary of its campaigns to divert waste into municipally controlled recycling and composting streams.

Bringing about wide scale household waste prevention is ultimately a difficult proposition because it requires change to consumer habits such as buying less, re-using more, and demanding longer life products, less disposable goods, and less packaging. These kinds of changes are not going to happen easily or quickly. It will take time to change consumer attitudes, and therefore attaining long term waste prevention objectives requires investment now in measures that will bring about the process of change required, including awareness raising and educational programmes. It cannot be expected that waste prevention messages will yield substantial immediate results. However, increasing the level of awareness and a wider recognition of the problems that waste creates, including how everyone can play their part will be essential in bringing about change in the long term.

Communications on Waste Prevention requires an integrated and targeted approach. Influencing behaviour brings together a complex mix of policy and economic measures, social, cultural and psychological factors. It requires a holistic approach that is able to:

- Win hearts and minds by overcoming the perceived barriers to action
- Achieve a common goal by working with a wide range of stakeholders and networks
- Provide credible information so that informed choices can be made
- Provide convenient support services and infrastructure to overcome physical barriers

As well as co-ordinating the messages discussed in previous sections there are additional activities that can be promoted through this type of campaign:¹²

¹² Source: National Resources & Waste Forum (2004), Waste Prevention Toolkit

- Reuse carrier bags from last shopping trip. Keeping them in a convenient place will serve as a reminder to take them on the next shopping trip.
- Use textile bags – they are stronger and can be used repeatedly or buy a 'bag-for-life' at the supermarket for a few pence
- Use excess carrier bags as bin liners and this will save money
- Unwanted clothes to charities, jumble sales or donate to the Salvation Army clothing banks. In some communities there are collections of unwanted clothing organised by volunteers to put items out in specially marked sacks.
- Use a lunch box to avoid foil or plastic wrap. Aluminium foil that is required can be re-used many times before it is finally recycled
- Reuse wrapping paper from birthday and Christmas presents to wrap other gifts. Decorative paper can be used by children for art classes at school
- Used Christmas cards can be cut up to make labels for gifts
- Swap music tapes, videos, CDs, DVDs, books or magazines with friends for other items or give them to charity or donate them to your local hospital, doctor's surgery or library
- Avoid using disposable products such as nappies, razors, pens, polystyrene cups and paper plates. Buy products that can be used again. They will have a longer lifetime and more often than not they will save you money as well
- Paper and card that has been printed on just one side is an ideal material for children to draw on
- Repair household products such as shoes, clothes, electrical items and furniture
- Jam jars and food containers can be washed out to make ideal storage containers for use around the house and in the garage. They can also be used in the shed and green-house as plant pots, for storing seeds and the like.
- Use rechargeable batteries and a battery charger. Such batteries can be used time and time again and can be fitted to toys, torches, audio equipment and many other household items

4.12.2 Costs

A reasonably generous budget of £15,000 has been allocated to support these activities with 40 days of waste officer time allocated to general campaigns activity.

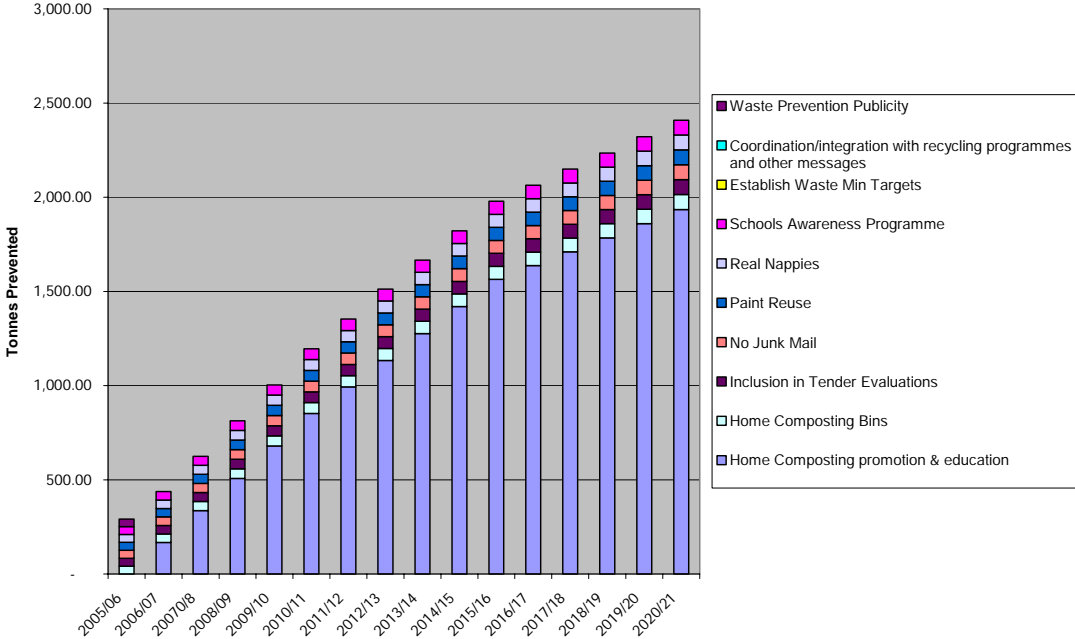
4.12.3 Benefits

No direct benefits have been modelled as accruing from this range of activities because no precise programme of activities has been considered at this stage and because determining the impacts of this type of activity are still harder than with the others initiatives described above. The principle benefit of this type of activity is that it underpins all the others contributing to the creation of changed social perceptions regarding the nature of waste and personal responsibility.

5.0 Summary Outputs of Initiatives Considered and Conclusions

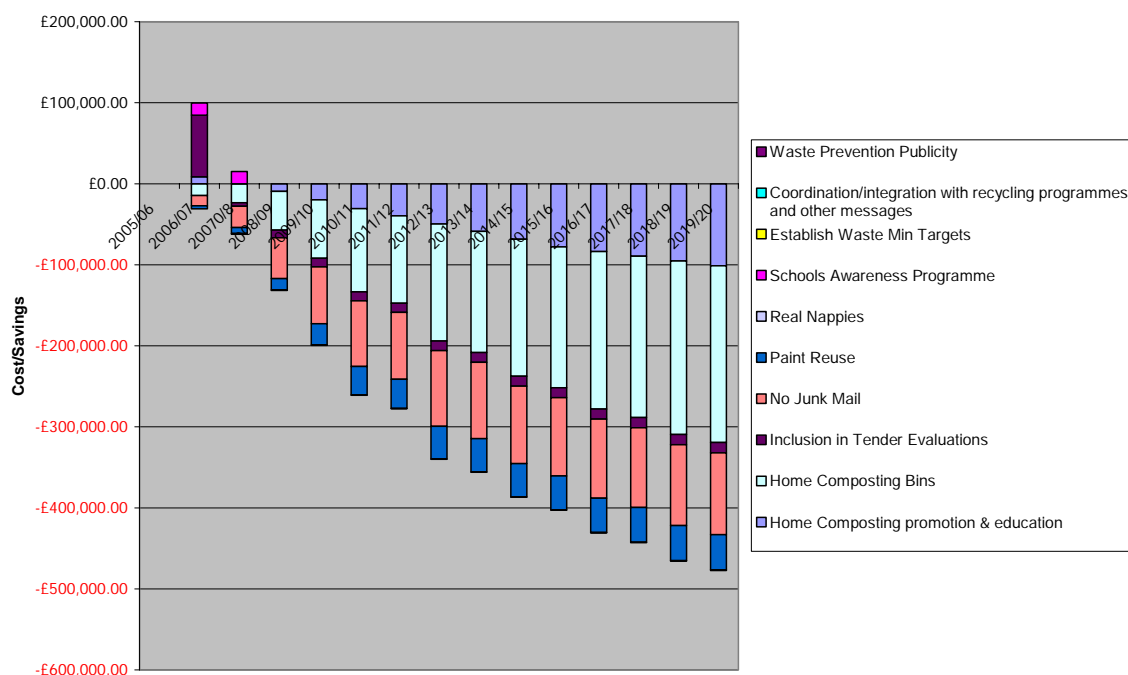
The total tonnage that is projected as being saved is illustrated in Figure 1

Figure 1:- Collated tonnage impacts of measures considered



The cumulative costs and savings of pursuing these activities are shown in Figure 2.

Figure 2:- Waste Prevention Activities Financial Cost / Benefit



These figures illustrate the very considerable relative effect of successfully promoting home composting, an activity that is being pursued with some vigour now at a national level by WRAP.¹³ However, they also reveal that waste prevention activities are not likely to have a very major impact on total waste arisings, at least in the context of this fairly conservative analysis. On the other hand, the business planning laid out herein also illustrates that the financial impact that these initiatives can have in the context of rapidly rising waste disposal costs and LATS permits is significant. Even if the price of LATS permits stays well beneath that which has been modelled here over the time considered (which though possible, seems unlikely given the nature of the scheme and the shortage of necessary non-landfill treatment capacity nationally) then a comprehensive programme of waste prevention activities would appear to be economically justifiable without considering 'softer' arguments such as the knock-on effect on recycling behaviour which is likely as people start to consider more carefully their waste generation and disposal behaviours.

It is worth considering also that those approaches which genuinely reduce, or re-use waste which would otherwise be generated / be sent for disposal are likely to generate environmental benefits. In the assessment of environmental priorities feeding into the European Commission's Fifth Environmental Action Plan, a report for the European Commission, estimated a benefit of €300 per tonne for avoided

¹³ WRAP is working with 36 partners made up of local authorities and other organisations, to distribute home composting bins across areas of the UK. This will be expanded in 2006. WRAP's aim is to provide compost bins for 1.5 million households by 2007.

compostable waste, and €380 per tonne for avoided recyclable waste.¹⁴ This is clearly very significant.

5.1 Next Steps

In order for the programme of initiatives to realise the outcomes being suggested above, a clear plan of action must be developed and decisions taken regarding the organisation or organisations that should be responsible for their delivery. WasteAware already acts on behalf of all the authorities of Hertfordshire and focuses on whole County outcomes. Furthermore, a key focus of its activities is waste prevention work and it is not surprising, therefore that in discussions with officers all authorities appear to be comfortable with an approach to waste prevention which is led by WasteAware.

The next step that is required, therefore, is to reach agreement on the size of the investment that should be made in waste prevention activities and how the programme funding should be split between the authorities. If the full range of activities that have been considered here are included in a programme for action then the indicated initial costs of that programme are likely to be in the region of £200,000. Much of this would be written down over time but a reasonably significant initial investment will, nevertheless, be required. A phased roll-out of activities would reduce costs particularly if paint recycling were to be rolled out more gradually with the cost of 20 paint banks contributing disproportionately heavily to total likely programme costs when bearing in mind the tonnage of waste that might be prevented through this initiative.

Once budgets are agreed, then a programme of activities should be drawn up for presentation to and officers so that final sign-off can be given and activity can start to be timetabled.

¹⁴ RIVM, EFTEC, NTUA and IIASA with TME and TNO (2000) Technical Background Report 7: Municipal Solid Waste Management, in *European Environmental Priorities: An Integrated Economic and Environmental Assessment*, Report to DG Environment, European Commission.

Appendix 1: Detailed Costs Benefit Calculations for Waste Prevention Activities

Home Composter Subsidy

Home Composting Bins						
Variable Costs	Cost (per item)					
Marketing, literature & support	£0.00					
Delivery / Distribution () & Storage Costs	£0.00					
Cost/subsidy	£10.00					
Sales	-					
Overall	£10.00					
Assumed Life (Years)	10					
Annualised Cost (per item)	£1.00					
	2005	2006	2007	2008	2009	2010
Fixed Costs						
Capital						
Labour						
Other		£3,000.00	£3,000.00	£3,000.00	£3,000.00	£3,000.00
Total	£0.00	£3,000.00	£3,000.00	£3,000.00	£3,000.00	£3,000.00
Annualised Total	£0.00	£3,000.00	£3,000.00	£3,000.00	£3,000.00	£3,000.00
Waste Prevention Officer Rate	£25,000.00					
Waste Prevention Officer Days		20.00	15.00	5.00	5.00	5.00
Waste Prevention Officer Total Costs	£0.00	£2,252.25	£1,689.19	£563.06	£563.06	£563.06
Number of households	443,838	447,516	451,225	454,965	458,735	462,537
New participants (%)	0.0%	0.5%	0.5%	0.5%	0.5%	0.5%
New participants	-	2,238	2,256	2,275	2,294	2,313
New participants, cumulative	0	2,238	4,494	6,769	9,062	11,375
Average avoided collection and disposal (kg/participant)		75	75	75	75	75
Of which,						
avoided kerbside refuse	0	18.75	18.75	18.75	18.75	18.75
avoided kerbside recycling	0	0	0	0	0	0
Avoided kerbside composting	0	18.75	18.75	18.75	18.75	18.75
Avoided CA, sent to disposal	0	0	0	0	0	0
Avoided CA sorted for recycling	0	0	0	0	0	0
avoided CA, sorted for composting	0	37.5	37.5	37.5	37.5	37.5
Average avoided collection and disposal, kerbside refuse (tonnes)	0.00	41.95	84.26	126.91	169.92	213.28
Average avoided collection and recycling	0.00	0.00	0.00	0.00	0.00	0.00
Average avoided collection and composting	0.00	41.95	84.26	126.91	169.92	213.28
Average avoided disposal CA tonnes	0.00	0.00	0.00	0.00	0.00	0.00
Average avoided treatment CA recycling	0.00	0.00	0.00	0.00	0.00	0.00
Average avoided treatment (incl. haulage), CA composting (tonne)	0.00	83.91	168.51	253.82	339.83	426.56
Total tonnes prevented	0.00	167.82	337.03	507.64	679.67	853.12
Marginal cost of disposal (£/tonne, incl. haulage and tax)	£ 42.00	£ 45.00	£ 48.00	£ 51.00	£ 54.00	£ 57.00
Marginal cost of recycling (£/tonne incl haulage)	-£ 10.00	-£ 10.00	-£ 10.00	-£ 10.00	-£ 10.00	-£ 10.00
Marginal cost of windrow composting (£/tonne, incl. haulage)	£ 42.00	£ 42.00	£ 42.00	£ 42.00	£ 42.00	£ 42.00
Cost of recycling collection	£ 90.00	£ 90.00	£ 90.00	£ 90.00	£ 90.00	£ 90.00
Marginal avoided cost of collection (=25% of collection cost)	£ 22.50	£ 22.50	£ 22.50	£ 22.50	£ 22.50	£ 22.50
Cost of recycling/composting collection	£ 40.00	£ 40.00	£ 40.00	£ 40.00	£ 40.00	£ 40.00
Marginal avoided cost of collection (=25% of collection cost)	£ 10.00	£ 10.00	£ 10.00	£ 10.00	£ 10.00	£ 10.00
Cost of refuse collection	£ 35.00	£ 35.00	£ 35.00	£ 35.00	£ 35.00	£ 35.00
Marginal avoided cost of collection (=25% of collection cost)	£ 8.75	£ 8.75	£ 8.75	£ 8.75	£ 8.75	£ 8.75
Estimated value of landfill allowances (£/tonne)	£25.00	£25.00	£25.00	£50.00	£100.00	£125.00
Avoided Cost Disposal	£ -	£ 1,887.96	£ 4,044.34	£ 6,472.41	£ 9,175.48	£ 12,156.91
Avoided Cost Treatment	£ -	£ 5,286.29	£ 10,616.38	£ 15,990.65	£ 21,409.46	£ 26,873.17
Avoided Cost Collection	£ -	£ 786.65	£ 1,579.82	£ 2,379.56	£ 3,185.93	£ 3,998.98
Avoided Cost LATS	£ -	-£ 293.68	-£ 589.80	-£ 1,776.74	-£ 4,757.66	-£ 7,464.77
Total Avoided Costs	£ -	£ 7,667.21	£ 15,650.74	£ 23,065.88	£ 29,013.21	£ 35,564.30
Total costs (annualised)	£0.00	£7,489.83	£9,182.90	£10,331.59	£12,625.27	£14,937.95
Costs Net of Benefits	£0.00	-£177.38	-£6,467.84	-£12,734.29	-£16,387.95	-£20,626.35
		-£389,201.91				
Total costs (not annualised)	£0.00	£27,628.07	£27,250.44	£26,311.29	£26,499.81	£26,689.90
Costs Net of Benefits	£0.00	£19,960.85	£11,599.70	£3,245.41	-£2,513.40	-£8,874.40

Home Composting Promotion and Education

Home Composting promotion & education

Variable Costs		Cost (per item)					
Marketing, literature & support	£2.00						
Delivery / Distribution & Storage Costs	£0.00						
Cost of item	£0.00						
Sales	£						
Overall	£0.00						
Amortisation Period (Years)	1						
Annualised Cost (per item)	£0.00						
		2005	2006	2007	2008	2009	2010
Fixed Costs							
Capital							
Labour							
Other			£15,000.00	£15,000.00	£15,000.00	£15,000.00	£15,000.00
Total	£0.00	£15,000.00	£15,000.00	£15,000.00	£15,000.00	£15,000.00	£15,000.00
Annualised Total	£0.00	£15,000.00	£15,000.00	£15,000.00	£15,000.00	£15,000.00	£15,000.00
Waste Prevention Officer Rate	£25,000.00						
Waste Prevention Officer Days			15.00	15.00	15.00	15.00	15.00
Waste Prevention Officer Total Costs	£0.00	£0.00	£1,689.19	£1,689.19	£1,689.19	£1,689.19	£1,689.19
Number of households		443,838	447,516	451,225	454,965	458,735	462,537
New participants (%)			0.3%	0.3%	0.3%	0.3%	0.3%
New participants		-	1,119	1,128	1,137	1,147	1,156
New participants, cumulative		0	1,119	2,247	3,384	4,531	5,687
Average avoided collection and disposal (kg/participant)		0	150	150	150	150	150
Of which,							
avoided kerbside refuse		0	37.5	37.5	37.5	37.5	37.5
avoided kerbside recycling		0	0	0	0	0	0
Avoided kerbside composting		0	37.5	37.5	37.5	37.5	37.5
Avoided CA, sent to disposal		0	15	15	15	15	15
Avoided CA sorted for recycling		0	0	0	0	0	0
avoided CA, sorted for composting		0	60	60	60	60	60
Average avoided collection and disposal, kerbside refuse (tonnes)		0.00	41.95	84.26	126.91	169.92	213.28
Average avoided collection and recycling		0.00	0.00	0.00	0.00	0.00	0.00
Average avoided collection and composting		0.00	41.95	84.26	126.91	169.92	213.28
Average avoided disposal CA tonnes		0.00	16.78	33.70	50.76	67.97	85.31
Average avoided treatment CA recycling		0.00	0.00	0.00	0.00	0.00	0.00
Average avoided treatment (incl. haulage), CA composting (tonne)		0.00	67.13	134.81	203.06	271.87	341.25
Total tonnes prevented		0.00	167.82	337.03	507.64	679.67	853.12
Marginal cost of disposal (£/tonne, incl. haulage and tax)	£	42.00	£ 45.00	£ 48.00	£ 51.00	£ 54.00	£ 57.00
Marginal cost of recycling (£/tonne incl haulage)	-£	10.00	-£ 10.00	-£ 10.00	-£ 10.00	-£ 10.00	-£ 10.00
Marginal cost of in vessel composting (£/tonne, incl. haulage)	£	42.00	£ 42.00	£ 42.00	£ 42.00	£ 42.00	£ 42.00
Cost of recycling collection	£	90.00	£ 90.00	£ 90.00	£ 90.00	£ 90.00	£ 90.00
Marginal avoided cost of collection (=25% of collection cost)	£	22.50	£ 22.50	£ 22.50	£ 22.50	£ 22.50	£ 22.50
Cost of composting collection	£	40.00	£ 40.00	£ 40.00	£ 40.00	£ 40.00	£ 40.00
Marginal avoided cost of collection (=25% of collection cost)	£	10.00	£ 10.00	£ 10.00	£ 10.00	£ 10.00	£ 10.00
Cost of refuse collection	£	35.00	£ 35.00	£ 35.00	£ 35.00	£ 35.00	£ 35.00
Marginal avoided cost of collection (=25% of collection cost)	£	8.75	£ 8.75	£ 8.75	£ 8.75	£ 8.75	£ 8.75
Estimated value of landfill allowances (£/tonne)	£	25.00	£ 25.00	£ 25.00	£ 50.00	£ 100.00	£ 125.00
Avoided Cost Disposal	£	-	£ 2,643.14	£ 5,662.07	£ 9,061.37	£ 12,845.67	£ 17,019.68
Avoided Cost Treatment	£	-	£ 4,581.45	£ 9,200.86	£ 13,858.56	£ 18,554.86	£ 23,290.08
Avoided Cost Collection	£	-	£ 786.65	£ 1,579.82	£ 2,379.56	£ 3,185.93	£ 3,998.98
Avoided Cost LATS	£	-	£ 125.86	£ 252.77	£ 761.46	£ 2,039.00	£ 3,199.19
Total Avoided Costs	£	-	£ 8,137.10	£ 16,695.52	£ 26,060.95	£ 36,625.46	£ 47,507.93
Total costs (annualised)	£0.00	£16,689.19	£16,689.19	£16,689.19	£16,689.19	£16,689.19	£16,689.19
Costs Net of Benefits		£0.00	£8,552.08	-£6.34	-£9,371.76	-£19,936.27	-£30,818.74
			-£550,095.59				
Total costs (not annualised)	£0.00	£16,689.19	£16,689.19	£16,689.19	£16,689.19	£16,689.19	£16,689.19
Costs Net of Benefits	£0.00	£8,552.08	-£6.34	-£9,371.76	-£19,936.27	-£30,818.74	

Real Nappies

Real Nappies						
Variable Costs	Cost (per item)					
Marketing, literature & support	£1.00					
Delivery / Distribution () & Storage Costs	£0.00					
Cost of item/subsidy	£30.00					
Sales	£					
Overall	£31.00					
Assumed Life of item (Years)	1					
Annualised Cost of Item (per item issued)	£31.00					
	2005	2006	2007	2008	2009	2010
Fixed Costs						
Capital						
Labour						
Other		£10,000.00	£10,000.00	£10,000.00	£10,000.00	£10,000.00
Total	£0.00	£10,000.00	£10,000.00	£10,000.00	£10,000.00	£10,000.00
Annualised Total	£0.00	£10,000.00	£10,000.00	£10,000.00	£10,000.00	£10,000.00
Waste Prevention Officer Rate	£25,000.00					
Waste Prevention Officer Days		10.00	10.00	10.00	10.00	10.00
Waste Prevention Officer Total Costs	£0.00	£1,126.13	£1,126.13	£1,126.13	£1,126.13	£1,126.13
Number of households	443,838	447,516	451,225	454,965	458,735	462,537
New participants (%)		0.1%	0.2%	0.3%	0.3%	0.3%
New participants	-	448	902	1,137	1,147	1,156
New participants, cumulative	0	448	895	1,343	1,343	1,343
Average avoided collection and disposal (kg/participant)	0	400	400	400	400	400
Of which,						
avoided kerbside refuse	0	400	400	400	400	400
avoided kerbside recycling	0	0	0	0	0	0
Avoided kerbside composting	0	0	0	0	0	0
Avoided CA, sent to disposal	0	0	0	0	0	0
Avoided CA sorted for recycling	0	0	0	0	0	0
avoided CA, sorted for composting	0	0	0	0	0	0
Average avoided collection and disposal, kerbside refuse (tonnes)	0.00	179.01	358.01	537.02	537.02	537.02
Average avoided collection and recycling	0.00	0.00	0.00	0.00	0.00	0.00
Average avoided collection and composting	0.00	0.00	0.00	0.00	0.00	0.00
Average avoided disposal CA tonnes	0.00	0.00	0.00	0.00	0.00	0.00
Average avoided treatment CA recycling	0.00	0.00	0.00	0.00	0.00	0.00
Average avoided treatment (incl. haulage), CA composting (tonne)	0.00	0.00	0.00	0.00	0.00	0.00
Total tonnes prevented	0.00	179.01	358.01	537.02	537.02	537.02
Marginal cost of disposal (£/tonne, incl. haulage and tax)	£ 42.00	£ 45.00	£ 48.00	£ 51.00	£ 54.00	£ 57.00
Marginal cost of recycling (£/tonne incl haulage)	-£ 10.00	-£ 10.00	-£ 10.00	-£ 10.00	-£ 10.00	-£ 10.00
Marginal cost of windrow composting (£/tonne, incl. haulage)	£ 42.00	£ 42.00	£ 42.00	£ 42.00	£ 42.00	£ 42.00
Cost of recycling collection	£ 90.00	£ 90.00	£ 90.00	£ 90.00	£ 90.00	£ 90.00
Marginal avoided cost of collection (=25% of collection cost)	£ 22.50	£ 22.50	£ 22.50	£ 22.50	£ 22.50	£ 22.50
Cost of recycling/composting collection	£ 40.00	£ 40.00	£ 40.00	£ 40.00	£ 40.00	£ 40.00
Marginal avoided cost of collection (=25% of collection cost)	£ 10.00	£ 10.00	£ 10.00	£ 10.00	£ 10.00	£ 10.00
Cost of refuse collection	£ 35.00	£ 35.00	£ 35.00	£ 35.00	£ 35.00	£ 35.00
Marginal avoided cost of collection (=25% of collection cost)	£ 8.75	£ 8.75	£ 8.75	£ 8.75	£ 8.75	£ 8.75
Estimated value of landfill allowances (£/tonne)	£ 25.00	£ 25.00	£ 25.00	£ 50.00	£ 100.00	£ 125.00
Avoided Cost Disposal	£ -	£ 8,055.29	£ 17,184.63	£ 27,388.00	£ 28,999.06	£ 30,610.11
Avoided Cost Treatment	£ -	£ -	£ -	£ -	£ -	£ -
Avoided Cost Collection	£ -	£ 1,566.31	£ 3,132.61	£ 4,698.92	£ 4,698.92	£ 4,698.92
Avoided Cost LATS	£ -	£ 3,043.11	£ 6,086.22	£ 18,258.66	£ 36,517.33	£ 45,646.66
Total Avoided Costs	£ -	£ 12,664.71	£ 26,403.46	£ 50,345.58	£ 70,215.31	£ 80,955.70
Total costs (annualised)	£0.00	£24,999.13	£38,872.14	£52,745.14	£52,745.14	£52,745.14
Costs Net of Benefits	£0.00	£12,334.42	£12,468.67	£2,399.56	£-17,470.16	£-28,210.56
		-£303,008.93				
Total costs (not annualised)	£0.00	£24,999.13	£38,872.14	£52,745.14	£52,745.14	£52,745.14
Costs Net of Benefits	£0.00	£12,334.42	£12,468.67	£2,399.56	£-17,470.16	£-28,210.56

No Junk Mail Promotion

No Junk Mail						
Variable Costs	Cost (per item)					
Marketing, literature & support	£	0.10				
Delivery / Distribution () & Storage Costs	£	0.20				
Cost of Stickers	£	0.05				
Sales						
Overall	£	0.35				
Assumed Life of promotion		2				
Annualised Cost	£	0.18				
		2005	2006	2007	2008	2009
		2010				
Fixed Costs						
Capital						
Labour						
Other			£7,500.00	£7,500.00	£7,500.00	£7,500.00
Total	£0.00	£7,500.00	£7,500.00	£7,500.00	£7,500.00	£7,500.00
Annualised Total	£0.00	£1,071.43	£1,071.43	£1,071.43	£1,071.43	£1,071.43
Waste Prevention Officer Rate	£25,000.00					
Waste Prevention Officer Days		10.00	10.00	10.00	10.00	10.00
Waste Prevention Officer Total Costs	£0.00	£1,126.13	£1,126.13	£1,126.13	£1,126.13	£1,126.13
Number of households	443,838	447,516	451,225	454,965	458,735	462,537
New participants (%)	0.0%	5.0%	0.0%	3.0%	0.0%	2.0%
New participants	-	22,376	-	13,649	-	9,251
New participants, cumulative	0	22,376	22,376	36,025	36,025	45,275
Average avoided collection and disposal (kg/participant)	0	20	20	20	20	20
Of which,						
avoided kerbside refuse	0	15	15	15	15	15
avoided kerbside recycling	0	5	5	5	5	5
Avoided kerbside composting	0	0	0	0	0	0
Avoided CA, sent to disposal	0	0	0	0	0	0
Avoided CA sorted for recycling	0	0	0	0	0	0
avoided CA, sorted for composting	0	0	0	0	0	0
Average avoided collection and disposal, kerbside refuse (tonnes)	0.00	335.64	335.64	540.37	540.37	679.13
Average avoided collection and recycling	0.00	111.88	111.88	180.12	180.12	226.38
Average avoided collection and composting	0.00	0.00	0.00	0.00	0.00	0.00
Average avoided disposal CA tonnes	0.00	0.00	0.00	0.00	0.00	0.00
Average avoided treatment CA recycling	0.00	0.00	0.00	0.00	0.00	0.00
Average avoided treatment (incl. haulage), CA composting (tonne)	0.00	0.00	0.00	0.00	0.00	0.00
Total tonnes prevented	0.00	447.52	447.52	720.49	720.49	905.51
Marginal cost of disposal (£/tonne, incl. haulage and tax)	£	42.00	£	45.00	£	48.00
Marginal cost of recycling (£/tonne incl haulage)	-£	10.00	-£	10.00	-£	10.00
Marginal cost of windrow composting (£/tonne, incl. haulage)	£	42.00	£	42.00	£	42.00
Cost of recycling collection	£	90.00	£	90.00	£	90.00
Marginal avoided cost of collection (=25% of collection cost)	£	22.50	£	22.50	£	22.50
Cost of recycling/composting collection	£	40.00	£	40.00	£	40.00
Marginal avoided cost of collection (=25% of collection cost)	£	10.00	£	10.00	£	10.00
Cost of refuse collection	£	35.00	£	35.00	£	35.00
Marginal avoided cost of collection (=25% of collection cost)	£	8.75	£	8.75	£	8.75
Estimated value of landfill allowances (£/tonne)	£	25.00	£	25.00	£	25.00
Avoided Cost Disposal	£	-	£	15,103.67	£	16,110.59
Avoided Cost Treatment	£	-	£	1,118.79	£	1,118.79
Avoided Cost Collection	£	-	£	5,454.10	£	5,454.10
Avoided Cost LATS	£	-	£	5,621.92	£	5,621.92
Total Avoided Costs	£	-	£	25,060.91	£	26,067.82
Total costs (not annualised)	£0.00	£16,457.66	£8,626.13	£13,403.25	£8,626.13	£11,863.88
Costs Net of Benefits	£0.00	-£8,603.25	-£17,441.70	-£39,237.91	-£63,738.59	-£92,496.11

