

Essex & Suffolk Water

Water Saving Toolkit

October 2007

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Executive Summary

Essex & Suffolk Water (ESW) wants to encourage its' domestic customers to be more water efficient. As part of ESWs long term water efficiency programme this project aimed to increase their reputation while highlighting the environmental responsibility we all face to help reduce waste and to help defer water resource development. Mouchel Parkman (MP) was commissioned to undertake a Water Saving Toolkit project within Chelmsford, Essex. The project presented involved the mailing out of an application pack to over 5,000 domestic customers. The application pack presented details of 19 water saving products and services that they could choose from, in exchange for details about their home and water use characteristics. Customers were able to reply direct to MP with their order, either by post or by calling a dedicated customer contact centre.

The key objective was to reduce water consumption through customer engagement. Critical to this was the collection of data to enable a robust evaluation of the project and cost benefit analysis.

A database was constructed to store the large volumes of data generated by the project. Extracts of the customer database, customer contact details, including customer survey forms were all stored in the project database. Additionally, the database was used for scheduling of appointments to deliver and fit the selected products and services, recording which items they received, the collation of meter read data and for producing daily work schedules for the site technicians visiting the customers' homes.

Of 5,378 customers contacted, 1,073 households completed the audit and were fitted with water saving products and services between November 2006 and March 2007. Meter reading data were collected from those properties that had an externally accessible water meter, and 187 flow loggers were installed to collect detailed water use information. Calculations were also undertaken to estimate the theoretical water saving achieved as a result of installing the products during the Water Saving Toolkit project.

The project resulted in each participating property saving on average 13.85 l/prop/day. This equates to a total saving of 0.015 Ml/day for the project study area.

Investigations were undertaken into the cost/benefit in terms of water saving for each product. While these provide a useful preliminary indicator for comparing each product against another, there are other factors that require consideration when selecting which products should be used in future projects. Further analysis was performed which incorporated factors including the ease to fit the item and the customer acceptance of each item.



The Table 1 provides of the key results from the project.

Table 1: Summary of key results

| Total customers mailed | 5,378 |
|------------------------|--|
| Applications received | 1,149 655 via post 494 via phone |
| Metered vs. unmeasured | Of those that applied 23% were Metered 18% were Unmeasured |
| Audits completed | 1,073 |
| Savings | 13.85 l/prop/day |

1 Introduction

Since 1997, Essex & Suffolk Water (ESW) has undertaken an annual programme of home water audits. Previously, various styles of audits have been undertaken. These include 'full' audits, which involved an assigned contractor fitting a number of products in the home and undertaking a survey of water use as well as, customer 'self audits', where the customers audited themselves by completing a water use survey using a pack provided by ESW. Retrofit projects installing variable flush devices have also taken place.

In 2006, ESW wanted to investigate the potential for saving water by issuing 2,000 domestic customers with water saving products to be fitted or used in their homes. Along with the delivery and installation of the water saving products, information was to be collected on how water was used in each household. Mouchel Parkman (formerly Ewan Group) were appointed by ESW to carry out this investigation. The project comprised of comparing the effectiveness of various water saving products and assessing those savings against the cost of the product and installation.

This project is different from those previously undertaken by ESW and currently by other water companies, in that it does not assume 'one size fits all'. The unique customer selection of products was designed to tailor the project to individual households' water practices and homes.

This project is vital to ESW's reputation as being the leading company in the development of water efficiency in the UK. This project is essential if ESW are to maintain its position as being innovative and progressive in the promotion of water efficiency around the home.

1.1 The area and its composition

ESW are responsible for the supply of potable water to around 735,000 customers in two supply areas across East Anglia.

The study area included the Springfield and Chelmer Village areas in the postcodes CM1 and CM2 of Chelmsford, Essex (Figures 1 and 2). This area was chosen as it has a wide variety of house types and ages. ESW had not completed a large water efficiency project in this area before so the scope to engage with customers install projects was great.

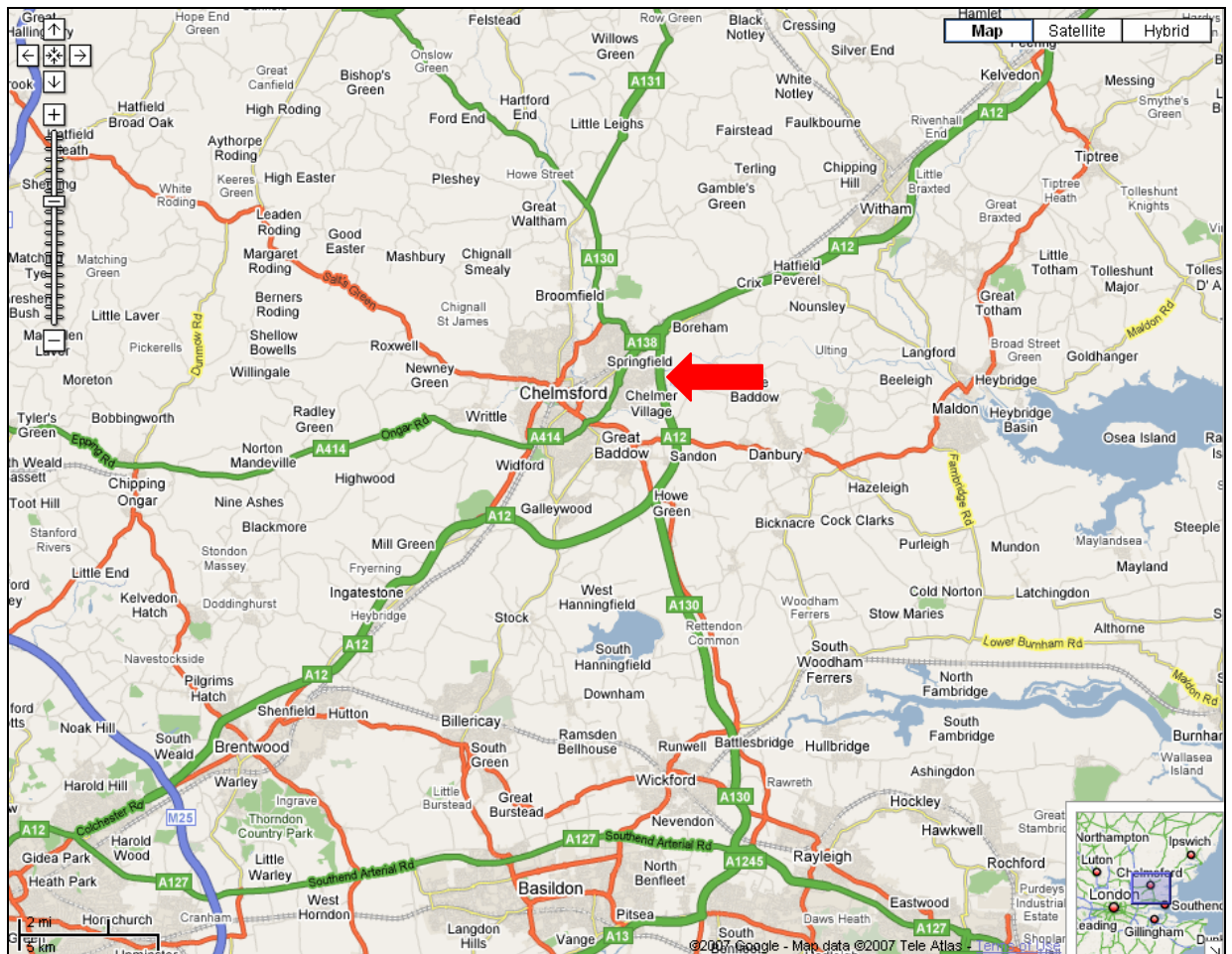


Figure 1: Location of Chelmsford, Essex

The aim was to target 5,000 homes, in order to achieve this and still have a range of house types and ages, the boundary area was drawn (Figure 2). This provided new houses (built in the last 5 years) through to houses built before 1900. The area was compact and densely populated to reduce travel time between properties. All the properties were also covered by the same local newspapers and radio stations allowing publicity to be more targeted.

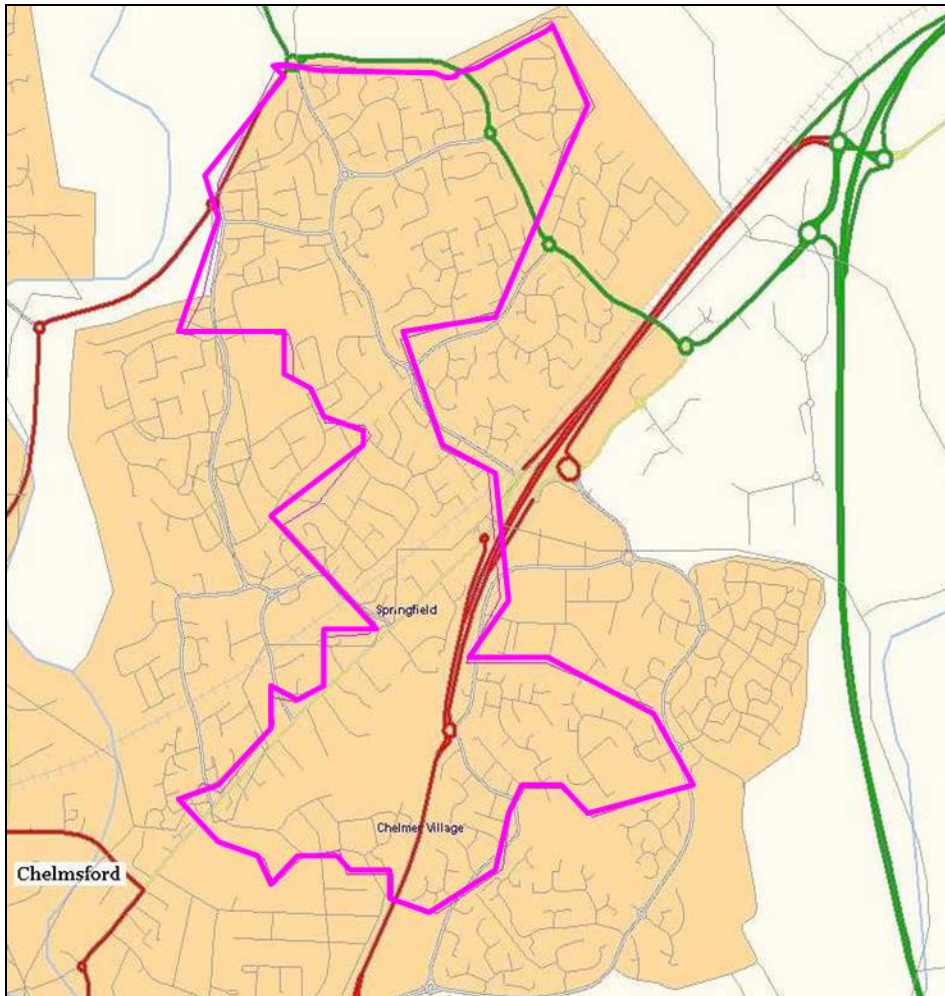


Figure 2: Boundary for Toolkit Project

1.2 Aims and objectives

The aim of the project was to provide customers with the tools to help them to think about the water they use and how they can reduce the amount they waste. The project was designed to collect information on water consumption and usage patterns through a cross section of residential customers. Customers in the study area were offered a range of free products and services that have been designed to help save water. They were then able to select which products and services they required and (depending on which products were chosen) have them fitted by a qualified plumber free of charge.

Physical properties of the household and details of customer behavioural patterns were to be collected along with actual water use data where available.



The data collected was to be used to:

1. Identify patterns in which types of households were interested in improving their home water use efficiency.
2. Identify which types of water saving products were most attractive to customers and were most appropriate to fit or retrofit to existing devices.
3. Determine the actual and theoretical volumes of water saved as a result of installing the products.
4. Determine the overall cost of the products and services in relation to the volumes of water they are able to save.

1.3 Staff Training

All project staff attended a training day designed and held by ESW. The training included ESW's corporate messages, the programme evaluation and monitoring programmes, the delivery of audit packs, the operation of the contents of the audit pack and the customer service expectations of ESW.

The field staff were also given additional product specific training by the respective product manufacturers relating to the installation and operation of the water saving products.

This training helped to provide background knowledge to answer any general questions that the householder might have regarding their water use.

All plumbers were qualified NVQ level 2 plumbing tradesmen, trained and registered under the National Water Hygiene Card Scheme or held existing Blue Cards issued by ESW.

2 Programme Approach

2.1 Promotion

In October 2006, the application packs for the Water Saving Toolkit project were sent with an invitation letter via post to 5,378 homes in the study area. The application pack provided the customers with information on the products available and an order form with a postage paid envelope to return their application to ESW.

To help promote the project to customers and encourage them to take part the local press were contacted. The following local papers printed articles on the project.

Essex Chronicle – 26th October 2006 – Introduction to the project

Chelmsford Weekly News – 23rd November 2006 – Further information

Essex Chronicle – 14th December 2006 – Interview with participating customer

Chelmsford Weekly News – 19th July 2007– Project results and winner of the dishwasher

The following radio interviews also took place on Essex local stations to promote the project.

Dream 107 – 17th November 2007 – News article on the project

BBC Essex – 22nd November 2007 – Interview to promote the project

An article was also posted on the Institute of Water Officers (IWO) website to provide results from the project and details of the dishwasher winner. This was published on 3rd July 2007

Copies of each article and the transcripts from the radio interviews are found in Appendix A.

2.2 Communications

The opportunity to participate in the project was offered to 5,378 ESW customers residing in the postcodes of CM1 (6AF – 6XN) and CM2 (6AF – 6YU) in the Springfield and Chelmer Village areas of Chelmsford, Essex.

Customers received a letter (Appendix B) and an application pack (Appendix C) allowing them to select from a list of 19 water saving products and services to be fitted or delivered to their homes free of charge. By allowing the customers to choose the



products and services that they thought would be most beneficial to them, it was hoped that there would be a greater acceptance of the project and a higher chance of the products being used in the home.

The application pack included several leaflets providing specifications and designs for each of the available products and services, as well as facts and figures relating to water consumption in the home (Appendix D). Technical information on plumbing systems and toilet types was also included. This additional information allowed the customer to make informed decisions about which products and services would be the most appropriate for their needs around the home. Further details of each product and service on offer can be found in section 2.6.

The customer was then able to place an order by filling out the application form and returning it by pre-paid envelope to ESW or by calling a dedicated local rate telephone number and placing the order over the phone.

Once the order was received and recorded within the database an appointment to visit and deliver the customer chosen products and services was made.

2.3 Ensuring uptake

The closing date for applications was Friday 15th December 2006, however less than 700 applications (of the desired number of 2000) had been received by that date. To increase customer participation a reminder letter was sent between 4th and 8th December to customers that had not yet responded. In total 4698 reminder letters were sent to customers that had not responded by the closing date. Following this a further 415 (8.8% return) applications were received.

All appointments (plumbing and non-plumbing) were made by telephoning the customer. In cases where a customer had not provided a daytime contact phone number, or the number provided was incorrect, a search of the listed phone numbers on the British Telecom website was undertaken. In addition to this, another mail out to these customers was made requesting them to call the customer contact centre to arrange an appointment. A total of 63 letters were sent out requesting contact telephone numbers from customers.

As a final approach to fulfil a customer's order, the field staff visited the customer's and either delivered/ fitted the products or left a note requesting that the customer contact the customer contact centre to arrange an appointment. Up to 3 visits on different days to 33 properties took place which generated 18 successful completed audits.

2.4 Description of questionnaire components

In addition to the products and services that were ordered, the application form required customers to complete a questionnaire to provide specific detail about their home and water use.

The application form included questions on the layout of their property and plumbing system as well as behavioural patterns of water use in their household. Table 2 provides a summary of the questionnaire that was included as part of the application form. This form was designed by ESW to assist MP with their work planning. The information collected was not used to its full potential.

Table 2: Detail of audit questionnaire

| Question on application form | Possible responses | Use of information |
|---|--|---|
| What type of property do you live in? | Detached, Semi-detached, Flat, Terraced, End-terraced, Bungalow. | To determine patterns in products selected with respect to property type |
| How old is your property? | Pre-1900, 1900-1950, 1951-1988, 1989-2000, 2001-present. | Since 1989 all new properties have a meter installed; Properties built since 2001 may already have dual flush toilets installed and will have a maximum 6litre flush. |
| Do you have a garden? | Yes, No | The presence or absence of a garden was used to assess if the customer could receive a water butt |
| How many people live in you property? | Open question | Used to determine a consumption rate per person |
| How many children between 7 and 11 years live in your property? | Open question | Used to investigate the effects on water consumption from educating children about water wise activities and including them in efforts to conserve water |
| How many toilets do you have in your property | Open question | Two of the toilet flush devices were limited to one of each item per household. Also used in calculating consumption |
| What type of toilet/s do you have? Indicate how many of each. | 9 litre toilet (pre-1993), 7.5 litre toilet (1993-2000), 6 litre dual flush toilet (button operated) | Properties built since 2001 may already have dual flush toilets installed and are therefore not eligible for retrofitting dual flush devices |
| Roughly when were your toilets installed? | Open question | Properties built since 2001 may already have dual flush toilets installed |
| What type of toilet do you have? | Siphon, Valve | The dual flush devices offered could only be fitted to siphon type toilets |



| Question on application form | Possible responses | Use of information |
|---|---|--|
| How many showers do you have | Open question | To check if the number of showerheads requested was a valid order and used to calculate water use |
| Approximately how many times a week are your shower(s) used | Open question | Used for calculations on water use and potential water savings following the installation of showerheads |
| What type of shower(s) do you have? | Mixer shower, Gravity fed shower, Power shower, Electric, Bath tap attachment | Used to determine the suitability of the products ordered (showerhead) |
| Do you have a bath? | Yes, No | Used to determine the suitability of the products ordered (bath measure) |
| Approximately how many times a week is your bath used? | Open question | Used for calculations on water use and potential water savings following the delivery of a bath measure |
| What type of plumbing system do you have? | Mains fed system, Combination (Combi) boiler, Gravity fed systems | Used to determine the suitability of the products ordered (showerhead) |
| Do you have any dripping taps? | Yes, No | Used to assess if a tap re washing was necessary |
| If yes, how many? | Open question | See above |
| Do you know the location of the external stop tap? | Yes, No | Used to assist the plumber if the mains water supply needs to be isolated to install products |

Customers applications were screened for completeness and details were entered into a project database. The database stored all of the questionnaire and order data and was also used to record all contacts made between the project team and the customers (refer Section 2.8).

Customers were contacted by phone to arrange a convenient time for a site technician to deliver or for a plumber to fit the ordered items to their home. Customers were able to choose either a morning or an afternoon appointment. It was preferred by MP that appointments were completed within normal working hours e.g. 8am – 5pm Monday to Friday. For customers that worked during the week there were limited evening and Saturday morning appointments available. In total there were 23 appointments made in the evening and 61 made on Saturdays. Arranging specific times for plumbing appointments was not practical as the duration of each plumbing appointment varied depending on which products could actually be fitted as well as any unforeseen problems.

2.5 Products and services offered

The toolkits offer allowed customers to 'spend' up to 30 credit points on products and services that they thought would most benefit their household in terms of reducing water consumption. Each item was allocated a credit point value and some products had a limit to the number that each household could order and a limit on the number available for the entire project (Table 3). It was decided that the rating would be in multiples of 5 to keep it simple. The rating for a product was determined by the potential water savings and the price to ESW for both the cost of the product and the cost to deliver or fit it e.g. was a plumber needed or not.

Table 3: Credit point values and limit for each product offered

| Area | Product | Credit Points | Limit per property | Number available for the project |
|---------------|----------------------|---------------|---------------------|----------------------------------|
| Children | Detective Kit | 10 | No limit | 1000 |
| Garden | Crystals | 5 | No limit | No limit |
| | Water Butt | 15 | 1 per property | 1000 |
| | Hose Gun | 5 | No limit | No limit |
| Leakage | Ecosave | 10 | No limit | 50 |
| | Leak Survey | 15 | Only 1 required | No limit |
| Toilets | Save-a-Flush | 5 | 1 per toilet | No limit |
| | Variflush | 15 | 1 per property | 500 |
| | DudleyTurbo88 | 15 | 1 per property | 500 |
| Taps | Kitchen Tap Insert | 10 | 1 pair per property | 200 |
| | Tap Inserts | 10 | 1 pair per property | 400 |
| | Tapmagic | 10 | 1 pair per property | 200 |
| | Beaker | 5 | No limit | No limit |
| | Tap Re-washing | 15 | 1 pair per property | No limit |
| | Drip Gauge | 5 | No limit | No limit |
| Shower & Bath | Aerated Showerhead | 10 | 3 per property | 1000 |
| | Digital Shower Timer | 10 | No limit | 1000 |
| | Shower Timer | 5 | No limit | No limit |
| | Bath Measure | 5 | No limit | 1000 |
| | Shower Flow Bags | 5 | No limit | No limit |

If, at the time of the appointment the plumber determined that the product was not suitable or the customer had changed their mind, alternatives were offered. It was stressed that the alternatives were not to exceed the 30 credit point limit. Table 4 shows the products that were offered to the customer if this was the case



Table 4: Products offered as an alternative if original product was not suitable

| Customers choice | 1 st Replacement product | 2 nd Replacement product |
|----------------------|---|-------------------------------------|
| Dudley Turbo 88 | Variflush | Save-a-flush |
| Variflush | Dudley Turbo 88 | Save-a-flush |
| Showerhead | Digital shower alarm | Shower timer |
| Challis tap inserts | Tapmagic tap inserts | Dripping tap gauge |
| Tapmagic tap inserts | Challis tap inserts | Dripping tap gauge |
| Miracle tap adaptors | Challis tap inserts | Tapmagic tap inserts |
| Water butt | Trigger hose gun (5) and two sachets of water storing crystals (5 each) | |

2.6 Delivery techniques

Each day, the field staff were emailed their respective appointment sheets for that day that were generated from the database. The appointment sheets (Appendix E) included customer details (name, address, phone number, etc), the audit details (property type, number of toilets, number of showers etc) and the products that the customer had ordered.

When the field staff arrived at the customer's home they explained the audit and ensured that all details on the appointment sheets were correct and to make amendments where they were not. At each property they were expected to record on their appointment sheet

- Details of which product had been installed or the service provided
- If the product installed or service provided has changed from the original request and details of why
- Any comments on fitting issues
- The length of time it took to install each product and the total time spent at the property
- The flow and pressure measurements
- Any comments from the customer

Children's Detective Kit

The children's detective kit (Appendix D) contained games, puzzles, an interactive CD-ROM, a pen and a water cycle colouring sheet. There was also a leaflet on how to save water around the home and in the garden. The aim of the pack was to encourage

children to get involved in saving water around the home. The kit was presented to the customer in a plastic bag. When the technician or plumber delivered the kit the householder was shown the contents and asked if they had any questions. The children's detective kit was worth 10 credit points and although designed for children between the age of 7 and 11 years a pack was available for each child within the family however there was a maximum of 1000 available for the project.

Water Crystals

The crystals swell holding water in readiness for the plant to take up. As less water drains through the plant pot, less frequent watering should be required. The water crystals were pre packaged into sachets. Each sachet was sufficient for one plant pot or hanging basket. There were instructions for use on the pack and this was highlighted to the customer when the products were delivered. The water crystals were worth 5 credit points and there was no limit to the number that could be ordered.

Water Butt

The 190 litre water butt was delivered with stand, a child-safe lid and a rain diverter. Due to the size of the product, the water butt kit was not delivered by the field technicians or plumbers. If a customer had ordered a water butt, the field technician or plumber was required to undertake an inspection to determine if the water butt could actually be fitted to a down pipe. This aimed to discourage water butts being ordered and then used elsewhere or resold. 619 customers ordered a water butt, 37 of these customers did not receive a water butt for the following reasons. 28 customers cancelled or changed their order and 9 customers were not eligible as they did not comply with the inspection criteria. 2 customers had ordered the water butt with the intention of giving it to a friend or relative that was outside the study area. Once the field technician had checked the suitability of the property, an email was sent to ESW to place an order with the supply company. They then delivered the water butt directly to the customer. The water butt was worth 15 credit points and there was a limit of one water butt per property and a maximum of 1000 available for the project.

Hose Gun

The trigger hose gun fits onto the end of the hose and allows the flow of water to be stopped instantly when moving around the garden or washing the car. The hose gun has five different settings offering alternative spray patterns and a catch to keep the lever depressed when continuous flow was required. The hose gun was simply handed to the customer along with any other products that they ordered. The trigger hose gun was worth 5 credit points and there was no limit to the number that each household could order.



Ecosave

The Ecosave leakage alarm is designed to be installed on or near the customer supply pipe to detect all water use in the home and garden, it can be attached to a 12-25mm exposed pipe. The device can detect if water is flowing through a pipe for any extended period and emits an audible alarm. 78 customers ordered the Ecosave, however only 39 of these customers had the product installed. 8 customers cancelled or changed their order and 14 could not be fitted because there was not an appropriate place to install the product i.e. no exposed pipe work. There were 17 cases where the plumber did not provide a reason for not being able to fit the device but offered the customer an alternative product.

It was also discovered that if the product was installed in a damp area it was more likely to sound even if there was no detectable leak. In four cases this resulted in either the customer contact staff advising the customer to remove the product or scheduling a remedial visit for a plumber to try to find a suitable position for the product or if necessary remove the product. If a product was removed an alternative was offered to the customer for the same credit point value. The Ecosave leakage alarm was worth 10 credit points and while there was no limit to the number that each customer could order, only one per property was required to adequately detect household leaks. There were a maximum of 50 units available for the project.

Leak Survey

A qualified plumber was required to perform the leak survey. The leak survey consisted of 3 approaches to detect leaks inside the customers' property. Initially the plumber checked with the customer they were not using any water and that all taps were turned off. The plumber conducted a visual inspection on all taps and overflows to check if any were dripping or discharging and checked if there was any flow being registered through the water meter (where installed). The final approach was to use a listening stick which is a tool used to amplify the sound of any water running through water pipes. The listening stick was placed on the external stopcock and the plumber listened through the ear piece to detect any slight flows through the pipe. If a supply pipe leak was detected it was to be referred to ESW's leakage department for follow up action. If an internal leak was detected the customer would be advised on what needed to be fixed and if appropriate, the work was completed by the plumber.

Save-a-flush

The Save-a-flush bag displaces water inside a toilet cistern. The bag swells to a one litre capacity, which reduces each subsequent flush by one litre. The Save-a-flush is not suitable for toilets with a flush volume of less than 7 litres. If a plumber had been assigned to the appointment because other products required installation he would install the Save-a-flush bag into the customers' cistern otherwise it was simply delivered and the customer was shown how to use the product. The Save-a-flush was worth 5

credit points and while there was no limit to the number that each customer could order, only one Save-a-flush should be fitted to each toilet cistern.

Variflush

A plumber was required to install the Variflush product. The installation involved removing the existing toilet flush handle and backing mechanism and replacing it with the Variflush. The Variflush worked by letting air interrupt the siphon at different points depending on the chosen setting. This allowed the user to select from 3 possible flush volumes by using the dial that was installed on the new handle. The maximum flush was the same flush volume as the original flush. The Variflush did not require the cistern to be drained as it could be fitted while the cistern was full of water. The Variflush came with a chrome-plated metal handle. This product was not suitable for slimline cisterns, concealed cisterns and high-level cisterns. The size of the cistern was to be recorded to allow estimates of the water savings to be made. There was a limit of one Variflush per household and they were worth 15 credit points.

Dudley Turbo 88

The Dudley Turbo 88 is a toilet siphon that converts a single flush toilet into a dual flush system. A plumber is required to fit the device. The entire siphon mechanism is replaced and attaches to the current handle. The retrofitted device allowed a reduced flush to be delivered when the handle was held down and a full flush to be delivered when the handle was used in the normal manner. The siphon is split into two sections. This allows the body to be removed easily which makes future servicing easy. The product was offered in two sizes (9 and 8 inch) aimed to fit most toilets. The product was not suitable for slimline cisterns, concealed cisterns and high-level cisterns. The Dudley Turbo 88 was worth 15 credit points and was limited to one per property.

Kitchen Tap Insert

The kitchen tap insert used was the multi directional aerator attachment Miracle Tap. The aerators were installed by plumbers and there was a limit of one pair per property. The aerator kit contained several adaptors which allowed the aerator to be fitted to most taps. The flow rate in litres per minute was recorded before and after fitting to allow calculations to be made on the water saving capability of the device. The kitchen tap inserts were worth 10 credit points.



Tap Inserts

There were two types of tap inserts available for use in either the bathroom or kitchen;

1. A tap aerator, made by Challis Water Controls
2. Tapmagic spray insert

The Challis tap aerator provided a champagne effect when running. The device allows a maximum flow rate of 6 litres per minute. The Tapmagic brand device had a diaphragm type valve which restricted the rate under low flow and a secondary stream surrounding the first when the tap was turned on harder. Both devices have been termed 'Tap Inserts' and calculations have been done with the devices grouped as one. If the tap did not have a screw thread, cam adjusters were used as an adaptor to allow the aerator to fit the tap. The flow rate in litres per minute was recorded before and after fitting to allow calculations to be made on the water saving capability of the device. When fitted details of the type and size of product installed was to be recorded, unfortunately at the start of the project this did not occur however towards the end of the project this was rectified. These products were fitted by a plumber and cam adjusters were worth 10 credit points regardless of which type was fitted. There was a limit of one pair per property.

Beaker

A collapsible beaker was delivered with any other ordered products. The beaker was to be used to reduce the amount of water used running the tap when brushing teeth. The beaker was worth 5 credit points.

Tap Re-washing

A tap re-washing service was offered to repair leaking taps. This was undertaken by a qualified plumber. The service involved refitting washers and repairing the washer seat (reseating) if required. The service was restricted to taps without ceramic discs. It was assumed that this service would be relatively straightforward to undertake. However a number (28%) of customers that requested this service had ceramic disc (1/4 turn) or mixer taps which required significantly more work to repair. To rewasher a set of taps required the isolation of both hot and cold water and then removal of the tap bodies to replace the rubber washer. If the washer seat was uneven or pitted then a reseating tool was used to resurface the washer seat (reseating). 18% of customers could not have their taps rewasher either due to the state of the taps or that the water could not be isolated. In cases where the re-washing could not occur a set of standard replacement taps were available and it would appear that 5 sets were installed. However, this can not be confirmed as it is believed that the fitting of these has been captured under 'tap washer replacement' instead of a 'tap replacement' as the latter was not set up as a data field on the plumbers' appointment sheet. A single set of taps rewasher was worth 15 points and there was a maximum of one set per property.

Drip Gauge

A drip gauge was delivered to the customer along with any other products or services that they had ordered. The drip gauge was used to measure the amount of water that was wasted per day from a dripping tap. The drip gauge was worth 5 credit points and there was no limit to the number per household.

Aerated Showerhead

The showerhead is designed so that air is injected into the flow. This gives the feeling of a similar or more powerful flow, but uses less water. The showerhead reduced the flow rate to 8litres/min. There was a minimum pressure requirement of 1 bar and a maximum pressure of 12 bar. The showerheads were not suitable for electric showers or if the flow was already below 8 litres/min. Aerated showerheads were fitted by a qualified plumber. The existing showerhead was removed and given to the customer. The new showerhead was fitted using thread seal tape and checked for leaks. The flow rate in litres per minute was recorded before and after fitting to allow calculations to be made on the water saving capability of the device. There was a limit of 3 showerheads per household and they were worth 10 credit points each.

Digital Shower Timer

A digital shower timer was delivered to the customer along with any other products or service that they had ordered and there was no limit to the number of timers that could be ordered. There were directions on the packaging and it was suggested that the timer was set to 5 minutes as a reminder to encourage reduction of water use in the shower. The digital shower timer was worth 10 credit points.

Shower Timer

The shower timer is like an egg timer and is based on the same principle as the digital shower timer as a reminder to reduce the time spent in the shower. The timer is set at 5 minutes. There was no limit to the number of timers that could be ordered and they were worth 5 credit points.

Bath Measure

The bath measure did not require a plumber to fit the product and it was delivered with any other products and services that the customer had ordered. The product was used to indicate the amount of water used in each bath and encourage customers to reduce the level of the bath and therefore the amount of water used in each bath. The measure was marked with lines at 2.5cm intervals. By reducing the level by 1 interval 15 litres of water could be saved. The bath measure was worth 5 credit points and there was no limit to the number that each customer could order.



Shower Flow Bags

The shower flow bags were used as a tool to allow the customer to calculate the amount of water used when they shower. The bag had instructions printed on it and was delivered with any other products or service that the customer had ordered. There was no limit to the number of shower flow bags that could be ordered and each bag was worth 5 credit points.

2.7 Collecting meter reading data

3076 (57%) of the customers mailed paid by metered tariff. In order to collect consumption data, meter readings were taken at all participating properties that had an external (outdoor) water meter. A total of 401 properties had at least one meter reading taken.

Meter readings were not taken at properties that had an internal water meter as this would have required the customer to be home to provide access. An initial meter reading was taken at least 2 weeks prior to the audit appointment. A second meter read was taken at the time that the products were delivered or fitted and a final meter reading was taken at least 2 weeks following the product installation. ESW specified that meter readings were taken 4 weeks pre and post appointment. However MP requested that this period be reduced to 2 weeks because of difficulties relating to scheduling appointments for customers 4 weeks in advance.

ESW was unable to identify any unmeasured customers taking part in the project which could have had a temporary 'drop-in' meter fitted.

To gather more detailed data, 200 properties were selected to have a flow logger installed on their water meter. All properties with meters installed with serial numbers fitted before 94M062136 cannot be logged. Any property with an Actaris Plus meter was also excluded from the list of possible properties to log. At the time of this project no Actaris Plus leads were available and it was decided that having just two types of leads (those that fit MSM and V210 meters) would be less confusing. Actaris meter have only been used recently by ESW so only a small number of newly metered properties were excluded. Logged properties were selected based on which products had been ordered. This approach was adopted to isolate data from the various water saving products to allow direct comparisons between products. Figure 3 illustrates the selection process followed.

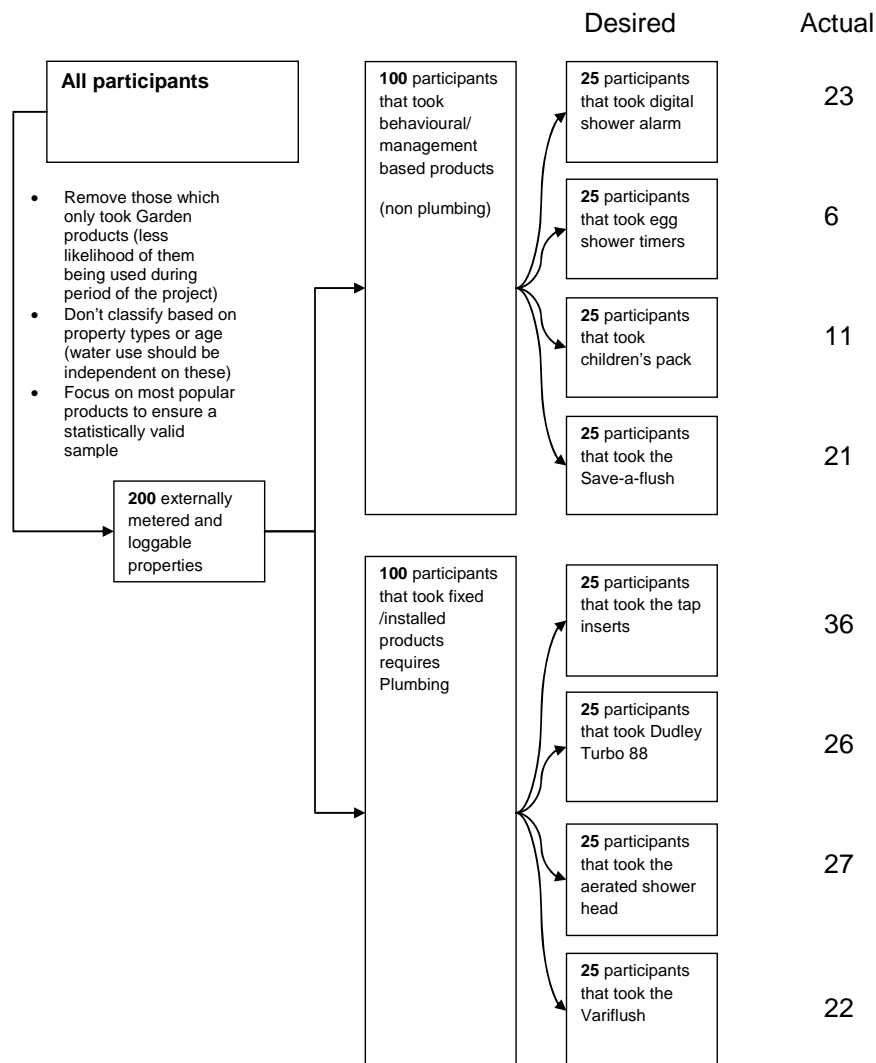


Figure 3: Design of properties selected to log

Unfortunately the actual products fitted was not always exactly what had been ordered by the customer. This meant that the location of loggers installed was not an even distribution over the categories shown above.

The reason that the sum of the actual number of loggers installed (172 no) does not equal the total number installed (187 no) is due to 3 reasons; firstly, there were 25 customers that ordered products in the above categories (and were logged) but were unable to have their initial order installed and are therefore not shown above (i.e. customer ordered a Variflush, but it was not suitable and had a Waterbutt installed instead). Secondly, 6 of the customers that were logged were not contactable and did not have an appointment. Finally, offering customers more than one product meant that a single logged customer can fall into more than one of the categories shown above (i.e. a logged customer ordered a Dudley Turbo 88 and an aerated showerhead and is counted in both categories) there were 16 cases where multiple products were counted for a single customer.



187(Loggers installed) – 25(with products not defined in above categories)
– 6(uncontactable) + 16(multiple products counted) = 172 (Loggers in defined categories)

2.8 Database

A project database was developed by MP using Microsoft Access to store and sort all of the data collected throughout the duration of the project. ESW provided a list of customer names and addresses which were used for the initial mail out of the toolkit offer. As mentioned above, customers were then able to respond by post or to phone the customer contact centre to register their order. The following section provides details of the various sections of the database.

2.8.1 Customer Details

The customer details provided by ESW were available to customer contact centre staff using the customer search screen on the database. The screen allowed users to search for a customer or group of customers by property reference number, name, street, postcode, etc. (refer Figure 4). The screen also gave a contact history summary of all of the contacts that the customer contact centre staff had with each customer and the time and date of the contact.

The screenshot shows a web-based search interface for Essex & Suffolk Water. On the left, there is a vertical list of search criteria: Property Reference, Customer Name, Address, Town, Post Code, Zone, Calls, Metered, and Meter Reads?, each with an adjacent input field. To the right of these fields is the ESSEX & SUFFOLK WATER logo and two buttons: 'Find Customer' and 'Remove Filter'. Below the search fields is a table with a header row containing the following columns: Reference, Post, Apt, Date, Call Date, Call Time, Meter, CustomerName, Address1, Address2, Town, PostCode, Loggable, and For Logging. The table body is currently empty. At the bottom of the form, there is a 'Record:' indicator showing '1 of 1' and a set of navigation arrows. Below the table are five buttons: 'Contact', 'Audit', 'Toolkit Orders', 'Meter Readings', and 'Customer Complaint', followed by a 'Close' button.

Figure 4: Database customer search form

2.8.2 Customer Contacts

Once a customer had been called (or had phoned in) the customer contact centre staff would log the type of call and be able to make any notes as required (refer Figure 5). The customer contact centre staff were then able to arrange a suitable appointment time for a site technician to fit or deliver the items that the customer had ordered.

| | | | |
|---|--|---|----------|
| | | Contact Logging | |
| Reference No | | Zone1 | |
| Name | | Estimated Duration: | 30 |
| Address 1 | | Plumber Appointments | |
| Address 2 | | Plumber Needed? | Y |
| Town | | Plumber: | Plumber3 |
| Post Code | | Appointment Day: | |
| Home Number | | Appointment Time: | |
| Confirmed Number | | Out of Normal time? I.e Saturday, Before 8.00 or Past 17.00 | |
| Previous Comments | | Schedule Comments: | |
| **Please update details if missing or inaccurate** | | | |
| Contact Type | | | |
| Participation | | | |
| Reason for Non-Participation or Comments | | | |
| Save And Close | | Exit | |

Figure 5: Database customer contact logging

Customer contact logging also allowed the customer contact centre staff to record a 'do not call' in a customer's call history. This was used in cases where the customer had decided that they no longer wanted to take part in the project. As the appointment scheduling for the project spanned from late November 2006 to the end of March 2007, there were customers that had placed an order early in the project and had often forgotten that they had placed an order and others who wanted to cancel their order due to losing interest, this applied to 29 customers.

2.8.3 Customer Orders

The customer order screen (Figure 6) had two functions and was used at two different stages of the project. Firstly the order that the customer had placed either by way of application form or over the telephone was entered into the form. These numbers were used in stock reporting and were also used to estimate the amount of time that the site technicians would need to fit the combination of products.



Secondly, it was used to detail which products were actually fitted on the day of the appointment. There was often a variation between what had been ordered and what was fitted. This was due to either the product not being suitable or the customer changing their mind on what they required. Any variation to the orders were recorded by the site technicians on their daily appointment sheet (Appendix E) and was then entered into the customer order on the database.

The screenshot shows a web-based form for a customer order. At the top right, there is a date and time field showing '15/12/2006' and '11:45:21'. Below this is the Essex & Suffolk Water logo. The form is divided into several sections:

- Reference No**: A field for the reference number.
- Name**: A field for the customer's name.
- Address 1**, **Address 2**, **Town**, **Post Code**: Fields for the customer's address.
- Check All Stock Levels**: A button to check stock levels.
- Total Points**: A field showing '30'.
- Toilet**: A table with columns for 'No.', 'Status', 'Comments', and 'Stock'. It lists items like 'Dudley Turbo 88', 'Vaniflush', and 'Save-A-Flush'.
- Bathroom**: A table with columns for 'No.', 'Status', 'Comments', and 'Stock'. It lists items like 'Showerhead', 'Digital Shower Alarm', 'Shower Timer', 'Shower Flow rate Bags', 'Bath Indicator', 'Tap Inserts (Bathroom)', 'Tap Re-Washing', 'Beaker', and 'Drip Gauge'.
- Outdoors**: A table with columns for 'No.', 'Status', 'Comments', and 'Stock'. It lists items like 'Water Butt', 'Hose Gun', and 'Water Crystals'.
- Leakage**: A table with columns for 'No.', 'Status', 'Comments', and 'Stock'. It lists items like 'Leak Survey', 'Ecosave', 'Kitchen Tap Insert', and 'Detective Kit'.
- Leaflets**: A section with a 'Delivered' dropdown menu.
- Average Time**: A field with the value '0'.
- Did a Plumber go and Do a non plumbing job?**: A checkbox.
- Fitted By**: A dropdown menu with 'Technician' selected.
- Name**: A field with 'Chris Smith' entered.
- Date Fitted**: A field with '23/02/2007' entered.
- Was it Out Of Normal times? I.e. Saturday, Before 8 or After 5.**: A dropdown menu with '0' selected.
- Flow Rates**: A button.
- Save and Close**: A button.


Figure 6: Database customer order form

2.8.4 Meter Readings

As detailed in Section 2.7, meter readings were taken before, after and at the time of product installation/delivery. When these values and corresponding dates were entered, the database was able to calculate actual daily consumption rates for each property.

The Meter Readings screen (Figure 7) was also used for recording any additional information relating to the meter readings including the serial number of any flow loggers installed.

Meter Readings



Reference No

Name

Address 1

Address 2

Town

Post Code

New Meter Reading Details:

Plumber:

Date:

Time:

Reading:

Comments:

Logger ID: 15140a

| | Meter Reading Description | Reading Date | Reading Time | Meter Reading | Comments |
|---|------------------------------|--------------|--------------|---------------|--------------------------------|
| ▶ | Logger Delivered | 21/02/2007 | 12:00:00 | 657.26 | 2nd batch 15140 |
| ▶ | Equipment Delivery Meter Rea | 12/03/2007 | 12:00:00 | 666.45 | |
| ▶ | Logger Picked up | 11/04/2007 | 12:00:00 | 679.16 | 15140 Returned to ESW 13 April |

Figure 7: Database meter reading data entry form

2.8.5 Reporting

The information collected and stored in the database was used on a daily basis to track the progress of the project and was also used to automatically generate weekly progress reports on all activities involved in the project, weekly stock reports and monthly invoices for the items that had been fitted. Completed reports with final figures are given in Appendix F.



3 Results

3.1 Number of customers contacted and audits delivered

The Water Saving Toolkit application pack invited customers to place an order by either filling out the application form (Appendix C) included in the pack and returning it in the paid envelope or by contacting the customer contact centre and placing their order over the phone. Table 5 provides a summary of the types of contact that were made between customers and the project team.

Table 5: Summary of customer contacts

| Contact Type | Total number | As a percentage of total study area (5378 customers) | As a percentage of those who applied (1149 customers) |
|-------------------------------|--------------|--|---|
| Application received by post | 655 | 12.2% | 57.0% |
| Application received by phone | 494 | 9.2% | 43.0% |
| Total applications received | 1,149 | 20.6% | N/A |
| | | | |
| Reminder letters sent | 4,698 | 87.4% | N/A |
| Total phone calls made | 5,236 | N/A | N/A |
| | | | |
| Audits completed | 1,073 | 19.95% | 93.39% |
| | | | |

1,149 customers agreed to take part in the project but only 1,073 (93.4%) of these customers had audits completed. There were 2 main reasons for this, firstly there was a delay between the receiving the application and scheduling the appointment which caused 29 (2.5%) customers to lose interest (or forget that they had placed an order) in the project and cancel their order. Customers were told that the appointments would be between November and March, however as some customers applied in October those with appointments in March had waited nearly 5 months. Secondly, after repeated attempts at contact (initial mail out, reminder mail out, phone number chasing using BT, letter requesting correct phone number, and finally knocking on the customers door to arrange an appointment), 21 (1.8%) customers could not be contacted

Another reason for not being able to complete the audit was that some customers had moved out of the study area after making their application.

Table 6: Distribution of applications received, appointments made and audits completed

| Number | | Nov 2006 | Dec 2006 | Jan 2007 | Feb 2007 | Mar 2007 | Apr 2007 | Total |
|-----------------------|----------------|----------|----------|----------|----------|----------|----------|-------------|
| Applications received | Avg. per day* | 29 | 42 | 4 | 0.2 | 0.1 | 0.1 | |
| | Total | 433 | 582 | 117 | 4 | 2 | 1 | 1149 |
| Appointments made | Avg. per day* | 8 | 54 | 23 | 10 | 6 | 0.2 | |
| | Total | 55 | 216 | 503 | 239 | 144 | 2 | 1159 |
| Audits completed | Avg. per day** | 2.9 | 3.4 | 5.1 | 4.6 | 4.9 | 1.5 | |
| | Total | 29 | 162 | 369 | 316 | 194 | 3 | 1073 |

*Average per day refers to each project working day.

**Average per plumber per day

As expected the majority of the customers (>99%) wishing to accept the offer responded within 2 months of receiving the application pack. However there was a small number of (8) customers that returned application forms several months after the initial mail out (Figure 8).

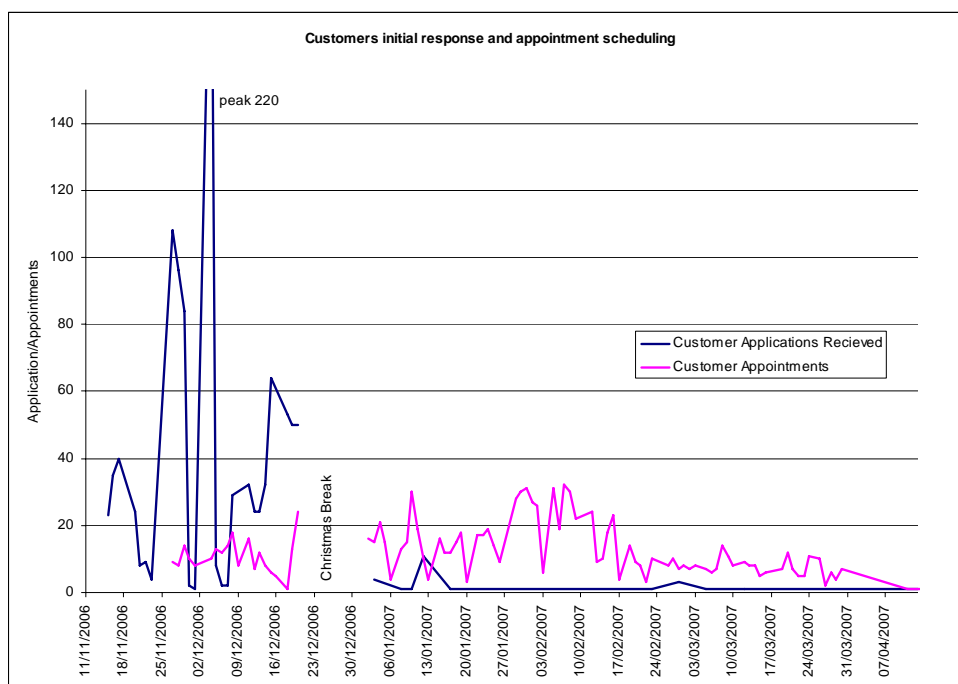


Figure 8: Customers initial response to invitation and appointment scheduling

Table 7 shows the distribution of customers' appointment booking preference. When booking appointments customers were offered the first available day, this was often the following day from when the contact with the customer was made. The table indicates that the majority of customers (65%) requested to have their appointments within one week of contact. Only 1 percent of customers requested to have their appointment greater than 4 weeks in advance. For some customers the time between returning the



application form and the contact to book the appointment was a couple of months so the customer would have been eager to receive their products.

Table 7: Time from customer contact to appointment

| Time in advance | % of appointments |
|-------------------|-------------------|
| 1 day | 14% |
| 2 days | 11% |
| 3 days | 9% |
| 4 days | 7% |
| 5 days | 8% |
| 6 days | 8% |
| 7days | 8% |
| Less than 1 week | 65% |
| More than 1 week | 35% |
| More than 2 weeks | 11% |
| More than 3 weeks | 3% |
| More than 4 weeks | 1% |

3.1.1 Missed appointments

Although the appointment times were agreed with the customer 46 still missed their appointments. The customers were called again to re-arrange the appointment.

There were also 34 occasions where the field staff had missed appointments made with the customer. Each customer received a £30 payment from MP and a re-arranged appointment was made. The reason for these missed appointments were grouped into 3 categories;

1. Field staff errors (4 no) – i.e. plumber misplaced appointment sheet, went to wrong address, weather prevented plumber from keeping appointment, etc.
2. Database errors (7 no) – the appointment report print did not allocate appointments to one plumber correctly on 12 February 2007.
3. Administration errors (23 no) – customer contact centre staff were booking appointments of past dates.

The main sources of missed appointments, database and administration errors, were resolved by programmer updates to the database to ensure that all appointments were captured in the daily appointment report printing and only allowing users to book appointments for current day or future dates.

3.2 Patterns in which customers participated

The data collected on the questionnaire form was used to identify patterns in which customers participated in the water saving project. Table 9 provides a summary of the questionnaire data. A full table detailing all customer responses to the survey questionnaire have been included as Appendix G.

Table 8: Summary of customer responses

| Question | Response | Number responded | Proportion of respondents |
|--------------------------|---|--------------------------------|---------------------------|
| Type of property | Detached and Semi detached | 699 | 61% |
| | Terraced | 265 | 23% |
| | Flat or bungalow | 98 | 9% |
| Age of house | Between 1951 and 1998 | 87 | 66% |
| Garden | Number with a garden | 1026 | 89% |
| Occupancy | 1 person | 222 | 19% |
| | 2 people | 430 | 37% |
| | 3 people | 156 | 14% |
| Households with Children | Between 7 and 11 years | 143 | 12% |
| Number of toilets | Average number | N/A | 1.77 |
| | Number of dual flush toilets | 450 toilets in 344 properties | 30% |
| | Number suitable for retro fit | 1310 toilets in 637 properties | 55% |
| Type of toilet | Siphon | 637 | 55% |
| | Valve | 239 | 21% |
| Number of showers | One | 884 | 77% |
| | Two | 145 | 13% |
| | No shower | 67 | 6% |
| | Number suitable for aerated shower head | 668 showers in 645 properties | 56% |
| Shower use | Average times per week | 10.4 | N/A |
| Number of Dripping taps | At least one | 113 | 10% |

- Of the customers who requested toilet devices 258 (76%) had a siphon type toilet, 62 (19%) had a valve type toilet and 18 (5%) did not define which type of toilet they had. This indicates that the majority of customers understood that they needed to have a siphon type toilet in order to have a Dudley Turbo 88 or a Variflush fitted.
- 57% of the customers mailed paid by metered tariff. The data collected indicates that metered customers were slightly more willing to participate than non metered customers. 22% of metered customers responded to the offer whereas 17% of unmeasured customers participated. 76% of metered customers ordered plumbing



products and 71% of non metered customers ordered plumbing products, indicating that metered customers were slightly more likely to order plumbing products.

3.3 Number of products supplied and fitted

Customers were offered a range of 19 products and services to choose from. These products and services were grouped into 6 categories; showers and baths, taps, toilets, leakage, garden and children. The total number of each product fitted or service completed has been given in Table 9.

Table 9: Actual number of products supplied/fitted

| Area | Product | Number supplied/fitted |
|---------------|----------------------|------------------------|
| Children | Detective Kit | 54 |
| Garden | Crystals | 583 |
| | Water Butt | 579 |
| | Hose Gun | 547 |
| Leakage | Ecosave | 39 |
| | Leak Survey | 39 |
| Toilets | Save-a-Flush | 237 |
| | Variflush | 112 |
| | DudleyTurbo88 | 151 |
| Taps | Kitchen Tap Insert | 159 |
| | Tap Inserts | 66 |
| | Beaker | 58 |
| | Tap Re-washing | 18 |
| | Drip Gauge | 13 |
| Shower & Bath | Aerated Showerhead | 223 |
| | Digital Shower Timer | 203 |
| | Shower Timer | 74 |
| | Bath Measure | 47 |
| | Shower Flow Bags | 11 |

Products that were selected by the customer in their initial application could not always be fitted.

158 customers ordered plumbing products but due to either the product being unsuitable or the customer changing their minds, they received only non plumbing products. This meant that time that had been scheduled to undertake a plumbing job was then not being used which gave the plumbers additional time to perform remedial and repair works (refer Section 5.1).

Appointments were arranged at the customers' convenience. In 46 cases the plumber arrived to conduct the audit and the customer was not home (Appendix F). Where this occurred, a calling card was left in the mail box and the customer was re-contacted to arrange another appointment.

Some customers experienced issues with the products fitted. The customer phoned the helpline to discuss any concerns they had. The customer call staff tried to sort out the problem over the phone by giving detailed instructions of how to rectify the issue. If the problem could not be solved by phone a further visit was made to the property. There were 23 remedial visits made to a total of 16 customers. This occurred when the customer was not happy with the device or how the device was performing. On these occasions the customer was offered alternative products to the same value.

3.3.1 *Patterns in products selected*

Customers were allowed to choose as many products and services as they liked as long as the total was 30 credit points or less (Section 2.6). As there was 19 products and services that customers could choose from it is not practical to present a summary of all possible combinations of these within the 30 credit point limit.

Table 9 shows that the majority of customers chose between 2 and 4 products. Few (5.2%) customers chose only one product or service and only 10 customers chose to use all of their credit points on 6 small value (5 credit point) products.

Table 9: Number of individual products installed

| Number of items installed | Number of customers | Percentage of total audits |
|---------------------------|---------------------|----------------------------|
| 0 | 9 | 0.8% |
| 1 | 55 | 5.1% |
| 2 | 243 | 22.6% |
| 3 | 458 | 42.7% |
| 4 | 256 | 23.9% |
| 5 | 42 | 3.9% |
| 6 | 10 | 0.9% |

At some properties changes to the customer order had to be made due to the products not being suitable. Table 10 shows the majority (52%) of customers received 3 different products or services. There were 9 households that had audits completed but no products installed. The primary reason for this is that customer had ordered products that were not suitable or they changed their mind at the time of the appointment and did not wish to have any other products.



Table 10: Number of different products installed

| Number of different items installed | Number of customers | Percentage of total audits |
|-------------------------------------|---------------------|----------------------------|
| 0 | 9 | 0.8% |
| 1 | 70 | 6.5% |
| 2 | 339 | 31.6% |
| 3 | 561 | 52.3% |
| 4 | 93 | 8.7% |
| 5 | 1 | 0.1% |

Table 11 shows that the majority of customers (62.3%) received products using all of their 30 credit points. There were 4 customers who only received one item and only used 5 credit points. 2 of these customers ordered tap inserts that were not suitable and instead received a trigger hose gun or a Save-a-Flush. One customer ordered a Dudley Turbo 88 which could not be fitted and instead received a trigger hose gun and the remaining customer only ordered a trigger hose gun.

There were 44 cases where customer received in excess of the allowed 30 credit points. The plumbers used their discretion when offering alternative products to a customer that could not have their first choice.

Table 11: Number of credit points spent

| Number of credit points spent | Number of customers | Percentage of total audits |
|-------------------------------|---------------------|----------------------------|
| 0 | 9 | 0.8% |
| 5 | 4 | 0.4% |
| 10 | 22 | 2.1% |
| 15 | 68 | 6.3% |
| 20 | 117 | 11.0% |
| 25 | 141 | 13.1% |
| 30 | 668 | 62.3.% |
| 35 | 44 | 4.1% |

Table 12 shows that the most popular products selected were all for use in the garden and the least popular products were those with no RRP and generally with lower credit ratings.

Table 12: Products in order of popularity

| Popularity | Product | % participants that ordered the product | Recommended Retail Price (RRP) | Unit purchase cost to ESW | Credit rating |
|------------|----------------------|---|--------------------------------|---------------------------|---------------|
| 1 | Water Butt | 56.8% | £65.80 | £22.74 | 15 |
| 2 | Crystals | 48.4% | £0.39 | £0.14 | 5 |
| 3 | Hose Gun | 47.2% | £5.49 | £0.49 | 5 |
| 4 | DudleyTurbo88 | 28.5% | £17.60 | £9.00 | 15 |
| 5 | Kitchen Tap Insert | 24.0% | £9.00 | £5.50 | 10 |
| 6 | Aerated Showerhead | 23.0% | £20.00 | £16.50 | 10 |
| 7 | Save-a-flush | 18.7% | - | £0.64 | 5 |
| 8 | Digital Shower Timer | 15.4% | £8.12 | £4.14 | 10 |
| 9 | Tap Inserts | 15.2% | £10.00 - £13.00 | £3.90 – £13.00 | 10 |
| 10 | Variflush | 9.2% | £20.00 | £12.00 | 15 |
| 11 | Shower Timer | 7.3% | £1.60 | £0.42 | 5 |
| 12 | Ecosave | 6.8% | £24.99 | £12.99 | 10 |
| 13 | Tap Re-washing | 6.2% | - | N/A | 15 |
| 14 | Beaker | 5.9% | - | £0.18 | 5 |
| 15 | Detective Kit | 5.0% | - | £8.18 | 10 |
| 16 | Leak Survey | 4.2% | - | N/A | 15 |
| 17 | Drip Gauge | 2.1% | - | £0.35 | 5 |
| 18 | Shower Flow Bags | 1.2% | - | £0.11 | 5 |
| 19 | Bath Measure | 0.3% | - | £2.67 | 5 |

- 57% of participants ordered the water butt. The product specifications (Appendix D) provided to the customers in the application pack indicated that the water butt had a recommended retail price of £65.80. It is considered that this, along with the high credit rating of 15 may have influenced the product selection. As 89% of customers have a garden (section 3.2) the water butt potentially appeals to nearly all customers who took part. Water butts are also a common product that are un-intrusive (when compared to retrofit products) to the customer. This is also likely to have made it the most popular product.
- Water saving crystals and the trigger hose gun (2nd & 3rd most popular respectively) only cost 5 credit points. These items may have been selected in order to use up any remaining credits after the customer had chosen one or two of the more costly (in terms of credits) items.
- The next three most popular products were all to be installed by a plumber (Dudley Turbo 88, kitchen tap inserts and the aerated showerhead). It is likely these are popular due to the fact customers were firstly receiving products worth a reasonable amount of money and also they would be installed for free by a plumber. These are



also devices with the highest potential water saving. For the Dudley Turbo 88 however there was only a 47% success rate when fitting the device (refer Table 13).

3.4 Patterns in which products were suitable

The design of the project was such that customers were allowed to select the products that they thought would be the most beneficial to their needs. While details were provided to assist them to make informed decisions, sometimes the product that was requested by the customer was not appropriate or could not be fitted.

Table 13: Success rate for the installation of products

| Product or service | Installation Success Rate | Reasons for not fitting |
|----------------------|---------------------------|--|
| Tap Rewashing | 28.1% | Taps unsuitable (mixer or ceramic disc), taps in poor repair |
| Tap Inserts | 40.3% | Tap not suitable, Customer preferred another device |
| Dudley Turbo 88 | 51.4% | Unable to isolate water, device not suitable for the cistern, cistern in poor repair |
| Ecosave | 53.4% | Exposed pipe work not available |
| Kitchen Tap inserts | 61.5% | Tap not suitable, Customer preferred another device |
| Drip Gauge | 76.5% | Customer preferred another device |
| Variflush | 77.6% | Device not suitable for the cistern, cistern in poor repair |
| Leak Survey | 86.7% | Customer preferred another device |
| Showerhead | 88.3% | Shower system not suitable (power shower) |
| Bath Measure | 88.7% | Customer preferred another device |
| Save-a-flush | 93.9% | Already displacement bag in cistern |
| Shower timer | 96.1% | Customer preferred another device |
| Water Butt | 98.0% | Property not suitable |
| Beaker | 98.1% | Customer no longer in study area |
| Crystals | 99.1% | Customer preferred another device |
| Hose Gun | 99.2% | Customer preferred another device |
| Digital Shower Timer | 99.5% | Customer no longer in study area |
| Flow Bag | 100.0% | - |
| Detective Kit | 100.0% | - |

The product with the lowest installation success rate was the tap re-washing. The reason for this was that a large number (28%) of applicants had ceramic disc or mixer taps which could not be easily re-washed or the taps were in a poor state of repair and would have been damaged further had the plumber attempted to re-washer.

The common reason for tap inserts not being installed was that the tap did not have a thread to directly fit the tap insert and the cam adjusters used to adapt the tap to a thread end were too large.

The installation of the Dudley Turbo 88 often proved difficult as it required removing the old cistern completely from the wall. Where they could not be fitted it was often the toilet was quite old and additional work would have been required once the cistern had been removed.

When shown the products some customers changed their mind and choose to receive a different device. This mainly occurred with the drip gauge and the leak survey.

When the plumber was discussing the project and the range of products available to the customers, the drip gauge did not appear to have the same value as some of the other products that were also worth 5 credit points. Similarly the leak detection service did not seem as tangible as products like the Waterbutt or the Dudley Turbo 88. The actual products that were chosen to replace the drip gauge and leak survey were varied for each customer depending on how many credit points they had left available.

3.5 Customer Satisfaction

Following the completion of work, an information pack was left with the customer. The pack included further information to customers relating to refurbishing a bathroom, designing a garden and buying a washing machine, with water efficiency in mind. In addition to this there was a competition entry form to win a water efficient dishwasher.

A customer satisfaction survey was also included for customers to fill out and return to ESW. 93 customers completed and returned the satisfaction survey, representing a return rate of 8.7%. Table 14 provides a summary of these customers' responses.

Table 14: Responses from customer satisfaction survey

| Question on Satisfaction survey | Number of responses to question | Satisfaction |
|--|---------------------------------|--------------|
| Was the information provided helpful? | 92 | 98% |
| Were you happy with the telephone appointment service? | 93 | 95% |
| Was the person that made the appointment courteous? | 92 | 97% |
| Was the appointment kept and on time? | 93 | 85% |
| Are you happy with the products you have received? | 91 | 89% |



| Question on Satisfaction survey | Number of responses to question | Satisfaction |
|---|---------------------------------|--------------|
| Are you happy with the quality of the plumbing services? | 81 | 89% |
| Was the plumber or field technician helpful and courteous? | 88 | 94% |
| Are you happy with the level of service that you have received? | 91 | 88% |

A sample of the customer responses to 'What did you like most about the project?' have been listed below.

- *Pleased to see that Essex & Suffolk are actively encouraging us to try and save water.*
- *I liked the fact that the water detective kit for kids encourages them to be more thoughtful of water usage in the future. I really want to save money and water. I think the project is a really good idea.*
- *I didn't realise I used so much water, and I learned from information in the pack.*
- *It was unexpected and served as a generous and timely reminder to me and my family as to the part we should play to conserve water supplies.*
- *Saving water with no outlay for myself.*

4 Water Savings

The aim of installing these devices was to gather data on the amount of water that could be saved following installation. There were 3 different methods of calculating water savings.

- An indirect calculation of theoretical savings. Performed on a per property basis dependent on which products had been fitted.
- A direct calculation taken from reading water meters to give actual water savings
- A direct interpretation of data collected by flow loggers

Table 15 shows a summary of the savings resulting from each method and the saving from combining all methods of calculation.

Table 15: Methods used to calculate water savings

| Method to calculate saving | Non plumbing devices only (l/prop/day) | Plumbing devices (l/prop/day) | All properties (l/prop/day) | All properties (Ml/day) |
|----------------------------|--|-------------------------------|-----------------------------|-------------------------|
| Theoretical | 8.86 | 18.34 | 14.55 | 0.016 |
| Meter readings | 0.73 | 4.24 | 2.62 | 0.003 |
| Logger data | 6.95 | 15.79 | 12.57 | 0.013 |
| Combined | 7.21 | 18.27 | 13.85 | 0.015 |

The derivation of these numbers and explanations of the differences are outlined below.



4.1 Theoretical savings from each product supplied

The theoretical calculations use property specific data collected from the audit as well as product specific details from manufacturers and other assumptions.

While a detailed description of the assumptions are provided in Appendix H, a brief summary of the procedure is given below.

The theoretical water saving was calculated for each product that was installed at each property. The total saving per property is calculated from the sum of the water savings for each individual product installed.

Dudley Turbo 88

If a Dudley Turbo was installed, the theoretical water saving was calculated on a potential water saving of 8.84% from a previous ESW water efficiency study. The average of the toilet volume in each household was then multiplied by the occupancy (where given by the customer) and an average of 5 flushes per person per day.

Variflush

If a Variflush was installed, the theoretical water saving was calculated on a potential water saving of 7.5% from a previous ESW and other water companies water efficiency studies in 2004. The average of the toilet volume in each household was then multiplied by the occupancy (where given by the customer) and an average of 5 flushes per person per day.

Aerated Showerhead

Where a showerhead was fitted, flow rates were taken before and after the installation, enabling the reduction in flow rate to be calculated. This was then multiplied by the number of showers per week (where given by the customer) and the average duration of a shower (as determined by previous ESW water efficiency studies).

Digital Shower Alarm

Following the project customers were sent a questionnaire to gather their feedback (see Section 6.5). From this data, it was determined that using a shower timer reduced the time spent in the shower by an average of 1.75 minutes in 41.9% of household that received the device. These figures were then multiplied by the number of showers per day and by the average shower flow rate. If an aerated showerhead was also installed at the property then this was taken into consideration when calculating water savings.

Shower Timer

The same calculations were used to evaluate the water savings from a shower timer as given above for the digital shower timer.

Shower Flow Bag

The shower flow bag was seen as a tool for customers to use to calculate the flow rate from their shower. While some customers may use this information and change their showering habits, the product itself was not considered to provide a significant water saving.

Drip Gauge

The drip gauge was a tool which allowed customer to measure the amount of water wasted from a dripping tap. From a previous ESW water efficiency study it was determined that 15% of customers that had a dripping tap would in fact repair it and that on average a dripping tap loses 13.08 litres per day. These figures were then multiplied to provide a theoretical water saving for the device.

Tap Re-washing

It was assumed that tap re-washing was performed on dripping taps. As shown above, on average a dripping tap loses 13.08 litres per day, therefore the theoretical saving from a tap re-washing is 13.08 litres per day.

Beaker

From previous ESW water efficiency studies it was determined that using the beaker when brushing teeth was able to save 2 litres per minute and that on average each person in the house took 2 minutes to brush their teeth. This was then multiplied by the number of people in the household (where given by the customer) to determine the theoretical water saving from a beaker. This assumes that all householders use the beaker each time they brush their teeth.

Tap Inserts

Where tap aerators were installed, flow rates were taken before and after the installation. It was assumed that usually a tap is not turned on fully so approximately half the full flow rate was used to calculate the savings in litres per minute. This was then multiplied by the average use of the tap (from the Code for Sustainable Homes Technical Guide, March 2007) per day (5.4 minutes) to give a theoretical saving as a result of installing the device.

Water butt

The theoretical water saving following the installation of a water butt was based on findings from previous water efficiency projects and industry agreed standards. It was assumed that a water butt is able to save 45 litres per week for 16 weeks of the year when it is being used.



Hose Gun

The theoretical water saving from a hose gun has been calculated on the assumption that each household uses the hose for 40 minutes, 33 times per year and that the flow rate from the hose is 500 litres per hour and that the hose gun is able to save 5% of this.

Water Crystals

The assumptions used to calculate the theoretical water savings as a result of using water crystals were taken from previous ESW water efficiency studies. Water crystals are able to save 20% of 2 litres per day for 16 weeks per year.

Leak Survey

The assumptions used to calculate the savings from having a leak survey undertaken were that 30% of properties that had a survey will have a leak and that 30 litres per day will be saved as a result of having the leak repaired.

Ecosave

The assumptions used for calculating theoretical water savings from an Ecosave were the same as those for the leak survey.

Kitchen Tap Insert

Where kitchen tap inserts were installed, flow rates were taken before and after the installation. It was assumed that when using the tap it is not turned on to full capacity so approximately half the full flow rate was used to calculate the savings in litres per minute. This was then multiplied by the average use of the tap (from the Code for Sustainable Homes Technical Guide, March 2007) per day (5.4 minutes) to give a theoretical saving as a result of installing the device.

Children's Detective Kit

The detective kit was a tool to increase awareness of water consumption to children. Whilst some customers may use this information and change their water use, the kit itself was not considered to provide a significant water saving.

Bath Measure

The theoretical water savings calculations for the bath measure assume that 37% customers that received a bath measure reduced their bath volume by 2.5 cm resulting in a 15.34 litre saving per bath. This was then multiplied by the number of baths taken per week (where given by customer).

The calculation of theoretical water savings has been determined on a per property basis and has further been categorised depending on whether the customer received any devices that required fitting by a professional plumber or not.

4.1.1 Plumbing products

Plumbing products were installed in 644 properties. Theoretical calculations have shown that this will result in a saving of 0.012 MI/d throughout the study area. An average of 18.34 l/prop/day.

4.1.2 Non plumbing products

There were 429 customers that received only non-plumbing products. Calculations have shown that installing non plumbing products was able to save approximately 0.004 MI/d throughout the study area, this equates to an average saving of 8.86l/prop/day.

4.2 Actual Water Savings from meter readings

Meter readings were taken on properties that had an external water meter installed. An initial meter reading was taken at least 2 weeks prior to the delivery and/or fitting of the water saving devices. A second meter reading was taken on the day that the audit took place and a third and final meter read was taken at least 2 weeks after the audit visit to install or deliver the products.

The data from the meter readings and dates that they were taken were then used to calculate the average daily water consumption before the water saving products were delivered and the daily consumption after the products were delivered.

Meter readings were taken on 401 properties however 25 of these did not have full data sets (i.e. one meter reading on the day of delivery and one 2 weeks either side of delivery). Therefore the results are from the 376 properties with complete meter reading data. The sample was reduced further to 358 due to the exclusion of outlying data. 14 properties were excluded because the change in consumption, when comparing before and after, was greater than 242 litres (2 standard deviations). 4 properties were excluded because incorrect meter readings were identified through a comparison against the ESW customer billing database.

The meter read measurements were used to calculate the daily consumption before and after the visit. Initially, no allowance was made for abnormal consumptions over the Christmas period. The average change in consumption was calculated and a significant increase was seen following the delivery. This increase may be a result of the timing of the study i.e. consumption patterns will change over the Christmas period as well as changing seasons and school half terms.

50% of properties had meter readings straddling the Christmas period. To overcome this a further meter read could have been taken the week before Christmas to ensure the period was excluded. This would have incurred an extra cost to ESW (around £1,000). The 187 properties with meter data spanning the Christmas period were excluded from the saving calculations.



The final dataset used to calculate the savings was therefore 235. The average change in daily water consumption was 2.62 litres/prop/day after the water saving products were installed. The range was quite significant. 178 properties showed an increase in consumption between 1 and 238 litres per day, whilst 175 properties showed a decrease in consumption between 1 and 221 litres per day.

4.3 Actual water saving from detailed flow logger analysis

A primary aim of the project was to install loggers on the meters of 200 properties to provide detailed consumption data. Collecting this data allowed ESW to analyse the consumption before and after the day the products were fitted or delivered. The data loggers were programmed to collect consumption data on a 15-minute basis.

Loggers were fitted a minimum of 2 weeks before the pre-planned appointment date and left in place for at least 2 weeks after. This provided a suitable period of consumption to allow robust analysis. Loggers were fitted on 187 properties during the project. Of these, 144 produced suitable logger data, representing a 77% success rate. 43 properties were excluded from analysis for varying reasons, as summarised in the following table:

Table 16: Flow loggers fitted

| Logger Deployment | |
|--|------------|
| Target number of loggers to be fitted | 200 |
| Actual number of loggers fitted | 187 |
| Exclusions | |
| Appointment cancellations | 5 |
| Customer vacant for 2-7 days during data collection period | 16 |
| No data available for entire period (could be due to logger failure, lead failure) | 16 |
| Logger removed too early | 3 |
| Other | 3 |
| Total number of successful logger data sets | 144 |

Although some loggers were installed before Christmas as they provide daily data the period over Christmas could be excluded. This applied to 70 properties. All of these had a visit after the 19th January 2007 and so had a period of at least 2 weeks of data before the visit but none of this within the Christmas period.

Analysis of the 144 loggers shows an average saving of 12.57 l/prop/day. 1,073 customers took part in the project, thereby showing an average saving of 0.013 Ml/day throughout the study area. However, more detailed analysis shows the difference in savings for properties that had plumbing products installed and for those that didn't.

4.3.1 Plumbing products

Plumbing products were installed in 92 of the 144 properties with suitable logger data. Analysis of the data before and after the appointments shows an average saving of 15.79 l/prop/day. As shown in 4.1.1, 644 properties had plumbing products installed. Extrapolating this data shows a saving of 0.010 MI/day throughout the study area.

4.3.2 Non-plumbing products

52 of the 144 properties that produced valid logger data received only non-plumbing products. Analysis of the data before and after the appointments shows an average saving of 6.95 l/prop/day. Section 4.1.2 shows that there were 429 customers that received only non-plumbing products. Extrapolating this data shows a saving of 0.003 MI/day throughout the study area. It is likely that this figure is on the conservative side. It is likely that the summer months will see greater savings due to the garden products being used.

4.4 Combined Savings

As shown above, analysis of results provided three sets of data based on assumptions, meter reads and logger data. These datasets were combined to provide an overall saving.

In calculating the change in consumption for each property, it was decided that where logger data was available, this would be used first. The meter data was then used next where available. If neither logger nor meter data was available e.g. the case with all unmeasured properties, the theoretical saving based on assumptions was used.

Combining the datasets provided the average savings shown in Table 17 below.

Table 17: Water savings calculated by combining all data sources

| | No. of properties | Saving (l/prop/day) | Study area Saving (MI/day) |
|--|-------------------|---------------------|----------------------------|
| All properties | 1,073 | 13.85 | 0.015 |
| Properties with plumbing products | 644 | 18.27 | 0.012 |
| Properties with non-plumbing products | 429 | 7.21 | 0.003 |



6 Evaluation of the Programme

When the average costs per property are combined with the details of theoretical volumes saved (provided in Section 4.1) a cost per volume saved can be calculated. Again this is reported for both plumbing and non-plumbing audits. The theoretical savings have been used as this is the only version of savings that is property specific and available for all properties.

6.1 Cost/ benefits of individual audit products

A cost benefit analysis has been undertaken of the 19 products and services offered to ESW customers through the Toolkits project. The plumbing and non-plumbing products and services have been analysed separately. The main reason for this is that the cost to deliver the non-plumbing products and services is £5.50 regardless of the number of products delivered. The cost of the product and the cost of installation has been used for the products requiring a plumber. The calculations used to populate Table 21 are based on the mean averages of theoretical water savings and use assumptions given in Section 4.1 and

Appendix H.

Due to customers being able to select multiple products or services to fit to their households, it is difficult to isolate the actual water savings based solely on meter read data.

Table 21: Cost / benefit of plumbing products

| Toolkit Items | Cost of Item | Cost of installation/ delivery | Water saved L/property/day | Cost per m ³ saved ¹ |
|---------------------|--------------|--------------------------------|----------------------------|--|
| Aerated shower head | £16.50 | £22.53 | 21.48 | £1.00 |
| Tap re-washing | £0.89 | £32.19 | 13.08 | £1.39 |
| Kitchen tap insert | £5.50 | £22.53 | 10.42 | £1.47 |
| Tap inserts | £23.62 | £22.53 | 15.88 | £1.59 |
| Dudley Turbo 88 | £9.00 | £41.85 | 7.70 | £3.62 |
| Variflush | £12.00 | £61.17 | 8.7 | £4.61 |
| Leak survey | £0.00 | £41.85 | Undetermined | |
| Ecosave | £12.99 | £32.19 | Undetermined | |

¹ Based on a product lifespan of 5 years

Table 21 provides details of the cost per m³ of water saved for each of the plumbing products. A cost/ benefit was not available for the leak survey or Ecosave as no leaks were detected as a result of this project. The savings have been calculated based on a product lifespan of 5 years. Both toilet retrofit products have a high cost per m³. The cost to install both products was high but also the water saving calculated were low. This highlights possible issue with the products. Since carrying out this project the EcoBETA dual flush retrofit product has been tested and the savings calculated are higher, it is recommended that this product is considered over the Dudley Turbo and Variflush in future projects.

Table 22 provides the cost per m³ of water saved for each of the non-plumbing products. The lifespan for the products has been set to 1 year for all expect the Save-a-flush and water butt that have an assumed lifespan of 5 years. Although the cost benefit is not as favourable for the non-plumbing products there are still strong reasons for using these products. Each one offers an educational benefit to the customer. They encourage the customer to think about the water they use and make a behavioural change. These products are designed to be sent to customers as a reminder to keep up the change. This has not been taken into account when calculating the cost/benefit. A cost of £5.50 has been used for the delivery; however it is unlikely these would be sent as single items. In reality, 94.8% of customers ordered 2 or more products which only incurred one delivery fee which in turn reduces the cost per litre saved on these products. It is not practical to determine every potential combination of 2, 3, 4 or 5 plumbing and non plumbing products in order to calculate the exact cost per m³ saved.

Table 22: Cost / benefits of non- plumbing products

| Toolkit Items | Cost of Item | Cost of installation/ delivery | Water saved L/property/day | Cost per m ³ saved ² |
|----------------------|--------------|--------------------------------|----------------------------|--|
| Save-a-flush | £0.64 | £5.50 | £10.17 | £0.33 |
| Beaker | £0.18 | £5.50 | £11.50 | £1.35 |
| Shower timer | £0.42 | £5.50 | £8.83 | £1.84 |
| Digital shower timer | £4.14 | £5.50 | £8.08 | £3.27 |
| Bath measure | £2.67 | £5.50 | £5.76 | £3.89 |
| Drip gauge | £0.35 | £5.50 | £2.55 | £6.28 |
| Water butt | £22.74 | £5.50 | £1.97 | £7.84 |
| Hose gun | £0.49 | £5.50 | £1.58 | £10.39 |
| Crystals | £0.14 | £5.50 | £0.03 | £497.31 |

² Based on a product lifespan of 5 years



| Toolkit Items | Cost of Item | Cost of installation/delivery | Water saved L/property/day | Cost per m ³ saved ² |
|------------------------|--------------|-------------------------------|----------------------------|--|
| Shower flow bags | £0.11 | £5.50 | Undetermined | |
| Children detective kit | £7.82 | £5.50 | Undetermined | |

The cost/ benefit provides a useful preliminary indicator for comparing each product against another, however there are other factors that require consideration when selecting which products should be used in future period.

6.2 Evaluation of which products should be included in future projects

Table 23 shows a simplistic quantified comparison between each of the devices, on a scale of 1 to 5 (5 being Excellent and 1 being Poor). No weighting has been placed on individual aspects i.e. 'cost of installation' is as important as 'customer take up'.

The additional factors used for the assessment in Table 23 were; Ease of delivering item, Potential to save water in household, Cost of installation per customer, Customer take-up and Potential sustainable saving.

- 'Ease of delivering the item' was based on the time required by the site technician to fit the device as well as comments recorded by the technician at the time of the appointment.
- Where available 'Cost/benefit' is a rank of the cost per m³ saved given in Table 21.
- 'Customer take-up' was based on actual number of each device fitted (Table 12).
- Potential sustainable saving took into account if the product aimed to influence the customer's behaviour (e.g. low sustainable saving) or if the product was installed e.g. plumber retro fit products.

Table 23: Assessment of individual products

| Toolkit Items | Ease of Delivering Item | Cost/ Benefit | Customer Take-up | Potential Sustainable saving | Total Score |
|---|-------------------------|---------------|------------------|------------------------------|-------------|
| <i>Save-a-flush (based on delivery not fitting)</i> | 5 | 5 | 3 | 5 | 18 |
| Aerated shower head | 3 | 5 | 4 | 5 | 17 |
| <i>Water butt</i> | 4 | 2 | 5 | 5 | 16 |
| Kitchen tap insert | 2 | 4 | 4 | 5 | 15 |
| Tap inserts | 2 | 4 | 4 | 5 | 15 |
| <i>Beaker</i> | 5 | 5 | 2 | 2 | 14 |
| Tap re-washing | 1 | 5 | 2 | 5 | 13 |
| Dudley Turbo 88 | 1 | 3 | 4 | 5 | 13 |
| <i>Digital shower timer</i> | 5 | 3 | 3 | 2 | 13 |

| Toolkit Items | Ease of Delivering Item | Cost/ Benefit | Customer Take-up | Potential Sustainable saving | Total Score |
|-------------------------|-------------------------|---------------|------------------|------------------------------|-------------|
| <i>Hose gun</i> | 5 | 1 | 5 | 2 | 13 |
| <i>Shower timer</i> | 5 | 4 | 2 | 2 | 13 |
| <i>Crystals</i> | 5 | 1 | 5 | 1 | 12 |
| Variflush | 2 | 2 | 2 | 5 | 11 |
| <i>Bath Measure</i> | 5 | 3 | 1 | 2 | 11 |
| <i>Drip gauge</i> | 5 | 2 | 1 | 1 | 9 |
| Ecosave | 2 | 2 | 2 | 3 | 9 |
| <i>Shower flow bags</i> | 5 | 2 | 1 | 1 | 9 |
| <i>Detective kit</i> | 4 | 2 | 1 | 2 | 9 |
| Leak survey | 3 | 2 | 1 | 3 | 9 |

Italics denotes non plumbing products

The details given in Table 23 indicate that when all aspects (ease of delivery, cost/benefit, customer take-up and sustainable savings) are considered, the Save-a-flush showerhead and waterbutt, are the most appropriate devices for use in full audit style water efficiency projects. The tap inserts, beaker and tap re-washing also scored highly.

The least appropriate products to the project were the leak survey, shower flow bags, Ecosave and drip gauge.

6.3 Demonstration of success of programme design method

As shown in Section 4.1 the installation of products under the Water Saving Toolkit project was theoretically able to save 0.015 MI/day). The majority of this saving was as a result of the installation of plumbing products 0.012 MI/day.

The customer feedback forms that were delivered with the water saving devices showed a positive acceptance by those customers that took part in the project. The responses indicated that the project had improved awareness of water efficiency in the home and that the initiative by ESW was welcomed by the public.

6.4 Focus groups

Utilities Project Management Ltd (UPM) were commissioned by ESW to organise and run discussion groups aimed at researching the opinions of the customers that participated in the project. The focus groups concentrated on similar issues to the follow-up questionnaire (see section 6.5), but provided the opportunity to promote discussion and therefore more detailed responses from the customers. The full report can be found in Appendix J. The focus groups aimed to meet the following objectives by establishing:

- General satisfaction with the project
- The effectiveness of literature
- The need for incentives and why entries for the free dishwasher competition were limited



- Possible grouping of the products into a restricted set of choices
- Issues arising from products requested not being fitted
- Why customers have/have not participated
- Expectations/concerns
- Operation of the project

ESW and UPM agreed to run four focus groups with a maximum attendance of ten customers per meeting. In essence, customers were selected at random. However, a selection criteria was agreed to form the groupings where practical. This was done with the aim of allowing discussions to develop between customers in a 'similar' situation. The groups were formed using the following criteria; when the customer participated in the project (i.e. before or after Christmas 2007), whether the household was high or low occupancy (families/sharers and singles/couples respectively), and whether the customer had chosen plumbing products that required plumbing skills.

UPM were provided with a database with customer details and the necessary information to select the groups as described above. 280 customers were contacted by UPM via telephone to invite them to take part. To encourage participation, customers were recruited by overtly marketing a recognition payment of a £15 major high street store voucher.

42 customers agreed to attend the discussion groups. 4 customers cancelled prior to the meeting. Of the remaining 38 customers, 24 attended on 30th May and 1st June 2007.

The full report, including the methodology and findings can be viewed in Appendix J. However, in summary:

- **Participants** – in general, all four groups were very satisfied with the intention, presentation and conduct of the project.
- **Introductory information pack** - all but one participant has kept the introductory information pack for future reference. The pack was considered as motivational in causing those attending to respond. It was suggested that the 'free' aspect of the project needed to be emphasised more from the beginning. The point system was deemed successful and was easily understood. There was slight concern about the amount of paper and card used. Most thought that they had not received the follow-up information pack. It was suggested that the two packs are combined for future projects.
- **Incentives** – the dishwasher was not considered necessary or a suitable prize. Many thought the initial offer of free products was enough of an incentive. The offer of a free water butt would be a very important element to get people to respond. Participants were unsure of the relevance of the dishwasher competition sheet. A washing machine would be a better prize. Or allowing the winner to have everything they wanted from the list of products.

- **Grouping of products** – Participants did not want the products to be grouped and liked being able to exercise preferences.
- **Why customers participated** – participants saw the project as a ‘free’, ‘something for nothing’ offer from ESW. Concern for the environment and the fact that a professional plumber would fit the devices.
- **Why customers may not have participated** – two customers specifically chose products that would not affect their plumbing system.
- **Negative issues** – the water butt delivery appeared to be the main concern. The time taken to deliver and the fact that it was not delivered at the time of visit was not satisfactory. Also, customers stated that they were not initially aware that there was catch involved.

Recommendations were made by UPM and can be viewed in detail in Appendix J. The primary suggestion was to use a form of quality assessment to assess the level of service given by the plumbers. This should be performed throughout the duration of the project, either by visiting properties after a visit has been completed, or through carrying out telephone customer satisfaction spot checks. This would facilitate timely finding out about delivery of information and products, as well as customer care.



6.5 Follow up questionnaire

As well as the focus group ESW sent questionnaires to customers to find out what they thought of the Water Saving Toolkit. The questionnaire (the detailed outcomes of which can be viewed in Appendix K) aimed to meet the following objectives:

- To assess the customers' views on the products and services that they had fitted/carried out, and of those that were offered in the project.
- To assess the customers' views and opinions of the introductory information pack, and how the pack influenced their willingness to participate in the project.
- To establish whether customers would have preferred the products and services offered in groups, with the development of the next project in mind.
- To understand how participating customers' water use might have changed as a result of taking part in the project.

Of the 1,073 customers who took part in the project, 934 customers were sent a follow-up questionnaire. This represented 87%. Unfortunately, the questionnaire formatting tool (Access 2003) did not allow the inclusion of customers that requested only one product or service. Therefore, 139 customers did not receive a questionnaire. The questionnaires were mailed between 4th and 8th May 2007. An internal deadline of 15th June was set, allowing the customers six weeks to complete and return the questionnaires.

Every customer was asked the same 'general' questions. These focused on the introductory information pack, why they participated in the project, whether they would have preferred to have been offered groups of products, and their water use since having participated. Then, each customer was asked a range of questions depending on the specific products and services they received. These questions aimed to discover what customer thought about the products and services, whether they continued to use the devices, and if appropriate why the products were not being used. Where possible, the answers were factored into the calculations of the water savings achieved by undertaking the project.

The following points summarise the main findings from the follow-up research:

- 48.6% of customers completed and returned the questionnaire.
- 52% of customers took part in the project to save water.
- 94.1% of customers thought the introductory information pack provided about the 'right amount of information'.
- 84.6% of customers thought the range of products and services on offer in the project was large enough.
- When customers were asked whether they would have preferred the products and services offered in groups, 82.6% replied 'no'.
- Several customers would have preferred not to have been limited to one toilet device, or one water butt.

- 76.2% of customers thought that they now use less water having participated in the project.
- Only 59.5% of customers could remember having received the extra information pack at the end of the project.

Several recommendations could be made based on the result of the follow-up research. The following points provide a summary of the key recommendations made in the full report (Appendix K).

- **Multiple products** – remove the limitation of each household only being able to have one Dudley Turbo 88, Variflush or water butt.
- **Introductory information pack** – include more pictures, enhance the ‘free’ message so that it is clearer and condense the information so that less paper/card is used thereby boosting the environmental credentials of the project.
- **Water butts** – revise the delivery and fitting methodology associated with the water butt kit. Delivering the water butt at the time of audit and the plumber fitting the water butt would reduce customer dissatisfaction.
- **Quality assessment** – some form of plumber audit needs to take place to ensure that the plumbers are undertaking each aspect of their work to the highest quality and maintaining the level of service expected by customers.
- **Additional products** – including greywater recycling and car washing products to cover these areas of water use.

The follow-up questionnaire proved to be a successful tool in gauging the level of customer satisfaction and providing ESW with the recommended improvements required to improve the next project.

6.6 Learning points

Sections 4.4 and 6.4 have demonstrated the success of the project in terms of potential to save water and public opinion. The following list provides detail on some improvements that could be implemented in future projects.

1. In some cases the water meter data collection period spanned the Christmas holiday and mid term period when the number of residents in the household may differ from the norm. This meant that the daily consumption may be skewed due to more or less people residing in the premises than was indicated by the customer in the audit form. It would be advantageous if holiday periods are excluded from the data collection periods in further projects.
2. A control group could have been used to benchmark the changes in consumptions too; however it is unlikely to have been able to correlate sufficiently well with the audit properties.



3. In some cases, the customer contact centre attempted to contact a customer that had placed an order in excess of 20 times including phone calling (15 calls), reminder letters (2 letters) and finally three attempts at door knocking. It was important to reach customers who had applied to take part in order not to disappoint them. MP also wanted to achieve as many completed visits as possible however it must be balanced with the added time and resources, A limit should be defined to the number of attempts to contact a customer so as to not be seen as causing a nuisance and to prevent wasting resources and time.
4. Including the Recommended Retail Price (RRP) of the products on the product specification sheets (Appendix D) may have influenced the customers' product selection. Future projects should focus on the amount of water that can be saved. This would encourage customers to choose the products with the greatest potential to save water rather than the most expensive devices.
5. Offering customers a choice of methods to place their order (mail back or phone in) ensured a higher uptake. Future projects could also include an email reply option.
6. To provide customers with a large amount of information in a self serve manner, an ESW webpage could be utilised to provide additional information of the project as well as the products on offer and downloadable application forms. The page could also include links to the product suppliers' websites to allow customer to research the products further if they wish.
7. The initial mail out should be undertaken in batches. This would ensure that the first customers to return their application are the first to get their appointments to reduce the 'drop out' rate. However, where there is a limit on how many of each product is available it does not give each customer an even chance of receiving their chosen products.
8. The field staff were not recording all data from their visits e.g. missing flow rate measurements. More attention needs to be given to check the collection of robust data is fully completed.

7 Conclusions

From the initial mail out of 5,378 customers, 1,073 audits were completed with water saving devices delivered and fitted to homes. This equates to an audit uptake rate of 20%. These initial mail outs were carried out in a single batch and appointments were scheduled in no specific order.

Customers were allowed to select multiple items within an allowable credit point limit (30 credits). Each customer being able to tailor their order to their specific needs may have increased the customer participation in the study but also meant that direct comparison using meter readings could not be used to compare the effectiveness of each product directly with another. This is a balance that needs to be considered when planning future projects. ESW's aim is to provide customers with sustainable water savings products and services yet these savings must be quantified and measured.

Calculations were performed to estimate the water saving that occurred as a result of installing the devices under the Water Saving Toolkit Project. Three methods were used to measure the savings; meter readings, per property logger data and theoretical savings. By combining the three data sets it is estimated that 0.015 MI/day will be saved in the 1,073 customer households that participated, an average of 13.85litres/prop/day.

Investigations into the cost/ benefit in terms of water saving for each product were undertaken. While these provide a useful preliminary indicator for comparing each product against another, there are other factors that require consideration when selecting which products should be used in future projects.

Further analysis was performed which incorporated factors including the ease to fit the item and the customer acceptance of each item. When factors other than cost per volume saved are considered the comparison of products indicated that the Save-a-flush, digital shower timer and the hose gun are the most appropriate devices for use in full audit style water efficiency projects. These items scored highly in ease of delivery (as they are non plumbing) and cost/benefit because they are inexpensive to purchase and have the potential to save significant volumes of water.

The least useful products were the Ecosave, leak survey and the Variflush. While they may be able to save substantial volumes of water they scored low on ease of delivery and customer take up.



8 Recommendations

The outcomes of the Water Saving Toolkit project have provided a valuable reference on which future studies can be based. The following recommendations have been broken into the two categories; Offer and Application pack and Database and Plumbing appointments.

8.1 Offer and application pack

The initial offer was made to over 5300 ESW customers in the Chelmsford area in one batch in October 2006. While the application pack stated that appointments to fit the devices would be between November 2006 and March 2007 some customers that returned their application early in the project, did not receive their ordered goods until later in the project. This resulted in some customers not remembering that they had placed an order or customers losing interest in the project and no longer wanting their goods delivered/ fitted. Future projects incorporating large numbers of customers should be scheduled in batches so that those customers that responded early in the project may have their appointment early in the project. It might also be worth considering sending a letter to all customers as soon as their applications are received. This can be used to confirm their order has been placed and provide them with details of their order which they can refer to in the future.

Giving each product or service a credit rating will have influence customers' selections. They would have also been influenced by the Recommended Retail Price (RRP) which was provided in the product specifications included in the application pack. The water butt which was the highest priced item and the highest credit rating (15 points) but actually provided little in terms of cost per litre of water saved, was one of the most popular items ordered. Future projects should also include information regarding the potential for water saving.

Offering a selection of products allowed the customer to choose which items were most suitable to their needs and may have increased the customer participation in the project. This design was excellent at promoting water saving in the household but was of less use for extracting useful reportable water saving results and calculations. Future products should provide a limited selection of products and services focussing on a specific area of the household (e.g. garden).

The data from the application form was designed to help with work planning. It is recommended that the future Contractor has input into these questions to ensure they firstly have knowledge of the information they can use and that it will be useful to them when planning workloads.

8.2 Database and plumbing appointments

The database was continually evolving to allow the addition of new data and provide new outputs. Using Microsoft Access as the database platform allows this type of flexibility but unfortunately the updates caused some downtime in using the database and caused delays in appointment scheduling. It is recommended this is taken into consideration when future databases are designed. It is essential that the database can be accessed at all times to ensure no inconvenience to the customer.

Some difficulty arose from the scheduling of appointments because not all of the devices were available at the beginning of the project. In future projects, scheduling of appointments should not begin until all devices are available.

The time required for each appointment varied between each property based on which products had been ordered. The database was able to calculate the amount of time required at each property and would not allow over booking of field staff time. In a number of properties the devices that the customer had ordered were not able to be fitted due to the existing conditions of the property and alternative devices were fitted. This obviously could not be foreseen but often had a large impact on the daily schedule of field staff.

The field staff were not recording all data from their visits e.g. missing flow rate measurements. More attention needs to be given to check the collection of robust data is fully completed. A more detailed regular review system of the work completed would confirm the level of data that is collected and allow any actions to improve the robustness are taken.