ESSEX & SUFFOLK WATER

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Essex & Suffolk Water

H_2eco

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Executive Summary

Essex & Suffolk Water (ESW) want to encourage its' domestic customers to be more water efficient. As part of ESWs long term water efficiency programme this project aims to increase their reputation while highlighting the environmental responsibility we all share to help reduce water waste and efficiently use current water resources.

Mouchel were commissioned to undertake the H_2eco project within Chelmsford, Essex. This project was based on the concept of customers working through the self audit process by completing a workbook. The H_2eco branding of the project reflected ESW's aims to continually find new and innovative ways to deliver the water efficiency message to their customers. Including 'eco' in the audit title drew the customer's attention towards the environmental benefits of saving water and saving money through reduced water use. The workbook asked a series of questions about their property, their appliances and how they currently use water. In addition it explained how they could use less in the future and offered a range of 13 water saving products. The project presented involved mailing out an application pack to over 7,500 domestic customers. Customers were able to reply direct to Mouchel 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 / education. Critical to this was the collection of data to enable a robust evaluation of the project and cost benefit analysis.

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

Of the 7,524 customers contacted, 1,495 households completed the audit and were fitted with water saving products and services between December 2007 and March 2008. Water savings were determined by direct measurement from metered households and through measurement by proxy for unmeasured households. Consumption data was collected from those properties that had an externally accessible water meter, and additionally 193 flow loggers were installed to collect more detailed water use information. Point of use measurement by proxy has allowed savings directly attributable to products to be determined.

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Using the data collected calculations were undertaken to calculate water saving achieved as a result of installing the products during the project.

Combining the meter and logger data, calculated savings showed an average saving of 30.55 l/property/day. This equates to a total saving of 0.05Ml/day (50,000 l/d) for the project study area.

Investigations have been undertaken to asses 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 has been performed to incorporate factors such as ease of installation and the customer acceptance / opinion of each item.

Table 1 provides of the key results from the project.

Table 1: Summary of key results

Key Result		
Total customers invited to participate	7,524	
Applications received	1,582 (21% of mailing)	
Metered vs. unmeasured	Of those that applied 62% were Metered (930) 38% were Unmeasured (565)	
Audits completed	1,495	
Product	**Quantity Fitted**	**Water saved L/property/day**
ecoBETA	903	48.3
Aerated shower head	301	36.8
Save-a-flush	524	13.8
Tap inserts	635	19.6
Kitchen tap insert	573	13.7
Tap re-washering	159	10.6
Bath measure	535	4.94
Shower Timer	1495	2.45
Water butt (standard)	985	1.90
Hose gun	1,026	1.51
Crystals	1,263	0.02
Children detective kit	684	Undetermined
Shower Flow Bag	1495	Undetermined
Savings		**30.55 l/prop/day**

1 Introduction

Over the last decade Essex & Suffolk Water (ESW) has had excellent success with the delivery of home water audit programmes. ESW is continually revising the delivery of water efficiency audits. Their overall objectives are to ensure that audits provide a high quality of customer service which is in keeping with the required standards of their customer charter (Section 1.2). As a commitment to continuous improvement in service, following each water efficiency project, a review of the approach is carried out and new ideas and methods of approach are developed.

The latest project, H_2eco has benefited from new ideas and developments from preceding water efficiency projects. Particular areas for improvements for H_2eco have been in recruitment of customers, product selection, literature and database design. This development between ESW and Mouchel has been refined over the years with the goal of improving delivery and customer experience year on year.

Previously, various styles of audits have been undertaken. The Water Saving Toolkits Project in 2006/2007 was the first to offer a choice of products to the customer, dependant on their individual circumstances but was restricted on quantities of particular products. H_2eco has progressed further by offering unrestricted quantities on most products and refining the selection available to those that offered greatest efficiency, water savings and cost benefit.

Mouchel (formerly Mouchel Parkman/Ewan) were appointed by ESW to undertake the project. This comprised contacting approximately 7,500 domestic customers offering water saving products to be fitted or used in their homes.

Focusing on the 'recruitment' of customers there was great potential to increase participation. By providing information and guidance, customers were given the opportunity to complete a personal assessment of the water they use within their home. Involving the customer in the audit process aimed to encourage their engagement in the project and 'Buy In' to the objectives (Section 2.1). It was felt that not involving the customer in the audit process on previous projects detracted from the customer experience and made them less likely to encourage neighbours and family members to take part. Utilising the 'self audit' process enhanced the customers understanding of the aims of the project.

Thirteen products and services (Section 2.2) were available to all of the customers within the H_2eco project area. (Larger selections of products and services had been offered on previous projects). However by, using data gathered from these the selection of products was refined using factors such as cost, ease of installation, efficiency, reliability and water savings achieved. This enabled the most appropriate products to be selected

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to achieve the greatest water savings from the properties offered the opportunity to take part.

Along with the delivery and installation of the water saving products, information was to be collected on the demographics of each household and their individual water use. Detailed logger data of individual property's water use would also be collected for a section of the study area to provide accurate water savings for calculation of final results.

Recognised as leaders in the development of water efficiency in the UK, ESW and Mouchel have become known for using innovative and progressive techniques in the promotion and delivery of water efficiency in and around the home.

The delivery of this project has drawn on the combined knowledge of both organisations in order to make improvements year on year, this project benefited from advances in:-

- Up to date reporting and monitoring enabling greater efficiency in the management of the project on a weekly basis.
- Literature sent to each customer including layout and content assisting the customer to complete the home audit more accurately by increasing their understanding about the products and services on offer. To ensure that waste products were kept to a minimum the application form and information booklet were reduced to A5 size and printed on recycled paper. The content was also refined and reduced to efficiently inform the customer without including unnecessary information which resulted in the use of less paper per application pack.
- Reduction in mileage, where possible by grouping plumber appointments and meter readings by post code.
- Service Level Agreements to control customer response times improving the overall service to the customer. Contacting customers within five days of returning their initial application either by telephone or letter ensured that they did not loose interest from extended periods without any contact regarding the project. Arranging appointments over a three month period also retained interest leaving each with a positive and educational experience.
- Tighter stock control from weekly monitoring of stock to provide an accurate schedule for re-ordering of appropriate quantities. (Section 2.10)
- Smarter database utilisation providing greater levels of automation reducing administrative time and reducing project costs (Section 2.7)

In order to maintain customer's interest and participation, the customer contact and plumbing audits were scheduled to be completed over a four month period. Key dates in

this process can be seen in the table below. A detailed project program can be found in Appendix L

Table 2: Key Project Dates

Activity	Date
Initial introductory letter to customer	December 2007
Start of plumbing audits	December 2007
Deadline for return of applications	January 2008
End of plumbing audits	March 2008
Calculation of water savings	May 2008
Submission of final report	July 2008

1.1 The Area and its Composition

ESW are responsible for the supply of potable water to around 772,813 customers in the Essex, North Suffolk and South Norfolk area with 95% of water being taken from the regions rivers and reservoirs.

The study area covered North Chelmsford and part of the village of Broomfield, postcode areas CM1 (1ER – 1TW, 4AA – 4YR and 7AA – 7ZT). This was the first time that a water audit project had been undertaken in this area, which greatly increased the potential for participation and ensured a wide variety of house types and ages be offered the opportunity to take part.

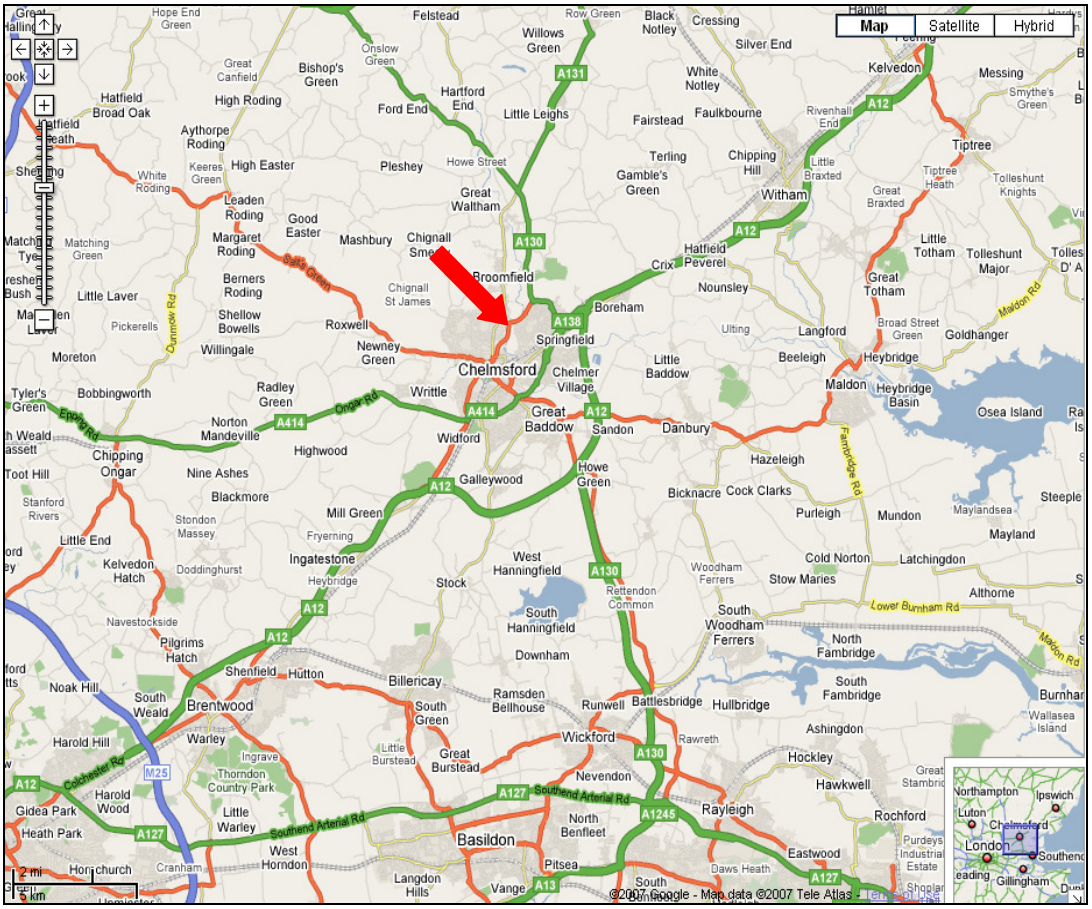

Figure 1: Location of Chelmsford, Essex

The aim was to target approximately 7,500 homes to achieve 1,500 responses. The predicted response rate calculated from previous audits was 20%. Within the boundary area (Figure 2) the selection 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, a factor proven previously to be important in increasing customer engagement and take up.

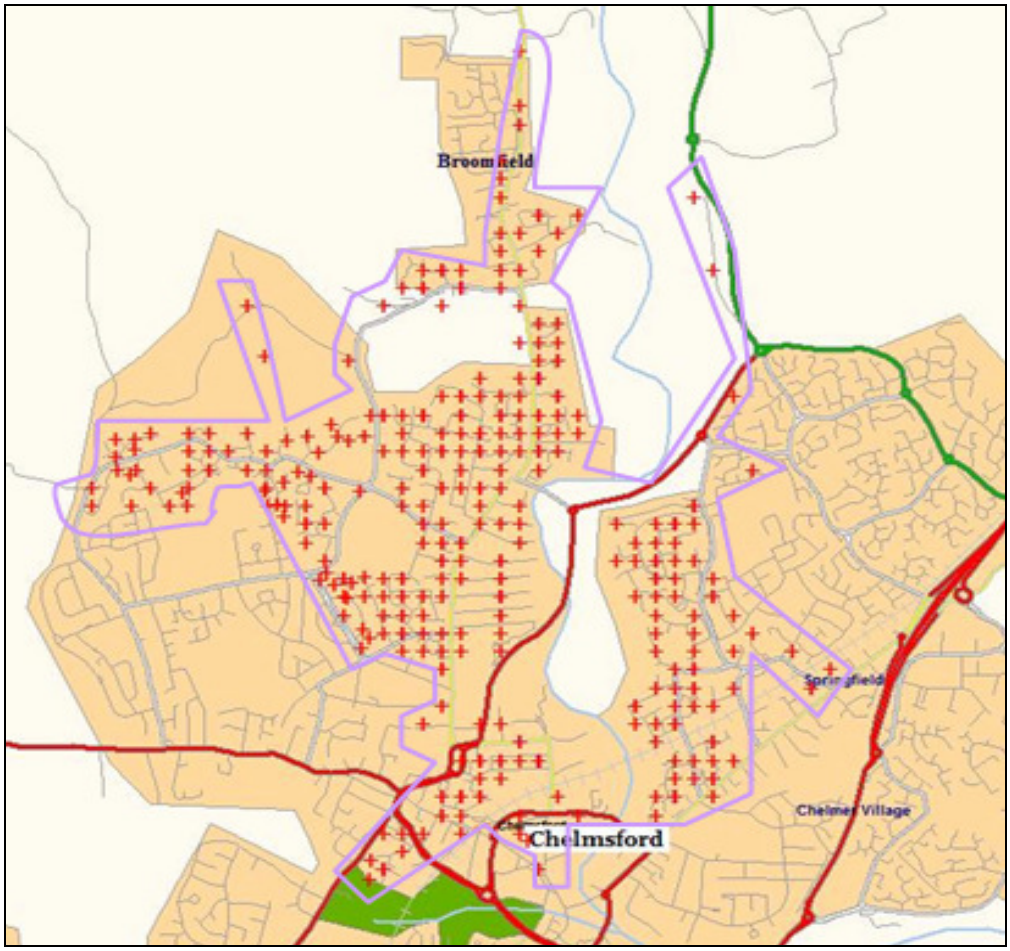

Figure 2: Boundary for H_2eco Project

1.2 Aims and Objectives

The overall aim of H_2eco is to engage the customer into water efficiency through following a self audit process leading to the supply or fitting of various water efficiency devices selected as appropriate and chosen by the customer.

ESW presented a number of objectives and requirements for the H_2eco Project, these were:

- To maximise water savings
- To ensure that all the requested data are captured
- To be able to demonstrate robustness in the results
- To collect data to enable water savings to be quantified and all aspects of the project to be fully evaluated for contribution to water saving, customer

satisfaction, economics, reliability/performance of products, plumbing issues and contractor performance.
- To engage customers and ensure satisfaction (within reasonableness) to encourage continued water efficiency
- To demonstrate innovation and cost effectiveness
- To maintain our position as leading water company in water efficiency

The aim of the project was to encourage customers to think about the water they use and how they could reduce the amount they waste. The project was designed to collect information on water consumption and usage patterns through a cross section of residential consumers.

Customers in the study area were offered a range of free products and services that have been designed to make saving water easy. They were able to select which products and services they thought applied best to their individual circumstances and have them fitted by a qualified plumber free of charge.

A selection of property characteristics and some water usage data were collected by the customer prior to their audit, with before and after flow data collected by the plumber at the time of audit.

The data collected was to be used to:

1. Identify if patterns existed to determine 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. (Sections 3.2 – 3.4).
3. Determine the actual and calculated volumes of water saved as a result of installing the products. (Section 4.4).
4. Determine the overall cost of the products and services in relation to the volumes of water they are able to save. (Section 6.1).

1.3 Staff Training

Prior to the training of staff Mouchel carried out specific competency based interviews to select the best candidates to take part in this project. Using our knowledge of the type of work involved and technical expertise required, as well as understanding ESW's high expectations of customer service, to determine the type of candidates we required to deliver the necessary outputs.

All project staff attended a training day delivered by ESW and Mouchel. The training included ESW's corporate messages, the programme evaluation and monitoring programmes. Also covered was guidance on collection of the data, information on why the data was required (to give the field staff a better understanding of what they were collecting and the reasons behind it) and the customer service expectations of ESW.

All aspects of Health and Safety were covered and task specific Risk Assessments were created and presented at the training day. Each plumber was given a detailed booklet containing background information on the project, guidance for completion of the audit sheets, product details to explain to the customer and Mouchel's health and safety policies.

Field staff were also given additional product specific training relating to the installation and operation of the water saving products. Each product was covered in detail with advice and tips on installation and potential issues that may arise. This training helped to provide background knowledge to answer any general questions that the householder might have regarding their water use. For the ecoBETA product which has the greatest training need, the manufacturer delivered the training. Some of the plumbers had worked on our previous projects and therefore were already experienced.

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.

This intensive induction day has been developed over the years by both Mouchel and ESW and is one of the reasons that much of the feedback is positive.

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2 Programme Approach

Past experience has shown that communication and customer engagement are key to the success of these types of projects. This section outlines the steps that were taken to maximise the customer response to ensure that the targets were achieved.

2.1 Customer Engagement

In November 2007, the application packs for the H_2eco project were sent with an invitation letter to 7,524 homes in the study area covering post codes CM1 (1ER – 1TW, 4AA – 4YR and 7AA – 7ZT) See Figure 2 (Section 1.1) . The application pack contained

- an information booklet containing guidance on each of the items available (to be read whilst completing the workbook)
- the workbook (application form)
- a shower flow bag to enable customers to check the flow rate of their showers prior to the audit
- a shower timer included for customers to measure the time spent in the shower and to challenge themselves to spend one minute less in the shower.

Examples of the letter and mail out materials can be found in Appendices A – D.

The mail out information was designed by ESW to take the customer through the process of auditing their property and assessing their needs as simply as possible.

2.2 The Self Audit Process

The design of the information booklet was developed in a workshop between ESW and Mouchel using knowledge and experience taken from previous projects particularly the Water Savings Toolkits project (2007)

As this project was to include the customer in the audit process, the questions were written in such a way that they were able to guide the customer through the audit process and enable the customer to provide correct and useful answers. The questions had to be very specific in the information that they were asking to establish the suitability of the products for each individual property. In this way the application for products combined suitability and customer choice.

The most functional way of doing this was to design the workbook in the style of a flow chart. By doing this the customer was visually led through the questions in each section,

in an easy to follow manner. Arrows were used between questions to draw the customers' attention to the next relevant question and extra information was included around the questions to aid understanding of the question.

Photographic aids were also utilised throughout the information booklet again providing assistance for the customer. On previous audits this data was collected by technicians or plumbers but as H_2eco proposed to utilise the audit process to give the customer greater understanding of the project and its aims, the information booklet and workbook took the place of the technician or plumber.

The information included technical information on toilet types and other specifications required for each of the products provided and allowed the customer to make decisions about which products and services would be the most appropriate for their needs and therefore involve them in the process of saving water.

In a change to previous projects the quantity of products available to each customer was virtually unlimited. For example with the ecoBETA, if the customer stated that they had seven toilets then seven toilet products were made available to them. In cases where the product ordered was unsuitable, an alternative was offered, (if available). Where no alternative product was suitable advice was given to the customer on what action to take next. Further details of each product and service on offer can be found in section 2.6.

Where a choice of product was available to address one water use e.g. the ecoBETA and Save-a-flush for wcs, the workbook first offered the primary water saving product, then the alternative, then where neither if applicable, advice specific to that water use,

To minimise the effort required by the customer the workbook was designed so that once completed the customer could fold and seal it to be sent back as return address and pre paid postage were printed on the back page meaning no envelope was required, reducing waste and removing another potential obstacle to up take.

However, if customers preferred they could call a dedicated local rate telephone number and place the order over the phone.

2.3 Publicity

To further promote the project to customers and encourage them to take part the local press were contacted. The following local paper printed an article on the project.

Chelmsford Weekly News – 27th November 2007 – Introduction to the project

The following radio interview also took place on an Essex local station to promote the project.

Dream 107 – 11th December 2007 – News article on the project

An article was also posted on the Institute of Water Officers (IWO) website to provide information about the project.

Copies of each article and the transcripts from the radio interview can be found in Appendix E

2.4 Products and Services Offered

Table 3: Products Offered

Area	Product	Limit per property	Plumber fit
Children	Detective Kit	No limit	N
Garden	Crystals	1 per property	N
	Water Butt	1 per property	Y
	Hose Gun	1 per property	N
Toilets	ecoBETA	1 per toilet	Y
	Save-a-Flush	1 per toilet	N
Taps	Kitchen Tap Insert	No limit	Y
	Tap Inserts	No limit	Y
	Tap Re-washering	No limit	Y
Shower & Bath	Aerated Showerhead	No limit	Y
	Bath Measure	1 per property	N
	Shower Timer	1 per property	N
	Shower Flow Bag	1 per property	N

ESW offered a choice of thirteen products to choose from for installation or delivery. H_2eco differed from previous audits in that there was very little limitation imposed on the quantity of products made available to the customer (Table 3). In this project, the water

butt, crystals and hose gun were the only products that were restricted to one per property. All other products were unlimited and so the customer was able to order quantities relevant to the size of their household. This greatly increased the potential for water savings per household as it could cater for all variations in household demography and plumbing arrangements

Available Products

Children's Detective Kit

The children's detective kit 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. There was also the chance for the children to win £30 WH Smith vouchers. To be entered into the competition the child had to complete and return a questionnaire on their water use and draw a poster about 'what water efficiency in the home means to you'. We received 18 entries and decided to offer two runner up prizes of £10 WH Smith vouchers and one overall winner.

Water Crystals

The water crystals are used by mixing with soil or potting compost in pots or hanging baskets. They work by absorbing water and then slowly releasing as the plants require it. 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.

Water Butt

Two sizes of water butt were made available. Both the 190 litre water butt and the space saving 100 litre water butt were delivered with stand, a child-safe lid and either a down pipe diverter or linking kit to join to an existing water butt. 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. The field technician checked the suitability of the property at the time of the appointment. The size of waterbutt selected was decided by the customer with advice from the field technician. Once selected, an email was sent to ESW to place an order with the supply company. The water butts were produced and delivered by Straight plc to the customer approximately 4 – 6 weeks later for installation by the customer. Where customers were unable to fit the water butt themselves due to personal circumstances, a water butt installation service was offered.

Hose Gun

The trigger hose gun is an attachment that fits onto the end of the hose and allows the flow of water to be stopped (via a gripped lever built into the handle) instantly when moving around the garden or washing the car. The hose gun has five different settings changed by twisting the end of the spray head 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.

ecoBETA

The ecoBETA was used as a retrofit plumbing device to convert standard toilets into dual flush toilets. The product is WRAS (Water Regulations Advisory Scheme) approved and works by introducing air and interrupting the siphon effect when the handle is pressed and released. The ecoBETA clips to the side of the siphon and a small pipe, attached to the ecoBETA is fitted to a hole drilled into the top of the siphon. If the toilet is flushed and the handle held down, the full volume of water in the cistern is delivered and the ecoBETA is bypassed, if flushed and released quickly, a reduced the volume of water is delivered. The actual volume delivered during the reduced flush is determined by the height on the siphon that the device is positioned with respect to the full water level i.e. the higher the device the smaller the reduced flush delivery volume. There were some limitations to the type of cistern and siphon that the ecoBETA could be fitted to. The cistern needed to be low level, (not the older style overhead cistern), the flush handle had to be positioned on the front of the cistern but could be on either the left or right (flush handles positioned on the side or push button flushes were not compatible). The cistern also needed to be of a standard depth (front to back), not slim line, to allow the ecoBETA enough room to function without the ball valve arm becoming obstructed. In a few cases the siphon was old and brittle and would not have withstood the hole being drilled into the top without cracking. In these cases, the plumber advised the customer of the reason why the ecoBETA could not be fitted.

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 was not suitable for toilets with a flush volume of less than 7 litres. Although the Save-a-flush did not require any plumbing to fit the product it was decided to include it in the items fitted by the plumber so savings could be accurately measured from it. For best savings the bag was positioned on its end between the siphon and the outside wall of the cistern to ensure as much water in the cistern was displaced as possible.

Miracle Tap Adaptor

The kitchen tap insert used was the multi directional aerator attachment Miracle Tap Adaptor. The aerators were installed by plumbers and could be fitted to a combined hot and cold outlet in either the kitchen or utility room. The customer could alter the flow from the adaptor between aerated or spray by twisting the end of the adaptor. The

aerator kit contained several adaptor rings 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.

Tap Inserts

It was intended to use Tapmagic spray inserts for the entire project but due to production issues a second type of insert was used. There were two types of tap inserts available for use in washbasins.

1. A tap aerator, made by Challis Water Controls

2. Tapmagic spray insert

The Challis tap aerator provided an aerated flow 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 full. 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 were recorded.

Tap Re-washering

A tap re-washering 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 and only where the work could be completed without causing damage to the basin.

Aerated Showerhead

The aerated showerhead, supplied by AL Challis Limited was the Aquiv8 412 model, designed to inject air 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 who checked the suitability of the shower. 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.

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 a visual indicator which attached to the inside of the bath. Its main purpose was as an educational tool to show how much water the customer could save. By seeing the amount of water used in each bath this would 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. All items were either termed plumbing or non plumbing dependent on the type of installation required.

Shower Timer

The shower timer was sent out with the original mailing and was designed as a visual reminder to the customer to reduce the amount of time spent in the shower. The timer was based around an egg timer design and ran out after 5 minutes.

Shower Flow Bag

The shower flow bag was provided as a tool to allow the customer to calculate the flow rate of their shower. The bag had instructions printed on it and was sent out with the original mailing so that customers could gauge the suitability of their shower for the aerated showerhead.

2.5 Customer Contact

It was the goal of the project to ensure that customers were contacted, engaged and an appointment booked in as short a timescale as possible to ensure that no lead went cold.

All customer contact was handled by Mouchel's dedicated call centre staff and the information gathered was recorded into a bespoke database which contained data of all contact with each customer as well as products ordered and subsequently installed. The call centre was staffed between the hours of 08:30 and 18:00 with some shifts continuing until 20:00 to catch customers returning home at later times.

The database designed for H2eco was a result of many improvements and developments learnt from previous water efficiency projects. The structure of the database was based on previous ESW project databases with improvements to cater for the new literature sent out to the customer. The database served 3 main purposes: recording customer contact, provision of project management information and reporting. The database functionality is described in section 2.10. Through the course of the project additions and improvements were continually made, one of the most significant

being the automation of the production and emailing of the of the Plumbers appointment sheets, meaning that the work for the following day could be generated and emailed to the field staff in a fraction of the time previously taken to complete this task.

Within the database some of the main sections of data recorded were the customers' contact details, data relating to water meters, all of the answers given in the workbook, the products and services ordered and all contact with the customer. A comprehensive description and explanations of the functionality of the database can be seen in Section 2.10.

Orders could be made in 2 ways either by the customer filling in the workbook or by contacting the call centre direct, although the latter only accounted for less than 5% of confirmed appointments.

If the order was received through the post Mouchel was targeted to get the information on to the database and make an initial attempt to contact the customer within 3 and 5 working days respectively.

Each order was recorded and quality controlled within the database, ensuring that all of the information on each application was captured. Once this process was complete customers were telephoned to arrange an appointment to visit and deliver the customer's chosen products and services. For appointments booked more than five days in advance, a letter was also sent confirming the date and time of their chosen appointment.

All appointments (plumbing and non-plumbing) were made by telephoning the customer, to maximise the number of customers involved where a customer had not provided a daytime contact phone number, or the number provided was incorrect, a letter was sent requesting that customers call the hotline number so that their details could be corrected and an appointment booked.

In some cases the missing information was resolved by a search of Directory Enquiries via the British Telecom website. 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 39 letters were sent out requesting contact telephone numbers from customers.

The application packs were sent to Royal Mail on 5th December 2007 following prior arrangement. However due to the Christmas post, without informing ESW or Mouchel, Royal Mail held the letters back and did not post them until after Christmas. The closing date for applications was initially Friday 18th January 2008, this did not give customers long to reply. Considering the previously mentioned problem with Royal Mail there was little confidence that customers had actually received the letters at all. In the two weeks following customers receiving the application pack 77 applications had been received.

To increase customer participation a reminder letter was sent on 7th January to customers that had not yet responded. In total 7,439 reminder letters were sent to those that had not responded by the closing date. Following this, a further 1448 (96.8%) applications were received.

For customers who could not be contacted during the hours of 09:00 and 17:00 alternative measures were used to attempt to make contact. The reasons for this were because of call centre staff being unable to leave a message or from no response to messages left for customers asking them to contact the call centre.

To attempt to make contact with those who appeared to be absent from the property during regular working hours, early evening calls were made up to 19:00hrs.

To reduce the likelihood of cancellations customers were offered the choice of a morning or afternoon appointment. Morning appointments were between 08:00 - 13:00 and afternoons were between 13:00 – 17:00. The majority of appointments were completed between Monday and Friday within these times, there were a few occasions where a more precise time window was requested by the customer. Although these were not guaranteed, the field staff did attempt to accommodate these requests where possible. Under ESW's Customer Charter, if a plumber arrived for an AM appointment after 13:00hrs or a PM appointment after 17:00hrs it was recorded as a plumber missed appointment. This meant that ESW were obliged to send a cheque for £30 to the customer for the inconvenience, this cost was then passed on to Mouchel. (See Section 3.1.1) A small number of Saturday appointments were also made available through February and March. In total 129 Saturday appointments were completed.

2.6 Collection of Customer information

It was the role of the contact centre administrative staff to ensure that the data from the workbooks was accurately recorded into the database. These were further audited by the project manager or peer reviewed to ensure consistency and to remove any input errors. As well as the quality review, errors were further controlled as the database created by Mouchel replicated exactly the order of questions and look of the workbook to make data entry as intuitive as possible.

The workbook contained a series of 36 questions, four covering demographic information on the household and 32 specific questions on sanitary wear, taps, the garden, vehicle washing and children.

Table 4: Detail of audit questions provides a summary of the questions that were included as part of the application.

Once the information for each order was complete on the database, the customer could be telephoned to arrange an appointment. The database was designed to highlight errors that had arisen from questions either not being answered, partially completed or the customer misunderstanding the question. During the telephone call to arrange an appointment, the call centre personnel were able to go through any questions that had not been answered satisfactorily. They were also able, through discussion with the customer, to identify additional products that could be installed that they had not originally considered.

Table 4: Detail of audit questions

Question on Audit Workbook	Possible response	Use of information
What type of house 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.
How many people live in you property?	Open question	Used to determine a consumption rate per person
How many children between 5 and 12 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
Does you toilet have a handle flush?	Yes/No	Used to determine the suitability of the products ordered (ecoBETA and Save-a-flush)
Is there easy access to the toilet cistern?	Yes/No	Used to determine the suitability of the products ordered (ecoBETA and Save-a-flush)
Is the toilet cistern standard size?	Yes/No	Used to determine the suitability of the products ordered (ecoBETA and Save-a-flush)
Is the cistern low level?	Yes/No	Used to determine the suitability of the products ordered (ecoBETA and Save-a-flush)
Does your property have a shower?	Yes/No	Used to determine the suitability of the products ordered (showerhead)
How many showers does your property have?	Open question	Used to determine the suitability of the products ordered (showerhead)
Have you timed how long you spend in the shower?	Open question	Used to estimate water usage.

Question on Audit Workbook	Possible response	Use of information
Have you measured the flow rate of your shower?	Yes/No	Used to estimate water usage.
What was the flow rate of your shower	Open question	Used to determine the suitability of the products ordered (showerhead)
Was the flow rate greater than 8 litres per minute?	Yes/No	Used to determine the suitability of the products ordered (showerhead)
Is your shower an electric shower?	Yes/No	Used to determine the suitability of the products ordered (showerhead)
Does your property have a bath?	Yes/No	Used to determine the suitability of the products ordered (bath measure)
Is the water outlet on any of your wash basin taps circular?	Yes/No	Used to determine the suitability of the products ordered (tap inserts)
Would you like tap inserts installed?	Yes/No	Used to determine the suitability of the products ordered (tap inserts)
Do you have any dripping taps?	Yes/No	Used to determine the suitability of the products ordered (Dripping Taps)
Would you like us to repair your dripping taps?	Yes/No	Used to determine the suitability of the products ordered (Dripping Taps)
Is the water outlet on your kitchen sink tap or utility room sink tap circular?	Yes/No	Used to determine the suitability of the products ordered (Miracle Tap Adaptor)
Does the tap have a combined outlet for hot and cold water?	Yes/No	Used to determine the suitability of the products ordered (Miracle Tap Adaptor)
Do you have a garden?	Yes/No	Used to determine the suitability of the products ordered (water butt)
Do you have space in your garden for a water butt?	Yes/No	Used to determine the suitability of the products ordered (water butt)
Do you have a plastic downpipe or an existing water butt to connect a new water butt to?	Yes/No	Used to determine the suitability of the products ordered (water butt)
Does your property have any pots or hanging baskets?	Yes/No	Used to determine the suitability of the products ordered (water saving crystals)
Do you have a vehicle which you wash at home?	Yes/No	Used to determine the suitability of the products ordered (hose gun)
Would you like a children's activity pack?	Yes/No	Used to determine the suitability of the products ordered (Children's pack)

Some customers did appear to experience problems following the flow chart design of the workbook. Often there were occurrences where the initial question in the section was answered incorrectly but the customer then went on to request the product. In these cases the call centre staff explained to the customer that they may not be able to receive the requested product and that the plumber would help them decide at the time of the appointment. It was explained that the product may not be suitable for their individual property.

The section on showers experienced some problems as customers often did not know if their shower was part of a pumped system. The call centre staff would try to establish this during the telephone call to arrange an appointment.

2.7 Delivery Techniques

Once an appointment had been booked for a customer, the database generated an appointment sheet (Appendix F). These could then be saved in groups assigned to each member of field staff and attached to an email.

From previous projects email has shown to be the most efficient means of distributing work to field staff. Appointments were sent to each member of field staff in the evening, detailing visits to be completed the following day. Once the appointment was completed and the data of the visit recorded they were faxed back to the office. When the appointment sheets had been returned to Mouchel, at the end of each day, all of the data collected was entered into the database.

The appointment sheet contained all of the information required for the field staff to complete the work at each property and was also used to collect vital data which would be used to calculate water savings. Included on the sheet were customer details, (name, address, phone number, etc) and the audit details, the products that the customer had ordered. Where the property was metered, a reading was also taken at the time of the appointment and recorded on the sheet.

When the field staff arrived at the customer's home they explained an overview of the audit to give the customer a better understanding of the motivation behind it. They also ensured that all details on the appointment sheets were correct and made amendments where they were not. At each property they were expected to record on their appointment sheet

- Details of which products 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
- Before and after flow measurements from taps and showers
- Any comments from the customer
- Signatures from the customer to confirm that had received everything they had ordered or agreeing the reason as to why a product could not be installed

- A meter reading, should it be required

Also data for weekly reporting and for the final report

2.8 Collecting meter reading data

To gather data on how much water was saved per property, meter readings were collected at all metered properties with an external, accessible meter.

It was hoped that some unmeasured households could be identified where temporary "drop-in" meters could be fitted, but no such properties applied to take part, so external meter readings could only be obtained from metered households.

Meter readings were not taken at properties that had an internal water meter. 40 metered properties were classed as unmeasured for the purposes of the project as their meters were not easily accessible and would have required the customer being at home on a further two occasions for the plumber to have access to collect meter readings. It was decided that this would cause too much inconvenience to the customer and may have dissuaded people from taking part in the project

The initial meter reading was taken at least 3 weeks prior to the audit appointment. A second meter reading was taken at the time that the products were delivered or fitted and a final meter reading was taken at least 3 weeks following the product installation.

960 (62%) of the participating customers pay for water. In order to collect consumption data, meter readings were taken at all participating properties that had an external (outdoor) water meter. A total of 649 properties had all three meter readings used.

The project database was utilised to generate record sheets for field staff to complete when taking the meter readings. Dates were recorded in the database of when the customer's application was received and when they had had their appointment. These dates dictated when the properties would appear on the lists to be sent out to field staff.

Some difficulties were experienced with collection of meter readings therefore a percentage (2.7%) could not be recorded. Common problems experienced were

- the meter pit could not be located (5 properties)
- the meter itself was unreadable due to scratched glass, condensation or flooded meter pits (7 properties)
- the serial number of the meter did not correspond with what was on site in the meter pit (14 properties)

2.8.1 Logger Data

To gather more detailed data, 193 properties were selected to have a flow logger installed on their water meter. The number of loggers provided was due to be 200 but due to technical difficulties 193 were supplied by ESW. The properties were selected at random from the early applications received from customers. With the appointment date and a meter reading recorded alongside the serial number from each logger it would be possible to see a change in the water use once the products had been installed.

2.9 Customer Satisfaction

Levels of customer satisfaction were determined through 2 approaches. UPM were commissioned by ESW to monitor customer satisfaction during the delivery of the audits. This is reported separately, but included the collection of customers' views about the project and products whilst issues were fresh in their minds. In addition, a customer satisfaction form was provided during the appointments for completion by customers. The results from this are analysed in section 3.6 below.

2.10 Database

The bespoke project database developed by Mouchel utilised Microsoft Access 2003 to store and process all of the data collected throughout the duration of the project. Its main functions were to

- record customers applications and progression
- track customer contact centre calls
- record appointment times and dates
- collate lists of customers requiring telephone calls to book appointments
- generate audit sheets and meter reading lists to enable field staff to accurately collect the data required
- automate conversion of audit sheets to PDF documents and attaching to emails
- record letters sent to the customer
- monitor field staff availability
- produce invoice, stock and progress reports

ESW provided Mouchel with the 7,524 customer's names and addresses within the project area which were used to populate the database. Once a customer's application had been received into the customer contact centre, the details of their application were entered into the database and progressed through the relevant stages.

2.10.1 User Login

To make the database auditable and record users additions, amendments or deletions all management and administrative staff were required to log into the database using their initials (Figure 3). This allowed administrative staff a controlled access to the relevant sections they needed for each task, to access the management section required a password and allowed completion of tasks such as changing plumber availability, running weekly/stock/invoice reports, tracking users progress and automation of job sheets. With the two sections of the database separated, access to different areas of the database could be regulated accordingly.

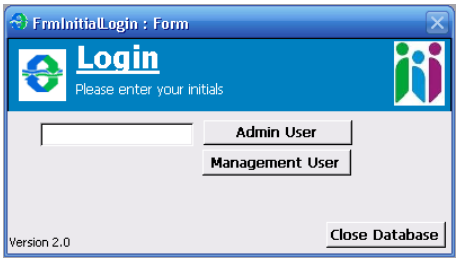


Figure 3: Initial log in screen

As each application progressed, numbered stages were allocated to each customer who returned an application. The stages, (Figure 4)10 in all, enabled contact centre staff to track each application, starting at 1 "Application received" through to 10 "Final meter reading entered".

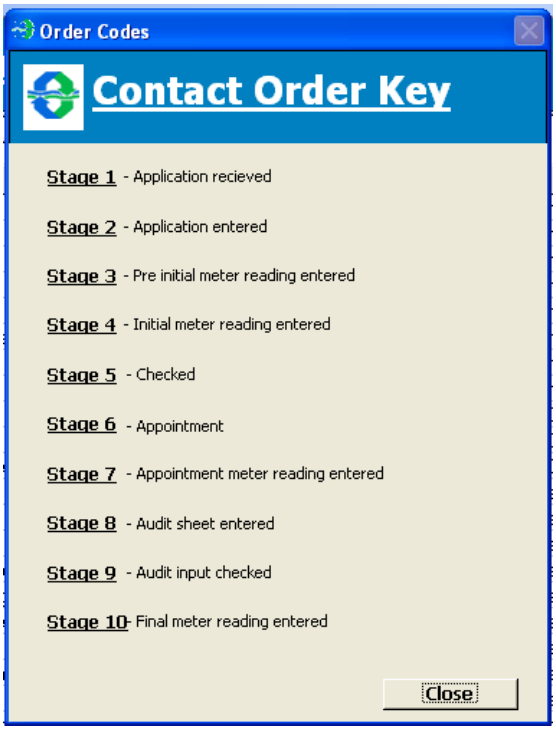


Figure 4: Contact Order Key

2.10.2 Customer Search

The customer details provided by ESW were available to customer contact centre staff using the Customer Search Screen of the database. The screen allowed users to search for a customer or group of customers by property reference number, name, address, current project stage and postcode. Within this screen an overview of all of the customers and what stage the customer had achieved could be viewed.

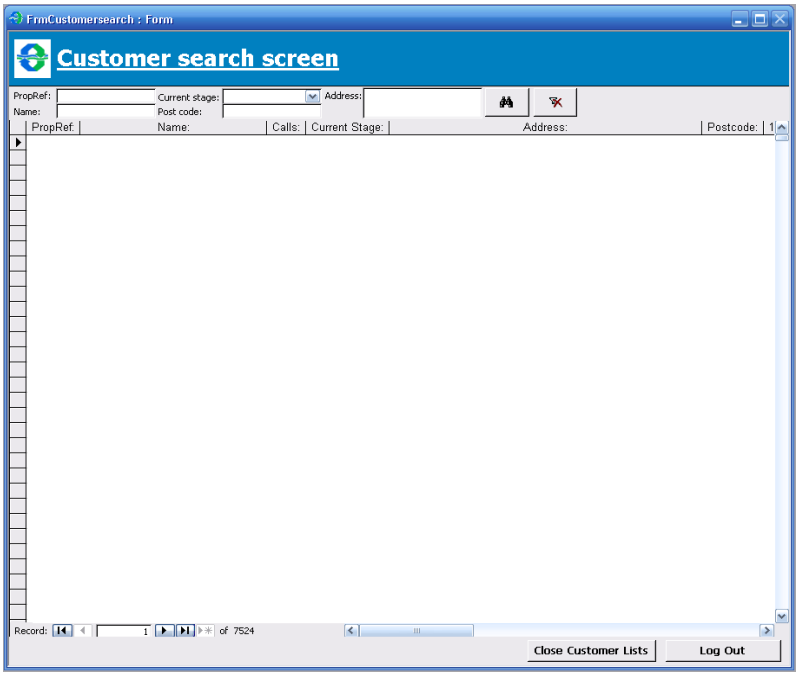


Figure 5: Database customer search form

2.10.3 Customer Workbook Received/Entry

On receipt of a workbook (application) sent from a customer the search screen was used to locate the customer and record that their application been received. The workbook could then be entered into the database (see figure 6).

This form carried out a system of checks on the data inputted and flagged errors to avoid incorrect data. Checks for omissions in the data supplied by the customer were also indicated, e.g. Phone numbers, Confirmed name, etc, including any logical errors that should not have been made e.g. Customer has stated that they don't have a bath but requested a bath measure. The flagged errors allowed for amendments to be made to the application during the telephone conversation to book an appointment.

This section was set out in the same order as the work book, with the different sections of the workbook displayed on tabs across the top to simplify data entry.

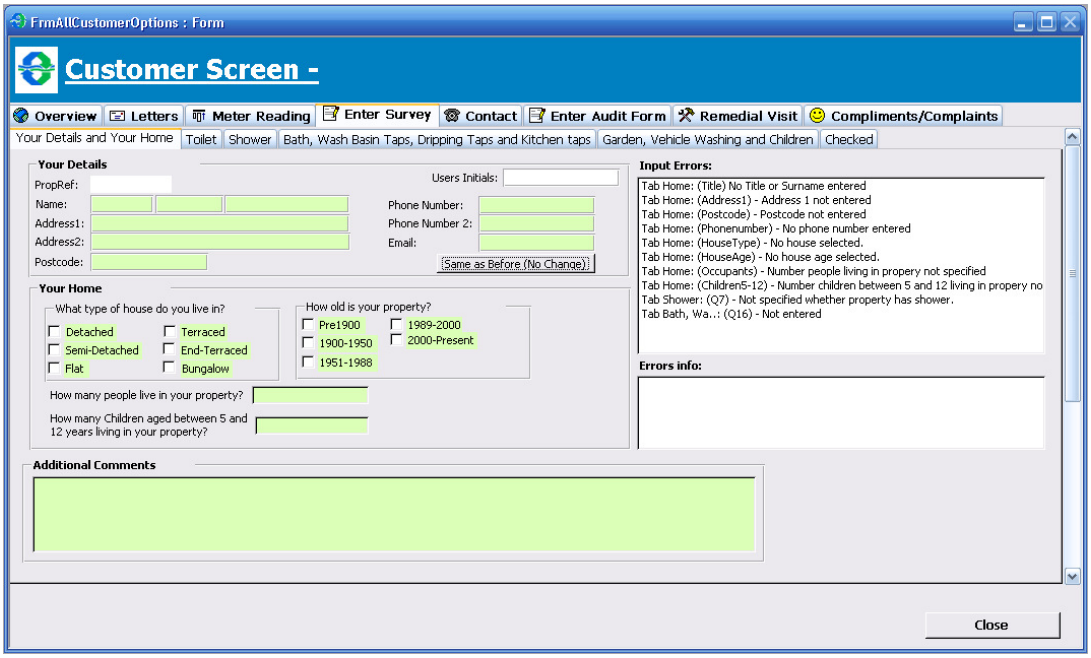


Figure 6: Workbook Entry Screen

2.10.4 Customer Contacts

Once a customer had been called (or had phoned in) the customer contact centre staff were able to log the appropriate type of call and make notes as required (Figure 7). For calls where the customer required an appointment, the customer contact centre staff were then presented with a list of dates (and AM and PM slots) selected depending on their previous meter reading date. These dates were automatically generated by the database depending on the availability of plumbers and the other appointments already booked for dates.

The contact screen also prompted the customer contact centre staff with any errors/missing information from the customer's workbook. This allowed the user to ask the relevant questions to the customer to complete missing data whilst they were in contact with them.

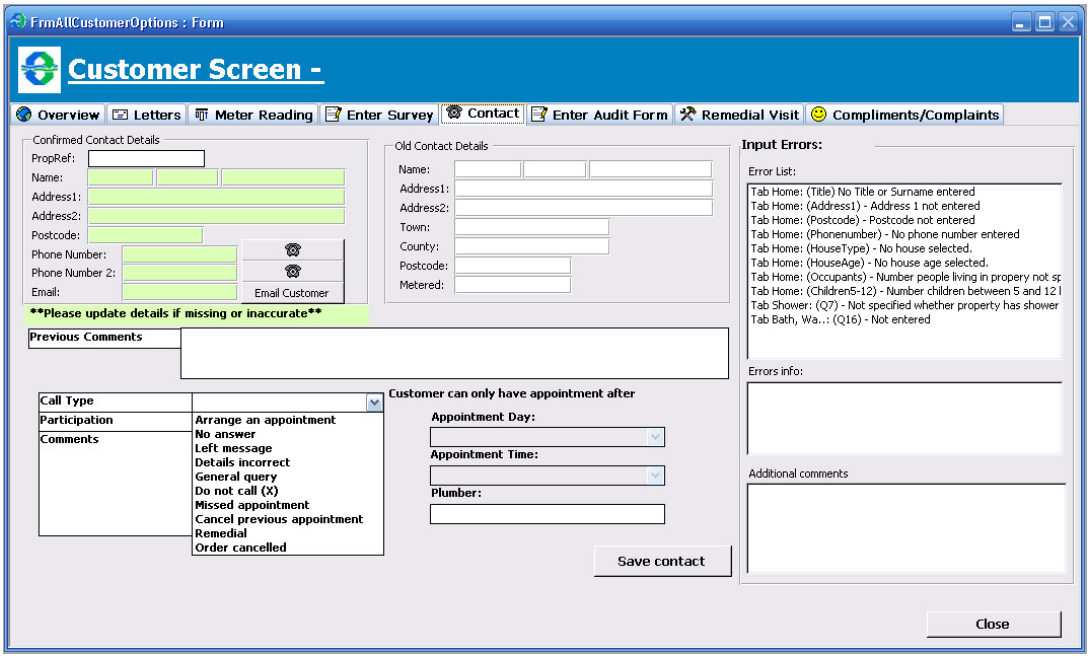


Figure 7: Database customer contact logging

Customer contact logging also allowed the customer contact centre staff to record an 'order cancelled' 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 2007 to the end of March 2008, there were customers that had placed an order early in the project and had either forgotten that they had placed an order, wanted to cancel their order due to losing interest, or were unable to be at the property during any of the available appointment times. This applied to 25 customers.

2.10.5 Audit Entry

The customer's order from the workbook was emailed to the plumber in an automatically generated appointment sheet. Plumbers were then able to fax back the completed appointment sheets at the end of each day to a local computer based fax machine. Faxes received were converted to an electronic version and saved to the server. Data from the appointment sheets were then entered into the audit entry section of the database (see Figure 8). The form was designed to replicate the job sheet sent to the plumber, for ease of data inputting. This ensured a high level of accuracy in the data entered.

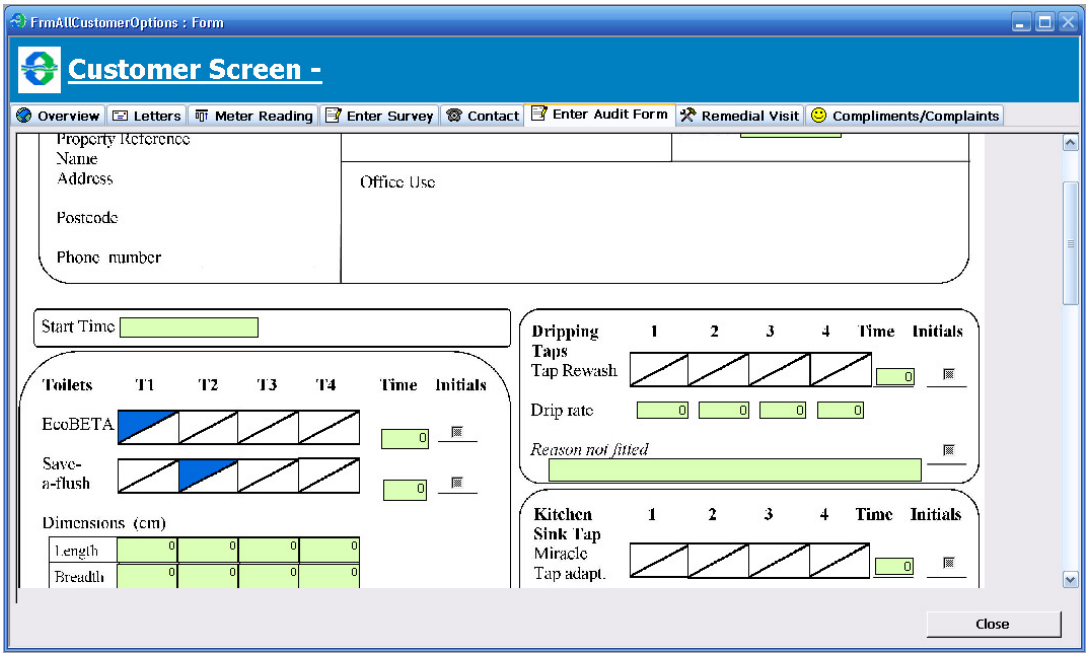


Figure 8: Database audit entry screen

2.10.6 Meter Readings

As detailed in Section 2.8, meter readings were taken before, after and at the time of product installation/delivery. When these values and corresponding dates were entered, the database calculated actual daily consumption rates for each property. This section of the database ran quality assurance checks on all numbers and dates entered, to ensure that data had been entered or recorded correctly.

The Meter Readings screen (Figure 9) was also used for recording any additional information relating to the meter readings including the serial number of any loggers installed.

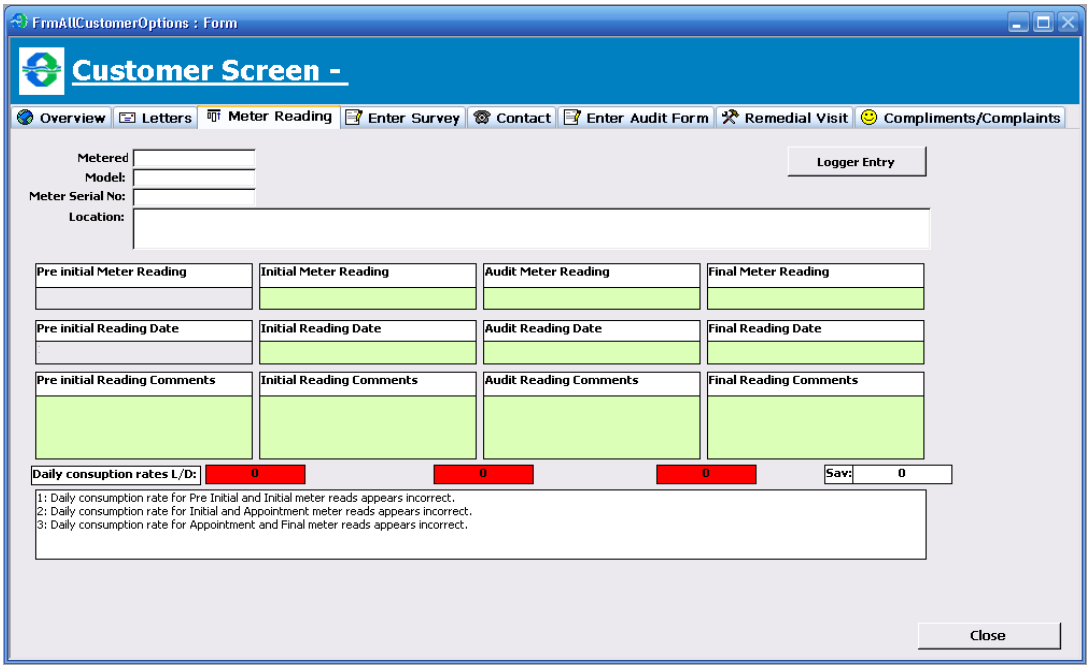


Figure 9: Database meter reading data entry form

2.11 Project Management

Through a varied experience gained from previous projects Mouchel and ESW have developed very effective processes for the project management of H_2eco. From the initial planning stages of the project Mouchel worked in partnership with ESW to establish Progress Meetings, Weekly Reporting and Service Level Agreements to closely monitor the progress of the project. Mouchel's style of project management has developed through experience gained from a long and successful history of water efficiency projects with many clients in the water industry.

After the initial 'start-up' meeting, fortnightly progress meetings were held to discuss the main aspects of the project. By frequent meetings the project could be assessed by ESW and Mouchel and any necessary adjustments made. Should issues arise, they could be dealt with swiftly without detriment to the project. See Appendix M for a standard agenda.

In addition Weekly Reports (see Appendix H) played a major role in observing the progress of applications, customer contact, appointments and stock. Through the weekly report Mouchel were able to provide ESW with accurate updates on stock, both products ordered and products fitted. ESW were able to assess quantities of stock required each week for the plumbers to complete their audits.

Also covered in the weekly report was the unique Service Level Agreement between Mouchel and ESW. This assessed many daily activities within the project and covered days between:

- Receipt of the customers' application and confirmation to the customer of receipt.
- Quality control of applications and contact with customers to book an appointment.
- Receipt of the plumbers' appointment sheet and its' recording on to the project database.

By keeping the above to five working days, it was ensured that customer focus on the project would be maintained to minimise numbers withdrawing from the project.

Each week, number of stock ordered, stock fitted and stock remaining were recorded, enabling efficient management of stock for the project. Stock collected from the ESW stores at Dukes Park was restricted to just one plumber who was responsible for recording stock distributed between the other plumbers. Plumbers were also required to complete weekly stock takes of their vehicles and submit to Mouchel.

The bespoke database created for the project also played a major part in the successful project management of H_2eco. On a daily basis the database was used to:

- Produce plumber appointment sheets and distribute work to the plumbers on site.
- Store customer specific data relating to each property.
- Record all contact with customers.
- Produce monthly invoice reports.
- Document water usage through meter readings.
- Track locations of data loggers.
- Provide data used in the weekly reports.

- Record plumbing staff availability and allocate appointments accordingly.
- Perform checks on completeness of data within the database to minimise errors.

The success of H2eco has been reflected by the excellent relationship between ESW and Mouchel and Mouchel's understanding of ESW's very specific requirements for their water efficiency projects.

3 Results

3.1 Number of customers contacted and audits delivered

The H_2eco application pack invited customers to complete a self audit and then place an order by either filling out the application form (Appendix B) posted to them and returning it postage paid 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 (7,524 customers)
Total applications received	1,582	21%
Reminder letters sent	7,402	98%
Total phone calls made	3,193	42%
Audits completed	1,495	20%

1,582 customers agreed to take part in the project but only 1,495 (95%) of these customers had audits completed. The main reason for this was after repeated attempts at contact (initial mail out, reminder mail out, BT Directory Enquiries, a letter requesting correct phone number and messages left), 62 (4%) customers could not be contacted and 25 (<2%) decided to cancel their order.

The most common reasons for customers cancelling their orders were:

- Having kitchen and or bathroom replaced/refurbished.
- Unable to make any of the appointment times offered.
- Products requested by customer but then cancelled by spouse.
- Wanted to fit products themselves, did not want a plumber to visit.
- Unexpected family bereavements.

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

Number		Dec 2007	Jan 2008	Feb 2008	Mar 2008	Total
Applications received	Avg. per day*	2.5	46.7	1.9	0	**10.2**
	Total	77	1448	56	1	**1582**
Appointments made	Avg. per day*	0.6	9.8	32.8	8.5	**10.3**
	Total	20	305	950	263	**1538**
Audits completed	Avg. per day**	0.3	6.6	27.8	15.4	**10.0**
	Total	8	206	805	476	**1495**

**Average per day refers to each project working day.*
***Average appointments completed by all plumbers per day.*

The majority of customers returned their workbook after the reminder mail out. The reminder letter was sent on 7th January, 33 days after the original mailing. Up to mid December 77 (4%) applications had been received. The initial slow uptake had been attributed to the application pack arriving with customers over the Christmas holiday and the problems experienced with Royal Mail discussed in Section 2.3. However once the reminder mail out had been distributed a further 1,448 applications were received through January. 57 applications were received after the closing date.

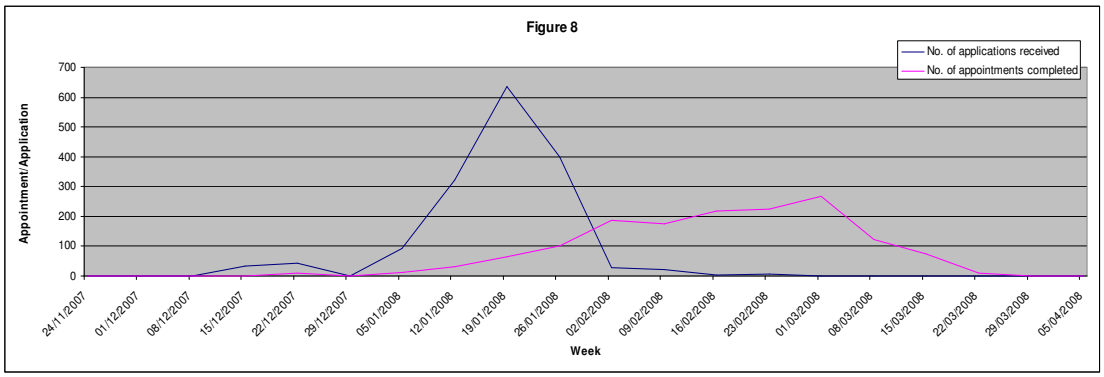


Figure 10: Customers initial response to invitation and appointment scheduling

Figure 10 shows the distribution of customers' appointment booking preference. When booking appointments customers were offered appointments during the following week but were also told that there were appointments available sooner if it was convenient. In the majority of cases (75%) customers requested to have their appointment within one week of being contacted.

Only 1% percent of customers requested to have their appointment greater than 4 weeks in advance. For 30 people who had been problematic to contact the time between

returning the application form and the contact to book the appointment was more than two months. There were also 75 whom we were unable to contact to arrange an appointment.

Table 7: Time from customer contact to appointment

Time in advance	% of appointments
0 days	2%
1 day	19%
2 days	11%
3 days	10%
4 days	8%
5 days	9%
6 days	10%
7days	6%
Less than 1 week	75%
More than 1 week	25%
More than 2 weeks	8%
More than 3 weeks	1%
More than 4 weeks	0.1%

It is possible that some appointments would have been completed more quickly if an evening appointment had been made available. 7 appointments that were cancelled may have been kept if an evening appointment had been made available.

3.1.1 Missed appointments

Although the appointment times were chosen by the customer and agreed during the phone call, 34 still missed their appointments.

During the day of the customers' appointment they were given two opportunities to be at home for the appointment within the allocated time slot. If no one was at the property at the first visit the plumber or technician noted the time that he had called on a pre-printed compliments slip which asked the customer to call the customer contact centre to arrange another appointment. If upon return at a later time there was still no one present at the property the time of the second visit and the details of their appointment were noted down and the compliments slip left at the property.

There were also 6 occasions where the field staff had missed appointments made with the customer. Each customer received £30 compensation and a re-arranged appointment was made. The reasons for these missed appointments were grouped into 2 categories;

1. Field staff errors (4) – i.e. plumber misplaced appointment sheet, went to wrong address, plumber confused AM appointment with PM appointment.

2. Administration errors (2) – the appointment sheet was not sent out.

The main sources of missed appointment and administration errors were resolved by programmer updates to the database and alterations to the appointment paperwork.

3.2 Patterns in which customers participated

In the first section of questions covered by the workbook demographic data was collected on the property and the household. The data collected was used to identify patterns in which customers participated in the water saving project. Table 8 provides a summary of the demographic data and selection of products.

Table 8: Summary of customer responses

Question	Response	Number responded	Proportion of respondents
Type of property	Detached and Semi Detached	1,074	68%
	Terraced or End Terrace	286	18%
	Flat or Bungalow	206	13%
Age of house	Pre 1900	49	3%
	1900-1950	380	24%
	1951-1988	906	58%
	1989-2000	122	8%
	2000-present	96	6%
Occupancy	1	350	22%
	2	690	44%
	3	211	13%
	4	211	13%
	5	65	4%
	6	10	1%
	>6	3	0.2%
Households with Children between 5 and 12 years	0	1,243	79%
	1	110	7%
	2	91	6%
	3	20	1%

Question	Response	Number responded	Proportion of respondents
	4	1	0.1%
Number of toilets	Average Number per property		1.84
	Number of toilets suitable for Retro-Fit device	1,923 toilets in 1,186 properties*	75%
Number of Showers	0	230	15%
	1	1025	65%
	2	294	19%
	3	19	1%
	4	3	0.2%
	6	1	0.1%
	Number suitable for aerated showerhead	247 showers out of 192 properties**	12%
Baths	Have Bath – Yes	1,378	87%
	-No	104	7%
Dripping Taps (number per property)	0**	1,202	76%
	1	223	14%
	2	108	7%
	3	19	1%
	4	13	1%
	5	1	0.1%
	6	1	0.1%
	7	1	0.1%
Garden	Has Garden – Yes	1,458	93%
	- No	67	4%

* No. in property declared by customer. **No. in property declared by customer ***Answered no.

From the customers who participated over half (58%) lived in properties between 57 and 20 years old. The most common occupancy was 2 and applied to 690 (44%) of the households participating.

53% of the customers mailed paid by metered tariff. The data collected indicates that metered customers were more willing to participate than non metered customers. 62% of metered customers responded to the offer whereas 38% of unmeasured customers participated.

55.1% of metered customers ordered plumbing products and 32.5% of non metered customers ordered plumbing products, indicating that metered customers were more likely to order plumbing products.

3.3 Number of products supplied and fitted

Customers were offered a range of 13 products and services to choose from. These products and services were grouped into 7 categories; toilets, showers, baths, taps, garden, vehicle washing and children. The total number of each product fitted or service completed can be seen in Table 9.

Table 9: Actual quantities of products supplied/fitted

Area	Product	Number ordered (total)	Total number of properties that ordered	Total number of properties where fitted	Number supplied/ fitted
Toilets	Save-a-Flush	409	277	364	524
	ecoBETA	1390	875	629	903
Showers	Aerated Showerhead	466	377	248	301
Bath	Bath Measure	580	580	535	535
Taps	Miracle Tap Adaptor	1077	872	544	573
	Tap Inserts	2496	850	357	635
	Tap Re-washering	548	356	109	159
Garden	Crystals	1316	1316	1263	1263
	Water Butt	1037	1037	985	985
Vehicle Washing	Hose Gun	1068	1068	1026	1026
Children	Detective Kit	680	403	396	684

NB Greyed cells denote only 1 item per property

3.3.1 Patterns in products selected

Table 10 shows that the majority of customers received between 3 and 5 products. The selection of products may have been restricted for some customers due to limitations on particular items. As many modern toilets are already manufactured to have a dual flush facility or have slim line style cisterns, the ecoBETA would not have been ordered as it either was not required or would not have been suitable. A conclusive figure is not available for this as some customers did not complete the toilet section of the application (54 properties). There were 700 toilets in 493 properties that had push button flush mechanisms.

Table 10: Actual quantities of products supplied/fitted

Number of items installed	Number of customers	Percentage of total audits
0	6	0.4%
1	58	3.9%
2	128	8.6%
3	233	15.6%
4	254	17.0%
5	222	14.8%
6	208	13.9%
7	157	10.5%
8	93	6.2%
9	57	3.8%
10	33	2.2%
11	19	1.3%
12	13	0.9%
13	6	0.4%
14	1	0.1%
15	1	0.1%
16	1	0.1%

Table 11 shows that mostly customers chose 3 (19%) or 4 (22%) different products or services commonly spread over two or three of the seven groups of products. There were 6 households that had audits completed but no products installed. The primary reason for this is that customer had ordered products that were not suitable (5 properties) or they changed their mind at the time of the appointment and did not wish to have any other products (1 property).

Table 11: Quantity of different types of product installed

Number of different items installed	Number of customers	Percentage of total audits
0	6	0.4%
1	64	4%
2	152	10%
3	280	19%
4	335	22%
5	276	18%
6	221	15%
7	104	7%
8	42	3%
9	12	1%
10	3	0.2%
11	0	0%

Table 12: Products in order of popularity

Popularity	Product	% participants that ordered the product	Unit purchase cost to ESW
1	Crystals	84.3%	£0.14
2	Hose Gun	68.0%	£0.49
3	Water Butt	67.1%	---
	Standard	---	£25.84
	Mini	---	£22.60
4	ecoBETA	56.5%	£9.75
5	Miracle Tap Adaptor	56.2%	£4.26
6	Tap Inserts (Challis & Tapmagic)	54.7%	£2.75 & £6.71
7	Bath Measure	36.3%	£2.67
8	Children's Detective Pack	25.9%	£5.96
9	Shower Head	24.1%	£18.70
10	Repair Dripping Taps	23.3%	£0
11	Save-a-flush	17.3%	£0.64

- the most popular items were the Crystals, Hose Gun and Water butt in the garden and vehicle sections.

- ecoBETA proved to be reasonably popular (56%) as it was providing a very obvious visual saving on water usage each time the toilet was flushed.

Products in the toilet section were very popular. This could be explained by the customers' perception of the product as the toilet has frequent use it would be perceived as being more likely to save water.

Twenty six properties already had a dual flush siphon installed but were unaware that they had it. This was adjusted by the plumber to be functional at the time of the appointment

The water butt and crystals relate well to the general awareness that the garden is an area with great potential for water savings.

3.4 Patterns in suitability of products

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, the audit was completed by the customer. Unfortunately this occasionally meant that the product requested was not appropriate and could not be fitted.

Table 13: Success rate for the installation of products

Product or service	Installation Success Rate	Most common reason for not fitting
Tap Re-washering	26.6%	Taps unsuitable (mixer or ceramic disc), taps in poor repair
Tap Inserts	22.9%	Tap not suitable – wrong shape
ecoBETA	62.7%	Cistern too narrow - interfered with ball valve arm.
Miracle Tap Adaptor	51.6%	Tap not suitable
Showerhead	57.6%	Shower system not suitable (power shower)
Bath Measure	98.3%	Customer decided not to have
Save-a-flush	82.2%	Already displacement bag in cistern
Water Butt	95.8%	Insufficient space at property
Crystals	99.9%	-
Hose Gun	99.8%	-
Detective Kit	98.5%	-

3.5 Products not fitted

The product with the lowest installation success rate was the tap re-washering (22.6%). The most frequent reason for this was due to many of the washers being the ceramic variety which on this audit were not able to be replaced.

Tap inserts also experienced a range of problems. In total, 1,856 ordered tap inserts could not be fitted. The most common reasons for tap inserts not being fitted were

- tap spouts oval or square
- tap not threaded and unable to fit cam adjuster
- customer refused as existing taps gold

Problems were also experienced with the fitting of ecoBETA. There were 501 toilets in which the ecoBETA could not be fitted. The most common problem was the cistern being too narrow and causing the ball valve arm to catch on the ecoBETA.

The aerated showerhead was not suitable at a number of properties due to the shower system being electric or pumped. It also would not function correctly if the flow rate was lower than 8 l/s. Although the literature sent out with the workbook stated clearly that the showerhead would not be suitable for pumped or electric showers there were still 191 ordered that could not be fitted.

128 customers ordered plumbing products but due to either the product being unsuitable or the customer changing their minds, they received only non plumbing products.

Some customers experienced problems with the products after installation. The customer phoned the customer call centre to discuss any concerns that they had. The customer call staff tried to solve the problem over the phone by giving detailed instructions of how to rectify the issue. If the problem could not be resolved by phone a remedial visit was made to the property. There were 28 remedial visits made in total.

In remedial cases involving an ecoBETA where it was decided that the product was likely to cause further problems, the plumber was able to offer the customer an alternative by installing a save-a-flush bag.

Very few customers appeared to tick as many items as possible. There were only 3 properties where 10 products were ordered and 12 properties where 9 products were ordered.

For the aerated showerhead, 171 properties (49%) of the 352 that placed orders did not collect a shower flow rate but still ticked to order an aerated showerhead. Of the 180

properties that did collect flow rates, only 13 properties measured the same rate or within 0.5 lpm of the correct rate.

There is potential that the exercise of gathering the flow data gave the customer a better understanding of water usage.

3.6 Customer Satisfaction

Following the completion of work, an information pack was left with the customer. The pack included further information for customers relating to

- product information
- saving water through showering
- recycling
- advice on purchasing water efficient products
- water saving products available for the bathroom
- water saving advice for the garden
- essential contact information for ESW departments

A customer satisfaction survey was also included for customers to fill out and return to ESW (Appendix K). 577 customers completed and returned the satisfaction survey, representing a return rate of 38.5%.

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 (%)
Did the introductory letter clearly explain what the project was about?	574	99.65
Were you clear about how the project would operate?	573	99.30
Did the information book provide you with sufficient information about the products on offer?	570	98.10

Question on Satisfaction survey	Number of responses to question	Satisfaction (%)
Did you manage to complete the workbook without any problems?	566	96.99
Were you happy with the telephone service?	571	98.95
Was the person who made the appointment helpful and courteous?	571	100.00
Are you happy with the products you have received?	565	96.64
If applicable, are you happy with the quality of the plumbing services?	440	98.18
Was the plumber or field technician helpful and courteous?	551	99.46
Are you happy with the overall level of service you received	566	98.94

A sample of the customer comments have been listed below.

- The project made me think about how much water I use and led me to see which products maybe suitable
- Our house has now become significantly more water efficient and my husband and I are absolutely delighted.
- It also helped greatly that it was free.

4 Water Savings

The main purpose of the project was to gather data on how much water could be saved by installing the various water saving devices at each of the properties within the study area. There were 3 different methods of calculating water savings.

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

Three methods of data collection were used as not all of the properties within the study area could have their water savings calculated using the same methods. Within the study area there were properties charged as metered and unmeasured. Metered properties could have a meter readings collected. Properties with data loggers were able to provide high resolution water usage data showing l/s every 15 minutes. For unmeasured properties actual flow data, measurement by proxy and assumptions taken from previous projects were used to calculate savings. This calculation was also used for measured properties with a meter which is not readily accessible.

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)	Study Area properties (Ml/day)
Calculated	3.80	51.52	42.09	0.063
Meter readings	-0.80	18.17	14.44	0.021
Logger data	13.12	17.78	12.19	0.018
Combined	**1.95**	**37.60**	**30.55**	**0.046**

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

4.1 Calculated savings from each product supplied

The calculated savings use property specific data and measurements collected from the audit as well as product specific details from manufacturers and other assumptions. The approach is based on the widely accepted "measurement by proxy" technique.

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

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

ecoBETA

Internal dimensions of the toilet cistern were collected, full water depth and depth when using the reduced flush. These measurements were used to calculate the volume of water in the cistern and how much would be released on a 'full flush' and a 'half flush'. 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, of these 2 will be a full flush and 3 a half flush. (Source – ESW micro component studies)

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).

Tap Re-washering

It was assumed that tap re-washering was performed on dripping taps. As shown above, on average a dripping tap loses 13.08 litres per day, the calculated saving from a tap re-washering is 8.39 litres per day

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 calculated saving as a result of installing the device.

Water butt

The calculated 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 calculated 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 calculated 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.

Miracle Tap Adaptor

Where Miracle Tap Adaptors were installed, flow rates were taken before and after the installation. It was assumed that the 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 calculated 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 calculated water savings for the bath measure assume that 41.9% (calculated from actual data from the Water Saving Toolkits Audit) 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 calculated water savings has been determined on a per property basis and has further been categorised depending on whether the customer received products defined as 'plumbing' or 'non plumbing'.

4.1.1 Plumbing products

Plumbing products were installed in 1,197 properties. Calculated calculations have shown that this will result in a saving of 0.062 Ml/d throughout the study area, an average of 51.52 l/prop/day.

4.1.2 Non plumbing products

There were 298 customers that received only non-plumbing products. Calculated savings have shown that installing non plumbing products was able to save approximately 0.001 Ml/d throughout the study area, this equates to an average saving of 3.80 l/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 3 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 3 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 930 properties and 649 had at least one meter reading collected. Problems were experienced with collection of some of the meter readings and therefore certain criteria were used to decide which data was viable to calculate water savings from.

The final figure of useable meter readings was 621. The reasons for the remaining 309 not being part of the data analysis are as follows

- water use was < 10 or > 100 l/d between the Pre-initial reading and Initial, the Initial and the audit and the audit and final readings (77 properties).

- incorrect meter readings at the end of the project identified through quality assurance checks. Checks were only scheduled towards the end of the audits, at time the errors were identified, site work had ceased (120 properties).

- From data collected on previous audits the decision was made to exclude any properties whose saving fell outside the limit of +/- 2 standard deviations. Analysis of the data showed a standard deviation of 96.3 l/day therefore any savings exceeding 192.6 l/d were excluded from the data set (28 properties).

- plumber could not locate, the meter was unreadable, manhole covers blocked, flooded meter pits (60 properties).

- meter readings were not in a logical order (24 properties).

The average change in daily water consumption was 14.44 l/prop/day after the water saving products were installed. 220 properties showed an increase in consumption, whilst 429 properties showed a decrease. The properties showing an increase in consumption are included within the calculated average.

From total responses 362 plumbing appointments and 61 non-plumbing appointments showed an increase in consumption. 835 plumbing appointments and 317 non-plumbing appointments showed a decrease.

4.2.1 Plumbing products

Plumbing products were installed in 1,197 properties. Calculated calculations have shown that this will result in a saving of 0.062 Ml/d throughout the study area, an average of 51.52l/prop/day.

4.2.2 Non plumbing products

There were 298 customers that received only non-plumbing products. Calculations have shown that installing non plumbing products was able to save approximately 0.001 Ml/d throughout the study area, this equates to an average saving of 3.80l/prop/day.

4.3 Actual water saving from detailed flow logger analysis

193 data loggers were installed on the water meters of a random selection of properties. 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 3 weeks before the pre-planned appointment date and left in place for at least 3 weeks after. This provided a suitable period of consumption to allow robust analysis. Of the 193 logger installed, 105 produced suitable logger data, representing a 54% success rate. 88 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	**193**
Exclusions	
Appointment cancellations or missed appointment	4
Partial dataset - customer vacant for 2-7 days during data collection period	27
No data available for entire period (could be due to logger failure, lead failure)	44
Meter and logger data comparison show unreliable data	9
Other	4
Total number of successful logger data sets	**105**

Analysis of the 105 loggers shows an average saving of 12.19 l/prop/day. 1,495 customers took part in the project, thereby showing an average saving of 0.018 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 86 of the 105 properties with suitable logger data. Analysis of the data before and after the appointments shows an average saving of 17.78 l/prop/day. Through the entire project, 1,197 properties had plumbing products installed. Extrapolating this data shows a saving of 0.021 Ml/day throughout the study area.

4.3.2 Non-plumbing products

19 of the 105 properties that produced valid logger data received only non-plumbing products. Analysis of the data before and after the appointments shows an average increase in consumption of 13.12 l/prop/day.

4.4 Differences in savings from the three approaches

The use of meter readings to measure the savings from this type of project has the disadvantage that the measurements are of total water use in the household not of the components of consumption which have been affected. Thus, changes in consumption may reflect duration of occupancy, changes in habits due to external influences and infrequent events which didn't occur in one of the measurement periods. Thus, the savings may not be a true reflection of the impact of the measures provided. However,

the advantage of this approach is that where the objective is to influence total water consumption, this is what is measured.

The use of logger data allows more understanding of the changes in consumption which have occurred. Previous work by ESW has reported techniques for analysis which have allowed changes from single wc flush to dual wc flush to be proven, even where other uses in the household have resulted in total household consumption increasing. The logger data can also identify a number of factors influencing total consumption such as periods of absence from the house or infrequent high use events.

Where meters cannot be fitted to unmeasured properties there is no scope for direct measurement of total household consumption. One option might be to assume that metered and unmeasured households have the same savings, but this is counter-intuitive to purpose of charging for water by measured volumes. The calculated savings approach using the measurement by proxy technique allows direct point of use measurements to be incorporated. Whilst some inaccuracy is introduced by this, it may not be any greater than the inaccuracies inherent in the use of before and after comparisons from meter and logger data.

4.5 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 calculated 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 (Ml/day)
All properties	1,495	30.55	0.046
Properties with plumbing products	1,197	37.60	0.045
Properties with non-plumbing products	298	1.95	0.0006

5 Reporting

5.1 Weekly Reports and Progress Meetings

As an additional development to previous water audits, Mouchel have maintained a weekly schedule of reporting on the progress of the project to ESW. The format of the weekly report was developed in consultation with Mouchel and was considered a useful management tool. Regular reports covering applications, stock and Service Level Agreements have enabled ESW and Mouchel to agree changes to the progression of the project, more efficiently manage stock and ensure excellent communication.

Along with the weekly report that was emailed to ESW each week, additional project resources were also sent. The current version of the database was sent in its functional form to allow ESW to interrogate and retrieve any data that they required from an up to date data source. This provided a transparent approach to the project management between Mouchel and ESW.

In addition to this, fortnightly progress meetings were scheduled to discuss all aspects of the project at each stage allowing any issues that may have arisen to be dealt with promptly.

7 Evaluation of the Programme

When the average costs per property are combined with the details of calculated 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 products. The calculated savings have been used as this is the only version of savings that is property specific and available for all properties.

7.1 Cost/ benefits of individual audit products

A cost benefit analysis has been undertaken of the 13 products and services offered to ESW customers through the H_2eco project. The cost of the product and the cost of installation have been used for the products requiring a plumber. The calculations used to populate Table 23 are based on the mean averages of calculated water savings and use assumptions given in Section 4.1.and Appendix I

Table 23: Cost / benefit of products

H_2eco Items	Cost of Item	Cost of installation/ delivery	Water saved L/property/day	Cost per m^3 saved[1]
ecoBETA	9.75	18.15	48.3	£0.39
Aerated Shower Head	18.70	21.18	36.8	£0.56
Save-a-flush	0.64	10.59	13.8	£1.07
Tap Inserts				
Challis	2.45	24.20	19.6	£1.13
Tapmagic	6.71	24.20	19.6	£1.13
Kitchen Tap Adaptor	4.26	24.20	13.7	£1.62
Tap re-washering		32.07	10.6	£2.50
Bath measure	2.67	1.00	4.94	£0.99
Water butt (standard)	25.84		1.90	£9.74
Water butt (mini)	22.60			
Hose gun	0.49	1.00	1.51	£16.20
Crystals	0.14	1.00	0.02	£1223.29
Children detective kit	5.96	2.00	Undetermined	---

Table 23 provides details of the cost per m^3 of water saved for each of the plumbing products. The savings have been calculated based on a product lifespan of 5 years. The Save-a-flush has a high cost per m^3 when compared against the ecoBETA. The costs to install the ecoBETA were relatively high but the cost per m^3 saved in comparison with the Save-a-flush is considerably lower. The aerated showerhead has also shown to give a good level of water savings in relation to its cost per m^3.

The lifespan for the non-plumbing 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 £7.93 has been used for the delivery; however it is unlikely these would be sent as single items. In reality, 95.7% 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 m^3 saved.

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.

The total cost of the project equates to £137.74 per property that completed an audit.

7.2 Evaluation of which products should be included in future projects

Table 24 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 18 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 field staff at the time of the appointment.

- Where available 'Cost/benefit' is a rank of the cost per m^3 saved given in Table18?

- 'Customer take-up' was based on actual number of each device fitted

- 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 24: Assessment of individual products

H_2eco Items	Ease of Delivering Item	Cost/ Benefit	Customer Take-up	Potential Sustainable saving	Total Score
Water butt	4	2	5	5	16
Save-a-flush	5	5	3	3	16
Aerated shower head	3	5	2	5	15
ecoBETA	3	2	5	5	15
Tap inserts	2	4	4	5	15
Kitchen tap insert	2	4	3	5	14
Bath Measure	5	3	3	2	13
Hose gun	5	1	5	2	13
Crystals	5	1	5	1	12
Tap re-washering	1	5	1	5	12
Detective kit	4	2	4	1	11

Italics denotes non plumbing products

The details given in Table 24 indicate that when all aspects (ease of delivery, cost/benefit, customer take-up and sustainable savings) are considered, the Save-a-flush, showerhead, water butt, tap inserts and ecoBETA are the most appropriate devices for use in full audit style water efficiency projects.

Water saving crystals and the children's detective pack scored lowest but both have educational value which should be taken in to consideration.

7.3 Demonstration of success of programme design method

As shown in Section 4.1 the installation of products under the H_2eco project was able to save 0.046 Ml/day. The majority of this saving was as a result of the installation of plumbing products.

From the comments received via the customer feedback forms it can be seen that H_2eco project has been very positively received. The responses indicated that much had been

done to raise awareness of water efficiency within the home and considered the initiative to have been a great success for ESW. Many commented on the fact that they had not realised how much water they consume and generally suggested that they were pleased to have had the opportunity to take part.

7.4 Learning points

Sections 3.5 and 0 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. The initial offer letter to customers was posted over the Christmas holiday period. Various problems arose from this, mainly a delay in the letter and application pack reaching customers but also because many were away from home over this period. Both contributed to an initial slow response and a reminder mailing was required to boost responses. It would be recommended to avoid this period for mailings of future audits to ensure that responses are unhindered.

2. The data set used to calculate savings from meter readings may have benefited from the inclusion of some of the properties whose readings were excluded. Quality assurance checks on the data recorded must take place from day one to ensure that the data set includes as many properties as possible.

3. Contacting customers would have been easier if the application form had specifically requested a day time contact telephone number. This may have increased the rate of appointments booked successfully and reduced time spent leaving messages.

4. 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.

5. Although the inclusion of the shower timer in the initial mailing in principle was an excellent idea, however this proved to be problematic for a number of reasons. Primarily additional time spent during the mailing but also problems experienced by Royal Mail in dealing with the bulkier envelope. Future projects may wish to include this item as part of the audit visit rather than the mailing.

8 Conclusions

From an initial mailing to 7,524 customers in the Chelmsford area 1,495 audits of installations of water saving devices were completed. From the responses received (1,582) this equates to an audit uptake rate of 21%. The initial mailing and subsequent 'reminder' mailing were sent in single batches. Audits were booked based on applications received from customers and scheduling was dictated by customer's choice of convenient dates and times.

Through completion of the workbook, participants were given a choice of 13 water saving products and services available in whichever quantity and combination was most suitable to their individual property. Through information provided, the customer was given the opportunity to tailor their selection to suit their specific needs.

The data collected was analysed to calculate the water savings achieved from the installation of the devices chosen as part of the H_2eco audit. Specific data was collected at each property by local plumbers to accurately record the savings of individual products within each property. On properties fitted with a water meter, readings were taken before and after installation to collect data to compare the efficiency of the products installed. To provide a second detailed data set, loggers were installed on 193 properties to record reductions in water usage. To estimate savings from unmeasured properties measurements by proxy and assumptions derived from previous audits provided a third data set.

From the data collected via meter readings, logger data and calculated savings it is estimated that a combined saving of 30.55 l/prop/day will be saved in the 1,495 customers properties that participated. For the whole study area this is extrapolated to a saving of 0.046 Ml/day.

Taking into consideration, cost, lifespan and water savings achieved a cost / benefit analysis was undertaken. Useful indications can be extracted from this to compare the products selected for this audit. Of the products selected, the aerated showerhead and the ecoBETA provided the highest water savings for the cost per m^3 and proved to be the most appropriate for this style of audit. Many of the non-plumbing items did not provide the same value in relation to cost and savings achieved but retained value to the audit for their educational potential. Ease of installation was also investigated in further detail and compared to the results from the cost / benefit analysis. The Save-a-flush, aerated showerhead and water butt scored highly with mid-level scores for ease of installation but good potential for high water savings.

9 Recommendations

The H2eco project has achieved great success and is the result of many refinements from previous audits. It can be classed as a valuable benchmark for which future studies can be based.

9.1 Mailing

The initial mail out was commenced in mid December which resulted in the completed application packs reaching Royal Mail during the Christmas holiday period. This caused many of the packs to be delayed in reaching customers and the time taken to receive applications back to be processed was extended by approximately two weeks. Also many people were not at home over this time which added to the delay in receiving applications. Future projects should be scheduled outside of this period to ensure that responses are not delayed or risk being lost due to the large volumes of mail being dealt with at that time of year.

9.2 Application Pack

The inclusion of the shower timer in the initial application pack unfortunately caused some hindrance in the packs reaching customers and may have had a small influence on responses. Due to their shape and the distortion to the envelope, some packs arrived with customers in a damaged state which could have deterred some from participating. It is recommended that for future audits that the timer be handed to the customer at the time of their appointment at which time it will compliment the products already installed and add to the education of the customer in increasing the awareness of water use.

9.3 Workbook and Information Book

From feedback received via the customer satisfaction forms some alterations could be made to the colours used in its design to aid the visually impaired. Use of more contrasting colours would make the text more prominent and easier to read.

The questions in the shower and wash basin inserts of the workbook caused a little confusion with some customers. In future audits photographic assistance could be used to aid customers in the selection of products suitable to their individual needs.

10 Appendices

10.1 Appendix A: Introductory Letter

ESSEX & SUFFOLK WATER

Hall Street, Chelmsford, Essex, CM2 0HH
Telephone: +44 (0)845 782 0999
Fax: +44 (0)1245 212475
www.eswater.co.uk

319724

Mrs K Knights
1 Barkis Close
Chelmsford
CM1 4UW

3 December 2007

Dear Mrs Knights

Welcome to H2eco

We are very pleased to offer you the opportunity to order a number of water efficiency products to help you make the most of water. These products will be delivered and where appropriate installed around your home and garden, and it's all free of charge. Our H2eco project is part of our ongoing drive to manage available water resources and reduce water wastage.

The Essex area is one of the driest parts of the country, receiving only half the national average rainfall. Did you know that around 50% of your water is already imported from neighbouring counties? By saving water, you can help to protect the environment and if you pay by a meter, you will save money too.

At no cost to you

We have chosen 11 products that will help you to save water around your house and garden, details of each are shown in the information booklet enclosed. There are no hidden "strings attached", - all will be provided free of charge and if the product requires installation by a plumber, we'll also provide one at no cost to you. To find out which products are suitable for your home and garden complete the workbook, seal the workbook together and put it in the post. The form is pre-paid so no stamp is required. The closing date for applications is Friday 18th January 2008.

We have also enclosed a free shower timer to enable you to start saving water today along with a shower flow bag for you to measure the flow rate of your shower, to see if an aerated showerhead would suit your home.

Call our order hotline on 0845 602 6391 for further information

You will need to provide us with a contact phone number in order for us to ring to arrange an appointment convenient to you. Please can you also write on your workbook your property reference, so that we can process your order quickly, your number is **319724**.

If you have any queries, or would like further information, please do not hesitate to call us on 0845 602 6391. We look forward to hearing from you and receiving your order.

Yours sincerely

Jenny Abel
Project Manager

H2eco

Essex & Suffolk Water is a trading division of Northumbrian Water Limited.
Registered in England & Wales No. 2366703
Registered Office: Northumbria House, Abbey Road, Pity Me, Durham, DH1 5FJ

10.2 Appendix B: Workbook

By answering the following questions you will be able to find out which water efficient products are suitable for you and your property. Use the information book to help you answer the questions.

Answer the questions by either ticking or filling in the relevant boxes.

Your details

Property reference

Name*

Address*

Contact telephone number*

* These lines must be filled in. Once we have received your completed form, we will telephone to arrange a time to deliver and/or fit your products. Your telephone number will only be used in conjunction with this project.

Email

Your home

What type of house do you live in?

- Detached
- Semi-Detached
- Flat
- Terraced
- End-Terrace
- Bungalow

How old is your property?

- Pre-1900
- 1900 – 1950
- 1951 – 1988
- 1989 – 2000
- 2000 – to present

How many people live in your property?

How many children aged between 5 and 12 years live in your property?

"Remember, all products are free"

Toilet

Answer the following questions to find out if the ecoBETA or save-a-flush is suitable for your toilet.

1. How many toilets does your property have?

Please answer the following questions for each toilet in your property. Answer each question with yes or no.

	Toilet 1	Toilet 2	Toilet 3	Toilet 4
2. Does the toilet have a handle flush?				
3. Is there easy access to the toilet cistern e.g. not concealed?				
4. Is the toilet cistern a standard size e.g not slimline (not a shallow depth from front to back)?				
5. Is the cistern low level?				

If yes to all (for one toilet) → These products may be suitable for your toilet(s).

If no to any (for one toilet) → These products are not suitable for your toilet(s). Please go to the shower section.

6. Would you like a ecoBETA or save-a-flush? Please tick to make your selection.

	ecoBETA	save-a-flush
Toilet 1		
Toilet 2		
Toilet 3		
Toilet 4		

Shower

Answer the following questions to find out if the aerated showerhead is suitable for your shower.

7. Does your property have a shower?

- Yes
- No → This product is not suitable for your property please go to the bath section.

8. How many showers does your property have?

9. Have you timed how long you spend in the shower?

- Yes → How long? ____ minutes
- No → Please go to question 10.

10. Have you measured the flow rate of your shower(s)?

- Yes
- No → To find out if your shower is suitable for an aerated showerhead you must measure the flow rate. If you are unable to do this please go to question 13.

11. What was the flow rate of your shower(s)?

	Shower 1	Shower 2	Shower 3
Flow rate (litres per minute)			

12. Was the flow rate greater than 8 litres per minute?

- Yes
- No

13. Is your shower an electric shower?

- Yes → This product is not suitable for your shower please go to the bath section.
- No

	Shower 1	Shower 2	Shower 3
Electric			

This product is not suitable for your property please go to the bath section.

This product may be suitable for your shower.

14. Would you like an aerated showerhead? Please tick the relevant box(es).

	Shower 1	Shower 2	Shower 3
Aerated showerhead			

Bath

Answer the following questions to find out if the bath measure is suitable for your property.

15. Does your property have a bath?

- Yes
- No → This product is not suitable for your property please go to the wash basin taps section.

16. Would you like a bath measure?

- Yes
- No

"Use the information book for extra information"

mouchel

Wash basin taps

Answer the following questions to find out if your wash basin taps are suitable for tap inserts.

17. Is the water outlet on any of your wash basin taps circular?

- Yes → How many? → This product may be suitable for your property.
- No → This product is not suitable for your property please go to the dripping taps section.

18. Would you like tap inserts installed?

- Yes
- No

Dripping taps

Answer the following questions to find out if we can repair your dripping taps.

19. Do you have any dripping taps?

- Yes → How many?
- No → Please go to the kitchen sink tap section.

20. Would you like us to repair your dripping tap(s)?

- Yes
- No

Kitchen sink tap

Answer the following questions to find out if the Miracle Tap adaptor is suitable for your kitchen sink tap.

21. Is the water outlet on your kitchen sink tap or utility room sink tap circular?

- Yes
- No → This product is not suitable for your property please go to the garden section.

22. Does the tap have a combined outlet for hot and cold water?

- Yes → This product may be suitable for your property
- No → This product is not suitable for your property please go to the garden section.

23. Would you like a Miracle Tap adaptor?

- Yes
- No

Number of suitable taps?

Garden

Answer the following questions to find out if a water butt is suitable for your garden.

24. Do you have a garden?

- Yes
- No → This product is not suitable for your property please go to question 28.

25. Do you have space in your garden for a water butt?

- Yes
- No → This product is not suitable for your property please go to question 28.

26. Do you have a plastic downpipe or an existing water butt to connect a new water butt to?

- Yes
- No → This product is not suitable for your property please go to question 28.

27. Would you like a water butt?

- Yes → This product may be suitable for your property.
- No → This product is not suitable for your property please go to question 28.

"For help completing this form, ring 0845 602 6391"

Garden - continued

Answer the following questions to find out if water saving crystals are suitable for your property.

28. Does your property have any pots or hanging baskets?

- Yes
- No → This product is not suitable for your property please go to the vehicle washing section

29. Would you like a packet of water saving crystals?

- Yes
- No

Vehicle washing

Answer the following questions to find out if you could use a hose gun.

30. Do you have a vehicle which you wash at home?

- Yes
- No → This product is not suitable for you please got to the children section

31. Would you like a hose gun?

- Yes
- No

Children

32. Would you like a children's activity pack?

- Yes → How many?
- No → You have now completed the workbook.

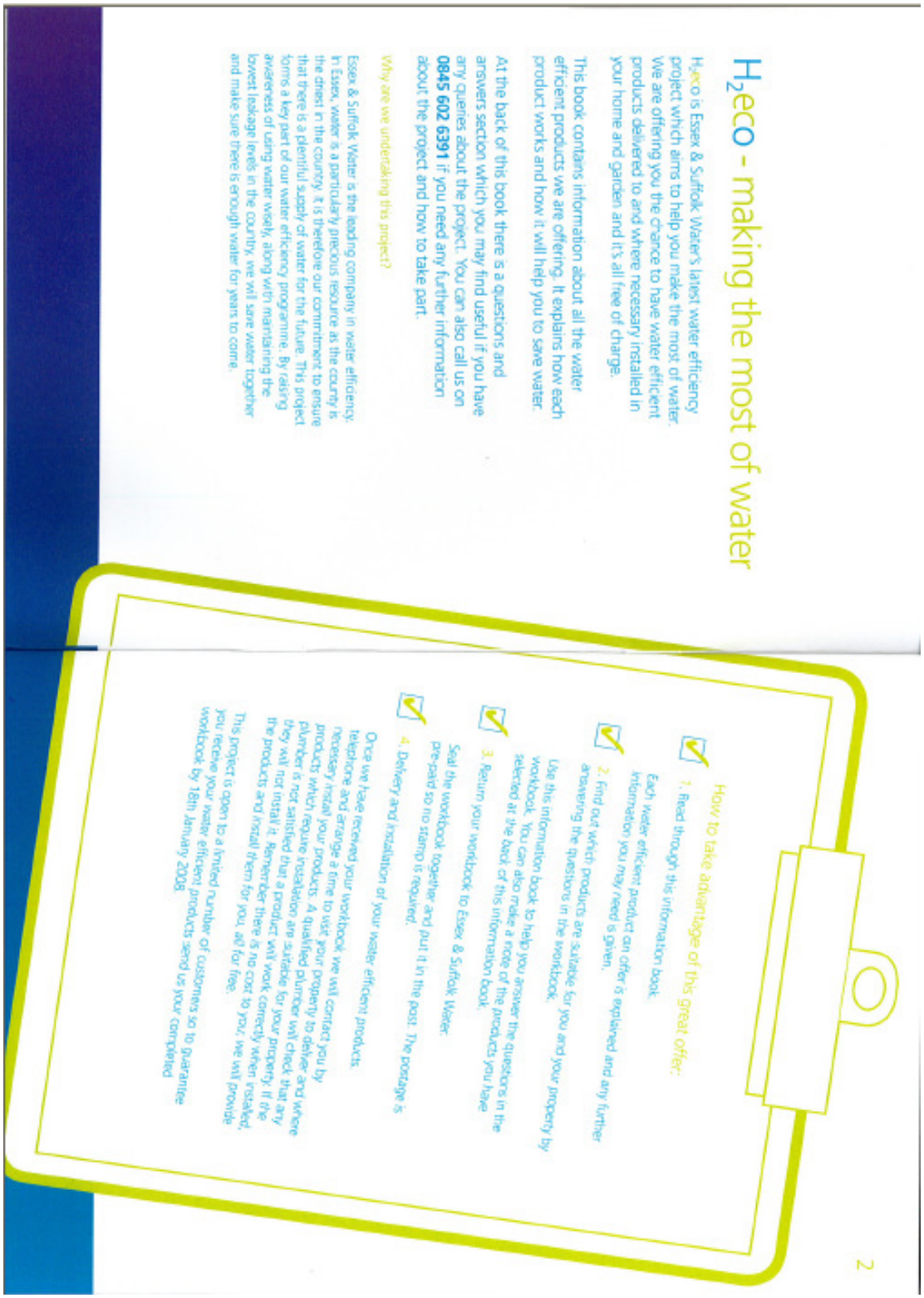
Moisten here to stick

Moisten here to stick

Thank you for taking the time to complete this workbook. You now know which water efficient products are suitable for your property. Complete the pages at the back of the information book to remind you which products you have selected.

Seal the workbook closed and send it back to us. Once we have received your workbook we will contact you by telephone to organise a suitable time to visit your property. We look forward to working with you to help you save water.

10.3 Appendix C: Information Book



H2eco - making the most of water

H2eco is Essex & Suffolk Water's latest water efficiency project which aims to help you make the most of water. We are offering you the chance to have water efficient products delivered to and where necessary installed in your home and garden and it's all free of charge.

This book contains information about all the water efficient products we are offering. It explains how each product works and how it will help you to save water.

At the back of this book there is a questions and answers section which you may find useful if you have any queries about the project. You can also call us on **0845 602 6391** if you need any further information about the project and how to take part.

Why are we undertaking this project?

Essex & Suffolk Water is the leading company in water efficiency. In Essex, water is a particularly precious resource as the county is the driest in the country. It is therefore our commitment to ensure that there is a plentiful supply of water for the future. This project forms a key part of our water efficiency programme. By raising awareness of using water wisely, along with maintaining the lowest leakage levels in the country, we will save water together and make sure there is enough water for years to come.

How to take advantage of this great offer:

1. Read through this information book.
   Each water efficient product on offer is explained and any further information you may need is given.
2. Find out which products are suitable for you and your property by answering the questions in the workbook.
   Use this information book to help you answer the questions in the workbook. You can also make a note of the products you have selected at the back of this information book.
3. Return your workbook to Essex & Suffolk Water.
   Seal the workbook together and put it in the post. The postage is pre-paid so no stamp is required.
4. Delivery and installation of your water efficient products.
   Once we have received your workbook we will contact you by telephone and arrange a time to visit your property to deliver and where necessary install your products. A qualified plumber will check that any products which require installation are suitable for your property. If the plumber is not satisfied that a product will work correctly when installed, they will not install it. Remember there is no cost to you, we will provide the products and install them for you, all for free.

This project is open to a limited number of customers so to guarantee you receive your water efficient products send us your completed workbook by 16th January 2008.

2

The bathroom

Toilet

The bathroom is probably the area of your home which uses the largest amount of water. Did you know that toilet flushing alone uses about one third of an average household's water consumption?

We are offering two products that will reduce your toilet's flush volume without affecting performance. Both products fit inside your existing toilet cistern and do not alter the external appearance of the toilet. As long as the toilet is suitable, we will install either product for free in all the toilets in your property. These products will be installed by a qualified plumber.

ecoBETA
The first product is called ecoBETA and it converts your toilet from a single flush toilet into a dual flush toilet. The product works by interrupting the vacuum created when your toilet is flushed, thereby activating a small flush. To achieve the small flush you push the flushing handle and let go straight away. You can still use the original larger flush by depressing the handle and holding it down for 1 to 2 seconds. The product can save between 20% and 30% of your total household water consumption.

Save-a-flush
The second product is a save-a-flush, which will reduce your toilet flush volume by 1 litre. The save-a-flush is a bag filled with crystals that absorb 1 litre of water from your toilet cistern. An average family of four using a save-a-flush in each of their toilets could potentially save over 7,000 litres of water a year.

Is your toilet suitable?

The ecoBETA and save-a-flush can only be installed in certain toilets. Firstly you must have a siphon system, which is in good condition; if you have a flush handle (rather than a button on top of the cistern) it is likely you have a siphon. Newer toilets tend to have a valve system and are not suitable. The toilet must also not have a concealed or high level cistern and must be a standard size.

Answer questions 1-6 in the workbook to find out if your property is suitable for these products.

The bathroom

Shower

Taking a shower is fast becoming the replacement to having a bath. Many people think that having a shower uses less water than having a bath, but this is not always the case.

The volume of water used by a shower depends very much on the time spent showering and the type of shower you have. A standard electric shower uses an average of 5 litres of water per minute. Whereas, a power shower may use 12 litres per minute (some use even more). If you spend 6 minutes in the shower you will use 72 litres of water which is about the same as a bath.

To help you save water whilst showering we are offering you an aerated showerhead.

Aerated showerhead

If you have a shower with a high flow rate you might be able to change your existing showerhead for an aerated showerhead. An aerated showerhead could cut your shower water use by up to 60% but importantly with no loss of performance. The product works by introducing air into the water flow. Although less water is used, the shower flow feels the same or in some cases more powerful than before. Also, if your shower is using a reduced amount of water you will save energy too as there will be less water to heat.

As long as the shower is suitable we will install the aerated showerhead for free on all the showers in your property. This product will be installed by a qualified plumber.

Can you have an aerated showerhead installed?

If your shower already has a low flow rate (8 litres per minute or less), the aerated showerhead is not necessary. Use the shower flow bag to work out the flow rate of your shower. The aerated showerhead is also not suitable on electric showers and requires a minimum pressure to work effectively (this will be tested by a plumber before it is installed).

Answer questions 7-14 in the workbook to find out if your property is suitable for this product.

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6

The bathroom

Bath

The average bath uses between 60 and 80 litres of water. Reducing the amount of water used in the bath, even by as little as a few centimetres, could result in substantial water savings over a year. We are offering a bath measure to help you work out how much water you use in the bath.

Bath measure

The bath measure has measurements along the side telling you how much water is used and to keep it steady it sticks to the bottom of your bath using suction pads. We would like to encourage you to reduce your bath level by 2.5cm and save 15 litres of water.

Wash basin taps

Washing your hands doesn't usually require much water. However, some wash basin taps have very high flow rates due to high water pressure, which means more water than necessary is used.

To help reduce water being wasted from wash basin taps, we are offering you the option of having tap inserts fitted to your existing tap.

Tap inserts

The tap insert offers two types of flow. By only turning the tap on a small amount gives a strong but water saving spray ideal for washing your hands. Opening the tap further bypasses the spray mode and the full flow rate of the tap is reached. The full flow rate will allow you to quickly fill the basin. Tap inserts can achieve up to a 70% water saving and you will also be saving energy because you will be heating less water when using the hot tap.

As long as the tap is suitable we will install tap inserts for free on all the wash basin taps in your property. This product will be installed by a qualified plumber.

Will tap inserts fit onto your taps?

Tap inserts are only suitable for taps where the water outlet is circular.

Answer questions 17-18 in the workbook to find out if your property is suitable for this product.

Answer questions 15-16 in the workbook to find out if your property is suitable for this product.

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The bathroom

Did you know that a dripping tap can waste almost 26 litres of water per day?

Dripping taps
If you have detected a dripping tap it could need re-washering. Any dripping taps will be repaired by a qualified plumber.

Can we fix your dripping tap?

Repairing a dripping tap should be relatively easy if your wash basin taps are the conventional style with rubber washers. However, some newer taps have a ceramic disc instead of a washer. If we cannot replace your ceramic disc we will recommend you contact your tap supplier for the appropriate parts.

Answer questions 19-20 in the workbook if you have dripping taps that need repairing.

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The kitchen

The kitchen sink

As well as washing up, the kitchen sink tap can be used for washing vegetables and rinsing dishes and for these tasks the full flow rate of the tap is not required. We are offering a product which will help you save water when carrying out these tasks.

Miracle Tap Adaptor
The product is called a Miracle Tap Adaptor and it fits onto the end of an existing kitchen sink tap. It is also suitable for a utility room sink tap. The Adaptor gives you the option of two flow types; a shower-spray or a soft aerated flow. It can reduce your kitchen sink water use by up to 27%. The Miracle Tap Adaptor also has a swivel head which allows you to direct the flow and it comes in two colours; white or black.

The product will be installed by a qualified plumber.

Will the Miracle Tap Adaptor fit onto your kitchen sink tap?

The Miracle Tap Adaptor is only suitable for kitchen sink taps which have a combined outlet for hot and cold water (mixer tap) and in addition the water outlet must be circular.

Answer questions 21-23 in the workbook to find out if your property is suitable for these products.

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The garden

For a large number of people, looking after the garden is an important aspect of everyday life. We would like you to use water moderately and efficiently in your garden and to help you do this we are offering you two gardening products.

Water butt

The first product we are offering is a water butt. By connecting a water butt to your guttering you can collect rainwater and use it in your garden. We are offering both a standard size and a space-saving mini butt. Both water butts are made from recycled plastic and are guaranteed for 10 years. The standard size water butt has a capacity of 190 litres. It measures 650mm in width and 960mm in height. The space-saving mini butt has a capacity of 100 litres and measures 380mm in width and 940mm in height.

With your water butt you can either order a diverter kit or a water butt linking kit. The diverter channels rainwater automatically from your guttering and prevents the water butt from overflowing when full. The water butt linking kit allows you to connect two water butts together.

We are offering one free water butt per property. Your water butt will be ordered when the field technician visits your property. Delivery will be up to 6 weeks from the date of this visit and you will be required to install it when it arrives.

Is your garden suitable for a water butt?

To receive a water butt your property must have a garden with space for a water butt. You also need a plastic downpipe (68mm round or 65mm square), this will be checked when the field technician visits your property. Once our field technician is satisfied you meet these requirements you can choose the size water butt you would like and whether you would like a diverter kit or a linking kit. This order will be passed to the delivery company and you should receive your water butt within 6 weeks.

Answer questions 24-27 in the workbook to find out if your property is suitable for this product.

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The garden

Water saving crystals

The second product we are offering is a pack of water saving crystals. The crystals are ideal for hanging baskets and pot plants. They are mixed with compost and reduce the need for frequent watering by storing water, allowing the plants to extract it as required.

Vehicle washing

Cleaning your vehicle can use a lot of water especially if you use a hose to rinse your vehicle. We are offering you a trigger hose gun to reduce water being wasted while washing your vehicle.

Trigger hose gun

Using a trigger hose gun allows you to turn the hose on and off rather than leaving it running, helping you to save water. The hose gun has five different settings offering alternative spray patterns and a specially designed catch to keep the lever depressed when continuous flow is required.

Answer questions 28-31 in the workbook to find out if you could use these products.

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Children

Children's activity pack

It is important to teach children about water and why it is a precious resource. Our children's activity pack aims to encourage children to get involved in saving water around the home. This is their chance to become a water detective and solve the mystery of the missing tires.

The pack includes games, puzzles, an activity CD ROM, a pen, a water cycle colouring sheet and a leaflet explaining how to save water around the home and in the garden.

The pack is suitable for children aged between 5 and 12 years, and we will supply one pack for each child within the family.

Answer question 32 if you would like a children's activity pack.

H_2eco

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The H2eco range

Having answered the questions in the workbook, you will now have a list of products which are possibly suitable for you and your property. For your records tick the products which you have identified as being suitable for you and your property.

Remember all products are free and those that need to be installed by a plumber will be installed free of charge.

- ecoBETA

- Save-a-flush

- Aerated showerhead

- Tap re-washering

- Tap inserts

- Miracle Tap Adaptor

- Water butt

- Trigger hose gun

- Water saving crystals

- Children's pack

- Bath measure

H2eco

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Questions and answers

Is there any cost involved?
No. The project, including the products and services, is entirely free to every customer who has been invited to take part. It is part of our legal duty to promote water efficiency and raise the awareness of using water wisely. The project also emphasises our commitment to provide free water efficient products to as many people as possible.

Why do I need to provide my telephone number?
It is essential that you provide your telephone number. Once we have received your workbook, you will be telephoned to arrange a time for the plumber or field technician to visit you. This will enable a mutually convenient date and time to be agreed. Your telephone number will only be used for the purpose of this project.

What happens once I have returned the completed workbook?
Once you have established which products are suitable for your property and we have received your workbook you will be telephoned to confirm this and to organise a mutually convenient date and time to visit. Visits to properties will take place between January 2008 and March 2008.

How have Essex & Suffolk Water selected the water efficient products?
Most of the products have been trialled in previous projects and have demonstrated water savings. Customer feedback following similar projects has also influenced our product selection. All of the products are appropriate to the WRAS (Water Regulations Advisory Scheme) and are approved by this scheme.

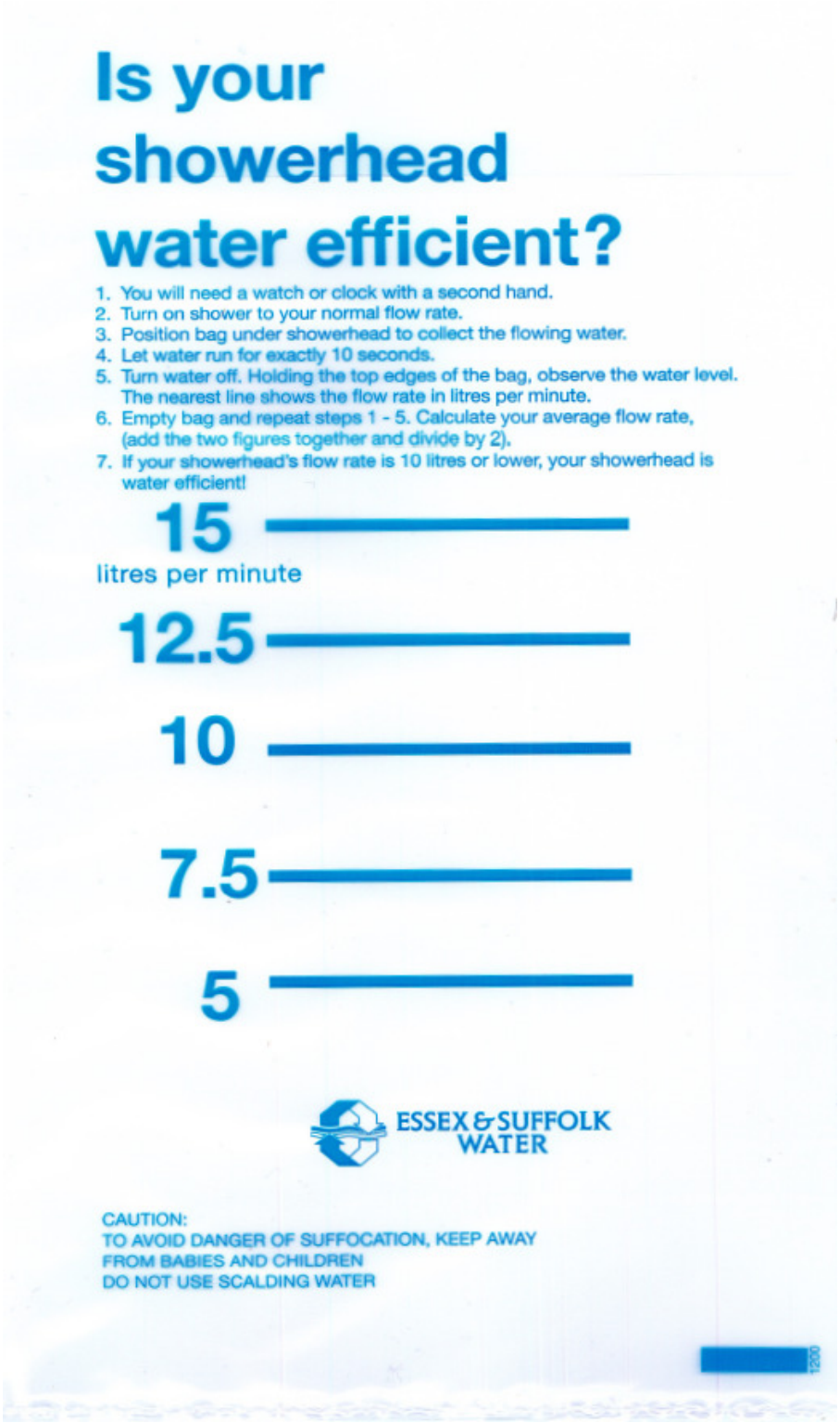
What should I do if I have any problems with any of the products?
If any of your products should fail within 3 months of the installation or delivery date, we will replace the product if appropriate. Please inform us by telephoning 0845 602 6391.

How do I check that the plumbers and field technicians are from Essex & Suffolk Water?
Each member of the team will have a photographic identification badge. The badge will say Essex & Suffolk Water working with 'Mouchel'. Mouchel is our contractor. The appointment date and time will be organised in advance therefore you should only expect a visit from the plumber or field technician at the pre-organised date and time. If you like we can arrange for you to have a personal password to help identify our representatives.

What should I do if I experience plumbing problems?
If you need any help or advice please ring 0845 602 6391.
In case of an emergency, please ring the plumbers' 24-hour helpline on 07841 363 254.

Are there a limited number of customers who can take part in this project?
Yes. We have mailed 7,500 customers asking them to participate in the project but only 1,500 of these will be able to take advantage of this great offer. Complete your workbook and return it to us by 18th January 2008 to avoid disappointment.

10.4 Appendix D: Shower Flow Bag



10.5 Appendix E: Publicity Documents

NORTHUMBRIAN WATER LTD

CLAIRE BISHOP

Our Reference : GB71296292

Your Reference : 3092819

WATER EFFICIENCY

Programme : NEWS
Station : DREAM 107.7
Date : 11/12/07
Time : 16:03
Duration : 31 SECONDS

tns media intelligence

BROADCAST TRANSCRIPT
TEL: 020 7868 6100

WATER EFFICIENCY
Programme : NEWS
Station : DREAM 107.7
Date : 11/12/07
Time : 16:03

NEWSREADER:

There's a chance for some Chelmsford residents to be more water efficient for free. Essex and Suffolk Water are offering about seven and a half thousand people living in the north of the town a chance to get their hands on energy saving gadgets like water butts.

Jenny Abel is from Essex and Suffolk Water.

JENNY ABEL: Essex and Suffolk Water

We ran really similar projects in terms of offering advice and water saving products, more in sort of the Chelmer Village area, and we got some really positive feedback from customers and also some really good water savings as well.

** *** **

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Client: Essex and Suffolk Water
Source: Chelmsford Weekly News
Date: 27 December 2007
Page: 7
Circulation: 48097
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Homeowners — please help company make most of water

WATER customers in Chelmsford are being invited to take part in a project designed to help them make the most of water.

The 'H2eco' project will allow homeowners to choose from a selection of free water-efficiency products for the home and garden suited to their individual needs.

Chelmsford based Essex and Suffolk Water is contacting 7,500 homes in the north Chelmsford area to invite them to take part in the initiative, which will run until February next year.

The first 1,500 homeowners to respond will be sent the goods they have selected from the range on offer, which includes a water butt, an aerated showerhead, a dual flush conversion kit, a children's activity pack and a trigger hose gun.

Other services provided as part of the initiative include the chance to have dripping taps repaired.

The idea is that those taking part will make permanent changes to the way they use water.

At the end of the project, the company will be able to calculate how much water has been saved.

Last year a similar initiative in Chelmsford found customers saved an overall equivalent of 28,936 baths of water during the first four months of the project.

Jenny Abel, project manager, said: "This is the latest in a series of award-winning water efficiency projects.

"It is hoped that the project will not only encourage people to save water, but energy too as there will be less water to heat if people are being careful about their use.

"The Essex area is one of the driest parts of the country, receiving only half of the national average rainfall, so it is important that we all do what we can to conserve water."

If you would like further information about the project, call 0845 602 6391.

FAO Jenny Abel, Demand Planning

IWO website – 6th December 2007

Project to Save Water in the Home

6th December 2007

Water customers in Chelmsford are being invited to take part in a project designed to help them make the most of water.

The 'H_2eco' project will allow homeowners to choose from a selection of free water efficiency products for the home and garden suited to their individual needs.

Essex & Suffolk Water is contacting 7,500 homes in the north Chelmsford area to invite them to take part in the initiative, which will run until February 2008.

The first 1,500 homeowners to respond will be sent the goods they have selected from the range on offer.

The products include a water butt, an aerated showerhead, a dual flush conversion kit, a children's activity pack and a trigger hose gun. Other services provided as part of the initiative include the chance to have dripping taps repaired.

In assessing their water use, it is hoped that those taking part will make permanent changes to the way that they use this precious resource. In using less water there will also be less to heat which means that customers will save energy and money too.

Essex & Suffolk Water is working with the contractor Mouchel who will be providing plumbers and field technicians.

At the end of the project, the company will be able to calculate how much water has been saved.

In a similar Essex & Suffolk Water initiative in Chelmsford last year, customers saved an overall equivalent of 28,936 baths of water during the first four months of the project.

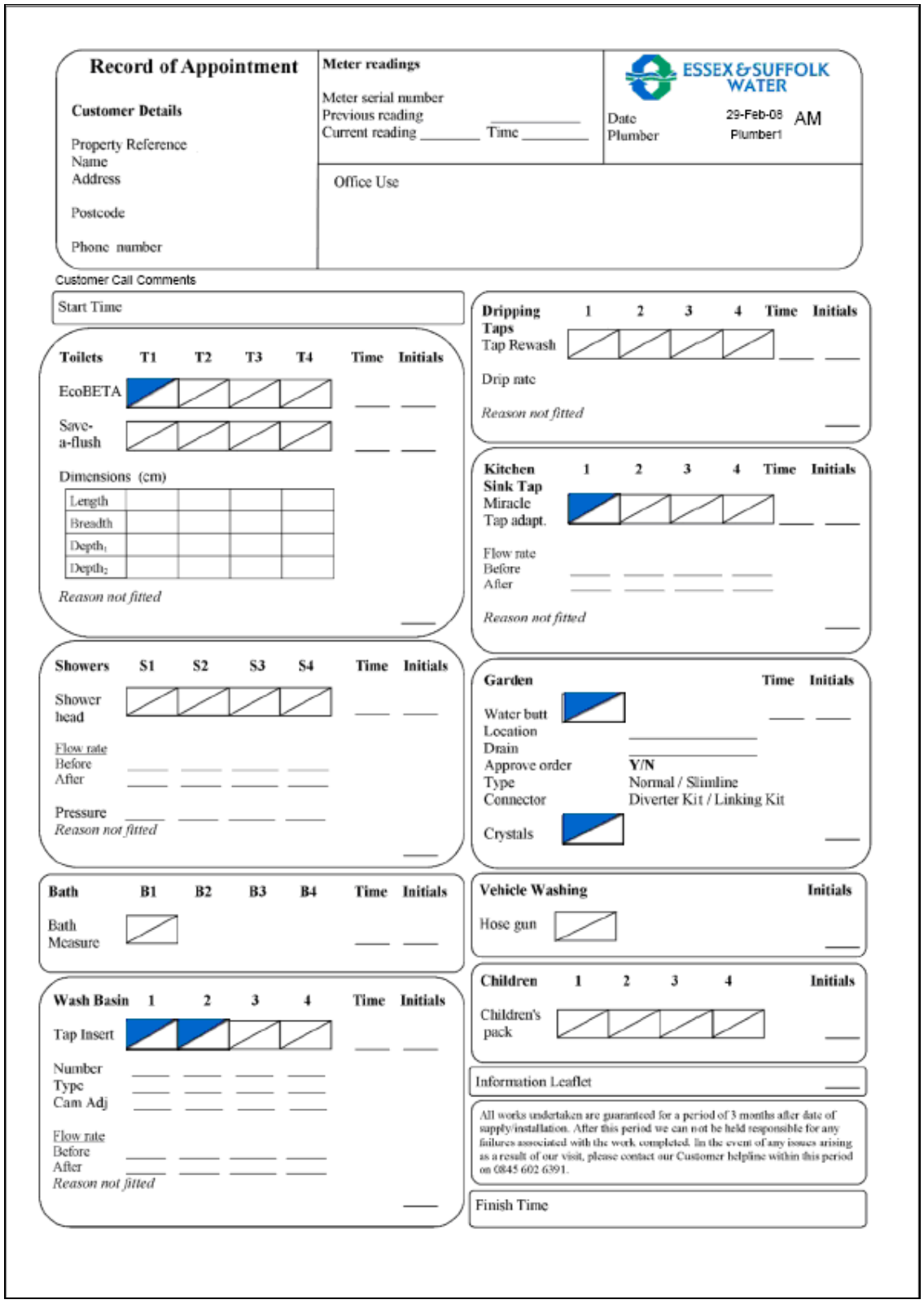
Jenny Abel, project manager said: "This is the latest in a series of award-winning water efficiency projects. It is hoped that the project will not only encourage people to save water but energy too as there will be less water to heat if people are being careful about their use.

"The Essex area is one of the driest parts of the country, receiving only half of the national average rainfall, so it is important that we all do what we can to conserve water."

If you would like further information about the project, please call 0845 602 6391.

© Mouchel

10.6 Appendix F: Example of appointment sheet



Record of Appointment

Customer Details

Property Reference
Name
Address

Postcode

Phone number

Meter readings

Meter serial number
Previous reading
Current reading _____ Time _____

ESSEX & SUFFOLK WATER

Date 29-Feb-08 AM
Plumber Plumber1

Office Use

Customer Call Comments

Start Time

Toilets	**T1**	**T2**	**T3**	**T4**	**Time**	**Initials**
EcoBETA						
Save-a-flush						

Dimensions (cm)

Length				
Breadth				
$Depth_1$				
$Depth_2$				

Reason not fitted

Showers	**S1**	**S2**	**S3**	**S4**	**Time**	**Initials**
Shower head						

Flow rate
Before
After

Pressure
Reason not fitted

Bath	**B1**	**B2**	**B3**	**B4**	**Time**	**Initials**
Bath Measure						

Wash Basin	**1**	**2**	**3**	**4**	**Time**	**Initials**
Tap Insert						

Number
Type
Cam Adj

Flow rate
Before
After
Reason not fitted

Dripping Taps	**1**	**2**	**3**	**4**	**Time**	**Initials**
Tap Rewash						

Drip rate

Reason not fitted

Kitchen Sink Tap	**1**	**2**	**3**	**4**	**Time**	**Initials**
Miracle Tap adapt.						

Flow rate
Before
After

Reason not fitted

Garden **Time** **Initials**

Water butt
Location
Drain
Approve order **Y/N**
Type Normal / Slimline
Connector Diverter Kit / Linking Kit

Crystals

Vehicle Washing	**Initials**
Hose gun	

Children	**1**	**2**	**3**	**4**	**Initials**
Children's pack					

Information Leaflet

All works undertaken are guaranteed for a period of 3 months after date of supply/installation. After this period we can not be held responsible for any failures associated with the work completed. In the event of any issues arising as a result of our visit, please contact our Customer helpline within this period on 0845 602 6391.

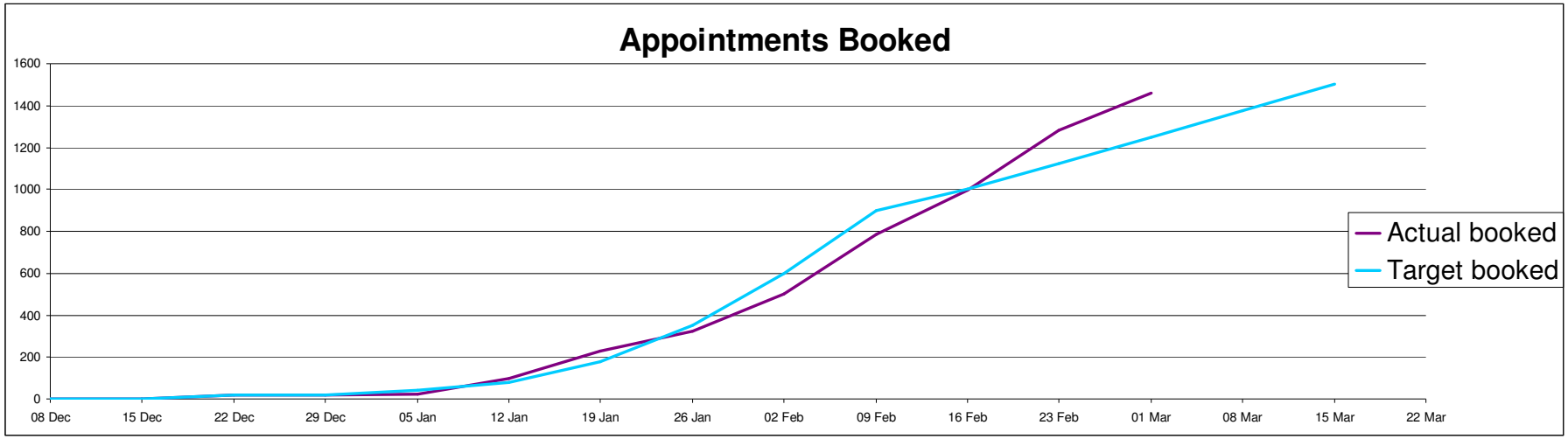
Finish Time

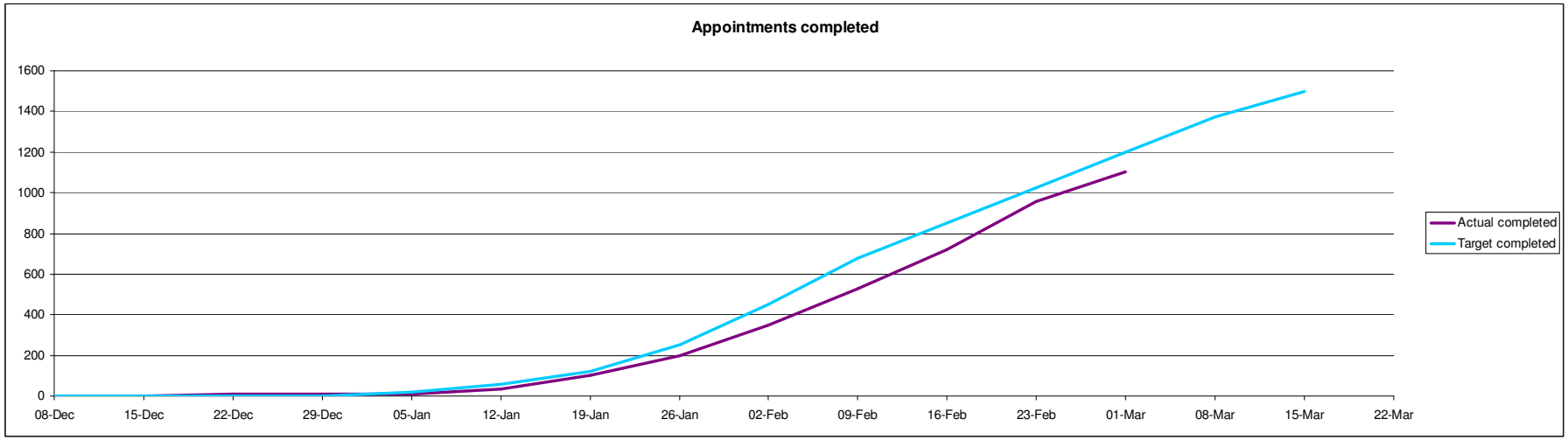
10.7 Appendix G: Examples of Weekly and Stock Reports

ESSEX & SUFFOLK WATER

Weekly Report (Applications)

	Weeks	Totals	24 Nov	01 Dec	08 Dec	15 Dec	22 Dec	29 Dec	05 Jan	12 Jan	19 Jan	26 Jan	02 Feb	09 Feb	16 Feb	23 Feb	01 Mar
	Target No of Properties	1500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Applications																
1	No. of application letters sent	7524	0	0	7524	0	0	0	0	0	0	0	0	0	0	0	0
1a	No. of order confirmations letters sent	1374	0	0	0	0	45	0	0	103	207	931	59	17	7	5	0
1b	No. of appointment confirmations letters sent	216	0	0	0	0	10	0	0	0	0	20	8	43	33	47	55
1c	No. of incorrect details letters sent	39	0	0	0	0	0	0	0	0	0	16	4	1	3	8	7
1d	No. of reminder letters sent	7402	0	0	0	0	0	0	0	7402	0	0	0	0	0	0	0
2	No. of applications received	1582	0	0	0	35	42	0	93	323	634	398	28	20	3	5	1
3	No. of applications entered	1575	0	0	0	35	42	1	95	145	293	907	30	18	3	5	1
	Phone calls																
4	No. Phone calls made	1245	0	0	0	1	30	0	2	30	78	64	155	257	155	312	161
4a	Calls not answered	501	0	0	0	1	24	0	2	10	28	17	57	160	36	72	94
4b	Messages left	687	0	0	0	0	6	0	0	20	44	34	94	91	115	219	64
4c	Incorect details	38	0	0	0	0	0	0	0	0	6	11	2	1	3	13	2
4d	Orders cancelled	19	0	0	0	0	0	0	0	0	0	2	2	5	1	8	1
	Appointments																
5	No. of appointments booked	1459	0	0	0	0	20	0	4	76	129	96	174	285	212	286	177
6	No. of appointments completed	1104	0	0	0	0	8	0	0	27	68	93	154	175	193	241	145
7	Average No. of appointments completed per day per plumber	6.37778					4		2.66667	5	6	7.26667	7.175	7.75833	8.26944	8.575	7.06667
	% of target. completed	73.60%	0.00%	0.00%	0.00%	0.00%	0.53%	0.00%	0.00%	1.80%	4.53%	6.20%	10.27%	11.67%	12.87%	16.07%	9.67%
	Remedial visits																
8	No. of remedial appointments booked	19	0	0	0	0	0	0	0	2	0	3	2	2	2	4	4
8a	Plumber related remedials	6	0	0	0	0	0	0	0	1	0	2	1	0	1	0	1
8b	Customer/device related remedials	13	0	0	0	0	0	0	0	1	0	1	1	2	1	4	3
9	No of remedial phonecalls incoming	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	No. of remedial appointments completed	12	0	0	0	0	0	0	1	2	0	2	2	2	2	1	0
	% plumber remedials	31.58%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	50.00%	0.00%	66.67%	50.00%	0.00%	50.00%	0.00%	25.00%
	Missed appointments																
11	No. of customer missed appointments	18	0	0	0	0	0	0	0	0	1	1	4	3	3	3	3
12	No. of Mouchel missed appointments	6	0	0	0	0	0	0	0	2	0	0	1	1	1	1	0
	% of Mouchel missed appointments	0.54%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.41%	0.00%	0.00%	0.65%	0.57%	0.52%	0.41%	0.00%
	Written complaints received	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Meter Reading																
13	No. of initial meter readings taken	1009	0	0	0	0	0	0	47	56	151	638	62	27	21	7	0
14	No. of appointment meter readings taken	574	0	0	0	0	0	0	0	1	1	23	45	37	185	202	80
15	No. of final meter readings taken	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
	Total No of meter reads taken	1598	0	0	0	0	0	0	47	57	152	661	107	64	206	209	95
	Logging Activity																
16	No. of loggers installed	193	0	0	0	0	0	0	45	55	81	12	0	0	0	0	0
17	No. of Loggers collected	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total No of logging activities undertaken	193	0	0	0	0	0	0	45	55	81	12	0	0	0	0	0


Appointments Booked
1600
1400
1200
1000
800
600
400
200
0
08 Dec
15 Dec
22 Dec
29 Dec
05 Jan
12 Jan
19 Jan
26 Jan
02 Feb
09 Feb
16 Feb
23 Feb
01 Mar
08 Mar
15 Mar
22 Mar
Actual booked
Target booked


Appointments completed
1600
1400
1200
1000
800
600
400
200
0
08-Dec
15-Dec
22-Dec
29-Dec
05-Jan
12-Jan
19-Jan
26-Jan
02-Feb
09-Feb
16-Feb
23-Feb
01-Mar
08-Mar
15-Mar
22-Mar
Actual completed
Target completed

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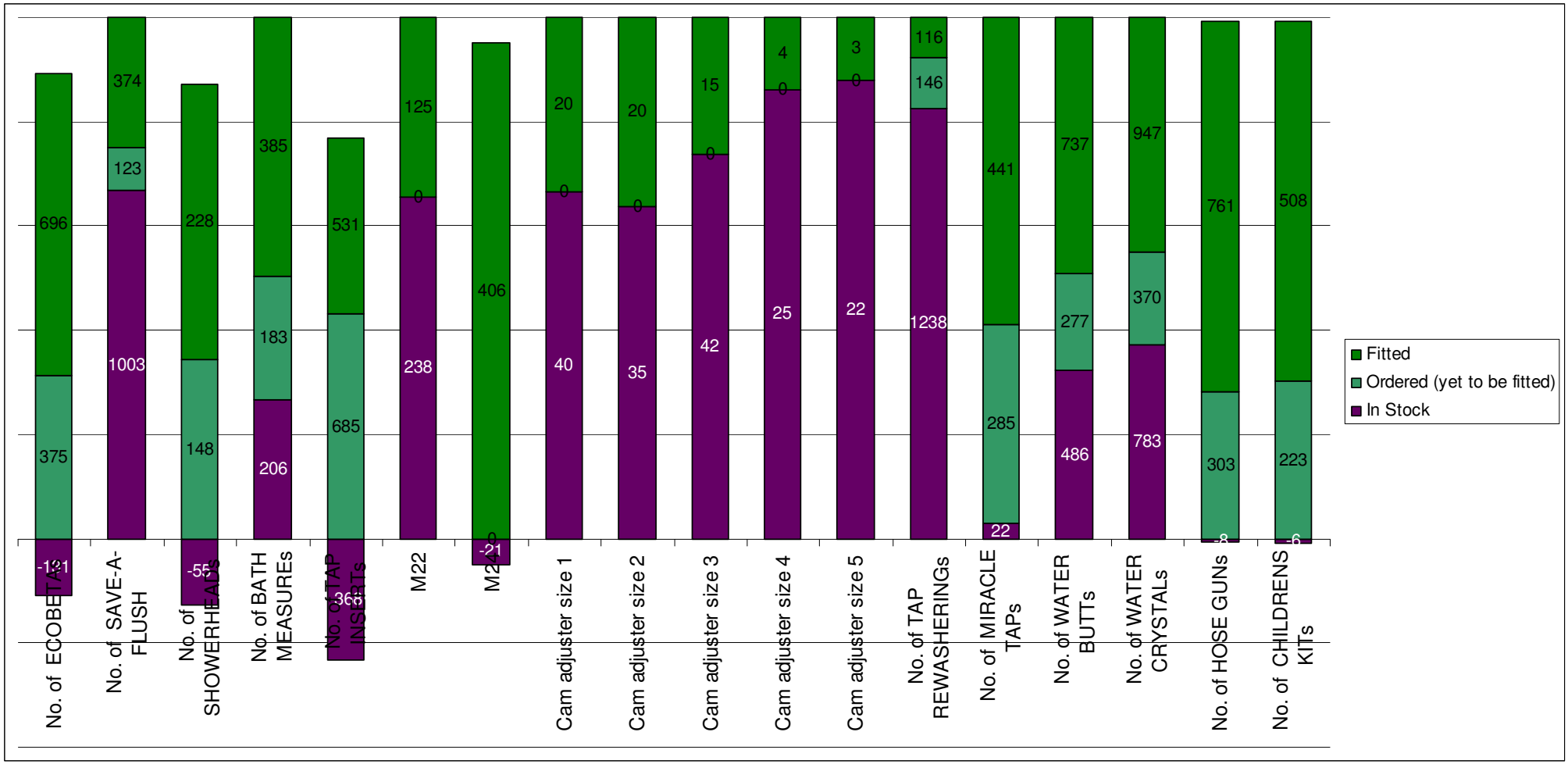
Fitted
Ordered (yet to be fitted)
In Stock
No. of ECOBETAs
696
375
-131
No. of SAVE-A-FLUSH
374
123
1003
No. of SHOWERHEADS
228
148
-55
No. of BATH MEASUREs
385
183
206
No. of TAP INSERTs
531
685
-363
M22
125
0
238
M24
406
0
-21
Cam adjuster size 1
20
0
40
Cam adjuster size 2
20
0
35
Cam adjuster size 3
15
0
42
Cam adjuster size 4
4
0
25
Cam adjuster size 5
3
0
22
No. of TAP REWASHERINGs
116
146
1238
No. of MIRACLE TAPs
441
285
22
No. of WATER BUTTs
737
277
486
No. of WATER CRYSTALs
947
370
783
No. of HOSE GUNs
761
303
-8
No. of CHILDRENS KITs
508
223
-6

10.8 Appendix H:-Example of Monthly Invoice

ESW H2eco		February 2008		
Costs		Unit rate	Number Fitted	Total
Project Management				
			Nil	£0.00
Non Plumbing				
Audit pack		£ -	0	£ -
Childrens detective pack		£ 2.00	28	£ 56.00
Bath measure		£ 1.00	20	£ 20.00
Crystals		£ 1.00	81	£ 81.00
Hose gun		£ 1.00	68	£ 68.00
Advice leaflets		£ 1.00	77	£ 77.00
Travel and prep time		£ 7.93	88	£ 697.84
Plumbing				
EcoBETA		£ 18.15	558	£ 10,127.70
Tap Magic		£ 24.20	433	£ 10,478.60
Miracle Tap		£ 24.20	354	£ 8,566.80
Rewashering		£ 32.07	92	£ 2,950.44
Showerhead		£ 21.18	174	£ 3,685.32
Travel and prep time		£ 16.34	814	£ 13,300.76
Save-a-flush		£ 10.59	305	£ 3,229.95
Audit pack		£ 9.08	787	£ 7,145.96
Meters/Logging				
Meter reads (pre & post audit)		£ 7.00	741	£ 5,187.00
Meter reads non plumbing audit		£ 2.00	39	£ 78.00
Meter reads plumbing audit		£ 3.03	15	£ 45.45
Logger install/ removal		£ 11.67	12	£ 140.04
Other				
Customer not at home		£ 30.00	14	£ 420.00
Plumber unable to fit any devices		£ 30.00	76	£ 2,280.00
Subtotal				£68,635.86
Discounts	number in single property	Discount	Number	Total
EcoBETA	2	-£2.72	134	-£364.82
	3	-£5.04	22	-£110.81
	4	-£5.04	3	-£15.11
	5	-£5.04	0	£0.00
Save-a-flush	2	-£1.59	72	-£114.37
	3	-£2.94	15	-£44.08
	4	-£2.94	3	-£8.82
	5	-£2.94	0	£0.00
Tap rewashering	2	-£4.81	23	-£110.64
	3	-£8.90	5	-£44.50
	4	-£8.90	1	-£8.90
	5	-£8.90		£0.00
Sub Total				-£822.04
Total				£67,813.82

10.9 Appendix I: Assumptions for calculated water savings

Product/Service	Assumption	Source
Save-a-flush	Calculated the average number of flushes per toilet per day	ACTUAL DATA - Toolkit application form data
	Device saves 1 litre per flush	Thurrock Home Survey
Aerated showerhead	Av. Time spent in shower = 6.48 mins	Thurrock Home Survey
	Actual average flow rate before = 6.96 l/min	ACTUAL DATA - Toolkit database
	Actual average flow rate after = 4.86 l/min	ACTUAL DATA - Toolkit database
	Device saves on average 27.5%	ACTUAL DATA - Toolkit database
	Av number of showers per week - use actual data from application forms	ACTUAL DATA - Toolkit database
	Sample of 71 properties	ACTUAL DATA - Toolkit database
Shower alarm/timer	41.9% of customers reduce time spent in shower	ACTUAL DATA - Toolkit follow-up questionnaire
	Av time shower reduced by is 1.45 mins	ACTUAL DATA - Toolkit follow-up questionnaire
Bath Indicator	Baths per week = 5.5	ACTUAL DATA - Toolkit database
	41.9% of customer reduce bath depth - assumed same customer response rate as for shower	ACTUAL DATA - Toolkit follow-up questionnaire
	Av. Saving by reducing depth by 2.5cm = 15.34 litres	Bath Volume Calculations
Tap Inserts/Aerators	Device saves on average 47.85%	ACTUAL DATA - Toolkit database
	Actual average flow rate before = 12.29 l/min	ACTUAL DATA - Toolkit database
	Actual average flow rate after =6.53 l/min	ACTUAL DATA - Toolkit database
	Frequency of use is 7.9 per person per day	Code for Sustainable Homes - Technical Guide (March 2007)
	People only open taps to 50% of their full open-tap flow rate	
	Duration per use if 41 seconds	Code for Sustainable Homes - Technical Guide (March 2007)
	therefore 5.4 minutes	Code for Sustainable Homes - Technical Guide (March 2007)
	Sample of 17 properties	ACTUAL DATA - Toolkit database
Dripping tap gauge	Assumes that 15% of customers repaired dripping taps (310 props - 48 repaired taps)	Thurrock Home Survey
	Av. Dripping tap flow rate = 13.08 l/prop/day	Thurrock Home Survey
Miracle Tap Adaptor	Device saves on average 27.1%	ACTUAL DATA - Toolkit database
	Actual average flow rate before = 14.25 l/min	ACTUAL DATA - Toolkit database
	Actual average flow rate after = 10.52 l/min	ACTUAL DATA - Toolkit database
	Frequency of use is 7.9 per person per day	Code for Sustainable Homes - Technical Guide (March 2007)
	Duration per use if 41 seconds	Code for Sustainable Homes - Technical Guide (March 2007)
	therefore 5.4 minutes	Code for Sustainable Homes - Technical Guide (March 2007)
	Sample of 36 properties	ACTUAL DATA - Toolkit database
Tap Rewashering Service	Av. Dripping tap flow rate = 13.08 l/prop/day	Thurrock Home Survey
Hose Gun	Frequency of use per year = 33 times	Thurrock Home Survey
	Av. Time spent using hose per use = 40 mins	Thurrock Home Survey
	Av. Flow rate of 500 l/hr	Thurrock Home Survey
	Device saves 5%	Thurrock Home Survey
Water Storing Crystals	Assumes people use 2 litres of water for 16 weeks of year	Thurrock Home Survey
	Product saves 20%	Thurrock Home Survey
Waterbutt	Assumes people use 45 litres per week for 16 weeks of yr	Thurrock Home Survey
Beaker	Av tap flow rate for brushing teeth is 3 l/min	Thurrock Home Survey
	56% customers said the beaker reminded them to turn tap off when brushing teeth	ACTUAL DATA - Toolkit follow-up questionnaire
	Av saving = 2 l/min	Thurrock Home Survey
	Two teeth brushing events per person per day	Thurrock Home Survey
	Teeth brushing event for 2 minutes	Thurrock Home Survey

10.10 Appendix J: Project Unit Costs

Product or Service		Cost
Non-Plumbing		
Children's Detective Pack		£2.00
Bath Measure		£1.00
Water Saving Crystals		£1.00
Hose Gun		£1.00
Advice Leaflet		£1.00
Travel and Prep Time		£7.93
Plumbing		
ecoBETA		£18.15
Tap Magic		£24.20
Aerated showerhead		£21.18
Save-a-flush		£10.59
Miracle Tap		£24.20
Tap rewashering		£32.07
Travel and Prep Time		£16.34
Audit Pack		£9.08
Meters/Logging		
Meter Reads (pre and post audit)		£7.00
Meter Reads non plumbing audit		£2.00
Meter Reads plumbing audit		£3.03
Logger Install/Removal		£11.67
Other		
Customer not at home		£30.00
Plumber unable to fit any devices		£30.00
Discounts	**Number in single property**	**Discount**
ecoBETA	2	£2.72
	3	£5.04
	4	£5.04
	5	£5.04
Save-a-flush	2	£1.59
	3	£2.94
	4	£2.94
	5	£2.94
Tap Re washering	2	£4.81
	3	£8.90
	4	£8.90
	5	£8.90

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10.11 Appendix K: Customer Satisfaction Survey

ESSEX & SUFFOLK WATER

Your satisfaction survey

As your water company, we are constantly striving to provide you with the level of service you require. To help us continue to do that, please spend a few minutes answering the questions below.

Name _____

Address _____

_____

_____

Postcode _____

1) Did the introductory letter clearly explain what the project was about?

☐ Yes ☐ No

2) Were you clear about how the project would operate? (i.e. you had to complete and return the workbook and you would then be telephoned and an appointment would be made to deliver and/or install your products).

☐ Yes ☐ No

3) Did the information book provide you with sufficient information about the products on offer?

☐ Yes ☐ No

4) Did you manage to complete the workbook without any problems?

☐ Yes ☐ No

5) Were you happy with the telephone service?

☐ Yes ☐ No

6) Was the person who made the appointment helpful and courteous?

☐ Yes ☐ No

7) Are you happy with the products you have received?

☐ Yes ☐ No

8) If applicable, are you happy with the quality of the plumbing services?

☐ Yes ☐ No

9) Was the plumber or field technician helpful and courteous?

☐ Yes ☐ No

10) Are you happy with the overall level of service you received?

☐ Yes ☐ No

If you have answered no to any of the above, please provide us with details or any further comments.

_____

_____

_____

What did you find most useful about the project?

_____

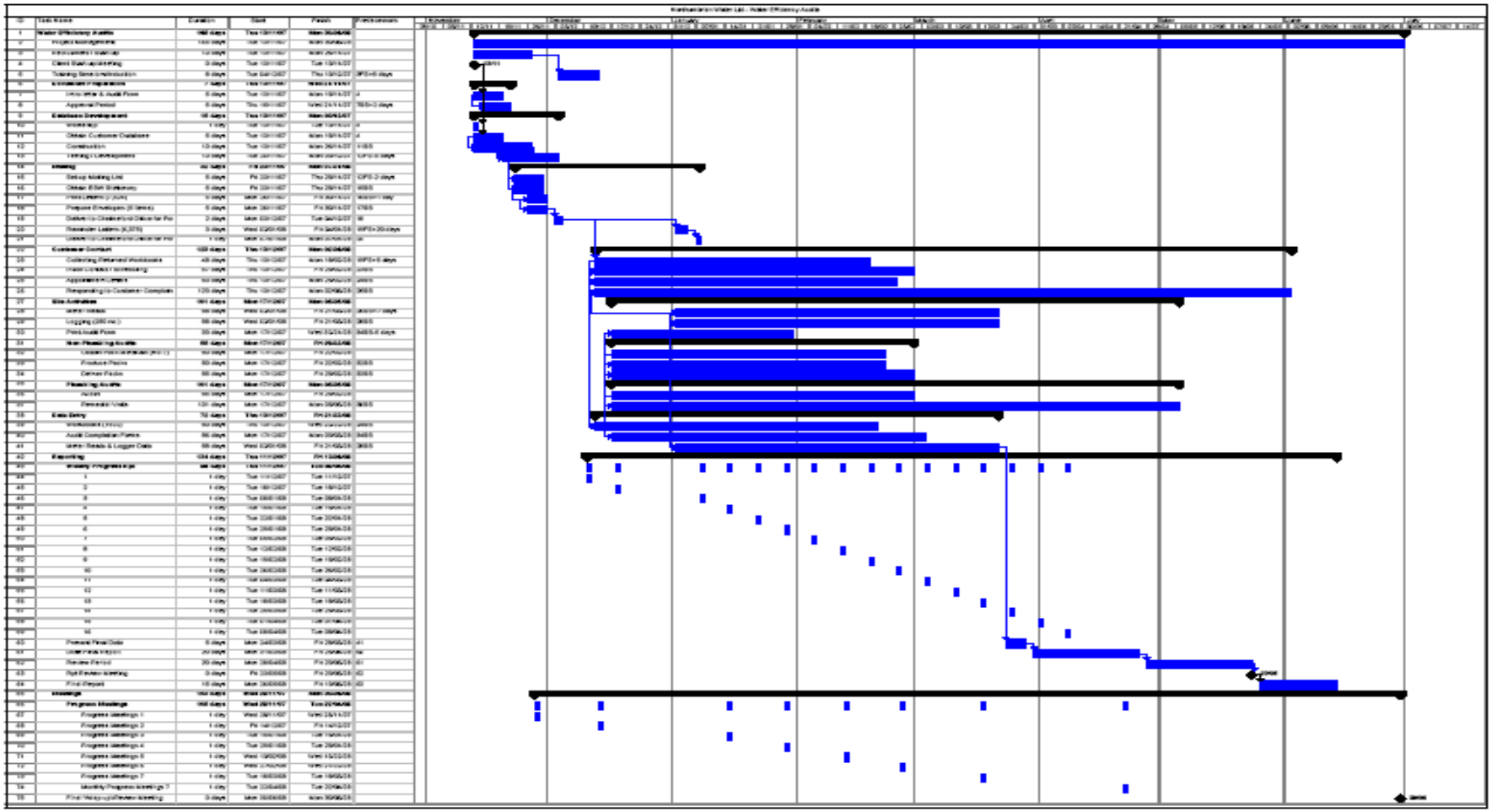
_____

_____

Thank you for taking the time to complete the satisfaction survey. Your views and opinions are very useful and will help us to improve future projects.

Please return your satisfaction survey in the pre-paid envelope provided.

10.12 Appendix L: Project Timetable



10.13 Appendix M: Standard Progress Meeting Agenda

PROJECT TITLE	H_2eco
PROJECT REFERENCE	NW438
MEETING TITLE	
DATE OF MEETING	
VENUE	

AGENDA

Attendees:			

1.	**Contract/Financial**
2.	**H&S**
3.	**Reporting** • Weekly reports • SLA's
4.	**Stock**
5.	**Update from UPM**
6.	**Database**
7.	**Customer contact/visits** • Customer satisfaction
8.	**Recruitment & Training**
9.	**Metering and logging**
10.	**Timetable**
11.	**Publicity**
12.	**Final report**
13.	**Any Other Business**
14.	**Date of next meeting**

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