Improving Accessibility to Housing Data

Department of Adult Services, Health and Housing
London Borough of Croydon

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Abstract

Social housing is a vital service provided to tenants by local authorities in the boroughs of London. The Croydon Council is one such authority; it manages housing stock and tenant information with two separate databases. However, in recent years the information held within these separate databases has become outdated and inconsistent. The goal of this project was to research solutions to this problem and contact vendors to build a strong business case for the Council to adopt. Myriad focus groups and interviews of Council staff revealed a universal desire for an updated system. The final business case submitted to the Council recommended the implementation of a middleware system to unify the existing databases and provide a central access point for both tenants and officers.

Acknowledgements

Executive Summary

This project focused on the development of a business case outlining strategies that could be taken by the Croydon Council to improve accessibility to housing information by its officers and tenants. The business case primarily focused on possible costs, benefits and functionalities of three options for future strategy. Firstly, the option of remaining with the status quo, or 'Do Nothing' was outlined. Through interviews with Council officers, we were able to clearly characterize the problems with the current system and why it would benefit from improvement. The other two options that were identified were those of a middleware overlay of the existing databases, and a total system replacement. The replacement system would provide far-reaching benefits for the Council and the housing department, but also came at the largest cost and greatest time of implementation. This implementation included the tedious process of data cleansing, a task that would have to be performed to ensure that the data migrated to the new system was consistent and had no conflicts. Due to the large scale of this complete replacement, our recommended solution was that of a middleware overlay which would effectively link the two housing management systems that existed at the Council.

The Department for Adult Services, Health, and Housing (DASHH), uses two independent database systems – Apex and OHMS. Apex is used on a daily basis to maintain and access property information, plan programmes of works, show energy efficiency ratings, etc. OHMS is used on a daily basis to manage tenants' information, repair history, rent accounts and lettings. Within OHMS there are five independent modules, Needs, Rents, Repairs, Decision Support and Home Purchase Management, all of which contain information relevant to properties and tenants. However, there is no way to query information from all five modules and have it displayed centrally. Additionally, Apex and OHMS must be manually synchronized, which leads to information quickly becoming outdated and potentially inconsistent.

Through a process of iterative interviews with key Council official we were able to identify the desired benefits of an improved system. Next, we contacted local boroughs to investigate the nature of other systems and solutions. These contacts allowed us to compose a list of vendors that would be potentially feasible for the Council to work with. Upon consultation with these vendors, we gained a much clearer understanding of the requirements and

functionality of each product. While we made initial contact with a large variety of companies, only a select group responded, due to the nature of the project being in the planning stages and the fact that we were not in the position to negotiate costs. However, the responsive vendors proved to be cooperative and provided us with accurate estimates of cost and timescale of implementation.

Through this contact with vendors, we identified a recommended solution that would be the most cost-effective for the Council to adopt. This proposed middleware solution focuses on enabling a real-time link between OHMS and Apex. Council officers would be able to combine data held on individual OHMS modules and/or with data from Apex and in this way, could use the information available to provide their services more efficiently and effectively. An internal survey has confirmed that there is interest in a central graphic user interface (GUI) that could be used to view housing information drawn from both the housing and stock databases. With this seamlessly integrated foundation, Croydon's recently purchased iSMART geographic information system (GIS) software could be utilised to its full potential by providing more customisable, accurate, and visual information for planning purposes. Through provision of password-protected access linked to individual tenant accounts, tenants could also view details about their homes such as planned improvements or rent account details. There is the potential for this central graphic user interface to support mobile working capabilities, further modernising the Council's technology.

A summary of the potential benefits to the Council are manifold. The recommended system would allow:

- Real-time links between OHMS modules and Apex;
- Combining data held on individual OHMS modules;
- Displaying information geographically using GIS;
- Web-based password protected access for tenants to specific areas;
- The Contact Centre to provide greater front line support;
- Self-servicing by officers and tenants;
- Identification and elimination of data inconsistencies;
- Access to data by officers outside of DASHH for specific queries;

- Incorporation of data from 'standalone' spread sheets (e.g. gas servicing); and
- Officers to work from home with secure mobile access.

With these benefits, it was shown that the project aligned with Council strategic goals. These are initiatives put in place to allow the Council to provide better quality of service and use their funds more wisely. Implementing the suggested middleware option would help the Council achieve its strategic goals to:

- Deliver high quality public services;
- Improve value for money;
- Enhance demand management;
- Reduce avoidable contact;
- Transform service delivery; and
- Promote mobile working.

Finally, we submitted our business case to the Council, outlining our findings and recommended solution. The business case contained a detailed options analysis explaining all possible costs, benefits, and favoured functionalities of each option. The business case can be found in the references section of this IQP report. During the final presentation to Council officials, we delivered a set of recommendations to be taken to give the project the greatest chance of success. These included the further development of the business case to include specific negotiations with vendors to provide accurate costs and time-of-implementation. Finally, the savings potential for the middleware should be quantified to allow for approving officials to compare figures of remaining with the current system or upgrading, thus identifying whether the project would be financially feasible. For this project to enter into the consideration period by approval boards there would need to be widespread support throughout the Council. We saw the middleware solution as being a very viable and realistic solution to the current issues with consistency and availability of housing data within the housing department of Croydon Council.

Authorship

This project represents a joint effort on the behalf of all members involved including the final business case, formal report and research conducted. James and Victor worked to interview Council officers and conduct phone conferences with vendors and other boroughs, while Gregory provided minutes and notes from these meetings. Research of relevant materials, composition and editing of both the business case and this report were completed equally among the three authors. Additionally, James produced most of the visuals, while Gregory summarized relevant findings, and Victor provided the necessary structure and organization for the report.

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1. Introduction

This project was designed as the second part of a two-term project, the first half being completed by a previous WPI team in April 2012. Our team, as well as the previous team, conducted their research in cooperation with the Croydon Council under the supervision of Judy Pevan, Stock Investment Manager. The teams worked directly with staff in the Department of Adult Services, Health and Housing (DASHH) drawing from their experience on day-to-day inner workings. The overall goal was to assist DASHH in developing a business case for possible improvements to the current housing stock and asset management systems. The previous team conducted the majority of the exploratory research and began to form a preliminary business case. Their research included positive initial tenant and officer reactions regarding the concept of a new integrated system that would ultimately allow the Council to take their housing services online. Our project built on this base to explore more fully the advantages and disadvantages of several management system options. We worked closely with Council officials to access the internal opinions and problems with the current system and how they may possibly benefit from any changes. Furthermore, we contacted vendors and referred to Council members to obtain cost and time of implementation estimates that vendors could offer the Council.

Currently, the Croydon Council provides social housing services to residents of the borough, managing around 16,100 tenants and 120,000 dwellings, 14,000 of which are Council-owned (Day, 2012). DASHH is the department that is directly responsible for managing these housing services. The information required to maintain these services is currently contained in two different databases (the Open House Management System 'OHMS' and Apex), which are unable to communicate with each other. There is no link between the databases and the Council's geographic information system (GIS) system, which means the updates have to be made manually, and causes data to become quickly outdated and inconsistent across both databases. Additionally, tenants are unable to access their information without intervention by Council officers.

The OHMS software is provided by Northgate, a software solutions company, and contains tenant data, including request history and rent account information. The Apex system is provided by Innovation, and is responsible for information regarding the dwellings, such as

repair and upgrade plans, and energy efficiency ratings of the buildings. The Council also uses a GIS to characterize the property locations by visualizations and maps. This system is provided by eSpatial and has the capability to display a multitude of information visually on a map, but is currently disconnected from most of the data within the housing management databases. The previous group outlined three options: (Option 1) To continue with the existing arrangements; (Option 2) develop middleware to work with the current databases and improve functionality; and, (Option 3) install a new system that completely replaces the existing database. The goal of our project was to develop a business case that expresses the advantages and disadvantages of each these options.

There are several reasons why DASHH would like to better integrate its housing management systems. Like many councils, Croydon is under enormous pressure to reduce overall costs, enhance in-house efficiency and effectiveness, and improve the services to the public. DASHH would also like to move towards a web based service that is self-serving and intuitive in hope that this will decrease avoidable contacts. The connectivity of all systems in one central location that is fully accessible via web portal and GIS software will improve these services by increasing accuracy of data, encouraging self-service and allowing more effective geospatial analysis for planning.

To create a valid business case, the project team identified four objectives. The team:

Explored the advantages and limitations of the current housing and asset management system used in DASHH;

Enumerated the advantages and disadvantages of Option 2 and 3 according to different audiences (including DASHH, Information and Communications Technology (ICT), tenants, and vendors);

Clearly portrayed all advantages and disadvantages to relevant stakeholders to solicit feedback; and,

Provided DASHH with a set of recommendations based on of the results and conclusions of the analysis.

These four objectives were completed with the ultimate goal of assisting DASHH to develop a business case for the most feasible improvement option for their current housing management system.

2. Literature Review

This chapter will explore the recent history of social housing in the United Kingdom, specifically the current state of the Croydon Council's housing department. The current practices of the Council will be outlined to demonstrate the nature of the database problem that has arisen. Finally case studies will be presented to showcase how other boroughs have solved similar issues.

2.1 Social Housing in the United Kingdom

The British government built large numbers of council houses in urban areas during a massive reconstruction effort following World War II to provide housing for those in need. Today an estimated 4 million households in England live in social or council houses, most of which are managed and maintained by local government authorities. However, John Hills notes that in the last 25 years there has been a steady decline in the number of housing units that are actively leased by local governments (Hills, 2007). Several factors have contributed to this decline, one of which being The Housing Act of 1980. This enacted the Right-to-Buy program, which provided the incentive that tenants who remained in their current residences for at least three years would then have the opportunity to buy the property outright (Hills, 2007). The restrictions placed on tenant eligibility have been tightened so that only those with the most deserving circumstances can qualify for housing, which consequently means that a very high proportion of tenants are unemployed, disabled, elderly, and/or of a minority ethnic background. In 2006, only 32% of social housing tenants were gainfully employed (Hills, 2007). Nevertheless, the Greater London Authority is planning to invest £1.9 billion between 2012 and 2015 in order to provide more than 55,000 new homes for tenants; a reflection of the growing need for affordable housing in the London region (Greater London Authority, 2012). This plan has commenced in accordance with the Decent Homes Standard, which was set forth in 2000 to ensure livable housing for those in need. This standard was part of the Decent Housing Program, which the Department for Environment, Transport, and the Regions (DETR) considered to be necessary. The Decent Homes Standard (Department for Communities and Local Government, 2006) requires that all housing should:

- Not contain any hazards to safety;
- Not require an essential component to be replaced or repaired by the tenant;
- Meet the qualification of being a modern facility;
- Provide adequate thermal comfort for its occupants.

Local governments responded accordingly, with strategies varying from repairs to demolition and rebuilding. As of 2010, the number of social houses failing to meet the Decent Homes Standards was only 20%, compared to 29% in 2006 (Croydon Council, 2012a).

2.2 Background on Croydon

The London borough of Croydon has an area 34 square miles and as of 2011, had a population of about 345,000 and a total of around 150,000 households. Seven-tenths of these households live in owner-occupied housing units, while the remaining three-tenths live in private or socially owned rental units. Overall, the Council owns around 14,000 properties, which contain the 120,000 dwelling units that they manage (Taylor 2012). Croydon is expecting a growth rate of 0.63% in population in the next several years, which means that in order to maintain the decent housing standard, Croydon needs to improve its system of organization and quality of service. In April of 2011 all housing owned by the Council met the decent housing standard. Although the Council has maintained the quality of their facilities, they would like to ensure that all the homes are kept at a high standard in the long term. Accordingly, the council has established various indicators to measure progress and identify necessary improvements in housing (Greater London Authority, 2010).

In Croydon, almost 7,000 people benefit from housing support services, including 4,000 living in supporting housing or floating support. This means that a good deal of the population needs support services. To be able to support these people, the Council must have a good infrastructure that will be able to provide citizens with the services they require. The Council has created several different departments to address specific services individually to improve support the citizens (Croydon Council, 2012b).

2.2.1 Structure of DASHH

Specifically, the Croydon Council contains nine different departments, one of which being the Department of Adult Services, Health and Housing (DASHH). They are the biggest department within the Croydon Council, with around 1,400 staff, and are committed to meeting the Decent Housing standards set forth by the Greater London Authority. DASHH has decreased the number of homeless citizens over the years by providing suitable housing, and has worked hard to increase the standard of living for many of its tenants. DASHH provides housing services to 16,100 council tenants and leaseholders. In 2010, DASHH advised and assisted 2,600 households, including 1,200 homeless households.

There are eight different departments within DASHH, the most relevant to housing being as follows: The Housing Management Division, The Assets and Renewal Division, The Needs and Options Division, and The Southwest London Housing Partnership (SWLHP). Each of these departments helps in some way with regulating and processing housing needs and information. The Southwest London Housing Partnership (SWLHP) brings together seven different southwest London Boroughs and work cooperatively on big picture housing issues. SWLHP is funded by both the Greater London Authority and the National Affordable Housing Programme. The Assets and Renewal Division helps to create programs to help housing meet the decent housing standard. Additionally, The Needs and Options Division support housing services by working to prevent homelessness and to increase access to housing options in Croydon. Finally, The Housing Management Division deals with day-to-day repairs to council housing and manages rent collection (Montes, 2010).

2.3 Current strategies in Croydon

The central government has recently undertaken initiative to improve and streamline the services provided by local councils. This process has a dual goal; both to better the services that are provided to the customer, and to reduce processing costs for the council. One such undertaking was the National Indicators program; a set of 198 standards created by the government to measure local councils' progress (Communities and Local Government, 2008). One particular National Indicator (NI) that is relevant to the housing program is NI 14. This indicator was put in place to "reduce avoidable contact." As defined by the indicator, avoidable

contact is the "average number of customer contacts per resolved request" (Improvement and Development Agency, 2008). Basically, the goal of this indicator was to reduce operating costs by lowering the amount of unnecessary contact received by an office from its customers. However, this indicator caused much controversy because some older, more traditional customers preferred to speak to a human who could quickly answer their questions. Subsequently, NI 179 was adopted to encourage the best "Value for Money," which translates to providing friendly and useful customer services through more cost-effective operations in local government. Another extremely important indicator was NI 160, which dealt with tenants' satisfaction with landlord services (Communities and Local Government, 2008).

2.3.1 Performance Indicators in Croydon

The Croydon Council has taken advantage of the United Kingdom's National Indicators to drive development forward. In the past, Croydon adopted the National Indicators (NI) 14 and 179, which together reduced direct contact between the Council and its tenants, while doing so in a cost-effective way. Croydon used these indicators to create new services which included face-to-face interaction centers, online interfaces, and call center services. Croydon also created the Tell Us Once program, the One Croydon website, and "Call Quality Monitoring" to connect more with the citizens (Croydon Council, 2010c).

In 2010, however, Croydon abandoned NI14, because it was not providing enough information to measure the borough's progress (Informed Publications Ltd., 2008). Instead, the Croydon Council is currently focusing on NI 160, to measure tenant's satisfaction with their landlord. A survey from 2008-2009 showed that the Council received the most "very satisfied" responses compared to other boroughs (Montes, 2010).

The Corporate Plan 2011-2013 for Croydon set some of the following short term goals and priorities: "Protecting resident priorities, Transforming the council, Reforming public services, Empowering communities, and Competing as a place" (Croydon Council, 2011a). These goals were created to help Croydon achieve the Community Strategy, which is intended to make Croydon a more connected and more efficient borough (Croydon Council, 2011a).

The Croydon Council also outlined specific indicators they will use to help monitor the progress they have made in customer service transactions. These indicators include "Access Croydon seen within 15 minutes", "Contact Centre: percentage of abandoned calls", and "Percentage of one-and-done transactions (Access Croydon and Contact Centre)". In the 2011 report, the only indicator of the three to show progress in a positive way was the Percentage of one-and-done transactions in the Contact Centre and through Access Croydon. Overall, the housing indicators have shown that the Council has been meeting their set targets and continue to show positive progress for the future. The council aspires to maintain momentum by implementing new technology that will help keep high percentages within each specific indicator.(Croydon Council, 2011b) Croydon is putting great effort into creating a more connected city that runs and performs at its best (Croydon Council, 2010b).

More recently (April to March of 2012), iMPOWER consulting company has educated the Council in what they call 'Demand Management'. Their definition of demand management is the idea of implementing strategies that encourage customers to improve efficiency. A humorous study was conducted in a busy European airport bathroom showed that simply painting a fake insect on the inside of a urinal actually improved aim and improved cleanliness by 80% (iMPOWER Consulting Ltd., n.d.). The study outlines that there are often quick and inexpensive ways to improve efficiency and service within an organization.

The Department of Adult Services, Health and Housing would like to develop ways to improve relationships with tenants while remaining consistent with Croydon's savings targets. More specifically, the council is applying this program within their housing department to influence the tenant behavior of self-accessing information. The Council would like their services to include web access to personal information to reduce the demand on Council officers. This type of service would be superior to phone call enquiries. It would reduce wait time and reduce internal costs, which directly relates to Council goals such as 'improving service' and providing 'mobile access'. The proposed solution would most definitely increase avoidable contacts within the Council; something they have recently been trying to work towards.

2.3.2 Croydon's Current Systems

The Council's Contact Centre deals with more than 7,000 calls per month or an average of 270 calls per day, as of March 2012 (Day, 2012). Table 1 shows how these calls were handled as well as the typical waiting times and call duration in recent months. Between 7% and 21% of calls in any month are abandoned, clearly showing that there is a need for an additional service to better serve the tenants.

Repairs Only	October 01/10/2011 31/10/2011	November 01/11/2011 30/11/2011	December 01/12/2011 31/12/2011	January 01/01/2012 31/01/2012	February 01/02/2012 29/02/2012	March 01/03/2012 31/03/2012
Calls Offered	7816	8359	7475	9300	8897	7392
Calls Handled	7253	7198	6677	7292	7338	6611
Calls Abandoned	563	1161	798	2008	1559	781
Callers Receiving Busy	0	0	0	0	0	0
% Handled	92.80%	86.11%	89.32%	78.41%	82.48%	89.43%
% Abandoned	7.20%	13.89%	10.68%	21.59%	17.52%	10.57%
% Receiving Busy	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Average Wait Time	01:05	02:19	01:33	03:00	02:42	01:51
Average Call Duration	03:53	03:53	03:44	03:55	03:46	03:47
Average Wrap Time	01:51	02:34	02:32	02:24	02:22	02:19
Average Handle Time	05:44	06:27	06:16	06:19	06:09	06:06
Longest Wait Time	12:39	21:55	14:16	21:21	20:19	20:38

Table 1: Incoming calls to Contact Centre per month (Day, 2012).

Currently, officers access housing management information via Open Housing Management System (OHMS) or APEX databases. OHMS is a housing management system provided by Northgate that manages rental, repair, and other data related to tenant needs and APEX is a stock information database provided by Innovation that stores information such as repair plans, energy efficiency ratings, and other data related to the nature of the housing 'stock.' Currently, officers access each database separately and input and export these data manually. This manual input of data leaves APEX and OHMS disconnected, inconsistent, and about typically 3 months out of date when accessed.
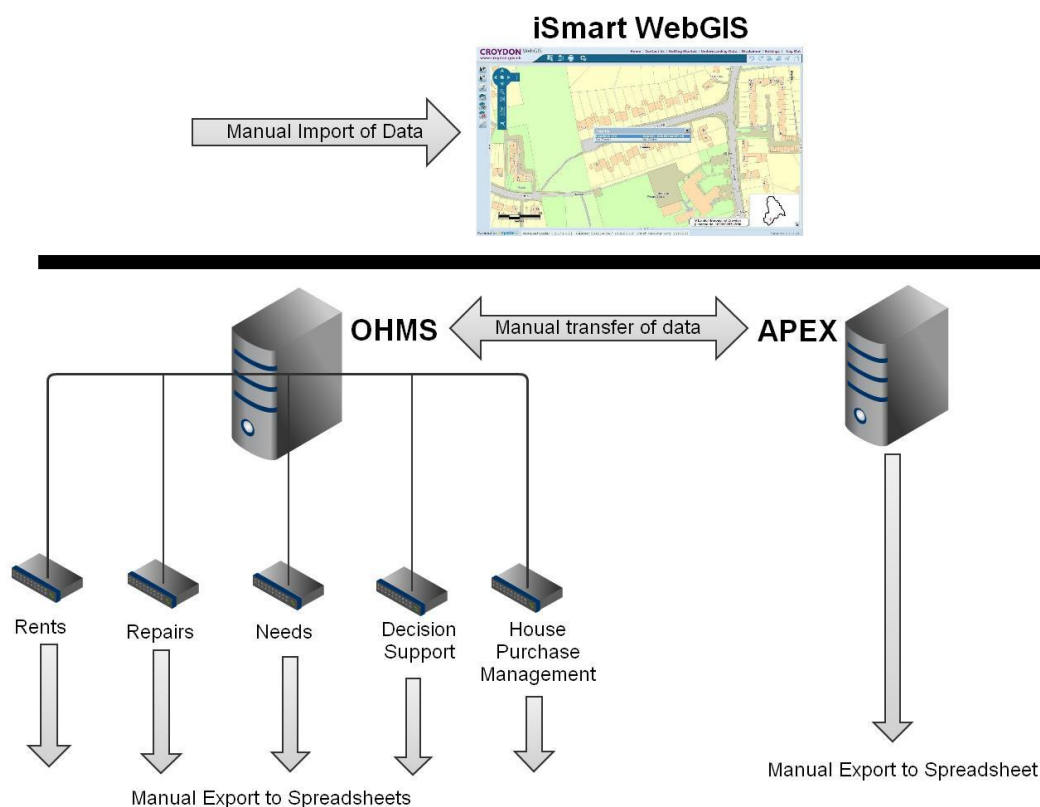
Figure 1: Graphic showing how Apex, OHMS, and GIS are separated.

OHMS is split into 5 different modules (rents, repairs, needs, decision support, and house purchase management) that currently cannot communicate with each other. A real-time link between the different modules of OHMS and a link between the APEX and OHMS databases would be extremely useful within the Council. Council officers would greatly benefit from having a centralised location to draw all information from which will help them improve their services to tenants. An internal survey has confirmed that there is interest in a central graphic user interface (GUI) that could be used to view housing information drawn from both housing and stock databases (Hufnagle, Rashid & Mao, 2012).

The Call Quality Monitoring system (CQM) is used to check the performance of the staff within the call center to make sure that customers are treated in a considerate and helpful manner. CQM has been implemented in other forms of communications including written and electronic forms, such as email (Croydon Council, 2010c). This system has enough benefits that

some sort of supplementary overlying middleware could lead to overall system improvements. (Croydon Council, 2009).

2.3.3 Call Centers

In 2006, the Council wanted to increase the number of phone calls dealt with directly, and in order to do so the number of trained staff was increased. Additionally, an automatic queuing system was created to assess waiting times, busy times, etc. to help improve the call center to make it work more efficiently (Croydon Council, 2006). Finally, the Council has implemented voice-recognition software to answer customer's questions during non-business hours. However, the call centers were still staffed during the day due to customer demand for human interaction and service (Croydon Council, 2011d; Croydon Council, 2011c) .

2.3.4 Face-to-Face

The Council created Access Croydon (previously "One Step") to help increase face-to-face interactions for all of Croydon's services (Croydon Council, 2010b). Access Croydon aims to reduce customer waiting time to get a face-to-face interaction. Access Croydon created a queuing system similar to those implemented at the call center to reduce waiting times (*What We Did: The Access Croydon Experience.*).

Another service that Croydon offers is the Partnership for Older People (POP) bus service, which is a bus that travels around Croydon to provide important services to those citizens that are older in age. POP has the advantage of providing people with a face-to-face interaction without the use of a telephone or the internet. Nearly 12,400 people have accessed information, advice, and services through the POP Bus service (Jim Montes, 2010). The POP Bus also provides services and information on health and housing (*POP Bus Service.*).

2.3.5 Customer Relationship Management in Croydon (CRM)

In 2009 the Council was made aware of the fact that customers desired a computer-integrated system for interactions and feedback regarding services and information. They realized that computer systems could be used to monitor customer satisfaction with various services and interactions (Croydon Council, 2010a). Specifically, DASHH realized that they

needed a better way to organize information. In 2005, the Housing Advising Team created the Customer Relationship Management System (CRM). The CRM is a database that records all the activity from a client and then sends the request to members in the Council departments. This service is extremely useful because a service request is automatically sent to corresponding department at time of the call. This request includes all relevant information about appointment and can be accessed almost immediately. The service request can then be updated after the appointment with any additional and necessary information. The system will then keep track of any future appointments with that client. The CRM also informs the employees which client is being serviced by specific offices and employees (*Chapter Three: Customer Care.*2007).

Croydon's current database management system is disorganized between different departments. There is no easy way for Council officials to request data from another department. More specifically, there is no link between the DASHH and the customer contact center databases. This lack of communication is a major issue for the Council, but the introduction of a new system will reduce the inefficiencies within the Council and allow a dynamic presentation of data. The switch from a static data management system to a dynamic system will guarantee the most up-to-date information that will be represented through their iSMART GIS software. We believe this GIS software could be utilized to its full potential if the Council were to purchase a solution to bridge the databases. The Council could then use the geographic representation of various data to recognize trends in areas such as energy inefficiencies of their facilities, and strategically plan upgrades for the future. Recently new 'platforms' have been developed that may be useful in integrating the different databases used by the different Council departments. Although social networking services such as Facebook are very popular, the Council feels that there is a need to first focus on basic platforms of communication. In order to do this, the Council has created a mobile version of their web site that they have named Croydon MOBI. They have been working to digitize all of their documents within the Electronic Document Record and Management System (EDRMS). More departments are currently adapting to the EDRMS program to help give employees better access to the information they need more efficiently (Croydon Council, 2009).

During the years of 2010 and 2011, the Council attempted to combine their database systems into a single platform to make information retrieval a more streamlined process.

Multiple current systems were analyzed to determine which systems would fit the Council's requests most efficiently. The CRM system will provide a solid foundation for trying to seamlessly integrate all council databases. In the end, the decision was made to develop a single customer account system to help increase the development of a bigger system (Croydon Council, 2011c).

2.3.6 Croydon Online

The recent increase in online transactions with customers has encouraged the council to consider bringing more of their transactions online. The website to manage these transactions would be PIN-controlled to ensure security and simplicity for customers. Tentatively, the CRM system would the use Microsoft SharePoint to allow users to access the system on a mobile device. The council also debated about whether or not to develop an app for mobile and web-based services, to make it easier to access information (Croydon Council, 2011c). While the Council does want to bring their services into the 'Digital Age,' it is also important to maintain the current systems for those who to be more averse to digital interfaces, specifically the elderly and handicapped residents. In order to reach these not technically disadvantaged customers, the Council has created large print and audio tapes for public use. The Council will also continue to maintain the call center and Access Croydon to reach a larger audience of customers. The Resident Checked Group has been gaining the feedback from the tenants to plan for ways to communicate in the future and to check the tenant's satisfaction with the current system (Croydon Council, 2006).While there are various methods of communicating with the council and the different departments that deal with specific issues, a more unified system would both be more efficient and easier to use. Consequently, the Council wishes to bring its services together so that as a whole they can be more productive and achieve more with for customer (*What We Did: The Access Croydon Experience.*).

2.4 Examples of Housing Systems

In recent years the housing industry has moved online and several different organizations have been going about differently. These online interfaces have been able to give the tenants and housing organizations more control over the things they want in a secure way. These developments are important to notice as to find the benefits and faults that the systems went

through. These developments will help Croydon Council to learn which features will work in their own system.

2.4.1 eSpatial

DASHH uses the Contact Centre database to record all enquiries and relays these requests to all departments within the Croydon Council. Currently the integration between this database and other departmental databases within the Council is lacking. The Council hopes that a new middleware system will allow all officers to instantly pull information from any database within the Council. The idea is that eSpatial's iSMART system will display any requested dynamic information in a user-friendly GIS mapping window.

This GIS software (iSMART) is currently underutilized and disconnected from the overall system. Apex contains information about the housing properties themselves, such as number of bedrooms and number of windows, while the OHMS database contains tenants' information, such as contact information and repairs history of their dwellings. GIS has the potential to display layers of information from Apex and OHMS on a map of the Croydon borough but currently cannot request data that would prove useful for future planning in areas such as CO_2 emissions. GIS could display the Council's properties, and officers can perform different analyses such as viewing the economic distribution of the borough population.

2.4.2 Case Studies

A case study from Oxford University recently analyzed the application of GIS-based modeling to reduce CO_2 emissions. Recent development of a DECoRuM (Domestic Energy, Carbon Counting and Carbon Reduction model) has allowed authorities to map baseline domestic CO_2 emissions with great accuracy. Rajat Gupta explains, "DECoRuM provides local authorities and energy advisers with a GIS-based tool to address the barrier of counting and reducing emissions locally" (Gupta, 2006). They can use this at a street level to help them visualize and plan future improvements. Additionally, the system can relate a financial cost estimate to each possible CO_2 emission reduction.

Figure 2: A modern GIS representation from Oxford Housing (Gupta, 2006).

DECoRuM uses the most up to date version of the Building Research Establishment Domestic Energy Model (BREDEM-12) linked to Standard Assessment Procedure (SAP) to estimate the annual energy use, costs, and CO_2 emissions of each property. It factors in the CO_2 emissions from space heating, water heating, lights and appliances. The data that is needed is broken into 5 categories: data for all dwellings, data from built form of the dwelling, data from age of dwelling, primary data for individual dwellings, and data for estimating the solar potential. Figure 2 displays an accurate depiction of what authorities can use to view CO_2 emissions. It includes an updated photo of each property to further clarify the facility in question, as well as a color-coded map of the individual annual CO_2 emissions (Gupta, 2006).

Researchers applied this technology to 318 dwellings and found that the facilities consume 49, 699 Gigajoules per year and a total of 3,026 tons of CO_2 emissions per year. The program reveals that solid wall insulation is the most cost-effective improvement for CO_2 emissions; followed by hot water cylinder insulation, cavity wall insulation and condensing boilers. Solar hot water and solar photovoltaic systems proved to be expensive and the least cost-

effective way to cut back on CO_2 emissions. It is interesting that the most cost-effective improvements do not necessarily save the most CO_2 emissions. An estimated 26,844 GJ/year and 1,504 tons of CO_2 reductions are possible with the correct planning using this DECoRuM system.

The Australian Public Housing sector has recently undergone some changes regarding their public housing budget. They cut costs on public housing infrastructure, which yielded fewer tenants and fewer venues for public housing. This budget cut has forced some Australian Public Housing establishments out of businesses. Tenants in these homes must relocate to operating housing facilities and the Public Housing sector is using GIS technology to help point tenants to the right housing center. Urban growth has forced the public housing sector to improve their relocation process using spatial technology. The Spatial Decision Support System (SDSS) prototype was installed on laptop computers and used by relocation officers to help aid tenants through the relocation process. The software drew from a database of geo-referenced images and put them into a street directory layout to help tenants gain a better understanding about the geographic characteristics of each possible home (Baker, 2008). Location was more of a concern than rental cost when tenants were considering locations because rents are capped at a proportion of household income and tenants would get similar rates at different locations (Baker, 2008). Tenants are more concerned with their distance away from family members and employers because that is often their primary source of income. Australian Public Housing addressed the problem of a "digital divide" within the tenant population by proving physical access of technology to vulnerable users such as the poor/aged/etc.

Landlords in the UK have explored different ways of dealing with anti-social tenant behavior. Tenants may sometimes be costly to the landlord because the tenant represents the community in a negative manner (noise complaint/known criminal/addict/etc.). The Labor Government's developed a Choice-based Lettings (CBL) system to help measure the desirability of a tenant. Tenants are evaluated based on their waiting time and overall necessity for housing. The CBL points are then used in a bidding war for all of the landlords' properties (Cowan & Marsh, 2005). "Between 2001 and 2003 the government ran 27 CBL pilots to test the approach and has stated as a policy objective that all local authorities should be running some form of CBL by 2010." Tenants welcomed the transparency of the CBL system and considered the

benefits worth the extra effort. However, the CBL studies did not accommodate for vulnerable households. This exclusion adversely affected those who could not actively use the technology (Piloting choice-based lettings: An evaluation.2004). This validates that the UK government approves of the CBL system and encourages organizations to adopt a merit-based system in the near future. Individuals in this case are free to choose, but more importantly obliged to be free (Rose, 1999).

It is apparent that "…the more opportunity people have to decide these things for themselves; the more likely they are to feel ownership of the decision and to be satisfied with the outcome. And the more information they have on which to base their decisions, the better those decisions are likely to be" (DETR/DSS, 2000). Croydon's tenants currently have the GIS capabilities for area info, but they do not have a link to property specific data that may set their facilities apart from others. A transparent web interface that provides up-to-date information available to all tenants will create a system that allows the tenants to manage themselves and to be more aware of their current state of living. Internally, this system will allow the Council to quickly answer any location-specific questions or strategically plan improvements for the future. One specific request that cannot currently be answered with the present system is the locations that have accessibility for the disabled. With the new theoretical system, Council members will be able to provide accurate advice about the best possible locations for tenants and will be able to send screenshots of each location and its surroundings to tenants.

2.5 Conclusion

Clearly, with 16,000 properties and 120,000 housing units, the Council has an enormous amount of information to handle. This data is managed within DASHH by two disconnected databases, which hampers the ability of officers to process information effectively and efficiently. Furthermore, tenants have been requesting a better way to communicate with the Council and vice versa for several years (Hills, 2007). Many local boroughs have already taken the initiative and upgraded to integrated database systems which are more streamlined and also allow the move to online services for tenant. The central interface that this would provide would give instant access to information by Council officers, thus reducing overhead of any unnecessary searching, and streamlining the databases for ease of use. Also, a user-friendly

interface for tenants would enable customers to access information independently, without the need for a middle-man.

The Croydon Council considers 'delivering high quality public services' and 'improving their current use of resources' a high priority. A direct access to property-specific information would strongly support the Council's agenda of 'Demand Management' and 'Avoidable Contact'. Tenant self-access to information will allow officers to spend their time more efficiently and therefore improve current use of resources. Reduced time spent retrieving data will most definitely improve the speed and efficiency of Council services throughout DASHH. However, as with any Council project, an improved system solution would require both funding and widespread support. To ensure the success and feasibility of this undertaking, a business case would need to be developed; thus outlining all the costs, advantages and disadvantages of the different options the Council could take. The next chapter describes the methodology to research the problem and complete the business case.

3. Methodology

In order to accurately explore solutions to improve DASHH's current system, we outlined a set of four objectives:

1. Explore the advantages and limitations of the current housing and asset management system used in DASHH.

2. Enumerate the advantages and disadvantages of Options 2 and 3 according to different audiences. (DASHH, ICT, tenants, & vendors)

3. Clearly portray all advantages and disadvantages to relevant stakeholders to solicit feedback.

4. Provide DASHH with a recommendation based upon the results and conclusions from the above objectives.

The main goal of our project was to expand upon an existing business case to help the Croydon Council assess the advantages and disadvantages of three Housing Management System (HMS) options considering all stakeholders that would be affected by the change. The previous group had outlined the following three options that we adopted as potential solutions to research:

Option 1: No change to the current HMS

Option 2: Development of a middleware overlay to integrate the two existing databases

Option 3: Purchase and implementation of an entirely new HMS

The previous WPI team conducted most of the exploratory research regarding tenants, initial assessments of staff, and potential improvements to the housing and asset management system. They concluded their work with a basic business case outlining the cost and feasibility of a middleware solution. This project followed up on the previous business case, focusing on the benefits and concerns of stakeholders in multiple departments within DASHH. Six weeks were spent analyzing the cost and feasibility of an entirely new housing and asset management database (Option 3) versus the cost and feasibility of an overlying middleware solution (Option 2). The resulting business case provided an analysis of the costs, feasibility and benefits of

Options 1, 2, and 3. Our goal was to develop a business case that clearly outlined the specific limitations in the current system, and specific departmental benefits of an integrated system. The factors that led to our final recommendations were based upon the opinion of all relevant audiences, and the assessment of the feasibility and the cost of each of the three options.

To accomplish the objectives set forth, a set of specific tasks were completed. The objectives and associated tasks are discussed below.

3.1 Objective 1: Explore the advantages and limitations of the current housing and asset management system used within DASHH.

Through research and enquiries to officers in the housing department, we gained a thorough understanding of the current data management systems and identified the shortcomings to be overcome. Then, we clarified the desired goals and features of an improved Housing Management System. We used resources provided by the previous team, and expanded on their knowledge to 'fill in' any gaps in their research. To do this, we researched a variety of internal tutorials aimed at training new Council officials in Apex, OHMS, and iSMART. After we gained a basic knowledge, we scheduled numerous interviews with officers in each department of DASHH and often had informal meetings with experts in OHMS modules, the Apex system, as well as the eSpatial GIS software.

During these encounters with DASHH officials, we learned how different departments conduct their day-to-day jobs and how the system could be improved to make officers' jobs quicker, easier, and therefore, more efficient. We requested specific complaints about how the current system inhibits them while performing their current jobs. Additionally, we had regular meetings and discussions with our sponsors Judy Pevan, Carl Taylor, and George Simms and ICT project manager Sean Hyden to work out the details specific to internal politics (costs, requests, etc.), technical specifications, and identify key figures with whom we should speak (see Appendix A for more information about interviews with members of the Council).

3.2 Objective 2: Enumerate the advantages and disadvantages of Options 2 and 3 according to different audiences. (DASHH, ICT, tenant, & vendors)

In order to explore the advantages and disadvantages of Options 2 and 3, we first needed to identify potential vendors and speak to them about the abilities and limitations of their products. The previous team explored cost and feasibility with primarily Option 2 vendors. We contacted these vendors and identified additional contacts using snowball sampling techniques in our conversations. This technique involved asking every party that we contacted if there were additional people or organizations that we could contact to further our research. While speaking with project managers of Apex and OHMS, we identified several Option 3 vendors that had previously presented their products at the Croydon Council. Using internet searches, we augmented this list to include a broad variety of Option 3 vendors, and began contacting each company to discover whether or not they could provide the Council with the combined housing and asset management system they requested.

We developed two separate templates for our scheduled conference calls with potential vendors. When speaking to both Options 2 and 3 companies, we clearly outlined that we were a group of three students who were conducting research on behalf of the Croydon Council to compose a business case, and we could not negotiate any prices. However, we did explain that all necessary information would be relayed to our superiors and if the vendors would cooperate with us, they could possibly be working with the Croydon Council to develop a solution in the near future. Our main topics of discussion were primarily what hardware and software the Council would need to run their product, whether or not their product was compatible with eSpatial's GIS software, and what possible cost and time of implementation estimates could they provide at that time. The content of each conversation between Option 2 vendors, Option 3 vendors, DASHH staff, ICT staff, and tenant/ tenant consultation staff are summarized below.

3.2.1 Option 2: Middleware Solution

From the middleware vendors we obtained information on the minimum system requirements to use their product. We forwarded this information to Council ICT staff to confirm that the software was or was not compatible with the Council's current technical infrastructure provided by Capgemini. This helped us prioritize the best possible middleware vendors to help

solve the Council's problem. Once it was confirmed that the companies were a viable middleware company, we scheduled follow-up conference calls to ask more specific questions. A selling point for these middleware vendors was if their product was compatible with eSpatial's iSMART GIS software. This GIS software was recently purchased and it would incur additional costs if the Council had to purchase a new GIS module to have a functioning geospatial analysis tool.

More information on conference calls with Option 2 can be found in Appendix E.

3.2.2 Option 3: New System

The Option 3 solution by definition is much more drastic of a change than the Option 2 solution. Accordingly, we requested information from the vendors on every possible desire and functionality outlined by all stakeholders in the previous group's work. If the Council were to purchase this system, it must be able to do everything they request and essentially encompass 'all of the bells and whistles'. All previously "optional" traits of the middleware system became requirements of the new system. Along with these questions we also requested quotes of cost magnitude and a possible timescale of implementation for projects of this size. Also, we questioned their licensing protocols, what their consulting costs were, and questioned their guarantee for security, specifically during online access. With these questions we were able to accurately compare and contrast Option 2 and 3 costs with preexisting annual costs of the current system.

More information on conference calls with Option 3 vendors can be found in Appendix F.

After these data were gathered, we met with internal officials within the ICT staff to discuss the feasibility of each option. We scheduled phone calls with the companies that currently manage OHMS (Northgate) and Apex (Innovation) to assess the feasibility of a middleware solution. During these interviews, we discussed how each vendor was unique, how costly each vendor's services were, and the overall technical experience that they appeared to bring to the problem.

3.3 Objective 3: Clearly portray all advantages and disadvantages to relevant stakeholders to solicit feedback

The methods used to assess these options included a variety of tasks, such as archival research, focus groups with stakeholders within the Council, interviews with staff members in other boroughs and interviews with software system vendors. Interviews were the primary tool for gathering feedback on how each department could benefit from an updated system. While conducting interviews with Council officers we used a storyboard demonstration to better explain how the changes would affect each specific party. Additionally, interviewees were asked if there was anyone else that should be contacted for further information on how the system would affect the department as a whole. Permission was obtained to take notes (see interview preamble in Appendix B). Interviewees were also asked for permission to quote them, noting that they would be given the right to review the final report before publication. This basic protocol was used to ensure their comfort and honesty.

After the initial requirements of the interface functionality had been established, different software options were evaluated to determine which would best suit the needs of the Council. We developed three detailed storyboards to characterize the options. The first portrayed the current system, the second with a middleware overlay, and the third with the ideal new system. The storyboards helped strengthen the business case and show stakeholders the kind of beneficial changes that a new system can give to DASHH. This visual representation was very helpful when presenting to groups of stakeholders.

Two focus groups were conducted on May 31st, 2012 to explain to relevant stakeholders the goals and aims of this project. All stakeholders were recruited by our sponsor liaison, Judy Pevan. Most of these stakeholders had no previous knowledge of this project, so the focus groups commenced with a quick overview of our Option 2 recommendation. We did not explain Option 3 because of the fact that anything Option 2 would be able to do, Option 3 would also be able to do. During our presentation, we stressed that we would like to keep it an open forum and that everyone present was encouraged to ask questions and provide input whenever they see fit. Our presentation served as a smooth transition into an open discussion that revealed many possible benefits and concerns with the newly proposed solution.

The information from these focus groups included problems with the current systems of OHMS, Apex and the GIS, and the lack of connectivity between them. During our focus group sessions, there were two members of the team presenting the storyboards and presentation and answering questions, while the remaining member took notes on any comments the officers had. (for more information see the focus group preamble in Appendix C)

3.4 Objective 4: Recommend to DASHH an appropriate strategy for future changes

To convey the knowledge gathered and conclusions reached, we put our findings into the standard Croydon business case format. This business case included tables outlining the costs of all three options, and the feedback that was gathered from various officers and departments. To fully develop this business case, we worked closely with Sean Hyden, Project Manager for the ICT department, and Judy Pevan. Hyden and Pevan were able to provide essential feedback that enabled us to clarify the document through revisions to better meet the needs of the intended audiences. Additionally, a critical review of business case was completed by Tony Snook, Risk and Project Manager of Corporate Programmes. This was done before final submission of the document to Council authorities on June 20th, 2012. The business case is referenced in the references section of this report (Erickson, Haley & Mannheim, 2012).

A final presentation based on the key points of the business case was given to Council officials on June 18th, 2012. This was done to visually present the three options and clearly portray the advantages and benefits of upgrading to the recommended solution. The online presentation tool Prezi was used to create an engaging slideshow that would be able to characterize the information flow in the housing databases. A key task that was completed through the presentation was that of making a wider Council audience aware of both the existing problem and the potential solutions.

4. Findings

Recognizing the need to explore the options for a better integration of OHMS and Apex databases, DASHH requested that WPI students conduct a two-part assessment from March to June to explore a possible solution. In March and April, the first WPI team conducted extensive background research that formed the foundation for the follow-up project. From the internal staff surveys, the previous team discovered that the main officer interests were to have a graphic user interface (GUI) to centrally access information, consistent data between Apex and OHMS, and more functional GIS software. Tenant surveys showed that there was interest in having rent account information online, as well as repair status queries available. Considering both tenant and official opinions, we evaluated the benefits of keeping the status quo versus purchasing middleware software or a new system. A summary of the internal staff opinions showed that a new system (Option 3) would require too steep of a training curve, and was too expensive. Nevertheless, internal staff had many complaints about the current system (Option 1) because manually entered data quickly created inconsistencies between databases which made officials' jobs more tedious. The research conducted with middleware (Option 2) and new system (Option 3) vendors showed that both solutions would improve Council services to help reduce avoidable contacts and increase efficiency. Over these seven weeks, the costs, feasibility, and overall opinion of the following three Options were analyzed:

Option 1: No change to the current HMS

Option 2: Development of a middleware overlay to integrate the two existing databases

Option 3: Purchase and implementation of an entirely new HMS

Our research was focused on the benefits and feasibility of an implementation of either Option 2 or Option 3. Additionally, we conducted interviews to identify both the problems with the current system and any benefits that might be gained from an improved system. Iterative meetings with DASHH officials and other officials aided us in framing the overall problem, operational parameters, and possible solutions for their current system. Although remaining with the current system (Option 1) would require no training curve whatsoever, Option 2 would provide a tool for the Council to cleanse their data with ongoing use of the current systems. We found that it is entirely possible for the middleware solution to recognize inconsistencies in data,

and then query information so officials can pick the most up-to-date information and cleanse all other entries. Option 3 companies requested that all data be cleansed before switching to a new system. This data cleansing issue was considered a top priority when speaking to ICT officials. Because of this priority, we outlined Option 2's capabilities as a key characteristic.

It was very evident from focus groups with DASHH officers that Option 1 was not preferred, and a change was universally desired. The desirable change was an overall consistency of data and communication between both housing and stock databases and increased access to more information. Officers were very enthusiastic at the prospect of having a more dynamically updated system, as this would save time and allow for information to be current. A very interesting result that came from these focus groups was that of legal issues. With uncertainty in the numbers stored in the databases, lawsuits have been raised, thus incurring legal fees for the Council. If there was a way to guarantee information on the database was correct it would prevent the Council from having to deal with these lawsuits.

Many day-to-day users of the current system expressed that they only ever used one or two modules of OHMS, and most were completely unfamiliar with Apex and the information it contained. After further discussion, many Council officials agreed that access and easy visibility of all modules within OHMS, as well as some Apex stock information could be extremely useful. An example given was if the Housing Management department could possibly view Apex information regarding disability access (ramps, lifts, etc.) they could more accurately place disabled tenants in vacant properties.

Judy Pevan, Carl Taylor, and Sean Hyden frequently stated that it should be made clear that we were students conducting research to compose a business case for the Croydon Council, and that we were not in the negotiation stages. Thus, we prefaced our conversations to vendors by outlining the fact that we were students conducting research; this may have been the reason why only a few companies responded and were willing to speak with us. Fifteen middleware vendors were contacted; 10 failed to respond; 3 responded but could not provide the requested services; and 2 responded and confirmed that they could provide the services required. We analyzed the feasibility of each product by questioning whether or not the product had the ability to query inconsistent information to aid in data cleansing, if the product could run on the

Council's current technical infrastructure, and if the product could integrate with eSpatial's iSMART GIS software. The two feasible middleware vendors worth pursuing were Attunity and CONNX Solutions. A summary of all middleware vendors contacted is below. For more information on contact with middleware vendors see Appendix E.

Response?	Middleware Vendor	Contact Name	Feasible?	Cost
Yes	Attunity Federate	Martin Hamilton	Yes	£227,500 first year, £39,600/year after
Yes	CONNX Solutions	Shirley McKinney	Yes	Waiting on costs
Yes	Integral Software Solutions	Alissa	No	
Yes	Solace System	General Enquiry	No	
Yes	P3ople4U Inc.	Spiro Lecatsas	No	
No	HiT Software. Inc.	General Enquiry	-	
No	Iron Mountain	General Enquiry	-	
No	Lixto Software	General Enquiry	-	
No	METIS	General Enquiry	-	
No	Prolifics	General Enquiry	-	
No	SkyHawk System	General Enquiry	-	
No	Treehouse Software	General Enquiry	-	
No	Cambridge Semantics	General Enquiry	-	

Table 2: Option 2 (Middleware) Contact Summary

Considering the implementation of Option 2, the Council would need to fund the maintenance of the middleware solution, as well as continue funding for the current Apex and OHMS databases. Based on our research, which has primarily been conference calls with middleware vendors, we discovered that the Council's current technical infrastructure could run a new middleware solution with few changes to the current systems in place.

Attunity, a middleware vendor that has expressed great interest, informed us of an example of a recent purchase of their Federate engine for 6 CPUs was £33,000. They offered consultation at £1,500/day (recommended 3 days) and training costs of £3,000. Following years incurred an annual fee of £5,940 (18% production fee). Estimated total costs for the first year were about £40,000 and an estimated timescale of implementation was 30 minutes to install the software on each CPU (180 minutes total). With Croydon's current system it would cost £227,500 for the first year and £39,600 for the annual fee. Attunity's middleware or "Federate

engine" will indeed be compatible with eSpatial's iSMART GIS software as long as Croydon's internal ICT staff can define an interface between the two. The Federate engine should be able to integrate Apex and OHMS databases, but the writing capability of the middleware is dependent on Northgate's licensing policies.
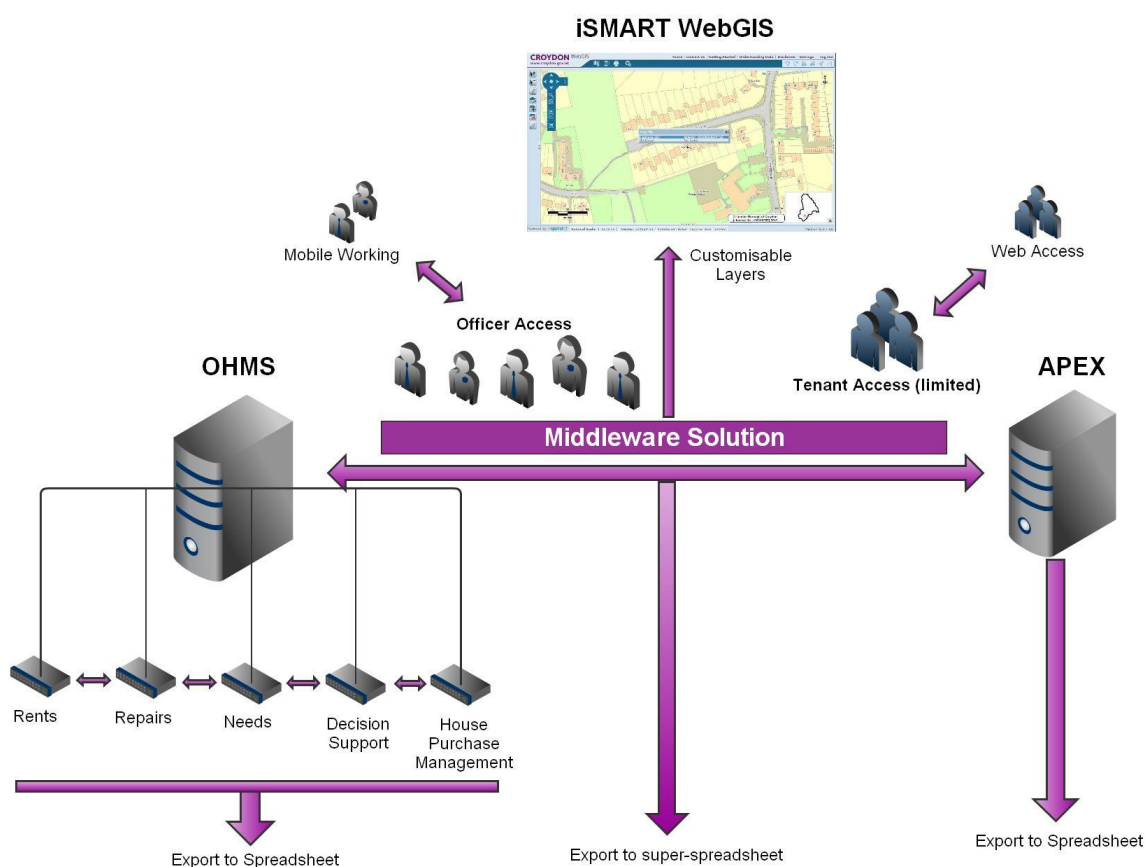
Figure 3: Depiction of increased connectivity of middleware overlay on Apex and OHMS.

After contacting middleware vendors we contacted new system (Option 3) vendors to compare with the costs of Options 1 and 2. We contacted 12 Option 3 vendors; 8 failed to respond; 2 responded and could not offer all services requested; and 2 responded that were deemed feasible. Yardi and Keystone were the two vendors that responded but Keystone only provided asset management systems, while Yardi only provided asset and housing management systems to the US and Canada and was not willing to work within the UK.
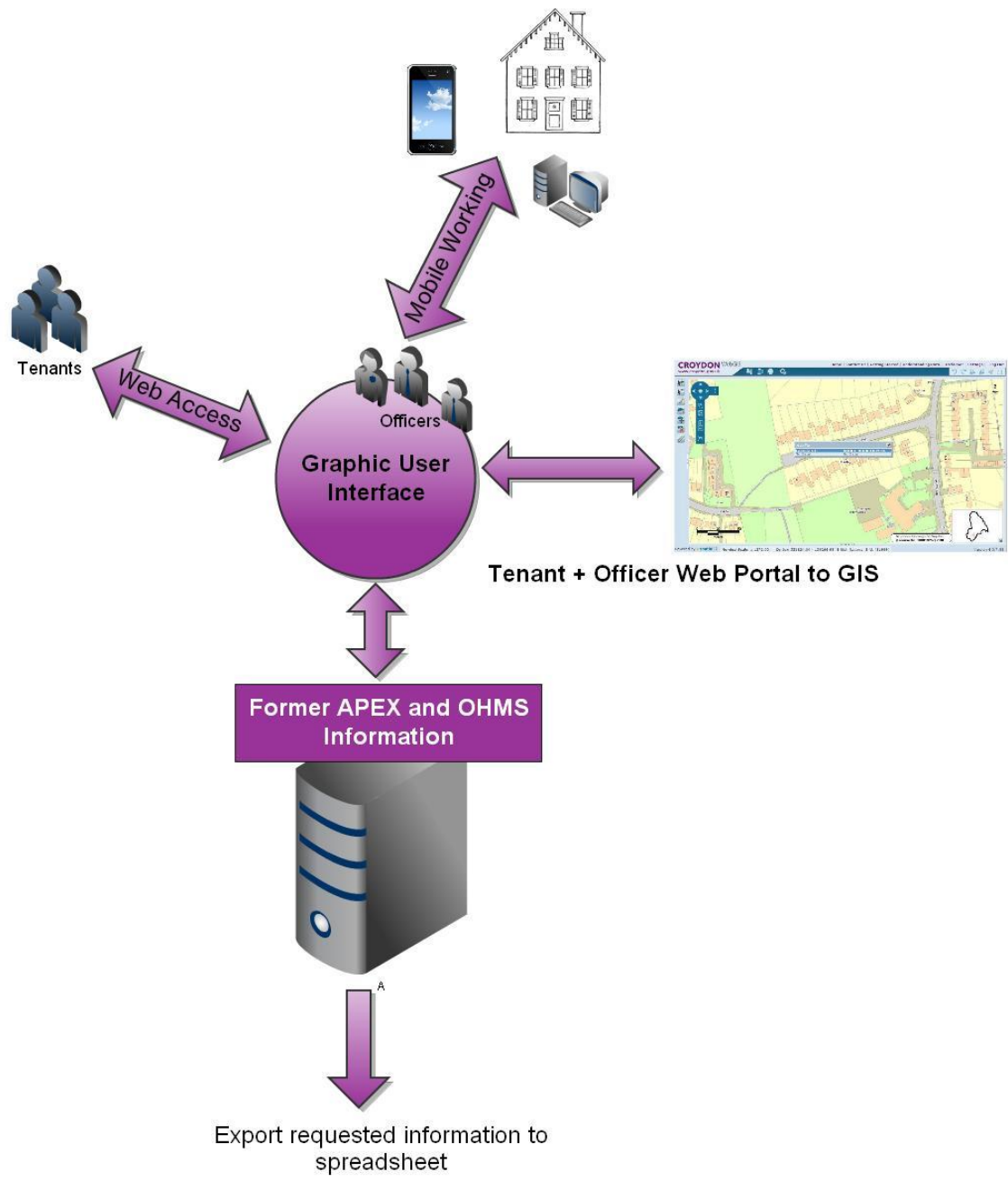
Figure 4: Representation of an ideal Option 3 system replacement solution.

During a conference call with Westminster Housing Partnership, we confirmed that they used a new asset and housing management system provided by Orchard. After contacting Orchard, we discovered they did indeed offer a product that was a feasible solution for Option 3,

but their Asset management system was too limited for DASHH's requests. However, Orchard partnered with Keystone to provide a completely integrated and sophisticated system. In order to get more services it would require that the Council purchase both Keystone and Orchard to get a full system, but that would then lead back to the issue of two separate systems instead of a single full-featured one. Because of this issue, Orchard was deemed feasible with limited capabilities. On the other hand, Civica appeared to be the most feasible solution, offering the most sophisticated functionality for an asset and housing management system. They provided us with a first year quote of £400,000 with a £50,000 fee in the years following. A conference call with an Orchard sales consultant revealed a cost estimate from about £150,000 to £200,000 for the initial system, as well as a £100,000 fee for implementation costs. Drawing from experience from similar projects, they estimated a timescale from six to nine months. This estimate is based on how long it will take the Council to cleanse their data internally. The sales representative provided a previous example of a 20,000 unit system with a Dell power edge T710 server with 8 hard drives that required 32 GB of RAM. This was the most accurate analogy to system requirements he could provide at this time. A summary of all Option 3 vendors contacted is presented below. The tables consist of the company contacted, the specific contact name, whether or not we received responses, feasibility in terms of matching the Council's needs, and finally cost to implement and maintain. For more information on contact with Option 3 vendors see Appendix F.

Response?	Feasible?	New System Vendor	Contact Name	Cost
Yes	Yes	Civica	Mark Holdsworth	£400,000 / first year, £50,000 per annum
Yes	Yes, limited	Orchard	Graham Humphreys	£150,000 to £200,000 / first year £100,000 per annum
Yes	No	Keystone		-
Yes	No	Yardi		-
No	-	Sybase		-
No	-	Raima, Inc.		-
No	-	TerraData Aster		-
No	-	Netezza		-
No	-	EMC		-
No	-	IBM		-
No	-	SAP		-

Table 3: Option 3 (New System) Contact Details

Option 3, unlike Option 2, excludes the use of current Apex and OHMS databases. Option 3 will completely replace DASHH's asset and housing management system and will allow complete integration between both the housing and stock databases. Although Option 3 may be more costly, it will solve many of the problems with the current system and will allow easy expansion of future modules such as asbestos register, mobile working, information management, financials, workforce scheduling, etc.

To gain relevant knowledge regarding different housing management systems, we used a technique known as snowball sampling. This involved continually asking people that were interviewed if there was anyone else that may be able to provide additional information. Using this tactic, we contacted a number of local boroughs within London. In preliminary emails and phone calls, we stated that we were working within the Croydon Council under Judy Pevan and Carl Taylor in the Stock Investment department to conduct research aimed at improving DASHH's housing and stock databases. The primary content of our conference calls was whether or not they were satisfied with their current system, if their system had sophisticated GIS capabilities, whether or not their housing and asset management databases were integrated, and what vendor provided their services.

Through a number of phone calls, we gained a good understanding about system functionalities of neighbouring Councils. We spoke with officials from other boroughs and questioned them about their system's similarities and differences with DASHH's system. Our research found that the council of Brent had a similar situation. Their housing database was provided by one company, First Housing, and their Asset information was stored on another database called Acolaid. They run GIS software called StatMapGIS that was developed by EarthLite. This GIS program appeared to be on par with eSpatial's iSMART program that DASHH used. They could not provide us with helpful advice because of their similar situation with two systems.

During a separate conference call with Hounslow, we found it interesting that they were also running OHMS, provided by Northgate, which was the system in use by DASHH. Furthermore, Hounslow used an Asset management system called CodeMan that was also provided by Northgate. These two systems are integrated and communicate much better than

DASHH's Apex and OHMS databases. Hounslow indicated that they have a very similar system to Croydon's and they too were interested in increased functionality in a GIS system to use for future planning. The borough of Richmond would not release information regarding their housing and stock information, but they did mention that they did not currently use GIS software and that Croydon's system appeared to be superior. However, their website seemed to be the most technologically advanced, as tenants had the ability to pay their rent, view account information, and file complaints or compliments.

Finally and perhaps the most informative, the Westminster Housing Partnership informed us that they had recently switched to a fully integrated system (Option 3) provided by Orchard. This system was primarily a housing management system but further questioning revealed that Orchard was in partnership with Keystone, an asset management provider. These two companies seamlessly integrate all information real-time. In addition to this, Westminster was also offered a limited asset management module provided by Orchard. After this conference call, we pursued Orchard for quotes and estimates of timescale and feasibility for a solution of DASHH's system. Our preliminary email to boroughs can be found in Appendix D, and a summary of all relevant information from surrounding councils can be seen below.

Borough	Contact Name	Vendor Provider	Comments
Brent	Alisdair MacLean	EarthLite (GIS) First Housing (Housing database) Acolaid (Asset database)	Uses StatMapGIS, provided by EarthLite. 2 databases used: First Housing and Acolaid
Hounslow	Rob Potter	Northgate (Asset database) OHMS (Housing database)	Similar state as Croydon. Also looking at improving GIS. Asset database is Codeman (Northgate)
Richmond	Martin Baines	Not provided	Does not use GIS.
Westminster	General Enquiry	Orchard	Recently upgraded to Orchard

Table 4: Summary of contact with various local authorities

After conducting various interviews with Council officers, we then composed an initial list of benefits that showed an integrated solution (either Option 2 or 3) would be beneficial to many departments within DASHH. We developed a short presentation using this initial list of benefits and our gathered knowledge about DASHH's current system and conducted two focus groups on May 31st, 2012. Seven Council officials attended the first session and 6 officials

attended the second. All were encouraged to voice their opinions whenever possible and were extremely helpful. Our presentation began with a quick run-through of our proposed solution of Option 2. We assumed that presenting Option 3 was unnecessary and would prove to be too confusing for a one-hour session. We concluded that anything Option 2 could do, Option 3 could also do with the exception of data cleansing. Therefore, all benefits expressed about the Option 2 solution would also be benefits for the Option 3 system with the exception of data cleansing and increased costs of implementation. Our presentation ended with the voicing of opinions gathered from DASHH officials previously spoken to about how this system would possibly benefit them.

During these focus groups, many outcomes were identified as universal benefits throughout most, if not all departments. Officials over multiple different departments expressed that more consistent and accurate data would increase their overall confidence when doing their jobs. A user-friendly interface would allow them to access information much more quickly, and the GIS capability of any requested information would most definitely aid them when planning improvements or providing tenants with recommendations. Additionally, a note-taking capability during data entry would allow officers to better communicate. This would clarify the misconceptions of data entry and would increase accuracy of data. Lastly, both tenants and officials agreed that a web module for tenant access would increase self-service, and thus decrease avoidable contacts.

Stock investment officials expressed that the manual export of summarized information upon request was very tedious and inefficient. Furthermore, the method used to update Apex leaves information in the system about 3 months out of date. Officials believed that real-time communication between Apex and OHMS could eliminate this problem and provide a great foundation for improvement across the entire system.

Responsive Repairs officials disliked the limited capabilities and restrictions between different modules of OHMS. They typically worked with the repairs module of OHMS, but often referred to the Rents module. There was no two-way exchange of information between all modules of OHMS and no intuitive way to use the different modules to their advantage. Easier access to all information within OHMS, as well as stock information on Apex with no restrictions would be extremely beneficial. They expressed that a photo capability of property

issues sent via text or email would be a unique way to communicate with tenants. Tenant access to their personal information would decrease officials' time on the phone, and allow them more time to plan improvements using iSMART. The ability to see the location of all DASHH-maintained properties alongside all repairs completed in the past 5 years would allow them to locate areas needing improvement that may have been previously neglected.

The tenant consultation team believed that the current website was not user friendly. Tenants do not have online accounts and therefore could not use the internet to request information specific to their properties. The ability to do so would improve service to tenants. Furthermore, the consultation team desired for the new solution to interact with the sounding board access databases that they used on a day to day basis.

Based upon survey analysis completed by the previous group, there was definite interest in an online interface for tenants to use. This was a main selling point for the Council to move forward with the project, as tenant satisfaction was a major factor. Additionally, this would benefit the tenants in more indirect ways, such as decreasing the time required for Contact Centre officials to retrieve the information necessary to answer a query.

Furthermore, members of the sustainable development and energy department informed us that they were limited by the amount of information they could directly access. If a direct link between Apex, OHMS and GIS existed, the information held within these databases could be used much more effectively to plan energy efficiency audits and improvement plans. Specifically, officers in the energy department require stock information that can be used to analyze how efficient each property is on energy. Thus, the incomplete data from the housing stock and very limited GIS functionality made their jobs difficult and inefficient. Consequently, the consolidation of all necessary data in one central location, and ability to use GIS to view said information would improve this department substantially.

A complete listing of the complaints with the current system and additional benefits desired for a new system can be seen in Table 5.

Department	Difficulties with Current System	Benefits of a New System
All Departments	• Inconsistencies in data between APEX and OHMS • Lack of data cleansing • Current system is not intuitive and requires technical expertise • Most officers only work with a few modules of OHMS and never access other modules	• User-friendly interface • GIS display of any requested information for planning • Web module for tenant access • Limited access to APEX • History of changes • Note taking capability • Limited access for officers to edit info, but capability for all to view
Stock Investment	• Manual export of summarized information upon request	• Real-time communication between APEX and OHMS • A system that recognizes inconsistencies and queries all similar data to aid data cleansing
Responsive Repairs	• Lack of stock information, leading to maintenance repair conflicts • OHMS has limited capabilities/restrictions • No two-way exchange of information	• Easier access to information with less restrictions • Photo capability for description of housing issues via text or email • Tenant access to personal information • Ability to see # of properties and # of repairs on GIS • Ability to see if requested repair is still under warrantee
Tenant Consultation Team	• Current website is not user friendly • No tenant accounts online	• Would prefer if their Sounding Board Access databases could interact with APEX and OHMS
Tenants	• No direct access route for self-service to information • Currently the Council cannot currently provide adequate services to tenants that cannot speak English	• Self-service access to information regarding rent accounts, repairs, and other personal details • Would allow tenants to report incorrect information about their property • Web interface could easily be translated into multiple different languages
Financial Services	• Irregular updating • GIS is slow to use and has limited data	• Capability to keep history of changes • Note-taking capabilities on tenant accounts • Compatibility with Oracle database
Sustainable Development and Energy	• Needs to request summarized information from Stock Investment that is manually exported	• Consolidation of data • Would like to use GIS to view all

	• Patchy and incomplete data for private housing stock • Limited functions in GIS	information requested
Housing Needs and Assessment	• 3rd party proxy info is entered into OHMS but cannot be accessed easily • Language barriers	• 3rd party proxy info flagged to show that there is another person to call (shared between all OHMS modules) • Tenant accounts include language translations and ability to apply for large print
Accounts	• £5,000 every time the Council takes a tenant to court • Inconsistent numbers lead to failed court cases	• Consistent numbers visible to both officers/tenants
Housing management	• Too much time in between matching tenants to facilities	• List of adaptations to property (handicapped access, stair climber, ramp, etc.)
Contact Centre	• Contact Centre passes calls off to officers in relevant departments	• Would have the ability to view information and answer tenant questions directly

Table 5: Complaints and potential benefits gathered from stakeholder focus groups

5. Conclusions & Recommendations

Throughout the seven weeks of our placement in London, we explored three possible alternatives to address the disconnected nature of the housing and stock databases currently used by the Croydon Council. Building on the research conducted by the previous WPI team, we focused on gathering the opinions of all various stakeholders within the Council as well as assessments of cost and feasibility from suitable vendors. After holding a number of iterative interviews with relevant staff, researching surrounding borough strategies, scheduling conference calls with possible vendors, and conducting two focus groups on May 31st, 2012, we arrived at the general consensus that an integrated system would be preferred over the present system. It was clear that Option 1 was not an adequate solution because staff inefficiencies in accessing and entering data often resulted in the accumulation of outdated and/or incorrect information in the system. Also, data in Apex and OHMS had to be imported into the GIS software manually, and the process was not intuitive or necessarily very helpful for planning and consultation purposes. Inaccuracy of data often led to unnecessary lawsuits that cost the Council an average of £120,000 per annum (Griffin, 2012). A slow response time and inaccuracy of data hindered the Council's ability to provide a quality public service to constituents, and for this reason we believed that a change was necessary.

The single, integrated database (Option 3) would require extensive data cleansing before data migration could occur. None of the Option 3 vendors we contacted offered 'data cleansing' or 'data realisation' services. The Council would have to work with an additional data cleansing company, or designate staff to sort through all of the data, identifying the most current and most accurate, and deleting all irrelevant information. This would incur extensive labour costs and increase the timescale of implementation. The middleware solution (Option 2) would provide a convenient way for officers to recognise inconsistencies so they could then cleanse the information between both databases. The software would query all related data for officials and provide a date of entry and location of entry in one central location. Therefore, day-to-day use of the software would allow officers to cleanse the data in manageable portions; further use would provide an easy avenue for maintaining accurate data. The Council would not need to employ additional workers because the software would aid in this process. The purchase of the

middleware software could facilitate the Council's ultimate move towards a single system if this was to be considered in the distant future, as the data would already be clean and consistent.

After analysing our research, we have come to the conclusion that compared to Option 3, Option 2 is the less expensive, more feasible, and more widely-accepted solution. We spoke to middleware vendors to gain a better understanding about the estimated cost and time it would take to implement such a middleware. The middleware solutions would be about £220,000 the first year with £35-40,000 every year following. The purchase of an entirely new housing and asset management system would be anywhere from £250,000-500,000 the first year with an extensive consultation cost for the years following. Option 3 would require a transition period that consists of hiring additional workers for data realisation, and then keeping the existing system funded and running while migrating and debugging the newly purchased system. This transition step would incur additional costs because previous external providers such as Northgate, Innovation, and Capgemini have to remain funded and the new external providers would also be funded at this time. It would take 4+ years to get Option 3 fully functional, as opposed to Option 2's 1-2 years. Comparison of both the estimated costs and timescales of Options 2 and 3 reveal that Option 2 is the most feasible and cost-effective solution.

The main benefits of the project can be seen in Figure 5; this map shows how the project outputs are linked to both benefits and strategic Council objectives. These objectives include reducing avoidable contact, improving value for money and demand management. The map also clearly shows that the dis-benefits greatly outweigh the project benefits and outcomes.
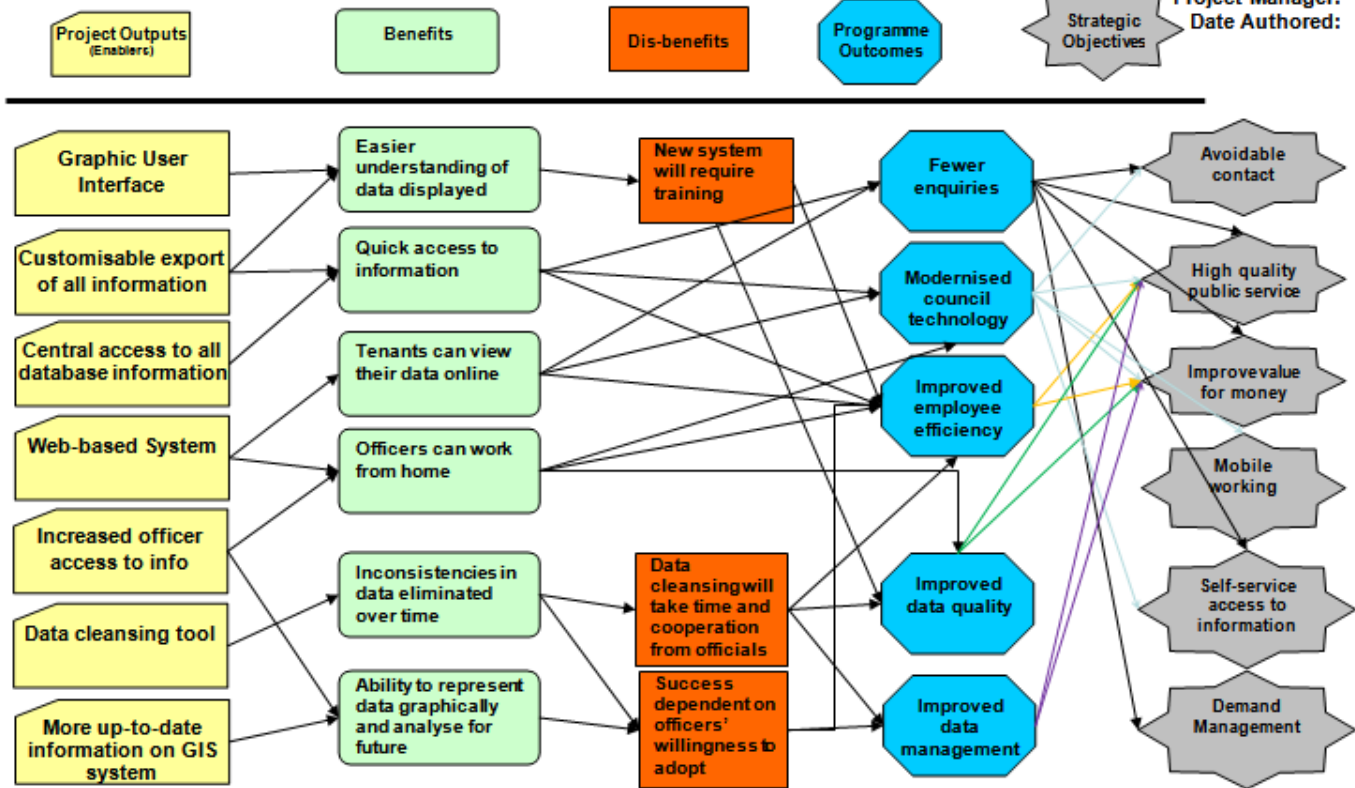
Project Benefits Map

Figure 5: Benefits map showing the outcomes of Middleware solution (Erickson, Haley, & Mannheim, 2012).

5.1 Recommendations for Future Strategy

The complete analysis of the three options, with advantages, disadvantages, costs and benefits, is presented in the business case that was submitted to Council authorities (Erickson, Haley & Mannheim, 2012).

The deciding factor between Options 2 and 3 was the overall cost and time of implementation. Following an options appraisal, our preferred recommended solution is that of **'middleware'** i.e. a sophisticated user friendly system that can access information from either OHMS or Apex using a single, central access point and view this data using GIS. The system would also be able to identify any inconsistencies between pieces of information within both

databases so that administrators could resolve these differences. Additionally, officer adoption of the middleware would likely be much higher due to the changes being less drastic than an entirely new system. Ultimately, a wide-ranging set of benefits would result if this middleware solution were to be implemented. The benefits and savings (Figure 5) far outweigh the costs that would be incurred to take the Council into a more advanced future system.

The middleware solution, Option 2, was determined to be the best strategy, but there were still several steps that would be necessary for DASHH to complete to receive funding and support from the rest of the Council. We recommend that DASHH and its staff work to further develop the business to include negotiations with vendors that give specific costs, as well as quantitative benefits. The Council-standard method for expressing cost savings is Full Time Equivalents, or FTEs. These FTEs represent the amount of time that would be directly saved by the implementation of the project, in terms of full-time officer positions. With the implementation of middleware, the major benefit would be repurposing officer time from answering tenant queries to more pressing matters, not necessarily eliminating positions. For the project to even begin to enter consideration by the approval boards there must be widespread support from not only officers in DASHH, but also tenants and other departments. This support must be gained by presenting the benefits to a wider Council audience, detailing that multiple departments will benefit, not solely DASHH. Another recommendation to ensure the project is a viable solution is piloting the upgrade to small groups. This process would entail the release of upgraded functionality to select officer and tenants groups for a trial period to gauge the user-friendliness of the system, possible problems, as well as if the benefits are indeed being realized. Finally, the data-cleansing process would have to occur through routine officer use with the aid of the middleware system. Again, this is one of the major benefits of the middleware as opposed to an entirely new system; the data cleansing would be done on a daily basis with minimal extra effort and without the need for a skilled data-cleansing team. The complete process and estimated timescale required to implement the system is shown in Figure 6.
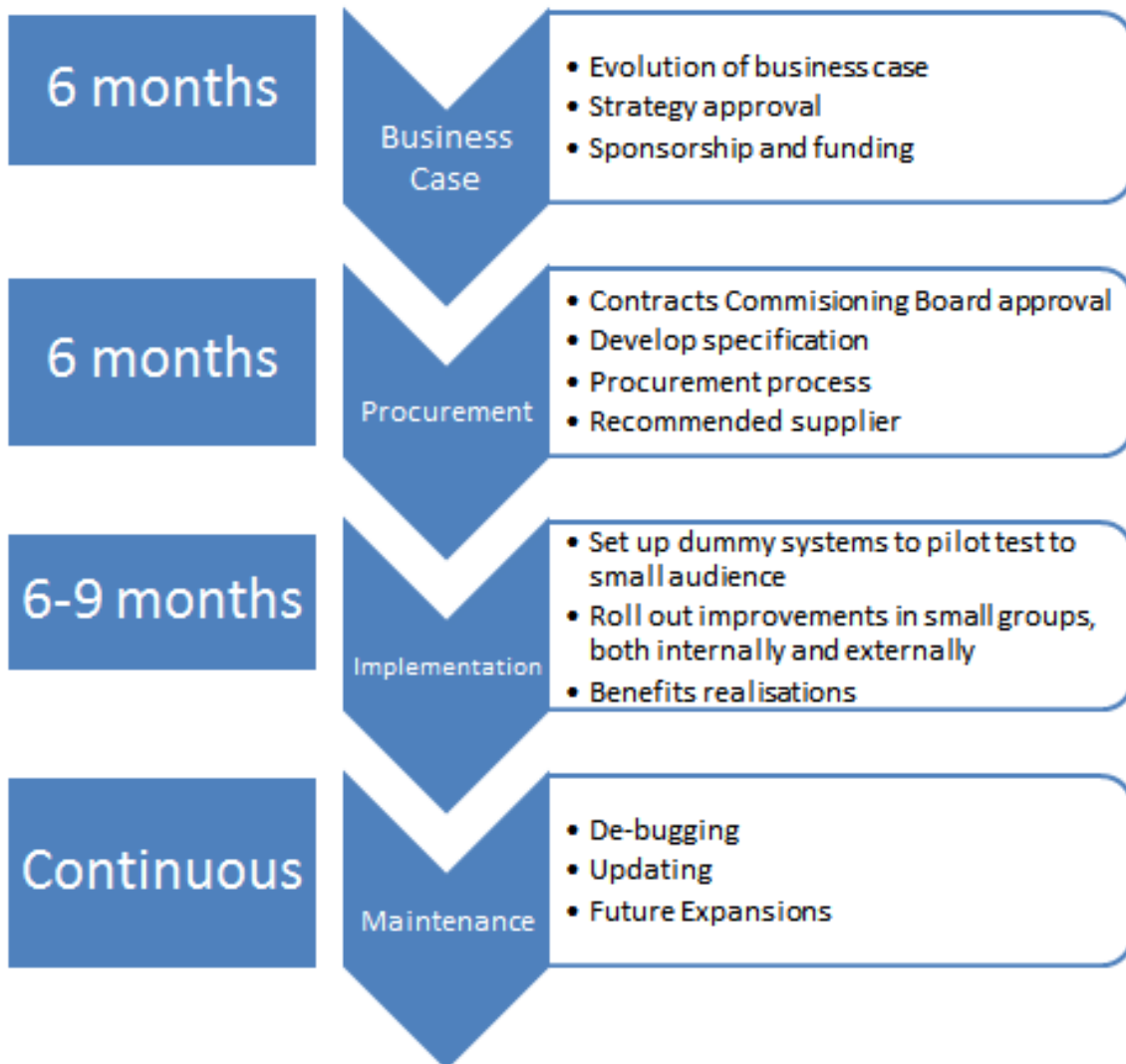
Figure 6: Timescale estimates for implementation of middleware (Erickson, Haley & Mannheim, 2012).

6. References

Baker, E. (2008). Improving Outcomes of Forced Residential Relocation: The Development of an

Australian Tenants' Spatial Decision Support System. *Urban Studies, journal.*

City of London. (n.d.) *London boroughs map.* Accessed 14 Mar 2012 from

http://www.cityoflondon.gov.uk/Corporation/maps/london_map.htm.

Cliftlands, Paul. (2012). *Personal Communicatio*n.

Communities and Local Government. (2008). *National Indicators for Local Authorities and Local*

Authority Partnerships: Handbook of Definitions.

Cowan, D., & Marsh, A. (2005). From need to choice, welfarism to advanced liberalism? Problematics of

social housing allocation. *Legal Studies, 25*, 22-48.

Croydon Council. (2006). *Croydon's Housing Strategy 2006/10.*

Croydon Council. (2009). *Transforming Croydon though technology.*

Croydon Council. 2010a. *Councillors – general informations.* Accessed 25 Mar 2012.

http://www.croydon.gov.uk/democracy/elected/generalinfo/

Croydon Council. 2010b. *Department of Adult Services and Housing.* Accessed 14 Mar 2012.

http://www.croydon.gov.uk/contents/departments/housing/pdf/756912/DASHH_Service_Plan_20

10-11.

Croydon Council. (2010c). *Croydon Scrutiny & Overview Committee Annual Report 2009-10.*

Croydon Council. (2010d). *Croydon's Community Strategy 2010-2015.*

Croydon Council. (2010e). *Customer service strategy 2010-2015.*

Croydon Council. (2011a). *Corporate plan 2011-2013.*

Croydon Council. (2011b). *Croydon Counts: 2011-2012 Performance Report.*

Croydon Council. (2011c). SCRUTINY AND OVERVIEW COMMITTEE. Town Hall, Croydon.

Croydon Council. (2011d). *Scrutiny and Overview Committee Minutes from September 2011.*

Croydon Council. (2012a). *Council Housing.* Retrieved 3/27, 2012, from

http://www.croydon.gov.uk/housing/councilhousing/

Croydon Council. (2012b). *HOUSING STRATEGY 2011/12-2015/16.*

Croydon Council. (2012c). *Draft Revenue Budget and Capital Programme.* Accessed 23 Mar 2012.

http://www.croydon.gov.uk/contents/departments/democracy/pdf/1035997/budget-book-2012-13.pdf.

Croydon Observatory. (2009). *Borough Profile.* Accessed 15 Mar 2012.

http://www.croydonobservatory.org/Borough/.

Croydon Online. (n.d.) *Croydon's Coat of Arms*. Accessed 14 Mar 2012.

http://www.croydononline.org/history/origins/arms.asp.

Day, Sharon. (2012). *Personal Communication.*

Department for Communities and Local Government. (2006). *A Decent Home: Definition and guidance for implementation.*

DETR/DSS. (2000). Quality and Choice: A Decent Home for All.

Department for Environment Food and Rural Affairs. (2009). *What is sustainable development?.*

Accessed 14 Mar 2012. http://archive.defra.gov.uk/sustainable/government/what/index.htm.

Department for Environment Food and Rural Affairs. (2005). *UK Government sustainable development strategy.* Accessed 14 Mar 2012.

http://archive.defra.gov.uk/sustainable/government/publications/uk-strategy/.

East Coulsdon Residents' Association. (n.d). *Croydon Ward Map*. Accessed 25 Mar 2012.

http://www.eastcoulsdon.co.uk/news6.html

Erickson, J., Haley, J. V., Mannheim, G. (2012). *Business Case: Improving Accessibility to Housing Data.* WPI, Worcester, MA.

Four Myths about the Digital Divide - Routledge.

Greater London Authority. (n.d.a). *Focus on London – Population and Migration.*

http://data.london.gov.uk/datastore/applications/focus-london-population-and-migration

Greater London Authority. (n.d.b). *London boroughs.* http://www.london.gov.uk/who-runs-london/london-boroughs

Greater London Authority. (2010). *Focus on London - Population and Migration.*

Greater London Authority. (2012). *Final Draft Consolidated Budget for 2012-13.*

Hills, J. (2007). *Ends and Means: The Future Roles of Social Housing in England.*

Holmes, I. (2009). Consolidating GIS in Local Government.

Improvement and Development Agency. (2008). *Reducing avoidable contact: a guide to NI 14.*

Informed Publications Ltd. (2008). *NI14: Help or Hindrance?-performance indicators and customer service.*

Jim Montes. (2010). Department of Adult Services and Housing Service Plan 2010/2011.

Lazarus, W. & Mora, F. (2000). Online Content for Low-Income and Underserved Americans: The Digital Divide's New Frontier.

Norris, P. (2001). Digital Divide: Civic engagement, information poverty, and the Internet worldwide. *Cambridge University Press.*

Pevan, Judy. (2012). *Personal Communication*.

Piloting choice-based lettings: An evaluation. (2004).

POP Bus Service. Retrieved April 7, 2012, from http://www.croydon.gov.uk/healthsocial/olderpeople/pop

Qureshi, S., & Davis, A. (2006). The Effect of E-Commerce on Development". *AMCIS 2006,*

RentGrow Upgrades TotalScreen Interface for Yardi Voyager Residential Property Management Software. (2009). *BusinessWire,*

Rose, N. (1999). *Powers of Freedom: Reframing Political Thought*. Cambridge: Publisher.

Taylor, Carl. (2012). *Personal Communication.*

University of Colorado. 2009. *Geographic Information Systems as an Integrating Technology: Context, Concepts, and Definitions*. Retrieved 14 Mar 2012 fromhttp://www.colorado.edu/geography/gcraft/notes/intro/intro.html.

What We Did: The Access Croydon Experience. Retrieved April 7, 2012 from http://www.flywheel.org.uk/what-we-did/the-access-croydon-experience/

7. Appendices

Appendix A: Current State of the Croydon Council

The London Borough of Croydon is one of the 32 boroughs that form Greater London (Greater London Authority, n.d.a). The borough is located in the southern part of the city (Figure 7), covers an area of almost 34 square miles, and as of 2011, had a population of 342,900 people (Greater London Authority, n.d.b).

Figure 7: Map of London's Boroughs, Croydon shown in pink (London Councils, n.d.)

London is governed by the Greater London Authority (GLA), which oversees the various local councils that manage each borough (Greater London Authority, n.d.b). Specifically, the borough of Croydon is governed by the Croydon Council. These local councils serve to oversee the various management tasks that a city requires. Also, they provide the various necessary services required to keep a borough running. These services encompass environmental, cultural, athletic, planning, and benefits areas.

The Croydon Council, which employs around 10,500 citizens, is currently the largest employer in Croydon. (Croydon Council, 2012). It includes 70 councilors who are elected every four years from each of the 24 wards (Figure 8), but are not considered employees of the Council, as they are elected officials (Croydon Council, 2010a). As seen in Figure 8, there are 37 Conservative councilors and 33 Labour Party councilors represented in the Croydon Council. Generally, the Conservative councilors are from the affluent southern regions of Croydon, whereas the less affluent Labour councilors are more from the Northern areas (The Guardian, 2012).
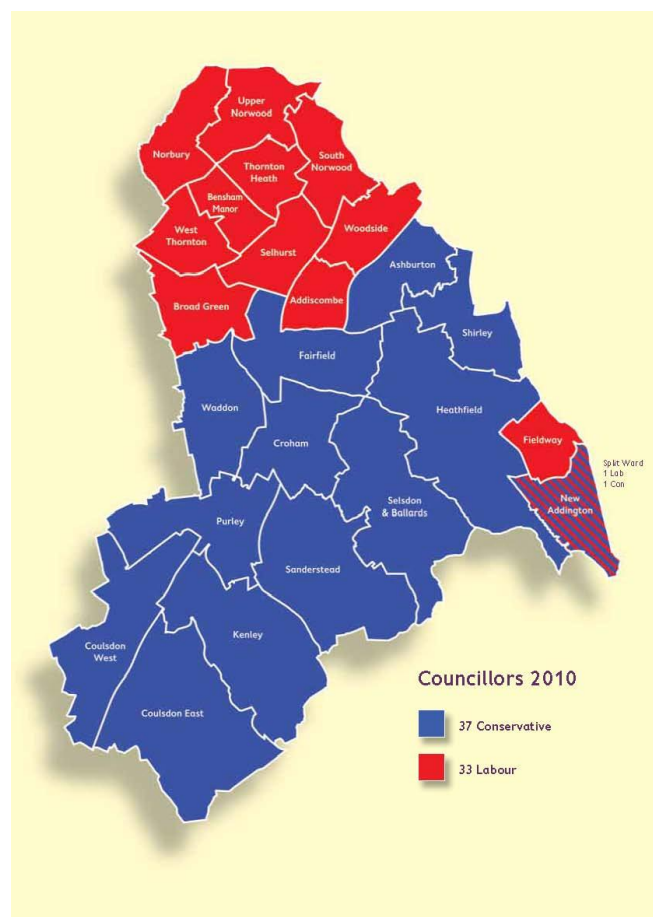
Figure 8: Party representation of Croydon's wards in 2010 (East Coulsdon Residents' Association, n.d.)

The Croydon Council as a whole is made up of multiple departments that are each individually responsible for managing different areas of service. As can be seen in Figure 9, the budget for the Council is broken up into varying divisions, the largest of which being the Department of Adult Services and Housing, more commonly referred to as DASHH.
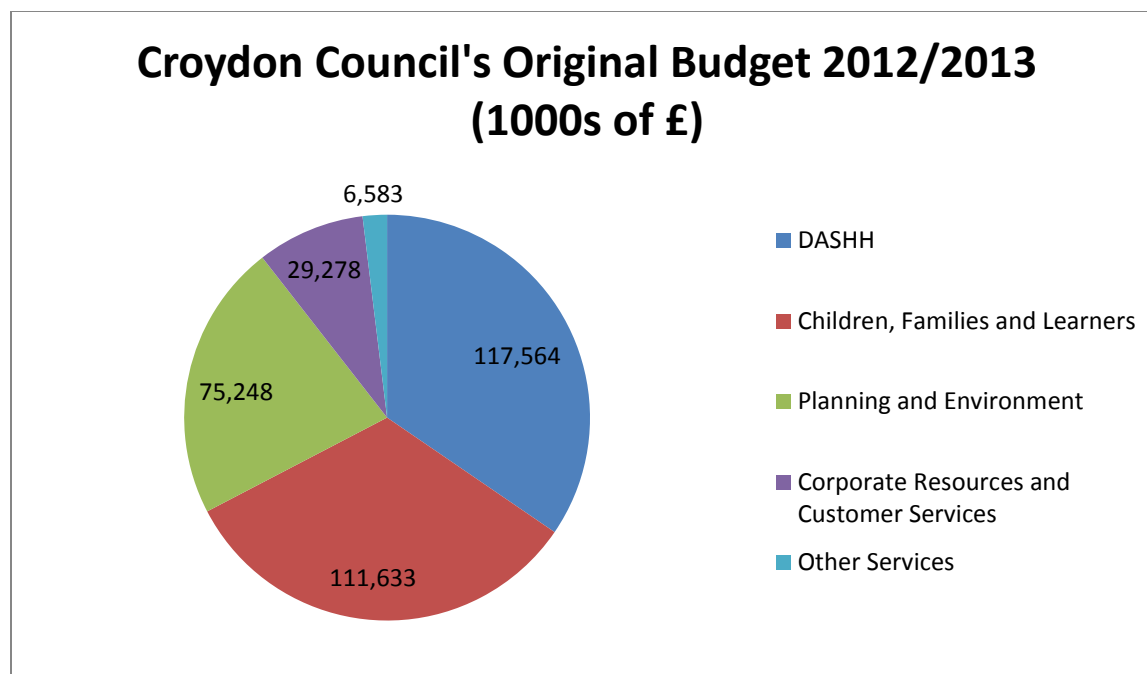
Figure 9: Croydon Council's budget division for 2012/2013 fiscal year (Croydon Council, 2012)

Over the years DASHH has decreased the number of homeless and worked to bring homes up to the decent housing standard. They are the biggest department within the Croydon Council, with around 1,400 staff, and are committed to meeting the Decent Housing Standards set forth by the Greater London Authority (Croydon Council, 2010b). Consequently, DASHH has set many goals for the Borough of Croydon to benefit the community as a whole (Croydon Council, 2010b). These goals are divided among several divisions of the Department, as can be seen in Figure 10.

Figure 10: Departmental structure of DASHH (Croydon Council, 2010b)
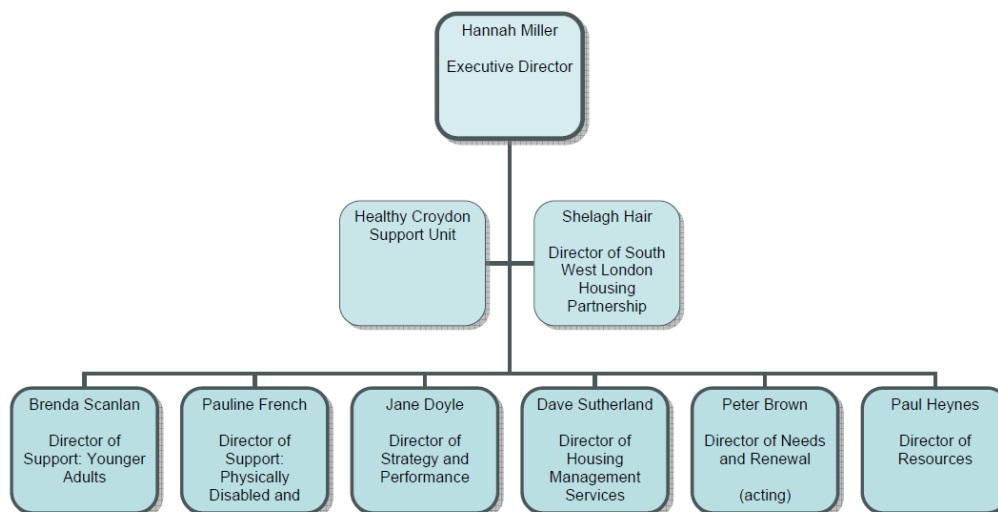
As shown in Figure 10, DASHH is separated into 8 different departments. The most relevant divisions for this project were determined to be the following:

1) The Housing Management Division, directed by Dave Sutherland, which manages rent collection and regular repairs to council homes.

2) The Assets and Renewal Division, directed by Peter Brown, which oversees a program designed to bring all council homes up to livable standards.

3) The Needs and Options Division, which focuses primarily on the Department's response to current housing needs.

4) The Southwest London Housing Partnership (SWLHP), directed by Shelagh Hair, which maintains a partnership between seven of London's boroughs and works together on housing issues (Croydon Council 2010).

Of specific interest to this project, DASHH is attempting to increase the efficiency of its front and back office operations and incorporate more streamlined and centralized databases into its interfaces (Croydon Council, 2010b). These improved systems will benefit both the tenants on the user-side and also the Council on the management side.

Appendix B: Interviews with members of the Croydon Council

General preamble for employee interviews

Thank you for taking the time to speak with us today. We are the second of two groups from Worcester Polytechnic Institute conducting research in partnership with the Department of Adult Services, Health and Housing (DASHH). Our goal is to improve the current database system that the department uses to provide a better experience for those accessing the information. We hope that the following questions will help us to evaluate how software interfaces may be improved and streamlined to aid in your ability to access the information needed on an everyday basis.

Do you mind if we quote you in our final report? We will of course give you an opportunity to review what we write prior to publication. Please feel free to stop the interview at any time, or skip any questions you wish not to answer. So, shall we get started?

Topical area: Current housing management system

- Recent changes made to the system and how those changes have impacted the system
- Any problems that the system has solved in the past
- The history of the systems and how the Croydon Council decided to use those systems
- Trying to create a central database system
- Are there any personal inconveniences you often run into using the current system?
- Can you think of any possible improvements that would fix this inconvenience?

Topical area: Goals and desired features for proposed system

- What have other systems done that they hope the Croydon system will have?
- Is there any personal motivation they have for improving the system? Are there any inconveniences they predict they will have while using the system?

Topical area: State-of-the-art systems in other boroughs or private sectors

- How they choose their system
- What are the benefits and faults in their system
- What they wished their system would do
- Additional contacts they may have that would be beneficial to our research

Appendix C: Structure for Focus Groups

General preamble for tenant focus group sessions

Thank you for taking the time to speak with us today. We are the second of two groups from Worcester Polytechnic Institute conducting research in partnership with the Department of Adult Services and Housing (DASHH). Our goal is to improve the current database system that the department uses to provide a better experience for those accessing the information. We hope that the following questions will help us to evaluate how the Council may better serve you and streamline its services. These questions were developed to evaluate desired features of a potential web-based interface used for housing services.

If you don't mind, we would like to record comments made during this session, but if you prefer we will just take notes. Also, we request permission to use any quotes taken in our final report. We will of course give you an opportunity to review what we write prior to publication. Please feel free to ask any questions you may have, and refrain from answering any questions that you do not wish to answer. So, shall we get started?

Topics to Discuss:

- What types of information do you wish to share with each group (DASHH and tenants)
- Issues each of the groups have with each other
- Issues the tenants have with the interface they will be using
- What they want out of the new system
- Would this new system make their lives easier or harder?
- Problems they may encounter with the current system?

Appendix D: Template for Contacting Local Authorities

The following templates were used to gather information from other boroughs and local authorities about systems that they are currently. This was done to get an idea of the implementation process experienced by other councils when upgrading their databases systems.

Phone Conference

Hello, this is _____, and I am working with a group of students from a university in the U.S. at the Croydon Council in their Housing Department. We are interested in any details that you would be willing to provide to us about your housing and asset management system. Croydon Council currently has two databases and is looking for a new combined solution. Your Council was recommended to us as an area to research to help further Croydon's improvement.

- What system are you currently using to manage these aspects of your housing department?
- Is there any way that we would be able to see how your system functions? i.e. video tutorials, demonstrations, or maybe a personal meeting?
- Would you be willing to send us any information on vendors that you may have worked with?
- Does your system have compatibility with GIS?
- Could you provide us with any possible estimates of order of magnitude of costs and time of implementation?
- Any vendors/Councils/ people within your Council that you would recommend we contact to further our research?

Contact us at lon.e12.croydon.web@gmail.com or call us on 0208 726 6000 ext. 61627.

Email

To Whom It May Concern,

We are a group of students from a university in the United States (Worcester Polytechnic Institute) and are working with Judy Pevan and Carl Taylor within the Croydon Council to expand on a business case related to housing stock databases.

Based on our research and current contacts, we have gathered that the _____ uses a database management system that is similar to the desires of the Croydon Council.

We are contacting your borough in order to better acclimate ourselves about how your database system(s) have recently improved to help manage housing stock more efficiently. Any screenshots, video tutorials, or perhaps scheduled meetings would be extremely useful for us to help strengthen our business case and would be greatly appreciated. We would also be interested in a list of any vendors that you researched, and which one you ultimately decided upon.

The Council is looking to improve upon their current system because it is currently inefficient and out-of-date. We are interested in the different capabilities of your system; more specifically its GIS capabilities.

We would be very grateful if you would be willing to set up either a conference call or meeting with us. Our phone number is 0208 726 6000 ext. 61627.

Thank you again for your time, and we look forward to hearing from you soon.

Jamie Erickson
Greg Mannheim
Victor Haley

Appendix E: Template for Contacting Middleware Vendors

Phone Conference

Hello, this is _____ and I am working with two fellow students conducting research at the Croydon Council in the Housing Department. We are interested in more information about a middleware solution that would allow the two existing databases being used by the Council to be linked and function as one. However, this project is still in the planning phase and we are not in a position to negotiate; we are only doing exploratory research at this time. Any information you provide us will be passed on to our superiors.

Information to reference should it be necessary:

- Two distinct databases are currently used, Apex and OHMS, provided by Innovation and Northgate, respectively. Apex is an asset management database. OHMS is a five tiered housing management system.
- We want a real-time link between the two to allow a Graphic User Interface to query both simultaneously and return information to a single location.
- Infrastructure services are provided to the Council by Capgemini.
- Middleware needs to communicate with GIS to pass it updated information.

We would like to know what the **minimum system requirements** would be to run your system. Additionally, we need to know any consultancy costs to provide this implementation. How does licensing work within your company? (per-user, batch, annually) Can you provide a rough estimate of the total cost of purchase, as well as an annual cost to maintain the system after implementation?

Thank you very much for your time, we will follow-up shortly.

Contact us on 0208 726 6000 ext. 61627.

Email

To Whom It May Concern,

We are students from Worcester Polytechnic Institute in the USA, working on a placement with Croydon Council's Department of adult services, health and housing (DASHH). Our placement involves research into a middleware overlay that will be able to help bring two existing housing ICT systems together in to "one" virtual database that can then be used to represent all information using eSpatial's iSMART GIS software. The two systems are further described below. Specifically we would like more specific information about your services such as any costs and timescale estimates that would be required to develop/implement such a middleware system.

We would like to emphasise that this project is currently in the business case development stage and we are simply requesting more information about the services your company could possibly provide the Council. We will not be the ones negotiating any final purchases, but any general costs and time estimates you are willing to provide us will be extremely useful to further develop Croydon's requirements.

The two database systems that Croydon use are:

Apex –
http://www.apexinfo.co.uk/solution/index.html

OHMS (also known as Northgate Housing) –
http://www.reading.gov.uk/council/dataprotection/fair-processing-notice-ohms/

It is our understanding that as long as our two databases recognise ODBC drivers, Croydon's current databases and GIS system will be compatible with middleware systems.

Necessary Basic Requirements
- Interact with OHMS and Apex databases to provide a single virtual database that appears to be continuous.
- Compatibility with eSpatial GIS software.
- Identify and/or eliminate duplicate or conflicting data within both databases.
- Needs to support simultaneous access by a multitude of different users.
- Security of information is paramount! Especially for mobile tenant and officer access.
- Assuming database structure remains as it currently is, middleware needs to be compatible with Northgate and Innovation's protocol to access data.

Possible Desired Features
- Ability to support eventual online access GUI for tenants.
- Also, have support for mobile access by officers from home.
- Possibility for tenants/officers to enter data directly into the correct database via the middleware.

We are attempting to identify all possible problems that the Council may face once they implement a middleware to help better streamline their process. Are there any further complications that we may want to relay to our ICT staff? Also if your company could send us price estimates as well as estimated time of creation for this middleware that would be extremely helpful. As far as timescales are concerned, we are looking to complete the mature business case by June 7th so it would be much appreciated if you could bear this in mind.

If any of this is unclear or if you would like to discuss this further with us, please telephone 0208 726 6000 ext. 61627. This email address can also be used to forward your information. If you are not the right person to deal with this could you please forward this on and let us know who we should be talking to?

Thank you again for your time, and we look forward to hearing from you soon.

Regards,
Jamie Erickson
Victor Haley
Greg Mannheim

Appendix F: Template for Contacting New System Vendors

Phone Conference

Hello, this is _____, and I am working with a group of students researching within the Croydon Council's housing department. We are developing a business case to outline different options to improve the current housing and asset management system.

We wanted to talk to you more about specific options concerning OHMS and Apex. As we understand it, there are four modules of OHMS that do not talk to each other, and we would like to know if this inter-modular communication is possible.

- Are you familiar with Apex? If so, is there any possible way for OHMS and Apex to be linked so that duplicate information is not stored in two different locations?
- No conflicting data stored in both Apex and OHMS. Need a live link between the two and ability to pull information from either database from a central interface.
- Also, do you offer a complete housing and asset management system? Complete replacement of OHMS and Apex. (Northgate Housing)
- Details about cost and implementation timeline?

Email

To Whom It May Concern,

We are students from Worcester Polytechnic Institute in the USA, working on a placement with Croydon Council's Department of adult services, health and housing (DASHH).

As part of our research we are comparing the introduction of a 'middleware' system to integrate our existing ICT databases (OHMS and APEX and GIS) versus purchase of a new combined housing management and asset management system that can also integrate with GIS and offer external tenant web access.

We would like to emphasise that this project is currently in the business case development stage and we are simply requesting more information about the services your company could possibly provide the Council. We will not be the ones negotiating any final purchases, but any general costs and time estimates you are willing to provide us will be extremely useful to further develop Croydon's requirements.

The two database systems that Croydon use are:

Apex –
http://www.apexinfo.co.uk/solution/index.html

OHMS (also known as Northgate Housing) –
http://www.reading.gov.uk/council/dataprotection/fair-processing-notice-ohms/

Currently the system data must be entered and edited manually which is proving to be an inefficient process, and data quickly becomes outdated.

Necessary Basic Requirements of New System
- Compatibility with eSpatial's GIS software.
- Needs to support simultaneous access by a multitude of different users.
- Support for outside access to database, such as web interface(s) for clients such as Council officers and tenants.
- Security of this information is paramount, especially for mobile officer and tenant access.
- Do you offer a 'data rationalisation' service? If so, please include daily costs/further information

Possible Desired Features
- Ability for tenants to complete transactions online, such as paying rent, making service enquiries, voicing complaints, and updating contact information.

We would like to use any information (costs/time estimates of implementation you can provide us to relay back to our sponsors within the Council to prove that this is the best possible avenue for them to take. As far as timescales are concerned, we are looking to complete the mature business case by June 7th so it would be much appreciated if you could bear this in mind.

If any of this is unclear or if you would like to discuss this further with us then please contact us on: lon.e12.croydon.web@gmail.com or telephone 0208 726 6000 ext. 61627. This email address can also be used to forward your information. If you are not the right person to deal with this could you please forward this on and let us know who we should be talking to?

Thank you again for your time, and we look forward to hearing from you soon.

Regards,
Jamie Erickson
Victor Haley
Greg Mannheim