

# **Zooming in on the Big Picture: Improving Geographical Information with ArcIMS**

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## **Abstract**

The Electronic Atlas (e-Atlas), a corporate ArcIMS application, is at the heart of the Borough's GIS strategy. Like many other organisations, the Borough suffers from having its data predominantly stored in departments that utilise many different GIS applications. Because the e-Atlas is free, data rich, simple to use and strongly supported, it has become the corporate standard for departmental use. The e-Atlas allows departments to share their map data throughout the organisation, as long as metadata is maintained and the latest copy is always available.

However, as more and more data is shared through the application, the issue of data quality and quality assurance is raised. This paper will explain how the e-Atlas is being used to improve the quantity and quality of GI available across the enterprise and the "stick-and-carrot" innovations employed to encourage users' participation.

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## **The Borough and GIS**

The Royal Borough of Kensington and Chelsea (RBKC) is a central London local government authority and one of 33 London Boroughs covering the greater London area. The Royal Borough covers five square miles and is an area of enormous historic and architectural interest, renowned for its handsome residential streets and green spaces. The Borough is also home to numerous embassies and many London landmarks such as Kensington Palace and The Natural History Museum.

RBKC has been using GIS for over a decade and like many UK Local Authorities GIS initially grew within our Planning department. However, with pockets of GIS growing within individual business groups it was soon recognised that a corporate approach was need. The Property and Land Applications team (PLAT) created in 2000 to maintain and develop the Land and Property Gazetteer were to also take on the role of a Corporate GIS Unit. A GIS User Group was established in January 2001 that included membership from each of the Borough's five business groups and GI audit was carried out to help identify key issues for a GIS Strategy.

Four years on and PLAT are now physically located within the IT department, reflecting the fact that GIS and the CLPG are fundamental aspects of the Borough's IT strategy. The team is now responsible for desktop and web based GIS support and development, maintenance and delivery of many corporate datasets including the CLPG and the dissemination of all GI datasets within the council.

A departmental culture towards GIS and GI data still predominates but many steps have been taken and are planned for the future to ensure a corporate approach is administered. The Borough's intranet based GIS, know as the electronic atlas or e-atlas is one of the key components to this change.

The e-Atlas was first launched in 2001. Built using ESRI's ArcIMS html viewer the application delivered a limited number of corporate datasets via the intranet. Following system usage and functionality reviews, with User feedback playing a critical factor, a number of limitations were identified. These included limited functionality with little potential for customisation and resulted in the system not being widely adopted. A number of versions were subsequently released using the Active X component and Active Server Pages (ASP). The current application connects to a SQL Server 7 database that stores metadata for each layer and stores user preferences, whilst only needing to reference a single map service file or AXL (Arc XML) document to identify available datasets. The combination of an easily maintained metadatabase with an ArcIMS application that is fully customisable now provides council employees with an intranet-mapping tool that has rich and diverse functionality and access to a much greater selection of accurate and reliable data.

## **What is the e-Atlas**

The e-Atlas is not a typical ArcIMS application. Many ArcIMS applications are user defined and built for one specific purpose, containing perhaps only a limited amount of data. The e-Atlas is different and uses a discrete philosophy. It is known that GIS is only as good as the GI it contains, and for GIS utilisation and analysis to be accurate and influential, requires that the GI it employs to be available in quantity and of an assured quality.

The e-Atlas is a tool created by the GIS team to confront the task of improving GI quality and quantity as well as providing a first class truly corporate GIS system to all its users. In short, we provide the system and functionality for the users, and they utilise it and quality assure the data held.

To achieve these ends requires encouragement & promotion to raise awareness as well as regulation and restraint where data is not being maintained. The first part of this process was the GI quality improvement programme.

## **GI Quality Improvement Programme**

The intended outcomes of this project were to enable departmental leaders to manage their own data and metadata records to the same standards as that of the corporate datasets, and to make this data as broadly available as possible; not just as published metadata but as fully accessible datasets. This data should be available in all GIS systems within RBKC.

This was initially achieved by the identification of a suitable data custodian in a department recognised as holding GI. The data custodians were made aware of the processes involved with the addition and updating of metadatabase records; how to maintain the datasets; and how to capture new or existing data held in the department.

The e-Atlas metadatabase is at the centre of this initiative and holds all the metadata for any available dataset. Apart from the standard metadata, these records also include GIS format availability and update cycles for each dataset. Each specific dataset effectively has a timer associated, i.e. 3 months, 6 months etc. whereby the data becomes 'out of date' and removed from corporate viewing; unless the data has been updated and quality assured by the custodian. This quality assurance process is vital for confidence and trust in the data provided. Many datasets are vital for the effective running of many departments at RBKC.

Upon completion of the GI Quality Improvement Programme, the number of available datasets had almost doubled to 189, with over 20 identified data custodians. Each custodian is now undertaking quality assurance, and many new datasets are now being created and catalogued in response to the general GI promotion undertaken. These newly added datasets are available in all the supported GIS formats and visible to everyone via the e-Atlas.

However, the project does not finished here. In many ways this was the start of an on-going commitment to GI quality. The main infrastructure and data cataloguing is now in place and general GI awareness has dramatically increased.

## **Gentle Persuasion**

So now we know what data we have, it is catalogued and available for use and searching; but how do we get the users to use it and check the quality of this newly abundant data for us?

Methods were then devised to encourage the use of the e-Atlas as a whole as well as to quality assure the data. These methods range from reward schemes to surgery sessions as a 'carrot approach' to e-Atlas implementation. These have had various degrees of success.

### ***Reward Schemes***

The e-Atlas reward scheme was introduced early in the undertaking. Each user earns points when using the e-Atlas. Each month a random draw for a bottle of wine takes place with the more points the users have the more chances they have of winning. Points were increased for users reporting data faults or adding feedback on suggestions for improvement or for using the advanced e-Atlas functionality. This worked well, sometimes too well, for existing users who know about the e-Atlas and the scheme, but what about users that do not know about the e-Atlas at all?

Please note: a maximum of 100 records are listed for each data set. It may take a few seconds for results to appear for all these layers!

[Listed Buildings](#)

### Listed Buildings

Map	EAST	NORTH	REFNO	GRADE	POSITION	PROPERTY	STREET	Feedback
N/A	524640	179195	35/3	II		NO 48 AND NOS 41 TO 46 (CONSEC)	ADDISON ROAD W14	<a href="#">Report</a>
N/A	524646	179186	35/3	II		NO 48 AND NOS 41 TO 46 (CONSEC)	ADDISON ROAD W14	<a href="#">Report</a>
N/A	524650	179179	35/3	II		NO 48 AND NOS 41 TO 46 (CONSEC)	ADDISON ROAD W14	<a href="#">Report</a>
N/A	524658	179169	35/3	II		NO 48 AND NOS 41 TO 46 (CONSEC)	ADDISON ROAD W14	<a href="#">Report</a>
N/A	524661	179162	35/3	II		NO 48 AND NOS 41 TO 46 (CONSEC)	ADDISON ROAD W14	<a href="#">Report</a>
N/A	524676	179158	35/4	II		NOS 36 TO 39 (CONSEC)	ADDISON ROAD W14	<a href="#">Report</a>
N/A	524678	179150	35/4	II		NOS 36 TO 39 (CONSEC)	ADDISON ROAD W14	<a href="#">Report</a>
N/A	524682	179145	35/4	II		NOS 36 TO 39 (CONSEC)	ADDISON ROAD W14	<a href="#">Report</a>
N/A	524686	179140	35/4	II		NOS 36 TO 39 (CONSEC)	ADDISON ROAD W14	<a href="#">Report</a>
N/A	524756	179076	35/5	II		QUEEN VICTORIA MONUMENT.	WARWICK GARDENS W14	<a href="#">Report</a>
N/A	524783	179099	35/6	II		NO. 1 TO 9 (OOD).	WARWICK GARDENS W14	<a href="#">Report</a>
N/A	524785	179092	35/6	II		NO. 1 TO 9 (OOD).	WARWICK GARDENS W14	<a href="#">Report</a>
N/A	524787	179088	35/6	II		NO. 1 TO 9 (OOD).	WARWICK GARDENS W14	<a href="#">Report</a>
N/A	524790	179082	35/6	II		NO. 1 TO 9 (OOD).	WARWICK GARDENS W14	<a href="#">Report</a>

**Feedback Form**

Please use the form to tell us if there is something wrong with the data.

**Type of Feedback**

New Data Notification

Change Request

Other

**Your Feedback**

Figure 1 - Reporting. The Feedback Form

### Promotional Activity

To encourage new users to participate in the e-Atlas required some promotional activity. The e-Atlas was promoted to departmental heads, introductory and ‘surgery sessions’ were set-up; and individuals were shown demonstrations via the GIS user group and other forums. By now nearly 700 users have tried the application, but now, how do we encourage regular use by departments and individuals?

### Departmental Data Loading

Regular use was mainly encouraged by helping the departments load and view their own data in the e-Atlas. Many datasets not held in a GIS format or paper based were converted and made available via the e-Atlas where quality assurance and indeed daily use could take place. This was of huge help to the departments concerned and ensured the use of the e-Atlas to use and view their data.

### Private Themes

However, some departments were reluctant to add their data into a corporate system as they were concerned about the quality, and subsequently how this might be interpreted and used by other colleagues. The ability of the e-Atlas to provide private themes that are only available to specific users or departments has gone a long way to rectify this problem. Thus allowing the important initial data load into the e-Atlas for quality assurance processing. After time, and when

the department is confident of the quality of the data, the map theme can be made available to a wider audience.

### Customisable Interface

In addition to core functionality, the e-Atlas is designed to be largely customisable for each users session. This is intended for more advanced users that utilise the service regularly and aims to reflect users different needs and preferences. This gives each user a sense of ownership and familiarity with the system that is designed to encourage use and make its use easier.

There are customisable options for the common interface layout, saving of print settings and workspaces, the size of the map displayed, and for the search radius for identifying features. However, the take-up of these features has been slow and requires promotion and support to instigate.

Improvements to functionality and the addition of new features are largely a user-driven process. There is a suggestions for improvement application process that is assessed and implemented on its merit. New features are made available to all users to avoid having different versions of the application.



Figure 2 - Customising the e-Atlas. Display Settings

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The Ordnance Survey mapping data included within this report is provided by RBKC in order to visualise data held in the e-Atlas. Persons viewing this data should contact Ordnance Survey copyright where they wish to license Ordnance Survey mapping/map data for their own use. The OS website can be found at <http://www.ordnancesurvey.gov.uk/>

## **A Good Example**

The Searches and Records Section, part of the Planning department, maintain constraint information relating to each property within the Borough. This was previously held in a paper based filing system, called the Comprehensive Index. Initially data capture was undertaken to convert the various paper-based datasets into a GIS format. This is a total exceeding twenty individual datasets.

Once achieved, the datasets were made available via the e-Atlas so that the department could then check and quality assure the data. Once the data is in the e-Atlas, it is now accessed on a daily basis and the department now rely on the e-Atlas for their constraint searches.

The data is initially available only in a private theme in the e-Atlas whilst the section reviews their data holding; subsequently upon approval this data will be made available to a wider audience.

This team is now more aware of GI and GIS as a result of this piece of work and will be looking to utilise more GIS functionality to improve the running and efficiency of their section.

## **Regulation and Control**

If gentle persuasion does not work, then a regulatory approach has to be administered, this being 'the stick'. Again a variety of processes were established to ensure that data quality is maintained, this time with a slightly different emphasis:

### ***Out-of-Date Data***

One of the main regulatory controls is based around the concept of data validity. Each dataset has an update cycle that the custodian is responsible for. A dataset will become out of date if the data, and subsequently the metadata, is not updated as per the required timescale defined in the metadata record. The custodian can see the 'shelf life' of the data and how many days to go before the records need updating. It is the custodians responsibility to ensure that these records are maintained.

### ***Data Removal***

So, if a dataset is out-of-date and the appropriate custodian has not updated the data or metadata what happens? The stick in this case is to encourage data maintenance, but if this fails then the data is liable to be removed, as incorrect data may well be more dangerous than no data at all.

Update Cycle				
Layer	Format	Last Modified	Custodian	Days To Go
Accident Claims	GGP	11/03/04 09:39:58	John Sharpe	Expired: 102
Advert Banners on Lamp Posts	GGP	22/01/04 11:02:15	Richard Vernon	213 to go
Advert Banners on Lamp Posts	ArcGIS/ESRI	30/01/04 10:31:30	Richard Vernon	221 to go
Advert Banners on Lamp Posts	MapInfo	30/01/04 10:31:34	Richard Vernon	221 to go
Aerial Photography	ArcGIS/ESRI	17/10/03 15:15:20	Mark Critchley	117 to go
Aerial Photography	MapInfo	17/10/03 15:15:47	Mark Critchley	117 to go
Aerial Photography	GGP	17/10/03 15:15:58	Mark Critchley	117 to go
Affordable Housing in Colville	GGP	16/04/04 15:13:37	Paul McCarthy	299 to go
Air Quality Monitoring Sites	ArcGIS/ESRI	17/10/03 15:36:22	Kyriacoulla Eleftheriou-Vaus	117 to go
Air Quality Monitoring Sites	MapInfo	17/10/03 15:36:22	Kyriacoulla Eleftheriou-Vaus	117 to go
Air Quality Monitoring Sites	GGP	17/10/03 15:36:22	Kyriacoulla Eleftheriou-Vaus	117 to go
All Other Social Services	ArcGIS/ESRI	24/03/04 10:16:14	Custodian Required	275 to go
All Recorded Crimes	Excel	19/03/04	Fiona Spence	Expired: 65

Figure 3 - Data Regulation. The Update Cycle

## A Bad Example

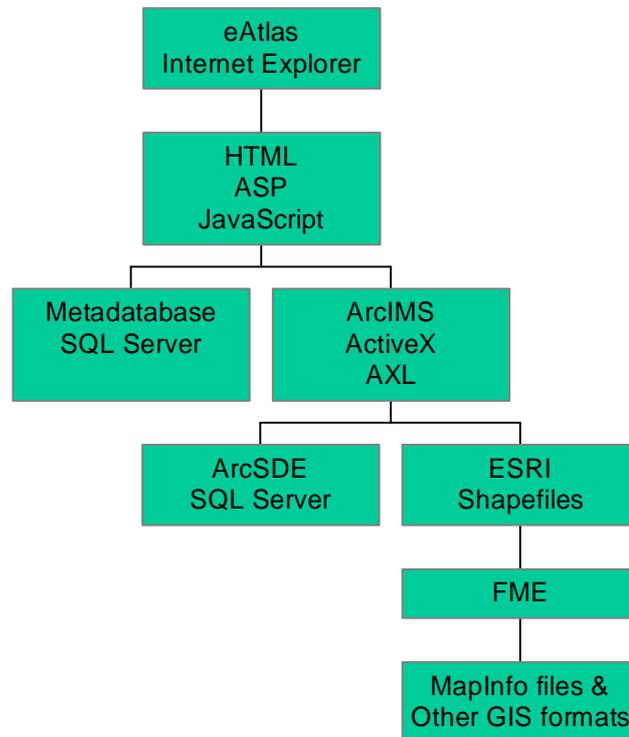
The Parking department were one of the more frequent users of the e-Atlas and used two datasets to check parking restrictions and the locations of 'Pay and Display' meters many times a day. However, the parking restriction data had not been maintained and had become out-of-date. This meant that the use of this dataset was providing misleading information to the parking officers concerned and could not be relied upon without a specific field site check before.

It was therefore of no practical benefit to the users and was subsequently removed from the e-Atlas. Once this data has been updated and quality assured it can be re-added to the e-Atlas where it will once again provide useful information. This process is now being undertaken and a new survey of parking restrictions is underway.

So although this is a 'bad example', it has highlighted the fact that the e-Atlas users are more aware than any others of the quality of the data held and are vital to the improvement of the quality of data held in the borough.

## How is the e-Atlas Built – A Technical Overview

The current version of the e-Atlas is based on the following technologies.



The e-Atlas is delivered to its users via a standard Microsoft Internet Explorer using three frames to manage the mapping and core functionality components. A single set of ASP pages and one AXL file are all that is required to serve base mapping and data themes using ArcIMS and the ActiveX control. The ActiveX connector was chosen due to its lightness, the fact that most of the processing occurs on the server rather than client and that code is not exposed to web page or the user.

Data is called from ArcSDE on SQL server, as well as from shapefiles. As much of the Borough's data is held in other formats there is a translation process that employs FME (Feature Manipulation Engine) to translate to the formats utilised by the e-Atlas. This update cycle occurs weekly in most cases.

Metadata, user preferences and other data tables are stored and called from a metadatabase held in SQL server. The metadatabase is central to the management of data and general running of the e-Atlas.

## Core Functionality

The e-Atlas was designed to provide a functionally rich GIS environment intended to be an alternative to a desktop GIS, that maybe costly for some departments that do not require a full-blown GIS. Therefore the core

functionality is based on the most common and simple uses of a desktop GIS. These are to locate an address, overlay some data and print a map.

For this reason, as the e-Atlas is launched, there is an initial option to either view mapping directly; to perform an address search based on the CLPG by property, street or postcode; or to enter the data catalogue to perform data searches or maintenance of metadata.

The interface is designed to be intuitive and as easy to use for non-GIS user as someone with previous experience. Help tips, guides and support features are embedded into the application

### ***Map Visualisation***

Of course this is basis of any GIS and it is provided quickly and effectively in the e-Atlas. A variety of basemaps and public and private themes provide the vector and raster data themes that can be visualised. Standard navigation and interrogation tools are provided to the user as per a standard desktop GIS.

Basemaps include standard scaled rasters, aerial photography, a polygonised vector dataset called MasterMap™, as well as other custom base mapping. On top of this are nearly 200 available vector map layers organised into map themes, which are available as either public or private themes.

### ***Address Search Facility***

The address searching facility is based around the Corporate Land and Property Gazetteer (CLPG) dataset that contains all the property information for the borough. This dataset is individually managed by a dedicated custodian and is updated on a daily basis.

The facility uses a point and click interface that breaks down from street level to individual properties. It is possible to search for streets, buildings and individual properties (Unique Property Reference Number – UPRN) and choose to view on a map or to view a report detailing the data held about each.

1. Search with: UPRN or [Building](#) or [Street](#) or [Postcode](#)

[Start Over](#)

2. Please select the first letter of the street.  
[A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#)

3. Please select a Street:

<a href="#">Halsey Street</a>	<a href="#">Hazlewood Crescent</a>	<a href="#">Hippodrome Place</a>	<a href="#">Holland Street</a>
<a href="#">Hans Crescent</a>	<a href="#">Hemus Place</a>	<a href="#">Hobury Street</a>	<a href="#">Holland Villas Road</a>
<a href="#">Hans Place</a>	<a href="#">Henniker Mews</a>	<a href="#">Hogarth Place</a>	<a href="#">Holly Mews</a>
<a href="#">Hans Road</a>	<a href="#">Herbert Crescent</a>	<a href="#">Hogarth Road</a>	<a href="#">Hollywood Mews</a>
<a href="#">Hans Street</a>	<a href="#">Hereford Square</a>	<a href="#">Holbein Mews</a>	<a href="#">Hollywood Road</a>
<a href="#">Hansard Mews</a>	<a href="#">Hesketh Place</a>	<a href="#">Holbein Place</a>	<a href="#">Horbury Crescent</a>
<a href="#">Harcourt Terrace</a>	<a href="#">Hesper Mews</a>	<a href="#">Holland Gardens</a>	<a href="#">Horbury Mews</a>
<a href="#">Harley Gardens</a>	<a href="#">Hewer Street</a>	<a href="#">Holland Park</a>	<a href="#">Hornton Place</a>
<a href="#">Harriet Street</a>	<a href="#">Highlever Road</a>	<a href="#">Holland Park Avenue</a>	<a href="#">Hornton Street</a>
<a href="#">Harriet Walk</a>	<a href="#">Hill Farm Road</a>	<a href="#">Holland Park Gardens</a>	<a href="#">Hortensia Road</a>
<a href="#">Harrington Gardens</a>	<a href="#">Hillgate Place</a>	<a href="#">Holland Park Mews</a>	<a href="#">Humber Drive</a>
<a href="#">Harrington Road</a>	<a href="#">Hillgate Street</a>	<a href="#">Holland Park Road</a>	<a href="#">Hurstway Walk</a>
<a href="#">Harrow Road</a>	<a href="#">Hillman Drive</a>	<a href="#">Holland Park Terrace</a>	<a href="#">Hyde Park Gate</a>
<a href="#">Hasker Street</a>	<a href="#">Hillsleigh Road</a>	<a href="#">Holland Place</a>	<a href="#">Hyde Park Gate Mews</a>
<a href="#">Hayden's Place</a>	<a href="#">Hippodrome Mews</a>	<a href="#">Holland Road</a>	

4. Please select :

- a Street Record : [Whole Street](#)
- a Number : [1/5](#) [6](#) [7](#) [8](#) [9](#) [10](#) [11](#) [11A](#) [12](#) [14](#) [15](#) [15/17](#) [16](#) [18](#) [19](#) [20](#) [21](#) [22](#) [23](#) [24](#) [25](#) [26](#) [27](#) [28](#) [29](#) [30](#) [31](#) [32](#) [33](#) [34](#) [35](#) [36](#) [38](#) [40](#) [41](#) [42](#) [43](#) [44](#) [45](#) [46](#) [47](#) [48](#) [49](#) [50](#) [51](#) [52](#) [54](#) [56/58](#) [60](#) [62](#) [64](#) [66](#) [68](#) [70](#) [72](#) [74](#) [82](#)
- a Building : [Evelyn House](#) [PLAYGROUND REAR OF 31/77 SHEFFIELD TERRACE](#) [Public Conveniences](#) [Town Hall](#)

Go to [Top](#) [Bottom](#)

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5. Results of Search

Town Hall	UPRN	217040918	Organisation	Electoral Reg.	<a href="#">View Map</a>
Hornton Street	Ward	Campden	Alternative	NDR Ref	<a href="#">More Reports</a>
LONDON	Easting	525359	Mainframe	Plan_id	<a href="#">Set Ref 1</a>
W8 7NX	Northing	179705	OS Addresspoint	Plan_Code	<a href="#">Set Ref 2</a>
					<a href="#">Feedback</a>

Figure 4 - Address Search Facility

### The Metadatabase

The metadatabase is key to the running of the e-Atlas and a powerful tool to manage the borough's GI in all its formats. This is a set of SQL server data tables that link into the e-Atlas and can be read and managed internally

The metadatabase has been developed internally so that the Borough's non-ArcGIS users can also enter and view metadata through the web application. While we might wish to, we do not currently use the metadata creation tools within ArcGIS or the ArcIMS metadata services.

Each dataset is recorded in the metadatabase with all the required information and system availability. Importantly, an update cycle is agreed and established with the custodian, as to whether this data is updated weekly, monthly, yearly etc., thus allowing users to find out how accurate the data is and when it is updated.

**Property Gazetteer**

Layer\_ID: 1

Title: Property Gazetteer

Description: Information on all properties within the borough. It is extracted from the Corporate Land & Property Gazetteer.

Keywords: Property BS7666 Address Building Street P

Type of data: Point

Themes using this layer: Property Information

Corporate/Departmental: Corporate

Custodian: Fiona Cross

Data source: corporate datasets

Quality assurance: Quality Assured by PLAT

Layer extent [m] [Ignore to use default]: N 182700 S 177000 E 528850 W 522850

Zoom Extent [Ignore to use default]: Max 3000 Min 0 Width m

Update Period: 1 week

Field suitable for labeling ['Unknown' will ignore]: Unknown

Conception Date (dd/mm/yy hh:mm:ss): 07/05/02

On Atlas:

On Internet:

On CAB1:

Searchable:

Delete Layer & Files:

Metadatabase: Files for Property Gazetteer: 3 entries.

Format	Modified by	Changes	Current
<a href="#">MapInfo</a>	Fiona Cross	Data updated.	Yes
<a href="#">GGP</a>	Fiona Cross	Data updated.	Yes
<a href="#">ArcGIS/ESRI</a>	Fiona Cross	Data updated.	Yes

Figure 5 - Property Gazetteer. A Metadata Record

The metadatabase is fully searchable using a 'GI Search Engine' embedded in the e-Atlas to provide a list of returned data results. The returned records may be interrogated to show the complete metadata records and also to provide the complete data custodians contact details. The details of all the GIS formats are also stored and whether these are current.

It is the responsibility of the data custodians to declare any new datasets that have been created, their native formats, as well as to maintain their data and update the metadata when required. Data translations are undertaken by the GIS team.

**Data Found Matching Search Criteria**

Click on Hyperlink to view record metadata

Search Criteria = "Street"  
16 Record(s) Returned on 22 June 2004.

ID	Title	Description	Custodian
1	<a href="#">Property Gazetteer</a>	Information on all properties within the borough. It is extracted from the Corporate Land & Property Gazetteer.	<a href="#">Fiona Cross</a>
3	<a href="#">Street Trees</a>	All trees in the borough that are along streets as opposed to open spaces or gardens	<a href="#">Planning</a>
21	<a href="#">Street Works</a>	Details of street works to road within RBKC and responsible utility company	<a href="#">Andrew Green</a>
59	<a href="#">Ordnance Survey ISM</a>	Internet Street Mapping provides detailed street-level mapping	<a href="#">Mark Critchley</a>
73	<a href="#">Parking Restrictions</a>	All RBKC Street Parking Restrictions	<a href="#">Mahmoud Siddiqi</a>
80	<a href="#">Ordnance Survey Street Gazetteer</a>	Gazetteer for looking up individual streets within RBKC.	<a href="#">Mark Critchley</a>
81	<a href="#">OSCAR Pedestrian Streets</a>	Ordnance Survey Centre Alignment Of Roads. Pedestrian streets only.	<a href="#">Mark Critchley</a>
89	<a href="#">Street Nameplates</a>	Location of Borough Street Nameplates	<a href="#">John Sharpe</a>
90	<a href="#">Public Street Lighting</a>	Street Lighting on public highways, maintained by RBKC	<a href="#">Richard Vernon</a>
91	<a href="#">Street Lighting Maintenance</a>	Sectors used for maintenance of street lighting	<a href="#">Richard Vernon</a>
92	<a href="#">Advert Banners on Lane Posts</a>	Advertising Banner locations on Street Lighting	<a href="#">Richard Vernon</a>
93	<a href="#">Flower Baskets on Street Lights</a>	Location of flower baskets on street lighting columns	<a href="#">Richard Vernon</a>
95	<a href="#">Non-Illuminated Signs</a>	Non-Illuminated signs for all roads	<a href="#">Alan Moore</a>
108	<a href="#">All Recorded Crimes</a>	Record of all crimes e.g. (Racial, Street, Young Offenders, Homophobic crimes) reported to the police	<a href="#">Fiona Spence</a>
122	<a href="#">Street Gazetteer</a>	Describe this layer	<a href="#">Mark Critchley</a>
181	<a href="#">Cycle Parking</a>	Distribution of cycle rack facilities, including photos of each.	<a href="#">Richard Fairley</a>

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Figure 6 - Searching for Data. Results Returned

### Update Procedures

The e-Atlas has an update cycle that employs three different websites to achieve. A development site is used for all new additions; a testing site for general user testing and feedback; and a live production site for all end users. The Arc XML (AXL) file also undergoes a similar updating process. This ensures minimal downtime of the live application and a procedure that maintains the integrity of the site and well as allowing rollback should something go wrong.

System maintenance is simple as there is just a single set of Active Server Pages and the one AXL file to update. Within the application there are custom tools to quickly record metadata, assign layers to themes and themes to users.

## **Improved Geographical Information**

The e-Atlas has without doubt improved both the quality and quantity of geographical information held at the Borough. The initial project work involved discovering and cataloguing data held in different departments, and provided a leap in data quantity that could be made available using the e-Atlas. This was key to the next stages of the e-Atlas implementation.

The quality of GI data available, started poorly when the e-Atlas was launched, but after nearly a year much more is known about the data we hold, what quality and format it is currently in, and there are programmes being undertaken to add and review data to the e-Atlas. Most of the datasets are live and being constantly updated; there for all to see via the e-Atlas.

The 'Stick and Carrot' approach employed by the GIS team has helped the momentum of the implementation process, as well as causing the minimum of upset and change to departmental procedures, with what can be sensitive issues. Some departments have been slower than others to realise the benefits on offer but now the message has spread.

More and more users are discovering the e-Atlas and what it can offer them in their team, and come back to the system more often as it is often quicker and simpler than previous methods and as long as the data integrity is maintained, everyone is content, so is that it?

## **Future Direction**

The e-Atlas constantly evolves naturally by team and user-driven initiatives. As ArcIMS knowledge within the team increases, the e-Atlas is becoming more streamlined and more adaptable to user needs. For example it is now possible to dynamically add data to themes and to switch on/off other data layers dynamically.

At time of writing (June 2004) we are eagerly awaiting the release of ArcGIS 9.0 in the United Kingdom and are becoming aware of the possibilities of using ArcGIS Server to deliver more advanced functionality than the e-Atlas can provide, including most significantly the ability to directly update GI through web applications. We think the e-Atlas will still have an important role to play in that it makes GI available to users and it has certainly done its job in raising awareness of the value of GI and the importance to keep it up to date.

It is envisaged in the current version of the e-Atlas will become a fully customisable dynamic vehicle for all of the data held at the borough. It is then necessary to increase departmental penetration, to throw the net as wide as possible and to increase the day-to-day usage of the application to confirm this as the new corporate standard at the borough.

The ideal is to have as many departments as possible using the e-Atlas as often as possible and for GI and GIS awareness to increase. We want to see more

people doing more with GIS and using the GIS team to meet their workplace requirements. After all the more our users do, the less we have to!

## **Contact Information**

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