

Project Acacia

Addressing Requirements Study

14 May 2004

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1. Introduction

1.1 Background

The Acacia programme is a collaborative project run by a partnership of government agencies to investigate and define the requirements for a single national infrastructure of joined-up, consistent, high quality, well-maintained addresses and property information.

The Acacia partnership comprises Ordnance Survey (OS), Land Registry, Registers of Scotland (RoS), Valuation Office Agency (VOA), Improvement and Development Agency (IDeA), and the Royal Mail. They concluded a Memorandum of Understanding (MOU) (Ref 1), signed in September 2002, that documents the intention of each member to develop and implement the Acacia programme. This MOU has more recently been taken to describe the Acacia Vision. The main reason for the involvement of the Registers of Scotland was to ensure that the parallel initiatives being advanced under the Acacia programme and the Definitive National addressing - Scotland exercise, followed a complementary path.

To date, the Acacia pilot project has been essentially a 'bottom up' approach to the addressing problem. It has undertaken data matching trials and specific areas of addressing research. Acacia work has been centred upon England and Wales, but the aim taken together with other complementary initiatives has also been to provide solutions capable of supporting application on a United Kingdom basis.

To consolidate the results of the research in a business context, it was considered essential to establish the core business requirements for the Acacia vision. This study is a 'top-down' approach to identify and record the business requirements and define what the Acacia vision actually is.

1.2 Investigation of requirements

This short investigation into the business requirements for addressing, as described in the Acacia Pilot Project "Terms of Reference for investigation of stakeholders business requirements" dated 4 February 2004, has been carried out by Rob Walker Consultancy Ltd during March and April 2004.

The addressing requirements of the following organisations were investigated:

- the Acacia partners: local government (IDeA), Valuation Office Agency, Land Registry, Registers of Scotland, Ordnance Survey and Royal Mail,
- other key government bodies such as ONS and the Office of the e-Envoy, and individual local authorities,
- other major users of address data such as utilities and market analysis organisations.

Key individuals in each organisation were identified to provide the source of the information. They were at the business strategy level rather than at the technical level. The list of respondents is given in Annex A.

The investigation was carried out by a formal set of questions, given in Annex B. These were carried out by a combination of face-to-face interviews, or telephone or email questionnaires (where the organisation or identified person is already known). In addition, an outline of the requirement was available from work already carried out on the Pilot Project. This was supplemented by the consultants' knowledge of the organisations concerned, through their previous work in this area, and a review of related documentation (see references).

This report describes the addressing requirements and current usage of the various users. It then describes the Acacia vision and provides an outline business case for a single national infrastructure of joined-up, consistent, high quality, well-maintained addresses and property information. Some specific issues relating to addresses are also discussed.

1.3 Addressing and addresses

Addresses are used throughout government and everyday life as descriptions of where places are. Most people are referenced by their home address. The most common form of address is the postal address, used by Royal Mail for the delivery of mail. The address is essentially a routing instruction leading to the property.

Addresses can also be used for objects without postal addresses (OWPAs). These include such things as (some) churches, halls, public facilities, industrial sites and land parcels. BS 7666-3 defines a general address structure for creating an address of an object.

All of the Acacia partners use addresses to a greater or lesser extent in their business processes. Many of them need to identify people, buildings and other objects in this way. Not all of these addresses are postal addresses.

2. Stakeholders' business requirements and processes

2.1 Local authorities

2.1.1 Requirements for addressing

Local authorities are interested in addresses for a wide range of purposes. The activities that they carry out which involve addresses include the following:

- statutory street naming and property numbering for domestic and commercial properties;
- highway construction and maintenance;
- street cleaning;
- street lighting and parks management;
- refuse collection;
- statutory planning and building approval;
- land charges;
- payment of benefits;
- social care;
- housing services;
- environmental health;
- health and safety;
- education management;
- library services;
- organising and holding elections;
- collection of Council Tax and non-domestic rates;
- trading standards;
- economic development;
- tourism,
- disaster management;
- strategic planning;
- asset management;
- maintenance of a range of public facilities;
- provision of statistical data to ODPM, ONS and others.

The types of object that local authorities are interested in include the following:

- domestic properties
- commercial properties
- industrial premises
- other taxable items (e.g. some churches, halls, electricity sub-stations, public carparks)
- land where Statutory responsibilities are relevant (e.g. for local land charges)
- local landmarks or relevant features (e.g. Glastonbury Tor, sports grounds)

- planning applications
- public facilities

Whilst some of these have postal addresses, many do not as they do not receive deliveries of mail. However, they have to be identified and accessed for other purposes. Table 1 shows the types of object used in each of the applications.

In addition to their historic and statutory obligations, local authorities are under several new pressures relating to their capture and management of address data. These pressures include:

- The need to provide one-stop information to citizens where a single enquiry can immediately identify and access relevant data across all local authority services. The address is a vital key for these purposes and customer relationship management (CRM) seen as an increasingly vital function.
- Recognition that data quality needs improvement. For example the comprehensiveness and currency of the base address data will affect funding (Implementing Electronic Government (IEG) and Rate Support Grant), the level of local taxations and Citizens' democratic rights to vote.
- New initiatives are dependent upon partnership working with other bodies and sharing comprehensive common address files, for example in relation to Crime & Disorder, Emergency Services, PAT 18 (Policy Action Team Audit 18 – Measuring neighbourhood conditions), social services, child protection registers, ValueBill. However, frequently these interactions may use slight variations of an address and therefore must be based on common referencing.
- A general drive towards greater back-office efficiency – collecting data once and consistently within each authority and using it many times.
- The need to coordinate services and reduce benefit fraud.
- New e-government initiatives such as electronic voting.

Table 1. Examples of Local Authority applications addressing requirements

	streets	domestic buildings	domestic sub-units	commercial buildings	commercial sub-units	industrial premises	other taxable items	subjects of planning applications	public facilities
street naming and property numbering	X	X	some	X	some	some	some		
highways	X	X		X		some			
street cleaning	X	X		X					
refuse collection	X	X	some	X	X	some			
planning and building approval		X	X	X	X	X		X	
land charges	X	X	some	X	some	X	some	X	X
benefits	X	X	X						
social care	X	X	X						
housing services	X	X	X						
environmental	X	X	X	X	X	X			X
health & safety	X	X	X	X	X	X			X
education	X	X	X						
libraries		X							
elections	X	X	X						
Council Tax & Non-domestic rates	X	X	X	X	X		X		
trading standards	X			X	X				
economic dev	X			X	X	X			X
disaster management	X	X		X	X	X			X
strategic planning	X	X		X	X	X			X
asset management	X								X
public facilities	X	X		X	X				X
statistics		X		X		X			X

2.1.2 Address datasets

Local authorities keep many address datasets. Historically these have been specific to an individual department or particular activity such as Council Tax and Non-domestic rates, Electoral Register, Planning Applications, Welfare and Education.

The Street Naming and Numbering function has statutory powers regarding addressing, and is responsible for street naming, property numbering and approval of property names. However, although local authorities may have kept a register of official addresses, the 'Naming and Numbering Register', they are often incomplete.

The New Roads and Street Works Act (1991) tasked local authorities with the creation of local gazetteers of streets (primarily for highways purposes, to contribute to the National Street Gazetteer). These contain a record of references to streets using the following:

- designated street names
- formal street descriptions for unnamed streets
- numbered streets
- other (unofficial) street names

These are used by Building Control, Environmental Health, Housing Grants, Local Land Charges and now within the local authorities local land and property gazetteers (LLPGs).

From 1999, most local authorities in England & Wales have been creating local gazetteers of land and property addresses to BS7666 standards (primarily for their own business purposes, to improve the quality of their addresses, to reduce the cost of maintenance of individual address lists and to leverage savings through back & front office IS integration). At the time of this report all but 20 authorities in England & Wales are at some stage of the process between LLPG creation and completion. Many of these local authorities have used their own implementation of, or have extended, BS 7666.

In England and Wales most of these LLPGs already contribute to the National Land and Property Gazetteer (NLPG), being managed by Intelligent Addressing on behalf of local government.

2.1.3 Address creation

The first stage of address creation is to create a new street. This involves the following:

1. a proposal is received (usually from a developer) to build new properties and a new street, or to convert existing property in some way that impinges on planning control;
2. where a new street is being created, the local authority carries out a consultation with up to 50 other interested parties (including Royal Mail) on the new street name, to ensure acceptability and that it is distinct from other local streets and the new name is adopted formally by a Council Meeting;
3. the street is recorded in the street gazetteer;

4. the street name is notified to other interested parties including the utilities and Royal Mail. There is no consistent way of doing this across all local authorities.

When the street exists, then a new address can be created. This involves the following:

1. the properties are numbered (this may be done initially on a temporary basis, for example using plot numbers, since the exact number may change if a new development is taking place);
2. the occupiers of the property are notified of the official address;
3. the address is published in a schedule of addresses that is communicated to other interested parties including utilities and Royal Mail. There is no consistent way of doing this across all local authorities.

2.1.4 NLPG process

The first cut of the NLPG was created from a range of sources including VOA Council Tax and Non-domestic rates, Property Intelligence's address dataset (of commercial properties) and Land Registry's Property Gazetteer. These were merged and linked to Ordnance Survey's ADDRESS-POINT co-ordinates where properties had postal addresses but the local authority had not yet allocated co-ordinates.

About 150 LLPGs are already regularly transferring local address change intelligence to the central National Land and Property Gazetteer (NLPG) "Hub" and a further 137 are expecting to start the regular updates in the next four months. For those areas where this has not taken place, the NLPG continues to maintain that part of the dataset with updates from VOA and HMLR. Thus the content and currency of the national dataset is different for different parts of the country.

The NLPG Hub provides different geographic cuts of data (e.g. for County Councils, Police Authorities, Fire Brigades etc), advises on consistency of approach to LLPG creation and maintenance, supports the LLPG Custodian groups and carries out a level of validation on the conformance of the LLPG data to BS7666.

2.1.5 Problems and issues

Local authorities' main issues concerning addresses are as follows:

- changing names of houses or businesses, where these are the only identifier of a building;
- various address versions held and used by citizens;
- resistance from residents to naming of streets, numbering of properties and designated addresses;
- lack of street names in some rural areas;
- inconsistent interpretation of objects without postal addresses, particularly land parcels remote from conventionally-addressed properties;
- general lack of co-ordination, especially lack of commonality of definition of a street between the National Street Gazetteer and Street Naming and Numbering, and lack of co-ordination;

- postal localities and post towns which conflict with geographic reality (e.g. a Salisbury posttown for a Hampshire property);
- changes to postcodes;
- vanity addresses (e.g. residents saying they live in Mayfair when they live in Soho);
- inconsistencies between LLPGs produced by district councils;
- incomplete LLPGs with respect to post codes and alternative addresses;
- little financial incentive or imperative for embracing efficient data creation and maintenance.

2.2 Valuation Office Agency

2.2.1 Requirements for addressing

The Valuation Office Agency (VOA) is responsible for valuation of properties for Council Tax (residential) and Non-domestic rates (other uses), and compiles and maintains the business rating and council tax valuation lists for England and Wales. This role is carried out by Scottish Assessors in Scotland. The information is passed to the local authority billing agencies for collection of these residential and business rates. In addition, VOA values property in England, Wales and Scotland for Inland Revenue tax purposes and provides a comprehensive service to government funded bodies.

All properties are identified by an address and most have a description. VOA has a use classification scheme for non-domestic properties. Essentially this covers all commercial properties, and some other adjuncts of commercial activities, such as advertising hoardings for which addresses can not readily be created.

2.2.2 Address datasets

The main address datasets are the Council Tax valuations records and the National Non-Domestic Rates file (a single composite street gazetteer and property address application referenced to the individual local authority areas). The major address related databases are:

- Central Database (CDB),
- Non-bulk Rating Database (individual taxable items, excluding central assessments),
- various major client based lists of property addresses.

The main addressable objects held are:

- residential,
- commercial/industrial,
- civic,
- land,
- rateable structures.

The history of addresses is kept and addresses are only deleted if they are not used. The address structure used is an extension of BS7666. It records the following information:

- firm/occupier,
- name/number,
- 3 layers of sub-street,
- street,
- locality,
- town,
- county,
- postcode.

VOA allocate notional postcodes to all rateable properties.

2.2.3 High-level data flow processes

The source of some address information is the local authorities who send addresses (and UPRNs) of properties to VOA for assessment, on an ad hoc basis. The VOA inspectors check the address against their existing records. Other addresses are created within VOA. After carrying out an assessment, the valuation and any new or changed addresses are sent to the local authority on a fortnightly basis. The transfer aspects of this process is now being computerised through the ValueBill project.

This process provides update data for the VOA central database. UPRNs and coordinates are obtained from NLPG for addresses supplied, and postcodes from PAF. Addresses are also received with property transactions from the Inland Revenue Stamps Office. These high-level processes are shown in figure 1.

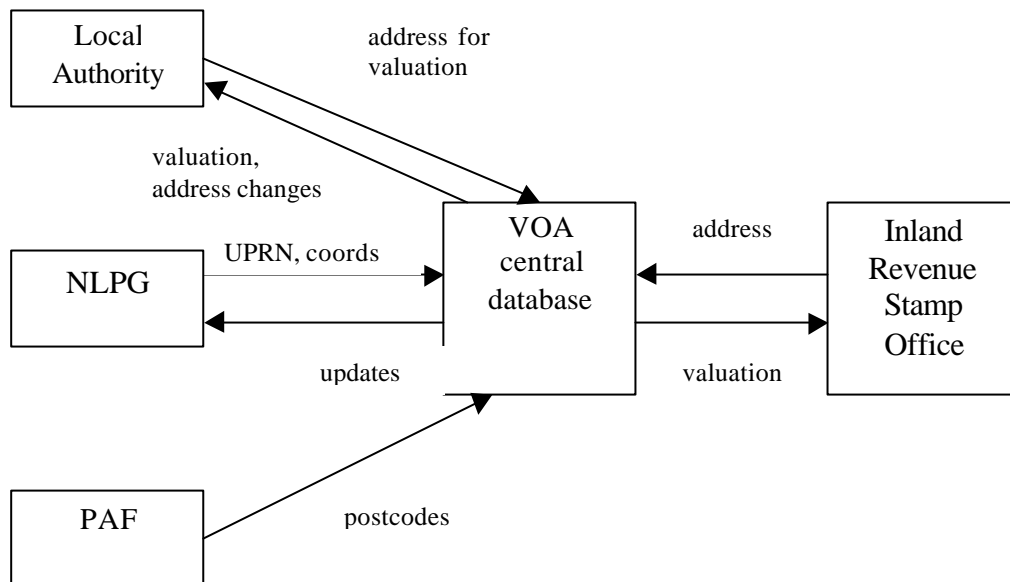


Figure 1. Valuation Office address processes

Ideally, VOA would like a single feed of data with addresses, postcodes and coordinates.

2.2.4 Problems and issues

VOA's main issues concerning addresses are as follows:

- identification of objects from non-postal addresses;
- use of secondary addressable objects;
- objects Without Postal Addresses (OWPA) and structures;
- considerable overlap and duplication of effort with other arms of the public sector in managing data;
- Royal Mail reluctant to deliver mail to some of their addresses.

The impact of incorrect addresses is as follows:

- failure to correctly identify property for Council Tax and NDR can undermine tax liability;
- resource wasted in correction;
- failure to achieve postal delivery of notices;
- jeopardising success of plans to put information online.

2.3 Royal Mail

2.3.1 Requirements for addressing

The Royal Mail's sole requirement for addressing is for the delivery of mail. Their addresses are postal delivery points, which may be residential or business properties or Post Office Box numbers (which may be commercial delivery points). The (postal) addresses represent the routing instructions for mail delivery. Royal Mail is not in general concerned about what the property is that is addressed, or who the occupier is. They are however interested in the volume of mail a property receives. Incorrect addresses create major problems for Royal Mail, leading to delayed and incorrect delivery and increased costs.

The postcode system provides a code for groups of adjacent postal delivery points, based on the Royal Mail internal organisational structure of area – district – sector - unit postcode. A unit postcode represents from one to fifty mail delivery points, with an average in residential areas of fifteen delivery points. Postcodes are widely used for analysis of demographics by a range of organisations in the public and private sectors.

2.3.2 Address datasets

The Postcode Address File (PAF) is a master record of current postal addresses. This is maintained for the sole purpose of efficient mail delivery, to help mail users to get addresses correct. As well as being used internally by Royal Mail, it is available as a product, issued monthly or quarterly, and is much used by bulk mail senders. It aims to

contain all residential properties, and most business properties (except those whose mail is delivered to a different, usually central location).

PAF is updated on a continuous basis. New properties are added when they start to receive mail. This means that there is a time lag in external PAF users being able to use new postal addresses. When addresses cease to exist, they are deleted as soon as possible.

The postal address has the following structure:

- property name or number – an identifier for the delivery point;
- dependent thoroughfare – a sub-street (seldom required);
- thoroughfare – the primary street;
- double dependent locality – a local name, usually only required in rural areas or where there is no named street;
- dependent locality – a geographically-defined area;
- posttown – the location of the main sorting office for the address (which may be different from the actual geographic town);
- postcode – a code identifying a group of adjacent delivery points.

Royal Mail also has a Redirections database containing address details of residential and commercial movers.

2.3.3 High-level data flow process

New addresses come from two main sources, local government and Royal Mail's own staff on the ground. Addresses of new properties are created by the local authority Street Naming and Numbering function (described under local government). Royal Mail's involvement in this process is to ensure that the street names and property numbers are unique and distinct, and to provide the definitive higher level address fields and the postcode.

Change information comes mainly from Royal Mail's own staff on the ground, who provide details of additional delivery points, changes to names (of buildings and organisations) and termination of delivery points. These changes are immediately sent through to the Royal Mail Address Management Centre who check the changes and update PAF. PAF is published on a monthly, quarterly or annual basis. The on-line version is essentially up-to-date. PAF provides the input to Ordnance Survey's ADDRESS-POINT dataset on a monthly basis. Ordnance Survey attaches a 10cm co-ordinate to new PAF addresses and investigates mismatches between entries in PAF and the existence or not of associated buildings on the ground. This is shown in figure 2.

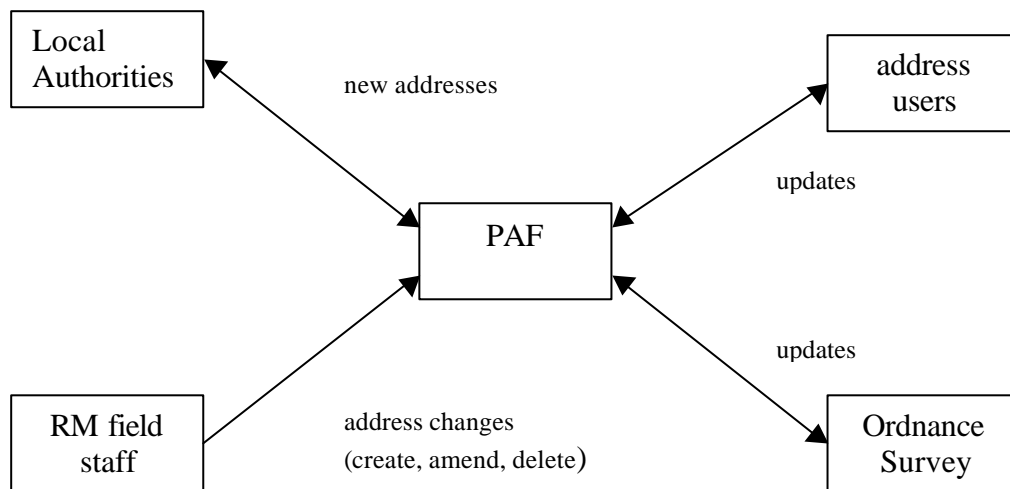


Figure 2. Royal Mail address process.

2.3.4 Problems and issues

Royal Mail's main issues concerning addresses are as follows:

- multi-occupancy properties;
- residential properties without house numbers;
- changing house names;
- changing business names where these are the only identifier of a building;
- unnamed streets;
- similar street names in a locality;
- difficulty in keeping pace with change.

2.4 Ordnance Survey

2.4.1 Requirements for addressing

Ordnance Survey is responsible for the definitive surveying and topographic mapping of Great Britain. It is also responsible for maintaining national cover of other important geospatial datasets. The most significant customer sectors for large scale data are local government, central government and the utilities. Ordnance Survey is responsible for depicting statutory boundaries, for example local government areas. Ordnance Survey co-operates with others in central and local government on projects such as the National Street Gazetteer.

Ordnance Survey captures and maintains a wide range of topographic and network objects, including the following:

- buildings,
- streets,
- land parcels,
- places (names),
- address co-ordinates,
- boundaries (local authorities).

These are designed to deliver an integrated set of geographic information within the Digital National Framework.

2.4.2 Address datasets

The main Ordnance Survey dataset is the large-scale topographic base. This encompasses all types of data, and is logically organised into a set of layers. The data is represented as sets of points, lines, polygons, symbols and text. It is structured into polygons (buildings, land parcels, paved areas, areas of water etc), each with its own topographic identifier (TOID). This structured data provides the basis of OS MasterMap.

ADDRESS-POINT is an address dataset based on the Royal Mail PAF, with a coordinate provided for each address (except for PO Boxes). The corresponding product in OS MasterMap is the Address Layer. OS MasterMap also contains an Integrated Transport Layer (ITN), which is a street dataset (an extension of the OSCAR product).

The Address Layer (and ADDRESS-POINT) originates from Royal Mail's postcode address file (PAF). Ordnance Survey uses on-the-ground GPS survey, aerial imagery and various other techniques to establish precise coordinates (with a precision of 10cm) for each address and match this to the property on the map, effectively joining up postal and topographic geography and creating a fixed link between the property and its address. Changes to the Address Layer follow on from changes to PAF which are received on a monthly basis. Additional change information is also received from other agencies. Updated versions of ADDRESS-POINT are supplied quarterly, while the update of the Address Layer normally takes two weeks.

The ITN layer contains the following linked street information:

- street name,
- street centre line,
- TOIDs (Topographic Identifiers of the polygons) making up the street.

This is obtained from the topographic database, updated on a regular basis from field observations. The ITN layer content will be enhanced over time.

The PointX product, produced in a joint venture with Landmark Information Group, provides a dataset of points of interest. The data includes classification, address and point coordinate. It includes many objects without postal addresses.

Ordnance Survey is the Concessionaire for the National Street Gazetteer (NSG). This gazetteer is required under the National Street Works Register Legislation. The gazetteer is made available through a partnership between Ordnance Survey and highway authorities. Individual highway authorities provide Ordnance Survey with their local gazetteer, which is then validated and supplied through the NSG website. They each form part of what is a national database of local street gazetteers. The gazetteer is designed to provide a complete list of all streets with their names and other information, with an unambiguous referencing system which can identify any length of 'street' in Great Britain. It conforms to BS 7666 Part 1. Because the updates are supplied on different timescales from different authorities, the NSG lacks consistency of quality, especially with respect to currency and completeness.

2.4.3 High-level data flow processes

Ordnance Survey address-related data is updated from a range of sources including:

- local authorities – Highway Authorities contribute to the National Street Gazetteer, and some local authorities also provide change information to Ordnance Survey field survey staff;
- field survey – by Ordnance Survey staff;
- Royal Mail (PAF);
- other agencies.

The high-level data flow processes are shown in figure 3.

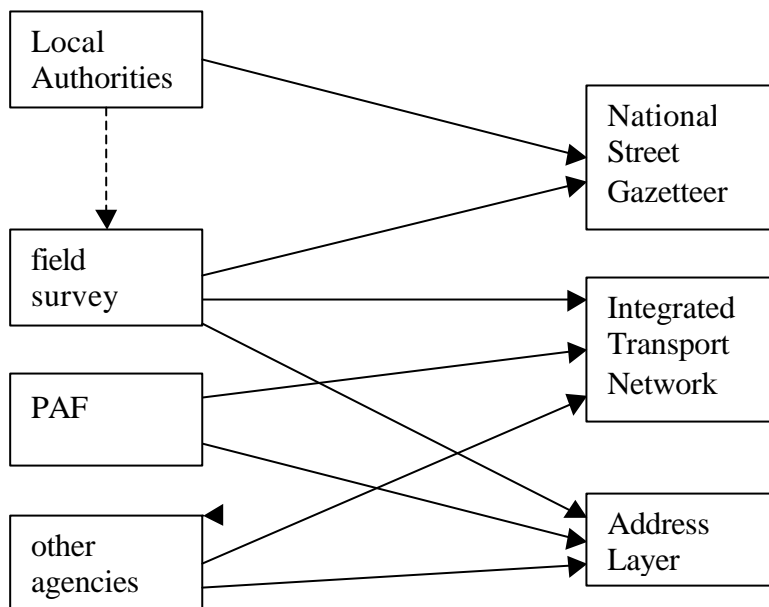


Figure 3. High-level Ordnance Survey data flows

2.4.4 Problems and issues

Ordnance Survey's current operational concerns regarding addresses are as follows:

- identifying consistent information about change from all relevant sources of such information;
- timing of notification of new and changed postal addresses;
- timing of inclusion of "not yet built" addresses in PAF;
- identification of buildings with no obvious postal address;
- consistent identification of deletions as well as creation of new addresses;
- organisation names and industrial units.

2.5 Land Registry & Registers of Scotland

2.5.1 Requirements for addressing

The function of land registration is carried out by Land Registry for England and Wales and Registers of Scotland (RoS) for Scotland. Although these operate under different legislation, the functions are essentially the same. The Land Registries are responsible for registering a variety of legal documents relating to land and property transactions. They:

- record property details;
- provide information to property purchasers and other citizen enquiries;
- contribute towards maintenance of national datasets;
- produce national statistics such as house price indices..

Addresses are fundamental to their working, being the way in which properties are identified with the general public. The objects addressed include both buildings (and parts of buildings), and land parcels. Addresses are stored in an extended BS7666 format.

2.5.2 Address datasets

The main address-related datasets are as follows:

- plans-based register – the individual plans of each registered property;
- register of plans, writs and deeds – the associated details relating to the property and the transactions.

The key to these is the address. Because properties are generally only registered on change of ownership, not all properties are included in the register. They keep a full history of change to addresses. Address data is used on a continuous basis within the land registries. There are dedicated resources of address managers, and more recently a Data Integrity Team, for managing the address data.

RoS use the OS ADDRESS-POINT source but BS 7666 compliant structure for storing address data. Land Registry now use BS 7666 compliant addresses with some of their old address fields.

The impact of wrong addresses is as:

- customers are unable to carry out a complete search;
- increased number of returns that require corrective action;
- unable to identify relevant information about a property/land from address, requiring use of map as search vehicle;
- missed business development opportunities.

2.5.3 High-level address data flow processes

In the main, the land registries create their data by interaction with the public, property professionals and existing records. Checks of address data are made against other datasets, namely ADDRESS-POINT and PAF. The high-level data flows are shown in Figure 4. Note that the linkage to NLPG only occurs in England and Wales.

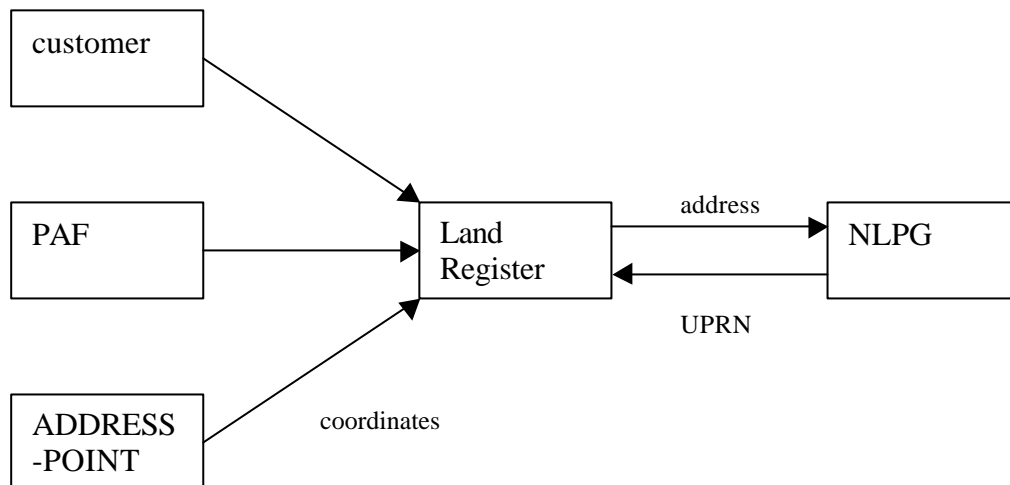


Figure 4. High-level address data flows for Land Registries.

2.5.4 Problems and issues

The Land Registries main problems regarding addresses are as follows:

- addresses submitted by customers that erroneously cannot be matched to the Register;
- non-structured historical addresses makes it difficult to reconcile with present description (e.g. ‘lefthand flat on third floor’ with ‘Flat 3A’);
- creating a standard address for properties that do not have formal or postal address (e.g. “land at ...”);
- staff modify addresses in an inappropriate manner;
- defining differences between postal addresses and OWPA;

- duplication and synchronisation of addresses (e.g. between Property Gazetteer and Registers of Title);
- lack of synchronisation with map content;
- ADDRESS-POINT issues
 - inconsistent flat description,
 - inconsistent indexing of hamlets (could be in building name, locality or thoroughfare),
 - currency of addresses,
 - inconsistencies with information on Land-Line,
 - inconsistency in location of farm names.

2.6 National Statistics

2.6.1 Office for National Statistics & General Register Office for Scotland

The Office for National Statistics (ONS) and the General Register Office for Scotland (GROS) have a strong interest in people, particularly where they live and work, and in businesses. Thus their interest in addresses is mainly for residential and business property.

The main activities of ONS related to addressing are as follows:

- the periodic census, where the requirement is to have complete coverage of the population;
- registration of births, marriages and deaths in England and Wales;
- production of social and economic statistics on a national, regional and neighbourhood basis;
- social survey sampling.

The main activities of GROS within Scotland are:

- registration of births, marriages, deaths, divorces and adoptions;
- carrying out periodic censuses.

2.6.2 Requirements for addressing

Address data is required for:

- joined up service delivery across different government agencies;
- census coverage, quality of census data and census administration;
- customer enquiry services;
- delivery of civil registration service - addresses included on registration documents;
- sample selection for social surveys;
- mail out for business surveys;
- improved public sector efficiency (through possible implementation of a Citizen Information Project (CIP) being led by ONS, if approved by Ministers).

The main objects of interest are:

- all households;
- communal residential properties;
- commercial properties;
- land use polygons (possibly in the future);

For Census enumeration, a base of address data must:

- identify different dwellings and types within a property at an address;
- identify where there is more than one household at a dwelling;
- identify commercial properties with sufficient accuracy to avoid printing and posting out a high volume of forms needlessly;
- identify communal residential establishments and their type, with an indication of the number of people resident.

There is an interest in dates of creation, change and deletion, so that change over time can be investigated. Linkage to topography (via seed point coordinates) is required for area summation. There is also an increasing interest in addresses of locations where events occur (e.g. crime/fire/accidents).

ONS is undergoing an extensive programme of statistical modernisation. Part of this programme includes the implementation of a Geographic Referencing Infrastructure (GRI) which is being developed to include an address layer (currently ADDRESS-POINT) and address matching tools. Although the GRI will initially hold an address gazetteer (defined as being an address list with a spatial referencing element), it is likely that it will need to support longer term requirements for an address register to link statistical attributes to addresses to underpin sample selection and census field work. ADDRESS-POINT could be replaced by any new comprehensive address list that becomes available in the future.

GROS has a postcode-based geographic referencing strategy and uses postcodes as building bricks in the collection, processing and presentation of population and vital statistics. The postcode is also used in the definition of urban areas.

2.6.3 Address datasets

The main address-related datasets held are as follows:

- an address database to support the conduct and administration of the 2001 Census;
- addresses included in the births, marriages and deaths registration process;
- business addresses for mailing out business surveys;
- PAF used for sampling social surveys;
- digital postcode boundaries;
- UK Addresses for resolving address/postcode queries.

The Census provides a valuable list of addresses that could be used to update other sources. The 2001 Census address database was created in 1998 and then frozen. The Census enumeration areas were created from PAF and ADDRESS-POINT, and

subsequent ground investigation by the Census enumerators. PAF was found to be out-of-date (particularly when it comes to the removal of properties) and had duplicate entries. This tended to manifest itself in local clusters, which therefore had a knock-on effect on the enumeration process and, eventually, on the quality of local statistics.

The addresses held in registers of births, marriages and deaths are based on the addresses presented by informants.

Currently, much of the data are processed at postcode level but, subject to the availability of a quality, comprehensive and fully maintained address gazetteer, data are likely to be processed increasingly at individual address level in the future.

2.6.4 Benefits of address quality improvements

The following benefits of address quality improvements have been identified:

- **More efficient and effective Census enumeration** – by undertaking a large part of the census by direct post-out and post-back, and by identification of properties that may be occupied by households or may be communal establishments where people may reside permanently or temporarily (e.g. hotels, hospitals, care homes);
- **More accurate area boundaries and small area statistics** - the quality of the statistics produced for small areas from a Census would be improved by more effective enumeration, and also by a more accurate address database, ideally with linked spatial properties. Access to unit level address information that is precisely grid-referenced could improve the quality of the recasting process by allowing for more precise counts of addresses within small areas.
- **Future potential benefits to government** – by linking definitive addressing to a population register, to enable better planning of services.

2.6.5 Problems and issues

The incomplete and/or inconsistent address records lead to missing data in the census resulting in the under-recording of information. ONS and GROS have found the following problems regarding address datasets:

- missing addresses in their version of PAF and ADDRESS-POINT;
- multi-occupancy premises – numerous households behind a single front door, differences between the various types of multi-occupancy buildings;
- incomplete business addresses, particularly businesses in new business/retail parks;
- inconsistent addresses, particularly relating to businesses, leading to duplication;
- PO boxes not related to physical locations;
- inconsistent locality names;
- address differences (when compared with census input from citizens).

2.7 Emergency Services

2.7.1 Requirements for addressing

The emergency services (police, ambulance, rescue) make extensive use of addresses. All locations of incidents are recorded by their address – residential, work places, public buildings, public facilities (parks, recreation grounds, transport interfaces). These address datasets are built up over time as a result of incidents. The main purpose of these address datasets are:

- to identify locations reported by the public;
- to access locations of incidents;
- to plan responses to future incidents.

2.7.2 Address datasets

Each emergency service has its own address gazetteer. This is based on the postal set of addresses identifying residential and commercial properties. PAF was originally used, but this is now augmented by ADDRESS-POINT. This basic address set is enhanced by the emergency service either through their own identification of important locations, and from the emergency control room in response to calls from the public.

The addresses added by the emergency service themselves are those that they identify as being of possible location of an incident. Thus, for example, fire services will add:

- all public buildings;
- sites of events;
- sites where hazardous chemicals are stored;
- places where people congregate, for example underground train stations;
- other important sites.

The emergency control rooms will build up addresses of locations of incidents, for example:

- public parks;
- late-night bus-stops;
- arcades.

Whilst ambulance services will have few addresses that are not postal, rescue services will have many, and police services may have more objects without postal addresses than those with postal addresses.

Some services add notional postcodes to non-postal addresses.

2.7.3 High-level data flow processes

The high-level address-creation process is shown in figure 5.

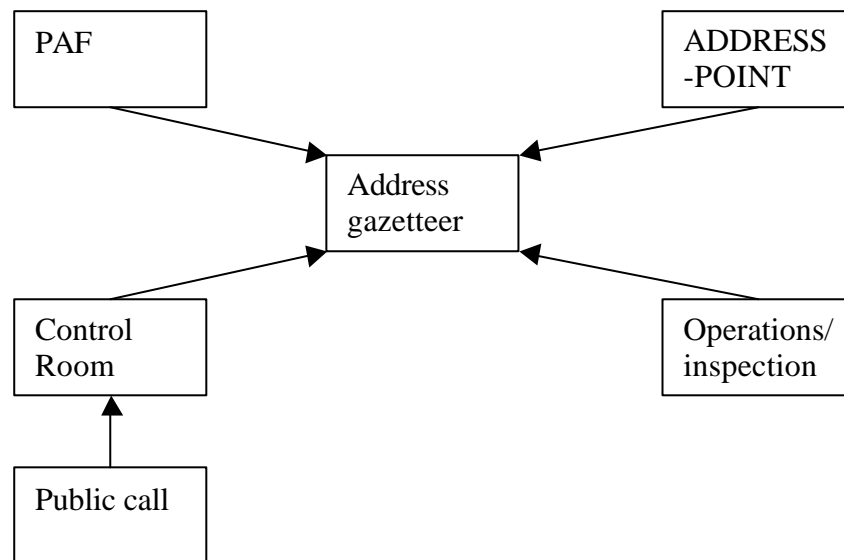


Figure 5. High-level address-creation process for emergency services

2.7.4 Problems and issues

Emergency services have the following problems with addresses:

- ill-defined addresses,
- unnamed streets,
- lack of property numbers,
- address changes, especially to building names,
- heavy reliance on local knowledge.

2.8 Utilities

2.8.1 Requirements for addressing

The utilities (gas, water, electricity, telecoms) make extensive use of addresses. The main business purposes are:

- customer billing,
- customer contact and services, including metering,
- support of special needs customers,
- work management,
- maintenance,
- sampling (e.g. water quality),
- response to emergencies,
- service planning, demand estimation and network modelling,
- asset management,
- investment planning.

Addresses are required of:

- residential, commercial, industrial properties,
- public facilities (public conveniences, other structures and sites), cattle troughs,
- other buildings receiving services (outbuildings),
- utility facilities (sub-stations, pumping stations etc).

Whilst these include all postal addresses, there are also many objects without postal addresses (for a water utility this may be up to the same number as postal addresses). Some addresses used for billing may be outside their area of operations, and may also be outside the country.

Incorrect addresses result in loss of revenue and increased costs of operations. Ideally, utilities would like access to a central maintained dataset of addresses of all residential units, commercial and industrial properties, together with a basic classification. This address set needs to include approved proposed new buildings.

2.8.2 Address datasets

Each utility will have a main address dataset, based upon PAF. To this is added customer service addresses that have been built up over time. Most of these are very comprehensive, although they may be incomplete in some areas.

2.8.3 High-level data flow processes

The high-level address-creation and maintenance process is shown in Figure 6.

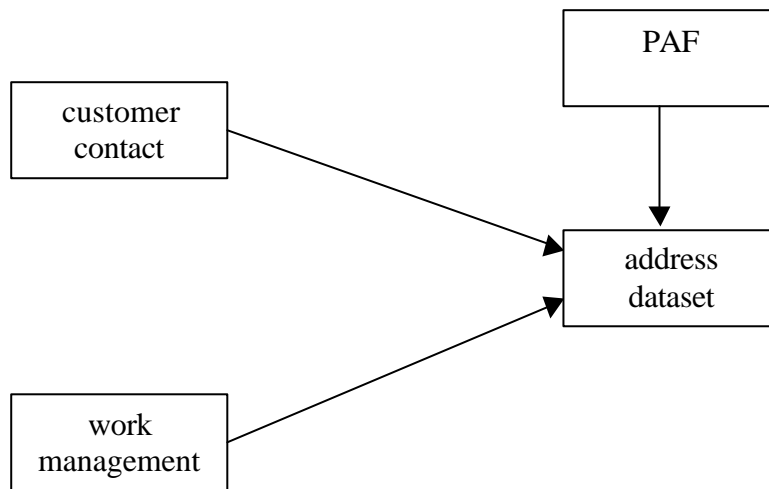


Figure 6. High-level address creation process for utilities.

2.8.4 Problems and issues

Utilities encounter the following problems with addresses:

- flats and other residential sub-units not in PAF;
- objects without postal addresses – cattle troughs, fountains, car parks
- commercial premises identified only by the occupier name;
- plot numbers and reconciliation with official addresses;
- mis-spelt addresses;
- vanity addresses;
- incorrect or unknown postcodes;
- lack of consistency in locality names;
- PAF and ADDRESS-POINT not being sufficiently up-to-date.

2.9 Other address users

2.9.1 Requirements for addressing,

Addresses are used throughout the public and commercial sectors, in the provision of services. These users and uses fall into three main categories:

- those relating to the location of people (residential addresses);
- those relating to the location of businesses;
- those relating to land and property.

2.9.2 Residential address users

Residential addresses, comprising "customers" and potential "customers" are used by many organisations including:

- Department of Health & National Health Service,
- Department of Work and Pensions,
- Driver and Vehicle Licensing Centre,
- Television Licensing,
- Inland Revenue,
- Passport Agency,
- commercial organisations,
- market research organisations.

The address datasets of most of these organisations use PAF, augmented by their own information, usually from new "customers". Spatial analysis is a frequently used procedure on these datasets, this is often by postcode.

2.9.3 Business address users

Business addresses users include:

- Inland Revenue,
- Customs and Excise,
- Companies House,
- Regional Business Links,
- DEFRA,
- market research organisations.

Most of these will build up their own address lists, with input from PAF and some commercial business address lists such as those provided by Thomson, Landmark and Property Intelligence.

2.9.4 Land and property address users

Land and property address users will require a broader base of addresses. Applications are:

- land information services, such as the National Land Information Service (NLIS) and various commercial property data services;
- land usage, such as the National Land Use Database;
- DEFRA, such as the IACS;
- property management, especially specific property holdings, such as Defence Estates and other major land owners.

2.9.5 High-level address data flow processes

The high-level data flows for these types of organisation are similar, and are shown in Figure 7.

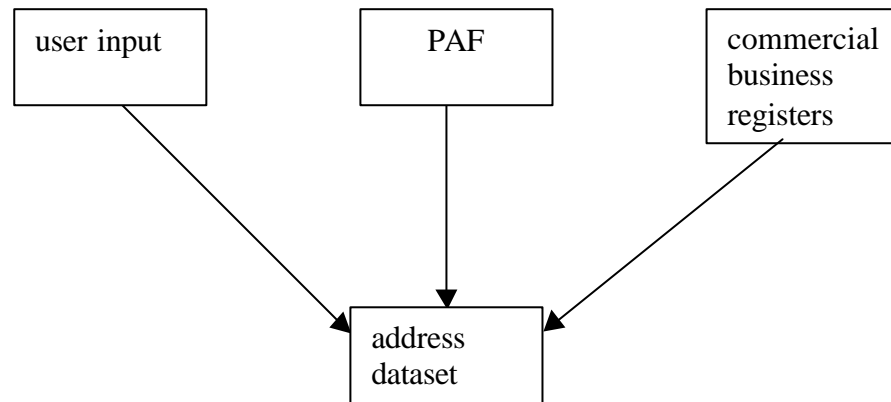


Figure 7. High-level address data-flow

2.9.6 Problems and Issues

The main problems and issues relating to addresses found by these users are:

- incompleteness - in both their own datasets and those providing input especially multi-occupancy;
- late incorporation of change - either through their own user processes or through datasets providing input;
- inability to match own records to those of partner organisations;
- difficulty in creating addresses for objects without postal addresses;
- duplicate addresses.

3. The Acacia vision

3.1 National address infrastructure

The Acacia vision is one of an infrastructure of joined-up consistent, maintained address and property information. This will provide a single point of contact for users to definitive address data, separate from the source datasets and independent from organisational biases (i.e. having a 'neutral ' view). It will be owned and managed by a designated authority for the benefit of the wide range of users in the public and private sectors. No assumption is made about how this will be implemented and delivered.

The Acacia Memorandum of Understanding (Ref 1) describes the aim of the Acacia work programme as

"... to co-ordinate the development and maintenance, and promote the use, of a definitive, consistent and joined-up national infrastructure of property addresses and related data with the related mapping so as to facilitate major economies, efficiencies and service improvements both in the public sector and throughout the economy.

As currently envisaged, the programme aims to promote the development and maintenance in the national interest of definitive national databanks of addresses (including postal and other elements), streets, non-addressable properties and in due course property ownership and occupancy parcels, together with the related definitive mapping, all linked together and held as a land and property layer within the framework of OS MasterMap, and all continuously updated and readily accessible to users."

A fuller statement of programme objectives is at Annex C.

3.2 Requirements for a National Address Infrastructure

3.2.1 Benefits

This investigation into addressing requirements also asked for views on an overall National Address Infrastructure (NAI). All respondents, with the exception of one, identified a requirement within their organisation for a NAI.

There were a wide range of perceived benefits to organisations. These can be classified as follows:

- Operational
 - the improvement of productivity and speed of services,
 - enhancement of products (e.g. data coverage, quality of data),
 - enhanced operating environment (e.g. data administration);
- Improved public sector efficiency

- making better provision for interoperability across government organisations and also for pan-European and international interoperability;
- Policy improvement.

3.2.2 Data

The data requirements for the NAI includes all postal and geographic addresses, giving complete and comprehensive data for all types of addressable objects. There is a requirement to hold addresses for objects with postal addresses.

The data is required to be:

- current, and kept up to date;
- dated to allow historic records;
- able to hold proposed address data (OS, Royal Mail).

It should contain the addresses for all residential and business properties. It is also required to hold a spatial locator, preferably a national grid reference for a representative point. The data should be compliant with BS 7666 and contain as a minimum everything that is currently held in ADDRESS-POINT.

3.2.3 Changes to business processes

There will be changes necessary to an organisation's business processes as a result of moving to using a NAI. The extent of these changes will depend on how the NAI is used by an organisation. In some cases there will be little change, in others there may be significant changes. In some organisations the changes will be seen as part of other on-going developments, simply an extension to allow the use of the NAI.

Potential changes could be:

- to database structures and software;
- the provision of interfaces / access to NAI;
- to index fields;
- for address maintenance;
- to provide enhanced fuzzy matching software.

3.2.4 Issues

Other key issues identified were:

- How will NAI fit in with NLPG;
- A legal framework to ensure that the NAI is used and the concept embraced.

3.3 A definitive address infrastructure

3.3.1 Objects included

The range of things (termed addressable objects) that could be included is potentially unlimited. Thus it is essential to limit the scope initially to the important categories of object that are of greatest interest and in most widespread use. The high-level categories of objects are as follows:

- residential buildings (separately identifiable physical structures such as houses, self-contained flats etc);
- residential sub-units (individual households within a physical structure, such as bedsits, rooms in hostels);
- commercial buildings;
- commercial sub-units;
- industrial premises (factories and operational sites such as yards);
- public buildings and facilities;
- land ownership parcels (these are often coincident with other properties);
- land parcels of particular interest (such as sites of events);
- specific taxable items that are items of land and property (for example car parks, but not advertising hoardings and ATMs).

The interest in each of these categories to the various Acacia partners and address users are shown in Table 2.

3.3.2 Related data

The basic information required for each object is as follows:

- its category (i.e. what it is);
- its address (or addresses);
- a point coordinate (for a centroid);
- metadata about how the record was created and amended (when, by whom etc).

For some objects (e.g. ownership land parcels), a polygon (at appropriate level of resolution) will also need to be available.

3.3.3 Data delivery

Data is required by the users through three main routes:

- datasets of particular sub-divisions of the data with particular detail at particular times (e.g. directory of commercial premises);
- automatically through integrated business processes (e.g. ValueBill);
- online transactions (e.g. citizen enquiries and e-government).

Table 2. Interest of each Acacia partner and category of user, in each category of addressable object.

	residential property	residential sub-unit	commercial property	commercial sub-unit	industrial premises	public facilities	land ownership parcel	other land parcels	other taxable items
local government	X	X	X	X	X	X	X	X	X
Royal Mail	X	some	X	some		some			
Ordnance Survey	X		X		X	X		X	some
Valuation Office	X	X	X	X	X		some	some	X
Land Registries	X		X		X		X		
National Statistics	X	X	X	X	X			some	
other central government	X	some	X	some	X	X		some	
emergency services	X	X	X	X	X	X		some	
utilities	X	some	X	some	X	X			
other commercial	X		X	some		X			
general public	X	X	X	X		X		some	

3.4 The lifecycle for addresses and data management

3.4.1 Address creation

The interest of each of the Acacia partners starts at a different point in the address creation process. This is shown in Table 3. Other address users are also interested in addresses across the range of stages.

Table 3 Interest in the address creation process

Address-related activity		Acacia partner				
Real-world activity	Address activity	Local Gov't	Royal Mail	Land Registry	Ordnance Survey	Valuation Office
land transaction	plot address			land registration		land valuation
outline planning		planning process				
design approval		add plot address to LLPG			recorded	
	provisional address	naming & numbering	add to 'Not yet built' file			
construction starts					provisional survey (major developments)	
	address finalisation & postcode assignment	naming & numbering	postcode assigned			
construction completion		building control			final survey	
occupancy starts		taxation etc	add address to PAF	ownership transaction	add to ADDRESS-POINT	valuation

The different points in the address lifecycle at which the various partners interest commences, means that it is very difficult if not impossible to keep their different address datasets synchronised.

3.4.2 Address change

Change to addresses can occur in many ways. Some of these changes will be corrections rather than real-world changes, for example the correction of spelling in a recorded address.

The main types of address change are:

- of name or number,
- of classification (e.g. from residential to commercial),
- of use,
- of owner,
- of occupancy,
- of recorded position (e.g. due to positional accuracy improvement),
- of postcode.

The interest of each Acacia partner in each type of change is shown in Table 4.

Table 4. Interest of Acacia partners in address changes

Change	Local government	Valuation Office	Land Registry	Ordnance Survey	Royal Mail
name or number	X	X	X	X	X
classification	X	X		X	
use	X	X		X	
owner	X	X	X		
occupancy	X	X			
position	X	X	X	X	
postcode	X	X	X		X

3.4.3 Address deletion

When an object is de-commissioned, most organisations archive the address details, as they will have an influence on future developments. The exception is Royal Mail, who only keep a record of current postal addresses.

3.5 Proposed management model

3.5.1 Governance

To be effective, the infrastructure will require direction, regulation and monitoring from the centre, by a government body independent of the data suppliers but working closely in partnership with them. This body should have ownership of the infrastructure and be part of (or directly accountable to) a government department with a remit across a range of areas.

The data suppliers will need to be obliged, subject to national agreements on the commercial arrangements, to supply data to the national infrastructure and other partner suppliers.

The data suppliers are mostly key users of the data as well. The other main users will be other central government departments and agencies, emergency services, utilities and commercial organisations. These will need to be consulted on a regular basis through a wider user group.

3.5.2 Management

In order for the joined-up infrastructure to be successful, it will have to be actively managed. Leaving things to the individual partners on a goodwill basis will not be sufficient. Roles and responsibilities will need to be defined.

An Implementation Authority, at the organisational level, will be required to manage the infrastructure. They will be responsible for day-to-day monitoring of the update processes and data quality control. They will carry out any data matching between the source datasets, and ensure that change information is disseminated to the partners.

3.5.3 Business processes

In the longer-term, the update process needs to be re-engineered, to remove the current duplication. Each task should be performed by a single organisation, and sent to a central facility for dissemination. A simplified process is shown in figure 8.

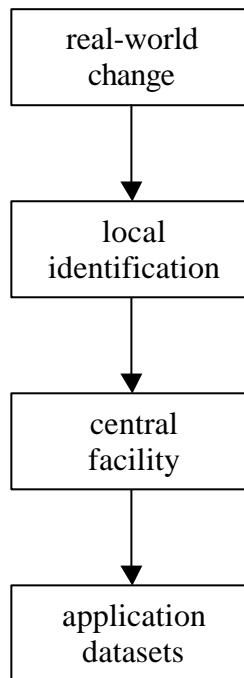


Figure 8. Idealised update process.

The introduction of a National Address Infrastructure may necessitate the re-engineering of the address creation processes and traditional roles and responsibilities for certain Acacia stakeholders.

The responsibility for each aspect might be as follows:

name/number	local authority
classification	VOA
use	local authority
owner	Land Registry
occupancy	local authority
position	Ordnance Survey
postcode	Royal Mail

In the shorter term, there will still be multiple sources of change that have to be resolved. The resolution could be achieved using the responsibilities listed above.

4. An outline business case for the Acacia project

4.1 Progress to date

The proposed national addresses infrastructure will be a national resource. There are several stages involved in putting such a major national resource in place, only some of which have so far been undertaken. The work to date has consisted of:

- a limited review of NLPG as a potential source for the list of definitive national addresses
 - this was undertaken before the requirements for a national address data-set had been fully considered and did not involve any significant quality audit of data or processes
- preliminary work on development costs and the business case.
- the Acacia Pilot Project,
 - data matching trials and research on six significant technical issues of addressing
- a short Requirements Analysis (this study)
 - a high level overview of the requirements for addressing
- a short Benefits Analysis
 - a high level preliminary study of costs and (particularly) benefits
- an investigation into multi-occupancy addresses.

These projects have produced useful information that will help to prepare the way for development and implementation of the Acacia vision. There are, however, still many different address datasets and different technical views on a national infrastructure solution. In addition there are related issues such as intellectual property rights that must be resolved. These will not be resolved without the proper governance, management, funding and a planned approach to the implementation.

4.2 Next stages

In order to move the Acacia Programme forward towards the implementation of a national infrastructure, the following work will need to be undertaken:

- detailed requirements analysis (of which this is a high level review);
- independent quality audit of NLPG and other source datasets, especially completeness and currency, and the maintenance regime;
- quality review of the address creation process;
- development of the vision of the National Address Infrastructure – this should include an optimum process for address creation and maintenance, and not just incorporate existing processes of Acacia partners. There is a need to consider the wider strategic implications of an efficient model, and possible changes in other players – one which accurately reflects actual data lifecycles;
- **Feasibility Study** of the technical options for implementation

- to review options, including NLPG, and select the preferred technical solution;
- Preparation of a full **Business Case** for implementation
 - to establish more securely the business case for government support and funding;
- Establish the governance and management structure for the National Address Infrastructure;
- Implementation of the National Address Infrastructure, including
 - provision of a quality assured central data resource
 - development of centrally managed processes to disseminate and maintain this resource.

The proposed national infrastructure needs to be established with the necessary government funding and regulation for it to be capable of adoption across all potential users. This work cannot be undertaken by an informal group of small government organisations, such as the work on the Acacia Programme to date. The programme governance is fundamental to the success of the initiative and necessary regardless of the means of implementation of the infrastructure.

4.3 Implications and benefits for Acacia partners

The Acacia partners will have to adopt a new role and associated responsibilities with respect to provision of data to a national resource. Most will also have to make improvements to their data management procedures and quality assurance. This in turn may require some changes to their internal business processes.

Once implemented the national address infrastructure will allow the Acacia partners access to quality assured data, and potentially save significant operational costs. It will help to meet their particular needs as follows:

Local government

Local government has the greatest use of addresses, due to the wide range of front-line services that it delivers to the citizen. A comprehensive address dataset, firstly of residential properties, and then of commercial and other properties is required. It will have major benefits of:

- increased revenues by reduction of missing properties subject to Council Tax and National non-domestic rates;
- improved efficiency in dealing with the public;
- more effective support of a partnership model for the delivery of services;
- efficiencies through the integration of back and front office Information Systems;
- better service planning through improved information about the population.

Valuation Office

Valuation Office supplies a service to local government, in valuing properties for taxation purposes. A comprehensive address dataset of properties, both domestic and non-domestic will bring the benefits of improved efficiency in its service by reducing the mismatches in address data.

Land Registries

Land registries are interested solely in registered land. A comprehensive address dataset will bring benefits of increased efficiency in their operational processes through identifying addresses and better information provision.

Ordnance Survey

A more effective and co-operation maintenance programme focused on core address information will improve the integration of all address databases with the underlying Ordnance Survey topographic, imagery and transport networks. This will provide a holistic framework that will benefit all users in both the public and private sectors.

Royal Mail

The benefit to Royal Mail of a comprehensive address dataset will be through reduction of incorrectly addressed mail which currently leads to increased costs.

4.4 Anticipated benefits to user community

Detailed analysis of the benefits of a national address infrastructure are outside the scope of this investigation, and are the subject of a separate investigation [Ref 7]. However, they can be expected across a range of areas as follows:

Other central government departments and agencies

A comprehensive address dataset of residential properties will benefit central government departments and agencies as follows:

- ONS through better address information for planning censuses;
- better targetting of resources;
- enabling e-government in the delivery of services to the public;
- enabling joined-up government and improved services to the citizen;
- enabling new projects such as CIP (Citizen's Information Project);
- providing licensing agencies such as Vehicle Licensing and TV licensing with better information about residential properties to enable them to reduce license evasion.

Other public sector users

Emergency services will benefit from a comprehensive address dataset through improved identification of locations for emergency response and planning.

Commercial users

Commercial users who can be expected to benefit from a comprehensive address dataset will include utilities and other service providers, and marketing organisations. They will benefit from better identification and targeting of customers and will have the potential to create new, innovative products and services.

General public

The general public will benefit from a comprehensive address dataset through improved public services, improved contact with service providers and reduced need for communication with government agencies when changing their address.

5. Specific issues

5.1 Address structures

The address structures used by the various Acacia partners differ. This has led to problems matching addresses, as found in the Acacia Pilot Project trials. Essentially there are two different address structures:

- postal addresses - as defined by Royal Mail for locations receiving mail deliveries, and described in **2.3**,
- geographic addresses - for a wider set of geographic objects, as defined in BS 7666 Part 3.

In practice, most of the Acacia partners use a hybrid to enable both types of address to be catered for.

The periodic review of BS 7666 is taking place this year. It is important that the Acacia partners are involved in this. This may be at the level of the Strategy Group (which is made up of the major stakeholders, who are being asked to provide sponsorship), or at the User Review Group, who will be asked to review all proposed changes.

5.2 Problem addresses

Although the rules for creating postal addresses, are well established, and guidelines have been produced for address creation for the NLPG, there are particular areas that regularly generate problems in all address datasets. These include the following:

- unnamed streets and unnumbered properties
- multi-occupancy premises
- occupant names used to identify premises
- objects without postal addresses

Unnamed streets and unnumbered properties are a particular problem in rural areas, where some properties may be identified by a name and a locality. Whilst these may be well-known locally, they are often insufficient to exactly locate the property in wider applications, and in particular the delivery of services.

Multiple-occupancy premises include flats, hostels and shared business premises. They are often only addressed to the higher level unit. Even where they are individually addressed, this is usually done in an inconsistent manner, particularly in the way that the individual unit is referenced, for example "first floor flat". This is the subject of a separate investigation [Ref 6].

Occupant names are often used to identify properties, particularly for commercial premises, for example "Dillons". This creates problems in two ways. Firstly, the name is often not the exact name, and therefore can appear in different forms in different places (e.g. "Dillons Newsagent"). Secondly, the name can be changed without any of the

addressing organisations being informed. Thirdly, the business may move to a new site, sometimes in the same street, taking the name with it. In this case, it will not be possible to differentiate between the two properties from the address.

Objects without postal addresses are a general source of addressing problems. There is inconsistency in the way of identifying them and describing them (the object name). Typical examples are the classification (e.g. hall/village hall/community hall) and the description of the location (e.g. "behind the Kings Arms").

For all of these types of problem addresses, definitive guidelines are required, covering the classification, description and location, including template examples.

5.3 Data management good practice

5.3.1 The need for data management

There is a range of activities concerned with the handling of data in any organisation. These will be implemented to varying degrees in different organisations. In general there is little awareness and commitment at senior levels of organisations of the importance of implementing good data management practises. The benefits from good data management include the following:

- increased confidence and trust in the data;
- increased use of data;
- improved quality and provision of timely information, fit for purpose within the business context;
- increased understanding of data and its use;
- improved business processes and resource allocation;
- better control over data access;
- more realistic charging becomes possible;
- there is scope to rationalise certain datasets and develop a one-stop shop approach to improve value for money and enhance stakeholder reputation.

5.3.2 Data management activities

Fundamental to the establishment of good data management within an organisation is the creation of a Data Policy or Data Strategy (Corporate Information Strategy). This provides a high level set of guiding principles and a plan for implementing and maintaining data management within the organisation. It establishes the framework within which data management will be carried out. As a minimum it should define the following:

- **Data documentation** for all datasets –metadata with a full description of the datasets, including definitions and source;
- **Data lifecycle** - covering development of a business case for data acquisition, data acquisition/creation, data maintenance (stewardship), data access/dissemination, data audit;

- **Roles and responsibilities**

The key roles for data management and their respective responsibilities are those of:

- **Data Owner** - with managerial and financial control of data, and legal rights over data, i.e. the Intellectual Property Rights and the Copyright.
- **Data Champion** - the senior member of an organisation who supports and presents the data issues to the managing board.
- **Data Manager** - with managerial responsibility for data management function within an organisation and implementation of the Data Policy.
- **Data Steward/Custodian** - responsible for the day-to-day management of each dataset within an organisation.
- **Data Users** - who have access to the data.
- **Data Auditors** – who independently check the quality of the data against agreed thresholds & targets.

The adoption of these roles will vary between organisations depending on the extent and level of data usage within an organisation.

5.4 Data quality assessment

Many of the address users have concerns about the quality of the current address datasets. In many cases, little is known about the data quality. For any such dataset, a formal quality assessment programme is required to establish:

- **completeness** - with respect to the specification of the dataset (which is often not formally defined). This includes both omissions (missing entries) and commission (duplicates) and is often difficult to establish as the totality of occurrences is not known. It requires comparing samples of the data with the source;
- **currency** - how up-to-date is the dataset, compared to the real world. This is different from the frequency of update of the dataset;
- **logical consistency** - are adjacent addresses recorded in the same way. Basic consistency checks can be made to find inconsistencies which will then require investigation in the field;
- **attribute accuracy** - how accurate are the alphanumeric details of the data. Simple checks can be made of spelling and valid values;
- **positional accuracy** - how accurate are the coordinates (compared with the true position in the real world). This can now be established on a sample basis using GPS.

6. Conclusions

1. All the Acacia partners currently have different business requirements for addresses. The objects that they are interested in are different. However, there is a core set of objects (residential and business premises) that is widely used.
2. The address lifecycle is complex and not rigorously defined. The interests of both Acacia partners and address users start at different points in this address lifecycle.
3. There is no current address solution that meets the needs of the National Address Infrastructure. No single organisation can supply all the address information that others require. However, local authorities are the most closely involved in the address creation and change processes and are therefore essential partners in any national address infrastructure.
4. The current address update process is fragmented. This leads to missing and erroneous addresses in a number of business systems, and causes major problems to the effective and efficient operation of government and other services. There is widespread duplication of effort within the management of addresses and the current address solutions are not effectively meeting the requirements of the users.
5. There is inconsistency between Acacia partners in address creation. BS7666 is not universally accepted by them, and where it is accepted, is not consistently implemented.
6. There are quality issues associated with all the current address datasets, particularly with respect to currency and completeness.
7. Address users outside the Acacia partnership require a single source of addresses, a National Address Infrastructure, and a simple pricing structure for their access and use. They currently do not feel that their needs are being adequately met.
8. For different business uses, different forms of address (postal, geographic) are required.
9. A central national address infrastructure will be essential for e-government and for many major government projects such as the Citizen's Information Project to deliver what is expected of them.
10. There are a range of anticipated benefits from a National Address Infrastructure to Acacia partners and address users. The main benefits (not yet fully perceived in many cases) are access to a quality assured comprehensive address dataset, improved service provision, improved operational efficiency, an improved basis for policy formulation. and the opportunity to create new products and services.

7. Recommendations

1. A central body should be set up to direct, own and oversee the national address infrastructure.
2. An implementing authority should be appointed to manage the address infrastructure, to manage the address update process and to control the quality of the address data.
3. Individual Acacia partners and other address users should have a single point of contact with the address infrastructure.
4. The issue of IPR for addresses and related pricing and commercial issues must be resolved as a matter of urgency.
5. Each addressable object should have a unique identifier, to relate the multiple forms of address. This identifier must be widely known and readily accessible.
6. The Acacia partners should modify their internal business processes to gain the benefit from the address infrastructure.
7. A simple high-level classification scheme for addressable objects should be established between the address suppliers.
8. Improved national guidelines for address creation and management should be produced, to ensure consistent quality of addresses, particularly among the relevant local authority functions.
9. All organisations contributing to the national address infrastructure should set up formal quality programmes to assess the quality of existing data, and to continuously improve quality.

Annexes

Annex A Organisations providing input

Basingstoke & Deane Borough Council	Peter Hood
Buckinghamshire County Council	Brian Grainger
Defence Estates	Lionel Elliott
Intelligent Addressing	Michael Nicholson
Land Registry	Malcolm Medhurst
Office of the e-Envoy	Maewyn Cumming
Office for National Statistics	Alan Taylor
Ordnance Survey	Cliff Garvey/Adrian Lovegrove
Registers of Scotland	Mike Traynor
Royal Mail	Robin Hardie/John Lancaster
United Utilities	Peter Mahon
Valuation Office Agency	David Hughes

Annex B Questionnaire used in this study**Project Acacia
Addressing Requirements Study****Investigation of requirements questionnaire**Instructions for completion of questionnaire:

Please fill in boxes in right hand column of the following tables, expanding the box as required. Some answers require lists of information. Add any other information, documents, lists as required as separate attachments.

Please return responses to Kate de Groot kate_de_groot@btinternet.com if possible by Friday 12 March 2004. Many thanks for your help.

Overview of business

Name of organisation.	
Name of respondent.	
Industry sector.	
What is the primary objective of your business ?	
List and define the core business functions.	
List major address-related data-sets and briefly describe their contents.	
Identify which major data-sets are used by which business functions.	
What is the impact on your business of wrong addresses?	
What is the frequency of use of address data (Continuously or Periodically) ?	
What resources do you have for information management e.g. staff numbers ?	

Addressable objects

Addressable objects are any data items which are identified by a real-world address.

Types of addressable objects used (e.g. residential property, commercial property, land parcel).	
Within which major data-sets of the business are these used ?	
What address structures are used (e.g. postal, own) ?	
Within which business functions are addresses : - created - read - updated - deleted ?	
Do you exchange address data externally, if so what data ?	
What objects do you have addressing problems with ?	
Resources for address data management e.g. staff numbers ?	
Describe any other problems/issues you may have with addresses.	

National address Infrastructure

This section investigates the requirement for an overall infrastructure of joined-up consistent, maintained address information. This investigation will look at why this is needed, it will not look at the implementation.

Do you require a National Address Infrastructure ?	
What data would you like to see it contain ?	
How will it help your organisation i.e qualitative benefits ?	
What, if any, changes would be required to your business processes to access it ?	
Any other implications for your organisation (e.g. costs, resources) ?	
What format of address should be used ?	
Should it contain coordinate references (e.g. lat/long of Nat Grid coordinates) ?	
What are your currency requirements (e.g. do you have any requirement to hold historic or proposed address data) ?	
Would you use it for objects without postal addresses ?	
Any other relevant address related problems or issues ?	

Thank you for your response.

Annex C Objectives for the Acacia Programme

General objective

The programme aims to promote the development and maintenance in the national interest of definitive national databanks of addresses (including postal and other elements), streets, non-addressable properties and in due course property ownership and occupancy parcels and possibly other elements as well, together with the related definitive mapping, all linked together and held as a land and property layer within the framework of OS MasterMap, and all continuously updated and readily accessible to users, so as to facilitate major economies, efficiencies, convenience and service improvements both in the public sector and throughout the economy.

Specific objectives

1. Facilitate completion of definitive, accurate, up to date *national databanks of addresses and street names, including definitive postal addresses, alias addresses and uprns (and in due time non-addressable properties as well)*, which will be available to replace thousands of separate addresses lists currently in use and will be used by public services, utilities and private sector users
2. Facilitate the *linking of addresses, streets and other textual data with mapping and map reference data* so that each dataset can be immediately accessed from the other
3. Facilitate the development of a *common and consistent national framework of property parcels or polygons*, broadly reflecting ownership or occupancy, which can be integrated within OS MasterMap and related to other important national polygons, including administrative areas, land use, environmental and planning polygons as well as physical features
4. Facilitate effective *dissemination of these data by electronic means* so as to ensure that maximum use is achieved in the national interest by public sector, commercial and personal users, along with ready access to other data held by Local Authorities, Land Registries, NLIS, Valuation Offices, Ordnance Survey and others
5. Facilitate the development of a robust but affordable *technical architecture* capable of delivering these facilities, keeping them up to date and making them readily accessible to users
6. Co-ordinate plans for *phasing in* the provision of these facilities in a spirit of not letting the best be the enemy of the good
7. Ensure effective *marketing* of the facilities, inside and outside the public sector, so as to ensure public sector take-up and make them readily accessible to the private sector

8. Focus keenly on serving the *public interest and customers* in the public, commercial and personal sectors
9. Ensure that the *data providers receive reasonable financial returns*, that their IP rights are respected, and that the work they have done in developing their brands, products and services is not needlessly duplicated or undermined
10. Encourage the development of *value-added applications* and packages by private firms
11. Develop a *governance and management structure* which will enable all the above things to happen and ensure that they do happen.

Annex D Definitions

address

means of referencing an object for the purposes of unique identification and location

addressable object

real-world object that has a fixed location and may be identified and referenced by means of one or more addresses

basic land and property unit

area of land, property or structure of fixed location having uniform occupation, ownership or function

DNA – Scotland

A programme which aims to compile, maintain and deploy a sustainable Scottish address database which is derived from Local Authorities, Regional Assessors and other data sources as appropriate.

land and property gazetteer

index of basic land and property units for a defined area

national land and property gazetteer

aggregation of local land and property gazetteers to provide complete coverage of Great Britain

postcode

set of characters identifying a group of postal delivery points, defined by the Royal Mail to facilitate the sorting and delivery of mail

posttown

town having a Royal Mail postal sorting office

primary addressable object

addressable object that can be addressed without reference to another addressable object

secondary addressable object

addressable object that is addressed by reference to a primary addressable object

street

whole or part of a highway, road, lane, footpath, square, court, alley or passage

unique property reference number

unique numeric identifier for a basic land and property unit

Annex E Abbreviations

CIP	Citizen Information Project
CRM	customer relationship management
DNF	Digital National Framework
IA	Intelligent Addressing
IDeA	Improvement and Development Agency
GROS	General Register Office Scotland
LLPG	Local Land and Property Gazetteer
NAI	National Address Infrastructure
NDR	Non-domestic rates
NLPG	National Land and Property Gazetteer
NSG	National Street Gazetteer
ONS	Office for National Statistics
OS	Ordnance Survey
OWPA	Object without postal address
PAF	Postcode Address File
RM	Royal Mail
RoS	Registers of Scotland
TOID	Topographic Identifier
UPRN	Unique Property Reference Number
VOA	Valuation Office Agency

References

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 - Part 2 *Specification for a land and property gazetteers*
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6. Investigation of multi-occupancy addresses in Nottingham. R James. April 2004.
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