

The Defra/WAG waste data strategy for waste streams across the UK

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SUSTAINABLE WASTE MANAGEMENT: MEETING THE NEED FOR BETTER DATA

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Section 1: Introduction

1.1 This paper sets out the strategy from the Department of Environment, Food and Rural Affairs (Defra) for the development and implementation of a new, 3-year data strategy ('the strategy') covering all waste streams in the UK (with the exception of Radioactive waste).

1.2 This strategy was consulted on in Autumn 2004 with results published in March 2005 and available through the web link:

<http://www.defra.gov.uk/corporate/consult/wip-data/index.htm>

1.3 This strategy has also published a partial Regulatory Impact Assessment, which was consulted on in Autumn 2005 with a summary of responses published in January 2006 and available through the web link:

<http://www.defra.gov.uk/corporate/consult/wip-data2/index.htm>

SECTION 2: Background

2.1 This country produces over 400 million tonnes of waste each year. Key waste streams include municipal, hazardous, commercial and industrial waste (C&I), and construction, demolition and excavation (CD&E) waste.

2.2 The Government's aim is to support progress in achieving sustainable waste management. There is an urgent need for Defra to develop an improved evidence-base, including better waste data, to support this aim.

2.3 Important recommendations for data needs were made by the Strategy Unit (SU), which was tasked by the Prime Minister with carrying out a review of Waste Strategy at the end of 2001. The SU report *Waste Not, Want Not* (published in November 2002) highlights that data on specific waste streams, their quantities, growth rates, composition, life cycles and impacts are inadequate and yet are vital to underpin sound waste management. The report concludes that current data collection and publication is widespread but not very well co-ordinated.

2.4 The Strategy Unit report also recommended that Defra and the Environment Agency (EA) should design a national strategy for the next three years to identify and fill key data gaps, and to produce better data for all waste streams.

The Government's approach

2.5 In its response to the SU report (published in February 2003), the Government undertook to establish a new sustainable waste management programme. The Waste Implementation Programme (WIP) is charged with taking forward a number of recommended activities. In particular, it is charged with concentrating, in conjunction with the EA, on establishing a specific work-stream to:

- deliver consistent and reliable information on waste streams;
- provide a sound evidence base for policy development, implementation, monitoring and evaluation; and
- develop a coherent dissemination process to ensure wider and more timely access to information.

Requirements for better data

2.6 The objective for WIP's data work-stream is to develop and implement a national 3-year waste data strategy covering all waste streams (with the exception of radioactive waste) and meeting the needs of all stakeholder groups.

These include:

- central government, including Defra, the Office of the Deputy Prime Minister (ODPM), the Department for Trade and Industry (DTI), the Waste and Resources Action Programme (WRAP) and the EA;
- local and regional government (including the Local Government Association);
- the waste industry, producers and the community waste sector; and
- the devolved administrations in Northern Ireland, Scotland and Wales.

2.7 WIP's data work-stream is concerned with the regular and routine collection, collation, manipulation and dissemination of quantitative waste data. A 4-phase programme is being followed:

- phase 1 comprised a review of data needs and current provision, and the development of a broad outline strategy – complete.
- phase 2 involved obtaining feedback on the outline strategy from stakeholders, and further detailed investigations into the feasibility and practical implementation of its proposals. This work helped with the development of the consultation document.
- phase 3 involved inviting comments from stakeholders on our provisional conclusions on data requirements, and how these should be met. This consultation process is now complete and results have been published on the Defra web-site:
<http://www.defra.gov.uk/corporate/consult/wip-data/index.htm>.
- following completion of this consultation exercise, and with Ministers' agreement, the next phase of work is concerned with implementation of the national waste data strategy.

Overview of the waste data strategy

2.8 The strategy aims to deliver joined-up, accurate, complete, consistent and timely data across all waste streams. It is intended to provide a sound evidence-base for policy making, land-use and business planning, target setting and performance monitoring.

2.9 In particular, the strategy proposes that:

- routine regulatory returns from all waste management facilities should replace the current system of surveys as the principle source of data;

- quarterly data should be collected on waste arisings and management, and annual data on infrastructure;
- this information should be collected at a detailed level in respect of waste type, facility type, and location; source sector is also to be collected though this is currently inconsistent in the returns data;
- 'primary' data will be uploaded to a central 'Hub' or data warehouse, where it can be manipulated to produce base data, summary reports and various ad-hoc analysis;
- the Hub should ultimately have GIS capability (i.e. geographic information and spatial referencing), offering the facility to provide mapping backdrops to waste data or of enabling the complex manipulation of waste and GIS data sets; and
- there should be various different user categories, ranging from full access to standard waste information only. User access should be via the Internet.

Approach to implementation

2.10 A 2-phase outline implementation programme is envisaged. The initial phase addresses the key 'municipal', 'industrial and commercial' and 'construction, demolition and excavation' waste streams (including hazardous waste).

2.11 For these waste streams, primary data are supplied to the Hub by the *WasteDataFlow* system (for municipal waste) and EA permitting and compliance systems (other waste streams). (As part of its regulatory role, the EA has responsibility for the collection of data for monitoring purposes.) The time-scale for Phase 1 implementation is for the system to go live from mid May 2006. Robust data should be available from the system after a further 12-month period.

2.12 The second phase, for which further consideration is required, will address agricultural, forestry, fishing, mines and quarries wastes, sewage sludge and dredging spoils. Imports and exports will also be addressed.

Key assumptions

2.13 Successful implementation of this waste data strategy depends on three critical assumptions.

First, that mandatory and consistent requirements (in relation to data content and frequency) for data returns are included in all relevant regulations for all waste

management facilities. This approach is necessary in order to ensure clarity, consistency and a level playing field for the industry. This particularly applies to exempt activities for which this is no mandatory reporting regime for waste received.

2.14 Secondly, that a common set of definitions and classifications and coding systems for waste types, facility types, source sectors and location is adopted. These are consistent with EU waste directives and are needed to ensure consistency in relation to data collection, communication, manipulation and interpretation. Whilst the definitions are agreed, some of the data currently held in the Environment Agency systems are in old UK classifications with mapping to the EU codings being a complicated task.

2.15 Thirdly, that there is timely development of the EA's proposed new permitting and compliance systems. These will not now be available until 2007 at the earliest. The strategy has been developed in conjunction with the EA, and Defra continues to work closely to help resolve systems and process development issues as they arise.

2.16 As a result of the delay in the new EA systems, the strategy is using existing EA systems to source the relevant data. Robust processes for collecting data are in place to deliver primary data to the standards set out in this strategy but the data does not satisfy all the ultimate strategic requirements due to coding deficiencies – as per 2.14.

Costs and benefits

2.17 The potential costs and benefits of the proposed strategy were published in a business case document, produced independently for Defra by Enviro Consulting Ltd. The Business Case was published on the Defra web-site in June 2005.

<http://www.defra.gov.uk/environment/waste/wip/data/pdf/wipdata-businesscase.pdf>

Contents of the strategy

2.18 The remainder of this document is structured along the following lines:

- section 3 sets out the key elements of the waste data strategy compared with the current position and identifies both the tangible and intangible benefits that it will deliver.
- section 4 outlines the systems architecture, functionality, scale and operations for collecting, manipulating and disseminating data.

- The base data and key reports that the system will provide as outputs are discussed in section 5. This section also shows how such outputs will help to meet the data requirements of key stakeholder groups.
- section 6 covers data collection, including the input data needed, data sources and processes used for collecting, entering and validating data. It also identifies possible deficiencies and how these could be addressed through regulation, working practices and appropriate systems development plans.
- Indicative systems costs for implementing the proposed strategy are discussed in more detail in section 7.
- Finally, section 8 seeks to expose the key risks involved in implementing the strategy, and suggests how these might best be managed.

SECTION 3: Key elements of the waste data strategy

Overview

3.1 Currently, data availability, quality and timeliness on waste arisings and management varies widely between waste streams. At best annual data are available some 12 months after the end of the relevant period, at worst no data are available at all. Much of the data available suffers from inaccuracy, inconsistency and incompleteness. Infrastructure data, too, are often inaccurate, incomplete, inconsistent and out of date. In addition, there is no ready access to simple performance measures – either the base data are not available or separate systems/manual methods are employed.

3.2 Against this background, the waste data strategy is implementing a new IT infrastructure developed to collate, manage, store and disseminate data, across all waste streams, in relation to:

- quarterly data on the quantity of waste produced (or arisings). This is broken down by waste type, producing sector (ultimately) and production location down to County and Unitary Authority level;
- quarterly data on how waste is managed in terms of the quantities by type and source of waste which are re-used, recovered or disposed of, by type of process and location down to a County and Unitary Authority level;
- annual data on waste infrastructure (re-use, recovery and disposal facilities) in terms of the number of (licensed, permitted, registered or registered exempt) facilities by type, and by waste types handled. This will include information on capacity, amount of waste received and location down to a County and Unitary Authority level;
- quarterly data in relation to cross-boundary movements/transfers of waste. This will address the quantities by type of waste which cross a national, regional or local authority boundary to reach a final re-use, recovery or disposal destination, by location of source and destination down to country or regional level;
- simple measures of waste production and management performance (time series trends, ratios, percentages) and of infrastructure (process) performance (time series trends, throughput, spare capacity and utilisation) by geographical area and/or facility/process type; and
- presentation of data (and measures) in tabular and, where appropriate, graphical form.

3.3 Possible longer-term developments might include:

- the development of on-board electronic vehicle weighing, data capture and data transmission systems, together with electronic location identifiers, waste receptor coding devices, etc. to open up the possibility of real-time data provision. Collation and reporting of data at more frequent intervals and in more detail would then be possible if required; and
- waste collection infrastructure (e.g. transport, containers, etc.) could also be included in the future.

Approach to data collection

3.4 Defra's approach recognises that primary data collection processes should minimise data collection effort by observing value/effort proportionality principles. A centrally co-ordinated approach is taken to data collection, in order to reduce the possibility of multiple data requests. In general, primary data should be collected electronically via quarterly (annual for infrastructure) routine regulatory returns, supplemented only where absolutely necessary by separate surveys or research.

3.5 Current regulatory data requirements vary widely both across and within waste streams according to regime and date first permitted. In addition, a number of exemptions exist, which mean that there is no formal requirement for data returns in some cases. Action to improve the consistency and quality of data across waste streams is already underway within the Environment Agency in terms of content and reporting frequency.

3.6 Achieving greater consistency also requires appropriate source data recording/entry processes in terms of waste definitions, classifications and associated codes. Completeness and accuracy of data will require regulation and enforcement to ensure high quality returns from all waste management sites, including those that are registered exempt. These data will be validated at entry to the primary collection systems, ideally using auto-electronic checking procedures to the maximum extent possible.

3.7 Data will initially be collected and presented on an England and Wales wide basis in the interests of both efficient and effective waste management and to facilitate EU reporting.

Data storage and dissemination

3.8 Currently there is no single, readily accessible source of waste data providing a complete, adequately detailed and consistent picture of the national waste business in terms of production, management and facilities. This is needed for policy-making, planning, operational management and decision-making purposes.

3.9 The new waste data system will comprise a central Internet-enabled 'Hub' or 'Data Warehouse' to aggregate, manipulate and disseminate data drawn from other primary data collection systems at specified intervals. Ultimately, the Hub could have the facility to present spatially located waste data on geographical maps of, for example, physical features, transport infrastructure, local authority boundaries, population densities, manufacturing locations, agricultural activity, etc. in association with other spatially located data (e.g. socio-economic data).

3.10 The primary data collection systems are generally owned and managed by third parties and include a variety of hardware and software platforms. Provision of data to the Hub is likely to be only one aspect of their functionality. These systems will generally transmit collated rather than primary/'raw' data to the Hub. In some cases, third-party management may be necessary to protect commercially confidential primary data.

3.11 Access to the Hub data will eventually be via the Internet, if necessary via a variable authorisation level entry scheme. The Hub will also ultimately have Internet-based hyperlinks to other supplementary systems, e.g. a database of relevant research or the Waste Treatment Technology database.

Data standards

3.12 EU waste definitions, classifications and coding systems are used for the purposes of collecting and processing data and for establishing protocols for data transfer from primary data collection systems to the central Hub.

3.13 The EU conventions used include:

- the 6 digit European Waste Catalogue (EWC) code to classify waste type;
- Recovery and Disposal (R&D) codes set out in the Waste Framework Directive to classify the type of facility/process used in managing waste to three levels (e.g. R1.1 Co-incineration of high calorific waste in cement kilns); and
- the UK Standard Industrial Classification (SIC) of Economic Activities 2003 (essentially identical to the EU NACE classification, and used to classify the waste producing sector/type). The SIC codings are not universally used in the waste industry and a certain amount of selling to the Waste Industry will be necessary prior to full implementation.

3.14 These conventions should be extended where necessary to give further precision for waste arisings and management and associated reporting.

Implementation

3.15 Implementation is being staged over a period in line with priorities, the resources available and primary data collection system developments. Additionally, the rate at which necessary regulatory or procedural steps can be taken to secure collection of the necessary raw data has a particular bearing on exempt activities.

3.16 Following the development of *WasteDataFlow* (covering municipal waste data needs), phase1 implementation is addressing data from WML and PPC facilities covering industrial and commercial, hazardous and municipal waste returns. For the purposes of implementation this will include some construction, demolition and excavation, non-organic agricultural, non-mineral mines and quarries and producer responsibility waste streams. Imports and exports of waste within these categories will also be included.

Benefits

3.17 Benefits of implementing the strategy are summarised below. Tangible direct benefits include:

- savings achieved by discontinuing the triennial EA National Waste Survey (estimated to cost around £2.4m per survey);
- savings achieved through discontinuing the biennial ODPM national construction and demolition (secondary aggregate) survey at a cost of

£60k per survey; this is subject to suitable mechanisms being put in place to gather data on exempt activities; and

- savings from the discontinuation of other national and local surveys/research as a result of the ready availability of reliable, timely data (e.g. RTAB waste planning surveys). Very conservatively, the amount of money spent per annum on these surveys across England and Wales is not less than £0.5m.

3.18 Intangible direct benefits include:

- the provision of accurate and detailed data in relation to waste type, facility type, source sector and location – as compared with currently inaccurate and/or incomplete surveys, and unreliable infrastructure data;
- additional classification/coding detail and better capacity, performance, etc. data to facilitate more in-depth analysis;
- more complete data covering all controlled waste streams and all registered waste handling facilities, achieved by placing consistent requirements for returns on all facilities (ideally, including exempt activities). This compares with current gaps in infrastructure and deposits data, e.g. for registered exempt sites and for local authority authorised waste management activity;
- availability of consistent data both within and between waste streams, facilitating uniform levels of analysis, comparison, modelling etc. across the whole waste scene. This is achieved by placing the same requirement for returns (in relation to data content and frequency) on all facilities and by establishing common standards for robust returns management on the regulator – as compared with the current inconsistent returns requirements and management methods;
- provision of up-to-date data (quarterly returns received no later than one quarter after the relevant period for arisings and management data, and annual returns within 3 months of the year-end for infrastructure data) to facilitate trend analysis and effective strategic and operational planning and management action. This compares with existing survey results, where annual data are available at best one year and sometimes two years after the end of the relevant period. Current infrastructure data are also not routinely updated and are significantly out-of-date;
- improved data will provide a sound evidence-base for more responsive, integrated government waste management policy-making,

target-setting, performance monitoring, benchmarking, complex analysis and modelling (e.g. forecasting, life cycle assessment, mass balance calculations, etc.). It will also help to support integrated regional and local government strategic and operational waste planning, management, performance monitoring, benchmarking, etc. Business and the community waste sector will benefit in relation to improved data for business planning and investment decision-making;

- data that will meet EU reporting needs and will assist in facilitating fast and informed responses by government to new EU initiatives and directives;
- eventual provision of an effective GIS capability, in the form of either mapping backdrops and/or interactive manipulation of waste with other spatially located data sets, would facilitate clear presentation and communication of data and complex analysis and modelling;
- electronic transmission of data from site to primary data system to Hub will minimise the amount of effort involved at all stages in the chain, eliminating transcription errors and speeding-up the process compared with existing (largely paper-based) systems;
- a significant reduction in data provider effort as it will no longer be necessary to respond to multiple requests for identical or similar data following the establishment of a central nationally managed/co-ordinated waste data collection and dissemination system. This relies on the development of the new systems within the Environment Agency, currently scheduled for delivery in 2007; and
- better detection and quantification of illegal activity, that will be possible if more robust data were made available in up- and down-stream mass balance calculations – current data are insufficiently robust to identify the full extent of undetected illegal activity with any certainty.

3.19 Further intangible indirect benefits include:

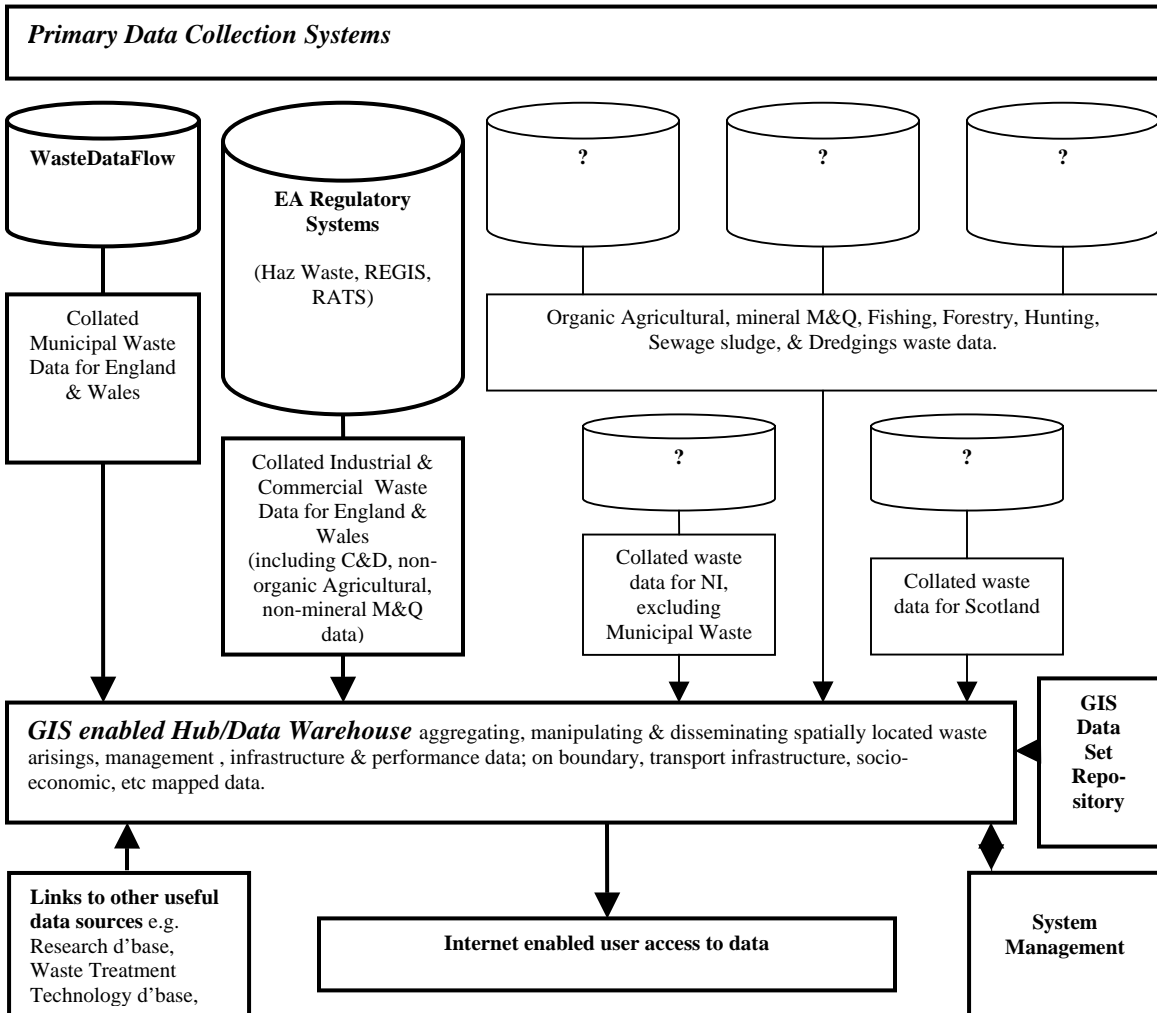
- more effective and efficient compliance monitoring and enforcement activity (including illegal waste detection and prosecution action) by regulators via the provision of more frequent and robust data; and
- the primary data needs of the waste data system, and the benefits that accrue, provide further strong justification for proceeding with early implementation of EA's waste systems and processes development strategy though these systems are not now due for delivery until 2007.

SECTION 4: Systems specification

Architecture

4.1 The proposed system architecture for the waste data strategy is indicated in conceptual outline in Figure 1.

Figure 1



4.2 From a development and operational perspective there are 3 main elements, discussed below.

4.3 First, a central 'Hub' facility will receive specified collated waste data electronically, at fixed intervals, from a series of generally remote primary data collection systems. The Hub will store this information and allow for manipulation of data to produce a variety of reports/outputs. Accessing relevant GIS datasets

will allow mapping facilities at a later date. These reports will be accessible to users via the Internet. The Hub is owned, developed and financed by Defra.

4.4 Secondly, remote 'primary data collection systems', which will deliver the required data to the Hub automatically or on request. These systems exist to meet the specific requirements of individual agencies or bodies (e.g. to support the EA's regulatory role). As such, they are mostly owned, financed and run by relevant third parties. Some special data processing and input data collection processes may be needed to meet the particular requirements of the Defra Hub. Any such changes will be financed by Defra.

4.5 Finally, links and interfaces between primary data collection systems and the Hub. Primary data collection systems operate in a variety of different IT environments, which are different from that established for the Hub. The preferred method of data transfer to the Hub will be via a standard file format such as XML, to eGIF standards, with common agreed definitions. Preliminary estimates suggest that the amounts of data to be transferred are too small to justify dedicated links. Defra is financing the links and interfaces needed.

4.6 Key elements of the specification are summarised below. Primary data collection systems are discussed further in Section 6, below.

The central Hub

4.7 It is proposed that the central Hub will comprise a suitable capacity for 'storage' and the 'data warehouse'. Collated data from primary sources will initially be held in a 'storage area' where an appropriate level of validation will be conducted. Further processing will undertaken as necessary, e.g. to eliminate duplication, differentiate between arisings and management data, etc. Data will then be transferred into the central Hub as system 'base data' for reporting. Although the onus for data validation will largely fall on the individual primary collection systems, further validation procedures will be carried out at the Hub input stage.

4.8 Quarterly waste arisings and management data, and annual waste infrastructure data, will be uploaded to the Hub at appropriate intervals. The data will be held within the Hub for a rolling 10-year period to facilitate trend analysis. There may also be an initial requirement to migrate one year's historical data from legacy systems (for infrastructure data).

4.9 The strategy calls for staged implementation of the Waste Data system in line with stakeholder priorities. Implementation Phase 1 will therefore only include *WasteDataFlow* (which collects Municipal Waste data for England, Wales, Northern Ireland and Scotland but only data for England and Wales will be extracted at present) and EA Regulatory systems as primary data sources.

4.10 The system outline specification for Phase One assumes that four interfaces will be needed for data transfer from these primary sources, one with *WasteDataFlow* and three with EA systems. The EA systems involved are:

- The interim Hazardous Waste reporting system.
- The existing RATS.
- The existing REGIS.

4.11 In the longer term it is possible that a single interface would be sufficient to extract all the data needed from EA systems.

4.12 An ETL (Extract Transform and Load) package has been recommended as the interface software. However, at first the data will be transferred and loaded on CD.

4.13 Phase 2 implementation will involve uploading, storing and processing primary data from as yet unidentified sources for the remaining waste streams. Work to identify data availability, sources and collection methods for these waste streams (i.e. organic agricultural, mineral mines and quarries, fishing, forestry, hunting, sewage sludge, dredging spoils etc.) is still in progress. In the short term, the data which are available for these waste streams might be input to the Hub manually via a 'system management' function. Similarly, no arrangements have yet been decided for collecting data for Scotland or Northern Ireland.

4.14 The Hub will be required to hold metadata and to provide an audit trail to trace primary data sources and time of uploads to the Hub.

4.15 In addition to the range of interfaces to primary data collection systems the Hub will ultimately have: an Internet browser-based user interface; an interface with either Defra's or the EA's GIS data set repository (depending upon location); a system management interface to a PC workstation; and, Internet-based hyperlinks to other useful sources of supplementary data such as Waste Research, Waste Treatment Technology, Socio-economic information, etc. databases. This application is dependant on the new EA systems currently planned for 2007.

Users and data delivery

4.16 Key data users will include:

- waste/environment policy-making staff, statisticians and economists in Central Government (largely Defra, ODPM, DTI, EA, WRAP, RGO's plus the devolved administrations);

- planners and waste management staff in regional and local government;
- waste industry business planning staff;
- waste producers (largely businesses with producer responsibility obligations); and
- community sector waste management organisations.

4.17 For system specification purposes users have been split into a number of different categories:

1. 'canned report users' – initially, reports will run by Defra and placed onto the website for users to download and use. As the data quality improves, a mass reporting tool will be available, providing pre-configured reports, but with the ability to change parameters and choose different report. There would be no provision of any GIS component or access to GIS software.
2. 'query and reporting users' - equipped with a web-based reporting interface plus mapping backdrops. This is dependant on the commissioning of the new EA systems scheduled for 2007.
3. 'power users' - equipped with desktop client, spatial and reporting tools (e.g. Business Objects) for complex manipulation of data and interaction with GIS data sets. Again, this is dependant on the new EA systems 2007.

4.18 It is anticipated that when data are initially released or at critical points in the planning cycle, demand for use of an analysis tool may be great. Estimates suggest that this could be as high as 25,000 users accessing the server over a period, capacity will need to be in-built to account for this.

Regulating user access

4.19 In general, users would be able to print reports directly using the tools. Eventually, it will be possible to download data to Excel to carry out further manipulation. Users will have 'read-only' access to data held on the Hub, and only system management staff will be able to change this data.

4.20 User access would be controlled via a registration and multiple authorisation-level security facility in line with different user types. This would serve to protect the commercial confidentiality aspects of data. It would also enable the introduction of a possible user subscription scheme as an option to

help finance the system, if necessary. Use of Internet-based system should mean that data would be available 24 hours per day, 7 days per week.

System reports

4.21 Reports will relate waste production, management and infrastructure data to variables such as waste stream/type, location/area, waste facility type, time period, recovery/disposal category, etc. Production of these reports will enable relatively simple calculations to be carried out to make pre-determined corrections to input data (see Section 6 for further details), calculate ratios and percentages, construct time-series trends, plot cross-boundary waste movements, etc.

4.22 The aims of the system will be to provide users with fast access to the data and reports needed, and a high degree of confidence in the integrity of the data provided. This is obviously dependent on the integrity of the primary data collection systems and their associated data collection, validation and entry processes (see Section 6).

GIS capability – after commissioning of new EA systems 2007

4.23 GIS data will be provided by the new Defra Spatial Repository or the EA GIS repository, or both, and will not be copied into the Hub. It is anticipated that the link to the GIS repositories would be carried out by Web Services and that spatial middleware would be provided by the Spatial Repository (so that system development would incur no GIS-related costs other than the link from the Hub to GIS Web Services). Similarly, for the 'power users', it is assumed that the API links between the GIS spatial client and the reporting client would be carried out as part of the Defra Information Architecture project at no cost to the Hub development.

4.24 Waste data would be linked to the spatially located GIS data via the NGR, post code or local authority identifier contained within the primary data collected and the base data held by the central Hub database. Site locations would be defined by a point-only (address, NGR or both) and there would be no polygon data in the database.

4.25 Precise GIS functionality has still to be decided. However, the relatively high cost of provision mitigates against it being provided for 'canned report users'. For 'query and reporting users' a series of user-selectable standard map backdrops is proposed, on which waste data reports could be presented. Typically the backdrops might be:

- local authority district, county and regional boundary maps;
- transport infrastructure maps;

- population density maps; or
- economic activity maps.

4.26 For 'power users' there would be no restriction on the GIS information called-up from the repository, and both it and waste data would be jointly open to manipulation, making a powerful tool for detailed data analysis, cross correlation of data sets and modelling.

Systems management

4.27 The systems management function will include responsibility for:

- validating the data input to the Hub from primary data collection systems (at entry but prior to consolidation to the Hub database) via both auto-checking and manual inspection routines (note that data quality/validation is primarily the responsibility of primary data collection system management);
- manually inputting data from primary data sources where electronic transfer is not possible;
- maintaining the integrity of waste data held in the Hub (accuracy, completeness, timeliness);
- maintaining the Hub software and hardware (system maintenance will be carried out via standard interfaces provided by the hardware operating system, database and tools);
- developing and enhancing the hub to meet user requirements;
- hub back-up (application software and data), security (user access, hacking, virus protection, etc) and disaster recovery (hardware, software, data);
- registration and issue of access codes to users;
- taking the lead, in conjunction with Primary Data System managers and user groups, in initiating and co-ordinating overall system and associated process maintenance and development, so as to ensure continuous improvement in the quality, integrity and scope of data available to users;

- taking the lead, in conjunction with the GIS repository manager, in ensuring that all GIS data sets needed by the hub are available in up-to-date form;
- maintaining all the Hub's links and interfaces jointly with interfacing systems' managers;
- promoting the beneficial use of, and support for, the system to users;
- providing user support facilities (e.g. user manuals, help-line, training, etc);
- putting in place and managing appropriate user consultation bodies and processes;
- securing and managing an appropriate budget/finance to support the management, maintenance and development of the system; and
- establishing and documenting robust standards and procedures for: monitoring, managing and reviewing system performance, and for system back-up, security and disaster recovery.

4.28 The systems management function would have the sole authority to change data held on the Hub. In the case of base data, any change required will be notified back to the originating source for correction/resubmission. It would also be the authorisation body for system enhancements and developments.

4.29 It is envisaged that system management would be assisted by the production of a series of System Management reports by the Hub. These could include: registered user listings, error reports, validation query reports, primary data upload status reports, etc.

SECTION 5: Data dissemination

General

5.1 Users will be able to analyse data held in the Hub and reports produced from it. Some data may not be accessible to all users in order to protect the commercial interests of the industry data provider.

5.2 Base data that are made available will be broken by waste type (EWC 6 digit code), process and location. Post code/NGR (8 digit) levels, Local Authority and source (SIC 4/5 digit code) will also be gathered and used as enhancements to the initial solution.

5.3 Reports will provide summaries of these data, and of information derived from them, by simple manipulation at higher levels of EWC, SIC, Process coding or location/area. These classification systems and associated codes and descriptions will have to be used at the lowest (i.e. most granular) level in collecting primary data (see Section 6) and in assembling base data. The structure of the proposed classification systems is described below.

Data classifications and coding

5.4 Appendix 3.1 of the initial consultation document: (<http://www.defra.gov.uk/corporate/consult/wip-data/index.htm>) refers to waste type and enables base data at the 6 digit EWC code level to be aggregated successively through Level 2, to Level 1.

5.5 Appendix 3.2 of the initial consultation (as above) refers to recovery and disposal operations/processes. It extends the Recovery and Disposal codes set out in annexes IIA & IIB of the Waste Framework Directive down to two further levels for primary data collection, base data and reporting purposes. Re-use categories are also included.

5.6 Appendix 3.4 of the initial consultation (as above) sets out the locational hierarchy for data aggregation and reporting purposes. In order to preserve commercial confidentiality, data will be aggregated at NUTS 2 level, counties and unitary authorities and higher levels.

5.7 The proposed classification systems require further detailing and would need to be updated in line with evolving EU and UK regulation and guidance.

Reporting facilities

5.8 Reports will be available in tabular and graphical form and will be of two types, standard and ad hoc. Standard ('canned') reports would aim to meet pre-determined general information needs and the pre-determined specific

information needs of particular stakeholder groups or organisations within them. This will make up the main bulk of reports for the initial Phase One. Ad hoc reports ('power' and 'query and reporting') may be produced by users to meet needs for reports not available as standard.

5.9 Access to base data and reports will be controlled as necessary via a suitable security system, in line with different user categories or for reasons of commercial confidentiality or revenue earning purposes. At this stage, commercial confidentiality is not a major issue (except in relation to specific base data). The possibility of charging for system use via annual subscription could be considered, if necessary, to help finance system development and operation.

5.10 It is proposed that data and derived reports should cover the following subject areas:

- waste arisings
- waste management
- waste infrastructure
- cross-boundary waste movements
- system management
- various ad-hoc analysis will also provide for modelling and forecasting outside of the hub.

5.11 Reports will initially be accessible to the user from the Defra website. Full GIS data set requirements are likely to include: boundary mapping at national, regional, county, unitary and district levels; transport infrastructure mapping and associated data; population mapping and associated (census) data; and, economic activity mapping and associated data. These requirements must be tempered with the need to preserve commercial confidentiality and therefore initially, will be aggregated at a high geographic level.

5.12 The conjunction of waste with GIS data sets will facilitate waste forecasting, waste facility planning, waste industry business planning, waste communications (e.g. to support the presentation of evidence at Planning Enquiries), as well as waste management policy- and decision-making.

5.13 A listing and brief description of content of the waste base data and some examples of standard reports for each subject area listed above follows in generic form. These are further detailed in Appendix 4. Users and uses for each are also briefly indicated. The report listings are not intended to be

comprehensive but are rather a starting point for detailed specification. Algorithms for deriving reports from base data are being developed.

5.14 In the first stages of implementation, data and reports will be available only for the priority municipal, industrial and commercial and construction and demolition waste streams in England and Wales. Industrial and commercial waste incorporates non-organic agricultural waste, non-mineral mining and quarry waste, hazardous waste, and imports and exports of waste.

Waste Arisings

5.15 Data will include quantities of waste produced (tonnes), including imports, by:

- type (description and EWC 6 digit code)
- period (within a specific quarter and/or year)
- location (8 digit NGR, post code, unitary, county, and region)
- producing sector (description and 4/5 digit SIC code) - not initially.

5.16 Information will be updated quarterly, and the system would hold 10 years worth of data on a rolling basis.

5.17 'Power' and 'query and reporting' users - these users will eventually be able to select sections of interest by time period, production location, waste type and ultimately, producing sector. Data would be available to view on screen, download selections for printing or to Excel for later use, and for manipulation at the user's work station.

5.18 Base data on waste arisings would also be used to support standard reporting facilities, as follows:

- For EU reporting, based on waste produced in the year in the UK by waste category and producing sector. (As specified in the EU Waste Statistics Regulation EC2150/2002 which is subject to on-going amendment.) Such reports would be used by Defra for mandatory biennial reporting to the EU.
- Reports setting out information on waste produced by waste category and tonnage, producing sector, region/country and year/quarter and any permutations thereof. These could potentially be used by all stakeholders for forecasting, strategic waste management planning, business, land-use and economic development planning, policy

making, policy effectiveness monitoring and evaluation, target setting and performance monitoring, informing the response to EU initiatives, public awareness campaigning and detailed analysis and modelling.

5.19 Different levels of granularity might be preferred by different users. Various reports will be possible based on the waste category, time and place variables and eventually, producer sector. Further work will be needed to establish the key standard reports required by stakeholders.

Waste Management

5.20 Base data will include the quantities (tonnes) of waste received, waste rejected, residual process waste produced and waste stored (at end of period) for each WML licensed, PPC permitted or other permitted site. These would be broken down by:

- waste type (description and 6 digit EWC code);
- source location (NGR, post code, Unitary, County, Region, Country);
- receiving site processing type applied to waste (description and 3 character R&D code);
- receiving site location (NGR, post code, Unitary, County, Region, Country);
- source sector (description and 4/5 digit SIC code) and, for waste management sites, source process type (description and 3 character R&D code); and
- NGR and postcode, these will not implemented in the first phase of the data hub which will also exclude SIC codes. These data are not currently collected or held consistently.

5.21 For waste exports, base data would be collected in relation to the quantity of waste exported by waste type (description and 6 digit EWC code), source process type (description and R&D code). Also, by source location (LA District/Unitary, County, Region, Country). Again, information would be updated quarterly, and the system would hold 10 years worth of data on a rolling basis.

5.22 'Power' and 'query and reporting' users only would be able to use these data to produce self-generated reports for policy-making etc. A 'data mining' facility to examine the detail behind/query reports will be developed later. It would also be possible to focus on a specific time period, waste type, processing type, source sector and/or source location. As above, these data would be available to

view on screen, or selected data could be downloaded for printing or saved to Excel for later use, modelling, manipulation etc.

5.23 Standard reports will also be available for use by Defra to support EU reporting. For example, covering waste recovered and disposed of in-year across the UK by waste category and region/country. Reports will be required, each covering different recovery/disposal methods in the format specified in the EU Waste Statistics Regulation EC2150/2002, which is subject to on-going amendment.

5.24 Further standard reports will be available for use by all stakeholders/users, e.g. in relation to:

- waste re-used, recovered, disposed of (at period end);
- waste re-used, recovered, disposed of, (at period end) and exported in the year by method/process type and waste type within region/country;
- waste re-used, recovered, disposed of, (at period end) by method/process type and quarter/year within region;
- waste processed/ managed in the year by R & D category including ideally, intermediate process stages and waste type within region; and
- waste exported in the year in question by method/process type and region/country; this subject requires significant analysis of databases before committing to the production of meaningful reports.

5.25 Other reports will be possible based on the management method, waste category, producer sector, time and place variables, and on varying levels of granularity. Further work is needed to establish the key standard reports needed and the degree of accuracy expected.

5.26 These reports could be used to assist in monitoring progress against policy objectives and targets (i.e. progress in moving up the waste hierarchy, meeting producer responsibility targets etc.), policy making and target setting, strategic waste management planning, business, land-use and economic development planning, informing the response to EU initiatives, public awareness campaigning, benchmarking performance by area, sector, etc. and for detailed analysis and modelling.

Waste Infrastructure

5.27 Base data will cover, for each WML licensed, PPC permitted or other permitted site/facility, location (8 digit NGR, post code, local authority district/unitary, county, region), operator/licence etc. holder (name and EA or

other registration number), site/facility type category(ies) (description(s) and 3 character R&D code(s)), waste types handled (descriptions and hazardous/non-hazardous 6 digit EWC code), permitted input capacity (tonnes per annum) in total and actual tonnage received (tonnes per annum in the previous year) by waste type. Data will be updated annually, and the system would hold 10 years worth of data on a rolling basis.

5.28 During phase 1, only recovery and disposal facilities are to be included. In the longer-term, however, consideration could be given to including collection transport, containers etc. and re-use facilities currently falling outside the regulatory regime. Also, there is no currently universally accepted definition of 'maximum capacity'. For the purposes of this strategy this is generally taken to mean the maximum capacity in tonnes per annum as recorded on the Environment Agency Licence or Permit. For landfill sites it is taken to mean the remaining capacity or void space at the end of the reporting year, measured in cubic metres and/or tonnes for which it is permitted.

5.29 In the longer term consideration could also be given to including 'operating costs' per tonne input for benchmarking purposes, as well as 'forecast throughput' for the coming year for capacity forecasting purposes although these could well be constrained through Commercial Confidentiality arguments.

5.30 'Power' and 'query and reporting' users only would again ideally be able to produce self-generated reports for policy making, performance monitoring, etc. However, 'data mining' could become constrained due to the commercial sensitivity of the data. These users would also have the facility to select sections of interest by time period, location, site/facility type and waste type. Information could be viewed on screen, and selections could be downloaded for printing or transferred to Excel, or for manipulation at a work-station.

5.31 Standard reports to facilitate mandatory EU reporting would again be available for use by Defra in relation to the number of waste R & D facilities in the UK, capacity and throughput by R & D category and by geographic area. The format of these reports would meet the specifications of the EU Waste Statistics Regulation EC2150/2002, which is subject to on-going amendment.

5.32 Other standard reporting facilities, available to all users, would address:

- the number, total permitted capacity and total tonnage received by facility type and geographic region within waste type; and
- the number, total permitted capacity and total tonnage received by facility type and year within region/country.

5.33 Hazardous and non-hazardous facilities and wastes would be specifically highlighted in reports. Many other reports would also be possible based on

facility type, capacity, location, waste type and operator variables, and on varying levels of granularity. A set of 30 formal reports have now been specified for production from the hub.

5.34 As above, these reports would aim to help policy making, strategic planning and investment decision-making, business, land-use and economic development planning, policy effectiveness monitoring, public awareness campaigning, informing the response to EU initiatives, inter-region etc. benchmarking, and detailed analysis and modelling.

Cross-boundary movements

5.35 Ultimately, reports would draw on waste management base data, using source location and receiving site (destination/deposit) location attributes to show cross-boundary movements of waste. These would cover, for example:

- total quantities of waste moved from each geographical area or region to each of the other areas within the UK within a particular quarter or year;
- total quantities of waste by waste category (including hazardous/non-hazardous) moved from each geographical area or region to each of the other areas within the UK within quarter/year; and
- total quantities of waste arisings ideally by producing sector moved from each area of origin to each of the other areas (first destination) within the UK within quarter/year.

5.36 Other reports would also be possible, addressing, for example, inter-regional movements by end-destination waste facility site/process type, inter-regional movements by distance of movement, inter-regional movement trends/changes over time, etc. Varying levels of granularity should also be possible, for example, inter-local authority district area movements. Further work would be needed, however, to establish the key standard reports needed and also the availability and quality of existing data.

5.37 These reports would be potentially useful to all stakeholders. For example, waste movement data is a vital ingredient in understanding how waste is managed across the country and in monitoring performance in relation to the 'proximity' principal. It would therefore contribute to effective policy-making, strategic planning and investment decision making, business, land-use and economic development planning, policy effectiveness monitoring, public awareness campaigning, informing the response to EU initiatives, inter-region etc. benchmarking, and detailed analysis and modelling.

Ad-hoc analysis

5.38 Reports drawing data variously from arisings, management and infrastructure base data, could be prepared, for example, for the purposes of:

- reconciling up-stream with down-stream waste data to identify possible illegal activity;
- reconciling waste arisings with final deposit data to show how waste (what waste produced by whom and where) is managed (what it ends up as and where), and balancing final deposit with arisings data. For wastes subjected to intermediate stage treatment and loss of original identity, this would involve the introduction of process models within the system to translate arisings data into intermediate and final deposit data. It is a longer term prospect;
- showing changes over time in how waste arisings of specified types (e.g. hazardous waste) or from specified producer sectors (e.g. the chemical industry) or from specified regions (e.g. NW etc.) are managed;
- relating waste arisings to waste management to infrastructure data within particular geographical areas, to show, for example, that a large waste producing area had a disproportionately small waste infrastructure and low waste management activity;
- trend analysis by the user in a variety of combinations of data at a district, regional and national level. Trend analysis, projections and modelling will not be carried out within the hub.

Note that reports intrinsically rely on the good quality of data provided. Mass balance equations are only accurate when not only is accurate data provided but also when there is a good understanding of the waste management process.

SECTION 6: Data collection

Overview

6.1 Outputs sourced from the central Hub will clearly reflect the quality of data flowing into the system. Successful implementation is therefore critically dependent on the ability of the primary data collection systems and processes to deliver the required data, in a way that which meets the necessary quality standards.

6.2 The waste data strategy calls for collection of data largely via routine (electronic) regulatory returns from waste management sites. This represents the most cost-effective means of meeting stakeholder needs, and the only identified viable alternative to the present deficient survey methods. This approach places regulatory requirements (in respect of the periodicity and content of returns) and the EA (as the principal waste regulator in England and Wales) at the core of implementation. Although the Strategy recommends a switch from surveys to routine regulatory returns as the principal method of data collection, survey/research work will still be needed to supplement the data obtained whether to plug gaps or enhance it.

6.3 At this stage in its development (for Phase 1 implementation) the strategy covers data collection only for the priority municipal, industrial and commercial and construction and demolition waste streams in England and Wales. Industrial and commercial incorporates non-organic agricultural waste, non-mineral mining and quarry waste and hazardous waste.

6.4 Further work (for Phase 2 implementation), which is at least partially dependent upon the outcome of pending regulation, is needed to develop the strategy for data collection on organic agricultural waste (largely manure and slurry) and mineral mines and quarries waste. On-going work is also needed to develop the data collection strategy for the fish, forestry, hunting, sewage sludge and dredgings sectors, for stockpiled waste and for capturing data for Scotland and Northern Ireland. Enhanced data on transfrontier shipments are also required.

6.5 The data collection processes and system for municipal waste are already in-hand following the implementation of *WasteDataFlow*. The current system will require only relatively minor changes to make it fully compatible with the waste data strategy. EA waste regulatory (permitting and compliance) data collection systems and processes constitute the main source of primary data for the other Phase 1 waste streams. The remainder of this section focuses on these.

Primary data requirements and standards

6.6 To meet the previously specified Hub base data requirements (see Section 4) the following (generic) data must be collected by the primary systems:

- Waste arisings, i.e. quantity of waste produced (tonnes) in the quarter. These data would be broken down by type of waste (description and EWC code), ideally - producing sector (description and SIC code) and location where produced (local authority district/unitary, county, region and country).
- Waste infrastructure, i.e. for each WML licensed or registered exempt facility, PPC permitted or other permitted site/facility, data updated annually in relation to site location (post code, local authority district/unitary, county, region and country), operator/permit holder (name and EA or other registration number), site/facility type(s) (description(s) and 3 character R&D code(s)), waste types handled (descriptions and EWC 6 digit code), permitted input capacity (tonnes per annum) in total (and by waste type) and waste arisings (tonnes per annum) in the previous year by waste type.
- Ultimately, it is planned that analysis as below will be possible though currently, data are not collected to this level of detail. Additionally, industry does not record data at this level.
- Waste management, i.e. quantities (tonnes) of waste received, waste rejected, residual process waste produced and waste stored (at end of period) in the quarter for each WML licensed or registered exempt, PPC permitted or other permitted site. These data would need to be collected in relation to type of waste (description and EWC code), source sector (description and 4/5 digit extended SIC code) and, in relation to waste management sites, also source facility type (description and 3 character R&D code). Data would also need to be broken down by source location (8 digit NGR, post code, LA District/Unitary, county, region and country), receiving site facility type (description and 3 character R&D code), and receiving site location (8 digit NGR, post code, local authority district/unitary, county, region and country).
- Waste exports, i.e. quantity of waste exported (tonnes) in the quarter, by type of waste (description and EWC code), source sector (description and 4/5 digit extended SIC code) and, for waste management sites, also source facility type (description and 3 character R&D code). Also, by source location (8 digit NGR and post code where relevant, local authority district/unitary, county, region and country) and country of destination.

6.7 The required primary data standards can be set in relation to individual stakeholder needs and current data deficiencies, which have previously been investigated and which encouraged the development of a strategy based on seeking to replace survey based primary data with electronic regulatory return-based data. Key parameters and standards, together with methods for achieving the standards, and the main benefits and possible difficulties with the proposed approach are set out in Table 1.

Definitions and classifications

6.8 A critical factor in meeting the necessary standards of accuracy and consistency is the adoption of a common set of waste definitions and classification systems by all those involved in making returns, and by those people and systems involved in their subsequent processing right through to assembly of base data and reports in the Hub.

Reporting requirements

6.9 A further critical factor in meeting primary data standards is the proposed introduction of a mandatory requirement for returns from all waste handling sites, including registered exempt sites (and the necessary associated regulator compliance and enforcement activity). However, detailed stipulation of data content and return periodicity requirements within regulations are likely to be needed to pick up data across the whole of the waste industry (both large and small concerns), to provide a 'level playing field' and to ensure total clarity of the requirement. This is a significant obstacle to providing a total waste picture.

6.10 In the interests of consistency, identical requirements need to be stipulated in all relevant regulations (i.e. WML, PPC, Hazardous Waste Regulations, etc.). Since the standard of data on returns would to an extent depend on that contained on transfer and consignment notes, the Duty of Care Regulations (or Code of Practice) and Hazardous Waste Regulations respectively should also stipulate a consistent data requirement for these. It has been suggested that data requirements could be stipulated within licence/permit conditions as a more flexible alternative to regulation. These issues continue to be explored and debated, but they remain unresolved at the current time. This directly impacts the derivation of a national waste database, addressing all the various waste streams and waste facilities.

Conclusion

6.11 In practice the proposed standards may never be totally met, but near-attainment would provide a huge improvement to the quality of waste data available. It is also acknowledged that, from the start of implementation, it would take significant time to reach the 'near-attainment' point, in respect of new

processes settling in, gaps being plugged, and, if necessary, enforcement action being taken.

6.12 The data requirements and approach outlined above are in line with current EA thinking.

Table 1:PRIMARY DATA STANDARDS				
Parameter	Target Standard	Method for Achieving	Benefit	Possible Difficulties
Accuracy	Correct use of EWC Code, R&D Code, SIC Code (eventually), Local Authority of Origin and Destination, Tonnage.	Promote value of accuracy. Education/Support for waste industry on making returns. Same data requirements stipulated in all regions. Audit and enforcement action by regulator. Use of common definition and classifications. Sound data entry and validation processes. Electronic data transfer to eliminate transcription errors.	Robust evidence base for policy making, planning and decision making.	Incidence of volume & volume/weight estimations i.e. no weighbridge. Compliance of smaller companies.
Completeness	All elements of returns completed. A minimum of 90% of expected returns received. A minimum of 50% of expected returns received electronically	Promote value of completeness. Education/support for industry in making returns. Data requirement stipulated in regulations. Audit and enforcement action by regulator.	Robust evidence base for policy making, planning & decision making.	Non-compliance of smaller companies. Illegal waste disposal.
Timeliness	Returns to be made within one month of end of quarter; latest three months after end of quarter.	Promote value of timeliness. Education/support for waste industry in making returns. Data requirement stipulated in all regulations. Audit and enforcement action by regulator.	Up-to-date evidence base for policy making, planning & decision making. Within year waste management monitoring and control.	Non-compliance of smaller companies.
Consistency	Standards of accuracy, completeness & timeliness consistent both across & within all waste streams.	Promote value of consistency. Education/support for industry in making returns. Data requirement stipulated in all regulations. Audit and enforcement action by regulator. Use of common definitions & classifications.	Consistent evidence base for policy making, planning & decision making. Consistent body of data for analysis and modelling.	Incidence of volume & volume/weight estimations i.e. no weighbridge. Compliance of smaller companies. Illegal waste disposal.

Parameter	Target Standard	Method for Achieving	Benefit	Possible Difficulties
Effort	Effort involved in (business) making the returns can only be justified by the value of any data thereby obtained.	<p>Promote value of system and outputs.</p> <p>Electronic returns readily collated & transferred from existing systems.</p> <p>National system obviates need for requests from multiple sources; probable reduction in effort overall.</p>	Voluntary participation only backed by regulation : better prospect of good quality data & faster implementation.	Non-compliance of smaller companies.

PRIMARY DATA PROVISION: MUNICIPAL WASTE – WASTEDATAFLOW

6.13 *WasteDataFlow* went live in April 2004 and has been implemented as a stand-alone system. It is an Internet-based application receiving quarterly electronic data returns from local waste collection, waste disposal and unitary authorities and providing user access to municipal waste base data and a suite of reports which are intended to contribute to landfill diversion target monitoring, LATS (Landfill Allowance Trading Scheme), Best Value Performance Indicators (BVPI's), and local management information needs.

6.14 The system has been designed to be consistent with the emerging waste data strategy. It broadly meets the primary data requirements for municipal waste in respect of waste arisings and waste management. However:

- it collects a good deal of information not required by the Hub. This is being edited out in data transfer;
- data does not currently include the descriptive codes (i.e. EWC, SIC, R & D) or full locational detail (i.e. NGR, post code) required. System and data collection processes are being modified to include these where possible and necessary;
- *WasteDataFlow* includes its own infrastructure data set, obtained from EA systems. Rationalisation of this and/or revised updating procedures is needed to ensure Hub, *WasteDataFlow* and EA infrastructure data sets remained matched;
- municipal waste data includes waste other than strictly household waste e.g. commercial, fly tip, recreational and abandoned vehicles. Equally, EA data systems duplicate much of the data provided by *WasteDataFlow*. Careful mapping of data between primary data sources and the Hub is needed during the system design stage to ensure that the best source for specific elements of data was selected, no double counting of data occurred, or that appropriate sector (SIC) codes were attached (where possible) to correctly locate the waste originating 'sector'. System 'editing' of data consistent with the map could be carried out at data transfer (i.e. via the interface arrangements) or within the 'storage' area of the Hub;
- *WasteDataFlow* does not capture all household waste arisings and management data. For example not all waste collected by the community waste sector outside the local authority recycling credit scheme is captured, there is as yet no effective means of capturing home compost data, and no sound method for collecting re-use data has yet been developed (nor even an agreed definition or regulatory framework). The data missing are not deemed to constitute a

significant proportion of the waste arising, methods of measuring these streams are under review; and

- *WasteDataFlow* generates its own user reports. These are being reviewed in conjunction with the specification of Hub reports to ensure there is no duplication and that the most appropriate report generating system is used.

6.15 Further work is needed to explore and resolve these issues in detail.

6.16 The standard of data captured by *WasteDataFlow* is largely dependent upon local authorities who feed data into the system. At present, provision of data is not mandatory in England (though it is in Wales). But, judging from the response rate achieved for the existing Municipal Waste Survey, at least 95% of local authorities are eventually expected to participate. Input data are validated at both the local authority and *WasteDataFlow* ends of the data entry process and, with the exception of the limited amounts of data based on volume/weight estimations, should be of an acceptable accuracy.

6.17 A great deal of effort is being put into user education, manuals, training, helpline and other support during *WasteDataFlow* implementation. This should help in reaching high levels of accuracy, completeness, consistency and timeliness. Ready, central availability of municipal waste data to the high standards anticipated should reduce the number of separate calls made on local authorities for data.

PRIMARY DATA PROVISION: OTHER PHASE 1 WASTE STREAMS – EA SYSTEMS

6.18 EA systems data output requirements and standards as input to the Hub have been set out above.

6.19 Waste arisings and management data are to be collected by EA systems via quarterly electronic returns (exceptionally paper returns) of waste receipts (together with information on waste rejected and residual process waste produced from all waste management sites). These should be submitted one month, and no later than one quarter, after the end of the period. The data needed on returns are those set out under 'Waste Management' in Section 5. This includes waste arisings data, ideally identified by the relevant source sector SIC code. The data processing to extract and collate arisings data will be carried out within the Hub storage area. Decisions on this should be decided during the detailed system design stage, as should any possible duplication of data with *WasteDataFlow*.

6.20 Meeting the standards set requires the adoption of common definitions and classification systems and the regulatory changes referred to in Section 5,

above. High quality data require robust and consistent EA data entry and validation processes (electronic and manual) and effective compliance monitoring, audit and enforcement processes. The waste data collection process, from waste management site to Hub input, is summarised diagrammatically in Figure 2.

Figure 2: The waste data collection process

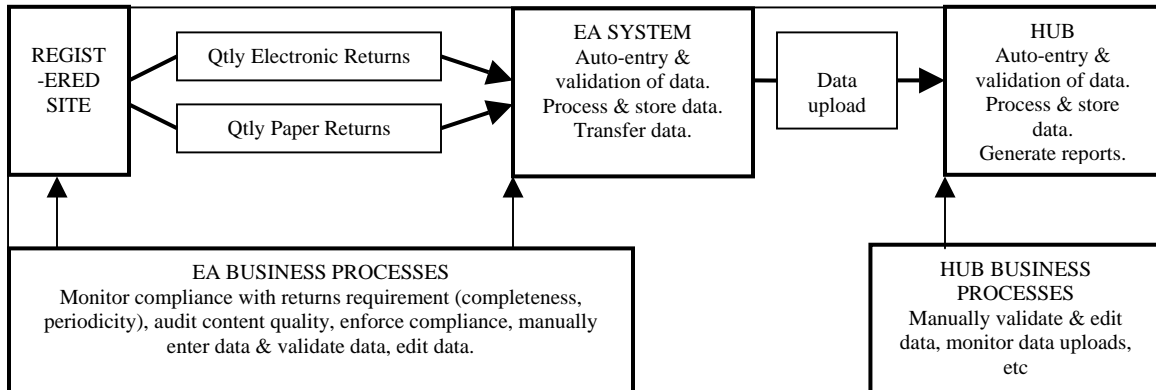
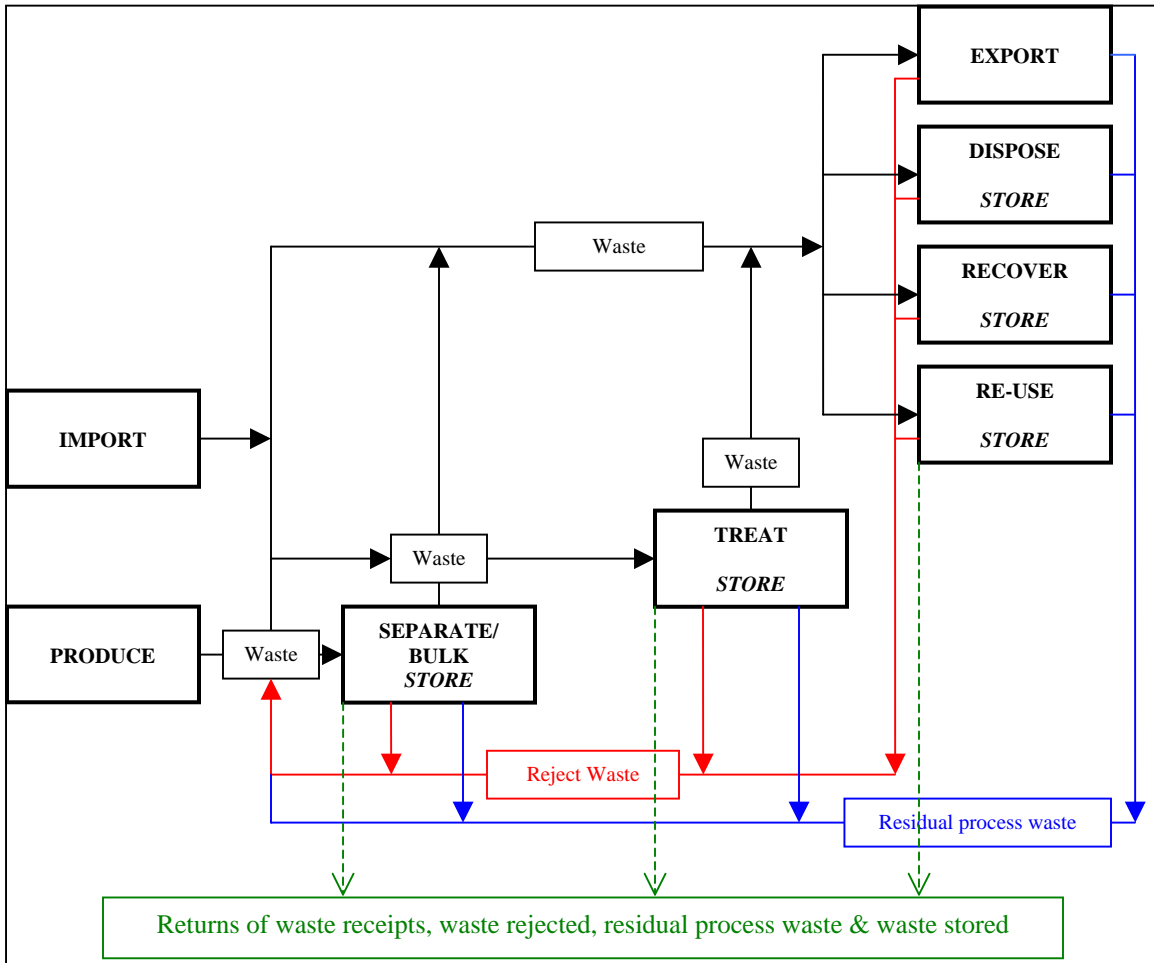


Figure 3: The Waste management Chain



6.21 Possible double counting of waste data could arise from waste flowing through multiple facilities with multiple data returns before final deposition. Double counting could also arise from recycling waste already counted once through the waste management chain (e.g. waste received but rejected by a recycling facility, and residual process waste at a recycling facility). Waste temporarily stored at a facility before processing is already counted within the waste arisings number. Rejected waste should be reported through normal tonnage returns.

6.22 A further complication is potential loss of identity as waste flows through the management chain (including, in the case of hazardous waste, the loss of its hazardous characteristics when treated).

6.23 Waste Industry infrastructure data/update data are to be collected by EA systems via annual electronic returns (exceptionally paper returns) of data from all waste management sites (whether regulated under WML, PPC or other

permitting arrangements). These should be submitted one month, and no later than one quarter after the end of the period. The data needed on returns are those set out under 'Waste Infrastructure' in Section 5, above. The relationship of the Hub infrastructure base data with that held on *WasteDataFlow* and within EA systems, and the methods of updating each of these data sets to preserve matching data, requires to be resolved during the detailed design stage.

6.24 It is proposed that waste export data should be collected by EA systems for *all* waste exports. The data needed are those set out under 'Cross boundary movements' in Section 5.

Current status and change requirements

6.25 Current relevant EA systems include:

- REGIS (which supports permitting under WML and provides WML infrastructure data).
- RATS (covering compliance under WML and providing WML waste management data).
- Interim Hazardous Waste returns system (the special/hazardous waste tracking system, which provides hazardous waste management data).

6.26 Current weaknesses, in relation to the primary data needs of the proposed Hub/waste data strategy can be summarised as follows:

- Fragmented and out-of-date systems, multiple data entry, manual data entry, variable effort put into data collection, validation and database maintenance, and lack of systems and process standardisation, all leading to variable/inconsistent data quality.
- No maximum capacity data, only permitted capacity data collected.
- Incomplete EWC, R&D, NGR and very little SIC coding data (data variable according to regulatory regime and the date/particular regulation permitted under within a individual regime).
- No waste management data for WML registered exempt sites (key areas include metals recovery, secondary aggregates and spreading to land).
- An incomplete picture of waste movements into Scotland and NI.
- Waste from small producers/small quantities of waste is often not recorded.

- Waste management data within the re-use category is not separately identified.
- Data from LA regulated sites are not collected by the EA e.g. mobile crushers/screeners for C & D waste, small incinerators.

6.27 As such, current EA systems, standards and associated data collection processes do not meet the Agency's own long-term regulatory registration and permitting, compliance monitoring and enforcement business needs. Nor are they capable of providing the Hub input data at the levels of quality and completeness needed.

6.28 An ambitious change programme has been embarked upon by the EA to rectify regulatory support issues, which is broadly consistent with delivering the data needed by the waste data strategy. This involves the development of integrated permitting, compliance and enforcement IT systems across all areas of the EA's business, and the introduction of nationally consistent business processes, all to common standards. The waste data strategy has been developed in close conjunction with EA management staff who have responsibility for waste. They are supportive of its content in respect of primary data needs, collection methods and periodicity, classification and coding approaches, the need for regulatory change, and systems approaches.

6.29 Given the deficiencies of current EA systems and processes it is proposed that where possible only EA's new systems and processes be used as primary data sources for the Hub. This should overcome the data deficiencies described above. The relevant EA primary data source systems and associated processes are:

- The Interim Hazardous Waste Returns system (new system, covering all permitting and providing waste infrastructure primary data).
- RATS/successor (new systems, covering all compliance and providing waste arisings/management primary data).
- REGIS/successor (which supports permitting under WML and provides WML infrastructure data).

6.30 However, current EA resource constraints and project planning indicate that the earliest these successor systems and associated processes would be available for waste permitting and compliance purposes is 2007. Good quality primary data from these might be expected to be available perhaps 12 months later (to allow for an appropriate settling in period). The acceptability of this time scale and the possibility of an accelerated programme, with its accompanying resource implications, requires debate.

6.31 Regulatory change governing exempt activities combined with the implementation of the agreed set of definitions and classification systems is needed to make good the maximum capacity, coding, registered exempt site, non-hazardous waste export, small producer, PPC and re-use data deficiencies referred to above.

6.32 As previously emphasised, data quality depends on consistent data requirements and periodicity being stipulated in all relevant regulations and codes of practice. The use of common definitions and classification systems across all waste streams is also paramount – now resolved. Following agreement in principle on the need for and content of regulatory change, particularly in relation to exempt activities, a period of up to some 16 months would be needed for consultation, drafting and issue of new regulations. This would include work needed to identify and quantify all possible impacts through formal Regulatory Impact Assessments (RIAs). In the interim, voluntary compliance with data collection requirements is sought. However, it is anticipated that complete (including exempt activities), accurate, consistent and timely data would not be attainable without the support of regulation. It is hoped that a further joint EA/Defra work group should be set up to manage work in these areas.

6.33 Change would be needed to data collected for (currently from the EA NIRS system and local authorities) and reports derived from Flycapture, so that the weight of waste involved could be captured. In practice, this may not be possible so some conversion may be required. This issue should be included within the remit of the work group proposed above, which should also look at gaps in data in relation to waste movements into Scotland and NI, and capturing data from local authority (or other) regulated sites.

6.34 The proposed changes might impose a requirement on the waste industry for additional data in waste returns and, for some, increased frequency in submission of returns (e.g. moving from annual to quarterly waste management returns, and from 'one-off' to annual for waste infrastructure data). However ultimately, electronic submission of data direct from their own business systems, and the fact that the proposed national waste data system, should obviate the need for many independent requests for data, particularly through the proposed new Environment Agency systems, should mean that any additional requirements do not place an unduly onerous burden on the waste industry. More importantly, it is hoped that the industry will benefit significantly from the improved quality of data made available to them as a result of these changes.

6.35 Quality of data on returns, and the enthusiasm with which the proposed requirements are taken up by the waste industry, depends on the provision of effective support to help in adapting to any new arrangements. With the phased approach being taken, any changes are flagged up well in advance and the

Waste Industry well briefed before they occur. This is key to the acceptance of the Waste Data Strategy.

SECTION 7: Implementation programme and budget

7.1 A high level implementation programme and budget is provided in Figure 4. This is further detailed and revised and updated at regular intervals. The programme plans for a 'go-live' date of May 2006 for Phase 1 of the waste data hub. This aim is crucially dependent upon EA systems.

7.2 Phase 1 implementation involves England and Wales, since both are partners in *WasteDataFlow* and have the EA as their principal regulator. It is proposed that Scotland and Northern Ireland would not become full participants until a later stage.

7.3 Implementation is being started before any changes to site data returns requirements, i.e. obligatory via regulation. This has the advantage of proving the system and demonstrating that the system works.

7.4 A further joint Defra/EA working group is proposed to tackle EA systems development issues, and to help co-ordinate development in line with the waste data strategy (Task 6). It is proposed that this group should also oversee change developments for *WasteDataFlow*.

7.5 It is envisaged that Task 9, Hub development and systems integration, is carried out by external contractors, (IBM) who will also prepare any necessary support materials

7.6 The development of a strategy for Phase 2 implementation is currently in progress. This should address sewage sludge, dredging spoils, forestry waste, fish waste, organic agricultural waste, mineral mines and quarries waste, stockpiled waste, should look further into producer responsibility wastes and may cover the inclusion of Scotland and Northern Ireland within the system. Implementation planning would follow approval of the Phase 2 strategy, but it is possible that the data from these areas might be input manually on either a permanent or interim basis, depending upon the amounts of data involved.

Figure 4: HIGH LEVEL IMPLEMENTATION PROGRAMME & BUDGET

Note: MS represents a milestone review point

Tasks	2004/05			2005/06				2006/07			
	September	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Phase 1											
1. Carry out Gateway Review Process 1	■										
2. Conduct full consultation exercise on the Waste Data Strategy (Defra)	■										
2.1 Preparation of materials & communications programme	■										
2.2 Mailings & seminars		■									
2.3 Assessment & documentation of feedback			■								
2.4 Review, revise, detail strategy, implementation programme & budget				■							
3. Carry out Gateway Review Process 2											
4. Develop, document & agree definitions, classification & coding systems (Work Group 1)											
4.1 Form joint Defra/EA working group (Work Group 1)				■							
4.2 Develop & document proposals				■							
4.3 Consult on & agree proposals with Data Advisory Panel (DAP)					■						
5. Develop, consult on & issue regulatory changes (Work Group 1)											
5.1 Produce consultation document					■						
5.2 Carry out full consultation on changes					■						
5.3 Assess consultation & draft regulations						■					
5.4 Consult on draft regulations							■				
5.5 Revise & issue regulations								■			
6. Develop EA primary data collection systems (Work Group 2)											
6.1 Form joint EA/Defra working group (Work Group 2)				■							
6.2 Agree programme, financing & contractual arrangements				■							
6.3 Implement new/modified waste permitting, compliance, Flycapture, NaTS systems & business processes					■						
7. Review progress											
7.1 Review, revise, detail strategy, implementation programme & budget						■					
7.2 Carry out Gateway Review Process 3						■					
8. Develop WasteDataFlow as primary data collection system (Work Group 2)											
8.1 Agree & specify changes changes needed					■						
8.2 Design, build & test					■						
8. Review progress											
8.1 Review, revise, detail strategy, implementation programme & budget								■			
8.2 Carry out Gateway Review Process 4								■			
9. Implement full Phase 1 waste data system (Contractors)											
9.1 Specify, design, build, test, instal hub & interfaces					■						
9.2 Prepare systems & user etc support documentation, help-line, education/training programme etc					■						
9.3 Systems integration, load & acceptance testing						■					
9.4 'Go-live'							■				
9.5 Obtain 'good' data								■			
10. Review progress											
10.1 Review, revise, detail strategy, implementation programme & budget									■		
10.2 Carry out Gateway Review Process 5									■		
Phase 2											
11. Develop strategy for Phase 2 implementation: 'other' waste streams	■										
12. Implement Phase 2				■	■	■	■	■	■	■	■
Indicative budget costs (£'m)											
Phase 1											
Indicative hub & interface costs											
Notional EA & WDF 'special' development costs					0.04 - 0.06	0.5 - 0.7	0.5 - 0.7	0.5 - 0.7	0.5 - 0.7		
User/returns contributors support costs						0.06 - 0.1	0.06 - 0.1	0.06 - 0.1	0.06 - 0.1		
Annual maintenance costs							0.14 - 0.2	0.01 - 0.03	0.03 - 0.05	0.03 - 0.05	0.03 - 0.05
TOTAL COST (Rounded)					0.04 - 0.06	0.6 - 0.8	0.6 - 0.8	0.7 - 1.0	0.5 - 0.7	0.06 - 0.1	0.09 - 0.15
Phase 2 Notional cost allowance								0.08	0.08	0.08	0.08

SECTION 8: Key programme risks

8.1 The key risks to successful strategy implementation are identified in Table 5, together with an indication of probability of occurrence, likely magnitude of impact, overall risk rating, and mitigating and contingency actions. This 'risk register' is updated at regular intervals during implementation. Probability and impact are rated as high (H), medium (M) or low (L). Risk rating is the product of the probability and impact ratings.

8.2 The most important risks to the successful waste data strategy implementation, and to which close management attention must be paid, are:

- ensuring that data taken from EA systems and WasteDataFlow are accurate and complete;
- ensuring that any new EA systems are developed to the required specification and within an acceptable timeframe;
- ensuring that, in parallel, new robust data collection processes are established within the EA;
- ensuring that compliance returns from waste management sites are received at acceptable levels of response, quality and timeliness;
- ensuring that the changes to regulation needed are satisfactorily prosecuted; and
- ensuring that a common set of definitions, classification and coding systems are commonly agreed and applied for purposes of collecting, transferring, manipulating and disseminating data.

TABLE 5: RISK ANALYSIS

Risk	Probability H/M/L	Impact H/M/L	Risk Rating H/M/L	Mitigating Action	Contingency Action
(1) New EA permitting & compliance systems consistent with requirements of the Waste Data Strategy are not completed to the schedule given herein	H	H	H	High level Defra/EA agreement on priorities & strategy. Close joint working at operational level. Additional financial support against SLA. Develop and implement alternate data extraction methods.	Interim use of current deficient systems and data. This is the current approach.
(2) Robust new data collection processes (data entry, validation, monitoring, audit, enforcement) are not established in EA in association with the new systems.	M	H	M+	High level Defra/EA agreement on priorities & strategy. Close joint working at operational level. Effective EA management action.	Interim reliance on existing deficient processes
(3) WasteDataFlow returns from LA's fall below response rate and quality needed to meet standards.	L	H	M	Promote value of WDF, lobby and support LAs, exert pressure via ODPM.	Regulation to mandate returns
(4) Returns from waste industry fall below response rate, timeliness and quality required to meet standards ie resists calls for data	M	H	M+	Promote value of system, lobby and support the industry. Possible regulation to mandate returns.	Robust enforcement action.
(5) Government resists enacting the regulatory change needed to assure level and quality of returns response from the Waste Industry.	M	H	M+	Promote value of system. Lobby Defra, ODPM, DTI officials and ministers.	Rely on voluntary response from the Waste Industry – promote value, lobby & support the industry.
(6) Project funding withdrawn.	L	H	M	Promote value of system. Lobby Defra, ODPM, DTI officials and ministers.	Introduce user subscription scheme. Obtain finance from devolved administrations.
(7) High proportion of site returns are paper based rather than electronic ie high data entry effort for EA, high rate of transcription errors.	L	M	L+	Promote value of electronic returns to both EA and industry, lobby and support the industry.	EA staffs up for manual data entry, validation & error correction implications.