

# **HILT Phase III: Final report**

## **Evaluation Report**

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**December 2006  
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# Contents

- HILT Phase III: Final report ..... 1
- 1. Introduction..... 3
  - 1.2. Architecture..... 4
  - 1.3. General Methodology..... 5
- 2. Use case definitions ..... 5
  - 2.1. Use case #1..... 5
  - 2.2. Use case #2/3..... 6
  - 2.3. Use case #4..... 6
  - 2.4. Use case #5..... 6
- 3. Functions..... 6
  - 3.1. explain Function name: explain..... 6
  - 3.2. get\_collections ..... 6
  - 3.3. get\_all\_records ..... 8
  - 3.4. get\_ddc\_records ..... 10
  - 3.5. get\_non\_ddc\_records ..... 11
  - 3.6. get\_filtered\_set ..... 11
- 4. Results ..... 15
  - 4.1. explain..... 15
  - 4.2. get\_collections ..... 17
  - 4.3. get\_all\_records ..... 28
  - 4.4. get\_ddc\_records ..... 38
  - 4.5. get\_non\_ddc\_records ..... 43
  - 4.6. get\_filtered\_set ..... 53
  - 4.7. Results summary for get\_all\_records, get\_ddc\_records & get\_non\_ddc\_records ..... 82
- 5. Recommendations..... 84
  - 5.1. Phrase searching ..... 84
  - 5.2. Scheme specific browse ..... 84
  - 5.3. New functions ..... 84
- 6. Future work..... 86
  - 6.1. Match types..... 86
  - 6.2. Use cases and functions ..... 86
  - 6.3. Mapping work..... 86

# 1. Introduction

An evaluation stage of the HILT Phase III pilot M2M demonstrator was to be undertaken following completion of the main development work (November/December 2006). The aim was to determine whether the pilot demonstrator operates as specified in the requirements document and, hence, whether it correctly delivers the functionality needed to meet the five use cases (devised during the preceding feasibility study). Outcomes will be used to inform the system refinement process, due to occur in January 2007. Six SOAP functions were designed to meet the functionality required by each of the use cases, either singly or in combination, and the working pilot is best tested by examining whether each part of the system architecture (see Figure 1) operates as specified in the requirements document when any given one of the functions is called.

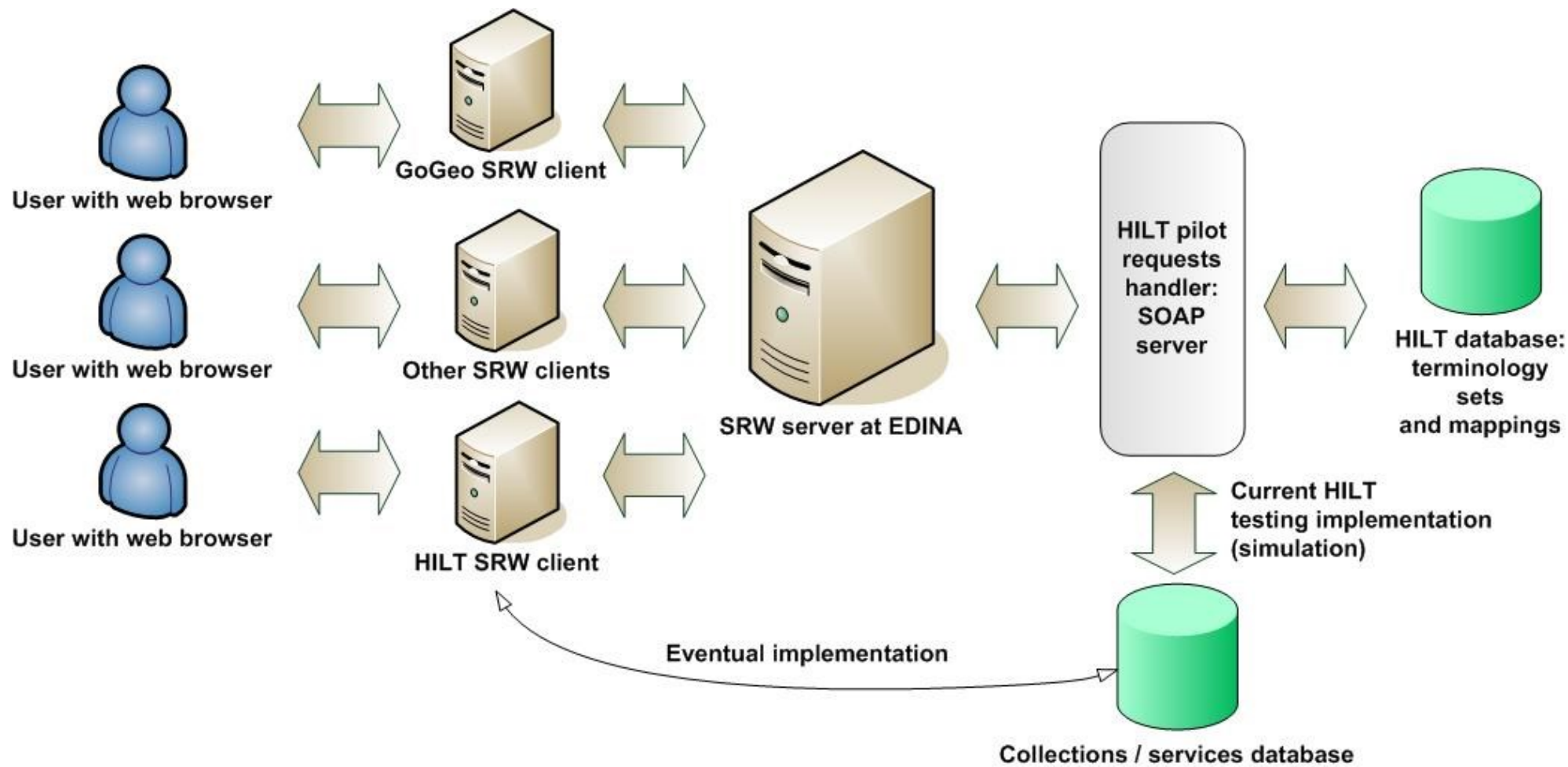
This report documents the use cases being addressed, the nature of the functions designed to meet the use cases, how each part of the system is required to operate when a function is called, methodologies determined to assess the satisfactory performance of functions, and associated results. It is **not** the intention of this evaluation to study the quality of mappings or retrieval performance. Results presented will enable the identification of issues or errors within the system as it is currently implemented (or requirements as currently specified) and any additional requirements for development beyond Phase III will be noted.

It should be noted that elements of the system's development, including performance, conformance to standards and efficacy of programming have been monitored and evaluated by the project team on a regular basis throughout the project lifetime. Technical aspects of the project have also been evaluated on a continuous basis by CDLR and EDINA programming staff. Table 1 summarises how each of the functions relate to the five use cases in HILT Phase III. Note that, in a user session involving more than one use case, the explain function would probably only be used once at the start of the session since it enables configuration of the client service.

Use cases	Functions					
	explain	get_collections	get_all_records	get_DDC_records	get_non_DDC_records	get_filtered_set
1	✓	✓		✓	✓	
2/3	✓					✓
4	✓					✓
5	✓		✓	✓	✓	✓

**Table 1: Functions as they feature within use cases**

## 1.2. Architecture



**Note:** Where there is interaction with the collections and services database, it is between any given client and the database. In the current pilot only the HILT SRW client interacts in this way.

Figure 1: HILT M2M Pilot Architecture

## 1.3 General Methodology

The following methodology will be used to assess whether each part of the system architecture (see Figure 1) operates as specified in the requirements document when any given one of the functions is called.

Verify and record a) the SRW client screen that initiates the function call b) the screen that shows the end results of the function call c) that each step in between the initiation and end results screen operates as specified in the requirements document, so that:

1. The user request is interpreted by an SRW client (a component of the requesting service interface) and this sends a query to the SRW server (a SOAP message that conveys an SRW request that includes a CQL search query).
2. The SRW server parses the query to obtain the search terms, and uses these in a call to the appropriate SOAP server function (the SOAP server translates the request into SQL for querying the database).
3. The response from the database to the SOAP server contains appropriate data (test using a SOAP client<sup>1</sup>, not shown in Figure 1) and this is returned to the SRW server wrapped in SKOS, the SKOS Mapping Vocabulary Specification (MVS) and Dublin Core Collection Description Application Profile (DC CD AP), as appropriate; the SRW server returns the data to the SRW client using SOAP.
4. The client service uses the wrapped data to provide a response to the user.

Since the operation of each function differs, the above methodology will be supplemented for each of the six SOAP functions. Additional methodology specific to the testing of each function is detailed in the relevant sections below. Note that the general methodology will not be used in evaluating the explain function, as described in 3.1 below.

## 2 Use case definitions

### 2.1 Use case #1

Emulate the Phase II pilot:

- Use the user's search term to identify DDC captions that might cover his or her topic and get user to 'disambiguate' captions (i.e. identify which does cover his or her topic) (`get_ddc_records`);
- Use DDC number associated with caption to identify collections that cover the subject area in which the user's topic 'sits' and the subject schemes they use and get user to choose collection to search and, in so doing, identify the subject scheme to use when searching (`get_collections`);
- Identify term in the scheme in question to use when searching for user's topic;
- Search for it and return hits to user (`get_non_ddc_records`).

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<sup>1</sup> Note that this is a tool for testing, *not* a normal part of the architecture. See the HILT SOAP client demonstrator at: <http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/hiltsoapclient.php>

## **2.2 Use case #2/3**

Provide enriched set of search terms that users can use (selectively or otherwise) to improve searches of local service database; includes term expansion, singular/plural mappings, spelling/typos correction (Google 'did you mean?') – (either `get_all_records` or `get_filtered_set`).

## **2.3 Use case #4**

Scheme hierarchy browse in 'no hits from HILT' or user/service request situation (`get_filtered_set`).

## **2.4 Use case #5**

Improved precision use cases, either via browsing scheme hierarchies, disambiguation or specific requests for narrower/related terms (other use cases plus `get_filtered_set`).

# **3 Functions**

## **3.1 explain**

**Function name:** explain

**Description:** A request to return a file holding data on the subject schemes used, the kinds of queries supported, the kinds of terminologies mark-ups offered, and so on, to enable distributed clients to interact with the service.

**Methodology:** The general methodology described in 1.3, used throughout the rest of the evaluation, will not be used for the explain function. All that needs to be shown for this function is that the SRW server responds to an explain request by returning an explain file that meets the standard for SRW explain in a way relevant to the current instantiation of the HILT pilot. The following steps will be applied here (and only here):

1. Obtain details of what information should be included in an SRW explain file (<http://www.loc.gov/standards/sru/explain/>) and determine which of these details are relevant to the current instantiation of the HILT pilot.
2. Obtain, from a client sending an SRW explain request results of using the SOAP function to populate the file sent back in response to SRW explain request. Check SRW client can send an SRW explain request. Check that response shown on screen to this request meets the details identified under 1 (above)

## **3.2 get\_collections**

**Function name:** get\_collections

**Description:** get\_collections classified under a specified DDC number or its stem. This covers requirement 9 as documented in the requirements document. In this instance retrieval is from a separate collections database hosted at the CDLR. Such retrieval in the future will be from the Information Environment Services Registry (IESR) and other similar registries external to JISC as they appear.

**Use case:** Will normally be used to help satisfy use case #1. In an operational situation, the assumption is that the collections and services database will be the IESR which has its own SRW server so that interaction would be between an SRW client and the IESR SRW server and database. In the HILT pilot, however, the process will be as follows:

1. A DDC number identified during the disambiguation stage is sent from the SRW client service to the SRW server.
2. The SRW server sends an appropriate request for get\_collections via the SOAP server.
3. The get\_collections function queries the database using successive truncations of the DDC number sent.
4. The SOAP requests handler receives back collections' connection details and scheme information.
5. The SOAP requests handler wraps the results in Dublin Core Collection Description Application Profile (DC CD AP) and sends the results back to the SRW server.
6. The SRW server sends the results back to the client service.
7. The client service processes the results to offer the user a set of collections relevant to their query.

**Methodology:** The general methodology (1.3) will be used to evaluate the above scenario, supplemented with the stages below.

1. Since there is no requirement for random selection, the identification of a suitable DDC number (300) was purposive, based on known collections database content. Obtain copy of messages sent from and to the SRW client and SRW server.
2. Illustrate 1) collections returned for DDC number 300; 000 and 700 will also be input to assess the reliability of the get\_collections functions, and, 2) collections returned that match truncated DDC numbers if there are no hits in the collection database directly matching the inputted number. Such output will be verified by a summary of known collection database content and assigned DDC numbers (see Table 3). The SOAP client will then be examined to ensure the requested DDC number retrieves the known collection information (including URL, connection information details and scheme information) and that such information is wrapped appropriately (i.e. in DC CD AP). This output will be copied for verification purposes and documented in the findings section. Screen shots will also be provided for those tests designed to demonstrate the truncation of DDC numbers (see below for further details).

**Known collections database content.** Table 2 below provides details of collections (e.g. number of collections/services, their name, and with which DDC number they are associated) by the DDC ten main classes. Although the collections database contains numerous collections and services classified to many numbers after the decimal point, it is convenient to test collections classified in the ten main classes since the purpose of the current study is to evaluate system processes only, irrespective of the number entered. 000 (Generalities) is included to demonstrate 'no hits'.

DDC number	Number of collections associated with DDC number	Description of associated collection(s) in database
000	0	- No hits -
100	1	BUBL LINK: Philosophy

200	1	BUBL LINK: Religion
300	3	Euro-barometer Survey Series; SOSIG; UK Data Archive
400	1	BUBL LINK: Language
500	2	Natural Selection; Web of Science
600	1	BUBL LINK: Technology
700	2	ADAM: Art, Design, Architecture and Media; VADS: Visual Arts Data Service
800	1	BUBL LINK: Literature
900	2	HDS: History Data Service; History Online

**Table 2: DDC numbers according to the ten main classes and their associated collection(s) from the HILT collections database**

**Note: Recall that DDC number 300 was used for testing. Other DDC numbers in the ten main classes have been provided to enable external verification. Also note that since the number used for the first stage of the get\_collections evaluation is in the ten main classes, truncation is not being tested since it will not be invoked for these numbers.**

**Truncation in get\_collections:** As noted in point 2 of the methodology above, it is necessary to test that get\_collections - aside from retrieving the correct database content in response to a corresponding DDC number – truncates DDC numbers correctly when no match is found against the input number or where low recall is experienced. Table 3 (below) provides details of collections (e.g. number of collections/services, their name, and the DDC number with which they have been classified). Since each of these DDC numbers only has one collection associated with it, HILT should truncate the extended number input (column 5) to provide details of this collection, but also (via truncation) other related collections where they exist. Known related collections identified in the database via manual truncation are noted in column 4.

1	2	3
Number inputted to demonstrate truncation	Description of associated collection(s) in database (retrieved following initial truncation)	Related collection(s) in database with associated DDC number (retrieved following subsequent truncations)
620.2	EEVL (620)	Not Applicable (no truncation beyond 620)
912.411	Digimap (912.41)	BUBL LINK: Maps (912); BUBL LINK: Geography (910)
780.79422	PATRON: Performing Arts Teaching Resources Online (780.7)	BUBL LINK: Music (780)

**Table 3: DDC numbers according and their associated collection(s) from the HILT collection and services database, and known related collections (derived via truncation)**

### 3.3 get\_all\_records

**Function name:** get\_all\_records

**Description:** Retrieves records that include – or are mapped to records that include – the term or term phrase specified.



**Use case:** This function covers requirement 10 as documented in the requirements document and satisfies aspects of use case #1, where it can perform the combined functions of `get_ddc_records` and `get_non_ddc_records`. It works as follows:

1. User enters term via the embedded SRW client service, and a resultant request is sent to the SRW server.
2. The SRW server parses the request to obtain search terms and uses these to call the SOAP `get_all_records` function.
3. The `get_all_records` function queries the database to find (1) all DDC records that either include the user term or that are mapped to from other non-DDC records that include the term (2) all non-DDC records mapped from the DDC records retrieved under (1) and returns these records to the SOAP server.
4. The SOAP requests handler wraps the results in SKOS Core with the SKOS Mapping Vocabulary Specification (MVS) and sends the results to the SRW server.
5. The SRW server sends the results back to the client service.
6. The client service processes the results to offer DDC and non-DDC records to the user.

**Methodology:** The general methodology (1.3) will be used to evaluate the above scenario, supplemented with the stages below.

1. Earlier in Phase III, 30 (approx.) concepts were mapped to the DDC spine from a number of terminologies to enable testing and development of the GoGeo! SRW client. To ensure a valid evaluation, terms were selected from this group because they were mapped to DDC from a number of schemes. Five terms were randomly identified for testing purposes. Those terms were as follows:

- *Environmental impacts* (GCMD)
- *Shore protection* (DDC)
- *Plant genetics* (HASSET)
- *Civil emergencies* (IPSV)
- *Land use site* (NMR)

Details of the selected existing mappings for the above terms are detailed in Table 4. Occurrence of these terms within the SOAP client demonstrator output will prove that the function is operating as originally specified. To ensure that indirectly mapped terms are being retrieved, equivalent terms from other terminologies are used. These can be seen in Table 4.

DDC number	DDC caption	GCMD	NMR	HASSET	IPSV
363.73	Pollution	<b>Environmental impacts</b>	-	Pollution	Pollution
627.58	<b>Shore protection</b>	Erosion	-	Coastal protection	Coastal erosion and protection
631.53	Plant propagation	Plant breeding and genetics	-	<b>Plant genetics</b>	-
363.34	Disasters	Natural hazards	-	Hazards, accidents and disasters	<b>Civil emergencies</b>
333	Economics of land and energy	Land use/Land cover	<b>Land use</b>	Land use	Planning (town and country)

			site		
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**Table 4: Selected terms, with mappings**

2. Verify that a) terms matching user term are returned, b) mapped terms, where applicable, from a number of schemes are returned. Such output will be verified by a summary of known mappings (see Table 4). The SOAP client will then be examined to ensure the requested term (i.e. plant genetics) receives the known mappings from other schemes and that such information is wrapped appropriately (i.e. in SKOS Core). This output, which should include DDC numbers, mapped terms with source scheme information and mapping match type (type of equivalence) details will be copied for verification purposes and documented in the findings section.

### 3.4 *get\_ddc\_records*

**Function name:** get\_ddc\_records

**Description:** Retrieves any DDC record that either includes the terms specified, or that is mapped to by a record that includes the terms specified.

**Use case:** This function meets requirement 11 of the requirements document and satisfies aspects of use case #1, but could be deployed in other contexts.

- User enters term via embedded SRW client service, and a resultant request is sent to the SRW server.
- The SRW server parses the request to obtain search terms and uses these in a call to the SOAP get\_DDC\_records function.
- The get\_DDC\_records function queries the database for DDC records that include the user term entered or that are mapped to by non DDC records that include the term.
- The SOAP requests handler receives DDC numbers and associated DDC captions, wraps the results in SKOS Core, and sends them back to the SRW server.
- The SRW server sends the results back to the client service.
- The client service processes the results to offer the user terms possibly relevant to their query from DDC with corresponding DDC numbers.

**Methodology:** The general methodology (1.3) will be used to evaluate the above scenario, supplemented with the stages below. The SOAP client demonstrator will be interrogated using the same test terms as in 3.3 (get\_all\_records). To prove the function is searching both DDC records directly and records mapped to DDC, terms taken from DDC and other schemes will be searched for.

1. Illustrate that terms returned in response to a term entered are entirely instances of that term found within DDC. DDC captions, together with corresponding numbers should be returned. Such output will be verified by comparing results with known DDC captions and terms from other schemes mapped to DDC, as detailed in Table 4. If when searching for a non DDC term, a DDC number and caption are returned, this information is being retrieved via a mapping. The SOAP client will then be examined to ensure the requested DDC records are wrapped appropriately (i.e. in SKOS Core). This output will be copied for verification purposes and documented in the findings section.

### 3.5 *get\_non\_ddc\_records*

**Function name:** get\_non\_ddc\_records

**Description:** Retrieves any non-DDC record that includes a mapping to the DDC number sent. That is, the system retrieves records from other schemes (non-DDC) that have been mapped to an input DDC number. Only the non-DDC records mapped to the DDC number sent are retrieved.

**Use case:** This function meets requirement 12 of the requirements document and satisfies aspects of use case #1, as follows:

- User chooses DDC number on screen and embedded SRW client service sends an appropriate request to the SRW server.
- The SRW server parses the request and sends an appropriate query to the SOAP get\_non\_DDC\_records function.
- The get\_non\_DDC\_records function searches the database to find non-DDC records containing a mapping to the DDC number sent and returns the results to the SOAP server.
- The SOAP server wraps the results in SKOS Core and SKOS MVS and returns them to the SRW server.
- The SRW server sends the results back to the client service; results comprise DDC number entered, terms from other schemes mapped to that DDC number, with the name of the scheme and match type information defining the relationship between a scheme's term and the DDC number entered.
- The client service processes the results and provides the user (via the service interface) with information on which term to use for individual schemes used by individual JISC collections.

**Methodology:** The general methodology (1.3) will be used to evaluate the above scenario, supplemented with the stages below. To retain consistency throughout the evaluation, DDC numbers detailed in Table 4 will be used to test this function. Each DDC number will be entered in turn. Results should indicate that mapped terms, with corresponding scheme information, are returned in response to a query for the DDC number to which they are mapped. No DDC captions should be returned in this instance.

1. Illustrate that results comprise mapped terms from all schemes (see Table 4 to verify results are as expected). The only DDC information that should be presented within this results set is the initial number input and its corresponding caption. Such output will be verified by ensuring all mapped terms in Table 4 are returned in response to a query for a DDC number. The SOAP client will then be examined to ensure the requested non-DDC records are wrapped appropriately (i.e. in SKOS Core, using MVS). This output will be copied for verification purposes and documented in the findings section.

### 3.6 *get\_filtered\_set*

**Function name:** get\_filtered\_set

**Description:** Retrieves records that meet the specified parameters; that is, the search term entered but 'filtered' by scheme name(s) and /or field name(s). Functionality to filter a search by scheme, and/or to search preferred and non-preferred terms will be in-built.

**Use case:** This function meets requirement 13 of the requirements document and satisfies aspects of use cases #2, 3, 4 and 5, but could be deployed in other contexts. It operates as follows:

- User enters term via embedded SRW client service, and a resultant request is sent to the SRW server.
- The SRW server parses the request and uses the results to send an appropriate query to the SOAP `get_filtered_set` function.
- The `get_filtered_set` function queries the database for records that match the terms and the specified filters and the results are sent back to the SOAP server.
- The SOAP server wraps the results in SKOS Core and returns them to the SRW server.
- The SRW server sends the results back to the client service; results comprise terms together with information about each term's source scheme, notation (DDC) or ID (other schemes), and broader, narrower and related terms, where applicable.
- The client service processes the results to provide the service interface with terms from specific schemes relevant to the query and with any relevant additional data on the terms (e.g. related terms).

**Methodology:** The general methodology (1.3) will be used to evaluate the above scenario, supplemented with the stages below. Again to retain consistency throughout the evaluation, Table 4 will form the basis of the testing of the `get_filtered_set` function to ensure use cases are met. A single term (extracted from Table 4) for which equivalences across four schemes are known will be used, as detailed in Table 5. `get_filtered_set` can be used to search for preferred and/or non-preferred terms and/or related for a given concept directly within any scheme, providing details of broader, narrower and related terms. Each term recorded in Table 5 will be searched for in turn, varying the scheme parameter (to that in which we know the term appears) by which to filter results sets in each case. Results should include information on broader, narrower and related terms for the given preferred term, as well as corresponding non-preferred terms. Such results will be verified using the predetermined data in Table 5.

1. Illustrate that results comprise terms from selected schemes. The SOAP client will then be examined to ensure the requested records are wrapped appropriately (i.e. in SKOS Core). This output will be copied for verification purposes and documented in the findings section.

Filter	DDC caption	GCMD	NMR	HASSET	IPSV
<b>Preferred terms</b>	Economics of land and energy	Land use/Land cover	Land use site <sup>2</sup>	LAND USE	Planning (town and country)
<b>Broader term</b>	Economics of labor, finance, land, energy	Human Dimensions	-	LAND	Land and premises
<b>Narrower term</b>	Philosophy and theory; Standard subdivisions*; Theories; Land surveys; Ownership of land; Natural resources and energy	Land Management; Land Tenure; Land Use Classes	-	N/A	Planning applications; compulsory purchase; Green belts; Structure plans; Town planning; District planning; Rural planning; Unitary development plans; Minerals local plan; Residential planning; Zoning; Street numbering and naming; Regional planning; Planning appeals; Urban development; Waste local plan; Planning regulations
<b>Non-preferred term</b>	-	-	Land use site	IDLE LAND	Property planning (land or buildings); Planning (land use); Development control; Building planning; Planning enforcement; Sites and projects policies (planning): Planning policy; Land use planning; Planning control; Local plans (land use); Development (planning applications)
<b>Related term</b>	-		-	AGRICULTURAL LAND; ENVIRONMENTAL PLANNING; LAND ECONOMICS; LAND RESOURCES; LAND TYPES; PUBLIC ACCESS RIGHTS	Urban communities; Rural communities; town centre management; Community development; Civic societies;

\* DDC subdivisions

**Table 5: Selected terms, with details of broader, narrower and related terms. Non-preferred terms are also listed.**

A second element to test is multiple scheme selection. Where more than one scheme is selected using the `get_filtered_set` function, relevant information should be returned for all schemes selected (where it is available). This should include preferred, non-preferred and related terms where appropriate. To assess the functionality of `get_filtered_set` the example in Table 6 will be used. The term 'Plant genetics' will be entered and all five schemes in Table 6 will be selected. Results

<sup>2</sup> While running the evaluation it was discovered that 'Land use site' is no longer a valid term within NMR therefore this term will be omitted from the test for `get_filtered_set`. The effect of omitting this test term is thought to be minimal since it had no broader or narrower terms, and no related or non-preferred terms.

should be returned for HASSET and GCMD within a single SKOS record; but not for DDC, IPSV, GCMD or NMR since the submitted search term does not feature in these terminologies. Additional detail (broader terms, etc), matching those shown in Table 6, should also be provided.

Filter	DDC caption	GCMD	NMR	HASSET	IPSV
<b>Preferred terms</b>	Plant propagation (631.53)	Plant breeding and genetics	-	PLANT GENETICS	-
<b>Broader term</b>	Cultivation and harvesting (631.5)	Agricultural Plant Science; Agriculture	-	BIOLOGY; BOTANY; GENETICS	-
<b>Narrower term</b>	Propagation from seeds (Sowing)(631.531); Propagation from bulbs and tubers (631.532); Propagation from suckers, runners, buds (631.533); Propagation by layering (631.534); Propagation from cuttings and slips (631.535); Transplanting (631.536)	-	-	-	-
<b>Non-preferred term</b>	-	-	-	PLANT BREEDING; PLANT REPRODUCTION	-
<b>Related term</b>	-	-	-	GENETICALLY MODIFIED CROPS	-

**Table 6: Selected terms, with details of broader, narrower and related terms. Non-preferred terms are also listed.**

A third aspect to test is filtering by preferred and non-preferred terms. These filters will be selected and deselected in turn to illustrate that non-preferred terms can be retrieved; such a search should provide the corresponding preferred term in each case. The accuracy/completeness of non-preferred terms returned will be verified by the output of an SQL query requesting non-preferred terms of a known preferred term within the HILT database. Table 6 will be used for this. Preferred terms from each scheme will be entered in turn, filtered by the source scheme only, with a request to search non-preferred terms only. The reverse will then be conducted (where applicable).

## 4 Results

This section documents the results of the testing detailed in section 3. Recall that the general methodology was used for most functions, supplemented with function-specific methodologies. Please note:

- Calling the SOAP server from the SRW client and the way in which client parses CQL functions does not alter between functions. As such, code for these steps in the general methodology is only reproduced once.
- Where code is largely identical within any one function (only differing, for example, in search value (DDC number or search term)) code will only be reproduced once.
- Where appropriate, lengthy SKOS records have been truncated to aid readability.
- Some lines of code have been modified in order to remove information which could potentially (if used by external agents) compromise HILT system components. In all cases this has simply meant replacing database names, table names, connection details, etc. with 'dummy' equivalents. This does not affect code validity.

### 4.1 *explain*

HILT is using a basic ZeeRex<sup>3</sup> explain record for the SRW server. Details obtained of what comprises an explain file are quoted below.

"...an XML document with an <explain> element at the top level, a <serverInfo> element within it, and <host>, <port> and <database> elements within that, containing the hostname, IP port number and database name respectively of a Z39.50 database which may be on the same server as the ZeeRex record or a different one ... In addition to the <serverInfo> section also found in F&N records, full records *may* also include the following sections:

- <databaseInfo>: contains human-readable information about the database: its title, a description, the address of a contact person, etc.
- <metaInfo>: information about the ZeeRex record itself: when it was created or last modified, when it was aggregated if at all, etc.
- <indexInfo>: information about how to search in the database: which indexes exist and what combinations of attributes may be used to search against them, which indexes can be used for sorting, scan, etc.
- <recordInfo>: information about which record syntaxes the database can serve records in, and which element sets are supported"<sup>4</sup>.

In the current instantiation of the HILT pilot, the following is returned in response to a call for the explain function:

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<sup>3</sup> ZeeRex: <http://explain.z3950.org/>

<sup>4</sup> ZeeRex: An Overview, Sections 3.1 and 3.2. Available: <http://explain.z3950.org/overview/index.html>

```

<zs:explainResponse>
  <zs:version>1.1</zs:version>
  <zs:record>
    <zs:recordSchema>http://explain.z3950.org/dtd/2.0/</zs:recordSchema>
    <zs:recordPacking>xml</zs:recordPacking>
    <zs:recordData>
      <explain>
        <serverInfo protocol="SRW/U" transport="http">
          <host>bodach.ucs.ed.ac.uk</host>
          <port>18111</port>
          <database>hilt</database>
        </serverInfo>
        <databaseInfo>
          <title primary="true">HILT</title>
          <description/>
          <author>CDLR, University of Strathclyde</author>
          <contact>http://cdlr.strath.ac.uk/</contact>
        </databaseInfo>
        <indexInfo>
          <set name="hilt"/>
          <index search="true">
            <title>Get Collections</title>
            <map>
              <name set="hilt">get_collections</name>
            </map>
          </index>
          <index search="true">
            <title>Get All Records</title>
            <map>
              <name set="hilt">get_all_records</name>
            </map>
          </index>
          <index search="true">
            <title>Get Ddc Records</title>
            <map>
              <name set="hilt">get_ddc_records</name>
            </map>
          </index>
          <index search="true">
            <title>Get Non Ddc Records</title>
            <map>
              <name set="hilt">get_non_ddc_records</name>
            </map>
          </index>
          <index search="true">
            <title>Get Filtered Set</title>
            <map>
              <name set="hilt">get_filtered_set</name>
            </map>
          </index>
        </indexInfo>
      </explain>
    </zs:recordData>
  </zs:record>
</zs:explainResponse>

```



```

        <index search="true">
            <title>Get Parents</title>
            <map>
                <name set="hilt">get_parents</name>
            </map>
        </index>
        <index search="true">
            <title>Get Children</title>
            <map>
                <name set="hilt">get_children</name>
            </map>
        </index>
        <index search="true">
            <title>Explain</title>
            <map>
                <name set="hilt">explain</name>
            </map>
        </index>
    </indexInfo>
    <schemaInfo>
        <schema identifier="http://www.w3.org/2004/02/skos/core#" />
    </schemaInfo>
    <configInfo>
        <default type="contextSet">hilt</default>
        <supports type="resultSets" />
    </configInfo>
</explain>
</zs:recordData>
</zs:record>
</zs:explainResponse>

```

## 4.2 *get\_collections*

The SRW client sends a query to the SRW server. Our test uses DDC numbers 300, 000 and 700 in the first instance; then 620.2, 912.411 and 780.79422 for truncation testing. Since the code used to execute this query remains constant irrespective of the number input, this code has only been provided once. The code below details a query for DDC 300:

```

my $conn = ZOOM::Connection->new("http://bodach.ucs.ed.ac.uk:18111/hilt",);
$conn->option(preferredRecordSyntax => "xml");

my $query = 'hilt.get_collections=300';
my $rs=$conn->search(new ZOOM::Query::CQL($query));

```

The SRW server parses the client query to obtain the search values:

```

use HILT::CQL::Parser;

```

```

use HILT::Client::SOAP;

my @obj_fields = qw(cql client);
our $functions;
our $parameters;
our $parameter_defaults;
our @parameter_list;
our $serverChoice;
our $AUTOLOAD;

# set the $parameter_list to be all those listed in $parameters values.
BEGIN {
    $functions = [ @HILT::Client::SOAP::METHODS ];
    $parameters = {
        %HILT::Client::SOAP::PARAMS
    };
    $parameter_defaults = {
        %HILT::Client::SOAP::PARAM_DEFAULTS
    };
    my %tmp_hash = ();
    for my $key (keys(%$parameters)) {
        my @list = @{$parameters->{$key}};
        @tmp_hash{@list} = (1) x @list;
    }
    @parameter_list = keys(%tmp_hash);
    $serverChoice = "get_all_records";
}

# ...
sub translate {
    my ($self, %hash) = @_;
    my $cql = $hash{cql}||$self->cql();
    my $client = $hash{client}||$self->client();

    my $parser = HILT::CQL::Parser->new();
    my ($qualifiers,$terms,$operators) = $parser->parse($cql);

    my @results = ();

    my %given_params = ();
    @given_params{@parameter_list} = map([],@parameter_list);
    my @calls = ();

    for (my $i = 0; $i <= $#{@$qualifiers}; $i++) {
        my $qualifier = $qualifiers->[$i];
        my $term = $terms->[$i];

        my $namespace = "hilt";
        my $function = $serverChoice;
        if ($qualifier =~ m/(.*)\.(.*)/) {
            $namespace = $1;

```

```

    $function = $2;
} else {
    $function = $qualifier;
}

if ($namespace eq "srw" and $qualifier eq "serverChoice") {
    $namespace = "hilt";
    $qualifier = $serverChoice;
}

if ($namespace eq "hilt") {
    #gather parameters
    if (grep ($function eq $_, @parameter_list)) {
        push(@{$given_params{$function}}, $term);
    } else {
        # gather functino calls
        push(@calls, [$function, $term]);
    }
}

}

for my $pair (@calls) {
    my ($function, $term) = @$pair;
    my $result;
    if (exists($parameters->{$function})) {
        my @set_params = @{$parameters->{$function}};
        my %hash = (shift(@set_params) => $term);
        for my $param (@set_params) {
            my $default = $HILT::Client::SOAP::PARAM_DEFAULTS{$param};
            my $given = $given_params{$param};
            if (ref($given) eq "ARRAY" and $#{$given} >= 0) {
                # $given is always an array ref, but it a scalar might be needed.
                if (ref($default) eq ref($given)) {
                    $hash{$param} = $given;
                } else {
                    $hash{$param} = @$given[0];
                }
            } else {
                $hash{$param} = $default;
            }
        }
        $result = $client->{$function}(%hash);
    } else {
        $result = $client->{$function}($term);
    }

    if ($result =~ m/<.*>/) {
        push(@results, $result);
    } else {

```

```

        warn("SOAP RESPONSE: $result\n");
    }
}

return @results;
}
# ...

```

The SRW server uses the values obtained from parsing the query to call the appropriate SOAP server function:

```

# ...
use vars(qw($AUTOLOAD $PACKAGE $URI $PROXY $AUTOTYPE $READABLE @SCHEMES
@METHODS %PARAMS %PARAM_DEFAULTS %PARAM_SEP));

@METHODS = qw(
    get_collections
    get_all_records
    get_DDC_records
    get_non_DDC_records
    get_filtered_set
    get_parents
    get_children
    explain
);
@SCHEMES = qw(AAT DDC GCMD HASSET IPSV LCSH MeSH NMR SPEIR UNESCO);
# All params for the following methods should be set for a SOAP call.
# If they are not set from the PARAM_DEFAULTS then they are mandatory
for the client to set.
# The first parameter is the CQL "term" (or equivalent).
%PARAMS = (
    get_filtered_set => [ qw(term scheme preferred related non_preferred
is_id) ],
    get_children => [ qw(id scheme) ],
    get_parents => [ qw(id scheme) ],
);
%PARAM_DEFAULTS = (
    scheme => [@SCHEMES],
    preferred => "true",
    related => "true",
    non_preferred => "true",
    is_id => "false",
);
%PARAM_SEP = (_default=>":");

$PACKAGE = '';
$URI      = "http://tempuri.org/\$PACKAGE";
$PROXY    = "http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/soapserver.php";

# ...
# this AUTOLOAD sub deals with most of the SOAP calls.

```

```

# to add a new one, add to the @METHODS list above.
sub AUTOLOAD {
    my $self = shift;
    my ($class, $method) = ($AUTOLOAD =~ m/(.*::)?(\w+)/);
    $class =~ s/::$//;

    die("$method not defined for $class") unless grep($_ eq $method,
@METHODS);

    my @soapArgs;
    # deal with methods that require parameters
    if (exists($PARAMS{$method})) {
        my %hash = @_;
        if ($hash{args}) {
            @soapArgs = @{$hash{args}};
        } else {
            @soapArgs = ();
            for my $param_name (@{$PARAMS{$method}}) {
                my $param_val = defined($hash{$param_name})?
                    $hash{$param_name}:$PARAM_DEFAULTS{$param_name};

                die("must pass '$param_name' parameter to $method()") unless
defined($param_val);
                # deal with array refs passed in
                if (ref($param_val) eq "ARRAY") {
                    my $sep = defined($PARAM_SEP{$param_name})?
                        $PARAM_SEP{$param_name}:$PARAM_SEP{_default};
                    $param_val = join($sep,@$param_val);
                    warn("param_val=$param_val\n");
                }
                push(@soapArgs,$param_val);
            }
        }
    } else {
        @soapArgs = @_
    }

    $self->som($self->soap()->${method}(@soapArgs));
    return ($self->result_as_xml());
}
# ...

```

Response from database to the SOAP server is returned to the SRW server wrapped in DC CD AP and forwarded to the SRW client. Given that there is knowledge of database content, results returned were checked against Table 2 (as detailed in 3.2). Tests using 300, 000 and 700 were successful and correct database content was retrieved. Copies of the returned query results (wrapped in DC CD AP) are detailed below.

Collections returned for DDC number 300:

HTTP/1.1 200 OK

Connection: close  
Date: Mon, 04 Dec 2006 14:31:51 GMT  
Server: Microsoft-IIS/6.0  
X-Powered-By: PHP/5.1.4  
Server: NuSOAP Server v0.7.2  
X-SOAP-Server: NuSOAP/0.7.2 (1.95)  
Content-Type: text/xml; charset=ISO-8859-1  
Content-Length: 5509

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<ns1:get_collectionsResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<metadata
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:dcterms="http://purl.org/dc/terms/"
xmlns:dcmitype="http://purl.org/dc/dcmitype/"
xmlns:iesr="http://iesr.ac.uk/terms/#usesControlledList"
xmlns:cld="http://purl.org/cld/terms/">
<dcmitype:Collection>
  <dc:title>Euro-barometer Survey Series</dc:title>
  <dc:identifier xsi:type="dcterms:URI">http://www.data-archive.ac.uk/findingData/snDescription.asp?sn=4392</dc:identifier>
  <dcterms:abstract>Surveys designed to measure public awareness of, and attitudes toward, the Common Market and other European Community
institutions; and, since 1974, to provide a regular monitoring of the social and political attitudes of the publics of the member
nations.</dcterms:abstract>
  <dc:creator>University of Essex</dc:creator>
  <dc:type xsi:type="dcterms:DCMitype">Collection</dc:type>
  <dc:subject xsi:type="dcterms:DDC">300</dc:subject>
  <iesr:usesControlledList xsi:type="iesr:CtrlDVocabsList">HASSET</iesr:usesControlledList>
  <iesr:usesControlledList xsi:type="iesr:CtrlDVocabsList">UNESCO</iesr:usesControlledList>
  <cld:isAccessedVia>http://www.data-archive.ac.uk/search/indexSearch.asp?ct=xmlKeywords&amp;q1=</cld:isAccessedVia>
</dcmitype:Collection>
<dcmitype:Collection>
  <dc:title>SOSIG</dc:title>
  <dc:identifier xsi:type="dcterms:URI">http://www.sosig.ac.uk/</dc:identifier>
  <dcterms:abstract>A free Web-based portal to Internet resources worldwide supporting learning and research. Search or browse the Internet
Catalogue for thousands of resources, hand-picked, described and classified by subject specialists. Undertake wider searches with the Social Science
Search Engine and find departments, courses, conferences and like-minded colleagues on the SOSIG Grapevine. My Account offers email updates, news
channels and publication of your research profile. SOSIG provides the Social Science, Business and Law hub for the RDN. Freely
available.</dcterms:abstract>
  <dc:creator>SOSIG, intute</dc:creator>
  <dc:type xsi:type="dcterms:DCMitype">Collection</dc:type>
  <dc:subject xsi:type="dcterms:DDC">300</dc:subject>
  <iesr:usesControlledList xsi:type="iesr:CtrlDVocabsList">APA</iesr:usesControlledList>
  <iesr:usesControlledList xsi:type="iesr:CtrlDVocabsList">CareData</iesr:usesControlledList>
  <iesr:usesControlledList xsi:type="iesr:CtrlDVocabsList">HASSET</iesr:usesControlledList>
```

```

        <iesr:usesControlledList xsi:type="iesr:CtrlVocabList">IBSS</iesr:usesControlledList>
        <iesr:usesControlledList xsi:type="iesr:CtrlVocabList">LIR</iesr:usesControlledList>
        <cld:isAccessedVia>http://www.sosig.ac.uk/roads/cgi-
bin/search.pl?attrib1=ANY&amp;amp;boolean=and&amp;amp;ranking=on&amp;amp;referrals=on&amp;amp;stemming=on&amp;amp;maxserver=8&amp;amp;method=any&amp;am
p;view=batched&amp;amp;bsize=10&amp;amp;categories=on&amp;amp;templatetype=all&amp;amp;highlight=on&amp;amp;database=SOSIG+ZPlugin&amp;amp;term1=</cld:
isAccessedVia>
</dcmitype:Collection>
<dcmitype:Collection>
    <dc:title>UK Data Archive</dc:title>
    <dc:identifier xsi:type="dcterms:URI">http://www.data-archive.ac.uk/</dc:identifier>
    <dcterms:abstract>Catalogue of social science data held by the Data Archive at the University of Essex, including the subject areas of
economics, education, employment and labour, environment, conservation and land use, government, leadership and elites, health, health services and
medical care, history, housing, industry and management, international systems, relationships and events, media, communication and language, political
behaviour and attitudes, population, vital statistics and censuses, psychology, reference and instructional, science and technology, social issues,
attitudes and behaviour, social structure and stratification, and travel and transport.</dcterms:abstract>
    <dc:creator>University of Essex</dc:creator>
    <dc:type xsi:type="dcterms:DCMIType">Collection</dc:type>
    <dc:subject xsi:type="dcterms:DDC">300</dc:subject>
    <iesr:usesControlledList xsi:type="iesr:CtrlVocabList">UNESCO</iesr:usesControlledList>
    <cld:isAccessedVia>http://www.data-archive.ac.uk/search/indexSearch.asp?ct=xmlKeywords&amp;amp;q1=</cld:isAccessedVia>
</dcmitype:Collection>
</metadata>
</item>
</return>
</nsl:get_collectionsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

### Collections returned for DDC number 000 (note that 'no hits' was the expected result for 000):

```

HTTP/1.1 200 OK
Connection: close
Date: Mon, 04 Dec 2006 14:53:18 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 616

```

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
  <SOAP-ENV:Body>
    <nsl:get_collectionsResponse xmlns:nsl="http://tempuri.org">
      <return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
        <item xsi:type="xsd:string">
          No match found
        </item>

```

```
</return>
</nsl:get_collectionsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

## Collections returned for DDC number 700:

```
HTTP/1.1 200 OK
Connection: close
Date: Mon, 04 Dec 2006 14:54:19 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 2611
```

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<nsl:get_collectionsResponse xmlns:nsl="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<metadata
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:dcterms="http://purl.org/dc/terms/"
xmlns:dcmitype="http://purl.org/dc/dcmitype/"
xmlns:iesr="http://iesr.ac.uk/terms/#usesControlledList"
xmlns:cld="http://purl.org/cld/terms/">
<dcmitype:Collection>
<dc:title>ADAM: Art, Design, Architecture and Media</dc:title>
<dc:identifier xsi:type="dcterms:URI">http://www.adam.ac.uk/</dc:identifier>
<dcterms:abstract>Information gateway to quality assured Internet resources for the general areas of art, design, architecture, and
media.</dcterms:abstract>
<dc:creator>Surrey Institute of Art and Design</dc:creator>
<dc:type xsi:type="dcterms:DCMIType">Collection</dc:type>
<dc:subject xsi:type="dcterms:DDC">700</dc:subject>
<iesr:usesControlledList xsi:type="iesr:CtrlVocabList">AAT</iesr:usesControlledList>
</dcmitype:Collection>
<dcmitype:Collection>
<dc:title>VADS: Visual Arts Data Service</dc:title>
<dc:identifier xsi:type="dcterms:URI">http://vads.ahds.ac.uk/</dc:identifier>
<dcterms:abstract>VADS provides the UK higher education community with access to digital research data appropriate for re-use, by building an
on-line archive of electronic resources created by and of use to the visual arts community. These resources will adhere to agreed standards of best
practice for the creation, management, preservation and access of electronic information.</dcterms:abstract>
<dc:creator>VADS, Surrey Institute of Art and Design University College</dc:creator>
<dc:type xsi:type="dcterms:DCMIType">Collection</dc:type>
```



```

        <dc:subject xsi:type="dcterms:DDC">700</dc:subject>
</dcmitype:Collection>
</metadata>
</item>
</return>
</nsl:get_collectionsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

Testing of truncation was also undertaken using additional DDC numbers. Given that there is knowledge of database content, results returned were checked against Table 3 (as detailed in 3.2). Tests using 620.2, 912.411 and 780.79422 were successful. Appropriate database content was retrieved and truncation was confirmed as functioning properly. Copies of the returned query results (wrapped in DC CD AP) are detailed below.

#### Collections returned using 620.2 employing truncation:

```

HTTP/1.1 200 OK
Connection: close
Date: Mon, 04 Dec 2006 14:56:53 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 2065

```

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<nsl:get_collectionsResponse xmlns:nsl="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<metadata
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:dcterms="http://purl.org/dc/terms/"
xmlns:dcmitype="http://purl.org/dc/dcmitype/"
xmlns:iesr="http://iesr.ac.uk/terms/#usesControlledList"
xmlns:cld="http://purl.org/cld/terms/">
<dcmitype:Collection>
<dc:title>EEVL</dc:title>
<dc:identifier xsi:type="dcterms:URI">http://www.eevl.ac.uk/</dc:identifier>
<dcterms:abstract>Provides quick and reliable access to the best engineering (including chemical and material engineering), mathematics, and
computing information available on the Internet. Services include an online catalogue of Internet resources that have been selected, evaluated and
classified by subject specialists. The resources include bibliographic, reference and research information, software and home pages of key

```

```

organisations. The EEVL service, one of the hubs of the RDN, also provides a number of additional information services, including targeted engineering
search engines and bibliographic databases. Freely available.</dcterms:abstract>
  <dc:creator>Heriot Watt University</dc:creator>
  <dc:type xsi:type="dcterms:DCMIType">Collection</dc:type>
  <dc:subject xsi:type="dcterms:DDC">620</dc:subject>
</dcmitype:Collection>
</metadata>
</item>
</return>
</nsl:get_collectionsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

### Collections returned using 912.411 employing truncation:

```

HTTP/1.1 200 OK
Connection: close
Date: Mon, 04 Dec 2006 14:45:50 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 2994

<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
  <SOAP-ENV:Body>
    <nsl:get_collectionsResponse xmlns:nsl="http://tempuri.org">
      <return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
        <item xsi:type="xsd:string">
          <metadata
            xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
            xmlns:dc="http://purl.org/dc/elements/1.1/"
            xmlns:dcterms="http://purl.org/dc/terms/"
            xmlns:dcmitype="http://purl.org/dc/dcmitype/"
            xmlns:iesr="http://iesr.ac.uk/terms/#usesControlledList"
            xmlns:cld="http://purl.org/cld/terms/">
            <dcmitype:Collection>
              <dc:title>Digimap</dc:title>
              <dc:identifier xsi:type="dcterms:URI">http://edina.ac.uk/digimap</dc:identifier>
              <dcterms:abstract>Project aiming to provide access to Ordnance Survey digital data as electronic maps, enabling users to produce paper copies
of the maps or download digital map data to a local computer. The experimental service is only available to registered users at six
institutions.</dcterms:abstract>
              <dc:creator>Edinburgh University</dc:creator>
              <dc:type xsi:type="dcterms:DCMIType">Collection</dc:type>
              <dc:subject xsi:type="dcterms:DDC">912.41</dc:subject>
            </dcmitype:Collection>

```

```

<dcmitype:Collection>
  <dc:title>BUBL LINK: Maps</dc:title>
  <dc:identifier xsi:type="dcterms:URI">http://bubl.ac.uk/link/</dc:identifier>
  <dcterms:abstract>Catalogue of selected Internet resources.</dcterms:abstract>
  <dc:creator>BUBL Information Service</dc:creator>
  <dc:type xsi:type="dcterms:DCMIType">Collection</dc:type>
  <dc:subject xsi:type="dcterms:DDC">912</dc:subject>
  <cld:isAccessedVia>http://hilt.cdlr.strath.ac.uk/bublsearch/bubl.cfm?queryString=</cld:isAccessedVia>
</dcmitype:Collection>
<dcmitype:Collection>
  <dc:title>BUBL LINK: Geography</dc:title>
  <dc:identifier xsi:type="dcterms:URI">http://bubl.ac.uk/link/</dc:identifier>
  <dcterms:abstract>Catalogue of selected Internet resources.</dcterms:abstract>
  <dc:creator>BUBL Information Service</dc:creator>
  <dc:type xsi:type="dcterms:DCMIType">Collection</dc:type>
  <dc:subject xsi:type="dcterms:DDC">910</dc:subject>
  <cld:isAccessedVia>http://hilt.cdlr.strath.ac.uk/bublsearch/bubl.cfm?queryString=</cld:isAccessedVia>
</dcmitype:Collection>
</metadata>
</item>
</return>
</nsl:get_collectionsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

### Collections returned using 780.79422 employing truncation:

```

HTTP/1.1 200 OK
Connection: close
Date: Mon, 04 Dec 2006 14:58:10 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 2460

```

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<nsl:get_collectionsResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<metadata
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:dcterms="http://purl.org/dc/terms/"
xmlns:dcmitype="http://purl.org/dc/dcmitype/"

```

```

xmlns:iesr="http://iesr.ac.uk/terms/#usesControlledList"
xmlns:cld="http://purl.org/cld/terms/"
<dcmitype:Collection>
  <dc:title>PATRON: Performing Arts Teaching Resources Online</dc:title>
  <dc:identifier xsi:type="dcterms:URI">http://www.lib.surrey.ac.uk/Patron/Patron.htm</dc:identifier>
  <dcterms:abstract>PATRON is a pilot project to develop a multimedia electronic library system to deliver on-demand digital audio, video,
scores and text in the areas of music and dance across high-speed broadband networks to the desktop. The project is driven by the need to improve
access to audio, video and scores in the library.</dcterms:abstract>
  <dc:creator>University of Surrey</dc:creator>
  <dc:type xsi:type="dcterms:DCMIType">Collection</dc:type>
  <dc:subject xsi:type="dcterms:DDC">780.7</dc:subject>
</dcmitype:Collection>
<dcmitype:Collection>
  <dc:title>BUBL LINK: Music</dc:title>
  <dc:identifier xsi:type="dcterms:URI">http://bubl.ac.uk/link/</dc:identifier>
  <dcterms:abstract>Catalogue of selected Internet resources.</dcterms:abstract>
  <dc:creator>BUBL Information Service</dc:creator>
  <dc:type xsi:type="dcterms:DCMIType">Collection</dc:type>
  <dc:subject xsi:type="dcterms:DDC">780</dc:subject>
  <cld:isAccessedVia>http://hilt.cdlr.strath.ac.uk/bublsearch/bubl.cfm?queryString=</cld:isAccessedVia>
</dcmitype:Collection>
</metadata>
</item>
</return>
</nsl:get_collectionsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

### 4.3 *get\_all\_records*

The SRW client sends a query to the SRW server. Testing uses five terms from different terminologies (as detailed in the supplementary methodology in 3.3). Those terms are as follows: *Environmental impacts* (GCMD), *Shore protection* (DDC), *Plant genetics* (HASSET), *Civil emergencies* (IPSV), *Land use site* (NMR). The code used by the client is as follows (note that connection information remains the same and has only been reproduced once):

```

my $conn = ZOOM::Connection->new("http://bodach.ucs.ed.ac.uk:18111/hilt",);
$conn->option(preferredRecordSyntax => "xml");

my $query = 'hilt.get_all_records= "environmental impacts"';
my $rs=$conn->search(new ZOOM::Query::CQL($query));

my $query = 'hilt.get_all_records= "shore protection"';
my $rs=$conn->search(new ZOOM::Query::CQL($query));

$query = 'hilt.get_all_records= "plant genetics"';
$rs=$conn->search(new ZOOM::Query::CQL($query));

$query = 'hilt.get_all_records= "civil emergencies"';

```

```
$rs=$conn->search(new ZOOM::Query::CQL($query));  
  
$query = 'hilt.get_all_records= "land use"';  
$rs=$conn->search(new ZOOM::Query::CQL($query));
```

The SRW server parses the client query to obtain the search values:

*See reproduction of this step in section 4.2.*

The SRW server uses the values obtained from parsing the query to call the appropriate SOAP server function:

*See reproduction of this step in section 4.2.*

Response from database to the SOAP server is returned to the SRW server wrapped in SKOS Core and using the SKOS MVS, and forwarded to the SRW client. Given that there is knowledge of database content, results returned were checked against Table 4 (as detailed in 3.3).

Tests using the selected terms were successful and appropriate database content was retrieved. Mapped terms from a number of schemes (as in Table 4, but also other schemes) were retrieved and verified as correct. Results were also wrapped correctly and contained the necessary supplementary information (e.g. DDC number, mapped terms with source scheme information, mapping match type, etc.). Copies of the returned query results (wrapped in SKOS Core and SKOS MVS) are detailed below.

Results returned for 'Environmental impacts' (GCMD):

```
HTTP/1.1 200 OK  
Connection: close  
Date: Wed, 06 Dec 2006 10:02:11 GMT  
Server: Microsoft-IIS/6.0  
X-Powered-By: PHP/5.1.4  
Server: NuSOAP Server v0.7.2  
X-SOAP-Server: NuSOAP/0.7.2 (1.95)  
Content-Type: text/xml; charset=ISO-8859-1  
Content-Length: 3843  
  
<?xml version="1.0" encoding="ISO-8859-1"?>  
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"  
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-  
ENC="http://schemas.xmlsoap.org/soap/encoding/">  
<SOAP-ENV:Body>  
<ns1:get_all_recordsResponse xmlns:ns1="http://tempuri.org">  
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">  
<item xsi:type="xsd:string">  
<rdf:RDF  
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"  
xmlns:skos="http://www.w3.org/2004/02/skos/core#"  
xmlns:map="http://www.w3.org/2004/02/skos/mapping#"  
xml:base="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/concepts.php">
```

```

<skos:Concept rdf:about="#363.73">
  <skos:prefLabel xml:lang="zxx">363.73</skos:prefLabel>
  <skos:altLabel xml:lang="en">Pollution</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>

  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85104530"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85104531"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85104532"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#2582"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#708"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#4794"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#1037"/>
  </map:exactMatch>
</skos:Concept>
<skos:Concept rdf:about="#sh 85104530">
  <skos:prefLabel xml:lang="en">Pollution</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 85104531">
  <skos:prefLabel xml:lang="en">Pollution--Economic aspects</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 85104532">
  <skos:prefLabel xml:lang="en">Pollution--Environmental aspects</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2582">
  <skos:prefLabel xml:lang="en">Pollution</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/UNESCO.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#708">
  <skos:prefLabel xml:lang="en">Environmental Impacts</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4794">
  <skos:prefLabel xml:lang="en">POLLUTION</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>

```

```

<skos:Concept rdf:about="#1037">
  <skos:prefLabel xml:lang="en">Pollution</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
</rdf:RDF>
</item>
</return>
</nsl:get_all_recordsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

## Results returned for 'Shore protection' (DDC):

```

HTTP/1.1 200 OK
Connection: close
Date: Wed, 06 Dec 2006 10:05:50 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 4609

```

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<nsl:get_all_recordsResponse xmlns:nsl="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xmlns:map="http://www.w3.org/2004/02/skos/mapping#"
xml:base="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/concepts.php">
<skos:Concept rdf:about="#627.58">
  <skos:prefLabel xml:lang="zxx">627.58</skos:prefLabel>
  <skos:altLabel xml:lang="en">Shore protection</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>

  <map:exactMatch>
    <skos:Concept rdf:about="#sh 99014448"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85027432"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85121794"/>
  </map:exactMatch>

```

```

    </map:exactMatch>
    <map:exactMatch>
      <skos:Concept rdf:about="#sh 99014447"/>
    </map:exactMatch>
    <map:exactMatch>
      <skos:Concept rdf:about="#556"/>
    </map:exactMatch>
    <map:exactMatch>
      <skos:Concept rdf:about="#1038"/>
    </map:exactMatch>
    <map:exactMatch>
      <skos:Concept rdf:about="#1122"/>
    </map:exactMatch>
    <map:exactMatch>
      <skos:Concept rdf:about="#7439"/>
    </map:exactMatch>
  </skos:Concept>
  <skos:Concept rdf:about="#sh 99014448">
    <skos:prefLabel xml:lang="en">Beach erosion--Monitoring</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#sh 85027432">
    <skos:prefLabel xml:lang="en">Coastal engineering</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#sh 85121794">
    <skos:prefLabel xml:lang="en">Shore protection</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#sh 99014447">
    <skos:prefLabel xml:lang="en">Shorelines--Monitoring</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#556">
    <skos:prefLabel xml:lang="en">Coastal protection</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/UNESCO.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#1038">
    <skos:prefLabel xml:lang="en">Erosion</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#1122">
    <skos:prefLabel xml:lang="en">COASTAL PROTECTION</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#7439">
    <skos:prefLabel xml:lang="en">Coastal erosion and protection</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#333.91716">
    <skos:prefLabel xml:lang="zxx">333.91716</skos:prefLabel>

```



```

    <skos:altLabel xml:lang="en">Shore protection, . . .</skos:altLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
</rdf:RDF>
</item>
</return>
</nsl:get_all_recordsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

### Results returned for 'Plant genetics' (HASSET):

```

HTTP/1.1 200 OK
Connection: close
Date: Wed, 06 Dec 2006 10:07:25 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 9541

```

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<nsl:get_all_recordsResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xmlns:map="http://www.w3.org/2004/02/skos/mapping#"
xml:base="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/concepts.php">
<skos:Concept rdf:about="#631.5233">
  <skos:prefLabel xml:lang="zxx">631.5233</skos:prefLabel>
  <skos:altLabel xml:lang="en">Agricultural genetics</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>

  <map:exactMatch>
    <skos:Concept rdf:about="#sh 99003210"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 96007794"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 87000678"/>
  </map:exactMatch>

```

```

    <map:exactMatch>
      <skos:Concept rdf:about="#sh 86003906"/>
    </map:exactMatch>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 00004757"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85102743"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85102780"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 90003137"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#81"/>
  </map:exactMatch>
</skos:Concept>
<skos:Concept rdf:about="#sh 99003210">
  <skos:prefLabel xml:lang="en">Agricultural genome mapping</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 96007794">
  <skos:prefLabel xml:lang="en">Clones (Plants)</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 87000678">
  <skos:prefLabel xml:lang="en">Crops--Genetic engineering</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 86003906">
  <skos:prefLabel xml:lang="en">Crops--Genetics</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 00004757">
  <skos:prefLabel xml:lang="en">Plant gene silencing</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 85102743">
  <skos:prefLabel xml:lang="en">Plant genetic engineering</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 85102780">
  <skos:prefLabel xml:lang="en">Plant mutation breeding</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 90003137">
  <skos:prefLabel xml:lang="en">Transgenic plants</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>

```

```

<skos:Concept rdf:about="#81">
  <skos:prefLabel xml:lang="en">Agricultural genetics</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/UNESCO.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#581.35">
  <skos:prefLabel xml:lang="zxx">581.35</skos:prefLabel>
  <skos:altLabel xml:lang="en">Genetics</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>

  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85102745"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85016002"/>
  </map:exactMatch>
</skos:Concept>
<skos:Concept rdf:about="#sh 85102745">
  <skos:prefLabel xml:lang="en">Plant genetics</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 85016002">
  <skos:prefLabel xml:lang="en">Plants--Variation</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#631.53">
  <skos:prefLabel xml:lang="zxx">631.53</skos:prefLabel>
  <skos:altLabel xml:lang="en">Plant propagation</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>

  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85102702"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85102705"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85102803"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85102780"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85102802"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 97003502"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#2539"/>
  </map:exactMatch>
</map:exactMatch>

```

```

        <skos:Concept rdf:about="#17"/>
    </map:exactMatch>
    <map:exactMatch>
        <skos:Concept rdf:about="#4712"/>
    </map:exactMatch>
</skos:Concept>
<skos:Concept rdf:about="#sh 85102702">
    <skos:prefLabel xml:lang="en">Plant breeding</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 85102705">
    <skos:prefLabel xml:lang="en">Plant cell culture</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 85102803">
    <skos:prefLabel xml:lang="en">Plant micropropagation</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 85102780">
    <skos:prefLabel xml:lang="en">Plant mutation breeding</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 85102802">
    <skos:prefLabel xml:lang="en">Plant propagation</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 97003502">
    <skos:prefLabel xml:lang="en">Vegetative propagation</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2539">
    <skos:prefLabel xml:lang="en">Plant genetics</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/UNESCO.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#17">
    <skos:prefLabel xml:lang="en">Plant Breeding and Genetics</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4712">
    <skos:prefLabel xml:lang="en">PLANT GENETICS</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
</rdf:RDF>
</item>
</return>
</nsl:get_all_recordsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

Results returned for 'Civil emergencies' (IPSV):

HTTP/1.1 200 OK  
Connection: close  
Date: Wed, 06 Dec 2006 10:11:27 GMT  
Server: Microsoft-IIS/6.0  
X-Powered-By: PHP/5.1.4  
Server: NuSOAP Server v0.7.2  
X-SOAP-Server: NuSOAP/0.7.2 (1.95)  
Content-Type: text/xml; charset=ISO-8859-1  
Content-Length: 3858

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<ns1:get_all_recordsResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xmlns:map="http://www.w3.org/2004/02/skos/mapping#"
xml:base="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/concepts.php">
<skos:Concept rdf:about="#363.34">
  <skos:prefLabel xml:lang="zxx">363.34</skos:prefLabel>
  <skos:altLabel xml:lang="en">Disasters</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>

  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85038303"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 91000441"/>
  </map:exactMatch>
  <map:narrowMatch>
    <skos:Concept rdf:about="#sh 85090214"/>
  </map:narrowMatch>
  <map:narrowMatch>
    <skos:Concept rdf:about="#2256"/>
  </map:narrowMatch>
  <map:narrowMatch>
    <skos:Concept rdf:about="#762"/>
  </map:narrowMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#2696"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#143"/>
  </map:exactMatch>
</item>
</return>
</ns1:get_all_recordsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

```

</skos:Concept>
<skos:Concept rdf:about="#sh 85038303">
  <skos:prefLabel xml:lang="en">Disasters</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 91000441">
  <skos:prefLabel xml:lang="en">Emergency management</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 85090214">
  <skos:prefLabel xml:lang="en">Natural disasters</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2256">
  <skos:prefLabel xml:lang="en">Natural disasters</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/UNESCO.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#762">
  <skos:prefLabel xml:lang="en">Natural Hazards</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2696">
  <skos:prefLabel xml:lang="en">HAZARDS, ACCIDENTS AND DISASTERS</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#143">
  <skos:prefLabel xml:lang="en">Civil emergencies</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
</rdf:RDF>
</item>
</return>
</nsl:get_all_recordsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

#### 4.4 *get\_ddc\_records*

The SRW client sends a query to the SRW server. Tests use the same five terms to assess the functionality of *get\_all\_records*. These terms belong to different terminologies (as detailed in the supplementary methodology in 3.3) and are as follows: *Environmental impacts* (GCMD), *Shore protection* (DDC), *Plant genetics* (HASSET), *Civil emergencies* (IPSV), *Land use* (NMR). The code used by the client is as follows (note that connection information remains the same and has only been reproduced once):

```

my $conn = ZOOM::Connection->new("http://bodach.ucs.ed.ac.uk:18111/hilt",);
$conn->option(preferredRecordSyntax => "xml");

my $query = 'hilt.get_ddc_records= "environmental impacts"';
my $rs=$conn->search(new ZOOM::Query::CQL($query));

```

```

my $query = 'hilt.get_ddc_records= "shore protection"';
my $rs=$conn->search(new ZOOM::Query::CQL($query));

$query = 'hilt.get_ddc_records= "plant genetics"';
$rs=$conn->search(new ZOOM::Query::CQL($query));

$query = 'hilt.get_ddc_records= "civil emergencies"';
$rs=$conn->search(new ZOOM::Query::CQL($query));

$query = 'hilt.get_ddc_records= "land use"';
$rs=$conn->search(new ZOOM::Query::CQL($query));

```

The SRW server parses the client query to obtain the search values:

*See reproduction of this step in section 4.2.*

The SRW server uses the values obtained from parsing the query to call the appropriate SOAP server function:

*See reproduction of this step in section 4.2.*

Response from the database to the SOAP server is returned to the SRW server wrapped in SKOS Core and forwarded to the SRW client. Given that there is knowledge of database content and DDC numbers to which terms from different terminologies are mapped, results from the query were checked against Table 4 (as detailed in 3.3).

Tests using the selected terms were successful and appropriate results were retrieved. Results returned in response to any term entered (DDC number(s) with associated caption(s)) were verified as correct. Results were also wrapped correctly (in SKOS Core). Copies of the returned query results are detailed below.

Results returned 'Environmental impacts' (GCMD):

```

HTTP/1.1 200 OK
Connection: close
Date: Wed, 06 Dec 2006 10:17:06 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 1165

```

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<ns1:get_ddc_recordsResponse xmlns:ns1="http://tempuri.org">

```

```

<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xml:base="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/concepts.php">

<skos:ConceptScheme rdf:about="http://hiltm2m.cdrl.strath.ac.uk/schemes/DDC.xml"/>

<skos:Concept rdf:about="#363.73">
    <skos:prefLabel xml:lang="zxx">363.73</skos:prefLabel>
    <skos:altLabel xml:lang="en">Pollution</skos:altLabel>
</skos:Concept>
</rdf:RDF>
</item>
</return>
</nsl:get_ddc_recordsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

### Results returned for 'Shore protection' (DDC):

```

HTTP/1.1 200 OK
Connection: close
Date: Wed, 06 Dec 2006 10:17:36 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 1421

```

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<nsl:get_ddc_recordsResponse xmlns:nsl="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xml:base="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/concepts.php">

<skos:ConceptScheme rdf:about="http://hiltm2m.cdrl.strath.ac.uk/schemes/DDC.xml"/>

<skos:Concept rdf:about="#627.58">
    <skos:prefLabel xml:lang="zxx">627.58</skos:prefLabel>
    <skos:altLabel xml:lang="en">Shore protection</skos:altLabel>

```



```

</skos:Concept>
<skos:Concept rdf:about="#333.91716">
  <skos:prefLabel xml:lang="zxx">333.91716</skos:prefLabel>
  <skos:altLabel xml:lang="en">Shore protection, . . .</skos:altLabel>
</skos:Concept>
</rdf:RDF>
</item>
</return>
</ns1:get_ddc_recordsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

### Results returned for 'Plant genetics' (HASSET):

```

HTTP/1.1 200 OK
Connection: close
Date: Wed, 06 Dec 2006 10:18:06 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 1646

```

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<ns1:get_ddc_recordsResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xml:base="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/concepts.php">
<skos:ConceptScheme rdf:about="http://hiltm2m.cdrl.strath.ac.uk/schemes/DDC.xml"/>
<skos:Concept rdf:about="#631.5233">
  <skos:prefLabel xml:lang="zxx">631.5233</skos:prefLabel>
  <skos:altLabel xml:lang="en">Agricultural genetics</skos:altLabel>
</skos:Concept>
<skos:Concept rdf:about="#581.35">
  <skos:prefLabel xml:lang="zxx">581.35</skos:prefLabel>
  <skos:altLabel xml:lang="en">Genetics</skos:altLabel>
</skos:Concept>
<skos:Concept rdf:about="#631.53">
  <skos:prefLabel xml:lang="zxx">631.53</skos:prefLabel>
  <skos:altLabel xml:lang="en">Plant propagation</skos:altLabel>

```

```
</skos:Concept>
</rdf:RDF>
</item>
</return>
</ns1:get_ddc_recordsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

### Results returned for 'Civil emergencies' (IPSV):

```
HTTP/1.1 200 OK
Connection: close
Date: Wed, 06 Dec 2006 10:18:30 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 1165
```

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<ns1:get_ddc_recordsResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xml:base="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/concepts.php">
<skos:ConceptScheme rdf:about="http://hiltm2m.cdrl.strath.ac.uk/schemes/DDC.xml"/>
<skos:Concept rdf:about="#363.34">
<skos:prefLabel xml:lang="zxx">363.34</skos:prefLabel>
<skos:altLabel xml:lang="en">Disasters</skos:altLabel>
</skos:Concept>
</rdf:RDF>
</item>
</return>
</ns1:get_ddc_recordsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

### Results returned for 'Land use site' (NMR):

```
HTTP/1.1 200 OK
```

```

Connection: close
Date: Wed, 06 Dec 2006 10:18:49 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 1178

```

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<ns1:get_ddc_recordsResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xml:base="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/concepts.php">
<skos:ConceptScheme rdf:about="http://hiltm2m.cdrl.strath.ac.uk/schemes/DDC.xml"/>
<skos:Concept rdf:about="#333">
<skos:prefLabel xml:lang="zxx">333</skos:prefLabel>
<skos:altLabel xml:lang="en">Economics of land and energy</skos:altLabel>
</skos:Concept>
</rdf:RDF>
</item>
</return>
</ns1:get_ddc_recordsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

## 4.5 *get\_non\_ddc\_records*

The SRW client sends a query to the SRW server. Our test uses DDC numbers 363.73, 627.58, 363.34, 333, as detailed in Table 4. Since the code used to execute this query remains constant irrespective of the number input, this code has only been provided once. The code below details a query for 363.73:

```

my $conn = ZOOM::Connection->new("http://bodach.ucs.ed.ac.uk:18111/hilt",);
$conn->option(preferredRecordSyntax => "xml");
my $query ='hilt.get_non_ddc_records=363.73';
my $rs=$conn->search(new ZOOM::Query::CQL($query));

```

The SRW server parses the client query to obtain the search values:

*See reproduction of this step in section 4.2.*

The SRW server uses the values obtained from parsing the query to call the appropriate SOAP server function:

*See reproduction of this step in section 4.2.*

Response from the database to the SOAP server is returned to the SRW server wrapped in SKOS Core and SKOS MVS, and forwarded to the SRW client. Since there is knowledge of database content and which terms from terminologies are mapped to the input DDC numbers, results from the query were checked against Table 4 (as detailed in 3.3).

Tests using the selected numbers were successful and appropriate results were retrieved. Results returned in response to any DDC number entered were verified as correct. Results included the initial DDC number input (and associated caption) and details of non-DDC mappings, as provided in Table 4. Results were also wrapped correctly (in SKOS Core and SKOS MVS). Copies of the returned query results are detailed below.

Results returned for DDC 363.73:

```
HTTP/1.1 200 OK
Connection: close
Date: Wed, 06 Dec 2006 10:24:43 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 3851
```

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<ns1:get_non_ddc_recordsResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xmlns:map="http://www.w3.org/2004/02/skos/mapping#"
xml:base="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/concepts.php">
<skos:Concept rdf:about="#363.73">
<skos:prefLabel xml:lang="zxx">363.73</skos:prefLabel>
<skos:altLabel xml:lang="en">Pollution</skos:altLabel>
<skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
```

```

    <map:exactMatch>
      <skos:Concept rdf:about="#sh 85104530"/>
    </map:exactMatch>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85104531"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85104532"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#2582"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#708"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#4794"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#1037"/>
  </map:exactMatch>
</skos:Concept>
<skos:Concept rdf:about="#sh 85104530">
  <skos:prefLabel xml:lang="en">Pollution</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 85104531">
  <skos:prefLabel xml:lang="en">Pollution--Economic aspects</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 85104532">
  <skos:prefLabel xml:lang="en">Pollution--Environmental aspects</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2582">
  <skos:prefLabel xml:lang="en">Pollution</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/UNESCO.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#708">
  <skos:prefLabel xml:lang="en">Environmental Impacts</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4794">
  <skos:prefLabel xml:lang="en">POLLUTION</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#1037">
  <skos:prefLabel xml:lang="en">Pollution</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
</rdf:RDF>

```

```
</item>
</return>
</nsl:get_non_ddc_recordsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

## Results returned for DDC 627.58:

```
HTTP/1.1 200 OK
Connection: close
Date: Wed, 06 Dec 2006 10:25:13 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 4261
```

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<nsl:get_non_ddc_recordsResponse xmlns:nsl="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xmlns:map="http://www.w3.org/2004/02/skos/mapping#"
xml:base="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/concepts.php">
<skos:Concept rdf:about="#627.58">
  <skos:prefLabel xml:lang="zxx">627.58</skos:prefLabel>
  <skos:altLabel xml:lang="en">Shore protection</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>

  <map:exactMatch>
    <skos:Concept rdf:about="#sh 99014448"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85027432"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 85121794"/>
  </map:exactMatch>
  <map:exactMatch>
    <skos:Concept rdf:about="#sh 99014447"/>
  </map:exactMatch>
</map:exactMatch>
</skos:Concept>
</item>
</return>
</nsl:get_non_ddc_recordsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

```

        <skos:Concept rdf:about="#556"/>
    </map:exactMatch>
    <map:exactMatch>
        <skos:Concept rdf:about="#1038"/>
    </map:exactMatch>
    <map:exactMatch>
        <skos:Concept rdf:about="#1122"/>
    </map:exactMatch>
    <map:exactMatch>
        <skos:Concept rdf:about="#7439"/>
    </map:exactMatch>
</skos:Concept>
<skos:Concept rdf:about="#sh 99014448">
    <skos:prefLabel xml:lang="en">Beach erosion--Monitoring</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 85027432">
    <skos:prefLabel xml:lang="en">Coastal engineering</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 85121794">
    <skos:prefLabel xml:lang="en">Shore protection</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 99014447">
    <skos:prefLabel xml:lang="en">Shorelines--Monitoring</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#556">
    <skos:prefLabel xml:lang="en">Coastal protection</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/UNESCO.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#1038">
    <skos:prefLabel xml:lang="en">Erosion</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#1122">
    <skos:prefLabel xml:lang="en">COASTAL PROTECTION</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#7439">
    <skos:prefLabel xml:lang="en">Coastal erosion and protection</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
</rdf:RDF>
</item>
</return>
</nsl:get_non_ddc_recordsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

## Results returned for DDC 631.53:

```
HTTP/1.1 200 OK
Connection: close
Date: Wed, 06 Dec 2006 10:26:09 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 4654
```

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<ns1:get_non_ddc_recordsResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xmlns:map="http://www.w3.org/2004/02/skos/mapping#"
xml:base="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/concepts.php">
<skos:Concept rdf:about="#631.53">
<skos:prefLabel xml:lang="zxx">631.53</skos:prefLabel>
<skos:altLabel xml:lang="en">Plant propagation</skos:altLabel>
<skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>

<map:exactMatch>
<skos:Concept rdf:about="#sh 85102702"/>
</map:exactMatch>
<map:exactMatch>
<skos:Concept rdf:about="#sh 85102705"/>
</map:exactMatch>
<map:exactMatch>
<skos:Concept rdf:about="#sh 85102803"/>
</map:exactMatch>
<map:exactMatch>
<skos:Concept rdf:about="#sh 85102780"/>
</map:exactMatch>
<map:exactMatch>
<skos:Concept rdf:about="#sh 85102802"/>
</map:exactMatch>
<map:exactMatch>
<skos:Concept rdf:about="#sh 97003502"/>
</map:exactMatch>
```



```

    <map:exactMatch>
      <skos:Concept rdf:about="#2539"/>
    </map:exactMatch>
    <map:exactMatch>
      <skos:Concept rdf:about="#17"/>
    </map:exactMatch>
    <map:exactMatch>
      <skos:Concept rdf:about="#4712"/>
    </map:exactMatch>
  </skos:Concept>
  <skos:Concept rdf:about="#sh 85102702">
    <skos:prefLabel xml:lang="en">Plant breeding</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#sh 85102705">
    <skos:prefLabel xml:lang="en">Plant cell culture</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#sh 85102803">
    <skos:prefLabel xml:lang="en">Plant micropropagation</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#sh 85102780">
    <skos:prefLabel xml:lang="en">Plant mutation breeding</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#sh 85102802">
    <skos:prefLabel xml:lang="en">Plant propagation</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#sh 97003502">
    <skos:prefLabel xml:lang="en">Vegetative propagation</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#2539">
    <skos:prefLabel xml:lang="en">Plant genetics</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/UNESCO.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#17">
    <skos:prefLabel xml:lang="en">Plant Breeding and Genetics</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
  </skos:Concept>
  <skos:Concept rdf:about="#4712">
    <skos:prefLabel xml:lang="en">PLANT GENETICS</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
  </skos:Concept>
</rdf:RDF>
</item>
</return>
</nsl:get_non_ddc_recordsResponse>
</SOAP-ENV:Body>

```

```
</SOAP-ENV:Envelope>
```

## Results returned for DDC 363.34:

```
HTTP/1.1 200 OK
Connection: close
Date: Wed, 06 Dec 2006 10:26:43 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 3866
```

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<ns1:get_non_ddc_recordsResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xmlns:map="http://www.w3.org/2004/02/skos/mapping#"
xml:base="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/concepts.php">
<skos:Concept rdf:about="#363.34">
<skos:prefLabel xml:lang="zxx">363.34</skos:prefLabel>
<skos:altLabel xml:lang="en">Disasters</skos:altLabel>
<skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>

<map:exactMatch>
<skos:Concept rdf:about="#sh 85038303"/>
</map:exactMatch>
<map:exactMatch>
<skos:Concept rdf:about="#sh 91000441"/>
</map:exactMatch>
<map:narrowMatch>
<skos:Concept rdf:about="#sh 85090214"/>
</map:narrowMatch>
<map:narrowMatch>
<skos:Concept rdf:about="#2256"/>
</map:narrowMatch>
<map:narrowMatch>
<skos:Concept rdf:about="#762"/>
</map:narrowMatch>
<map:exactMatch>
<skos:Concept rdf:about="#2696"/>
</map:exactMatch>
```

```

        </map:exactMatch>
        <map:exactMatch>
            <skos:Concept rdf:about="#143"/>
        </map:exactMatch>
    </skos:Concept>
    <skos:Concept rdf:about="#sh 85038303">
        <skos:prefLabel xml:lang="en">Disasters</skos:prefLabel>
        <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
    </skos:Concept>
    <skos:Concept rdf:about="#sh 91000441">
        <skos:prefLabel xml:lang="en">Emergency management</skos:prefLabel>
        <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
    </skos:Concept>
    <skos:Concept rdf:about="#sh 85090214">
        <skos:prefLabel xml:lang="en">Natural disasters</skos:prefLabel>
        <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
    </skos:Concept>
    <skos:Concept rdf:about="#2256">
        <skos:prefLabel xml:lang="en">Natural disasters</skos:prefLabel>
        <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/UNESCO.xml"/>
    </skos:Concept>
    <skos:Concept rdf:about="#762">
        <skos:prefLabel xml:lang="en">Natural Hazards</skos:prefLabel>
        <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
    </skos:Concept>
    <skos:Concept rdf:about="#2696">
        <skos:prefLabel xml:lang="en">HAZARDS, ACCIDENTS AND DISASTERS</skos:prefLabel>
        <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
    </skos:Concept>
    <skos:Concept rdf:about="#143">
        <skos:prefLabel xml:lang="en">Civil emergencies</skos:prefLabel>
        <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
    </skos:Concept>
</rdf:RDF>
</item>
</return>
</nsl:get_non_ddc_recordsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

### Results returned for DDC 333:

```

HTTP/1.1 200 OK
Connection: close
Date: Wed, 06 Dec 2006 10:27:12 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1

```

Content-Length: 3849

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<ns1:get_non_ddc_recordsResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xmlns:map="http://www.w3.org/2004/02/skos/mapping#"
xml:base="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/concepts.php">
<skos:Concept rdf:about="#333">
<skos:prefLabel xml:lang="zxx">333</skos:prefLabel>
<skos:altLabel xml:lang="en">Economics of land and energy</skos:altLabel>
<skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>

<map:narrowMatch>
<skos:Concept rdf:about="#sh 85074345"/>
</map:narrowMatch>
<map:exactMatch>
<skos:Concept rdf:about="#sh 85090254"/>
</map:exactMatch>
<map:exactMatch>
<skos:Concept rdf:about="#1838"/>
</map:exactMatch>
<map:narrowMatch>
<skos:Concept rdf:about="#757"/>
</map:narrowMatch>
<map:narrowMatch>
<skos:Concept rdf:about="#3387"/>
</map:narrowMatch>
<map:narrowMatch>
<skos:Concept rdf:about="#1152"/>
</map:narrowMatch>
<map:exactMatch>
<skos:Concept rdf:about="#92443"/>
</map:exactMatch>
</skos:Concept>
<skos:Concept rdf:about="#sh 85074345">
<skos:prefLabel xml:lang="en">Land use</skos:prefLabel>
<skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#sh 85090254">
<skos:prefLabel xml:lang="en">Natural resources</skos:prefLabel>
<skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/LCSH.xml"/>
</skos:Concept>
```

```

<skos:Concept rdf:about="#1838">
  <skos:prefLabel xml:lang="en">Land economics</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/UNESCO.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#757">
  <skos:prefLabel xml:lang="en">Land Use/Land Cover</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#3387">
  <skos:prefLabel xml:lang="en">LAND USE</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#1152">
  <skos:prefLabel xml:lang="en">Planning (town and country)</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#92443">
  <skos:prefLabel xml:lang="en">LAND USE SITE</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/NMR.xml"/>
</skos:Concept>
</rdf:RDF>
</item>
</return>
</nsl:get_non_ddc_recordsResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

## 4.6 *get\_filtered\_set*

The SRW client sends a query to the SRW server. Recall that the system tests for `get_filtered_set` were divided into three distinct sections (general filtered set test, multiple scheme selection, and filtering searches by preferred and non-preferred terms). Testing for 'general filtered set' uses five terms from different terminologies (as detailed in the supplementary methodology in 3.6), each of which were searched for in turn. Terms are: *Economics of land and energy* (DDC), *Land use/Land cover* (GCMD), *Land use* (HASSET), *Planning (town and country)* (IPSV). The code used by the client alter slightly depending on the parameters selected and has therefore been reproduced for each search.

'Economics of land and energy' (DDC), with filter set to DDC:

```

my $conn = ZOOM::Connection->new("http://bodach.ucs.ed.ac.uk:18111/hilt",);
$conn->option(preferredRecordSyntax => "xml");

my $query = 'hilt.scheme = DDC and hilt.get_filtered_set = "Economics of land and energy"';

my $rs=$conn->search(new ZOOM::Query::CQL($query));

```

'Land use/Land cover (GCMD), with filter set to GCMD:

```

my $conn = ZOOM::Connection->new("http://bodach.ucs.ed.ac.uk:18111/hilt",);
$conn->option(preferredRecordSyntax => "xml");

my $query = 'hilt.scheme = GCMD and hilt.get_filtered_set = "land use/land cover"';
$rs=$conn->search(new ZOOM::Query::CQL($query));

```

#### 'Land use' (HASSET), with filter set to HASSET:

```

my $conn = ZOOM::Connection->new("http://bodach.ucs.ed.ac.uk:18111/hilt",);
$conn->option(preferredRecordSyntax => "xml");

my $query = 'hilt.scheme = HASSET and hilt.get_filtered_set = "land use"';
$rs=$conn->search(new ZOOM::Query::CQL($query));

```

#### 'Planning (town and country)', with filter set to IPSV:

```

my $conn = ZOOM::Connection->new("http://bodach.ucs.ed.ac.uk:18111/hilt",);
$conn->option(preferredRecordSyntax => "xml");

my $query = 'hilt.scheme = NMR and hilt.get_filtered_set = "planning(town and country)"';
$rs=$conn->search(new ZOOM::Query::CQL($query));

```

#### The SRW server parses the client query to obtain the search values:

```

use HILT::CQL::Parser;
use HILT::Client::SOAP;

my @obj_fields = qw(cql client);
our $functions;
our $parameters;
our $parameter_defaults;
our @parameter_list;
our $serverChoice;
our $AUTOLOAD;

# set the $parameter_list to be all those listed in $parameters values.
BEGIN {
    $functions = [ @HILT::Client::SOAP::METHODS ];
    $parameters = {
        %HILT::Client::SOAP::PARAMS
    };
    $parameter_defaults = {
        %HILT::Client::SOAP::PARAM_DEFAULTS
    };
    my %tmp_hash = ();
    for my $key (keys(%$parameters)) {
        my @list = @{$parameters->{$key}};
        @tmp_hash{@list} = (1) x @list;
    }
}

```

```

    }
    @parameter_list = keys(%tmp_hash);
    $serverChoice = "get_all_records";
}

# ...
sub translate {
    my ($self, %hash) = @_;
    my $cql = $hash{cql}||$self->cql();
    my $client = $hash{client}||$self->client();

    my $parser = HILT::CQL::Parser->new();
    my ($qualifiers,$terms,$operators) = $parser->parse($cql);

    my @results = ();

    my %given_params = ();
    @given_params{@parameter_list} = map([],@parameter_list);
    my @calls = ();

    for (my $i = 0; $i <= $#{@qualifiers}; $i++) {
        my $qualifier = $qualifiers->[$i];
        my $term = $terms->[$i];

        my $namespace = "hilt";
        my $function = $serverChoice;
        if ($qualifier =~ m/(.*)\.(.*)/) {
            $namespace = $1;
            $function = $2;
        } else {
            $function = $qualifier;
        }

        if ($namespace eq "srw" and $qualifier eq "serverChoice") {
            $namespace = "hilt";
            $qualifier = $serverChoice;
        }

        if ($namespace eq "hilt") {
            #gather parameters
            if (grep ($function eq $_,@parameter_list)) {
                push(@{$given_params{$function}},$term);
            } else {
                # gather function calls
                push(@calls,[$function,$term]);
            }
        }
    }
}

```

```

for my $pair (@calls) {
    my ($function,$term) = @$pair;
    my $result;
    if (exists($parameters->{$function})) {
        my @set_params = @{$parameters->{$function}};
        my %hash = (shift(@set_params) => $term);
        for my $param (@set_params) {
            my $default = $HILT::Client::SOAP::PARAM_DEFAULTS{$param};
            my $given = $given_params{$param};
            if (ref($given) eq "ARRAY" and $#{@$given} >= 0) {
# $given is always an array ref, but it a scalar might be needed.
                if (ref($default) eq ref($given)) {
                    $hash{$param} = $given;
                } else {
                    $hash{$param} = @$given[0];
                }
            } else {
                $hash{$param} = $default;
            }
        }
        $result = $client->{$function}(%hash);
    } else {
        $result = $client->{$function}($term);
    }

    if ($result =~ m/<.*>/) {
        push(@results,$result);
    } else {
        warn("SOAP RESPONSE: $result\n");
    }
}

return @results;
}
# ...

```

The SRW server uses the values obtained from parsing the query to call the appropriate SOAP server function:

```

# ...
use vars(qw($AUTOLOAD $PACKAGE $URI $PROXY $AUTOTYPE $READABLE @SCHEMES
@METHODS %PARAMS %PARAM_DEFAULTS %PARAM_SEP));

@METHODS = qw(
    get_collections
    get_all_records
    get_DDC_records
    get_non_DDC_records
    get_filtered_set
    get_parents
    get_children

```



```

        explain
    );
@SCHEMES = qw(AAT DDC GCMD HASSET IPSV LCSH MeSH NMR SPEIR UNESCO);
# All params for the following methods should be set for a SOAP call.
# If they are not set from the PARAM_DEFAULTS then they are mandatory
for the client to set.
# The first parameter is the CQL "term" (or equivalent).
%PARAMS = (
    get_filtered_set => [ qw(term scheme preferred related non_preferred
is_id) ],
    get_children => [ qw(id scheme) ],
    get_parents => [ qw(id scheme) ],
);
%PARAM_DEFAULTS = (
    scheme => [@SCHEMES],
    preferred => "true",
    related => "true",
    non_preferred => "true",
    is_id => "false",
);
%PARAM_SEP = (_default=>":");

$PACKAGE = '';
$URI      = "http://tempuri.org/\$PACKAGE";
$PROXY    = "http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/soapserver.php";

# ...
# this AUTOLOAD sub deals with most of the SOAP calls.
# to add a new one, add to the @METHODS list above.
sub AUTOLOAD {
    my $self = shift;
    my ($class, $method) = ($AUTOLOAD =~ m/(.*::)?(\w+)/);
    $class =~ s/::$/;

    die("$method not defined for $class") unless grep($_ eq $method,
@METHODS);

    my @soapArgs;
    # deal with methods that require parameters
    if (exists($PARAMS{$method})) {
        my %hash = @_;
        if ($hash{args}) {
            @soapArgs = @{$hash{args}};
        } else {
            @soapArgs = ();
        }
        for my $param_name (@{$PARAMS{$method}}) {
            my $param_val = defined($hash{$param_name})?
                $hash{$param_name}:$PARAM_DEFAULTS{$param_name};

            die("must pass '$param_name' parameter to $method()") unless
defined($param_val);
        }
    }
}

```

```

        # deal with array refs passed in
        if (ref($param_val) eq "ARRAY") {
            my $sep = defined($PARAM_SEP{$param_name})?
                $PARAM_SEP{$param_name}:$PARAM_SEP{_default};
            $param_val = join($sep,@$param_val);
            warn("param_val=$param_val\n");
        }
        push(@soapArgs,$param_val);
    }
}
} else {
    @soapArgs = @_
}

$self->som($self->soap()->${method})(@soapArgs);
return ($self->result_as_xml());
}
# ...

```

Response from database to the SOAP server is returned to the SRW server wrapped in SKOS Core and forwarded to the SRW client. Results returned were checked against Table 5 (as detailed in 3.6) for appropriate broader and narrower terms, related terms and non-preferred terms (where applicable). Tests using the selected terms were successful and appropriate database content was retrieved. Results were also wrapped correctly. Copies of the returned query results (wrapped in SKOS Core) are detailed below.

Search for 'Economics of land and energy' (DDC):

```

HTTP/1.1 200 OK
Connection: close
Date: Wed, 06 Dec 2006 10:48:51 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 4050

```

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<ns1:get_filtered_setResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xml:base="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/concepts.php">

```

```

<skos:Concept rdf:about="#333">
  <skos:prefLabel xml:lang="zxx">333</skos:prefLabel>
  <skos:altLabel xml:lang="en">Economics of land and energy</skos:altLabel>
  <skos:broader rdf:resource="#331-333"/>
  <skos:narrower rdf:resource="#333.001"/>
  <skos:narrower rdf:resource="#333.002-.009"/>
  <skos:narrower rdf:resource="#333.01"/>
  <skos:narrower rdf:resource="#333.08"/>
  <skos:narrower rdf:resource="#333.1-.5"/>
  <skos:narrower rdf:resource="#333.7-.9"/>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#331-333">
  <skos:prefLabel xml:lang="zxx">331-333</skos:prefLabel>
  <skos:altLabel xml:lang="en">Economics of labor, finance, land, energy</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#333.001">
  <skos:prefLabel xml:lang="zxx">333.001</skos:prefLabel>
  <skos:altLabel xml:lang="en">Philosophy and theory</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#333.002-.009">
  <skos:prefLabel xml:lang="zxx">333.002-.009</skos:prefLabel>
  <skos:altLabel xml:lang="en">Standard subdivisions</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#333.01">
  <skos:prefLabel xml:lang="zxx">333.01</skos:prefLabel>
  <skos:altLabel xml:lang="en">Theories</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#333.08">
  <skos:prefLabel xml:lang="zxx">333.08</skos:prefLabel>
  <skos:altLabel xml:lang="en">Land surveys</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#333.1-.5">
  <skos:prefLabel xml:lang="zxx">333.1-.5</skos:prefLabel>
  <skos:altLabel xml:lang="en">Ownership of land</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#333.7-.9">
  <skos:prefLabel xml:lang="zxx">333.7-.9</skos:prefLabel>
  <skos:altLabel xml:lang="en">Natural resources and energy</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
</rdf:RDF>
</item>
</return>

```

```
</nsl:get_filtered_setResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

## Search for 'Land use/Land cover' (GCMD):

```
HTTP/1.1 200 OK
Connection: close
Date: Wed, 06 Dec 2006 10:49:55 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 4215
```

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<nsl:get_filtered_setResponse xmlns:nsl="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xml:base="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/concepts.php">
<skos:Concept rdf:about="#757">
<skos:prefLabel xml:lang="en">Land Use/Land Cover</skos:prefLabel>
<skos:broader rdf:resource="#695"/>
<skos:narrower rdf:resource="#759"/>
<skos:narrower rdf:resource="#760"/>
<skos:narrower rdf:resource="#761"/>
<skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#930">
<skos:prefLabel xml:lang="en">Land Use/Land Cover</skos:prefLabel>
<skos:broader rdf:resource="#888"/>
<skos:narrower rdf:resource="#932"/>
<skos:narrower rdf:resource="#933"/>
<skos:narrower rdf:resource="#934"/>
<skos:narrower rdf:resource="#935"/>
<skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#695">
<skos:prefLabel xml:lang="en">Human Dimensions</skos:prefLabel>
<skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
```

```

<skos:Concept rdf:about="#759">
  <skos:prefLabel xml:lang="en">Land Management</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#760">
  <skos:prefLabel xml:lang="en">Land Tenure</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#761">
  <skos:prefLabel xml:lang="en">Land Use Classes</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#888">
  <skos:prefLabel xml:lang="en">Land Surface</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#932">
  <skos:prefLabel xml:lang="en">Land Cover</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#933">
  <skos:prefLabel xml:lang="en">Land Productivity</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#934">
  <skos:prefLabel xml:lang="en">Land Resources</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#935">
  <skos:prefLabel xml:lang="en">Land Use Classes</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
</rdf:RDF>
</item>
</return>
</nsl:get_filtered_setResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

## Search for 'Land use' (HASSET):

```

HTTP/1.1 200 OK
Connection: close
Date: Wed, 06 Dec 2006 10:55:48 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 94422

```

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<ns1:get_filtered_setResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xml:base="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/concepts.php">

/*RESULT TRUNCATED */

<skos:Concept rdf:about="#3387">
  <skos:prefLabel xml:lang="en">LAND USE</skos:prefLabel>
  <skos:broader rdf:resource="#3373"/>
  <skos:related rdf:resource="#106"/>
  <skos:related rdf:resource="#2044"/>
  <skos:related rdf:resource="#3377"/>
  <skos:related rdf:resource="#3383"/>
  <skos:related rdf:resource="#3386"/>
  <skos:related rdf:resource="#4985"/>
  <skos:altLabel xml:lang="en">IDLE LAND</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>

/*RESULT TRUNCATED */

<skos:Concept rdf:about="#3377">
  <skos:prefLabel xml:lang="en">LAND ECONOMICS</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#3383">
  <skos:prefLabel xml:lang="en">LAND RESOURCES</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#3373">
  <skos:prefLabel xml:lang="en">LAND</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#106">
  <skos:prefLabel xml:lang="en">AGRICULTURAL LAND</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2044">
  <skos:prefLabel xml:lang="en">ENVIRONMENTAL PLANNING</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>

```

```

<skos:Concept rdf:about="#3386">
  <skos:prefLabel xml:lang="en">LAND TYPES</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4985">
  <skos:prefLabel xml:lang="en">PUBLIC ACCESS RIGHTS</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>

/*RESULT TRUNCATED */

</rdf:RDF>
</item>
</return>
</nsl:get_filtered_setResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

**Search for 'Planning (town and country)' (IPSV) (Note an additional related term was found in results set (Building and construction). This extra term was found in the database, indicating that the term had been accidentally omitted during the construction of Table 5.):**

```

HTTP/1.1 200 OK
Connection: close
Date: Wed, 06 Dec 2006 11:04:54 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 22085

```

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<nsl:get_filtered_setResponse xmlns:nsl="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xml:base="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/concepts.php">
<skos:Concept rdf:about="#579">
  <skos:prefLabel xml:lang="en">Building and construction</skos:prefLabel>
  <skos:broader rdf:resource="#685"/>
  <skos:narrower rdf:resource="#686"/>
  <skos:narrower rdf:resource="#2301"/>
  <skos:narrower rdf:resource="#2308"/>

```

```

<skos:narrower rdf:resource="#2796"/>
<skos:narrower rdf:resource="#5254"/>
<skos:narrower rdf:resource="#5255"/>
<skos:narrower rdf:resource="#5256"/>
<skos:narrower rdf:resource="#5260"/>
<skos:related rdf:resource="#1468"/>
<skos:related rdf:resource="#576"/>
<skos:related rdf:resource="#1138"/>
<skos:related rdf:resource="#3022"/>
<skos:related rdf:resource="#5125"/>
<skos:related rdf:resource="#1713"/>
<skos:related rdf:resource="#342"/>
<skos:related rdf:resource="#1713"/>
<skos:altLabel xml:lang="en">Construction industry</skos:altLabel>
<skos:altLabel xml:lang="en">Building work</skos:altLabel>
<skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#5906">
  <skos:prefLabel xml:lang="en">Civic societies</skos:prefLabel>
  <skos:broader rdf:resource="#2647"/>
  <skos:broader rdf:resource="#4550"/>
  <skos:related rdf:resource="#1138"/>
  <skos:related rdf:resource="#4579"/>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4705">
  <skos:prefLabel xml:lang="en">Community development</skos:prefLabel>
  <skos:broader rdf:resource="#642"/>
  <skos:related rdf:resource="#1138"/>
  <skos:altLabel xml:lang="en">Local development</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#1138">
  <skos:prefLabel xml:lang="en">Planning (town and country)</skos:prefLabel>
  <skos:broader rdf:resource="#496"/>
  <skos:narrower rdf:resource="#12"/>
  <skos:narrower rdf:resource="#13"/>
  <skos:narrower rdf:resource="#1137"/>
  <skos:narrower rdf:resource="#2207"/>
  <skos:narrower rdf:resource="#2209"/>
  <skos:narrower rdf:resource="#2210"/>
  <skos:narrower rdf:resource="#2211"/>
  <skos:narrower rdf:resource="#2212"/>
  <skos:narrower rdf:resource="#2215"/>
  <skos:narrower rdf:resource="#2220"/>
  <skos:narrower rdf:resource="#2221"/>
  <skos:narrower rdf:resource="#2221"/>
  <skos:narrower rdf:resource="#2238"/>
  <skos:narrower rdf:resource="#2244"/>
  <skos:narrower rdf:resource="#2247"/>
  <skos:narrower rdf:resource="#2779"/>
  <skos:narrower rdf:resource="#5898"/>

```



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<skos:narrower rdf:resource="#6643"/>
<skos:related rdf:resource="#579"/>
<skos:related rdf:resource="#671"/>
<skos:related rdf:resource="#865"/>
<skos:related rdf:resource="#3150"/>
<skos:related rdf:resource="#4705"/>
<skos:related rdf:resource="#5906"/>
<skos:altLabel xml:lang="en">Property planning (land or buildings)</skos:altLabel>
<skos:altLabel xml:lang="en">Planning (land use)</skos:altLabel>
<skos:altLabel xml:lang="en">Development control</skos:altLabel>
<skos:altLabel xml:lang="en">Building planning</skos:altLabel>
<skos:altLabel xml:lang="en">Planning enforcement</skos:altLabel>
<skos:altLabel xml:lang="en">Sites and projects policies (planning)</skos:altLabel>
<skos:altLabel xml:lang="en">Planning policy</skos:altLabel>
<skos:altLabel xml:lang="en">Land use planning</skos:altLabel>
<skos:altLabel xml:lang="en">Planning control</skos:altLabel>
<skos:altLabel xml:lang="en">Local plans (land use)</skos:altLabel>
<skos:altLabel xml:lang="en">Development (planning applications)</skos:altLabel>
<skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#865">
  <skos:prefLabel xml:lang="en">Rural communities</skos:prefLabel>
  <skos:broader rdf:resource="#642"/>
  <skos:narrower rdf:resource="#1409"/>
  <skos:narrower rdf:resource="#4552"/>
  <skos:related rdf:resource="#450"/>
  <skos:related rdf:resource="#1138"/>
  <skos:related rdf:resource="#4583"/>
  <skos:related rdf:resource="#7084"/>
  <skos:altLabel xml:lang="en">Farming communities</skos:altLabel>
  <skos:altLabel xml:lang="en">Communities (rural)</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#3150">
  <skos:prefLabel xml:lang="en">Town centre management</skos:prefLabel>
  <skos:broader rdf:resource="#476"/>
  <skos:related rdf:resource="#1138"/>
  <skos:related rdf:resource="#2647"/>
  <skos:related rdf:resource="#3064"/>
  <skos:related rdf:resource="#3142"/>
  <skos:altLabel xml:lang="en">Pedestrianisation</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#671">
  <skos:prefLabel xml:lang="en">Urban communities</skos:prefLabel>
  <skos:broader rdf:resource="#642"/>
  <skos:related rdf:resource="#496"/>
  <skos:related rdf:resource="#969"/>
  <skos:related rdf:resource="#1138"/>
  <skos:altLabel xml:lang="en">Brownfield sites</skos:altLabel>
  <skos:altLabel xml:lang="en">Towns</skos:altLabel>

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        <skos:altLabel xml:lang="en">Communities (urban)</skos:altLabel>
        <skos:altLabel xml:lang="en">Cities</skos:altLabel>
        <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#685">
    <skos:prefLabel xml:lang="en">Business sectors</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#686">
    <skos:prefLabel xml:lang="en">Building regulations</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2301">
    <skos:prefLabel xml:lang="en">Builders</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2308">
    <skos:prefLabel xml:lang="en">Self build projects</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2796">
    <skos:prefLabel xml:lang="en">Building sites</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#5254">
    <skos:prefLabel xml:lang="en">Carpentry</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#5255">
    <skos:prefLabel xml:lang="en">Bricklaying</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#5256">
    <skos:prefLabel xml:lang="en">Plumbing</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#5260">
    <skos:prefLabel xml:lang="en">Electrical installation and servicing</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#1468">
    <skos:prefLabel xml:lang="en">Non-residential property</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#576">
    <skos:prefLabel xml:lang="en">Architecture</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#1138">
    <skos:prefLabel xml:lang="en">Planning (town and country)</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>

```

```

</skos:Concept>
<skos:Concept rdf:about="#3022">
  <skos:prefLabel xml:lang="en">Road building</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#5125">
  <skos:prefLabel xml:lang="en">Do It Yourself</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#1713">
  <skos:prefLabel xml:lang="en">Engineering</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#342">
  <skos:prefLabel xml:lang="en">Housing repairs and renovation</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2647">
  <skos:prefLabel xml:lang="en">Built environment</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4550">
  <skos:prefLabel xml:lang="en">Community associations</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4579">
  <skos:prefLabel xml:lang="en">Conservation groups</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#642">
  <skos:prefLabel xml:lang="en">Life in the community</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#496">
  <skos:prefLabel xml:lang="en">Land and premises</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#12">
  <skos:prefLabel xml:lang="en">Planning applications</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#13">
  <skos:prefLabel xml:lang="en">Compulsory purchase</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#1137">
  <skos:prefLabel xml:lang="en">Green belts</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2207">
  <skos:prefLabel xml:lang="en">Structure plans</skos:prefLabel>

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        <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2209">
    <skos:prefLabel xml:lang="en">Town planning</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2210">
    <skos:prefLabel xml:lang="en">District planning</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2211">
    <skos:prefLabel xml:lang="en">Rural planning</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2212">
    <skos:prefLabel xml:lang="en">Unitary development plans</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2215">
    <skos:prefLabel xml:lang="en">Minerals local plan</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2220">
    <skos:prefLabel xml:lang="en">Residential planning</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2221">
    <skos:prefLabel xml:lang="en">Zoning</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2238">
    <skos:prefLabel xml:lang="en">Street numbering and naming</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2244">
    <skos:prefLabel xml:lang="en">Regional planning</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2247">
    <skos:prefLabel xml:lang="en">Planning appeals</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2779">
    <skos:prefLabel xml:lang="en">Urban development</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#5898">
    <skos:prefLabel xml:lang="en">Waste local plan</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#6643">

```

```

        <skos:prefLabel xml:lang="en">Planning regulations</skos:prefLabel>
        <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#579">
    <skos:prefLabel xml:lang="en">Building and construction</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#671">
    <skos:prefLabel xml:lang="en">Urban communities</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#865">
    <skos:prefLabel xml:lang="en">Rural communities</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#3150">
    <skos:prefLabel xml:lang="en">Town centre management</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4705">
    <skos:prefLabel xml:lang="en">Community development</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#5906">
    <skos:prefLabel xml:lang="en">Civic societies</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#1409">
    <skos:prefLabel xml:lang="en">Villages</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4552">
    <skos:prefLabel xml:lang="en">Village societies</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#450">
    <skos:prefLabel xml:lang="en">Countryside</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4583">
    <skos:prefLabel xml:lang="en">Young farmers clubs</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#7084">
    <skos:prefLabel xml:lang="en">Rural economy</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#476">
    <skos:prefLabel xml:lang="en">Public administration</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>

```

```

<skos:Concept rdf:about="#3064">
  <skos:prefLabel xml:lang="en">Traffic management</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#3142">
  <skos:prefLabel xml:lang="en">Transport planning</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#969">
  <skos:prefLabel xml:lang="en">Regeneration</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cd1r.strath.ac.uk/hiltm2m/schemes/IPSV.xml"/>
</skos:Concept>
</rdf:RDF>
</item>
</return>
</nsl:get_filtered_setResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

Where more than one scheme is selected using the `get_filtered_set` function, relevant information should be return for all schemes selected (where applicable). This should include preferred, non-preferred and related terms. The test for the 'multiple scheme selection' function used one term (*Plant genetics*) from HASSET (as detailed in the supplementary methodology in 3.6 and Table 6). The code used by the client to execute/send this query is as follows (Note: the selection of all terminologies is the default implementation. It is therefore unnecessary to specify that the search should be initiated across all terminologies):

```

my $query = 'hilt.get_filtered_set = "plant genetics"';
$rs=$conn->search(new ZOOM::Query::CQL($query));

```

The SRW server parses the client query to obtain the search values:

*See reproduction of this step above (section 4.6).*

The SRW server uses the values obtained from parsing the query to call the appropriate SOAP server function:

*See reproduction of this step above (section 4.6).*

Response from the database to the SOAP server is returned to the SRW server wrapped in SKOS Core and forwarded to the SRW client. Results from the query were checked against Table 6 (as detailed in 3.6). Results should be returned for HASSET and GCMD within a single SKOS record, but not for DDC, NMR or IPSV since the submitted term does not feature in these terminologies.

The test was successful in that the system functions as specified in the requirements document; however, retrieved results were not as originally expected. Appropriate results were retrieved as expected for HASSET, with correct broader terms, related terms and non-preferred terms. Results were also wrapped correctly (in SKOS Core). The expected result from GCMD was not retrieved since the system does not Boolean 'AND' search terms. The addition of an intermediary search stage using Boolean AND for phrase searching will be recommended in section 5.

A truncated copy of the returned query results are detailed below:

```
HTTP/1.1 200 OK
Connection: close
Date: Mon, 11 Dec 2006 12:10:01 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 358044
```

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<ns1:get_filtered_setResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xml:base="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/concepts.php">
```

```
/*RESULT TRUNCATED */
```

```
<skos:Concept rdf:about="#4712">
  <skos:prefLabel xml:lang="en">PLANT GENETICS</skos:prefLabel>
  <skos:broader rdf:resource="#624"/>
  <skos:broader rdf:resource="#2467"/>
  <skos:related rdf:resource="#2465"/>
  <skos:altLabel xml:lang="en">PLANT BREEDING</skos:altLabel>
  <skos:altLabel xml:lang="en">PLANT REPRODUCTION</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
```

```
/*RESULT TRUNCATED */
```

```
<skos:Concept rdf:about="#624">
  <skos:prefLabel xml:lang="en">BOTANY</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2467">
  <skos:prefLabel xml:lang="en">GENETICS</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2465">
  <skos:prefLabel xml:lang="en">GENETICALLY MODIFIED CROPS</skos:prefLabel>
```

```
<skos:inScheme rdf:resource="http://hiltm2m.cdlr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
```

```
/*RESULT TRUNCATED */
```

The third and final aspect of `get_filtered_set` is filtering searches by preferred and non-preferred terms. The test for the 'multiple scheme selection' used the preferred and non-preferred terms detailed in Table 6. The client code used to execute this query - for preferred and non-preferred terms respectively - is reproduced below.

- **Filter set to preferred**

'Plant reproduction' (HASSET), filter set to preferred:

```
my $query = 'hilt.get_filtered_set = "plant reproduction" and hilt.scheme = HASSET and hilt.preferred = true and hilt.related = false and hilt.non_preferred = false';
```

```
my $rs=$conn->search(new ZOOM::Query::CQL($query));
```

'Plant propagation' (DDC), filter set to preferred:

```
my $query = 'hilt.get_filtered_set = "plant propagation" and hilt.scheme = DDC and hilt.preferred = true and hilt.related = false and hilt.non_preferred = false';
```

```
my $rs=$conn->search(new ZOOM::Query::CQL($query));
```

'Plant breeding and genetics' (GCMD), filter set to preferred:

```
my $query = 'hilt.get_filtered_set = "plant breeding and genetics" and hilt.scheme = GCMD and hilt.preferred = true and hilt.related = false and hilt.non_preferred = false';
```

```
my $rs=$conn->search(new ZOOM::Query::CQL($query));
```

- **Filter set to non-preferred**

'Plant genetics' (HASSET), filter set to non-preferred:

```
my $query = 'hilt.get_filtered_set = "plant genetics" and hilt.scheme = HASSET and hilt.preferred = false and hilt.related = false and hilt.non_preferred = true';
```

```
my $rs=$conn->search(new ZOOM::Query::CQL($query));
```

The SRW server parses the client query to obtain the search values:



*See reproduction of this step above (section 4.6).*

The SRW server uses the values obtained from parsing the query to call the appropriate SOAP server function:

*See reproduction of this step above (section 4.6).*

Response from the database to the SOAP server is returned to the SRW server wrapped in SKOS Core and forwarded to the SRW client. Results from the query were checked against Table 6 (as detailed in 3.6). The tests were successful and results were retrieved as expected with correct preferred and non-preferred terms. Results were also wrapped correctly (in SKOS Core). However – as found in the 'multiple scheme selection test' - since the system is implemented to find any instance of any term input (rather than the phrase 'Plant genetics'), retrieved results were occasionally lengthy and often irrelevant (see section 5 for further details). A truncated copy of the returned query results are detailed below:

Results for 'Plant reproduction' (HASSET), filter set to preferred:

```
HTTP/1.1 200 OK
Connection: close
Date: Mon, 11 Dec 2006 14:32:21 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 11810
```

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<ns1:get_filtered_setResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xml:base="http://hiltm2m.cdlnr.strath.ac.uk/hiltm2m/concepts.php">
<skos:Concept rdf:about="#1517">
<skos:prefLabel xml:lang="en">DECORATIVE PLANTS</skos:prefLabel>
<skos:broader rdf:resource="#4716"/>
<skos:altLabel xml:lang="en">CUT FLOWERS</skos:altLabel>
<skos:altLabel xml:lang="en">DECORATIVE SHRUBS</skos:altLabel>
<skos:altLabel xml:lang="en">FLOWERS</skos:altLabel>
<skos:altLabel xml:lang="en">HOUSEPLANTS</skos:altLabel>
<skos:inScheme rdf:resource="http://hiltm2m.cdlnr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
```

```

<skos:Concept rdf:about="#3016">
  <skos:prefLabel xml:lang="en">INDUSTRIAL PLANTS</skos:prefLabel>
  <skos:narrower rdf:resource="#3962"/>
  <skos:narrower rdf:resource="#4851"/>
  <skos:related rdf:resource="#2163"/>
  <skos:altLabel xml:lang="en">FACTORIES</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4712">
  <skos:prefLabel xml:lang="en">PLANT GENETICS</skos:prefLabel>
  <skos:broader rdf:resource="#624"/>
  <skos:broader rdf:resource="#2467"/>
  <skos:related rdf:resource="#2465"/>
  <skos:altLabel xml:lang="en">PLANT BREEDING</skos:altLabel>
  <skos:altLabel xml:lang="en">PLANT REPRODUCTION</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4713">
  <skos:prefLabel xml:lang="en">PLANT RESOURCES</skos:prefLabel>
  <skos:broader rdf:resource="#4157"/>
  <skos:narrower rdf:resource="#2340"/>
  <skos:related rdf:resource="#4716"/>
  <skos:altLabel xml:lang="en">RARE PLANTS</skos:altLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4716">
  <skos:prefLabel xml:lang="en">PLANTS</skos:prefLabel>
  <skos:broader rdf:resource="#6658"/>
  <skos:narrower rdf:resource="#1389"/>
  <skos:narrower rdf:resource="#1517"/>
  <skos:narrower rdf:resource="#6500"/>
  <skos:related rdf:resource="#624"/>
  <skos:related rdf:resource="#4713"/>
  <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#5216">
  <skos:prefLabel xml:lang="en">REPRODUCTION (BIOLOGICAL)</skos:prefLabel>
  <skos:broader rdf:resource="#4685"/>
  <skos:narrower rdf:resource="#211"/>
  <skos:narrower rdf:resource="#2222"/>
  <skos:narrower rdf:resource="#3878"/>
  <skos:narrower rdf:resource="#3879"/>
  <skos:narrower rdf:resource="#4864"/>
  <skos:narrower rdf:resource="#4984"/>
  <skos:related rdf:resource="#2236"/>
  <skos:related rdf:resource="#2237"/>
  <skos:related rdf:resource="#2467"/>
  <skos:related rdf:resource="#2618"/>
  <skos:related rdf:resource="#4357"/>
  <skos:related rdf:resource="#6177"/>
  <skos:related rdf:resource="#6621"/>

```

```

        <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4716">
    <skos:prefLabel xml:lang="en">PLANTS</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#3962">
    <skos:prefLabel xml:lang="en">MILLS</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4851">
    <skos:prefLabel xml:lang="en">POTTERIES</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2163">
    <skos:prefLabel xml:lang="en">FACTORY OCCUPATIONS</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#624">
    <skos:prefLabel xml:lang="en">BOTANY</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2467">
    <skos:prefLabel xml:lang="en">GENETICS</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2465">
    <skos:prefLabel xml:lang="en">GENETICALLY MODIFIED CROPS</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4157">
    <skos:prefLabel xml:lang="en">NATURAL RESOURCES</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2340">
    <skos:prefLabel xml:lang="en">FOREST RESOURCES</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#6658">
    <skos:prefLabel xml:lang="en">VEGETATION</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#1389">
    <skos:prefLabel xml:lang="en">CROPS</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#1517">
    <skos:prefLabel xml:lang="en">DECORATIVE PLANTS</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#6500">

```

```

        <skos:prefLabel xml:lang="en">TREES</skos:prefLabel>
        <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4713">
    <skos:prefLabel xml:lang="en">PLANT RESOURCES</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4685">
    <skos:prefLabel xml:lang="en">PHYSIOLOGY</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#211">
    <skos:prefLabel xml:lang="en">ANIMAL BREEDING</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2222">
    <skos:prefLabel xml:lang="en">FECUNDITY</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#3878">
    <skos:prefLabel xml:lang="en">MENOPAUSE</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#3879">
    <skos:prefLabel xml:lang="en">MENSTRUATION</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4864">
    <skos:prefLabel xml:lang="en">PREGNANCY</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4984">
    <skos:prefLabel xml:lang="en">PUBERTY</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2236">
    <skos:prefLabel xml:lang="en">FERTILITY</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2237">
    <skos:prefLabel xml:lang="en">FERTILITY TREATMENT</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2618">
    <skos:prefLabel xml:lang="en">GYNAECOLOGY</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4357">
    <skos:prefLabel xml:lang="en">OBSTETRICS</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>

```

```

<skos:Concept rdf:about="#6177">
  <skos:prefLabel xml:lang="en">SURROGATE MOTHERS</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdler.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#6621">
  <skos:prefLabel xml:lang="en">UROGENITAL SYSTEM</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdler.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
</rdf:RDF>
</item>
</return>
</ns1:get_filtered_setResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

### Results for 'Plant propagation' (DDC), filter set to preferred:

```

HTTP/1.1 200 OK
Connection: close
Date: Mon, 11 Dec 2006 14:33:50 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 5714

```

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<ns1:get_filtered_setResponse xmlns:ns1="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xml:base="http://hiltm2m.cdler.strath.ac.uk/hiltm2m/concepts.php">
<skos:Concept rdf:about="#634.0441">
  <skos:prefLabel xml:lang="zxx">634.0441</skos:prefLabel>
  <skos:altLabel xml:lang="en">Grafting (Plant propagation)--fruit crops</skos:altLabel>
  <skos:broader rdf:resource="#634.04"/>
  <skos:inScheme rdf:resource="http://hiltm2m.cdler.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#635.91541">
  <skos:prefLabel xml:lang="zxx">635.91541</skos:prefLabel>
  <skos:altLabel xml:lang="en">Grafting (Plant propagation)--ornamental plants</skos:altLabel>

```

```

        <skos:broader rdf:resource="#635.91"/>
        <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#631.53">
    <skos:prefLabel xml:lang="zxx">631.53</skos:prefLabel>
    <skos:altLabel xml:lang="en">Plant propagation</skos:altLabel>
    <skos:broader rdf:resource="#631.5"/>
    <skos:narrower rdf:resource="#631.531"/>
    <skos:narrower rdf:resource="#631.532"/>
    <skos:narrower rdf:resource="#631.533"/>
    <skos:narrower rdf:resource="#631.534"/>
    <skos:narrower rdf:resource="#631.535"/>
    <skos:narrower rdf:resource="#631.536"/>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#634.04">
    <skos:prefLabel xml:lang="zxx">634.04</skos:prefLabel>
    <skos:altLabel xml:lang="en">Cultivation, harvesting, related topics of orchards, of fruits, of trees</skos:altLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#635.91">
    <skos:prefLabel xml:lang="zxx">635.91</skos:prefLabel>
    <skos:altLabel xml:lang="en">Specific techniques; apparatus, equipment, materials</skos:altLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#631.5">
    <skos:prefLabel xml:lang="zxx">631.5</skos:prefLabel>
    <skos:altLabel xml:lang="en">Cultivation and harvesting</skos:altLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#631.531">
    <skos:prefLabel xml:lang="zxx">631.531</skos:prefLabel>
    <skos:altLabel xml:lang="en">Propagation from seeds (Sowing)</skos:altLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#631.532">
    <skos:prefLabel xml:lang="zxx">631.532</skos:prefLabel>
    <skos:altLabel xml:lang="en">Propagation from bulbs and tubers</skos:altLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#631.533">
    <skos:prefLabel xml:lang="zxx">631.533</skos:prefLabel>
    <skos:altLabel xml:lang="en">Propagation from suckers, runners, buds</skos:altLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#631.534">
    <skos:prefLabel xml:lang="zxx">631.534</skos:prefLabel>
    <skos:altLabel xml:lang="en">Propagation by layering</skos:altLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#631.535">

```

```

        <skos:prefLabel xml:lang="zxx">631.535</skos:prefLabel>
        <skos:altLabel xml:lang="en">Propagation from cuttings and slips</skos:altLabel>
        <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#631.536">
    <skos:prefLabel xml:lang="zxx">631.536</skos:prefLabel>
    <skos:altLabel xml:lang="en">Transplanting</skos:altLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/DDC.xml"/>
</skos:Concept>
</rdf:RDF>
</item>
</return>
</nsl:get_filtered_setResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

### Results for 'Plant breeding and genetics' (GCMD), filter set to preferred:

```

HTTP/1.1 200 OK
Connection: close
Date: Mon, 11 Dec 2006 14:46:03 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 1437

```

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<nsl:get_filtered_setResponse xmlns:nsl="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xml:base="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/concepts.php">
<skos:Concept rdf:about="#17">
    <skos:prefLabel xml:lang="en">Plant Breeding and Genetics</skos:prefLabel>
    <skos:broader rdf:resource="#12"/>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#12">
    <skos:prefLabel xml:lang="en">Agricultural Plant Science</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/GCMD.xml"/>

```

```
</skos:Concept>
</rdf:RDF>
</item>
</return>
</nsl:get_filtered_setResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

## Results 'Plant genetics' (HASSET), filter set to non-preferred:

```
HTTP/1.1 200 OK
Connection: close
Date: Mon, 11 Dec 2006 14:52:26 GMT
Server: Microsoft-IIS/6.0
X-Powered-By: PHP/5.1.4
Server: NuSOAP Server v0.7.2
X-SOAP-Server: NuSOAP/0.7.2 (1.95)
Content-Type: text/xml; charset=ISO-8859-1
Content-Length: 7355
```

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/">
<SOAP-ENV:Body>
<nsl:get_filtered_setResponse xmlns:nsl="http://tempuri.org">
<return xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="xsd:string[1]">
<item xsi:type="xsd:string">
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xml:base="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/concepts.php">
<skos:Concept rdf:about="#624">
<skos:prefLabel xml:lang="en">BOTANY</skos:prefLabel>
<skos:broader rdf:resource="#546"/>
<skos:narrower rdf:resource="#4687"/>
<skos:narrower rdf:resource="#4688"/>
<skos:narrower rdf:resource="#4712"/>
<skos:related rdf:resource="#4155"/>
<skos:related rdf:resource="#4716"/>
<skos:related rdf:resource="#6658"/>
<skos:altLabel xml:lang="en">PLANT BIOLOGY</skos:altLabel>
<skos:inScheme rdf:resource="http://hiltm2m.cdldr.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4687">
<skos:prefLabel xml:lang="en">PHYTOGEOGRAPHY</skos:prefLabel>
<skos:broader rdf:resource="#624"/>
<skos:broader rdf:resource="#4675"/>
```



```

        <skos:altLabel xml:lang="en">DISTRIBUTION OF PLANTS</skos:altLabel>
        <skos:altLabel xml:lang="en">PLANT GEOGRAPHY</skos:altLabel>
        <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4688">
    <skos:prefLabel xml:lang="en">PHYTOPATHOLOGY</skos:prefLabel>
    <skos:broader rdf:resource="#624"/>
    <skos:related rdf:resource="#4548"/>
    <skos:altLabel xml:lang="en">PLANT DISEASES</skos:altLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4712">
    <skos:prefLabel xml:lang="en">PLANT GENETICS</skos:prefLabel>
    <skos:broader rdf:resource="#624"/>
    <skos:broader rdf:resource="#2467"/>
    <skos:related rdf:resource="#2465"/>
    <skos:altLabel xml:lang="en">PLANT BREEDING</skos:altLabel>
    <skos:altLabel xml:lang="en">PLANT REPRODUCTION</skos:altLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4713">
    <skos:prefLabel xml:lang="en">PLANT RESOURCES</skos:prefLabel>
    <skos:broader rdf:resource="#4157"/>
    <skos:narrower rdf:resource="#2340"/>
    <skos:related rdf:resource="#4716"/>
    <skos:altLabel xml:lang="en">RARE PLANTS</skos:altLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#546">
    <skos:prefLabel xml:lang="en">BIOLOGY</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4687">
    <skos:prefLabel xml:lang="en">PHYTOGEOGRAPHY</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4688">
    <skos:prefLabel xml:lang="en">PHYTOPATHOLOGY</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4712">
    <skos:prefLabel xml:lang="en">PLANT GENETICS</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4155">
    <skos:prefLabel xml:lang="en">NATURAL HISTORY</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4716">
    <skos:prefLabel xml:lang="en">PLANTS</skos:prefLabel>
    <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>

```

```

</skos:Concept>
<skos:Concept rdf:about="#6658">
  <skos:prefLabel xml:lang="en">VEGETATION</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#624">
  <skos:prefLabel xml:lang="en">BOTANY</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4675">
  <skos:prefLabel xml:lang="en">PHYSICAL GEOGRAPHY</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4548">
  <skos:prefLabel xml:lang="en">PATHOLOGY</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2467">
  <skos:prefLabel xml:lang="en">GENETICS</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2465">
  <skos:prefLabel xml:lang="en">GENETICALLY MODIFIED CROPS</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#4157">
  <skos:prefLabel xml:lang="en">NATURAL RESOURCES</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
<skos:Concept rdf:about="#2340">
  <skos:prefLabel xml:lang="en">FOREST RESOURCES</skos:prefLabel>
  <skos:inScheme rdf:resource="http://hiltm2m.cdrl.strath.ac.uk/hiltm2m/schemes/HASSET.xml"/>
</skos:Concept>
</rdf:RDF>
</item>
</return>
</nsl:get_filtered_setResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

#### **4.7 Results summary for `get_all_records`, `get_ddc_records` & `get_non_ddc_records`**

DDC No.	DDC caption	GCMD	NMR	HASSET	IPSV	Get_all_records	Get_ddc_records	Get_non_ddc_records
363.73	Pollution	<b>Environmental impacts</b>	-	Pollution	Pollution	✓	✓	✓
627.58	<b>Shore protection</b>	Erosion	-	Coastal protection	Coastal erosion and protection	✓	✓	✓
631.53	Plant propagation	Plant breeding and genetics	-	<b>Plant genetics</b>	-	✓	✓	✓
363.34	Disasters	Natural hazards	-	Hazards, accidents and disasters	<b>Civil emergencies</b>	✓	✓	✓
333	Economics of land and energy	Land use/Land cover	<b>Land use site</b>	Land use	Planning (town and country)	✓	✓	✓

**Table 7: Results summary of the get\_all\_records, get\_ddc\_records and get\_non\_ddc\_records. Tick denotes a successful test using the appropriate test term or DDC number.**

## **5. Recommendations**

### **5.1 *Phrase searching***

The current search algorithm is as follows:

Step 1: exact matches sought for phrase e.g. 'plant genetics'

Step 2: exact matches sought for individual terms within a phrase e.g. 'plant'; 'genetics'.

The result of step 2 is that, currently, some irrelevant material is being returned. For example, a user searching for 'plant genetics' using `get_all_records` is unlikely to find resources relating to the broad topic of 'genetics' useful, as currently being returned. Similarly, a query for 'plant reproduction' using `get_filtered_set` returns terms such as 'puberty', 'menopause' and similar, which are obviously irrelevant to the query.

It is recommended that further research be conducted to assess the wider effects of Step 2's inclusion in the search parameters. It is considered likely that this second step produces unnecessary noise in results sets and that the service will return more appropriate results sets in its absence. A better second step may involve the use of Boolean 'AND'. Step 2 above could then become a 'step 3'.

### **5.2 *Scheme specific browse***

Use case 4 states "Scheme hierarchy browse in 'no hits' from HILT' or user/service request situation (`get_filtered_set`)". This means that in a scenario where no hits are retrieved from HILT for any given term, the browse interface of an appropriate scheme will be presented to the user. This is not currently happening. Although HILT has already implemented scheme specific browsing for DDC, AAT, GCMD, NMR, IPSV and an area of UNESCO. This work has not yet been integrated because a) the HILT SRW client has been designed to emulate the HILT Phase II pilot and therefore does not use any of the aforementioned vocabularies (except DDC as the spine) and b) the remit of the GoGeo! SRW client was to offer query expansion functionality to the user; as such, the scheme specific browse feature has not been built in.

In addition, due to the architectural set-up of the pilot server, the `get_filtered_set` function operates on the SOAP server requests handler \* while the scheme browse information is held on a separate Linux machine. This means that a user must be switched from one to the other in the event of 'no hits' in response to a query. It is recommended that this 're-rerouting' be programmed. Even although this will be largely artificial in terms of the desired architecture, it will, at this stage, enable us to show proof of concept to meet the 'no hits' aspect of use case 4.

### **5.3 *New functions***

Experimentation with the creation of scheme specific browse interfaces led to the suggestion that two new functions be created – get\_children and get\_parents. When a term is selected the get\_children function will be used to identify the immediate narrower terms, thus leading the user down the hierarchy; similarly, the get\_parents function will facilitate the identification of all broader terms, leading the user up the hierarchy.

Get\_filtered\_set was originally envisaged as incorporating this functionality but closer examination of performance issues and general efficiency of the system justifies the proposed creation of these two additional functions.

## **6. Future work**

### **6.1 *Match types***

Further research into match types should be conducted to establish how best to express the nature of equivalence relationships between terms. Currently, five mapping types are in use, in line with the SKOS Mapping Vocabulary Specification (MVS). These are exact match, narrow match, broad match, major match and minor match. It is thought likely that further match types may prove useful although this theory must be considered in the context of user testing.

### **6.2 *Use cases and functions***

It is considered likely that a range of additional use cases, and therefore functions, will prove valuable within the HILT service. A survey of potential users of HILT (both services/collections and individuals) should be undertaken to inform the HILT team on what these use cases might be. Appropriate functionality can then be designed and built in to the system.

### **6.3 *Mapping work***

The DDC-LCSH mappings provided by OCLC are not always appropriate. It is envisaged that a review of existing mappings will be required to enhance the service in the future. A methodology for determining new mappings should also be devised as part of the programme of future work.