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OGC® Canadian Geospatial Data Infrastructure WFS and GML Best Practices

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Preface

This report is intended to reflect the lessons learned during execution of the Canadian Geospatial Data Infrastructure Interoperability Pilot project, in the domain of application schema design and Web Feature Service setup and operation.

Suggested additions, changes, and comments on this draft report are welcome and encouraged. Such suggestions may be submitted by email message or by making suggested changes in an edited copy of this document. The changes made in this document version, relative to the previous version, are tracked by Microsoft Word, and can be viewed if desired. If you choose to submit suggested changes by editing this document, please first accept all the current changes, and then make your suggested changes with change tracking on.

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OGC® Canadian Geospatial Data Infrastructure WFS and GML Best Practices

1 Introduction

1.1 Scope

This OGC™ document gives guidelines and recommendations for administrators, users and implementers of Web Feature Services serving Geography Markup Language encoded response documents.

This OGC™ document is applicable to the design, implementation and operation of Web Feature Service networks.

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Recipients of this document are requested to submit, with their comments, notification of any relevant patent claims or other intellectual property rights of which they may be aware that might be infringed by any implementation of the standard set forth in this document, and to provide supporting documentation.

1.2 Document contributor contact points

All questions regarding this document should be directed to the editor or the contributors:

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1.3 Revision history

Date	Release	Editor	Primary clauses modified	Description
28 Jan 08	1	Rushforth		1st public release

1.4 Future work

Improvements in this document are desirable to continue to build the body of practical experience-based knowledge of best practices in the domain of Web Feature Services. As the experience in this domain grows, the knowledge gained by practitioners in the field is invaluable to those organizations and professionals contemplating entry into the use of this important technology.

2 References

The following documents are referenced in this document. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the normative document referred to applies.

OGC 06-121r3, *OpenGIS® Web Services Common Standard*
OGC 04-094, *OpenGIS® Web Feature Service Implementation Standard*
OGC 03-105r1, *OpenGIS® Geography Markup Language (GML) Encoding Standard*
OGC 06-049r1, *OpenGIS® GML 3.1.1 simple features profile (1.0.0)*

3 Terms and definitions

For the purposes of this report, the definitions specified in Clause 4 of the OWS Common Standard [OGC 06-121r3] shall apply. In addition, the following terms and definitions apply.

3.1
GML Application Schema
An XML schema which imports some or all definitions from the GML Schemas in order to model spatial phenomena in GML. Can be designed by the database designer or adopted from a vertical environment. Examples of vertical standards GML Application Schema are GeoSciML and CityGML.

4 Conventions

4.1 Abbreviated terms

CGDI	Canadian Geospatial Data Infrastructure
IT	Information Technology
SDI	Spatial Data Infrastructure
SOA	Service Oriented Architecture

XML	eXtensible Markup Language
WFS	Web Feature Service
GML	Geography Markup Language

5 Overview

The Canadian Geospatial Data Infrastructure Interoperability Pilot (CGDI IP) project sought to demonstrate operational use of Web Feature Services in the context of three use case scenarios. These use cases were designed to reflect the possible or likely roles and uses of WFS in the CGDI. The pilot project brought together a group of public and private sector organizations representative of the CGDI community, and in particular of the GeoBase initiative.

GeoBase is an initiative of the Canadian Council on Geomatics, which provides quality geospatial data free of charge via a web portal. The GeoBase web portal provided the business context for use cases 1 and 2. In use case 1 the user was enabled to browse, query and download framework data via the portal WFS and WMS services using web clients, while use case 2 outlined a workflow wherein a (privileged) data custodian uses WFS-T to update the framework data layers based on feature-based GeoRSS feedback from (non-privileged) external data users.

The project was executed in essentially 3 phases: Setup, during which the pilot participants developed and agreed to adopt and implement a shared "community schema" published into a pilot WFS network consisting of provincial and national servers, ii) development, during which the technology providers implemented or adapted user interface software required to execute the use cases and iii) testing, during which the use cases were refined, executed demonstrated and captured. During all three phases of pilot execution, issues were uncovered and managed. The scope of these issues ranged from feature and property semantics to network connectivity and firewall issues.

This document deals only with issues related to characteristics of WFS, GML, or software implementations of those standards, as uncovered during all phases of pilot execution, and provides recommendations such as might be considered "best practices" or suggestions for change where applicable.

6 Issues

6.1 Difficulty of implementing community application schema

6.1.1 Description

There are two possible situations when deploying a WFS to serve features:

- No data exists; the WFS is being used to capture features starting from scratch

- There is preexisting data, in tables, files or other data structures, which is to be WFS-enabled. This is likely the most common situation.

In both situations, mapping[1] of the internal data structures to the external GML Application Schema takes place. This mapping is either pre-defined, or not. Some WFS implementations provide limited or no facilities to change the default mapping, passing through the characteristics of the data store, effectively relying on the data store facilities for application schema support. Others provide a fixed mapping, or a mapping which has rigid characteristics. Others offer complete mapping flexibility with powerful facilities. The key point is that the mechanism is common to all implementations, yet varies widely between implementations in its nature and quality.

The experience of the participants in the CGDI IP project was that the mapping of internal database tables and columns to a GML Application Schema was (a) common to every participating organization and (b) in some cases quite a difficult or impossible exercise.

The situation in the CGDI IP was dominantly one wherein pre-existing database data tables and columns had to be mapped to the agreed-upon community-developed GML Application Schema. The pre-existence of the data tables was due to the fact the participants used features of types which are used in the GeoBase context: roads, place names and administrative areas. In many cases in the CGDI IP project, the database tables had to be (re-)created explicitly to support the mapping to the community GML Application Schema. In a pilot scenario this was acceptable, however in a production environment, this could be prohibitively costly.

As mentioned, the mechanism for doing the database mapping varies between WFS implementations. It was the experience of the pilot participants that the variety in mapping facilities is a barrier to use and interoperability of WFS and GML.

Regardless of how it is accomplished, the need to do database mapping is universally present where WFS is used, and especially so in situations where the application schema must follow an external specification, such as in this project. This suggests that a facility for enabling non-default database mapping is warranted. It is recognized that this implies changes to some WFS implementations, and optimally, to the WFS standard itself.

6.1.2 **Discussion**

6.1.2.1 **Background**

The three mapping-related issues that WFS implementers need to be aware of are:

1. the order of elements is important in GML documents and application schemas
2. database column data types need to be mapped to XML Schema data types.

[1] mapping in this context refers to the translation of database tables' columns and data types to the GML Application Schema (XML Schema) elements' data types

3. names of elements in GML documents and application schemas are not necessarily the same as the names of corresponding tables and columns in spatial databases.

With regard to 1. above, features derived by extension from gml:AbstractFeatureType follow an xs:sequence. So database columns must be mapped in a prescribed order to follow the GML Application Schema. (Where the App Schema is generated by the WFS in response to the table layout at best uses a default mapping, and at worst, forces the database administrator to create a new table or a view (if supported by the WFS) to match the order). In some implementations of WFS, the geometry-valued property is always listed first in the feature, necessitating on-the-fly transformation outside of the WFS.

With regard to 2. above, in many cases, the SQL column datatypes need to be mapped to XML Schema types via a type conversion which is not necessarily "default" (i.e. not a mapping chosen by the WFS developer, but instead, one chosen by the WFS administrator). Once again, this is not uniformly available in WFS implementations and therefore requires table re-definition.

Finally, in regard to 3. above, it is a common situation that database columns names do not match a proposed schema and must therefore be mapped to another name in the application schema. In some cases, because the WFS is unable to do anything other than a default mapping (ie it is not a configurable characteristic), the fact that many databases can only use uppercase column and table names leads to the inability of that WFS to comply to an external schema other than its own version of it. This is a serious interoperability concern.

6.1.2.2 **The experience in the CGDI IP**

The CGDI Interoperability Pilot participant organizations were reflective of the CGDI at large: the centres of responsibility for geomatics from seven provinces participated directly. There was a fundamental requirement in the pilot for each organization to publish data according to an agreed-upon community schema. This schema was designed for interoperability in that the features and their properties served by the CGDI IP WFS network nodes were commonly agreed to by each participating agency, and could thus be processed by common or shared software. The internal details of a feature's implementation within the spatial data infrastructures of the various geomatics agencies across the country were, by design, beyond the scope of the agreement. However, each organization had content which semantically correlated with features and properties in the community schema. This situation would be perhaps similar to one in which diverse organizations agreed to develop a common database based on any vertical standard, such as GeoSciML or CityGML, for example. Those organizations might not share a physical database structure, but they would agree to a conceptual one as implemented by the standard. So the experience of the CGDI IP participants is likely universally applicable. Each CGDI IP organization implemented a WFS for the pilot, there were several different WFS used, including both open source and commercial off-the-shelf (COTS) software. Additionally, the computing and database environments in each agency are typically quite different. The manner in which each WFS software implementation deals with the mapping issue varies, but it is an issue common to all of the implementations.

6.1.3 **Recommendation**

To simplify administration of WFS, a non-default mapping mechanism should be developed by WFS implementers. To ensure interoperability between WFS implementations, a standard mechanism to address the mapping issue should be specified.

The common mechanism should define an XML vocabulary which declares the mapping from external WFS / GML application schema to the internal computing/database environment. This could take different forms, and further investigation and prototyping is required to identify an optimal and generally implementable solution. An example of a mapping document from the CubeServ WFS is presented in Appendix A. This document describes the mapping of a spatial table and its columns to a feature and its properties within the pilot schema. The existence of this document demonstrates the fact that mapping is an issue that has been encountered and worked through by some implementers.

The proposed general solution would be comprised of two related developments:

- First, develop standardized schema annotations to describe the mapping. The advantage of this is that the application schema and the mapping information are integrated. The markup language of the annotations would be developed for this explicit purpose, or adapted from some existing suitable example. These annotations would constitute a data definition / data mapping language for WFS.

- Secondly, define a mechanism whereby a compliant WFS could accept an annotated schema as a request body, and define a feature and properties implemented via the encoded mapping.

A possibility for such a request would be a "CreateFeatureType" WFS operation which, in the case where the tables referenced by the annotations did not exist, would create empty, or initial feature types, mapped to newly created spatial database data structures internally, as specified by the content of the CreateFeatureType schema annotations in the request. This operation would **not** be used by service **consumers**, but by **service administrators** and would result in dynamic changes to the capabilities of the service itself by adding to the FeatureTypeList section of the Capabilities document. Note that in the case where **no mapping annotations** were provided, a default mapping based on the application schema characteristics could be created. This has the added merit of making the application schema of primary importance in the WFS service creation process, instead of the datastore's implementation driving the WFS application schema.

Similarly, in the case where spatial database tables already exist, a "CreateFeatureType" WFS request, properly annotated, could map the specified feature type definition to the existing table(s) and columns, in a manner conceptually similar to a SQL view created with the CREATE VIEW DDL statement. The annotations would dictate the mapping of the application schema features and properties to the datastore. This would maintain the benefit of making the application schema primordial in the WFS service creation process.

The mechanism described above would be in some ways similar in nature to the WMS-SLD mechanism where a compliant WMS can declare that it is SLD-capable, and that this is an optional mechanism within the WFS standard. It is important to note that this operation is only meant to be available to administrative users, not web clients, because it obviously involves intimate familiarity with the internal database structures. Furthermore, the vocabulary used in the schema annotations would have to be somewhat generic yet broadly applicable since the implementation details of database implementations (eg relational tables vs files or some other data store) would have to be reflected in the vocabulary to a certain extent.

Further research is required to identify more examples of mapping vocabularies that have been developed, in order that those efforts inform any standards arising out of this work.
Annex B
Example of a "CreateFeatureType" request is a listing of an example of an XML mapping vocabulary encoded as schema annotations and wrapped in a proposed "CreateFeatureType" request. The example is based on the CubeWerx XML map used during the CGDI IP project (Annex A
Example of a mapping vocabulary instance document).

6.2 Ordering of feature properties semantically unimportant, yet imposed by GML.

6.2.1 Description

Because the GML AbstractFeature content model is based on xsd:sequence, WFS and clients are required to enforce an ordering of feature properties, where the ordering adds no apparent value to the feature but carries a cost in terms of effort to achieve schema validity.

6.2.2 Discussion

While this issue may be related to the mapping issue, it is worth noting that in relational model, the order of columns does not matter. This is considered convenient. The requirement to present pilot features properties in a particular order was noted as a difficulty, particularly by participants who had no access to schema mapping technologies. In some cases, scripts had to be written to dynamically re-order content served by a WFS in order to achieve community schema compatibility. While this was a very interesting and perhaps broadly useful development, there were performance costs of the re-ordering processing, and it would be desirable to not have to do them at all.

6.2.3 Recommendation

Consider relaxing the requirement that features derived from gml:AbstractFeatureType follow an xsd:sequence by enabling xsd:all as the default content model, allowing schema designers to choose the more restrictive xsd:sequence or xsd:choice appropriate to the situation.

6.3 Performance related to data volumes and bandwidth consumption

6.3.1 Description

Large data volumes generated in WFS responses transmitted from server to client degrade performance where bandwidth between client and server is a scarce resource. Furthermore, processing of large amounts of data, both server and client, results in longer delays and the consequent perception that "GML is slow". The performance degradations are a result of many factors, including:

- inherent large size of geographic data
- verbosity of GML application schemas and instance documents
- response documents uncompressed

6.3.2 Discussion

6.3.2.1 Verbosity of GML Application Schemas

It is axiomatic that digital geographic data size is large and that GML encoding of geographic data exacerbates the issue. The former is a consequence of the 1) the large size of the universe 2) the need to model parts of the universe in greater detail than is usual in normal data management, in order to derive benefit from analytical tools such as GIS. The latter is a consequence of several (seemingly unavoidable) factors, but it can be either intensified or mitigated by (in) appropriate GML Application Schema design.

Good data design is relative to the application to which the data is put, and to the computing environment (i.e. multi-tier, 2-tier, or single-tier). What is good for shape file design or other spatial format applications might not transition well to a GML environment without adaptation. For example, a column or field in a shape file which is dominantly empty still takes up as much space in the file as if the field were dominantly full, because of the fixed record length nature of the file. The length of the name of the field contributes very little to the overall size of the file, because it is stored only once, in the file header. When translated to GML, the opposite is true. In the case where a feature property is dominantly empty, if the GML Application Schema defines it so (via @minOccurs), the element only appears in the feature where data values exist, and thus may take up very few bytes in the file or response document. Where the name of a feature property (element) is very long, the number of bytes used by the element opening and closing tags can easily outstrip the number of bytes of their content (i.e. the value of the element).

6.3.2.2 Compression and bandwidth

From Wikipedia, "...the term "bandwidth" is often used metaphorically, to describe the amount of data that can be transferred to or from the website or server, measured in bytes transferred over a prescribed period of time."

Where bandwidth limitations are of concern, some characteristics of XML, and GML in particular exacerbate the performance issue due to bandwidth consumption and the resulting relatively slow request and response cycles.

6.3.3 **Recommendation 1**

Minimize markup by making properties optional (@minOccurs="0"). Optional properties which are null should not be returned by a WFS, which can yield great economies of data in the case where a feature has a lot of null property values. A corollary of this schema design best practice is: if a database table's column can be "not null" conceptually, allow it to be so physically. Do not put a space character or other placeholder data in the column's values, since this will force the output of the element start and end tags and the placeholder data as their content in response documents, even if the property was designated as optional by the GML application schema.

6.3.4 **Recommendation 2**

Minimize markup by using shortest reasonable element names for all properties, up to and including mnemonic names, if applicable. Do not create completelySelfDocumentingPropertyOrFeatureElementNames, since they will end up like this:

```
<Lake>
    <completelySelfDocumentingPropertyName>1</completelySelfDocumentingPropertyName>
</Lake>
```

in the response documents, which depending on the application and request, may result in large files with high markup-to-data ratios. Use schema annotations or other external metadata to provide human-readable and comprehensible data dictionary definitions. This will result in lower markup-to-data ratios and likely smaller, better performing files.

6.3.5 **Recommendation 3**

Implement support for the HTTP header `Accept-Encoding:gzip` on clients and servers such that large response documents are compressed by the server prior to transmission and uncompressed transparently by the client. GML response documents typically yield high compression ratios due to their text content. The result will be a slight processing overhead in the case of small files, but should be compensated by performance benefits for larger responses which are common in the WFS environment.

6.4 **Feature source connections and truncation or paging of WFS query results**

6.4.1 **Description**

The use of maxFeatures by the client is an important means of verifying connectivity with the server without impacting interactive performance. Its use also potentially prevents or mitigates server overload by minimizing the server burden imposed by the client merely to establish connectivity or verify content models. However, when

maxFeatures is enabled by default on the server, it potentially creates a situation where corrupted (truncated) datasets are returned to the client, and can lead to potentially serious errors in data interpretation.

6.4.2 **Discussion**

MaxFeatures is a request attribute within the WFS vocabulary. It is intended to allow clients to establish connectivity with the server without forcing the return of large volumnes of feature data and consequent usability degradation. In certain situations, particularly publicly available WFS services, there may be a need to control the amount of data that can be requested by a client. The reason for this is that requests of this nature are obviously resource-intensive and lead to:

- Perceived poor performance by WFS in general due to a few large requests slowing down the request "queue".
- Crashing of the WFS server or even the physical server itself due to out-of-memory or similar conditions.

Where such situation exists, many WFS offer a facility to the administrator, used to limit the amount of data returned to the client, by governing the maximum number of features returned: if the number of features selected by a given client request exceeds that numerical limit, the data set is truncated, numerically at that point, and no message indicating this truncation is issued. This can lead to misleading results and errors in interpretation by clients, especially in situations where the human client is unaware of the limiting number. The consequences of such misinterpretations could range from inconsequential or merely annoying, to catastrophic, depending on the application.

6.4.3 **Recommendation**

Do not use the maxFeatures harness server-side. Define a standard service exception such that, in the case in which a result would contain more than an administrator-defined number of features, the standard service exception would be returned. Define a standard "paging" mechanism for WFS, allowing the transfer of data one "page" set at a time, whereby a WFS client, when apprised of a situation where the limit had been exceeded (via the service exception mentioned above), could re-submit the request with a maxFeatures parameter set to value less than the maximum and a page number.

6.5 **Interactive performance of WFS optimized when used in conjunction with WMS.**

6.5.1 **Description**

WFS is sometimes described as having poor performance, especially compared with intranet (binary) geograhic data servers, and WMS, in fact. This runs contrary to the experience within the CGDI IP, within parameters described here.

While it is technically possible to connect a client to one or more WFS and perform interactive map visualization based on dynamic feature download and rendering, it is

rarely the optimal approach to interacting with WFS endpoints. More appropriate is the use of WFS in conjunction with one or more WMS. In such a scenario, the WMS can be queried for an image of a region of interest; the layers can be administered on either the server or client, such that they display (or not) based on the scale of the request. If appropriate, the client can "turn on" the WFS layers for the same region of interest and thus enable interaction with the actual data. This balanced use of WMS and WFS is considered essential to optimal performance of interactive applications such as those described by the CGDI IP use cases.

Often when using a WFS/WMS client, the user is required to manipulate the "state" of layers displayed in that client, by turning them on or off, or applying symbolization etc. What can happen is that where a WFS client is made to issue unconstrained or poorly constrained requests, the performance of the WFS response can appear poor. This is not a reflection on WFS as a technology per se, but rather on the need to apply intelligent scale-dependant feature requests, and to use WMS as the primary visualization mechanism for maps, and use the WFS for access to data.

6.5.2 **Discussion**

As part of the CGDI IP, a WMS service was developed and deployed through a collaboration of personnel from the pilot, the National Atlas of Canada, and the Centre for Topographic Information, Sherbrooke. This WMS was a single service endpoint available to the pilot clients which performed scale-dependant rendering of dozens of layers of geographic data, including roads and place names as a single "layer", without the need for the client to maniplate the state of the layers. Thus, interaction with this service was extremely simple, so much so that it was possible to manually

6.5.3 **Recommendation: Balance use of WMS, WFS with and without maxFeatures**

6.6 Client – server interoperability impacted by use of WFS 1.0 and WFS 1.1 together

6.6.1 **Discussion**

Interoperability is impacted when WFS 1.0 and 1.1 protocols are mixed in an application environment. For example, WFS 1.1 allows the request to specify a srsName attribute of a query, allowing the response to be encoded according to a different spatial reference system than that of the "native" dataset, where the WFS reprojects the data on the fly, whereas WFS 1.0 requests do not provide this facility. Thus, where WFS 1.0 requests are a possibility, the application environment must agree on a pre-determined spatial reference system.

6.6.2 **Recommendation 1**

Use WFS 1.1, and use a GML 3 simple features profile –based application schema. An example of the GML 3 SF Level 0 application schema used in the pilot is presented in Annex C

CGDI IP Community GML Application Schema. The use of a profile restricts the range of encodings that are possible and is more readily implementable.

6.6.3 **Recommendation 2**

Use a pre-determined spatial reference system and do not reproject on the fly unless unavoidable.

Annex A
Example of a mapping vocabulary instance document

Annex A
Example of a mapping vocabulary instance document

```
<?xml version="1.0" encoding="UTF-8"?>
<xmlmap table="roadseg">
  <xmlname>RoadSegment</xmlname>
  <namespacePrefix>gb</namespacePrefix>
  <namespaceURL>http://www.geobase.ca/interop-pilot-2007</namespaceURL>
  <column name="CGDI_ID">
    <xmlname>cgdiId</xmlname>
    <minOccurs>1</minOccurs>
    <maxOccurs>1</maxOccurs>
  </column>
  <column name="ACCURACY">
    <xmlname>planimetricDataAccuracy</xmlname>
    <minOccurs>1</minOccurs>
    <maxOccurs>1</maxOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="ACQTECH">
    <xmlname>acquisitionTechnique</xmlname>
    <minOccurs>1</minOccurs>
    <maxOccurs>1</maxOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="ACQPROVIDER">
    <xmlname>acquisitionProvider</xmlname>
    <minOccurs>1</minOccurs>
    <maxOccurs>1</maxOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="ACQORREVDATE">
    <xmlname>acquisitionOrRevisionDate</xmlname>
    <minOccurs>1</minOccurs>
    <maxOccurs>1</maxOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="NROADCLASS">
    <xmlname>nationalRoadClass</xmlname>
    <minOccurs>1</minOccurs>
    <maxOccurs>1</maxOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="RTENUM1">
    <xmlname>routeNumber1</xmlname>
    <minOccurs>0</minOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="RTENAMEFR1">
    <xmlname>routeNameFrench1</xmlname>
    <minOccurs>0</minOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="RTENAMEEN1">
    <xmlname>routeNameEnglish1</xmlname>
    <minOccurs>0</minOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
```

```
  <column name="EXITNUM">
    <xmlname>exitNumber</xmlname>
    <minOccurs>0</minOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="NUMLANES">
    <xmlname>numberOfLanes</xmlname>
    <minOccurs>1</minOccurs>
    <minOccurs>1</minOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="PAVSTATUS">
    <xmlname>pavementStatus</xmlname>
    <minOccurs>1</minOccurs>
    <minOccurs>1</minOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="PAVRDSURFTYPE">
    <xmlname>pavedRoadSurfaceType</xmlname>
    <minOccurs>0</minOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="UNPAVRDSURFTYPE">
    <xmlname>unpavedRoadSurfaceType</xmlname>
    <minOccurs>0</minOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="STRUCTID">
    <xmlname>structureID</xmlname>
    <minOccurs>0</minOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="STRUCTTYPE">
    <xmlname>structureType</xmlname>
    <minOccurs>0</minOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="STRUCTNAMEFR">
    <xmlname>structureNameFrench</xmlname>
    <minOccurs>0</minOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="STRUCTNAMEEN">
    <xmlname>structureNameEnglish</xmlname>
    <minOccurs>0</minOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="ROADSEGID">
    <xmlname>roadSegmentID</xmlname>
    <minOccurs>1</minOccurs>
    <maxOccurs>1</maxOccurs>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
  <column name="SEGMENT_">
    <xmlname>segment</xmlname>
    <xmltype>gml:CurvePropertyType</xmltype>
    <useGmlsfShortForm>Y</useGmlsfShortForm>
  </column>
</xmlmap>
```

Annex B
Example of a “CreateFeatureType” request

```
<?xml version="1.0" encoding="UTF-8"?>
<CreateFeatureType version="1.1.1" service="WFS" xmlns="http://www.opengis.net/wfs"
xmlns:gml="http://www.opengis.net/gml" xmlns:ogc="http://www.opengis.net/ogc"
xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:gmlsf="http://www.opengis.net/gmlsf"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:gb="http://www.geobase.ca/interop-
pilot-2007" xmlns:ows="http://www.opengis.net/ows" inputFormat="text/xml;
subtype=gml/3.1.1/sfgml">
  <FeatureType>
    <Name>gb:RoadSegment</Name>
    <Title>Road Segment</Title>
    <Abstract>Example for CreateFeatureType request</Abstract>
    <ows:Keywords>
      <ows:Keyword>CGDI EXAMPLE</ows:Keyword>
    </ows:Keywords>
    <DefaultSRS>urn:x-ogc:def:crs:EPSG:6.11.2:4326</DefaultSRS>
    <OutputFormats>
      <Format>text/xml; subtype=gml/3.1.1/sfgml</Format>
    </OutputFormats>
    <ows:WGS84BoundingBox>
      <ows:LowerCorner>-95.1560592651367 41.7346687316895</ows:LowerCorner>
      <ows:UpperCorner>-74.3444290161133 52.6324462890625</ows:UpperCorner>
    </ows:WGS84BoundingBox>
    <xs:schema targetNamespace="http://www.geobase.ca/interop-pilot-2007"
elementFormDefault="qualified" attributeFormDefault="unqualified" version="1.1">
      <xs:annotation>
        <xs:appinfo
source="http://schemas.opengis.net/gml/3.1.1/profiles/gmlsfProfile/1.0.0/gmlsfLevels.xsd"
>
          <gmlsf:ComplianceLevel>0</gmlsf:ComplianceLevel>

<gmlsf:GMLProfileSchema>http://schemas.opengis.net/gml/3.1.1/profiles/gmlsfProfile/1.0.0/
gmlsf.xsd</gmlsf:GMLProfileSchema>
        </xs:appinfo>
      </xs:annotation>
      <xs:import namespace="http://www.opengis.net/gml"
schemaLocation="http://schemas.opengis.net/gml/3.1.1/profiles/gmlsfProfile/1.0.0/gmlsf.xs
d"/>
      <xs:import namespace="http://www.opengis.net/gmlsf"
schemaLocation="http://schemas.opengis.net/gml/3.1.1/profiles/gmlsfProfile/1.0.0/gmlsfLev
els.xsd"/>
      <!-- ==========================================================
        global element declarations
        ========================================================== -->
      <xs:element name="RoadSegment" type="gb:RoadSegmentType"
substitutionGroup="gml:_Feature"/>
      <xs:complexType name="RoadSegmentType">
        <xs:annotation>
          <xs:appinfo>
            <db_schema>CGDI_MAINT</db_schema>
            <table>ROADSEG</table>
          </xs:appinfo>
          <xs:documentation>
            A road is a linear Section of the earth that is designed for or
            the result of vehicular movement. A Road Segment is the
            representation of a portion of a road that shares the same
            sub-defined linear event attributes.
         </xs:documentation>
        </xs:annotation>
        <xs:complexContent>
          <xs:extension base="gml:AbstractFeatureType">
            <xs:sequence>
              <xs:element name="cgdiId">
                <xs:annotation>
```

```
                    <xs:appinfo>
                      <column>
                        <name>CGDI_ID</name>
                      </column>
                    </xs:appinfo>
                    <xs:documentation>
The "cgdiId" is supposed to be a UUID string generated
and assigned for each feature in the pilot project.
When the provincial data partners initialize their
databases, they will need to generate this value for
each feature.  This could be a pilot wide service, or
could be done locally.  The format of the string is agreed to be like this
urn:uuid:39073691-C393-351D-E040-007F010066D1
                     </xs:documentation>
                  </xs:annotation>
                  <xs:simpleType>
                    <xs:restriction base="xs:string">
                      <xs:maxLength value="64"/>
                    </xs:restriction>
                  </xs:simpleType>
                </xs:element>
                <xs:element name="planimetricDataAccuracy" type="xs:integer">
                  <xs:annotation>
                    <xs:appinfo>
                      <column>
                        <name>ACCURACY</name>
                      </column>
                    </xs:appinfo>
                  </xs:annotation>
                </xs:element>
                <xs:element name="acquisitionTechnique" type="xs:string">
                  <xs:annotation>
                    <xs:appinfo>
                      <column>
                        <name>ACQTECH</name>
                      </column>
                    </xs:appinfo>
                  </xs:annotation>
                </xs:element>
                <xs:element name="acquisitionProvider" type="xs:string">
                  <xs:annotation>
                    <xs:appinfo>
                      <column>
                        <name>ACQPROVIDER</name>
                      </column>
                    </xs:appinfo>
                  </xs:annotation>
                </xs:element>
                <xs:element name="acquisitionOrRevisionDate" type="xs:string">
                  <xs:annotation>
                    <xs:appinfo>
                      <column>
                        <name>ACQORREVDATE</name>
                      </column>
                    </xs:appinfo>
                  </xs:annotation>
                </xs:element>
                <xs:element name="nationalRoadClass" type="xs:string">
                  <xs:annotation>
                    <xs:appinfo>
                      <column>
                        <name>NROADCLASS</name>
                      </column>
                    </xs:appinfo>
                  </xs:annotation>
                </xs:element>
                <xs:element name="routeNumber1" type="xs:string" minOccurs="0">
                  <xs:annotation>
                    <xs:appinfo>
                      <column>
                        <name>RTENUM1</name>
                      </column>
```

```
      </xs:appinfo>
    </xs:annotation>
  </xs:element>
  <xs:element name="routeNameFrench1" type="xs:string" minOccurs="0">
    <xs:annotation>
      <xs:appinfo>
        <column>
          <name>RTENAMEFR1</name>
        </column>
      </xs:appinfo>
    </xs:annotation>
  </xs:element>
  <xs:element name="routeNameEnglish1" type="xs:string" minOccurs="0">
    <xs:annotation>
      <xs:appinfo>
        <column>
          <name>RTENAMEEN1</name>
        </column>
      </xs:appinfo>
    </xs:annotation>
  </xs:element>
  <xs:element name="exitNumber" type="xs:string" minOccurs="0">
    <xs:annotation>
      <xs:appinfo>
        <column>
          <name>EXITNUM</name>
        </column>
      </xs:appinfo>
    </xs:annotation>
  </xs:element>
  <xs:element name="numberOfLanes" type="xs:integer">
    <xs:annotation>
      <xs:appinfo>
        <column>
          <name>NUMLANES</name>
        </column>
      </xs:appinfo>
    </xs:annotation>
  </xs:element>
  <xs:element name="pavementStatus" type="xs:string">
    <xs:annotation>
      <xs:appinfo>
        <column>
          <name>PAVSTATUS</name>
        </column>
      </xs:appinfo>
    </xs:annotation>
  </xs:element>
  <xs:element name="pavedRoadSurfaceType" type="xs:string" minOccurs="0">
    <xs:annotation>
      <xs:appinfo>
        <column>
          <name>PAVRDSURFTYPE</name>
        </column>
      </xs:appinfo>
    </xs:annotation>
  </xs:element>
  <xs:element name="unpavedRoadSurfaceType" type="xs:string" minOccurs="0">
    <xs:annotation>
      <xs:appinfo>
        <column>
          <name>UNPAVRDSURFTYPE</name>
        </column>
      </xs:appinfo>
    </xs:annotation>
  </xs:element>
  <xs:element name="structureID" type="xs:string" minOccurs="0">
    <xs:annotation>
      <xs:appinfo>
        <column>
          <name>STRUCTID</name>
        </column>
```

```
            </xs:appinfo>
          </xs:annotation>
        </xs:element>
        <xs:element name="structureType" type="xs:string" minOccurs="0">
          <xs:annotation>
            <xs:appinfo>
              <column>
                <name>STRUCTTYPE</name>
              </column>
            </xs:appinfo>
          </xs:annotation>
        </xs:element>
        <xs:element name="structureNameFrench" type="xs:string" minOccurs="0">
          <xs:annotation>
            <xs:appinfo>
              <column>
                <name>STRUCTNAMEFR</name>
              </column>
            </xs:appinfo>
          </xs:annotation>
        </xs:element>
        <xs:element name="structureNameEnglish" type="xs:string" minOccurs="0">
          <xs:annotation>
            <xs:appinfo>
              <column>
                <name>STRUCTNAMEEN</name>
              </column>
            </xs:appinfo>
          </xs:annotation>
        </xs:element>
        <xs:element name="roadSegmentID" type="xs:string">
          <xs:annotation>
            <xs:appinfo>
              <column>
                <name>ROADSEGID</name>
              </column>
            </xs:appinfo>
          </xs:annotation>
        </xs:element>
        <xs:element name="segment" type="gml:CurvePropertyType">
          <xs:annotation>
            <xs:appinfo>
              <column>
                <name>SEGMENT_</name>
              </column>
            </xs:appinfo>
          </xs:annotation>
        </xs:element>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
 </xs:complexType>
</xs:schema>
</FeatureType>
</CreateFeatureType>
```

Annex C
CGDI IP Community GML Application Schema

The following GML simple features profile Level 0 application schema was used in the CGDI IP project. Not all participants implemented every feature type, and control of data quality was limited to schema validity, due to the prototype nature of the network.

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<xsd:schema xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:gmlsf="http://www.opengis.net/gmlsf" xmlns:gml="http://www.opengis.net/gml"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:gb="http://www.geobase.ca/interop-
pilot-2007" xmlns="http://www.geobase.ca/interop-pilot-2007"
targetNamespace="http://www.geobase.ca/interop-pilot-2007" elementFormDefault="qualified"
attributeFormDefault="unqualified" version="1.1">
  <!-- Name:    interop-pilot-nrnv12.xsd                                    -->
  <!-- Scope:   define elements and types for CGDI interoperability WFS  -->
  <!--          pilot                                                      -->
  <!-- History: V0.1 Created 2007-04-19                                    -->
  <!--          Modified: 2007-04-27 - removed xsd:nonNegativeInteger     -->
  <!--                                 replaced with xsd:integer           -->
  <!--                    2007-06-26 - changed length of cgndbKey          -->
  <!--                    2007-06-28 - added cgdiId to                     -->
  <!--                                 AbstractPilotFeatureType, which     -->
  <!--                                 is therefore inherited by all       -->
  <!--                                 features in the pilot.              -->
  <!--                    2007-09-14 - relaxed minLength, maxLength        -->
  <!--                                 facets on AdministrativeArea/id     -->
  <!--                    2007-09-20 - removed all references to           -->
  <!--                                 minLength since it is not a valid -->
  <!--                                 gmlsf facet; replaced with length -->
  <!--                                 facet                             -->
  <!--                  2007-10-02 - changed gb:name to gb_name           -->
  <!--                             - changed gb:location to gb:pointLocation-->
  <!--                  2007-10-09 - added comments to describe properties more clearly?
-->
  <!--                                                                     -->
  <!-- Constraints:  Based on GML simple features profile document       -->
  <!--               06-049r1                                              -->
  <!-- Sources: content model based upon available schemas and           -->
  <!--          and data from NRCan GeoBase CGNDB, NRN and               -->
  <!--          Statistics Canada 2006 census geography                  -->
  <!--          GML application schemas                                  -->
  <!-- import constructs from the GML Feature and Geometry schemas       -->
  <!--                                                                     -->
  <xsd:annotation>
    <xsd:appinfo
source="http://schemas.opengis.net/gml/3.1.1/profiles/gmlsfProfile/1.0.0/gmlsfLevels.xsd"
>
      <gmlsf:ComplianceLevel>0</gmlsf:ComplianceLevel>

<gmlsf:GMLProfileSchema>http://schemas.opengis.net/gml/3.1.1/profiles/gmlsfProfile/1.0.0/
gmlsf.xsd</gmlsf:GMLProfileSchema>
    </xsd:appinfo>
  </xsd:annotation>
  <xsd:import namespace="http://www.opengis.net/gml"
schemaLocation="C:\schemas\ogc\gml\3.1.1\base\gml.xsd"/>
  <xsd:import namespace="http://www.opengis.net/gmlsf"
schemaLocation="C:\schemas\ogc\gml\3.1.1\profiles\gmlsfProfile\1.0.0\gmlsfLevels.xsd"/>
  <!-- ========================================================
       global element declarations
       ======================================================== -->
  <xsd:element name="RoadSegment" type="gb:RoadSegmentType"
substitutionGroup="gml:_Feature"/>
```

```
  <xsd:element name="FerryConnectionSegment" type="gb:FerryConnectionSegmentType"
substitutionGroup="gml:_Feature"/>
  <xsd:element name="Junction" type="gb:JunctionType" substitutionGroup="gml:_Feature"/>
  <xsd:element name="BlockedPassage" type="gb:BlockedPassageType"
substitutionGroup="gml: Feature"/>
  <xsd:element name="TollPoint" type="gb:TollPointType"
substitutionGroup="gml:_Feature"/>
  <xsd:element name="PlaceName" type="gb:PlaceNameType"
substitutionGroup="gml:_Feature"/>
  <xsd:element name="AdministrativeArea" type="gb:AdministrativeAreaType"
substitutionGroup="gml:_Feature">
    <xsd:annotation>
      <xsd:documentation>
            Current provincial admin area, e.g. municipality or equivalent.
        </xsd:documentation>
    </xsd:annotation>
  </xsd:element>
  <xsd:element name="CensusDivision" type="gb:CensusDivisionType"
substitutionGroup="gml:_Feature"/>
  <!-- ============================================================
       type definitions for National Road Network
       ============================================================ -->
  <xsd:complexType name="RoadSegmentType">
    <xsd:annotation>
      <xsd:documentation>
            A road is a linear Section of the earth that is designed for or
            the result of vehicular movement. A Road Segment is the
            representation of a portion of a road that shares the same
            sub-defined linear event attributes.
        </xsd:documentation>
    </xsd:annotation>
    <xsd:complexContent>
      <xsd:extension base="gml:AbstractFeatureType">
        <xsd:sequence>
          <xsd:element name="cgdiId">
            <xsd:annotation>
              <xsd:documentation>
The "cgdiId" is supposed to be a UUID string generated
and assigned for each feature in the pilot project.
When the provincial data partners initialize their
databases, they will need to generate this value for
each feature.  This could be a pilot wide service, or
could be done locally.  The format of the string is agreed to be like this
urn:uuid:39073691-C393-351D-E040-007F010066D1
                    </xsd:documentation>
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:maxLength value="64"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="planimetricDataAccuracy" type="xsd:integer"/>
          <xsd:element name="acquisitionTechnique" type="xsd:string"/>
          <xsd:element name="acquisitionProvider" type="xsd:string"/>
          <xsd:element name="acquisitionOrRevisionDate" type="xsd:string"/>
          <xsd:element name="nationalRoadClass" type="xsd:string"/>
          <xsd:element name="routeNumber1" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNumber2" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNumber3" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNumber4" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNumber5" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameFrench1" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameFrench2" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameFrench3" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameFrench4" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameEnglish1" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameEnglish2" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameEnglish3" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameEnglish4" type="xsd:string" minOccurs="0"/>
          <xsd:element name="exitNumber" type="xsd:string" minOccurs="0"/>
          <xsd:element name="numberOfLanes" type="xsd:integer"/>
```

```
          <xsd:element name="pavementStatus" type="xsd:string"/>
          <xsd:element name="pavedRoadSurfaceType" type="xsd:string" minOccurs="0"/>
          <xsd:element name="unpavedRoadSurfaceType" type="xsd:string" minOccurs="0"/>
          <xsd:element name="structureID" type="xsd:string" minOccurs="0"/>
          <xsd:element name="structureType" type="xsd:string" minOccurs="0"/>
          <xsd:element name="structureNameFrench" type="xsd:string" minOccurs="0"/>
          <xsd:element name="structureNameEnglish" type="xsd:string" minOccurs="0"/>
          <xsd:element name="roadSegmentID" type="xsd:string"/>
          <xsd:element name="segment" type="gml:CurvePropertyType"/>
        </xsd:sequence>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>
  <xsd:complexType name="FerryConnectionSegmentType">
    <xsd:annotation>
      <xsd:documentation>
            The route a ferry follows when transporting vehicles between
            two fixed locations on the road network. A Ferry Connection
            is the representation of a ferry route in-between Junctions.
            Two Junctions always bound a Ferry Connection.</xsd:documentation>
    </xsd:annotation>
    <xsd:complexContent>
      <xsd:extension base="gml:AbstractFeatureType">
        <xsd:sequence>
          <xsd:element name="cgdiId">
            <xsd:annotation>
              <xsd:documentation>The "cgdiId" is supposed to be a UUID string generated
and assigned for each feature in the pilot project.
When the provincial data partners initialize their
databases, they will need to generate this value for
each feature.  This could be a pilot wide service, or
could be done locally.  The format of the string is agreed to be like this
urn:uuid:39073691-C393-351D-E040-007F010066D1
                    </xsd:documentation>
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:maxLength value="64"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="planimetricDataAccuracy" type="xsd:integer"/>
          <xsd:element name="acquisitionTechnique" type="xsd:string"/>
          <xsd:element name="acquisitionProvider" type="xsd:string"/>
          <xsd:element name="acquisitionOrRevisionDate" type="xsd:string"/>
          <xsd:element name="nationalRoadClass" type="xsd:string"/>
          <xsd:element name="routeNumber1" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNumber2" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNumber3" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNumber4" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNumber5" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameFrench1" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameFrench2" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameFrench3" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameFrench4" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameEnglish1" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameEnglish2" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameEnglish3" type="xsd:string" minOccurs="0"/>
          <xsd:element name="routeNameEnglish4" type="xsd:string" minOccurs="0"/>
          <xsd:element name="ferrySegmentID" type="xsd:string"/>
          <xsd:element name="segment" type="gml:CurvePropertyType"/>
        </xsd:sequence>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>
  <xsd:complexType name="JunctionType">
    <xsd:annotation>
      <xsd:documentation>
            A Junction is a Point Feature that is always connected to
            one or more Road Elements or Ferry Connections. A
            Junction is defined at the intersection of two or more road
            centrelines, at the intersection of a road and a ferry, at the
```

```
            end of a dead end road and at the intersection of a road or
            ferry with a National, Provincial or Territorial Boundary.
          </xsd:documentation>
    </xsd:annotation>
    <xsd:complexContent>
      <xsd:extension base="gml:AbstractFeatureType">
        <xsd:sequence>
          <xsd:element name="cgdiId">
            <xsd:annotation>
              <xsd:documentation>The "cgdiId" is supposed to be a UUID string generated
and assigned for each feature in the pilot project.
When the provincial data partners initialize their
databases, they will need to generate this value for
each feature.  This could be a pilot wide service, or
could be done locally.  The format of the string is agreed to be like this
urn:uuid:39073691-C393-351D-E040-007F010066D1
                    </xsd:documentation>
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:maxLength value="64"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="exitNumber" type="xsd:string" minOccurs="0"/>
          <xsd:element name="junctionType" type="xsd:string"/>
          <xsd:element name="location" type="gml:PointPropertyType"/>
        </xsd:sequence>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>
  <xsd:complexType name="BlockedPassageType">
    <xsd:annotation>
      <xsd:documentation>
            A structure purposely placed across a road to prevent further
            access.
          </xsd:documentation>
    </xsd:annotation>
    <xsd:complexContent>
      <xsd:extension base="gml:AbstractFeatureType">
        <xsd:sequence>
          <xsd:element name="cgdiId">
            <xsd:annotation>
              <xsd:documentation>The "cgdiId" is supposed to be a UUID string generated
and assigned for each feature in the pilot project.
When the provincial data partners initialize their
databases, they will need to generate this value for
each feature.  This could be a pilot wide service, or
could be done locally.  The format of the string is agreed to be like this
urn:uuid:39073691-C393-351D-E040-007F010066D1
                    </xsd:documentation>
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:maxLength value="64"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="planimetricDataAccuracy" type="xsd:integer"/>
          <xsd:element name="acquisitionTechnique" type="xsd:string"/>
          <xsd:element name="acquisitionProvider" type="xsd:string"/>
          <xsd:element name="acquisitionOrRevisionDate" type="xsd:string"/>
          <xsd:element name="roadElementNID" type="xsd:string"/>
          <xsd:element name="blockedPassageType" type="xsd:string"/>
          <xsd:element name="location" type="gml:PointPropertyType"/>
        </xsd:sequence>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>
  <xsd:complexType name="TollPointType">
    <xsd:annotation>
      <xsd:documentation>
```

```
            Place where a right-of-way is charged to borrow a motorway,
            a bridge, etc.
          </xsd:documentation>
    </xsd:annotation>
    <xsd:complexContent>
      <xsd:extension base="gml:AbstractFeatureType">
        <xsd:sequence>
          <xsd:element name="cgdiId">
            <xsd:annotation>
              <xsd:documentation>The "cgdiId" is supposed to be a UUID string generated
and assigned for each feature in the pilot project.
When the provincial data partners initialize their
databases, they will need to generate this value for
each feature.  This could be a pilot wide service, or
could be done locally.  The format of the string is agreed to be like this
urn:uuid:39073691-C393-351D-E040-007F010066D1
                    </xsd:documentation>
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:maxLength value="64"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="planimetricDataAccuracy" type="xsd:integer"/>
          <xsd:element name="acquisitionTechnique" type="xsd:string"/>
          <xsd:element name="acquisitionProvider" type="xsd:string"/>
          <xsd:element name="acquisitionOrRevisionDate" type="xsd:string"/>
          <xsd:element name="roadElementNID" type="xsd:string"/>
          <xsd:element name="tollPointType" type="xsd:string"/>
          <xsd:element name="location" type="gml:PointPropertyType"/>
        </xsd:sequence>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>
  <xsd:complexType name="CensusDivisionType">
    <xsd:annotation>
      <xsd:documentation/>
    </xsd:annotation>
    <xsd:complexContent>
      <xsd:extension base="gml:AbstractFeatureType">
        <xsd:sequence>
          <xsd:element name="cgdiId">
            <xsd:annotation>
              <xsd:documentation>The "cgdiId" is supposed to be a UUID string generated
and assigned for each feature in the pilot project.
When the provincial data partners initialize their
databases, they will need to generate this value for
each feature.  This could be a pilot wide service, or
could be done locally.  The format of the string is agreed to be like this
urn:uuid:39073691-C393-351D-E040-007F010066D1</xsd:documentation>
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:maxLength value="64"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="id">
            <xsd:annotation>
              <xsd:documentation>This would contain a concatenation of prId+cdId in real
life.</xsd:documentation>
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:length value="4"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="gb_name">
            <xsd:annotation>
```

```
              <xsd:documentation>GeoServer was unable to serve the name element in the
pilot namespace, so we had to change the name to gb_name to workaround the
bug.</xsd:documentation>
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:maxLength value="100"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="type" minOccurs="0">
            <xsd:annotation>
              <xsd:documentation>See enumeration of possible values for list of Census
Division types in Canada.</xsd:documentation>
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:maxLength value="3"/>
                <xsd:enumeration value="CDR">
                  <xsd:annotation>
                    <xsd:documentation>Census division / Division de
recensement</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="CT">
                  <xsd:annotation>
                    <xsd:documentation>County / Comte</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="CTY">
                  <xsd:annotation>
                    <xsd:documentation>County</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="DIS">
                  <xsd:annotation>
                    <xsd:documentation>District</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="DM">
                  <xsd:annotation>
                    <xsd:documentation>District municipality</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="MB">
                  <xsd:annotation>
                    <xsd:documentation>Management board</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="MRC">
                  <xsd:annotation>
                    <xsd:documentation>Municipalite regionale de
comte</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="RD">
                  <xsd:annotation>
                    <xsd:documentation>Regional district</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="REG">
                  <xsd:annotation>
                    <xsd:documentation>Region</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="RM">
                  <xsd:annotation>
                    <xsd:documentation>Regional municipality</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="TE">
                  <xsd:annotation>
```

```
                    <xsd:documentation>Territoire equivalent</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="TER">
                  <xsd:annotation>
                    <xsd:documentation>Territory / Territoire</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="UC">
                  <xsd:annotation>
                    <xsd:documentation>United counties</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="ccFPop" type="xsd:integer" minOccurs="0">
            <xsd:annotation>
              <xsd:documentation>Current Census Final Population</xsd:documentation>
            </xsd:annotation>
          </xsd:element>
          <xsd:element name="ccFPdwell" type="xsd:integer" minOccurs="0">
            <xsd:annotation>
              <xsd:documentation>Current Census Final Private  Dwelling
count</xsd:documentation>
            </xsd:annotation>
          </xsd:element>
          <xsd:element name="prId">
            <xsd:annotation>
              <xsd:documentation>See on-line documentation of provincial codes in use by
Statistics Canada as the "Standard Geographical Classification". 10=NL, 11=PE, 12=NS,
13=NB, 24=QC, 35=ON, 46=MB, 47=SK, 48=AB, 59=BC, 60=YT, 61=NT, 62=NU.  For the purpose of
the pilot, either the SGC code or the Canada Post 2-character letter code will be
adequate. <a name="ProvinceGeocodes"/>
                <a
href="http://geodepot.statcan.ca/Diss2006/Reference/COGG/LongDescription e.jsp?GEO_LEVEL=
2&amp;REFCODE=10&amp;TYPE=L" target="_top">Documentation of Standard Geographical
Classification province codes</a>
              </xsd:documentation>
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:length value="2"/>
                <xsd:enumeration value="10"/>
                <xsd:enumeration value="11"/>
                <xsd:enumeration value="12"/>
                <xsd:enumeration value="13"/>
                <xsd:enumeration value="24"/>
                <xsd:enumeration value="35"/>
                <xsd:enumeration value="46"/>
                <xsd:enumeration value="47"/>
                <xsd:enumeration value="48"/>
                <xsd:enumeration value="59"/>
                <xsd:enumeration value="60"/>
                <xsd:enumeration value="61"/>
                <xsd:enumeration value="62"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="boundary" type="gml:MultiSurfacePropertyType"/>
        </xsd:sequence>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>
  <xsd:complexType name="AdministrativeAreaType">
    <xsd:annotation>
      <xsd:documentation>
            Simplified pilot content model based on STC Census Subdivision
            Definitions and provenance of enumerated domain values are
            documented
```

```
            <a
href="http://geodepot.statcan.ca/Diss2006/Reference/COGG/LongDescription_e.jsp?GEO_LEVEL=
10&amp;REFCODE=10&amp;TYPE=L" target="_top">here</a>.
            <a name="AdministrativeAreaType"/>
      </xsd:documentation>
    </xsd:annotation>
    <xsd:complexContent>
      <xsd:extension base="gml:AbstractFeatureType">
        <xsd:sequence>
          <xsd:element name="cgdiId">
            <xsd:annotation>
              <xsd:documentation>The "cgdiId" is supposed to be a UUID string generated
and assigned for each feature in the pilot project.
When the provincial data partners initialize their
databases, they will need to generate this value for
each feature.  This could be a pilot wide service, or
could be done locally.  The format of the string is agreed to be like this
urn:uuid:39073691-C393-351D-E040-007F010066D1</xsd:documentation>
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:maxLength value="64"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="id" type="xsd:string">
            <xsd:annotation>
              <xsd:documentation>Since the content model of AdministrativeArea was based
on that of CensusSubdivision from Statistics Canada, the id property was used for the
concatenated value of prId+cdId+csdId, which is equal to the Standard Geographical
Classification code of a CSD.  Since this is a pilot, it is not really essential that
this be followed by participants.  </xsd:documentation>
            </xsd:annotation>
          </xsd:element>
          <xsd:element name="gb_name">
            <xsd:annotation>
              <xsd:documentation>This element records the name of the area.  The original
name of the element - name - could not be served by GeoServer due to a hard-core bug.  So
the pilot participants agreed to change to gb_name to work around the
bug.</xsd:documentation>
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:maxLength value="100"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="type">
            <xsd:annotation>
              <xsd:documentation>See the enumeration documentation comments for
allowable content.</xsd:documentation>
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:maxLength value="3"/>
                <xsd:enumeration value="C">
                  <xsd:annotation>
                    <xsd:documentation>City / Cite</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="CC">
                  <xsd:annotation>
                    <xsd:documentation>Chartered community</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="CE">
                  <xsd:annotation>
                    <xsd:documentation>Cite</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="CG">
                  <xsd:annotation>
```

```
                    <xsd:documentation>Community government</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="CM">
                  <xsd:annotation>
                    <xsd:documentation>County (municipality)</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="CN">
                  <xsd:annotation>
                    <xsd:documentation>Crown colony / Colonie de la
couronne</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="COM">
                  <xsd:annotation>
                    <xsd:documentation>Community</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="CT">
                  <xsd:annotation>
                    <xsd:documentation>Canton (municipalite de)</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="CU">
                  <xsd:annotation>
                    <xsd:documentation>Cantons unis (municipalite de)</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="CY">
                  <xsd:annotation>
                    <xsd:documentation>City</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="DM">
                  <xsd:annotation>
                    <xsd:documentation>District municipality</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="HAM">
                  <xsd:annotation>
                    <xsd:documentation>Hamlet</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="ID">
                  <xsd:annotation>
                    <xsd:documentation>Improvement district</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="IGD">
                  <xsd:annotation>
                    <xsd:documentation>Indian government district</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="IM">
                  <xsd:annotation>
                    <xsd:documentation>Island municipality</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="IRI">
                  <xsd:annotation>
                    <xsd:documentation>Indian reserve / Reserve
indienne</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="LGD">
                  <xsd:annotation>
                    <xsd:documentation>Local government district</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="LOT">
                  <xsd:annotation>
```

```
                    <xsd:documentation>Township and royalty</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="M">
                  <xsd:annotation>
                    <xsd:documentation>Municipality / Municipalite</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="MD">
                  <xsd:annotation>
                    <xsd:documentation>Municipal district</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="ME">
                  <xsd:annotation>
                    <xsd:documentation>Municipalite</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="MU">
                  <xsd:annotation>
                    <xsd:documentation>Municipality</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="NH">
                  <xsd:annotation>
                    <xsd:documentation>Northern hamlet</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="NL">
                  <xsd:annotation>
                    <xsd:documentation>Nisga'a land</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="NO">
                  <xsd:annotation>
                    <xsd:documentation>Unorganized / Non organise</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="NV">
                  <xsd:annotation>
                    <xsd:documentation>Northern village</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="NVL">
                  <xsd:annotation>
                    <xsd:documentation>Nisga'a village</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="P">
                  <xsd:annotation>
                    <xsd:documentation>Parish / Paroisse (municipalite
de)</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="PE">
                  <xsd:annotation>
                    <xsd:documentation>Paroisse (municipalite de)</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="RCR">
                  <xsd:annotation>
                    <xsd:documentation>Rural community / Communaute
rurale</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="RDA">
                  <xsd:annotation>
                    <xsd:documentation>Regional district electoral
area</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="RG">
```

```
                    <xsd:annotation>
                      <xsd:documentation>Region</xsd:documentation>
                    </xsd:annotation>
                  </xsd:enumeration>
                  <xsd:enumeration value="RGM">
                    <xsd:annotation>
                      <xsd:documentation>Regional municipality</xsd:documentation>
                    </xsd:annotation>
                  </xsd:enumeration>
                  <xsd:enumeration value="RM">
                    <xsd:annotation>
                      <xsd:documentation>Rural municipality</xsd:documentation>
                    </xsd:annotation>
                  </xsd:enumeration>
                  <xsd:enumeration value="RV">
                    <xsd:annotation>
                      <xsd:documentation>Resort village</xsd:documentation>
                    </xsd:annotation>
                  </xsd:enumeration>
                  <xsd:enumeration value="S-E">
                    <xsd:annotation>
                      <xsd:documentation>Indian settlement / Etablissement
indien</xsd:documentation>
                    </xsd:annotation>
                  </xsd:enumeration>
                  <xsd:enumeration value="SA">
                    <xsd:annotation>
                      <xsd:documentation>Special area</xsd:documentation>
                    </xsd:annotation>
                  </xsd:enumeration>
                  <xsd:enumeration value="SC">
                    <xsd:annotation>
                      <xsd:documentation>Subdivision of county municipality / Subdivision
municipalite de comte</xsd:documentation>
                    </xsd:annotation>
                  </xsd:enumeration>
                  <xsd:enumeration value="SE">
                    <xsd:annotation>
                      <xsd:documentation>Settlement / Etablissement</xsd:documentation>
                    </xsd:annotation>
                  </xsd:enumeration>
                  <xsd:enumeration value="SET">
                    <xsd:annotation>
                      <xsd:documentation>Settlement</xsd:documentation>
                    </xsd:annotation>
                  </xsd:enumeration>
                  <xsd:enumeration value="SM">
                    <xsd:annotation>
                      <xsd:documentation>Specialized municipality</xsd:documentation>
                    </xsd:annotation>
                  </xsd:enumeration>
                  <xsd:enumeration value="SNO">
                    <xsd:annotation>
                      <xsd:documentation>Subdivision of unorganized / Subdivision non
organisee</xsd:documentation>
                    </xsd:annotation>
                  </xsd:enumeration>
                  <xsd:enumeration value="SV">
                    <xsd:annotation>
                      <xsd:documentation/>
                    </xsd:annotation>
                  </xsd:enumeration>
                  <xsd:enumeration value="T">
                    <xsd:annotation>
                      <xsd:documentation>Town</xsd:documentation>
                    </xsd:annotation>
                  </xsd:enumeration>
                  <xsd:enumeration value="TC">
                    <xsd:annotation>
                      <xsd:documentation>Terres reservees aux Cris</xsd:documentation>
                    </xsd:annotation>
                  </xsd:enumeration>
```

```
                <xsd:enumeration value="TI">
                  <xsd:annotation>
                    <xsd:documentation>Terre inuite</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="TK">
                  <xsd:annotation>
                    <xsd:documentation>Terres reservees aux Naskapis</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="TL">
                  <xsd:annotation>
                    <xsd:documentation>Teslin land</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="TP">
                  <xsd:annotation>
                    <xsd:documentation>Township</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="TV">
                  <xsd:annotation>
                    <xsd:documentation>Town / Ville</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="V">
                  <xsd:annotation>
                    <xsd:documentation>Ville</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="VC">
                  <xsd:annotation>
                    <xsd:documentation>Village cri</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="VK">
                  <xsd:annotation>
                    <xsd:documentation>Village naskapi</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="VL">
                  <xsd:annotation>
                    <xsd:documentation>Village</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
                <xsd:enumeration value="VN">
                  <xsd:annotation>
                    <xsd:documentation>Village nordique</xsd:documentation>
                  </xsd:annotation>
                </xsd:enumeration>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="ccFPop" type="xsd:integer" minOccurs="0">
            <xsd:annotation>
              <xsd:documentation>Current Census Final Population.  Integer greater than
or equal to zero.  Optional.</xsd:documentation>
            </xsd:annotation>
          </xsd:element>
          <xsd:element name="ccFPdwell" type="xsd:integer" minOccurs="0">
            <xsd:annotation>
              <xsd:documentation>Current Census Final Dwelling count.  Integer greater
than or equal to zero.  Optional.</xsd:documentation>
            </xsd:annotation>
          </xsd:element>
          <xsd:element name="prId">
            <xsd:annotation>
              <xsd:documentation>10=NL, 11=PE, 12=NS, 13=NB, 24=QC, 35=ON, 46=MB,47=SK,
48=AB, 59=BC, 60=YT, 61=NT, 62=NU.  This is a Statistics Canada standard, called the
Standard Geographical Classification.  The domain is not enumerated by this schema, so
the 2-character Canada Post mnemonic codes will work just as well in the
pilot</xsd:documentation>
```

```
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:length value="2"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="cdId" type="xsd:string">
            <xsd:annotation>
              <xsd:documentation>Once again, this is from the Standard Geographical
Classification of Statistics Canada.  The hierarchy of an administrative area is PR-CD-
CSD (Province-Census Division-Census Subdivision)</xsd:documentation>
            </xsd:annotation>
          </xsd:element>
          <xsd:element name="boundary" type="gml:MultiSurfacePropertyType"/>
        </xsd:sequence>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>
  <xsd:complexType name="PlaceNameType">
    <xsd:annotation>
      <xsd:documentation>
            Simplified pilot model based on downloaded geobase gml data.
        </xsd:documentation>
    </xsd:annotation>
    <xsd:complexContent>
      <xsd:extension base="gml:AbstractFeatureType">
        <xsd:sequence>
          <xsd:element name="cgdiId">
            <xsd:annotation>
              <xsd:documentation>The "cgdiId" is supposed to be a UUID string generated
and assigned for each feature in the pilot project.
When the provincial data partners initialize their
databases, they will need to generate this value for
each feature.  This could be a pilot wide service, or
could be done locally.  The format of the string is agreed to be like this
urn:uuid:39073691-C393-351D-E040-007F010066D1</xsd:documentation>
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:maxLength value="64"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="geographicalName">
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:maxLength value="100"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="cgndbKey">
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:maxLength value="5"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="genericTerm" type="xsd:string"/>
          <xsd:element name="conciseTerm" type="xsd:string"/>
          <xsd:element name="latitude" type="xsd:string"/>
          <xsd:element name="longitude" type="xsd:string"/>
          <xsd:element name="datum" type="xsd:string">
            <xsd:annotation>
              <xsd:documentation>eg NAD83</xsd:documentation>
            </xsd:annotation>
          </xsd:element>
          <xsd:element name="ntsMap" type="xsd:string">
            <xsd:annotation>
              <xsd:documentation>National Topographic Series mapsheet
identifier.</xsd:documentation>
            </xsd:annotation>
```

```
          </xsd:element>
          <xsd:element name="regionName" type="xsd:string">
            <xsd:annotation>
              <xsd:documentation>Province name</xsd:documentation>
            </xsd:annotation>
          </xsd:element>
          <xsd:element name="featureId">
            <xsd:annotation>
              <xsd:documentation>See document on twiki schema page about this
property.</xsd:documentation>
            </xsd:annotation>
            <xsd:simpleType>
              <xsd:restriction base="xsd:string">
                <xsd:maxLength value="32"/>
              </xsd:restriction>
            </xsd:simpleType>
          </xsd:element>
          <xsd:element name="pointLocation" type="gml:PointPropertyType">
            <xsd:annotation>
              <xsd:documentation>GeoServer was unable to serve the location property
name, so we changed it to pointLocation to work around the bug.</xsd:documentation>
            </xsd:annotation>
          </xsd:element>
        </xsd:sequence>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>
</xsd:schema>
```