Completing a Single, Survey-Aware Cadastre for British Columbia

Esri International User Conference
July 13th 2017

Brian Greening
Director, ParcelMap BC Operations
British Columbia is the 3rd largest province in Canada and covers a total area of 944,735 km² (364,764 sq mi)

Approximately 93% of land is Provincial Crown land
~ 90% is unsurveyed
~ 2% is covered by fresh water
~ 40,000 Islands

Approximately 7% of land is privately owned land
~ 2,100,000 titled parcels
~ 500,000 strata parcels (condominium)
~ 50% of new parcels are strata
~ 1% is Federal land

Over:
2x California (424,000 km²)
3x United Kingdom (243,600 km²)
9 different primary survey systems used to describe land:

- First System 1851: Hudson's Bay Company Sections
- Second System 1858: Sections and Ranges Vancouver Island
- Third System 1858: Sections, Ranges, Blocks
- Fourth System: Variable Sized District Lots
- Fifth System 1873: Townships in New Westminster District
- Sixth System: Provincial Townships
- Seventh System: Island Townships
- Eighth System: District Lot System
- Ninth System: Dominion Lands

Geo-referencing of survey plans:

- 5 UTM Zones: 7N, 8N, 9N, 10N, 11N
- 3 Reference Datums: 3 Realizations of NAD83 CSRS
Lands administered in:

2 x Provincial land registries
- land title register ("PID")
- Crown land registry ("PIN")

plus
- Canada Lands registry
- Treaty First Nation registries
# ParcelMap BC: Project Primary Goal

Create and develop an operational model for a *single, complete, trusted* and *sustainable* visual representation of lands in British Columbia within a given parcel and its relationship to adjacent parcels.

<table>
<thead>
<tr>
<th>Single</th>
<th>• One parcel fabric covering all local government areas including municipalities, the rural areas of all Regional Districts, and all surveyed parcels of provincial Crown lands.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete</td>
<td>• Account for all active survey parcels in the provincial Crown Land Registry and all parcels with active titles in the land title register.</td>
</tr>
<tr>
<td>Trusted</td>
<td>• Define standards for parcel attribution, topology, currency, auditability, and spatial accuracy. New surveys adhere to spatial accuracy standards aiding in improving quality over time.</td>
</tr>
<tr>
<td>Sustainable</td>
<td>• ParcelMap BC parcel fabric and operational framework is financially sustainable being maintained and enhanced over time by LTSA with guidance from our stakeholders.</td>
</tr>
</tbody>
</table>
ParcelMap BC: Where are we today – Project?

Phase I ~ 59 months duration

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Stage 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition and Procurement</td>
<td>Technology Build and Fabric Compilation</td>
</tr>
<tr>
<td>22 months duration</td>
<td>~ 33 months duration</td>
</tr>
</tbody>
</table>

Phase II

| Enhancement and Fabric Improvements |

Phase III

| Confirmation of Scope and High-Level Plan |

2012 2013 2014 2015 2016 2017 +

Phase I ~ 59 months duration

Scope Refinement 4 months

Stage 2 Technology Build and Fabric Compilation ~ 33 months duration

Phase II

Ongoing Operations
ParcelMap BC begins operations upon delivery of first compilation increment, and parcel fabric management capability

Confirmation of Scope and High-Level Plan

We are Here
ParcelMap BC: Who was involved?

Participating Stakeholders

Province of British Columbia
Source contributions, provincial adoption, Open Government view

Integrated Cadastral Information Society
Local Government contributions & member distribution channel

Association of BC Land Surveyors
Survey Plan Dataset submissions

BC Assessment
ParcelMap BC Grant Program to assist local government adoption

Core Project Team

MacDonald, Dettwiler and Associates (MDA)
Martin Newby Consultants (MNC)
Esri Canada
ParcelMap BC: Where are we today – Fabric?

COMPLETED!

Compiled & moved to Operations incrementally:

- 29 Regional administrative areas;
- Divided into 18 compilation increments;
- Accepted in 14 delivery cycles.

First in August 2015
Last in June 2017
Focused on using the best / pedigree sources:

**Spatial Representation**

*Initial Compilation*
- Geometry inversed from pre-existing representations or COGO from Plan
- 12000 Cadastral Ties collected plus ~ 35000 horizontal geodetic control monuments

*During Operations*
- Geometry from **Survey Plan Datasets** from land surveyors
- New control with (nearly) every new survey plan dataset
- Capturing Surveyed Interests (ex. Easements, rights of way, Road dedications, etc...)
- Performing Spatial Improvements (LSAs, etc...)

**Attribution & Event Triggers**
- Land title register: for completeness & attribution on titled parcels
- Crown land registry: for completeness & attribution on Crown land parcels
Survey Plan Datasets

A requirement for all new survey plans with the support of the BC land surveyors.

• Mandated by the Surveyor General of BC under Practice Bulletin #3
• Submission required prior to acceptance of legal survey plan by the LTSA
• Voluntary since December 2015, Mandatory since September 2nd 2016

“Create, Validate and Submit” electronic submission process

• .DWG + .CSV and metadata via web form
COMPLETED!

Systems supporting ParcelMap BC were commissioned in 4 major releases:

**R1: Jan ’15**
- Parcel Fabric Manager
- Production Fabric

**R2: Oct ’15**
- Work Management & Reporting
- Survey Plan Dataset Submission

**R3: Apr ’16**
- Surveyor Search & Download
- Published Fabric

**R4: Aug ’16**
- Parcel Information Search
- ParcelMap Direct
- Operational Reporting

©2017 Land Title and Survey Authority of British Columbia
ParcelMap BC: Systems / Technology

Production Parcel Fabric

Published Parcel Fabric

Parcel Fabric Manager & Work Manager

Secure Web Service Transfer

ParcelMap Direct

myLTSA Customer Portal

Parcel Information Search

Surveyor Search & Download

Survey Plan Dataset Submission

ParcelMap BC: Systems / Technology

Production Parcel Fabric

Published Parcel Fabric

Parcel Fabric Manager & Work Manager

Secure Web Service Transfer

ParcelMap Direct

myLTSA Customer Portal

Parcel Information Search

Surveyor Search & Download

Survey Plan Dataset Submission
ParcelMap BC: PFM & Work Management
ParcelMap BC: Service Channels

Survey Plan Dataset Submissions on myLTSA Portal:
Land Surveyors: *launched November ’15* (Mandatory submissions since September ’16)

ParcelMap BC Search on myLTSA Portal:
- Land Surveyors: *launched April ’16*
- Other myLTSA users: *launched Aug ’16*
- Guest users: *launched July 10th ’17*

ParcelMap Direct web service:
Extracts & Updates for Participating Stakeholders: *launched August ’16*

ParcelMap BC - Open Government on BC Data Catalogue
Simplified data model available under OGL: *launched November ’16*
ParcelMap BC: Benefits, Opportunities & Moving Forward

Single, shared point of reference to drive efficiency
- Increases accuracy & speed of real property transactions in BC
- Supports more informed land-related research, planning & business decisions

Authoritative representation
- Triggers & attribution direct from land title register and Crown land registry
- Datasets from land surveyors based on plan filings to update spatial representation

Timely Updates
- Published daily with service target of 2 day turnaround (once fully operational)

Continual Improvement
- Georeferenced surveys power adjustments and improvements to the survey-aware fabric

Adoption allows current maintainers to focus on value-add products
- Development Plans: Surrey adopts Survey Plan Dataset standard
- Change vector output simplifies alignment (ex. aligned Boundaries & Infrastructure)
Questions?

More Info available at:

ltsa.ca/ParcelMapBC

The Land Title and Survey Authority of British Columbia (LTSA) is a publicly accountable, statutory corporation formed in 2005 responsible for operating the land title and survey systems of British Columbia