ParcelMap BC

Survey Plan Dataset Specifications

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CHANGE RECORD

ISSUE	DATE	PAGE(S)	DESCRIPTION
0/1	23 Sept. 2014	All	For 90% Review
1/0	06 Oct. 2014	All	First Issue
1/1	27 Nov. 2014	All	First Issue, First Revision
1/2	28 Aug. 2015	All	First Issue, Second Revision Incorporation of feedback from ABCLS, minor clarifications throughout, update web links, include higher resolution Figures, remove redundant references
1/3	17 Feb. 2016	All	First Issue, Third Revision Update hyperlinks throughout to link to new LTSA.ca website Added additional note about all layers being required in section 3.1 Added item 5 of Rules for Creation of Survey Data Control Point File in section 3.2 Removed unused fields from Table 3-3 Updated values in Table 3-4 to match CPDM values instead of ESRI default values

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ACRONYMS AND ABBREVIATIONS

2D	Two Dimensional
ABCLS	Association of BC Land Surveyors
ASTRA	ASTRA is the LTSA's enterprise line-of-business system used for management of the Land Title Register, and processing submissions to the Surveyor General's Division. It also includes the myLTSA Customer Portal used for customer submissions to, and searches of the Land Titles Register.
CAD	Computer Aided Design
CLR	Crown Land Registry
COTS	Commercial Off-The-Shelf
CSRS	Canadian Spatial Reference System
CSV	Comma Separated Value – a data file format
DL	District Lot
DWG	.dwg ("Drawing") file, a Computer Aided Design (CAD) file format
GNSS	Global Navigation Satellite System
LTR	Land Title Register
LTSA	Land Title and Survey Authority
MASCOT	Management of Survey Control Operations and Tasks - a provincial government system for managing information pertaining to the physical control monuments that comprise the BC Geo-spatial Reference
N/A	Not Applicable
PID	Parcel Identifier (Land Title Register)
PIN	Parcel Identifier Number (Crown Land Registry)
PMBC	ParcelMap BC
PPM	Parts Per Million
PPP	Precise Point Positioning
RTN	Real Time Network, as defined in the General Survey Instruction Rules (Applicable Documents A-1)
TBC	To Be Confirmed
TBD	To Be Determined
UI	User Interface
UTM	Universal Transverse Mercator

1 INTRODUCTION

1.1 Purpose

This document defines the specification of the Survey Plan Dataset to be submitted to the ParcelMap BC Parcel Fabric Manager system through the Survey Plan Submission on-line submission tool to be accessed via the myLTSA Customer Portal.

The digital Survey Plan Dataset will be used to:

- Integrate newly Surveyed Parcels and Geo-Referenced Points with the existing fabric via the Parcel Fabric Manager (PFM) system used by the ParcelMap BC Operations Team, and
- Improve the overall spatial accuracy of the ParcelMap BC fabric.

1.2 Scope

This document defines the Survey Plan Dataset and the organization of its elements (metadata, digital files, format, and content) for submission by Land Surveyors into the ParcelMap BC Parcel Fabric Manager.

The following is NOT in scope for this document:

- Business process for overall Crown Land Registry and Land Title Register submission;
- Details or specifications regarding the Survey Plan Submission on-line submission tool and its integration into the myLTSA Customer Portal;
- Survey Plan Dataset submission user responses. Survey Plan Datasets will be validated based on this specification, but user responses, such as validation error messages, are not included in this document as they are an aspect of the UI interaction design;
- Other services provided to ABCLS Land Surveyors through the Customer Portal. There is a list of services to be provided, such as search and download parcels. These services are not discussed in this document.

1.3 Intended Audience

This document is intended for:

- LTSA business specialists who must ensure the Survey Plan Dataset Specifications defined are correct and sufficient to support ParcelMap BC operations.
- ABCLS Land Surveyors who must prepare a Survey Plan Dataset and submit it through the myLTSA Customer Portal on-line submission tool.
- ParcelMap BC system engineers and developers who must design and build the ParcelMap BC fabric and related systems.

- ParcelMap BC Operations team who must interpret and work with the Survey Plan Dataset submission to update and maintain the ParcelMap BC fabric.

1.4 Overview

This document is structured as follows:

- Section 1, Introduction, is this introduction.
- Section 2, Business Constraints and Considerations, identifies business constraints and considerations that are used as guidelines for making decisions on the Survey Plan Dataset Specifications.
- Section 2, Survey Plan Dataset Specifications, defines the Survey Plan Dataset bundle to be submitted by the Land Surveyors, and the data elements and organization of the bundle.
- Appendix A, Example Survey Plan Dataset files, provides some sample Survey Plan Dataset files.

1.5 Document

1.5.1 Applicable Documents

The following documents form part of this specification to the extent referenced herein. Any conflict between any of these documents shall be brought to the attention of LTSA for resolution.

A-1 General Survey Instruction Rules V3.10 – January 2016, ABCLS

A-2 Surveyor General Circular Letters, LTSA:, specifically:

Circular Letter No. 463: Official Horizontal Datums for Georeferencing Legal Surveys in British Columbia, and

Land Survey Act of British Columbia

A-3 Practice Bulletin No 3:

Surveyor General's Requirements for the Submission of a Survey Plan Dataset to Support ParcelMap BC

1.5.2 Reference Documents

The following documents were used for background information for this document

R-1 ParcelMap BC Requirements Document PMBC-53-4188

R-2 Autodesk .dwg File Specification

2 BUSINESS CONSTRAINTS AND CONSIDERATIONS

This section identifies business constraints and considerations for the Survey Plan Dataset Specification. They are used as guidelines for making decisions on specification details.

- Do not impact existing CLR & LTR registration business processes.
- Support BC land survey requirements and regulations via a requirement established through a Surveyor General directive under Sections 14.1(c) and 14.1(c.1) of the *Land Survey Act*.
  - Practice Bulletin No 3: Surveyor General's Requirements for the Submission of a Survey Plan Dataset to Support ParcelMap BC.
- Minimize new work/tools required by the BC Land Surveyor community unless the need for new work/tools is offset by tangible benefits to the BC Land Surveyor community.
- Deliver useful functions to Land Surveyors including planning facilitation and submission validation.
- Optimize the automation and manual work processes required by the ParcelMap BC Operations team and the Parcel Fabric Manager system.

3 SURVEY PLAN DATASET SPECIFICATIONS

This section defines data elements to be included in the Survey Plan Dataset, and the organization of the data elements to be submitted through the Survey Plan Submission tool via the myLTSA Customer Portal for use in the ParcelMap BC Parcel Fabric Manager system.

A Survey Plan Dataset consists of the following three (3) components:

1) Survey Data CAD File – all spatial information that defines the Survey Plan (i.e. lines, arcs, annotations, natural boundaries etc.) as required by this specification.
2) Survey Data Control Point File – all control points shown on the Survey Plan (listed in MASCOT and Georeferenced points derived or referenced in the survey).
3) Survey Plan Metadata Submission Web Form (provided by Customer Portal) – metadata that describes the Survey Plan Dataset (i.e. Survey Date, Plan Type, etc.).

The following sub-sections describe what data elements are included in which component.

In addition to what is defined in these components, other data elements needed to incorporate a Survey Plan Dataset into ParcelMap BC will be obtained by accessing either the Land Title Register, Crown Land Registry, or set through standard operating procedures or system parameters maintained by the ParcelMap BC Operations team. These data elements will not be collected from the Land Surveyors.

3.1 Survey Data CAD File Specification

The following describes the CAD file format and standards:

- CAD file submissions must be two dimensional (2D) .dwg format (reference R-2).
- Individual CAD files are required for each new plan. i.e. a new subdivision and a new easement cannot be submitted in one submission even if the plans are to be submitted to the registry concurrently.
- All CAD file submissions must accurately reflect those elements of the plan to be filed as required by this specification.
- CAD file data must be segregated according to the layers listed in Table 3-1. If data is provided that does not have a layer defined in the chart it must be located on layers not specified in the Table. All PMBC required layers (9) must be present within the CAD file even if they do not contain any data.
- Line work must be topologically clean and without duplicates (on the same layer), gaps or overshoots.
- All data on layers specified in Table 3-1 must be drawn in Model space.
- The coordinate system of the CAD file must be UTM NAD83 (CSRS), per Circular Letter No. 463 (reference A-2), and be geo-referenced and located as per the General Survey Instruction Rules (reference A-1).
- Use of the dimension and bearing quality checking function is optional. If a land surveyor does not want to use this functionality they need not place any data on layer PMBC_DIM.

Table 3-1 Survey Plan Dataset CAD Entities and Layers

Entities	Layer name
One closed polygon surrounding the extent of the survey is required. This polygon need not be coincident with other line work on other layers (it can be 'free hand') and should include the lands surveyed (entities within the heavy outline as well as other survey evidence found or set on the plan and resolved boundaries). The polygon may also include the connection lines to control that are within a reasonable proximity of the survey (long ties to georeferencing control that would significantly change the survey extent need not be included within this polygon). The polygon must be drawn as a closed shape without gaps. This polygon will be used to show the extent of the survey work on any given plan. This entity is not to be shown (plotted) on official plan of record (pdf).	PMBC_SURVEY_LIMITS
For plans that create or redefine lots or portions thereof this layer is to contain the text that describes the smallest component of the legal description that uniquely identifies the parcel within the plan (in many cases this would be the lot number). *Dedicated as Road, Dedicated as Park, Return to Crown and Common Property* are other examples of labels that should be on this layer. For plans that create interest parcels such as easements, rights of way and covenants this layer should contain unique text that describes the area such as *"Easement Area 1", "Easement Area 2"*, etc. This layer does not include road names or water body names. This information can be provided as single line text or multi-line text and may include leaders (but not required).	PMBC_DESIGNATION
Parcel lines, arcs and 2D polylines (for natural boundaries only) within and coincident with the exterior boundaries of the land being dealt with by the plan, commonly referred to as "within and coincident with the heavy outline". This layer is not to include parcel boundaries that are to be cancelled as a result of the plan nor shall it include interest parcel (easement, right of way, covenant or lease) lines. This layer is not to include radial lines.	PMBC_PARCEL_LINE
Interest parcel lines, arcs and 2D polylines (for natural boundaries only) within and coincident with the exterior boundaries of the interest being dealt with by the plan, commonly referred to as "within and coincident with the heavy outline" for NEW interest parcels. The interest parcel in its entirety is required to be drawn on this layer even where boundaries are coincident with underlying parcel lines and arcs features.	PMBC_INTEREST_LINE
Surveyed connection lines – full length (not foreshortened). This layer is not to include radial lines.	PMBC_TIE_LINE

Entities	Layer name
Additional resolved parcel boundary lines that are not included as part of layer PMBC_PARCEL_LINE or PMBC_INTEREST_LINE– full length (not foreshortened). These lines are outside of the heavy outline.	PMBC_RESOLVED_LINES
Dimensions (i.e., distances, bearings and arc lengths) and associated leader lines. This information should be provided as single line text. Information on this layer that is within a block entity or is an object label will not be processed.	PMBC_DIM
Road Name, Lane, Road Allowance and Walk Way Text This information can be provided as single line text or multi-line text.	PMBC_ROAD_NAME
Any other CAD entities that the land surveyor feels would be useful in understanding the plan can be included in this optional layer.	PMBC_OTHER

The following three figures provide an example of the application of the layer elements defined in Table 3-1:

Figure 3-1 represents the sample plan as it would appear for filing in the Land Title Office. For illustration, in Figure 3-2, the elements from the plan which are included in the layers defined by Table 3-1, have been coloured as described in the legend included in the Figure. Note that all elements in Figure 3-2 which are shown in black can be provided on layers that are not prescribed in Table 3-1 and are not required in PMBC. Figure 3-3 provides a view of the information which is required to be provided in the PMBC Survey Data CAD file. Note that Figure 3-2 is illustrative only, and as shown in Figure 3-3 PMBC requires full-length lines, rather than the foreshortened lines shown in Figure 3-2.

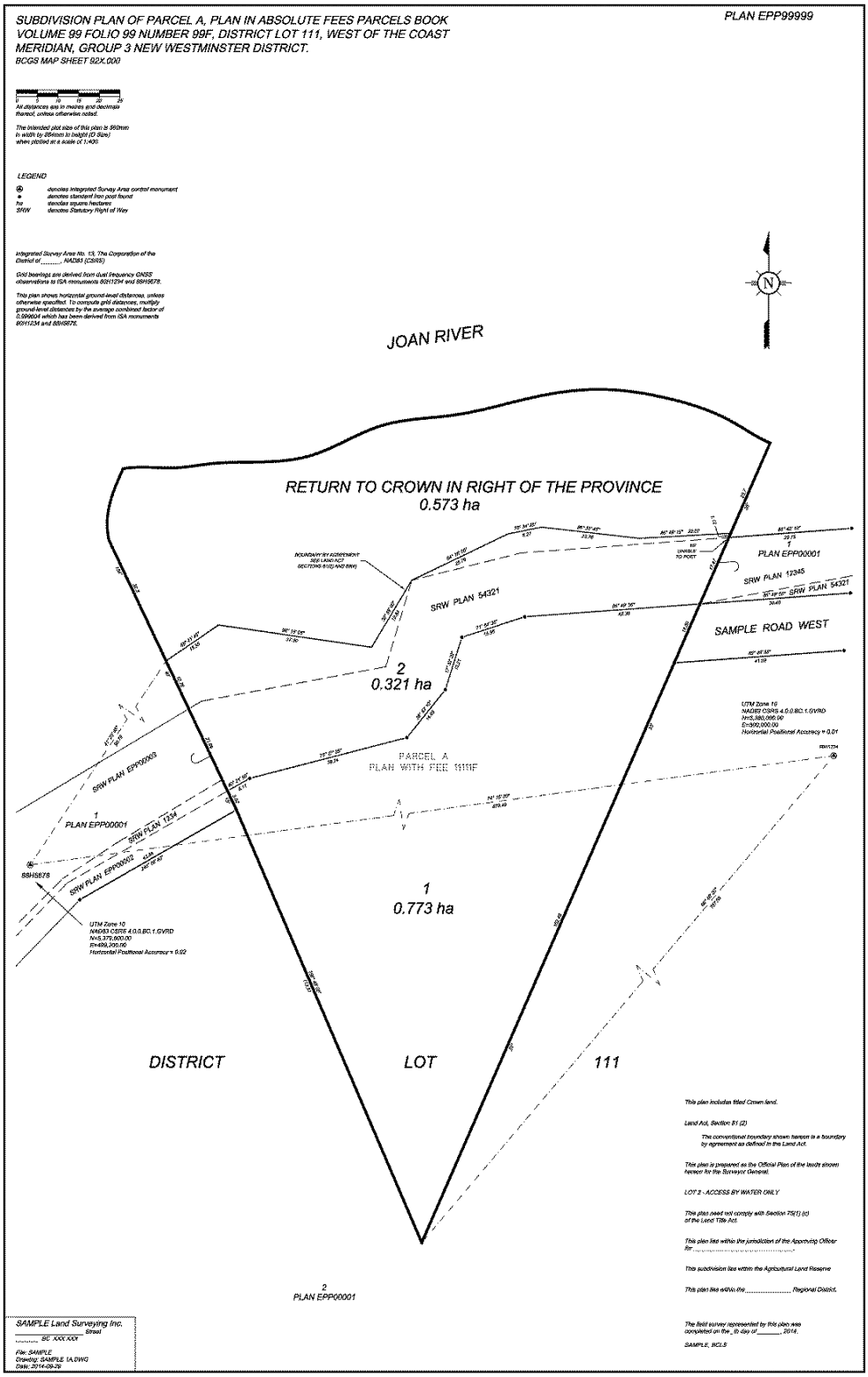

Figure 3-1 Sample Plan Prepared for Filing in the Land Title Office
(Full resolution PDF available with Sample Dataset download found in Appendix A)

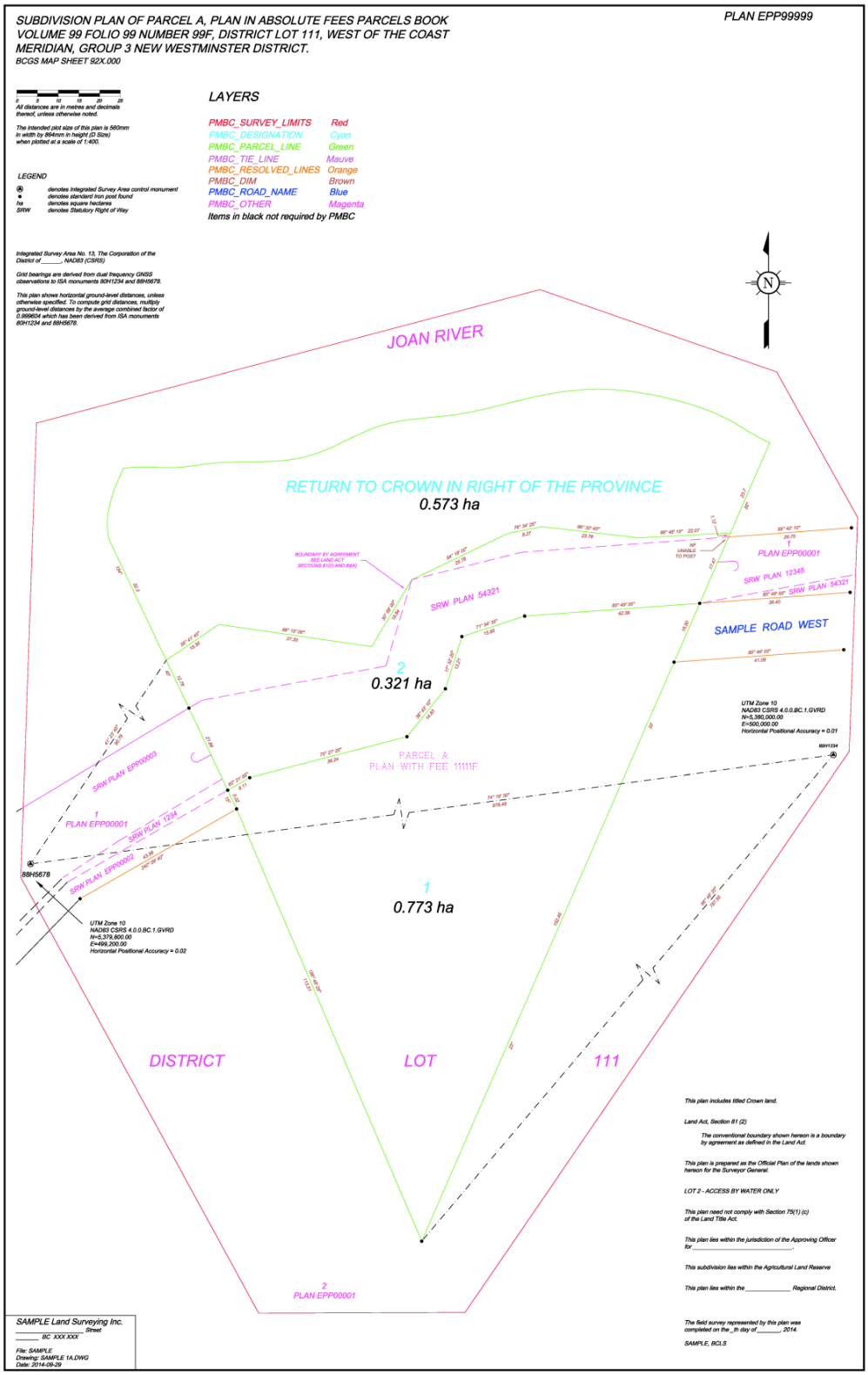

Figure 3-2 Sample Plan Indicating the Layers Defined in Table 3-1
(Full resolution PDF available with Sample Dataset download found in Appendix A)

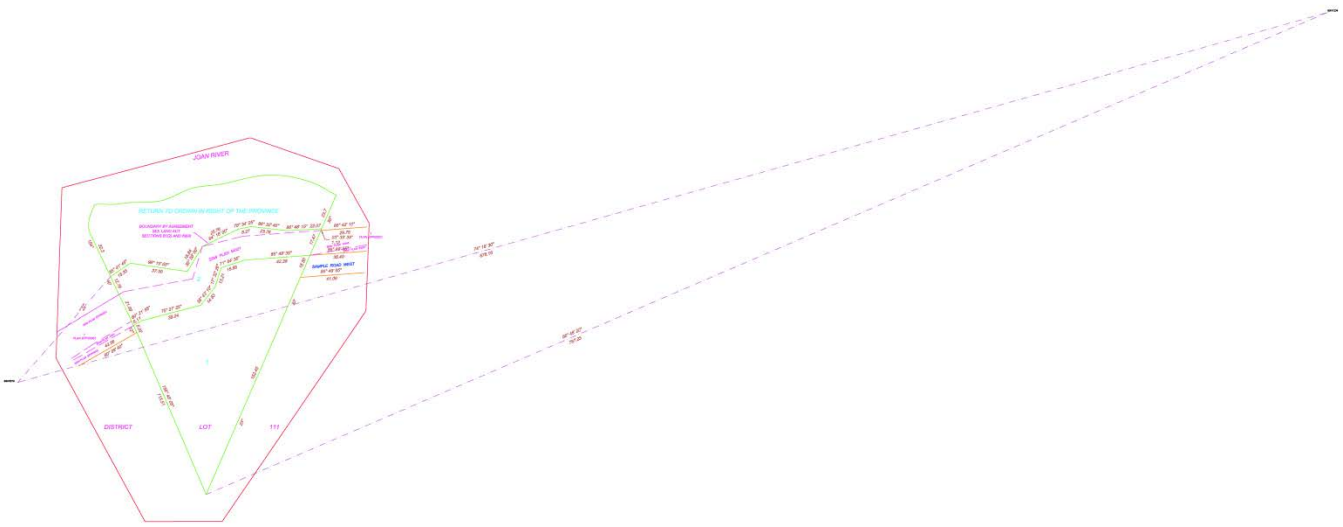

Figure 3-3 Net Information Required by the Layers Defined in Table 3-1
(Full resolution PDF available with Sample Dataset download found in Appendix A)

3.2 Survey Data Control Point File Specification

This section defines the requirements for the Survey Data Control Point file, which will accompany the CAD file in the survey dataset submission.

In the following table "Conditional" means is mandatory only if another condition is met, if the other condition is not met then the field is not required to be filled out.

Table 3-2 Survey Data Control Point File

Data Element	Description	Mandatory?	Notes
Point Number	Identification number for the point	Y	For MASCOT, this would be the GCM_NO number, other points are at the discretion of the land surveyor
Northing	Northward-measured distance (y-coordinate)	Y	In the specified UTM coordinate system
Easting	Eastward-measured distance (x-coordinate)	Y	In the specified UTM coordinate system
Orthometric Height	Height above geoid	N	If no elevation has been provided, this field should be left empty
Description	Describes the Point	Y	Text string, for MASCOT points use the Tablet Marking, other points are at the discretion of the land surveyor

Data Element	Description	Mandatory?	Notes
Horizontal Accuracy (Semi-Major)	The Horizontal Positional Accuracy as defined in the GSIR OR the semi-major axis of the error ellipse at a 95% confidence level (in metres)	Conditional	Required unless Point Type is Geodetic (MASCOT); for MASCOT points, leave empty
Horizontal Accuracy (Semi-Minor)	The semi-minor axis of the error ellipse at a 95% confidence level (in metres)	N	If empty, assumes error circle based on Horizontal Accuracy (Semi-Major)
Horizontal Accuracy Angle	Azimuth of semi-major axis of error ellipse (in Decimal Degrees DD)	N	If empty, assumes error circle based on Horizontal Accuracy (Semi-Major)
Z Accuracy	Z-coordinate accuracy at a 95% confidence level	Conditional	Required if an orthometric height has been provided. For MASCOT points, leave empty
Point Type	The type of point being captured, one of: • G (for Geodetic) • S (for Survey) • F (for Fabric)	Y	Geodetic is a point listed in MASCOT. Survey is a point that has been georeferenced for the subject plan. Fabric is a point whose georeferenced position has been derived from ParcelMap BC.

Rules for Creation of Survey Data Control Point File

1) The data elements in the file must be separated by a Comma "," including blanks where no data has been provided, for example P,N,E,Z,D,,,,,G.
2) Each point record in the file must be provided on a separate line.
3) The file shall not contain a header line.
4) The file extension must be .csv.
5) Point numbers must be only numeric values with no alpha or separator characters.

3.3 Survey Plan Metadata Specification

This section defines data elements to be submitted by completing a web form through the Survey Plan Submission tool accessed via the myLTSA Customer Portal.

In the following table "Conditional" means is mandatory only if another condition is met, if the other condition is not met then the field is not required to be filled out.

Table 3-3 Survey Plan Metadata

Data Element	Description	Mandatory?	Type	Notes
CLR Plan Number	The Crown Land Registry number (EPC) of the survey plan for which the survey data set applies	Conditional	Text	One of CLR Plan Number or LTR Plan Number must be present. Prefix must be included
LTR Plan Number	The Land Title Registry number (EPP, EPS for electronic plans or historic 3 letter plan prefix) of the survey plan for which the survey data set applies	Conditional	Text	One of CLR Plan Number or LTR Plan Number must be present. Typically this number will be EPP or EPS unless the plan is a type that requires the use of a historic plan number (Strata Plan Amendment for example) Prefix must be included
Control Number	The Control Number of the associated LTR or CLR Plan	Conditional	Text	The Control Number of the signed PDF plan that is to be registered and of which the dataset represents. Mandatory for all electronic plans.
Land Surveyor File Reference	Reference associated with plan being submitted	N	Text	
Plan Type	Type of plan being submitted	Y	Specified Selection	One choice from a list of the required plan types listed in Practice Bulletin #3, Section 5.
UTM Zone (Spatial Reference)	Universal Transverse Mercator map projection zone number	Y	Specified Selection	One of: • NAD_1983_CSRS_UTM_Zone_7N • NAD_1983_CSRS_UTM_Zone_8N • NAD_1983_CSRS_UTM_Zone_9N • NAD_1983_CSRS_UTM_Zone_10N • NAD_1983_CSRS_UTM_Zone_11N

Data Element	Description	Mandatory?	Type	Notes
Dimension Reference	Identifies whether the optional dimension annotations in the dataset are UTM grid or are ground distances..	Y	Specified Selection	Note that as Per Section 3.1, the Survey Plan Dataset must be submitted in Grid. This Dimension Reference element is describing whether the optional dimension annotations are grid or ground distances.
Datum and Version (Realization)	Datum and Version (epoch) used to georeference the plan	Y	Specified Selection	One of: • NAD83(CSRS) 4.0.0.BC.1 • NAD83(CSRS) 4.0.0.BC.1.GVRD • NAD83(CSRS) 3.0.0.BC.1.NVI • NAD83(CSRS) 3.0.0.BC.1.CRD • NAD83(CSRS) 2002.0 • NAD83(CSRS) 1997.0
Comments	Land Surveyor description of submission	N	Free Text	Field may be blank.
Commission Number	Land Surveyor's Commission Number	Y	Free Text	The commission number of the land surveyor who digitally signed the plan.
Survey Date	Field survey completion date, as would be noted on the plan certification form.	Y	Date	For explanatory plans this should be the Checklist date.
Average Combined Factor	The average combined factor for the survey dataset	Y	Bounded Number	Valid values are between 0.9 and 1.1
Additional Combined Factor	Other combined factors used in the plan, if more than one is used	N	Text	Possible list of additional combined factors – comma separated – for use by PMBC operators

Data Element	Description	Mandatory?	Type	Notes
Relative Survey Accuracy Category	Describes the relative accuracy of the survey as assessed by the land surveyor. Used in a parcel fabric adjustment.	Y	Specified Selection Note: Table 3-4 details the criteria for the accuracy categories.	Accuracy category will be a value between 1 and 7 and will be used by the Parcel Fabric Manager. Auto-populated by the system as '3', but changeable by the submitter. Parcels with a high accuracy category will have a higher weight in the adjustment and will adjust less than those parcels with lower accuracies.
Georeferen-cing Method	One of the following: • GNSS or conventional ties to passive control points listed in MASCOT • GNSS ties to active control points listed in MASCOT • GNSS ties to private RTN integrated with the British Columbia Geo-Spatial Reference framework • Precise Point Positioning (PPP) • Ties to a previously georeferenced survey that meets the georeferencing requirements of the survey being undertaken • PMBC, where the type of survey plan is not required to be geo-referenced • PMBC, where the	Y	Specified Selection	Follows acceptable georeferencing methods as defined in the GSIR Section 2-6 (1).

Data Element	Description	Mandatory?	Type	Notes
	ABCLS has granted an exemption from the requirement to geo-reference • Other method approved by the ABCLS			

For reference, Table 3-4 provides the definitions of the relative survey accuracy categories. For PMBC, the category will be defaulted to Accuracy Level 3, consistent with the GSIR.

Table 3-4 Relative Survey Accuracy Category

Accuracy Level	Standard Deviation Bearing (secs)	Standard Deviation Distance (m)	PPM (parts per million)
1	5	0.001	5
2	30	0.01	20
3	60	0.02	50
4	120	0.05	200
5	300	0.2	500
6	3,600	1	1,000
7	6,000	10	10,000

A EXAMPLE SURVEY PLAN DATASET FILES

This is a link to example Survey Plan Dataset files, which include Sample Survey Plan Datasets;

- Each Sample set includes:
  - A DWG file - refer to Section 3.1 Survey Data CAD File Specification
  - A CSV file - refer to Section 3.2 Survey Data Control Point File Specification
  - A PDF file for Survey Plan images – this is NOT part of the Survey Plan Dataset, and is included here for reference only.

What is not included in these samples:

- Survey Plan Metadata - refer to Section 3.3 Survey Plan Metadata Specification