Frequently asked questions:
Geo-referencing Guide

How does the geo-referencing requirement affect the way I draft survey plans for registration at LTO and filed at AEP/AER?

Plans with the CAD file prepared on a GRID plane will need to comply with the Geo-referencing requirements:

- One geo-referenced point identified on the plan with symbol and text
- 3TM, UTM or 10TM coordinates for the reference point
- Datum used; either NAD83 (Original) or NAD83 (CSRS)
- Combined Factor used to scale ground distances to the mapping plane
- A statement in the legend on the origin of the bearings

For plans prepared with the CAD file on the GROUND plane, in addition to the requirements noted above for CAD files prepared on a GRID plane, the CAD file can be drafted or prepared exactly the way it has been to date. When it is finished, the CAD file should be translated to the geo-referenced point (coordinates) and then rotated to the appropriate GRID bearing derived from an ASCM or ATS point or according to the bearings derived from GNSS observations.

Can I use GROUND distances to prepare my CAD file?

GROUND distances are the governing values pertaining to that survey; these are the annotated values that are shown (and registered) on the plan. This will not change.

Some surveyors still prepare their CAD drawings using GROUND distances; less effort will be required by surveyors if they choose to continue this practice. This new requirement will give surveyors a choice in preparing and submitting their CAD file: GROUND or GRID distances can be used; as long as it is noted in the metadata file.

How do I orientate the CAD file and what bearings do I show on the face of the survey plan?

The CAD file must be orientated (rotated) to match the grid bearings derived from either:

- Ties to survey control or
- GNSS observations or
- ATS V4.1 coordinates

The bearings shown on the face of the survey plan and the TIF or PDF image will still be the same bearings that would have been used previously (i.e., oriented using an assumed bearing from another plan or from ties to an Alberta Survey Control Marker (ASCM) or from the Alberta Township System (ATS)).

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How do I show or indicate the bearings and orientation that I am using?

For survey plans, there must be a statement in the Legend indicating the origin of bearings as:

- Grid, derived from GNSS observations, or
- Grid, derived from the line between ASCM 12345 and ASCM 54321, or
- Assumed from Plan 987654. If the bearings are assumed from a plan, the corresponding grid bearing must be shown in the legend, or
- Grid derived from published ATS coordinates from xxxx to xxxx. State the ATS points used; for example: NE 1-05-13-4 to E 12-05-13-4

Examples:

- "Bearings are 3TM NAD83; derived from line between ASCM 1234 and ASCM 3865 and are referred to 114 degree West Longitude."
- "Bearings are UTM NAD83; derived from GNSS observations at ASCM 3865 and are referred to 117 degree West Longitude."
- "Bearings are UTM NAD83; derived from ATS V4.1 coordinates from NE 1-05-13-W4 to E 12-05-13-W4."

Is there a preference between 3TM or UTM projection for the CAD file?

Use of the 3TM or UTM projection for the CAD file is dependent on whether the survey falls within an Urban Cadastral Map Area or a Rural Cadastral Map Area. Presently LTO plan bearings are referred to 3TM in the case of an Urban Mapping Area, and UTM in the case of a Rural Mapping Area. To assist in determining which area your survey falls in, please see: Fact Sheet 10 - Mapping Planes in Alberta.

Which Combined Scale Factor (CSF) should we indicate in the CAD file?

For survey plans, the CSF should be derived from one of the following:

- The preference is to use a CSF for a point in the middle of the survey, or
- For the geo-referenced point indicated in the Legend, or
- Other manner prescribed by the Alberta Land Surveyor

What is the difference between NAD83 (Original) and NAD83 (CSRS)?

With satellite positioning, the NAD83 datum has been adjusted to be more accurate. NAD83 (Original) and NAD83 (CSRS) are based on the same reference ellipsoid; however, NAD83 (Original) is offset approximately 2m from the geo-centre. NAD83 (CSRS) is an updated, more accurate, three- dimensional realization of the NAD83 reference system taking advantaged of improved GNSS positioning.

Can I use NAD 83 (CSRS) coordinates?

Yes, CSRS is a more accurate determination of the NAD83 datum (see question above).

Are all the ASCMs available in either the NAD83 (Original) or NAD 83 (CSRS) datum?

NAD83 (Original) coordinates are available for all ASCMs with published coordinates. Coordinates referenced to the NAD83 (CSRS) datum are only published for those ASCMs that make up the NAD83 (CSRS) subset. For more information on the CSRS subset go to: https://www.alberta.ca/geodetic-control-unit.aspx.

Why should we use "observed" rather than "published" coordinates?

Published coordinates for survey control markers reflect adjustments (and distortions) that have been applied to the network. Especially through the use of GNSS, modern surveys may be more accurate than the local control network. By using observed coordinates, the true location of the survey is used and any discrepancy with the published coordinates can be investigated and fixed. If you must use published coordinates for the location of the reference point, NAD83 (CSRS) coordinates are more accurate and preferable.

Can other practitioners acquire the CAD files submitted?

No, the CAD files are used only by LTO, AEP, AER and ADP/AltaLis and only for the purpose for which they were submitted (i.e., the approval and registration process and for mapping the new survey). They are not released or available to any other party.

Do I have to have my CAD line work exactly match the distances shown on the body of my plan?

The CAD file should accurately represent the plan of survey and be to scale. In the future, plans of survey (including the CAD file) that are not accurate may be rejected prior to registration. As government and surveyors automate more and more functions it will be important to have accurate line work in the CAD file.

Do descriptive plans have to be geo-referenced?

Yes, descriptive plans submitted to LTO have to be geo-referenced. The RP information should be shown on the body of the plan and in the CAD file as is outlined in this document. The tie will be via the ATS v4.1 by using a coordinate from the ATS file. Surveyors can get the ATS file from AltaLis via https://www.altalis.com/. This is similar to how AEP/AER sketch plans have been and continue to be geo-referenced.

Will 10TM geo-referencing also be acceptable?

LTO, AEP and AER accept 10TM plans

Is the use of observed coordinates mandatory?

No, it is not mandatory to use observed coordinates. As per the above question "Why should we use "observed" rather than "published" coordinates?" it is preferred in situations where GNSS observations may be better than the local ASCMs. Rural situations where the local control is derived via Inertial Survey System (ISS) positioning, for example, should be treated differently from urban areas where the control is well integrated and more consistent with GNSS observations. It is left up to the surveyor to decide whether to use published or derived coordinates. A key point when using published values is to use the more accurate coordinates from the ASCM NAD83 (CSRS) subset.

Why does the geo-referencing symbol and RP text have to show up on the TIFF image/plot file plans we send to LTO?

Showing the symbol and text on the plan of public record provides users additional information regarding geo-referencing. Surveyors will be able to use this information to determine, for example, what ground points on a GPS survey were used to establish a grid bearing. The information could also be used to support re-establishment of a lost monument. The symbol and PRRP text must be shown on plot/pdf files and the CAD file submitted to LTO, AEP, and the AER.

Is it at our discretion whether we display the geo-referencing information in the legend or in the body of the plan?

As outlined in the geo-referencing FAQs document (available on SPIN) the prescribed symbol and unique text identifier (PRRP) must be shown in the body of the plan (plot/pdf file) and the CAD file and the other information (central meridian, mapping projection, bearing reference, etc.) may be shown in the Legend (see sample plan).

Is the grid reference point to be displayed on the plot file submitted or just the CAD file on layer 35?

This information must be shown on both the plot / pdf file and the CAD file.

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