



BCTS

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EMS ISO 14001 Registered



TSN Global Positioning Specifications Effective June 1, 2012

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1.0 INTERPRETATION

- 1.1 BCTS must meet the standards set in the [British Columbia Mapping Standards For use in RESULTS Submissions Version 1.1](#). It is left up to the recipient to choose the method to obtain these standards and the use of a GPS system is just one of the several ways of obtaining this level of accuracy.
- 1.2 Should the recipient choose to use GPS as the method of surveying to produce maps for FTA/RESULTS submissions, then the specifications set in this document must be followed. This will provide assurance to the BCTS Program that the standards set forth in [British Columbia Mapping Standards For use in RESULTS Submissions Version 1.1](#) are being met.
- 1.3 The target accuracy for this Schedule is 10 metres in the horizontal dimension at a 95% confidence level.

2.0 FIELD GPS DATA CAPTURE

- 2.1 During static point-mode surveys, the minimum recording duration at each survey point shall be 30 seconds with at least 15 individual position fixes during that period. High significance features, such as sample plots, map ties, PoC and PoT, shall be a minimum of 150 seconds and at least 50 individual position fixes.
- 2.2 Position fixes for linear features mapped dynamically shall be no more than 25 metres apart. Maximum speed for dynamic linear feature mapping is 100 km/h with 1-second data logging
- 2.3 Position fixes for linear features mapped statically (i.e. static or point-to-point traverses) shall be no more than 50 metres apart, and be a minimum of 15 seconds long with at least 5 individual position fixes
- 2.4 Times of GPS events for interpolated points on linear traverses shall be accurate to at least 0.25 seconds
- 2.5 The field GPS receiver shall be set to position or record observations to a minimum of four satellites (sometimes known as "3D" mode).
- 2.6 The minimum satellite elevation angle/mask for the field GPS receiver is 15 degrees above the horizon. The minimum elevation angle/mask of the GPS reference station is 10 degrees. The separation distance between the GPS reference station and field receivers shall be less than 500 kilometres.
- 2.7 Dilution of Precision (DOP) values for both static (point) surveys and dynamic (linear traversing) surveys shall not exceed the following values:

General DOP: 10 (used if HDOP or PDOP is not available)

Position DOP: 8 (used if HDOP is not available)

Horizontal DOP: 5 (preferred whenever possible)

Vertical DOP: 5 (used only when elevations are required)

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- 2.8 Use of Recreational Grade GPS (where data collection does not facilitate post processing, Garmin 76 etc.) shall be limited to open canopy, post disturbance data capture. Recreational Grade GPS must have Wide Area Augmentation System (WAAS) capability and be enabled.

3.0 GPS DATA PROCESSING AND INTERPRETATION

- 3.1 All non Recreational Grade GPS positions shall be corrected by standard differential GPS methods (pseudorange Reference Station as or navigation corrections). If navigation corrections are used, the same set of GPS satellites shall be used at the GPS at the field receiver for all corrected positions.
- 3.2 All GPS Reference Stations shall be validated according to the procedures outlined in [British Columbia Standards, Specifications and Guidelines For Resource Surveys Using Global Positioning System \(GPS\) Technology - Release 4.0](#). If temporary reference stations are used, they shall be approved by the BCTS Contract Co-ordinator before the field work starts.
- 3.3 Real-time corrections shall use a DGPS Service, or GPS Reference Station, validated by Base Mapping and Geomatic Service, GeoBC. Only pseudorange corrections which have associated range-rates and an overall latency of less than 10 seconds will be acceptable.

4.0 PROJECT DELIVERABLES

- 4.1 The recipient shall submit a project report which includes the following information, as a minimum.
- A listing of all personnel (Contractor and Subcontractors) involved in the project detailing their particular duties and background (i.e. educational background; formal GPS training details ; experience on similar projects, etc.).
 - A list of all hardware and software used on the project; including but not limited to: GPS hardware and particulars (i.e. models, receivers numbers, data loggers, antennas, firmware versions, etc.); GPS software and particulars (i.e. name, version number, settings, etc.); mapping software (i.e. name, version number, settings, etc.); and utility software (i.e. name, version number, settings, etc.).
 - A description of the GPS reference stations used.
- 4.2 The data files created by this project are the property of the Ministry and access to all files created in the completion of the works shall be made available to the Ministry.
- 4.3 The Recipient shall store a copy of all the materials and survey data for at least two years, or as defined by the BCTS Contract Co-ordinator, following the map submission into RESULTS.
- 4.4 The Recipient shall inform the BCTS Contract Co-ordinator before destruction of the materials and data.

5.0 QUALITY ASSURANCE AND AUDIT

- 5.1 The Recipient shall be responsible for overall quality control of all the components of a GPS survey.
- 5.2 All submitted work shall be subject to Ministry of Forest's quality assurance and audit.
- 5.3 For GPS traverses done in the dynamic linear mode, at least 95 % of the individual GPS position fixes shall be within 10 metres (horizontal measurement perpendicular to the line) from the true position of the line.
- 5.4 For GPS point features, at least 95 % of the individual position fixes shall be within 10 metres (horizontal linear measure) of the true location of the point. If statistical methods are used to reject outliers, 2 standard deviations shall be used for the minimum level of significance.
- 5.5 The Recipient shall rectify at his or her own expenses all deficiencies identified by quality inspection/checks and audits.