

How do I reference coordinates on Sable Island?

Sable Island is located over 175 km from the coast of Nova Scotia in the Atlantic Ocean. It measures approximately 40 km in length and is less than 1 km at its widest point. Although more than 20 Nova Scotia Control Monuments (NSCMs) were installed on the Island as part of the Nova Scotia Coordinate Control System (NSCCS) in the early 1980s, most of these have been enveloped by the sea or sand. At least one NSCM remains on Bald Dune.

As an alternative method of providing coordinate referencing services on Sable Island, the Province installed a permanent Global Navigation Satellite System (GNSS) station on the garage at Main Station. Station SABL is one of 40 Nova Scotia Active Control Stations (NSACS) that allow for precise, differential GNSS positioning to be performed relative to it.

There are some distinct positioning differences on Sable Island versus the rest of Nova Scotia when utilizing the NSACS network:

- Cellular communications are not available, which prohibits widespread use of high accuracy, real-time kinematic (RTK) positioning directly over the Internet; and
- There is only one Active Control Station, therefore Network RTK (NTRK) does not apply (errors accrue at 1 mm / km instead of 0.5 mm / km for NRTK)

Options for surveying in the Nova Scotia Coordinate Referencing System on Sable Island include:

- a) Single Reference Station RTK using SABL: When users are within range of the Wi-Fi network around Main Station (roughly a 1.5 km range), it is possible to receive real-time corrections over the internet. A request must be made to access the GNSS receiver output corrections. When outside of the Wi-Fi range, kinematic data can be stored on the roving unit and post processed with appropriate software in Post Processed Kinematic (PPK) mode. Without wireless communications, however, there is no way of knowing if ambiguities will be resolved in post processing.
- b) Static Positioning using SABL: A GNSS receiver can be located anywhere on Sable Island and positioned relative to SABL through post processing with appropriate software. SABL data is made available through NRCan's Canadian Active Control System (CACS) data distribution website. As a general guideline, one hour of data should be collected at the user's reference station location for every 10 km distance from SABL to obtain ± 1 cm or better position accuracy.
- c) Single Reference Station RTK using an Independent Reference Station: When accurate RTK surveys are required, the user can deploy their reference station anywhere near the survey site and perform a static survey as described in b). After determining the coordinates for their reference station and assigning

	<p>them, an RTK survey can be performed by using a wireless radio. If the user does not have a wireless communication device (eg. radio), kinematic data can be collected and post processed in Post Processed Kinematic (PPK) mode. The disadvantage of not using a wireless communication device is that the user does not know if a loss of lock has occurred at the roving receiver. Placing the reference station close to the survey site increases the chances of having fixed ambiguities.</p> <p>d) <u>Precise Point Positioning (PPP)</u>: Using a dual frequency GNSS receiver, data can be collected over a point and submitted to NRCan’s PPP service. As a general guideline, 3 hours of data are required to obtain accuracies of ± 3 cm or better and 12 hours of data are required to obtain accuracies of ± 1 cm or better in all three solution components.</p> <p>There is one NSHPN located on the helipad at Main Station (NSCM 240000, federal station 911021). This NSCM should be used as an accuracy check to verify equipment settings.</p> <p>Coordinates for both SABL and 240000 are published in NAD83(CSRS)2010.0.</p>
<p>Where can I get data?</p>	<p>Coordinate values for NSCMs on Sable Island can be obtained through the NSCRS Viewer. https://gis8.nsgc.gov.ns.ca/NSCRS/</p> <p>Data from SABL can be obtained through NRCan’s CACS data distribution website. Users must sign in. http://webapp.geod.nrcan.gc.ca/geod/data-donnees/cacs-scca.php</p> <p>Elevations for federal benchmarks can be found through NRCan’s data distribution website for passive geodetic monuments: http://webapp.geod.nrcan.gc.ca/geod/data-donnees/passive-passif.php?locale=en</p>
<p>Related Documents</p>	<ul style="list-style-type: none"> - NSCRS Technical Support 0002 NSACSS Network

Useful Links:

NSCRS Viewer - <https://gis8.nsgc.gov.ns.ca/NSCRS/>

NRCAN PPP tool - <http://webapp.geod.nrcan.gc.ca/geod/tools-outils/ppp.php?locale=en>

Illustrations:



Location of NSACS SABL (left) and SABL Antenna Mast attached to the Garage at Main Station(right)



Location of NSHPN 240000 (Federal Station 911021) on Helipad.