

Surveyor-General's Direction No. 12

Control Survey Checklist

Please note Survey Report file name, if applicable:

This checklist is designed to facilitate the process of designing, carrying out, processing, adjusting, and submitting a control survey intended for update in SCIMS.

Users must refer to *Surveyor-General's Direction No.12 – Control Surveys and SCIMS (SGD12)* and the *Technical Specifications for NSW Secondary Control Surveys (Tech Specs)* for all relevant standards, specifications, and requirements.

1	General / Overview	yes	n/a
1.1	The control survey has been carried out to establish		
1.2	The control survey meets the following proposed horizontal Class		
1.3	The control survey meets the following proposed vertical Class		
1.4	The following surveying technique has been used		
2	Consultation	yes	n/a
2.1	Any variations to SGD12 have been discussed with and agreed to by DCS Spatial Services.		
3	Survey Mark Placement	yes	n/a
3.1	Survey marks have been placed to the approved standard detailed in <i>Surveyor-General's Direction No. 1 (SGD1)</i> .		
3.2	A Locality Sketch Plan has been drafted and submitted to SCIMS for each survey mark placed as detailed in <i>Surveyor-General's Direction No. 2 (SGD2)</i> .		
3.3	Survey marks have been placed considering WH&S, access, GNSS suitability and any long-term impacts.		
4	Equipment	yes	n/a
4.1	The instrument measurement precision is appropriate for the proposed Class considering station density (see SGD12 Table 2 and Tech Specs).		
4.2	All instruments and ancillary equipment have been checked and calibrated. Documentation and certificates are available upon request by DCS Spatial Services. Refer to <i>Surveyor-General's Directions No. 5 & 9</i> .		
4.3	Total station instrument(s) and ancillary equipment has been calibrated and checked in accordance with <i>Surveyor-General's Direction No. 5 (SGD5)</i> .		
4.4	GNSS equipment has been verified in accordance with <i>Surveyor-General's Direction No. 9 (SGD9)</i> .		
4.5	GNSS equipment used correct IGS antenna and AUSGeoid models.		
4.6	Instruments meet the accuracy and precision specifications outlined in the Tech Specs .		

5	Network Design	yes	n/a
5.1	The network design is fit for purpose and optimised for the proposed Class.		
5.2	The station density is appropriate for the proposed Class considering the adopted survey technique and achievable measurement precision (see SGD12 Table 2).		
5.3	For large-scale control networks, DCS Spatial Services or nominated representative has been consulted on the proposed network design and control strategy .		
5.4	A network diagram is provided.		
5.5	Sufficient number of survey control marks are of the equivalent or better Class and contain Positional Uncertainty.		
5.6	Alternatively, an approved survey technique has been used to connect into Positional Uncertainty and establish datum.		
5.7	Survey control marks surround the survey so that control is interpolated.		
6	Observations (General)	yes	n/a
6.1	Any variations to the specifications outlined in the Technical Specifications for NSW Secondary Control Surveys have been discussed with and agreed to by DCS Spatial Services.		
6.2	Field notes and log sheets are recorded and supplied to DCS Spatial Services. All necessary metadata including observer details, date, mark labels, start/stop times, instrument filenames, instrument/target heights, observation/field conditions, etc. have been recorded. <i>Note: Recommended GNSS Logsheets are included in the SGD12 Resource Pack.</i>		
7	Observations (Traversing)	yes	n/a
7.1	Distance, horizontal and vertical angles, instrument and target heights have been recorded.		
7.2	All survey marks have been occupied with both instrument and target.		
7.3	The minimum number of rounds have been observed for the proposed Class. Measurements have been observed in ABC – CBA order from face-left to face-right and in both directions.		
7.4	Atmospherics recorded at each station set-up e.g. temperature, pressure and humidity.		
7.5	Horizontal and vertical angle measurements have been reduced and checked in terms of residuals and range, and meet the proposed Class tolerances.		
7.6	Distances are averaged and reduced to the ellipsoid with full metadata supplied. Appropriate atmospheric and geometric corrections have been applied.		
7.7	If Trig Heighting, all measurements are less than the allowable maximum observation distances (Class B < 300m, Class C < 600m) and minimum ground clearances have been observed.		
8	Observations (Levelling)	yes	n/a
8.1	Daily instrument vertical collimation checks (i.e. two-peg test) and staff verticality checks have been carried out and recorded.		
8.2	The “Leap-frog” system of progression, two-way levelling and correct observation method has been used. Instrument has been levelled by the ‘unsystematic’ method. <i>Note: One-way loops are not considered two-way levelling. The return run needs to be in exact opposite order as the forerun.</i>		
8.3	The level run meets the maximum allowable misclose of forward and back level runs for the proposed Class.		
8.4	The minimum number of survey control marks have been met (or exceeded) to prove AHD71 datum and is appropriate for the size and Class of survey.		
8.5	The maximum misclose on survey control marks meets the proposed Class.		
8.6	Approximate coordinates for unestablished survey marks have been provided to DCS Spatial Services.		

8.7	Invar staff calibration corrections have been applied if found to be significant. Details have been provided to DCS Spatial Services.		
8.8	Height differences have been reduced between survey marks (not change points).		
9	Observations (GNSS)	yes	n/a
9.1	Correct GNSS equipment specifications and options have been used (e.g. minimum epoch sampling rate, multi-GNSS capability, dual frequency capability etc.).		
9.2	Minimum number of independent occupations per station have been observed for the proposed Class.		
9.3	GNSS static baselines have been processed from a known starting survey mark with accurate GDA2020 horizontal coordinates and ellipsoid height with all baselines processed outwards from this point (i.e. seeding a network).		
9.4	GNSS static baselines have been processed accounting for baseline length, receiver type, ionospheric effects and achieve ambiguity resolution.		
9.5	No trivial baselines have been observed or processed.		
9.6	Raw observations in both native and RINEX format for all GNSS static and reference station occupations are submitted.		
9.7	Processed GNSS static baseline vector data (incl. variance/covariance information) is provided in an ASCII data exchange format as exported from proprietary software.		
9.8	AUSPOS observations meet the required average ambiguity resolution and horizontal Positional Uncertainty thresholds.		
10	Observations (RTK)	yes	n/a
10.1	A minimum of 3 x 'established' GDA2020 (Class D or better) and 3 x 'accurate' AHD71 (Class B / LD or better) survey control marks with Positional Uncertainty have been connected into.		
10.2	Daily RTK site validation(s) have been completed with details submitted to DCS Spatial Services.		
10.3	RTK site transformation parameters have been applied if found to be significant with details submitted to DCS Spatial Services.		
10.4	RTK coordinate and height differences between independent occupations are within tolerance and commensurate with the proposed Class of survey.		
10.5	The raw RTK/NRTK position or baseline results (i.e. coordinate results <i>without</i> applying a site transformation) collected on all survey marks (incl. existing survey control marks), have been submitted to DCS Spatial Services.		
11	Computation and Adjustment	yes	n/a
11.1	If GDA2020 coordinates are required, a 3D least squares adjustment has been performed using ellipsoid heights as vertical constraints.		
11.2	If AHD71 heights are required, a separate adjustment has been performed using AHD71 heights as vertical constraints.		
11.3	A successful minimally constrained least squares adjustment has been carried out and an assessment of Class made.		
11.4	A fully constrained least squares adjustment has been carried out to determine provisional coordinates .		
11.5	Positional Uncertainty has been calculated.		
11.6	Appropriate input standard deviations have been applied to all observations commensurate with the estimated measurement, survey, and instrument precision.		
11.7	Explanation is provided where observations have been rejected or reweighted, and orientation / rotation or scale parameters have been solved for.		
11.8	The fully constrained adjustment constraints are commensurate with the control strategy (see SGD12 Section 8 and 9).		
11.9	Disagreement and issues in survey control have been analysed and communicated to DCS Spatial Services for further investigation.		

12	Survey Report and Checklist	yes	n/a
12.1	A survey report has been completed and submitted to DCS Spatial Services summarising the control survey and demonstrating compliance with SGD12 for update of SCIMS. <i>Note: Template and example survey reports are provided in the SGD12 Resource Pack and <u>must</u> be used.</i>		
12.2	The survey report and checklist has been signed and is of a professional standard allowing for easy interpretation by DCS Spatial Services.		
13	Data Submission	yes	n/a
Data Submission Items			
The following items must be addresses and included for each control survey data submission			
13.1	Field Notes, Log sheets, Survey Plans, Session Diagrams are signed and submitted.		
13.2	Locality Sketch Plans (LSP) for any new survey mark(s) placed using the correct form . LSPs must be directly submitted to the Office of the Surveyor-General using the Locality Sketch Plan submission form in the Survey Services section of the Spatial Services Customer Hub . For bulk submissions, please use SCIMS@customerservice.nsw.gov.au		
13.3	Photos of survey marks, sites, field / observation conditions etc. <i>Note: All photos must be clearly renamed to the PSM number and include the date of capture e.g. PM123456 YYYYMMDD.</i>		
13.4	Raw data in digital format as directly exported from the instrument(s).		
13.5	Unedited raw data in digital format specified by DCS Spatial Services that can be recognised by any text editing or word processing program. <ul style="list-style-type: none"> • Traversing (.asc) • Levelling (.dat) • GNSS (RINEX) <i>Note: DCS Spatial Services can provide format files for a variety of instruments upon request. Alternatively, contact the instrument supplier on how to produce export files.</i>		
13.6	Edited raw data file(s) that have been amended for data cleaning / processing purposes. All edits within a file must be clearly distinguishable using the “*” prefix and a comment. Any edits must be outlined in the accompanying survey report.		
13.7	Processing / Reduction file(s) as exported directly from software package e.g. GNSS processed baselines from proprietary software.		
13.8	Least Square input and output file(s) for both the <i>minimally</i> constrained and <i>fully constrained adjustments</i> .		
13.9	Survey Report summarising the project and addressing the requirements outlined in SGD12 Section 10 . Survey reports must be submitted in .pdf format (with your signature) and as a Microsoft Word document (for follow on work by DCS Spatial Services). <i>Note: A Survey Report Template is provided in the SGD12 Resource Pack and <u>must</u> be used. Various Survey Report Examples are also provided to assist.</i>		
Data Submission Requirements			
The following data submission requirements must be adhered to:			
13.10	Data has been submitted using the Project Data Submission link in the DCS Spatial Services Customer Hub unless otherwise instructed.		
13.11	Data and accompanying information are presented in a clear, professional, and unambiguous manner.		

I have used the checklist to assist with preparation and submission of a control survey intended to update SCIMS as detailed in SGD12. All relevant items have been addressed.

I understand that DCS Spatial Services reserves the right to contact me for any missing, incomplete or incorrect items and that it is my responsibility to ensure all data is properly archived to facilitate this.

Name			
Date			
Signature		Surveyor's reference	