



The  
**LAND SURVEYORS  
LICENSING BOARD**  
of WESTERN AUSTRALIA



# **SURVEY PRACTICE GUIDELINES**



**FOR SUBDIVISIONS WITHIN**

**SPECIAL  
SURVEY AREAS**

**2019**

**Version 1.1**



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These guidelines are issued by the Land Surveyors Licensing Board of WA under regulations 26A (4) and (5) of the *Licensed Surveyors (General Surveying Practice) Regulations 1961*. For the purposes of regulation 10 of the *Transfer of Land (Surveys) Regulations 1995* the Registrar has approved the matters herein related to plans and the way plans are prepared and presented.



**These guidelines approved as amended by the Land Surveyors Licensing Board on 21<sup>st</sup> March 2019**

A handwritten signature in black ink, reading "Paul Rhodes".

**Paul Rhodes**  
CHAIRMAN  
Land Surveyors Licensing Board of WA

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## **1.0 INTRODUCTION**

### **1.1 Special Survey Areas**

- 1.1.1 These guidelines apply to all Crown and freehold subdivisions and survey-strata developments in rural, rural residential and town and suburban areas involving more than 10 serviced lots where roads are created. It is also expected that these Special Survey Area (SSA) procedures will be used in all subdivisions where site works can be expected to destroy survey marks necessary for the accurate and reliable re-establishment of the new or original boundaries.
- 1.1.2 Whilst it is important for SSAs to have strong connections to the state geodetic survey, these guidelines are primarily intended to describe the best cadastral survey practices to maintain and improve the standard of boundary definition in such subdivisions.

## **2.0 SURVEY SPECIFICATIONS AND STANDARDS**

### **2.1 Re-establishment Survey**

- 2.1.1 All original boundaries comprising the surround of the subdivision must be comprehensively re-established before pre-calculating the plan. The re-establishment survey must be comprised of new measurements only. The only original values acceptable are those from a recent earlier stage of the same development carried out under these guidelines by the same survey firm. Where the residue land from a subdivision forms a balance lot of more than 20 hectares, the re-establishment may be confined to the area(s) being developed.
- 2.1.2 Subsequent stages of the subdivision of the original parent lot must be connected by re-establishment and control survey to the earlier stages, and the entire perimeter of the parent lot must be re-established when the balance becomes less than 20 hectares.

### **2.2 Connections to the State Geodetic Survey**

- 2.2.1 Subdivision control networks must be connected to the State Geodetic Survey, using terrestrial or Global Navigation Satellite System (GNSS) survey techniques. To constrain the survey and provide a redundancy, independent connections between a minimum of two different Standard Survey Marks (SSMs) are essential. Any existing SSM used must be fully validated from its reference marks (RMs) prior to adoption. Those existing marks must be of at least the same positional uncertainty as that being sought for the control survey being undertaken. For the purposes of providing connection to SSMs, only existing geodetic survey marks for which Landgate has published information can be used.
- 2.2.2 The highest order of existing geodetic survey marks that are easily accessible and in the vicinity of the subdivision should be used.
- 2.2.3 The selected geodetic survey marks should be at a spacing of less than 5km from the subdivision. If the existing geodetic survey network appears to be inadequate to control the subdivision, Landgate should be consulted via e-mail to [geodesy@landgate.wa.gov.au](mailto:geodesy@landgate.wa.gov.au).

- 2.2.4 In some circumstances, such as when the state geodetic survey network is sparse, it can be sufficient for the new control network to be connected to at least three reliable points of an adjacent SSA control network.
- 2.2.5 In any case, connections should always be made to selected validated control points of adjacent networks whether carried out by the same or a different survey firm. This will prevent “edge matching” problems between successive developments/stages.
- 2.2.6 In extensive subdivisions that are developed over several stages, each stage must connect to each SSM that exists within 2km of the subdivision.

### 2.3 Accuracy

- 2.3.1 The method of survey and the accuracy of the measurements shall be such that there is less than a 1% probability that the actual error in the position of any mark with respect to any other mark will exceed K millimetres, where

$$K = F \sqrt{(0.04 + S^2)}$$

where S is the direct distance between two points in kilometres, and F is as specified in the following table:

	Mark to which the above tolerance applies	With respect to	F
(a)	Any temporary control mark (TCM) of the initial control and surround survey.	Any other TCM, any SSM, any control station on an adjacent subdivision.	60
(b)	Any permanent control mark (PSM or PCM) and any cadastral reference mark or intersection spike (RM).	Any other PSM, PCM, RM, any SSM or TCM.	90

### 2.4 General Guidelines for Control Surveys

- 2.4.1 The Intergovernmental Committee on Surveying and Mapping (ICSM) has published the Standard for the Australian Survey Control Network (Special Publication 1 or SP1), the latest version of which can be downloaded from:  
[http://www.icsm.gov.au/publications/sp1/Standard-for-Australian-Survey-Control-Network\\_v2.1.pdf](http://www.icsm.gov.au/publications/sp1/Standard-for-Australian-Survey-Control-Network_v2.1.pdf)
- 2.4.2 The recommended techniques and reduction practices outlined in SP1 are suitable to satisfy the control network accuracy required by these guidelines.

- 2.4.3 Horizontal survey control, once completed, must form a closed figure that is connected into a minimum of two existing geodetic survey marks. It is expected that connections will be made to all existing geodetic survey marks in reasonable proximity to the subdivision, and which are passed when carrying out the re-establishment survey. Least squares adjustments of the network, both minimally constrained and constrained by the connections into existing control, must be carried out to verify that the survey meets the required accuracy.
- 2.4.4 Control network observations may be by traditional terrestrial or GNSS techniques or a combination of both.
- 2.4.5 Observations may be made as indicated in guidelines 2.5 and 2.6 below with reference to SP1.
- 2.4.6 There must be sufficient solid marks within the initial control survey to control and survive the civil works and from which the final control marks are placed. Generally, it is expected that at least four such marks will provide sufficient redundancy to ensure an accurate network of permanent final control marks.

## **2.5 Control Survey by Terrestrial Survey Measurements**

- 2.5.1 EDM instruments and 1" theodolite, 5" digital theodolite or 3" total station should be used. Serial numbers of instruments must be documented in the control field record together with the date of the last calibration.

## **2.6 Control Surveys Using GNSS**

- 2.6.1 **Limitations** These guidelines are specific to using GNSS for survey control within Special Survey Areas. This imposes the following understanding and limitations:
- 2.6.1.1 All ancillary equipment is in good adjustment and repair and operated competently. This is of particular importance with GNSS because it is a 3-dimensional (3D) technique requiring accurate location of the antenna horizontally and vertically over any survey mark;
- 2.6.1.2 Receivers and baseline reduction software is to be of the "geodetic" type;
- 2.6.1.3 Only carrier phase observations using two or more receivers for baseline measurements are considered for these guidelines; and
- 2.6.1.4 Satellite geometry during the field observation phase of any survey must be sufficient to ensure accurate results.

## **2.7 Observational and Processing Techniques**

- 2.7.1 It is the responsibility of the surveyor to assess which static or kinematic GNSS technique should be used to achieve the task being undertaken. Meteorological observations are not required.
- 2.7.2 The antenna type using the igs antenna code from [https://igsceb.jpl.nasa.gov/igsceb/station/general/rcvr\\_ant.tab](https://igsceb.jpl.nasa.gov/igsceb/station/general/rcvr_ant.tab) or the ngs antenna code from <http://www.ngs.noaa.gov/ANTCAL/> must be recorded in the control Field Record.
- 2.7.3 For baseline processing, all known geodetic coordinates must be entered as Geocentric Datum of Australia 2020 (GDA2020) coordinates obtained from Landgate's Geodetic Survey Marks Register (GESMAR).
- 2.7.4 The use of GNSS derived C/A code point positions at known geodetic survey marks may not achieve the required level of precision to allow accurate



baseline processing. The coordinates used for known geodetic survey marks should be as accurate as possible.

2.7.5 All adjustments of GNSS data should be 3D, on GDA2020.

### **3.0 FIELD NOTES FOR CONTROL AND RE-ESTABLISHMENT SURVEYS**

#### **3.1 Timing of Lodgement**

3.1.1 The cadastral re-establishment, subdivisional control, connections to SSMs and ties to existing control are to be lodged with Landgate within 14 days of completion of field work.

**3.2 Re-establishment and Control Field Record.** The re-establishment and control Field Record should contain:

3.2.1 A sketch of re-establishment survey, control network and connections to SSMs or existing control;

3.2.2 Coordinate values used to constrain the survey and their derivation (e.g. GDA2020, PCG2020 etc.);

3.2.3 Constrained control points should be reference to the closest SSM by radiation;

3.2.4 The coordinate values used for internal control points;

3.2.5 Observed and adjusted (adopted) measurements;

3.2.6 Transformation parameters/EPSSG codes, where applicable; and

3.2.7 GNSS baselines reduced to pseudo-observed mid-azimuth and either spheroidal distance or ground distance (preferably both).

**3.3** Refer to guideline 8.3 for the requirements on numbering control points and 7.1 if lodging an eFB for the initial control survey.

#### **4.0 PLANS**

**4.1** Plans are to be lodged in accordance with standard Landgate requirements for deposited plans.

#### **4.2 Number of Sheets**

4.2.1 There is no limit to the number of sheets that may be included in plans for subdivisions within a Special Survey Area.

#### **4.3 Connections Across Roads**

4.3.1 Connections across roads, consisting of an angle from an alignment and the distance across the road, must be recorded on the plan at each angle point; at a suitable scale, using enlargements and additional sheets as necessary for clarity. It is acceptable to omit the half angles in the case of parallel road alignments. Connections between the angle points of a series of shorter boundaries that comprise the sides of a parallel road in a town or suburban subdivision may be omitted such that there is no more than 50 metres between connections, and providing that there is a connection across the road at the end of each straight section longer than 50 metres. These distances may be extended to 100 metres for rural and rural-residential subdivisions.

## 4.4 Depicting Improvements

4.4.1 **Depicting Retaining Walls.** It is common in large urban subdivisions for numerous retaining walls to be constructed to allow level building sites to be formed. In some cases, these walls are built over common boundaries. In such cases, the local government may insist on party wall easements or easements of support being created for that part of the wall (and earth) on the high side of the wall. Where easements are created under section 136C of the *Transfer of Land Act 1893*, a supporting document will be necessary.

4.4.2 Plan presentation options are:

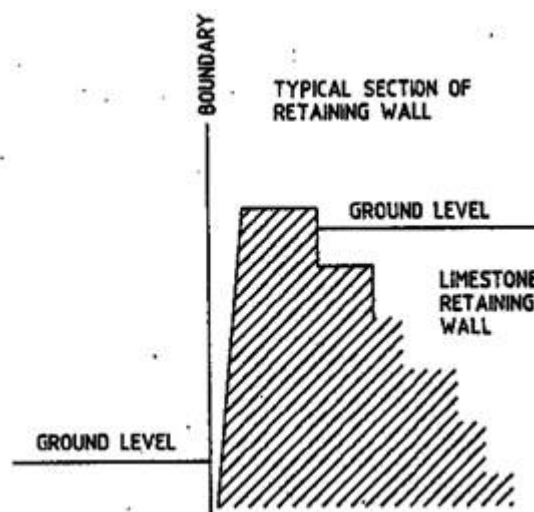
4.4.2.1 Where an appropriate easement is created on the plan that provides for the erection of retaining walls to be built over common boundaries there is no need to depict the walls on the plan;

4.4.2.2 Where retaining walls are built over common boundaries and no appropriate easements are created, the surveyor must depict the walls on the plan. This depiction must also dimension the extent to which the walls encroach into the lower lots; and

4.4.2.3 If there are retaining walls throughout a subdivision that are contained completely (including footings) in each high or low lot, then there is no need to show the walls on the plan. However, a statement on the plan describing the positions of the walls relative to the boundaries and a sketch, similar to that below, to depict the general arrangement, is required;

Example:

“This subdivision contains retaining walls which are all located within the high lots”.





4.4.3 To ensure clarity, separate plan sheets may be necessary to depict easements or walls.

4.4.4 **Depicting Other Improvements.** If part of a building, wall or other significant improvement is built such that it crosses over the boundary between the subject land and an abutting lot, the encroachment must be recorded on the plan. Connections to buildings, walls and other types of significant improvements that are close to, but do not cross over, the boundary of the subject land may be recorded on the plan at the surveyor's discretion.

#### **4.5 SSA Indication**

4.5.1 All plans that use these guidelines must show that the subdivision is being undertaken using the "Special Survey Area Guidelines" in the following ways:

4.5.1.1 Use of a tick box (eg SSA  Yes  No) or short statement (eg SSA Yes/No);

4.5.1.2 Use of a short statement declaring a Special Survey Area e.g. "Declared as Special Survey Area Yes";

4.5.1.3 The following notation in the graphic area of the plan;  
*"Survey carried out under Regulation 26A Special Survey Area guidelines."*, and

4.5.1.4 the notation "Reg 26A (4)" within the "Approved" or "Plan Approved" panel of the plan.

#### **4.6 Contact Details**

4.6.1 It is recommended that the surveyor show the survey firm's name, address, telephone numbers and e-mail address on the plan. It is suggested that the survey firm's job number may also be appropriate to display.

#### **4.7 Field Records**

4.7.1 The Field Records listed in the "FIELD RECORDS" section of the deposited plan shall be the "re-establishment and control" Field Records for the subdivision.

### **5.0 FINAL MARKING OF SUBDIVISIONS IN TOWN AND SUBURBAN AREAS**

#### **5.1 Permanently Marked Final Control Survey (Permanent Survey Marks (PSMs) and Permanent Control Marks (PCMs))**

5.1.1 There are significant re-establishment benefits to be obtained from the use of a final control survey that is permanently marked in long-term secure positions. Such marks should be one order of accuracy higher than traditional reference marks placed from the cadastral marking.

5.1.2 Under these guidelines, and subject to meeting the accuracy specifications of guideline 2.3, a network of inter-visible permanent marks can replace the referencing required by General Regulations 37 and 38. These marks would allow the re-establishment of any lot on that plan.

5.1.3 The PSMs and PCMs will be integrated into the Spatial Cadastral Database (SCDB) each with a recognisable identifier indexed to the Field Record (see guideline 8.3) and their coordinates can be disseminated together with lot corner coordinates through the Geospatial team at Landgate.

- 5.1.4 PSMs should have their point numbers stamped on them. If practicable, PCM point numbers should be placed neatly next to the mark (using paint, a pen or stamped aluminium tag). When physically numbering marks it is not necessary to include the Field Record number.
- 5.1.5 There should be at least one PSM placed for every 50 new lots created from all stages of a development. Marks must be placed such that every lot corner within each plan of a town or suburban subdivision is within 100 metres of a PSM or PCM.
- 5.1.6 There must be at least two PSMs or PCMs for each plan that remain inter-visible one to another after the subdivision has been built up.
- 5.1.7 There must be at least two connections to PSMs or PCMs from adjacent SSA plans, and the originating plan of all such PSMs/PCMs is to be stated.
- 5.1.8 Additional PSMs and PCMs are to be placed in accordance with the spatial coverage stated above, such that from each PSM or PCM at least two others are visible at the time of the survey, and at least one remains visible after the subdivision has been built up.
- 5.1.9 Where practicable and safe, it is desirable that a witness post and sign be placed at each PSM to indicate the presence of a survey mark.
- 5.1.10 PSMs must consist of solid material and be put in to be firm and stable, protected by a hatch cover where appropriate. They are to be placed in positions that can reasonably be expected to remain safe from disturbance in the long term. Lids should be hinged or otherwise attached to the hatch cover to reduce the risk of personal injury and/or property damage for members of the public. Legal advice is that a more secure lid would lessen the risk of legal action against a surveyor.
- 5.1.11 A formed concrete plinth 0.15 m wide and 0.1m thick is desirable to protect the hatch cover in trafficable areas eg parks, mowed verges etc.
- 5.1.12 The required form for a PSM is a brass plaque inscribed survey mark or a steel rod measuring at least 300 millimetres in length and 10 millimetres in diameter set in a concrete block measuring at least 150 millimetres square at the top, 250 millimetres square at the base and 500 millimetres in depth.
- 5.1.13 If pre-cast marks are used, construction should be in accordance with Appendix 1 of Landgate's Guideline For Placement Of Standard Survey Marks available at:  
[https://www0.landgate.wa.gov.au/\\_data/assets/pdf\\_file/0018/16344/GSU-04-Landgate-Reqmts-for-Placement-of-Standard-Survey-Marks-V3.pdf](https://www0.landgate.wa.gov.au/_data/assets/pdf_file/0018/16344/GSU-04-Landgate-Reqmts-for-Placement-of-Standard-Survey-Marks-V3.pdf)
- 5.1.14 PSMs should be referenced by a mark of PCM quality within 5 metres, preferably on line to an adjacent PSM or PCM.
- 5.1.15 When an existing SSM falls within the perimeter of a subdivision conducted under these guidelines, it can be used as a PSM. The original name/number of the SSM will remain as its primary identifier.
- 5.1.16 Suggested forms of PCMs (not an exhaustive list) are as follows:
  - 5.1.16.1 Iron spike as in General Regulation 38, or deck spike, driven flush in a solid, paved surface;
  - 5.1.16.2 Iron spike as in General Regulation 38 buried in the verge in locations likely to remain safe in the long term eg 0.3-0.5m behind the kerb;
  - 5.1.16.3 Plug (or similar) fixed into a solid, paved surface;
  - 5.1.16.4 Iron spike as in general regulation 38 set in concrete; and
  - 5.1.16.5 Centre-punched star picket set in concrete.
- 5.1.17 An iron spike as in general regulation 38, or a suitable alternative mark, shall be placed at all truncated road intersection points.
- 5.1.18 It is recommended that there be at least one mark below the ground surface for each 20 lots of all stages in a development.

- 5.1.19 There should be a variety of mark types within each plan to give maximum chance of survival from future civil and domestic works.
- 5.1.20 A PSM or PCM must be located at each road intersection within each plan.
- 5.1.21 There must be as least three PSMs or PCMs within each plan.
- 5.1.22 The following types of marks are not permitted:
  - 5.1.22.1 Concrete nails;
  - 5.1.22.2 Marks on extruded kerbing;
  - 5.1.22.3 Marks in brick/block paving;
  - 5.1.22.4 Drillholes less than 4mm in diameter and less than 10mm deep; and
  - 5.1.22.5 Wick pen marks.

## **5.2 Marking Only When Safe From Disturbance**

- 5.2.1 The final lot corner marks, PSMs and PCMs associated with any plan being surveyed within these guidelines must only be placed when they are safe from disturbance, and should remain visible after substantial completion of the servicing of the subdivision (generally after all earthworks have been completed, roads have been kerbed and sealed, sewers and drainage installed and the verge surfaces smoothed).
- 5.2.2 It is not acceptable practice to complete the final marking when on site before roads have been sealed and kerbed – surveyors must make arrangements for deferred final marking or return to complete the final marking after those works have been completed.

## **5.3 Marking Corners on Walls**

- 5.3.1 When a lot corner is on top of a high perimeter wall or on the far side of such a wall, an offset mark (either additional or replacement and not necessarily a peg) should be placed on the side boundary but within the lot to indicate the side boundary to the proprietor and builder.
- 5.3.2 The offset mark should not have the appearance of that usually used for corner marks – and especially not be placed with an aluminium plate in the same manner as is used for corner marks.

## **5.4 Inaccessible Corners and Offset Marking**

- 5.4.1 Where a lot corner is inaccessible an offset mark should be placed in a position that clearly indicates the position of the boundaries.
- 5.4.2 Land owners often find it difficult to find the position of the true corner from an offset mark. What may seem straightforward to a surveyor is not the case for others who have little knowledge as to how to locate the corner from the offset mark.
- 5.4.3 For each inaccessible mark, the following should be considered to prevent offset marking being misinterpreted as corner marking:
  - 5.4.3.1 Some indication should be made that the offset mark is not at the lot corner. This may be achieved by indicating with a waterproof pen on the wall or a nearby stake that the mark is a certain distance from the corner;
  - 5.4.3.2 Numbering should be carried out in such a manner that indicates the mark is not at the corner; and
  - 5.4.3.3 Offset marks **should not** be placed with an aluminium plate in the same manner as is used for corner marks.
- 5.4.4 When an offset mark is placed, even though not ideal, an attempt should be made to place a mark at the true corner to assist land owners.

## **5.5 Deferred Final Marking**

- 5.5.1 Authorisation may be obtained to defer the final marking until after the plan is “in order for dealings” in cases where a development is fully bonded or where other exceptional circumstances exist.
- 5.5.2 To use this option an application must be made to the Inspector of Plans and Surveys at Landgate who will assess the situation and may grant a conditional approval under General Regulation 26A (1). Strict compliance with any conditions imposed, including the timing of the lodgement of survey sheets, is necessary. Also see guidelines 9.4 and 9.5.

## **6.0 MARKING RURAL SUBDIVISIONS**

### **6.1 Rural and Rural-Residential**

- 6.1.1 Whilst some re-establishment benefits can be obtained from the use of a final control survey that is permanently marked in long-term secure positions in rural and rural-residential areas, these benefits are generally much less than in built-up areas. Part 5 of the General Regulations must be considered, especially regulations 37, 38, 39, 40 and 50.
- 6.1.2 In rural and rural-residential areas there should be at least one PSM placed for each subdivisional plan. A PSM or PCM must be situated within 200 metres of, and visible from, every lot corner.
- 6.1.3 Referenced corners and intermediate spikes can be regarded as being equivalent to PCMs, but they will only be integrated into the SCDB as a normal cadastral mark unless included within the subdivisional control network.
- 6.1.4 Intermediate spikes should be placed on every boundary such that (in addition to the requirement of General Regulation 39) from each end mark or intermediate mark on that boundary, another mark should be visible on line in both directions.
- 6.1.5 General Regulations 37 and 38 must be considered when applying the paragraphs immediately above.
- 6.1.6 These guidelines do not replace the provisions of General Regulation 39.
- 6.1.7 Where these guidelines apply to a rural or rural residential subdivision that is marked before development works have been completed, and where the lot marking is not expected to be disturbed, the surveyor is required to:
- 6.1.7.1 Comply with guidelines 2.1 to 2.3; and
  - 6.1.7.2 Include in the deposited plan(s) for the subdivision "Survey Information Sheets" that provide details of any new reference and/or permanent control marks placed.
- 6.1.8 Where no control survey is carried out, the cadastral alignments can be regarded as adequate control.

## **7.0 FINAL CONTROL SURVEY**

### **7.1 Final Control Survey**

- 7.1.1 The final control survey that establishes the PSMs and PCMs from which the lots are pegged provides connections to the geodetic datum. However, the primary purpose of these marks is to provide strong re-establishment of the boundaries with the subdivision.
- 7.1.2 Details of the observations made for the final control survey are to be included in a CSD file lodged as an electronic field book (eFB) at Landgate via e-mail within 7 days of lodging the relevant survey sheet. Deposited plans not subject to deferred final marking (see guideline 5.5) will not be made in order for dealings until there has been received at Landgate a survey sheet, an FSC (see guideline 9.1) and an eFB relevant to the final marking on the survey sheet.
- 7.1.3 The relationship between the new control established in the eFB and the surround and/or the initial control survey shown in the re-establishment and control Field Record must be clearly shown in the eFB. The eFB is also to include the observations that establish any stage or intermediate control that was used to supplement the initial control contained in the re-establishment and control Field Record (see guideline 3.2).
- 7.1.4 These control points will be classed as Temporary Control Points (TCMs). If further re-establishment of original cadastral alignments is carried out in conjunction with the intermediate control, then the re-establishment and connections to control must be lodged in a Field Record in accordance with guideline 3.2. Guideline 8.3 must be followed when showing control point numbers.

### **7.2 eFB\_CSD File**

- 7.2.1 The name of the CSD file lodged as the eFB is to be prefixed by the Field Record number allocated and include CSD as the extension. (e.g. eFB90000.CSD)
- 7.2.2 All **final adjusted** control values (angles and distances) should be included in the CSD file (eFB) and must match those shown on the survey sheets. The local point numbers are to be used when creating the CSD file but the full name of the SSM, PSM or PCM or TCM including the FB or eFB prefix **must** be included in the "pntlabel" attribute of the point record (Record ID 10) for each point contained in the CSD file. (e.g. eFB90000/8569)
- 7.2.3 The DP number(s) to which the eFB is relevant to should be noted in record 1 of the CSD file.
- 7.2.4 TCMs, PSMs and PCMs are to be given point types T in the CSD file. Landgate will amend the point types for PSMs and PCMs during integration. TCMs will always retain the T point type.
- 7.2.5 The CSD file for the final control survey is to follow the requirements outlined in the CSD User Guide shown in the "Survey and Plan Practice Manual" with reference to the above which are specific to these guidelines.

### **7.3 eFB Certification**

- 7.3.1 For the purposes of certification by a licensed surveyor under regulation 17 of the *Licensed Surveyors (General Surveying Practice) Regulations 1961* the eFB lodged for the final control survey is to be regarded as forming part of

that plan (ie. the licensed surveyor who signs the plan (Regulation 54 Certificate) is responsible for the survey in the eFB. (Also see guideline 8.1)

## **7.4 eFB Miscellaneous Matters**

- 7.4.1 The eFB may be noted on the FSC at the surveyor's discretion. In cases where an eFB is not required a statement to that effect should be included with the FSC.
- 7.4.2 An eFB is not required for a survey sheet when all the control points on that survey sheet have already been contained in a previously lodged eFB or Field Record. Each control point will retain the original point name.
- 7.4.3 The eFB can contain calculated connections to selected cadastral points, especially those shown on the survey sheets.
- 7.4.4 Calculated connection angles are to be provided relative to a control network line, rather than to another calculated connection line. If cadastral connections are supplied as part of the eFB submission, surveyors must ensure that angles between control network lines are included and independent to cadastral connection lines. This enables independence between the control network and cadastral connections.

## **8.0 SURVEY SHEETS**

### **8.1 Survey Sheets**

- 8.1.1 Separate sheets are to be added to deposited plans showing the relationships between the control and/or reference marks and the new cadastral alignments. For survey-strata schemes within Special Survey Areas this information must be included in the final control Field Record and not added to the plan.
- 8.1.2 Every deposited plan within an SSA requires a survey sheet, and every survey-strata plan within an SSA requires a final control Field Record.
- 8.1.3 A separate Regulation 54 Certificate is required to be shown on the Survey Sheet(s) if the surveyor signing that sheet is different to the surveyor who initially signed the Certificate on sheet 1 of the deposited plan.
- 8.1.4 In this case the surveyor signing the Survey Sheet(s) will also be responsible for the eFB. (See guideline 7.2)
- 8.1.5 Each PSM and PCM must have at least one direct boundary connection, and there must be a minimum of four such connections to cadastral alignments within the plan. However, it is recommended that connections be shown to multiple points at road intersections.
- 8.1.6 Survey Sheets must describe the type of mark used for each PSM and PCM.
- 8.1.7 PSMs/PCMs that are in safe positions remote from the lot boundaries on a plan can be exempt from the requirement for direct boundary connections at the discretion of the surveyor.
- 8.1.8 Survey Sheets may show additional information, such as connections to street infrastructure, for locating PSMs and PCMs.

### **8.2 Sheet Headings**

- 8.2.1 To clearly indicate the purpose of the Survey Sheet(s), they are to have a bold heading which states "Survey Information Only". A heading of "Survey Sheet" is also to be included.

### **8.3 Numbering of Control Points**



- 8.3.1 Unique control point numbers must be used for each stage of a development. Duplication of point numbers with adjoining stages or subdivisions must be avoided. It is recommended that surveyors subdividing adjoining parcels discuss control-numbering issues as soon as possible.
- 8.3.2 Intermediate and final control points (PSMs and PCMs) are to be numbered as a string by reference to the eFB number and the surveyors local point number. (e.g. *eFB84702/9005*)
- 8.3.3 Initial control points known as Temporary Control Marks (TCMs) that are recorded in the surround/re-establishment/control survey Field Record are to be numbered as a string by reference to the Field Record number and the surveyors local point number (e.g. *FB80702/9000*).
- 8.3.4 The eFB or field book prefix used for control point numbers should be that book number in which the control point was initially created, and which shows the initial observations used to fix that control point.
- 8.3.5 Any replacement marks should be allocated a new point number to avoid confusion and potential errors.
- 8.3.6 It is strongly suggested that the survey sheet include a tabulated list of all SSMs, TCMs, PSMs and PCMs located within the land extent depicted in the survey sheet. This list should also state the marks from previous stages/subdivisions that have not been located or proved to have been destroyed/damaged.

#### **8.4 Angles, Mid-Azimuths and Bearings**

- 8.4.1 All final adjusted values for the final control survey should be contained in a CSD file and lodged as an eFB as indicated in guideline 7.1.
- 8.4.2 If GNSS is used for observing the control network, then angles calculated from the end azimuths and the mean ground level distances are to be shown in the CSD file (eFB).
- 8.4.3 Bearings should be used on the Survey Sheet(s) in lieu of angles to depict connections from control marks to cadastral alignments and to show road casement details (i.e. road alignments) provided some indication is made as to the datum. Where bearings and mid-azimuths are used on the plan there must be a clear indication of what values are being used.
- 8.4.4 To avoid possible orientation errors and to provide connectivity it is requested that surveys of abutting developments by the same survey firm retain the datum used on that preceding adjacent development.

#### **8.5 Rounding Errors**

- 8.5.1 Survey Sheets added to deposited plans should record to three decimal places the following values:
  - 8.5.1.1 the total distances of all road straights, (preferably between intersection points);
  - 8.5.1.2 truncation set-back distances where not already shown within the plan;
  - 8.5.1.3 lot distances where the rounded values on the main plan graphic lose the required millimetre precision; and
  - 8.5.1.4 frequent connections across roads.
- 8.5.2 The purpose of this information is to reduce errors in future re-establishment caused by rounding errors or accumulation of errors.

#### **8.6 Lot dimensions not to be shown on Survey Sheet**



- 8.6.1 Angles and distances around new lots should not be shown on the Survey Sheet(s). This information is already contained within the previous sheet(s) of the plan.

## **8.7 Curved Boundaries**

- 8.7.1 If the plan has boundaries that are circular curves, full curve details must be recorded somewhere on the plan.

## **8.8 Depiction of Non-Standard Marks**

- 8.8.1 If non-standard or offset marks are used, they are to be depicted on the Survey Sheet(s).

## **9.0 SURVEY CERTIFICATES AND ADMINISTRATION**

### **9.1 Final Survey Certificates**

- 9.1.1 A Final Survey Certificate (FSC) in the form in the Table at General Regulation 55E must be lodged with the Inspector of Plans and Surveys before the deposited plan of any subdivision surveyed in accordance with these guidelines will be passed for dealings, except in the following situations:

9.1.1.1 when deferred final marking in accordance with guidelines 5.5, 9.3 and 9.4 applies; and

9.1.1.2 Subdivisions that are fully marked before the plan is lodged, and for which a survey sheet or, in the case of a survey-strata, a final control Field Record has been lodged.

- 9.1.2 Alternatively, the requirement to lodge a separate Final Survey Certificate may be met by the addition of the following certificate to ALL survey sheets in your lodgement.

9.1.3 Reg. 55E: (d) The marks shown on these plans of survey were in place on.....

9.1.4 The Licensed Surveyor accepting responsibility for the survey sheets, will by this action, also be accepting responsibility for the 55E (d) certification.

### **9.2 Delay in FSC Lodgement**

- 9.2.1 If more than two months elapse from the date of marking to the lodgement of the FSC, the certificate must be accompanied by a written statement by the surveyor to the effect that the majority of the marks of the subdivision remained in place at the date of lodgement of the FSC.

### **9.3 Deferred Final Marking - Initial Survey Certificate**

- 9.3.1 Where deferred final marking is carried out in accordance with guideline 5.5 the surveyor must lodge with the Inspector of Plans and Surveys an initial survey certificate (ISC) in the form in the Table to this guideline, together with







- 9.5.1 Surveyors must authorise release before plans will be delivered to WA Planning Commission (WAPC).
- 9.5.2 Plans will not be made in order for dealings until WAPC approval has been endorsed and the ISC (if applicable), FSC (when required), survey sheet(s) or final control Field Record (if applicable), and eFB have been lodged.

## **10.0 RE-SUBDIVISIONS AND RE-SURVEYS WITHIN SPECIAL SURVEY AREAS**

- 10.1 Any re-subdivision of a lot or lots within a Special Survey Area must comply with these guidelines (i.e. once an SSA, always an SSA). Where original control or referencing is replaced or enhanced the information is to be included in Survey Sheet(s) added to the new subdivision plan, or in the case of a survey-strata, lodged in a Field Record.
- 10.2 Any re-survey of a lot or lots within a Special Survey Area must comply with Regulation 8(2) of the *Licensed Surveyors (General Surveying Practice) Regulations 1961*. Where original control or referencing is replaced or enhanced the information is to be included in a Field Record.
- 10.3 Original cadastral corners should be re-positioned from the closest available reliable permanent marks (SSMs, PSMs, PCMs, intersection spikes or referenced corners). Only in circumstances where no permanent marks remain within a Special Survey Area should the spatially upgraded SCDB coordinates be the sole source to position cadastral corners.
- 10.4 While undertaking re-subdivisions and re-surveys within an SSA, if there are existing houses or structures on the neighbouring properties, a connection is to be made where practicable, with an explanation of the type of construction. These connections will enable those points to be coordinated for future benefit.
- 10.5 Field Records from the original plan are not to be brought forward on plans of re-subdivision.

**END OF DOCUMENT**