



Department of **Mines,
Petroleum and Exploration**
Geological Survey of Western Australia

**GEOLOGICAL SURVEY and RESOURCE
STRATEGY DIVISION**

**Provisions and Regulations
of the Mining Act 1978
and Directives Relating to
Survey**

(REVISED) – 20/5/2024

CONTENTS

<u>PART I</u>	<u>SECTIONS OF THE MINING ACT AFFECTING SURVEYS</u>	<u>Pages 1 - 6</u>
<u>PART II</u>	<u>REGULATIONS OF THE MINING ACT RELATING TO THE REQUIREMENTS OF MARKING OUT AND SURVEYING MINING TENEMENTS</u>	<u>Pages 7 - 19</u>
<u>PART III</u>	<u>SCHEDULE 3 — TRANSITIONAL PROVISIONS RELATING TO GEOCENTRIC DATUM OF AUSTRALIA</u>	<u>Pages 20 - 24</u>
<u>PART IV</u>	<u>DIRECTIONS FOR THE GUIDANCE OF SURVEYORS PERFORMING SURVEYS FOR THE DEPARTMENT OF MINES, PETROLEUM AND EXPLORATION UNDER THE MINING ACT 1978</u>	<u>Pages 25 - 36</u>
<u>PART V</u>	<u>REQUIREMENTS FOR LIMITED MARKING SURVEYS OF MINING TENEMENTS</u>	<u>Pages 37 - 41</u>
<u>SCHEDULE I</u>	<u>TENEMENT CLOSE AND AREA DETERMINATION</u>	<u>Page 42</u>
<u>SCHEDULE II</u>	<u>STANDARD ABBREVIATIONS FOR ORIGINAL POSTS, PEGS, INTERMEDIATE SPIKES AND REFERENCE MARKS</u>	<u>Page 43</u>
<u>SCHEDULE III</u>	<u>SAMPLE FIELD NOTES FOR LIMITED MARKING SURVEYS USING DGPS TECHNOLOGY</u>	<u>Page 44 - 49</u>

NOTE that PARTS I, II and III are not a substitute for the original legislation.

Persons using the information in this document must in addition acquaint themselves with the full provisions of the Mining Act 1978 and the Land Surveyors Licensing Act 1909 and any other relevant legislation.

PART 1

INDEX TO SECTIONS OF THE MINING ACT AFFECTING SURVEYING

Preliminary

[Section 9\(B\)](#)

Position on Earth's surface

Administration

[Section 15\(2\)](#)

Prohibition from adjudicating in certain matters or from using certain information (employees not to use information for personal gain)

Mining Tenements - General Provisions

[Section 47](#)

Survey of area of prospecting licence not required in first instance

[Section 58\(2\) \(a\),\(b\)](#)

Application for exploration licence

[Section 70G](#)

Survey of area of retention licence not required in first Instance

[Section 80\(1\)](#)

Surveys of mining leases

[Section 82\(1\) \(ba\),
\(bb\) & \(g\)](#)

Covenants and conditions of lease

[Section 89](#)

Form of general purpose lease

[Section 90](#)

Application of certain provisions to general purpose leases

[Section 104\(2\)](#)

Entry on land for purpose of marking out, surveying etc.

[Section 105\(1\)](#)

Marking out of mining tenement.

[Section 105B](#)

Grant of tenement subject to survey

[Section 106](#)

Offence of destroying marks or obstructing surveyor etc.

Administration of Justice

[Section 132\(1\) \(a\)](#)

Jurisdiction of warden's court

[Section 134\(1\) \(e\), 2,
& \(3\) \(h\)](#)

Powers of warden's court

Regulations

[Section 162\(1\)](#)

Power to make regulations governing survey

[& \(2\) \(ka\)](#)

SECTIONS OF THE MINING ACT AFFECTING SURVEYS

Position on Earth's surface

- Section 9(B)
- (1) Where for the purposes of this Act, or the regulations made for the purposes of this Act, it is necessary to determine the position on the surface of the Earth of a point, line or area, that position is to be determined by reference to the prescribed Australian datum.
 - (2) Regulations that prescribe a datum for the purposes referred to in subsection (1), or amend that datum or prescribe another datum to replace that datum, may make any transitional or savings provisions that are necessary or convenient to be made —
 - (a) in relation to mining tenements granted or acquired before the regulations take effect;
 - (b) in relation to applications for mining tenements pending when the regulations take effect; or
 - (c) for any other purpose.
 - (3) Regulations referred to in subsection (2) may modify or otherwise affect the operation of this Act.

Prohibition from adjudicating in certain matters or from using certain information (employees not to use information for personal gain)

- Section 15
- (2) A warden or an officer appointed pursuant to section 11 who uses any information that comes to his knowledge in the course of, or by reason of, his appointment as a warden or as such an officer for the purpose of personal gain is guilty of a crime.

Penalty: Imprisonment for 2 years or a fine of \$1 000.

Survey of area of prospecting licence not required in first instance

- Section 47
- (1) On an application for a prospecting licence or on a prospecting licence being granted the land affected is not thereby required to be surveyed, but where a dispute arises with respect to the position of such land or the boundaries or any boundary thereof the warden or Minister may order a survey to be made of the boundaries or the boundary in order to settle the dispute.
 - (2) A survey required under subsection (1) shall be –
 - (a) arranged in accordance with the regulations, and
 - (b) paid for by such party or parties to the dispute as the warden or the Minister determines.

Application for exploration licence

- Section 58
- (2)(a) On an application for an exploration licence or on an exploration licence being granted the land affected is not thereby required to be surveyed, but where a dispute arises with respect to the position of such land or the

boundaries or any boundary thereof the warden or Minister may order a survey to be made of the boundaries or the boundary in order to settle the dispute.

- (b) A survey ordered under paragraph (b) shall be arranged and paid for by such party or parties to the dispute as the warden or Minister determines.

Survey of area of retention licence not required in first instance

- Section 70G
- (1) On an application for a retention licence or on a retention licence being granted the land affected is not thereby required to be surveyed, but where a dispute arises with respect to the position of that land or the boundaries or any boundary of that land the warden or the Minister may order a survey to be made of the boundaries or the boundary in order to settle the dispute.
 - (2) A survey required under subsection (1) shall be –
 - (a) arranged in accordance with the regulations, and
 - (b) paid for by such party or parties to the dispute as the warden or the Minister determines.

Surveys of mining leases

- Section 80
- (1) Land the subject of a mining lease shall be surveyed, but it shall not be necessary for the survey to be carried out prior to the granting of the lease.

Covenants and conditions of lease

- Section 82
- (1)(ba) arrange and pay for a survey of such land within the prescribed time and in the prescribed manner
 - (bb) where the lease is surrendered in part, arrange and pay for a resurvey of such land within the prescribed time and in the prescribed manner
 - (g) be liable to have the lease forfeited if he is in breach of any of the covenants or conditions of the lease, if he fails to comply with any requirement under section 84A(2) or 115B(2) in relation to the lease or if a report required under paragraph (e) or section 115A in relation to the land the subject of the lease is not filed in accordance with this Act.

Form of general purpose lease

- Section 89
- A general purpose lease shall be in the prescribed form and shall contain such covenants, terms and conditions as are prescribed and specified therein and such additional terms and conditions as the Minister may, from time to time, in writing specify.

Application of certain provisions to general purpose leases

- Section 90
- The provisions of sections 74, 75, 76, 79, 80, 82A, 83, 84, 84A, 104 and 105 apply, with such modifications as the

circumstances require, to and in relation to a general purpose lease as if a reference in those sections to a mining lease were a reference to a general purpose lease.

Entry on land for purpose of marking out, surveying etc.

- Section 104 (2) Subject to subsections (3) to (5) of this section, for the purposes of surveying any land in connection with a mining tenement, any surveyor authorised in that behalf may -
- (a) enter and re-enter from time to time on any land, with such assistants as he thinks fit; and
 - (b) affix and set up on the land survey pegs, marks and poles; and
 - (c) do all such things as may be necessary for the purposes of the survey.

Marking out of mining tenement

- Section 105 (1) Before an application for a mining tenement other than an exploration licence or a retention licence is made, the land in relation to which the mining tenement is sought shall be marked out in the prescribed manner and in the prescribed shape.

Grant of tenement subject to survey

- Section 105B The grant of a mining tenement shall be deemed to have been made subject to a condition that the land applied for is found to have been available for the purposes of that grant after a survey has been made of the tenement.

Offence to remove marks, etc

- Section 106 A person who -
- (a) without lawful authority removes, destroys or alters the position of any peg, notice, survey peg, mark, post, cairn of stones or pole used for the purposes of any marking out or survey made or being made under section 104; or
 - (b) wilfully damages, destroys or otherwise interferes with any peg, survey peg, mark, post, cairn of stones, pole erected or notice posted for the purposes of this Act; or
 - (c) wilfully obstructs, hinders, or interferes with any person lawfully engaged in marking out or surveying any land under that section, is guilty of an offence against this Act.

Jurisdiction of warden's court

- Section 132 (1) A Warden's court has jurisdiction to hear and determine all such actions, suits and other proceedings cognizable by any court of civil jurisdiction as arise in respect of -
- (a) the area, dimensions, or boundaries of mining tenements,
and generally all rights claimed in, under or in relation to any mining tenement or purported mining tenement, or relating to any matter in respect of which jurisdiction is under any provision of this Act conferred upon the warden's court.

Powers of warden's court

- Section 134 (1) A Warden's court has power to make orders on all matters within its jurisdiction, for:
- (d) the determination of the area, extent, dimensions or boundaries of any mining tenement or as to the respective rights of the owner of the primary tenement and the special prospecting licence or mining lease for gold granted in relation to that tenement pursuant to section 56A, 70 or 85B.
- (2) The costs of all proceedings in the warden's court under this Act shall be in the discretion of the court and the amount thereof may be determined by the court or taxed by the warden or the mining registrar, as the court may direct.
- (3) A warden's court at any stage of any proceedings pending therein may, of its own motion, or on the application of any party to those proceedings, order —
- (h) the measurement or survey of any land or mining tenement or part thereof, and the making of plans and drawings thereof by any person duly qualified for the particular purpose.

Power to make regulations governing survey

- Section 162 (1) The Governor may make such regulations as are contemplated by this Act, or as he deems necessary or expedient for the purposes of this Act and any such regulations may confer upon a prescribed person or body specified in the regulations a discretionary authority.
- (2) Without limiting the generality of the powers conferred by subsection 1 of this section, those regulations may -
- (ka) provide for any matter relating to the surveying of mining tenements, including -

- (i) requiring that surveying to be carried out by a surveyor (in this paragraph referred to as "the approved surveyor") approved by the Minister or an officer of the Department in accordance with any specified written law, any instructions given by an officer of the Department, a warden or the Minister or any direction published by the Department, or any 2 or all 3 of the foregoing;
- (ii) the course to be adopted by the approved surveyor if he finds that a mining tenement or application therefor is not marked out in the prescribed shape referred to in section 105;
- (iii) the hearing by the warden's court of disputes arising during the course of that surveying concerning the positions of pegs or otherwise, or of objections to the survey of a mining tenement or of land the subject of an application for a mining tenement, and the determination by the Minister of those disputes or objections;
- (iv) the correction of errors or omissions in that surveying and the completion of surveying that are uncompleted;
- (v) the lodging of reports relating to surveys with the Department;
- (vi) the entry on land by officers of the Department for the purpose of inspecting surveys.

PART II

INDEX TO REGULATIONS OF THE MINING ACT RELATING TO THE REQUIREMENTS OF MARKING OUT AND SURVEYING MINING TENEMENTS

Miscellaneous Licences

[Regulation 38](#) Shape of licence (refer to Regulation 92 for other tenements)

Part V – General Regulations

Marking Out Mining Tenements – Part V

[Regulation 59](#) Manner of marking out tenement
[Regulation 60](#) Stones used to support posts
[Regulation 61](#) Marking out surveyed land (land identical to late survey/s)
[Regulation 62](#) Surplus land may be applied for by others
[Regulation 66](#) Description of boundaries

Boundary Marks – Part V

[Regulation 71](#) Boundary marks to be maintained
[Regulation 72](#) No liability for mining if boundary marks not maintained
[Regulation 73](#) Holder to identify boundaries

Prescribed Australian Datum – Part V

[Regulation 89A](#) Geocentric Datum of Australia (refer to Section 9B)

Miscellaneous – Part V

[Regulation 92](#) Shape of tenement (refer to Regulation 38 for Miscellaneous Licence)
[Regulation 113](#) Employees not to use information

Part VI - Surveys

[Regulation 116](#) Terms used
[Regulation 117](#) Approved surveyors
[Regulation 118](#) Initiation of mining surveys
[Regulation 118A](#) Notice of proposed mining surveys
[Regulation 118B](#) When mining surveys are to be carried out
[Regulation 119](#) Boundary marks to be pointed out
[Regulation 120](#) Adjustment of boundaries
[Regulation 120A](#) Disputes and objections in mining survey
[Regulation 120C](#) Correction of errors or omissions
[Regulation 120D](#) Cost of check surveys and of correction of errors to be met by approved surveyors
[Regulation 120E](#) Report of surveyed tenements to be prepared

REGULATIONS OF THE MINING ACT RELATING TO THE REQUIREMENTS OF MARKING OUT AND SURVEYING MINING TENEMENTS

MISCELLANEOUS LICENCES

Marking out and application

Shape of licence

Regulation 38

A miscellaneous licence may be of any shape but the boundaries of the land shall where practicable comprise straight lines.

Part V – General Regulations

Marking Out Mining Tenements

Manner of marking out tenement

Regulation 59

- (1) Land in respect of which a person is seeking a mining tenement shall, except where other provision is expressly made, be marked out -
 - (a) by fixing firmly in the ground -
 - (i) at or as close as practicable to each corner or angle of the land concerned; or
 - (ii) if there is an existing survey mark at a corner or angle of the land concerned, as close as practicable to the survey mark without moving, changing or otherwise interfering with the survey mark, a post projecting at least 1 metre above the ground; and
 - (b) subject to sub regulation (3), by either -
 - (i) cutting 2 clearly identifiable trenches; or
 - (ii) placing 2 clearly identifiable rows of stones,each at least 1 metre long from each post in the general direction of the boundary lines; and
 - (c) then by fixing firmly to one of the posts as the datum post, notice of marking out in the form of Form. 20.
- (2) Where the land adjoins other land in respect of which the same person is seeking or holds a mining tenement, common posts, and if required, common trenches or

common rows of stones may be used for the marking out of each parcel of land.

- (3) Where a post is fixed as close as practicable to an existing survey mark under subregulation (1)(a)(ii), marking out in the manner described in subregulation (1)(b) is not required.

Stones used to support posts

Regulation 60 Where, because of the nature of the ground, it is not practicable to fix posts firmly in the ground as required by regulation 59(1), stones may be used to support the posts.

Marking out surveyed land

Regulation 61 It shall not be necessary to mark out land in respect of which a mining tenement is sought, the boundaries of which are identical with any surveyed land, other than by fixing -

- (a) at a corner of the boundaries; or
- (b) if there is an existing survey mark at a corner of the boundaries, as close as practicable to the survey mark without moving, changing or otherwise interfering with the survey mark,

a datum post to which the notice of marking out in the form of Form 20 is affixed.

Surplus land may be applied for by others

- Regulation 62 (1) A person who makes an application for a mining tenement which is marked out to comprise an area in excess of the maximum area provided in the Act for such tenement is, before the tenement is granted, liable to have the surplus land at either end, or side, marked out at the option of another person who wishes to apply for a mining tenement in respect of that surplus land.
- (2) Subregulation (1) does not apply in respect to any land containing the workings of the person first marking out, or on which any permanent building has been erected.

Description of Boundaries

Regulation 66 The boundaries of every mining tenement applied for, other than an exploration licence, shall be described from either:

- (a) an existing survey mark;
- (b) a prominent ground feature shown on the public plans of the Department;
- (c) latitude and longitude; or
- (d) Map Grid of Australia 1994 or 2020 coordinates.

BOUNDARY MARKS

Boundary marks to be maintained

Regulation 71 The applicant for, or holder of, a mining tenement shall maintain posts, trenches or other sufficient boundary marks required by the Act and these regulations.

No liability for mining if boundary marks not maintained

Regulation 72 If posts or trenches or other sufficient boundary marks are not maintained on a mining tenement as provided in regulation 71 and a person enters and commences mining thereon, he shall not be liable for damage if he ceases mining thereon as soon as the posts are replaced, or the trenches or other sufficient boundary marks are renewed, and notice in writing is given to him to withdraw.

Holder to identify boundaries

Regulation 73 The holder of a mining tenement shall at any reasonable time identify or cause to be identified the boundaries of the tenement for any person requiring the information, by pointing out to that person the posts, trenches and other boundary marks of the tenement or by supplying a plan or description thereof.

PRESCRIBED AUSTRALIAN DATUM

Geocentric Datum of Australia — section 9B

Regulation 89A (1) This regulation has effect subject to the transitional provisions set out in Schedule 3.

 (2) The Geocentric Datum of Australia (“**the GDA**”) is prescribed for the purposes referred to in section 9B.

 (3) The reference ellipsoid for the GDA is the Geodetic Reference System 1980 (“**GRS80**”) ellipsoid with a semi-major axis of 6 378 137 m exactly and an inverse flattening (1/f) of 298.257 222 101.

 (4) The reference frame for the GDA is realised by the coordinates of the following Australian Fiducial Network geodetic stations referred to the GRS80 ellipsoid determined

within the International Earth Rotation Service Terrestrial Reference Frame 1992 (ITRF92) at the epoch of 1994.0 —

No.	Name	South Latitude	East Longitude	Ellipsoidal Height
AU 012	Alice Springs	23° 40' 12.44592"	133° 53' 07.84757"	603.358 m
AU 013	Karratha	20° 58' 53.17004"	117° 05' 49.87255"	109.246 m
AU 014	Darwin	12° 50' 37.35839"	131° 07' 57.84838"	125.197 m
AU 015	Townsville	19° 20' 50.42839"	146° 46' 30.79057"	587.077 m
AU 016	Hobart	42° 48' 16.98506"	147° 26' 19.43548"	41.126 m
AU 017	Tidbinbilla	35° 23' 57.15627"	148° 58' 47.98425"	665.440 m
AU 019	Ceduna	31° 52' 00.01664"	133° 48' 35.37527"	144.802 m
AU 029	Yaragadee	29° 02' 47.61687"	115° 20' 49.10049"	241.291 m

1.4.5.1 Computation of GDA2020 coordinates

GDA2020 coordinates were computed using a rigorous, 3D network adjustment of all available GNSS and terrestrial data from Commonwealth, state and territory jurisdictional archives. This adjustment enables the determination of GDA2020 coordinates and supports the computation of positional uncertainty and relative uncertainty between any survey control marks in Australia. The national GDA2020 adjustment was undertaken by Geoscience Australia with input from geodetic specialist representatives from all jurisdictional survey organisations.

The national GDA2020 network adjustment involved a rigorous least squares adjustment of all data. In the past, adjustments were undertaken with higher order data being held fixed in lower order adjustments. This resulted in distortions in the datum that have become more apparent when compared with high accuracy GNSS data observed in ITRF2008 or ITRF2014 and transformed back to 1994 using a 7-parameter similarity transformation. By performing a single national rigorous adjustment these distortions have been reduced and relative uncertainty can be computed for any given points on the datum.

The national GDA2020 network adjustment includes all available GNSS and terrestrial data from the jurisdictional archives, constrained using the Asia-Pacific Reference Frame (APREF) time series combination solution. This solution is calculated weekly by Geoscience Australia for approximately 450 APREF stations within Australia's jurisdiction and it provides a link between ITRF2014 and GDA2020. The development of GDA2020 has also seen the creation of the National GNSS Campaign Archive stored at Geoscience Australia. This archive contains all GNSS observations provided by state and territory jurisdictions greater than six hours duration. The data was processed (and will continue to be as new data is available) by Geoscience Australia to create a national high quality GNSS network.

(Geocentric Datum of Australia 2020 Technical Manual – Version 1.4)

1.4.6 Summary of Australian horizontal datums

A summary of the Australian datums is provided in Table 1.6. In some previous documentation, GDA and AGD have been documented as the name of the datum and the epoch has been appended to describe the coordinate set (e.g. AGD66). To avoid confusion, it is recommended that the epoch be appended when describing the name of the datum so users can differentiate between them (e.g. GDA94 and GDA2020). The EPSG codes for the datums are shown in Table 1.7.

Table 1.6: Summary of the parameters of Australian datums.

Datum	Geographic Coordinate Set	Grid Coordinates	Reference Frame	Ellipsoid / Spheroid	Semi-major axis (m)	Inverse Flattening
GDA2020	GDA2020	MGA2020	ITRF2014	GRS80	6378137.0	298.257222101
GDA94	GDA94	MGA94	ITRF1992	GRS80	6378137.0	298.257222101
AGD84	AGD84	AMG84		ANS	6378160.0	298.25
AGD66	AGD66	AMG66		ANS	6378160.0	298.25

Table 1.7: EPSG codes of Australian datums.

Datum	Geographic Coordinate Set	EPSG Code Geodetic Datum	EPSG Code Geodetic CRS (Geocentric)	EPSG Code Geodetic CRS (Geographic 3D)	EPSG Code Geodetic CRS (Geographic 2D)
GDA2020	GDA2020	1168	7842	7843	7844
GDA94	GDA94	6283	4938	4939	4283
AGD84	AGD84	6203	-	-	4203
AGD66	AGD66	6202	-	-	4202

1.5 Overview of the differences among GDA2020, ITRF2014 and GNSS reference frames

1.5.1 GDA2020 and ITRF2014

GDA2020 is aligned with ITRF2014 (Altamimi et al., 2016) at epoch 2020.00. ITRF2014 is the most recent realisation of a global network of accurate coordinates (and their velocities) maintained by the International Earth Rotation and Reference Systems Service (IERS) and derived from geodetic observations (VLBI, SLR, GPS and DORIS) (Seeber, 1993).

On January 1 2020, ITRF2014 at epoch 2020.0 will coincide with GDA2020. From January 1 2017 until January 1 2020, the difference between ITRF2014 coordinates (at the observed epoch) and GDA2020 coordinates will continually converge as the Australian tectonic plate moves 7 cm per year in a north-easterly direction. Until 2020, there will be an increasing convergence in the coordinates of GDA2020 and ITRF2014. From January 1 2020, there will be an increasing divergence in the coordinates of the GDA2020 and ITRF2014.

(Geocentric Datum of Australia 2020 Technical Manual – Version 1.4)

MISCELLANEOUS

Shape of tenement

Regulation 92

The shape of a mining tenement other than a graticular exploration licence, a miscellaneous licence or one marked out pursuant to regulation 61 shall be in the form of a rectangle, but if the presence of boundaries of mining tenements, other boundaries or natural features make it necessary or desirable to vary this shape, each side of the tenement shall be a straight line and where possible at right angles to an adjacent side or parallel to an opposite side.

Employees not to use information

Regulation 113

A person employed by the Department in any capacity who uses for the purposes of personal gain any information that comes to his knowledge in the course of, or by reason of, his employment with the Department commits an offence.

Part VI - SURVEYS

Terms used

Regulation 116

In this Part, unless the contrary intention appears -
"approved surveyor" means licensed surveyor who is for the time approved under Regulation 117;

"Director" means the person for the time being holding or acting in the office of the Executive Director Resource Tenure Division in the Department under Part 3 of the *Public Sector Management Act 1994*

"licensed surveyor" has the meaning given by section 3 of the *Licensed Surveyors Act 1909*;

"mining survey" means survey required under the Act or these regulations in respect of the boundaries of the area of land to which a tenement relates;

"tenement" means mining tenement or application therefor.

Approved surveyors

Regulation 117 (1)

The Minister may from time to time -

- (a) approve for the purposes of this Part, a person who is a licensed surveyor; and

- (b) on the recommendation of the Director given under subregulation (3), withdraw an approval given under this subregulation.
- (2) Subject to the Act and this Part, all mining surveys shall be carried out by approved surveyors in accordance with -
 - (a) *the Licensed Surveyors Act 1909* and the *Licensed Surveyors (General Surveying Practice) Regulations 1961* or a procedure approved by the Director; and
 - (b) such directions as are from time to time published by the Department for the guidance of approved surveyors.
- (3) If, in the opinion of the Director, an approved surveyor has not complied with the requirements of subregulation (2), the Director may recommend to the Minister that the approval of the approved surveyor be withdrawn under subregulation (1).
- (4) If an approved surveyor ceases to be a licensed surveyor, his approval is deemed to be withdrawn under subregulation (1) at the time of that cessation.

Initiation of mining surveys

- Regulation 118
- (1) Subject to subregulation (2), the Director shall -
 - (a) when a mining survey is ordered to be made under section 47(1), 58(2)(b), or 70G(1) of the Act; or
 - (b) subject to section 80 of the Act, after the lodging of an application for a mining lease;
 - (c) subject to section 80, as read with section 90, of the Act, after the lodging of an application for a general purpose lease; or
 - (d) when a mining survey is requested by the Minister or a warden's court for the purpose of determining any matter relating to the boundaries of a tenement,

arrange for a mining survey of the relevant tenement to be made as soon as practicable by an approved surveyor.

- (2) subregulations (1)(b) and (c) do not apply to applications lodged on or after 1 July 1991.
- (3) Subject to regulation 118C a survey of a mining lease under section 80 of the Act, or of a general purpose lease under

section 90 of the Act may be arranged by the holder of the tenement and carried out at any time, but if the Director directs, by written notice given to the holder of the tenement, that a survey be arranged and carried out, the holder of the tenement must arrange for a survey to be carried out within the time specified in the notice.

Notice of proposed mining surveys

- Regulation 118A (1) Where the Director proposes to carry out a mining survey of a tenement, the Director shall serve by post, notice of that fact on -
- (a) the applicant for, or holder of the tenement concerned; and
 - (b) an applicant for, or a holder of any adjoining tenement.
- (2) Where the lessee proposes or is required to carry out a mining survey of a tenement on or after 1 July 1991, the approved surveyor who is to carry out the survey shall serve by post notice of that fact on an applicant or a holder of any adjoining tenement.
- (3) The Director shall provide an approved surveyor with the details of adjoining tenement applicants and holders for the purposes of complying with subregulation (2), when requested to do so by the approved surveyor.

When mining surveys are to be carried out

- Regulation 118B A mining survey, in relation to a lease application lodged after 1 July 1991 -
- (a) shall, when required by the Director, be arranged by the applicant as soon as possible; or
 - (b) may, where the Director has not indicated that a mining survey is required at any particular time, be arranged by the applicant at any time.

Boundary marks to be pointed out

- Regulation 119 (1) When a mining survey is to be carried out, the applicant for or the holder of the tenement concerned who does not make himself or his agent available at a reasonable time in order to point out to the approved surveyor carrying out the mining survey his corner posts and other boundary marks commits an offence.
- (2) Subregulation (1) does not apply where the application giving rise to the mining survey is lodged on or after 1 July 1991.

Adjustment of boundaries

- Regulation 120 (1) Subject to this regulation, an approved surveyor shall carry out a mining survey in respect of -
- (a) a tenement other than an exploration licence so as to conform with -
 - (i) the land indicated by the applicant in marking out that tenement; and
 - (ii) the prescribed shape referred to in section 105(1) of the Act;
- or
- (b) an exploration licence or an application therefor to conform with the substance of the description thereof.
- (2) If, in the case of an application for a tenement other than an exploration licence, an adjustment made to achieve conformity under subregulation (1) would affect adjoining interests, the approved surveyor concerned shall survey the relevant tenement as strictly in accordance with its marking out as the circumstances permit.
- (3) If an approved surveyor finds that a tenement being surveyed by him encroaches on another tenement having priority in application over the first mentioned tenement, the approved surveyor shall excise from the area of the first mentioned tenement the area of that encroachment.
- (4) The Director shall provide an approved surveyor with details relating to priority of adjoining tenements, for the purposes of complying with subregulation (3), when requested to do so by the approved surveyor.

Disputes and objections in mining survey

- Regulation 120A (1) If a dispute arises during a mining survey concerning the position of posts or otherwise and the parties to the dispute cannot agree, the approved surveyor concerned shall -
- (a) forthwith report the matter to the Director at Perth; and
 - (b) not proceed with the mining survey pending determination of the dispute under subregulation (5).
- (2) The Director shall, as soon as is practicable after receiving a report made to him under subregulation (1), refer the matter so reported to him to the mining registrar, together

with his own report on that matter for the benefit of the warden.

- (2a) Subregulations (1) and (2) do not apply where the application giving rise to the mining survey described in subregulation (1) is lodged on or after 1 July 1991.
- (3) After a mining survey, the Director shall serve by post on the persons referred to in regulation 118A (1), a copy of the documents referred to in regulation 120E and a covering letter.
- (3a) A person who has been served under subregulation (3) may, within 30 days of the date of the covering letter, lodge an objection as to the mining survey and the objection shall be lodged in the form of Form 16.
- (4) Subject to Section 135 of the Act, a dispute or objection referred or lodged under this regulation shall be heard by the warden's court.
- (5) When the warden has heard a dispute or objection under subregulation (4), he shall forward the notes of evidence and his recommendation relating to the dispute or objection to the Minister, who shall determine the dispute or objection.

Correction of errors or omissions

- Regulation 120C
- (1) The Director may request an approved surveyor to correct any errors or omissions in a mining survey carried out by the approved surveyor.
 - (2) If the approved surveyor to whom a request is made under subregulation (1) does not promptly comply with the request, the Director may request another approved surveyor to correct the errors or omissions concerned.
 - (3) If a mining survey has not been completed by an approved surveyor in accordance with these regulations or areas have been incorrectly computed, by an approved surveyor, but the Director does not wish to reject the mining survey concerned, the Director may request another approved surveyor to complete that mining survey in accordance with these regulations or to correct the computations, as the case requires.
 - (4) The cost of correction or completion in compliance with a request made under subregulation (2) or (3) is a debt due to the Minister by the approved surveyor —

- (a) to whom the relevant request was made under subregulation (1); or
- (b) who did not complete a mining survey, or who made incorrect computations, within the meaning of subregulation (2),
 - as the case requires, and may be recovered from that approved surveyor by the Minister by action in a court of competent jurisdiction.

Cost of check surveys and of correction of errors to be met by approved surveyors

Regulation 120D

If an independent check survey requested by the Director within 2 years of the completion of a mining survey shows that unacceptable errors or omissions are present in the mining survey, the cost of that check survey and of correcting those errors or omissions is a debt due to the Minister by the approved surveyor who carried out the mining survey and may be recovered from that approved surveyor by the Minister by action in a court of competent jurisdiction.

Report of surveyed tenements to be prepared

Regulation 120E

An approved surveyor shall cause to be prepared for each tenement surveyed by him, a report of Form 44 and shall cause that report to be lodged.

WESTERN AUSTRALIA

MINING ACT 1978
Regulation 120E
REPORT OF APPROVED SURVEYOR
(To be lodged for each tenement surveyed)

TENEMENT TYPE	TENEMENT NUMBER	HOLDER / APPLICANT	DATE OF MARKING	SURVEYOR NAME & FIELD BOOK NUMBER

- | | YES | NO |
|--|--------------------------|--------------------------|
| 1. I have surveyed the tenement boundaries in accordance with the regulations. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. The boundaries surveyed are in accordance with the Holder's/Applicant's/Agent's markings. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. The Holder/Applicant/Agent attended the site and is satisfied with the positions of the surveyed boundaries. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. The adjoining tenement Holder(s)/Applicant(s)/Agent(s) attended the site and is (are) satisfied with the position of the surveyed boundaries. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Adjoining land tenures have been located as instructed and are endorsed. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Positions of any buildings, workings, shafts, roads and other significant features, where practical, have been located. | <input type="checkbox"/> | <input type="checkbox"/> |

*For any "NO" response above, a written report is required.

..... APPROVED SURVEYOR
...../...../20...

NOTE: Any additional information relating to the conduct of this survey must be presented in a brief written report below or can be included as additional page 2 of this document.

PART III

INDEX TO THE THIRD SCHEDULE — TRANSITIONAL PROVISIONS RELATING TO GEOCENTRIC DATUM OF AUSTRALIA

- [1. Interpretation](#)
- [2. Geocentric Datum of Australia \(section 9B\)](#)
- [3. Exploration Licences](#)
- [4. Land surrendered or forfeited etc](#)
- [5. Land Exempt under section 19](#)
- [6. Areas declared under section 57\(4\), and savings](#)
- [7. Certain prospecting licences and mining leases may be amalgamated with exploration licences](#)
- [8. Prescribed land does not need to be marked out](#)

PART III

SCHEDULE 3 — TRANSITIONAL PROVISIONS RELATING TO GEOCENTRIC DATUM OF AUSTRALIA

1. Terms used

(1) In this Schedule —

“**Geocentric Datum of Australia 2020**” (*the GDA2020*) is prescribed for the purposes referred to in section 9B

“**Geocentric Datum of Australia 94**” (*the GDA 94*) is prescribed for the purposes referred to in section 9B

“**Australian Geodetic Datum 84**” (*the AGD 84*) means the datum described in clause 2;

“**block**” means a block as described in section 56C;

“**commencement day**” means the day on which section 5 of the *Acts Amendment (Australian Datum) Act 2000* comes into operation;

“existing exploration licence” means an exploration licence referred to in clause 3(1) or (3);

“number”, in relation to a block, has the same meaning as it has in section 56C (4);

“prescribed land” means all of an area of land that, as a result of the operation of section 9B in relation to the Geocentric Datum of Australia referred to in regulation 89A —

- (a) immediately before the commencement day, was on the western and southern boundaries, but not within, a block or blocks; and
 - (b) on the commencement day, is in the block or blocks identified by reference to the same number or numbers by reference to which the block or blocks referred to in paragraph (a) was or were identified.
- (2) The note and diagram after clause 8 are provided to assist understanding and do not form part of this Schedule.

2. Australian Geodetic Datum

- (1) For the purposes of this Schedule, the Australian Geodetic Datum 84 (the AGD 84) is defined by an ellipsoid having a semi-major axis (equatorial radius) of 6 378 160 m and a flattening of 1/298.25 and fixed by the position of the origin being the Johnston Geodetic Station in the Northern Territory of Australia.
- (2) The Johnston Geodetic Station is taken to be situated at —
- (a) 25° 56' 54.5515" south latitude and 133° 12' 30.0771" east longitude; or
 - (b) where decimal reckoning is used, 25° 56.90919' south latitude and 133° 12.50129' east longitude,

and to have a ground level elevation of 571.2 m above the ellipsoid referred to in subclause (1).

3. Exploration licences

- (1) For the purposes of the Act or these regulations, the position on the surface of the Earth of the land that is the subject of an exploration licence in force before the commencement day is to be determined by reference to the Australian Geodetic Datum.
- (2) For the purposes of the Act or these regulations, the position on the surface of the Earth of the land that is the subject of an application for an exploration licence lodged before the commencement day and pending immediately before that day is to be determined by reference to the Australian Geodetic Datum.
- (3) For the purposes of the Act or these regulations, the position on the surface of the Earth of the land that is the subject of an exploration licence granted on or after the commencement day in respect of an application referred to in subclause (2) is to be determined by reference to the Australian Geodetic Datum.

4. Land surrendered or forfeited etc.

(1) If after the commencement day —

- (a) land becomes available from an existing exploration licence; and
- (b) any portion of that land is in a block in respect of which an exploration licence has been granted in respect of an application lodged on or after the commencement day,

the exploration licence referred to in paragraph (b) is to be amended, by force of this subclause, to include the land that has become available from the existing exploration licence.

(2) If after the commencement day —

- (a) land becomes available from an existing exploration licence; and
- (b) any portion of that land is in a block in respect of which an application for an exploration licence is lodged on or after the commencement day,

the application referred to in paragraph (b) is taken to extend to the land that has become available from the existing exploration licence and, if an exploration licence is granted in respect of that application, that land is to be included in the exploration licence.

(3) Subclauses (1) and (2) do not apply if —

- (a) the land that becomes available from an existing exploration licence has been included in an application under section 67 or 70B; and
- (b) a mining lease, general purpose lease or retention licence has been granted in respect of the application.

(3a) Subclauses (1) and (2) do not apply if —

- (a) the land that becomes available from an existing exploration licence has been included in a reversion licence application; and
- (b) a prospecting licence has been granted in respect of the reversion licence application.

(4A) Subclauses (1) and (2) do not apply if —

- (a) the land that becomes available from an existing exploration licence has been included in an application under section 100(1); and
- (b) a mining tenement has been granted in respect of the application.

(4) Subclause (2) does not apply if the land that becomes available from an existing exploration licence is in a block identified by reference to the same number as a block in respect of which an application referred to in subclause (2)(b) has been lodged.

(5) A reference in this clause to land becoming available from an existing exploration licence is a reference to the land that is the subject of the licence being surrendered under section 65 or to the surrender, forfeiture (otherwise than under section 98) or expiry of the licence.

5. Land exempted under section 19

For the purposes of the Act or these regulations, the position on the surface of the Earth of land that is the subject of an exemption given by an instrument in force under section 19 and made before the commencement day is to be determined by reference to the Australian Geodetic Datum.

6. Areas declared under section 57(4), and savings

- (1) For the purposes of the Act or these regulations, the position on the surface of the Earth of land that is the subject of a declaration in force under section 57(4) and made before the commencement day is to be determined by reference to the Geocentric Datum of Australia.
- (2) Subclause (1) does not affect the validity of —
 - (a) an existing exploration licence; or
 - (b) an application for an exploration licence lodged before the commencement day and pending immediately before that day.

7. Certain prospecting licences and mining leases may be amalgamated with existing exploration licences

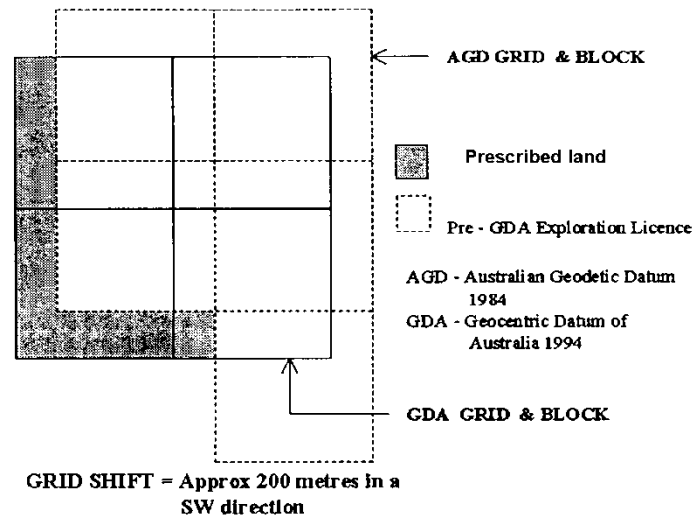
- (1) If a person is the holder of both an existing exploration licence and another tenement, the person or an agent of the person may, without marking out the land, apply in writing to the Minister in the manner prescribed for the purposes of section 67A(1) for the other tenement, or part of the other tenement, to be amalgamated with the exploration licence.
- (2) Another tenement, or part of another tenement, cannot be amalgamated with an exploration licence under this clause unless the land that is the subject of the other tenement, or of that part of the other tenement, is —
 - (a) wholly within the same block or same blocks within which the land that is the subject of the exploration licence is situated; and
 - (b) contiguous with the land referred to in paragraph (a).
- (3) Subject to subclause (2), section 67A(4) and (5) apply to an application under subclause (1) as if —
 - (a) the application had been made under section 67A(1); and
 - (b) a reference in section 67A(4) or (5) to “secondary tenement” were a reference to, as the case requires, the “other tenement” or “part of the other tenement” mentioned in subclause (1).
- (4) This clause does not affect the operation of section 67A.
- (5) In this clause —

“another tenement” or “other tenement” means a prospecting licence or mining lease applied for and granted after the commencement day in respect of prescribed land.

8. Prescribed land does not need to be marked out

Despite section 105, if an application for a prospecting licence or mining lease is made on or after the commencement day in respect of prescribed land only, that land does not need to have been marked out.

Note: The following diagram shows an example of prescribed land referred to in this Schedule.



PART IV

INDEX TO DIRECTIONS FOR THE GUIDANCE OF SURVEYORS PERFORMING SURVEYS FOR THE DEPARTMENT OF MINES, PETROLEUM AND EXPLORATION

PRELIMINARY

- [1. Interpretation](#)

SURVEYS

- [2. Estimate of survey cost may be required](#)
- [3. Pre-requisites to survey of a tenement](#)
- [4. Survey Instructions](#)
- [5. Effecting the survey](#)
- [6. Surveyors to provide information](#)
- [7. Information relating to Surveys belongs to Department](#)
- [8. General obligations of Surveyors](#)
- [9. Lapsing and renewal of instructions for surveys](#)
- [10. How area of a tenement to be calculated](#)
- [11. Identification of adjoining tenements](#)

TENEMENT MARKING

- [12. Survey Marks](#)
- [13. Witness posts at corner survey marks](#)
- [14. Removal or obliteration of superseded survey marks](#)
- [15. Procedure when boundaries of new tenements and of existing holdings coincide](#)
- [16. Details to be shown if boundary determined by calculation or offset](#)
- [17. Procedure when the complete cadastral survey of a tenement is deemed unnecessary](#)
- [18. Procedure when tenement found to encroach on protected land](#)
- [19. Procedure when unsurveyed utility found to traverse tenement](#)
- [20. Procedure when tenement boundary conforms to a curved protective boundary of a utility](#)

CONNECTION SURVEYS

- [21. How surveys to be connected](#)
- [22. Connection to control points](#)
- [23. Angle from connecting traverse to previous survey to be recorded](#)
- [24. Connection utilising Global Positioning System technology](#)

FIELD NOTES AND REPORTS

- [25. Field Books, report forms, etc to remain the property of the Department](#)
- [26. Requirements for setting out field notes](#)
- [27. Place names to be recorded](#)
- [28. Map anomalies to be reported](#)

ACCOUNTS AND INSURANCE

- [29. Lodging and payment of accounts](#)
- [30. Times to be vouched for](#)
- [31. Worker's Compensation requirements](#)
- [32. Professional indemnity and public liability insurance](#)

DIRECTIONS FOR THE GUIDANCE OF SURVEYORS PERFORMING SURVEYS FOR THE DEPARTMENT OF MINES, PETROLEUM AND EXPLORATION UNDER THE MINING ACT 1978

These directions are to be applied as supplementary to *Licensed Surveyors (Guidance of Surveyors) Regulations 1961* and are authorised by the Mining Regulations 1981, Regulation: 117(2).

PRELIMINARY

Terms used – (refer to Regulation 116)

1. In these directions:

"Act" or "the Act" or "this Act" means the Mining Act 1978.

"Regulations" means the Mining Regulations 1981.

"General Regulations" means the *Licensed Surveyors (Guidance of Surveyors) Regulations 1961*

"Department" means the Department of Mines, Petroleum and Exploration (DMPE) of Western Australia.

"Direction" means one of these directions authorised by Regulation 117(2) of the Act.

"Director" means the person for the time being holding or acting in the office of the Executive Director of the Resource Tenure Division of the Department under Part 3 of the *Public Sector Management Act 1994*.

"Holding" means a mining tenement, lease, location, lot, reserve, or other land tenure unit.

"Limited Marking" means a tenement surveyed by a procedure approved by the Director pursuant to General Regulation 26(A)(1) and Subregulation 117(2)(a) of the Act.

"Paragraph" means a paragraph of the direction or subdirection in which the term appears.

"Plan" includes a diagram.

"Protected width" means the width from the relevant utility which is referred to in the conditions to which the tenement is subject.

"Schedule" means a schedule to these directions.

"Sub-direction" means a sub-direction of the direction in which the term appears unless otherwise stated.

"Survey" means an approved mining survey under Part VI of the Regulations of the Act or other survey requested by the Director.

"Approved Surveyor" means licensed surveyor who is for the time approved under Regulation 117.

"Survey Mark" means a cairn, peg, post, spike, trench or other mark made or placed by a surveyor as required by the Licensed Surveyors Act 1909 and its regulations and referred to in these directions.

"Limited Marking Survey Contract System" means that the applicant or holder arranges and bears full cost of survey.

"Utility" means pipeline, power line, railway, road or tramway etc.

SURVEYS

Estimate of survey costs may be required

2. (1) Before arranging for a mining survey to be made as provided in Regulation 118(1) of the Act the Director may require an approved surveyor to submit to him an estimate of the time required for the completion of a survey and of the fees and charges expected to be payable in respect thereof. (Only if the Department is paying)

Pre-requisites to proposed mining surveys – Regulation 118A(2)

3. Before commencing a tenement survey, the surveyor shall-
 - (a) communicate with the applicant for or the holder of the tenement concerned to enable that applicant or holder to comply with Regulation 119 of the Regulations;
 - (b) serve by post on contiguous tenement applicants or holders an advice of intent to survey. The Director shall provide the surveyor with details of contiguous tenement applicants and holders
 - (c) comply with Regulation 118A of the Regulations.

Survey Instructions

4. Upon nomination of preferred surveyor by tenement holder, the Department will compile survey instructions. Preparation and searching will be charged at an hourly rate.
Instructions remain the property of the Department and are to be returned on completion of survey.

Effecting the survey

5. Only a listed Department approved surveyor may effect survey. A list of approved surveyors, in accordance with Section 162 (2)(ka)(i) of the Act and Regulation 117, is available on the Department website.

Surveyors to provide information

6. A surveyor shall, in respect of a survey carried out by him -
- (a) comply with any direction of the Director and provide such other information as the Director may request in relation to that survey; and
 - (b) inform the Director of -
 - (i) any encroachment by the tenement surveyed on any other holding occasioned by miss-description or by the miss-plotting of that mining tenement or adjoining holdings or by both;
 - (ii) the location of the boundaries of any holdings protected by the conditions to which the tenement surveyed is subject or by section 117 of the Act;
 - (iii) any inconsistencies between the tenement as surveyed and the description and marking off of that tenement by the applicant therefore and any apparent attempt to mislead the surveyor; and
 - (iv) the conditions and sufficiency of the marking off of the tenement surveyed and the type of materials used.

Information relating to survey belongs to Department

7. (1) All information provided relating to survey is to be returned, with the field notes, to the Department. The surveyor will be expected to disclose all doubts, discrepancies and difficulties and to afford all other information obtainable by him relative to the property, that may aid in securing accuracy and completeness.
- (2) Subject to subdirection (3) and (4), a surveyor shall not without the permission in writing of the Director make public anything in any field notes or other information -
- (a) referred to in subdirection (1); and,
 - (b) made or obtained by him.
- (3) Subdirection (2) does not apply to information which is required by or under the Act to be given as evidence in proceedings in a warden's court.
- (4) Subdirection (2) does not apply to the applicant or holder under the Limited Marking Survey Contract System - refer to Subregulation 118(2).

General obligations of surveyors

8. A Surveyor shall -

- (a) provide all instruments, tools, materials, stores and labour necessary for the proper execution of the work undertaken by him in relation to a mining survey;
- (b) ensure that all equipment used is in proper adjustment to accurately determine angles and distances measured;
- (c) at all times comply with the Health Safety and Welfare Regulations and the Surveying (private practice) Industry Award provisions; and
- (e) behave in a professional manner and not act in any way which would bring discredit to the Department.

Lapsing and renewal of instructions for surveys

9. (1) If a survey is not completed within a reasonable time, or specified period, those instructions shall cease to have effect, subject to sub clause (2) (a).
- (2) A surveyor holding uncompleted instructions for a mining survey-
- (a) may, before the expiry of the relevant period referred to in subdirection (1), apply to the Director for the instructions relating to the survey to be extended; and
 - (b) shall, if the relevant period referred to in subdirection (1) expires without the instructions relating to the survey having been extended under subdirection (2) (a) or withdrawal of the contract by the Lessee, forthwith return the instructions to the Director.

How area of a tenement to be calculated

10. (1) Subject to subdirection (2), a surveyor shall calculate the area of a tenement in accordance with General Regulation 35A.
- (2) An area calculated in accordance with subdirection (1) and referred to in the second column of Schedule I shall be deemed to be enlarged or diminished, as the case requires, to the nearest unit of area set out opposite to that area in the third column of that Schedule. (refer to page 41 herein)

Identification of adjoining tenements

11. A surveyor shall, when he surveys a tenement which adjoins, surrounds or is in close proximity to another tenement or holding, so identify the other tenement or holding and make such measurements as to enable abutments or encroachments to be verified.

TENEMENT MARKING

Survey Marks

12. (1) Subject to Regulation 117(2) and General Regulation 26(A), tenements are to be marked in accordance with the General Regulations except that paragraph (a) of the Table to General Regulation 36 shall apply to all tenements.
- (2) The prefixes "M" (for Mining Lease), "P" (for Prospecting Licence), "E" (for Exploration Licence), "G" (for General Purpose Lease), "L" (for Miscellaneous Licence) and "R" (for Retention Licence) shall be stamped with the tenement numbers as appropriate on the corner posts.
- (3) Reference marks at corners are to be in accordance with general regulations 37 and 38. If the spikes are not sunk, even where practicable, the field notes must record that fact and an assurance that long term survival is expected.

Witness posts at corner survey marks

13. The surveyor shall erect adjacent to every corner survey mark a witness post consisting of a galvanised iron fence dropper, a star iron picket or in saline areas a wooden pole or other substantial mark firmly set to protrude not less than 1 metre above the ground.

Removal or obliteration of superseded survey marks

14. When the boundaries of a new survey differ from those of an old mining survey, the surveyor carrying out the new survey may remove or obliterate the survey marks relating to the old mining survey and shall show in the field notes the positions of the boundaries and the details of the survey marks which have been removed or obliterated.

Procedure when boundaries of new tenements and of existing holdings coincide

15. When the boundaries of a new tenement coincide wholly or partly with any existing survey, the surveyor of the new tenement shall -
- (a) inspect and, if necessary, renovate the line marking of the coincident boundaries;
 - (b) not measure the line marking of the coincident boundaries unless it is necessary to do so in order to re-establish that line marking;
 - (c) subject to paragraph (d), renumber with the number of the new tenement all corner survey marks -
 - (i) established by previous mining surveys; and
 - (ii) belonging to other holdings coinciding with the corner of the new tenement;

and shall, if necessary, renew those corner survey marks;

- (d) if it is not possible to comply with paragraph (c)(ii) in respect of any corner survey mark referred to in that paragraph, place adjacent to that corner survey mark in accordance with Direction 11(2) a witness post with the number of the new tenement and Departmental mark thereon, and shall record what he has done in his field notes; and
- (e) take particular care to record in his field notes -
 - (i) those survey marks which have been renumbered or renewed under this Direction;
 - (ii) in the case of a new tenement which is not an exploration licence or retention licence, the positions of the pegs or other marks employed by the applicant for the new tenement in marking it out relative to the boundaries established by the survey of the new tenement; and
 - (iii) when a survey mark is placed under Regulation 120 and the applicants marking is not adjacent to the survey mark, the surveyor should remove the applicant's marking to obviate any future confusion as to which mark is the corner of the tenement (Direction 24(1)(v) applies);

unless the Director otherwise directs.

Details to be shown if boundary determined by calculation or offset

16. When a surveyor determines a boundary line from calculation or offset in accordance with General Regulation 26 or 27, he shall show clearly in his field notes, together with the azimuth and length of the boundary concerned, details of how that boundary was located from existing survey marks or how the length of that boundary was established.

Procedure when the complete cadastral survey of a tenement is deemed unnecessary

17. In the event a complete cadastral marking of survey is deemed unnecessary, for whatever reason, procedures to be adopted will be as instructed by the Director.

Procedure when tenement found to encroach on protected land

18. If on survey the tenement concerned is found to encroach on land required to be protected by the conditions to which the tenement is subject, the surveyor concerned shall make connections as will enable an accurate calculation to be made of all intersections of those boundaries encroached upon.

Procedure when unsurveyed utility found to traverse tenement

19. Should a surveyor carrying out a mining survey find that an unsurveyed railway, road, tramway, pipeline, telegraph line, power transmission line or other utility traverses the mining tenement concerned, he shall measure to the point where the new surveyed boundary of that tenement crosses the centreline of that utility and shall show this information in his field notes.

Procedure when tenement boundary conforms to a curved unsurveyed protective boundary of a utility

20. (1) A surveyor shall when defining the boundary of a tenement conforming with the curve of a pipeline, railway, road or tramway -
- (a) mark the tangent points on the centre line at each end of that curve by measuring the tangent distance back from the intersection point;
 - (b) calculate and mark a series of chords centrally along the curve as follows:
 - (i) in the case of a curve with a radius of less than 400m, chords having a length of 60m; or
 - (ii) in the case of a curve with a radius of 400m or more, chords having a length of 100m; and
 - (c) mark off the boundary parallel to the chords referred to in paragraph (b) at a distance equal to the protected width of the utility.

CONNECTION SURVEYS

How surveys to be connected

21. (1) a surveyor shall connect each new survey to -
- (a) a previous authorised survey;
 - (b) a geodetic station;
 - (c) a control point established in such a position that it can be connected to the national geodetic survey (See Direction 20); or
 - (d) by using Global Positioning System (GPS) technology.

Connection to control points

22. (1) A surveyor shall connect a control point referred to in Direction 19(1)(c) to the national geodetic survey by recognised methods and shall in so doing avoid the use of eccentric or satellite stations and "false origins" when reading angles.
- (2) If an eccentric or satellite station is used for the purpose of subdirection (1), it should be numbered as a reference mark with the next sequential number to the existing reference marks of that control station and the surveyor shall take special care to record angles and distances locating that reference mark in relation to the existing marking.
- (3) A number to index a control point into the State Survey System will be supplied by the Director.
- (4) Should a new control point be on a feature which has an officially approved name, that name may be included in the identifier, but as secondary to the number in subdirection (3).
- (5) Any doubts on re-establishment of an old or disturbed control station or the naming of new stations should be referred to the Director.

Angle from connecting traverse to previous survey to be recorded

23. When a surveyor makes a connection in accordance with General Regulation 23 by traverse to a previous authorised survey, he shall observe and record the angle from the traverse to the previous authorised survey.

Connection utilising Global Positioning System technology

24. Global Positioning System (GPS) technology may be used to determine coordinate values of tenement corners. Refer to Part VI.

FIELD NOTES AND REPORTS

Field books, report forms, etc to remain property of the Department

25. Field books, report forms and other requisite printed official forms will be supplied free of charge to surveyors acting under instructions given to them by the Director, but shall, notwithstanding anything in these Regulations, remain the property of the Department

Requirements for setting out field notes

26. (1) A surveyor shall ensure that field notes made by him in respect of a mining survey set out:
- (i) the type and number of the tenement concerned.
 - (ii) the name of the mine or mining operations on the tenement surveyed.
 - (iii) the numbers on posts if the boundary is along existing surveyed boundaries.

- (iv) the connection of the subject tenement to adjoining tenements or holdings.
 - (v) the position of applicants marking in relation to survey marks, particularly in relation to Direction 13(e)(iii).
 - (vi) the calculated area of the tenement concerned.
 - (vii) the date on which the approved surveyor completed field marking.
 - (viii) connections to shafts and workings on the tenement concerned.
 - (ix) the approximate position of the tenement concerned in relation to the nearest mining centre.
 - (x) the approximate direction of true north.
 - (xi) details of the survey instruments used in the survey, with data on the constants, corrections and accuracy tests employed.
 - (xii) any distance or angle not measured by the surveyor shall be designated "cal" or "orig" according to whether it has been calculated or accepted from adjacent surveys.
 - (xiii) the abbreviations in Schedule II are to be utilised.
- (2) Shall lodge with the field notes all forms and survey information issued with instructions under Regulation 118, together with the report required under Regulation 120E and information requested under Direction 3 of these Directions.

Place names to be recorded

27. Known place names are to be recorded. Care must be taken to obtain the correct spelling and record origins of new names.

Map anomalies to be reported

28. A surveyor who discovers a map anomaly during the course of a survey shall record that anomaly in his report vide Regulation 120E.

ACCOUNTS AND INSURANCE

Lodging and payment of accounts

29. (1) A surveyor shall lodge his account for any work performed in the form required by the Director.
- (2) When an account lodged under subdirection (1) has been checked against any estimate lodged, the Director shall cause payment to be made accordingly.

Times to be vouched for

30. A surveyor who lodges under Direction 27 an account for work performed by him shall lodge with that account a diary giving full particulars of the time spent in the field and in the office.

Worker's Compensation requirements

31. A surveyor shall -
- (a) whenever requested by the Director to do so, supply to the Director evidence that he holds a current policy of insurance required by Section 160 of the *Worker's Compensation and Rehabilitation Act 1981*, or a current exemption under Section 164 of that Act;
 - (b) append to each account lodged under Direction 27, a statement of the names of the employees of the surveyor engaged on the mining survey to which that account relates and of the capacity in which those employees were so employed; and
 - (c) certify on each statement appended under paragraph (b) that the employees named in that statement were, during the course of the mining survey concerned, covered by the policy of insurance or exemption referred to in paragraph (a).

Professional indemnity and public liability insurance

32. A surveyor shall -
- (a) take out a policy of professional indemnity and public liability insurance; and
 - (b) when requested to do so by the Director, supply evidence of a current policy of the kind referred to in paragraph (a).

PART V

Index to Requirements for Limited Marking Surveys of Mining Tenements

- [1. Introduction](#)
- [2. Geographic Position or Pickup](#)
- [3. Accuracy and Proof](#)
- [4. The Tenement](#)
- [5. Marking Generally](#)
- [6. Field Notes](#)
- [7. Specific Mining Tenement Survey and Data Presentation Requirements Using GPS](#)

Requirements for Limited Marking Surveys of Mining Tenements

1. Introduction

- 1.1 These guidelines apply to the survey of mining tenements with limited marking under General Regulation 26A(1) and Regulation 117(2)(a).
- 1.2 They are technology independent, although it is expected that most surveys will be made using GPS.

2. Geographic Position or Pickup

- 2.1 (a) Connections must be made to existing cadastral boundaries or mining tenements in close proximity to the subject tenement.

or

(b) If there is an SSM or geodetic station within five kilometres of the tenement, the tenement must be connected to at least one SSM including an azimuth connection. Redundant measurements to an additional SSM or geodetic station within five kilometres of the first should be made if reasonably possible.
- 2.2 If the survey uses GPS, redundant connections to SSM's or geodetic stations are expected even if these are much longer than five kilometres.
- 2.3 SSM's are to be used as base stations wherever practicable. In isolated areas remote from geodetic control a base station established in an appropriate position by a static base line to the State Geodetic Network can be used.

3. Accuracy and Proof

- 3.1 Any boundary or connection survey involving the use of GPS is to be performed in accordance with Class D requirements laid down in *ICSM Publication No 1 Standards and Specifications for Control Surveys (SP1, Version 2.1) and Geocentric Datum of Australia 2020 Technical Manual – (Version 1.4)*.
- 3.2 Proof of the measurements through redundancies is essential. This applies especially to the use of GPS. The separate GPS observation of all reference marks (RMs), with redundant checks by terrestrial observations is one recommended method of obtaining the necessary redundancies. Refer to Specific Mining Tenement Survey and Data Presentation Requirements Using GPS. Surveys effected by traverse connecting or radiations from control to tenement marking out corners require all corners be accessed on at least 2 separate occasions for close checking purposes.

3.3 Azimuth control is necessary if a tenement is surveyed terrestrially.

4. The Tenement

4.1 The corners of all tenements should be marked in accordance with paragraph (a) of the Table to General Regulation 36.

4.2 Referenced survey marks shall be placed every two (2) kilometres, or thereabout, along any tenement boundary exceeding three (3) kilometres in length.

4.3 In those cases where identification of the ground position of the boundary may be required soon by the tenement holder, for example if mining is expected to approach the boundary in the short term, the client should be made aware that it would be advantageous to have sufficient boundary intermediates for future boundary definition.

The method of placement of intermediate markers is flexible and is at the discretion of the surveyor and/or holder:

4.4 Boundaries need not be cleared.

5. Marking Generally

5.1 It is accepted that for environmental reasons clearing of vegetation will be minimised. Even if clearing of a boundary is needed for the tenement holder, it may be limited in extent or height to suit the purpose.

5.2 The marks must be indicated sufficiently to find despite the absence of clearing. Corner marks must be witnessed by indicators such as star iron pickets or galvanised iron fence droppers. Vegetation should be cleared within 2 or 3 metres around corner marks. Trenches or rock pointers must be made.

6. Field Notes

Refer to Part III for Directions on Field Notes and Reports.

7. Specific Mining Tenement Survey And Data Presentation Requirements Using GPS

7.1 Survey

(a) SSM's to be used as base stations wherever practicable. Where it is not practicable to use a SSM as a base station a control point established in an appropriate position by a static base line to the state geodetic network can be used.

- (b) Horizontal stability of the geodetic base station to be validated from reference marks.
- (c) Base station input coordinates to be validated by an observation to a RM at the SSM and/or another suitably located SSM.
- (d) For cadastral connections using two or three referenced marks;
 - (i) validate each mark from its reference marks.
 - (ii) observe a reading at each mark.
 - (iii) check that the azimuth and distance calculated agrees with original to specified regulation standards.
 - (iv) If accuracies to cadastral close standards are not achieved, re-observe the mark(s) to check for possible GPS error.
- (e) To minimise the effects of Multipath errors where practical use a ground plane on the rover receiver (ground plane always required on base station).

7.2 Presentation of Field Notes

- (a) All data should include quality control records for;
 - (i) GPS hardware/software, including serial numbers of receivers and antennas.
 - (ii) GPS method adopted (eg RTK).
 - (iii) Number of satellites.
 - (iv) PDOP, HDOP, VDOP etc.
 - (v) GPS base station details, input coordinates and baseline information.
 - (vi) Covariance Matrix.
- (b) Fully detailed field book index page.
- (c) All corners and additional pickup to be allocated a local point number, cross referenced to a separate computer listing, containing;
 - (i) GDA 2020 value co-ordinate listing and geographicals.

- (ii) AHD heights.
 - (iii) MGA Zone.
 - (iv) Area N value
 - (v) Convergence.
 - (vi) Grid bearing and distance, mid azimuth and ground distance.
 - (vii) Spheroidal angular close.
 - (viii) Area close.
 - (ix) Spheroidal angles between SSM connections and cadastral tie lines.
- (d) All data files are to be digitally archived by the contractor for future retrieval.
 - (e) MGA co-ordinates are not to be shown in field notes, as they are subject to change should any re-adjustment of the control be undertaken.

NOTE: Online field book file containing a coordinate listing and tenement close printout values must agree with separate online CSD file values.

An online Form 44 Surveyor's Report file

**Please refer to examples supplied for further clarification
- see schedule III.**

Failure to comply with these minimum standard requirements will result in rejection of the survey until all the above details are fully and correctly submitted.

SCHEDULE 1

(Direction 8(2))

TENEMENT CLOSE and AREA DETERMINATION

Mining tenement survey areas determined correct to three decimal places (0.001 ha)

NOTE: In the case of large multi section tenements:-

Each section is to be treated as an individual survey with each section area determined correct to three decimal places (0.001 ha)

Total area: To be the summation of the individual sections (determined after each individual section has been determined correct to three decimal places) (0.001 ha)

SCHEDULE II
(Direction 33(j))

**STANDARD ABBREVIATIONS FOR ORIGINAL POSTS, PEGS,
INTERMEDIATE SPIKES OR REFERENCE MARKS**

<u>Meaning</u>	<u>Abbreviation</u>
Post, etc. found	OM
Post, etc. renewed	OMR
Post, etc. adjusted	OM adj.
Post, etc. gone	OM gone
Post, etc. removed	OM removed
Post, etc. gone and replaced	OM gone R
Post, etc. gone not replaced	OM s gone
(WP put adjacent to strainer etc).	
Witness Post	WP

SCHEDULE III

SAMPLE FIELD NOTES FOR LIMITED MARKING SURVEYS USING GPS TECHNOLOGY

EQUIPMENT

GPS MODEL USED _____

BASE STATION

A GPS BASE STATION WAS ESTABLISHED AT GEODETIC
CONTROL POINT _____ WITH A REDUNDANCY
CHECK TO GEODETIC CONTROL POINT _____.

Job ID :
 Job name :
 Description :
 Reference :
 Field Surveyor :
 Computer Operator :
 Date Printed :

	<u>GDA 2020 Zone</u>		<u>AHD</u>		
Point	Easting	Northing	Height	Code	Description
1	720276.802	6892485.124	528.627	BC 01	1
58	726209.384	6900780.914	546.380	SSM SAND1 CHK	58
	726209.404	6900780.941	546.236	SSM SAND1 ORIG OF	STN SUMMARY
50	720625.790	6893242.735	513.893	APP'S CNR P 805	50
51	720634.321	6893261.317	513.811	APP'S CNR M 415	51
52	720585.115	6891541.242	504.085	M 415 CONC	52
53	720567.805	6891539.367	503.875	M 415 CONC	53
54	720343.844	6891533.353	503.590	M 415 CONC	54
55	720830.441	6891567.769	505.942	NE LS GML 1300	55
56	720604.631	6892381.704	518.479	NW LS MC 4574	56
59	716152.487	6891616.576	506.821	M 415 CONC	59
60	716152.480	6891617.578	506.823	CNR 59 RM1 TSP	60
61	716153.484	6891616.570	506.820	CNR 59 RM2 TSP	61
62	715151.000	6891588.000	513.000	CNR M 412 DGPS	62
63	716076.379	6893247.409	508.712	SW P 805 PEG	63
64	716126.291	6893377.826	508.277	NW M 415 PEG	64
65	715246.355	6893398.934	508.693	NE LS M 21 CONC	65
66	720746.468	6893298.694	500.000	E 165 CALC	66
67	716126.215	6893382.898	500.000	CALC NW M 415	67
68	716126.212	6893382.907	508.306	NW CNR M 415 GL	68
69	716126.218	6893381.901	508.305	CNR 68 RM 2 TS	69
70	716127.207	6893382.902	508.302	CNR 68 RM 1 TS	70
71	720623.205	6893183.657	514.244	NW LS MC4573CON	71
72	720823.174	6893179.025	515.041	LINE SP	72
73	720617.376	6892931.647	511.628	LINE SP	73
74	720625.924	6893300.891	500.000	NE M 415 CALC	74
75	720625.924	6893300.891	513.359	NE M 415 GL	75
78	716805.000	6895283.000	500.000	CNR P931/932DGP	78

Job ID :
 Job name :
 Description :
 Reference :
 Field Surveyor :
 Computer Operator :
 Date Printed :
 Computer Operator :
 Date printed :

GDA Zone : ____
 Area N value: _____.____

SPH						
POINT	EASTING	NORTHING	HEIGHT	LATITUDE	LONGITUDE	CONVERGENCE
75	720625.924	6893300.891	527.36	-28 4 2.2	119 14 41.9	1 3 24.1
71	720623.205	6893183.657	528.24	-28 4 6.0	119 14 41.9	1 3 24.2
52	720585.115	6891541.242	518.09	-28 4 59.3	119 14 41.6	1 3 26.0
53	720567.805	6891539.367	517.88	-28 4 59.4	119 14 40.9	1 3 25.7
54	720343.844	6891533.353	517.59	-28 4 59.7	119 14 32.7	1 3 21.8
59	716152.487	6891616.576	520.82	-28 4 59.5	119 11 59.2	1 2 9.4
68	716126.212	6893382.907	522.31	-28 4 2.2	119 11 57.1	1 2 6.5
75	720625.924	6893300.891	527.36	-28 4 2.2	119 14 41.9	1 3 24.1

MINING LEASE DIMENSIONS

FROM	TO	GRID BRG	GRID DIST	MID AZIMUTH	GROUND DIST
75	71	181 19 43.0	117.266	180 16 18.8	117.252
71	52	181 19 42.7	1642.857	180 16 17.6	1642.662
52	53	263 49 4.4	17.411	262 45 38.6	17.409
53	54	268 27 42.5	224.042	267 24 18.8	224.015
54	59	271 8 15.0	4192.183	270 5 29.4	4191.737
59	68	359 8 51.9	1766.526	358 6 44.0	1766.358
68	75	91 2 39.2	4500.459	89 59 53.8	4499.981

TOTAL AREA 789.9519 HA

COMPUTED ANGLES

AT	FROM	TO	SPHEROIDAL ANGLE
71	52	75	180 0 1.3
52	53	71	97 30 39.3
53	54	52	175 21 21.9
54	59	53	177 19 27.5
59	68	54	91 59 22.1
68	75	59	88 6 11.9
75	71	68	89 42 56.2

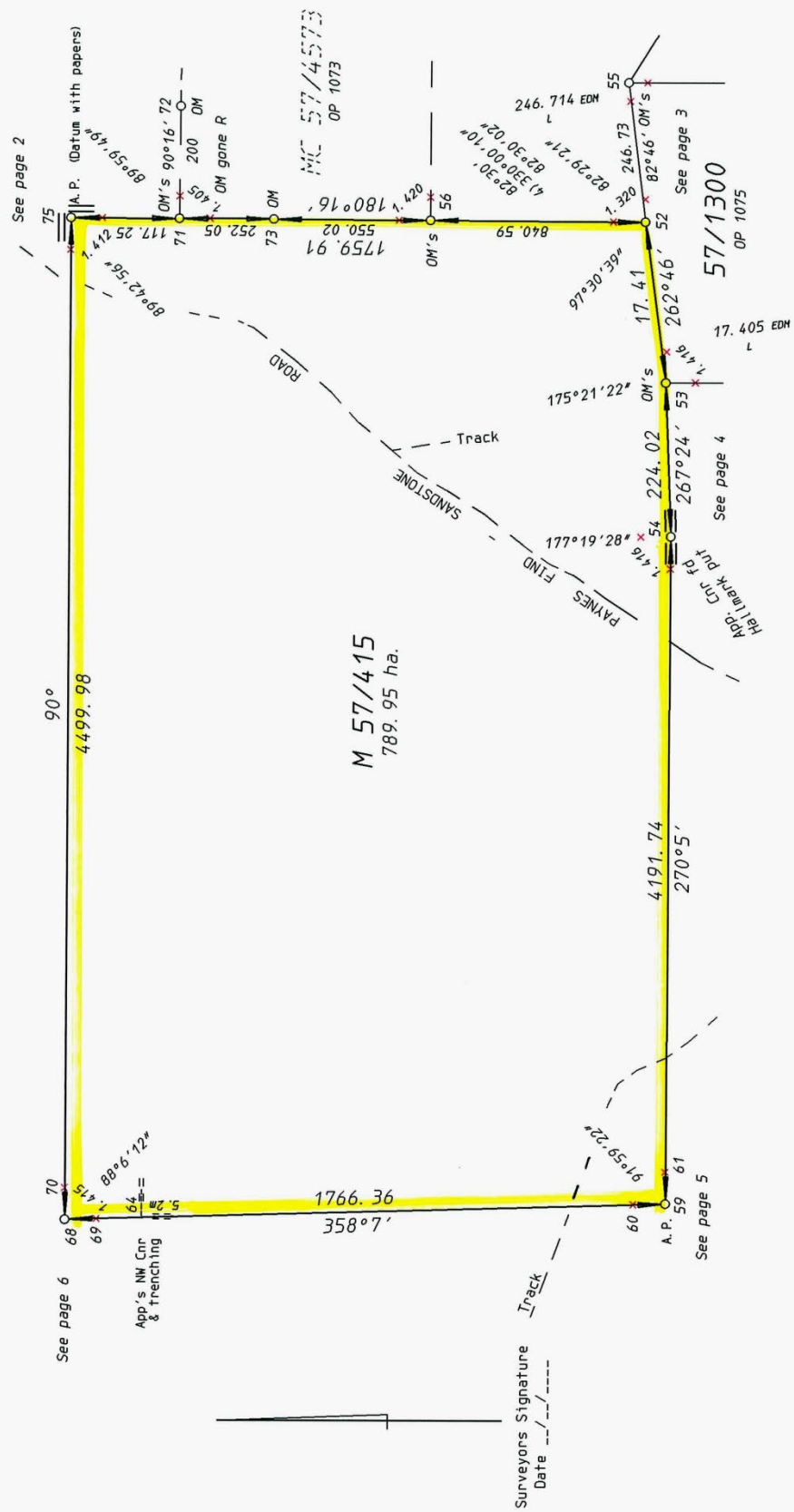
900 0 0.0

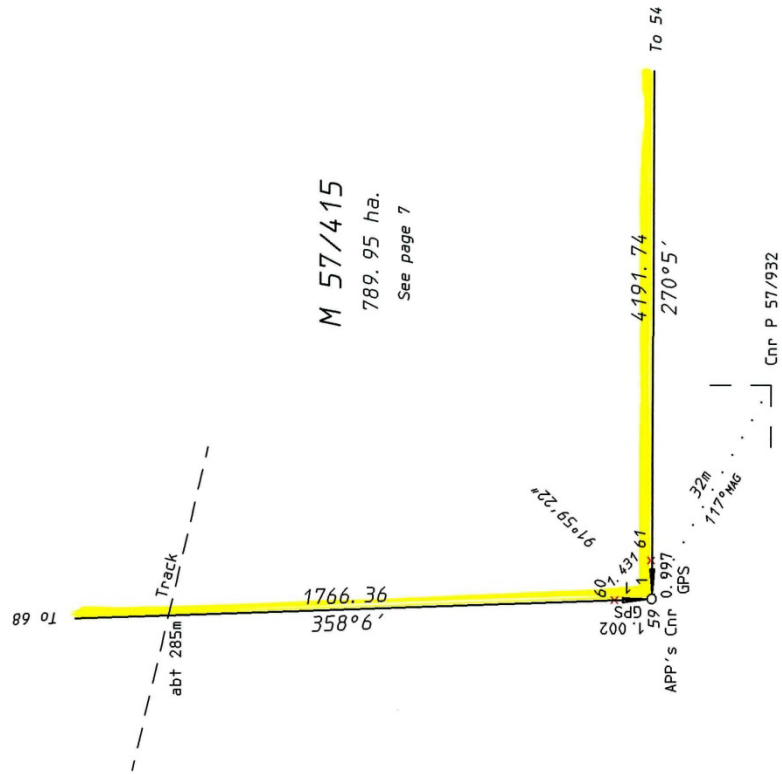
REFERENCING DETAILS

FROM	TO	GRID BRG	GRID DIST	MID AZIMUTH	GROUND DIST
75	71	181 19 43.0	117.266	180 16 18.8	117.252
75	73	181 19 34.2	369.343	180 16 9.9	369.299
71	72	91 19 37.0	200.023	90 16 11.0	199.999
71	73	181 19 30.1	252.077	180 16 5.7	252.048
52	56	1 19 48.7	840.689	0 16 23.2	840.589
52	55	83 49 43.0	246.756	82 46 14.9	246.726
59	60	359 8 51.9	1.002	358 6 44.3	1.002
59	61	91 8 15.0	0.997	90 5 29.4	0.997
68	69	179 8 52.7	1.005	178 6 34.8	1.005
68	70	91 2 39.3	0.995	89 59 45.3	0.995

COMPUTED ANGLES

AT	FROM	TO	SPHEROIDAL ANGLE
75	68	71	270 17 3.8
75	71	73	359 59 51.0
75	73	71	0 0 9.0
71	75	72	89 59 53.9
71	72	73	89 59 52.9
71	73	52	0 0 11.9
52	71	56	0 0 5.5
52	56	55	82 29 53.8
52	55	53	179 59 21.4
59	54	60	268 0 39.9
59	60	61	91 59 22.2
59	61	68	268 0 50.8
68	59	69	359 59 45.2
68	69	70	271 53 50.2
68	70	75	360 0 20.2





M 57/415
789.95 ha.
See page 7

Surveyors Signature
Date __/__/____