



Government Gazette

of the State of

New South Wales

Number 98

Friday, 15 May 2020

The New South Wales Government Gazette is the permanent public record of official NSW Government notices. It also contains local council, non-government and other notices.

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SURVEYING AND SPATIAL INFORMATION REGULATION 2017

Survey and Drafting Directions for Mining Surveyors 2020 (NSW Mines) Order

I, NARELLE UNDERWOOD, Surveyor-General of NSW, pursuant to Clause 4 of the *Surveying and Spatial Information Regulation 2017*, make the following Order.

Dated 7 May 2020



Narelle Underwood
Surveyor-General of NSW
Spatial Services

1. Name of Order

This Order is the *Survey and Drafting Directions for Mining Surveyors 2020 (NSW Mines)*.

2. Commencement

This Order commences on the day it is published in the NSW Government Gazette.

3. Revocation

The Order *Survey and Drafting Directions for Mine Surveyors 2015 (NSW - Mines)* published in the NSW Government Gazette No 86 of 2 October 2015 at pages 3096-3153, is revoked on the day this Order commences.



Survey and Drafting Directions for Mining Surveyors 2020

(NSW Mines)



Title: Survey and Drafting Directions for Mining Surveyors 2020 (NSW Mines)

Issued by the Surveyor-General, by order, pursuant to Clause 4, *Surveying and Spatial Information Regulation 2017*.

These Directions replace the Survey and Drafting Directions for Mine Surveyors (NSW- Mines) gazetted 2 October 2015, issued pursuant to Clause 4 of the *Surveying and Spatial Information Regulation 2012*.

These Directions are for all mines within New South Wales and combine both the NSW Coal and NSW Metalliferous and Extractive Industries Directions.

Published by

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Cover photograph of mining in the Hunter Valley
Supplied by: The Bloomfield Group

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[NSW Resources Regulator](#)

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All other enquiries should be forwarded to:

Email: Surveyor-General-Approvals@customerservice.nsw.gov.au

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Spatial Services (B) P20/10/003

Document Control Sheet

Record of Document Issues

Version No.	Issue Date	Nature of Amendment
1.0	October 2015	Initial Release
2.0	May 2020	Major Revision - <i>Surveying and Spatial Information Regulation 2017</i> , adoption of GDA2020, grid system change and new arrangements for lodgement of the Mine Survey Plan with the NSW Resources Regulator

Document Approval:

Approved By:



Narelle Underwood
Surveyor-General of NSW
Date of Approval: May 2020

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1. General

1.1 Authorisation

The survey, plan and digital data standards detailed in these Directions are required by the *Surveying and Spatial Information Act 2002* and Clause 4 of the *Surveying and Spatial Information Regulation 2017*.

The Mine Survey Plan is required to be kept in accordance with Part 5 of the *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014* (referred to in these Directions as ‘the Regulation’).

1.2 Preparation

These Directions are provided principally for the conduct of surveys and preparation of plans for mines in New South Wales. They provide guidance for preparation and presentation of the Mine Survey Plan. They also provide some guidance to the preparation of other plans (Section 8 of these Directions) based on the Mine Survey Plan information that is required by the Regulation and various Departmental Guidelines. In particular, the preparation of plans required in support of various applications that may be required for the conduct of mining operations in New South Wales.

A transition period of two years from the date of release of these Directions is provided for compliance with the requirements to survey and submit information in MGA2020.

1.3 Compilation

The Mine Survey Plan consists of sectionalised sheets to represent the required information as a conventional plan, referred to as “soft copy” as well as spatial data, referred to as Mine Working Spatial Information.

The Mine Survey Plan shall be sectionalised into sheets as a best fit for individual mines for presentation as a soft copy plan. Each sheet will represent a part or whole of one or more mined seams, mining levels or an area of the void or quarrying operation shown within the Mine Survey Plan.

In determining the best fit for the sheet layout, the surveyor should be mindful of the need to provide for expansion of the mine and to fit with adjoining mine workings. If in doubt the surveyor should consult with the Regulator and with neighbouring mines.

The Surveyor-General may request of the Department copies of all or any Mine Survey Plan to be lodged with the Register of Public Surveys in accordance with Section 7 of the *Surveying and Spatial Information Act 2002*.

Where old workings exist it shall be assumed, for the purpose of marking the Mine Survey Plan, that they constitute a danger until the contrary is proven. In this situation, all plans should be regarded with suspicion until their accuracy has been verified.

Reasonable effort should be made to obtain all existing information about old workings and, once obtained, to ensure that they are recorded on the Mine Survey Plan in accordance with these Directions.

1.4 Transfer to MGA2020

When the Mine Survey Plan is being prepared to comply with these Directions, and the workings of any part of the mine were completed prior to 31st March 2000, it shall be acceptable to draw an outline of such workings and to endorse the new sheet(s) to refer to any previously prepared plan held by the Department for detail.

The relationship of the origin and height datum of any set of drawings to the current mine grid and datum or to MGA2020 and AHD71 must be established. A notation must appear on the Mine Survey Plan as to the location of any additional information relevant to the Mine Survey Plan including reference to the datum.

Workings previously shown as an outline shall be reproduced in full on the Mine Survey Plan if they become active unless otherwise specified in writing by the Chief Inspector.

Nothing shall prevent the transfer of mine workings in full to the Mine Survey Plan.

It must be noted all Mine Survey Plans shall be submitted on MGA2020 and AHD71 regardless of the "Letter of Datum Reference" used for surveying. The Nominated Mining Surveyor is responsible for any transformations to MGA2020 and AHD71.

1.5 Symbols

The technical symbols, sign conventions and definitions to be shown on the Mine Survey Plan, and any other plans required by these Directions shall conform to those illustrated in the:

- Australian Standard for Mine Plans - Preparation and Symbols (AS-4368-1996)
- Australian Standard for Graphic Representation of Coal Seams and Associated Strata (AS-2916-2007)
- Other relevant Australian Standards.

If a symbol is not provided within the Australian Standards the Nominated Mining Surveyor may create a suitable symbol to be shown in the legend.

1.6 Nomination of a Mining Surveyor

The mine operator must nominate a registered mining surveyor in accordance with the Regulation.

1.7 Liability of a Nominated Mining Surveyor

The liability of a Nominated Mining Surveyor in complying with these Directions for a mine shall be limited to the period of time of nomination as the Mining Surveyor for that mine.

2. Definitions

In these Directions the following words and terms have the meanings indicated.

Act	Means the <i>Work Health & Safety (Mines & Petroleum Sites) Act 2013</i> .
Regulation	Means the <i>Work Health and Safety (Mines and Petroleum Sites) Regulation 2014</i> .
Adit	Means a horizontal or near horizontal entrance to a mine.
Administration Sheet	The administration sheet is an approved form that contains all of the administrative data, signature, and certification for the Mine Survey Plan.
Attribute	A database field attached to a feature object in a theme used to describe spatial data and is also known as “object data”.
Australian Height Datum (AHD)	AHD is the datum surface approximating mean sea level that was adopted by the National Mapping Council of Australia in May 1971.
Bench Marks	Marks established at or in a mine from which the levels (heights) of the mine workings are determined.
Borehole	A borehole includes any hole (whether vertical, horizontal, inclined, or a combination of these), that may affect the safety of the mine, drilled for: exploration; gas drainage; outburst relief; water drainage; services e.g. power and water; auger holes; for transport of materials including (but not limited to) sand, inflammable materials or fuels, cement, slurry, sewage or water; or any other purpose. However, does not include blast holes or shallow holes that do not intersect another seam, level or area of the mine.
Borehole Plan	A plan or plans in addition to the Mine Survey Plan prepared in accordance with these Directions where density of boreholes affects the clarity of these plans.
Closed Mine	Includes an abandoned mine, a discontinued mine (other than a suspended mine) and a former mine.
Control Surveys	Substantially marked surveys forming a closed survey network completed in accordance with ICSM 2007 special publication “Standards and Practices for Control Surveys (SP1) Version 1.7.”
DTM	Digital terrain model.
Department	Has the same meaning as defined in Section 5 of the Act.
Declared Dam	Has the same meaning as Part 4.1 of <i>Dam Safety Regulation 2019</i> .
Electrical Installation	Has the same meaning as it has in Part 4.7 <i>Work Health and Safety Regulation 2017</i> . For the purpose of these Directions mobile plant and equipment is not included.
Emplacement Areas	Has the same meaning as defined in the Regulation. Note now includes Tailings Storage Facilities as per updated definition in the Regulation.

Endorsement	A notation created, initialled and dated by the certifying Nominated Mining Surveyor, drawing attention to any aspect of a plan or spatial information that is considered necessary or informative that may or may not be a requirement under these Directions or any legislation.
ESRI Geodatabase	A database created through ESRI ArcGIS software containing digital themes and their attribute information, allowing access to large volumes of geographic data (see Section 9 of these Directions).
Feature Type	Description on how spatial data should be defined, for example, a point, line, or polygon.
First Workings	In relation to a mining operation, includes all work undertaken to establish a mine by driving development openings for an underground mine.
Geocentric Datum of Aust (GDA94)	The datum surface approximating the shape of the earth’s surface that was adopted by the Inter-Governmental Committee for Surveying and Mapping in May 1990.
Geocentric Datum of Aust (GDA2020)	The datum surface approximating the shape of the earth’s surface that was adopted in the National Measurement (Recognised-value Standard or Measurement of Position) Determination 2017.
GNSS	Means a Global Navigation Satellite System as per the <i>Surveying and Spatial Information Regulation 2017</i> .
Hazardous Material	Includes substances defined as Hazardous Chemicals and/or Dangerous in the ADG Code and Explosives and security sensitive dangerous substances (SSDS) of the <i>Explosives Act 2003</i> .
Height Datum	All levels shown on the Mine Survey Plan, and all other plans prepared under these Directions, shall be reduced to Australian Height Datum (AHD71).
ICSM (2007) SP1 (version 1.7)	The Inter-Governmental Committee on Surveying and Mapping Special Publication 1 “Standards and Practices for Control Surveys (SP1), (version 1.7)”.
Inrush Hazard	Has the same meaning as defined in the Regulation.
Level Plan	A compilation of Mine Working Spatial Information and other digital themes that when combined show the mine workings for each level of an underground metalliferous mine, necessary for the Mine Survey Plan.
Level Working Sheet	A sectionalised sheet indicating each level, derived from the Mine Working Spatial Information, formatted for the mapping area of the sheets, that when re-combined cover the total area worked in an underground metalliferous mine.
Integrated Survey Grid and Co-ordinate System (ISG66)	A system of co-ordinate surveys previously used for the State of New South Wales. This grid is a Transverse Mercator projection of the Australian National Spheroid of 1966.
Map Grid of Australia 1994 (MGA94)	MGA94 means Map Grid of Australia that is a rectangular co-ordinate system using a Universal Transverse Mercator Projection with zones 6 degrees wide and based on the Geocentric Datum of Australia 1994.

Map Grid of Australia 2020 (MGA2020)	MGA2020 means Map Grid of Australia that is a rectangular co-ordinate system using a Universal Transverse Mercator Projection with zones 6 degrees wide and based on the Geocentric Datum of Australia 2020.
Metadata	“Information about data” and is used to inform the user of the lineage, accuracy and limitations that may exist within the data. The aim of metadata is to enable the end-user to work with the data with a known level of confidence.
Mine	Has the same meaning as defined in the Act.
Mine Baseline	A permanently marked surveyed line included in the State Survey Control Network.
Mine Holder	Has the same meaning as defined in the Act.
Mine Operator	Has the same meaning as defined in the Act.
Mine Survey Plan	Mine Survey Plan required under Part 5 of the Regulation.
Mine Working Digital Themes	Any spatial data that is required in the mapping area of the Mine Survey Plan (i.e. Seam Workings Sheets, Level Working Sheets or Void Sheets), as Mine Working Spatial Information under these Directions. Preparation of the digital themes will be in accordance with Section 9 of these Directions.
Mine Working Spatial Information	Digital files containing Mine Survey Plan data in the form of digital themes prepared in accordance with these Directions.
Mining Surveyor	A person registered as a Mining Surveyor under the <i>Surveying and Spatial Information Act 2002</i> .
Natural Feature	A natural feature includes any feature that may affect the safety of the mine eg bank of stream, mean high water mark, edge of cliff etc.
Natural Feature Plan	A plan or plans in addition to the Mine Survey Plan prepared in accordance with these Directions where the density of the natural features affects the clarity of these plans.
Nominated Mining Surveyor (Mine Surveyor)	A person registered as a Mining Surveyor under the <i>Surveying and Spatial Information Act 2002</i> and nominated under Schedule 10, Statutory Functions of the Regulation as responsible for the conduct of Mining Surveys and the preparation of the Mine Survey Plan.
NSW Land Registry Services	NSW Land Registry Services operates the NSW land titles registry for the State Government and the people of New South Wales.
Open Cut	Means a surface excavation.
Raise or rise	Means a development excavated upwards from a level drive or crosscut.
Regulation	Means the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 .
Regulator	Has the same meaning as defined in the Act.
Reporting Period	The Reporting Period for the Mine Survey Plan shall be as requested by the Regulator.

Seam Working Plans	A compilation of Mine Working Spatial Information and other digital themes that when combined show the mine workings for a seam of an underground coal mine, necessary for the Mine Survey Plan.
Seam Working Sheets	A sectionalised sheet, derived from the Mine Working Spatial Information, formatted for the mapping area sheets, that when re-combined, cover the total area worked in an underground coal mine.
Seam	Any coal bearing stratum or combination thereof mined as a discrete entity. Refer to the Department for correct naming of coal seams.
Secondary Surveys	Are surveys originating from Control Surveys or Subsidiary Surveys utilised by the Nominated Mining Surveyor to accurately locate all of the workings of the mine that are not included in Control Surveys or Subsidiary Surveys.
Shaft	Means a vertical or near vertical entrance to a mine.
Soft Copy	Soft Copy means plans prepared to PDF (Portable Document Format) file format.
Statutory Function	As per Schedule 10 of the Regulation.
Stope	Means an excavation in a metalliferous mine, other than development workings, made for the purpose of excavating ore.
Subsidiary Survey	A survey originating on Control Surveys to develop the workings of a mine or to locate the position of the workings of a mine.
Supervision	When a survey is carried out in accordance with these Directions the Nominated Mining Surveyor must exercise such personal oversight and direction of the work as is necessary to ensure that the Nominated Mining Surveyor has the knowledge to certify all aspects of the survey and that the survey has been carried out in accordance with sound professional practice and these Directions.
Survey Records	For the purpose of these Directions, survey records shall be taken to mean any plan, survey or spatial information required under these Directions and includes field books, level books, co-ordinate books, calculations and any other note books, sheets or plans used for recording relevant survey data, all survey observations, and compilations whether recorded or stored in written, photographic, digital or electronic form.
Surveyor-General	Surveyor-General means the person holding office or acting as the Surveyor-General of NSW under Part 4 of the <i>Government Sector Employment Act 2013</i> .
Suspended Mine	Any discontinuance of all work at the mining operation, where the mining is suspended but the operation is kept on a care and maintenance basis.
Themes	Theme refers to a type of information stored on a single layer of a digital drawing document. Themes are listed in Section 9 Table 4 and Table 5 of these Directions.
Underground Baseline	A permanently marked survey line established in underground workings from which underground surveys are developed. The Underground Baseline shall be connected by Control Survey to the Mine Baseline.

Ventilation Plan	As required by the Regulation.
Void	The limit of all excavations, ramps and disturbed ground, including in situ blasted material within an open cut mine.
Void Plan	A compilation of Mine Working Spatial Information and other digital themes that when combined show the position of all excavations, ramps, disturbed areas and highwall mining within an open cut mine, necessary for the Mine Survey Plan.
Void Sheets	A sectionalised sheet derived from the Mine Working Spatial Information, formatted for the mapping area of the sheets, that when re-combined, cover the total area worked in an open cut mine.
Winze	Means a development excavated downwards from a drive or crosscut.
Working Section	The seam or part of a seam that is normally mined in an underground coal mine and which may include out of seam strata.

3. Survey Standards and Procedures

3.1 Origin of Co-ordinates

A metalliferous or extractive industry underground mine may apply to the Chief Inspector for an exemption to allow for surveying to a local grid and a “Letter of Datum Reference” where the relationship between the local grid and the height datum and MGA2020 and AHD71 can be accurately provided.

To allow for a metalliferous or extractive industry underground mine to be surveyed on a local grid and datum, a copy of the exemption granted by the Chief Inspector as required above and a copy of the “Letter of Datum Reference” must be provided to the Department, and the information must be updated as necessary.

At all mines where a “Letter of Datum Reference” has not been granted all surveys made and carried out in accordance with these Directions shall be calculated and plotted using the Map Grid of Australia (MGA2020).

All surveys are to originate from the Mine Baseline or may originate from any other mark included in the State Survey Control Network having a standard of accuracy consistent or greater with that of the Mine Baseline.

The horizontal survey of the Mine Baseline must be planned and surveyed to Class “B” standards of accuracy as defined in ICSM (2007) SP1 (version 1.7). The geometry of the network should be consistent with this standard of accuracy.

Each end of the Mine Baseline should be assigned an AHD71 Reduced Level surveyed to ICSM (2007) SP1 (version 1.7) Class “LD” (spirit levelling) or Class “B” (Trigonometric or GPS heighting) or better.

Should the position or co-ordinate values of the Mine Baseline change, this information shall be reported to the Surveyor-General in accordance with Clause 39 of the *Surveying and Spatial Information Regulation 2017*.

The Mine Baseline shall not be less than 250 metres in length.

The mark names, numbers and values of the mine baseline should be provided to the Department and be recorded on the Mine Survey Plan.

For an existing mine, the current baseline marks should be retained provided they are of a durable nature.

3.2 Control Surveys and Subsidiary Surveys

Accuracy

Each control survey and subsidiary survey must be planned, surveyed and analysed to ensure they satisfy the conditions to achieve a standard of accuracy as prescribed in ICSM (2007) SP1 (version 1.7) to achieve Class “D” or better. When calculating compliance to ICSM (2007) SP1 (version 1.7) Class “D” via the formula $r = c(d + 0.2)$ this Direction specifically defines d as the following:

d = distance to any station in km, with a minimum value of 1(km)

Marking

Each control survey station and subsidiary survey station shall be adequately referenced and substantially marked. As far as practicable the marks shall be placed in a position least likely to be disturbed.

Where offset survey stations (wall stations) are employed, the spigot and prism required to replicate the co-ordinate shall be specified on the Mine Survey Plan.

3.3 Secondary Surveys

Secondary surveys shall be employed by the Nominated Mining Surveyor where necessary to accurately locate all of the mine workings on the Mine Survey Plan to the accuracy nominated in Table 1.

Table 1 - Required positional accuracy for secondary surveys employed to locate mine workings

Secondary Surveys	
Accuracy	Scale
0.5m	1:500
1m	1:1000
2m	1:2000
2m	1:4000

3.4 Correlation of Surface and Underground Surveys

Correlation between surface and underground surveys shall be consistent with a Class “D” survey as prescribed in ICSM (2007) SP1 (version 1.7).

In correlation of surface and underground surveys where methods other than direct traverse are employed for azimuth or co-ordinate transfer, the surveys shall be shown on a plan separate from the Mine Survey Plan and shall disclose the special survey methods employed. The plan shall be submitted to the Regulator and the Nominated Mining Surveyor shall certify that the survey shown on the plan is accurate and meets the requirements of these Directions.

3.5 Elevation Surveys

Order of accuracy of benchmarks

Such surveys shall be completed to ICSM (2007) SP1 (version 1.7) Class “LD” or Class “D” standards of accuracy.

Accuracy of mine workings

Such surveys shall be completed to ICSM (2007) SP1 (version 1.7) Class “LE” standard of accuracy or to within 0.5m. Where vertical measurement is necessary for transference of the value of the surface bench mark to a nominated underground bench mark, the maximum permissible error should not exceed 0.05m.

3.6 Survey Records and Supply of Survey Information

Systematic and reasonable care shall be taken by the Nominated Mining Surveyor for the safe preservation of all survey records required under these Directions.

Survey records for each of the following purposes shall be kept at the survey office for the mine:

- control surveys
- subsidiary surveys
- secondary surveys
- elevation surveys
- surface movement and subsidence surveys.

Such survey records shall be maintained manually in field book or other stable material, electronic text or image or other means not visually perceptible without the aid of a machine or other device. Where a machine or other device is required to access the stored data the Nominated Mining Surveyor shall ensure the data is regularly updated to a media and format that is currently available.

Survey records are to be permanently recorded and maintained in accordance with ICSM (2007) SP1 (version 1.7) and these Directions.

All survey books shall be maintained in good order and shall have the following description clearly and permanently marked on the cover and inside title page:

- the mine name
- the catalogue number
- for underground mines, the seam or level name to which the book refers
- consecutive index number.

The following procedures shall be adopted for entries into survey books:

- all survey observations and measurements shall be recorded at the time of survey
- in the event of alteration of a mistake there shall be no erasure. The erroneous entry should be struck through and the correction written above
- the datum line of the survey and the azimuth adopted shall be clearly indicated
- lengths shall be entered at the time they are measured. Where appropriate, corrections shall be noted and the lengths deduced there from shall be clearly indicated
- bearings and distance from reference marks must be clearly shown
- reference marks and bench marks placed by the surveyor shall be so noted and the positions and descriptions thereof shall be shown by a sketch in the appropriate book
- lines remeasured shall be so specified and original distances and bearings shown
- the Nominated Mining Surveyor shall sign the field book that the work shown therein was performed by the Nominated Mining Surveyor or under the Nominated Mining Surveyor's supervision and indicate the date on which the work was signed.

Where surveys are recorded in electronic form the information to be recorded shall be consistent with that required for survey books (see above). A complete and separate duplicate of such records shall be preserved on paper or disc or other permanent electronic medium.

The Nominated Mining Surveyor of any mine, upon the request of the Regulator, shall make available, in a format specified by the Regulator all or any survey records or certified copies thereof.

Upon suspension of a mine, all mine survey records relevant to the preparation of the Mine Survey Plans shall be prepared by the Nominated Mining Surveyor for submission to the Department. A guidance document shall be included detailing file structure, formats, descriptions and other necessary information to enable additional end users to interrogate the information.

On closure of the mine these records shall be submitted to the Regulator for retention.

In the case where UAV platforms are used to capture a DTM for the generation of mine survey information through pixel recognition processes, the photographs captured are to be retained for a period of 2 years.

3.7 Requirements where Workings are to become Inaccessible

Before any part of the workings of a mine becomes inaccessible, and where practical and safe to do so, the position of all points of the workings shall be established from a control, subsidiary or secondary survey.

Sufficient levels shall be taken to enable contours of the floor of the working section to be calculated and shown on the Mine Survey Plan. (See Section 3.5 Elevation Surveys).

Where inaccessible workings are not surveyed in accordance with these Directions, the Nominated Mining Surveyor may draw upon any available resources of the mine to best locate the inaccessible workings for the purpose of completion of the Mine Survey Plan with suitable endorsements.

3.8 Surface Movement and Subsidence

Where the Regulator directs, surveys are to be undertaken to record surface movement, including subsidence induced by mining.

Such surveys shall be carried out in accordance with the standards set out in these Directions, or as otherwise directed by the Regulator.

Such surveys shall be carried out under the supervision of, and certified by, a Registered Mining Surveyor.

All subsidence survey data, including field notes, is to be kept at the mine in accordance with Section 3.6 of these Directions.

3.9 Survey of Boreholes

Boreholes are to be identified by a unique name or number and are to be shown on the Mine Survey Plan. Collar and/or commencement locations of boreholes are to be established from a control, subsidiary or secondary survey, with both MGA coordinates and AHD levels in accordance with these Directions.

The following information will also be recorded, wherever possible, whether from direct survey or other source i.e. driller's log, geophysical survey:

- total length (or depth)
- inclination (or declination) and
- plan projection (bearing or azimuth) when other than near vertical.

The Nominated Mining Surveyor shall be satisfied that the holes are accurately recorded and represented on the Mine Survey Plan with regard to mine safety.

3.10 Maintenance of Survey Equipment

Survey equipment shall be maintained regularly and kept in good adjustment according to the manufacture's recommendations.

Electronic distance measuring equipment used for Control and Subsidiary Surveys shall be verified in accordance with Surveyor-General's Direction No. 5 "Calibration of Electronic Distance Measuring (EDM) Equipment" at least once each year and immediately after service and repair.

GNSS equipment used in mining surveys shall be verified against the Mine Baseline upon acquisition and after any change in software, firmware or hardware.

Survey equipment used in borehole surveys for dip and direction shall be maintained regularly and kept in good adjustment according to the manufactures recommendations.

4. Mine Survey Plan – Soft Copy

4.1 General

Direction

The Mine Survey Plan shall be prepared by or under the direct supervision of the Nominated Mining Surveyor. It should be prepared within three months of commencement of the operation, or such other time as the Regulator may direct by notice in writing served on the operator of the mine.

Updating the Mine Survey Plan

Except where the mine is considered suspended or closed, the Mine Survey Plan must be reviewed as directed by the Regulator. Sufficient surveys must be undertaken to ensure that the mine workings, voids or stopes are accurately represented on the Mine Survey Plan in accordance with these Directions.

Composition

The Mine Survey Plans are prepared from the Seam Working Sheet, Level Working Sheet or Void Sheet information for a mine and other layout data required under these Directions.

The Mine Survey Plan sheets shall be AO size International Standards Organisation and may be orientated in either portrait or landscape direction. A standard (recommended) layout is available from the Department.

4.2 Seam Working Sheets, Level Working Sheets and Void Sheets

The Seam Working Sheets, Level Working Sheets and Void Sheets shall be compiled from the Mine Working Spatial Information and other digital themes as necessary to truly represent the survey of the mine as required by these Directions.

The Seam Working Sheets shall be at a reduction ratio of 1:4000 with sufficient sheets to cover the extent of the mine workings and necessary adjacent workings. In the case where such a scale limits the clarity, sheets at a reduction ratio of 1:2000 may be used.

The Void Sheets shall be at a reduction ratio of 1:4000 with sufficient sheets to cover the extent of the mine workings and necessary adjacent workings. In the case where such a scale limits the clarity, sheets at a reduction ratio of 1:2000 may be used.

The Level Working Sheets shall be at a reduction ratio of 1:1000 with sufficient sheets to cover the extent of the mine workings and necessary adjacent workings. In the case where such a scale limits the clarity, sheets at a reduction ratio of 1:500 may be used.

Table 2 - Scales applied to sheets compiled from the Mine Working Spatial Information

Mine Survey Plan	
Sheets	Scale
Seam Working Sheets	1:2000
	1:4000
Level Working Sheets	1:500
	1:1000
Void Sheets	1:2000
	1:4000

The Seam Working Sheets, Level Working Sheets and Void Sheets shall be sized to fit the mapping area of the Mine Survey Plan sheets. The mapping area will be 750 mm x 625 mm with grid lines at maximum 125 mm x 125 mm intervals.

Full lines are to be shown for the Map Grid of Australia. The extremities of each grid line shall be annotated with the grid value. For an existing mine operating to a local grid, a second grid comprising tick marks shall display the local coordinate system.

4.3 Preparation of Mine Survey Plan

The Mine Survey Plan must be prepared as required by the Regulation.

Mine Working Digital Themes

- The workings of the mine, including disused workings and boreholes:
 - Mine Working Outline – an outline of the mine workings
 - First Workings – Development
 - Second Workings or Stopes
 - Void Detail Line
 - Void Detail Point
 - Highwall Mining/Auger Mining
 - Underground Auger Areas
 - Mine Underground Access - mine shafts, staple shafts, adits, winze and drifts and all major ventilation devices
 - Borehole Locations
 - Surveyed Geofeatures - all known outcrops, sub crops, faults, dykes, cinder belts, and other significant dislocations as surveyed
 - Working Section Floor Contours - calculated from spot heights and working level floor heights shown in blue
 - Void Contour at 5m vertical intervals
- Any other disused workings that are attached, or in close proximity, to the mine:
 - Adjacent Mine Workings - an outline of all mine workings in any seam in any direction within 100 metres of the current seam being worked
 - Adjacent Seam Workings - all mine workings (including other mines) in the seam being mined within 100 metres of the current workings
- The location of high voltage electrical installations
- The location of telephones and other fixed plant associated with the radio and telecommunications systems
- Water dams and emplacement areas, including basal contours
- Natural features surrounding the mine
- Places for the storage of hydrocarbons or explosives
- In the case of an underground mine – points of entry and exit, including emergency exits

- Refuge chambers (in an underground mine)
- Caches, refill stations and change-over stations (in an underground coal mine).

Additional themes required under these Directions for the preparation of the mine survey plan

- Barriers and Restricted Zones
- Boundary Control Marks
- Cadastral Parcels - state if NSW DCS Spatial Services DCDB is used
- Grid Lines
- Mining Approvals/Acceptances - extent to be shown in red
- Mining Lease Boundaries
- Potential Sources of Inrush - to be shown outlined in green
- Survey Control Stations including Bench Marks
- Date Lines (dashed) indicating the extent of workings for each survey Reporting Period.

Mine Survey Plan layout information

In the sheet heading area:

- Name of the Mine
- Catalogue Number
- Parish and County names
- Name of the Seam/s or Level/s being represented for Underground or the “void” for Open Cut
- Name of other mine workings known to have been extracted in that sheet area, together with the catalogue number for those workings (see Section 4.10 of these Directions)
- Number of the sheet within the sheet index that make up the operation.

In the map surround area:

- Reduction ratio and a graphical (bar) scale together with a statement that all measurements are in metres
- North point indicating grid north
- Schedule of symbols used on the particular sheet
- Sheet index showing
 - All sheets necessary to cover the mine operation
 - Number of each sheet
 - An extent of the mining tenure
 - The particular sheet shown by a heavy outline
 - Outline of mine workings

- For underground coal mines, a section of the seam identifying the working section appropriately symbolised, named and the section location identified by coordinates. Additional sections may be shown if the seam thickness or working section varies significantly or the Seam is affected by intrusions, sills or stone bands
- For coal mines, a section of the stratum from the surface to the basal seam, appropriately symbolised, seams named and section location identified by coordinates
- Schedule of endorsements made by the Nominated Mining Surveyor
- Schedule of second working, barrier penetration or open cut approvals, Mining Operation Plans (MOP's) accepted by the Department
- Statement or schedule certifying the accuracy of the sheet, including:
 - The name of the Nominated Mining Surveyor
 - The certifying surveyor's BOSSI Identification Number
 - The date of Certification
- Origin of levels and the grid bearing and terminal survey stations of the Mine Baseline or survey control marks used for surveys within the sheet
- MGA Zone
- For underground mines, schedules of:
 - survey marks and Bench Marks containing their identification, coordinates and height
 - adits, shafts, rises, winzes, drifts, staple shafts and bins, with coordinates and heights of the commencing and finishing locations.

In the mapping area:

The Mine Working Digital Themes and sufficient detail in the form of annotation to identify the characteristics of type, name, dislocation or status should be shown together with the following detail:

- For underground coal mines, panel names and sufficient heading and cut through numbers (or letters) to identify the numbering system
- The position of all boreholes within that sheet or:
 - where it is not practical to show all boreholes on the seam, level or void sheets, a separate "Borehole Plan" which shall become part of the Mine Survey Plan, shall be produced as an overlay
 - a reference on the Seam, Level and Void Workings Sheet is required to indicate the existence of any Borehole Plan sheet
 - all boreholes should be identified as to type and name and their current status e.g. open, sealed or capped
 - where boreholes are drilled in adjacent strata, sufficient reduced levels should be shown to indicate their position
 - any borehole that is removed by the mining process or is in the void, is not required to be shown. However, remnant stubs of these holes, which may present a hazard to future mining operations, must be shown

- For natural features surrounding the mine where it is not practical to show all features within the mapping area, a separate “Natural Features Plan” shall become part of the Mine Survey Plan and be produced as an overlay
- For underground coal mines, the datelines corresponding to the position of the workings shall be noted in the format provided by AS4368
- For underground coal mines, contour lines of the floor of the working section
- For underground metalliferous mines, the working level floor heights (from spot heights)
- For open cut mines, break lines and contour lines provides levels of the void
- Outline of limits of highwall mining and augering. The maximum extent of this mining in the seam or void is to be shown and identified. Approximate levels into the extremity of highwall mining and augering are to be shown every fifty (50) metres
- Water dams and emplacements. The position of the:
 - o top water level of any dam containment declared under the *Dams Safety Act 2015*
 - o Notification Area of the declared dam as notified under Section 80 of the *Mining Act 1992*
- The position of any approved areas, barriers, protective pillars or restrictive zones to be left in the seam pursuant to:
 - o provisions of the Regulation
 - o leases in force granted or deemed to have been granted under the *Mining Act 1992*
 - o any approval condition, consent direction or concurrence given in accordance with the provision of the aforesaid Acts or Leases
- Cadastral information in background line type.

4.4 Additional Information

Nothing in these Directions shall prevent the inclusion of any additional information on the Mine Survey Plan providing it is shown in a manner consistent with these Directions.

The Nominated Mining Surveyor shall show on the Mine Survey Plan any additional information as directed in writing by the Regulator.

Any additional information discovered by or indicated to the Nominated Mining Surveyor which may present a hazard to the mine, adjacent mines or persons in those mines should be recorded on the Mine Survey Plan.

4.5 Endorsement

Where any information shown on the Mine Survey Plan is considered to be in doubt, or is information the Nominated Mining Surveyor considers requires endorsing, the Mine Survey Plan shall be suitably endorsed.

4.6 Old Workings/Surveys

Where old surveys or old workings are converted to MGA2020, or the current Local Grid/Datum such conversion shall be suitably endorsed on the Mine Survey Plan.

4.7 Administration Sheet

The Soft Copy of the Mine Survey Plan shall be certified by the Nominated Mining Surveyor in the form of the Administration Sheet located on the DCS Spatial Services website after the most recent review has been charted.

The Nominated Mining Surveyor shall, by including the Administration Sheet, declare for their period of nomination that the:

- Mine Survey Plan has been prepared in accordance with these Directions
- surveys shown on the Mine Survey Plan have been completed to accuracy as prescribed in these Directions.

4.8 Certification History

The Mine Survey Plan shall have recorded in the Certification of Accuracy schedule the details for each previous surveyor nominations.

4.9 Cessation of Duties of a Nominated Mining Surveyor

At the time of cessation of duties, and after Certification has taken place, the Nominated Mining Surveyor shall produce a Soft Copy of the Mine Survey Plan and a copy of the Mine Working Spatial Information for retention at the mine office. The Nominated Mining Surveyor shall supply the information to the Regulator.

The incoming Operator should make a Soft Copy of the Mine Survey Plan for a record of commencement of work.

Charting Cessation of Duties of the Nominated Mining Surveyor

Upon permanent cessation of duties of the Nominated Mining Surveyor, the Mine Survey Plan shall be charted and dated by the Nominated Mining Surveyor. The Nominated Mining Surveyor shall show the date of the workings at the time of cessation in a similar manner to that of the Mine Survey Plan.

The note 'Charted to date of Cessation of duties of the Nominated Mining Surveyor is to be shown in the' Schedule of Accuracy' above the date.

The Nominated Mining Surveyor shall by dating the Certification of Accuracy schedule declare for their period of nomination until the date of cessation of duty that the:

- Mine Survey Plan has been prepared in accordance with these Directions
- surveys shown on the Mine Survey Plan have been completed to an accuracy prescribed in these Directions.

4.10 Catalogue Number

The Department's cataloguing system shall continue for each mine according to a unique number identification system prefixed by the letters **RT** for coal mines and **MWP** for metalliferous and extractive industry mines. This unique number is to be clearly identified on the Mine Survey Plan or any copy thereof.

5. Mine Survey Plan - Mine Working Spatial Information

This section refers to the preparation, composition and supply of the Mine Working Spatial Information as a digital file.

5.1 Preparation

The Mine Working Spatial Information shall be prepared by or under the supervision of the Nominated Mining Surveyor.

The Mine Working Digital Themes shall be prepared to the standards required by Section 9 of these Directions.

All Mine Working Digital Themes shall be kept at the mine.

5.2 Composition

The Mine Working Spatial Information shall be digital files of the Mine Working Digital Themes for the whole of the mine. Digital files are 2D or 3D format as directed in Table 3 and they are compatible with the Department's ESRI Geodatabase.

5.3 Supply

For the supply of the Mine Survey Plan, unless otherwise required by these Directions the minimum information in the form of digital themes listed in Table 3 are required for each Seam Workings Plan, Level Workings Plan or Void Plan.

Table 3 - Minimum number of digital themes to be supplied as appropriate to each mining type

Minimum Themes Supplied for Mine Working Spatial Information				
Theme	Underground		Open Cut	
	2D	3D	2D	3D
Coal				
Mine Working Outline		•		•
First working		•		
Second Workings		•		
Mine Underground Access		•		
Underground Augers		•		
Highwall/Auger Mining		•		•
Mining Lease Boundary	•		•	
Working Section Floor Contours		•		
Void Detail				•
Void Contours				•
Hazardous Material*	•		•	

Minimum Themes Supplied for Mine Working Spatial Information				
Theme	Underground		Open Cut	
Emplacement Areas**		•		•
Emplacement Contours**		•		•
Declared dams		•		•
Metalliferous and Extractive Industries				
Mine Working Outline		•		•
Void Contours				•
Void Detail				•
Mining Lease Boundary	•		•	
Hazardous Material*	•		•	
Emplacement Areas**		•		•
Emplacement Contours**		•		•
Declared dams		•		•

* Hazardous Material spatial theme submitted for storages where Hazardous Chemical Notification required (S328 of *WHS Regulation 2017*) and/or explosives licenses are held (*Explosives Act 2003*)

** Emplacement Areas includes Tailings Storage Facilities as per the updated definition in the *WHS (Mines and Petroleum Sites) Amendment Regulation 2019*

5.4 Certification

The Nominated Mining Surveyor shall, by signing the Administration Sheet, declare the Mine Working Digital Themes prepared on behalf of the Operator and provided to the Operator for submission, were used in the preparation of the Mine Survey Plan - Soft Copy for that period.

6. Supply of Mine Survey Plan

6.1 Period Supply

A certified copy of the Mine Survey Plan shall be supplied to the Regulator in accordance with the Regulation. Refer to the Form and Manner document published by the Resources Regulator for the submission requirements for the Mine Survey Plan.

[Click here](#) to review submission guidance material.

[Click here](#) to complete the submission via the Regulator Portal.

6.2 Change of Mine Operator

When a mine operator is to cease operating and be replaced by another operator, the outgoing operator must update the Mine Survey Plan and provide the updated plan to the mine holder. Part 1 of the Regulation sets out this requirement.

7. Closing plan

7.1 Suspension of Operations

Where a mine has not been worked for a period of 2 months the Mine Survey Plan shall be charted and submitted to the Regulator in accordance with the Regulation.

Charting for Suspension of Operations - procedures to be followed in the case of the suspension of a mine:

- The Mine Survey Plan shall be charted and dated by the Nominated Mining Surveyor to the date of suspension. The Nominated Mining Surveyor shall place a broken line around the extent of the workings, which shall be dated and initialled
- The note 'Charted to date of Suspension of Operations' is to be shown in the 'Schedule of Certification of Accuracy' above the date and the name of Nominated Mining Surveyor.

7.2 Closure of Operations

Where a mine is to close, the Mine Survey Plan shall be charted and sent to the Regulator in accordance with the Regulation.

Charting for Closure - procedures to be followed in the case of the closure of a mine:

- The Mine Survey Plan shall be charted, dated and signed by the Nominated Mining Surveyor to the date of closure. The Nominated Mining Surveyor shall place a broken line around the extent of the workings, which shall be dated and initialled
- The note 'Charted to date of Closure of Operations' is to be shown in the 'Schedule of Certification of Accuracy' above the date and the Nominated Mining Surveyor's signature.

8. Other Plans

Nothing shall prevent the Nominated Mining Surveyor from combining one or more of the following plans provided legibility of the combined plan is retained. All such plans should be prepared generally in accordance with these Directions and should be certified and endorsed, as required, by the Nominated Mining Surveyor or appropriate mine official as described in Section 8.8 (Declaration) of these Directions.

8.1 Ventilation Plan (Underground Mines)

The ventilation plan shall be compiled generally in accordance with these Directions at a scale of not less than 1:5000. The mine operator of an underground mine must ensure a ventilation plan is prepared as per Division 5 of the Regulation - Specific control measures - underground mines.

A legend will be shown on the plan depicting symbols used together with a graphical representation of the scale.

8.2 Emplacement Areas

The emplacement area plan shall be a survey certified by the Nominated Mining Surveyor and prepared as per Schedule 3 of the Regulation for all coal mines.

8.3 Highwall Mining

The highwall mining plan shall be a plan of activity certified by the Nominated Mining Surveyor and prepared as per Schedule 3 of the Regulation for all coal mines.

8.4 Barrier Mining

The barrier plan shall be a survey plan certified by the Nominated Mining Surveyor and prepared as per Schedule 3 of the Regulation for all coal mines.

8.5 Shallow depth of cover mining

The shallow depth of cover plan shall be a survey plan certified by the Nominated Mining Surveyor and prepared as per Schedule 3 of the Regulation for underground coal mines.

8.6 Mining in outburst control zones

The mining in outburst control zones plan shall be a survey plan certified by the Nominated Mining Surveyor and prepared as per Schedule 3 of the Regulation for underground coal mines.

8.7 Plans Standard – General

Any plan (including those subject to these Directions) required to be drafted by the Nominated Mining Surveyor for purposes of the mine, should be prepared in accordance with the relevant Australian Standard - in particular, but not limited to, AS4368 and AS2916.

8.8 Declaration

A plan referred to in Section 8 of these Directions shall have an appropriate area on the plan allocated for Certification by the Manager of Mining Engineering and/or Nominated Mining Surveyor as appropriate for information on that plan. Such certification shall indicate the origin of the information and that the information shown on the plan is truly represented.

9. Standards for the Preparation of Mine Working Digital Themes

9.1 General

These Directions require that the Mine Survey Plan be prepared using the Mine Working Digital Themes as described in Section 4.3 (Preparation of Mine Survey Plan).

Section 9 provides standard methods for the construction and preparation of the Mine Working Digital Themes. This includes identifying how each theme should be represented graphically, and the attribute information that should be included to describe each featured object in the theme.

This section also identifies other supporting information that is required to be submitted to the Regulator as provided for in Section 5.2 (Composition) of these Directions.

9.2 Theme Attribute Name and Definitions

Table 4 identifies attribute names and definitions that must be used for all Mine Working Digital Themes.

Attribute names are not to exceed ten characters in length. All theme names and attribute names can be in either title case or lowercase, and individual attribute values may be expressed in upper or lower case. Underscores must be used to join multiple words because gaps are not permissible.

Use standard attribute values because this allows the Department and other users of the themes to develop standard enquiries through their GIS software. Values for all attributes are required to be attached for all objects in the theme.

All themes are to be prepared using the database format specified in Table 4. Numbers with decimal values should be stored as floating numbers. All other numbers should be stored as integers or characters.

9.3 Theme Attribute Allocation and Feature Type

All objects in a theme must have attributes attached, and be of the same feature type (e.g. point, line, or polygon). Each theme required is listed in Table 5 with corresponding attributes and feature types that must be used to represent the theme spatially.

In some instances, a Mine Workings Digital Theme may need to be represented by more than one theme. For example, Borehole Locations would normally be points for vertical boreholes and lines for horizontal or inclined boreholes. Where multiple shapes are to be used to represent a theme, and a separate theme is created, attribute fields must be consistent with that particular Mine Working Digital Theme.

Theme Attribute Categories

Mine Working Digital Themes attributes are divided into three categories. The attribute categories are as follows and the attribute names for each category are identified in Table 5.

- | | |
|------------------------|--|
| Core attributes: | common to all themes and include mine name, catalogue number, date the theme data was charted to, and the person charting the theme data to the Mine Survey Plan. |
| Additional attributes: | unique to a particular theme or common to several themes. Attributes that are common to several themes may include seam name, type of workings and when the workings were driven or mined. |
| Metadata attributes: | required to be attached to the themes only when they are prepared for submission to the Regulator in accordance with these Directions. |

9.4 File Naming Convention

Table 6 identifies the specific file name that must be used for each Mine Working Digital Theme for submission to the Regulator in accordance with these Directions.

9.5 Metadata Statement

A Metadata Statement for the Mine Working Digital Themes must be included in all submissions to the Regulator in accordance with these Directions. The Metadata Statement must be in Adobe Acrobat (.pdf) format and in the form identified on the DCS Spatial Services website. Metadata Statements must be given a file name indicating mine name, catalogue number and date.

9.6 Administration Sheet

The Administration Sheet is an approved form that contains all of the administrative data, signature, and certification for the Mine Survey Plan and must be submitted to the Regulator in accordance with these Directions. The Administration Sheet must be in Adobe Acrobat (.pdf) format and in the form identified on the DCS Spatial Services website. The Administration Sheet must be given a file name indicating mine name, catalogue number and date.

9.7 File Format

All Mine Working Digital Themes that are to be submitted to the Regulator in accordance with these Directions must be submitted as shapefiles.

The shapefile format consists of four or more files with the following file extensions:

- shp** - main file that stores the feature geometry; required
- shx** - index file that stores the index of the feature geometry; required
- dbf** - dBASE table that stores the attribute information of features
- prj** - file that stores the coordinate system information
- sbn and sbx** (optional) - files that store the spatial index of the features.

9.8 Date

Date attributes are to be in database format ‘character’ and be in the form “dd/mm/yyyy” where date of workings are accurately known, general format “month year” (May 2006) or as a time period (1950-2000 or pre 2000) when the charted period cannot be accurately shown.

9.9 Precision

Spatial themes should be provided in the best available precision.

9.10 Seam abbreviations

The Department maintains a list of official seam name abbreviations. Dataset seam names must be consistent with this list.

9.11 Preparation of Additional Themes

If additional themes are to be submitted with those required by these Directions, the attributes, attribute names and formats should be consistent with Section 9 of these Directions.

9.12 Preparation of Additional Attributes

If additional attributes are required for a theme, the attributes and their formats should be developed consistent with Section 9 of these Directions.

Nominated Mining Surveyors are encouraged to create additional attributes that will assist in the preparation and supply of the Soft Copy and in support of safe mining operations.

Table 4 - Theme attribute names and definitions

Attribute Name	Description	Database Format	Max Length	Input Value	Example	Options List
Accuracy	Class of survey	Character	50	Chartor determined		
Adj_RT_No	Catalogue Number for the adjacent mine relating to the feature	Character	10	Department determined	RT76	
Adjustment	Reference to adjustment file	Character	20	Chartor determined		
Ackn_Num	Schedule 11 Acknowledgement number from SafeWork NSW (only relevant if notification made to SafeWork NSW)	Character	50	Charter defined	NDGO28222	
App_date	Date of approval or acceptance	Character	10	Chartor determined		
App_id	Name of approval	Character	30	Chartor determined		
App_type	Type of approval	Character	30	Chartor determined		
Azimuth	Not used if borehole is vertical	Character	20	Chartor determined		
Barr_date	Date the barrier originated	Character	10	Chartor determined	23/05/1974	
Barr_type	Type of barrier	Character	100	Chartor determined	Colliery holding	
Bdy_name	Name of coal operation boundary	Character	50	Chartor determined		
Bdy_type	Type of boundary	Character	50	Chartor determined		
Bhole_date	Date borehole surveyed	Character	10	Chartor determined	30/06/2010	
Bhole_diam	Borehole diameter in millimetres	Character	10	Chartor determined		
Bhole_name	Name of borehole	Character	20	Chartor determined		

Attribute Name	Description	Database Format	Max Length	Input Value	Example	Options List
Cable_type	Type of high voltage cable	Character	20	Chartor determined		
Cat_No	Catalogue Number for NSW mines	Character	15	Department determined	RT123 MWP11	
Caution	Warning on use of theme	Character	254	Compulsory and must be in the form described in the options list and included in the Metadata Statement	This theme should not be read in isolation. It is one of many themes that comprise the Mine Survey Plan. The MSP held by the Regulator is the true record of the mine workings.	
Chart_date	Date feature was inserted in theme	Character	20	Chartor determined	30/06/2010	
Chamber_name	Name of the refuge chamber	Character	50	Chartor determined		
Chartor	Surveyor inserting feature into theme	Character	50	Chartor determined	Joe Bloggs	
Class_Div	Class Division number assigned to material being stored as described in ADG Code	Character	10	As per to ADG Code Dangerous Goods list Table 3.2.3	2.1	
Code_no	AS 4368 code number	Character	20	Chartor determined		
Collar_rl	Height of the collar of borehole (AHD)	Character	20	Chartor determined		
Cont_type	Contour type	Character	30	Select from Options List		Seam floor, Void floor
County_id	Name of county	Character	50	Chartor determined		
Comm_type	Type of communication device	Character	100	Chartor determined	Radio	
Dam_name	Name of declared dam	Character	100	Chartor determined		

Attribute Name	Description	Database Format	Max Length	Input Value	Example	Options List
Dam_class	Classification of Declared Dam by consequence category as per Part 3.6 of Dam Safety Regulation 2019	Character	100	Select from Options List		extreme consequence, high A consequence, high B consequence, high C consequence, significant consequence, low consequence, very low consequence
Data_name	Data identifier	Character	50	Provider determined	RT371_0909 MWP11_0909	
Date_work	Date workings were driven or extracted	Character	50	Chartor determined	30/11/2005 MAR2005 Pre 2000	
Dept_file	Department file number	Character	20	Chartor determined		
Depth	Total depth or length of borehole (metres)	Character	10	Chartor determined		
Descript	Description of feature and/or theme	Character	100	Chartor determined		
Dip	Overall dip of the feature	Character	10	Chartor determined		
Direction	Direction expressed as a bearing and in decimal degrees	Character	20	Chartor determined		
Displace	Displacement of Fault (metres) and direction of Down Throw (degrees)	Character	20	Chartor determined		
Easting	Easting in MGA2020	Floating Integer	10.3	Chartor determined		
Emplc_id	Emplacement area name	Character	50	Chartor determined		
Emplc_type	Emplacement area type	Character	50	Options list		Coarse Reject, Fines Reject, Coarse and fines

Attribute Name	Description	Database Format	Max Length	Input Value	Example	Options List
End_date	End date of approval - if applicable	Character	10	Charator determined		
Endorse	Feature status	Character	254	Charator determined		
E_station	Name of emergency station	Character	50	Charator determined	Cache, refill, change-over	
Entry_dim	Diameter or width by height of entry (metres)	Character	20	Charator determined		
Entry_name	Name of entry	Character	50	Charator determined		
Entry_type	Type of entry	Character	50	Select from Options List		Drift portal, Shaft, Tunnel, Ventilation shaft - Upcast, Ventilation Shaft - Downcast, Adit, other
Exit_type	Type of exit	Character	50	Select from Options List		Drift portal, Shaft, Tunnel, Ventilation shaft - Upcast, Ventilation Shaft - Downcast, Adit, other
Exp_Lic_num	Explosives Licence Number	Character	50	Charter defined	23235	
Feat_type	Type of geological feature	Character	50	Charator determined		
Field_note	Reference to Field Book	Character	50	Charator determined		
File_date	File date	Character	10	Provider determined	30/06/2010	
File_name	Theme file name	Character	50	Provider determined		
Finish_rl	Height of the finish of the borehole (AHD71)	Character	20	Charator determined		

Attribute Name	Description	Database Format	Max Length	Input Value	Example	Options List
FW_Ref	First working location reference	Character	50	Chartor determined	15 cut through to 18 cut through Note: only required for newly surveyed workings	
Grid_value	Easting or northing value of the grid line	Character	20	Chartor determined		
Hazard_type	Type of hazardous material	Character	100	Select from Options List		Non Hazardous + Dangerous, Hazardous + Dangerous, Hazardous + Non Dangerous, other
Height	Height (AHD71)	Character	20	Chartor determined	123.123	
Initials	Surveyor's initials	Character	10	Chartor determined		
Inrush_id	Name to identify inrush control zone	Character	100	Chartor determined		
Inrush_type	Inrush risk type	Character	100	Chartor determined		
Land_tag	Cadastral parcel identifier – LPI format	Character	50	Chartor determined		
Level_name	Name of underground level name	Character	20	Chartor determined	Level 980	
LW_Name	Name of Longwall	Character	50	Chartor determined	LW 306	
Mark_id	Boundary corner mark identifier	Character	20	Chartor determined		
Mark_type	Type of boundary corner mark	Character	50	Chartor determined		

Attribute Name	Description	Database Format	Max Length	Input Value	Example	Options List
Maximum_RL	Minimum RL (AHD71) on underground level	Character	50	Charter determined	120	
Max_Cap	Maximum Capacity of storage tank/area	Integer	20	Charter defined	70000	
Mine_name	Name of the operation relating to the mine survey plan	Character	50	Department determined	Acme Colliery	
Minimum_RL	Maximum RL (AHD71) on underground level	Character	50	Charter determined	100	
MWP_no	Catalogue number for metalliferous and extractive industry operations	Character	15	Department determined	MWPT1	
Natural_Feature	Name of natural feature	Character	100	Charter determined	Hunter River	
Northing	Northing in MGA2020	Floating Integer	11.3	Charter determined		
Pack_Group	Packing Group assigned to the material being stored as described in ADG Code	Character	10	Charter defined	1,2 or 3, 1a, etc	
Parish_id	Name of Parish	Character	50	Charter determined		
Plan_catno	Survey plan catalogue	Character	20	Department determined	M27000	
Plant_name	Name of plant	Character	50	Charter determined		
Plantype	Type of cadastre parcel - Spatial Services format	Integer	10	Select from Options List		Refer to Spatial Services metadata accompanying DCDB
Portion_no	Mining portion	Character	100	Department determined	ML20	
Pres_date	Date that dam was prescribed	Character	10	Charter determined		

Attribute Name	Description	Database Format	Max Length	Input Value	Example	Options List
Provider	Person lodging the Mine Survey Plan	Character	50	Provider determined		
RT_No	Catalogue number for coal operations	Character	10	Department determined	RT123	
Seam_name	Name of the seam relating to the feature	Character	60	Regulator list	Bayswater	
Ship_name	Proper shipping name assigned to the material being stored as described in ADG Code	Character	100	Charter defined	AMMONIUM NITRATE	
Source	Where the feature was sourced.	Character	50	Select from Options List		Mine survey, Other survey, Digitised, CAD drawn, Calculated, Coordinate entry, Mine records, Department records, Mining lease, Planning Approval, Mining Approval, other
Station_id	Name of survey station	Character	20	Chartor determined		
Status	Status of Feature	Character	50	Select from Options List		Working, Suspended, Discontinued, Abandoned, Closed, Current, Final, Destroyed, In progress, Temporary, Sealed, Open, Adopted by mine, Adopted by NSW Industry, R&E, Flooded, Indicated, Inferred

Attribute Name	Description	Database Format	Max Length	Input Value	Example	Options List
Stor_type	Storage facility type	Character	50	Select from Options list		Above Ground Tank, Area - Non Gas Free Tanks, Corrosive Cabinet, Cylinder Store, Cylinder(s) In Use, Decanting Cylinder/s, Drum Store, Enclosed Roof Store, Explosives Magazine, Explosives Processing, Explosives Receptacle, External Magazine, External Processing, Fenced Compound, Flammable Liquids Cabinet, IBC, In Original Packages, Internal Magazine, Magazine, Mobile Processing Unit, Non-roofed store, Organic Peroxides Cabinet, Portable tanks/Isotainer, Process Blending, Process Dispersing, Process Distillation, Process Extraction, Process Mixing, Process Package Filling, Process Piping, Process Vessel, Refrig. Shipping Container, Refrigeration Plant., Roofed Store, Roofless Bulk Storage, Roofless Packaged Store, Room Inside A Building, Shipping Container, Silo, Stock Pile, Storage Hopper, Toxics Cabinet, Underground Cavern, Underground Magazine
Surv_date	Date of survey	Character	10	Charator determined		

Attribute Name	Description	Database Format	Max Length	Input Value	Example	Options List
Surveyor	Nominated Mining Surveyor certifying the Mine Working Digital Theme	Character	50	Chartor determined		
Theme_name	Mine Working Digital Theme name	Character	50	Provider determined		
Title_name	Mining lease identifier	Character	30	Department determined	MLXXXX	
Type	Type of control station	Character	50	Chartor determined		
Typ_Quan	Typical Quantity stored in storage tank/area	Integer	20	Charter defined	50000	
UN_Number	UN Number assigned to material being stored as described in ADG Code	Character	10	Charter defined	UN 2917	
Unit	Unit of storage quantity	Character	10	Select from Options list		L, KG
Voltage	Number of volts	Character	20	Chartor determined	4000	
Width	Width of feature	Character	20	Chartor determined		
Work	Type of mine workings	Character	50	Select from Options List	First workings	First workings, Second workings, Workings outline, Void detail, Void outline, Adjacent workings outline, Adjacent first workings, Adjacent second workings, Surface highwall workings, Surface auger workings, Underground auger workings
Work_Start	Date when workings first commenced in the horizon	Character	10	Charter determined	30/11/2005	
Work_Finish	Date when workings completed in the horizon	Character	10	Charter determined	30/11/2005	

Table 5 - Theme allocation and feature type

Theme Name	Sub Theme	Feature Type	Attribute Category	
			* Core Attributes	** Metadata Attributes
* Core Attributes are: Mine_name, Cat_No, Chart_date, Status, Source, Endorse, Chartor and Descript ** Metadata Attributes are: Theme_name, Data_name, File_name, File_date, Caution, Surveyor and Provider				
Any other disused workings that are attached, or in close proximity, to the mine				
Adjacent Mine Workings	Partial Outline	Line	All	Seam_name, Work
	Full Outline	Polygon		
Adjacent Seam Workings	First Workings	Line	All	Seam_name, Work
	Second Workings	Polygon		Seam_name, Work
The workings of the mine, including disused workings and boreholes				
Borehole Locations	Vertical Boreholes	Point	All	Seam_name, Easting, Northing, Azimuth, Bhole_date, Bhole_name, Code_no, Collar_rl, Finish_rl, Depth
	Horizontal/Inclined Boreholes	Line	All	Seam_name, Easting, Northing, Azimuth, Dip, Bhole_date, Bhole_name, Code_no, Collar_rl, Finish_rl, Depth
First Workings		Line	All	Seam_name, Date_Work, Work, FW_Ref
Highwall/ Auger Mining		Polygon	All	Seam_name, Date_Work, Work
Mine Underground Access		Polygon	All	Seam_name, Easting, Northing, Azimuth, Dip, Entry_type

Theme Name	Sub Theme	Feature Type	Attribute Category		
			* Core Attributes	** Metadata Attributes	
* Core Attributes are: Mine_name, Cat No, Chart_date, Status, Source, Endorse, Chartor and Descript ** Metadata Attributes are: Theme_name, Data_name, File_name, File_date, Caution, Surveyor and Provider					
Mine Working Outline	Coal				
	Underground			Seam_name, Work	
	Open cut		All	Seam_name, Work	All
	Metalliferous	Polygon			
	Underground			Level Name, Minimum RL, Maximum RL	
	Open cut				
Second Workings		Polygon	All	Seam_name, Date_Work, Work, LW_Name	All
Underground Auger Areas		Polygon	All	Seam_name, Date_work, Work	All
Surveyed Geofeatures		Line	All	Seam_name, Azimuth, Feat_id, Feat_type, Code_no, Direction, Displacement, Width	All
		Polygon			
Void Contours		Line	All	Height	All
	Void Line	Line	All		All
Void Detail	Void Point	Point	All		All
		Line	All	Seam_name, Height	All
Working Section Floor Contours		Line	All		All

Theme Name	Sub Theme	Feature Type	Attribute Category	
			* Core Attributes	** Metadata Attributes
* Core Attributes are: Mine_name, Cat No, Chart_date, Status, Source, Endorse, Chartor and Descript ** Metadata Attributes are: Theme_name, Data_name, File_name, File_date, Caution, Surveyor and Provider				
Water dams and emplacement areas				
Declared Dams		Polygon	All	Dam_name, Pres_date, Bdy_type, Dam_Class All
Emplacement Areas		Polygon	All	Emplc_id, Emplc_type All
Emplacement Contours		Line	All	Height All
Natural Features surrounding the mine				
Natural Feature		Polygon	All	Natural_Feature All
		Point		
		Line		
The location of high voltage electrical installations				
High Voltage Electrical		Polygon	All	Cable_type, Plant_name, voltage All
		Point		
		Line		
The location of telephones and other fixed plant associated with the radio and telecommunications systems				
Communication Systems		Polygon	All	Comm_type All
		Point		
		Line		

Theme Name	Sub Theme	Feature Type	Attribute Category	
			* Core Attributes	** Metadata Attributes
* Core Attributes are: Mine_name, Cat No, Chart_date, Status, Source, Endorse, Chartor and Descript ** Metadata Attributes are: Theme_name, Data_name, File_name, File_date, Caution, Surveyor and Provider				
Places for the storage of hydrocarbons or explosives				
Hazardous Material		Polygon	All	Hazard_type, Ackn_Num, Typ_Quan, Max_Cap, Stor_type, Unit, Ship_name, Pack_Group, Class_Div, UN_Number All
In the case of an underground mine – points of entry and exit, including emergency exits				
Entry and Exits		Polygon	All	Entry_type, Exit_type, Easting, Northing
		Point		
Refuge chambers (in an underground mine)				
Refuge Chambers		Polygon	All	Chamber_name, Easting, Northing All
Caches, refill stations and change-over stations (in an underground coal mine)				
Emergency Stations		Polygon	All	E_Station, Easting, Northing All
		Point		
Additional themes				
Barriers & Restricted Zones		Polygon	All	Seam_name, Dept_file, Barr_type, Barr_date All
Boundary Control Marks		Point	All	Easting, Northing, Mark_id, Mark_type All
Cadastral Parcels		Polygon	All	Land_tag, Plan_type All
Datelines		Polygon	All	Seam_name, Date_work, Initials All

Theme Name	Sub Theme	Feature Type	Attribute Category		
			* Core Attributes	Additional Attributes	** Metadata Attributes
* Core Attributes are: Mine_name, Cat No, Chart_date, Status, Source, Endorse, Chartor and Descript ** Metadata Attributes are: Theme_name, Data_name, File_name, File_date, Caution, Surveyor and Provider					
Grid Lines		Line	All	Grid_value	All
Mining Approvals		Polygon	All	Seam_name, Dept_file, App_id, App_type, App_date, End_date	All
Mining Lease Boundaries		Polygon	All	Seam_name, Portion_no, Title_name, Plan_catno	All
Potential Sources of Inrush		Polygon	All	Seam_name, Inrush_id, Inrush_type	All
Survey Control Stations		Point	All	Seam_name, Easting, Northing, Height, Station_id, Type, Field_note, Adjustment, Surv_date	All

Table 6 - File naming convention

Theme name	File name definition	Example
Adjacent Mine Workings	adjmine_[RT No]_[Chart_date]	adjmine_rt701_March2006 (outline - adjacent mines in all other seams)
	adjmine_[MWP No]_[Chart_date]	adjmine_MWP11_March2006 (outline - adjacent mines in all other levels)
Adjacent Seam workings	adjseam1_[RT No]_[Chart_date]	adjseam1_rt701_March2006 (1st workings for adjacent mines in same seam as RT701)
	adjseam2_[RT No]_[Chart_date]	adjseam2_rt701_March2006 (1st workings for adjacent mines in same seam as RT701)
	adjlevel1_[MWP No]_[Chart_date]	adjlevel1_MWP11_March2006 (1st workings for adjacent mines in same Level as MWP11)
	Adjlevel2_[MWP No]_[Chart_date]	Adjlevel2_MWP11_March2006 (1st workings for adjacent mines in same Level as MWP11)
Barriers & Restricted Zones	barrier_[RT No]_[Chart_date]	barrier_rt701_March2006
	boreholes_vert_[RT No]_[Chart_date]	boreholes_vert_rt701_March2006
Borehole Locations	boreholes_horiz_[RT No]_[Chart_date]	boreholes_horiz_rt701_March2006
	boreholes_vert_[MWP No]_[Chart_date]	boreholes_vert_MWP11_March2006
	boreholes_horiz_[MWP No]_[Chart_date]	boreholes_horiz_rt701_March2006
	bdy_control_[RT No]_[Chart_date]	bdy_control_rt701_March2006
Boundary Control Marks	bdy_control_[MWP No]_[Chart_date]	bdy_control_MWP11_March2006
	lcl_cadastre_[RT No]_[Chart_date]	lcl_cadastre_rt701_March2006
Cadastral Parcels	lcl_cadastre_[MWP No]_[Chart_date]	lcl_cadastre_MWP11_March2006
	comm_[RT No]_[Chart_date]	comm_rt701_March2006
Communication Systems	comm_[MWP No]_[Chart_date]	comm_MWP11_March2006

Theme name	File name definition	Example
Date lines	dateline_[RT No]_[Chart_date]	dateline_rt701_March2006
Declared Dams	dam_[RT No]_[Chart_date]	dam_rt701_March2006
	dam_[MWP No]_[Chart_date]	dam_MWPI1_March2006
	e_stations_[RT No]_[Chart_date]	e_stations_rt701_March2006
Emergency Stations	e_stations_[MWP No]_[Chart_date]	e_stations_MWPI1_March2006
	emplacement_[RT No]_[Chart_date]	emplacement_rt701_March2006
Emplacement Areas	emplacement_[MWP No]_[Chart_date]	emplacement_MWPI1_March2006
	emp_cont_[RT No]_[Chart_date]	emp_cont_rt701_March2006
Emplacement Contours	emp_cont_[MWP No]_[Chart_date]	emp_cont_MWPI1_March2006
	entry_exit_[RT No]_[Chart_date]	entry_exit_rt701_March2006
Entry and Exits	entry_exit_[MWP No]_[Chart_date]	entry_exit_MWPI1_March2006
	work1_[RT No]_[Chart_date]	work1_rt701_March2006
Grid Lines	grid_[MGA zone]_[RT No]_[Chart_date]	grid_m56_rt701_March2006
	grid_[MGA zone]_[MWP No]_[Chart_date]	grid_m56_MWPI1_March2006
Hazardous Material	hazard_[RT No]_[Chart_date]	hazard_rt701_March2006
	hazard_[MWP No]_[Chart_date]	hazard_MWPI1_March2006
Highwall/ Auger Mining	highwall_auger_[RT No]_[Chart_date]	highwall_auger_rt701_March2006
High Voltage Electrical	high_voltage_[RT No]_[Chart_date]	high_voltage_rt701_March2006
	high_voltage_[MWP No]_[Chart_date]	high_voltage_MWPI1_March2006

Theme name	File name definition	Example
Mining Approvals	mining_approval_[RT No]_[Chart_date]	mining_approval_rt701_March2006
Mining Lease Boundaries	title_[RT No]_[Chart_date]	title_rt701_March2006
	title_[MWP No]_[Chart_date]	title_MWP11_March2006
Mine Underground Access	minfra_[RT No]_[Chart_date]	minfra_rt701_March2006
	minfra_[MWP No]_[Chart_date]	minfra_MWP11_March2006
Mine Working Outline underground	extents_[RT No]_[Chart_date]	extents_rt701_March2006
	extents_[MWP No]_[Chart_date]	extents_MWP11_March2006
Mine Working Outline open cut	extents_void_[RT No]_[Chart_date]	extents_void_rt701_March2006
	extents_void_[MWP No]_[Chart_date]	extents_void_MWP11_March2006
Natural Features	nat_feature_[RT No]_[Chart_date]	nat_feature_rt701_March2006
	nat_feature_[MWP No]_[Chart_date]	nat_feature_MWP11_March2006
Potential Sources of Inrush	pot_inrush_[RT No]_[Chart_date]	pot_inrush_rt701_March2006
	survey_[RT No]_[Chart_date]	survey_rt701_March2006
Survey Control Stations	survey_[MWP No]_[Chart_date]	survey_MWP11_March2006
	geology_[RT No]_[Chart_date]	geology_rt701_March2006
Surveyed Geofeatures	geology_[MWP No]_[Chart_date]	geology_MWP11_March2006
	geology_area_[RT No]_[Chart_date]	geology_area_rt701_March2006
	geology_area_[MWP No]_[Chart_date]	geology_area_MWP11_March2006
	work2_[RT No]_[Chart_date]	work2_rt701_March2006
Underground Auger Areas	ug_auger_[RT No]_[Chart_date]	UG_auger_rt701_March2006

Theme name	File name definition	Example
Void Contours	void_cont_[RT No]_[Chart_date]	void_cont_rt701_March2006
	void_cont_[MWP No]_[Chart_date]	void_cont_MWPI1_March2006
Void Detail	void_point_{RT No}_Chart_date}	void_point_rt701_March2006
	void_line_[RT No]_[Chart_date]	void_line_rt701_March2006
	void_line_[MWP No]_[Chart_date]	void_line_MWPI1_March2006
	void_point_[MWP No]_[Chart_date]	void_point_MWPI1_March2006
Working Section Floor Contours	contour_[RT No]_[Chart_date]	contour_rt701_March2006

End of Direction