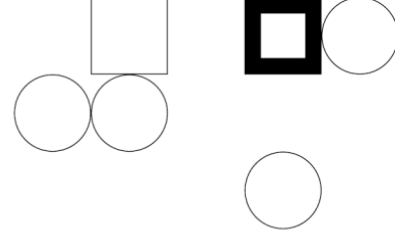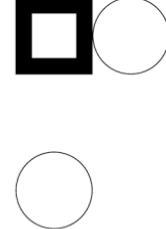# Rail

Product Description
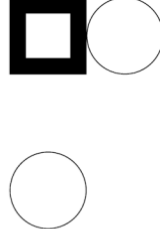May 2021
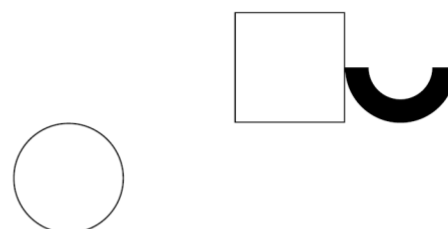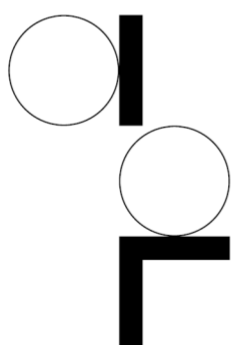
Geoscape

Disclaimer

Geoscape Australia endeavours to ensure that the information in this document is correct at the time of publication. It does not accept responsibility for any consequences arising from the use of this information. Readers should rely on their own skill and judgement to apply the information to particular issues.
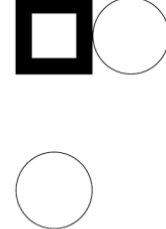
Contents

1. Overview

1.1 Delivery Organisation - Geoscape Australia

Geoscape is the digital Australia – a comprehensive representation of our built environment. It is consistently formatted spatial data that describes the addresses, land, buildings and transport networks across Australia's complex cities, regional centres and rural communities.

Geoscape Australia is the trading name of PSMA Australia Limited, a self-funded public company owned by the governments of Australia. The organisation's first major initiative was to support the 1996 Census through the provision of Australia's first national digital basemap at street-level.

We were incorporated in 2001 and tasked with collating, transforming and delivering national spatial datasets. Our establishment reflected the desire of Australian governments to work together to establish national, location information infrastructure to advance the emerging information economy. Geoscape Australia is now a trusted source of essential national location data, with a diverse ecosystem of data partners.

The value of Geoscape data is in its richness. It enables a range of innovations and applications. To support broad use of the data, it is available through online subscription services in business-ready formats, as well as customised enterprise plans. Geoscape Australia has a network of solution partners that integrate Geoscape data into other products and services. The partner network includes traditional geospatial specialists and data engineers, as well as software developers, marketing service providers, systems integrators and consultancies.

1.2 Data Product Specification Title

Rail Product Description

1.3 Reference Date

May 2021

1.4 Responsible Party

PSMA Australia Limited trading as Geoscape Australia

ABN: 23 089 912 710

Unit 6, 113 Canberra Avenue, GRIFFITH ACT 2603 Australia

T: +61 2 6260 9000

E: info@geoscape.com.au

URL: www.geoscape.com.au
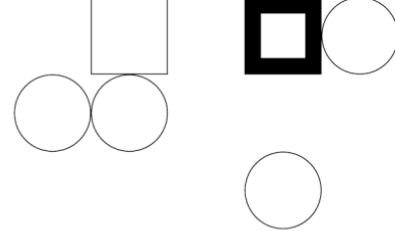
1.5 Language

English

1.6 Topic Category

Spatial data and metadata for railway lines and stations within Australia.

1.7 Informal Description of the Data Product

Rail is a national digital dataset which represents rail tracks including light rail as well as stations across Australia. The Rail dataset has two layers: Railway Lines (lines) and Railway Stations (points).

1.8 Distribution Format

This document is available in PDF format. For other formats and use of this document, contact Geoscape Support (support@geoscape.com.au).

1.9 Copyright and disclaimer

Please see geoscape.com.au/legal/data-copyright-and-disclaimer/.

1.10 Privacy

Geoscape products and services should not contain any personal or business names or other sensitive information. Geoscape undertakes reasonable data cleansing steps as part of its production processes to ensure that is the case. If you think that personal information may have inadvertently been included in Geoscape products or services, please contact support@geoscape.com.au.
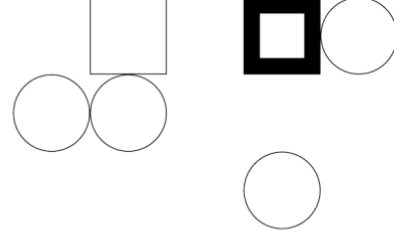
2. Specification Scope

2.1 Scope Identification

Rail is a standalone data theme containing two layers called Railway Lines and Railway Stations.

2.2 Extent

National spatial coverage of rail lines and stations for Australia.
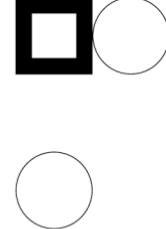
3. Data Product Identification

3.1 Title

Rail

3.2 Alternate Titles

Geoscape Rail

3.3 Abstract

Rail is a digital representation of railway lines and stations for Australia. This dataset provides an optimised aggregated national view of railway line and station geometry and attribution. The dataset is created from multiple sources including jurisdictional data which is revised regularly and supplied in varying formats and at different levels of quality.

3.4 Purpose

Rail is designed to meet the needs of organisations that require a graphical representation of locations of the railway lines and stations (including light rail lines) to integrate with other data in servicing their business needs.

3.5 Topic Category

Vector and data defined by coordinates (latitude and longitude) with associated textual (aspatial) metadata.

3.6 Geographic Description

The spatial coverage of Rail includes Australia's land mass. The Bounding Box for this data is as follows:

- North bounding latitude: -9˚
- South bounding latitude: -44˚
- East bounding longitude: 160˚
- West bounding longitude: 96˚

The area covers the land mass of Australia, including offshore islands (Christmas Island, Cocos (Keeling) Islands, and Norfolk Island).

The spatial domain is described by the polygon:
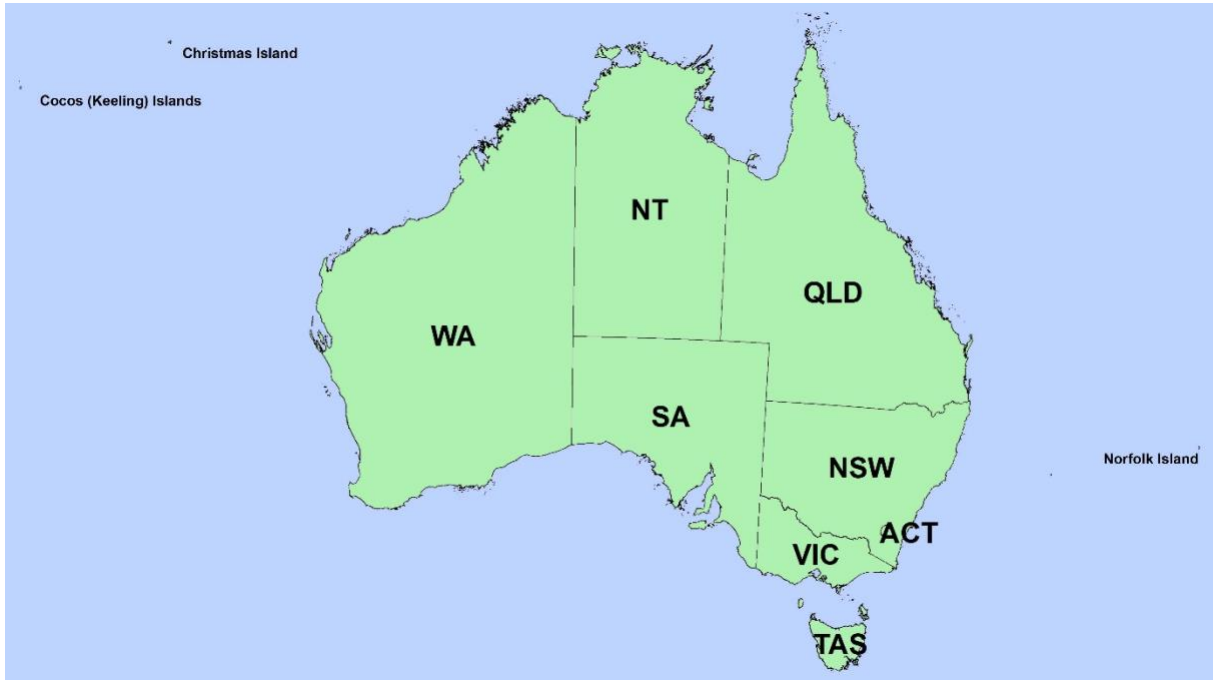
Geographic extent name

AUSTRALIA INCLUDING EXTERNAL TERRITORIES – AUS – Australia – Australia

The States and Territories within Australia are represented by the following:

State or Territory Name	Abbreviation	Character Code
New South Wales	NSW	1 (or 01)
Victoria	VIC	2 (or 02)
Queensland	QLD	3 (or 03)
South Australia	SA	4 (or 04)
West Australia	WA	5 (or 05)
Tasmania	TAS	6 (or 06)
Northern Territory	NT	7 (or 07)
Australian Capital Territory	ACT	8 (or 08)
Other Territories	OT	9 (or 09)

Note: Geoscape has aligned Other Territories (OT) with the Australian Bureau of Statistics (ABS). It includes the Territory of Christmas Island, Territory of Cocos (Keeling) Islands, Jervis Bay Territory and more recently the inclusion of Norfolk Island. OT does not include any other external Territory.

4. Data Content and Structure

The Rail dataset is a feature-based product. A data model is included (Appendix A - Data Model Diagram) with an associated data dictionary (Appendix B - Data Dictionary).

4.1 Feature-Based Data

The feature type is a spatial point and line. The table below outlines the features and their integration into related datasets.

Table 1: Feature descriptions and integration into related datasets

Entity	Description	Integration
Railway Line	Railway captures railway lines. A railway may have multiple line segments defining its spatial existence.	No integration to other datasets (except State).
Railway Station	A railway station is a simple point dataset capturing the location of railway stations.	A Railway Station has: 0 or 1 related gazetted Locality record. Most of the time a Station will be related to a Locality. Will only not be related to a locality where the Railway Station falls within an unincorporated area.

4.2 Feature-Based Application Schema (Data Model)

The Rail dataset Data Model Diagram is set out in Appendix A - Data Model Diagram.

4.3 Data Dictionary

4.3.1 Feature-Based Feature Catalogue

The feature catalogue in support of the application schema is provided in Appendix B - Data Dictionary. Spatial attributes are added to the feature catalogue in the same manner as other attributes for completeness and conformance to the application schema.

Table 2 refers to all tables in the Feature Catalogue.

Table 2: Feature Catalogue

Column	Description
Name	The name of the column in the Integrated Database.
Data Type	The data type of the column based on the types defined in ISO 19103:2015. Parentheses capture Scale, Precision and Maximum Length, where applicable.
Description	A description of the column and what the expected contents are.
Primary Key	If 'Y' then this column must always have a unique value. (Has # entry in the data model tables).
Mandatory Field	Y = mandatory. If 'Y' (mandatory), this column is populated with data.
10 Character Alias	An alias for this column name - up to 10 characters maximum. Used to define the name of the column when in ESRI Shapefile format.

For all tables the Persistent Identifier (_pid), date_created and date_retired fields are governed by the ICSM Policy and Guidelines for Incremental Update. This can be accessed by following the link below.

https://www.icsm.gov.au/sites/default/files/2017-03/incremental_up-date_guidelines.pdf

4.3.2 Feature-Based Content Scope

All geometry and metadata for lines and points within the Rail dataset.
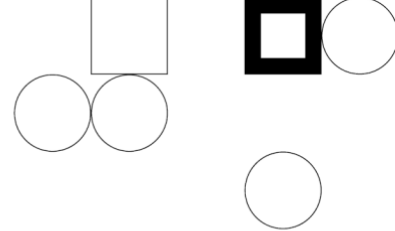
5. Reference System

5.1 Spatial Reference System

GDA94

Horizontal Datum: The Geocentric Datum of Australia 1994 (GDA94) is the target horizontal datum.

Coordinate System: Geographic Coordinate System Geocentric Datum of Australia 1994 (GDA94).

GDA2020

Horizontal Datum: The Geocentric Datum of Australia 2020 (GDA2020) is the target horizontal datum.

Coordinate System: Geographic Coordinate System Geocentric Datum of Australia 2020 (GDA2020).

5.2 Temporal Reference System

Gregorian calendar

5.3 Reference System Scope

The spatial objects and temporal attribution for the Rail dataset.

6. Data Quality

6.1 Positional Accuracy

Positional accuracy is an assessment of the closeness of the location of the spatial objects in relation to their true positions on the earth's surface.

The positional accuracy includes:

- a horizontal accuracy assessment
- a vertical accuracy assessment

The horizontal and vertical positional accuracy are the assessed accuracy after all transformations have been carried out.

Relative spatial accuracy of Rail reflects that of the jurisdictional source data. The accuracy is +/- 2 metres in urban areas and +/- 10 metres in rural and remote areas. Localised deviations from these accuracy metrics does occur and improvement programs are being undertaken to provide wide scale consistent data accuracy. No "shift" of data as a means of "cartographic enhancement" to facilitate presentation has been employed for any real-world feature.

The Rail dataset is classified as "BB" accuracy. That is, 90% of well-defined features are within 1mm (at plot scale) of their true position, eg 1:500 equates to +/- 0.5metre and 1:25,000 equates to +/- 25 metres. Anecdotal evidence suggests that the spatial accuracy of the major part of the dataset (at all scales) is frequently better than BB.

Note: The accuracy of geometric representation is given by the difference between the position of the geometric representation of an object and its absolute position, as measured with respect to the geodetic network.

6.2 Coordinates Referencing the GDA2020 Datum

Spatial features referencing the GDA2020 datum are produced using a coordinate transformation from the GDA94 datum using the following parameters.

shift_x = 0.06155,

shift_y = -0.01087,

shift_z = -0.04019,

rotate_x = -0.0394924,

rotate_y = -0.0327221,

rotate_z = -0.0328979,

scale_adjust = -0.009994
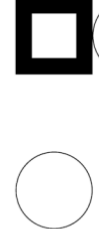
6.3 Attribute accuracy

Attribute accuracy is an assessment of the reliability of values assigned to features in the dataset in relation to their true 'real world' values.

Key attributes (name and the unique identifier) have a high degree of accuracy in the order of 99.09%. Other attributes derived from the processing of supplied data may have a lower degree of accuracy but less than previously released data. All attribute accuracies are dependent on the data accuracy supplied to Geoscape Australia.

For this product, feature and attribute accuracy is a measure of the degree to which the features and attribute values of spatial objects agree with the information on the source material. The allowable error in attribute accuracy was previously up to 5%.

A precise attribute accuracy assessment may not always be possible. In these cases an intuitive estimate of the expected attribute accuracy or the likely maximum error based on previous experience is acceptable.

6.4 Logical consistency

Logical consistency is a measure of the degree to which data complies with the technical specification. The allowable error in logical consistency previously ranged from 3% to 5%. The test procedures are a mixture of software scripts and onscreen, visual checks.

The data structure has been tested for conformance with the data model. The following have been tested and confirmed to conform:

- File names
- Attribute names
- Attribute lengths
- Attribute types
- Attribute domains
- Attribute order in file.
- Object type
- Compulsory attributes populated.

6.5 Topological consistency

Topological consistency is the measure of how features spatially relate to other features within and across themes. Topological inconsistencies are identified using a combination of automated rules and visual analysis. Where topological inconsistencies are identified they are notified back to the supplier organisation for remediation at the source. Some minor topological inconsistencies are corrected during product processing using automated rules. The level of topological consistency is dependent on the data supplied to Geoscape.

During product processing there is some attempt to improve topological consistency across state and territory borders, using both automated rules and onscreen analysis. Cross border topological consistency is a complex issue and Geoscape continues to engage the Federal, State and Territory governments of Australia to improve the topological consistency of spatial datasets across these borders.
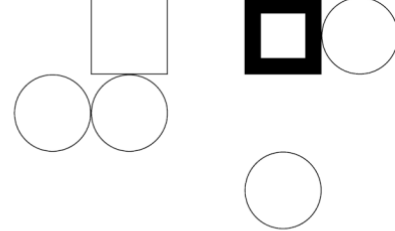
6.6 Completeness

Completeness is an assessment of the extent and range of the dataset with regard to completeness of coverage, completeness of classification and completeness of verification.

Attribute completeness

All attributes for each object are populated according to the data model, noting that some attributes are not mandatory.

Temporal accuracy for each layer is applicable to its most current release.

Quality scope

Line and point geometry accuracy and attribute accuracy for all included areas.
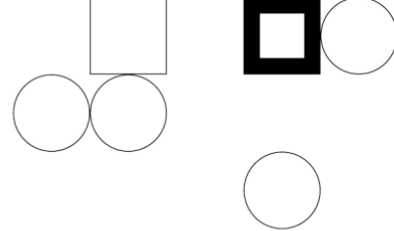
7. Data Capture

All spatial data is supplied by the jurisdictions (Commonwealth, state and territory governments) through various agencies.

The digital Rail lines and points as well as their legal identifiers have been derived from the relevant bodies from each Australian state and territory jurisdiction.

8. Data Updates and Maintenance

Maintenance of Rail is carried out using GIS desktop applications.

Data maintenance – Manual Process

Contributors	PSMA Australia	LYNX

```
Contributor Data Provided ──────────────────────────────────► Contributor data checked against relevant profile
                                                                        │
        Pass ? ◄──── Data accessed by data manager ◄──────────────────┘
         │  │
       YES  NO──► Data manually checked by data manager ──► Can be Used? ?
         │                                                      │         │
         │                                                    YES        NO
         │                                                      │         │
         ▼        Data manually modified if neccessary ◄────────┘         │
   Data join made between appropriate IDB data and Contributor data        │
         │                                                                 ▼
         ▼                                                        Data Not Used, Contributor contacted
   Dataset table(s) updated
         │
         ▼
   Jurisdiction table(s) updated (if information supplied)
         │
         ▼
   Table(s) uploaded into LYNX ──────► Raw Table(s) data
                                              │
                                              ▼
   Pass ? ◄──── QA Report ◄──── QA check Report generated
    │  │
   NO  YES────────────────► Dataset extracts prepared for distribution
    │                                │
    └──► (back to Dataset table(s))  ▼
                               Dataset data EXTRACT
```

8.1 Update frequency

Geoscape Australia releases updates to datasets on either a monthly, quarterly, or as required frequency. The Rail dataset is updated as required with any updates delivered in the months of February, May, August and November when applied. As required means datasets are updated when significant change is provided by the jurisdictions for inclusion into the product.

8.2 Maintenance scope

Geoscape Australia's data maintenance occurs for existing objects with changed geometry and/or attributes, as well as data for new objects within the release period.

9. Delivery Format

9.1 Components

Rail is a vector data product and is made available for each state or territory in the formats listed below.

MapInfo

Format Name

TAB – MapInfo Professional

Specification

The MapInfo TAB format is a popular geospatial vector data format for geographic information systems software. It is developed and regulated by MapInfo as a proprietary format. This format includes files with the following extensions: *.tab, *.dat, *.id, *.map

TAB files support geospatial standards such as Open GIS, the OGC, ISO, W3C and others.

Language

English

Shape

Format Name

Shape – ESRI

Specification

This format includes files with the following extensions: *.shp, *.shx, *.dbf

ESRI Shapefile Technical Description, an ESRI White Paper, July 1998

Follow this link: www.esri.com/library/whitepapers/pdfs/shapefile.pdf

Language

English

Oracle Data Pump

Format Name

Oracle 11g Data Pump Format

Specification

The Data Pump (dump) file set is made up of one or more files that contain table data, database object metadata, and control information. More information is available from **Oracle**.
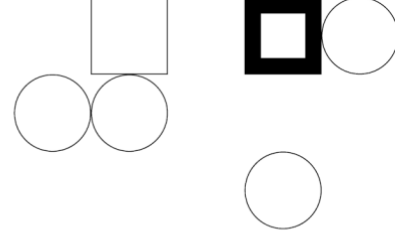
Language

English
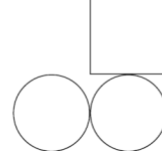
10. Geoscape Partner Network

The value of Geoscape's products is in the richness of the partner networks who have specialist skills and knowledge to provide business-ready solutions. Our network includes traditional geospatial specialists, data engineers, software developers, marketing service providers, system integrator, independent software vendors, research organisations and consultancies.

geoscape.com.au/partners/
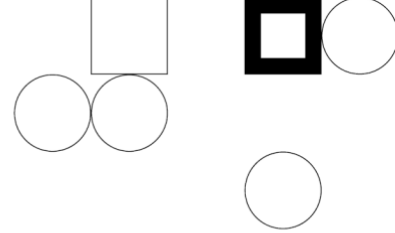
11. Contact Geoscape

Contact us to provide feedback on the Rail product or for further information on accessing Geoscape Data:

Geoscape Australia Limited
Unit 6, 113 Canberra Avenue, Griffith ACT 2603
T: 02 6260 9000
E: support@geoscape.com.au

W: http://geoscape.com.au/

Appendix A – Data Model Diagram
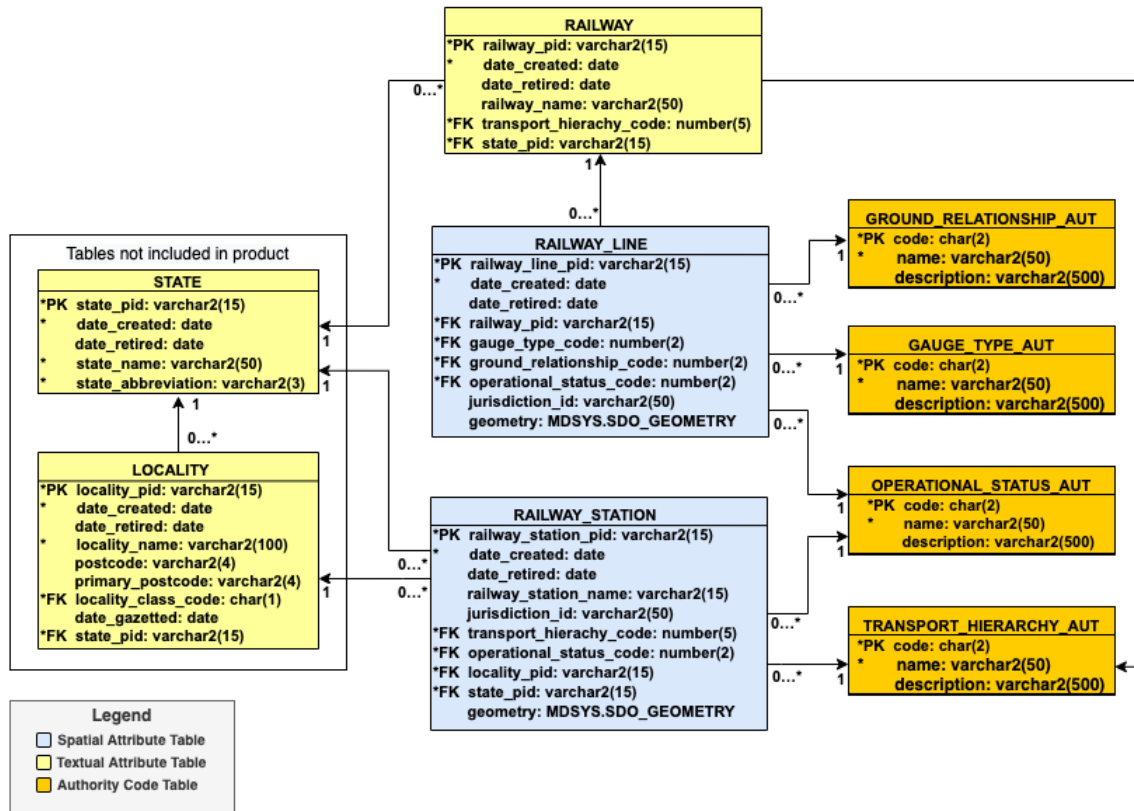
Appendix B - Data Dictionary

Table B1: RAILWAY

Name	Data Type	Description	Prim Key	Man	F K TABLE	F K Col	10 Char Alias
RAILWAY_PID	varchar2(15)	The Persistent Identifier is unique to the real world feature this record represents.	Y	Y	-	-	RW_PID
DATE_CREATED	date	Date this record was created.	N	Y	-	-	DT_CREATE
DATE_RETIRED	date	Date this record was retired.	N	N	-	-	DT_RETIRE
RAILWAY_NAME	varchar2(50)	Name of railway, if exists.	N	N	-	-	NAME
TRANSPORT_HIERARCHY_CODE	number(5)	Transport hierarchy code.	N	Y	TRANSPORT_HIERARCHY_AUT	CODE	THIER_CODE
STATE_PID	varchar2(15)	State or territory persistent identifier.	N	Y	STATE	STATE_PID	STATE_PID

Table B2: RAILWAY_LINE

Name	Data Type	Description	Prim Key	Man	F K TABLE	F K Col	10 Char Alias
RAILWAY_LINE_PID	varchar2(15)	The Persistent Identifier is unique to the real world feature this record represents.	Y	Y	-	-	RW_LNE_PID
DATE_CREATED	date	Date this record was created.	N	Y	-	-	DT_CREATE
DATE_RETIRED	date	Date this record was retired.	N	N	-	-	DT_RETIRE
RAILWAY_PID	varchar2(15)	The railway persistent identifier.	N	Y	RAILWAY	RAILWAY_PID	RW_PID

Name	Data Type	Description	Prim Key	Man	F K TABLE	F K Col	10 Char Alias
GAUGE_TYPE_CODE	number(2)	Gauge type code.	N	Y	GAUGE_TYPE_AUT	CODE	GGTYP_CODE
GROUND_RELATIONSHIP_CODE	number(2)	Ground relationship code.	N	Y	GROUND_RELATIONSHIP_AUT	CODE	GRREL_CODE
OPERATIONAL_STATUS_CODE	number(2)	Operational status code.	N	Y	OPERATIONAL_STATUS_AUT	CODE	OPSTT_CODE
JURISDICTION_ID	varchar2(50)	ID the jurisdictions used for this record.	N	N	-	-	JRSDCTN_ID
GEOMETRY	line	Line geometry.	N	Y	-	-	GEOMETRY

Table B3: RAILWAY_STATION

Name	Data Type	Description	Prim Key	Man	F K TABLE	F K Col	10 Char Alias
RAILWAY_STATION_PID	varchar2(15)	The Persistent Identifier is unique to the real world feature this record represents.	Y	Y	-	-	RAILST_PID
DATE_CREATED	date	Date this record was created.	N	Y	-	-	DT_CREATE
DATE_RETIRED	date	Date this record was retired.	N	N	-	-	DT_RETIRE
JURISDICTION_ID	varchar2(50)	ID used by jurisdiction for record - not mandatory as not supplied for some data.	N	N	-	-	JRSDCTN_ID
RAILWAY_STATION_NAME	varchar2(50)	The railway station name, if exists.	N	N	-	-	NAME
TRANSPORT_HIERARCHY_CODE	number(5)	Transport Hierarchy Code - e.g. 501.	N	Y	TRANSPORT_HIERARCHY_AUT	CODE	THIER_CODE

Name	Data Type	Description	Prim Key	Man	F K TABLE	F K Col	10 Char Alias
OPERATIONAL_STATUS_CODE	number(2)	Operational, Under Construction, Disused	N	Y	OPERATIONAL_STATUS_AUT	CODE	OPSTT_CODE
LOCALITY_PID	varchar2(15)	The locality persistent identifier where a railway station falls within (if applicable).	N	N	LOCALITY	LOCALITY_PID	LOC_PID
STATE_PID	varchar2(15)	State Persistent Identifier	N	Y	STATE	STATE_PID	STATE_PID
GEOMETRY	point	Point geometry	N	Y	-	-	GEOMETRY

Table B4: GAUGE_TYPE_AUT

Name	Data Type	Description	Prim Key	Man	F K TABLE	F K Col	10 Char Alias
CODE	number(2)	Gauge type code e.g. 1. This is the persistent identifier.	Y	Y	-	-	CODE_AUT
NAME	varchar2(50)	The gauge type code name. e.g. OPERATIONAL.	N	Y	-	-	NAME_AUT
DESCRIPTION	varchar2(254)	Description of what the gauge type code means.	N	N	-	-	DSCPN_AUT

Table B5: GAUGE_TYPE_AUT Codes

Code	NAME	Code	NAME
1	STANDARD	3	NOT KNOWN
2	NARROW	4	BROAD

Table B6: TRANSPORT_HIERARCHY_AUT

Name	Data Type	Description	Prim Key	Man	F K TABLE	F K Col	10 Char Alias
code	number(5)	Transport hierarchy code e.g. 301. This is the persistent identifier.	Y	Y	-	-	CODE_AUT
NAME	varchar2(50)	Name of transport hierarchy code e.g. National or State Highway.	N	Y	-	-	NAME_AUT
DESCRIPTION	varchar2(254)	Description of what the transport hierarchy code means.	N	N	-	-	DSCPN_AUT

Table B7: TRANSPORT_HIERACHY_AUT Codes

CODE	NAME	DESCRIPTION
301	National or State Highway	Roads which are of importance in a national sense, and/or are a major interstate through route, and/or are principal connector roads between capitals and/or major regions and or key towns/commercial centres/inter-transport hubs.
302	Arterial Road	Well maintained and widely used roads which are major connectors for national highways or state highways, major centres, key towns, or have major tourist importance or which main function is to form the principal avenue of communication for metropolitan traffic movements.
303	Sub-arterial Road	Acts as connector between highways and/or arterial roads, or as an alternative for arterial roads, or a principal avenue for massive traffic movements
304	Collector Road	Provides for traffic movement between sub-arterial and local roads or to distribute traffic to local street systems.
305	Local Road	Provides property access. Includes service roads that may share the same name as higher order roads.
308	Undetermined	Classification undetermined.
309	Access road	Road designed to provide access to the rear of, into or within a property but may not necessarily be part of the public road network. They generally do not have addresses. Would be applied to urban service lanes, driveways, and other tracks on private property.
400	Pedestrian Thoroughfare	A road or passage whose main purpose is to provide non-vehicular access for pedestrians but may allow some vehicular access (eg malls). Also includes arcades, cycle tracks and foot tracks.
500	Railway Line 1	Public Railway Lines

CODE	NAME	DESCRIPTION
501	Railway Station	Railway Station
503	Railway Line 2	Railway Lines which are Privately owned.
600	Busway	A road which has been dedicated as a rapid bus-only transit way. This does not include roads which have bus-only lanes.
700	Any Identified aircraft landing ground	Any Identified aircraft landing ground
701	Helipad	Helipad

Table B8: OPERATIONAL_STATUS_AUT

Name	Data Type	Description	Prim Key	Man	F K TABLE	F K Col	10 Char Alias
CODE	number(2)	The operational status code. This is the persistent identifier.	Y	Y	-	-	CODE_AUT
NAME	varchar2(50)	The name of the operational status code e.g. Operational.	N	Y	-	-	NAME_AUT
DESCRIPTION	varchar2(254)	Description of what the operational status code means.	N	N	-	-	DSCPN_AUT

Table B9: OPERATIONAL_STATUS_AUT Codes

Code	NAME	Code	NAME
1	Operational	5	Closed
2	Under Construction	6	Proposed
3	Disused	7	Notional
4	Unknown		

Table B10: GROUND_RELATIONSHIP_AUT

Name	Data Type	Description	Prim Key	M an	F K TABLE	F K Col	10 Char Alias
CODE	number(2)	Ground relationship code e.g. 1. This is the persistent identifier.	Y	Y	-	-	CODE_AUT
NAME	varchar2(50)	Name of the ground relationship code e.g. In Tunnel	N	Y	-	-	NAME_AUT
DESCRIPTION	varchar2(254)	Description of what the ground relationship code means.	N	N	-	-	DSCPN_AUT

Table B11: GROUND_RELATIONSHIP_AUT Codes

Code	NAME	DESCRIPTION
0	Unknown	
1	Above Ground or On Bridge	Road passes over a bridge, and is therefore above the ground or water.
2	In Tunnel	Road passes through a tunnel, and is therefore below the ground or water.
3	On Ground	Road is on the ground. Default value.
4	Other	This may include causeways, dam walls, fords or other crossings.
5	On Water	This includes ferry routes or other On Water transportation.