# Road Network File, Reference Guide, 2016

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## Standard table symbols

The following symbols are used in Statistics Canada publications:

.    not available for any reference period
..   not available for a specific reference period
...  not applicable
0    true zero or a value rounded to zero
$0^s$  value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
$^p$  preliminary
$^r$  revised
x    suppressed to meet the confidentiality requirements of the *Statistics Act*
$^E$  use with caution
F    too unreliable to be published
*    significantly different from reference category (p < 0.05)

# Table of contents

# Road Network File, Reference Guide, Census year 2016

This reference guide is intended for users of the Road Network File. The guide provides an overview of the file, the general methodology used in its creation, and important technical information.

## What's new?

- The 2016 Census Road Network File contains information such as street arc unique identifier, street name, type, direction, address range and class. It also includes the unique identifier, name and type for each side of a street arc (where applicable) for the following geographic levels:
    - province or territory
    - census subdivision
    - census metropolitan area or census agglomeration

- The 2016 Road Network File includes updates to the road network that were made using the following provincially sourced data:
    - the province of Prince Edward Island
    - the province of New Brunswick
    - the province of Nova Scotia
    - the province of Quebec
    - the province of Ontario for thirty-five census divisions: Stormont, Dundas and Glengarry (3501), Prescott and Russell (3502), Leeds and Grenville (3507), Lanark (3509), Frontenac (3510), Lennox and Addington (3511), Hasting (3512), Prince Edward (3513), Northumberland (3514), Peterborough (3515), Kawartha Lakes (3516), Durham (3518), York (3519), Dufferin (3522), Wellington (3523), Niagara (3526), Perth (3531), Chatham-Kent (3536), Essex (3537), Lambton (3538), Huron (3540), Muskoka (3544), Haliburton (3546), Renfrew (3547), Nipissing (3548), Parry Sound (3549), Manitoulin (3551), Sudbury (3552), Greater Sudbury / Grand Sudbury (3553), Timiskaming (3554), Cochrane (3556), Algoma (3557), Thunder Bay (3558), Rainy River (3559) and Kenora (3560)
    - the province of Alberta
    - the province of British Columbia.

These efforts have improved the representation of the road network.

# 1. About this guide

This reference guide does not provide details on specific software packages that are available for use with the 2016 Census Road Network File. Users are advised to contact the appropriate software vendor for information.

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## 2. Overview

The 2016 Census Road Network File depicts the digital road line coverage for Canada and contains information such as street arc unique identifier (UID), name, type, direction, address range, rank and class. It also includes the UID, name and type for each side of a street arc (where applicable) for the following geographic levels:

- province or territory
- census subdivision
- census metropolitan area or census agglomeration.

The 2016 Census Road Network File is available as a national file.

### How to cite this guide

*Road Network File, Reference Guide, Second edition, 2016 Census*. Statistics Canada Catalogue no. 92-500-G.

### How to cite this product

*Road Network File, 2016 Census*. Statistics Canada Catalogue no. 92-500-X.

# 3. About this product

## Purpose of the product

The purpose of the 2016 Census Road Network File is to provide a framework for mapping and spatial analysis. It also supports Geographic Information System (GIS) applications used for land use and demographic studies, and for social, economic and market research.

The 2016 Census Road Network File is positionally consistent with the 2016 Census geography boundary files, which provide additional reference for mapping.

The 2016 Census Road Network File should be used in conjunction with the 2016 suite of geography products.

## Definitions and concepts

Geographic terms and concepts are briefly defined in the *Dictionary, Census of Population, 2016*. http://www12. statcan.gc.ca/census-recensement/2016/ref/dict/index-eng.cfm

## Content

The 2016 Census Road Network File contains street arcs depicting the national road network and includes attribute information such as street arc unique identifier, name, type, direction, address range, rank and class. It also includes the unique identifier (UID), name and type for each side of a street arc (where applicable) for the following geographic levels:

- province or territory
- census subdivision
- census metropolitan area or census agglomeration.

## General methodology

The National Geographic Database (NGD) is a joint Statistics Canada–Elections Canada initiative to develop and maintain a national road network database that serves the needs of both organizations. The objective of the NGD is to continually improve the quality and currency of road network coverage using updates from provinces, territories and local sources. The source file used to create the Road Network File resides in Statistics Canada's Spatial Data Infrastructure and was derived directly from data stored on the NGD.

### Creation of the 2016 Census Road Network File

The Road Network File was created from a source file consisting of all streets, highways and other road segments maintained in Statistics Canada's Spatial Data Infrastructure (SDI). A copy of the source file in its original format was created to facilitate geoprocessing (e.g., joins, modifications and verification operations). Additional attribute information (i.e., province or territory, census metropolitan area and census subdivision attributes) was then joined to the spatial component at the road segment level (see Table 4.1). The resulting file, containing both the spatial content and the attribute content, was verified against the source file maintained in the SDI.

The file was verified for spatial and attribute content, translated into French and English, and appropriately named according to the file naming convention http://www.statcan.gc.ca/pub/92-500-g/92-500-g2016001-eng.htm#b1. Final data processing consisted in converting the file using FME® (Safe Software) into the following file formats supported by Geographic Information System (GIS) software: ArcGIS® (.shp), Geography Markup Language (.gml) and MapInfo® (.tab).

The ArcGIS®, Geography Markup Language and MapInfo® files were compressed into WinZip® files (file extension .zip) and made available for download from the Statistics Canada website.

## Limitations

Statistics Canada maintains Road Network File information to support the census and other Statistics Canada activities. The relative position of road network features is important in maps created for reference purposes; therefore, relative positional accuracy takes precedence over absolute positional accuracy. The Road Network

File does not contain street information required for route optimization. For example, data on one-way streets, dead ends and other street obstacles are not included in the Road Network File. Consequently, this file is not recommended for engineering applications, emergency dispatching services, surveying or legal applications.

The Road Network File contains road arcs with address ranges sourced from field observation or administrative data sources, with imputed address ranges, or without address ranges.

The limitations of the Road Network File should be recognized for uses other than the mapping, analysis and retrieval of Statistics Canada data.

The positional accuracy of the file does not support cadastral, surveying, digitizing or engineering applications.

## Comparisons to other products/versions

Differences between the 2016 Census Road Network File and previous versions of the Road Network File include the following:

- The 2016 Census Road Network File contains additional roads, street names, address ranges and road classes.
- The 2016 Census Road Network File is compatible with the suite of 2016 Census geography products.
- The 2016 Census Road Network File does not necessarily follow the 2011 Census boundaries.
- The 2016 Census Road Network File includes updates to the road network that were made using the following provincially sourced data:
    - o the province of Prince Edward Island (2013)
    - o the province of New Brunswick (2014-2015)
    - o the province of Nova Scotia (2013-2014)
    - o the province of Quebec (2014-2015)
    - o the province of Ontario (2010-2014)
    - o the province of Alberta (2013-2014)
    - o the province of British Columbia (2009).

There was a continuing alignment for all provinces. These efforts have improved the representation of the road network.

## Using with other products

When considering whether to use the 2016 Census Road Network File, users should be aware of its compatibility or incompatibility with files available from other sources. Such files may not be consistent with Statistics Canada files.

## Reference date

The geographic reference date is a date determined by Statistics Canada to finalize the geographic framework for which statistical data are collected, tabulated and reported. For the 2016 Census, the geographic reference date is January 1, 2016.

# 4. Technical specifications

## Record layout and data descriptions

The following table identifies and briefly describes selected attributes that make up the 2016 Census Road Network File.

**Table 4.1**
**Census Road Network File record layout**

| Attribute name | Data type | Description |
|---|---|---|
| NGD_UID | Character (10) | Unique identifier of the arc |
| NAME | Character (50) | Street name associated with the arc |
| TYPE | Character (6) | Street type associated with the arc |
| DIR | Character (2) | Street direction associated with the arc |
| AFL_VAL | Character (9) | Civic address found on the left-hand side of the arc at the FROM node |
| ATL_VAL | Character (9) | Civic address found on the left-hand side of the arc at the TO node |
| AFR_VAL | Character (9) | Civic address found on the right-hand side of the arc at the FROM node |
| ATR_VAL | Character (9) | Civic address found on the right-hand side of the arc at the TO node |
| CSDUID_L | Character (7) | Uniquely identifies a census subdivision (composed of the 2-digit province or territory unique identifier followed by the 2-digit census division code and the 3-digit census subdivision code), left-hand side of arc |
| CSDNAME_L | Character (100) | Census subdivision name, left-hand side of arc |
| CSDTYPE_L | Character (3) | Census subdivisions are classified according to designations adopted by provincial/territorial or federal authorities, left-hand side of arc |
| CSDUID_R | Character (7) | Uniquely identifies a census subdivision (composed of the 2-digit province or territory unique identifier followed by the 2-digit census division code and the 3-digit census subdivision code), right-hand side of arc |
| CSDNAME_R | Character (100) | Census subdivision name, right-hand side of arc |
| CSDTYPE_R | Character (3) | Census subdivisions are classified according to designations adopted by provincial/territorial or federal authorities, right-hand side of arc |
| CMAUID_L | Character (3) | Uniquely identifies a census metropolitan area/census agglomeration, left-hand side of arc |
| CMANAME_L | Character (100) | Census metropolitan area or census agglomeration name, left-hand side of arc |
| CMATYPE_L | Character (1) | Census metropolitan area or census agglomeration type, left-hand side of arc |
| CMAUID_R | Character (3) | Uniquely identifies a census metropolitan area/census agglomeration, right-hand side of arc |
| CMANAME_R | Character (100) | Census metropolitan area or census agglomeration name, right-hand side of arc |
| CMATYPE_R | Character (1) | Census metropolitan area or census agglomeration type, right-hand side of arc |
| PRUID_L | Character (2) | Uniquely identifies a province or territory, left-hand side of arc |
| PRNAME_L | Character (100) | Province or territory name, left-hand side of arc |
| PRUID_R | Character (2) | Uniquely identifies a province or territory, right-hand side of arc |
| PRNAME_R | Character (100) | Province or territory name, right-hand side of arc |
| RANK | Character (1) | A 1-digit code that identifies the rank of road segments. |
| CLASS | Character (2) | Identifies the different types of street features. |

## Attribute domain values

### Representation of unknown or no value

The null value is used to represent missing or non-existent values for a street's name, type, direction and address range.

The null value is also used for geographic area unique identifiers, names and types to indicate that a geographic area is outside Canada.

## Street type

This value indicates the street type associated with the arc.

**Table 4.2**
**Street type**

| Type | Description |
| --- | --- |
| N/A | not applicable |
| < Null > | no type |
| ABBEY | Abbey (E) |
| ACCESS | Access (E) |
| ACRES | Acres (E) |
| AIRE | Aire (E) |
| ALLEY | Alley (E) |
| ALLÉE | Allée (F) |
| AUT | Autoroute (F) |
| AV | Avenue (F) |
| AVE | Avenue (E) |
| BAY | Bay (E) |
| BEACH | Beach (E) |
| BEND | Bend (E) |
| BLOC | Bloc (F) |
| BLOCK | Block (E) |
| BLVD | Boulevard (E) |
| BOUL | Boulevard (F) |
| BOURG | Bourg (F) |
| BRGE | Barrage (F) |
| BROOK | Brook (E) |
| BYPASS | By-pass (E) |
| BYWAY | Byway (E) |
| C | Centre (F) |
| CAMPUS | Campus (E) |
| CAPE | Cape (E) |
| CAR | Carré (F) |
| CARREF | Carrefour (F) |
| CDS | Cul-de-sac (E) |
| CERCLE | Cercle (F) |
| CH | Chemin (F) |
| CHASE | Chase (E) |
| CIR | Circle (E) |
| CIRCT | Circuit (F) |

**Table 4.2  (continued)**
**Street type**

| Type | Description |
| --- | --- |
| CLOSE | Close (E) |
| COMMON | Common (E) |
| CONC | Concession (E) |
| CÔTE | Côte (F) |
| COUR | Cour (F) |
| COURS | Cours (F) |
| COVE | Cove (E) |
| CRES | Crescent (E) |
| CREST | Crest (E) |
| CRNRS | Corners (E) |
| CROFT | Croft (E) |
| CROIS | Croissant (F) |
| CROSS | Crossing (E) |
| CRSSRD | Crossroads (E) |
| CRT | Court (E) |
| CTR | Centre (E) |
| DALE | Dale (E) |
| DELL | Dell (E) |
| DESSTE | Desserte (F) |
| DIVERS | Diversion (E) |
| DOWNS | Downs (E) |
| DR | Drive (E) |
| DRPASS | Droit de passage (F) |
| ÉCH | Échangeur (F) |
| END | End (E) |
| ESPL | Esplanade (E) |
| ESTATE | Estates (E) |
| EXPY | Expressway (E) |
| EXTEN | Extension (E) |
| FARM | Farm (E) |
| FIELD | Field (E) |
| FOREST | Forest (E) |
| FRONT | Front (E) |
| FSR | Forest service road (E) |
| FWY | Freeway (E) |
| GATE | Gate (E) |
| GDNS | Gardens (E) |
| GLADE | Glade (E) |
| GLEN | Glen (E) |

**Table 4.2 (continued)**
**Street type**

| Type | Description |
|---|---|
| GREEN | Green (E) |
| GRNDS | Grounds (E) |
| GROVE | Grove (E) |
| HARBR | Harbour (E) |
| HAVEN | Haven (E) |
| HEATH | Heath (E) |
| HGHLDS | Highlands (E) |
| HILL | Hill (E) |
| HOLLOW | Hollow (E) |
| HTS | Heights (E) |
| HWY | Highway (E) |
| ÎLE | Île (F) |
| IMP | Impasse (F) |
| INLET | Inlet (E) |
| ISLAND | Island (E) |
| KEY | Key (E) |
| KNOLL | Knoll (E) |
| LANDNG | Landing (E) |
| LANE | Lane (E) |
| LANEWY | Laneway (E) |
| LINE | Line (E) |
| LINK | Link (E) |
| LKOUT | Lookout (E) |
| LMTS | Limits (E) |
| LOOP | Loop (E) |
| MALL | Mall (E) |
| MANOR | Manor (E) |
| MAZE | Maze (E) |
| MEADOW | Meadow (E) |
| MEWS | Mews (E) |
| MONTÉE | Montée (F) |
| MOOR | Moor (E) |
| MOUNT | Mount (E) |
| MTN | Mountain (E) |
| ORCH | Orchard (E) |
| PARADE | Parade (E) |
| PARC | Parc (F) |
| PASS | Passage (E) |
| PATH | Path (E) |

**Table 4.2 (continued)**
**Street type**

| Type | Description |
| --- | --- |
| PEAK | Peak (E) |
| PINES | Pines (E) |
| PK | Park (E) |
| PKY | Parkway (E) |
| PL | Place (E) |
| PLACE | Place (F) |
| PLAT | Plateau (E) |
| PLAZA | Plaza (E) |
| POINTE | Pointe (E) |
| PORT | Port (E) |
| PROM | Promenade (F) |
| PT | Point (E) |
| PTWAY | Pathway (E) |
| PVT | Private (E) |
| QUAI | Quai (F) |
| QUAY | Quay (E) |
| RAMP | Ramp (E) |
| RANG | Rang (F) |
| RD | Road (E) |
| RDPT | Rond point (F) |
| REACH | Reach (E) |
| RG | Range (E) |
| RIDGE | Ridge (E) |
| RISE | Rise (E) |
| RLE | Ruelle (F) |
| ROUTE | Route (F) |
| ROW | Row (E) |
| RTE | Route (E) |
| RTOFWY | Right of way (E) |
| RUE | Rue (F) |
| RUIS | Ruisseau (F) |
| RUN | Run (E) |
| SECTN | Section (E) |
| SENT | Sentier (F) |
| SIDERD | Sideroad (E) |
| SQ | Square (E) |
| ST | Street (E) |
| STROLL | Stroll (E) |
| SUBDIV | Subdivision (E) |

**Table 4.2 (concluded)**
**Street type**

| Type | Description |
|------|-------------|
| TERR | Terrace (E) |
| THICK | Thicket (E) |
| TLINE | Townline (E) |
| TOWERS | Towers (E) |
| TRACE | Trace (E) |
| TRAIL | Trail (E) |
| TRNABT | Turnabout (E) |
| TRUNK | Trunk (E) |
| TSSE | Terrasse (F) |
| VALE | Vale (E) |
| VIA | Via (E) |
| VIEW | View (E) |
| VILLAS | Villas (E) |
| VILLGE | Village (E) |
| VISTA | Vista (E) |
| VOIE | Voie (F) |
| WALK | Walk (E) |
| WAY | Way (E) |
| WHARF | Wharf (E) |
| WOOD | Wood (E) |
| WYND | Wynd (E) |

## Street direction

Street direction can be used in conjunction with street name and type to identify common street elements (e.g., Elm ST S, versus Elm ST W or Elm ST). Street direction has no relation to the direction in which the street arc was digitized.

**Table 4.3**
**Street direction**

| Street direction | Street description |
|------------------|--------------------|
| < Nulle > | no type |
| E | East / Est |
| N | North / Nord |
| NE | North East / Nord-est |
| NO | Nord-ouest |
| NW | North West |
| O | Ouest |
| S | South / Sud |
| SE | South East / Sud-est |
| SO | Sud-ouest |
| SW | South West |
| W | West |

## CSDTYPE_L and CSDTYPE_R

Census subdivisions are classified according to designations adopted by provincial, territorial or federal authorities. The geographic reference date associated with the assignment of CSDTYPE_L and CSDTYPE_R is January 1, 2016.

**Table 4.4**
**Census subdivision types**

| CSDTYPE | CSD description |
|---|---|
| C | City / Cité |
| CC | Chartered community |
| CG | Community government |
| CN | Crown colony / Colonie de la couronne |
| COM | Community |
| CT | Canton (municipalité de) |
| CU | Cantons unis (municipalité de) |
| CV | City / Ville |
| CY | City |
| DM | District municipality |
| HAM | Hamlet |
| ID | Improvement district |
| IGD | Indian government district |
| IM | Island municipality |
| IRI | Indian reserve / Réserve indienne |
| LGD | Local government district |
| LOT | Township and royalty |
| M | Municipality / Municipalité |
| MD | Municipal district |
| MÉ | Municipalité |
| MU | Municipality |
| NH | Northern hamlet |
| NL | Nisga'a land |
| NO | Unorganized / Non organisé |
| NV | Northern village |
| P | Parish / Paroisse (municipalité de) |
| PE | Paroisse (municipalité de) |
| RCR | Rural community / Communauté rurale |
| RDA | Regional district electoral area |
| RGM | Regional municipality |
| RM | Rural municipality |
| RV | Resort village |
| S-É | Indian settlement / Établissement indien |
| SA | Special area |

**Table 4.4**
**Census subdivision types (concluded)**

| CSDTYPE | CSD description |
|---|---|
| SC | Subdivision of county municipality / Subdivision municipalité de comté |
| SÉ | Settlement / Établissement |
| SET | Settlement |
| SG | Self-government / Autonomie gouvernementale |
| SM | Specialized municipality |
| SNO | Subdivision of unorganized / Subdivision non organisée |
| SV | Summer village |
| T | Town |
| TC | Terres réservées aux Cris |
| TI | Terre inuite |
| TK | Terres réservées aux Naskapis |
| TL | Teslin land |
| TP | Township |
| TV | Town / Ville |
| V | Ville |
| VC | Village cri |
| VK | Village naskapi |
| VL | Village |
| VN | Village nordique |

## CMATYPE_L and CMATYPE_R

Census metropolitan area or census agglomeration.

**Table 4.5**
**Census metropolitan area or census agglomeration type**

| CMA or CA type | Description |
|---|---|
| B | Census metropolitan area (CMA) |
| D | Census agglomeration (CA) that is not tracted |
| K | Census agglomeration (CA) that is tracted |
| < Null > | not applicable (outside of CMA or CA) |

## PRUID_L and PRUID_R

These values uniquely identify a province or territory. The geographic reference date associated with the assignment of PRUID_L and PRUID_R is January 1, 2016.

**Table 4.6**
**Provinces and territories**

| PRUID | Province or territory name |
|---|---|
| 10 | Newfoundland and Labrador / Terre-Neuve-et-Labrador |
| 11 | Prince Edward Island / Île-du-Prince-Édouard |
| 12 | Nova Scotia / Nouvelle-Écosse |
| 13 | New Brunswick / Nouveau-Brunswick |
| 24 | Quebec / Québec |
| 35 | Ontario |
| 46 | Manitoba |
| 47 | Saskatchewan |
| 48 | Alberta |
| 59 | British Columbia / Colombie-Britannique |
| 60 | Yukon |
| 61 | Northwest Territories / Territoires du Nord-Ouest |
| 62 | Nunavut |
| < Null > | not applicable (outside of Canada) |

## RANK

Rank is a value assigned to a street arc to facilitate the selection of streets.

**Table 4.7**
**Rank**

| Street rank code | Street rank description |
|---|---|
| 1 | Trans-Canada Highway |
| 2 | National Highway System (not rank 1) |
| 3 | Major Highway (not rank 1 or 2) |
| 4 | Secondary Highway, Major Street (not rank 1, 2, or 3) |
| 5 | All other streets (not rank 1, 2, 3, or 4) |

## CLASS

The street class code identifies the different types of street features within the 2016 Census Road Network File.

**Table 4.8**
**Street class code**

| Street class code | Street class description |
| --- | --- |
| 10 | Highway |
| 11 | Expressway |
| 12 | Primary highway |
| 13 | Secondary highway |
| 20 | Road |
| 21 | Arterial |
| 22 | Collector |
| 23 | Local |
| 24 | Alley/Lane/Utility |
| 25 | Connector/Ramp |
| 26 | Reserve/Trail |
| 27 | Rapid transit |
| 28 | Planned |
| 29 | Strata |
| 80 | Bridge/Tunnel |
| 90, 95 | Unknown |

## Software formats

The 2016 Census Road Network File is available for download from the Statistics Canada website in the following formats:

- ArcGIS®
  File extension: .shp
- Geography Markup Language (GML) 3.1.1
  File extension: .gml
- MapInfo®
  File extension: .tab

## File extension and accented character information

The ArcGIS®, Geography Markup Language and MapInfo® files are compressed into WinZip® files (file extension .zip).

An XML schema file (.xsd) is included to describe and validate the structure and content of the .gml files.

The 2016 Census Road Network File contains attributes with accented characters. They were successfully tested on the desktop versions of ArcGIS® 10.2.2, MapInfo 12.0® and FME Data Inspector 2015.1.

## Geographic representation

The 2016 Census Road Network File is available on the Statistics Canada website in the following geographic representation:

- Projection: Lambert conformal conic
- False easting: 6200000.000000
- False northing: 3000000.000000

- Central meridian: -91.866667
- Standard parallel 1: 49.000000
- Standard parallel 2: 77.000000
- Latitude of origin: 63.390675
- Linear unit: metre (1.000000)
- Datum: North American 1983 (NAD83)
- Prime meridian: Greenwich
- Angular unit: degree
- Spheroid: GRS 1980.

The North American Datum of 1983 (NAD83) is an adjustment of the 1927 datum that reflects the higher accuracy of geodetic surveying.

Users of the 2016 Census Road Network File can transform the file into the representation that best satisfies their needs, knowing the effects of these representations on angles, areas, distances and direction. Users have the option to choose the best projection in concert with the map's objectives.

## File naming convention

Spatial product file names follow a file naming convention. The geographic area and code, file type, geographic reference date, software type and language are embedded within the file name. Standardizing the names of the files facilitates the storage of compressed files, all of which have the extension .zip.

Each file name has 13 characters. All letters are in lower case to maintain consistency.

**First character:** projection of file

- l - projection in Lambert conformal conic

**Next three characters:** primary geographic level of file

- rnf - road network file

**Next three numbers:** geographic code of coverage

- 000 - Canada

**Next character:** file type

- r - road network file

**Next two numbers:** geographic reference date

The geographic reference date is a date determined by Statistics Canada for the purpose of finalizing the geographic framework for which census data are collected, tabulated and reported. For the 2016 Census, the geographic reference date is January 1, 2016.

- 16 - geographic reference date is 2016

**Next character:** file format

- a - ArcGIS® (.shp)
- g - Geography Markup Language (.gml)
- m - MapInfo® (.tab)

**Final two characters:** language

- _e - English
- _f - French

# 5. Data quality

Spatial data quality elements provide information on the fitness- for- use of a spatial database by describing why, when and how the data were created, and how accurate the data are. The elements include an overview describing the purpose and usage, as well as specific quality elements reporting on the lineage, positional accuracy, attribute accuracy, logical consistency and completeness. This information is provided to users for all spatial data products disseminated.

## Lineage

Lineage describes the history of the spatial data, including descriptions of the source material from which the data were derived, and the methods of derivation. It also contains the dates of the source material, and all transformations involved in producing the final digital files.

The National Geographic Database (NGD) is a joint Statistics Canada–Elections Canada initiative to develop and maintain a spatial database that serves the needs of both organizations. The objective of the NGD is to continually improve the quality and currency of spatial coverage using updates from provinces, territories and local sources. The source files used to create the Road Network File reside in Statistics Canada's Spatial Data Infrastructure (SDI) and were derived directly from data stored on the NGD.

The data in the 2016 Census Road Network File were derived from the SDI environment based on a copy of the NGD that contains the road network in Canada, as well as street attributes (name, type, direction, address range, rank and class).

The files were verified for their spatial and attribute content, translated into French and English, and appropriately named according to the file naming convention. The geographic area unique identifier, name and type, and the relationships between the various geographic levels, are found in the SDI.

Final data processing consisted in converting the file using FME® (Safe Software) into the following GIS file formats: ArcGIS® (.shp), Geography Markup Language (.gml) and MapInfo® (.tab).

Road information was incorporated from a variety of sources, including provincially sourced data, municipal maps and field observation. The timeliness of the NGD varies from region to region depending on the source data.

## Positional accuracy

Positional accuracy refers to the absolute and relative accuracy of the positions of geographic features. Absolute accuracy is the closeness of the coordinate values in a dataset to values that are true or accepted as true. Relative accuracy is the closeness of the relative positions of features to their respective relative positions accepted as or being true. Descriptions of positional accuracy include the quality of the final file or product after all transformations.

The Spatial Data Infrastructure (SDI) is not fully Global Positioning Systems (GPS)-compliant. However, every possible attempt is made to ensure that the geographic area boundaries maintained in the Spatial Data Infrastructure respect the limits of the administrative entities that they represent (e.g., provinces, territories and census subdivisions) or on which they are based (e.g., census metropolitan areas and census agglomerations). The positional accuracy of these limits is dependent upon source materials used by Statistics Canada to identify the location of limits. In addition, due to the importance placed on relative positional accuracy, the positional accuracy of other geographic data (e.g., road network data and hydrographic data) that are stored within the Spatial Data Infrastructure is considered when positioning the limits of the standard geographic areas.

### Absolute positional accuracy

Absolute positional accuracy describes the degree to which the position of features in a geographic database reflects their true position on the ground (i.e., the closeness of reported coordinate values to values accepted as true).

The 2016 Census Road Network File includes updates to the road network that were made using the following provincially- sourced data:

- the province of Prince Edward Island (2013)
- the province of New Brunswick (2014-2015)
- the province of Nova Scotia (2013-2014)
- the province of Quebec (2014-2015)
- the province of Ontario (2010-2014)
- the province of Alberta (2013-2014)
- the province of British Columbia (2009).

There was a continuing alignment for all provinces. These efforts have improved the representation of the road network.

The information present in the Spatial Data Infrastructure (SDI) road layer was developed for the purposes of statistical analysis and census operations. The absolute position of roads in the SDI varies with the source files and documents used to build and maintain the database. Therefore, the road layer is not suitable for high precision measurement applications such as engineering or property transfers, nor for other uses that might require highly accurate measurements of the earth's surface.

Absolute positional accuracy is not a requirement for census processes.

## Relative positional accuracy

Relative positional accuracy describes the degree to which the position of features in a geographic database reflects their true ground relationships.

For the National Geographic Database, relative positional accuracy is important. A road must appear in the its proper position relative to other roads and physical features.

## Attribute accuracy

Attribute accuracy refers to the accuracy of quantitative attributes and the correctness of non-quantitative attributes. No explicit testing for attribute accuracy is done; however, results from internal operations suggest a high degree of accuracy.

Data entry during maintenance operations includes a data control process to ensure that attributes are properly associated to a specific geometric feature. This includes the association, as well as its accuracy.

As noted under the "Lineage" section, the attributes (names, types and unique identifiers) of all standard geographic areas are sourced from Statistics Canada's Spatial Data Infrastructure. The names and types of administrative standard geographic areas are updated using source materials from provincial, territorial and municipal authorities.

The class attribute is not updated on a regular basis; as such, quality checks are not performed to verify its accuracy.

## Logical consistency

Logical consistency describes the fidelity of relationships encoded in the structure of the digital spatial data. For example, a street arc that does not have a street name should not have a street type.

The 2016 Census Road Network File was verified against data in the Spatial Data Infrastructure and found to be logically consistent.

## Consistency with other products

The position of the arcs in the 2016 Census Road Network File is not necessarily consistent with previous editions of boundary files or road network files as a result of updates made using provincially and territorially sourced data.

Topology checks were performed with the 2016 Census Road Network File and the 2016 Census Boundary Files to measure the degree of integration in these products. The results indicated that the degree of integration was within the default tolerance parameters, as defined below:

- Tolerance: 0.001 metres
- Resolution: 0.0001 metres.

## Completeness

Completeness refers to the degree to which geographic features, their attributes and their relationships are included or omitted in a data set. It also includes information on selection criteria, definitions used, and other relevant mapping rules.

New road features have been added to the National Geographic Database to create a more complete road layer and are present in this edition of the Road Network File.

**Table 5.1**
**Number of road features in the 2016 Census Road Network File**

| National level | Number of arcs | Arc length (kilometres) |
|---|---|---|
| Named, Full Address Range on At Least One Side | 1,284,738 | 503,285 |
| Named | 1,857,608 | 777,955 |
| Not Named | 305,450 | 379,995 |
| Canada | 2,163,058 | 1,157,951 |

**Note:** arc length was calculated in Lambert conformal conic projection.

## Appendices

See definitions of the geography universe from the *Dictionary, Census of Population, 2016* http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/index-eng.cfm.

See Figure 1.1 Hierarchy of standard geographic areas for dissemination, 2016 Census http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/figures/f1_1-eng.cfm in the *Dictionary, Census of Population, 2016*.

See Table 1.1 Geographic areas by province and territory, 2016 Census http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/tab/t1_1-eng.cfm in the *Dictionary, Census of Population, 2016*.

See Table 1.5 Census subdivision types by province and territory http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/tab/t1_5-eng.cfm, 2016 Census in the *Dictionary, Census of Population, 2016*.