Design Manual for Roads and Bridges

General Principles and Scheme Governance
General information

GG 184
Specification for the use of Computer Aided Design

(formerly IAN 184/16)

Revision 0

Summary
This document contains specifications for the use of Computer Aided Design (CAD). It defines methods for managing the production, distribution and quality of construction information using CAD systems, through a disciplined process for collaboration and a specified naming convention.

Application by Overseeing Organisations
Any specific requirements for Overseeing Organisations alternative or supplementary to those given in this document are given in National Application Annexes to this document.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Highways England team. The email address for all enquiries and feedback is: Standards_Enquiries@highwaysengland.co.uk

This is a controlled document.

Contents

Release notes

Version	Date	Details of amendments
0	Feb 2020	GG 184 replaces IAN 184/16. This full document has been re-written to make it compliant with the new Highways England drafting rules.

Foreword

Publishing information

This document is published by Highways England.

This document supersedes IAN 184/16 which is withdrawn.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

Introduction

Background

This document represents the Overseeing Organisations' specifications for the use of Computer Aided Design (CAD) in compliance with BS EN ISO 19650 [Ref 6.N]. The ISO establishes the methodology for organisation and digitisation of information about buildings and civil engineering works, including Building Information Modelling (BIM). This document defines methods for managing the production, distribution and quality of construction information using CAD systems, through a disciplined process for collaboration, naming and modelling practice.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 4.N] apply to this document.

Abbreviations

Abbreviations

Abbreviation	Definition
AIR	Asset Information Requirements
BIM	Building Information Modelling
BS	British Standard
CAD	Computer Aided Design
EIR	Exchange or Employer's Information Requirements
GIS	Geographic Information System
ISO	International Organisation for Standardisation
NBS	National Building Specification
OS	Ordnance Survey
PDF	Portable Document Format
XML	eXtensible Markup Language

Terms and definitions

Terms and definitions

Term	Definition
Asset class	An asset class is a categorisation of infrastructure assets for asset management purposes. Typical classes for highways management include pavement, structures, drainage, geotechnical, and technology.
Asset information requirements	Information requirements in relation to the operation of an asset.
Component	A component is a construction product.
Computer Aided Design	Computer Aided Design (CAD) software is used by architects, engineers, designers and others to create precision drawings or technical illustrations. NOTE: CAD software can be used to create two-dimensional (2-D) drawings or three-dimensional (3-D) models.
Geographic Information System	A Geographic Information system (GIS) is a system designed to capture, store, manipulate, analyse, manage, and present all types of spatial or geographical data.
Information container	Named persistent set of information retrievable from within a file, system or application storage hierarchy. Structured information containers include geometrical models, schedules and databases. Unstructured information containers include documentation, video clips and sound recordings.
Information model	Model comprising: documentation, non-graphical information and graphical information.
Layer	A layer is a generic grouping functionality in a CAD or GIS system. NOTE: Documents or maps can be organised by assigning objects to layers according to logical categories.
Metadata	Metadata are attributes assigned to each information container in the project's common data environment.
Topographic survey	A topographic survey is a survey that gathers data about the elevation of points on a piece of land. The purpose of a topgraphic survey is to collect data about the natural and man-made features of the land, as well as its elevations.
Transmittal	A brief note sent with a document to explain the contents of that document.

1. Scope

Aspects covered

1.1 This document represents the specifications for the use of Computer Aided Design (CAD), the naming conventions, file formats and coding requirements for producing survey, design, construction and asset-related data, including geometrical and non-geometrical data and documentation, that shall be delivered from the options, development and construction phases of infrastructure projects.

NOTE *This document provides for continuity of information through stages and between parties, enabling efficient and effective generation of asset-related data from project inception into operation. However, it does not cover exchange of data into the Overseeing Organisations' asset management systems.*

1.2 This specification shall apply to all projects irrespective of scope and size.

1.3 The information delivery plan shall acknowledge the specification contained herein.

1.4 The information delivery plan shall be issued to the Overseeing Organisation for acceptance, in accordance with the contractual requirements.

1.5 The information delivery plan shall commit to delivery of information and data in accordance with this document.

Implementation

1.6 This document shall be implemented forthwith on all schemes on the Overseeing Organisations' motorway and all-purpose trunk roads according to the implementation requirements of GG 101 [Ref 4.N].

Use of GG 101

1.7 The requirements contained in GG 101 [Ref 4.N] shall be followed in respect of activities covered by this document.

2. Information container and metadata

Information container and model

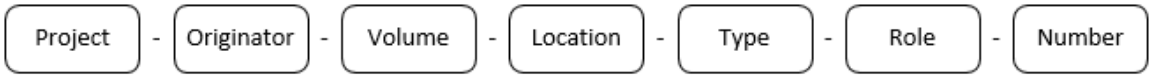
2.1 All CAD derived information containers or models created, exchanged or delivered shall use the following naming convention in accordance with BS EN ISO 19650 [Ref 6.N].

2.1.1 Information containers that are not specific to the project under consideration, and which have well recognised naming conventions, should not follow this specification.

NOTE *Examples of information containers that need not follow this specification include tiled Ordnance Survey vector or raster mapping, files from adjacent or other infrastructure projects, or third-party records that are named in accordance with BS 1192 [Ref 1.N] or BS EN ISO 19650 [Ref 6.N].*

2.2 Information containers shall be named in accordance with Figure 2.2.

Figure 2.2 Naming convention



2.3 The project field shall be selected in accordance with the relevant National Application Annex.

2.4 The originator field shall be selected in accordance with the relevant National Application Annex.

2.5 The volume field shall be selected from those given in Appendix A.

2.6 An illustrated location strategy shall be proposed as part of the information delivery plan, for the approval of the Overseeing Organisation.

2.6.1 The field length for the location code should be as short and concise as possible and not exceed 16 characters.

2.6.2 Guidance given in Appendix B should be used to define the location field.

2.7 A list of document types shall be proposed as part of the information delivery plan, for the approval of the Overseeing Organisation.

2.7.1 The type field representing the document type may be selected from either the fixed list in BS EN ISO 19650 [Ref 6.N] Part 2, UK National Annex, or one of the additional codes given in Appendix C.

2.8 A list of document roles shall be proposed as part of the information delivery plan, for the approval of the Overseeing Organisation.

2.8.1 The role field may be either a single character from the fixed list in BS EN ISO 19650 [Ref 6.N] (Part 2, UK National Annex), or one of the two-character codes defined in Appendix D.

2.9 The number field holds no significance, but shall be selected to give a unique file name.

2.9.1 Each project should fix a consistent length for the number field from 4 to 6 digits, using leading zeros where necessary.

2.9.2 Blocks of numbers may be allocated or generated as needed.

Delimiters

2.10 Table 2.10 lists the permitted unicode references that shall be used as delimiters.

Table 2.10 Unicode references

Character name	Unicode code point
Hyphen Minus	U+002D
Underscore Low Line	U+005F

2.11 Fields shall be separated by a hyphen minus.

2.12 Within a field, where a separator is needed, the underscore low line character shall be used.

File extension

2.13 The file extension shall be determined by the relevant software.

Metadata

2.14 Metadata shall be provided for all files.

NOTE *Metadata is a set of data that describes and gives information about other data. It can help manage a file, such as when it was created and revised, file type and other technical information.*

2.14.1 Other metadata or other fields not described in this section may be used and include units, coordinate reference system, scale, sheet size (A1, A2, A3 etc.).

2.15 A drawing title shall be provided.

2.16 An information container / file description shall be provided to describe the contents of the file.

2.17 A revision code shall be provided in accordance with BS EN ISO 19650 [Ref 6.N] Part 2, UK National Annex.

2.18 A status code shall be provided in accordance with BS EN ISO 19650 [Ref 6.N] Part 2, UK National Annex.

2.19 A state code shall be given, either "Preliminary" or "Construction".

2.20 The date of issue shall be provided in accordance with BS ISO 8601 [Ref 2.N].

2.21 The project stage (or design fix) shall be provided as detailed in the National Application Annex.

3. Information exchange

3.1 Information containers / files shall be exchanged in accordance with the project's contractual requirements.

3.2 Information containers / files shall be delivered in an immutable read-only file format, and in their native file format, with any accompanying reference files.

NOTE 1 Immutable file formats are regarded as the primary deliverable in contractual situations. They are regarded as more secure, they are readable by a wider variety of applications on more platforms, and are less prone to obsolescence through withdrawal of support for software. Native files give added value through their ability to be reused and referenced by other disciplines. The combination of immutable and native file formats provides sufficient security to demonstrate that contractual deliverables have been met while also helping to ensure that information is reusable.

NOTE 2 While no file format can be deemed to be completely immutable, Portable Document Format (PDF) files created in accordance with ISO 32000 [Ref 3.N] can be considered sufficiently secure so as not to be easily changed.

NOTE 3 Files created in open formats can be opened with either free or paid-for software. This means they can be read and used by more people, they help people to share work more easily, and make it easier and cheaper to do business with government.

3.3 Files shall be delivered according to a set of commonly used formats.

NOTE A set of commonly used open and proprietary file formats is found in Appendix E.

3.4 Where non-common file formats are proposed for use, approval shall be sought from the Overseeing Organisation.

NOTE No limitation is imposed by this document on the software used.

3.5 A licence in perpetuity shall be permitted to the Overseeing Organisation to view and/or use any information supplied under the contract.

3.6 Where the native file format is less than 2 years old, approval shall be sought from the Overseeing Organisation to use it.

3.7 Software dependencies related to 3rd-party add-on products or vendors' layered products shall be declared in the transmittal information.

Transmittal

3.8 A transmittal document shall describe all files being transmitted as part of each exchange of data.

3.9 The transmittal document shall tabulate at least the following file name and metadata:

1) file name;
2) drawing title;
3) file description;
4) revision code;
5) status code;
6) date issued;
7) project stage;
8) warning to open read-only if dependent software unavailable.

3.10 The text in the transmittal shall be machine-readable, i.e. capable of being copied as characters, not solely as an image.

4. Model and drawing files

Introduction

4.1 CAD models and drawing files shall, where appropriate, be 3D, with embedded, associated or linked data, and be capable of interrogation and analysis by digital processes.

NOTE *CAD models and drawing files are no longer intended purely for interpretation by the human eye. Working to this document ensures that information can be generated consistently, effectively and efficiently from CAD models.*

4.2 Design management systems shall include the following key elements to enable generation of accurate asset-related data that can be validated and verified:

1) named containers (file names);
2) classification (layer names);
3) unique identification;
4) standard component names;
5) asset information requirements (AIR);
6) adherence to modelling rules and principles;
7) adherence to CAD composition and presentation rules and guidance.

Named containers (file names)

4.3 Files shall be named according to the specifications in Section 2.

Classification (layer names)

4.4 Layers within CAD files shall use the naming convention given in Section 4 in accordance with BS EN ISO 13567 [Ref 7.N], Section 6 mandatory fields and the optional clause 7.7.

NOTE *The term "layer" here indicates generic grouping functionality in the chosen CAD system.*

4.5 Layers shall be named in accordance with Figure 4.5.

Figure 4.5 Layer convention

4.5.1 The terms and translations given in Table 4.5.1 should be used.

Table 4.5.1 Terms used in ISO 13567

Term used	Term used in BS EN ISO 13567
Role	Agent (see sub-clause 6.1)
Classification	Element (see sub-clause 6.2)
Presentation	Presentation (see sub-clause 6.3)
Description	User Defined (see sub-clause 7.7)

4.6 The role field shall be either a single character from the fixed list in BS EN ISO 19650 [Ref 6.N], Part 2, UK National Annex, or one of the two-character codes defined in Appendix D.

4.7 The classification field shall be based on the Uniclass 2015 classification system from the National Building Specification (NBS).

4.7.1 Uniclass 2015 is a dynamic classification and users should be aware of the changing nature of the system.

NOTE *Uniclass is the UK implementation of ISO 12006-2 [Ref 1.I] Building construction -- Organisation of information about construction works -- Part 2: Framework for classification.*

4.7.2 For option/feasibility stages, the classification field should be taken from the tables Entities (En), Elements / Functions (EF) or Spaces / Locations (SL).

4.7.3 For development, detailed design and construction stages, the classification field should be taken from the tables Systems (Ss), Products (Pr) or Construction Aids (CA).

4.7.4 The table for CAD (Zz) in the NBS should be used to select the classification field for all drawing-related matters at all project stages.

4.8 The presentation field shall be selected from BS EN ISO 13567 [Ref 7.N].

4.9 The description field shall give a clear and concise explanation of the Uniclass2015 using CamelCase.

4.9.1 Consistency should be applied in the descriptive text used, through the use of template / seed files appropriate to each discipline.

NOTE 1 *Although Uniclass permits underscores, ISO 13567-2 [Ref 8.N] sub-clause 6.2 stipulates a maximum of six alphanumeric characters, and the underscore and hyphens are used for other purposes. For purposes of this specification, therefore, underscores are not used within the classification field.*

NOTE 2 *Examples:*

1) D-Co3265-M-NaturalAreas

2) CH-EF3060-P-Pavements

NOTE 3 *The full text descriptions from the NBS table are often unsuitable, as these can be long and can contain punctuation characters.*

4.10 Where it is necessary to distinguish between different types or configurations of items or assets that fall under the same classification code, an additional options field shall be appended to the description.

4.11 Where options are appended to the description, they shall be in the form of Figure 4.11.

Figure 4.11 Options appended to description

4.11.1 Where an 'OptionName' is given with no 'OptionValue', that value should default to Boolean TRUE.

NOTE *Options can be interpreted by software to turn polylines into schedules, quantities, 3D models etc. This document does not limit or dictate how any optional information is used, but clarity is encouraged.*

Unique identification of assets

4.12 Unique identifiers, other than the internal identifiers of the CAD system, shall be assigned to each component.

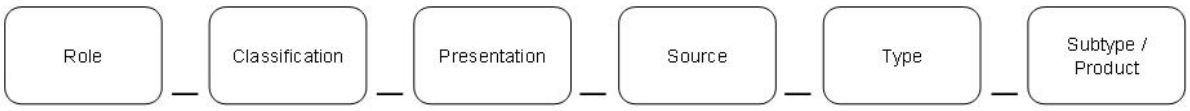
NOTE *See the National Application Annex for specific requirements.*

Standard component names

4.13 Components designed for multiple use such as blocks, cells, within or across multiple projects, shall be named in accordance with BS 8541-1 [Ref 5.N].

4.14 The names of components shall adopt the convention of Figure 4.14.

Figure 4.14 Component names



4.15 The component name shall use the underscore character between fields.

4.16 The role field shall be selected from Appendix D.

4.17 The classification field shall be based on Uniclass 2015.

4.18 The presentation field shall be either M2 or M3.

4.19 The source field shall be the originator field as defined in the National Application Annex.

4.20 The type field shall be a short CamelCase description.

4.21 The subtype field shall be a unique 4-digit number.

Asset information requirements

4.22 The CAD models and drawing files shall contain, or be linked to databases that hold, the properties of the assets as required by Overseeing Organisation's AIR.

4.23 Each file shall contain only one asset class.

4.23.1 A single asset class for a project may be spread across multiple files, provided that there is no duplication.

Modelling rules and principles

4.24 Interoperability issues shall be resolved at project outset to ensure consistent appearance of CAD elements (e.g. line type/styles, text, dimensions, hatching, etc.) when translating between software packages.

4.24.1 The following guidelines for AutoCAD/MicroStation should be adopted:

1) use the native MicroStation line styles and AutoCAD line types where possible;
2) when editing AutoCAD files in MicroStation, use the line types that import with the drawing;
3) when editing AutoCAD files converted from MicroStation, use the line styles that import with the drawing;
4) note that the AutoCAD annotative functionality does not translate to MicroStation.

4.24.2 The guidelines for AutoCAD/MicroStation should also apply to presentation from other systems.

4.25 The level of detail suitable for the project shall be proposed within the information delivery plan.

NOTE *The accuracy and completeness of the 3D modelling needs to be appropriate to the stage of the project and the intended use of the model.*

4.26 Where both 3D and 2D representations are required, the 2D representation shall be derived automatically from the 3D representation.

4.27 Point assets shall be represented by dimensionally correct 3D components.

4.27.1 Point assets may be represented by 2D symbols where the true size of the component can be overlooked on the finished drawing.

4.28 The insertion point and axes of such components and symbols shall be meaningful and logical in the context of that object's purpose on the project.

4.29 Construction, reference or spine lines for each continuous asset shall be created and supplied, either as geographic vector file formats, or as 3D polylines / linestrings on layers that comply with the requirements of this document.

NOTE *The creation of construction, reference or spine lines for each continuous asset can support exchange to survey equipment for setting out.*

4.30 Linear assets such as safety barrier beams or rails and posts, shall be represented by spatially correct 3D components.

4.30.1 Linear assets may be represented by 2D line styles where the true size of the component can be confusing in a plan view at larger scales.

4.30.2 Where the approach uses line styles to depict assets such as utilities, their exclusion zones should also be depicted.

4.30.3 The "spine" line of any extrusion should be in a meaningful and logical position on the cross section.

4.30.4 The position of the spine should be clearly marked on an accompanying file / drawing.

NOTE 1 *It is acceptable to model thin components as extruded profiles.*

NOTE 2 *CAD entities that bound or enclose 3D space are preferred to wire-line representations. Entities such as solids and "watertight" (topologically closed) meshes have intrinsic properties of volume. These, along with other meshes, surfaces and faces, have surface area. Some extruded shapes can have readily found length and cross-sectional area. Adopting these kinds of entities for the components of the design can facilitate time and cost modelling.*

CAD composition and presentation rules and guidance

4.31 Drawing rendition files shall compose the necessary reference files, frames and notes to achieve the required contractual deliverable.

4.31.1 Drawing rendition files should not contain more than one drawing (i.e. multiple tabs are not permitted), so that management and version control are not compromised.

4.31.2 Drawing sheet files should not be attached as reference files, except where the capabilities of the CAD system make this unavoidable, for example vertical profiles, developed elevations etc.

4.32 Model files shall not retain references to other model drawings used during development when shared or used by drawing renditions.

4.32.1 For convenience, otherwise empty arrangement drawings may be saved with assemblies of reference files such as survey tiles.

NOTE *The otherwise empty arrangement drawings can thus be attached in a single command.*

4.33 Drawing rendition files shall attach model files (types M3 and M2) on dedicated layers, one for unclipped content and one for each clip boundary such as cut lines.

4.34 Model files (types M3 and M2) shall be attached in model space.

Drawing frame and title blocks

4.35 Drawing frames, title and revision blocks etc. shall be attached in paper space.

4.36 Title blocks shall contain the minimum information shown in Table 4.36.

Table 4.36 Title block content

Metadata	Description
Client	Name of the Overseeing Organisation
Number	Named container number in accordance with this specification
Title	A simple, short title for the container
Status	In accordance with this document
State	In accordance with this document
Revision	In accordance with this document
Project title	The clients given title for the project
Originator / supplier project reference number	In accordance with this document
Originator / supplier details	In accordance with this document
Scale	In accordance with this document
Original size	Paper size of the drawing rendition (A0, A1 etc)
Date of issue	Date the drawing was issued
Project stage or design fix	In accordance with the National Application Annex.

4.36.1 Title blocks should follow the example layout shown in Figure 4.36.1.

Figure 4.36.1 Sample title block layout

Scales

4.37 Plans, details, sections and elevations shall clearly indicate the scale to which they are drawn.

4.38 The scale field within the title block shall be populated to show the scale of drawn elements.

4.38.1 Scale bars should be included to assist stakeholders.

4.38.2 Scales should be selected from those in Table 4.38.2.

Table 4.38.2 Permitted drawing scales

1:1	1:10	1:100	1:1,000	1:10,000	1:100,000
-	-	1:125	1:1,250	1:12,500	1:125,000
1:2	1:20	1:200	1:2,000	1:20,000	1:200,000
-	1:25	1:250	1:2,500	1:25,000	1:250,000
1:5	1:50	1:500	1:5,000	1:50,000	1:500,000

4.38.3 Where historic maps (such as OS County Series 1:10,560) are required for illustrating a historical context, they should not be used on drawings of proposed works.

4.38.4 The number of scales used on a drawing should be kept to a minimum.

4.38.5 On multi-disciplinary projects, wherever practical the adopted scale should be the same for similar areas covered across all disciplines.

4.39 Where a scale is not relevant to the drawing sheet, the scale texts in Table 4.39 shall be used.

Table 4.39 Permitted scale texts if not relevant to drawing

Scale text	Usage
As shown	Multiple scale drawings (show scale with the detail title), non- standard scales.
NTS	Not to scale. Schematic views etc.
N/A	Not applicable. Standard notes drawing, schedules etc.

Revision and cloud marks

4.40 Changes between revisions of models and drawings shall be indicated though a reference accompanied by clouding and listed and described on the title blocks revision section.

4.41 As-built drawings shall contain no clouding.

Text

4.42 Arial font shall be used for all annotation.

4.43 The text sizes indicated in Table 4.43 shall be adopted.

Table 4.43 Text sizes

Plotted height (mm) (at full size)	Purpose
1.8	A4 & A3 sketches
2.5	General annotation, labels and dimensions
3.5	More prominent notes, labels, dimensions and minor headings
5.0	Headings, titles and grid text
7.0	Larger headings

4.44 The text width factor shall be 1.

4.44.1 Line spacing for interoperability should be:

1) AutoCAD = 1.0x (default);
2) MicroStation = 0.667.

4.45 Justification shall be left centre.

4.46 The text case adopted shall be used consistently across a project.

4.47 Abbreviations for SI units shall be presented using the appropriate case.

4.47.1 UPPER CASE is preferred and should be used for all annotation, titles and labels however sentence case is permitted.

4.47.2 Text should not obscure content.

4.47.3 Text should be legible when printed at reduced size (e.g. A1 to A3).

Dimensions and leaders

4.48 Filled 2.5mm arrow heads shall be used.

4.49 Text justification shall be above and centred (default).

4.50 Dimension line weight shall be set to 0.18mm.

4.51 Dimension text height shall be consistent with general text height.

4.52 Dimensions shall be created using the software application dimensioning tools.

4.53 Dimensions styles and text heights shall be consistent across a set of drawings.

4.54 Dimensions shall be legible when printed at reduced size (e.g. A1 to A3).

4.55 Dimensions shall be associative without dimension overrides.

4.56 Dimensions shall be annotative (AutoCAD) or annotation scale (MS).

4.57 Dimensions shall reside on one or more dedicated layers.

4.58 Multileaders shall be used (annotative AutoCAD).

4.59 All text shall be left justified.

4.60 Landing shall be set to the middle of the top line.

4.61 Filled 2.5mm arrow heads shall be used for point accuracy.

4.62 Filled dot 2.5 mm shall be used to indicate areas.

Line types

4.63 Line types shall be defined by layer.

4.63.1 Standard line types and styles provided by the CAD system should be used.

NOTE *Where these are not suitable, additional custom line types can be defined and shared with project parties.*

4.64 Element line type designation shall be determined at project outset, documented in the information delivery plan and used consistently across a project.

4.65 The line types, styles and settings in Tables 4.65a - 4.65d shall be used with the corresponding software.

Table 4.65a AutoCAD line types

ACADISO.linLine Type	
Continuous	
Dot	Dot2
Hidden	Hidden2
Dashed	Dashed2
Dashdot	Dashdot2
Divide	Divide2
Center	Center2
Border	Border2
Phantom	Phantom2

Table 4.65b MicroStation Line Styles

lstyle.rsc Line Style	Description
0	Continuous
1	Dot
2	Medium dash
3	Long dash
4	Dot, dash
5	Short dash
6	Dash, dot, dot
7	Long dash, short dash

Table 4.65c AutoCAD Line Type Settings

	LTSCALE	PSLTSCALE
Element	1	
Model Space	Finished drawing scale e.g. 500	n/a
Paper Space	1	1

Table 4.65d MicroStation Custom Line Style Settings

Global line style scale	Finished drawing scale e.g. 500
Reference: global line style scale	Master
References: scale line styles by reference scale	On

Line weights and colours

4.66 Plotted line widths shall be 0.05mm; 0.13mm; 0.18mm; 0.25mm; 0.35mm; 0.5mm; 0.7mm; 1.0mm; 1.4mm; or 2.0mm.

4.66.1 Line weights should be set by layer rather than by element.

4.67 Pen widths shall be set by object line weight, not by pen table.

4.68 Colours 0 to 9 inclusive shall plot as black lines.

4.69 Colours other than 0 to 9 shall plot in monochrome or their drawn colour according to the chosen plot settings.

Hatching and shading

4.70 Hatching and shading shall be kept to the minimum necessary to define areas and types clearly.

4.70.1 Only patches of the material hatch pattern sufficient to clearly show the intent of the hatching should be shown.

NOTE *Using patches of the material hatch pattern can keep CAD file sizes down.*

4.70.2 Default patterns should be used where possible.

4.70.3 Custom hatch patterns may be used where necessary.

4.71 Hatching shall be consistent across a project for the same element designation.

4.72 Hatching/patterning shall be created using the relevant tools available within the software.

4.73 Draw order and transparency settings of filled regions shall not cover required graphical information.

4.74 All hatching shall be associative and annotative.

4.75 All hatching shall reside on dedicated layers to allow easy control of visibility.

4.76 All hatching shall reside in model space / design view.

4.77 Each hatched area shall be defined as a single hatched entity and not grouped with other hatched areas.

4.78 For large regions of hatching and zoning, a separate model drawing shall be created to aid drawing update order and speed of display (e.g. landscaping, zoning and staging drawings).

Background mapping and copyright

4.79 Where background mapping data products are used (Ordnance Survey or otherwise) in drawings, the appropriate copyright acknowledgements shall be included.

NOTE *For further guidance, see the information on the Ordnance Survey website OSCA [Ref 2.I].*

5. Associated data

5.1 Attribute data for asset classes shall be supplied in the form of asset data files.

NOTE *Common file formats are given in Appendix E.*

5.2 Attribute data for any asset shall comply with the field names, formats and domains defined in the National Application Annex.

5.3 Associated data or schedule information shall be prepared in database-ready form.

NOTE *Database-ready form means that properties for each component are included as single-line records.*

5.4 The property names shall be the column titles, starting with the unique identifiers in the first column.

6. Survey data

Survey specifications

6.1 Survey specifications (including standards, grid or mapping, areas, routes, hazards, landowners affected, survey procedures, instrumentation, monitoring, accuracy requirements, post-processing requirements etc.) shall be defined in the survey requirements.

Topographic survey data

6.2 Topographic surveys shall be delivered as 3D CAD model files in accordance with the provisions of this document.

6.3 Unless otherwise specified, symbols and annotation in topographic survey drawings shall be suitable for presentation at 1:500 scale.

6.4 Where the objects surveyed extend up or down from ground level, separate layers shall be provided for the ground level lines and the other vertical extent.

NOTE *For example, the tops of walls, fences, ditches will be in separate layers from their bases.*

6.5 Features at ground level shall not cross except at a common point.

6.6 Features at ground level shall not be continuous across bridge decks.

6.7 Features at ground level shall stop and restart at the ends of the bridge deck.

6.8 Features that represent closed boundaries shall be geometrically closed.

6.9 Property information relating to point assets (spot levels, references etc.) shall be provided as linked attributes, not as unrelated text.

NOTE *Within AutoCAD the association is achieved through attributed blocks, and within Bentley MicroStation through tags.*

6.10 Asset codes shall be as defined by the Overseeing Organisation.

7. Coordinate systems

7.1 All data shall be supplied in accordance with the requirements for units, coordinate systems, projections and datums as defined by the Overseeing Organisation.

8. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	BSI. BS 1192, 'Collaborative production of architectural, engineering and construction information'
Ref 2.N	BSI. BS ISO 8601, 'Data elements and interchange formats. Information interchange. Representation of dates and times.'
Ref 3.N	ISO. ISO 32000, 'Document management -- Portable document format'
Ref 4.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 5.N	BSI. BS 8541-1, 'Library objects for architecture, engineering and construction. Identification and classification. Code of practice.'
Ref 6.N	BSI. BS EN ISO 19650, 'Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) - Information management using building information modelling'
Ref 7.N	BSI. BS EN ISO 13567, 'Technical product documentation - Organization and naming of layers for CAD'
Ref 8.N	International Organization for Standardization. ISO 13567-2, 'Technical product documentation — Organization and naming of layers for CAD — Part 2: Concepts, format and codes used in construction documentation'

9. Informative references

The following documents are informative references for this document and provide supporting information.

Ref 1.I	ISO. ISO 12006-2, 'Building construction -- Organisation of information about construction works -- Part 2: Framework for classification'
Ref 2.I	Ordanance Survey. OSCA, 'https://www.ordnancesurvey.co.uk/business-and-government/help-and-support/public-sector/copyright-acknowledgements.html'

Appendix A. Volume codes

Table A.1 contains volume codes.

Table A.1 Volume codes

Category	Code	Purpose
General	GEN	Scheme-wide generic information
	GHS	Health and Safety
Highways	HAC	Highway Approvals & Consents
	HAW	Accommodation Works
	HDG	Drainage
	HEL	Power / Electrical
	HFE	Fencing
	HGT	Geotechnical
	HGN	General
	HKF	Kerbs, Footways and Paved Areas
	HLG	Road Lighting
	HMC	Motorway Communications
	HMK	Road Markings
	HML	Mainline Geometric Layout
	HPV	Road Pavements
	HRR	Road Restraint System (Vehicle and Pedestrian)
	HSC	Site Clearance
	HSL	Traffic Signals
	HSN	Traffic Signs
	HSR	Side Roads Geometric Layout
Structures	SBR	Bridges and Major Culverts
	SGN	General
	SGT	Geotechnical
	SGY	Gantries
	SMA	Masts
	SMN	Minor Structures and Culverts
	SRW	Retaining Walls
	SSP	Special structures
	STU	Tunnels
Environment	EAC	Environmental Approvals & Consents
	EAQ	Air Quality
	EBD	Biodiversity
	EGN	General

Table A.1 Volume codes (continued)

Category	Code	Purpose
	EGT	Geology and Soils
	EHR	Heritage/Historic resources
	ELS	Landscape
	ENM	Non-Motorised Users
	ENV	Noise & Vibration
	ETS	Townscape
	EWE	Water Environment
Survey	VAB	Asbestos survey
	VAS	Accident Statistics
	VDS	Drainage Survey
	VES	Environmental survey
	VGN	Survey General
	VGT	Geotechnical Investigation
	VNR	National Road Telecommunications Services (NRTS)
	VPS	Pavement Systems
	VSM	Structures management
	VSS	Stakeholder Surveys
	VTO	Topographical
	VTR	Traffic Survey
	VUT	Utilities
Legal	LDC	Development Consent Order
	LLO	Land Ownership Boundaries
	LSI	Statutory Instruments
Temporary	TTM	Traffic management
	TTW	Temporary works

Appendix B. Location code guidance

The Location field of information containers / file names is flexible in order to accommodate the variety of disciplines and type of project. It may indicate a specific structure on a project, or a position along the route.

The general form is optional letters followed by an integer numeral.

The order of the tables does not convey a hierarchy or preference.

B1 Buildings

To be used for the asset management or construction of a building, from BS EN ISO 19650 [Ref 6.N] UK National Annex.

Table B.1 Buildings

Code	Description
ZZ	multiple levels/locations
XX	no level/location applicable
00	base level
01	level 01
02	level 02
M1	mezzanine above level 01
M2	mezzanine above level 02, etc.
B1	basement level 1

B2 Existing network

The following options should be considered when developing the volume and location strategy for work / schemes on the existing network.

B2.1 Section or Network reference

The following codes are examples only. An underscore '_' may replace a slash ' / ' which is present in the Overseeing Organisation's Network Referencing System.

Table B.2 Network reference

Code	Description
A30	Roadnumber or Roa_number
A308M	Roadnumber or Roa_number
0600A556_110	Section Label or Sect_Label
0600M53_156	Section Label or Sect_Label

B2.2 Structures key

There is an option to utilise the key or the number.

Example structure key and numbers shown. An underscore '_' may replace a slash ' / ' which is present in the Overseeing Organisation's asset or structures management systems.

Table B.3 Structures key or number

Key	Number	Description
32720	A556_25.90	Green / Accommodation Over bridge
33039	A556_28.6_R1	Retaining Wall
33620	A556_23.7_S1	MS4 Cantilever Gantry

B2.3 Direction

Table B.4 Directions

Code	Description
NB	North bound
SB	South bound
CW	Clockwise
EB	East bound
WB	West bound

B2.4 Other asset identifiers

Table B.5 Asset identifiers

Code	Description
5WA21P	Unique on-site identification label
SJ7282_1706a	Unique asset reference

Examples from various asset management systems. This type of location code should only be used when the works specifically relate to that asset.

B3 New works

The following options should be considered when developing volume and location strategy for new works / schemes or where the new section reference has not yet been determined.

B3.1 Location type

Table B.6 Location type

Code	Description
Linear asset	
ML	Mainline
SR	Side or Slip Road
Individual asset	
S	A structure
B	A bridge
G	A gantry
R	A retaining wall or similar

B3.2 Direction

Table B.7 Direction

Code	Description
A	Carriageway A, typically North bound
B	Carriageway B, typically South bound
C or CR	Central Reservation
Z or ZZ	Entire carriageway
J	Carriageway A off slip
K	Carriageway A on slip
L	Carriageway B off slip
M	Carriageway B on slip

B3.3 Section identifier

Table B.8 Section identifier

Code	Description
S1	Section 1, junction 1 to junction 2
S2	Section 2, junction 2 to junction n
L1	Link 1, chainage 0100 to chainage 1500*
L2	Link 2, chainage 1500 to chainage 3400*
J1	New junction number 1
J2	New junction number 2

*Numbers are for illustrative purposes only.

B4 Combinations

The options above can be used in multiple combinations with a sequential integer numeral, to suit the size and complexity of the project.

Table B.9 Numeral

Code	Description
01	First
02	Second
03	Third
04	Forth
etc	
10	Tenth

B4.1 Examples

The options above can be used in multiple combinations, to suit the size and complexity of the project.

Consider the need for an underscore '_' to separate parts of the code to aide clarity, however keeping the field as short as possible.

Table B.10 Example combinations

Code	Description
ML01	Type+Numeral - First Mainline reference
SR02	Type+Numeral - Second side road
S03	Type+Sequential - Third Structure
G04	Type+Sequential - Forth Gantry
A308_01	Road Number+Sequential

Appendix C. Type codes

The type field of file names can comprise the codes listed in the following tables:

Table C.1 Type codes for drawings and models

Code	Type	Description
AF	Animation File	Video file based on a model.
CM	Combined Model	A series of individual / discipline models federated together to view an entire project as a whole.
DE	Detail Drawing	Standard detail drawings and content not included in the model.
DR	Drawing	Drawing rendition, created solely to be printed either to PDF or paper, drawing templates etc. DR should be used for any drawing where a drawing frame is used.
M2	Two dimensional model	Typically used as a reference, contents are 2D only.
M3	Three dimensional model	Typically used as a reference, contents are 3D only.
MR	Model Rendition	Published 3D model file, typically consumed into the combined model.
SC	Schematic	Model based on chainage, e.g. for communications drawings.
SK	Sketch	Typically, singular plan/section, not for client approval.
SU	Survey	Topographical, structural inspection, environmental, socio-economic, geotechnical investigation, coring investigations, materials investigation, condition.
VS	Visualisation	Typically, a photo rendering/montage based on a model.

Table C.2 Type codes for documents

Code	Type	Description
BQ	Bill of Quantities	Bill of Quantities (used by commercial function only)
CA	Calculation(s)	Structural, calculations, hydraulic or similar calculations
DT	Document Transmittal Note	Correspondence management

Appendix D. Role codes

The role field can comprise the codes listed in the BS EN ISO 19650 [Ref 6.N] UK National Annex and if required supplement with the following table:

Table D.1 Role codes

Code	Role
AX	Architectural – General
CB	Civil – Bridges and Structures
CD	Civil – Drainage
CE	Civil – Earthworks
CH	Civil – Highways
CT	Civil – Tunnels
CU	Civil – Utilities
CW	Civil – Temporary Works
EC	Electrical – Control Systems and Technology
EO	Lighting Engineer
GI	Geotechnical Investigation
KK	Client
LA	Landscape and Environment – Air and Noise
LE	Landscape and Environment – Environmentalist
LH	Landscape and Environment – Heritage
LS	Landscape and Environment - Architecture
QS	Quantity Surveyor
TP	Town Planner
TR	Civil – Traffic Modelling
TS	Traffic Signals
VT	Geographical/Geospatial and Land Surveyor
WM	Contractors – Main Contractor
XX	Subcontractor
ZC	Commercial and Cost Management
ZH	Stakeholder Liaison
ZL	Legal
ZM	Project Management
ZQ	Quality Assurance
ZS	Health & Safety / CDM

Appendix E. File formats

The allowable format should not constrain or prohibit the authoring organisation's ability to chose the appropriate tool for creating data. However methods for ongoing interoperability over the whole asset lifecycle should be considered when preparing files for exchange.

E1 CAD file formats

E1.1 Proprietary formats

Typical file formats include the native file formats of vendors such as Autodesk and Bentley. Other vendors' systems such as Trimble (Tekla or Novapoint) are not prohibited by this specification. The formats proposed for use in a project should be clearly listed in the information delivery plan.

Common formats:

1) DGN, I.DGN (Bentley, MicroStation, Intergraph);
2) DWG, DWF, DXF, FBX (Autodesk);
3) NWD, NWF, NWC (Autodesk / Navisworks);
4) RVT (AutoDesk / Revit);
5) 3DM (Rhino).

E1.2 Open formats

Model file exchange by the use of open interoperable file formats governed by International Organisation for Standardisation should be considered:

1) IFC (BuildingSmart - ISO 16739);
2) STEP (ISO 10303).

E2 Documents formats

E2.1 Proprietary formats

This specification does not prohibit the use of other vendors' systems, such as Google, Lotus etc. Commonly used formats are:

1) DOC, DOCX (Microsoft Word);
2) XLS, XLSX (Microsoft Excel);
3) PPT, PPTX (Microsoft Powerpoint).

E2.2 Open formats

Open formats which are endorsed by UK Government Digital Services are:

1) ODT (OpenDocument Text) for text documents;
2) ODS (OpenDocument Spreadsheet) for spreadsheets;
3) ODP (OpenDocument Presentation) for presentation slides.

E3 Open standard general file formats

1) CSV (Comma-separated values) for datasets designed to be machine-readable;
2) PDF (Portable document format) saved as PDF/A for fixed layout documents;
3) XML (eXtensible Markup Language) for datasets designed to be machine-readable;
4) JSON (JavaScript Object Notation) for datasets designed to be machine-readable;

5) BCF (BuildingSmart BIM Collaboration Format);
6) AGS (A text file format used to transfer data between organisations in the site investigation industry, developed by the Association of Geotechnical and Geoenvironmental Specialists).

E4 Geographic vector data file formats

1) SHP (Esri shapefiles). These consist of 4 mandatory linked files:
   a) SHP contains the graphic definition of the point assets, continuous assets or area assets of a given type;
   b) SHX contains indexes to the shp file;
   c) DBF is a dBase-compliant file containing the non-graphic data for the same assets in the same order;
   d) PRJ sets the projection.
2) GDB (Esri Geodatabase)
3) TAB (MapInfo tables)
4) GeoJSON (geographic JSON) for representing simple geographical features along with their non-spatial attributes

E5 Other file formats

E5.1 Point cloud file formats

1) LAS (an industry-standard binary format for storing airborne LiDAR data) and associated zipped file format LAZ;
2) PTS (Leica, often referred to as 3D Points File Graphics, does not retain any original scan or registration information);
3) PTX (Leica, contains all of the information from the original scan plus additional registration information);
4) POD (Bentley, Pointtools files);
5) ASTM E57 (ASTM - formerly known as American Society for Testing and Materials - vendor neutral file format for storing point clouds, images, and metadata produced by 3D imaging systems, such as laser scanners);
6) XYZ (Ascii point cloud format);
7) PTD.

E5.2 Aerial and satellite imagery file formats

1) ECW (Enhanced Compression Wavelet);
2) GEOTIFF (Allows georeferencing information to be embedded within a TIFF file);
3) JPEG, JPEG 2000 (Joint Photographic Experts Group);
4) World files (Plain text data files used by GIS systems to georeference raster map images, the name of the world file is formed by appending the letter "w" to the end of the raster filename, alternatively the second letter of the three-letter filename extension is replaced with the last letter, and the third letter is replaced with the letter "w" - e.g. if the map file ends in JPG then the separate world file ends in JGW).

E5.3 Alignment file formats

1) IfcAlignment 1.0;
2) OGC (Open Geospatial Consortium) GML (Geography Markup Language) Alignment;

3) LandXML 1.2 (ideally using the restricted schema of the model view definition);
4) OGC GML 3.3 or higher.

E5.4 Terrain data file formats

1) LandXML 1.2 (ideally using the restricted schema of the model view definition);
2) MX Genio text files.

General Principles and Scheme Governance
General information

GG 184
England National Application Annex to GG 184 Specification for the use of Computer Aided Design

(formerly IAN 184/16)

Revision 0

Summary
This National Application Annex contains the Highways England specific requirements related to the specification for the use of Computer Aided Design.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Highways England team. The email address for all enquiries and feedback is: Standards_Enquiries@highwaysengland.co.uk

This is a controlled document.

Contents

Release notes

Version	Date	Details of amendments
0	Feb 2020	Highways England National Application Annex to GG 184.

Foreword

Publishing information

This document is published by Highways England.

This document supersedes IAN 184/16 which is withdrawn.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

Introduction

Background

This document represents the specifications for naming standards, file formats and coding requirements for survey, design, construction and asset-related data, including geometrical and non-geometrical data and documentation, to be delivered to Highways England from the options, development and construction phases of infrastructure projects. This specification applies to all projects irrespective of scope and size.

Requirements for import into the Highways England's asset management systems are contained in the ADMM [Ref 1.N].

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 2.N] apply to this document.

Abbreviations

Abbreviations

Abbreviation	Definition
ADMM	Asset Data Management Manual
ODN	Ordnance Datum Newlyn
OS	Ordnance Survey
PIN	Project identification number

Terms and definitions

Terms

Term	Definition
Portfolio Control Framework	The Portfolio Control Framework provides a standard programme life-cycle and its associated stages, and describes the delivery of the programme of works for projects within the portfolio, for operations.
Project Control Framework	The Project Control Framework provides a defined life-cycle with a clear start and end point, broken into phases and stages structured around key milestones, for major projects.

E/1. Container naming

E/1.1 The project field and originator fields of the container naming specifications for Highways England shall be in accordance with section E/1.

NOTE *The core requirements give general container naming specifications.*

Project field

E/1.2 Unless otherwise instructed by Highways England, the project field shall be the characters "HE" followed by the Highways England 6-digit project identification number (PIN).

NOTE *The HE Supply Chain Portal contains a lookup table of PINs.*

Originator field

E/1.3 The originator field shall contain a unique abbreviation for the originator of the file.

E/1.4 The originator field shall identify the party that has the contractual responsibility with Highways England.

E/1.5 Abbreviations shall be from 2 to 6 characters long.

E/1.6 A separate code shall be established representing any joint venture.

E/1.7 Abbreviations shall be proposed for approval by Highways England.

NOTE *The HE Supply Chain Portal contains a list of registered abbreviations and their owners.*

Project stage

E/1.8 The project stage shall be as defined in the Portfolio Control Framework for operations, or the Project Control Framework for major projects.

E/2. Asset data and non-graphic data

Asset codes

E/2.1 Asset codes shall be as defined in the ADMM [Ref 1.N].

NOTE *The ADMM also defines the relationship between asset codes and Uniclass.*

E/2.2 Attribute data for asset classes that are defined in ADMM shall be supplied in the form as defined in the ADMM.

E/3. Coordinate systems

Units

E/3.1 All coordinated model files shall be in metres.

E/3.2 Standard detail drawings, sections and component models shall either be in metres or millimetres.

E/3.3 Where detail drawings, sections and component models are incorporated into coordinated models, they shall be scaled to metres.

E/3.4 Dimensions shall be displayed in either metres or millimetres in accordance with normal practice.

Coordinate systems and projections

E/3.5 All coordinates shall be referenced to Ordnance Survey's National Grid.

E/3.6 The appropriate coordinate system and projection to be used for the activity shall be agreed with Highways England and in accordance with Highways England's survey requirements.

E/3.7 Where any local grid is used, data shall be supplied in both National Grid and local grid coordinates.

Datums

E/3.8 All levels shall be relative to Ordnance Datum Newlyn (ODN).

E/4. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Highways England. ADMM, 'Asset Data Management Manual'
Ref 2.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'

Department for Infrastructure
An Roinn Bonneagair

General Principles and Scheme Governance
General information

GG 184
Northern Ireland National Application Annex to GG 184 Specification for the use of Computer Aided Design

Revision 0

Summary
This National Application Annex contains the Department for Infrastructure Northern Ireland specific requirements related to the specification for the use of Computer Aided Design.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated team in the Department for Infrastructure, Northern Ireland. The email address for all enquiries and feedback is: dcu@infrastructure-ni.gov.uk

This is a controlled document.

Contents

Release notes

Version	Date	Details of amendments
0	Feb 2020	Department for Infrastructure Northern Ireland National Application Annex to GG 184.

Foreword

Publishing information

This document is published by Highways England on behalf of Department for Infrastructure, Northern Ireland.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

Introduction

Background

This National Application Annex represents the Department for Infrastructure Northern Ireland specifications for naming standards, file formats and coding requirements for survey, design, construction and asset-related data, including geometrical and non-geometrical data and documentation, to be delivered to Department for Infrastructure, Northern Ireland from the options, development and construction phases of infrastructure projects. This specification applies to all projects irrespective of scope and size.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 1.N] apply to this document.

Abbreviations

Abbreviations

Abbreviation	Definition
LPS	Land and Property Services (Northern Ireland)
LPSDB	Land and Property Services (Northern Ireland) Datum, Belfast

NI/1. Container naming

NI/1.1 The project field and originator field of those specifications for Department for Infrastructure shall be in accordance with section NI/1.

NOTE *The core requirements document gives general container naming specifications.*

Project field

NI/1.2 The project field shall be as directed by the Department for Infrastructure.

Originator field

NI/1.3 The originator field shall be as directed by the Department for Infrastructure.

NI/2. Asset data and non-graphic data

NI/2.1 Asset codes shall be as advised by the Department for Infrastructure.

NI/3. Coordinate systems

Units

NI/3.1 All coordinated model files shall be in metres.

NI/3.1.1 Standard detail drawings, sections and component models may be in metres or millimetres.

NI/3.2 Where standard detail drawings, sections and component models are incorporated into coordinated models they shall be scaled to metres.

NI/3.2.1 Dimensions may be displayed in metres or millimetres in accordance with normal practice.

Coordinate systems and projections

NI/3.3 All coordinates shall be georeferenced to the Irish Grid 1975 Irish Grid [Ref 2.N].

NI/3.4 The appropriate coordinate system and projection to be used for the activity shall be agreed in accordance with the Department for Infrastructure's survey requirements.

NI/3.5 Where any local grid is used, data shall be supplied in both Irish Grid and local grid coordinates.

Datums

NI/3.6 All levels shall be relative to Land and Property Services (Northern Ireland) Datum, Belfast.

NI/4. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 2.N	Ordanance Survey Ireland. Irish Grid, 'The Irish Grid'

General Principles and Scheme Governance
General information

GG 184
Scotland National Application Annex to GG 184 Specification for the use of Computer Aided Design

Revision 0

Summary
This National Application Annex contains the Transport Scotland specific requirements related to the specification for the use of Computer Aided Design.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Transport Scotland team. The email address for all enquiries and feedback is: TSStandardsBranch@transport.gov.scot

This is a controlled document.

Contents

Release notes

Version	Date	Details of amendments
0	Feb 2020	Transport Scotland National Application Annex to GG 184.

Foreword

Publishing information

This document is published by Highways England on behalf of Transport Scotland.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

Introduction

Background

This National Application Annex represents the Transport Scotland specifications for naming standards, file formats and coding requirements for survey, design, construction and asset-related data, including geometrical and non-geometrical data and documentation, to be delivered to Transport Scotland from the options, development and construction phases of infrastructure projects. This specification applies to all projects irrespective of scope and size.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 1.N] apply to this document.

S/1. Container naming

S/1.1 The project field and originator field of those specifications for Transport Scotland shall be in accordance with section S/1.

NOTE *The core requirements document gives general container naming specifications.*

Project field

S/1.2 The project field shall be as directed by Transport Scotland.

Originator field

S/1.3 The originator field shall be as directed by Transport Scotland.

S/2. Asset data and non-graphic data

S/2.1 Asset codes shall be as advised by Transport Scotland.

S/3. Coordinate systems

Units

S/3.1 All coordinated model files shall be in metres.

S/3.1.1 Standard detail drawings, sections and component models may be in metres or millimetres.

S/3.2 Where standard detail drawings, sections and component models are incorporated into coordinated models they shall be scaled to metres.

S/3.2.1 Dimensions may be displayed in metres or millimetres in accordance with normal practice.

Coordinate systems and projections

S/3.3 All coordinates shall be referenced to Ordnance Survey's National Grid.

S/3.4 The appropriate coordinate system and projection to be used for the activity shall be agreed in accordance with Transport Scotland's survey requirements.

S/3.5 Where any local grid is used, data shall be supplied in both National Grid and local grid coordinates.

Datums

S/3.6 All levels shall be relative to Ordnance Datum Newlyn (ODN).

S/4. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'

Llywodraeth Cymru
Welsh Government

General Principles and Scheme Governance
General information

GG 184
Wales National Application Annex to GG 184 Specification for the use of Computer Aided Design

Revision 0

Summary
There are no specific requirements for Welsh Government supplementary or alternative to those given in GG 184.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Welsh Government team. The email address for all enquiries and feedback is: Standards_Feedback_and_Enquiries@gov.wales

This is a controlled document.

Contents

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Version	Date	Details of amendments
0	Feb 2020	Welsh Government National Application Annex to GG 184.