

# DIN EN ISO 14825:2005-11 (E)

Intelligent transport systems - Geographic Data Files (GDF) - Overall data specification (ISO 14825:2004); English version EN ISO 14825:2004

---

<b>Contents</b>	<b>Page</b>
Foreword .....	24
Introduction.....	25
<b>1</b> Scope .....	<b>28</b>
<b>2</b> Normative references .....	<b>28</b>
<b>3</b> Terms and definitions .....	<b>28</b>
3.1 General terms .....	28
3.2 Mathematical terms .....	31
3.3 Geodetical terms .....	32
3.4 GDF Terms .....	33
<b>4</b> Symbols (and abbreviated terms).....	<b>36</b>
<b>5</b> Overall Conceptual Data Model.....	<b>36</b>
5.1 Data Models in GDF.....	36
5.2 The overall Data Model of GDF .....	36
5.2.1 The Feature Model.....	36
5.2.2 Levels in GDF.....	38
5.2.3 Graph topology supported by this International Standard.....	38
5.3 The basic building blocks of topological features in a GDF: Nodes, Edges and Faces.....	41
5.4 The basic building blocks of non-explicit topological features in a GDF: Dots, Polylines and Polygons .....	41
5.5 The Attribute Model.....	41
5.6 The Relationship Model .....	42
5.7 The Feature Representation Scheme .....	43
5.8 Data Management.....	44
<b>6</b> Feature Catalogue .....	<b>45</b>
6.1 Generic Specifications.....	45
6.1.1 Features and Feature Themes.....	45
6.1.2 Feature Class Codes .....	45
6.1.3 Simple and Complex Features .....	45
6.1.4 Feature hierarchy .....	45
6.1.5 Data Model for the Feature Catalogue.....	45
6.1.6 User-defined Features.....	45
6.2 Roads and Ferries .....	46
6.2.1 General Overview .....	46
6.2.2 Address Area .....	48
6.2.3 Address Area Boundary Element .....	48
6.2.4 Aggregated Way .....	48
6.2.5 Enclosed Traffic Area.....	48
6.2.6 Ferry.....	49
6.2.7 Ferry Connection.....	49
6.2.8 Interchange .....	50
6.2.9 Intersection .....	50
6.2.10 Junction.....	50
6.2.11 Road.....	52
6.2.12 Road Element.....	56
6.2.13 Roundabout.....	57
6.2.14 Topological relations between Junctions, Road Elements, Enclosed Traffic Areas, Ferry Connections and Address Areas.....	57
6.3 Administrative Areas.....	60
6.3.1 General Overview .....	60
6.3.2 Administrative Boundary Element.....	61

6.3.3	Administrative Boundary Junction .....	61
6.3.4	Administrative Place A to Z .....	62
6.3.5	Country .....	62
6.3.6	Order-1 to 7 Areas.....	62
6.3.7	Order-8 Area .....	63
6.3.8	Order-9 Area .....	63
6.3.9	Supra-National Area .....	63
6.4	Named Areas .....	63
6.4.1	General Overview.....	63
6.4.2	Boundary Element .....	63
6.4.3	Boundary Junction .....	64
6.4.4	Built-up Area .....	64
6.4.5	Census District.....	65
6.4.6	Elective District .....	65
6.4.7	Emergency Medical Dispatch District.....	65
6.4.8	Fire Dispatch District.....	65
6.4.9	Named Area .....	65
6.4.10	Phone District.....	65
6.4.11	Police District .....	65
6.4.12	Postal District.....	66
6.4.13	School District.....	66
6.5	Land Cover And Use.....	66
6.5.1	General Overview.....	66
6.5.2	Building.....	67
6.5.3	Artificial Surface .....	67
6.5.4	Urban Fabric.....	68
6.5.5	Continuous Urban Fabric.....	68
6.5.6	Discontinuous Urban Fabric.....	68
6.5.7	Industrial, Commercial And Transport Unit.....	68
6.5.8	Industrial Or Commercial Unit.....	69
6.5.9	Road And Rail Network And Associated Land .....	69
6.5.10	Port Area.....	69
6.5.11	Airport .....	70
6.5.12	Mine, Dump And Construction Site .....	70
6.5.13	Mineral Extraction Site .....	70
6.5.14	Dump Site .....	71
6.5.15	Construction Site .....	71
6.5.16	Artificial, Non-Agricultural Vegetated Area.....	71
6.5.17	Green Urban Area .....	71
6.5.18	Sport And Leisure Facility .....	72
6.5.19	Agricultural Areas.....	72
6.5.20	Arable Land .....	72
6.5.21	Non-Irrigated Arable Land.....	73
6.5.22	Permanently Irrigated Land .....	73
6.5.23	Rice Field .....	73
6.5.24	Permanent Crop .....	74
6.5.25	Vineyard.....	74
6.5.26	Fruit Trees And Berry Plantation .....	74
6.5.27	Olive Grove.....	75
6.5.28	Pasture And Rangeland .....	75
6.5.29	Pasture.....	75
6.5.30	Rangeland.....	75
6.5.31	Heterogeneous Agricultural Area .....	76
6.5.32	Annual Crop Associated With Permanent Crop .....	76
6.5.33	Complex Cultivation Pattern.....	76
6.5.34	Land Principally Occupied By Agriculture, With Significant Area Of Natural Vegetation .....	76
6.5.35	Agro-Forestry area.....	77
6.5.36	Forest And Semi-Natural Area.....	77
6.5.37	Forest .....	77
6.5.38	Broad-Leaved Forest.....	78

6.5.39	Coniferous Forest.....	78
6.5.40	Mixed Forest.....	78
6.5.41	Scrub And/Or Herbaceous Vegetation Association .....	79
6.5.42	Natural Grassland.....	79
6.5.43	Moor And Heathland .....	79
6.5.44	Sclerophyllous vegetation.....	80
6.5.45	Transitional Woodland/Scrub.....	80
6.5.46	Open Space With Little Or No Vegetation.....	80
6.5.47	Beach, Dune And Sand Plain .....	81
6.5.48	Bare Rock.....	81
6.5.49	Sparsely Vegetated Area .....	81
6.5.50	Burnt Area .....	81
6.5.51	Glacier And Perpetual Snow .....	81
6.5.52	Wetland.....	81
6.5.53	Inland Wetland .....	82
6.5.54	Inland Marsh.....	82
6.5.55	Peatbog.....	83
6.5.56	Forested Wetland .....	83
6.5.57	Coastal Wetland.....	83
6.5.58	Salt marsh .....	84
6.5.59	Saline .....	84
6.5.60	Intertidal flat .....	84
6.5.61	Island .....	84
6.6	Structures.....	85
6.6.1	General Overview .....	85
6.6.2	Structure.....	85
6.7	Railways .....	85
6.7.1	General Overview .....	85
6.7.2	Railway Element .....	85
6.7.3	Railway Element Junction .....	85
6.8	Waterways .....	86
6.8.1	General Overview .....	86
6.8.2	Canal.....	87
6.8.3	Coastal Lagoon.....	87
6.8.4	Estuary.....	88
6.8.5	Inland Water .....	88
6.8.6	Lake.....	88
6.8.7	Marine Water .....	88
6.8.8	Reservoir .....	88
6.8.9	River.....	88
6.8.10	Sea And Ocean .....	89
6.8.11	Water Body.....	89
6.8.12	Water Boundary Element.....	89
6.8.13	Water Boundary Junction.....	89
6.8.14	Water Course .....	90
6.9	Road Furniture.....	90
6.9.1	General Overview .....	90
6.9.2	Environmental Equipment.....	90
6.9.3	Signpost .....	90
6.9.4	Traffic Light.....	91
6.9.5	Traffic Sign.....	91
6.9.6	Lighting.....	91
6.9.7	Measurement Device.....	92
6.9.8	Road Markings.....	92
6.9.9	Safety Equipment .....	92
6.9.10	Pedestrian Crossing.....	92
6.10	Services .....	93
6.10.1	General Overview .....	93
6.10.2	Entry Point of Service .....	93
6.11	Public Transport .....	94

6.11.1	General Overview.....	94
6.11.2	Line.....	95
6.11.3	Public Transport Junction .....	95
6.11.4	Public Transport Point .....	96
6.11.5	Route.....	96
6.11.6	Route Link .....	96
6.11.7	Stop Area.....	96
6.11.8	Stop Point.....	96
6.12	Chainage Referencing Features .....	97
6.12.1	General Overview.....	97
6.12.2	Chainage Referencing Section.....	98
6.12.3	Reference Point.....	99
6.13	General Features.....	99
6.13.1	General Overview.....	99
6.13.2	Centre Point of Feature .....	99
6.13.3	Traffic Location .....	100
7	Attribute Catalogue.....	100
7.1	Generic Specifications .....	100
7.1.1	Attribute Types.....	100
7.1.2	Attribute Values .....	100
7.1.3	Attribute Type Name.....	100
7.1.4	Simple Attributes, Composite Attributes and Sub-Attributes.....	100
7.1.5	Composite attributes combined with the restrictive sub-attribute <i>Validity Direction</i> .....	101
7.1.6	Composite attributes combined with the restrictive sub-attribute <i>Lane Dependent Validity</i> ...	102
7.1.7	Composite attributes combined with the restrictive sub-attribute <i>Street Side</i> .....	102
7.1.8	Composite attributes combined with the restrictive sub-attribute <i>Validity Period</i> .....	103
7.1.9	Composite attributes combined with the restrictive sub-attribute <i>Vehicle Type</i> .....	103
7.1.10	Names in combination with a Language Code .....	104
7.1.11	Default Attribute Values .....	104
7.1.12	Relation between attributes and features: Segmented Attributes .....	104
7.1.13	Attributes of General Features .....	106
7.1.14	Attributes of Relationships.....	106
7.1.15	Attribute Type Codes.....	106
7.1.16	User-defined Attributes .....	106
7.1.17	The Data Model for Attributes .....	106
7.2	Attributes for multiple Feature Themes.....	114
7.2.1	Alternate Name.....	114
7.2.2	Alternate Name Body.....	115
7.2.3	Alternate Name Text .....	115
7.2.4	Association Type .....	116
7.2.5	Chainage.....	116
7.2.6	Common Language .....	116
7.2.7	Containment Type.....	117
7.2.8	Currency .....	117
7.2.9	Display Class.....	117
7.2.10	Exit Number.....	118
7.2.11	External Identifier.....	118
7.2.12	Multi Media Action .....	118
7.2.13	Multi Media Description.....	118
7.2.14	Multi Media File Attachment Name .....	119
7.2.15	Multi Media File Attachment Type.....	119
7.2.16	Multi Media Time Domain.....	120
7.2.17	Multi-Media File Attachment .....	120
7.2.18	Multi-Media File Attachment Context.....	121
7.2.19	Name Component .....	121
7.2.20	Name Component Length .....	122
7.2.21	Name Component Offset.....	122
7.2.22	Name Component Type.....	122
7.2.23	Name Prefix .....	123

7.2.24	Official Code.....	123
7.2.25	Official Language .....	123
7.2.26	Official Name.....	123
7.2.27	Official Name Body.....	124
7.2.28	Official Name Text .....	124
7.2.29	Opening Period .....	125
7.2.30	Place within Place Classification .....	125
7.2.31	Population .....	125
7.2.32	Population Class .....	126
7.2.33	Positional Accuracy .....	126
7.2.34	Postal Code.....	126
7.2.35	Street Side .....	126
7.2.36	Toll .....	127
7.2.37	Toll Charge.....	127
7.2.38	Validity Direction .....	128
7.2.39	Validity Period.....	128
7.3	Attributes for Roads and Ferries .....	128
7.3.1	Accident.....	128
7.3.2	Accident Date.....	129
7.3.3	Accident Identifier .....	129
7.3.4	Address Information .....	129
7.3.5	Alternate Name .....	130
7.3.6	Alternate Name Body .....	130
7.3.7	Alternate Name Text.....	130
7.3.8	Alternate Street Name .....	130
7.3.9	Alternate Street Name Body .....	131
7.3.10	Alternate Street Name Text.....	131
7.3.11	Average Vehicle Speed .....	132
7.3.12	Blocked Passage .....	132
7.3.13	Blocked Passage Location .....	132
7.3.14	Blocked Passage Type.....	133
7.3.15	Chainage.....	133
7.3.16	Chainage Offset .....	133
7.3.17	Composite Exit Number .....	134
7.3.18	Composite Form of Way .....	134
7.3.19	Composite Intersection Type .....	134
7.3.20	Composite Pronunciation.....	135
7.3.21	Construction Status .....	135
7.3.22	Currency .....	135
7.3.23	Direction of Traffic Flow .....	135
7.3.24	Directional Prefix .....	135
7.3.25	Directional Suffix .....	135
7.3.26	Display Class .....	135
7.3.27	Divided Road Element.....	135
7.3.28	Divider.....	136
7.3.29	Divider Type .....	136
7.3.30	Divider Width.....	137
7.3.31	Emergency Vehicle Lane .....	137
7.3.32	Enclosed Traffic Area Type .....	137
7.3.33	Exit Number.....	138
7.3.34	External Identifier .....	138
7.3.35	Ferry Type .....	138
7.3.36	First House Number .....	138
7.3.37	Form of Way .....	138
7.3.38	Freeway .....	141
7.3.39	Frequency of a Traffic Connection .....	141
7.3.40	Functional Road Class.....	142
7.3.41	Height of Pass.....	143
7.3.42	High Occupancy Vehicle.....	143
7.3.43	House Number Range .....	143

7.3.44	House Number Structure .....	144
7.3.45	Interchange Type .....	147
7.3.46	Intermediate House Number .....	147
7.3.47	Junction Type.....	147
7.3.48	Lane Dependent Validity .....	148
7.3.49	Last House Number .....	149
7.3.50	Lateral Offset.....	149
7.3.51	Length of a Road Element.....	149
7.3.52	Location Reference.....	149
7.3.53	Location Reference Code.....	150
7.3.54	Location Reference Type .....	150
7.3.55	Magnetic Anomalies .....	151
7.3.56	Maximum Height Allowed .....	151
7.3.57	Maximum Length Allowed.....	151
7.3.58	Maximum Number of Lanes .....	151
7.3.59	Maximum Total Weight Allowed.....	151
7.3.60	Maximum Weight per Axle Allowed .....	151
7.3.61	Maximum Width Allowed.....	151
7.3.62	Measured Length .....	152
7.3.63	Minimum Number of Lanes.....	152
7.3.64	Minimum Number of Occupants .....	152
7.3.65	Mountain Pass.....	152
7.3.66	Multi Media Action .....	153
7.3.67	Multi Media Description.....	153
7.3.68	Multi Media File Attachment .....	153
7.3.69	Multi Media File Attachment Context.....	153
7.3.70	Multi Media File Attachment Name .....	153
7.3.71	Multi Media File Attachment Type.....	153
7.3.72	Multi Media Time Domain.....	153
7.3.73	Name Component .....	153
7.3.74	Name Component Length .....	153
7.3.75	Name Component Offset.....	153
7.3.76	Name Component Type .....	153
7.3.77	Name Prefix .....	153
7.3.78	National Road Class .....	154
7.3.79	Number of Lanes.....	154
7.3.80	Official Code .....	154
7.3.81	Official Name .....	154
7.3.82	Official Name Body .....	154
7.3.83	Official Name Text.....	154
7.3.84	Official Street Name .....	154
7.3.85	Official Street Name Body.....	155
7.3.86	Official Street Name Text .....	156
7.3.87	Opening Period .....	156
7.3.88	Ownership .....	156
7.3.89	Pass.....	156
7.3.90	Passing Restrictions .....	157
7.3.91	Paved Road Surface Type.....	157
7.3.92	Pavement Status .....	157
7.3.93	Percentage of International Traffic .....	157
7.3.94	Positional Accuracy.....	157
7.3.95	Postal Code .....	157
7.3.96	Pronunciation .....	157
7.3.97	Pronunciation System .....	158
7.3.98	Removable Blockage.....	158
7.3.99	Road Gradient .....	158
7.3.100	Road Inclination .....	159
7.3.101	Road Surface .....	159
7.3.102	Road Surface Condition .....	159
7.3.103	Route Number .....	159

7.3.104 Routing Identifier .....	159
7.3.105 Routing Sequence Number .....	159
7.3.106 Routing Type.....	159
7.3.107 Scenic Value .....	160
7.3.108 Slip Road Type.....	160
7.3.109 Special Restrictions .....	164
7.3.110 Special Routing .....	164
7.3.111 Speed Restrictions .....	164
7.3.112 Street Side .....	165
7.3.113 Street Type Prefix .....	165
7.3.114 Street Type Suffix .....	165
7.3.115 Toll .....	166
7.3.116 Toll Charge.....	166
7.3.117 Toll Road .....	166
7.3.118 Traffic Flow.....	166
7.3.119 Traffic Flow Measurement .....	166
7.3.120 Traffic Flow Measurement Type.....	166
7.3.121 Traffic Flow Measurement Unit .....	166
7.3.122 Traffic Jam Sensitivity .....	166
7.3.123 Trailing Spaces .....	167
7.3.124 Travel Time.....	167
7.3.125 Unpaved Road Surface Type.....	167
7.3.126 Validity Direction .....	167
7.3.127 Validity Period.....	167
7.3.128 Vehicle Type.....	168
7.3.129 Width.....	168
7.4 Attributes for Roads and Ferries and Chainage Referencing Features .....	168
7.4.1 Scope of this sub-clause .....	168
7.4.2 Accident.....	168
7.4.3 Accident Date.....	168
7.4.4 Accident Identifier .....	169
7.4.5 Construction Status .....	169
7.4.6 Direction of Traffic Flow .....	169
7.4.7 Directional Prefix .....	170
7.4.8 Directional Suffix .....	170
7.4.9 Lateral Offset.....	171
7.4.10 Maximum Height Allowed .....	171
7.4.11 Maximum Length Allowed .....	171
7.4.12 Maximum Total Weight Allowed.....	172
7.4.13 Maximum Weight per Axle Allowed.....	172
7.4.14 Maximum Width Allowed .....	172
7.4.15 Measured Length.....	172
7.4.16 National Road Class.....	173
7.4.17 Number of Lanes .....	173
7.4.18 Paved Road Surface Type .....	174
7.4.19 Pavement Status.....	174
7.4.20 Percentage of International Traffic .....	174
7.4.21 Road Surface .....	175
7.4.22 Road Surface Condition.....	175
7.4.23 Route Number .....	176
7.4.24 Route Number Body.....	176
7.4.25 Route Type Prefix .....	177
7.4.26 Route Type Suffix .....	177
7.4.27 Routing Identifier .....	177
7.4.28 Routing Sequence Number .....	178
7.4.29 Routing Type.....	178
7.4.30 Separator .....	179
7.4.31 Special Routing .....	179
7.4.32 Traffic Flow.....	179
7.4.33 Traffic Flow Measurement .....	180

7.4.34	Traffic Flow Measurement Type .....	180
7.4.35	Traffic Flow Measurement Unit .....	180
7.4.36	Unpaved Road Surface Type .....	181
7.4.37	Vehicle Type .....	181
7.4.38	Width .....	185
7.5	Attributes for Administrative Areas .....	185
7.5.1	Administrative Boundary Type.....	185
7.5.2	Administrative Structure Identifier.....	186
7.5.3	Alternate Name.....	187
7.5.4	Alternate Name Body.....	187
7.5.5	Alternate Name Text .....	187
7.5.6	Common Language .....	187
7.5.7	Display Class.....	187
7.5.8	External Identifier.....	187
7.5.9	ISO Country Code .....	187
7.5.10	Multi Media Action .....	187
7.5.11	Multi Media Description.....	187
7.5.12	Multi Media File Attachment .....	187
7.5.13	Multi Media File Attachment Context.....	187
7.5.14	Multi Media File Attachment Name .....	187
7.5.15	Multi Media File Attachment Type.....	188
7.5.16	Multi Media Time Domain.....	188
7.5.17	Name Component .....	188
7.5.18	Name Component Length .....	188
7.5.19	Name Component Offset.....	188
7.5.20	Name Component Type.....	188
7.5.21	Name Prefix .....	188
7.5.22	Official Code.....	188
7.5.23	Official Language.....	188
7.5.24	Official Name .....	188
7.5.25	Official Name Body .....	188
7.5.26	Official Name Text.....	188
7.5.27	Place within Place Classification .....	188
7.5.28	Population .....	188
7.5.29	Population Class.....	189
7.5.30	Positional Accuracy.....	189
7.5.31	Postal Code .....	189
7.5.32	Region Code .....	189
7.5.33	Street Side .....	189
7.5.34	Summer Time .....	189
7.5.35	Time Zone .....	189
7.5.36	Validity Period .....	190
7.6	Attributes for Named Areas .....	190
7.6.1	Alternate Name.....	190
7.6.2	Alternate Name Body.....	190
7.6.3	Alternate Name Text .....	190
7.6.4	Boundary Type.....	190
7.6.5	Common Language .....	191
7.6.6	Display Class.....	191
7.6.7	External Identifier.....	191
7.6.8	Multi Media Action .....	191
7.6.9	Multi Media Description.....	191
7.6.10	Multi Media File Attachment .....	191
7.6.11	Multi Media File Attachment Context.....	191
7.6.12	Multi Media File Attachment Name .....	191
7.6.13	Multi Media File Attachment Type.....	191
7.6.14	Multi Media Time Domain.....	191
7.6.15	Name Component .....	191
7.6.16	Name Component Length .....	191
7.6.17	Name Component Offset.....	191

7.6.18	Name Component Type .....	191
7.6.19	Name Prefix.....	192
7.6.20	Official Code.....	192
7.6.21	Official Language .....	192
7.6.22	Official Name.....	192
7.6.23	Official Name Body.....	192
7.6.24	Official Name Text .....	192
7.6.25	Place within Place Classification .....	192
7.6.26	Population .....	192
7.6.27	Population Class .....	192
7.6.28	Positional Accuracy .....	192
7.6.29	Postal Code.....	192
7.6.30	Settlement Type.....	192
7.6.31	Street Side.....	193
7.6.32	Validity Period.....	193
7.7	Attributes for Land Cover And Use .....	193
7.7.1	Alternate Name .....	193
7.7.2	Alternate Name Body .....	193
7.7.3	Alternate Name Text.....	193
7.7.4	Building Class Name.....	193
7.7.5	Display Class .....	194
7.7.6	Multi Media Action.....	194
7.7.7	Multi Media Description .....	194
7.7.8	Multi Media File Attachment.....	194
7.7.9	Multi Media File Attachment Context .....	194
7.7.10	Multi Media File Attachment Name .....	194
7.7.11	Multi Media File Attachment Type .....	194
7.7.12	Multi Media Time Domain .....	194
7.7.13	Name Component.....	194
7.7.14	Name Component Length.....	194
7.7.15	Name Component Offset .....	194
7.7.16	Name Component Type .....	194
7.7.17	Name Prefix.....	194
7.7.18	Official Name.....	194
7.7.19	Official Name Body.....	195
7.7.20	Official Name Text .....	195
7.7.21	Park Type.....	195
7.7.22	Positional Accuracy .....	195
7.7.23	Sand Area Type .....	195
7.7.24	Validity Period.....	195
7.8	Attributes for Structures.....	196
7.8.1	Alternate Name .....	196
7.8.2	Alternate Name Body .....	196
7.8.3	Alternate Name Text.....	196
7.8.4	Display Class .....	196
7.8.5	External Identifier .....	196
7.8.6	Maximum Height Allowed .....	196
7.8.7	Maximum Length Allowed .....	196
7.8.8	Maximum Total Weight Allowed.....	196
7.8.9	Maximum Weight per Axle Allowed.....	196
7.8.10	Maximum Width Allowed .....	196
7.8.11	Multi Media Action.....	196
7.8.12	Multi Media Description .....	196
7.8.13	Multi Media File Attachment.....	196
7.8.14	Multi Media File Attachment Context .....	197
7.8.15	Multi Media File Attachment Name .....	197
7.8.16	Multi Media File Attachment Type .....	197
7.8.17	Multi Media Time Domain .....	197
7.8.18	Name Component.....	197
7.8.19	Name Component Length.....	197

7.8.20	Name Component Offset.....	197
7.8.21	Name Component Type.....	197
7.8.22	Name Prefix.....	197
7.8.23	Official Code.....	197
7.8.24	Official Name.....	197
7.8.25	Official Name Body.....	197
7.8.26	Official Name Text.....	197
7.8.27	Positional Accuracy.....	197
7.8.28	Structure Category.....	198
7.8.29	Structure Identifier.....	198
7.8.30	Structure Type.....	198
7.8.31	Validity Direction.....	200
7.8.32	Validity Period.....	201
7.9	Attributes for Railways.....	201
7.9.1	Alternate Name.....	201
7.9.2	Alternate Name Body.....	201
7.9.3	Alternate Name Text.....	201
7.9.4	Display Class.....	201
7.9.5	External Identifier.....	201
7.9.6	Multi Media Action.....	201
7.9.7	Multi Media Description.....	201
7.9.8	Multi Media File Attachment.....	201
7.9.9	Multi Media File Attachment Context.....	201
7.9.10	Multi Media File Attachment Name.....	201
7.9.11	Multi Media File Attachment Type.....	201
7.9.12	Multi Media Time Domain.....	201
7.9.13	Name Component.....	202
7.9.14	Name Component Length.....	202
7.9.15	Name Component Offset.....	202
7.9.16	Name Component Type.....	202
7.9.17	Name Prefix.....	202
7.9.18	Official Code.....	202
7.9.19	Official Name.....	202
7.9.20	Official Name Body.....	202
7.9.21	Official Name Text.....	202
7.9.22	Positional Accuracy.....	202
7.9.23	Validity Direction.....	202
7.9.24	Validity Period.....	202
7.10	Attributes for Waterways.....	202
7.10.1	Alternate Name.....	202
7.10.2	Alternate Name Body.....	203
7.10.3	Alternate Name Text.....	203
7.10.4	Display Class.....	203
7.10.5	External Identifier.....	203
7.10.6	Multi Media Action.....	203
7.10.7	Multi Media Description.....	203
7.10.8	Multi Media File Attachment.....	203
7.10.9	Multi Media File Attachment Context.....	203
7.10.10	Multi Media File Attachment Name.....	203
7.10.11	Multi Media File Attachment Type.....	203
7.10.12	Multi Media Time Domain.....	203
7.10.13	Name Component.....	203
7.10.14	Name Component Length.....	203
7.10.15	Name Component Offset.....	203
7.10.16	Name Component Type.....	204
7.10.17	Name Prefix.....	204
7.10.18	Official Code.....	204
7.10.19	Official Name.....	204
7.10.20	Official Name Body.....	204
7.10.21	Official Name Text.....	204

7.10.22	Positional Accuracy .....	204
7.10.23	Validity Direction .....	204
7.10.24	Validity Period.....	204
7.10.25	Water Body Type .....	204
7.10.26	Water Boundary Element Type .....	205
7.11	Attributes for Road Furniture.....	206
7.11.1	Destination Info on Traffic Sign .....	206
7.11.2	Destination Location .....	206
7.11.3	Direction .....	207
7.11.4	Display Class .....	208
7.11.5	Equipment Identifier.....	208
7.11.6	Exit Number.....	208
7.11.7	External Identifier .....	209
7.11.8	Multi Media Action.....	209
7.11.9	Multi Media Description .....	209
7.11.10	Multi Media File Attachment.....	209
7.11.11	Multi Media File Attachment Context .....	209
7.11.12	Multi Media File Attachment Name .....	209
7.11.13	Multi Media File Attachment Type .....	209
7.11.14	Multi Media Time Domain .....	209
7.11.15	Official Code.....	209
7.11.16	Other Textual Content of a Traffic Sign .....	209
7.11.17	Positional Accuracy .....	209
7.11.18	Route Number On Sign .....	210
7.11.19	Sign Text.....	210
7.11.20	Symbol on Traffic Sign .....	210
7.11.21	Traffic Sign Class .....	211
7.11.22	Traffic Sign Information .....	213
7.11.23	Validity Period.....	213
7.11.24	Value on Traffic Sign .....	213
7.12	Attributes for Services .....	214
7.12.1	Alternate Name .....	214
7.12.2	Alternate Name Body .....	214
7.12.3	Alternate Name Text.....	214
7.12.4	Accepted Credit Cards.....	214
7.12.5	Airport Code.....	214
7.12.6	Alternate Name .....	214
7.12.7	Brand Name.....	215
7.12.8	Breakfast Available .....	215
7.12.9	Business Lunch .....	215
7.12.10	Car Dealer Type .....	215
7.12.11	City Centre Administrative Class.....	216
7.12.12	Commercial Airline Service .....	216
7.12.13	Commuter/Regional Railway Station.....	216
7.12.14	Departure/Arrival .....	217
7.12.15	Destination of Flight Connection .....	217
7.12.16	Display Class .....	217
7.12.17	Domestic/International.....	217
7.12.18	Entry Point Type .....	217
7.12.19	Facilities En Suite.....	218
7.12.20	Flight Info .....	218
7.12.21	General Aviation .....	219
7.12.22	Government Type .....	219
7.12.23	Height of Pass.....	219
7.12.24	House Number .....	220
7.12.25	ID of Flight Connection .....	220
7.12.26	Importance .....	220
7.12.27	International Railway Station .....	221
7.12.28	Main Railway Station.....	221
7.12.29	Military Airport.....	221

7.12.30 Multi Media Action .....	221
7.12.31 Multi Media Description.....	221
7.12.32 Multi Media File Attachment .....	221
7.12.33 Multi Media File Attachment Context.....	221
7.12.34 Multi Media File Attachment Name .....	222
7.12.35 Multi Media File Attachment Type.....	222
7.12.36 Multi Media Time Domain.....	222
7.12.37 Name Component .....	222
7.12.38 Name Component Length .....	222
7.12.39 Name Component Offset.....	222
7.12.40 Name Component Type .....	222
7.12.41 Name Prefix .....	222
7.12.42 Number of Rooms.....	222
7.12.43 Official Code.....	222
7.12.44 Official Name .....	222
7.12.45 Official Name Body .....	222
7.12.46 Official Name Text.....	223
7.12.47 Opening Period .....	223
7.12.48 Park and Ride Facility.....	223
7.12.49 Parking Facilities Available .....	223
7.12.50 Parking Type .....	223
7.12.51 Place Name.....	223
7.12.52 Population .....	224
7.12.53 Population Class.....	224
7.12.54 Positional Accuracy.....	224
7.12.55 Post Office Type.....	224
7.12.56 Postal Code .....	224
7.12.57 Priceband.....	224
7.12.58 Railway Station Type .....	225
7.12.59 Rating .....	225
7.12.60 Restaurant Facilities Available .....	226
7.12.61 Service Address .....	226
7.12.62 Snack Served .....	226
7.12.63 Street Name .....	227
7.12.64 Street Side .....	227
7.12.65 Suitable for Disabled .....	227
7.12.66 Telefax Number .....	227
7.12.67 Telephone Number .....	227
7.12.68 Time Difference of Flight Connection.....	228
7.12.69 Time of Arrival of Flight Connection.....	228
7.12.70 Time of Departure of Flight Connection .....	228
7.12.71 Toll Point Type .....	228
7.12.72 Urban Railway Station .....	229
7.12.73 Validity Period .....	229
7.13 Attributes for Public Transport .....	229
7.13.1 Alternate Name.....	229
7.13.2 Alternate Name Body.....	229
7.13.3 Alternate Name Text .....	229
7.13.4 Chainage.....	230
7.13.5 Display Class.....	230
7.13.6 External Identifier.....	230
7.13.7 Multi Media Action .....	230
7.13.8 Multi Media Description.....	230
7.13.9 Multi Media File Attachment .....	230
7.13.10 Multi Media File Attachment Context.....	230
7.13.11 Multi Media File Attachment Name .....	230
7.13.12 Multi Media File Attachment Type.....	230
7.13.13 Multi Media Time Domain.....	230
7.13.14 Name Component .....	230
7.13.15 Name Component Length .....	230

7.13.16 Name Component Offset .....	230
7.13.17 Name Component Type .....	230
7.13.18 Name Prefix .....	230
7.13.19 Official Code.....	231
7.13.20 Official Name.....	231
7.13.21 Official Name Body.....	231
7.13.22 Official Name Text .....	231
7.13.23 Positional Accuracy .....	231
7.13.24 Public Transport Mode.....	231
7.13.25 Route Direction .....	231
7.13.26 Type of Public Transport Point .....	232
7.13.27 Validity Direction .....	232
7.13.28 Validity Period.....	232
7.14 Attributes for Chainage Referencing Features.....	232
7.14.1 Accident.....	232
7.14.2 Accident Date.....	232
7.14.3 Accident Identifier .....	232
7.14.4 Chainage.....	232
7.14.5 Construction Status .....	232
7.14.6 Direction of Traffic Flow .....	232
7.14.7 Display Class .....	233
7.14.8 External Identifier .....	233
7.14.9 Lateral Offset.....	233
7.14.10 Maximum Height Allowed .....	233
7.14.11 Maximum Length Allowed .....	233
7.14.12 Maximum Total Weight Allowed.....	233
7.14.13 Maximum Weight per Axle Allowed .....	233
7.14.14 Maximum Width Allowed .....	233
7.14.15 Measured Length .....	233
7.14.16 Multi Media Action .....	233
7.14.17 Multi Media Description .....	233
7.14.18 Multi Media File Attachment.....	233
7.14.19 Multi Media File Attachment Context .....	233
7.14.20 Multi Media File Attachment Name .....	233
7.14.21 Multi Media File Attachment Type .....	234
7.14.22 Multi Media Time Domain .....	234
7.14.23 National Road Class.....	234
7.14.24 Number of Lanes .....	234
7.14.25 Official Code.....	234
7.14.26 Paved Road Surface Type .....	234
7.14.27 Pavement Status.....	234
7.14.28 Percentage of International Traffic .....	234
7.14.29 Positional Accuracy .....	234
7.14.30 Road Surface .....	234
7.14.31 Road Surface Condition.....	234
7.14.32 Route Number .....	234
7.14.33 Routing Identifier .....	234
7.14.34 Routing Sequence Number .....	234
7.14.35 Routing Type.....	234
7.14.36 Special Routing .....	235
7.14.37 Traffic Flow.....	235
7.14.38 Traffic Flow Measurement .....	235
7.14.39 Traffic Flow Measurement Type.....	235
7.14.40 Traffic Flow Measurement Unit .....	235
7.14.41 Unpaved Road Surface Type.....	235
7.14.42 Validity Direction .....	235
7.14.43 Validity Period.....	235
7.14.44 Value on Reference Point .....	235
7.14.45 Vehicle Type.....	235
7.14.46 Width.....	235

8	Relationship Catalogue .....	236
8.1	Generic Specifications .....	236
8.1.1	Features and their Relationships .....	236
8.1.2	Relationship types .....	243
8.1.3	Relationship Type Codes .....	243
8.1.4	Arity of a Relationship .....	243
8.1.5	Partners of a Relationship .....	243
8.1.6	Homogeneous Relationships and their constraints .....	243
8.2	Relationship Types .....	244
8.2.1	Building along Road Element .....	244
8.2.2	Building Associated with Administrative Area .....	245
8.2.3	Building Associated with Built-up Area .....	245
8.2.4	Built-up Area Associated with Administrative Area .....	245
8.2.5	Centre Point of Feature belonging to Feature .....	245
8.2.6	Chainage Referencing .....	245
8.2.7	District Associated with Administrative Area .....	246
8.2.8	District Associated with Built-up Area .....	246
8.2.9	Divided Junction .....	246
8.2.10	Enclosed Traffic Area Associated with Administrative Area .....	246
8.2.11	Enclosed Traffic Area Associated with Built-up Area .....	246
8.2.12	Exit at Interchange .....	246
8.2.13	Ferry Connection Associated with Administrative Area .....	247
8.2.14	Ferry Connection Associated with Named Area .....	247
8.2.15	Ferry Connection Associated with Built-up Area .....	247
8.2.16	Fork .....	247
8.2.17	Grade Separated Crossing .....	247
8.2.18	Junction Associated with Administrative Area .....	248
8.2.19	Junction Associated with Built-up Area .....	248
8.2.20	Place within Place .....	248
8.2.21	Priority Manoeuvre .....	248
8.2.22	Prohibited Manoeuvre .....	249
8.2.23	Public Transport Point along Route Link .....	252
8.2.24	Reference Point Location along Road Element .....	252
8.2.25	Restricted Manoeuvre .....	253
8.2.26	Road Element Associated with Administrative Area .....	253
8.2.27	Road Element Associated with Built-up Area .....	253
8.2.28	Road Element Associated with District .....	254
8.2.29	Road Element Associated with Named Area .....	254
8.2.30	Road Element belonging to Service .....	254
8.2.31	Road Element leading to Enclosed Traffic Area .....	254
8.2.32	Road related Object related to Chainage Referencing Section .....	254
8.2.33	Road related object related to Road Element .....	254
8.2.34	Route Link along Road Element .....	255
8.2.35	Service along Road .....	255
8.2.36	Service along Road Element .....	255
8.2.37	Service Associated with Administrative Area .....	255
8.2.38	Service Associated with Built-up Area .....	255
8.2.39	Service Associated with Named Area .....	255
8.2.40	Service at Intersection .....	255
8.2.41	Service at Junction .....	255
8.2.42	Service related to Service .....	256
8.2.43	Signpost Information .....	256
8.2.44	Stop Point along Road Element .....	257
8.2.45	Stop Point along Route .....	257
8.2.46	Stop Point at Junction .....	257
8.2.47	Stop Point located near Service .....	258
8.2.48	Through Route .....	258
8.2.49	Toll Route .....	259
8.2.50	Traffic Light Along Road Element .....	259
8.2.51	Traffic Sign Along Road Element .....	259

9	Feature Representation Rules.....	259
9.1	Generic Specifications.....	259
9.1.1	Introduction.....	259
9.1.2	Feature Categories.....	259
9.1.3	Types of Toplogy.....	262
9.1.4	Levels of Representation.....	262
9.1.5	Layers on Level 0.....	264
9.1.6	Rules for Level 0 Representation.....	266
9.2	Roads and Ferries.....	269
9.2.1	Introduction.....	269
9.2.2	Level 2 Representation.....	269
9.2.3	Level 1 Representation.....	270
9.2.4	Level 0 Representation.....	271
9.3	Administrative Areas.....	272
9.3.1	Level 1 and Level 2 Representation.....	272
9.3.2	Level 0 Representation.....	273
9.4	Named Areas.....	273
9.4.1	Level 2 Representation.....	273
9.4.2	Level 1 Representation.....	273
9.4.3	Level 0 Representation.....	274
9.5	Land Cover And Use.....	274
9.5.1	Level 2 Representation.....	274
9.5.2	Level 1 Representation.....	274
9.5.3	Level 0 Representation.....	275
9.6	Structures.....	275
9.6.1	Level 2 Representation.....	275
9.6.2	Level 1 Representation.....	275
9.6.3	Level 0 Representation.....	277
9.7	Railways.....	277
9.7.1	Level 2 Representation.....	277
9.7.2	Level 1 Representation.....	277
9.7.3	Level 0 Representation.....	278
9.8	Waterways.....	278
9.8.1	Level 2 Representation.....	278
9.8.2	Level 1 Representation.....	278
9.8.3	Level 0 Representation.....	278
9.9	Road Furniture.....	279
9.9.1	Level 2 Representation.....	279
9.9.2	Level 1 Representation.....	279
9.9.3	Level 0 Representation.....	279
9.10	Services.....	279
9.10.1	Level 1 and Level 2 Representation.....	279
9.10.2	Level 0 Representation.....	279
9.11	Public Transport.....	279
9.11.1	Level 2 Representation.....	279
9.11.2	Level 1 Representation.....	280
9.11.3	Level 0 Representation.....	280
9.12	Chainage Referencing Features.....	280
9.12.1	Level 1 and Level 2 Representation.....	280
9.13	General Features.....	280
9.13.1	Level 2 Representation.....	280
9.13.2	Level 1 Representation.....	280
9.13.3	Level 0 Representation.....	280
10	Metadata Catalogue.....	281
10.1	Generic Specification.....	281
10.1.1	Introduction.....	281
10.1.2	Syntax of the Metadata Description.....	281
10.1.3	Partitioning of a Dataset.....	281
10.1.4	Information Units.....	281

10.1.5	Medium Units .....	282
10.2	Headers and Terminators.....	282
10.2.1	General.....	282
10.2.2	Album Header.....	282
10.2.3	Volume Terminator .....	285
10.2.4	Dataset Header .....	285
10.2.5	Layer Header .....	288
10.2.6	Section Header .....	290
10.3	Data Dictionary.....	294
10.3.1	General.....	294
10.3.2	Field Definition .....	294
10.3.3	Record Definition .....	298
10.3.4	Feature Definition .....	299
10.3.5	Attribute Definition .....	300
10.3.6	Attribute Value Definition.....	302
10.3.7	Relationship Definition.....	302
10.4	Table of Contents.....	303
10.4.1	General.....	303
10.4.2	Directory .....	304
10.4.3	Spatial Domain .....	305
10.4.4	Network Specification .....	305
10.4.5	Default Attribute Values .....	306
10.4.6	Administrative Structure Definition .....	306
10.4.7	Abbreviation .....	307
10.5	Source Material .....	308
10.5.1	General.....	308
10.5.2	Source.....	308
10.6	Geodetic Parameters .....	314
10.6.1	General.....	314
10.6.2	Geodetic Datum .....	314
10.6.3	Vertical Datum.....	315
10.6.4	Reference Ellipsoid.....	316
10.6.5	Projection Method.....	317
10.6.6	National Map Grid .....	318
10.6.7	Geoid Undulation .....	320
10.6.8	Magnetic Declination.....	321
10.7	Update Information .....	322
10.7.1	General.....	322
10.7.2	Time Stamp Format .....	322
10.8	General Comment.....	322
11	Logical Data Structures.....	323
11.1	Introduction .....	323
11.1.1	Data Descriptive Language ESN .....	323
11.1.2	Lists, elements and ranges.....	323
11.1.3	Summary of the syntax notation .....	324
11.1.4	Elementary data types .....	325
11.1.5	Other basic data types .....	333
11.2	Album Data Structures .....	335
11.2.1	General.....	335
11.2.2	Album .....	335
11.2.3	Global Album Information.....	335
11.2.4	Local Character Set Definition List.....	337
11.3	Dataset .....	337
11.3.1	Dataset List.....	337
11.3.2	Dataset .....	338
11.3.3	Dataset Global Data.....	338
11.3.4	Dataset Header .....	338
11.3.5	Data Dictionary.....	340
11.3.6	Directory .....	344

11.3.7	Spatial Domain.....	345
11.3.8	Source.....	345
11.3.9	Default Attribute .....	347
11.3.10	Network Specifications .....	348
11.3.11	Abbreviations.....	348
11.3.12	Administrative Structure Definition .....	348
11.3.13	Geodetical Parameters.....	349
11.4	Layer and Section.....	352
11.4.1	Layers .....	354
11.4.2	Section.....	354
11.4.3	Nodes.....	358
11.4.4	Edges .....	358
11.4.5	Faces.....	359
11.4.6	Texts .....	360
11.4.7	Time Domains .....	360
11.4.8	Attributes.....	368
11.4.9	Point Features.....	369
11.4.10	Line Features .....	370
11.4.11	Area Features.....	371
11.4.12	Complex Features .....	372
11.4.13	Object References .....	373
11.5	Update Information.....	374
11.6	Conversion.....	375
11.6.1	Conversion list.....	376
11.6.2	Conversion .....	376
11.7	Relationships .....	376
11.7.1	Relationship list.....	376
11.7.2	Relationship .....	376
11.7.3	Partner list.....	377
11.7.4	Partner .....	377
12	Media Record Specifications.....	377
12.1	General Specifications.....	377
12.1.1	Introduction.....	377
12.1.2	Logical Record.....	377
12.1.3	Media Record .....	377
12.1.4	Continuation Record .....	378
12.1.5	Null Record.....	378
12.1.6	Fields of Variable and Fixed Length.....	378
12.1.7	Repeating Fields.....	378
12.1.8	Repeating Field Groups .....	378
12.1.9	Packing .....	378
12.1.10	Data Types.....	379
12.1.11	Character sets.....	379
12.1.12	Justification.....	379
12.1.13	Order of Records .....	379
12.1.14	Order of subrecords.....	380
12.1.15	Links between data records .....	381
12.2	Field Specifications .....	388
12.2.1	Field Name.....	388
12.2.2	Record Control Fields .....	388
12.2.3	Common fields.....	391
12.2.4	Fields in Global Records .....	393
12.2.5	Fields in Data Records.....	393
12.2.6	Fields in Update Records .....	399
12.2.7	Fields Catalogue.....	401
12.3	Additional Constraints for Topological Features.....	411
12.3.1	Order of Co-ordinate triplets in Edge Records.....	411
12.3.2	Order of Edges in Line Features, Area Features and Faces .....	411
12.3.3	Order of Features in Relationship Records .....	411

12.4	Additional Constraints for Non-Explicit Topological Features: Order of Co-ordinate triplets in Feature Records .....	411
12.5	Mandatory Records .....	412
12.6	Record Format Specifications: Global Records .....	412
12.6.1	Album Header Record [ALHDREC] .....	412
12.6.2	Dataset Header Record [DSHDREC] .....	414
12.6.3	Field Definition Record [FIELDEFREC] .....	416
12.6.4	Record Definition Record [RECDEFREC] .....	417
12.6.5	Attribute Definition Record [ATDEFREC] .....	417
12.6.6	Directory Record [DIREC] .....	418
12.6.7	Feature Definition Record [FEATDEFREC] .....	419
12.6.8	Spatial Domain Record [SPADOREC] .....	419
12.6.9	Relationship Definition Record [RELDEFREF] .....	420
12.6.10	Source Record [SRCEREC] .....	420
12.6.11	Abbreviation Record [ABBRREC] .....	423
12.6.12	Administrative Structure Definition Record [ADMSTRDREC] .....	424
12.6.13	Default Attribute Record [DATTVALREC] .....	424
12.6.14	Attribute Value Definition Record [ATTVALREC] .....	424
12.6.15	Network Specification Record [NWSPECSREC] .....	425
12.6.16	Geodetical Parameter Records .....	425
12.6.17	Layer Header Record [LAYHREC] .....	429
12.6.18	Section Header Record [SECHREC] .....	430
12.6.19	Comment Record [COMMENTREC] .....	433
12.6.20	Volume Termination Record [VOLTERMREC] .....	434
12.7	Record Format Specifications : Data Records .....	434
12.7.1	Node Record [NODEREC] .....	434
12.7.2	Edge Record [EDGEREC] .....	435
12.7.3	Face Record [FACEREC] .....	435
12.7.4	Point Feature Record [POFEREC] .....	436
12.7.5	Line Feature Record [LIFEREC] .....	436
12.7.6	Area Feature Record [ARFEREC] .....	438
12.7.7	Complex Feature Record [COFEREC] .....	439
12.7.8	Text Record [TEXTREC] .....	440
12.7.9	Attribute Record [ATTREC] .....	440
12.7.10	Conversion Record [CONVERTREC] .....	441
12.7.11	Relationship Record [RELATREC] .....	442
12.7.12	Time Domain Record [TIMEREC] .....	442
12.7.13	Object Reference Record [OBJREFREC] .....	443
12.8	Record Format Specifications: Update Records .....	443
12.8.1	Geo Update Information Record [UPDIREC.01] .....	443
12.8.2	Object Update Information Record [UPDIREC.02] .....	444
12.8.3	Object Attribute Update Information Record [UPDIREC.03] .....	445
Annex A	(normative) Semantic Codes .....	446
A.1	Feature Theme and Feature Class Codes .....	446
A.2	Attribute Type Codes .....	450
A.2.1	Attributes for multiple Feature Themes .....	450
A.2.2	Attributes for Roads and Ferries .....	451
A.2.3	Attributes for Roads and Ferries and Chainage Referencing Feature .....	453
A.2.4	Attributes for Administrative Areas .....	454
A.2.5	Attributes for Named Areas .....	454
A.2.6	Attributes for Land Cover And Use .....	454
A.2.7	Attributes for Structures .....	454
A.2.8	Attributes for Railways .....	454
A.2.9	Attributes for Waterways .....	454
A.2.10	Attributes for Road Furniture .....	455
A.2.11	Attributes for Services .....	455
A.2.12	Attributes for Public Transport .....	456
A.2.13	Attributes for Chainage Referencing .....	456
A.2.14	User-defined Attributes .....	456

<b>A.3</b>	<b>Attribute Value Codes</b> .....	<b>457</b>
<b>A.3.1</b>	<b>Attribute Value Codes for Multiple Feature Themes</b> .....	<b>457</b>
<b>A.3.2</b>	<b>Attribute Value Codes for Roads and Ferries</b> .....	<b>458</b>
<b>A.3.3</b>	<b>Attribute Value Codes for Roads and Ferries and Chainage Referencing Features</b> .....	<b>461</b>
<b>A.3.4</b>	<b>Attribute Value Codes for Administrative Areas</b> .....	<b>463</b>
<b>A.3.5</b>	<b>Attribute Value Codes for Settlements and Named Areas</b> .....	<b>464</b>
<b>A.3.6</b>	<b>Attribute Value Codes for Land Cover and Use</b> .....	<b>464</b>
<b>A.3.7</b>	<b>Attribute Value Codes for Structures</b> .....	<b>465</b>
<b>A.3.8</b>	<b>Attribute Value Codes for Railways</b> .....	<b>465</b>
<b>A.3.9</b>	<b>Attribute Value Codes for Waterways</b> .....	<b>465</b>
<b>A.3.10</b>	<b>Attribute Value Codes for Road Furniture</b> .....	<b>466</b>
<b>A.3.11</b>	<b>Attribute Value Codes for Services</b> .....	<b>467</b>
<b>A.3.12</b>	<b>Attribute Value Codes for Public Transport</b> .....	<b>470</b>
<b>A.4</b>	<b>Relationship Type Codes</b> .....	<b>470</b>
<b>A.4.1</b>	<b>Defined Relationship Type Codes</b> .....	<b>470</b>
<b>A.4.2</b>	<b>User-defined Codes</b> .....	<b>474</b>
<b>Annex B</b>	<b>(informative) Metadata Codes</b> .....	<b>475</b>
<b>B.1</b>	<b>MARC Language Codes [4]</b> .....	<b>475</b>
<b>B.2</b>	<b>ISO 3166 Country Codes [7]</b> .....	<b>483</b>
<b>B.3</b>	<b>Codes for Geodetic Systems</b> .....	<b>488</b>
<b>B.3.1</b>	<b>Reference Codes for Horizontal Datums [11]</b> .....	<b>488</b>
<b>B.3.2</b>	<b>Reference Codes for Grid Systems [11]</b> .....	<b>494</b>
<b>B.3.3</b>	<b>Reference Codes for a number of Vertical Datums</b> .....	<b>499</b>
<b>B.3.4</b>	<b>List of Projection Types and Parameters</b> .....	<b>500</b>
<b>B.3.5</b>	<b>Reference Codes for Ellipsoids [11]</b> .....	<b>501</b>
<b>B.3.6</b>	<b>Reference Codes for Projection Types [11]</b> .....	<b>503</b>
<b>Annex C</b>	<b>(informative) Services</b> .....	<b>504</b>
<b>C.1</b>	<b>Service Definitions</b> .....	<b>504</b>
<b>C.1.1</b>	<b>Amusement Park</b> .....	<b>504</b>
<b>C.1.2</b>	<b>Airline Access</b> .....	<b>504</b>
<b>C.1.3</b>	<b>Airport</b> .....	<b>504</b>
<b>C.1.4</b>	<b>ATM</b> .....	<b>504</b>
<b>C.1.5</b>	<b>Bank</b> .....	<b>504</b>
<b>C.1.6</b>	<b>Bowling Centre</b> .....	<b>504</b>
<b>C.1.7</b>	<b>Business Facility</b> .....	<b>504</b>
<b>C.1.8</b>	<b>Bus Station</b> .....	<b>504</b>
<b>C.1.9</b>	<b>Camping</b> .....	<b>504</b>
<b>C.1.10</b>	<b>Car Dealership</b> .....	<b>504</b>
<b>C.1.11</b>	<b>Car Shipping Terminal</b> .....	<b>505</b>
<b>C.1.12</b>	<b>Caravan Site</b> .....	<b>505</b>
<b>C.1.13</b>	<b>Cargo Centre</b> .....	<b>505</b>
<b>C.1.14</b>	<b>Casino</b> .....	<b>505</b>
<b>C.1.15</b>	<b>Cinema</b> .....	<b>505</b>
<b>C.1.16</b>	<b>City Hall</b> .....	<b>505</b>
<b>C.1.17</b>	<b>City Centre</b> .....	<b>505</b>
<b>C.1.18</b>	<b>Coach and Lorry Parking</b> .....	<b>505</b>
<b>C.1.19</b>	<b>Community Centre</b> .....	<b>505</b>
<b>C.1.20</b>	<b>Court House</b> .....	<b>505</b>
<b>C.1.21</b>	<b>Cultural Centre</b> .....	<b>505</b>
<b>C.1.22</b>	<b>Customs</b> .....	<b>505</b>
<b>C.1.23</b>	<b>Department Store</b> .....	<b>505</b>
<b>C.1.24</b>	<b>Embassy</b> .....	<b>506</b>
<b>C.1.25</b>	<b>Emergency Call Station</b> .....	<b>506</b>
<b>C.1.26</b>	<b>Emergency Medical Service</b> .....	<b>506</b>
<b>C.1.27</b>	<b>Exhibition or Conference Centre</b> .....	<b>506</b>
<b>C.1.28</b>	<b>Ferry Terminal</b> .....	<b>506</b>
<b>C.1.29</b>	<b>Fire Brigade</b> .....	<b>506</b>
<b>C.1.30</b>	<b>First Aid Post</b> .....	<b>506</b>
<b>C.1.31</b>	<b>Free Port</b> .....	<b>506</b>

C.1.32	Frontier Crossing.....	506
C.1.33	Golf Course .....	506
C.1.34	Government Office.....	506
C.1.35	Historical Monument .....	506
C.1.36	Hospital/Polyclinic .....	506
C.1.37	Hotel or Motel .....	507
C.1.38	Kindergarten.....	507
C.1.39	Library .....	507
C.1.40	Marina.....	507
C.1.41	Motoring Organisation Office .....	507
C.1.42	Mountain Pass Summit .....	507
C.1.43	Museum .....	507
C.1.44	Open Parking Areas.....	507
C.1.45	Parking Garage .....	507
C.1.46	Petrol Station.....	507
C.1.47	Pharmacy.....	507
C.1.48	Place of Worship.....	507
C.1.49	Police Station .....	508
C.1.50	Post Office .....	508
C.1.51	Public Phone .....	508
C.1.52	Railway Station .....	508
C.1.53	Recreation Facility .....	508
C.1.54	Rent-a-Car Pick Up/Return.....	508
C.1.55	Rest Area .....	508
C.1.56	Restaurant .....	508
C.1.57	Roadside Diner.....	508
C.1.58	School .....	508
C.1.59	Shopping Centre .....	508
C.1.60	Ski Lift Station.....	508
C.1.61	Ski Resort .....	508
C.1.62	Sports Centre .....	509
C.1.63	Stadium.....	509
C.1.64	Swimming Pool .....	509
C.1.65	Theatre .....	509
C.1.66	Toll Location.....	509
C.1.67	Tourist Attraction.....	509
C.1.68	Tourist Office.....	509
C.1.69	Transport Company.....	509
C.1.70	Travel Agency .....	509
C.1.71	University or College.....	509
C.1.72	Vantage Point .....	509
C.1.73	Vehicle Repair Facility.....	509
C.1.74	Warehouse.....	509
C.1.75	Winery .....	510
C.1.76	Zoo.....	510
C.2	Feature Class Codes for Services.....	510
<b>Annex D</b>	<b>(normative) Syntax for Time Domains.....</b>	<b>512</b>
D.1	General Description.....	512
D.2	Starting Date syntax .....	512
D.2.1	Introduction .....	512
D.2.2	Sharp Time Terms.....	512
D.2.3	Fuzzy Time Terms.....	514
D.2.4	Summarizing table of all “sharp” symbols .....	514
D.2.5	Summarizing table of “fuzzy” symbols .....	514
D.2.6	Valid format combinations and default values for Starting Dates.....	515
D.3	Time duration syntax.....	520
D.3.1	Introduction .....	520
D.3.2	Sharp Time Terms.....	520
D.3.3	Fuzzy Time Terms.....	521

D.3.4	Summarizing table of all “sharp” symbols .....	522
D.3.5	Summarizing table of “fuzzy” symbols .....	522
D.3.6	Valid format combinations and default values for Time Durations .....	523
D.3.7	Time Domain examples .....	523
D.4	Time Domain combinations .....	525
D.4.1	General aspects .....	525
D.4.2	Example .....	526
D.5	Resolution of a Time Equation .....	526
D.5.1	Introduction .....	526
D.5.2	Boolean tables .....	526
D.5.3	Example of a resolution .....	527
<b>Annex E</b>	<b>(normative) Sectioning GDF Datasets .....</b>	<b>528</b>
E.1	Goal of Sectioning .....	528
E.2	Definitions .....	528
E.3	Rules of Sectioning .....	528
E.3.1	General .....	528
E.3.2	Determination of Sections .....	528
E.3.3	Level-0 Elements .....	529
E.3.4	Level-1 and 2 Features .....	529
E.3.5	Names .....	529
E.3.6	Relationships .....	530
E.3.7	Attributes .....	530
E.4	Relationship between <i>Sections</i> , <i>Layers</i> and <i>Datasets</i> .....	530
<b>Annex F</b>	<b>(informative) Rules for the Formation of Level 2 Features from Roads and Ferries .....</b>	<b>531</b>
F.1	Basic guidelines .....	531
F.1.1	Introduction .....	531
F.1.2	The difference between Intersections and Interchanges: Roundabouts .....	531
F.2	More guidelines for the formation of Intersections .....	532
F.2.1	Crossings .....	532
F.2.2	The practical case .....	533
<b>Annex G</b>	<b>(informative) Administrative Area Type Names for a Number of Countries .....</b>	<b>541</b>
<b>Annex H</b>	<b>(informative) Definition of Measuring Methods .....</b>	<b>542</b>
H.1	Scope .....	542
H.2	Description of Data Quality .....	542
H.3	Methods for Quality Measurement .....	542
H.3.1	General .....	542
H.3.2	Format Quality Checking .....	542
H.3.3	Semantical Quality Checking .....	543
H.4	Direct Semantical Quality Checking .....	544
H.4.1	Sampling Method .....	544
H.4.2	ISO 2859 “Sampling procedures for inspection by attributes” .....	544
H.4.3	Applying ISO 2859 to Digital Map Databases .....	545
H.4.4	Definition of Checks .....	547
H.4.5	Checking Procedure .....	549
H.5	Reporting Results .....	550
<b>Annex I</b>	<b>(informative) Specification of possible use of Attribute Types per Feature/Relationship .....</b>	<b>551</b>
I.1	Introduction .....	551
I.2	Roads and Ferries .....	551
I.3	Administrative Areas .....	571
I.4	Named Areas .....	579
I.5	Land Cover Use .....	591
I.6	Structures .....	595
I.7	Railways .....	596
I.8	Waterways .....	597
I.9	Road Furniture .....	599
I.10	Services .....	605
I.11	Public Transport .....	605

<b>I.12</b>	<b>Chainage Referencing Features .....</b>	<b>610</b>
<b>I.13</b>	<b>General Features.....</b>	<b>611</b>
<b>I.14</b>	<b>Specification of possible use of Attribute Types per Relationship.....</b>	<b>612</b>
	<b>Bibliography .....</b>	<b>616</b>