

Environmental Noise Directive

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June 2021	Issue first version
July 2022	Update UML diagrams of DF4_8: agglomerations, major roads, major railways and major airports <ul style="list-style-type: none"> - referenceLink: multiplicity is changed to 0 to many - new code list NoiseIndicatorIncludingAgglomerationValue is included for major sources in noise exposure data (DF4_8), used when reporting information for “mostExposedFacadeIncludingAgglomeration”
October 2022	Update UML diagram of DF2 Competent authorities to align with the Commission Implementing Decision (EU) 2021/1967: <ul style="list-style-type: none"> - clarification of reporting data on quiet areas (if no quiet area is delimited, no information shall be reported) - update of data type CompetentAuthorityDetails, attribute buildingNumber: multiplicity is changed to 0 to 1 (optional) - constraint in data types RoleByMajorRoad and RoleByMajorRail is changed to: ESTATUnitCode is mandatory if reportingLevel is country, NUTS or LAU

Contents

Summary	8
Acknowledgements	9
1 Overview of the Environmental Noise Directive (END)	10
2 Overview of INSPIRE Directive	12
3 Introduction to data model and data modelling process	14
3.1 Scope	14
3.2 Summary of data modelling process	15
4 END reporting data model overview	16
5 END mapping to INSPIRE spatial data themes	20
5.1 Scope and overview of mapping	20
5.2 Evaluation of mapping to INSPIRE spatial data themes and data models	21
5.2.1 Major roads and major railways	21
5.2.2 Major airports	22
5.2.3 Agglomerations	22
5.2.4 Noise contour maps	22
5.2.5 Quiet areas in agglomerations or in open country	22
5.2.6 Noise action plans	22
5.2.7 References to other geospatial data	23
5.3 Coordinate reference systems	23
6 Description of streamlined data model	25
6.1 Notation for data model description	25
6.2 Common complex data types used across the END data model	25
6.2.1 INSPIRE data type Identifier	25
6.2.2 INSPIRE data type ThematicIdentifier	26
6.2.3 Data type of geographical names - SimpleGeographicalName	27
6.2.4 Data type for referencing documents and other sources - SimpleCitation	29
6.3 INSPIRE data model property characteristic voidable	31
6.4 References to INSPIRE reference geospatial data sets of transport networks	31
6.5 Code lists management	32
6.6 Centreline geometry representation of roads and railways	33
7 Data model for major roads (DF1_5)	36
7.1 Feature type MajorRoadSource	36
7.2 Data types	40
7.2.1 Data type Identifier	40
7.2.2 Data type ThematicIdentifier	40
7.2.3 Data type SimpleGeographicalName	40
7.3 Code lists	40
8 Data model for major railways (DF1_5)	41
8.1 Feature type MajorRailwaySource	41
8.2 Data types	44
8.2.1 Data type Identifier	45
8.2.2 Data type ThematicIdentifier	45
8.2.3 Data type SimpleGeographicalName	45
8.3 Code lists	45

9	Data model for major airports (DF1_5)	46
9.1	Feature type MajorAirportSource	46
9.2	Data types	48
9.2.1	Data type SimpleGeographicalName	48
9.3	Code lists	48
10	Data model for agglomerations (DF1_5)	49
10.1	Feature type AgglomerationSource	49
10.2	Data types	53
10.2.1	Data type Identifier	53
10.2.2	Data type ThematicIdentifier	53
10.2.3	Data type SimpleGeographicalName	53
10.3	Code lists	53
11	Data model for competent authorities (DF2)	56
11.1	Top level data types	58
11.1.1	Data type CompetentAuthorityDetails	58
11.1.2	Top level data type CompetentAuthorityAgglomeration	58
11.1.3	Top level data type CompetentAuthorityAirport	59
11.1.4	Top level data type CompetentAuthorityRoad	59
11.1.5	Top level data type CompetentAuthorityRail	59
11.1.6	Top level data type CompetentAuthorityQuietArea	60
11.2	Data types	60
11.2.1	Data type RoleByAgglomeration	60
11.2.2	Data type AgglomerationSourceRoleType	61
11.2.3	Data type RoleByCAOCCode	61
11.2.4	Data type RoleByMajorRoad	62
11.2.5	Data type RoleByMajorRail	62
11.2.6	Data type TypeByQuietArea	63
11.2.7	Data type ThematicIdentifier	64
11.2.8	Data type ESTATUnitReference	64
11.3	Code lists	64
12	Data model for noise limit values (DF3)	67
12.1	Top level data types	69
12.1.1	Top level data type SourceReportData	69
12.2	Data types	69
12.2.1	Data type LimitValueType	69
12.2.2	Data type LimitValueDetailType	70
12.2.3	Data type SimpleCitation	71
12.2.4	Data type ThematicIdentifier	71
12.3	Code lists	71
13	Strategic noise maps - Noise contours (DF4_8)	74
13.1	Feature type EnvHealthDeterminantNoiseMeasure	75
13.2	Code lists	78
14	Strategic noise maps – Noise exposure data (DF4_8)	81
14.1	Top level data types	86
14.1.1	Top level data type ESTATUnitReference	86
14.1.2	Top level data type ExposureAgglomeration	86
14.1.3	Top level data type ExposureMajorRailway	87
14.1.4	Top level data type ExposureMajorRoad	88
14.1.5	Top level data type ExposureMajorAirport	89

14.2	Data types	90
14.2.1	Data type PopulationExposureInAgglomerationType.....	90
14.2.2	Data type PopulationExposureType.....	91
14.3	Code lists	93
15	Data model for noise control programmes (DF6_9)	96
15.1	Top level data types	98
15.1.1	Top level data type NoiseControlProgrammeAgglomeration.....	98
15.1.2	Top level data type NoiseControlProgrammeAirport.....	99
15.1.3	Top level data type NoiseControlProgrammeRail.....	99
15.1.4	Top level data type NoiseControlProgrammeRoad	100
15.2	Data types	101
15.2.1	Data type ESTATUnitType	101
15.2.2	Data Type SimpleCitation.....	102
15.2.3	Data type ThematicIdentifier	102
15.3	Code lists	102
16	Data model for noise action plans for agglomerations (DF7_10)	104
16.1	Feature type NoiseActionPlanCoverageArea.....	104
16.2	Top level data types	110
16.2.1	Data type NoiseActionPlanAgglomeration	110
16.3	Data types	112
16.3.1	Data type LegalContextType	112
16.3.2	Data type SimpleCitation	112
16.3.3	Data type LimitValueType.....	112
16.3.4	Data type PublicConsultationDetail	113
16.3.5	Data type AggMappingResultDetail.....	114
16.3.6	Data type AggReductionMeasureType	115
16.3.7	Data type PlannedMeasureType.....	116
16.3.8	Data type AggReductionHealthImpact	117
16.3.9	Data type ExposedToIndicatorType	118
16.4	Code lists	119
17	Data model for noise action plans for major airports (DF7_10).....	123
17.1	Feature type NoiseActionPlanCoverageArea.....	123
17.2	Top level data types	129
17.2.1	Data type NoiseActionPlanMajorAirport	129
17.3	Data types	131
17.3.1	Data type LegalContextType	131
17.3.2	Data type SimpleCitation	131
17.3.3	Data type LimitValueType.....	131
17.3.4	Data type PublicConsultationDetail	132
17.3.5	Data type AirMappingResultDetail	133
17.3.6	Data type AirReductionMeasureType.....	134
17.3.7	Data type PlannedMeasureType.....	135
17.3.8	Data type AirReductionHealthImpact	135
17.3.9	Data type ExposedToIndicatorType	136
17.4	Code lists	137
18	Data model for noise action plans for major railways (DF7_10)	141
18.1	Feature type NoiseActionPlanCoverageArea.....	141
18.2	Top level data types	147
18.2.1	Data type NoiseActionPlanMajorRailway	147
18.3	Data types	149

18.3.1	Data type LegalContextType	149
18.3.2	Data type SimpleCitation	149
18.3.3	Data type ReportingLevelType	149
18.3.4	Data type LimitValueType	150
18.3.5	Data type PublicConsultationDetail	150
18.3.6	Data type RailMappingResultDetail	152
18.3.7	Data type RailReductionMeasureType	153
18.3.8	Data type PlannedMeasureType.....	153
18.3.9	Data type RailReductionHealthImpact.....	154
18.3.10	Data type ExposedToIndicatorType	155
18.4	Code lists	155
19	Data model for noise action plans for major roads (DF7_10)	160
19.1	Feature type NoiseActionPlanCoverageArea.....	160
19.2	Top level data types	166
19.2.1	Data type NoiseActionPlanMajorRoad	166
19.3	Data types	168
19.3.1	Data type LegalContextType	168
19.3.2	Data type SimpleCitation	168
19.3.3	Data type ReportingLevelType	168
19.3.4	Data type LimitValueType	169
19.3.5	Data type PublicConsultationDetail	169
19.3.6	Data type RoadMappingResultDetail.....	171
19.3.7	Data type RoadReductionMeasureType	172
19.3.8	Data type PlannedMeasureType.....	172
19.3.9	Data type RoadReductionHealthImpact	173
19.3.10	Data type ExposedToIndicatorType	174
19.4	Code lists	174
20	Data model for quiet areas (DF7_10)	179
20.1	Feature type QuietArea	179
20.2	Data types	184
20.2.1	Data type SimpleGeographicalName	184
20.2.2	Data Type SimpleCitation.....	184
20.2.3	Data type ThematicIdentifier	184
20.2.4	Data type Identifier	184
20.3	Code lists	184
Annex 1	Detailed data models	187
Annex 2	Conceptual data model development process	206
Annex 3	Definition of spatial data in END and INSPIRE.....	208
Annex 4	Commonly used INSPIRE concepts.....	210
Annex 5	Overview of code lists in the END data model.....	212
Annex 6	Glossary	215
Annex 7	Acronyms.....	218

Summary

The Environmental Noise Directive 2002/49/EC (END)¹ defines reporting obligations for assessing and managing environmental noise. With the introduction of the directive 2007/2/EC on establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)² and the new Regulation 2019/1010 of the European Union (EU) on the alignment of reporting obligations in the field of legislation related to the environment, Member States will have to make data available from the END in agreement with the INSPIRE Directive. These changes in the reporting of noise data were adopted under the Commission Implementing Decision (EU) 2021/1967³. Therefore, a new data model which fulfils both, the END and the INSPIRE requirements was developed by the European Environment Agency.

The main objective of this document is to develop a data model that allows countries to deliver noise data in compliance with the new Commission Implementing Decision (EU) 2021/1967 and that builds up on the current data model for noise. This document describes how the INSPIRE data specifications were used to model all noise data flows (DF) that are currently reported under the END:

- Noise Sources (DF1_5),
- Competent Authorities (DF2),
- Limit Values (DF3),
- Strategic Noise Maps including noise contour maps and noise exposure data (DF4_8),
- Noise Control Programmes (DF6_9),
- Noise Action Plans and Quiet Areas (DF7_10).

The conceptual data model presents the agreed content for the END reporting data flows and serves as a basis to develop data exchange formats. For this purpose, the feasibility of the new data model, in particular the parts that include spatial information, was tested by developing encoding schemas and using data transformation tools to geoPackage and Geography Markup Language (GML) formats. The countries, the European Commission (EC) and the Joint Research Centre (JRC) provided additional support for modelling the data flows using INSPIRE specifications. The data model was produced using Unified Modelling Language (UML) and designed on the basis of the following INSPIRE data specifications: Area Management Restriction and Regulation Zones, Road Transport Network, Railway Transport Network, Air Transport Network and Human Health and Safety.

The data model described in this document along with the schemas in encoding formats will be used for reporting noise data through the European Environment Agency (EEA) reporting mechanism.

¹ <http://data.europa.eu/eli/dir/2002/49/oj>

² <http://data.europa.eu/eli/dir/2007/2/oj>

³ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021D1967>

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We would also like to acknowledge those organisations and groups that provided input to the report or feedback as part of the consultation process:

- representatives of EEA member and cooperating countries, who provided input through the European Environment Information and Observation Network (Eionet) national reference centres on noise as well as extranet members on noise;
- the European Commission — Directorate-General for the Environment;
- the European Commission — Joint Research Centre;

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1 Overview of the Environmental Noise Directive (END)

The Environmental Noise Directive (END) – Directive 2002/49/EC⁴ relating to the assessment and management of environmental noise, contains several provisions which require Member States (MS) to communicate information to the European Commission (EC) concerning the preparation and publication of **strategic noise maps** and **noise management action plans** for:

- All roads, railways, airports, and industrial sites within agglomerations with more than 100.000 inhabitants
- major roads (more than 3 million vehicles a year)
- major railways (more than 30.000 trains a year)
- major airports (more than 50.000 movements a year, including small aircrafts and helicopters).

The main aim of the END is to identify noise pollution levels and to trigger the necessary action both at Member State and at EU level. To pursue its stated aims the END focuses on the determination of exposure to environmental noise, ensuring information on environmental noise and its effects is made available to the public, and preventing and reducing environmental noise where necessary, preserving environmental noise quality where it is good. This Directive applies to noise to which humans are exposed, particularly in built-up areas, in public parks or other quiet areas in an agglomeration, in quiet areas in open country, near schools, hospitals and other noise-sensitive buildings and areas. It does not apply to noise that is caused by the exposed person himself, noise from domestic activities, noise created by neighbours, noise at work places or noise inside means of transport or due to military activities in military areas.

A Reporting Mechanism was developed first in 2007 to fulfil the reporting requirements of the Directive 2002/49/EC. This reporting mechanism has been updated and refined throughout the years. A number of factors were considered for the development of the new Reporting Mechanism:

- To simplify the reporting for Member States and minimize their reporting burden
- To reduce repetition through the use of relational database principles
- To adopt reporting formats that better suit the type of information to be reported, and which were in line with existing EEA/EC reporting approaches
- To keep the consistency of reporting formats between successive reporting rounds
- To allow data quality checking and assessment of data being reported.

The data model proposed in this paper has been developed to facilitate Member State reporting in a common format ensuring both that the reporting requirements of the END and of INSPIRE are met.

Specific instructions concerning the reporting platform and how to submit the requested information will be further developed in line with the Reportnet 3.0 (currently being developed and planned to be operational in 2022).

There are a number of articles of the END that were amended by the Regulation (EU) 2019/1010 of the European Parliament and of the Council on the alignment of reporting obligations in the field of legislation related to the environment. The amendments mainly relate to data availability and dissemination and the means by which is mandatory to conduct the reporting. The amendments are explained in detail below:

⁴ https://ec.europa.eu/environment/noise/directive_en.htm

Regulation (EU) 2019/1010 of the European Parliament and of the Council on the alignment of reporting obligations in the field of legislation related to the environment	
Data availability and dissemination	Amendment number 3 to Directive 2002/49/EC ⁵ : in Article 9, paragraph 1 is replaced by the following: <i>1. Member States shall ensure that the strategic noise maps they have made, and where appropriate adopted, and the action plans they have drawn up are made available and disseminated to the public in accordance with relevant Union legislative acts, in particular Directives 2003/4/EC (*)⁶ and 2007/2/EC (**)⁷ of the European Parliament and of the Council, and in conformity with Annexes IV and V to this Directive, including by means of available information technologies.</i>
Information exchange mechanism	Amendment number 5 to Directive 2002/49/EC ⁸ : in Annex VI, point 3 is replaced by the following: <i>3. Information exchange mechanism</i> <i>The Commission, assisted by the European Environment Agency, shall, by means of implementing acts, develop a mandatory digital information exchange mechanism to share the information from the strategic noise maps and summaries of action plans, as referred to in Article 10(2). Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 13(2).</i>

In order to fulfil the requirements from the above regulation (EU) 2019/1010, the commission adopted the implementing decision (EU) 2021/1967 on setting up a mandatory data repository and a mandatory digital information exchange mechanism in accordance with Directive 2002/49/EC⁹.

This END data model documentation is aligned with the new implementing decision and provides detailed conceptual and technical information on the new END digital information exchange mechanism.

⁵ <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1570187880808&uri=CELEX:32019R1010>

⁶ (*) Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC (OJ L 41, 14.2.2003, p. 26).

⁷ (**) Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) (OJ L 108, 25.4.2007, p. 1).'

⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1570187880808&uri=CELEX:32019R1010>

⁹ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021D1967>

2 Overview of INSPIRE Directive

The INSPIRE Directive 2007/2/EC¹⁰ aims to create a European Union spatial data infrastructure for the purposes of EU environmental policies or activities which may have an impact on the environment¹¹. This European Spatial Data Infrastructure will enable the sharing of environmental spatial information among public sector organisations, facilitate public access to spatial information across Europe and assist in policy-making across boundaries.

INSPIRE is based on the infrastructures for spatial information established and operated by the Member States of the European Union and other European countries. The Directive addresses 34 spatial data themes and defines essential requirements for interoperability and, where practicable, harmonisation of spatial data sets and spatial data services, way to describe spatial data sets and services (metadata), a set of network services to discover and access spatial data sets and measures for sharing of spatial data sets and services including reducing practical obstacles, likely occurring at the point of use.

The Directive came into force on 15 May 2007 and will be implemented in various stages, with full implementation required by 2021. To ensure that the spatial data infrastructures of the Member States is compatible and usable in a Community and transboundary context, the INSPIRE Directive required that common Implementing Rules (IR) were adopted in a number of specific areas:

- Data specifications related to 34 spatial data themes,
- Metadata for spatial data sets, series and spatial data services,
- Network services (discovery, view, download, transformation, invoke),
- Data and service sharing,
- Monitoring and reporting of INSPIRE implementation.

The Implementing Rules on interoperability of spatial datasets and services is underpinned with the INSPIRE technical guidelines for spatial data themes¹² that have been developed based on the common methodology for data specifications development and international standards, such as International Organization for Standardization (ISO), Open Geospatial Consortium (OGC) or World Wide Web Consortium (W3C).

The European Spatial Data Infrastructure is supported by the Community INSPIRE geoportal¹³ operated by the European Commission. The INSPIRE geoportal provides an entry point to available spatial data sets through network services established and operated by the Member States and other European countries implementing INSPIRE.

INSPIRE implementation is supported by the Commission expert group called INSPIRE Maintenance and Implementation Group (MIG) that consists of representatives of the INSPIRE national contact points. The MIG coordinates the joint activities between the European Commission (DG Environment and the JRC), the EEA and the EU Member States to support the maintenance and implementation of the INSPIRE Directive. The MIG has a permanent sub-group focusing on technical aspects (MIG-T) and can set up temporary sub-groups focusing on specific actions defined in the maintenance and implementation work programme (MIWP). The MIG actions defined in the work programme 2016-2020 provided several solutions to simplify INSPIRE implementation, e.g. simplified data – service

¹⁰ Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE);

<http://data.europa.eu/eli/dir/2007/2/oj>

¹¹ <https://inspire.ec.europa.eu/>

¹² <https://inspire.ec.europa.eu/Themes/Data-Specifications/2892>

¹³ <https://inspire-geoportal.ec.europa.eu/>

linking in metadata, alternative encodings such as geoJSON¹⁴ or geoPackage¹⁵ or use of new emerging standards. This practice will continue in the new MIG work-programme 2020 – 2024 which aims to modernise and include INSPIRE into the scope of the Commission initiatives on European data spaces and digital transformation.

The amendment of INSPIRE Directive¹⁶ and the Commission Implementing Decision¹⁷ as regards INSPIRE monitoring and reporting introduce a new mechanism to monitor the availability of the spatial data sets used for reporting under the environmental legislation. Those spatial data sets are defined in the priority list of datasets for eReporting¹⁸ and developed and managed by the INSPIRE Maintenance and Implementation Group (MIG)¹⁹. The list includes, among others, several spatial data sets related to and reported under the Environmental Noise Directive.

The European Commission provides a set of components supporting INSPIRE implementation in addition to the INSPIRE Geoportal, among others several registers²⁰, including INSPIRE code list register, validator for INSPIRE metadata, data sets and services²¹, INSPIRE monitoring and reporting tools or INSPIRE Community Forum²² - the platform to exchange implementation, thematic or other opinions and practices.

This diverse source of information has been evaluated and included into the development of the END data model to ensure compliance with the END reporting obligations and the INSPIRE Directive.

¹⁴ <https://github.com/INSPIRE-MIF/2017.2>

¹⁵ <https://github.com/IAAA-Lab/U2G/blob/master/GeoPackage/geopackage-encoding-rule.md>

¹⁶ <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1570187880808&uri=CELEX:32019R1010>

¹⁷ Commission Implementing Decision of 19.8.2019 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards monitoring and reporting

¹⁸

<https://webgate.ec.europa.eu/fpfis/wikis/display/InspireMIG/Action+2016.5%3A+Priority+list+of+datasets+for+e-Reporting>

¹⁹ <https://inspire.ec.europa.eu/inspire-maintenance-and-implementation/46>

²⁰ <https://inspire.ec.europa.eu/registry/>

²¹ <https://inspire.ec.europa.eu/validator/>

²² <https://inspire.ec.europa.eu/forum/>

3 Introduction to data model and data modelling process

3.1 Scope

The END data model has been developed to satisfy the reporting obligations specified in the Directive for the countries, as well as voluntary information that will enable data compliance, assessment and interpretation of the delivered information. At the same time, several INSPIRE spatial data themes refer to environmental noise use cases, including the reporting under the Environmental Noise Directive. Therefore, several key factors have been considered in the development of the new END reporting data model:

- To ensure conformity with both Directives respecting the END reporting cycles and the INSPIRE Directive full implementation roadmap
- To avoid or at least minimise multiple provision of spatial data sets under END and INSPIRE Directive and ensure better use of national infrastructures for spatial information
- To increase harmonisation and re-use of data, reduce fragmentation of data flows, and
- To consider functionalities of the new Reportnet 3.0 platform, such as a possibility for reporting at regional level or data harvesting, e.g. by using INSPIRE network services (still under development).

The scope of the data model presented in this document is therefore on a set of data that has to be reported under the END to the Commission and not on, usually more detailed and precise, data used in the noise modelling process. However, it is important to mention that datasets needed for noise modelling are likely covered by the INSPIRE Directive scope and shall be available through the INSPIRE infrastructure.

This document describes the new data model that has been developed for the Environmental Noise Directive in order to handle the requirements that European Union Member States (MS) and other reporting countries are required to report following the INSPIRE data specifications. The data model documentation will be reviewed by the European Commission Directorate-General Environment (DG ENV) and the Eionet-National Reference Centres for Noise.

The document tackles the following issues:

- The legal basis for reporting END data spatially according to INSPIRE specifications
- The data model overview
- The alignment between spatial data reported within the scope of the END and the INSPIRE spatial data themes and specifications
- The detailed description of the streamlined data model.

At a later stage, this document will be complemented with specific reporting guidelines that will describe Quality Assurance / Quality Control (QA/QC) procedures and how to report the new schemas using the new version of the EEA reporting platform, namely Reportnet 3.0.

The new END data model includes spatial data that conceptually matches with diverse INSPIRE spatial data themes.

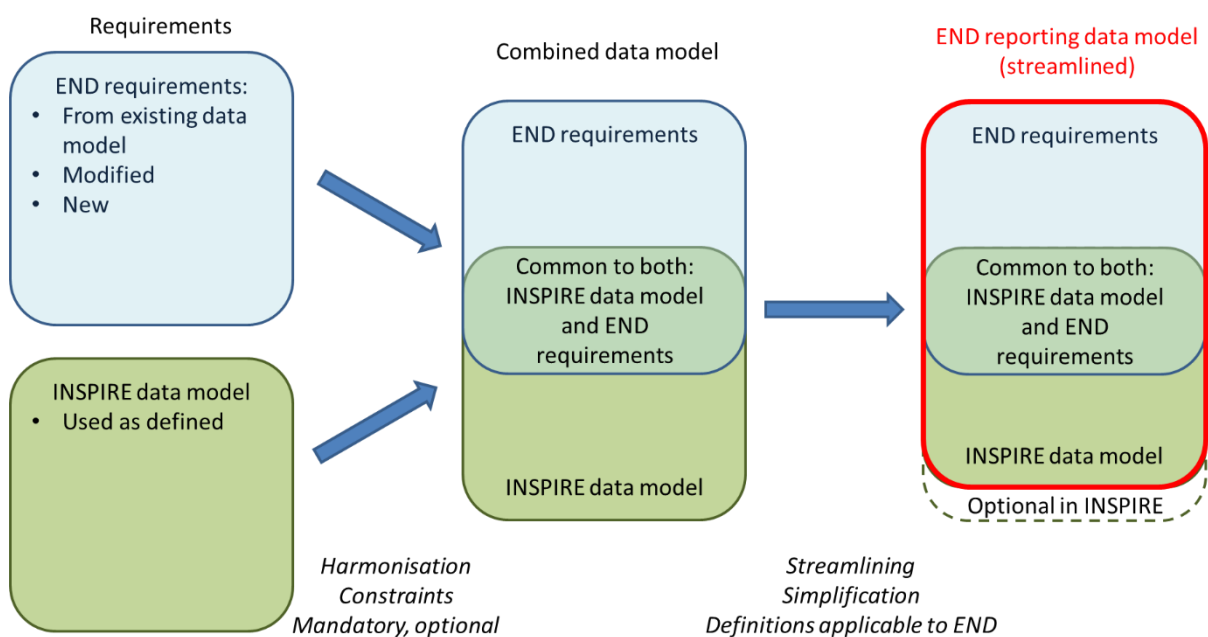
The previous END Data Model and Reporting Mechanism documentation has been used as a starting point for data modelling and as source of definitions of the END specific data requirements. The INSPIRE data specifications have been used as source of common methodology for data modelling and definitions of INSPIRE concepts.

3.2 Summary of data modelling process

The modelling process is described below. Further details are described in *Annex 2 Conceptual data model development process*

1. Establishing clear needs for spatial data under the END Directive reporting obligations,
2. Setting the basic mapping between the spatial data in END and the INSPIRE spatial data themes, considering also related INSPIRE data specifications and data models,
3. Taking as a basis of data modelling the original INSPIRE data models and evaluate data overlap and differences with the END requirements (and previous END reporting data model) focusing only on required spatial object types (e.g. for road or railway representation, for delineation of agglomerations), and adding specific END requirements (not present in the INSPIRE data models),
4. Streamlining and simplification rules have been focused on the END requirements to provide the streamlined END reporting data model. This data model doesn't include those properties from the INSPIRE data models that are optional and not required in the END scope, and includes simpler properties and data types, if applicable, based on proposed simplification rules developed for alternative encodings in INSPIRE²³.

Figure 1. Process of content matching between END and INSPIRE to develop END data model

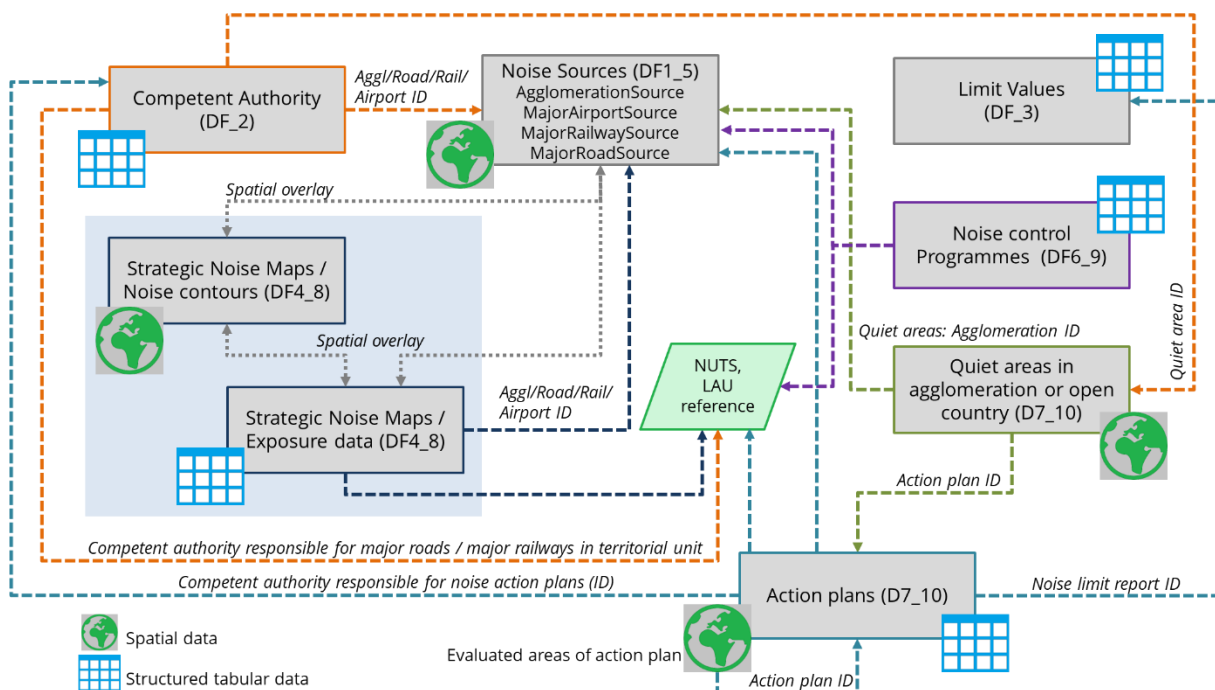


²³ <https://webgate.ec.europa.eu/fpfis/wikis/pages/viewpage.action?pageId=277742184>

4 END reporting data model overview

The new complete END data model includes data models corresponding to each END reporting data flow. The data models which include spatial information are designed as a combination of INSPIRE data models and specific END requirements. Further on, some other concepts, designed in the INSPIRE data specifications or developed through the INSPIRE Maintenance and Implementation (MIG) Work Programme, were used across data models, e.g. identifiers, harmonised data types or proposed alternative simplified data types. A schematic view of the complete END data model indicates the use and combination of spatial data and structured tabular data with basic relationships between individual data models (and reporting data flows): see Figure 2.

Figure 2. Combination of basic types of data in the END data model



The complete END data model covers all reporting obligations which are used as a basis to define packages that contain individual data models. The following packages are defined:

- **Noise Sources (DF1_5)**: major roads, major railways, major airports and agglomerations
- **Competent Authority (DF2)**: information about competent authorities and bodies responsible for implementing the END including noise maps, action plans and quiet areas
- **Limit Values (DF3)**: provision of any national or local noise limit values in place
- **Strategic Noise Maps (DF4_8)**: with information on:
 - Exposure data: estimated number of people living in areas exceeding the END noise reporting thresholds
 - Noise contours: noise contour maps present spatial extent of noise levels for different noise indicators
- **Noise Control Programmes (DF6_9)**: information on noise-control programmes that have been carried out in the past and noise-measures in place
- **Noise Action Plans and Quiet Areas (DF7_10)**: information on
 - Action plans designed to reduce and manage noise problems and its effects;
 - Protection and preservation of quiet areas in agglomerations or in open country.

The individual data models are interconnected to allow combining data from different data flows together.

This END data model also introduces a common basis of geospatial units for reporting specific aggregated and descriptive data (e.g. exposure data in the strategic noise maps). The model supports the use of different geospatial units that will allow the reporting of data not only at country or regional levels but also at smaller spatial units. Those are the well-established system of territorial units for statistics (NUTS) and local administrative units (LAU). The corresponding datasets exist in the Member States and member countries and they also exist as common pan-European datasets and are regularly updated. The datasets of nomenclature of territorial units for statistics (NUTS) and local administrative units (LAU), provided in specific scale, are also available as public data²⁴.

A comprehensive use of geospatial data or references to spatial objects gives opportunity to combine or cross-check data based on location information.

Table 1 shows the different reporting level options for each dataflow. It also indicates the geometry of the spatial data expected to be reported, if any.

For the noise sources dataflow (DF1_5), the roads, railways, airports and agglomerations of each country need to be submitted in spatial format and should be accompanied by their corresponding road, rail, agglomeration or airport identifier and other properties, e.g. annual traffic flow.

The reporting of competent authorities (DF_2) does not require any spatial data. The competent authorities of roads and railways in charge of the noise mapping or the action planning can be reported at country level, at NUTS1, at NUTS2, at NUTS3, at LAU, or at road/rail segment level (by identifiers). Competent authorities of major airports need to be reported using ICAO codes. Competent authorities of agglomerations need to be reported using agglomeration identifiers. Competent authorities in charge of protecting quiet areas is optional but recommended to report by using quiet area identifiers.

The limit values of a country or a defined reporting region (DF3) do not require any spatial information. The limit values can be reported at country level and it is possible to report these limits separately for each noise source or together for all sources.

The strategic noise maps (DF4_8) are comprised by two types of data. The noise contours are submitted as spatial data and need to be submitted using a closed line geometry or a polygon. The population exposure data is linked to spatial units and can be provided using different reporting levels. The population exposure data for major roads and railways can be reported at country level or using smaller territorial units such as NUTS 1, 2, 3 or LAU. In addition, unique identifiers for major roads and for major railways within LAU or NUTS areas can also be provided on voluntary basis for the submission of exposure information. For major airports the data has to be reported by ICAO code with the possibility to represent the population exposure at LAU level. The information on population exposure inside agglomerations for road, rail, industry, major roads inside agglomeration or major railways inside agglomeration can be reported either at agglomeration level or using LAU units. The population exposure for airports or major airports inside agglomerations can be reported at agglomeration level or at LAU level along with the respective ICAO code when major airports' information is reported. The connection between the population exposure data and noise contours is achieved also by the same categories of noise indicators and ranges or values used in both types of data.

The noise control programmes do not require any spatial data and can be submitted using different reporting levels. : country, NUTS1, NUTS2, NUTS3, LAU or at entity level. All noise control programmes

²⁴ <https://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/administrative-units-statistical-units>

need to specifically include the road segment identifier, the rail segment identifier, the ICAO code in the case of major airports and the unique identifier of an agglomeration that they refer to.

The noise action plans require the reporting of spatial information in the form of a polygon. The action plan information needs to be completed for each polygon or multipolygon for which the action plan is drawn up. The summary information of the noise action plans based on Annex III, V and VI of the END will be provided in tabular format. Such information includes indicating the road segment identifiers, the rail segment identifiers, the ICAO codes and the unique identifiers of an agglomeration covered in the action plan.

Quiet areas are included within the dataflow DF7_10 and require reporting a polygon of the quiet area that is being protected from environmental noise. For quiet areas within agglomerations it is required to specify the agglomeration identifier.

Table 1 Overview of reporting level options per data flow

	Levels of reporting						Spatial data**		
	Country ^{a)}	NUTS 1, 2, 3	Agglomeration	LAU	Airport ICAO	Road/Rail segment	Line	Point	Polygon
Noise sources (DF1_5)									
Major Road						x	x		
Major Rail						x	x		
Major Airports					x			x	
Agglomeration			x						x
Competent authorities (DF_2)									
Major Road	x	x		x		x			
Major Rail	x	x		x		x			
Major Airports					x				
Agglomeration (road, rail, air industry, major road, major rail, major airport)			x						No spatial data to be provided
Quiet areas			Quiet area ID						
Noise limit values (DF_3)									
Major Road									
Major Railway									
Major Airports									
Agglomeration (road, rail, air industry)									No spatial data to be provided
Strategic noise maps (DF4_8) Noise contour maps									
Major Road (including agglomerations)							x		x
Major Rail (including agglomerations)							x		x
Major Airports (including agglomerations)							x		x

	Levels of reporting						Spatial data**		
	Country ^{a)}	NUTS 1, 2, 3	Agglomeration	LAU	Airport ICAO	Road/Rail segment	Line	Point	Polygon
Agglomeration Road							x		x
Agglomeration Rail							x		x
Agglomeration Air							x		x
Agglomeration Industry							x		x
Strategic noise maps (DF4_8) Population exposure									
Major Road	x	x		x					
Major Rail	x	x		x					
Major Airports				x	x				
Major Roads inside Agglomerations			x	x					
Major Railways inside Agglomerations			x	x					
Major Airports inside Agglomerations			x	x	x				No spatial data to be provided
Agglomeration Road			x	x					
Agglomeration Rail			x	x					
Agglomeration Air			x	x					
Agglomeration Industry			x	x					
Noise control programmes (DF6_9)									
Major Road	x	x		x		x			
Major Rail	x	x		x		x			
Major Airports	x	x		x	x				No spatial data to be provided
Agglomeration	x	x	x	x					
Noise action plans (DF7_10) Summary							Coverage Area		
Major Road						x			x
Major Rail						x			x
Major Airports					x				x
Agglomeration			x						x
Quiet areas (DF7_10)									
Quiet areas in agglomeration		x							x

	Levels of reporting						Spatial data**		
	Country ^{a)}	NUTS 1, 2, 3	Agglomeration	LAU	Airport ICAO	Road/Rail segment	Line	Point	Polygon
Quiet areas in open country									x

Notes: ^a Country or reporting region

**In some cases geometries such as multiline and multipolygons can be provided.

5 END mapping to INSPIRE spatial data themes

5.1 Scope and overview of mapping

The scope of the INSPIRE spatial data themes and corresponding data specifications is focused on the general characteristics of spatial data that can be applicable to different use cases, reporting obligations are only one of them. Therefore, the INSPIRE data models mostly include general information, such as unique identifiers and geometry of spatial objects, object life cycle information related to data management principles and a set of other basic characteristics describing those spatial objects, e.g. name or specific categories.

On the other hand, the reported data under the END Directive are specifically designed to fulfil the reporting obligations and criteria defined by the END. These requirements have to be properly combined with the basic INSPIRE data models for spatial data.

The list of identified spatial data in the scope of the END Directive are related to the following INSPIRE spatial data themes, presented in Table 2 (definitions are provided in *Annex 3 Definition of spatial data in END and INSPIRE*).

Table 2. Overview of mapping END spatial data to INSPIRE spatial data themes

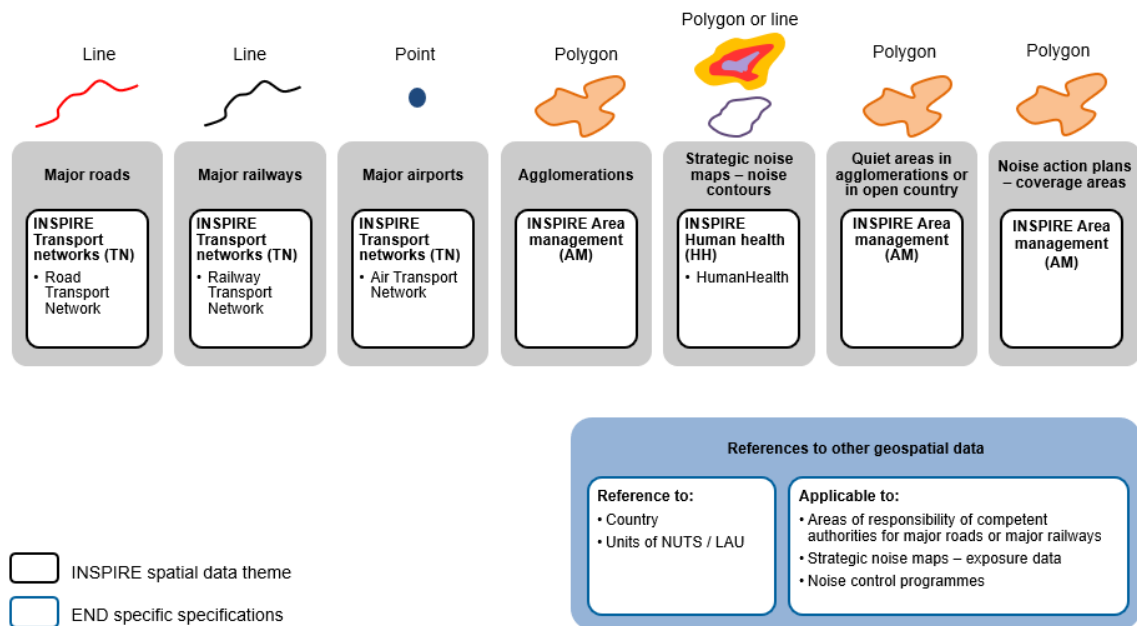
Basis for END spatial data	INSPIRE spatial data theme	INSPIRE spatial object type
Major roads (DF1_5)	INSPIRE Transport networks (TN) and specific Road Transport Network	RoadLink
Major Railways (DF1_5)	INSPIRE Transport networks (TN) and specific Railway Transport Network	RailwayLink
Major Airports (DF1_5)	INSPIRE Transport networks (TN) and specific Air Transport Network	AerodromeNode
Agglomerations (DF1_5)	INSPIRE Area management / restriction / regulation zones & reporting units (AM)	ManagementRestrictionOrRegulationZone
Noise contour maps (DF4_8)	INSPIRE Human health and safety (HH)	EnvHealthDeterminantMeasure (*)
Quiet areas in agglomerations or in open country (DF7_10)	INSPIRE Area management / restriction / regulation zones & reporting units (AM)	ManagementRestrictionOrRegulationZone
Noise Action plans (DF7_10)	INSPIRE Area management / restriction / regulation zones & reporting units (AM)	ManagementRestrictionOrRegulationZone

Legend :

(*) INSPIRE data model is included in the revision of the Implementing Rules on Interoperability²⁵

The INSPIRE data specifications mostly include general types of geometry of spatial information providing flexibility to define geometry types needed for specific purpose. Spatial data for the END purpose will be provided in suitable geometry types that are supported also by the INSPIRE data specifications, as shown in Figure 3.

Figure 3. Spatial data for END purpose, INSPIRE spatial data themes and expected geometry type



5.2 Evaluation of mapping to INSPIRE spatial data themes and data models

5.2.1 Major roads and major railways

The INSPIRE Transport networks (TN) data specifications define data models for typical transport modes: road, railway, air, water and cable transport. The data specifications also provide conditions for interconnected and topologically correct networks and how to apply a simple object and linear referencing that can be created on top of basic representation of physical transport infrastructures for specific transport properties, e.g. speed, type of pavement, electrification, etc.

The major roads and railways defined in the END are similar to the INSPIRE TN roads or railways with two important differences: the segments of major roads and railways are designed in a way to correspond with the END criteria of annual traffic flow and they present only a subset of a complete road or railway transport networks. Therefore, the spatial data related to major roads and major railways are considered as separate and specific datasets for the END reporting that are based on the combined data model of END requirements and the relevant INSPIRE TN data models for roads and railways.

²⁵ The European Commission is preparing the revision of the Implementing Rules on Interoperability (Commission Regulation (EU) No 1089/2010), expected to be adopted in 2020. The revision responds to requests on simplification, correction of errors or improved harmonisation that have been raised by the stakeholders involved in the INSPIRE implementation or INSPIRE users, and confirmed by the INSPIRE MIG. The revision applies also to the application schema of INSPIRE Human health and safety theme.

5.2.2 Major airports

Airports are part of the INSPIRE Air Transport Network data model, providing, among others, location information in a form of point geometry and two internationally recognised airport identifications: the International Air Transport Association (IATA) and the International Civil Aviation Organization (ICAO) codes.

The main requirements for spatial data related to major airports in the END are location by point geometry type and the airport identification through ICAO code. Both, location and ICAO code of airport are included in the INSPIRE Air Transport Network data specifications. Therefore, it can be expected that an INSPIRE spatial dataset of airports could be used as a source for location information and combined together with the END specific requirements for major airports. In this particular case, the previous data model for major airports could be re-used, while, when needed, location and geometry information could be provided by utilising appropriate INSPIRE network services (e.g. download service).

5.2.3 Agglomerations

The END Directive defines agglomerations as urbanised areas with a certain number of population, exceeding 100,000 people and a population density such that the Member State considers it to be an urbanised area.

The INSPIRE Area management / restriction / regulation zones & reporting units (AM) spatial data theme defines a more general and broader scope of areas managed, regulated or used for reporting at international, European, national, regional and local levels, including also, among others, noise restriction zones. This nature of areas managed or used for reporting provides the basis to map the agglomerations in the END with the INSPIRE AM spatial data theme.

5.2.4 Noise contour maps

The END Directive sets the basic requirements for strategic noise maps that can include spatial data more directly. Already under the current END reporting, the noise contour maps are reported as part of the strategic noise maps data submission. However, they are not provided in a harmonised way.

The INSPIRE spatial data theme Human Health and Safety (HH) is focused also on geographical distribution of information indicating effect on health or well-being of humans linked directly or indirectly to the quality of the environment, including pressures from noise. A dedicated data model of the INSPIRE HH for environmental health determinants is suitable to present the noise contours under the END Directive.

5.2.5 Quiet areas in agglomerations or in open country

The END recognises the need to preserve areas of good acoustic quality, referred as to 'quiet areas'. According to the END, quiet areas in agglomerations are areas delimited by competent authorities that are not exposed to certain noise values and quiet areas in the open country are areas undisturbed by noise traffic, industry or recreational activities.

Those areas are recognised as management areas and therefore, have been mapped according to the INSPIRE Area management / restriction / regulation zones & reporting units (AM) spatial data theme.

5.2.6 Noise action plans

The END Directive sets the basic requirements for noise action plans reporting. A new content structure was developed for reporting the summary information related to the action plans. In addition, the new model includes the provision of spatial information. The spatial information has been

included to assist the EC in checking the countries' fulfilment of the action plans' reporting as well as to visualise the areas that are covered by an action plan. The area covered by an action plan represents the area that has been evaluated by the competent authority in order to take decisions on reducing the negative health effects of noise. For urban areas, it is expected to be the boundary area of an agglomeration, a district in an agglomeration, or a LAU unit. For major sources, it is expected to be the area surrounding the noise source which has been evaluated by noise contours during the noise mapping process or the area in which health effects due to noise from the major source are likely to occur.

The data model of noise action plans combines two parts of information: a summary information of the noise action plan and the spatial information of the areas where the noise action plan applies. The nature of areas provide the basis to map the areas of noise action plans related to END with the INSPIRE Area management / restriction / regulation zones & reporting units (AM) spatial data theme.

5.2.7 References to other geospatial data

The END data model includes also references to geospatial data of territorial units within the Member States and member countries to provide specific data required under the END. For this purpose, the common nomenclature of territorial units for statistics (NUTS) that is established and governed by the statistical office of the European Union (EU), Eurostat, is going to be used. The NUTS classification²⁶ defines hierarchical levels of units from country boundaries to smaller regions, as following:

- Country level boundary
- NUTS 1: major socio-economic regions
- NUTS 2: basic regions for the application of regional policies
- NUTS 3: small regions for specific diagnoses
- LAU²⁷: local administrative units, that covers the demand for statistics at a local level, are compatible with NUTS and are the building blocks of the NUTS.

The common European geospatial data of NUTS and LAU include the EU Member States and other European countries and ensures harmonisation and granularity of data that can be re-used for the END reporting.

The END data model doesn't include specifications of country boundaries, NUTS and LAU units. This type of geospatial data is also related to the INSPIRE spatial data themes on Statistical units and/or Administrative units. Therefore, it can be expected the geospatial data will be provided according to those INSPIRE specifications. The END data model references the NUTS / LAU spatial objects by their known and unique identifiers.

5.3 Coordinate reference systems

The INSPIRE Directive and its implementing rules provide detailed requirements for provision of spatial data, among others a list of coordinate reference systems and map projections suitable to cover the European spatial extent.

The INSPIRE data specifications on coordinate reference systems²⁸ provides a harmonised specification for uniquely referencing spatial information, either using three-dimensional, two-dimensional or compound coordinate reference systems for determining the horizontal and vertical components. It also provides the specification for map projections to be used for geo-referencing the spatial

²⁶ <https://ec.europa.eu/eurostat/web/nuts/background>

²⁷ <https://ec.europa.eu/eurostat/web/nuts/local-administrative-units>

²⁸ <https://inspire.ec.europa.eu/Themes/130/2892>

information in plane coordinates. For the END scope, the most suitable coordinate reference system(s) will be defined based on the coordinate reference systems defined in the INSPIRE specifications.

6 Description of streamlined data model

This documentation includes streamlined views of data models that cover actual requirements in the context of the Environmental Noise Directive. Detailed views of data models are included in *Annex 1 Detailed data models*. The detailed views of data models include complete INSPIRE data models and other detailed information related to the END reporting, e.g. constraints, conditions, default values.

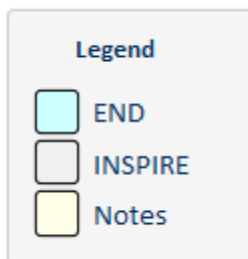
6.1 Notation for data model description

The following chapters contains the different data models developed. Each model is presented through five main elements:

- General description of data model,
- Data model diagram,
- Feature types, top level data types, definitions and descriptions,
- Other complex data types used when a property (attribute) has several items of information (e.g. , Identifier (INSPIRE)),
- Code lists: a series of pre-defined values to standardise the information gathered for certain properties (attributes) (e.g. NoiseSourceValue, ZoneTypeCode (INSPIRE)).

The data models include a colouring system as visual aid to understand the content and its origin. The distinction between elements requested from the END and from the INSPIRE Directive have been done through the following legend (see Figure 4), including as well explanation notes:

Figure 4. Legend used in the END data models



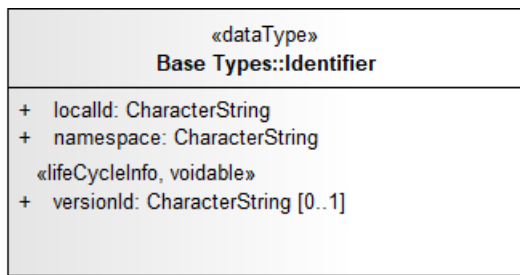
6.2 Common complex data types used across the END data model

The INSPIRE data specifications include several harmonised complex data types that are used across different INSPIRE data models. The same principle is used also in the complete END data model which includes complex data types defined in INSPIRE and others, specifically designed for the END reporting purpose. The complex data types are defined with aim to organise pieces of information into meaningful logical units, e.g. a complex data for describing a document can include several properties such as title, date of issuing, URL of the on-line document version, etc. This chapter describes the structure of common complex data types used across the END data model. The following chapters (from chapter 7 to chapter 18) provide detailed information about complex data types used in each individual data model in the complete END data model.

6.2.1 INSPIRE data type Identifier

Identifier: External unique object identifier published by the responsible body, which may be used by external applications to reference the spatial object.

Figure 5. INSPIRE data type Identifier



It is defined in the INSPIRE Implementing Rules on Interoperability and it is composed of three attributes (details are described in *Annex 4. Commonly used INSPIRE concepts*):

localId: A local identifier, assigned by the data provider. The local identifier is unique within the namespace, that is no other spatial object carries the same unique identifier.

It is mandatory.

namespace: Namespace uniquely identifying the data source of the spatial object.

It mandatory.

versionId: The identifier of the particular version of the spatial object. If the specification of a spatial object type with an external object identifier includes life-cycle information, the version identifier is used to distinguish between the different versions of a spatial object. Within the set of all versions of a spatial object, the version identifier is unique.

In the END data model, versionId of Identifier data type is not foreseen to be used as versions of same objects are not monitored in the reporting data flows. It is optional.

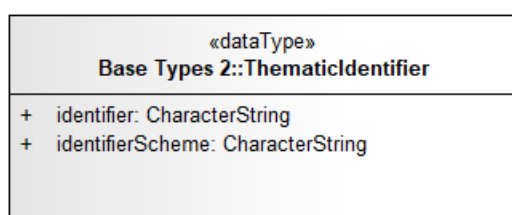
A good practice in identifier management also applies to use already commonly agreed identifiers of spatial objects (e.g. for END: major road identifier, major railway identifier, agglomeration identifier) as localId. However, if the Member States have already in place different rules for the INSPIRE Identifier data type, these rules can apply also for END reported data.

6.2.2 INSPIRE data type ThematicIdentifier

The concept of thematic identifiers is used also in the INSPIRE data specifications. For this purpose, the complex data type ThematicIdentifier presents the use of identifiers of spatial objects agreed within a specific thematic domain or a use case. Re-using those identifiers keeps traceability and conformity with previously provided data (e.g. under other types of specifications). Different thematic domains can define different thematic identifiers for the same spatial object following the most suitable domain needs and requirements, e.g. a road can carry a national code, international code or a specific code for the END reporting purpose; a protected site can carry a national or regional code or Natura 2000 site code. Thus, to distinguish identifiers among different thematic domains, the ThematicIdentifier data type includes also information of the domain within which that identifier is defined and is unique.

ThematicIdentifier: Thematic identifier to uniquely identify the spatial object.

Figure 6. INSPIRE data type ThematicIdentifier



It is defined in the INSPIRE Implementing Rules on Interoperability and it is composed of two attributes:

identifier: Unique identifier used to identify the spatial object within the specified identification scheme.

It is mandatory.

identifierScheme: Identifier defining the scheme used to assign the identifier.

It is mandatory.

The END data model primarily includes the concept of thematic identifiers. Therefore, ThematicIdentifier data type is used across the complete END data model to uniquely identify spatial objects and all other objects – entities, e.g.: major road segments, major railway segments, agglomerations, competent authorities, quiet areas, reports of limit values, noise control programmes and noise action plans. In case of major airports or other airports, the internationally defined ICAO code is used as unique identifier.

As ThematicIdentifier requires to define also a domain, the unique domain for the END reporting purpose is defined as “**EUENDCode**” and it is default value in the END data model. The thematic identifier scheme EUENDCode will be described and published in the Eionet Data Dictionary, at: <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>.

For the END reporting purpose, the complete URL of EUENDCode must be provided for attribute identifierScheme, as shown in the next example.

Example:

identifierScheme = <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>

6.2.3 Data type of geographical names - SimpleGeographicalName

The INSPIRE data specifications re-use the data type GeographicalName, defined in the INSPIRE Geographical names data model, for specifying names of spatial objects. However, this highly complex and nested data type became very impractical for simple use of names of spatial objects in other data models. Therefore, the INSPIRE MIG Work Programme action on alternative encoding (2017.2)²⁹ proposed a simpler data type that could replace the more complex data type GeographicalName in specific cases. Based on this information, the SimpleGeographicalName data type has been defined for the END reporting purpose.

SimpleGeographicalName: Provides a name in English language and in national language, including code of national language.

²⁹ <https://github.com/INSPIRE-MIF/2017.2/tree/master/model-transformations>

Figure 7. INSPIRE data type SimpleGeographicalName

«dataType» SimpleGeographicalName
+ nameEng: CharacterString + localName: CharacterString + localNameLanguage: iso639-3

«codeList» iso639-3
<i>tags</i> vocabulary = http://dd.eionet.europa.eu/vocabulary/common/iso639-3/

It is composed of three attributes:

nameEng: name in English language.

It is mandatory. If English name is not available, local name can be reused with Latin alphabet.

localName: name in the national or local language.

It is mandatory.

localNameLanguage: specification about the national or local language by providing a three-letter language code from ISO 639-3.

This attribute uses a value from the code list Iso639-3. It is mandatory.

Code list:

Iso639-3: Language codes according to the standard ISO 639-3.

The code list includes language codes according to the standard ISO 639-3.

The code list iso639-3 is published in the Eionet Data Dictionary: <http://dd.eionet.europa.eu/vocabulary/common/iso639-3/>.

The subset of language codes that corresponds with the countries reporting under the END will be used.

Figure 8. Code list iso639-3

«codeList» iso639-3
<i>tags</i> vocabulary = http://dd.eionet.europa.eu/vocabulary/common/iso639-3/

Example:

- German language

- Code: deu
- URL: <http://dd.eionet.europa.eu/vocabulary/common/iso639-3/deu>
- Spanish language:
 - Code: spa
 - URL: <http://dd.eionet.europa.eu/vocabulary/common/iso639-3/spa>

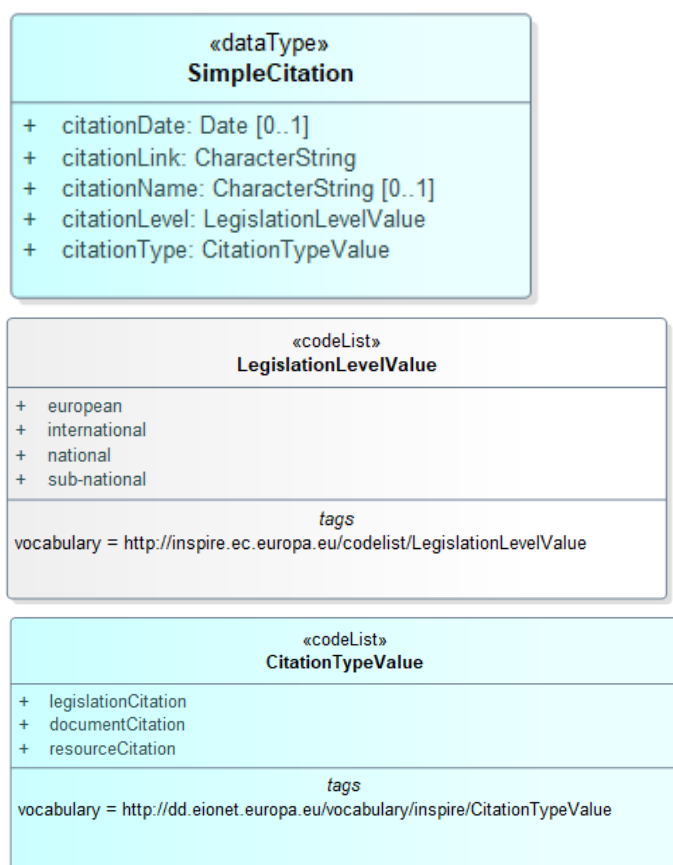
6.2.4 Data type for referencing documents and other sources - SimpleCitation

The INSPIRE data specifications use different data types for a citation and description of data or information sources, e.g. legislation, reports or other types of documents and sources. Those are ISO 19115 CI_Citation³⁰ and specifically defined common data types DocumentCitation and LegislationCitation³¹. However, these complex data types became very impractical if only a simple citation is required. Therefore, the INSPIRE MIG Work Programme action on alternative encoding (2017.2)³² proposed a simple data type that could be used for citation of diverse sources

Based on this information, the SimpleCitation data type has been defined for the END reporting purpose. The SimpleCitation data type includes the following information about the source: date, link, name (or title), level and type. A source can be a legal act, report or other types of documents or sources.

SimpleCitation: Provides a citation of a source.

Figure 9. INSPIRE data type SimpleCitation



³⁰ <https://inspire.ec.europa.eu/data-model/approved/r4618-ir/html/EARoot/EA1/EA3/EA13/EA15/EA2739.htm>

³¹ <https://inspire.ec.europa.eu/data-model/approved/r4618-ir/html/index.htm?goto=2:1:9:3:7453>

³² <https://github.com/INSPIRE-MIF/2017.2/tree/master/model-transformations>

The data type SimpleCitation is composed of the following attributes:

citationDate: Date when the source was issued.

It is optional.

citationLink: Link to the website where the source is available.

It is mandatory.

citationName: Title of the source.

It is optional.

citationLevel: Legislative or administrative level at which the source has been adopted.

This attribute uses a value from the INSPIRE code list LegislationLevelValue. It is mandatory.

citationType: Type of source.

This attribute uses a value from the code list CitationTypeValue. It is mandatory.

The code list CitationTypeValue is going to be managed in the Eionet Data Dictionary³³.

Code lists:

LegislationLevelValue: The level at which a legal act or convention has been adopted.

For the END reporting purpose, this code list defines the level at which a citation, legal act or report has been adopted: international, European, national or sub-national level. This is the INSPIRE code list published in the INSPIRE code list register: <http://inspire.ec.europa.eu/codelist/LegislationLevelValue> .

Figure 10. Code list LegislationLevelValue

«CodeList» LegislationLevelValue
+ european + international + national + sub-national
<i>tags</i> vocabulary = http://inspire.ec.europa.eu/codelist/LegislationLevelValue

CitationTypeValue: Type of citation.

This code list defines the type of citation indicating legislation, document or other resource.

The code list CitationTypeValue is going to be managed in the Eionet Data Dictionary³⁴:

<http://dd.eionet.europa.eu/vocabulary/inspire/CitationTypeValue> .

³³ <https://dd.eionet.europa.eu/>

³⁴ <https://dd.eionet.europa.eu/>

Figure 11. Code list CitationTypeValue

«codeList» CitationTypeValue	
+	legislationCitation
+	documentCitation
+	resourceCitation
<i>tags</i>	
vocabulary = http://dd.eionet.europa.eu/vocabulary/inspire/CitationTypeValue	

6.3 INSPIRE data model property characteristic voidable

The spatial information in the END data model is based on the underpinning INSPIRE data models, thus inheriting also properties and their characteristics and constraints. One of such characteristics is “voidable” which is used to declare “no data” in a data set. When a property value is not present in a spatial data set, but it may be present or applicable in the real world, the value of void may be used as a value of that property. The INSPIRE data models include stereotype <<voidable>> for such properties. The void values are defined in the INSPIRE code list VoidReasonValue³⁵.

The INSPIRE properties that are mandatory and voidable are included also in the END data model. The values of those properties can be provided in two ways:

- When data is not available, the void reason is required. The proposed void reason is “Unpopulated” (The characteristic is not part of the dataset maintained by the data provider. However, the characteristic may exist in the real world.)³⁶, or
- Value of a property is provided for a spatial object in a data set.

Code list:

VoidReasonValue: Reasons for void values.

This is the INSPIRE code list published in the INSPIRE code list register:
<https://inspire.ec.europa.eu/codelist/VoidReasonValue>.

Figure 12. Code list VoidReasonValue

«codeList» VoidReasonValue	
+	Unknown
+	Unpopulated
+	Withheld

6.4 References to INSPIRE reference geospatial data sets of transport networks

There is no doubt that diverse detailed and high scale spatial data sets, that fall also under the INSPIRE Directive scope, are needed for evaluation of noise pollution, e.g. for noise modelling, developing of strategic noise maps or noise action plans, however this is out of scope of the END reporting data.

The major transport noise sources, defined in the END – major roads, major railways and major airports, represent only subsets of wider transport network data sets (that are in the scope of the INSPIRE Directive) and include additional data required by the END. These subsets are created with a

³⁵ <https://inspire.ec.europa.eu/codelist/VoidReasonValue>

³⁶ <https://inspire.ec.europa.eu/codelist/VoidReasonValue/Unpopulated>

focus on the END criteria of annual traffic flow of more than three million vehicle passages a year for a major road, more than 30 000 train passages per year for a major railway and more than 50 000 movements per year for a major airport. According to these criteria, the individual major road or major railway segments might be generated by additional processing of basic road or railway data, e.g. joint or split geometry, combining roads, highway exits or entries or roundabouts into individual road segment, or combining railway corridors into individual railway segment.

The alternative approach in data modelling could be using a harmonised linear referencing according to the INSPIRE TN data specifications to reference the END properties directly to the reference geospatial data sets of transport networks available in the European spatial data infrastructure (INSPIRE). However, this approach might go beyond current capacities in preparing reporting data for the END reporting purpose. Heterogeneity of INSPIRE implementation might also require individual adaptations for using these data sets directly as part of reported data which is also out of scope of the END reporting data. Therefore, for the END reporting purpose, it is expected that reported spatial data sets of major roads, major railways and major airports will explicitly include geometry of spatial objects and their other properties.

The END data models of major roads, major railways and major airports are based on underpinning INSPIRE data models combined with the END requirements. Additionally, a simple referencing mechanism is included as a step forward to create in future a better connectivity to the reference geospatial data sets of transport networks accessible in the INSPIRE infrastructure. This simple reference is optional and constructed of two parts:

- Link to a reference dataset (linkToReferenceDataset)
- Link to a reference object in that dataset (linkToReferenceObject).

Figure 13. Simple relationship to reference geospatial data of transport networks

linkToReferenceDataset: CharacterString [0..1] linkToReferenceObject: CharacterString [0..1]

A link to a reference dataset in the INSPIRE infrastructure can be provided by:

- Link to a metadata of the data set
- Service
- Other information – location from which the dataset can be downloaded.

A link to a reference spatial object in that data set can be provided by spatial object identifier. If a spatial object identifier is already provided as a resolvable URI, it will allow a direct access to that spatial object and its properties.

This simple relationship to a spatial object has a diverse meaning: it can reflect an exact match between two spatial objects (e.g. major airport), a part of the reference geospatial object (e.g. a major road is a subset (part) of a longer road object) or links to several reference geospatial objects (e.g. major railway segment is composed of several railway corridors).

6.5 Code lists management

The INSPIRE registry³⁷ provides a central access point to a number of centrally managed INSPIRE registers, including the code list register. The INSPIRE code list register contains the code lists and their values, as defined in the INSPIRE implementing rules on interoperability of spatial data sets and services (Commission Regulation (EU) No 1089/2010). The code lists are referenced in the INSPIRE data models and re-used also in the END data model.

³⁷ <http://inspire.ec.europa.eu/registry>

The EEA established a similar register, the Eionet Data Dictionary, with aim to support reporting data flows by providing harmonised vocabularies³⁸. The code lists defined in the END data model, i.e. code lists with specific END related content, commonly known code lists (e.g. ISO language codes) and extended INSPIRE code lists for the END reporting purpose, will be managed in the Eionet Data Dictionary.

The Eionet Data Dictionary describes each concept (code list and code list values) with a set of information, e.g. identifier, label, notation, definition, relationship with other concepts (e.g. relationship to INSPIRE code list values) and management information.

The complete list of code lists used in the END data model is included in *Annex 5*.

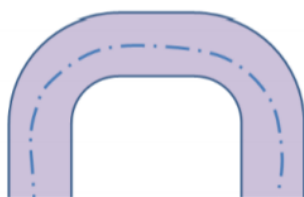
6.6 Centreline geometry representation of roads and railways

The spatial data sets of major roads, major railways or other types of roads and railways for the END reporting purpose are associated with the INSPIRE spatial data theme transport networks. The data models of major roads and major railways are designed as extension of underlying INSPIRE data models of spatial object types RoadLink and RailwayLink, both including a centreline geometry representation. According to the INSPIRE TN, the primary way of representing a transport network is by a centreline (i.e. a line that approximates the centre of the real world object). The centrelines of road and rail objects shall fall within the extent of the physical real world object that they represent if the road or railway link is indicated as not being ‘fictitious’. The INSPIRE TN data specifications include more detailed information of acceptable or not acceptable examples of centreline geometry representation³⁹.

Figure 14. Centreline geometry representation with regard to the real world object



The centreline falls inside the real world object. (Acceptable)



The centreline falls inside the real world object and while it does not follow the exact centreline it is acceptable. (Acceptable)

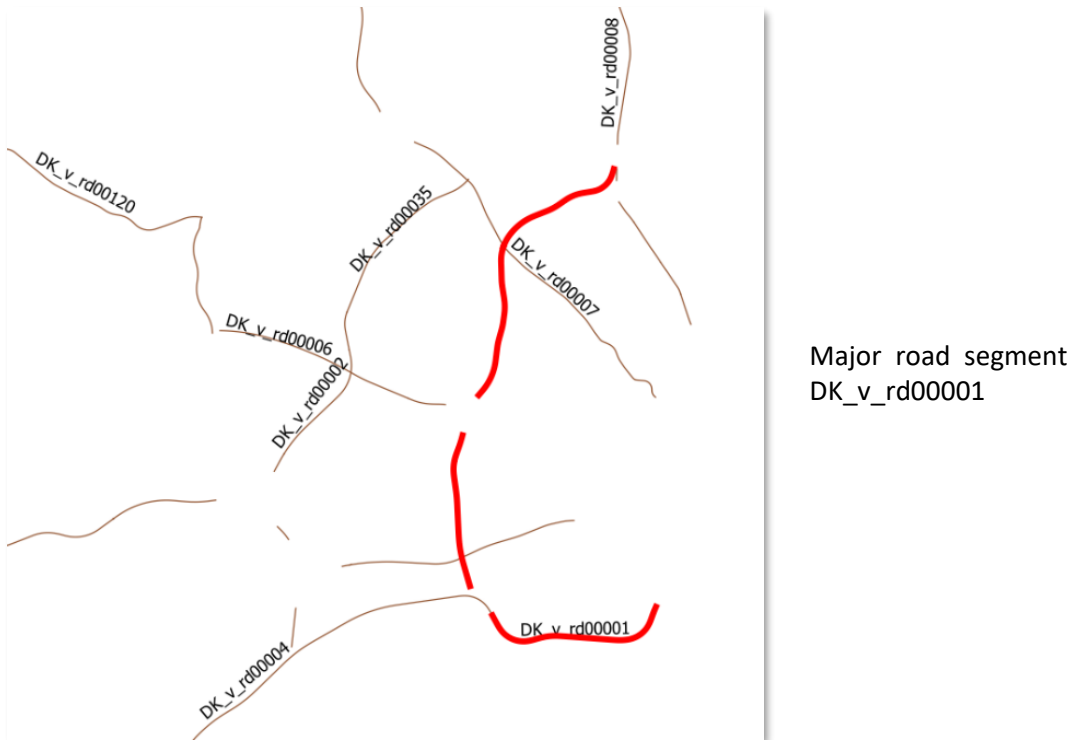
Source: D2.8.1.7 Data Specification on Transport Networks – Technical Guidelines

For the END reporting purpose of major roads, major railways or other types of roads and railways, only a centreline is expected to represent the location of the real physical road or railway regardless of number of carriageways or traffic lanes (roads) or parallel tracks (railways) or traffic flow directions. A centreline geometry shall apply to roads and railways and their splits (forks) that are considered as major roads or major railways for the END reporting purpose. The annual traffic flow data assigned to each major road or major railway segment shall include the combined traffic flow from both directions.

³⁸ <https://dd.eionet.europa.eu/vocabularies>

³⁹ <https://inspire.ec.europa.eu/id/document/tg/tn>

Figure 15. Centreline geometry representation of major roads



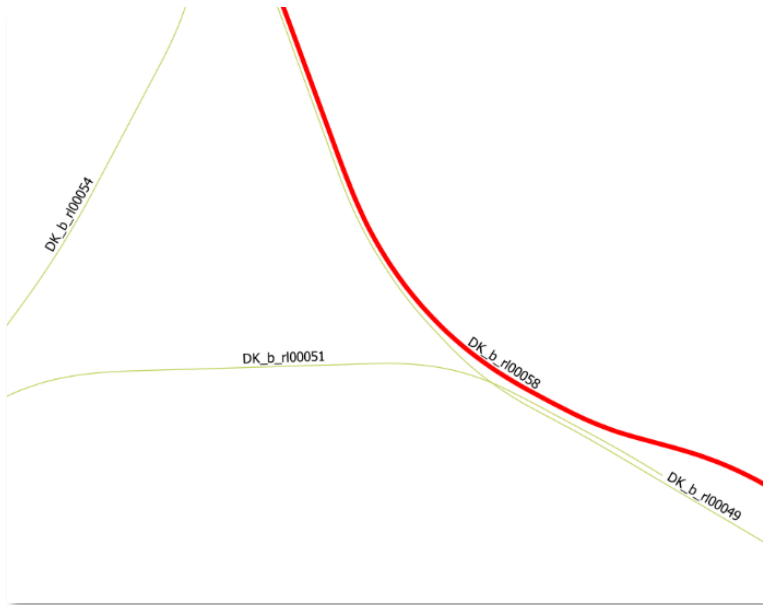
Source: END reported data from Denmark

Figure 16. Major roads in Austria: one centreline per road



Source: END reported data from Austria

Figure 17. Centreline geometry representation of major railways



Major railway segment
DK_b_r100058

Source: END reported data from Denmark

Figure 18. Major railways in Germany: one centreline per railways



Source: END reported data from Germany

7 Data model for major roads (DF1_5)

According to the END, a major road shall mean a regional, national or international road, designated by the Member State, which has more than three million vehicle passages a year. Therefore, major roads present a sub-set of a broader road network(s) and require specific properties e.g. road identifier, annual traffic flow and geometry as location information of real-world physical roads.

The data model for major roads is based on the INSPIRE TN data specifications for Road Transport Network and extended with the END specific properties. Figure 19 presents the streamlined view of the data model and the detailed data model is presented in *Annex 1*.

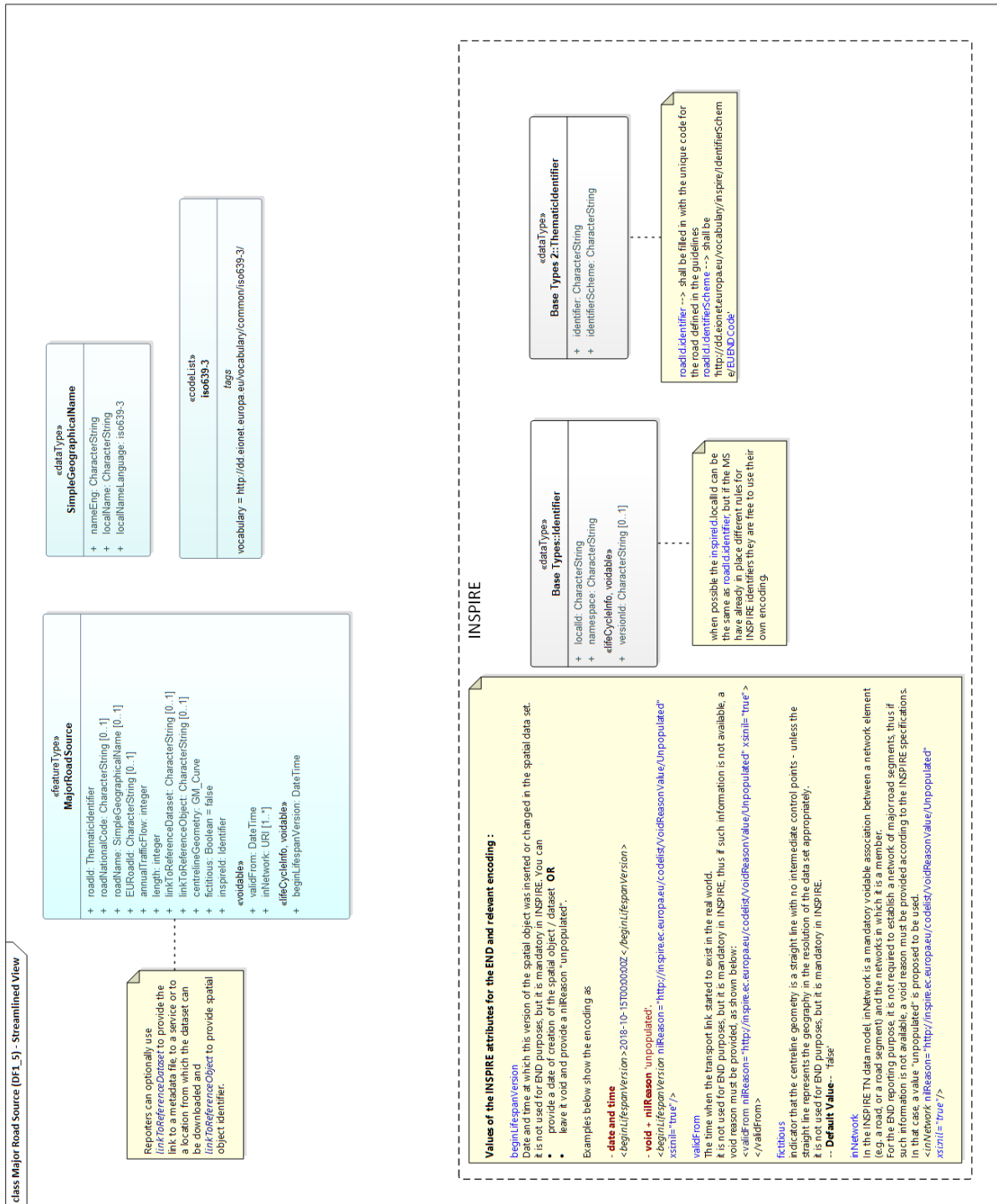
7.1 Feature type MajorRoadSource

The feature type MajorRoadSource combines the properties of the INSPIRE TN feature type RoadLink⁴⁰ and specific properties required under the END (see Figure 19).

The data model explicitly includes geometry of major road segments as centreline (see 6.6) and it includes also a simple option to provide information about the reference dataset of road network and specific reference road to which major roads could be linked. This information increases the connectivity between major roads defined for the END reporting purpose and reference road network(s) that could be already available through the INSPIRE infrastructure.

⁴⁰ <http://inspire.ec.europa.eu/data-model/approved/r4618-ir/html/index.htm?goto=2:1:9:7:7627>

Figure 19. Streamlined data model for major roads (DF1_5)



The feature type MajorRoadSource is composed of the following attributes:

roadId: Unique identifier assigned to each major road segment.

This attribute is provided according to the data type ThematicIdentifier. It is mandatory. Specific guidelines for data type ThematicIdentifier for the END reporting purpose:

- roadId.identifier: shall be filled in with the unique code of a major road segment
- roadId.identifierScheme: shall be <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>.

roadNationalCode: Road code used within Member State.

It is optional.

roadName: Official road name used within Member State.

This attribute is provided according to the data type SimpleGeographicalName. It is optional.

EURoadId: European road code used to reference the road.

It is optional.

annualTrafficFlow: Number of vehicle passages in a year on the major road segment.

It is mandatory.

length: Actual length of the major road segment, in metres.

It is mandatory.

linkToReferenceDataset: Information about INSPIRE reference dataset of road network to which major road could be linked.

The reference can be provided in the following options: a) a reference to a metadata of the dataset, b) a web service to access the dataset, including INSPIRE download service, or c) a reference to a web site from where the dataset can be accessed and downloaded. It is optional.

linkToReferenceObject: Reference to road (spatial object) in the reference dataset of road network that is provided in the attribute linkToReferenceDataset.

It is optional.

centrelineGeometry: Geometry of major road, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, geometry shall be represented as a centreline of a major road. It is mandatory.

fictitious: Identification of the trajectory of the major road segment as a real (physical) road or a fictitious trajectory between road segments, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, major road segments always present real (physical) roads, therefore a default value “false” is expected for this attribute. It is mandatory.

inspireId: External object identifier of the spatial object, defined in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It is provided according to the data type Identifier. It is mandatory. Specific guidelines for the data type Identifier for the END reporting purpose:

- inspireId.localId: When possible the inspireId.localId can be the same as roadId.identifier, but if a Member State has already in place different rules for INSPIRE identifiers these rules could be used.
- inspireId.namespace: A data provider will define the namespace considering also a Member State rules for INSPIRE identifiers, if available.

validFrom: Starting date and time of validity of a major road, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, validity information of major roads (i.e. when it started to exist in the real world) is not required, however a void reason has to be provided according to the INSPIRE TN data specifications. In that case, a value “unpopulated” is proposed to be used. It is mandatory.

inNetwork: Means a reference to the networks in which the major road is a member, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is the association in the INSPIRE data model defined as the mandatory voidable association between a network element (e.g. a road, or a road segment) and the networks in which it is a member. For the END reporting purpose, it is not required to establish a network of major road segments, thus if such information is not available, a void reason must be provided according to the INSPIRE specifications. In that case, a value “unpopulated” is proposed to be used.

In cases, where it is possible to establish such membership to road networks, it must be provided according to the INSPIRE TN specifications.

It is mandatory.

beginLifespanVersion: It records a start or a change of major road segments in the spatial dataset, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, lifespan information when a major road segment has been inserted or changed in the spatial dataset is not required. However, beginLifespanVersion can be provided as:

- date and time information of creation of a major road segment in a dataset, or of creation of a dataset itself, or
- a void reason must be provided. In that case, the value “unpopulated” is proposed to be used.

It is mandatory.

7.2 Data types

The following specific complex data types are used in the data model.

7.2.1 Data type Identifier

The data type **Identifier** is an INSPIRE data type and is defined to describe external unique object identifier and used across INSPIRE spatial data themes and data models.

It is defined in the INSPIRE Implementing Rules on Interoperability and it is composed of three attributes: localId, namespace and versionId.

Details are described in 6.2.1 and *Annex 4. Commonly used INSPIRE concepts*.

7.2.2 Data type ThematicIdentifier

The data type **ThematicIdentifier** is an INSPIRE data type and is defined to uniquely identify the spatial object within a particular information domain, e.g. in the END scope.

It is defined in the INSPIRE Implementing Rules on Interoperability and it is composed of two attributes: identifier and identifierScheme.

Details are described in 6.2.2 and *Annex 4. Commonly used INSPIRE concepts*.

7.2.3 Data type SimpleGeographicalName

The data type **SimpleGeographicalName** is a simpler version of the INSPIRE GeographicalName data type. It is defined for the END reporting purpose and provides a name in English language and in national or local language, including code of national or local language.

It is composed of three attributes: nameEng, localName and localNameLanguage.

Details are described in 6.2.3.

7.3 Code lists

The data model includes the following pre-defined code lists:

Iso639-3: Language codes according to the standard ISO 639-3.

Details are described in 6.2.3.

8 Data model for major railways (DF1_5)

According to the END, a major railway shall mean a railway, designated by the Member State, which has more than 30.000 train passages per year. Therefore, major railways present a sub-set of a broader railway network and require specific properties e.g. railway identifier, annual traffic flow and geometry as location information of real-world physical railways.

The data model for major railways is based on the INSPIRE TN data specifications for Railway Transport Network and extended with END specific properties. Figure 20 presents the streamlined view of the data model and the detailed data model is presented in *Annex 1*.

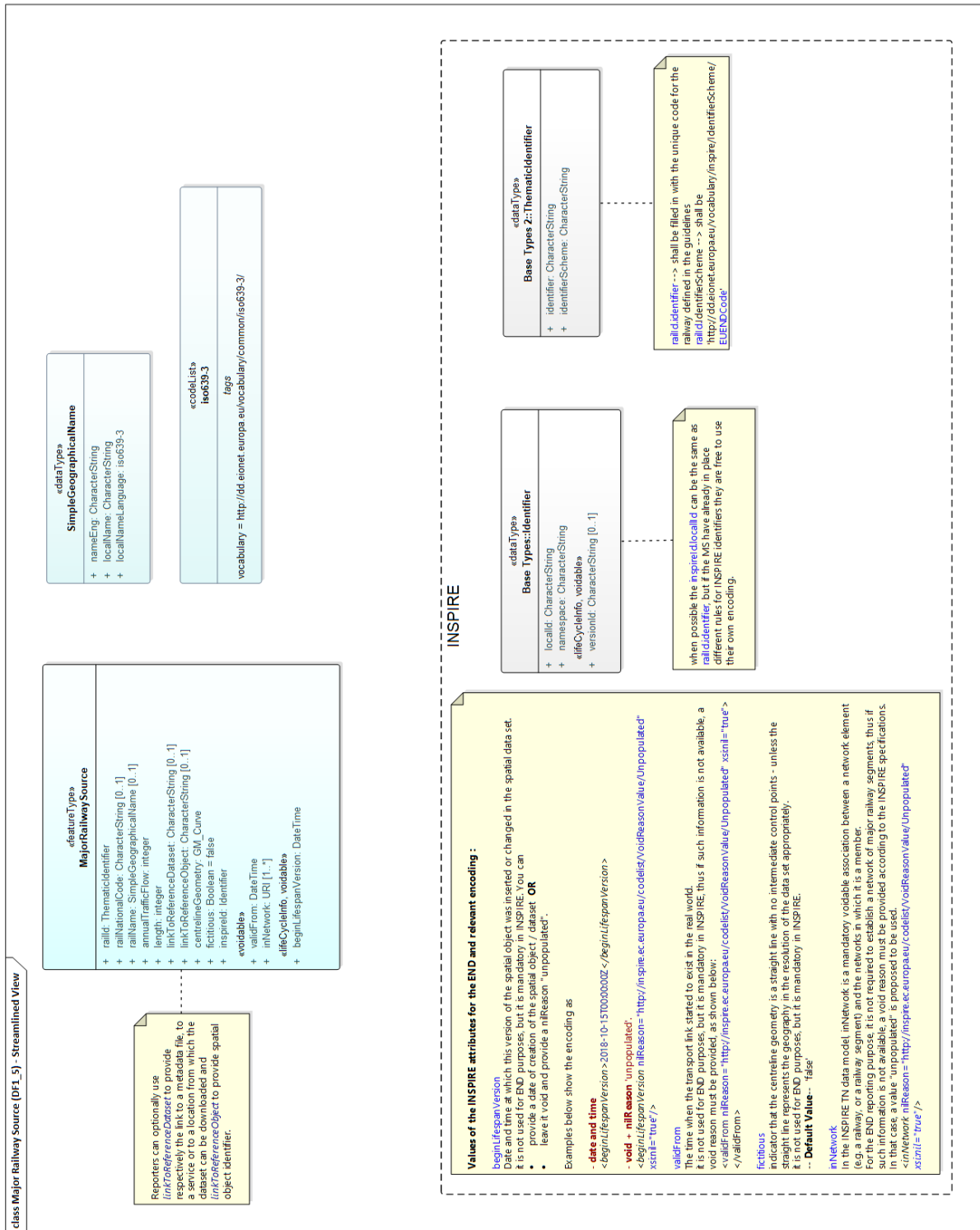
8.1 Feature type MajorRailwaySource

The feature type MajorRailwaySource combines the properties of the INSPIRE TN feature type RailwayLink⁴¹ and specific properties required under the END Directive. The feature type RailwayLink describes the geometry and it can be used to represent stretches of railway with one or multiple tracks. (see Figure 20).

The data model explicitly includes geometry of major railway segments as centreline (see 6.6) and it also includes a simple option to provide information about the reference dataset of railway network and specific reference railway to which major railway segment could be linked. This information increases the connectivity between major railways defined for the END reporting purpose and reference railway network(s) that could be already provided according to the INSPIRE data specifications and available through the INSPIRE infrastructure.

⁴¹ <http://inspire.ec.europa.eu/data-model/approved/r4618-ir/html/index.htm?goto=2:1:9:4:7508>

Figure 20. Streamlined data model for major railways (DF1_5)



The feature type MajorRailwaySource is composed of the following attributes:

railId: Unique identifier assigned to each major railway segment.

This attribute is provided according to the data type ThematicIdentifier. It is mandatory.

Specific guidelines for data type ThematicIdentifier for the END reporting purpose:

- railId.identifier: shall be filled in with the unique code of a major railway segment
- railId.identifierScheme: shall be <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>.

railNationalCode: Railway code (railway identification number) used within Member State.

It is optional.

railName: Official rail name used within Member State.

This attribute is provided according to the data type SimpleGeographicalName. It is optional.

annualTrafficFlow: Number of train passages in a year on the major railway segment.

It is mandatory.

length: Actual length of the major railway segment, in metres.

It is mandatory.

linkToReferenceDataset: Information about INSPIRE reference dataset of railway network to which major railway could be linked.

The reference can be provided in the following options: a) a reference to a metadata of the dataset, b) a web service to access the dataset, including INSPIRE download service, or c) a reference to a web site from where the dataset can be accessed and downloaded. It is optional.

linkToReferenceObject: Reference to railway (spatial object) in the reference dataset of railway network that is provided in the attribute linkToReferenceDataset.

It is optional.

centrelineGeometry: It presents geometry of major railway, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, geometry shall be represented as a centreline of a major railway. It is mandatory.

fictitious: Identification of the trajectory of the major railway segment as a real (physical) railway or a fictitious trajectory between railway segments, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, major railways segments always present real (physical) railways, therefore a default value “false” is expected for this attribute. It is mandatory.

inspireId: External object identifier of the spatial object, defined in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It is provided according to the data type Identifier. It is mandatory. Specific guidelines for the data type Identifier for the END reporting purpose:

- inspireId.localId: When possible the inspireId.localId can be the same as railId.identifier, but if a Member State has already in place different rules for INSPIRE identifiers these rules could be used.
- inspireId.namespace: A data provider will define the namespace considering also a Member State rules for INSPIRE identifiers, if available.

validFrom: Starting date and time of validity of a major railway, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, validity information of major railways (i.e. when it started to exist in the real world) is not required, however a void reason has to be provided according to the INSPIRE TN data specifications. In that case, a value “unpopulated” is proposed to be used. It is mandatory.

inNetwork: Means a reference to the networks in which the major railway is a member, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is the association in the INSPIRE data model defined as the mandatory voidable association between a network element (e.g. a railway, or a railway segment) and the networks in which it is a member. For the END reporting purpose, it is not required to establish a network of major railway segments, thus if such information is not available, a void reason must be provided according to the INSPIRE specifications. In that case, a value “unpopulated” is proposed to be used.

In cases, where it is possible to establish such membership to railway networks, it must be provided according to the INSPIRE TN specifications. It is mandatory.

beginLifespanVersion: It records a start or a change of major railway segments in the spatial dataset, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, lifespan information when a major railway segment has been inserted or changed in the spatial dataset is not required. However, beginLifespanVersion can be provided as:

- date and time information of creation of a major railway segment in a dataset, or of creation of a dataset itself, or
- a void reason must be provided. In that case, the value “unpopulated” is proposed to be used.

It is mandatory.

8.2 Data types

The following specific complex data types are used in the data model.

8.2.1 Data type Identifier

The data type **Identifier** is an INSPIRE data type and is defined to describe external unique object identifier and used across INSPIRE spatial data themes and data models.

It is defined in the INSPIRE Implementing Rules on Interoperability and it is composed of three attributes: localId, namespace and versionId.

Details are described in 6.2.1 and *Annex 4. Commonly used INSPIRE concepts*.

8.2.2 Data type ThematicIdentifier

The data type **ThematicIdentifier** is an INSPIRE data type and is defined to uniquely identify the spatial object within a particular information domain, e.g. in the END scope.

It is defined in the INSPIRE Implementing Rules on Interoperability and it is composed of two attributes: identifier and identifierScheme.

Details are described in 6.2.2 and *Annex 4. Commonly used INSPIRE concepts*.

8.2.3 Data type SimpleGeographicalName

The data type **SimpleGeographicalName** is a simpler version of the INSPIRE GeographicalName data type. It is defined for the END reporting purpose and provides a name in English language and in national or local language, including code of national or local language.

It is composed of three attributes: nameEng, localName and localNameLanguage.

Details are described in 6.2.3.

8.3 Code lists

The data model includes the following pre-defined code lists:

Iso639-3: Language codes according to the standard ISO 639-3.

Details are described in 6.2.3.

9 Data model for major airports (DF1_5)

According to the END, major airport shall mean a civil airport, designated by the Member State, which has more than 50.000 movements per year (a movement being a take-off or a landing), excluding those purely for training purposes on light aircraft.

The data model for major airports includes spatial data, however only a point geometry is expected to indicate a location of a major airport. Spatial data of airports are also in the scope of the INSPIRE Directive and the INSPIRE TN data specifications for Air Transport Network which defines a feature type `AerodromeNode`⁴² with general information about airports, including location and internationally recognised airport codes such as IATA and ICAO codes.

A location of major airports for the END reporting purpose could be provided from spatial datasets of airports available and accessible in the INSPIRE infrastructure. The data model for major airports can indirectly link to the INSPIRE data model and appropriate spatial data sets of airports through the airport ICAO code. However, due to heterogeneity in INSPIRE implementation and available spatial data sets, the geometry is still explicitly required for the spatial data sets of airports for the END reporting purpose.

Therefore, a simple data model of major airports is designed for the END reporting purpose including all END required properties instead of using and extending the INSPIRE data model for `AerodromeNode` feature type (see Figure 21).

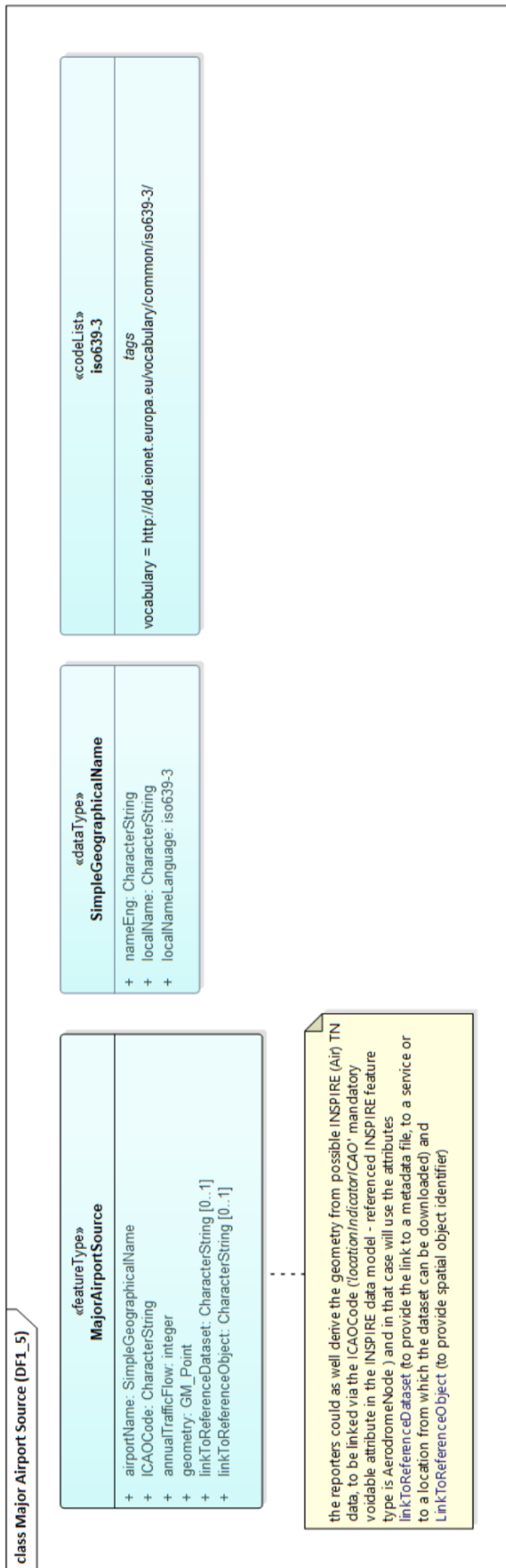
9.1 Feature type `MajorAirportSource`

The feature type `MajorAirportSource` includes basic airport information, including location, ICAO code, name and annual traffic data.

The data model of major airports includes also a simple option to provide information about the reference dataset of air network and specific reference airport to which a major airport could be linked. This information increases the connectivity between major airports defined for the END reporting purpose and reference air network(s) that could be already provided according to the INSPIRE data specifications and available through INSPIRE infrastructure.

⁴² <https://inspire.ec.europa.eu/data-model/approved/r4618-ir/html/index.htm?goto=2:1:9:3:7453>

Figure 21. Streamlined data model for major airports (DF1_5)



The feature type MajorAirportSource is composed of the following attributes:

airportName: Official name of the major airport.

This attribute is provided according to the data type SimpleGeographicalName. It is mandatory.

ICAOCode: Unique international code of airport defined by the International Civil Aviation Organization.

ICAOCode applies to major airports defined in the END. It is mandatory.

annualTrafficFlow: Number of movements in a year at the major airport.

It is mandatory.

geometry: Geometry represents location of the major airport.

This attribute corresponds with the INSPIRE geometry attribute. For the END reporting purpose, point geometry is required. It is mandatory.

linkToReferenceDataset: Information about INSPIRE reference dataset of airport network to which major airport could be linked.

The reference can be provided in the following options: a) a reference to a metadata of the dataset, b) a web service to access the dataset, including INSPIRE download service, or c) a reference to a web site from where the dataset can be accessed and downloaded. It is optional.

linkToReferenceObject: Reference to airport (spatial object) in the reference dataset of airport network that is provided in the attribute linkToReferenceDataset, through matching ICAO code of a major airport.

It is optional.

9.2 Data types

The following specific complex data types are used in the data model.

9.2.1 Data type SimpleGeographicalName

The data type **SimpleGeographicalName** is a simpler version of the INSPIRE GeographicalName data type. It is defined for the END reporting purpose and provides a name in English language and in national or local language, including code of national or local language.

It is composed of three attributes: nameEng, localName and localNameLanguage.
Details are described in 6.2.3.

9.3 Code lists

The data model includes the following pre-defined code lists:

Iso639-3: Language codes according to the standard ISO 639-3.
Details are described in 6.2.3.

10 Data model for agglomerations (DF1_5)

According to the END, agglomeration shall mean part of a territory, delimited by the Member State, having a population in excess of 100.000 persons and a population density such that the Member State considers it to be an urbanised area.

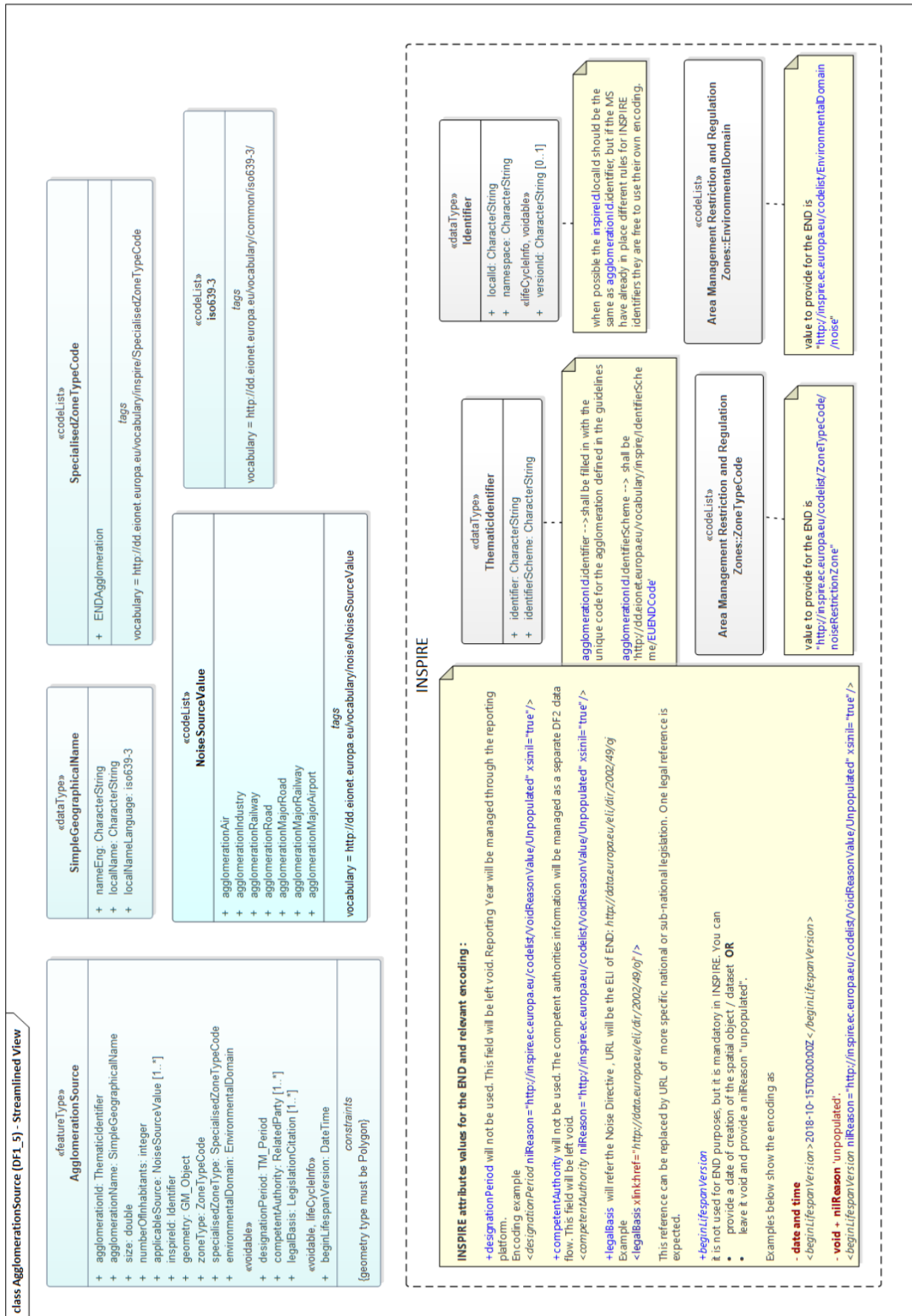
The data model for agglomerations includes spatial data and is based on the INSPIRE AM data specifications which is designed to accommodate different types of managed areas established in diverse environmental domains (e.g. air, climate and climate change, waste, water, noise, etc.). Therefore, it is necessary to include all properties from the INSPIRE AM that are needed to unambiguously describe agglomerations for the END reporting purpose. For this purpose, the following INSPIRE AM properties are included: environmental domain, zone type and specialised zone type. Those properties can carry uniform default values that correspond with the END reporting purposes. Figure 22 presents the streamlined view of the extended INSPIRE data model with END specific properties for agglomerations, and the detailed data model is presented in *Annex 1*.

10.1 Feature type AgglomerationSource

The feature type AgglomerationSource combines the properties of the INSPIRE AM feature type ManagementRestrictionOrRegulationZone⁴³ and specific properties required under the END Directive.

⁴³ <http://inspire.ec.europa.eu/data-model/approved/r4618-ir/html/index.htm?goto=2:3:4:1:7936>

Figure 22. Streamlined data model for agglomerations (DF1_5)



The feature type AgglomerationSource is composed of the following attributes:

agglomerationId: Unique identifier assigned to each agglomeration.

This attribute is provided according to the data type ThematicIdentifier. It is mandatory.

Specific guidelines for data type ThematicIdentifier for the END reporting purpose:

- agglomerationId.identifier: shall be filled in with the unique code of agglomeration
- agglomerationId.identifierScheme: shall be <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>.

agglomerationName: Name of agglomeration.

This attribute is provided according to the data type SimpleGeographicalName. It is mandatory.

size: Area of coverage of the agglomeration, in km².

It is mandatory.

numberOfInhabitants: Number of inhabitants living inside the boundary of the agglomeration.

It is mandatory.

applicableSource: Name of the existing type of noise sources inside the agglomeration and for which strategic noise maps and action plans need to be provided.

The attribute is provided according to NoiseSourceValue. It is mandatory.

The applicable code list values are the following:

- agglomerationAir (if source exists in agglomeration)
- agglomerationIndustry (if source exists in agglomeration)
- agglomerationRailway (if source exists in agglomeration)
- agglomerationRoad (if source exists in agglomeration)
- agglomerationMajorRoad (if source exists in agglomeration)
- agglomerationMajorRailway (if source exists in agglomeration)
- agglomerationMajorAirport (if source exists in agglomeration)

inspireId: External object identifier of the spatial object, defined in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It is provided according to the data type Identifier. It is mandatory.

Specific guidelines for the data type Identifier for the END reporting purpose:

- inspireId.localId: When possible the inspireId.localId can be the same as agglomerationId.identifier, but if a Member State has already in place different rules for INSPIRE identifiers these rules could be used.
- inspireId.namespace: A data provider will define the namespace considering also a Member State rules for INSPIRE identifiers, if available.

geometry: Spatial extent of the agglomeration, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, geometry of the agglomeration shall be presented as area, by using polygon geometry type. It is mandatory.

zoneType: Zone type related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the INSPIRE code list ZoneTypeCode. It is mandatory.

The applicable code for the END reporting purpose is “noise restriction zone (noiseRestrictionZone)”.

specialisedZoneType: Definition of an agglomeration in the END scope, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the extended INSPIRE code list SpecialisedZoneTypeCode. It is mandatory.

The applicable code for the END reporting purpose is “ENDagglomeration”.

environmentalDomain: Defines the environmental domain related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the INSPIRE code list EnvironmentalDomain. It is mandatory.

The applicable code for the END reporting purpose is “noise”.

designationPeriod: Designation period of the agglomeration, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, information when agglomeration was legally designated is not required, however a void reason has to be provided according to the INSPIRE AM data specifications. In that case, a value “unpopulated” is proposed to be used. It is mandatory.

competentAuthority: Description of the organisation(s) responsible for managing, restricting or regulating measures or activities related to environmental noise within designated agglomeration, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, a dedicated data model is provided to describe information about competent authorities and their responsibilities (see Competent Authorities (DF2)). Therefore, to avoid duplication of data, information about competent authorities related to agglomerations are not required in this data model but a void reason has to be provided according to the INSPIRE AM data specifications. In that case, a value “unpopulated” is proposed to be used. It is mandatory.

legalBasis: Information on legal instrument or document that required the establishment of the agglomeration, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is the association in the INSPIRE data model which requires that a legal instrument is provided. For the END reporting purpose, only one legal instrument is required that can be provided in the following ways:

- as the reference to the END by providing the European Legislation Identifier (ELI)⁴⁴ (as default reference): <http://data.europa.eu/eli/dir/2002/49/oj>, or

⁴⁴ <https://eur-lex.europa.eu/eli-register/about.html>

- as the reference to a more specific national or sub-national legal instrument by providing its URL.

beginLifespanVersion: It records a start or a change of agglomerations in the spatial dataset, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, lifespan information when an agglomeration has been inserted or changed in the spatial dataset is not required. However, beginLifespanVersion can be provided as:

- date and time information of creation of agglomeration in a dataset, or of creation of a dataset itself, or
- a void reason must be provided. In that case, the value “unpopulated” is proposed to be used.

It is mandatory.

10.2 Data types

The following specific complex data types are used in the data model.

10.2.1 Data type Identifier

The data type **Identifier** is an INSPIRE data type and is defined to describe external unique object identifier and used across INSPIRE spatial data themes and data models.

It is defined in the INSPIRE Implementing Rules on Interoperability and it is composed of three attributes: localId, namespace and versionId.

Details are described in 6.2.1 and *Annex 4. Commonly used INSPIRE concepts*.

10.2.2 Data type ThematicIdentifier

The data type **ThematicIdentifier** is an INSPIRE data type and is defined to uniquely identify the spatial object within a particular information domain, e.g. in the END scope.

It is defined in the INSPIRE Implementing Rules on Interoperability and it is composed of two attributes: identifier and identifierScheme.

Details are described in 6.2.2 and *Annex 4. Commonly used INSPIRE concepts*.

10.2.3 Data type SimpleGeographicalName

The data type **SimpleGeographicalName** is a simpler version of the INSPIRE GeographicalName data type. It is defined for the END reporting purpose and provides a name in English language and in national or local language, including code of national or local language.

It is composed of three attributes: nameEng, localName and localNameLanguage.

Details are described in 6.2.3.

10.3 Code lists

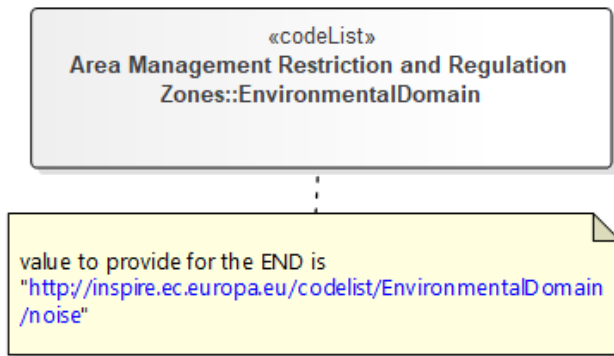
The data model includes the following pre-defined code lists:

EnvironmentalDomain: Environmental domain, for which environmental objectives can be defined.

This is the INSPIRE code list published in the INSPIRE code list register:

<http://inspire.ec.europa.eu/codelist/EnvironmentalDomain>

Figure 23. Code list EnvironmentalDomain applicable to data model for agglomerations (DF1_5)



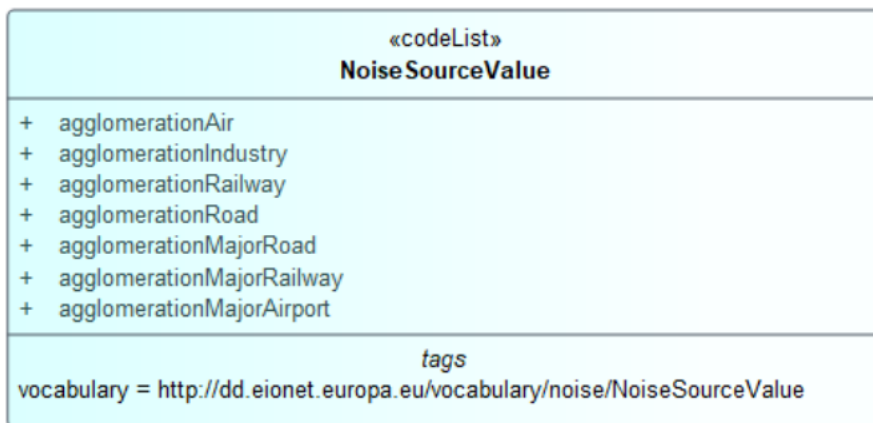
Iso639-3: Language codes according to the standard ISO 639-3. Details are described in 6.2.3.

NoiseSourceValue: Type of noise sources.

The complete code list NoiseSourceValue contains the different types of noise sources, including major noise sources, noise sources in agglomerations, major noise sources in agglomerations and all noise sources inside and outside agglomerations. <https://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceValue>

The code values applicable for this data model are the following:

Figure 24. Code list NoiseSourceValue applicable to data model for agglomeration source (DF1_5).



SpecialisedZoneTypeCode: Additional classification value that defines the specialised type of zone.

For the END reporting purpose, the INSPIRE code list SpecialisedZoneTypeCode is extended and it is going to be published in the Eionet Data Dictionary. It includes agglomerations in the END scope. <http://dd.eionet.europa.eu/vocabulary/inspire/SpecialisedZoneTypeCode>.

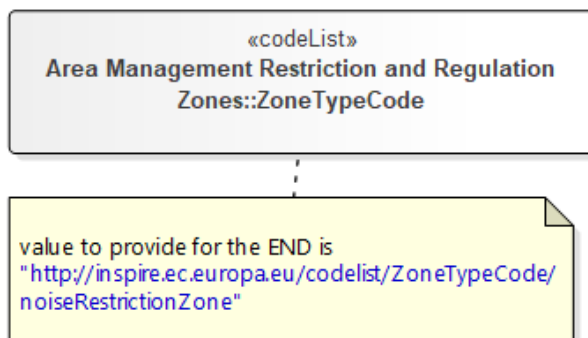
Figure 25. Code list SpecialisedZoneTypeCode applicable to data model for agglomerations (DF1_5)



ZoneTypeCode: High-level classification defining the type of Management, Restriction or Regulation Zone.

This is the INSPIRE code list published in the INSPIRE code list register:
<http://inspire.ec.europa.eu/codelist/ZoneTypeCode>.

Figure 26. Code list ZoneTypeCode applicable to data model for agglomerations (DF1_5)



11 Data model for competent authorities (DF2)

The data model for competent authorities (see Figure 27) includes two basic types of information:

- General information about the competent authority and bodies responsible for implementing the END Directive, represented by the data type CompetentAuthorityDetails, and
- Description of responsibilities (roles) that a competent authority or its organisational unit has within the END scope with regard to making and, where relevant, approving noise maps and action plans for agglomerations, major roads, major railways and major airports; and collecting noise maps and action plans as defined in the END Article 4. Competent authorities for designating quiet areas (inside and outside urban areas) have also been added as optional information.

Six top level data types have been defined, five of them corresponding to the noise sources specified in the END, and the CompetentAuthorityDetails already mentioned. The five top level data types related to the noise sources are defined to provide the competent authority information at agglomeration level, major roads level, major railways level, major airports level and quiet areas level, as following:

- CompetentAuthorityAgglomeration (mandatory to be provided)
- CompetentAuthorityAirport (mandatory to be provided)
- CompetentAuthorityRoad (mandatory to be provided)
- CompetentAuthorityRail (mandatory to be provided)
- CompetentAuthorityQuietArea (to be provided on optional basis).

The responsibilities of competent authorities providing information related to major roads and major railways can be provided at country level, at NUTS1, at NUTS2, at NUTS3 level, at LAU level, or at entity level (entity representing one or more major roads or one or more major railways respectively). Several competent authorities can be reported for one major source, agglomeration or quiet area.

Figure 27. Conceptual diagram of competent authorities

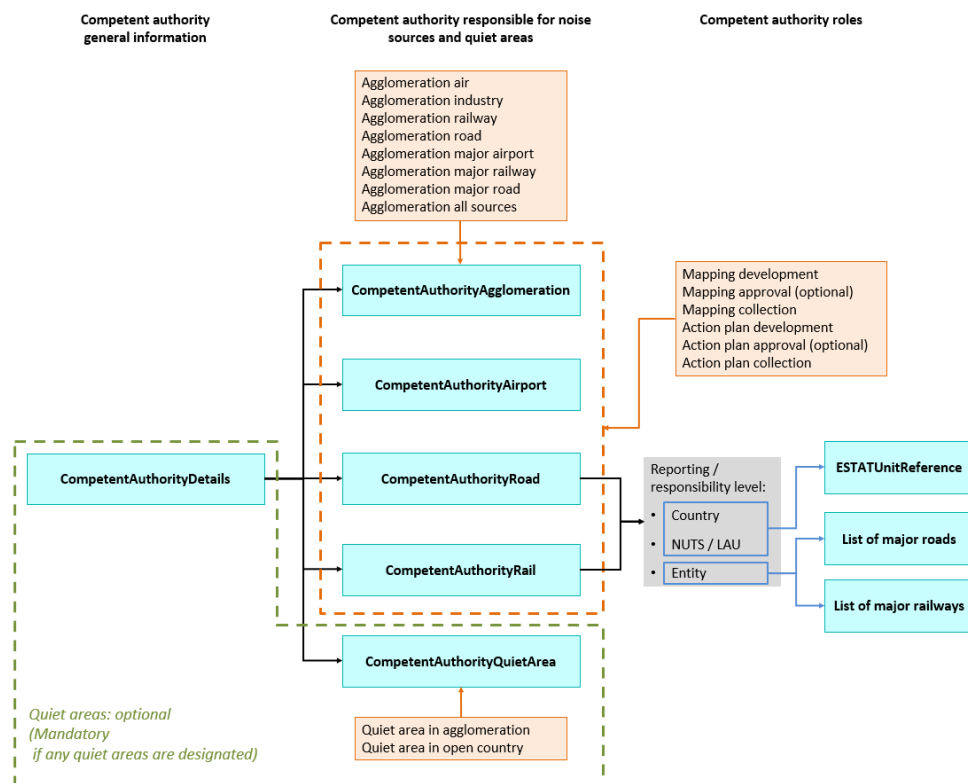
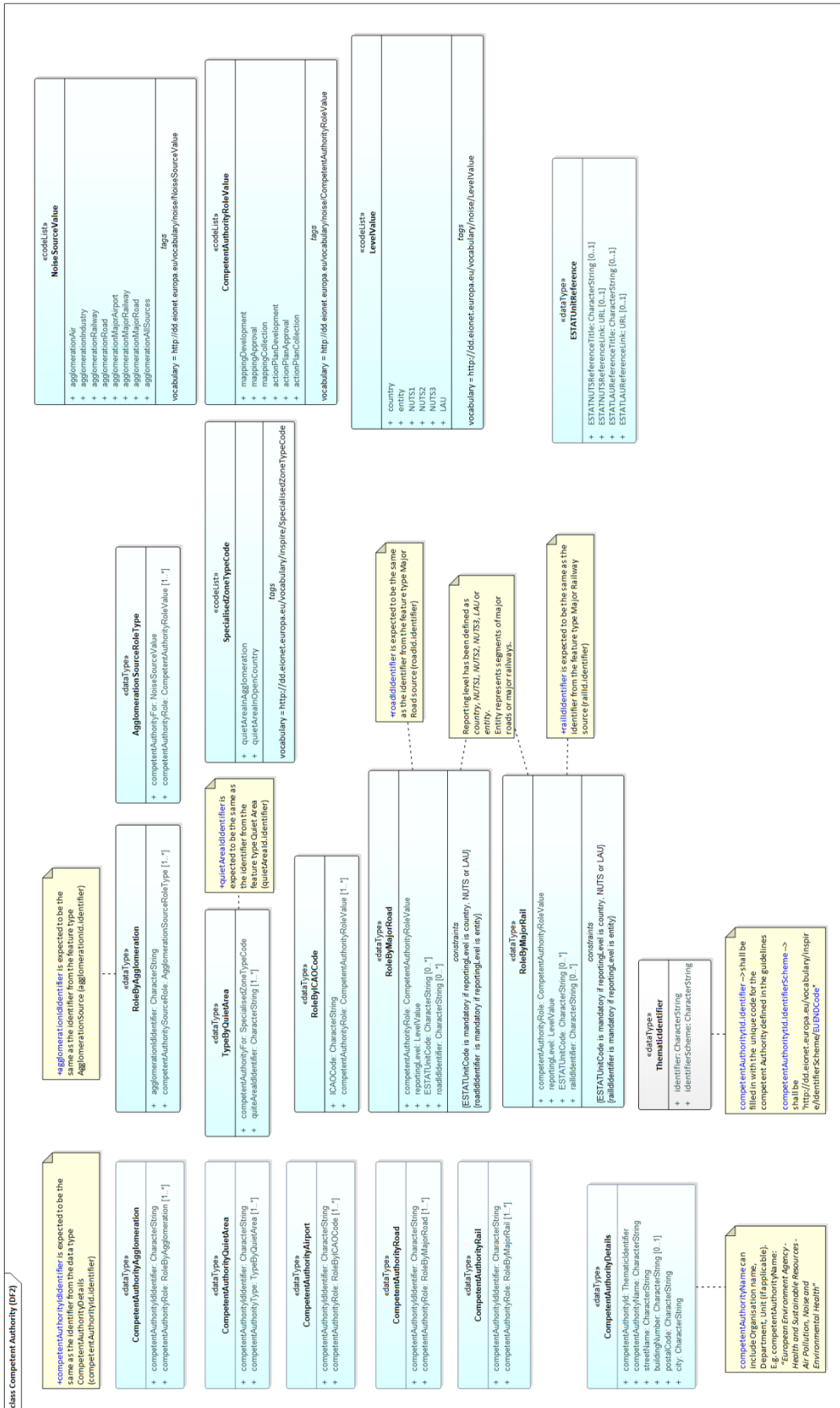


Figure 28. Data model of competent authorities (DF2)



11.1 Top level data types

11.1.1 Data type *CompetentAuthorityDetails*

The data type *CompetentAuthorityDetails* includes information about the competent authority and bodies responsible for implementing the END Directive.

competentAuthorityId: Unique identifier of the competent authority.

This attribute is provided according to the data type *ThematicIdentifier*. It is mandatory.

Specific guidelines for data type *ThematicIdentifier* for the END reporting purpose:

- *competentAuthorityId.identifier*: shall be filled in with the unique code of competent authority
- *competentAuthorityId.identifierScheme*: shall be <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>.

competentAuthorityName: Full name of the competent authority responsible for implementing the END Directive, that can include the Organisation name, Department and Unit (if applicable).

It is mandatory.

streetName: Street name as part of the competent authority's official address.

It is mandatory.

buildingNumber: Number of the building as part of the competent authority's official address.

It is optional.

postalCode: Postal code of the city where the competent authority is located. It is part of the competent authority's official address.

It is mandatory.

city: Name of the city where the competent authority is located. It is part of the competent authority's official address.

It is mandatory.

11.1.2 Top level data type *CompetentAuthorityAgglomeration*

This top level data type is created to provide all relevant responsibilities of the competent authority or its organisational units with regard to developing, approving or collecting noise maps and action plans related to noise in agglomerations. Responsibilities of competent authority or its organisational units shall be provided for each agglomeration.

It is composed of the following attributes:

competentAuthorityIdIdentifier: Unique identifier of the competent authority.

It is expected to be the same as the identifier from the data type *CompetentAuthorityDetails* (*competentAuthorityId.identifier*). It is mandatory.

competentAuthorityRole: Roles of the competent authority with regard the specific noise sources.

This attribute is provided according to the data type RoleByAgglomeration. It is mandatory.

11.1.3 Top level data type CompetentAuthorityAirport

This top level data type is created to provide all relevant responsibilities of the competent authority or its organisational units with regard to developing, approving or collecting noise maps and action plans related to noise from major airports. Responsibilities of competent authority or its organisational units shall be provided for each major airport.

It is composed of the following attributes:

competentAuthorityIdIdentifier: Unique identifier of the competent authority.

It is expected to be the same as the identifier from the data type CompetentAuthorityDetails (competentAuthorityId.identifier).It is mandatory.

competentAuthorityRole: Roles of the competent authority for major airport.

This attribute is provided according to the data type RoleByICAOCode. It is mandatory.

11.1.4 Top level data type CompetentAuthorityRoad

This top level data type is created to provide all relevant responsibilities of the competent authority or its organisational units with regard to developing, approving or collecting noise maps and action plans related to noise from major roads. Responsibilities of competent authority or its organisational units shall be provided for major road segments.

It is composed of the following attributes:

competentAuthorityIdIdentifier: Unique identifier of the competent authority.

It is expected to be the same as the identifier from the data type CompetentAuthorityDetails (competentAuthorityId.identifier).It is mandatory.

competentAuthorityRole: Roles of the competent authority for major road.

This attribute is provided according to the data type RoleByMajorRoad. It is mandatory.

11.1.5 Top level data type CompetentAuthorityRail

This top level data type is created to provide all relevant responsibilities of the competent authority or its organisational units with regard to developing, approving or collecting noise maps and action plans related to noise from major railways. Responsibilities of competent authority or its organisational units shall be provided for major railway segments.

It is composed of the following attributes:

competentAuthorityIdIdentifier: Unique identifier of the competent authority.

It is expected to be the same as the identifier from the data type CompetentAuthorityDetails (competentAuthorityId.identifier). It is mandatory.

competentAuthorityRole: Roles of the competent authority for major railway.

This attribute is provided according to the data type RoleByMajorRail. It is mandatory.

11.1.6 Top level data type CompetentAuthorityQuietArea

This top level data type is created to provide information about the competent authority or its organisational units with regard to designation of quiet areas (both inside agglomerations and in open country). This complete data type is optional for the END reporting purpose. This means that if no quiet area is delimited no information shall be reported.

It is composed of the following attributes:

competentAuthorityIdIdentifier: Unique identifier of the competent authority.

It is expected to be the same as the identifier from the data type CompetentAuthorityDetails (competentAuthorityId.identifier). It is mandatory.

competentAuthorityType: Defines the quiet area type and a set of quiet areas for which the competent authority is responsible.

This attribute is provided according to the data type TypeByQuietArea. It is mandatory.

11.2 Data types

11.2.1 Data type RoleByAgglomeration

The data type RoleByAgglomeration provides the information about the responsibilities that the competent authority has with regard to specific noise sources within a specific agglomeration.

Figure 29. General structure of the data type RoleByAgglomeration



agglomerationIdIdentifier: Unique identifier assigned to each agglomeration.

It is expected to be the same as the identifier from the feature type AgglomerationSource (agglomerationId.identifier). It is mandatory.

competentAuthoritySourceRole: It combines noise sources and roles of competent authority.

This attribute is provided according to the data type AgglomerationSourceRoleType. It is mandatory.

11.2.2 Data type AgglomerationSourceRoleType

The data type AgglomerationSourceRoleType defines applicable roles of competent authority to a specific noise source inside agglomerations.

competentAuthorityFor: Noise source for which the competent authority is responsible.

This attribute uses a value from the code list NoiseSourceValue. It is mandatory.

The applicable code list values are the following:

- Conditional (applicable specific noise source or combined all sources shall be provided):
 - o agglomerationAir (if applicable)
 - o agglomerationIndustry (if applicable)
 - o agglomerationRailway (if applicable)
 - o agglomerationRoad (if applicable) or
 - o agglomerationAllSources (if specific noise sources are not provided)
- Optional :
 - o agglomerationMajorAirport
 - o agglomerationMajorRailway
 - o agglomerationMajorRoad.

if agglomerationMajorAirport, agglomerationMajorRailway or agglomerationMajorRoad are not selected, it will be assumed that the major sources inside agglomeration are already covered within the competentAuthority specified for agglomerationRoad/Railway/Airport.

competentAuthorityRole: Role of the competent authority with regard to the selected noise source.

This attribute uses a value from the code list CompetentAuthorityRoleValue. It is mandatory.

The applicable code list values are the following:

- mappingDevelopment
- mappingApproval (only if applicable)
- mappingCollection
- actionPlanDevelopment
- actionPlanApproval (only if applicable)
- actionPlanCollection

11.2.3 Data type RoleByICAOCode

The data type RoleByICAOCode defines applicable roles of competent authority responsible for noise from air traffic with regard a selected airport.

ICAOCode: Unique international code of airport defined by the International Civil Aviation Organization.

It is mandatory.

competentAuthorityRole: Role of the competent authority.

This attribute uses a value from the code list CompetentAuthorityRoleValue. It is mandatory.

The applicable code list values are the following:

- mappingDevelopment
- mappingApproval (only if applicable)
- mappingCollection

- actionPlanDevelopment
- actionPlanApproval (only if applicable)
- actionPlanCollection

11.2.4 Data type RoleByMajorRoad

The data type RoleByMajorRoad defines applicable roles of competent authority responsible for noise from road traffic.

competentAuthorityRole: Role of the competent authority.

This attribute uses a value from the code list CompetentAuthorityRoleValue. It is mandatory.

The applicable code list values are the following:

- mappingDevelopment
- mappingApproval (only if applicable)
- mappingCollection
- actionPlanDevelopment
- actionPlanApproval (only if applicable)
- actionPlanCollection

reportingLevel: Reporting level in which the competent authority is responsible for major roads.

This attribute uses a value from the code list LevelValue. It is mandatory.

The applicable code list values are the following:

- Conditional (administrative unit or entity should be provided):
 - o country
 - o entity (representing one or more segments of major roads)
 - o NUTS 1
 - o NUTS 2
 - o NUTS 3
 - o LAU

ESTATUnitCode: Unique code corresponding to the reporting level chosen, according to Eurostat classification of territorial units.

This code is related to the reportingLevel chosen, e.g. NUTS code if reportingLevel is NUTS (1, 2 or 3), LAU code if reportingLevel is LAU or country code if reportingLevel is country.

It is conditional, and shall be reported if country, NUTS (1, 2 or 3) or LAU is selected in reportingLevel attribute.

roadIdIdentifier: Unique identifier assigned to each major road segment.

It is expected to be the same as the identifier from the feature type MajorRoadSource (roadId.identifier). It is conditional, and shall be reported if entity is selected in reportingLevel attribute.

11.2.5 Data type RoleByMajorRail

The data type RoleDetailsRail defines applicable roles of competent authority responsible for noise from railway traffic.

competentAuthorityRole: Role of the competent authority.

This attribute uses a value from the code list `CompetentAuthorityRoleValue`. It is mandatory. The applicable code list values are the following:

- `mappingDevelopment`
- `mappingApproval` (only if applicable)
- `mappingCollection`
- `actionPlanDevelopment`
- `actionPlanApproval` (only if applicable)
- `actionPlanCollection`

reportingLevel: Reporting level in which the competent authority is responsible for major railways.

This attribute uses a value from the code list `LevelValue`. It is mandatory.

The applicable code list values are the following:

- Conditional (administrative unit or entity should be provided):
 - o `country`
 - o `entity` (representing one or more segments of major railways)
 - o `NUTS 1`
 - o `NUTS 2`
 - o `NUTS 3`
 - o `LAU`

ESTATUnitCode: Unique code corresponding to the reporting level chosen, according to Eurostat classification of territorial units.

This code is related to the reportingLevel chosen, e.g. NUTS code if reportingLevel is NUTS (1, 2 or 3), LAU code if reportingLevel is LAU or country code if reportingLevel is country.

It is conditional, and shall be reported if country, NUTS (1, 2 or 3) or LAU is selected in reportingLevel attribute.

railIdIdentifier: Unique identifier assigned to each major railway segment.

It is expected to be the same as the identifier from the feature type `MajorRailSource` (`railId.identifier`). It is conditional, and shall be reported if entity is selected in reportingLevel attribute.

11.2.6 Data type `TypeByQuietArea`

The data type `TypeByQuietArea` defines the type of quiet area and a list of corresponding quiet areas.

competentAuthorityFor: A quiet area type for which the competent authority is responsible.

This attribute uses a value from the code list `SpecialisedZoneTypeCode`. It is mandatory.

The applicable code list values are the following:

- `quietAreaInAgglomeration`
- `quietAreaInOpenCountry`

quietAreaIdentifier: Unique identifier of the quiet area.

It is expected to be the same as the identifier from the feature type `QuietArea` (`quietAreaId.identifier`). It is mandatory.

11.2.7 Data type ThematicIdentifier

The data type ThematicIdentifier is an INSPIRE data type and is defined to uniquely identify the spatial object within a particular information domain, e.g. in the END scope.

It is defined in the INSPIRE Implementing Rules on Interoperability and it is composed of two attributes: identifier and identifierScheme.

Details are described in 6.2.2 and *Annex 4. Commonly used INSPIRE concepts*.

11.2.8 Data type ESTATUnitReference

The top level data type ESTATUnitReference contains the reference information concerning NUTS or LAU data if the reporting level of the competent authority is provided through those EUROSTAT classification of territorial units.

ESTATNUTSReferenceTitle: Version of the NUTS data used for the noise data reporting.

It is optional and conditional. Needs to be reported if the reporting level of the competent authority is specified at NUTS level.

ESTATNUTSReferenceLink: Link to the NUTS data used for the noise data reporting.

It is optional and conditional. Needs to be reported if the reporting level of the competent authority is specified at NUTS level.

ESTATLAUReferenceTitle: Version of the LAU data used for the noise data reporting.

It is optional and conditional. Needs to be reported if the reporting level of the competent authority is specified at LAU level.

ESTATLAUReferenceLink: Link to the LAU data used for the noise data reporting.

It is optional and conditional. Needs to be reported if the reporting level of the competent authority is specified at NUTS level.

11.3 Code lists

The data model includes the following pre-defined code lists:

LevelValue: Level at which the major roads and major railways competent authorities' report information to fulfil the END reporting purposes.

This code list includes the reporting level at which major roads and major railways competent authorities report information to fulfil the END reporting purposes, i.e. at country, sub-national or at individual entity (major road segment or major railway segment) level.

<https://dd.eionet.europa.eu/vocabulary/noise/LevelValue>

Figure 30. Code list LevelValue

«codeList» LevelValue
<ul style="list-style-type: none"> + country + entity + NUTS1 + NUTS2 + NUTS3 + LAU
<i>tags</i>
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/LevelValue

CompetentAuthorityRoleValue: Main responsibilities of competent authorities related to noise maps and action plans.

This code list includes main responsibilities of competent authorities, i.e. making, developing, approving or collecting noise maps and action plans.

<https://dd.eionet.europa.eu/vocabulary/noise/CompetentAuthorityRoleValue>

Figure 31. Code list CompetentAuthorityRoleValue

«codeList» CompetentAuthorityRoleValue
<ul style="list-style-type: none"> + mappingDevelopment + mappingApproval + mappingCollection + actionPlanDevelopment + actionPlanApproval + actionPlanCollection
<i>tags</i>
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/CompetentAuthorityRoleValue

NoiseSourceValue: Type of noise sources.

The complete code list NoiseSourceValue contains the different types of noise sources, including major noise sources, noise sources in agglomerations, major noise sources in agglomerations and all noise sources inside and outside agglomerations.

<https://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceValue>

The code values applicable for this data model are the following:

Figure 32. Code list NoiseSourceValue applicable to data model for competent authorities (DF2).

«codeList» Noise SourceValue
<ul style="list-style-type: none"> + agglomerationAir + agglomerationIndustry + agglomerationRailway + agglomerationRoad + agglomerationMajorAirport + agglomerationMajorRailway + agglomerationMajorRoad + agglomerationAllSources
<i>tags</i>
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceValue

SpecializedZoneTypeCode: Additional classification value that defines the specialised type of zone.

For the END reporting purpose, the INSPIRE code list SpecialisedZoneTypeCode is extended and it is going to be published in the Eionet Data Dictionary. It includes quiet area in agglomeration and quiet area in open country.

<http://dd.eionet.europa.eu/vocabulary/inspire/SpecialisedZoneTypeCode>.

Figure 33. Code list SpecializedZoneTypeCode applicable to quiet areas

«codeList» SpecialisedZoneTypeCode
<ul style="list-style-type: none"> + quietAreaInAgglomeration + quietAreaInOpenCountry
<i>tags</i>
vocabulary = http://dd.eionet.europa.eu/vocabulary/inspire/SpecialisedZoneTypeCode

12 Data model for noise limit values (DF3)

This data model includes information about adopted documents or reports describing where the limit values in force or under preparation are applied for road-traffic noise, rail-traffic noise, aircraft noise around airports and noise on industrial activity sites. The noise limit values of interest are those applied in residential areas or other sensitive areas including schools and hospitals.

The noise limit values' data model is presented in Figure 35.

Figure 34. Conceptual diagram of limit values and reports

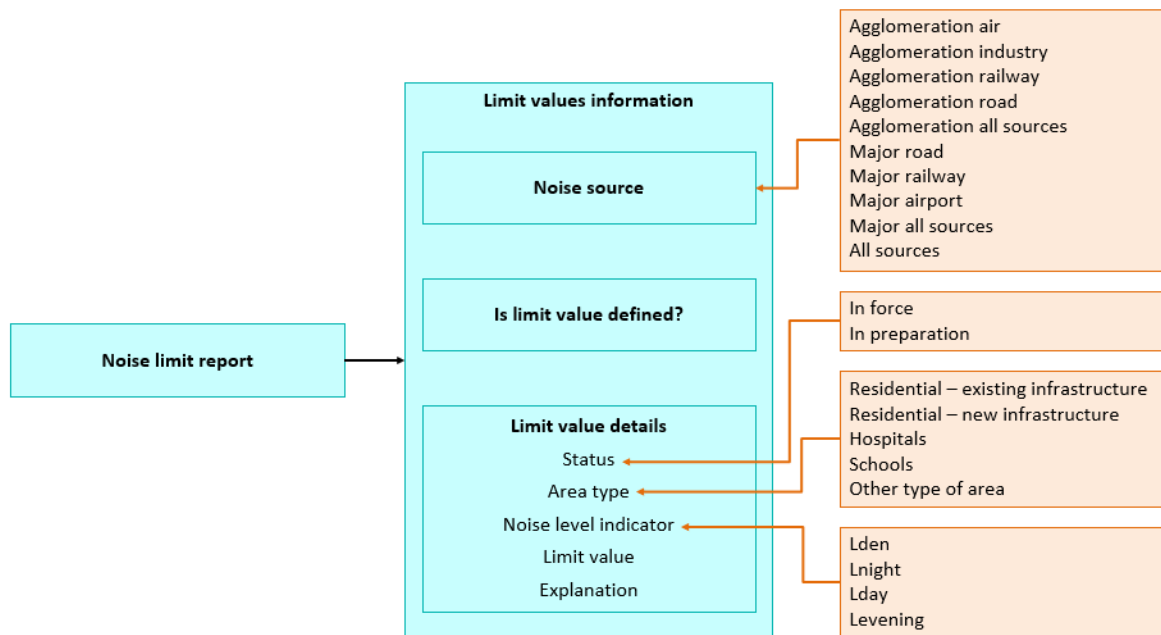
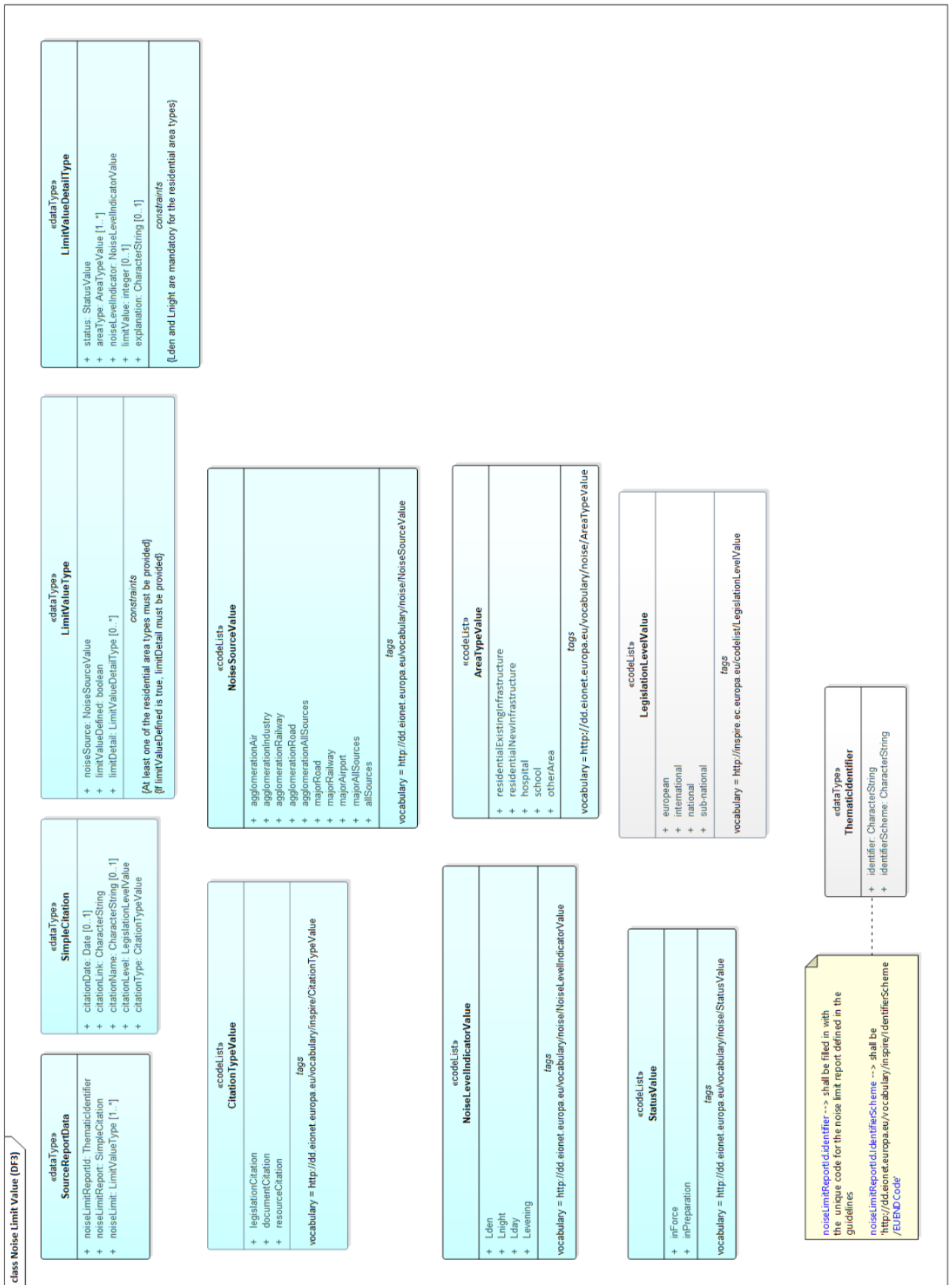


Figure 35. Data model for noise limit values (DF3)



12.1 Top level data types

12.1.1 Top level data type SourceReportData

The top level data type SourceReportData includes main information about the report or document describing limit values with regard to noise sources and noise indicators. The provision of information at report level allows to describe several limit values in force or in preparation with regard to different noise sources related to different noise indicators L_{den} (day-evening-night noise level), L_{night} (night noise level), L_{day} (day noise level) or $L_{evening}$ (evening noise level) through related complex data types.

It is composed of the following attributes:

noiseLimitReportId: Unique identifier of the noise limit values' report.

This attribute is provided according to the data type ThematicIdentifier. It is mandatory. Specific guidelines for data type ThematicIdentifier for the END reporting purpose:

- noiseLimitReportId.identifier: shall be filled in with the unique code of the report
- noiseLimitReportId.identifierScheme: shall be <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>.

noiseLimitReport: Information about the noise limits report.

This attribute is provided according to the data type SimpleCitation. It is mandatory.

noiseLimit: Limit values in force or in preparation related to each noise source, indicator and type of area where the noise limit is applied.

This attribute is provided according to the data type LimitValueType. It is mandatory.

12.2 Data types

The following data types are used in the data model.

12.2.1 Data type LimitValueType

The data type LimitValueType provides information about the noise source and details of noise limit values.

It is composed of three attributes:

noiseSource: Indication of the noise source for which the noise limit is described .

This attribute uses a value from the code list NoiseSourceValue. It is mandatory.

The applicable code list values are the following:

- Conditional (applicable specific noise source or combined all sources shall be provided)
 - o Concerning agglomerations:
 - agglomerationAir (if applicable)
 - agglomerationIndustry (if applicable)
 - agglomerationRailway (if applicable)
 - agglomerationRoad (if applicable) or
 - agglomerationAllSources (if specific noise sources are not provided)

- Concerning major sources:
 - majorRoad (if applicable)
 - majorRailway (if applicable)
 - majorAirport (if applicable) or
 - majorAllSources (if specific major noise sources are not provided)
- If none of the above codes are provided, then the code value allSources should be provided

limitValueDefined: Declaration on whether a limit value exists.

This attribute is a Boolean. It is mandatory.

limitDetail: Details of the noise limit value.

This attribute is provided according to the data type LimitValueDetailType. It is conditional and should be provided if the limit value exists / is declared as existing.

12.2.2 Data type LimitValueDetailType

The data type LimitValueDetailType provides detailed information about the specific limit value, in force or in preparation (in dB), related to the different noise indicators and the type of area where the noise limit is applied.

It is composed of the following attributes:

status: Description of the status of the limit value: in force or in preparation.

This attribute uses a value from the code list StatusValue. It is mandatory.

The applicable code list values are the following:

- inForce
- inPreparation

areaType: Type of area where the noise limit is applied.

This attribute uses a value from the code list AreaTypeValue. It is mandatory.

The applicable code list values are the following:

- Mandatory: limit values for at least one residential area types shall be provided:
 - residentialExistingInfrastructure
 - residentialNewInfrastructure
- Optional:
 - hospital
 - school
 - otherArea

noiseLevelIndicator: Noise indicator used to establish the limit value.

This attribute uses a value from the code list NoiseLevelIndicatorValue. It is mandatory.

The applicable code list values are the following:

- Mandatory (must be provided per selected area type):
 - L_{den}
 - L_{night}

- Optional:
 - L_{day}
 - L_{evening}

limitValue: Noise level value (in dB).

Mandatory if the noise limit is in force or in preparation.

explanation: Any kind of further explanation considered interesting besides the information contained in the noise limit value report.

It is optional.

12.2.3 Data type SimpleCitation

The data type SimpleCitation provides a citation of a source. This data type provides information about a report, including date of adoption, link to a website, title, legislative or administrative level at which the report has been adopted and type of source (e.g. report).

It is composed of the following attributes: citationDate, citationLink, citationName, citationLevel and citationType.

Details are described in 6.2.4.

12.2.4 Data type ThematicIdentifier

The data type ThematicIdentifier is an INSPIRE data type and is defined to uniquely identify the spatial object within a particular information domain, e.g. in the END scope.

It is defined in the INSPIRE Implementing Rules on Interoperability and it is composed of two attributes: identifier and identifierScheme.

Details are described in 6.2.2 and *Annex 4. Commonly used INSPIRE concepts*.

12.3 Code lists

The data model includes the following pre-defined code lists:

AreaTypeValue: Type of area where the noise limit is applied.

This code list defines types of areas where certain noise limit values apply.

<https://dd.eionet.europa.eu/vocabulary/noise/AreaTypeValue>

Figure 36. Code list AreaTypeValue

«codeList» AreaTypeValue
+ residentialExistingInfrastructure
+ residentialNewInfrastructure
+ hospital
+ school
+ otherArea
<i>tags</i>
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/AreaTypeValue

CitationTypeValue: Type of citation.

The code list is described in 6.2.4.

LegislationLevelValue: The level at which a legal act or convention has been adopted.

The code list is described in 6.2.4.

NoiseLevelIndicatorValue: Type of noise indicators.

This code list defines the noise indicators: L_{den} , L_{night} , L_{day} OR $L_{evening}$.

<https://dd.eionet.europa.eu/vocabulary/noise/NoiseLevelIndicatorValue>

Figure 37. Code list NoiseLevelIndicatorValue

«codeList» NoiseLevelIndicatorValue
+ Lden + Lnight + Lday + Levening
<i>tags</i> vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/NoiseLevelIndicatorValue

NoiseSourceValue: Type of noise sources.

The complete code list NoiseSourceValue contains the different types of noise sources, including major noise sources, noise sources in agglomerations, major noise sources in agglomerations and all noise sources inside and outside agglomerations.

<https://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceValue>

The code values applicable for this data model are the following:

Figure 38. Code list NoiseSourceValue applicable to data model for noise limit values (DF3)

«codeList» NoiseSourceValue
+ agglomerationAir + agglomerationIndustry + agglomerationRailway + agglomerationRoad + agglomerationAllSources + majorRoad + majorRailway + majorAirport + majorAllSources + allSources
<i>tags</i> vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceValue

StatusValue: Status of noise limit values.

This code list defines the status of limit values: in force or in preparation.

<https://dd.eionet.europa.eu/vocabulary/noise/StatusValue>

Figure 39. Code list StatusValue

«codeList» StatusValue
+ inForce + inPreparation
<i>tags</i> vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/StatusValue

13 Strategic noise maps - Noise contours (DF4_8)

Strategic noise maps are used within the END scope for the global assessment of noise exposure in a given area due to different noise sources or for overall predictions for such an area. Member States shall also ensure the strategic noise maps are made available and disseminated to the public and to the European Commission which is entitled to establish a database of information on strategic noise maps in order to facilitate the compilation of information to the European Parliament and the Council, and are used in the Member States as a basis for action plans.

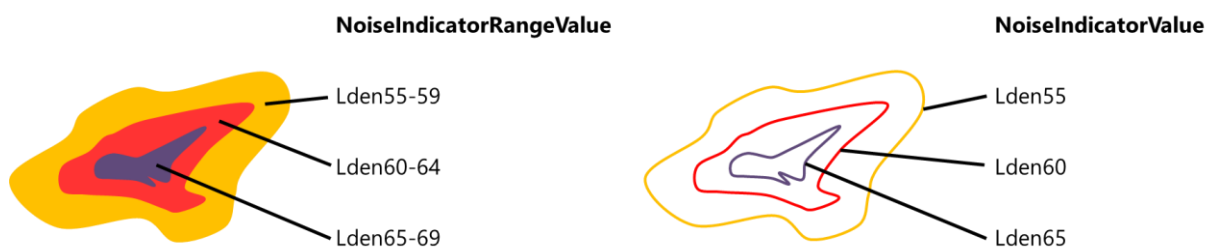
Strategic noise maps include two sets of data. The first piece of information are the noise maps produced within the noise mapping process. These maps are used for quantifying and visualising noise levels geographically. As a result of the noise maps, the number of people exposed to noise across the territory is derived. These two sets of information are reported within the strategic noise maps of the END. In this section, we describe the noise contour maps data model.

The END data model for strategic noise maps - noise contours (DF4_8) provides areas of distribution of noise levels for two main noise indicators L_{den} and L_{night} . For this purpose, the INSPIRE data model for environmental health determinant defined in the INSPIRE Human health and safety data specifications, which presents a link between human health and the quality of the environment, such as noise, has been selected. The INSPIRE data model completely fulfils the END requirements entirely and allows to provide specific information about noise indicators and noise / sound levels in ranges of 5 dB as defined in the END. This harmonised information is used in strategic noise maps for both, noise contours and exposure data. Information is provided as a noise range, e.g. $L_{den55-59}$, or as a noise value, e.g. L_{den55} , with regard to each indicator L_{den} and L_{night} . In the data model, this information is provided in two separate code lists. The proper use of this information is related to the type of geometry representing noise contours.

The geometry type allows to provide noise contours as areas (polygon or multipolygon geometry type) or as isolines (line geometry type). In case the geometry type is area, the assigned noise information is noise range from the code list `NoiseIndicatorRangeValue`. If the geometry type is line, the assigned noise information is noise value from the code list `NoiseIndicatorValue`. The compatibility between information provided as isolines or areas is achieved if an isoline represents the outer boundary of an area of noise contour and a single noise value of the isoline (e.g. L_{den55}) represents the lowest value in the noise range (e.g. $L_{den55-59}$) of the noise contour area.

The isolines have to be provided as closed lines or polylines.

Figure 40. Assigning noise level information to noise contours with area or line geometry



The data model of strategic noise maps – noise contours allows to provide mandatory and optional data for the END reporting purpose. While reporting of mandatory data fulfils the END, the INSPIRE Directive sets a wider scope of making spatial data available through the infrastructure for spatial information to support Community policies that affect the environment. Therefore, it is highly recommended to include at least the most detailed data of noise contours that correspond with the

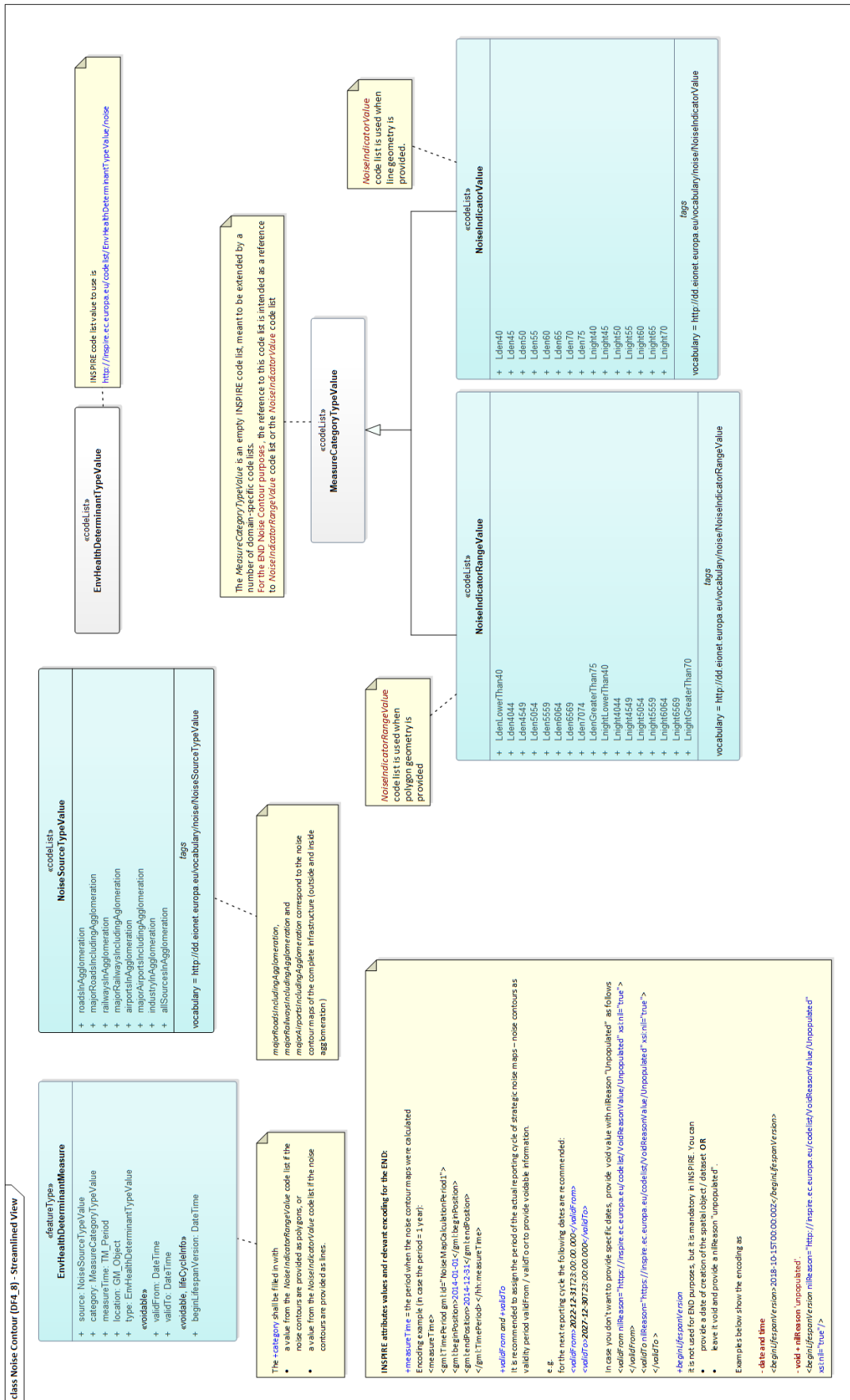
mandatory noise indicators and ranges defined for reporting of noise exposure data, as it is likely that such data exists. This will ensure the complete set of strategic noise maps and harmonisation between noise contours and exposure data.

13.1 Feature type EnvHealthDeterminantNoiseMeasure

The feature type EnvHealthDeterminantNoiseMeasure is defined in the INSPIRE HH data specifications as the specialised feature type related to noise exposure from the base feature type EnvHealthDeterminantMeasure (defined as a generic feature type for different environmental health determinants).

It includes the information corresponding to the areas or isolines affected by high noise levels as determined by the Environmental Noise Directive, for both L_{den} and also L_{night} on voluntary basis (see Figure 41).

Figure 41. Streamlined data model for noise contour maps (DF4_8)



The feature type EnvHealthDeterminantNoiseMeasure is composed of the following attributes:

source: Source of the noise contour map, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose it defines the END noise source types. This attribute uses a value from the code list NoiseSourceTypeValue. It is mandatory.

The applicable code list values are the following:

- Mandatory:
 - o majorRoadsIncludingAgglomeration
 - o majorRailwaysIncludingAgglomeration
 - o majorAirportsIncludingAgglomeration
- Optional:
 - o roadsInAgglomeration
 - o railwaysInAgglomeration
 - o airportsInAgglomeration
 - o industryInAgglomeration
 - o allSourcesInAgglomeration

The code list values “majorRoadsIncludingAgglomeration”, “majorRailwaysIncludingAgglomeration” and “majorAirportsIncludingAgglomeration” correspond to the noise contour maps of the complete infrastructure (outside and inside agglomerations).

category: Identifies the different indicator values or range values of the noise contour maps.

This is an INSPIRE attribute. This attribute uses a value from the extended INSPIRE code list MeasureCategoryTypeValue. For the END reporting purpose, two extended code list are defined: NoiseIndicatorRangeValue code list and NoiseIndicatorValue code list with regard to the type of geometry of noise contours. It is mandatory.

If the noise contours are provided as area (polygon or multipolygon geometry), the applicable code list is NoiseIndicatorRangeValue.

If the noise contours are provided as isolines (line geometry), the applicable code list is NoiseIndicatorValue.

measureTime: Period when the noise contour map has been calculated, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, the measureTime presents the provision of the period when the noise contour map has been calculated showing the situation in the preceding calendar year. The information must be provided with two parameters beginPosition and endPosition (encoding example is in the UML diagram). It is mandatory.

location: Geometry of the noise contour maps, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, the geometry of the noise contour map can be polygon or multipolygon (preferred option) or line. It is mandatory.

type: Type related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the INSPIRE code list EnvHealthDeterminantTypeValue. It is mandatory.

The applicable code for the END reporting purpose is “noise”.

validFrom: Starting date and time of validity of a noise contour map, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, validity information of noise contour maps (i.e. when it started to exist in the real world) can be provided as a starting date of the actual reporting cycle for strategic noise maps (recommended to provide), or as voidable information - a void reason has to be provided according to the INSPIRE HH data specifications. In that case, a value “unpopulated” is proposed to be used. It is mandatory.

validTo: Ending date and time of validity of a noise contour map, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, validity information of noise contour maps (i.e. when it is no longer valid in the real world) can be provided as an end date of the actual reporting cycle for strategic noise maps (recommended to provide), or as voidable information - a void reason has to be provided according to the INSPIRE HH data specifications. In that case, a value “unpopulated” is proposed to be used. It is mandatory.

beginLifespanVersion: It records a start or a change of noise contours in the spatial dataset, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, lifespan information when a noise contour has been inserted or changed in the spatial dataset is not required. However, beginLifespanVersion can be provided as:

- date and time information of creation of a noise contour in a dataset, or of creation of a dataset itself, or
- a void reason must be provided. In that case, the value “unpopulated” is proposed to be used.

It is mandatory.

13.2 Code lists

The data model includes the following pre-defined code lists:

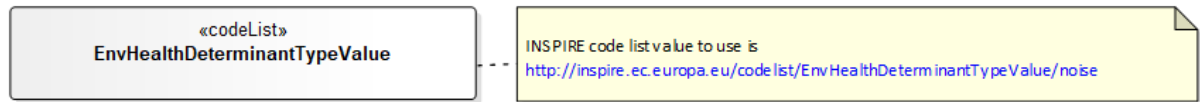
EnvHealthDeterminantTypeValue: Type of environmental health determinant.

This is an INSPIRE code list where the different environmental health determinants are listed.

It is published in the INSPIRE code list register:

<http://inspire.ec.europa.eu/codelist/EnvHealthDeterminantTypeValue>.

Figure 42. Code list EnvHealthDeterminantTypeValue applicable to data model for noise contour maps (DF4_8).



MeasureCategoryTypeValue: The measure categories.

This is an empty INSPIRE code list⁴⁵ meant to be extended by a number of domain-specific code lists. For the END reporting purpose, the reference to this code list is intended as reference to NoiseIndicatorRangeValue code list or NoiseIndicatorValue code list.

NoiseIndicatorRangeValue: Indicator of noise range values both for L_{den} and L_{night} indicators.

This code list is designed for the END reporting purpose by extending the INSPIRE code list MeasureCategoryTypeValue:

<https://dd.eionet.europa.eu/vocabulary/noise/NoiseIndicatorRangeValue> .

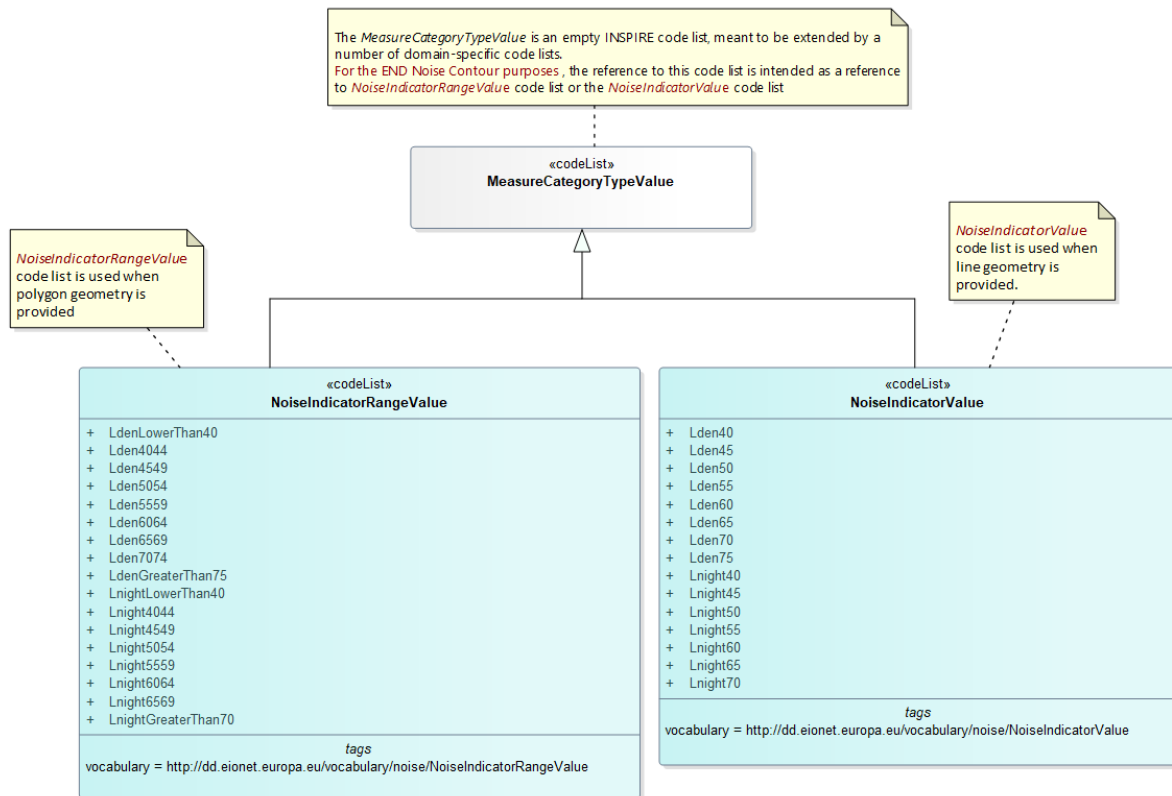
NoiseIndicatorValue: Indicator of noise values both for L_{den} and L_{night} indicators.

This code list is designed for the END reporting purpose by extending the INSPIRE code list MeasureCategoryTypeValue:

<https://dd.eionet.europa.eu/vocabulary/noise/NoiseIndicatorValue>.

Figure 43. Code list MeasureCategoryTypeValue extended by NoiseIndicatorRangeValue and NoiseIndicatorValue

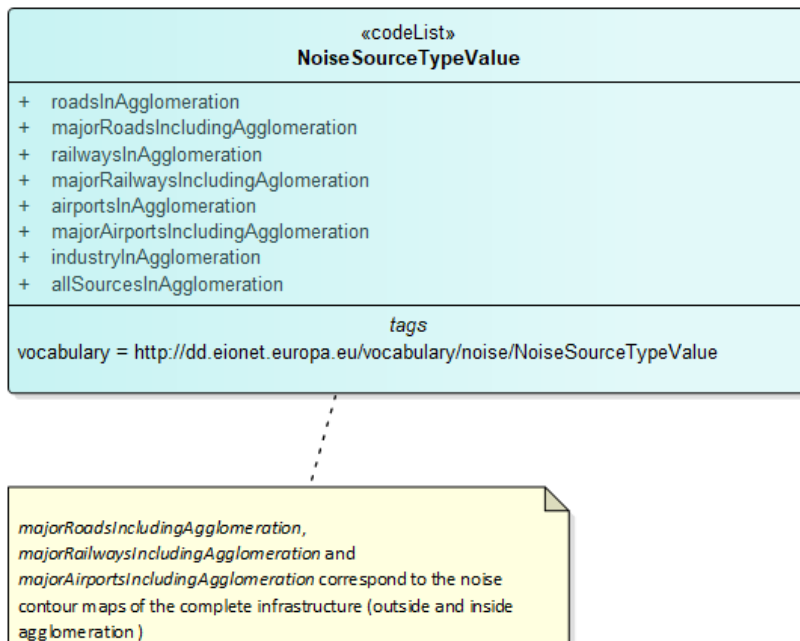
⁴⁵ The code list MeasureCategoryTypeValue has been designed as part of the revision of the INSPIRE Implementing Rules on Interoperability for the INSPIRE HH data model. It will be managed in the INSPIRE code list register.



NoiseSourceTypeValue: Different noise sources of the noise contour maps.

This code list is designed for the END reporting purpose by extending the INSPIRE code list `NoiseSourceTypeValue`: <http://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceTypeValue>.

Figure 44. Code list `NoiseSourceTypeValue`



14 Strategic noise maps – Noise exposure data (DF4_8)

Strategic noise maps are in the core of the END scope for a global assessment of noise exposure in a given area due to different noise sources or for overall predictions for such an area. Member States shall also ensure the strategic noise maps are made available and disseminated to the public and to the European Commission which is entitled to establish a database of information on strategic noise maps in order to facilitate the compilation of information to the European Parliament and the Council, and are used in the Member States as a basis for action plans.

Strategic noise maps include two sets of data. The first piece of information are the noise maps produced within the noise mapping process. These maps are used for quantifying and visualising noise levels geographically. As a result of the noise maps, the number of people exposed to noise across the territory is derived. These two sets of information are reported within the strategic noise maps of the END. In this section, we describe the data model for the information on exposed population.

The END data model for strategic noise maps – noise exposure data (DF4_8) describes data on estimated number of people, dwellings, schools and hospitals located in an area exposed to certain levels of a noise indicator for the different noise sources evaluated. The END data model includes the data model of noise exposure in agglomerations (see

Figure 46) and the data model of noise exposure from major noise sources – major airports, major railways and major roads (see Figure 47). These information can be provided using a variety of spatial areas covering different levels of granularity. By using Eurostat spatial data on territorial units, an additional option is given to reporters to provide population exposure data in a wider variety of spatial units. The END data model includes five top level data types:

- ESTATUnitReference: description of reference geospatial data sets of NUTS and LAU units selected to report exposure data.
- ExposureAgglomeration: exposure data inside in agglomerations
- ExposureMajorRailway: exposure data related to major railways
- ExposureMajorRoad: exposure data related to major roads
- ExposureMajorAirport: exposure data related to major airports.

Figure 45. Conceptual diagram for strategic noise maps -noise exposure data

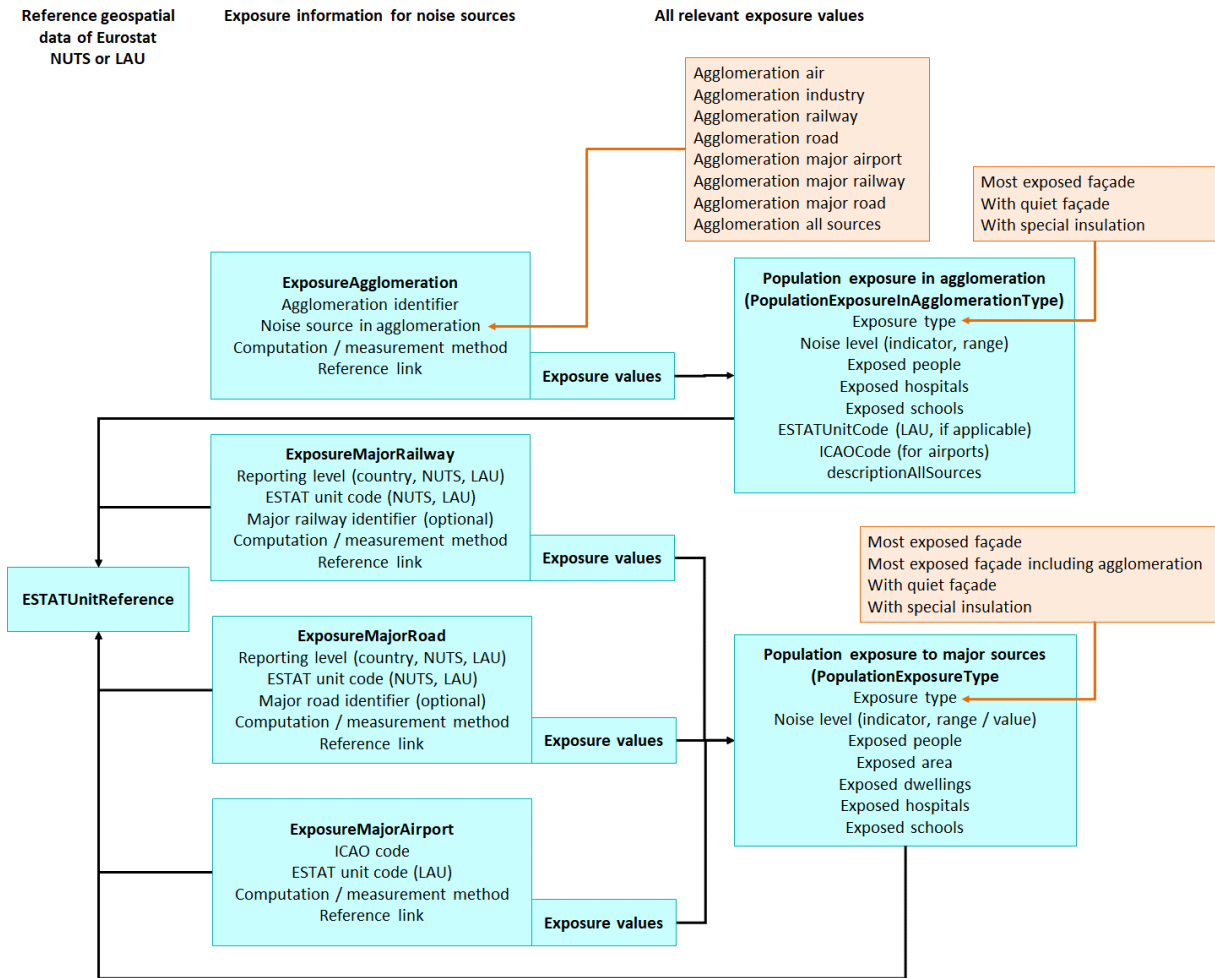


Figure 46. Data model for strategic noise maps – noise exposure data in agglomerations (DF4_8)

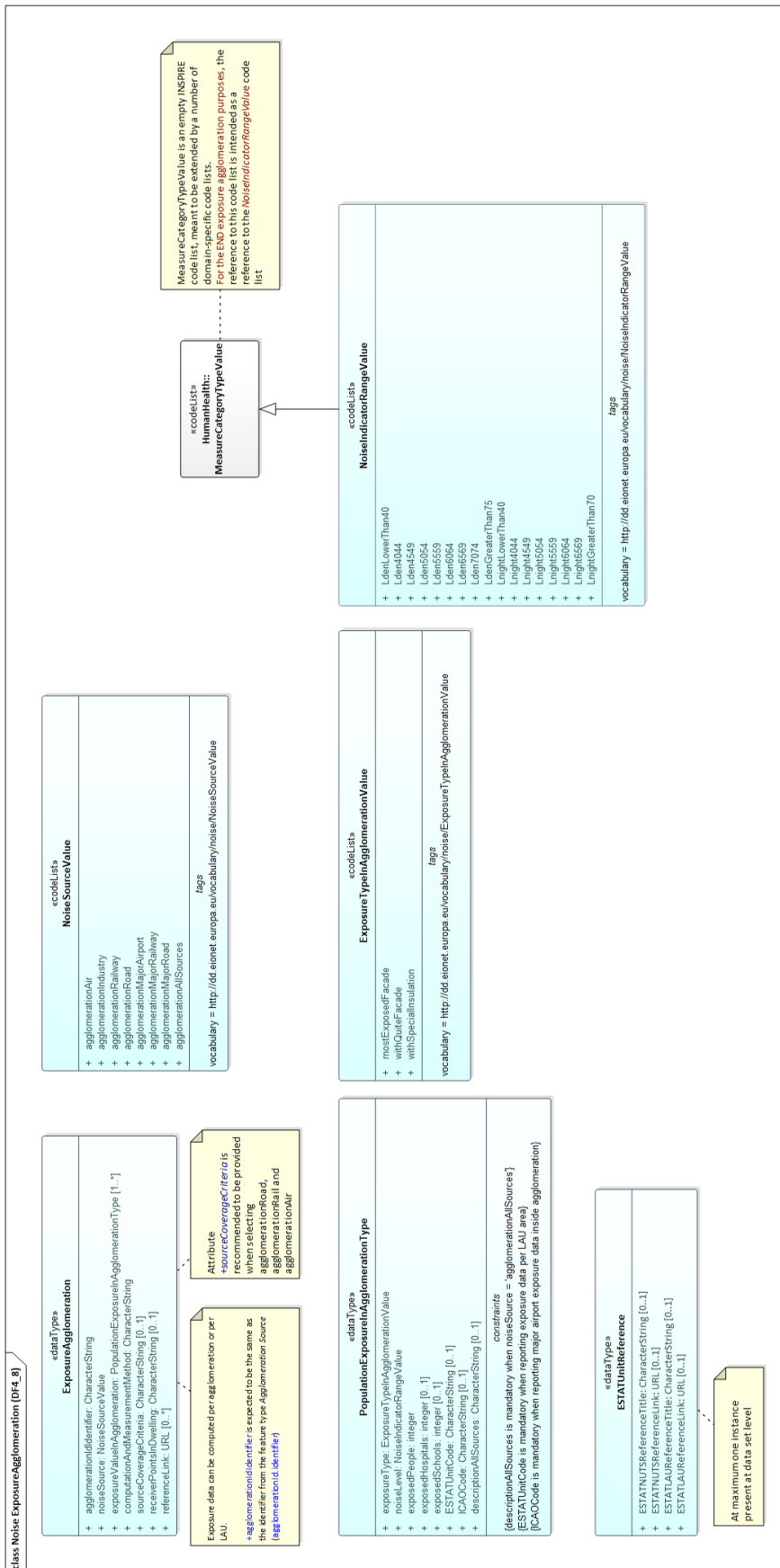
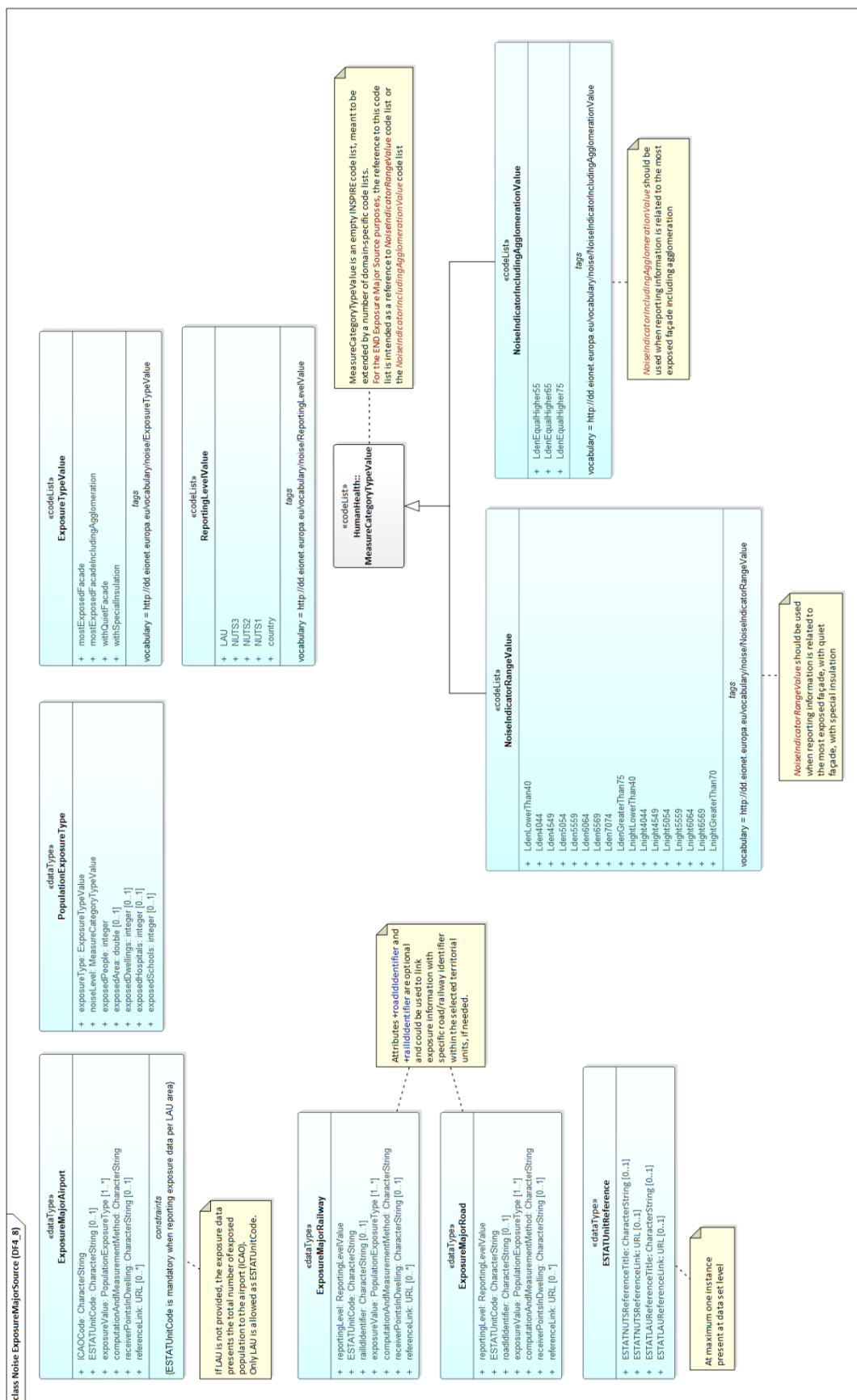


Figure 47. Data model for strategic noise maps – noise exposure data from major sources (DF4_8)



14.1 Top level data types

14.1.1 Top level data type *ESTATUnitReference*

The top level data type *ESTATUnitReference* contains the reference information concerning NUTS or LAU data if the exposure information is provided through those EUROSTAT classification of territorial units.

ESTATNUTSReferenceTitle: Version of the NUTS data used for the noise data reporting.

It is optional and conditional. Needs to be reported if exposure information is specified at NUTS level.

ESTATNUTSReferenceLink: Link to the NUTS data used for the noise data reporting.

It is optional and conditional. Needs to be reported if exposure information is specified at NUTS level.

ESTATLAUReferenceTitle: Version of the LAU data used for the noise data reporting.

It is optional and conditional. Needs to be reported is exposure information is specified at LAU level.

ESTATLAUReferenceLink: Link to the LAU data used for the noise data reporting.

It is optional and conditional. Needs to be reported is exposure information is specified at LAU level.

14.1.2 Top level data type *ExposureAgglomeration*

The top level data type *ExposureAgglomeration* contains the exposure information to different noise levels and indicators due to different noise sources that are mapped inside agglomerations, as determined by the Environmental Noise Directive.

agglomerationIdIdentifier: Unique identifier assigned to each agglomeration.

It is expected to be the same as the identifier from the feature type *AgglomerationSource* (*agglomerationId.identifier*). It is mandatory.

noiseSource: Noise source of the exposed population values inside agglomeration.

This attribute uses a value from the code list *NoiseSourceValue*. It is mandatory.

The applicable code list values are the following:

- Mandatory (for all applicable sources as declared in DF1_5 “applicableSource”):
 - *agglomerationAir*,
 - *agglomerationIndustry*,
 - *agglomerationRail*
 - *agglomerationRoad*
 - *agglomerationMajorAirport*
 - *agglomerationMajorRailway*
 - *agglomerationMajorRoad*
- Optional:
 - *agglomerationAllSources*

exposureValueInAgglomeration: It specifies all information on population exposure, including schools and hospitals, to be provided inside agglomerations following END demands.

This attribute is provided according to the data type PopulationExposureInAgglomerationType. It is mandatory.

computationAndMeasurementMethod: Computation and measurement method being used to calculate the noise maps.

It is mandatory.

sourceCoverageCriteria: Information on criteria used to select the roads and railways that are mapped in agglomerations.

It is optional. Attribute sourceCoverageCriteria is recommended to be provided when selecting agglomerationRoad, agglomerationRail.

receiverPointsInDwelling: Information on the methods employed to calculate exposure to noise at the most exposed façade as described in section 2.8 of Annex II to Directive 2002/49/EC.

It is optional.

referenceLink: Link to the published online information.

It is optional. This attribute can present links (URL) to maps, web applications, or other online information.

14.1.3 Top level data type ExposureMajorRailway

The top level data type ExposureMajorRailway contains the exposure information to different noise levels and indicators due major railways, as determined by the Environmental Noise Directive.

reportingLevel: Reporting level of the exposure data related to major railways.

This attribute uses a value from the code list ReportingLevelValue. It is mandatory.

The applicable code list values are the following:

- Conditional (one reporting level should be provided):
 - country
 - NUTS1
 - NUTS2
 - NUTS3
 - LAU

ESTATUnitCode: Unique code corresponding to the reporting unit chosen, according to Eurostat classification of territorial units.

It is mandatory. This code is related to the reportingLevel chosen, e.g. NUTS code if reportingLevel is NUTS (1, 2 or 3), LAU code if reportingLevel is LAU or country code if reportingLevel is country.

railIdIdentifier: Unique code corresponding to a railway comprised within the territorial unit code. The railway segments must be split according to the territorial unit chosen in reportingLevel and that will be used for reporting of exposure data.

It is expected to be the same as the identifier from the feature type MajorRailwaySource (railId.identifier). It is optional.

exposureValue: It specifies all information on population exposure, including schools and hospitals, to be provided for major railways following END demands.

This attribute is provided according to the data type PopulationExposureType. It is mandatory.

computationAndMeasurementMethod: Computation and measurement method being used to calculate the noise maps.

It is mandatory.

receiverPointsInDwelling: Information on the methods employed to calculate exposure to noise at the most exposed façade as described in section 2.8 of Annex II to Directive 2002/49/EC.

It is optional.

referenceLink: Link to the published online information.

It is optional. This attribute can present links (URL) to maps, web applications, or other online information.

14.1.4 Top level data type ExposureMajorRoad

The top level data type ExposureMajorRoad contains the exposure information to different noise levels and indicators due major roads, as determined by the Environmental Noise Directive.

reportingLevel: Reporting level of the exposure data related to major roads.

This attribute uses a value from the code list ReportingLevelValue. It is mandatory.

The applicable code list values are the following:

- Conditional (one reporting level should be provided):
 - country
 - NUTS1
 - NUTS2
 - NUTS3
 - LAU

ESTATUnitCode: Unique code corresponding to the reporting unit chosen, according to Eurostat classification of territorial units.

It is mandatory. This code is related to the reportingLevel chosen, e.g. NUTS code if reportingLevel is NUTS (1, 2 or 3), LAU code if reportingLevel is LAU or country code if reportingLevel is country.

roadIdIdentifier: Unique code corresponding to a road comprised within the territorial unit code. The road segments must be split according to the territorial unit chosen in reportingLevel and that will be used for reporting of exposure data.

It is expected to be the same as the identifier from the feature type MajorRoadSource (roadId.identifier). It is optional.

exposureValue: It specifies all information on population exposure, including schools and hospitals, to be provided for major roads following END demands.

This attribute is provided according to the data type PopulationExposureType. It is mandatory.

computationAndMeasurementMethod: Computation and measurement method being used to calculate the noise maps.

It is mandatory.

receiverPointsInDwelling: Information on the methods employed to calculate exposure to noise at the most exposed façade as described in section 2.8 of Annex II to Directive 2002/49/EC.

It is optional.

referenceLink: Link to the published online information.

It is optional. This attribute can present links (URL) to maps, web applications, or other online information.

14.1.5 Top level data type ExposureMajorAirport

The top level data type ExposureMajorAirport contains the exposure information to different noise levels and indicators due major airports, as determined by the Environmental Noise Directive.

ICAOCode: Unique international code of airport defined by the International Civil Aviation Organization.

It is mandatory.

ESTATUnitCode: Unique code corresponding to the reporting unit chosen, according to Eurostat classification of territorial units.

Only LAU codes are allowed. It is optional, but when exposure data is reported at LAU level, this attribute is mandatory.

exposureValue: It specifies all information on population exposure, including schools and hospitals, to be provided for major airports following END demands.

This attribute is provided according to the data type PopulationExposureType. It is mandatory.

computationAndMeasurementMethod: Computation and measurement method being used to calculate the noise maps.

It is mandatory.

receiverPointsInDwelling: Information on the methods employed to calculate exposure to noise at the most exposed façade as described in section 2.8 of Annex II to Directive 2002/49/EC.

It is optional.

referenceLink: Link to the published online information.

It is optional. This attribute can present links (URL) to maps, web applications, or other online information.

14.2 Data types

14.2.1 Data type *PopulationExposureInAgglomerationType*

The data type *PopulationExposureInAgglomerationType* provides information about population exposure, including schools and hospitals, to be provided inside agglomerations per each noise source to be mapped, both for L_{den} and L_{night} range values specified in the END.

exposureType: Defines the characteristics of the dwellings' façade where noise exposure is calculated.

This attribute uses a value from the code list *ExposureTypeInAgglomerationValue*. It is mandatory. The applicable code list values are the following:

- Mandatory:
 - *mostExposedFacade*
- Optional:
 - *withQuietFacade*
 - *withSpecialInsulation*

noiseLevel: Defines the dB range value for L_{den} or L_{night} at which the number of people exposed is calculated.

This attribute uses a value from the code list *NoiseIndicatorRangeValue*. It is mandatory. The code list *NoiseIndicatorRangeValue* shall be used when reporting information related to the most exposed façade (mandatory), *withSpecialInsulation* (optional) and *withQuietFacade* (optional). The applicable code list values for *NoiseIndicatorRangeValue* are the following:

- Mandatory:
 - *Lden5559*
 - *Lden6064*
 - *Lden6569*
 - *Lden7074*
 - *LdenGreaterThan75*
 - *Lnight5054*
 - *Lnight5559*
 - *Lnight6064*
 - *Lnight6569*
 - *LnightGreaterThan70*
- Optional: other code list values: see section 14.3.

exposedPeople: Number of people exposed to noise according to the selected noise range, indicator and source.

It is mandatory.

exposedHospitals: Number of hospitals exposed to noise according to the selected noise range, indicator and source.

It is optional.

exposedSchools: Number of schools exposed to noise according to the selected noise range, indicator and source.

It is optional.

ESTATUnitCode: Unique code corresponding to the reporting unit chosen, according to Eurostat classification of territorial units.

Only LAU codes are allowed. It is optional, but when exposure data is reported at LAU level, this attribute is mandatory.

ICAOCode: Unique international code of airport defined by the International Civil Aviation Organization.

It is optional, but when exposure data is reported for a specific major airport inside agglomeration, this attribute is mandatory.

descriptionAllSources: Description of the noise sources considered for calculating exposure data.

It is optional, but when noiseSource = "agglomerationAllSources", this attribute is mandatory.

14.2.2 Data type PopulationExposureType

The data type PopulationExposureType provides information about population exposure, including schools and hospitals, to be provided for major sources (major roads, major railways and major airports), both for L_{den} and L_{night} range values specified in the END.

exposureType: Defines the characteristics of the dwellings' façade where noise exposure is calculated.

This attribute uses a value from the code list ExposureTypeValue. It is mandatory.

The applicable code list values are the following:

- Mandatory:
 - mostExposedFacade
 - mostExposedFacadeIncludingAgglomeration
- Optional:
 - withQuietFacade
 - withSpecialInsulation

noiseLevel: Defines the dB range value for L_{den} or L_{night} at which the number of people exposed is calculated.

This attribute uses a value from the extended INSPIRE code list MeasureCategoryTypeValue, i.e. NoiseIndicatorRangeValue and NoiseIndicatorIncludingAgglomerationValue. It is mandatory.

The code list NoiseIndicatorRangeValue shall be used when reporting information related to the most exposed façade (mandatory), withSpecialInsulation (optional) and withQuietFacade (optional). The applicable code list values for NoiseIndicatorRangeValue are the following:

- Mandatory:
 - Lden5559
 - Lden6064
 - Lden6569
 - Lden7074
 - LdenGreaterThan75
 - Lnight5054
 - Lnight5559
 - Lnight6064
 - Lnight6569
 - LnightGreaterThan70
- Optional: other code list values: see section 14.3.

The code list NoiseIndicatorIncludingAgglomerationValue shall be used when reporting information related to the most exposed façade including agglomerations. The applicable code list values for NoiseIndicatorIncludingAgglomerationValue are the following:

- Mandatory:
 - LdenEqualHigher55
 - LdenEqualHigher65
 - LdenEqualHigher75

exposedPeople: Number of people exposed to noise according to the selected noise range, indicator and noise source (outside and including agglomerations).

It is mandatory.

exposedArea: Area (in km²) at a specific noise range and indicator (including agglomerations).

It is mandatory when reporting exposure information of the most exposed façade including agglomerations.

exposedDwellings: Number of dwellings exposed to noise according to the selected noise range, indicator and source (including agglomerations).

It is mandatory when reporting exposure information of the most exposed façade including agglomerations.

exposedHospitals: Number of hospitals exposed to noise according to the selected noise range, indicator and source.

It is optional.

exposedSchools: Number of schools exposed to noise according to the selected noise range, indicator and source.

It is optional.

14.3 Code lists

The data model includes the following pre-defined code lists:

ExposureTypeInAgglomerationValue: Location of the measurement/ type of dwelling used for the exposure calculations.

It distinguishes between exposure at the most exposed façade, at dwellings with quiet façade and at dwellings with special insulation.

<https://dd.eionet.europa.eu/vocabulary/noise/ExposureTypeInAgglomerationValue>

Figure 48. Code list *ExposureTypeInAgglomerationValue*

«codeList» ExposureTypeInAgglomerationValue
+ mostExposedFacade + withQuiteFacade + withSpecialInsulation
tags vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/ExposureTypeInAgglomerationValue

ExposureTypeValue: Location of the measurement/ type of dwelling used for the exposure calculations.

It distinguishes between exposure at the most exposed façade outside agglomerations or at the most exposed façade including agglomerations, at dwellings with quiet façade and at dwellings with special insulation.

<https://dd.eionet.europa.eu/vocabulary/noise/ExposureTypeValue>

Figure 49. Code list *ExposureTypeValue*

«codeList» ExposureTypeValue
+ mostExposedFacade + mostExposedFacadeIncludingAgglomeration + withQuietFacade + withSpecialInsulation
tags vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/ExposureTypeValue

MeasureCategoryTypeValue: The measure categories.

It is an empty INSPIRE code list meant to be extended by a number of domain-specific code lists. For the END reporting purpose, the reference to this code list is intended as reference to NoiseIndicatorRangeValue code list or NoiseIndicatorIncludingAgglomerationValue code list.

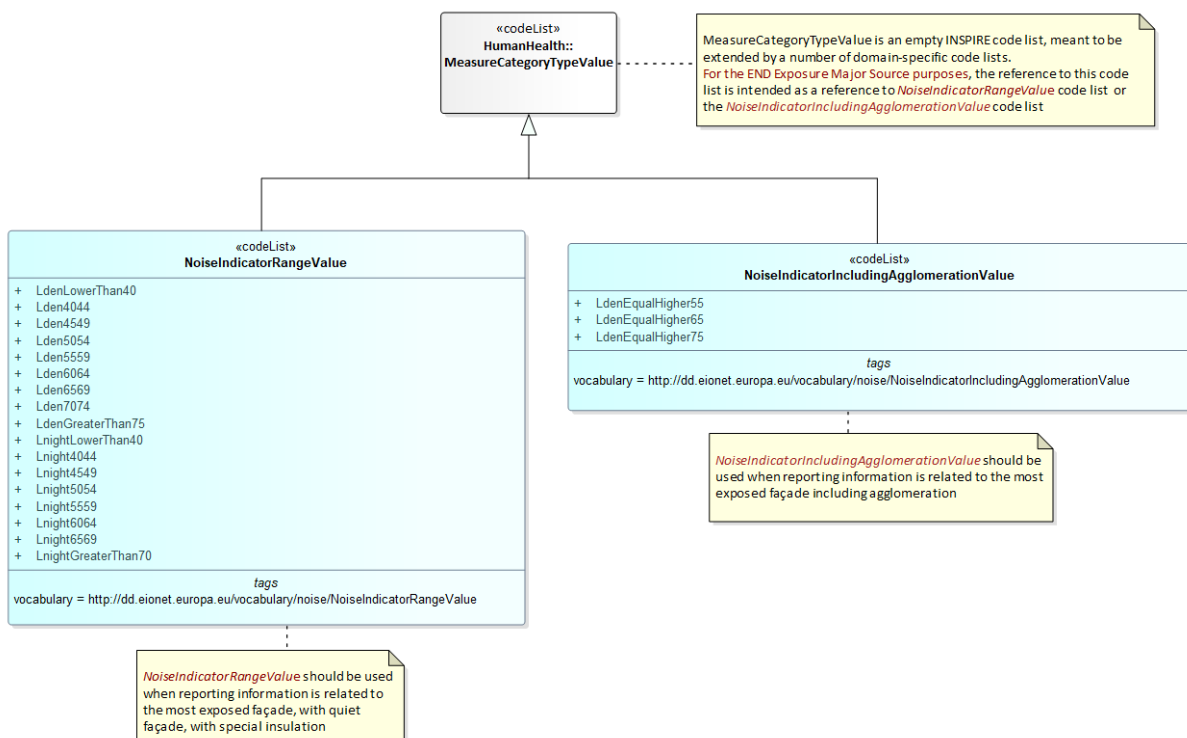
NoiseIndicatorRangeValue: Indicator of noise range values both for L_{den} and L_{night} indicators.

This code list is designed for the END reporting purpose by extending the INSPIRE code list MeasureCategoryTypeValue:
<https://dd.eionet.europa.eu/vocabulary/noise/NoiseIndicatorRangeValue> .

NoiseIndicatorIncludingAgglomerationValue: Indicator of noise values for L_{den} indicators.

This code list is designed for the END reporting purpose by extending the INSPIRE code list MeasureCategoryTypeValue:
<http://dd.eionet.europa.eu/vocabulary/noise/NoiseIndicatorIncludingAgglomerationValue> .

Figure 50. Code list MeasureCategoryTypeValue extended by NoiseIndicatorRangeValue and NoiseIndicatorIncludingAgglomerationValue



NoiseSourceValue: Type of noise sources.

The complete code list NoiseSourceValue contains the different types of noise sources, including major noise sources, noise sources in agglomerations, major noise sources in agglomerations and all noise sources inside and outside agglomerations.
<https://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceValue>

The code values applicable for this data model are the following:

Figure 51. Code list NoiseSourceValue applicable to data model for noise exposure data (DF4_8).

«codeList» Noise SourceValue
<ul style="list-style-type: none"> + agglomerationAir + agglomerationIndustry + agglomerationRailway + agglomerationRoad + agglomerationMajorAirport + agglomerationMajorRailway + agglomerationMajorRoad + agglomerationAllSources
<i>tags</i>
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceValue

ReportingLevelValue: Level of territorial units for reporting exposure values.

This code list includes the reporting level at which exposure values due to major roads or major railways will be reported. For example: at country level, at NUTS level (NUTS 1, NUTS 2 and NUTS 3) or at LAU level.

<https://dd.eionet.europa.eu/vocabulary/noise/ReportingLevelValue>

Figure 52. Code list ReportingLevelValue

«codeList» ReportingLevelValue
<ul style="list-style-type: none"> + LAU + NUTS3 + NUTS2 + NUTS1 + country
<i>tags</i>
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/ReportingLevelValue

15 Data model for noise control programmes (DF6_9)

The data model includes information about noise control programmes that have been carried out in the past and noise measures in place for major roads, railways, airports and agglomerations (see Figure 53 and Figure 54).

The noise control programmes can apply to noise sources in specific territorial unit (country, NUTS or LAU) or they can apply to individual entity of noise source (e.g. major road, major railway, major airport or agglomeration). The data model includes also basic citation information of the noise control programme and option to provide more detailed explanation.

The data model includes four top level data types related to noise sources:

- NoiseControlProgrammeAgglomeration
- NoiseControlProgrammeAirport
- NoiseControlProgrammeRail
- NoiseControlProgrammeRoad.

Figure 53. Conceptual diagram for noise control programmes

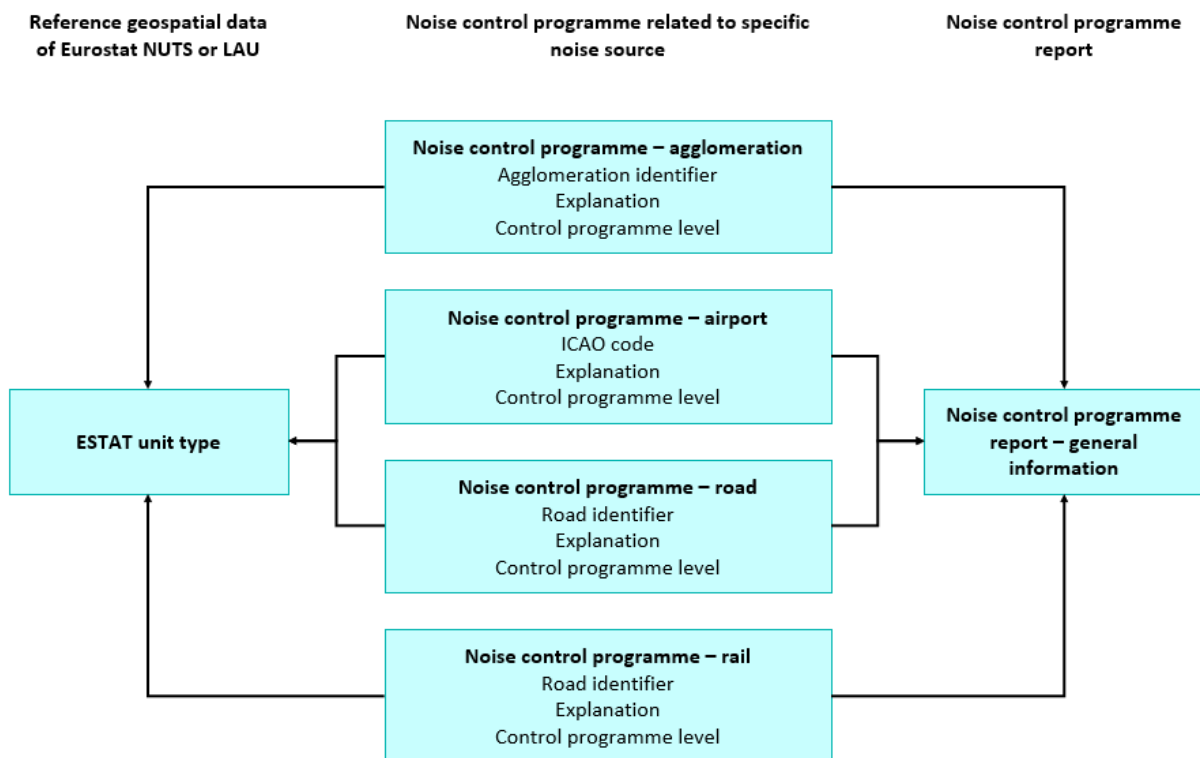
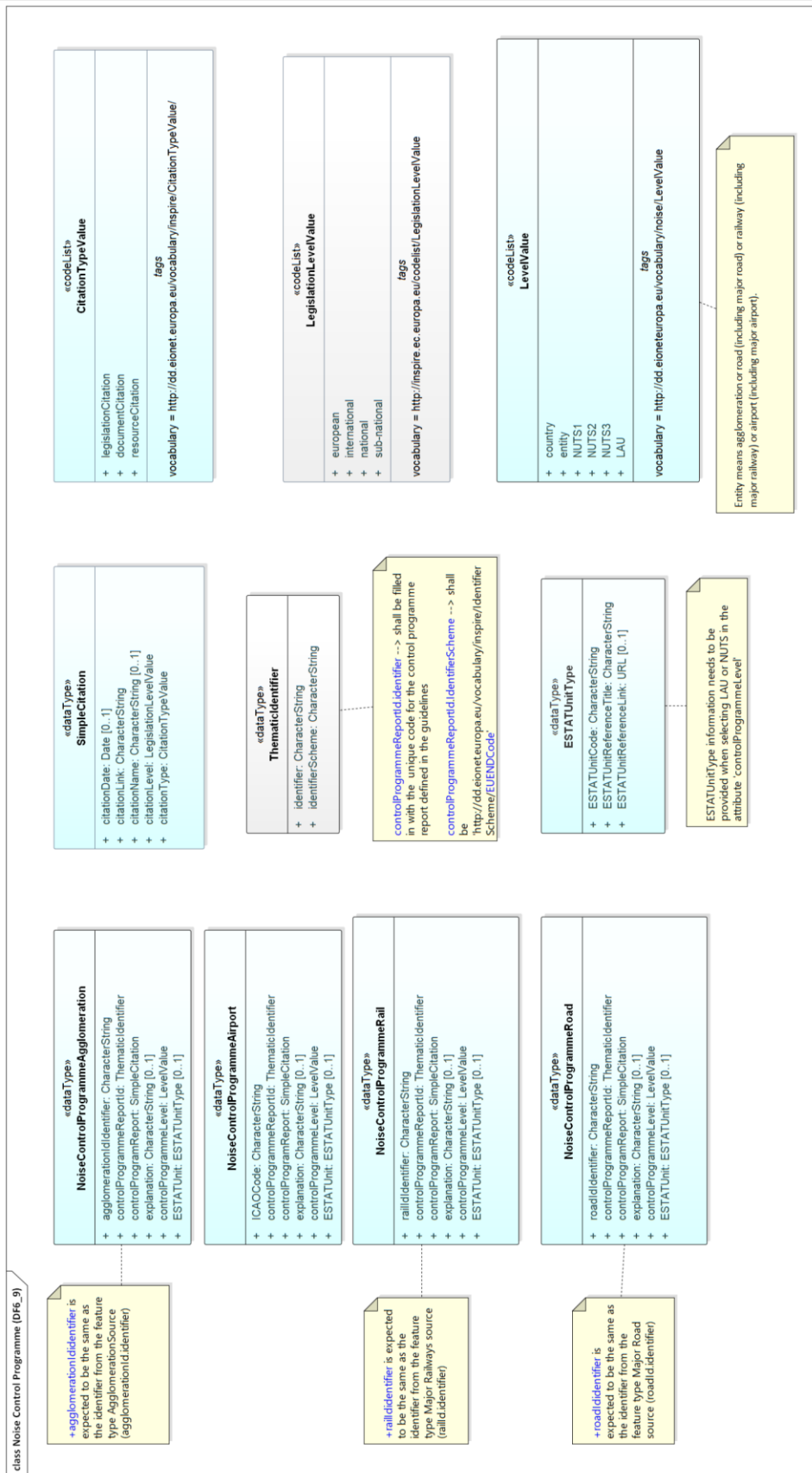


Figure 54. Data model for noise control programmes (DF6_9)



15.1 Top level data types

15.1.1 Top level data type NoiseControlProgrammeAgglomeration

The top level data type NoiseControlProgrammeAgglomeration contains the information about noise control programmes that have been carried out in the past and noise measures in place in agglomerations, as determined by the END.

agglomerationIdIdentifier: Unique identifier assigned to each agglomeration.

It is expected to be the same as the identifier from the feature type AgglomerationSource (agglomerationId.identifier). It is mandatory.

controlProgrammeReportId: Unique identifier assigned to each noise control programme.

This attribute is provided according to the data type ThematicIdentifier. It is mandatory.

Specific guidelines for data type ThematicIdentifier for the END reporting purpose:

- controlProgrammeReportId.identifier: shall be filled in with the unique code of the report
- controlProgrammeReportId.identifierScheme: shall be <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>.

controlProgrammeReport: Information about the noise control programme report.

This attribute is provided according to the data type SimpleCitation. It is mandatory.

explanation: Any kind of further explanation considered interesting besides the information contained in the noise control programme report.

It is optional.

controlProgrammeLevel: Reporting level of the noise control programme.

This attribute uses a value from the code list LevelValue. It is mandatory.

The applicable code list values are the following:

- Conditional (one reporting level should be provided):
 - o entity
 - o LAU
 - o NUTS1
 - o NUTS2
 - o NUTS3
 - o country

ESTATUnit: Unique code corresponding to the reporting unit chosen.

This attribute is provided according to the data type ESTATUnitType. It is conditional, and needs to be provided when selecting noise control programme level as LAU or NUTS (in the attribute controlProgrammeLevel).

15.1.2 Top level data type NoiseControlProgrammeAirport

The top level data type NoiseControlProgrammeAirport contains the information about noise control programmes that have been carried out in the past and noise measures in place in major airports, as determined by the END.

ICAOCode: Unique international code of airport defined by the International Civil Aviation Organization.

It is mandatory.

controlProgrammeReportId: Unique identifier assigned to each noise control programme.

This attribute is provided according to the data type ThematicIdentifier. It is mandatory. Specific guidelines for data type ThematicIdentifier for the END reporting purpose:

- controlProgrammeReportId.identifier: shall be filled in with the unique code of the report
- controlProgrammeReportId.identifierScheme: shall be <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>.

controlProgrammeReport: Information about the noise control programme report.

This attribute is provided according to the data type SimpleCitation. It is mandatory.

explanation: Any kind of further explanation considered interesting besides the information contained in the noise control programme report.

It is optional.

controlProgrammeLevel: Reporting level of the noise control programme.

This attribute uses a value from the code list LevelValue. It is mandatory.

The applicable code list values are the following:

- Conditional (one reporting level should be provided):
 - o entity
 - o LAU
 - o NUTS1
 - o NUTS2
 - o NUTS3
 - o country

ESTATUnit: Unique code corresponding to the reporting unit chosen.

This attribute is provided according to the data type ESTATUnitType. It is conditional, and needs to be provided when selecting noise control programme level as LAU or NUTS (in the attribute controlProgrammeLevel).

15.1.3 Top level data type NoiseControlProgrammeRail

The top level data type NoiseControlProgrammeRail contains the information about noise control programmes that have been carried out in the past and noise measures in place in major railways, as determined by the Environmental Noise Directive.

railIdIdentifier: Unique identifier assigned to each major railway segment.

It is expected to be the same as the identifier from the feature type MajorRailSource (railId.identifier). It is mandatory.

controlProgrammeReportId: Unique identifier assigned to each noise control programme.

This attribute is provided according to the data type ThematicIdentifier. It is mandatory.

Specific guidelines for data type ThematicIdentifier for the END reporting purpose:

- controlProgrammeReportId.identifier: shall be filled in with the unique code of the report
- controlProgrammeReportId.identifierScheme: shall be <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>.

controlProgrammeReport: Information about the noise control programme report.

This attribute is provided according to the data type SimpleCitation. It is mandatory.

explanation: Any kind of further explanation considered interesting besides the information contained in the noise control programme report.

It is optional.

controlProgrammeLevel: Reporting level of the noise control programme.

This attribute uses a value from the code list LevelValue. It is mandatory.

The applicable code list values are the following:

- Conditional (one reporting level shall be provided):
 - o entity
 - o LAU
 - o NUTS1
 - o NUTS2
 - o NUTS3
 - o country

ESTATUnit: Unique code corresponding to the reporting unit chosen.

This attribute is provided according to the data type ESTATUnitType. It is conditional, and needs to be provided when selecting noise control programme level as LAU or NUTS (in the attribute controlProgrammeLevel).

15.1.4 Top level data type NoiseControlProgrammeRoad

The top level data type NoiseControlProgrammeRoad contains the information about noise control programmes that have been carried out in the past and noise measures in place in major roads, as determined by the END.

roadIdIdentifier: Unique identifier assigned to each major road segment.

It is expected to be the same as the identifier from the feature type MajorRoadSource (roadId.identifier). It is mandatory.

controlProgrammeReportId: Unique identifier assigned to each noise control programme.

This attribute is provided according to the data type ThematicIdentifier. It is mandatory.

Specific guidelines for data type ThematicIdentifier for the END reporting purpose:

- controlProgrammeReportId.identifier: shall be filled in with the unique code of the report
- controlProgrammeReportId.identifierScheme: shall be <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>.

controlProgrammeReport: Information about the noise control programme report.

This attribute is provided according to the data type SimpleCitation. It is mandatory.

explanation: Any kind of further explanation considered interesting besides the information contained in the noise control programme report.

It is optional.

controlProgrammeLevel: Reporting level of the noise control programme.

This attribute uses a value from the code list LevelValue. It is mandatory.

The applicable code list values are the following:

- Conditional (one reporting level should be provided):
 - o entity
 - o LAU
 - o NUTS1
 - o NUTS2
 - o NUTS3
 - o country

ESTATUnit: Unique code corresponding to the reporting unit chosen.

This attribute is provided according to the data type ESTATUnitType. It is conditional, and needs to be provided when selecting noise control programme level as LAU or NUTS (in the attribute controlProgrammeLevel).

15.2 Data types

15.2.1 Data type ESTATUnitType

The data type ESTATUnitType contains the information about the unique code, reference and link to Eurostat territorial units if the declared noise control programme is defined at LAU or NUTS level.

ESTATUnitCode: Unique code of territorial unit (NUTS or LAU), according to the Eurostat classification of territorial units.

This attribute includes the NUTS or LAU code. It corresponds to the level of the noise control programme defined as NUTS or LAU in the attribute controlProgrammeLevel, e.g. NUTS code if level is NUTS (1, 2 or 3) or LAU code if level is LAU. It is mandatory.

ESTATUnitReferenceTitle: Title and version of the Eurostat territorial unit data set used for the noise data reporting.

This attribute corresponds to the level of the noise control programme defined as NUTS or LAU in the attribute controlProgrammeLevel, e.g. NUTS data set title or LAU data set title. It is mandatory.

ESTATUnitReferenceLink: Link to Eurostat data set used for the noise data reporting.

For example: URL of NUTS data set or URL of LAU data set. It is optional.

15.2.2 Data Type SimpleCitation

The data type **SimpleCitation** provides a citation of a source. This data type provides information about a report, including date of adoption, link to a website, title, legislative or administrative level at which the report has been adopted and type of source (e.g. report).

It is composed of the following attributes: citationDate, citationLink, citationName, citationLevel and citationType. Details are described in 6.2.4.

15.2.3 Data type ThematicIdentifier

The data type **ThematicIdentifier** is an INSPIRE data type and is defined to uniquely identify the spatial object within a particular information domain, e.g. in the END scope.

It is defined in the INSPIRE Implementing Rules on Interoperability and it is composed of two attributes: identifier and identifierScheme. Details are described in 6.2.2 and *Annex 4. Commonly used INSPIRE concepts*.

15.3 Code lists

The data model includes the following pre-defined code lists:

CitationTypeValue: Type of citation.

The code list is described in 6.2.4.

LegislationLevelValue: The level at which a legal act or convention has been adopted.

The code list is described in 6.2.4.

LevelValue: Reporting level of the noise control programme.

This code list defines the reporting level of the noise control programme, including the following: country level, NUTS level (NUTS 1, NUTS 2 or NUTS 3), LAU level or entity level. Entity means

agglomeration or road (including major road) or railway (including major railway) or airport (including major airport).

<https://dd.eionet.europa.eu/vocabulary/noise/LevelValue>

Figure 55. Code list LevelValue

«codeList» LevelValue
+ country + entity + NUTS1 + NUTS2 + NUTS3 + LAU
<i>tags</i> vocabulary = http://dd.eioneteuropa.eu/vocabulary/noise/LevelValue

Entity means agglomeration or road (including major road) or railway (including major railway) or airport (including major airport).

16 Data model for noise action plans for agglomerations (DF7_10)

Noise action plans (NAP) are in the core of the END scope to manage noise issues and effects, including noise reduction if necessary in those areas where strategic noise maps have been developed.

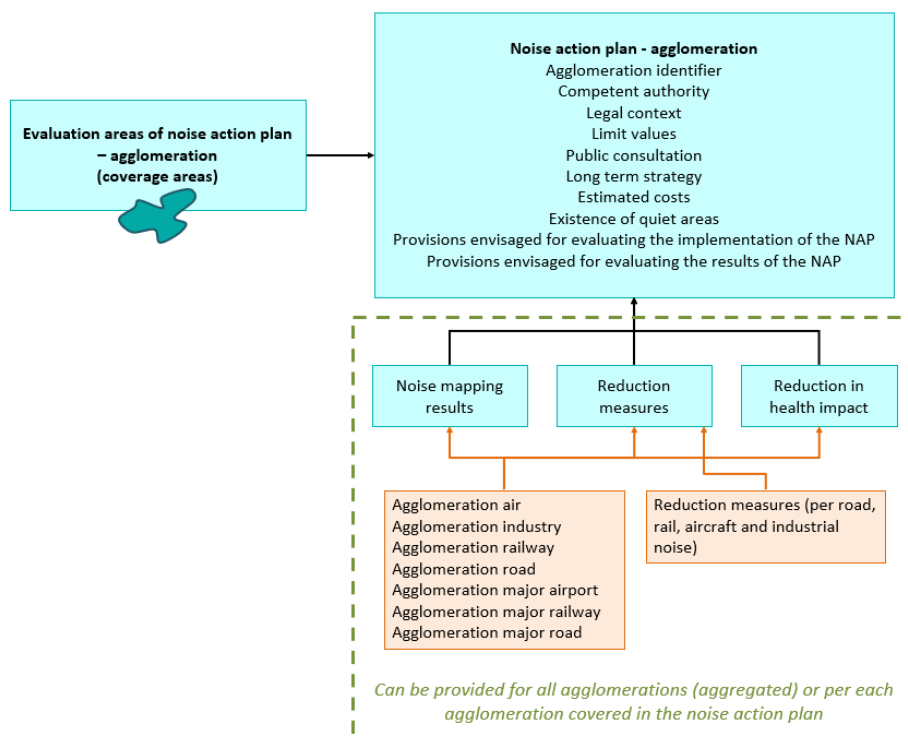
A new content structure has been developed to provide the summary information of the noise action plans linked to the areas covered by the action plans. This noise action plan area represents the area that has been evaluated by the competent authority in order to take decisions on reducing the negative health effects of noise. It is expected to be the area of the agglomeration, a polygon inside the agglomeration, a polygon representing a district of the agglomeration or a polygon which includes the agglomeration plus some surrounding areas.

The data model for noise action plans for agglomerations includes two parts of information:

- Spatial data of noise action plan areas is based on the INSPIRE Area management / restriction / regulation zones & reporting units (AM) spatial data theme.
- Summary information of the noise action plans based on Annex III, V and VI of the END.

The streamlined view of the INSPIRE AM data model (Figure 56, Figure 57) includes all properties that are needed to unambiguously describe the area covered by each action plan reported within the END scope. For this purpose, the following INSPIRE AM properties are included: environmental domain, zone type and specialised zone type. Those properties can carry uniform default values that correspond with the END reporting purpose. The detailed data model is presented in *Annex 1*.

Figure 56. Conceptual diagram for action plans for agglomerations



16.1 Feature type NoiseActionPlanCoverageArea

The feature type NoiseActionPlanCoverageArea combines the properties of the INSPIRE AM feature type ManagementRestrictionOrRegulationZone⁴⁶ and specific properties required under the END.

⁴⁶ <http://inspire.ec.europa.eu/data-model/approved/r4618-ir/html/index.htm?goto=2:3:4:1:7936>

class NoiseActionPlanAgglomeration (DF7_10) - CodeLists

codeLists
NoiseSourceValue
+ agglomerationAir
+ agglomerationIndustry
+ agglomerationRailway
+ agglomerationRoad
+ agglomerationMajorRoad
+ agglomerationMajorAirport
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceValue
tags

codeLists
ConsultationMeansValue
+ survey
+ meeting
+ workshop
+ focusGroup
+ advertisement
+ publicEvent
+ informationCampaign
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/ConsultationMeansValue
tags

codeLists
StakeholdersTypeValue
+ citizens
+ NGOs
+ privateSector
+ governmentalBodies
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/StakeholdersTypeValue
tags

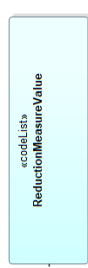
codeLists
PrioritisationCriteriaValue
+ cost-benefits
+ numberOfExposedPeople
+ levelOfNoiseExposure
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/PrioritisationCriteriaValue
tags

codeLists
EvaluationMechanismValue
+ survey/enquiry
+ calculation
+ measurements
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue
tags

ReductionMeasureValue is an empty code list.

Constraint:

- if the noise source is "agglomerationRoad" or "agglomerationMajorRoad" then reductionMeasure attribute shall contain implemented/planned measures values from the *RoadMeasureValue* codeList (<http://dd.eionet.europa.eu/vocabulary/noise/RoadMeasureValue>)
- if the noise source is "agglomerationRailway" or "agglomerationMajorRailway" then reductionMeasure attribute shall contain implemented/planned measures values from the *RailMeasureValue* codeList (<http://dd.eionet.europa.eu/vocabulary/noise/RailMeasureValue>)
- if the noise source is "agglomerationAir" or "agglomerationMajorAirport" then reductionMeasure attribute shall contain implemented/planned measures values from the *AirportMeasureValue* codeList (<http://dd.eionet.europa.eu/vocabulary/noise/AirportMeasureValue>)
- if the noise source is "agglomerationIndustry" then reductionMeasure attribute shall contain implemented/planned measures values from the *IndustryMeasureValue* codeList (<http://dd.eionet.europa.eu/vocabulary/noise/IndustryMeasureValue>)



codeLists
RoadMeasureValue
measureSource
emissionLevels
roadSurface
lowNoiseTyres
quietEngines
exhaust
quietPublicTransport
timeRestriction
timeRestrictionHGV
timeRestrictionPassenger
speedReductionMeasure
speedReduction
roundaboutsJunctions
physicalTrafficCalming
trafficAlteredZones
roadsideVegetationMeasure
publicTransportIncrease
cyclingWalkingIncrease
smartMobility
reductionTrafficFlows
bankeroutingHGV
bankeroutingPassenger
parkingManagement
bankeroutingTrucks
measureAP
noiseBarrierMeasure
noiseBarrier
greenNoiseBarrier
buildingInsulationMeasure
buildingInsulation
urbanPlanning
landUsePlanning
planningAndOrdinance
bufferZones
noiseQualityArea
quietArea
soundcape
infrastructureChange
newInfrastructure
newByPass/duct
closeRailStructure
closeRailwayRoute
closeStation
communityEngagement
informationDissemination
communication
measureForBehaviouralChange
educationAwarenessActivities
promotingOtherModes



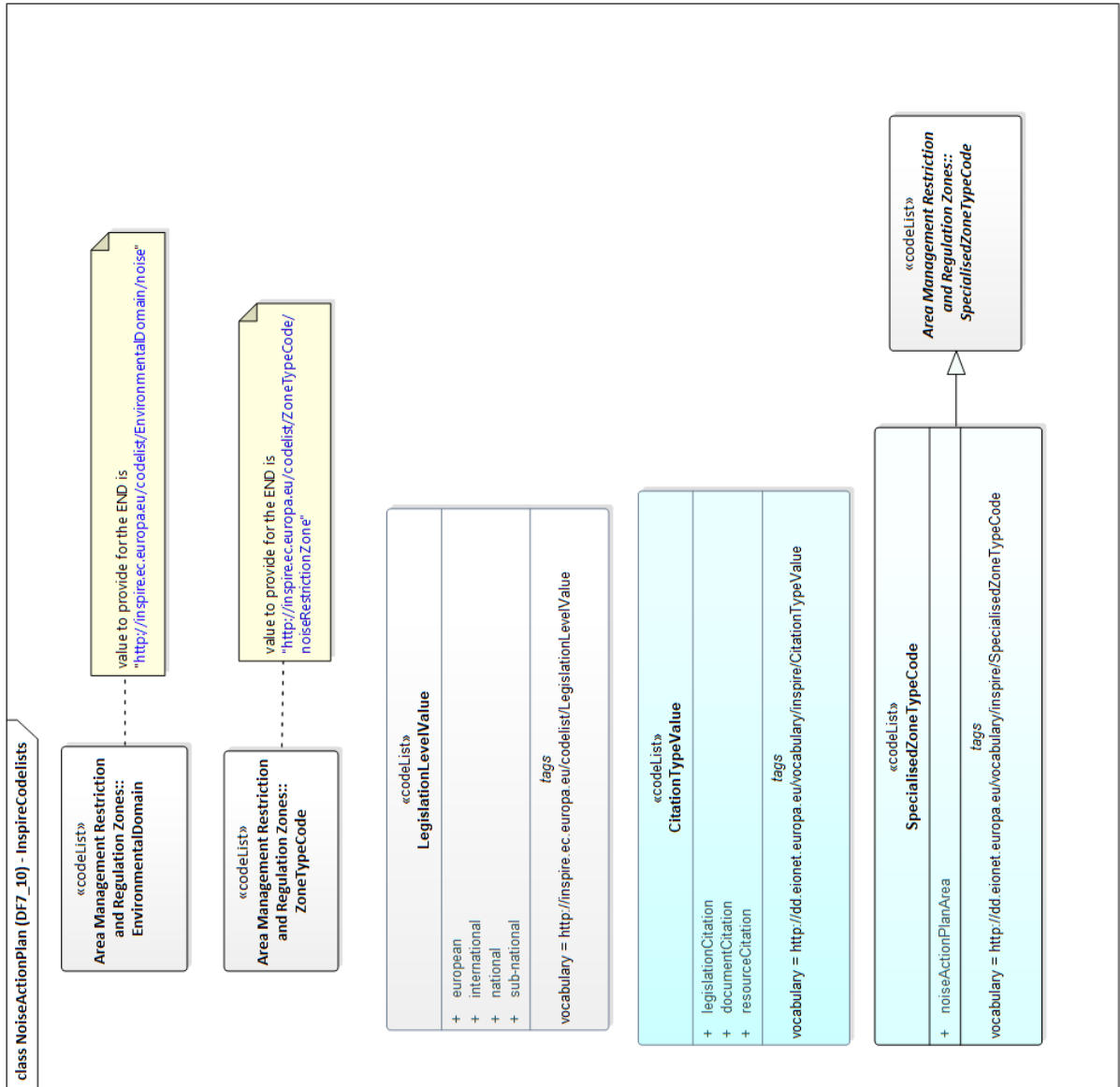
codeLists
RailMeasureValue
measureSource
emissionLevels
railTrack
lowNoiseWheels
quietEngines
timeRestriction
timeRestrictionFlight
timeRestrictionPassenger
speedReductionMeasure
speedReduction
trafficCalmedZones
otherTrafficManagementMeasure
reductionRailTrucks
bankeroutingHGV
bankeroutingPassenger
measureAP
noiseBarrierMeasure
noiseBarrier
greenNoiseBarrier
buildingInsulationMeasure
buildingInsulation
urbanPlanning
landUsePlanning
planningAndOrdinance
bufferZones
noiseQualityArea
quietArea
soundcape
infrastructureChange
newInfrastructure
newRoute
closeRailStructure
closeRailwayRoute
closeAirport
communityEngagement
informationDissemination
communication
measureForBehaviouralChange
educationAwarenessActivities
promotingOtherModes



codeLists
AirportMeasureValue
measureSource
emissionLevels
quietAircraft
timeRestriction
curfewHours
managementOfAirTrafficOperations
managementOfAirTrafficOperations
managementRunwayGroundOperations
measureAP
noiseBarrierMeasure
noiseBarrier
greenNoiseBarrier
buildingInsulationMeasure
buildingInsulation
otherInsulation
urbanPlanning
landUsePlanning
planningAndOrdinance
sensitiveAreaPlanning
bufferZones
noiseQualityArea
quietArea
soundcape
infrastructureChange
closedInfrastructure
closureIndustry
closureAirport
communityEngagement
informationDissemination
communication
measureForBehaviouralChange
educationAwarenessActivities
promotingOtherModes



codeLists
IndustryMeasureValue
measureSource
emissionLevels
quietOperations
timeRestriction
operationTimeRestriction
noiseBarrierMeasure
noiseBarrier
greenNoiseBarrier
buildingInsulationMeasure
buildingInsulation
otherInsulation
urbanPlanning
landUsePlanning
planningAndOrdinance
sensitiveAreaPlanning
bufferZones
noiseQualityArea
quietArea
soundcape
infrastructureChange
closedInfrastructure
closureIndustry
closureAirport
communityEngagement
informationDissemination
communication
measureForBehaviouralChange
educationAwarenessActivities
promotingOtherModes



The feature type NoiseActionPlanCoverageArea is composed of the following attributes:

actionPlanIdIdentifier: Unique identifier assigned to each noise action plan.

It is expected to be the same as the identifier from the noise action plan for agglomerations in the NoiseActionPlanAgglomeration data type. It is mandatory.

inspireId: External object identifier of the spatial object, defined in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It is provided according to the data type Identifier. It is mandatory. Specific guidelines for the data type Identifier for the END reporting purpose:

- inspireId.localId: A local identifier, assigned by the data provider. It could be combined with the unique identifier of the noise action plan which defines the area (actionPlanIdIdentifier). If a Member State has already in place rules for INSPIRE identifiers these rules could be used.
- inspireId.namespace: A data provider will define the namespace considering also a Member State rules for INSPIRE identifiers, if available.

geometry: Spatial extent of the area covered by an action plan, according to the definition in the INSPIRE implementing rules on interoperability.

This is an inspire attribute. It represents the area that has been evaluated by the competent authority in order to take decisions on reducing the negative health effects of noise. It is mandatory.

For the END reporting purpose, geometry of the noise action plans for agglomerations shall be presented as a boundary area of an agglomeration, a district in an agglomeration, a LAU unit or a more specific area in agglomeration.

zoneType: Zone type related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the INSPIRE code list ZoneTypeCode. It is mandatory.

The applicable code for the END reporting purposes is “noise restriction zone (noiseRestrictionZone)”.

specialisedZoneType: Definition of a noise action plan area in the END scope, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the extended INSPIRE code list SpecialisedZoneTypeCode. It is mandatory.

The applicable code for the END reporting purposes is “noiseActionPlanArea”.

environmentalDomain: Defines the environmental domain related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the INSPIRE code list EnvironmentalDomain. It is mandatory.

The applicable code for the END reporting purposes is “noise”.

designationPeriod: Designation period of noise action plan area for agglomeration, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, information when noise action plan area for agglomeration was legally designated is not required. Legal information is included in the summary information of noise action plans. However, a void reason has to be provided according to the INSPIRE AM data specifications. In that case, a value “unpopulated” is proposed to be used. It is mandatory.

competentAuthority: Description of the organisation(s) responsible for developing noise action plans aimed at managing, mitigating, restricting or regulating measures or activities related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, a dedicated data model is provided to describe information about competent authorities and their responsibilities (see Competent Authorities (DF2)). Therefore, to avoid duplication of data, information about competent authorities related to noise action plans for agglomerations are not required in this data model but a void reason has to be provided according to the INSPIRE AM data specifications. In that case, a value “unpopulated” is proposed to be used. It is mandatory.

legalBasis: Information on legal instrument that enforces a competent authority to adopt noise action plans, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is the association in the INSPIRE data model which requires that a legal instrument is provided. For the END reporting purpose, only one legal instrument is required that can be provided in the following ways:

- as the reference to the END by providing the European Legislation Identifier (ELI)⁴⁷ (as default reference): <http://data.europa.eu/eli/dir/2002/49/oj>, or
- as the reference to a more specific national or sub-national legal instrument by providing its URL.

beginLifespanVersion: It records a start or a change of areas of the noise action plan for agglomeration in the spatial dataset, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, lifespan information when an area of the noise action plan for agglomeration has been inserted or changed in the spatial dataset is not required. However, beginLifespanVersion can be provided as:

- date and time information of creation of an area of the noise action plan for agglomeration in a dataset, or of creation of a dataset itself, or
- a void reason must be provided. In that case, the value “unpopulated” is proposed to be used.

It is mandatory.

⁴⁷ <https://eur-lex.europa.eu/eli-register/about.html>

16.2 Top level data types

16.2.1 Data type NoiseActionPlanAgglomeration

The top level data type NoiseActionPlanAgglomeration contains the summary information related to the action plan's reporting for agglomerations for the different noise sources that are mapped inside agglomerations, as determined by the Environmental Noise Directive

actionPlanId: Unique identifier assigned to each noise action plan.

This attribute is provided according to the data type ThematicIdentifier. It is mandatory.

Specific guidelines for data type ThematicIdentifier for the END reporting purpose:

- actionPlanId.identifier: shall be filled in with the unique code of the noise action plan
- actionPlanId.identifierScheme: shall be <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>.

agglomerationIdentifier: One or more unique identifiers of the agglomerations covered in the noise action plan.

It is expected to be the same as the identifier from the feature type AgglomerationSource (agglomerationId.identifier). It is mandatory.

competentAuthorityIdIdentifier: Unique identifier of the competent authority.

It is expected to be the same as the identifier from the data type CompetentAuthorityDetails (competentAuthorityId.identifier) of DF2. It is mandatory.

legalContext: It indicates the legal context details of the noise action plan following END demands.

This attribute is provided according to the data type LegalContextType. It is mandatory.

limitValues: It indicates any noise limit values in place considered for the evaluation and implementation of noise management and reduction actions.

This attribute is provided according to the data type LimitValueType. It is mandatory.

publicConsultation: It describes the public consultation of the proposed noise action plan.

This attribute is provided according to the data type PublicConsultationDetail. It is mandatory

noiseMappingResults: It describes the summary of the information from the strategic noise maps within the area covered by the action plans.

It includes the estimated number of people exposed to noise and the identification of problems and situations that need to be improved.

This attribute is provided according to the data type AggMappingResultDetail. It is mandatory.

reductionMeasures: It contains any management or noise-reduction measures already in force or preparation as well as the description of any actions within the area covered by the action plan which the competent authorities intend to take in the next five years.

Specific measures related to protection of quiet areas inside agglomerations need to be specified in the quiet areas dataflow.

This attribute is provided according to the data type `AggReductionMeasureType`. It is mandatory.

affectedPeopleReduction: It contains the information about the estimates in terms of the reduction of people affected including the reduction of people suffering health effects of noise.

This attribute is provided according to the data type `AggReductionHealthImpact`. It is mandatory.

longTermStrategy: It indicates if a long-term strategy to abate noise pollution is included in the NAP.

It is a Boolean attribute. It is mandatory.

longTermStrategyExplanation: Explanation about the action's plan long-term strategy.

It is optional.

estimatedOverallCost: Estimated overall cost of the action plan.

It is optional. If provided, costs must have related currency (and viceversa).

costCurrency: Currency in which the cost is provided.

It is optional. If provided, costs must have related currency (and viceversa).

quietAreas: It indicates if the action plan includes any measures to protect quiet areas.

It is a Boolean attribute. It is optional.

implementationMechanism: It indicates if there are any provisions envisaged for evaluating the implementation of the noise action plan.

It is a Boolean attribute. It is mandatory.

implementationMechanismDescription: Description of the provisions envisaged for evaluating the implementation of the noise action plan.

It is optional.

resultsEvaluationMechanism: It indicates if there are any provisions envisaged for evaluating the results of the noise action plan.

It is a Boolean attribute. It is mandatory.

resultsEvaluationMechanismDescription: Description of the provisions envisaged for evaluating the results of the noise action plan.

This attribute uses a value from the code list `EvaluationMechanismValue`. It is optional.

The applicable code list values are the following:

- survey/enquiry

- calculation
- measurements.

16.3 Data types

The following specific complex data types are used in the data model.

16.3.1 Data type *LegalContextType*

The data type *LegalContextType* contains the legal context details of the noise action plan following END demands.

actionPlanStartDate: Date when the noise action plan is adopted.

It is mandatory.

actionPlanEndDate: Date when the noise action plan is expected to be implemented.

It is optional.

actionPlanDocument: Information about the complete action plan document.

This attribute is provided according to the data type *SimpleCitation*. It is optional.

additionalDescription: Additional information about the legal context of the noise action plan.

It is optional.

16.3.2 Data type *SimpleCitation*

The data type **SimpleCitation** provides a citation of a source. This data type provides information about a legal instrument, including date of adoption, link to a website, title, legislative or administrative level at which the legal instrument has been adopted and type of source.

It is composed of the following attributes: *citationDate*, *citationLink*, *citationName*, *citationLevel* and *citationType*.

Details are described in 6.2.4.

16.3.3 Data type *LimitValueType*

The data type *LimitValueType* indicates any noise limit values in place considered for the evaluation and implementation of noise management and reduction actions within the area covered by the action plan.

noiseLimitReportIdIdentifier: Unique identifier of the noise limit values' report.

It is expected to be the same as the identifier from the data type *SourceReportData* (*noiseLimitReportId.identifier*) of the limit values data model (DF3). It is conditional: or *noiseLimitReportIdIdentifier* is provided or one pair of attributes *otherCriteriaLimitDetail* – *otherCriteriaDescription* must be provided.

otherCriteriaLimitDetail: Noise limit value (indicator and dB) used as criteria for the evaluation and implementation of noise management and reduction actions within the area covered by the action plan.

It is conditional: or noiseLimitReportIdIdentifier is provided or one pair of attributes otherCriteriaLimitDetail – otherCriteriaDescription must be provided.

otherCriteriaDescription: Description of the other criteria used for the evaluation and implementation of noise management and reduction actions within the area covered by the action plan.

It is conditional: or noiseLimitReportIdIdentifier is provided or one pair of attribute otherCriteriaLimitDetail – otherCriteriaDescription must be provided.

16.3.4 Data type PublicConsultationDetail

The data type PublicConsultationDetail describes the information about the public consultation of the noise action plan.

consultationDocumentationSummary: Summary of the public consultation documentation.

It is optional.

consultationDocumentationOnline: URL links to the public consultation documents.

It is optional.

consultationStartDate: Start date of the public consultation period.

It is mandatory.

consultationEndDate: End date of the public consultation period.

It is mandatory.

consultationMeans: Type of consultation mechanism used to reach different stakeholders.

This attribute uses a value from the code list ConsultationMeansValue. It is conditional: either attribute consultationMeans or attribute otherConsultationMeans shall be provided.

The applicable code list values are the following:

- survey
- meeting
- workshop
- focusGroup
- advertisement
- publicEvent
- informationCampaign

otherConsultationMeans: It is used for indicating other types of consultation mechanisms not outlined in the code list ConsultationMeansValue.

It is conditional: either attribute `consultationMeans` or attribute `otherConsultationMeans` shall be provided.

stakeholdersType: Type of stakeholders participating in the public consultation.

This attribute uses a value from the code list `StakeholdersTypeValue`. It is conditional: either attribute `stakeholdersType` or attribute `otherStakeholdersType` shall be provided.

The applicable code list values are the following:

- citizens
- NGOs
- privateSector
- governmentalBodies

otherStakeholdersType: It is used for indicating other types of stakeholders participating in the public consultation not outlined in the code list `StakeholdersTypeValue`.

It is conditional: either attribute `stakeholdersType` or attribute `otherStakeholdersType` shall be provided.

numberOfParticipants: Number of people that participated in the public consultation.

It is optional.

commentsReceived: Indicates if any comments were received during the public consultation process.

It is a Boolean attribute. It is mandatory.

commentsIncludedInNAP: Indicates if any comments received during the consultation process have been included in the noise action plan.

It is a Boolean attribute. It is mandatory.

NAPReviewed: Indicates if noise action plan has been revised after the public consultation process.

It is a Boolean attribute. It is optional.

reviewExplanation: Explanation about the revision process of the NAP after the consultation process.

It is optional.

16.3.5 Data type `AggMappingResultDetail`

The data type `AggMappingResultDetail` summarizes the information from the strategic noise maps.

agglomerationIdentifier: Unique identifier assigned to an agglomeration that is included in the noise action plan.

Can be provided in action plans containing more than one agglomeration where mapping results are provided separately per each agglomeration included in the noise action plan.

It is expected to be the same as the identifier from the feature type `AgglomerationSource` (`agglomerationId.identifier`). It is optional.

noiseSource: Noise source inside agglomeration addressed by the action plan.

This attribute uses a value from the code list NoiseSourceValue. It is mandatory.

The applicable code list values are the following:

- Mandatory (for applicable sources as declared in DF1_5 “applicableSource”):
 - agglomerationAir
 - agglomerationIndustry
 - agglomerationRail
 - agglomerationRoad
- Optional:
 - agglomerationMajorAirport
 - agglomerationMajorRailway
 - agglomerationMajorRoad

exposedLden55: Number of people exposed to equal or more than 55 dB L_{den} in the area covered by the action plan.

It is mandatory.

exposedLnight50: Number of people exposed to equal or more than 50 dB L_{night} in the area covered by the action plan.

It is mandatory.

exposedOtherIndicator: Number of people exposed to another noise indicator than L_{den} and L_{night} relevant for the noise action plan.

This attribute is provided according to the data type ExposedToIndicatorType. It is optional.

situationForImprovementExplanation: Description of the problems identified and situations that need to be improved.

It is mandatory.

situationForImprovementPrioritisationCriteria: Description of the prioritization criteria used for developing the noise action plan.

This attribute uses a value from the code list PrioritisationCriteriaValue. It is optional.

The applicable code list values are the following:

- cost-benefits
- numberOfExposedPeople
- levelOfNoiseExposure.

16.3.6 Data type AggReductionMeasureType

The data type AggReductionMeasureType contain the noise abatement measures already existing or being implemented by the action plan described.

agglomerationIdentifier: Unique identifier assigned to an agglomeration that is included in the noise action plan.

Can be provided in action plans containing more than one agglomeration where reduction measures are provided separately per each agglomeration included in the noise action plan. It is expected to be the same as the identifier from the feature type AgglomerationSource (agglomerationId.identifier). It is optional.

noiseSource: Noise source inside agglomeration addressed by the action plan.

This attribute uses a value from the code list NoiseSourceValue. It is mandatory.

The applicable code list values are the following:

- Mandatory (for applicable sources as declared in DF1_5 “applicableSource”):
 - agglomerationAir
 - agglomerationIndustry
 - agglomerationRail
 - agglomerationRoad
- Optional:
 - agglomerationMajorAirport
 - agglomerationMajorRailway
 - agglomerationMajorRoad.

existingMeasure: Noise abatement measures already existing when adopting the noise action plan.

This attribute uses a value from the code list ReductionMeasureValue which presents a set of more specific code lists of reduction measures. It is mandatory.

For airports inside agglomerations the code list AirportMeasureValue applies. For roads inside agglomerations the code list RoadMeasureValue applies. For railways inside agglomerations the code list RailMeasureValue applies. For industries inside agglomerations the code list IndustrialMeasureValue applies.

plannedMeasureDetail: Description of the noise abatement measures that will be implemented within the action plan.

This attribute is provided according to the data type PlannedMeasureType. It is mandatory.

16.3.7 Data type PlannedMeasureType

The data type PlannedMeasureType describes the measures that will be implemented to reduce noise impacts in the area covered by the action plan.

plannedMeasure: Actions which the competent authorities intend to take in the next five years to reduce noise impacts in the area covered by the action plan.

This attribute uses a value from the code list ReductionMeasureValue which presents a set of more specific code lists of reduction measures. It is mandatory.

For airports inside agglomerations the code list AirportMeasureValue applies. For roads inside agglomerations the code list RoadMeasureValue applies. For railways inside agglomerations the code list RailMeasureValue applies. For industries inside agglomerations the code list IndustrialMeasureValue applies.

expectedBenefits: Explanation about the expected benefits of implementing the planned measures.

It is mandatory.

cost: Cost of the measures described.

It is optional. If provided, costs must have related currency (and viceversa).

costCurrency: Currency in which the cost is provided.

It is optional. If provided, costs must have related currency (and viceversa).

allMeasuresInCost: Indication of whether all measures are included in the cost calculation.

It is a Boolean attribute. It is optional.

measuresInCost: Name of the noise abatement measures included in the cost calculation.

It uses the values of the code list ReductionMeasureValueIt. It is optional.

16.3.8 Data type *AggReductionHealthImpact*

The data type *AggReductionHealthImpact* contain the information about the number of people experiencing a reduction in terms noise levels or in terms of health effects such as annoyance, sleep disturbance, ischaemic heart disease or other relevant effects due to the implementation of the noise action plan.

agglomerationIdentifier: Unique identifier assigned to an agglomeration that is included in the noise action plan.

Can be provided in action plans containing more than one agglomeration where reduction of health impacts are provided separately per each agglomeration included in the noise action plan.

It is expected to be the same as the identifier from the feature type *AgglomerationSource* (*agglomerationId.identifier*). It is optional.

noiseSource: Noise source inside agglomeration addressed by the action plan.

This attribute uses a value from the code list *NoiseSourceValue*. It is mandatory.

The applicable code list values are the following:

- Mandatory (for applicable sources as declared in DF1_5 “applicableSource”):
 - *agglomerationAir*,
 - *agglomerationIndustry*,
 - *agglomerationRail*
 - *agglomerationRoad*
- Optional:
 - *agglomerationMajorAirport*
 - *agglomerationMajorRailway*
 - *agglomerationMajorRoad*.

numberExperiencingReduction: Estimated number of people experiencing noise reduction in the area covered by the action plan.

This attribute is provided according to the data type ExposedToIndicatorType. The attributes in ExposedToIndicatorType are mandatory if none of the following are provided: numberHAReduction, numberHSDReduction, numberIHDReduction.

numberHAReduction: Estimated number of people experiencing a reduction in terms of highly annoyance in the area covered by the action plan.

It is optional.

numberHSDReduction: Estimated number of people experiencing a reduction in terms of the highly sleep disturbance in the area covered by the action plan.

It is optional.

numberIHDReduction: Estimated number of people experiencing a reduction in terms of ischaemic health disease incidence in the area covered by the action plan.

It is optional

otherHealthEffectReduction: Name of any other relevant health effect of noise that has been estimated in the action plan.

It is optional.

numberExperiencingOtherHealthEffectReduction: Estimated number of people experiencing a reduction in terms other relevant health effects in the area covered by the action plan.

It is conditional: if otherHealthEffectReduction is provided, the related number of people, attribute numberExperiencingOtherHealthEffectReduction, shall be provided.

explanationHealthImpact: Additional information on the measures that are included in the calculation of the health reduction or other relevant information about the calculation.

It is optional.

estimatedCostBenefit: Estimated cost benefit of the measures described in the action plan. .

It is optional.

16.3.9 Data type ExposedToIndicatorType

The data type ExposedToIndicatorType provides information about the estimated number of people experiencing noise reduction in the area covered by the action plan and the methodology used to estimate the number of people experiencing reduction.

nrOfPeople: Number of people experiencing a reduction in noise levels.

It is mandatory if none of the following are provided: numberHAReduction, numberHSDReduction, numberIHDReduction.

explanationMethod: Textual explanation of the methodology used to estimate the number of people experiencing reduction.

It is mandatory if none of the following are provided: numberHAReduction, numberHSDReduction, numberIHDReduction.

16.4 Code lists

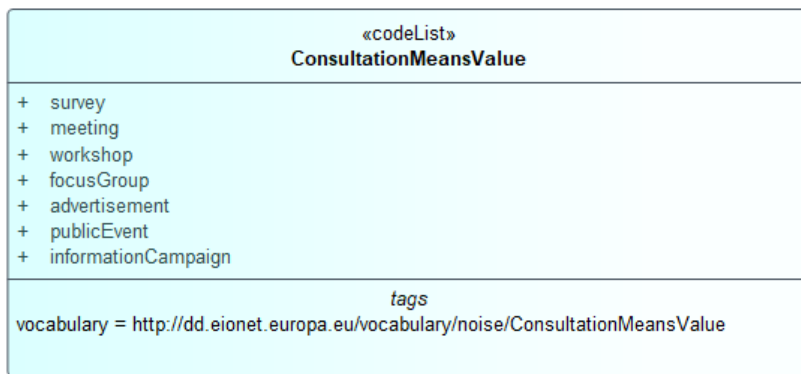
The data model includes the following pre-defined code lists:

ConsultationMeansValue: Types of public consultation.

The code list contains different types of public consultations.

<https://dd.eionet.europa.eu/vocabulary/noise/ConsultationMeansValue>

Figure 58. Code list ConsultationMeansValue

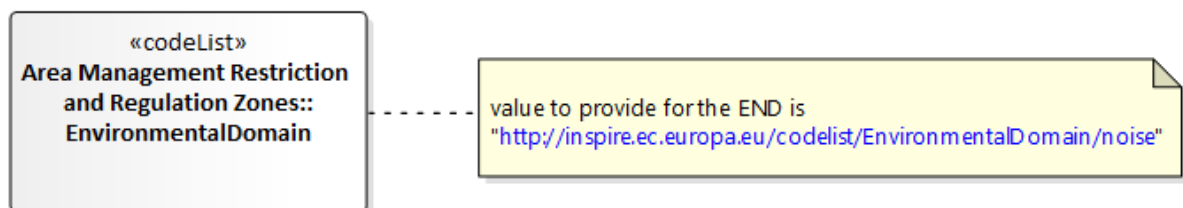


EnvironmentalDomain: Environmental domain, for which environmental objectives can be defined.

This is the INSPIRE code list published in the INSPIRE code list register:

<http://inspire.ec.europa.eu/codelist/EnvironmentalDomain>

Figure 59. Code list EnvironmentalDomain applicable to data model for noise action plans (DF7_10)



EvaluationMechanismValue: Criteria used to evaluate the results of the noise action plan.

The code list contains different criteria.

<https://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue>

Figure 60. Code list EvaluationMechanismValue

«codeList» EvaluationMechanismValue
+ survey/enquiry + calculation + measurements
<i>tags</i>
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue

NoiseSourceValue: Type of noise sources.

The complete code list NoiseSourceValue contains the different types of noise sources, including major noise sources, noise sources in agglomerations, major noise sources in agglomerations and all noise sources inside and outside agglomerations.

<https://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceValue>

The code values applicable for this data model are the following:

Figure 61. Code list NoiseSourceValue applicable to data model for noise action plans for agglomerations (DF7_10)

«codeList» Noise SourceValue
+ agglomerationAir + agglomerationIndustry + agglomerationRailway + agglomerationRoad + agglomerationMajorRoad + agglomerationMajorRailway + agglomerationMajorAirport
<i>tags</i>
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceValue

PrioritisationCriteriaValue: Criteria used to set noise reduction priorities of the action plan.

The code list contains different criteria.

<https://dd.eionet.europa.eu/vocabulary/noise/PrioritisationCriteriaValue>

Figure 62. Code list PrioritisationCriteriaValue

«codeList» PrioritisationCriteriaValue
+ cost-benefits + numberOfExposedPeople + levelOfNoiseExposure
<i>tags</i>
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/PrioritizationCriteriaValue

ReductionMeasureValue: Noise abatement measures.

The code list is organised into four code lists: RoadMeasureValue, RailMeasureValue, AirportMeasureValue and IndustryMeasureValue.

RoadMeasureValue: Noise abatement measures for road noise.

<https://dd.eionet.europa.eu/vocabulary/noise/RoadMeasureValue>

RailMeasureValue: Noise abatement measures for railway noise.

<https://dd.eionet.europa.eu/vocabulary/noise/RailMeasureValue>

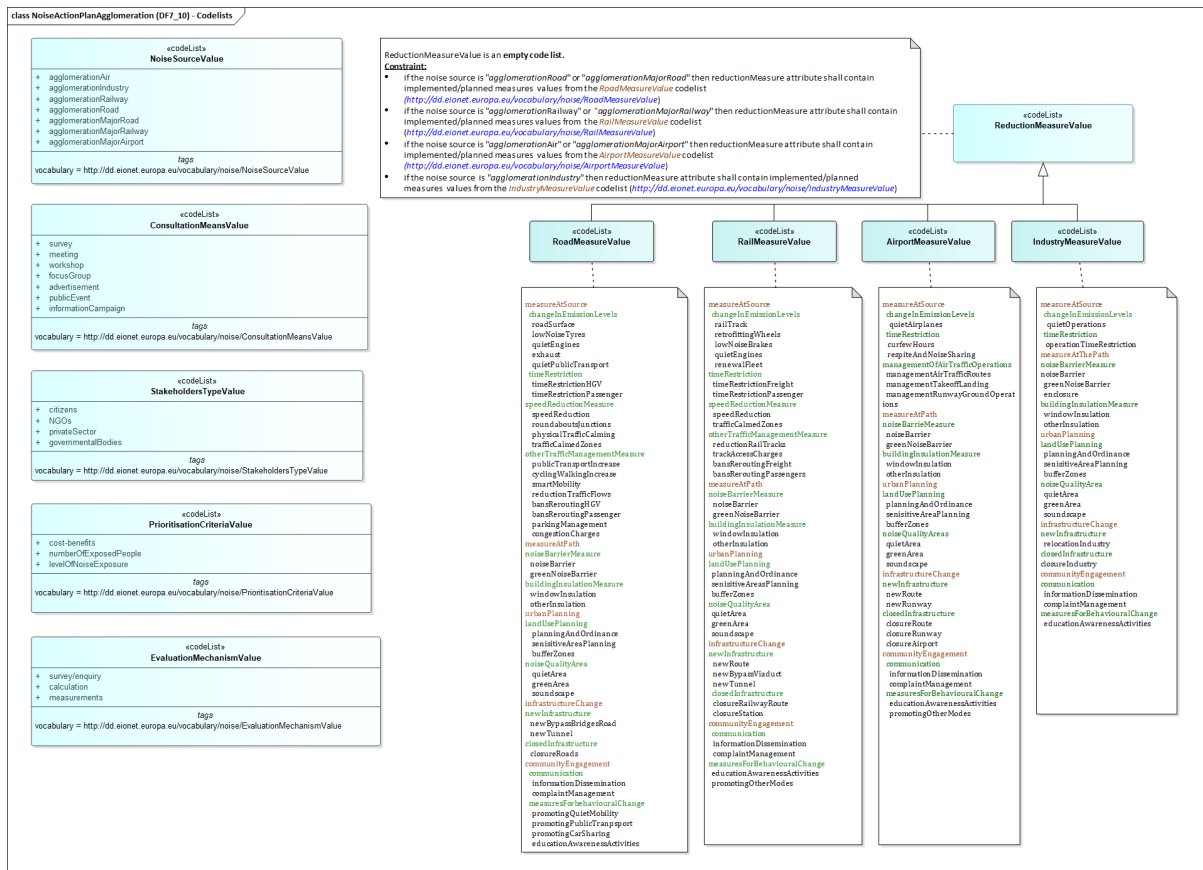
AirportMeasureValue: Noise abatement measures for aircraft noise.

<https://dd.eionet.europa.eu/vocabulary/noise/AirportMeasureValue>

IndustryMeasureValue: Noise abatement measures for industrial noise.

<https://dd.eionet.europa.eu/vocabulary/noise/IndustryMeasureValue>

Figure 63. Code list ReductionMeasureValue

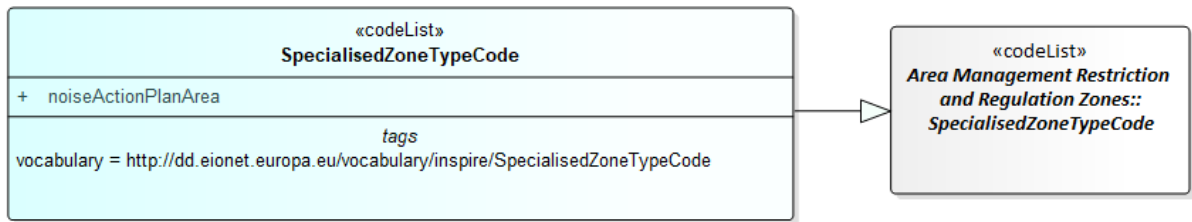


SpecialisedZoneTypeCode: Additional classification value that defines the specialised type of zone.

For the END reporting purpose, the INSPIRE code list SpecialisedZoneTypeCode is extended and it is going to be published in the Eionet Data Dictionary. It includes the coverage area of the noise action plans.

<http://dd.eionet.europa.eu/vocabulary/inspire/SpecialisedZoneTypeCode>

Figure 64. Code list SpecialisedZoneTypeCode applicable to data model for noise action plans for major sources (DF7_10)



StakeholdersTypeValue: Types of stakeholders participating in the public consultation.

The code list contains different types of stakeholders.

<https://dd.eionet.europa.eu/vocabulary/noise/StakeholdersTypeValue>

Figure 65. Code list StakeholdersTypeValue

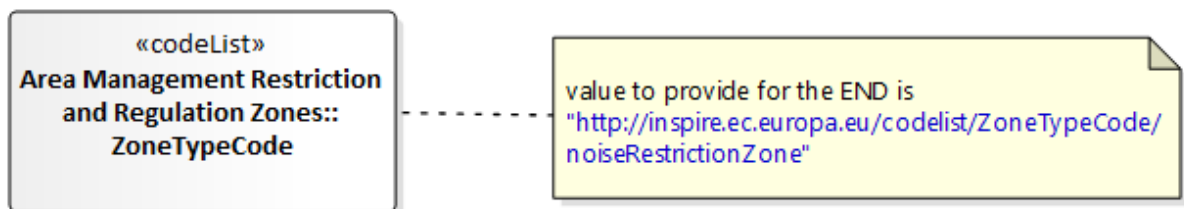


ZoneTypeCode: High-level classification defining the type of Management, Restriction or Regulation Zone.

This is the INSPIRE code list published in the INSPIRE code list register:

<http://inspire.ec.europa.eu/codelist/ZoneTypeCode>.

Figure 66. Code list ZoneTypeCode



17 Data model for noise action plans for major airports (DF7_10)

Noise action plans (NAP) are in the core of the END scope to manage noise issues and effects, including noise reduction if necessary in those areas where strategic noise maps have been developed.

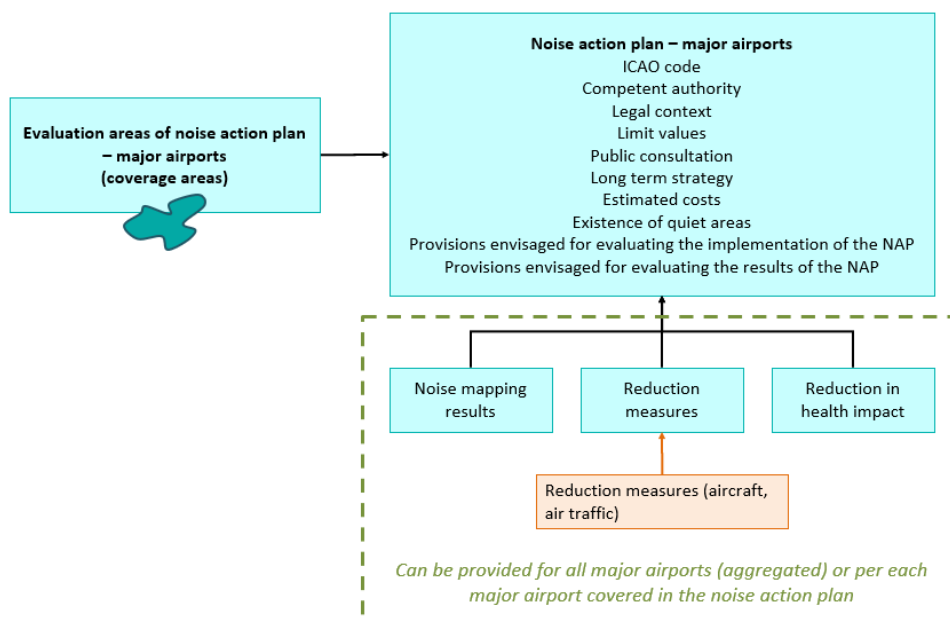
A new content structure has been developed to provide the summary information of the noise action plans linked to the areas covered by the action plans. This noise action plan area represents the area that has been evaluated by the competent authority in order to take decisions on reducing the negative health effects of noise. For major airports it is expected to be the area surrounding the noise source which has been evaluated by noise contours during the noise mapping process or the area in which health effects due to noise from the major source are likely to occur.

The data model for noise action plans for major airports includes two parts of information:

- Spatial data of noise action plan areas is based on the INSPIRE Area management / restriction / regulation zones & reporting units (AM) spatial data theme.
- Summary information of the noise action plans based on Annex III, V and VI of the END.

The streamlined view of the INSPIRE AM data model (see Figure 67, Figure 68) includes all properties that are needed to unambiguously describe the area covered by each action plan reported within the END scope. For this purpose, the following INSPIRE AM properties are included: environmental domain, zone type and specialised zone type. Those properties can carry uniform default values that correspond with the END reporting purpose. The detailed data model is presented in *Annex 1*.

Figure 67. Conceptual diagram for action plans for major airports



17.1 Feature type NoiseActionPlanCoverageArea

The feature type NoiseActionPlanCoverageArea combines the properties of the INSPIRE AM feature type ManagementRestrictionOrRegulationZone⁴⁸ and specific properties required under the END.

⁴⁸ <http://inspire.ec.europa.eu/data-model/approved/r4618-ir/html/index.htm?goto=2:3:4:1:7936>

class NoiseActionPlanMajorAirport (DF7_10) - Codelists

Codelists	
ConsultationMeansValue	
<ul style="list-style-type: none"> + survey + meeting + workshop + focusGroup + advertisement + publicEvent + informationCampaign 	
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/ConsultationMeansValue	tags

Codelists	
Stakeholders TypeValue	
<ul style="list-style-type: none"> + citizens + NGOs + privateSector + governmentalBodies 	
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/StakeholdersTypeValue	tags

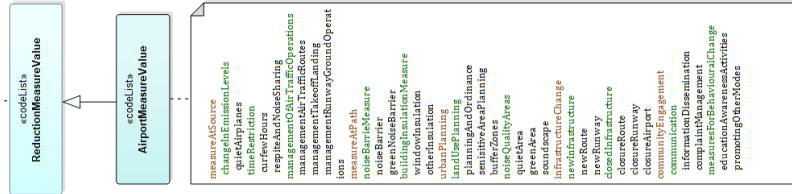
Codelists	
PrioritisationCriteriaValue	
<ul style="list-style-type: none"> + cost-benefits + numberOfExposedPeople + levelOfNoiseExposure 	
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/PrioritizationCriteriaValue	tags

Codelists	
EvaluationMechanismValue	
<ul style="list-style-type: none"> + survey/enquiry + calculation + measurements 	
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue	tags

ReductionMeasureValue is an empty code list.

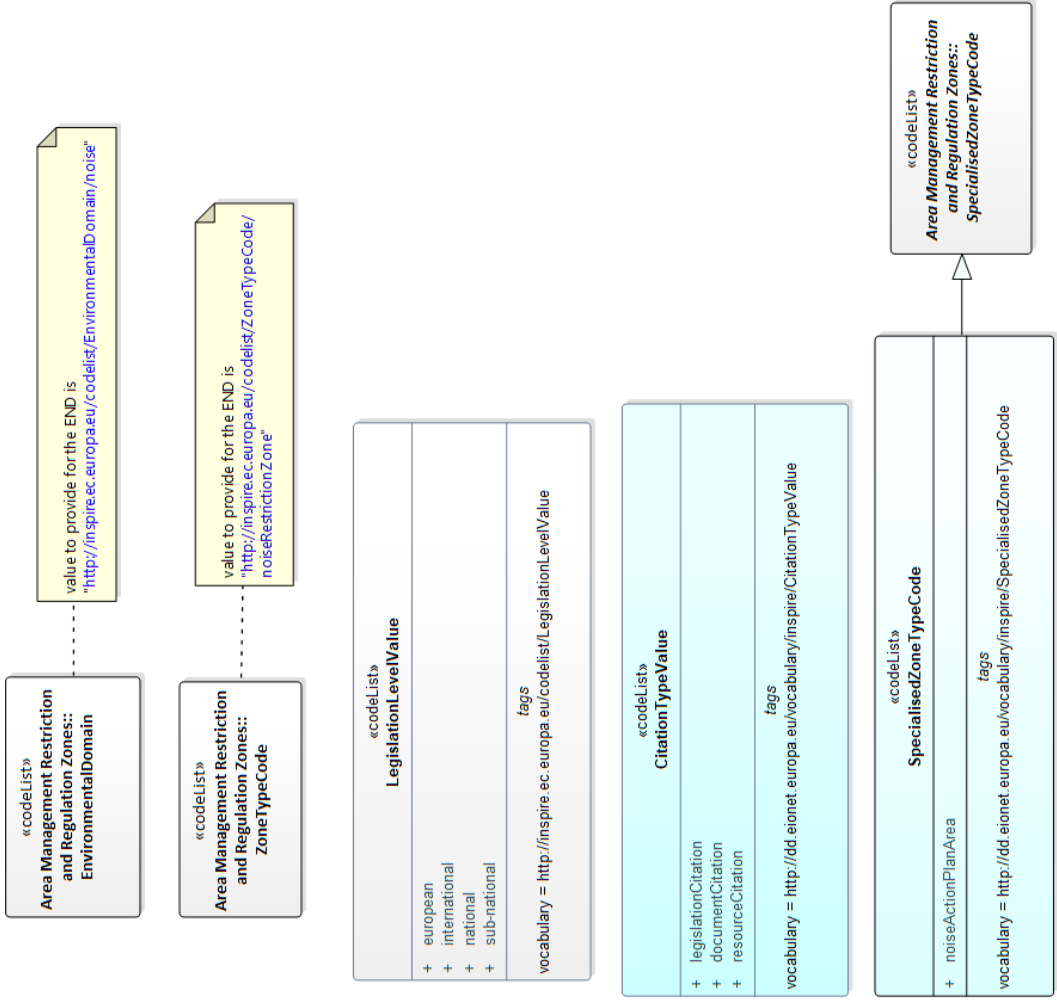
Constraint:

- If the noise source in the NoiseActionPlanMajorSource feature type is "majorAirport" then reductionMeasureValue shall contain implemented/planned measures values from the AirportMeasureValue codelist (<http://dd.eionet.europa.eu/vocabulary/noise/AirportMeasureValue>)



- ReductionMeasureValue Codelist:**
- measureOfSource
 - changeInEmissionLevels
 - quietAirplanes
 - timeRestriction
 - curfewHours
 - repairsAndNoiseShielding
 - noiseShielding
 - managementOfTrafficFlows
 - managementOfTakeoffLanding
 - managementOfRunwayGroundOperations
 - noiseShielding
 - noiseBarrierMeasure
 - greenNoiseBarrier
 - buildingInsulationMeasure
 - noiseShielding
 - urbanPlanning
 - landUsePlanning
 - planningAndOrdinance
 - noiseShielding
 - bufferZonePlanning
 - noiseQualityAreas
 - quietArea
 - greenArea
 - noiseShielding
 - infrastructureChange
 - newInfrastructure
 - newRoute
 - newRunway
 - noiseShielding
 - noiseShielding
 - closureRunway
 - closureAirport
 - communityEngagement
 - communication
 - communityEngagement
 - complaintManagement
 - measuresForBehaviouralChange
 - educationAwarenessActivities
 - promotingOtherModes

class NoiseActionPlan (DF7_10) - InspireCodeLists



The feature type NoiseActionPlanCoverageArea is composed of the following attributes:

actionPlanIdIdentifier: Unique identifier assigned to each noise action plan.

It is expected to be the same as the identifier from of the noise action plan for major airports in the NoiseActionPlanMajorAir data type. It is mandatory.

inspireId: External object identifier of the spatial object, defined in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It is provided according to the data type Identifier. It is mandatory. Specific guidelines for the data type Identifier for the END reporting purpose:

- inspireId.localId: A local identifier, assigned by the data provider. It could be combined with the unique identifier of the noise action plan which defines the area (actionPlanIdIdentifier). If a Member State has already in place rules for INSPIRE identifiers these rules could be used.
- inspireId.namespace: A data provider will define the namespace considering also a Member State rules for INSPIRE identifiers, if available.

geometry: Spatial extent of the area covered by an action plan, according to the definition in the INSPIRE implementing rules on interoperability.

This is an inspire attribute. It represents the area that has been evaluated by the competent authority in order to take decisions on reducing the negative health effects of noise. It is mandatory.

For the END reporting purpose, geometry of the noise action plans for agglomerations shall be presented as a boundary area of an agglomeration, a district in an agglomeration, a LAU unit or a more specific area in agglomeration.

zoneType: Zone type related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the INSPIRE code list ZoneTypeCode. It is mandatory.

The applicable code for the END reporting purposes is “noise restriction zone (noiseRestrictionZone)”.

specialisedZoneType: Definition of a noise action plan area in the END scope, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the extended INSPIRE code list SpecialisedZoneTypeCode. It is mandatory.

The applicable code for the END reporting purposes is “noiseActionPlanArea”.

environmentalDomain: Defines the environmental domain related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the INSPIRE code list EnvironmentalDomain. It is mandatory.

The applicable code for the END reporting purposes is “noise”.

designationPeriod: Designation period of noise action plan area for agglomeration, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, information when noise action plan area for agglomeration was legally designated is not required. Legal information is included in the summary information of noise action plans. However, a void reason has to be provided according to the INSPIRE AM data specifications. In that case, a value “unpopulated” is proposed to be used. It is mandatory.

competentAuthority: Description of the organisation(s) responsible for developing noise action plans aimed at managing, mitigating, restricting or regulating measures or activities related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, a dedicated data model is provided to describe information about competent authorities and their responsibilities (see Competent Authorities (DF2)). Therefore, to avoid duplication of data, information about competent authorities related to noise action plans for agglomerations are not required in this data model but a void reason has to be provided according to the INSPIRE AM data specifications. In that case, a value “unpopulated” is proposed to be used. It is mandatory.

legalBasis: Information on legal instrument that enforces a competent authority to adopt noise action plans, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is the association in the INSPIRE data model which requires that a legal instrument is provided. For the END reporting purpose, only one legal instrument is required that can be provided in the following ways:

- as the reference to the END by providing the European Legislation Identifier (ELI)⁴⁹ (as default reference): <http://data.europa.eu/eli/dir/2002/49/oj>, or
- as the reference to a more specific national or sub-national legal instrument by providing its URL.

beginLifespanVersion: It records a start or a change of areas of the noise action plan for agglomeration in the spatial dataset, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, lifespan information when an area of the noise action plan for agglomeration has been inserted or changed in the spatial dataset is not required. However, beginLifespanVersion can be provided as:

- date and time information of creation of an area of the noise action plan for agglomeration in a dataset, or of creation of a dataset itself, or
- a void reason must be provided. In that case, the value “unpopulated” is proposed to be used.

It is mandatory.

⁴⁹ <https://eur-lex.europa.eu/eli-register/about.html>

17.2 Top level data types

17.2.1 Data type NoiseActionPlanMajorAirport

The top level data type NoiseActionPlanMajorAirport contains the summary information related to the action plan's reporting for agglomerations for the different noise sources that are mapped inside agglomerations, as determined by the Environmental Noise Directive

actionPlanId: Unique identifier assigned to each noise action plan.

This attribute is provided according to the data type ThematicIdentifier. It is mandatory.

Specific guidelines for data type ThematicIdentifier for the END reporting purpose:

- actionPlanId.identifier: shall be filled in with the unique code of the noise action plan
- actionPlanId.identifierScheme: shall be <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>.

ICAOCode: The unique international airport codes as defined by the International Civil Aviation Organization that are covered in the noise action plan.

It is mandatory. One or more can be provided.

competentAuthorityIdIdentifier: Unique identifier of the competent authority.

It is expected to be the same as the identifier from the data type CompetentAuthorityDetails (competentAuthorityId.identifier) of DF2. It is mandatory.

legalContext: It indicates the legal context details of the noise action plan following END demands.

This attribute is provided according to the data type LegalContextType. It is mandatory.

limitValues: It indicates any noise limit values in place considered for the evaluation and implementation of noise management and reduction actions.

This attribute is provided according to the data type LimitValueType. It is mandatory.

publicConsultation: It describes the public consultation of the proposed noise action plan.

This attribute is provided according to the data type PublicConsultationDetail. It is mandatory

noiseMappginResults: It describes the summary of the information from the strategic noise maps within the area covered by the action plans.

It includes the estimated number of people exposed to noise and the identification of problems and situations that need to be improved.

This attribute is provided according to the data type AirMappingResultDetail. It is mandatory.

reductionMeasures: It contains any management or noise-reduction measures already in force or preparation as well as the description of any actions within the area covered by the action plan which the competent authorities intend to take in the next five years.

Specific measures related to protection of quiet areas outside agglomerations need to be specified in the quiet areas dataflow. This attribute is provided according to the data type AirReductionMeasureType. It is mandatory.

affectedPeopleReduction: It contains the information about the estimates in terms of the reduction of people affected including the reduction of people suffering health effects of noise.

This attribute is provided according to the data type AirReductionHealthImpact. It is mandatory.

longTermStrategy: It indicates if a long-term strategy to abate noise pollution is included in the NAP.

It is a Boolean attribute. It is mandatory.

longTermStrategyExplanation: Explanation about the action's plan long-term strategy.

It is optional.

estimatedOverallCost: Estimated overall cost of the action plan.

It is optional. If provided, costs must have related currency (and viceversa).

costCurrency: Currency in which the cost is provided.

It is optional. If provided, costs must have related currency (and viceversa).

quietAreas: It indicates if the action plan includes any measures to protect quiet areas.

It is a Boolean attribute. It is optional.

implementationMechanism: It indicates if there are any provisions envisaged for evaluating the implementation of the noise action plan.

It is a Boolean attribute. It is mandatory.

implementationMechanismDescription: Description of the provisions envisaged for evaluating the implementation of the noise action plan.

It is optional.

resultsEvaluationMechanism: It indicates if there are any provisions envisaged for evaluating the results of the noise action plan.

It is a Boolean attribute. It is mandatory.

resultsEvaluationMechanismDescription: Description of the provisions envisaged for evaluating the results of the noise action plan.

This attribute uses a value from the code list EvaluationMechanismValue. It is optional.

The applicable code list values are the following:

- survey/enquiry
- calculation

- measurements.

17.3 Data types

The following specific complex data types are used in the data model.

17.3.1 Data type *LegalContextType*

The data type *LegalContextType* contains the legal context details of the noise action plan following END demands.

actionPlanStartDate: Date when the noise action plan is adopted.

It is mandatory.

actionPlanEndDate: Date when the noise action plan is expected to be implemented.

It is optional.

actionPlanDocument: Information about the complete action plan document.

This attribute is provided according to the data type *SimpleCitation*. It is optional.

additionalDescription: Additional information about the legal context of the noise action plan.

It is optional.

17.3.2 Data type *SimpleCitation*

The data type **SimpleCitation** provides a citation of a source. This data type provides information about a legal instrument, including date of adoption, link to a website, title, legislative or administrative level at which the legal instrument has been adopted and type of source.

It is composed of the following attributes: *citationDate*, *citationLink*, *citationName*, *citationLevel* and *citationType*.

Details are described in 6.2.4.

17.3.3 Data type *LimitValueType*

The data type *LimitValueType* indicates any noise limit values in place considered for the evaluation and implementation of noise management and reduction actions within the area covered by the action plan.

noiseLimitReportIdIdentifier: Unique identifier of the noise limit values' report.

It is expected to be the same as the identifier from the data type *SourceReportData* (*noiseLimitReportId.identifier*) of the limit values data model (DF3). It is conditional: or *noiseLimitReportIdIdentifier* is provided or one pair of attributes *otherCriteriaLimitDetail* – *otherCriteriaDescription* must be provided.

otherCriteriaLimitDetail: Noise limit value (indicator and dB) used as criteria for the evaluation and implementation of noise management and reduction actions within the area covered by the action plan.

It is conditional: or noiseLimitReportIdIdentifier is provided or one pair of attributes otherCriteriaLimitDetail – otherCriteriaDescription must be provided.

otherCriteriaDescription: Description of the other criteria used for the evaluation and implementation of noise management and reduction actions within the area covered by the action plan.

It is conditional: or noiseLimitReportIdIdentifier is provided or one pair of attribute otherCriteriaLimitDetail – otherCriteriaDescription must be provided.

17.3.4 Data type PublicConsultationDetail

The data type PublicConsultationDetail describes the information about the public consultation of the noise action plan.

consultationDocumentationSummary: Summary of the public consultation documentation.

It is optional.

consultationDocumentationOnline: URL links to the public consultation documents.

It is optional.

consultationStartDate: Start date of the public consultation period.

It is mandatory.

consultationEndDate: End date of the public consultation period.

It is mandatory.

consultationMeans: Type of consultation mechanism used to reach different stakeholders.

This attribute uses a value from the code list ConsultationMeansValue. It is conditional: either attribute consultationMeans or attribute otherConsultationMeans shall be provided.

The applicable code list values are the following:

- survey
- meeting
- workshop
- focusGroup
- advertisement
- publicEvent
- informationCampaign

otherConsutationMeans: It is used for indicating other types of consultation mechanisms not outlined in the code list ConsultationMeansValue.

It is conditional: either attribute `consultationMeans` or attribute `otherConsultationMeans` shall be provided.

stakeholdersType: Type of stakeholders participating in the public consultation.

This attribute uses a value from the code list `StakeholdersTypeValue`. It is conditional: either attribute `stakeholdersType` or attribute `otherStakeholdersType` shall be provided.

The applicable code list values are the following:

- citizens
- NGOs
- privateSector
- governmentalBodies

otherStakeholdersType: It is used for indicating other types of stakeholders participating in the public consultation not outlined in the code list `StakeholdersTypeValue`.

It is conditional: either attribute `stakeholdersType` or attribute `otherStakeholdersType` shall be provided.

numberOfParticipants: Number of people that participated in the public consultation.

It is optional.

commentsReceived: Indicates if any comments were received during the public consultation process.

It is a Boolean attribute. It is mandatory.

commentsIncludedInNAP: Indicates if any comments received during the consultation process have been included in the noise action plan.

It is a Boolean attribute. It is mandatory.

NAPReviewed: Indicates if noise action plan has been revised after the public consultation process.

It is a Boolean attribute. It is optional.

reviewExplanation: Explanation about the revision process of the NAP after the consultation process.

It is optional.

17.3.5 Data type AirMappingResultDetail

The data type `AirMappingResultDetail` summarizes the information from the strategic noise maps.

ICAOCode: Unique international code for an airport defined by the International Civil Aviation Organization that is included in the noise action plan.

Can be provided in action plans containing more than one airport where mapping results are provided separately per each airport included in the noise action plan.

It is optional.

exposedLden55: Number of people exposed to equal or more than 55 dB L_{den} in the area covered by the action plan.

It is mandatory.

exposedLnight50: Number of people exposed to equal or more than 50 dB L_{night} in the area covered by the action plan.

It is mandatory.

exposedOtherIndicator: Number of people exposed to another noise indicator than L_{den} and L_{night} relevant for the noise action plan.

This attribute is provided according to the data type `ExposedToIndicatorType`. It is optional.

situationForImprovementExplanation: Description of the problems identified and situations that need to be improved.

It is mandatory.

situationForImprovementPrioritisationCriteria: Description of the prioritization criteria used for developing the noise action plan.

This attribute uses a value from the code list `PrioritisationCriteriaValue`. It is optional.

The applicable code list values are the following:

- cost-benefits
- numberOfExposedPeople
- levelOfNoiseExposure.

17.3.6 Data type `AirReductionMeasureType`

The data type `AirReductionMeasureType` contain the noise abatement measures already existing or being implemented by the action plan described.

ICAOCode: Unique international code for an airport defined by the International Civil Aviation Organization that is included in the noise action plan.

Can be provided in action plans containing more than one airport where reduction measures are provided separately per each airport included in the noise action plan.

It is optional.

existingMeasure: Noise abatement measures already existing when adopting the noise action plan.

This attribute uses a value from the code list `ReductionMeasureValue` which presents a set of more specific code lists of reduction measures. It is mandatory.

For major airports the code list `AirportMeasureValue` applies.

plannedMeasureDetail: Description of the noise abatement measures that will be implemented within the action plan.

This attribute is provided according to the data type PlannedMeasureType. It is mandatory.

17.3.7 Data type PlannedMeasureType

The data type PlannedMeasureType describes the measures that will be implemented to reduce noise impacts in the area covered by the action plan.

plannedMeasure: Actions which the competent authorities intend to take in the next five years to reduce noise impacts in the area covered by the action plan.

This attribute uses a value from the code list ReductionMeasureValue which presents a set of more specific code lists of reduction measures. It is mandatory.
For major airports the code list AirportMeasureValue applies.

expectedBenefits: Explanation about the expected benefits of implementing the planned measures.

It is mandatory.

cost: Cost of the measures described.

It is optional. If provided, costs must have related currency (and viceversa).

costCurrency: Currency in which the cost is provided.

It is optional. If provided, costs must have related currency (and viceversa).

allMeasuresInCost: Indication of whether all measures are included in the cost calculation.

It is a Boolean attribute. It is optional.

measuresInCost: Name of the noise abatement measures included in the cost calculation.

It uses the values of the code list AirportMeasureValue. It is optional.

17.3.8 Data type AirReductionHealthImpact

The data type AirReductionHealthImpact contain the information about the number of people experiencing a reduction in terms noise levels or in terms of health effects such as annoyance, sleep disturbance, ischaemic heart disease or other relevant effects due to the implementation of the noise action plan.

ICAOCode: Unique international code for an airport defined by the International Civil Aviation Organization that is included in the noise action plan.

Can be provided in action plans containing more than one airport where reduction of health impacts are provided separately per each airport included in the noise action plan.

It is optional.

numberExperiencingReduction: Estimated number of people experiencing noise reduction in the area covered by the action plan.

This attribute is provided according to the data type `ExposedToIndicatorType`. The attributes in `ExposedToIndicatorType` are mandatory if none of the following are provided: `numberHAReduction`, `numberHSDReduction`, `numberIHDReduction`.

numberHAReduction: Estimated number of people experiencing a reduction in terms of highly annoyance in the area covered by the action plan.

It is optional.

numberHSDReduction: Estimated number of people experiencing a reduction in terms of the highly sleep disturbance in the area covered by the action plan.

It is optional.

numberIHDReduction: Estimated number of people experiencing a reduction in terms of ischaemic health disease incidence in the area covered by the action plan.

It is optional

otherHealthEffectReduction: Name of any other relevant health effect of noise that has been estimated in the action plan.

It is conditional: if `otherHealthEffectReduction` is provided, the related number of people, attribute `numberExperiencingOtherHealthEffectReduction`, shall be provided.

numberExperiencingOtherHealthEffectReduction: Estimated number of people experiencing a reduction in terms other relevant health effects in the area covered by the action plan.

It is conditional: if `otherHealthEffectReduction` is provided, the related number of people, attribute `numberExperiencingOtherHealthEffectReduction`, shall be provided.

explanationHealthImpact: Additional information on the measures that are included in the calculation of the health reduction or other relevant information about the calculation.

It is optional.

estimatedCostBenefit: Estimated cost benefit of the measures described in the action plan. .

It is optional.

17.3.9 Data type `ExposedToIndicatorType`

The data type `ExposedToIndicatorType` provides information about the estimated number of people experiencing noise reduction in the area covered by the action plan and the methodology used to estimate the number of people experiencing reduction.

nrOfPeople: Number of people experiencing a reduction in noise levels.

It is mandatory if none of the following are provided: numberHAReduction, numberHSDReduction, numberIHDReduction.

explanationMethod: Textual explanation of the methodology used to estimate the number of people experiencing reduction.

It is mandatory if none of the following are provided: numberHAReduction, numberHSDReduction, numberIHDReduction.

17.4 Code lists

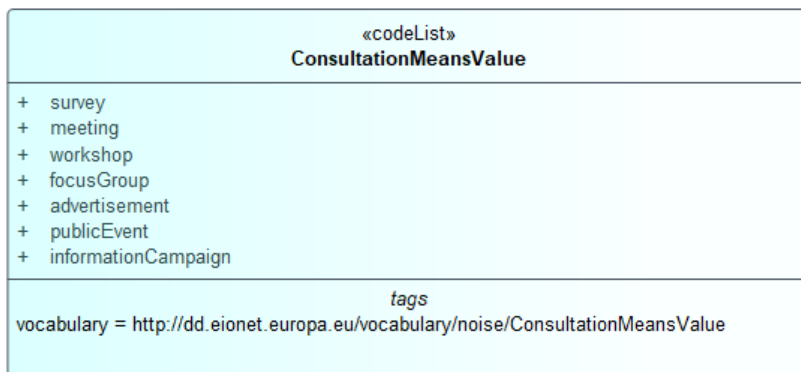
The data model includes the following pre-defined code lists:

ConsultationMeansValue: Types of public consultation.

The code list contains different types of public consultations.

<https://dd.eionet.europa.eu/vocabulary/noise/ConsultationMeansValue>

Figure 69. Code list ConsultationMeansValue

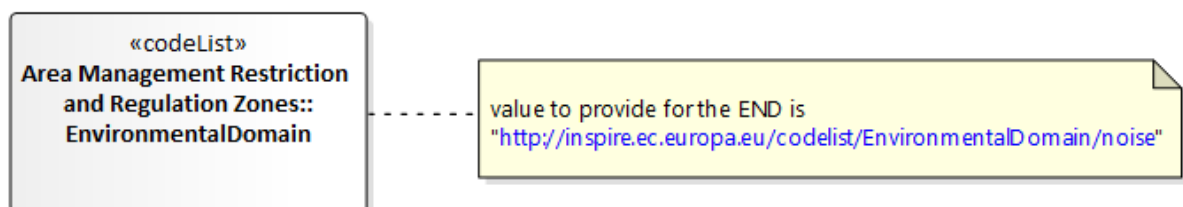


EnvironmentalDomain: Environmental domain, for which environmental objectives can be defined.

This is the INSPIRE code list published in the INSPIRE code list register:

<http://inspire.ec.europa.eu/codelist/EnvironmentalDomain>

Figure 70. Code list EnvironmentalDomain applicable to data model for noise action plans (DF7_10)



EvaluationMechanismValue: Criteria used to evaluate the results of the noise action plan.

The code list contains different criteria.

<https://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue>

Figure 71. Code list EvaluationMechanismValue

«codeList» EvaluationMechanismValue
+ survey/enquiry + calculation + measurements
<i>tags</i> vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue

PrioritisationCriteriaValue: Criteria used to set noise reduction priorities of the action plan.

The code list contains different criteria.

<https://dd.eionet.europa.eu/vocabulary/noise/PrioritisationCriteriaValue>

Figure 72. Code list PrioritisationCriteriaValue

«codeList» PrioritisationCriteriaValue
+ cost-benefits + numberOfExposedPeople + levelOfNoiseExposure
<i>tags</i> vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/PrioritizationCriteriaValue

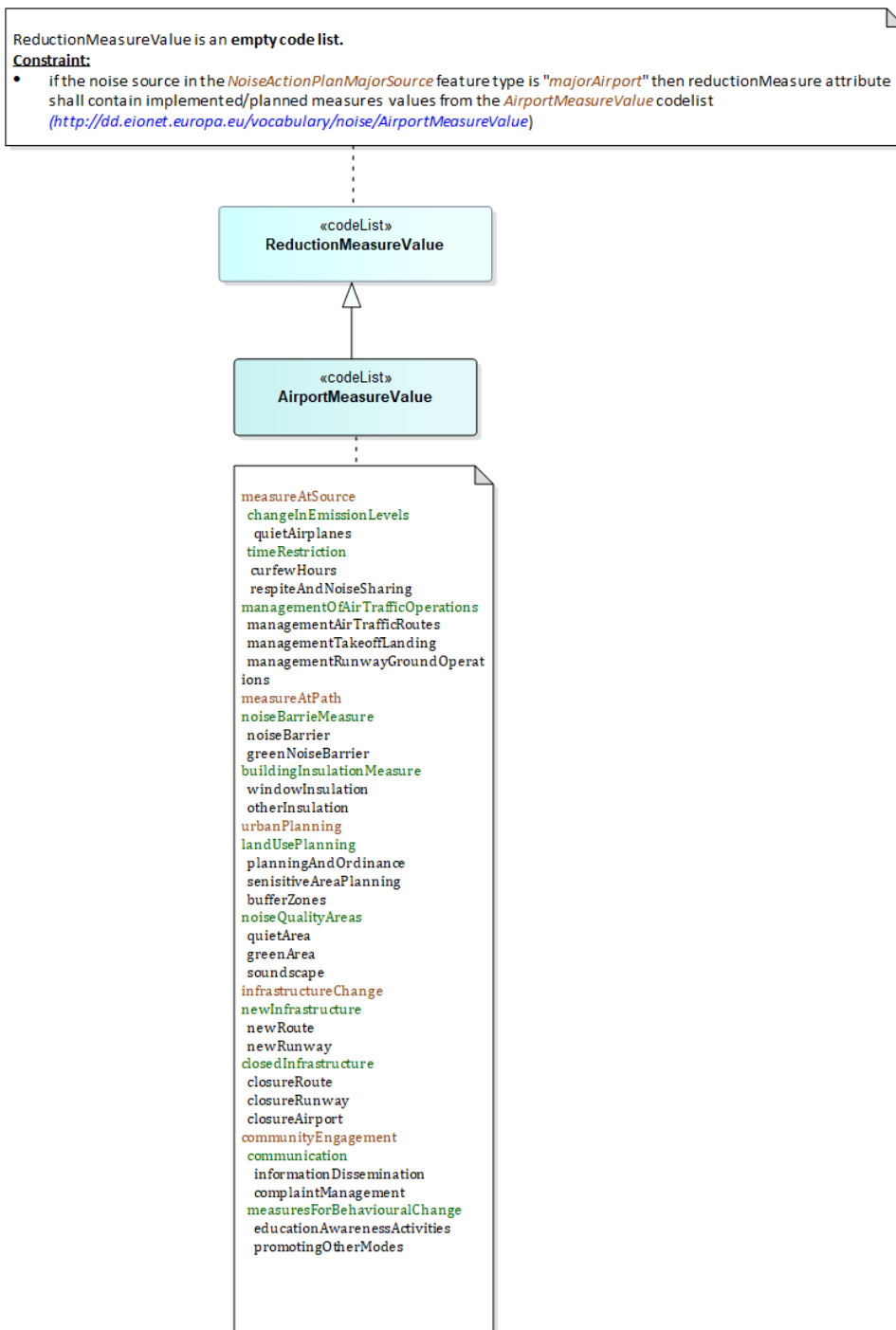
ReductionMeasureValue: Noise abatement measures.

For action plans corresponding to major airports, the applicable code list within ReductionMeasureValue is AirportMeasureValue.

AirportMeasureValue: Noise abatement measures for aircraft noise.

<https://dd.eionet.europa.eu/vocabulary/noise/AirportMeasureValue>

Figure 73. Code list ReductionMeasureValue

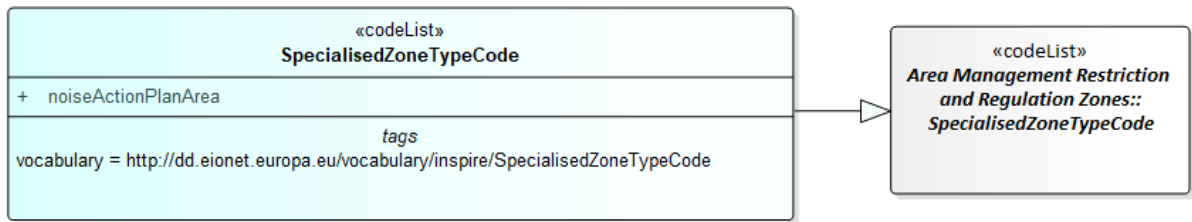


SpecialisedZoneTypeCode: Additional classification value that defines the specialised type of zone.

For the END reporting purpose, the INSPIRE code list SpecialisedZoneTypeCode is extended and it is going to be published in the Eionet Data Dictionary. It includes the coverage area of the noise action plans.

<http://dd.eionet.europa.eu/vocabulary/inspire/SpecialisedZoneTypeCode>.

Figure 74. Code list SpecialisedZoneTypeCode applicable to data model for noise action plans for major sources (DF7_10)



StakeholdersTypeValue: Types of stakeholders participating in the public consultation.

The code list contains different types of stakeholders.

<https://dd.eionet.europa.eu/vocabulary/noise/StakeholdersTypeValue>

Figure 75. Code list StakeholdersTypeValue



ZoneTypeCode: High-level classification defining the type of Management, Restriction or Regulation Zone.

This is the INSPIRE code list published in the INSPIRE code list register:

<http://inspire.ec.europa.eu/codelist/ZoneTypeCode>.

Figure 76. Code list ZoneTypeCode



18 Data model for noise action plans for major railways (DF7_10)

Noise action plans are in the core of the END scope to manage noise issues and effects, including noise reduction if necessary in those areas where strategic noise maps have been developed.

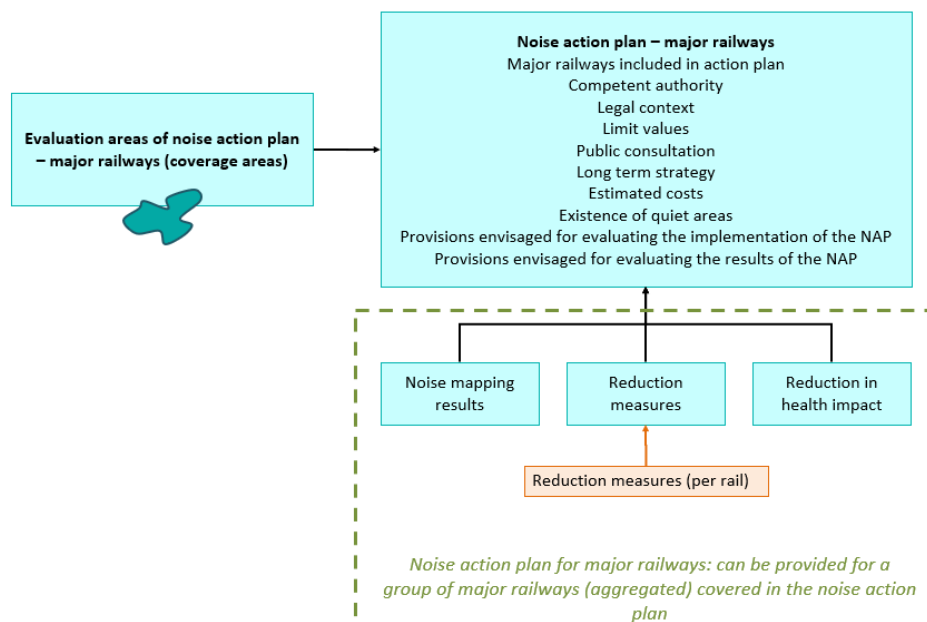
A new content structure has been developed to provide the summary information of the noise action plans linked to the areas covered by the action plans. This noise action plan area represents the area that has been evaluated by the competent authority in order to take decisions on reducing the negative health effects of noise. For major railways it is expected to be the area surrounding the noise source which has been evaluated by noise contours during the noise mapping process or the area in which health effects due to noise from the major source are likely to occur.

The data model for noise action plans for major sources includes two parts of information:

- Spatial data and is based on the INSPIRE Area management / restriction / regulation zones & reporting units (AM) spatial data theme.
- Summary information of the noise action plans based on Annex III, V and VI of the END.

The streamlined view of the INSPIRE AM data model (Figure 77, Figure 78. Streamlined data model for noise action plans for major railways (DF7_10) includes all properties that are needed to unambiguously describe the area covered by each action plan reported within the END scope. For this purpose, the following INSPIRE AM properties are included: environmental domain, zone type and specialised zone type. Those properties can carry uniform default values that correspond with the END reporting purposes. The detailed data model is presented in *Annex 1*.

Figure 77. Conceptual diagram for major roads and major railways



18.1 Feature type NoiseActionPlanCoverageArea

The feature type NoiseActionPlanCoverageArea combines the properties of the INSPIRE AM feature type ManagementRestrictionOrRegulationZone⁵⁰ and specific properties required under the END Directive.

⁵⁰ <http://inspire.ec.europa.eu/data-model/approved/r4618-ir/html/index.htm?goto=2:3:4:1:7936>

class NoiseActionPlanMajorRailway[DF7_10] - CodeLists

«codeList» ConsultationMeansValue	
+ survey	
+ meeting	
+ workshop	
+ focusGroup	
+ advertisement	
+ publicEvent	
+ informationCampaign	
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/ConsultationMeansValue	
tags	

«codeList» StakeholdersTypeValue	
+ citizens	
+ NGOs	
+ privateSector	
+ governmentalBodies	
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/StakeholdersTypeValue	
tags	

«codeList» PrioritisationCriteriaValue	
+ cost-benefits	
+ numberOfExposedPeople	
+ levelOfNoiseExposure	
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/PrioritizationCriteriaValue	
tags	

«codeList» EvaluationMechanismValue	
+ survey/enquiry	
+ calculation	
+ measurements	
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue	
tags	

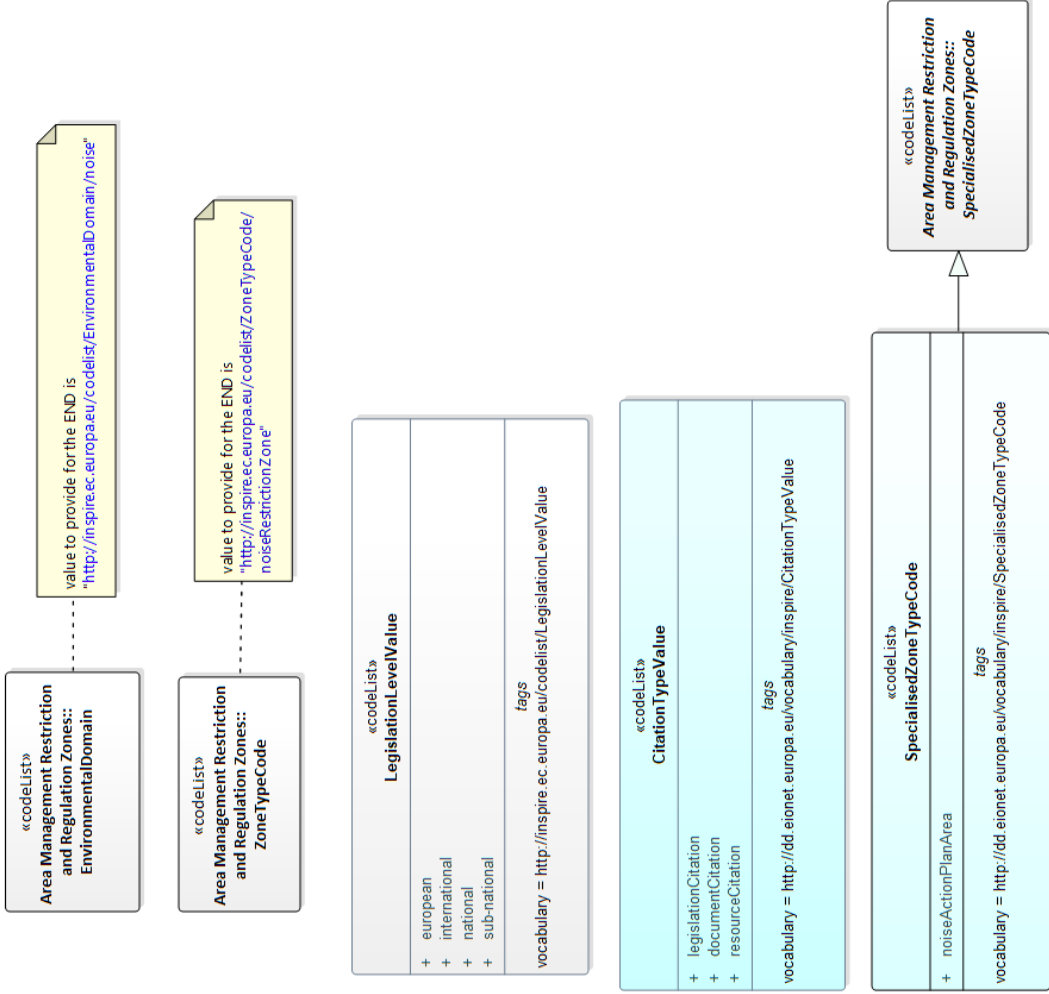
ReductionMeasureValue is an empty code list.
Constraint:

- if the noise source in the *NoiseActionPlanMajorSource* feature type is "majorRailway" then reductionMeasure attribute shall contain implemented/planned measures values from the *RailMeasureValue* code list (<http://dd.eionet.europa.eu/vocabulary/noise/RailMeasureValue>)



- measureAtSource
- changeInEmissionLevels
- railTrack
- retrofittingWheels
- lowNoiseBrakes
- quietSleepers
- quietFasteners
- timeRestriction
- timeRestrictionFreight
- timeRestrictionPassenger
- speedReductionMeasure
- speedReduction
- otherTrafficManagementMeasure
- reductionRailTracks
- trackAccessCharges
- banOnRoutingFreight
- banOnRoutingPassengers
- noiseBarriersMeasure
- noiseBarrier
- greenNoiseBarrier
- buildingInsulationMeasure
- windDeflection
- soundInsulation
- landUsePlanning
- PlanningAndOrdinance
- sensitiveAreasPlanning
- bufferZones
- noiseQualityArea
- greenArea
- soundscapes
- infrastructureChange
- newInfrastructure
- newRoute
- newTypeOfRailroad
- CloseInfrastructure
- CloseRailwayRoute
- CloseStation
- communityEngagement
- communityEngagement
- infrastructureDissemination
- complaintManagement
- measureForBehaviouralChange
- educationAwarenessActivities
- promotingOtherModes

class NoiseActionPlan (DF7_10) - InspireCodeLists



The feature type NoiseActionPlanCoverageArea is composed of the following attributes:

actionPlanIdIdentifier: Unique identifier assigned to each noise action plan.

It is expected to be the same as the identifier from the noise action plan for railways in the NoiseActionPlanMajorRail data type. It is mandatory.

inspireId: External object identifier of the spatial object, defined in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It is provided according to the data type Identifier. It is mandatory. Specific guidelines for the data type Identifier for the END reporting purpose:

- inspireId.localId: A local identifier, assigned by the data provider. It could be combined with the unique identifier of the noise action plan which defines the area (actionPlanIdIdentifier). If a Member State has already in place rules for INSPIRE identifiers these rules could be used.
- inspireId.namespace: A data provider will define the namespace considering also a Member State rules for INSPIRE identifiers, if available.

geometry: Spatial extent of the area covered by an action plan, according to the definition in the INSPIRE implementing rules on interoperability.

This is an inspire attribute. It represents the area that has been evaluated by the competent authority in order to take decisions on reducing the negative health effects of noise. It is mandatory.

For the END reporting purpose, geometry of the noise action plans for major sources shall be presented as area, by using polygon geometry type, surrounding the noise source which has been evaluated during the noise mapping process or the area in which health effects due to noise from the major source are likely to occur.

zoneType: Zone type related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the INSPIRE code list ZoneTypeCode. It is mandatory.

The applicable code for the END reporting purposes is “noise restriction zone (noiseRestrictionZone)”.

specialisedZoneType: Definition of a noise action plan area in the END scope, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the extended INSPIRE code list SpecialisedZoneTypeCode. It is mandatory.

The applicable code for the END reporting purposes is “noiseActionPlanArea”.

environmentalDomain: Defines the environmental domain related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the INSPIRE code list EnvironmentalDomain. It is mandatory.

The applicable code for the END reporting purposes is “noise”.

designationPeriod: Designation period of noise action plan area for major sources, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, information when noise action plan area for major sources was legally designated is not required. Legal information is included in the summary information of noise action plans. However, a void reason has to be provided according to the INSPIRE AM data specifications. In that case, a value “unpopulated” is proposed to be used. It is mandatory.

competentAuthority: Description of the organisation(s) responsible for developing noise action plans aimed at managing, mitigating, restricting or regulating measures or activities related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, a dedicated data model is provided to describe information about competent authorities and their responsibilities (see Competent Authorities (DF2)). Therefore, to avoid duplication of data, information about competent authorities related to noise action plans for major sources are not required in this data model but a void reason has to be provided according to the INSPIRE AM data specifications. In that case, a value “unpopulated” is proposed to be used. It is mandatory.

legalBasis: Information on legal instrument that enforces a competent authority to adopt noise action plans, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is the association in the INSPIRE data model which requires that a legal instrument is provided. For the END reporting purpose, only one legal instrument is required that can be provided in the following ways:

- as the reference to the END by providing the European Legislation Identifier (ELI)⁵¹ (as default reference): <http://data.europa.eu/eli/dir/2002/49/oj>, or
- as the reference to a more specific national or sub-national legal instrument by providing its URL.

beginLifespanVersion: It records a start or a change of areas of the noise action plan for major sources in the spatial dataset, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, lifespan information when an area of the noise action plan for major sources has been inserted or changed in the spatial dataset is not required. However, beginLifespanVersion can be provided as:

- date and time information of creation of an area of the noise action plan for major sources in a dataset, or of creation of a dataset itself, or
- a void reason must be provided. In that case, the value “unpopulated” is proposed to be used.

It is mandatory.

⁵¹ <https://eur-lex.europa.eu/eli-register/about.html>

18.2 Top level data types

18.2.1 Data type NoiseActionPlanMajorRailway

The top level data type NoiseActionPlanMajorRailway contains the summary information related to the action plan's reporting for major railways, as determined by the Environmental Noise Directive

actionPlanId: Unique identifier assigned to each noise action plan.

This attribute is provided according to the data type ThematicIdentifier. It is mandatory.

Specific guidelines for data type ThematicIdentifier for the END reporting purpose:

- actionPlanId.identifier: shall be filled in with the unique code of the noise action plan
- actionPlanId.identifierScheme: shall be <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>.

majorRailwaysInActionPlan: Indication of the major railways included in the noise action plan through rail identifiers or territorial units for statistics.

This attribute is provided according to ReportingLevelType. It is mandatory.

competentAuthorityIdIdentifier: Unique identifier of the competent authority.

It is expected to be the same as the identifier from the data type CompetentAuthorityDetails (competentAuthorityId.identifier) of DF2. It is mandatory.

legalContext: It indicates the legal context details of the noise action plan following END demands.

This attribute is provided according to the data type LegalContextType. It is mandatory

limitValues: It indicates any noise limit values in place considered for the evaluation and implementation of noise management and reduction actions.

This attribute is provided according to the data type LimitValueType. It is mandatory.

publicConsultation: It describes the public consultation of the proposed noise action plan.

This attribute is provided according to the data type PublicConsultationDetail. It is mandatory

noiseMappinResults It describes the summary of the information from the strategic noise maps within the area covered by the action plans.

It includes the estimated number of people exposed to noise and the identification of problems and situations that need to be improved.

This attribute is provided according to the data type RailMappingResultDetail. It is mandatory

reductionMeasures: It contains any management or noise-reduction measures already in force or preparation as well as the description of any actions within the area covered by the action plan which the competent authorities intend to take in the next five years.

Specific measures related to protection of quiet areas outside agglomerations need to be specified in the quiet areas dataflow.

This attribute is provided according to the data type RailReductionMeasureType. It is mandatory.

affectedPeopleReduction: It contains the information about the estimates in terms of the reduction of people affected including the reduction of people suffering health effects of noise.

This attribute is provided according to the data type RailReductionHealthImpact. It is mandatory.

longTermStrategy: It indicates if a long-term strategy to abate noise pollution is included in the NAP

It is a Boolean attribute. It is mandatory.

longTermStrategyExplanation: Explanation about the action's plan long-term strategy.

It is optional.

estimatedOverallCost: Estimated overall cost of the action plan.

It is optional. If provided, costs must have related currency (and viceversa).

costCurrency: Currency in which the cost is provided.

It is optional. If provided, costs must have related currency (and viceversa).

quietAreas: It indicates if the action plan includes any measures to protect quiet areas.

It is a Boolean attribute. It is optional.

implementationMechanism It indicates if there are any provisions envisaged for evaluating the implementation of the noise action plan.

It is a Boolean attribute. It is mandatory.

implementationMechanismDescription: Description of the provisions envisaged for evaluating the implementation of the noise action plan.

It is optional.

resultsEvaluationMechanism: It indicates if there are any provisions envisaged for evaluating the results of the noise action plan.

It is a Boolean attribute. It is mandatory.

resultsEvaluationMechanismDescription: Description of the provisions envisaged for evaluating the results of the noise action plan.

This attribute uses a value from the code list EvaluationMechanismValue. It is optional.

The applicable code list values are the following:

- survey/enquiry
- calculation
- measurements

18.3 Data types

The following specific complex data types are used in the data model.

18.3.1 Data type *LegalContextType*

The data type *LegalContextType* contains the legal context details of the noise action plan following END demands.

actionPlanStartDate: Date when the noise action plan is adopted.

It is mandatory.

actionPlanEndDate: Date when the noise action plan is expected to be implemented.

It is optional.

actionPlanDocument: Information about the complete action plan document.

This attribute is provided according to the data type *SimpleCitation*. It is optional.

additionalDescription: Additional information about the legal context of the noise action plan.

It is optional.

18.3.2 Data type *SimpleCitation*

The data type **SimpleCitation** provides a citation of a source. This data type provides information about a legal instrument, including date of adoption, link to a website, title, legislative or administrative level at which the legal instrument has been adopted and type of source.

It is composed of the following attributes: *citationDate*, *citationLink*, *citationName*, *citationLevel* and *citationType*.

Details are described in 6.2.4.

18.3.3 Data type *ReportingLevelType*

The data type *ReportingLevelType* indicates the major railways included in the noise action plan through rail identifiers or territorial units for statistics.

railIdIdentifier: One or more unique identifiers of the major railways included in the noise action plan.

It is conditional. *railIdIdentifier* needs to be provided if none of the following are provided: *allInLAUCode*, *allInNUTSCode*, *allInCountry*.

allInLAUCode: One or more LAU codes that indicate that all railways covered in those units are included in the noise action plan.

It is conditional. *allInLAUCode* needs to be provided if none of the following are provided: *railIdIdentifier*, *allInNUTSCode*, *allInCountry*.

allInNUTSCode: One or more NUTS codes that indicate that all railways covered in those units are included in the noise action plan.

It is conditional. allInNUTSCode needs to be provided if none of the following are provided: railIdIdentifier, allInLAUCode, allInCountry.

allInCountry: Country code that indicate that all railways covered in the country are included in the noise action plan.

It is conditional. allInCountry needs to be provided if none of the following are provided: railIdIdentifier, allInLAUCode, allInNUTSCode.

18.3.4 Data type LimitValueType

The data type LimitValueType indicates any noise limit values in place considered for the evaluation and implementation of noise management and reduction actions within the area covered by the action plan.

noiseLimitReportIdIdentifier: Unique identifier of the noise limit values' report

It is expected to be the same as the identifier from the data type SourceReportData (noiseLimitReportId.identifier) of the limit values data model (DF3) . It is conditional: or noiseLimitReportIdIdentifier is provided or one pair of attributes otherCriteriaLimitDetail – otherCriteriaDescription must be provided.

otherCriteriaLimitDetail: Noise limit value (indicator and dB) used as criteria for the evaluation and implementation of noise management and reduction actions within the area covered by the action plan.

It is conditional: or noiseLimitReportIdIdentifier is provided or one pair of attributes otherCriteriaLimitDetail – otherCriteriaDescription must be provided.

otherCriteriaDescription: Description of the other criteria used for the evaluation and implementation of noise management and reduction actions within the area covered by the action plan.

It is conditional: or noiseLimitReportIdIdentifier is provided or one pair of attributes otherCriteriaLimitDetail – otherCriteriaDescription must be provided.

18.3.5 Data type PublicConsultationDetail

The data type PublicConsultationDetail describes the information about the public consultation of the noise action plan.

consultationDocumentationSummary: Summary of the public consultation documentation.

It is optional.

consultationDocumentationOnline: URL links to the public consultation documents.

It is optional.

consultationStartDate: Start date of the public consultation period.

It is mandatory.

consultationEndDate: End date of the public consultation period.

It is mandatory.

consultationMeans: Type of consultation mechanism used to reach different stakeholders.

This attribute uses a value from the code list ConsultationMeansValue. It is conditional: either attribute consultationMeans or attribute otherConsultationMeans shall be provided.

The applicable code list values are the following:

- survey
- meeting
- workshop
- focusGroup
- advertisement
- publicEvent
- informationCampaign

otherConsulationMeans: It is used for indicating other types of consultation mechanisms not outlined in the code list ConsultationMeansValue.

It is conditional: either attribute consultationMeans or attribute otherConsultationMeans shall be provided.

stakeholdersType: Type of stakeholders participating in the public consultation.

This attribute uses a value from the code list StakeholdersTypeValue. It is conditional: either attribute stakeholdersType or attribute otherStakeholdersType shall be provided.

The applicable code list values are the following:

- citizens
- NGOs
- privateSector
- governmentalBodies

otherStakeholdersType: It is used for indicating other types of stakeholders participating in the public consultation not outlined in the code list StakeholdersTypeValue.

It is conditional: either attribute stakeholdersType or attribute otherStakeholdersType shall be provided.

numberOfParticipants: Number of people that participated in the public consultation.

It is optional.

commentsReceived: Indicates if any comments were received during the public consultation process

It is a Boolean attribute. It is mandatory.

commentsIncludedInNAP: Indicates if any comments received during the consultation process have been included in the NAP.

It is a Boolean attribute. It is mandatory.

NAPReviewed: Indicates if NAP has been revised after the public consultation process.

It is a Boolean attribute. It is optional.

reviewExplanation: Explanation about the revision process of the NAP after the consultation process.

It is optional.

18.3.6 Data type RailMappingResultDetail

The data type RailMappingResultDetail summarizes the information from the strategic noise maps.

railIdIdentifier: Unique identifier assigned to a railway that is included in the noise action plan.

Can be provided in action plans containing more than one railway where mapping results are provided separately per each railway included in the noise action plan.

It is expected to be the same as the identifier from the feature type MajorRailSource (railId.identifier). It is optional.

exposedLden55: Number of people exposed to equal or more than 55 dB L_{den} in the area covered by the action plan.

It is mandatory.

exposedLnight50: Number of people exposed to equal or more than 50 dB L_{night} in the area covered by the action plan.

It is mandatory.

exposedOtherIndicator: Number of people exposed to another noise indicator than L_{den} and L_{night} relevant for the noise action plan.

This attribute is provided according to the data type ExposedToIndicatorType. It is optional.

situationForImprovementExplanation: Description of the problems identified and situations that need to be improved.

It is mandatory.

situationForImprovementPrioritisationCriteria: Description of the prioritization criteria used for developing the noise action plan.

This attribute uses a value from the code list PrioritisationCriteriaValue. It is optional.

The applicable code list values are the following:

- cost-benefits

- numberOfExposedPeople
- levelOfNoiseExposure

18.3.7 Data type RailReductionMeasureType

The data type RailReductionMeasureType contain the noise abatement measures already existing or being implemented by the action plan described

railIdIdentifier: Unique identifier assigned to a railway that is included in the noise action plan.

Can be provided in action plans containing more than one railway where reduction measures are provided separately per each railway included in the noise action plan.

It is expected to be the same as the identifier from the feature type MajorRailSource (railId.identifier). It is optional.

existingMeasure: Description of noise abatement measures already existing when adopting the noise action plan.

This attribute uses a value from the code list ReductionMeasureValue which presents a set of more specific code lists of reduction measures. It is mandatory.
For major railways the code list RailMeasureValue applies.

plannedMeasureDetail: Description of the noise abatement measures that will be implemented within the action plan.

This attribute is provided according to the data type PlannedMeasureType. It is mandatory.

18.3.8 Data type PlannedMeasureType

The data type PlannedMeasureType describes the measures that will be implemented to reduce noise impacts in the area covered by the action plan .

plannedMeasure: Actions which the competent authorities intend to take in the next five years to reduce noise impacts in the area covered by the action plan. .

This attribute uses a value from the code list ReductionMeasureValue which presents a set of more specific code lists of reduction measures. It is mandatory.
For major railways the code list RailMeasureValue applies.

expectedBenefits: Explanation about the expected benefits of implementing the planned measures.

It is mandatory.

cost: Cost of the measures described.

It is optional. If provided, costs must have related currency (and viceversa).

costCurrency: Currency in which the cost is provided.

It is optional. If provided, costs must have related currency (and viceversa).

allMeasuresInCost: Indication of whether all measures are included in the cost calculation.

It is a Boolean attribute. It is optional.

measuresInCost: Name of the noise abatement measures included in the cost calculation.

It uses the values of the code list RailMeasureValue. It is optional.

18.3.9 Data type RailReductionHealthImpact

The data type RailReductionHealthImpact contain the information about the number of people experiencing a reduction in terms noise levels or in terms of health effects such as annoyance, sleep disturbance, ischaemic heart disease or other relevant effects due to the implementation of the noise action plan.

railIdIdentifier: Unique identifier assigned to a railway that is included in the noise action plan.

Can be provided in action plans containing more than one railway where reduction of health impacts are provided separately per each railway included in the noise action plan.

It is expected to be the same as the identifier from the feature type MajorRailSource (railId.identifier). It is optional.

numberExperiencingReduction: Estimated number of people experiencing noise reduction in the area covered by the action plan.

This attribute is provided according to the data type ExposedToIndicatorType. The attributes in ExposedToIndicatorType are mandatory if none of the following are provided: numberHAReduction, numberHSDReduction, numberIHDReduction.

numberHAReduction: Estimated number of people experiencing a reduction in terms of highly annoyance in the area covered by the action plan.

It is optional.

numberHSDReduction: Estimated number of people experiencing a reduction in terms of the highly sleep disturbance in the area covered by the action plan.

It is optional.

numberIHDReduction: Estimated number of people experiencing a reduction in terms of ischaemic health disease incidence in the area covered by the action plan.

It is optional

otherHealthEffectReduction: Name of any other relevant health effect of noise that has been estimated in the action plan.

It is conditional: if otherHealthEffectReduction is provided, the related number of people should be provided.

numberExperiencingOtherHealthEffectReduction: Estimated number of people experiencing a reduction in terms other relevant health effects in the area covered by the action plan.

It is conditional: if otherHealthEffectReduction is provided, the related number of people should be provided.

explanationHealthImpact: Additional information on the measures that are included in the calculation of the health reduction or other relevant information about the calculation.

It is optional.

estimatedCostBenefit: Estimated cost benefit of the measures described in the action plan.

It is optional.

18.3.10 Data type ExposedToIndicatorType

The data type ExposedToIndicatorType provides information about the estimated number of people experiencing noise reduction in the area covered by the action plan and the methodology used to estimate the number of people experiencing reduction.

nrOfPeople: Number of people experiencing a reduction in noise levels.

It is mandatory if none of the following are provided: numberHAReduction, numberHSDReduction, numberIHDReduction.

explanationMethod: Textual explanation of the methodology used to estimate the number of people experiencing reduction.

It is mandatory if none of the following are provided: numberHAReduction, numberHSDReduction, numberIHDReduction.

18.4 Code lists

The data model includes the following pre-defined code lists:

ConsultationMeansValue: Types of public consultation.

The code list contains different types of public consultations.

<https://dd.eionet.europa.eu/vocabulary/noise/ConsultationMeansValue>

Figure 79. Code list ConsultationMeansValue

«codeList» ConsultationMeansValue
<ul style="list-style-type: none"> + survey + meeting + workshop + focusGroup + advertisement + publicEvent + informationCampaign
<i>tags</i>
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/ConsultationMeansValue

EnvironmentalDomain: Environmental domain, for which environmental objectives can be defined.

This is the INSPIRE code list published in the INSPIRE code list register:

<http://inspire.ec.europa.eu/codelist/EnvironmentalDomain>

Figure 80. Code list EnvironmentalDomain



EvaluationMechanismValue: Criteria used to evaluate the results of the noise action plan.

The code list contains different criteria.

<https://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue>

Figure 81. Code list EvaluationMechanismValue

«codeList» EvaluationMechanismValue
<ul style="list-style-type: none"> + survey/enquiry + calculation + measurements
<i>tags</i>
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue

PrioritisationCriteriaValue: Criteria used to set noise reduction priorities of the action plan.

The code list contains different criteria.

<https://dd.eionet.europa.eu/vocabulary/noise/PrioritisationCriteriaValue>

Figure 82. Code list *PrioritisationCriteriaValue*

«codeList» PrioritisationCriteriaValue
+ cost-benefits + numberOfExposedPeople + levelOfNoiseExposure
<i>tags</i> vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/PrioritizationCriteriaValue

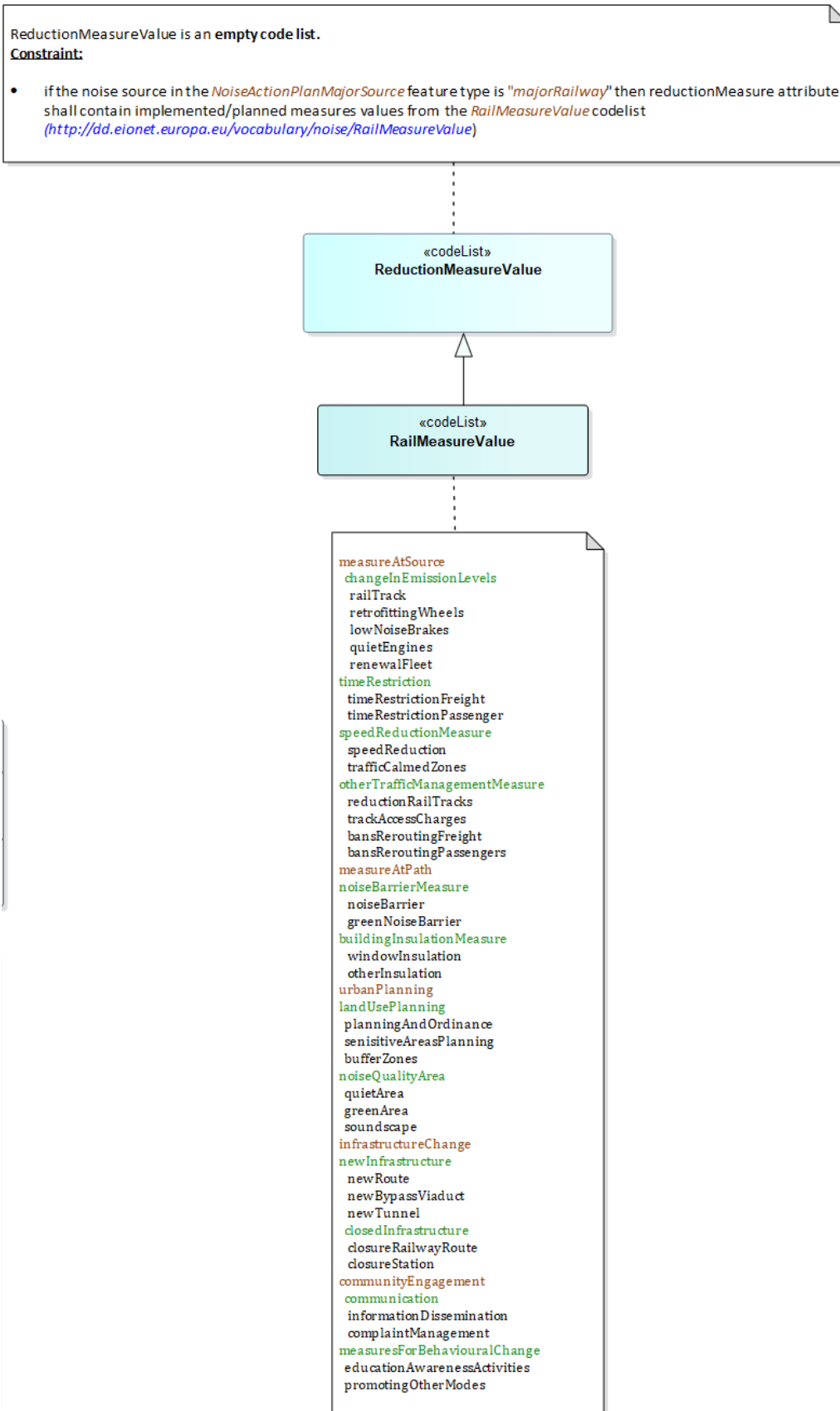
ReductionMeasureValue: Measures to reduce noise impacts.

For action plans corresponding to major railways, the applicable code list is RailMeasureValue.

RailMeasureValue: Noise abatement measures for railway noise.

<https://dd.eionet.europa.eu/vocabulary/noise/RailMeasureValue>

Figure 83. Code list ReductionMeasureValue

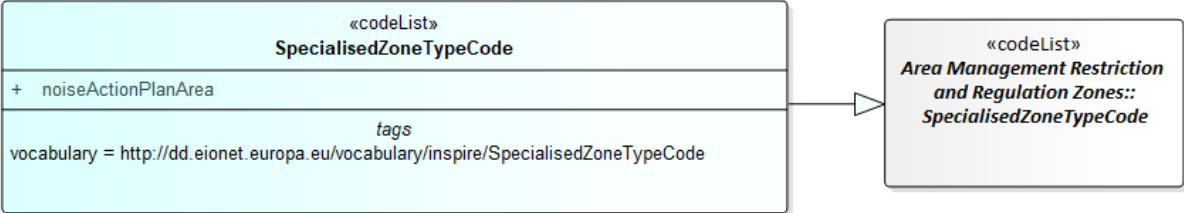


SpecialisedZoneTypeCode: Additional classification value that defines the specialised type of zone.

For the END reporting purpose, the INSPIRE code list SpecialisedZoneTypeCode is extended and it is going to be published in the Eionet Data Dictionary. It includes the coverage area of the noise action plans.

<http://dd.eionet.europa.eu/vocabulary/inspire/SpecialisedZoneTypeCode>.

Figure 84. Code list SpecialisedZoneTypeCode applicable to data model for noise action plans for major sources (DF7_10)

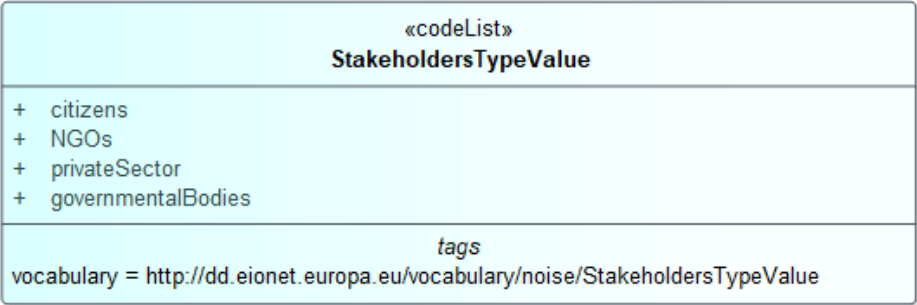


StakeholdersTypeValue: Types of stakeholders participating in the public consultation.

The code list contains different types of stakeholders.

<https://dd.eionet.europa.eu/vocabulary/noise/StakeholdersTypeValue>

Figure 85. Code list StakeholdersTypeValue

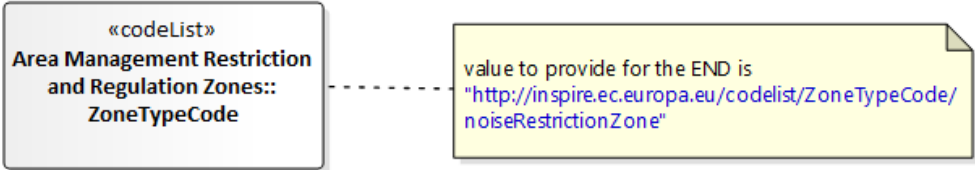


ZoneTypeCode: High-level classification defining the type of Management, Restriction or Regulation Zone.

This is the INSPIRE code list published in the INSPIRE code list register:

<http://inspire.ec.europa.eu/codelist/ZoneTypeCode>.

Figure 86. Code list ZoneTypeCode



19 Data model for noise action plans for major roads (DF7_10)

Noise action plans are in the core of the END scope to manage noise issues and effects, including noise reduction if necessary in those areas where strategic noise maps have been developed.

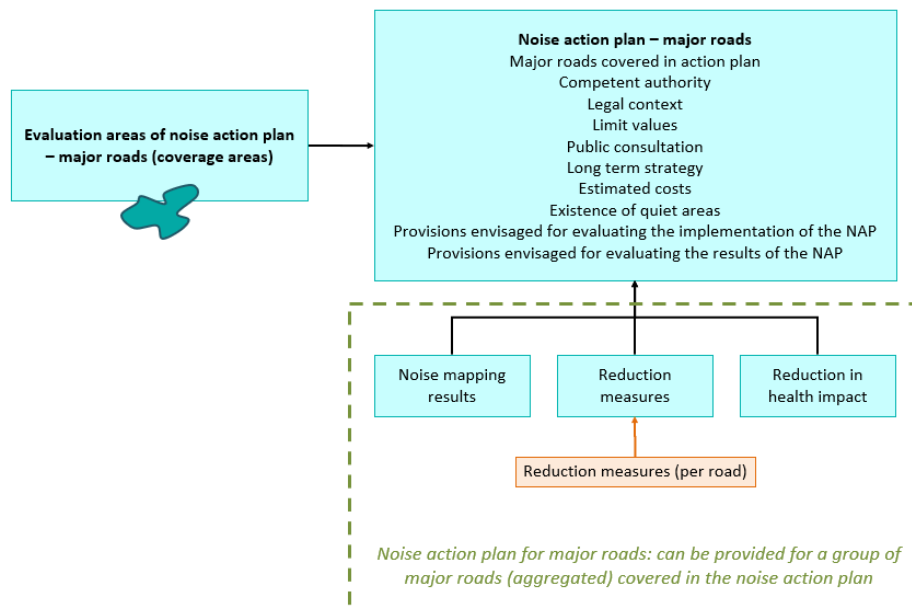
A new content structure has been developed to provide the summary information of the noise action plans linked to the areas covered by the action plans. This noise action plan area represents the area that has been evaluated by the competent authority in order to take decisions on reducing the negative health effects of noise. For major roads it is expected to be the area surrounding the noise source which has been evaluated by noise contours during the noise mapping process or the area in which health effects due to noise from the major source are likely to occur.

The data model for noise action plans for major sources includes two parts of information:

- Spatial data and is based on the INSPIRE Area management / restriction / regulation zones & reporting units (AM) spatial data theme.
- Summary information of the noise action plans based on Annex III, V and VI of the END.

The streamlined view of the INSPIRE AM data model (Figure 77, Figure 78. Streamlined data model for noise action plans for major railways (DF7_10) includes all properties that are needed to unambiguously describe the area covered by each action plan reported within the END scope. For this purpose, the following INSPIRE AM properties are included: environmental domain, zone type and specialised zone type. Those properties can carry uniform default values that correspond with the END reporting purposes. The detailed data model is presented in *Annex 1*.

Figure 87. Conceptual diagram for major roads



19.1 Feature type NoiseActionPlanCoverageArea

The feature type NoiseActionPlanCoverageArea combines the properties of the INSPIRE AM feature type ManagementRestrictionOrRegulationZone⁵² and specific properties required under the END Directive.

⁵² <http://inspire.ec.europa.eu/data-model/approved/r4618-ir/html/index.htm?goto=2:3:4:1:7936>

class NoiseActionPlanMajorRoad (DFZ_10) - Codelists

«codeLists» ConsultationMeansValue	
+ survey	
+ meeting	
+ workshop	
+ focusGroup	
+ advertisement	
+ publicEvent	
+ informationCampaign	
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/ConsultationMeansValue	
tags	

«codeLists» StakeholdersTypeValue	
+ citizens	
+ NGOs	
+ privateSector	
+ governmentalBodies	
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/StakeholdersTypeValue	
tags	

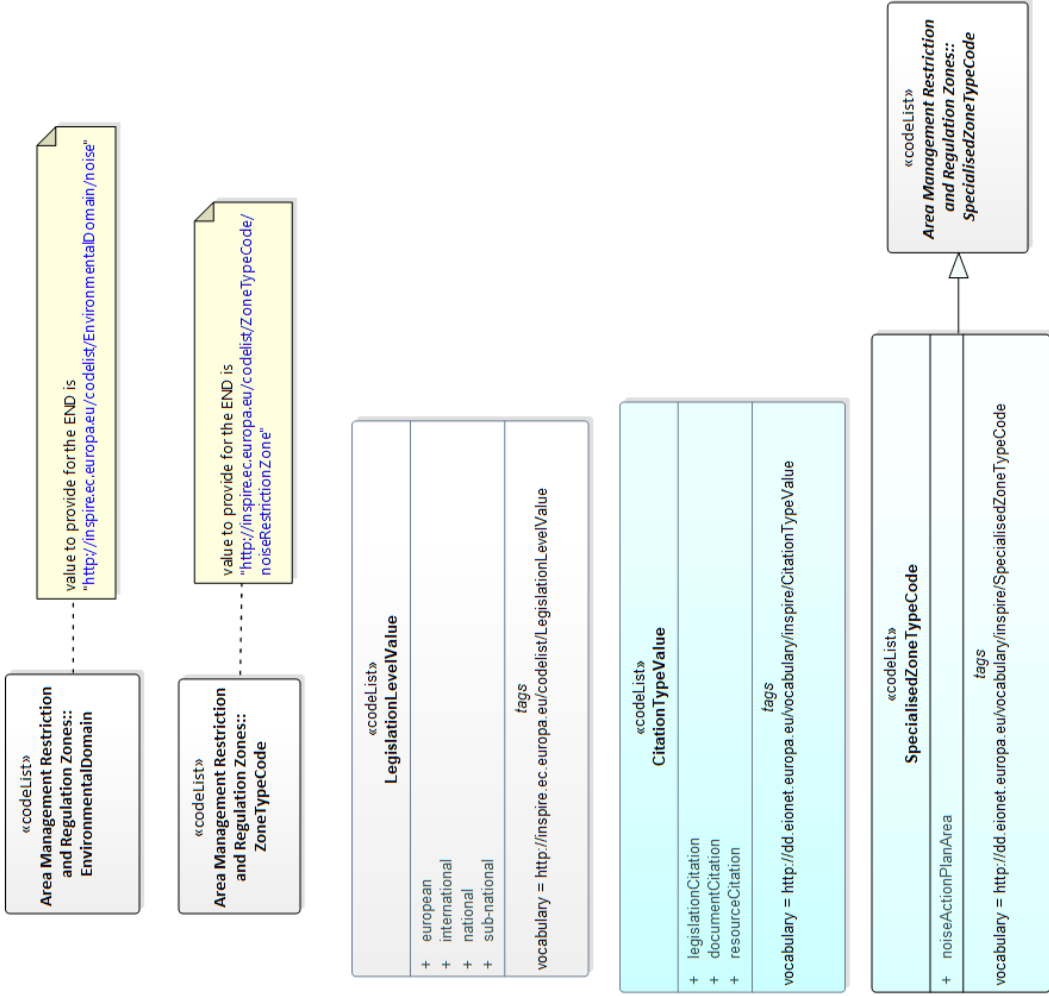
«codeLists» PrioritizationCriteriaValue	
+ cost-benefits	
+ numberOfExposedPeople	
+ levelOfNoiseExposure	
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/PrioritizationCriteriaValue	
tags	

«codeLists» EvaluationMechanismValue	
+ survey/enquiry	
+ calculation	
+ measurements	
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue	
tags	

ReductionMeasureValue is an empty code list.
Constraint:
 • If the noise source in the NoiseActionPlanMajorRoad source feature type is "majorRoad" then reductionMeasure attribute must be implemented/ populated from the NoiseMeasureValue codelist (<http://dd.eionet.europa.eu/vocabulary/noise/RoadReductionValue>)



class NoiseActionPlan (DF7_10) - InspireCodeLists



The feature type NoiseActionPlanCoverageArea is composed of the following attributes:

actionPlanIdIdentifier: Unique identifier assigned to each noise action plan.

It is expected to be the same as the identifier from the noise action plan for roads in the NoiseActionPlanMajorRoad data type. It is mandatory.

inspireId: External object identifier of the spatial object, defined in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It is provided according to the data type Identifier. It is mandatory. Specific guidelines for the data type Identifier for the END reporting purpose:

- inspireId.localId: A local identifier, assigned by the data provider. It could be combined with the unique identifier of the noise action plan which defines the area (actionPlanIdIdentifier). If a Member State has already in place rules for INSPIRE identifiers these rules could be used.
- inspireId.namespace: A data provider will define the namespace considering also a Member State rules for INSPIRE identifiers, if available.

geometry: Spatial extent of the area covered by an action plan, according to the definition in the INSPIRE implementing rules on interoperability.

This is an inspire attribute. It represents the area that has been evaluated by the competent authority in order to take decisions on reducing the negative health effects of noise. It is mandatory.

For the END reporting purpose, geometry of the noise action plans for major sources shall be presented as area, by using polygon geometry type, surrounding the noise source which has been evaluated during the noise mapping process or the area in which health effects due to noise from the major source are likely to occur.

zoneType: Zone type related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the INSPIRE code list ZoneTypeCode. It is mandatory.

The applicable code for the END reporting purposes is “noise restriction zone (noiseRestrictionZone)”.

specialisedZoneType: Definition of a noise action plan area in the END scope, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the extended INSPIRE code list SpecialisedZoneTypeCode. It is mandatory.

The applicable code for the END reporting purposes is “noiseActionPlanArea”.

environmentalDomain: Defines the environmental domain related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the INSPIRE code list EnvironmentalDomain. It is mandatory.

The applicable code for the END reporting purposes is “noise”.

designationPeriod: Designation period of noise action plan area for major sources, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, information when noise action plan area for major sources was legally designated is not required. Legal information is included in the summary information of noise action plans. However, a void reason has to be provided according to the INSPIRE AM data specifications. In that case, a value “unpopulated” is proposed to be used. It is mandatory.

competentAuthority: Description of the organisation(s) responsible for developing noise action plans aimed at managing, mitigating, restricting or regulating measures or activities related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, a dedicated data model is provided to describe information about competent authorities and their responsibilities (see Competent Authorities (DF2)). Therefore, to avoid duplication of data, information about competent authorities related to noise action plans for major sources are not required in this data model but a void reason has to be provided according to the INSPIRE AM data specifications. In that case, a value “unpopulated” is proposed to be used. It is mandatory.

legalBasis: Information on legal instrument that enforces a competent authority to adopt noise action plans, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is the association in the INSPIRE data model which requires that a legal instrument is provided. For the END reporting purpose, only one legal instrument is required that can be provided in the following ways:

- as the reference to the END by providing the European Legislation Identifier (ELI)⁵³ (as default reference): <http://data.europa.eu/eli/dir/2002/49/oj>, or
- as the reference to a more specific national or sub-national legal instrument by providing its URL.

beginLifespanVersion: It records a start or a change of areas of the noise action plan for major sources in the spatial dataset, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, lifespan information when an area of the noise action plan for major sources has been inserted or changed in the spatial dataset is not required. However, beginLifespanVersion can be provided as:

- date and time information of creation of an area of the noise action plan for major sources in a dataset, or of creation of a dataset itself, or
- a void reason must be provided. In that case, the value “unpopulated” is proposed to be used.

It is mandatory.

⁵³ <https://eur-lex.europa.eu/eli-register/about.html>

19.2 Top level data types

19.2.1 Data type NoiseActionPlanMajorRoad

The top level data type NoiseActionPlanMajorRoad contains the summary information related to the action plan's reporting for major roads, as determined by the Environmental Noise Directive

actionPlanId: Unique identifier assigned to each noise action plan.

This attribute is provided according to the data type ThematicIdentifier. It is mandatory.

Specific guidelines for data type ThematicIdentifier for the END reporting purpose:

- actionPlanId.identifier: shall be filled in with the unique code of the noise action plan
- actionPlanId.identifierScheme: shall be <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>.

majorRoadsInActionPlan: Indication of the major roads included in the noise action plan through roads identifiers or territorial units for statistics. The unique identifiers of the roads covered in the noise action plan.

This attribute is provided according to the data type ReportingLevelType. It is mandatory.

competentAuthorityIdIdentifier: Unique identifier of the competent authority.

It is expected to be the same as the identifier from the data type CompetentAuthorityDetails (competentAuthorityId.identifier) of DF2. It is mandatory.

legalContext: It indicates the legal context details of the noise action plan following END demands.

This attribute is provided according to the data type LegalContextType. It is mandatory

limitValues: It indicates any noise limit values in place considered for the evaluation and implementation of noise management and reduction actions.

This attribute is provided according to the data type LimitValueType. It is mandatory.

publicConsultation: It describes the public consultation of the proposed noise action plan.

This attribute is provided according to the data type PublicConsultationDetail. It is mandatory

noiseMappingResults It describes the summary of the information from the strategic noise maps within the area covered by the action plans.

It includes the estimated number of people exposed to noise and the identification of problems and situations that need to be improved.

This attribute is provided according to the data type RoadMappingResultDetail. It is mandatory

reductionMeasures: It contains any management or noise-reduction measures already in force or preparation as well as the description of any actions within the area covered by the action plan which the competent authorities intend to take in the next five years.

Specific measures related to protection of quiet areas outside agglomerations need to be specified in the quiet areas dataflow.

This attribute is provided according to the data type RoadReductionMeasureType. It is mandatory.

affectedPeopleReduction: It contains the information about the estimates in terms of the reduction of people affected including the reduction of people suffering health effects of noise.

This attribute is provided according to the data type RoadReductionHealthImpact. It is mandatory.

longTermStrategy: It indicates if a long-term strategy to abate noise pollution is included in the NAP

It is mandatory.

longTermStrategyExplanation: Explanation about the action's plan long-term strategy.

It is a Boolean attribute. It is optional.

estimatedOverallCost: Estimated overall cost of the action plan.

It is optional. If provided, costs must have related currency (and viceversa).

costCurrency: Currency in which the cost is provided.

It is optional. If provided, costs must have related currency (and viceversa).

quietAreas: It indicates if the action plan includes any measures to protect quiet areas.

It is a Boolean attribute. It is optional.

implementationMechanism It indicates if there are any provisions envisaged for evaluating the implementation of the noise action plan.

It is a Boolean attribute. It is mandatory.

implementationMechanismDescription: Description of the provisions envisaged for evaluating the implementation of the noise action plan.

It is optional.

resultsEvaluationMechanism: It indicates if there are any provisions envisaged for evaluating the results of the noise action plan.

It is a Boolean attribute. It is mandatory.

resultsEvaluationMechanismDescription: Description of the provisions envisaged for evaluating the results of the noise action plan.

This attribute uses a value from the code list EvaluationMechanismValue. It is optional.

The applicable code list values are the following:

- survey/enquiry
- calculation
- measurements

19.3 Data types

The following specific complex data types are used in the data model.

19.3.1 Data type *LegalContextType*

The data type *LegalContextType* contains the legal context details of the noise action plan following END demands.

actionPlanStartDate: Date when the noise action plan is adopted.

It is mandatory.

actionPlanEndDate: Date when the noise action plan is expected to be implemented.

It is optional.

actionPlanDocument: Information about the complete action plan document.

This attribute is provided according to the data type *SimpleCitation*. It is optional.

additionalDescription: Additional information about the legal context of the noise action plan.

It is optional.

19.3.2 Data type *SimpleCitation*

The data type **SimpleCitation** provides a citation of a source. This data type provides information about a legal instrument, including date of adoption, link to a website, title, legislative or administrative level at which the legal instrument has been adopted and type of source.

It is composed of the following attributes: *citationDate*, *citationLink*, *citationName*, *citationLevel* and *citationType*.

Details are described in 6.2.4.

19.3.3 Data type *ReportingLevelType*

The data type *ReportingLevelType* indicates the major roads included in the noise action plan through roads identifiers or territorial units for statistics.

roadIdIdentifier: One or more unique identifiers of the major roads included in the noise action plan.

It is conditional. *roadIdIdentifier* needs to be provided if none of the following are provided: *allInLAUCode*, *allInNUTSCode*, *allInCountry*.

allInLAUCode: One or more LAU codes that indicate that all roads covered in those units are included in the noise action plan.

It is conditional. *allInLAUCode* needs to be provided if none of the following are provided: *roadIdIdentifier*, *allInNUTSCode*, *allInCountry*.

allInNUTSCode: One or more NUTS codes that indicate that all roads covered in those units are included in the noise action plan.

It is conditional. allInNUTSCode needs to be provided if none of the following are provided: roadIdIdentifier, allInLAUCode, allInCountry.

allInCountry: Country code that indicate that all roads covered in the country are included in the noise action plan.

It is conditional. allInCountry needs to be provided if none of the following are provided: roadIdIdentifier, allInLAUCode, allInNUTSCode.

19.3.4 Data type LimitValueType

The data type LimitValueType indicates any noise limit values in place considered for the evaluation and implementation of noise management and reduction actions within the area covered by the action plan.

noiseLimitReportIdIdentifier: Unique identifier of the noise limit values' report

It is expected to be the same as the identifier from the data type SourceReportData (noiseLimitReportId.identifier) of the limit values data model (DF3) . It is conditional: or noiseLimitReportIdIdentifier is provided or one pair of attributes otherCriteriaLimitDetail – otherCriteriaDescription must be provided.

otherCriteriaLimitDetail: Noise limit value (indicator and dB) used as criteria for the evaluation and implementation of noise management and reduction actions within the area covered by the action plan.

It is conditional: or noiseLimitReportIdIdentifier is provided or one pair of attributes otherCriteriaLimitDetail – otherCriteriaDescription must be provided.

otherCriteriaDescription: Description of the other criteria used for the evaluation and implementation of noise management and reduction actions within the area covered by the action plan.

It is conditional: or noiseLimitReportIdIdentifier is provided or one pair of attributes otherCriteriaLimitDetail – otherCriteriaDescription must be provided.

19.3.5 Data type PublicConsultationDetail

The data type PublicConsultationDetail describes the information about the public consultation of the noise action plan.

consultationDocumentationSummary: Summary of the public consultation documentation.

It is optional.

consultationDocumentationOnline: URL links to the public consultation documents.

It is optional.

consultationStartDate: Start date of the public consultation period.

It is mandatory.

consultationEndDate: End date of the public consultation period.

It is mandatory.

consultationMeans: Type of consultation mechanism used to reach different stakeholders.

This attribute uses a value from the code list ConsultationMeansValue. It is conditional: either attribute consultationMeans or attribute otherConsultationMeans shall be provided.

The applicable code list values are the following:

- survey
- meeting
- workshop
- focusGroup
- advertisement
- publicEvent
- informationCampaign

otherConsulationMeans: It is used for indicating other types of consultation mechanisms not outlined in the code list ConsultationMeansValue.

It is conditional: either attribute consultationMeans or attribute otherConsultationMeans shall be provided.

stakeholdersType: Type of stakeholders participating in the public consultation.

This attribute uses a value from the code list StakeholdersTypeValue. It is conditional: either attribute stakeholdersType or attribute otherStakeholdersType shall be provided.

The applicable code list values are the following:

- citizens
- NGOs
- privateSector
- governmentalBodies

otherStakeholdersType: It is used for indicating other types of stakeholders participating in the public consultation not outlined in the code list StakeholdersTypeValue.

It is conditional: either attribute stakeholdersType or attribute otherStakeholdersType shall be provided.

numberOfParticipants: Number of people that participated in the public consultation.

It is optional.

commentsReceived: Indicates if any comments were received during the public consultation process

It is a Boolean attribute. It is mandatory.

commentsIncludedInNAP: Indicates if any comments received during the consultation process have been included in the NAP.

It is a Boolean attribute. It is mandatory.

NAPReviewed: Indicates if NAP has been revised after the public consultation process.

It is a Boolean attribute. It is optional.

reviewExplanation: Explanation about the revision process of the NAP after the consultation process.

It is optional.

19.3.6 Data type RoadMappingResultDetail

The data type RoadMappingResultDetail summarizes the information from the strategic noise maps.

roadIdIdentifier: Unique identifier assigned to a road that is included in the noise action plan.

Can be provided in action plans containing more than one road where mapping results are provided separately per each road included in the noise action plan.

It is expected to be the same as the identifier from the feature type MajorRoadSource (roadId.identifier). It is optional.

exposedLden55: Number of people exposed to equal or more than 55 dB L_{den} in the area covered by the action plan.

It is mandatory.

exposedLnight50: Number of people exposed to equal or more than 50 dB L_{night} in the area covered by the action plan.

It is mandatory.

exposedOtherIndicator: Number of people exposed to another noise indicator than L_{den} and L_{night} relevant for the noise action plan.

This attribute is provided according to the data type ExposedToIndicatorType. It is optional.

situationForImprovementExplanation: Description of the problems identified and situations that need to be improved.

It is mandatory.

situationForImprovementPrioritisationCriteria: Description of the prioritization criteria used for developing the noise action plan.

This attribute uses a value from the code list PrioritisationCriteriaValue. It is optional.

The applicable code list values are the following:

- cost-benefits

- numberOfExposedPeople
- levelOfNoiseExposure

19.3.7 Data type RoadReductionMeasureType

The data type RoadReductionMeasureType contain the noise abatement measures already existing or being implemented by the action plan described

roadIdIdentifier: Unique identifier assigned to a road that is included in the noise action plan.

Can be provided in action plans containing more than one road where reduction measures are provided separately per each road included in the noise action plan.

It is expected to be the same as the identifier from the feature type MajorRoadSource (roadId.identifier). It is optional.

existingMeasure: Description of noise abatement measures already existing when adopting the noise action plan.

This attribute uses a value from the code list ReductionMeasureValue which presents a set of more specific code lists of reduction measures. It is mandatory.
For major roads the code list RoadMeasureValue applies.

plannedMeasureDetail: Description of the noise abatement measures that will be implemented within the action plan.

This attribute is provided according to the data type PlannedMeasureType. It is mandatory.

19.3.8 Data type PlannedMeasureType

The data type PlannedMeasureType describes the measures that will be implemented to reduce noise impacts in the area covered by the action plan .

plannedMeasure: Actions which the competent authorities intend to take in the next five years to reduce noise impacts in the area covered by the action plan. .

This attribute uses a value from the code list ReductionMeasureValue which presents a set of more specific code lists of reduction measures. It is mandatory.
For major roads the code list RoadMeasureValue applies.

expectedBenefits: Explanation about the expected benefits of implementing the planned measures.

It is mandatory.

cost: Cost of the measures described.

It is optional. If provided, costs must have related currency (and viceversa).

costCurrency: Currency in which the cost is provided.

It is optional. If provided, costs must have related currency (and viceversa).

allMeasuresInCost: Indication of whether all measures are included in the cost calculation.

It is a Boolean attribute. It is optional.

measuresInCost: Name of the noise abatement measures included in the cost calculation.

It uses the values of the code list RoadMeasureValue. It is optional.

19.3.9 Data type RoadReductionHealthImpact

The data type RoadReductionHealthImpact contain the information about the number of people experiencing a reduction in terms noise levels or in terms of health effects such as annoyance, sleep disturbance, ischaemic heart disease or other relevant effects due to the implementation of the noise action plan.

roadIdIdentifier: Unique identifier assigned to a road that is included in the noise action plan.

Can be provided in action plans containing more than one road where reduction of health impacts are provided separately per each road included in the noise action plan.

It is expected to be the same as the identifier from the feature type MajorRoadSource (roadId.identifier). It is optional.

numberExperiencingReduction: Estimated number of people experiencing noise reduction in the area covered by the action plan.

This attribute is provided according to the data type ExposedToIndicatorType. The attributes in ExposedToIndicatorType are mandatory if none of the following are provided: numberHAReduction, numberHSDReduction, numberIHDReduction.

numberHAReduction: Estimated number of people experiencing a reduction in terms of highly annoyance in the area covered by the action plan.

It is optional.

numberHSDReduction: Estimated number of people experiencing a reduction in terms of the highly sleep disturbance in the area covered by the action plan.

It is optional.

numberIHDReduction: Estimated number of people experiencing a reduction in terms of ischaemic health disease incidence in the area covered by the action plan.

It is optional

otherHealthEffectReduction: Name of any other relevant health effect of noise that has been estimated in the action plan.

It is conditional: if otherHealthEffectReduction is provided, the related number of people should be provided. It is optional.

numberExperiencingOtherHealthEffectReduction: Estimated number of people experiencing a reduction in terms other relevant health effects in the area covered by the action plan.

It is conditional: if otherHealthEffectReduction is provided, the related number of people should be provided.

explanationHealthImpact: Additional information on the measures that are included in the calculation of the health reduction or other relevant information about the calculation.

It is optional.

estimatedCostBenefit: Estimated cost benefit of the measures described in the action plan.

It is optional.

19.3.10 Data type ExposedToIndicatorType

The data type ExposedToIndicatorType provides information about the estimated number of people experiencing noise reduction in the area covered by the action plan and the methodology used to estimate the number of people experiencing reduction.

nrOfPeople: Number of people experiencing a reduction in noise levels.

It is mandatory if none of the following are provided: numberHAReduction, numberHSDReduction, numberIHDReduction.

explanationMethod: Textual explanation of the methodology used to estimate the number of people experiencing reduction.

It is mandatory if none of the following are provided: numberHAReduction, numberHSDReduction, numberIHDReduction.

19.4 Code lists

The data model includes the following pre-defined code lists:

ConsultationMeansValue: Types of public consultation.

The code list contains different types of public consultations.

<https://dd.eionet.europa.eu/vocabulary/noise/ConsultationMeansValue>

Figure 89. Code list ConsultationMeansValue

«codeList» ConsultationMeansValue
+ survey + meeting + workshop + focusGroup + advertisement + publicEvent + informationCampaign
<i>tags</i>
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/ConsultationMeansValue

EnvironmentalDomain: Environmental domain, for which environmental objectives can be defined.

This is the INSPIRE code list published in the INSPIRE code list register:

<http://inspire.ec.europa.eu/codelist/EnvironmentalDomain>

Figure 90. Code list EnvironmentalDomain



EvaluationMechanismValue: Criteria used to evaluate the results of the noise action plan.

The code list contains different criteria.

<https://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue>

Figure 91. Code list EvaluationMechanismValue

«codeList» EvaluationMechanismValue
+ survey/enquiry + calculation + measurements
<i>tags</i>
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue

PrioritisationCriteriaValue: Criteria used to set noise reduction priorities of the action plan.

The code list contains different criteria.

<https://dd.eionet.europa.eu/vocabulary/noise/PrioritisationCriteriaValue>

Figure 92. Code list *PrioritisationCriteriaValue*

«codeList» PrioritisationCriteriaValue
+ cost-benefits + numberOfExposedPeople + levelOfNoiseExposure
<i>tags</i> vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/PrioritizationCriteriaValue

ReductionMeasureValue: Measures to reduce noise impacts.

For action plans corresponding to major roads, the applicable code list is RoadMeasureValue.
<https://dd.eionet.europa.eu/vocabulary/noise/RoadMeasureValue>

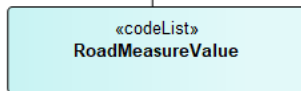
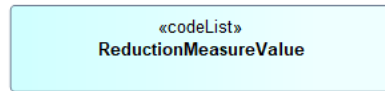
RoadMeasureValue: Noise abatement measures for road noise.

Figure 93. Code list ReductionMeasureValue

ReductionMeasureValue is an empty code list.

Constraint:

- if the noise source in the *NoiseActionPlanMajorSource* feature type is "majorRoad" then reductionMeasure attribute shall contain implemented/planned measures values from the *RoadMeasureValue* codelist (<http://dd.eionet.europa.eu/vocabulary/noise/RoadMeasureValue>)



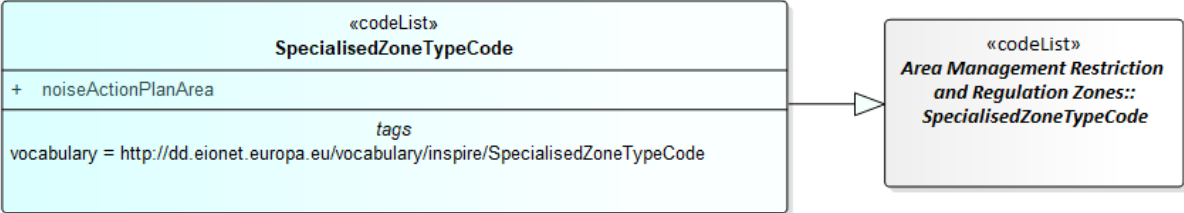
- measureAtSource
- changeInEmissionLevels
- roadSurface
- lowNoiseTyres
- quietEngines
- exhaust
- quietPublicTransport
- timeRestriction
- timeRestrictionHGV
- timeRestrictionPassenger
- speedReductionMeasure
- speedReduction
- roundaboutsJunctions
- physicalTrafficCalming
- trafficCalmedZones
- otherTrafficManagementMeasure
- publicTransportIncrease
- cyclingWalkingIncrease
- smartMobility
- reductionTrafficFlows
- bansReroutingHGV
- bansReroutingPassenger
- parkingManagement
- congestionCharges
- measureAtPath
- noiseBarrierMeasure
- noiseBarrier
- greenNoiseBarrier
- buildingInsulationMeasure
- windowInsulation
- otherInsulation
- urbanPlanning
- landUsePlanning
- planningAndOrdinance
- sensitiveAreaPlanning
- bufferZones
- noiseQualityArea
- quietArea
- greenArea
- soundscape
- infrastructureChange
- newInfrastructure
- newBypassBridgesRoad
- newTunnel
- closedInfrastructure
- closureRoads
- communityEngagement
- communication
- informationDissemination
- complaintManagement
- measuresForBehaviouralChange
- promotingQuietMobility
- promotingPublicTransport
- promotingCarSharing
- educationAwarenessActivities

SpecialisedZoneTypeCode: Additional classification value that defines the specialised type of zone.

For the END reporting purpose, the INSPIRE code list SpecialisedZoneTypeCode is extended and it is going to be published in the Eionet Data Dictionary. It includes the coverage area of the noise action plans.

<http://dd.eionet.europa.eu/vocabulary/inspire/SpecialisedZoneTypeCode>.

Figure 94. Code list SpecialisedZoneTypeCode applicable to data model for noise action plans for major sources (DF7_10)

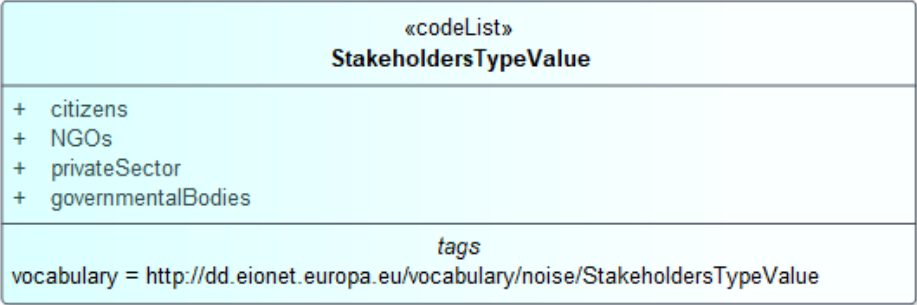


StakeholdersTypeValue: Types of stakeholders participating in the public consultation.

The code list contains different types of stakeholders.

<https://dd.eionet.europa.eu/vocabulary/noise/StakeholdersTypeValue>

Figure 95. Code list StakeholdersTypeValue

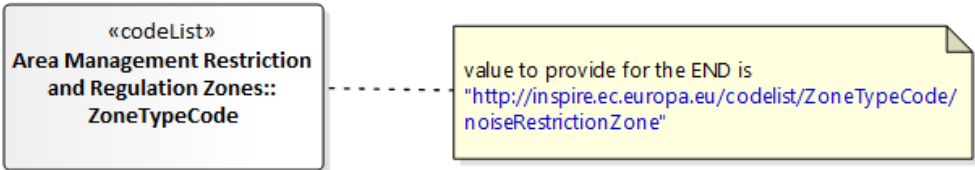


ZoneTypeCode: High-level classification defining the type of Management, Restriction or Regulation Zone.

This is the INSPIRE code list published in the INSPIRE code list register:

<http://inspire.ec.europa.eu/codelist/ZoneTypeCode>.

Figure 96. Code list ZoneTypeCode



20 Data model for quiet areas (DF7_10)

The data model includes two types of quiet areas defined in the END reporting purpose : quiet areas in agglomerations and in open country.

According to the END, quiet area in an agglomeration shall mean an area, delimited by the competent authority, for instance which is not exposed to a value of L_{den} or of another appropriate noise indicator greater than a certain value set by the Member State, from any noise source. Quiet area in open country shall mean an area, delimited by the competent authority, that is undisturbed by noise from traffic, industry or recreational activities.

Quiet areas can be represented with spatial data which correspond with the INSPIRE AM spatial data theme. The core part of this data model is therefore the INSPIRE data model of management areas extended with specific data relevant for the END reporting purpose. The streamlined view of the INSPIRE AM data model (see Figure 97) includes all properties that are needed to unambiguously describe quiet areas for the END reporting purpose. For this purpose, the following INSPIRE AM properties are included: environmental domain, zone type and specialised zone type. Those properties can carry uniform default values that correspond with the END reporting purpose. Figure 97 presents the streamlined view of the extended INSPIRE data model with END specific properties for quiet areas, and the detailed data model is presented in *Annex 1*.

20.1 Feature type QuietArea

The feature type QuietArea combines the properties of the INSPIRE AM feature type ManagementRestrictionOrRegulationZone⁵⁴ and specific properties required under the END. It contains the information about the protection of the quiet areas designed by the competent authorities. It includes information about type of noise sources from which the quiet area is protected, the protection measures that are used for protecting the quiet area and the links to the relevant action plans where the protection of the quiet area is included.

⁵⁴ <http://inspire.ec.europa.eu/data-model/approved/r4618-ir/html/index.htm?goto=2:3:4:1:7936>

The feature type QuietArea contains the following attributes:

quietAreald: Unique identifier assigned to each quiet area.

This attribute is provided according to the data type ThematicIdentifier. It is mandatory. Specific guidelines for data type ThematicIdentifier for the END reporting purpose:

- quietAreald.identifier: shall be filled in with the unique code for the quiet area
- quietAreald.identifierScheme: shall be <http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/EUENDCode>.

quietAreaName: Name of the quiet area.

This attribute is provided according to the data type SimpleGeographicalName. It is optional.

quietAreaType: Characteristics of the quiet area.

A quiet area type could be a natural reserve, green space, quiet built-up area, cemetery, etc. It is mandatory.

quietAreaDocumentation: Any existing documentation related to the designation of the quiet area described.

This attribute is provided according to the data type SimpleCitation. It is optional.

agglomerationIdIdentifier: Unique agglomeration identifier where the quiet area described is designated.

It is expected to be the same as the identifier from the feature type AgglomerationSource (agglomerationId.identifier). It is conditional, and should be provided if the quiet area is in agglomeration.

protectionFrom: Defines the type of noise source from which the quiet area is protected.

This attribute uses a value from the code list NoiseSourceValue. It is optional.

The applicable code list values are the following:

- agglomerationAir
- agglomerationIndustry
- agglomerationRailway
- agglomerationRoad
- majorAirport
- majorRailway
- majorRoad

protectionFromOtherSource: Additional type of noise sources from which the quiet area is protected.

This attribute describes potential other types of noise sources, e.g. wind turbines, recreational noise, a quiet area is protected from. It is optional.

protectionMeasure: Measures for protecting the designated quiet area from noise.

This attribute describes measures for protecting a quiet area from noise sources and exposure. It is mandatory.

actionPlanIdIdentifier: Unique identifier of noise action plan that includes protection or preservation of a quiet area.

It is expected to be the same as the identifier from the data types NoiseActionPlanAgglomeration, NoiseActionPlanMajorAirport, NoiseActionPlanMajorRailway, NoiseActionPlanMajorRoad (actionPlanId.identifier). It is conditional, and should be provided if a quiet area is addressed by the noise action plan.

geometry: Spatial extent of the quiet area, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, geometry of the quiet area shall be presented as area, by using polygon geometry type. It is mandatory.

inspireId: External object identifier of the spatial object, defined in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It is provided according to the data type Identifier. It is mandatory. Specific guidelines for the data type Identifier for the END reporting purpose:

- inspireId.localId: When possible the inspireId.localId can be the same as quietAreaId.identifier, but if a Member State has already in place different rules for INSPIRE identifiers these rules could be used.
- inspireId.namespace: A data provider will define the namespace considering also a Member State rules for INSPIRE identifiers, if available.

zoneType: Zone type related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the INSPIRE code list ZoneTypeCode. It is mandatory.

The applicable code for the END reporting purpose is “noise restriction zone (noiseRestrictionZone)”.

specialisedZoneType: Defines if the quiet area is located inside or outside agglomerations in the END scope, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the extended INSPIRE code list SpecialisedZoneTypeCode. It is mandatory.

The applicable code list values are the following:

- quietAreaInAgglomeration
- quietAreaInOpenCountry.

environmentalDomain: Defines the environmental domain related to environmental noise, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. It uses a value from the INSPIRE code list EnvironmentalDomain. It is mandatory.

The applicable code for the END reporting purpose is “noise”.

designationPeriod: Designation period of the quiet area, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, a designation period of quiet area is not required, however it can be provided in the following ways:

- If the date of designation of quiet area is known, the designationPeriod must be provided with two parameters: beginPosition as date of designation and endPosition as indeterminate, meaning the quiet area is designated in present time, or
- If this information is not known or available, a void reason has to be provided according to the INSPIRE AM data specifications. In case a voidable information is provided, a value “unpopulated” is proposed to be used as void reason. It is mandatory.

competentAuthority: Description of the organisation(s) responsible for managing, restricting or regulating measures or activities to designate or protect quiet areas, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, the dedicated data model is provided to describe information about competent authorities and their responsibilities (see Competent Authorities (DF2)). Therefore, to avoid duplication of data, information about competent authorities related to quiet areas are not required in this data model but a void reason has to be provided according to the INSPIRE AM data specifications. In that case, a value “unpopulated” is proposed to be used. It is mandatory.

legalBasis: Information on legal instrument or document that required the establishment of the quiet area, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is the association in the INSPIRE data model which requires that a legal instrument is provided. For the END reporting purpose, only one legal instrument is required that can be provided in the following ways:

- as the reference to the END by providing the European Legislation Identifier (ELI)⁵⁵ (as default reference): <http://data.europa.eu/eli/dir/2002/49/oj>, or
- as the reference to a more specific national or sub-national legal instrument by providing its URL.

beginLifespanVersion: It records a start or a change of quiet areas in the spatial dataset, according to the definition in the INSPIRE Implementing Rules on Interoperability.

This is an INSPIRE attribute. For the END reporting purpose, lifespan information when a quiet area has been inserted or changed in the spatial dataset is not required. However, beginLifespanVersion can be provided as:

- date and time information of creation of a quiet area in a dataset, or of creation of a dataset itself, or
- a void reason must be provided. In that case, the value “unpopulated” is proposed to be used.

It is mandatory.

⁵⁵ <https://eur-lex.europa.eu/eli-register/about.html>

20.2 Data types

20.2.1 Data type SimpleGeographicalName

The data type **SimpleGeographicalName** is a simpler version of the INSPIRE GeographicalName data type. It is defined for the END reporting purpose and provides a name in English language and in national or local language, including code of national or local language.

It is composed of three attributes: nameEng, localName and localNameLanguage.
Details are described in 6.2.3.

20.2.2 Data Type SimpleCitation

The data type **SimpleCitation** provides a citation of a source. This data type provides information about a report, including date of adoption, link to a website, title, legislative or administrative level at which the report has been adopted and type of source (e.g. report).

It is composed of the following attributes: citationDate, citationLink, citationName, citationLevel and citationType.
Details are described in 6.2.4.

20.2.3 Data type ThematicIdentifier

The data type **ThematicIdentifier** is an INSPIRE data type and is defined to uniquely identify the spatial object within a particular information domain, e.g. in the END scope.

It is defined in the INSPIRE Implementing Rules on Interoperability and it is composed of two attributes: identifier and identifierScheme.
Details are described in 6.2.2 and *Annex 4. Commonly used INSPIRE concepts*.

20.2.4 Data type Identifier

The data type **Identifier** is an INSPIRE data type and is defined to describe external unique object identifier and used across INSPIRE spatial data themes and data models.

It is defined in the INSPIRE Implementing Rules on Interoperability and it is composed of three attributes: localId, namespace and versionId.
Details are described in 6.2.1 and *Annex 4. Commonly used INSPIRE concepts*.

20.3 Code lists

The data model includes the following pre-defined code lists:

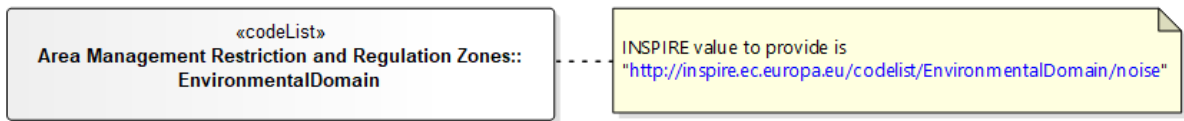
CitationTypeValue: Type of citation.

The code list is described in 6.2.4.

EnvironmentalDomain: Environmental domain, for which environmental objectives can be defined.

This is the INSPIRE code list published in the INSPIRE code list register:
<http://inspire.ec.europa.eu/codelist/EnvironmentalDomain>

Figure 98. Code list EnvironmentalDomain applicable to data model of quiet areas (DF7_10)



Iso639-3: Language codes according to the standard ISO 639-3.
Details are described in 6.2.3.

LegislationLevelValue: Level at which a legal act or convention has been adopted.

The code list is described in 6.2.4.

NoiseSourceValue: Type of noise sources.

The complete code list NoiseSourceValue contains the different types of noise sources, including major noise sources, noise sources in agglomerations, major noise sources in agglomerations and all noise sources inside and outside agglomerations.

<https://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceValue>

The code values applicable for this data model are the following:

Figure 99. Code list NoiseSourceValue applicable to data model for quiet areas (DF7_10)

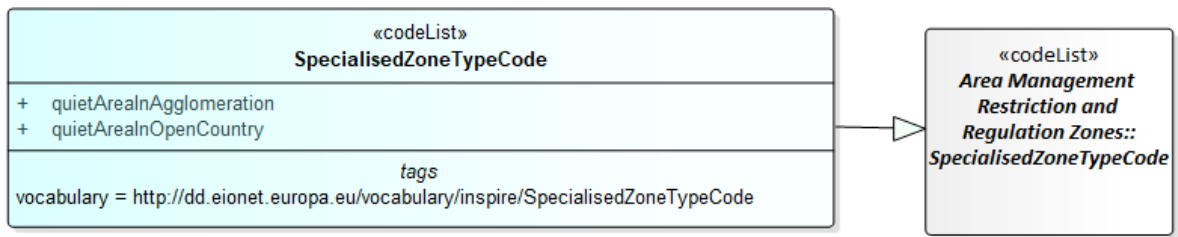
«codeList» NoiseSourceValue
<ul style="list-style-type: none"> + agglomerationAir + agglomerationIndustry + agglomerationRailway + agglomerationRoad + majorAirport + majorRailway + majorRoad
<i>tags</i>
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceValue

SpecialisedZoneTypeCode: Additional classification value that defines the specialised type of zone.

For the END reporting purpose, the INSPIRE code list SpecialisedZoneTypeCode is extended and it is going to be published in the Eionet Data Dictionary. It includes quiet area in agglomeration and quiet area in open country.

<http://dd.eionet.europa.eu/vocabulary/inspire/SpecialisedZoneTypeCode>.

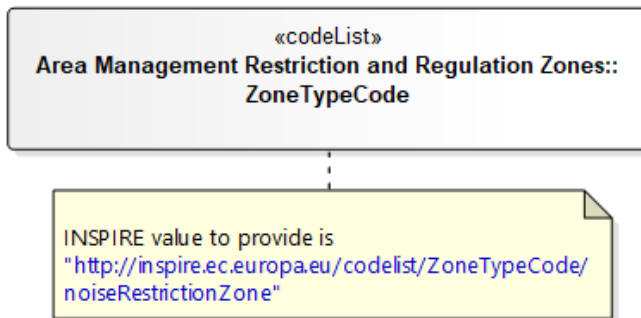
Figure 100. Code list SpecialisedZoneTypeCode applicable to data model for quiet areas (DF7_10)



ZoneTypeCode: High-level classification defining the type of Management, Restriction or Regulation Zone.

This is the INSPIRE code list published in the INSPIRE code list register:
<http://inspire.ec.europa.eu/codelist/ZoneTypeCode>.

Figure 101. Code list ZoneTypeCode applicable to data model for quiet areas (DF7_10)



Annex 1

Detailed data models

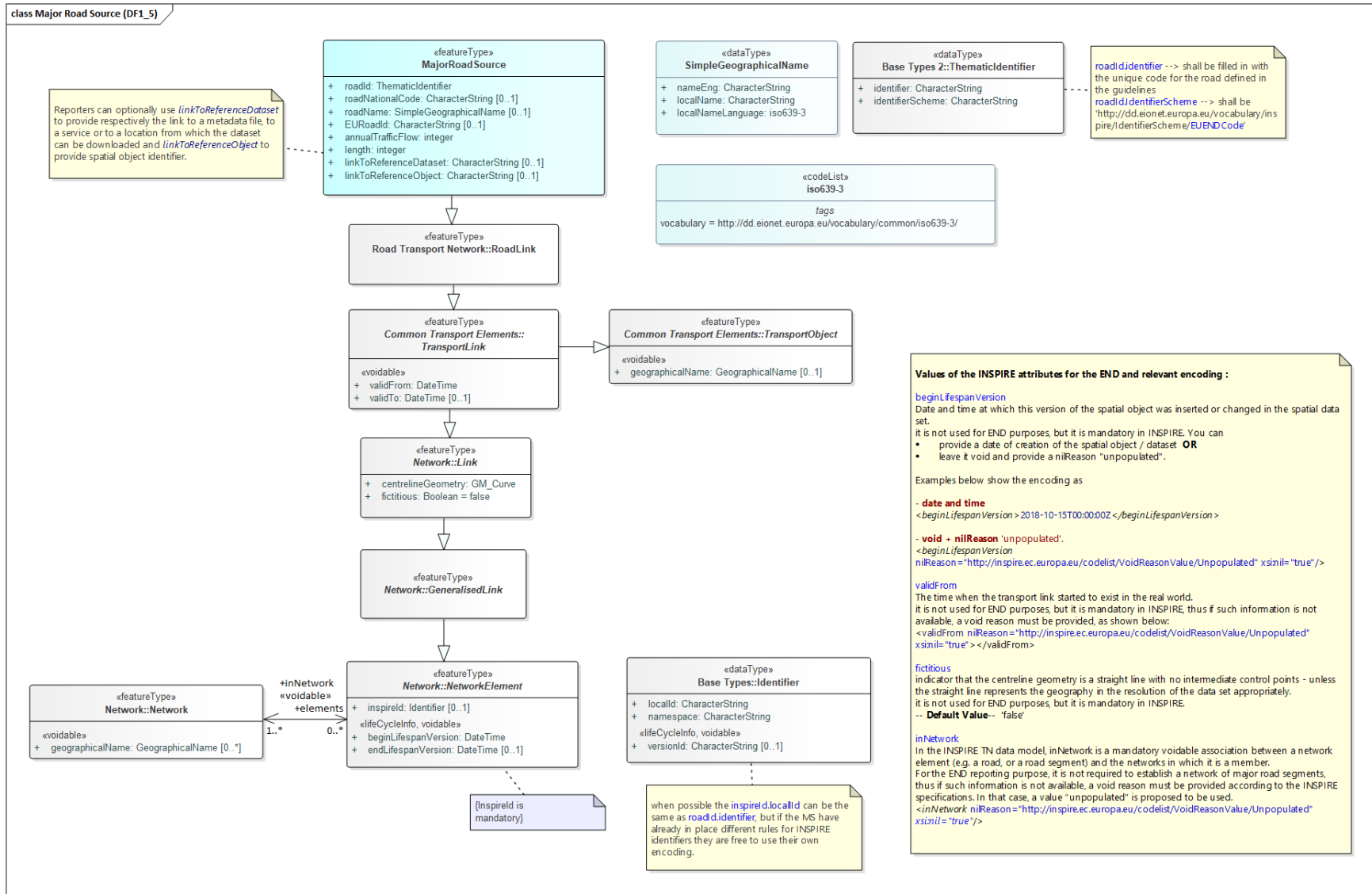
The data models of the INSPIRE spatial data themes have been designed to accommodate a broad range of diverse use cases and a heterogeneity of existing spatial data sets in the Member States and countries. The flexibility of the INSPIRE data models is reached also by including several optional properties – attributes.

The END data model includes the requirements to fulfil the END reporting purpose. A majority of the properties (attributes) in the END data model are mandatory or conditional (applicable under certain conditions) and only a minor set of attributes is optional. With this focus in mind, the streamlined data model views described in the main chapters of this document present the scope and extent of data required to be reported under the END. Therefore, the streamlined data model views do not include optional attributes of the underlying INSPIRE data models which are not required for the END reporting purpose. The encoding practice in INSPIRE implementation allows to omit optional attributes if they are not present or available. This approach also reduces the size of encoding file formats, e.g. GML. However, the detailed view of the END data model with complete underlying INSPIRE data models might be important for understanding the INSPIRE data specifications and implementation.

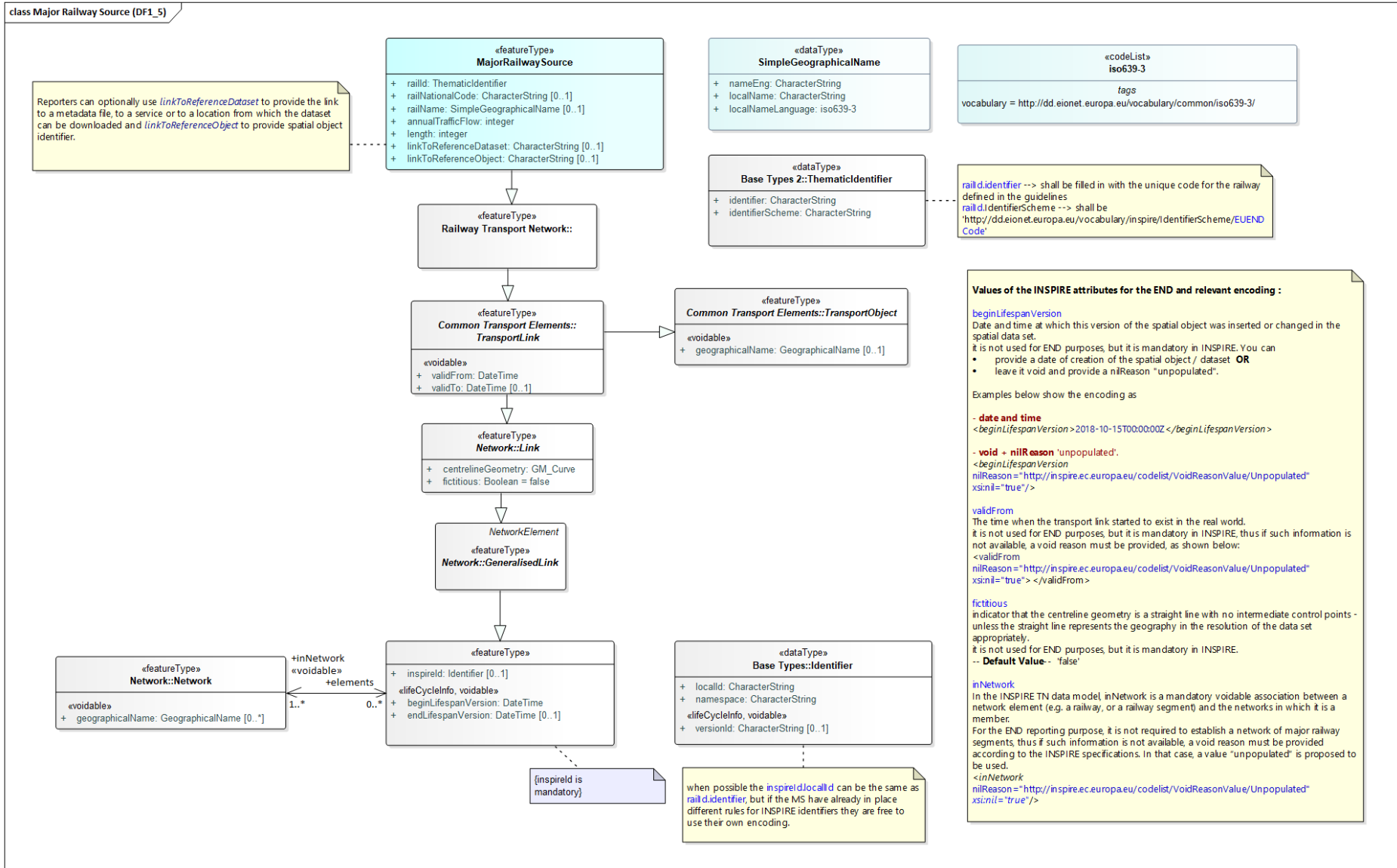
This annex includes diagrams of the following detailed data models with underlying complete INSPIRE data models:

- **Major roads:** the feature type MajorRoadSource extends the INSPIRE feature type RoadLink
- **Major railways:** the feature type MajorRailwaySource extends the INSPIRE feature type RailwayLink
- **Agglomerations:** the feature type AgglomerationSource extends the INSPIRE feature type ManagementRestrictionOrRegulationZone
- **Strategic noise maps - noise contours:** the INSPIRE feature type EnvHealthDeterminantNoiseMeasure is re-used
- **Action plans for agglomerations, for major airports, for major railways and for major roads (DF7_10):** the feature type NoiseActionPlanCoverageArea extends the INSPIRE feature type ManagementRestrictionOrRegulationZone.
- **Quiet areas:** the feature type QuietArea extends the INSPIRE feature type ManagementRestrictionOrRegulationZone.

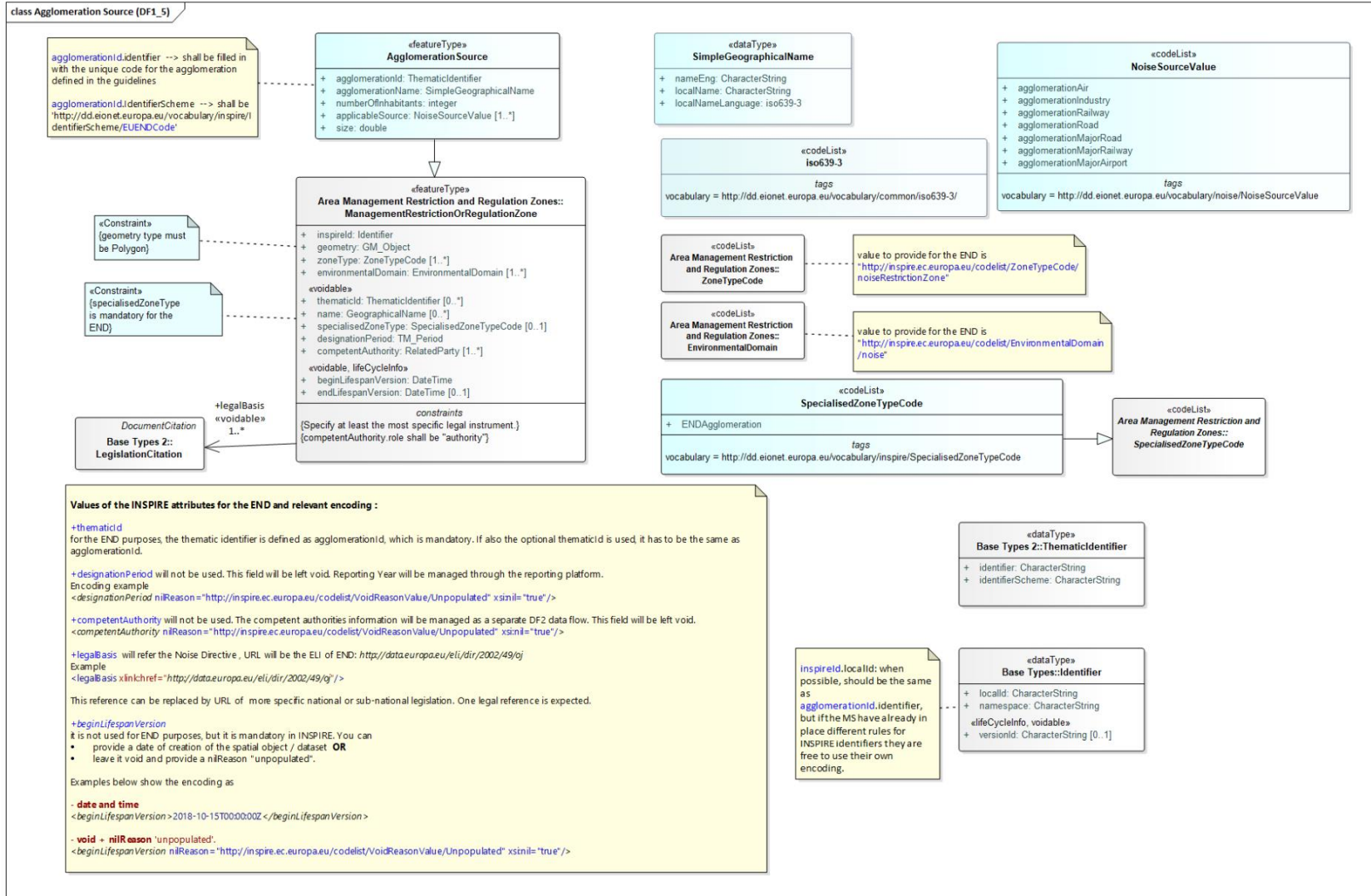
Major roads (DF1_5)



Major railways (DF1_5)

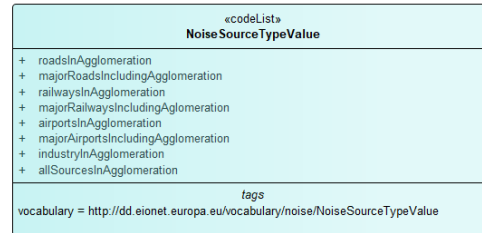
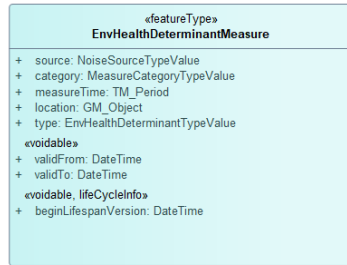


Agglomerations



Strategic noise maps – noise contours (DF4_8)

class Noise Contour (DF4_8) - Streamlined View



INSPIRE code list value to use is <http://inspire.ec.europa.eu/code/list/EnvHealthDeterminantTypeValue/noise>

The **+category** shall be filled in with

- a value from the *NoiseIndicatorRangeValue* code list if the noise contours are provided as polygons, or
- a value from the *NoiseIndicatorValue* code list if the noise contours are provided as lines.

majorRoadsIncludingAgglomeration, *majorRailwaysIncludingAgglomeration* and *majorAirportsIncludingAgglomeration* correspond to the noise contour maps of the complete infrastructure (outside and inside agglomeration)

The *MeasureCategoryTypeValue* is an empty INSPIRE code list, meant to be extended by a number of domain-specific code lists. For the END Noise Contour purposes, the reference to this code list is intended as a reference to *NoiseIndicatorRangeValue* code list or the *NoiseIndicatorValue* code list



INSPIRE attributes values and relevant encoding for the END:

+measureTime = the period when the noise contour maps were calculated
 Encoding example (in case the period = 1 year):
 <measureTime>
 <gm:TimePeriod gm:lid="NoiseMapCalculationPeriod1">
 <gm:beginPosition>2014-01-01</gm:beginPosition>
 <gm:endPosition>2014-12-31</gm:endPosition>
 </gm:TimePeriod></hh:measureTime>

+validFrom and +validTo
 It is recommended to assign the period of the actual reporting cycle of strategic noise maps – noise contours as validity period *validFrom* / *validTo* or to provide *voidable* information.
 e.g.
 for the next reporting cycle the following dates are recommended:
 <validFrom>2022-12-31T23:00:00.000</validFrom>
 <validTo>2027-12-30T23:00:00.000</validTo>

In case you don't want to provide specific dates, provide *void* value with *nilReason* "Unpopulated" as follows
 <validFrom nilReason="https://inspire.ec.europa.eu/code/list/VoidReasonValue/Unpopulated" xsi:nil="true">
 </validFrom>
 <validTo nilReason="https://inspire.ec.europa.eu/code/list/VoidReasonValue/Unpopulated" xsi:nil="true">
 </validTo>

+beginLifespanVersion
 It is not used for END purposes, but it is mandatory in INSPIRE. You can

- provide a date of creation of the spatial object / dataset **OR**
- leave it void and provide a *nilReason* "unpopulated".

Examples below show the encoding as

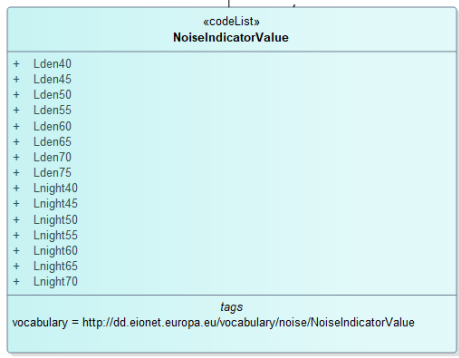
```

- date and time
<beginLifespanVersion>2018-10-15T00:00:00Z</beginLifespanVersion>

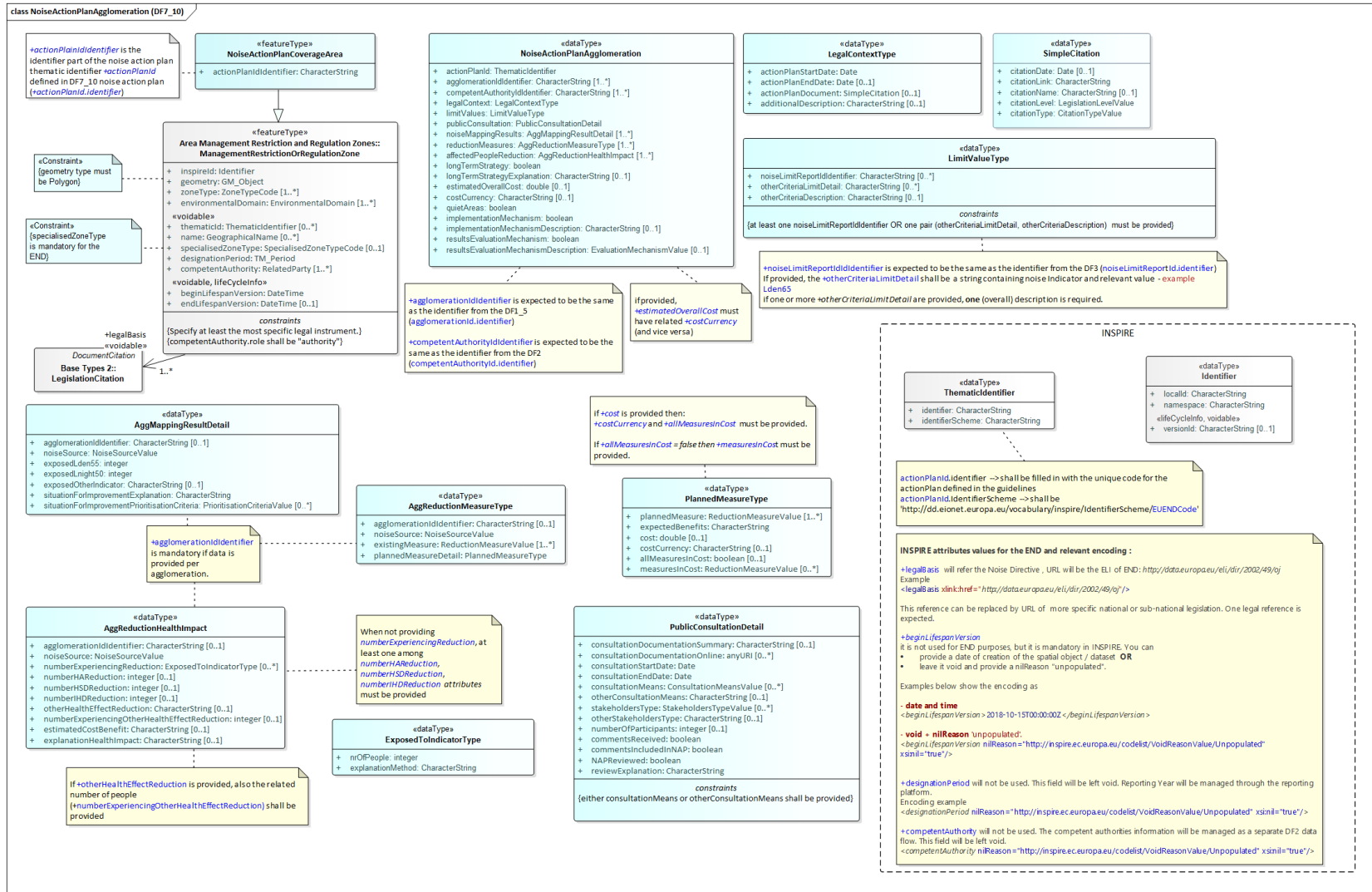
- void + nilReason 'unpopulated'.
<beginLifespanVersion nilReason="http://inspire.ec.europa.eu/code/list/VoidReasonValue/Unpopulated"
xsi:nil="true"/>
    
```

NoiseIndicatorRangeValue code list is used when polygon geometry is provided

NoiseIndicatorValue code list is used when line geometry is provided.



Action plans for agglomerations (DF7_10)



class NoiseActionPlanAgglomeration (DF7_10) - Codelists

«codeList» Noise Source Value
+ agglomerationAir + agglomerationIndustry + agglomerationRailway + agglomerationRoad + agglomerationMajorRoad + agglomerationMajorRailway + agglomerationMajorAirport
tags
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceValue

«codeList» Consultation Means Value
+ survey + meeting + workshop + focusGroup + advertisement + publicEvent + informationCampaign
tags
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/ConsultationMeansValue

«codeList» Stakeholders Type Value
+ citizens + NGOs + privateSector + governmentalBodies
tags
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/StakeholdersTypeValue

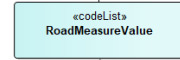
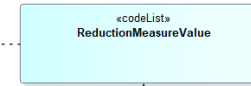
«codeList» Prioritisation Criteria Value
+ cost-benefits + numberOfExposedPeople + levelOfNoiseExposure
tags
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/PrioritisationCriteriaValue

«codeList» Evaluation Mechanism Value
+ survey/enquiry + calculation + measurements
tags
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue

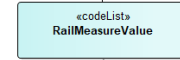
ReductionMeasureValue is an empty code list.

Constraint:

- if the noise source is "agglomerationRoad" or "agglomerationMajorRoad" then reductionMeasure attribute shall contain implemented/planned measures values from the *RoadMeasureValue* codelist (<http://dd.eionet.europa.eu/vocabulary/noise/RoadMeasureValue>)
- if the noise source is "agglomerationRailway" or "agglomerationMajorRailway" then reductionMeasure attribute shall contain implemented/planned measures values from the *RailMeasureValue* codelist (<http://dd.eionet.europa.eu/vocabulary/noise/RailMeasureValue>)
- if the noise source is "agglomerationAir" or "agglomerationMajorAirport" then reductionMeasure attribute shall contain implemented/planned measures values from the *AirportMeasureValue* codelist (<http://dd.eionet.europa.eu/vocabulary/noise/AirportMeasureValue>)
- if the noise source is "agglomerationIndustry" then reductionMeasure attribute shall contain implemented/planned measures values from the *IndustryMeasureValue* codelist (<http://dd.eionet.europa.eu/vocabulary/noise/IndustryMeasureValue>)



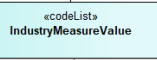
measureAtSource
changeInEmissionLevels
roadSurface
lowNoiseTyres
quietEngines
exhaust
quietPublicTransport
timeRestriction
timeRestrictionHGV
timeRestrictionPassenger
speedReductionMeasure
speedReduction
roundaboutsJunctions
physicalTrafficCalming
trafficCalmZones
otherTrafficManagementMeasure
publicTransportIncrease
cyclingWalkingIncrease
smartMobility
reductionTrafficFlows
bansReroutingHGV
bansReroutingPassenger
parkingManagement
congestionCharges
measureAtPath
noiseBarrierMeasure
noiseBarrier
greenNoiseBarrier
buildingInsulationMeasure
windowInsulation
otherInsulation
urbanPlanning
landUsePlanning
planningAndOrdinance
sensitiveAreaPlanning
bufferZones
noiseQualityArea
quietArea
greenArea
soundscape
infrastructureChange
newInfrastructure
newBypassBridgesRoad
newTunnel
closedInfrastructure
closureRoads
communityEngagement
communication
informationDissemination
complaintManagement
measuresForBehaviouralChange
promotingQuietMobility
promotingPublicTransport
promotingCarSharing
educationAwarenessActivities



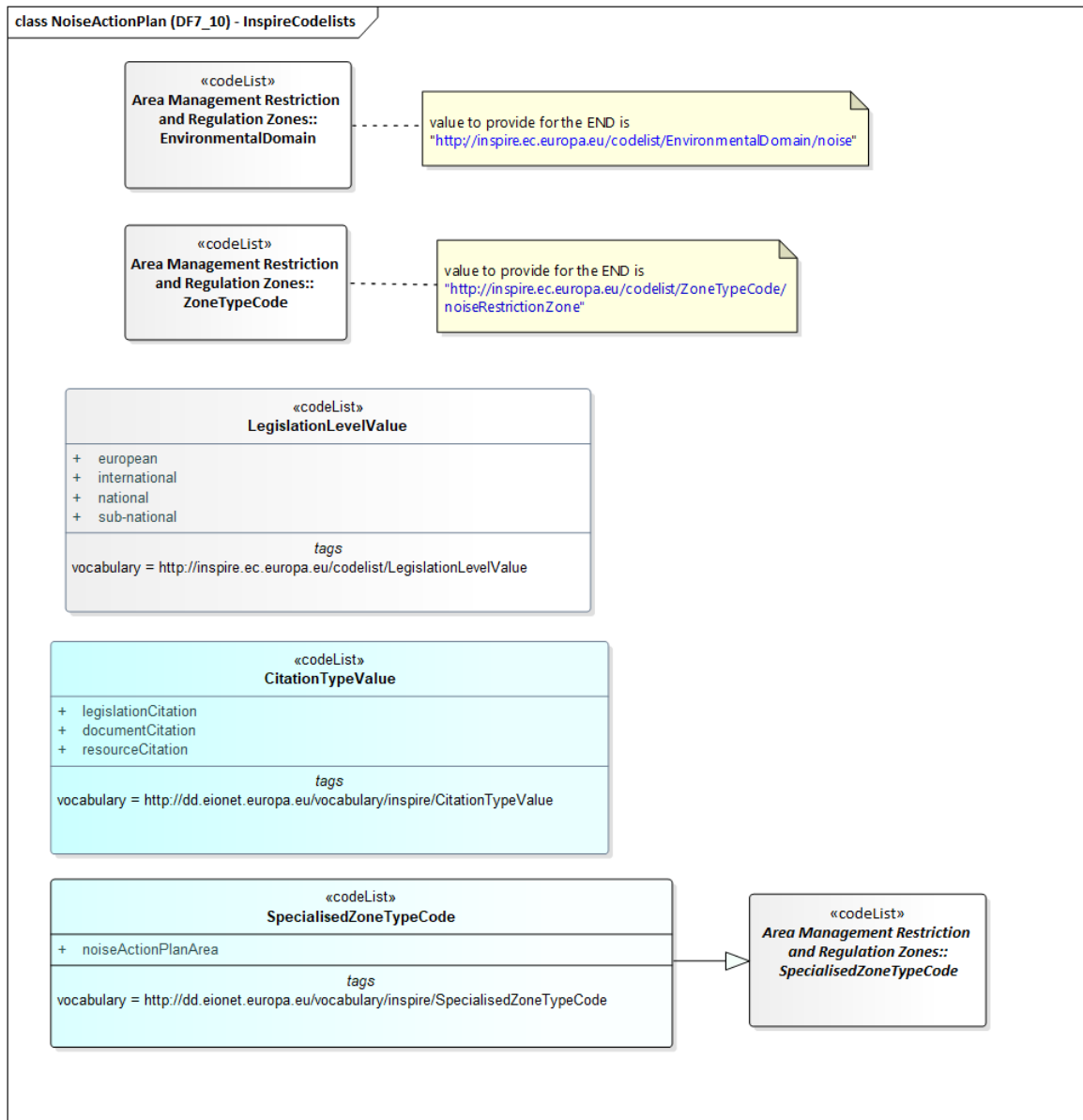
measureAtSource
changeInEmissionLevels
railTrack
retrofittingWheels
lowNoiseBrakes
quietEngines
renewalFleet
timeRestriction
timeRestrictionFreight
timeRestrictionPassenger
speedReductionMeasure
speedReduction
trafficCalmZones
otherTrafficManagementMeasure
reductionRailTracks
trackAccessCharges
bansReroutingFreight
bansReroutingPassengers
measureAtPath
noiseBarrierMeasure
noiseBarrier
greenNoiseBarrier
buildingInsulationMeasure
windowInsulation
otherInsulation
urbanPlanning
landUsePlanning
planningAndOrdinance
sensitiveAreasPlanning
bufferZones
noiseQualityArea
quietArea
greenArea
soundscape
infrastructureChange
newInfrastructure
newRoute
newBypassViaduct
newTunnel
closedInfrastructure
closureRailwayRoute
closureStation
communityEngagement
communication
informationDissemination
complaintManagement
measuresForBehaviouralChange
educationAwarenessActivities
promotingOtherModes



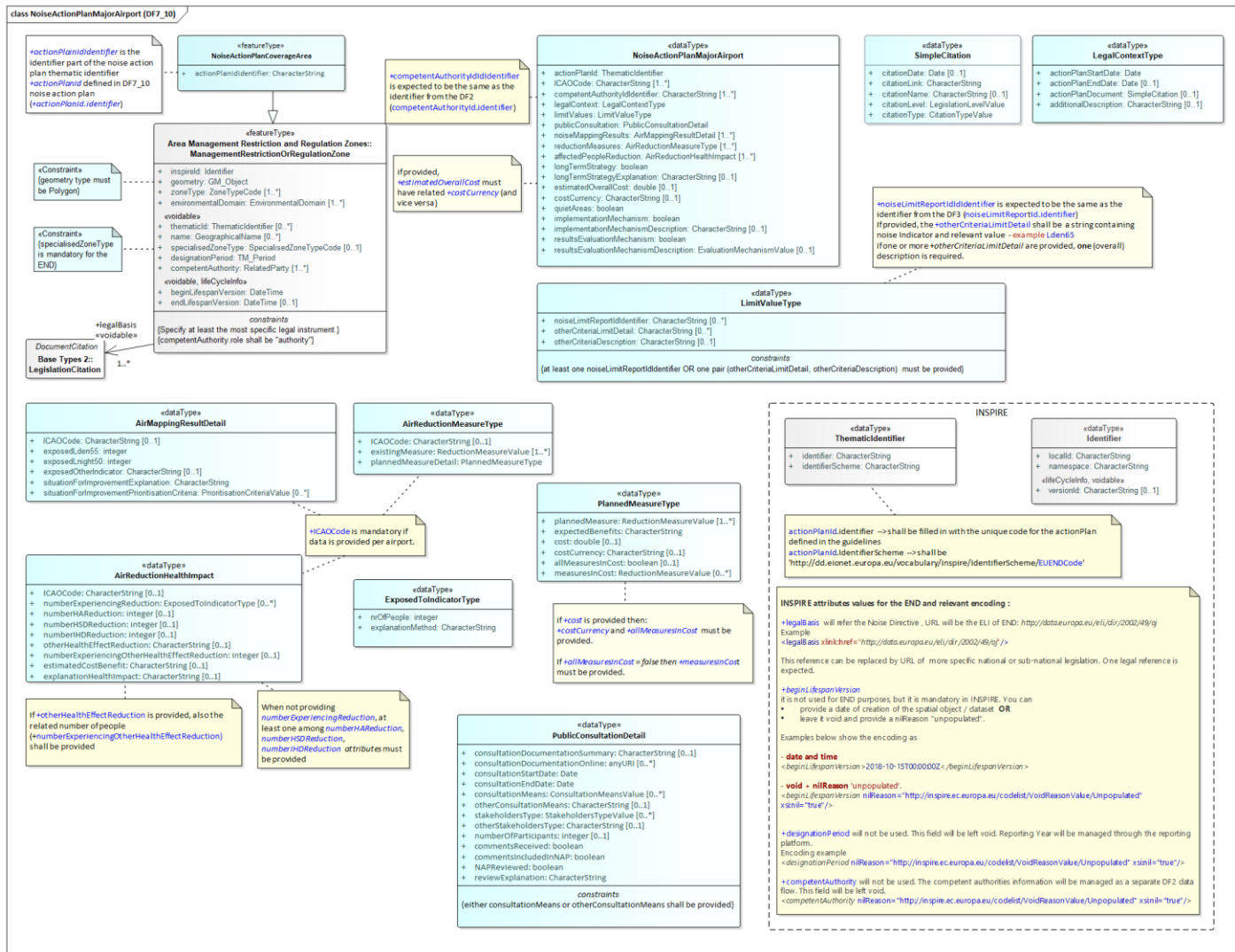
measureAtSource
changeInEmissionLevels
quietAirplanes
timeRestriction
curfewHours
respiteAndNoiseSharing
managementOfAirTrafficOperations
managementOfAirTrafficRoutes
managementTakeoffLanding
managementRunwayGroundOperations
measureAtPath
noiseBarrierMeasure
noiseBarrier
greenNoiseBarrier
buildingInsulationMeasure
windowInsulation
otherInsulation
urbanPlanning
landUsePlanning
planningAndOrdinance
sensitiveAreaPlanning
bufferZones
noiseQualityAreas
quietArea
greenArea
soundscape
infrastructureChange
newInfrastructure
newRoute
newRunway
closedInfrastructure
closureRoute
closureRunway
closureAirport
communityEngagement
communication
informationDissemination
complaintManagement
measuresForBehaviouralChange
educationAwarenessActivities
promotingOtherModes



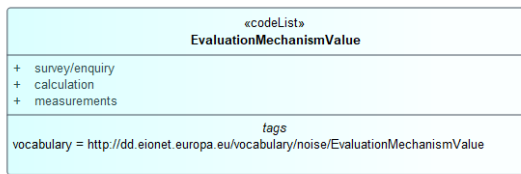
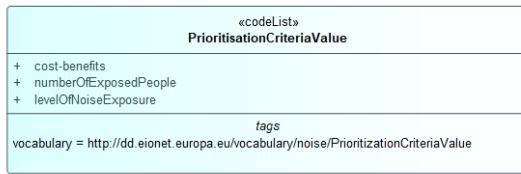
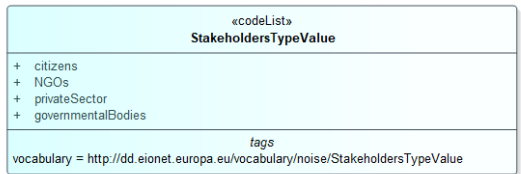
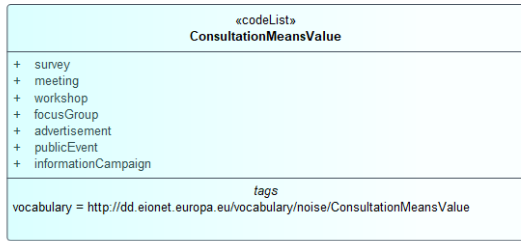
measureAtSource
changeInEmissionLevels
quietOperations
timeRestriction
operationTimeRestriction
measureAtThePath
noiseBarrierMeasure
noiseBarrier
enclosure
buildingInsulationMeasure
windowInsulation
otherInsulation
urbanPlanning
landUsePlanning
planningAndOrdinance
sensitiveAreaPlanning
bufferZones
noiseQualityArea
quietArea
greenArea
soundscape
infrastructureChange
newInfrastructure
relocationIndustry
closedInfrastructure
closureIndustry
communityEngagement
communication
informationDissemination
complaintManagement
measuresForBehaviouralChange
educationAwarenessActivities



Action plans for major airports (DF7_10)



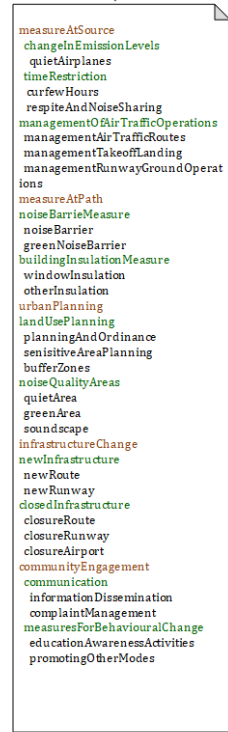
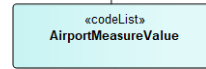
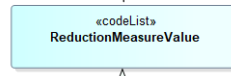
class NoiseActionPlanMajorAirport (DF7_10) - Codelists

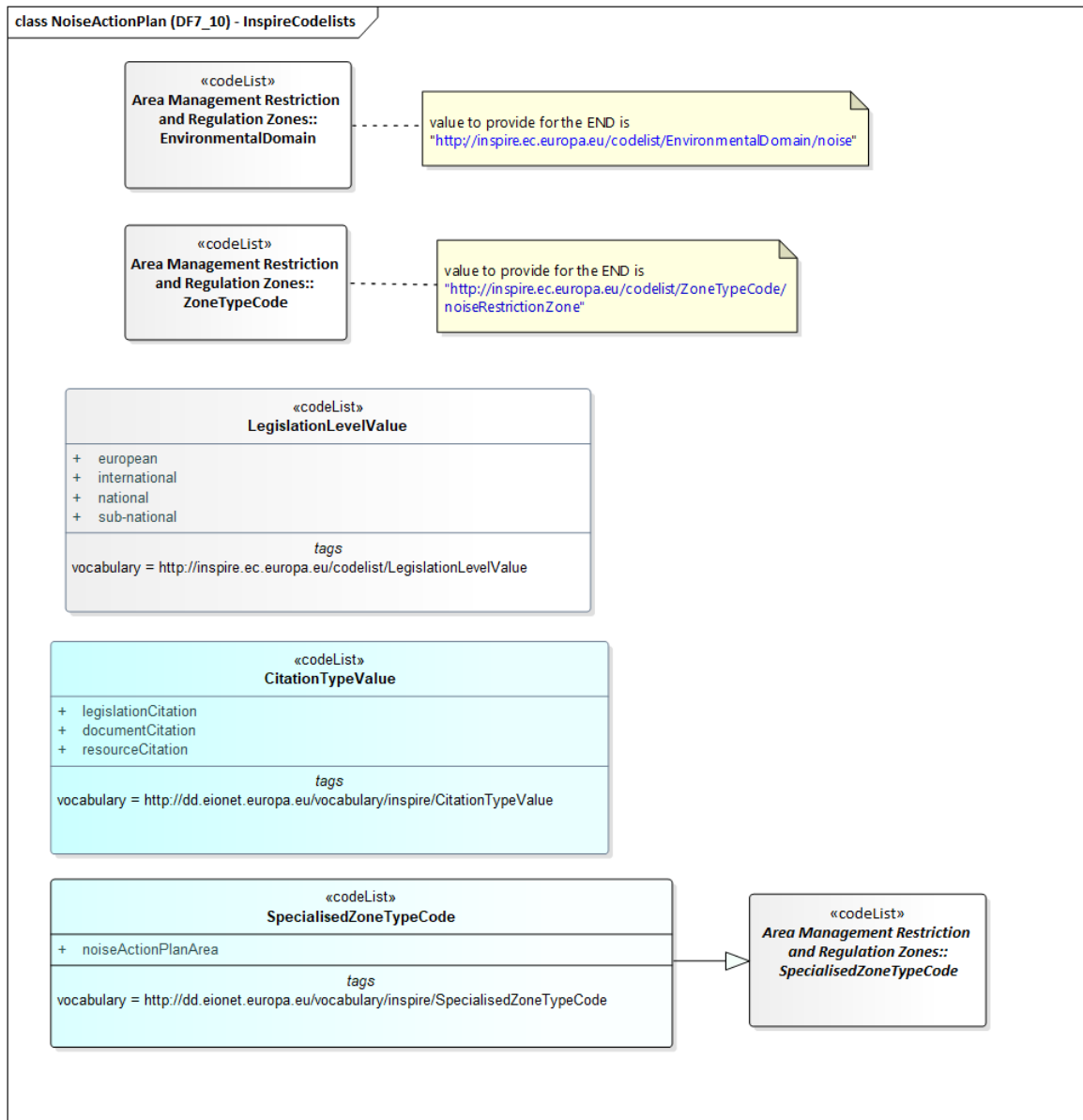


ReductionMeasureValue is an empty code list.

constraint:

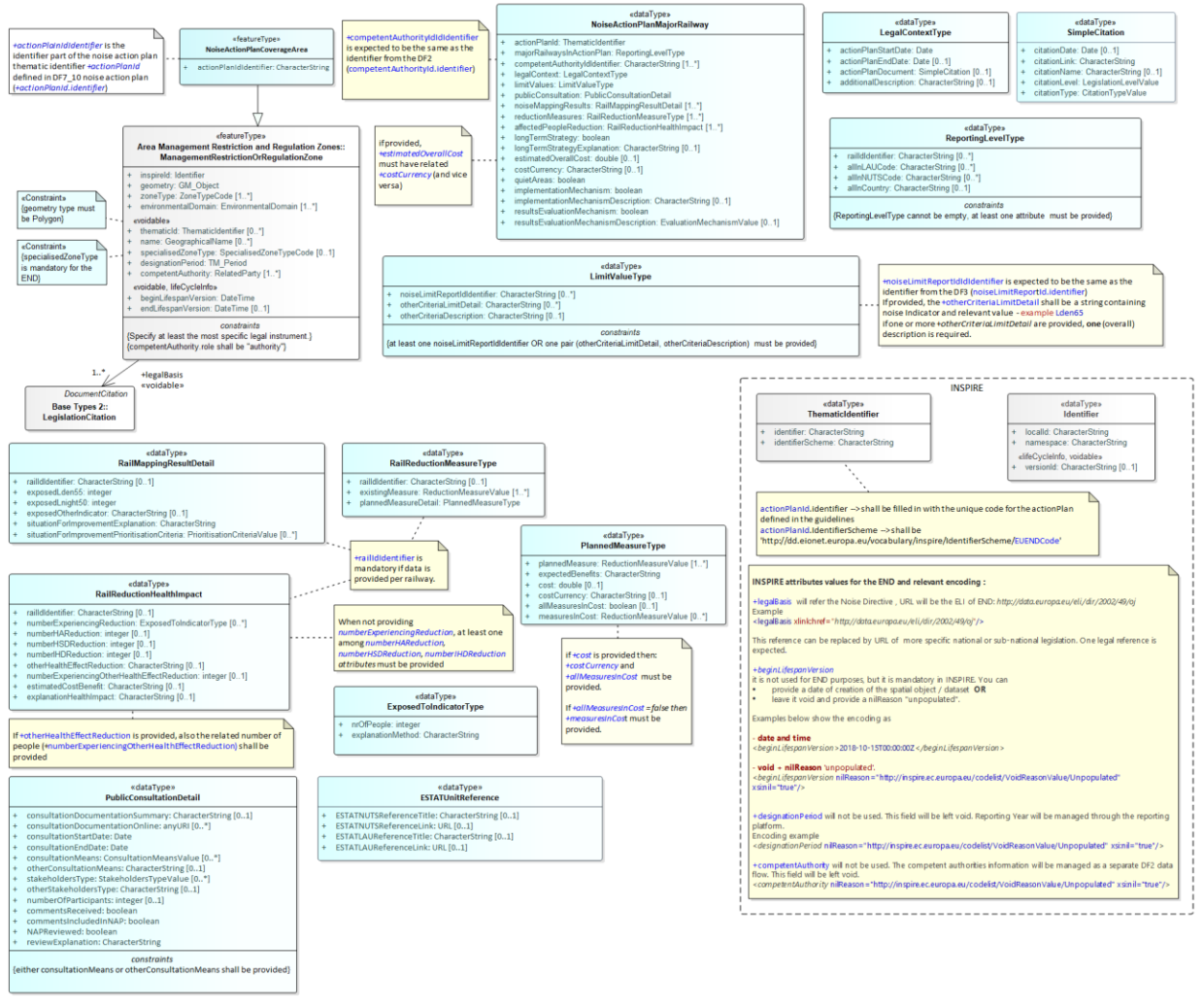
- if the noise source in the *NoiseActionPlanMajorSource* feature type is "majorAirport" then reductionMeasure attribute shall contain implemented/planned measures values from the *AirportMeasureValue* codelist (<http://dd.eionet.europa.eu/vocabulary/noise/AirportMeasureValue>)





Action plans for major railways (DF7_10)

class NoiseActionPlanMajorRailway (DF7_10)



class NoiseActionPlanMajorRailway(DF7_10) - Codelists

«codeList» ConsultationMeansValue
+ survey + meeting + workshop + focusGroup + advertisement + publicEvent + informationCampaign
tags
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/ConsultationMeansValue

«codeList» StakeholdersTypeValue
+ citizens + NGOs + privateSector + governmentalBodies
tags
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/StakeholdersTypeValue

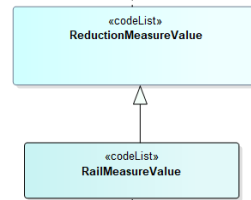
«codeList» PrioritisationCriteriaValue
+ cost-benefits + numberOfExposedPeople + levelOfNoiseExposure
tags
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/PrioritizationCriteriaValue

«codeList» EvaluationMechanismValue
+ survey/enquiry + calculation + measurements
tags
vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue

ReductionMeasureValue is an empty code list.

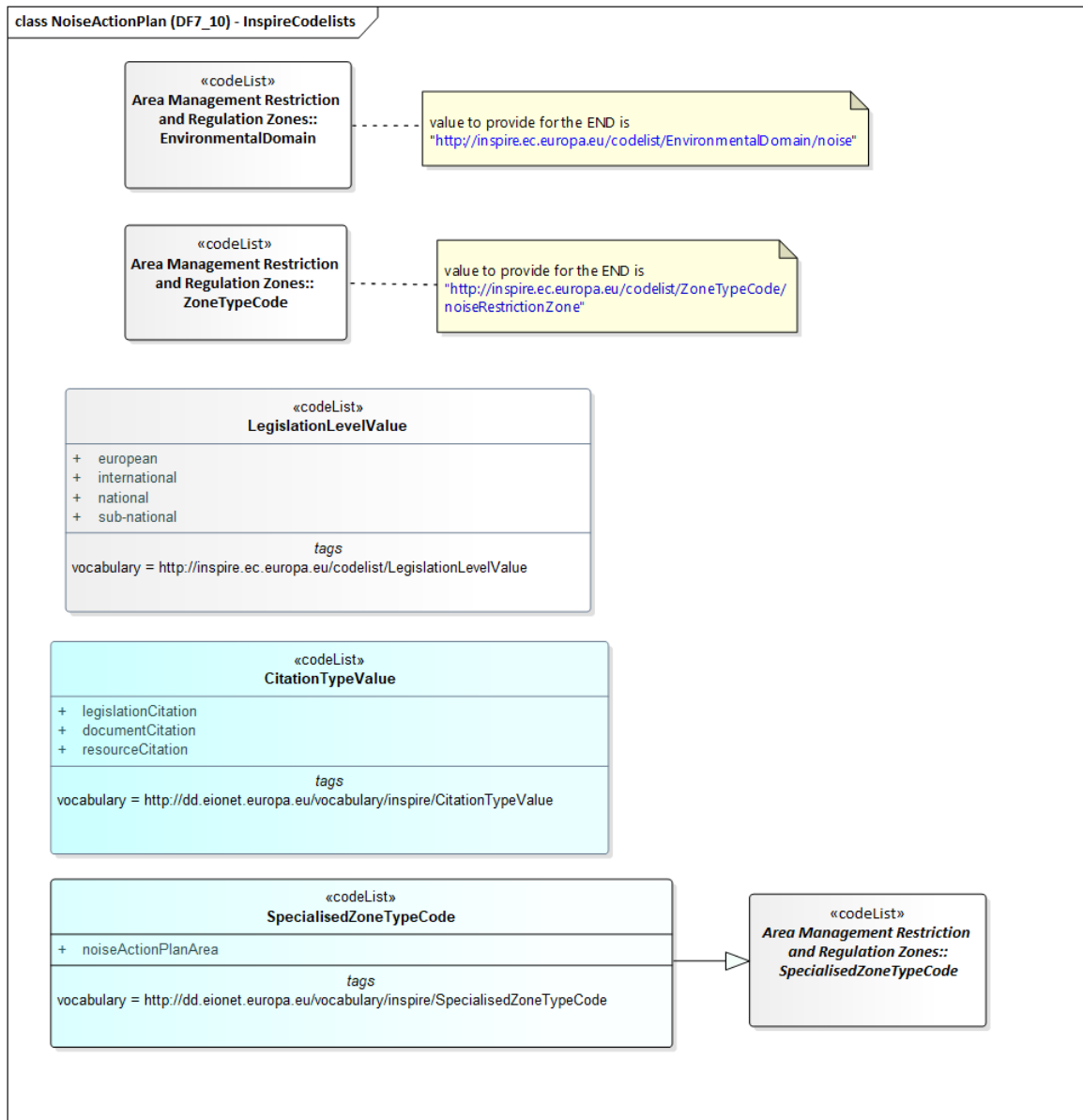
Constraint:

- if the noise source in the *NoiseActionPlanMajorSource* feature type is "majorRailway" then reductionMeasure attribute shall contain implemented/planned measures values from the *RailMeasureValue* codelist (<http://dd.eionet.europa.eu/vocabulary/noise/RailMeasureValue>)



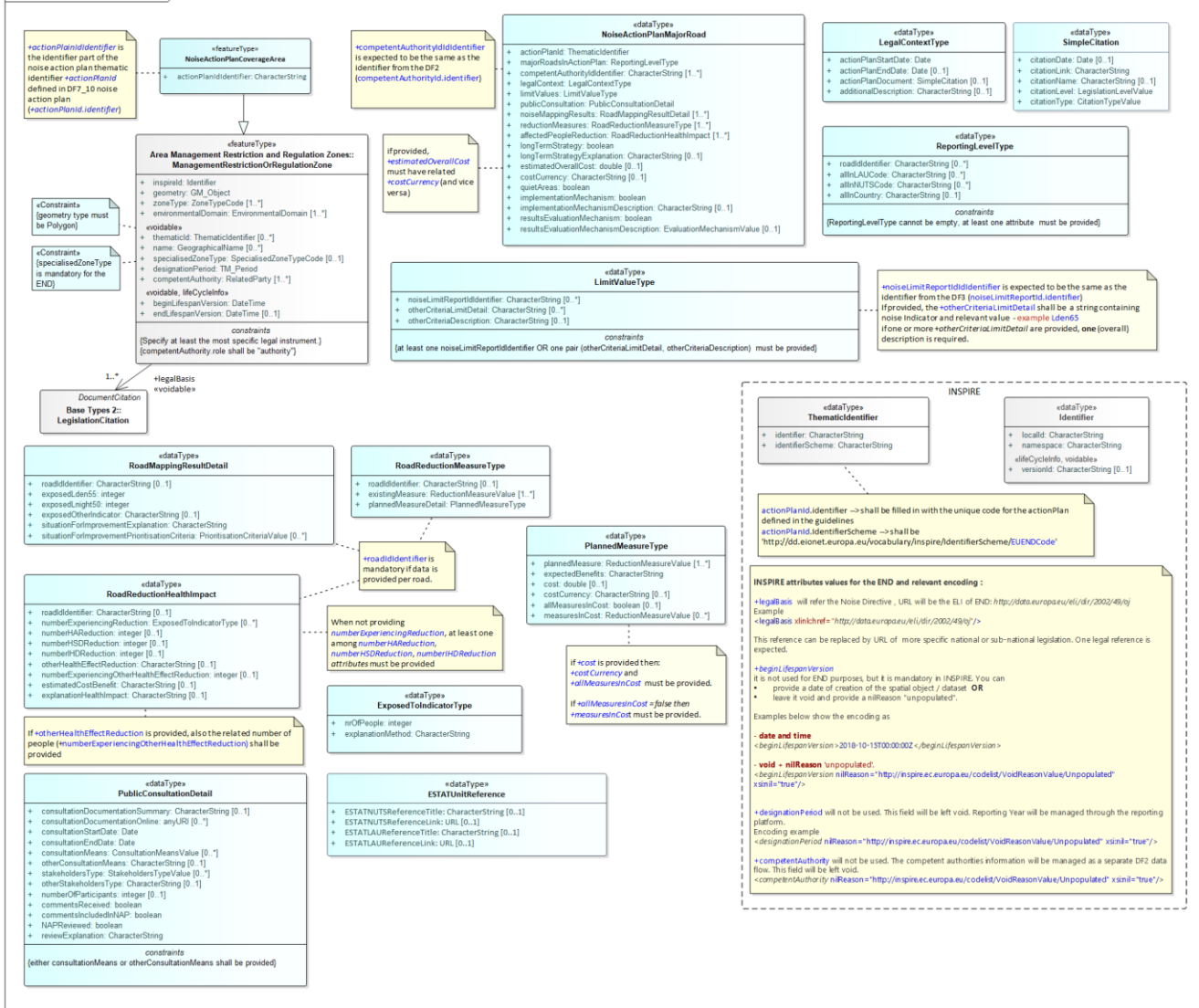
```

measureAtSource
changeInEmissionLevels
railTrack
retrofittingWheels
lowNoiseBrakes
quietEngines
renewalFleet
timeRestriction
timeRestrictionFreight
timeRestrictionPassenger
speedReductionMeasure
speedReduction
trafficCalmedZones
otherTrafficManagementMeasure
reductionRailTracks
trackAccessCharges
banReroutingFreight
banReroutingPassengers
measureAtPath
noiseBarrierMeasure
noiseBarrier
greenNoiseBarrier
buildingInsulationMeasure
windowInsulation
otherInsulation
urbanPlanning
landUsePlanning
planningAndOrdinance
sensitiveAreaPlanning
bufferZones
noiseQualityArea
quietArea
greenArea
soundscape
infrastructureChange
newInfrastructure
newRoute
newBypassViaduct
newTunnel
closureInfrastructure
closureRailwayRoute
closureStation
communityEngagement
communication
informationDissemination
complaintManagement
measureForBehaviouralChange
educationAwarenessActivities
promotingOtherModes
    
```



Action plans for major roads (DF7_10)

class NoiseActionPlanMajorRoad (DF7_10)



class NoiseActionPlanMajorRoad (DF7_10) - Codelists

<p>«codeList» ConsultationMeansValue</p> <ul style="list-style-type: none"> + survey + meeting + workshop + focusGroup + advertisement + publicEvent + informationCampaign <p style="text-align: right;">tags</p> <p>vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/ConsultationMeansValue</p>

<p>«codeList» StakeholdersTypeValue</p> <ul style="list-style-type: none"> + citizens + NGOs + privateSector + governmentalBodies <p style="text-align: right;">tags</p> <p>vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/StakeholdersTypeValue</p>

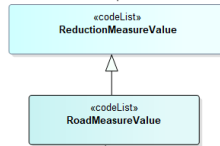
<p>«codeList» PrioritisationCriteriaValue</p> <ul style="list-style-type: none"> + cost-benefits + numberOfExposedPeople + levelOfNoiseExposure <p style="text-align: right;">tags</p> <p>vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/PrioritizationCriteriaValue</p>
--

<p>«codeList» EvaluationMechanismValue</p> <ul style="list-style-type: none"> + survey/enquiry + calculation + measurements <p style="text-align: right;">tags</p> <p>vocabulary = http://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue</p>
--

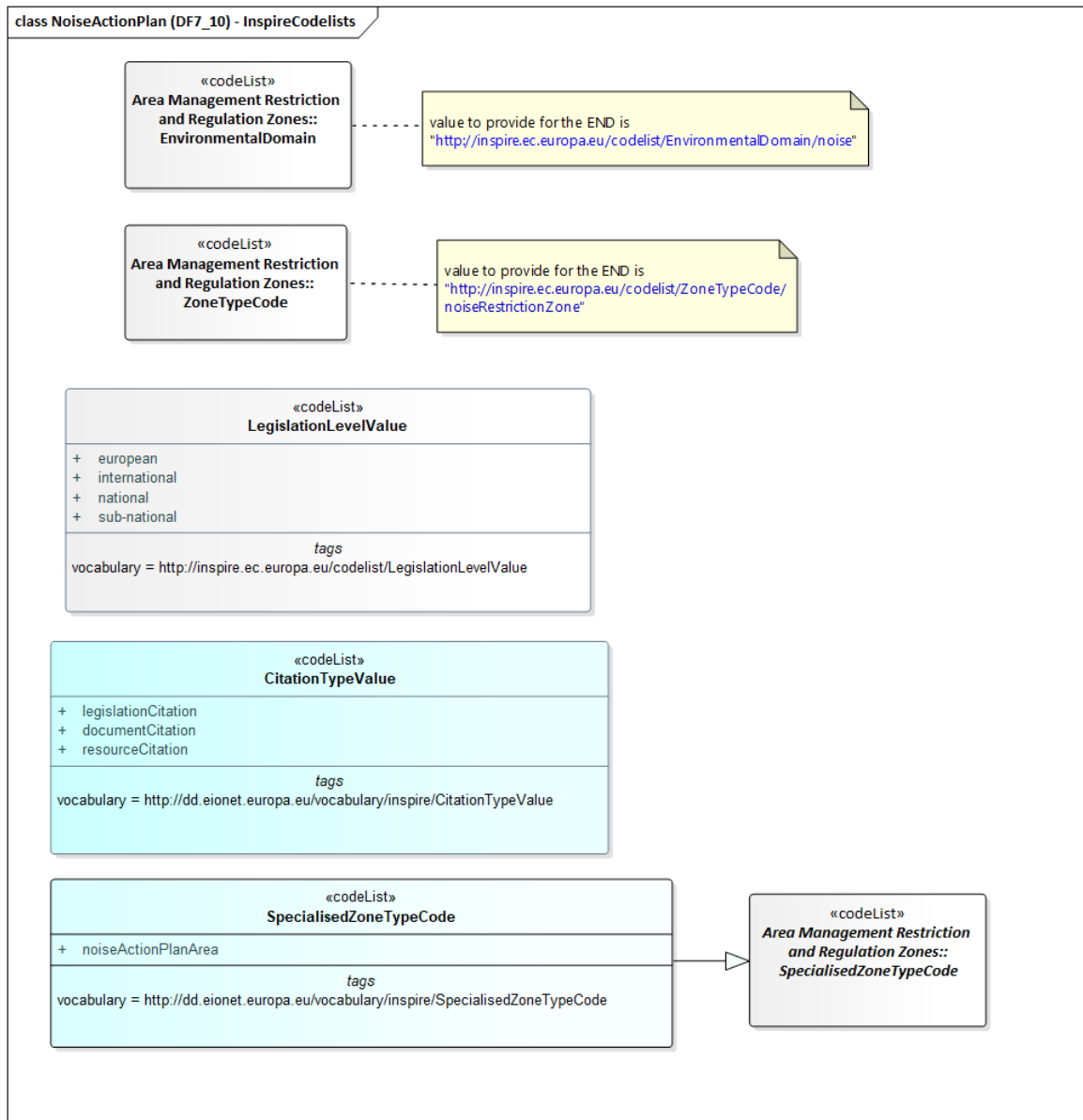
ReductionMeasureValue is an empty code list.

Constraint:

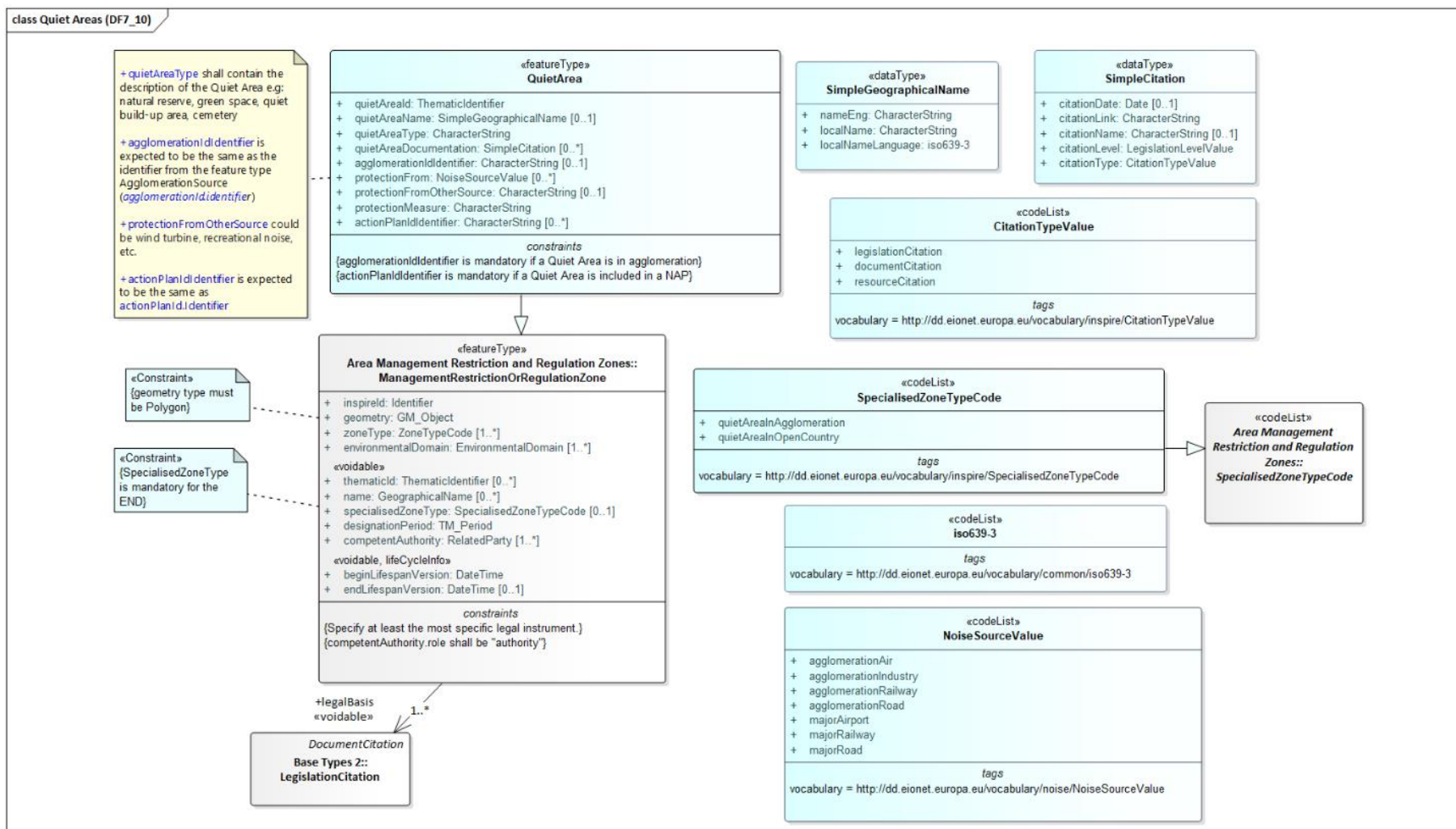
- If the noise source in the *NoiseActionPlanMajorSource* feature type is "majorRoad" then reductionMeasure attribute shall contain implemented/planned measures values from the *RoadMeasureValue* codelist (<http://dd.eionet.europa.eu/vocabulary/noise/RoadMeasureValue>)

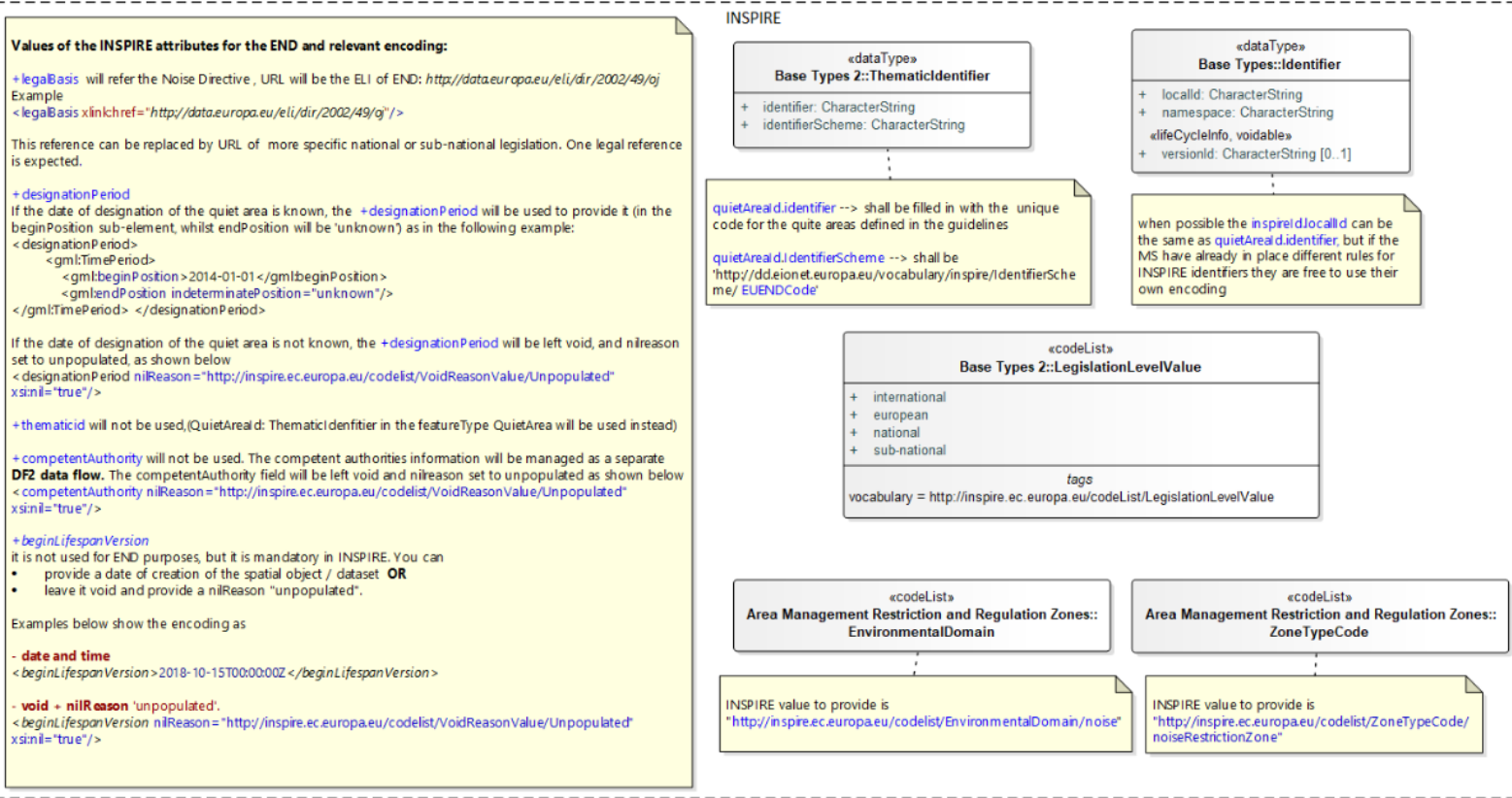


- measureAtSource
changeInEmissionLevels
roadSurface
lowNoiseTyres
quietEngines
exhaust
quietPublicTransport
timeRestriction
timeRestrictionsHGV
timeRestrictionPassenger
speedReductionMeasure
speedReduction
roundaboutFunctions
physicalTrafficCalming
trafficCalmedZones
otherTrafficManagementMeasure
publicTransportIncrease
cyclingWalkingIncrease
smartMobility
reductionTrafficFlows
bansReroutingHGV
bansReroutingPassenger
parkingManagement
congestionCharges
measureAtPath
noiseBarrierMeasure
noiseBarrier
greenNoiseBarrier
buildingInsulationMeasure
windowInsulation
otherInsulation
urbanPlanning
landUsePlanning
planningAndOrdinance
sensitiveAreaPlanning
bufferZones
noiseQualityArea
quietArea
greenArea
soundscape
infrastructureChange
newInfrastructure
newBypassBridgesRoad
newTunnel
closedInfrastructure
closureRoads
communityEngagement
communication
informationDissemination
complainManagement
measureForBehaviouralChange
promotingQuietMobility
promotingPublicTransport
promotingCarSharing
educationAwarenessActivities



Quiet areas (DF7_10)





Annex 2

Conceptual data model development process

The new END data model is intended to satisfy the reporting obligations that countries must satisfy. Another key factor in the development of the END data model was to ensure conformity with the relevant INSPIRE data specifications for spatial data. Within the INSPIRE Directive scope, the Member States have an obligation to make their data available in a harmonised form. Therefore, the alignment between the END and INSPIRE provides a common basis to provide spatial data in a harmonised way fulfilling legal requirements of both Directives.

The END conceptual data model development followed the INSPIRE data specifications and was developed by using the UML modelling language in a neutral way that can be applicable to different real implementations. Fine tuning of the data model required several iterations to provide a satisfying and optimised data model. The development comprised the following main steps:

1. Evaluating END requirements for spatial data

The END focus is on assessment and management of unwanted or harmful outdoor sound created by human activities. It refers to diverse real-world phenomena like noise sources, traffic flows, distribution of environmental noise, areas with low environmental noise impact or management of noise issues and effects where they appear. Understanding phenomena that can be represented with clear spatial information have been the initial task of development.

2. Establishing INSPIRE spatial data themes

Each identified spatial data source in the END scope have been compared with the INSPIRE spatial data themes to establish the most representative spatial data themes applicable to the END concepts. The next step included a more detailed investigation to identify the appropriate INSPIRE data models and spatial object types. Overview of identified spatial data and their definitions are provided in Annex 3 Definition of spatial data in END and INSPIRE.

3. Content matching and specific END rules

The INSPIRE data models have been considered as basis to which the END concepts and requirements have been compared, including detailed information about definitions, types, multiplicities, constraints and relationships. The matching describes a few typical situations where the content is:

- Defined in the INSPIRE data model,
- Common to both: INSPIRE data model and END requirements,
- Present only in the END requirements.

In addition, exact geometry types and mandatory properties in the END scope were defined. The outcome presented the overall combined data model with original INSPIRE data models as basis and extended specific requirements stemming from the END requirements. The extension rules set out by INSPIRE require to formally keep the original model in its entirety.

4. Streamlining and simplification

The streamlining and simplification have been applied after a thorough understanding of the combined data model from both sources INSPIRE and END. Streamlining has been applied for the END data model as follows:

- Optional INSPIRE properties that are not required by the END have been excluded (not required in the reporting data flow),

- Mandatory voidable INSPIRE properties are included in the END data model with recommended values to be provided, where feasible. In case where values are not available or known, a void reason is expected to be provided for the END reporting purpose. Inclusion of mandatory voidable INSPIRE properties also allows Member State to provide more complete data according to the INSPIRE specifications if such data already exist.

Simplification was applied in two main cases, if possible:

- specific END requirements were included in a form of simple structures and types, and
- optional properties composed of complex data types in the INSPIRE data models were replaced with simpler data structures and types.

Simplification rules developed by the INSPIRE MIG action on alternative encodings were used for this purpose⁵⁶.

⁵⁶ <https://webgate.ec.europa.eu/fpfis/wikis/pages/viewpage.action?pageId=277742184>

Annex 3

Definition of spatial data in END and INSPIRE

The END and INSPIRE Directive provide general definitions of phenomena that can be represented with spatial data. Further on, the INSPIRE data specifications provide more detailed technical definitions of spatial object types, their properties and relationships that are included in the INSPIRE Directive Implementing Rules.

END definition	INSPIRE spatial data theme definition	INSPIRE spatial object type definition
Major road shall mean a regional, national or international road, designated by the Member State, which has more than three million vehicle passages a year.	INSPIRE transport networks spatial data theme is defined as: “Road, rail, air and water transport networks and related infrastructure. Includes links between different networks. Also includes the trans-European transport network as defined in Decision No 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community Guidelines for the development of the trans-European transport network and future revisions of that Decision.”	RoadLink is defined as: “A linear spatial object that describes the geometry and connectivity of a road network between two points in the network. Road links can represent paths, bicycle roads, single carriageways, multiple carriageway roads and even fictitious trajectories across traffic squares.”
Major railway shall mean a railway, designated by the Member State, which has more than 30.000 train passages per year.		RailwayLink is defined as: “A linear spatial object that describes the geometry and connectivity of a railway network between two points in the network.”
Major airport shall mean a civil airport, designated by the Member State, which has more than 50.000 movements per year (a movement being a take-off or a landing), excluding those purely for training purposes on light aircraft.		AerodromeNode is defined as: “Node located at the aerodrome reference point of an airport/heliport, which is used to represent it in a simplified way. DEFINITION Aerodrome Reference Point (ARP): The designated geographical location of an aerodrome, located near the initial or planned geometric centre of the aerodrome and normally remaining where originally established [AIXM3.3]. DEFINITION Airport/heliport: A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft/helicopters [AIXM5.0].
Noise contour maps are part of the strategic noise maps which shall mean a map	INSPIRE human health and safety spatial data theme is defined as:	EnvHealthDeterminantMeasure is defined as:

END definition	INSPIRE spatial data theme definition	INSPIRE spatial object type definition
<p>designed for the global assessment of noise exposure in a given area due to different noise sources or for overall predictions for such an area.</p>	<p>“Geographical distribution of dominance of pathologies (allergies, cancers, respiratory diseases, etc.), information indicating the effect on health (biomarkers, decline of fertility, epidemics) or well-being of humans (fatigue, stress, etc.) linked directly (air pollution, chemicals, depletion of the ozone layer, noise, etc.) or indirectly (food, genetically modified organisms, etc.) to the quality of the environment.”</p>	<p>“A raw measurement performed at some place that is of interest for human health determinant analysis.” EnvHealthDeterminantNoiseMeasure is the specific extension of EnvHealthDeterminantMeasure for noise.</p>
<p>Agglomeration shall mean part of a territory, delimited by the Member State, having a population in excess of 100 000 persons and a population density such that the Member State considers it to be an urbanised area.</p>	<p>INSPIRE area management / restriction / regulation zones & reporting units spatial data theme is defined as: “Areas managed, regulated or used for reporting at international, European, national, regional and local levels. Includes dumping sites, restricted areas around drinking water sources, nitrate-vulnerable zones, regulated fairways at sea or large inland waters, areas for the dumping of waste, noise restriction zones, prospecting and mining permit areas, river basin districts, relevant reporting units and coastal zone management areas.”</p>	<p>ManagementRestrictionOrRegulationZone is defined as: “Area managed, restricted or regulated in accordance with a legal requirement related to an environmental policy or a policy or activity that may have an impact on the environment at any level of administration (or used for reporting at international, European, national, regional and local) levels.”</p>
<p>Action plans shall mean plans designed to manage noise issues and effects, including noise reduction if necessary.</p>		
<p>Quiet area in an agglomeration shall mean an area, delimited by the competent authority, for instance which is not exposed to a value of L_{den} or of another appropriate noise indicator greater than a certain value set by the Member State, from any noise source.</p>		
<p>Quiet area in open country shall mean an area, delimited by the competent authority, that is undisturbed by noise from traffic, industry or recreational activities.</p>		

Annex 4

Commonly used INSPIRE concepts

The INSPIRE data specifications include several common concepts, e.g. feature types, data types or code lists that are used in different INSPIRE data specifications. This annex describes those INSPIRE concepts that are included also in the END data model, because the END data model inherits or re-uses INSPIRE data models.

Description of INSPIRE concepts is also available in the INSPIRE registers⁵⁷ which provide a solid technical basis and documentation to support INSPIRE implementation, among others:

- **INSPIRE glossary**⁵⁸: describes general terms and definitions that specify the common terminology used in the INSPIRE Directive and in the INSPIRE Implementing Rules documents, e.g. data types,
- **INSPIRE feature concept dictionary**⁵⁹: acts as a common feature concept dictionary for all INSPIRE data specifications,
- **INSPIRE code list register**⁶⁰: contains the code lists and their values, as defined in the INSPIRE implementing rules on interoperability of spatial data sets and services.

1. Life cycle information of spatial objects in spatial dataset

INSPIRE data specifications, where applicable, use a common way to describe life cycle information of a spatial object in a spatial dataset. Lifespan information is provided by a pair of attributes:

beginLifespanVersion: Date and time at which this version of the spatial object was inserted or changed in the spatial dataset.

endLifespanVersion: Date and time at which this version of the spatial object was superseded or retired in the spatial data set.

2. Voidable properties

The voidable characteristic is used to describe those properties of a spatial object that may not be present in some spatial datasets, even though they may be present or applicable in the real world. This means, that for all properties defined for a spatial object, a value has to be provided:

- either the **corresponding value** (if available in the data set maintained by the data provider), or
- the **value of void**.

A void value shall imply that no corresponding value is contained in the source spatial dataset maintained by the data provider or no corresponding value can be derived from existing values at reasonable costs. The reason for a void value should be provided where possible using a listed value from the INSPIRE VoidReasonValue code list to indicate the reason for the missing value. Briefly, the following void values are defined: unknown, unpopulated and withheld.

See also: <http://inspire.ec.europa.eu/codelist/VoidReasonValue> .

⁵⁷ <http://inspire.ec.europa.eu/registry/>

⁵⁸ <http://inspire.ec.europa.eu/glossary>

⁵⁹ <http://inspire.ec.europa.eu/featureconcept>

⁶⁰ <http://inspire.ec.europa.eu/codelist>

3. Information on validity of spatial objects

INSPIRE data specifications use a concept of validity to record the validity of the real-world phenomenon represented by a spatial object. The concept is different from the life cycle information of a spatial object which is used as a practice of managing or maintaining spatial objects in a spatial dataset. Validity is described by a pair of attributes “valid from” and “valid to”. Specific INSPIRE data models use this concept if applicable and may give examples what —being valid means for a specific real-world phenomenon represented by a spatial object.

validFrom: specifies the date and time at which the real-world phenomenon became valid in the real world.

validTo: specifies the date and time at which the real-world phenomenon is no longer valid in the real world.

4. INSPIRE data types

Identifier: External unique object identifier published by the responsible body, which may be used by external applications to reference the spatial object.

This data type is composed of three properties:

- **localId:** A local identifier, assigned by the data provider. The local identifier is unique within the namespace, that is no other spatial object carries the same unique identifier.
- **namespace:** Namespace uniquely identifying the data source of the spatial object.
- **versionId:** The identifier of the particular version of the spatial object, with a maximum length of 25 characters. If the specification of a spatial object type with an external object identifier includes life-cycle information, the version identifier is used to distinguish between the different versions of a spatial object. Within the set of all versions of a spatial object, the version identifier is unique.

More information is available in the INSPIRE glossary, <http://inspire.ec.europa.eu/glossary/Identifier> .

ThematicIdentifier: Has been designed to uniquely identify the spatial object within a particular information domain. For this purpose, it is composed of two attributes:

- **identifier:** unique identifier used to identify the spatial object within the specified identification scheme.
- **identifierScheme:** Identifier defining the scheme used to assign the identifier.

More information is available in the INSPIRE glossary, <http://inspire.ec.europa.eu/glossary/ThematicIdentifier> .

5. INSPIRE code lists

VoidReasonValue: Reasons for void values.

<http://inspire.ec.europa.eu/codelist/VoidReasonValue>

LegislationLevelValue: The level at which a legal act or convention has been adopted.

<http://inspire.ec.europa.eu/codelist/LegislationLevelValue>

Annex 5

Overview of code lists in the END data model

The END data model uses agreed structured and pre-defined values from code lists. This overview includes code list name, location in the code list register and the URL.

Code list in END data model	Eionet Data Dictionary or INSPIRE Code list register	Code list URL
AirportMeasureValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/AirportMeasureValue
AreaTypeValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/AreaTypeValue
CitationTypeValue	Eionet Data Dictionary (inspire)	http://dd.eionet.europa.eu/vocabulary/inspire/CitationTypeValue
CompetentAuthorityRoleValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/CompetentAuthorityRoleValue
ConsultationMeansValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/ConsultationMeansValue
EvaluationMechanismValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/EvaluationMechanismValue
ExposureTypeInAgglomerationValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/ExposureTypeInAgglomerationValue
ExposureTypeValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/ExposureTypeValue
IdentifierScheme	Eionet Data Dictionary (inspire)	http://dd.eionet.europa.eu/vocabulary/inspire/IdentifierScheme/
IndustryMeasureValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/IndustryMeasureValue
Iso639-3	Eionet Data Dictionary (common)	http://dd.eionet.europa.eu/vocabulary/common/iso639-3
NoiseIndicatorRangeValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/NoiseIndicatorRangeValue

Code list in END data model	Eionet Data Dictionary or INSPIRE Code list register	Code list URL
NoiseIndicatorValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/NoiseIndicatorValue
NoiseLevelIndicatorValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/NoiseLevelIndicatorValue
NoiseIndicatorIncludingAgglomerationValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/NoiseIndicatorIncludingAgglomerationValue
NoiseSourceTypeValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceTypeValue
NoiseSourceValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/NoiseSourceValue
PrioritisationCriteriaValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/PrioritisationCriteriaValue
LevelValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/LevelValue
RailMeasureValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/RailMeasureValue
ReportingLevelValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/ReportingLevelValue
RoadMeasureValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/RoadMeasureValue
SpecialisedZoneTypeCode	Eionet Data Dictionary (inspire)	http://dd.eionet.europa.eu/vocabulary/inspire/SpecialisedZoneTypeCode
StakeholdersTypeValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/StakeholdersTypeValue
StatusValue	Eionet Data Dictionary (noise)	http://dd.eionet.europa.eu/vocabulary/noise/StatusValue
EnvDeterminantHealthValue	INSPIRE Code list register	http://inspire.ec.europa.eu/codelist/EnvHealthDeterminantTypeValue
EnvironmentalDomain	INSPIRE Code list register	http://inspire.ec.europa.eu/codelist/EnvironmentalDomain
LegislationLevelValue	INSPIRE Code list register	http://inspire.ec.europa.eu/codelist/LegislationLevelValue
VoidReasonValue	INSPIRE Code list register	http://inspire.ec.europa.eu/codelist/VoidReasonValue

Code list in END data model	Eionet Data Dictionary or INSPIRE Code list register	Code list URL
ZoneTypeCode	INSPIRE Code list register	http://inspire.ec.europa.eu/codelist/ZoneTypeCode

Annex 6

Glossary

Agglomeration: shall mean part of a territory, delimited by the Member State, having a population in excess of 100.000 persons and a population density such that the Member State considers it to be an urbanised area [END].

Attribute: In the context of INSPIRE, means a characteristic of spatial object [based on INSPIRE]. Property can be used as synonym. In the ISO 19101, a feature attribute is defined as characteristic of a feature.

Boolean type: means type that allows expression with a true or false value.

Class: means a description of a set of objects that share the same attributes, operations, methods, relationships and semantics [ISO 19103].

Code list: means a list of named literal values. In the context of INSPIRE, two general types of code lists are defined: code lists whose allowed values comprise only the values specified in the INSPIRE Implementing Rule on Interoperability, and code lists whose allowed values include also other values.

Data model: is an abstract model that organizes elements of data and standardizes how they relate to one another and to the properties of real-world entities. A data model explicitly determines the structure of data. Data models are specified in a data modelling notation, which is often graphical in form [Wikipedia, https://en.wikipedia.org/wiki/Data_model].

Data type: means a descriptor of a set of values that can be assigned to attributes.

Environmental noise: shall mean unwanted or harmful outdoor sound created by human activities, including noise emitted by means of transport, road traffic, rail traffic, air traffic, and from sites of industrial activity such as those defined in Annex I to Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control [END].

Eurostat: Eurostat is the statistical office of the European Union. <https://ec.europa.eu/eurostat>

External object identifier: means a unique object identifier which is published by the responsible body, which may be used by external applications to reference the spatial object [INSPIRE].

Feature: means abstraction of real world phenomena [ISO 19101]. In the context of INSPIRE and this document, the term is synonymously with spatial object [INSPIRE Glossary, <http://inspire.ec.europa.eu/glossary/Feature>].

Geography Markup Language: is an XML encoding in compliance with ISO 19118 for the transport and storage of geographic information modelled in accordance with the conceptual modelling framework used in the ISO 19100 series of International Standards and including both the spatial and non-spatial properties of geographic features. ISO 19136:2007 defines the XML Schema syntax, mechanisms and conventions. <https://www.iso.org/standard/32554.html>

GeoPackage: is an open, standards-based, platform-independent, portable, self-describing, compact format for transferring geospatial information, defined by the Open Geospatial Consortium (OGC). <https://www.ogc.org/>

Identifier: means a linguistically independent sequence of characters capable of uniquely and permanently identifying that with which it is associated, in accordance with EN ISO 19135 [INSPIRE].

INSPIRE: Infrastructure for Spatial Information in the European Community. Infrastructure for spatial information means metadata, spatial data sets and spatial data services; network services and technologies; agreements on sharing, access and use [INSPIRE]. The INSPIRE Directive (2007/2/EC) aims to establish an infrastructure for the sharing of environmental spatial data within the European Union. This will enable sharing among public sector organisations, facilitate public access to spatial data across Europe, and will aid in cross-boundary policy making.

International Organization for Standardization: is an independent, non-governmental international organisation with a membership of national standards bodies. <https://www.iso.org>

Life-cycle information: means a set of properties of a spatial object that describe the temporal characteristics of a version of a spatial object or the changes between versions [INSPIRE].

Linear reference system: means a reference system that identifies a location by reference to a segment of a linear spatial object and distance along that segment from a given point [ISO 19116 - modified].

L_{day}: day-noise indicator. Shall mean the noise indicator for annoyance during the day period, as further defined in Annex I [END].

L_{den}: day-evening-night noise indicator. Shall mean the noise indicator for overall annoyance, as further defined in Annex I [END].

L_{evening}: evening-noise indicator. Shall mean the noise indicator for annoyance during the evening period, as further defined in Annex I [END].

L_{night}: night-time indicator. Shall mean the noise indicator for sleep disturbance, as further defined in Annex I [END].

Major airport: shall mean a civil airport, designated by the Member State, which has more than 50.000 movements per year (a movement being a take-off or a landing), excluding those purely for training purposes on light aircraft [END].

Major railway: shall mean a railway, designated by the Member State, which has more than 30.000 train passages per year [END].

Major road: shall mean a regional, national or international road, designated by the Member State, which has more than three million vehicle passages a year [END].

Metadata element: means a discrete unit of metadata, in accordance with EN ISO 19115 [INSPIRE].

Metadata: means information describing spatial data sets and spatial data services and making it possible to discover, inventory and use them [INSPIRE].

Noise action plan: shall mean a plan designed to manage noise issues and effects, including noise reduction if necessary [END]. In the END scope, noise action plans can refer to identified major noise sources, agglomerations, quiet areas or other specific noise situations. The reference is provided by object identifiers or directly as spatial data.

Noise contour map: presents the data on an existing or predicted noise situation in terms of a noise indicator, indicating breaches of any relevant limit value in force, the number of people affected in a certain area, or the number of dwellings exposed to certain values of a noise indicator in a certain area. Noise contours are part of the strategic noise maps. In the END scope, noise contour maps can be presented as areas or isolines.

Object referencing: means consistent method of referencing spatial data to location using existing spatial objects [INSPIRE Glossary, <http://inspire.ec.europa.eu/glossary/ObjectReferencing>].

Package: means a general purpose mechanism for organizing elements into groups [INSPIRE].

Quiet area in an agglomeration: shall mean an area, delimited by the competent authority, for instance which is not exposed to a value of L_{den} or of another appropriate noise indicator greater than a certain value set by the Member State, from any noise source [END].

Quiet area in open country: shall mean an area, delimited by the competent authority, that is undisturbed by noise from traffic, industry or recreational activities [END].

Relationship: means a semantic connection among model elements [ISO 19103].

Spatial data: means any data with a direct or indirect reference to a specific location or geographical area [INSPIRE]. In the END scope, spatial data directly include location information.

Spatial dataset: means an identifiable collection of spatial data [INSPIRE]. In the END scope, spatial dataset will typically include location information and other properties according to INSPIRE data specifications and specific data requested under the END.

Spatial object type: means a classification of spatial objects. In the conceptual schema language UML a spatial object type will be described by a class with stereotype <<featureType>>.

Spatial object: means an abstract representation of a real-world phenomenon related to a specific location or geographical area [INSPIRE]. It is also synonymous with "(geographic) feature" as used in the ISO 19100 series

Strategic noise map: shall mean a map designed for the global assessment of noise exposure in a given area due to different noise sources or for overall predictions for such an area [END].

UML – Unified Modelling Language: is a general-purpose, developmental, modelling language. It is used in many different ways and in many different problem domains to diagram a system's structure and behaviour. UML is adopted as the conceptual schema language to represent and model geographic information described in details in the standard ISO 19103 - Geographic information – Conceptual schema language.

Voidable: means that, for an attribute or association role a value of 'void' may be made available if no corresponding value is contained in the spatial data sets maintained by the Member States or no corresponding value can be derived from existing values at reasonable costs. If an attribute or association role is not voidable, the table cell specifying its voidability is left blank [INSPIRE].

Annex 7 Acronyms

AM: Area Management

dB: Decibel

DF: Data flow

DF1_5: Noise sources

DF2: Competent authorities

DF3: Noise limit values

DF4_8: Strategic noise maps

DF7_10: Noise action plans and quiet areas

EEA: European Environment Agency

END: Environmental Noise Directive

EU: European Union

GML: Geography Markup Language

HA: Highly Annoyed

HH: Human Health

HSD: Highly Sleep Disturbed

IATA: International Air Transport Association

ICAO: The International Civil Aviation Organization

INSPIRE: Infrastructure for Spatial Information in Europe

ISO: International Organization for Standardization

JRC: Joint Research Centre

km: Kilometre

LAU: Local Administrative Units

L_{day}: Day noise level

L_{den}: Day-evening-night noise level

L_{evening}: Evening noise level

L_{night}: Night noise level

MIG: Maintenance and Implementation Group

MS: Member State

NAP: Noise Action Plan

NUTS: Nomenclature of Territorial Units for Statistics

OGC: Open Geospatial Consortium

QA: Quality Assurance

QC: Quality Control

TN: Transport Networks

UML: Unified Modelling Language

W3C: World Wide Web Consortium

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The European Topic Centre on Air pollution,
transport, noise and industrial pollution (ETC/ATNI)
is a consortium of European institutes under a
framework partnership contract to the European
Environment Agency.

