

DD CEN/TS 16157-3:2011



BSI Standards Publication

Intelligent transport systems — DATEX II data exchange specifications for traffic management and information

Part 3: Situation Publication

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National foreword

This Draft for Development is the UK implementation of CEN/TS 16157-3:2011. DD ENV 13106:2000 and DD ENV 13777:2000 were withdrawn in 2007 as ENV 13106:2000 and ENV 13777:2000 expired without producing an EN standard.

DATEX II is founded on a single UML model which is made available in a useable format to all through the website, <http://www.datex2.eu/>.

This publication is not to be regarded as a British Standard.

It is being issued in the Draft for Development series of publications and is of a provisional nature. It should be applied on this provisional basis, so that information and experience of its practical application can be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the international organization responsible for its conversion to an international standard. A review of this publication will be initiated not later than 3 years after its publication by the international organization so that a decision can be taken on its status. Notification of the start of the review period will be made in an announcement in the appropriate issue of *Update Standards*.

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into an international Standard, to extend the life of the Technical Specification or to withdraw it. Comments should be sent to the Secretary of the responsible BSI Technical Committee at British Standards House, 389 Chiswick High Road, London W4 4AL.

The UK participation in its preparation was entrusted to Technical Committee EPL/278, Road transport informatics.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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**Intelligent transport systems - DATEX II data exchange
specifications for traffic management and information - Part 3:
Situation Publication**

Systèmes de transport intelligents - Spécifications DATEX
II d'échange de données pour la gestion du trafic et
l'information routière - Partie 3: Publication de situations

Intelligente Transportsysteme - DATEX II Datenaustausch
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Informationen - Teil 3: Situationsveröffentlichungen

This Technical Specification (CEN/TS) was approved by CEN on 10 April 2011 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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Foreword

This document (CEN/TS 16157-3:2011) has been prepared by Technical Committee CEN/TC 278 “Road transport and traffic telematics”, the secretariat of which is held by NEN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes ENV 13106:2000, ENV 13777:2000.

As a user of the standard, attention is drawn to the resources of www.datex2.eu. This web site contains related software tools and software resources that aid the implementation of CEN/TS 16157 DATEX II.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This Technical Specification defines a common set of data exchange specifications to support the vision of a seamless interoperable exchange of traffic and travel information across boundaries, including national, urban, interurban, road administrations, infrastructure providers and service providers. Standardisation in this context is a vital constituent to ensure that interoperability, reduction of risk, reduction of the cost base and promotion of open marketplace objectives are achieved that will lead to many social, economic and community benefits as a result of more informed travellers, network managers and transport operators.

Delivering European Transport Policy in line with the White Paper issued by the European Commission requires co-ordination of traffic management and the development of seamless pan European services. With the aim to support sustainable mobility in Europe, the European Commission has been supporting the development of information exchange mainly between the actors of the road traffic management domain for a number of years. In the road sector, DATEX II has been long in fruition, with the European Commission being fundamental to its development through an initial contract and subsequent co-funding through the Euro-Regional projects. With this standardisation of DATEX II there is a real basis for common exchange between the actors of the traffic and travel information sector.

This Technical Specification includes the framework and context for exchanges, the modelling approach, data content, data structure and relationships and communications specification.

This Technical Specification supports a methodology that is extensible.

The third part of this Technical Specification deals with the publication of situation information. It specifies the structures and definitions of information that may be exchanged to convey situation information relating to a road network, both from a road network manager and road user point of view.

The European Committee for Standardisation (CEN) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning procedures, methods and/or formats given in this document.

CEN takes no position concerning the evidence, validity and scope of patent rights.

1 Scope

This Technical Specification (CEN/TS 16157-3) specifies and defines component facets supporting the exchange and shared use of data and information in the field of traffic and travel.

The component facets include the framework and context for exchanges, the modelling approach, the data content, the data structure and relationships and the communications specification.

This Technical Specification is applicable to:

- traffic and travel information which is of relevance to road networks (non urban and urban);
- public transport information that is of direct relevance to the use of a road network (e.g. road link via train or ferry service).

This Technical Specification establishes specifications for data exchange between any two instances of the following actors:

- Traffic Information Centres (TICs);
- Traffic Control Centres (TCCs);
- Service Providers (SPs).

Use of this Technical Specification may be applicable for use by other actors.

This Technical Specification includes the following types of information content:

- road traffic event information – planned and unplanned occurrences both on the road network and in the surrounding environment;
- operator initiated actions;
- road traffic measurement data, status data and travel time data;
- travel information relevant to road users, including weather and environmental information;
- road traffic management information and instructions relating to use of the road network.

This part of the CEN/TS 16157 specifies the informational structures, relationships, roles, attributes and associated data types required for publishing situation traffic and travel information within the DATEX II framework. This is specified as a DATEX II Situation Publication sub-model which is part of the DATEX II platform independent model, but this Part excludes those elements that relate to location information which are specified in CEN/TS 16157-2 and those elements that relate to VMS settings which are specified in Part 4 of CEN/TS 16157 [4].

2 Conformance

The DATEX II platform independent data model of which the Situation Publication sub-model is a part, corresponds to the Level A model as defined in CEN/TS 16157-1.

Conformance with this Part shall require platform independent models from which platform specific models are generated to comply with the UML modelling rules defined in CEN/TS 16157-1 and with the following requirements of this sub-model which are expressed in this part:

- comply with all stipulated minimum and maximum multiplicity requirements for UML elements and relationships;
- comply with all definitions, types and ordering;
- employ optional elements as specified;
- comply with all expressed constraints.

It should be noted that conformance of a publication service with all the structural requirements stated above does not necessarily ensure that the informational content of that service will be semantically comprehensible.

3 Normative references

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

CEN/TS 16157-1:2011, *Intelligent transport systems — DATEX II data exchange specifications for traffic management and information — Part 1: Context and framework*

CEN/TS 16157-2, *Intelligent transport systems — DATEX II data exchange specifications for traffic management and information — Part 2: Location referencing*

ISO 639-2: 1998, *Codes for the representation of names of languages — Part 2: Alpha-3 code*

4 Terms and definitions

For the purposes of this document, the terms and definitions given in CEN/TS 16157-1:2011 and the following apply.

4.1

destination

specification of the end point of a defined route or itinerary

NOTE This may be either a location on a road network or an area location.

4.2

location

identifiable geographic place

NOTE It is either on a road network (as a point or a linear location) or as an area. This may be provided in one or more referencing systems.

[EN ISO 19112:2005]

4.3

Itinerary route

navigable ordered sequence of locations with a start point and an end point

4.4

RSS

really simple syndication

Really Simple Syndication comprises a Web feed format used to publish frequently updated sources of information

4.5 situation
identifiable occurrence in the real world comprising one or more traffic/travel circumstances which are linked by one or more causal relationships. Each Situation has its own life-cycle which encompasses the life-cycles of its component circumstances

4.6 situation element
identifiable occurrence in the real world comprising one traffic/travel circumstance which has its own life-cycle

NOTE Details of each situation element are mapped into a single data record.

5 Symbols and abbreviations

For the purposes of this document, the abbreviation of terms given in CEN/TS 16157-1 and the following apply.

ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ETRS89	European Terrestrial Reference System 1989
GUID	Globally Unique IDentifier
HTML	Hyper Text Mark-up Language
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
IMDG	International Maritime Dangerous Goods (code)
IP	Internet Protocol
LPG	Liquid Petroleum Gas
PDF	Portable Document Format
TREM	Transport Emergency Card
UML	Unified Modeling Language
UNDG	United Nations Dangerous Goods (number)
URL	Uniform Resource Locator
VIP	Very Important Person
VMS	Variable Message Sign

6 UML notation

The UML notation used in these Technical Specifications shall be as described in ISO/IEC 19501. A short summary explaining the notation used in this Technical Specification is provided in Annex A of the Part 1 of CEN/TS 16157.

7 The Situation Publication model

7.1 Overview of the Situation Publication model

The Situation Publication model shall comprise a number of packages, with the “SituationPublication” package providing the entry to the model and the subordinate “SituationRecord” package modelling the individual elements of situations. The “SituationPublication” package shall be one of several packages which are immediately subordinate to the “PayloadPublication” package and hence forms the top of the hierarchy in the Situation Publication model. The “SituationRecord” package shall make use of a number of packages from within the “ReusableClasses” package thus invoking a hierarchy of packages.

Each “SituationPublication” instance shall specify any number of individual situations in the real world, each of which shall comprise separate, but related, elements which are modelled in DATEX II as “SituationRecords”.

A “SituationRecord” shall be further specialised as being either of type “NonRoadEventInformation”, “TrafficElement”, “OperatorAction” or “GenericSituationRecord”. The “GenericSituationRecord” is provided purely for user extension of the model.

“NonRoadEventInformation”, as the name suggests, models events and information which are not occurring directly on or related to the road itself, but may still indirectly affect the operation of the road network, e.g. a road side service area is closed or a ferry service is not operating.

“TrafficElement” models events, activities and conditions which are occurring on the road network or are directly affecting the operation of the road network, e.g. an accident, an obstruction on the road or bad weather.

“OperatorAction” models actions or initiatives that a traffic operator may implement (either manually or automatically) to mitigate dangerous or poor driving conditions, and maintain optimal efficiency and safety of the road network which may include maintenance of the road infrastructure.

The entry class of each of the “NonRoadEventInformation”, “TrafficElement”, “OperatorAction” or “GenericSituationRecord” sub-packages shall be a class in the higher level package. The hierarchy of packages shall be strictly linear without any circular referencing.

Some of the packages and individual classes used within the “SituationPublication” package reside in a “ReusableClasses” package because they can be used in different places within this package or by other packages either now or in the future. The “ReusableClasses” package shall be a container for a number of sub-packages and individual reusable classes. Those sub-packages and classes which are contained in the “ReusableClasses” package are identified in the following clauses. The use of individual classes from the “ReusableClasses” package are described each time they are used in the “SituationPublication” since their context may affect their semantics.

7.2 The “SituationPublication” package

7.2.1 Overview of the “SituationPublication” package

The “SituationPublication” package shall be immediately subordinate to the “PayloadPublication” package and comprises a sub-model for defining publishable “Situations”, each of which may comprise one or more elements (see Figure 1). Each element of a “Situation” shall be modelled as an individual “SituationRecord”.

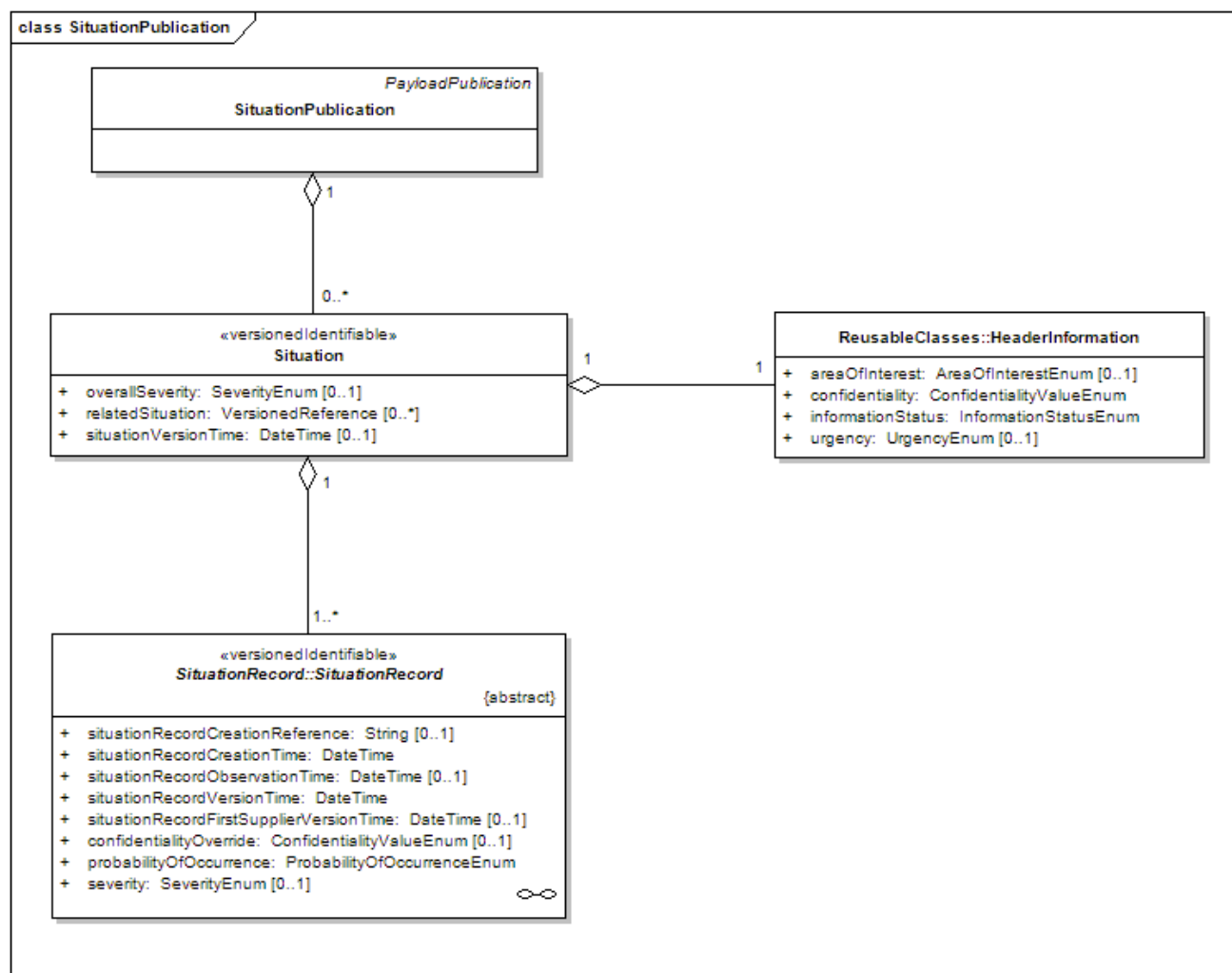


Figure 1 — The “SituationPublication” package class model

7.2.2 Semantics of the “SituationPublication” package

7.2.2.1 “SituationPublication” package semantics – general

The “SituationPublication” class shall be the only entry point of the package and is a specific realisable case of a “PayloadPublication”. Each “SituationPublication” may contain any number of separate situations each of which themselves may comprise one or more elements. Each element of a “Situation” shall be modelled as a “SituationRecord” in DATEX II.

The modelling of each situation and each component situation element represented by an instance of a “SituationRecord” class shall be uniquely identifiable for the particular DATEX II service and have its own lifecycle. Also since each may iterate through different time-stamped versions all instances of the “Situation” and “SituationRecord” classes shall have an assigned version. Hence both classes have an assigned stereotype of <<versioned/identifiable>> (see Part 1 of CEN/TS 16157 for how the implementation of this stereotype in the PSM allows identity and version to be represented in a data exchange).

7.2.2.2 “Situation” class

The “Situation” class shall be the base class for detailing a situation that may affect traffic on the roads.

- **Attribute “relatedSituation”** may provide a reference to any other versioned “Situation” that is published by the same publication creator which is related to this “Situation”. There may be any number of related “Situations”. For instance a “Situation” containing an “Accident” element and a resulting “AbnormalTraffic” element (e.g. indicating queuing traffic) could be related to a “Situation” containing an “AbnormalTraffic” element on the opposite carriageway.

7.2.2.3 “HeaderInformation” class

(from “ReusableClasses” package)

Each instance of a “Situation” shall have associated metadata contained in the “HeaderInformation” class which allows the supplier of the publication to specify how the recipient should treat the information contained in the “Situation”.

7.3 The “SituationRecord” package

7.3.1 Overview of the “SituationRecord” package

The package, “SituationRecord”, shall comprise a sub-model for defining an individual element of a “Situation” as a single identifiable, version managed record (see Figure 2).

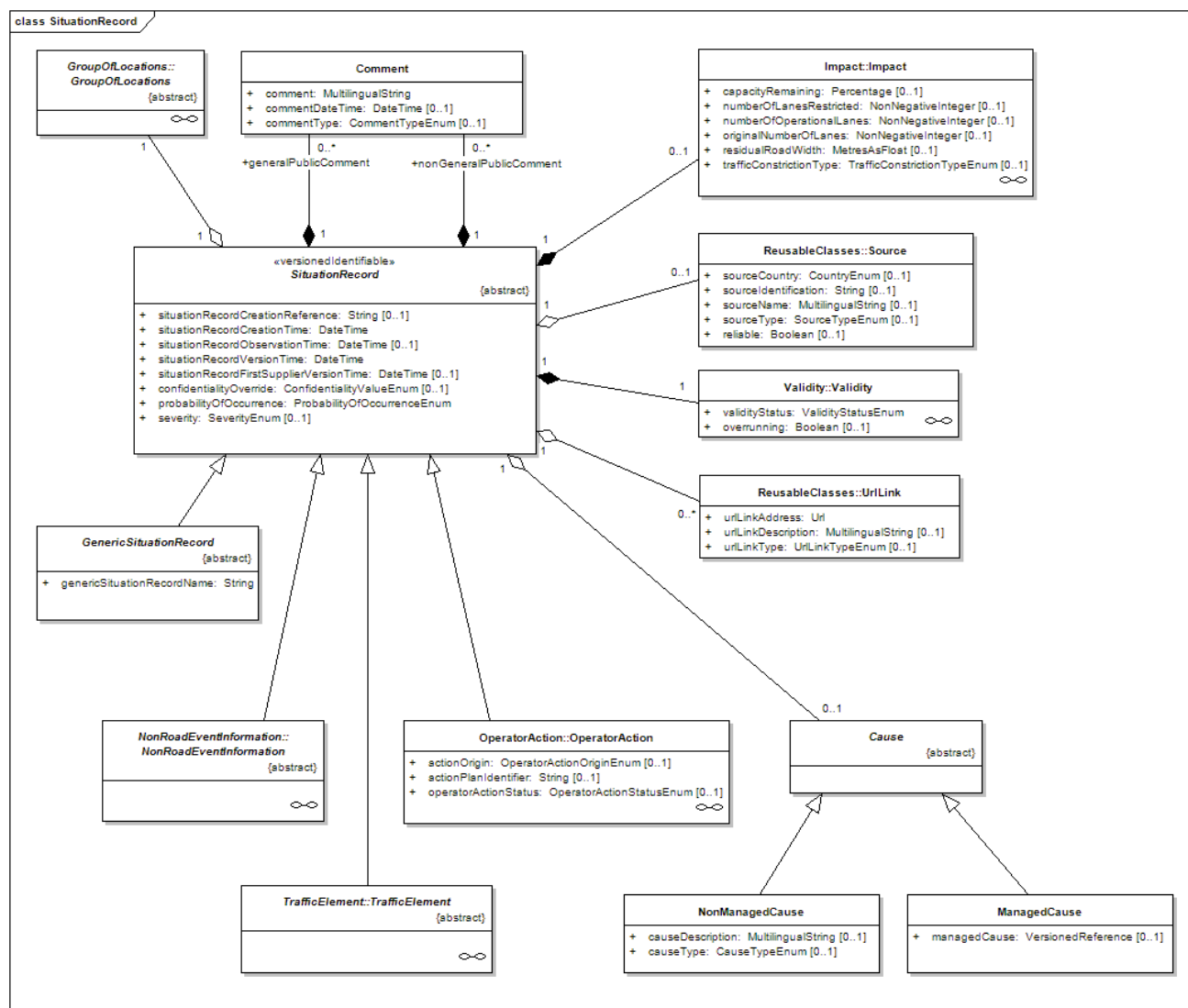


Figure 2 — The “SituationRecord” package class model

7.3.2 Semantics of the “SituationRecord” package

7.3.2.1 “SituationRecord” package semantics – general

The “SituationRecord” package shall comprise an abstract “SituationRecord” class which shall be realised as one of four specialisations which are used to model the details of an element of a “Situation”. Each version of a “SituationRecord” shall have associated location information and validity information as a minimum.

7.3.2.2 “SituationRecord” class

The “SituationRecord” class is abstract and shall be realised as an instance of either a “NonRoadEventInformation”, a “TrafficElement”, an “OperatorAction” or a “GenericSituationRecord”. The latter may only be used if a level B extension is required for a new type of “SituationRecord”.

The purpose of each of these instances of a “SituationRecord” is as follows:

- **“NonRoadEventInformation”**: events and information which are not occurring directly on or related to the road itself, but may still indirectly affect the operation of the road network
- **“TrafficElement”**: events, activities and conditions which are occurring on the road network or are directly affecting the operation of the road network
- **“OperatorAction”**: actions or initiatives that a traffic operator (or an automatic system under the operator’s control) may implement to mitigate dangerous or poor driving conditions, and maintain optimal efficiency and safety of the road network
- **“GenericSituationRecord”**: a generic record for use in level B extensions of the DATEX II model.

Before describing the details of the “SituationRecord” class it needs to be understood that the DATEX II model has been designed to cater for the relaying of traffic and travel information down a supply chain of systems or nodes where the first system (the “creator”) in that chain creates “SituationRecords” in its database and then supplies them to the next system in the chain. Each system in the supply chain is a “supplier” to the next. The attributes in the “SituationRecord” reflect this supply chain concept and, if used correctly, should assist with the correct processing of situation information received via complex supply chains.

- **Attribute “situationRecordCreationReference”** may be used to specify a reference for the “SituationRecord” object that was created by the original supplier in the supply chain when the first version of the record was created. This shall not change in subsequent versions of the same “SituationRecord”. It is up to the original supplier to manage these references which may be used by downstream systems to correctly process data received via diverse supply chains (e.g. the same data may be unknowingly received via different supply chains and this reference will help identify such occurrences).
- **Attribute “situationRecordCreationTime”** shall be used to specify the date/time that the first version of the SituationRecord object was created by the original supplier. It shall not change in subsequent versions of the same “SituationRecord”. Again shall be up to the original supplier to create this time stamp.
- **Attribute “situationRecordObservationTime”** may be used to specify the time at which the information contained in the current version of the “SituationRecord” was actually observed by the original source of the information (i.e. as close to the sensing source as possible).
- **Attribute “situationRecordVersionTime”** shall be used to specify the date/time that this current version of the “SituationRecord” was written into the database of the supplier which is involved in this data exchange. This time and the associated version identification shall be different from those provided by preceding suppliers (if there are any) in the supply chain since they are relative to this supplier. Note that the actual version of the “SituationRecord” is placed in an attribute which is part of the platform specific realisation of the <<versionedIdentifiable>> stereotype.
- **Attribute “situationRecordFirstSupplierVersionTime”** may be used to specify the date/time that the current version of the “SituationRecord” was written into the database of the original supplier in the supply chain. If there is only the current supplier in the supply chain then this time should be identical to that in “situationRecordVersionTime” and hence would not normally be given.

7.3.2.3 “Comment” class

The “Comment” class may be used to allow any number of free text comments to be specified for an instance of a “SituationRecord”. The association used to relate to the “SituationRecord” specifies whether the comment shall be allowed to be published to the general public or not (identified by role names of “generalPublicComment” and “NonGeneralPublicComment” respectively). Each “SituationRecord” instance may have any number of each type of these comments.

Each “comment” attribute shall be of a multilingual string type which means a publication may contain the same comment in several different languages.

- **Attribute “commentType”** may be used to classify the type of comment. This should be helpful in allowing a recipient to use the information more effectively.

7.3.2.4 “Source” class

(from “ReusableClasses” package)

The “Source” class may be used to identify details of the source from which the information contained in the instance/version of the “SituationRecord” was obtained. The details can include the source’s statement about the reliability of the information.

Where there are several systems in a supply chain this source information should be set by the first supplier in the chain who acquired the information. It should be relayed unchanged by subsequent suppliers in the chain, unless those suppliers modify the information or merge it with information from other sources, whereupon they should replace this information with their own.

- **Attribute “reliable”** can provide an indication of whether the source of the information deems it to be reliable. It is up to the recipient of the information to understand what criteria the source is using to set this reliability attribute. For instance the source may be using some automatic health check system on the sensor equipment to set this value, or it may be being set manually. An understanding of this can influence the recipient’s perception of this attribute’s value.

7.3.2.5 “UrlLink” class

(from ReusableClasses package)

The “UrlLink” class may be used to allow any number of Uniform Resource Locators (URL) to be specified where further information relating to the instance of the “SituationRecord” may be found. A URL may point to additional documentation in PDF format or HTML format, image data, video or voice streams or an RSS feed.

7.3.2.6 “Cause” class

The “Cause” class may be used to allow a supplier to provide information about the cause of the situation element which is defined by the “SituationRecord”. The “Cause” class is abstract and therefore shall be realised as an instance of either a “NonManagedCause” or a “ManagedCause”.

7.3.2.7 “NonManagedCause” class

The “NonManagedCause” class may be used to allow a supplier to provide information about the cause of the situation element which is not something that is managed by the supplier which is providing this data exchange service (i.e. the publication creator). Hence the cause cannot be identified by a reference to another “SituationRecord” produced by the supplier. Only a description and a type of cause can be provided.

7.3.2.8 “ManagedCause” class

The “ManagedCause” class may be used to allow a supplier to provide information about the cause of the situation element when it is something that is also managed by the supplier which is providing this data exchange service (i.e. the publication creator). Hence the cause should be identified by a reference (the “managedCause” attribute) to another version managed “SituationRecord” produced by the supplier.

7.4 The “Impact” package

7.4.1 Overview of the “Impact” package

(from “ReusableClasses” package)

The package, “Impact”, shall comprise a sub-model for defining an assessment of the impact that the situation element described in the “SituationRecord” will have or is having on the driving conditions on the road (see Figure 3). The specified impact is deemed to hold true for all the valid periods of the “SituationRecord” as defined by the associated “Validity” class and over the full length of the location defined for the “SituationRecord”. If the impact (e.g. delay) varies over the valid periods of the “SituationRecord” or over separate locations within the “SituationRecord” then separate “SituationRecords” should be created instead for each of the different levels of impact over time or space.

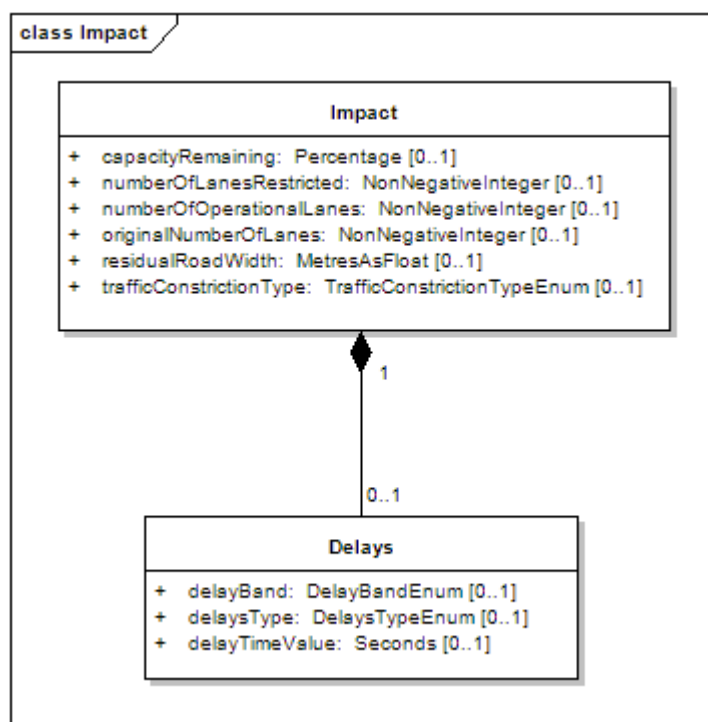


Figure 3 — The “Impact” package class model

7.4.2 Semantics of the “Impact” package

7.4.2.1 “Impact” package semantics – general

The “Impact” package shall model the details of the assessed impact that an event or operator action will have or is having on the driving conditions in terms of the roads ability to carry traffic and in terms of delays on that traffic. The impact shall be deemed to be constant through the validity periods and locations defined for the whole “SituationRecord”.

7.4.2.2 “Impact” class

The “Impact” class shall contain the basic impact information in terms of the constraints imposed by the situation element defined in the “SituationRecord” instance on the road network. This may be expressed in terms of remaining flow capacity, reductions in the physical road size and/or obstructions and blockages.

7.4.2.3 “Delays” class

The “Delays” class may be used to detail the delays being or expected to be caused by the situation element defined in the “SituationRecord” instance within the validity periods and locations defined for the situation element. Delays may be expressed in terms which are relative to normal conditions, in terms of a course

classification and as absolute times. It is recommended that only one of these options should be used to avoid confusion.

7.5 The “Validity” package

7.5.1 Overview of “Validity” package

(from “ReusableClasses” package)

The package, “Validity”, shall comprise a sub-model for defining the temporal validity of a situation element described in the “SituationRecord” instance, or the impact of such a situation element, where validity in this context means the time period in which the real world event, activity, action or impact being described actually occurs or is predicted to occur (see Figure 4).

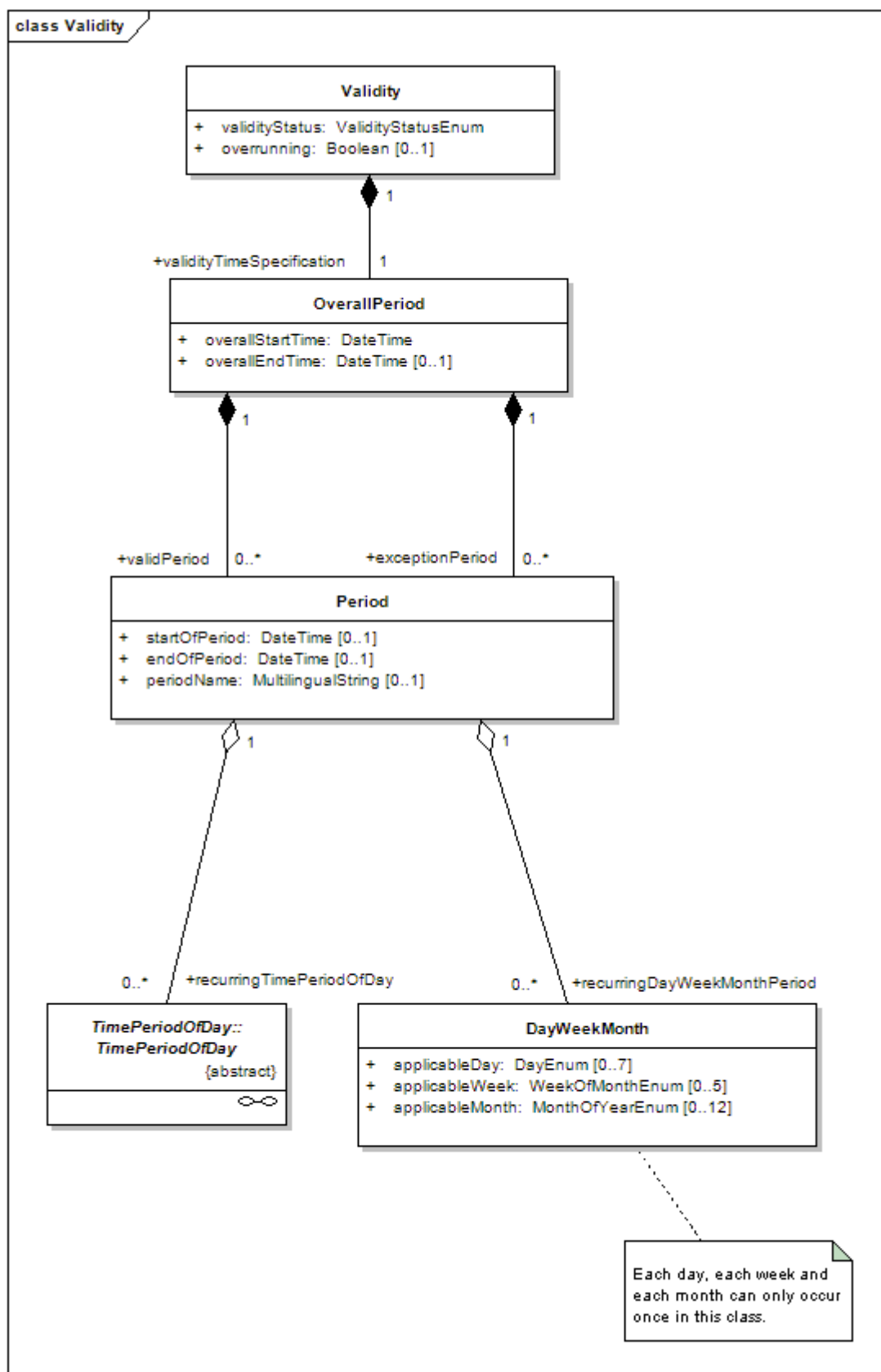


Figure 4 — The “Validity” package class model

7.5.2 Semantics of the “Validity” package

7.5.2.1 “Validity” package semantics – general

The temporal validity of a situation element defined by a “SituationRecord” or its impact can be very simple with just overall start and end times, or complex having several valid and invalid periods within a period defined by overall start and end times. The temporal validity may also be temporarily suspended or active regardless of the validity time specification (i.e. the validity time specification is temporarily overridden).

7.5.2.2 “Validity” class

The “Validity” class shall allow a supplier to identify whether the temporal validity specified in the remainder of the package is currently overridden and whether the validity period is overrunning that previously stated.

- **Attribute “validityStatus”** shall specify whether the temporal validity is specified by the remainder of this package or not. If not, it shall be specified as being “active” (i.e. temporarily valid regardless of the validity time specification in the remainder of this package) or “suspended” (i.e. temporarily invalid regardless of the validity time specification in the remainder of this package).
- **Attribute “overrunning”** may be used to specify whether the validity period is overrunning its expected duration as defined in previous versions of the publication.

7.5.2.3 “OverallPeriod” class

The “OverallPeriod” class shall be used to specify the bounding start and end times of the validity period, within which there may be any number of valid and invalid (exception) periods. There shall be at least an overall start time specified here.

7.5.2.4 “Period” class

The “Period” class may be used to specify either a single valid or invalid (exception) period or a set of repeating valid or invalid periods within a specified period. Hence each period shall be specified as either a single time period, or as a number of recurring time periods within a single time period.

There may be any number of these valid and invalid (exception) periods within the overall validity period. The overall validity period defined in the “OverallPeriod” class by the “startOfPeriod” and “endOfPeriod” attributes shall strictly bound (i.e. override) any periods defined in this class.

Note that where an invalid (exception) period overlaps (intersects) a valid period the validity shall be regarded as invalid.

7.5.2.5 “DayWeekMonth” class

The “DayWeekMonth” class may be used to allow recurring periods to be specified in terms of days of the week, weeks of the month and months of the year. The recurring periods are defined by the intersection of each of these values.

This class shall be used with an association that has a role name of “recurringDayWeekMonthPeriod” identifying that it is used for specifying recurring periods.

- **Attribute “applicableDay”** may be used to identify in which day of the week the period resides. Note that where this recurring period is specified in conjunction with a “TimePeriodOfDay” (via the role name “recurringTimePeriodOfDay”) and that specifies a period which spans midnight then this “applicableDay” value relates to the start time of that period.
- **Attribute “applicableMonth”** may be used to identify in which month of the year the period resides.
- **Attribute “applicableWeek”** may be used to identify in which week of the year the period resides.

7.6 The “TimePeriodOfDay” package

7.6.1 Overview of the “TimePeriodOfDay” package

(from “ReusableClasses” package)

The package, “TimePeriodOfDay”, may be used which shall define a continuous period within a 24 hour period (see Figure 5).

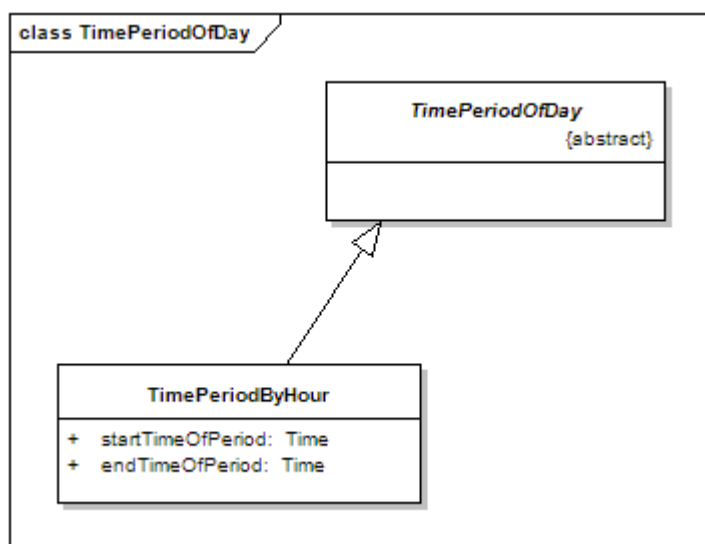


Figure 5 — The “TimePeriodOfDay” package class model

7.6.2 Semantics of the “TimePeriodOfDay” package

7.6.2.1 “TimePeriodOfDay” class

The “TimePeriodOfDay” class is abstract and shall be realised as an instance of “TimePeriodByHour”. This structure has been used to allow other methods of specifying time periods within a day to be added in the future, such as by the phase of the day (e.g. during day light hours etc.).

7.6.2.2 “TimePeriodByHour” class

The “TimePeriodByHour” class shall specify the start and end of a period by the time of day.

7.7 The “NonRoadEventInformation” package

7.7.1 Overview of the “NonRoadEventInformation” package

(from “ReusableClasses” package)

The package, “NonRoadEventInformation”, may be used which shall comprise a sub-model for defining information about events which are not directly located on or directly affecting the road, but which may never the less indirectly influence the behaviour of drivers and hence the characteristics of traffic flow (see Figure 6).

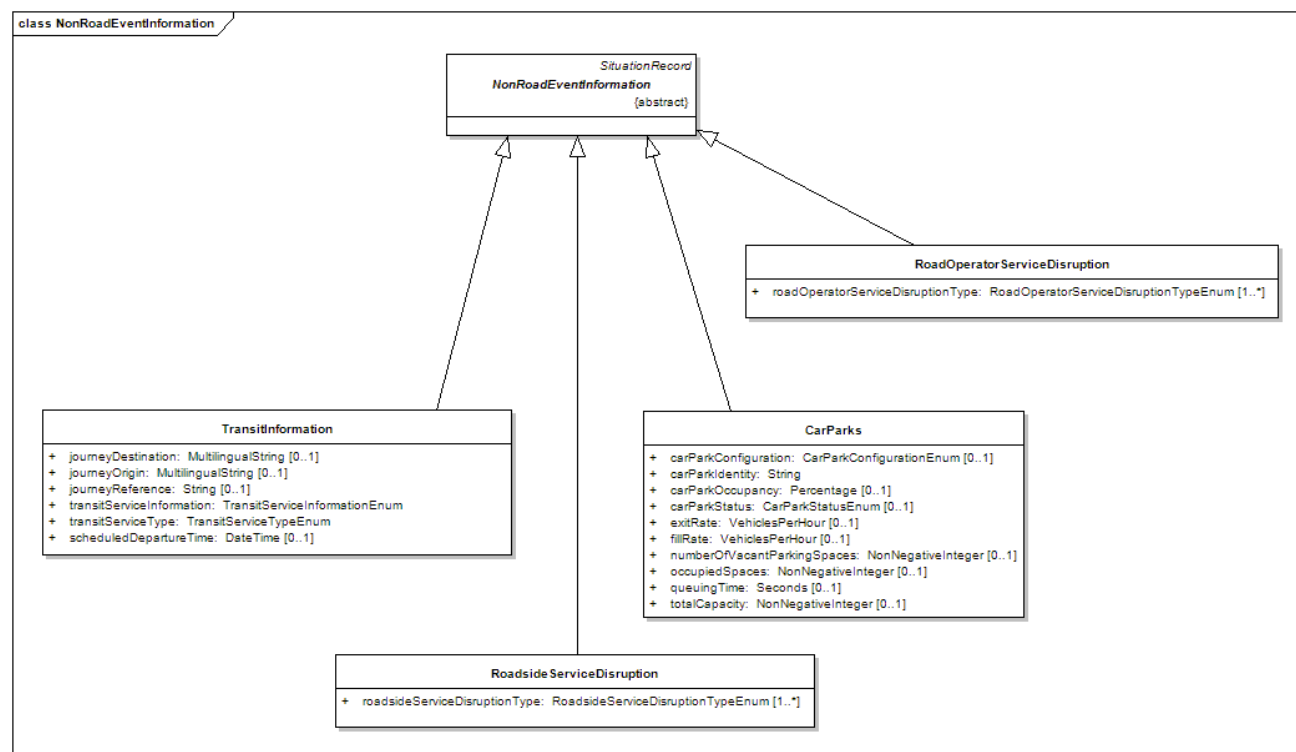


Figure 6 — The “NonRoadEventInformation” package class model

7.7.2 Semantics of the “NonRoadEventInformation” package

7.7.2.1 “NonRoadEventInformation” package semantics – general

The “NonRoadEventInformation” package shall comprise an abstract “NonRoadEventInformation” class which shall be realised as one of four specialisations which are used to model the details of information relating to events which are not directly located on or directly affecting the road.

7.7.2.2 “NonRoadEventInformation” class

The “NonRoadEventInformation” class is abstract and shall be realised as an instance of one of “TransitInformation”, “RoadsideServiceDisruption”, “CarParks” or “RoadOperatorServiceDisruption”.

7.7.2.3 “TransitInformation” class

The “TransitInformation” class may be used which shall allow a supplier to provide information relating to transit services, such as their availability and their departure times/delays, which might be of direct interest to road users, e.g. connecting rail or ferry services. It is not intended to be used as a means of publishing general public transport information, but only that which might be of direct relevance to road users.

7.7.2.4 “RoadsideServiceDisruption” class

The “RoadsideServiceDisruption” class may be used which shall allow a supplier to provide information about disruption to normal roadside services (e.g. specific services at a service area).

7.7.2.5 “CarParks” class

The “CarParks” class may be used which shall allow a supplier to provide information about the state of a car park such as number of vacant spaces, queuing time and the rate that it is filling up or emptying plus some characteristic information about the car park (e.g. total capacity and configuration).

7.7.2.6 “RoadOperatorServiceDisruption” class

The “RoadOperatorServiceDisruption” class may be used which shall allow a supplier to provide information about disruption to normal services provided by the road operator such as traffic officer patrol services or telephone information services.

7.8 The “TrafficElement” package

7.8.1 Overview of the “TrafficElement” package

(from “ReusableClasses” package)

The package, “TrafficElement”, may be used which shall comprise a sub-model for defining information about events or activities which are located on the road network or which may directly affect a section of the road network but which are not planned or instigated by the road operator as part of traffic management activities (see Figure 7). Note that some activities may be planned by others (e.g. the police, civil authorities or dissident groups).

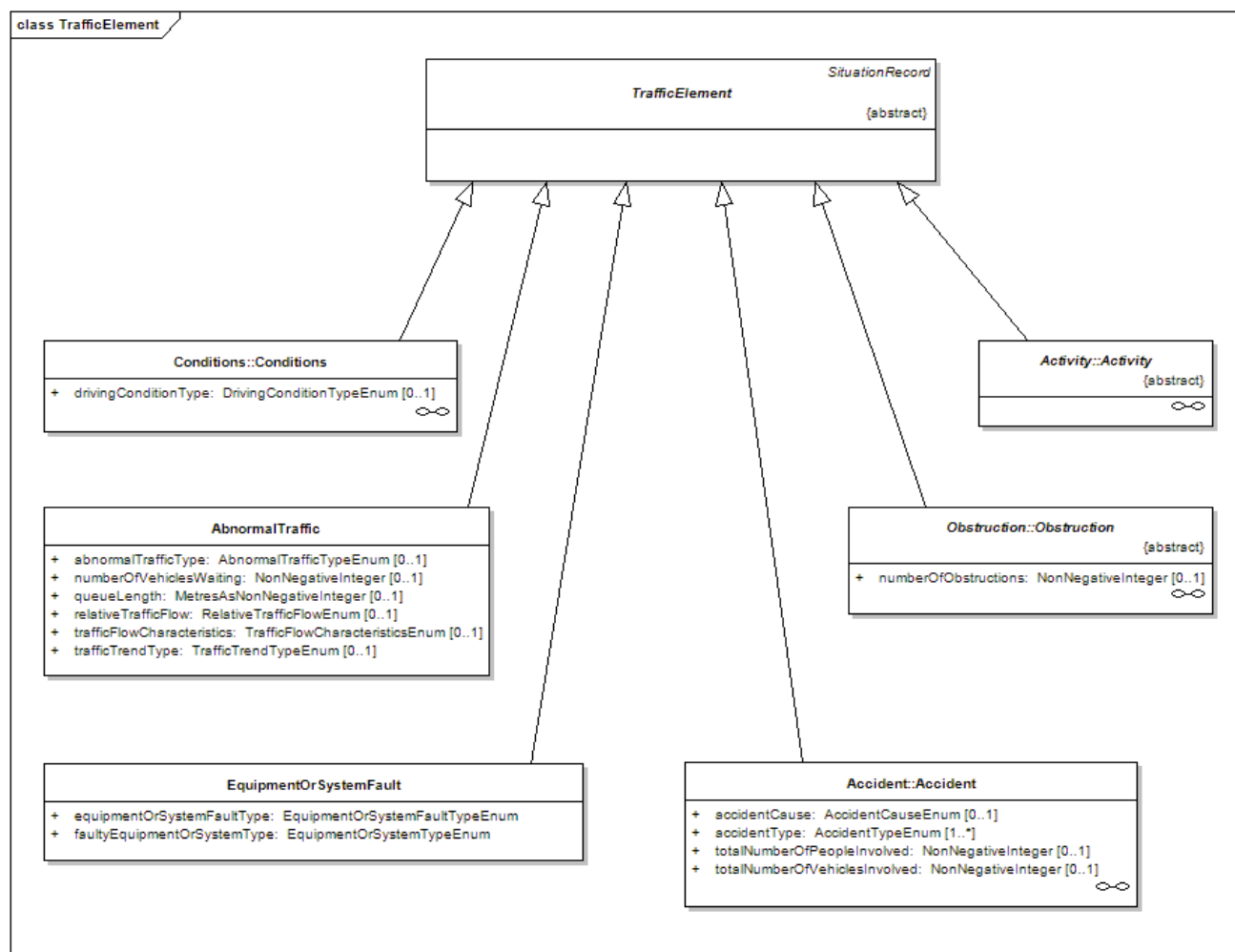


Figure 7 — The “TrafficElement” package class model

7.8.2 Semantics of the “TrafficElement” package

7.8.2.1 “TrafficElement” package semantics – general

The “TrafficElement” package shall comprise an abstract “TrafficElement” class which shall be realised as one of six specialisations which are used to model the details of the different types of events.

7.8.2.2 “TrafficElement” class

The “TrafficElement” class is abstract and shall be realised as an instance of either “Conditions”, “AbnormalTraffic”, “EquipmentOrSystemFault”, “Accident” or as one of the specialisations of the “Obstruction” or “Activity” classes.

7.8.2.3 “AbnormalTraffic” class

An instance of the “AbnormalTraffic” class may be used which shall allow a supplier to provide information about instances of abnormal traffic conditions at locations on the road network. These conditions can be described in a number of ways, including relative to normally expected conditions at the point on the network and at that date/time.

7.8.2.4 “EquipmentOrSystemFault” class

An instance of the “EquipmentOrSystemFault” class may be used which shall allow a supplier to provide information about an equipment or system which is faulty, malfunctioning or not in a fully operational state that may be of interest or concern to road operators and road users. This shall be used for conveying information about electrical/electronic equipments and systems, not about damaged civil infrastructure (see 7.19, the “Obstruction” package for details).

7.9 The “Conditions” package

7.9.1 Overview of the “Conditions” package

(from “TrafficElement” package within “ReusableClasses” package)

The package, “Conditions”, shall comprise a sub-model for defining information about conditions which may affect driving, and specifically for defining details of road surface conditions or environmental conditions (see Figure 8). The package contains concrete “SituationRecord” subclasses within a “SituationPublication”, some of which may have associated quantitative measures relating to the conditions on the road e.g. wind speed or depth of snow.

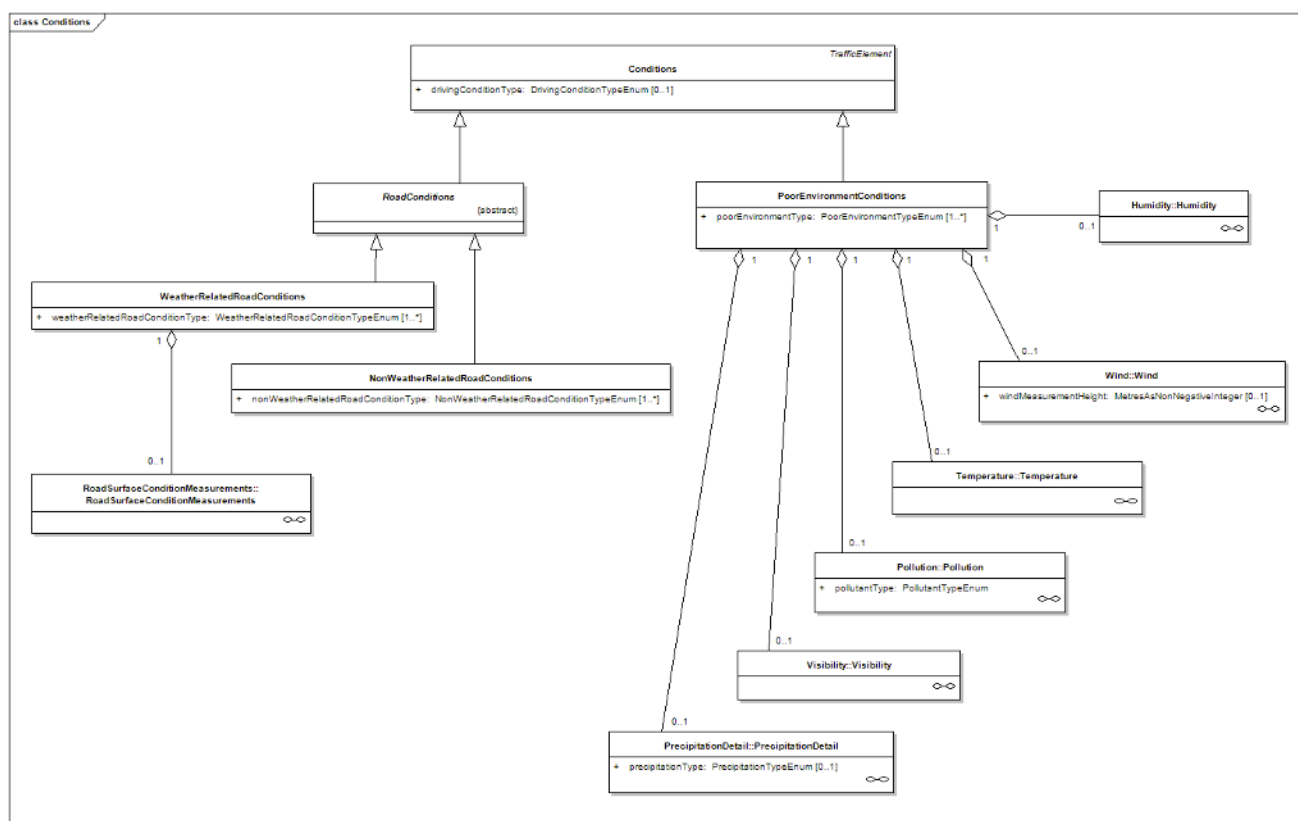


Figure 8 — The “Conditions” package class model

7.9.2 Semantics of the “Conditions” package

7.9.2.1 “Conditions” package semantics – general

The information that is modelled in the “Conditions” package is a general assessment of the driving conditions plus details of the road surface conditions and poor environmental conditions (including weather). The base class, “Conditions”, is a realisable class which shall be specialised as either “RoadConditions” or “PoorEnvironmentConditions”.

7.9.2.2 “Conditions” class

This is the base class that shall be used for detailing all conditions that may affect or degrade normal driving conditions on the road.

- **Attribute “drivingConditionType”** specifies a high level assessment of the driving conditions which are being or may in the future be experienced on the road by travellers.

7.9.2.3 “RoadConditions” class

This is an abstract class that shall be realised as an instance of either “WeatherRelatedRoadConditions” or “NonWeatherRelatedRoadConditions”. Road conditions in this context specifically relates to road surface conditions of any type.

7.9.2.4 “WeatherRelatedRoadConditions” class

This class shall allow road surface conditions which are related to weather conditions to be specified.

7.9.2.5 “NonWeatherRelatedRoadConditions” class

This class shall allow road surface conditions which are not related to weather conditions (e.g. diesel on the road or loose chippings) to be specified.

7.9.2.6 “PoorEnvironmentConditions” class

This class shall allow any environmental conditions that may affect driving on the road to be specified. These may be specified as simple poor environment types or may additionally be qualified by specific measurement data relating to the type of conditions (see 7.10, the “WeatherRelated” package for details).

- **Attribute “poorEnvironmentType”** shall be used to provide a description of the type of poor environmental conditions affecting the driving conditions on the road. There may be more than one type of poor environmental condition specified simultaneously.

7.10 The “WeatherRelated” package

7.10.1 Overview of the “WeatherRelated” package

(from “ReusableClasses” package)

The package, “WeatherRelated”, shall comprise a collection of classes each of which allow measurements to be specified relating to specific aspects of weather or pollution conditions or their effects (see Figure 9).

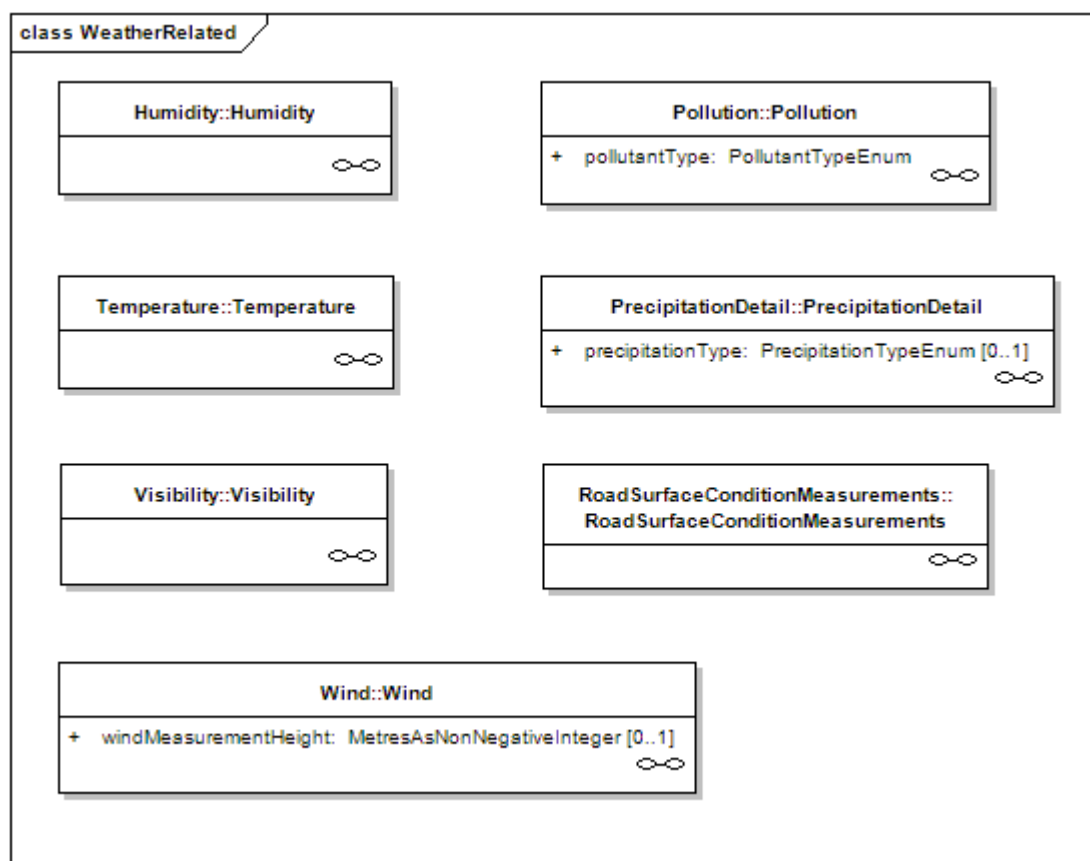


Figure 9 — The “WeatherRelated” package class model

7.10.2 Semantics of the “WeatherRelated” package

The aspects of weather or pollution measurements modelled in this package relate to humidity, temperature, visibility, wind, pollution, precipitation and road surface conditions. All of the classes representing these aspects should be used solely for conveying measurement data as would be measured by sensors deployed out on or close to the road network. Each of these classes is described in its specific package.

7.11 The “Humidity” package

7.11.1 Overview of the “Humidity” package

(from “WeatherRelated” package within “ReusableClasses” package)

The package, “Humidity”, shall allow relative humidity measurements to be specified (see Figure 10).

7.11.2 Semantics of the “Humidity” package

Relative humidity measurements shall be expressed as a percentage. Note that each instance of a measurement may be accompanied by information about the measurement via the PercentageValue class which inherits a number of metadata attributes from the DataValue class.

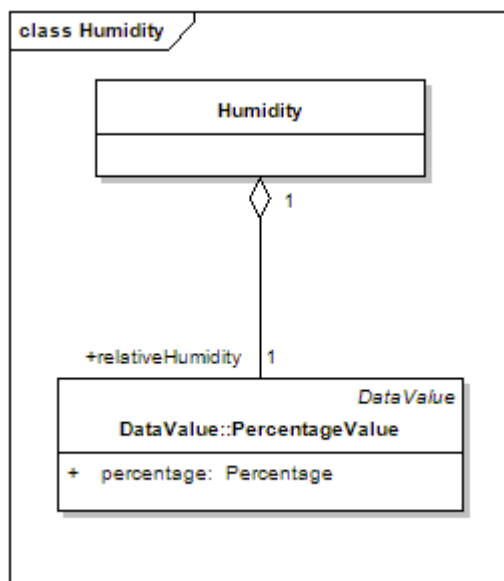


Figure 10 — The “Humidity” package class model

7.12 The “Temperature” package

7.12.1 Overview of the “Temperature” package

(from “WeatherRelated” package within “ReusableClasses” package)

The package, “Temperature”, shall allow a number of different atmospheric temperature measurements to be specified (see Figure 11).

7.12.2 Semantics of the “Temperature” package

Individual measurements of air temperature, dew point temperature, maximum temperature and minimum temperature may be specified. Note that each instance of a measurement may be accompanied by information about the measurement via the TemperatureValue class which inherits a number of metadata attributes from the DataValue class.

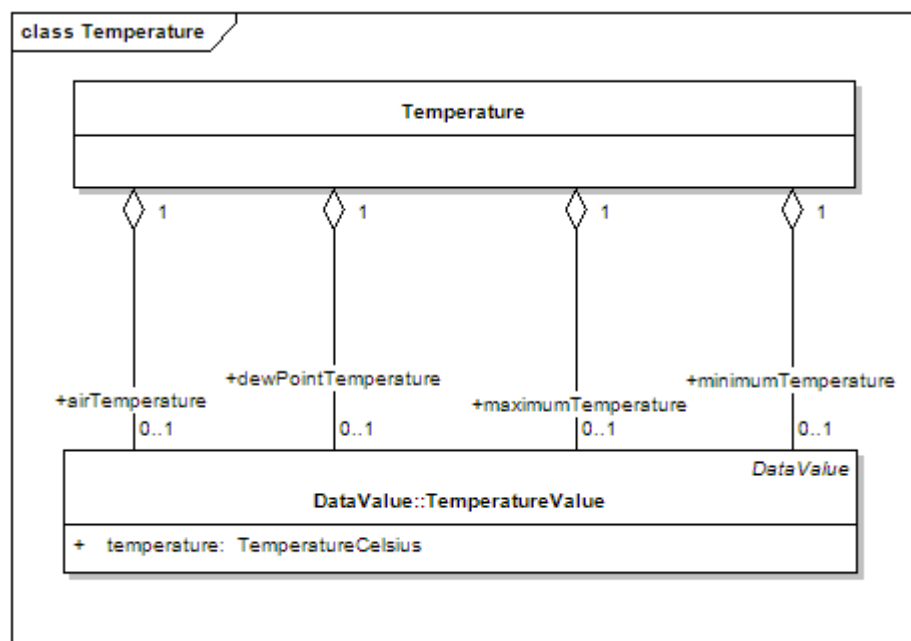


Figure 11 — The “Temperature” package class model

7.13 The “Visibility” package

7.13.1 Overview of the “Visibility” package

(from “WeatherRelated” package within “ReusableClasses” package)

The package, “Visibility”, shall allow minimum visibility distance measurements to be specified (see Figure 12).

7.13.2 Semantics of the “Visibility” package

Minimum visibility distance measurements shall be given in integer metres. Note that each instance of a measurement may be accompanied by information about the measurement via the IntegerMetreDistanceValue class which inherits a number of metadata attributes from the DataValue class.

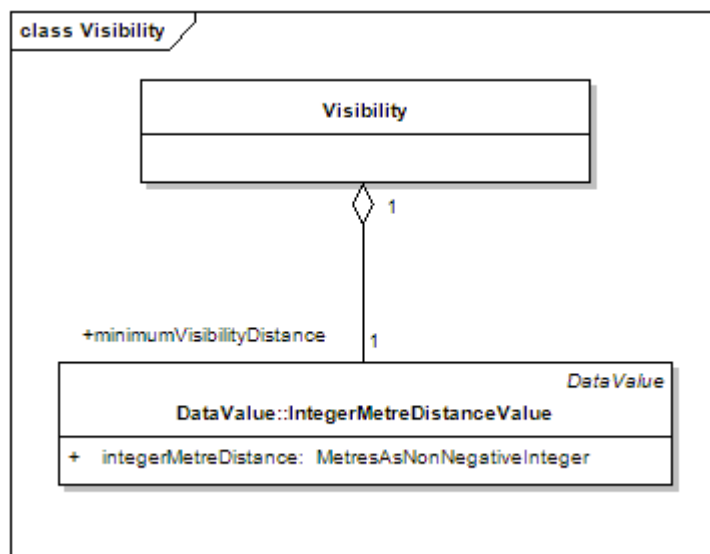


Figure 12 — The “Visibility” package class model

7.14 The “Wind” package

7.14.1 Overview of the “Wind” package

(from “WeatherRelated” package within “ReusableClasses” package)

The package, “Wind”, shall allow a number of different measurements relating to wind to be specified (see Figure 13).

7.14.2 Semantics of the “Wind” package

Individual measurements of wind speed, maximum wind speed and wind direction (both bearing and compass) may be specified. Note that each instance of a measurement may be accompanied by information about the measurement via the SpeedValue, DirectionBearingValue and DirectionCompassValue classes which inherit a number of metadata attributes from the DataValue class.

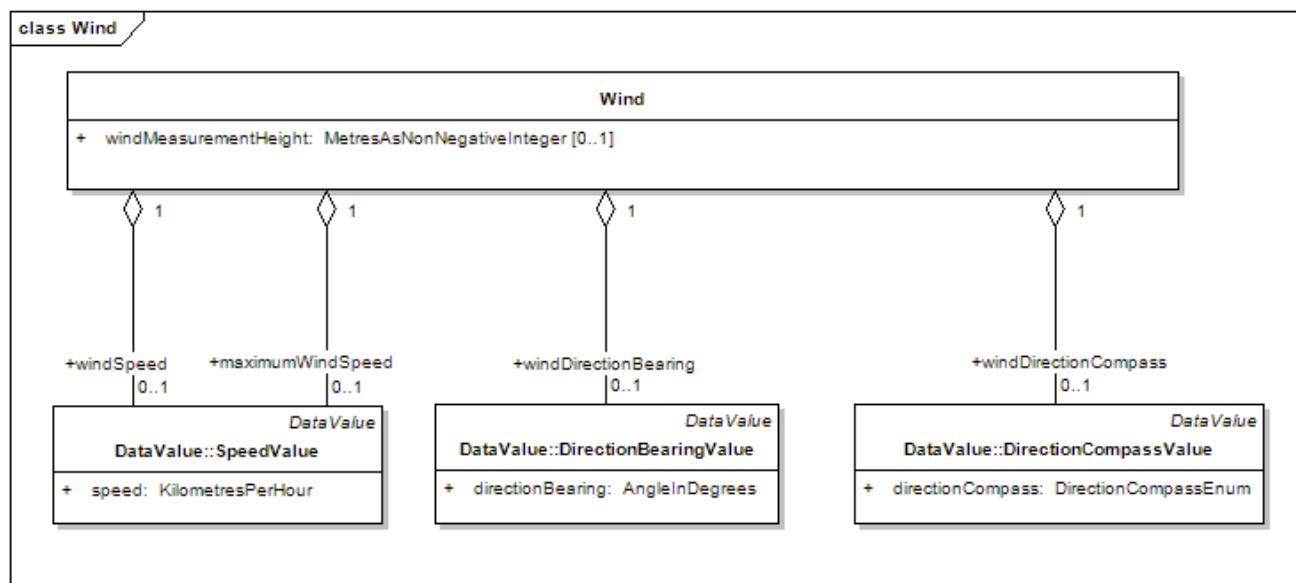


Figure 13 — The “Wind” package class model

7.15 The “Pollution” package

7.15.1 Overview of the “Pollution” package

(from “WeatherRelated” package within “ReusableClasses” package)

The package, “Pollution”, shall allow pollution concentration measurements to be specified (see Figure 14).

7.15.2 Semantics of the “Pollution” package

Pollution concentration measurements shall be given in micrograms per cubic metre. Note that each instance of a measurement may be accompanied by information about the measurement via the MicrogramsConcentrationValue class which inherits a number of metadata attributes from the DataValue class.

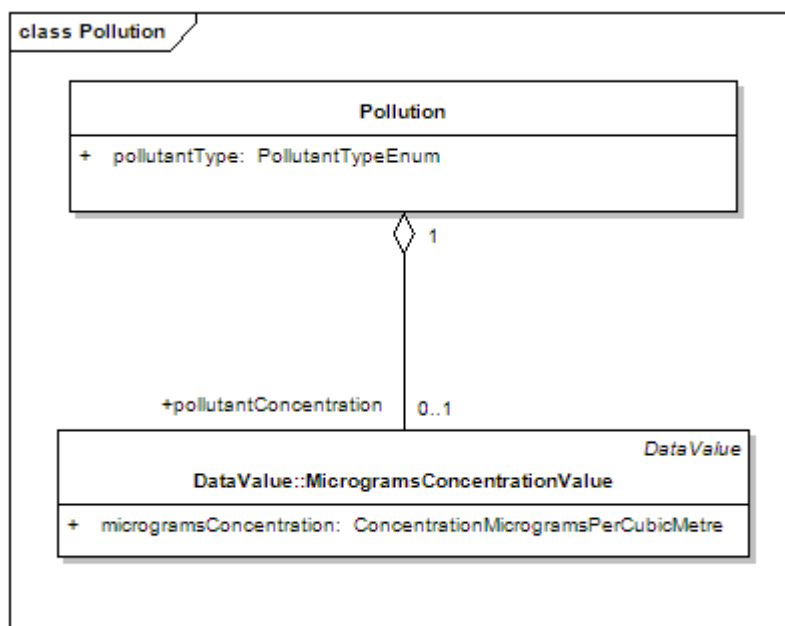


Figure 14 — The “Pollution” package class model

7.16 The “PrecipitationDetail” package

7.16.1 Overview of the “PrecipitationDetail” package

(from “WeatherRelated” package within “ReusableClasses” package)

The package, “PrecipitationDetail”, shall allow measurements relating to precipitation to be specified (see Figure 15).

7.16.2 Semantics of the “PrecipitationDetail” package

Individual measurements of intensity and depth of precipitation may be specified. Note that each instance of a measurement may be accompanied by information about the measurement via the *PrecipitationIntensityValue* and *FloatingPointMetreDistanceValue* classes which inherit a number of metadata attributes from the *DataValue* class.

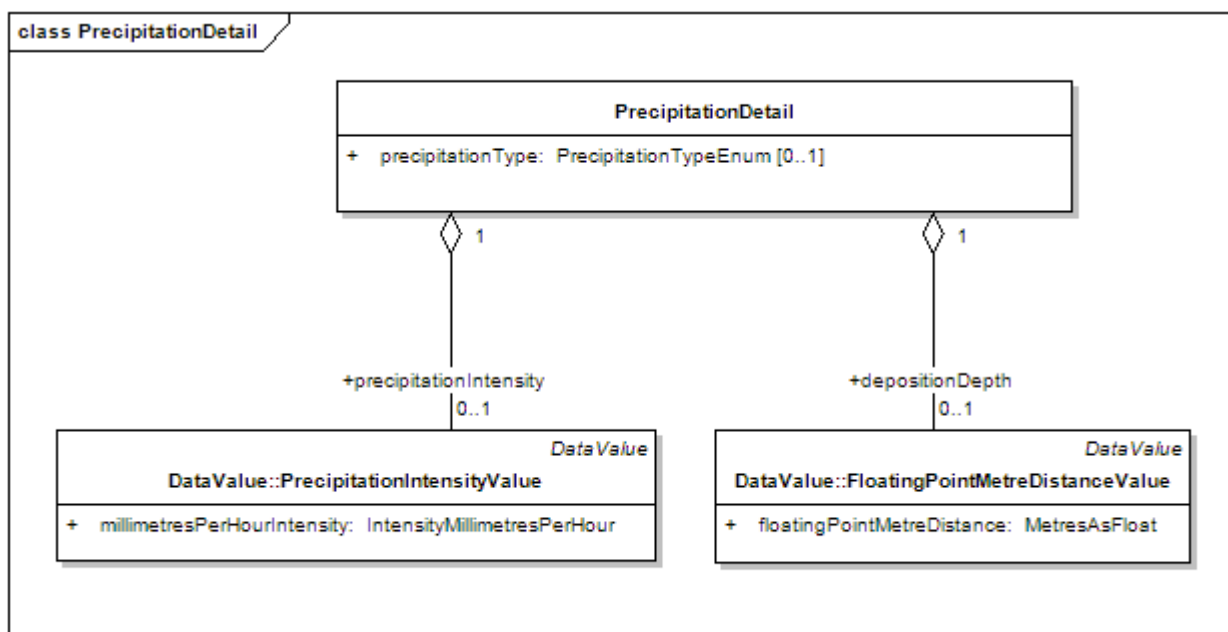


Figure 15 — The “PrecipitationDetail” package class model

7.17 The “RoadSurfaceConditionMeasurements” package

7.17.1 Overview of the “RoadSurfaceConditionMeasurements” package

(from “WeatherRelated” package within “ReusableClasses” package)

The package, “RoadSurfaceConditionMeasurements”, shall allow road surface condition measurements which are related specifically to the weather to be specified (see Figure 16).

7.17.2 Semantics of the “RoadSurfaceConditionMeasurements” package

Individual measurements of road surface temperature, road surface protection temperature, de-icing application rate, de-icing concentration, depth of snow and water film thickness may be specified. Note that each instance of a measurement may be accompanied by information about the measurement via the TemperatureValue, ApplicationRateValue, KilogramsConcentrationValue and FloatingPointMetreDistanceValue classes which inherit a number of metadata attributes from the DataValue class.

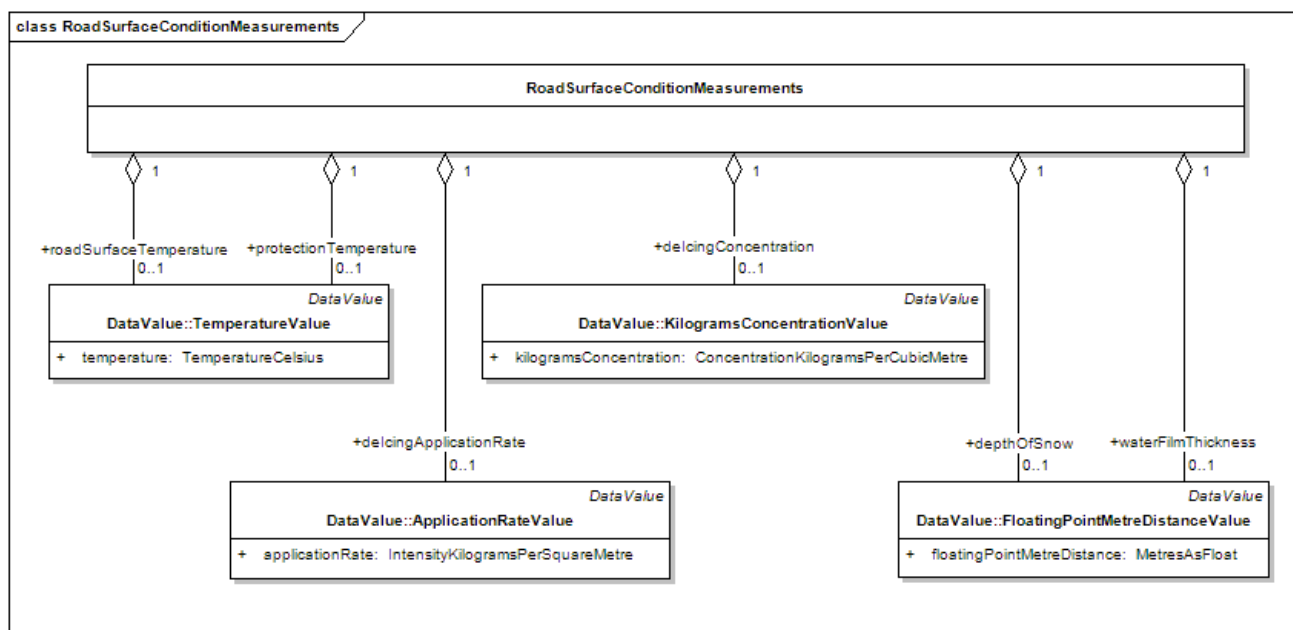


Figure 16 — The “RoadSurfaceConditionMeasurements” package class model

7.18 The “Accident” package

7.18.1 Overview of the “Accident” package

(from “Traffic Element” package within “ReusableClasses” package)

The package, “Accident”, shall comprise a sub-model for defining information about accident events involving vehicles which occur on the road network (see Figure 17).

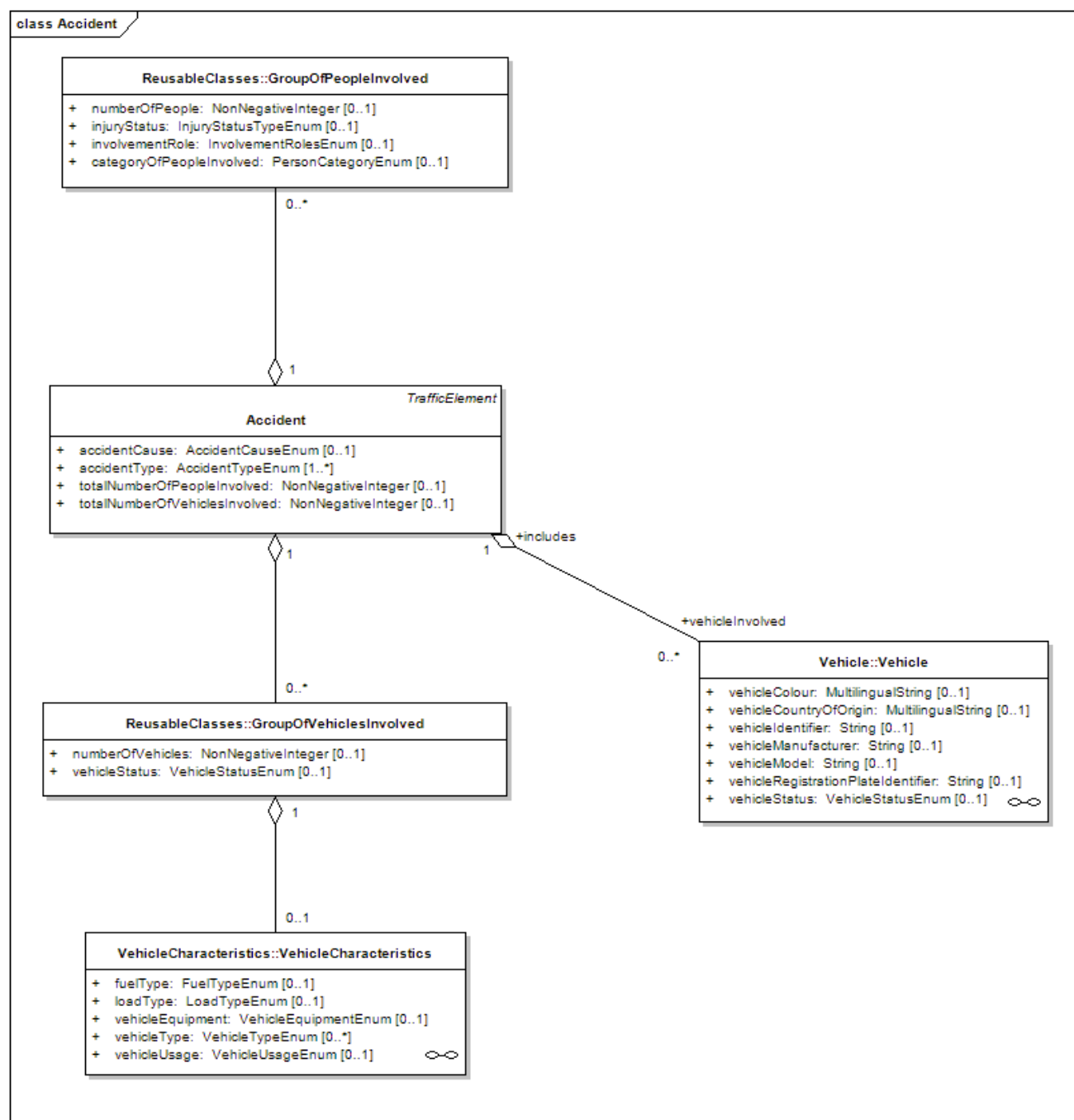


Figure 17 — The “Accident” package class model

7.18.2 Semantics of the “Accident” package

7.18.2.1 “Accident” package semantics – general

The information that is modelled in the “Accident” package shall identify the type and cause of the accident and the details of the vehicle(s) and people involved which may be of use to traffic managers and traffic information service providers. Details of vehicles involved can be provided as relating to a group of vehicles or as information specific to individual vehicles by using the associations with the “GroupOfVehiclesInvolved” class or the “Vehicle” class respectively.

7.18.2.2 “Accident” class

An instance of the “Accident” class shall allow a supplier to provide basic information about vehicle accidents which includes at a minimum the type of the accident.

7.18.2.3 “GroupOfVehiclesInvolved” class

(from ReusableClasses package)

This class may be used to allow details of a group of vehicles involved in an accident which share common characteristics and/or status to be specified. There may be more than one group of vehicles involved in an accident, each having a common set of characteristics (e.g. lorries over a certain weight) and/or status (e.g. broken down). The number in each group can be specified.

7.18.2.4 “GroupOfPeopleInvolved” class

(from ReusableClasses package)

This class may be used to allow details of a group of people involved in an accident which share common attributes to be specified. There may be more than one group of people involved in an accident, each having a common role in the accident (e.g. vehicle passenger), status (e.g. seriously injured) and/or category (e.g. child). The number in each group can be specified.

7.19 The “Obstruction” package

7.19.1 Overview of the “Obstruction” package

(from “Traffic Element” package within “ReusableClasses” package)

The package, “Obstruction”, shall comprise a sub-model for defining information about obstructions of a physical nature on or adjacent to the roadway which may disrupt or endanger traffic (see Figure 18).

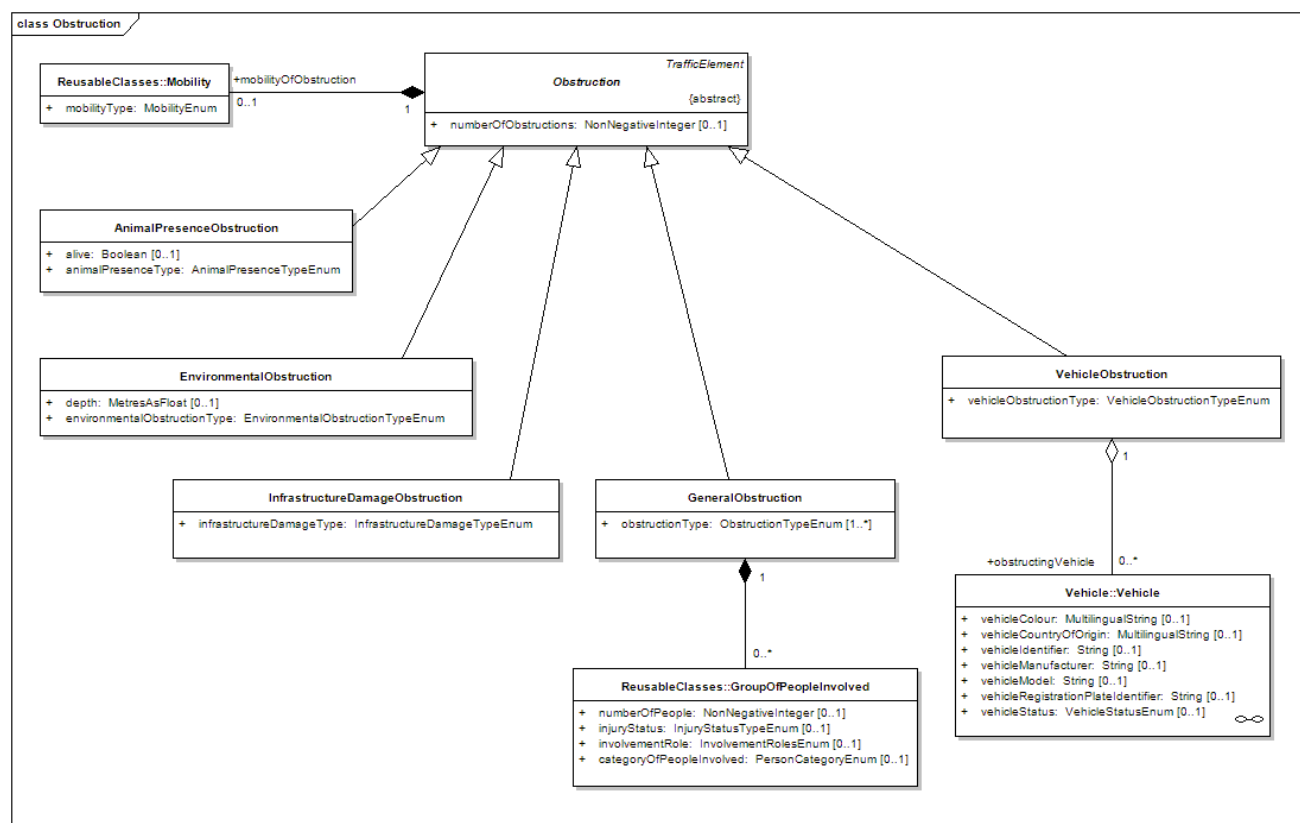


Figure 18 — The “Obstruction” package class model

7.19.2 Semantics of the “Obstruction” package

7.19.2.1 “Obstruction” package semantics – general

The information that is modelled in the “Obstruction” package shall identify details of obstructions of a variety of types which may be either stationary or mobile. The obstructions modelled shall be of type general, animal presence, environmental, infrastructure or vehicle related. Obstructions are things of a physical nature which are having, or potentially may have, a material impact on the traffic flowing on the road network. Usually these physical things occur on the road itself, but not always. For instance a house fire or a rail crash close to the road may have a material effect on traffic flows and would therefore be classed as an obstruction.

7.19.2.2 “Obstruction” class

The “Obstruction” class is abstract and shall be realised as an instance of either “GeneralObstruction”, “AnimalPresenceObstruction”, “EnvironmentalObstruction”, “InfrastructureDamageObstruction” or “VehicleObstruction”.

7.19.2.3 “GeneralObstruction” class

An instance of the “GeneralObstruction” class shall allow a supplier to identify the nature of the obstruction(s) as being one of a number of general types.

7.19.2.4 “AnimalPresence” class

An instance of the “AnimalPresence” class shall allow a supplier to specify details of obstruction(s) which involve animals on the road.

7.19.2.5 “EnvironmentalObstruction” class

An instance of the “EnvironmentalObstruction” class shall allow a supplier to specify details of obstruction(s) which are the result of environmental conditions.

7.19.2.6 “InfrastructureDamageObstruction” class

An instance of the “InfrastructureDamageObstruction” class shall allow a supplier to specify details of obstruction(s) which are the result of failures or damage to the road infrastructure. This is specifically the civil infrastructure, not the electronic/system infrastructure which is covered by the “EquipmentOrSystemFault” class (see clause 0). It may be on, under or above the road itself.

7.19.2.7 “VehicleObstruction” class

An instance of the “VehicleObstruction” class shall allow a supplier to specify details of obstruction(s) which are caused by one or more vehicles.

7.19.2.8 “Mobility” class

(from ReusableClasses package)

The “Mobility” class in this case shall allow a supplier to specify whether the obstruction is mobile or stationary.

7.20 The “Activity” package

7.20.1 Overview of the “Activity” package

(from “Traffic Element” package within “ReusableClasses” package)

The package, “Activity”, shall comprise a sub-model for defining information about human activities other than relating to the traffic stream which are causing or may cause traffic disruption (see Figure 19).

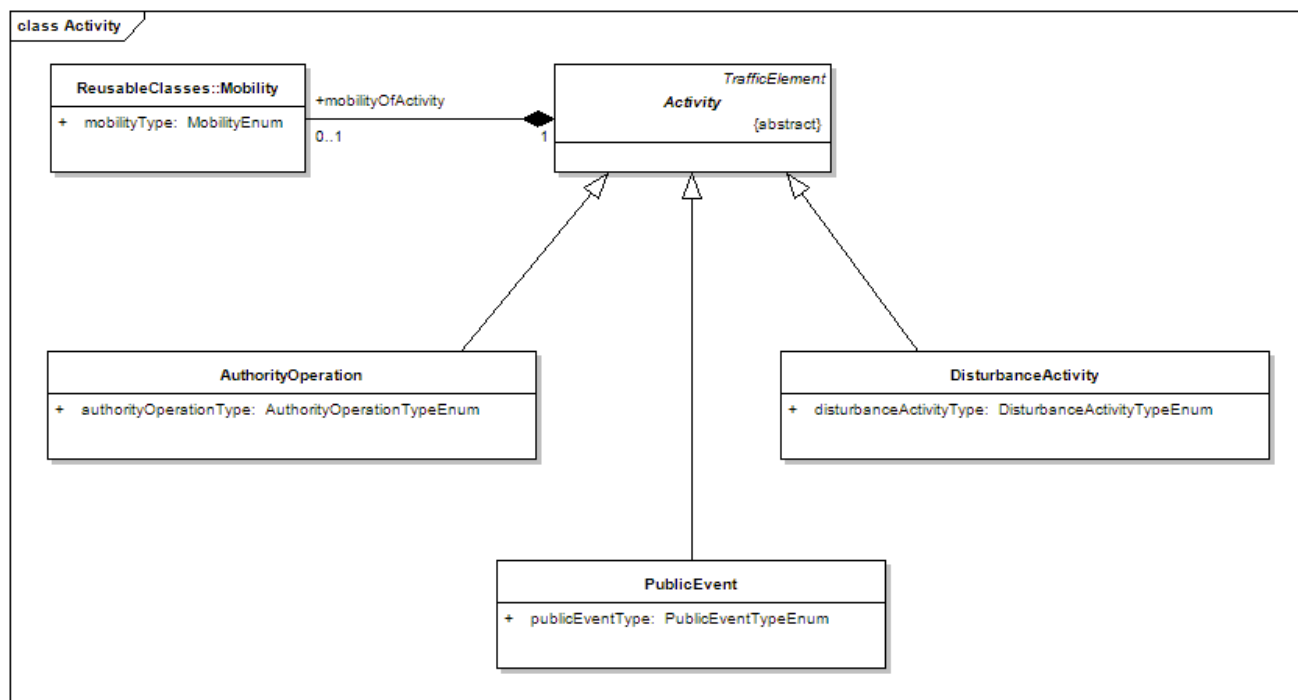


Figure 19 — The “Activity” package class model

7.20.2 Semantics of the “Activity” package

7.20.2.1 “Activity” package semantics – general

The information that is modelled in the “Activity” package shall identify details of human activities of a variety of types which may be either stationary or mobile. The activities modelled relate to those organised or initiated by official authorities (other than the road operator itself), those relating to public events or those activities which are of a disturbance nature.

7.20.2.2 “Activity” class

The “Activity” class is abstract and shall be realised as an instance of either “AuthorityOperation”, “PublicEvent” or “DisturbanceActivity”.

7.20.2.3 “AuthorityOperation” class

An instance of the “AuthorityOperation” class shall allow a supplier to identify a type of activity organised or initiated by an official authority. This does not include road operator initiated activities that are normally used to ameliorate dangerous or poor driving conditions (see 7.23, the OperatorActions package for details).

7.20.2.4 “PublicEvent” class

An instance of the “PublicEvent” class shall allow a supplier to identify a type of public event activity which may cause traffic disruption, typically because it may be a traffic generator or because it may disrupt the flow of traffic such as in the case of a parade or procession.

7.20.2.5 “DisturbanceActivity” class

An instance of the “DisturbanceActivity” class shall allow a supplier to identify a type of human action either of a public disorder nature or of a situation alert type which may cause traffic disruption. Usually these are of an unplanned nature, although not necessarily unplanned by the perpetrators of the disturbance.

7.20.2.6 “Mobility” class

(from ReusableClasses package)

The “Mobility” class in this case shall allow a supplier to specify whether the activity is mobile or stationary.

7.21 The “Vehicle” package

7.21.1 Overview of the “Vehicle” package

(from “ReusableClasses” package)

The package, “Vehicle”, shall comprise a sub-model for defining information about an individual vehicle (see Figure 20).

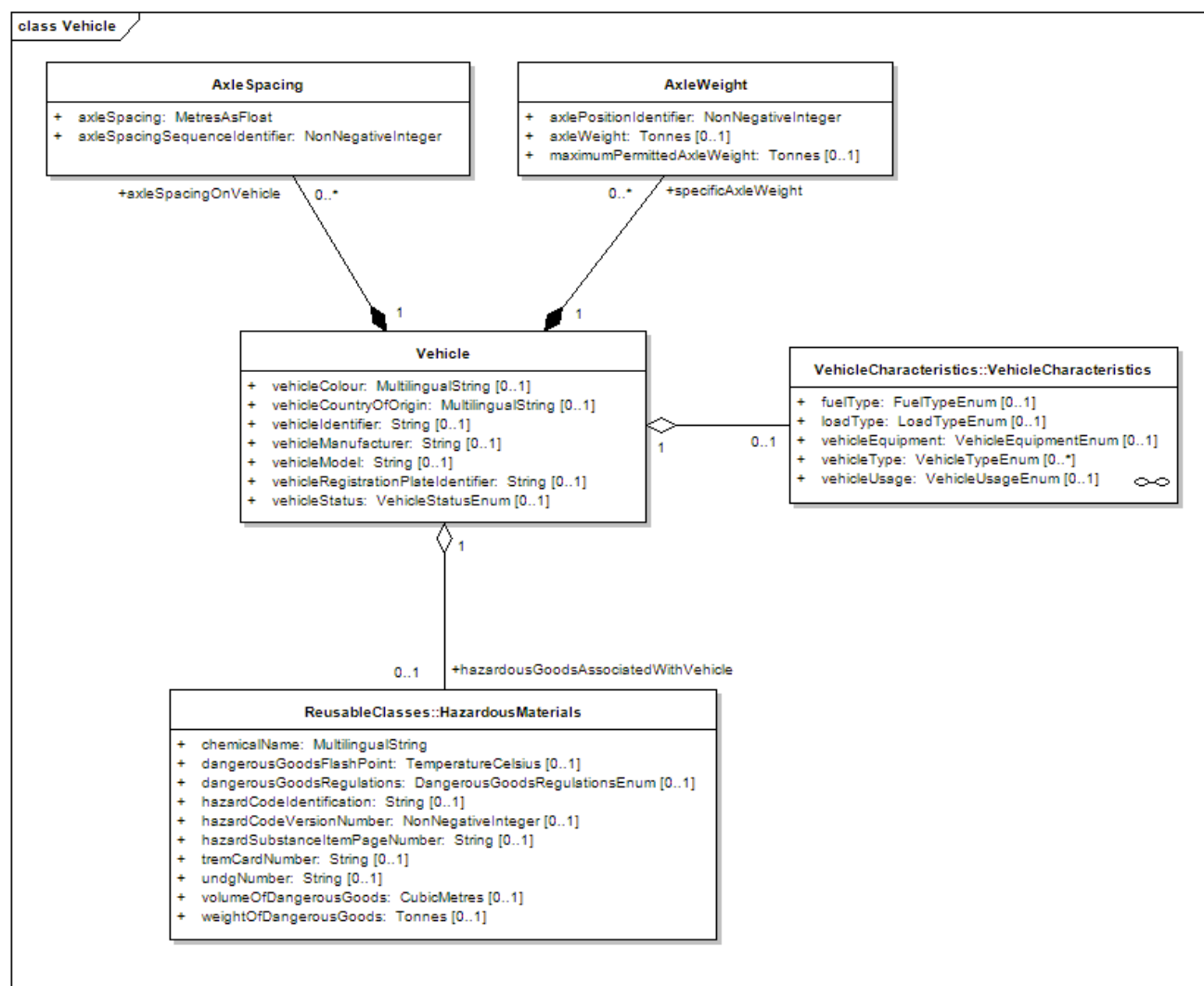


Figure 20 — The “Vehicle” package class model

7.21.2 Semantics of the “Vehicle” package

7.21.2.1 “Vehicle” package semantics – general

The information that is modelled in the “Vehicle” package shall identify details of an individual vehicle and the load which it may be carrying.

7.21.2.2 “Vehicle” class

An instance of the “Vehicle” class shall allow a supplier to identify the specific details relating to a single individual vehicle and its load.

7.21.2.3 “AxleSpacing” class

The “AxleSpacing” class may be used to allow a supplier to identify the spacing between adjacent sets of axles on a specific vehicle, indexed from the front of the vehicle.

- **Attribute “axleSpacingSequenceIdentifier”** shall identify which axle spacing is being specified, e.g. a value of ‘1’ indicates that the “axleSpacing” value relates to the distance between the front axle and the next axle from the front of the vehicle.

7.21.2.4 “AxleWeight” class

The “AxleWeight” class may be used to allow a supplier to identify the actual weight and the maximum permitted weight on a specified axle on a specific vehicle.

- **Attribute “axlePositionIdentifier”** shall identify to which axle the specified weight values relate, e.g. a value of ‘1’ indicates that it is the front axle weight that is being specified.

7.21.2.5 “HazardousMaterials” class

(from ReusableClasses package)

The “HazardousMaterials” class may be used to allow a supplier to identify the actual details of any hazardous material or dangerous goods that the vehicle is carrying or at least is thought to be carrying.

7.22 The “VehicleCharacteristics” package

7.22.1 Overview of the “VehicleCharacteristics” package

(from “ReusableClasses” package)

The package, “VehicleCharacteristics”, shall comprise a sub-model for defining the characteristics of vehicles (see Figure 21).

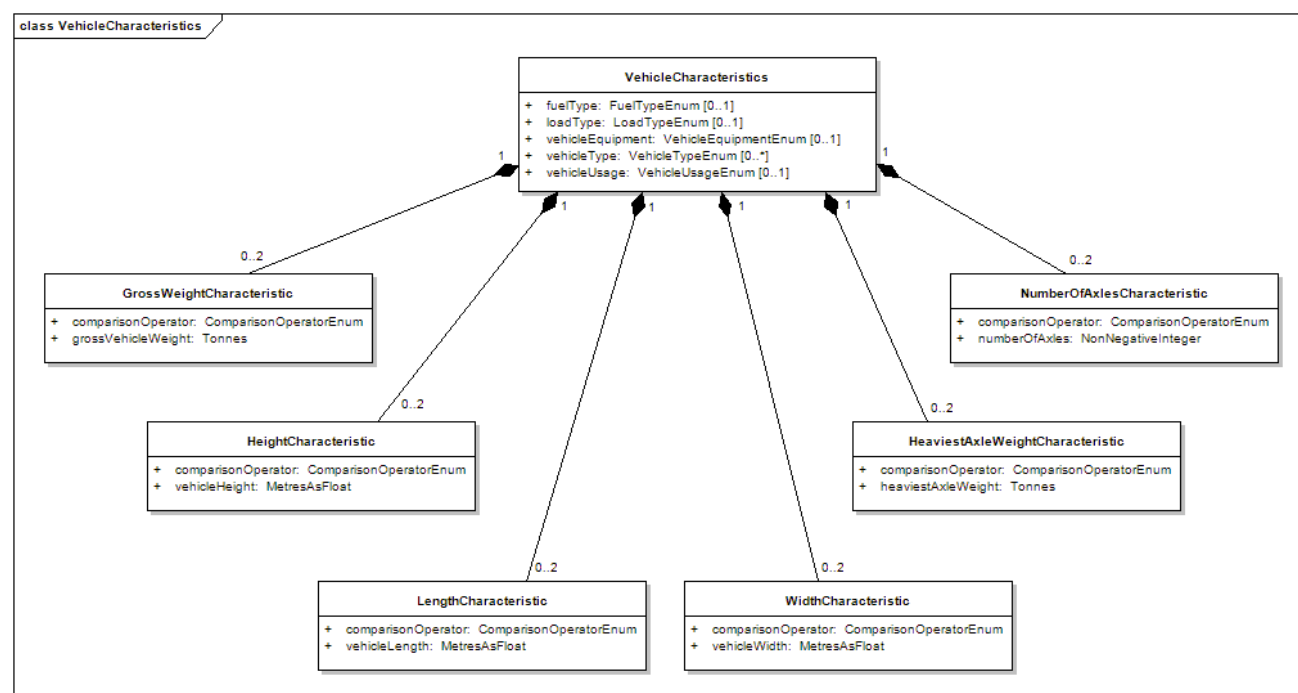


Figure 21 — The “VehicleCharacteristics” package class model

7.22.2 Semantics of the “VehicleCharacteristics” package

7.22.2.1 “VehicleCharacteristics” package semantics – general

The information that is modelled in the “VehicleCharacteristics” package shall identify a set of vehicle characteristics, some of whose values can be specified using comparative operators (e.g. greater than ‘x’ but less than ‘y’).

7.22.2.2 “VehicleCharacteristics” class

An instance of the “VehicleCharacteristics” class shall allow a supplier to identify a base set of vehicle characteristics.

7.22.2.3 “GrossWeightCharacteristics” class

The “GrossWeightCharacteristics” class may be used to allow a supplier to identify the actual gross weight of a vehicle. By providing two instances of this class a supplier can specify the gross weight as being between a lower and upper limit.

7.22.2.4 “HeightCharacteristic” class

The “HeightCharacteristic” class may be used to allow a supplier to identify the actual height of a vehicle. By providing two instances of this class a supplier can specify the height as being between a lower and upper limit.

7.22.2.5 “LengthCharacteristic” class

The “LengthCharacteristic” class may be used to allow a supplier to identify the actual length of a vehicle. By providing two instances of this class a supplier can specify the length as being between a lower and upper limit.

7.22.2.6 “WidthCharacteristic” class

The “WidthCharacteristic” class may be used to allow a supplier to identify the actual width of a vehicle. By providing two instances of this class a supplier can specify the width as being between a lower and upper limit.

7.22.2.7 “HeaviestAxleWeightCharacteristic” class

The “HeaviestAxleWeightCharacteristic” class may be used to allow a supplier to identify the actual heaviest axle weight of a vehicle. By providing two instances of this class a supplier can specify the heaviest axle weight as being between a lower and upper limit.

7.22.2.8 “NumberOfAxlesCharacteristic” class

The “NumberOfAxlesCharacteristic” class may be used to allow a supplier to identify the actual number of axles on a vehicle. By providing two instances of this class a supplier can specify the number of axles as being between a lower and upper limit.

7.23 The “OperatorAction” package

7.23.1 Overview of the “OperatorAction” package

(from “ReusableClasses” package)

The package, “OperatorAction”, may be used which shall comprise a sub-model for defining information about road operator actions which affect the road network or the users of the road network and are intended to help prevent or correct dangerous or poor driving conditions or maintain the road infrastructure (see Figure 22).

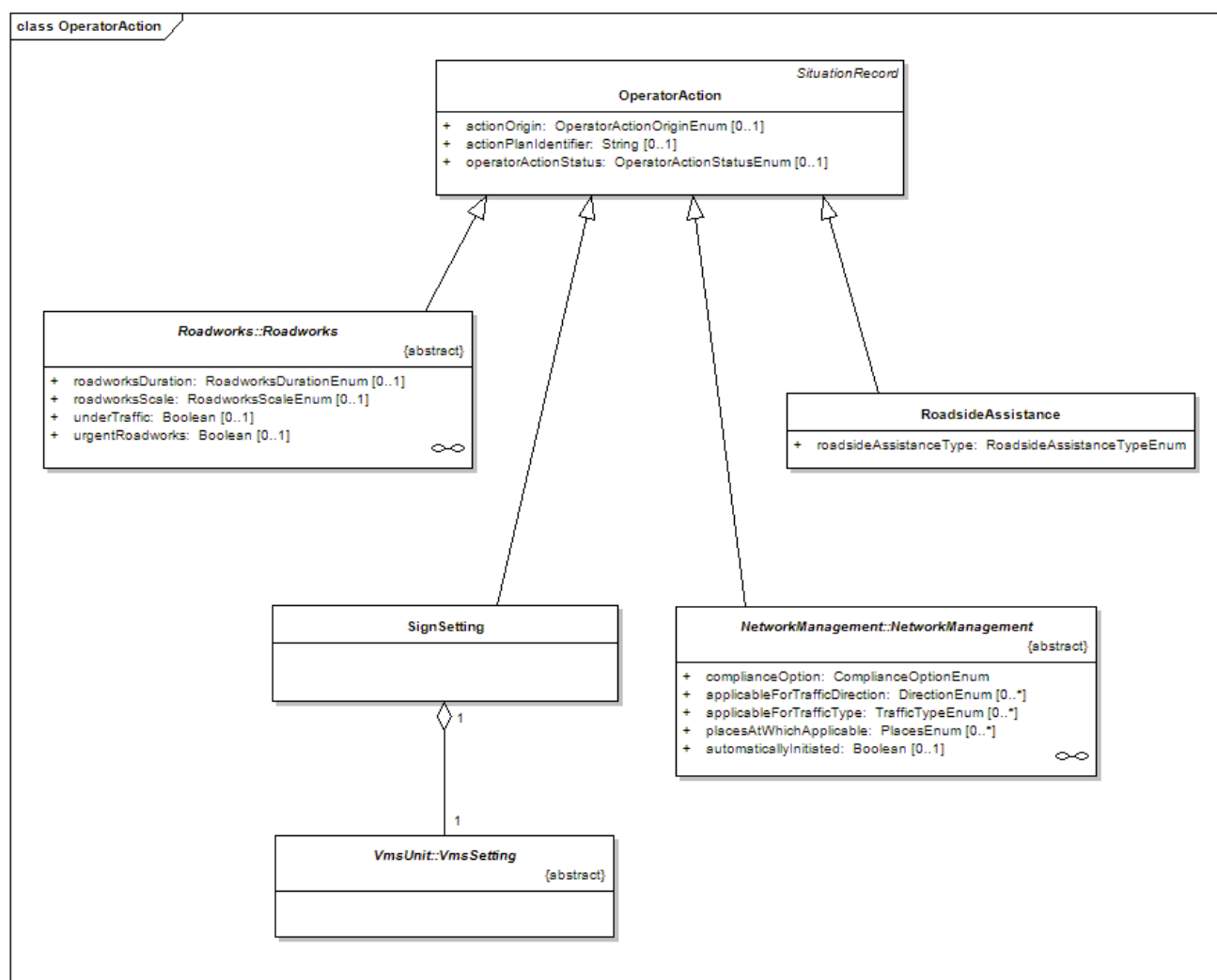


Figure 22 — The “OperatorAction” package class model

7.23.2 Semantics of the “OperatorAction” package

7.23.2.1 “OperatorAction” package semantics – general

The “OperatorAction” package shall comprise an “OperatorAction” class which shall be specialised as one of four types which are used to model the details of the different road operator actions.

7.23.2.2 “OperatorAction” class

The “OperatorAction” class is a realisable class which may be further specialised as instances of either “RoadsideAssistance” or “SignSetting”, or as one of the specialisations of the “Roadworks” or “NetworkManagement” abstract classes.

- **Attribute “actionOrigin”** indicates whether the action has been instigated by the road operator (internal) or by someone or some system external to the road operator, e.g. an adjacent road authority/operator requesting the action.
- **Attribute “actionPlanIdentifier”** provides the identification of the traffic management action plan to which the action relates, if it is part of such a plan.
- **Attribute “operatorActionStatus”** provides information about the status of the operator action in terms of whether it is actually now only a request, is approved but not yet implemented, is in the process of being implemented (i.e. not yet fully implemented), is fully implemented, is rejected by the road operator, has had its termination requested, or is in the process of being terminated. If this attribute is not present then it should be assumed that the action is implemented in accordance with the information in the “Validity” package.

7.23.2.3 “RoadsideAssistance” class

An instance of the “RoadsideAssistance” class may be used to allow a supplier to provide information about assistance that is required or being given at the roadside, for example, vehicle repair.

7.23.2.4 “SignSetting” class

An instance of the “SignSetting” class may be used to allow a supplier to provide information about the settings and status of a variable message sign (VMS) which is set as a result of an operator action (either manually or automatically) and which may be directly related to other elements in the Situation.

7.23.2.5 “VmsSetting” class

The details of the “VmsSetting” class and its sub-model are specified in Part 4 of CEN/TS 16157 [4].

7.24 The “Roadworks” package

7.24.1 Overview of the “Roadworks” package

(from “Operator Action” package within “ReusableClasses” package)

The package, “Roadworks”, shall comprise a sub-model for defining information about road works, either maintenance or construction works, instigated by the road operator or authority or instigated by an authorized organization such as a utility company (see Figure 23).

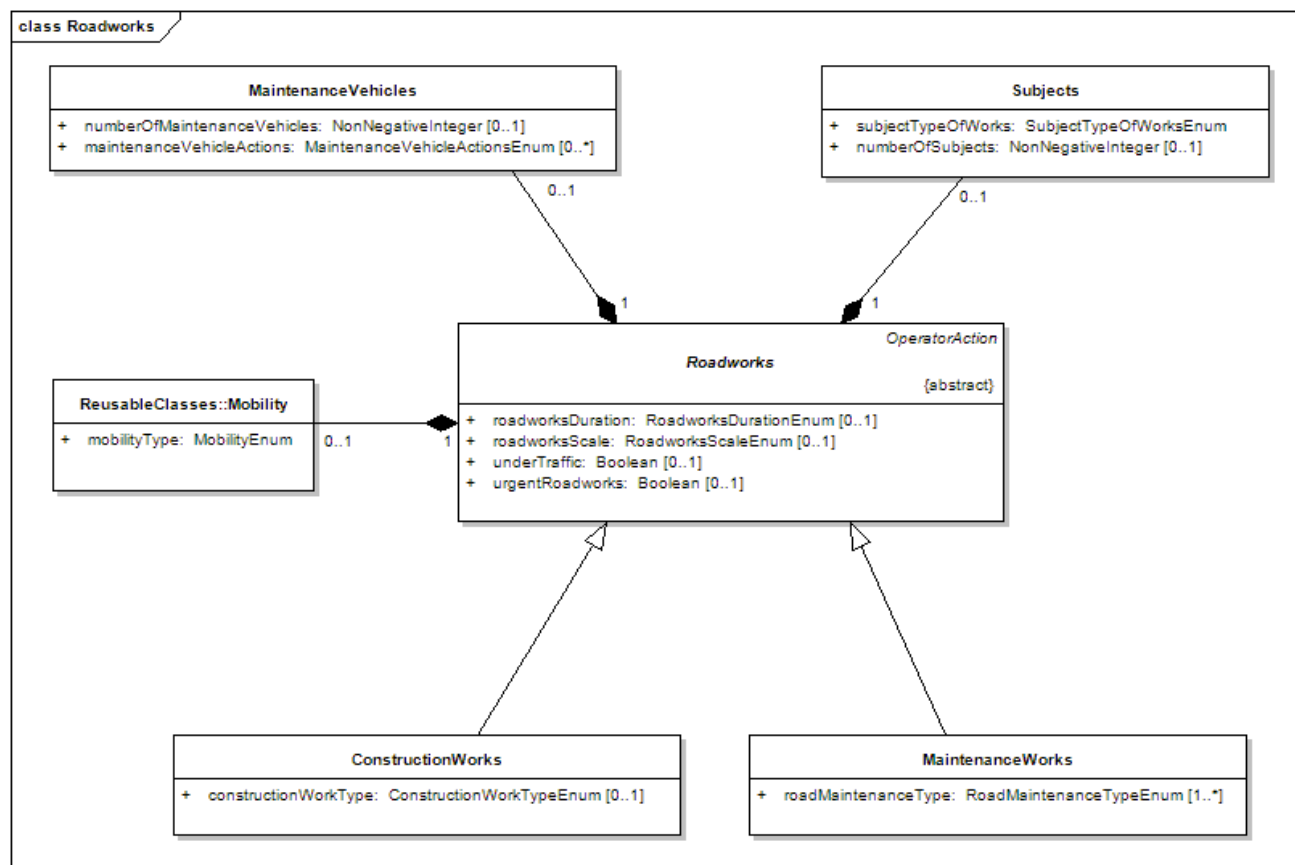


Figure 23 — The “Roadworks” package class model

7.24.2 Semantics of the “Roadworks” package

7.24.2.1 “Roadworks” package semantics – general

The “Roadworks” package shall comprise an abstract “Roadworks” class which is realised as one of two specialisations which are used to model the details of the different types of road works activities (i.e. construction works and maintenance works).

7.24.2.2 “Roadworks” class

The “Roadworks” class is abstract and shall be realised as an instance of either “ConstructionWorks” or “MaintenanceWorks”.

— **Attribute “underTraffic”** may be used to identify whether the road section where the road works are located is open or closed to traffic. A value of “true” indicates that the road section is still open to traffic.

7.24.2.3 “ConstructionWorks” class

An instance of the “ConstructionWorks” class shall allow a supplier to identify the road works as being associated with a type of road infrastructure construction.

7.24.2.4 “MaintenanceWorks” class

The “MaintenanceWorks” class shall allow a supplier to identify the road works as being associated with a type of maintenance of the road infrastructure.

7.24.2.5 “MaintenanceVehicles” class

The “MaintenanceVehicles” class may be used to allow a supplier to identify the number of maintenance vehicles involved with the road works and their types of actions, e.g. slow moving.

7.24.2.6 “Subjects” class

The “Subjects” class may be used to allow a supplier to identify the type and number of road infrastructure items that are the subject of the road works.

7.24.2.7 “Mobility” class

(from “ReusableClasses” package)

The “Mobility” class in this case may be used to allow a supplier to specify whether the road works activity is mobile or stationary.

7.25 The “NetworkManagement” package

7.25.1 Overview of the “NetworkManagement” package

(from “OperatorAction” package within “ReusableClasses” package)

The package, “NetworkManagement”, shall comprise a sub-model for defining an individual road operator action that is specifically related to managing the usage of the road network or for controlling the behaviour of road users on the road network (see Figure 24). This includes road usage restrictions, whether by legal order or by operator decision, road, carriageway and lane closures, weight and dimension limits, contraflows, reroutings, specific instructions to drivers and other general management actions. These actions may be identified as being automatically or manually initiated and marked as requiring either mandatory or advisory driver compliance.

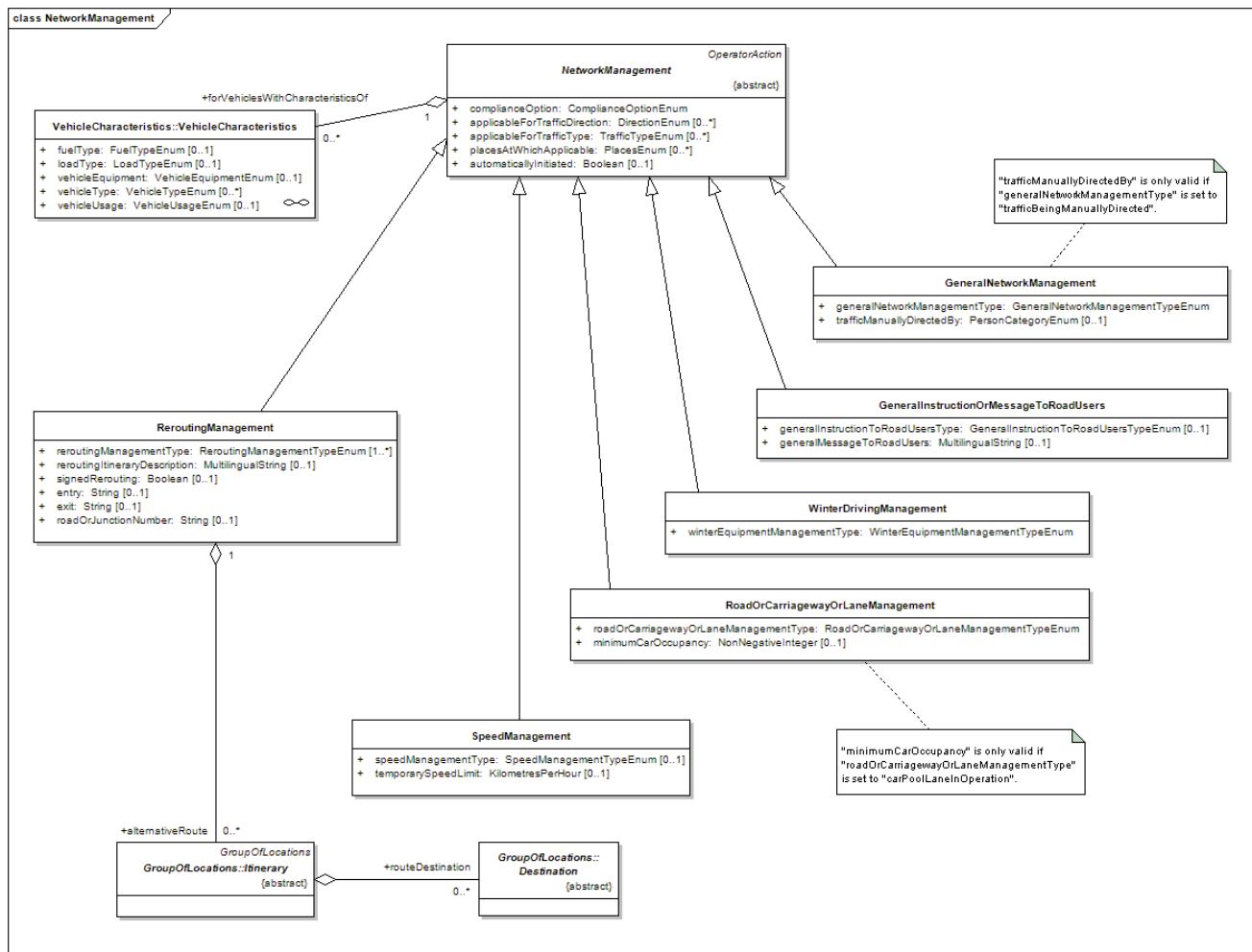


Figure 24 — The “NetworkManagement” package class model

7.25.2 Semantics of the “NetworkManagement” package

7.25.2.1 “NetworkManagement” package semantics – general

The “NetworkManagement” package shall allow network management actions undertaken by a road operator to be modelled as one of a number of specific types. Network management actions range from specific actions which apply to the road network, such as the closure of a road, to a range of instructions, such as no overtaking which may be issued to users of the road network. The range of actions specifically covers the management of reroutings on the road network, management of speed, winter driving restrictions, instructions to road users, and general traffic management actions.

Each management action can be qualified as applying to vehicles with specific characteristics, and/or travelling towards a general direction or destination and can be specified as having mandatory or advisory compliance status.

7.25.2.2 “NetworkManagement” class

The “NetworkManagement” class is abstract and shall be realised as an instance of either “ReroutingManagement”, “SpeedManagement”, “RoadOrCarriagewayOrLaneManagement”, “WinterDrivingManagement”, “GeneralInstructionToRoadUsers” or “GeneralNetworkmanagement”.