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Republic of Germany (AdV)

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on the

Modelling of Geoinformation

of Official Surveying and Mapping

(GeoInfoDok)

Chapter 5
Technical applications of the basic schema

Section 5.4
Explanations on ATKIS®

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1 Preliminary remarks

1.1 History

In 1989 the state survey authorities of the states of the Federal Republic of Germany decided to describe its earth's surface not only in a graphical format using topographical state maps but also in digital format. This decision was preceded by some five years of development work. Extensive conception activities created the basis for all the ATKIS documentation. Also in 1989 the recommendation made by the AdV for the federal states to introduce the "ATKIS official topographic cartographic information system" was enacted.

1.2 General information on earth's surface modelling

The purpose of the ATKIS AAA application schema is to divide the landscape according to principally topographical standpoints, classify the topographical manifestations and facts of the landscape and thus define the content of the Digital Landscape Models (DLM). It provides the modelling regulations required for setting up and updating the DLM. This schema also contains more detailed information that lies in the dovetail area with other technical data that is not essentially topographical.

The ATKIS AAA application schema is attribute-oriented. Accordingly, the landscape is arranged generally by feature types and in detail using attributes.

By modelling the landscape according to the ATKIS AAA application schema, a regulation has been developed that satisfies the requirements of today's GIS market and at the same time creates the preconditions for common use of AFIS, ALKIS and ATKIS data. ATKIS is therefore an important component of a spatial data infrastructure in Germany.

1.3 Harmonisation of geodata bases on ALKIS

The ALKIS and ATKIS geodata bases are appropriately harmonised. The objective of developing a unique data model as the basis of data interchange between ALKIS and ATKIS has thus been achieved. The semantic relations between the two systems have been examined specified according to standard regulations and have been harmonised. Modelling thus enables information for ALKIS and ATKIS to be recorded only once.

The existing feature catalogues ATKIS-OK (ATKIS feature catalogue) and OBAK-LIKA (sample feature catalogue, real estate cadastre) have been harmonised as far as possible by incorporating the utilisation type directory of OSKA-LIKA/DGK5 (feature key catalogue) and OSKA-KLASS (feature key catalogue classification). During this process, specifically the semantic correlations and modelling for the features types of land use of the real estate cadastre and the corresponding feature type areas of DLM (residential area, traffic, vegetation, water). The semantic correlations and modelling for the building and topography of the real estate cadastre and ATKIS were harmonised as well.

It was possible to achieve complete semantic harmonisation of the feature types for the ground areas ("land use" feature type area). In terms of geometric expression however, ATKIS takes account of the line modelling of roads, paths, railways and waters. Due to the degree of abstraction in ATKIS, these surface objects are in some cases modelled in ALKIS only as line representations of surfaces. During the harmonisation process, particular account was taken of this situation in the designation of feature types (e.g. road centre line instead of road).

The result of harmonisation thus enables information for ALKIS and ATKIS to be recorded only once and to be mutually interchanged. This is illustrated in the diagram below, especially for the "yellow area".

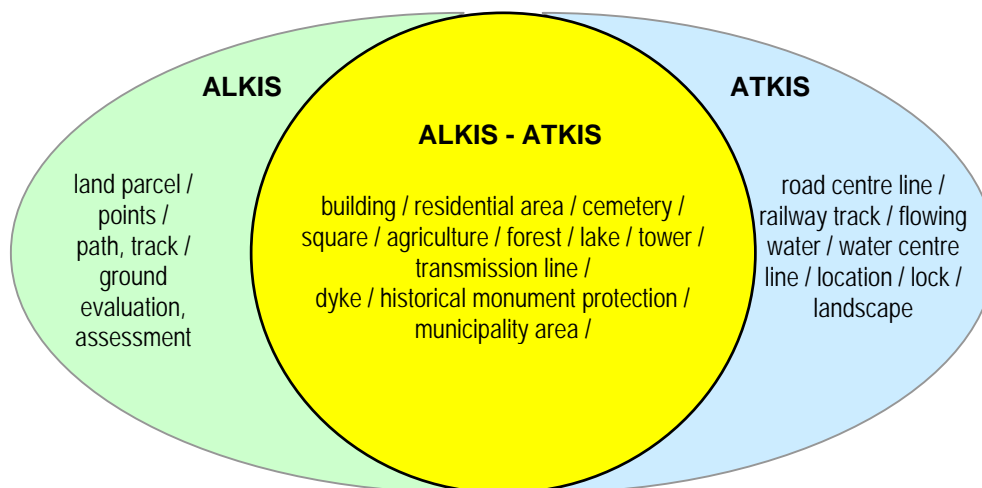


Figure 5.4 – 1. : Common use of feature types

1.4 Consideration of existing draft standards and de-jure standards

The consolidated results of the national and international efforts to achieve standardisation have been observed. International standardisation projects in the field of geoinformation are currently being conducted by the "Technical Committee 211 Geographic Information/ Geomatics" of the "International Organization for Standardization (ISO)".

1.5 Conceptual modelling language

The ATKIS application schema is recorded entirely through the conceptual description language UML in order to guarantee a correct link to the AFIS-ALKIS-ATKIS-basic schema (see also Chapter 3.1.2 of the GeoInfoDok document). Relevant Word or HTML documents are derived as required from the UML model using a rose script. Revisions to the model are made only in the UML data model. The relevant NAS interface files can also be derived using a further derivation tool (see Chapter 10). Consistency between the data model, the catalogues and the interface is thus guaranteed at all times. In principle however, the derived catalogues cannot reflect the data model in the same scope as the original UML data model. There is currently no usable software-independent interface to replace the UML data model, which means that only the Rational Rose software used by the AdV currently enables full legibility of the data model. Use of the Rational Rose UML tool is therefore recommended in order to see the full information scope of the data model at a glance.

Consistency conditions, formation regulations, information on basic spatial reference forms and also further information and qualifications are also described – where possible – in the formal description language "Object Constraint Language (OCL)". If this is not possible, such information is described in text form.

1.6 Association to technical data connection

The association to technical data connection comprises the options for integration and linking of data within and outside of ATKIS. Data outside of ATKIS can be linked to the ATKIS-DLM data using references. The AAA basic schema provides the necessary tools. These are transferred to all ATKIS feature types by way of inheritance and are then always available as options.

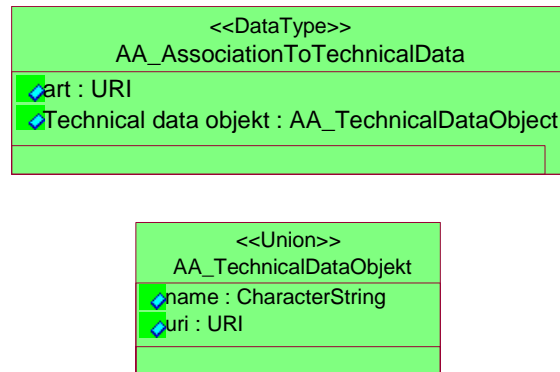


Figure 5.4 – 2. : Modelling of the technical data connection in UML

Each feature in the ATKIS data in primary database can manage the "refers to outside" feature type, which conceals the AA_AssociationToTechnicalData. The "type" attribute refers to an externally (outside of ATKIS) managed list, in which the type of technical data connection is specified. The reference to the technical data object can consist either of a name and/or ID or from a URI and is managed in the "technical data object" attribute type. This also enables references to be made to features in other technical databases.

A definitive list containing possible associations technical data was not realised within ATKIS and shall be specified for each state.

1.7 Inheritance of properties from the AFIS-ALKIS-ATKIS basic schema

The AFIS-ALKIS-ATKIS basic schema contains generally valid data for creating feature types in the abstract class "AA_Object". By connecting the technical feature types in the ATKIS technical schema to AA_Feature via inheritance, these properties are transferred to the respective technical feature types. The table below contains a brief explanation on some properties for the basic schema that are transferred to ATKIS feature types.

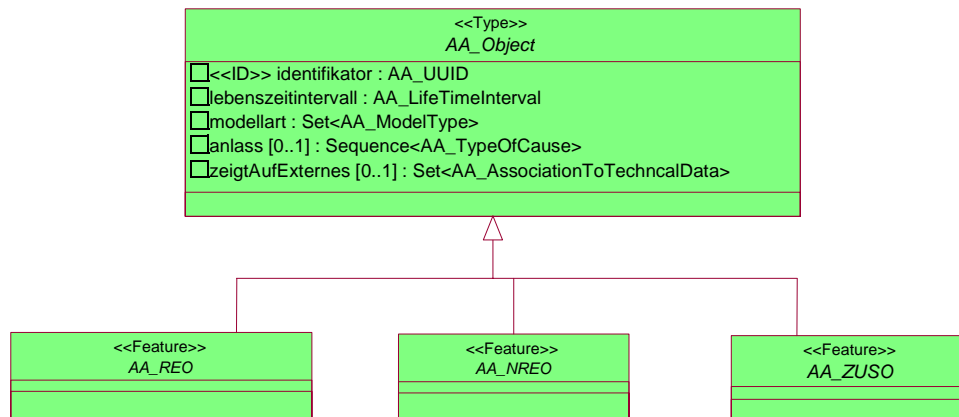


Figure 5.4 – 3. : Modelling of the basic class AA_Object in UML

Properties of the basic class AA-Object

Identifier	The identifier is the unique designation for a feature and will in the future replace the corresponding technical code (e.g. point code, building code). Therefore technical codes are optionally applied as far as they exist.
Refers to external	Can be used to create references to externally managed technical documents, e.g. cadastre document (see also internal chapter on association to technical data)
Cause	Indicates the technical reason for the emergence, revisions and demise of a feature. The update causes are defined at technical level and not in the basic schema.
Model type	The model type defines the technical association of the individual feature types to the various technical schemas. In ATKIS, all technical feature types in the database carry model type Basis-DLM.
Lifetime interval	The lifetime interval indicates the system-related time of creation and expiry of an ALKIS feature in primary database.

Table 5.4 – 1: Inheritance of properties from the basic schema

Further explanations on properties can be found in the basic schema.

1.8 Theme formation in ATKIS to represent identical geometry

The AFIS-ALKIS-ATKIS basic schema enables feature types with the following geometric and topological characteristics to be described:

- (1) Point, line or surface objects containing topological information. Line and surface objects are non-intersecting. The feature types are derived from the TA_* classes of the basic schema and share geometry.
- (2) Point, line or surface objects, which (can) share reciprocally dependent lines or point geometries. The feature types are derived from the AG_* classes of the basic schema.
- (3) Point, line or surface objects containing reciprocally independent geometries. The feature types are derived from the AU_* classes of the basic schema.

To prove the identity of common geometries for objects of characteristics (1) and (2), use is made of the construct for the theme formation in the AFIS-ALKIS-ATKIS application schema which is also anchored in the AFIS-ALKIS-ATKIS basic schema. One theme summarises all affected feature types. Topological relationships and common geometric usage are possible only within a theme. The following three theme types exist:

- (1) Topological themes (TS_theme)
- (2) Themes with general, common point and line use (AA_point line theme) and
- (3) Themes with individual, common point and line use (AA_point line theme).

For features associated with theme types (1) and (2), database of geometrical identity is compulsory, for theme type (3) features, a decision as to whether geometric identities are explicitly set or not can be made at instance level (by the administrator involved in the collection process).

The names of the themes and the associated feature types are defined in the application schema according to the specifications of data type AX_ThemeDefinition (in the NAS operations package) in what is referred to as an *instance-forming grade* (instances of AX_ThemeDefinition). For each theme, an additional model type is defined for which this theme applies. This rules out the possibility of common geometric use of feature for various model types (e.g. ALKIS and ATKIS).

The table below shows the themes defined for the ATKIS application scope. It is not possible to form further identity combinations in the ATKIS application schema. A distinction is drawn between mandatory (value = 1000) and user-defined (value = 2000) theme formation for the "type" property of the "AX_ThemeDefinition" data type. In the case of mandatory theme formation, all indicated feature types are part of the theme and the feature types always

share the geometries. The user-defined theme formation is set in the collection process, if from a technical point of view, an identity has to be expressed between two or several feature types, e.g. between parcel boundary and line of the house. The "dimension" attribute type indicates the dimensionality of the geometric complex, i.e. a distinction is drawn between point-line themes and topological surface themes. A dimension stated with a value of 1000 refers to a point-line theme; a value of 2000 indicates a topological theme.

Topological themes:
Land use base DLM (ground areas): All feature types of the feature type are "land use"
Traffic centre lines base DLM: AX_RoadCentreLine, AX_RoadWayCentreLine, AX_CarriageWayCentreLine, AX_ShippingRouteFerryTraffic, AX_PathSteep
Railway tracks base DLM: AX_RailwayTrack, AX_ShippingRouteFerryTraffic
Water centre lines base DLM: AX_WaterCentreLine; AX_WaterStationingCentreLine, AX_SeepingWater
Areas base DLM: AX_Boundary, AX_MunicipalArea, AX_District, AX_AdminstrativeDistrict, AX_GovernmentDistrict, AX_FederalState, AX_NationalState
Themes with general, common point and line use:
Buildings base DLM: AX_Building, AX_Component
Slope / Embankment base DLM: AX_EmbankmentArea, AX_Breakline
Individual theme formation for the feature types:
Land use base DLM (overlapping area) All feature types of the feature type are "land use"
Land use base DLM (level-spanning) All feature types of the feature type are "land use"

Table 5.4 – 2: Theme formation in ATKIS

2 Modelling of the ATKIS basic DLM

2.1 Fundamental principles

In the ATKIS basic DLM, the landscape is described by point, line and surface objects. The degree of abstraction of the ATKIS basic DLM means that objects modelled in ALKIS as surfaces are shown in ATKIS as points or lines.

The network of roads and paths, railway lines and waters then divides the landscape into meshes, insofar as the objects lie on the earth's surface. These meshes are usually filled by surface features from the "land use" feature type area, so that every section of the earth's surface is described completely and redundancy-free. The earth's surface is further described by the overlapping feature types in the other feature type areas.

2.2 Description of the earth' surface by means of ground areas and overlaying features

The earth's surface is described completely and redundancy-free by feature types of the feature type area "Land use" lying on the earth's surface. If features of these feature types lie above or below the earth's surface these situations are modelled by means of structures and an under passing relation between the structure and its over- or under passing feature (see paragraph 2.9). The further description of the earth's surface is done by the overlaying feature types of other feature type areas.

2.3 Object type

An object is either a concrete, geometrically separable section of the earth's surface (e.g. The Edersee) which is described as a spatially-referenced elementary object (REO) or a technical circumstance without spatial reference (e.g. user) which is described as a non-spatially referenced elementary object (NREO). To model complex circumstances, composed objects (ZUSO) are formed which can logically link together various combinations of elementary objects.

2.4 Attributes

Attributes define qualitative and quantitative properties that describe a feature in more detail. They are feature elements whose individual structure has to be described as attribute type for each feature type. An amount of attributes of different attribute types can be assigned to one feature. Attributes can be multiple, i.e. attributes of the same attribute type can appear several times.

The attribute type contains the self-centred properties of features of one feature type. They are characterised in more detail by means of name, code, data type, cardinality, definition and attribute value (for qualitative attributes).

The attribute value is given if relevant characteristics for an attribute type are available. The attribute value of an attribute is often chosen via the dominance principle, e.g. the outweighing property is used for the choice of the attribute value. In particular this is applied to the merge of feature types in the course of the DLM50 derivation from the base DLM.

The cardinality is available for attributes and relations indicating if elements of one attribute type or relation of a feature type can appear multiple or not. The lower bound and if possible the upper bound are given. If the lower bound is at 0, the attribute type or relation is optional. A "*" as upper bound means that the attribute or relation can appear several times.

2.5 Spatial reference

In the ATKIS basic DLM, all spatially-referenced basic forms described in the AAA basic schema can be used.

2.6 Feature formation

In the ATKIS basic DLM, features are formed in accordance with the rules indicated in Table 5.4 – 3. Furthermore, the principle of all REO's ending or beginning at the border of a Federal State is binding.

Rules of object formation

Rules of formation for new REO's or ZUSO's to be recorded	
A new REO is formed:	<ul style="list-style-type: none"> - if the spatial reference type changes (e.g. from line to surface) - if the value of an attribute changes - if an attribute is added or eliminated - if the number of attribute values changes for an attribute that has multiple approval, - at identical level intersections of line objects that belong to a topological network - in individual object-dependent cases
A new ZUSO is formed,	<ul style="list-style-type: none"> - when the first ZUSO-associated REO is formed

Updating REO or ZUSO	
An existing REO is deleted and a new REO with new identifier is generated:	<ul style="list-style-type: none"> - if the feature type changes - if the spatial reference type changes - if one REO is split into two or several REOs - if two or several REOs are grouped together to form one REO
An existing REO retains an identifier:	<ul style="list-style-type: none"> - if the geometry changes within the context of model accuracy - if the value of an attribute changes - if an attribute is added or eliminated - if the number of attribute values changes for an attribute that has multiple approval - if an overpass/underpass relation changes - if a hierarchical relation changes
An existing ZUSO is deleted and a new ZUSO with new identifier is generated:	<ul style="list-style-type: none"> - if the feature type changes
An existing ZUSO contains an identifier:	<ul style="list-style-type: none"> - if a ZUSO-associated REO is added or eliminated - if an attribute value changes - if an attribute is added or eliminated - if the number of attribute values changes for an attribute that has multiple approval

Table 5.4 – 3: Rules of feature formation

2.7 Recording criteria

The recording criterion, in conjunction with the rules for object formation, the definition of the feature types and the attributes, specifies the scope and the minimum variables of the features to be recorded. The content of the base DLM orients by the content of the topographic map at the relevant map scale, e.g. features are recorded completely for the base DLM if their topographic meaning is adequate to the map scale 1:10000/1:25000. That is the case if one feature fulfils the given minimum dimensions.

Objects are classified according to their predominant property (dominance principle). Any landscape objects that undershoot the indicated minimum dimension and are therefore not recorded as model features are assigned to one of the adjacent landscape objects. The area of a landscape object can be divided on the basis of a change in value type. Within a feature type, differentiation and demarcation occurs according to value types only if areas are thus created

that satisfy the defined recording criteria. Deviating recording criteria can be found either with the description of the feature type group or with the feature type itself.

2.8 Recording accuracy

The model accuracy of ± 3 metres is referred to the geometry of basically line features of the base DLM. This relates to roads, railways and rivers modelled as lines as well as topological nodes in the road and railway network.

2.9 Vertical description of the earth's surface

The basic DLM is a two-dimensional information system. In order to model the vertical layer of objects above and below the earth's surface, the "hasDirectlyBelow" relation is used. The feature situated highest above the earth's surface contains the "hasDirectlyBelow" relation to the feature situated below it (e.g. road "hasDirectlyBelow" bridge).

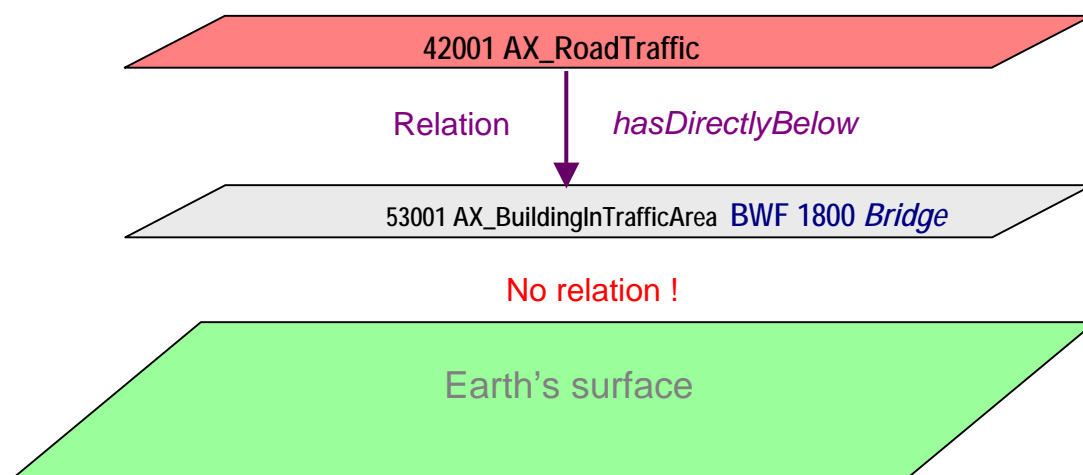


Figure 5.4 – 4. : Vertical illustration of the landscape above the earth's surface

No relation is created to objects that lie above the earth's surface.

For underground features, the vertical situation is described from the feature located in the structure (e.g. road "hasDirectlyBelow" tunnel).

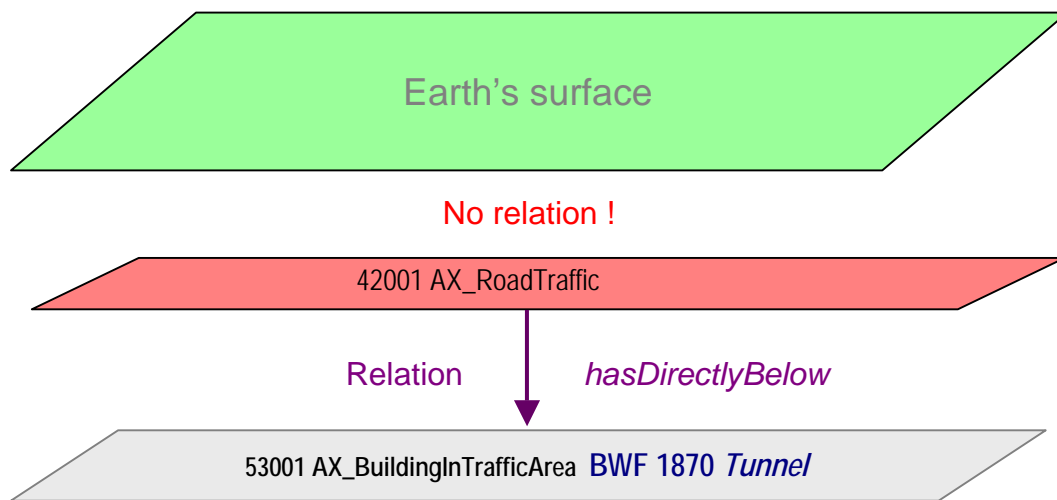


Figure 5.4 – 5. : Vertical illustration of the landscape below the earth's surface

The examples below describe how vertical levels are modelled in ATKIS.

- a) In the landscape, a road on a bridge passes over another road: The geometry of the bridge and the road centre line must be identical. The road centre line contains the relation "hasDirectlyBelow" to the bridge structure.

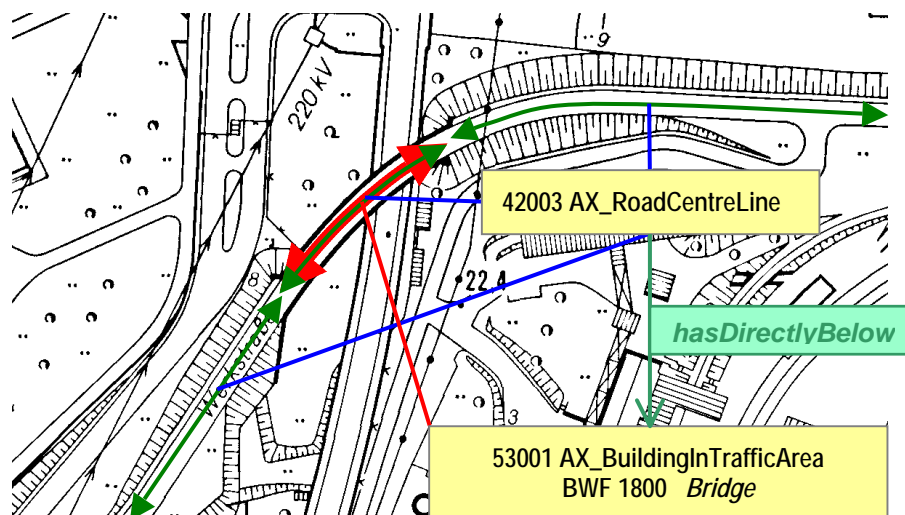


Figure 5.4 – 6. : Vertical illustration of the landscape with the relation "hasDirectlyBelow"

- b) The water runs under the motorway into a duct. The geometry of the duct and the piped water are identical. The water centre line contains the relation

"hasDirectlyBelow" to the duct. The water centre line is not part of the earth's surface in the area of the duct.

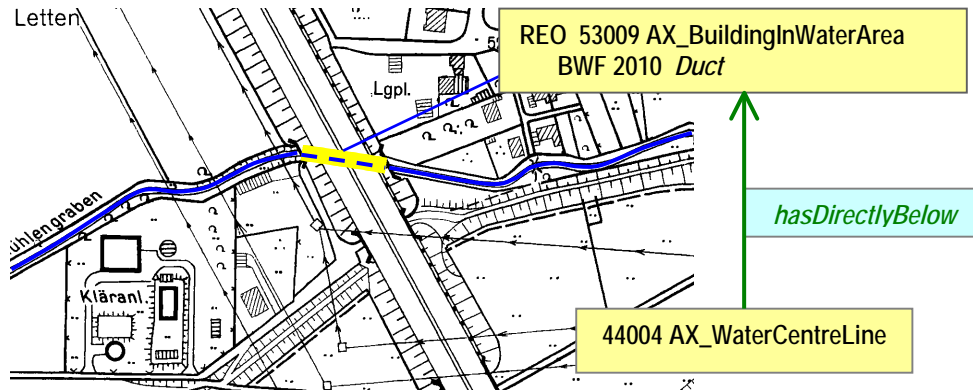


Figure 5.4 – 7. : Example for the modelling of a duct

2.10 Quality data and accuracies in the AAA technical schema

Quality data can be managed within the metadata, insofar as they relate to the database as a whole. They can, however, also be stored by feature type. In this case, the "quality data" attribute type is proposed for the corresponding feature types. The AAA technical schema contains the geometric accuracies of the spatially-referenced feature types in dependence of the various model types.

More information concerning quality parameters are given in due course in the meta information system of the AdV.

3 Content of the AAA technical schema ATKIS

3.1 Primary database data

Primary database data comprises all geo-information of the official surveying agencies in form of AFIS, ALKIS and ATKIS. It contains the complete description of feature types including data to its cartographic or textual performance in one or more map scales (see paragraph 4.1).

Primary database data of ATKIS is all feature types, attributes, attribute value and relations that carry a model type of ATKIS (e.g. "base DLM"). A subset of the primary database data is the core data inventory.

3.2 Core data inventory

The core data inventory of the ATKIS base DLM is the database provided by all surveying authorities of the states of the Federal Republic of Germany for all users throughout the country. It is a subset of the primary database data for the base DLM and is marked in the feature catalogue as "G". It includes also the corresponding metadata identified in the common AAA metadata catalogue as an obligatory requirement.

The following were taken into consideration for stipulating the core data inventory:

1. The nationwide demands by legal, official and industrial users.
2. The feature types, attributes and relations strongly necessary for the production of the topographic maps at scale 1:10.000 and 1:25.000.
3. The interoperation between ALKIS and ATKIS.
4. The current AFIS-ALKIS-ATKIS technical schema

The technical view of the feature type area "land use" in the real estate cadastre is now harmonising with the landscape view in ATKIS. In order to derive the ground area in ATKIS from the land use in ALKIS, this requires all the necessary feature types to be defined as core data inventory. Taking a holistic view of official surveying and mapping, the core data inventories of ALKIS, ATKIS and AFIS should also be merged to form a core database containing its geo-data. For this reason, all feature types commonly used by ALKIS and ATKIS for land use are completely applied to the ALKIS core data inventory. All the ground areas in ATKIS can thus be derived from ALKIS and vice versa.

4 Presentation objects

4.1 Fundamentals

Because of their universal properties presentation objects are described in the AAA base schema. In the presentation objects all information is summarized

- that is necessary for the presentation of text and symbols for a certain cartographic output,
- that deviates from the standard recording of the portrayal catalogue or
- that cannot be presented in exceptional case

The presentation objects contain the symbol number and further properties for the control of the presentation, e.g. recording priorities and type.

Thereby several cases can occur due to the optional leading relation "usingForPresentationOf" (cardinality 0...*):

- Storing of spatial objects and presentation objects with relation "usingForPresentationOf" to the presentation object
- Storing of spatial objects and presentation objects without relation "usingForPresentationOf" to the presentation object

The data model also admits the storing of free presentation objects without the need of a spatial object.

4.2 Feature types of the presentation model

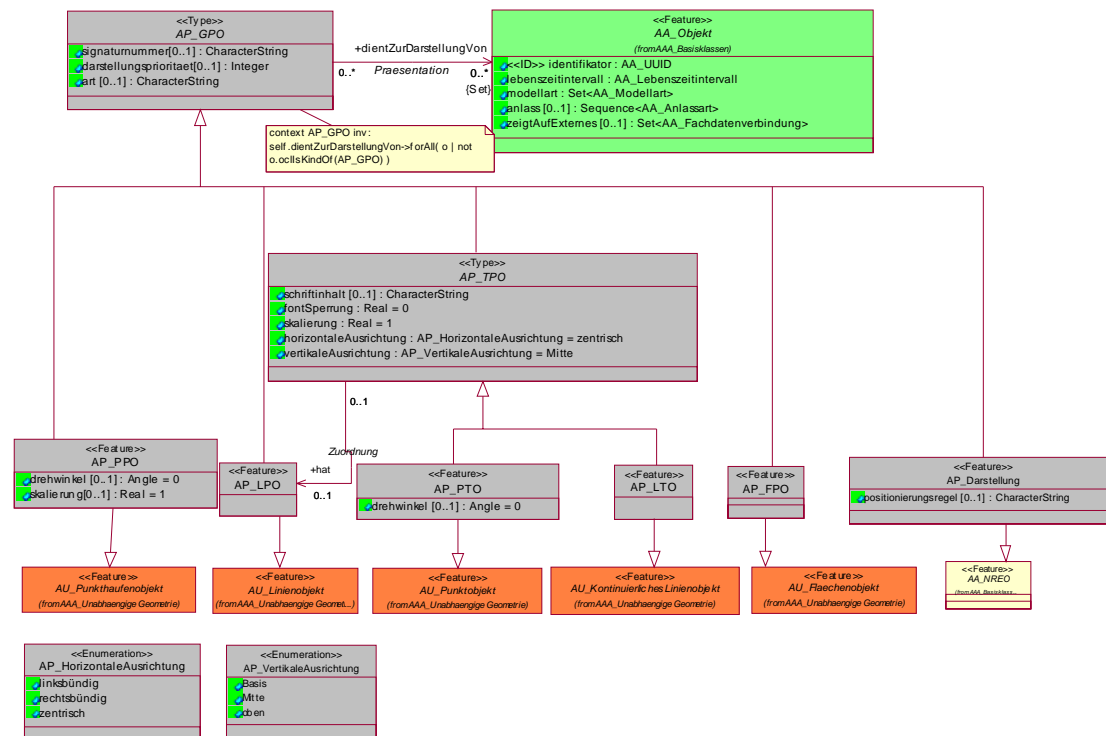


Figure 5.4 – 8. : AAA presentation model of the AAA base schema

The feature type 02300 AP_GPO

The generic presentation object AP_GPO in the AAA basic schema serves for the control of the presentation flow that can be bound with the spatial object via the relation "usingForPresentationOf" as the relation has the cardinality 0..*. The generic presentation object bequeath the properties to the textual, point, line and area presentation objects of the AAA basic schema. Portrayal specification number, priority of presentation and presentation type are kept as properties.

Attribute type "Type"

In the portrayal catalogue all presentation objects have information about the presentation "type" in connection with concretely defined derivation rules in order to guarantee the uniqueness of assigned properties to a spatial object during presentation. When e.g. several properties of an object shall be recorded in a presentation object, the value of the attribute "type" describes about what kind of presentation proportions the presentation object is involved. The acceptable values are specified in the portrayal catalogue.

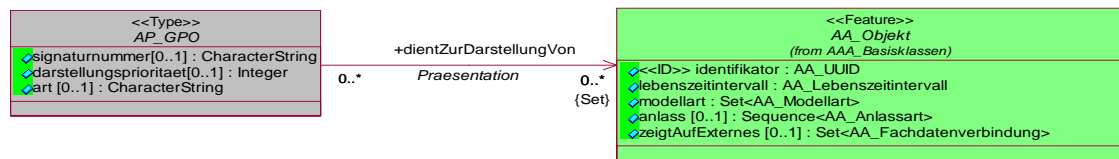


Figure 5.4 – 9. : Extract of the basic schema, AP_GPO

Attribute type "Portrayal specification number"

This attribute type contains the portrayal specification number according to the portrayal catalogue whereas a unique assignment between the presentation parts of a spatial object and the presentation objects via a portrayal specification number is no longer possible as the portrayal specification number is used by several derivation rules. The identification of a presentation object via portrayal specification number is therefore not possible. To be able to address concrete presentation parts of a spatial object within the presentation, the use of the attribute type "type" is absolutely necessary.

Free presentation objects (usingForPresentationOf = NULL) must have a portrayal number.

Feature type AX_Representation

The feature type AP_Representation is concatenated with the abstract class AP_TPO via a relation in order to associate a concrete defined position for a textual presentation object. At the attribute type "position rules" several position rules how to position symbols are saved in corresponding position numbers. The inheritance to all presentation objects via AP_GPO is not necessary as the pure presentation objects already contain the results from the evaluation of the position rules, like the point mass object "area sampling" of forest or sea.

A position rule defines concretely at what distance trees are situated in a forest and if the distribution is regular or by chance.

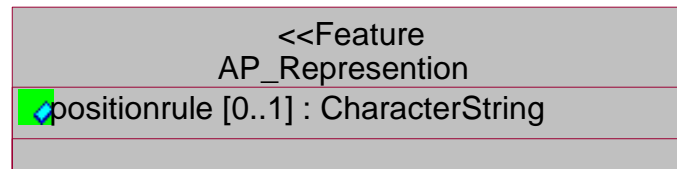


Figure 5.4 – 10. : Extract of the basic schema, AX_Representation

The feature type 02340 AP_TPO

The feature type AP_TPO (textual presentation object) is an abstract class of the AAA base schema and describes general properties that can be assigned via inheritance to textual presentation objects of different geometric form. The feature type 02340 AP_TPO consists of the following properties: content of character field, font spacing, scale, horizontal and vertical alignment. Within the framework of inheritance the object AP_PTO (textual presentation object with point geometry) and the object AP_LTO (textual presentation object with line geometry) are addressed. From the following Figure 5.4 – 11 the existing relations can be derived.

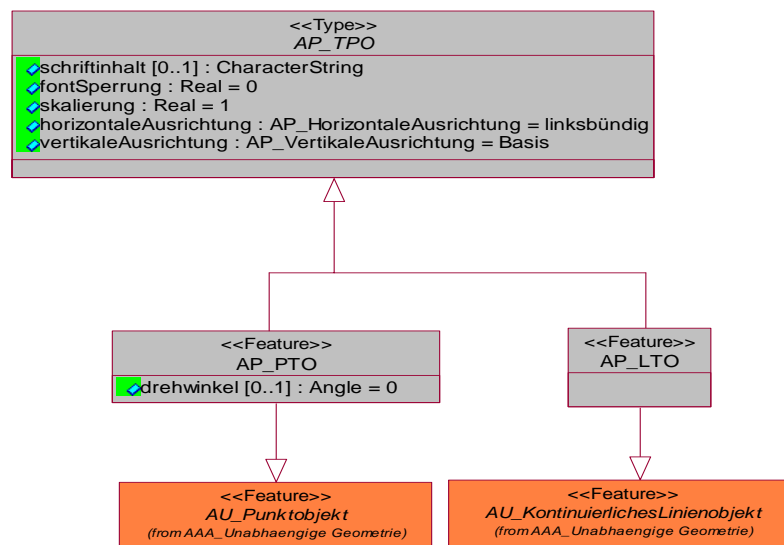


Figure 5.4 – 11. : Extract of the basic schema, AP_TPO

5 Location

5.1 Data on the location

From the location feature type area with feature type group "data on the location", ATKIS uses the following feature types:

- 12002 AX_LocationDescriptionWithHouseNumber
- 12003 AX_LocationDescriptionWithPseudoNumber

as non-spatially referenced elementary objects of the abstract feature type "location" and the selection data type "location description". The feature types relevant to ATKIS appear in the UML overview below in yellow.

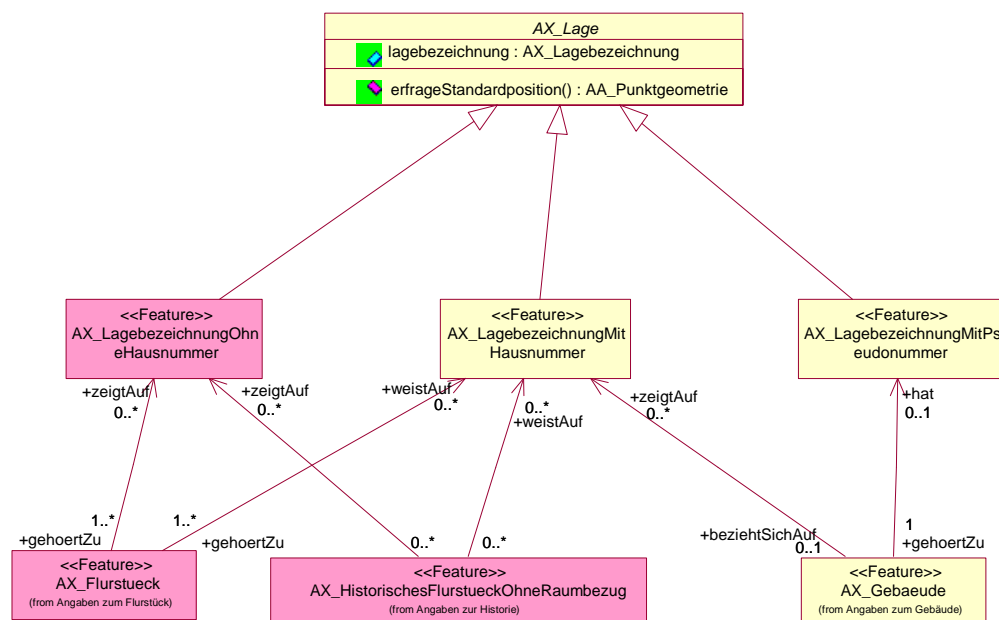


Figure 5.4 – 12. : Feature type group for "data on the location" from UML

5.1.1 Feature type 12002 AX_LocationDescriptionWithHouseNumber

The feature type 12002 AX_LocationDescriptionWithHouseNumber as a non-spatially referenced elementary object with the attribute types house number and district represents the customary or officially specified position description for land parcel and building. It inherits the non-encrypted or encrypted position description from the abstract top class AX_Location.

5.1.2 Feature type 12003 AX_LocationDescriptionWithPseudoNumber

In the absence of a definitive house number for a building, the cadastre-managing authority may, for internal purposes, assign a provisional number referred to as “pseudo number” via the feature type 12003 AX_LocationDescriptionWithPseudoNumber.

6 Owner

6.1 Feature type group personal and primary database data

From the owner feature type area with "personal and primary database data" feature type group, the base DLM uses the following feature type:

- 21001 AX_Person

as a non-spatially referenced elementary object. All personal data required for the clear identification of a person is recorded in the 21001 feature type AX_Person. To represent personal data within user profiles, a relation is created from the 81001 AX_User feature type to the feature type 21001 AX_Person (user role). Individual access authorisations for the ATKIS primary database data can thus be registered and saved (see chapter 12).

7 Building

7.1 Feature type group "data on the building"

From the feature type area with feature type group "data on the building", ATKIS uses the following feature types:

- 31001 AX_House
- 31002 AX_PartOfHouse

as spatially-referenced elementary objects.

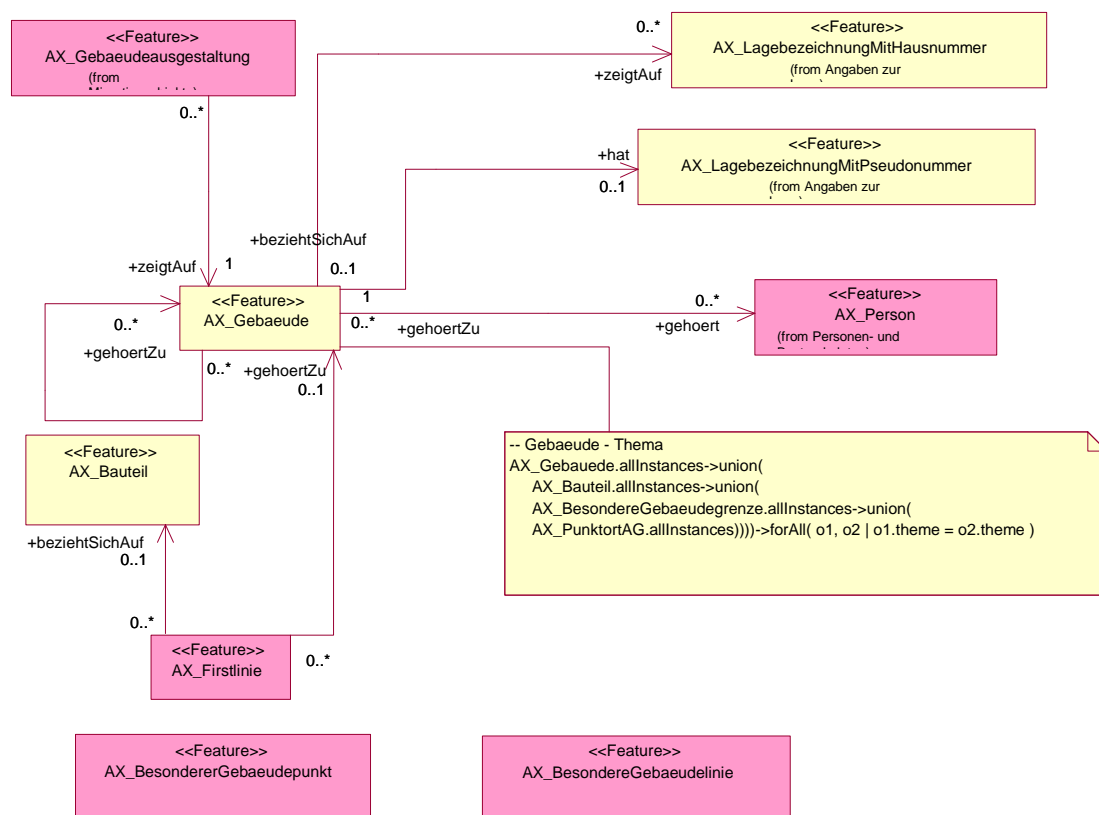


Figure 5.4 – 13. : Feature type group for "data on the house" from UML

7.1.1 Feature type 31001 AX_House

The feature type 31001 AX_House is modelled as a spatially-referenced elementary object. The technical and geometric description of a house with defined outline is supplemented by a corresponding assignment of a house function and other self-referenced properties, where applicable. The house on the earth's surface is represented through the vertical projection of

the building. The house thus always surrounds all its associated components. One exception is the underground house that is not part of the house area.

The feature type 31001 AX_House can also be modelled as points. But this modelling is only valid for the ATKIS technical schema.

7.1.2 Attribute type: "house function"

The "house function" attribute type describes, according to the dominance principle, the functional meaning of a house that is objectively recognisable at the time of data collection. The code list for the house functions covers exclusively the following three top groups:

- residential house
- house for business or commercial
- house for public business

The houses are more differentiated on attribute level.

7.1.3 Attribute type "further building function"

The attribute type "further house function" is applied in those cases where a house has a special function beside the dominant house function, e.g. a kindergarten is situated on the ground floor of a multi-storey residential house.

7.1.4 Attribute type "house code"

The attribute type "house code" is modelled as string. The structure of the string can be seen in the sketch below. The first 24 positions build the unique building number within the federal republic. From the 25. position onwards specific encodings for federal states can be marked.

The house code is a unique number for the house consisting of the keys for the municipality (8 positions), road (5 positions), the house number of the house (4 positions), the additional addressing (4 positions) and the serial number of the house (3 positions). The positions have to be kept right-adjusted. Missing positions are filled up with zero. The additional addressing and the serial number of the outhouse are optional and will be filled with "_" if unaccounted.

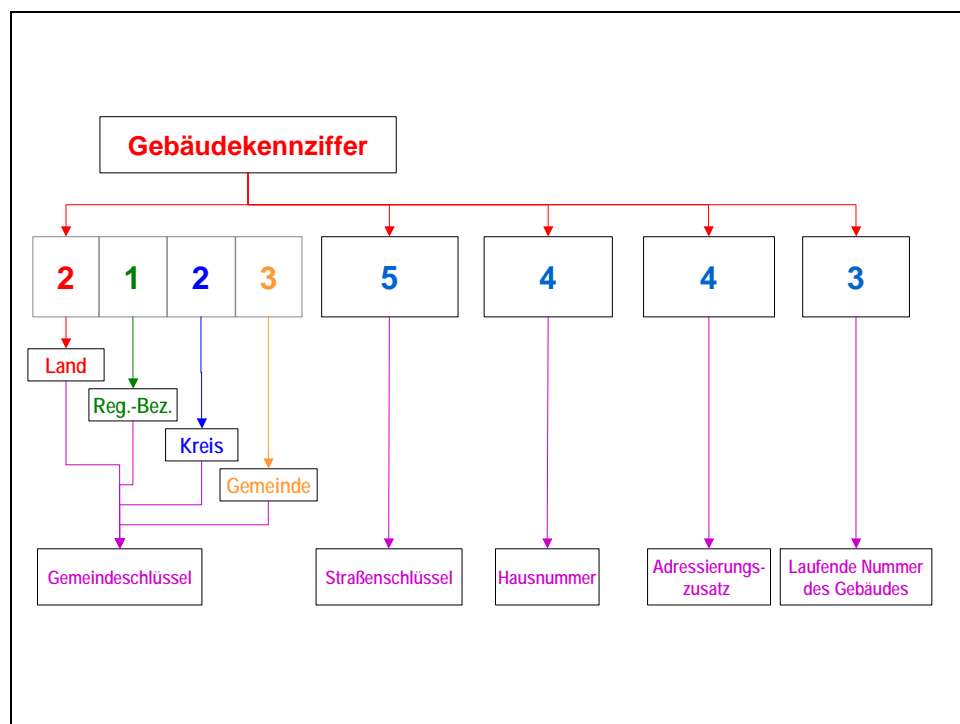


Figure 5.4 – 14. : Composition of the house code

7.1.5 Feature type 31002 AX_PartOfHouse

Parts of houses that have properties deviating from the respective "house" feature or being of special nature (forming characteristics), e.g. storeys, passageways and arcades deviation from the dominant house form, belong to the feature type 31002 AX_PartOfHouse as a spatially-referenced elementary object. 31002 AX_PartOfHouse as part of a house always lies within

the outline of the house, unless it lies below the earth's surface. The direct reference to the house is realised through the common geometry theme. It is therefore not necessary to carry an explicit relation.

The tower situated in a building is recorded as feature of the feature type 31002 AX_PartOfHouse with the attribute type "construction type" and the attribute value "tower inside house". Freestanding towers are recorded as features of the feature type 51001 AX_Tower (see also chapter 9, feature type 51001 AX_Tower).

The chimney situated in a house is recorded as feature of the feature type 31002 AX_PartOfHouse with the attribute type "construction type" and the attribute value "chimney inside house". Freestanding chimneys are recorded as features of feature type 51002 AX_StructureOrUnitForIndustryAndCommerce with the attribute type "structure function" and the attribute value "chimney" (see also chapter 9, feature type 51002 AX_StructureOrUnitForIndustryAndCommerce).

The passages lead in ATKIS as points and lines are modelled as feature type 53001 AX_BuildingInTrafficArea (see chapter 9).

8 Land use

The "land use" feature type area includes the feature type groups of

- 41000 residential area
- 42000 traffic
- 43000 vegetation
- 44000 water

These objects represent the earth's surface with no gaps or overlaps.

Due to the diversity of landscape feature forms, the earth's surface is not to be represented uniquely. The principle already described, that features of the "land use" feature type area must not overlap, becomes applicable if the objects lie on the earth's surface. The topological network of ground areas are modelled by means of theme definition (see paragraph 1.8).

If objects from the "land use" feature type area lie above or below the earth's surface, they may overlap only if an object of feature type 53001 AX_BuildingInTrafficArea or 53009 AX_BuildingInWaterArea lies between. The "hasDirectlyBelow" relation must not be created between "land use" objects.

8.1 Residential area

The feature type group with designation "residential area" and code 41000 contains both built and non-built areas which are characterised by settlement of human beings or contribute towards settlement. The feature type group includes the following feature types:

- 41001 AX_ResidentialArea
- 41002 AX_IndustrialAndCommercialArea
- 41003 AX_Dump
- 41004 AX_MiningOperation
- 41005 AX_OpencastMinePitQuarry
- 41006 AX_CombinedUseArea
- 41007 AX_AreaWithSpecialFunctionalCharacteristic
- 41008 AX_SportLeisureAndRecreationArea
- 41009 AX_Cemetery

The feature types have exclusively surface characteristic. In principle, all feature types 41001, 41002, 41006, 41007, 41008 and 41009 are recorded, i.e. irrespective of their size. Feature types 41003, 41004 and 41005 are recorded from a size of 1 ha.

The areas with structural character also include individual residential building plots, estates, operations and similar installations outside of locations that are inhabited or regularly used by humans. Subordinate buildings such as sheds and barns located in open fields, rarely inhabited hunting lodges and weekend homes outside holiday home areas are not included in feature types 41001, 41002, 41006 or 41007. Gardens are assigned to areas with structural character unless used for commercial purposes.

Significant for the assignment of areas with structural character is the actual 'function' and not the potentially deviating function proposed by the general development plan. A reciprocal demarcation occurs if the minimum size of 1 ha is exceeded. Within an object, differentiation and demarcation occurs according to value types only if areas are created with a minimum size of 1 ha. Smaller areas of a feature type are added to one of the adjacent areas, the characteristics of which are comparatively similar in respect of the feature type. A residential area is to be assigned to a mixed use area in preference to an industrial area or an area with a specific functional character. By contrast, areas with a structural character must never be assigned to vegetation area objects.

If both residential and vegetation areas describe the locality, the residential area is always modelled as the ground area. The vegetation area is then shown as an overlapping feature 54001 AX_VegetationCharacteristic.

Example:

A holiday home estate is located in a wooded area. The holiday home estate is modelled as an object of feature type 41008 AX_SportLeisureAndRecreationArea with the function attribute and value type 4310 "weekend and holiday home area". The vegetation is described with feature type 54001 AX_VegetationCharacteristic with the vegetation attribution and value type 1203 "tree population, deciduous and conifers".

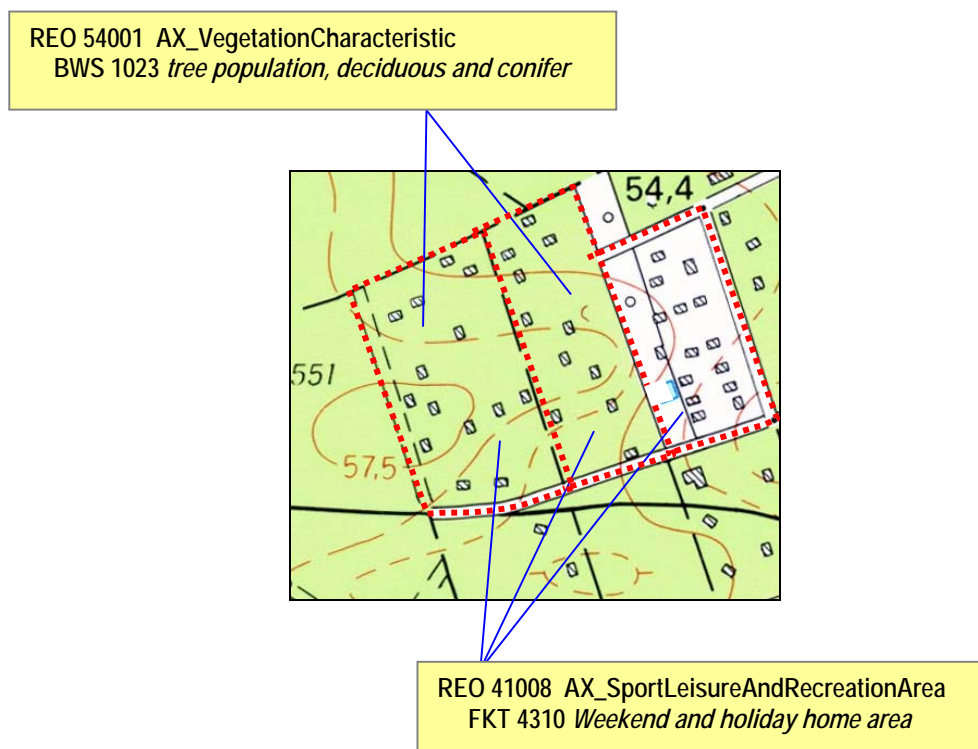


Figure 5.4 – 15. : Example to show the overlapping of a residential area with vegetation

In the following particularities to selected feature types are described:

Feature type 41002 AX_IndustrialAndCommercialArea

In the basic DLM industrial and commercial areas are modelled completely irrespective of their function. For the assignment of the attribute "function" to the feature type **AX_IndustrialAndCommercialArea** different minimum dimensions are valid. In case of lower deviation the attribute type "function" will be resigned (controlled via cardinality 0..1) but the feature type will be recorded completely.

Feature type 41008 AX_SportLeisureAndRecreationArea

In the feature type 41008 sport, leisure and recreation areas are modelled completely irrespective of their function. For the proof of attribute values for the attribute type "function" different selection criteria are valid.

The assignment of the attribute values for "function" are also calculated in an evaluation of the respective minimum dimensions. At lower deviations the assignment of attribute value for the "function" is not resigned in any case but rather the attributive upper group is applied. In cases where objects cannot be assigned to any upper group, the attribute type "function" is dropped (controlled via cardinality 0..1).

8.2 Traffic

The feature type group with designation "traffic" and code 42000 contains both built and non-built areas that serve the traffic system. The feature type group includes the following feature types:

- 42001 AX_RoadTraffic
- 42002 AX_Road
- 42003 AX_RoadCentreLine
- 42005 AX_RoadwayCentreLine
- 42008 AX_CarriagewayCentreLine
- 42009 AX_Square
- 42010 AX_RailTraffic
- 42014 AX_RailwayLine
- 42015 AX_AirTraffic
- 42016 AX_ShippingTraffic

8.2.1 Feature formation for roads

In the basic DLM, roads and carriageways are modelled as lines. A road usually consists of a road body and a roadway. If the centre lines of the road body and the roadway are identical as part of the accuracy requirements (standard case), only one centre line is recorded as a feature type 42003 AX_RoadCentreLine. Each spatially-referenced elementary object (REO) 42003 AX_RoadCentreLine is part of a composed object (ZUSO) 42002 AX_Road. The adjacent features from the "land use" feature type area are extended up to the "road centre line".

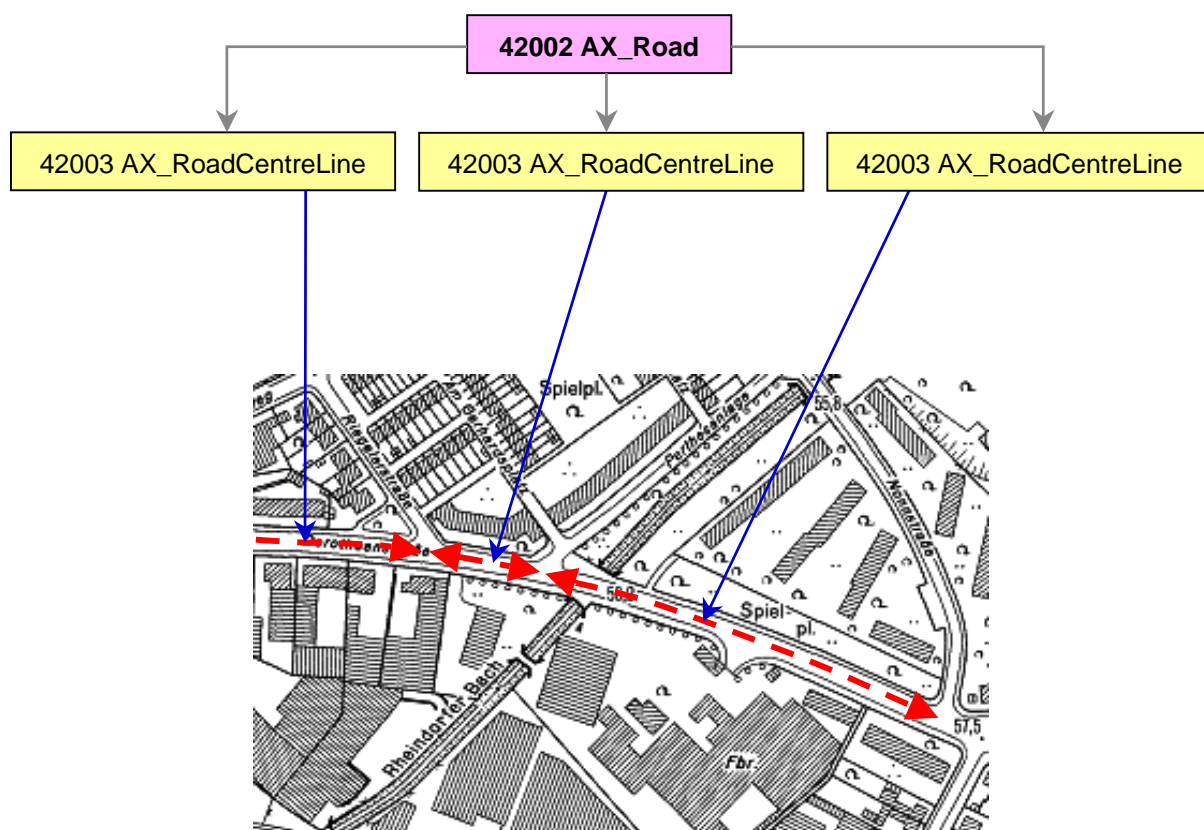


Figure 5.4 – 16. : Modelling of a road

If the centre lines of the road body and the roadway are not identical as part of the accuracy requirements, the road body is modelled as feature type 42003 AX_RoadCentreLine and the roadway is modelled as feature type 42005 AX_RoadwayCentreLine.

In the case of roads with structurally separate direction roadways, the road centre line runs in the centre of the structural separation. Each direction roadway is recorded as feature type 42005 AX_RoadwayCentreLine. 42003 AX_RoadCentreLine and 42005 AX_RoadwayCentreLine are components of composed object 42002 AX_Road. The areas between 42005 AX_RoadwayCentreLine and 42003 AX_RoadCentreLine and also between 42005 AX_RoadwayCentreLine and 42005 AX_RoadwayCentreLine are assigned by feature type 42001 AX_RoadTraffic. The adjacent features from the "land use" feature type area are extended up to the outer roadway centre lines.

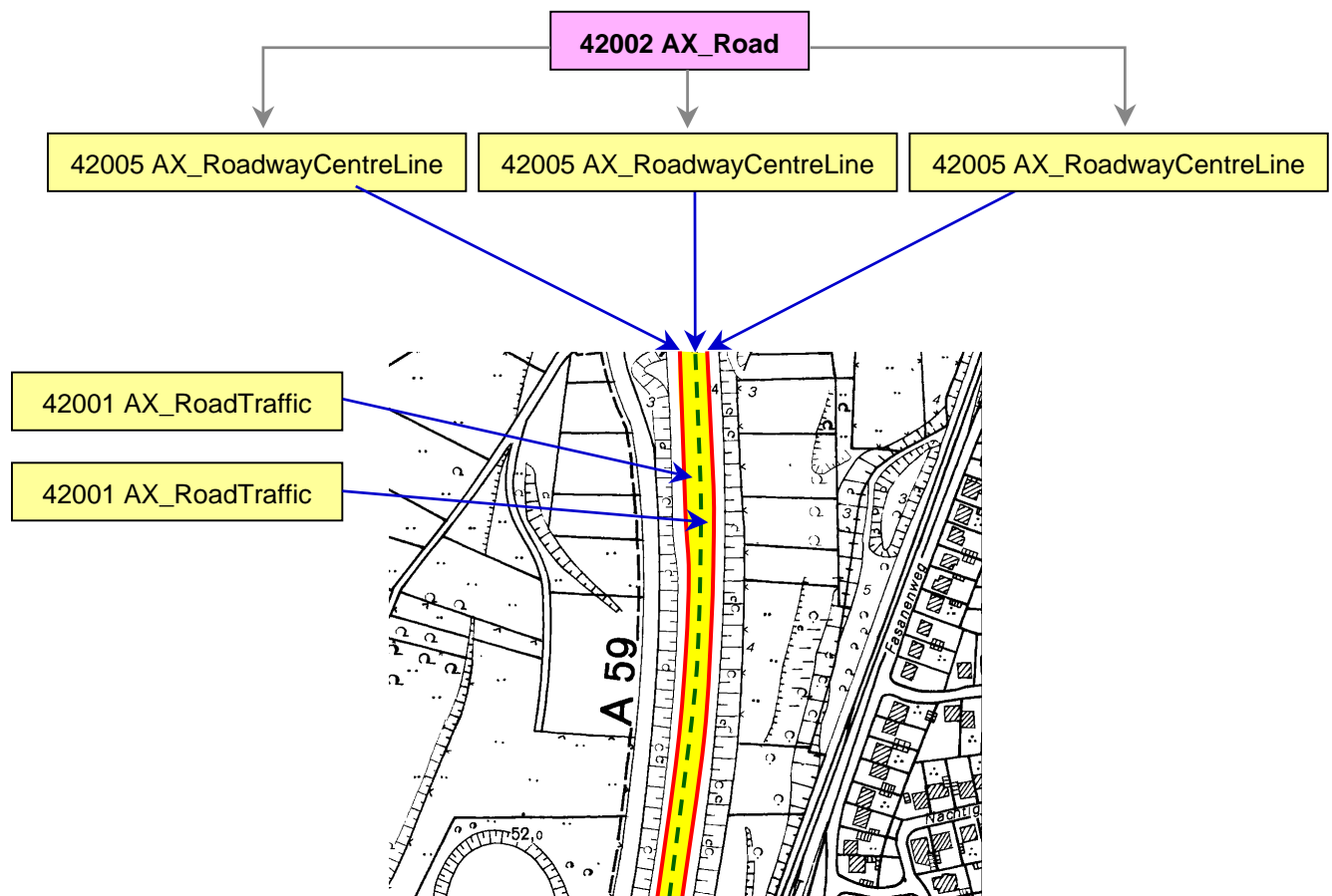


Figure 5.4 – 17. : Modelling of a road with physically separate direction roadway centre lines

8.2.2 Feature formation for railway line

These traffic routes consist of the subgrade and one or several railway lines. The subgrade includes the track, small ditches for draining the subgrade, side and protective strips and small embankments. One or more railway lines can run on one subgrade. In the basic DLM, the rail-borne traffic routes are modelled by the line feature type 42014 AX_RailwayLine and the surface feature type 42010 AX_RailwayTraffic.

The feature type 42014 AX_RailwayLine describes a certain section in the network of the rail-borne traffic routes, the feature type 42010 AX_RailwayTraffic the areas relevant to the operation of rail-borne traffic.

If the rail-borne traffic route consists only of a railway line (normal case), only feature type 42014 AX_RailwayLine is recorded on the free section. The free line usually starts and ends at the entry signal or the entry points to a railway station. There is no explicit modelling of rail traffic.

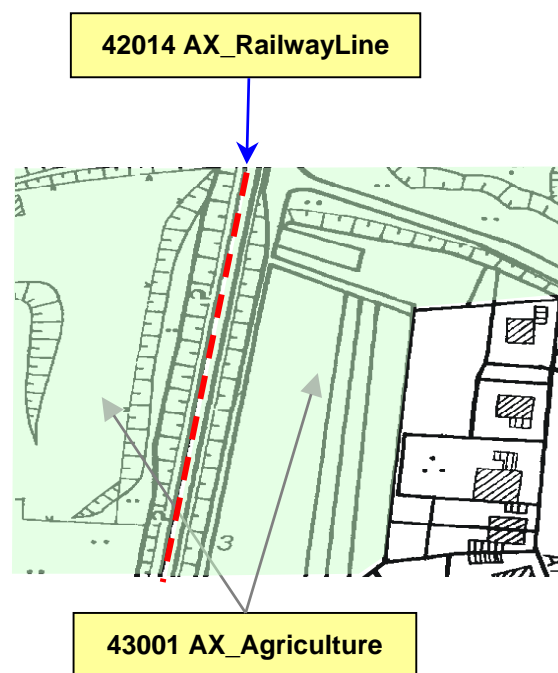


Figure 5.4 – 18. : Modelling of a railway line

If the rail-borne traffic route consists of several railway lines, both feature type 42014 AX_RailwayLine and feature type 42010 AX_RailwayTraffic are recorded on the free section and in the railway station.

On free section the feature type 42014 AX_RailwayLine limits within lying objects of the feature type 42010 AX_RailwayTraffic. The adjacent features from the "land use" feature type area are pulled up to the outer boundary of the 42010 AX_RailwayTraffic.

The area of a railway station is modelled by the feature types 42010 AX_RailwayTraffic and the overlaying area 53004 AX_RailTrafficUnit. The outer contour of both objects is identical. The railway lines lie within the railway station. The adjacent features from the "land use" feature type area are pulled up to the outer boundary of 42010 AX_RailwayTraffic.

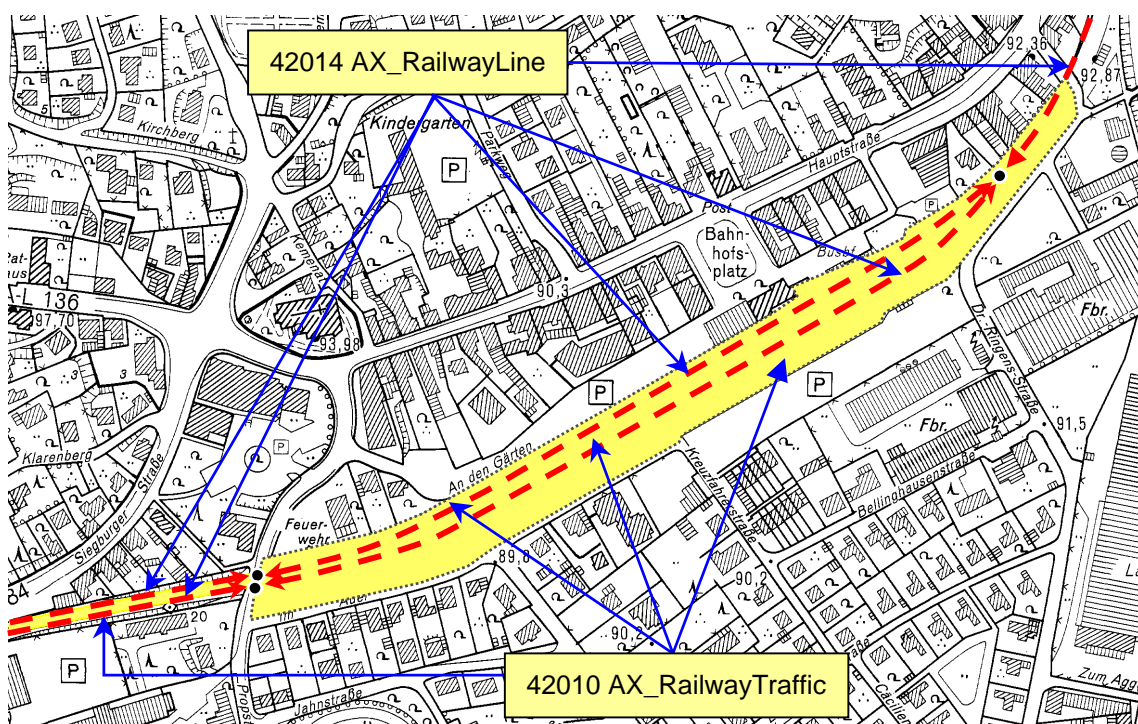


Figure 5.4 – 19. : Modelling of several railway lines

8.3 Vegetation

The feature type group with designation "vegetation" and code 43000 comprises areas for agricultural and forestry use which are characterised by natural vegetation or vegetation-free areas. The feature type group includes the following feature types:

- 43001 AX_Agriculture
- 43002 AX_Wood
- 43003 AX_Copse
- 43004 AX_Heath
- 43005 AX_Moor
- 43006 AX_Marsh
- 43007 AX_UncultivatedArea
- 43008 AX_CurrentlyUndeterminableArea

The vegetation areas are described not only as feature types but also as attribute values. Feature type 43001 AX_Agriculture records all areas used for agricultural purposes. Differentiation according to the dominant use (e.g. arable land, grassland, garden land) is realised through the attribute type "vegetation characteristic".

Objects of the "vegetation" feature type group are in principle recorded only from an area of 1 ha. Exceptions are feature types 43002 AX_Wood and 43003 AX_Copse which are recorded from an area as small as $\geq 0,1$ ha.

Areas that do not meet the recording criteria specified for the feature type are assigned to one of the adjacent areas. Other vegetation areas are considered as a priority, specifically those whose characteristics are comparatively similar in respect of the feature type. Thus, a copse will be assigned to a wooded area in preference to an agricultural area.

Vegetation areas that do not satisfy the recording criterion are to be integrated into the surface residential areas if there is no option of assigning them to other vegetation areas.

As due to the diverse landscape feature forms, the earth's surface cannot always be clearly represented and objects of the "land use" feature type area may never overlap, the vegetation character in residential areas can be considered through feature type 54001 AX_Vegetation-Characteristic (see 8.1, Figure 5.4 – 15).

8.4 Water

The feature type group with designation "water" and code 44000 comprises the areas of the earth's surface that are covered with water.

The feature type group includes the following feature types:

- 44001 AX_FlowingWater
- 44002 AX_Watercourse
- 44003 AX_Canal
- 44004 AX_WaterCentreLine
- 44005 AX_Basin
- 44006 AX_StandingWater
- 44007 AX_Sea

In the water feature type group, the bodies of water on the earth's surface are recorded without overlaps by line or surface objects (see subsection 1.8). The feature types 44002 AX_Watercourse and 44003 AX_Canal are composed objects (ZUSO) and consist of one or several REO 44001 AX_FlowingWater and/or one or several REO 44004 AX_WaterCentreLine.

Natural (brook) and artificial (canal) waters are recorded as objects of feature type 44001 AX_FlowingWater or as objects of feature type 44004 AX_WaterCentreLine. Waters up to 12 m width are modelled as line objects of feature type 44004 AX_WaterCentreLine, waters over 12 m width as surface objects of feature type 44001 AX_FlowingWater. The waters are geometrically bordered by their bank line. In the case of feature type 44007 AX_Sea, the bank line is at average high tide, in the case of other waters the bank line is at average water level.

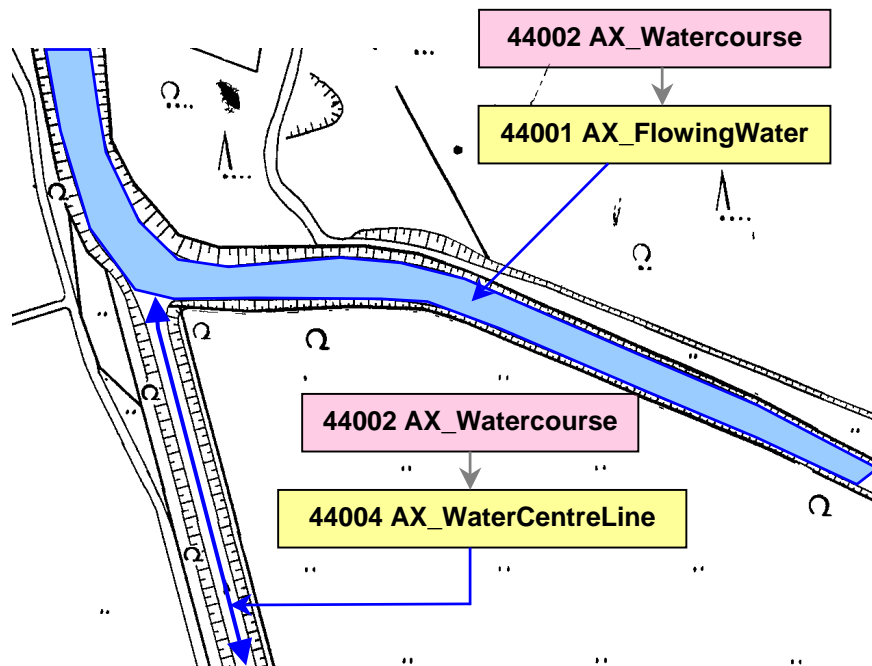


Figure 5.4 – 20. : Modelling of a watercourse

The principle already described, that objects of the "land use" feature type area must not overlap, becomes applicable if the objects lie on the earth's surface.

In the gapless and free overlapping description of the earth's surface the features of the feature type

44001 AX_FlowingWater, 44005 AX_Basin, 44006 AX_StandingWater and 44007 AX_Sea of the feature type group "water" take part if they run or lie on the earth's surface.

If waters are piped or covered in their contour then they do not belong to the features that declare the earth's surface gaplessly. Furthermore they may only overlap objects of feature type "land use" if an object of feature type 53009 AX_BuildingInWaterArea (e.g. duct) lies between. The water feature running aboveground or belowground receives a relation to the structure. The water therefore does not participate in the theme formation of the "land use" feature type area and at the same time the information is held that the features do not lie on the earth's surface.

Surface modelled dams, dam walls and weirs create special situations in the water area. They interrupt the water. As in reality there are no water areas below these structures, the area below the structure is described through the object of feature type 43007 AX_Uncultivated-Area and the attribute "function" with the attribute value FKT 1100 "water accompanying area".

If a water flows below the earth's surface through granular soil, the situation is represented through feature type 57004 AX_SeepageLine.

Generally a flowing direction is assigned to the waters. It can be derived by evaluating the water code or from the directional geometry of the water centre line.

9 Buildings, installations and other data

The feature type area of "buildings, installations and other data" consists of the following feature type groups:

- 51000 Buildings and installations in residential areas
- 52000 Special units in settlement areas
- 53000 Buildings, units and installations for traffic
- 54000 Specific vegetation characteristics
- 55000 Specific feature of water
- 56000 Specific data on traffic
- 57000 Specific data on water

The objects of the feature type area "structures, installations and other data" must always be considered in the technical context with the features of the "land use" feature type area. The feature type area "structures, installations and other data" also contains information actually assigned to the land use area, which, however, according to the dominance principle, is not managed as objects of the "land use" feature type area. The feature types of the feature type area "structures, installations and other data" overlap the objects of the feature type area "land use" without dissecting them or punching out the areas.

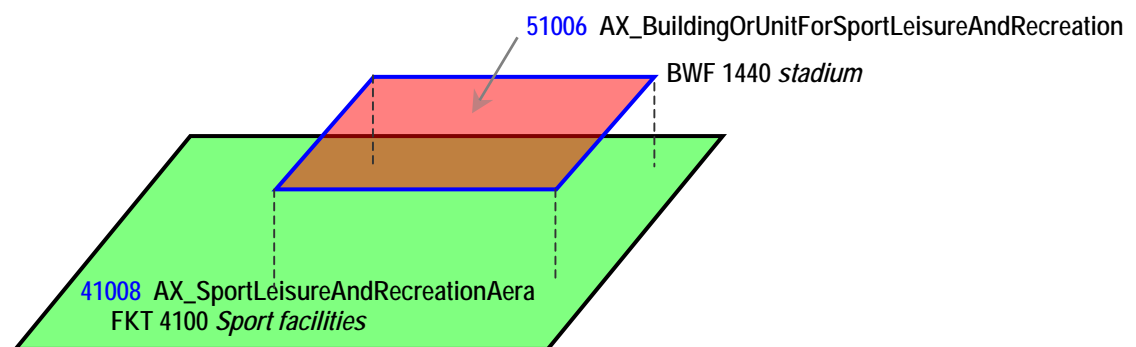


Figure 5.4 – 21. : Overlapping on ground areas

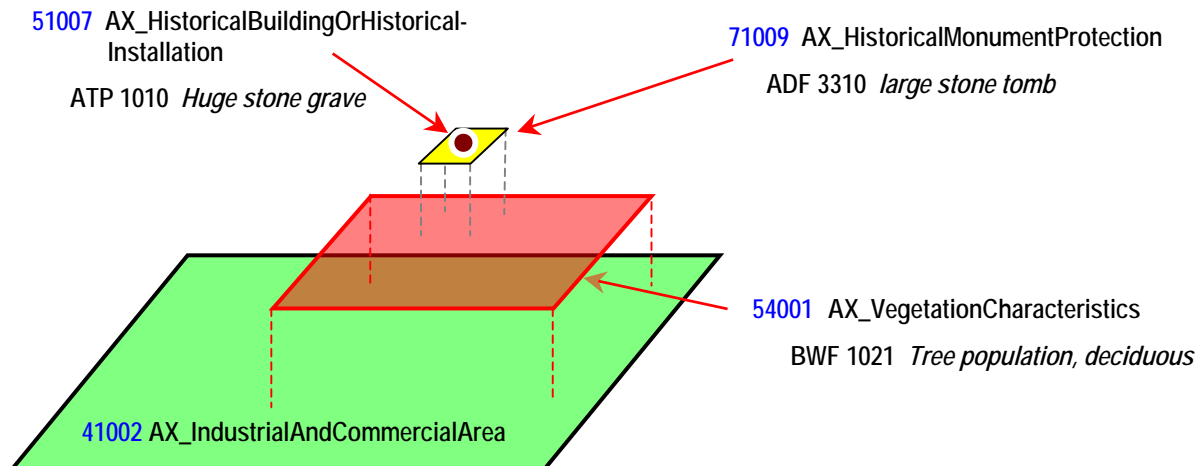


Figure 5.4 – 22. : Overlapping on ground areas

Special features on individually selected feature types are described below.

Feature type 51001 AX_Tower

A Tower is a towering building situated on a relatively small area that can be free-standing on the terrain or is situated on another building. In ATKIS the free-standing tower is modelled as feature of feature type 51001 AX_Tower. The tower in a building is recorded as feature of feature type 31002 AX_PartOfHouse with the attribute type "Construction type" and the attribute value "Tower inside house" (see also paragraph 7.1.5)

Feature type 51002 AX_BuildingOrUnitForIndustryAndCommerce

(BWF 1290 "chimney")

A chimney can be free-standing or is situated within a building contour. In ATKIS free-standing chimneys are modelled as features of feature type 51003 "BuildingOrUnitFor-IndustryAndCommerce. The chimney in a building is recorded as feature of feature type 31002 AX_PartOfHouse with the attribute "type of construction" and the attribute value "Chimney inside house" (see also paragraph 7.1.5)

Feature type 51002 AX_BuildingOrUnitForIndustryAndCommerce

(BWF 1250 "mast") **and also 51005 AX_HighVoltageLine**

Lines and masts are not modelled as a topological network. Geometrically, however, a line network is recorded through derivation of the individual features 51005 AX_HighVoltageLine from the "AU_ContinuousLineObject". Data users (e.g. energy supply companies) are at liberty to interlink a topological network from the existing data.

Feature types 52002 AX_Port and 52003 AX_Lock

Feature types 52002 AX_Port and 52003 AX_Lock are surface units which can overlap various feature types from different areas. The overlap option is, however, severely restricted in respect of ground areas. To describe the water areas, only objects that belong to the "water" feature type group may lie within 52002 AX_Port and 52003 AX_Lock. The land areas must be recorded as objects of feature type AX_ShippingTraffic with the attribute "function" and the attribute value FKT 5610 "port unit (land area)" and/or FKT 5620 "lock (land area)". Other overlaps, e.g. through objects of feature type 31001 AX_House are permissible.

Feature type 53001 AX_BuildingInTrafficArea

The modelling of the bridge (function 1800-1830) is dependent on the features lying on the bridge. The following rules are to be applied:

- The bridge has to be modelled as line feature if one or more line and geometric identically modelled features are situated on the bridge.
- The bridge has to be modelled as area feature if one or more area modelled features are situated on the bridge.
- The bridge has to be modelled as area feature if several not-geometric identically modelled features are situated on the bridge.

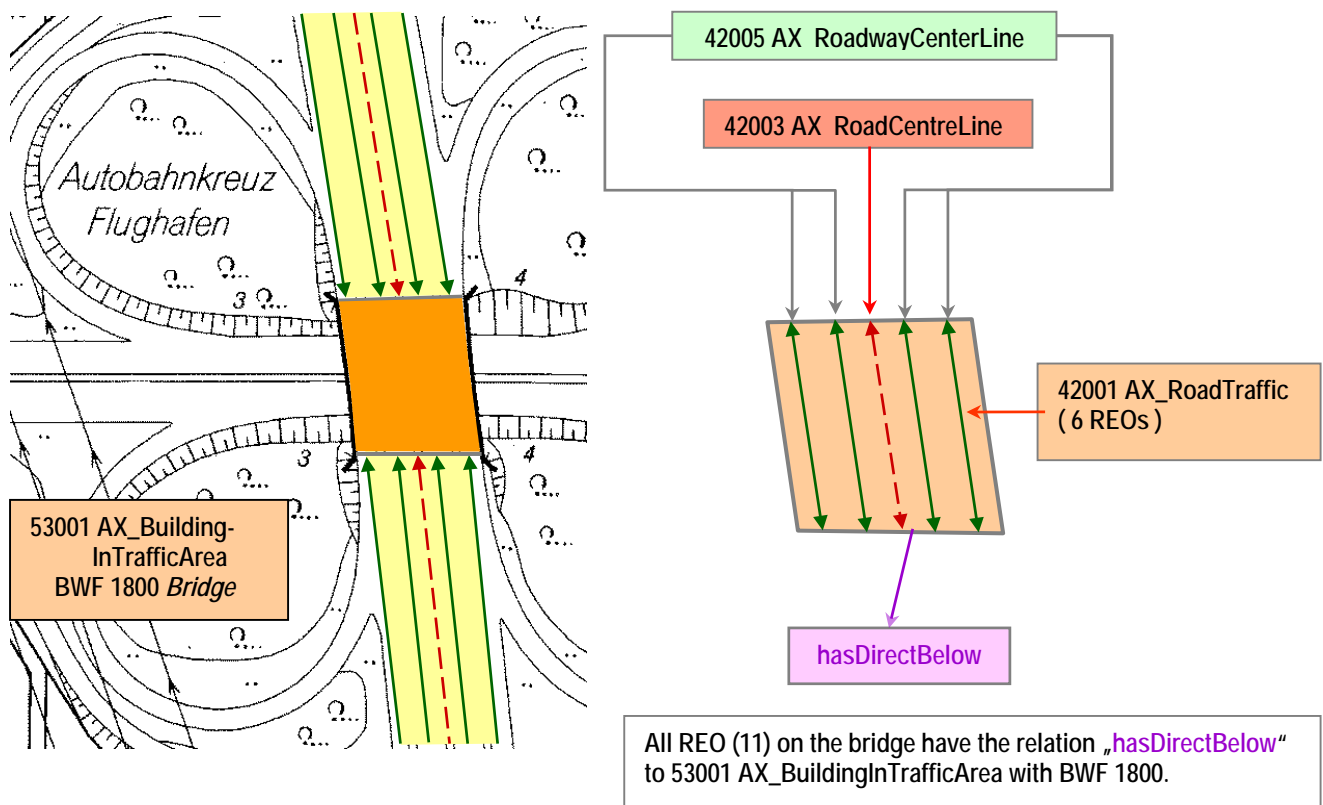


Figure 5.4 – 23. : Modelling of a areal feature bridge

The structure "tunnel" can be composed of one or more tunnel sections. The modelling of these tunnel sections as feature "tunnel" is dependent on the geometric form. If the distance

between the tunnel sections is too big so that they are to be modelled as separated features in the base DLM, two features are to be kept.

For the modelling of the "tunnel" (Function 1870) the following rules are to be applied:

- The tunnel has to be modelled as line feature if one or more line and geometric identically modelled features are situated in the tunnel.
- The tunnel has to be modelled as area feature if one or more area modelled features are situated in the tunnel.
- The tunnel has to be modelled as area feature if several not-geometric identically modelled features are situated in the tunnel.

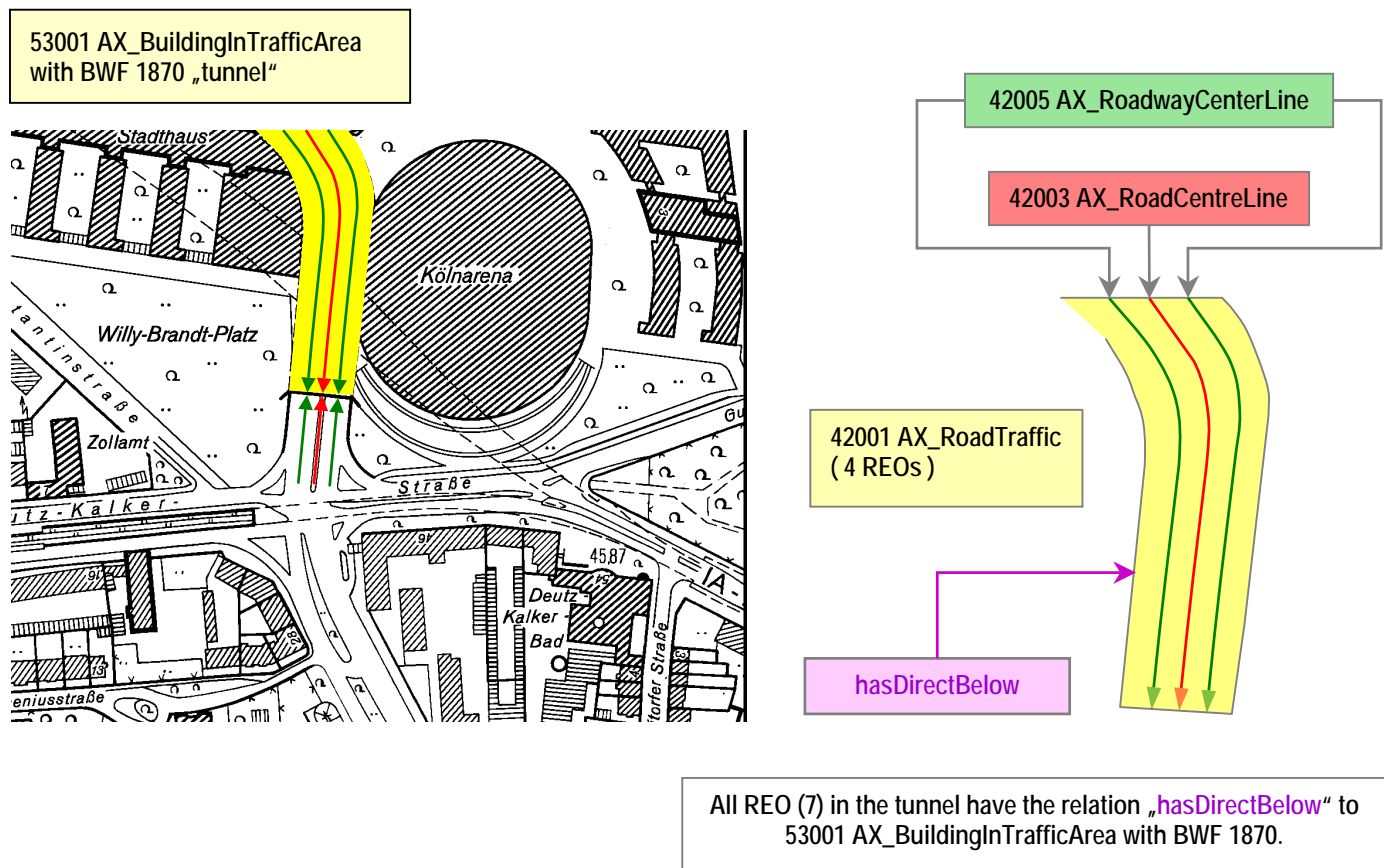


Figure 5.4 – 24. : Modelling of a areal feature tunnel

For the modelling of a passage as line feature no relations are built. Geometric identity is guaranteed via the following consistency rules:

- The attribute value 1900 "passage" of the attribute type "structure function" is always overlaying a feature of feature type 42003 AX_RoadCentreLine, 42008 AX_RoadwayCentreLine or 53003 AX_RoadPathSteepTrack.

If the passage is modelled as line feature, a REO of the passing traffic way has to be created being identically with the passage.

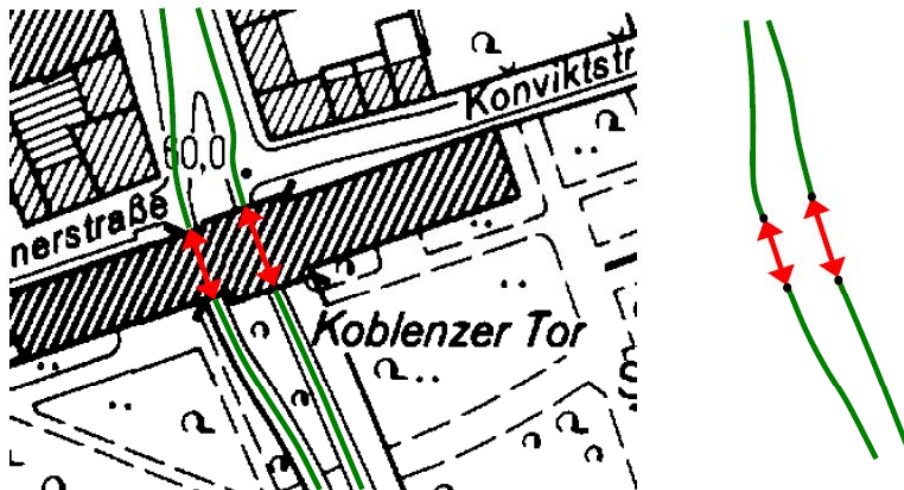


Abbildung 5.4 – 25.: Modellierung einer linienförmigen Durchfahrt

Figure 5.4 – 25.: Modelling of a linear passage

Feature type 53002 AX_RoadTrafficUnit (art 2000 "ford")

The ford modelled as line always overlays a feature of the feature type 42003 AX_RoadCentreLine, AX_RoadwayCentreLine or 53003 AX_RoadPathSteepTrack.

Feature type 53003 AX_RoadPathSteepTrack

In the feature type 53003 AX_RoadPathSteepTrack subordinate roads are recorded which are important from a topographical point of view, although in accordance with the dominance principle, are not assigned to the "land use" feature type area (e.g. footpaths in green areas).

Feature type 53009 AX_BuildingInWaterArea

The surface modelled structures for this feature type, e.g. dams or bank protection create a special situation. These objects must be underlined with feature type 43007 "uncultivated area" and the attribute "function" and the attribute value FKT 1100 "water associated area". This guarantees the continuous and intersection-free description of the earth's surface.

Feature type 54001 AX_VegetationCharacteristic

The earth's surface is usually described through objects of the "land use" feature type area which must not overlap. If both residential areas and vegetation areas describe the locality, the residential area is always modelled as the ground area. The vegetation area is then shown as an overlapping feature type 54001 AX_VegetationCharacteristic (see Figure 5.4 – 15).

Feature type 55001 AX_WaterCharacteristic

Feature type 55001 AX_WaterCharacteristic describes specific features of a water, e.g. those of rapids. As the AX_WaterCharacteristic overlaps the ground area, the topological network of the water is not interrupted at this point.

Feature type group 56000 "Specific data on traffic"

This feature type group includes the feature types 56001 AX_NetworkNode, 56002 AX_ZeroPoint, 56003 AX_Section and 56004 AX_Branch. These four feature types form the linkage elements to the technical data of the road building authority. It is modelled as part of the valid standards of the road building authorities (ASB, OKSTRA) and thus enables data to be interchanged in an automated fashion between the two authorities.

No independent theme is formed for these feature types. The line objects 56003 AX_Section and 56004 AX_Branch are derived from AU_ContinuousLineObject. This guarantees the correlation between the geometries.

The feature types of the feature type group "Specific data on traffic" overlap all other feature types.

Feature type 57002 AX_ShippingRouteFerryTraffic

The feature type 57002 AX_ShippingRouteFerryTraffic describes regular ship or ferry connections. The feature type 57002 AX_ShippingRouteFerryTraffic with the attribute "type" and the attribute value ART 1710 "car ferry traffic" and/or ART 1720 "railway ferry traffic" is geometrically integrated between AX_RoadCentreLine or AX_RoadwayCentreLine so as to create a closed network.

Feature type 57003 AX_WaterStationingCentreLine

The features 57003 AX_WaterStationingCentreLine and 44004 AX_WaterCentreLine form the topological network for the water. They form the basis of water stationing systems managed by the technical administrations of the government and the states. The feature 57003 AX_WaterStationingCentreLine is a centre line in surface recorded features of the feature type 44001 AX_FlowingWater and has two technical functions. It is

- a) a water centre line specified by the water and shipping route authority for federal waters and
- b) an approximating centre line in all surface recorded flowing waters, which corresponds to the specifications of the guidelines of the regional water association (LAWA).

The topological network is closed by the confluence of a surface water and another surface water, lakes and ponds and also the area of seepage lines through a fictitious water stationing centre line.

The water stationing values present at the water centre lines are not a component of the basic DLM.

Feature type 57004 AX_SeepageLine

If a water flows below the earth's surface through unconsolidated material, the situation is recorded by the surface feature type 57004 AX_SeepageLine. The topological network of the water is closed in the seepage line contour by a fictitious "water stationing centre line".

10 Relief

The relief is the surface of the earth being subject of a constant modification due to collaboration of endogenous and exogenous power.

The surface is defined as the boundary between the concrete earth, the water and the glacier on the one hand and the air on the other. It is described completely and three-dimensionally through a representative point mass, the Digital Terrain Model (DGM). The features of the DGM are not kept in the basic DLM but in the ATKIS technical schema. The common data model and the coordination between the ATKIS basic DLM and the ATKIS DGM led to the same feature mapping principles.

Selected characteristic relief forms are modelled two-dimensionally in the base DLM as feature types belonging to the feature type group "relief forms" and "primary DGM". As height information relative feature heights are kept having no respect to the official height reference.

The feature types of the feature type area "relief" overlay the ground areas.

From the feature type area "relief" the feature types of the feature type group "relief forms" are kept in ATKIS:

- 61001 AX_EmbankmentCliff
- 61002 AX_EmbankmentArea
- 61003 AX_DamWallDyke
- 61004 AX_Cut
- 61005 AX_CaveEntrance
- 61006 AX_RockLumpOfRockNeedleRock
- 61007 AX_Dune
- 61008 AX_ContourLine.

as well as from the feature type group "primary DGM" the feature type:

- 62040 AX_TerrainEdge.

In the following particularities to selected feature types are described:

The feature type 61001 AX_EmbankmentCliff

The topographically different terrain structures embankment and cliff are modelled as composed object (ZUSO) 61001 AX_EmbankmentCliff. It consists of one or more REO 62040 AX_TerrainEdge or one REO 61002 AX_EmbankmentArea and one or more REO 62040 AX_TerrainEdge. The geometry of the feature type 62040 AX_TerrainEdge is always identical with parts of the contour geometry of the feature type 61002 AX_EmbankmentArea (see Figure 5.4 – 26 and Figure 5.4 – 27).

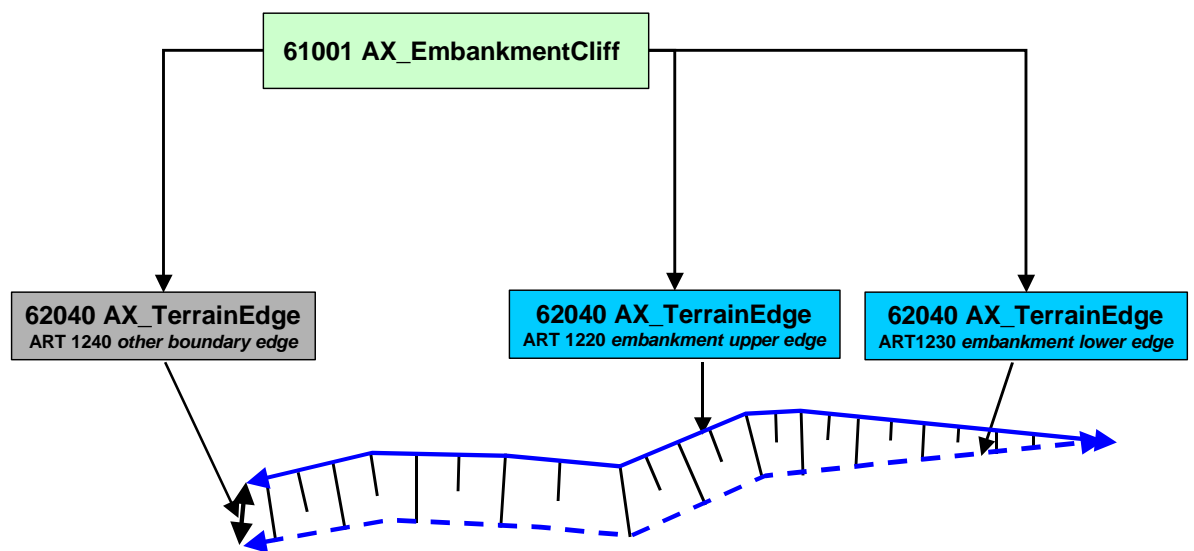


Figure 5.4 – 26. : Modelling of embankments with terrain edges

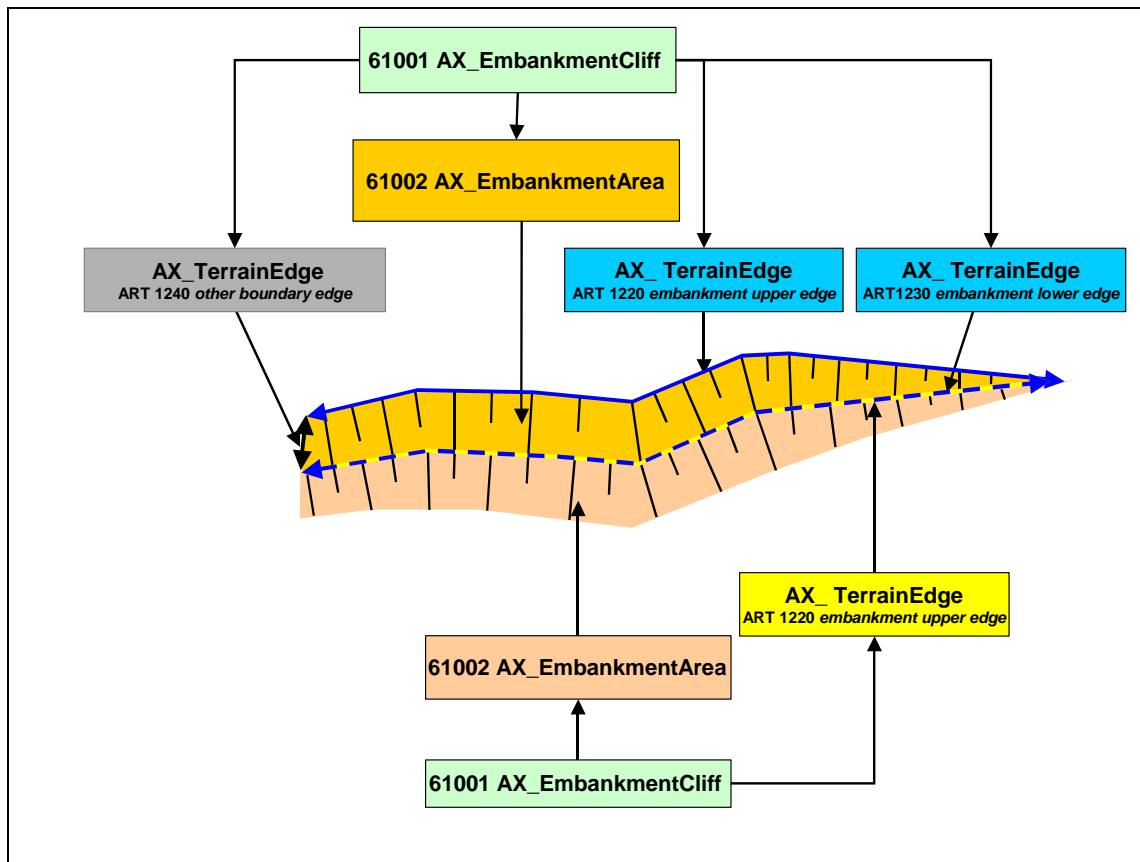


Figure 5.4 – 27. :Modelling of embankments with embankment areas and surface edges

Feature type 61008 AX_ContourLine

Except for the feature type 61008 AX_ContourLine all feature types describe selected characteristic relief forms, normally with a relative height value. The feature type 61008 AX_ContourLine is evidence of the complete description of the country's terrain height by describing the vertical interval of the individual contour lines to the official reference system. With help of attributive information "height of the contour line" the terrain height can be described above (contour line) or below (depth contour) of a height reference system.

10.1 Primary DGM

The feature type group with the description "Primary DGM" and the code "62000" describes the feature types that are primarily necessary for the construction of the DGM. The feature type "terrain edge" – necessary for the description of the feature type 62040 AX_EmbankmentCliff – is situated in this feature type group. So the feature type group is also part of the basic DLM.

11 Legal stipulations, area units, catalogues

The feature type area of "legal stipulations, area units, catalogue" consists of the following feature type groups:

- 71000 Stipulation governed by public law and other stipulations
- 73000 Catalogues
- 74000 Geographical area units
- 75000 Administrative area units

11.1 Information on legal stipulations

The original proof of stipulations subject to public law is justified by the relevant law and is the responsibility of the accountable departments. The official surveying and mapping of the federal states should emphasise public law and other stipulations, which are determined by their position on the earth's surface, identified and described by their most important characteristics. Stipulations subject to public law are restrictions (e.g. protected areas) that are justified by public law. The legal stipulations cover several feature types, in consideration of technical and modelling aspects. The feature types and their properties abstract the real facts and are modelled in both the ALKIS and the ATKIS technical schemas.

The feature type area "legal stipulations, area units, catalogues" is from a real estate point of view semantically coordinated with the geotopographical outlook of the geobasic data at AdV level and harmonised as part of the model accuracy. This guarantees a joint and unified use of the official geobasic data; further coordination with the geodata of the technical authorities is being pursued state and nationwide on the basis of the conceptual AdV basic schema. The transparency generated by the new data modelling enables unified standard presentations in terms of both content and cartography, which can be prepared in the form of information, viewing, output or automated download.

11.2 Stipulations subject to public law and other stipulations

The feature type group is divided by legal areas and includes the following feature types:

- 71004 AX_OtherStipulationAccordingToWaterLaw
- 71005 AX_ProtectedAreaAccordingToWaterLaw
- 71006 AX_NatureEnvironmentOrSoilConservationLaw
- 71007 AX_ProtectedAreaAccordingToNatureEnvironmentOrSoilConservationLaw
- 71009 AX_HistoricalMonumentProtection
- 71011 AX_OtherLaw
- 71012 AX_ProtectionZone.

Reference is made via the feature type group to property related constraints, charges or other properties. The material stipulations are based on specific legal regulations. Assignment, classification, dedication and demarcation are the responsibility of the accountable and/or managing departments. The feature types relevant to ATKIS appear in the UML overview below in yellow.

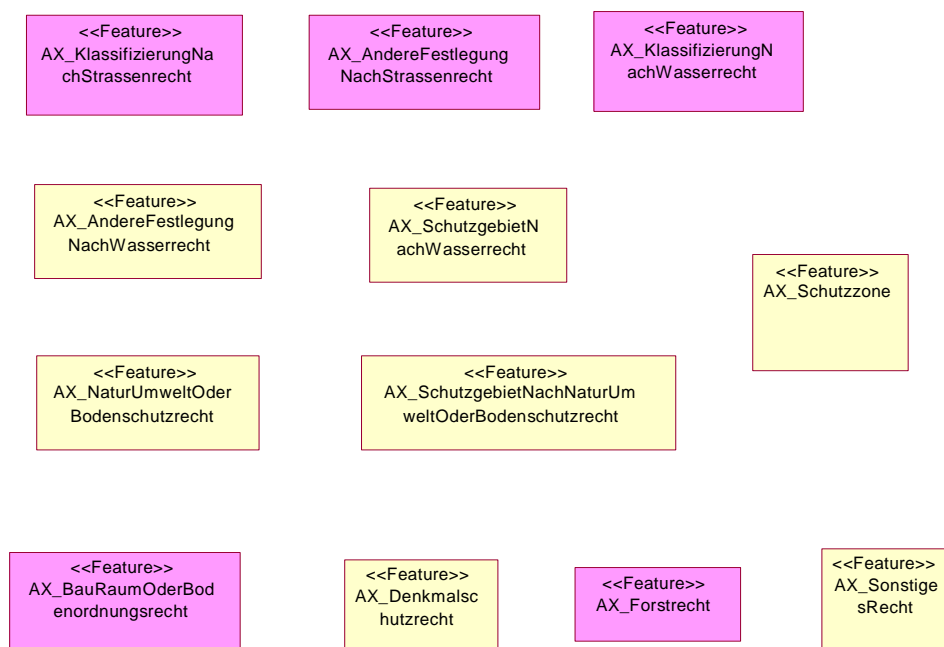


Figure 5.4 – 28. : Legal stipulations derived from UML

Besides the type of stipulation, other technical properties of the legal stipulations are modelled in the AFIS-ALKIS-ATKIS application schema as follows:

Feature type 71012 AX_ProtectionZone

Protection zones have been assigned to a higher level of protected area through modelling of the protection zones as ZUSO. From a technical viewpoint, the ZUSO forms a bracket around the individual REO protection zones in order to identify those with differing attributes. The protected areas are sub-divided in accordance with the following laws – "protected areas according to the water law" and "protected areas according to nature, environmental or soil conservation law".

If the feature type 71005 AX_ProtectedAreaAccordingToWaterLaw (ZUSO) or 71007 AX_ProtectedAreaAccordingToNatureEnvironmentOrSoilConservationLaw is not divided into different protection zones, a feature of the feature type 71012 AX_ProtectionZone is modelled nevertheless. The outer contour of the protection area is recorded and the feature obtains the attribute "zone" and the attribute value ZON 9997 "Attribute does not apply".

The feature type group "stipulations governed by public law and other stipulations" with the feature types relevant to ATKIS are modelled as follows (simplified):

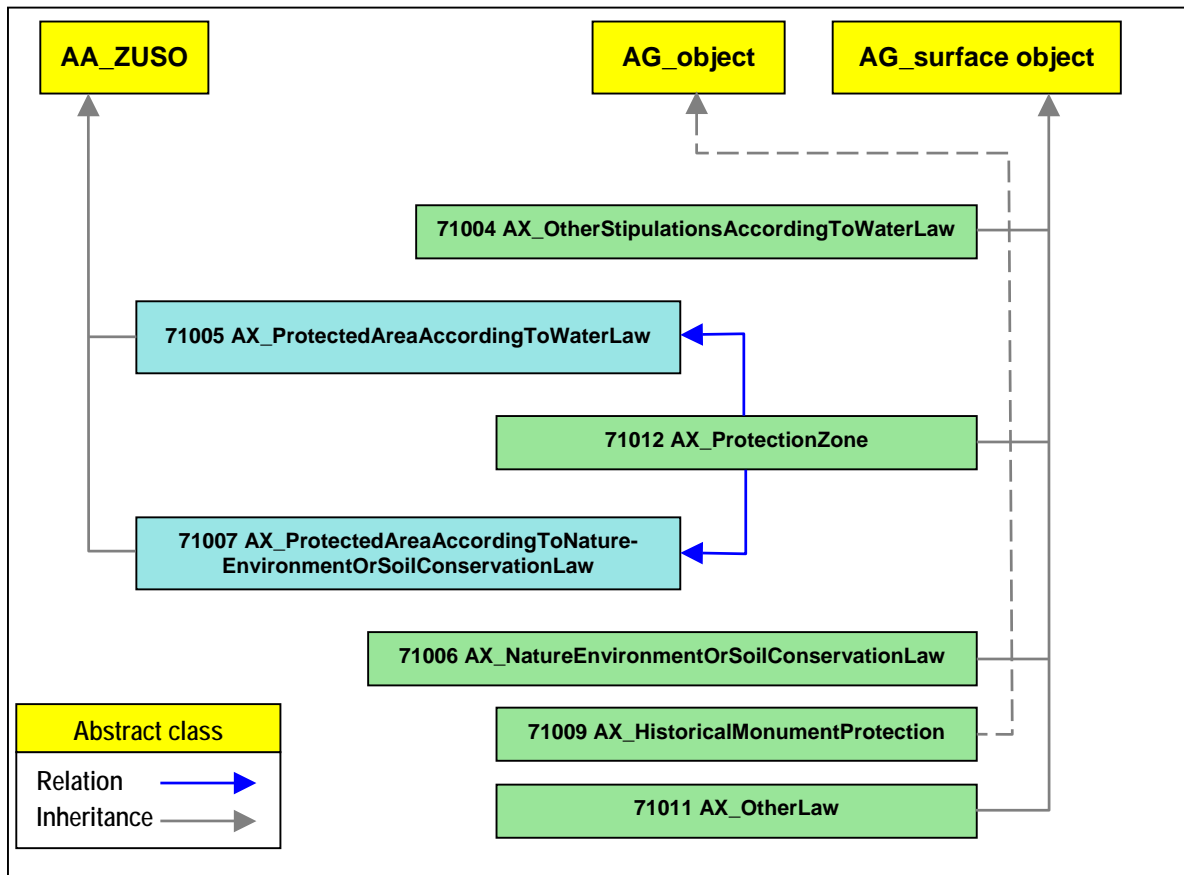


Figure 5.4 – 29. : Stipulations subject to public law and other stipulations

The "protected area according to water law" and "protection zone" are modelled for example through the following four objects:

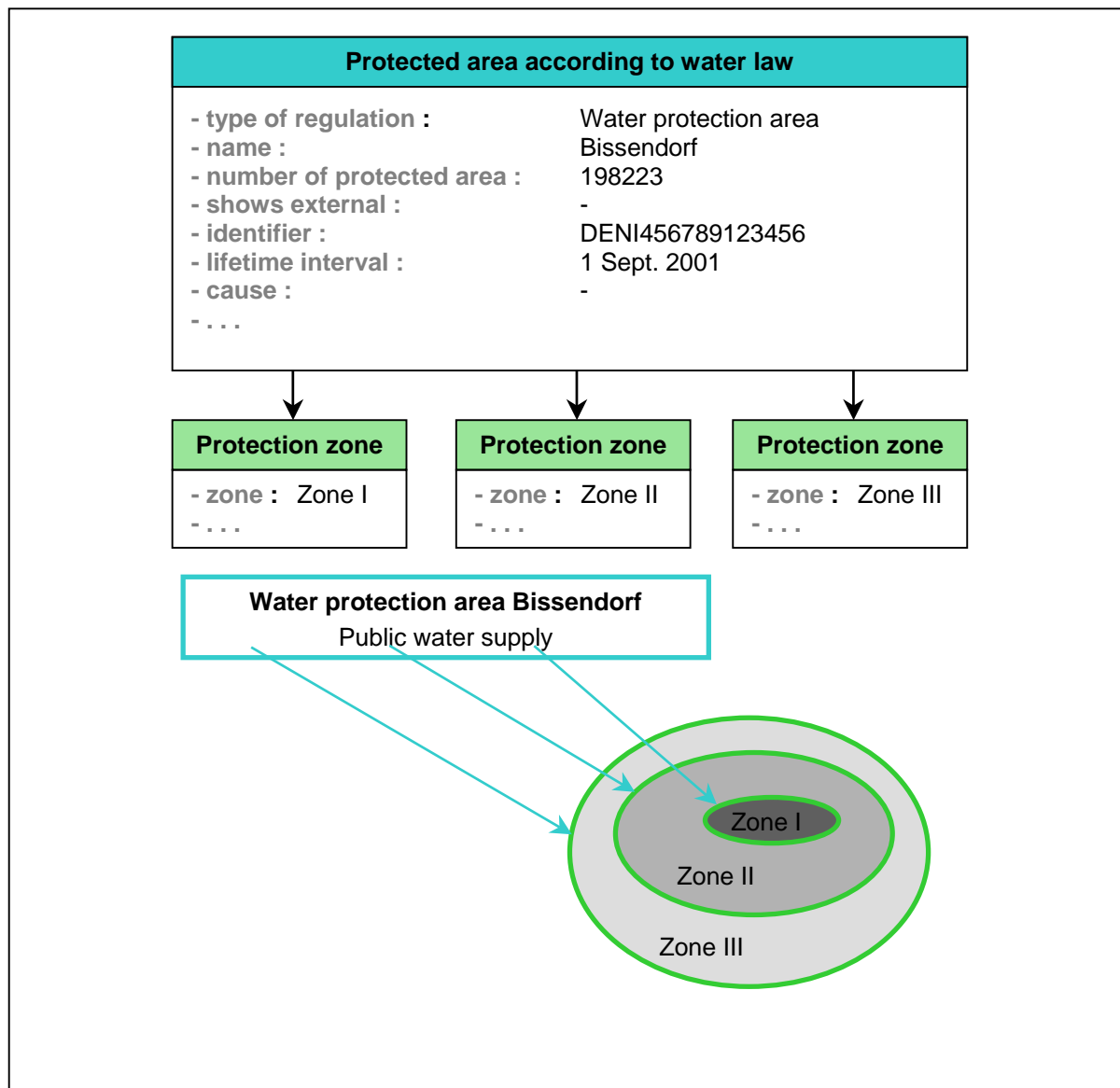


Figure 5.4 – 30. : Example of a "Protected area according to water law"

11.3 Catalogues

The AFIS-ALKIS-ATKIS application schema contains feature types which exhibit pure catalogue properties and therefore have no spatial reference. These are held in the "catalogue" feature type with code "73000". These feature types are inherited by an abstract class "catalogue entry". Each catalogue entry represents an instance of the corresponding catalogue feature type. The catalogues are used in ATKIS, in order to derive the longhand designation for encrypted information. The codes are required in a series of feature types, e.g. the encrypted position designation.

The feature type group contains the following feature types:

- 73001 AX_NationalState
- 73002 AX_FederalState
- 73003 AX_GovernmentDistrict
- 73004 AX_DistrictOrRegion
- 73005 AX_Municipality
- 73006 AX_MunicipalitySection
- 73009 AX_AdministrativeCommunity
- 73013 AX_LocationDescriptionCatalogueEntry

Each ATKIS database independently carries catalogue entries in conformity with the corresponding technical catalogues.

11.4 Geographical area units

This feature type group includes the following feature types:

- 74001 AX_Landscape
- 74002 AX_SmallAreaLandscapeSection
- 74003 AX_NamedPlace
- 74004 AX_Island
- 74005 AX_Domicile

Feature types "landscape" and "small landscape section" describe the earth's surface in respect of its appearance in relation to soil forms, vegetation and settlement.

11.5 Administrative area units

The feature type group "Administrative area units" includes the following feature types:

- 75003 AX_MunicipalArea
- 75004 AX_AreaNationalState
- 75005 AX_AreaFederalState
- 75006 AX_AreaGovernmentDistrict
- 75007 AX_AreaDistrict
- 75008 AX_Condominium
- 75009 AX_AreaBorder
- 75010 AX_Area

These feature types represent the areas of the administrative units (e.g. municipal area). The features inherit from an abstract class 75010 AX_Area modelled as TA_MultiSurface-Component. Thereby the modelling of enclaves and exclaves are possible. Areas are assigned to the topological theme "Areas basic DLM". ATKIS uses this topological theme for all feature types of feature type group "Administrative area units". All adjacent areas must thus share the geometry.

12 User profile feature type area

User pre-conditions and data protection requirements determine a user's access to ATKIS. Each user has individual access rights for accessing ATKIS data, which are described and specified in the user profile. The access right takes account of personal, content, spatial and time-related aspects and also the function determination. The user profile indicates whether a reading or a writing (enter, change, delete) access, a regular data interchange or an automated download process are approved. As the user profiles are to be permanently stored, they have been accepted into the ATKIS primary database data feature catalogue description and for the feature types of the user profile, an independent "user profile" feature type area with the corresponding feature type group "user profile" is formed.

This feature type group includes the following feature types:

- 81001 AX_User
- 81002 AX_UserGroup
- 81003 AX_UserGroupWithAccessMonitoring
- 81004 AX_UserGroupNBA.

These relate to feature types without spatial reference. A spatial reference is not required to manage the user profile. The feature types are created for AFIS, ALKIS, ATKIS.

The "user group" feature type holds information regarding access control and selection habits of the users for primary data base data submission. Each user is therefore able to control both the access authorisation and the NBA process. The feature type 81001 AX_User contains all individual, user-specific properties used for providing primary database data. The "user group" feature type contains information on selection and/or access control that can also apply for several users, enabling these users to be concentrated into user groups.

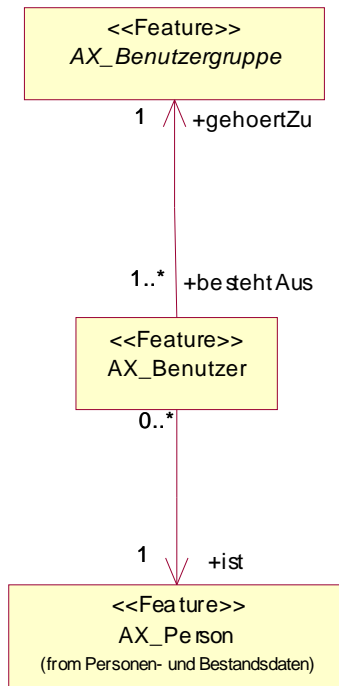


Figure 5.4 – 31. : Feature type group "user profile" in UML

Feature type 81001 AX_User

In the feature type AX_User, information on the user is managed, e.g. required data format or time limitation of the access authorisation. Personal-related properties are created on the relation to the "person" feature type in the "personal and primary database data" feature type group. Each user is assigned through relation "belongs to" with cardinality 1 to precisely one user group.

Several users having the same access authorisation are concentrated into user groups. Several "user" feature types that can be assigned to different user groups can be created for one person. It is possible, however, for a user to be assigned to only one user group.

Feature type 81002 AX_UserGroup

Information, e.g. designation, accountable department, coordinate reference system is held on the group through the "user group" feature type. In the "coordinate reference system" attribute, the preferred coordinate reference system (CRS) can be indicated for coordinate data in the output primary database data. The data is optional and if omitted, the "native", i.e. CRS

present in the primary database data is used. The coordinates are then output in the same format as they are stored.

Feature type 81003 AX_UserGroupWithAccessMonitoring

In the feature type 81003 AX_UserGroupWithAccessMonitoring, information on ATKIS primary database users is managed, which limits the scope of use and updating for reasons of data consistency and data protection. The relevant data are held through attribute types "selection criteria" and "access type product code use".

Feature type 81004 AX_UserGroupNBA

The feature type 81004 AX_UserGroupNBA stores the information relevant to effecting the NBA supply, e.g. the selection criteria to be applied. In this case, access rights are not verified separately and consideration of such is to be guaranteed by the administrator during generation and maintenance of the NBA user groups.

Feature types 81004 AX_UserGroupNBA and 81003 AX_UserGroupWithAccessMonitoring inherit further properties from feature type 81002 AX_UserGroup in respect of attribute types "designation, accountable department, coordinate reference system".

In both feature types 81004 AX_UserGroupNBA and 81003 AX_UserGroupWithAccessMonitoring the selection criteria is assigned to the various levels:

- (1) Selection criteria for the user group describe the objects to which access is permitted. For each object type to which access is permitted, a query shall be created in order to specify spatial and technical areas for selection and access authorisation. The scope of the objects to be selected from one feature type can be limited through filter ratings (e.g. only all land parcels of a district are selected from feature type "land parcel". The scope of the permitted ratings is extremely limited, which simplifies process ability. Only the following ratings are permitted in a query:
 - Spatial operators (act only on REO feature types);
 - Operators on attributes "lifetime interval" and "model type".
- (2) The time authorisation is specified in attribute type "area – time" for the NBA process. The form and intervals in which the user group receives revision data is indicated, e.g. update event-related and/or effective date-related submission including the relevant effective date.

- (3) The function access is specified in attribute types "access type product code use". The reading and writing functions that the user group may perform are stored here. For the utilisation process, the product code specifies the output products for which the user group is approved (attribute type "access type product code utilisation").

Appropriate examples for modelling user profiles can be found in [Annex 4](#) of GeoInfoDok, Section 5.3.

13 ATKIS metadata

13.1 General information

Metadata are "data on data" and describe geodata in terms of user-relevant aspects for evaluating the usability of the data and access to the same.

The metadata for ATKIS shall be carried in a metadata information system. On the one hand, this metadata information system notifies interested parties of this data prior to the ATKIS primary database data being used. On the other hand, metadata is provided to the user together with these data on submission of primary database data. The same applies for the submission of outputs that have been derived from primary database data. Update functions are provided for updating metadata.

Metadata also contain general statements on the quality of the data. Detailed quality data with a specific technical significance are managed at the object itself. For this purpose, quality elements (origin or quality parameters) are indicated in the ATKIS feature catalogue description for the feature types in question. These quality elements can be submitted to and evaluated by the user in conjunction with the primary database data.

The structure, terminology and definition of the metadata is derived from ISO/CD 19115. The ISO standard is currently available in draft format. The information below refers to the 19.12.2000 status. For describing metadata as geoinformation, an object model in the UML language is used in accordance with ISO standard.

14 Processes

14.1 Fundamental principles

With the exception of collection, the processes of qualification, management, utilisation and transfer are described in the technical concept for the modelling of geoinformation by official surveying and mapping. The relevant specifications can be found in Section 3.7 of GeoInfoDok.

The overview below illustrates the process chain in ATKIS. The collection data generated in the ATKIS structure following subsequent qualification are transferred after the update decision in the form of ATKIS update data within the updating process to the ATKIS primary database data. Through the utilisation process, the relevant data from the ATKIS primary database data and the associated metadata are prepared for output in an analogous and/or digital format, where applicable through a presentation. Processes can be described and recorded in a formal manner. The updating process including all functionalities and flows is to be recorded as a UML sequence diagram.

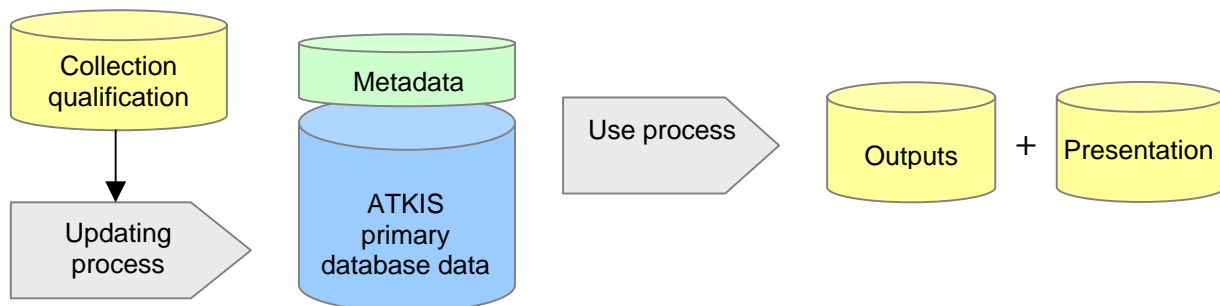


Figure 5.4 – 32. : Overview of the process sequence in ATKIS

The processes in AFIS-ALKIS-ATKIS are controlled by special NAS operations such as AX_revision case, AX_set-up job, AX_reservation job, AX_disable job and AX_utilisation job.

The jobs are modelled as data types with stereotype <<Request>> (select). The features of these data types exist only until the job is complete. The results are modelled as data types with stereotype <<Response>> (result) and exist only until the results are transferred to a NAS document.

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Vocabulary and reference list

Objektartenbereich Objektartengruppe Objektart Attributart Bezeichner Relationsart	Feature type area Feature type group Feature type Attribute type Name Relation type
Objektartenbereich „Flurstücke, Lage, Punkte“	Feature type area "parcels, location, points"
Angaben zur Lage	Data on location
AX_LagebezeichnungOhneHausnummer	AX_LocationDescriptionWithoutHouseNumber
Verschlüsselte Lagebezeichnung	Encoded location description
Unverschlüsselte Lagebezeichnung	Uncoded location description
gehört_zu	Belongs_to
AX_LagebezeichnungMitHausnummer	AX_LocationDescriptionWithHouseNumber
Verschlüsselte Lagebezeichnung	Encoded location description
Unverschlüsselte Lagebezeichnung	Uncoded location description
Hausnummer	House number
gehört_zu	Belongs_to
Bezieht_sich_auf	Relates_to
Objektartenbereich „Eigentümer“	Feature type area "owner"
Personen- und Bestandsdaten	Personal and land register data
AX_Person	AX_Person
Nachname oder Firma	Surname or company
Vorname	Christian name
Objektartenbereich „Gebäude“	Feature type area "house"
Angaben zum Gebäude	Data on the house
AX_Gebaeude	AX_House
Gebäudefunktion	House function
Wohngebäude	Residential house
Wohnheim	Residential home
Gebäude für öffentliche Zwecke	House für public business
Gebäude für Wirtschaft und Gewerbe	House for Business or commercial
Gebäudekennzeichen	House code
Gehört_zu	belongsTo
AX_Bauteil	AX_PartOfHouse
Objektartenbereich „Tatsächliche Nutzung“	Feature type area "actual use"
AX_TatsaechlicheNutzung	AX_ActualUse
Siedlung	Residential area
AX_Wohnbauflaeche	AX_ResidentialAreaSurface
AX_IndustrieUndGewerbeflaeche	AX_IndustrialAndCommercialArea
Funktion	Function
Industrie und Gewerbe	Industrial and commercial
AX_Halde	AX_Dump
AX_Bergbaubetrieb	AX_MiningOperation
AX_TagebauGrubeSteinbruch	AX_OpencastMinePitQuarry
AX_FlaecheGemischterNutzung	AX_CombinedUseArea
AX_FlaecheBesondererFunktionalerPraegung	AX_AreaWithSpecificFunctionalCharacteristic
AX_SportFreizeitUndErholungsflaeche	AX_SportLeisureAndRecreationArea
Funktion	Function
Grünanlage	Public park
Wildgehege	Animal enclosure
Safaripark, Wildpark	safari park, animal park
AX_Friedhof	AX_Cemetery

Objektartenbereich Objektartengruppe Objektart Attributart Bezeichner Relationsart	Feature type area Feature type group Feature type Attribute type Name Relation type
Verkehr	Traffic
AX_Strassenverkehr	AX_RoadTraffic
AX_Strasse	AX_Road
AX_Strassenachse	AX_RoadCentreLine
AX_Fahrbahnachse	AX_RoadwayCentre
AX_Weg	AX_Path
AX_Wegachse	AX_CarriagewayCentreLine
AX_Platz	AX_Place
AX_Bahnverkehr	AX_RailTraffic
AX_Flugverkehr	AX_AirTraffic
AX_Bahnstrecke	AX_RailwayLine
AX_Schiffsverkehr	AX_ShippingTraffic
Vegetation	Vegetation
AX_Landwirtschaft	AX_Agriculture
AX_Wald	AX_Wood
Laub- und Nadelwald	Deciduous trees and wood conifer
AX_Gehoelz	AX_Copse
AX_Heide	AX_Heath
AX_Moor	AX_Moor
AX_Sumpf	AX_Marsh
AX_UnlandVegetationsloseFläche	AX_UnproductiveArea
Gewässerbegleitfläche	water accompanying area
AX_FlaecheZurZeitUnbestimmbar	AX_CurentlyUndeterminedAera
Gewässer	Water
AX_Fliessgewaesser	AX_FlowingWater
AX_Wasserlauf	AX_Watercourse
AX_Kanal	AX_Canal
AX_Gewaesserachse	AX_WaterCentreLine
AX_Hafenbecken	AX_Basin
AX_StehendesGewaesser	AX_StandingWater
AX_Meer	AX_Sea
Objektartenbereich „Bauwerke, Einrichtungen und sonstige Angaben“	Feature type area “buildings, installations and other data”
Bauwerke und Einrichtungen in Siedlungsflächen	Buildings and installations in residential areas
AX_BauwerkeEinrichtungenUndSonstigeAngaben	AX_BuildngsInstallationsAndOtherData
AX_Turm	AX_Tower
AX_BauwerkOderAnlageFuerIndustrieUndGewerbe	AX_BuildingOrUnitForIndustryAndCommerce
AX_VorratsbehaelterSpeicherbauwerk	AX_ReservoirStorageBuilding
AX_Transportanlage	AX_TransportUnit
AX_Leitung	AX_Line
AX_BauwerkOderAnlageFuerSportFreizeitUndErholung	AX_BuildingOrUnitForSportLeisureAndRecreation
Schießanlage	Schooling unit
Spielfeld	Game reserve
AX_HistorischesBauwerkOderHistorischeEinrichtung	AX_HistoricalBuildingOrHistoricalInstallation
AX_HeilquelleGasquelle	AX_MedicinalSpringGasSource
AX_SonstigesBauwerkOderSonstigeEinrichtung	AX_OtherBuildingOrOtherInstallation
AX_EinrichtungInOeffentlichenBereichen	AX_InstallationInPublicAreas
AX_BesondererBauwerkspunkt	AX_SpecificBuildingPoint
Besondere Anlagen auf Siedlungsflächen	Specific units in settlerment areas
AX_Ortslage	AX_Location
AX_Hafen	AX_Port
AX_Schleuse	AX_Lock
AX_Grenzuebergang	AX_CheckPoint

Objektartenbereich Objektartengruppe Objektart Attributart Bezeichner Relationsart	Feature type area Feature type group Feature type Attribute type Name Relation type
AX_Testgelaende	AX_TestArea
Bauwerke, Anlagen und Einrichtungen für den Verkehr	Buildings, units and installations for transport
AX_BauwerkImVerkehrsbereich	AX_BuildingInTrafficArea
Brücke	Bridge
Tunnel	Channal
Durchlass	Duct
AX_Strassenverkehrsanlage	AX_RoadTrafficUnit
AX_WegPfadSteig	AX_RoadPathSteepTrack
AX_Bahnverkehrsanlage	AX_RailTrafficUnit
AX_SeilbahnSchwebebahn	AX_CableRailwaySuspensionRailway
AX_Gleis	AX_Track
AX_Flugverkehrsanlage	AX_AirTrafficUnit
AX_EinrichtungenFuerDenSchiffsverkehr	AX_InstallationsForNavigation
AX_BauwerkImGewaesserbereich	AX_BuildingInWaterArea
Besondere Vegetationsmerkmale	Specific vegetation attribute
AX_Vegetationsmerkmal	AX_VegetationAttribute
Besondere Eigenschaften von Gewässern	Specific features of water
AX_Gewaessermakmal	AX_WaterAttribute
AX_UntergeordnetesGewaesser	AX_SubordinateWater
Bach	brook
Besondere Angaben zum Verkehr	Specific data on traffic
AX_Netzknoten	AX_NetworkNodes
AX_Nullpunkt	AX_ZeroPoint
AX_Abschnitt	AX_Section
AX_Ast	AX_Branch
Besondere Angaben zum Gewässer	Specific data on water
AX_Wasserspiegelhoehe	AX_WaterLevel
AX_SchiffahrtslinieFaehrverkehr	AX_NavigationLineFerryTransport
AX_Gewaesserstationierungsachse	AX_WaterStationingCentreLine
Objektartenbereich „Relief“	Feature type area "relief"
Reliefformen	Relief forms
AX_BoeschungKliff	AX_EmbankmentCliff
AX_Gelaendekante	AX_GroundEdge
AX_DammWallDeich	AX_DamWallDyke
AX_Hoehleneingang	AX_CaveEntrance
AX_Einschnitt	AX_Cleft
AX_FelsenFelsblockFelsnadel	AX_RocksLumpOfRockNeedleRock
AX_Duene	AX_Dune
AX_Hoehenlinie	AX_ContourLine
Objektartenbereich „Gesetzliche Festlegungen, Gebietseinheiten, Kataloge“	Feature area "legal stipulations, area units, catalogues"
Öffentlich-rechtliche und sonstige Festlegungen	Stipulation governed by public law and other stipulations
AX_SchutzgebietNachWasserrecht	AX_ProtectedAreaAccordingToWaterLaw
AX_NaturUmweltOderBodenschutzrecht	AX_NatureEnvironmentOrSoilConservationLaw
AX_SchutzgebietNachNaturUmweltOderBodenschutzrecht	AX_ProtectedAreaAccordingToNatureEnvironmentOrSoilConservationLaw
AX_Denkmalschutzrecht	AX_HistoricalMonumentProtection
AX_SonstigesRecht	AX_OtherLaw
AX_Schutzzone	AX_ProtectionZone
Kataloge	Catalogues

Objektartenbereich Objektartengruppe Objektart Attributart Bezeichner Relationsart	Feature type area Feature type group Feature type Attribute type Name Relation type
AX_Nationalstaat	AX_NationalState
Schlüssel	Key
Bezeichnung	Description
AX_Bundesland	AX_FederalState
AX_Regierungsbezirk	AX_GovernmentDistrict
AX_KreisRegion	AX_DistrictOrRegion
AX_Gemeinde	AX_Municipality
AX_Gemeindeteil	AX_MunicipalitySection
AX_Gemarkung	AX_CadastralDistrict
AX_GemarkungsteilFlur	AX_CadastralDistrictSectionOrFields
AX_Verwaltungsgemeinschaft	AX_AdministrativeCommunity
AX_Buchungsblattbezirk	AX_RegisterSheetDistrict
AX_Dienststelle	AX_Department
AX_Behörde	AX_Authority
AX_Verband	AX_Association
AX_LagebezeichnungKatalogeintrag	AX_LocationDescriptionCatalogueEntry
AX_Gemeindekennzeichen	AX_MunicipalityCode
AX_Katalogeintrag	AX_CatalogueEntry
AX_Buchungsblattbezirk_Schluessel	AX_RegisterSheetDistrictCode
AX_Dienststelle_Schluessel	AX_DepartmentCode
AX_Bundesland_Schluessel	AX_FederalStateCode
AX_Gemarkung_Schluessel	AX_CadastralDistrictCode
AX_GemarkungsteilFlur_Schluessel	AX_CadastralDistrictSectionOrFieldsCode
AX_Regierungsbezirk_Schluessel	AX_GovernmentDistrictCode
AX_Kreis_Schluessel	AX_DistrictCode
AX_VerschlusselftelLagebezeichnung	AX_CodedLocationDescription
Geographische Gebietseinheiten	Geographical area units
AX_Wohnplatz	AX_Domicile
AX_Landschaft	AX_Landscape
AX_KleinraeumigerLandschaftsteil	AX_SmallAreaLandscapeSection
AX_Gewann	AX_NamedPlace
AX_Insel	AX_Island
Administrative Gebietseinheiten	Administrative area units
AX_Baublock	AX_BuildingBlock
AX_WirtschaftlicheEinheit	AX_EconomicUnit
AX_KommunalesGebiet	AX_MunicipalArea
AX_Gebiet	AX_Area
AX_Gebiet_Nationalstaat	AX_Area_NationState
AX_Gebiet_Bundesland	AX_Area_FederalState
AX_Gebiet_Regierungsbezirk	AX_Area_GovernmentDistrict
AX_Gebiet_Kreis	AX_Area_District
AX_Kondominium	AX_Condominium
AX_Gebietsgrenze	AX_AreaBorder
Objektartenbereich „Nutzerprofile“	“User profile” feature type area
Nutzerprofile	User profile
AX_Benutzer	AX_User
AX_Benutzergruppe	AX_UserGroup
AX_BenutzergruppeMitZugriffskontrolle	AX_UserGroupWithAccessMonitoring
Selektionskriterium	Selection criteria
ZugriffsartProduktKennungBenutzung	AccessTypeProductCodeUtilisation
ZugriffsartProduktKennungFuehrung	AccessTypeProductCodeManagement
ZugriffsartFortführungsanlass	AccessTypeUpdateCause
AX_BenutzergruppeNBA	AX_UserGroupNBA

Objektartenbereich Objektartengruppe Objektart Attributart Bezeichner Relationsart	Feature type area Feature type group Feature type Attribute type Name Relation type
ZugriffsartProduktKennungBenutzung	accessTypeProductCodeUtilisation
ZugriffsartProduktKennungFührung	accessTypeProductCodeUpdating
ZugriffsartFortführungsanlass	accessTypeUpdateCause
AX_BereichZeitlich	AX_TemporalRange
Metadaten	
Raumbezug	ReferenceSystem
Darstellungsart	SpatialRepresentation
Qualität	Quality
Vertrieb	Distribution
Informationsinhalt	ContentInformation
Signaturenkatalog	PortrayalCatalogueReference
Anwendungsschema	ApplicationSchema
Zugriffs- und Nutzungsbeschränkungen	Constraints
Identifikation	Identification
Datenpflege	MaintenanceInformation
Erweiterte Metainformationen	MetadataExtensionInformation