Conferenza AMFM 2015

Esempi di armonizzazione di dati di reti tecnologiche

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Sommario

- INSPIRE US data theme: esperienza nel progetto GeoSmartCity
- Esempio di trasformazione di dati verso il modello dati GSC
- Un possibile mapping verso INSPIRE US per la classe “Infrastruttura di alloggiamento reti”

Estensione di INSPIRE Utilities and Government Services (US) - *"Utility networks"* sub-model

Pilot coinvolti:

[**P06**] Comarca of Pamplona (ES), [**P07**] Genova (IT), [**P08**] Oeiras (PT), [**P09**] Flanders Region (BE), [**P10**] South Moravian Region (CZ), [**P11**] Ruda Śląska (PL)

Focus sui casi d'uso Italiani:

GSC data modelling supporta l'allineamento delle Specifiche Nazionali rispetto ai requisiti della Direttiva INSPIRE in materia di Utility networks.

Focus sui casi d'uso della Regione delle Fiandre:

GSC data model estende INSPIRE US data model a partire dalle informazioni necessarie per la gestione delle reti fognarie delle Fiandre (Aquafin's AQS2.0 data model)

GeoSmartCity - Underground Data Model

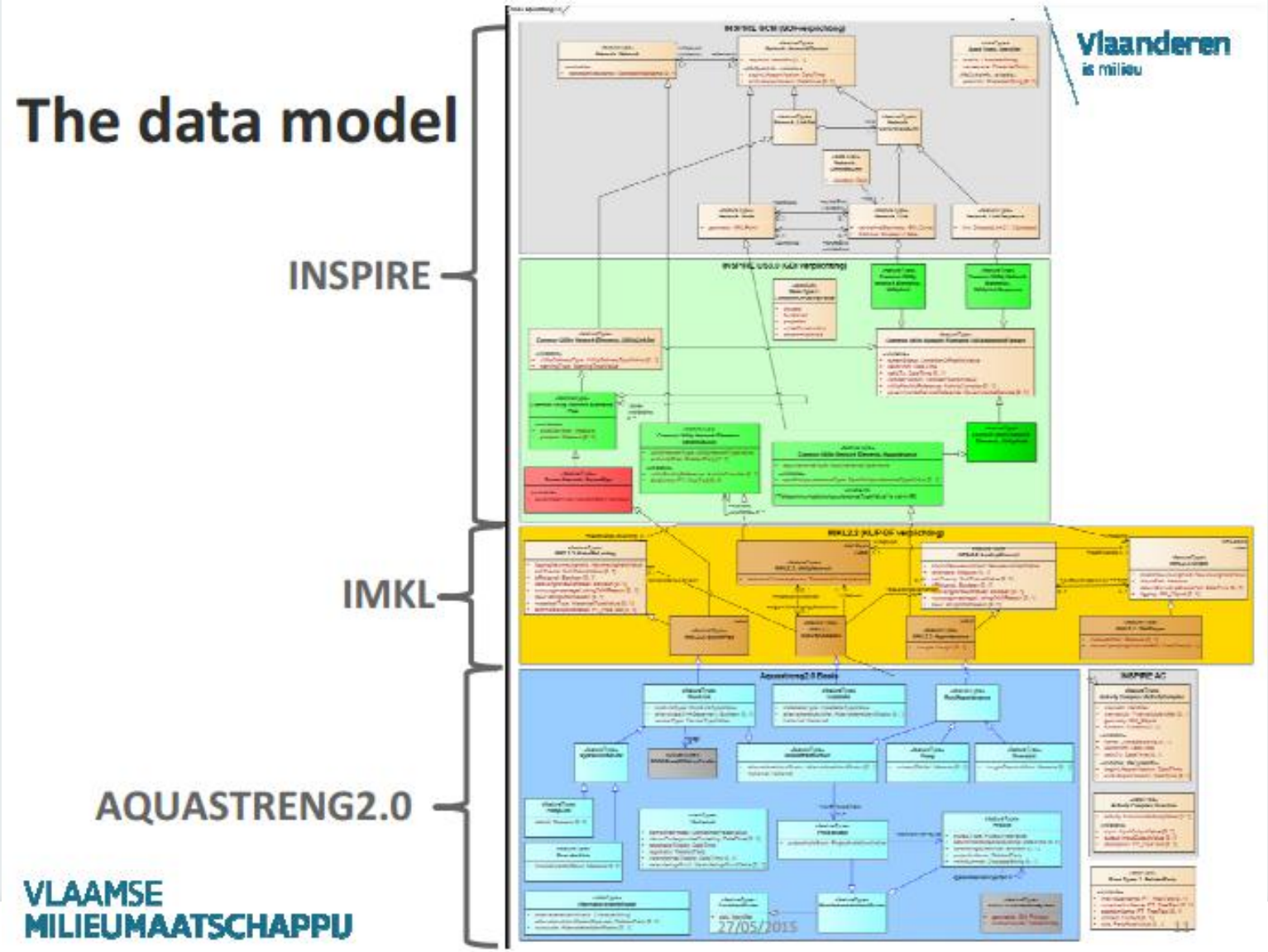
Il data model **GeoSmartCity Underground** estende il core **Utility Networks Profile** del data model INSPIRE per Utilities and Government Services (US).
Le informazioni sono contenute in:

- Un "***New Common Types***" application schema, che contiene tutti I nuovi (cioè inesistenti feature/data type in INSPIRE US core model) common elements condivisi tra i diversi utility network type

- Sei ***network-specific extended*** application schema:
    - Electricity network
    - Oil, Gas & Chemicals network
    - Sewer network
    - Telecommunications network
    - Thermal network
    - Water network

- Una ***theme-specific extension*** del Base Model "Activity Complex" application schema
    - Activity Complex

Flanders Pilot National Specification Data Model



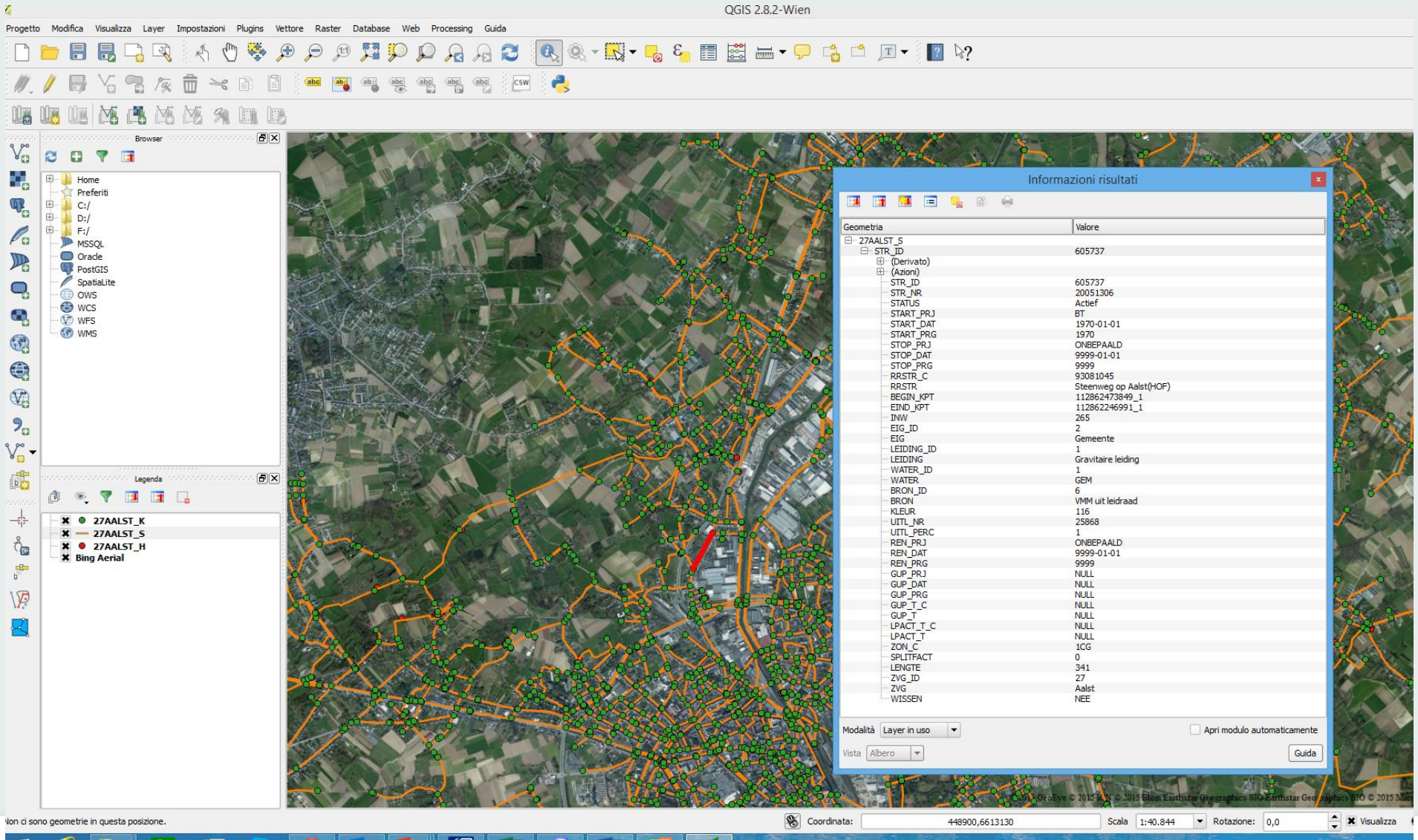
GeoSmartCity

cip competitiveness and innovation framework programme 2007–2013

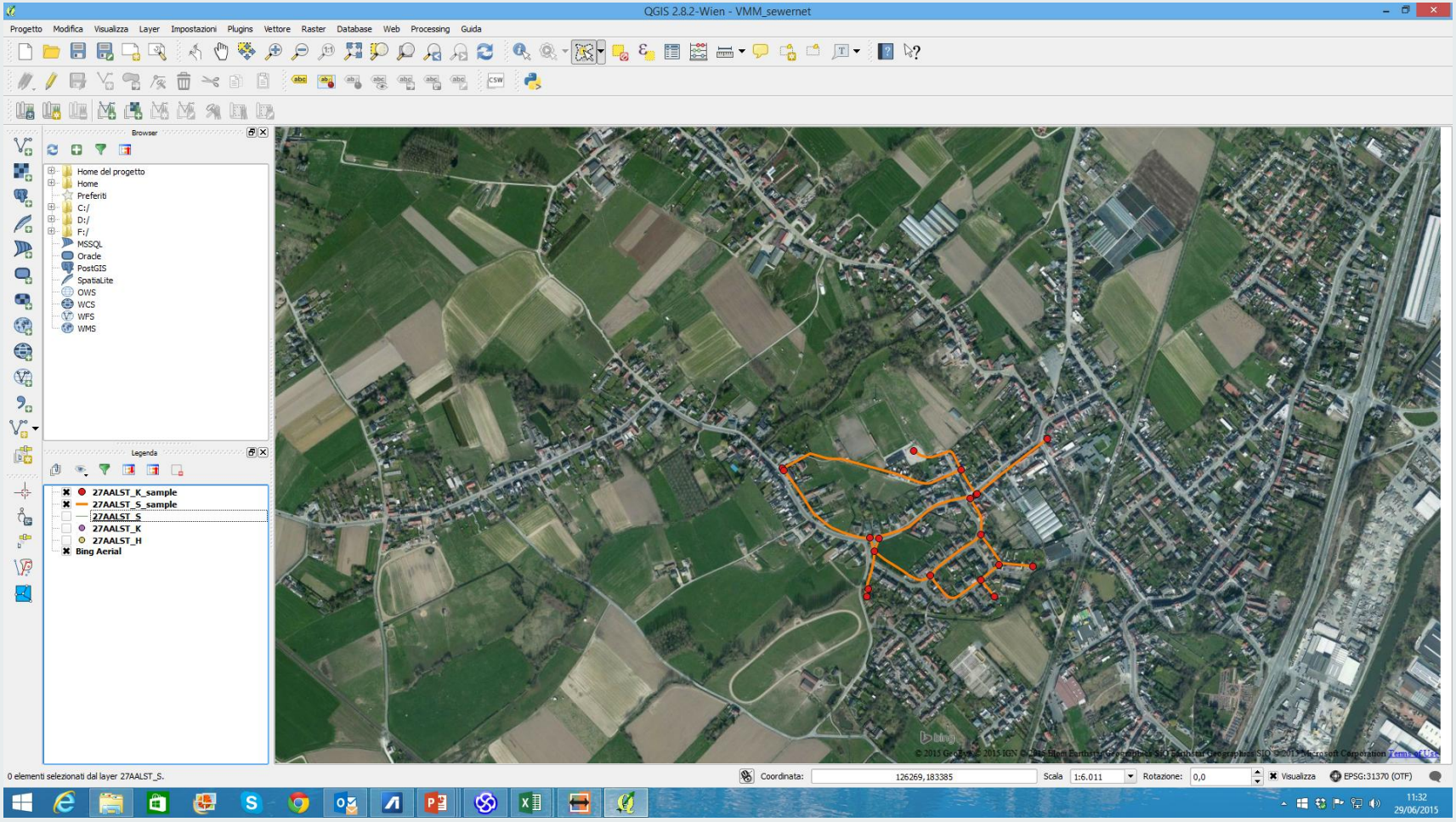
Mapping Table example: GSC Sewer pipe extended

Type	Documentation	Attribute / Association role	Attribute documentation	Values / Enumerations	Multiplicity	Voidable / Non-	P07	P08	P09	P10	P06	P11
SewerPipeExtended *Supertypes:* *Pipe UtilityLinkSet* *UtilityNetworkElement* *LinkSet* *NetworkElement*	A utility link or link sequence for the conveyance of sewage.	**beginLifespanVersion**	Date and time at which this version of the spatial object was	DateTime	1	voidable	Underground.LinearClass.L_CREATION					POCZATEKWERSJIOBIEKTU
		inspireId	External object identifier of the spatial object.NOTEAn external	Identifier	0..1		Underground.LinearClass.COD_CLASSE + Underground.LinearClass.FILE_ID					PRZESTRZENNAZW + LOKALNYID
		endLifespanVersion	Date and time at which this version of the spatial object was	DateTime	0..1	voidable						KONIECWERSJIOBIEKTU
		inNetwork	The networks in which a network element is a member.	Network	1..*	voidable						
		link	The set of links and link sequences that constitute the link	GeneralisedLink	1..*		link to Utility link feature type - See types spreadsheet for Utility link feature type					
		currentStatus	The status of an utility object with regards to its completion and use.	ConditionOfFacilityValu	1	voidable	Underground.LinearClass.L_STA					ISTNIENIE + EKSPLOATACJA
		validFrom	The time when the utility network element started to exist in the real	DateTime	1	voidable	Underground.LinearClass.L_BORN					STARTOBIEKT
		validTo	The time from which the utility network element no longer exists	DateTime	0..1	voidable						KONIECOBIEKT
		verticalPosition	Vertical position of the utility object relative to ground.	VerticalPositionValue	1	voidable	Underground.LinearClass.L_POS_SUP					PRZEBIEG
		utilityFacilityReference	Reference to a facility activity complex that is linked (related) to	ActivityComplex	0..1							
		governmentalServiceReference	Reference to a governmental service object that is linked	GovernmentalService	0..1							
		utilityDeliveryType	Kind of utility delivery network e.g. transport, distribution,	UtilityDeliveryTypeValue	0..1				sewerAppurtenance.utilityDeliveryType			FUNKCJA
		warningType	Kind of overground visible warning mechanism used to	WarningTypeValue*	1	voidable						
		pipeDiameter	Pipe outer diameter.For convex shaped objects (e.g. a circle) the	Measure	1	voidable	Underground.LinearClass.L_DIA					SREDNICA +
		pressure	The maximum allowable operating pressure at which a product is	Measure	0..1	voidable						
		cables	A pipe may contain one or more cables.	Cable	0..*	voidable						
		pipes	A pipe may contain one or more pipes.	Pipe	0..*	voidable						
		sewerWaterType	Type of sewer water.	codelist SewerWate	1	voidable	SewerNetwor.L_F_TIPFOG		sewerAppurtenance.sewerWaterType			TypKanal
		sewerPipeType	Type of the segment	codelist SewerPipeT	1	voidable	SewerNetwork.L_F_TY		sewerLink.sewerLinkType			RODZAJPRZEWODU
		sewerPipeDepthMeasure	Measure of the Depth of the pipe	DepthMeasure	1..*	voidable	See DepthMeasure data type in the types spreadsheet					
		sewerPipeRoadPosition	position relative to the road	Codelist roadPosition	0..1		Underground.LinearClass.L_POS					
		sewerPipeStartNodeTerrainQuote	Terrain quote of initial node	Measure	0..1		SewerNetwork.QUO_INI					
		sewerPipeStartNodeFlowingQuote	Flowing quote of the initial node	Measure	0..1		SewerNetwork.SCO_INI					
		sewerPipeEndNodeTerrainQuote	Terrain quote of final node	Measure	0..1		SewerNetwork.QUO_FIN					
		sewerPipeEndNodeFlowingQuote	Flowing quote of the final node	Measure	0..1		SewerNetwork.SCO_FIN					
		sewerPipeDimensions	lenght,height,width of the pipe	PipeDimensions	0..1		see pipeDimension type - in the types spreadsheet					
		sewerPipeSourceOfData	info about how data was obtained	sourceOfData	0..1		see sourceOfData type - in the types spreadsheet					
		sewerPipeMaterialType		Codelist PipeMaterial	0..1		Underground.LinearClass.L_MAT					
		sewerPipeOrigin	info about pipe origin	InfrastructureOrigin	0..1	voidable	see InfrastructureOrigin data type - in the types spreadsheet					
		sewerPipeAlternativeId		Identifier	0..*				sewerPipe.alternative id			
		sewerPipeAlternativeAuthorityRole		RelatedParty	0..*				sewerPipe.alternativeIdOwner			
		sewerPipeMunicipality	The municipality where the sewerpipe is located	CharacterString	0..1				sewerPipe.municipality			
		sewerPipeStreet	the street where the sewerpipe is located	CharacterString	0..1				sewerPipe.street			
		sewerPipeTransportType	The way the transport is carried out (pressure, gravitationary, ...)	Code List	0..1				sewerPipe.transportType			
		sewerPipeProjectAction		ProjectAction	1..*	voidable	link to ProjectAction feature type - See GSC-New feature spreadsheet					
		sewerPipeRecoveryPresent	Presence of recovery of the pipe	boolean* true /false	0..1		SewerNetwork.L_F_RISAN					
		sewerPipeRecoveryType	Type of recovery of the pipe	recoveryTypeValue	0..1		SewerNetwork.L_F_T_RIS					
		sewerPipeDeliveryLocationType	* sewage treatment plant *soil * surface water body *other	Codelist SewerNetw			SewerNetwor.L_F_REC					
		sewerPipeDigsCode		UndergroundWorks	0..1		link to UndergroundWorks feature type - See GSC-New feature spreadsheet					

Source data model



Source data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Progetto Modifica Visualizza Layer Impostazioni Plugins Vettore Raster Database Web Processing Guida
Browser
Home del progetto
Home
Preferiti
C:/
D:/
F:/
MSSQL
Oracle
PostGIS
SpatiaLite
OWS
WCS
WFS
WMS
Legenda
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27AALST_S_sample
27AALST_S
27AALST_K
27AALST_H
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Coordinata: 126269,183385
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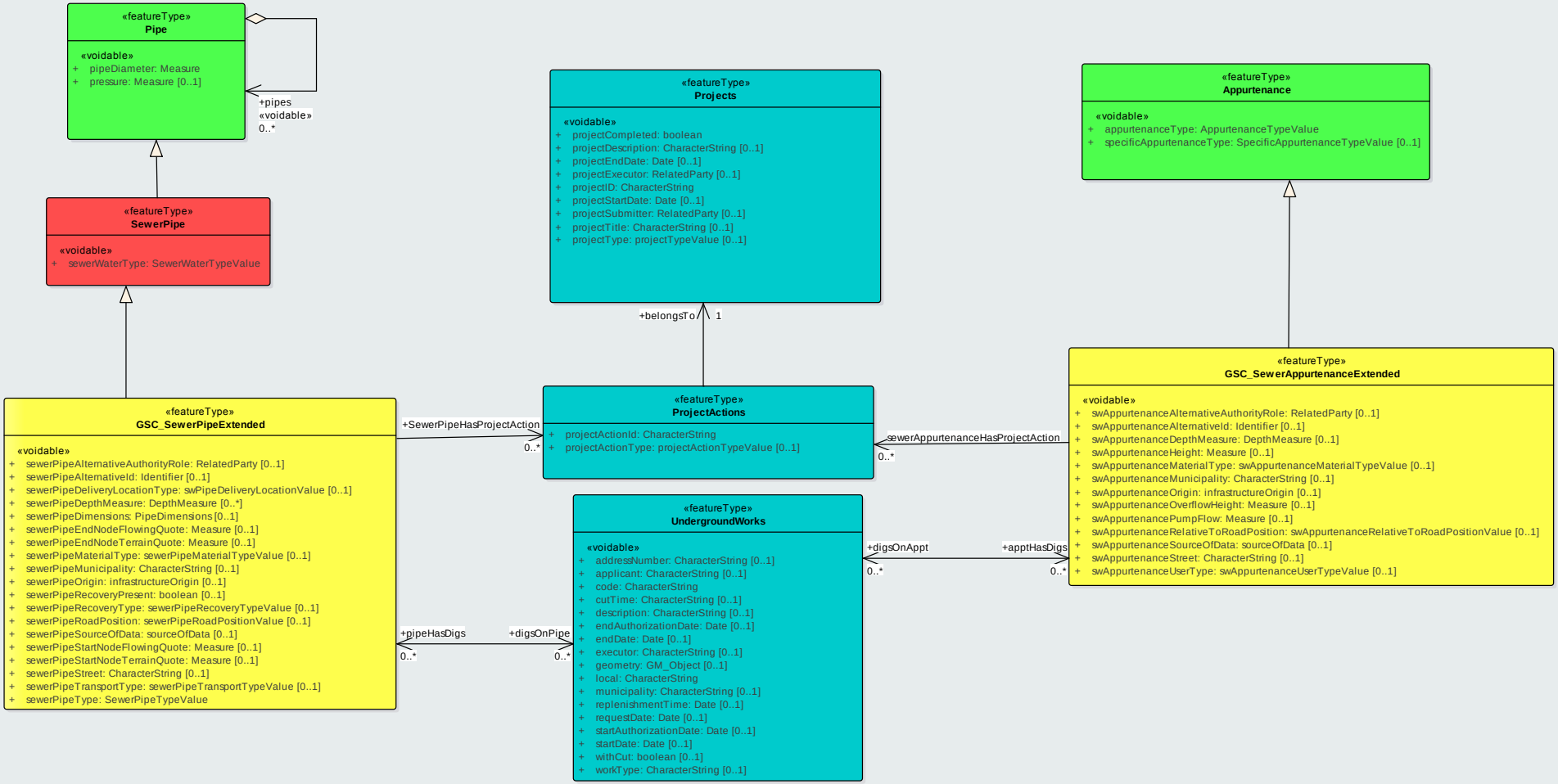
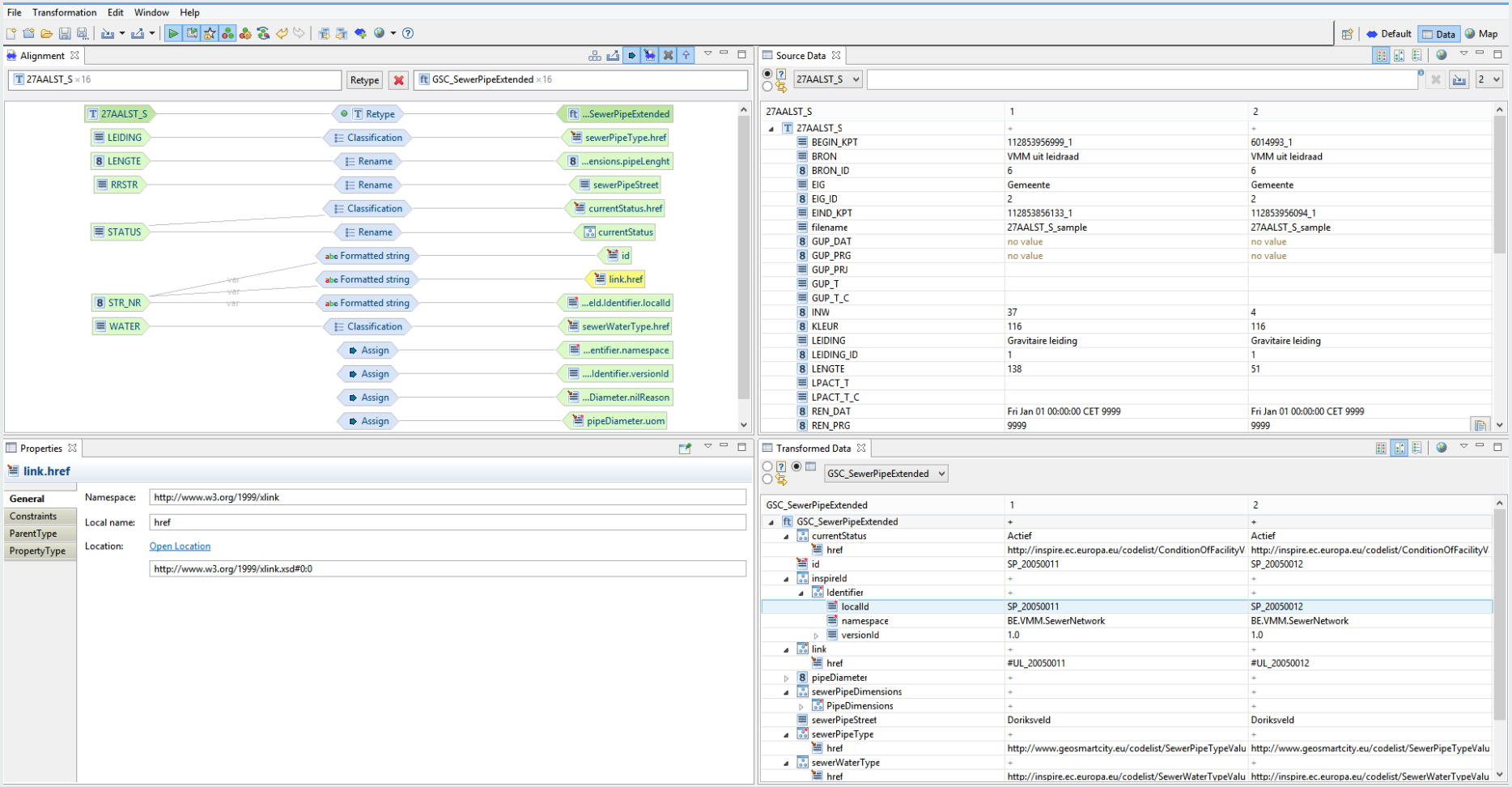
29/06/2015

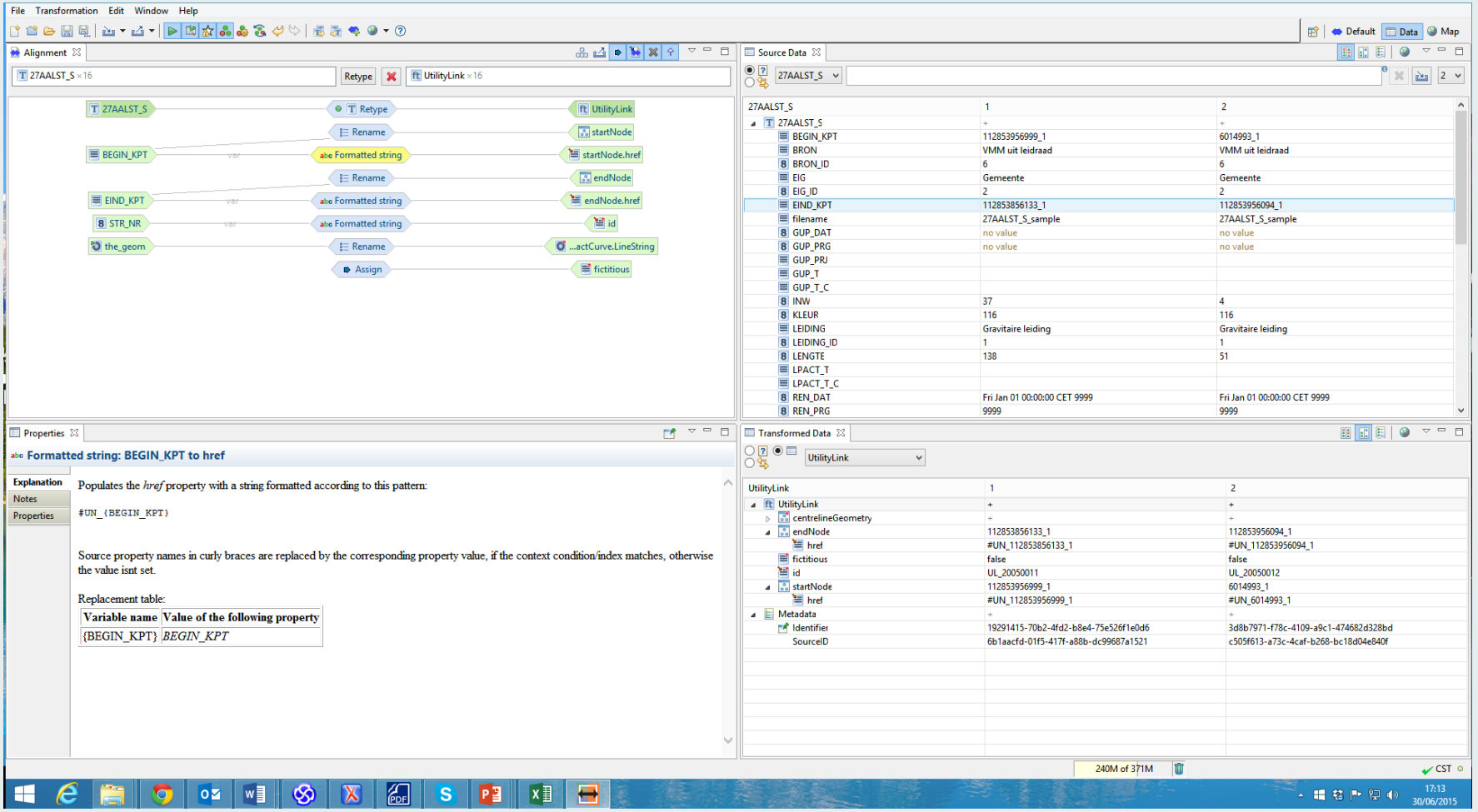
Target data model: GeoSmartCity – Sewer Network Extended



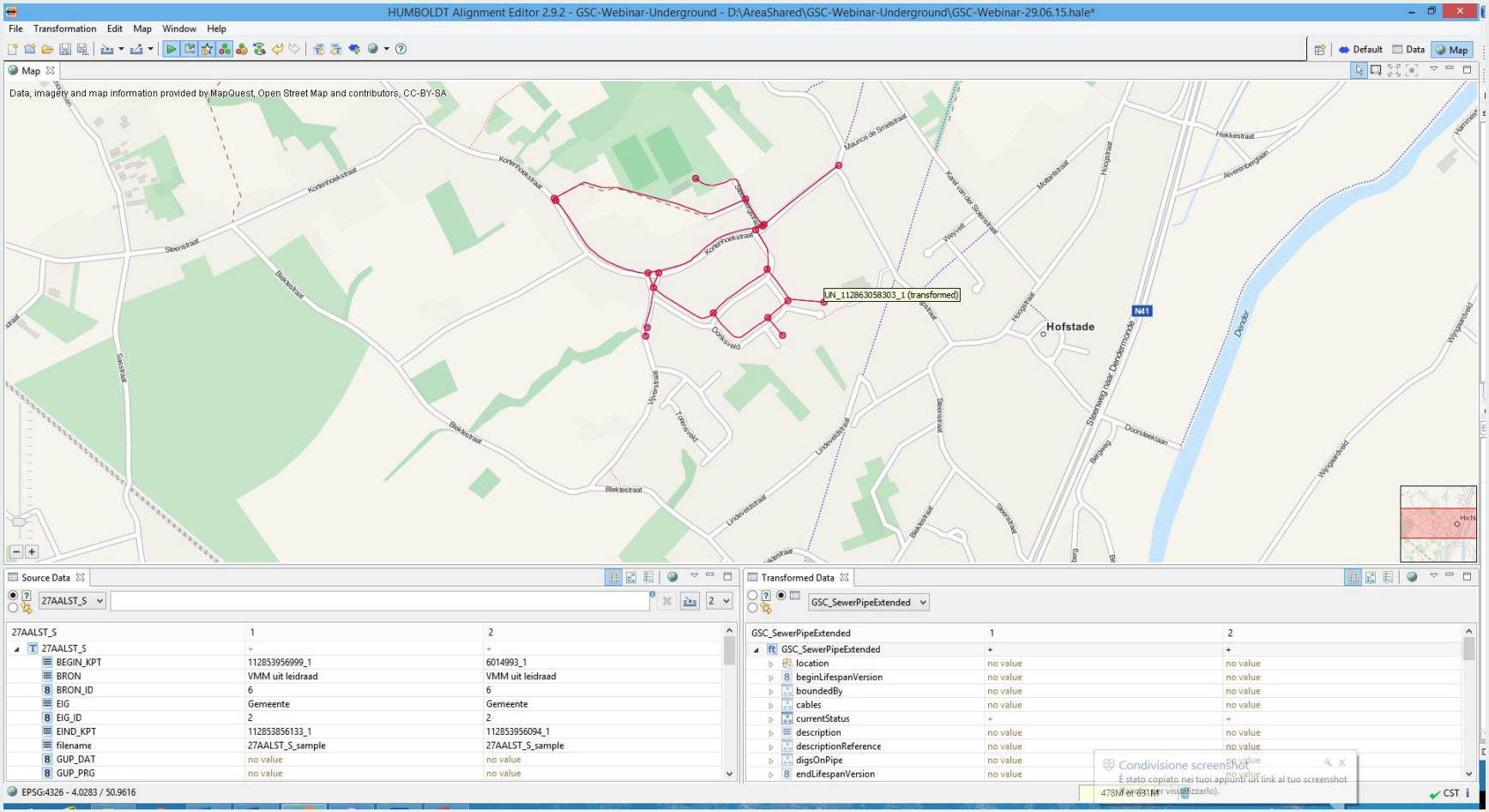
HALE transformation of source data



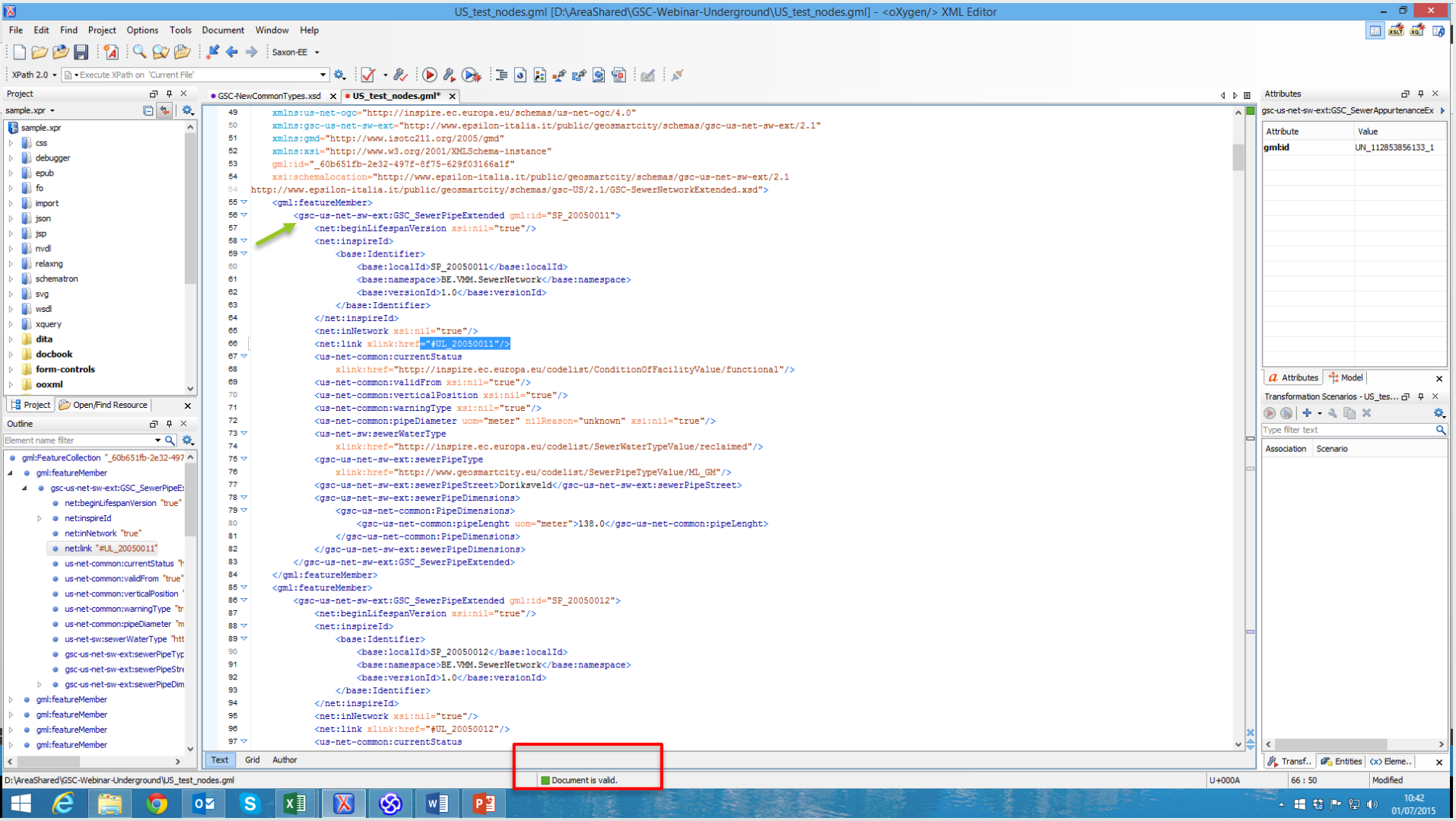
HALE transformation of source data



HALE Map view of transformed data



Transformed data



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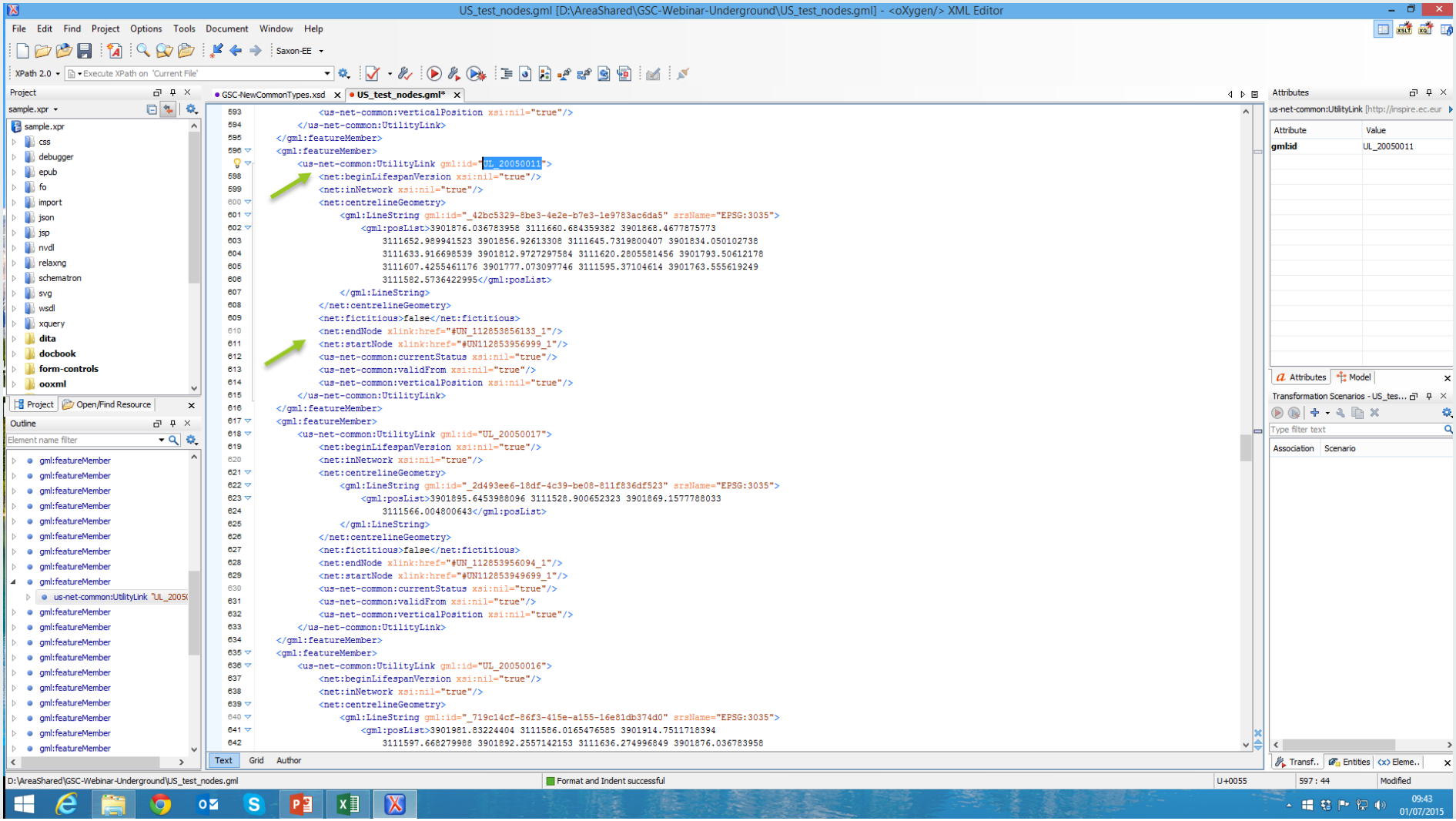
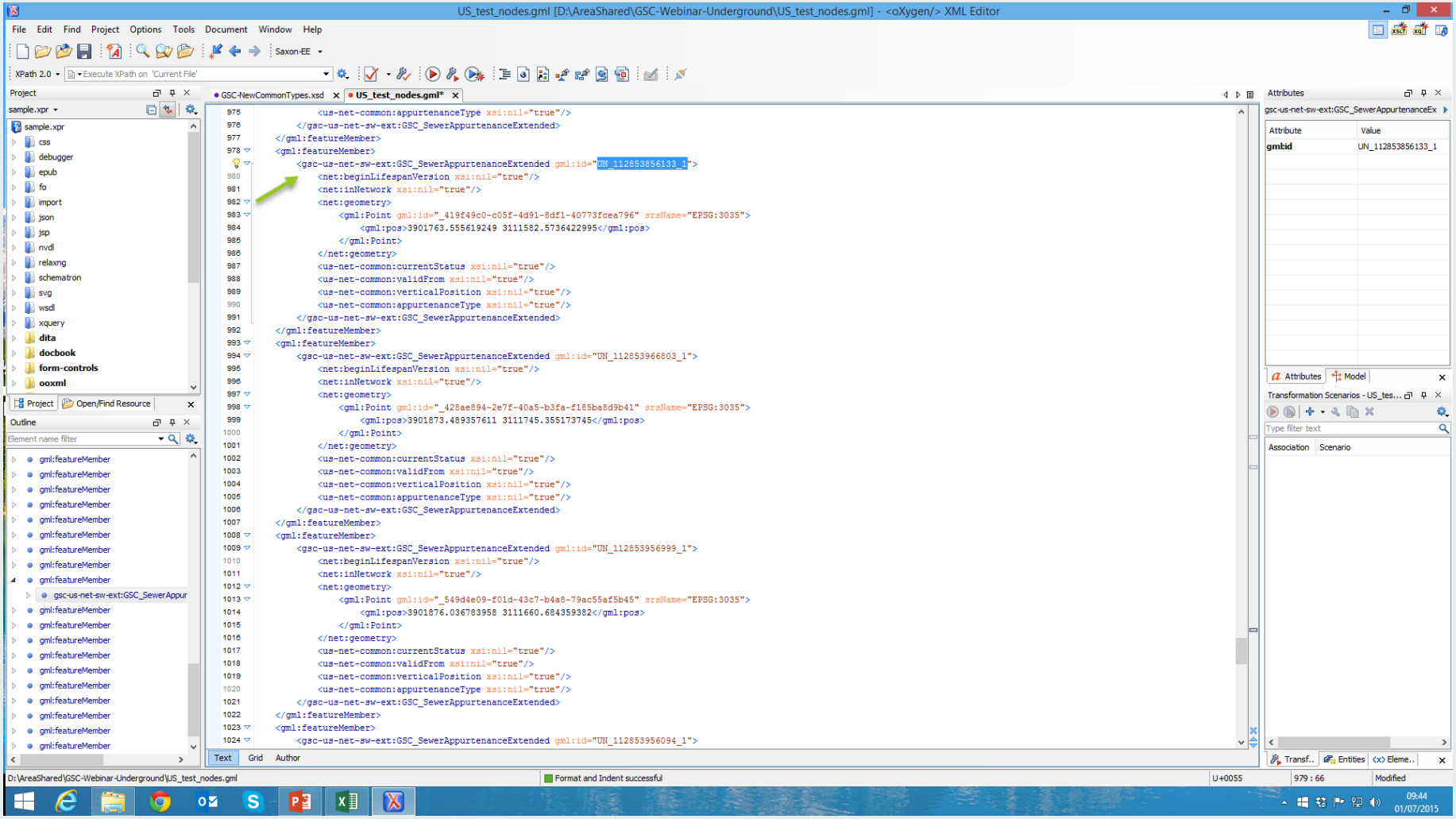


Transformed data



Mapping delle specifiche nazionali italiane

INSPIRE core

INSPIRE extended

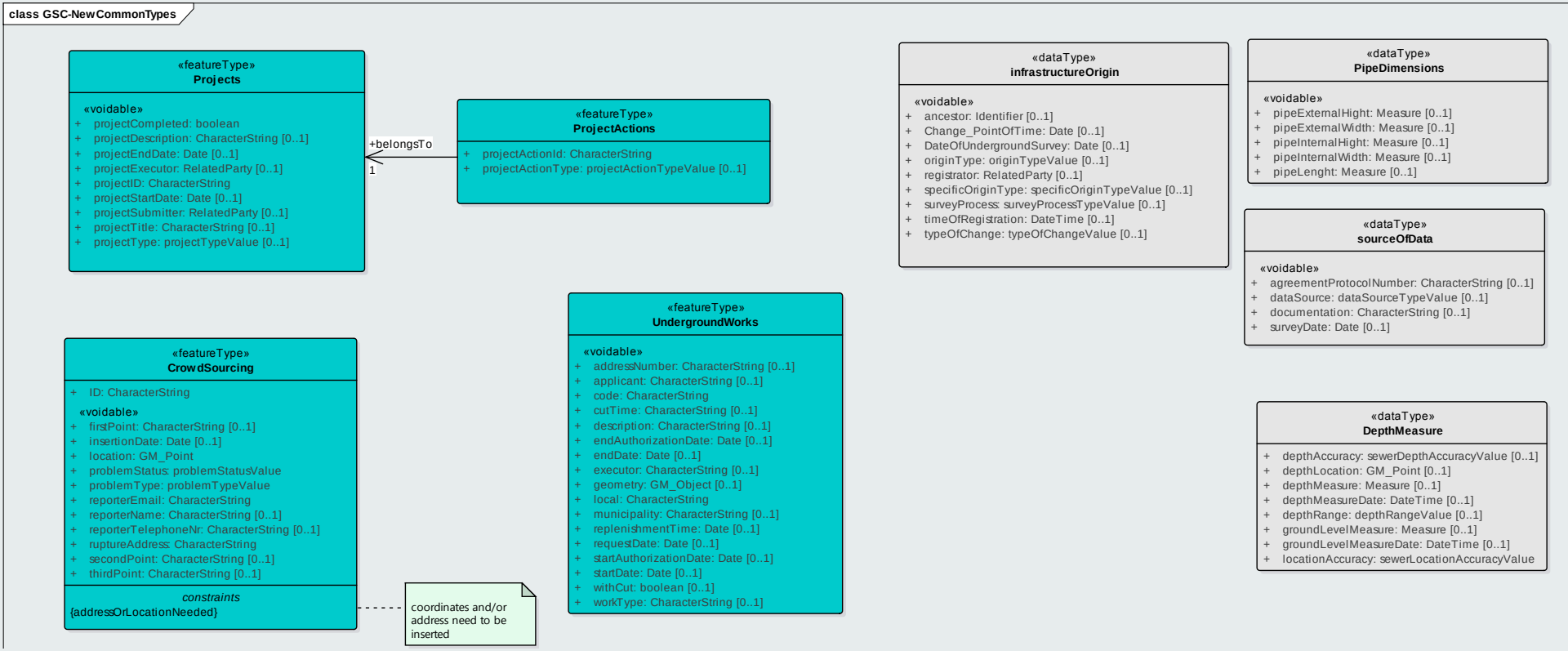
GSC extended

Type	Documentation	Attribute / Association role	Attribute documentation	Values / Enumerations	Multiplicity	Voidable / Non	P07
		beginLifespanVersion	Date and time at which this version of the spatial object was	DateTime	1	voidable	Underground.LinearClass.L_CREATION
		inspireId	External object identifier of the spatial object.NOTEAn external	Identifier	0..1		Underground.LinearClass.COD_CLASSE + Underground.LinearClass.FILE_ID
		endLifespanVersion	Date and time at which this version of the spatial object was	DateTime	0..1	voidable	
		inNetwork	The networks in which a network element is a member.	Network	1..*	voidable	
		link	The set of links and link sequences that constitute the link	Generalised Link	1..*		link to Utility link feature type - See types spreadsheet for Utility link feature type
		currentStatus	The status of an utility object with regards to its completion and use.	ConditionOfFacilityValu	1	voidable	Underground.LinearClass.L_STA
		validFrom	The time when the utility network element started to exist in the real	DateTime	1	voidable	Underground.LinearClass.L_BORN
		validTo	The time from which the utility network element no longer exists	DateTime	0..1	voidable	
		verticalPosition	Vertical position of the utility object relative to ground.	VerticalPositionValue	1	voidable	Underground.LinearClass.L_POS_SUP
		utilityFacilityReference	Reference to a facility activity complex that is linked (related) to	ActivityComplex	0..1		
		governmentalServiceReference	Reference to a governmental service object that is linked	GovernmentalService	0..1		
		utilityDeliveryType	Kind of utility delivery network e.g. transport, distribution,	UtilityDeliveryTypeValue	0..1		
		warningType	Kind of overground visible warning mechanism used to	WarningTypeValue*	1	voidable	COD_CL_SEG
		pipeDiameter	Pipe outer diameter.For convex shaped objects (e.g. a circle) the	Measure	1	voidable	Underground.LinearClass.L_DIA
		pressure	The maximum allowable operating pressure at which a product is	Measure	0..1	voidable	
		cables	A pipe may contain one or more cables.	Cable	0..*	voidable	
		pipes	A pipe may contain one or more pipes.	Pipe	0..*	voidable	
		sewerWaterType	Type of sewer water.	codelist SewerWater	1	voidable	SewerNetwor.L_F_TIPFOG
SewerPipeExtended		sewerPipeType	Type of the segment	codelist	1	voidable	SewerNetwork.L_F_TY
Supertypes: Pipe UtilityLinkSet UtilityNetworkElement LinkSet NetworkElement	A utility link or link sequence for the conveyance of sewage.	sewerPipeDepthMeasure	Measure of the Depth of the pipe	DepthMeasure	1..*	voidable	See DepthMeasure data type in the types spreadsheet
		sewerPipeRoadPosition	position relative to the road	Codelist roadPosition	0..1		Underground.LinearClass.L_POS
		sewerPipeStartNodeTerrainQuote	Terrain quote of initial node	Measure	0..1		SewerNetwork.QUO_INI
		sewerPipeStartNodeFlowingQuote	Flowing quote of the initial node	Measure	0..1		SewerNetwork.SCO_INI
		sewerPipeEndNodeTerrainQuote	Terrain quote of final node	Measure	0..1		SewerNetwork.QUO_FIN
		sewerPipeEndNodeFlowingQuote	Flowing quote of the final node	Measure	0..1		SewerNetwork.SCO_FIN
		sewerPipeDimensions	lenght,height,width of the pipe	PipeDimensions	0..1		see pipeDimension type - in the types spreadsheet
		sewerPipeSourceOfData	info about how data was obtained	sourceOfData	0..1		see sourceOfData type - in the types spreadsheet
		sewerPipeMaterialType		Codelist PipeMaterial	0..1		Underground.LinearClass.L_MAT
		sewerPipeOrigin	info about pipe origin	InfrastructureOrigin	0..1	voidable	see InfrastructureOrigin data type - in the types spreadsheet
		sewerPipeAlternativeId		Identifier	0..*		
		sewerPipeAlternativeAuthorityRole		RelatedParty	0..*		
		sewerPipeMunicipality	The municipality where the sewerpipe is located	CharacterString	0..1		
		sewerPipeStreet	the street where the sewerpipe is located	CharacterString	0..1		
		sewerPipeTransportType	The way the transport is carried out (pressure, gravitationary, ...)	Code List	0..1		
		sewerPipeProjectAction		ProjectAction	1..*	voidable	link to ProjectAction feature type - See GSC-New feature spreadsheet
		sewerPipeRecoveryPresent	Presence of recovery of the pipe	boolean* true /false	0..1		SewerNetwork.L_F_RISAN
		sewerPipeRecoveryType	Type of recovery of the pipe	recoveryTypeValue	0..1		SewerNetwork.L_F_T_RIS
		sewerPipeDeliveryLocationType	* sewage treatment plant *soil * surface water body *other	Codelist SewerNetw			SewerNetwor.L_F_REC
		sewerPipeDigsCode		UndergroundWorks	0..1		link to UndergroundWorks feature type - See GSC-New feature spreadsheet

Mapping delle specifiche nazionali italiane

	Type	Documentation	Attribute / Association role	Attribute documentation	Values / Enumerations	Multiplicity	Voidable / Non-	P07
INSPIRE core	**ElectricityCable** Supertypes: *CableUtilityLinkSetUtilityNetworkElementLinkSetNetworkElement*	electricity cable A utility link or link sequence used to convey electricity from one location to another.	**currentStatus**	-- Name -- current status	ConditionOfFacilityValue*	1	voidable	Underground.LinearClass.L_STA
			validFrom	-- Name -- valid from	DateTime	1	voidable	Underground.LinearClass.L_BORN
			validTo	-- Name -- valid to	DateTime	0..1	voidable	
			verticalPosition	-- Name -- vertical	VerticalPositionValue*	1	voidable	Underground.LinearClass.L_POS_SUP
			utilityFacilityReference	-- Name -- utility facility	ActivityComplex	0..1	voidable	
			governmentalServiceReference	-- Name -- governmental	GovernmentalService	0..1	voidable	
			beginLifespanVersion	Date and time at which this	DateTime	1	voidable	Underground.LinearClass.L_CREATION
			inspireId	External object identifier of the	Identifier	0..1		Underground.LinearClass.COD_CLASSE + Underground.LinearClass.FILE_ID
			endLifespanVersion	Date and time at which this	DateTime	0..1	voidable	
			inNetwork	The networks in which a	Network	1..*	voidable	
			link	The set of links and link	GeneralisedLink	1..*		link to Utility link feature type - See types spreadsheet for Utility link feature type
			utilityDeliveryType	-- Name -- utility delivery	UtilityDeliveryTypeValue*	0..1	voidable	
			warningType	-- Name -- warning type	WarningTypeValue	1	voidable	COD_CL_SEG
			operatingVoltage	-- Name -- operating	Measure	1	voidable	TR_ELE_VOP
			nominalVoltage	-- Name -- nominal	Measure	1	voidable	TR_ELE_VNO
INSPIRE extended			**electricityCableType**	Type of electricity	ElectricityCableTypeValue*	1	voidable	ElectricityNetwork.ElectricityCable.L_E_TUBALL
			electricityCableConductorMaterialType	Cable conductor	ElectricityCableConductorMaterial	1	voidable	ElectricityNetwork.ElectricityCable.L_E_CONDUT
			conductorSize	Size of the conductor	Length	1	voidable	ElectricityNetwork.ElectricityCable.L_E_SEZCAV
GSC extended			**electricitySegmentType**	Type of the segment	ElectricitySegmentTypeValue	0..1		ElectricityNetwork.ElectricityCable.L_E_TY
			electricityLineType	Sequience of contiguous	Text(50)	0..1		ElectricityNetwork.ElectricityCable.L_E_LINEL
			electricityLineName	Name of the electricity line	Text(100)	0..2		ElectricityNetwork.ElectricityCable.L_E_DENL
			electricityStartPlant	Origin plant	Text(100)	0..3		ElectricityNetwork.ElectricityCable.L_E_IMP_DA
			electricityEndPlant	Destination plant	Text(100)	0..4		ElectricityNetwork.ElectricityCable.L_E_IMP_A

GeoSmartCity - New Common Types



Type	Documentation	Attribute / Association role	Attribute documentation	Values / Enumerations	Multiplicity	Voidable	P07
UndergroundWorks	feature type describing the works related to underground networks (soil digs, municipal intervention ..)	code	ID of the underground work (soil digs / municipal intervention…)	CharacterString	1	voidable	SoilDigs.Code Note:it's the Number of the authorization in Monic@ service
		applicant	Society asking for authorization	CharacterString	0..1		SoilDigs.Applicant
		executor	Society executing the work	CharacterString	0..1		SoilDigs.Executor
		workType	Type of the authorized work	CharacterString	0..1		SoilDigs.WorkType
		description	Short description of the work	CharacterString	0..1		SoilDigs.Description
		municipality	municipality in which the work is realized	CharacterString	1	voidable	SoilDigs.Municipio
		addressNumber	Address number of the working area (if available)	CharacterString	0..1		SoilDigs.AddressNumber
		geometry		GM_Object	0..1		
		startAuthorizationDate	Beginning date of the authorization	Date	0..1		SoilDigs.BeginningAuthorizationDate
		endAuthorizationDate	Ending date of the authorization	Date	0..1		SoilDigs.EndingAuthorizationDate
		startDate	date in which works begin	Date	0..1		
		endDate	date in which works end	Date	0..1		
		replenishmentTime	Date / Time Replenishment	Date	0..1		
		requestDate	Date / Time of the request of intervention	Date	0..1		
		local	Local	CharacterString	0..1		
		withCut	With / without cut	Boolean	0..1		
		cutTime	Cut time	CharacterString	0..1		
Projects	feature type giving information about the transformation projects	projectID	ID of project	CharacterString	1		UrbanTransformationAreas.ID
		projectTitle	Name of the project	CharacterString	1		UrbanTransformationAreas.Title
		projectDescription	Short description of the project	CharacterString	0..1		UrbanTransformationAreas.Description
		projectSubmitter	Organization that submits the project	RelatedParty	1		UrbanTransformationAreasPromoter
		projectExecutor	Organization that realizes the project	RelatedParty	0..1		UrbanTransformationAreas.Executor
		projectStartDate	Beginning year of the project	Date	0..1		UrbanTransformationAreas.WorkBeginning
		projectType	The value from this attribute is a code from the "ProjectTypeValue" code list.	Code list	0..1		
		projectEndDate	End Date of project (can be the actual or the foreseen one)	Date	0..1		
		projectCompleted	indicates if the end date is the actual or the assumed one	Boolean	0..1		
		geometry	The area interested by the project	GM_Polygon	0..1		UrbanTransformationAreas.GEOMETRY_2D
ProjectActions	feature type giving info about the type of the action performed by the project on	projectActionType	The type of project action: *construct,* stop, *renovation, *change	Code list	1		
		projectActionID		CharacterString	1		
CrowdSourcing	feature type describing information needed for crowdsourcing purposes	reporterName	Name	CharacterString	0..1		
		reporterTelephoneNr	Telephone contact	CharacterString	0..1		
		reporterEmail	email	CharacterString	1		
		ruptureAddress	Address of the rupture	CharacterString	0..1		
		location	coordinates of the rupture	GM_POINT	0..1		
		problemType	type of reported problem	codelist	1		
		statusOfTheProblem	*reported *inCharge *resolved	codelist	0..1		
		insertionDate	date in which rupture has been reported	date	1		
		firstPoint	First point of reference	CharacterString	1		
		secondPoint	Second reference point	CharacterString	0..1		
		thirdPoint	Third point of reference	CharacterString	0..1		
		addressOrLocationNeeded	coordinates and/or address need to be inserted				

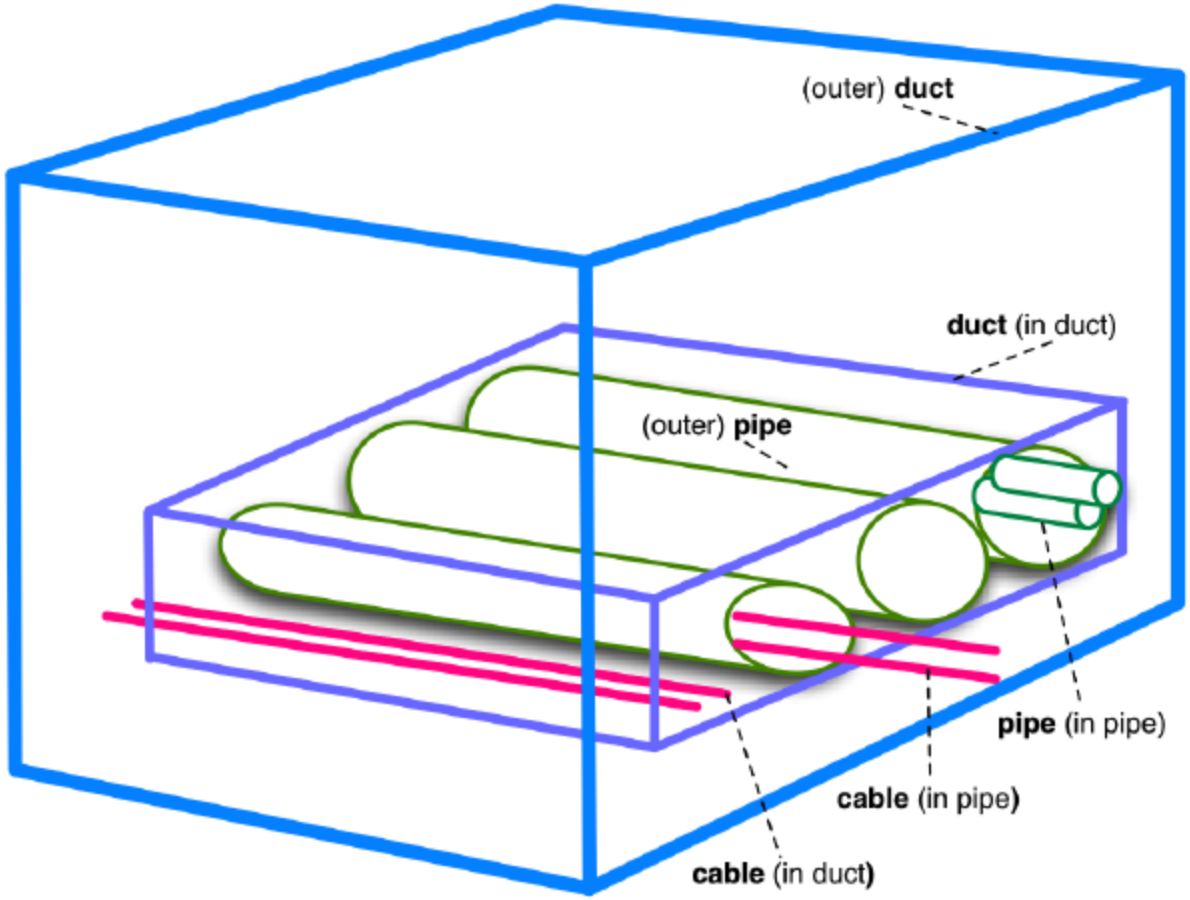
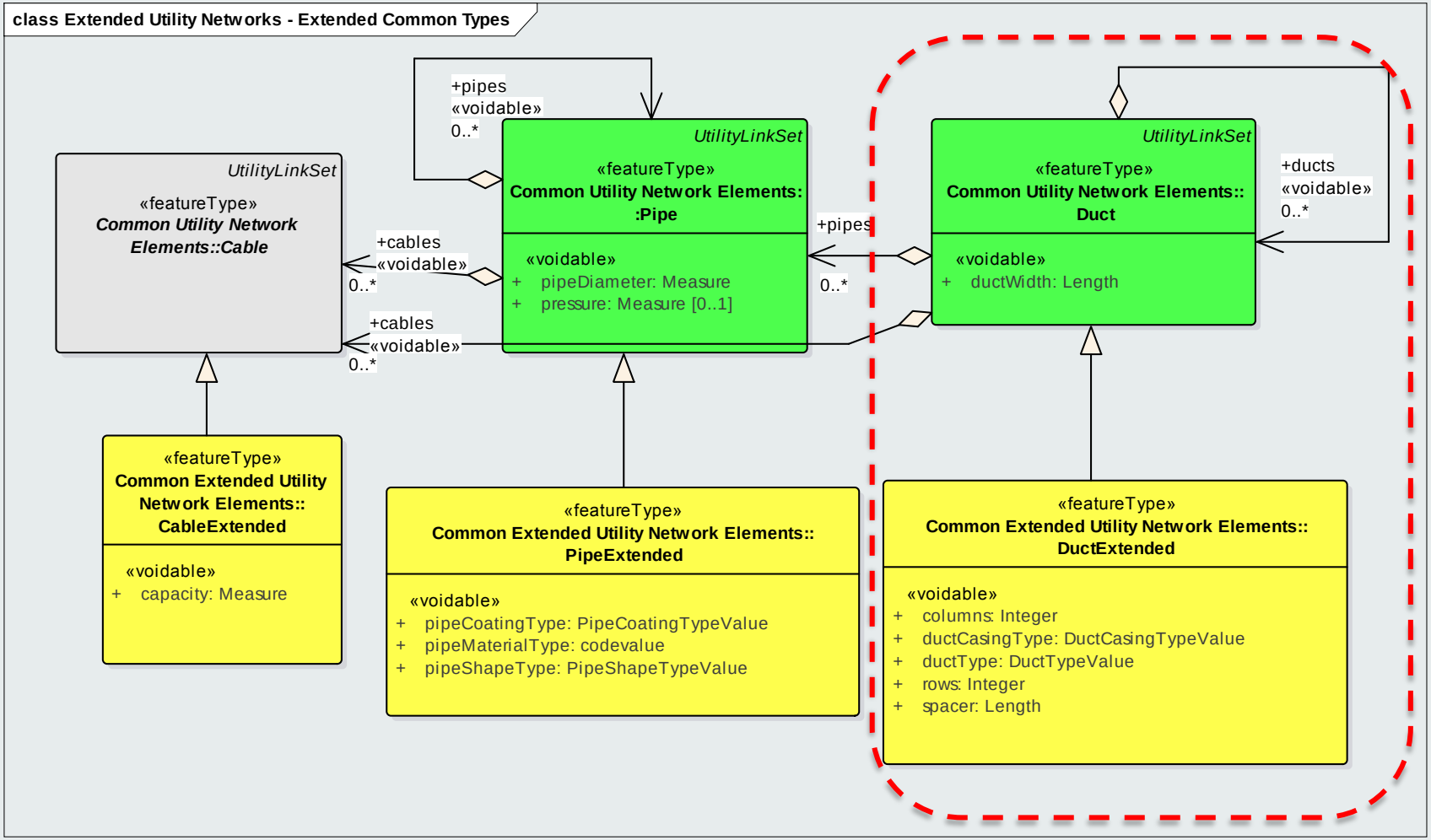


Figure 9 – Physical relations between cables, pipes and ducts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UtilityLinkSet
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Common Utility Network Elements::Cable
+pipes
«voidable»
0..*
UtilityLinkSet
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«voidable»
+ pipeDiameter: Measure
+ pressure: Measure [0..1]
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+ capacity: Measure
«featureType»
Common Extended Utility Network Elements::PipeExtended
«voidable»
+ pipeCoatingType: PipeCoatingTypeValue
+ pipeMaterialType: codevalue
+ pipeShapeType: PipeShapeTypeValue
«featureType»
Common Extended Utility Network Elements::DuctExtended
«voidable»
+ columns: Integer
+ ductCasingType: DuctCasingTypeValue
+ ductType: DuctTypeValue
+ rows: Integer
+ spacer: Length

GRAZIE!

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