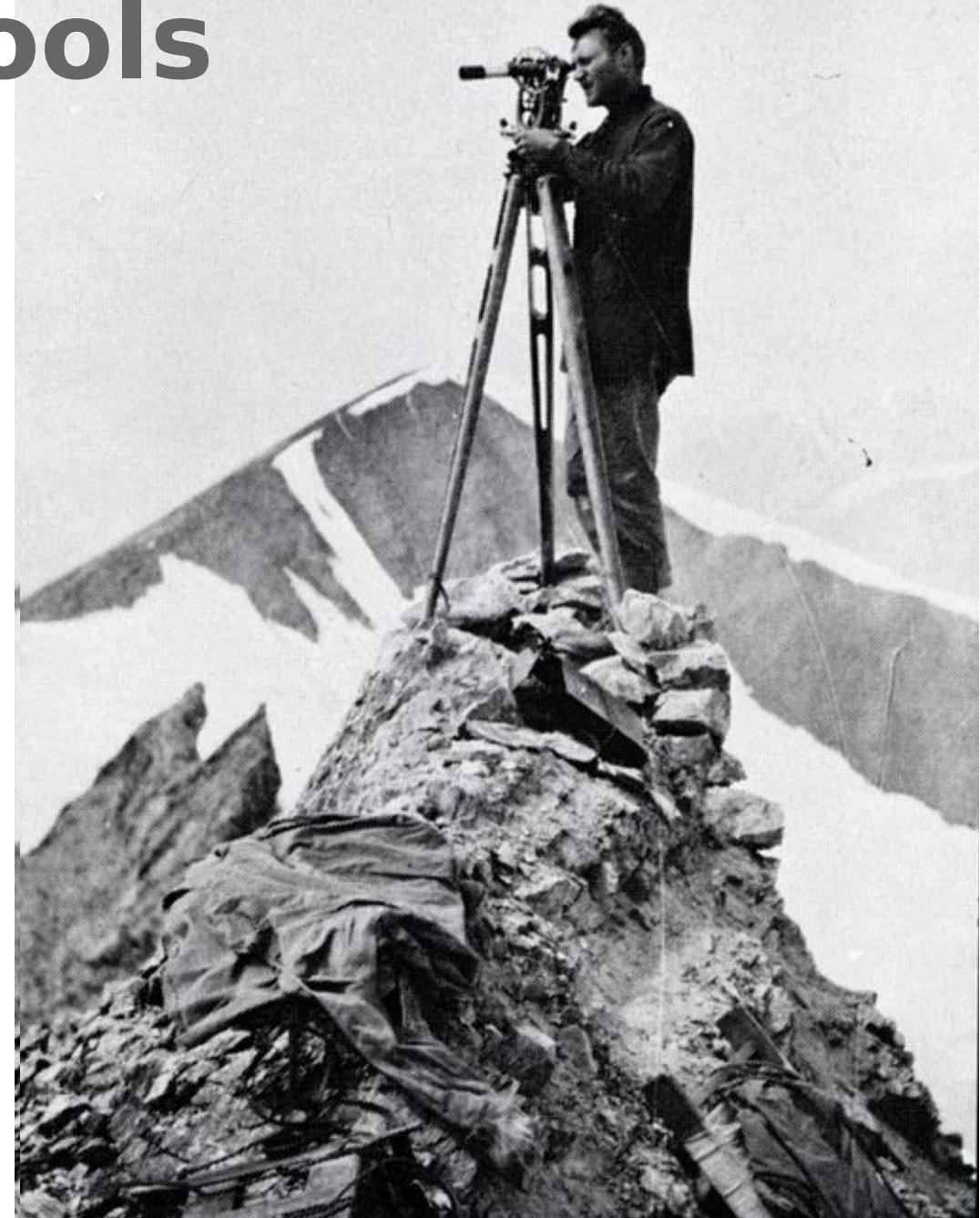
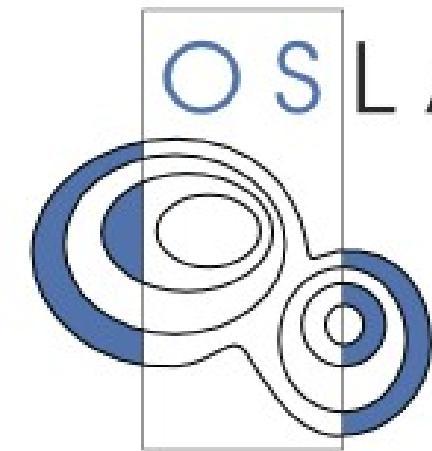


OpenSource tools for Surveying



Vincent Picavet
Oslandia



**OpenSource GIS
Since 2009**

**Consulting, audit, development, training,
assistance, support...**

**Environment, transportation, water, energy,
smartcity, logistics, geomarketing...**

**PostGIS, QGIS, MapServer, Mapnik, Routing,
data processing, simulation...**

www.oslandia.com

SUMMARY



Context

The need

GIS

Data

Surveying

- **Hardware**
- **Software**

Versioning

Simulation

Future



CONTEXT



Valcea County, Romania Pop. 300 000

European project Water network development

GIS setup needed

29 pumping stations

19 wastewater stations

1000km distribution

350km wastewater



THE NEED



Desktop GIS
Field data model
Centralized data repository
Surveying
Offline and versions management
Simulation coupling
Map + web rendering

Hardware + Software + expertise

GIS



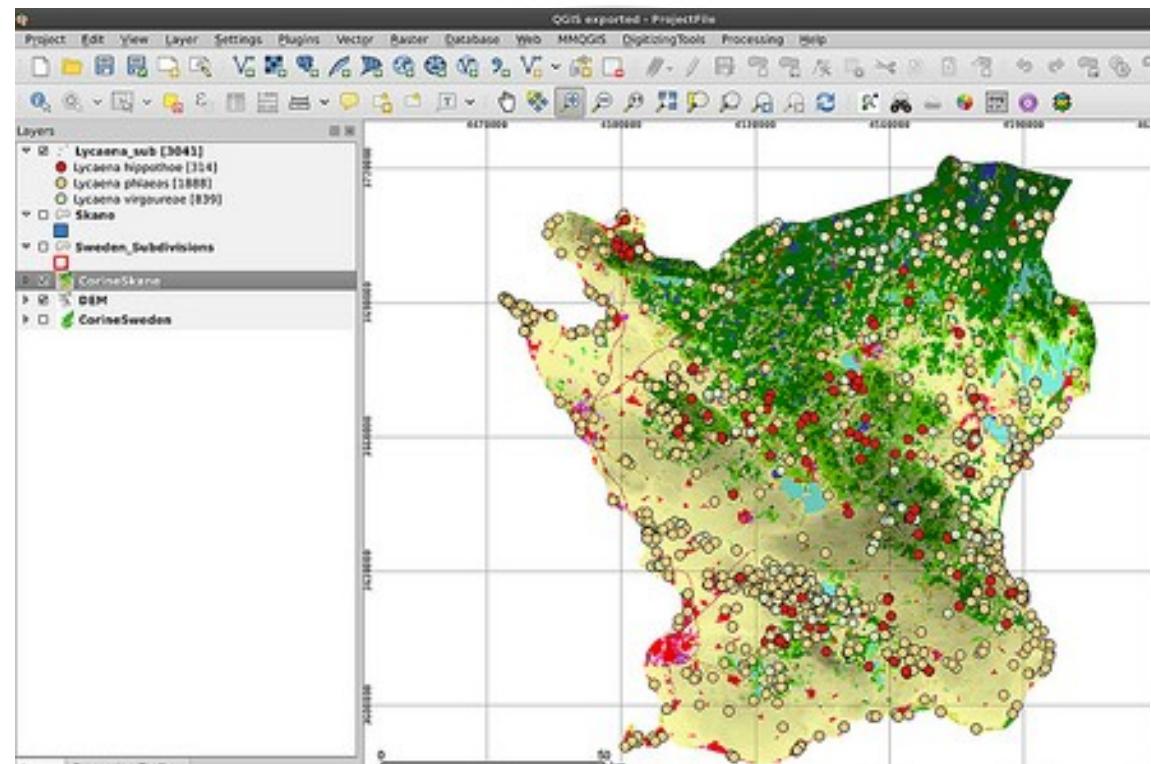


Desktop GIS : QGIS

Projects development :

- Objects
- Symbology
- Composers
- Forms

Plugin training

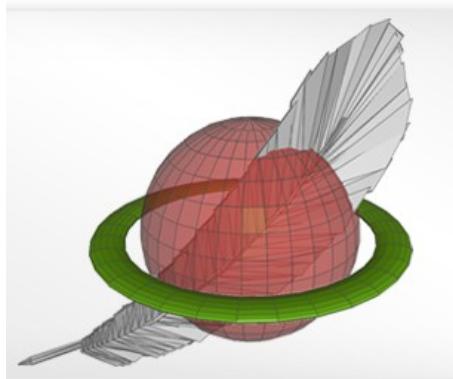




Data repository : PostGIS

- Version 9.3
- Data model design
- Training

Embedded : SpatiaLite



PC

QGIS

Client

Data management
Database management
Quantum GIS
PgAdmin



Data



Spatial database
PostgreSQL + PostGIS

Raster data
(Aerial, satellite...)



**Synchronization
Versionning**

Server

ROAM

Client



Data



Embedded spatial database
**Spatialite
Rasterlite**

Surveying

DATA



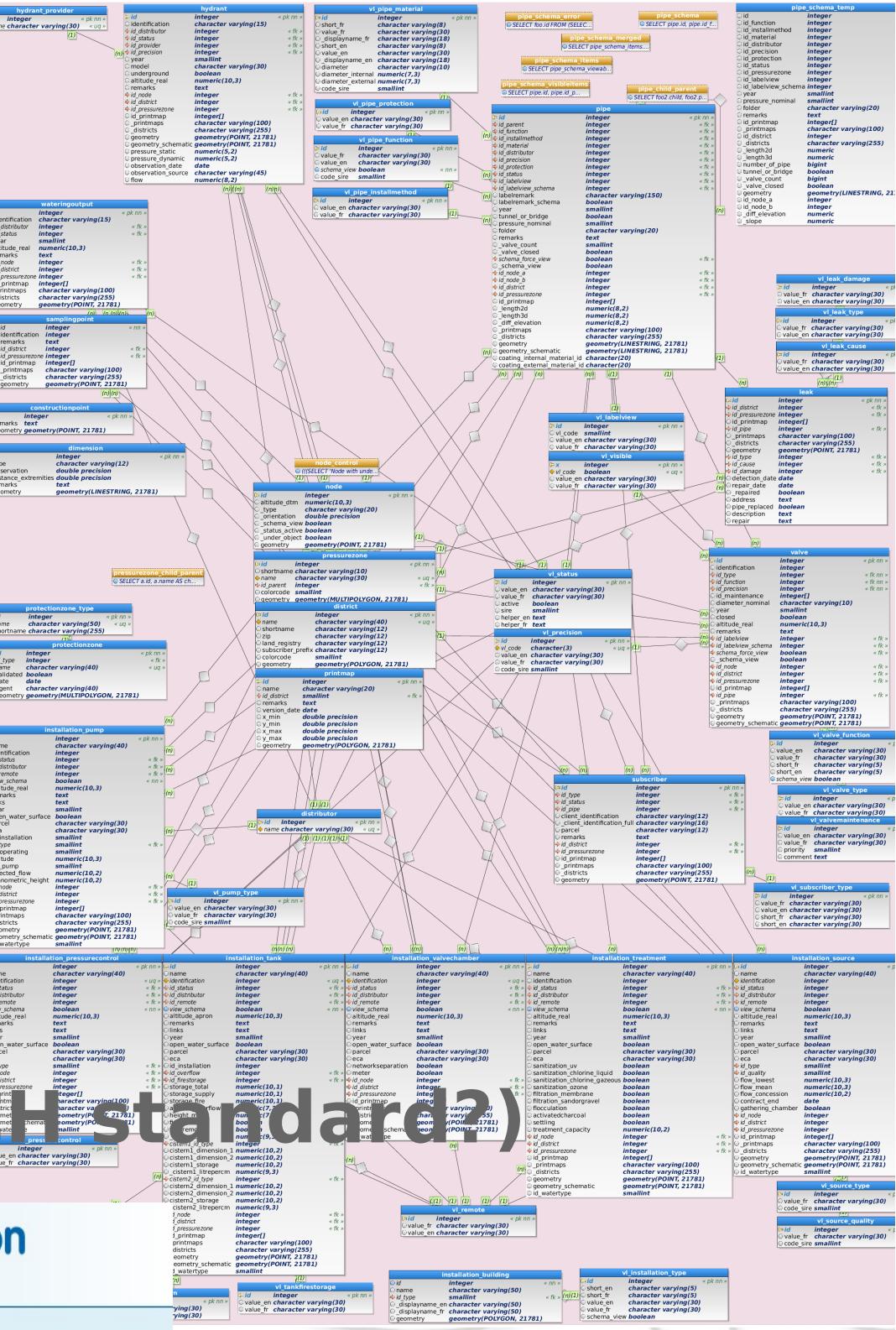
Data model

- Distribution
- Wastewater

Distribution : SIGE model

Projet qWat
Nodes, pumps, valves
Leaks, pipes, stations,
pressure zones,
tanks...

Wastewater: Work in progress (Ch. standard 2)



SURVEYING - HARDWARE





GPS



€525

http://leica-geosystems.com/downloads123/zz/gpsgis/Zeno_GG03/brochures-datasheet/Leica_Zeno_GG03_DAT_en.pdf

http://leica-geosystems.com/en/Leica-Zeno-GG03_99885.htm

Tablet



PANASONIC FZ-G1

**Windows 8
(or 7, happily)
64b, 4GB RAM
128GB SSD
WIFI, Bluetooth
3G/4G
10" HD
touch + stylus
Rugged**



SURVEYING - SOFTWARE





NMEA GPS Support
Domain-specific objects
Digitizing
Notes
Camera
GUI ergonomy (touch / stylus)
OpenSource
Configurable
Translatable
« QGIS compatibility »

« ROAM »

Specific application

QGIS-powered

Same projects

Same rendering

Vector / Raster

Online / offline

SpatiaLite data (or other)

Project management GUI

IntraMaps Roam: Mobile Data Collection

The map displays a street network with buildings labeled with numbers such as Nr. 1, Nr. 2, Nr. 4, Nr. 5, Nr. 6, Nr. 8, Nr. 10, Nr. 10A-Nr. 12, Nr. 11, Nr. 11A, Nr. 12A, Nr. 14, Nr. 16, Nr. 55, and Nr. 57. Several yellow lines represent sewer pipe segments, each marked with a circular icon containing 'CM'. These segments are labeled with pipe sizes: '250 PVC STR. VEGA', '300 PVC', '315 PVC', and '300 PVC'. A road is labeled 'STR. STRAUBING'. The top right corner of the map shows a vertical stack of three circles.

Map Center: 451919.853868, 400844.518249

Project: Canalizare Valcea User: Tableta.04

Map

Home View

Aerial Photo

Pan

Zoom In

Zoom Out

Select

Cam

Capture

Capture at GPS

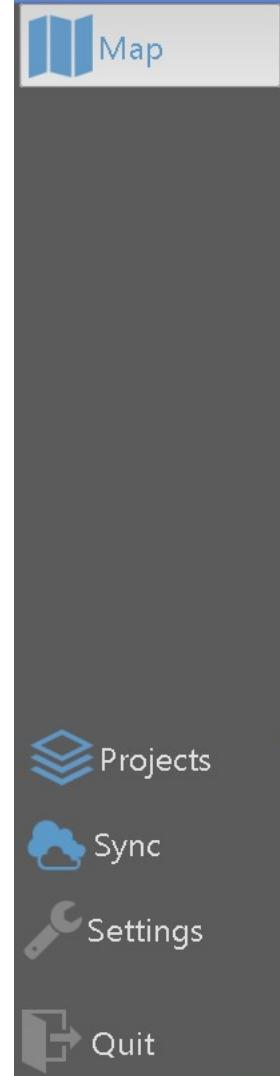
Projects

Sync

Settings

Quit

IntraMaps Roam: Mobile Data Collection



Home View Aerial Photo Pan Zoom In Zoom Out Select Cam Capture Capture at GPS

1 of 1

conducte_canal (Conducte Canal)

Id	1092
Tip Conducta	Menajera
Material	PVC
Diametru	300
Stare Functională	Functional
Strada	STR. STRAUBING
Forma Conductă	Circular
An Execuție	2010
Descriere	NULL
Ult Editor	postgres
Ult Data	2014-03-11 09:44:00
Ar lesire	266
Ar Intrare	285

Project: Canalizare Valcea User: Tableta.04

Map Center: 451909.701333, 400848.282672

Nr. 5

250 PVC C160

STR. VEGA

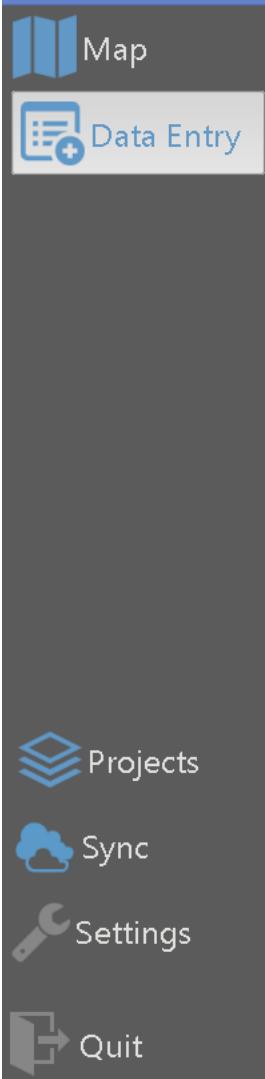
300 PVC

STR. STRAUBING

Nr. 6

Nr. 8

Nr. 12A



Delete



Cancel



Save

Diametru	<input type="text" value="300"/>
Material	<input type="text" value="PVC"/>
Stare Funcțională	<input type="text" value="Functional"/>
Forma Conductă	<input type="text" value="Circular"/>
AR intrare	<input type="text" value="285"/>
AR ieșire	<input type="text" value="266"/>
Descriere	<input type="text"/>



Cancel Save

ID Conducta

Stare

Functie

Precizie

Precizie alti

Tip

Observatii

Precizie alti

Imprecisa

Mai buna de 100 cm

Mai buna de 50 cm

Mai buna de 10 cm

Mai buna de 5 cm

Necunoscuta

IntraMaps Roam: Mobile Data Collection

Map

Data Entry

Cancel

Save

Functie: Conducta de distributie

Metoda de instalare: Ingropare

Material/Dimensiuni: Polietilena 80

Distribuitor: APAVIL

Precizie: Precisa

Stare: Functional

Tip apa: Potabila

Remark:

Projects

Sync

Settings

Quit

Project

1 q 2 w 3 e 4 r 5 t 6 y 7 u 8 i 9 o 0 p

a s d f g h j k l ; Enter

↑ z x c v b n m , . ? ↑

&123 Ctrl ☺ < > ☰

2:26 PM
4/8/2014

IntraMaps Roam: Mobile Data Collection

Map Home View Aerial Photo Pan Zoom In Zoom Out Select Cam▼ Capture Capture at GPS

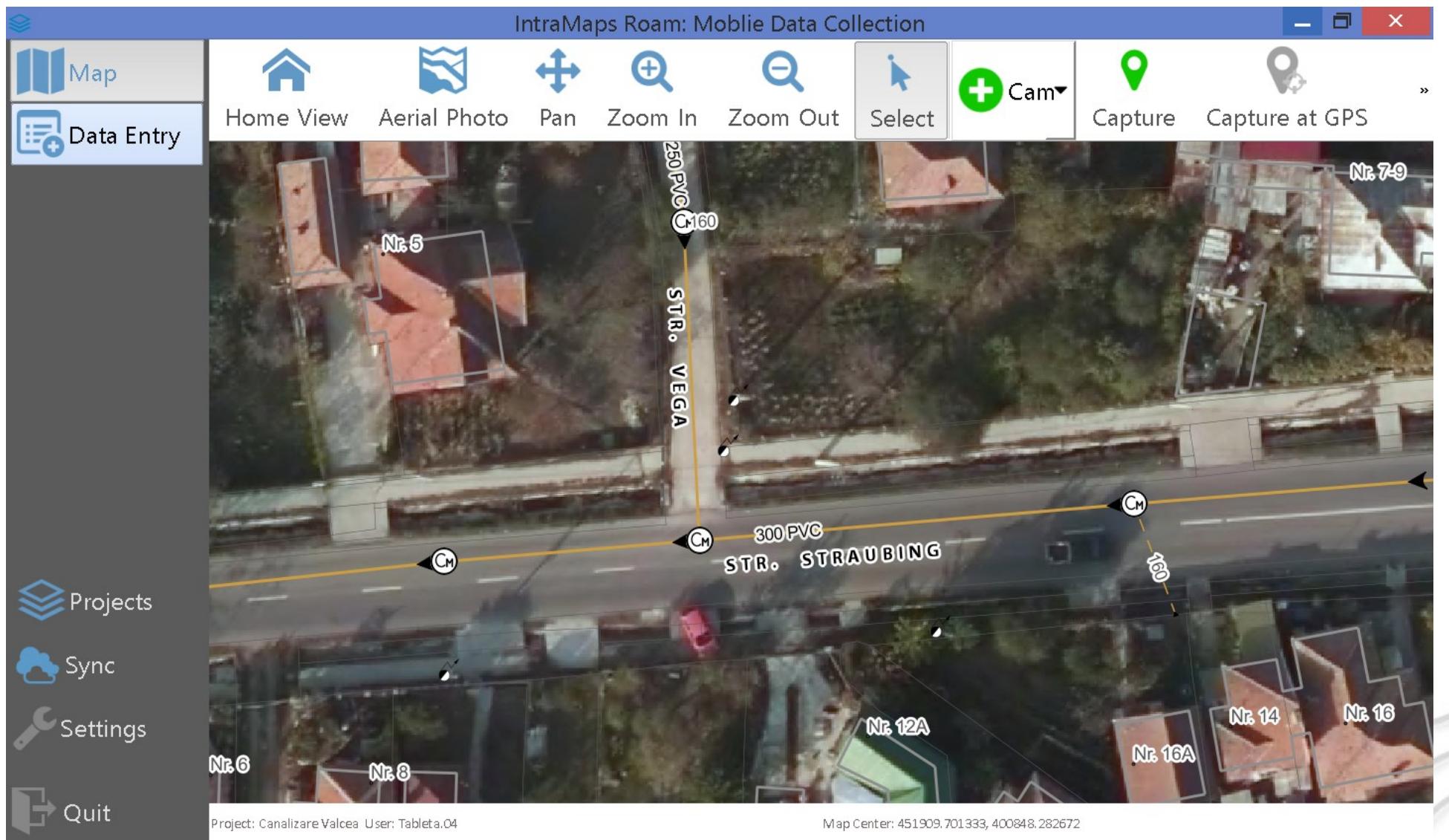
camine_canal (Camin Canal)

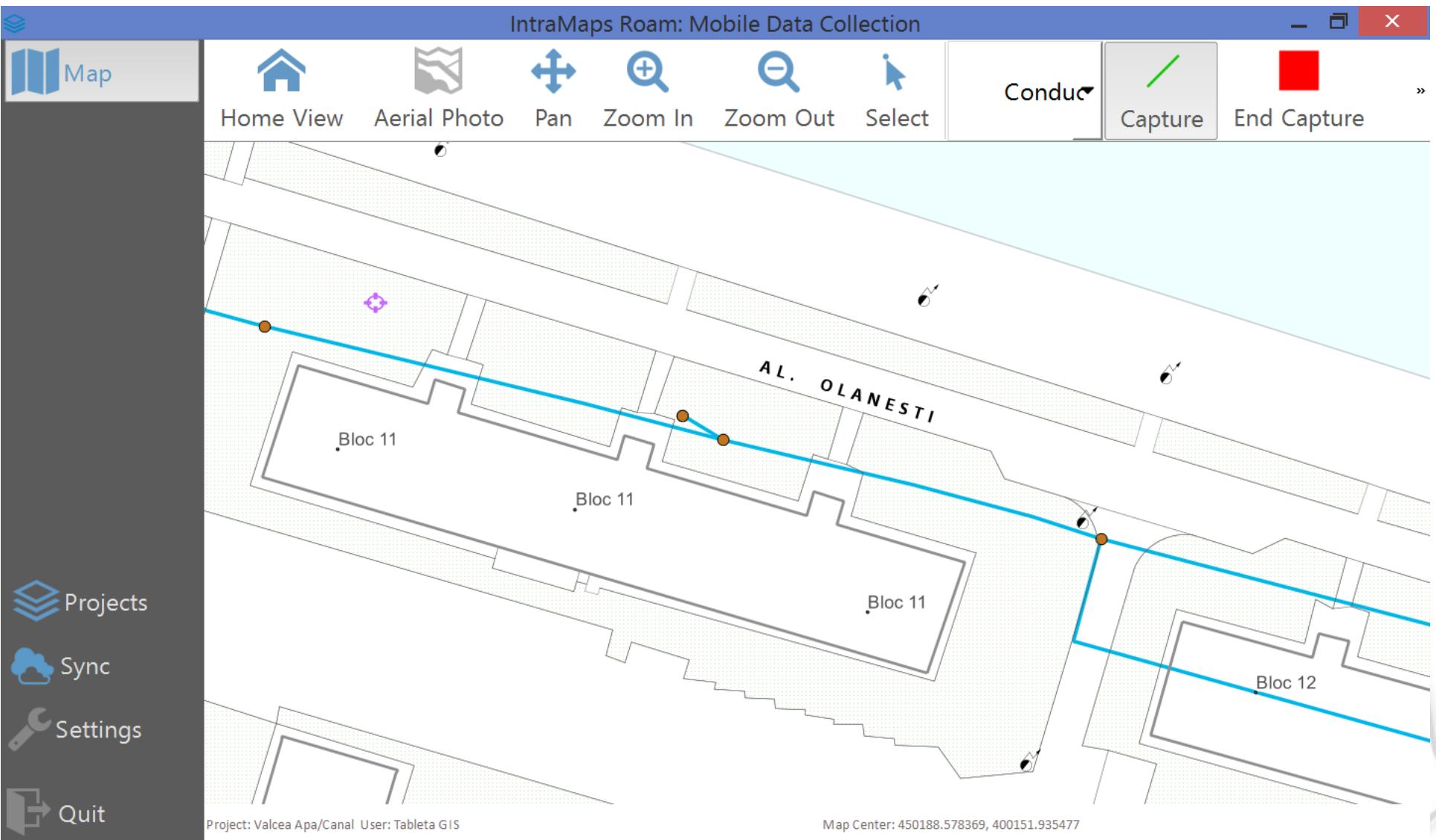
conducte_canal (Conducte Canal)

	Id	1091
	Tip Conducta	Menajera
	Material	PVC
	Diametru	300
	Stare Functionala	Functional
	Strada	STR. STRAUBING
	Forma Conducta	Circular
	An Executie	2010
	Descriere	NULL
	Ult Editor	postgres
	Ult Data	2014-03-11 09:44:00
	Ar lesire	285
	Ar Intrare	281

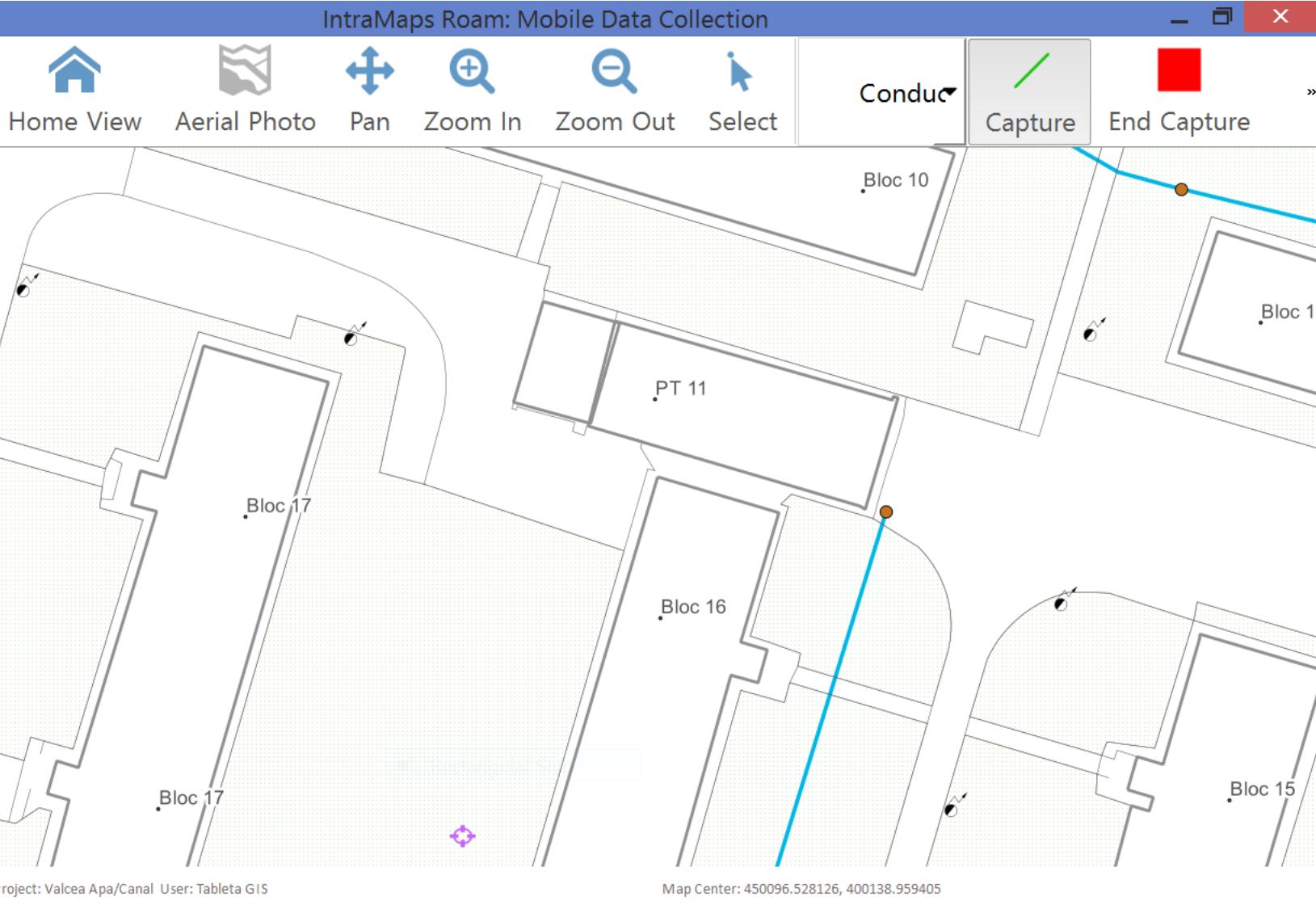
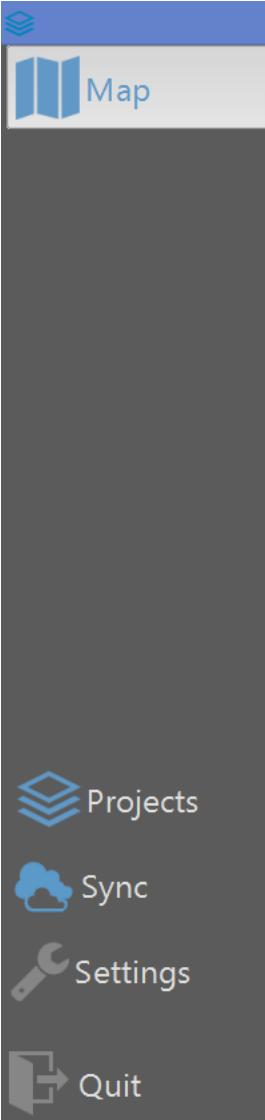
Project: Canalizare Valcea User: Tableta.04

Map Center: 451909.701333, 400848.282672



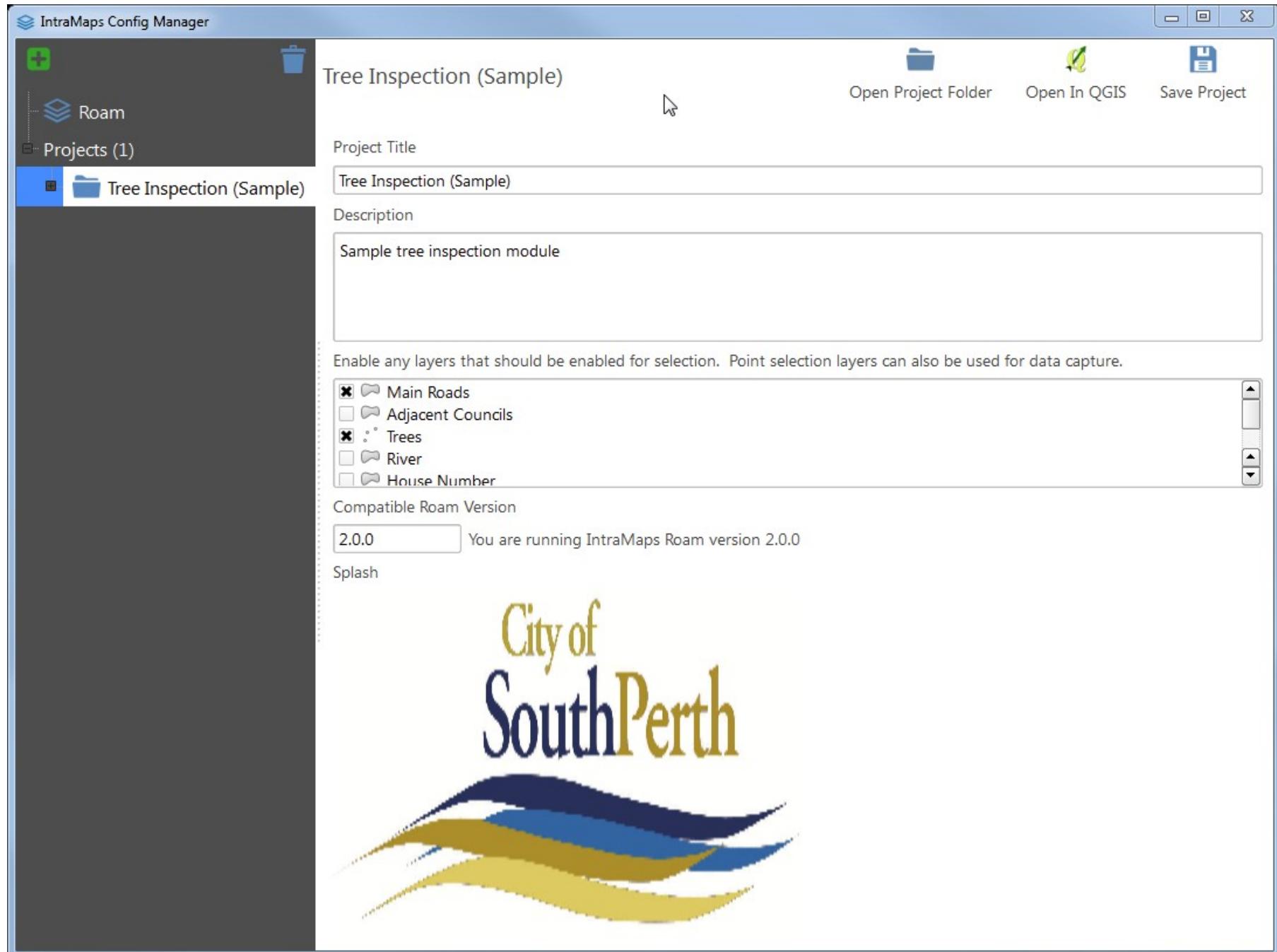


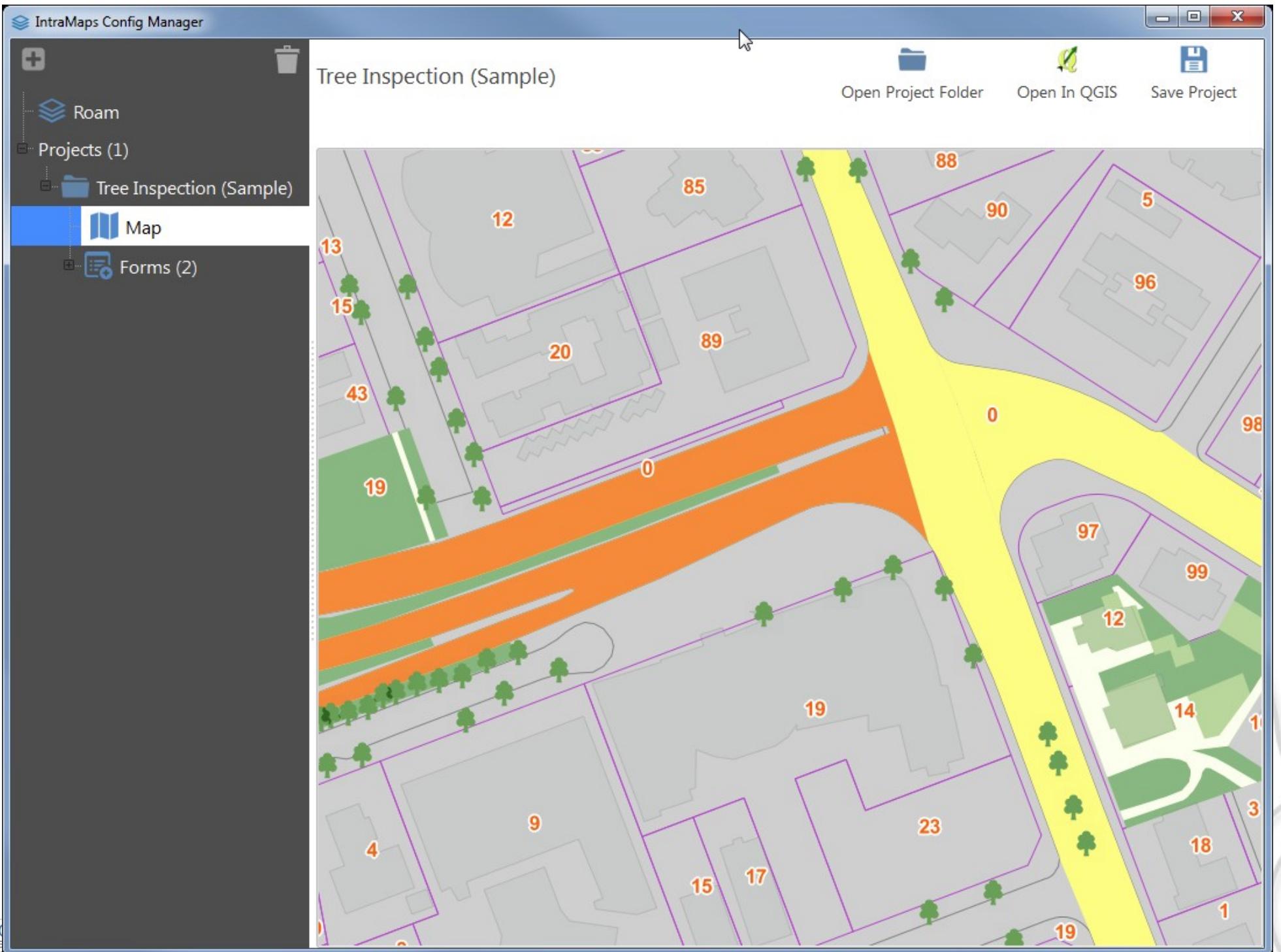
IntraMaps Roam: Mobile Data Collection



Project management GUI









Roam

Projects (1)

Tree Inspection (Sample)



Forms (2)

Second Inspection

Tree Inspection



Tree Inspection (Sample)



Open Project Folder



Open In QGIS



Save Project

Form folder [trees2](#)

Label Second Inspection

Capture Layer Trees

Type auto

Form

Preview



Add Attribute



Remove Attribute

ID (Text)

Ward (List)

Photo (Image)

Inspection Date (Date)

Powerlines over head? (List)

Suburb (List)

Tree height (m) (Text)

Condition (List)

Botanical Name (List)

Attribute

Field ward (TEXT)

Name Ward

Control List

Required?

Hidden?

Read Only Never

Default Value

 Allow Null Value From layer From pre-defined list

Single item per line. Descriptions can be added after the item using a semicolon e.g Test ; My Testing

Sub Type;Como Beach

Sub Type2;Mill Point

Sub Type3;Moresby

Sub Type4;Manning

VERSIONING



Strong project requirements :

- data history**
- offline work**
- scenario management**

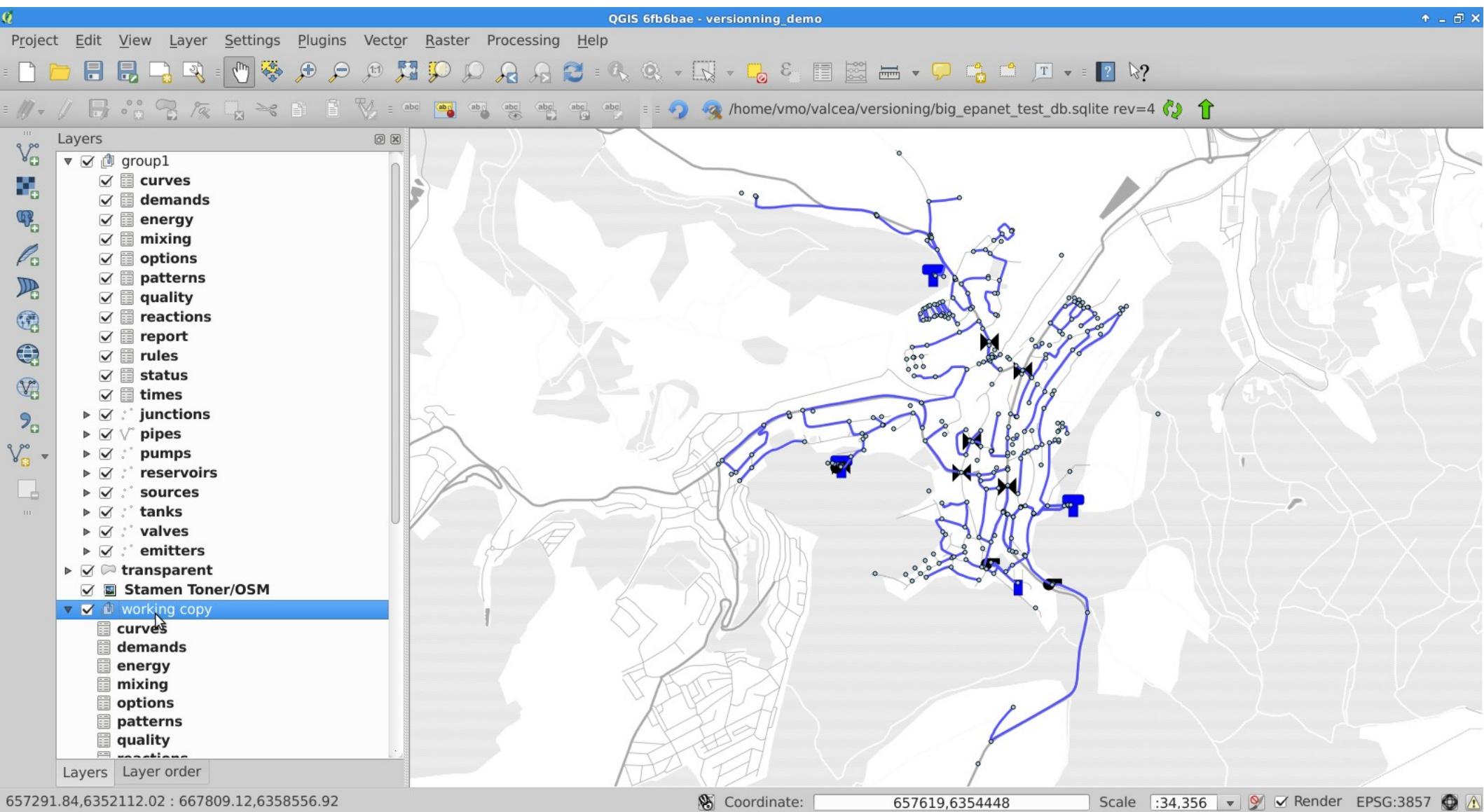
=> data versioning

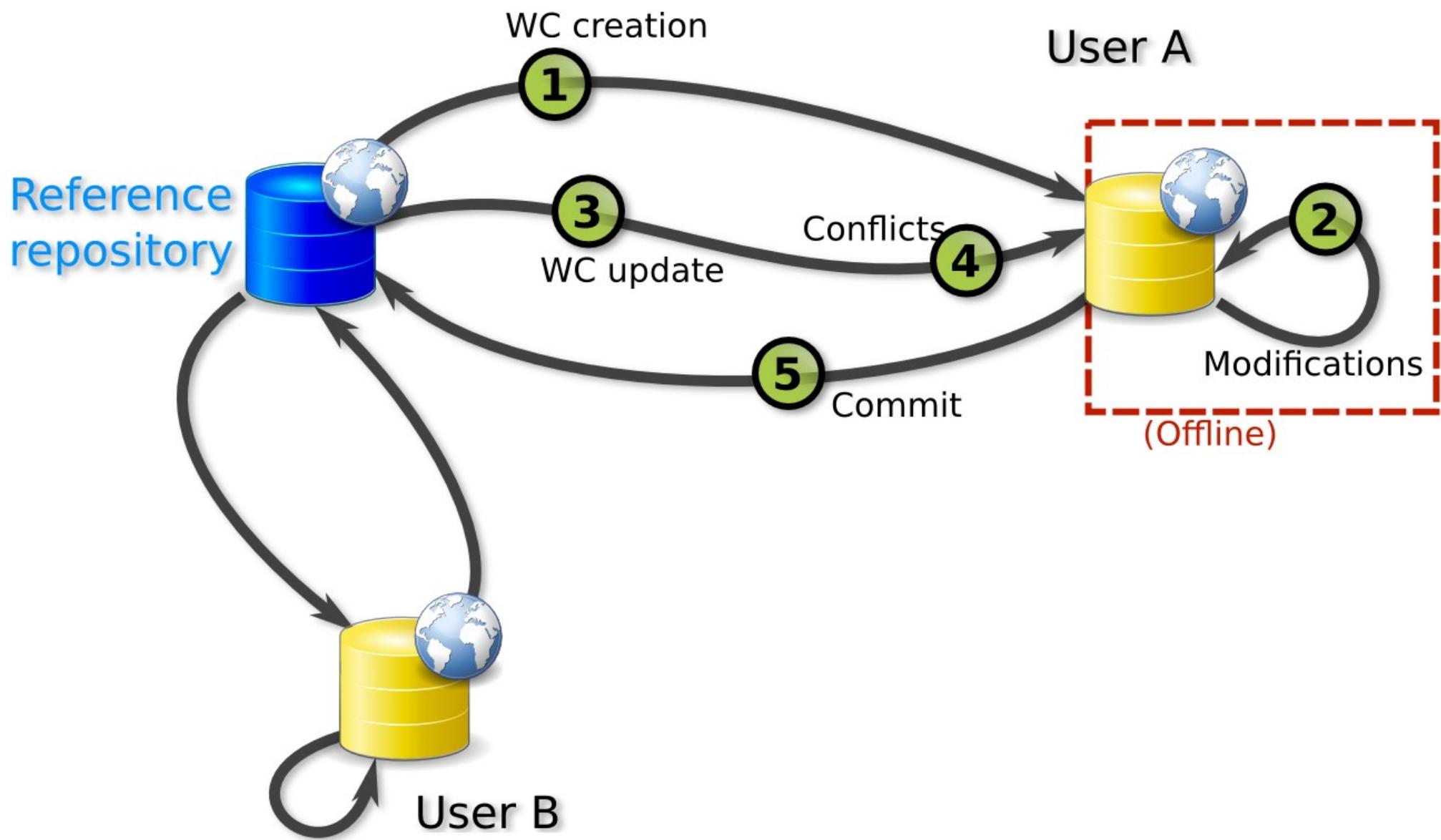
- PostGIS / SpatiaLite**
- commits**
- branches**
- conflict management**



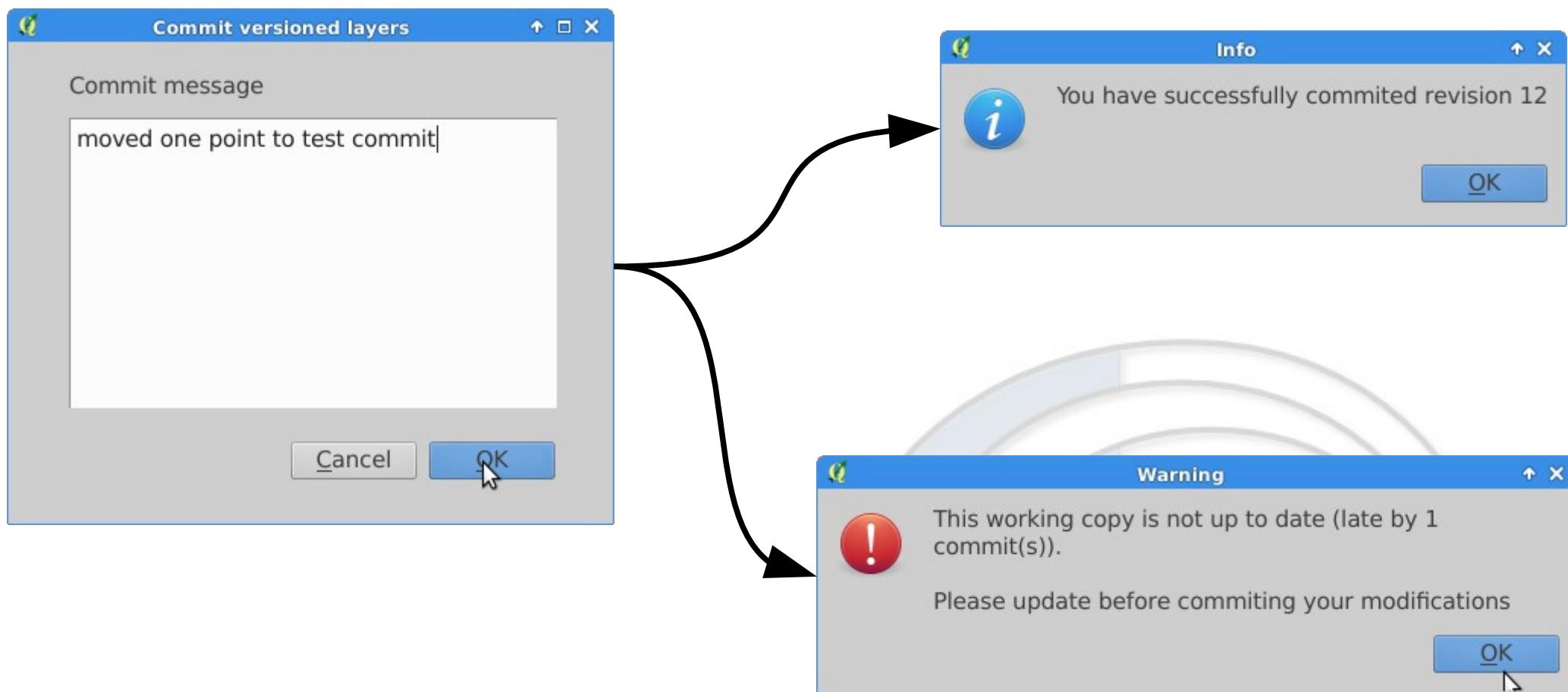
Working copy (WC)

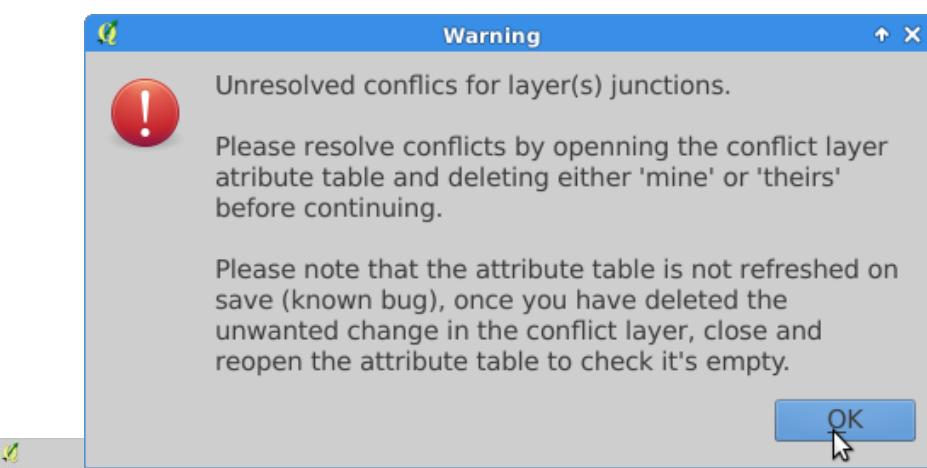
- Offline (SpatiaLite) → Tablet
- In database





Commit





Conflict management

The screenshot shows a QGIS interface with a map of a network. The map features a dense cluster of blue dots representing junctions, connected by green lines representing pipes. The background shows a grayscale map of buildings and terrain. On the left, the 'Layers' panel is open, displaying a tree view of project layers: 'junctions conflicts' (checked), 'group1' (unchecked), 'working copy' (checked), and several other checked layers like 'curves', 'demands', 'energy', etc. Below these are 'junctions' (checked), 'pipes' (checked), 'pumps' (checked), and 'reservoirs' (checked). At the bottom, an 'Attribute table - junctions_conflicts :: Features total: 2, filtered: 2, selected: 1' is shown with two rows of data:

	conflict_id	origin	action	OGC_FID	id noeud	altitude	emande bas	irbe modulat	unk_rev_beg	runk_rev_end	trunk_parent	trunk_child	ranch_rev_b	branch_rev_e	/branch_pare	ybranch_c
0	329	mine	modified	331	N18b2	315.67	0.081346...	DOM_AUD...	12	NULL	329	NULL	NULL	NULL	NULL	NULL
1	329	theirs	modified	330	N18b2	315.67	0.081346...	DOM_AUD...	11	NULL	329	NULL	NULL	NULL	NULL	NULL

A 'Show All Features' button is at the bottom left.

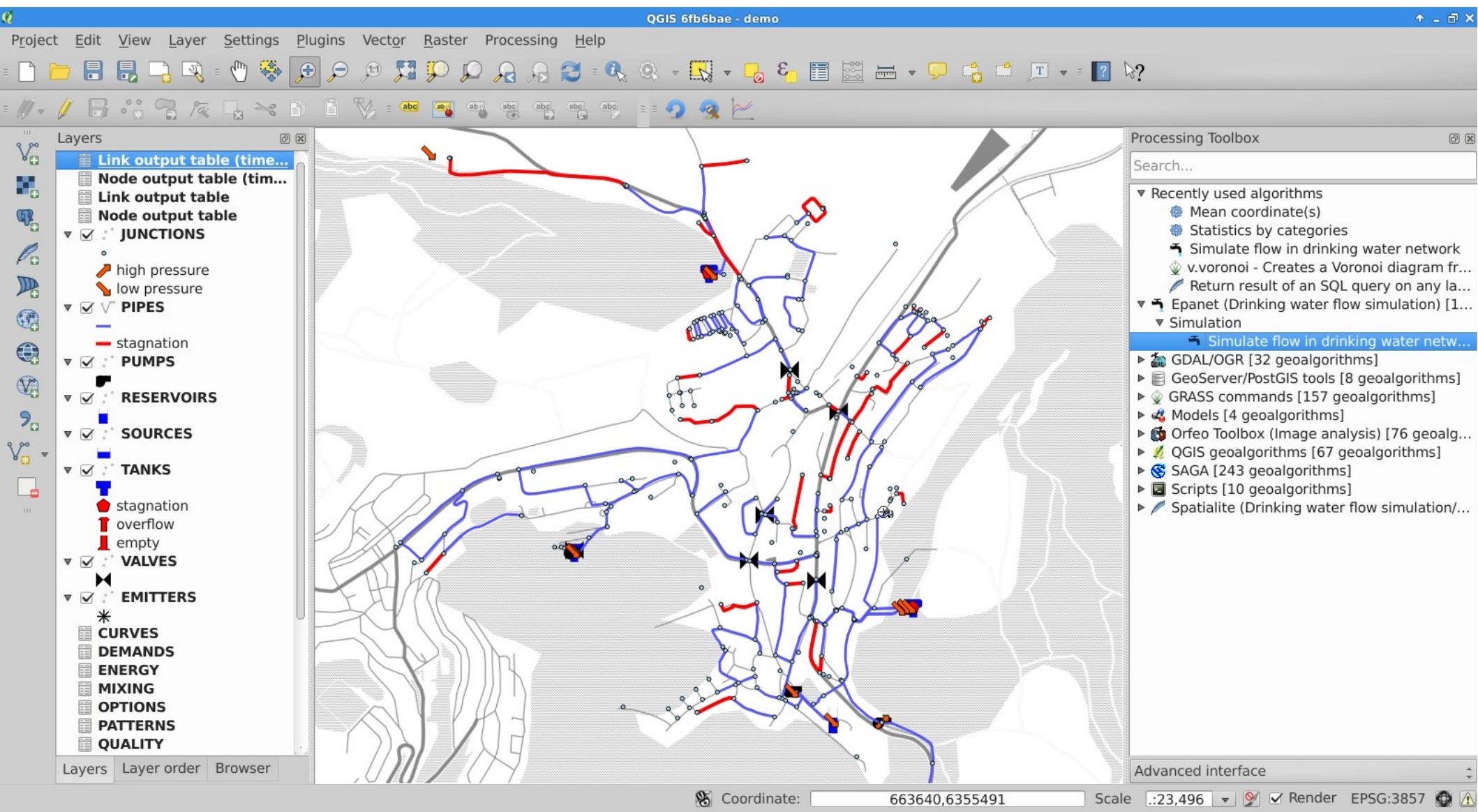
SIMULATION



EPANET integration

Hydraulics simulation

Processing = geo-data algorithms

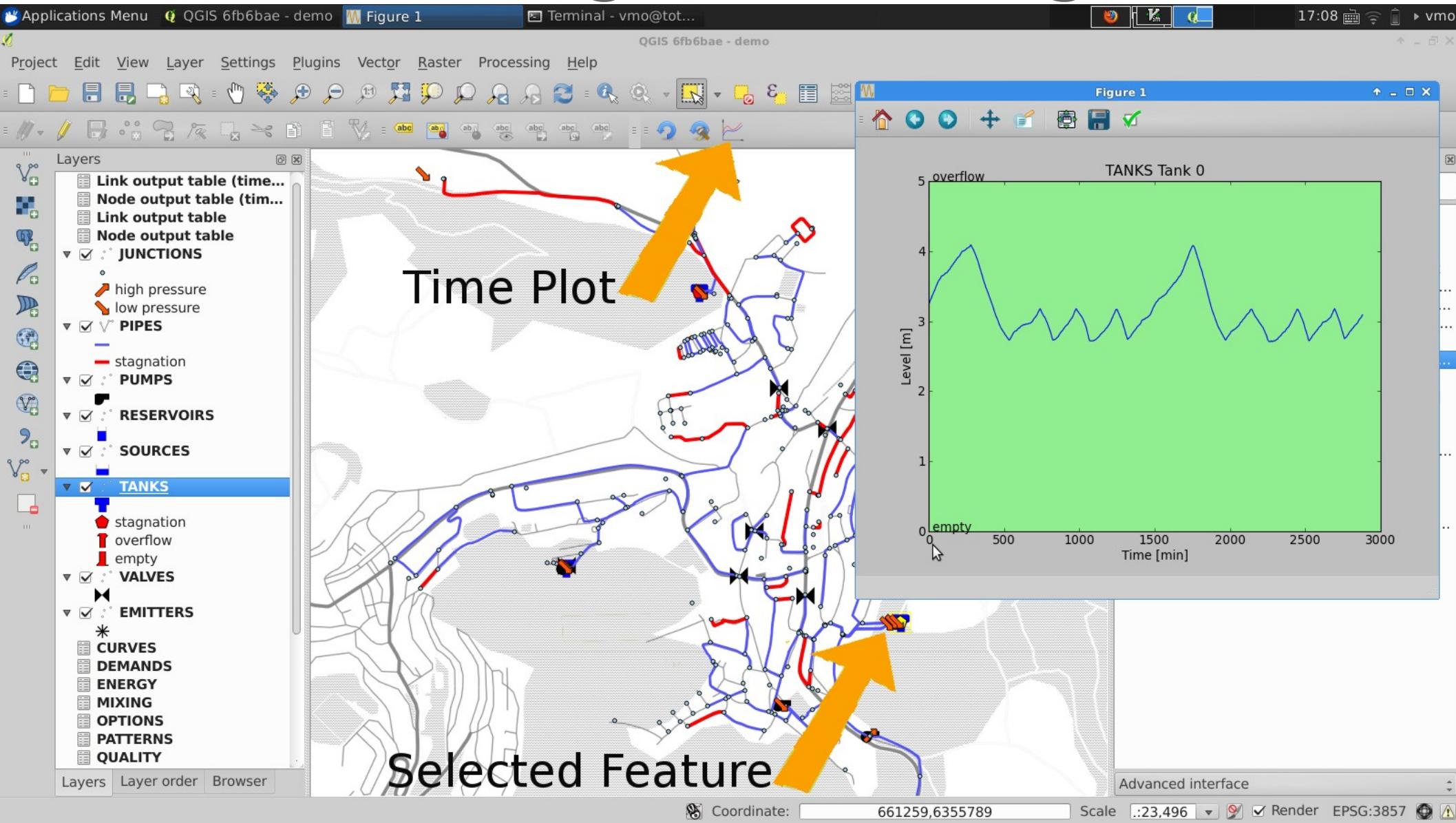


Map of results

Temporal data visualization

Database integration

SWMM integration coming soon



FUTURE



Better domain specific objects
Database design (+wastewater), QGIS GUI

Surveying software improvements
GPS tracking and infos, capture data on canvas...

SCADA connections

Geo-Webservices, SOS

Integrated software stack

Community
Users, contributors, funders

Questions ?

@vpicavet

@Oslandia_en

infos@oslandia.com

www.oslandia.com

Thanks to

Vincent Mora

Hugo Mercier

Tudor Barascu

Denis Rouzaud

GIS Office of Apavil

Nathan Woodrow (DMS)

