OpenSource Software for WATER management

Vincent Picavet
Oslandia

Water Management

Surface water hydrology
Groundwater hydrology
Urban hydraulics

PROCESSING, PostGIS,

QGEP, QWAT,

ROAM, qgis_versioning

qgis_epanet, qgis_swmm

FREEWAT

OSLANDIA

Cloud WebServices

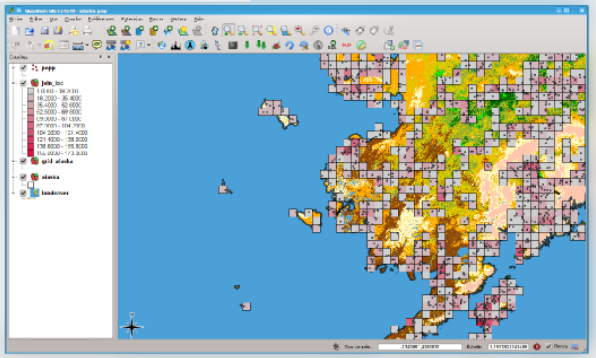
SWMM

EPANET

TauDEM

Plugins

QGIS CORE



Spatial Database

PostGIS Spatial PostgreSQL

Oracle Spatial and Graph

Microsoft SQL Server

PROCESSING

GDAL

FTOOLS

SAGA GIS

GRASS

PostGIS

OTB

LAS

OPENCV

R

OSLANDIA

Hydrology : PROCESSING

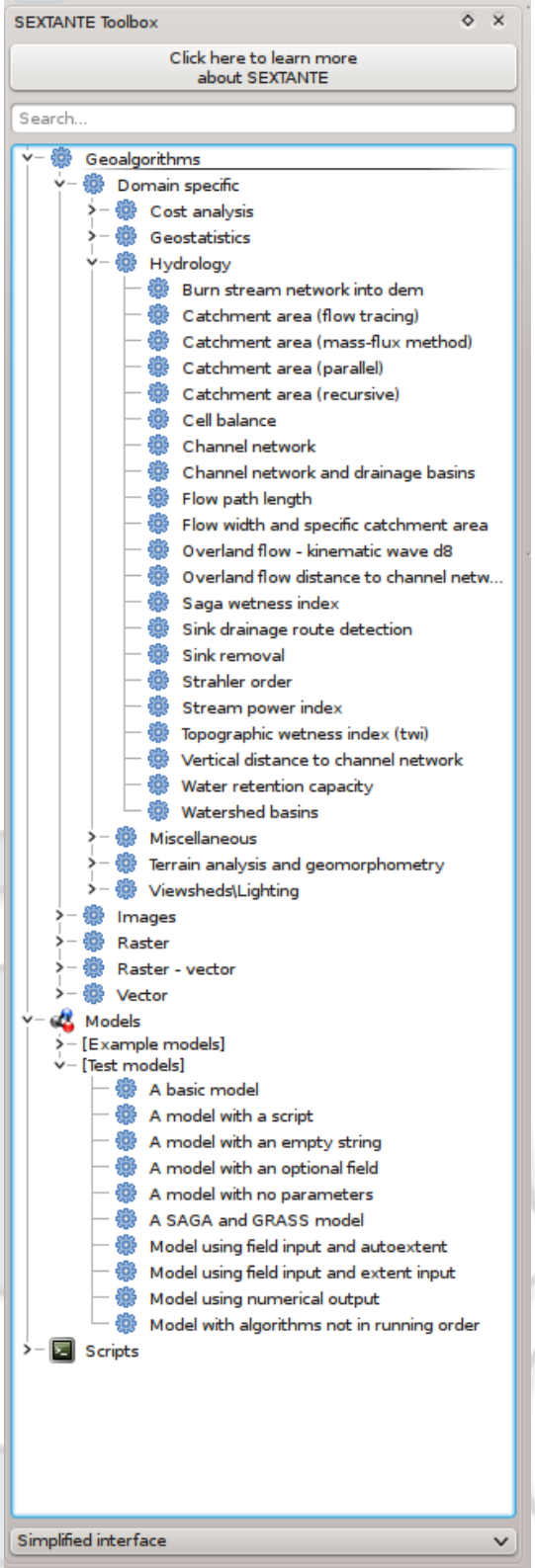
OSLANDIA

Modules

- GDAL
  - Raster
  - Raster analysis
  - DEM
- SAGA
- GRASS
- TauDEM

→ PROCESSING

PROCESSING algorithms



OSLANDIA

GRASS

Flow calculation
Groundwater flow
Hydrological models
Sediment
Stream modules
Watershed
Flooding areas

http://grasswiki.osgeo.org/wiki/Hydrological_Sciences

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SAGA

Catchment
Sink management
Watershed segmentation
Water retention capacity
Watershed basins
Wetness index
Upslope area

OSLANDIA

TauDEM

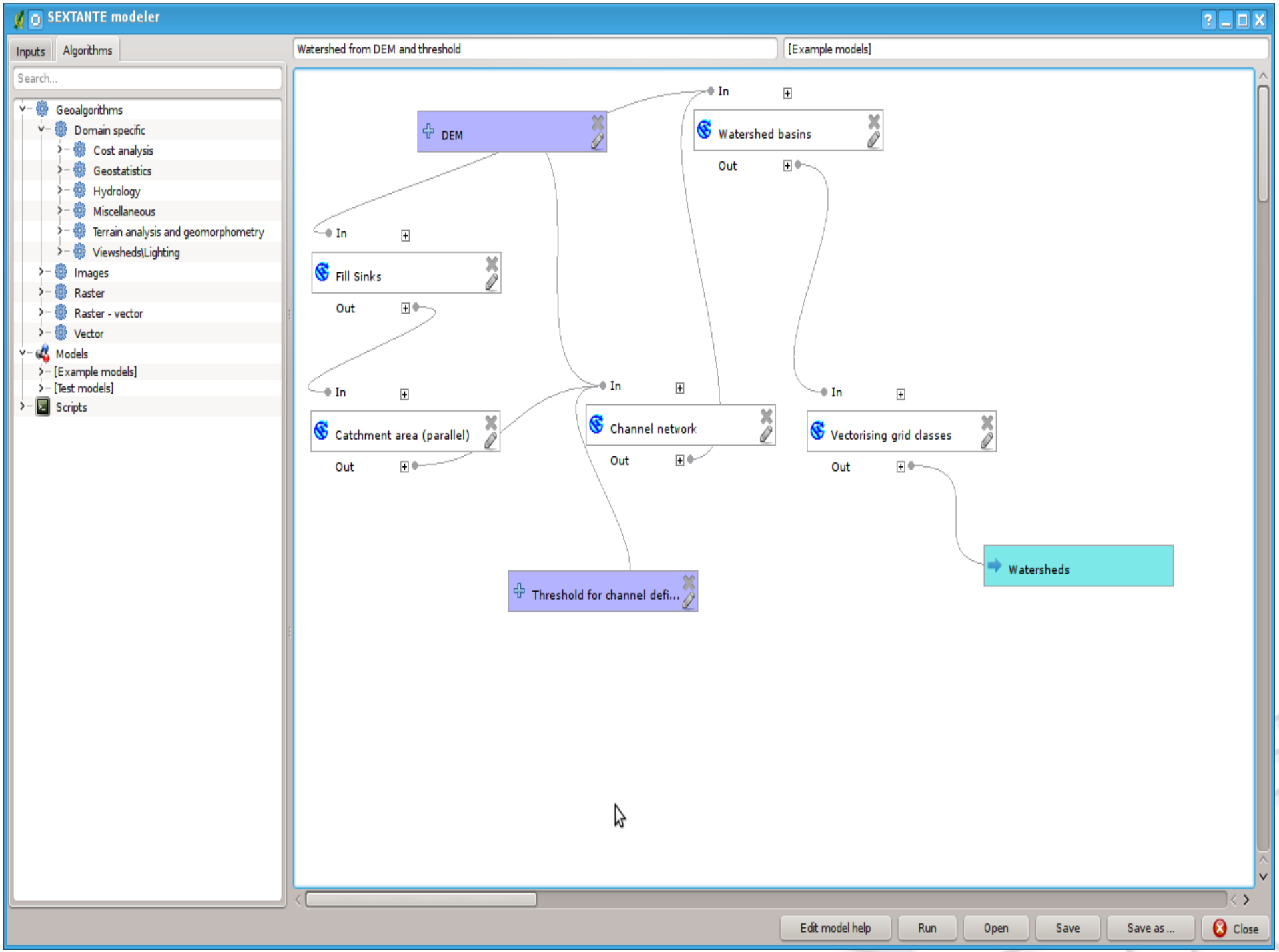
(Terrain Analysis Using Digital Elevation Models)

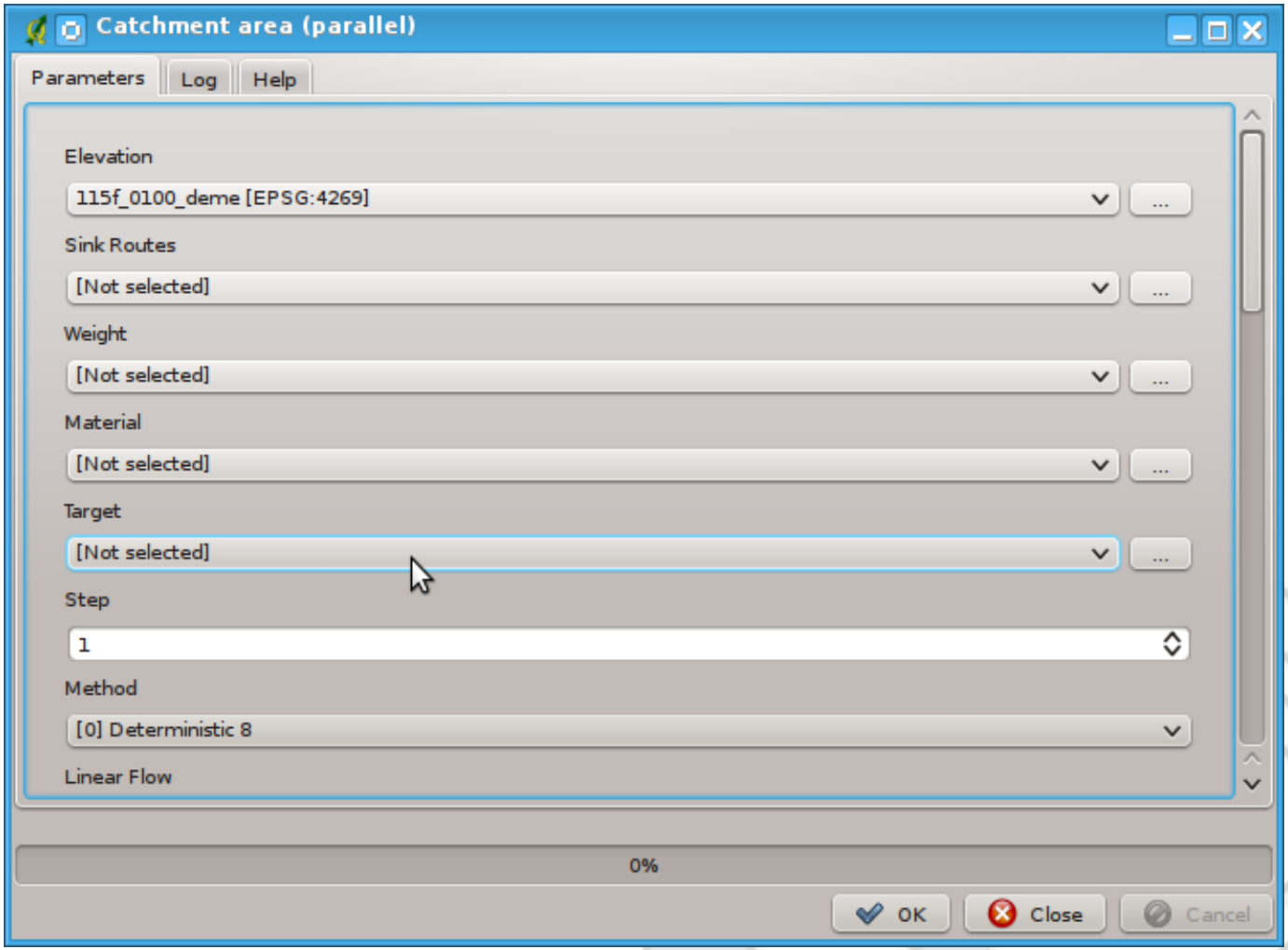
DEM → Hydrology Integrated in PROCESSING

Flow paths, slopes, contributing areas, stream network delineation, channel network delineation, (sub-)watershed delineation, Watershed / segment attribution, slope/area ratios, accumulation, reverse accumulation, avalanche runout areas...

OSLANDIA

Complex / custom models




Catchment area (parallel)
Parameters
Log
Help
Elevation
115f_0100_deme [EPSG:4269]
Sink Routes
[Not selected]
Weight
[Not selected]
Material
[Not selected]
Target
[Not selected]
Step
1
Method
[0] Deterministic 8
Linear Flow
0%
OK
Close
Cancel

Catchment area (parallel)

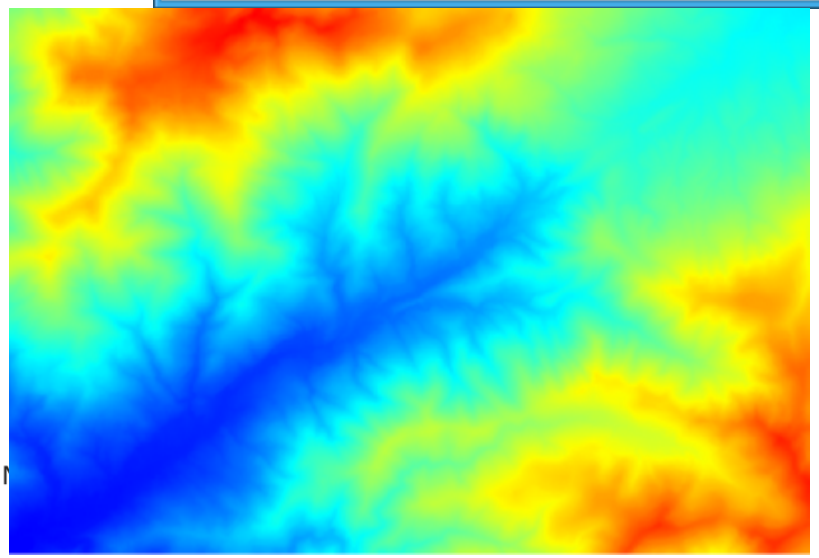
Parameters | Log | Help

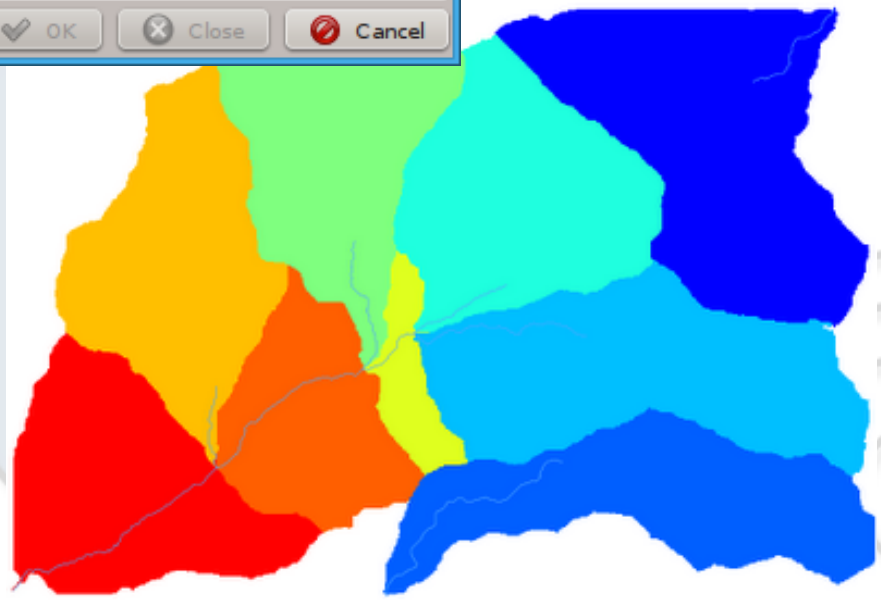
```
Elevation: 115f_
Sink Routes: [not set]
Weight: [not set]
Material: [not set]
Target: [not set]
Catchment Area: Catchment Area
Catchment Height: Catchment Height
Catchment Slope: Catchment Slope
Total accumulated Material: Total accumulated Material
Accumulated Material from _left_ side: Accumulated Material from _left_ side
Accumulated Material from _right_ side: Accumulated Material from _right_ side
Step: 1
Catchment Aspect: Catchment Aspect
Flow Path Length: Flow Path Length
Method: Deterministic 8
Linear Flow: yes
Linear Flow Threshold: 500.000000
Linear Flow Threshold Grid: [not set]
Channel Direction: [not set]
Convergence: 1.000000


ready

Create index: 115f_

ready
```

Processing algorithm...

86%

OK | Close | Cancel





Network analysis

OSLANDIA

PostGIS

PostGIS topology
Custom topology
Recursive queries
Vector processing

→ Data quality

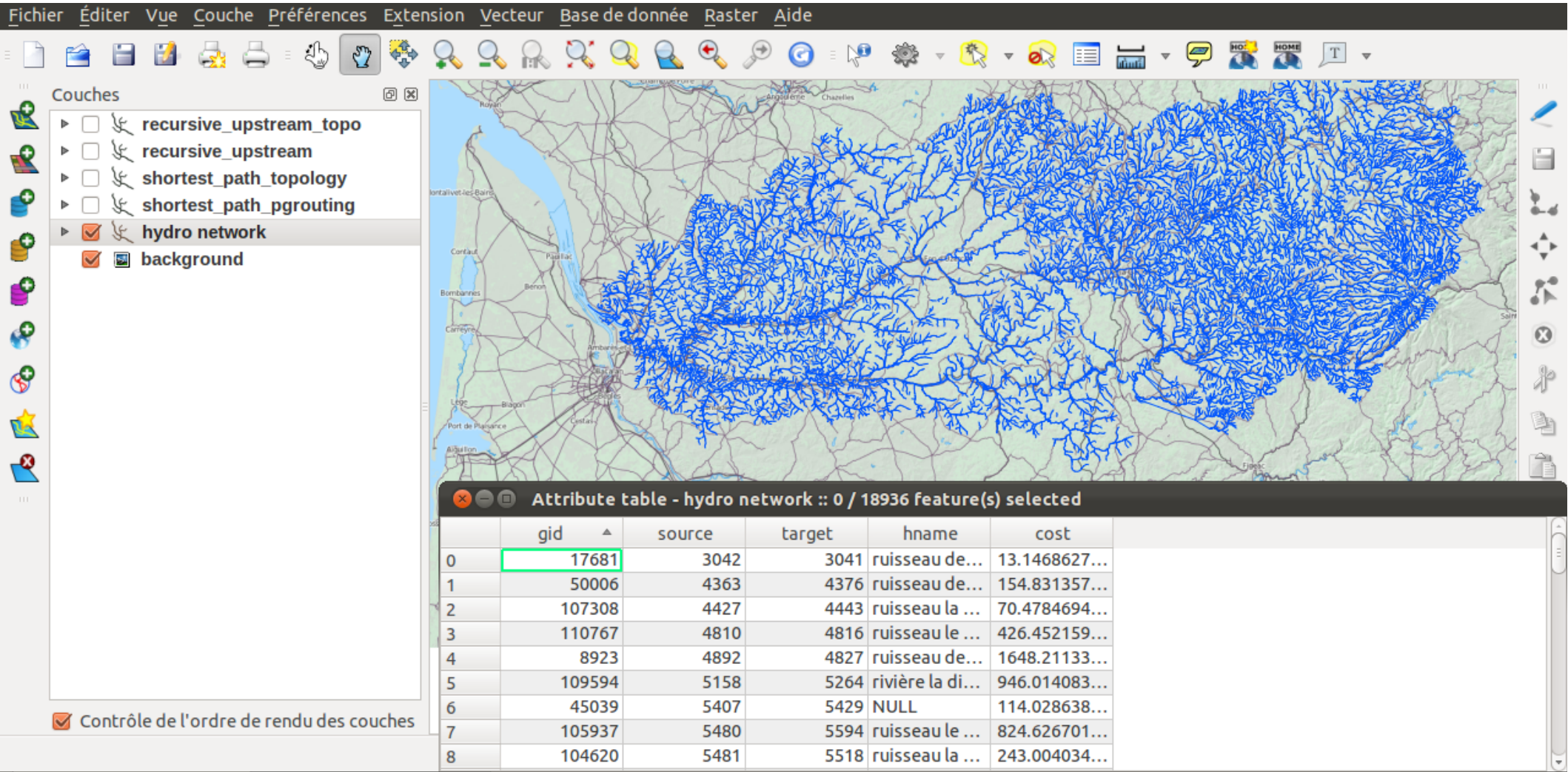
Validity, topology construction,
Constraints, topo/geom coherency
Semi-automated edition

→ Network analysis

Pumps activation, zone isolation
Multiple networks, history...

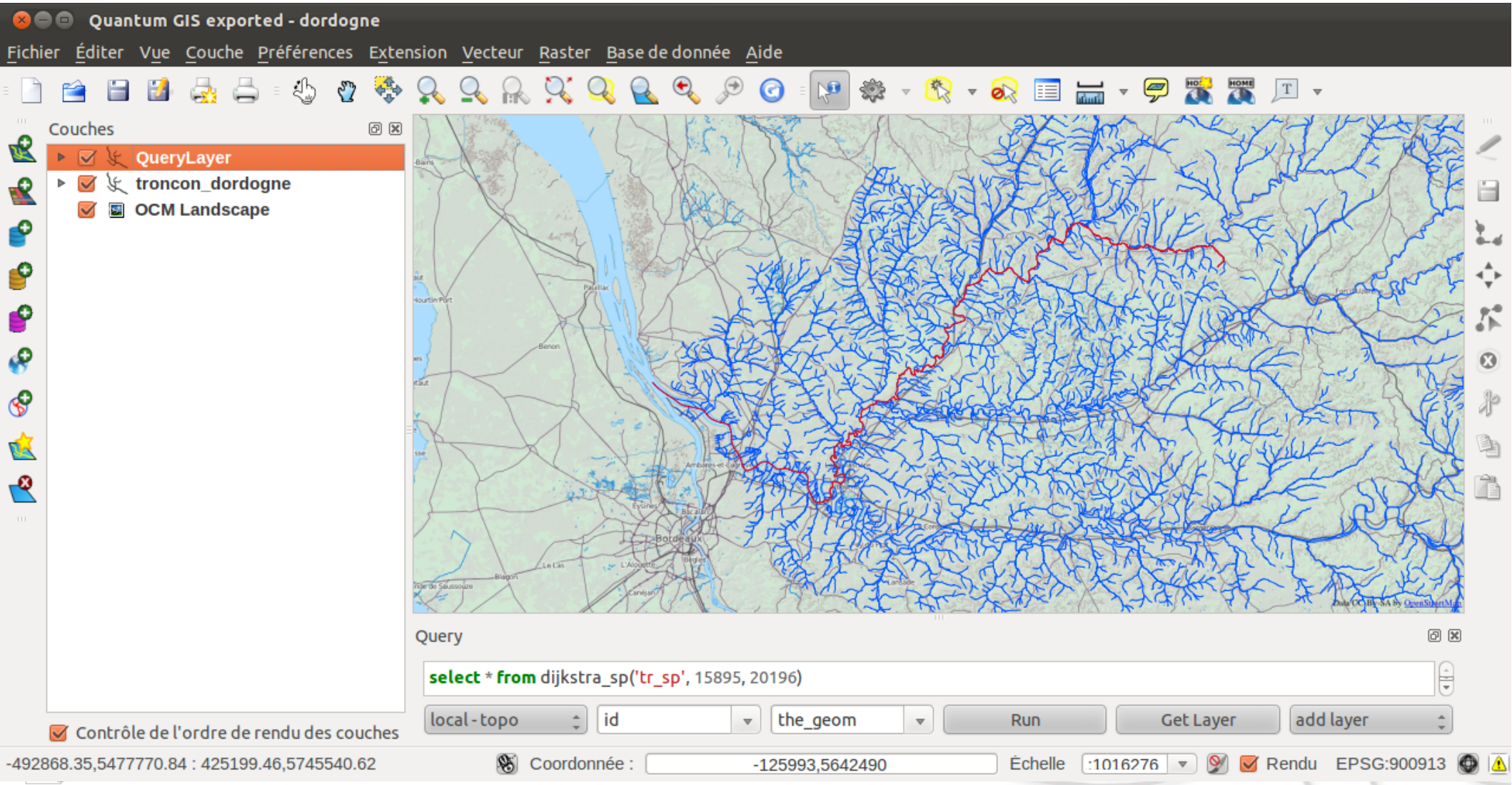
OSLANDIA

Hydro network

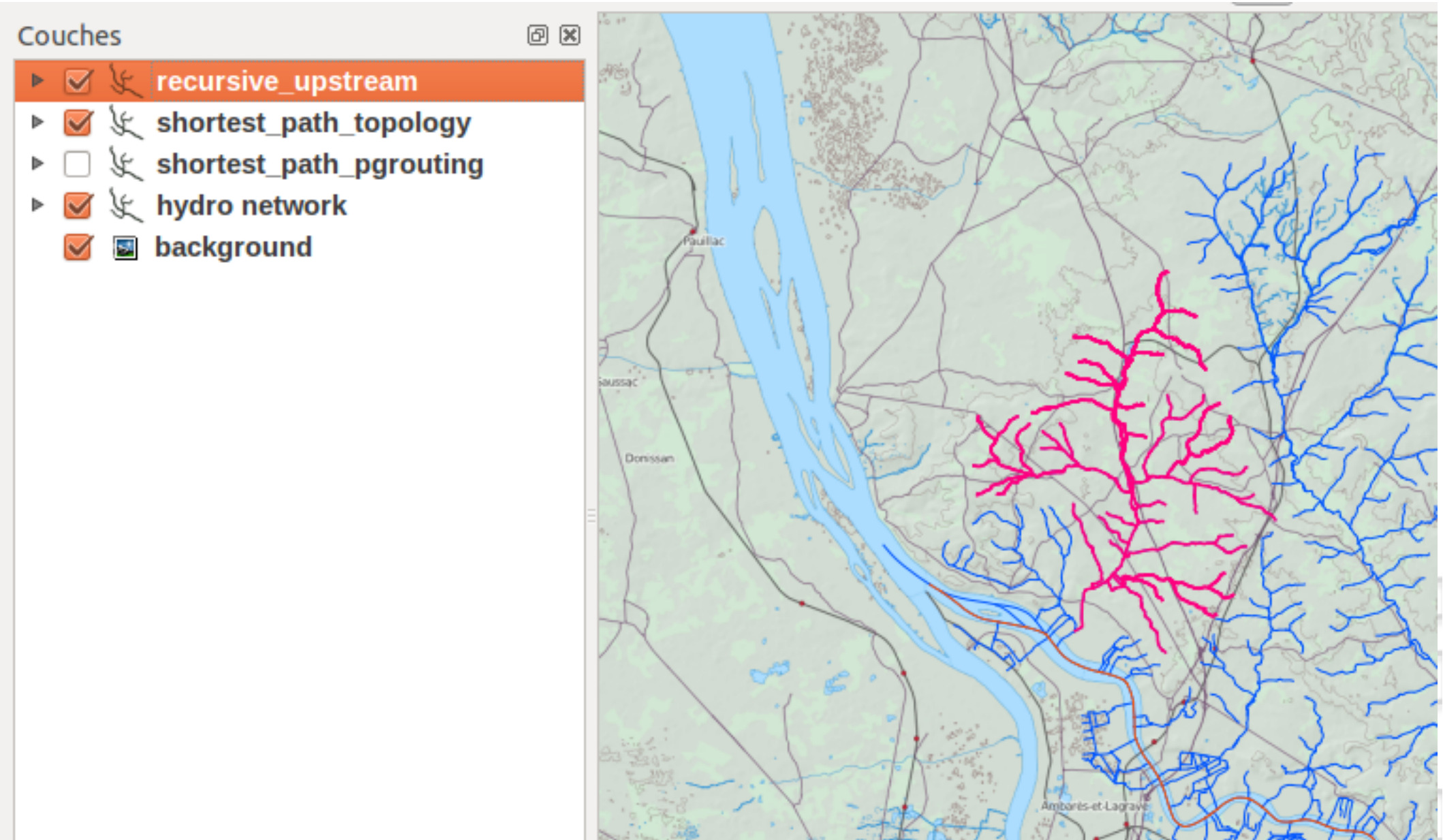


	gid	source	target	hname	cost
0	17681	3042	3041	ruisseau de...	13.1468627...
1	50006	4363	4376	ruisseau de...	154.831357...
2	107308	4427	4443	ruisseau la ...	70.4784694...
3	110767	4810	4816	ruisseau le ...	426.452159...
4	8923	4892	4827	ruisseau de...	1648.21133...
5	109594	5158	5264	rivière la di...	946.014083...
6	45039	5407	5429	NULL	114.028638...
7	105937	5480	5594	ruisseau le ...	824.626701...
8	104620	5481	5518	ruisseau la ...	243.004034...

Path finding



Find upstream



```
create table
        rec_res as
with recursive
        search_graph(gid, source, depth, path, length, cycle) as (
                select
                        g.gid, g.source, 1 as depth, ARRAY[g.gid] as path
                        , cost, false as cycle
                from
                        tr as g
                where
                        gid = 31913
                union all
                select
                        g.gid
                        , g.source
                        , sg.depth + 1 as depth
                        , path || g.gid as path
                        , sg.length + g.cost as length
                        , g.gid = ANY(path) as cycle
                from
                        tr as g
                join
                        search_graph as sg
                on
                        sg.source = g.target
                where
                        not cycle
        )
select
        sg.*
        , tr.geom
from
        search_graph as sg
join
        tr
on
        sg.gid = tr.gid
limit 1000;
```

1

2

3

CTE récursive

gid integer	source integer	depth integer	path integer[]	length double precision	cycle boolean	geom geometry(MultiLineString,2154)
31913	20850	1	{31913}	2666.0523017	f	01050000206A08000001000
33855	20735	2	{31913,	3473.3086319	f	01050000206A08000001000
32477	20845	2	{31913,	2725.7640259	f	01050000206A08000001000
33854	19909	3	{31913,	7183.7295195	f	01050000206A08000001000

Wastewater : QGEP

OSLANDIA

QGEP

VSA-DSS compatible waste-water documentation and management system based on QGIS (QGIS).

QGIS plugin + PostGIS

Swiss standard model

(http://www.vsa.ch/vsa-dss/datenmodell/)

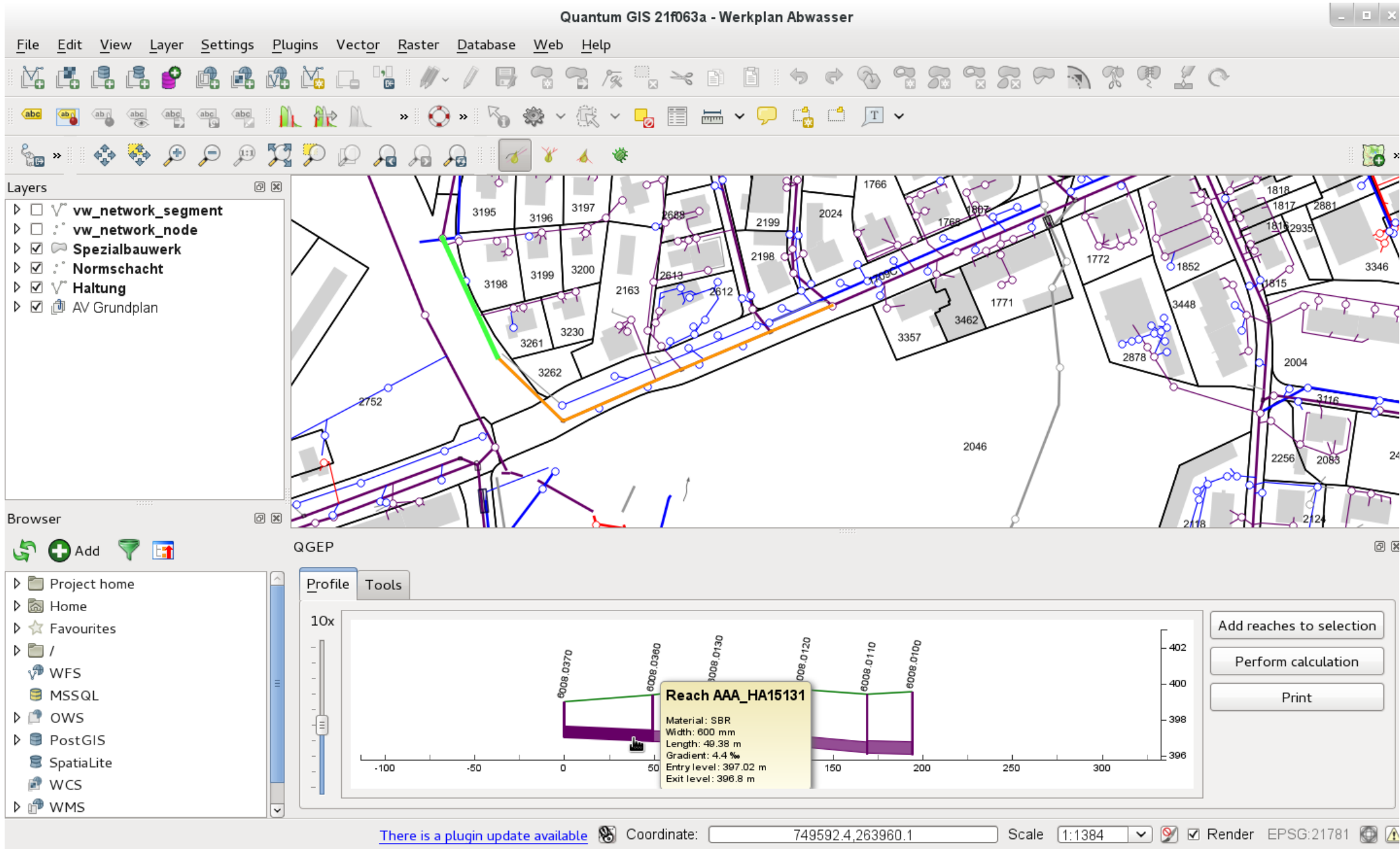
Digitizing

Profiles

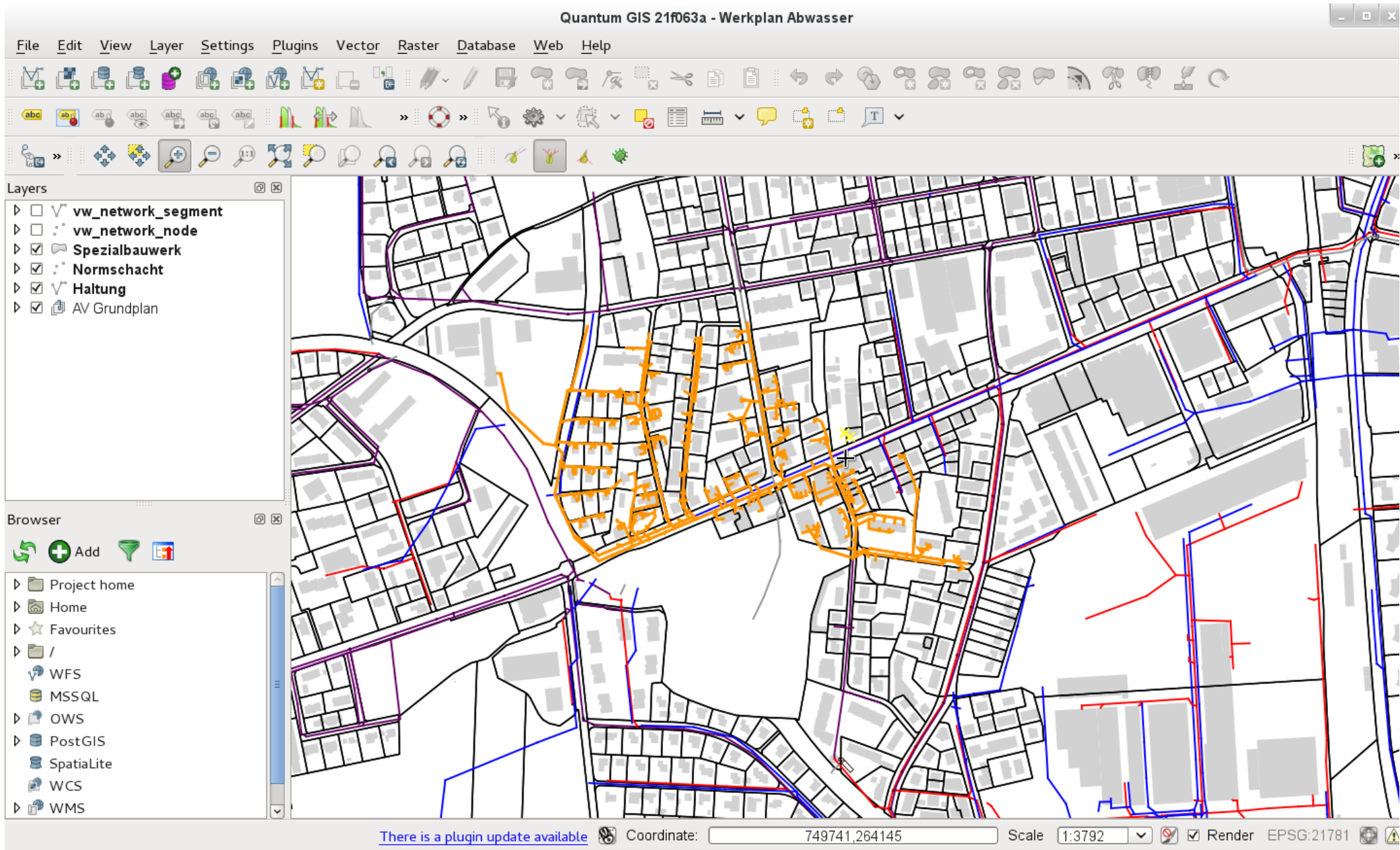
Quality control

Symbology, exports

Under development..⇒ QGIS Core


Quantum GIS 21f063a - Werkplan Abwasser
File Edit View Layer Settings Plugins Vector Raster Database Web Help
Layers
vw_network_segment
vw_network_node
Spezialbauwerk
Normschacht
Haltung
AV Grundplan
Browser
Add
Project home
Home
Favourites
/
WFS
MSSQL
OWS
PostGIS
SpatiaLite
WCS
WMS
QGEP
Profile
Tools
10x
Reach AAA_HA15131
Material: SBR
Width: 600 mm
Length: 49.38 m
Gradient: 4.4 ‰
Entry level: 397.02 m
Exit level: 396.8 m
Add reaches to selection
Perform calculation
Print
There is a plugin update available
Coordinate:
749592.4,263960.1
Scale
1:1384
Render
EPSG:21781

OSLANDIA


Quantum GIS 21f063a - Werkplan Abwasser
File Edit View Layer Settings Plugins Vector Raster Database Web Help
Layers
vw_network_segment
vw_network_node
Spezialbauwerk
Normschacht
Haltung
AV Grundplan
Browser
Add
Project home
Home
Favourites
/
WFS
MSSQL
OWS
PostGIS
SpatiaLite
WCS
WMS
There is a plugin update available
Coordinate:
749741,264145
Scale
1:3792
Render
EPSG:21781

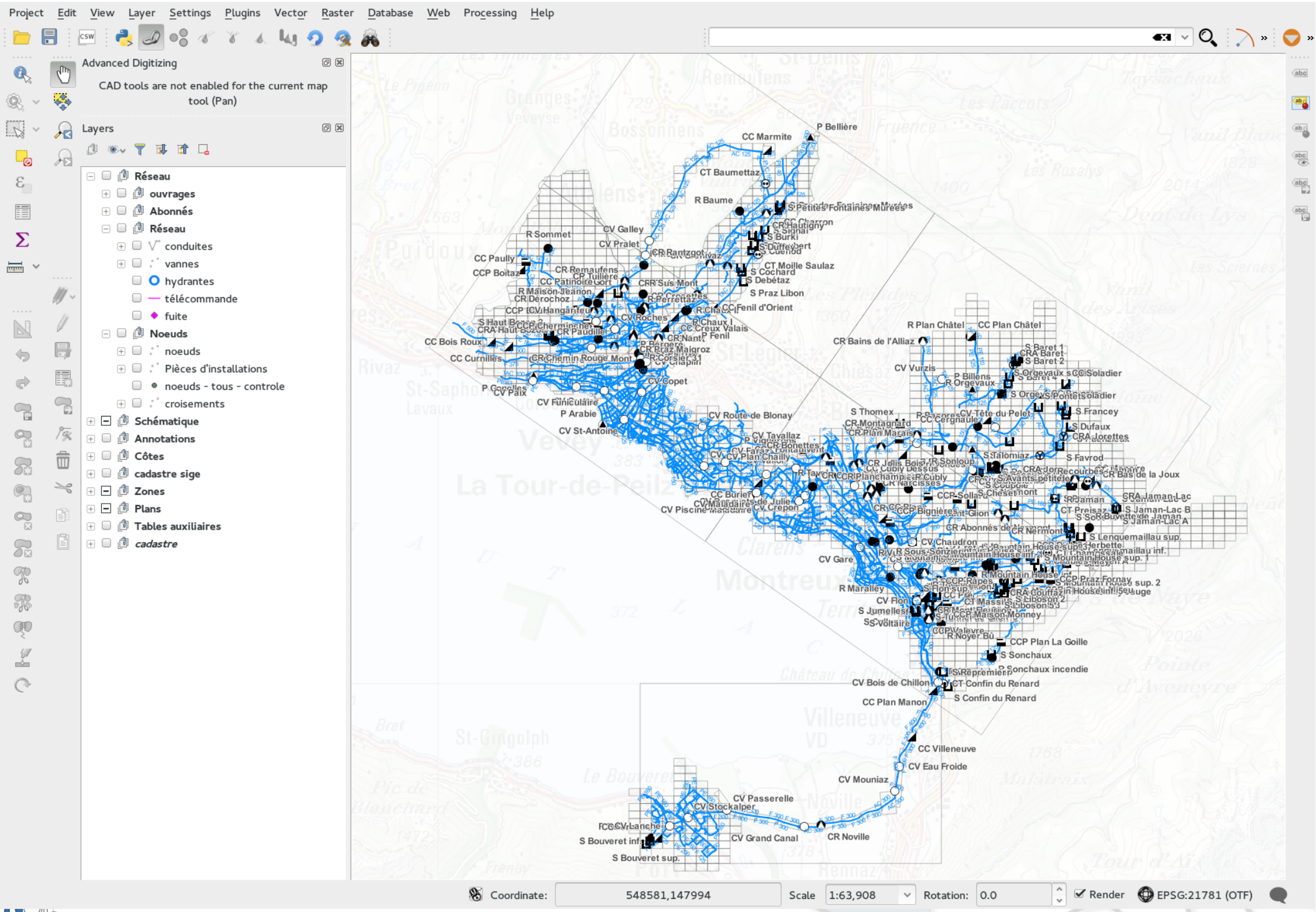
OSLANDIA

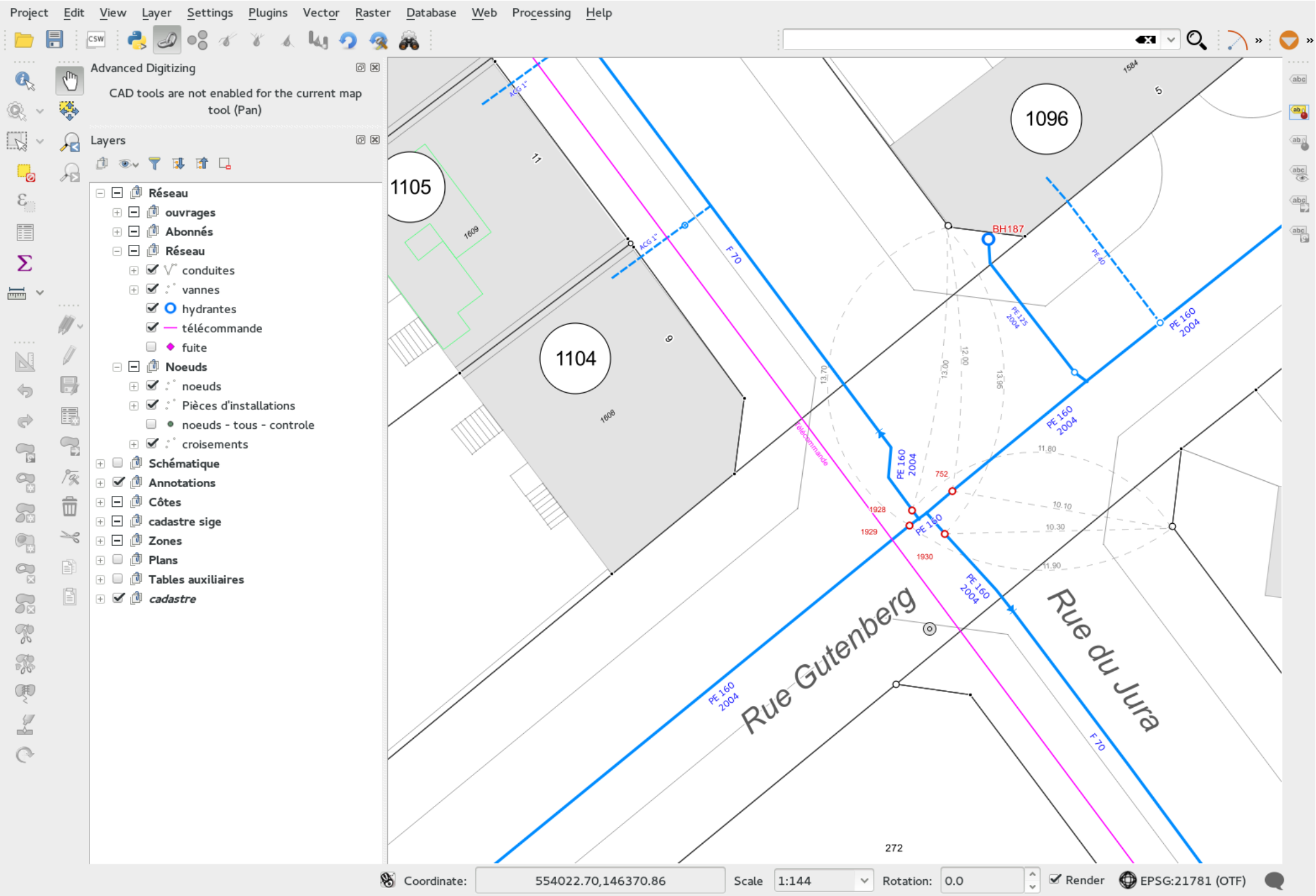
Distribution : QWAT

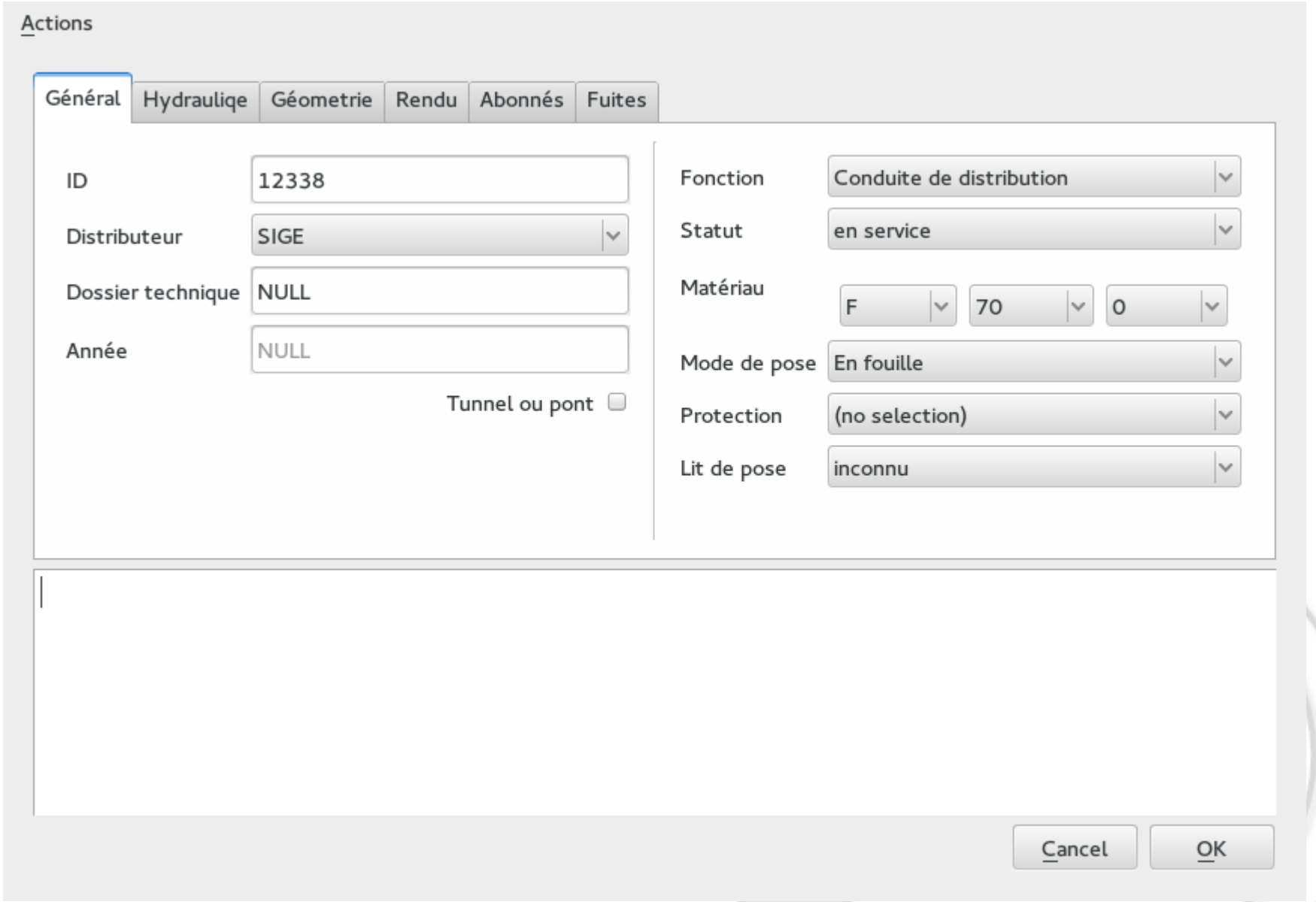
OSLANDIA

PostGIS + QGIS

- Internal product from SIGE (Lausanne)
- Production at SIGE & Valcea & Pully
- Model + QGIS configuration + tools
- Genericity + industrialization
- Funding for 2016
- Other production planned 2016


Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Help
Advanced Digitizing
CAD tools are not enabled for the current map tool (Pan)
Layers
Réseau
ouvrages
Abonnés
Réseau
conduites
vannes
hydrantes
télécommande
fuite
Noeuds
noeuds
Pièces d'installations
noeuds - tous - controle
croisements
Schématique
Annotations
Côtes
cadastre sige
Zones
Plans
Tables auxiliaires
cadastre
Coordinate: 548581,147994
Scale 1:63,908
Rotation: 0.0
Render
EPSG:21781 (OTF)


Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Help
Advanced Digitizing
CAD tools are not enabled for the current map tool (Pan)
Layers
Réseau
ouvrages
Abonnés
Réseau
conduites
vannes
hydrantes
télécommande
fuite
Noeuds
noeuds
Pièces d'installations
noeuds - tous - controle
croisements
Schématique
Annotations
Côtes
cadastre sige
Zones
Plans
Tables auxiliaires
cadastre
1105
1104
1096
1609
1608
1584
BH187
F 70
PE 160 2004
PE 125 2004
PE 40
télécommande
752
1928
1929
1930
Rue Gutenberg
Rue du Jura
272
Coordinate:
554022.70,146370.86
Scale
1:144
Rotation:
0.0
Render
EPSG:21781 (OTF)

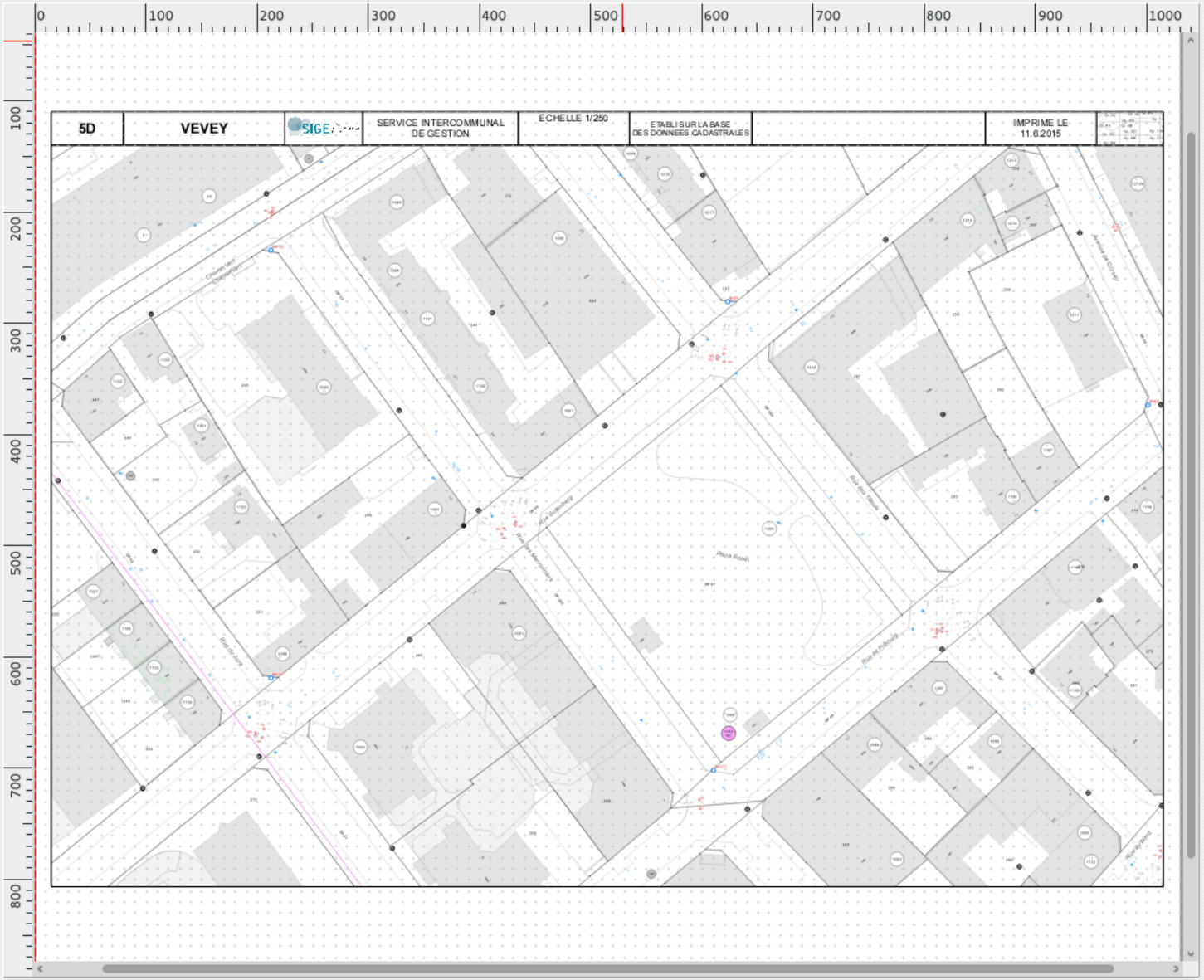

Actions
Général
Hydrauliqe
Géometrie
Rendu
Abonnés
Fuites
ID
12338
Distributeur
SIGE
Dossier technique
NULL
Année
NULL
Tunnel ou pont
Fonction
Conduite de distribution
Statut
en service
Matériau
F
70
0
Mode de pose
En fouille
Protection
(no selection)
Lit de pose
inconnu
Cancel
OK

	id	identification	fk_distributor	type	fonction	fk_status	fk_precision	'k_precisionalt	entretien	iamètre nomin	année	fermée	tworkseparati	altitude	re
3367	18338	*NULL*	SIGE	sprinkler	vanne branc...	en service	Inconnu	Inconnue	{}	1.25"	2010	f	*NULL*	*NULL*	*NUL*
6581	8218	*NULL*	SIGE	sprinkler	vanne branc...	en service	Inconnu	Inconnue	{}	125	2003	f	*NULL*	*NULL*	*NUL*
7062	16649	*NULL*	SIGE	sprinkler	vanne branc...	en service	Inconnu	Inconnue	{}	1.25"	2006	f	*NULL*	*NULL*	*NUL*
7574	18566	*NULL*	SIGE	sprinkler	vanne branc...	en service	Inconnu	Inconnue	{}	*NULL*	2011	f	*NULL*	*NULL*	*NUL*
7575	18567	*NULL*	SIGE	sprinkler	vanne branc...	en service	Inconnu	Inconnue	{}	*NULL*	2011	f	*NULL*	*NULL*	*NUL*
8004	13616	*NULL*	SIGE	sprinkler	vanne branc...	en service	Inconnu	Inconnue	{}	*NULL*	1899	f	*NULL*	*NULL*	*NUL*
8124	18157	*NULL*	SIGE	sprinkler	vanne branc...	en service	Inconnu	Inconnue	{}	1.25"	2010	f	*NULL*	*NULL*	*NUL*
10228	15048	*NULL*	SIGE	sprinkler	vanne branc...	en service	Inconnu	Inconnue	{}	*NULL*	2005	f	*NULL*	*NULL*	*NUL*
12148	19077	*NULL*	SIGE	sprinkler	vanne branc...	en service	Inconnu	Inconnue	{}	2"	2012	f	*NULL*	*NULL*	*NUL*
13921	17657	*NULL*	SIGE	sprinkler	vanne branc...	en service	Inconnu	Inconnue	{}	150	2009	f	*NULL*	*NULL*	*NUL*
14844	20004		SIGE	sprinkler	vanne branc...	en service	Précis	Inférieure à ...	{}	1.25"	2014	f	*NULL*	*NULL*	

fk_type | vanne clayton | Apply | Case sensitive

OSLANDIA

Composer Edit View Layout Atlas Settings



Items | Command history

Command history

<empty>

Composition | Item properties | Atlas generation

Composition

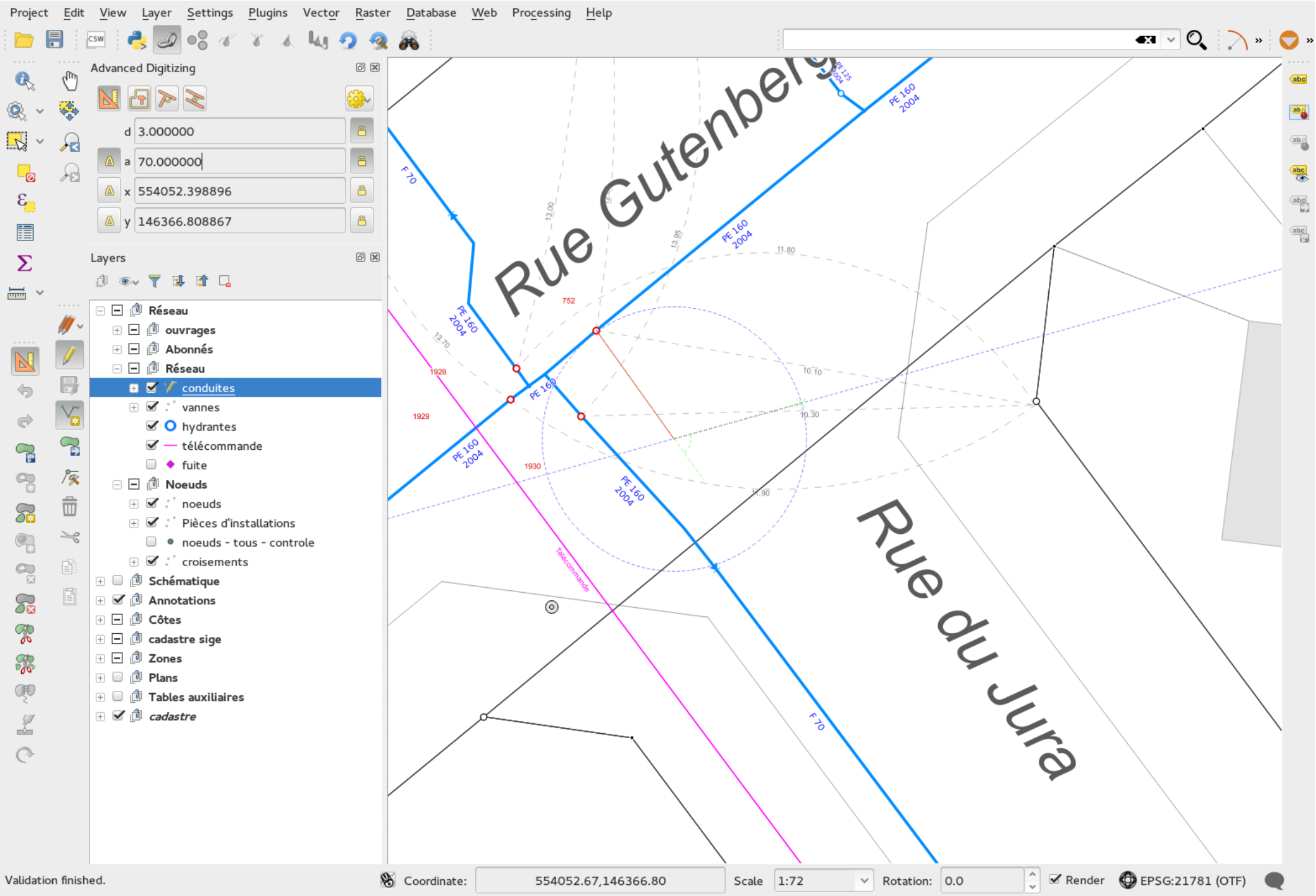
Paper and quality

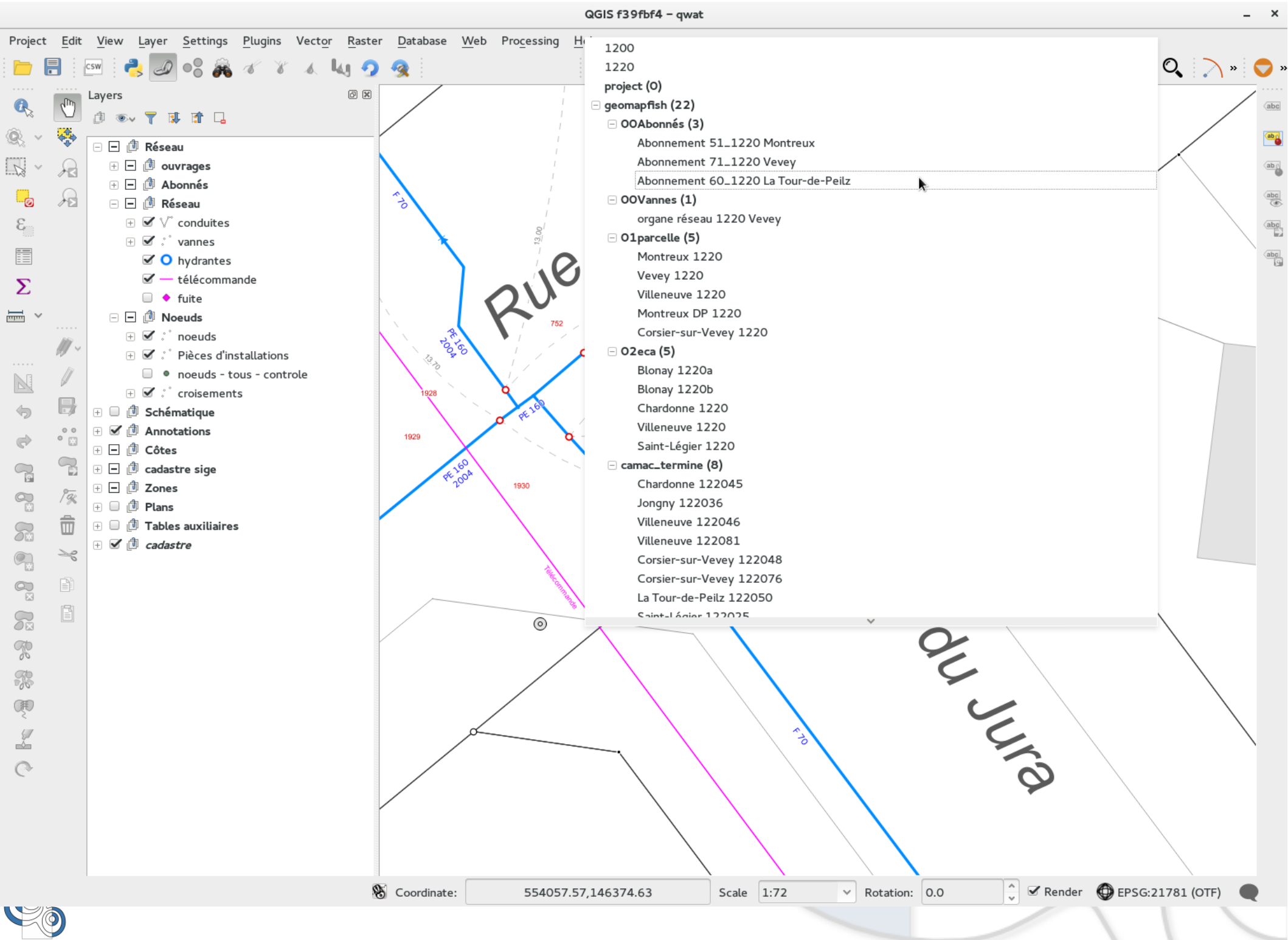
Presets	Custom
Width	1030.00
Height	914.00
Units	mm
Number of pages	1
Orientation	Landscape
Page background	Change...
Export resolution	300 dpi
Print as raster	☑
World file on	☐ Map 1

Guides and Grid

x: 528.14 mm y: 0 mm page: 1 24.7% Atlas feature 1857 of 2052

OSLANDIA


Project
Edit
View
Layer
Settings
Plugins
Vector
Raster
Database
Web
Processing
Help
Advanced Digitizing
d 3.000000
a 70.000000
x 554052.398896
y 146366.808867
Layers
Réseau
ouvrages
Abonnés
Réseau
conduites
vannes
hydrantes
télécommande
fuite
Noeuds
noeuds
Pièces d'installations
noeuds - tous - controle
croisements
Schématique
Annotations
Côtes
cadastre sige
Zones
Plans
Tables auxiliaires
cadastre
Rue Gutenberg
Rue du Jura
PE 160 2004
PE 125 2004
F 70
752
1928
1929
1930
Télécommande
Validation finished.
Coordinate:
554052.67,146366.80
Scale
1:72
Rotation:
0.0
Render
EPSG:21781 (OTF)


QGIS f39fbf4 – qwat
Project Edit View Layer Settings Plugins Vector Raster Database Web Processing
Layers
Réseau
ouvrages
Abonnés
Réseau
conduites
vannes
hydrantes
télécommande
fuite
Noeuds
noeuds
Pièces d'installations
noeuds - tous - controle
croisements
Schématique
Annotations
Côtes
cadastre sige
Zones
Plans
Tables auxiliaires
cadastre
1200
1220
project (0)
geomapfish (22)
OOAbonnés (3)
Abonnement 51_1220 Montreux
Abonnement 71_1220 Vevey
Abonnement 60_1220 La Tour-de-Peilz
OOVannes (1)
organe réseau 1220 Vevey
O1parcelle (5)
Montreux 1220
Vevey 1220
Villeneuve 1220
Montreux DP 1220
Corsier-sur-Vevey 1220
O2eca (5)
Blonay 1220a
Blonay 1220b
Chardonne 1220
Villeneuve 1220
Saint-Légier 1220
camac_termine (8)
Chardonne 122045
Jongny 122036
Villeneuve 122046
Villeneuve 122081
Corsier-sur-Vevey 122048
Corsier-sur-Vevey 122076
La Tour-de-Peilz 122050
F 70
PE 160 2004
PE 160
752
1928
1929
1930
Télécommande
Rue
du Jura
Coordinate:
554057.57,146374.63
Scale
1:72
Rotation:
0.0
Render
EPSG:21781 (OTF)

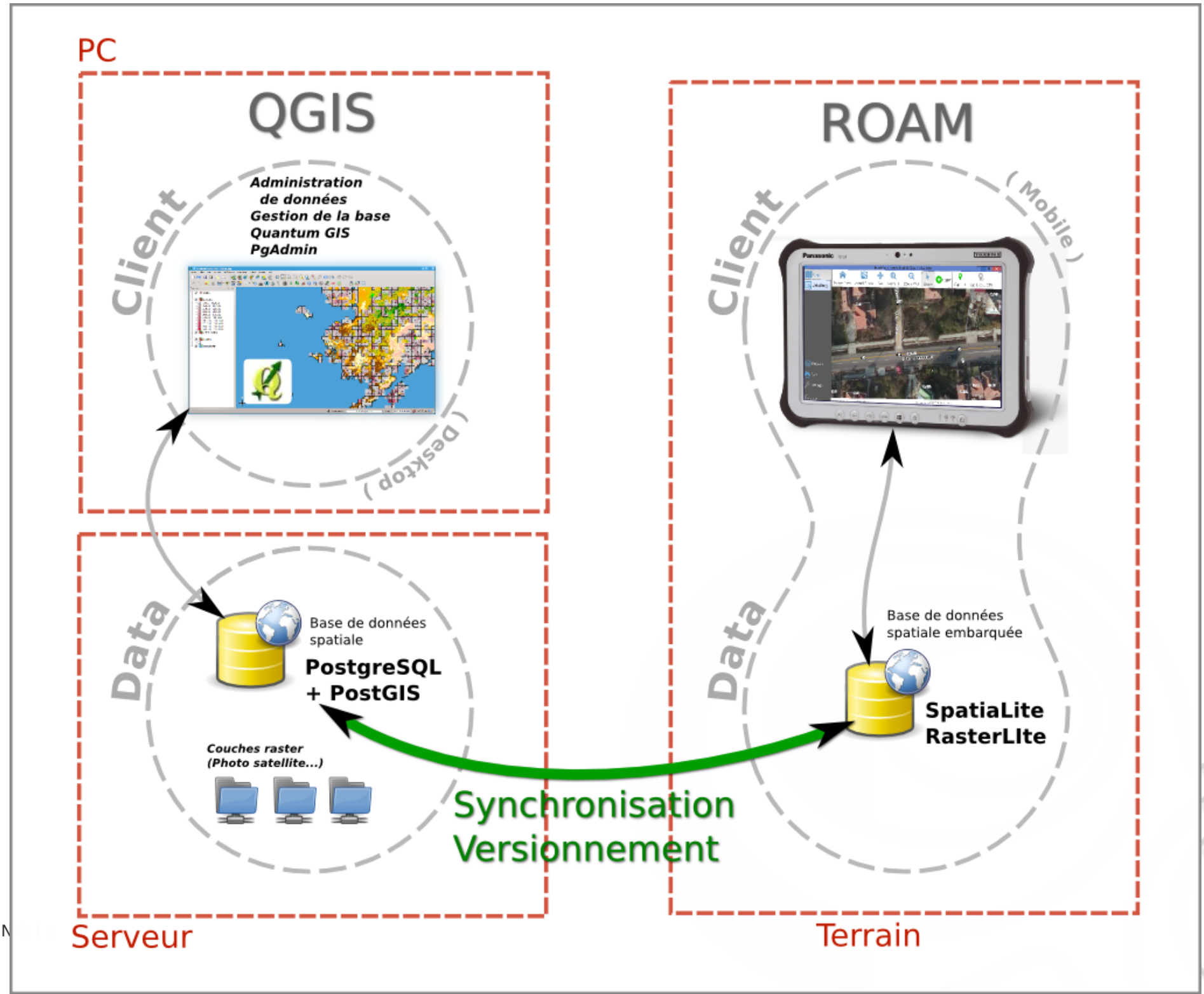
2016 :

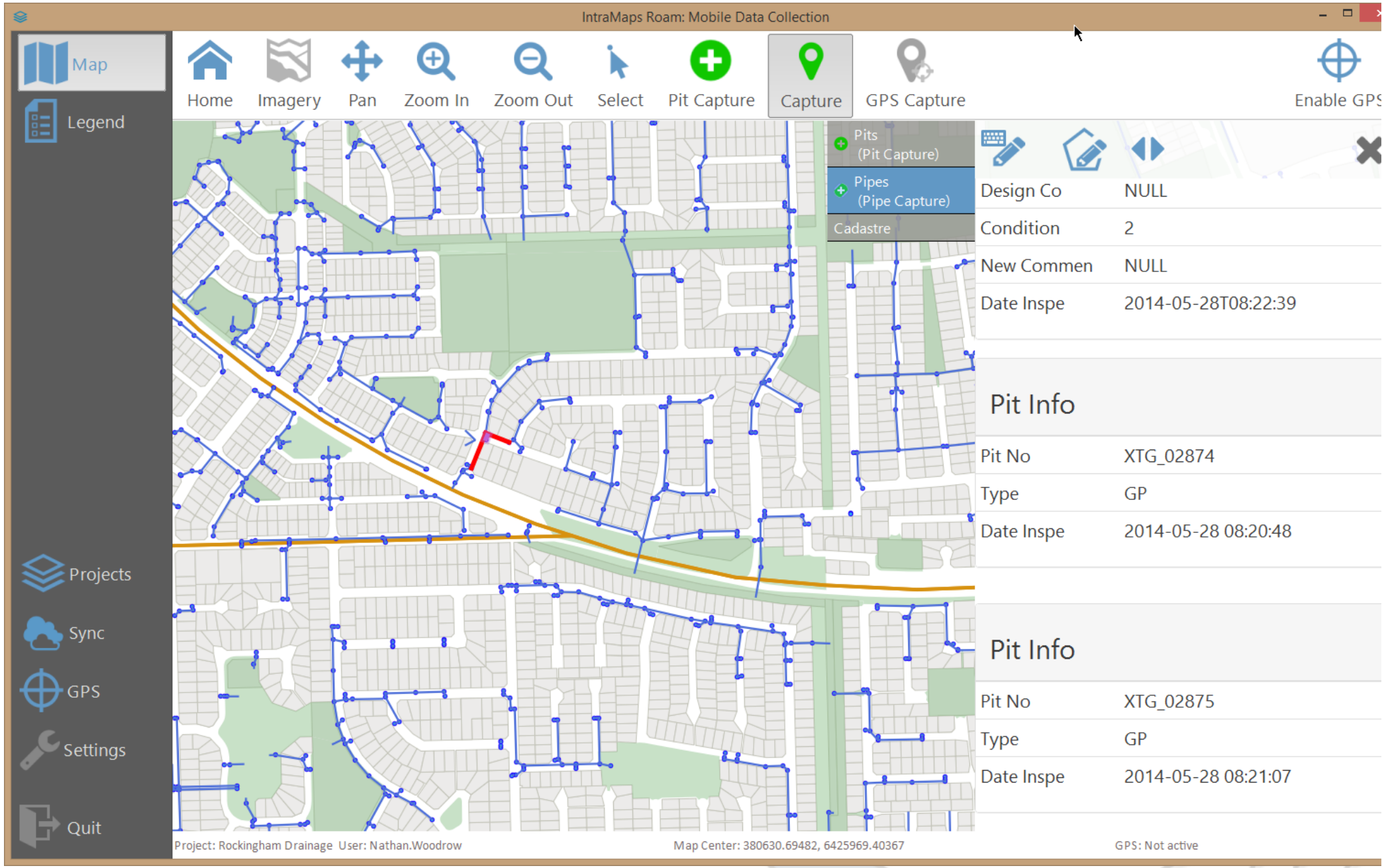
- Product genericity
- Performance & Stress tests
- Specific developments
- Packaging
- Communication
- Project organization
- New partners ?

On the field: ROAM

OSLANDIA


Panasonic
TOUGHPAD


PC
QGIS
Client
(Desktop)
Administration
de données
Gestion de la base
Quantum GIS
PgAdmin
ROAM
Client
(Mobile)
Data
Base de données
spatiale
PostgreSQL
+ PostGIS
Couches raster
(Photo satellite...)
Serveur
Synchronisation
Versionnement
Data
Base de données
spatiale embarquée
SpatiaLite
RasterLIte
Terrain


IntraMaps Roam: Mobile Data Collection
Map
Legend
Projects
Sync
GPS
Settings
Quit
Home
Imagery
Pan
Zoom In
Zoom Out
Select
Pit Capture
Capture
GPS Capture
Enable GPS
Pits (Pit Capture)
Pipes (Pipe Capture)
Cadastre
Design Co NULL
Condition 2
New Commen NULL
Date Inspe 2014-05-28T08:22:39
Pit Info
Pit No XTG_02874
Type GP
Date Inspe 2014-05-28 08:20:48
Pit Info
Pit No XTG_02875
Type GP
Date Inspe 2014-05-28 08:21:07
Project: Rockingham Drainage User: Nathan.Woodrow
Map Center: 380630.69482, 6425969.40367
GPS: Not active

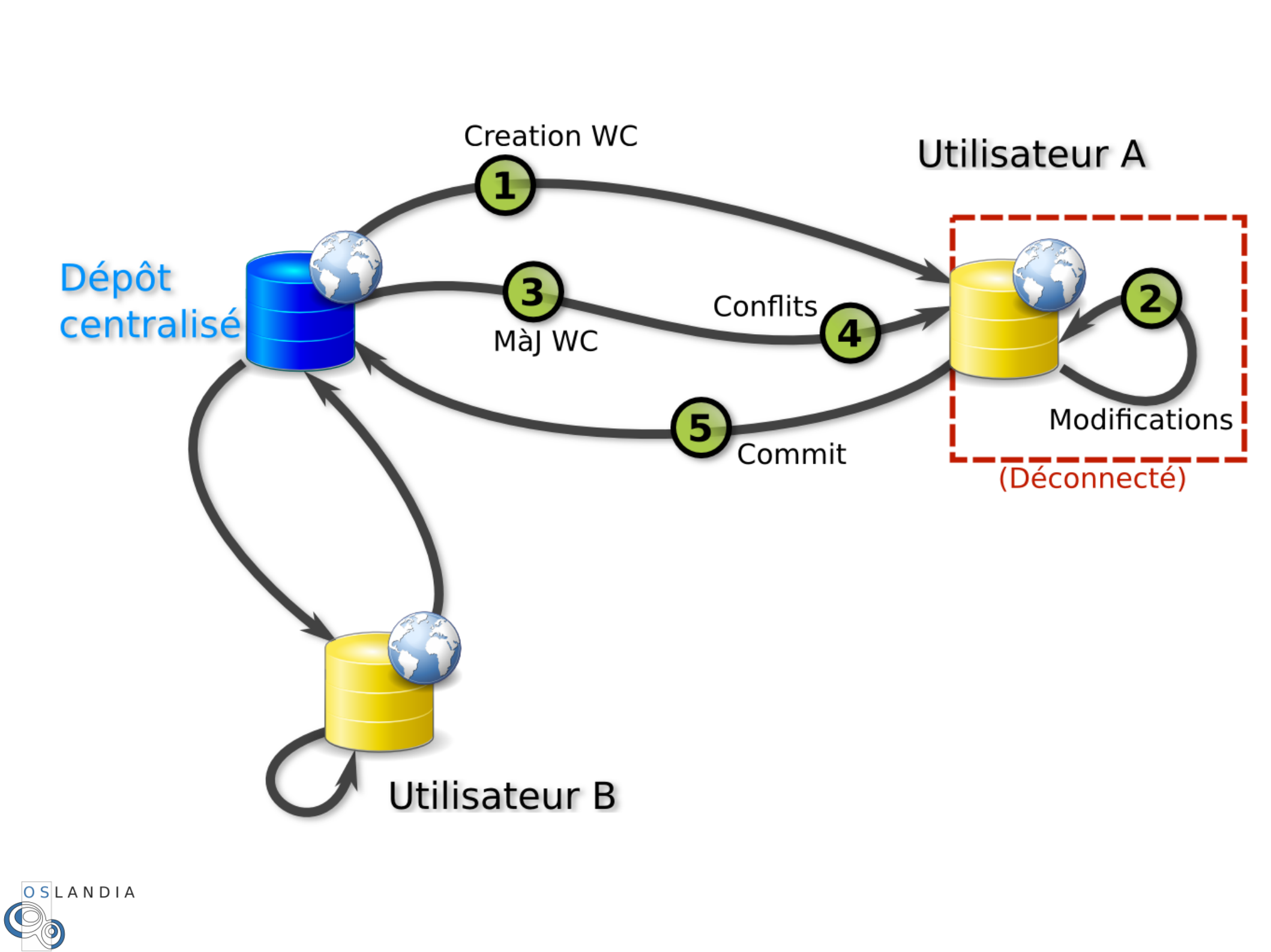
On the field : qgis_versioning

OSLANDIA

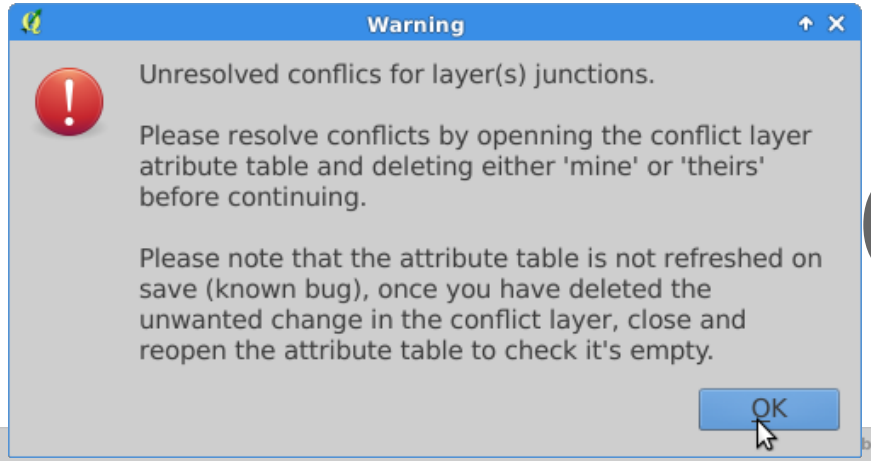
History
Offline work
Scenarios

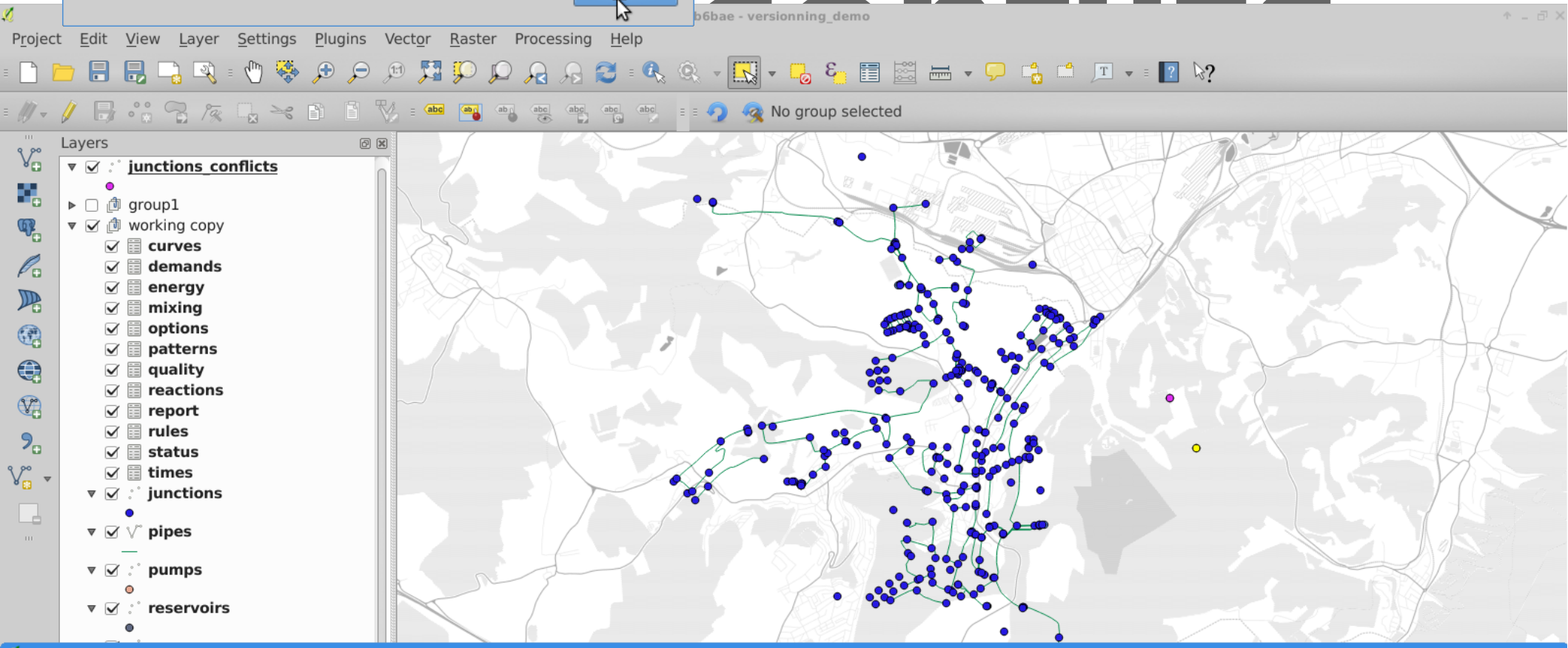
⇒ Data versioning

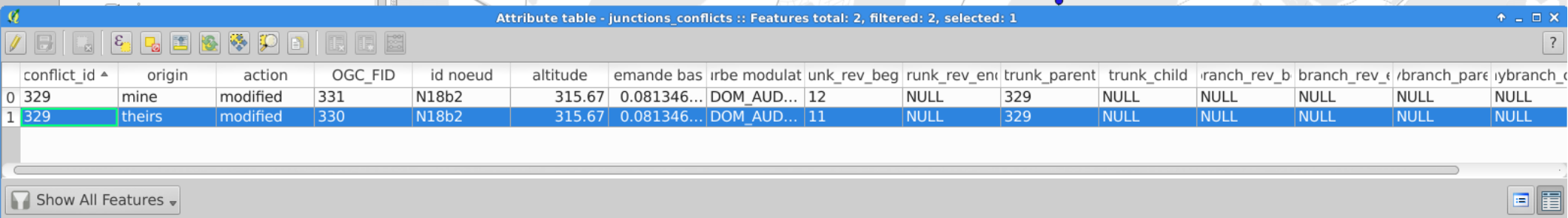
PostGIS + SpatiaLite
« Subversion»
  Commits / branches
  Conflict management


Creation WC
1
Utilisateur A
Dépôt
centralisé
3
MàJ WC
Conflits
4
2
Modifications
5
Commit
(Déconnecté)
Utilisateur B

Resolution de conflits

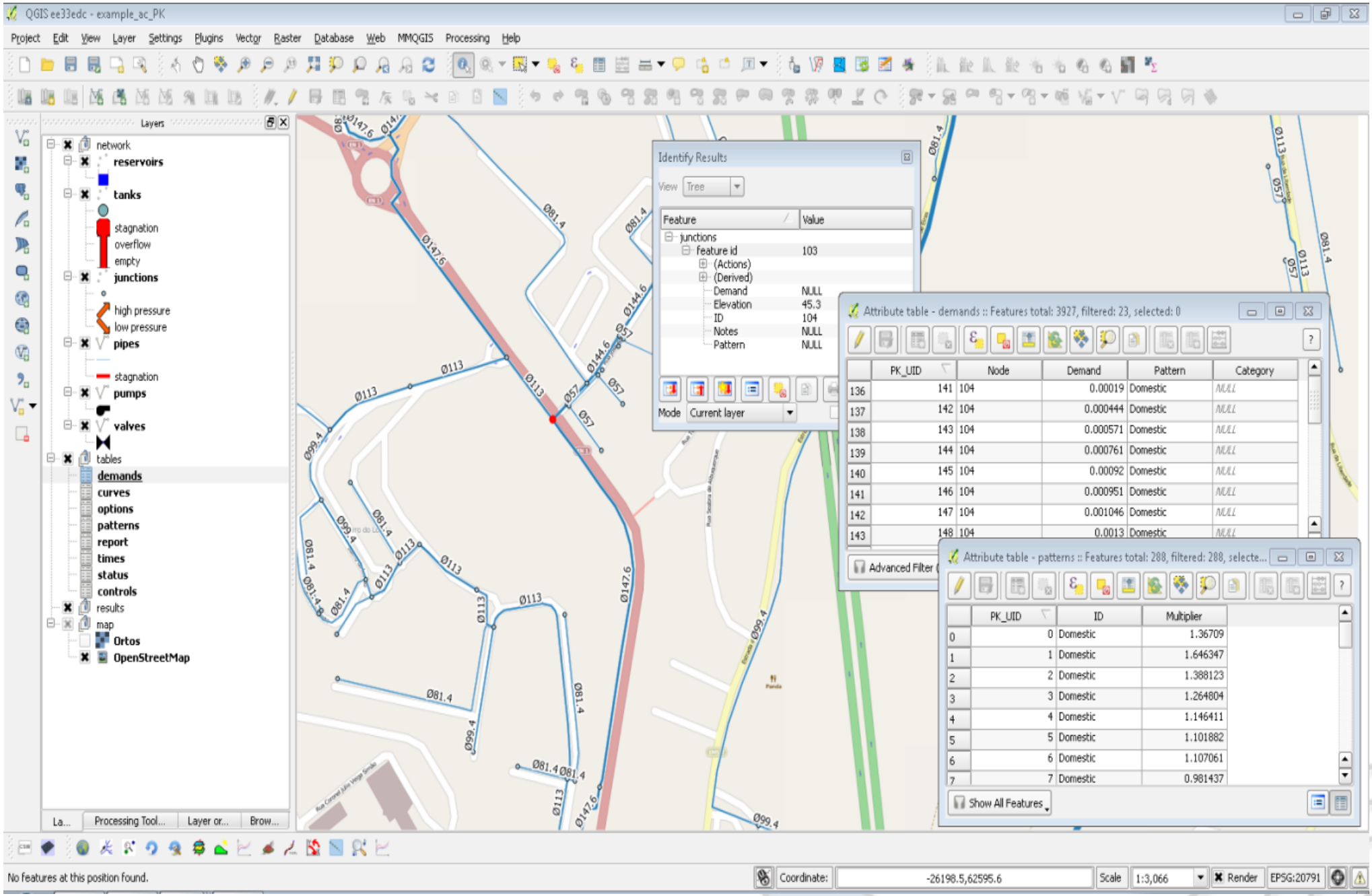




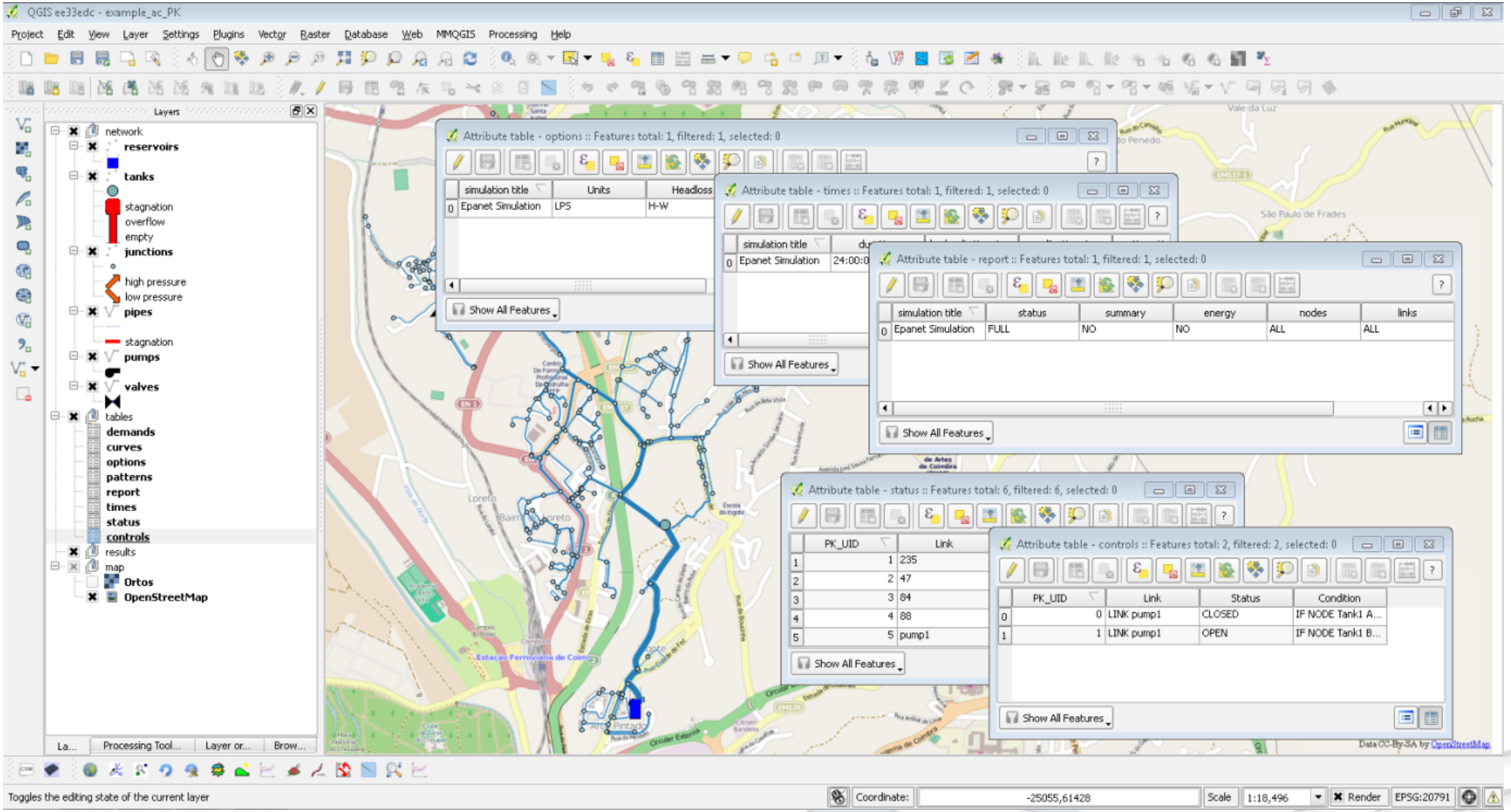


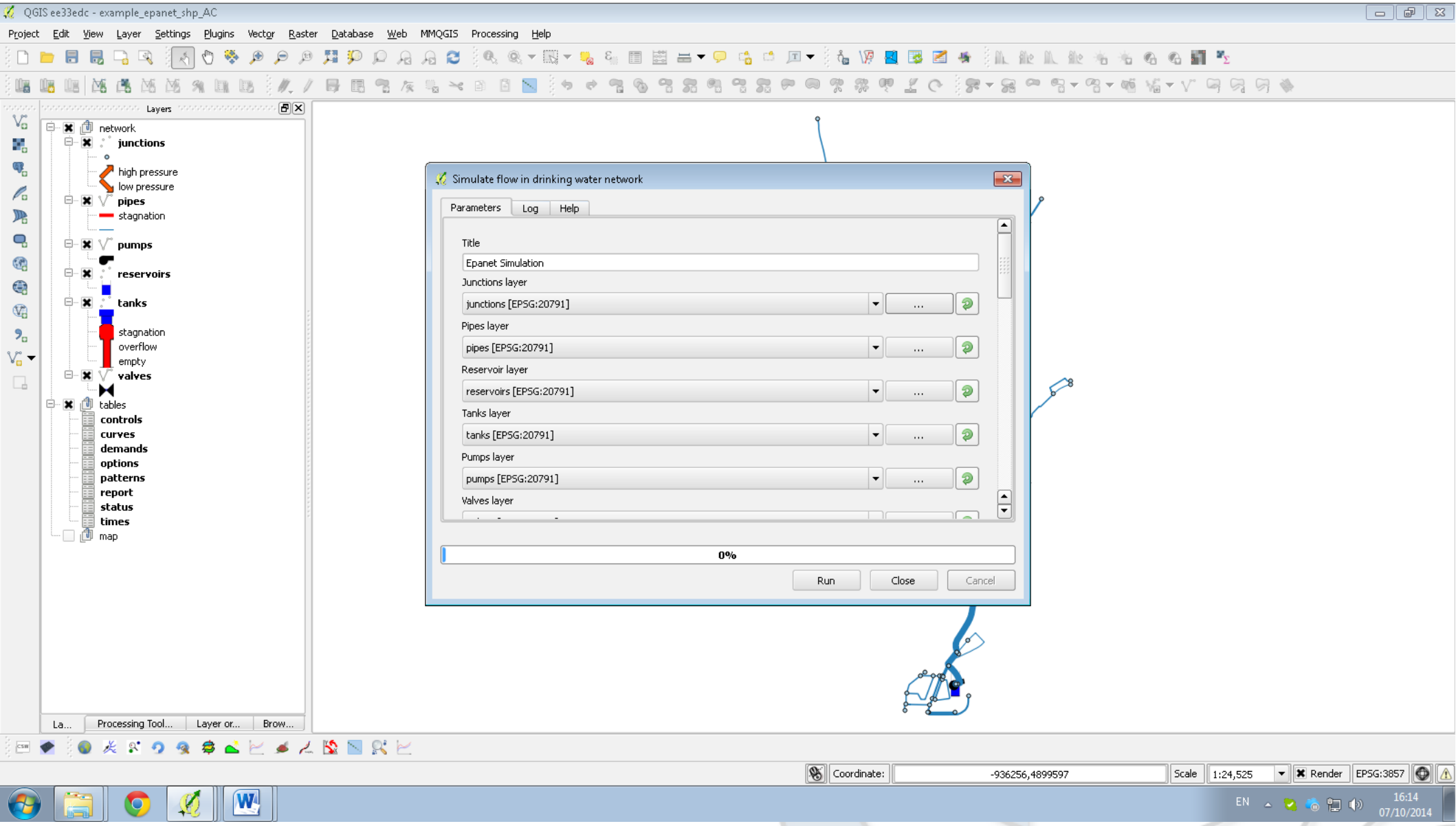
	conflict_id	origin	action	OGC_FID	id noeud	altitude	emande bas	ırbe modulat	unk_rev_beg	runk_rev_en	trunk_parent	trunk_child	ranch_rev_b	branch_rev_	branch_pare	ybranch_
0	329	mine	modified	331	N18b2	315.67	0.081346...	DOM_AUD...	12	NULL	329	NULL	NULL	NULL	NULL	NULL
1	329	theirs	modified	330	N18b2	315.67	0.081346...	DOM_AUD...	11	NULL	329	NULL	NULL	NULL	NULL	NULL

Simulation : qgis_epanet

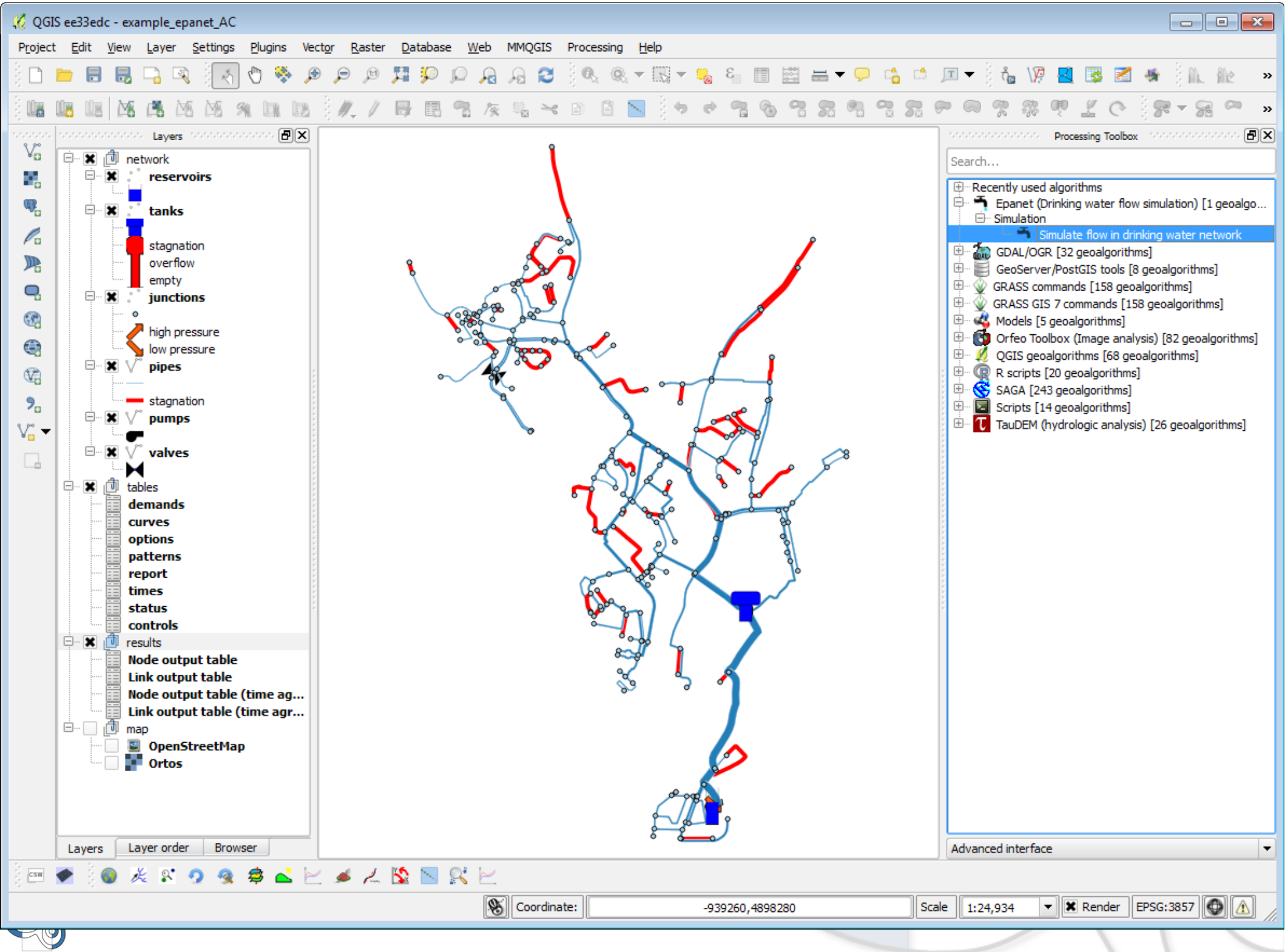

QGIS ee33edc - example_ac_PK
Project Edit View Layer Settings Plugins Vector Raster Database Web MMQGIS Processing Help
Layers
network
reservoirs
tanks
stagnation
overflow
empty
junctions
high pressure
low pressure
pipes
stagnation
pumps
valves
tables
demands
curves
options
patterns
report
times
status
controls
results
map
Ortos
OpenStreetMap
Identify Results
View Tree
Feature Value
junctions
feature id 103
(Actions)
(Derived)
Demand NULL
Elevation 45.3
ID 104
Notes NULL
Pattern NULL
Mode Current layer
Attribute table - demands :: Features total: 3927, filtered: 23, selected: 0
PK_UID Node Demand Pattern Category
136 141 104 0.00019 Domestic NULL
137 142 104 0.000444 Domestic NULL
138 143 104 0.000571 Domestic NULL
139 144 104 0.000761 Domestic NULL
140 145 104 0.00092 Domestic NULL
141 146 104 0.000951 Domestic NULL
142 147 104 0.001046 Domestic NULL
143 148 104 0.0013 Domestic NULL
Advanced Filter
Attribute table - patterns :: Features total: 288, filtered: 288, selecte...
PK_UID ID Multiplier
0 0 Domestic 1.36709
1 1 Domestic 1.646347
2 2 Domestic 1.388123
3 3 Domestic 1.264804
4 4 Domestic 1.146411
5 5 Domestic 1.101882
6 6 Domestic 1.107061
7 7 Domestic 0.981437
Show All Features
La... Processing Tool... Layer or... Brow...
No features at this position found.
Coordinate: -26198.5,62595.6
Scale 1:3,066
Render
EPSG:20791

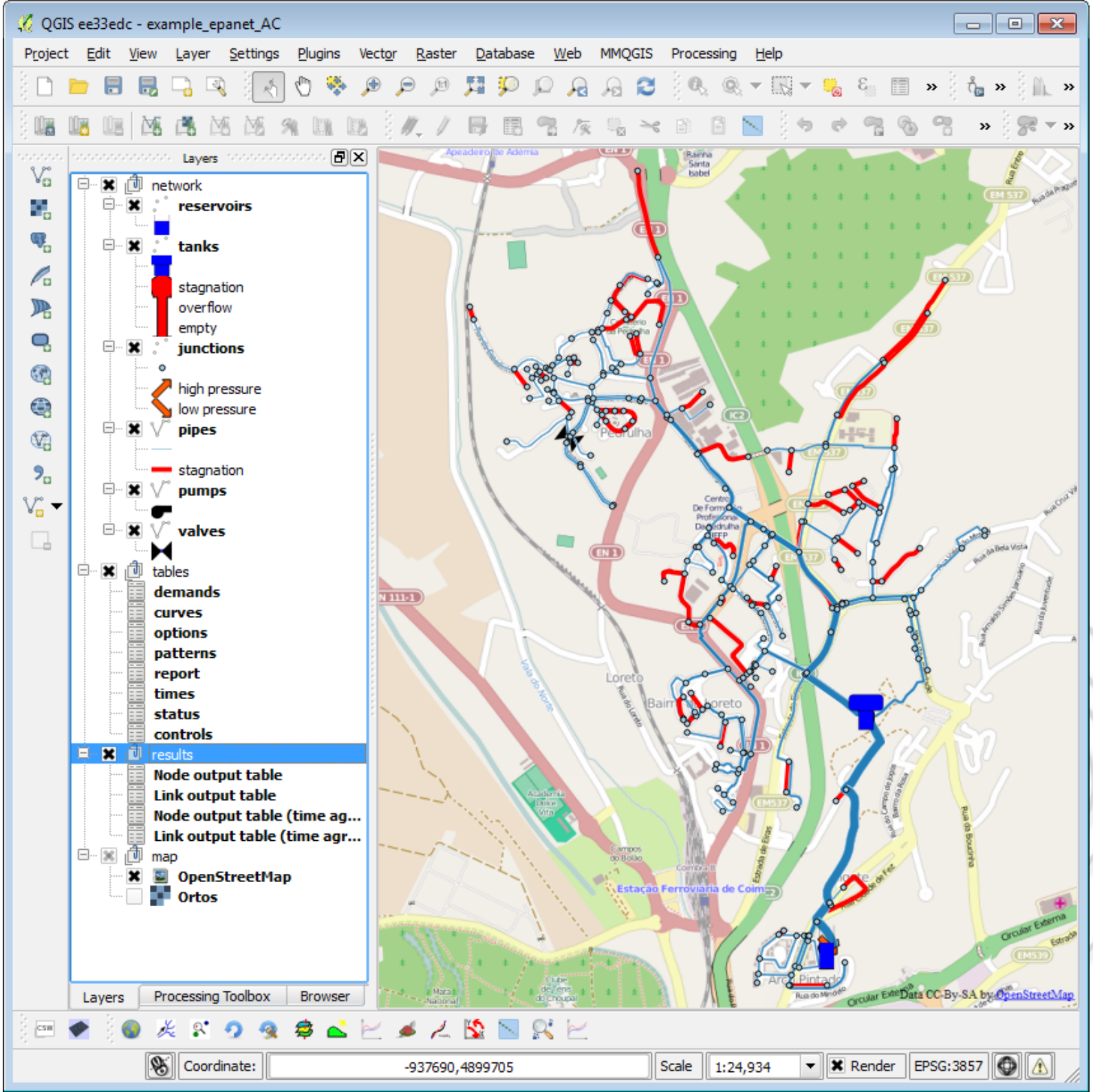
OSLANDIA

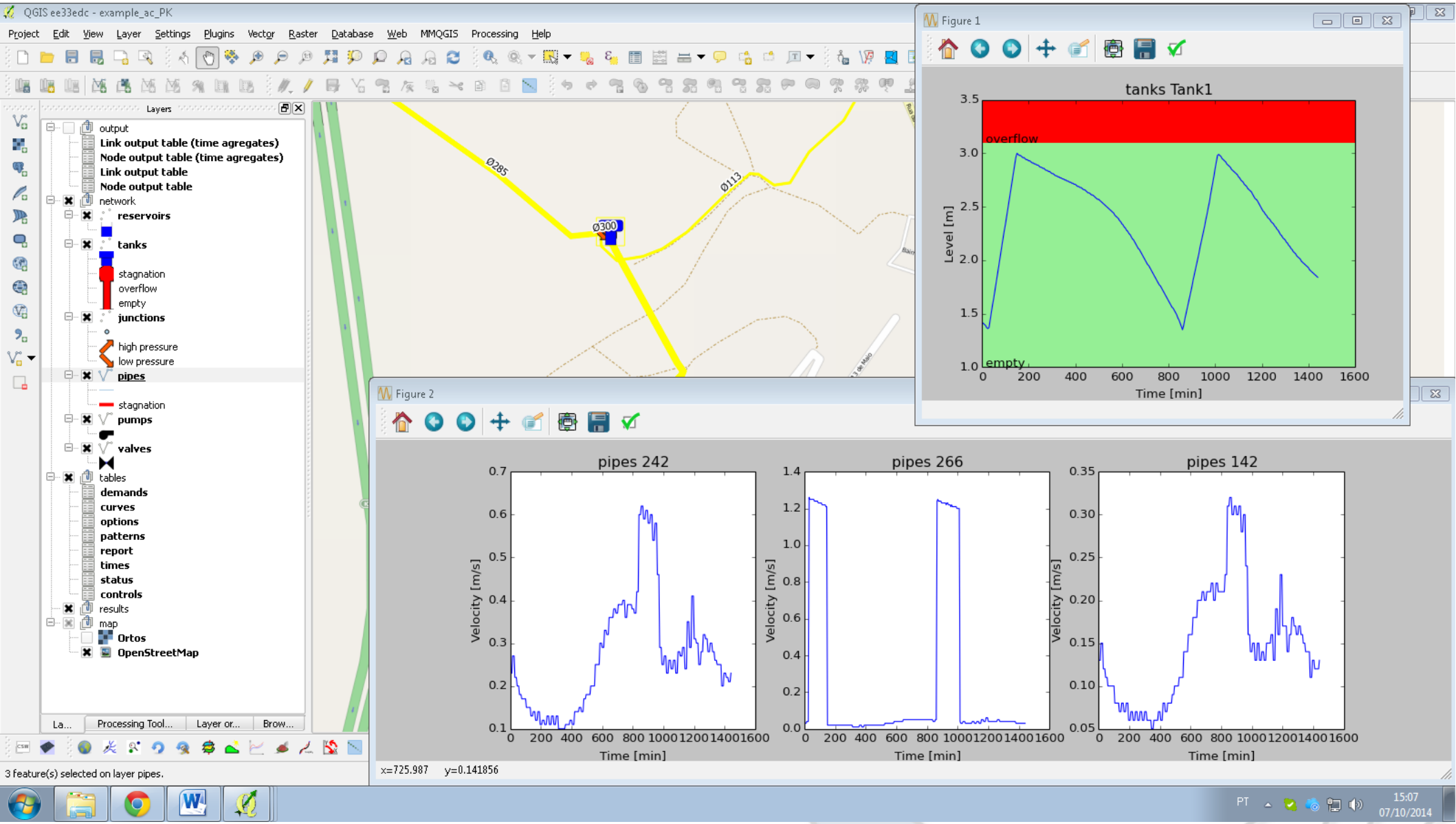

QGIS ee33edc - example_ac_PK
Project Edit View Layer Settings Plugins Vector Raster Database Web MMQGIS Processing Help
Layers
network
reservoirs
tanks
stagnation
overflow
empty
junctions
high pressure
low pressure
pipes
stagnation
pumps
valves
tables
demands
curves
options
patterns
report
times
status
controls
results
map
Ortos
OpenStreetMap
Attribute table - options :: Features total: 1, filtered: 1, selected: 0
simulation title | Units | Headloss
0 | Epanet Simulation | LPS | H-W
Show All Features
Attribute table - times :: Features total: 1, filtered: 1, selected: 0
simulation title
0 | Epanet Simulation | 24:00:0
Show All Features
Attribute table - report :: Features total: 1, filtered: 1, selected: 0
simulation title | status | summary | energy | nodes | links
0 | Epanet Simulation | FULL | NO | NO | ALL | ALL
Show All Features
Attribute table - status :: Features total: 6, filtered: 6, selected: 0
PK_UID | Link
1 | 1 | 235
2 | 2 | 47
3 | 3 | 84
4 | 4 | 88
5 | 5 | pump1
Show All Features
Attribute table - controls :: Features total: 2, filtered: 2, selected: 0
PK_UID | Link | Status | Condition
0 | 0 | LINK pump1 | CLOSED | IF NODE Tank1 A...
1 | 1 | LINK pump1 | OPEN | IF NODE Tank1 B...
Show All Features
Toggles the editing state of the current layer
Coordinate: -25055,61428
Scale 1:18,496
Render
EPSG:20791


QGIS ee33edc - example_epanet_shp_AC
Project Edit View Layer Settings Plugins Vector Raster Database Web MMQGIS Processing Help
Layers
network
junctions
high pressure
low pressure
pipes
stagnation
pumps
reservoirs
tanks
stagnation
overflow
empty
valves
tables
controls
curves
demands
options
patterns
report
status
times
map
Simulate flow in drinking water network
Parameters Log Help
Title
Epanet Simulation
Junctions layer
junctions [EPSG:20791]
Pipes layer
pipes [EPSG:20791]
Reservoir layer
reservoirs [EPSG:20791]
Tanks layer
tanks [EPSG:20791]
Pumps layer
pumps [EPSG:20791]
Valves layer
0%
Run
Close
Cancel
Coordinate:
-936256,4899597
Scale
1:24,525
Render
EPSG:3857
EN
16:14
07/10/2014

OSLANDIA


QGIS ee33edc - example_epanet_AC
Project Edit View Layer Settings Plugins Vector Raster Database Web MMQGIS Processing Help
Layers
network
reservoirs
tanks
stagnation
overflow
empty
junctions
high pressure
low pressure
pipes
stagnation
pumps
valves
tables
demands
curves
options
patterns
report
times
status
controls
results
Node output table
Link output table
Node output table (time ag...
Link output table (time agr...
map
OpenStreetMap
Ortos
Layers Layer order Browser
Processing Toolbox
Search...
Recently used algorithms
Epanet (Drinking water flow simulation) [1 geoalgo...
Simulation
Simulate flow in drinking water network
GDAL/OGR [32 geoalgorithms]
GeoServer/PostGIS tools [8 geoalgorithms]
GRASS commands [158 geoalgorithms]
GRASS GIS 7 commands [158 geoalgorithms]
Models [5 geoalgorithms]
Orfeo Toolbox (Image analysis) [82 geoalgorithms]
QGIS geoalgorithms [68 geoalgorithms]
R scripts [20 geoalgorithms]
SAGA [243 geoalgorithms]
Scripts [14 geoalgorithms]
TauDEM (hydrologic analysis) [26 geoalgorithms]
Advanced interface
Coordinate: -939260,4898280 Scale 1:24,934 Render EPSG:3857


QGIS ee33edc - example_epanet_AC
Project Edit View Layer Settings Plugins Vector Raster Database Web MMQGIS Processing Help
Layers
network
reservoirs
tanks
stagnation
overflow
empty
junctions
high pressure
low pressure
pipes
stagnation
pumps
valves
tables
demands
curves
options
patterns
report
times
status
controls
results
Node output table
Link output table
Node output table (time ag...
Link output table (time agr...
map
OpenStreetMap
Ortos
Layers
Processing Toolbox
Browser
Data CC-By-SA by OpenStreetMap
Coordinate:
-937690,4899705
Scale
1:24,934
Render
EPSG:3857


QGIS ee33edc - example_ac_PK
Project Edit View Layer Settings Plugins Vector Raster Database Web MMQGIS Processing Help
Layers
output
Link output table (time agregates)
Node output table (time agregates)
Link output table
Node output table
network
reservoirs
tanks
stagnation
overflow
empty
junctions
high pressure
low pressure
pipes
stagnation
pumps
valves
tables
demands
curves
options
patterns
report
times
status
controls
results
map
Ortos
OpenStreetMap
Ø285
Ø113
Ø300
3 feature(s) selected on layer pipes.
Figure 1
tanks Tank1
overflow
empty
Level [m]
Time [min]
Figure 2
pipes 242
pipes 266
pipes 142
Velocity [m/s]
Time [min]
x=725.987 y=0.141856
PT
15:07
07/10/2014

OSLANDIA

SIMULATION – wastewater

- Qgis-swmm
- Processing extension
- SWMM interface

Still beta → work / help / funding needed !

OSLANDIA

FREEWAT

Free and Open Source Software Tools for Water Resource Management

EU HORIZON 2020 Project

Simulation : FREEWAT

OSLANDIA

Integrated modelling environment

- EU Framework Directive
- Improvement over EU projects :

  SID&GRID, MARSOL, QUIMET, NITRATOS, FEDER12

  Surface, groundwater, transportation, hydrogeochemical, pollutants, GIS, 3D

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 642224

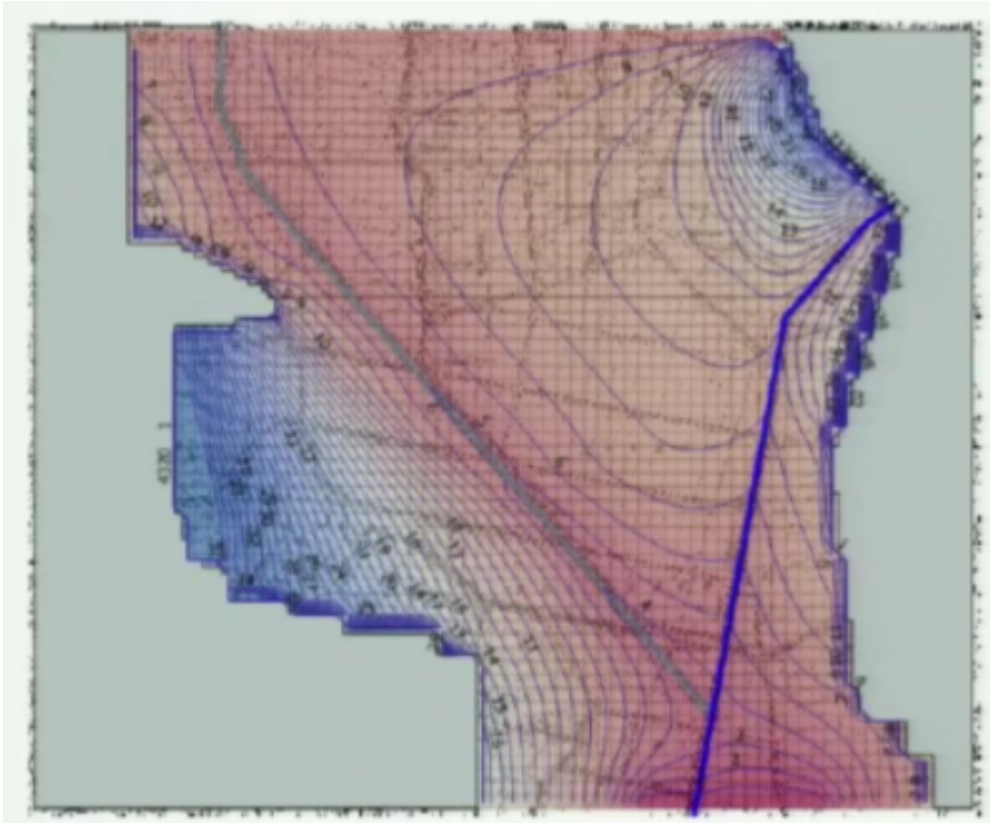
- OpenSource
- QGIS-based
- QGIS GUI extensions
- Processing extensions

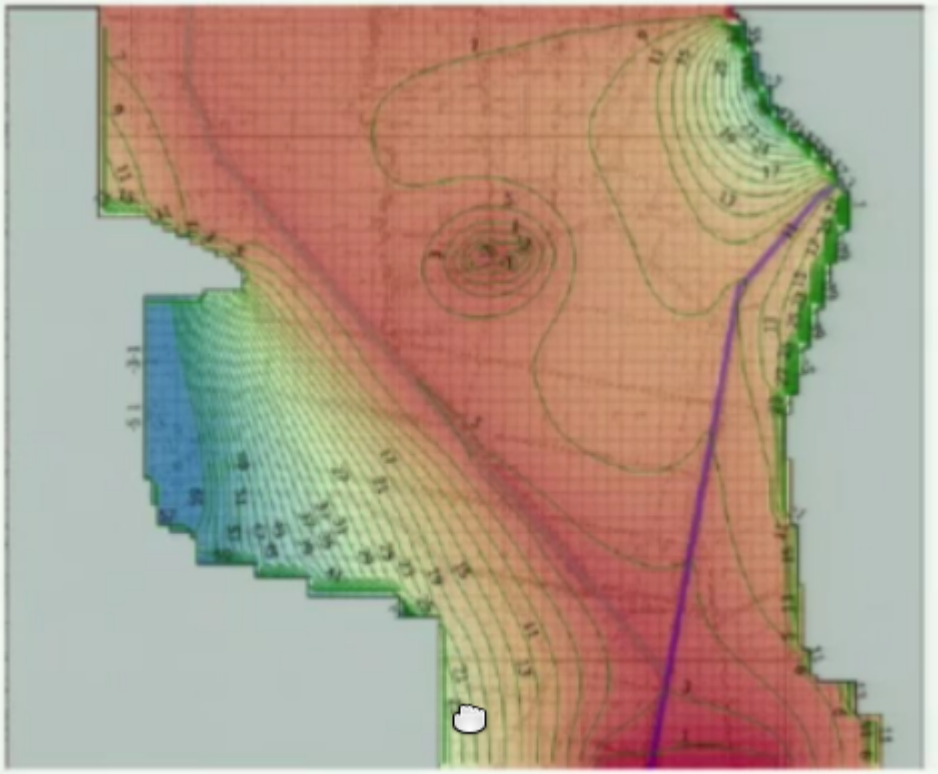
- First pre-release versions
- Release late 2016

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 642224

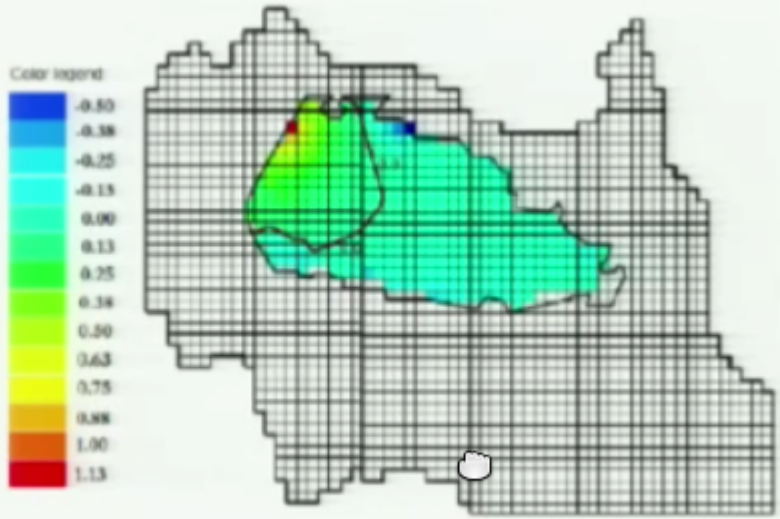
New modules

- Management & planning
- Terrain data analysis
- Calibration, uncertainty, sensibility
- Unsaturated zone transportation
- Lake interactions
- Culture water needs
- Groundwater quality
- Analysis, interpretation, hydrogeology visualization





Lake seepage (+out lake, - in lake)



Source: assessment of lake groundwater interaction: Turawa case, Poland, PhD Thesis, Arm El Zehairy, 2014

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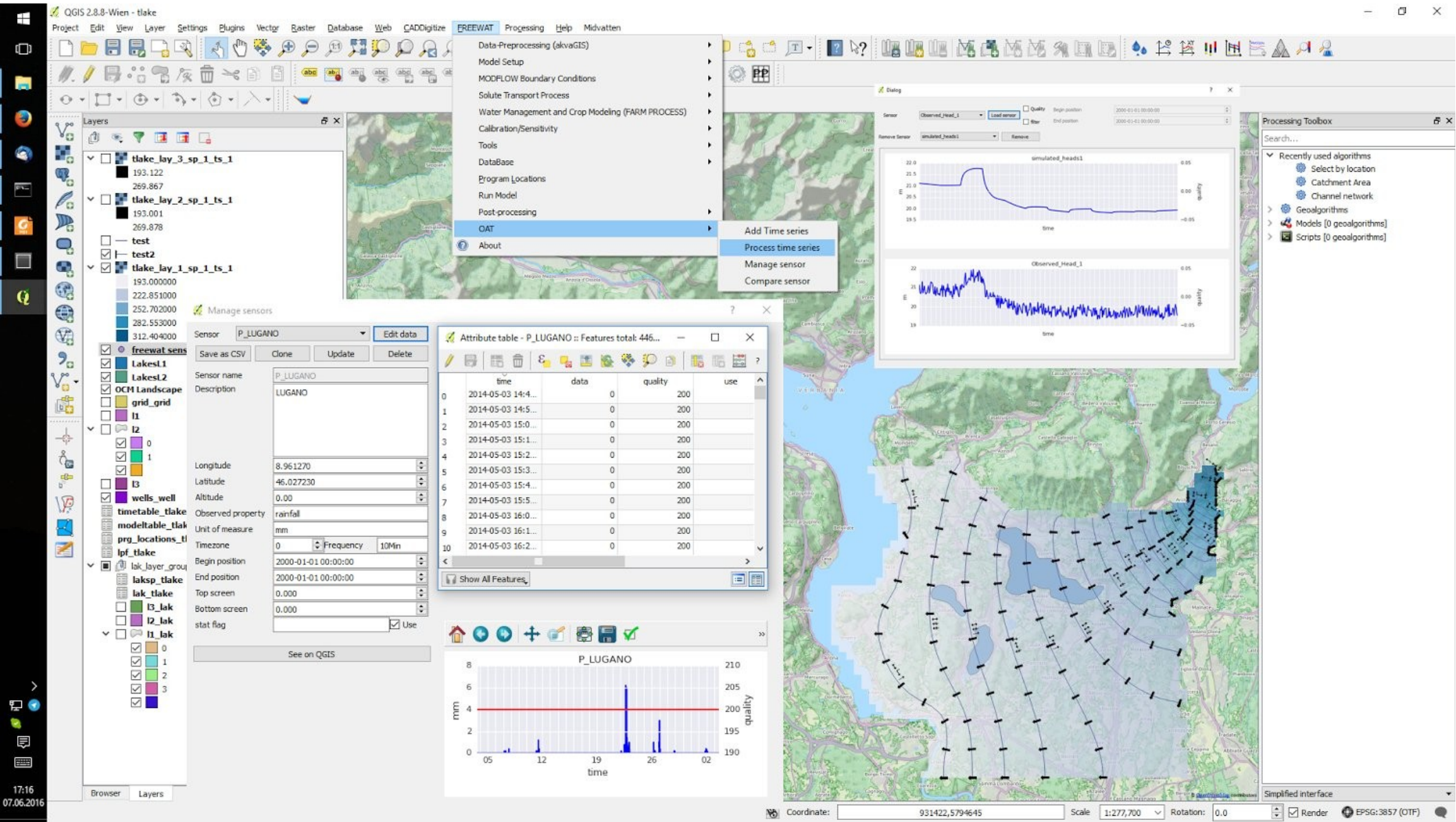

QGIS 2.8.8-Wien - tlake
Project Edit View Layer Settings Plugins Vector Raster Database Web CADDigitize FREEWAT Processing Help Midvatten
Data-Preprocessing (akvaGIS)
Model Setup
MODFLOW Boundary Conditions
Solute Transport Process
Water Management and Crop Modeling (FARM PROCESS)
Calibration/Sensitivity
Tools
DataBase
Program Locations
Run Model
Post-processing
OAT
About
Add Time series
Process time series
Manage sensor
Compare sensor
Layers
Manage sensors
Sensor P_LUGANO
Edit data
Save as CSV
Clone
Update
Delete
Sensor name P_LUGANO
Description LUGANO
Longitude 8.961270
Latitude 46.027230
Altitude 0.00
Observed property rainfall
Unit of measure mm
Timezone 0
Frequency 10Min
Begin position 2000-01-01 00:00:00
End position 2000-01-01 00:00:00
Top screen 0.000
Bottom screen 0.000
stat flag
Use
See on QGIS
Attribute table - P_LUGANO :: Features total: 446...
time data quality use
Show All Features
P_LUGANO
mm
quality
time
Processing Toolbox
Search...
Recently used algorithms
Select by location
Catchment Area
Channel network
Geoalgorithms
Models [0 geoalgorithms]
Scripts [0 geoalgorithms]
simulated_heads1
Observed_Head_1
Browser
Layers
Coordinate: 931422,5794645
Scale 1:277,700
Rotation: 0.0
Render
EPSG:3857 (OTF)
Simplified interface
17:16
07.06.2016

Open items

OSLANDIA

Data models
Data streams / Webservices
Better simulation integration
Sensor integration
SCADA connections
Better visualizatino
Packaging
Community
Development & funding mutualization

Questions ?

OSLANDIA

vincent.picavet@oslandia.com

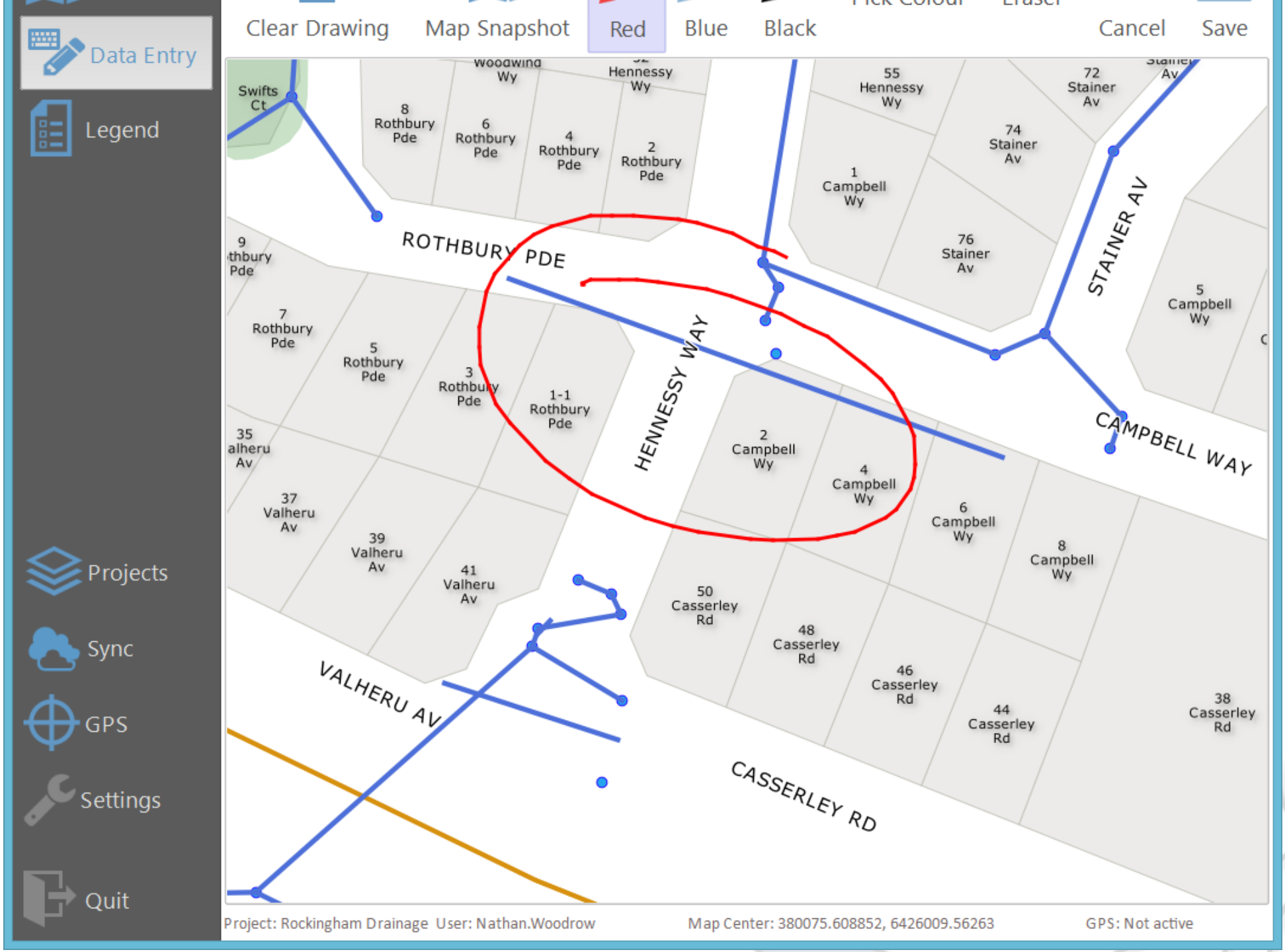
Twitter : @vpicavet

http://www.oslandia.com

PANASONIC FZ-G1

Windows 8
(or 7, better)
64b, 4GB RAM
128GB SSD
WIFI, Bluetooth
3G/4G
10'' HD
Tactile + stylus
Roughed

http://www.panasonic.com/business/toughpad/us/rugged-windows-fz-g1-tablet-specs.asp


Clear Drawing
Map Snapshot
Red
Blue
Black
Cancel
Save
Data Entry
Legend
Projects
Sync
GPS
Settings
Quit
Swifts Ct
8 Rothbury Pde
6 Rothbury Pde
4 Rothbury Pde
2 Rothbury Pde
Woodwind Wy
Hennessy Wy
55 Hennessy Wy
72 Stainer Av
74 Stainer Av
1 Campbell Wy
76 Stainer Av
ROTHBURY PDE
STAINER AV
9 Rothbury Pde
7 Rothbury Pde
5 Rothbury Pde
3 Rothbury Pde
1-1 Rothbury Pde
HENNESSY WAY
5 Campbell Wy
2 Campbell Wy
4 Campbell Wy
6 Campbell Wy
8 Campbell Wy
CAMPBELL WAY
35 Valheru Av
37 Valheru Av
39 Valheru Av
41 Valheru Av
50 Casserley Rd
48 Casserley Rd
46 Casserley Rd
44 Casserley Rd
38 Casserley Rd
VALHERU AV
CASSERLEY RD
Project: Rockingham Drainage User: Nathan.Woodrow
Map Center: 380075.608852, 6426009.56263
GPS: Not active

IntraMaps Roam: Mobile Data Collection

Map

Data Entry

Legend

Projects

Sync

GPS

Settings

Quit

Delete

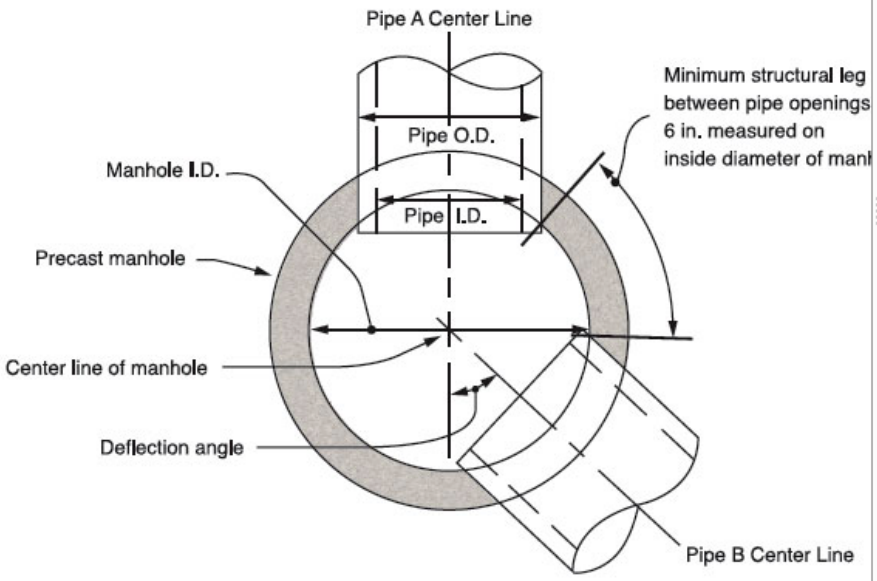
Upstream Node G5/3

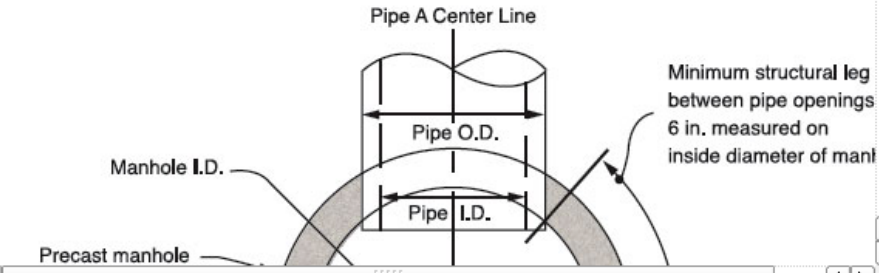
Downstream Node G5/2

Help

Hello this is generated from JS

Upstream manhole ID.
Fill this in with the upstream node ID.





Project: Gympie Demo Project User: Nathan.Woodrow

Map Center: 0, 0

GPS: Not active

OSLANDIA

Map
Data Entry
Legend
Search
Projects
Sync
GPS
Settings
Quit

Access Pits

Cancel
Save

Asset ID

Sewer Type: Access Chamber | **Access Chamber** | Access Chamber | Access Chamber | Access Chamber

Location Accuracy: **Unreliable** | Co-ordinated | As-con Pickup | Surveyed | Unsurveyed

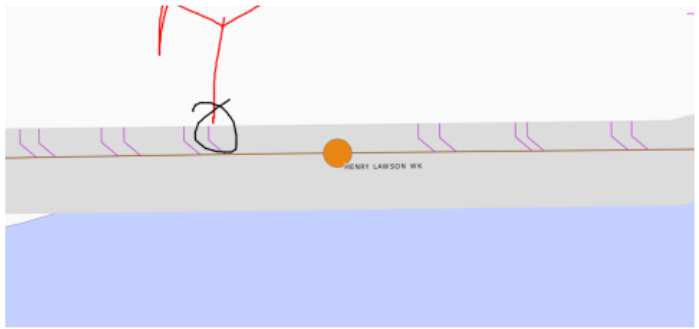
Cover Type: **Trafficable** | Non-trafficable

Depth (m): 3.00 | − | +

Condition: 0 - Not Rated | 1 - Excellent | 2 - Good | **3 - Average** | 4 - Poor | 5 - Very Poor

Inspection Date: 16/04/2015 4:38:52 PM

Photo



Project: Sewer Access Pit Sample User: Nathan.Woodrow Map Center: 115.879540508, -31.951778441 GPS: Not active 1:205

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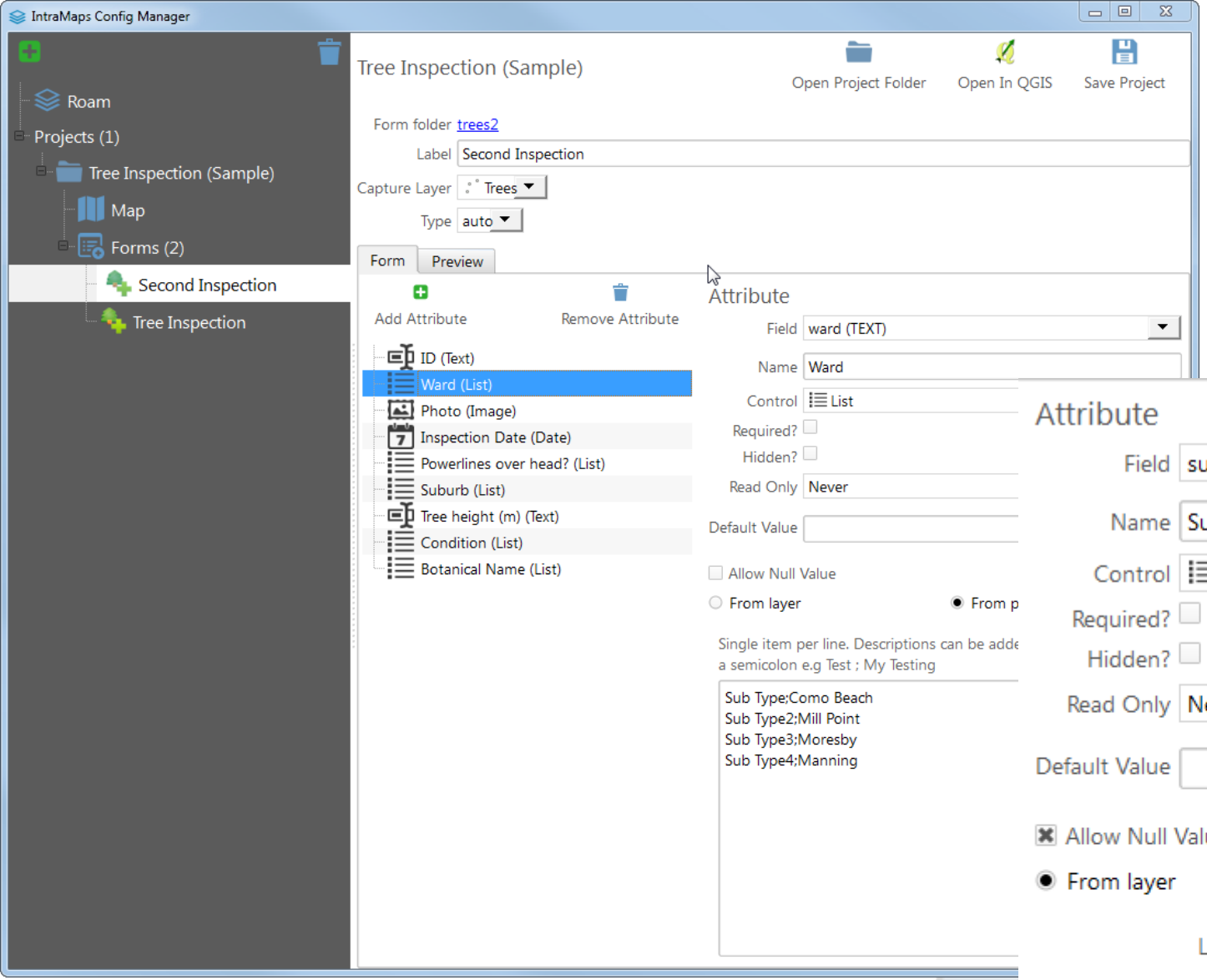
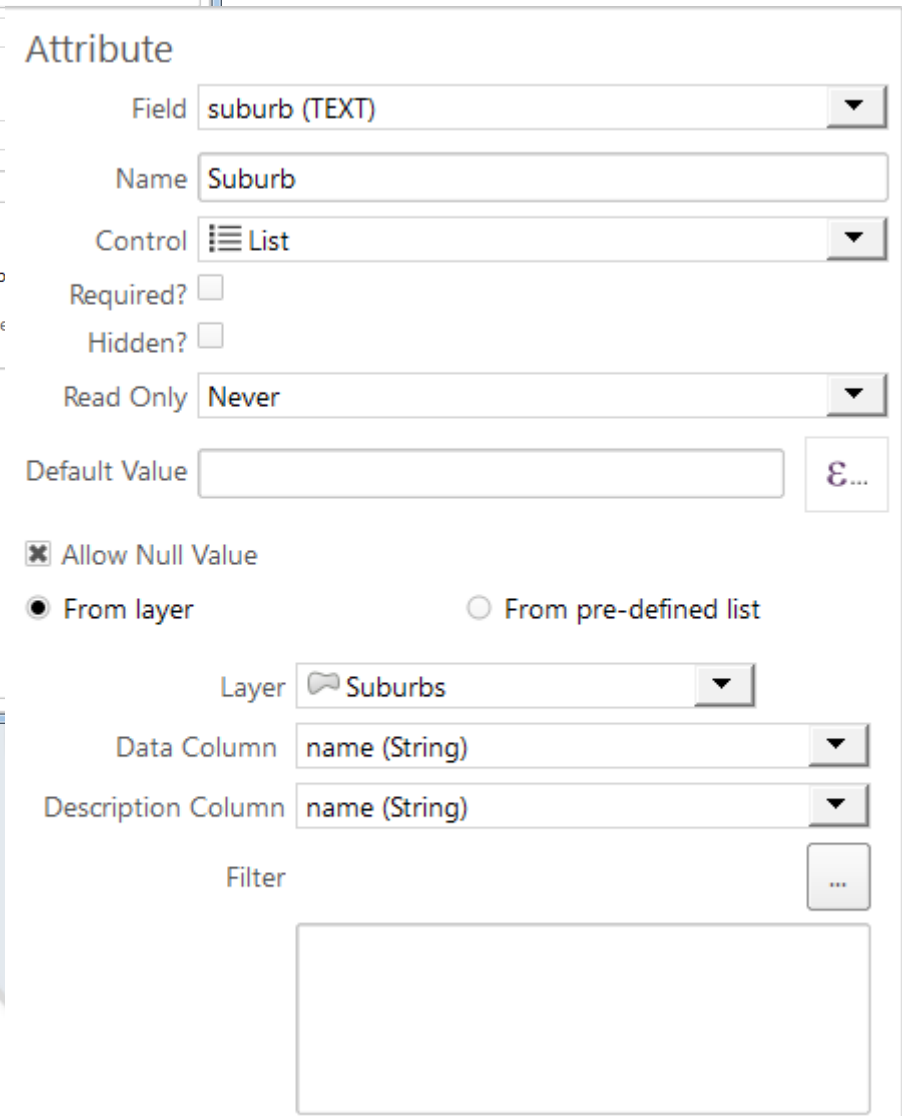

IntraMaps Config Manager
Roam
Projects (1)
Tree Inspection (Sample)
Map
Forms (2)
Second Inspection
Tree Inspection
Tree Inspection (Sample)
Open Project Folder
Open In QGIS
Save Project
Form folder trees2
Label Second Inspection
Capture Layer Trees
Type auto
Form
Preview
Add Attribute
Remove Attribute
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 p
Single item per line. Descriptions can be adde
a semicolon e.g Test ; My Testing
Sub Type;Como Beach
Sub Type2;Mill Point
Sub Type3;Moresby
Sub Type4;Manning


Attribute
Field suburb (TEXT)
Name Suburb
Control List
Required?
Hidden?
Read Only Never
Default Value
Allow Null Value
From layer
From pre-defined list
Layer Suburbs
Data Column name (String)
Description Column name (String)
Filter

OSLANDIA