OpenStreetMap & PostGIS

Predmet: Geografski informacioni sistemi

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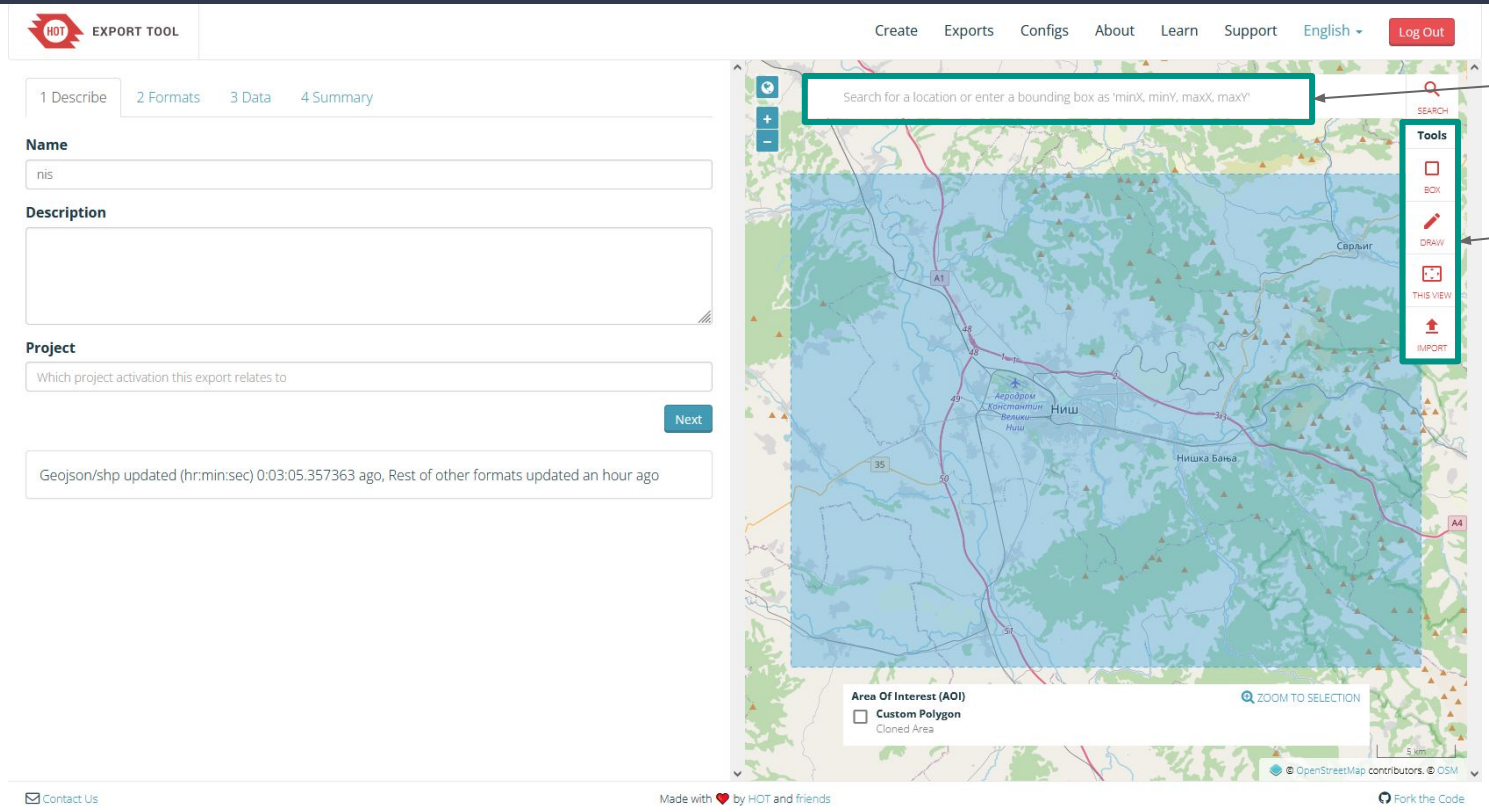
Sadržaj

1. Preuzimanje OSM fajla
2. Importovanje OSM fajla u PostgreSQL (osm2pgsql)
3. Povezivanje baze u QGIS-u
4. Kreiranje upita i lejera

Preuzimanje OSM fajla

- Kreiranje i preuzimanje OSM fajla se vrši na hot export sajtu (https://export.hotosm.org/)
- Potrebno je na mapi sa desne strane pretražiti oblast za koju želimo da preuzmemo podatke ili ručno selektovati oblast na mapi pomuću nekih od alata sa desne strane.

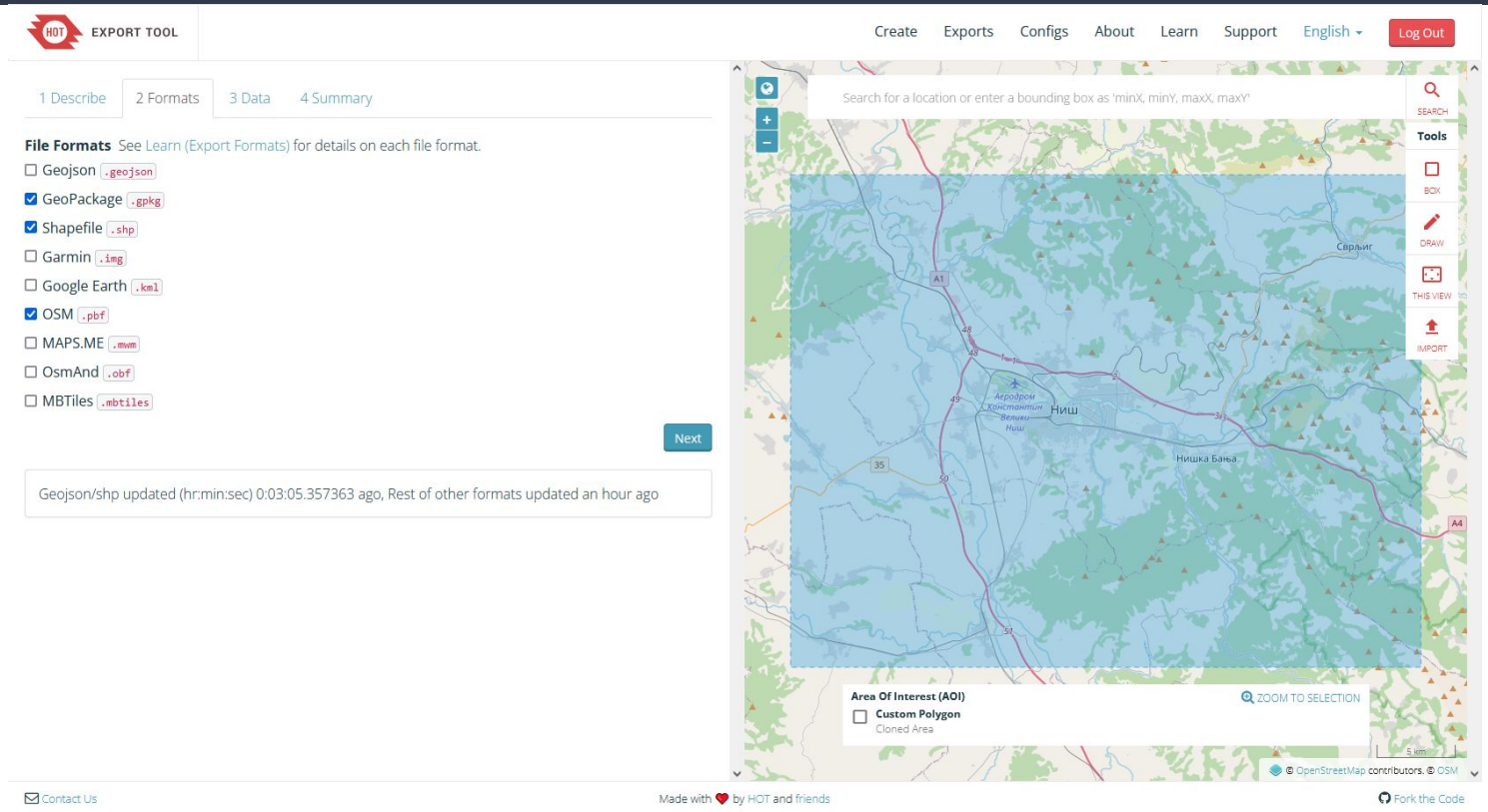


Pretraga

Alati

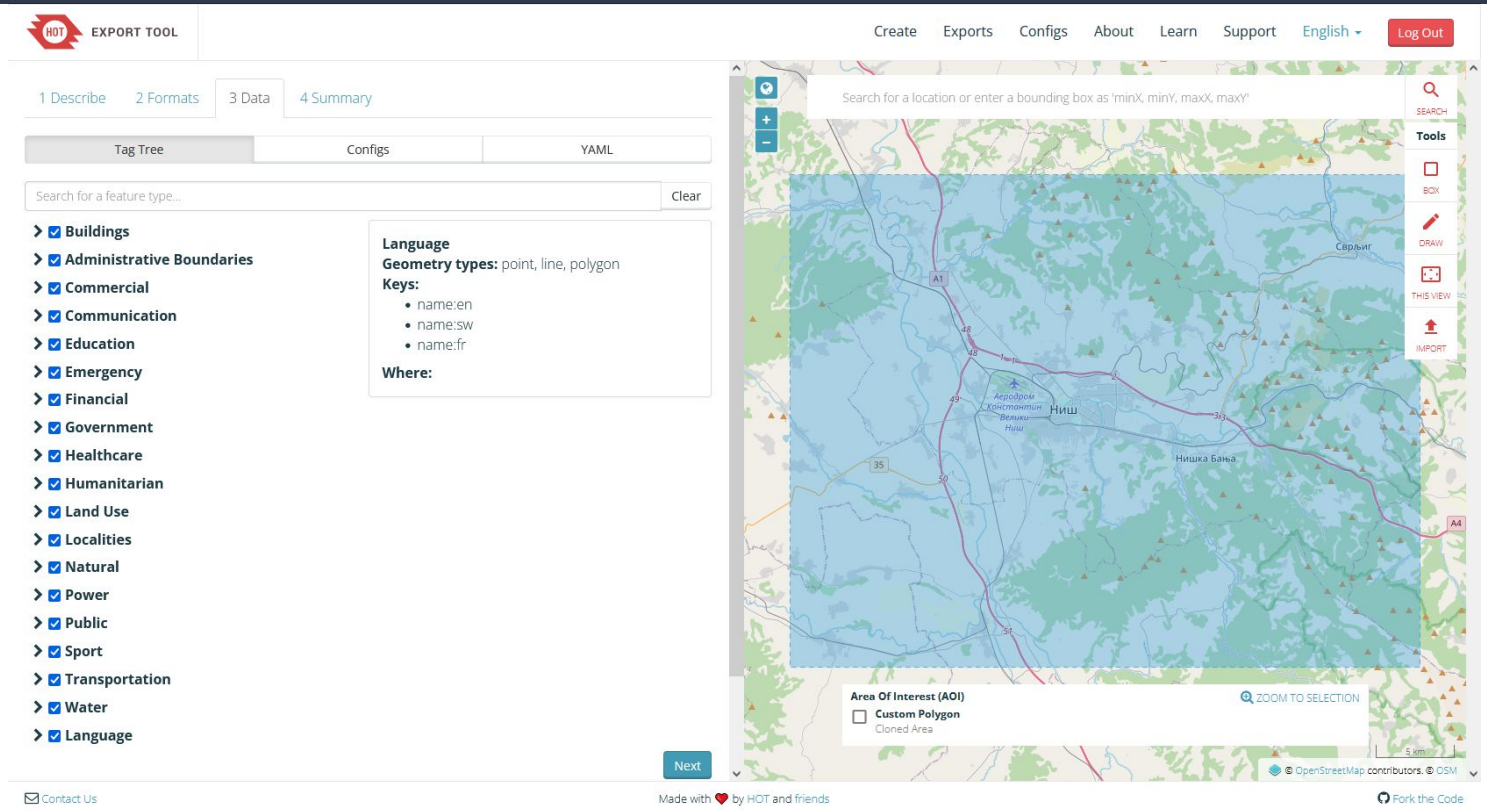
Preuzimanje OSM fajla

- Nakon toga potrebno je odabrati formate fajlova koje želimo da preuzmemo



Preuzimanje OSM fajla

- Biramo koje podatke želimo za tu oblast i nakon toga dobijamo pregled odabranih stavki gde je potrebno potvrditi izbor, nakon toga možemo da skinemo fajlove.

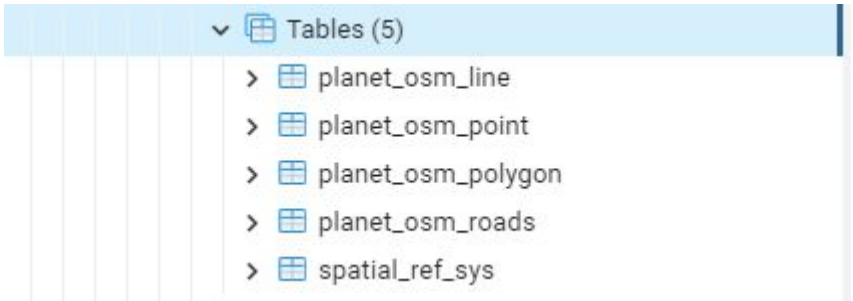


Importovanje OSM fajla u PostgreSQL (osm2pgsql)

- Potrebno je preuzeti osm2pgsql alat https://osm2pgsql.org/doc/install.html
- Zatim je potrebno preuzeti style file sa adrese https://learnosm.org/files/default.style
- U PostgreSQL-u je potrebno napraviti bazu podataka i u toj bazi izvršiti sledeću komandu

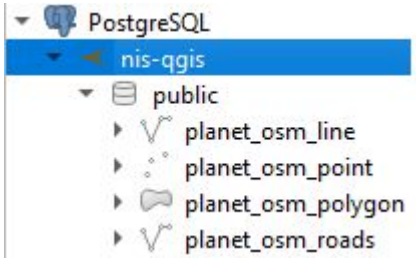
  CREATE EXTENSION postgis;
- Nakon toga možemo izvršiti importovanje OSM fajla pomuću sledeće komande

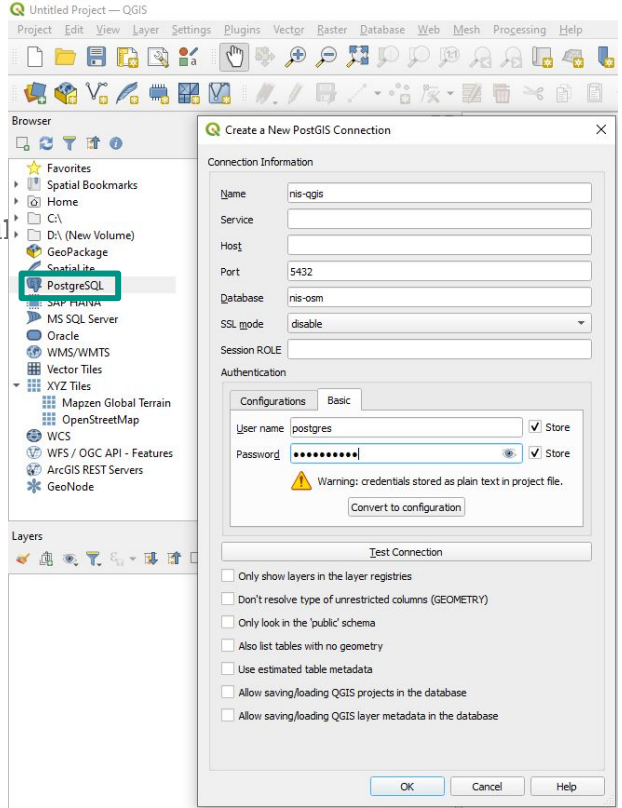
  osm2pgsql -c -d nis-gis -U postgres -W -H localhost -S C:\Users\Desktop\GiS\default.style C:\Users\Desktop\GiS\nis.osm.pbf
- Nakon toga dobijamo sledeće tabele u bazi



Povezivanje baze u QGIS-u

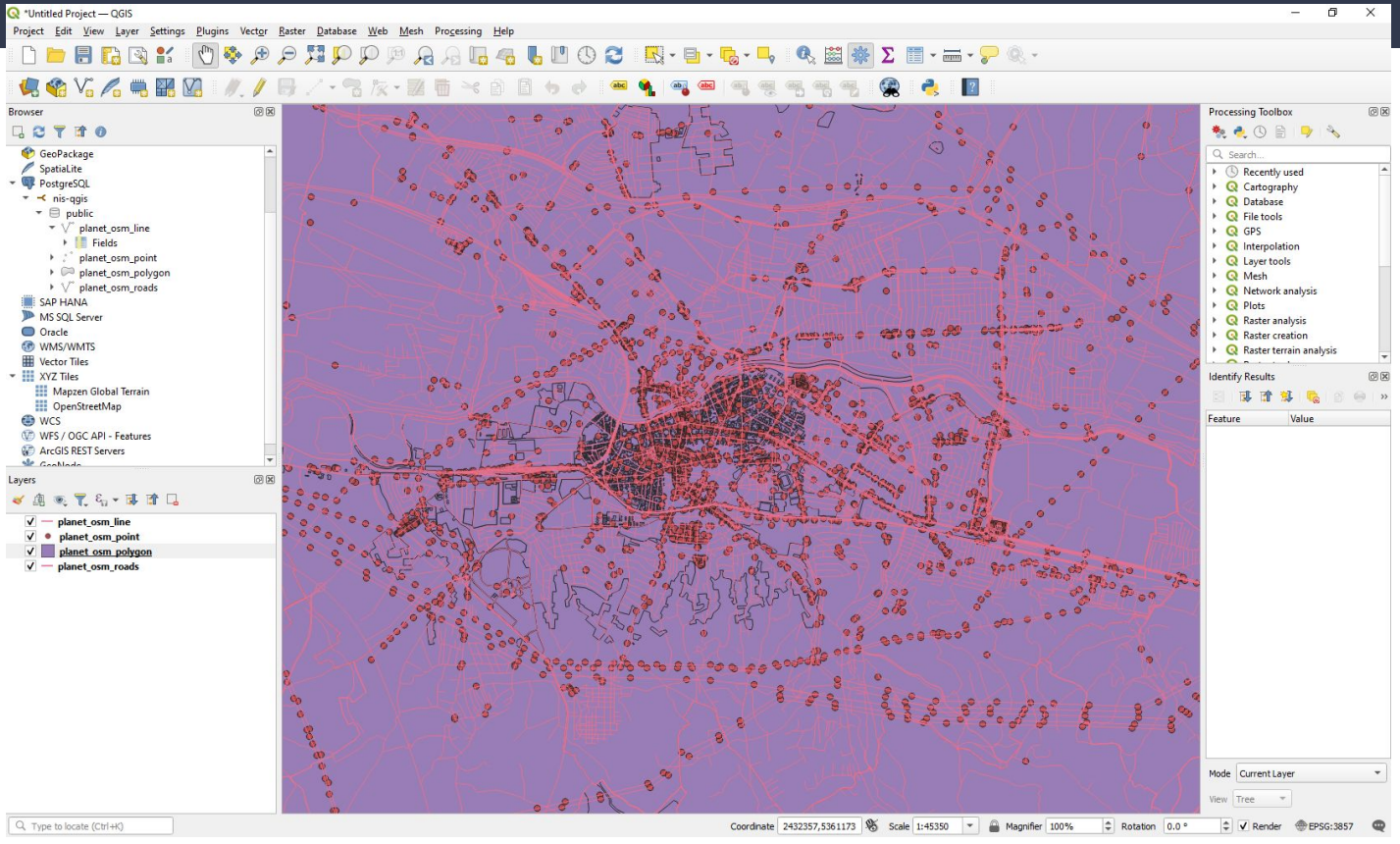
- U QGIS softveru desnim klikom na PostgreSQL -> New Connection, kreiramo konekciju
- Zatim popuniti podatke potrebne za kreiranje konekcije kao na slici
- Nakon uspešne konekcije dobijamo tabele kao u bazi





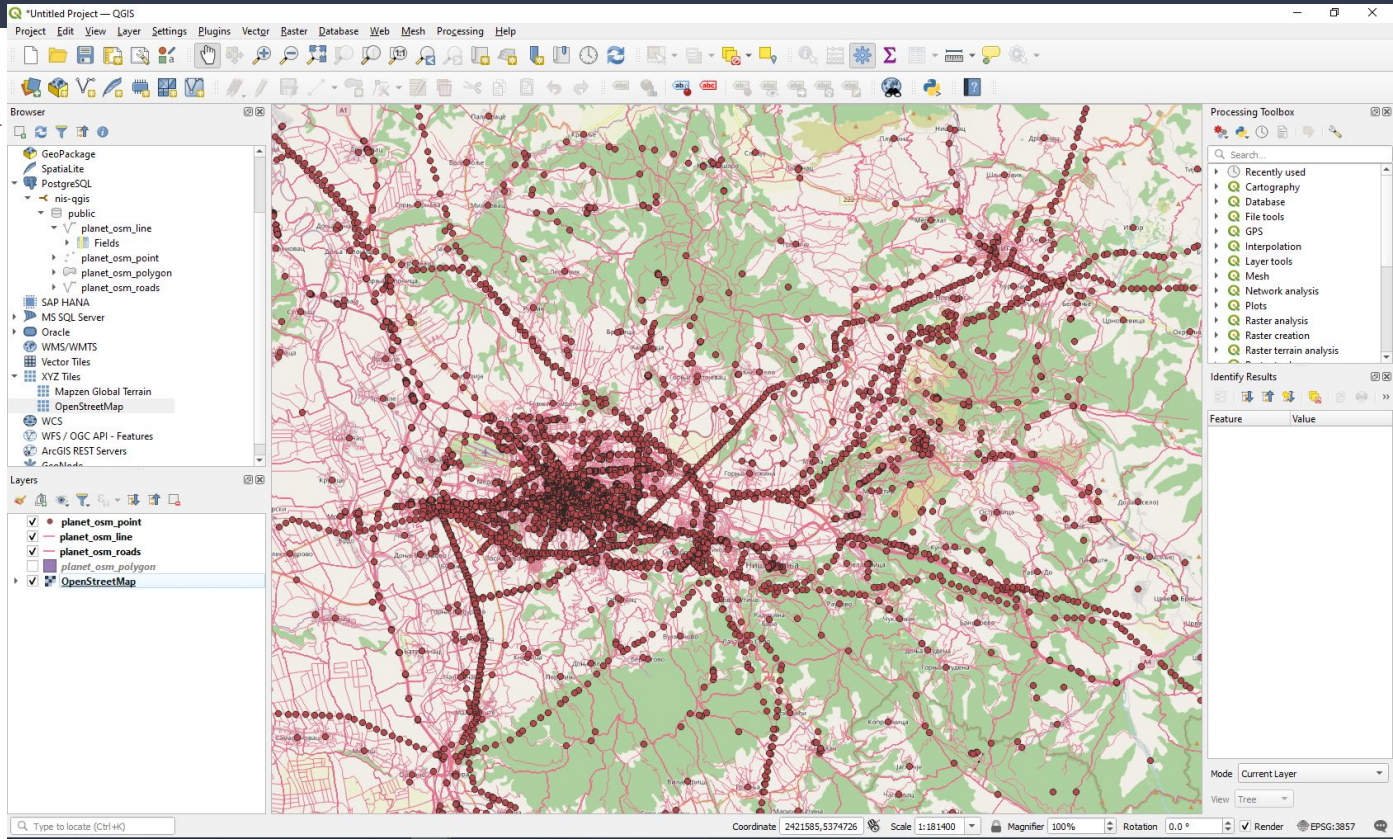
Prikaz podataka iz baze

Prikaz svih lejera iz baze.



Prikaz podataka iz baze

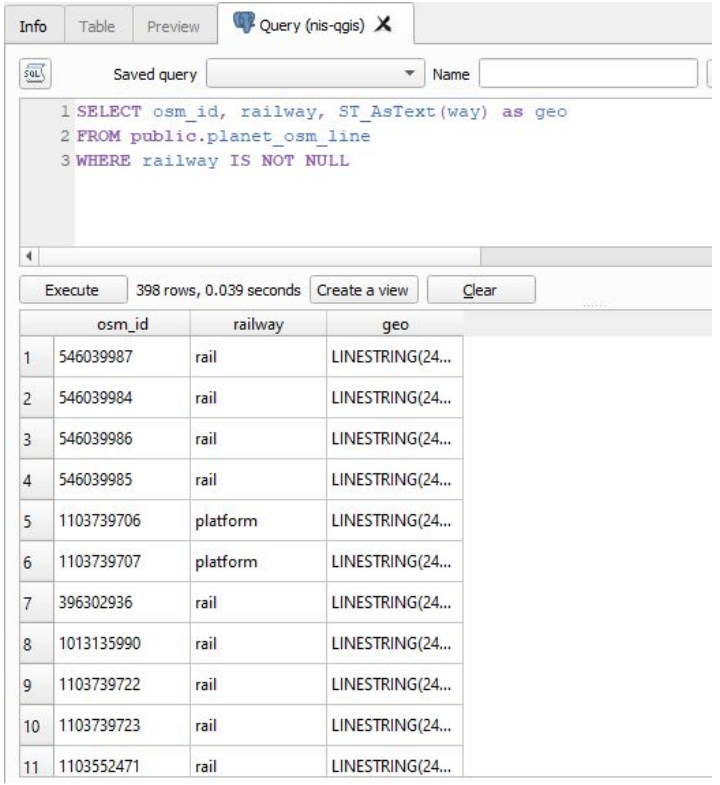
Prikaz podataka iz baze sa OpenStreetMap lejerom



Upit 1 - LineString

- Upit za prikaz pruga

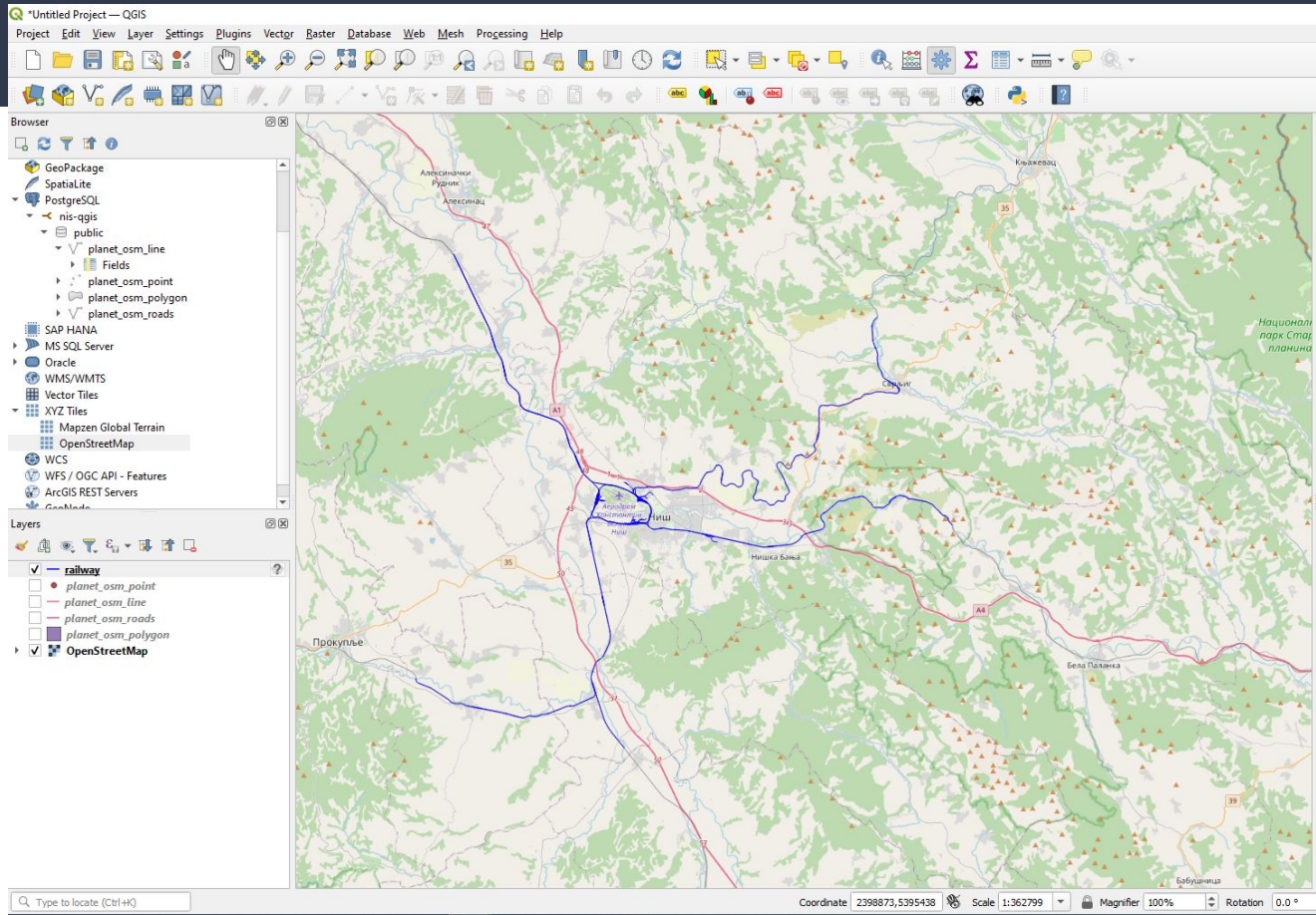
```
SELECT osm_id, railway, ST_AsText(way) as geo
FROM public.planet_osm_line
WHERE railway IS NOT NULL
```



	osm_id	railway	geo
1	546039987	rail	LINESTRING(24...
2	546039984	rail	LINESTRING(24...
3	546039986	rail	LINESTRING(24...
4	546039985	rail	LINESTRING(24...
5	1103739706	platform	LINESTRING(24...
6	1103739707	platform	LINESTRING(24...
7	396302936	rail	LINESTRING(24...
8	1013135990	rail	LINESTRING(24...
9	1103739722	rail	LINESTRING(24...
10	1103739723	rail	LINESTRING(24...
11	1103552471	rail	LINESTRING(24...

Upit 1 – lejer na mapi

Prikaz pruga plavom bojom na mapi



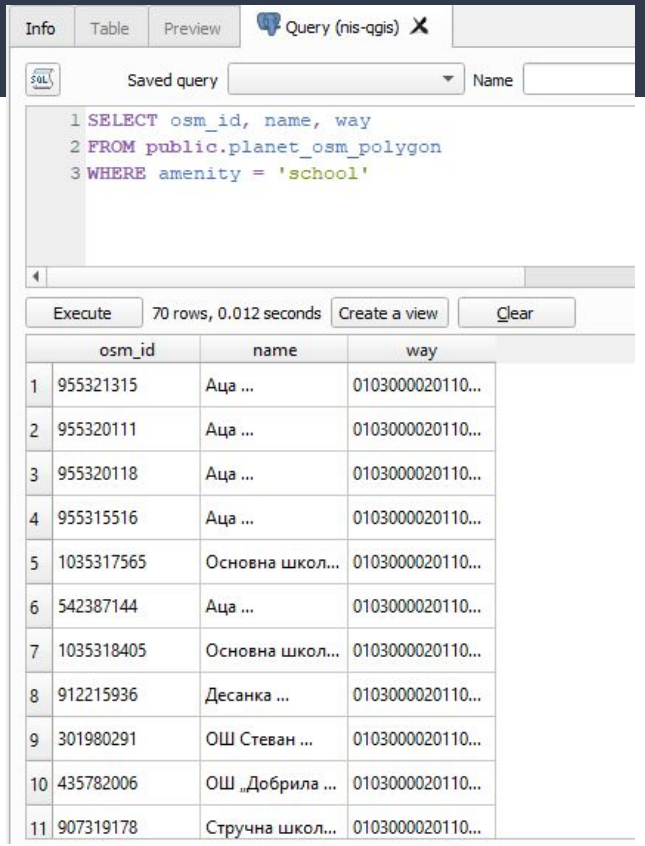
Upit 2 - Poligon

- Upit za prikaz skola kao poligon

SELECT osm_id, name, way

FROM public.planet_osm_polygon

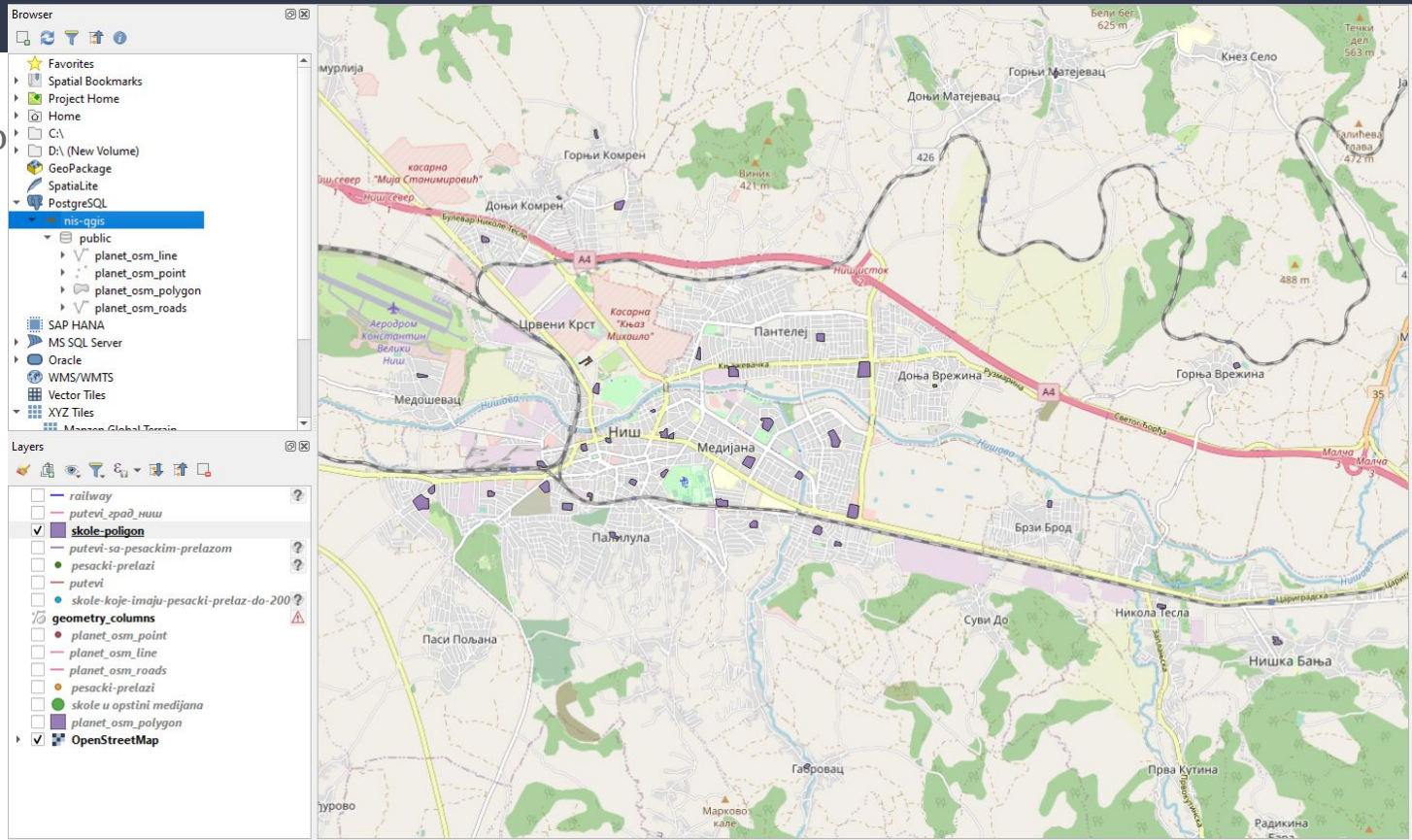
WHERE amenity = ‘school’



	osm_id	name	way
1	955321315	Аца ...	0103000020110...
2	955320111	Аца ...	0103000020110...
3	955320118	Аца ...	0103000020110...
4	955315516	Аца ...	0103000020110...
5	1035317565	Основна школ...	0103000020110...
6	542387144	Аца ...	0103000020110...
7	1035318405	Основна школ...	0103000020110...
8	912215936	Десанка ...	0103000020110...
9	301980291	ОШ Стеван ...	0103000020110...
10	435782006	ОШ „Добрила ...	0103000020110...
11	907319178	Стручна школ...	0103000020110...

Upit 2 - lejer na mapi

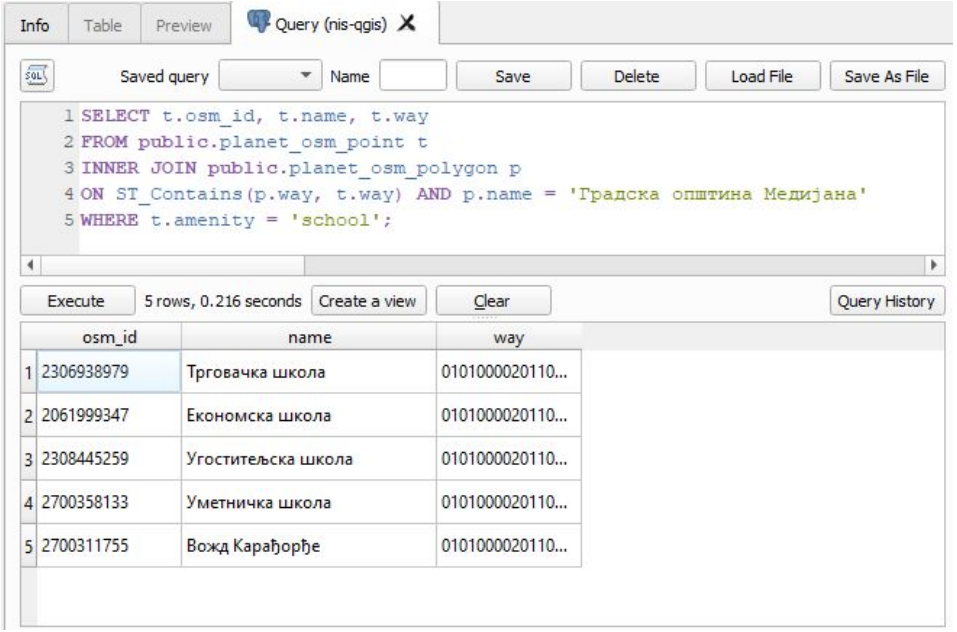
Prikaz škola ljubičasto bojom na mapi



Upit 3 - Point/Polygon

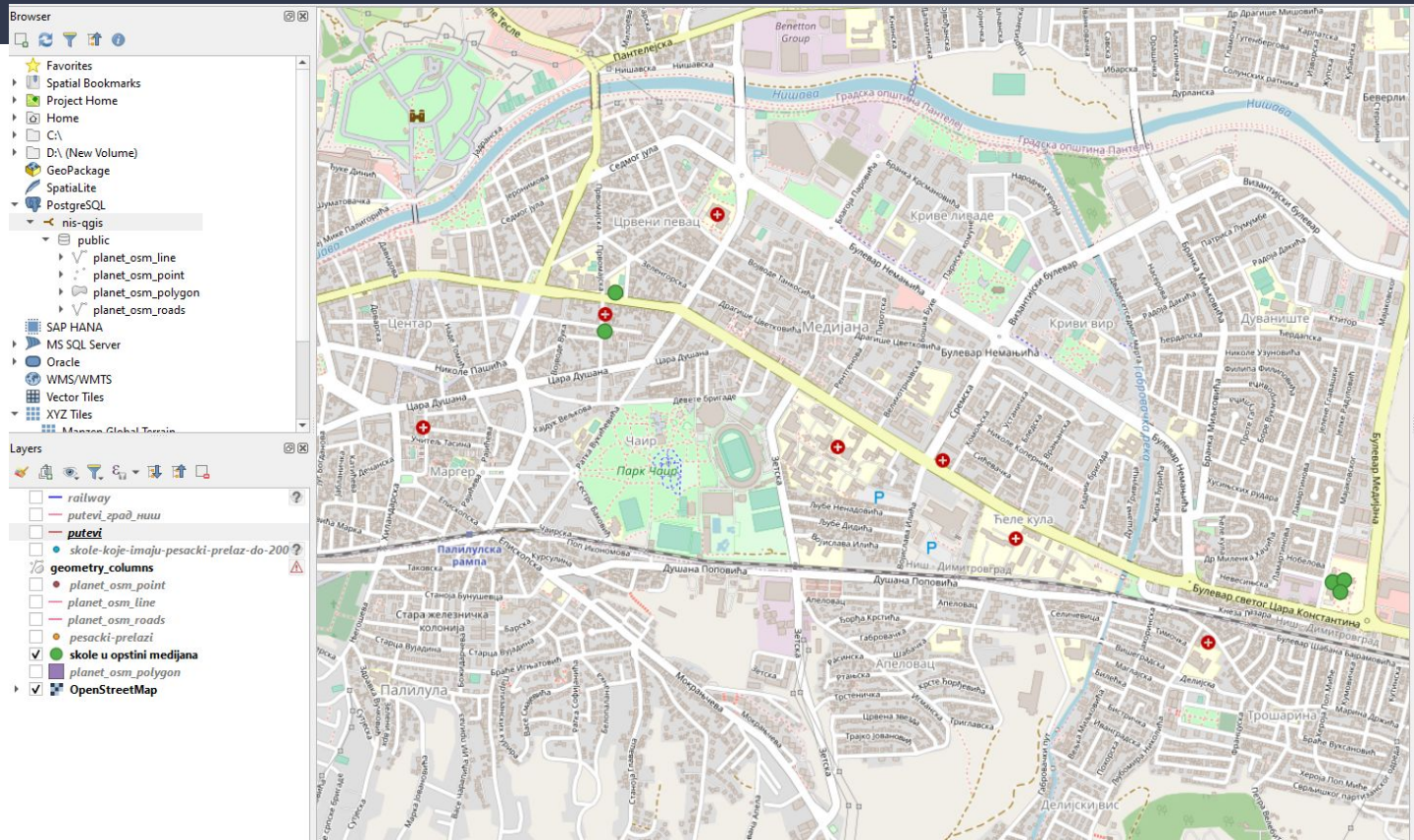
- Upit za prikaz škola u opštini Medijana

```
SELECT t.osm_id, t.name, t.way
FROM public.planet_osm_point t
INNER JOIN public.planet_osm_polygon p
ON ST_Contains(p.way, t.way)
AND p.name = 'Градска општина Медијана'
WHERE t.amenity = 'school'
```



Upit 3 - lejer na mapi

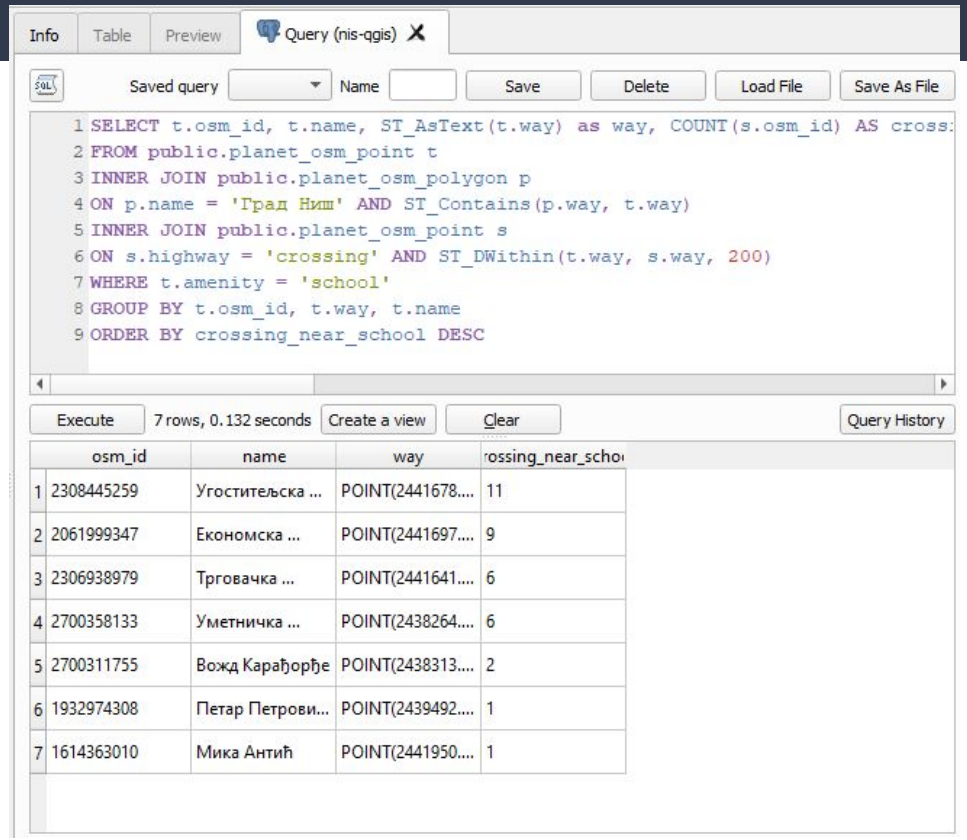
Prikaz škola u opštini Medijana



Upit 4 - Point/Polygon

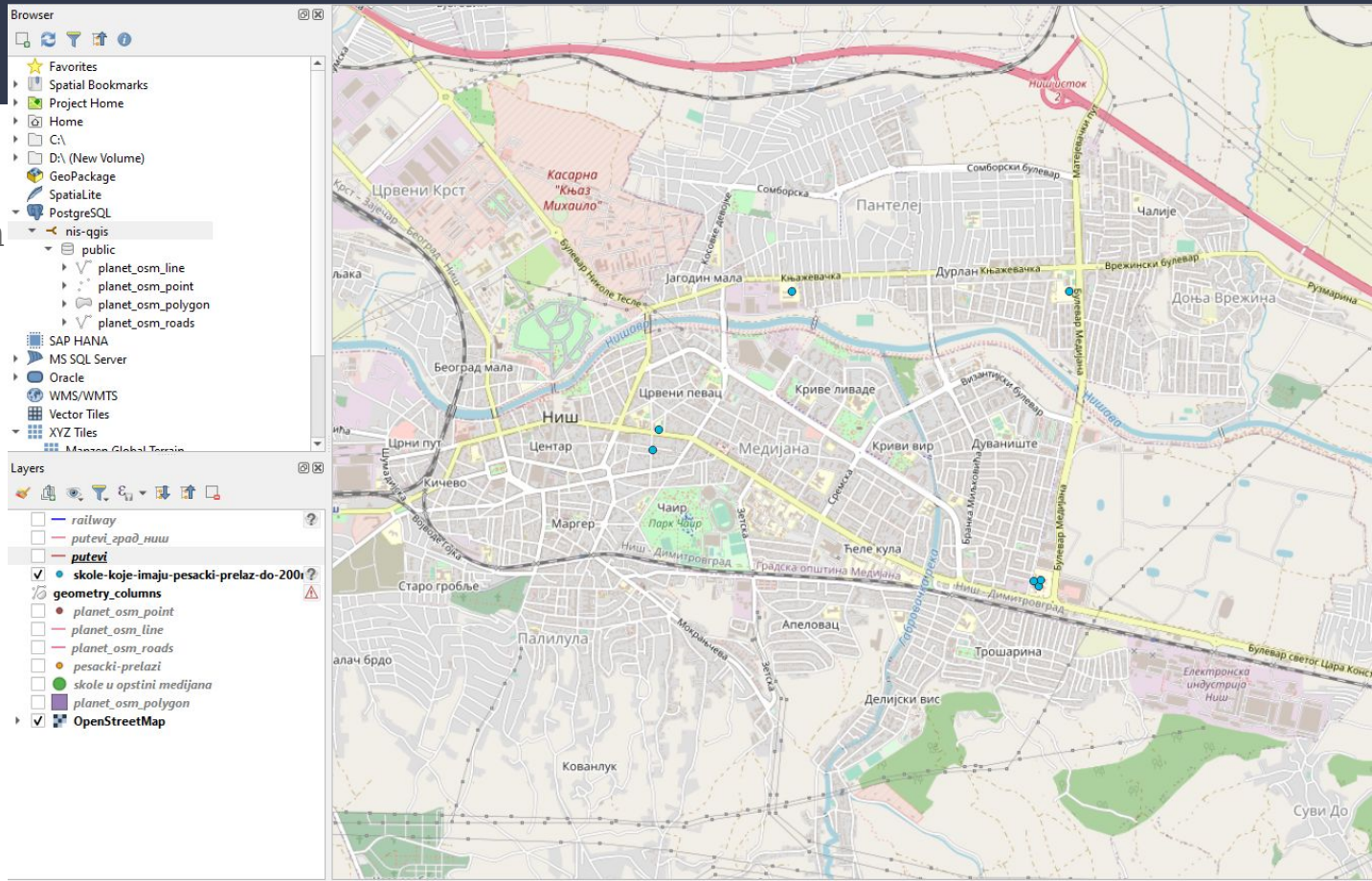
- Upit za prikaz škola koje imaju pešački prelaz do 200m udaljenosti od škole

```
SELECT t.osm_id, t.name, ST_AsText(t.way) as way,
COUNT(s.osm_id) AS crossing_near_school

FROM public.planet_osm_point t

INNER JOIN public.planet_osm_polygon p

ON p.name = 'Град Ниш' AND ST_Contains(p.way, t.way)

INNER JOIN public.planet_osm_point s

ON s.highway = 'crossing' AND ST_DWithin(t.way, s.way, 200)

WHERE t.amenity = 'school'

GROUP BY t.osm_id, t.way, t.name

ORDER BY crossing_near_school DESC
```



Upit 4 - lejer na mapi

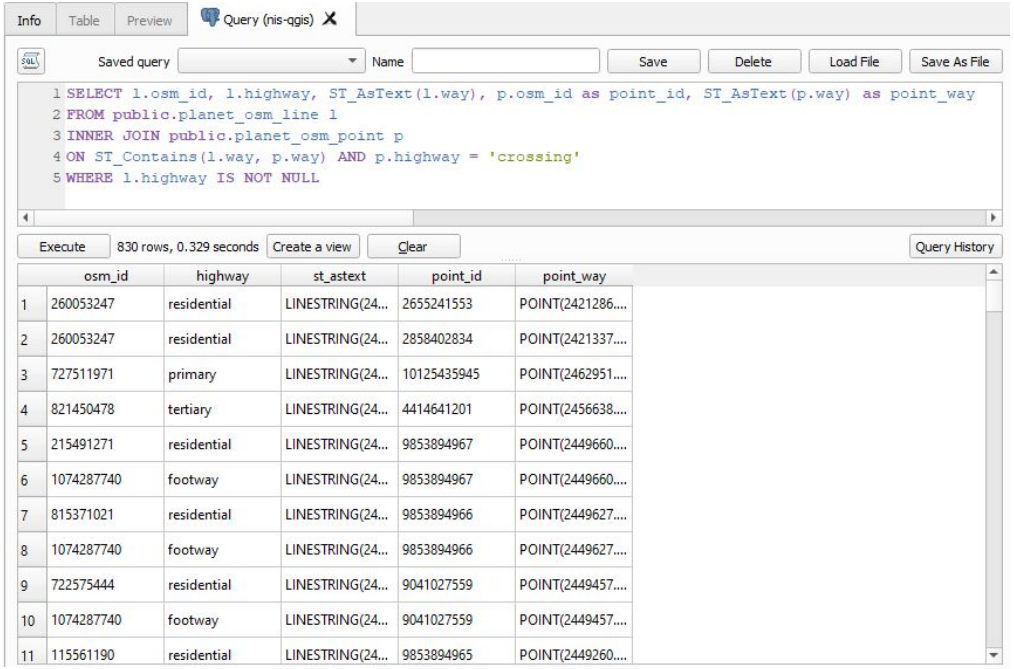
Prikaz škola koje imaju pešački prelaz do 200m udaljenosti od škole



Upit 5 - Point/LineString

- Upit za prikaz pešačkih prelaza i puteva na kojima se nalaze pešački prelazi

```
SELECT l.osm_id, l.highway, ST_AsText(l.way), p.osm_id as point_id, ST_AsText(p.way) as point_way

FROM public.planet_osm_line l

INNER JOIN public.planet_osm_point p

ON ST_Contains(l.way, p.way) AND p.highway = 'crossing'

WHERE l.highway IS NOT NULL;
```



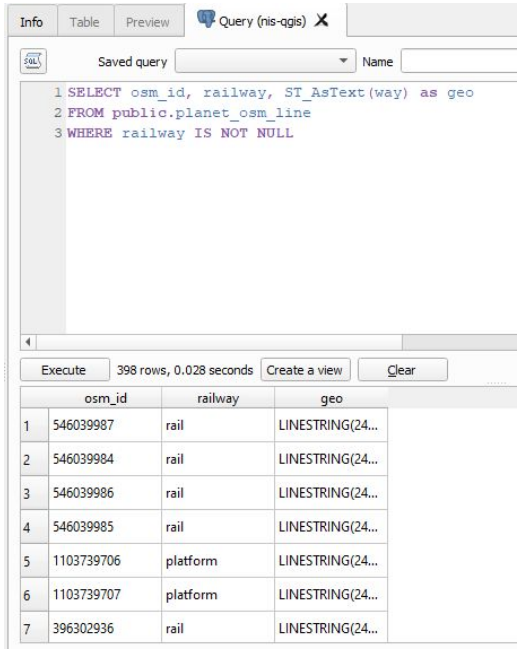
	osm_id	highway	st_astext	point_id	point_way
1	260053247	residential	LINESTRING(24...	2655241553	POINT(2421286....
2	260053247	residential	LINESTRING(24...	2858402834	POINT(2421337....
3	727511971	primary	LINESTRING(24...	10125435945	POINT(2462951....
4	821450478	tertiary	LINESTRING(24...	4414641201	POINT(2456638....
5	215491271	residential	LINESTRING(24...	9853894967	POINT(2449660....
6	1074287740	footway	LINESTRING(24...	9853894967	POINT(2449660....
7	815371021	residential	LINESTRING(24...	9853894966	POINT(2449627....
8	1074287740	footway	LINESTRING(24...	9853894966	POINT(2449627....
9	722575444	residential	LINESTRING(24...	9041027559	POINT(2449457....
10	1074287740	footway	LINESTRING(24...	9041027559	POINT(2449457....
11	115561190	residential	LINESTRING(24...	9853894965	POINT(2449260....

Upit 5 - lejer na mapi

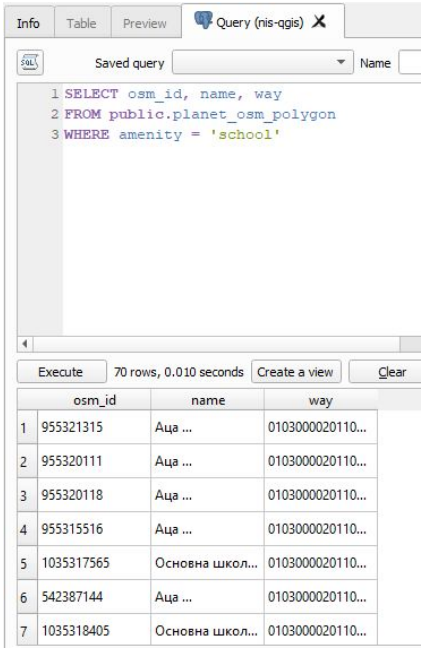
Prikaz pešačkih prelaza i puteva na kojima se nalaze pešački prelazi

Upiti bez indeksa

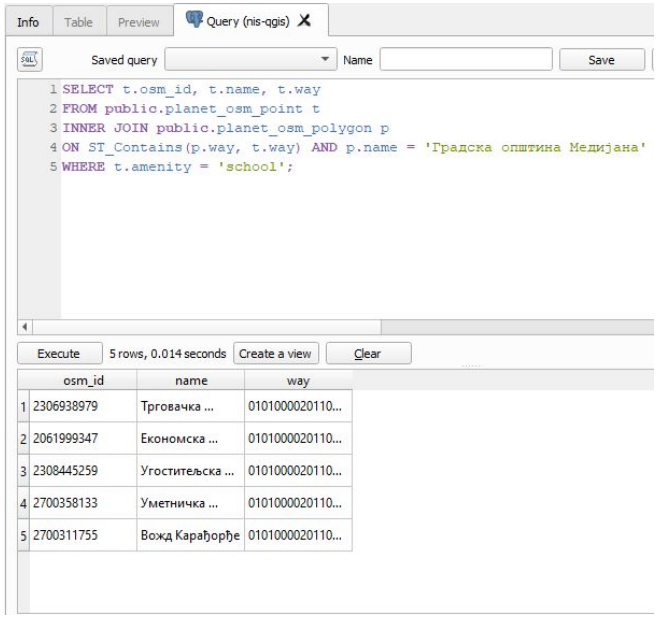
Upit 1 - Prikaz pruga



Upit 2 - Škole kao polygon

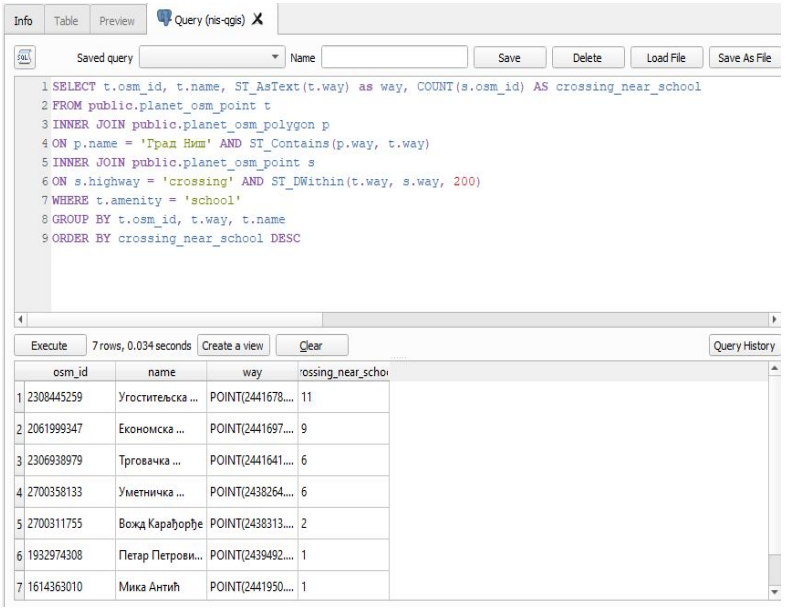


Upit 3 - Škole opština Medijana

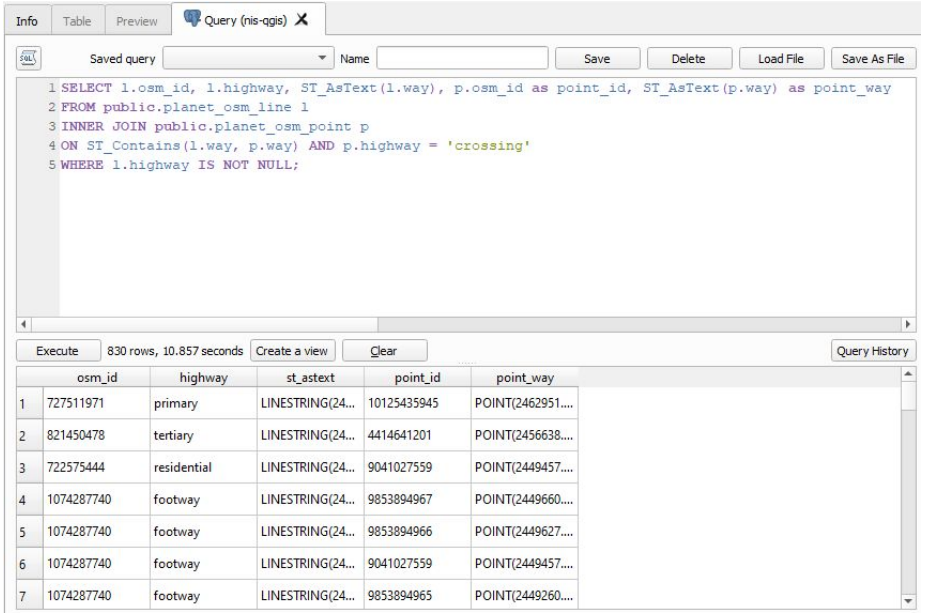


Upiti bez indeksa

Upit 4 - Škole i pešački prelazi



Upit 5 - Pešački prelazi i putevi



Pregled brzine upita sa i bez indeksa

	Sa indeksima	Bez indeksa
Upit 1	0.039	0.028
Upit 2	0.012	0.010
Upit 3	0.216	0.014
Upit 4	0.132	0.034
Upit 5	0.329	10.857

Vrednosti u sekundama