

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 pomoću nekih od alata sa desne strane.

The screenshot displays the HOT Export Tool interface. On the left, there is a form with sections for 'Name' (containing 'nis'), 'Description', and 'Project' (with a text input and a 'Next' button). Below the form, a status bar indicates 'Geojson/shp updated (hr:min:sec) 0:03:05.357363 ago, Rest of other formats updated an hour ago'. The main area is a map of Nis, Serbia, with a blue dashed rectangle indicating the 'Area Of Interest (AOI)'. A search bar at the top of the map says 'Search for a location or enter a bounding box as 'minX, minY, maxX, maxY''. On the right, a 'Tools' panel is visible, containing icons for 'BOX', 'DRAW', 'THIS VIEW', and 'IMPORT'. Arrows point from the text 'Pretraga' to the search bar and from 'Alati' to the tools panel. The bottom of the page includes a footer with 'Contact Us', 'Made with ❤ by HOT and friends', and 'Fork the Code'.

Pretraga

Alati

Preuzimanje OSM fajla

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

The screenshot displays the HOT Export Tool interface. On the left, the 'File Formats' section lists various output formats with checkboxes: Geojson (.geojson), GeoPackage (.gpkg), Shapefile (.shp), Garmin (.img), Google Earth (.kml), OSM (.pbf), MAPS.ME (.mvm), OsmAnd (.obf), and MBTiles (.mbtiles). The 'OSM (.pbf)' option is selected. A 'Next' button is located below the list. A status message indicates: 'Geojson/shp updated (hr:min:sec) 0:03:05.357363 ago, Rest of other formats updated an hour ago'. On the right, a map preview shows a region with a blue-shaded 'Area Of Interest (AOI)' and a 'Custom Polygon' overlay. The map includes labels for 'Ниш' (Niš) and 'Нишка Бања' (Niška Banja). The interface also features a search bar, navigation controls, and a 'Log Out' button at the top right.

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.

The screenshot displays the HOT Export Tool interface, which is used for exporting OpenStreetMap (OSM) data. The interface is divided into several sections:

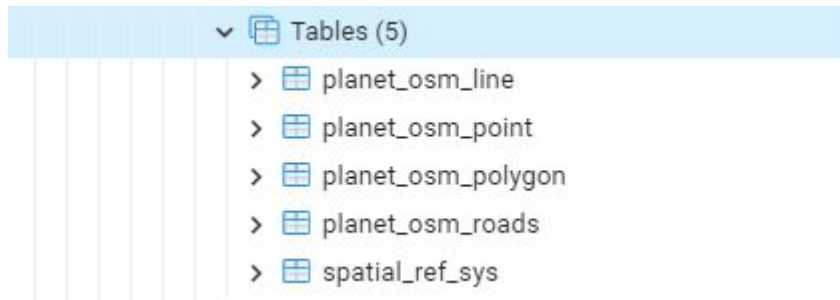
- Header:** Includes the HOT logo, "EXPORT TOOL" text, and navigation links: "Create", "Exports", "Configs", "About", "Learn", "Support", "English", and a "Log Out" button.
- Progress Bar:** Shows four steps: "1 Describe", "2 Formats", "3 Data", and "4 Summary".
- Feature Selection:** A "Tag Tree" section on the left lists various OSM features with checkboxes. The "Language" section on the right specifies "Geometry types: point, line, polygon" and lists "Keys" (name:en, name:sw, name:fr) and "Where" (Cloned Area).
- Map View:** A large map of Niš, Serbia, showing the "Area Of Interest (AOI)" selected. The map includes labels for "Аеродром Константин Велики Ниш" and "Нишка Бања". A search bar at the top of the map allows for location or bounding box input.
- Tools Panel:** A vertical panel on the right side of the map contains tools for "SEARCH", "BOX", "DRAW", "THIS VIEW", and "IMPORT".
- Footer:** Includes a "Contact Us" link, a "Made with ❤ by HOT and friends" statement, and a "Fork the Code" link.

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 pomoću sledeće komande

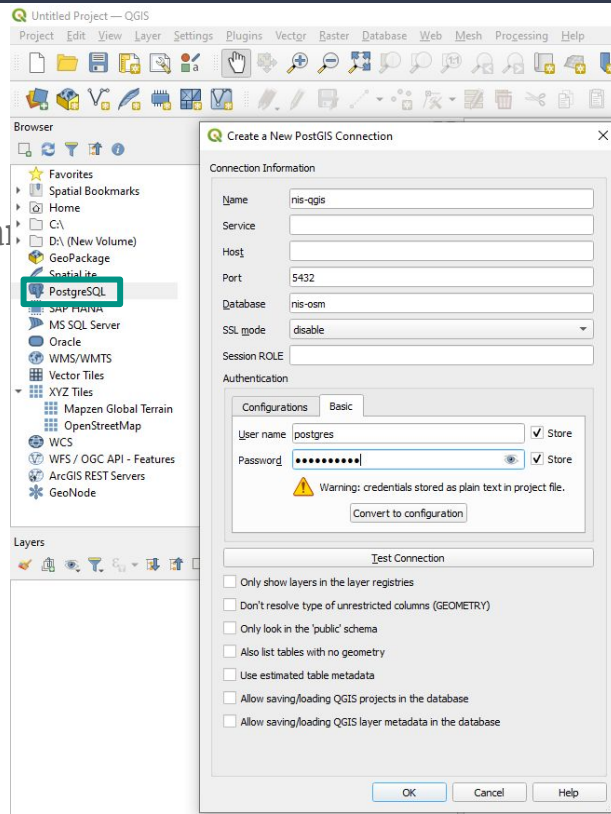
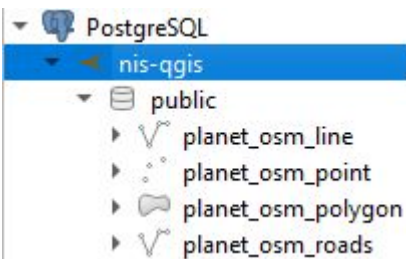
```
osm2pgsql -c -d nis-gis -U postgres -W -H localhost -S C:\Users\Desktop\GiS\default.style  
C:\Users\Desktop\GiS\nis.osm.pbf
```

- Nakon toga dobijamo sledeće tabele u bazi



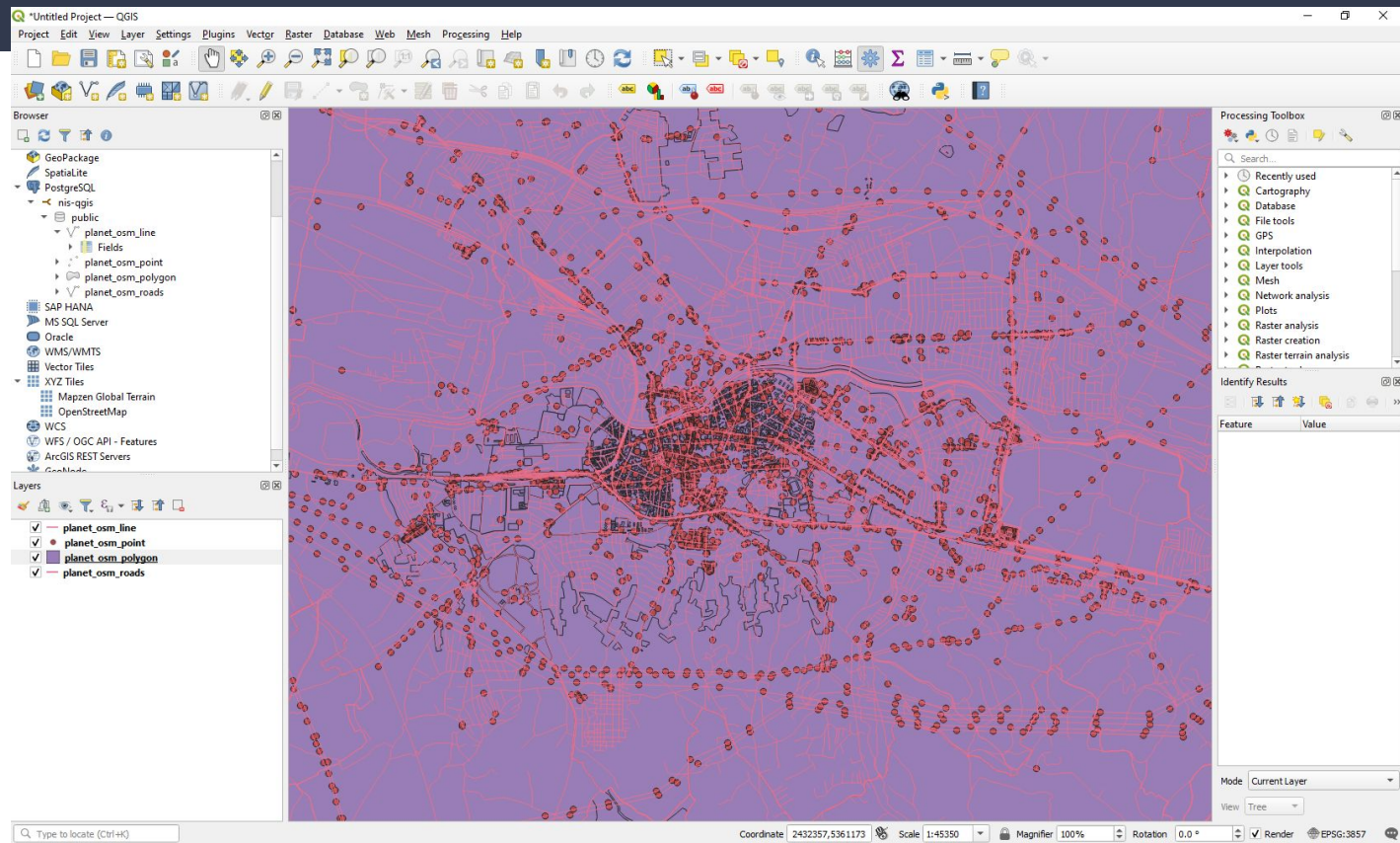
Povezivanje baze u QGIS-u

- 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



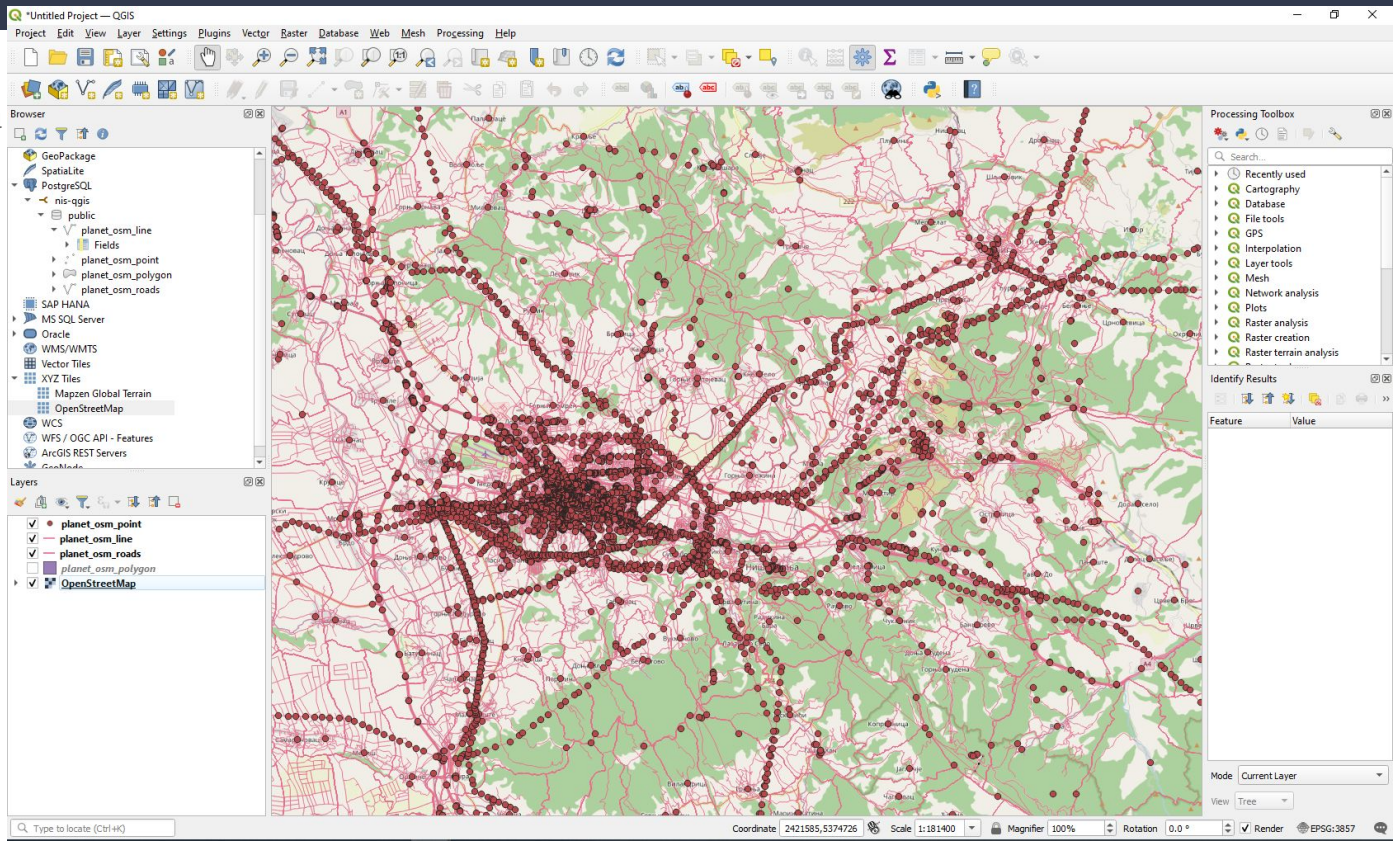
Prikaz podataka iz baze

Prikaz svih lejera
iz baze.



Prikaz podataka iz baze

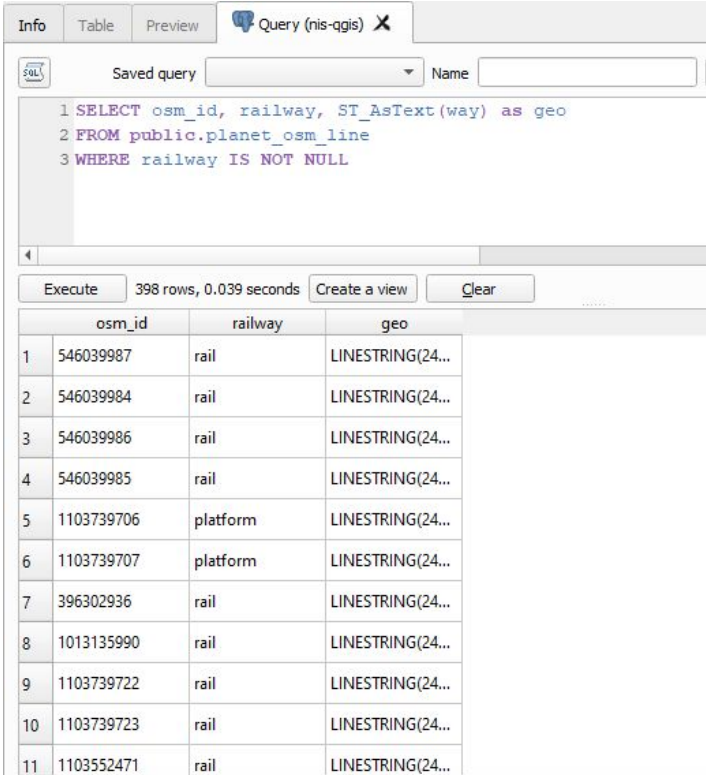
Prikaz podataka iz baze sa
OpenStreetMap lejerom



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
```



Query (nis-qgis) X

Saved query Name

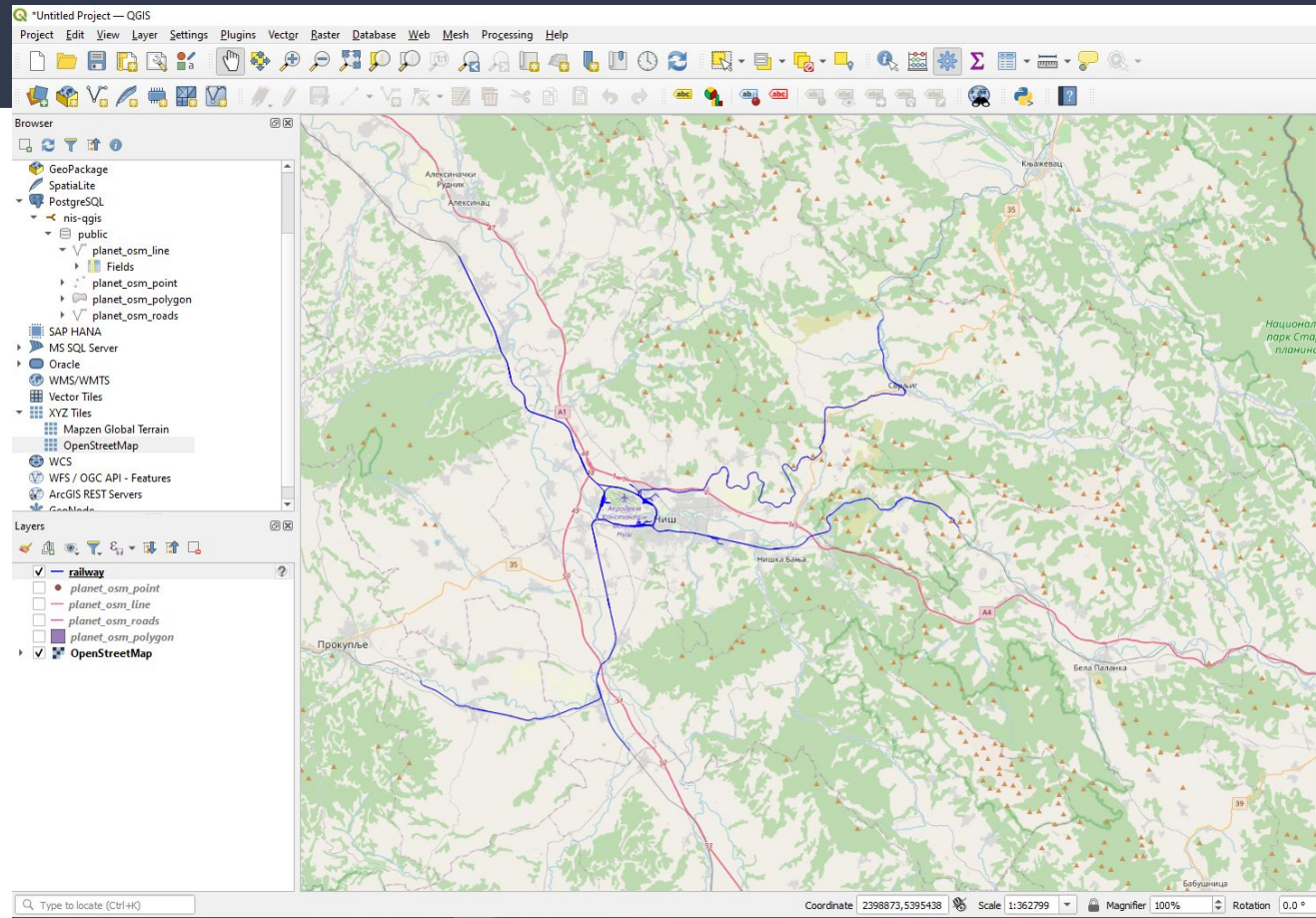
```
1 SELECT osm_id, railway, ST_AsText(way) as geo  
2 FROM public.planet_osm_line  
3 WHERE railway IS NOT NULL
```

Execute 398 rows, 0.039 seconds Create a view Clear

	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



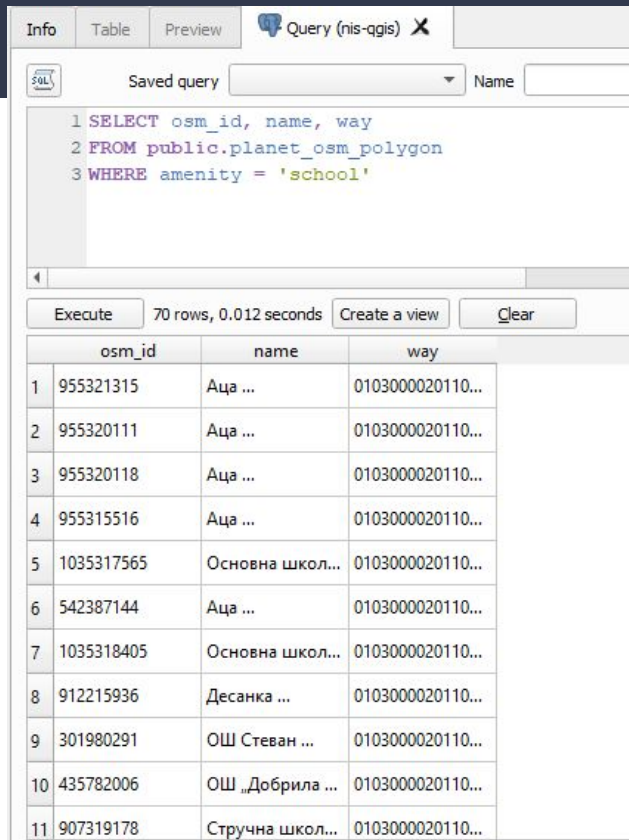
Upit 2 – Polygon

- Upit za prikaz skola kao poligon

```
SELECT osm_id, name, way
```

```
FROM public.planet_osm_polygon
```

```
WHERE amenity = 'school'
```



The screenshot shows a SQL query editor with the following query:

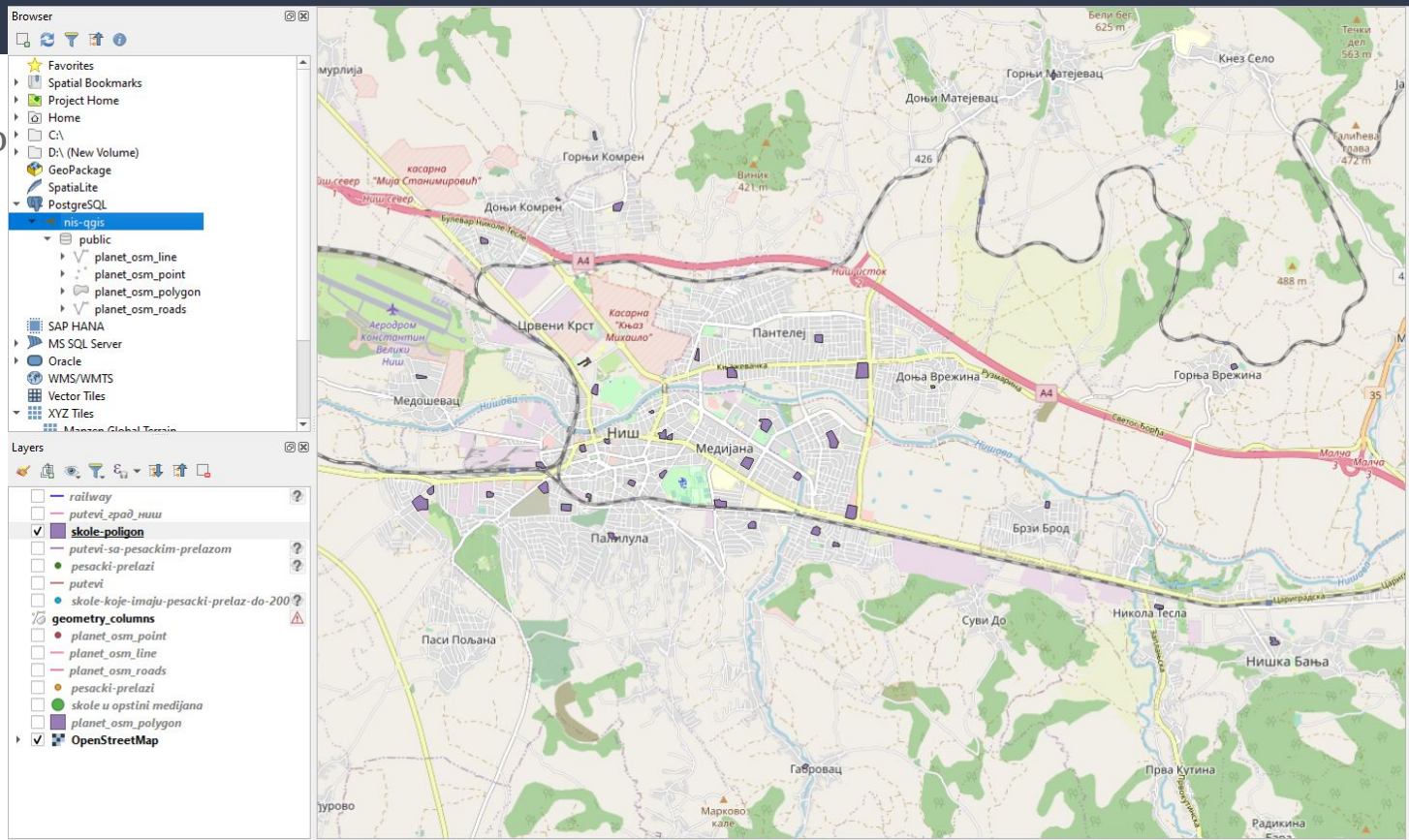
```
1 SELECT osm_id, name, way
2 FROM public.planet_osm_polygon
3 WHERE amenity = 'school'
```

Below the query editor, the results are displayed as a table with 70 rows. The first 11 rows are shown in the screenshot. The table has three columns: osm_id, name, and way.

	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

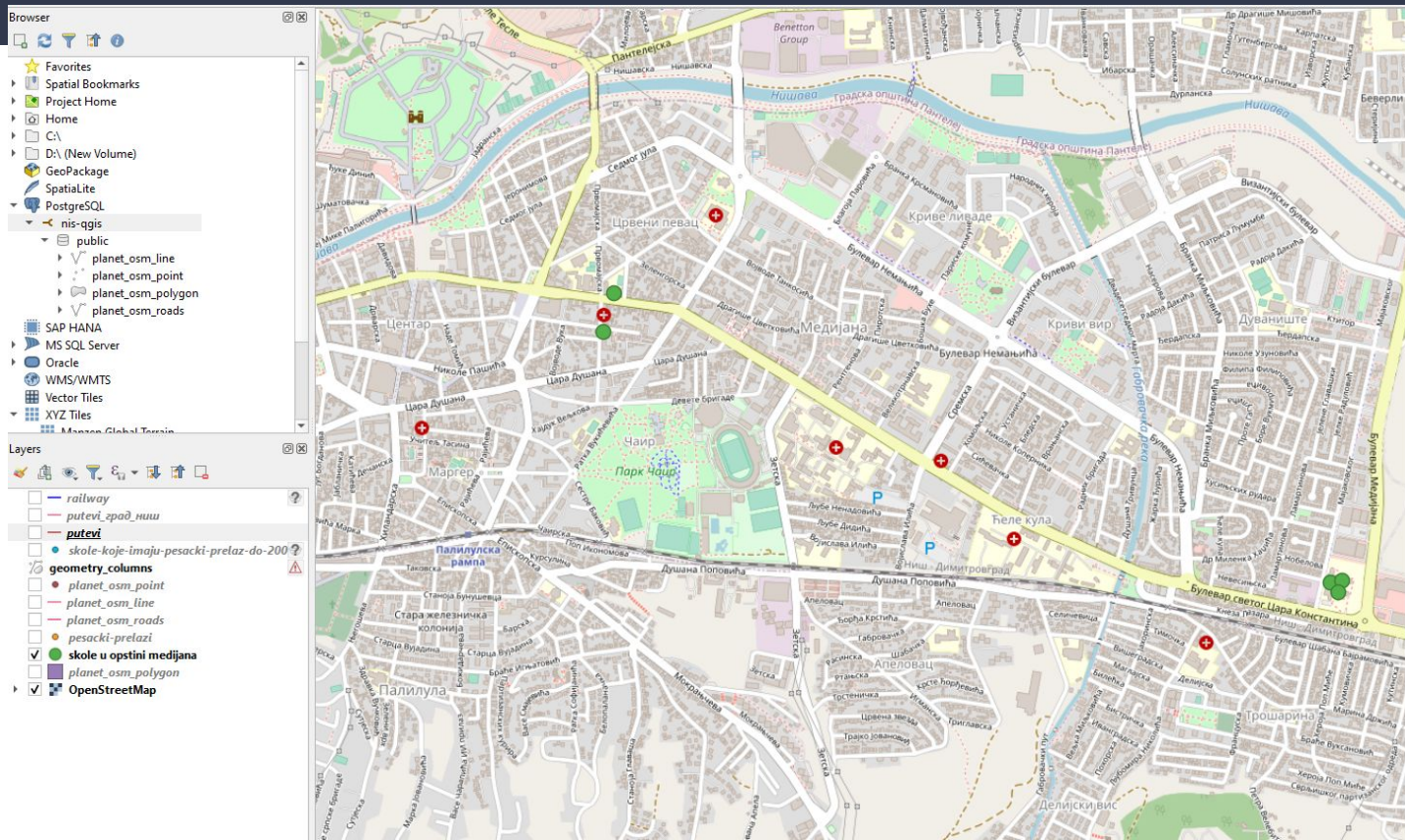
```
SELECT t.osm_id, t.name, t.way
FROM public.planet_osm_point t
INNER JOIN public.planet_osm_polygon p
ON ST_Contains(p.way, t.way)
AND p.name = 'Градска општина Медијана'
WHERE t.amenity = 'school'
```

The screenshot shows a SQL query editor interface. At the top, there are tabs for 'Info', 'Table', and 'Preview'. Below these is a 'Query (nis-qgis)' tab. The main area contains a SQL query. Below the query, there are buttons for 'Execute', 'Create a view', and 'Clear'. To the right of the 'Execute' button, it says '5 rows, 0.216 seconds'. Below the buttons is a table with 5 rows and 3 columns: 'osm_id', 'name', and 'way'. The table contains the following data:

	osm_id	name	way
1	2306938979	Трговачка школа	0101000020110...
2	2061999347	Економска школа	0101000020110...
3	2308445259	Угоститељска школа	0101000020110...
4	2700358133	Уметничка школа	0101000020110...
5	2700311755	Вожд Карађорђе	0101000020110...

Upit 3 – lejer na mapi

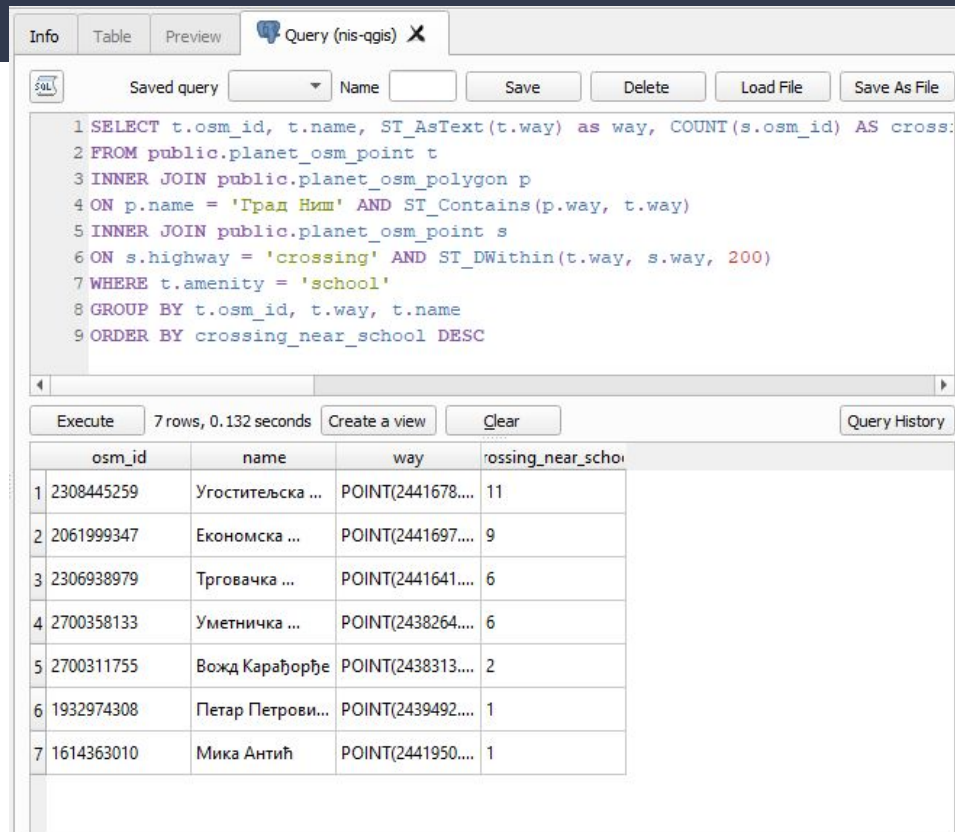
Prikaz škola u opštini Medijana



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 = 'Трад Ним' 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
```



The screenshot shows a SQL query editor interface. The query is as follows:

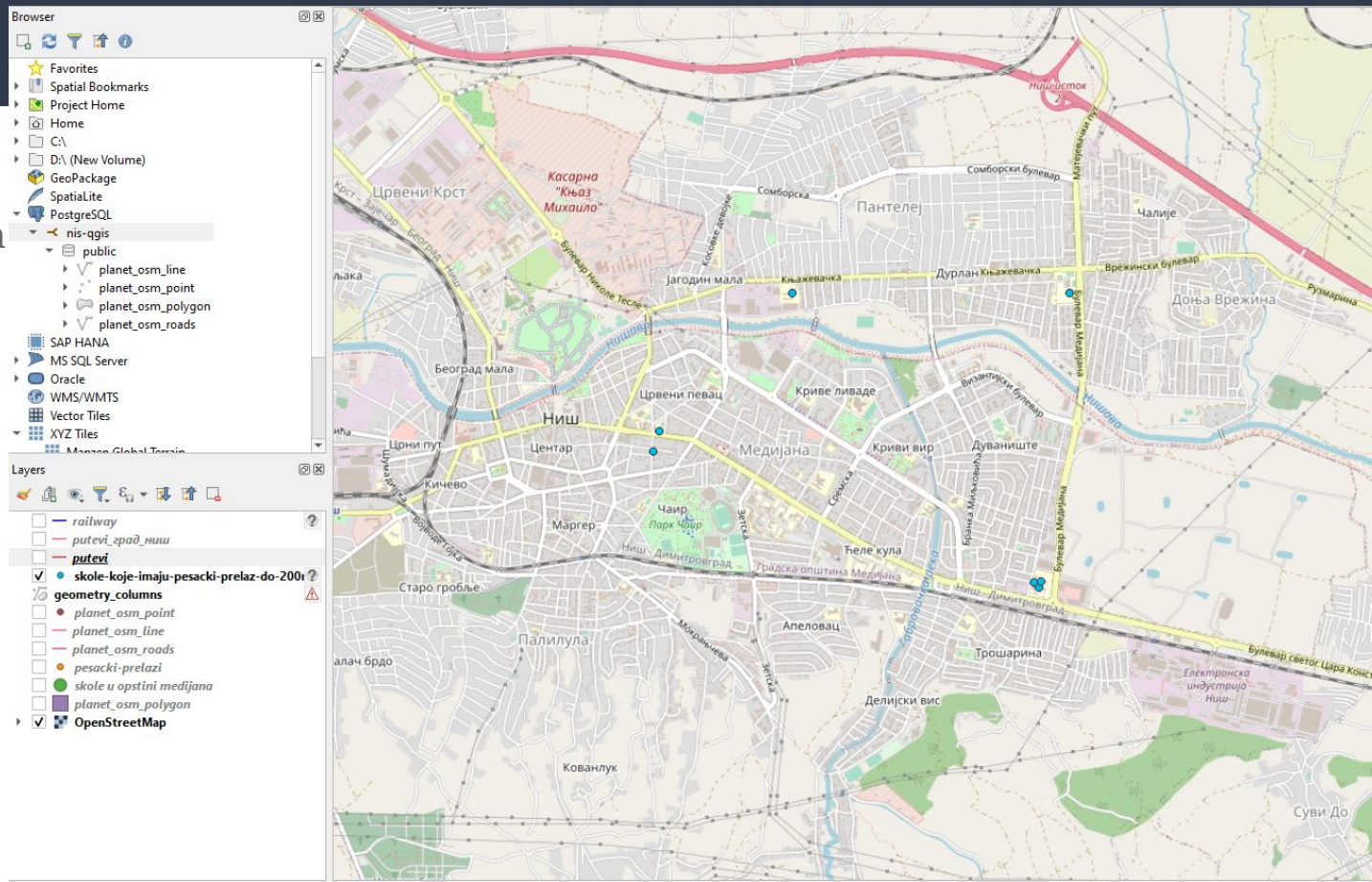
```
1 SELECT t.osm_id, t.name, ST_AsText(t.way) as way, COUNT(s.osm_id) AS cross:  
2 FROM public.planet_osm_point t  
3 INNER JOIN public.planet_osm_polygon p  
4 ON p.name = 'Трад Ним' AND ST_Contains(p.way, t.way)  
5 INNER JOIN public.planet_osm_point s  
6 ON s.highway = 'crossing' AND ST_DWithin(t.way, s.way, 200)  
7 WHERE t.amenity = 'school'  
8 GROUP BY t.osm_id, t.way, t.name  
9 ORDER BY crossing_near_school DESC
```

The query is executed, showing 7 rows of results. The results table is as follows:

	osm_id	name	way	crossing_near_school
1	2308445259	Угоститељска ...	POINT(2441678....	11
2	2061999347	Економска ...	POINT(2441697....	9
3	2306938979	Трговачка ...	POINT(2441641....	6
4	2700358133	Уметничка ...	POINT(2438264....	6
5	2700311755	Вожд Карађорђе	POINT(2438313....	2
6	1932974308	Петар Петрови...	POINT(2439492....	1
7	1614363010	Мика Антић	POINT(2441950....	1

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;
```

The screenshot shows a SQL query editor interface. The query is as follows:

```
1 SELECT l.osm_id, l.highway, ST_AsText(l.way), p.osm_id as point_id, ST_AsText(p.way) as point_way  
2 FROM public.planet_osm_line l  
3 INNER JOIN public.planet_osm_point p  
4 ON ST_Contains(l.way, p.way) AND p.highway = 'crossing'  
5 WHERE l.highway IS NOT NULL
```

Below the query editor, the results are displayed in a table with 5 columns: osm_id, highway, st_astext, point_id, and point_way. The table contains 11 rows of data.

	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

Info Table Preview Query (nis-ogis) X

Saved query Name

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

Execute 398 rows, 0.028 seconds Create a view Clear

	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...

Upit 2 - Škole kao polygon

Info Table Preview Query (nis-ogis) X

Saved query Name

```
1 SELECT osm_id, name, way
2 FROM public.planet_osm_polygon
3 WHERE amenity = 'school'
```

Execute 70 rows, 0.010 seconds Create a view Clear

	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...

Upit 3 - Škole opština Medijana

Info Table Preview Query (nis-ogis) X

Saved query Name Save

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

Execute 5 rows, 0.014 seconds Create a view Clear

	osm_id	name	way
1	2306938979	Трговачка ...	0101000020110...
2	2061999347	Економска ...	0101000020110...
3	2308445259	Угоститељска ...	0101000020110...
4	2700358133	Уметничка ...	0101000020110...
5	2700311755	Вожд Карађорђе	0101000020110...

Upiti bez indeksa

Upit 4 - Škole i pešački prelazi

InfoTablePreviewQuery (nis-ogis) X

Full

Saved query

Name

Save

Delete

Load File

Save As File

```
1 SELECT t.osm_id, t.name, ST_AsText(t.way) as way, COUNT(s.osm_id) AS crossing_near_school
2 FROM public.planet_osm_point t
3 INNER JOIN public.planet_osm_polygon p
4 ON p.name = 'Траг Нис' AND ST_Contains(p.way, t.way)
5 INNER JOIN public.planet_osm_point s
6 ON s.highway = 'crossing' AND ST_DWithin(t.way, s.way, 200)
7 WHERE t.amenity = 'school'
8 GROUP BY t.osm_id, t.way, t.name
9 ORDER BY crossing_near_school DESC
```

Execute7 rows, 0.034 secondsCreate a viewClearQuery History

	osm_id	name	way	crossing_near_school
1	2308445259	Угоститељска ...	POINT(2441678...	11
2	2061999347	Економска ...	POINT(2441697...	9
3	2306938979	Трговачка ...	POINT(2441641...	6
4	2700358133	Уметничка ...	POINT(2438264...	6
5	2700311755	Вожд Карађорђе	POINT(2438313...	2
6	1932974308	Петар Петрови...	POINT(2439492...	1
7	1614363010	Мика Антић	POINT(2441950...	1

Upit 5 - Pešački prelazi i putevi

InfoTablePreviewQuery (nis-ogis) X

Full

Saved query

Name

Save

Delete

Load File

Save As File

```
1 SELECT l.osm_id, l.highway, ST_AsText(l.way), p.osm_id as point_id, ST_AsText(p.way) as point_way
2 FROM public.planet_osm_line l
3 INNER JOIN public.planet_osm_point p
4 ON ST_Contains(l.way, p.way) AND p.highway = 'crossing'
5 WHERE l.highway IS NOT NULL;
```

Execute830 rows, 10.857 secondsCreate a viewClearQuery History

	osm_id	highway	st_astext	point_id	point_way
1	727511971	primary	LINESTRING(24...	10125435945	POINT(2462951...
2	821450478	tertiary	LINESTRING(24...	4414641201	POINT(2456638...
3	722575444	residential	LINESTRING(24...	9041027559	POINT(2449457...
4	1074287740	footway	LINESTRING(24...	9853894967	POINT(2449660...
5	1074287740	footway	LINESTRING(24...	9853894966	POINT(2449627...
6	1074287740	footway	LINESTRING(24...	9041027559	POINT(2449457...
7	1074287740	footway	LINESTRING(24...	9853894965	POINT(2449260...

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