

# Exercise 6: SQL for spatial queries

## Introduction:

This assignment explores different combinations of spatial operations:

Selecting by non-spatial attributes.

Selecting data by spatial properties.

Selecting data by location.

Combination of spatial operations:

## Query:

Selecting buildings for the non-spatial attributes.

Execution of the query to select all school buildings on Salzburg Figure 1. This query is not spatial, it is created through the description of a column type.

Selection of school and church type Figure 1, Figure 2, Figure 3.

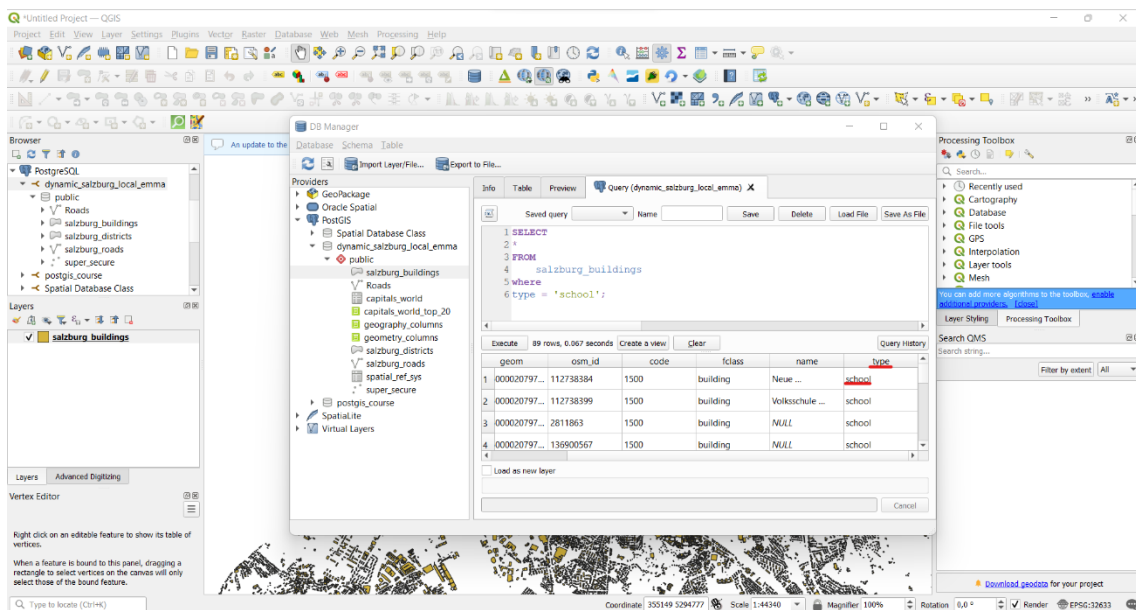


Figure 1: Query Salzburg Schools.

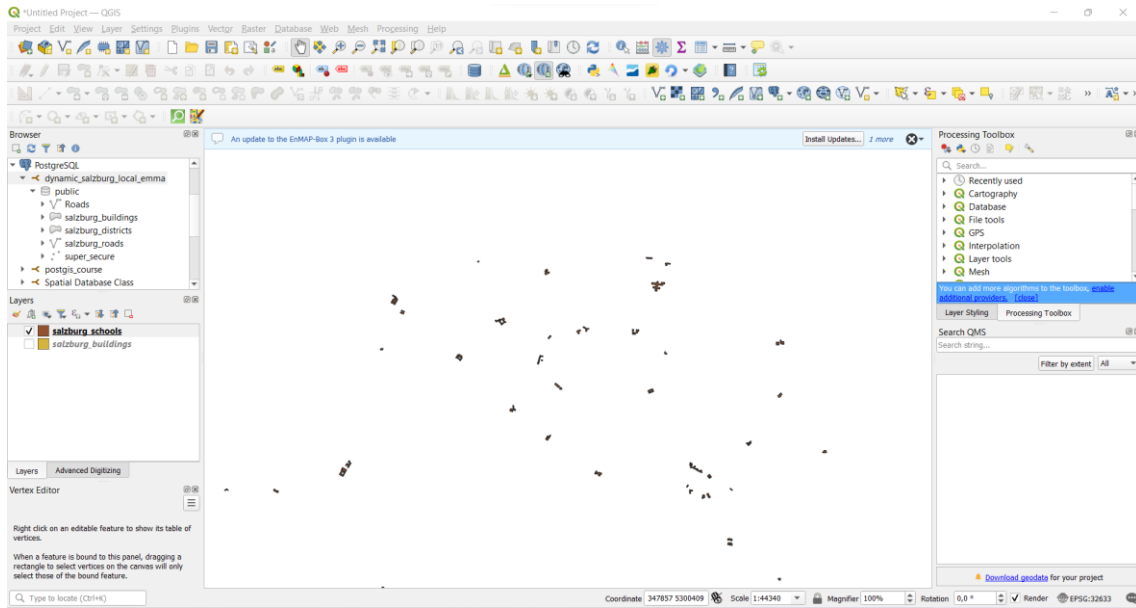


Figure 2: School query.

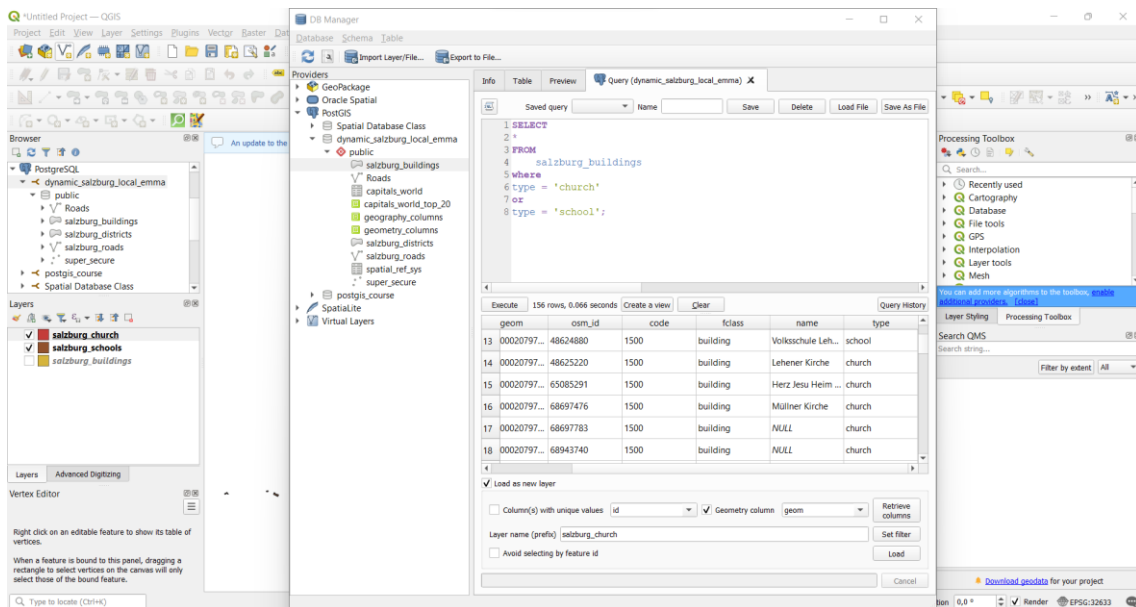


Figure 3: School and church query.

### Selecting data by spatial properties:

The function 'st\_area' calculates the area with the geometry of the coordinates from the database. This query indicates the creation of a new area column for the 'type schools' Figure 4, Figure 5.

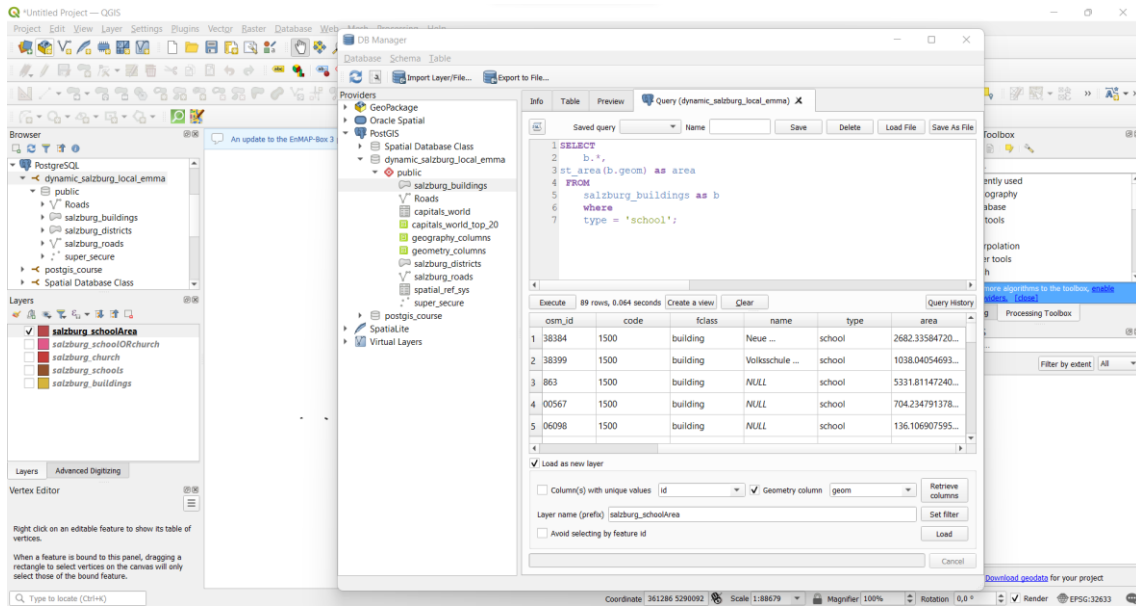


Figure 4: School area query.

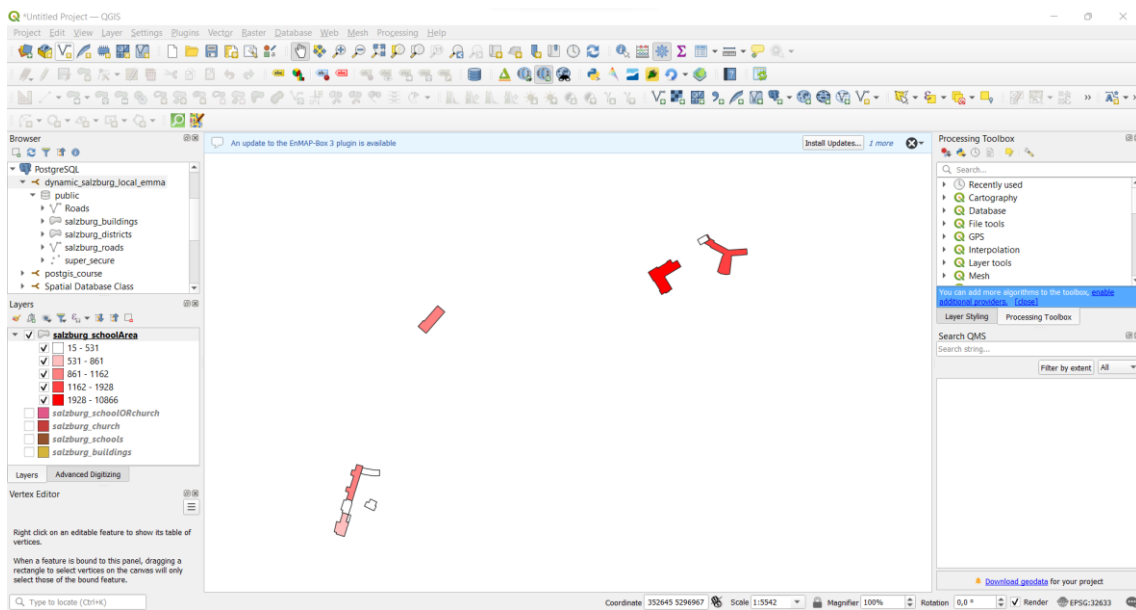


Figure 5: Schools buildings classified by area.

Selecting data by location:

The following lines are queries executed in respect of the location.

1. The query permits to calculate the cross product from all distances, Figure 6. Figure 7 shows the distance through the 'Glockenturm' to the layer of buildings in the city of Salzburg.
2. The query showing the average of the distance to the centre cannot be added as a map layer. The query can be found on the Figure 8.
3. The Visualization, query of 500 m buffer from 'Glockenturm', Figure 9, Figure 10.

4. The Visualization, query of 1000 m buffer from 'Glockenturm'. The total number of buildings in this area is 1906, Figure 11, Figure 12.

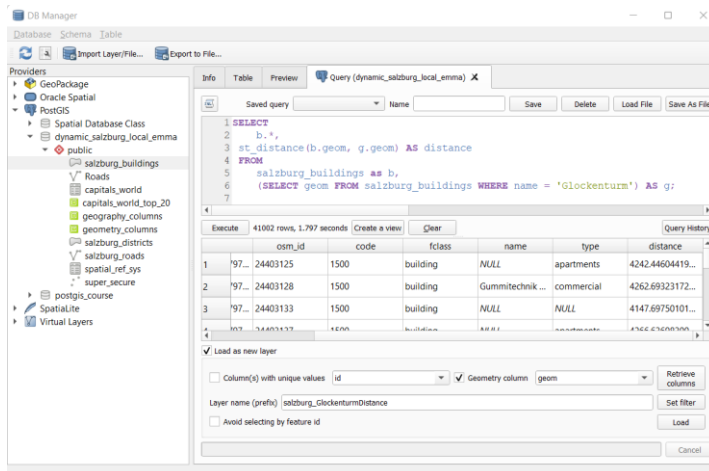


Figure 6: Query for the distance from Glockenturm to the buildings of the city of Salzburg.

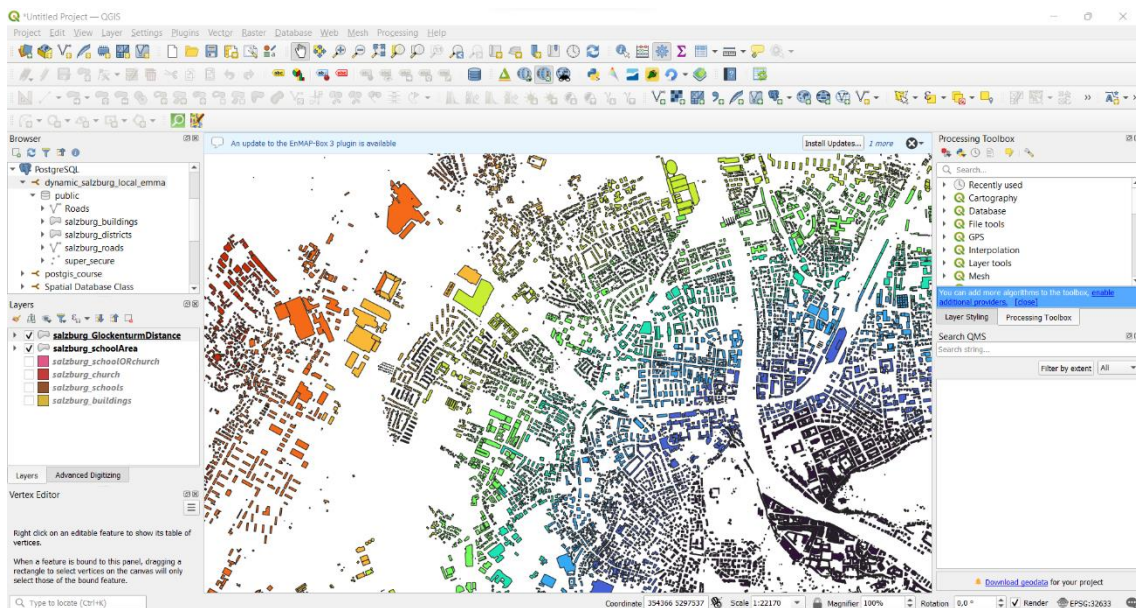


Figure 7: Distance from Glockenturm to the buildings of the city of Salzburg.

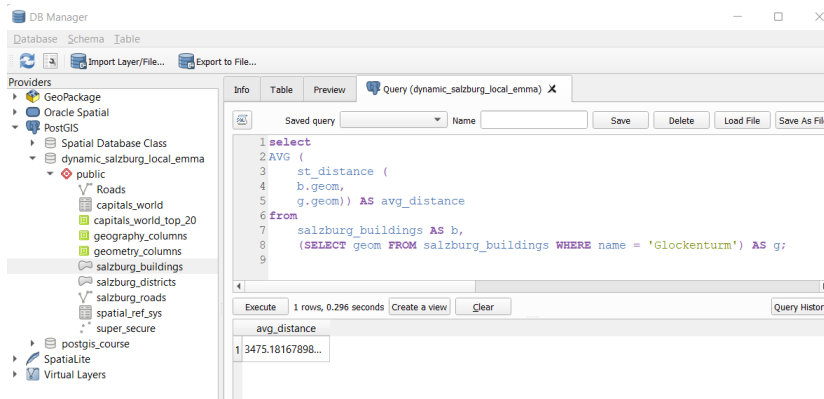


Figure 8: Query of average distance of the buildings from a reference point.

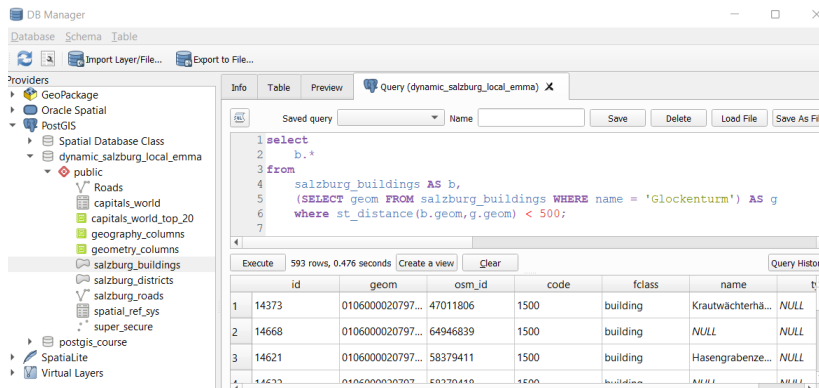


Figure 9: Query of 500 m buffer from Glockenturm.

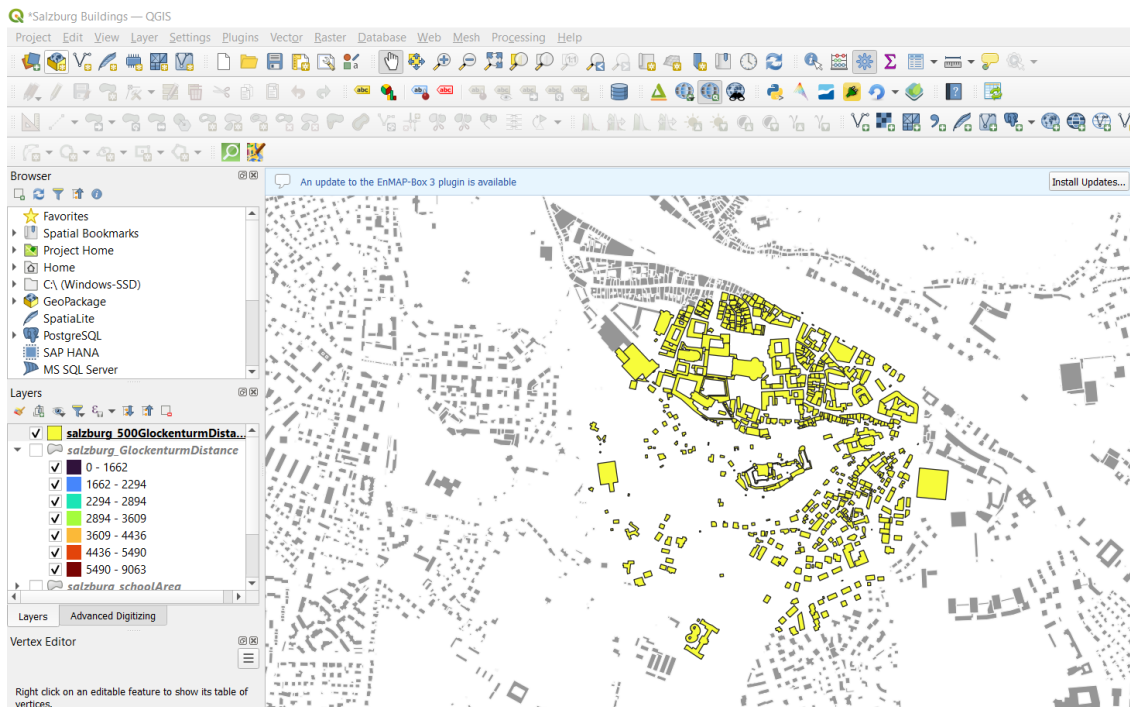


Figure 10: Visualization, query of 500 m buffer from Glockenturm.

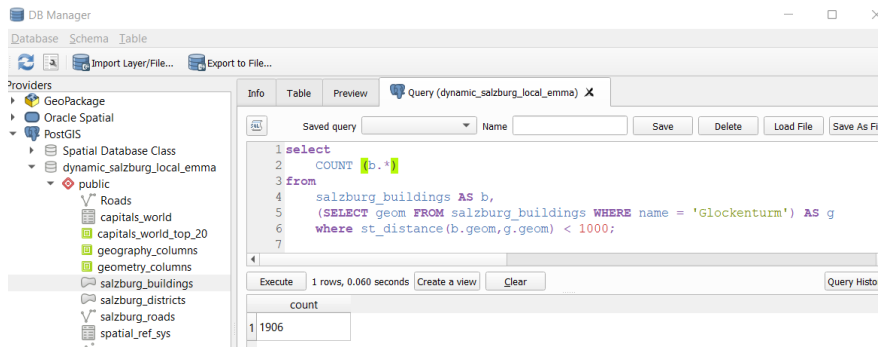


Figure 11: Query of counting the closest buildings from 1000m from Glockenturm.

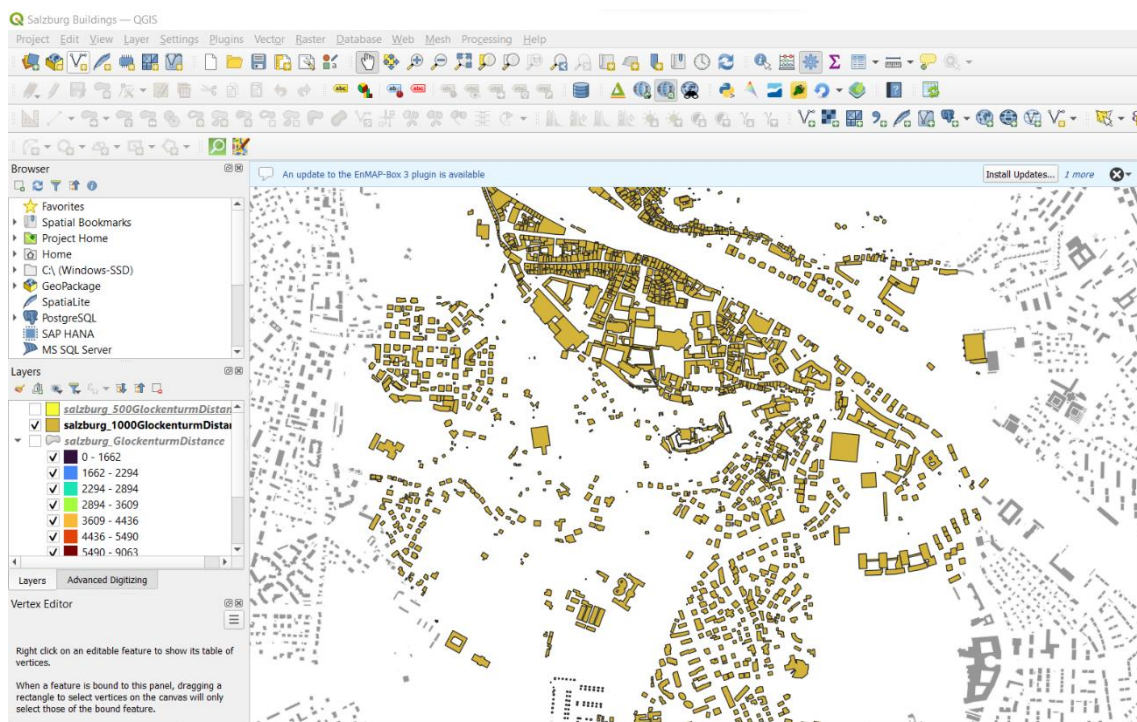


Figure 12: Visualization, query of 1000 m buffer from Glockenturm.

## Combination of spatial operations:

Of course, it is also possible to combine spatial operations and filters. The following images represent the average size of all buildings in a radius of 1km from the fortress 'Glockenturm'. The mean (average) of the buildings is 298.67m<sup>2</sup> Figure 11, Figure 12.

In order to do the query, it is defined by the following:

The data selected from the file and the columns

```
(" from  
salzburg_buildings as b,  
(SELECT geom FROM salzburg_buildings WHERE name = 'Glockenturm') as g")
```

Secondly, the condition of ("where") allows the selection from the data (" from"). The definition of the condition of ("where") in this case, has one function ("st\_distance")...

Finally, the principal function is defined inside ("select"), inside this, the average area of the buildings of the selected data can be written.

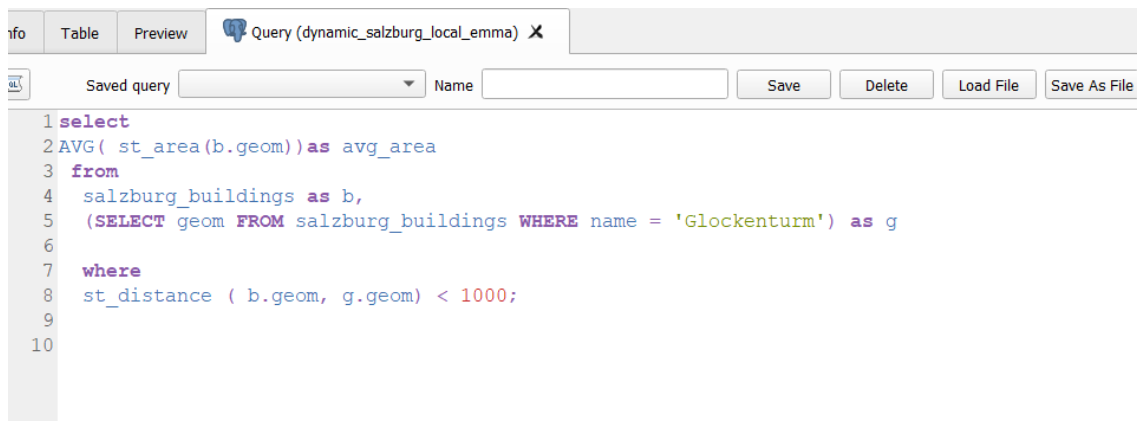


Figure 13: Calculation query of the average area from a distance zone building.

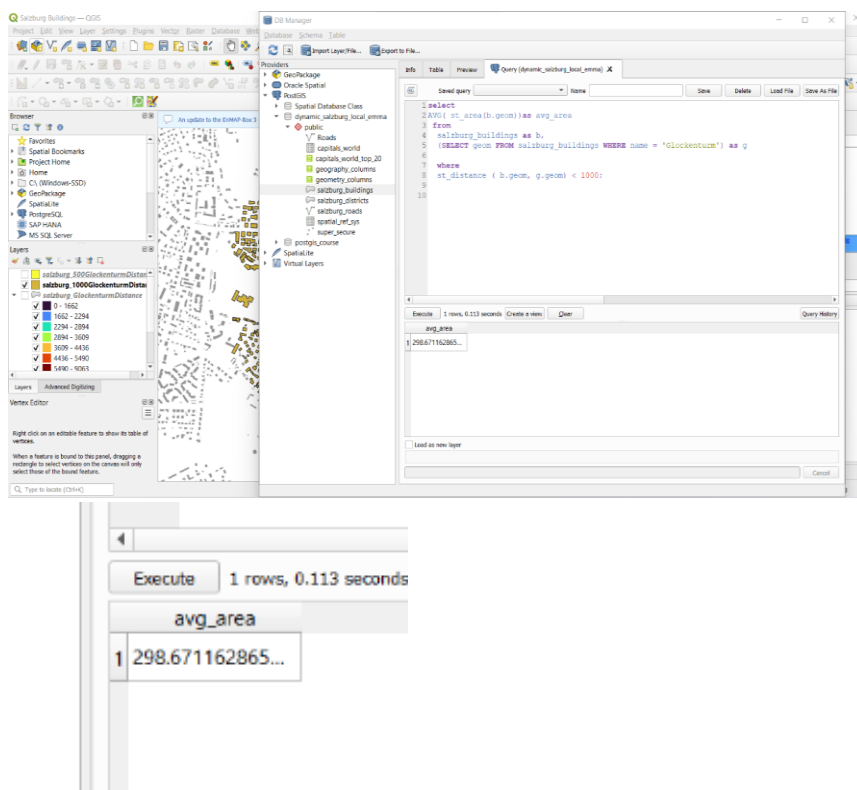


Figure 14: Result 298.67m<sup>2</sup>, calculation query of the average area from a distance zone building.