3D City Database (for PostgreSQL) Quick installation guide

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Overview

Install required software

Set up the database

Connect to the database via the Importer/Exporter

Add additional database schemas (Optional)

Install ADE plug-ins (Optional)

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Software requirements

- **Java 11 JDK**
  - https://www.oracle.com/java/technologies/javase/jdk11-archive-downloads.html
- **PostgreSQL (e.g. v. 12.x) + PostGIS (e.g. v. 3.x) + PgAdmin 4 (e.g. v. 6.x)**
  - https://www.postgresql.org/download/
  - https://postgis.net/install/ (generally already installed with PostgreSQL)
  - https://www.pgadmin.org/download/ (generally already installed with PostgreSQL)
- **CityGML 3D City Database Suite**
  - https://github.com/3dcitydb/3dcitydb-suite/releases
- **Google Earth Pro** (optional, only if you want to export to kml/Collada)
  - https://www.google.com/earth/versions/#download-pro
- **NodeJS** (optional, needed only if you want to use the Web-map-client)
  - https://nodejs.org/en/

Software installation order

1) Install Java (if not yet installed)

2) Install PostgreSQL
   – Install PostGIS (generally installed together with PostgreSQL, see next slides)
   – Install PgAdmin (generally installed together with PostgreSQL, see next slides)

3) Install the 3DCityDB suite
   – Execute the .jar file, it will start the installation process

4) Install Google Earth (optional)

5) Install NodeJS (optional)

PostgreSQL

Software required
Software install
• Java
• **PostgreSQL**
• PgAdmin/PostGIS
• 3DCityDB
• Google Earth
• NodeJS
Database setup
Imp/Exp connection
Additional schemas
ADE plug-ins

• **RECOMMENDED:** Install PostgreSQL on your computer using the automatic installer (Stack builder).

• Please take care to:
  – Properly set a **password** for your *postgres* **user**. The *postgres* user is the administrator of the PostgreSQL database cluster. <u>Do not lose the password!!</u>
  – You can generally set the default *port* of PostgreSQL to **5432**.

PgAdmin / PostGIS

- **PGAdmin4** is generally installed by default, no need to do anything
- The Stack builder application allows you to install also other applications, such as **PostGIS** and (optionally) a webserver (here: PEM)

3DCityDB

NOTA BENE: The detailed installation guide can be found here:

https://3dcitydb-docs.readthedocs.io/en/latest/

In the following slides, only the main points are presented

1) Install the **3D City Database Suite**

– If you want to install it in the program files directory (e.g. C:\Program Files\3DCityDB-Importer-Exporter) you must make that directory writable by everybody (i.e. not only by the administrator!)

– Alternatively, you can install the 3DcityDB in any other directory where you have writing privileges

– At the end, you should have the icon of the Importer/Exporter on your desktop (or start menu)

2) Launch the Importer/Exporter just to test whether it starts correctly

3DCityDB

Overview

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Database setup

Procedure overview

1) In PostgreSQL (via the PgAdmin GUI)
   – Connect to the PostgreSQL server
   – Create a new empty database that will contain your 3D city model data
   – Add the extensions for PostGIS, PostGIS-raster, etc.
   – See the next slides for details

2) From the 3DCityDB installation folder
   – Edit the CONNECTION_DETAILS.bat file and run the CREATEDB script to create the tables (and other objects) in the database you have created in the previous step
   – See the next slides for details

3) Connect to the database (e.g. via PgAdmin) just to check that you created the tables

4) Connect to the database from the 3DCityDB Importer/Exporter

Connecting to the database

• AFTER you have successfully installed PostgreSQL, you can access the database server via PgAdmin

ALTERNATIVELY

• You do not have PostgreSQL installed on your own computer, but you know the connection parameters to connect to a remote server

• **In both cases**, you will need information about:
   – **Server name** or **IP address**   ("localhost" if it is on your computer)
   – **Database name**   (generally "postgres" if it is on your computer)
   – **Port**   (generally 5432 if it is on your computer)
   – **Username, Password**   (e.g. the ones created before if it is on your computer)
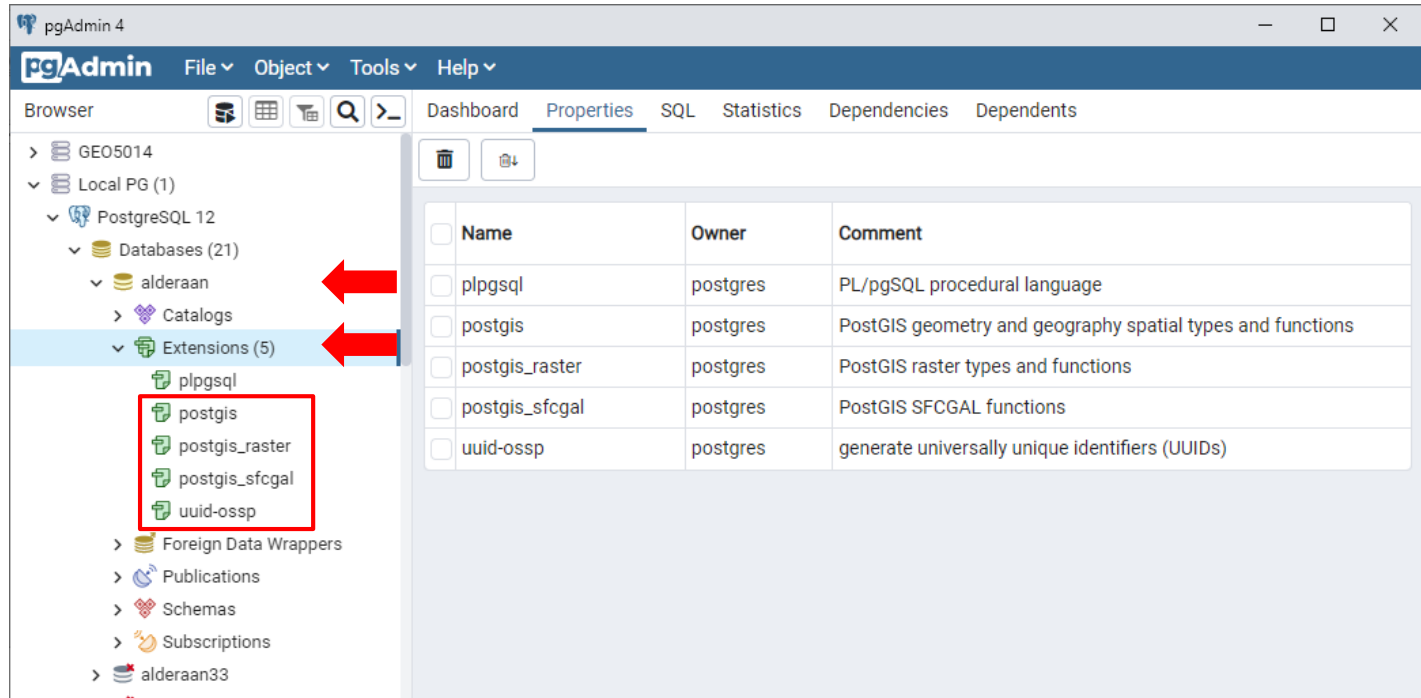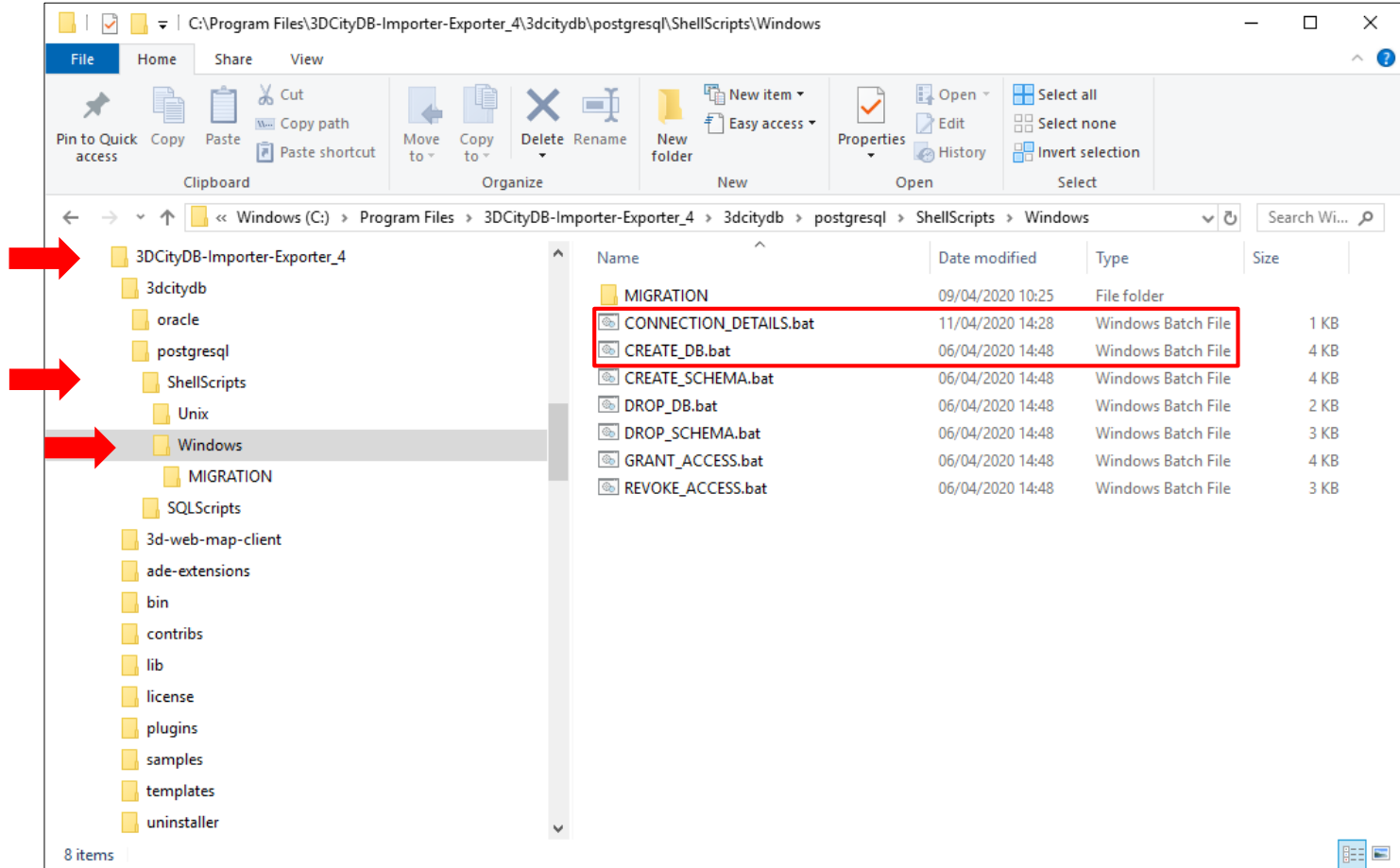
Connecting to the database from PgAdmin

Database setup
- **Database connection**
- Database creation
- Create tables etc.
- Check via PgAdmin

Imp/Exp connection
Additional schemas
ADE plug-ins

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- Create a (link to the) database server
  - You are actually creating a connection to the database server from PgAdmin
  - Click on menu Object\Create\Server **OR** right mouse-click\Create\Server and fill out the fields
  - **Please note**: this step may not be required if you already have a server connection established

In the "General" tab, you simply add a name to identify your connection

Here, FOR EXAMPLE, the string is "PostgreSQL-12 on my PC"

Connecting to the database from PgAdmin

- Create a (link to the) database server
  - You are actually creating a connection to the database server from PgAdmin
  - Click on menu Object\Create\Server **OR** right mouse-click\Create\Server and fill out the fields
  - **Please note:** this step may not be required if you already have a server connection established
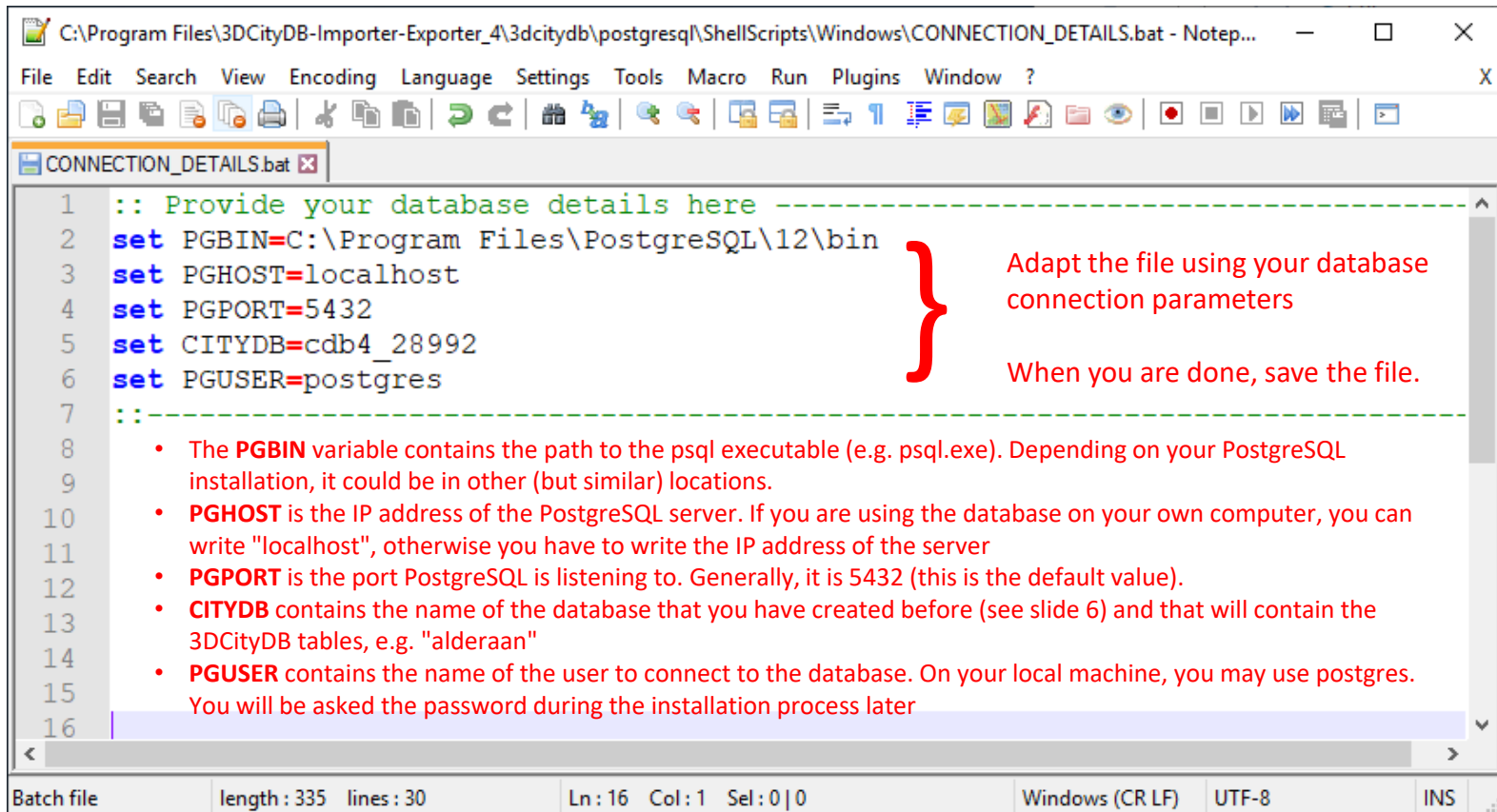

Software required
Software install
Database setup
- **Database connection**
- Database creation
- Create tables etc.
- Check via PgAdmin
Imp/Exp connection
Additional schemas
ADE plug-ins
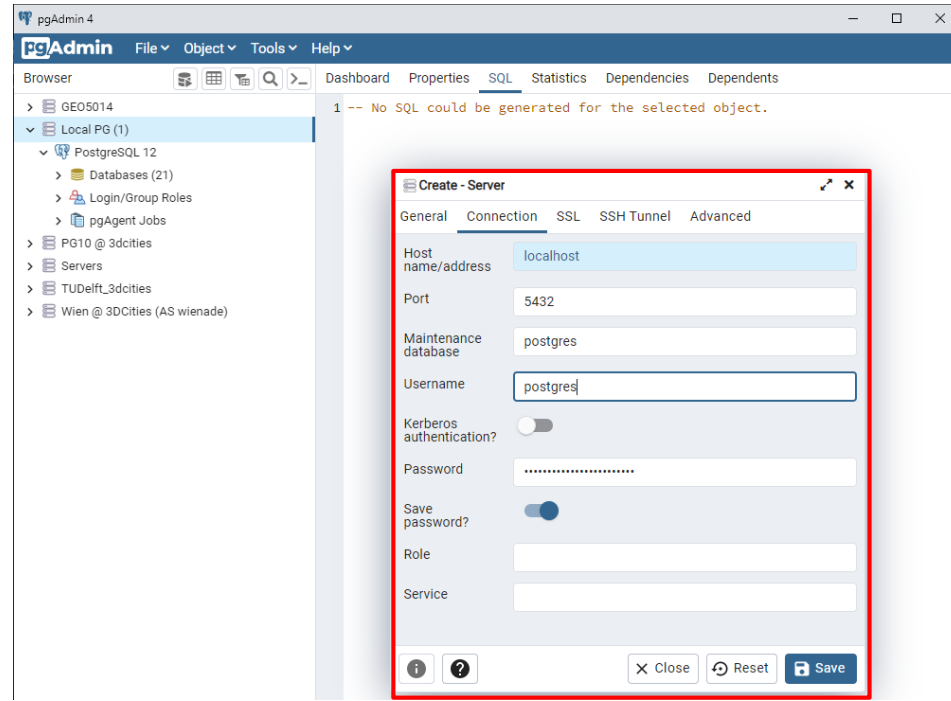
In the "Connection" tab, you add the connection parameters
- Host name / IP address
- Port
- Database name
- Username
- Password

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Database creation

- Once you have created a connection, you can create the database that will contain your city mode data
  - Click on menu Object\Create\Database **OR** right mouse-click\Create\Database and fill out the fields
  - Choose the name you want, ideally the name of the city
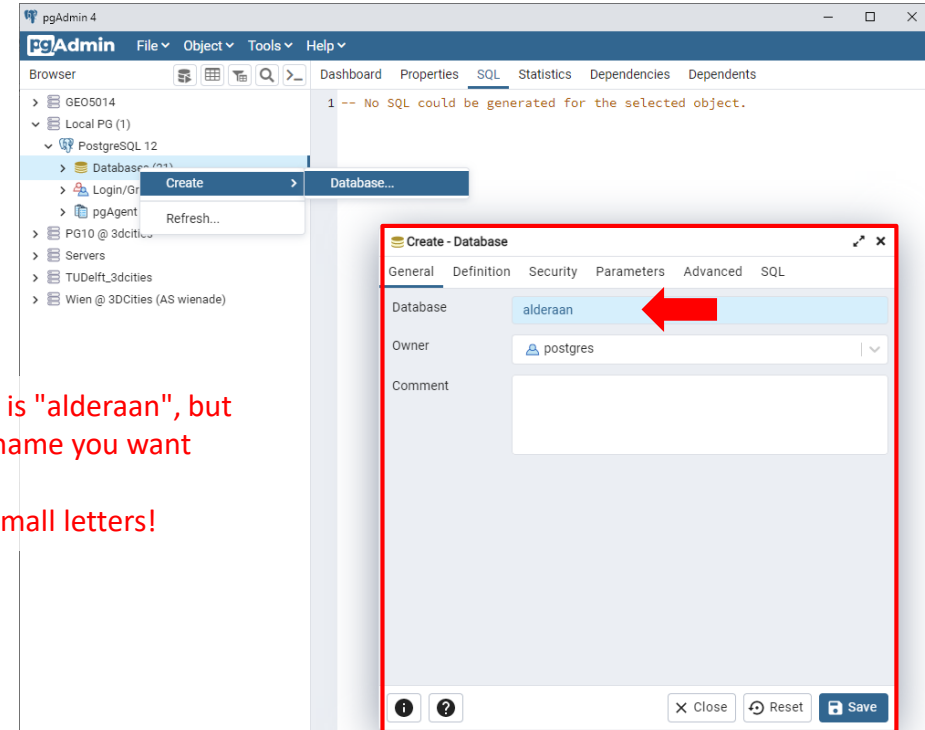
Here, **for example,** it is "alderaan", but you can choose any name you want

Best if you use only small letters!

Database creation

Software required
Software install
Database setup
• Database connection
• **Database creation**
• Create tables etc.
• Check via PgAdmin
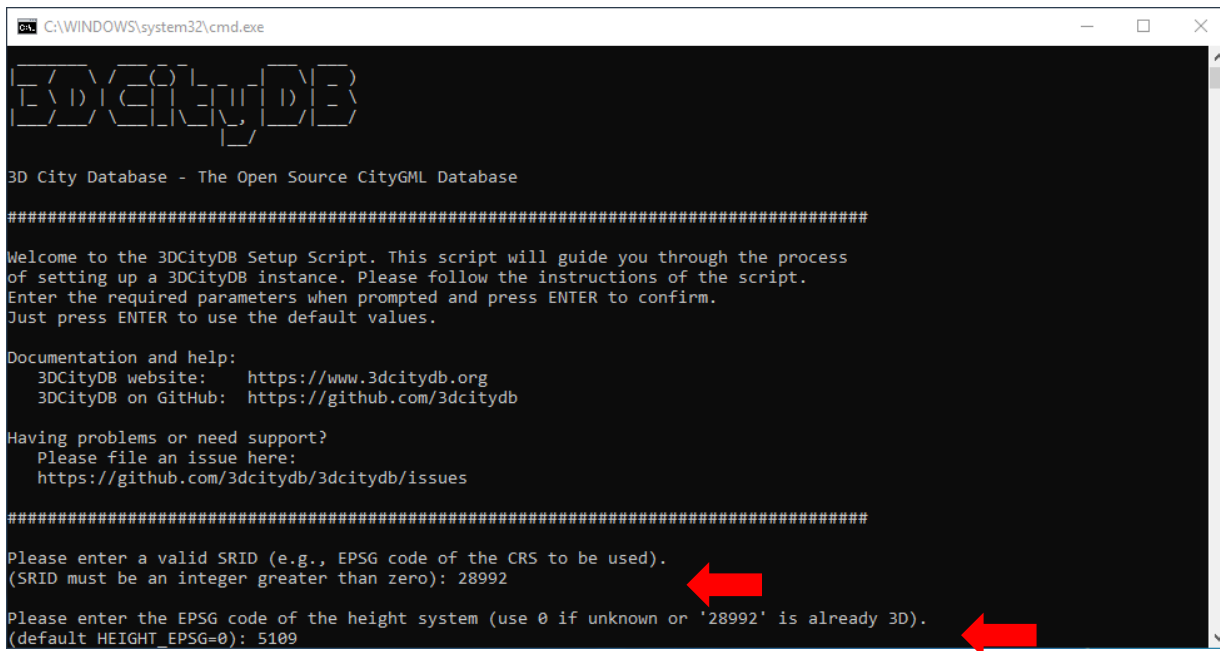Imp/Exp connection
Additional schemas
ADE plug-ins
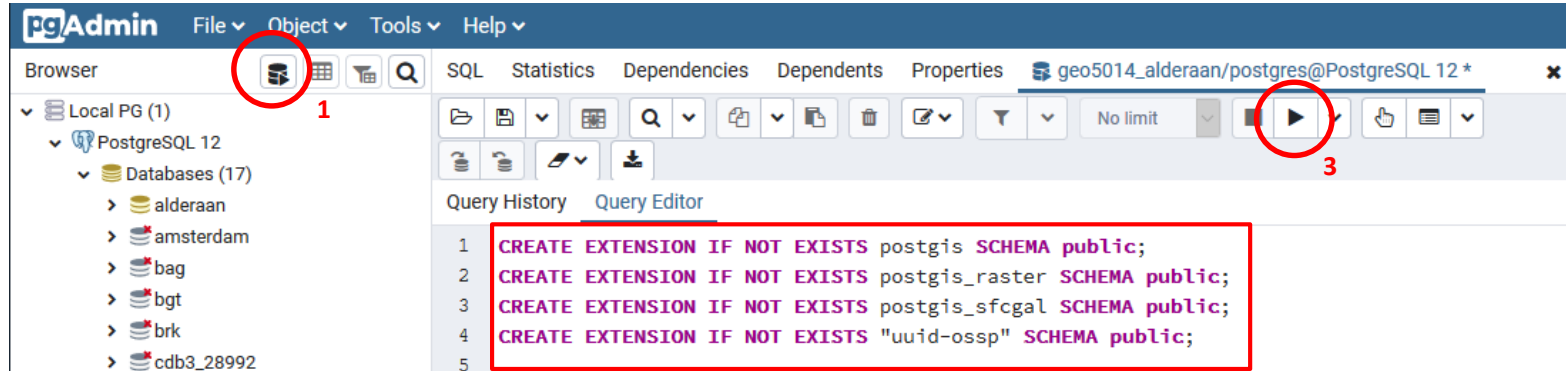
Add PostGIS (and othe extensions) to the database you have just created

1) Open a SQL query window
2) Copy and paste the text written in the yellow box into the query window
3) Run the query

CREATE EXTENSION IF NOT EXISTS postgis SCHEMA public;

CREATE EXTENSION IF NOT EXISTS postgis_raster SCHEMA public;

CREATE EXTENSION IF NOT EXISTS postgis_sfcgal SCHEMA public;

CREATE EXTENSION IF NOT EXISTS "uuid-ossp" SCHEMA public;

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Database creation

- Check that you have correctly installed the extensions in your database
  - Open "Extensions" item in your database (e.g. "alderaan")
  - Check that the extensions are listed there (the "plpgsql" one is installed by default)

Create tables and other database objects

NOTA BENE: The detailed installation guide can be found here:

https://3dcitydb-docs.readthedocs.io/en/latest/first-steps/index.html

In the following slides, only the main points are presented

- Go to the **3DCityDB installation folder** and look for the 3dcitydb\postgresql\ShellScrips directory. It should look like in the next slides
    - Open the CONNECTION_DETAILS.bat file in a text editor and insert your PostgreSQL connection details
    - Run the CREATEDB script (for Windows and Unix in the corresponding subfolders)

Create tables and other database objects
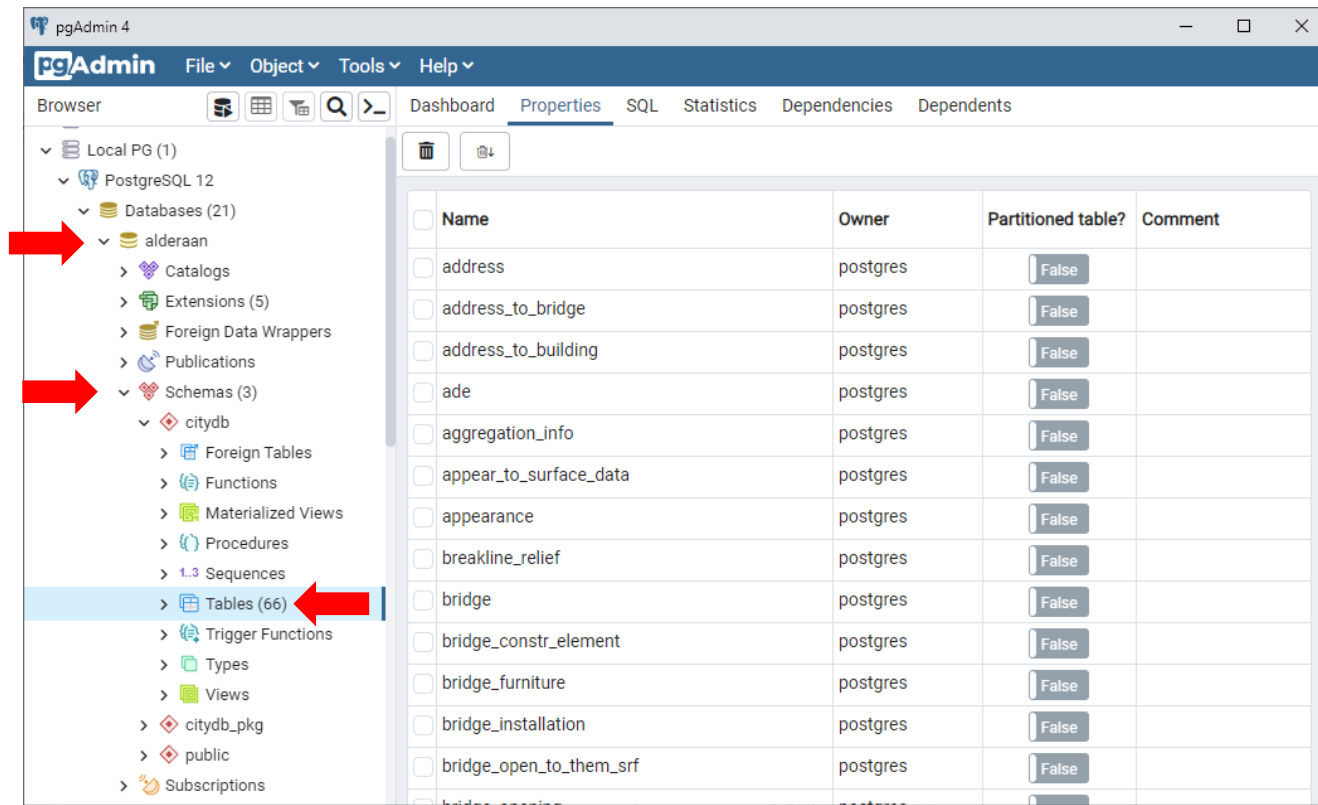
Software required
Software install
Database setup
• Database connection
• Database creation
• **Create tables etc.**
• Check via PgAdmin
Imp/Exp connection
Additional schemas
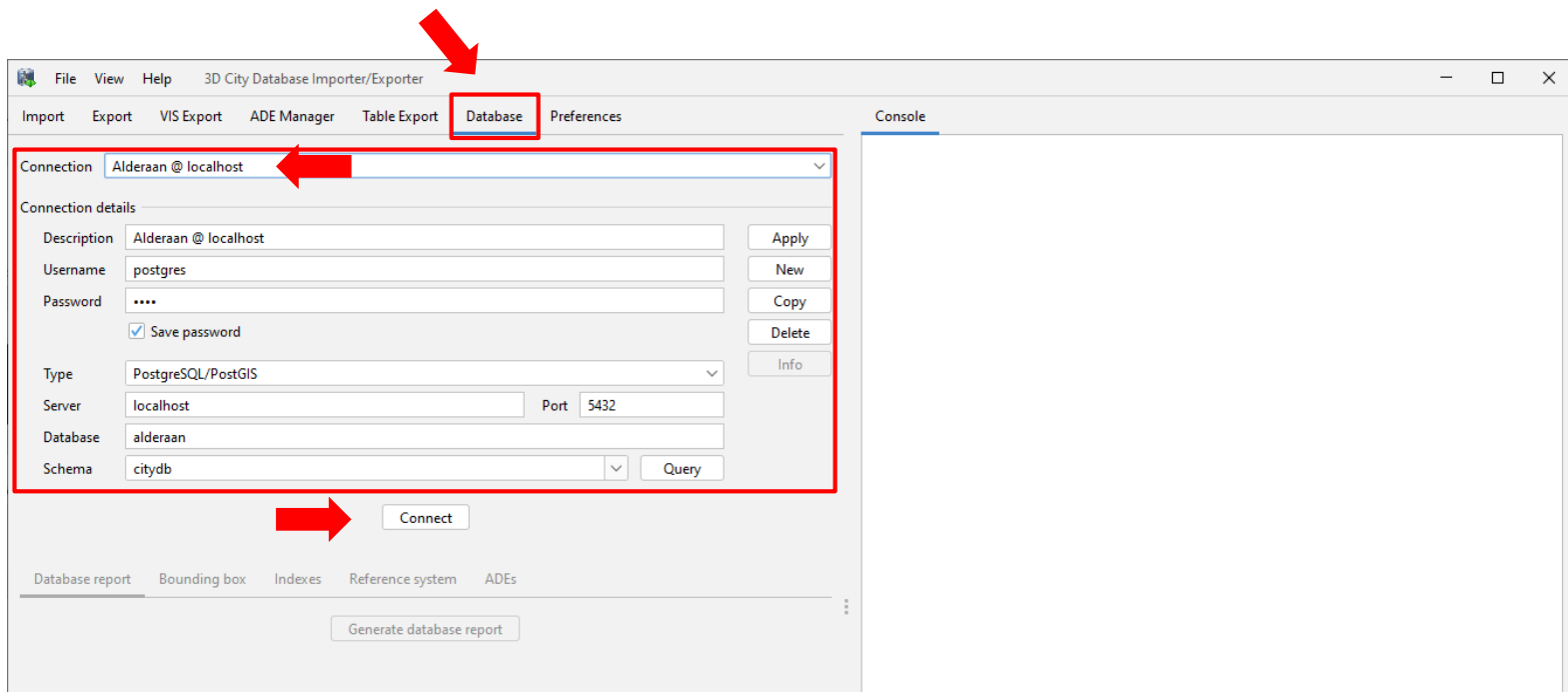ADE plug-ins

Create tables and other database objects

Software required
Software install
Database setup
• Database connection
• Database creation
• **Create tables etc.**
• Check via PgAdmin
Imp/Exp connection
Additional schemas
ADE plug-ins

C:\Program Files\3DCityDB-Importer-Exporter_4\3dcitydb\postgresql\ShellScripts\Windows\CONNECTION_DETAILS.bat - Notep...

CONNECTION_DETAILS.bat

```
1  :: Provide your database details here ------------------------------
2  set PGBIN=C:\Program Files\PostgreSQL\12\bin
3  set PGHOST=localhost
4  set PGPORT=5432
5  set CITYDB=cdb4_28992
6  set PGUSER=postgres
7  ::------------------------------------------------------------------
```

Adapt the file using your database connection parameters

When you are done, save the file.

- The **PGBIN** variable contains the path to the psql executable (e.g. psql.exe). Depending on your PostgreSQL installation, it could be in other (but similar) locations.
- **PGHOST** is the IP address of the PostgreSQL server. If you are using the database on your own computer, you can write "localhost", otherwise you have to write the IP address of the server
- **PGPORT** is the port PostgreSQL is listening to. Generally, it is 5432 (this is the default value).
- **CITYDB** contains the name of the database that you have created before (see slide 6) and that will contain the 3DCityDB tables, e.g. "alderaan"
- **PGUSER** contains the name of the user to connect to the database. On your local machine, you may use postgres. You will be asked the password during the installation process later

Batch file   length : 335   lines : 30   Ln : 16   Col : 1   Sel : 0 | 0   Windows (CR LF)   UTF-8   INS

Create tables and other database objects

Find out the EPSG codes that apply to your city/region. Here some examples:

- **Netherlands**
  - Horizontal datum EPSG: 28992
  - Vertical datum EPSG: 5109
  - (Will automatically create the GMLSrsName: **urn:ogc:def:crs,crs:EPSG::28992,crs:EPSG:5109**)
- **Trento (Italy)**
  - Horizontal datum EPSG: 25832
  - Vertical datum EPSG: 5214
  - (Will automatically create the GMLSrsName: **urn:ocg:def:crs,crs:EPSG::25832,crs:EPSG::5214**)
- **Vienna (Austria)**
  - Horizontal datum EPSG: 31256
  - Vertical datum EPSG: 1267
  - (Will automatically create the GMLSrsName: **urn:ocg:def:crs,crs:EPSG::31256,crs:EPSG::1267**)

Create tables and other database objects

- Run the batch file CREATE_DB and set the EPSG codes for horizontal and vertical datum, as shown in the image here

- Then press enter, the GMLSRSNAME variable will be automatically generated (accept the proposed value) and the install script will start and install all tables etc.

Create tables and other database objects

- Upon successful installation, you should get something like this

Check via PgAdmin

- Open PgAdmin and check that the **citydb** and **citydb_pkg** schemas are there. The **citydb** schema should contain 66 tables

Software required
Software install
Database setup
• Database connection
• Database creation
• Create tables etc.
• **Check via PgAdmin**
Imp/Exp connection
Additional schemas
ADE plug-ins

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Install required software

Set up the database
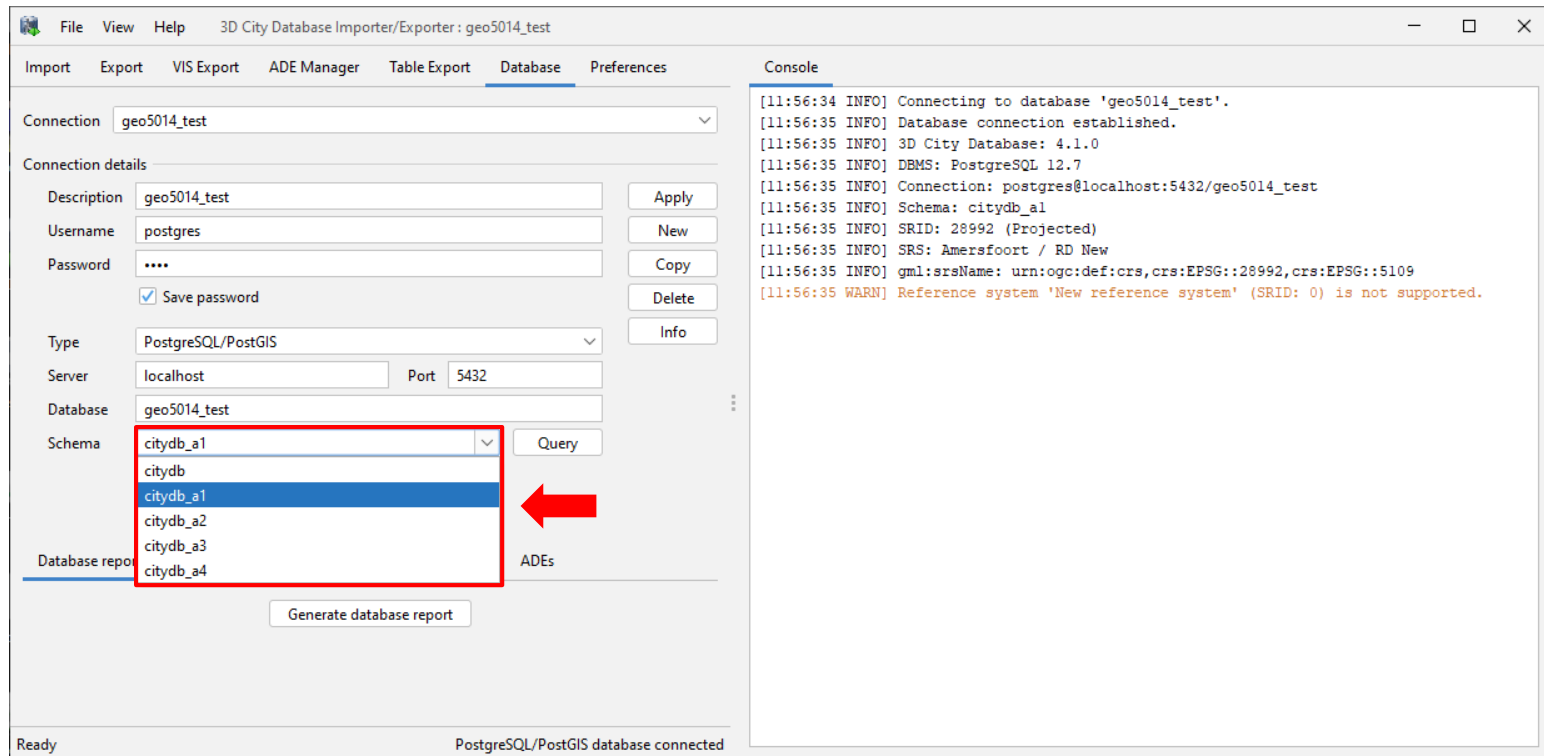
Connect to the database via the Importer/Exporter

**Add additional database schemas (Optional)**

Install ADE plug-ins (Optional)

Connecting to the database via Importer/Exporter

- AFTER you have successfully installed PostgreSQL, you can access the database server via PgAdmin

ALTERNATIVELY

- You do not have PostgreSQL installed on your own computer, but you know the connection parameters to connect to a remote server

- **In both cases**, you will need information about:
  - **Server name** or **IP address**   ("localhost" if it is on your computer)
  - **Database name**   (generally "postgres" if it is on your computer)
  - **Port**   (generally 5432 if it is on your computer)
  - **Username, Password**   (e.g. the ones created before if it is on your computer)

Connecting to the database via Importer/Exporter

- Launch the 3DCityDB Importer/Exporter, select the "Database" tab
  - The Description field contains a simple string to identify the connection
  - Fill out the remaining fields with the connection parameters
  - Click on Connect

Software required
Software install
Database setup
• Database connection
• Database creation
• Create tables etc.
• Check via PgAdmin
Imp/Exp
connection
Additional schemas
ADE plug-ins

- Launch the 3DCityDB Importer/Exporter, select the "Database" tab
  - Upon successful connection, you will see the notification in the console

Software required
Software install
Database setup
• Database connection
• Database creation
• Create tables etc.
• Check via PgAdmin
**Imp/Exp
connection**
Additional schemas
ADE plug-ins

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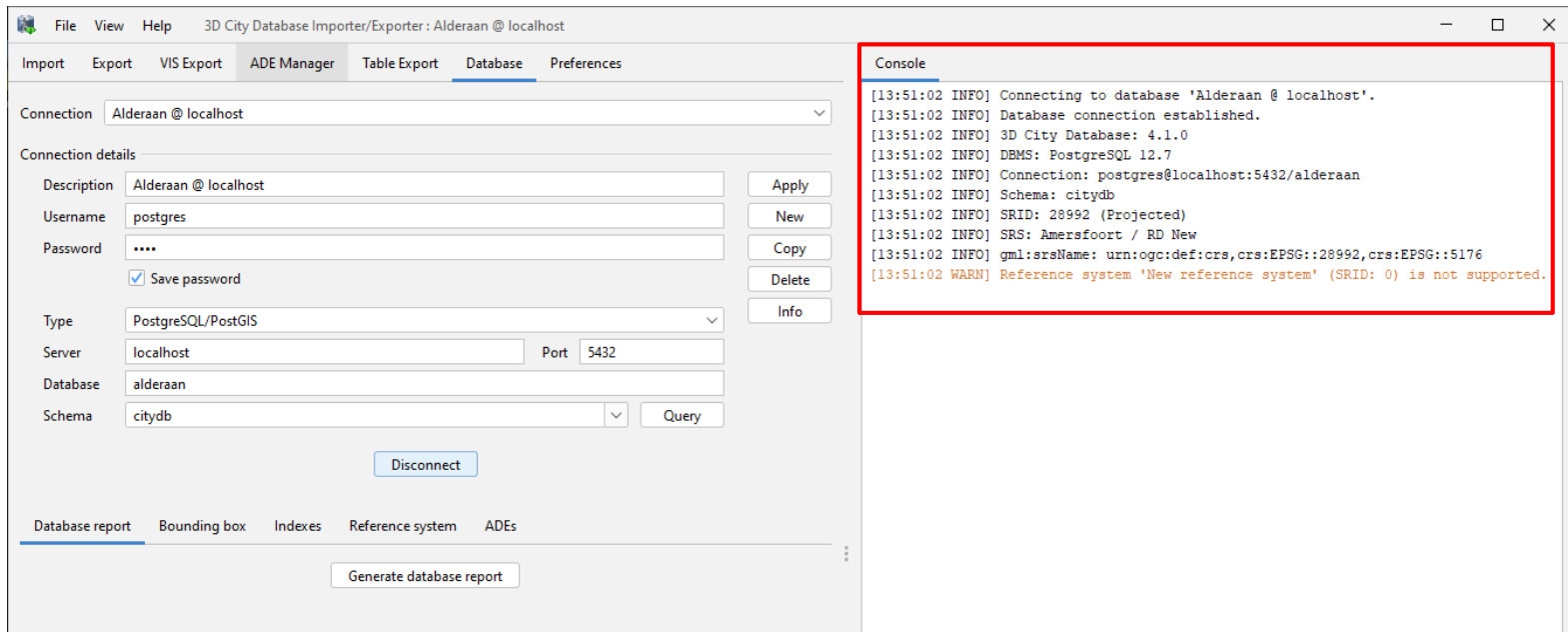
Connecting to the database via Importer/Exporter
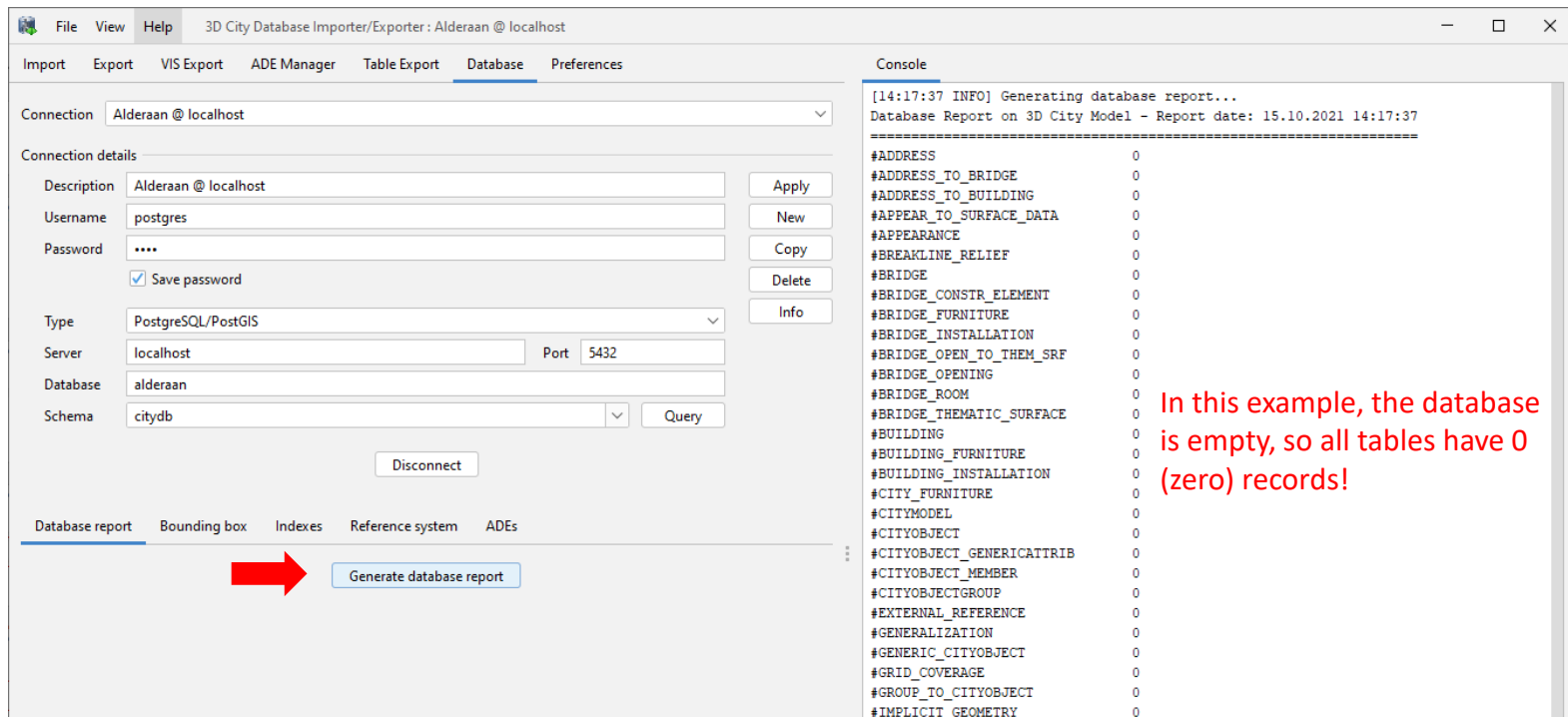
- Launch the 3DCityDB Importer/Exporter, select the "Database" tab
  - You can optionally also **Generate a database report**
  - If starting from an empty database, it will simply show that all tables are empty! ☺

Software required
Software install
Database setup
• Database connection
• Database creation
• Create tables etc.
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Imp/Exp connection
Additional schemas
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Overview

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Add additional database schemas (Optional)

Install ADE plug-ins (Optional)

3D City Database: additional schemas

- **To add additional schemas** (OPTIONAL, besides the default citydb):

  – Check the connection parameters in file **CONNECTION_DETAILS.bat** (should be the same as before)

  – Run the **CREATE_SCHEMA** script. You will be requested to enter the name of the additional schema (e.g. "citydb_a1", or "scenario_1", etc.)

  – You can choose any name you want, but try to use only small letters

  – The new schema and its contents will be added automatically. The new schema will have the same CRS of the citydb schema

  – You can repeat these steps and add more schemas to the same database. At the end you will have

    • The citydb schema and *n* additional schemas

    • Only one citydb_pkg schema
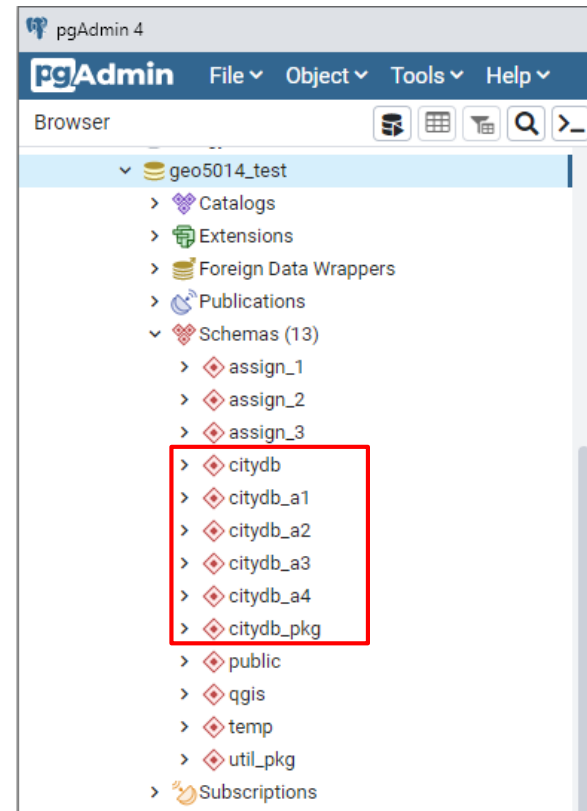
3D City Database: additional schemas

Software required
Software install
Database setup
• Database connection
• Database creation
• Create tables etc.
• Check via PgAdmin
Imp/Exp connection
Additional schemas
ADE plug-ins

- When using the Importer/Exporter, you can choose which schema to use to import/export data from the GUI.

Overview

Install required software

Set up the database

Connect to the database via the Importer/Exporter

Add additional database schemas (Optional)

Install ADE plug-ins (Optional)

ADE plug-in installation

Software required
Software install
Database setup
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Additional schemas
ADE plug-ins
• **Installation**
• Data import
• Data export

Please note: These slides refer to the Energy ADE plug-in for the 3DCityDB. However, a similar procedure can be followed for other ADE plug-ins.

1) Download the **energy-ade-citydb** extension for the Importer/Exporter

   – https://github.com/3dcitydb/energy-ade-citydb/releases/

2) Unzip it in folder ade-extensions of your 3DCityDB install path
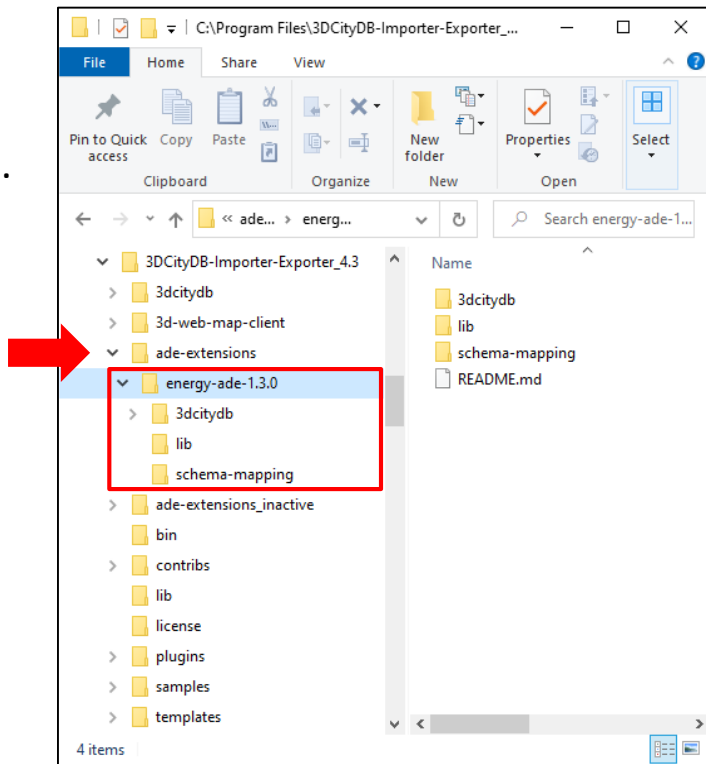
Detailed instructions available on-line

• https://3dcitydb-docs.readthedocs.io/en/latest/plugins/ade-manager/index.html
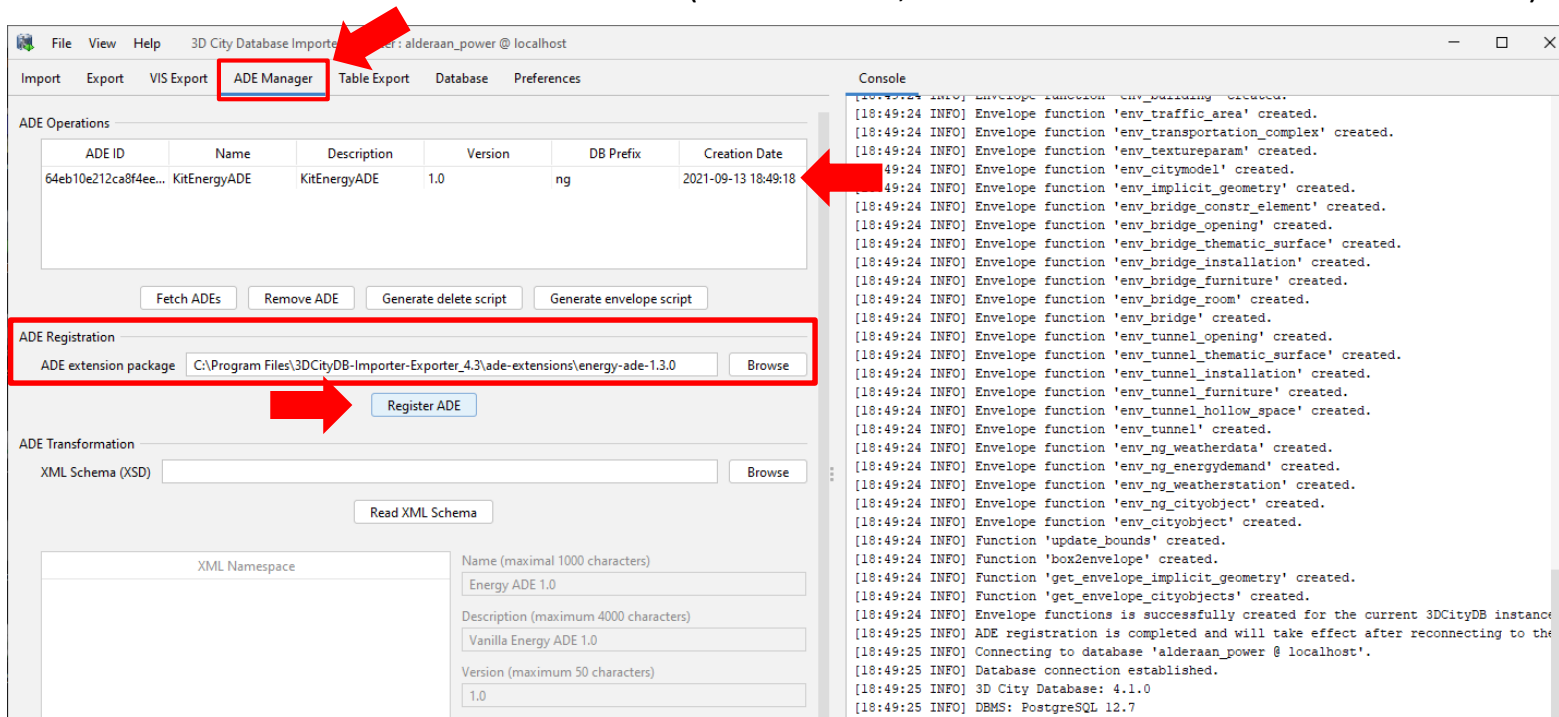
ADE plugin installation

- From the Importer/Exporter, connect to an existing 3DCityDB instance
  - In the "ADE extension package" add the path to the plug-in folder unzipped before
  - "Register" the ADE from the ADE Manager tab
  - The ADE will be added to the ADE list (and all tables, etc. will be added to the current schema)

Software required
Software install
Database setup
Imp/Exp connection
Additional schemas
ADE plug-ins
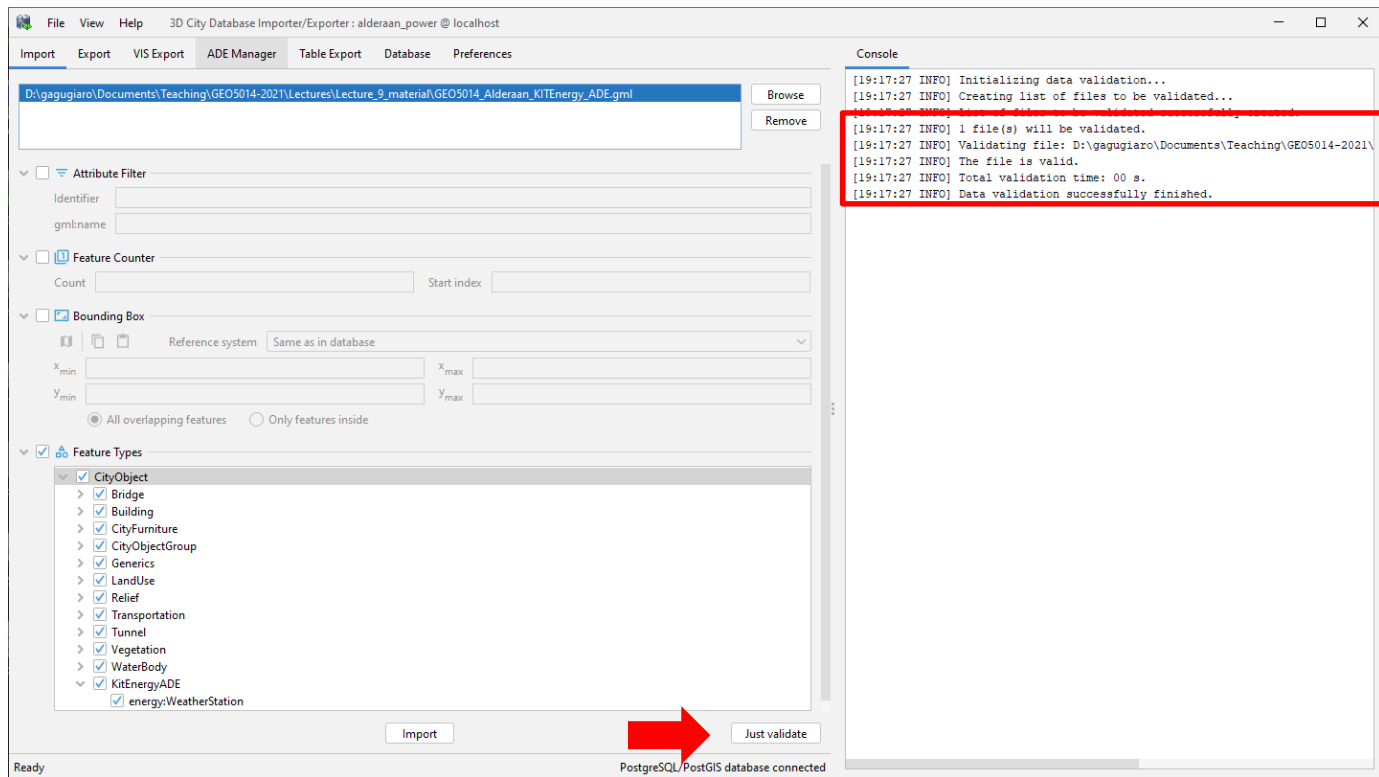• **Installation**
• Data import
• Data export

TUDelft
3Dgeoinfo

ADE plugin installation

- Check also in the database tab the ADEs properties

Software required
Software install
Database setup
Imp/Exp connection
Additional schemas
ADE plug-ins
• **Installation**
• Data import
• Data export

ADE plugin installation

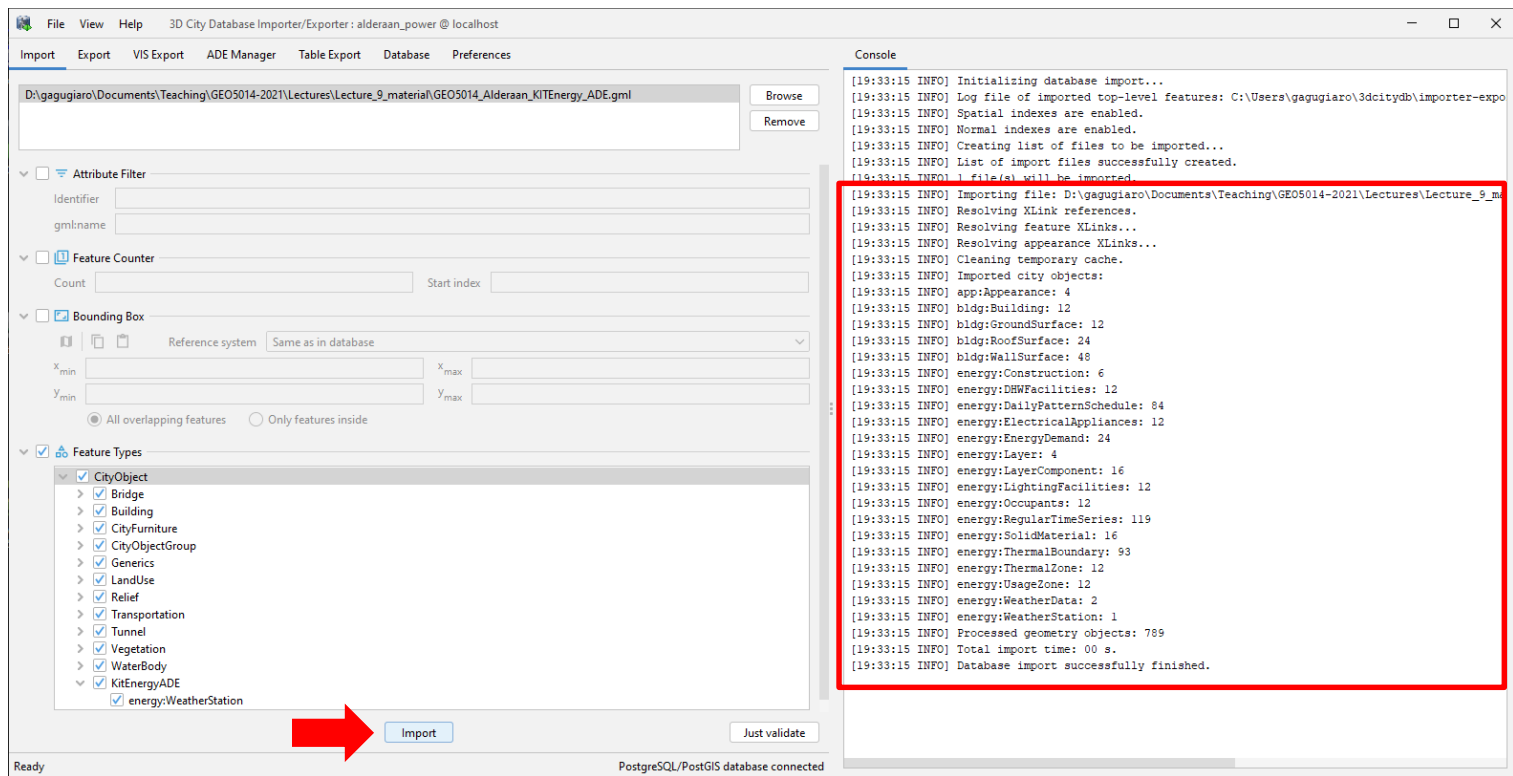- Check in PgAdmin: new tables (and functions) with prefix "ng" have been added

Software required
Software install
Database setup
Imp/Exp connection
Additional schemas
ADE plug-ins
• **Installation**
• Data import
• Data export

The **prefix** depends on the ADE!

For example, the prefix "ng" is used here for the Energy ADE

TUDelft
3Dgeoinfo

ADE data import

- To import ADE data into the extended 3DCityDB, the procedure is the same as with non-ADE data via the Import tab

Software required
Software install
Database setup
Imp/Exp connection
Additional schemas
ADE plug-ins
• Installation
• **Data import**
• Data export

ADE data import

- To import ADE data into the extended 3DCityDB, the procedure is the same as with non-ADE data via the Import tab
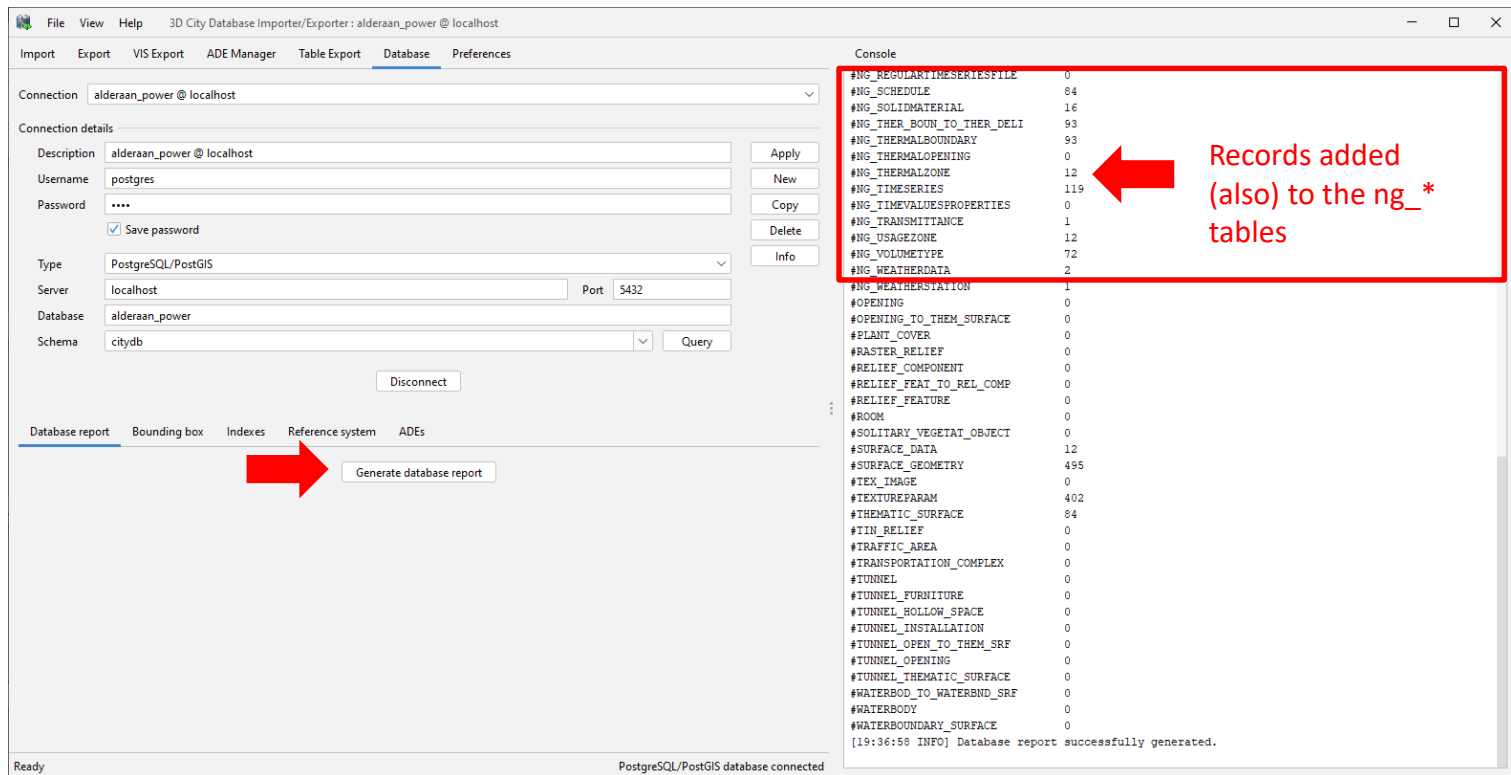
Software required
Software install
Database setup
Imp/Exp connection
Additional schemas
ADE plug-ins
• Installation
• **Data import**
• Data export

ADE data import

- Check also the database report in the database tab!

Software required
Software install
Database setup
Imp/Exp connection
Additional schemas
ADE plug-ins
• Installation
• **Data import**
• Data export

ADE data export

- Conceptually analogous to the procedure without ADE content. Simply choose what to export, and run the exporter!

Software required
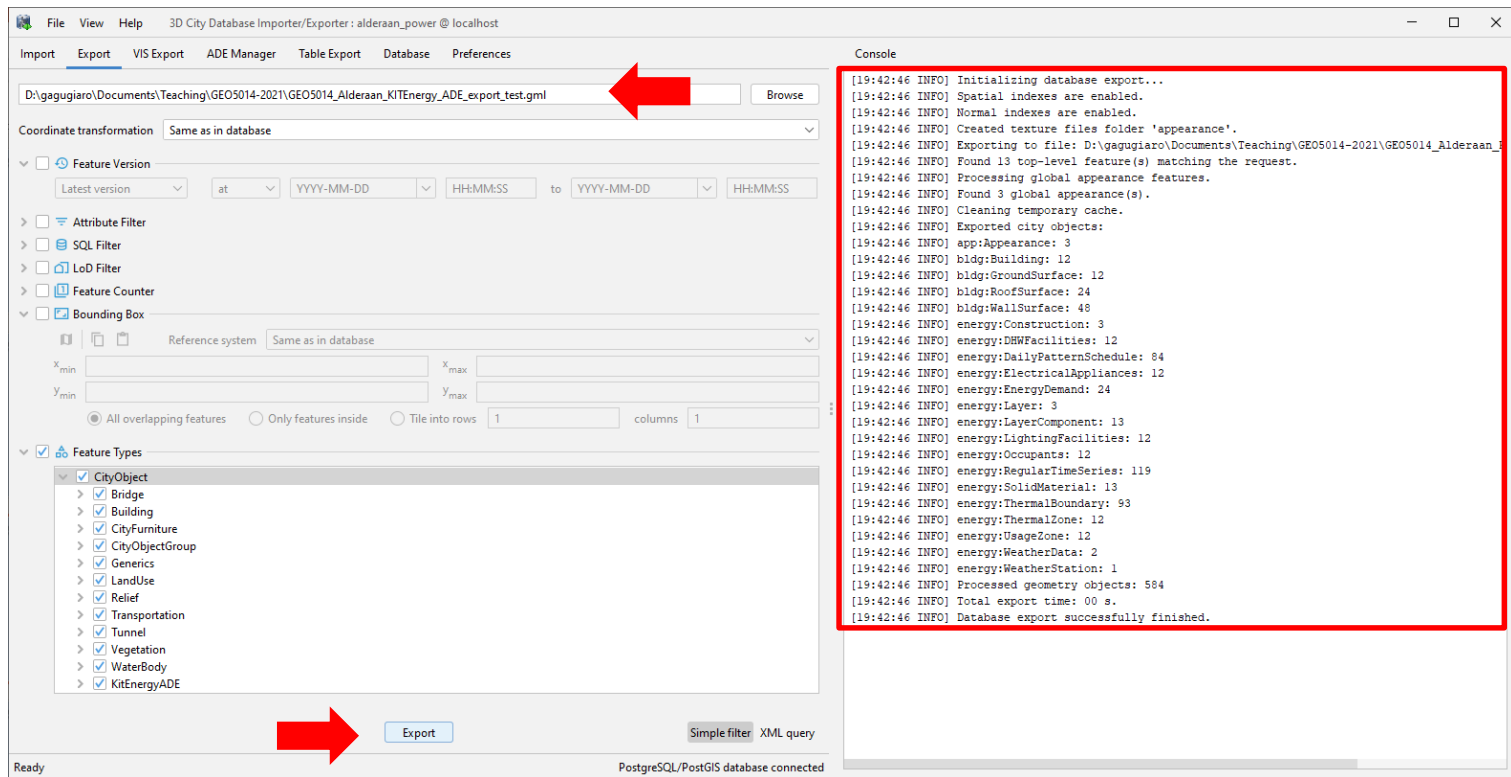**Software install**
Database setup
Imp/Exp connection
Additional schemas
ADE plug-ins
- Installation
- Data import
- **Data export**

Further resources

- Fur further information, check the official 3DCityDB documentation regarding the installation procedure details

- **Online documentation**
  – https://3dcitydb-docs.readthedocs.io/en/latest/

- **Online tutorial by TU Munich**
  – https://github.com/3dcitydb/tutorials

Software required
PostgreSQL
3DCityDB
Further resources

Thank you for your attention!

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