
SmartGIS

Distribucija 0.1

Manufaktura Ltd

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Napomena: This project is under active development.

1.1 Introduction

SmartGIS is a modern web-based software for digitizing spatial data and displaying it in 2D and 3D environments. Artificial intelligence-based tools and algorithms further assist users in the tasks of recognizing and classifying digital objects.

Main features and benefits:

- Effective data management
- Mobility and cooperation
- Intuitive user interface
- Applicability in various projects
- Ideal for dislocated teams

1.1.1 Data management

Import and export various geospatial data formats, such as shapefiles, geodatabases, and raster data.

Functions for creating, editing, and updating geospatial data, including tools for digitizing maps.

Map visualization: create and display interactive maps, including the use of various symbols, colors, and labels to represent different data layers.

Integration with other software tools, such as CAD and survey software, to import and export data between systems.

1.1.2 Mobility and collaboration

SmartGIS can serve large and often remote teams. Collaboration and simultaneous work on projects, as well as data exchange and processing means savings in time and money. The possibility of using pallication from the office but also from the field gives added value to the teams working on digitization - they are not tied to one location or workstation, but can complete projects faster, more efficiently and with a higher quality result.

1.1.3 AI supported

Tools and algorithms based on artificial intelligence are built into the application, for automatic recognition of digital objects, automatic export, conversion or integration of obtained data.

1.1.4 Applicability and client target group

SmartGIS can be used by public institutions and companies, local governments, traffic secretariats, urban planning agencies, etc. as well as stakeholders of the „Smart City” initiative; private companies dealing with field mapping and digitization of roads, traffic signals, bridges, buildings and structures, greenery, pipelines, transmission lines, or other important objects that need to be digitized due to legal regulations, regulations or business processes.

1.1.5 Work online or install the platform on-premises

You can use SmartGIS online, where we create a copy of the application and host it on a cloud server. It is also possible to install the complete system on the customer's server. In this case you must meet certain requirements:

- linux operating system
- docker installed $\geq 19.0.3$
- docker-compose installed $\geq 1.29.2$
- ssh access and public ip during installation

1.1.6 Business and general values

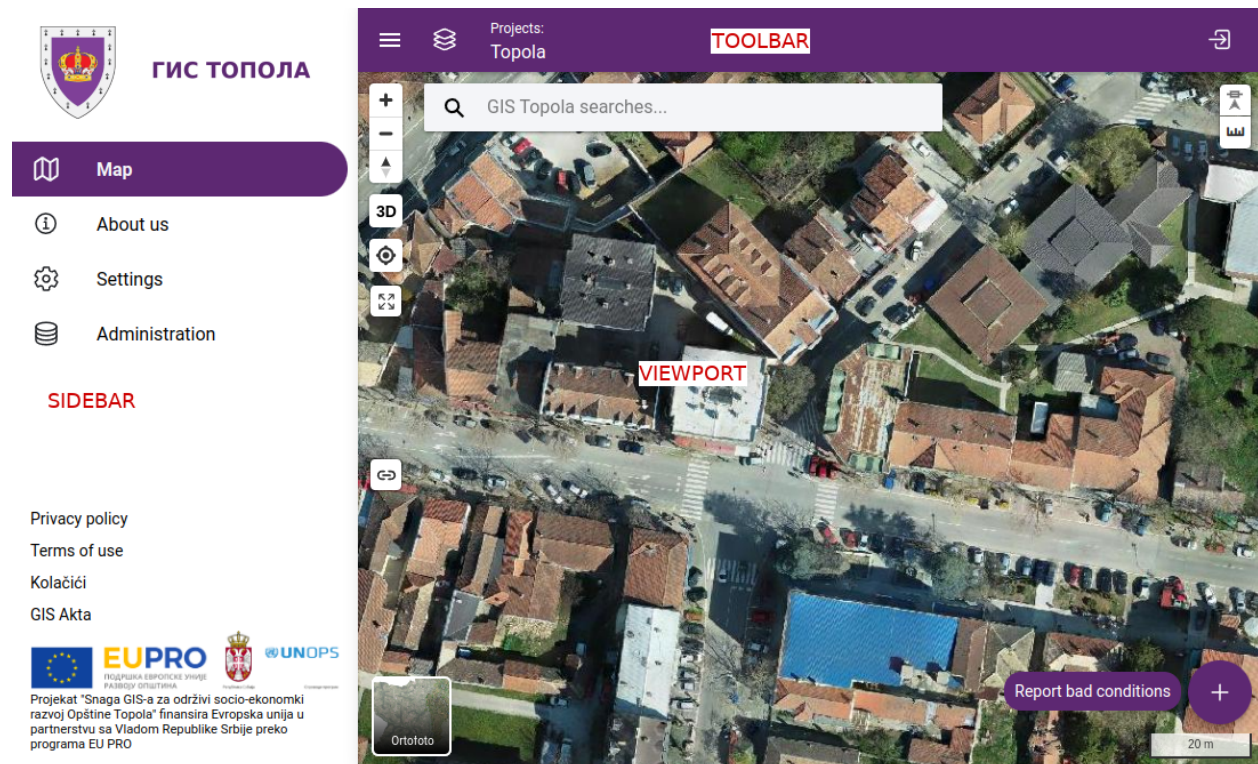
By adopting new digital tools and clear procedures, users will significantly reduce the manual work that characterized most digitization processes; will be able to expand the portfolio of services by offering new ways of working; they will get better quality data in less time and with less invested human and financial resources; on the other hand, the community gets new and improved existing public services, more accurate data and greater transparency.

1.1.7 Based on modern technologies

SmartGIS is built as a web application, with some offline components that are ideal for smaller and simpler projects, with limited seton functions and tools. The client-server architecture enables easy, fast and efficient use regardless of location (Internet connection is necessary). The software also works on average PCs/laptops on modern Internet browsers.

1.2 Application interface

The application interface is providing clear and intuitive navigation and access to key features and tools.



Slika 1: Main screen

1.2.1 Toolbar

The following functions are available via the toolbar:



Slika 2: Toolbar

Toolbar items:

- open sidebar
- login / user account
- open map legend
- project selector
- navigation information on administration page

1.2.2 Sidebar

The navigation menu of the application is located here. It contains fixed, context-dependent and freely definable elements.

Main elements

- application logo
- map viewer
- settings
- administration pages

Customizable items

- about us page
- privacy policy
- terms of use
- cookie consent settings
- custom pages defined by application initialization

When initializing the application, we can specify which pages should be displayed on the sidebar. The content of the pages can be changed at any time. If the application has been initialized for multiple languages, these pages can be loaded in all the languages that have been specified.

1.2.3 Viewport

The start screen of the application is the *Map viewer*. Here you can access ready-made maps, integrated point clouds, search functions and digitization tools. The viewport is used to display the map and access the associated tools.

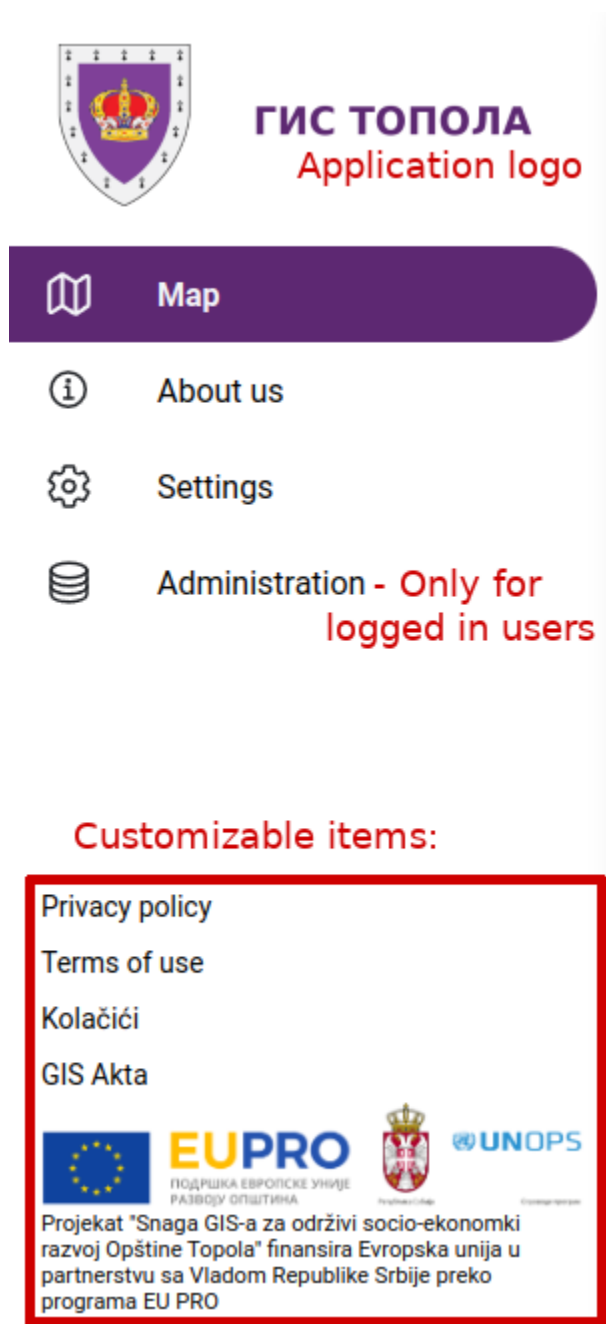
1.3 User account

1.3.1 Login

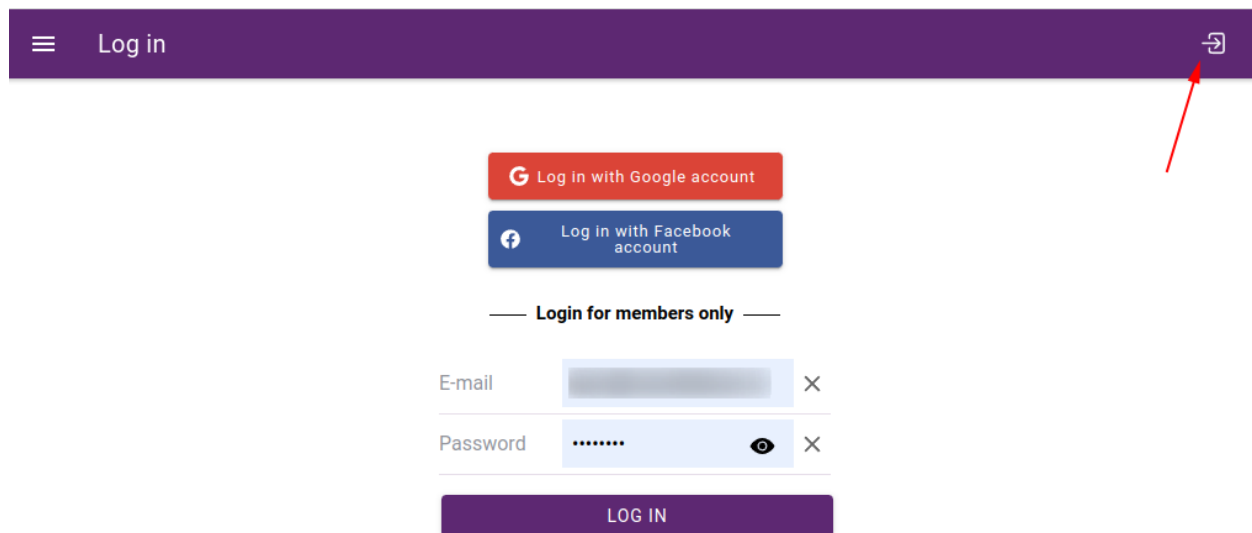
Users can log in by entering their email address and password. Users are registered on the administration page by an administrator. When configuring the application, it is possible to allow users to log in with a Google or Facebook account. This should be used when setting up WebGIS portals where external users can access certain services, e.g. reporting bugs, posting comments, etc.

1.3.2 My account

On the account page you can view the basic details of the logged in user and change the password.

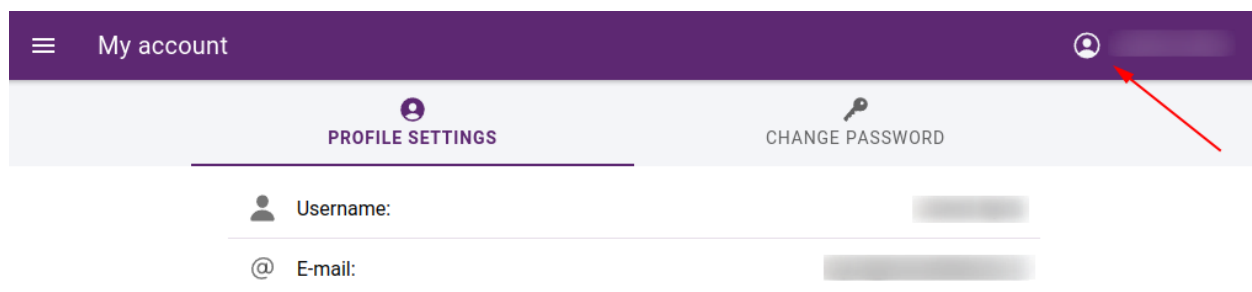


Slika 3: Sidebar



The login form is displayed on a white background. At the top, there is a dark purple header bar with a hamburger menu icon on the left, the text "Log in" in the center, and a user profile icon on the right. A red arrow points to the user profile icon. Below the header, there are two social login buttons: a red "Log in with Google account" button and a blue "Log in with Facebook account" button. Below these is a section titled "Login for members only" with a dashed line. Underneath, there are two input fields: "E-mail" and "Password". The "E-mail" field has a light blue border and a clear button (X) on the right. The "Password" field has a light blue border, a masked password (dots), an eye icon to toggle visibility, and a clear button (X) on the right. Below the input fields is a dark purple "LOG IN" button.

Slika 4: Login



The "My account" page is displayed on a white background. At the top, there is a dark purple header bar with a hamburger menu icon on the left, the text "My account" in the center, and a user profile icon on the right. A red arrow points to the user profile icon. Below the header, there are two tabs: "PROFILE SETTINGS" (active, with a person icon) and "CHANGE PASSWORD" (with a key icon). Below the tabs, there are two input fields: "Username:" and "E-mail:". The "Username:" field has a light blue border and a clear button (X) on the right. The "E-mail:" field has a light blue border and a clear button (X) on the right.

Slika 5: My account

1.4 Map viewer

A user-friendly interface that is easy to navigate and allows users to view and interact with maps in real-time. It has the ability to display multiple layers of geospatial data, such as satellite imagery, street maps, and demographic data.

Main features

- Tools for zooming in and out of maps and panning to different areas of interest.
- Functions for searching for specific locations or addresses, as well as tools for navigating maps using tools such as a compass or a scale bar.
- Interactive features such as pop-up windows, highlighting, and querying of data layers.
- Ability to share maps with others by sharing a link to the map viewer.
- Compatibility with mobile devices, allowing users to view maps on-the-go using smartphones and tablets.
- Secure access to the map viewer, with options for user authentication and authorization.

1.4.1 Working with projects

The maps created in the administration interface are called projects. Access rights can be granted to projects and the layers on them. This allows to control, for example, whether a map or its layers should be public or which teams can edit the content of certain layers (digitizing, edit attributes, upload images / attachments).

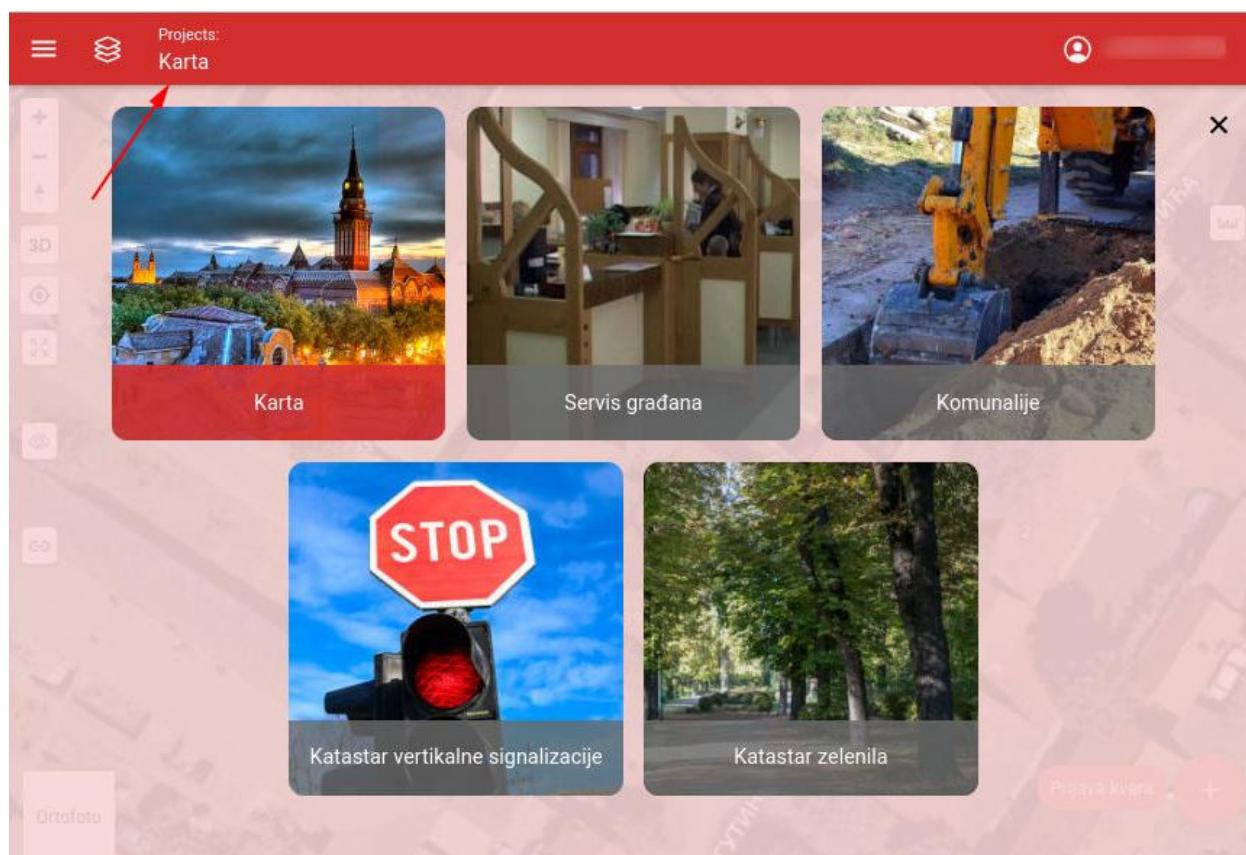
As a first step, the project selection screen will appear. You can call this up later using the project selector in the toolbar. After loading the selected project, the map viewer will be initialized.

1.4.2 Viewport

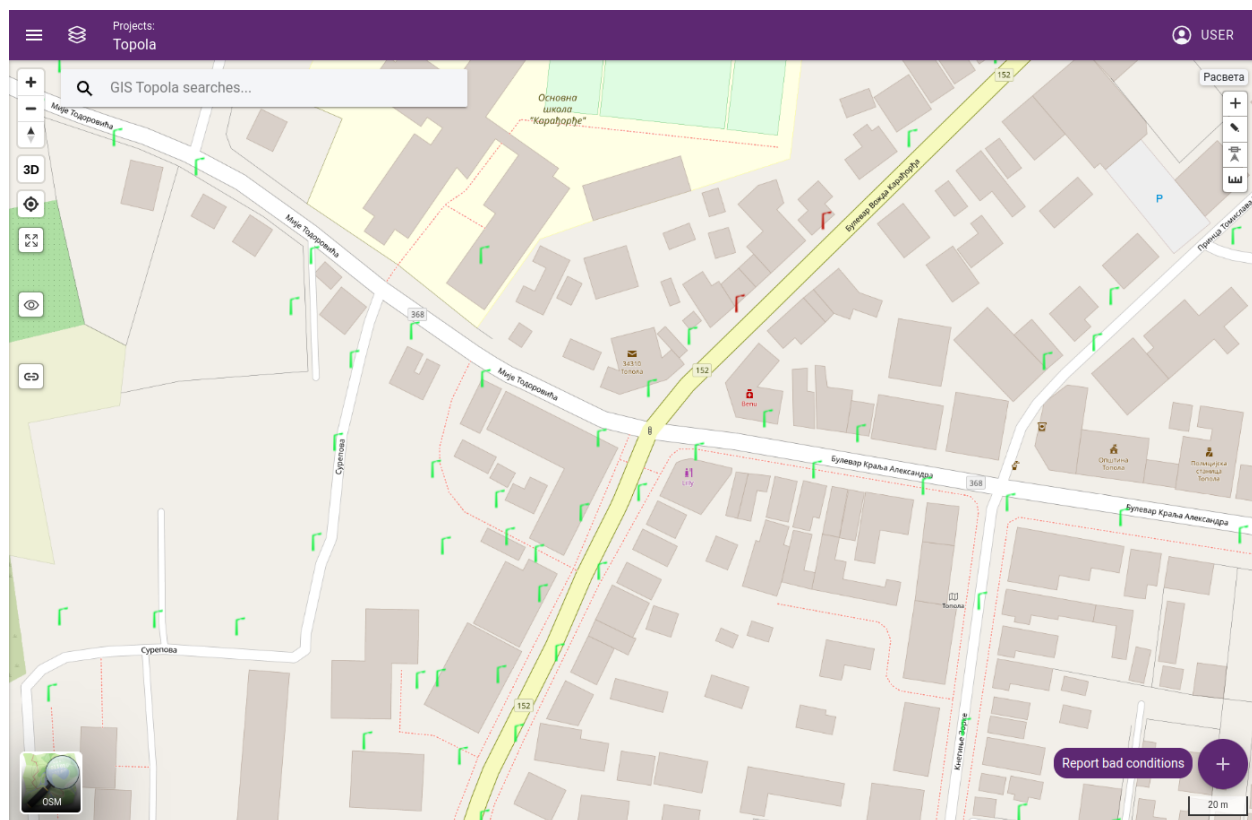
A large area dedicated to displaying the map and its data layers, taking up the majority of the application window. It contains toolbars and menus that provide access to the map's various functions and tools, such as zooming, panning, measuring, digitizing.

Tools:

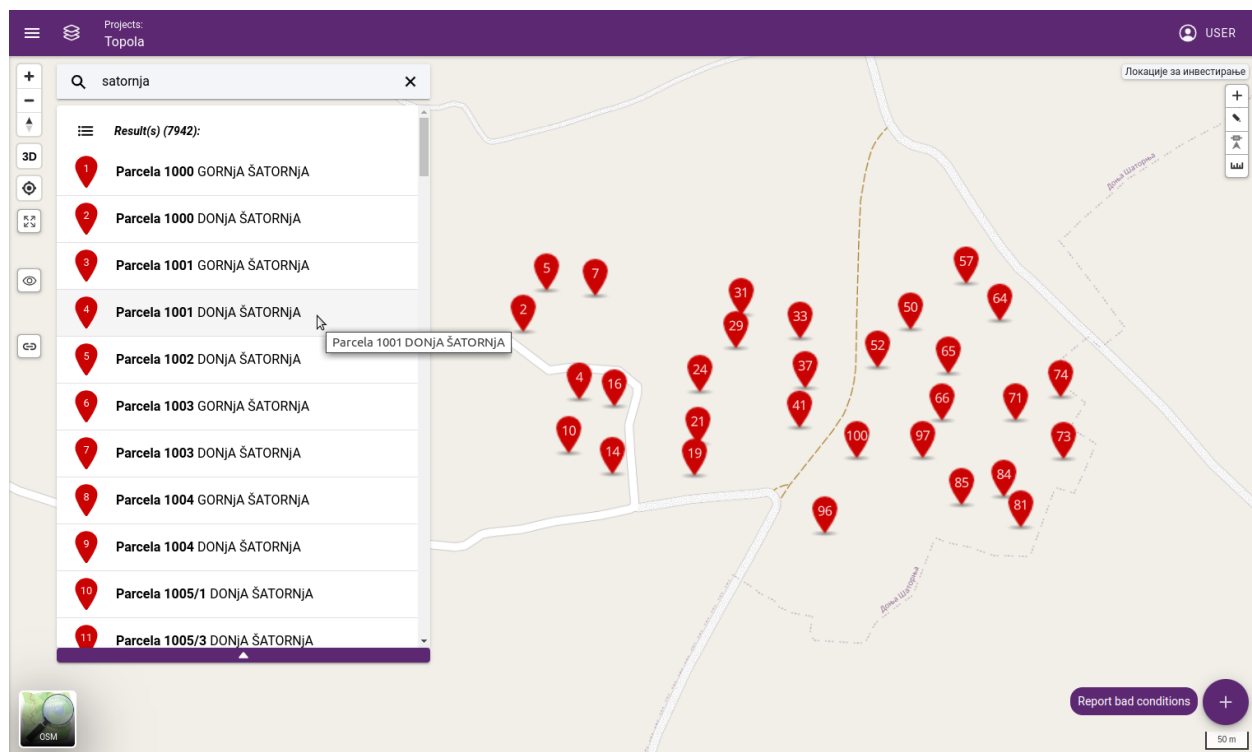
1. Search bar: Search can be executed with a keyword. After the search, results will be displayed in a dropdown menu (maximum of 100 items) and pins will be placed on the map. When a result is selected from the list, map will be focused on the result's pin.
1. Zoom in and out: „+” zooms in and the „-” button zooms out the map.
2. Reset map orientation: If the map is previously rotated (press and hold the right mouse button), its orientation can be reset to the default north-facing position.
3. 3D view: This function is used with a 3D layer. First, check a 3D object layer, and activate the tool.
1. Find my location: Map will be focused on the user's approximate geolocation.
2. Zoom to extent: Map zoom level and position will be reset to its default values.



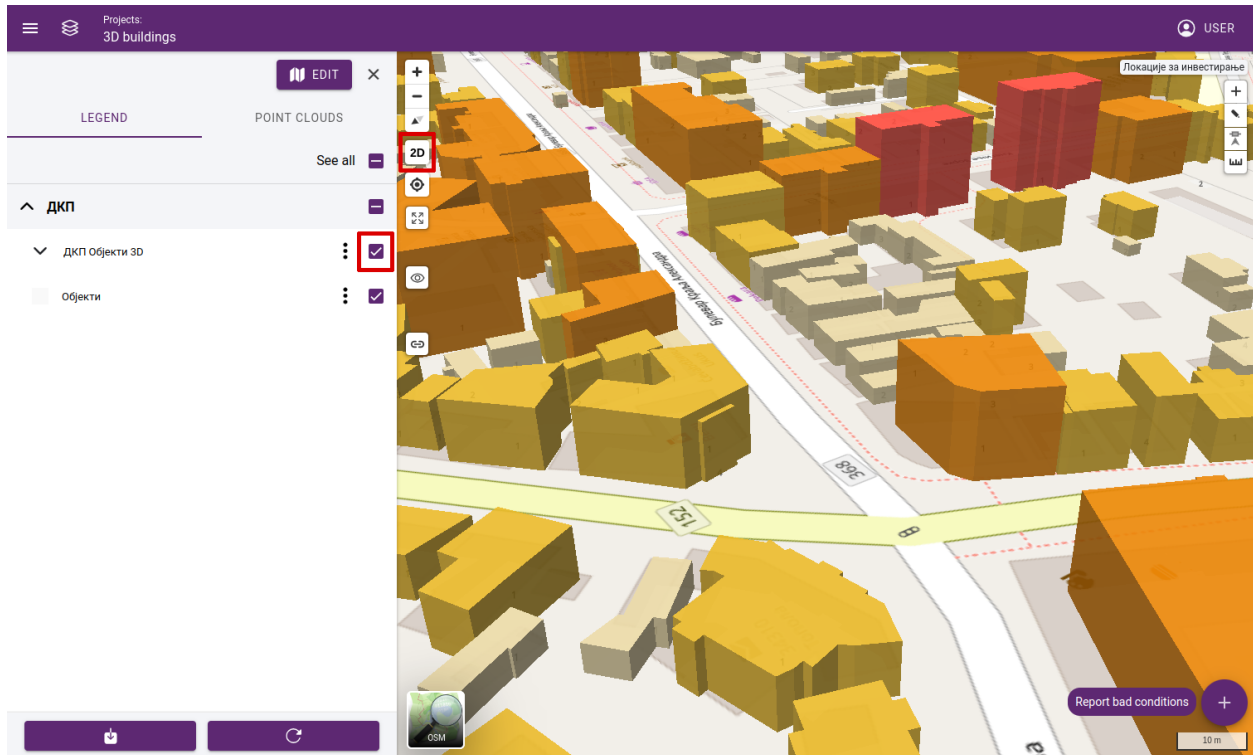
Slika 6: Project selection screen



Slika 7: Map view



Slika 8: Search results



Slika 9: 3D view

3. Open point cloud: Drag and drop the tool on the map to open its location in the point cloud map.

1. Get permalink: Current location on the map can be converted in a link format copied

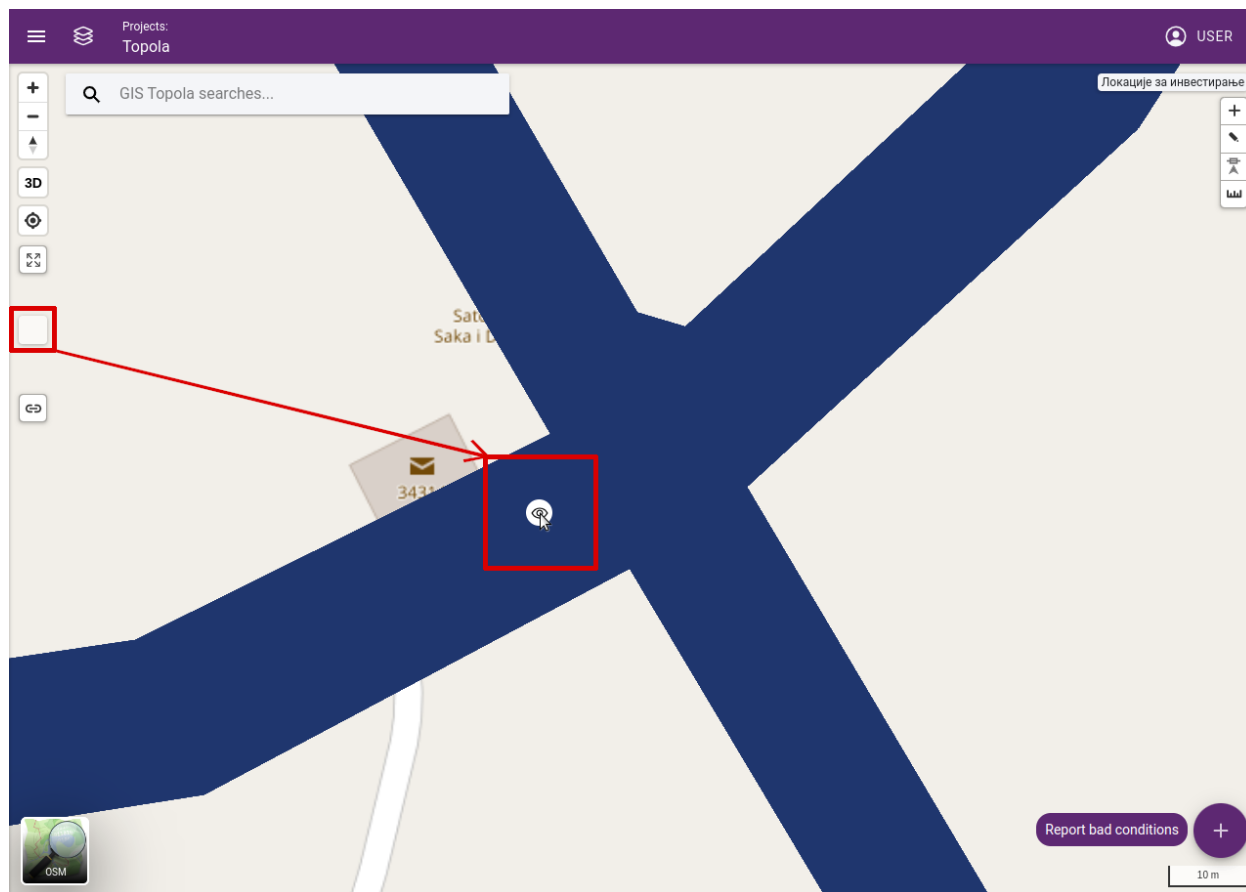
1. Basemap selector: The current map type can be changed.

2. 2D digitizing tools: These tools are available when the active layer is set. Objects on the map can be created, edited or its properties changed.

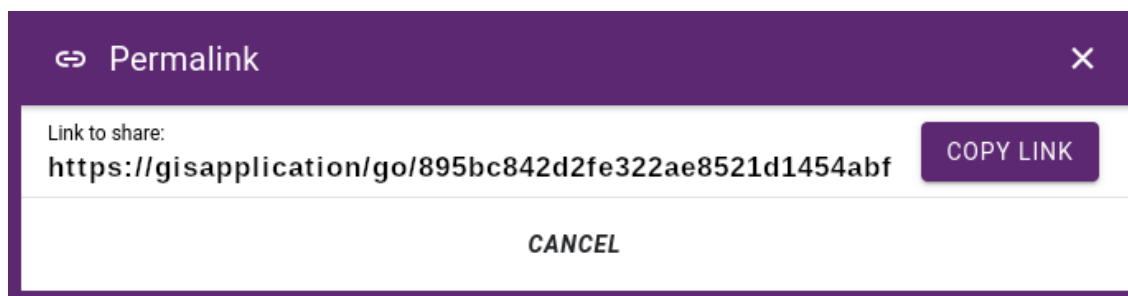
More about the 2D tools can be found here: [2d tools](#)

3. Snap tool: Snap tool is used with the 2D digitizing tools or with the measurement tool. It can be:

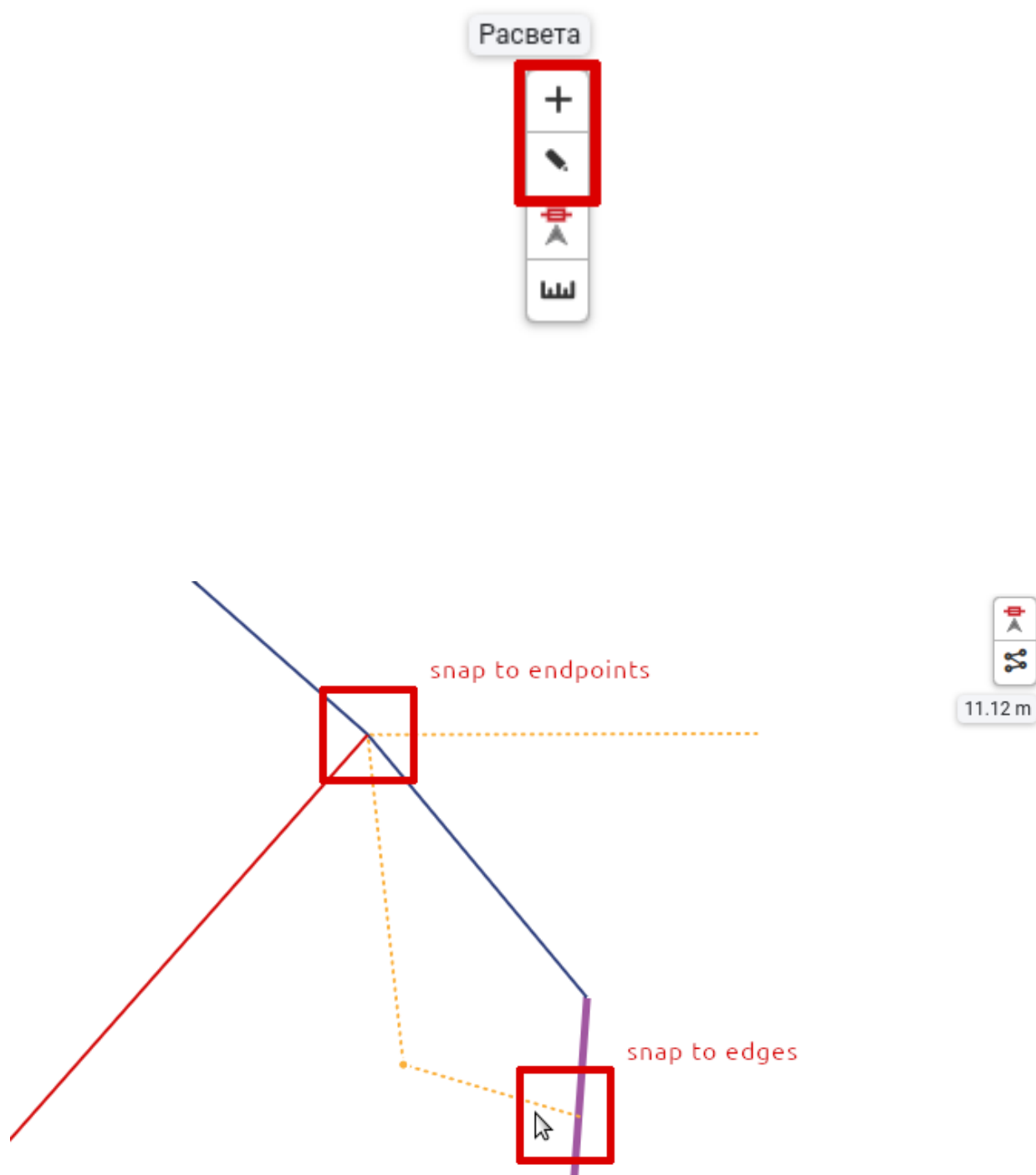
- set to snap to the objects edges.
- set to snap to the objects endpoints.
- set to snap to the objects edges and endpoints.
- turned off.



Slika 10: Dragging eye to point cloud coverage area



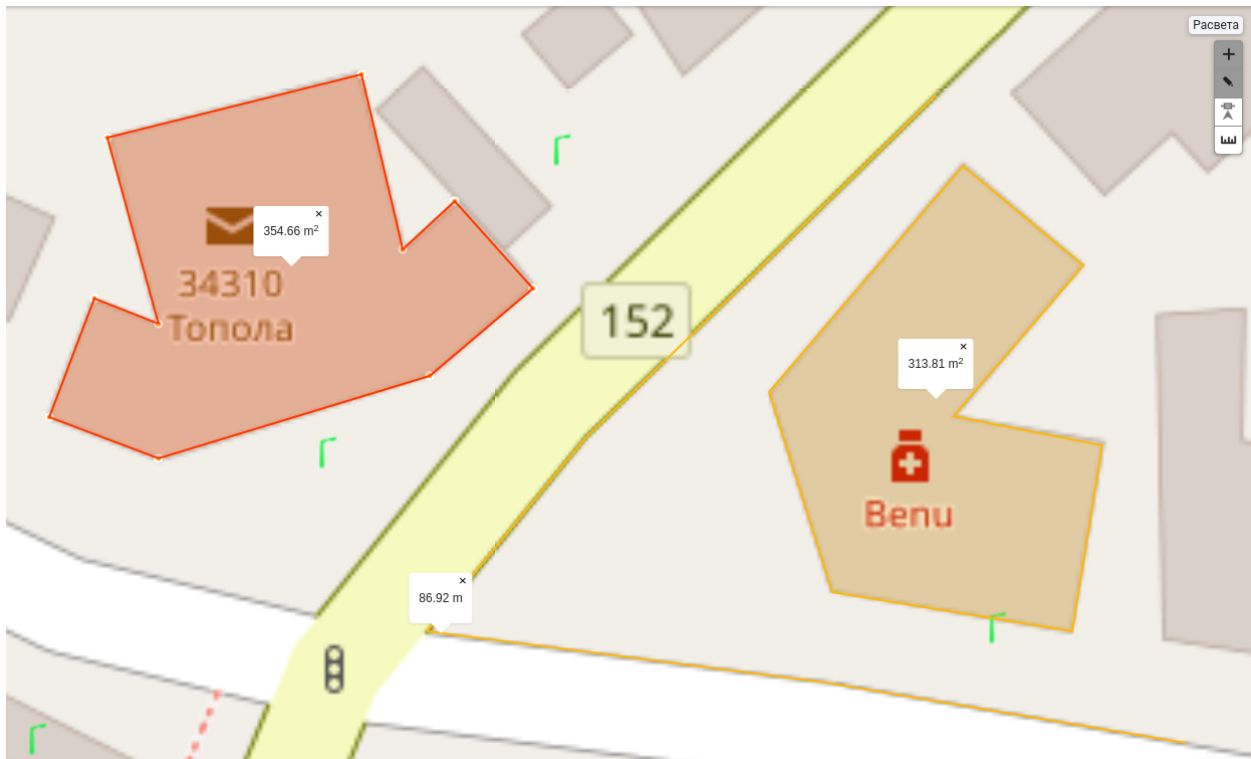
Slika 11: Permalink



Slika 12: The snap tool in action

1. Measurement tools: Different measuring tools can be used to measure area or distance. Measurements can be taken by selecting the desired tool and clicking on the map. Measurements can be completed by double-clicking on the map.

- Measure distance: Distance is measured between multiple points, minimum of two.
- Measure area: Area is measured between multiple points, minimum of three.
- Turn off: Disable the measurement tool and clear all measurements on the map.

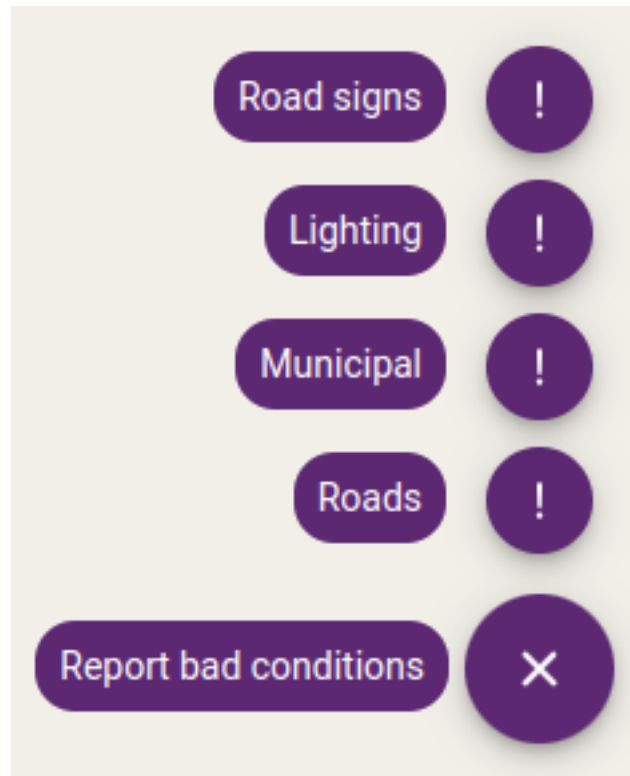


Slika 13: Measuring area and distance

1. Report bad conditions: A report can be created in three category, it can be a road sign, lighting, municipal or road defect. When a category is selected it can be created when clicked on the map, then a popup is opened where the defect details can be defined. This is an optional feature. When preparing a report, it can be created on an existing layer as an object, or it can be attached to an existing object as a report document.

For example if a road lighting defect has to be reported:

- First the „lighting” tool must be selected under „report bad conditions”.
- When the tool is activated, the lighting layer (on this layer all lighting objects are defined) is set as the active layer.
- To report a problem select a lighting object on the map.



Slika 14: Fault reports

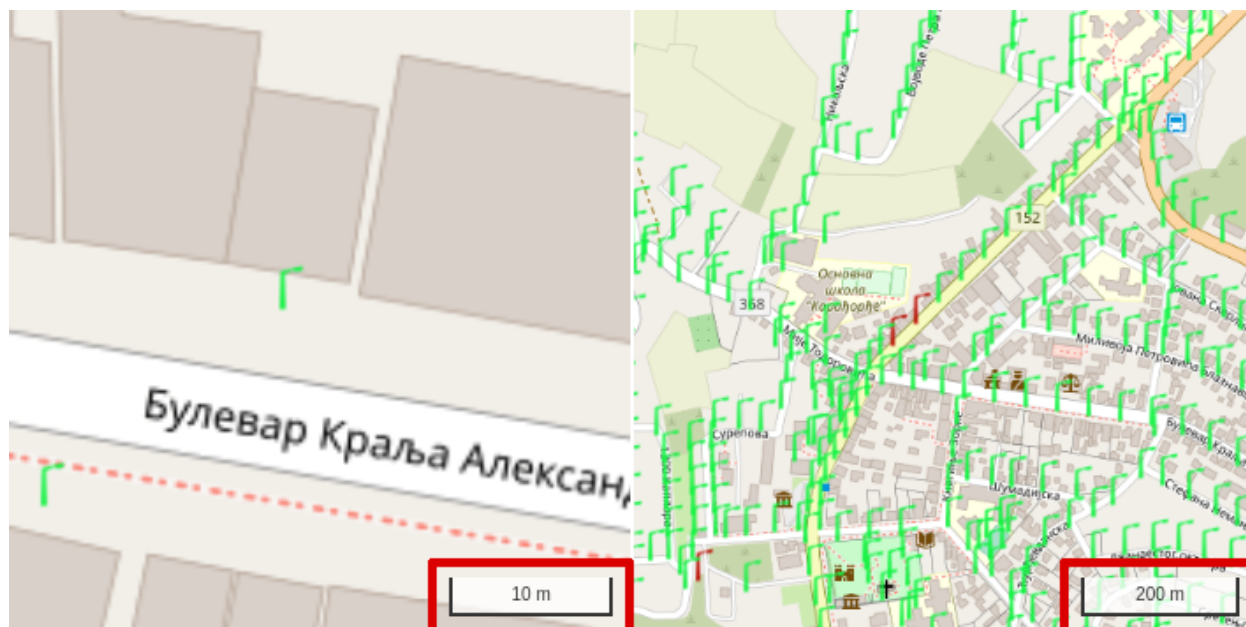
- When the object is selected the object's form is opened on the „report bad conditions” tab.
 - Fill the required fields like type of defect, contact number, comment and save the report.
1. Map scale bar: Scale bars provide a visual indication of distance and feature size on the map. Scale bar updates on every zoom level.

1.4.3 Basemap selector

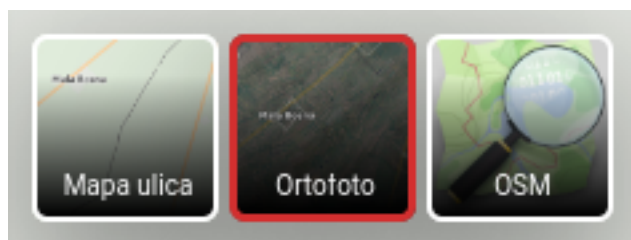
A basemap is a background map that provides context and reference for the data being analyzed, making it easier to understand the relationships between data and geography.

Basemaps can be assembled in map editor or added from public services like OpenStreetmap tiles or WMS services - see *Basemap administration* section.

If multiple basemaps are assigned to a project, you can switch between them using the basemap selector.



Slika 15: Scale bar in different zoom levels



Slika 16: Basemap selector

1.4.4 Map legend

The map legend list available layers for the current project, displays the symbology used for each data layer and allows users to turn layers on and off. Layers can be switched on and off at several levels:

- switch on/off all layers on the map
- switch on/off all layers in a folder
- switch on/off a layer
- switch on/off a layer class

Savjet: Vector layers can be classified by attribute, and these classes are also shown in the map legend. It is possible to display only the features belonging to the selected classes.

The layers pop-up menu contains the following commands:

- Open table - opens attribute table. Available only for editable layers.
- Zoom to - zooms to the layer's extent. Available after the layer has been loaded.
- Edit - navigates to [layer editor](#) page. Available for users with edit permissions on the selected layer.
- Cache - opens the [cache manipulation panel](#). Available for users with edit permissions on the selected layer.

If point clouds are attached to the project, the map legend will be extended with a list of available point clouds. In addition to toggling point clouds on and off, you can zoom in on the area they cover, or zoom in on the area of all the point clouds in a folder.

At the bottom of maplegend are the export and reload layers functions

1.4.5 Export data

You can populate layers marked as editable in the application, using the digitizing tools and forms. These layers can be exported from the database.

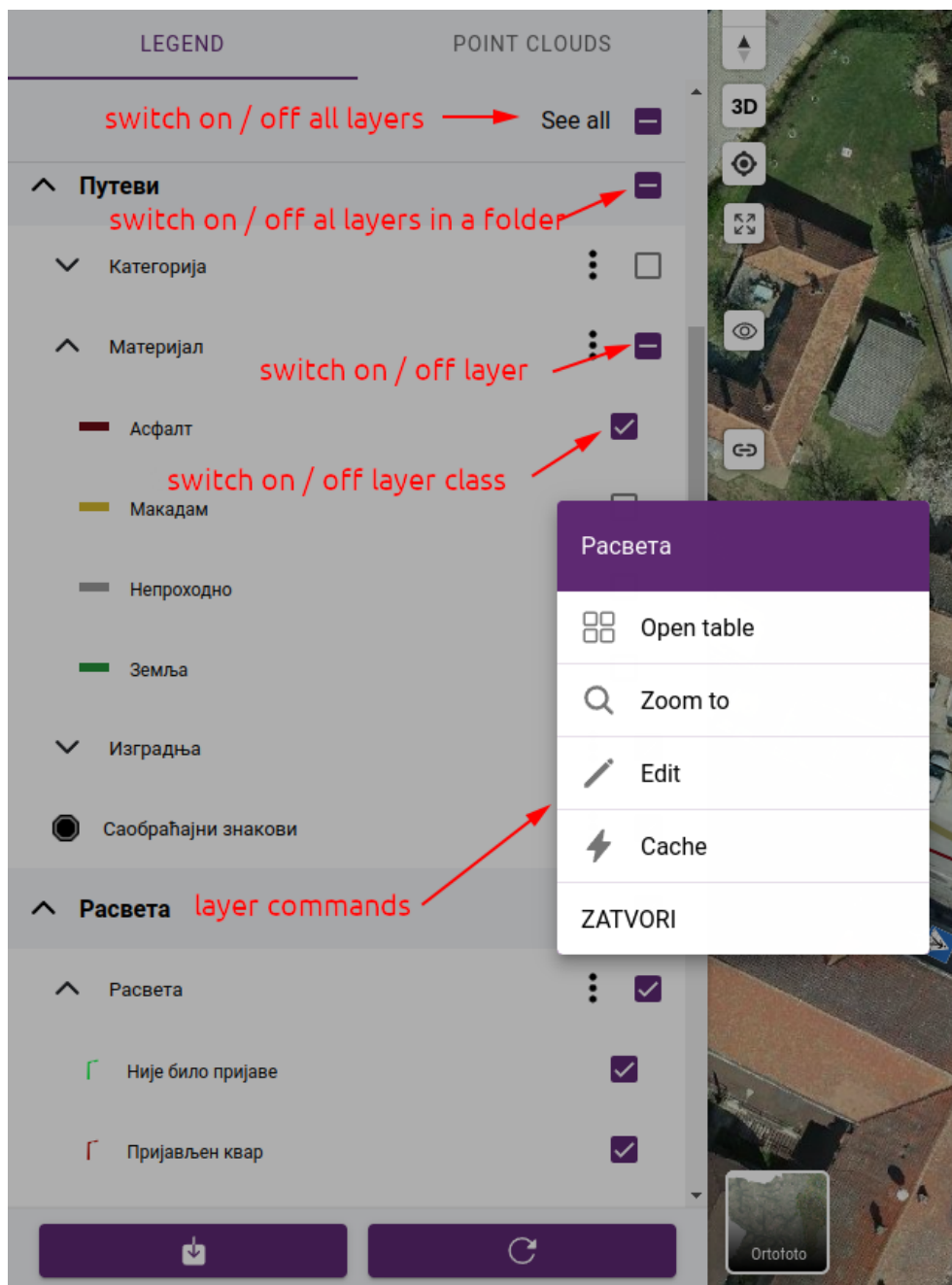
The layers can be exported in GIS, CAD and spreadsheet formats:

- .shp - ESRI ShapeFile
- .gdb - File Geodatabase (GDB)
- .dxf - Autocad DXF
- .csv - Comma Separated list (CSV)
- .xlsx - MS Excel

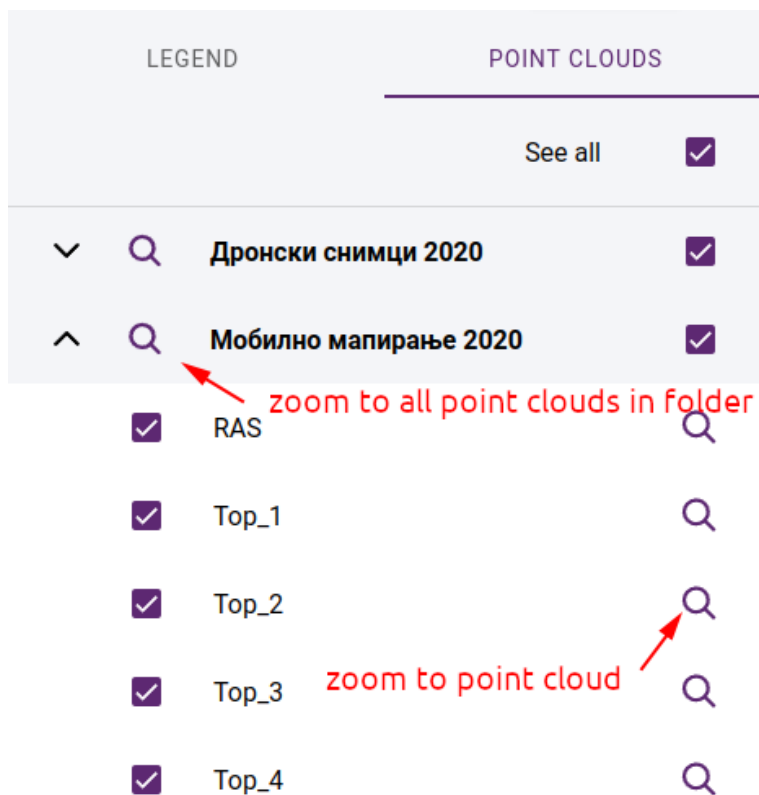
Napomena: Formats .csv and .xlsx are exporting only the attribute table without spatial data.

In addition to the layer data, it is also possible to export the assigned images and attachments. You can choose to export all or only the active layers. If point clouds are available, it is possible to limit the export to the area covered by the point clouds that are connected.

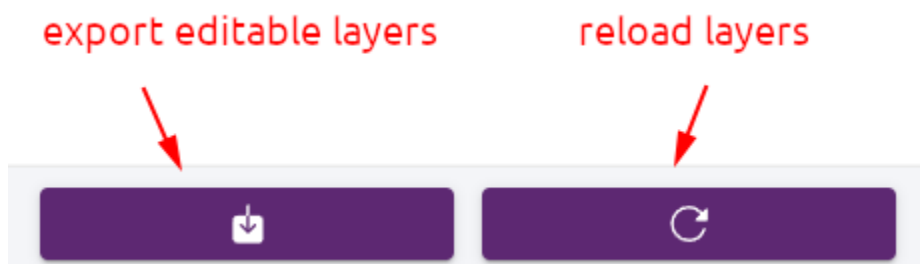
Napomena: Export is available only for logged in users. Only those layers are exported for which the user has export permission. The permissions can be set by the project owner or an administrator on the [map administration pages](#).



Slika 17: Layers



Slika 18: Point clouds



Slika 19: Export / refresh

Since we can export a lot of large layers, exporting can take some time. To avoid waiting for the result, you can choose the notification option. In this case, you can continue working and receive a notification email with a download link after the export is complete.

Slika 20: Layer export dialog

1.5 Layer editor

Introduction ...

1.5.1 Attribute table

Objects are displayed mainly on the 2D map, but there is an option to display object's attributes arranged in a table view. To open a layer's objects in the table view in the legend, open a layer group, and the layer's more option select the option „open in table”.

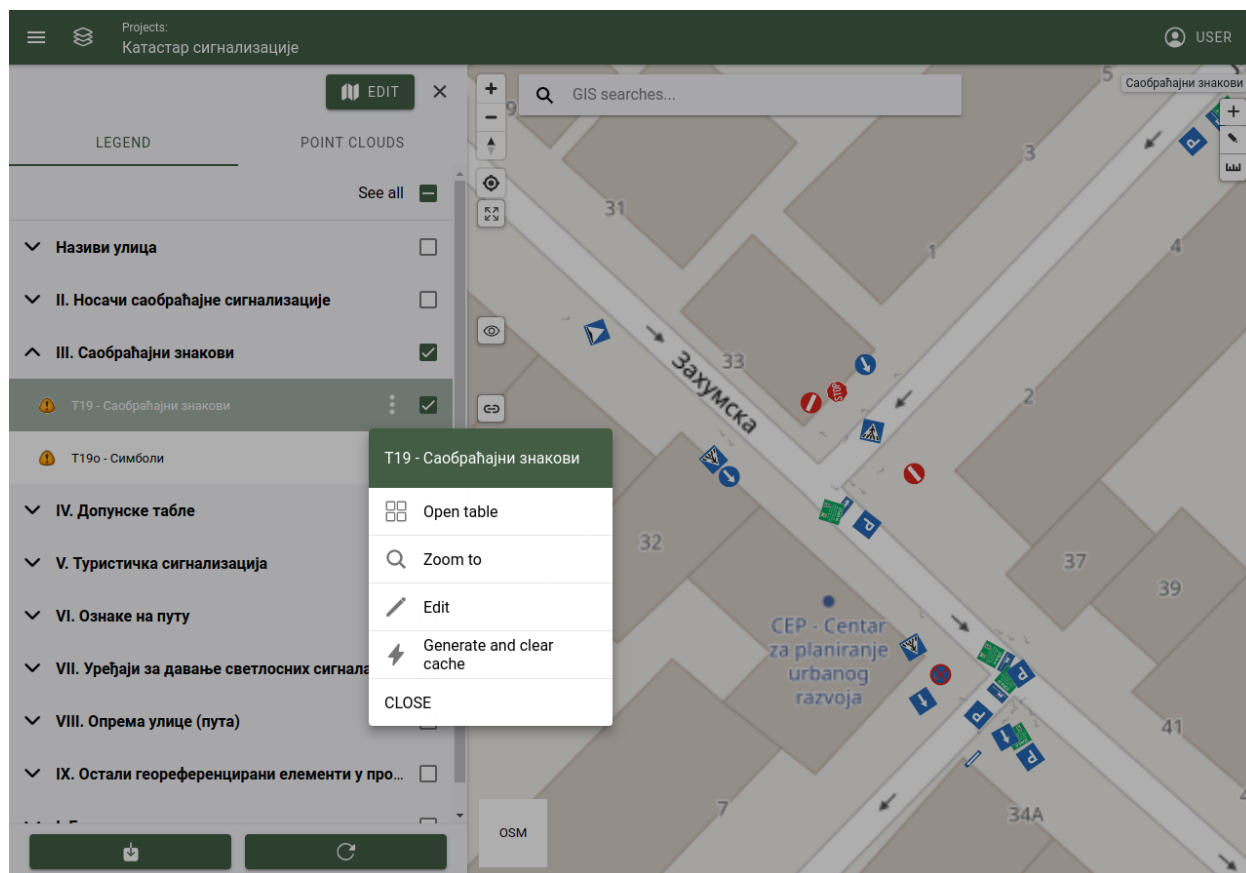
Table actions

1. Selected layers in tabs

When multiple layers are opened, it's objects attributes are displayed in tabs. Tabs can be selected to change which layer content is displayed or it can be closed.

2. Filtering content by polygon selection

By selecting the tool polygon filtering, drawing will be activated, and a polygon can be drawn on the 2D map. Table data will be filtered according to the drawn polygon, only those objects will be displayed in the table, which are inside the drawn polygon.



Slika 21: Opening attribute table from layer, more options

1. SAOBRAĆAJNI ZNAKOVI x										2.	3.	4.	5.	6.	7.	8.
9. Зона	ID ↑	Фотографија знак	Знакови	Положај знака смер кретања	Број носача знака	Величина	Назив општине	Назив улице								
10. Filter...	Filter...	Filter...	Filter...	Filter...	Filter...	Filter...	Filter...	Filter...								
11.	1	21		Са десне стране	1	0.60	СТАРИ ГР...	ТАКОВС								
	1	22		Са десне стране	1	0.60	ПАЛИЛУЛА	ТАКОВС								
	1	23		Са леве стране	1	0.60	СТАРИ ГР...	ТАКОВС								
	1	24		Са десне стране	1	0.60 x 0.60	СТАРИ ГР...	ТАКОВС								
	1	25		Са десне стране	1	0.90 x 0.90	ПАЛИЛУЛА	ТАКОВС								
	1	26		Са десне стране	1	0.60	ПАЛИЛУЛА	ТАКОВС								
10 48,678 total 13.										14. < 1 2 3 4 5 >						

Slika 22: Attribute table

Actions:

- Polygon selection: Turns on the tool, drawing is activated on the 2D map and it can finish by double clicking on the map.
- Cancel selection: Turns off the tool, clear the filter from the map and table.

3. Compact view

By selecting the tool (turning on and off) table rows will be adjusted to its minimal height. If table rows contains images (with lables) they will be reduced to fit the table rows.

4. Filter map with table data

By selecting the tool (turning on and off) the 2D map will be filtered by the table data. If table data is already filtered, map will be filter accordingly.

5. Export table data

By selecting this tool exporting data from table is possible.

Settings:

- Content of export: Layers, images, attachments.
- Methode of download: Download can be executed immediately, or scheduled. Scheduled exports are placed in a queue, when the export is finished the user will be notified by email.
- **Exported file format: File format can be:**
 - .gdb
 - .shp
 - .csv
 - .dxf
 - .xlsx
- Cancel: Cancels the export and close the popup window.
- Export: Start the export process.

Savjet: Not all user can export data, permission has to be attached to the user to allow export.

6. Show or hide table columns

Table column visibility can be changed to set which table columns will be shown or hidden.

Settings:

- Select all: Deselects all columns.
- Deselect all: Selects all columns.
- Save: Save settings and close the popup window.

Napomena: Only the checked columns will be shown.

7. Show or hide table

Minimize or restore table view.

8. Close

Closes the table view section.

9. Sorting table data by column

Table data can be sorted ascending or descending, by clicking on the column name.

10. Filter table data by set value

Table data will be filtered by the selected columns value.

11. Zoom on object

Focuses the 2D map on the selected object.

12. Edit object's attributes

Opens up the object's attribute form popup. In this popup the object's data can be changed and saved.

13. Itmes per page

Number of object per page can be set. It can be 10, 25, 50, 100, 500, 1000 or all.

Napomena: The more objects are set to display, (1000 or all) the greater will be the impact on performance.

14. Paging

Used to page through the list of objects.

1.5.2 Attribute form

Object's attributes and parameters can be edited on the attribute from.

Napomena: Layer object actions are tied to user permissions.

Open form

The form can be opened from multiple places:

- by selecting an object from the 2D map;
- by selecting an object and with the open form tool;
- from table with the open form button.

Mandatory, important fields

In the object's from, fields that are marked with:

- Marked with red: Mandatory fields, they must be filled to save the object's parameters.
- Marked with yellow: Not a mandatory fields, but they are important.
- Marked with no color: Object can be saved without filling these fields.

Lookup tables

Object form	
DATA	HISTORY
Положај знака смер кретања Са десне стране	Број носача знака 1
Вазећи правилник 85/17	Група знака
Шифра саобраћајног знака 1	Шифра саобраћајног знака 2
Допунска табла 0	Редно место на стубу
Осветљење знака Без или самостално по дифолту	Материјал израде Метал
Лице знака -	fluorescentna_podloga нема

CANCEL SAVE & CLOSE SAVE

Slika 23: Object's attribute form

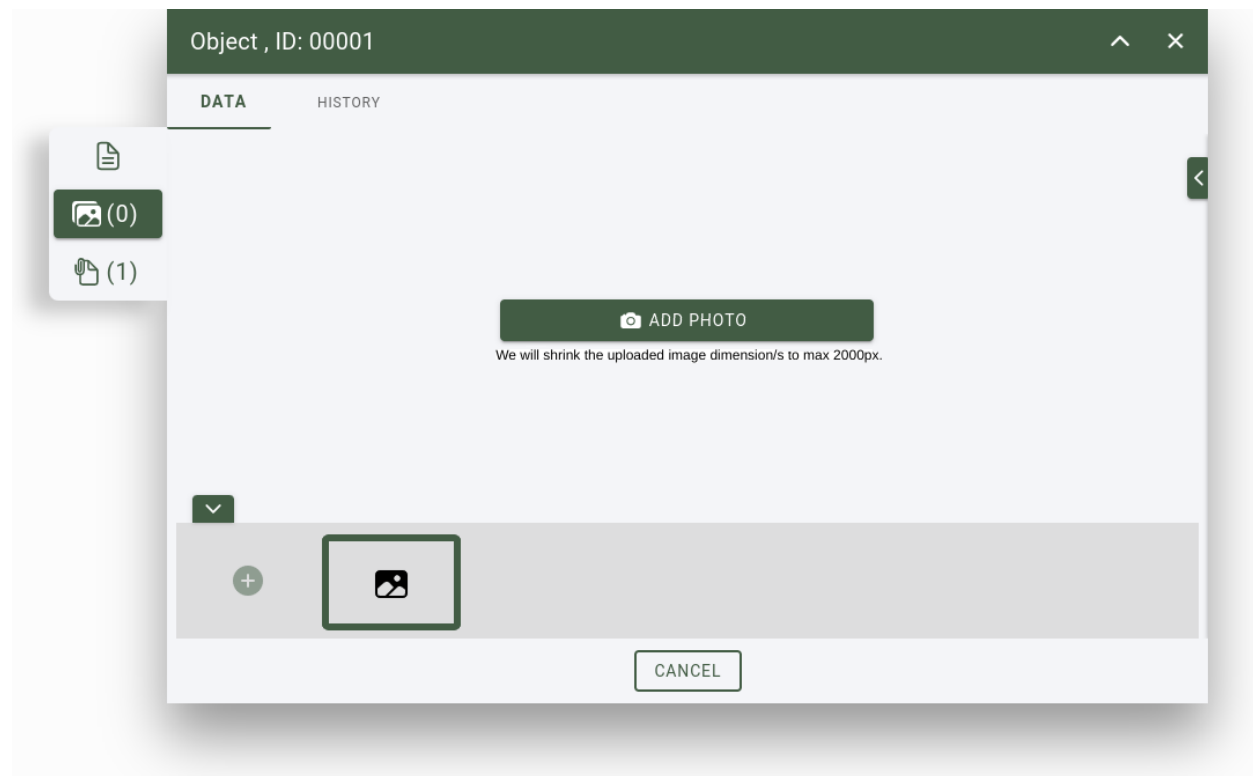
Geolocation, automatic fields

Attach images

Additional images can be attached to the object. It can be uploaded from the users computer, or if the user uses from a mobile device camera photo can be uploaded, or it can be generated from the - if available - nearby panoramic images.

Actions:

- Add photo: An image can be selected and prepared for upload. Multiple images can be prepared for upload.
- Select a system generated image from panoramic images nearby: The system can generated panoramic images by setting the min and max distance, rotation and the number of generated. When the parameters are set a list of images are generated (defined by the „number of images” parameter). From the list a single image can be selected for upload.
- Crop: When the image is selected, it can be cropped. Set the cropping rectangle to the desired width and height and press the „crop” button. To reset the cropping, press the „X” button.
- Cancel: Cancel the upload and close the attribute form.
- Upload: Starts the upload procedure. After the image is uploaded successfully a new image upload can be made when the „+” button is pressed in the image slider, or the selected image can be removed.
- Restart: Return to the add photo phase and a new image can be prepared.
- Add new image: A new image can be selected and prepared for upload.



Slika 24: Attribute form, image manager

Attach documents

Additional files, documents can be attached to the object. It can be uploaded from the users computer.

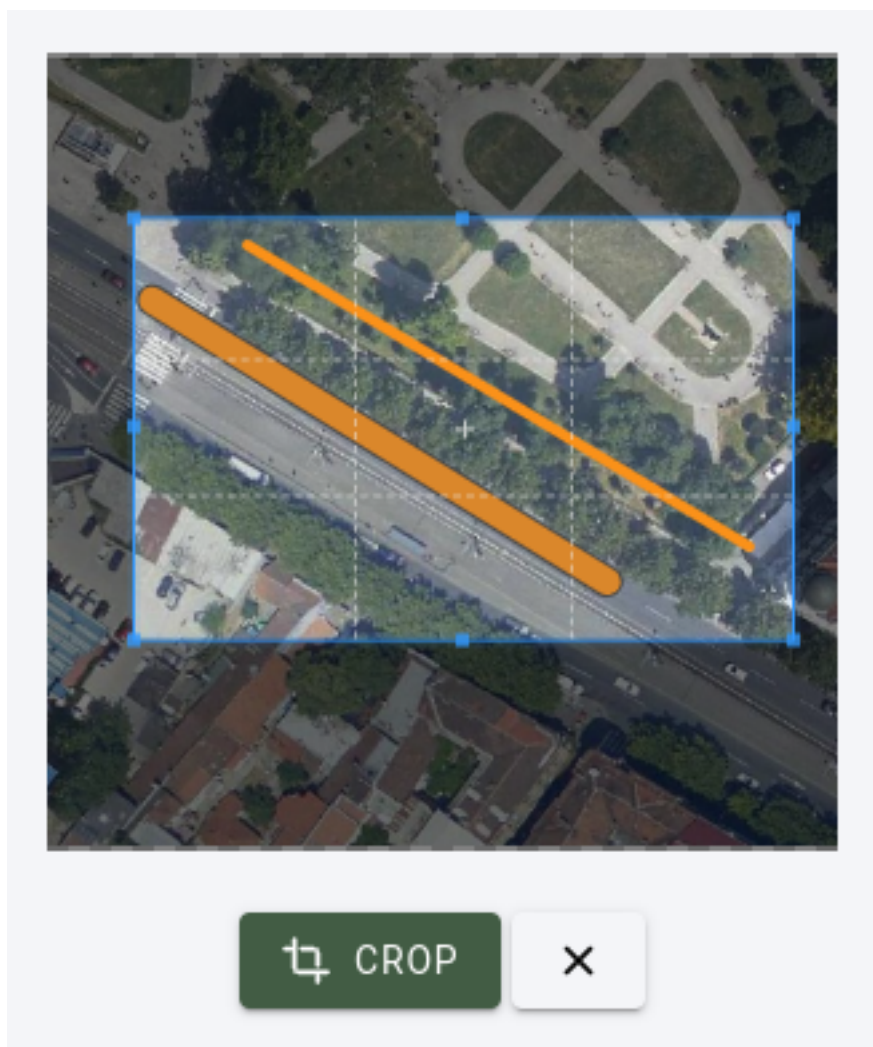
Actions:

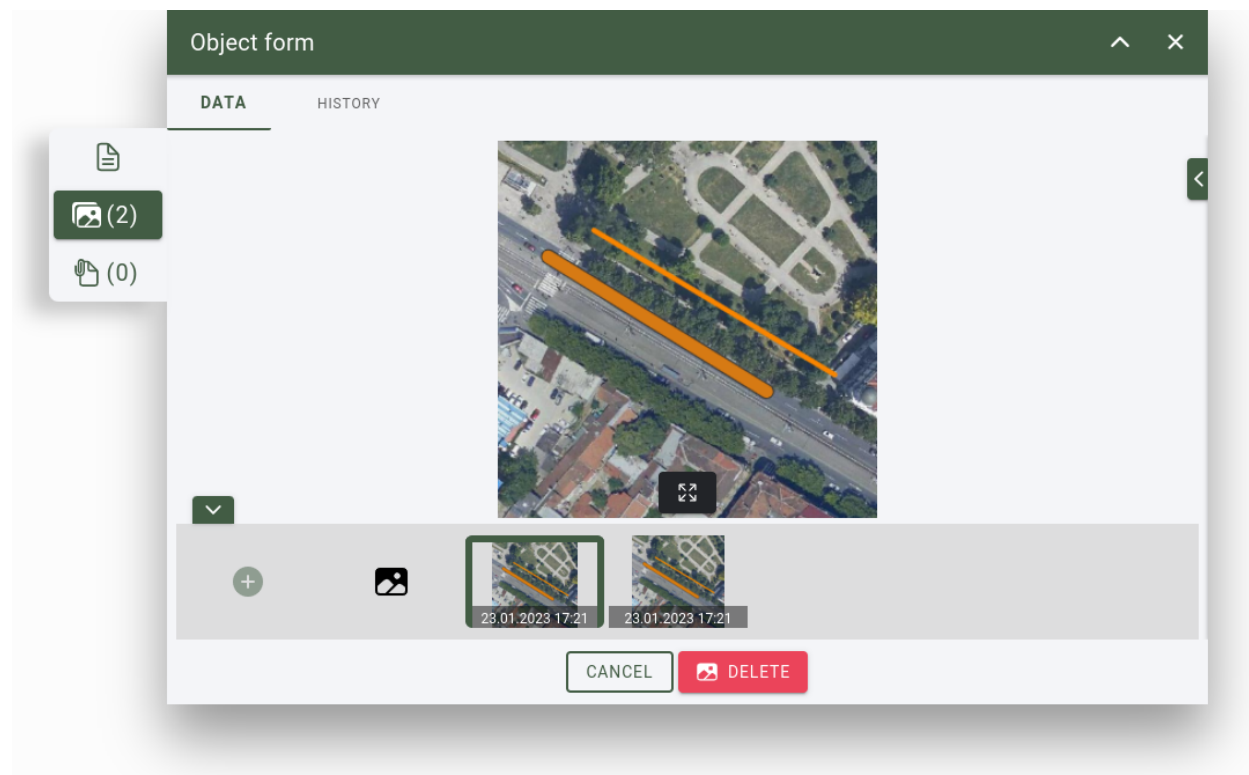
- Add: A file can be selected and prepared for upload. Multiple files can be prepared for upload.
- Upload: Start the upload process.
- Remove file: At the end of the row there is an „X” button to remove prepared file from upload. When all files are removed, the upload button will be hidden.

1.5.3 2D digitizing tools

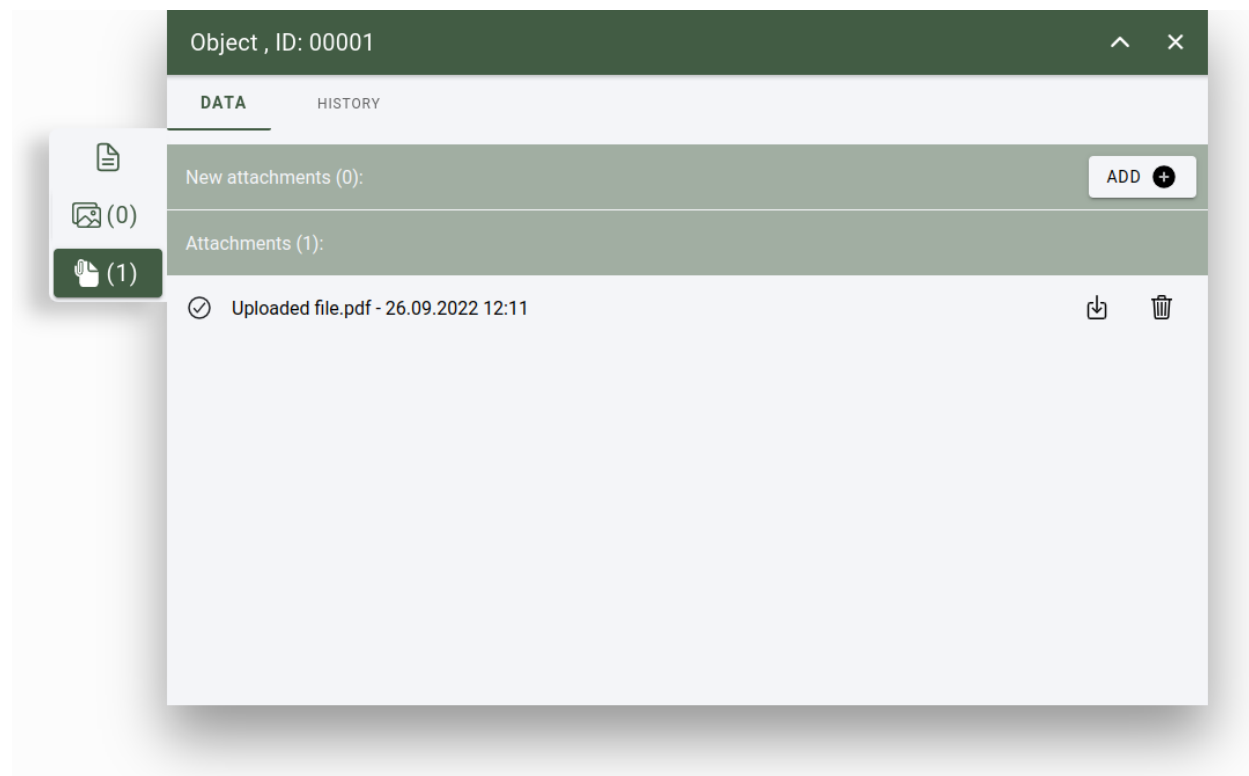
Select active layer from map legend

Layers are represented in layer groups. A layer can be set as active layer, when a layer group is opened and a layer is selected from the list (clicked on the layer's name). Toolbar will appear inside the map view's upper right corner along with active layer's name.

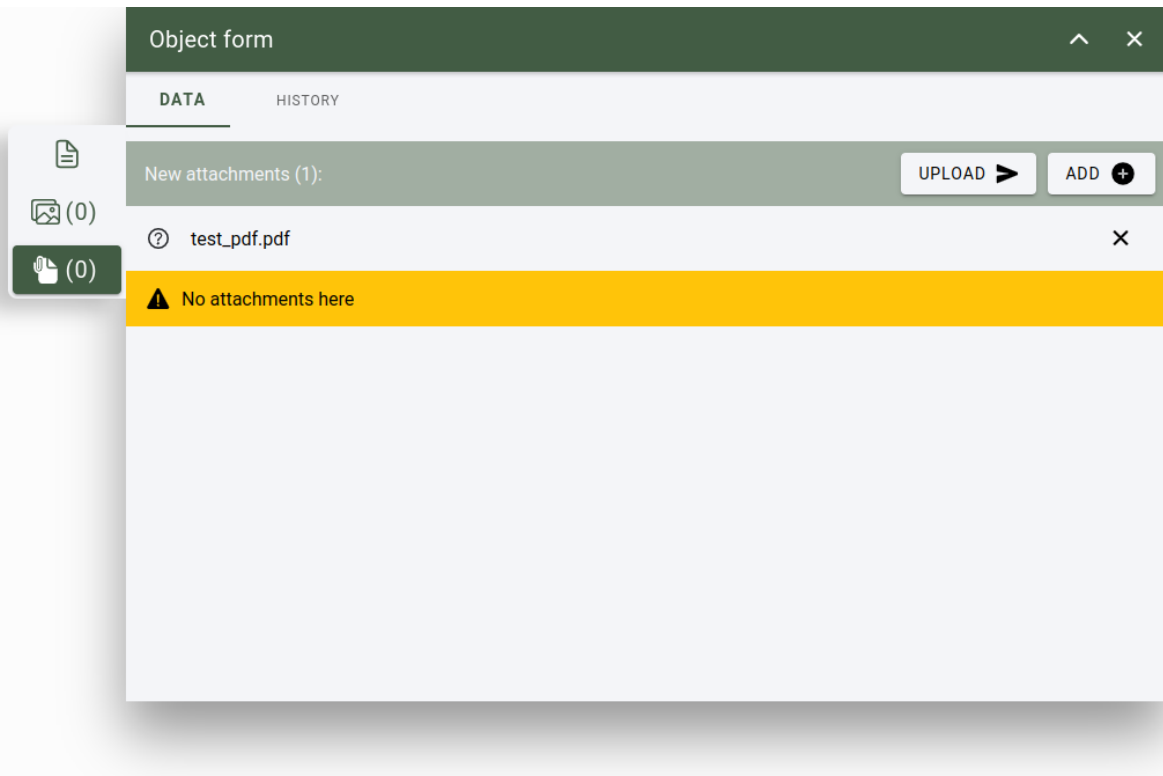




Slika 25: List of uploaded images



Slika 26: Attribute form, file manager



Slika 27: List of uploaded files

Add new feature

Adding an object's is possible, when the active layer is set. To add an object, select the „+” tool from the toolbar.

Actions:

- Drawing and object is done by activating the tool and clicking on the map.
- To finishing drawing the new object simply double click on the object's last point on the map. (when drawing a point object, single clicking on the map is enough, double clicking is necessary only when drawing an object with multiple points like lines or poligons)

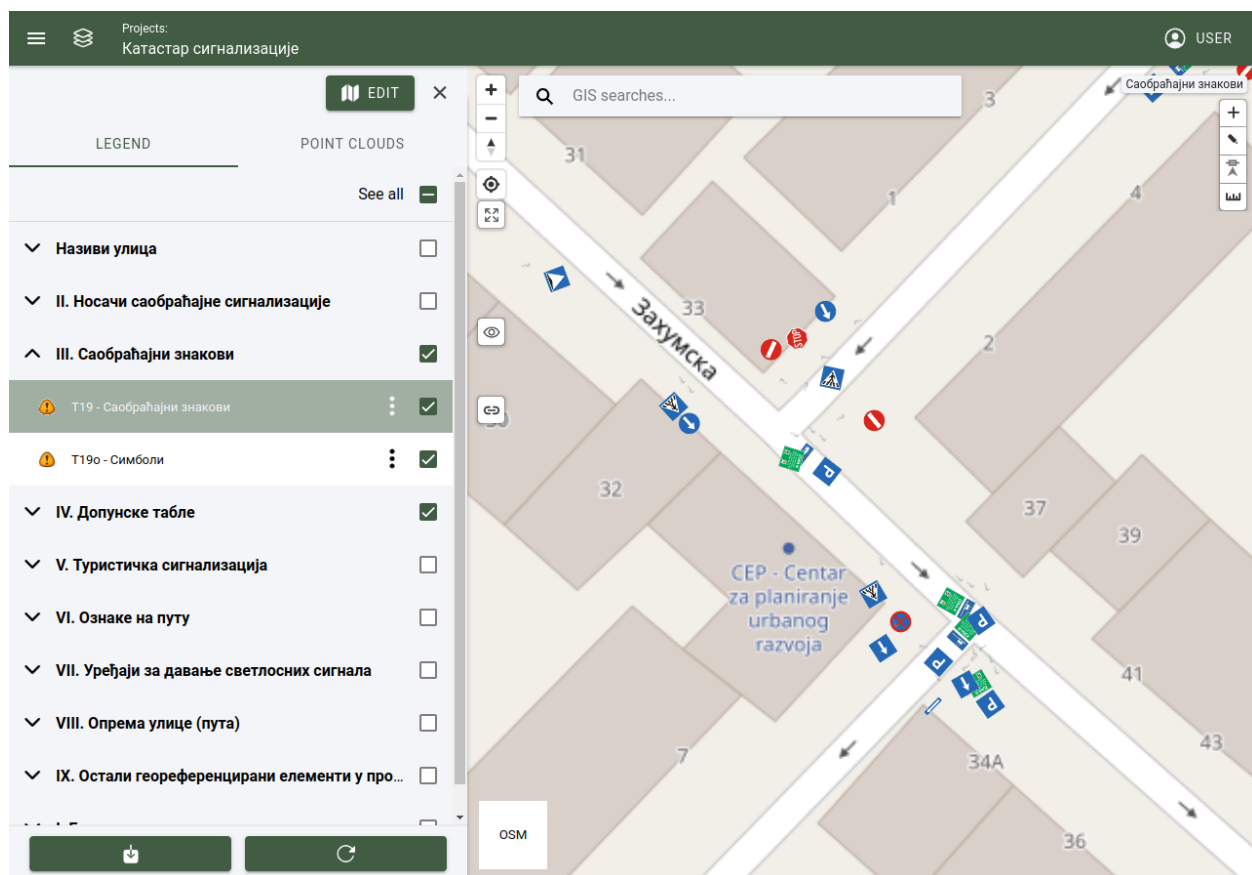
Savjet: For example, when drawing a line object which contains of 3 points, draw the first and sercond point and when drawing the third point double click to finish the object.

Edit existing feature

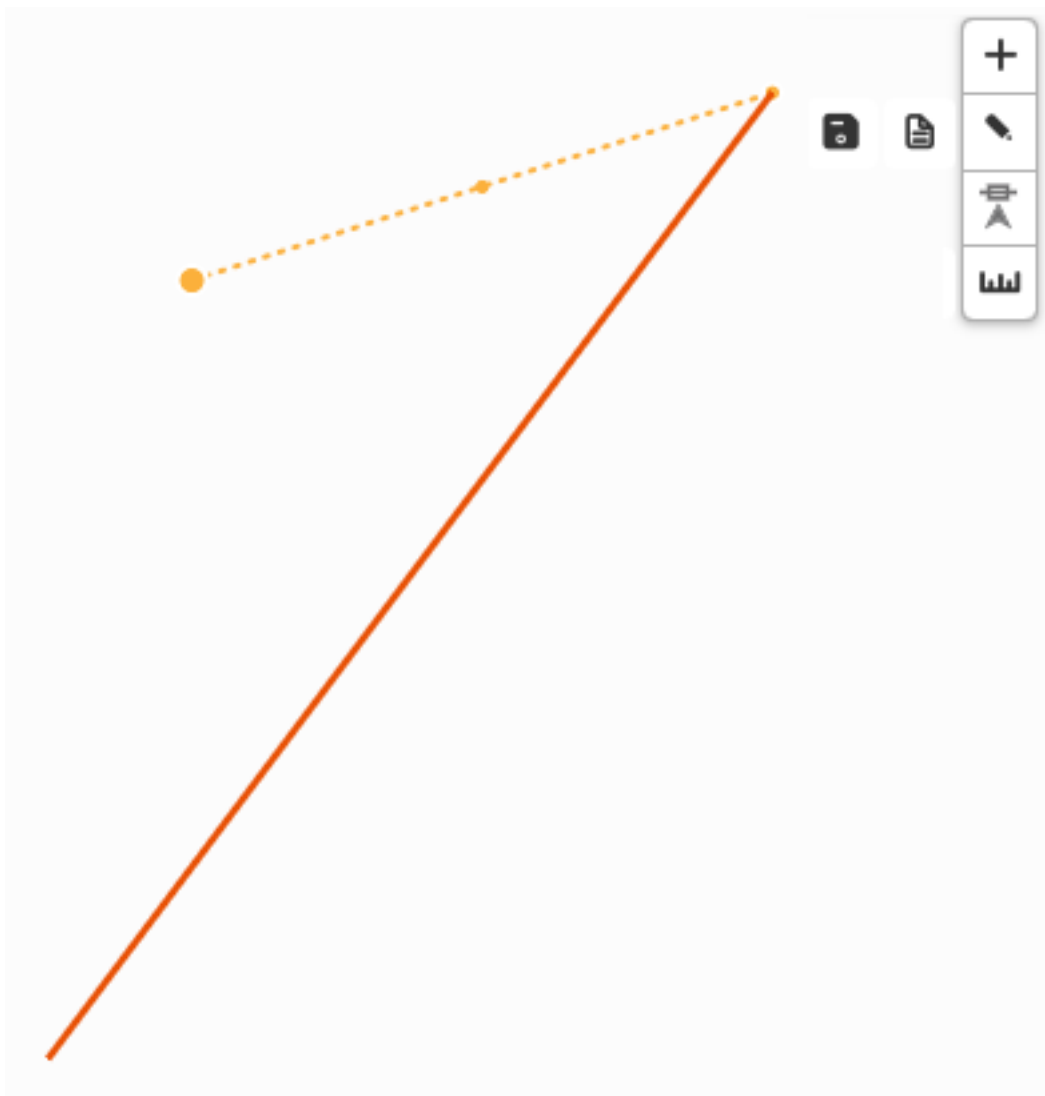
Editing an object's is possible, when the active layer is set. To edit an object, select the „pencil” tool from the toolbar.

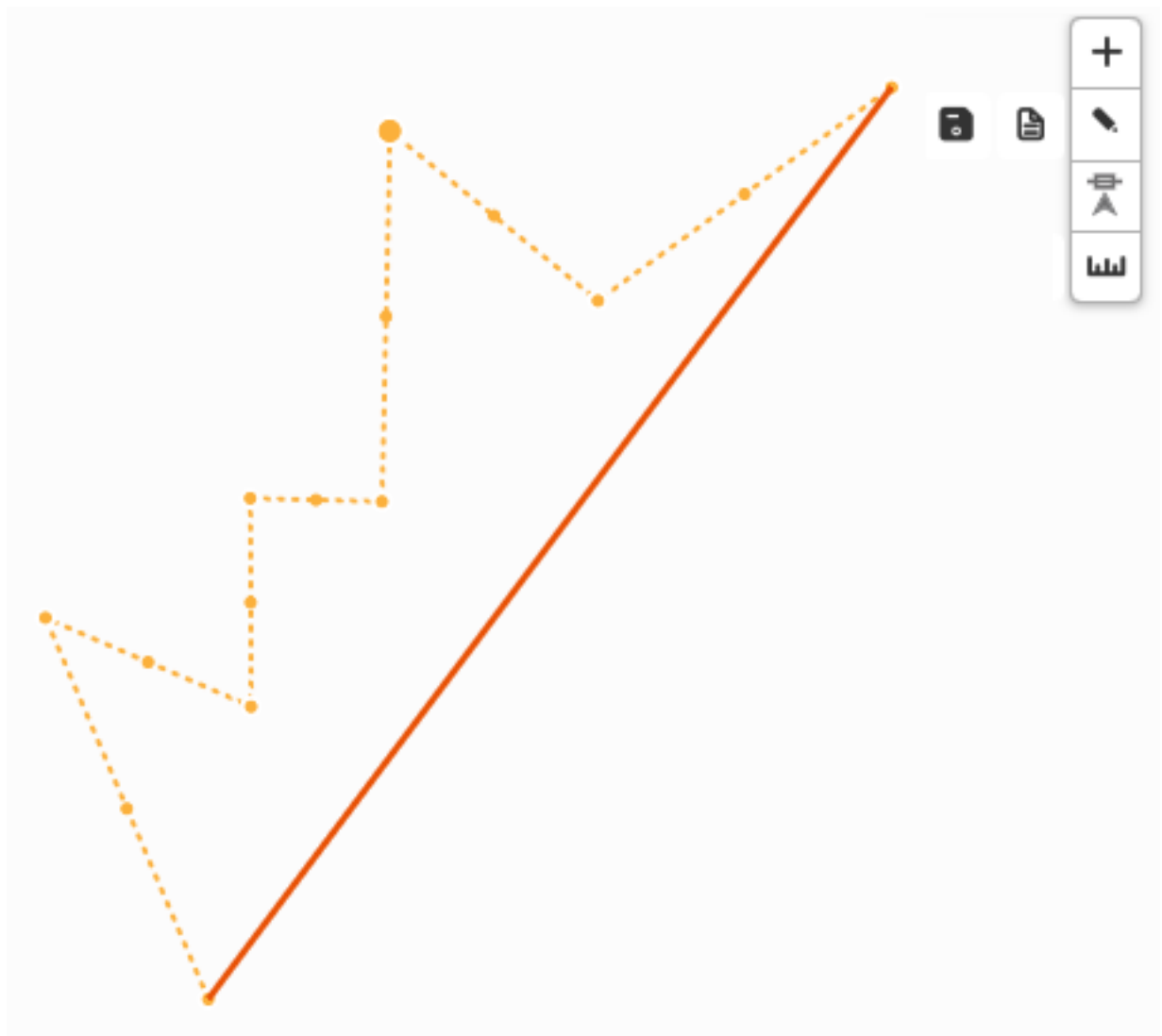
Actions:

- On the map, select an object to activate it.
- Click on the object again to edit its points.
- Click and drag the endpoints to relocate.
- Click and drag the lines to breake and create additional endpoints.



Slika 28: Slecting the active layer





- To save the edited object click on the „save” tool (this will save the new position of the object) or on the „open form” tool (this will open the object’s form, and additional parameters can be modified).

Delete feature

To remove an object, object must be selected on the 2D map. When the object is selected, object can be removed through the objects form by selecting the remove button.

Undo / redo

Undo or redo tool is active when add or edit tool is selected.

Actions:

- Undo: Undo an action.
- Redo: Redo an action.

Snapping

Snap to vertex tool can be activated or deactivated. When drawing an object, and the pointer is near to another object, it will jump or snap to the other object’s point. Snap to vertex can be used when an object is edited or a new is created.

Snap tool types:

- Line: Pointer snaps to the object’s line.
- Vertex: Pointer snaps to the object’s point.
- Line and vertex: Pointer snaps to the object’s lines and points.

Open attribute form

When an object is selected from the map, object’s attributes are opened and displayed in the attribute form. Object’s data can be changed and saved.

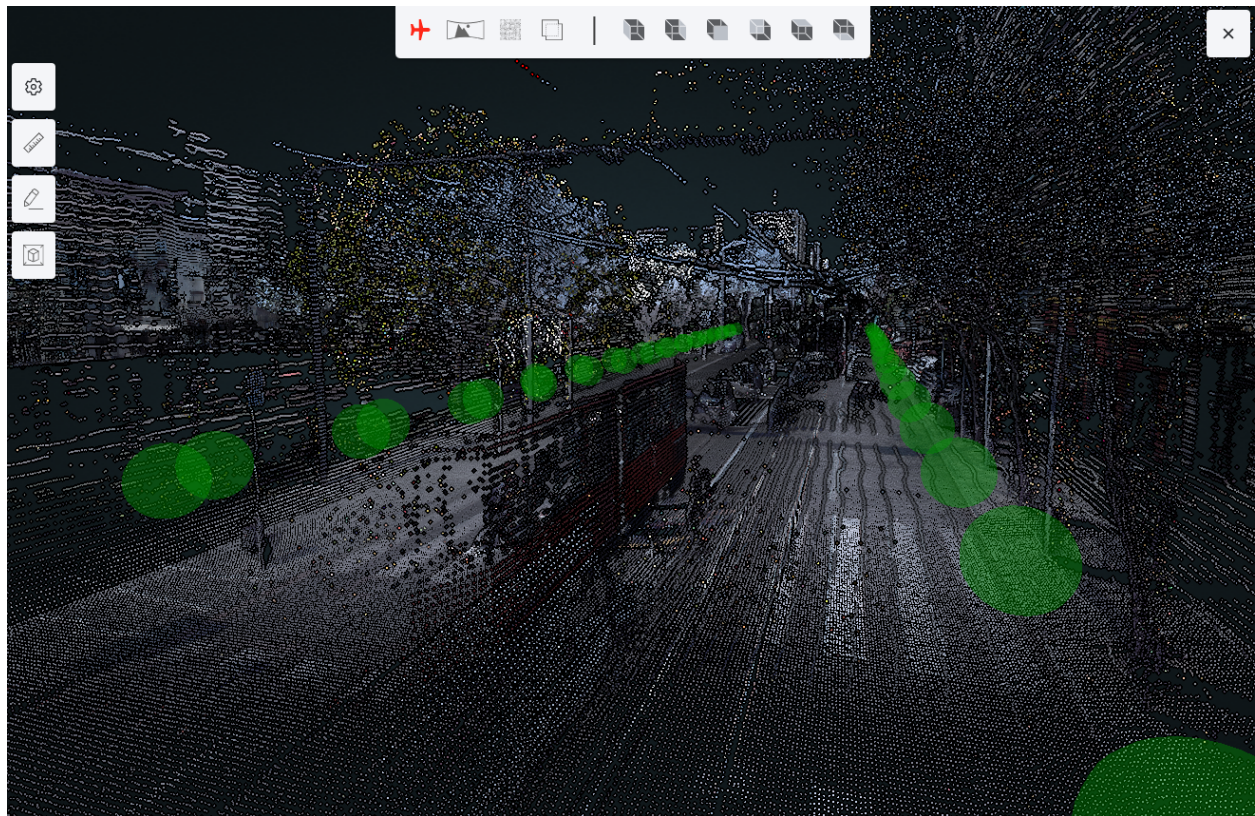
Attribute form

1.5.4 3D digitizing tools

Savjet: use document **User manual - Point cloud**

3D digitalizing tools are used to create precisely defined objects on the point cloud map, by creating relations between the cloud’s points.

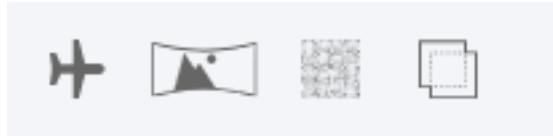
Napomena: Digitalization tools that are for creating or editing features are available when the active layer is set.



Slika 29: Point cloud map

View modes

There are 4 map view modes and 6 camera view modes.



Map view modes:

- Bird eye view: User's point of view is set to free, camera can be moved, rotated zoomed freely on the point cloud map.
- Panorama spherical view: User's point of view is placed to the nearest panorama sphere. A panorama image is displayed, the camera can be rotated freely, zoom is limited.
- Point cloud spherical view: User's point of view is placed to the nearest panorama sphere, only point cloud points are displayed. Camera can be rotated freely, zoom is limited.
- Combined spherical view: User's point of view is placed to the nearest panorama sphere, combined view is used with point cloud and panorama image. Camera can be rotated freely, zoom is limited.

User view of the point cloud map is rotated to its predefined views:



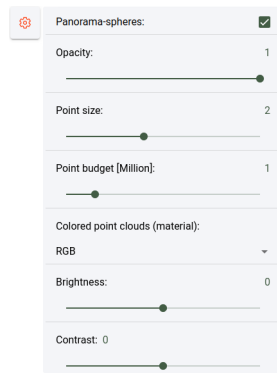
- Left side view
- Right side view
- Front side view
- Back side view
- Top side view
- Bottom side view

Settings

Settings of the point cloud map can be set.

Actions:

- Panorama spheres: Show or hides the panorama spheres on the point cloud map.
- Opacity: Changes the opacity of the point cloud points.
- Size of points: Changes the size of points on the point cloud map.
- Point budget [Million]: Changes the number of rendered points on the point cloud map.
- Colored points clouds (material): Change the coloring of the point cloud map.
- Brightness: Changes the brightness of the points on the point cloud map.
- Contrast: Changes the contrast of the points on the point cloud map.
- Gamma: Changes the gamma of the points on the point cloud map.



Slika 30: Point cloud settings

Measurement tools

Measurement tools are used to measure length, distance, height, area, angle on the point cloud map. Measurement is done between point, (minimum of two) that are set on the point cloud map.



Tools:

- Measurement of distance: Distance is measured between points, multiple points can be set.
- Measurement of height: Measurement is done between point, distance is measured only vertically.
- Measurement of distance on horizontal plane: Measurement is done between point, distance is measured only horizontally.
- Measurement of area: Area is measured between minimum of three points.
- Measurement of angle: Angle is measured between 3 points.
- Measurement of angle facing north: Angle is measured between 3 points. When the first point is placed, a second point is placed on the map facing north, and the third point can be placed.

Add new feature

When the add tool is active, drawing a new object is possible on the point cloud map, when a layer is set as active layer. By default the add tool can be activated with the button „e”.



Napomena: The new object's type, depends on the active layer's type. It can be point, line or polygon.

Edit existing feature

When the edit tool is active, objects on the point cloud map are selectable. Selected objects can be edited (add new points, remove, change parameters on form, etc.). By default the edit tool can be activated with button „r”. Edited points can be moved on selected axis. (button „x”)



Actions:

- Left click on object (single click): First click selects the object. (point, line, polygon) Other objects cant be selected until the current object is deselected.
- **When the object is selected:**
 - Position of the edited object's point can be changed along x, y, z axes.
 - Add new point to the end of the object. (ctrl + click on line of the object, this action is done by a shortcut)
 - Add new point on the line of the object. (between existing points) (shift click on the line of the object, this action is done by a shortcut)
 - Remove object points: Remove points of the selected object. (buttons „delete” or „d”, this action is done by a shortcut)
 - Active object edit can be deactivated with button „esc”.
- Layer selection: Selected layer (active layer):
- When another layer is selected, active drawn object can be saved, removed, or continued.
- Save parameters: Parameters can be saved through „open form” tool or when the „space” button is pressed.
- Shortcuts: More information about shortcuts under section „Shortcuts”.

Follow drawing

Follow drawing tool can be activated alongside with the add or edit tool. When the tool is activated and drawing on the point cloud map, camera will be focused on the newly drawn or edit object's points.



Undo / redo

Undo or redo tool is active when add or edit tool is selected.



Actions:

- Undo: Undo an action.
- Redo: Redo an action.

Delete feature

Delete tool is active when an object is selected in the point cloud map.



Actions:

- Remove object: Remove selected object.

Copy / paste feature

Tool can be used with the edit tool. When an object is selected on the point cloud map, the tool can be activated. When clicked on the copy tool, the paste tool activates. When clicked on the paste tool the mouse cursor changes to a cross. In this state the copied object can be pasted on the point cloud map.



Join line features

Tool can be used with the edit tool. When an object is selected it changes to color yellow, then another object can be selected by pressing the ctrl button on the keyboard and selecting it on the point cloud map. The second object will change its color to green. Then the join line tool is activated. When used the user will be asked to join the two objects. When it is accepted the first object's geometry will be changed and the second object will be removed.



Snapping

Snap to vertex tool can be activated or deactivated. When drawing an object, and the pointer is near to another object, it will jump or snap to the other object's point. Snap to vertex can be used when an object is edited or a new is created.



Snap tool types:

- Line: Pointer snaps to the object's line.
- Vertex: Pointer snaps to the object's point.
- Line and vertex: Pointer snaps to the object's lines and points.



Slika 31: Snapping modes

Open attribute form

Form can be opened with open object's form tool. When the form is opened it is filled with fields where the object's parameter can be changed. (by default form can be opened with „space” button)



Actions on form:

1. Data: Fields where the object parameters can be set or changed.
2. Cancel: Cancel and close object popup window.
3. Save and close: Save object's parameters and close the object's form popup.
4. Save: Save object's parameters.
5. Delete: Remove selected object.
6. Object attachments: Photos and attachments can be managed.

More info about the object form can be read here. [Attribute form](#)

Clipbox

Clipbox tool is used to clip a selected part of the point cloud map. When the clipbox is set, only the clipped part is visible, other parts of the point cloud map will be hidden. This tool make the work easier, and concentrates on a limited section of the point cloud map.

Actions:

- Clipbox checkmark button: Activates the tool. To use it, click on the desired part of the point cloud map and press the left mouse button to place the clipbox marker.
- **Tool options:**
 - Scale clipbox: Clipbox can be scaled vertically or horizontally by proportions.
 - Scale clipbox by the axis: Clipbox can be scaled by the x, y, z axis.
 - Rotate clipbox: Clipbox can be rotated by the x, y, z axis.
 - Move clipbox: Clipbox can be moved by the x, y, z axis.
 - **Activate clip: Activate the clipbox, showing only the selected part.**
 - * Return to active clipping: Only available when the clipbox is activated, the point cloud is returned to its original state, and the tool stays active, and can be used again.
 - * Cancel clipping: Only available when the clipbox is activated, cancels the clipping the point cloud map returns to its original state and deactivated the clipbox tool.
 - Deactivates Cancel clip: Deactivates the clipbox tool.

Object , ID: 401001

DATA HISTORY 1.

Положај знака смер кретања Са десне стране	Број носача знака 1
Вазећи правилник 85/17	Група знака II - Знакови изричитих наредби
Шифра саобраћајног знака 1 II-43	Шифра саобраћајног знака 2 II-43
Допунска табла 0	Редно место на стубу 1
Осветљење знака Без или самостално по дифолту	Материјал израде Пластика
Лице знака Класа 3	fluorescentna_podloga нема
Усклађеност СРПСЕН1289912011	Боја основе знака

6.

CANCEL SAVE & CLOSE SAVE DELETE

2. 3. 4. 5.

Slika 32: Attribute form

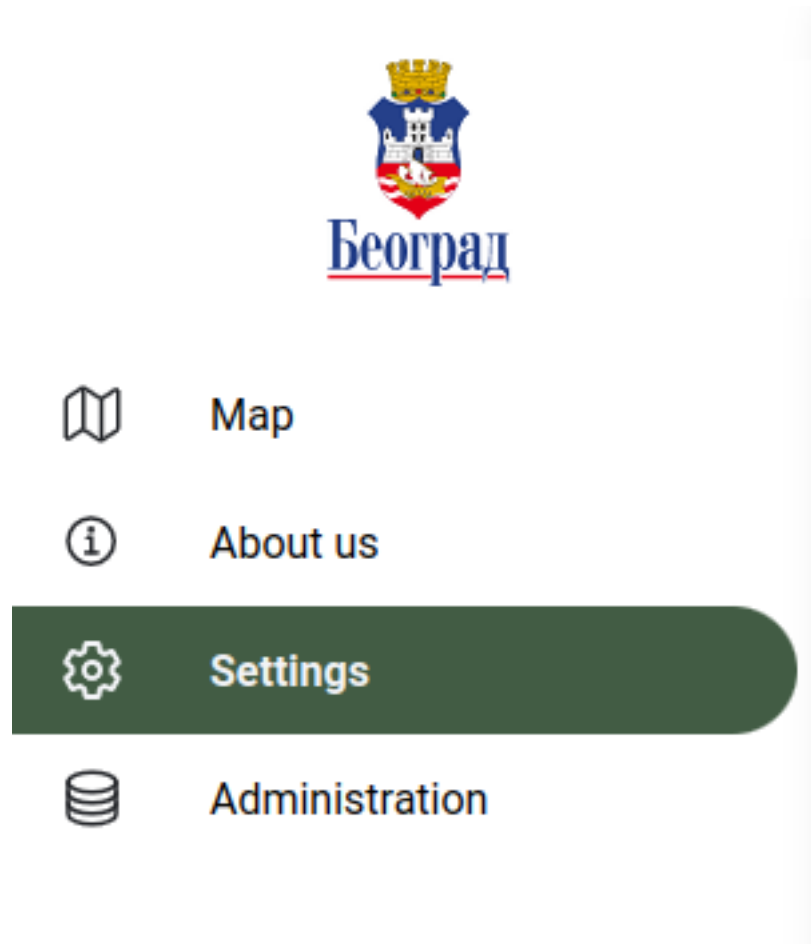


Shortcuts

Shortcuts are used on the point cloud map. They are useful when objects are added or edited. More info about shortcuts can be read here. [Shortcuts](#)

1.6 Settings

Under settings basic system settings can be changed and set.



1.6.1 Select language

Application language can be switched between english, serbian, hungarian or other language that is defined in the system.

Language:

CP

SR

EN

1.6.2 Dark mode

Dark mode can be turned on or off. When turned on a darker color scheme is used throughout the system to reduce eye strain by darkening the background and reducing contrast with your surroundings.

Dark mode:



Dark mode:



1.6.3 Shortcuts

Shortcuts are used frequently when working with gis objects. Default shortcuts can be changed by the users needs.

Shortcuts:

FUNCTION	SHORTCUT			
Command 1:	shift	▼		
Command 2:	control	▼		
Command 3:	c	▼		
Point cloud <-> Street view:		▼	+	u
Street view - photograph:		▼	+	i
Street view - cloud:		▼	+	o
Street view - combined:		▼	+	p
Street view - zoom in:		▼	+	w

1.7 Create your own maps

Map creation involves the process of combining data layers, styling them with colors, symbols, and labels, and arranging them in an appropriate order to create an informative and visually appealing map.

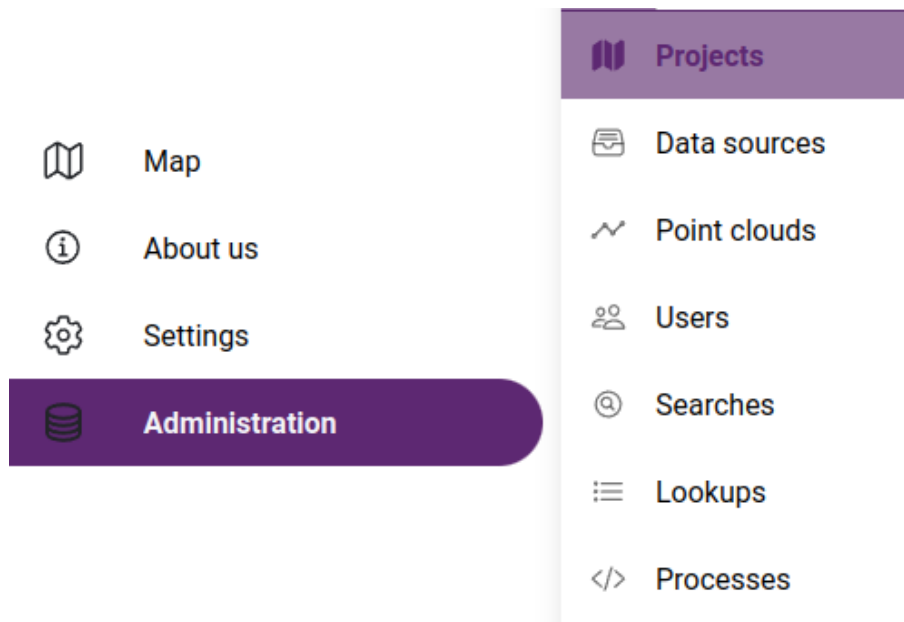
Main steps to provide the data to be displayed on the map:

- Data acquisition: Collecting or acquiring the data to be included in the map, such as demographic data, satellite imagery, or road networks.
- Data preparation: Cleaning and organizing the data, fixing any errors or inconsistencies, and transforming it into a suitable format for use in the GIS application.
- Data projection: Defining the map projection, which is the way the data is represented on a flat surface, such as a computer screen.

Creating maps in SmartGIS involves the following operations:

- Data source collection - Creating a library from spatial data and cloud resources
- 3D point cloud collection (optional) - Creating a library from point cloud recordings and spherical images
- Map creation: Defining map attributes and access rights, selection of available point clouds
- Laying out the map: Arranging the data layers in an appropriate order and defining the overall appearance of the map, including the title, legend, and scale.
- Data symbology: Defining the symbols, colors, and labels used to represent the data on the map, including the type of symbol, size, and color.
- Interactivity: Adding interactive features to the map, such as pop-up windows and querying of data layers.

Data and map operations are managed on the administration pages. These pages are only available to users added within the application, on the [Team management](#) page.



Slika 33: Accessing administration pages

1.7.1 Data sources

Data sources play a crucial role in GIS map creation. They provide the raw materials for creating maps and are the foundation upon which maps are built.

Maps can be created using a variety of data formats:

- **Vector data formats:** Vector data formats, such as Shapefile and GeoJSON, store data as points, lines, and polygon shapes and are commonly used for GIS maps.
- **Raster data formats:** Raster data formats, such as GeoTIFF and JPEG 2000, store data as grids of cells with each cell representing a specific value and are commonly used for satellite imagery and digital elevation models.
- **Database formats:** Database formats, such as PostGIS, are used to store large amounts of GIS data and provide advanced query and analysis capabilities.
- **Web service formats:** Web service formats, such as WMS, allow data to be accessed and displayed as a map through a web interface.

There are many sources for obtaining data to use in GIS maps:

- **Government agencies:** Many government agencies make data available to the public for free or for a fee.
- **Commercial data providers:** There are many commercial data providers that specialize in providing data for GIS mapping, such as Esri and DigitalGlobe.
- **Open data portals:** Many governments and organizations have established open data portals, which provide access to data for free or for a small fee. Examples include the European Commission's Copernicus program and the U.S. government's data.gov portal.
- **Crowdsourced data:** Crowdsourced data, such as OpenStreetMap, is becoming increasingly popular as a source of data for GIS maps. This data is generated by volunteers who collect and share data about the world around them.
- **Satellite imagery:** Remote sensing technology is widely used to capture data about the Earth's surface, including satellite imagery, which can be used as a data source for GIS maps.

- Drone-collected data: It is increasingly popular in GIS applications as it provides fast, cost-effective and accurate data collection options.
- Personal data collection: Data can be collected personally, such as through field surveys, to create custom data sets for use in GIS maps.

Data source administration pages can be accessed from the sidebar: [Administration->Data Sources](#).

Data source sections

Data sources are divided into the following classes:

- File data sources
- Database connections
- WMS services
- External services



Slika 34: Data source sections

File data sources

Usually data sources are available in files. After preparation, they must be in a suitable file format to be imported into the application.

Supported **vector** formats

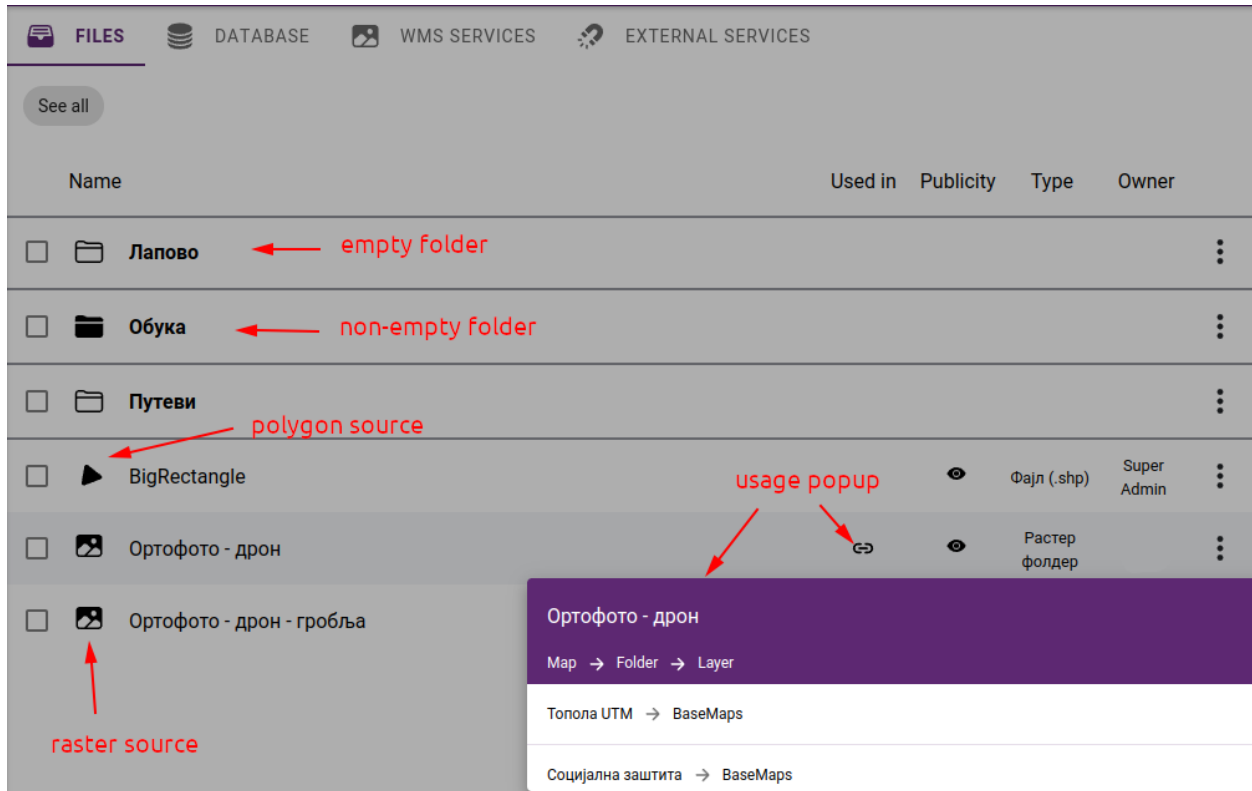
- ESRI ShapeFile
- ESRI Geopdatabase
- Mapinfo TAB
- Mapinfo MIF
- Autocad DXF
- GeoJSON
- KML

Supported **raster** formats

- TIFF
- JPEG

File structure

File data sources are organized into folders. The current folder is listed with its subfolders.



Slika 35: Data source folder contents by opening the usage pop-up window

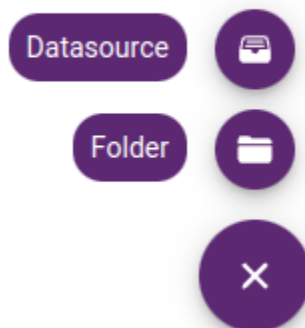
To create a new folder, click the **+** icon in the bottom right corner, select **Folder** and enter name

It is possible to move a data source or folder to another folder using the **MOVE** function. To do this, we first need to select the data source(s) and/or folder(s) to activate the **MOVE** option:

After clicking on the **MOVE** button, we need to select the destination folder and click on button **MOVE HERE**:

Selected datasources can also be deleted by clicking on the Trash icon:

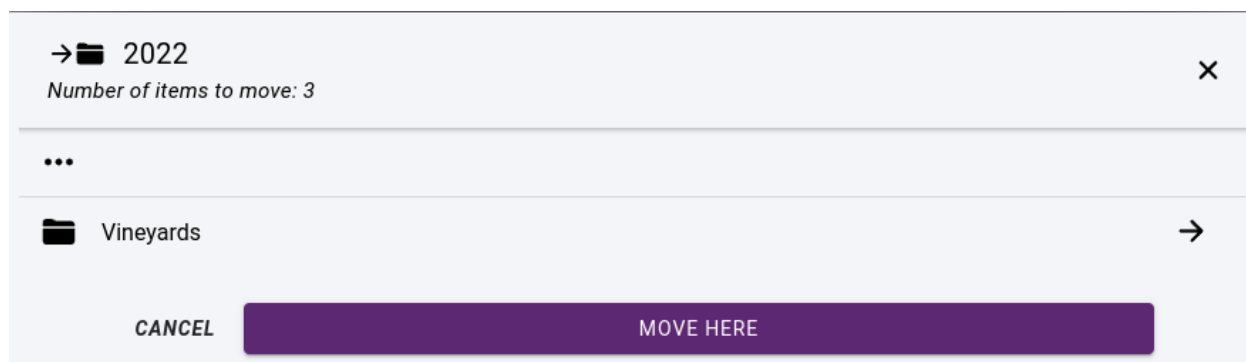
Napomena: The trash icon is active only if none of the selected datasources has usage on any map.



Slika 36: Creating new data source or folder

<div> <div>FILES</div> <div>DATABASE</div> <div>WMS SERVICES</div> <div>EXTERNAL SERVICES</div> </div>					
See all		<div> <div>🗑️</div> <div>✕</div> <div>(2) MOVE → 📁</div> </div>			
Name	Used in	Publicity	Type	Owner	
<input type="checkbox"/> 📁 Обука					⋮
<input type="checkbox"/> 📁 Путеви					⋮
<input type="checkbox"/> ▶ BigRectangle		👁️	Фajл (.shp)	Super Admin	⋮
<input checked="" type="checkbox"/> 🖼️ Ортофото - дрон	🔗	👁️	Растер фолдер		⋮
<input type="checkbox"/> 🖼️ Ортофото - дрон - гробља	🔗	👁️	Растер фолдер		⋮

Slika 37: Selecting datasources, folders



Slika 38: Moving a datasource



Creating a new data source

To create a new folder, click the **+** icon in the bottom right corner and select **Datasource**. A **New datasource** panel will appear with the following fields:

- **Name** - datasource name
- Description - optional description
- Attribution - optional copyright text for XYZ datasources and WMS connections. If the copyright text is available, it will be displayed on maps where the data source is in use.
- **Type** - importing files or content of a folder
- **Format** spatial format
- **Basemap** - whether it should be available as a basemap
- **Files** - UPLOAD files from computer or IMPORT by selecting from the server
- **Projection** - data projection - select from list or enter projection string in **PROJ.4** format
- **Encoding** - encoding of the attribute table
- **Geometry type** - select geometry type for vector data sources

Savjet: If you need to upload large files, you should upload them via FTP and import them as a data source. This can be particularly important for rasters where the data source usually has many files in a folder.

Savjet: In the case of vector data, it is recommended to store them in the application's spatial database rather than as files. To do this, select the **ADD TO APPLICATION'S DATABASE** button.

Datasource editing

It is possible to subsequently change the settings of data sources and perform other operations. To do this, click on **...** at the end of the line and select from the local menu:

- **Edit** - opens data source edit form
- **Delete** - deletes a data source
- **Add to Application's database** - datasource will be available in Application's spatial database as a PostGIS table
- **Add to project** - add data source to a project by creating a new layer
- **Download** - download datasource files in a ZIP archive. This feature is available only to users with export permissions set in the *Team Management* section.

If you want to add the data source to a project, you need to select the project and target folder:

+ New datasource: File

GENERAL SETTINGS

Name:

id:

0

Description:

Type:

Файл ▾

Format:

ESRI Shapefile ▾

Basemap:

☐

UPLOAD

DIRECTORY

* Need to be uploaded one of each following data types::
.shp, .shx, .dbf

* Also, you can upload one of each following::
.prj, .qpj, .cpg

CHOOSE FILES

Files:

Projection:

EPSG:32634

EPSG:32634 / UTM zone 34N ▾

Encoding:

UTF-8 ▾

Geometry type:

Polygon ▾

CANCEL

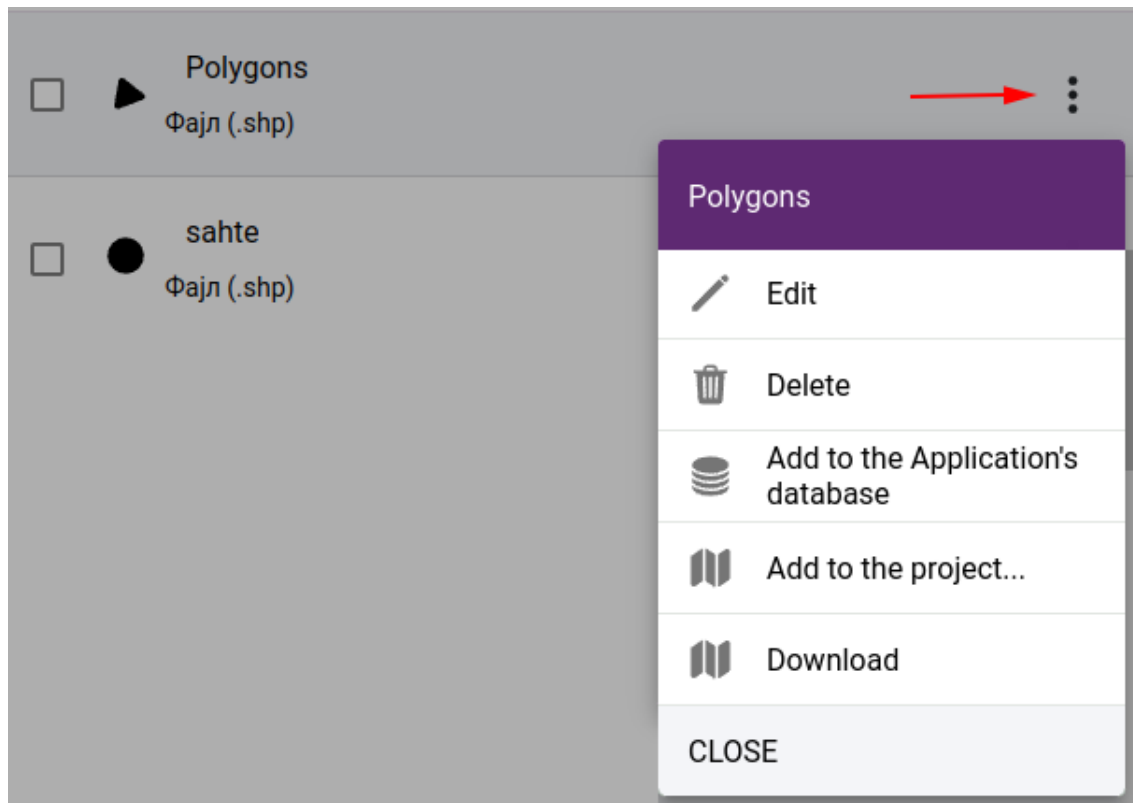
CREATE DATASOURCE

ADD TO THE APPLICATION'S DATABASE

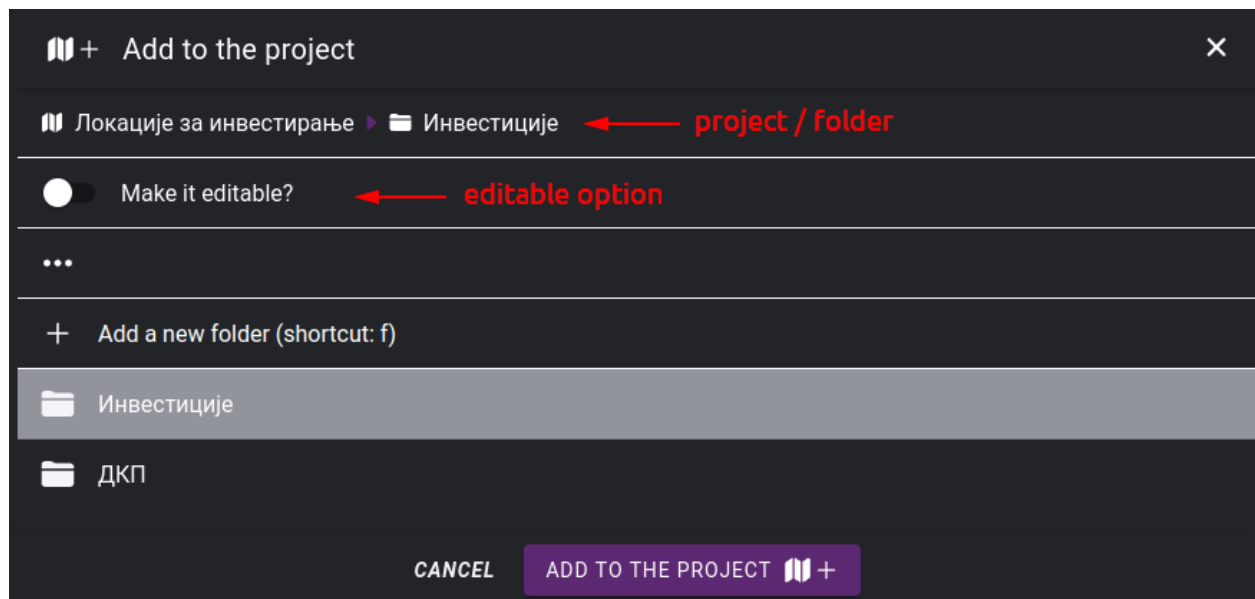
Slika 39: Creating new file data source

50

Poglavlje 1. Contents



Slika 40: Datasource commands



Slika 41: Selecting map legend folder

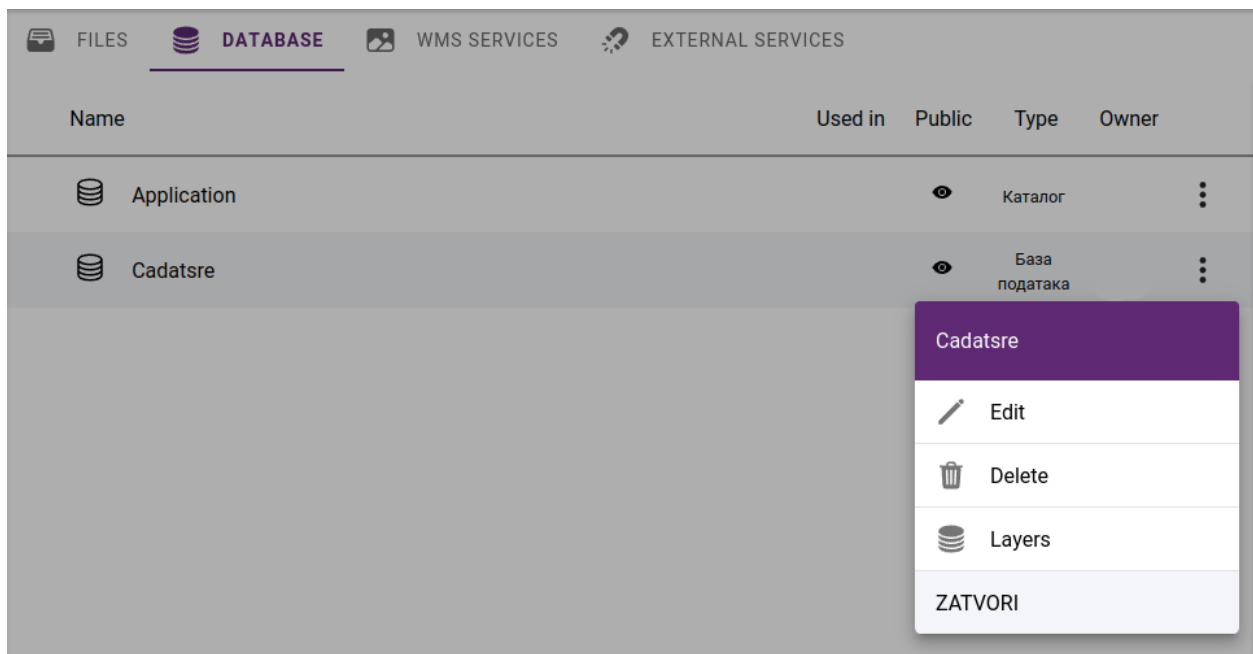
Napomena: If you select in the „add to project” window that the layer should be editable, then the digitization tool, the attribute forms and the attribute table will be available.

Databases

Data sources can also be attached directly from databases. The Application’s database is automatically linked to the system. In addition, it is possible to include other databases by specifying connection parameters. These databases must be accessible from the application server machine.

Supported database engines:

- PostgreSQL - PostGIS
- MS SQL Spatial
- Oracle Spatial
- MySQL



Slika 42: List of databases

It is possible to list the spatial tables of the attached database by clicking on **Layers** in a popup menu.

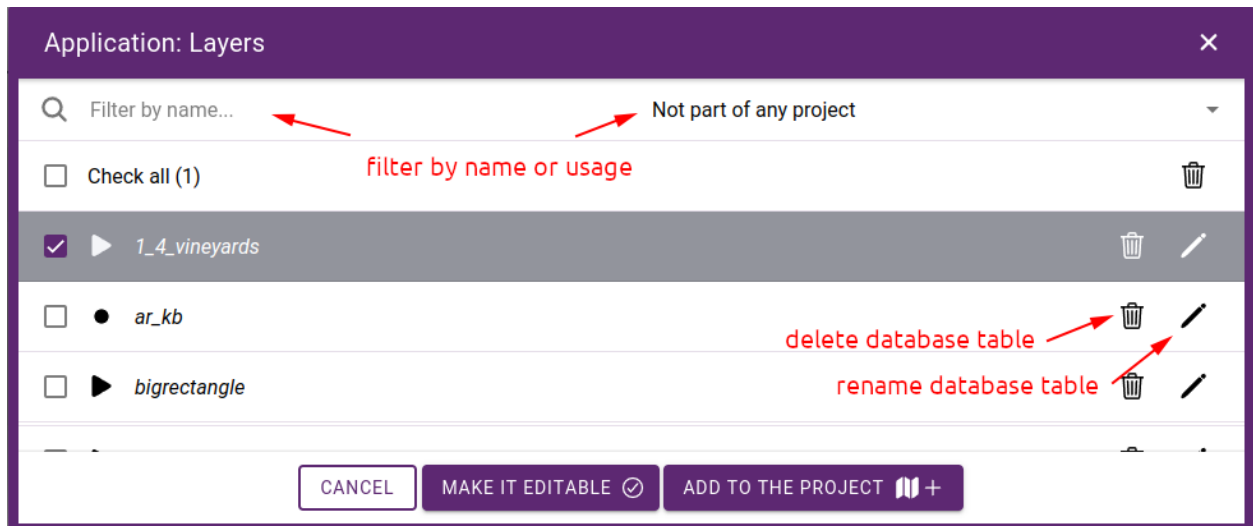
There is an option to transfer layers to the application database by clicking on the **ADD TO DATABASE** button or add them directly to a project as a new layer by clicking on the **ADD TO PROJECT** icon.



Slika 43: List of layers in a database

Application's database

The application's database stores spatial data in its own PostGIS database as layers. Layers can be divided into two groups: they can be edited or just used to create maps. Editing layers on the map is done with 2D/3D digitization tools. See section: [Layer editor](#). The [Field editor](#) allows you to specify how to fill in the attribute table.




Slika 44: Content of the application's database


Tables can be deleted / renamed if they are not in use on maps. It is possible to set layers editable by clicking on the **MAKE EDITABLE** button, or adding them directly to a project as a new layer by clicking on the **ADD TO PROJECT** icon.


WMS services


WMS (Web Map Service) is a standard protocol for serving geospatial data as maps over the Internet. WMS services allow GIS data to be accessed, displayed, and used in a variety of applications and platforms, including web-based GIS applications, desktop GIS software, and mobile devices.









WMS services can be hosted by government agencies, private companies, and academic institutions, and can be accessed for free or for a fee, depending on the provider.

 FILES

 DATABASE

 WMS SERVICES

 EXTERNAL SERVICES

Name	Used in	Publicit y	Type	Owner
 Corine Land Cover 1990			WMS	 ⋮
 Corine Land Cover 2018			WMS	 ⋮

Slika 45: List of WMS services

In order to be able to use a WMS server in SmartGIS, the access parameters need to be specified. Some WMS services may require a username and password to access the service. These argument are usually provided by the service provider, and is used by the built in WMS client to request maps.

Savjet: It is possible to enter copyright text in the Attribution field. This will appear on the map when a layer of the WMS service becomes visible.

External map services

We can use external services to access map tiles. Then the user's browser as a client communicates directly with the service. External services can only be used as basemaps, they cannot be part of the layers displayed in map legend.

Supported services

- XYZ compatible tile services
- Bing maps imagery

1.7.2 Mobile mapping data

Mobile Mapping is the process of collecting geospatial data from mobile vehicles such as cars, drones, boats, trains or aeroplanes. In SmartGIS, we can use two types of data generated from Mobile Mapping: **Point clouds** and **Panoramic images**.

A point cloud is a set of points in space that represent the surface of an object. Two common methods are used to generate point clouds: LiDAR and photogrammetry. **LiDAR** is a technology that uses lasers in order to measure distances from the sensor on the LiDAR device to objects in the environment. **Photogrammetry** uses photographs taken from various angles of an object in order to calculate its dimensions and generate a 3D model by using triangulation. These point clouds can be used in SmartGIS for *3D digitization* of map objects.

A panoramic photography is essentially a photo with a wide format, whether that's vertical or horizontal. Either way, they are taken by taking a series of photos which overlap to create one single image.

New datasource: WMS

GENERAL SETTINGS

Name:

id:

0

Description:

Attribution:

URL:

Username:

Password:

Authorization method:

WMS version:

1.3.0

CANCEL

CREATE DATASOURCE

Slika 46: Adding a WMS service

Mobile mapping data is always uploaded via FTP.

Point clouds

The common file format for point clouds is LAS (or compressed LAZ). LAS files collected in a bundle are called **trajectories**. Such trajectories can be imported into the application packed in **.zip**, **.rar** or **.7z** format. In the process, the files are unpacked and prepared for web display, which requires the **Potree** format.

The application also accepts point clouds in Potree format, in which case it is only necessary to unpack the archive.

Panoramic images

In SmartGIS, each panorama image series must belong to a trajectory. The images of the trajectory should also be packed in a **.zip**, **.rar** or **.7z** archive. Such a package should also include a metadata .txt file containing a list of the images. This will include the position of each image and other information.

Napomena: Panoramic metadata is a tab delimited text file with column names in the header which should be: **GPS Time, Image Filename, East, North, Height, Omega, Phi, Kappa**

Trajectory administration

Trajectory administration pages can be accessed from the sidebar: [Administration->Point clouds](#).

The trajectory administration is split into two sections: one for accessible trajectories and another for trajectories undergoing processing. The accessible trajectories are organized into folders, which are also utilized for grouping in both the administrative pages and maplegend panel. The trajectory administration page displays the contents of the selected folder.

Create a trajectory

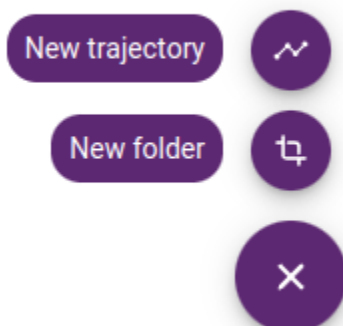
To create a new trajectory, click the + icon in the bottom right corner, select **New trajectory**.

The add trajectory form will appear with the following fields:

- **Name** - trajectory name
- **Date of recording** - date of field data collection
- **Projection** - data projection - select from list or enter projection string in **PROJ.4** format
- **Use spherical photos?** - are panoramic images available for the point cloud?
- **Point cloud** - select archive from (.zip, .rar, .7z) server or enter URL to use hosted point cloud
- **Point cloud URL** - folder URL where **cloud.js** Potree file is located
- **Panoramic images** - select archive from server or enter folder URL of hosted images
- **Images URL** - URL of images
- **Small images URL** - optional URL of small images folder
- **Metadata (.txt)** - upload metadata for hosted images
- **Preview image size** - select if you want to use optimized images

Administration - Trajectories								
<div> <div>✓ AVAILABLE</div> <div>✓ PROCESSING</div> </div>		<div> <div>available trajectories</div> <div>in preparation</div> </div>		<div> Folder: <div>selected folder</div> → Drone recordings 2020 <div></div> <div></div> </div>				
Name	?	Point cloud source	Panoramic images source	Date	Projection	Active		
<input type="checkbox"/> G1	?	Import	Import	—	EPSG:32634	<input checked="" type="checkbox"/>		
<input type="checkbox"/> G2	?	Import	Import	—	EPSG:32634	<input checked="" type="checkbox"/>		
<input type="checkbox"/> G3	?	Import	Import	—	EPSG:32634	<input checked="" type="checkbox"/>		
<input type="checkbox"/> G4	?	Import	Import	—	EPSG:32634	<input checked="" type="checkbox"/>		
<input type="checkbox"/> G5	?	Import	Import	—	EPSG:32634	<input checked="" type="checkbox"/>		
<input type="checkbox"/> G6	?	Import	Import	—	EPSG:32634	<input checked="" type="checkbox"/>		
<input type="checkbox"/> G7	?	Import	Import	—	EPSG:32634	<input checked="" type="checkbox"/>		
<input type="checkbox"/> Groblja	?	Import	Import	—	EPSG:32634	<input checked="" type="checkbox"/>		
							<div>add new trajectory / folder</div> <div>+</div>	

Slika 47: List of trajectories



Slika 48: Creating a new trajectory or folder

Napomena: In SmartGIS, mobile map data can only be uploaded via FTP.

When you have large images, you can speed up the display by using a lower resolution collection. You can choose to use the **ORIGINAL** or the reduced copy and specify the amount of reduction - **LARGE**, **SMALL**. When reducing the size, the images are also generated in a lower resolution on the server and used in the application. However, if you want to use part of an image, it will always be cropped from the original image.

Napomena: After the processing is finished (if necessary), the created trajectory will be in the **unclassified** folder. It will not be available automatically to the application, you need to toggle **Active** to enable it.

The trajectory parameters can be changed later and the point cloud or panoramic images can be replaced. To do this, click on ... at the end of the line and select **Edit** from the menu that appears.

This menu also contains the **Delete** and **Export** trajectory commands. You can only delete trajectories that are not used in projects. Export gives the URL of the point cloud and the panoramic images which can be used in another application, e.g. in another installed SmartGIS instance. In addition to retrieving URLs, it is possible to download a metadata file for panoramic images.

Trajectory folders

The trajectory screen shows a list of the selected folder. The **unclassified** folder contains those that have not yet been classified. It is possible to get a listing of all trajectories by selecting the **See all** option:



The name of the selected folder can be changed, and the folder can be deleted if it is empty. To move trajectories, they must first be selected, and the **MOVE** button appears. Click on it to select the destination folder to move to in a popup panel.

Processing list

If trajectories are created from a packed archive, they must first be processed on the server before the application can use them. The following operations may be required:

- **unpacking the archive** - both point clouds and panoramic images should be in a single **.zip**, **.rar** or **.7z** file
- **conversion of LAS files to Potree format** - this step is omitted if we have already unpacked the Potree archive
- **image size reduction of panoramic images** - this step is omitted if **ORIGINAL** is selected as the display resolution
- **inserting images into database** by processing the metadata file


These operations can be time-consuming and put a heavy load on the server. Therefore, their execution does not start when the trajectory is created, but they are placed in a waiting queue. For information on the status of processing operations, see the **Processing** tab. This list contains the trajectory until the processing is finished.

+  New Trajectory 

GENERAL SETTINGS

Name:

Date of recording:

Pick a date... 

Projection: EPSG:32634

EPSG:32634 / UTM zone 34N ▾



Use spherical photos?


☒

POINT CLOUD

—



^

 IMPORT 

BROWSE LIBRARY 


Import path:

PANORAMIC IMAGES

 IMPORT 

Images URL: https://smartgis-app.geo.rs/vtour/panorama/Nis_5-1/

Small images URL: https://smartgis-app.geo.rs/vtour/panorama/small/Nis_5-1/

Metadata (.txt): Orbit_LBP_13_6_r.txt 


Preview image size:

ORIGINAL

✓ MEDIUM

SMALL

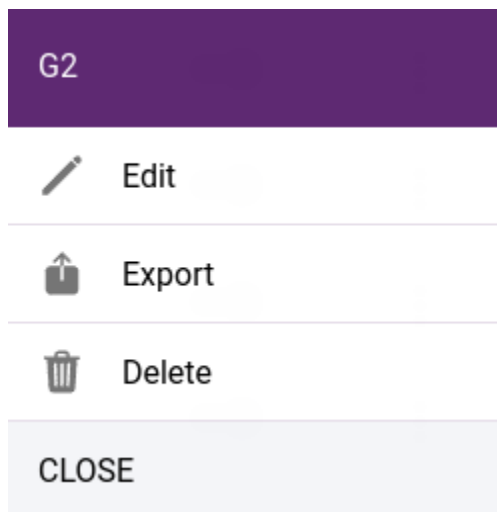
CANCEL

 CREATE TRAJECTORY

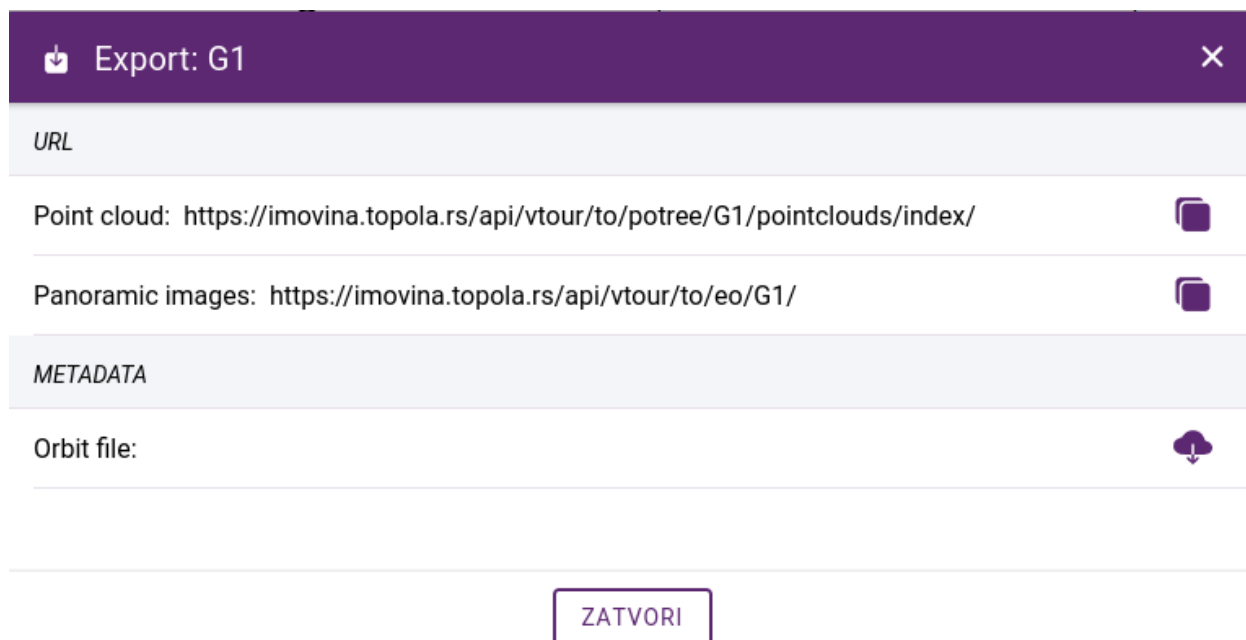
Slika 49: New trajectory form

1.7. Create your own maps

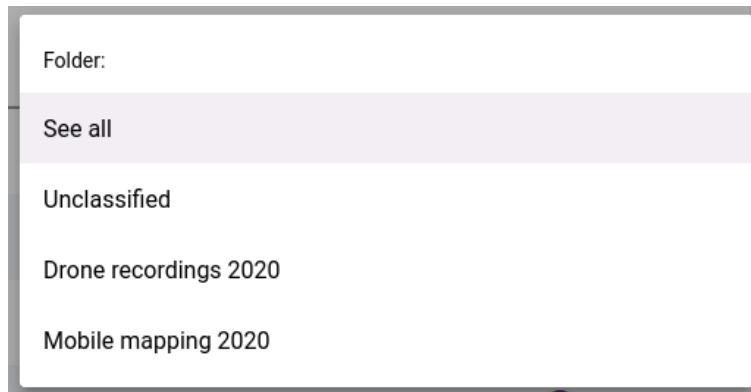
59



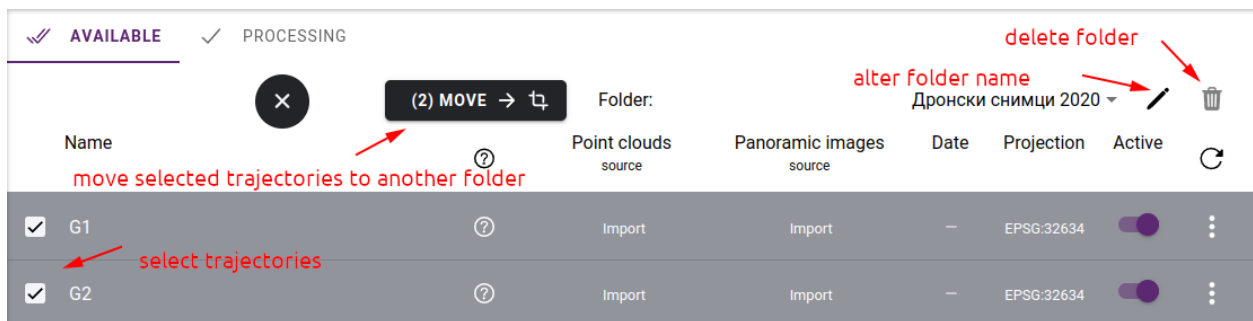
Slika 50: Local menu commands



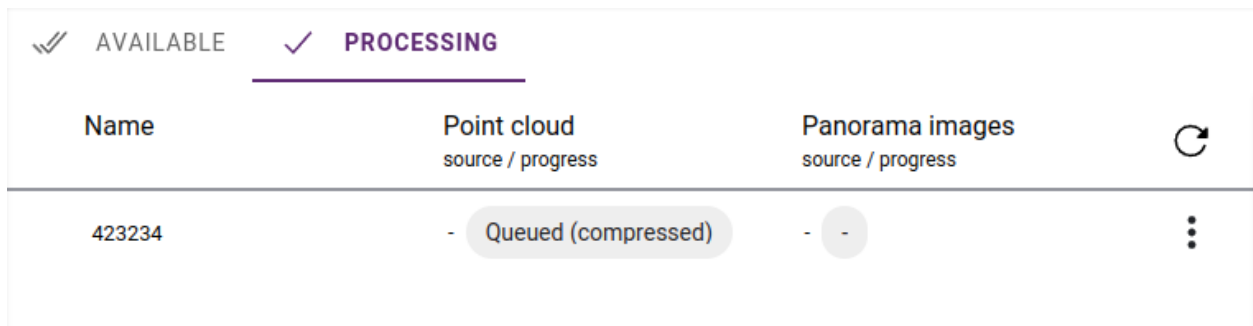
Slika 51: Exporting a trajectory



Slika 52: Folder selection



Slika 53: Folder actions



Slika 54: Processing status

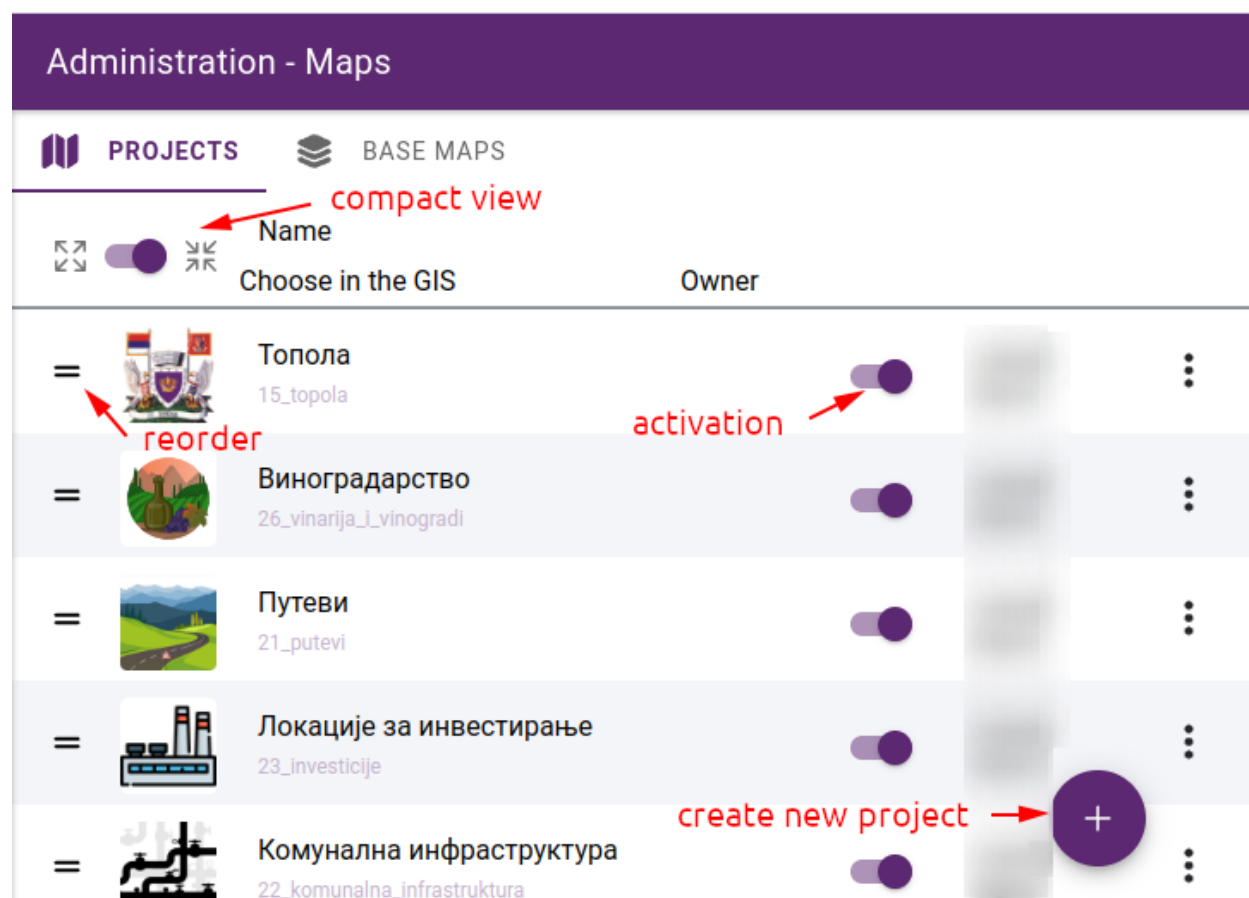
1.7.3 Maps - Projects

The SmartGIS application presents and works on map-based projects. These projects or maps are constructed from the *data sources* and *trajectories* discussed in the previous chapters.

Project administration pages can be accessed from the sidebar: *Administration->Projects*.

Project list

In the list, each project is displayed with a preview image in the order we have defined. With the activate/deactivate function you can control whether the project is available in the application, whether it is displayed in the map selector.



Slika 55: Listing of projects

Preview image

The preview image for your projects is automatically generated based on the base map and the layers that are initially activated. If you want to represent the project with your own image, you can do this by uploading an image which should be 256x256 pixels in size. Simply click the upload icon on the existing preview image and select the file to upload.



Slika 56: Upload icon

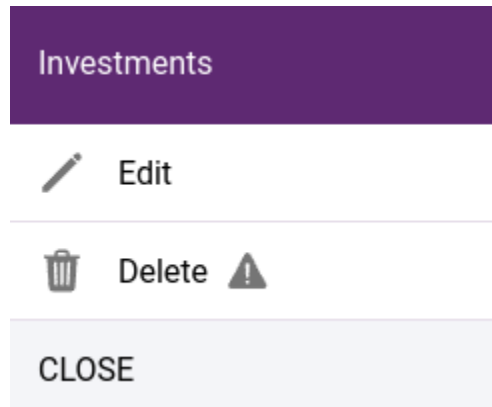
Reordering projects

You can change the order of the projects at any time. Just grab the reorder icon at the beginning of each row and move the row to the desired position.

Savjet: It's a good idea to switch to compact view to get a better overview of the list of projects and to make it easier to move around.

Editing, deleting projects

Project editing / deleting functions can be accessed by clicking on ...* in the row. The editor opens even if you click on the project name.



Slika 57: Map functions

Pažnja: The deletion is not limited to those with empty content. If a project is deleted, its entire contents will be removed. This operation is not reversible.

Project building

Building a project involves the following steps:

- Creating a new map with basic data and permissions
- Assigning base maps to the project
- Assigning trajectories to the project
- Creating the folder structure of the maplegend
- Creating layers, specifying symbols
- Defining permissions on layers

Map creation

To create a new map, click on + in the bottom right corner of the *project list* and fill in the basic data in the pop-up panel:

- **Name** - project's name
- **Description** - optional description text
- **Attribution** - optional, when available, it is displayed as copyright text for the map. Additional copyrights may be added if layers/datasources have their own.
- **Visibility** - access rights to the project: **Everyone can access, Logged in users only, Selected user groups only**. If you choose to allow certain user groups to see the project, a new line will open where you can select the groups.

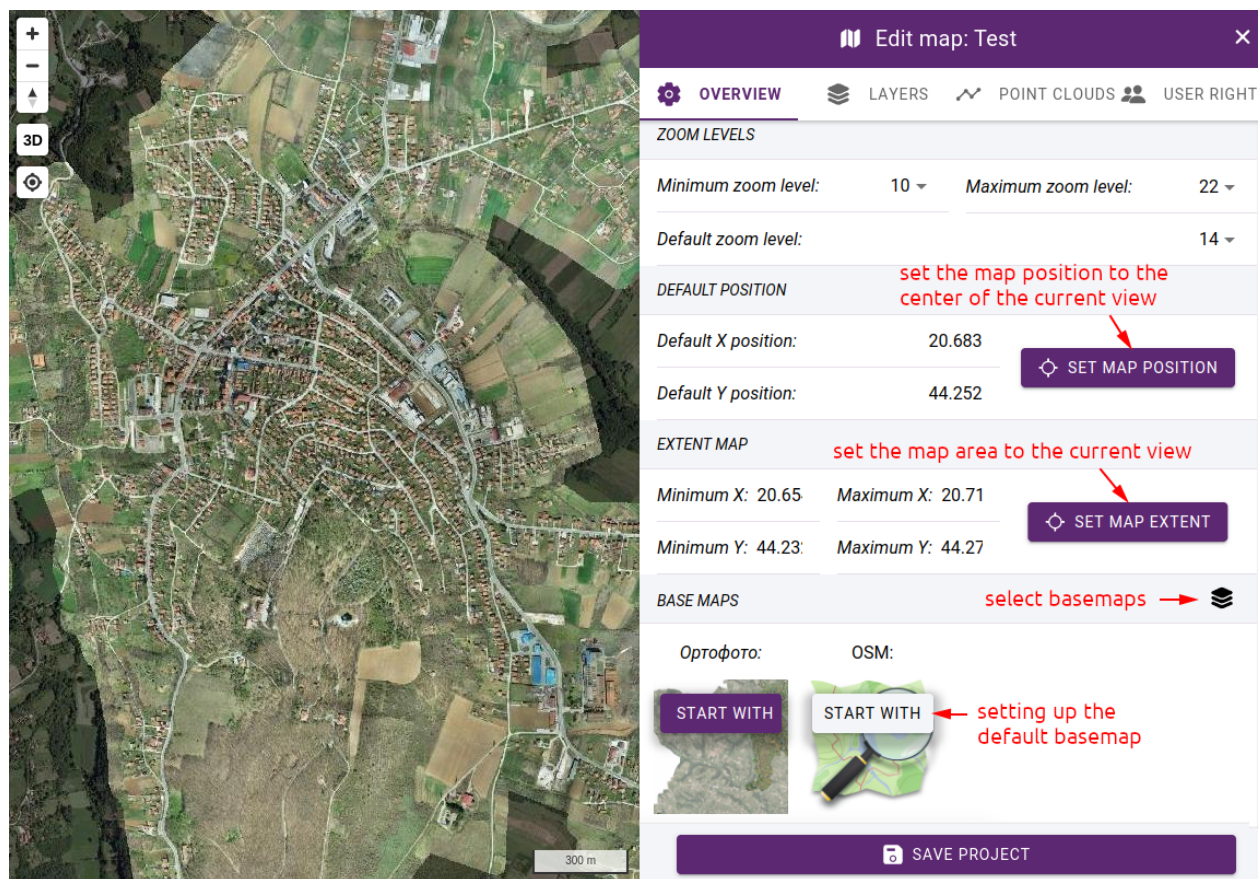
- Projection - fixed EPSG:4326, due to limitations in the software library that displays the map (MapLibre GL JS)
- **Point cloud projection** - all pointclouds for a project must be in the same projection.

Slika 58: New project panel

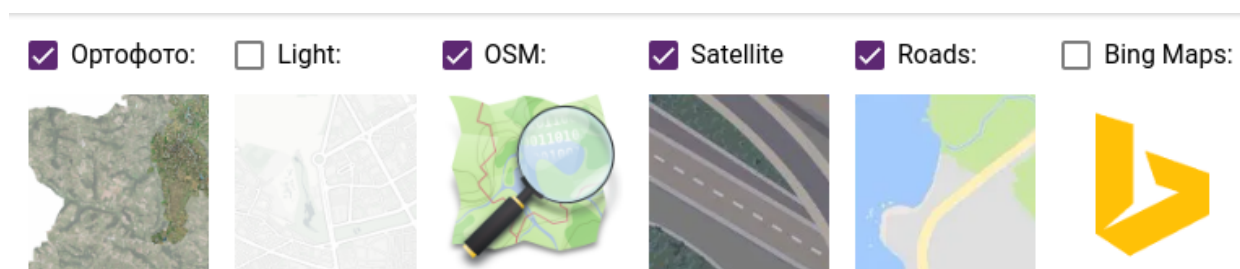
After saving, the map editor window opens, which is divided into two parts: the map preview window and the settings window. You can specify additional parameters in the OVERVIEW tab in the settings:

- **Zoom levels** - setting the minimum, maximum zoom level and the default zoom level at which the map starts for users
- **Default position** - specify the starting position of the map.
- **Map extent** - define the area of the map. The layout also allows you to navigate outside this area, in which case you can use the „Zoom to extent” button to return to the base area. Furthermore, the tilecache generation of layers is limited to the specified area.
- **Basemap selection** - a pop-up panel shows a list of basemaps, from which you can choose which ones should be available on the map

Napomena: The preview window is initially empty, you have to choose basemaps and select one as default, then the basemap will be displayed.



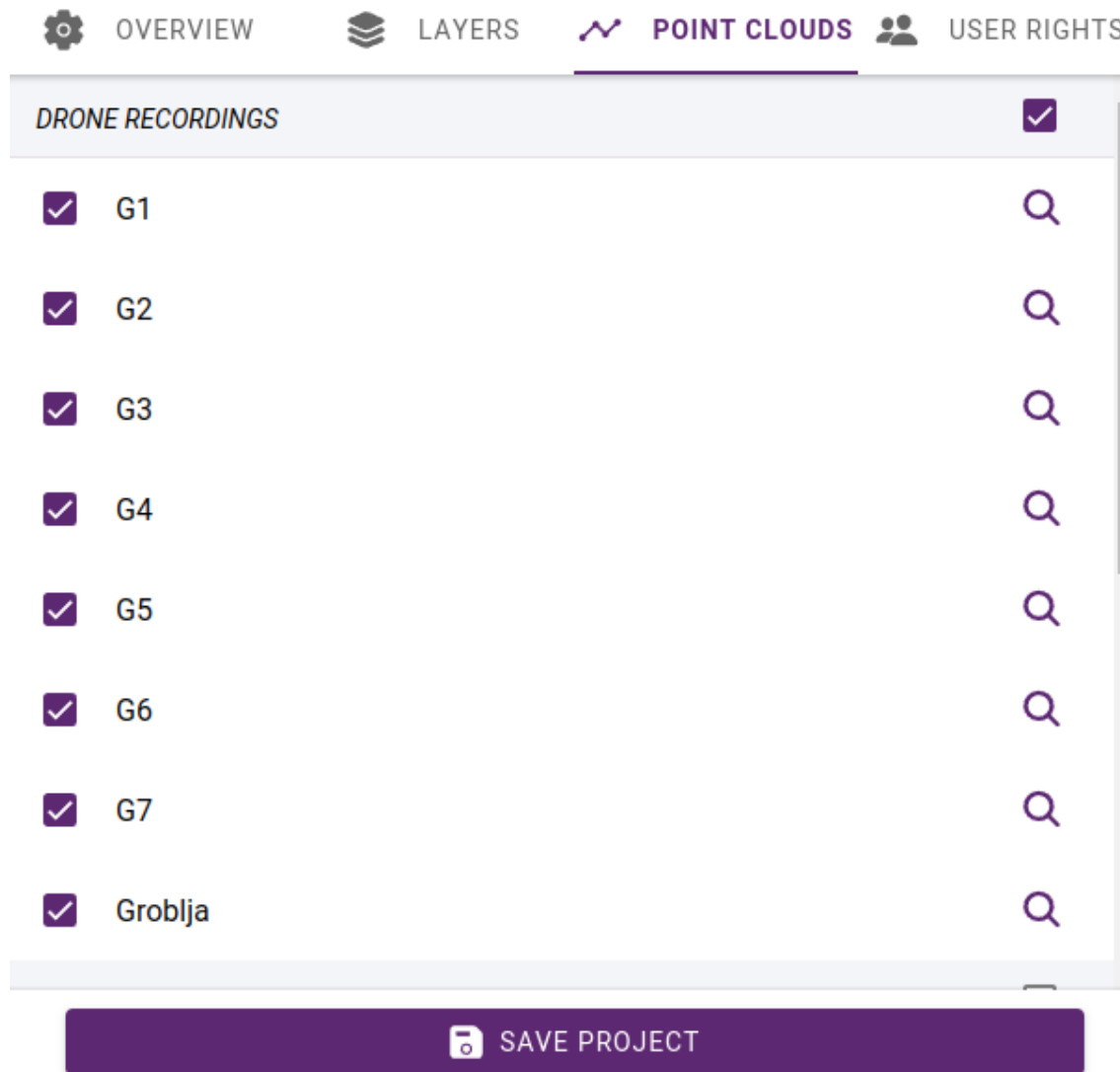
Slika 59: Editing project details



Slika 60: Basemap selection

Trajectory selection

If point clouds are to be used, they must be added to the project. You can do this in the POINT CLOUDS tab. All the point clouds that are in the same projection as the one you specified in the OVERVIEW tab under **Point cloud projection** are listed here, grouped by folder. Select the trajectories that should be available in the project.



Slika 61: Selecting trajectories

Adding layers to the map

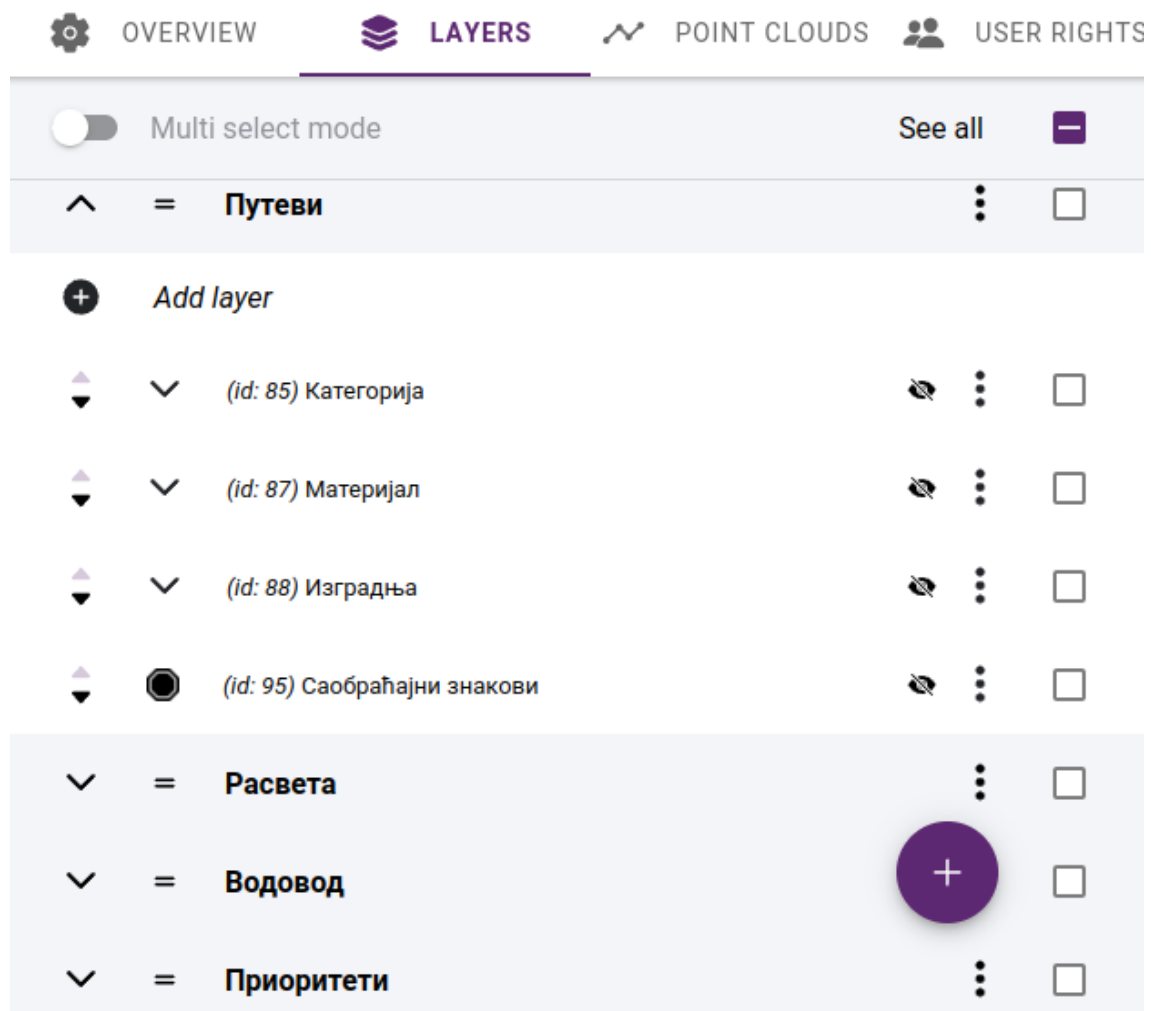
We can fill the map with content in the LAYERS tab of the map editor. Layers are sorted into folders, first you need to create the folders and add the layers in them.

Folders

Layer folders refer to the grouping of map layers into a hierarchical structure, allowing users to easily manage and organize complex maps with multiple layers. In a map legend with layer folders, individual map layers can be organized into folders providing a clear and organized view of the map data.

Layer folders are commonly used to group related map layers, such as all the layers for a particular city or region, or all the layers for a specific type of data, such as transportation, land use, or demographic data.

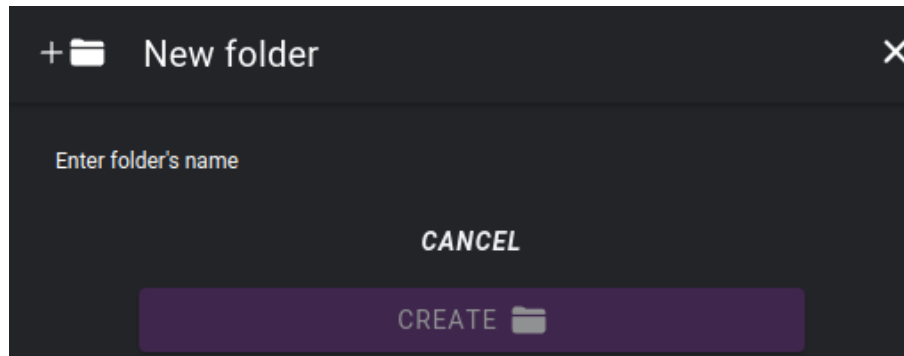
By organizing map layers into folders, users can turn multiple layers on and off at once, making it easier to compare and analyze different map scenarios. Additionally, layer folders can be expanded and collapsed, allowing users to focus on specific map data as needed.



Slika 62: Folders

Create folders

Add a new folder by clicking the + button in the lower right corner of the LAYERS panel. Enter the folder name in the pop-up dialog that appears.



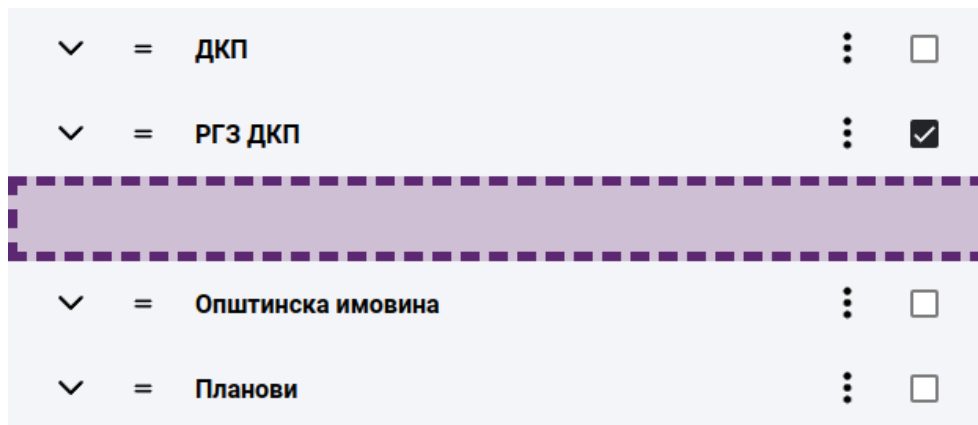
Slika 63: Creating a new folder

Folders can be renamed or deleted at any time, these functions can be accessed by clicking on ...* in the row of the folder.

Pažnja: The deletion is not limited to those with empty content. If a folder is deleted, its entire contents will be removed. This operation is not reversible.

Reordering folders

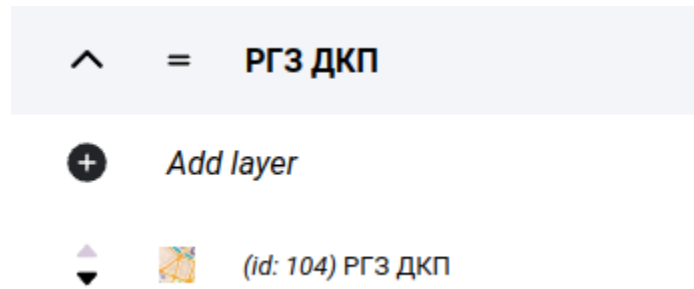
New folders are always added to the end of the list. You can change the order of the folders at any time. Drag the folder to the right place by holding the drag icon at the beginning of the row.



Slika 64: Moving a folder

Adding a layer to a folder

The first item in the list of all folders is „Add layer”. Clicking on it will open the layer editor panel.



Layer creation

When creating a new layer, the basic settings and selection of the data source are performed in the opening panel.






- **Name** - layer name
- **Description** - optional description
- **Attribution** - optional, when available, it is displayed as copyright text.
- **Format - rendering formats:**
 - Vector (single file)
 - Vector tiles
 - Image tiles
- **Opacity** - layer opacity
- **Language**
- **Legend type**
 - Without - layer will not be on the map legend
 - Single - single symbol
 - List - multiple symbols in case of layer classification
- **Checked on start** - whether it is initially on
- **Info popup** - enable a pop-up window when clicking on an item. Popup content can be customized in [Info popup](#) section.


Datasource selection

In this step you have to select the data source from the library, further settings like defining symbols, labels are linked to the data source.

File geodatabase - choose from a list of available layers.

WMS service - connects to the service and retrieves the available layers and which projections and image formats are supported

 Topola ▶  Road network ▶ +  New layer  

 Show on map: ☐

Name: Roads

Description:

Attribution: © Op

Format: Vectors ▾

Opacity: 100


Language: All ▾


Legend type: List ▾

Checked on start ☐

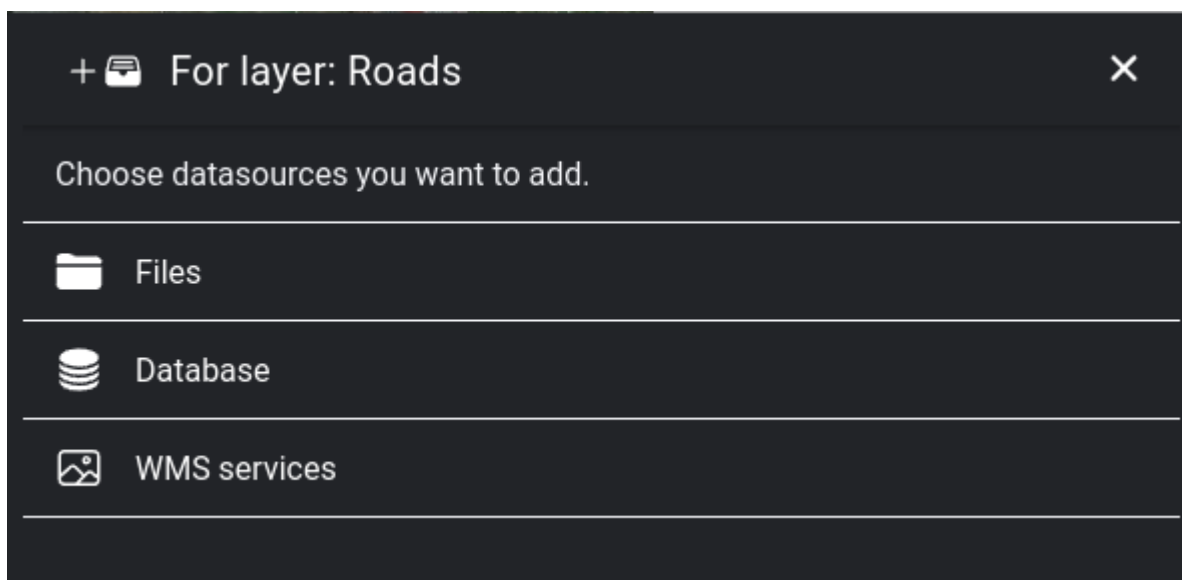
Info popup: ☐

DATASOURCE

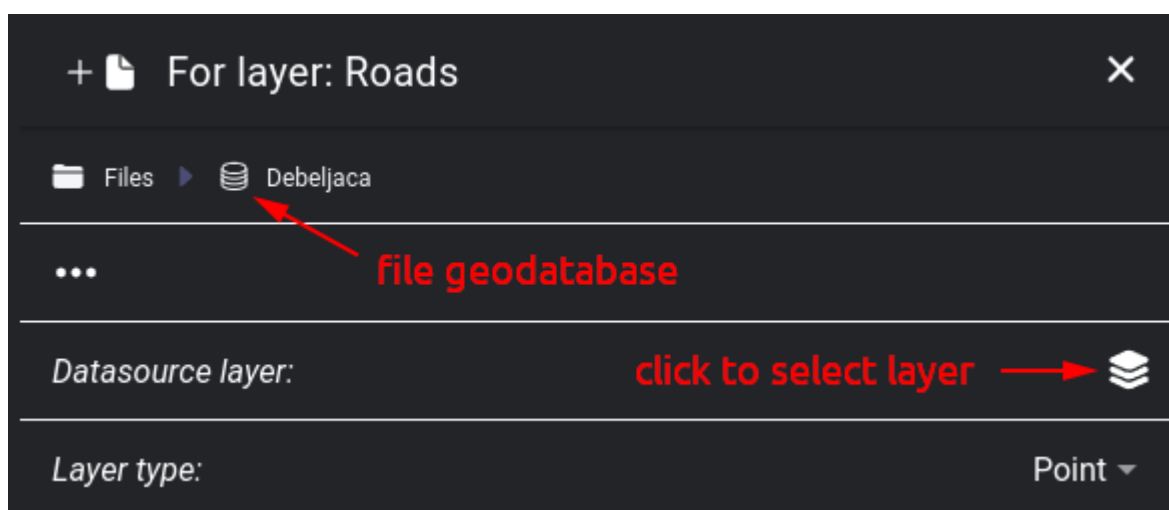
 Add datasource

 CREATE LAYER

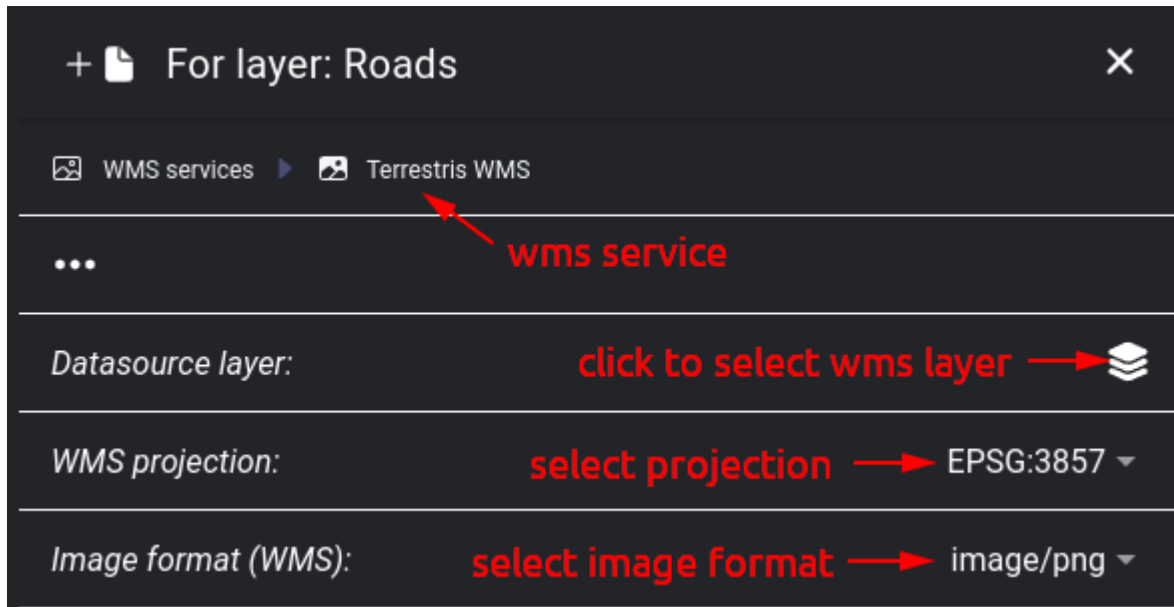
Slika 65: Basic settings



Slika 66: Browse datasource library



Slika 67: File geodatabase selected



Slika 68: WMS service selected

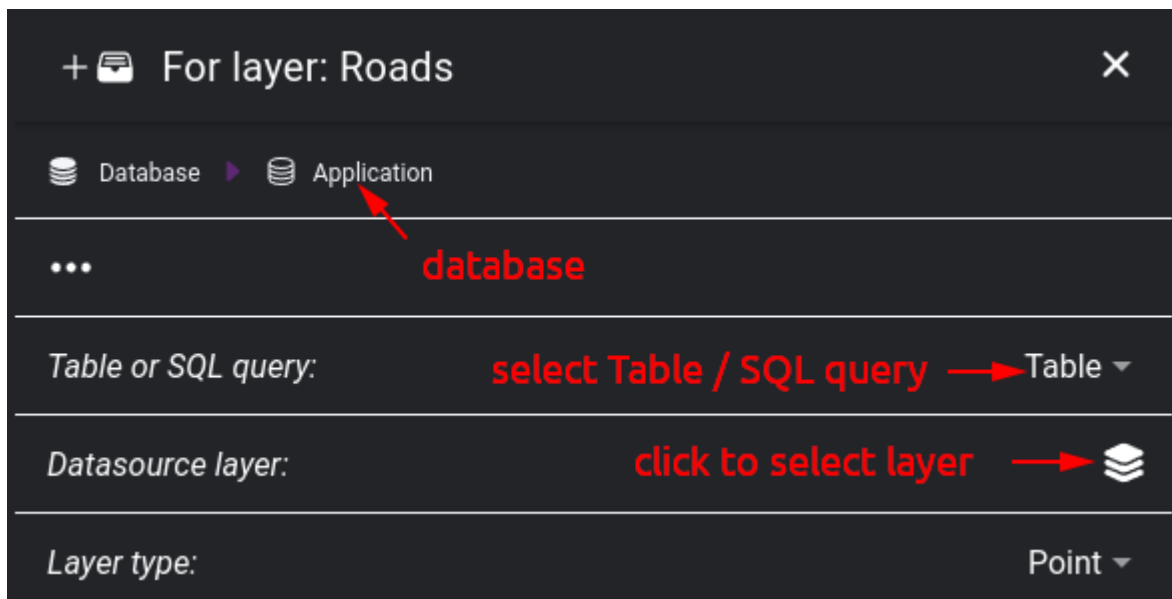
Database connection - we can choose to connect to a table in a database, or the data source can be based on an SQL query.

Savjet: It is possible to add multiple data sources to a layer. This is useful for raster base maps when combining e.g. orthophoto with road networks, labels. This option is currently only supported on image tiles, it does not work with vector tiles.

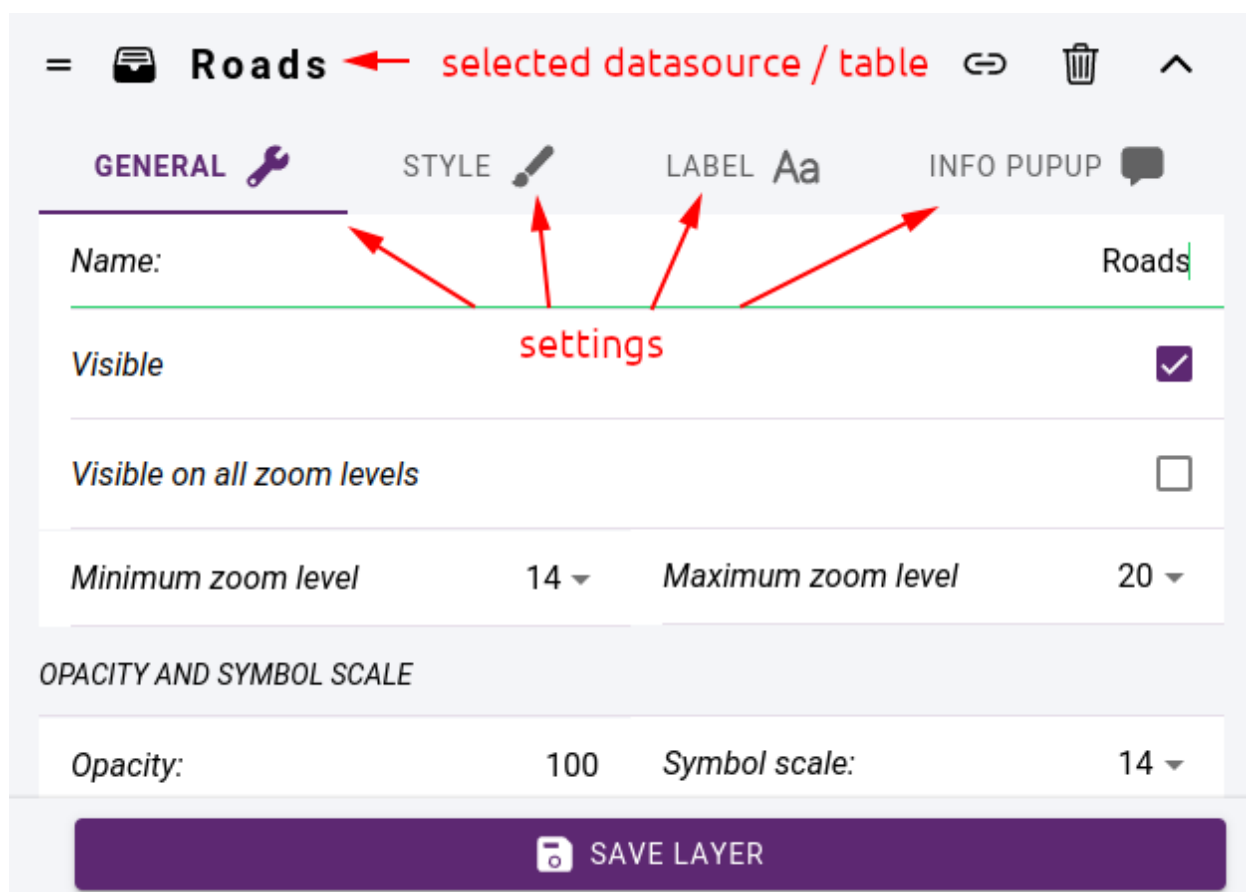
After adding the data source, you need to make additional settings on the layer, which are displayed in tabs.

General settings:

- **Name** - name can be show on info popup window
- **Visible** - whether it is visible or hidden.
- **Visible on all zoom levels** - if this option is not checked, we have to select the minimum / maximum zoom levels at which it will be displayed
- **Opacity** - layer opacity (0-100)
- **Symbol scale** - the zoom level at which the default settings apply. For example, for a symbol you can set the parameters Size, Min. size, Max. size. What you specify for Size will be valid at the Default scale, zooming in will increase to Max. size, zooming out will decrease to. Min size.



Slika 69: Database connection selected



Slika 70: Datasource related settings

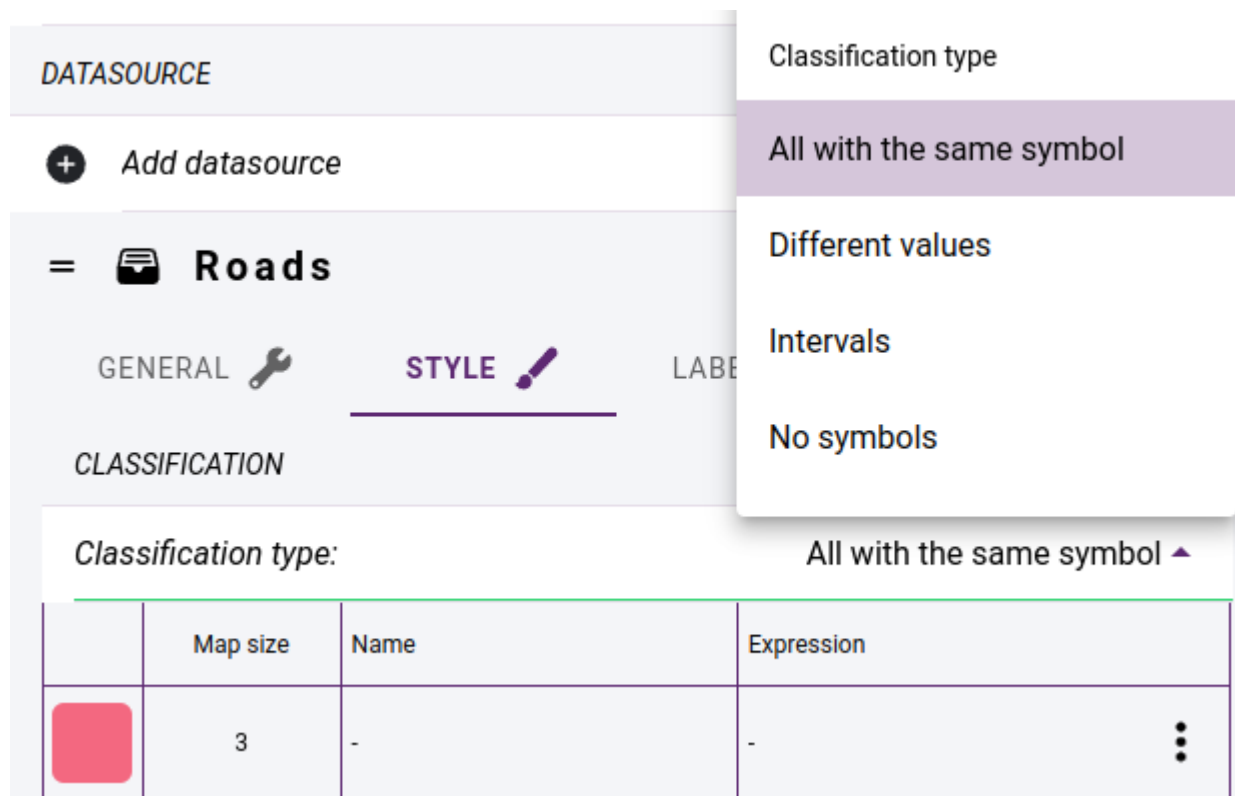
Styling

Styling is the process of adjusting the appearance of various map elements such as markers, lines, polygons, and labels to improve the visual appearance of a layer.

The following styling techniques can be used:

- Adjusting the thickness, opacity, and color of lines and polygons to highlight specific features or show boundaries.
- Changing the color, size, and shape of map markers to differentiate between different types of points of interest or to represent data.
- Adding labels to map elements to provide additional context or information to the viewer.

Styling is done on the **STYLE** tab by specifying styling classes. It is possible to display all elements with the same style, or to create a classification according to an attribute of the data source. Each of the resulting classes must be styled separately.



Slika 71: Layer classification methods

Savjet: If you want a layer that only has labels, you should select **No symbols** in the **Classification type**.

Clicking on a line of the class will bring up a panel where you can change the name of the class, its expression, and the style parameters.

- Classification based on **different values** - a style class is created for all the different values of the selected **classification field**.
- Classification based on **intervals** - we specify the number of classes, the value range of the selected numeric attribute will be divided into the desired number of intervals. You can do two types of interval mapping: you

can create intervals with the same range of values, or you can create intervals with the same number of elements. The classes you create are assigned a generated colour. These can be randomized or you can specify two colours and use a gradient between them to get the others.

CLASSIFICATION

Classification type: Different values ▾

Classification field: kategorija ▾

Classification style: Gradient ▾

remove existing → Start color: [Red Circle]

classify based on attribute → End color: [Blue Circle]

NEW COLLECTION CREATE CLASSES


CLASSES add class manually → ⋮

	Map size	Name	Expression
[Blue Square]	2	Државни путеви	("[kategorija]" = "P0") ⋮

Slika 72: Layer classification

Click on **CREATE CLASSES** button to create the classes. Each class is given a name and a classification expression that assigns the elements of the layer to the class.

Savjet: If you use classification, set *Legend type* in the layer settings to **List**. Then the classes will be listed in maplegend under the layer with their names and symbols.



 Edit: Roads ×

GENERAL SETTINGS

Name:

Roads

Expression: ("[kategorija]" = "P0")

  #0d0db8

Use fill color? ☒

Width :


2

Min. width:

2

Max. width:

2

 Outline (color): *Transparent*

User outline color? ☐


Outline width :

1

Outline min. width:

0


Outline max. width

Dashed : 


Opacity :

100

Double line :



CANCEL

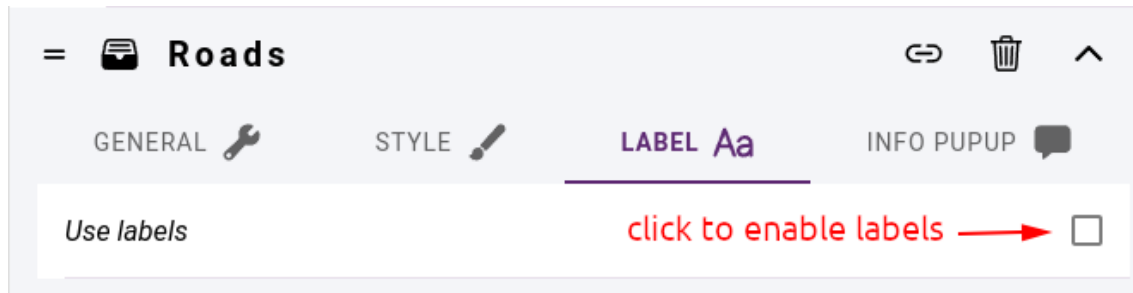
 SAVE

Slika 73: Setting symbol properties for a class

Labels

Labels are typically used to provide names or other relevant information about geographic features such as cities, streets, bodies of water, and points of interest. To create a label, the data source must have an attribute whose values can be written to the map.

First we need to enable the use of labels in the **LABEL** tab:



Slika 74: Enable labels

Label settings:

- **Label field** - the field whose content is displayed as label
- **Angle source - label angle**
 - value - fixed value for all labels, e.g.: 0
 - field - the field containing the angle value
 - follow - the labels are drawn along the lines (only for line layers)
 - expression - a unique expression that can include field names, constants, arithmetic operations
- **Visible on all scales** - whether the label should appear on all scales on which the layer appears. If unchecked, **Min zoom level** and **Max zoom level** must be selected.
- **Font** - select from available fonts
- **Label size, Minimum size, Maximum size** - size parameters
- **Use fill color** - whether to use a fill color, color selector
- **Use outline color** - whether to use an outline color, color selector
- **Position** - label justify relative to feature position
- **Offset X, Offset Y** - label offset relative to feature position
- **Force** - force display of label even if it overlaps with others
- **Buffer** - leave blank space around label

GENERAL SETTINGS

Label field:

Angle source:

vrednost ▾

Fixed value:

0

Visible on all scales

☒

FONT

Font:

Open Sans Regular ▾

Label size:

10


Minimum size:

10

Maximum size:


10

COLORS

 Use fill color?

☒

☐

 User outline color?

☐

Outline (color):
transparent

POSITION

position:

Cent... ▾

offset X:

0

offset Y:

0

force:

☐

buffer:

0

Slika 75: Label settings

Info popup

You can enable the display of info-popup in the default settings of the layer. When you click on an element of the layer on the map, the corresponding information is displayed in a small popup window. Its content can be specified using a template created in an HTML editor.

The values of the fields in the template are represented by their names between brackets. The field names can be added between pipe symbols (|). There are two special expressions **{layername}** and **{classname}**. These replace the layer and class names respectively.

If the layer is editable and images can be included in the elements, you can insert the main image or an image gallery showing all the images.

GENERAL STYLE LABEL Aa INFO POPUP

HTML EDITOR reset to default RESET HTML TEMPLATE

{id}| {broj_parcele}| {matbrko}| {matbrnas}|
 {centroid_x}| {centroid_y}| {rgz_id}| {ko_naziv}|
 {ko_naziv_lat}|

click on {} or || to copy field value or caption

Main photo: → 250 x ↓ 250 ADD
 Photo gallery: → auto x ↓ 50 ADD

add photo to template

add gallery viewer to template

* Click on the side of a field to copy the code to insert the translated name (symbols: ||) or value (symbols: {}) of the field to the clipboard.

HTML editor

B *I* U Paragraph 3

{layername}
 {broj_parcele}
 {ko_naziv}

DIMENSIONS limit popup window size

Max width (px):	300
Max height (px):	500

Slika 76: Info popup settings

Napomena: The info-popup window only appears on the map if the layer is in vector rendering format.

Field editor

If the layer is based on a data source that is editable, you can retrieve the attribute table for the layer or the attribute form for each element in the map viewer. In this case, the **TABLE FIELDS** tab will appear in the layer editor, where you can access the settings for the layer fields.


Name	Widget	Default Min / Max	Mandatory
= id_znaka string	READ ONLY	—	—
= sifra_znaka string	INPUT	—	—
= grupa_znaka string	LOOKUP GRUPA_ZNAKA	None —	—

Slika 77: Layer fields


Special options

When clicking on Special options, the settings for the layer are displayed:


HIGHLIGHTED FIELDS


Photo field:


fotografija ▾


Photo field 2:

None ▾



Rotation field:

rotacija ▾



Height field:

None ▾

INPUT FORM


Field sort order:

"Mandatories" first ▾


Number of columns to display:

I

II

III

IIII

Special options

^

Slika 78: Special options

- **Photo field** and **Photo field 2** - in case the layer has a field where the names of the images are stored, this field has to be selected. Up to 2 such fields can be specified. In this case you will be able to add one or two photos on the edit form. If you do not specify such fields, you can add more than one photo to an element.
- **Rotation field** - field containing the rotation value. The selected field will be linked to the point cloud rotation measurement, so the measured value will be immediately included in the field.
- **Height field** - which field contains the height value. The selected field will be linked to the pointcloud altitude measurement, so the measured value will be immediately included in the field.
- **Field sort order** - the order of the fields on the attribute form. You can choose between **Mandatories first** - in which case the mandatory fields come first and then the rest, or **Sorted order" where the fields appear in the order you set up.**
- **Number of columns to display** - specify how many fields to display per line on the form

kategorija Primarna deonica - Deo državnog puta		polo_aj_d Pripada_mreži_državnih_puteva	
re_im_sao Jednosmeran_višekolovozne_dvosmerne_ulice		naziv_grad KO_Pantelej	
_ifra_gra 71307	oznaka_lok 142	vrsta_kolo Asfalt	prose_na_ 11.97
oznaka_put A4	oznaka_deo 4046	naziv_ulic	oznaka_po_ 4046/1
oznaka_zav 4048/1	du__ina_de 2111.01	nagib_puta 0.228515718393881	datum_unos 08-11-2021

Slika 79: Displaying fields - mandatories first (highlighted in red)

oznaka_put A4	oznaka_deo 4047	kategorija Primarna deonica - Deo državnog puta	
polo_aj_d Pripada_mreži_državnih_puteva			
naziv_ulic	oznaka_po_ 4049/1	oznaka_zav 4047/1	re_im_sao Jednosmerna
naziv_grad KO_Pantelej	_ifra_gra 71307	oznaka_lok 142	du__ina_de 2104.19
prose_na_ 11.46	nagib_puta 0.218658713228644	vrsta_kolo Asfalt	datum_unos 08-11-2021

Slika 80: Displaying fields - sorted order

Field settings

field name and data type		input widget	default value, constraints	
Name		Widget	Default Min / Max	Mandatory
= pravilnik string		LOOKUP VAZECI_PRAVILNIK	None	mandatory / important
= redno_mesto_na_stubu string	reorder fields	INPUT	e.g. 6 [0 , 10]	Important
= rotacija integer		INPUT	e.g. 6 [0 , 10]	Mandatory

Slika 81: Field settings

The data source fields are unlisted. The first column shows the field name and data type. Next, the input widget can be selected, depending on this, the next column shows the settings for the values, e.g. default value, minimum and maximum value. In the **Mandatory** column you can specify whether the field should be mandatory (red background on the input form) or **Important**. Important fields are highlighted in yellow, but are not mandatory.

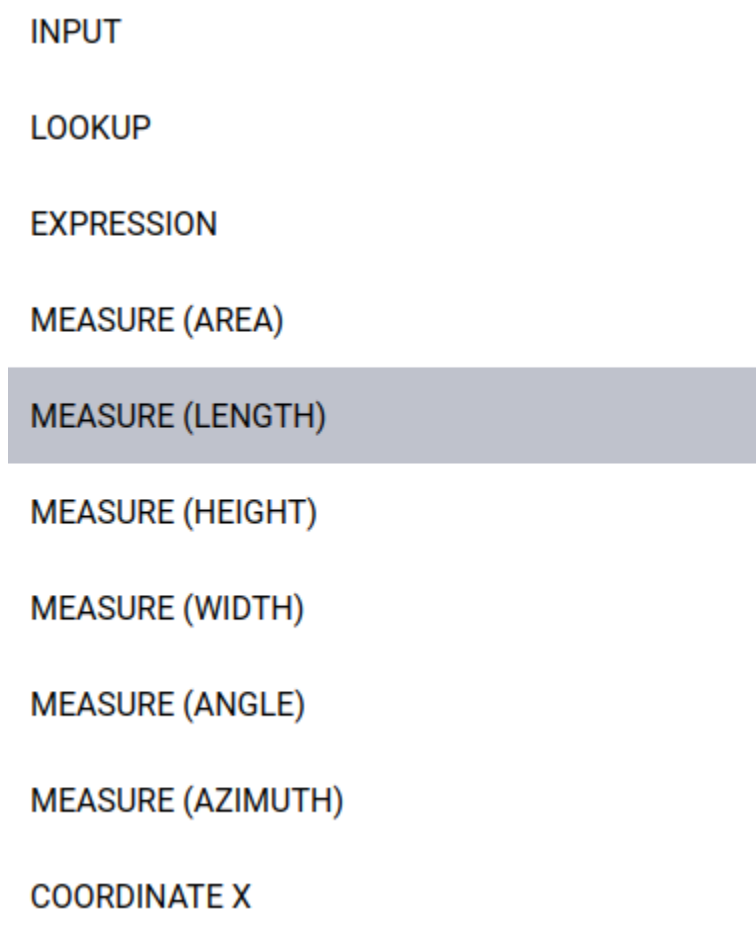
You can change the order of the fields. To do this, drag the field to the appropriate place using the drag icon at the beginning of the row.

Widgets

Various widgets are available depending on the data type of the field:

- **input** - general input control
- **lookup** - select value from a lookup table. See more in section [Lookup tables](#)
- **checkbox** - a toggle control that allows you to choose between two values
- **auto increment** - automatic filling of an integer field
- **expression** - expression derived from field values by mathematical operations, e.g.: „{rotation} + 90”
- **measures** - add a measure widget to the field leading to the point cloud measure and fill the field with the measured value.
- **coordinates x, y, z** - fill in field value with feature coordinate
- **geolocate** - during geolocation we look for the nearest element of another layer. To do this, you need to select a data source for the geolocation and a field whose value will be populated into the field.
- **date created** - date/time of feature creation
- **date modified** - date/time of feature change
- **user created** - the user who created the feature

- **user modified** - the user who made the change
- **read only** - read only field
- **hidden** - not visible on feature form



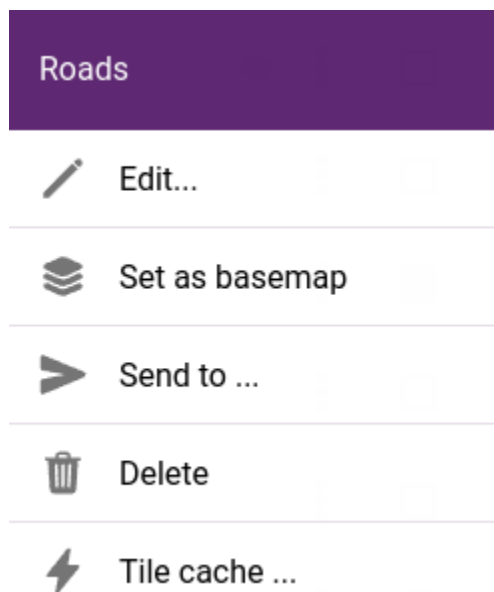
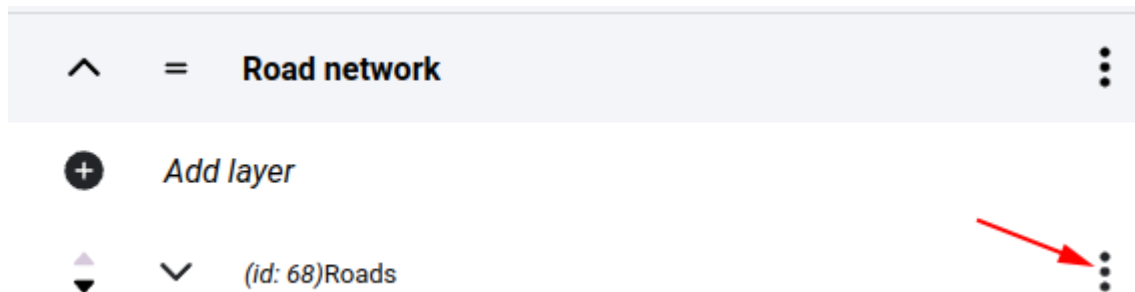
Slika 82: Widget selection

Layer commands

In the map editor, click on ... in the layers row to invoke the layer commands.

Edit

Opens layer settings panel



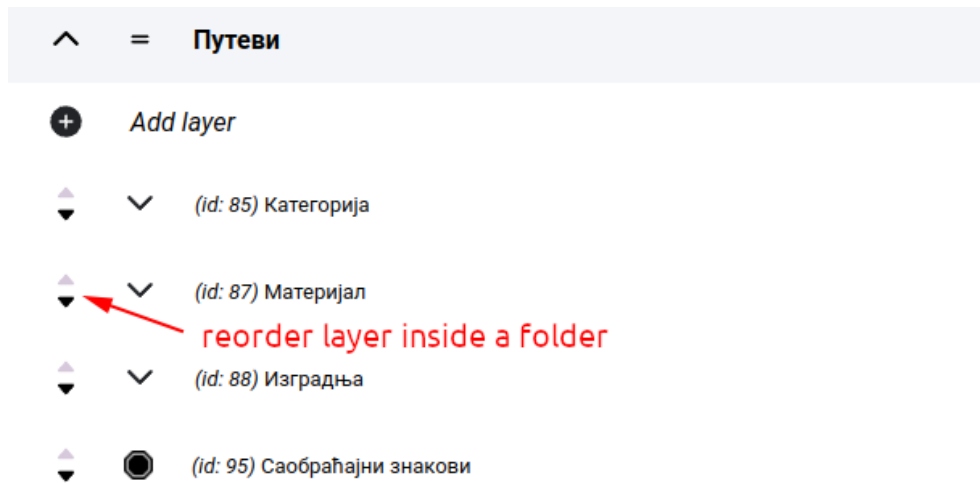
Slika 83: Layer commands

Set as basemap

Adds the layer to the list of basemaps.

Copy / move layers

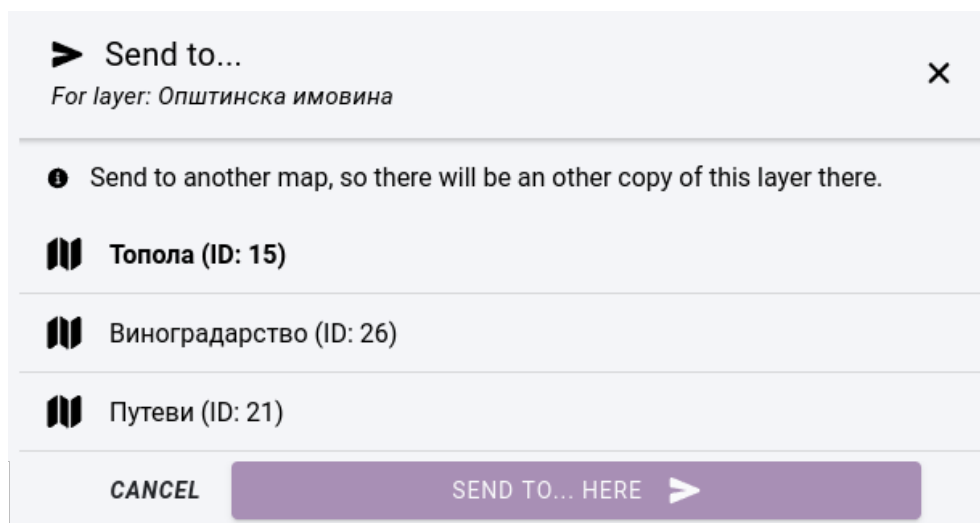
Layers can be moved within a folder by clicking on the up and down arrows at the beginning of the rows.



Slika 84: Reordering layers

If you want to relocate a layer to another folder you have to use the SEND command.

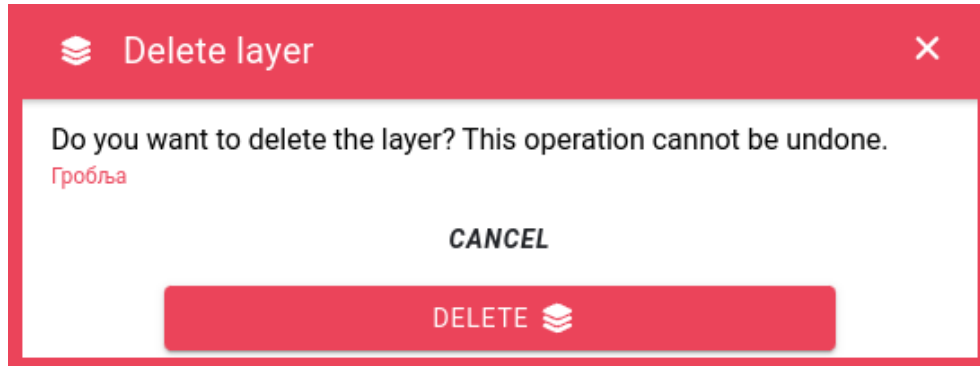
Savjet: With the SEND function it is also possible to place your layer on another map. It will be present both in the original folder and in the folder selected on the new map.



Slika 85: Sending layer to another map

Deletion

When deleting a layer, two cases are possible: if the layer is also in use in another project, it will only be removed from the current folder, but not deleted. If it is only used in this project, an extra warning will be given that the layer will be permanently deleted and this operation cannot be undone.



Slika 86: Layer deletion

Caching

The contents of both vector and raster layers are cached by the system. This speeds up map loading because it is not necessary to read the data source every time, but only to transfer the files stored on the server. We use two types of cache one is tile-cache when we divide the area into tiles at each zoom level and file-cache (for vector rendering only) when we store the layer contents in one file. In layer settings: *Rendering format*, the **Image tiles** and **Vector tiles** modes use a tile cache, and **Vector** stores the layer contents in a file.

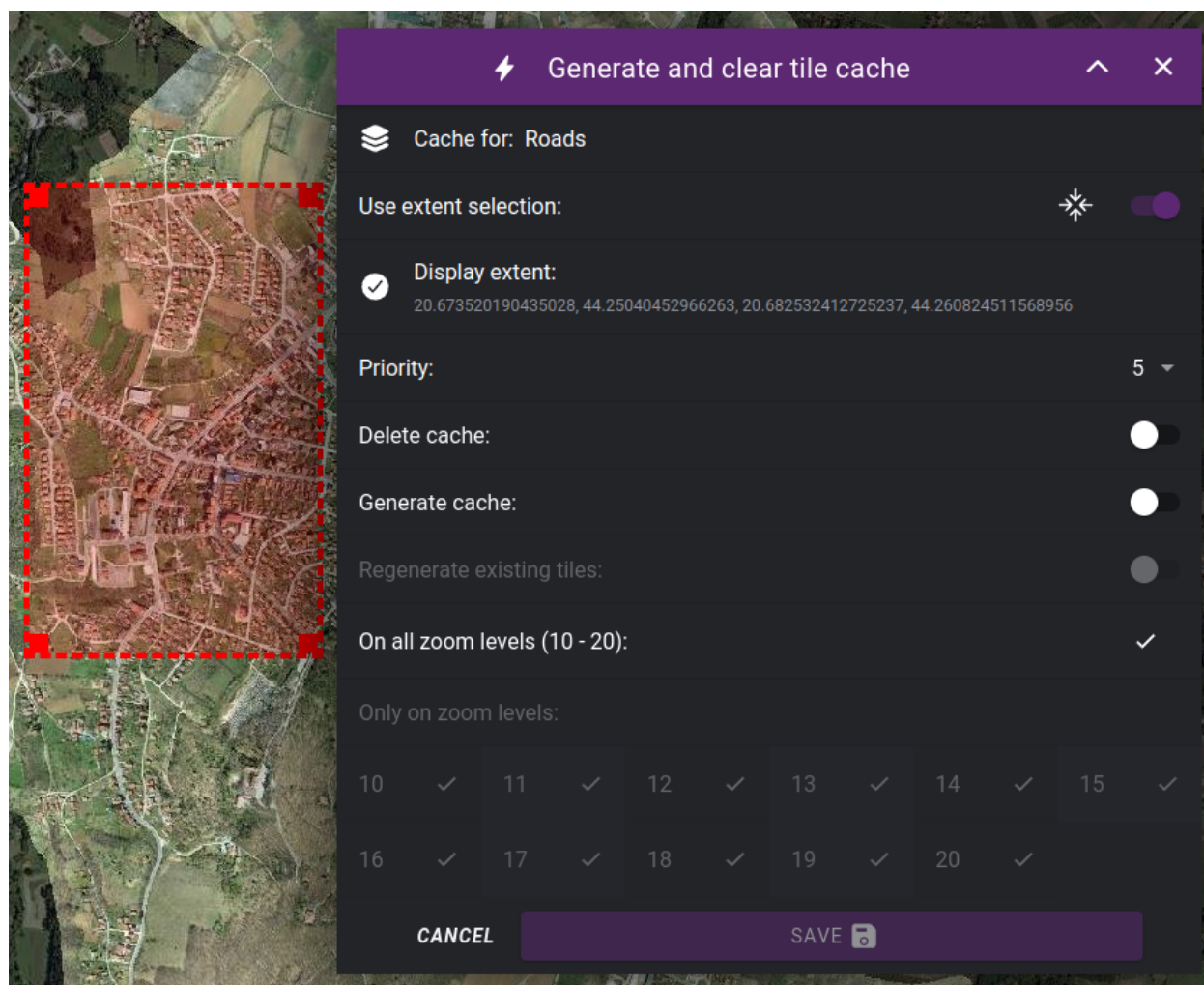
When the contents of the data source are updated, these cached files expire because they were created while the previous state was still active. In this case, they must be overwritten. The system cannot keep track of changes to the contents of data sources because, for example, in the Application Database PostGIS database, a table belonging to a layer can be accessed by external software. In such cases we have to take care of flushing the cache.

With tile cache, when the map client requests an area that is not in the cache, the user has to wait until the server has generated the content based on the data source and placed it in the cache to serve further requests. This can be done in advance by having the server cache the entire tile cache.

In case the cache is in a file, the **Delete cache** option will appear in the commands, in case of tile caches the **Tile cache** option will open a dialog:

- Use extent selection - limit operations to a selected area on the map
- Priority - priority of operations
- Delete cache - empty tiles
- Generate cache - create tiles (note that either Delete or Generate must be selected)
- Re-generate existing tiles - if create is checked then this option overwrites existing tiles, if it is not checked then it skips them.
- On all zoom levels / only on selected zoom levels - limit operation to zoom levels

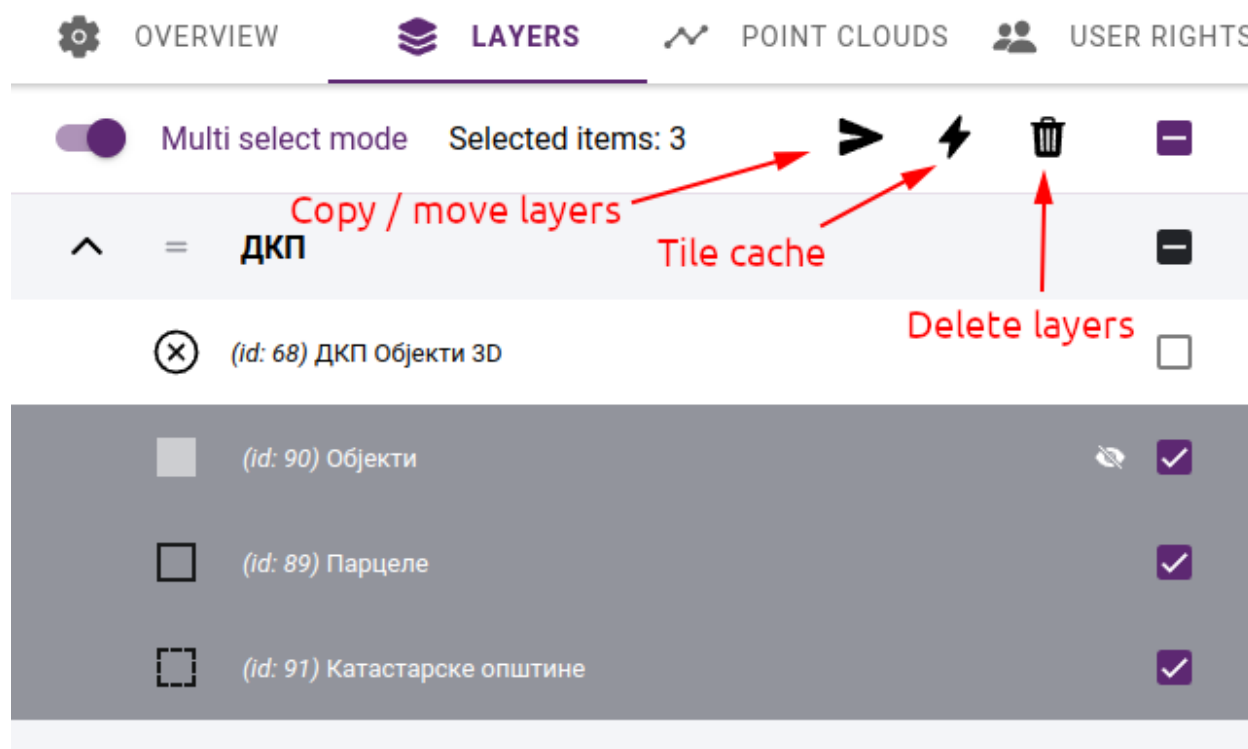
After saving the tile-cache options, the operations continue in the background and can be followed on the Processes page.



Slika 87: Options for creating and deleting tile caches

Multi select mode

It is also possible to perform an operation on multiple layers at the same time. These include Move / copy, Delete and Tile cache. To do this, turn on the **Multi select mode** switch, select the layers and click on the action command icon above.



Slika 88: Multi select mode commands

Permissions

Map layer user permissions represent the level of access and control that each user group has over the data and functionality of each layer within the application. User permissions can be set at the layer level to control who has the ability to view, edit, or export data within that layer:

- **View access** - users can view data within the layer but cannot make any changes or edits.
- **Edit access** - users can modify data within the layer, such as adding or deleting features or changing attribute information.
- **Export access** - users can download the layer in various GIS or tabular formats.

The permissions can be set in the **USER RIGHTS** tab of the map editor. Here you can set the **View / Edit / Export** permissions for each layer. We can define access rights on user group level.

When editing and exporting, you always have to select which user groups are eligible.

Napomena: For the export function, it is not enough that a user belongs to a group that has export enabled. In addition, export must be enabled in general on the *user's profile*.

OVERVIEW LAYERS POINT CLOUDS USER RIGHTS

Visibility View Edit Export

Set all: set the same permissions on all layers

^ Road network set the same permissions on layers inside the folder

(id: 85)Category Logged in users available for all logged in users

(id: 87)Material Public available for everyone

(id: 88)Year of construction Public

✓ Roadway layer is available only for selected user groups

^ Traffic signs ЛЕР

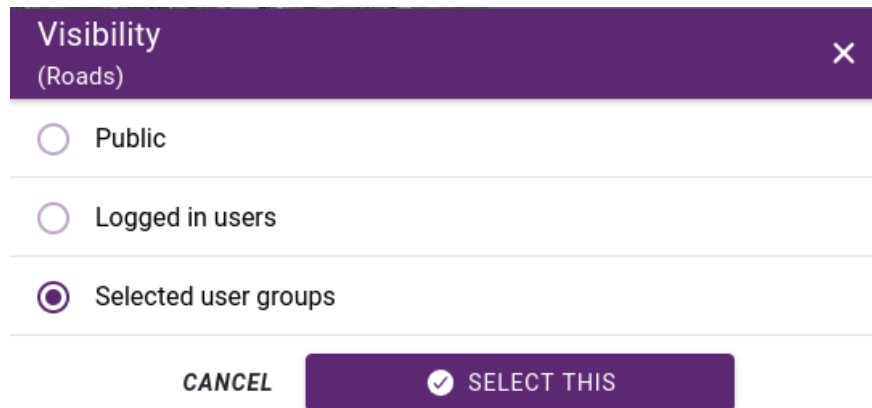
(id: 95)Traffic signs Selected user groups ЛЕР Општинска Управа Општинска Управа

(id: 96)Reports Public

Slika 89: User rights

For view access, you can choose from the following options:

- **Public** - the layer is public to everyone who has access to the map
- **Logged in users** - available to members of staff with a login account
- **Selected user groups** - specify which user groups it will be available to.



The image shows a 'Visibility' dialog box for 'Roads'. It has a title bar with a close button. Below the title bar, there are three radio button options: 'Public', 'Logged in users', and 'Selected user groups'. The 'Selected user groups' option is selected. At the bottom, there are two buttons: 'CANCEL' and 'SELECT THIS'.

Slika 90: View access

Basemaps

A basemap is a background map that provides context and reference for the data being analyzed and displayed. Basemaps typically include political boundaries, bodies of water, and physical features such as roads, land use, and terrain. They can also include satellite imagery, street maps, or other data layers that provide context and reference for the data being analyzed.

The role of a basemap in a GIS application is to provide a visual representation of the geographic context for the data being analyzed, making it easier to understand the relationships between data and geography. Basemaps can also provide a reference for navigation and help users orient themselves when exploring and analyzing data.

Basemaps are available from Administration > Projects > Basemaps tab:

Adding basemaps


Basemaps can be created from data sources in the following ways:


- **Datasource can be marked as basemap on *Datasource edit form***
- **External data sources always treated as basemaps**
- **Set existing layer as basemap** - in the map editor, click on ... in the layers row to invoke the layer commands and select *set as basemap*:
- **Create a basemap layer from the datasource library**





Click on + to add new basemap and use the *Layer creation* to create a compound basemap from several datasources.

Važno: Explain the following topics:

Administration - Maps

 PROJECTS

 **BASE MAPS**

Name	
	Ορτοφωτο (ID: 67) 67_ortofoto_-_dron
	Ορτοφωτο 2009 (ID: 170) 170_ortofoto_2009
	test (ID: 193) 193_test
	OSM (ID: -193) datasource_xyz_193

created in layer editor

external datasource or datasource marked as basemap

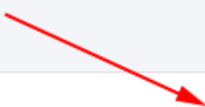
Slika 91: Basemap list


Ortophoto

✓

📄

✕

 DETAILS

 PREVIEW

GENERAL SETTINGS

Name:

Ортофото - дрон

id:

169

Description:

Owner:

Janoš Apro

Type:

tileindex

UNIQUE ATTRIBUTES

Basemap:

☒

Projection:

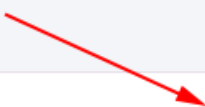
EPSG:32634

EPSG:32634 / UTM zone 34N ▾

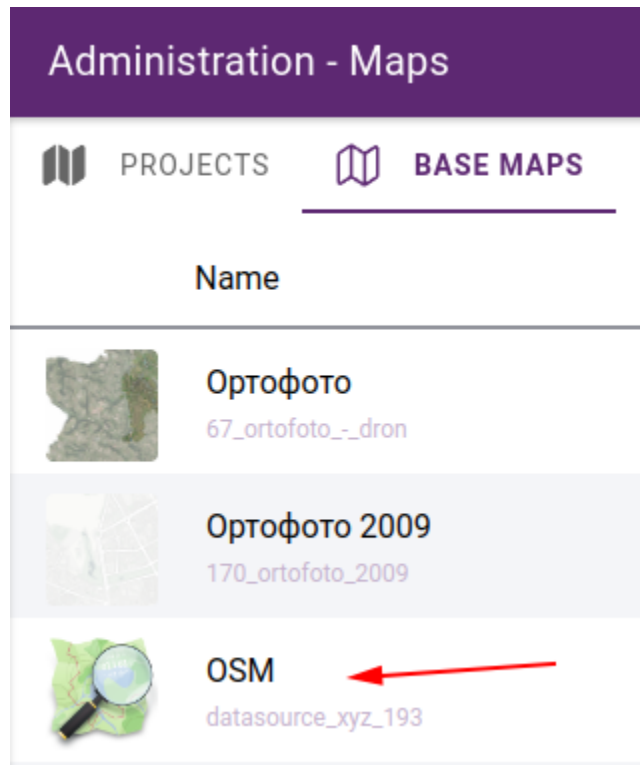
Folder:

📁 CHOOSE

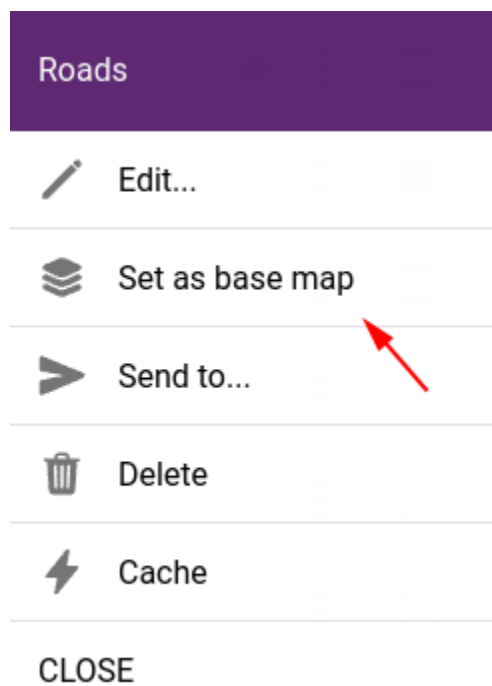
SAVE DATASOURCE



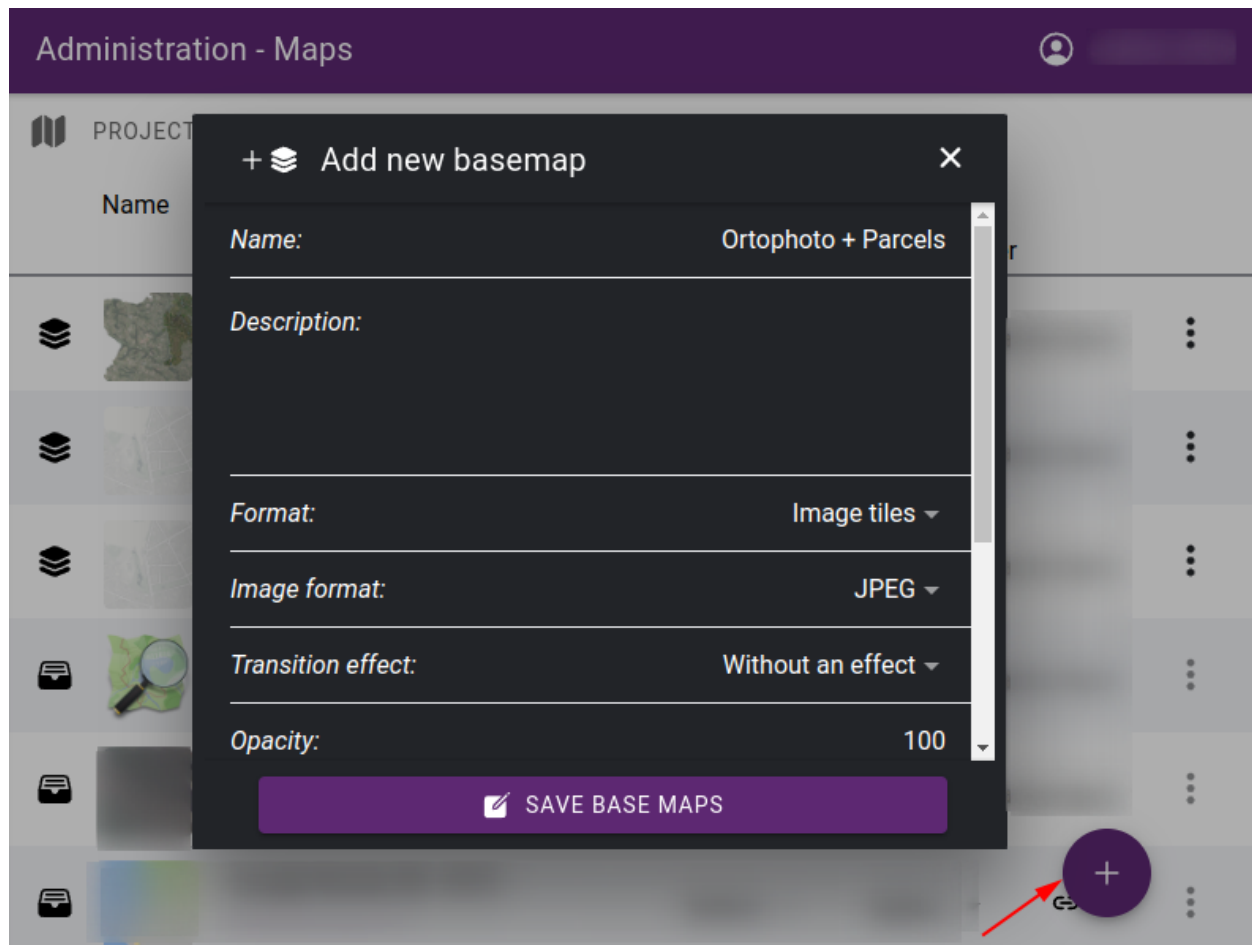
Slika 92: Mark datasource as basemap



Slika 93: External datasources are listed in base maps section



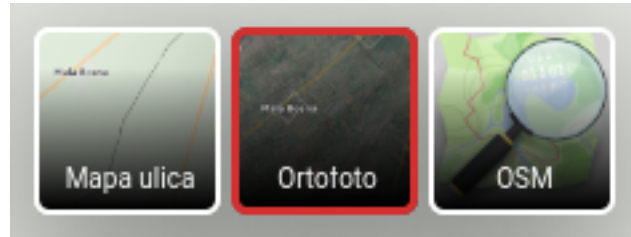
Slika 94: Set layer as basemap



Slika 95: Create new basemap from datasources

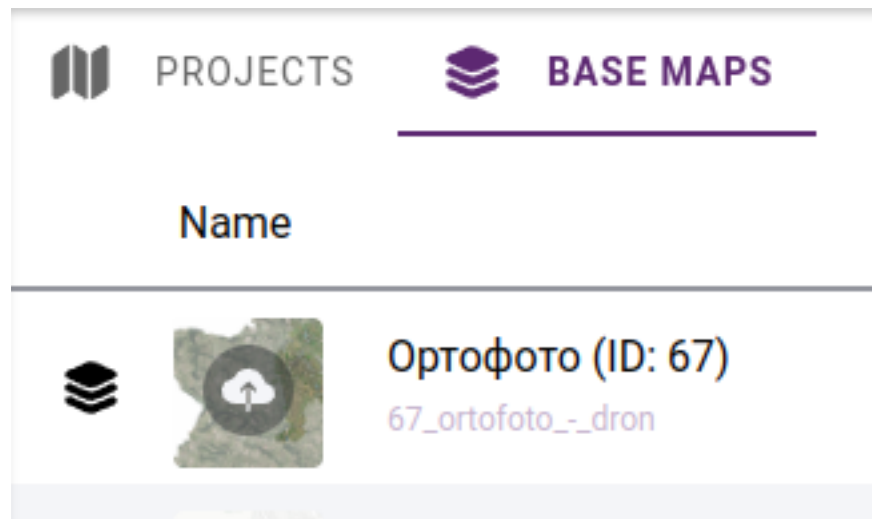
Preview image

Preview images help you to visually identify basemaps more easily. They are displayed in the basemap selector in the bottom left corner of the map:



Slika 96: Preview images in basemap selector

The preview is automatically generated based on the data source(s) that compose the basemap. It is possible to replace the generated image with your own. Simply click on the preview image in the list of basemaps and select the new image:



Slika 97: Upload preview image

Permissions

You can also control the visibility of basemaps. This can be important if you want to hide certain basemaps from the public or restrict them to certain teams.

In the basemap list, set the access rights in the **Visibility** column:

- **Public** - available for everyone
- **Logged in users** - available from logged in users
- **Selected user groups** - available to users who are members of one of the selected user groups. If you choose this option, you must select the preferred user groups in the next column.

Visibility	
Public	▼
Public	▼
Public	▼
Public	▼
Logged in users	▼
Selected user groups	▼
Logged in users	▼

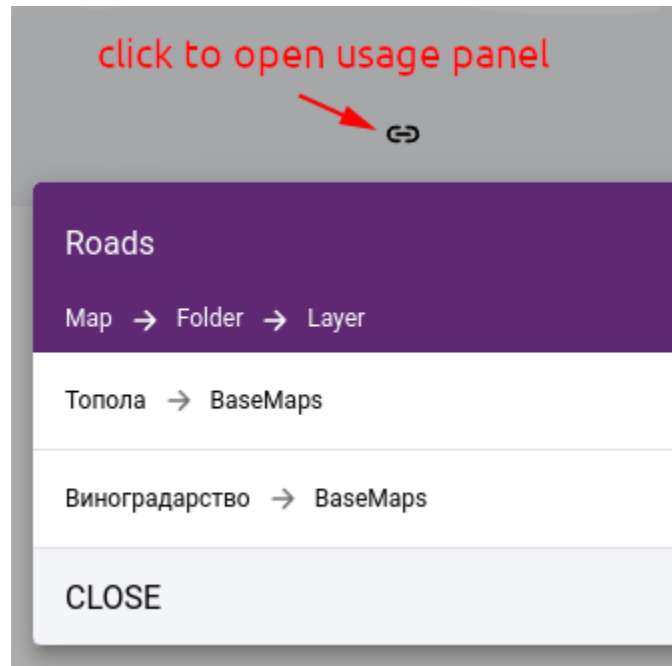
click to select preferred user groups

Администратори , Попис и... ▼

Slika 98: Basemap permissions

Usage

It is possible to list where each basemap is in use. This will give you the maps that are listed as basemaps or as layers in the maplegend:



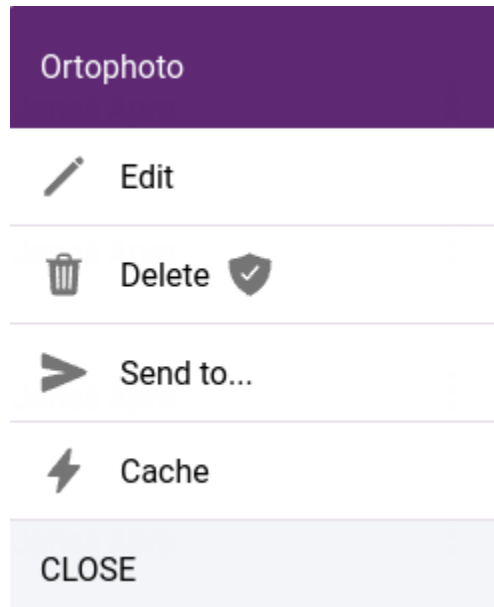
Slika 99: Usage panel

Local menu

In basemap listing, click on ... at the end of a row to invoke the basemap commands:

- **Edit** - edit basemap in layer editor
- **Delete** - delete basemap. Note that it will only be removed from the base map list if the same layer is on any map.
- **Send to...** - send basemap as layer to a map. In the pop-up window, select the map and the folder where the layer will be placed.
- **Cache** - opens the *cache manipulation panel*

Napomena: The local menu is only available for layers created in admin, not for data sources marked as basemaps.



Slika 100: Basemap commands

1.7.4 Lookup tables

Lookup tables are ...

Lookup widget selection

1.8 Team management

This part is only accessible to registered users with an administrative permissions. It can be reached after login, in the main menu select „Administration” then „Users”.

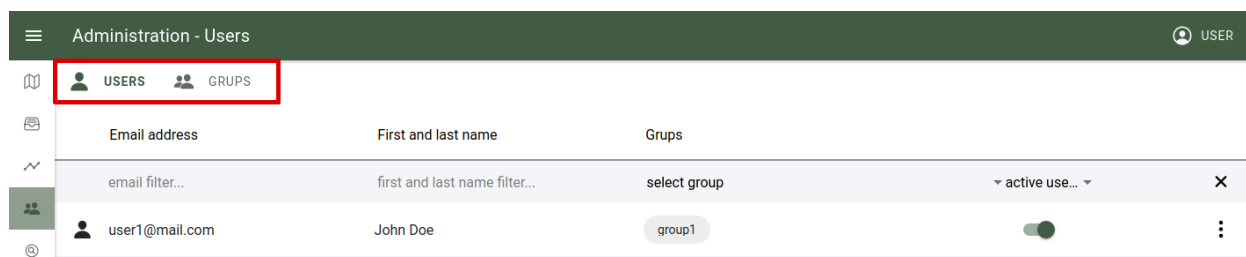
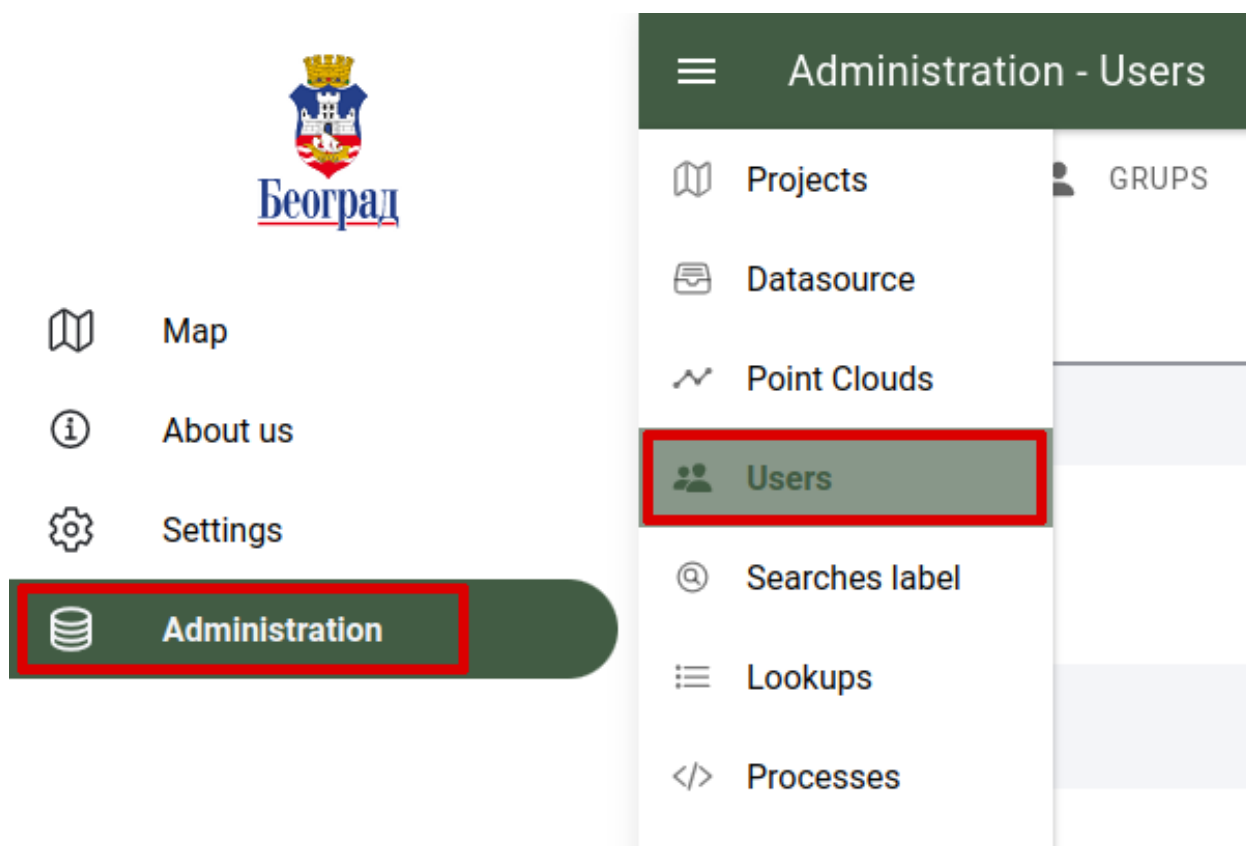
The two main function groups „Users” and „Groups” are sorted in tabs.

1.8.1 Users

System users can be created, edited, user groups can be attached or detached from users, and users can be activate or deactivate.

Actions:

- Create new user: A new user can be created when the „+” button is pressed on the right botton corner.
 - Default data tab:
 - * Email: Email of the user must be set.
 - * Active: User can be saves as active or inactive, incative users cant log into the system.
 - * Password: Password and confirm password must be set.
 - * Name and surname: Name and last name of the user must be set.
 - Groups tab:



Slika 101: Users and groups

Email address	First and last name	Grups	active use...	
email filter...	first and last name filter...	select group	▼ active use... ▼	×
user1@mail.com	John Doe	group1	<input checked="" type="checkbox"/>	⋮
user2@mail.com	John Doe	group2	<input checked="" type="checkbox"/>	⋮
user3@mail.com	John Doe	group1 group4	<input checked="" type="checkbox"/>	⋮
user4@mail.com	John Doe	admin	<input checked="" type="checkbox"/>	⋮
user5@mail.com	John Doe	group4 group5	<input checked="" type="checkbox"/>	⋮
user6@mail.com	John Doe	group3	<input checked="" type="checkbox"/>	⋮
user7@mail.com	John Doe	group1 group5	<input checked="" type="checkbox"/>	⋮
user8@mail.com	John Doe	group3	<input checked="" type="checkbox"/>	⋮
user9@mail.com	John Doe	group1	<input checked="" type="checkbox"/>	⋮
user10@mail.com	John Doe	group2	<input checked="" type="checkbox"/>	⋮

10 | total number of users: 183 1 / 19

Slika 102: List of users in the system

user9@mail.com	John Doe	group1	<input checked="" type="checkbox"/>	⋮
user10@mail.com	John Doe	group2	<input checked="" type="checkbox"/>	⋮

10 | total number of users: 183 1 / 19

Slika 103: Create new user

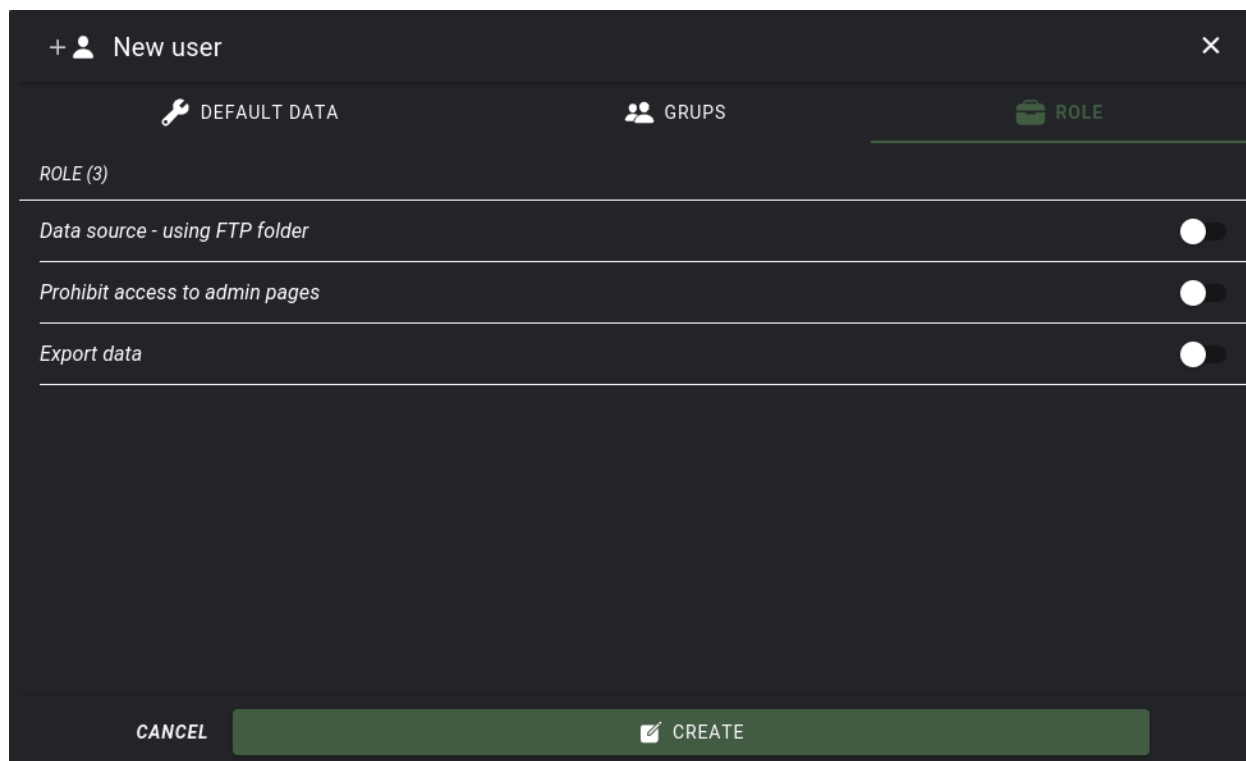
Slika 104: Create new user, default data tab

- * Groups: Existing groups are listed and can be attached to the user. A user can be attached to multiple groups, it can be a group member or an administrator of the group.
- Role tab:
 - Various permissions can be set to the user like:
 - * Using FTP folders (When turned on data can be uploaded on datasource, data structure can be modified and the FTP folder can be used)
 - * Prohibit access to the admin pages (When turned on the administration menu and its sub-menus can't be reached)
 - * Export data (When turned on data can be exported from the system)
- When all parameters are set the user creation can be finished by pressing the „Create” button or to cancel it the „Cancel” button.
- Edit user: User can be edited when at the end of the row „more option” and „edit” button is pressed. To close the panel press the „Close” button.

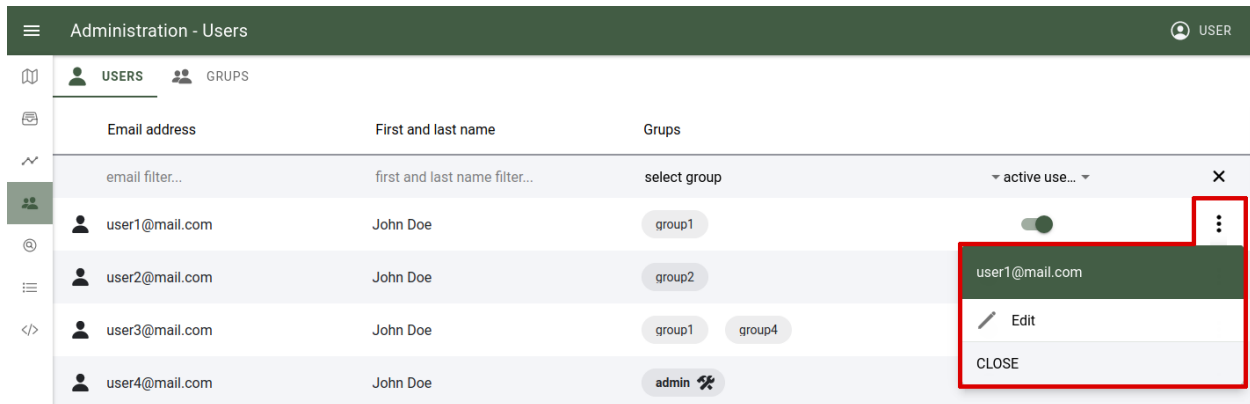
When the user is edited, user data is displayed on the sidepanel which is opened on the right side. User data like default data, groups and roles can be edited and saved.



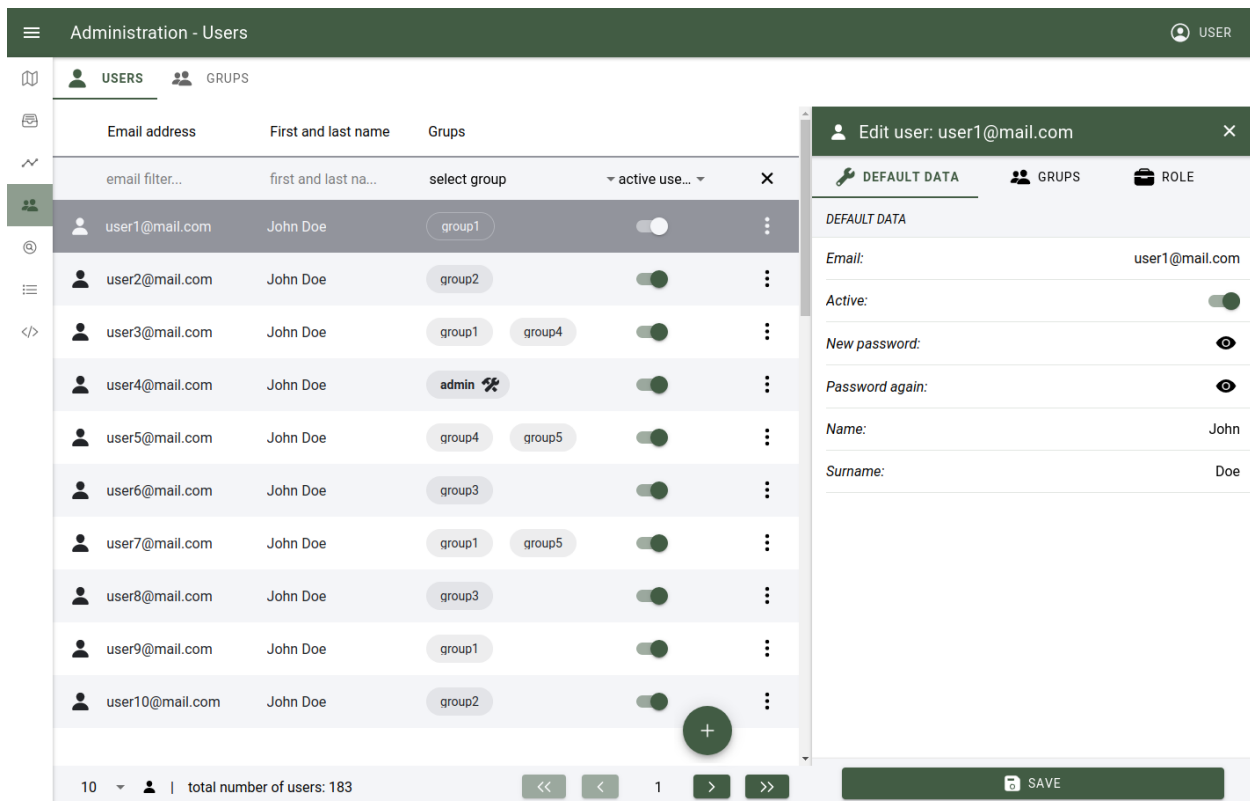
Slika 105: Create new user, groups tab



Slika 106: Create new user, role tab



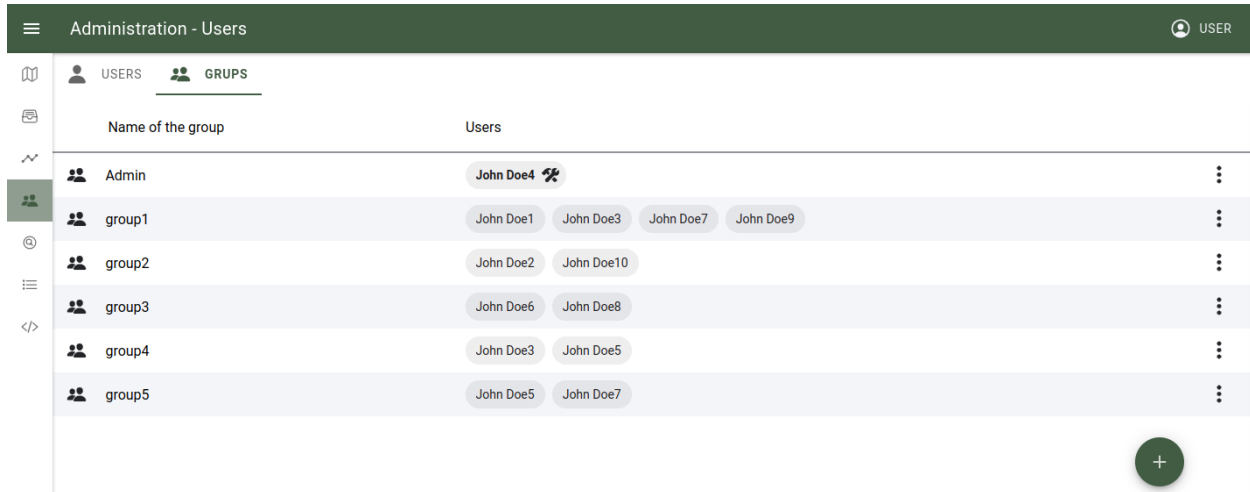
Slika 107: More options panel



Slika 108: Edit user panel

1.8.2 Groups

Groups are used to regulate the users permissions in user management. When a user has admin permission in a group, it can create new users, edit others in the same group or in the attached groups. As a group member, only those users will be listed where the user is attached as group member.



Slika 109: List of groups in the system

Napomena: For example when user1 is attached to group1 as administrator, it can create or edit users in group1.

Napomena: For example When user2 is attached to group2 and group3 as group member, to user2, only users of group2 and group3 will be listed as ready only.

User statuses can be:

1. Administrator of the group
2. Active member of the group
3. Member of the group but user is inactive



Slika 110: Statuses

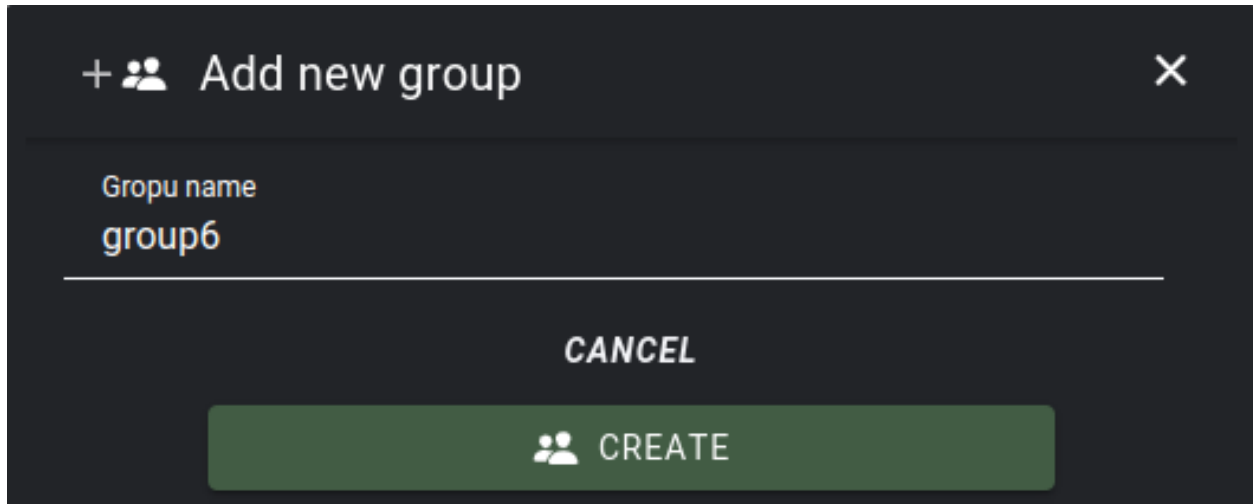
Actions:

- Create new group: A new group can be created when the „+” button is pressed on the right bottom corner.

Group name is mandatory, to create the group press the „Create” button, to cancel the action press the „Cancel” button.



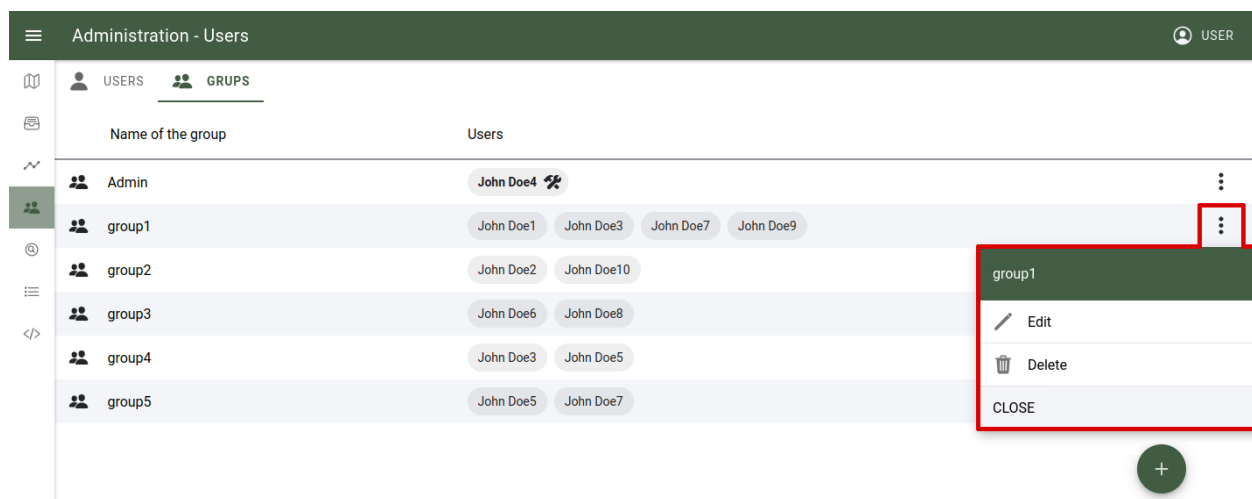
Slika 111: Create new group



Slika 112: New group popup

- Edit or delete group: Group can be edited or removed, when at the end of the row „more option” and „edit” or „remove” button is pressed. To close the panel press the „Close” button.

Napomena: Only empty groups (groups without users attached to it) can be removed.



Slika 113: More options panel