



Import, transfer and edition
of geographic data with



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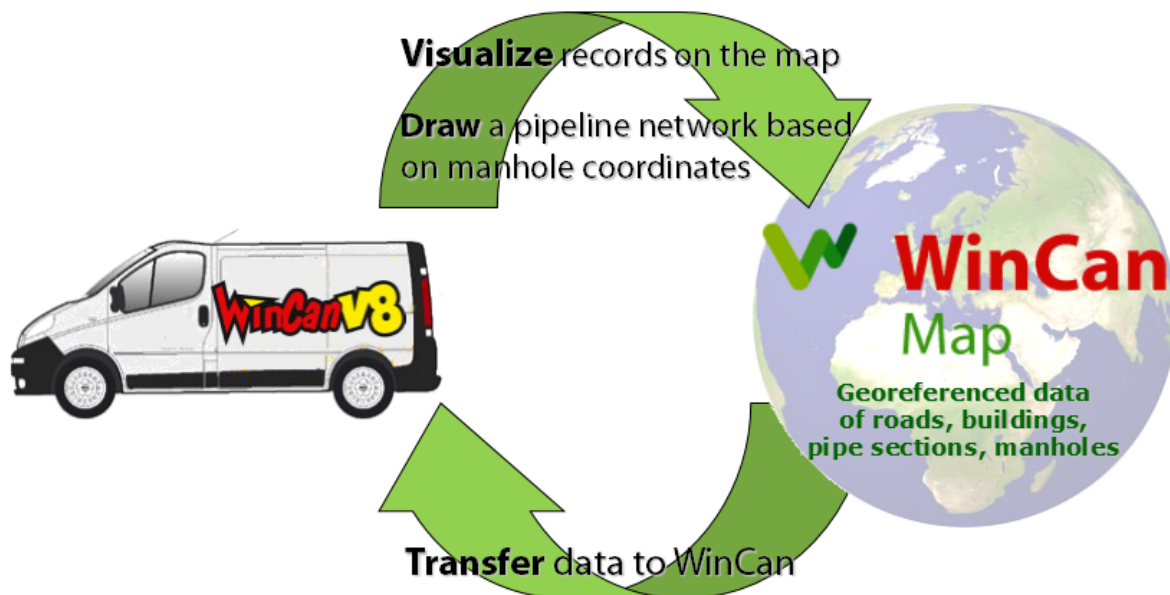
1.Introduction

The module Map is providing an interface that allows the user a quick and easy transfer of geographic data from any GIS (ArcGIS, MapInfo, AutoCAD, Open StreetMap etc.) to the pipe inspection software WinCan VX. No additional installation of a GIS or GIS component is therefore needed.

Map is installed together with WinCan VX on a computer located in a TV truck or in the office and is activated by a license. Simply **import** the **geographic data** you obtained from your client (i.e. engineer offices, pipe inspection companies, water authorities etc.) highlight the sections and manholes displayed on the map with the mouse and finally transfer their content into the section and manhole table of WinCan VX. A lot of typing work can thus be avoided and the risk of errors due to manual data entry is significantly lowered too.

Map also allows **creating new** and **correcting existing** geographic data directly in the TV truck in order you may directly hand out this updated data stuff to the client together with the inspection report.

If the **manhole coordinates** have been entered previously in WinCan VX the module Map will then be able to automatically draw the network built by all the manhole and pipelines of your current project.

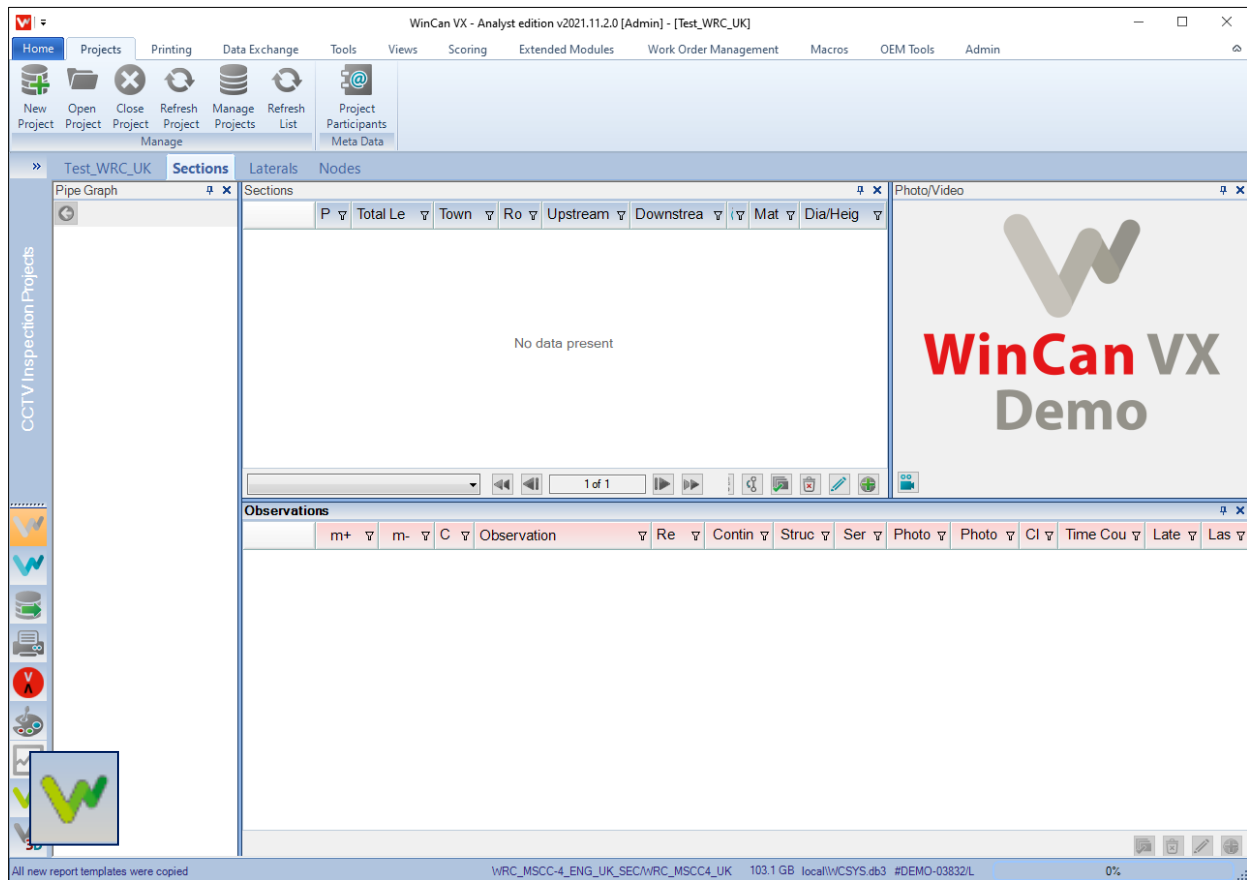


1.1 System requirements

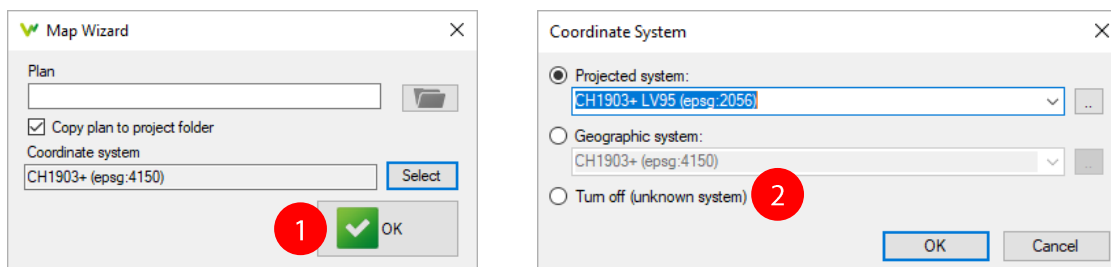
- Windows 10 Pro and Windows 11 Pro; all the corresponding updates must be downloaded and installed.
- Microsoft .NET-Framework 4.5 (latest version)
- Pipe inspection software WinCan VX (version 1.2025.17.1 or higher)

2. Launching and quitting the application

The module MAP can easily be launched from the pipe inspection software WinCan VX hitting the corresponding button in the vertical quick access bar to the left as shown below:



Next you will automatically be asked for the corresponding projection system (e.g. Switzerland = EPSG:21781 or EPSG:2056; Germany = EPSG:4839 or EPSG:5243 etc.) as well as a geo-referenced satellite image or map file the operator can use for spatial orientation:




If you haven't got any geo-referenced map just continue with OK (1) and also turn off the projection system (2) in case you don't know it.

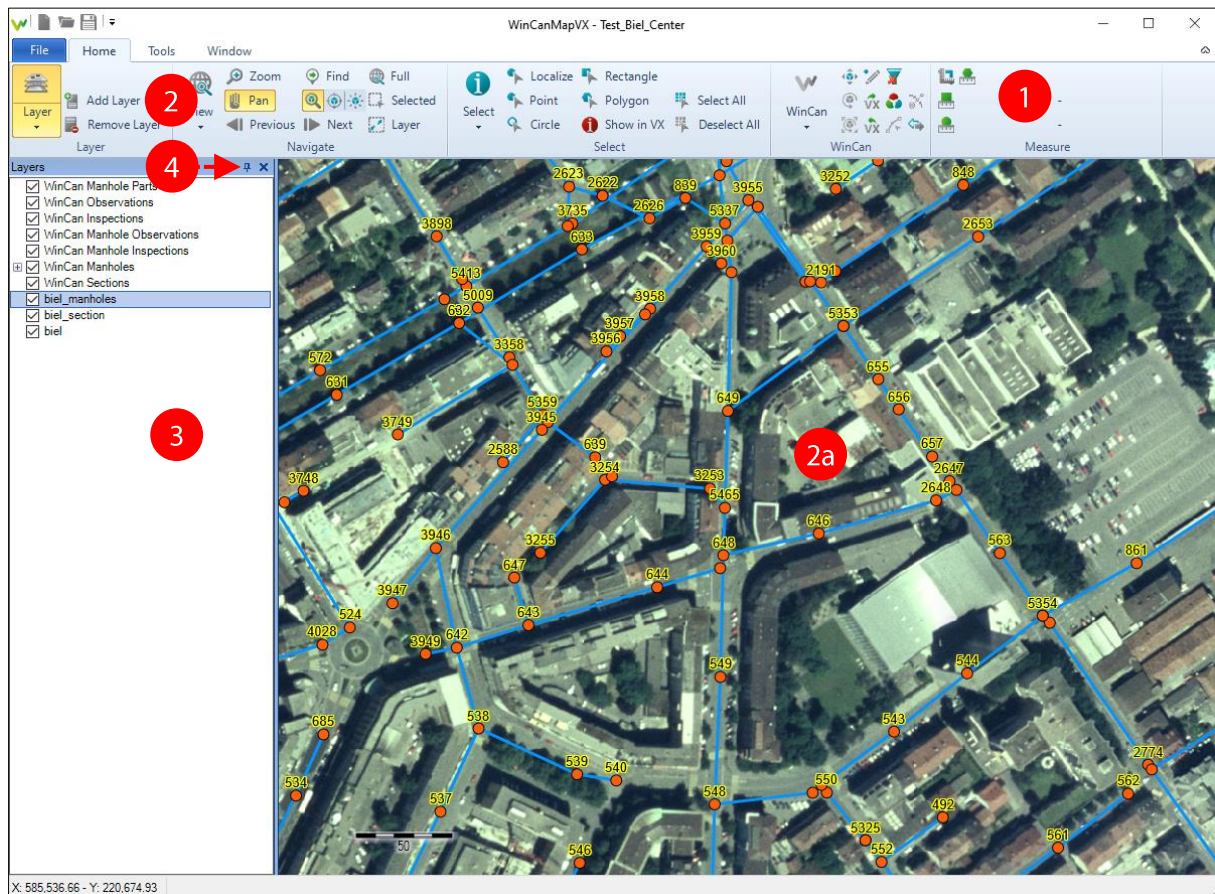
The main window then shows a default layout of the different working panels that can be modified and saved at any time by the user.

2.1 Main window

The main screen of MAP is subdivided into 3 areas:

1. Ribbon bar with corresponding command groups
2. Map panel to display the currently preferred geographic area: the data are shown (2a) as soon as the corresponding object layers have been added to the map project hitting the command *Home > Add Layer* (2).
3. Legend panel to show the content of the object layers based on SHAPE files and the WinCan layers based on the data that have already been transferred into the WinCan project.

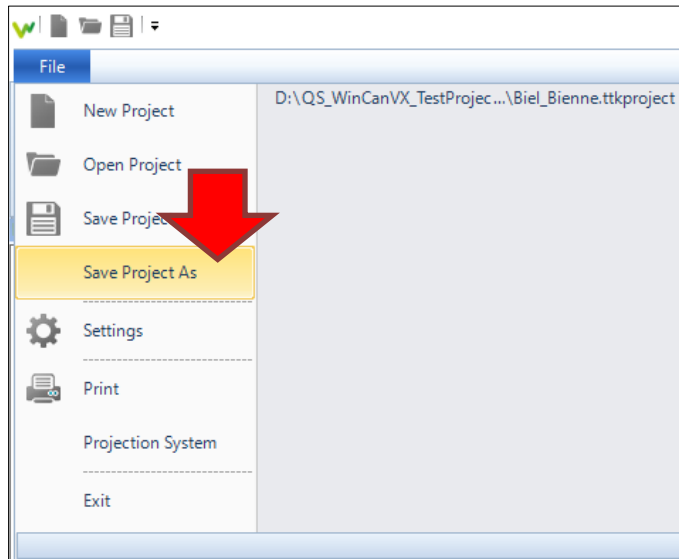
The legend (3) can be hidden automatically once the pin icon  has been activated (4) OR even undocked from the main window to move it freely on any location on the current or a second screen:



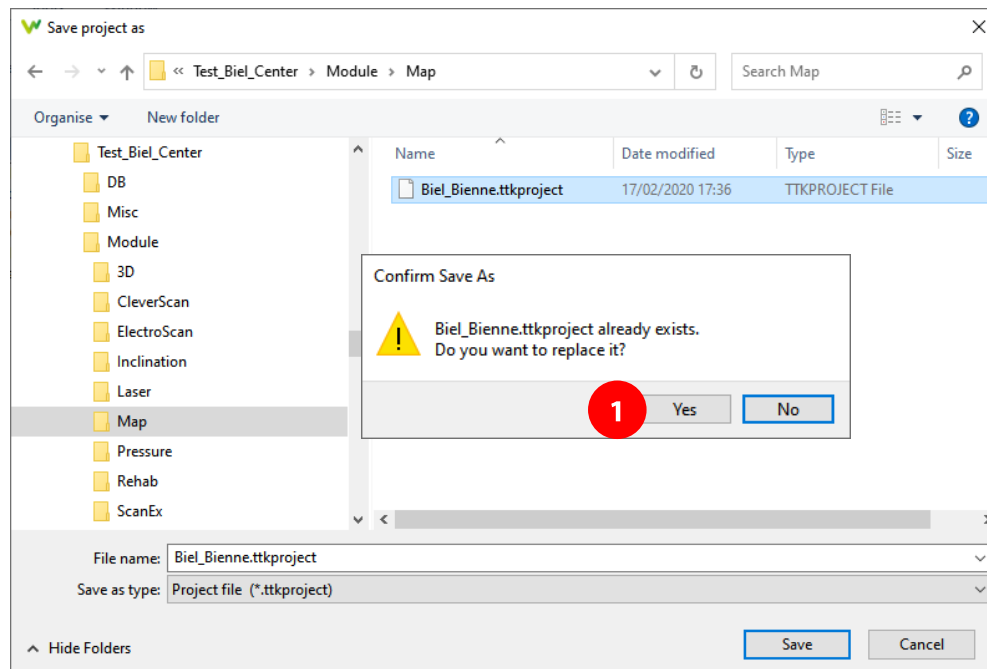
The main window appears in a medium size after the first launch of the application. Like all other WINDOWS panels it can be minimized, maximized, enlarged and moved on a second (larger) screen to improve the general view to the map when using the pan or zoom tools.

2.2 Saving MAP projects

Click on the command *File > Exit* to quit the program. The various modifications of layer properties within the current MAP project are NOT saved automatically. So always make sure you have manually saved it before, using the command *File > Save Project As*:



You will then be asked to browse for the corresponding destination folder. It is recommended to use the existing project subfolder *Module\Map* where you may also store the SHAPE files provided by the GIS managers (engineer offices, local water authorities):

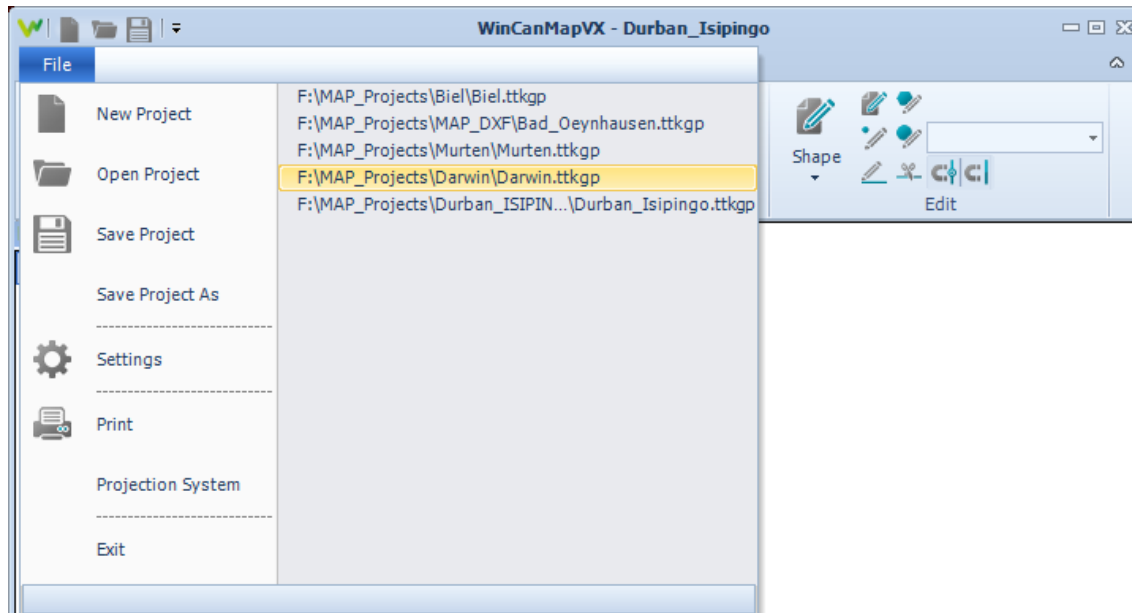


Also use the command *File > Save Project As* when you want to save modifications of layer properties into the same project file in the future. The software then asks you directly whether you want to overwrite the existing file. Confirm with Yes (1) to do so.

3. Working with MAP projects

MAP projects consist on a **collection of geo-referenced records** that are needed to build up the pipeline network. These data records or layers are saved in different formats and are either used as transfer layers or simply for spatial orientation.

A new MAP project is created and saved in the format ttkgp (ttkgp = tatuk-GIS). Existing project data must be available in this format too in order you can open them in MAP.



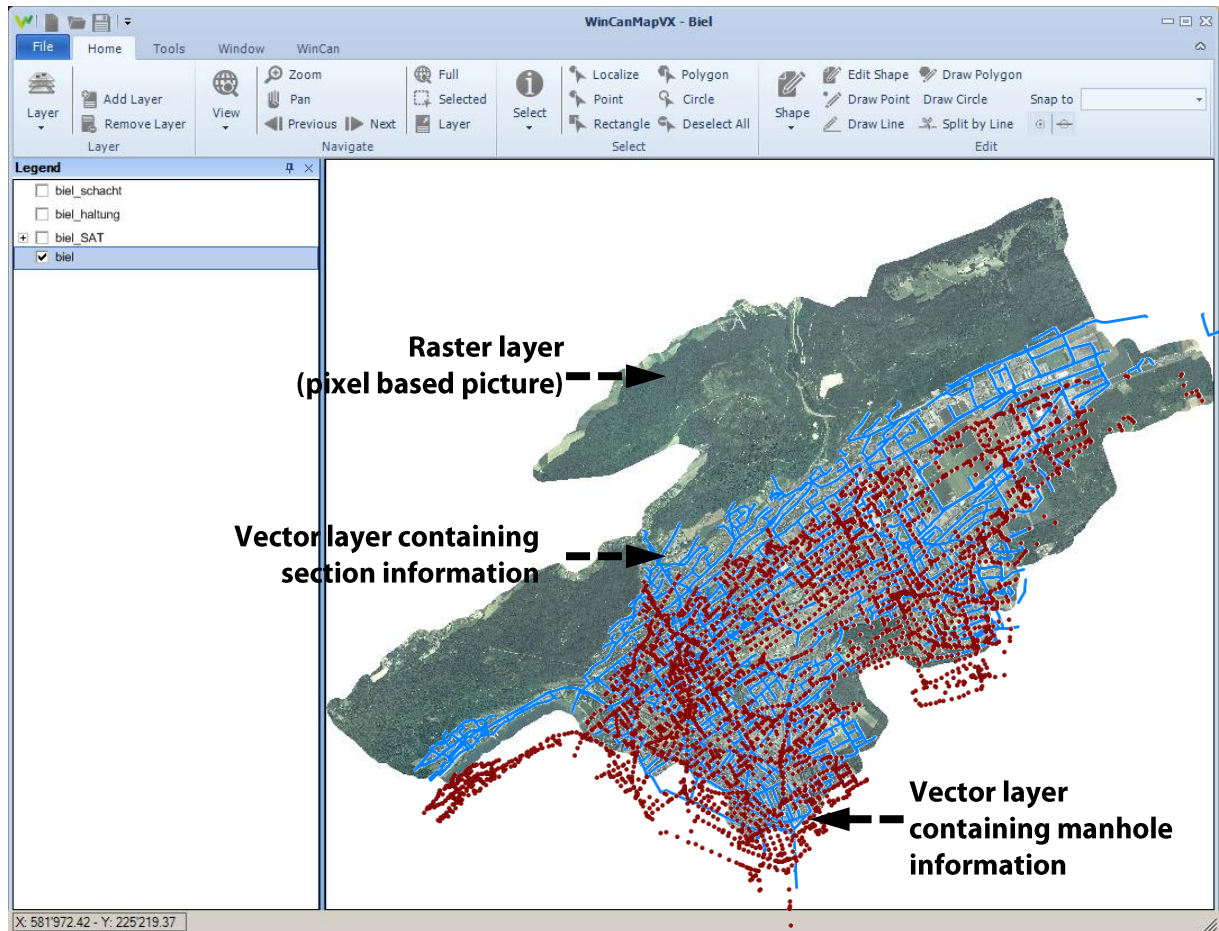
MAP project files contain the following important information:

- Layers representing sections and manholes based on original SHAPE files provided by a GIS manager. Further layers representing streets, buildings, landscape elements etc. are optional and mostly not available.
- WinCan layers based on object data that have already been imported into WinCan and that are automatically created by MAP.
- Properties per layer that contain information about how to show the corresponding objects (i.e. sections or manholes) on the MAP interface: sections and manholes can thus be displayed with specific icons and labels.
- Display of frequently used queries as sub-layers:
 1. Show sections ordered by **diameter classes** and displayed in specific colours
 2. Show sections ordered by **pipe material** and displayed in specific colours
 3. Show sections ordered by **section type** and displayed in specific colours
 4. Show sections ordered by **construction year** and displayed in specific colours etc.

Each sub-layer can thus be represented in the legend panel by its coloured icon

3.1 Layers

After adding the geographic data into a new project in MAP they are shown as so called drawing or object layers that are precisely snapped to each other:



There is a fundamental difference between raster and vector layers. **Raster layers** are based on pixel data (i.e. pictures). Satellite or aerial view pictures, scanned plots etc. are good examples for this type of layer. Raster pictures can only be displayed properly within a defined zoom range. When zooming in close to an object every single pixel is simply enlarged and the picture will NOT be able to show you more detailed information.

When available as **vector layers** on the other hand the data can be described with geometric forms (i.e. vectors) like lines, triangles, rectangles etc. MAP is supporting different vector formats. Some of them are needed for **data transfer (e.g. section and manhole layers)** whereas others just contain information for spatial orientation (e.g. outlines of streets, buildings). Zooming in close to an object of a vector layer will not create any loss of quality.

Important:

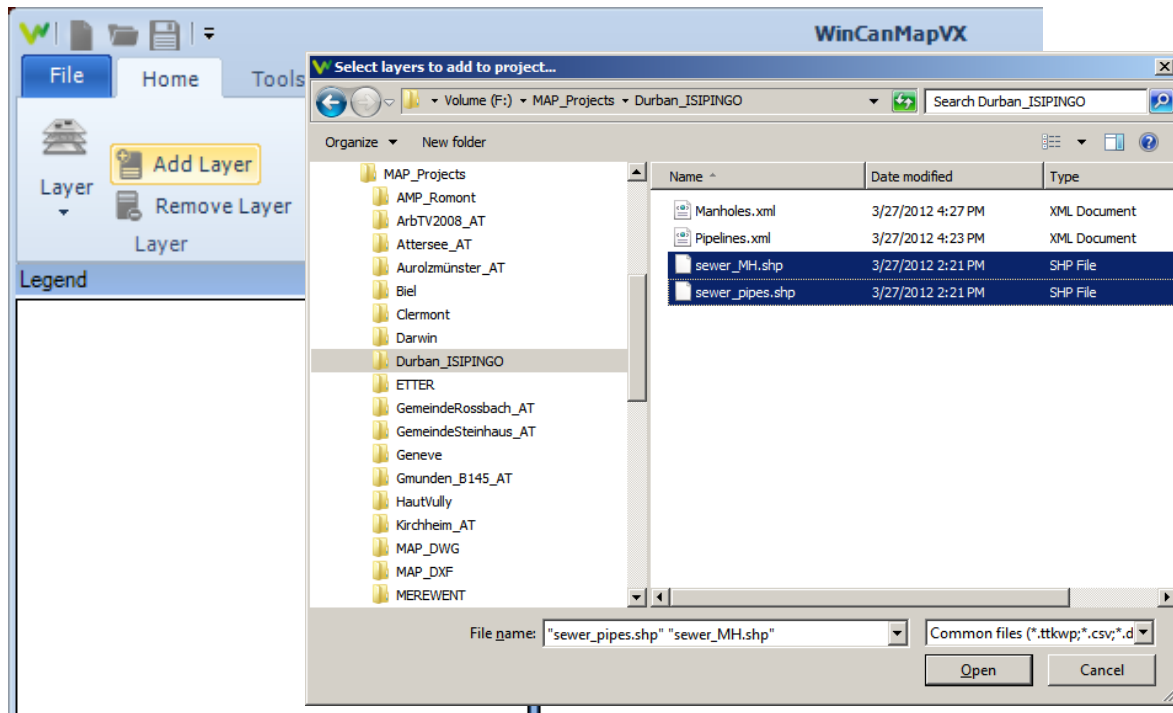
In order the different layers precisely snap together they need to be geo-referenced (i.e. ...*calibrated with a coordinate system valid for a given region...*). This job has to be done by the GIS manager (professional staff member of an engineer office or the local water authorities etc.).

3.2 Importing layers

The vector based layer data used in MAP are mostly available in the format SHP. These SHAPE files only allow the storage of data that contain just ONE type of geometric shapes like:

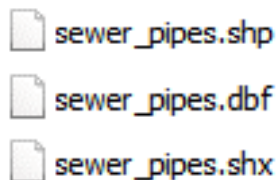
- Polygons = outlines of streets, buildings, lakes, parks...
- Lines = sections, arrows for flow direction...
- Points = manholes, pumping stations...

Activate the command *Home > Add Layer*, select the files with the extension SHP in the dialogue box that follows and click on the button *Open* to import them into the project. Multiple file selection is possible too:



You may also **directly** move the SHP files from the Windows Explorer to the Map window using the *Drag & Drop* functionality of your left mouse key.

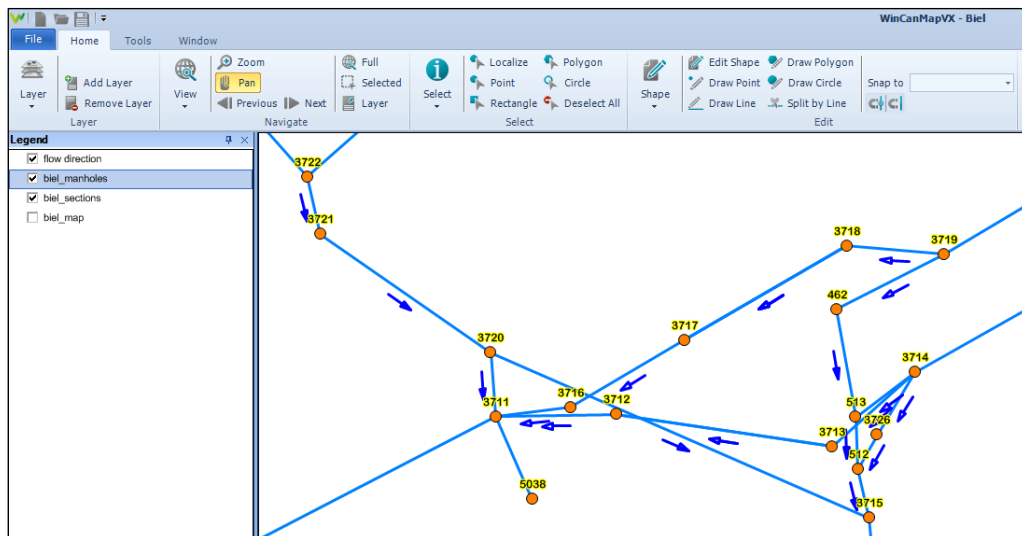
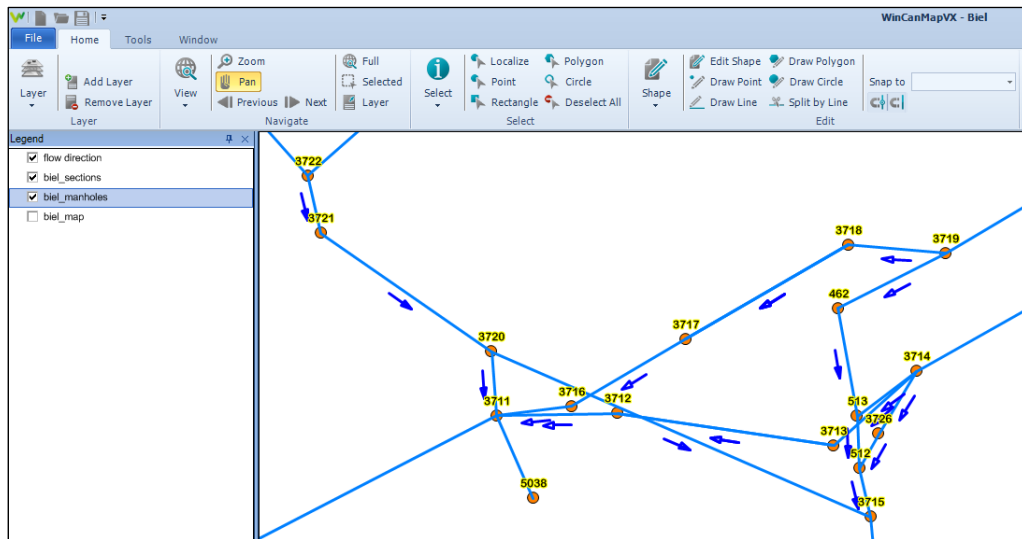
Always check whether the SHAPE files are available as a complete file group that must contain at least the following three files:



In order Map-VX is able to correctly display an object layer the SHP file itself is NOT sufficient; the corresponding DBF as well as the SHX file are needed too!

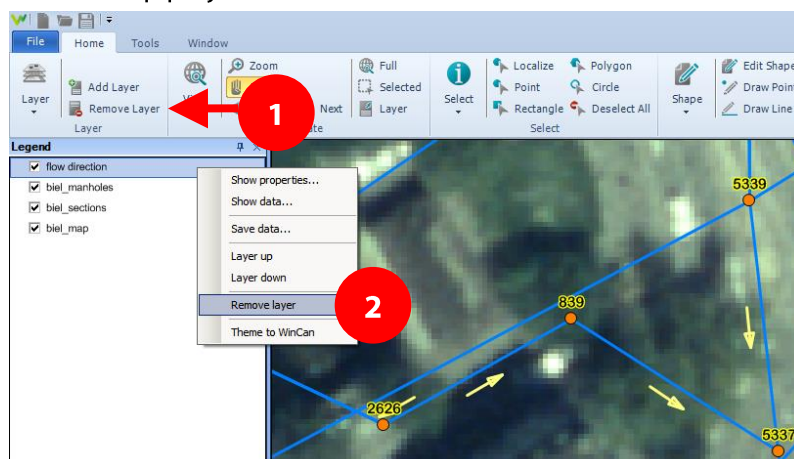
3.3 Changing the layer order

Select the layer from the legend and move it upward using the *Drag&Drop* functionality of the left mouse key: The displaced layer is thus covering those that lie underneath:



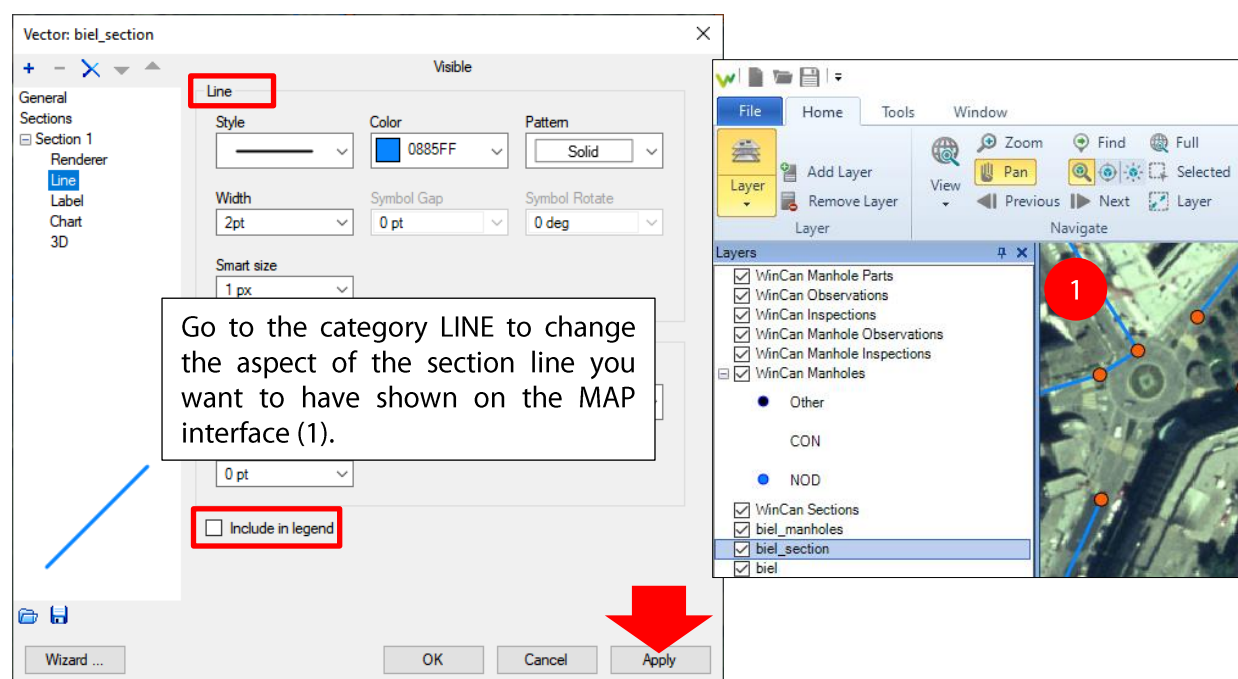
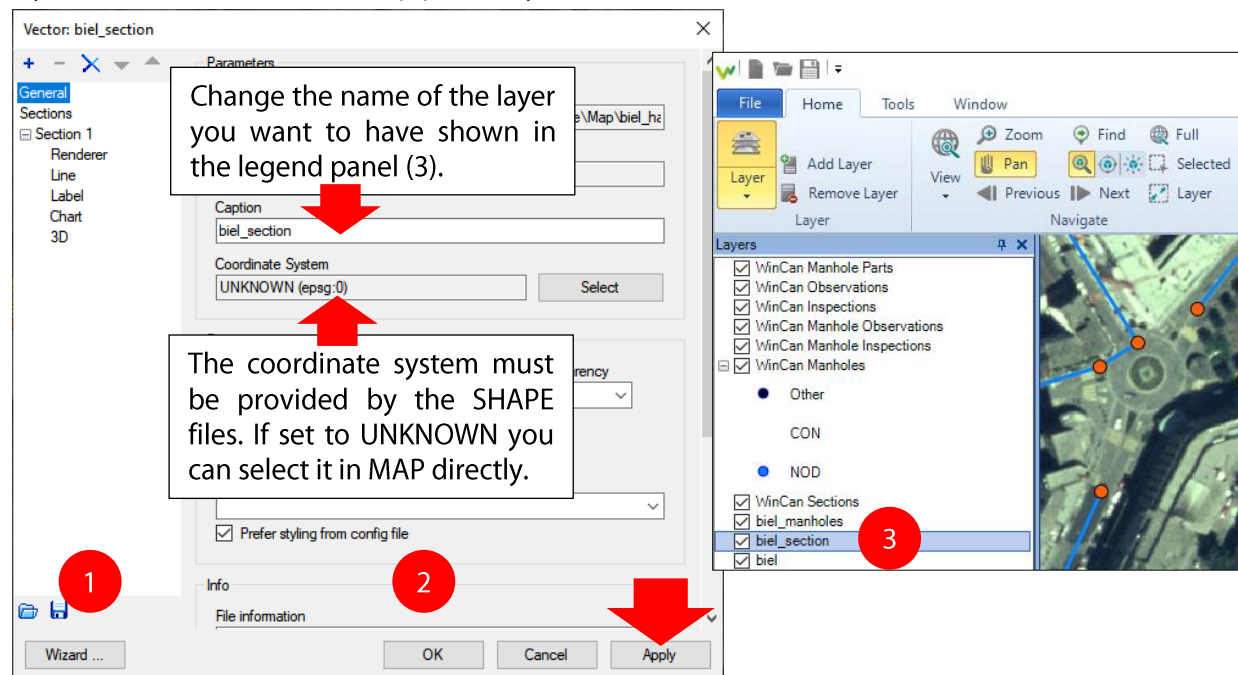
3.4 Removing layers

Select the command *Remove layer* in the context menu to the selected layer to remove it from the current Map project:

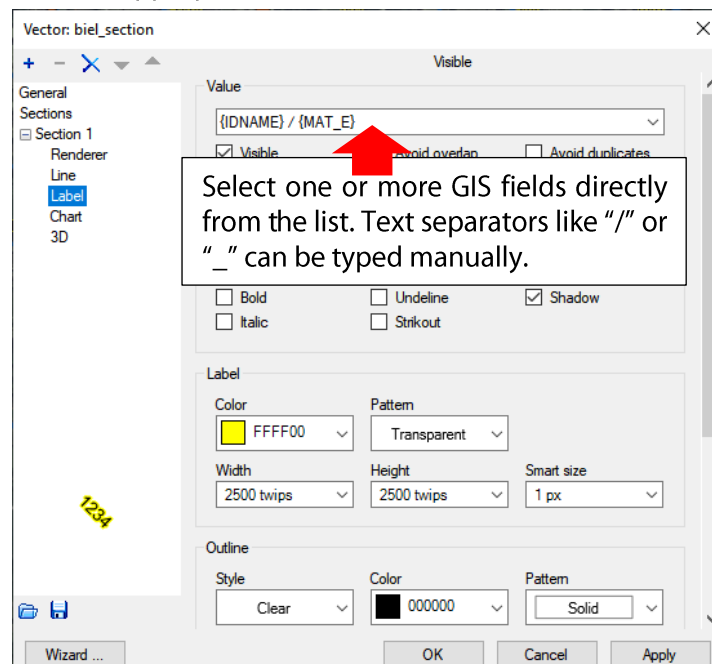


3.5 Modifying layer properties

The properties of each object layer can be modified in detail using the context menu command *Show properties* for the selected layer. The following pages focus on the most important setting categories (1) and their options (2) inside the properties dialogue that a user will usually apply in order to have the layers shown as needed for the pipe survey:



The sub-category LABEL allows the user to have the corresponding object shown on the MAP interface with the appropriate name.



Vector: biel_section

Visible

Value: {IDNAME} / {MAT_E}

☒ Visible ☐ Avoid overlap ☐ Avoid duplicates

☐ Bold ☐ Undeline ☒ Shadow
☐ Italic ☐ Strikout

Label

Color: FFFF00 Pattern: Transparent

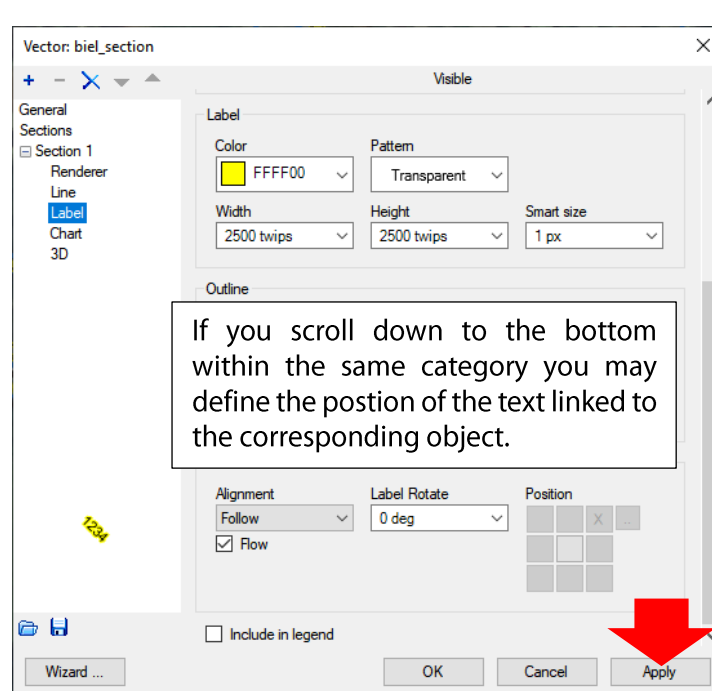
Width: 2500 twips Height: 2500 twips Smart size: 1 px

Outline

Style: Clear Color: 000000 Pattern: Solid

Wizard ... OK Cancel Apply

Select one or more GIS fields directly from the list. Text separators like "/" or "_" can be typed manually.



Vector: biel_section

Visible

Label

Color: FFFF00 Pattern: Transparent

Width: 2500 twips Height: 2500 twips Smart size: 1 px

Outline

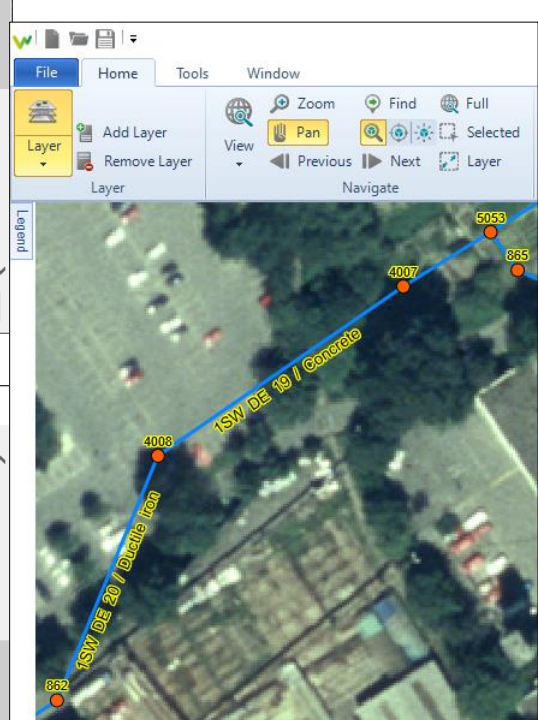
Alignment: Follow Label Rotate: 0 deg Position: [Grid]

☒ Flow

☐ Include in legend

Wizard ... OK Cancel Apply

If you scroll down to the bottom within the same category you may define the position of the text linked to the corresponding object.

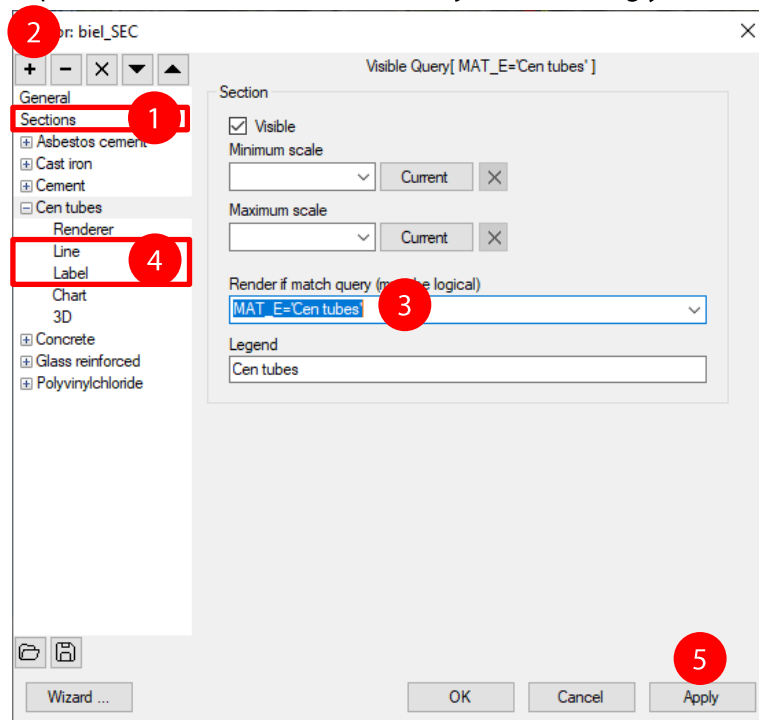


Hitting the *Plus* button at the top left of the properties dialogue, the user may subdivide the objects of the current layer into different groups or classes and write the corresponding criteria like *diameter*, *section type/usage*, *pipe material*, *construction year* etc. Objects that match the criteria are then shown in specific colours and symbols which can also be displayed in the legend panel.

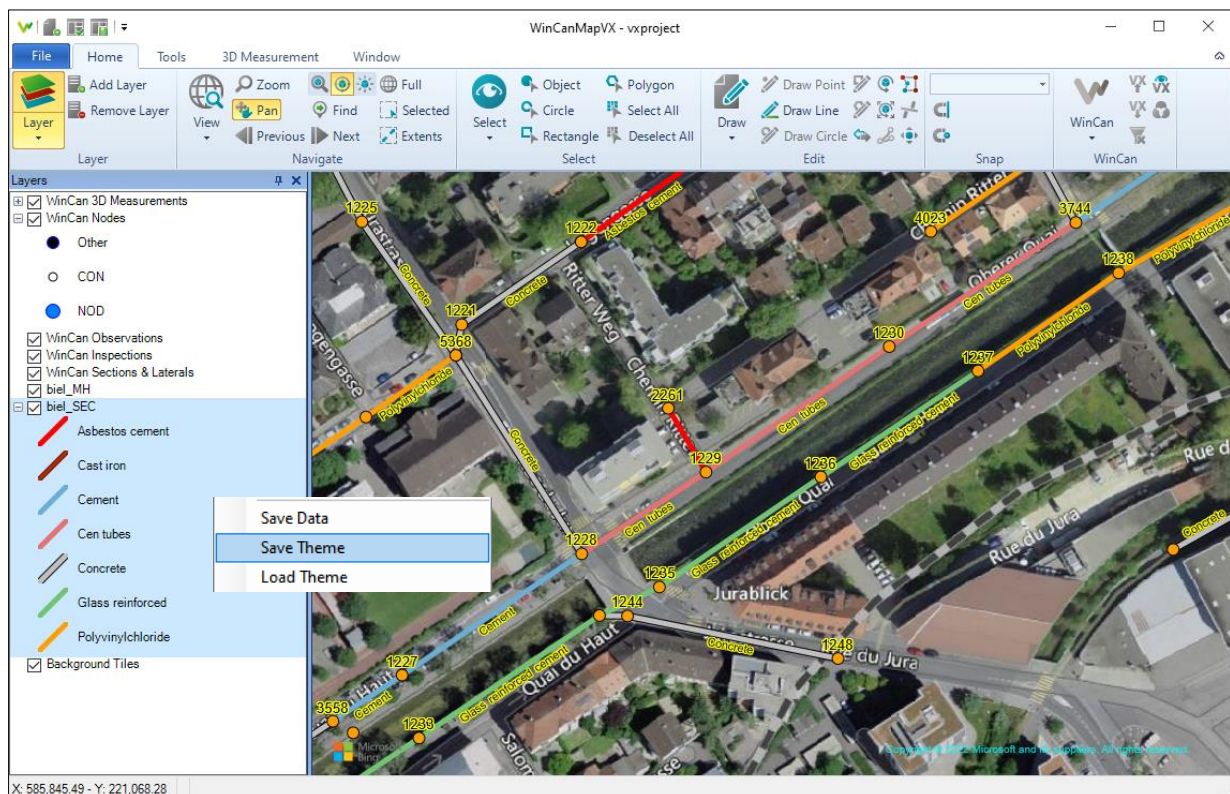
The following pages provide two examples how to write criteria (queries) correctly in order to have the section groups subdivided into different **diameter** or **pipe material classes** and shown accordingly on the MAP interface.

Example2: Show sections grouped by pipe material

Click on *Sections* (1) in the left part of the dialogue and hit the PLUS button (2) to add a new section (object group): Next write the criteria for the different pipe materials as shown in the sample below (3). Select colour and symbol (*Line*) that should represent the corresponding material and choose a caption (*Label*) that describes the objects accordingly (4):



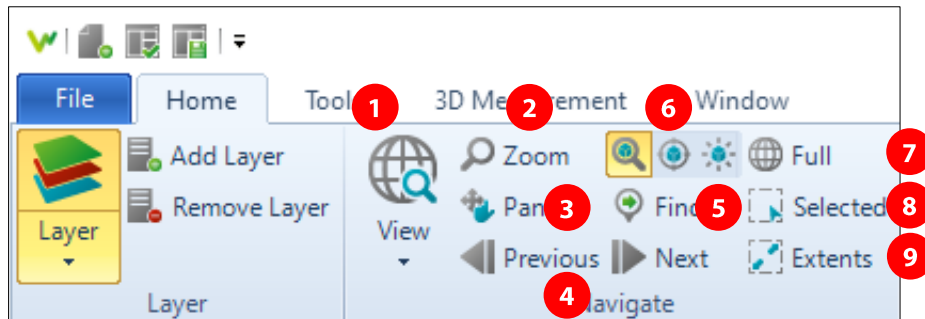
The Map interface finally shows each section in the specified color for the corresponding material.



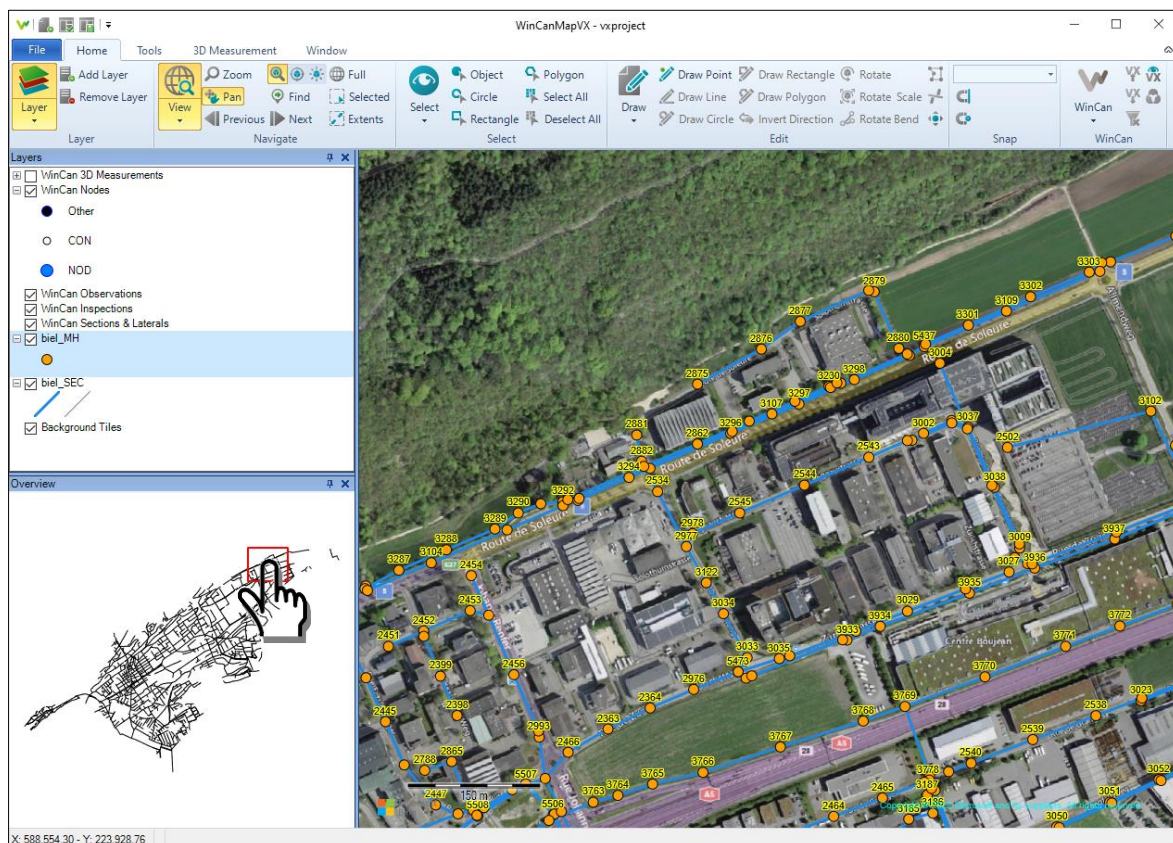
You may save this type of section display as an additional THEME for further use and select a sensible name for the new theme (e.g. Sections_MATERIAL).

4.Navigation tools

Zooming in and **zooming out** the map view can easily be done with the mouse wheel. On the other hand the command group *Navigate* in the ribbon bar provides additional buttons to control the different map views:

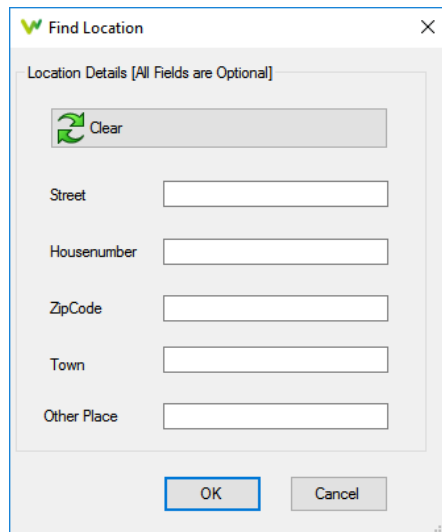


1. Click on this button to open the map overview panel: the spatial extent of the whole map project can thus be displayed in a **small sized** format below the legend. Simply zoom in the map within the main window to get the currently visible area on the map highlighted by a red frame in the overview panel. Then move the red frame to another location in the overview panel to get the corresponding area shown and zoomed on the map:



2. Clicking this button is displaying the mouse pointer as a magnifier. The user is able now to draw a rectangle on the current map view to have it **zoomed in** directly to the extent of that selection.
3. Move the current map view directly with the mouse within the map panel keeping the left mouse key pressed.
4. Use the buttons *Previous* and *Next* to switch between map views you have already zoomed to before.

5. Hit this button to run the search dialogue below that provides a cleaned-up input mask for a quick object search:




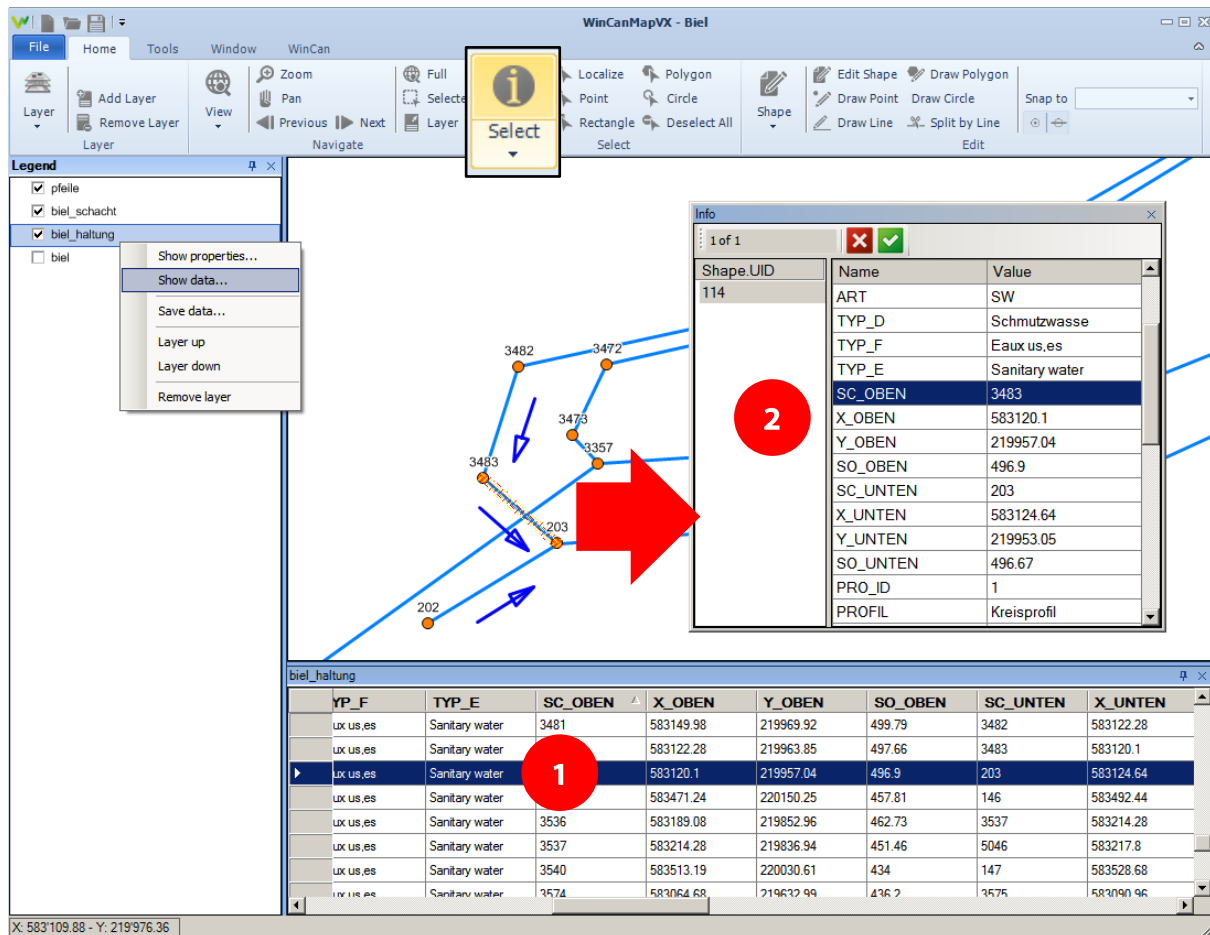
The image shows a 'Find Location' dialog box with a title bar containing a green 'W' icon and a close button. Below the title bar is a section titled 'Location Details [All Fields are Optional]'. Inside this section, there is a 'Clear' button with a circular arrow icon. Below the 'Clear' button are five text input fields labeled 'Street', 'Housenumber', 'ZipCode', 'Town', and 'Other Place'. At the bottom of the dialog box are two buttons: 'OK' and 'Cancel'.

6. This button group contains three possibilities, how objects selected in WinCan should be shown and highlighted in Map (*Select & Zoom*, *Select; Flash-up*).
7. This button is zooming the map view in a way ALL object layers are displayed in the map panel at their full extent.
8. This button is zooming to the area that contains the currently **selected** objects.
9. This button is zooming the map view to the object layer which is currently **highlighted in the legend** and displays it in the map panel at its full extent.

5. Show object data

The contents of the SHAPE files (i.e. geographic data) for sections and manholes can fast and easily be called up. Map-VX is therefore providing the following two possibilities:

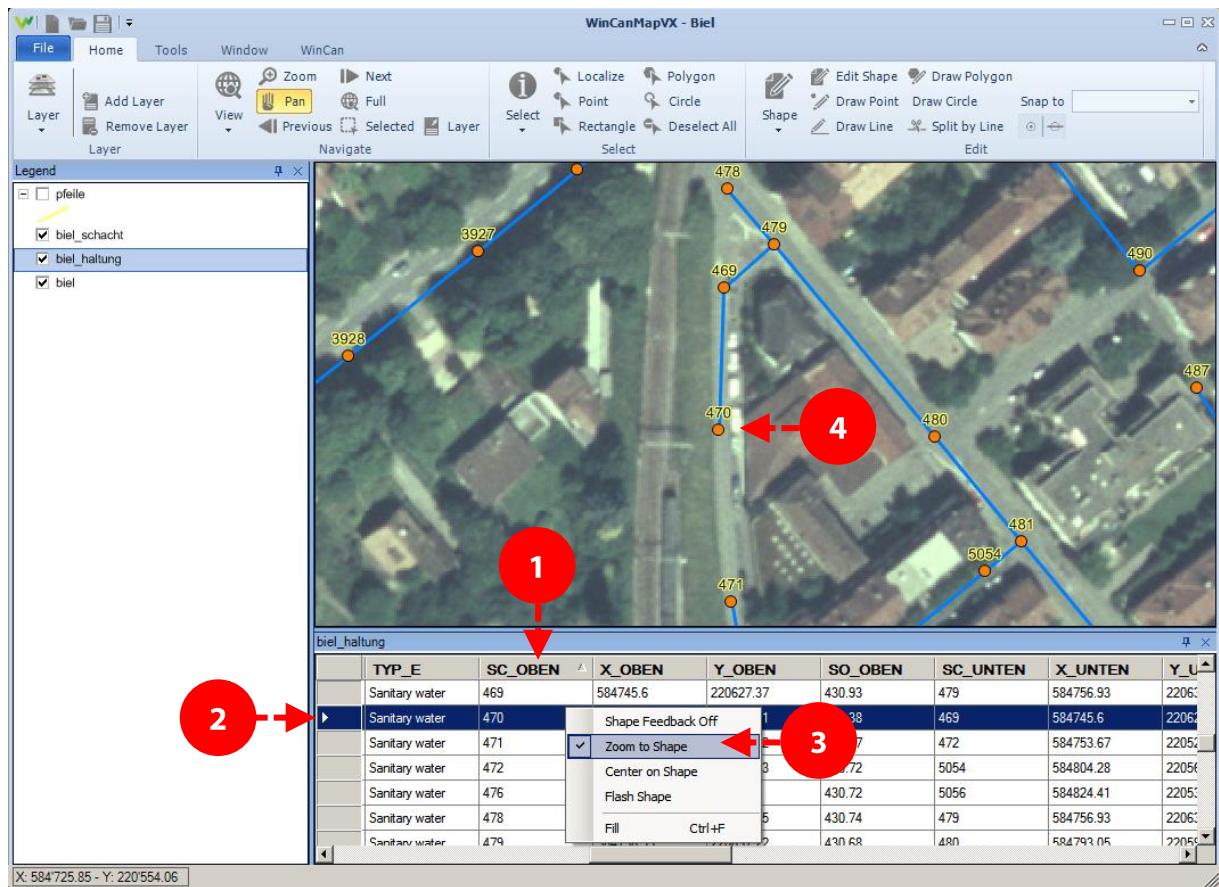
1. Showing **all** data of a specified object layer via the context menu command *Show data*.
2. Show the data of **selected** objects of a specified layer hitting the button 



The user may drag these additionally displayed data panels either somewhere on the MAP-VX interface (2) or pin it to one of the margins of the main window (1).

5.1 Looking for objects

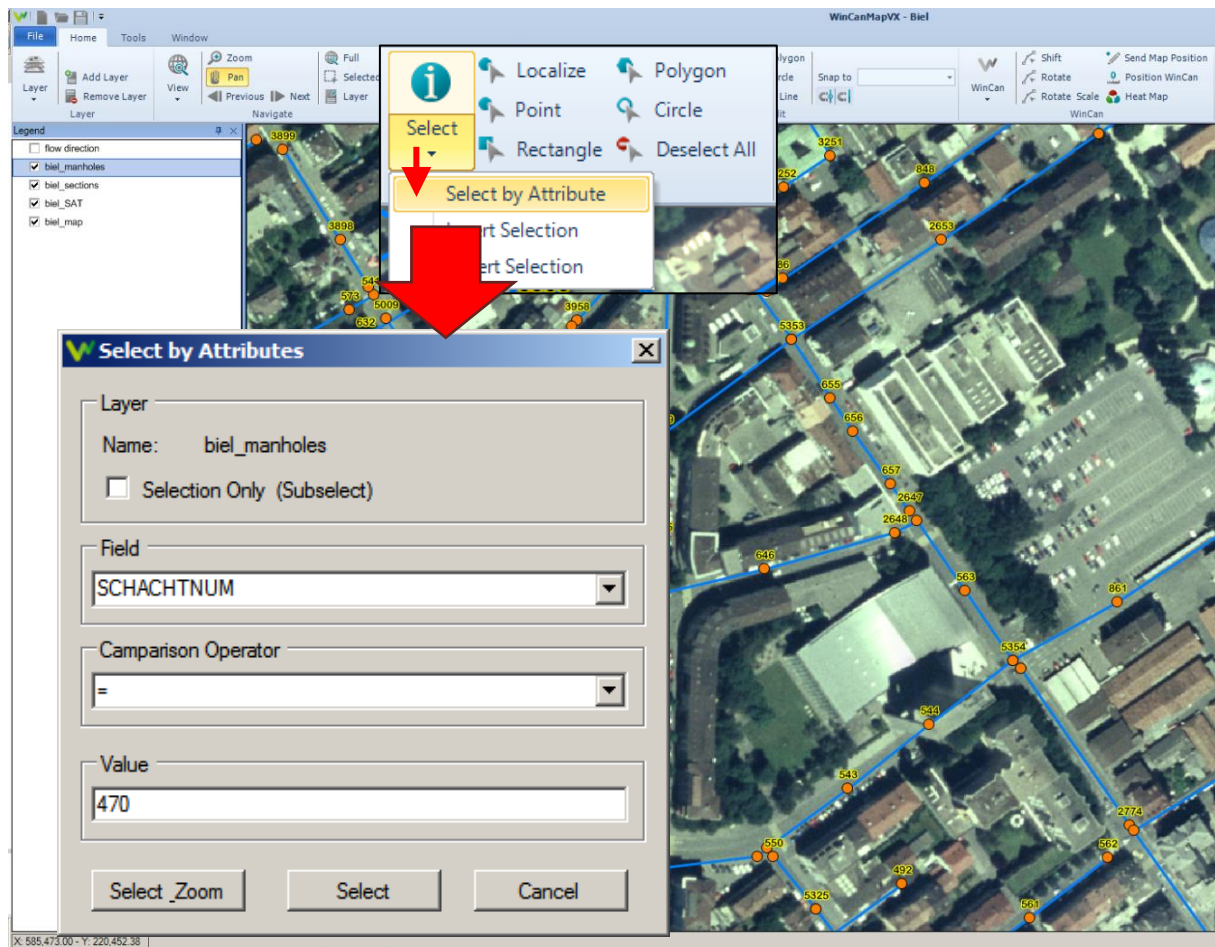
Single sections or manholes as object layer elements can be found quickly when showing the data table to the corresponding layer (1). Focus on the column containing the unique section or manhole names, sort them either in the ascending or descending order (1) and highlight the record that you will find after scrolling down the sorted list (2).



Finally right click on the highlighted record and select the command *Zoom to Shape* (3): Map-VX will then zoom immediately to the corresponding object (section, manhole pumping station etc.) and show its location directly on the map (4):


Show object data

If you already know the exact expression of a section or manhole attribute (e.g. name or number of the upstream/downstream manhole) you will be able to enter the value DIRECTLY in the dialogue shown below. Select the command *Select, Select by Attribute* to open the search panel:



6. Transfer object data into WinCan VX

Data transfer is one of the most important functionalities in Map-VX. Master data for pipe sections and manholes can be indicated quickly, simply and flawlessly when importing them directly from GIS systems which they are managed in. Subsequently typing errors are excluded and the operator can focus on the current survey job.

Via the button  the user can quickly access all GIS data linked to the selected object (pipe section or manhole) and therefore is able to detect the GIS fields containing data that eventually will have to be transferred to the pipe inspection software WinCan VX.

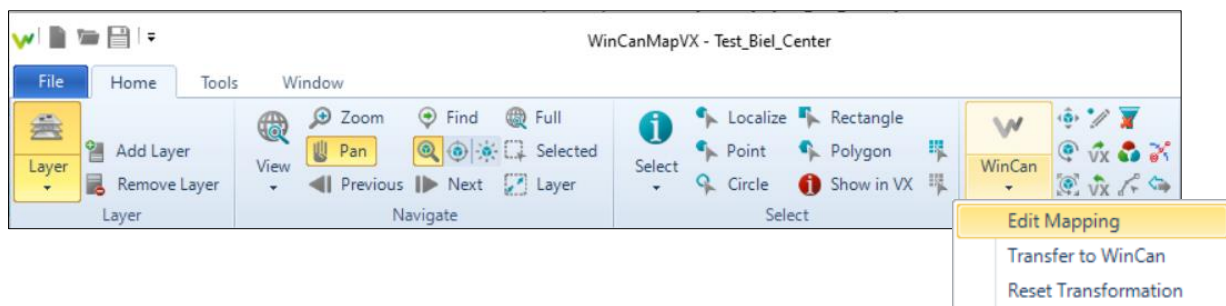
6.1 Field mapping

Before GIS-data can be transferred into WinCanVX, each GIS field needs to be mapped or assigned manually to the corresponding WinCan field. The most important **section/manhole fields** are listed below:

OBJ_Key	-> Section/Manhole Name (unique name to identify the section/manhole)
OBJ_Length	-> Section length (distance from Upstream Manhole to Downstream Manhole)
OBJ_DepthToInvert	-> Depth of the manhole (distance from cover to bench/channel)
OBJ_City	-> Name of the City/Town where the section/manhole is located
OBJ_Street	-> Name of the Street where the section/manhole is located
nodeFromKey	-> Name of the Upstream Manhole
nodeToKey	-> Name of the Downstream Manhole
OBJ_Shape	-> Shape of the pipe (circular, rectangular, egg-shaped etc.)
OBJ_Size1	-> Diameter/Height of the pipe [mm] / [inch]
OBJ_Size2	-> Width of the pipe [mm] / [inch]
OBJ_Material	-> Material of the pipe (concrete, steel etc.)
OBJ_SectionType	-> Type of section (wastewater, stormwater, mixed water)
OBJ_Usage	-> Type of section (replaces OBJ_SectionType in some standards)
OBJ_WasteWaterType	-> Type of section (replaces OBJ_SectionType in some standards)

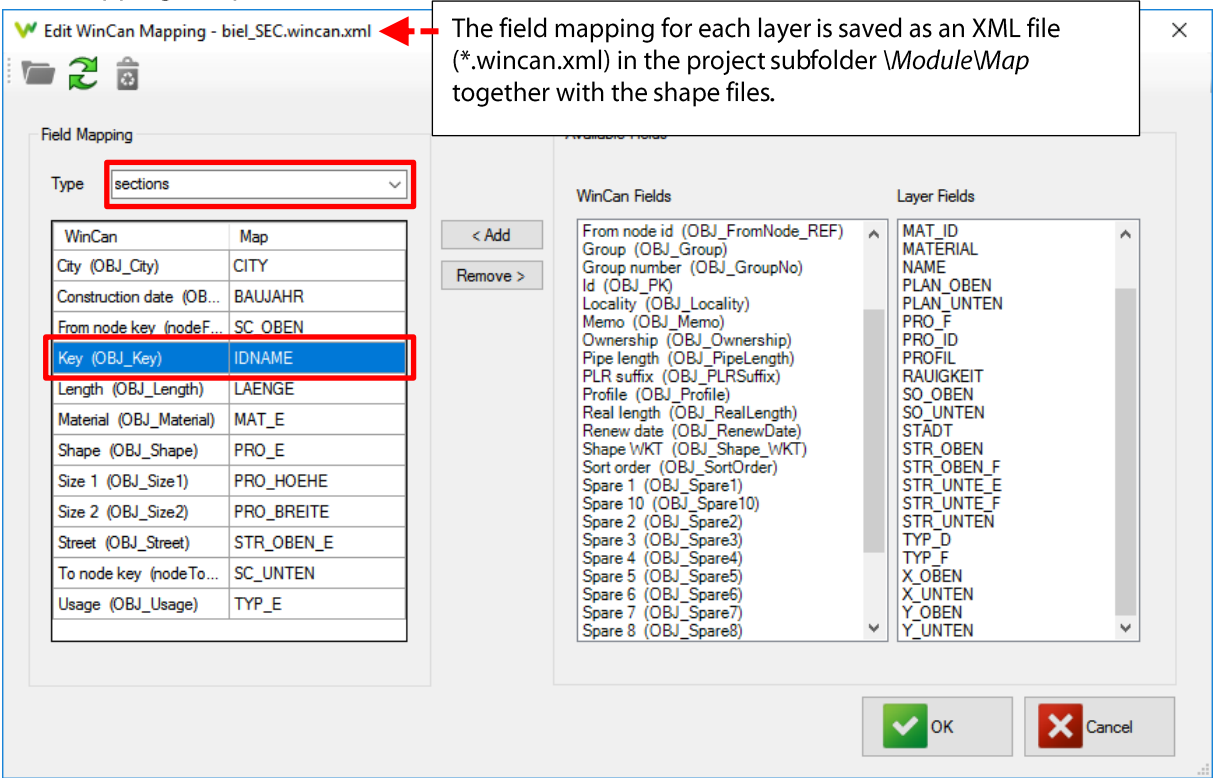
The **manhole coordinates** are transferred automatically from **the SHAPE files** and do not need to be included in the field mapping.

To start with the field mapping select an object layer and call up the menu command *Home > WinCan > Edit Mapping*:

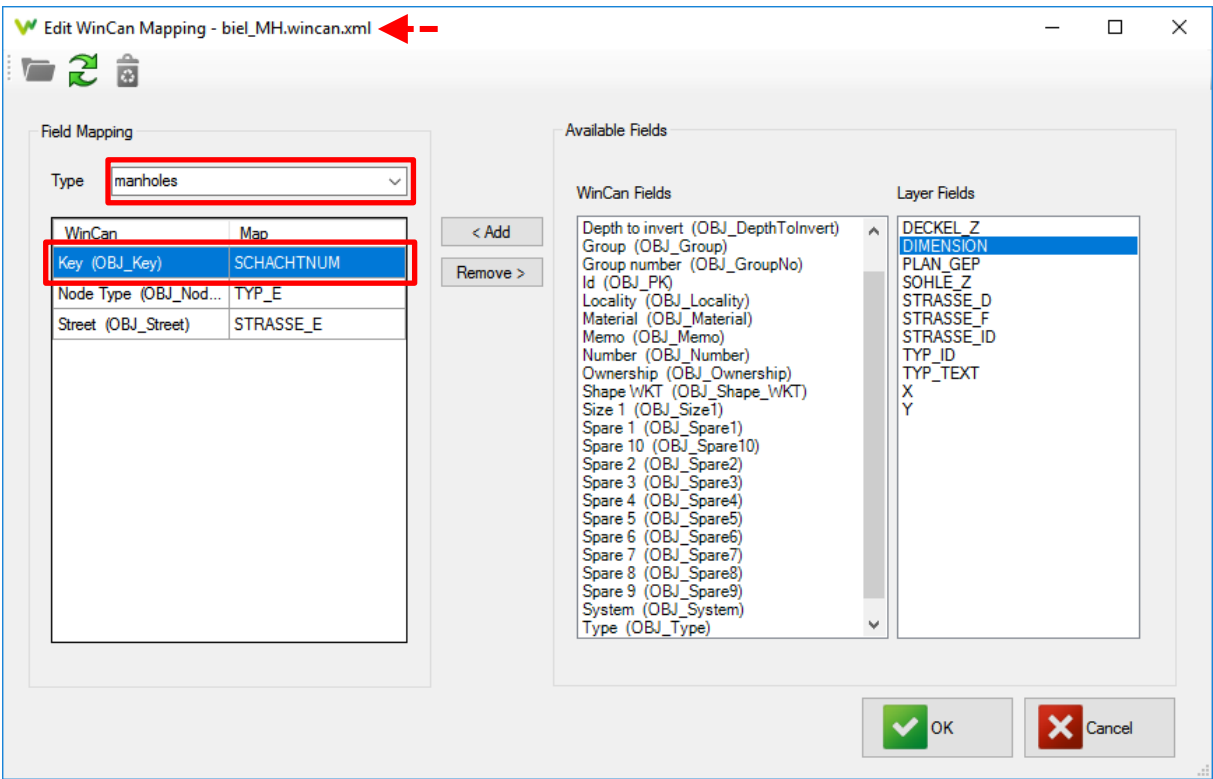


The following page provides a sample of a standard mapping for the transfer of **section and manhole data**. Select the **GIS field** that matches the corresponding **WinCan field** in the right part and click on the button *Add* in order to set the field assignment in the left part of the dialogue box. The names of the WinCan fields are taken directly from the template used in the current project.

Especially note the field assignments highlighted in red that are **mandatory** for a successful transfer.
field mapping sample for **sections**:



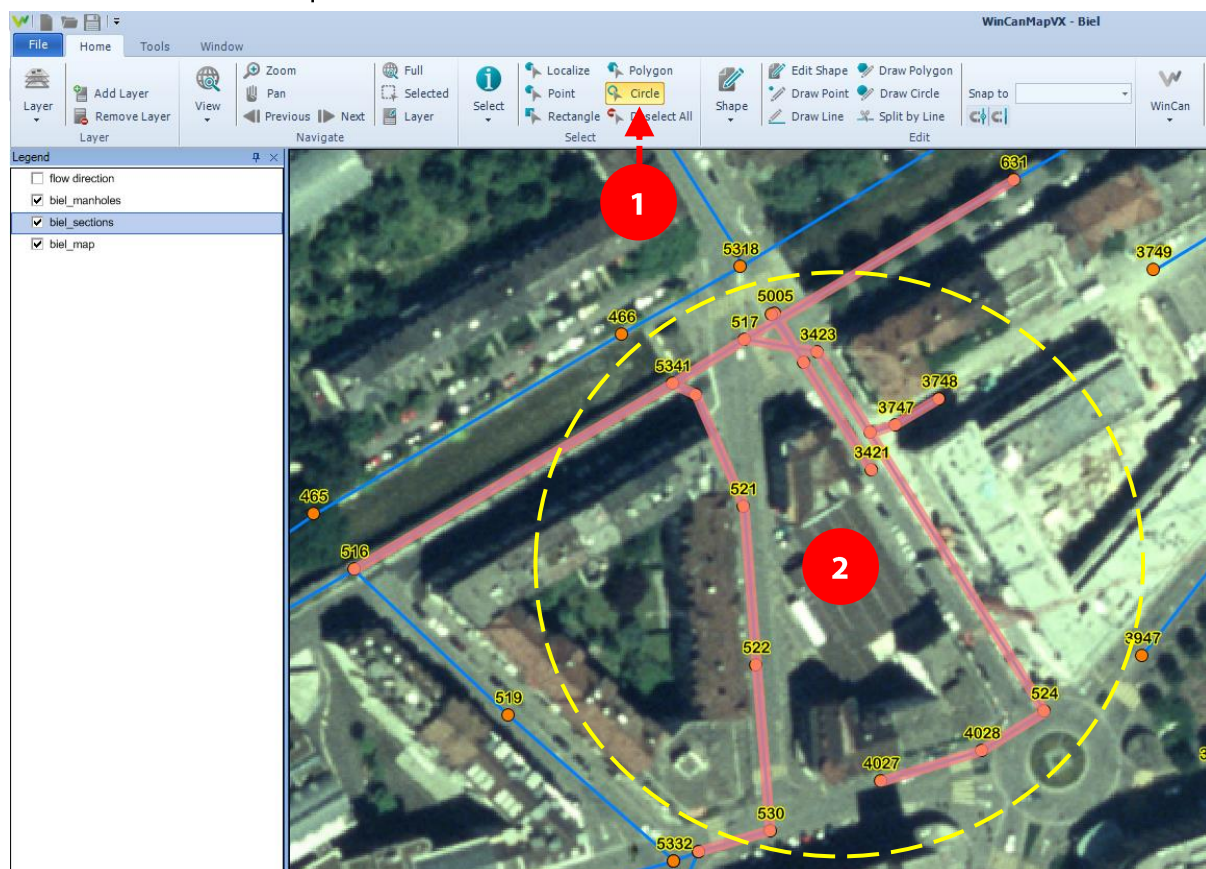
Field mapping sample for **manholes**:



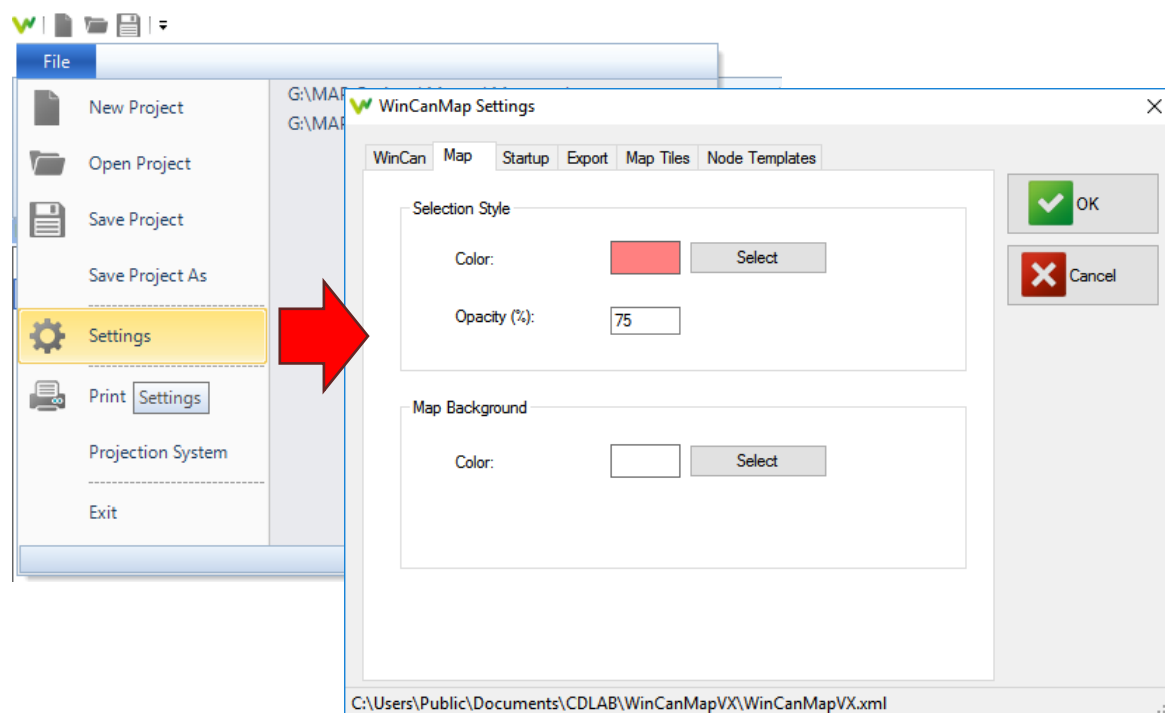
Existing field mappings can be re-used for other projects. So simply select the corresponding file *.wincan.xml.

6.2 Selecting and transferring objects

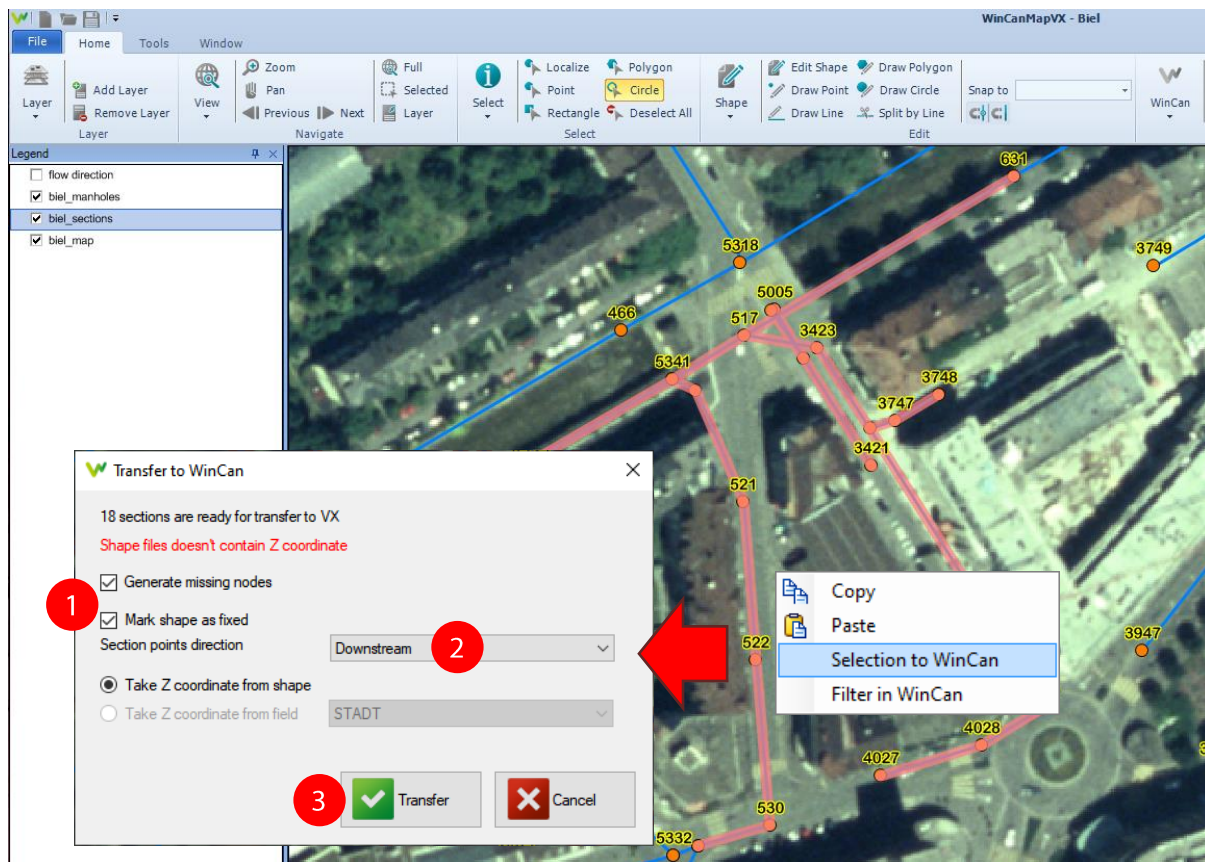
Choose a selection mode directly via the ribbon bar (e.g. *circular selection*) and highlight the objects to be transferred on the map (1).



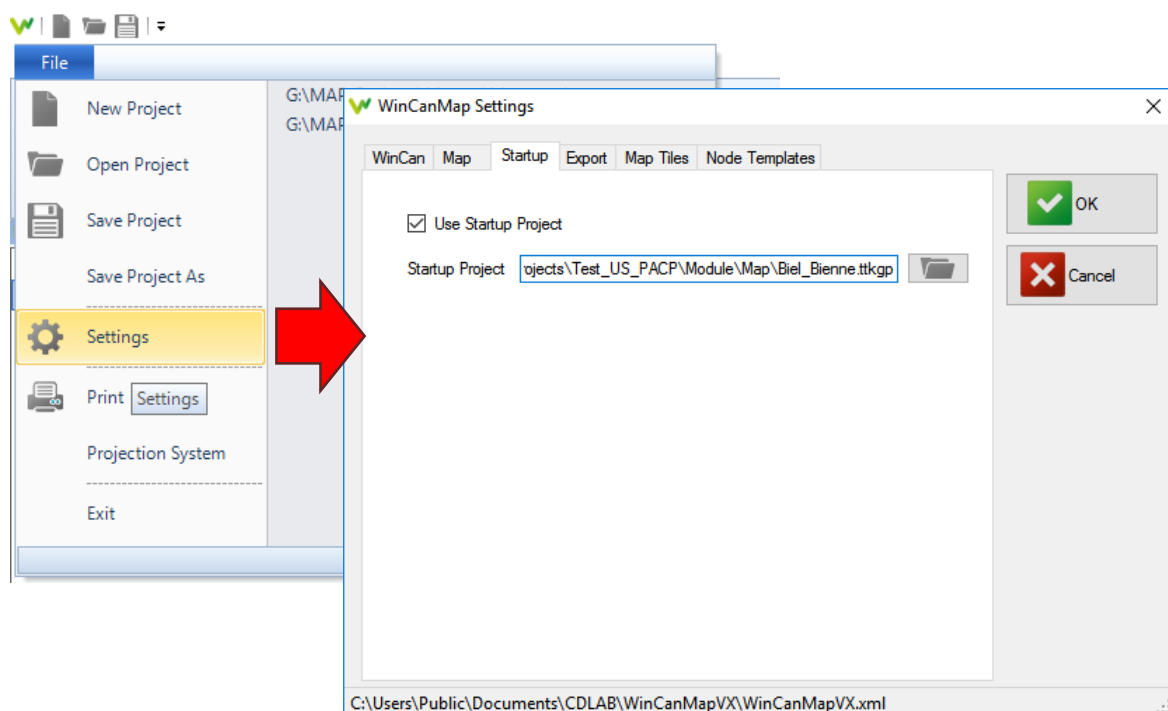
To select objects separated from each other activate the point selection and keep the CTRL key pressed. The command *Deselect All* (2) discards every selection. The colour for the selected objects can always be customized via the command *File > Settings > Map*:




The data transfer from MAP is only possible if a new project has been created and opened in WinCan VX first. Next select the sections you want to have transferred into WinCan VX, right click somewhere on the map and hit the context menu command *Selection to WinCan*. Check both options (1) in the dialogue box below, set the connection points direction to *Downstream* (2) and launch the data transfer (3). The progress finally is displayed in a separate information box:

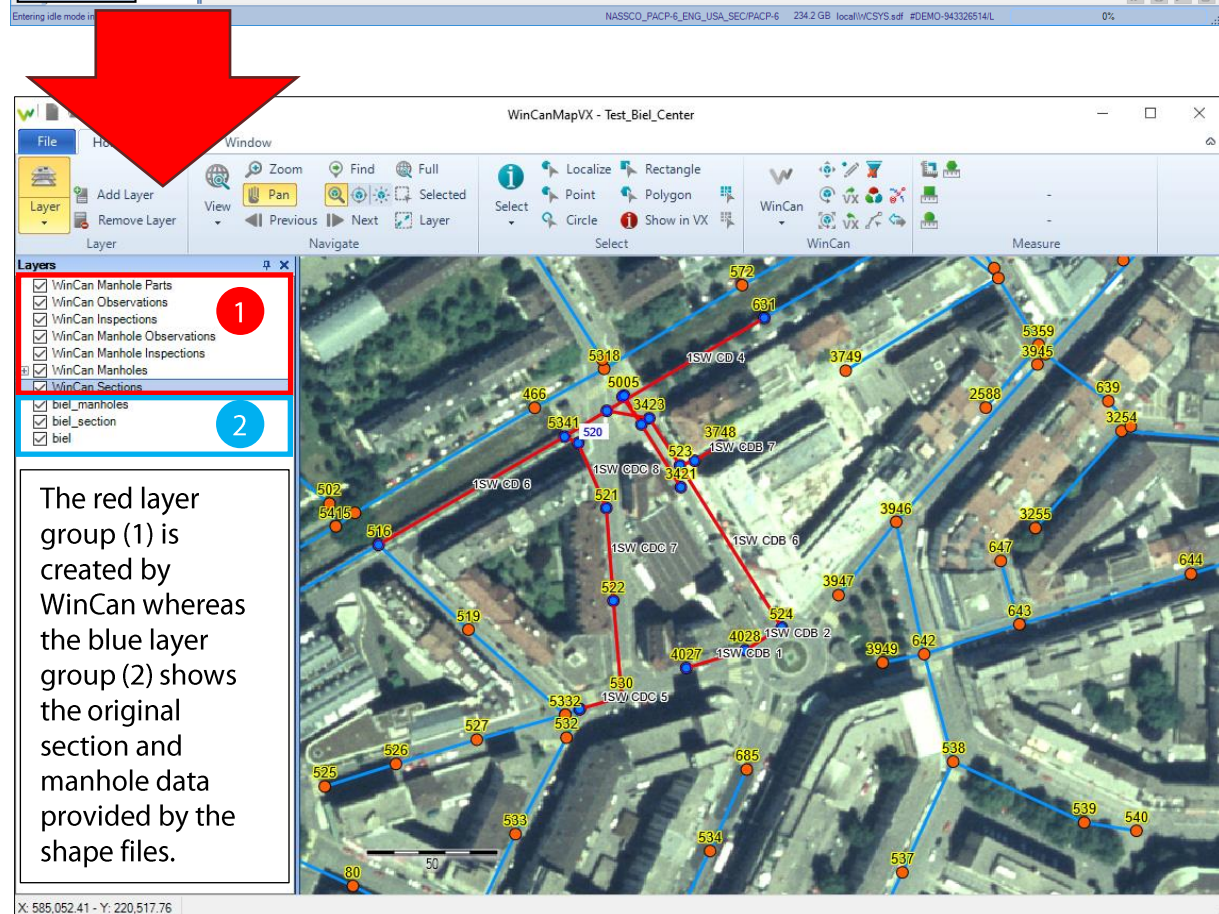
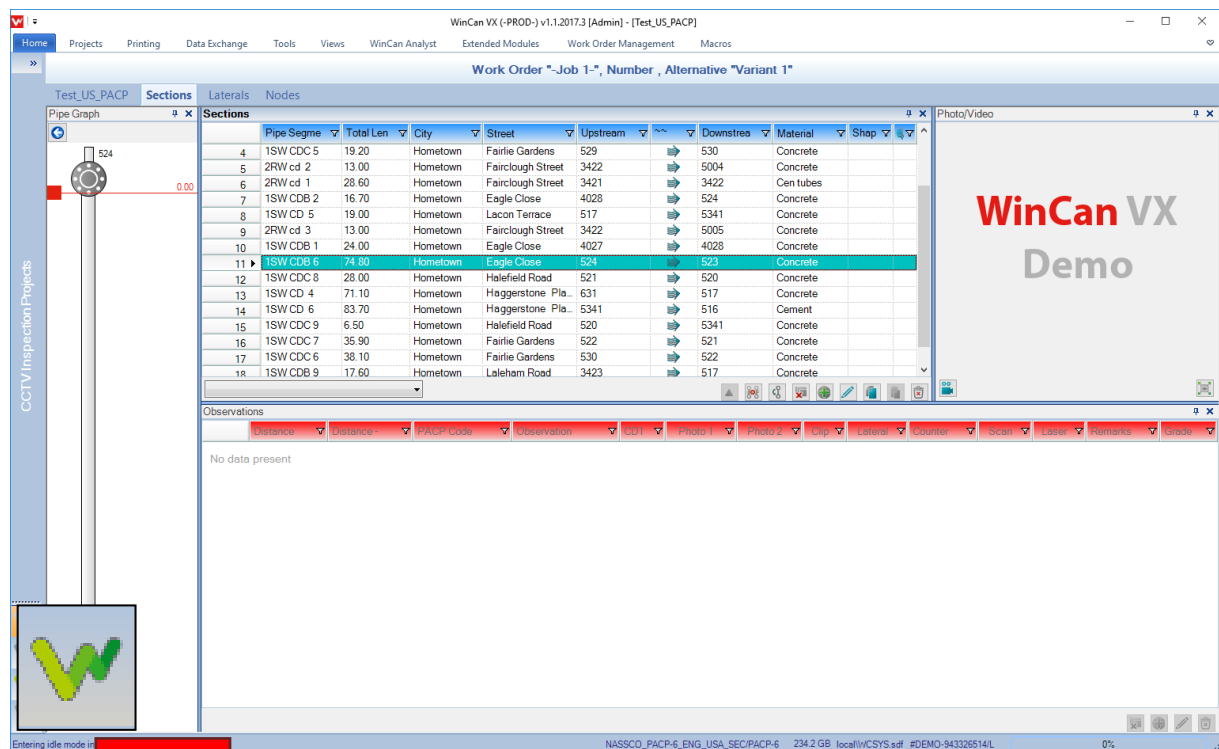


Once objects have been transferred you may follow the inspection progress if you copy the shape files as well as the MAP project file (*.ttkgp) into the subfolder *Modules\Map* of the current project and set this one as a Startup folder:



Transfer object data into WinCan VX

From now the data provided by the Map project (*.ttkpp) are launched automatically as soon as the user hits the button  from the WinCan project that may already contain previously transferred data:



So the user is able to see at one glance the sections, which have already been transferred and are now ready to be inspected (1) and the sections yet to be transferred if ever needed (2).

6.3 Showing objects in Map

You can subsequently highlight any transferred record in WinCan VX and the software automatically jumps to the corresponding pipe section or manhole in Map:

WinCan VX (-PROD-) v1.1.2017.3 [Admin] - [Test_US_PACP]

Home Projects Printing Data Exchange Tools Views WinCan Analyst Extended Modules Work Order Management Macros

Work Order "-Job 1-", Number , Alternative "Variant 1"

Test_US_PACP Sections Laterals Nodes

Pipe Graph

524

0.00

	Pipe Segme	Total Len	City	Street	Upstream	Downstream	Material	Shap
4	1SW CDC 5	19.20	Hometown	Fairlie Gardens	529	530	Concrete	
5	2RW cd 2	13.00	Hometown	Fairclough Street	3422	5004	Concrete	
6	2RW cd 1	28.60	Hometown	Fairclough Street	3421	3422	Cen tubes	
7	1SW CDB 2	16.70	Hometown	Eagle Close	4028	524	Concrete	
8	1SW CD 5	19.00	Hometown	Lacon Terrace	517	5341	Concrete	
9	2RW cd 3	13.00	Hometown	Fairclough Street	3422	5005	Concrete	
10	1SW CDB 1	24.00	Hometown	Eagle Close	4027	4028	Concrete	
11	1SW CDB 6	74.80	Hometown	Eagle Close	524	523	Concrete	
12	1SW CDC 8	28.00	Hometown	Halefield Road	521	520	Concrete	
13	1SW CD 4	71.10	Hometown	Haggerstone Pla...	631	517	Concrete	
14	1SW CD 6	83.70	Hometown	Haggerstone Pla...	5341	516	Cement	
15	1SW CDC 9	6.50	Hometown	Halefield Road	520	5341	Concrete	
16	1SW CDC 7	35.90	Hometown	Fairlie Gardens	522	521	Concrete	
17	1SW CDC 6	38.10	Hometown	Fairlie Gardens	530	522	Concrete	
18	1SW CDB 9	17.60	Hometown	Laleham Road	3423	517	Concrete	

Observations

Distance Distance - PACP Code Observation CD1 Photo 1 Photo 2 Clip Lateral Counte

No data present

WinCanMapVX - Test_US_PACP

File Home Tools Window

Layer Add Layer Remove Layer Layer

View Pan Previous Next Navigate

Select Localize Show in VX Point Circle Rectangle Select Deselect All

Draw Edit

WinCan WinCan VX Measure

Legend

WinCan Manhole Parts

WinCan Observations

WinCan Inspections

WinCan Manhole Observations

WinCan Manhole Inspections

WinCan Manholes

WinCan Sections

biel_manholes

biel_section

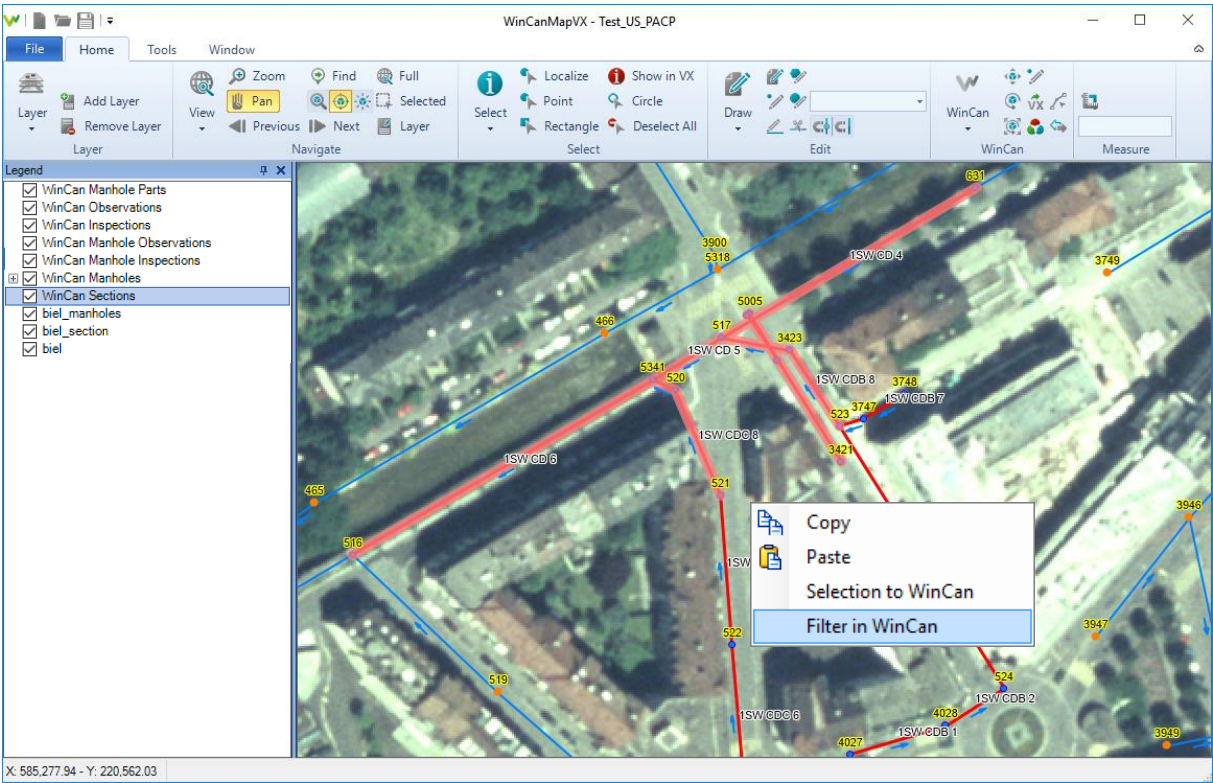
biel

X: 585,217.41 - Y: 220,543.29

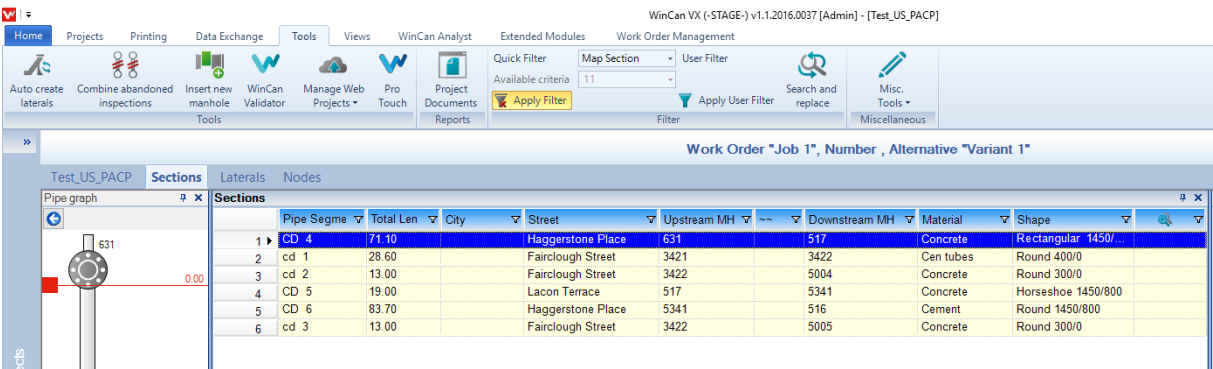
6.5 Showing filtered objects in WinCan VX or Map

All objects transferred to WinCan VX (pipe sections and manholes) can be highlighted and then filtered directly via MAP.

Highlight a section group in MAP for that purpose using the point selection tool and keeping the CTRL-key pressed. Next right click on the map area and select the context menu command *Filter in WinCan*:



The software then is going to filter the highlighted sections and shows you the result in WinCan VX:



Transfer object data into WinCan VX

Vice versa filtered sections in WinCan VX can easily and quickly be shown in Map-VX. Enter the desired criteria via the filter function of WinCan VX...


The WinCan VX interface displays the 'Sections' table for 'Test_US_PACP'. The table lists pipe segments with their total lengths, cities, streets, and manhole numbers. The 'Pipe Segment' column is highlighted in blue.

	Pipe Segment	Total Length	City	Street	Upstream MH	Downstream MH	Material	Shape
1	1SW DFA 2	14.00	Hometown	East End Road	5343	89	Concrete	
2	1SW DF 10	15.00	Hometown	East End Road	92	5420	Concrete	
3	1SW DFA 3	50.30	Hometown	East End Road	89	84	Concrete	
4	1SW DFA 5	7.00	Hometown	East End Road	84	5420	Concrete	
5	1SW DFA 1	40.50	Hometown	East End Road	90	93	Concrete	
6	1SW DFA 4	35.60	Hometown	East End Road	88	84	Concrete	

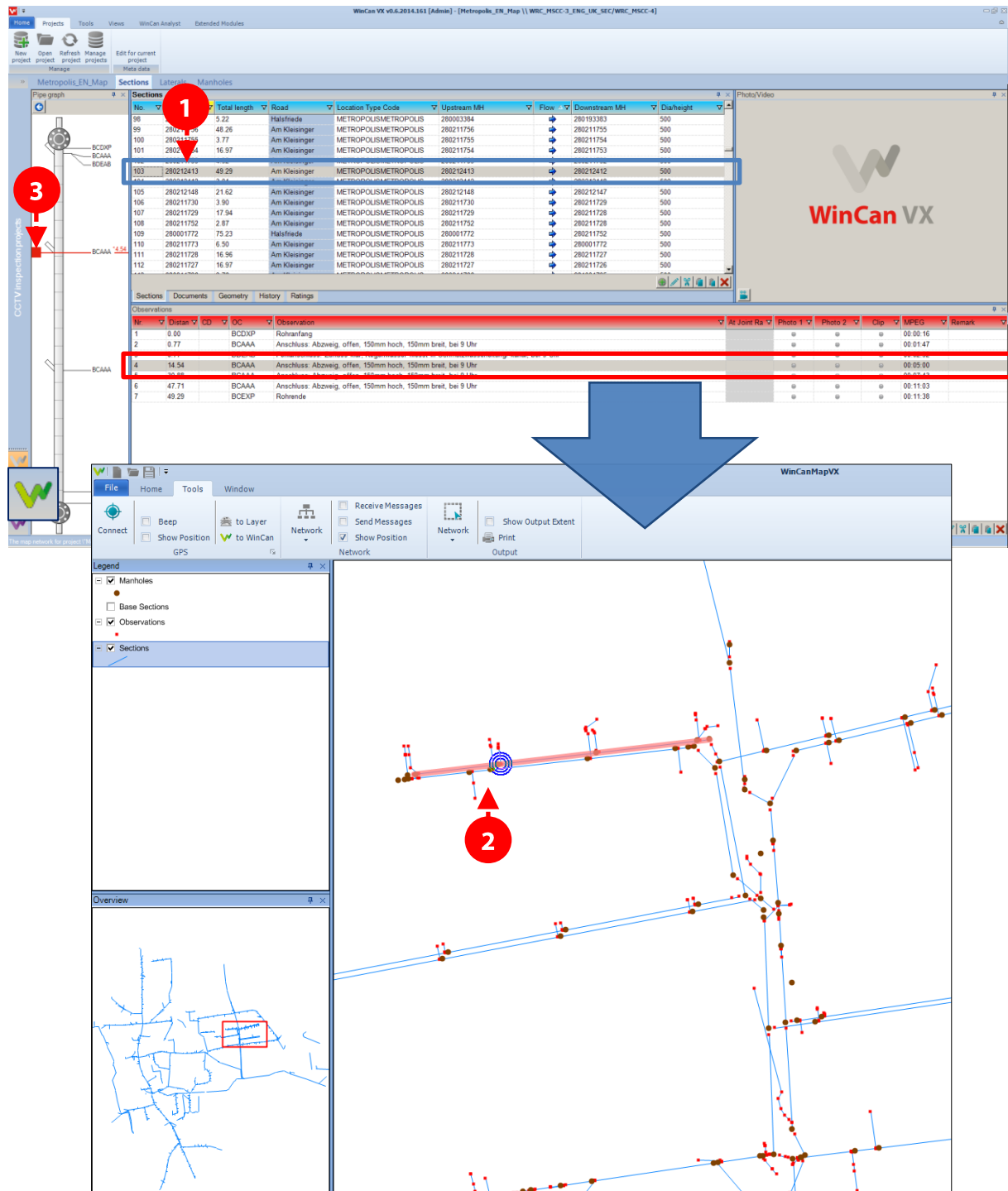
...and the software subsequently is going to highlight the filter result in Map-VX:

The WinCanMapVX interface shows an aerial map view with highlighted sections. The 'Legend' on the left lists various WinCan objects, including 'WinCan Sections', which is checked. The map displays a network of red lines representing the pipe segments, with manhole numbers (e.g., 5343, 5420, 89, 92, 84, 93, 88) and segment labels (e.g., 1SW DFA 2, 1SW DF 10, 1SW DFA 3, 1SW DFA 5, 1SW DFA 1, 1SW DFA 4) overlaid. The status bar at the bottom shows coordinates: X: 585,176.58 - Y: 220,311.09.

7. Show inspections in Map

Once all sections have been transferred from Map and inspected in WinCanVX, the observations for each section can be visualized at any time when hitting the button .

Map directly shows the highlighted section (1) in WinCan VX. The blue circle (3) represents the current observation and jumps from one damage site to the next when scrolling up and down with the slider (3) in WinCan VX or switching to the next/previous observation line:

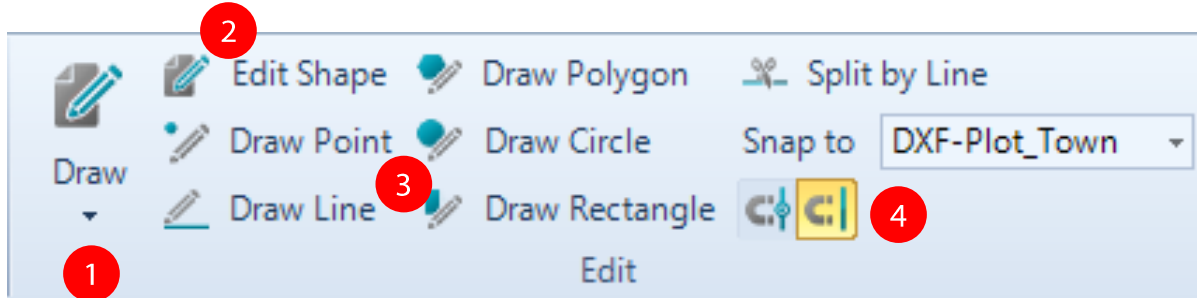


The image displays two software windows. The top window is WinCanVX, showing a 'Sections' table with columns: No., Total length, Road, Location Type Code, Upstream MH, Flow, Downstream MH, and Dia/height. A red circle labeled '1' highlights a section in the table. Below the table is an 'Observations' table with columns: No., Distan, DC, Observation, At Joint Ra, Photo 1, Photo 2, Clip, MPEO, and Remark. A red circle labeled '3' highlights a row in the observations table. A large blue arrow points from the WinCanVX window to the bottom window, WinCanMapVX. The bottom window shows a map with a network of lines and points. A red circle labeled '2' highlights a specific point on the map. The WinCanMapVX window also includes a 'Legend' panel on the left with checkboxes for 'Manholes', 'Base Sections', 'Observations', and 'Sections'.

8. Edit object layers

Map allows the edition of all objects which have been transferred into WinCanVX and are shown accordingly on the Map interface. So after finishing the survey of all transferred sections the operator will be able to export **corrected or completed geographic data** to the client (engineer offices, water authorities, construction officials etc.) who can directly import and thus easily **update** their GIS database.

New or existing objects can be drawn or moved inside the corresponding object layer within Map by means of the command group *Tools > Edit* in the ribbon bar:



1. This arrow button lists all commands for the edition of object layers.
2. This function is activating the edit mode for object layers.
3. This group is providing all the tools for drawing new objects (points = manholes; lines = sections; polygons = building outlines etc.).
4. This field is used to indicate which layer the previously drawn object should snap to: a manhole point thus should precisely snap to a section line or a reference line on the DXF-plot and vice versa.

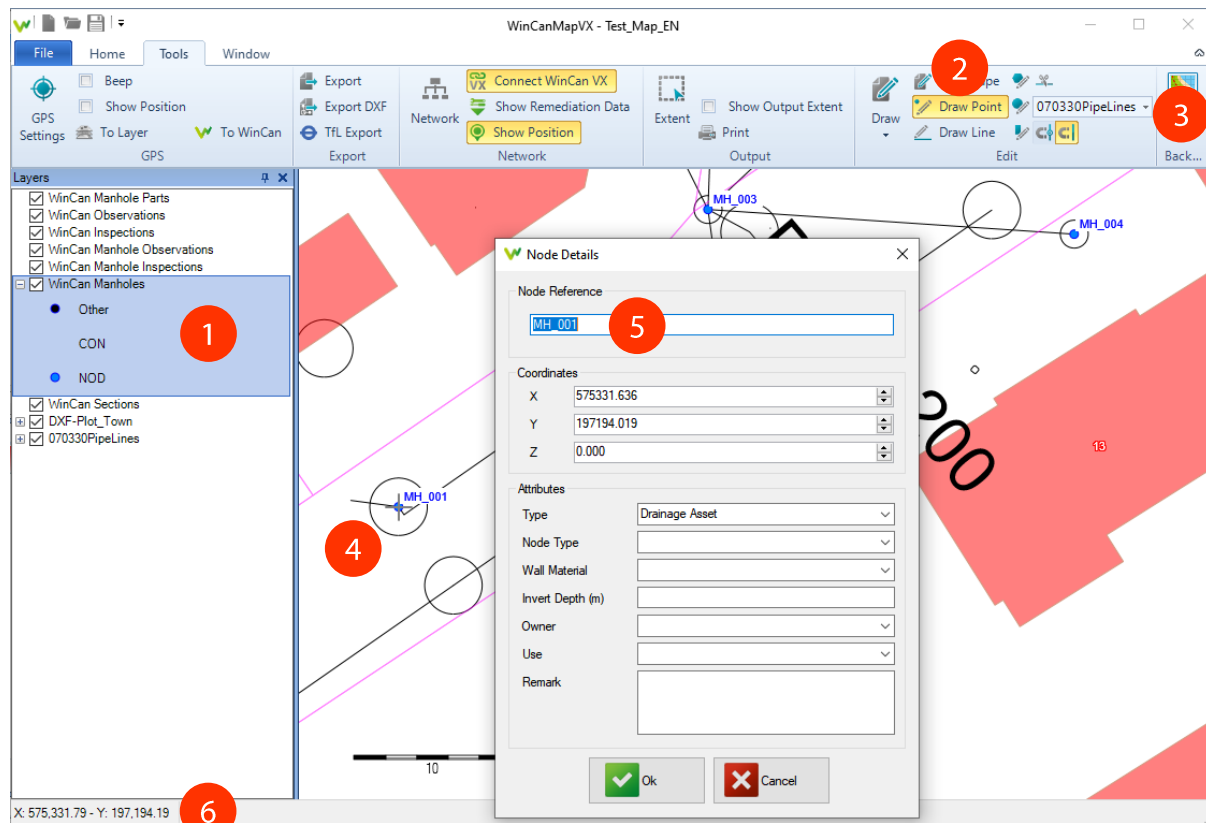
The following chapters are going to describe in detail, what the operator must do, if he is going to discover a **new object** (e.g. manhole) or if he wants to change the position of and **existing object** or delete it from the map interface.

8.1 Creating new objects

In order to have new objects (e.g. manholes) created, Map provides two possibilities, that are described and illustrated in this sub-chapter:

Follow the steps below to **draw new manholes directly on the map interface**:

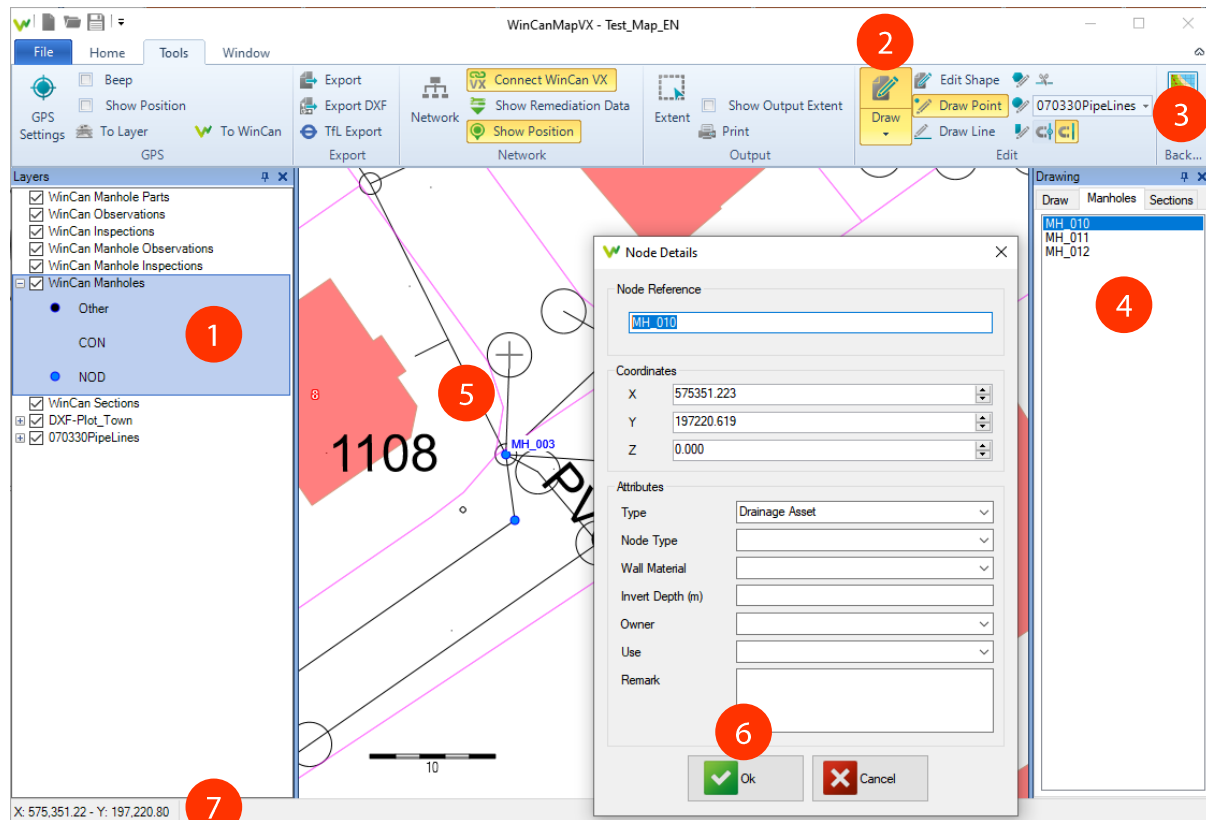
1. Select the layer *WinCan_Manholes*.
2. Hit the button *Draw Point*.
3. Select the DXF-plot with the reference lines the new manhole should snap to.
4. Go to the desired position on the DXF-plot and draw the manhole hitting the left mouse key.
5. Enter the name for the new manhole in the dialogue that pops up and confirm it:



6. The coordinates are taken directly from the DXF-plot and written into the coordinate fields in *WinCanVX*:

Follow the steps below **to draw existing manholes on the map interface:**

1. Enter the manholes in *WinCanVX*, switch to Map and select the layer *WinCan_Manholes*.
2. Hit the button *Draw* to get the drawing panel shown on the right of the Map interface (4) and activate the button *Draw Point*.
3. Select the DXF-plot with the reference lines the new manhole should snap to.
4. Go to the drawing panel, activate the tab *Manholes* and grab an existing manhole from the list.
5. Go to the desired position on the DXF-plot and draw the manhole hitting the left mouse key.
6. Confirm the manhole position in the dialogue box that follows:

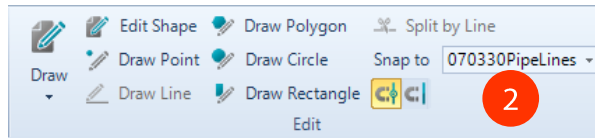


7. The coordinates are taken directly from the DXF-plot and written into the coordinate fields in WinCanVX:

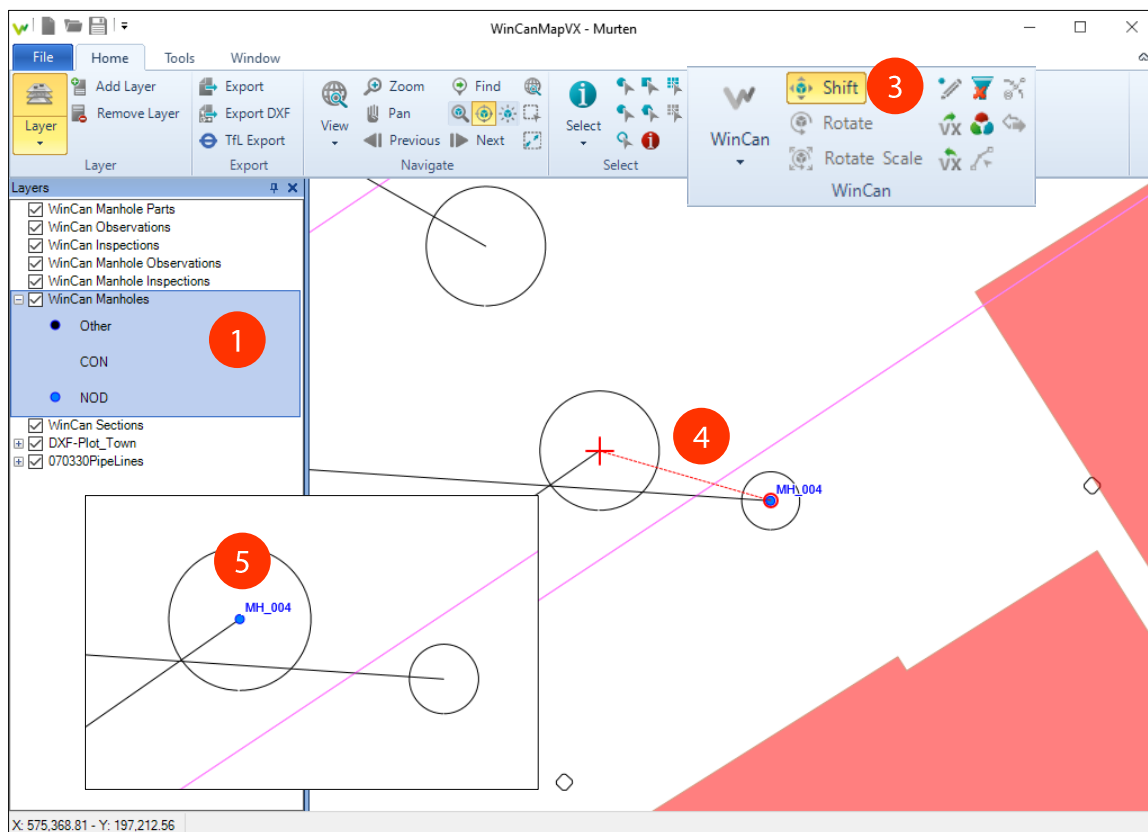
8.2 Displacing or deleting existing objects

The following example shows how one can displace or delete an existing manhole on the map:

1. Select the layer *WinCan_Manholes* in the legend
2. Go to *Tools > Edit* and select the corresponding DXF-layer (2) the manhole should snap to from the list box:



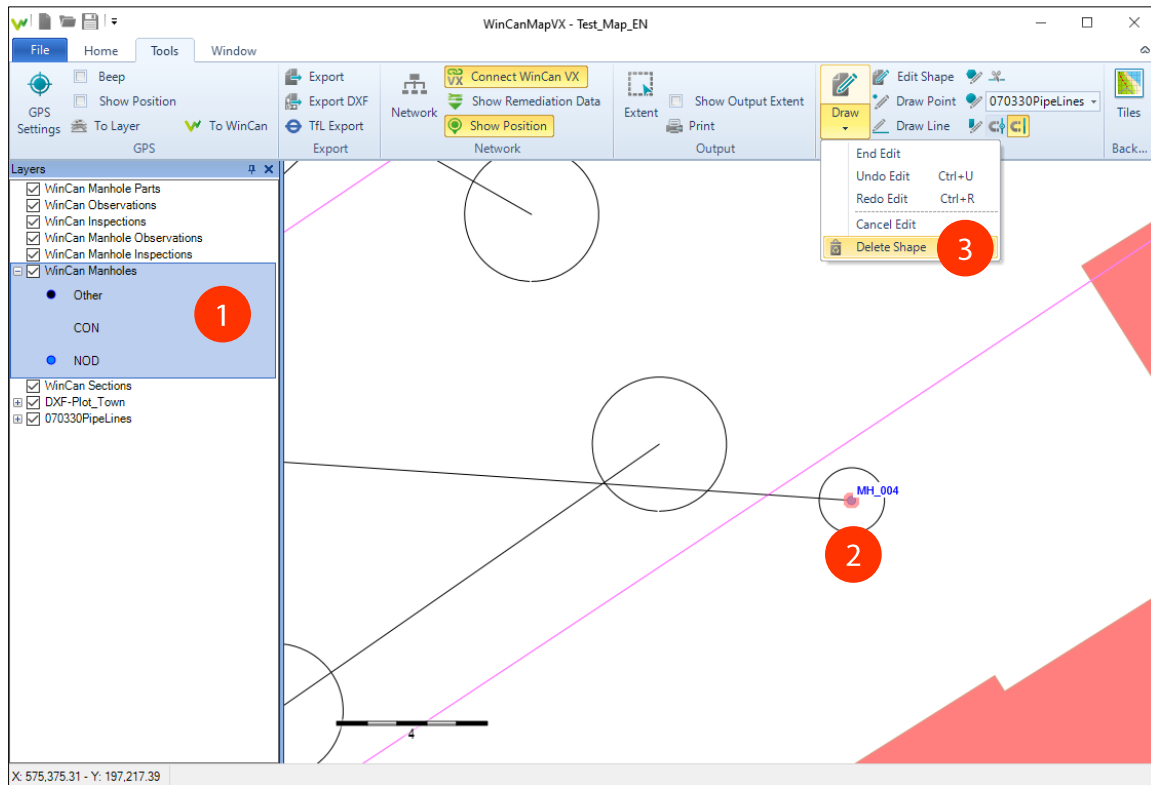
3. Hit the function button *Home > WinCan > Shift*.
4. Click directly on the manhole to be displaced, drag it to the desired position (4) keeping the left mouse key pressed. The manhole is then highlighted with a red circle representing the edit mode.
5. Release the left mouse key as soon as a red cross highlights the desired position the manhole should snap to.



Mind that Map does not automatically drag a linked section line to the new location of the manhole. So you have to repeat the steps above and move the section to the new manhole position making sure the section line snaps to the layer *WinCan_Manholes*.

Edit object layers

In order to delete an object, select the corresponding *WinCan* layer (1), activate one of the selection tools (e.g. *Home > Select > Point*) and click on the object to be deleted (2). Next switch to *Tools > Draw > Delete Shape* (3):

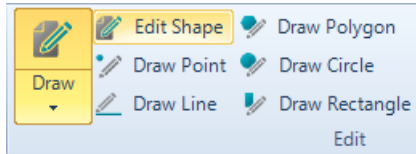


8.3 Modifying the geometry of existing pipe sections

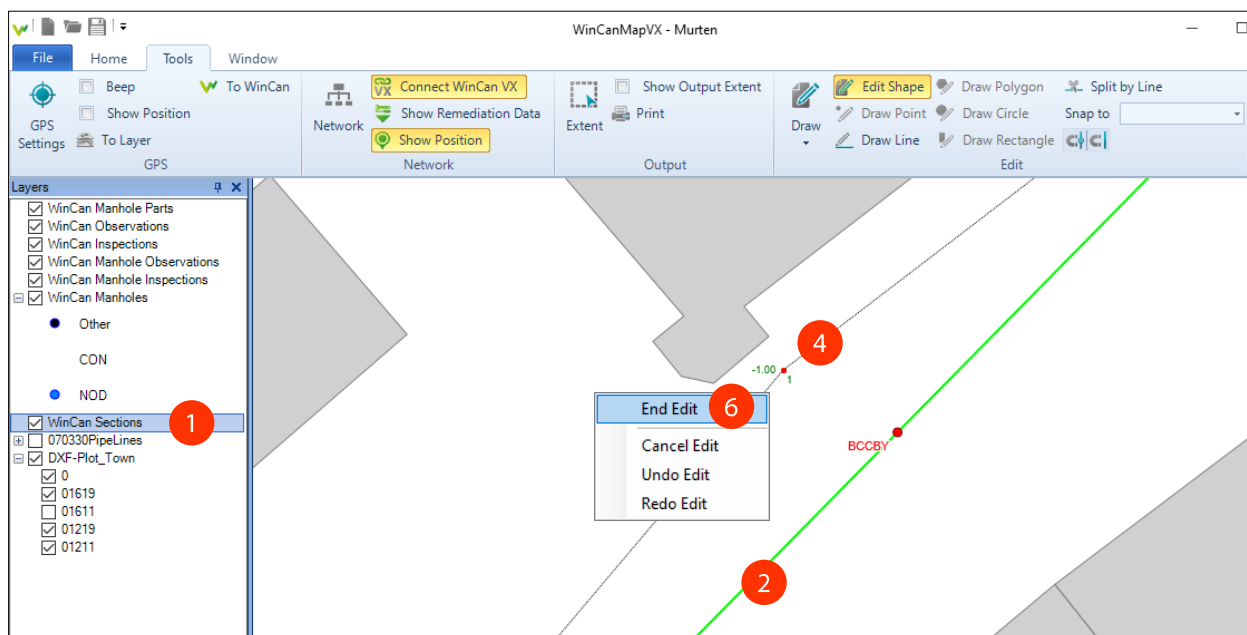
WinCan Map draws a section always as a straight line per default. When the operator has to enter a pipe bend at a given position, the corresponding observation will appear on the inspection protocol, but Map still shows it as an observation point on a straight line.

In order to have pipe bends shown on the Map as close to reality as possible, you can edit the section and re-draw the pipe course taking the objects of the background plot as a reference. The steps below describe in detail how you must proceed:

1. Highlight the layer *WinCan_Sections* on the legend.
2. Select the section whose course you want to re-draw.
3. Activate the command *Tools > Edit Shape*.

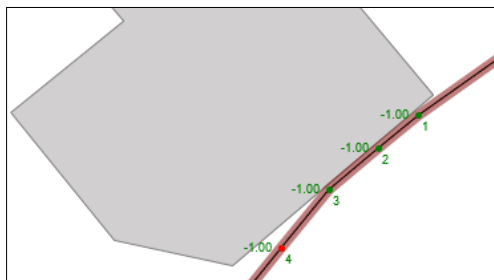


4. Grab the section at a specific position (e.g. observation point describing a pipe bend) and put it to the desired location via Drag & Drop. You can either confirm or decline this change via the context menu command *End edit* or *Undo edit*:



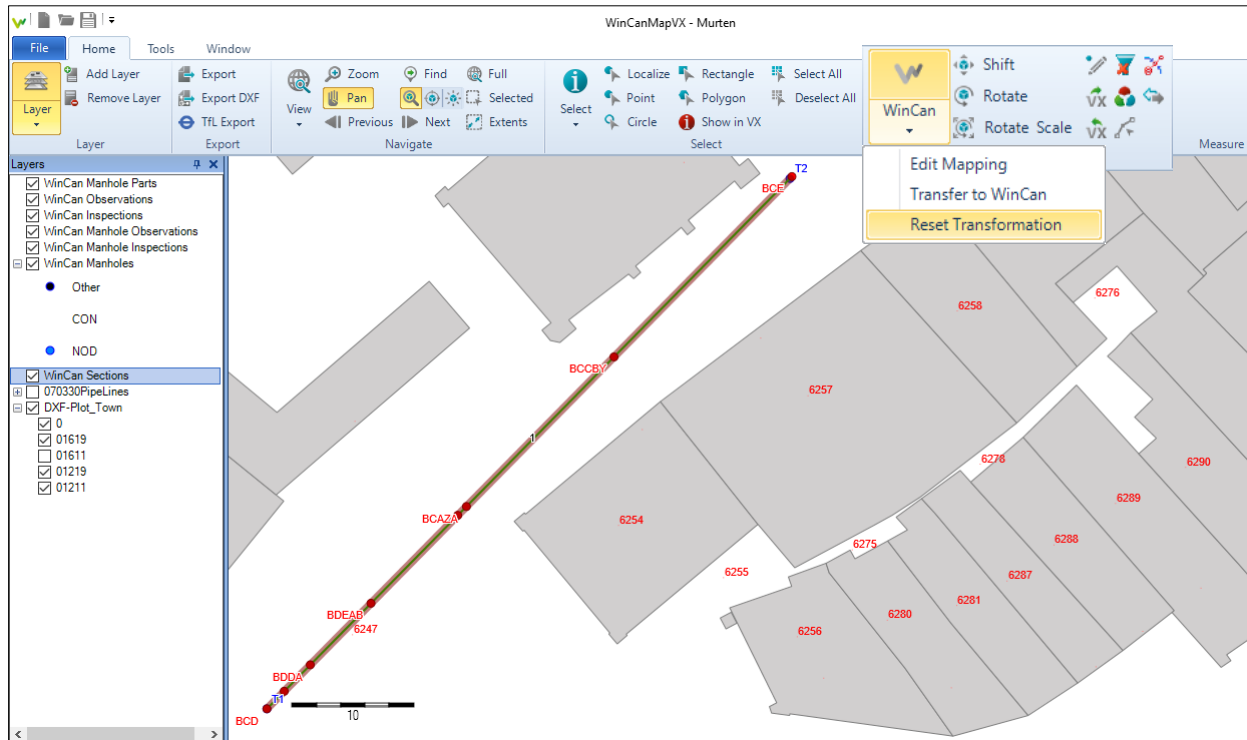
5. Repeat the last step as many times as you want in order to displace further section points.
6. Hit the context menu command *End edit* to confirm the new pipe course or hit *Undo edit* to decline all changes and reset the section line.

This finally gets the pipe bend represented on the background map as close to reality as possible:



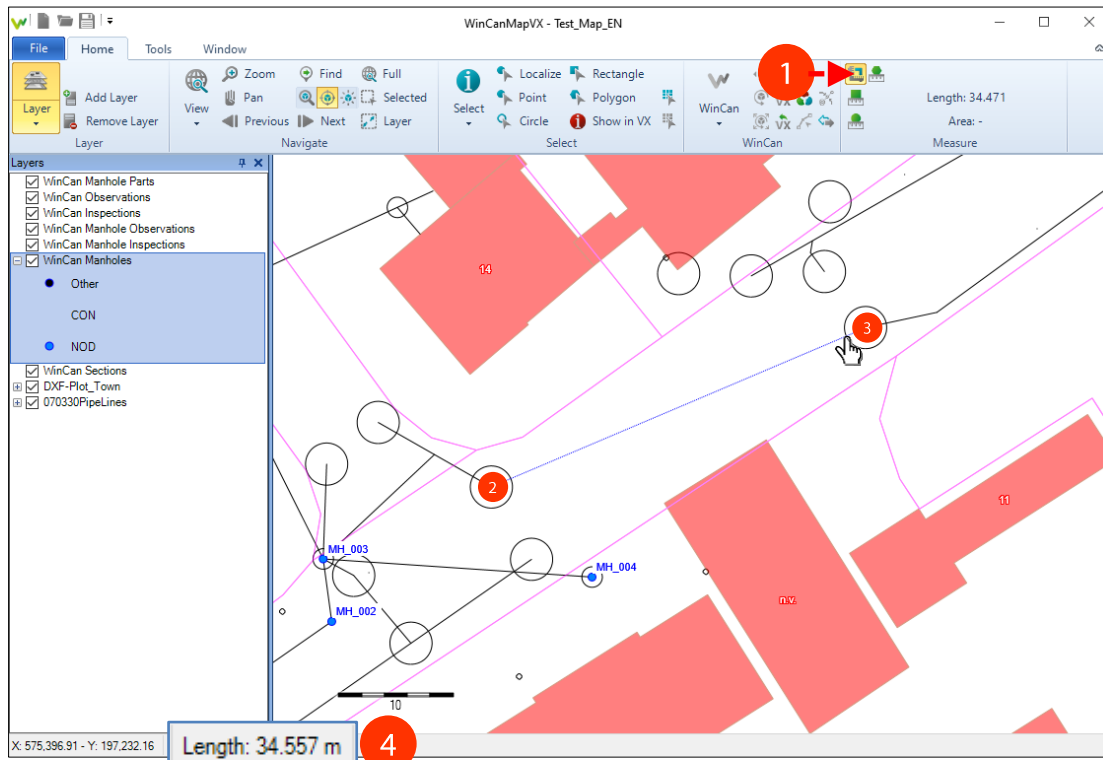
Edit object layers

In case the result is not satisfying it is always possible later on to reset all the edits you previously did using the command *Home > WinCan > Reset transformation*. So the pipe course you have modified manually again becomes a straight line:



8.4 Measuring distance between two reference points


In case you need to verify a section length, you can directly measure the distance between two manholes using the ruler tool (1). Just click on a start point (2) and drag a line to the end point (3). The distance is continuously calculated and displayed in the status bar on the left (4):

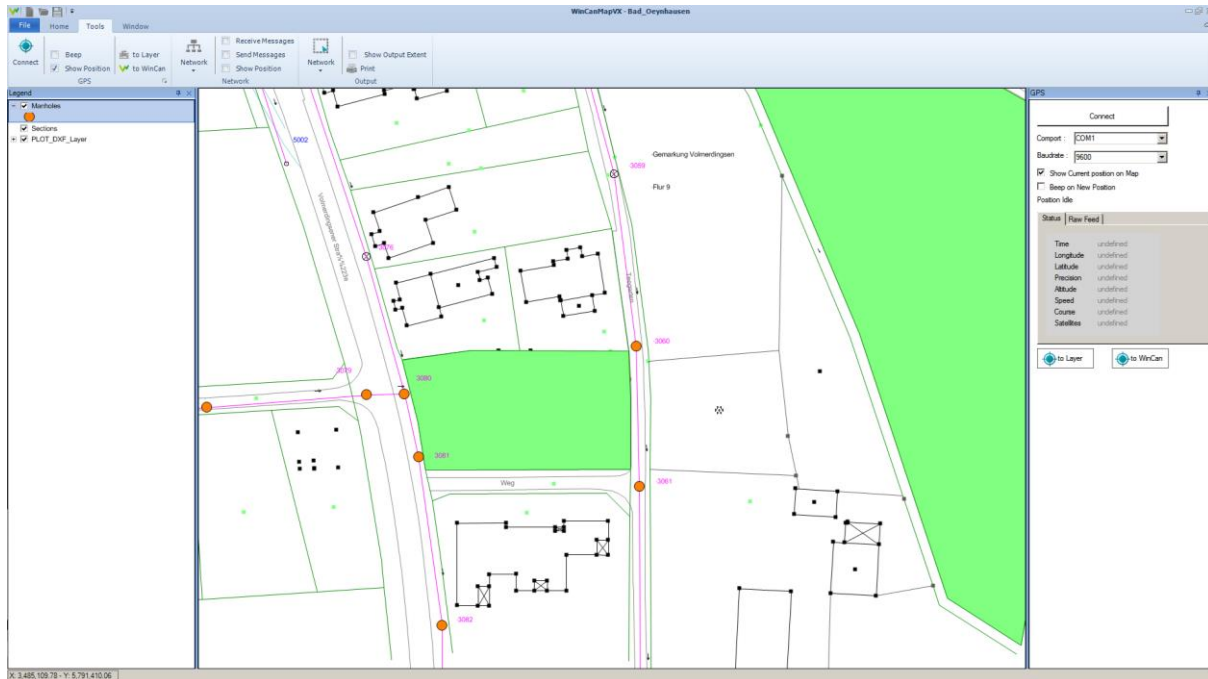


Right click once on a blank spot on the map to stop the measurement:

8.5 Getting manhole positions via GPS receiver


The map section can also be coupled with a GPS device (*GPS = Global Positioning System*). For that purpose a GPS device compatible to the standard *NMEA 0183* has to send the current position constantly to the COM port of the computer it is connected to.

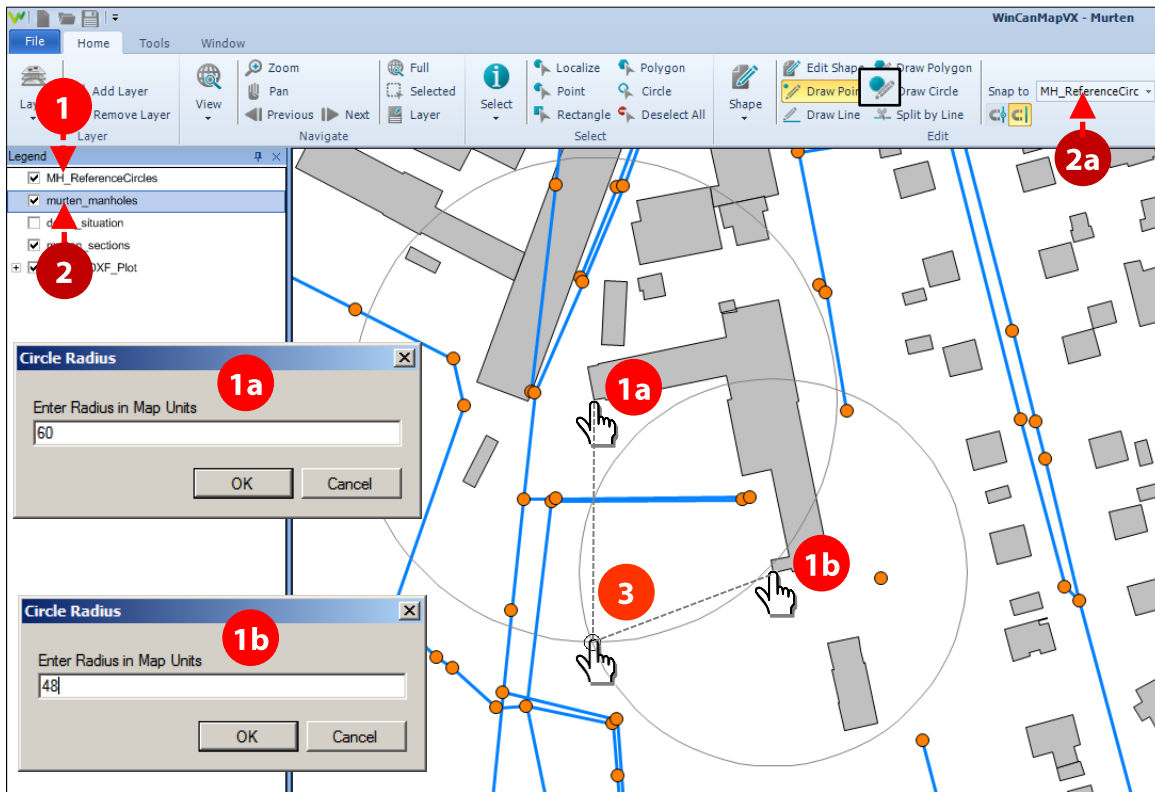
Click the button  to make appropriate settings in the working panel that subsequently pops up:




8.6 Setting manhole positions with reference circles

In case a GPS device is missing or providing inaccurate position information the exact manhole position can also be calculated with 2 reference circles. If the aforementioned manhole has not been drawn on the plan you will have to measure the distance between a known start point (e.g. building corner) and the real manhole position.

Subsequently create a new polygon layer (e.g. *MH_ReferenceCircles.shp* (1)) and draw the required 2 reference circles using the button  as shown below. The centre of the circle always corresponds to the start point of the distance measurement (1a and 1b) and the radius is always equal to the previously measured distance between start point and manhole:



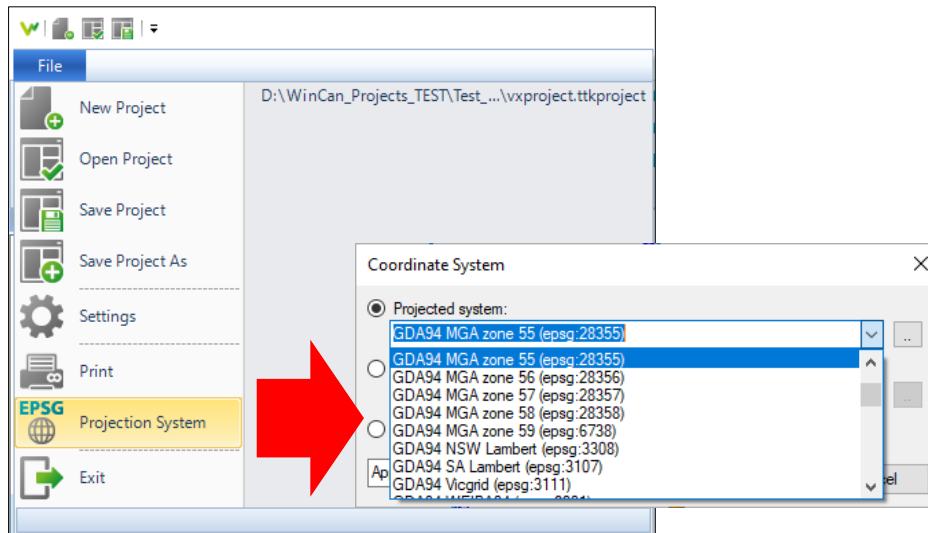
Finally switch to the manhole layer (2), add the missing manhole with the button  at the intersection point of the two circle lines (3) and note that the new manhole must precisely snap to the layer *MH_ReferenceCircles* (i.e. the intersection point).

9. Using map tiles from an external service provider

For better spatial orientation a geo-referenced satellite image can be used as a background layer and move the project data perfectly to the corresponding geographic region.

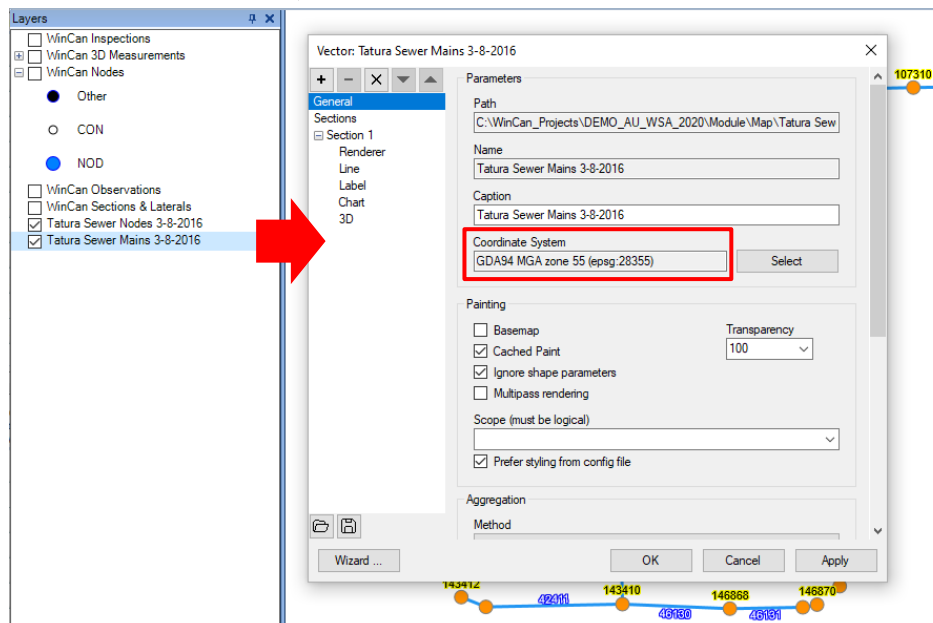
In most cases such map data are not provided by end customers, so WinCan Map allows the user to connect to the external service *Microsoft BING Maps*.

First run the command *File > Projection System* to open a list of all worldwide used coordinate systems (projection systems) among which you will also find the one valid for that region where the current pipeline network is located:



The list box depicted above shows a group of coordinate systems which are valid for Australia.

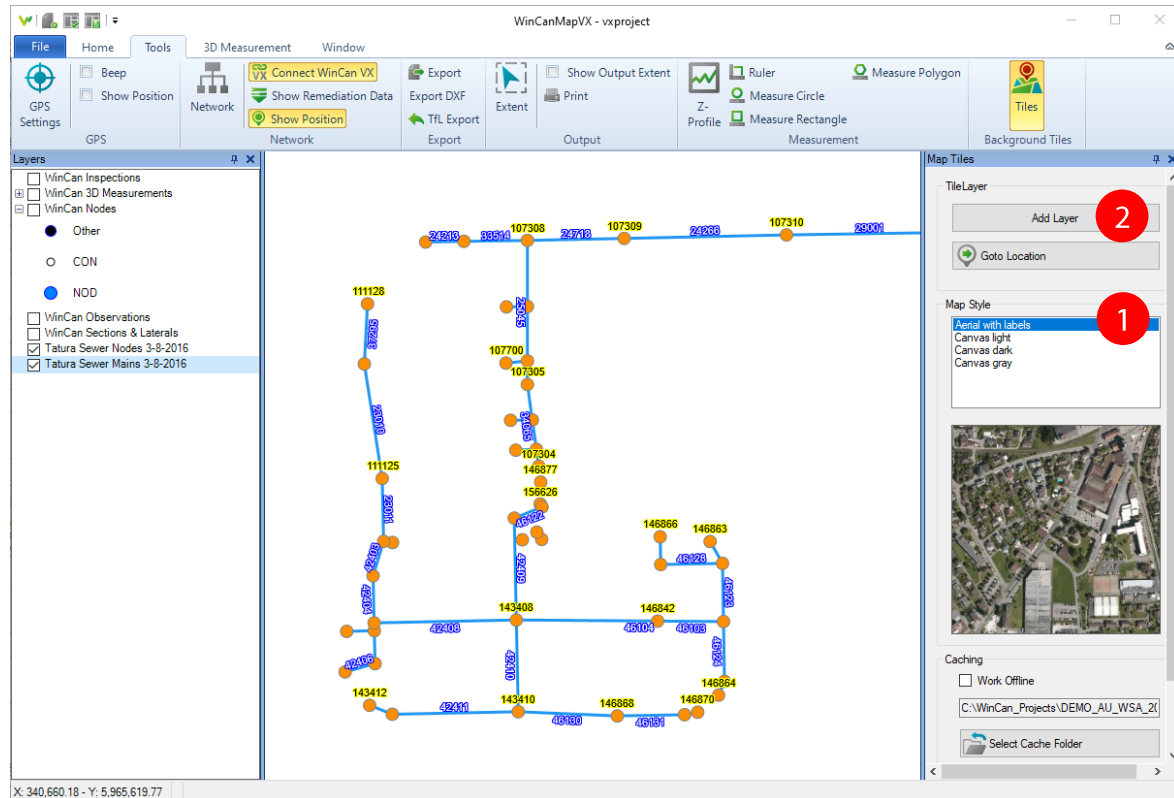
Information about the currently used projection system can be obtained from the properties dialogue of the original SHAPE layers:



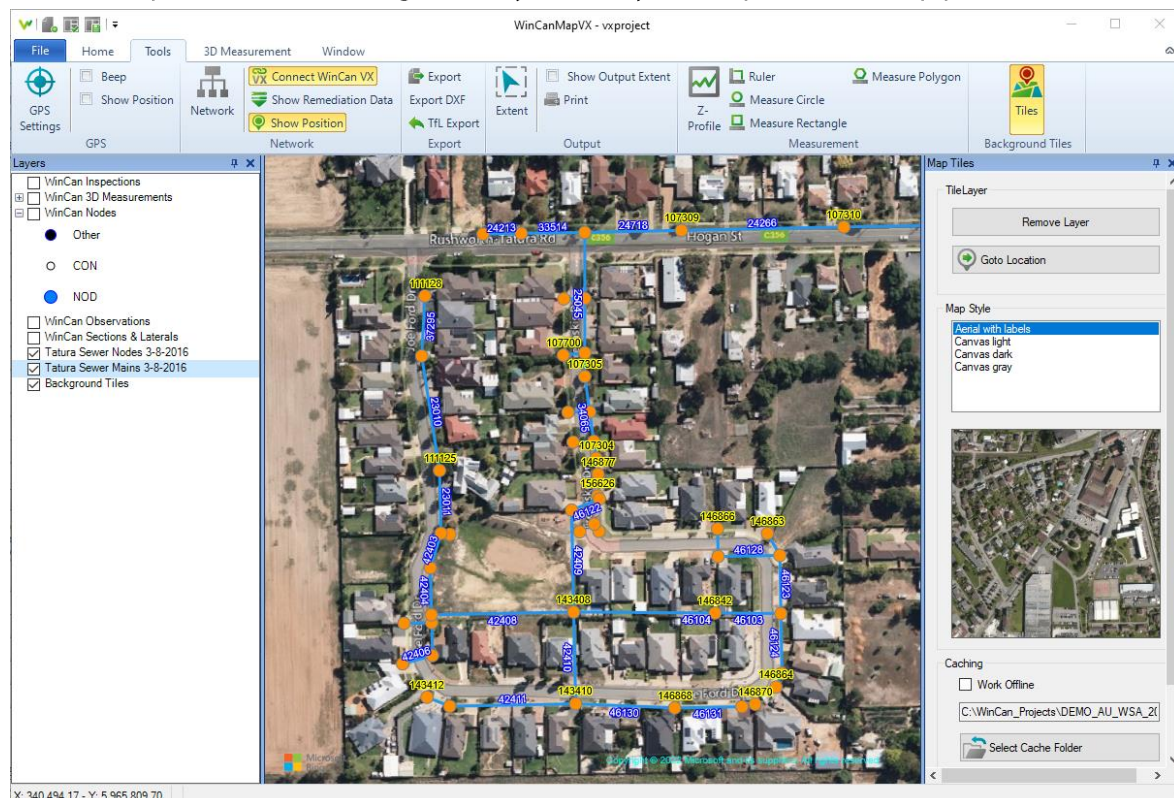
If the projection system which the manhole and pipeline layers are based on is unknown, you will have to ask the engineer office for the EPSG code of the correct projection system.

Using map tiles from an external service provider

Next select the tab command *Tools > Tiles* that opens a working panel on the right side of the main screen. The user is able now to access directly to the map material provided by the *Microsoft BING* file server. Therefore select the map style (1) before you click on the button *Add Layer* (2):



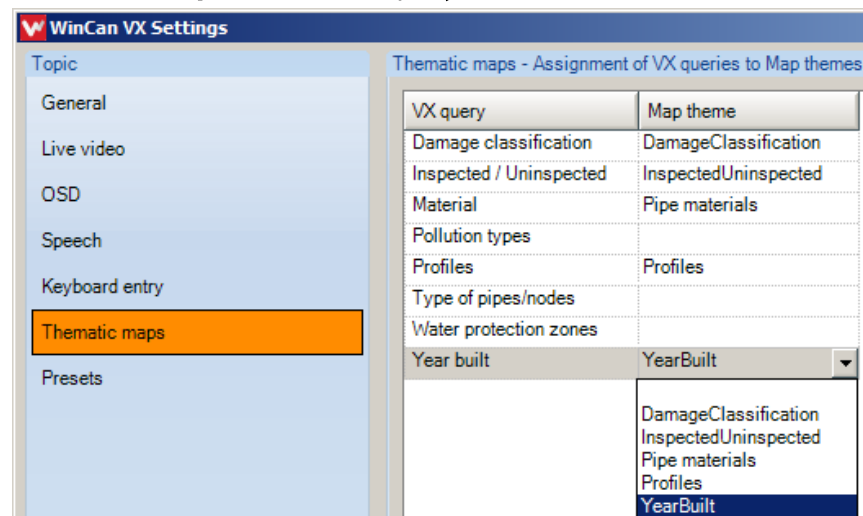
WinCan Map will zoom the background layer directly to the spot where the pipeline network is located:



Mind that you will need a powerful internet connection to make full use of the *Microsoft Bing Maps* service.

10. Visualizing Map topics (predefined queries)

Open WinCan VX and select the command *Home > Settings > Thematic maps*. Assign a Map topic of your choice to each **predefined** VX query:



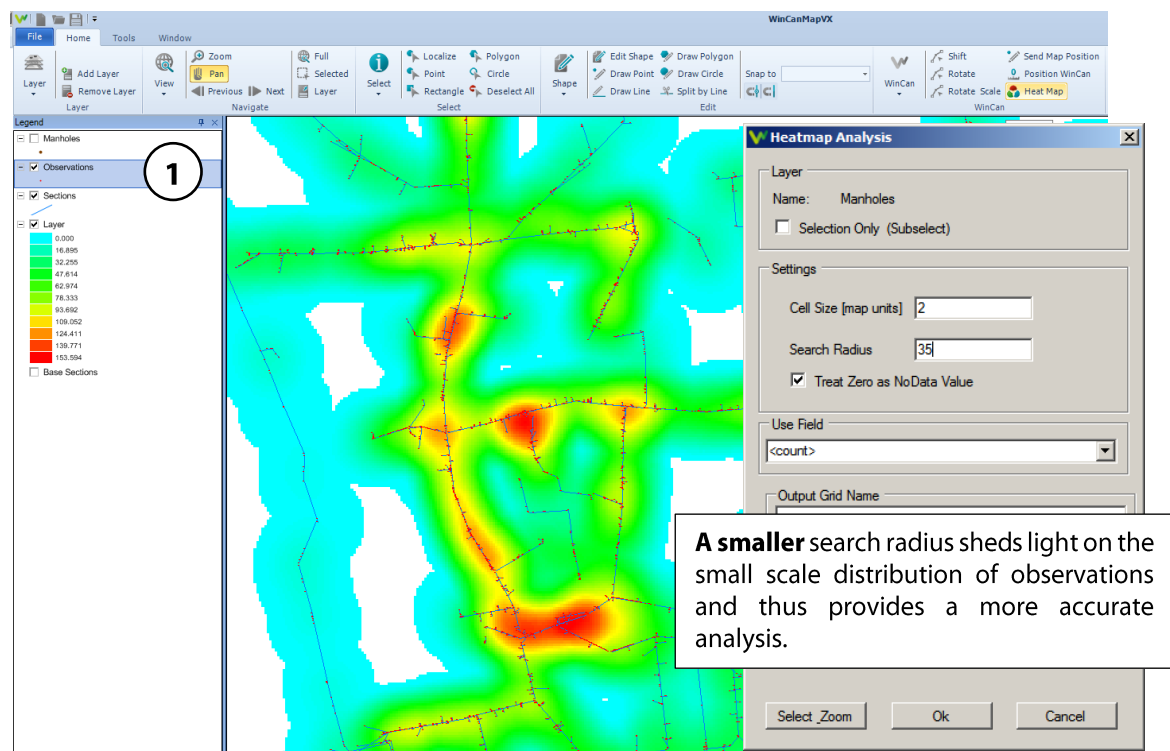
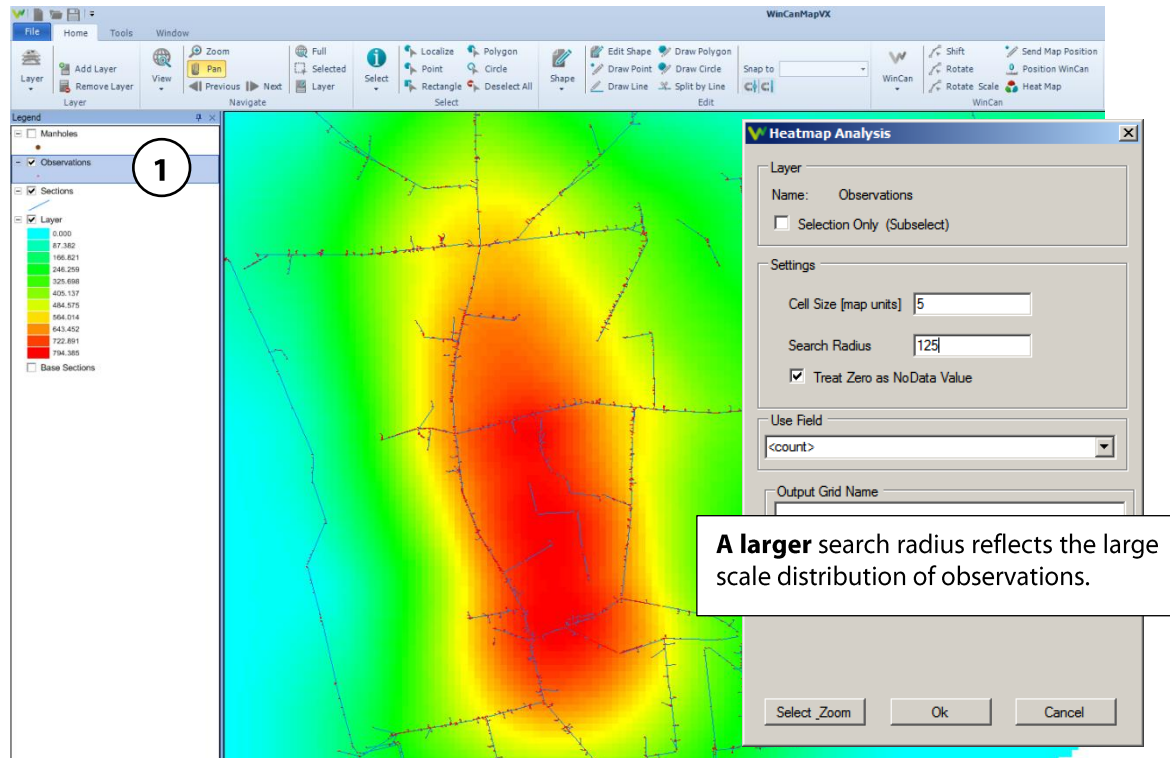
The user will be able from now to call up the chosen topic in WinCan VX for the current project when selecting the corresponding query listed in *WinCan Analyst > GIS query*. There are currently 8 topics available which are briefly described below:

1. Classification of damage (*DamageClassification*):
Displaying and labelling all sections according to their damage classification using default colours.
2. Inspection progress (*InspectedUninspected*):
Query for the inspection progress. WinCan VX handles a section as inspected as soon as it contains at least 2 observations.
3. Pipe material (*material*):
Displaying and labelling all sections according to their pipe material using default colours (concrete, PVC, steel, etc.)
4. Purpose of the pipe line (*pollution type*):
Displaying and labelling all sections according to their purpose (waste water, rainwater, mixed water etc.).
5. Pipe profiles (*profiles*):
Displaying and labelling all sections according to their profile (circle, egg, rectangle mouth etc.).
6. Type of pipe line (*type of pipes/nodes*):
Displaying and labelling of all main and lateral pipes (house connections).
7. Protection zones (*water protection zones*):
Displaying and labelling the location of all pipe lines regarding to water protection zones.
8. Year of construction (*year built*):
Displaying and labelling all sections according to their year of construction using default colours.

11. Thermographic visualization of defect density

The objects or damage images of the project can be illustrated according to their density as thermographic image. **Red** is representing areas on the map with high, **Blue** those with a low object or event density.

First select the layer (e.g. observations/damage sites) whose object density you want to show on the map (1) and click on the command *Home > Heat Map*. In the subsequent dialogue window you must set the size of the field grid as well as the search radius [m]:

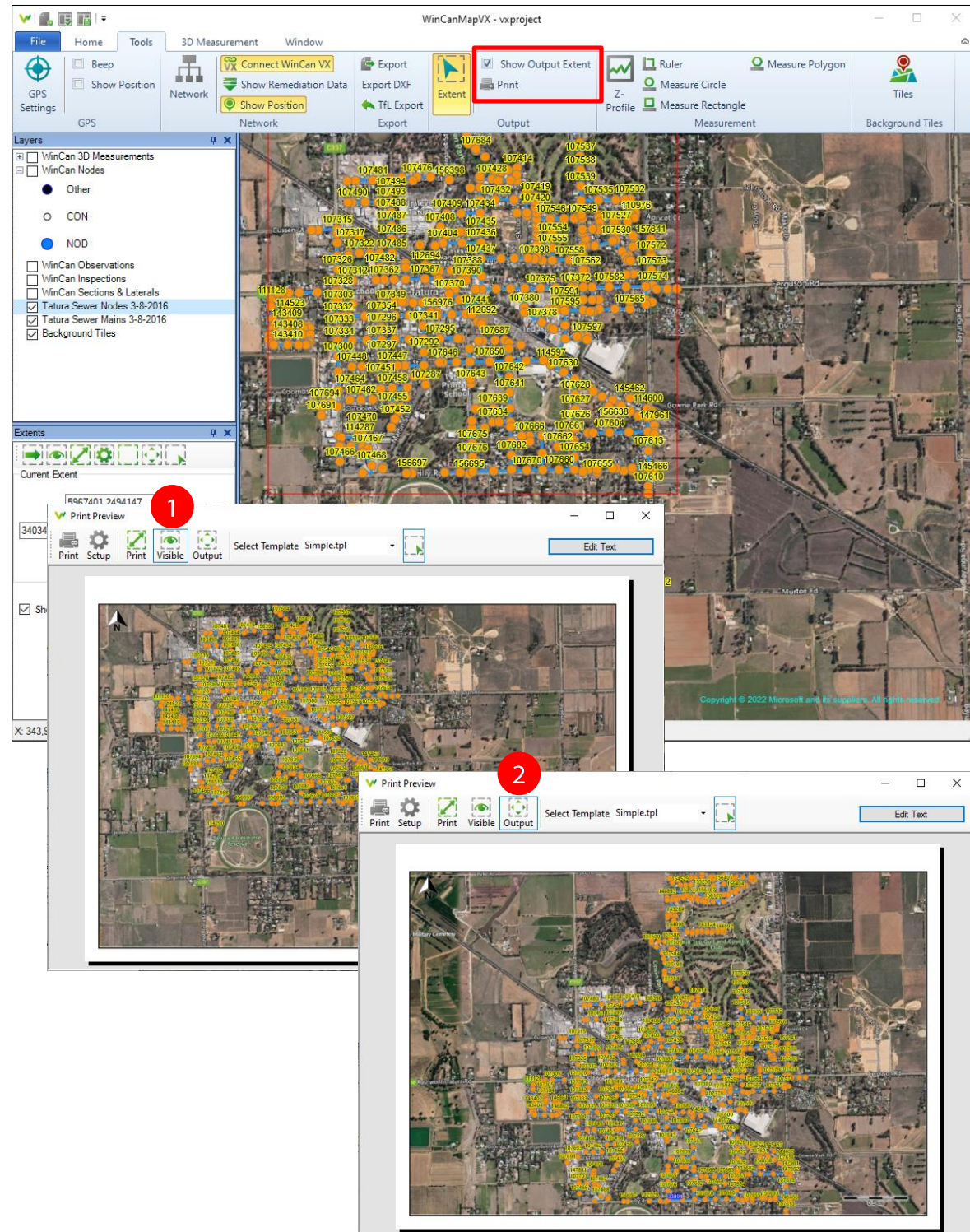


In case the colour gradients should be displayed rather smoothly choose a small area grid which however should be at least 2 m. The display of areas with even smaller grid sizes takes much more time and is recommended only on computers with appropriate CPU power and memory size (core i5, 8GByte of RAM, 64 bit operating system).

12. Printing data

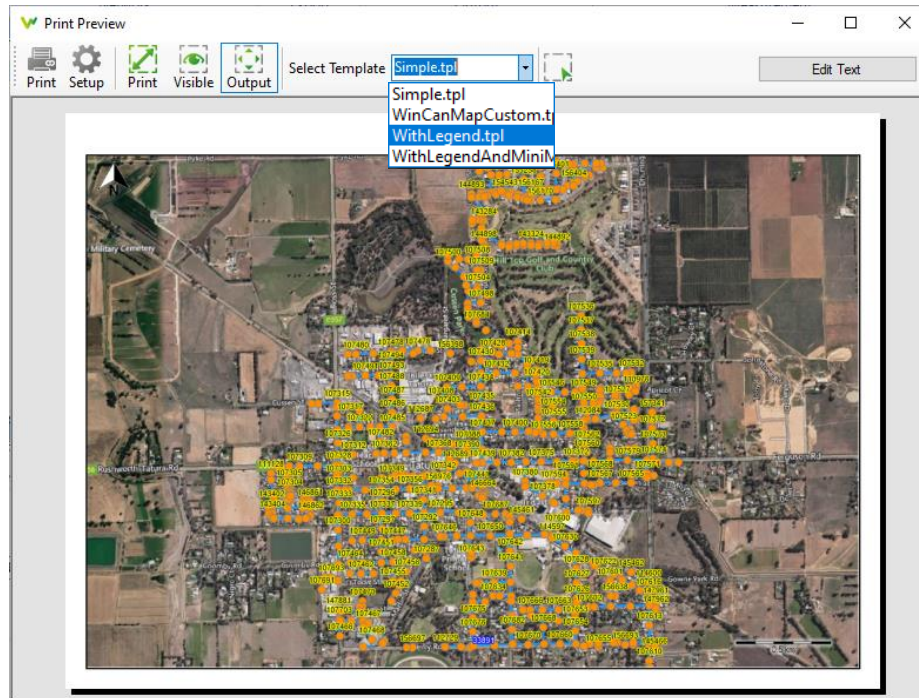
The geographic data can be printed directly in Map-VX where you may choose among four built-in printing templates. The **print-out** is done via the command *Tools > Output > Print*.

In the following dialogue box the user can finally specify the extent of the map section to be printed. Hitting the button *Visible* (1) returns a print preview of the **currently visible area** in WinCan Map, the button *Output* (2) zooms the preview to the **predefined output area**.

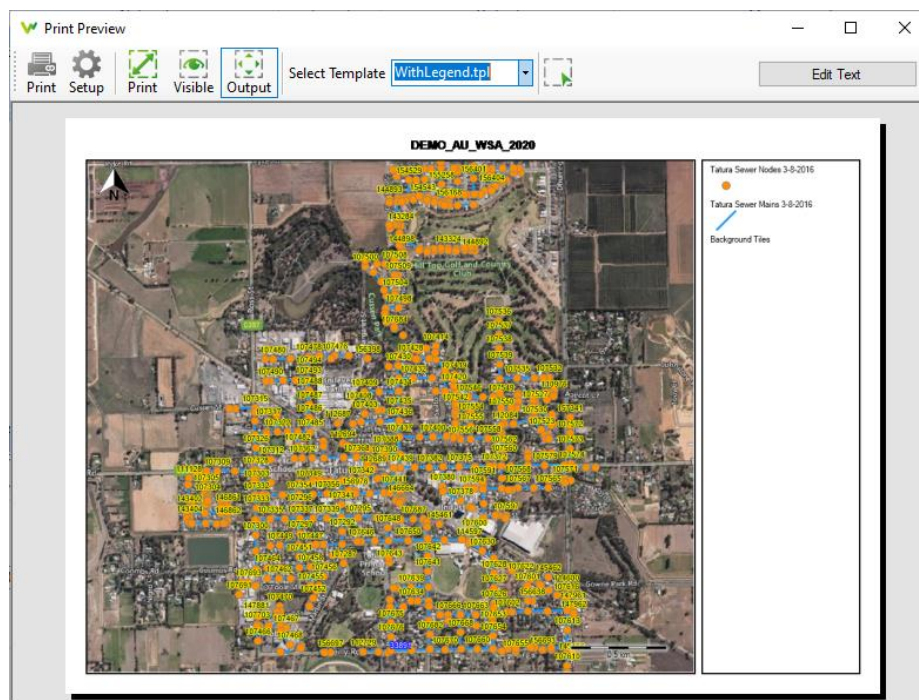


Printing data

The field *Select Template* allows the user to choose among up to four predefined printing layouts:

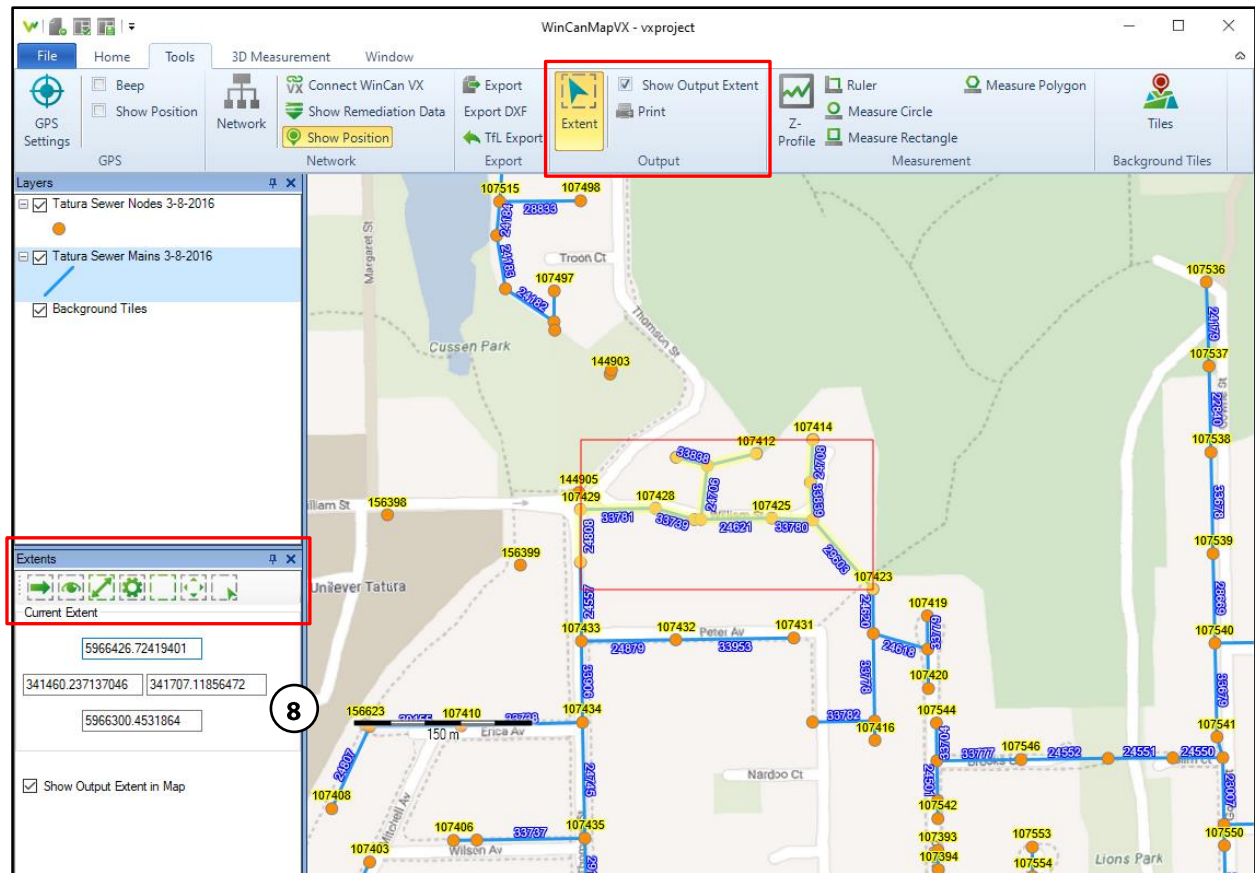


Hit the button *Edit Text* to write yourself a map title and select the template *WithLegend* to include the legend in the printout.



13. Exporting data

Before exporting data via Map-VX the user must define an output area. This is done via the command *Tools > Output > Show Output Extent*. Click on the button *Extent* to display the working panel with all the output options below the legend:



To define the output extent for further data export the user has got 7 possibilities available as icon buttons which are explained in detail below:

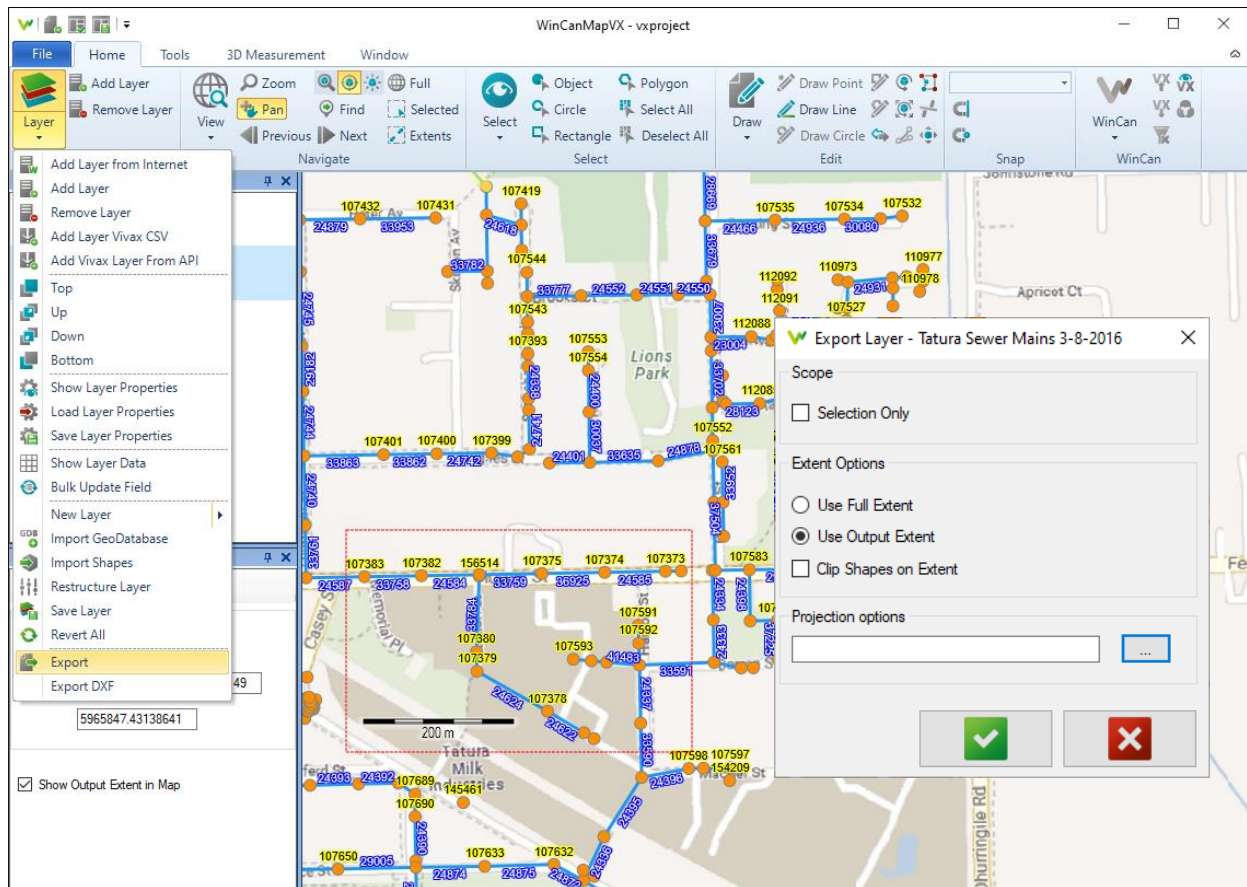


1. The map area with the selected objects is exported (see illustration above)
2. The currently visible map area is exported.
3. The WHOLE map area is exported.
4. Free selection of the export area: The selection rectangle will snap to the predefined coordinate points (8).
5. The data layer currently selected in the legend is exported.
6. The current view zooms to the selected export area.
7. Free selection of the export area: The selection rectangle ignores any coordinate points. The selection of an **empty** map area is automatically adopting the data field structure (without content) of the currently selected layer. So the existing attributes of a section layer may easily be transferred to a **new layer** for lateral sections (satellites).

Always activate the check box *Show Output Extent in Map* in order to display the red frame around the map area that corresponds to the preferred output.

Exporting data

Once selected the user can export all objects (sections and manholes) inside this map area via the command *Home > Layer > Export*:



Select the **second** option in the dialogue box that follows, if you have already set an output area before. Activate the **first** option, if you don't want to set any limited output area and prefer to export all available objects (sections and manholes) which are shown on the map.

Subsequently the exported data can be saved in the file formats SHP (SHAPE format), DXF (AutoCad format) or CSV (MSExcel compatible).

