

# **GeoDT Desktop v1.0**

## **QGIS Plug-In Install Guide**



Geospatial  
Information Technology Co., Ltd.

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# 1 Introduction to GeoDT Desktop

## 1.1 What is GeoDT Desktop?

GeoDT is a combination of the words ‘Geo-Spatial’ and ‘Design Too’, which means ‘tool for designing geographic information’. GeoDT Desktop is a QGIS plug-in that is installed and used in a desktop environment. In order to perform spatial data inspection, detailed conditions such as inspection type, options, and the coordinate system must be set.

## 1.2 GeoDT Desktop functions and features

GeoDT Desktop features and functions include:

- **Work in the offline environment**

GeoDT Desktop is easy to use from your desktop anytime and anywhere without an internet connection. Users can conveniently manage geographic information by selecting the appropriate filter.

- **Easy UI**

GeoDT Desktop supports the inspection and editing of map layers and can be used easily for your convenience.

- **Module**

GeoDT Desktop is an extension plug-in for QGIS Desktop. User can use any combination of basic functions provided by QGIS and extensions shared by the community at the same time.

## 1.3 Terminology

- **Spatial information**

It refers to the location information of natural or artificial objects in the space such as ground, underground, water, underwater, and related information for spatial recognition and decision making.

- **Plug-in**

Computer program module or device for adding functions to the main program. In this manual, the main program is QGIS and the plug-in is GeoDT Desktop.

- **QGIS**

QGIS (formerly: Quantum GIS) is a cross-platform free-open source desktop geographic information system (GIS) application that provides data viewing, editing, and analysis.

- **GeoDT Desktop**

It is the program covered in this manual. This plug-in supports the ability to easily inspect spatial data in QGIS.

- **Object**

An object that exists in the real world as a spatial or non-spatial element, and can be expressed in the GIS.

- **Inspection**

The process of verifying the integrity of user's spatial information. Inspection allows the user to find and correct errors in his/her geospatial information.

- **.py**

The extension of the python file. GeoDT Desktop is a plug-in written in Python.

- **.shp**

The extension of the shape file. Shp file is a data format that stores and provides geometric position and attribute information about ESRI geography. Nowadays, it is used as a universal spatial data format.

- **Coordinate system**

Coordinates are pairs of numbers representing the position of a point in a straight line, plane, or space. A coordinate system is a system or standard that defines the meaning and arrangement of coordinates.

- **Vertex**

A point on the x, y coordinate system that forms a Polygon.

- **Polygon**

An object that connects a set of vertices. The vertices are arranged in a row to form polygons.

- **Elevation/altitude**

The vertical distance from the reference horizontal plane (vertical reference plane) to a point on the surface of the earth. That is, the vertical distance from the average sea level to a certain point. In Korea, the sea level of Incheon Port is set as the national vertical standard.

- **Contour**

A line connecting the same elevation points on the surface used to represent the relief of the terrain. The contour spacing is narrower at steep slopes and wider at gentle slopes.

## 2 GeoDT Desktop function

### 2.1 Plug-in Screen Composition

#### 2.1.1 Preference

In the Preference tab, enter the layer definition option file, the inspection option file, and the data to be inspected.

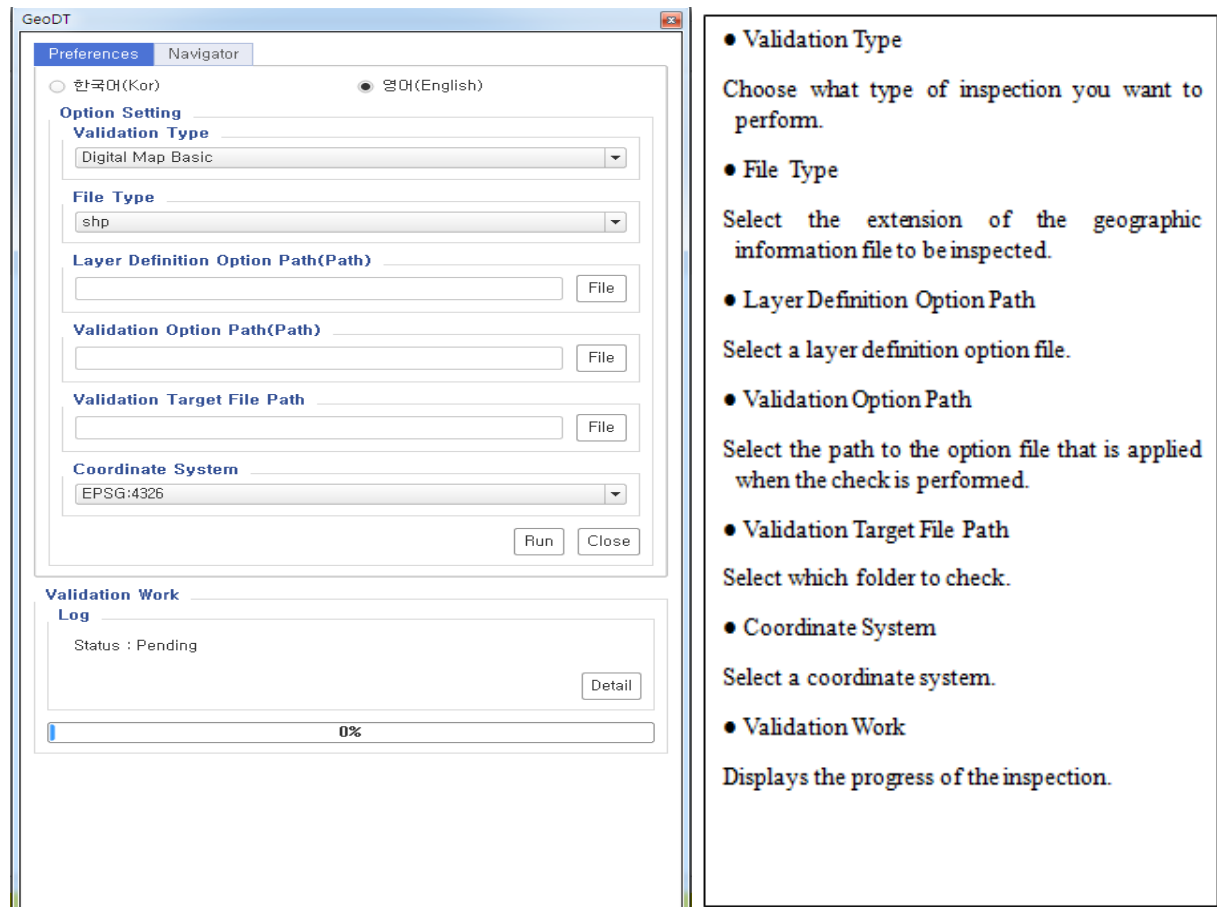


Figure 1: Preference interface

### 2.1.2 Navigator

The Navigator tab allows the user to view the inspection results and previous inspection files and to work with QGIS.

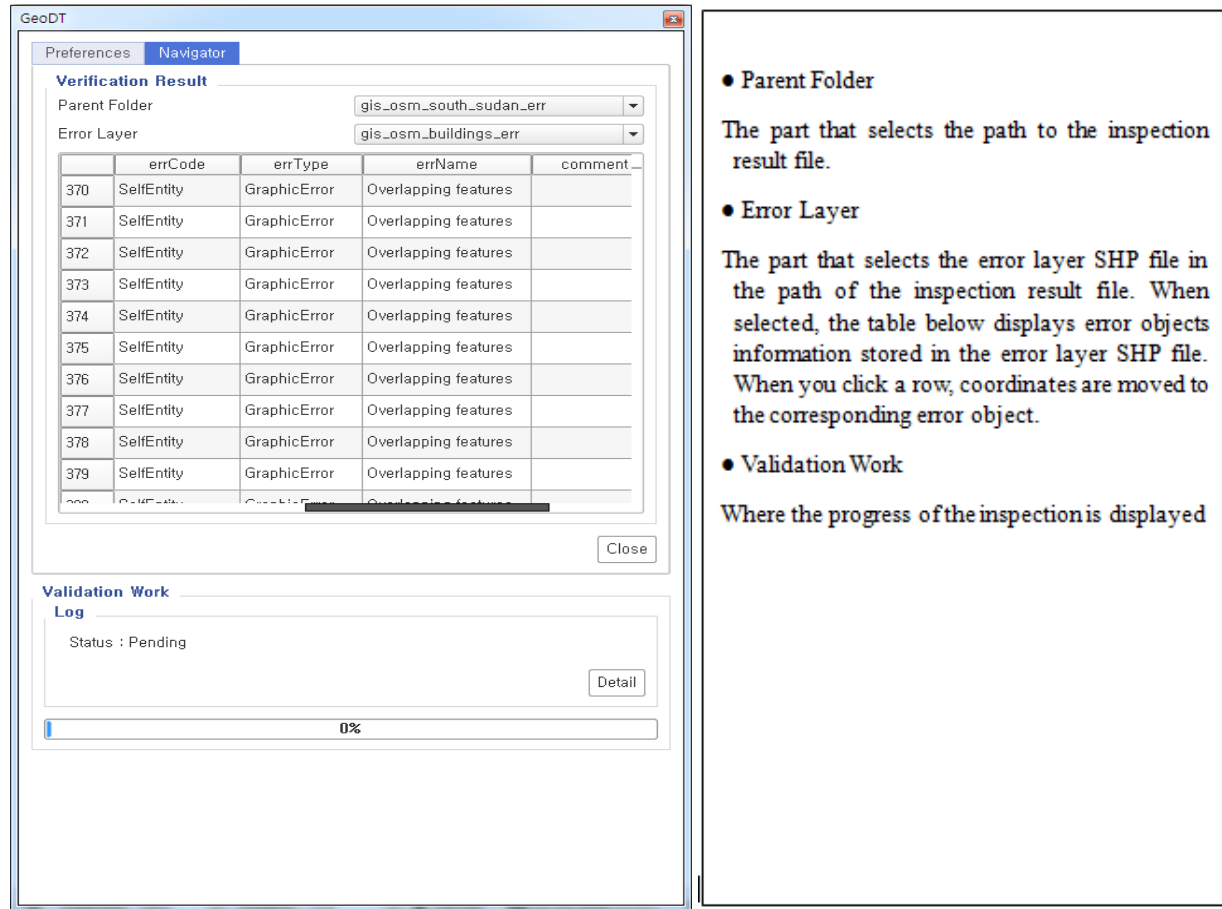


Figure 2: Navigator tab interface

## 2.2 Pre-work

An installation procedure in this manual is for Windows operating system users. Installation files are different according to user's operating system and bit version, so please check before installation. The installation sequence consists of three steps: **1. QGIS installation, 2. GeoDT folder placement, 3. val folder placement.** Please follow the manual below to install.

### 2.2.1 QGIS installation

QGIS is a basic tool for using GeoDT Desktop. Depending on the version of QGIS, the use of some functions of GeoDT may be restricted, so please download the specified version of QGIS.

The installation file can be downloaded for free after searching for version(2.18.13) at <https://qgis.org/downloads/>. In case, if searching the appropriate version is difficult, you can download the file from the link below. Please download the installation file for based on your operating system.

- 32-bit operating system users: <https://qgis.org/downloads/QGIS-OSGeo4W-2.18.13-1-Setup-x86.exe>
- 64-bit operating system users: [https://qgis.org/downloads/QGIS-OSGeo4W-2.18.13-1-Setup-x86\\_64.exe](https://qgis.org/downloads/QGIS-OSGeo4W-2.18.13-1-Setup-x86_64.exe)

### 2.2.2 Placing GeoDT folder

GeoDT Desktop plug-in execution file is a plug-in related executable file. GeoDT.zip file can be downloaded for free from the following link: <https://github.com/ODTBuilder/OpenGDS-Desktop-QgisPlugin>.

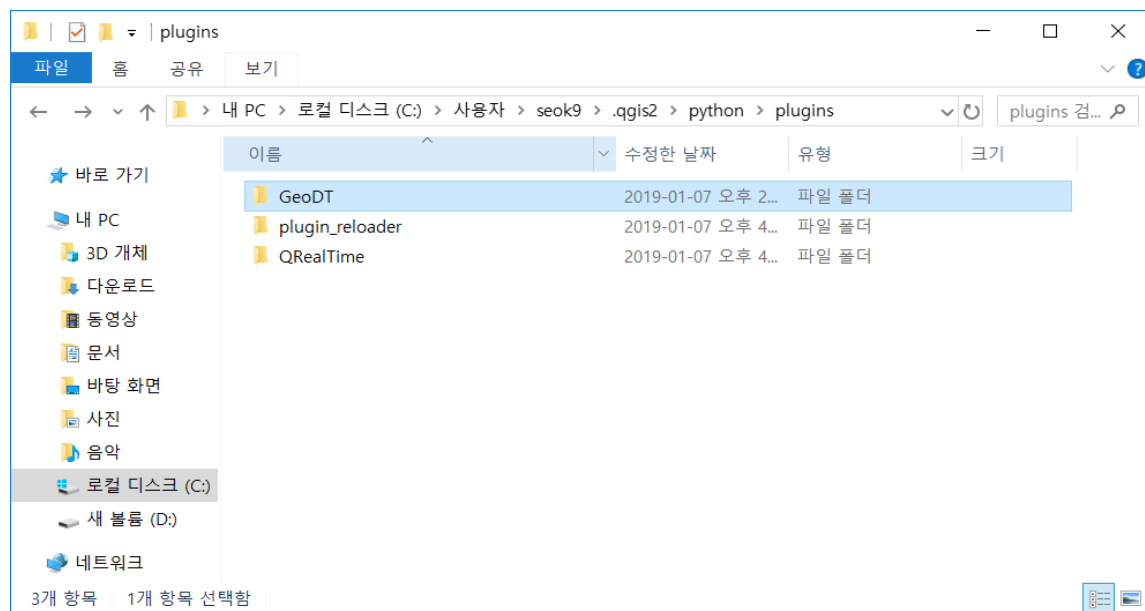


Figure 3: Placing GeoDT Folder

Unzip the GeoDT.zip file and move the created GeoDT folder to the path C:\Users\[User's account]\.qgis2\python\plugins.

### 2.2.3 Placing Val folder

Val folder includes batch files, jar files and example files that perform the inspection. The val.zip file can be downloaded for free from the following link: <https://github.com/ODTBuilder/OpenGDS-Desktop-QgisPlugin>.



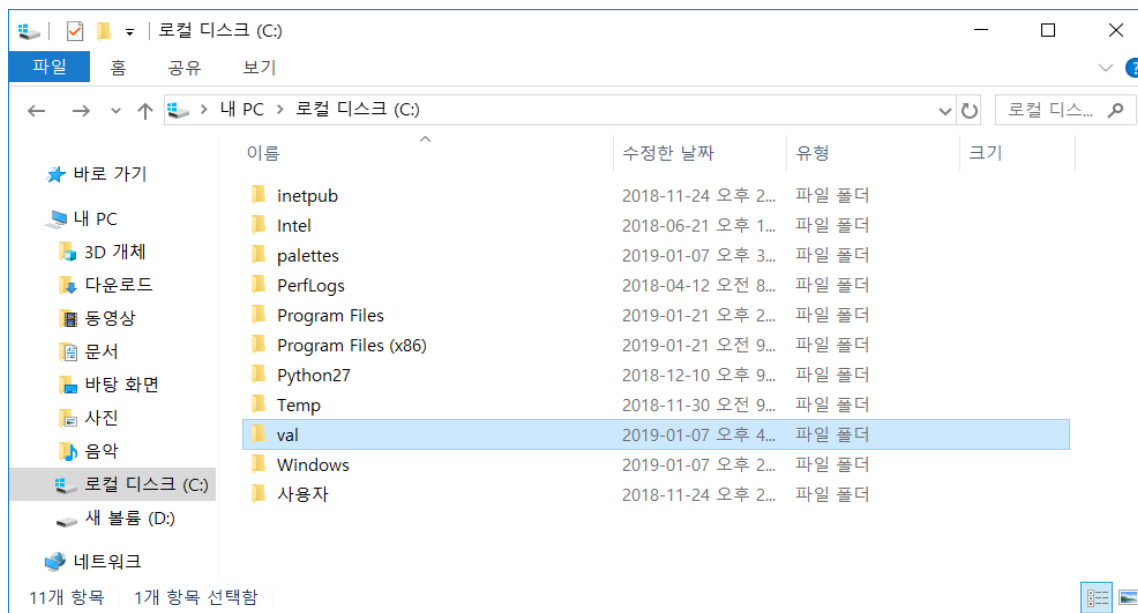


Figure 4: Placing val Folder

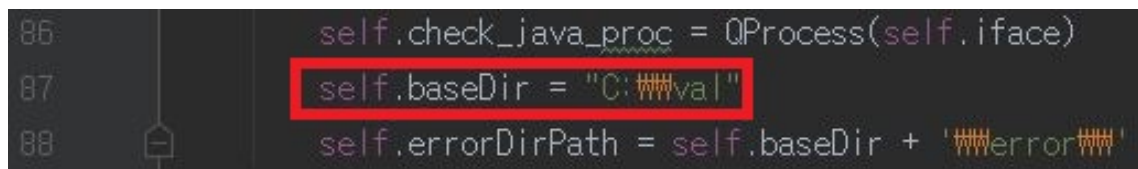


Figure 5: GeoDT.py

Unzip val.zip and move the generated val folder to C:\.

If you want to change the path, you have to edit the source file.

Find the `self.baseDir` value in **line 87** of `C:\Users\[User's account]\qgis2\python\plugins\GeoDT\GeoDT.py` and modify it to the desired path.

## 2.3 Set up GeoDT Desktop plug-in in QGIS

How to add GeoDT Desktop plug-in icon to QGIS Desktop.

- After running QGIS  
**Plugins > Manage and Install Plugins**
- Search for 'GeoDT\_Desktop' in the search bar at the top
- If 'GeoDT\_Desktop' is not found, check the setting 'Show also experimental plugins'

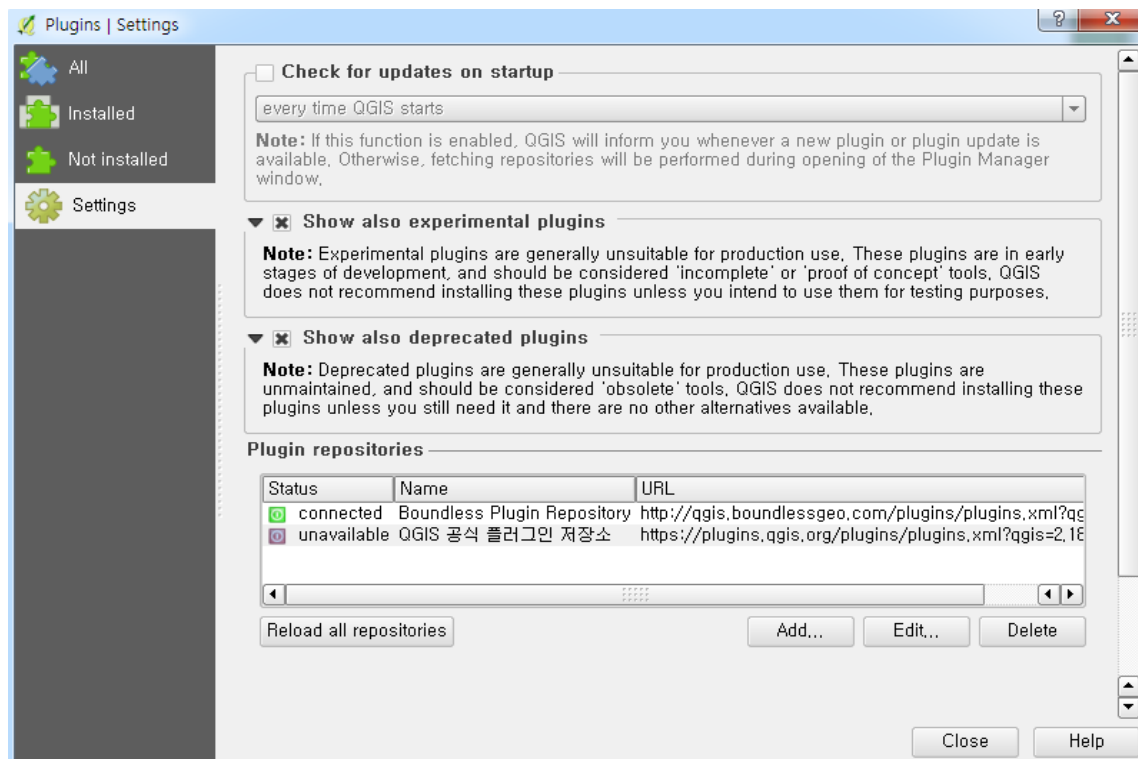


Figure 6: Plug-in Settings-1

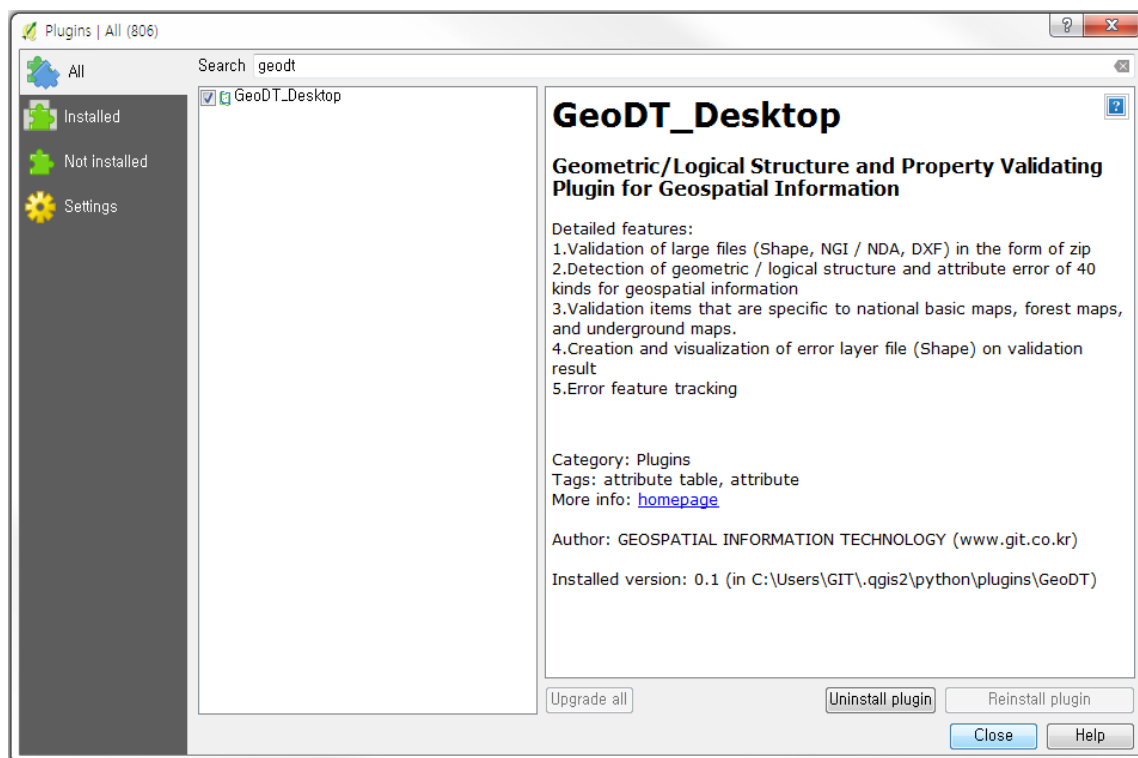


Figure 7: Plug-in Settings-2

- Check the box to the left of the found 'GeoDT\_Desktop' item'

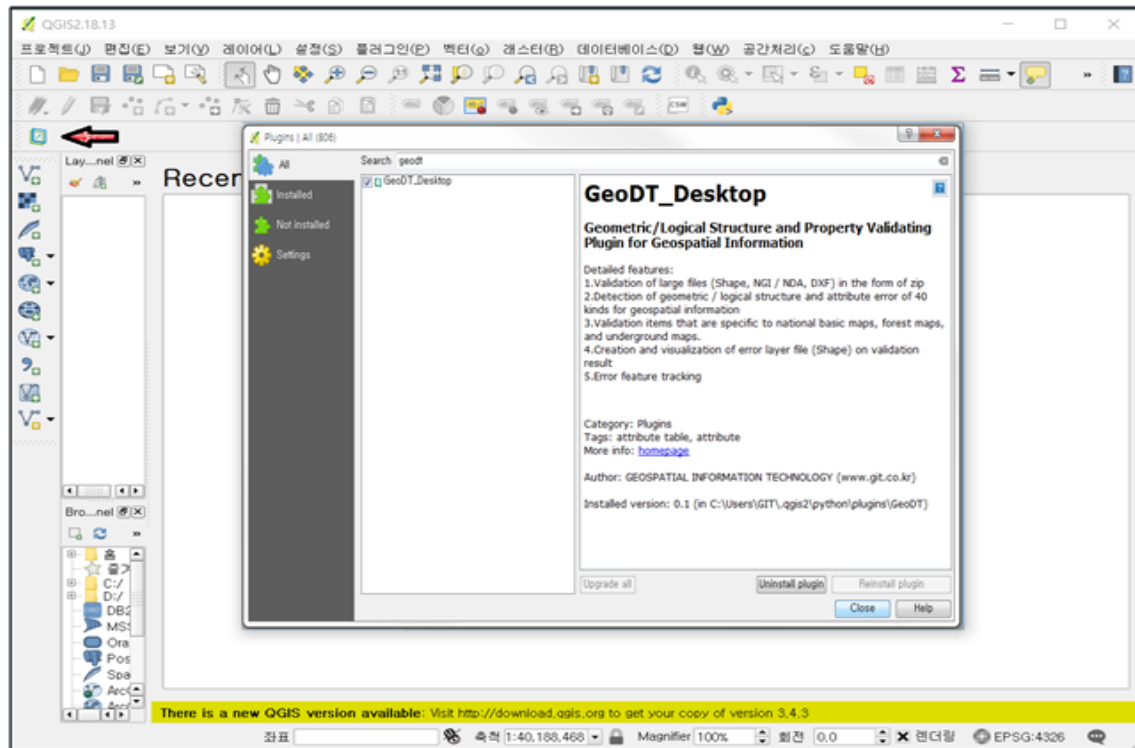


Figure 8: Plug-in Settings-3

- If the following window is activated on the right of QGIS after clicking the icon, it is successfully set up.

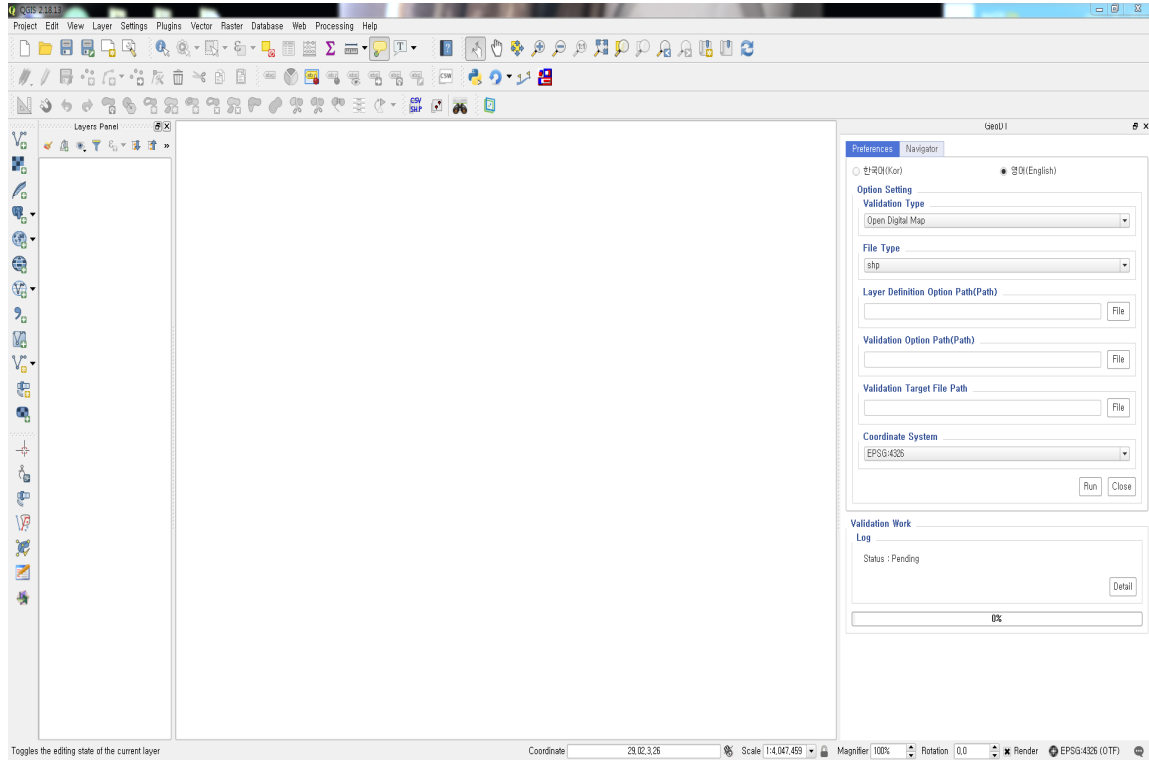


Figure 9: Plug-in Settings-4

Now, preparation for the use of QGIS and GeoDT Desktop is completed.

## 2.4 Inspection Run Example and Confirmation

### 2.4.1 Set up the inspection path

In the 'Preferences'tab, set the options as follows:

- **Validation Type:** Open Digital Map
- **File Type:** *shp*
- **Layer Definition Option Path:** *C:/val/osm\_layer\_setting.json*
- **Validation Option Path:** *C:/val/osm\_option\_setting.json*
- **Validation Target File Path:** *C:/val/gis\_osm\_south\_sudan*
- **Coordinate System:** *EPSG:4326*

Preferences

Navigator

☐ 한국어(Kor)
☒ 영어(English)

Option Setting

Validation Type

Open Digital Map

File Type

shp

Layer Definition Option Path(Path)

C:/val/osm\_layer\_setting.json

File

Validation Option Path(Path)

C:/val/osm\_option\_setting.json

File

Validation Target File Path

C:\val\gis\_osm\_south\_sudan

File

Coordinate System

EPSG:4326

Run

Close

Validation Work

Log

Status : Pending

Detail

0%

Figure 10: Inspection Path Description

13

After checking whether the above inspection option is applied correctly, click the ‘Ren’button on the bottom right of the Coordinate System tab.

#### Reference

‘Layer definition option’file and ‘Review option’file can be created via GeoDT Web. For more information, please refer to ‘Target Layer Settings’and ‘Details of Inspection Items’on the official website ([http://www.geodt.co.kr/pages/web.html#layer\\_setting/](http://www.geodt.co.kr/pages/web.html#layer_setting/)).

### 2.4.2 Running the inspection

Once the inspection begins, the ‘Inspection’tab at the bottom will inform about your progress and estimated time to complete the inspection. Clicking on the ‘More’button will show the detailed inspection progress in the text box at the bottom, while the bottom green bar shows the overall progress.

If you see a status message of ‘Success’in the Log,then the inspaection has been completed successfully.

Preferences

Navigator

☐ 한국어(Kor)
☒ 영어(English)

Option Setting

Validation Type

Open Digital Map

File Type

shp

Layer Definition Option Path(Path)

C:/val/osm\_layer\_setting.json

File

Validation Option Path(Path)

C:/val/osm\_option\_setting.json

File

Validation Target File Path

C:\\val\\gis\_osm\_south\_sudan

File

Coordinate System

EPSG:4326

Run

Close

Validation Work

Log

Processing.... ( 0:00:14 / 0:05:39 )

Detail

4%

Figure 11: Running the inspection

### 2.4.3 Inspection confirmation

You can check the inspection result by clicking the ‘Navigator’ tab at the top. The test results are stored in a folder in `C:/val/error`. If you want to check the previous inspection result, you can set the ‘*Parent Folder*’ and ‘*Error Layer*’ of ‘Verification Result’ to bring up the desired inspection result layer.

The properties of the table shown in ‘Error Layer’ are as follows.

- **layerID**: Unique identifier of the layer on which the error occurred
- **featureID**: Unique identifier of the object on which the error occurred

- **errType:** Type of newly occurred error(Graphic Error/Attribute Error/Adjacent Error)
- **errName:** Error name(20 kinds of)
- **comment:** Detailed description of the error

Preferences

Navigator

Verification Result

Parent Folder

gis\_osm\_south\_sudan\_191008\_114121

Error Layer

191008\_114122\_graphic\_err

	layerID	featureID	errType	errName
1	gis_osm_buildings	gis_osm_buil...	GraphicError	Overlappin features
2	gis_osm_buildings	gis_osm_buil...	GraphicError	Overlappin features
3	gis_osm_buildings	gis_osm_buil...	GraphicError	Overlappin features
4	gis_osm_buildings	gis_osm_buil...	GraphicError	Overlappin features
5	gis_osm_buildings	gis_osm_buil...	GraphicError	Overlappin features
6	gis_osm_buildings	gis_osm_buil...	GraphicError	Overlappin features
7	gis_osm_buildings	gis_osm_buil...	GraphicError	Overlappin features
8	gis_osm_buildings	gis_osm_buil...	GraphicError	Overlappin features
9	gis_osm_buildings	gis_osm_buil...	GraphicError	Overlappin features
10	gis_osm_buildings	gis_osm_buil...	GraphicError	Overlappin features
11	gis_osm_buildings	gis_osm_buil...	GraphicError	Overlappin features

Close

Figure 12: Inspection confirmation



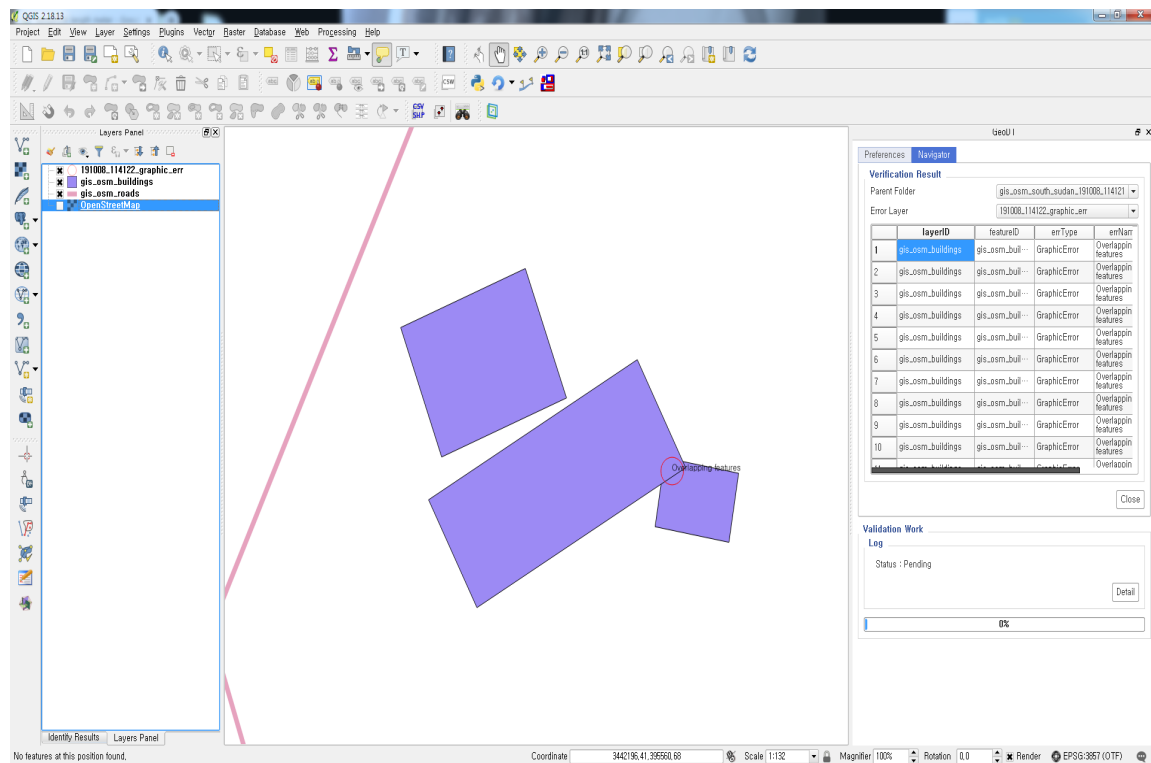


Figure 13: QGIS inspection result screen

Clicking on the property value of an error will take you to the location where the error occurred.

## 3 Appendix

### 3.1 Creating Layer Definition File and Inspection Item Definition File

This section describes how to create the layer definition file and inspection item definition file in a more detailed way. These files are selected before performing the inspection process. Layer definition file and inspection item definition files can be created through GeoDT\_Web which is the web version of GeoDT. You can set items to be applied or not applied to the inspection, and set detailed options such as a relationship with other layers, numerical values, and property values. Besides, you can also save the option settings for a quick inspection.

#### 3.1.1 Setting Inspection Options

Before setting the inspection options, register and log in to GeoDT\_Web(). You will be able to create, edit, and save inspection options via your user account when you sign up as a member. After logging in, click the ‘Setting’ button on the right side of the top menu, and you will be directed to the Inspection Option Setting page.

- **Creating a new option**

Creating and saving a new custom inspection option. Newly created inspection option is used as a quick setting when the inspection request is made.

- **Managing Custom Options**

Checking and deleting custom options.

- **Importing/exporting an inspection options**

Importing or exporting an inspection options. File format is json.

GeoDT Web 한국어 | English Editor Validation Result Setting 김동홍 Sign-out

New	Unselect all	Select all	Delete selected
No	Title	Category	
1	place	Digital Map 2.0	
2	osm_south_sudan	Digital Map 2.0	
3	digitalmap20	Digital Map 2.0	
4	undefined	Open Digital Map	

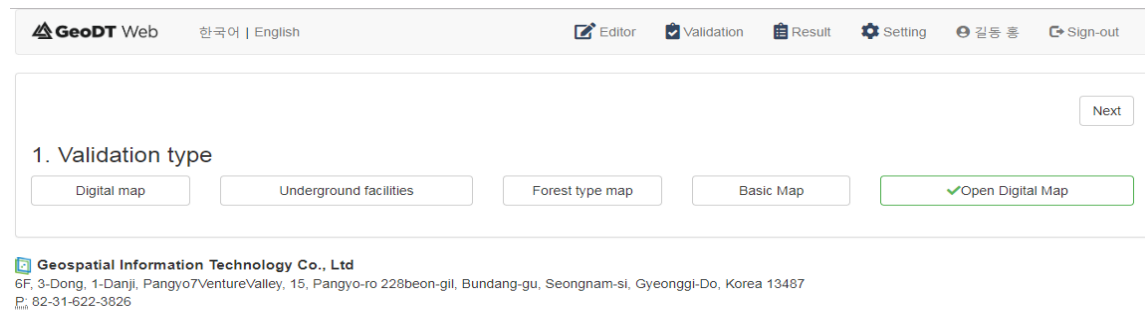
Geospatial Information Technology Co., Ltd  
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P: 82-31-622-3826

Figure 14: Inspection Option Settings page

## Creating the new custom inspection options

This section describes how to create new custom inspection options. The method below is an example to help users understand the whole process. Please note that it may differ from the user's inspection option.

1. Click the 'New' button on the Set Inspection Option page.
2. Select the type of inspection. In this example, select ' **Open Digital Map**' and click the 'next' button.



The screenshot shows the 'GeoDT Web' interface. At the top, there is a navigation bar with links for 'Editor', 'Validation', 'Result', 'Setting', and user options '김동홍' and 'Sign-out'. Below this, the '1. Validation type' section contains five buttons: 'Digital map', 'Underground facilities', 'Forest type map', 'Basic Map', and 'Open Digital Map'. The 'Open Digital Map' button is highlighted with a green border and a green checkmark. A 'Next' button is located in the top right corner of the form area. At the bottom, the company information for 'Geospatial Information Technology Co., Ltd.' is displayed, including their address and phone number.

Figure 15: Validation type settings page.

3. To create a Category, click the 'Add category' button and enter a name (ex. Building) to the 'Category' Name field.
4. To add a new layer, click the 'Add layer' button.
5. In the 'Code Entry' field, enter the name the same as layer name of the shp file that is going to be inspected.
6. In the Type field, select the Geometry type(ex. Point, LineString, Polygon, etc.) that the layer complies with.
7. To enter the property field structure that the layer must comply with and the fixed property values for each field, click on the 'Add Fixed Properties' button.

(ex. When setting up as shown below, all objects in the gis.osm.buildings.shp layer are of the MultiPolygon type, and in its turn, it means that the property field must consist of codes and fclass.

In 'code' field, the following values should be entered: property value equals '1500', the type of property value is VARCHAR, and the string of length 4.

In 'fclass' field, only 'building' can be entered in the property value field, and the type of property value VARCHAR does not check the length of the string.

Objects that do not comply with the above are classified as error objects.)

Buildings

Add layer

Delete category

Code

gis\_osm\_buildings

Type

MULTIPOLYGON

Delete layer

Fixed Attribute

Add fixed attribute

Attribute name

code

Attribute type

VARCHAR

Length

4

Null value allowed?

☐

Allowed value

1500

Delete fixed attribute

Attribute name

fclass

Attribute type

VARCHAR

Length

Null value allowed?

☐

Allowed value

building

Delete fixed attribute

Figure 16: Layer definition settings page

## Reference

- (a) While defining options, the layer code in the layer definition part must be the same as the shp file name that is going to be inspected.
- (b) Classification is used for the user's convenience while setting up options.
- (c) You can add multiple layers under the classification name, and also add multiple fixed attributes under the layer name.

8. Once all layers have been defined, click the 'Export configuration' button at the top of the page to download the layer definition file (.json).
9. Click the 'Next' button and go to the Inspection Options settings page.
10. In order to open Inspection items list, select the classification name from the item's list for which you want to set the inspection. The Inspection items list consists of the descriptions of 20 items that can be performed in the inspection type '**Open Digital Map**', and examples are described in the section **3.2 Detailed description of Inspection Items**.

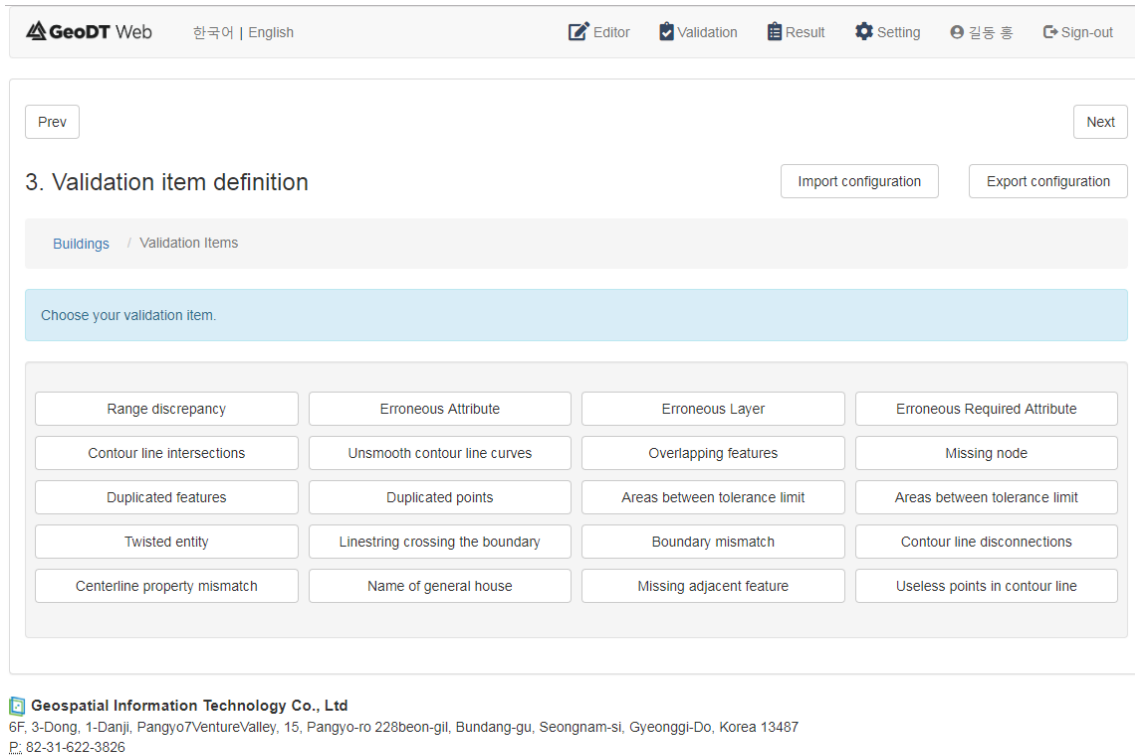


Figure 17: Validation item definition settings page.

11. Select 'Erroneous Layer' item among the inspection items list. This item is an item that checks whether or not a layer is compliant with the Geometry Type selected in the Layer definition step, and checks whether or not an inspection can be performed or not performed without entering a layer relationship, numeric, or attribute value condition.
12. Select the 'Overlapping features' item among the inspection item's list. This item is an item that determines whether or not objects in one layer overlap with other objects in the same layer or objects in the other layer, also enters a layer relationship and a numerical condition.
13. When you have finished defining inspection items, click the 'Export configuration' button to download the inspection items definition file (.json).
14. Then, click the 'Next' button to save the layer definition and inspection items definition settings. You can also view and modify them when you log in.

### 3.1.2 Detailed Settings of Inspection Items

Each of the 20 inspection items available in the Open Digital Map must be set up in a detailed way. The detailed condition consists of Filter, Numeric Condition, Attribute Condition, and Layer relationships, and each item has the required prerequisites. The prerequisites for each item are described in the section **3.2 Detailed description of Inspection Items**.

- Filter

Filter	
Perform the inspection by filtering only objects with specified property values.	
<b>Filter &gt;Code</b>	Enter the layer name to apply the attribute filter to.
<b>Filter&gt;Attribute name</b>	Enter attribute Key value to apply filtering.
<b>Filter&gt;Acceptable values</b>	Enter a filter allowable value.

한국어 | English

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 Result
 Setting
 김등홍
 Sign-out

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3. Validation item definition

Import configuration

Export configuration

[Buildings](#) / 
 [Contour line intersections](#) / 
 [Filter](#) / Enter the detail figure

Add a new layer code, then enter details.

Clear Settings

Add layer code

Code:

gis\_osm\_buildings

▼

Delete layer code

Add filter

Attribute name:

code

Acceptable values:

1500

Delete filter

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Figure 18: Filter Setup Screen

- Condition

Condition	
The inspection is performed by applying required numerical conditions, such as area, length and error range to inspection item among the Geometry Inspection items.	
<b>Condition &gt;Code</b>	Set the layer code to which numerical conditions are applied.
<b>Condition &gt;Figure</b>	Set the numerical value or an allowable error value.
<b>Condition &gt;Condition</b>	Set the range of numerical or allowable error values.

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### 3. Validation item definition

Import configuration
Export configuration

Buildings / Areas between tolerance limit / Condition / Enter the detail figure

Add a new layer code, then enter details.

Clear Settings

Add layer code

Code:
gis\_osm\_buildings
Delete layer code

Figure:
1
Condition:
and Over
Interval:
Numeric value

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6F, 3-Dong, 1-Danji, Pangyo7VentureValley, 15, Pangyo-ro 228beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-Do, Korea 13487  
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Figure 19: Condition Setup Screen

- Attribute

Attribute	
Check if the properties of the object are appropriate.	
Attribute >Code	Set the layer code to perform attribute checking.
Attribute >Attribute name	Set attribute name to perform attribute checking.
Attribute >Acceptable values	Set the allowable value of the attribute value.
Attribute >Figure	If attribute value is a number, set the value of the number.
Attribute >Condition	Set comparison condition of numerical and attribute values.
Attribute >Interval	Set the interval between allowable values.

GeoDT Web

한국어 | English

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3. Validation item definition

Import configuration

Export configuration

Buildings / Name of general house / Attribute / Enter the detail figure

Add a new layer code, then enter details.

Clear Settings

Add layer code

Code: gis\_osm\_buildings

Delete layer code

Add attribute

Connected filter:

Not selected

Attribute name: code

Acceptable values: Enter acceptable values separated by commas. ex) 1,2,3

Figure: Numeric value

Condition: Not selected

Interval: Numeric value

Delete Attribute

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6F, 3-Dong, 1-Danji, Pangyo7VentureValley, 15, Pangyo-ro 228beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-Do, Korea 13487

82-31-622-3826

Figure 20: Attribute Setup Screen



- Relation

Relation
Set the layers to establish relations such as inclusion, overlay, and etc., between the selected layers.

GeoDT Web한국어 | English

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3. Validation item definition

Import configurationExport configuration

Buildings / Overlapping features / Relation / Select relationship layer

Choose the category to validate.

All categorys

Buildings


 **Geospatial Information Technology Co., Ltd**  
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Figure 21: Relation Setup Screen

## 3.2 Detailed description of Inspection Items

This section describes the inspection items that are detectable in GeoDT\_Desktop.

### 3.2.1 Open Digital Map

Detailed definition of inspection items for Open Digital Map.

#### Graphical error

##### Segments between length tolerance limit

It occurs when an object of type LineString is less than the area(m) entered in the numerical condition.

Prerequisites: Numerical conditions (layer name/numerical value/condition)



Figure 22: Segments between length tolerance limit

### Areas between tolerance limit

It occurs when an object of type Polygon is less than the area( $m^2$ ) entered in the numerical condition.

Prerequisites: Numerical conditions (layer name/numerical value/condition)

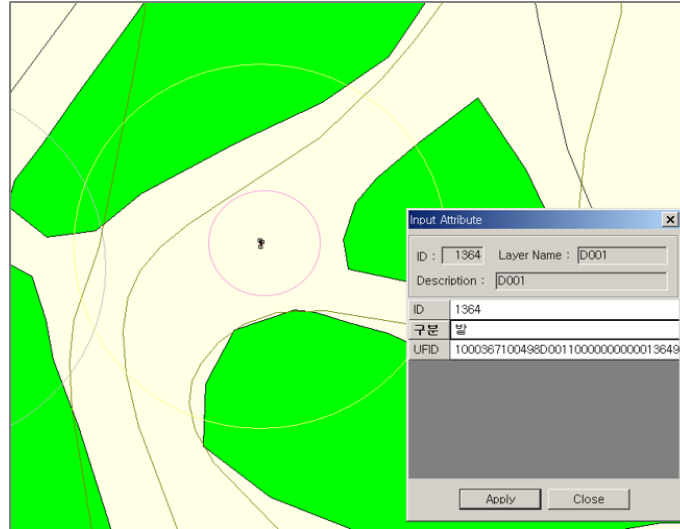


Figure 23: Areas between tolerance limit

### Overlapping features

It occurs when an object overlaps with another object in the same layer or another layer.

Prerequisites: Numerical conditions (layer name/numerical value/condition), layer connection

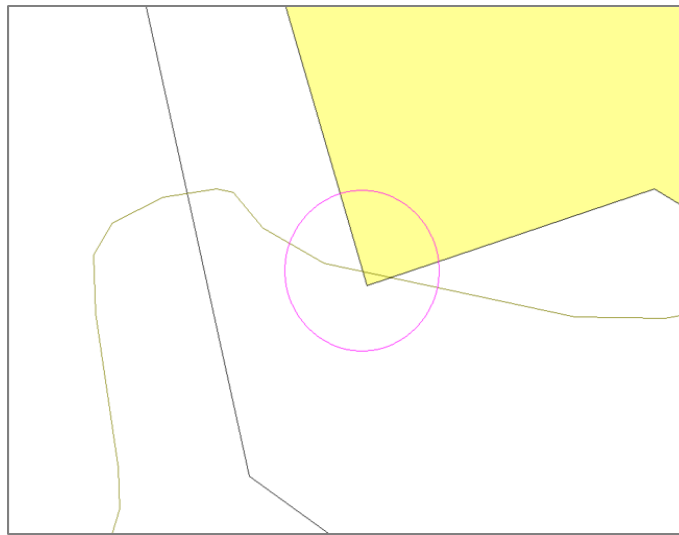


Figure 24: Overlapping features

## Duplicated features

It occurs when there are more than two objects in the same location with the same value for Vertex.

Prerequisites:

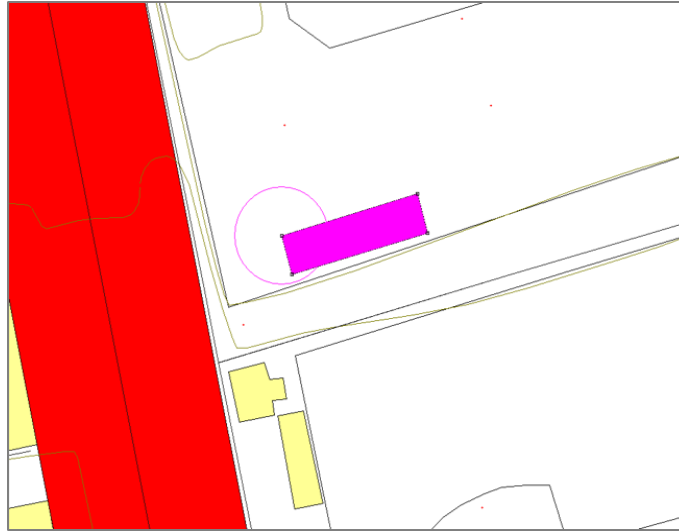


Figure 25: Duplicated features

## Unsmooth contour line curves

It occurs when the contour layer object's Vertex distance angle is less than 90 degrees.

Prerequisites: Numerical conditions (layer name/numerical value/condition)

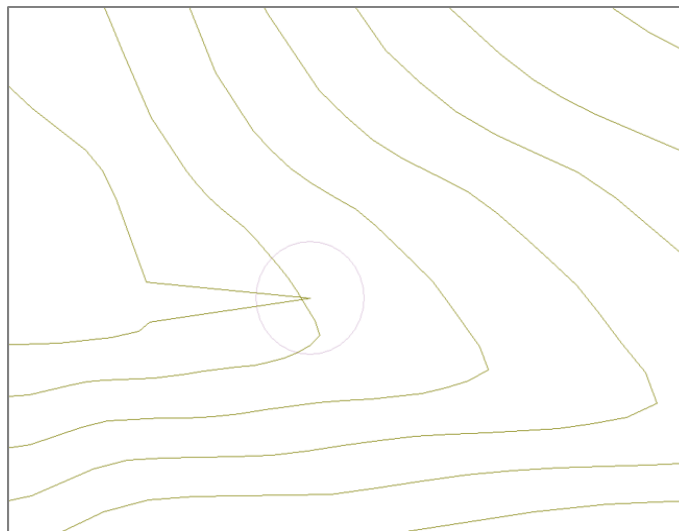


Figure 26: Unsmooth contour line curves

### Contour line intersections

It occurs when one object in a contour layer is twisted on its own or intersected with another contour object in the same layer.

Prerequisites:

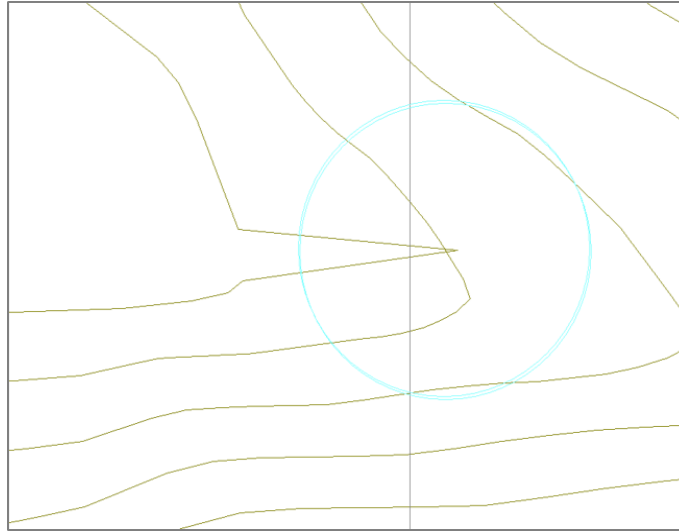


Figure 27: Contour line intersections

### Contour line disconnections

It occurs when objects in the contour layer are not closed or broken within the inspection zone.

Prerequisites: Numerical conditions (layer name)



Figure 28: Contour line disconnections

## Useless points in contour line

It occurs when the contour layer object has an angle of less than 6 degrees between the three consecutive vertexes and a length of less than 3 meters between the two vertexes.

Prerequisites:

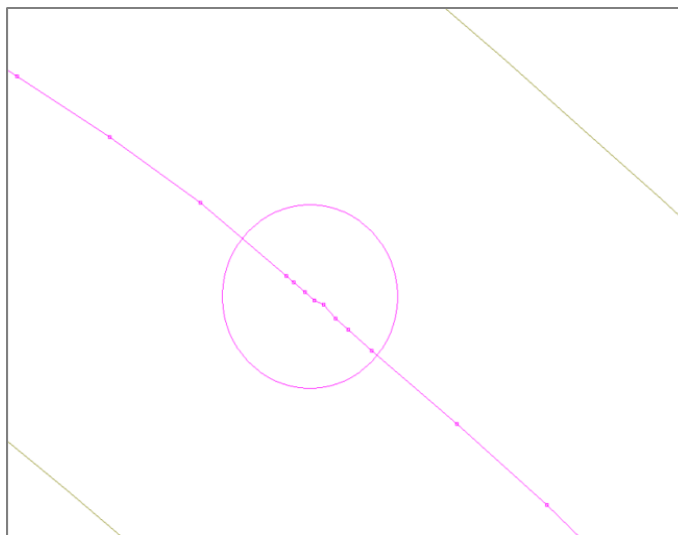


Figure 29: Useless points in contour line

## Duplicated points

It occurs when more than one Vertex exists in the same location within an object of type LineString or Polygon.

Prerequisites:

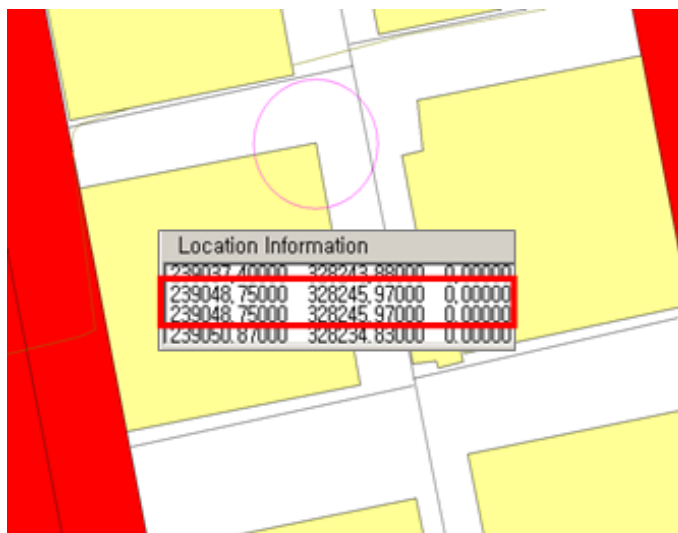


Figure 30: Duplicated points

### Boundary mismatch

It occurs when objects of type Polygon or LineString do not fit into the inclusion relationship with other objects.

Prerequisites: Numerical conditions (layer name/numerical value/condition), layer connection

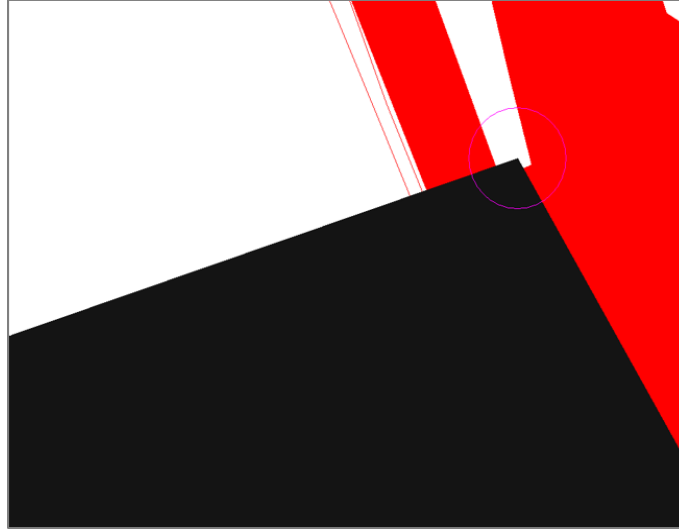


Figure 31: Boundary mismatch

### Missing node

It occurs when both endpoints of a LineString type object are not in contact with a Polygon type object in the inclusion relationship.

Prerequisites: Numerical conditions (layer name/numerical value/condition), layer connection

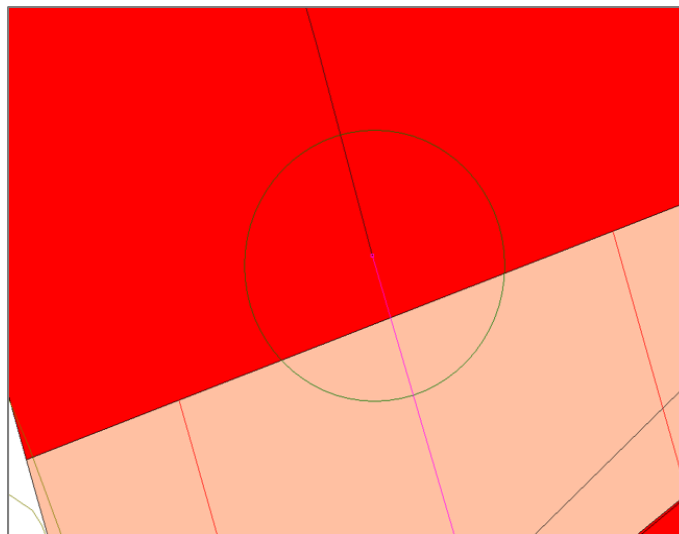


Figure 32: Missing node

### Erroneous Layer

It occurs when an object has a type other than the Geometry type defined in the user layer definition file.

Prerequisites:

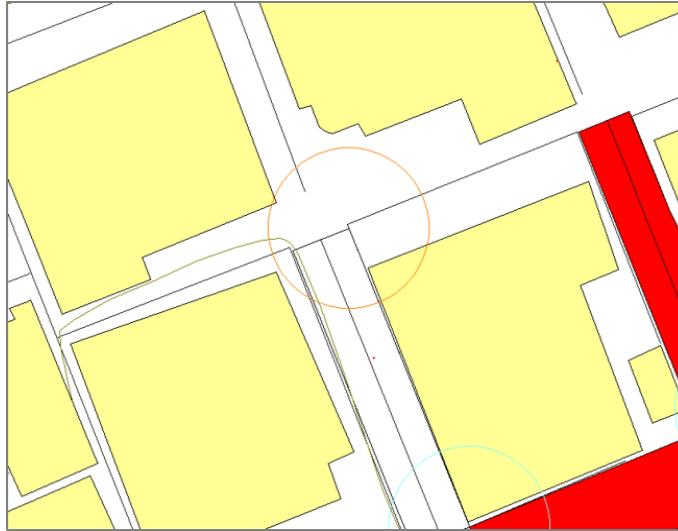


Figure 33: Erroneous Layer

### LineString crossing the boundary

It occurs when an object exists outside the inspection zone or is intersected with the inspection zone.

Prerequisites: Numerical conditions (layer name/numerical value/condition), layer connection

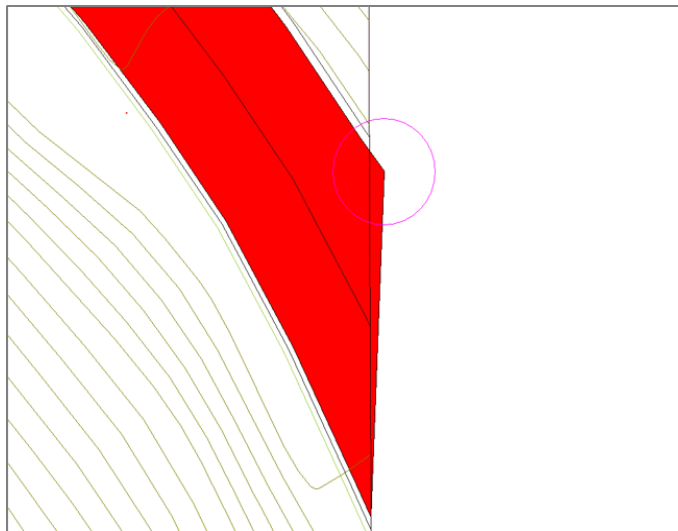


Figure 34: LineString crossing the boundary



### Twisted entity

It Occurs when the outer line of an object in the Polygon layer is self-intersected.  
Prerequisites:

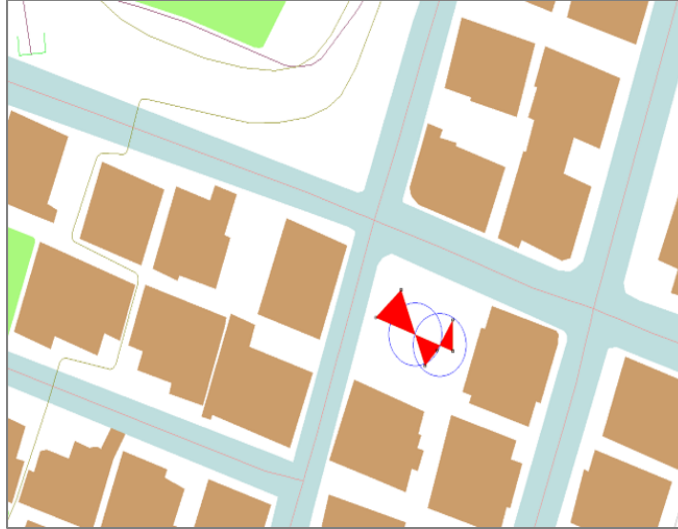


Figure 35: Twisted entity

### Attribute error

#### Name of general house

It occurs when the building classification of a building object is 'general house' and the building name value is present. Prerequisites: Attribute check (layer name/attribute name).

## Erroneous Required Attribute

It occurs when the required attribute value, entered in the inspection item definition file, does not exist in the object's properties.

Prerequisites:

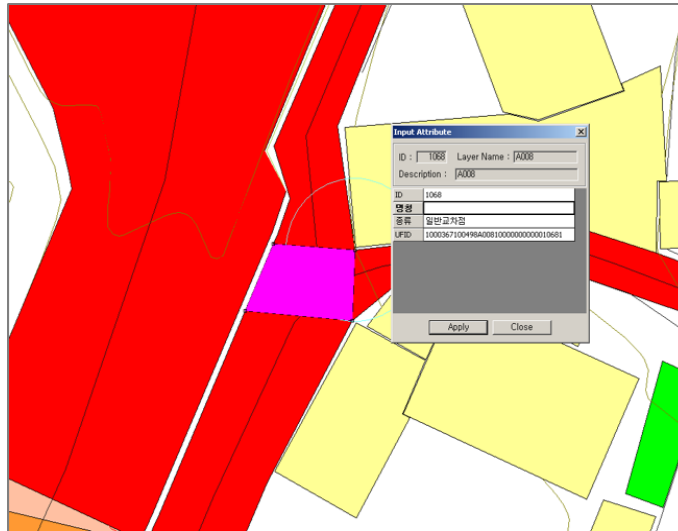


Figure 36: Erroneous Required Attribute

## Erroneous Attribute

It occurs when the object's attribute field structure is not the same as the attribute field structure of the layer entered in the inspection item definition file.

Prerequisites:

### Range discrepancy

It occurs when the elevation value of an object that has height attributes, such as contours, elevations, and buildings, is entered incorrectly.

Prerequisites: Attribute check (layer name/ attribute name/numeric value/condition)

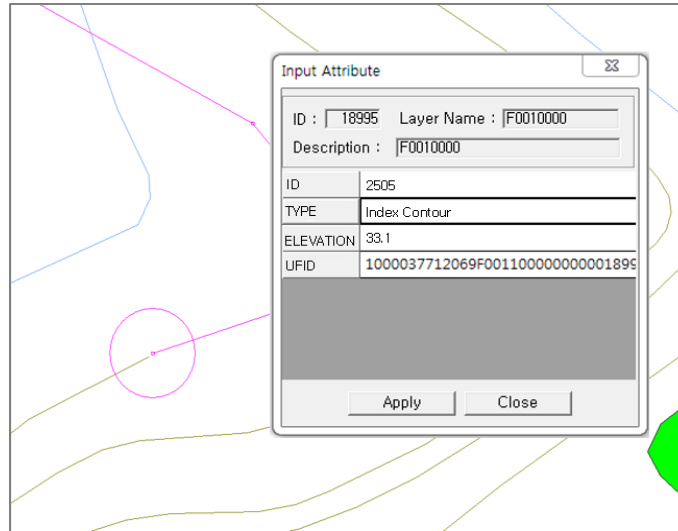


Figure 37: Range discrepancy

### Adjacent error Missing adjacent feature

It occurs when no objects need to be adjacent within the same layer exist.

Prerequisites: Numerical conditions (layer name/numerical value/condition)

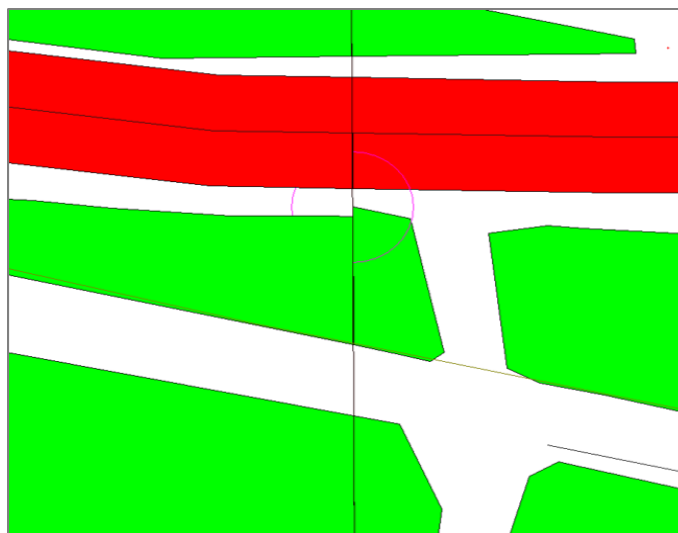


Figure 38: Missing adjacent feature

## Centerline property mismatch

It occurs when two LineString objects adjacent to the same layer are not aligned.  
Prerequisites: Numerical conditions (layer name/numerical value/condition), Attribute check (layer name/ attribute name)

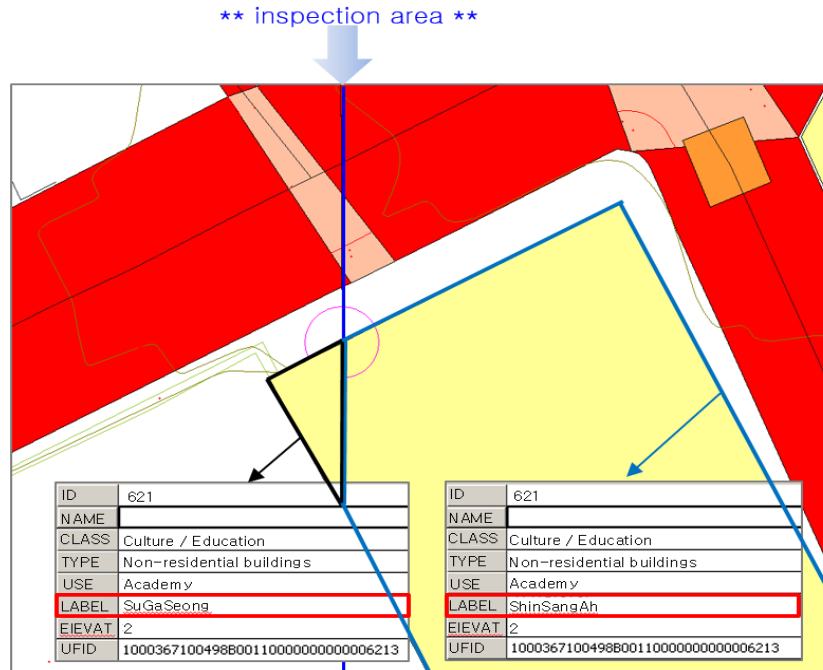


Figure 39: Centerline property mismatch