



downsize of information

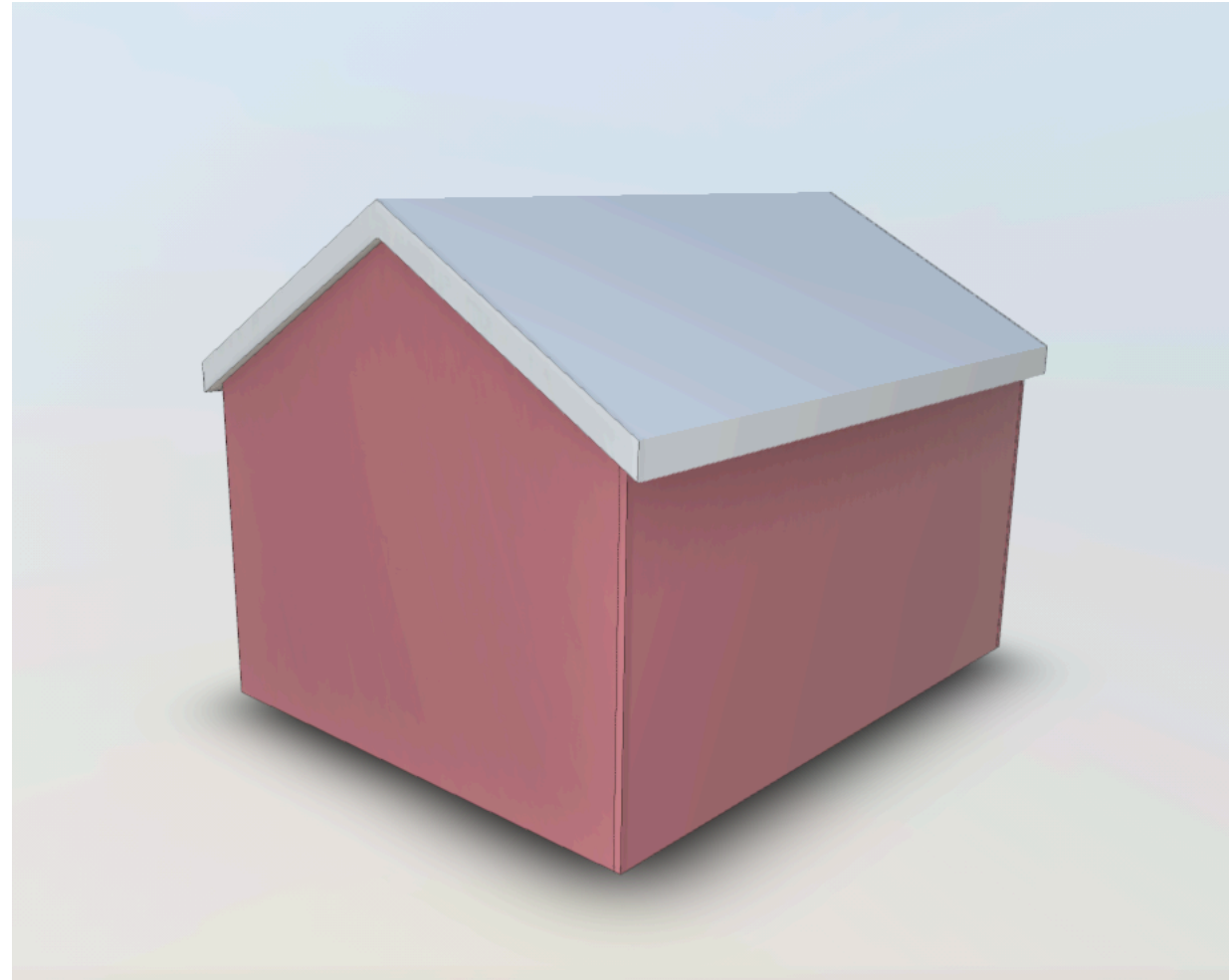
manual checking

duration process



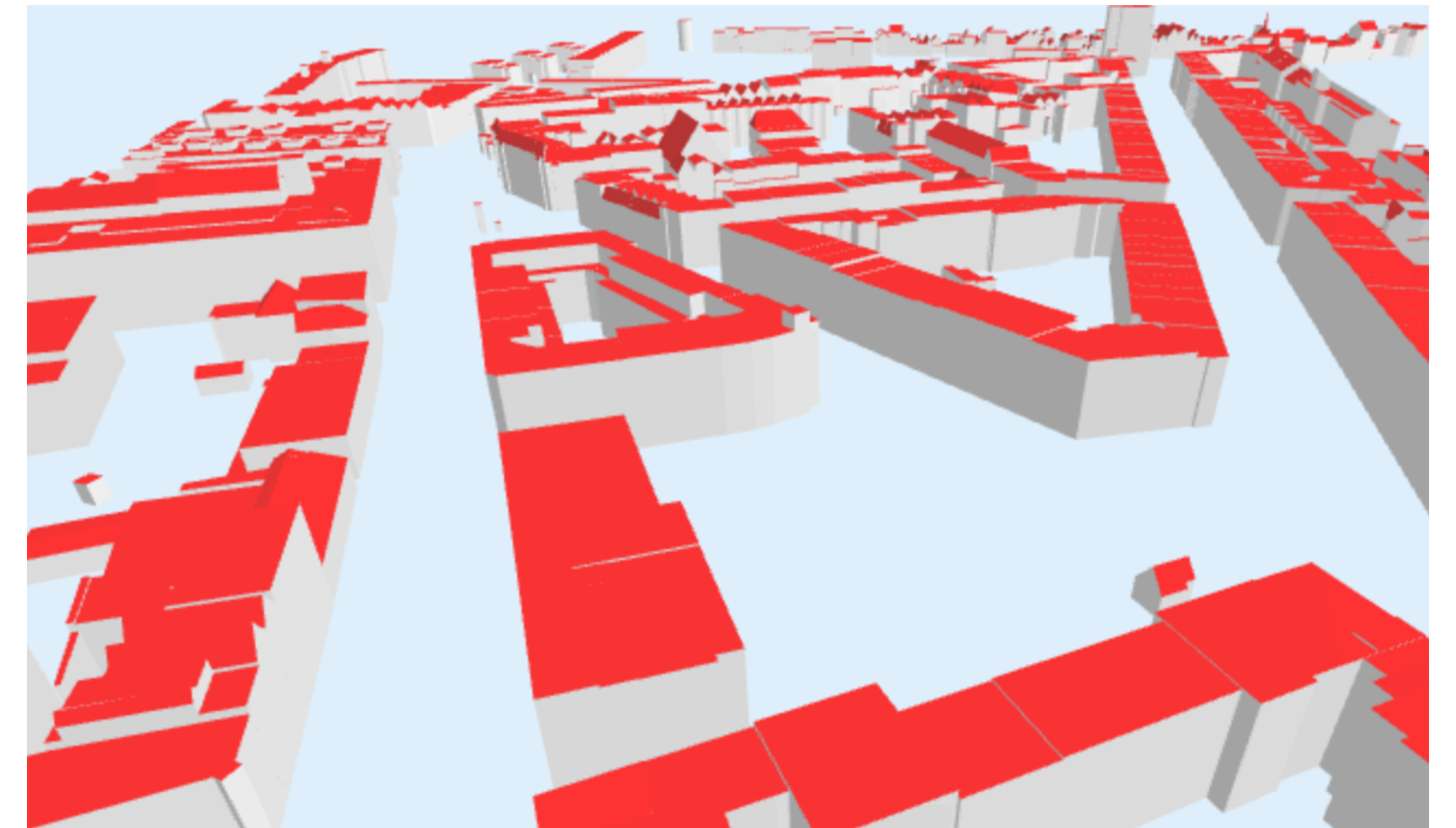
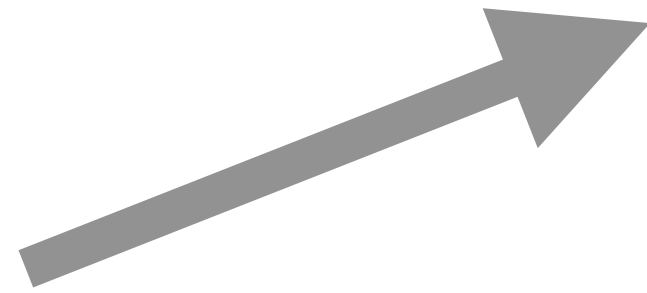
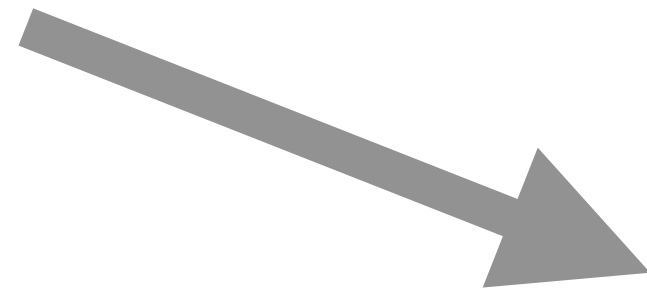
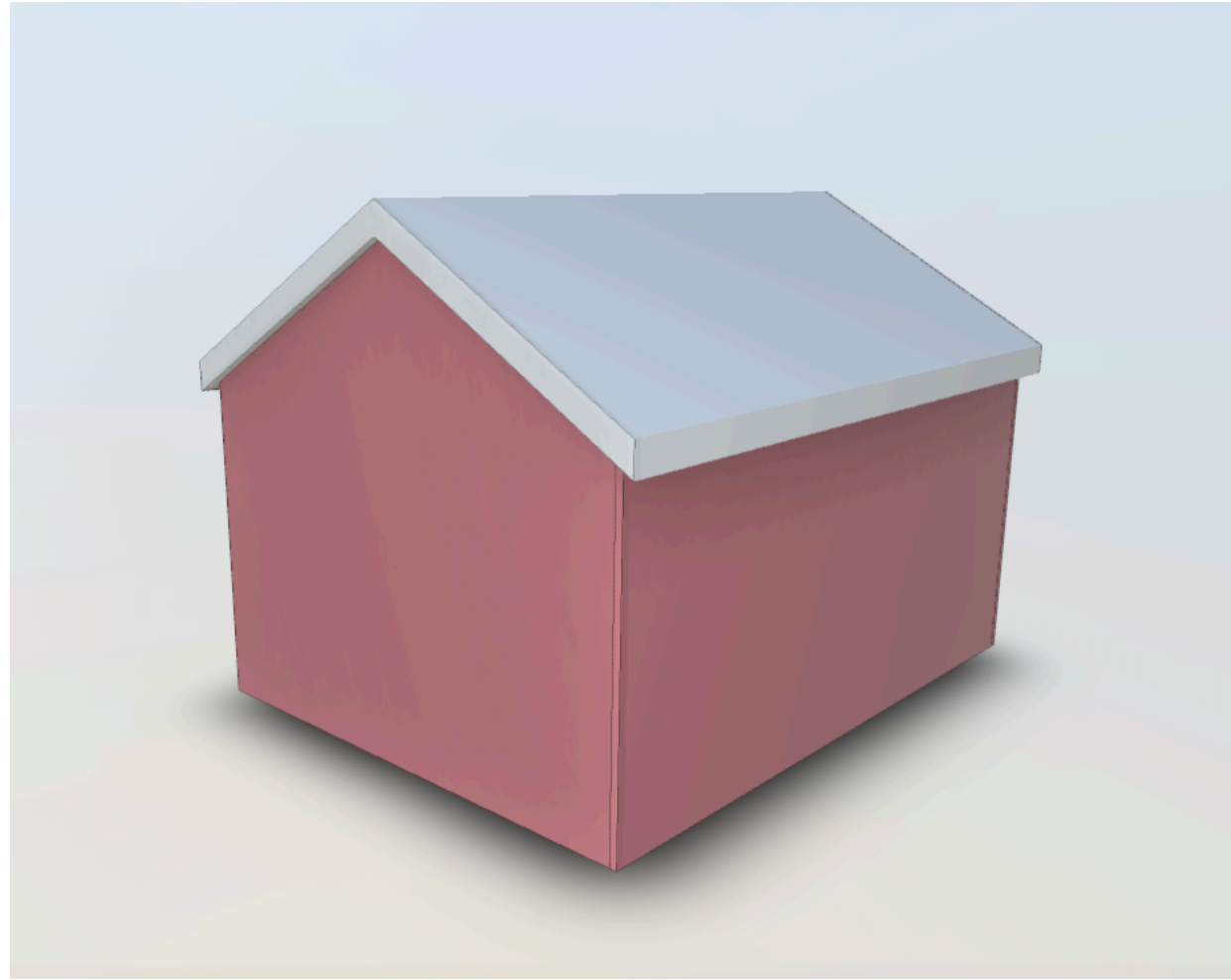
- Large areas
- More detailed
- SOR
- CityJSON

BAG: <https://www.geobasisregistraties.nl/basisregistraties/adressen-en-gebouwen>



- Single projects
- More context
- Simple BIM created
- IFC





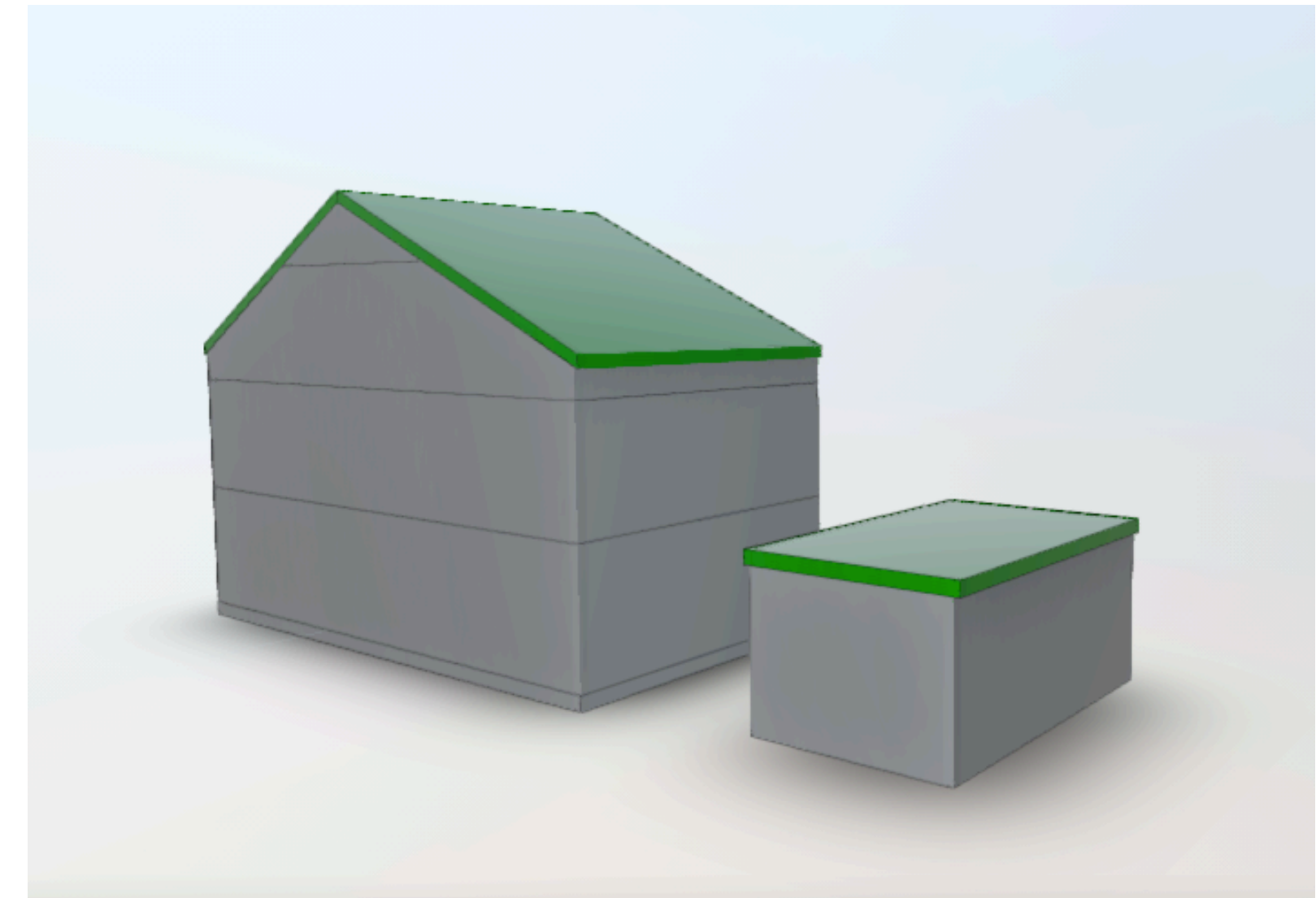
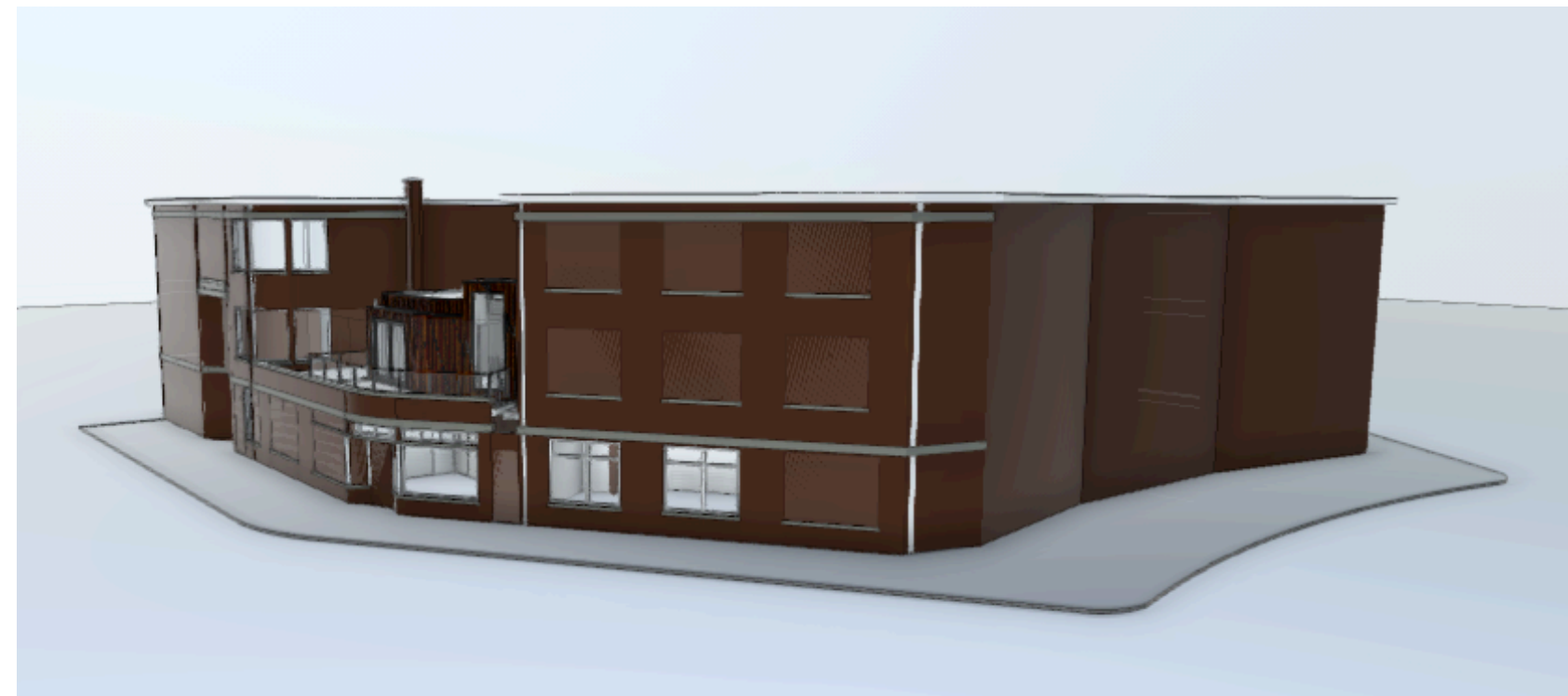
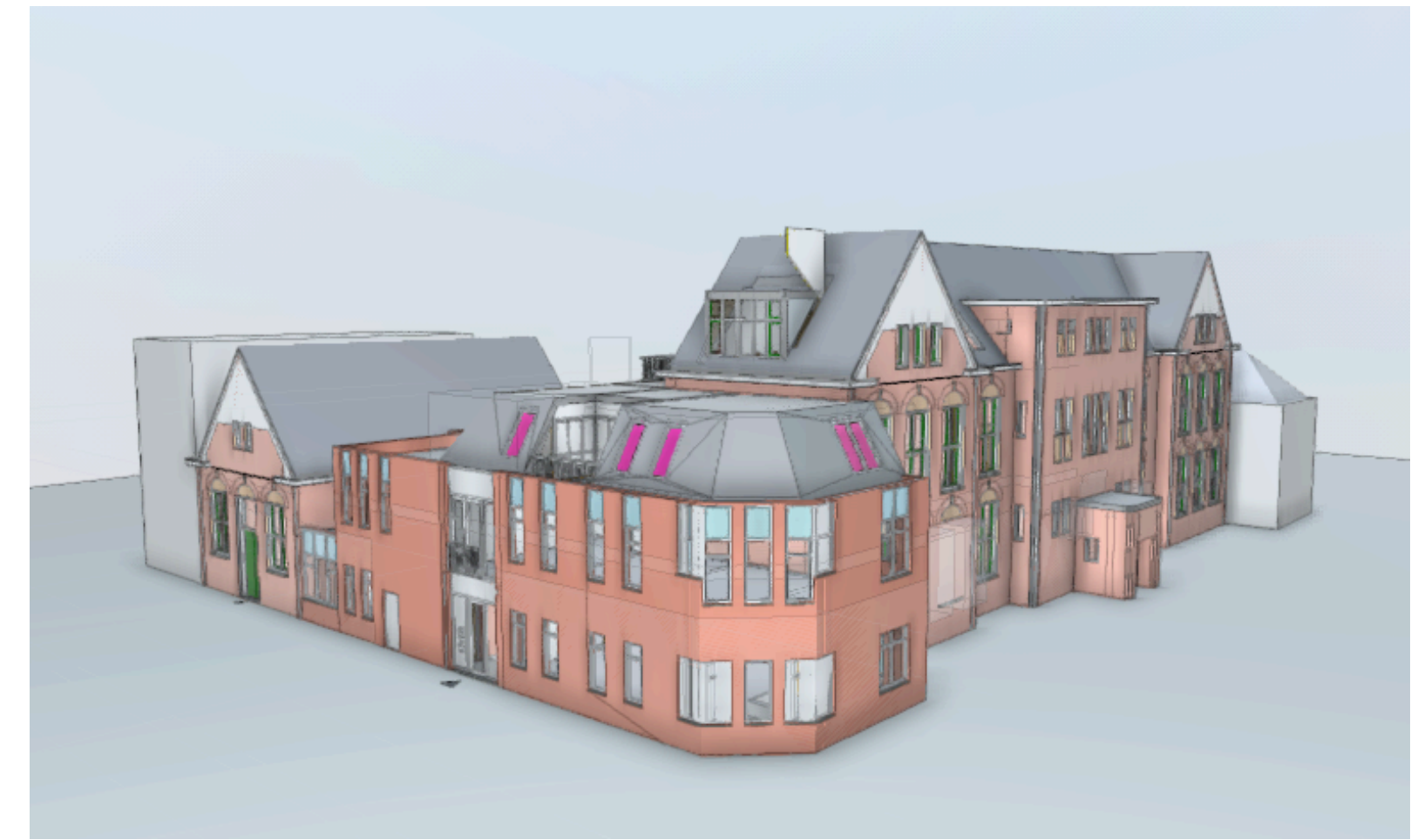
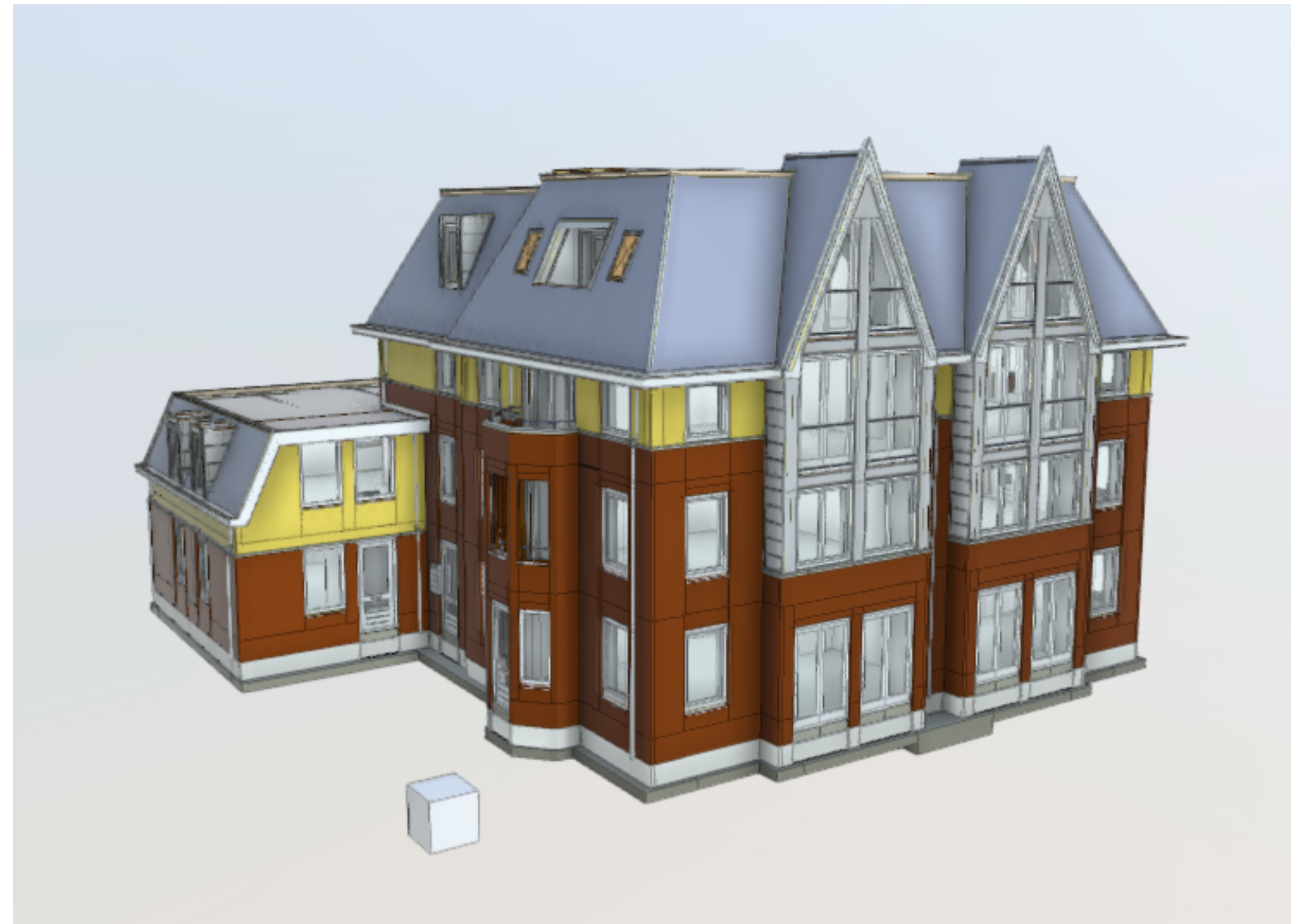
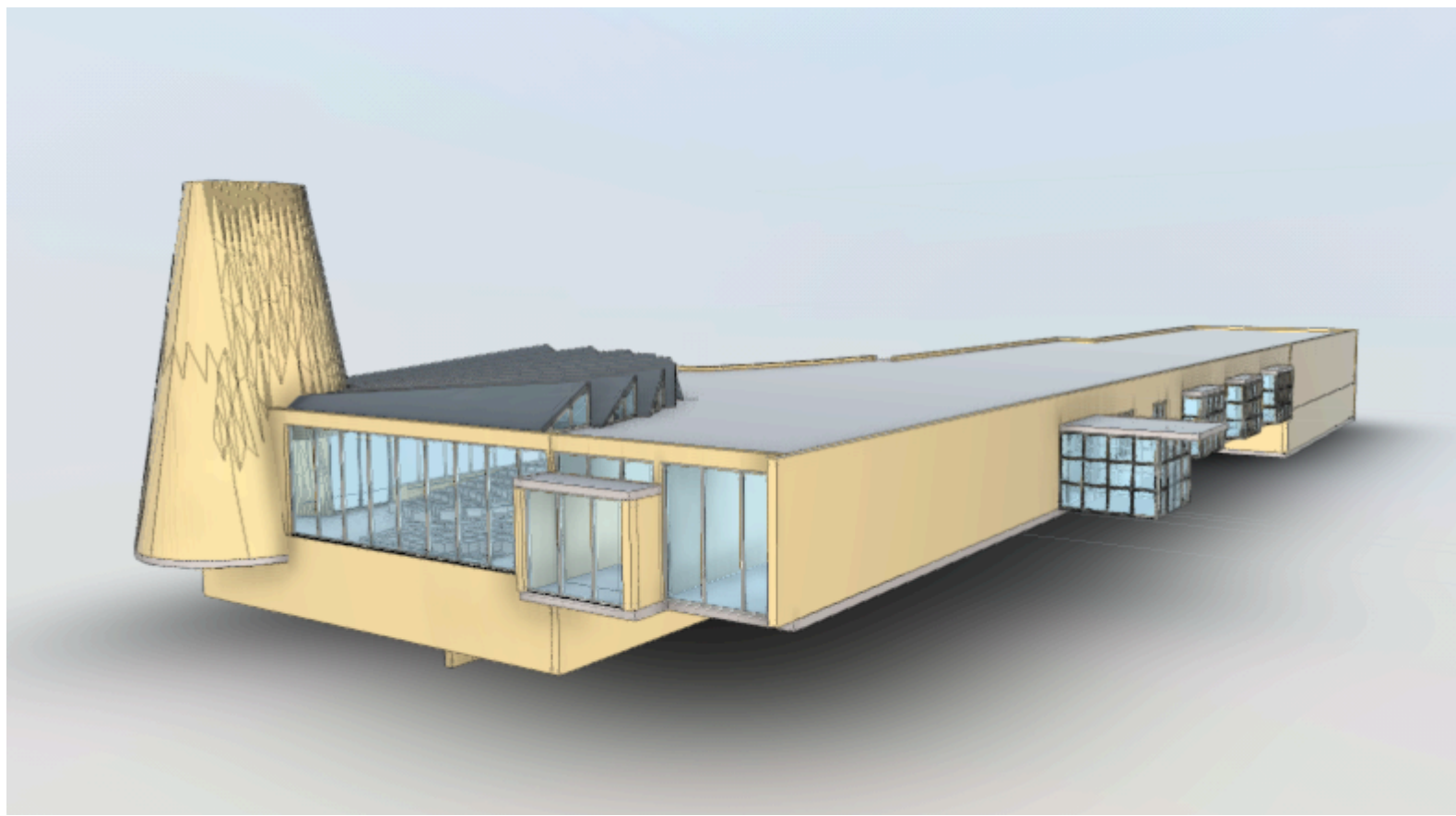
Delfshaven, Rotterdam: <https://www.cityjson.org/datasets/>

**How could BIM support the digital building permit process in the Netherlands?**

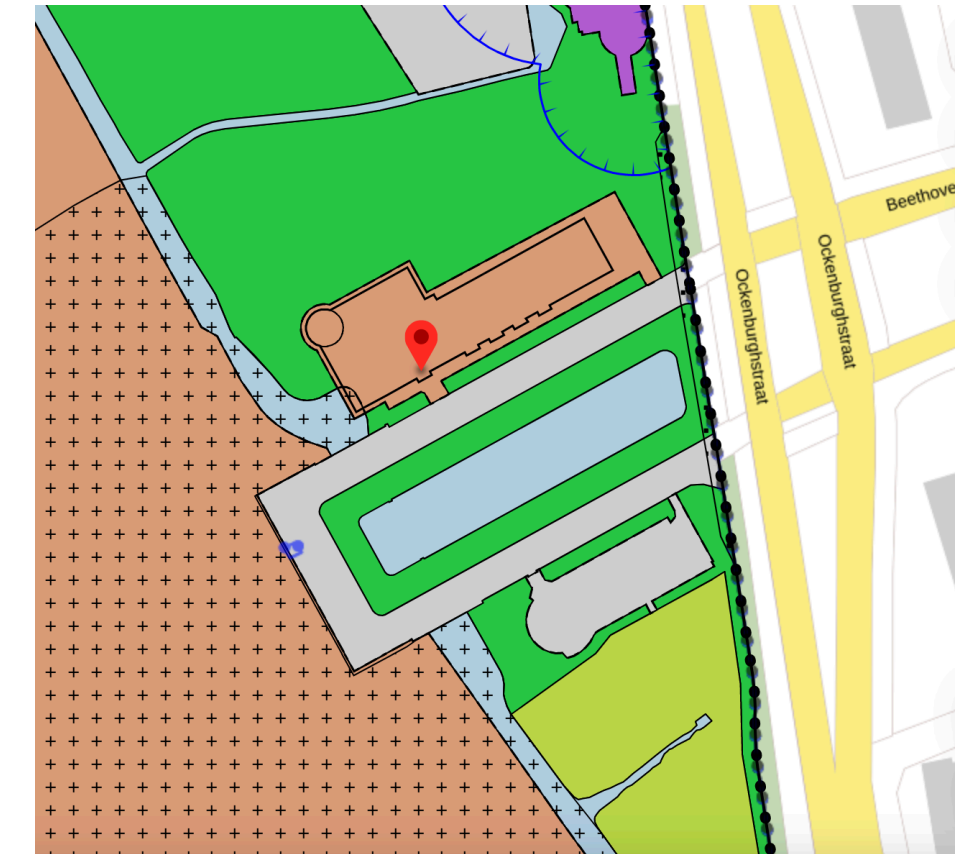
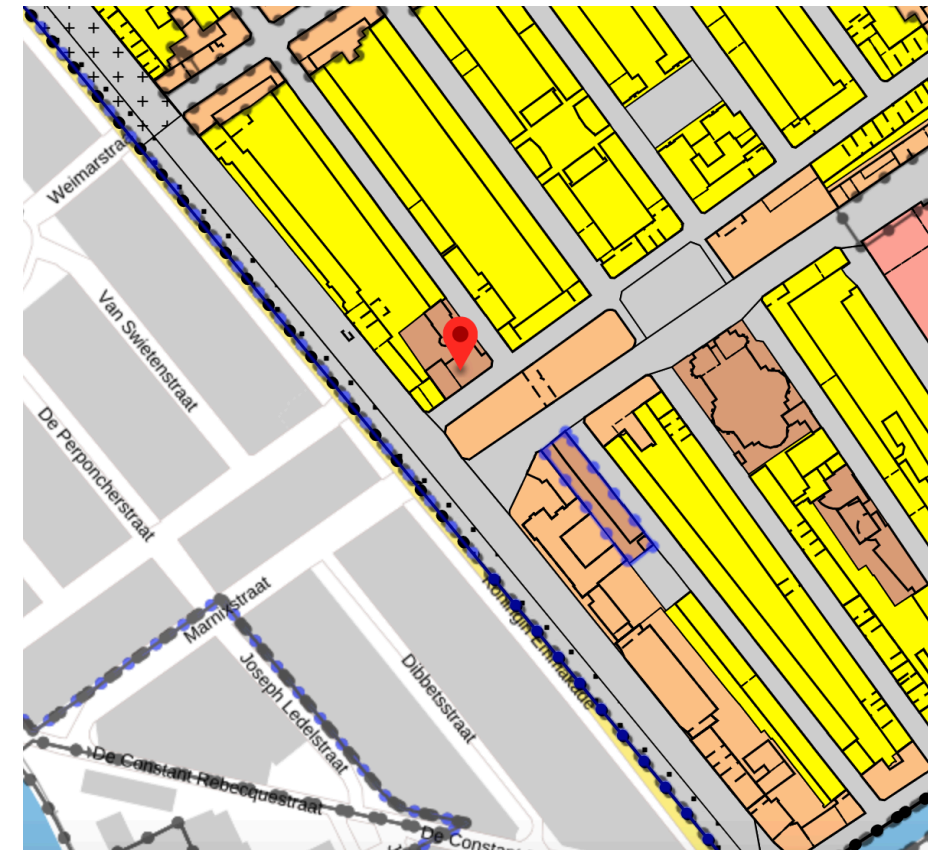
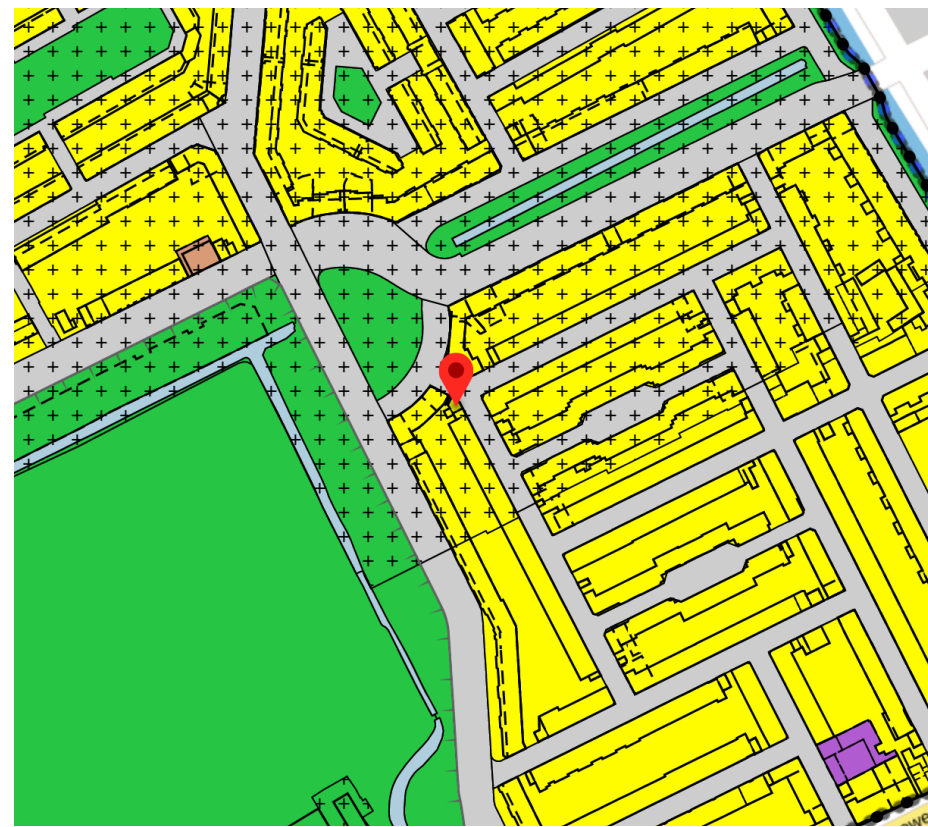
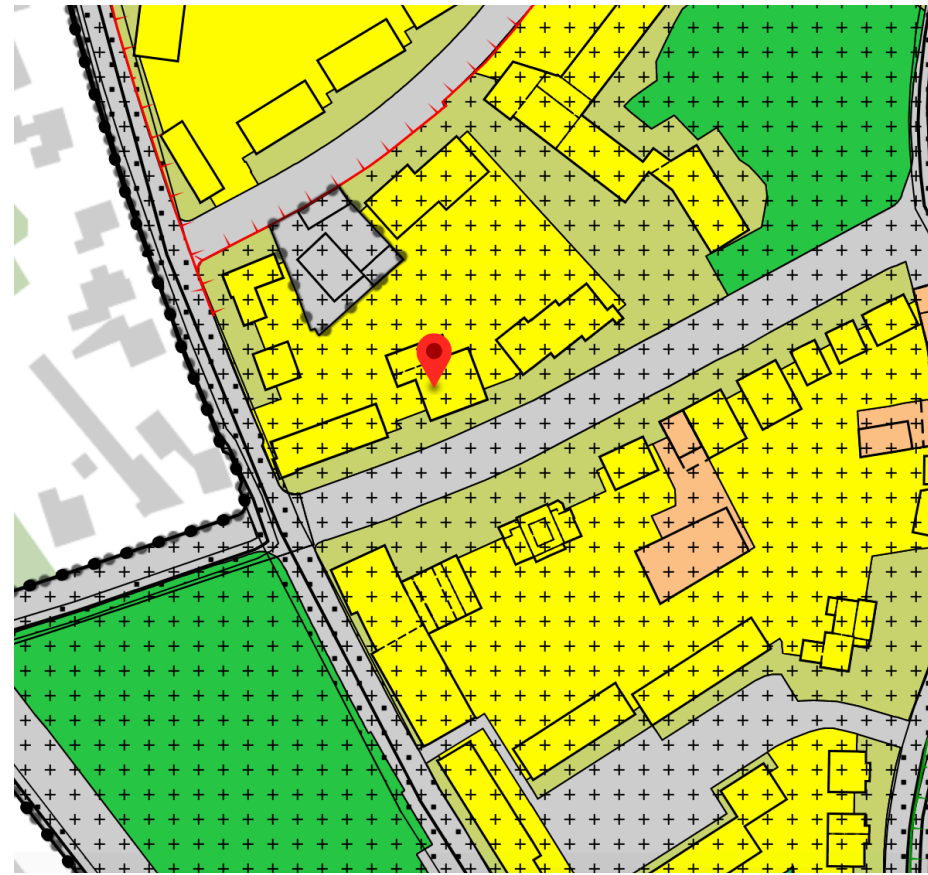


1. Which information from the BIM and the SOR is needed for the digital building permit process?
2. Which required information in the BIM and the SOR is present? Which required information is absent?
3. Which information from the BIM and the SOR should be converted regarding the digital building permit process?
4. How to perform a conversion between BIM and SOR supporting the digital building permit process?

**Which information from the BIM and the  
SOR is needed for the digital building  
permit process?**



**Which information from the BIM and the SOR is needed for the digital building permit process?**



*Land use plans (in Dutch: bestemmingsplannen)*

**Which information from the BIM and the SOR is needed for the digital building permit process?**

**Maximum building height**  
**Maximum gutter height**

Which information from the BIM and the SOR is needed for the digital building permit process?



roof

wall

road

ground height

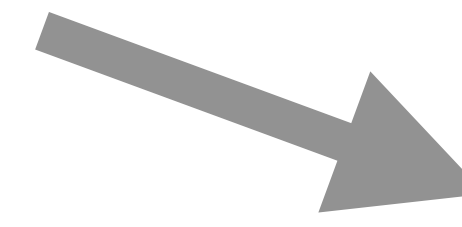
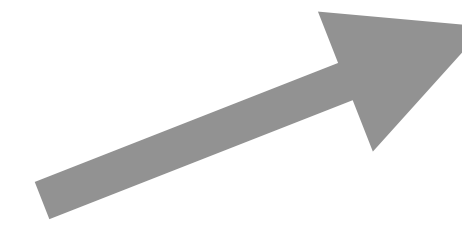
**Which information from the BIM and the SOR is needed for the digital building permit process?**

roof

wall

road

ground height



Which information from the BIM and the SOR is needed for the digital building permit process?

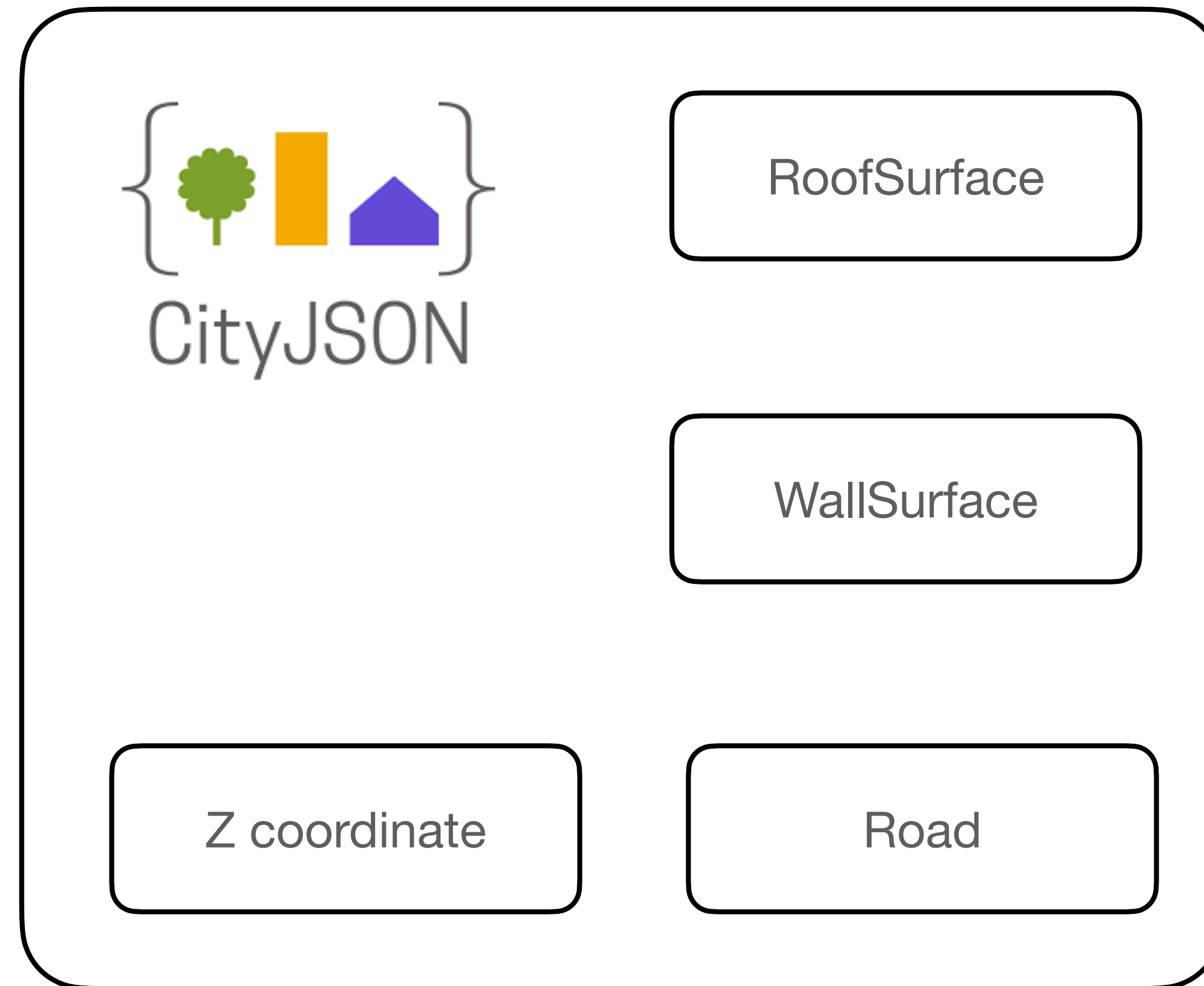


IfcRoof

IfcWall

Which information from the BIM and the SOR is needed for the digital building permit process?





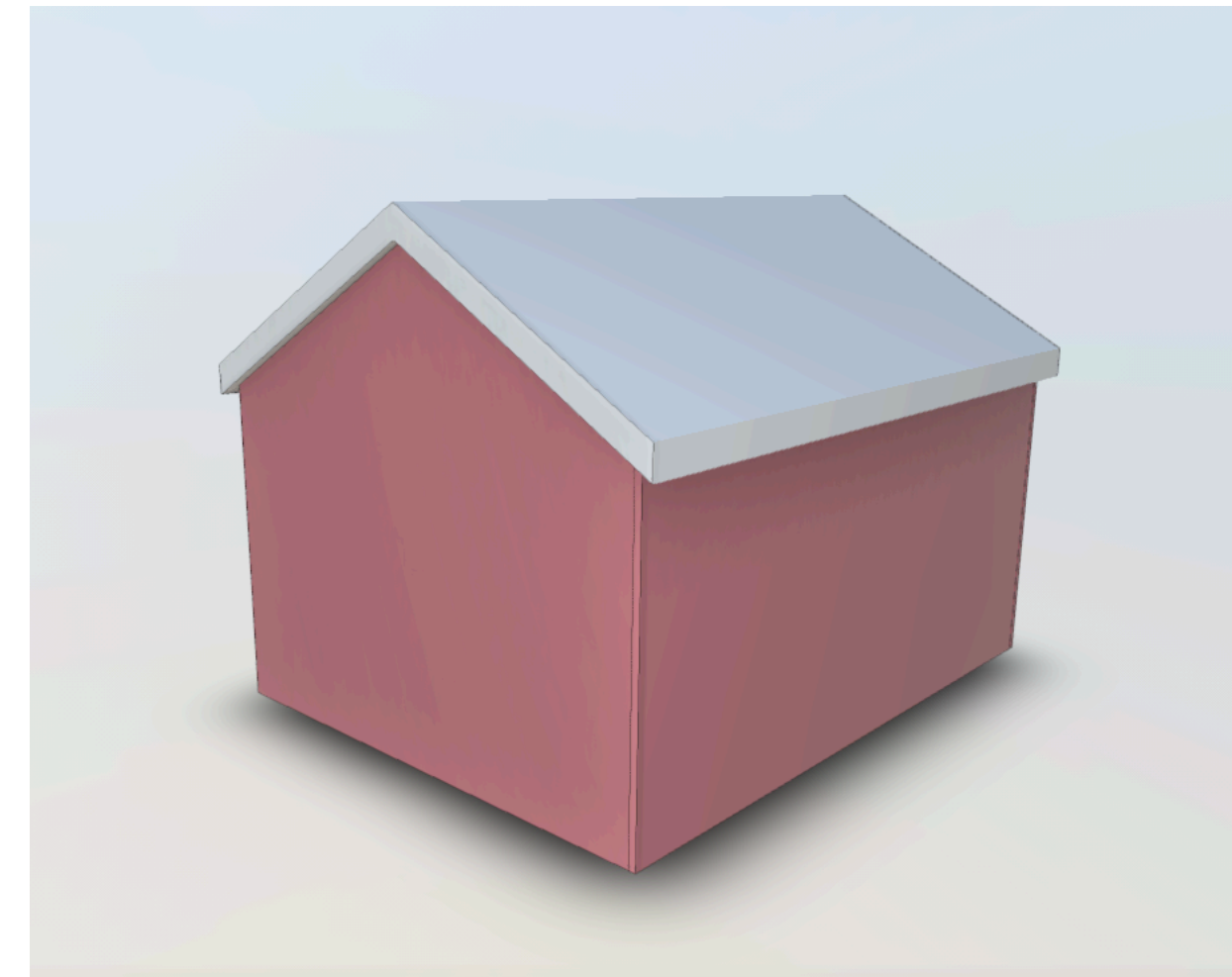
**Which information from the BIM and the SOR is needed for the digital building permit process?**

**Which information from the BIM and the SOR is needed for the digital building permit process?**

**Which required information in the BIM and the SOR is present? Which required information is absent?**

IfcRoof

IfcWall



**Which required information in the BIM and the SOR is present? Which required information is absent?**

RoofSurface

WallSurface

Road

Z coordinate



SOR: <https://www.digitaleoverheid.nl/nieuws/doorontwikkeling-van-basisregistraties-in-samenhang-dis-geo/>

**Which required information in the BIM and the SOR is present? Which required information is absent?**

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**Which information from the BIM and the SOR should be converted regarding the digital building permit process?**

IfcRoof



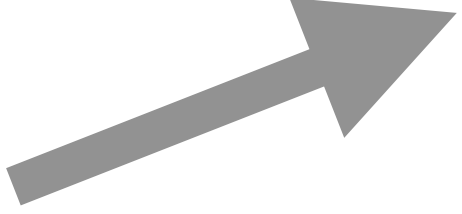
IfcWall



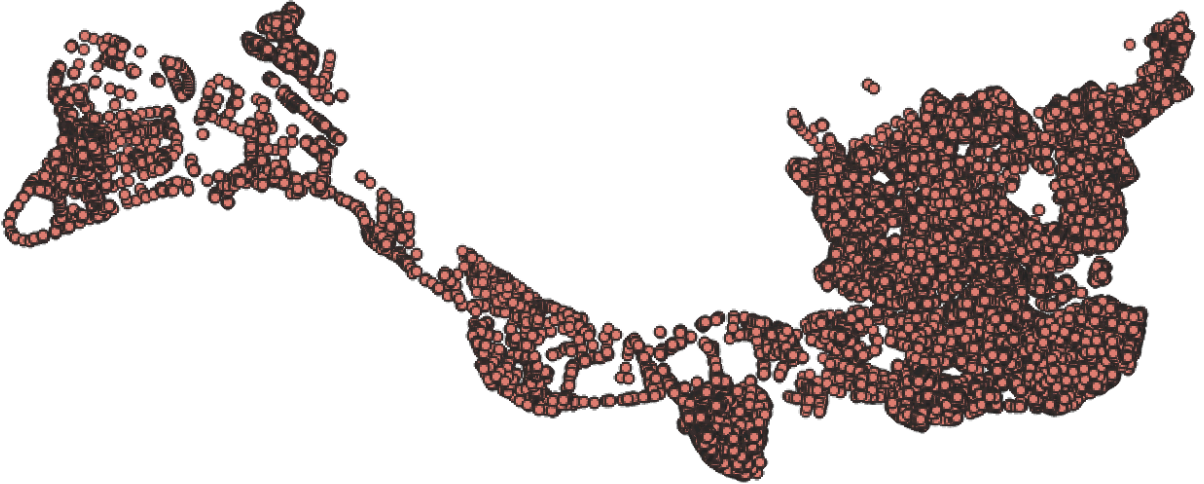
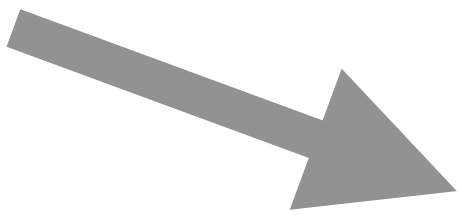
**Which information from the BIM and the SOR should be converted regarding the digital building permit process?**



Peil

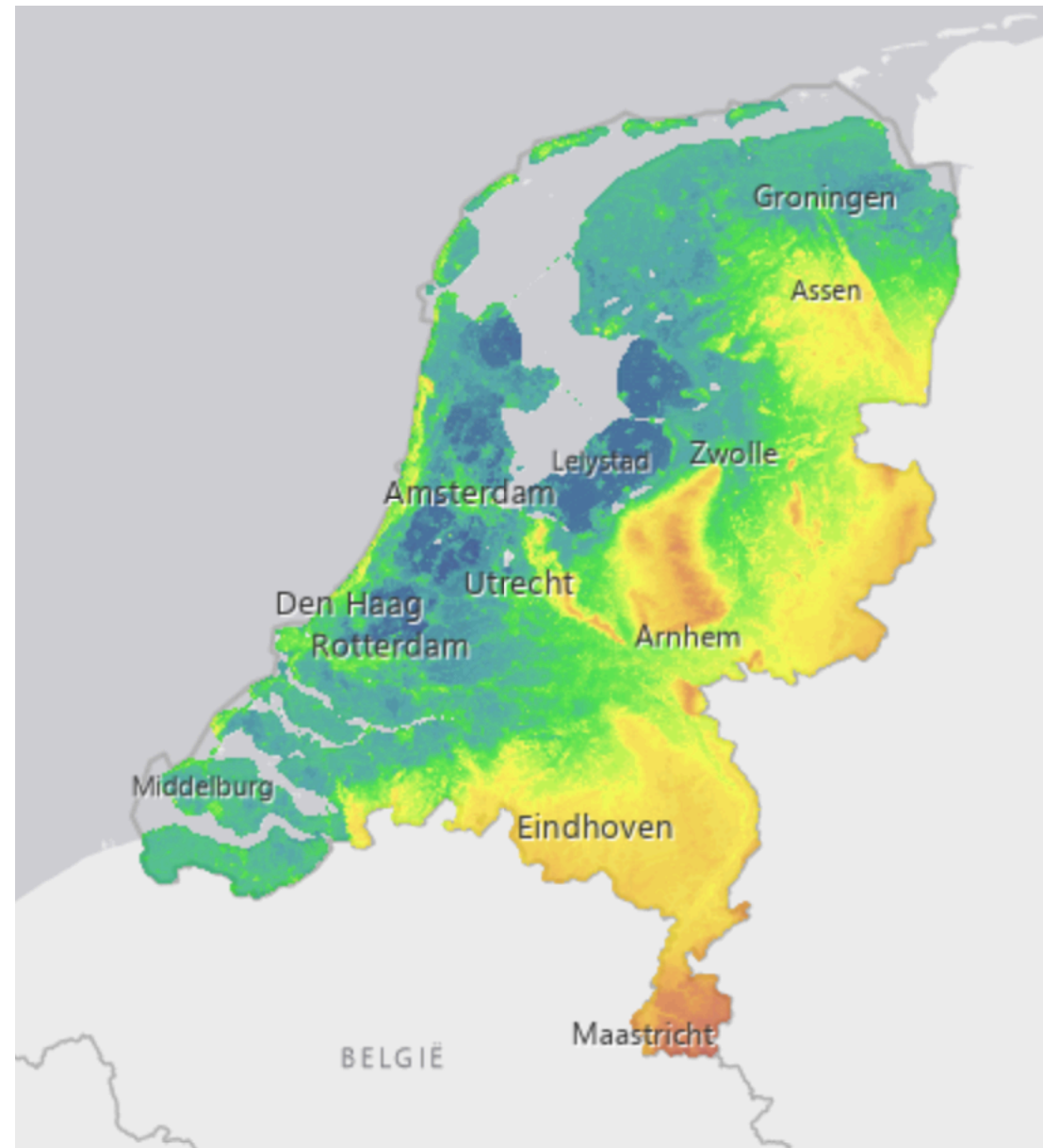


3D Basisvoorziening: <https://www.pdok.nl/3d-basisvoorziening>



Which information from the BIM and the SOR should be converted regarding the digital building permit process?

Ground height



AHN viewer: <https://www.ahn.nl/ahn-viewer>

**Which information from the BIM and the SOR should be converted regarding the digital building permit process?**

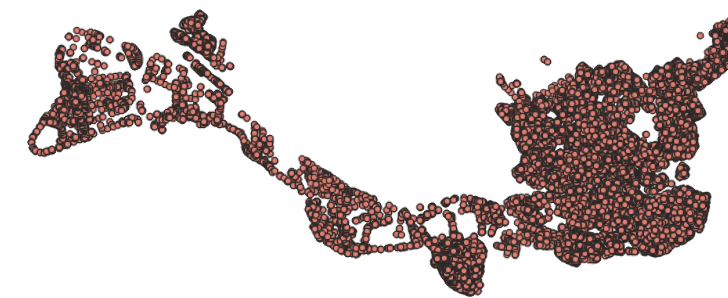
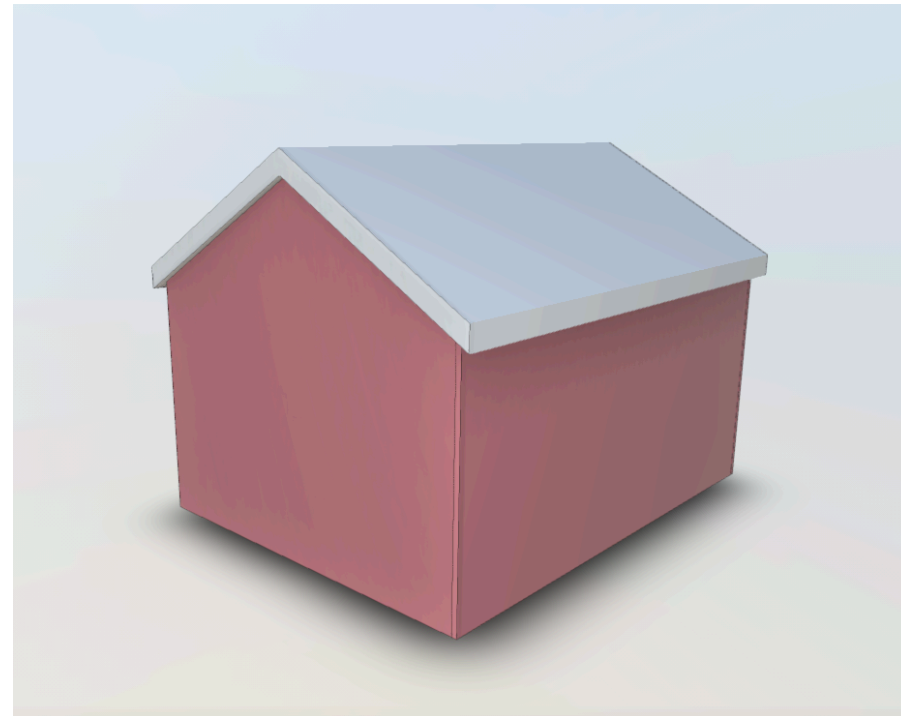
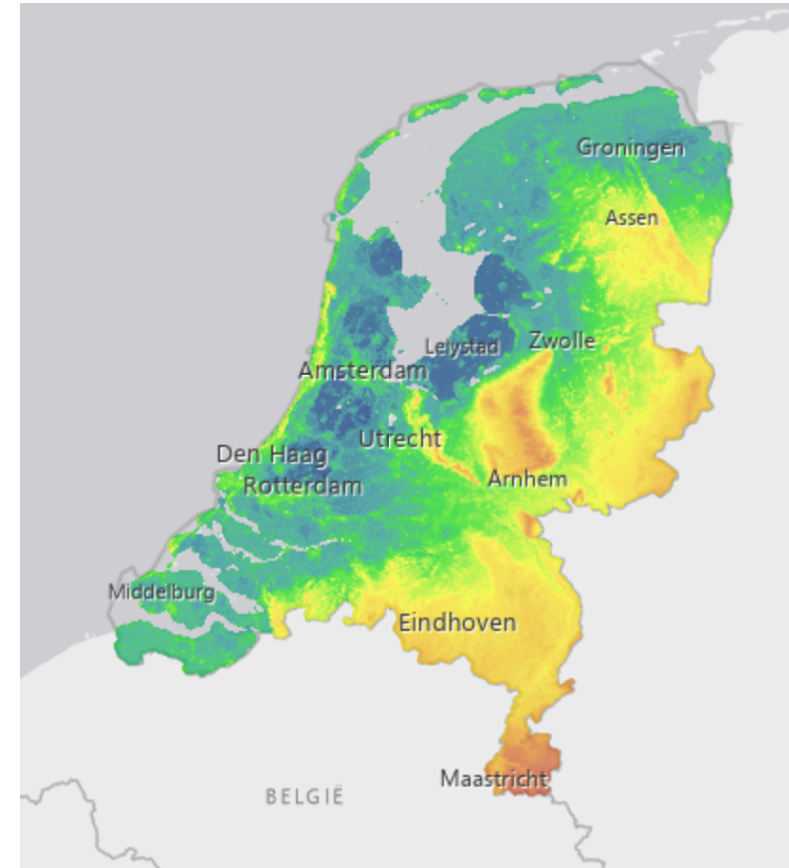
**Which information from the BIM and the SOR should be converted regarding the digital building permit process?**

**How to perform a conversion between BIM  
and SOR supporting the digital building  
permit process?**



*Assigning real-world coordinates to BIMs [Ohori et al., 2018]*

**How to perform a conversion between BIM and SOR supporting the digital building permit process?**



How to perform a conversion between BIM and SOR supporting the digital building permit process?

# Conversion

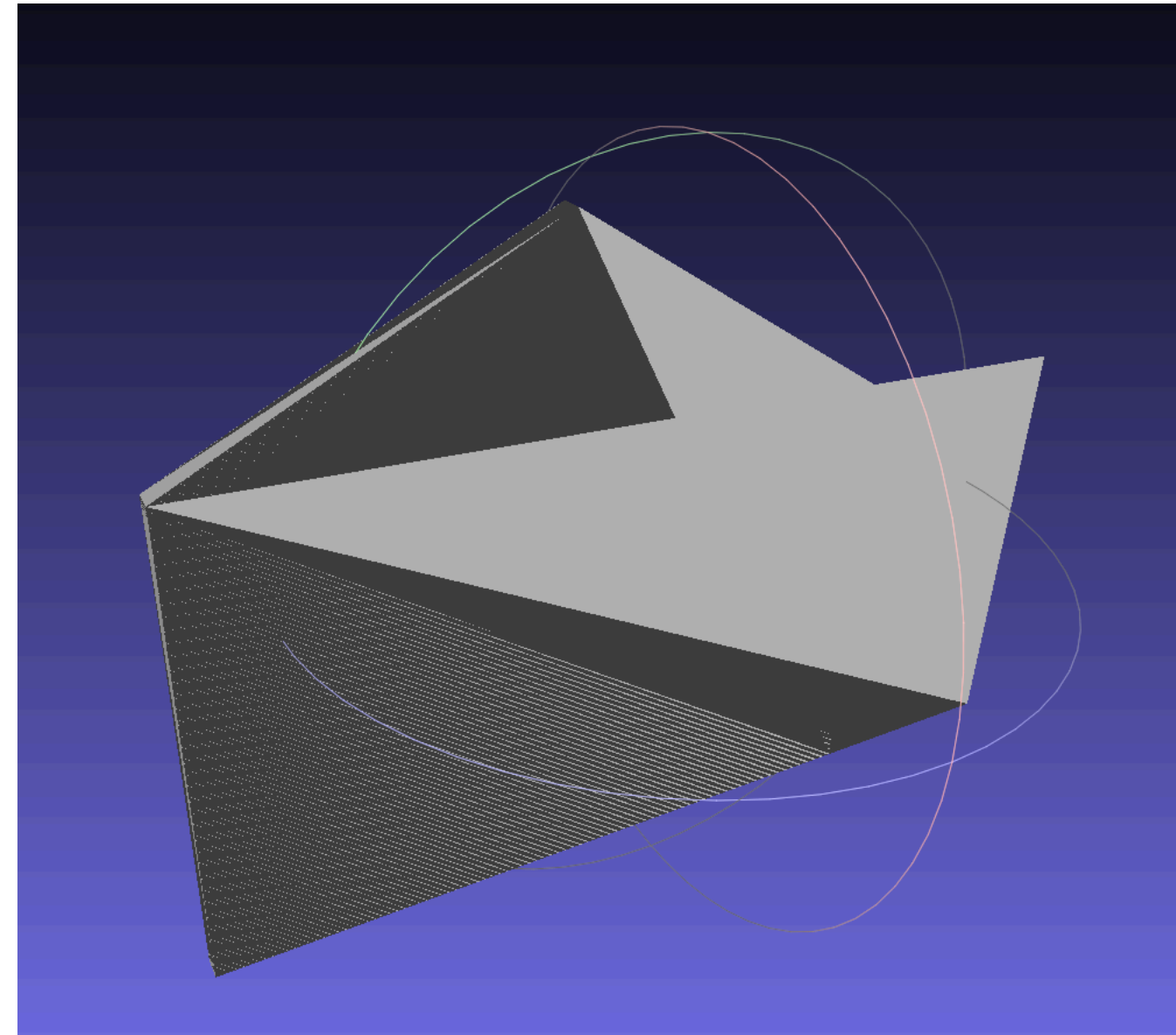
Requirements for 3D city model

Required information from BIM

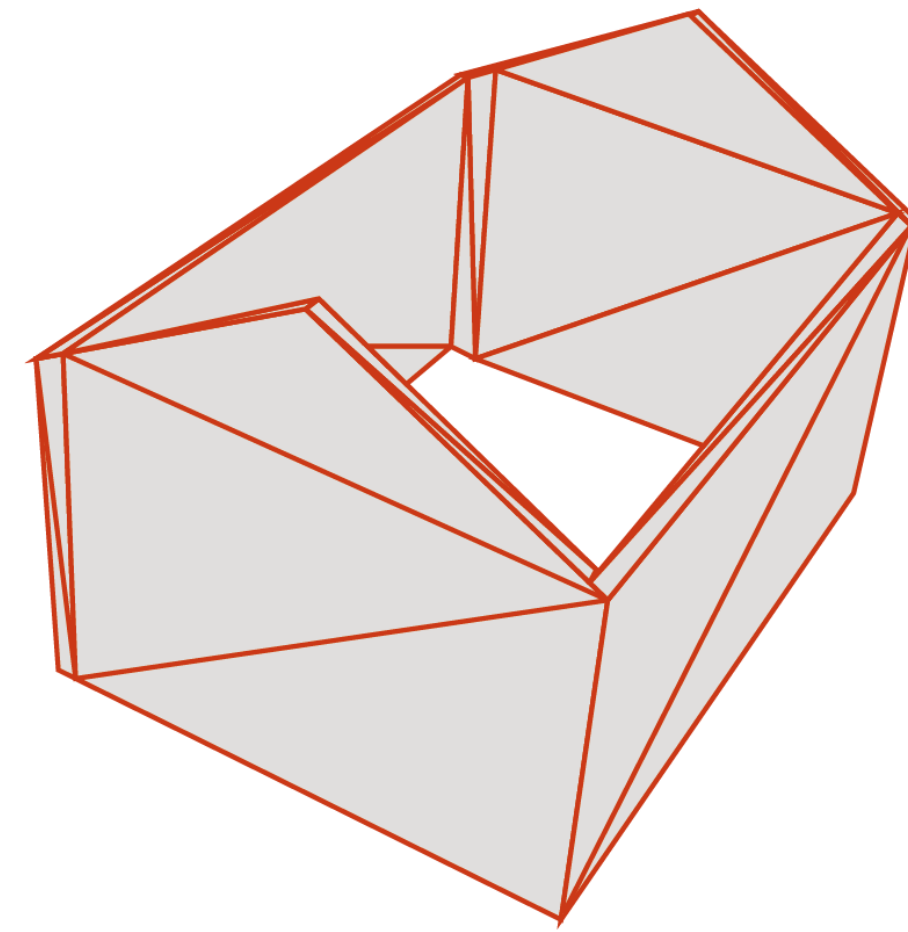
# Walls

How to perform a conversion between BIM and SOR supporting the digital building permit process?

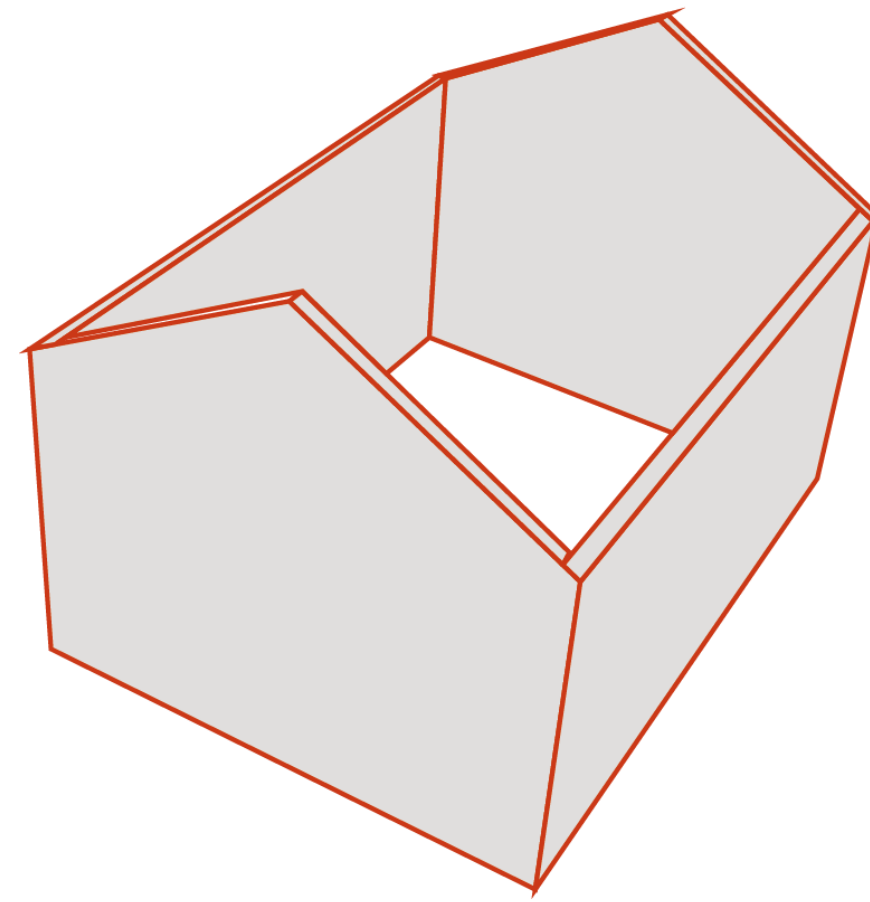




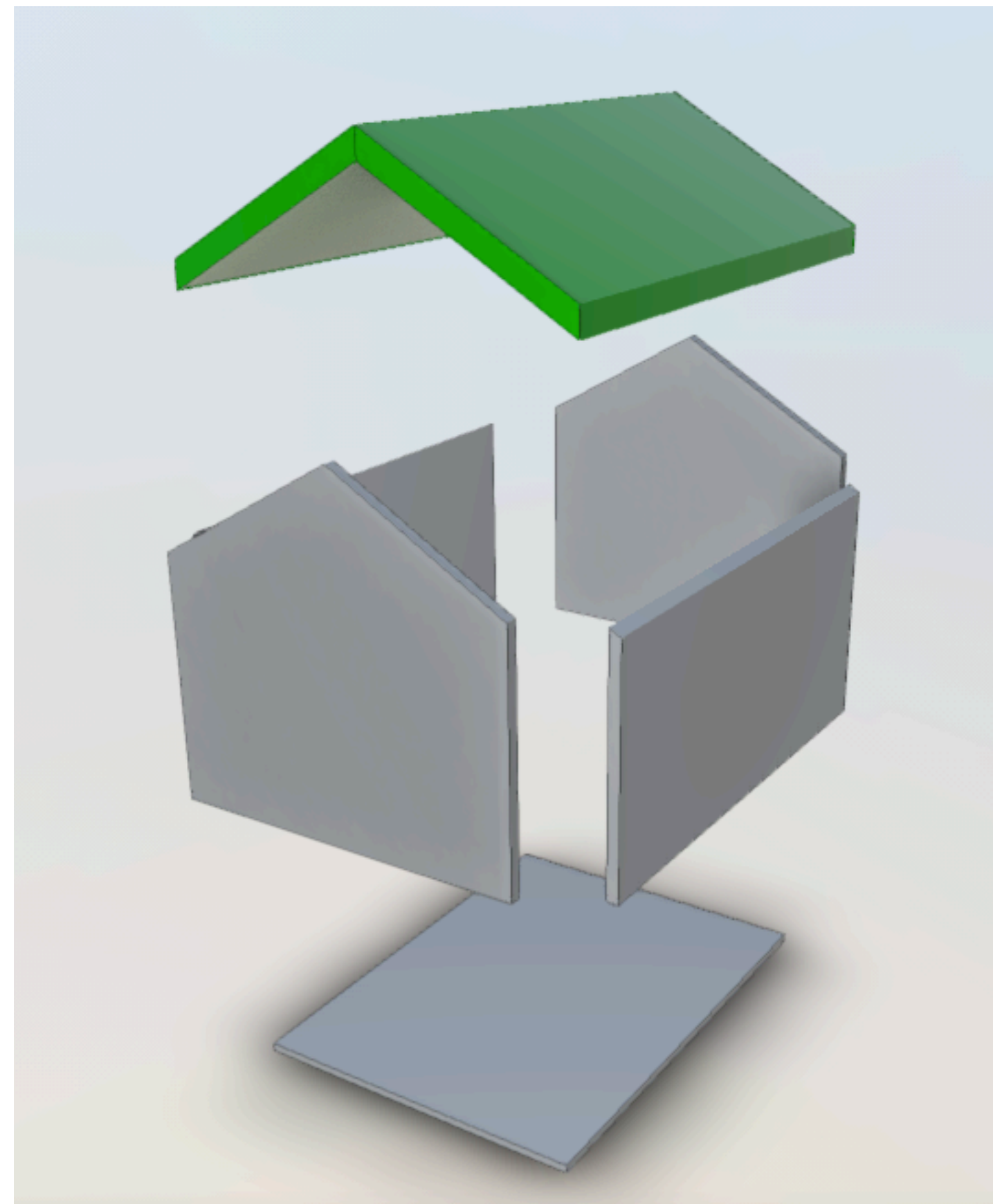
**How to perform a conversion between BIM and SOR supporting the digital building permit process?**



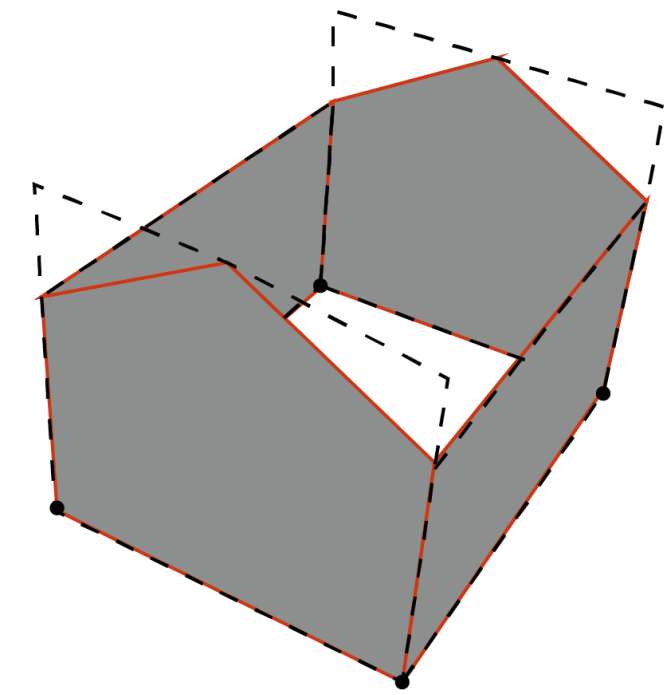
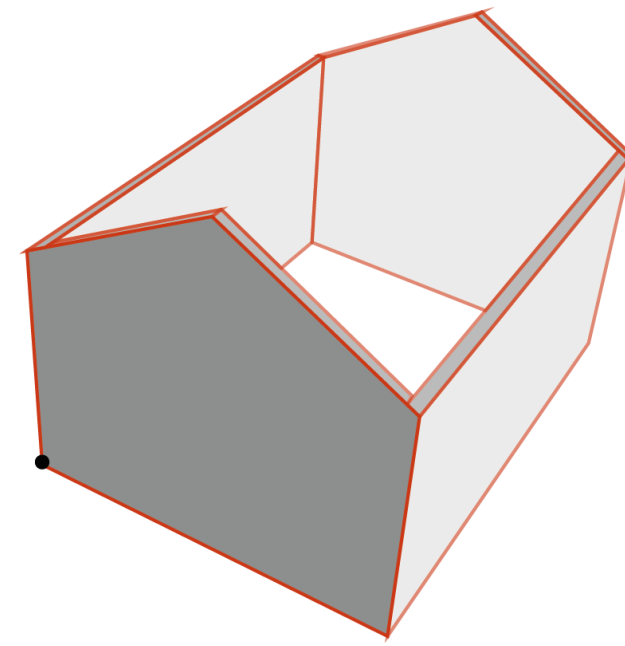
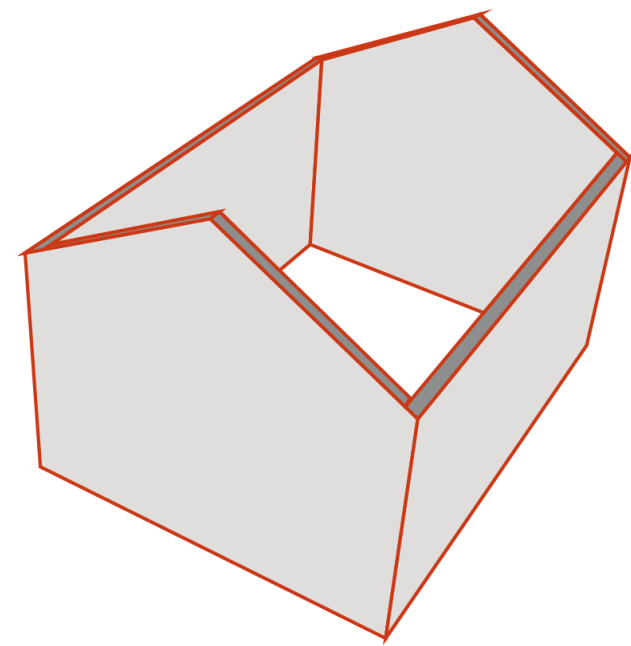
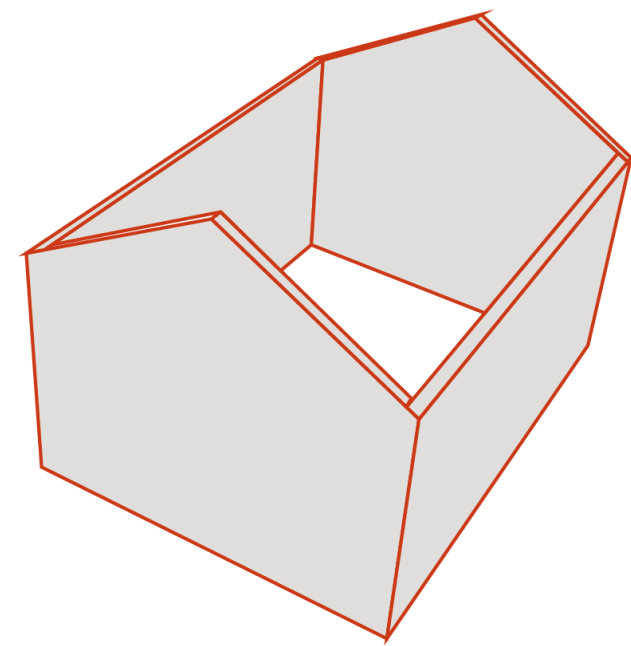
**How to perform a conversion between BIM and SOR supporting the digital building permit process?**



**How to perform a conversion between BIM and SOR supporting the digital building permit process?**

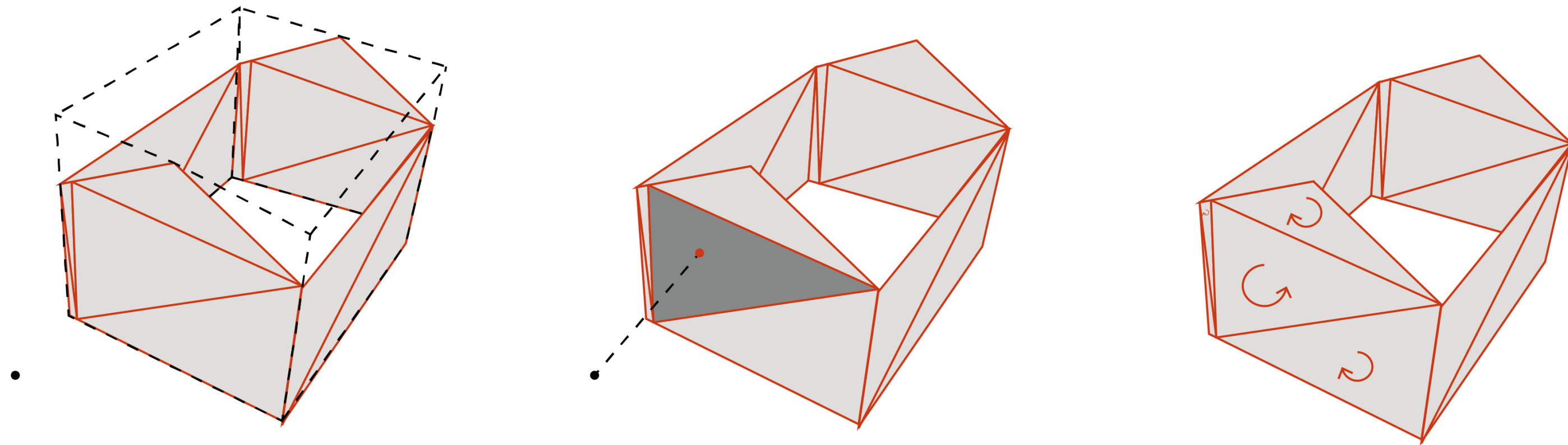


**How to perform a conversion between BIM and SOR supporting the digital building permit process?**

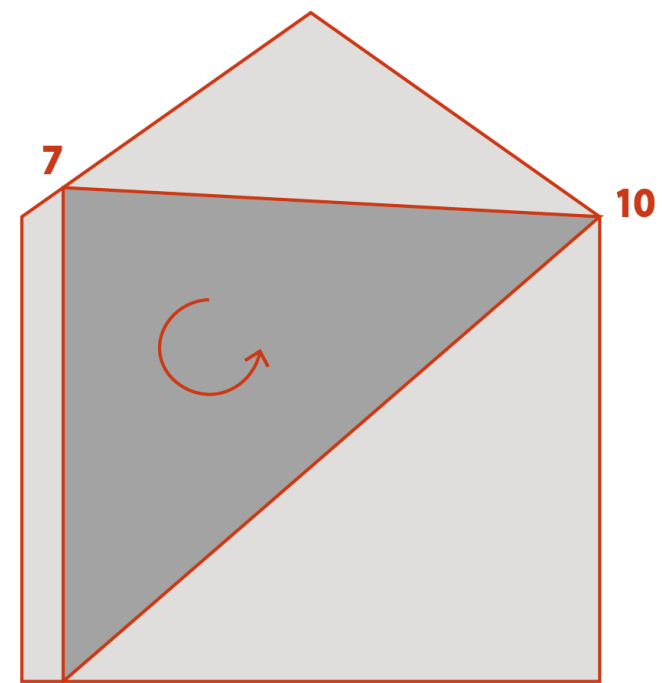
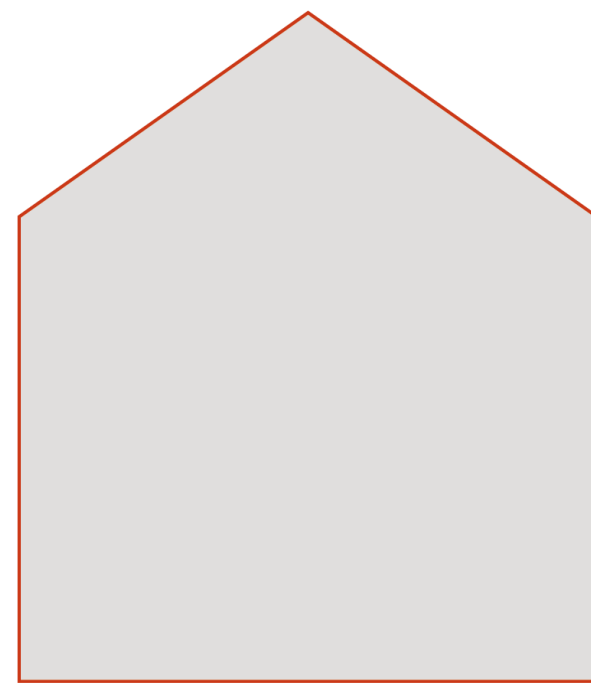


**... and the ground surface**

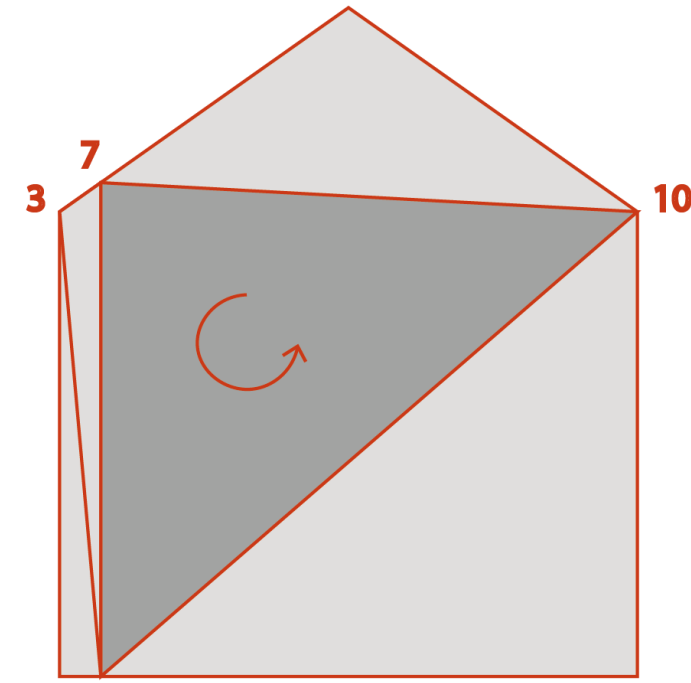
How to perform a conversion between BIM and SOR supporting the digital building permit process?



**How to perform a conversion between BIM and SOR supporting the digital building permit process?**

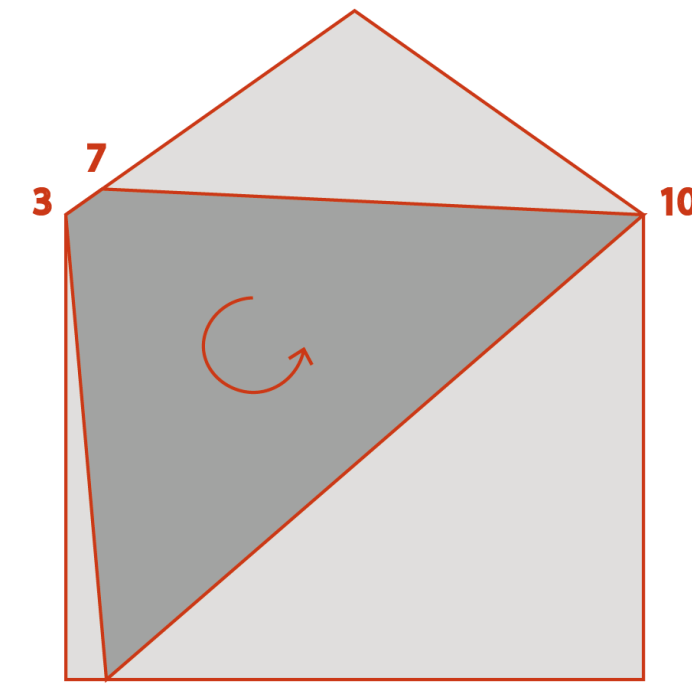


brep\_surface = [7, 5, 10]



brep\_surface = [7, 5, 10]

triangle = [3, 5, 7]



brep\_surface = [7, 3, 5, 10]

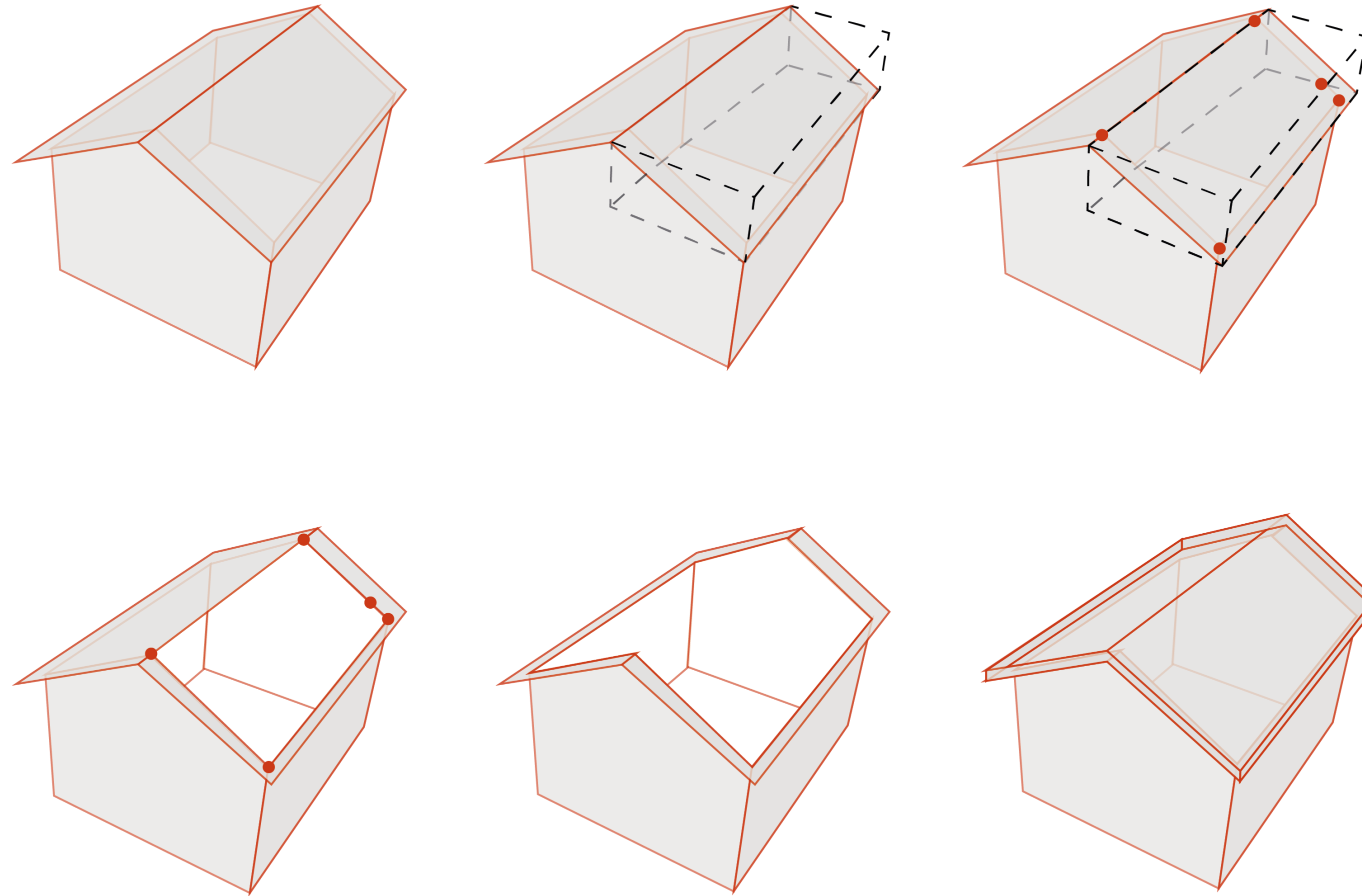
How to perform a conversion between BIM and SOR supporting the digital building permit process?

# Roof

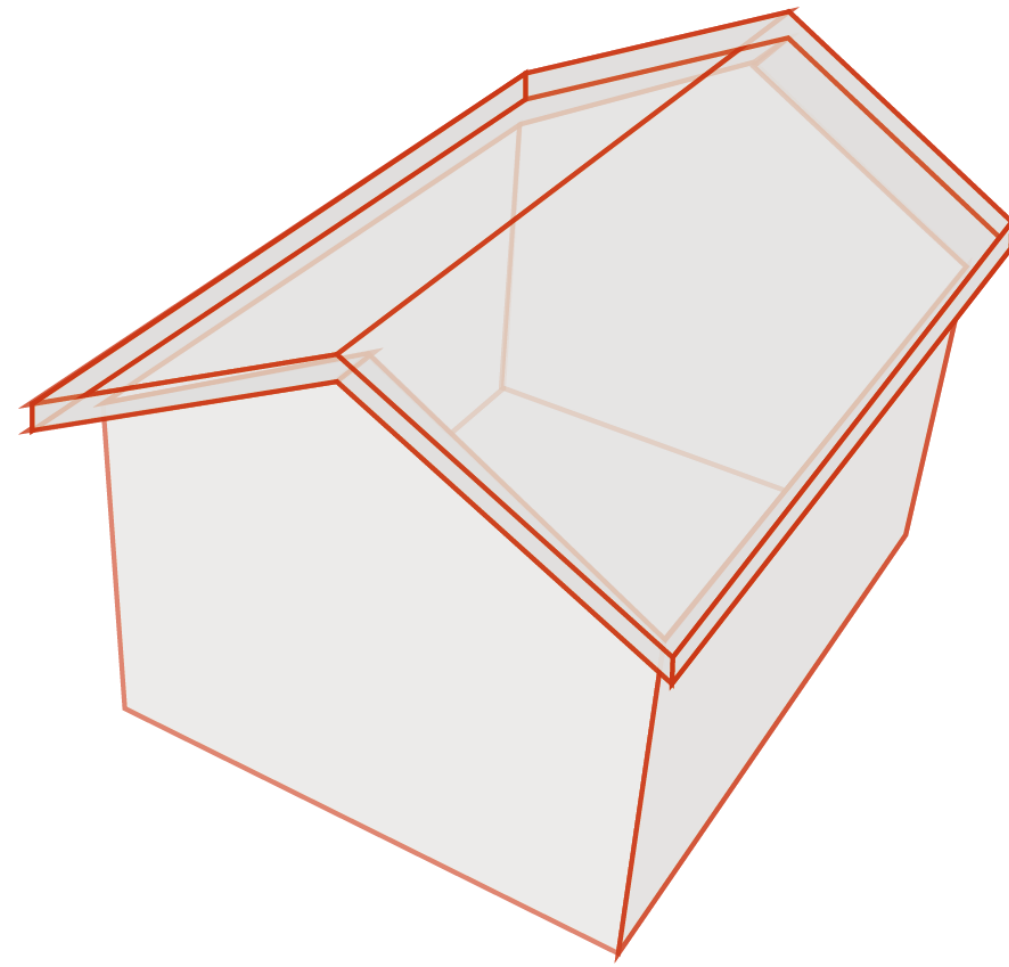


# Merging walls and roof

How to perform a conversion between BIM and SOR supporting the digital building permit process?



**How to perform a conversion between BIM and SOR supporting the digital building permit process?**



**How to perform a conversion between BIM and SOR supporting the digital building permit process?**

# Coordinates

How to perform a conversion between BIM and SOR supporting the digital building permit process?



**WGS84 (DMS) → WGS84 (DD) → transformation → RD**

How to perform a conversion between BIM and SOR supporting the digital building permit process?

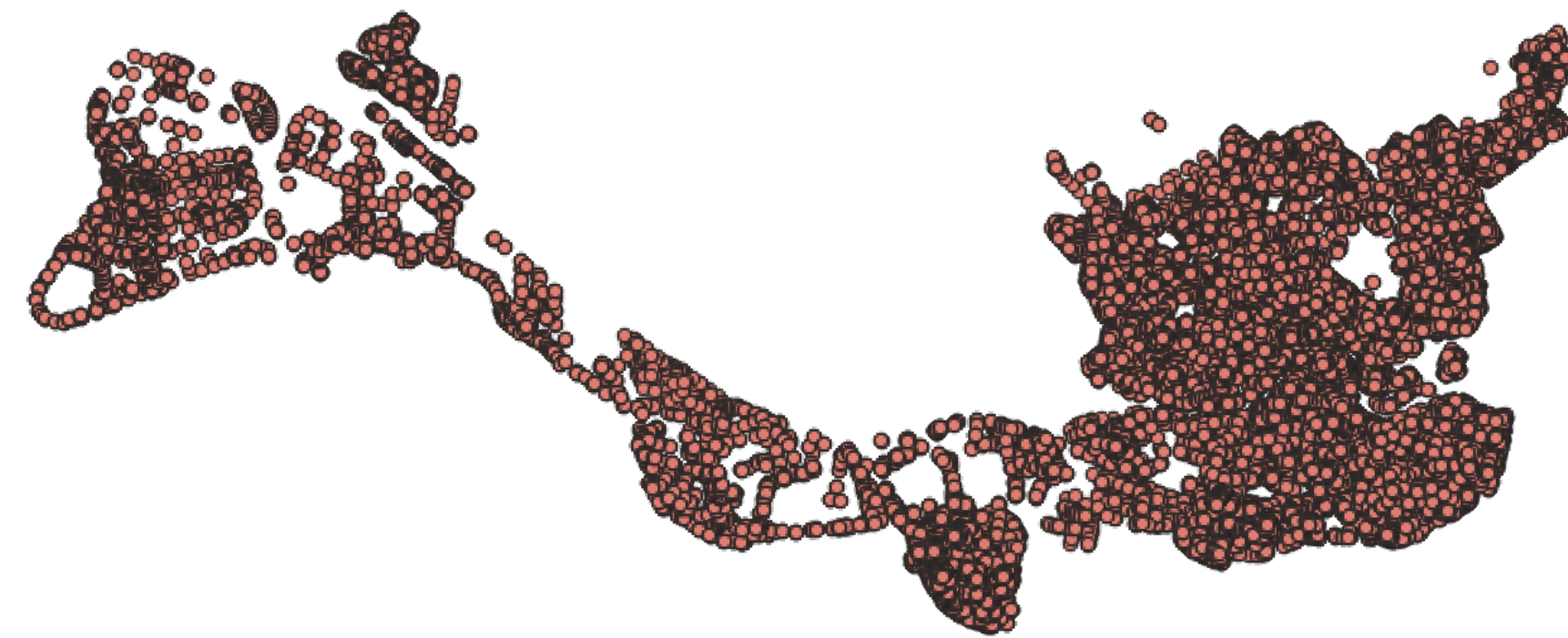
# Peil

**How to perform a conversion between BIM and SOR supporting the digital building permit process?**



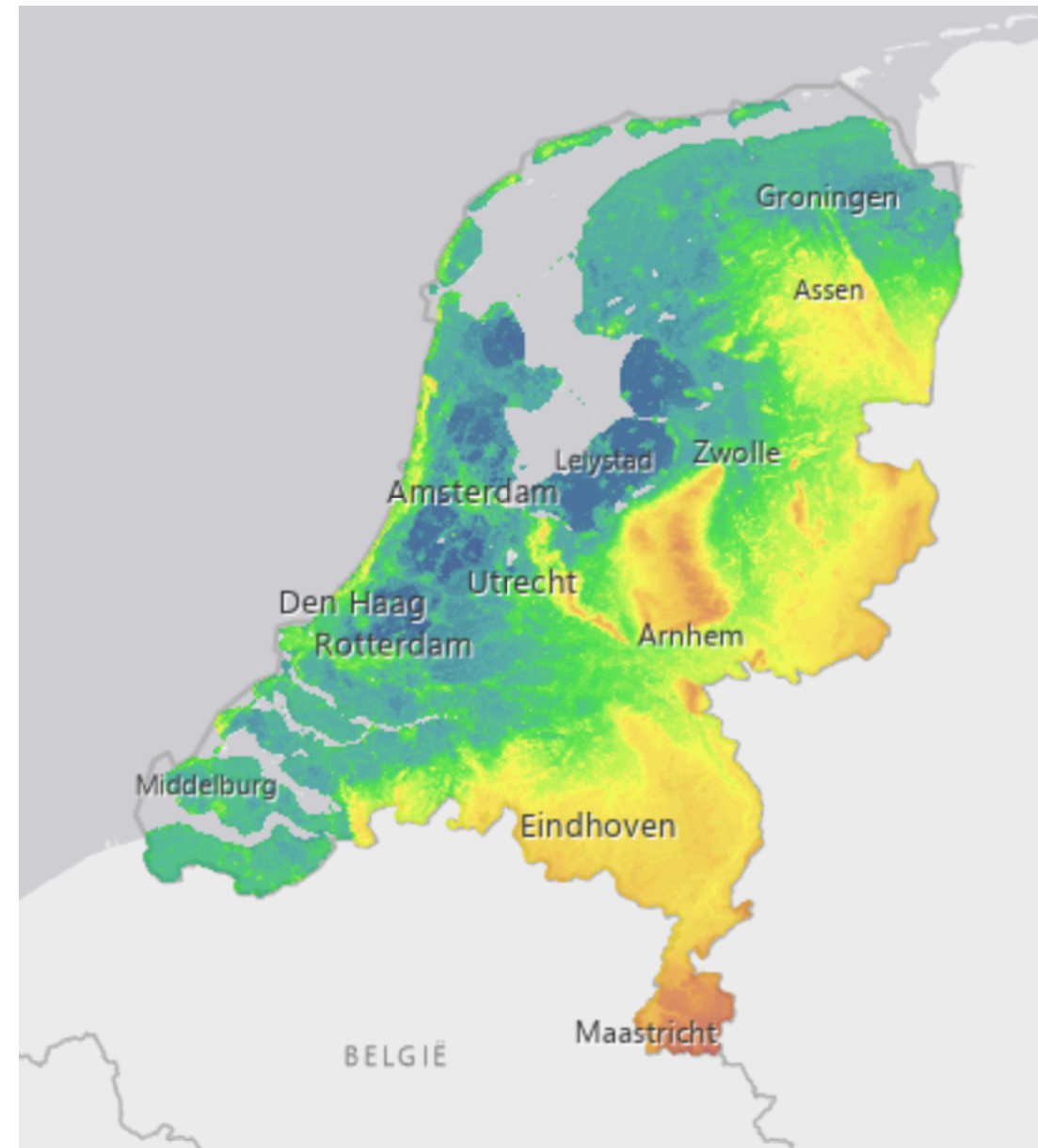
**How to perform a conversion between BIM and SOR supporting the digital building permit process?**



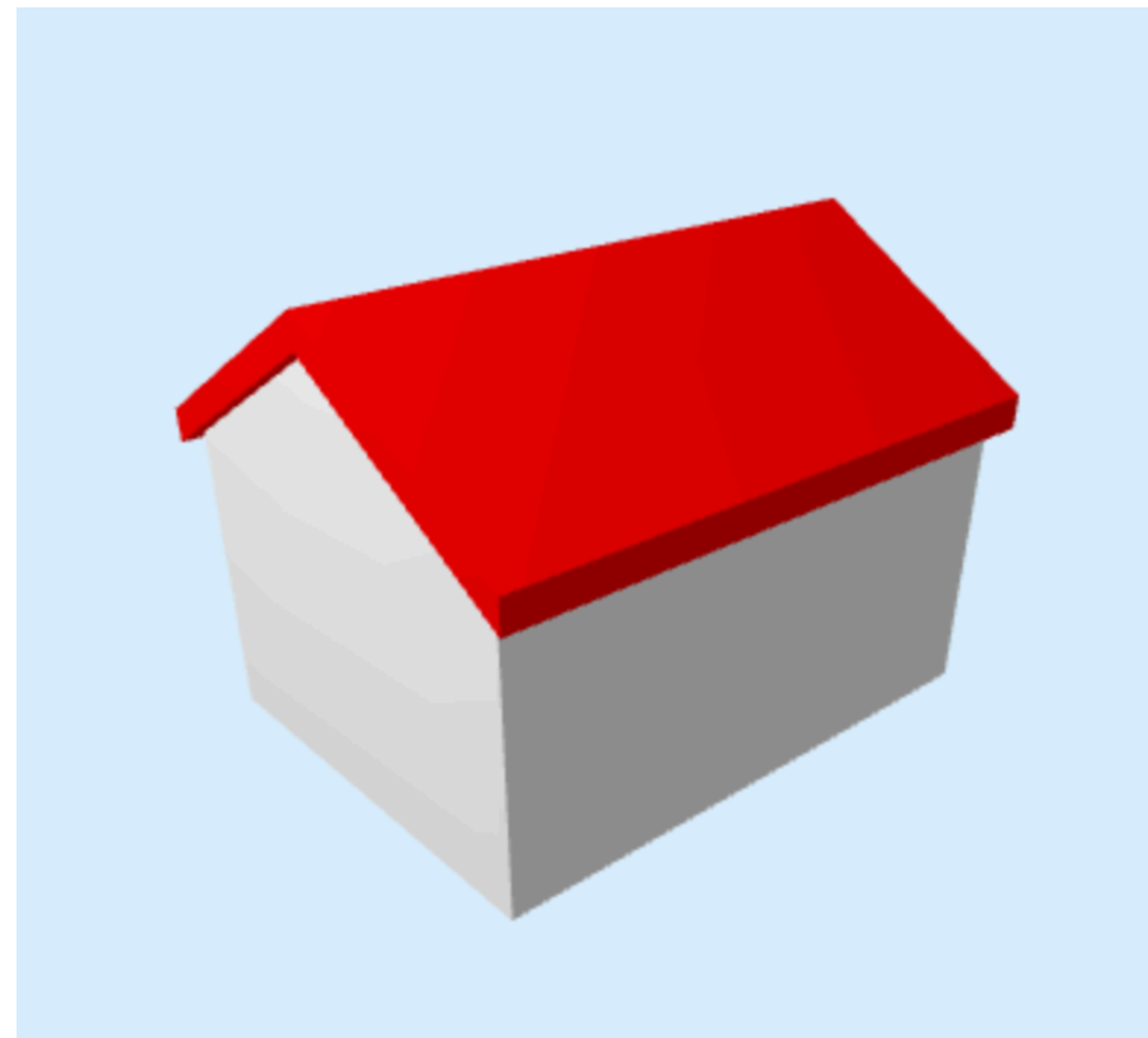


**How to perform a conversion between BIM and SOR supporting the digital building permit process?**

# Ground height



**How to perform a conversion between BIM and SOR supporting the digital building permit process?**



**How to perform a conversion between BIM and SOR supporting the digital building permit process?**

```
{
  "all_errors": [],
  "dataset_errors": [],
  "features": [
    {
      "errors": [],
      "id": "3XgvSNiMzD7BG3JQ5TA73n",
      "primitives": [
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          "numberfaces": 13,
          "numbervertices": 30,
          "type": "MultiSurface",
          "validity": true
        }
      ]
    }
  ]
}
```

**How to perform a conversion between BIM and SOR supporting the digital building permit process?**

# Rule checking

How to perform a conversion between BIM and SOR supporting the digital building permit process?

# Maximum building height

```
{  
  "building_id": "3XgvSNiMzD7BG3JQ5TA73n",  
  "rule": "Maximum building height",  
  "maximum building height in rule": 23.92,  
  "current building height": 17.44,  
  "result": "Building satisfies the rule."  
}
```



# Maximum gutter height

```
{  
  "building_id": "3XgvSNiMzD7BG3JQ5TA73n",  
  "rule": "Maximum gutter height",  
  "maximum gutter height in rule": 19.92,  
  "current gutter height": 14.96,  
  "result": "Building satisfies the rule."  
}
```

**How to perform a conversion between BIM and SOR supporting the digital building permit process?**

# Guidelines

# Guidelines integration



Adding features

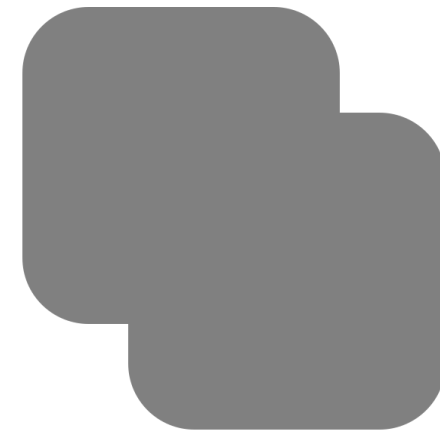


Georeferencing

# Guidelines digital building permit process



Georeferencing



Joining building  
elements



IFC schema

**How could BIM support the digital building permit process in the Netherlands?**