

# MATERIAL FILES

## MULTIFUNCTIONAL URBAN STRUCTURE DESIGN

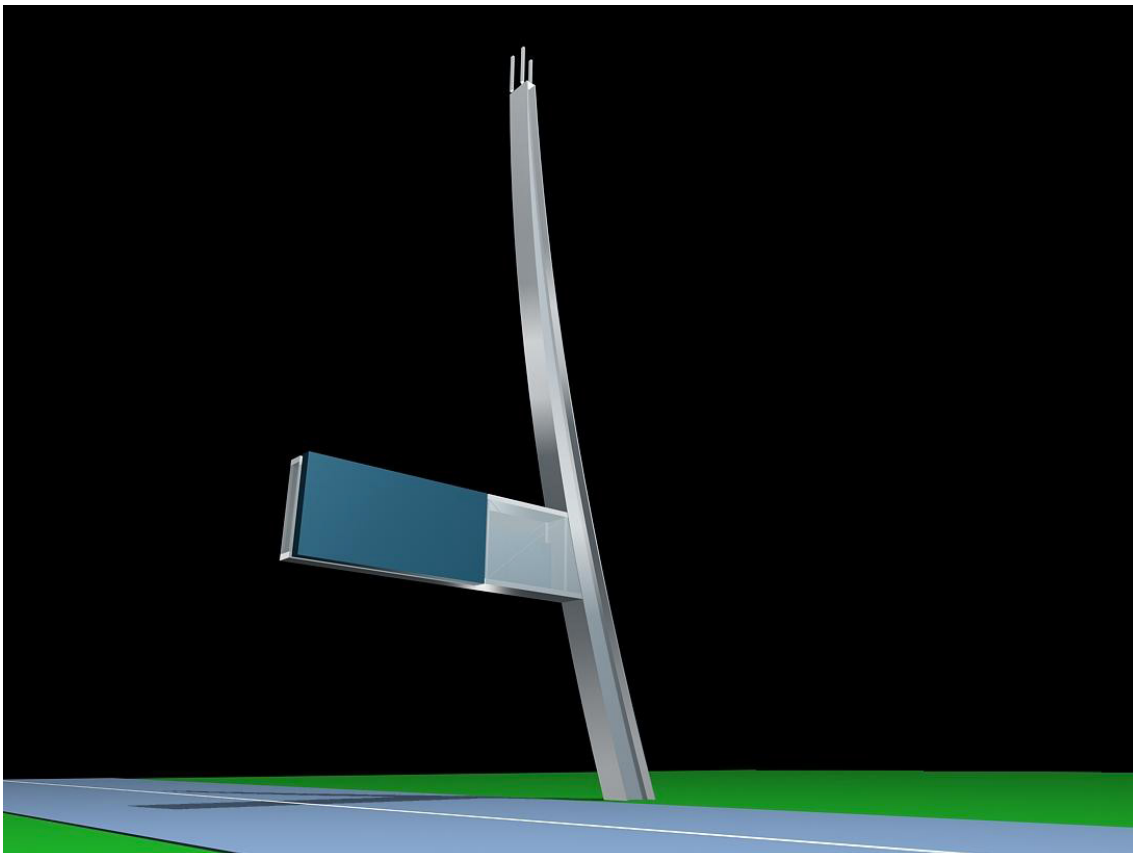
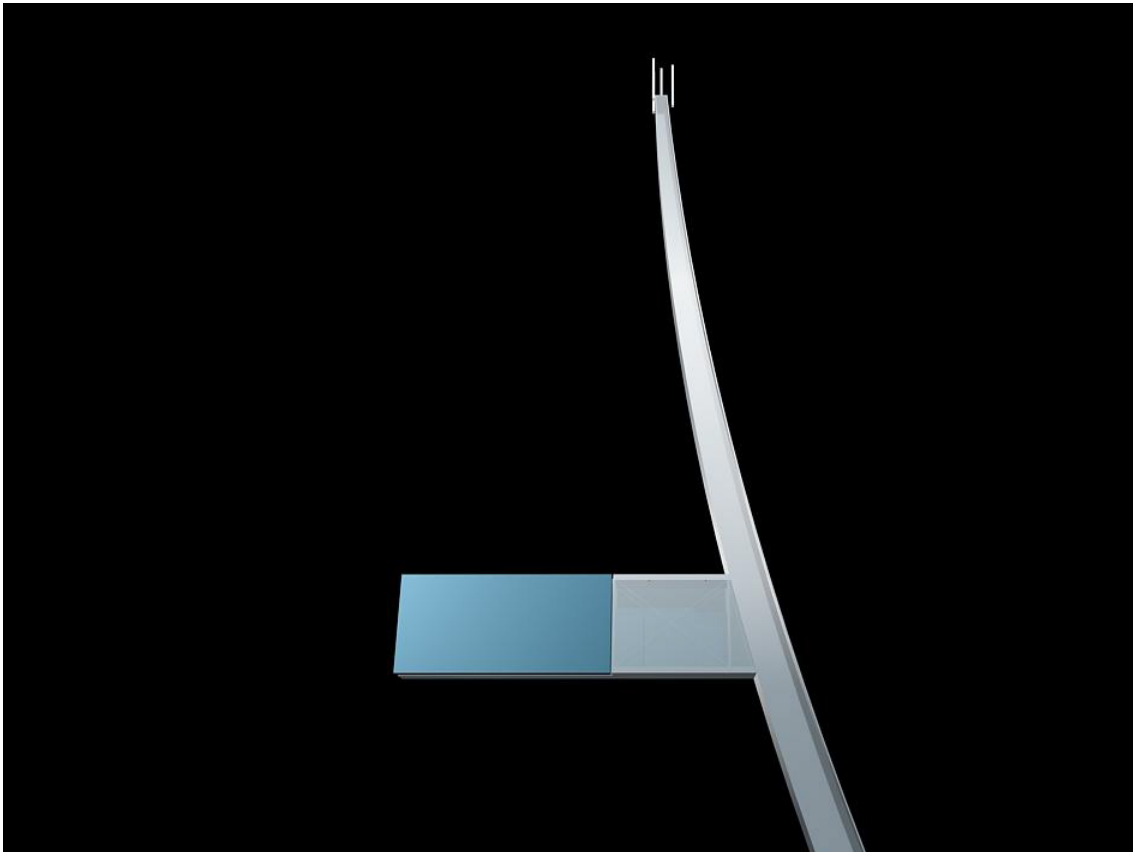
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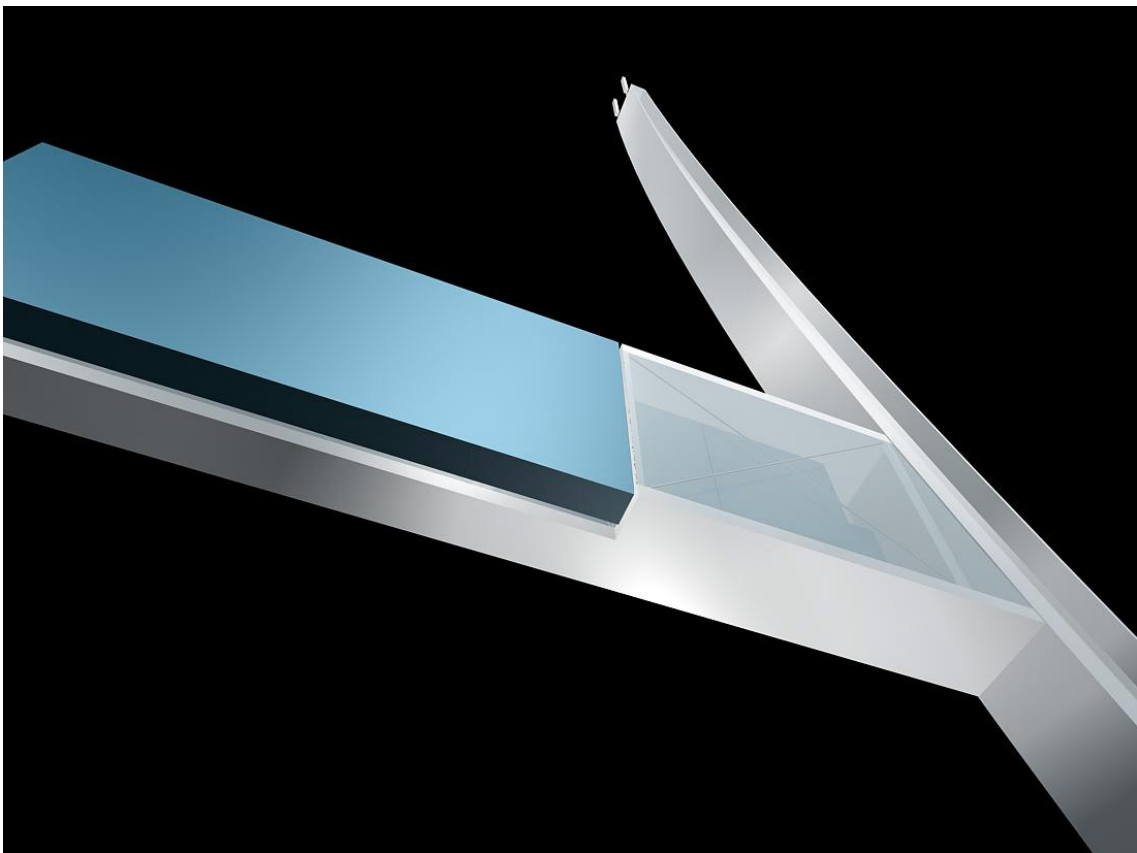
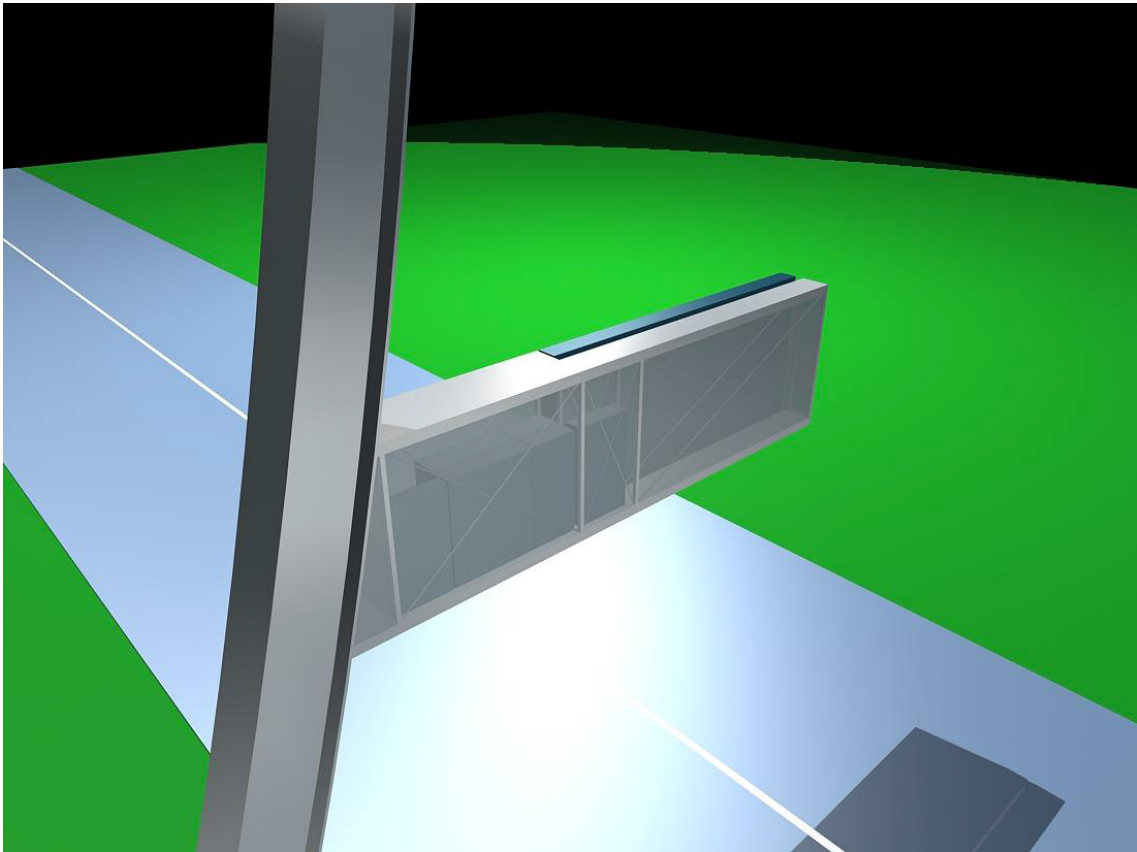
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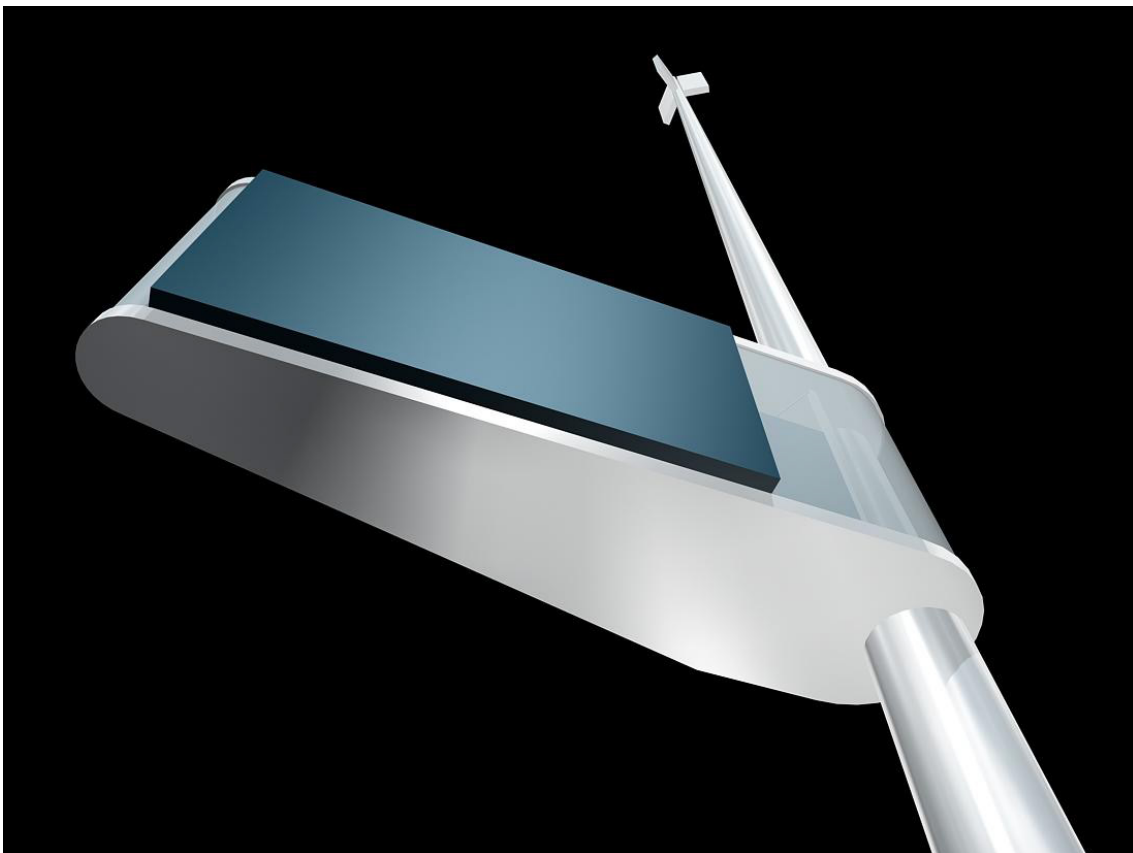
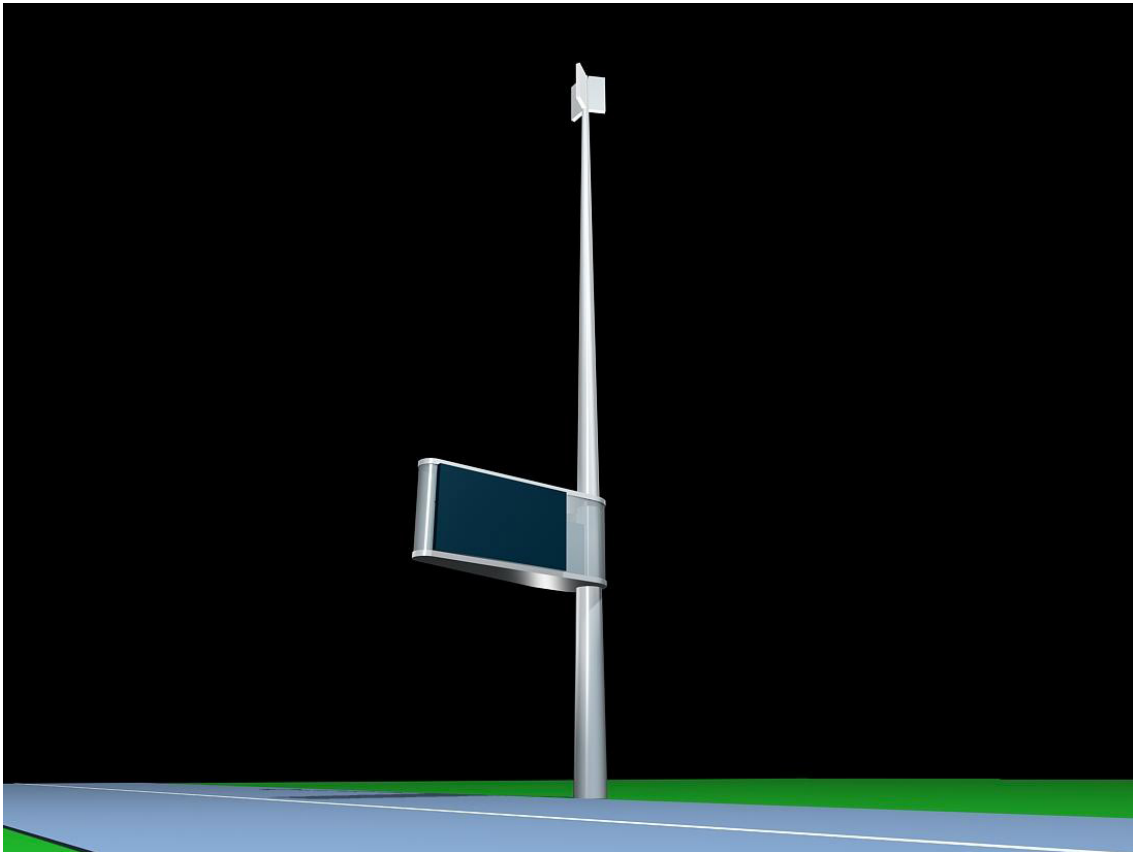
1. Urban design structures
2. Antennas and equipment boxes

# URBAN DESIGN STRUCTURES

## some examples



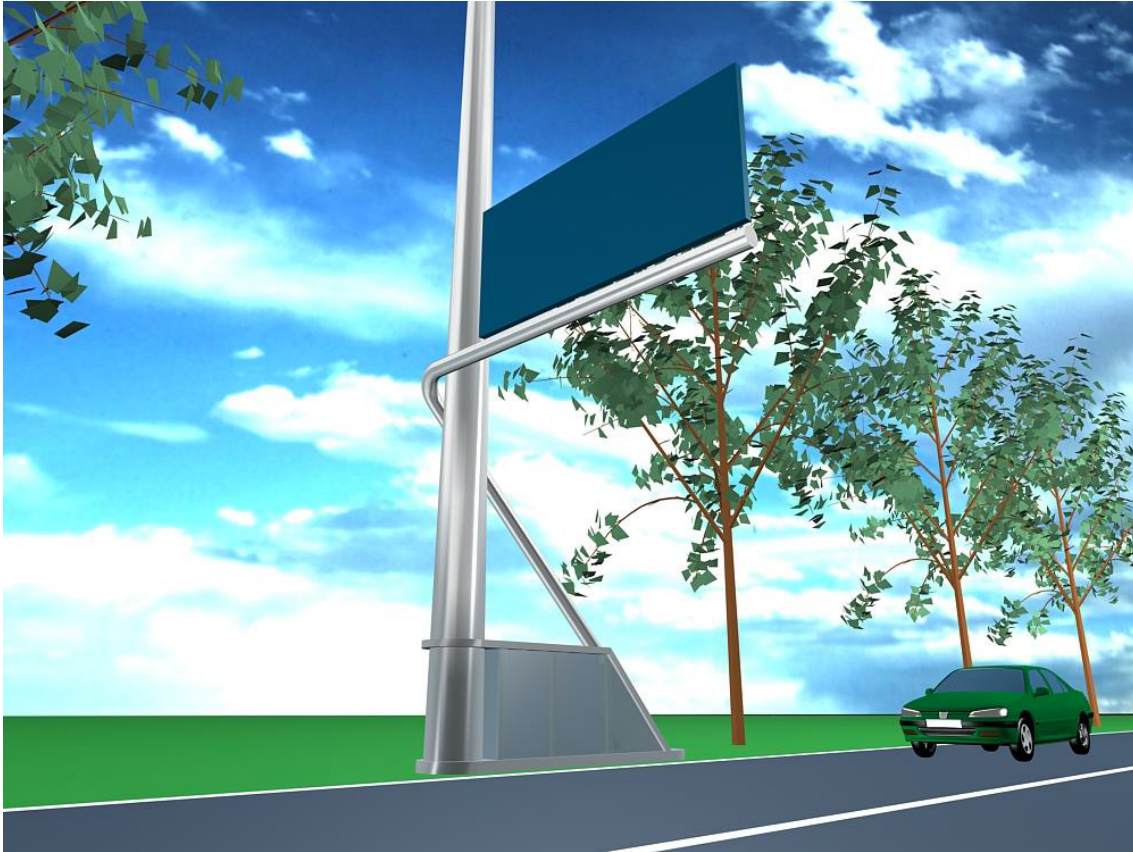




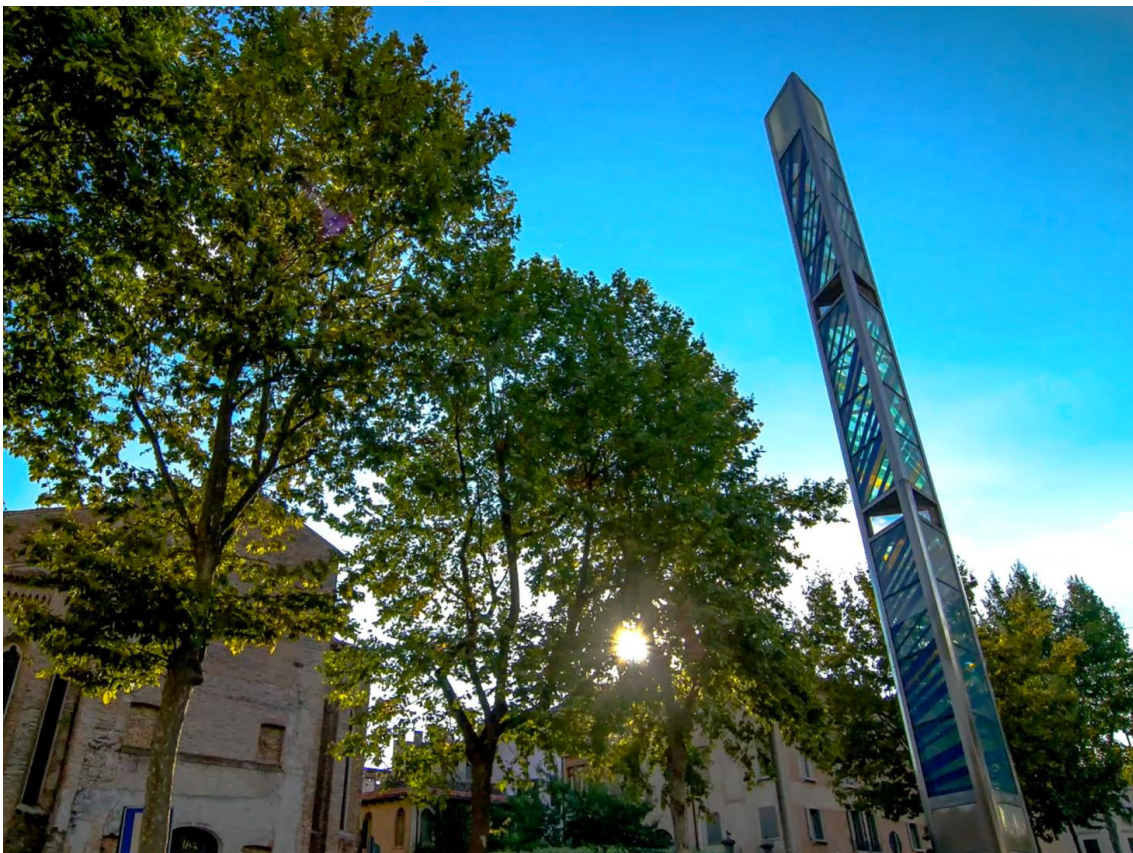
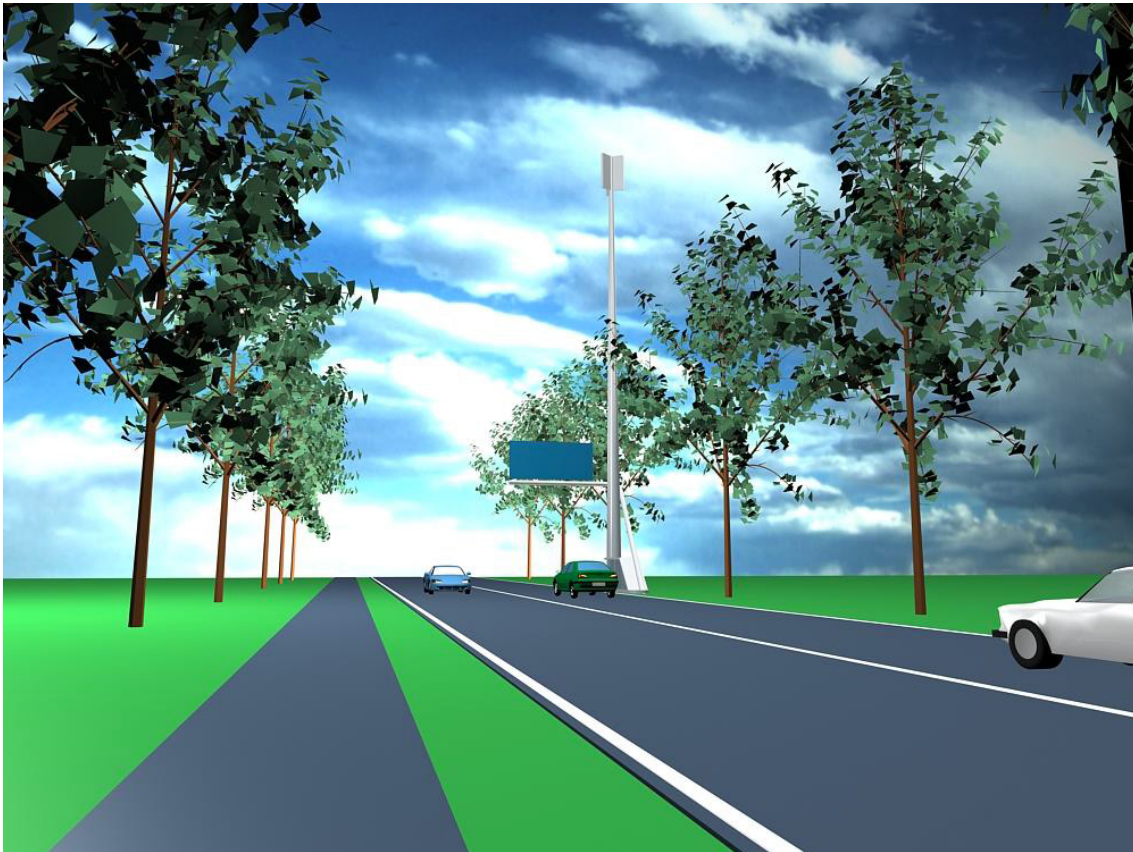








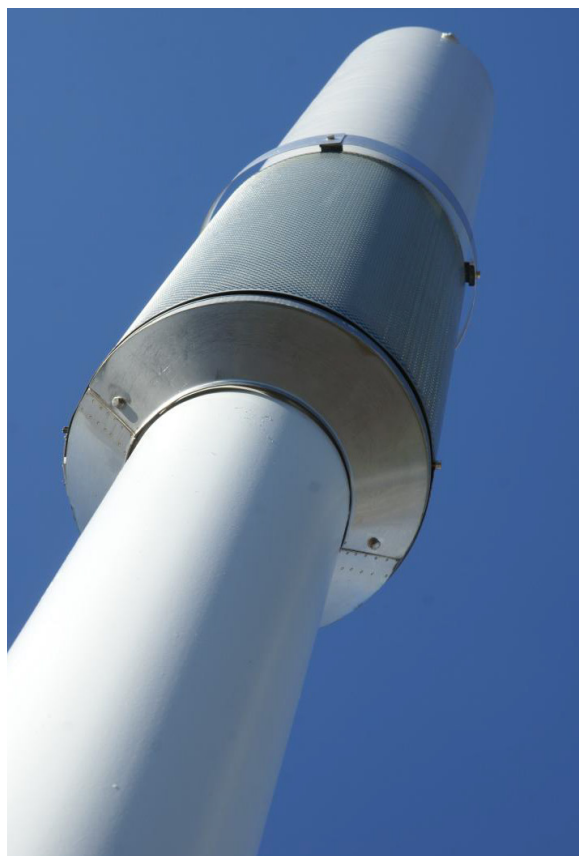




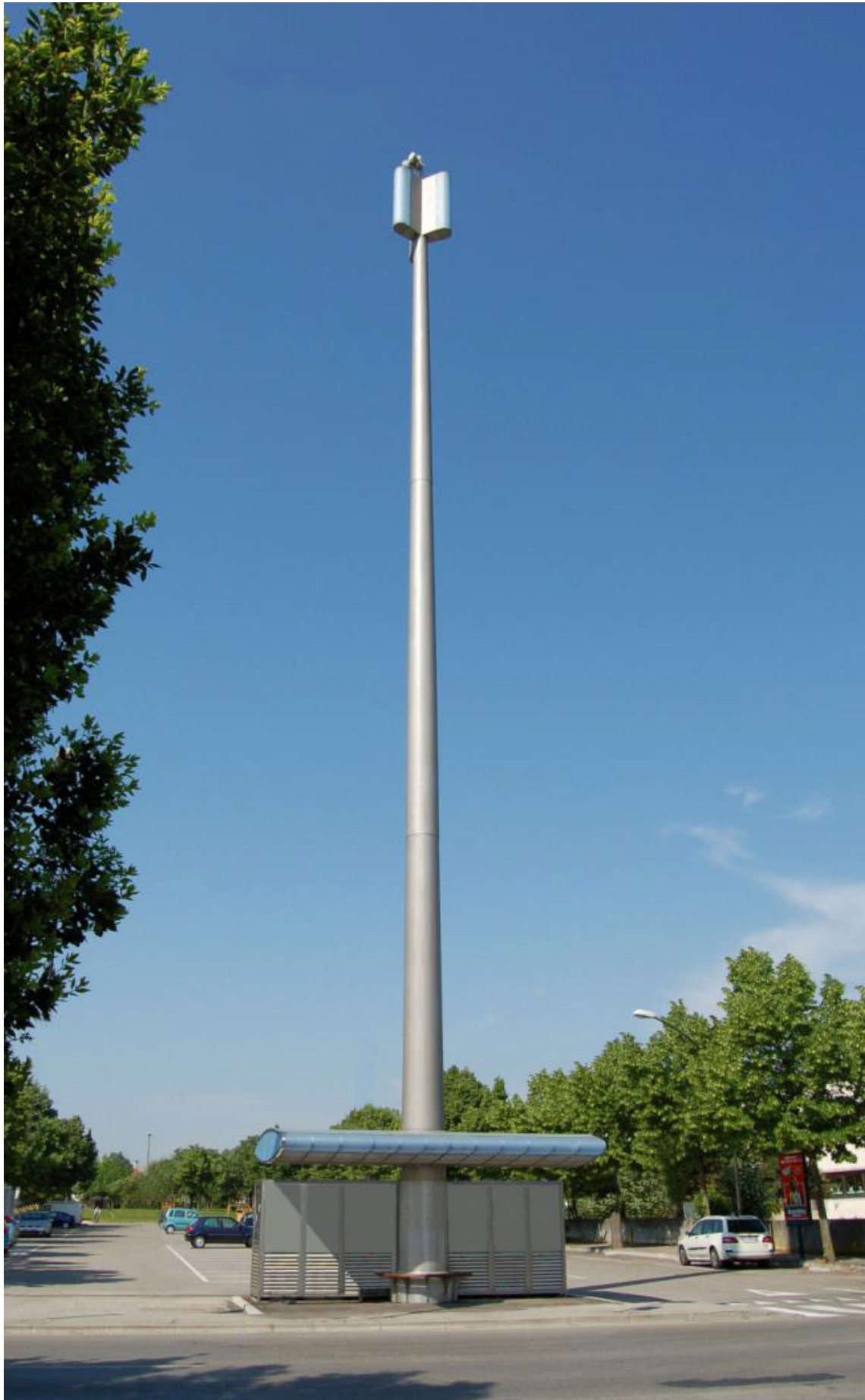














# ANTENNAS and EQUIPMENT dimensions & installation examples



## Sectors

The structures you design will host **3 sectors**. The **sectors** are units made of **2 antennas** and **2 equipment boxes** each.

### 1. Antennas

Each antenna can be considered in terms of volume as a box measuring 300x160x70mm (HxLxW). Antennas are always installed in pairs, either one over the other or at the same level (see *Image 2.2* below).

Cellular antennas are usually installed on supporting pipes of about 60mm diameter, in order to allow them to tilt and rotate to the desired angle for the best network coverage. Pipes are usually connected to a central pole (89 or 114mm of diameter and about 1/1,5m height); considering the supporting pipe the total distance between cellular antennas and central pole is about 120mm (60mm diameter plus other 60mm). Antennas must be placed in the highest position to allow radio coverage; the two antennas can be placed one over the other, or at the same level.

Remember that there should be some space to rotate each antenna (from +30° to -30° horizontally) and tilt it downwards (of max 10°).

You should also provide some free space for cables under each antenna (about 300mm). Ultimately, provide an easy access to the antennas for maintenance or repairing activities.

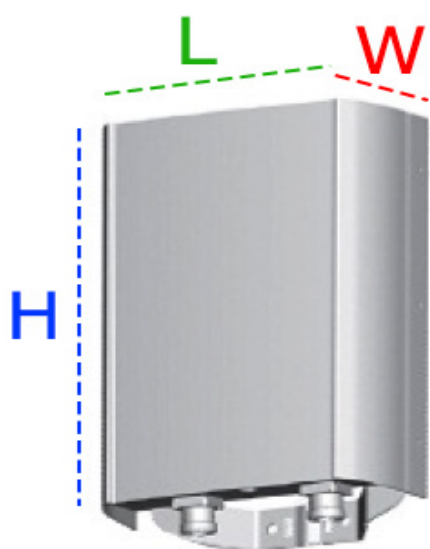


Image 2.1: The size of antenna is 300x160x70mm (HxLxW)

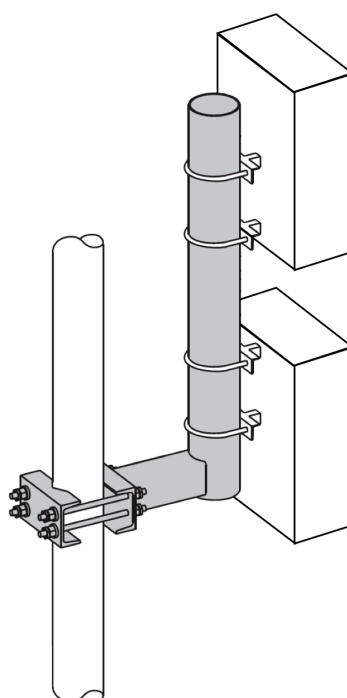


Image 2.2: Example of two antennas installed on a supporting pipe.

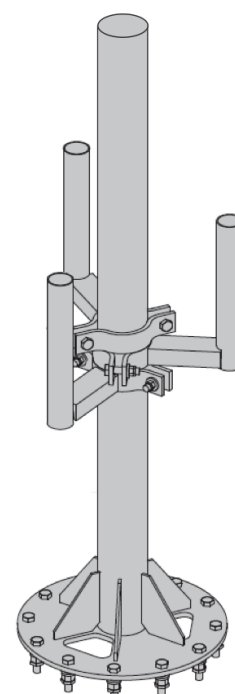


Image 2.3: Configuration examples with 6 antennas to cover 360° (each pair is placed at 120°)

## 2. Equipment boxes

Each equipment box measures 400x360x180mm (HxLxW).

Equipment boxes are used to send the radio signal to respective antennas so they don't need to be oriented as the antennas.

Equipment boxes are usually placed at the base inside the structure (in this case you can design a small technical cabinet) but they can also be installed near (behind or below) the antennas with a sort of collar around the central pole.

Equipment boxes and antennas are connected with cables that run inside the structure.

For repairing and maintenance activities, please consider an easy access to the equipment boxes.

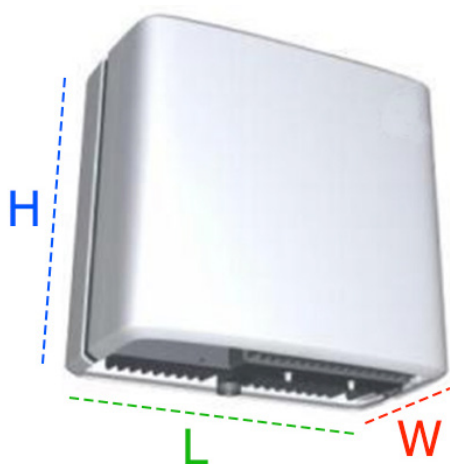


Image 2.4: The size of equipment box is 400x360x180mm (HxLxW)

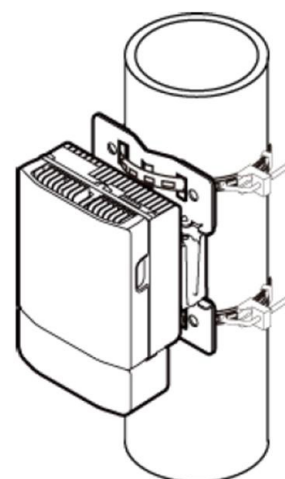


Image 2.5: Installation type 1 - equipment boxes installed on the pole

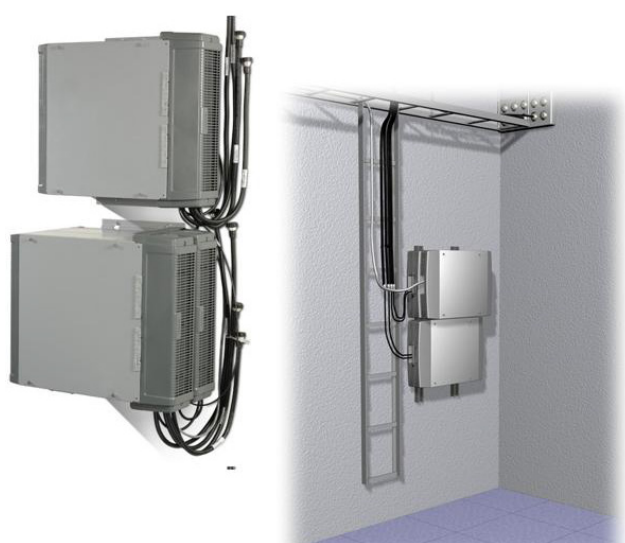


Image 2.6: Installation type 2 - equipment boxes installed on the wall



Image 2.7: Installation type 3- equipment boxes installed on the ground level (eg.