Physical model description and geometry

1. Physical model description

The laboratory facility was built in the Hydraulic Laboratory of the Centre of Technological Innovation in Construction and Civil Engineering (CITEEC) at the University of A Coruña (Spain), and consists of a rainfall simulator located 2.6 m over a 36 m^2 full-scale street section.

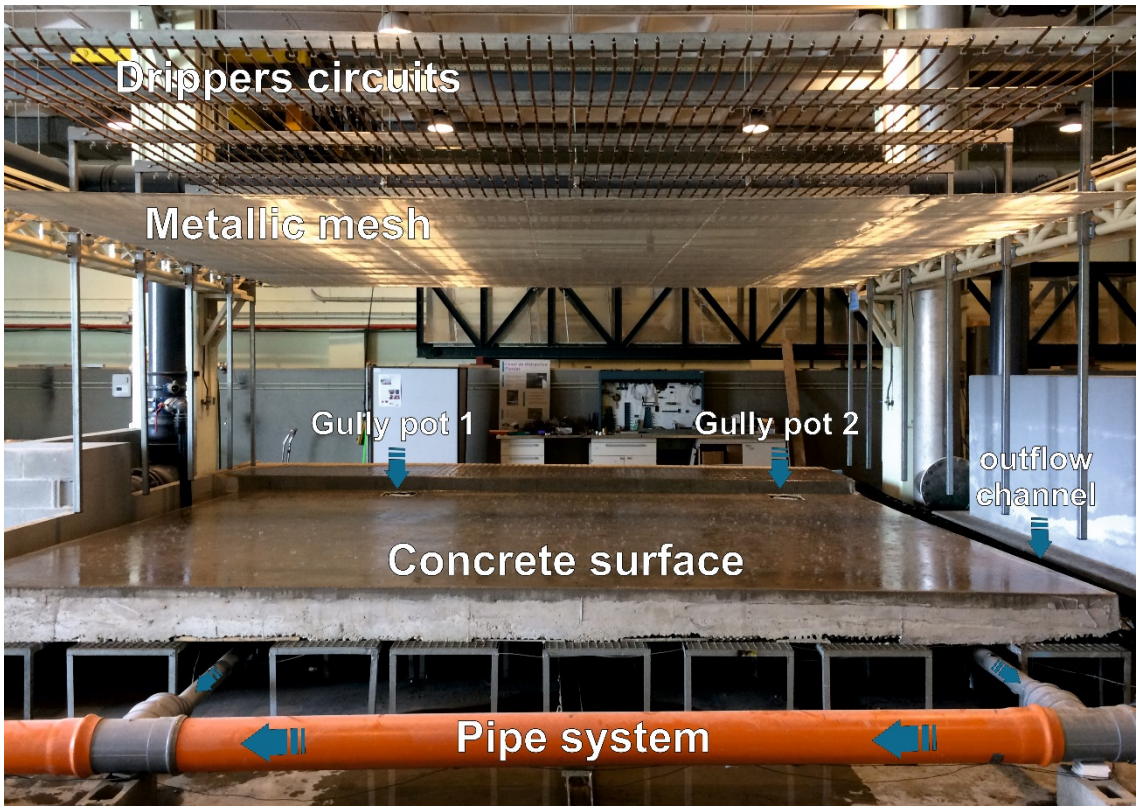

Figure 1. Street section physical model general view

Pressure-compensating irrigation drippers (PCJ-CNL, Netafim™) disposed in a grid layout and inserted in two overlapped circuits of pipes make up the rain generation system. One dripper inserted in each circuit generate 1.2 and 2 L/h respectively. Therefore, taken into account that the longitudinal and transversal distances between drippers in each circuit are 0.2 m (25 drippers per square meter), the rainfall simulator is able to generate rainfalls with a rain intensity of 30, 50 and, if both circuits are used at the same time, 80 mm/h. In order to obtain a suitable rain uniformity and drop size distribution, the drops generated are broken and distributed by a metallic welded mesh with 3 mm square openings, located 0.6 m below the drippers. The rain intensity distributions of the rainfalls was measured with a 0.5 m x 0.5 m grid of vessels and the results are included in the zip folder '*2_Rain_intensity_maps.zip*'.

The street surface consists of a tiled sidewalk and a concrete roadway. The generated rainfall runoff drains into the pipe system through two gully pots located along the curb and a lateral outflow channel. Then, flow is transported to a common pipe system outlet.

2. Physical model geometry

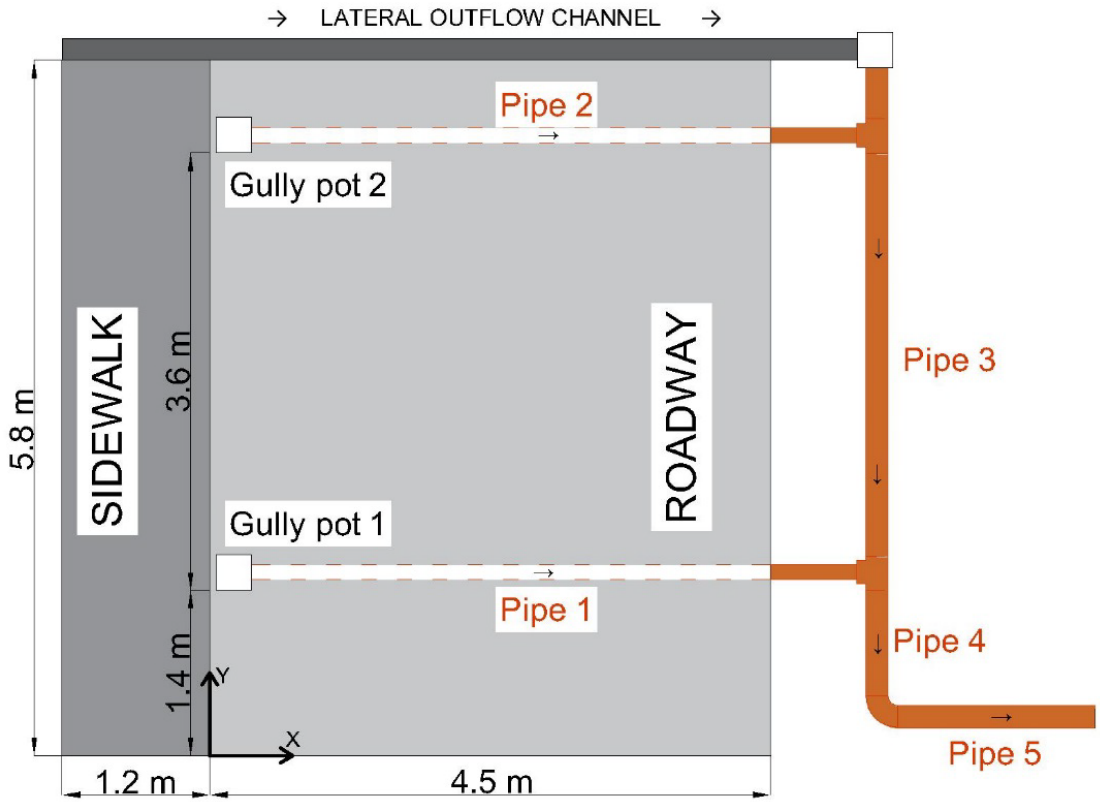

Figure 2. Street section physical model scheme

The roadway has an approximate transversal slope of 2% up to the sidewalk and a 0.5% longitudinal slope up to an outflow channel. The detailed surface elevation data was obtained by punctual measures in a 0.5 m x 0.5 m grid and by the Structure from Motion (SfM) photogrammetric technique with a resolution of 5 mm. The XYZ coordinates of the model surface obtained using each technique can be found in '*3_Elevation_data.zip*'. Raw data and further details of the SfM application is included in the dataset WASHTREET - Structure from Motion data. Both gully pots are located 0.02 m next to the curb and its dimensions are 0.3 m x 0.3 m. They are 28 cm depth and the bottom of the pipes are inserted 9.8 cm above the gully pots base.

The pipes diameter, length and slope are included in the Table 2. The length of the pipes were obtained considering the intersection between pipes as reference points. Pipes 1 and 2 are connected at both ends of pipe 3 at a height of 5.15 and 4.20 cm from the bottom of pipe 3 respectively.

Table 2. Pipe system geometry.

Pipe	Diameter (mm)	Length (m)	Slope (%)
1	85	5.30	1.7
2	85	5.25	0.87
3	190	3.72	0.54
4	190	1.23	0.58
5	190	2.93	0.52
Outflow channel	-	6.70	1.42