
Supplementary Materials

Real-time identification and positioning of sewer blockage based on liquid level analysis
in rural area

Table S1. Summary table of liquid level change rate and fluctuation range of DN200 drainage pipeline under normal operation and after blocking

Q(m ³ /h)	Liquid level change rate of DN200 drainage pipeline (mm/min)			The fluctuation range of DN200 drainage pipeline (mm)		
	Normal	Downstream of the blocking point	Upstream of the blocking point (DN150)	Normal (maximum fluctuation)	Downstream of the blocking point (minimal)	Upstream of the blocking point (DN150, minimum)
0.5	(-30,28)	(-16~ -20)	(14~18)	12.5—5.5	16.5—8.5	6—17
1	(-20,26)	(-16~ -22)	(18~30)	19—11.5	17.5—8	10—29
1.5	(-24,16)	(-16~ -32)	(30~38)	26—19.5	14—8.5	12—33
2	(-24,24)	(-14~ -24)	(36~48)	24—19	25—15.5	14—42
2.5	(-24,24)	(-12~ -20)	(46~48)	28—18.5	25.5—17.5	17—50
3	(-28,20)	(-12~ -30)	(42~60)	28—20	30—19	18—45
3.5	(-24,26)	(-30~ -44)	(48~74)	39—28	27—13.5	20—48
4	(-22,18)	(-20~ -26)	(56~80)	32—23	29—19.5	23—62
4.5	(-24,32)	(-16~ -28)	(48~66)	32—20.5	37—26	24—55
5	(-22,34)	(-24~ -30)	(46~74)	37.5—31.5	36.5—22.5	26—58

Table S2. Results of blockage identification through upstream and downstream liquid level monitoring of DN150 and DN200 drainage pipes after blockage

Q (m ³ /h)	Identification result of drainage pipe obstruction of DN150			Identification result of drainage pipe obstruction of DN200		
	1 m upstream of the blocking point	29.55 m downstream of the blocking point	60.4 m downstream of the blocking point	24.85 m upstream of the blocking point	4 m upstream of the blocking point	26.85 m downstream of the blocking point
0.5	√/√/√	√/√/√	√/√/√		√/√/—	√/√/√
1	√/√/√	√/√/√	√/√/√		√/√/√	√/√/√
1.5	√/√/√	√/√/—	√/—/√		√/√/√	√/√/√
2	√/√/√	√/√/√	√/√/√		√/√/√	√/√/√
2.5	√/√/√	√/√/√	√/√/√		√/√/√	√/√/√
3	√/√/√	√/√/√	√/√/√		√/√/√	√/—/√
3.5	√/√/√	√/√/√	√/√/√		√/√/√	√/√/√
4	√/√/√	√/—/√	√/√/√		√/√/√	√/√/—
4.5	√/√/√	√/√/√	√/√/√		√/√/√	√/√/√
5	√/√/√	√/√/√	√/√/√		√/√/√	√/—/√

1. √ in the table indicates that the blockage can be identified successfully, — indicates that the blockage cannot be identified.

2. √ / √ / √ means that 0.2 kg, 0.15 kg, and 0.1 kg obstructions cause drainage pipe blockage and can be identified.