water

MDPI

Characterizing supply variability and operational challenges in an intermittent water distribution network

Supporting Information

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Contents:

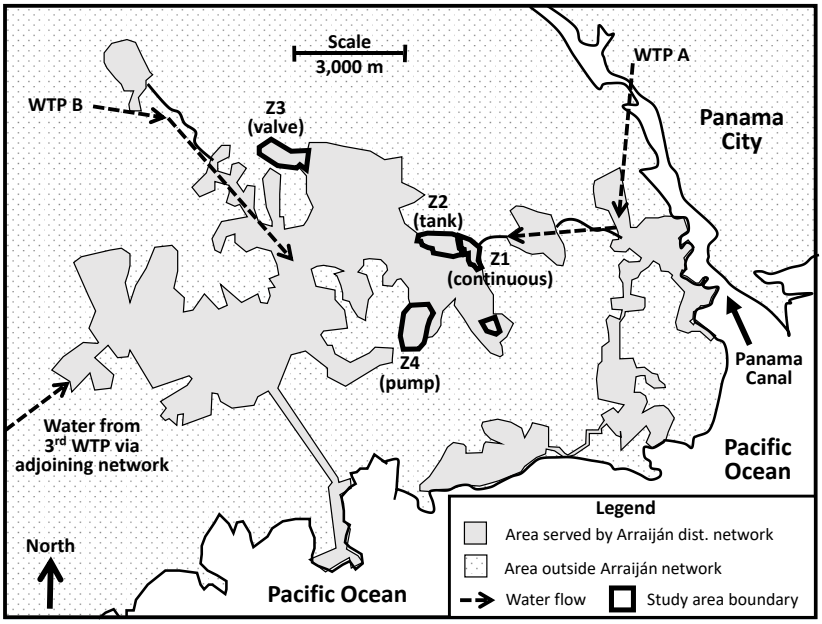

Figure S1: Location of the study zones and upstream monitoring points. Source: Modified from Louis Berger Group Fortalecimiento institucional del IDAAN a través de acciones de optimización para la ciudad de Panamá 2010.

Figure S2: Schematic of Study Zone 1. (Source of satellite images and study zone schematic: Google Earth and IDAAN's GIS database)

Figure S3: Schematic of Study Zone 3. Pressure and entrance flow were measured at the ENT location, approximately 1 km to the southeast of the bottom right corner of the diagram. Water quality grab samples were collected and chlorine, turbidity and pressure were monitored continuously at the pump station discharge, located approximately 400 m to the south (upstream) of ENT. (Source of satellite images and study zone schematic: Google Earth and IDAAN's GIS database)

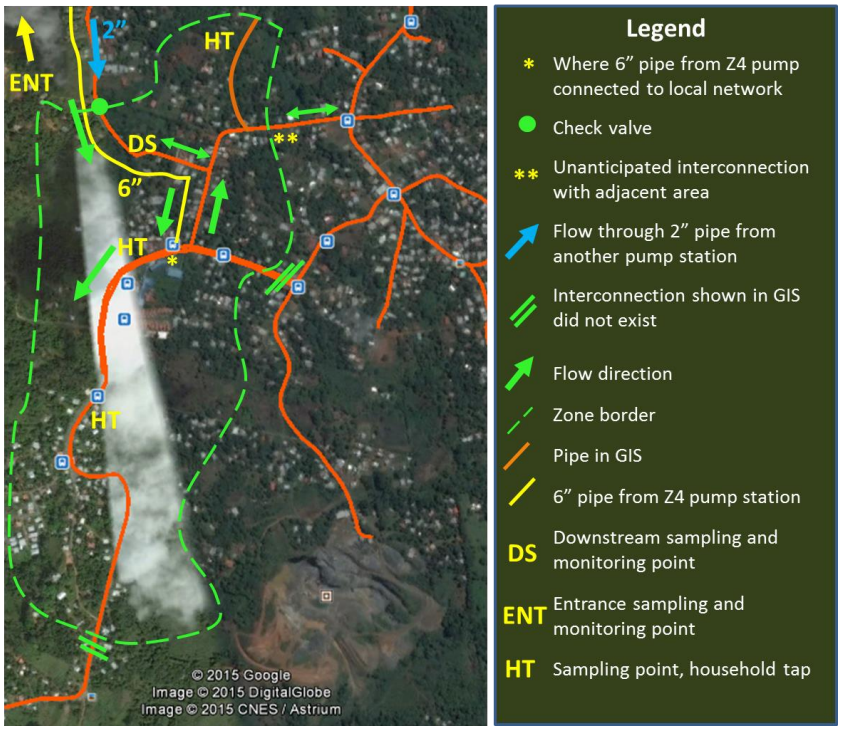

Figure S4: Schematic of Study Zone 4. The sampling and continuous monitoring point (ENT) was located at the discharge of the Zone 4 pump station, approximately 2 km north of the upper-left corner of this diagram. (Source of satellite images and study zone schematic: Google Earth and IDAAN's GIS database)

Commented [KN1]: Correct?

JOHN: Yes, Correct

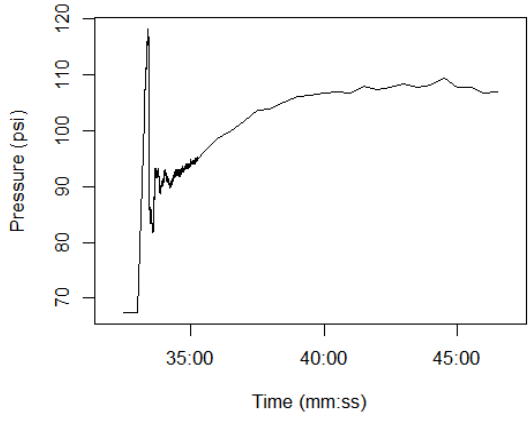

Figure S5: Pressure transient at 3:30 am 11-18-2014 at the discharge of the Zone 4 pump station caused by the startup of the second of two pumps.

43 **Table S1:** The ten zones with the highest break rates. *The second-ranked zone was downstream of
44 the Study Zone 4 pump station. †The fifth-ranked zone was Study Zone 3.

Zone Rank (by break rate)	Pipe length (km)	Number of breaks	Breaks per km per year	Age (years)	Supply
1	0.07	12	55.57	10 to 25	Continuous
2*	0.52	51	32.69	10 to 25	Intermediate
3	1.50	119	26.36	<10	Intermediate
4	0.44	22	16.77	>25	Continuous
5†	1.35	30	7.41	<10	Intermittent
6	0.88	18	6.85	10 to 25	Intermittent
7	0.20	4	6.68	>25	Continuous
8	2.64	49.8	6.28	10 to 25	Continuous
9	3.08	54.6	5.91	10 to 25	Continuous
10	0.42	7	5.52	<10	Continuous

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