

# A 3D Geodatabase for urban underground infrastructures: implementation and application to groundwater management in Milan metropolitan area.

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**Table S1.** Complete list and main features of the underground car parks located in the study area.

Name	Bottom (m a.s.l.)	Depth (m)	Area x 10 <sup>3</sup> (m <sup>2</sup> )	Volume x 10 <sup>3</sup> (m <sup>3</sup> )	Period	Floors	Location
Arduino	112.9	11	5.67	62.37	< 1990	3	Downtown
Benedetto Marcello	106.53	14	3.05	42.7	< 1990	4	Downtown
Carducci Olona	101.2	17	3.42	58.14	< 1990	5	Downtown
Cesariano	111.5	11	4.54	49.94	< 1990	3	Downtown
Conca del Naviglio	101.92	14	2.43	34.02	< 1990	4	Downtown
Emo	116.23	11	2.76	30.36	< 1990	3	North of Milan
Erculea	100.91	17	1.3	22.1	< 1990	5	Downtown
Fratelli Bandiera	103.5	14	2.81	39.34	< 1990	4	Downtown
Giotto	107.05	14	4.49	62.86	< 1990	4	Downtown
Giulio Cesare	109.2	14	4.42	61.88	< 1990	4	Downtown
Gramsci	110.2	14	4.3	60.2	< 1990	4	Downtown
Majno	101.86	17	2.05	34.85	< 1990	5	Downtown
Manusardi	100.25	14	2.12	29.68	< 1990	4	Downtown
Mascagni	102.2	14	4.63	64.82	< 1990	4	Downtown
Numa Pompilio	100.7	17	4.07	69.19	< 1990	5	Downtown
Ozanam	105.63	14	4.6	64.4	< 1990	4	Downtown
Pavia	99.84	14	3.38	47.32	< 1990	4	Downtown
Piazza Diaz	108.5	11	2.4	26.4	< 1990	3	Downtown
Puccini	101.33	20	1.68	33.6	< 1990	6	Downtown
Rio de Janeiro	105.7	11	2.27	24.97	< 1990	3	Downtown
Rio de Janeiro/Andrea del Sarto	105.7	11	2.64	29.04	< 1990	3	Downtown
Rossetti	115.2	8	2.88	23.04	< 1990	2	Downtown
San Barnaba	105.4	11	7.45	81.95	< 1990	3	Downtown
Solera Mantegazza	107.85	14	2.92	40.88	< 1990	4	Downtown
Toce/Boltraffio	115.33	11	4.55	50.05	< 1990	3	Downtown
Tommaseo	103.89	17	3.15	53.55	< 1990	5	Downtown
Veglia/Caserta	120.9	8	22.28	178.24	< 1990	2	North of Milan
Vittor Pisani	107.58	14	8.78	122.92	< 1990	4	Downtown
Alghero	122.72	5	2.12	10.6	1990–2002	1	North of Milan
Ampere/Compagni	104.5	14	2	28	1990–2002	4	Downtown
Aretusa Nord	110.75	11	4.39	48.29	1990–2002	3	Downtown
Bacchiglione/Scheiwiller	99.9	11	3.35	36.85	1990–2002	3	South of Milan
Balilla/Zamenhof	105.66	8	2.4	19.2	1990–2002	2	Downtown
Bellosio/Facchinetti	102.46	8	3.71	29.68	1990–2002	2	Downtown
Bicocca P7	122.1	11	5.67	62.37	1990–2002	3	North of Milan
Bicocca P8	125.5	8	6.67	53.36	1990–2002	2	North of Milan
Capecelatro/Pessano	116.35	8	5.05	40.4	1990–2002	2	Downtown
Cardinal Ferrari	101.53	14	2.24	31.36	1990–2002	4	Downtown
Caterina da Forlì	108.97	11	10.35	113.85	1990–2002	3	Downtown
Cechov	122.54	8	2.92	23.36	1990–2002	2	North of Milan
Cervi/Assietta	130.11	8	8.05	64.4	1990–2002	2	North of Milan
Ciceri Visconti	101.47	11	4.16	45.76	1990–2002	3	Downtown
Ciclamini/Margherite	111.5	8	3	24	1990–2002	2	West
Cilea 100	126.83	8	4.37	34.96	1990–2002	2	North of Milan
Costa/Loreto	106.9	14	1.97	27.58	1990–2002	4	Downtown
Dateo Sud	102.8	14	2.11	29.54	1990–2002	4	Downtown
Don Calabria	116.85	8	6.4	51.2	1990–2002	2	North of Milan

Donati/Redaelli	110.01	8	9.53	76.24	1990–2002	2	Downtown
Etiopia	111.66	8	0.5	4	1990–2002	2	Downtown
Feltrinelli	101.83	5	8.3	41.5	1990–2002	1	South of Milan
Grado	118.77	8	1.68	13.44	1990–2002	2	North of Milan
Graf/De Pisis Ovest	128.9	8	5.94	47.52	1990–2002	2	North of Milan
Isimbardi	102.9	8	2.64	21.12	1990–2002	2	South of Milan
Lampugnano	119.85	8	3.78	30.24	1990–2002	2	North of Milan
Leone XIII	115.35	8	7.4	59.2	1990–2002	2	Downtown
Menotti Serrati	98.94	5	7.5	37.5	1990–2002	1	South of Milan
Moisè Loria/Stromboli	101.5	17	3	51	1990–2002	5	Downtown
Monte Popera/Piana	101.12	5	2.8	14	1990–2002	1	South of Milan
Moscova	107	14	7.32	102.48	1990–2002	4	Downtown
Nikolajevka	113.4	8	4.64	37.12	1990–2002	2	West
Ojetti	124.16	8	7.03	56.24	1990–2002	2	North of Milan
Po	105.2	14	6.87	96.18	1990–2002	4	Downtown
Risorgimento Sud	102.8	14	2.11	29.54	1990–2002	4	Downtown
Sarca/Nota	123.99	8	4.4	35.2	1990–2002	2	North of Milan
Spaventa/Meda	104.44	8	5.46	43.68	1990–2002	2	South of Milan
Suzzani	129.85	8	3.56	28.48	1990–2002	2	North of Milan
Trechi	132.14	8	3.97	31.76	1990–2002	2	North of Milan
Viganò	110.61	14	2.19	30.66	1990–2002	4	Downtown
Volontari	108.8	14	1.3	18.2	1990–2002	4	Downtown
Accursio	115.6	14	4.55	63.7	2002–2007	4	North of Milan
Adda	102	20	0.81	16.2	2002–2007	6	Downtown
Avezana	98.07	11	2.04	22.44	2002–2007	3	South of Milan
Balla	125.58	8	2.65	21.2	2002–2007	2	North of Milan
Bazzini	102.2	17	1.49	25.33	2002–2007	5	Downtown
Betti	123.7	8	5.69	45.52	2002–2007	2	North of Milan
Betulle Est	118.01	5	4.6	23	2002–2007	1	West
Betulle Ovest	118.2	5	2.49	12.45	2002–2007	1	West
Bibbiena/Centro Civico	105.65	8	3.86	30.88	2002–2007	2	Downtown
Bordighera/Alzaia Naviglio Pavese	102.56	11	3.32	36.52	2002–2007	3	South of Milan
Broggini	119.07	5	2.17	10.85	2002–2007	1	West
Carafa/Conte Verde	120.2	11	3.3	36.3	2002–2007	3	North of Milan
Caroli/Ricordo	121.53	8	3.77	30.16	2002–2007	2	North of Milan
Cascina Bianca	106.2	5	7.88	39.4	2002–2007	1	South of Milan
Dalmazia	101.75	8	2.09	16.72	2002–2007	2	Downtown
De Lemene	120.6	8	2.29	18.32	2002–2007	2	North of Milan
De Nicola/San Vigilio	106.46	5	4.78	23.9	2002–2007	1	South of Milan
De Pretis/San Vigilio	106.4	5	4.52	22.6	2002–2007	1	South of Milan
De Pretis/Voltri	106.89	5	4.73	23.65	2002–2007	1	South of

							Milan
Gandhi/Perlasca	128.2	8	4.31	34.48	2002–2007	2	North of Milan
Giulio Romano	96.45	17	2.48	42.16	2002–2007	5	Downtown
Govone	110.19	17	1.6	27.2	2002–2007	5	Downtown
Leoncavallo	108	14	2.54	35.56	2002–2007	4	Downtown
Lucerna	113.39	8	4	32	2002–2007	2	West
Maffei	100.9	14	3.41	47.74	2002–2007	4	Downtown
Marmolada	124.4	11	3.36	36.96	2002–2007	3	North of Milan
Monte Baldo	117.22	8	3.1	24.8	2002–2007	2	Downtown
Monte Velino/Cadibona	102.83	8	7.05	56.4	2002–2007	2	Downtown
Montemartini/Fabio Massimo	101.38	8	7.16	57.28	2002–2007	2	South of Milan
Murani	101.6	14	3.38	47.32	2002–2007	4	Downtown
Muttoni/Quarenghi	124.8	8	3.99	31.92	2002–2007	2	North of Milan
Novelli	103.2	14	1.17	16.38	2002–2007	4	Downtown
Populonia/Valassina	117.68	11	8.68	95.48	2002–2007	3	North of Milan
Prinetti/Vida	114.2	11	3.25	35.75	2002–2007	3	North of Milan
Riccione	120.95	11	1.91	21.01	2002–2007	3	North of Milan
Romagnoli/Bertieri	107.34	11	2.11	23.21	2002–2007	3	Downtown
Salmoiraghi/Stuparich	115.37	11	1.76	19.36	2002–2007	3	Downtown
Sammartini/Lunigiana	112.3	11	3.49	38.39	2002–2007	3	Downtown
San Giusto/Val Poschiavina	116.7	8	5.56	44.48	2002–2007	2	Downtown
Silla	131.3	5	5.82	29.1	2002–2007	1	North of Milan
Trani/Malipiero/Mecenate	100.1	8	5.92	47.36	2002–2007	2	Downtown
Valsesia Est	116.45	5	3.42	17.1	2002–2007	1	West
Valsesia Ovest	116.6	5	1.96	9.8	2002–2007	1	West
Washington/Piemonte	100.35	20	3.02	60.4	2002–2007	6	Downtown
Correggio Est	107.81	14	1.03	14.42	2007–2014	4	Downtown
Correggio Ovest	106.95	14	2.75	38.5	2007–2014	4	Downtown
Dateo Nord	99.8	17	1.94	32.98	2007–2014	5	Downtown
Manuzio	103.56	17	2.27	38.59	2007–2014	5	Downtown
Meda	102.85	17	2.1	35.7	2007–2014	5	Downtown
Osculati/Camerino	125.14	11	0.45	4.95	2007–2014	3	North of Milan
Quinto Alpini	106.47	14	1.66	23.24	2007–2014	4	Downtown
Risorgimento nord	96.9	20	1.43	28.6	2007–2014	6	Downtown
Sabotino	96.91	17	2.47	41.99	2007–2014	5	Downtown
Sant'Ambrogio	102	17	7.41	125.97	2007–2014	5	Downtown
Savona Tolstoj	110.67	5	1.08	5.4	2007–2014	1	Downtown
Vittadini	99.23	14	3.63	50.82	2007–2014	4	Downtown
XXV Aprile	105.2	17	5.07	86.19	2007–2014	5	Downtown
Total parks: 126				5,157			

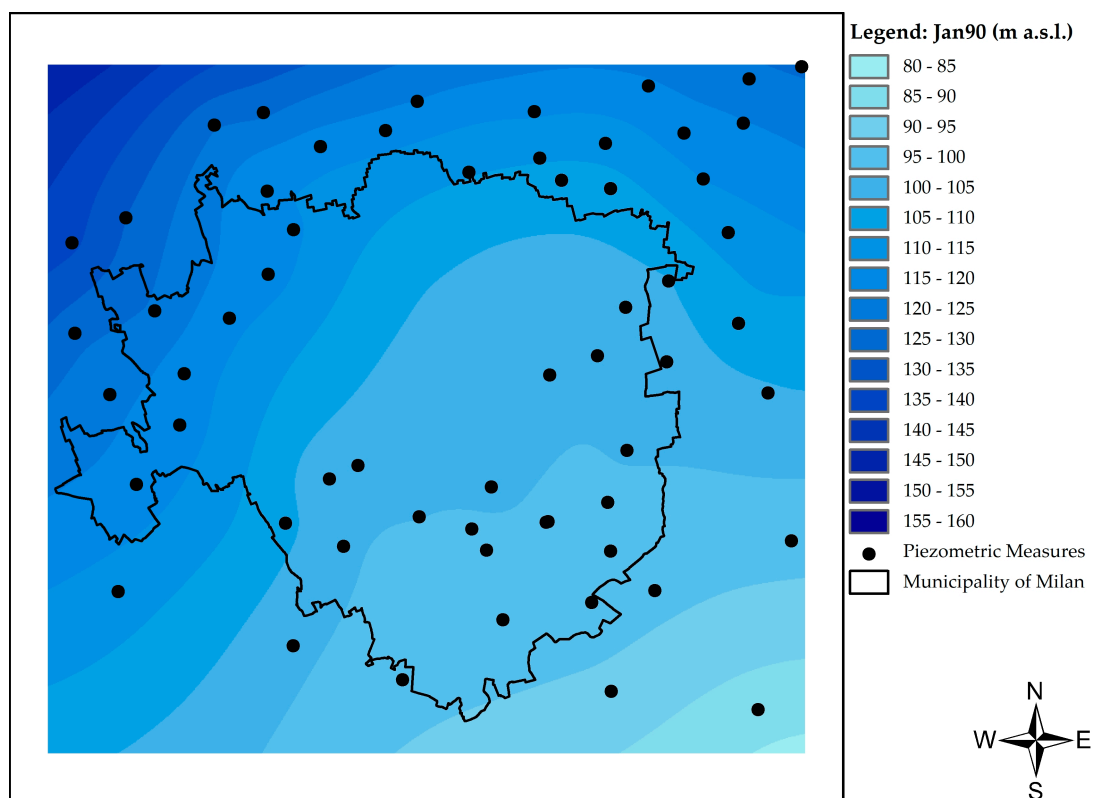


Figure S1. GW table map for Jan90.

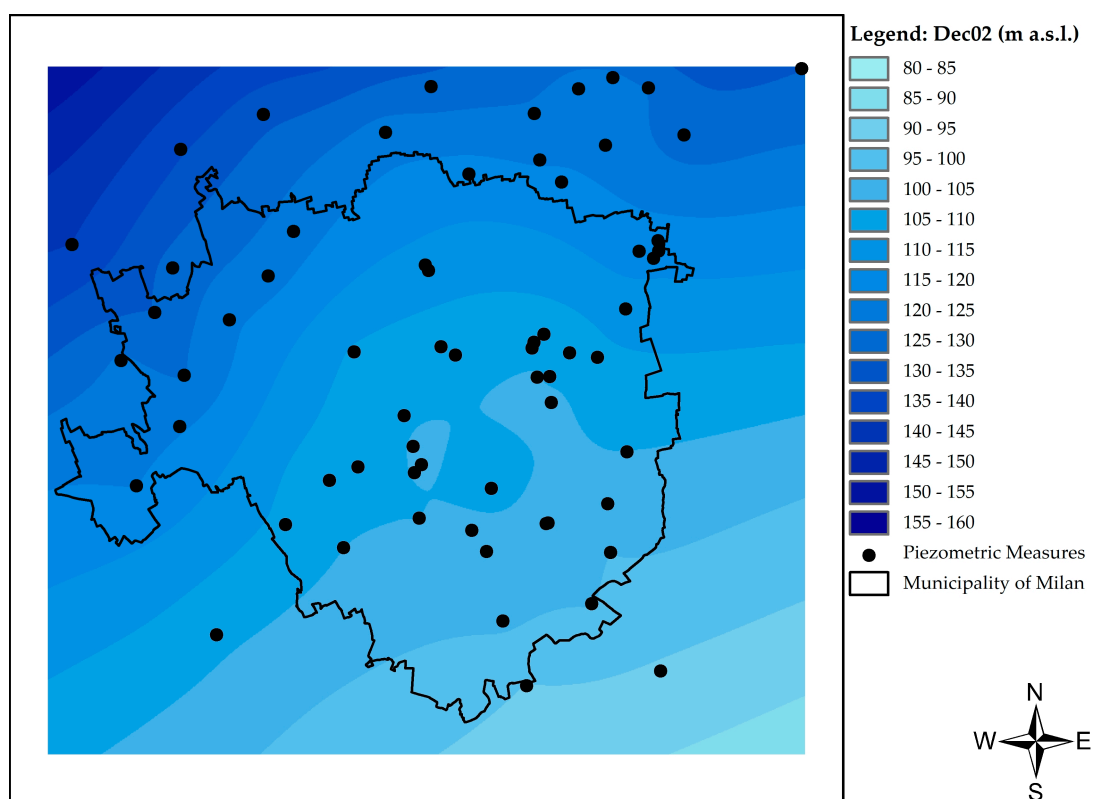


Figure S2. GW table map for Dec02.

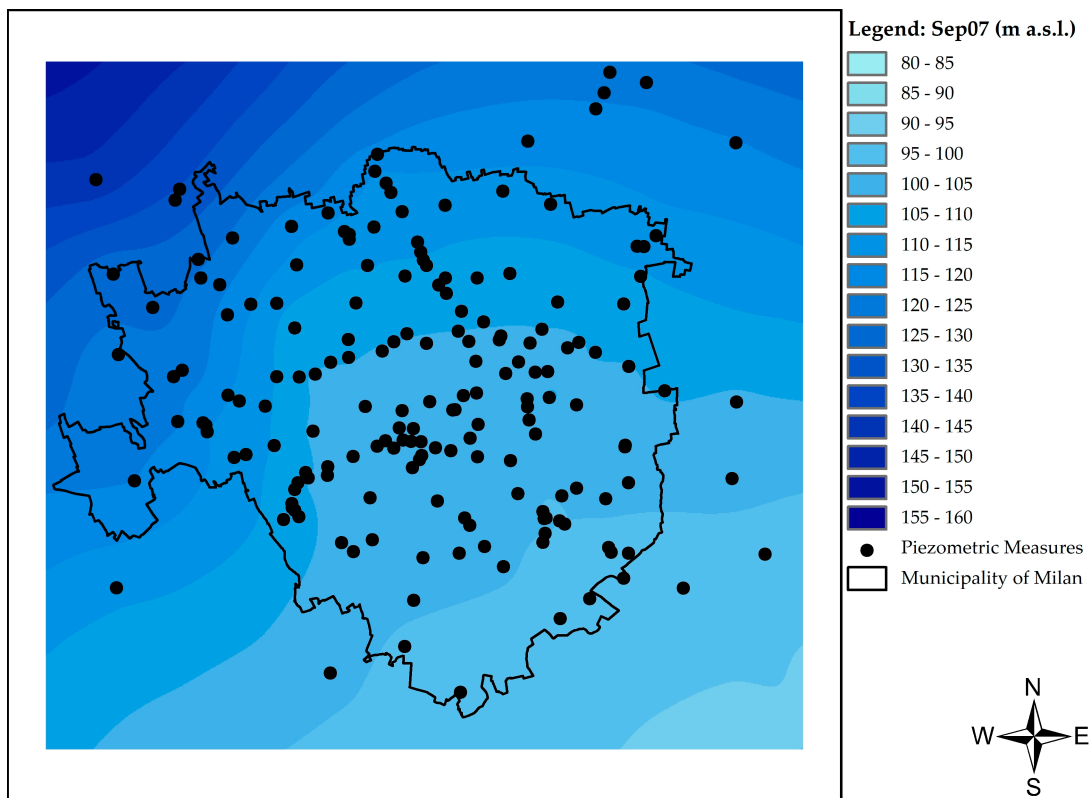


Figure S3. GW table map for Sep07.

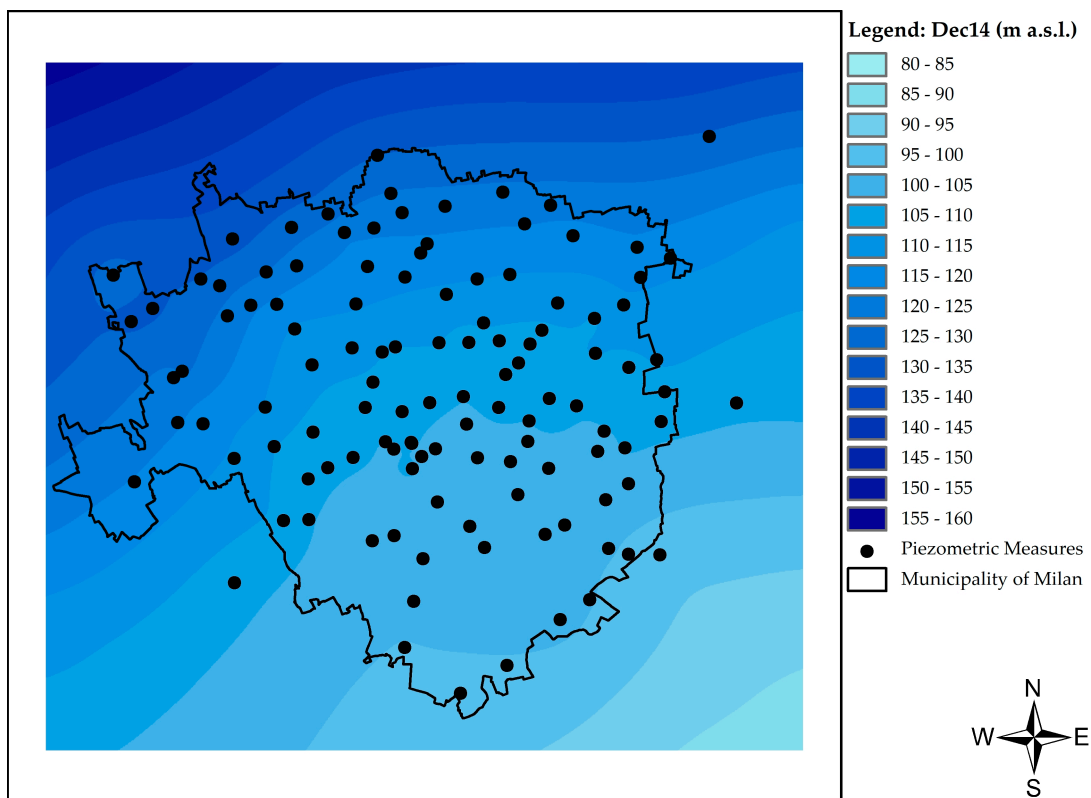


Figure S4. GW table map for Dec14.



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Link to the WebGIS service: <https://arcg.is/HHWDi0>. This allows a more detailed visualization of the contents of the 3D GDB.