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Nota di contenuto	Cover -- Contents -- Preface -- Acknowledgements -- Part A: Groundwater for Urban Water-Supply -- A1 ESSENTIAL DIAGNOSTIC PROCEDURES -- Why is groundwater important to water utilities? -- How can groundwater impact water service utilities? -- What data are needed to diagnose groundwater management needs? -- How is private urban waterwell use relevant to water utilities? -- Could water utilities have 'hidden interests' in groundwater management? -- Who has the institutional responsibility for groundwater resources? -- Does your water utility have capacity for groundwater management? -- A2 FORMULATING STRATEGIC ACTIONS -- What actions are needed as regards groundwater resource management? -- What actions are needed as regards groundwater quality protection? -- How can groundwater monitoring be strengthened for adaptive management? -- Part B: Groundwater Hazards for Urban Infrastructure -- B1 CHARACTERISATION OF PROBLEMS -- Why is groundwater important to city infrastructure planning? -- How does urbanisation impact the groundwater regime? -- What data are needed to diagnose subsurface management needs? -- Who has institutional responsibility for urban

groundwater resources? -- Can your agency contribute effectively to urban groundwater management? -- B2 ESSENTIAL STEPS FOR INTEGRATED ACTION -- Which procedures can ensure that groundwater considerations are always included in urban planning? -- What types of groundwater information are essential for the urban planning process? -- How should the development of urban subsurface space be administered with regard to groundwater considerations? -- Part C: Examples of Urban Groundwater Management -- C1 BANGKOK (THAILAND) -- Major reduction and redistribution of groundwater abstraction to control land subsidence (data from Buapeng & Foster, 2008) -- C2 LIMA (PERU). Planned conjunctive use to stabilise the groundwater reserves of a critical aquifer in a hyper-arid setting (data from Foster et al., 2010c) -- C3 HAMBURG (GERMANY) -- Well-managed groundwater resource development with emphasis on monitoring for quality protection (data from Foster et al., 2020b) -- C4 BUCHAREST (ROMANIA) -- Improving understanding of a shallow groundwater system to aid design and operation of subsurface infrastructure (data from Gogu, 2019) -- C5 BEBERIBE (AQUIFER) -- Use of the beberibe aquifer as a strategic water-supply reserve and regulating private groundwater supply (data from Foster et al., 2010a) -- C6 LUSAKA (ZAMBIA) -- Efforts to confront groundwater quality protection and meet pro-poor demand in a fast-growing city (data from Nkuwa, 2003 -- Kangomba & Bäumle, 2013 -- and Foster et al., 2020a) -- References.

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#### Sommario/riassunto

Groundwater beneath cities is important. Water utilities and private abstractors use it as a secure source of water-supply and municipal authorities have to cope with it when planning sanitation and using underground space for building and transportation infrastructure, but all too often neither have a comprehensive understanding. This Guidebook aims to highlight what water utilities and municipal government can do to improve groundwater assessment, management and monitoring to avoid experiencing 'nasty surprises'. Groundwater, especially from deeper aquifers, is a critical resource for enhancing urban water-supply security under climate-change stress. But to achieve its use sustainably will require adaptive promotion of resource management and protection, according to local circumstances. In recent times municipal governments are making much more use of urban subsurface space (especially down to 15-metres depth) for construction. Traditionally the drainage and stability of such structures were achieved by individual site investigation, but today a more coordinated approach is needed to managing shallow groundwater conditions. The Guidebook is divided into three complementary parts: Part A is intended for guidance of water-utility, together with water-resource agency and municipal sanitation department, staff working to improve urban water-supply resilience, with its inevitable requirement to get more involved in groundwater management. Part B is intended for guidance of municipal government authorities working to improve the design and execution of urban infrastructure to avoid potentially costly subsurface drainage issues, structural instability and groundwater flooding problems. Part C provides a series of case histories on urban groundwater management from around the world.

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