

## A knowledge standard for urban water management

### Une base de connaissances pour la gestion de l'eau urbaine

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#### RÉSUMÉ

Aux Pays-Bas, la gestion des eaux usées, des eaux pluviales et des eaux souterraines relève de la responsabilité des municipalités. Traditionnellement, cela impliquait des réseaux d'égouts unitaires et séparatifs. Depuis quelques décennies, cette responsabilité s'étend à tous les types d'infrastructures bleues et vertes, allant des revêtements perméables et les réseaux d'infiltration aux noues et bassins de rétention d'eau. Les municipalités sont également responsables de la gestion de l'espace public. L'exploitation et la gestion des systèmes publics d'eau urbaine sont de plus en plus complexes et nécessitent une approche intégrée et une collaboration étroite. Par conséquent, les municipalités doivent s'assurer de disposer d'une équipe de professionnels de l'eau possédant les connaissances et les compétences requises pour mener à bien leurs missions et atteindre les objectifs fixés en matière de gestion de l'eau.

Stichting RIONED développe des outils et des connaissances pour accompagner les professionnels de l'eau urbaine. Ce résumé présente trois outils importants. Le 'Branchestandaard' est un ensemble complet de descriptions du niveau de connaissances requis pour exercer les fonctions des professionnels de l'eau urbaine. Le 'Kennisbank' est un wiki en ligne dédié à l'eau urbaine, recensant les connaissances que ces professionnels devraient posséder. Le Cours de base et son matériel pédagogique, d'une durée d'un an, est une formation sur l'eau urbaine destinée à tous les professionnels du secteur n'ayant pas suivi de formation universitaire ou appliquée préalable. Le contenu de ce cours s'appuie sur le 'Branchestandaard' et utilise les ressources du 'Kennisbank'.

#### ABSTRACT

In the Netherlands, municipalities are responsible for wastewater collection, stormwater management and groundwater management. Traditionally, this involved combined and separated sewer systems. Since a few decades this also involves all types of blue-green infrastructure, ranging from porous pavements, infiltration sewers to bioswales and ponds. The municipalities are also responsible for management of public space. The operation and management of public urban water systems is becoming increasingly complex, requiring an integrated approach and intensive collaboration. Therefore, municipalities must ensure they employ a team of water professionals with the right knowledge and skills to perform their tasks and achieve the desired water management and ambitions.

Stichting RIONED develops tools and knowledge to support the urban water professionals. This abstract introduces three important tools. The 'Branchestandaard' is a comprehensive set of descriptions of the knowledge level urban water professionals should have to be able to perform their tasks. The 'Kennisbank' is an online urban water wiki that provides the knowledge that urban water professionals should possess. The Basic Course and its course materials, is a one year course on urban water that all urban water professionals without a preceding dedicated education at university or applied university level should follow. The course material is developed to cover the Branchestandaard set of descriptions, while using materials from the Kennisbank.

#### KEYWORDS

Compétences, connaissances, cours, gestion de l'eau, normes, rôles

Competencies, courses, knowledge, roles, standard, watermanagement

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## 1 THE KNOWLEDGE FOR URBAN WATER MANAGEMENT

### 1.1 Watermanagement in the Netherlands

In the Netherlands, 342 municipalities are responsible for wastewater collection, stormwater management and groundwater management. Traditionally, this involved combined and separated sewer systems. Since a few decades this also involves all types of blue-green infrastructure, ranging from porous pavements, infiltration sewers to bioswales and ponds. The municipalities are also responsible for management of public space, which has to ensure that no flooding of houses occurs at storms smaller than T=100.

Skilled professionals are needed to perform a desired level of urban water management and realize its ambitions. The operation and management of public urban water systems is becoming increasingly complex, in the politically dynamic context with climate change in growing cities, where intensive collaboration is becoming increasingly important. Consider the integrated approach with spatial planning, sustainable and efficient, and the collaboration with fellow authorities, umbrella organizations and residents.

Stichting RIONED is the umbrella organization in the Netherlands for urban water management; 99% of the municipalities are members of the foundation, and also water authorities, ministries, consultancy firms and water companies. The foundation provides the professional community and municipal officials with knowledge and information, using authorized standards and new insights from research.

### 1.2 The 'Branchestandaard'

#### 1.2.1 What is the Branchestandaard ?

Stichting RIONED has developed a tool, called the 'Branchestandaard'. It is a comprehensive set of descriptions of the knowledge level urban water professionals should have to be able to perform all their water-related tasks. The municipal water-related tasks are divided into strategic, tactical, and operational categories. These categories are research, assessment, drafting measures, implementing measures, general, and data management. The activities required for carrying out policy-making and organizational activities in the strategic and tactical categories are described in the Branchestandaard.

In addition to knowledge, the urban water manager must also have the associated competencies in a specific role. The Branchestandaard describes these competencies.

#### 1.2.2 The 'Kennisbank' and knowledge areas

The 'Kennisbank' is an online urban water wiki, managed by Stichting RIONED. It provides the knowledge that urban water professionals should possess. The knowledge available in the Kennisbank is connected to the descriptions in the Branchestandaard.

In the Branchestandaard three different knowledge levels are described:

1. The basic knowledge level: this level aligns with the content of courses and training, most important the Basic Course.
2. Additional knowledge level: this level is needed if a municipality wants to carry out more activities themselves beyond the basic level, without hiring a consultancy firm,
3. Specialist knowledge level: this level is very often provided by consultants.

In the Kennisbank, the corresponding level is stated on each knowledge page.

The knowledge has been divided into 12 core and 55 sub-core knowledge areas. The core knowledge areas are shown in Figure A.

1. Policy, legislation and regulations	7. Process, record and validate data
2. Water management	8. Hydraulic functioning
3. Knowledge of related disciplines	9. Assess research results
4. Embedding in organization and organizational plans	10. Technical knowledge design
5. Resource management (finance and personnel)	11. Technical knowledge measures
6. Research methods and techniques	12. Outsourcing and contract formation

Figure A: Core knowledge areas in the Branchestandaard, the Kennisbank and the courses for urban water management

**1.2.1 The Basic Course**

Stichting RIONED has a strong connection to the training center, the ‘Water Academy’. The Basic Course is offered by this training center. The Basic Course is a one year course on urban water that all urban water professionals without a preceding dedicated education at university or applied university level should follow.

The course material is developed to cover the Branchestandaard set of descriptions, while using materials from the Kennisbank. Consultants who have developed knowledge for the Kennisbank are often also teachers for the Water Academy.

**1.2.2 The knowledge scan**

Together with Stichting RIONED, the teachers for the Basic Cours and/or the consultants for the Kennisbank developed a ‘Knowledge scan’.

The knowledge scan is an essential part of the Branchestandaard process, explicitly intended to demonstrate an organization's current level of (available) basic knowledge. The knowledge scan seems like a kind of exam, it can be taken in a group of colleagues within one municipality, or in a group with several municipalities.

With about 5 questions for each knowledge area, the results of the scans provide insight into the broad aspects of existing knowledge an/or identify any gaps in specific knowledge areas. To apply the scan in a group of water professionals has the added benefit of allowing professionals to better share each other's knowledge and/or to jointly address gaps in knowledge. With this insight they can strengthen their collaboration, take courses at the Water Academy together and/or study their missing knowledge areas from the Kennisbank.

Over 60% of municipalities have already participated in the scan once or twice. This involves approximately 3-15 urban water professionals per municipality, depending on its size.

Figure B-1 en B-2 shows the results for 19 participants. The results show for example that three participants scored ‘good’ for knowledge area 8, while two scored ‘bad’: they can improve each other's knowledge. An idea would be a course for most of them on watermanagement.

1. Policy, legislation and regulations	2. Water management	3. Knowledge of related disciplines	4. Embedding in org. and organizational plans	7. Process, record and validate data	8. Hydraulic functioning	9. Assess research results	6. Research methods and techniques	10. Technical knowledge design	11. Technical knowledge measures	5. Resource management (finance and personnel)	12. Outsourcing and contract formation
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow

Figure B-1: An example of knowledge scan results

Legenda	score range	
Green	90-100%	Good
Yellow	70-90%	Sufficient
Orange	50-70%	Doubtful
Red	25-50%	Insufficient
Dark Red	0-25%	Bad

	1	2	3	4	5	6	7	8	9	10	11	12
max score	62,0	83,0	87,0	86,0	78,0	100,0	78,0	83,0	88,0	97,0	96,0	100,0
gemiddelde	57,6	45,7	57,4	61,7	50,2	57,1	57,5	62,6	66,4	76,6	54,9	73,2
90-100	1	0	0	0	0	2	0	0	0	3	1	3
70-90	3	1	2	7	2	2	2	5	3	9	4	3
50-70	11	6	16	15	7	10	8	12	11	16	10	8
25-50	8	13	21	21	14	21	17	24	24	0	11	21
0-25	0	1	0	0	1	2	0	0	0	0	1	0
Totaal	19	19	19	19	19	19	19	19	19	19	19	19

Figure B-2: An example of knowledge scan results - scores

### 1.2.3 Competencies and roles

Finally, the Branchestandaard describes roles in urban water management and their associated competencies, appropriate for the municipal water-related tasks. Within the general nature of standard profiles, nine main roles have been identified, each with two key competencies. In total, 14 competencies have been identified. Identifying several core competencies under each role provides a complete picture of the required competencies.

## 2 A FUTURE PROOF TEAM

The Basic Course, the Knowledge scan and the Kennisbank have a solid interaction. The Branchestandaard process in combination with the Kennisbank, and the Basic Course and course materials gives us a highly effective system for facilitating targeted knowledge sharing in urban water management.

The results of a Branchestandaard process provide input for the formation of a future-proof team, ready to achieve the desired standard of good water management and to fulfil ambitions in a living environment full of challenges. Figure C illustrates the coherence.

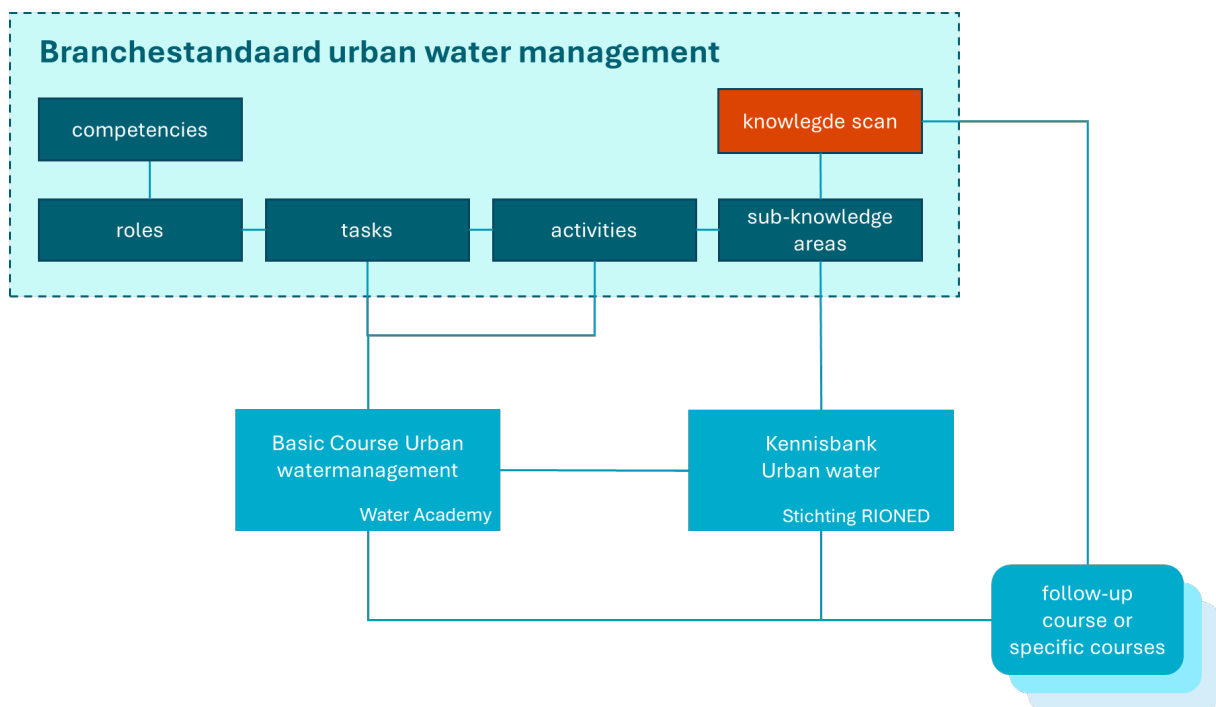


Figure C: The coherence between the Branchestandaard, the Kennisbank and the courses for urban water management