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Adopted by the Minister of the Environment as of 30 January 1997 by Regulation No. 8

GROUND WATER SURVEY, USAGE AND PROTECTION

1. GROUND WATER SURVEY

1.1 Under Section 12(5) of the Water Act, ground water surveys may only be performed by enterprises provided they hold an appropriate license therefor. The licence is also required for the design, drilling and liquidation of borewells. The license is issued as per the procedure set forth by the Government of the Republic.

1.2 A survey of ground water is reconciled before the commencement of works with a local office of a national environment service and registered by the foundation of Estonian Geology Centre.

1.3. The permission to commence works is given by the local government. Disagreements raising upon the issuance of the permissions are to be solved by the county governor or by a court.

1.4. The reserve of ground water (incl. the mineral springwater) which is determined by the analysis is presented to a ground water committee for evaluation. Based on the evaluations performed by the ground water committee, the Minister of the Environment grants or rejects the reserve of ground water. The committee can request additional materials based on their statute.

1.5. Upon the completion of the work, the design client has to provide one report of the results to the foundation of the Estonian Geology Centre and another copy to the local office of national environment service.

1.6. Reports on ground water analysis are accessible to the public and are to be filed with the water registry of local office of national environment service. The surveyor is responsible for preparing the result data on a pre-formatted datasheet which will be transformed into a digital mode and has to be provided to the registrar in one month after making the report available to the public. The registrar authenticates the data, whereafter he or she places them in a registry file or returns them to the surveyor for a review within one month after receiving the data.

1.7. Reports, which besides hydrogeological data include financial data related to activities of the client of survey can be issued to the public by the foundation of the Estonian Geology Centre or by the local office of national environment service only after receipt a permission from the client and only during the course of three years.

2. GROUND WATER USAGE

2.1. The rights and responsibilities associated with the usage and protection of the ground water are derived from the Water Act.

2.2 If the usage of ground water for a resident or group of residents in a city, town or private settlement exceeds 500 m³/d from one single level of ground water, an approved ground water area for water-consumption needs to be established.

2.3. In order to access ground waters, the consumer needs to establish a water intake. The procedures of designing, drilling, maintaining and eliminating borewells of ground water intakes are set forth by the Minister of the Environment.

2.4. In order to get necessary land for building the ground water intake to satisfy the needs of a city, village, enterprise or a co-operative water consumption, a contract of rent or contract of sale is negotiated and the proper servitudes are prepared.

2.5. A licence for special purpose use of water needs to be obtained in case of ground water consumption exceeding 5m³ per day or if the water usage involves any amount of mineral springwater.

2.7. The licence for special purpose use of ground water is issued by the person authorised by the Minister of the Environment, taking into account the previously confirmed amount of ground water. In case of absence of ground water around the water levels of Cambrian-Vendian, Ordovician-Cambrian as well as Devonian-Silurian, the issuer of the licence takes into consideration an opinion expressed by the Estonian Geology Centre.

2.8. Based on an approved design a water intake construction and borewell drilling licence needs to be obtained for the drilling activities. The borewell drilling licence is valid for one year. The issuer of the drilling licence will also provide the well a national code, which is further used as the identification number of the well by the registry of ground water.

2.9. The drilling entity is responsible for maintaining a report-card (Appendix 4) and present it to the foundation of the Estonian Geology Centre (during one month after the design completion), registrar as well as local office of national environmental agency. It is recommended to provide a report card consisting the data of borewell on a digital media.

2.10. Unusable borewells or ones that are dangerous to the quality of ground water as well as boreholes that have completed their mission will be liquidated by

the order of the owner or manager by the means of plugging according to the regulations set forth by the Minister of the Environment. A special statement will be provided to the client, to the local office of national environmental service as well as to the registrar of the ground waters in one month following the completion of the design.

2.11. In case of diminishing demand for water consumption or in case of owners' or managers' decision to close the operation, the unused borewells need to be closed and maintained by closing the opening by welding until a new owner (manager) has emerged. The registry of unused borewells is located at a county or city government and local office of national environmental service.

3. GROUND WATER PROTECTION

3.1. Ground water intakes have to be protected by a sanitary protection area according to Section 28 of the Water Act and restrictive conditions outlined in Section 281. The creation and restrictive conditions of sanitary protection area is regulated by the Minister of the Environment.

3.2. In case of special-purpose ground water intake, according to Subsection(21) 3) of the Water Act, the manager is responsible for keeping records of water usage, measure water level in the borewells and observation wells. They also have to take a water sample once a year for the complete chemical analysis of the quality of water according to the requirements set forth by the water licence and the results must be presented on a pre-formatted paper document as well as on a digital media to the issuer of the water licence and to the ground water registrar as often as the water licence requires it.

3.3. Disagreements between the parties will be discussed and solved by the Ministry of the Environment in one month after the submission of the petition or by the court.

3.4. In case of non-compliance with the rules of ground water, sanctions will be used according to the current law.

3.5. The ground water protection regulations apply to all institutional and private individuals.

Appendix 2

Adopted by the Ministry of the Environment as of 30 January 1997,

Regulation No. 8

STANDARDS RELATED TO THE DESIGN, DRILLING, MAINTAINING AND LIQUIDATION OF BOREWELLS.

1. GENERAL

1.1. The procedures outlined herein are effective and apply to public and single water intake systems of borewells.

1.2. Borewells can be designed, drilled with, and liquidated by enterprises who have acquired a proper licence for doing it.

1.3. The search for the best borewell location is based on technical and economical calculations with taking into account current planning of the region, geological-hydrogeological conditions as well as the possibility to implement a sanitary protection area.

1.4. During the designing, the radiuses of effect of the existing borewells are to be taken into consideration.

1.5. If a region in question includes activities of the mining industry, any new borewells are to be harmonised with the mining enterprise.

1.6. Amortised as well as unused borewells shall be liquidated in order to prevent potential pollution in the ground water by plugging according to the current regulations.

1.7. The responsibility for timely liquidation of the borewells falls on the owner of the well.

1.8. The quality and timeliness of the elimination by plugging is overseen by a local office of a national environmental service agency with co-operation with local government.

2. STANDARDS REGULATING THE DESIGNING, HARMONISATION OF BOREWELLS, APPLICATION PROCESS TO OBTAIN CONSTRUCTION AND DRILLING LICENCES, CONSTRUCTION, APPLICATION FOR USAGE LICENCE AND THE PROCESS OF FILING TO CONSTRUCTION REGISTRY.

2.1. Borewells are built only on the basis of designs, regardless of the depth of the borewell.

2.2. The borewells opening the ground levels of Cambrian-Vendian, Ordovician-Cambrian and Devonian-Silurian on highly populated areas have to be constructed consistently with the general and detailed planning regulations.

2.3. The design of borewell is to be put together in a capacity which provides for the possibility to estimate the usage and protection requirements of ground water.

2.4. In cities and in other highly populated areas and sparsely housed areas, where the ground water consumption exceeds 500m³ per day, a design involves:

- Project of borewell;
- Project of sanitary protection area;
- Project of the construction of water intake area.

2.5. In cities and other highly populated areas, where the ground water consumption is below 500m³ per day, a design involves:

- the design of borewell, which includes the boundaries of sanitary protection area as well as associated restrictions;
- design of the construction of water intake area.

2.6. On a sparsely housed area, where the ground water consumption is below 500m³ but exceeds 10m³ per day for a satisfaction of a single property, a design includes:

- The design for borewell, which includes the boundaries of the sanitary protection area associated restrictions as well as construction plan of the top building.
- DESIGN of water intake construction upon a design client's request.

2.7. On a sparsely housed area, where the ground water consumption is below 10m³ per day, a design includes:

- The design of the borewell, which includes the proposed care-measures for the protection of ground water at the watering place as well as the construction plan of the top building.
- design of the water intake, if requested by the client.

2.8. In order to prepare the design of the borewell, the builder of the water intake shall submit an application to the state environmental board of that location (see

Appendix 3), which shall grant the application within two weeks. When processing the application, it may be requested that the location of the borewell be chosen on site.

2.9. The requirements for designing a water intake borewell are available in the local government institutions. The local government shall also appoint persons to concord the design.

2.10. On the basis of the concorded design that has been approved by the local government a building permit shall be obtained from the local government and a permit to drill a well from the Estonian Geology Centre. Depending on the site of the borewell, the issuer of the permit to drill a well may demand that a cartage be performed on borewells whose depth exceeds 100 m.

2.11. If the design of the water intake borewell consists of several parts, for example, of separate borewell design or a borewell, buildings, and sanitary protection zone, all designs shall be concorded together. The client shall formalise the concordance of a design or designs, their approval, application for building and drilling permit; if necessary, he or she may also subcontract these procedures to an authorised person, including the designer.

3. CHOICE OF GROUND WATER LAYER

3.1. Existence of ground water supply, approved by the Minister of the Environment on the proposal of the Ground Water Committee, is a prerequisite for designing of borewells.

3.2. For obtaining potable water, such water layer is chosen in which the quality of ground water conforms to the potable water standard. In case of industrial water, layers with renewable ground water supply near the ground surface shall be preferred.

3.3. If necessary, building of observation wells shall be prescribed in the designs of larger new water intake borewells in towns, settlements and elsewhere; for this, the proposal shall be made by the state environmental board of the location of the borewell.

4. CHOICE OF STRUCTURE OF BOREWELL

4.1. The borewell design shall set out the depth, initial and end diameter, reinforcement of the walls, the type of the filter, etc.

4.2. The diameter of the operating part of the borewell depends on the type of the filter to be designed and its diameter, and the size of the water lift device and depth where it is installed.

4.3. The structure of the borewell shall ensure that:

4.3.1. loose and mellow sediments are fixed;

4.3.2. the main column of the borewell is cemented behind piping in order to prevent the upper water layers from mixing and isolate the water layer used;

4.3.3. loose and mellow sediments are isolated and sufficient amount of water passes;

4.3.4. the main column of the casing pipe is at least 0.2 m above the ground or the floor of the pinging station;

4.3.5. the space between the external diameters of the preceding and subsequent casing pipes is 100 mm for sleeve joint and 60 mm for nipple joint piping;

4.3.6. it is possible to perform carrotage, clean the borewell and perform dynamic measurements of the water level.

4.4. The materials used to build a borewell shall have appropriate certificates and their use shall be concorded with the Health Protection Inspectorate.

5. TESTS AND INTRODUCTION INTO USE OF BOREWELL

5.1. After the drilling has been finished, cleaning pumping is carried out in the borewell until the pumped water clarifies.

5.2. In order to determine the hydrogeological parameters of the borewell, test pumping exceeding the planned capacity by 1.3 times is carried out.

Test pumping shall be carried out until the capacity and dynamic water level stabilise.

5.3. In the course of test pumping, water samples for bacterial, physical and chemical analyses shall be taken, whereas by the time the samples are taken, the operational capacity shall have to be increased by 1.3 times.

5.4. If the quality of water fails to conform to the requirements for potable– and industrial water, an additional design shall be prepared for processing water.

5.5. The drilling organisation shall transfer to the client a sealed well, accompanied by the borewell passport (Appendix 6).

5.6. Upon introduction into use, the top of the borewell shall be sealed to avoid pollution of the water layer. The top shall allow measurement of the water layer in the borewell, and a tap for taking samples shall be installed.

5.7. The drilling company shall inform the state environmental board of the location of the borewell two weeks prior to the commencement of work, and submit the necessary data according to the clause 2.9 of the Appendix 1 hereof.

5.8. The borewell passport shall set out the following data:

5.8.1. the state code;

5.8.2. the name of the owner or possessor of the borewell;

5.8.3. the location of the borewell, geographical co-ordinates with second precision, and location plan 1:10,000, 1:25,000, or more precise;

5.8.4. absolute height of the ground on the site of the borewell;

5.8.5. the name of the drilling organisation and the time of drilling;

5.8.6. profile of the borewell;

5.8.7. structure of the borewell;

5.8.8. hydrogeological parameters of the borewell (capacity, static and dynamic water level);

5.8.9. data on the water analyses according to the water standard and the client's requirements to industrial water;

5.8.10. suggestions concerning arrangement of drawing of water, the capacity and sinking depth of the pump.

5.9. Additional test pumping shall be performed in and new water analysis taken from borewells that are introduced into use later than six months after their completion. The possessor of the borewell shall be liable for the completion of such works.

6. LIQUIDATION OF BOREWELLS

6.1. Borewells shall be liquidated by means of plugging on the basis of the design ordered by the owner or possessor of the borewell. The liquidation design of the borewell shall be concorded with the state environment board of the location of the borewell.

6.2. The drilling organisation notifies the state environment board of the location of the borewell of the liquidation of the borewell two weeks before performing the works.

6.3. The liquidated borewell shall remain in the register of buildings.

6.4. The liquidation design of borewells shall involve the following data:

6.4.1. the state code of the borewell;

6.4.2. the name of the owner or possessor of the borewell and their site;

6.4.3. the name of the organisation that drilled the well and the number of passport;

6.4.4. technical condition and the cause for liquidation of the borewell;

6.4.5. description of the technology of liquidation works.

6.5. Upon liquidating borewells, the following technological requirements shall be observed:

6.5.1. Before plugging, the borewell is chlorinated with a solution in which 100–125 mg active chlorine is used for one litre of water.

6.5.2. If the water in the borewell to be liquidated is substantially polluted, cleaning pumping shall be performed before plugging in the borewell until the water conforms to the applicable requirements.

6.5.3. The water-supplying part of the borewell shall be filled with disinfected loose material (coarse-grained sand, fine gravel or scree). The surface of loose material layer shall remain 2–3 below the lower end of the main column of casing piping of the borewell.

6.5.4. The rest of the borewell cavity shall be filled with cement mortar 1:1:2 or dry concrete, brand 100–150.

6.5.5. A cavity shall be dug around the mouth of the borewell above the ground, and the casing pipe shall be cut at least 0.5 m below the ground. The cavity shall be filled with clay or argillaceous soil.

6.5.6. If the working part of the borewell has been filled with irrelevant objects or the borewell contains dropped deep pumps, the working part of the borewell shall be cleaned to the extent which allows to isolate the water-supplying part.

6.5.7. If the water-supplying part of the borewell opens two or more water layers, they shall be isolated by plugging. For that purpose, the water-supplying parts of the borewell shall be filled with inactive loose material; the water isolator shall be provided by a concrete (clay) waterproof plug.

6.5.8. If the isolation behind the casing pipes of the borewell to be liquidated is damaged or missing, and if two or more water layers have been isolated by casing piping, the casing piping shall be torpedoed above the water isolator separating these layers. Upon plugging of the borewell, cementation is provided behind the casing piping in the torpedoed part.

6.5.9. Upon liquidation of overflowing borewells, the overflow shall be stopped before plugging in the following cases:

6.5.9.1. if static water level is more than 1.5 m above the ground, the casing piping shall be extended until the overflow stops, and the borewell shall be plugged in the regular manner;

6.5.9.2. if static water level is higher, heavy clay solution is pumped into the water-supplying part of the borewell until the overflow stops; after that, the borewell shall be plugged.

6.6. The person performing the works shall prepare a report that is given to the owner, copies of the shall be given to the state environmental board of the location of the borewell, the person keeping the Ground Water Committee, and to the foundation of the Estonian Geology Centre within one month after completion of works.