

## NRC Publications Archive Archives des publications du CNRC

### Instructions for observation of groundwater levels on housing sites Peckover, F. L.; Schriever, W. R.

This publication could be one of several versions: author's original, accepted manuscript or the publisher's version. / La version de cette publication peut être l'une des suivantes : la version prépublication de l'auteur, la version acceptée du manuscrit ou la version de l'éditeur.

For the publisher's version, please access the DOI link below. / Pour consulter la version de l'éditeur, utilisez le lien DOI ci-dessous.

#### **Publisher's version / Version de l'éditeur:**

<https://doi.org/10.4224/40000664>

*Building Research Note, 1952-08-01*

#### **NRC Publications Archive Record / Notice des Archives des publications du CNRC :**

<https://nrc-publications.canada.ca/eng/view/object/?id=63614246-e877-4c2f-b731-330d6042bd84>

<https://publications-cnrc.canada.ca/fra/voir/objet/?id=63614246-e877-4c2f-b731-330d6042bd84>

Access and use of this website and the material on it are subject to the Terms and Conditions set forth at

<https://nrc-publications.canada.ca/eng/copyright>

READ THESE TERMS AND CONDITIONS CAREFULLY BEFORE USING THIS WEBSITE.

L'accès à ce site Web et l'utilisation de son contenu sont assujettis aux conditions présentées dans le site

<https://publications-cnrc.canada.ca/fra/droits>

LISEZ CES CONDITIONS ATTENTIVEMENT AVANT D'UTILISER CE SITE WEB.

**Questions?** Contact the NRC Publications Archive team at

PublicationsArchive-ArchivesPublications@nrc-cnrc.gc.ca. If you wish to email the authors directly, please see the first page of the publication for their contact information.

**Vous avez des questions?** Nous pouvons vous aider. Pour communiquer directement avec un auteur, consultez la première page de la revue dans laquelle son article a été publié afin de trouver ses coordonnées. Si vous n'arrivez pas à les repérer, communiquez avec nous à PublicationsArchive-ArchivesPublications@nrc-cnrc.gc.ca.



CANADA

# Building Research Note

Ser  
TH1  
B92  
no. 2  
1952  
BLDG

ANALYZED

## INSTRUCTIONS FOR OBSERVATION OF GROUNDWATER LEVELS ON HOUSING SITES

by

F.L. Peckover and W.R. Schriever

The level of water in the ground is often the key to many troubles encountered on housing sites--those encountered by the householder as well as the builder. An excessively high water level may cause flooding of basements and cracking of house walls, and impede the function of septic tanks and drainage facilities. An unusually low groundwater level may cause shrinkage of some soils with possible structural damage.

It is often of use to observe changes in the groundwater level and try to relate these to other occurrences on the site. Such observations may also be useful under certain conditions in choosing building sites and planning design and construction details.

The purpose of this Note is to give instructions for making a simple installation in the ground by means of which the groundwater level may be observed. This installation consists essentially of a common well point.<sup>†</sup>

---

<sup>†</sup> A well point is a screened cylinder connected to a vertical pipe and sunk in the ground for extracting water from the soil on construction sites.

3342930

connected to an open pipe which extends above the ground surface. The well point acts as a filter, keeping out the soil but allowing the groundwater elevation inside it to change as in the surrounding soil. The level of the water in the well point is measured by means of the open pipe.

Equipment (see Figure 1)

- 1 post hole auger, 4 inches or more in diameter, with a T-handle and extensions
- 1 self-jetting well point, 36 inches long (available from suppliers of construction equipment) with sharp driving point (similar to Stang or Griffin types).
- 1 standard galvanized iron pipe,  $1\frac{1}{2}$  inches nominal diameter (see section "Preliminary Work" for length)
- 1 galvanized iron pipe cap,  $1\frac{1}{2}$ -inch size, small hole drilled in one side
- 1 heavy hammer
- 1 cubic foot of clean uniform sand

Jetting assembly consisting of:

- 1 pipe tee  $1\frac{1}{2}$ -inch nominal diameter
- 2 pieces pipe,  $1\frac{1}{2}$ -inch nominal diameter, 6 inches long
- 1 pipe cap,  $1\frac{1}{2}$ -inch nominal diameter
- 1 reducing coupling,  $1\frac{1}{2}$  to  $3/4$ -inch nominal diameter
- 1 garden hose and fittings

Preliminary Work

The first operation is to make an auger boring to see what kind of soil is present and to find the approximate level of the groundwater table. Choose a spot where the installation will be convenient to read in summer and winter, but will not be unsightly or subject to damage. If the site is sloping, choose a location on the uphill side of the location of any structure. It is not necessary to carry this boring deeper than 10 or 12 feet, since if the groundwater is below this, it is unlikely to have an effect on nearby house foundations.

During boring operations, keep a careful record of the kind of soil encountered at various depths, noting in particular the depth of any changes. When groundwater is encountered or the required depth of boring is reached, it is necessary to wait until the level of the water becomes steady in the hole. This may be a matter of minutes in a sand or gravel soil, or days in a clay soil. At any rate, check the water level in the open hole periodically until no further rise is observed.

The groundwater level may vary as much as 8 or 10 feet in one location between wet and dry seasons. In most parts of Canada it is usually highest between November and April and lowest about September. Taking into account the time of year at which the boring is made and the observed groundwater level, an estimate of the depth of boring and length of  $1\frac{1}{2}$ -inch pipe required may be made. The well point, when placed in the bottom of the bore hole, should be completely below the groundwater level at all times of year, and the  $1\frac{1}{2}$ -inch pipe, when connected to the top of the well point, should extend 18 inches above the surface of the ground. The pipe may then be cut to the required length and threaded at both ends. Two or three short pipe sections may be preferable to one long section if the assembly is to be driven down.

#### Installation Procedure

It is necessary to get the well point down to the required depth and at the same time keep the screen openings from becoming clogged by fine soil.

In sand and gravel soil, the bore hole may not stay open below the water level. After the well point and  $1\frac{1}{2}$ -inch pipe are firmly connected and lowered into the hole, it will therefore help if a garden hose is attached to the top of the pipe (see jetting assembly in Figure 1), and the water pressure turned on full. Due to the ball valve of a self-jetting well point, water will thus be forced out through the openings in the nose of the well point, loosening the soil below. At the same time the assembly should be pushed or hammered down until the top of the pipe is at the required level. If large stones are encountered it may not be possible to do this, and another hole may have to be tried. Heavy driving with a hammer should be done with care. While driving, it is always best to keep the pipe cap in place and use a hardwood or plywood cushion between the pipe cap and hammer. When the installation is complete, the hole is backfilled with tamped soil, a small amount of which is heaped up around the pipe at the ground surface.

In clay or soft soil, the sides of the bore hole will usually stand up long enough for the assembly to be placed. In this case,



however, the soil may smear over the screen openings in the well point, preventing water from flowing in or out readily. After the bore hole is carried to the required depth and the well point and pipe are lowered into place, therefore, clean uniform sand should be dropped down the hole to settle in the circular space between the well point screen and the surrounding soil. If this sand can be tamped firmly with a long wooden rod, best results will be obtained. The sand backfill should extend to within 2 or 3 feet of the ground surface. Above this, the soil removed from the hole by the auger should be tamped firmly back into place, leaving a small amount of excess at the ground surface. If a gallon of clean water is then poured down the pipe, this will flush out the screen and improve the performance of the installation.

#### Method of Taking Measurements

The water level within the pipe may be read sufficiently accurately by means of metallic surveying or other canvas tape which will not stretch appreciably. Cloth tape or pieces of string are unsuitable and should not be used.

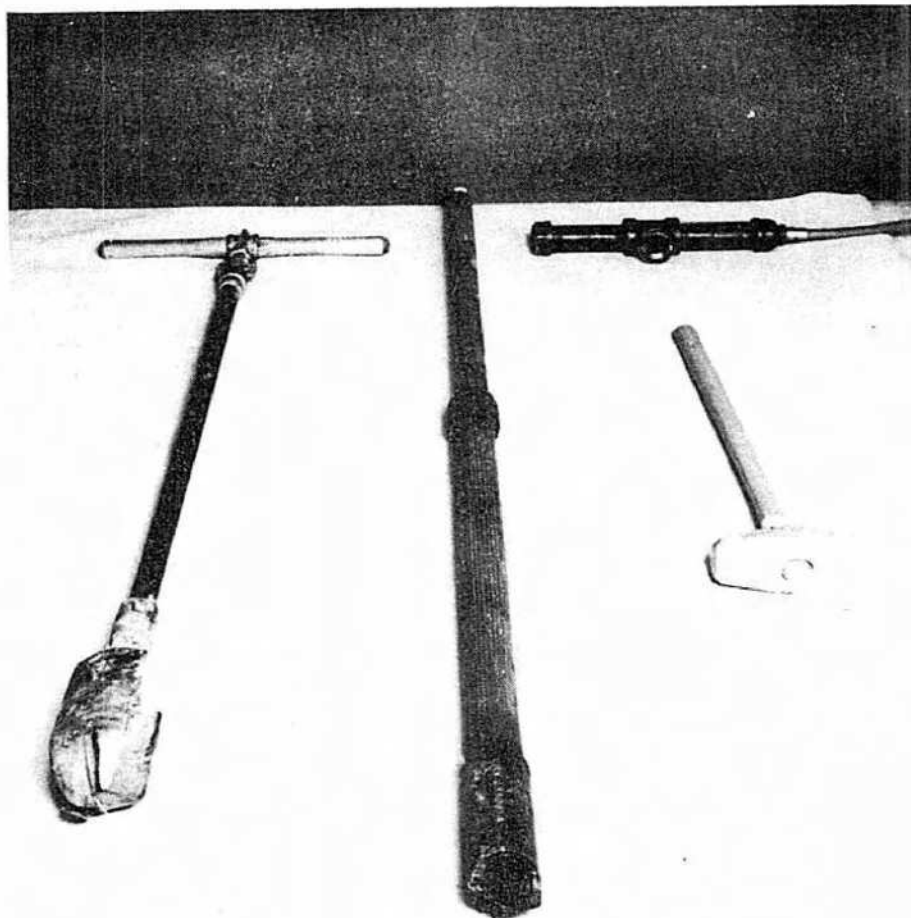
A small weight such as a fishing sinker should be fastened to the end of the tape. If the tape is then whitened for a short distance from the end with common chalk, the level of the water will show clearly. If the tape is lowered to an even foot mark at the top of the pipe, the wetted length may be subtracted from this reading to give the depth of water. Readings should be taken to the nearest 1/4 inch. The pipe cap should of course be replaced after every reading.

#### Records

The elevation of the top of the pipe should be related to a bench mark in the area. In this way the true elevation of the water may be recorded at weekly intervals, along with comments on rainfall, temperature and snow conditions.

---

The Division of Building Research will be interested to hear of unusual groundwater conditions or to offer advice if trouble is encountered in the installation of equipment such as that described in this Note.



Equipment for Groundwater Table Observation Pipe

Left to right: 4 inch diameter post hole auger  
Well point with pipe attached  
Jetting assembly and sledge hammer