

Assessment of existing water supply well at the Betty Dick Cabin, Rocky Mountain National Park

Summary

The existing well at the Betty Dick Cabin does not meet current construction or public health standards. The well could be made suitable for nonpotable uses by extending the well casing above ground surface and backfilling the pit. However, water from the well would be classified as “groundwater under the direct influence of surface water” and would require filtering to make it suitable for potable uses. It would probably be cheaper and easier to construct a new well to meet current drinking water standards.

Discussion

A site visit was made to assess the condition of the existing well at the Betty Dick Cabin in the Kawuneeche Valley, on the west side of Rocky Mountain National Park. The well is located in T4N, R76W, NW¼ of Section 12 (Figure 1). There is no record of this well in the Colorado Dept. Water Resources database. Construction of the well probably predates permitting requirements for domestic wells.

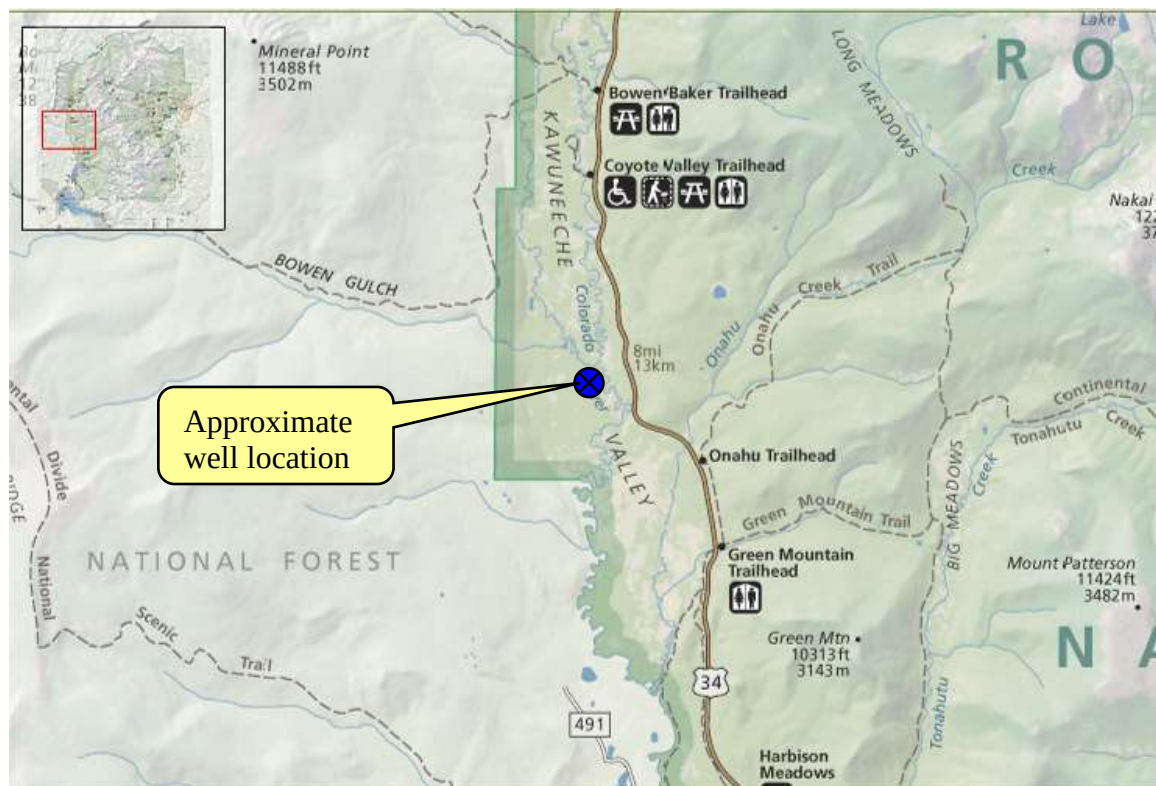


Figure 1. Approximate location of well at the Betty Dick Cabin.

The well is located in a well pit about 50 feet west of the cabin. The pit is about 4 feet deep and the top of the well casing rises about 1 foot above the concrete floor of the pit (Figure 2). Construction of a well pit was a common practice in the past, but is generally

not allowed now due to the potential for surface water to drain into the well pit and contaminate the well.



Figure 2. Well pit. The staining on the walls shows that water in the pit is frequently above the top of the well casing, creating the potential for contamination of the well.

The depth of the well was measured by inserting a steel tape through an access hole at the top of the well casing. The well is about 28 feet deep, measured from the top of the well casing.

I was able to probe with a piece of rebar through an opening between the concrete floor of the well pit and the well casing. The rebar could easily be pushed through the sediments adjacent to the well casing, indicating a total lack of a concrete seal to prevent surface water from infiltrating and contaminating the well.

The well obtains water from the sand and gravel alluvial deposits associated with the Colorado River. These are very porous sediments and will yield large amounts of water to a well. It is unknown whether there are perforations in the sides of the well casing to allow water to enter the well, or if all of the water enters through the opening at the bottom of the well casing. Either method of well construction is common.

The static water level in the well was a few inches below the top of the casing.

The well was test pumped using the existing submersible pump. The well produced 12 gpm and was pumped for about 20 minutes, resulting in a stable water level about 3 feet below the top of the well casing. The well would probably be able to sustain a continuous flow of water at that rate due to the completion of the well in the permeable sand and gravel sediments.

The water pumped from the well had a very low conductivity, 118 us/cm, indicating a very small amount of dissolved minerals in the water. However, the water contained a lot of fine-grained, black sediment; possibly corrosion from the well casing. The sediment might also be fine-grained, alluvial sand deposited by the river. The sand could enter the well through large perforations in the well casing. The well continued to produce noticeable amounts of sand after 20 minutes of continuous pumping. It's likely the sand-pumping would always be a problem with this well.

I recommend plugging and abandonment of this well for the following reasons;

1. The well does not meet current construction and public health standards, primarily because it lacks a surface seal and is finished below grade in a well pit.
2. The well produces fine-grained, black sand, which would be a perpetual problem.
3. The shallow depth to groundwater and proximity to the Colorado River makes it likely that the water pumped from the well would be classified as "groundwater under the direct influence of surface water".
4. The location of the septic system, in relation to the well, is unknown.

Construction of a new well at this site should include the following considerations;

1. Locate the well an adequate distance, and upgradient, from the septic leachfield.
2. Locate the well as far from the river as possible to reduce the potential of surface water influence.
3. Do not locate the well near any ponds, wetlands, or marshy areas because they could be potential sources of poor quality water.
4. Construct the well to meet current construction standards, especially with respect to the depth of the surface seal.
5. Use PVC well screen and casing to reduce the effects of corrosion of steel casing.
6. Allow a lot of time for development of the well (pumping, surging, and jetting) to remove fine-grained sand from the vicinity of the well screen.
7. Complete the well with well screen, not perforated casing.

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Larry Martin
NPS Water Resources Division
Ft. Collins, CO
(970)-225-3515