



Maryland

Department of the Environment


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MEMORANDUM

March 13, 2025

TO: All Local Approving Authorities

FROM: John A. Boris, Jr., LEHS 
Geologist, Program Consultant
Wastewater Pollution Prevention & Reclamation Program

THRU: Nony Howell, LEHS 
Program Manager
Wastewater Pollution Prevention & Reclamation Program

RE: Confined vs Unconfined Well Construction in the Coastal Plains Aquifers

Purpose

This memorandum clarifies the Department's position regarding the determination of whether a well is classified as confined or unconfined in Hydrogeological Areas 1 & 2, as defined in COMAR 26.04.04B(1 & 2). This classification is essential to ensure compliance with water well construction requirements, water quality standards and application of horizontal distance setbacks. Unless greater setback distances are noted in a groundwater protection report Maryland regulations require confined aquifer water supply sources be fifty feet (50') from sources of contamination and sewage disposal areas whereas unconfined aquifer water supplies must maintain a one hundred feet (100') setback.

The following definitions from COMAR 26.04.04.02B are relevant to this discussion:

- **Aquifer:** A formation or group of formations that contains sufficient saturated permeable material to yield significant quantities of water to a well.
- **Confined Aquifer:** An aquifer bounded above and below by beds of distinctly lower permeability, containing groundwater under pressure greater than atmospheric pressure (synonymous with "artesian aquifer").

- **Confining Layer:** A body of impermeable or significantly less permeable material adjacent to one or more aquifers.
- **Grout or Grouting Material:** A stable, impervious bonding material providing a watertight seal in the annular space as required.
- **Unconfined Aquifer:** An aquifer not bounded above by a low-permeability layer, with groundwater under pressure approximately equal to atmospheric pressure (synonymous with "water table aquifer").

Additional relevant regulatory citations include:

- **COMAR 26.04.04.15 B:** Describes the five hydrogeological areas.
- **COMAR 26.04.04.19.19E(7):** Describes relative depths to confining layers.
- **COMAR 26.04.04.30D:** Outlines bacteriological, chemical, and physical water quality requirements for nonpublic potable water supply wells.
- **COMAR 26.04.04.30E:** Allows additional analyses if contaminants are suspected.
- **COMAR 26.04.04.30F:** Establishes potable water contaminant standards per US EPA regulations.
- **COMAR 26.04.04.30J:** Governs permanent deviations for water treatment devices where contamination exists.

Well Construction Determination Process

1. **Initial Application Review**
 - The well driller submits an application that includes the proposed location and screen depth.
 - The Approving Authority reviews the aquifer intended for screening, ensuring compliance with COMAR 26.04.04.19E(7).
 - Potable water supply wells may not be screened into depths where water quality is known to exceed the National Primary Drinking Water Standards.
2. **Permit Approval Process**
 - The Approving Authority reviews construction setbacks and site location in accordance with the proposed well construction depth and aquifer intended for use.
 - Any special conditions, such as confined aquifer, additional grout requirements, specialized water quality testing, or specific screen intervals, are added to the permit.
 - Inspection of the well drilling location, construction and grouting is recommended to ensure compliance with the permit.
3. **Post-Construction Review**
 - Upon submission of the well completion report, review to ensure the well has been constructed as per the permit, including location, approximate well depth, approved aquifer unit and if any other special conditions have been met.
 - Based on conformance with the above steps, determination of confined or unconfined aquifers can be decided.

4. Water Quality Testing & Compliance

- The presence of contaminants (e.g., nitrates, PFAS) in a well classified as confined raises concerns about construction integrity or geological anomalies.
- If contamination is detected:
 - The well construction is reviewed for compliance.
 - The geological strata are analyzed for inconsistencies.
 - If discrepancies from published geological data (COMAR 26.04.04.19E(7)) are identified, a study may be necessary to determine if changes should be made in the issuance of future well construction permits.
 - Upon discovery of contaminants that are of surficial origin in water sampling results from confined aquifer wells, setback distances to septic systems should increase until aquifer assessment is completed.
 - Variations in permeability or water quality within the aquifer do not automatically constitute a confined well unless the confining layer is explicitly identified per COMAR 26.04.04.19E(7).

5. Granting of Permanent Deviations

- If a water quality exceeds the Maximum Contaminant Level (MCL) for specific contaminants, the Approving Authority may consider a permanent deviation under COMAR 26.04.04.30J.
- Special conditions may be imposed to ensure that future potable water supply wells within an area are screened in strata where contaminants do not exceed MCLs.
- Granting a permanent deviation does not reduce the required construction setbacks per COMAR 26.04.04.4B(2).

Summary Guidance

- **Unconfined Well:** Any well constructed in the boundary identified in COMAR 26.04.04.15B(1) above the first confining layer as defined in COMAR 26.04.04.19.19E(7) is classified as unconfined. These wells are not eligible for permanent deviations unless covered under COMAR 26.04.04.30J(6-8).
- **Confined Well:** Any well constructed within boundaries identified in COMAR 26.04.04.15B(2) screened below the first confining layer, meeting all construction requirements shall be classified as confined in Hydrogeological Areas 2. These wells are not eligible for permanent deviations unless covered under COMAR 26.04.04.30J(6-8).

For further questions, please contact John Boris at john.boris@maryland.gov or (410) 537-3678.