

Issue Paper The Potomac Aquifer as a Fundamental Barrier to Data Center Development in New Kent County August 2026

Executive Summary

New Kent County sits atop the confined Potomac aquifer within Virginia's Coastal Plain aquifer system, east of Interstate 95. This resource is the primary source of public drinking water for the county's systems. A comprehensive 2026 Virginia Department of Environmental Quality (DEQ) report, mandated by the General Assembly, concludes that the Coastal Plain aquifer system has essentially no remaining capacity for significant new industrial groundwater withdrawals under current permitting standards. Areas including New Kent and neighboring Charles City have among the most constrained capacity.

Data centers, particularly those relying on evaporative or hybrid cooling, routinely require water volumes far exceeding sustainable additional withdrawals in this region (often hundreds of thousands to millions of gallons per day for hyperscale facilities). Approving data center applications that depend on groundwater (or that would strain limited municipal supplies drawn from the aquifer) would conflict with state science, existing DEQ reduction mandates for New Kent's major systems by 2038, risks of land subsidence and saltwater intrusion, and the county's location in the Chesapeake Bay watershed.

The aquifer's fragility provides a clear, science-based, and legally supportable barrier to data center incursion. Local land-use decisions should treat groundwater availability as a threshold constraint, consistent with DEQ findings and the county's own transition toward costly surface-water alternatives.

New Kent's Dependence on the Potomac Aquifer

New Kent County's public water systems withdraw groundwater primarily from the Potomac aquifer (with limited use of other Coastal Plain aquifers). The water is typically of high quality, requiring only disinfection. Multiple county wells serve systems such as Bottoms Bridge, Central, and others.

State policy has long recognized over-extraction risks. DEQ has directed progressive reductions in permitted groundwater withdrawals for the county's largest systems, with significant cuts required by approximately 2038. This has driven New Kent to pursue expensive surface-water alternatives, including a Pamunkey River intake and treatment project (estimated costs already in the tens of millions of dollars). Current capacity meets existing demand, but long-term growth is constrained without new sources. Recent permit modifications and public notices confirm ongoing reliance on the Potomac aquifer for public supply.

Scientific and Regulatory Reality: The 2026 DEQ Coastal Plain Groundwater Report

In July 2026, DEQ released its report on *Groundwater Supply East of Interstate 95*, prepared in cooperation with the U.S. Geological Survey pursuant to Senate Joint Resolution 25 (2024). Key findings include:

- The Virginia Coastal Plain aquifer system (including New Kent, Charles City, Henrico, and surrounding localities) is under serious stress. Groundwater levels in the Potomac aquifer have resumed declining after a period of relative stability.
- Major historical withdrawals have driven inland water levels below sea level in places, contributing to land subsidence and elevating the risk of saltwater intrusion into freshwater zones.
- DEQ modeled hypothetical 3-million-gallon-per-day industrial withdrawals (a scale relevant to large data centers using evaporative cooling) at multiple sites across the Coastal Plain. **None** of the modeled withdrawals met current permitting criteria.
- Maximum sustainable additional withdrawals that could potentially qualify under technical standards ranged from roughly 360,000 gallons per day in the most favorable (and remote) locations down to less than 30,000 gallons per day in western Coastal Plain areas closer to the I-95 corridor, including zones encompassing New Kent and Charles City.
- The report concludes that, under current conditions, it is unlikely a data center using evaporative cooling (or any comparable large water user) could secure a reliable, sufficient groundwater supply anywhere in the Coastal Plain. DEQ further recommends that localities in groundwater management areas limit planned growth based on groundwater availability when alternative sources are not feasible.

These findings are not speculative; they rest on decades of cooperative DEQ–USGS modeling of the Potomac and related aquifers.

Data Center Water Demands Are Incompatible with Available Capacity

Data center cooling demands vary by technology, climate, and density, but even efficient facilities impose large loads:

- Typical hyperscale campuses can require hundreds of thousands of gallons per day; some proposals in the broader region have cited average or peak demands in the 600,000–2 million gallon range.
- Evaporative cooling is water-intensive; closed-loop or air-cooled systems reduce but do not eliminate demand (and often increase energy use). Indirect water use for power generation adds further pressure.
- New Kent’s constrained additional capacity (in the low tens of thousands of gallons per day in the most stressed zones) cannot support even modest new industrial users without displacing existing residential, agricultural, or public-supply needs or accelerating aquifer decline.

Any data center relying on a new well, expanded municipal allocation from the Potomac aquifer, or significant consumptive use would face severe permitting hurdles at the state level and would undermine the county's own transition away from groundwater dependence.

Compounding Risks

- **Chesapeake Bay Watershed:** Additional large withdrawals and any associated discharges or runoff contribute to cumulative stress on a watershed already subject to strict nutrient and sediment goals.
- **Subsidence and Saltwater Intrusion:** Continued or increased pumping risks irreversible land sinking and contamination of the freshwater resource that supplies homes and farms.
- **Existing Mandates and Costs:** New Kent is already investing in surface-water infrastructure precisely because state regulators have determined that continued heavy reliance on the Potomac aquifer is unsustainable. Adding data-center demand would raise costs for all ratepayers and jeopardize the reliability of the public supply.
- **Regional Precedents:** Neighboring Charles City faces parallel aquifer constraints and has seen strong resident opposition to projects involving new wells or large industrial water use. Statewide, the DEQ report has prompted calls for legislative action and special sessions.

Legal and Policy Implications

Under Virginia law, local governments retain substantial authority over land use. Conditional-use permits, rezonings, and comprehensive-plan consistency determinations may (and should) consider resource constraints. Approving a use that requires water volumes the state science shows cannot be sustainably permitted creates legal and practical vulnerability: future denial of groundwater permits, ratepayer burdens, environmental liability, and inconsistency with state groundwater-management goals.

Private nuisance, environmental, or process challenges could also arise if approved facilities later face water shortages or cause measurable aquifer impacts. The DEQ report supplies objective evidence that groundwater availability is a legitimate, non-arbitrary basis for denial or for imposing conditions that effectively preclude aquifer-dependent projects.

Recommendations

1. Treat documented groundwater capacity as a threshold screening criterion for any data-center or similar high-water-use application.
2. Require applicants to demonstrate a non-groundwater water supply (public surface water with confirmed capacity and allocation, or fully closed-loop systems with verified low consumptive use) and to fund independent hydrogeologic review.
3. Align local ordinances and the forthcoming data-center standards with DEQ findings, explicitly incorporating aquifer protection and the 2038 reduction mandates.
4. Coordinate with DEQ and neighboring localities (Charles City, Henrico, etc.) on cumulative impacts.

5. Prioritize the county's surface-water transition projects so that any future growth occurs on a sustainable footing rather than further depleting the Potomac aquifer.

Conclusion

New Kent's location on the stressed Potomac aquifer is not a minor planning detail—it is a hard physical and regulatory constraint. The 2026 DEQ report establishes that significant new industrial groundwater demand is incompatible with the resource's remaining capacity. Data centers that would draw upon or strain this aquifer should be rejected on scientific, fiscal, environmental, and legal grounds. Establishing the aquifer as an explicit barrier protects the county's drinking-water supply, avoids irreversible damage, and ensures that land-use decisions remain consistent with state determinations of sustainability.

This position is grounded in current state science and New Kent's own water-supply realities. It provides a durable foundation for denying applications that would otherwise impose unsustainable demands on a shared, finite resource.

Data Centers in New Kent & The Potomac Aquifer