

## **Impacts of Septic Tank Effluent from a Proposed Residential Development on Water Quality, Adams County, Colorado**

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**Abstract.** Individual sewage disposal systems (ISDS) have been shown to be an effective method of treatment for domestic wastewater. They also are advantageous from a water resources standpoint because there is little water leaving the local hydrologic system. However, if unfavorable settings exist, septic tank effluent (STE) can have a detrimental effect on local water-quality. This study will focus on impacts of a proposed 2500 home development to area water quality. The development plans to utilize ISDS to accommodate all domestic wastewater generated within the residential development. The study area is located just west of Brighton, Colorado, on the northwestern margin of the Denver Basin. Efforts of this research will focus on impacts of STE to local groundwater and surface water systems.

The Arapahoe Aquifer, which exists at relatively shallow depths in the study area, is suspected to be vulnerable to nitrogen contamination. Nitrate, a common product of STE, may already be at elevated levels in the Arapahoe Aquifer in this area due to prior agricultural practices. Furthermore, the geologic structure of the Arapahoe Formation and the local subsurface hydrologic system are not well understood at this location.

The objective of this study is to achieve the following: 1) characterize the local geologic and hydrologic system and elucidate the controls important for the nitrogen transport, 2) develop a monitoring program which will determine locations vulnerable to contamination and provide a long-term sampling and analysis plan, and finally 3) quantitatively assess the impacts of widespread STE discharge on local water quality most likely using a combination of analytical and numerical models.