

PURPOSE: In Colorado jurisdictions, county and municipal building departments often adjudicate discrepancies in differing regulations where structures and environmental factors may interact. In Delta County, the Health Department currently provides this role for reconciling regulations for the Board of Health (BOH) where the health and environment require prevention from potential contamination due to Onsite Wastewater Treatment Systems (OWTS) and floodwaters.

POLICY¹: It is the responsibility of Delta County Health Department to ensure that any OWTS, and the components of that system, be designed in such a way as to prevent and protect the system and its associated structures from inundation by floodwaters within the **100-year floodplain**. Sufficient anchoring should be provided for all OWTS components below the ground surface and be floodproofed to prevent floodwaters from intrusion into the system or discharge into floodwaters. Prevention mechanisms such as waterproofing, backflow prevention, and placement of the upper infiltrative surface a minimum of one foot above the base flood elevation (BFE)² shall be used for all non-residential structures together with attendant utility and sanitary facilities. *Residential structures* are addressed separately by the Delta County Flood Damage Prevention Regulations.

BACKGROUND: Delta County Health Department's (DCHD) Onsite Wastewater Treatment System (OWTS) regulations incorporate Colorado Regulation 43 "by reference" and in doing so states that:

*"The system as approved by a local public health agency must be designed to minimize or eliminate infiltration of floodwaters into the system and discharge from the system into the floodwaters. The OWTS must be located to avoid impairment to floodwaters or contamination from them during flooding."*³

It also defines a *limiting layer* as:

"a horizon or condition in the soil profile or underlying strata that limits the treatment capability of the soil or severely restricts the movement of fluids. This may include soils with low or high permeability, impervious or fractured bedrock, or a seasonal or current ground water surface."

These statements are also consistent with *Delta County Flood Damage Prevention Regulations* which state that:

*"On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding"*⁴.

As normal redoximorphic⁵ features are not always present in soil profiles to determine a *limiting layer*, it may be difficult to determine an appropriate elevation in the soil profile for a typical seasonal water event. Given that is the case, a reliable representation of a *limiting layer* may not be present and the

¹ Items referencing the terms "flood" may have been **bolded** for discrimination of references to **100-year floodplain** (1% chance of flooding in any given year) and **floodway** (synonymous with the channel of a river or other watercourse and the adjacent land areas that must be reserved per FEMA).

² **Base Flood**- means the flood having a one percent chance of being equaled or exceeded in any given year.
Base Flood Elevation (BFE) - The elevation shown on a FEMA Flood Insurance Rate Map for Zones AE, AH, A1-A30, AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO that indicates the water surface elevation resulting from a flood that has a one percent chance of equaling or exceeding that level in any given year.

³ Regulation 43.8(K)1-2 Floodplains

⁴ Delta County Flood Damage Prevention Regulations, Section 8.1.3 (3).

⁵ Redoximorphic features (RMFs) consist of color patterns in a soil that are caused by loss (depletion) or gain (concentration) of pigment compared to the matrix color, formed by oxidation/reduction of iron and/or manganese coupled with their removal, translocation, or accrual; or a soil matrix color controlled by the presence of iron (2+).

FEMA defined elevation of BFE⁶ alone will be the sole criteria in determining the elevation profile for the leachfield in a 100-year floodplain. This, combined with the fact that BFE is a term not explicitly used in OWTS regulations, warrants that Delta County have clear guidance when determining the criteria for elevations that must meet the minimum OWTS and Floodplain guidelines. In some circumstances, it may dictate that DCHD simply use the standard “one-foot above BFE” for the “upper infiltrative surface” of the OWTS (footnote 7), and in others recommend application of a more conservative interpretation of that elevation. To be clear, the 100-year floodplain is not considered by the WQCD to be included in the definition of a *limiting layer*. Thus, the WQCD has provided clarity regarding how this policy may be defined in a general sense:

“The intent of Regulation 43 is to provide the required vertical separation from a limiting layer as noted in Table 7-2 of Reg. 43 for all sites. If a site is in the 100-year floodplain, and a limiting layer is not present, then the upper infiltrative surface [the one at the base of the chamber or rock/pipe] of the soil treatment area must be no lower than the identified 100-year flood elevation.⁷ Note that the above items identify the intent of Regulation 43. As with any portion of this regulation, local agencies can always be “more stringent than” this regulation where the local board of health identifies the need.”

As such, it is consistent with the regulatory intent of Delta County’s BOH to meet the minimum requirements (“one-foot above BFE”) of the state and federal flood damage prevention regulations, while at the same time providing the community with acceptable guidelines with which to make more reasonable decisions to protect their homes and property.

ASSOCIATED REFERENCES/REGULATIONS:

- Delta OWTS Regulations (2022), 1.4B(10): *“Floodplain: No permits shall be issued for systems to be repaired, altered or installed within a floodway. Permits will be issued for structures in the 1% and 2% floodplain (100-year & 500yr) only after a structure has obtained a Floodplain Permit from the Department.”*
- Regulation 43.3(57): *“Floodplain (100-year)” means an area adjacent to a stream which is subject to flooding as the result of the occurrence of a one hundred (100) year flood, and is so adverse to past, current or foreseeable construction or land use as to constitute a significant hazard to public or environmental health and safety or to property or is designated by the Federal Emergency Management Agency (FEMA) or National Flood Insurance Program (NFIP). In the absence of FEMA/NFIP maps, a professional engineer must certify the flood plain elevations.”* and 43.3(58), *“Floodway” means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot or as designated by the Federal Emergency Management Agency or National Flood Insurance Program. In the absence of FEMA/NFIP maps, a professional engineer must certify the floodway elevation and location.”*
- Regulation 43.5(F)1,(g),4-5:
 - *(4) The estimated depth of periodically saturated soils and bedrock, or flood elevation, if applicable; and*
 - *(5) The proposed elevation of the infiltrative surface of the soil treatment area, from an established datum (either ground surface or a benchmark)*
- Regulation 43.8(K)1-2 Floodplains:

⁶ Maps containing this information can be found at: <https://www.deltacountyco.gov/13/GIS & Flood Hazard Map - Address Look-Up>

⁷ For more discussion on “infiltrative surface” definitions in various circumstances, see: [Clarification Regarding the term “Infiltrative Surface” within Regulation 43](Clarification Regarding the term ‘Infiltrative Surface’ within Regulation 43)

- 1. A new, expanded or repair/replacement OWTS installed in a 100-year **floodplain** must meet or exceed the requirements of the Federal Emergency Management Agency and the local emergency agency. Repairs of an existing system must meet the requirements as feasible. The system as approved by a local public health agency must be designed to minimize or eliminate infiltration of **floodwaters** into the system and discharge from the system into the **floodwaters**. The OWTS must be located to avoid impairment to floodwaters or contamination from them during **flooding**.
 - 2. A new or expanded OWTS must not be installed in a **floodway** designated in a 100-year **floodplain** where a conforming OWTS outside the **floodway** can be installed. For any new OWTS or system repair that may affect the **floodway** delineation, appropriate procedures must be followed including revision of the **floodway** designation, if necessary.
- **Regulation 43.9(A) 1-2, Design Criteria - Components:**
 - A. Tanks and Vaults
 - 1. Watertightness
 - a. Septic tanks, vaults, dosing tanks, other treatment components, risers and lids must not allow infiltration of ground water or surface water and must not allow the release of wastewater or liquids through other than designed openings.
 - b. When the final compartment of a tank is being proposed for use as a pump or siphon chamber, the wall between this chamber and the previous chamber must be watertight except for the intended hydraulic opening.
 - c. Acceptable watertightness testing methods performed at a manufacturer's site or in the field include water filling the tank or vacuum testing.
 - 2. Tank Anchoring: In locations where ground water or **floodwaters** may cause instability problems to the septic tank, vault, or other treatment unit in the OWTS due to flotation, the tank, vault or unit must be anchored in a manner sufficient to provide stability when the tank is empty. Risers must be included in the buoyancy calculations.
 - a. If a manufacturer provides recommendations for anchoring designs, they may be used if they meet the conditions present at the site.
 - b. If a manufacturer does not provide recommendations for provisions to compensate for buoyancy, or if the professional engineer chooses to provide his/her own designs, the anchoring system design must be prepared by the professional engineer.
- **Delta County Flood Damage Prevention Regulations, Section 8.1.2 Construction Materials and Methods:**
 - (3) All new construction and substantial improvements shall be constructed with electrical, heating, ventilation, plumbing, air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.
- **Delta County Flood Damage Prevention Regulations, Section 8.1.3 Utilities:**
 - (1) All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of **flood** waters into the system;
 - (2) New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters; and, (3) On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.