

# Memo



To: Jade Krueger, Planning Administrator, Teton County  
Idaho

From: Ted Van Holland, P.E. & Jennifer Zung, P.E.

CC: Sharon Fox, Planner I, Teton County, Idaho

Date: 7/26/2023

Re: Irish Acres Subdivision Level I Nutrient-Pathogen Evaluation Review

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Per request from the Teton County Planning and Zoning Department, Harmony Design & Engineering has reviewed the Level I Nutrient Pathogen Evaluation for the Irish Acres Subdivision dated September 9, 2022 prepared by Y2 Consulting. The report is sealed by an Idaho-licensed professional engineer, and follows the basic steps outlined in DEQ guidance (Howarth, et al., 2002). The following items are noted as deserving clarification or reconsideration by the author in conducting the spreadsheet model simulations.

1. Compliance Boundaries

The evaluation considered several potential compliance boundaries, including the subdivision in its entirety, and also each lot individually. The analyses do not examine the effects of certain combinations of adjacent lots aligned with the modeled gradient. An example would be a grouping of Lots 7, 2, and 1 as a unit, and apply the corresponding unit parameters in the spreadsheet model.

2. Design Flow

The subdivision proposes 10 lots and 10 homes were included in the evaluation. Each home was assigned the 300 gallon-per-day default parameter value of the model spreadsheet. This equates to a 4-bedroom house. The NP evaluation does not consider a guest house or greater bedroom count, or why the presumed 4-bedrooms per lot is representative of anticipated future development. If guest houses are expected and allowed, or the number bedrooms anticipated may be greater than 4, there should be discussion of how that would affect the evaluation conclusions.

3. Hydraulic Conductivity Estimate Above Reference Range

The hydraulic conductivity used in all model simulations is 100 ft/day. Selection of this hydraulic conductivity value is not well supported. The author describes the 100ft/day value as “conservative” for this use, noting that it is on the lower end of typical values for sand and gravel aquifers. The drilling logs cited and provided in the appendix make frequent mention of significant clay, which can greatly retard flow in porous media. There are several logs that have included pumping test data that could be used to infer a more supported hydraulic conductivity value. Evaluating this kind of existing data seems consistent with the Level 1 Nutrient-Pathogen criteria. Many of these rudimentary tests report production of 1 gallon per minute flow per foot of drawdown. While they lack rigorous description of

methods or results, they should at least be compared with the assumed conductivity rate selected. The two best published estimates of conductivity covering this vicinity are from Nicklin (2003) and Cosgrove and Taylor (2007). Both of these assign values close to 25ft/day for this location.

4. Modeled Hydraulic Gradient Inconsistent with References

The author assumes that the hydraulic gradient reflects the slope of the ground surface: 0.01 ft/ft. This generalized approximation seems a poor substitute for more specific references provided in mapping by Kilburn (1964), Nicklin (2003), and Cosgrove & Taylor (2007), which indicate that 0.006 is a representative value for this location. These maps do generally agree with this author's assertion that the direction of groundwater flow is east to west.

5. Phosphorus and Pathogen Impacts to Groundwater and Surface Water Not Addressed

The report leaves out any meaningful discussion on the impacts of phosphorus and pathogens released in the on-site systems, as DEQ guidance recommends.