

Technical Memorandum

TO: Mayre Flowers, Citizens for a Better Flathead **DATE:** March 25, 2008

FROM: Chris Cerquone, R.S. No. 422, Cam Stringer, PG **PROJ. NO.:** 13968.000

CC: **PROJ. NAME:** North Shore Ranch

SUBJECT: **Review of Additional Information, Preliminary Plat Application, Proposed North Shore Ranch**

On November 27, 2007, Geomatrix Consultants, Inc. (Geomatrix) prepared a technical memorandum that identified concerns and issues with the August 2007 Preliminary Plat Application (PPA) submitted by Kleinhans Farms Estates, LLC (applicant) for the proposed North Shore Ranch subdivision in Flathead County, Montana. As the November hearing was canceled this memo was not presented. Since that time, the applicant has provided additional information about the project. Geomatrix has reviewed this information, and provides the following additional comments as well as our memo of November 27, 2007.

Mr. Chris Cerquone, Senior Scientist and Montana Registered Sanitarian and Mr. Cam Stringer, Senior Hydrogeologist in Geomatrix's Missoula office reviewed the application. Mr. Cerquone has more than 18 years of diverse environmental consulting and regulatory oversight experience. As an Environmental Health and Water Quality Specialist for the Missoula City-County Health Department, he routinely evaluated projects involving groundwater and surface water quantity and quality issues, from basin-wide water resource studies to review of proposed subdivision projects. Mr. Stringer has more than 18 years of groundwater and surface water hydrology experience. He has managed numerous groundwater characterizations, including projects involving complex groundwater modeling and interactions between groundwater and surface water.

A review of new information submitted by the applicant answers some questions, but raises others. Concerns with the proposed subdivision include the following:

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1. **Contamination of the Shallow Aquifer.** The applicant has submitted additional information concerning the degradation of nutrients associated with increased usage of lawn fertilizers and placement of an equestrian facility on the site. The technical information provided appears sound; however, it is important to consider that nutrients are not the only contaminants of concern for shallow groundwater. The conversion of agricultural land to lawns and paved surfaces will result in increased loading of herbicides (2,4-D in fertilizers), metals, chlorides (present in deicers), and oil and grease (asphalt and oils) to groundwater and possibly the lake (see discussion of groundwater interaction with lake). 2,4-D, found in weed and feed and other lawn products, was the most frequently detected pesticide in stream and shallow groundwater from urban lawns (USGS 1998). Suburban lawns and gardens commonly receive 2-3 times more applications of herbicides per acre than agricultural land (Pimentel 1991).

Unlike nutrients, some of these contaminants will not readily degrade in the highly organic anaerobic subsurface environment at this site. Due to the nature of the soil (sands and silty sands) and shallow groundwater at the site, it is virtually impossible to prevent increased loading of these contaminants to groundwater. Reported groundwater gradients and velocities provided by the applicant indicate these contaminants will not be diluted and may concentrate in groundwater to concentrations above regulatory standards.

Proposed bio-swales and retentions would only provide limited treatment for storm water. Contaminants dissolved in the storm water that have a low affinity to bind to organics will discharge to the groundwater aquifer. Based on groundwater elevations (Borehole B-7, 2.0 feet bgs) and the proposed location of storm water ponds, storm water will discharge directly to groundwater at the site. Discharge of storm water to the groundwater may require a discharge permit from the Montana Department of Environmental Quality (Administrative Rules of Montana [ARM], Chapter 30, Subchapter 11). In addition, contamination of the shallow aquifer is directly counter to Growth Policy requirements P10.3 and P36.6, which encourage impact-mitigated development in shallow