

## MEMORANDUM

**TO:** Mark Kaltsas, City Planner/Administrator

**FROM:** Shane Nelson, Hakanson Anderson  
Kaci Fisher, Hakanson Anderson

**DATE:** March 7, 2016

**RE:** Comments on request to amend existing CUP for Horseman, Inc.

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We have reviewed the request to amend the existing Conditional Use Permit (CUP) for Horseman, Inc. to increase the amount of allowable horses from 40 to 80. As the City's Water Resources Engineer, our review focused only on the water quality implications of the proposed request. We have the following comments:

1. According to literature an average 1,000 pound horse can produce up to 50 pounds of manure per day. Therefore, 80 horses could produce up to 4,000 pounds of manure per day. Further, research indicates that there is approximately 3.2 pounds of available phosphorus per ton of manure (University of Minnesota). This would equate to 6.4 pounds of phosphorus per day or 2,336 pounds of phosphorus per year for 80 horses. Therefore, manure management is essential. While the University of Minnesota does recommend one horse per two acres, they also state, "If well-managed pasture on fertile soil is provided mainly for exercise and supplement grazing, only 1 acre per horse may be needed."
2. As a condition of approval, the City could consider requiring the applicant to test the soil on an annual basis and prior to manure application. It is likely that the soil may be phosphorous rich from past manure applications, and future manure applications may not be required to support vegetation. If the soil has a high in-situ phosphorous concentration which exceeds the phosphorous uptake from the vegetation, excess phosphorous will likely enter the downstream watershed. Therefore, as a condition of approval, the applicants would only be allowed to land apply the manure if the soils test indicate that the soil will support it (i.e. within a given range).
3. The use of vegetative buffers around drainage ways and wetlands should be considered. Vegetative buffers decrease the amount of nutrients entering the watershed by decreasing the rate of the runoff and trapping sediment and nutrients, which then can be absorbed by the vegetation. Figure 1 depicts the wetland boundaries as identified by the National Wetland Inventory. In addition, we completed a desktop analysis of the wetland boundary as depicted in Figure 2, which is slightly different from the National Wetland Inventory, but is believed to be more accurate.

Figure 3 depicts the recommended buffer locations, which would be upland of the wetland boundary. In addition, buffers are also recommended in drainage ways in which concentrated runoff exists due to the lay of the land. We are depicting and recommending an average buffer width of 25 feet as advised by the Third Generation Pioneer-Sarah Creek Watershed Plan (which only requires buffers for new or re-developments).

4. The application material depicted three paddock areas in which the animals are rotated for grazing in order to allow vegetation to re-establish during pasture rest periods. We support this practice, as bare soil is prone to erosion and allows phosphorous-rich soil to directly enter the watershed. The City could incorporate the rotation of paddocks as a condition of approval. We suggest that paddock areas be required to maintain at least 70 percent cover to limit the amount of soil runoff from entering the watershed, and if 70 percent cover cannot be maintained during rest periods, a supplemental food source is advised.
5. Lastly, the City could consider requiring annual monitoring of the surface water in the wetland / ditch system as a condition of the approval. Many industrial users have been required to conduct stormwater grab sampling in recent years as a condition of the MPCA's Industrial Permit. This method would directly monitor the nutrient levels in the surface water itself and assure that watershed impacts have been mitigated. We would recommend that two samples be obtained, one on the east side of the ditch near CR 92 and one on the west side, just prior to discharge.

In summary, there are several strategies that could be considered for protecting water quality within the watershed associated with this request. Implementation of best management practices such as vegetative buffers, manure management, and rotational grazing would be recommended to support the proposed animal unit density.