

DATE: October 21, 2005

TO: Kristi Bischofberger, Watershed Administrator

FROM: Scott R. Wheaton, Watershed Scientist
Watershed Management Services

SUBJECT: Parcel ID 02018119-000 (Mental Health Trust Lands) '05 Streams Mapping

Kristi, as you requested, we have completed reconnaissance mapping of stream and drainageway features for portions of Parcel ID 02018119-000. This parcel has been previously mapped (see appended WMS mapping file document dated December 2002). Mapping in 2002 was performed with snow on the ground making it difficult to determine exact source and channel locations for small first order streams. Though no snow was present, current mapping was impeded by dense stands of devils club typical along stream channels and recent leaf-fall obscuring small channel features, but all features shown on the attached map were able to be positively identified on the ground. Though some features were spatially intermittent, all mapped streams displayed very well defined channels from source to outlet except in areas of significant disturbance (mostly along and immediately adjacent to the gas pipeline alignment). All features also had pronounced and easily identifiable source areas. All carried flows from source to outlet at the time of mapping. All features identified in the 2002 mapping were observed during the current mapping, though continuing ground disturbance along the gas pipeline alignment had noticeably altered some stream channel positions. Limited map-grade GPS point data were collected to help locate features on MOA base orthoimagery (Figure 1).

Though the two largest stream features located during our recent mapping originate in spring sources east of Goldenview Drive, most of the smaller stream features were strongly associated with a steep escarpment trending north and south along the west boundary of the parcel. Sources for these small features consist of springs and seepage zones aligned along the lower face of the escarpment. Stream channels from these source areas typically are located within well defined ravines and swales ranging from a few meters to as much as 10 meters wide near their upper ends along the lower slope of the escarpment, and merge into and flow across a broad band of wet ground extending 20 to 40 meters west from the base of the escarpment. Interestingly, location ribbons apparently placed during wetland delineations quite frequently outlined these stream swales in the field, though these features do not appear to have been included in the recent wetlands mapping prepared by CH2M Hill for this area.

In fact based on our observations from both our current and 2002 field mapping efforts, wet ground is quite common as highly localized, though secondary, features along the middle and lower slopes of the escarpment while adjacent to the base of the escarpment wetter ground becomes predominant. This type of gradational character can be typical where surfacing of shallow groundwater is promoted by sharp breaks in slope, and should be recognized as an important terrain complex to be mapped and managed as a whole (rather than as isolated bits and pieces too small to be mapped or considered as apparently was the approach in the CH2

mapping). I have mapped the approximate extent of this complex as a 'sensitive discharge zone' in both Figure 1 and in mapping performed in 2002.

Finally, although we did not have time to walk and map drainageways (non-stream, overland storm water flow paths) during our recent mapping we have provided a rough estimation of the probable location of the major features crossing the parcel in question. Although development may result in diversion of a substantial fraction of flow directly across adjacent property to the south, natural flow paths will result in much of storm water runoff being discharged down through the small stream channels, across the wetland terrain at the base of the escarpment and ultimately directly into the upper end of Potter's Marsh (Figure 1). Currently peak surface flows are attenuated by substantial detention created by the natural soils and vegetation and by the hydraulic 'brake' created by the stream swales and wetland terrain present at the bottom of the escarpment. Development will remove this natural detention and create dramatically greater peak flows, particularly given the steep slopes along the escarpment and along the hillslopes immediately adjacent to Potter Creek Canyon and Potter's Marsh. Given the significant degree of erosion and siltation that has resulted from just the relatively modest disturbance along the existing gas pipeline alignment, mitigation of storm water drainage impacts will be very important in the development of this site.

From a storm water drainage perspective we offer the following recommendations:

- Streams on this parcel occupy steep sided swales that will be sensitive to erosion, siltation and icing with any disturbance. Increase setbacks for all stream features to a minimum of 50 feet (for a total protected corridor width of 100 feet (Figure 1).
- All stream features in this vicinity cross very steep slopes, both within and outside the parcel in question and will be subject to very rapid erosion and sedimentation with any significant increase in peak stream flows. Ensure adequate control of peak and volume of storm water discharged from development storm water drainage systems.
- Set aside as an area to be minimally disturbed the gradational ground water discharge zone that extends along the face of the escarpment from approximately midslope on the escarpment to the west boundary of the property (Figure 1). This zone has a very high density of springs and streams whose disturbance would likely create significant icings, erosion and siltation problems downstream as well as impact the hydrology of Potter Marsh.
- The wetland terrain at the base of the escarpment could provide ideal filtering and detention function given a suitably controlled peak storm water input rate. Consider the escarpment set-aside for potential use in receiving and detaining increased development runoff (assuming adequate pretreatment and management of hydraulic loading). This area also has high functional value for development for larger community recreational use, particularly considering the fact that the pipeline alignment is already in place along the base of the escarpment.
- Conversely we do not recommend that any significant trail construction be allowed along any of the stream features crossing the parcel in question (including the proposed re-location of the Moen Trail). As noted above, these features are by and large located in incised and steeply sided features quite sensitive to construction and disturbance. On the other hand, the Moen Trail is ideally located for stability along a ridge of shallow bedrock and at the crest of the escarpment.

- Smaller stream features across this parcel are difficult to locate and identify due to their intermittent nature and a dense vegetative canopy. Though our current mapping is reasonably complete and accurate, it is not intended to supplant either a precise survey or accurate location of these features in the field. As development progresses, we strongly urge that first developers locate any stream feature in the field and that then these locations be checked and revised by WMS in the field before a final survey of these features is done.

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cc: Sharon Ferguson, Senior Planner
Steve Ellis, Plan Reviewer
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Figure 1: Parcel 02018119-000 Streams and Drainageways

