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River Engineering
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President

BORDERLINE SURVEYS Ltd.
10111- 110th Street | Box 2661 Fairview, Alberta

RE: Greg Alexander Subdivision (N.E 27 – 083 – 23 – W5M)
Flooding Assessment of Built Roads / Ditches

A rural subdivision is being developed in NE 27 -083-23-W5M in Grimshaw (M.D of Peace River). The developer Greg Alexander has partially built some of the roads and ditches as shown on Figure 1. The developer's Drainage Plan is to drain flows to the M.D ditch in SE running north south and to the wetland located in south west corner. M.D of Peace River wanted an assessment of the adequacy of the built roads and ditches to drain flood runoff and not to cause flooding on the proposed lots. The following is a description of the methodology in doing the assessment and the subsequent results:

- Methodology: The assessment was based on assessing the peaks generated from the lots for the 100 –Year 24 Hour rainstorm. The data for the modeling was obtained from the IDF (Intensity Duration frequency Curve) for Peace River rain gauge. Rational Method was used with HydroCAD model to generate the Lot peak flows.

  The generated peak flow (**Figure 2**) was checked against the capacity of the road ditch using the Manning formulae using HydroCAD.

  The data used for the as built ditches by Gregg was obtained by Borderline Surveys.

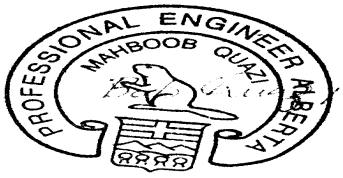
- Results of Analysis:

  The analysis shows that the flow depths generated by the peak flow out of a typical Lot (7.9 Acres) increases the flow depth in the constructed road ditch by 0.12 m. The Road ditches are approximately 0.8 m deep. Therefore, the incoming outflows from the Lots will cause minor rise in water levels in the constructed road ditches. Most of the Lots have 2 to 3 m rise from start from the road to the top so the dwellings if properly located should be safe from flooding.

  The MD ditch to the SE of the property was checked with the inflows from the Lots. It was found that the rise in water levels caused by the incoming flows is minor (< 0.10 m), the receiving M.D ditch is 0.80 m deep and has enough capacity to handle the inflows from this subdivision. Also there is factor of flood

peaks timing. The flood peaks from the subdivision will arrive earlier than the peak on the MD road ditch.

In conclusion the constructed road ditches constructrd by the developer have enough capacity to carry the flood flows and the M.D road ditch has enough capacity to handle the outflows from the development. This conclusion is based on the limited data from the site. The analysis can be further refined at a later date when more site data is available.



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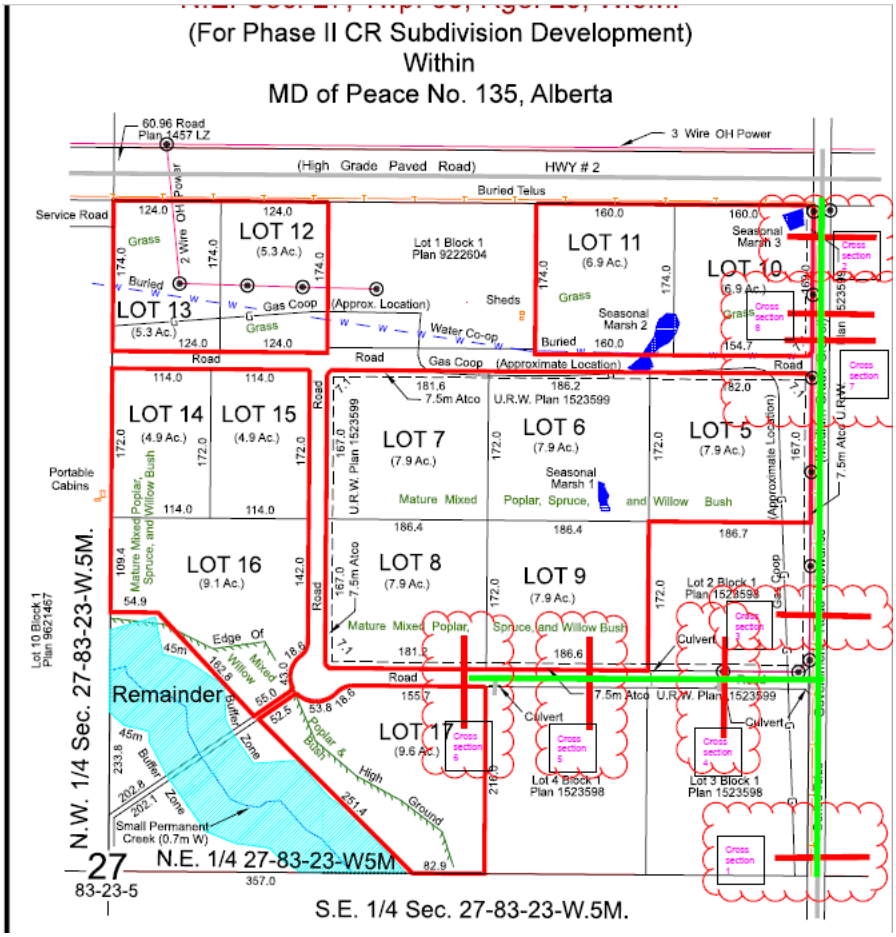

Figure 1 – Subdivision Plan

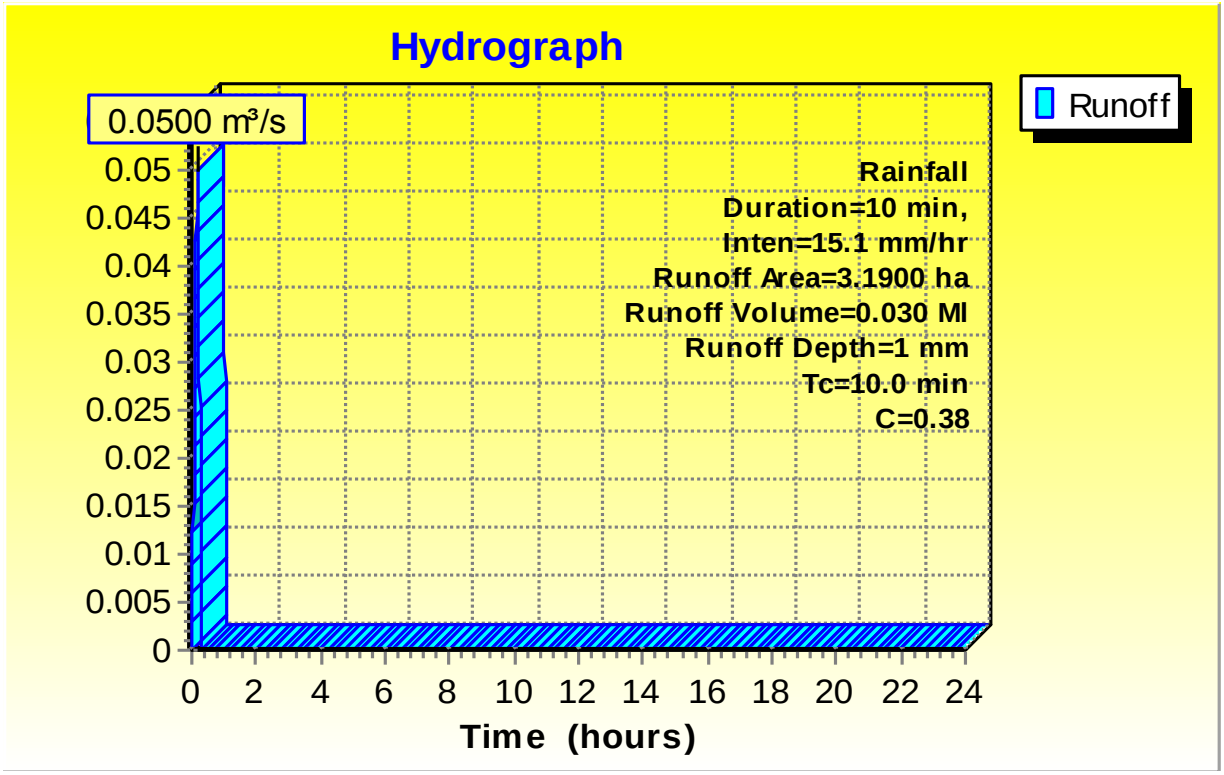

Figure 2– Peak Outflow