DRAFT Wapiti Ridge Estates

(Pt. SW 5-52-18-W5M)

- Subdivision Application
- Land Use Bylaw Amendment Application
- Conceptual Scheme/Supporting Documentation
- Traffic Impact Assessment (EXH Engineering Ltd.)
- Elevation Contours re: Embarras and McLeod Rivers (EXH Engineering Ltd.)
- Percolation/Near-Surface Water Table Tests (EXH Engineering Ltd.)
- Groundwater Potential Assessment Report (Waterline Resources Inc.)

Prepared for:

Alvin Olchowy and Patricia Myson-Olchowy

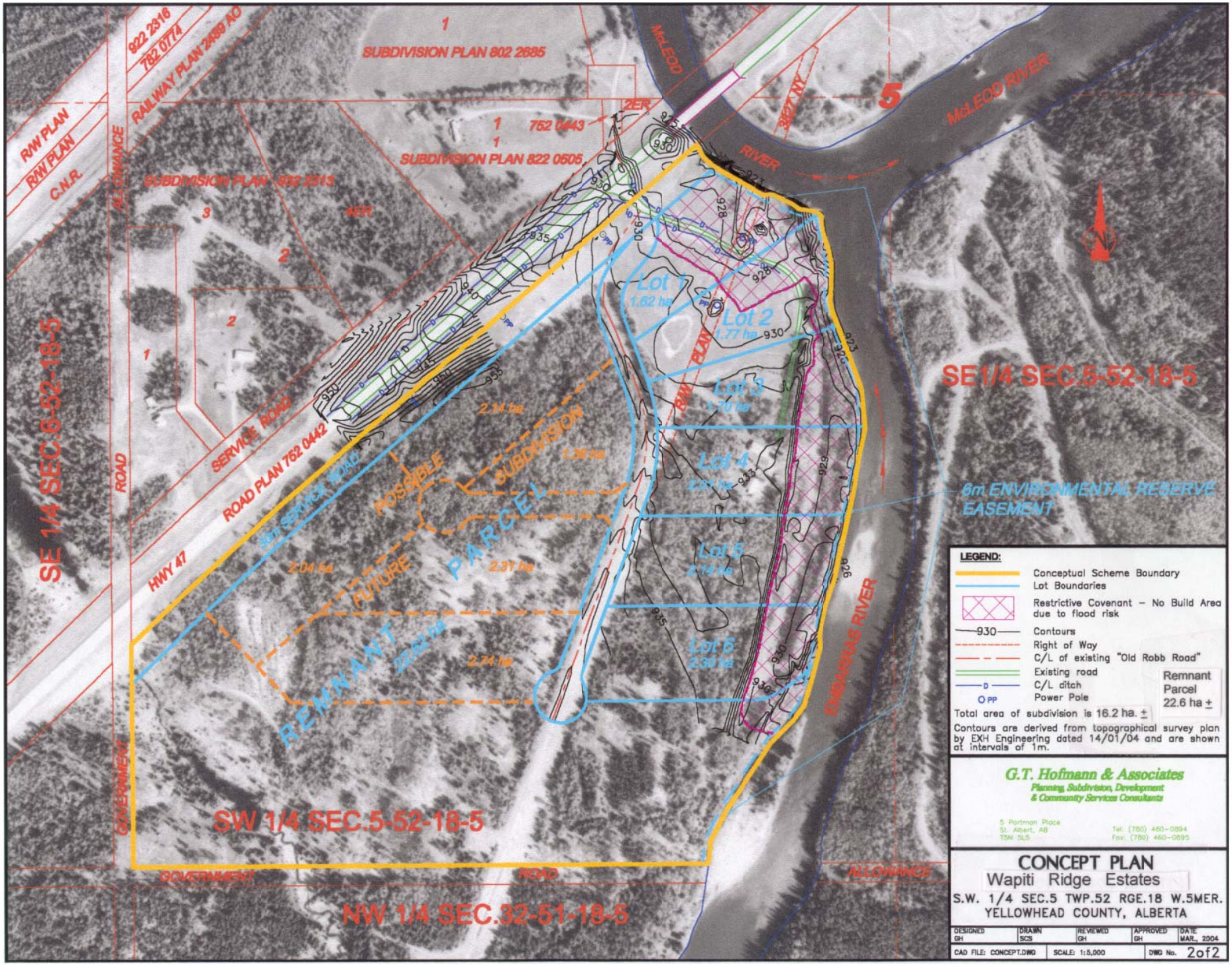
Prepared/Compiled by:

G.T. Hofmann & Associates

Submitted to:

Yellowhead County

(September 2004)


SUBDIVISION PLAN 802 2685
SUBDIVISION PLAN 822 0505
SUBDIVISION PLAN 802 2313
752 0443
922 2316
762 0774
RAILWAY PLAN 2499 AO
R/W PLAN
R/W PLAN
C.N.R.
ALLOWANCE
ROAD
SE 1/4 SEC.6-52-18-5
SERVICE ROAD
ROAD PLAN 762 0442
HWY 47
16A SERVICE ROAD
POSSIBLE
SUBDIVISION
FUTURE
PARCEL
REMNANT
22.62 ha
2.14 ha
1.38 ha
2.04 ha
2.37 ha
2.74 ha
McLEOD
RIVER
McLEOD RIVER
Lot 1
1.62 ha
Lot 2
1.77 ha
Lot 3
1.70 ha
Lot 4
2.14 ha
Lot 5
2.14 ha
Lot 6
2.58 ha
R/W PLAN
EMBARRAS RIVER
SE1/4 SEC.5-52-18-5
6m ENVIRONMENTAL RESERVE EASEMENT
SW 1/4 SEC.5-52-18-5
NW 1/4 SEC.32-51-18-5
GOVERNMENT
ROAD
ALLOWANCE
LEGEND:
Conceptual Scheme Boundary
Lot Boundaries
Restrictive Covenant – No Build Area due to flood risk
Contours
Right of Way
C/L of existing "Old Robb Road"
Existing road
C/L ditch
Power Pole
Remnant Parcel 22.6 ha ±
Total area of subdivision is 16.2 ha. ±
Contours are derived from topographical survey plan by EXH Engineering dated 14/01/04 and are shown at intervals of 1m.
G.T. Hofmann & Associates
Planning, Subdivision, Development & Community Services Consultants
5 Portman Place
St. Albert, AB
T8N 5L5
Tel: (780) 460-0894
Fax: (780) 460-0895
CONCEPT PLAN
Wapiti Ridge Estates
S.W. 1/4 SEC.5 TWP.52 RGE.18 W.5MER.
YELLOWHEAD COUNTY, ALBERTA
DESIGNED GH
DRAWN SCS
REVIEWED GH
APPROVED GH
DATE MAR., 2004
CAD FILE: CONCEPT.DWG
SCALE: 1:5,000
DWG No. 2of2

Yellowhead County

RETURN COMPLETED APPLICATION FORM TO:

Yellowhead County
2716 - 1st. Avenue, Edson, Alberta T7E 1N9
Ph. (780) 723-4800
Fax (780) 723-5066
Email info@yellowheadcounty.ab.ca

APPLICATION FOR SUBDIVISION APPROVAL (Check which applies) ___ By plan of subdivision ___ By other instrument	**For Office Use Only**	
	Date of receipt of Form A as complete	File No.
	Fees Submitted:	

THIS FORM IS TO BE COMPLETED IN FULL WHEREVER APPLICABLE BY THE REGISTERED OWNER OF THE LAND THAT IS THE SUBJECT OF THIS APPLICATION OR BY AN AUTHORIZED PERSON ACTING ON HIS/HER BEHALF

1. **Name(s) of registered owner(s) of land to be subdivided** Alvin Olchowy; Patricia Mysan-Olchowy

   Address and phone no. Box 6989 Edson AB T7E 1V3 (780) 723-4945

2. **Authorized person(s) acting on behalf of registered owner(s)** _____

   Address and phone no. _____

This personal information is being collected under the authority of Section 653 of the Municipal Government Act, Being Chapter M-26.1 R.S.A., 2000 and will be used to process the subdivision application. It is protected by the privacy provisions of the Freedom of Information and Protection of Privacy Act, Chapter F-18.5 R.S.A., 2000. If you have any questions about the collection of this personal information, please contact the Director of Planning, Yellowhead County, 2716-1 Ave., Edson AB T7E 1N9, (780) 723-4800.

3. **LEGAL DESCRIPTION AND AREA OF LAND TO BE SUBDIVIDED (ie: existing titled area)**

All/part of the SW 1/4 Section 5 twp. 52 range 18 west of 5 meridian

Being all/part of lot _____ block _____ Reg. Plan No. _____ Certificate of Title No. _____

Municipal Address (if applicable) _____

Area of above-described parcel of land to be subdivided (ie: existing titled area) 38.8 ha ±

4. **LOCATION OF LAND TO BE SUBDIVIDED**

a. Is the land situated immediately adjacent to the municipal boundary? Yes _____ No X
   If "Yes", the adjoining municipality is _____

b. Is the land situated within 0.5 miles of the right-of-way of a Highway? Yes X No _____
   If "Yes", the Highway is No. 47, the Secondary Road is No. _____

c. Is the land situated within 0.5 miles of a river, watercourse, lake or other permanent body of water, or a canal or drainage ditch? Yes X
   No _____ If "Yes", state its name McLeod / Embarras Rivers

d. Is the proposed parcel within 1.5 km of a sour gas facility? Yes _____ No _____

5. **EXISTING AND PROPOSED USE OF LAND TO BE SUBDIVIDED**

a. Existing use of land Rural District — a single residence and garage on site

b. Proposed use of land **PLEASE INDICATE THE SIZE AND EXACT USE(S) OF:**

   (a) The parcel(s) being created: Country Residential

   (b) The remainder (remnant) of the existing titled area: to remain Rural District and contain one new residence / garage for the owners

c. The land use district ("zoning") applied to the existing titled area under the Land Use Bylaw Rural District

6. PHYSICAL CHARACTERISTICS OF LAND TO BE SUBDIVIDED

a. Describe the nature of the topography of the land (e.g. flat, rolling, steep, mixed, etc.) _____

b. Describe the nature of the vegetation and water on the land (e.g. brush, tree stands, etc. - sloughs, creeks, etc.)
Heavily treed (mixed forest) except for area where gravel has been removed.

c. Describe the kind of soil on the land (e.g. sandy, loam, clay, etc.) _____

7. EXISTING BUILDINGS ON THE LAND PROPOSED TO BE SUBDIVIDED

Describe any buildings, historical or otherwise, and any structures on the land and whether they are to be demolished or moved
1 residence, 1 garage

8. WATER SERVICES

a) Existing Source of Water: groundwater

b) If the application will result in six or more lots on the quarter section in total, according to Section 23(3)(a) and (b) of the Water Act (Provincial Statutes) an application for subdivision is considered incomplete until one of the following requirements regarding water supply for the proposed subdivision is submitted. Please check one (or more) of the following:

1. ___ Proposed water supply to new lots by a licensed (surface) water distribution system
2. X Proposed water supply to new lots by individual water wells, and
   i. ✓ Attached to the application is a report certified by a Professional Engineer, Hydrologist or Geophysicist which states that there is sufficient water to supply 1250 cubic metres of water per year to each proposed lot, and that the proposed diversion will not interfere with any existing household user, licensees, or traditional agricultural users who currently exist, or
   ii. ___ The diversion of water by water wells for each proposed lot conforms with an applicable, approved water management plan.

9. SEWER SERVICES

a) Existing sewage disposal: on-site tmt.

b) Proposed sewage disposal: _____

10. REGISTERED OWNER OR PERSON ACTING ON HIS/ HER BEHALF

I(we) X Alvin Olchowy / Patricia Myson-Olchowy being the registered owner(s) ____, OR authorized to act on behalf of the registered owner(s) ____, do hereby certify that the information given on this form is full and complete and is, to the best of my(our) knowledge, a true statement of the facts relating to this application for subdivision approval.

Signature(s) X _____ _____

Date X _____

THE FOLLOWING INFORMATION MUST ALSO BE INCLUDED IN SUPPORT OF YOUR APPLICATION WHICH WILL NOT BE CONSIDERED COMPLETE AND PROCESSED UNTIL SUPPLIED:

a) A complete application form.

b) An accurate sketch of the proposed subdivision area to include:
   i) An approximate location, dimensions, areas and boundaries of the proposed subdivision.
   ii) North arrow.
   iii) An approximate location of all existing buildings (temporary and permanent), driveways and road approaches on the property with their distances to existing and proposed property lines.
   iv) An approximate location of existing wells, septic fields, fences, trees and any permanent bodies of water on the land.
   v) The sketch is to be drawn with a straight edge as accurately as possible.

c) Application Fee.

d) A complete Authorization/ Right of Entry form.

Yellowhead County

2716 - 1st Avenue, Edson, Alberta, Canada T7E 1N9
Telephone 780-723-4800 or 1-800-665-6030, Facsimile 780-723-5066

PLANNING DEPARTMENT

Our File:_____

AUTHORIZATION FORM

I (We) _____,
{name(s) of registered owner(s)}

being the registered owner(s) of _____,
{legal description of land being subdivided}

do herby authorize _____
{individual or firm making application}

to make application to subdivide the above-described land on my(our) behalf.

_____ _____
{signature(s) of registered owner(s)}

RIGHT OF ENTRY

I(We) Alvin Olchowy; Patricia Myson-Olchowy
{name(s) of registered owner(s)}

being the registered owner(s) of Pt SW 5. 52. 18. W5M
{legal description of land being subdivided}

do hereby authorize representatives of Yellowhead County and other agencies designated in the Municipal Government Act, Being Chapter M-26.1, R.S.A. 2000 to enter upon my (our) land so that they may inspect same in connection with my(our) subdivision application.

X _____ X _____
{signature(s) of registered owner(s)}

YELLOWHEAD COUNTY

Application No._____

APPLICATION FOR AMENDMENT TO THE

YELLOWHEAD COUNTY
LAND USE BYLAW NO. 7.98

I/WE hereby make application to amend the Yellowhead County Land Use Bylaw No. 7.98.

Applicant: Name Alvin Olchowy and Patricia Myson-Olchowy Telephone (780)723-4945

Address Box 6989 Edson, AB T7E 1V3

Owner of Land: Name Alvin Olchowy and Patricia Myson-Olchowy Telephone (780)723-4945

Address Box 6989, Edson, AB T7E 1V3

Land Description: Lot _____ Block _____ Reg. Plan _____

SW 5-52-18-W5 Certificate of Title 942 272 409

Amendment Proposed

FROM Rural District TO County Residential District

Reasons in support of Application for Amendment

- see attached

I/We enclose $200.00 being the application fee, payable to Yellowhead County.

January 15, 2004
DATE

Alvin Olchowy
SIGNATURE OF APPLICANT(S)
Patricia Myson-

January 15, 2004
DATE

Alvin Olchowy
SIGNATURE OF LANDOWNER(S)
Patricia Myson

This personal information is being collected under the authority of Municipal Government Act, Being Chapter M-26 R.S.A., 2000 and will be used to process amendments to the Land Use Bylaw No. 7.98. It is protected by the privacy provisions of the Freedom of Information and Protection of Privacy Act, Chapter F-18.5 R.S.A., 2000. If you have any questions about the collection of this personal information, please contact the Director of Planning, Yellowhead County, 2716-1 Ave., Edson AB T7E 1N9, (780) 723-4800.

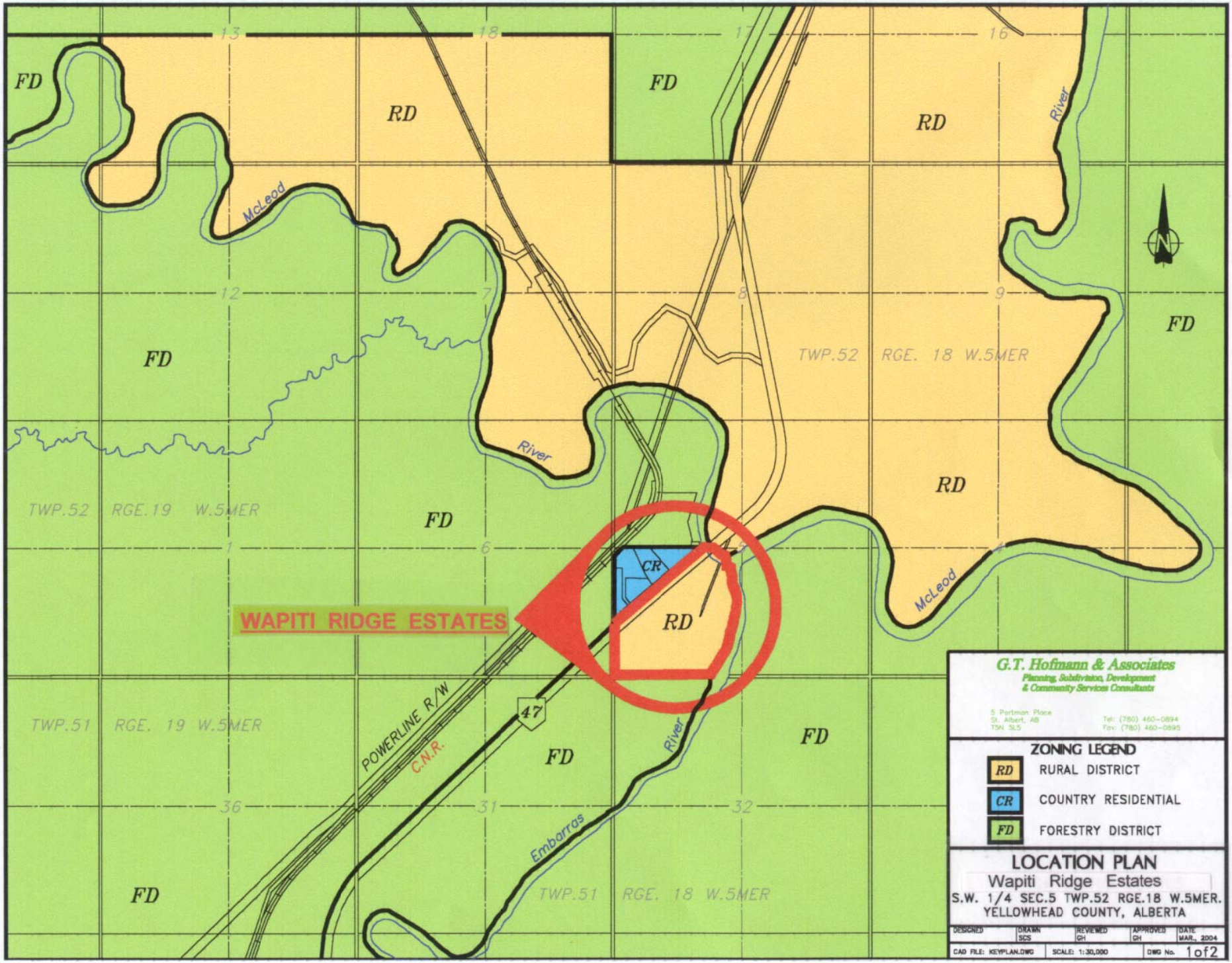

WAPITI RIDGE ESTATES
FD
RD
CR
TWP.52 RGE. 19 W.5MER
TWP.52 RGE. 18 W.5MER
TWP.51 RGE. 19 W.5MER
TWP.51 RGE. 18 W.5MER
McLeod River
Embarras River
POWERLINE R/W
C.N.R.
47
13
18
17
16
12
7
8
9
1
6
36
31
32
N
G.T. Hofmann & Associates
Planning, Subdivision, Development & Community Services Consultants
5 Portman Place
St. Albert, AB
T8N 5L5
Tel: (780) 460-0894
Fax: (780) 460-0895
ZONING LEGEND
RD RURAL DISTRICT
CR COUNTRY RESIDENTIAL
FD FORESTRY DISTRICT
LOCATION PLAN
Wapiti Ridge Estates
S.W. 1/4 SEC.5 TWP.52 RGE.18 W.5MER.
YELLOWHEAD COUNTY, ALBERTA
DESIGNED
DRAWN SCS
REVIEWED GH
APPROVED GH
DATE MAR., 2004
CAD FILE: KEYPLAN.DWG
SCALE: 1:30,000
DWG No. 1of2

TABLE OF CONTENTS

		Page
1)	Introduction	1
2)	Setting and Adjacent Land Uses	1
3)	Land Use Policy/Bylaw Context	2
4)	Land Use, Subdivision Design, Development Standards, Density and Staging	3
5)	Services	5
6)	Municipal/School Authority Impact	6
7)	Conclusion	7

APPENDICES

1) Traffic Impact Assessment
(Prepared by EXH Engineering Ltd.)
2) Response to Traffic Impact Assessment
(Alberta Transportation)
3) Elevation Contours Adjacent to McLeod and Embarras Rivers
(Prepared by EXH Engineering Ltd.)
4) Response to Elevation Contours
(Alberta Environment)
5) Percolation/Near-Surface Water Table Tests
(Prepared by EXH Engineering Ltd.)
6) Groundwater Potential Assessment
(Prepared by Waterline Resources Inc.)

1) INTRODUCTION

The following is submitted in support of two applications. The first is an application to amend the Yellowhead County Land Use Bylaw No. 7.98 to redistrict approx. 16.2 ha. of the SW ¼ of Section 5-52-18-W5M from RD – Rural District to CR - Country Residential (the remnant lands, approx. 22.6 ha., are to remain within the RD District). The second is a corresponding application to create a 6-lot multi-parcel country residential subdivision with an internal public road, comprising approx. 16.2 ha., to be known as "Wapiti Ridge Estates" (see accompanying subdivision concept/application, Land Use Bylaw amendment application and the Location Plan).

2) SETTING AND ADJACENT LAND USES

The subject land, which consists of approx. 38.8 ha., is located along the southeast side of Highway No. 47 at the confluence of the Embarras River and McLeod River. It is across Highway No. 47 from a 5-lot CR subdivision to the northwest (see the Location Plan). The Embarras River forms the eastern boundary of the subject land, the approx. 150 m northern border follows the McLeod River, Highway No. 47 forms the northwest boundary, an undeveloped road allowance forms the west boundary and the southern boundary of the subject quarter section forms the south boundary.

The subject land contains a dwelling and a garage, which is to be contained within Proposed Lot 4 (refer to the Concept Plan). In the past, material for nearby road construction has been removed from the most northerly portion of the subject land, within portions of Proposed Lots 1, 2 & 3 as well as the northerly portion of the proposed internal and service roads. As a result, there are areas of slightly lower elevation (between 2 – 3 metres) within Proposed Lots 1 and 2 toward the McLeod River. Old Robb Road traverses the subject land, almost in a north-south direction, the alignment of which, for the most part, being utilized as the internal road for the proposed subdivision. A power line runs along much of the east side of old Robb Road. With the exception of the old borrow area to the north, the old Robb Road as well as a small clearing surrounding the existing dwelling and garage, the subject land is well treed (mostly spruce, mixed with some aspen). The internal road is proposed to intersect with Highway No. 47 where the existing access to the site is located.

Proposed Lot 1 is adjacent to the McLeod River while Proposed Lots 2-6 as well as the remnant parcel are next to the Embarras River. Depending on where you are, this property offers both vista and seclusion. With a very limited supply of private land this far south along Highway No. 47, this proposal will provide a much-needed supply of residential lots within an exceptional setting.

3) LAND USE POLICY/BYLAW CONTEXT

The subject land is currently within the RD – Rural District of the Land Use Bylaw which allows for a maximum of 5 residential parcels per quarter. Since five CR parcels already exist within the quarter section immediately to the northwest, across Highway No. 47, the creation of any additional residential parcels requires redistricting the subdivision area from the RD – District to the CR - District. In terms of compatibility with adjacent lands, it is important to note that the five residential parcels across the Highway are within the CR – District, the same districting being sought here. It should also be noted that only the subdivision area, including the internal road, is to be within the CR – District. The proposed remnant parcel will remain within the RD – District.

The CR - District stipulates a minimum parcel size of 1.0 hectare (~2.5 acres) and does not specify a maximum parcel size. All of the proposed parcels are larger than the prescribed 1.0 hectare minimum, each with a developable area of at least 0.4 ha. in accordance with County policy and Alberta Environment's Guidelines. This component is discussed further under Section 5 below, particularly with respect to sewage treatment and availability of potable water. Reference is made to percolation/near-surface water table testing conducting by EXH Engineering Ltd. and a Groundwater Potential Assessment conducted by Waterline Resources Inc.

As mentioned, the proposed subdivision is to be serviced with an internal road that will intersect with Highway No. 47 generally where the existing, approved parcel access is located. The internal road will be built to the standards and satisfaction of Yellowhead County. A 30 metre wide service road dedication is located along the entire length of Highway 47. With respect to Highway 47, a Traffic Impact Assessment has been conducted and reviewed by Alberta Transportation, which is discussed under Section 4 immediately below. It is understood that the intersection with Highway 47 will require approval from Alberta Transportation. Section 4 also addresses the 1:100 floodplains of the McLeod and Embarras Rivers.

4) LAND USE, SUBDIVISION DESIGN, DEVELOPMENT STANDARDS, DENSITY AND STAGING

The LUB amendment and the accompanying subdivision concept being proposed are intended to provide a much-needed supply of residential lots in an area strategically located between the Edson area and the Coal Branch, where private land is very scarce. As described earlier, the setting is exceptional. It is expected that the 6-lot subdivision being proposed here will become fully occupied very quickly.

The subdivision has been designed to take as much advantage of the terrain and existing vegetation as possible to provide well-spaced building sites for dwellings in keeping with the intended nature/character of the subdivision. All six Proposed Lots as well as the remnant parcel will gain access via the internal road which, for the most part, follows the alignment of Old Robb Road. The internal road, which forms a cul-de-sac at the southern terminus, will cause a single intersection only with Highway 47 a sufficient distance south of the bridge traversing the McLeod River.

Very briefly, the Concept Plan shows a possible 5-lot second stage of subdivision which would gain access from a second small cul-de-sac going west from the Old Robb Road alignment located approximately at the boundary separating Proposed Lots 4 and 5. As will be discussed shortly, subdividing this second stage will have comparatively larger costs associated with it due to terrain, intersection treatment, etc. and is being shown simply for planning purposes to illustrate what the owner/developer may intend to do at some future date and how that might fit in with what is being proposed now. The owner wishes to build a new dwelling on the remnant parcel south of Proposed Lot 6.

At the request of Alberta Transportation, EXH Engineering Ltd. conducted a Traffic Impact Assessment (TIA) to address impacts associated with both stages of subdivision vis a vis Highway 47 in terms of expected volumes, turning movements, intersection treatment, illumination, pedestrian traffic, and so forth. The full report is attached as Appendix 1. As can be seen in a letter from Alberta Transportation in response to the TIA, see Appendix 2, the Department concurs that the creation of the six-lot subdivision (referred to as Stage 1) would require only Type I b intersection treatment. They felt, however, that the additional 5-lot subdivision (referred to as Stage 2) would trigger the need for Type II b treatment at the sole expense of the owner/developer. Although modified Type II b treatment might be acceptable for Stage 2, this still represents a cost level beyond what the owner/developer is willing to absorb. Hence, the LUB amendment and the subdivision are restricted at this point to the six-lot first stage.

As can be seen on the attached Concept Plan, Proposed Lots 2-6 as well as the remnant parcel are bounded by the Embarras River with the McLeod River forming the boundary of Proposed Lot 1. As these are major rivers, one needs to be diligent in identifying their respective 1:100 year floodplains and make the required accommodations in the subdivision concept to ensure development within the proposed parcels will be safe from 1:100 flood events. To this end, EXH Engineering Ltd. was contracted to produce detailed contour/elevational data so that a reasonable degree of certainty could be enjoyed (see Appendix 3). Once the elevations were calculated, Alberta Environment Protection (AEP) was asked to confirm previously researched flood information. As the e-mail correspondence in Appendix 4 indicates, AEP has calculated the 1:100 year flood level, with freeboard, to be 6.2 m above the bed of the McLeod River and concluded that safe building sites can be provided by restricting development to a contour elevation of 929 m and above.

Knowing the elevation at and above which development would be safe, it is equally important to ensure that mechanisms are put in place to ensure that below the safe elevation, development is restricted. Several options were considered. The first option, a Conservation Easement (CE), was dismissed as a CE is not normally used simply to protect development from a floodplain: more suitable means are available. The second option was to employ Environmental Reserve, either in the form of a lot (ER) or an easement (ERE). The difficulty with utilizing either an ER or ERE exclusively to deal with this case is that the Municipal Government Act requires that land taken as ER or ERE must be/remain in its natural state. As the Concept Plan shows, a good portion of the area at or below 929 – 930 m elevation adjacent to both Rivers has been altered and is no longer in its natural state, most evident in Proposed Lots 1 and 2 as well as the most northerly portion of Proposed Lot 3 where the borrow material has been removed.

In light of the difficulties associated with using an ER or ERE, the Concept Plan proposes a third, blended option: in addition to a standard 6.0 m wide ERE along the full length of the Embarras and McLeod Rivers, a Restrictive Covenant (RC), running with the land, that stipulates "no-build due to flood risk". This would be registered against the titles created making it very clear to purchasers/builders/homeowners (and serve as a reminder to the County as Development Authority) that while these areas can be enjoyed, building/development within the portions of the lots covered by the RC is prohibited.

No municipal or school reserve land is being proposed. It is anticipated that cash-in-lieu of reserve land owing for the subdivision area is to be paid to the County as a condition of subdivision approval with a Deferred Reserve Caveat (DRC) for the municipal

reserve owing for the remnant being registered against the title created for the remnant. While several power (e.g. AltaLink) and natural gas (e.g. Yellowhead Gas Co-op) interests are registered against the title for the subject land, circulation of the applications to the AEUB will reveal if any sour gas or high pressure sweet gas facilities are present within adjacent lands that will have to be accounted for in the design and/or approval of the subdivision.

The current proposal will result in a population density of just under 2.0 persons per gross hectare (approx. 23 people within the subdivision area using an average household size of 3.25 persons). Even with a household size of four persons, the subdivision will result in no more than 28 people.

5) SERVICES

The results of the percolation and near-surface water table testing conducted by EXH Engineering Ltd. are presented in Appendix 5. Acceptable percolation rates for septic field sewage treatment (ie: between 5 and 60 minutes per inch) were found within Proposed Lots 3, 5 and 6. Since the dwelling within Proposed Lot 4 is connected to a working septic system, no percolation testing was conducted. Percolation rates favourable for septic field sewage treatment were not found on Proposed Lots 1 and 2 (the best perc. rates were still slightly above the 60 minutes/inch limit). This may not be surprising considering these two proposed lots contain the borrow area. As is often the case, it is likely here as well that the more course material at the surface was removed for use in road construction leaving exposed the more impermeable, underlying clay, silty clay layers. Such conditions, however, would be conducive, in fact requisite, for the installation of sewage treatment mounds. In light of these sub-surface conditions, it can be said that on-site sewage treatment can be safely accommodated within each of the proposed parcels. No near-surface water table problems were identified in the sub-surface soil testing/analysis conducted by EXH.

As far as groundwater is concerned, the Waterline Resources Inc. report (see Appendix 6) concludes that aquifers underlying the subdivision area could meet the potable groundwater diversion required to service this development in accordance with standards/amounts specified in the Water Act.

It is understood that the owner/developer will be responsible for all utilities including electric power, natural gas, telephone, etc.

Should the owner/developer be responsible for developing a storm water management plan as part of the development agreement, it should be noted that the large parcels will provide for maximum on-parcel stormwater absorption/drainage. Moreover, the lay of the land is such that whatever overland storm water run off there would be could be easily channelled toward either the Embarras River or the McLeod River.

6) MUNICIPAL/SCHOOL AUTHORITY IMPACT

Yellowhead County will be in the position of being able to acquire a tax base (as compared to the existing, limited use) at comparatively little cost. Because of on-site servicing, the County would not be responsible for the maintenance of any municipal services. As there is no municipal or school reserve land being proposed, and development is protected from the two floodplains by way of a "no-build" RC in combination with a standard 6.0 m wide ERE, there will be no ownership of or on-going responsibility for such lands by the County. Of course the County will become responsible for maintenance of the internal road, providing emergency services to the residents, and so forth. However, the low density of the subdivision itself should have little impact on the internal road. In addition, the County already incurs the costs of maintaining the existing roads in the area and this subdivision will provide 6 additional lots contributing to the tax base for maintenance and service provision.

In terms of impact on schools in the area, the subdivision will result in an estimated maximum of 14 school-aged children (assuming a household size of four - ie: 28 people in total - with two school-aged children in each household). In reality, the number of school-aged children may be less. Regardless, the effect on the two school systems in the area is arguably negligible. In fact, if school bus service is already provided to the existing CR across Highway 47, increasing the number of children in the area could improve the economics of delivering the service.

7) CONCLUSION

The foregoing, in our opinion, provides sufficient information with which to evaluate and decide upon the LUB amendment and accompanying subdivision proposal. It also our position that it fully satisfies the need to undertake conceptual, advance planning in support of redistricting and subdivision applications.

In conclusion, we ask that the Council of Yellowhead County find this Conceptual Scheme and supporting documentation acceptable and proceed with the approvals we seek.

Respectfully submitted,

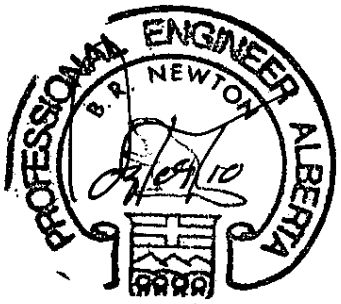
Greg Hofmann, M.A., ACP MCIP

APPENDIX 1) Traffic Impact Assessment
(Prepared by EXH Engineering Ltd.)

Traffic Impact Assessment
Proposed Subdivision Development
SW 5-52-18-W5M

Alvin Olchowy

September, 2003



PERMIT TO PRACTICE
EXH ENGINEERING SERVICES LTD.
Signature
Date Sept 10/03
PERMIT NUMBER: P 5347
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

Prepared By:

EXH Engineering Services Ltd.
Red Deer, Alberta

Project No. 1203290

EXH Engineering Services Ltd.

EXECUTIVE SUMMARY

EXH Engineering Services Ltd was retained to carry out a traffic impact assessment associated with a proposed residential subdivision development on SW 5-52-18-W5M adjacent to Highway 47. The expansion is proposed to consist of 11 residential lots in 2 stages.

Upon review of the traffic generation associated with the site development, and the corresponding impact on Highway 47, the following conclusions were reached:

- Highway 47 has sufficient capacity to accommodate the anticipated increase in traffic volume associated with the proposed development.
- Projected left-turn volumes resulting from the proposed development require a Type Ib intersection configuration for Stage 1 of the development.
- Projected left-turn volumes resulting from the proposed development require a Type Ib intersection configuration for the full development (Stages 1 and 2). Additional review is recommended at the time of Stage 2 development.
- Projected right-turn volumes are not high enough to warrant a dedicated right-turn lane under either Stage 1 or full development conditions.
- There is no warrant for illumination of the proposed intersection or for accommodation of pedestrian traffic under either Stage 1 or full development conditions.

TABLE OF CONTENTS

I. PROJECT INFORMATION 1

II. ESTIMATED SITE TRAFFIC GENERATION 2

III. CURRENT TRAFFIC VOLUMES 3

IV. PROJECTED TRAFFIC VOLUMES 3

V. ROADWAY CAPACITY 3

VI. LEFT TURN MANOEUVRES 4

VII. RIGHT TURN MANOEUVRES 5

VIII. ADDITIONAL CONSIDERATIONS 5

IX. CONCLUSIONS AND RECOMMENDATIONS 6

X. CLOSURE 6

APPENDICES

APPENDIX A PROJECT FIGURES

Map 1	Site Location
Sketch #1	Existing Site Conditions
Sketch #2	Proposed Development
Sketch #3	Projected Design Hourly Volumes and Turning Manoeuvres – Stage 1 PM Peak Hour
Sketch #4	Projected Design Hourly Volumes and Turning Manoeuvres – Stage 1 and 2 PM Peak Hour
Figure D-7b	Intersection Treatment (Type Ib)
Figure D-7d	Intersection Treatment (Type IIb)

APPENDIX B DAILY TRAFFIC ESTIMATES/HIGHWAY TRAFFIC COUNTS

APPENDIX C INTERSECTION ANALYSIS

APPENDIX D SITE PHOTOGRAPHS

EXH Engineering Services Ltd. was retained by Mr Alvin Olchowy to carry out a traffic impact assessment associated with a proposed residential development on his property in SW 5-52-18-W5M adjacent to Highway 47. The general site location is shown on the attached Map 1, Appendix A.

This assessment is intended as a review of the following specific issues:

- The estimated traffic volume generated by the development at average and peak times.
- The estimated future left-turn and right-turn manoeuvres for the Access/Highway 47 intersection at peak times.
- Appropriate modifications to Highway 47 to accommodate the proposed development.

This review is based upon traffic volume estimates. No site traffic counts have been conducted. A site survey has not been carried out.

I. PROJECT INFORMATION

The site location is shown on Map 1, Appendix A. The attached Sketch #1 and Sketch #2 (Appendix A), as provided by the Owner, show the existing site and the proposed lot layout in context with the adjacent roadway system.

Site development is proposed as 11 residential lots. This represents full site development of two identified phases. Phase 1 consists of lots 1 thru 6; Phase 2 consists of lots 7 thru 11. Current site development consists of a dwelling and yard. The existing development will be absorbed as one of the 11 developed lots. The Highway 47 access is existing, and had served the old Robb Road alignment.

Highway 47 runs along the west side of the subject property, with the Embarras River to the north. The Highway 47 bridge crossing of the McLeod River is immediately north of the access location.

Highway 47 is a two-lane undivided roadway with a rural cross-section. The speed is posted at 100 kph through the project area for both north and south-bound traffic. The alignment is straight, with the nearest curve 300 – 350 m to the north. There is a hill to the south, cresting approximately 350 – 400 m from the site access.

The existing site access is asphalted, with a width of 30 m at the east edge of Highway 47, a depth of 23 m and a width on the property of 7 m. It is located approximately 14 km from east-bound Highway 16.

There is a residential approach opposite the site access. Additional residential approaches are located 200 – 250 m to the north and 300 – 350 m to the south. The nearest major intersection with a Township or Range Road is more than 400 m from the access location.

II. ESTIMATED SITE TRAFFIC GENERATION

Estimates contained herein are based upon the Institute of Transportation Engineers (ITE) Manual, 6th Edition. For the purpose of this review, we have used the following ITE average trip-end generation:

Single-Family Detached Housing (Code 210)

ITE estimates are based upon observed measurement. Data sheets are contained in Appendix B. ITE data provides a range of trip generation rates for the specific types of development, along with suggested averages. Estimates are categorized by typical weekday and AM/PM Peak Hour traffic volumes for the adjacent roadway.

Average daily traffic generation for a single family dwelling in an urban setting is suggested as 9.57, with an AM peak of 0.77 and a PM peak of 1.01. Given the rural nature of the development, a lower trip rate in the range of 8 – 9 is more likely. 9.0 was used for this review. No adjustment was made to the peak-hour rates. The percentage of peak-hour traffic was based upon the corresponding Design Hour percentage Highway 47.

Assuming 11 residential lots, average daily traffic generation estimates for the future development in each phase are contained in Table 1. Peak hour traffic generation estimates are contained in Table 2. Some numbers have been rounded.

TABLE 1: ESTIMATED TRAFFIC VOLUMES – AVERAGE DAILY – INDIVIDUAL PHASES

PHASE	UNITS	TRIP RATE	% IN	% OUT	IN	OUT	TOTAL TRIPS
1	6	9.0	50	50	27	27	54
2	5	9.0	50	50	23	22	45
Total	11				50	49	99

TABLE 2 – ESTIMATED FUTURE TRAFFIC VOLUMES – PEAK HOUR

Time Period	Units	Trip Rate	% In	% Out	In	Out	Total Trips
AM Peak Hour	6	0.8	25	75	1	4	5
	11	0.8	25	75	2	7	9
PM Peak Hour	6	1.0	64	36	4	2	6
	11	1.0	64	36	7	4	11

III. CURRENT TRAFFIC VOLUMES

Published Alberta Transportation traffic volumes for Highway 47 provide average daily traffic counts at a location 4.2 km south of the Highway 16/Highway 47 intersection (Appendix B). For the purpose of this review, an average daily traffic volume of 940 vehicles per day (vpd) has been assumed. There is no change between the average daily volumes and the average summer volumes. Traffic volumes represent the total traffic in both directions.

IV. PROJECTED TRAFFIC VOLUMES

The design period used for this analysis was 20 years. A growth rate of 2.5% non-compounded for the design horizon was assumed for Highway 47. The measured traffic volumes over the past 10 years fluctuate widely, with a number of years showing a drop in traffic volumes. This growth rate was chosen to allow for a reasonable long-term increase in Highway 47 volumes.

The 2.5% growth rate results in an estimated average daily traffic volume of 1408 for 2023, representing the base traffic volume for the highway. It has been assumed that additional site volumes will be in addition to this estimate, resulting in a total Highway 47 volume of 1462 under Stage 1 and 1507 under full development.

V. ROADWAY CAPACITY

The average daily traffic volume of 99 generated by the site expansion at full capacity represents an increase of 7% over the design horizon volume for Highway 47 of 1408. This is well within the typical capacity for a primary highway.

VI. LEFT TURN MANOEUVRES

Left turn warrants are based upon the level of probability that a vehicle in the advancing traffic stream in the design hour will not arrive at an intersection when another vehicle, travelling in the same direction, is stopped waiting to make a left turn. The associated hazard this represents decreases with decreased design speed. The analysis of left turn manoeuvres off Highway 47 was conducted in phases based on the tentative development plan supplied by the Owner.

Alberta Transportation typically utilizes the 100th highest hourly volume for design functions. For a rural situation, this will tend to be in the order of 12% of the average daily traffic volume. Traffic volumes generated by development are based upon the PM Peak Hour volumes suggested by ITE data, and given in Table 2. This is a two-way volume prior to the addition of development traffic. Volumes for turning manoeuvres are illustrated in Appendix A.

For the purpose of this review, it is necessary to make assumptions with respect to the direction from which the traffic is approaching the site. It is assumed that 90% of traffic exiting the site will turn north (right) onto Highway 47 in order to access Highway 16. Similarly, 90% of traffic accessing the site is assumed to be south-bound, resulting in a left-hand turn.

Assuming staged development of the site and Highway 47 volumes at the 20-year design horizon, peak hour estimates are summarized in Table 3. Left turn refers to south-bound Highway 47 traffic turning into the site. Highway 47 traffic has been assumed as an even split between south-bound and north-bound. Some numbers have been rounded.

TABLE 3 – PEAK HOUR TURNING ESTIMATES – HIGHWAY 47

PHASE(S)	WESTBOUND (OPPOSING)	EASTBOUND (ADVANCING)	LEFT TURNS	% LEFT TURN
1	88	88	4	4.5%
1 and 2	90	90	6	6.7%

Figure D-7.4, Appendix C, represents an initial traffic volume warrant for the intersection, using a Highway (Main Road) volume of 1507. Traffic volume for the site access (Intersection Road) is equivalent to the development traffic for each stage.

Volumes for Stage 1 of the development fell within an area suggesting further analysis, as either a Type Ib or Type IIb intersectional treatment could be required. Volumes for Stage 2 fell just outside the limit for a Type IIb intersectional treatment.

Further analysis was conducted using Alberta Transportation Intersection Design System (IDS) software, version 1.01. This determined a Type Ib configuration under both development scenarios, with full development being close to the Type IIb requirement. Further analysis should be conducted at the time of Stage 2 development, based upon actual Stage 1 traffic counts.

Refer to Appendix C for the IDS output. Typical intersection configurations are shown in Appendix A.

VII. RIGHT TURN MANOEUVRES

The Alberta Transportation warrant for a right turn lane requires that the intersecting road have an average daily traffic volume in excess of 900 vehicles and a right turn volume in excess of 360 vehicles. Using the assumptions noted, the average daily right-turns onto the site will be in the order of 10 at full development based upon 99 total vehicle trips on the access road.

A dedicated right-turn lane is not warranted.

VIII. ADDITIONAL CONSIDERATIONS

This review is intended as a general overview of a number of site aspects. Some additional issues have been identified for consideration:

- Sight distances for passenger vehicle and light trucks appear to be satisfactory. Sight distances for larger units, such as recreational vehicles, appear to me marginal and should be confirmed.
- The proximity to the McLeod River bridge should not be a concern, and it does not appear to impact sight distances to the north.
- The separation between the access location and the start of the Highway 47 curve to the north appears to meet the minimum Alberta Transportation requirements.
- There is currently no significant pedestrian traffic in the area that would require accommodation as a result of this proposed development.

- Currently there is no illumination along Highway 47 in proximity to the subject site. Establishment of illumination as a result of the site development is not warranted.

IX. CONCLUSIONS AND RECOMMENDATIONS

Based upon the information contained herein, we have the following comments, conclusions and recommendations:

1. The estimated average daily traffic volume generated by both stages of the proposed site development can be accommodated by Highway 47.
2. For Stage 1 development, a Type Ib intersection treatment is sufficient for the intersection of Highway 47 and the site access road.
3. Full development of the site will require a Type Ib intersection treatment, based upon current estimates. Further analysis should be conducted at the time of Stage 2 development, based upon actual stage 1 traffic counts.
4. Projected right-turn volumes are not high enough to warrant a dedicated right-turn lane under either Stage 1 or full development conditions.
5. There is no warrant for illumination of the proposed intersection or for accommodation of pedestrian traffic under either Stage 1 or full development conditions.

In summary, estimated traffic volumes resulting from the proposed site development can be accommodated by a Type Ib intersection configuration for Stage 1. This intersection configuration may also be sufficient to accommodate full site development.

X. CLOSURE

This report has been prepared based on the best information available at the time. It is intended to provide conceptual review of the specific issues. Numbers will change through detailed design or a more comprehensive site evaluation.

This report has been prepared by EXH Engineering Services Ltd. for the use of the identified land Owner. Use by third parties, without the express written permission of EXH Engineering Services Ltd. is not permitted.

APPENDIX 2) Response to Traffic Impact Assessment
(Alberta Transportation)

Alberta
TRANSPORTATION

Think & Drive
SAFETY STARTS WITH YOU!

North Central Region
Transportation & Civil Engineering
Division – Edson District

Suite 202, 111 – 54 Street
Edson, Alberta
Canada T7E 1T2

Telephone 780/723-8250
Toll Free connection outside Edmonton 310-0000
Fax 780/723-8387
We're on the Web: http://www.trans.gov.ab.ca

File: 1970/52-18/SW 5

September 29, 2003

Alvin & Patricia Olchowy,
Box 6989,
Edson, AB T7E 1V3

Dear Sir/Madam:

RE: TRAFFIC IMPACT ASSESSMENT
PROPOSED SUBDIVISION
SW 5-52-18-5, HWY 47

The Department has reviewed the Traffic Impact Assessment (TIA) that you submitted from EXH Engineering Ltd.

We are in agreement that Stage 1 will require only a Type I b intersection treatment. However, we typically use 10-12 trips per unit per day for country residential subdivisions, which would result in total development trips of 110 to 132. This would require a Type II b intersection for Stage 2. EXH Engineering alluded to the fact that Stage 2 would be borderline between Type I b and Type II b but the Department feels that it would be more on the Type II b side.

With that said, the Department recognizes the close proximity of the bridge to the north and that there may not be sufficient room for the tapers. If that is the case, we will consider a modified Type II b intersection if required and ask that you have your engineering firm determine this and submit a "best fit" design for the north side of the intersection for review. Moving the intersection further south would not work as it shortens the sight distance to the south and affects the location of the intersection on the other side of the highway.

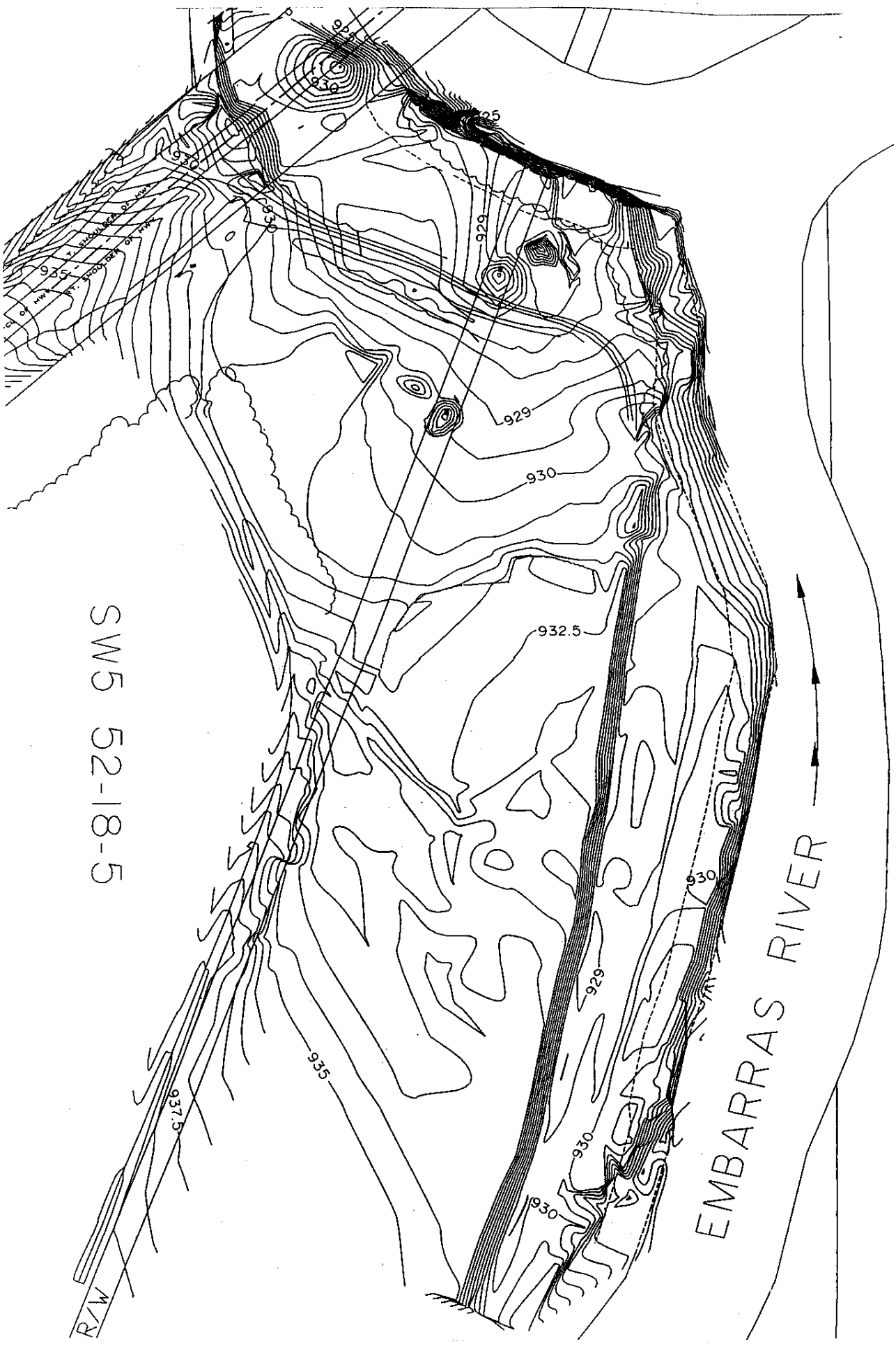
Please keep in mind that if the subdivision is to go ahead, it will require approval of the intersection and it shall be the applicant's responsibility to construct the Type II b intersection at no cost to Alberta Transportation.

Sincerely,

James F. Cox,
Development and Planning
Technologist

cc: Brent Shepherd, Yellowhead County

APPENDIX 3) Elevation Contours Adjacent to McLeod and Embarras Rivers
(Prepared by EXH Engineering Ltd.)


SW5 52-18-5
EMBARRAS RIVER
R/W
925
929
930
932.5
935
937.5

APPENDIX 4) Response to Elevation Contours
(Alberta Environment)

Larry Garner

To: brent.sheperd@YellowheadCounty.ab.ca
Subject: Proposed Subdivision SW 5-52-18-W5M

Brent,

I have reviewed our files for this location at the confluence of the Embarras River and McLeod River. We have determined that the 1:100 year return period flood level, with freeboard, to be 6.2m above the McLeod River bed. This information was obtained by transferring data from a site further downstream. Without more detailed information that would include river cross section surveys and hydrologic analysis, it is not possible to provide a more precise flood elevation.

We believe that providing an ERE and Restrictive Covenant based on the contour elevation of 929m, will provide a safe building site.

Please do not hesitate to contact me with any additional questions.

Larry

Larry Garner R.E.T.
River Engineering and Water Monitoring Section
larry.garner@gov.ab.ca
Ph: 780-427-2376
Fax: 780-422-0262

APPENDIX 5) Percolation/Near-Surface Water Table Tests

(Prepared by EXH Engineering Ltd.)

Alvin Olchowy
SW 5-52-18-W5M

Oct. 29, 2003

ATTENTION: Alvin Olchowy

RE: Percolation Rates and Ground Water Conditions
SW 5-52-18-W5M

Five of the nine percolation test holes did not fall within the allowable rates of 5 to 60 minutes/2.5 cm (or 2 to 23.6 min/cm) for a test hole diameter of 200mm, see attached. The soils conditions varied significantly across the proposed development area. Soils with significant sand, gravel and areas with silty sand as well as silty clay were observed during drilling.

No water was found in all three water table test holes. The depth of the holes are 2.4m, 2.6m, and 2.4m for water test holes 1,2, and 4, respectively.. The perk test and water table test was performed on October 17, 2003 and October 28, 2003.

Should you have any questions, please call our office at (780) 712-5000. Thank you for using our services.

Sincerely,

Ahmad Elsayed, E.I.T

/attachments

cc Doug Laboucane, EXH Engineering Services Ltd.

PERCOLATION TEST

DATE: OCTOBER 28 / 03

TEST HOLE	INITIAL TIME	FINAL TIME	INITIAL HEIGHT (MM)	FINAL HEIGHT (MM)	DROP (MM)	TIME INTERVAL (MIN)	RATE MIN/CM	RATE (6INCHES) MIN/2.5CM	RATE(8INCHES) MIN/2.5CM	AVG.(8inches) MIN/2.5CM
3B-NEW	3:06	3:36	428	443	15	30	20.0	50.8	67.7	
3B-NEW	3:36	4:06	442	456	14	30	21.4	54.4	72.5	
3B-NEW	4:06	4:44	455	472	17	38	22.4	56.9	75.9	
PERK RATE										
										72.0
3A-NEW	3:10	3:39	465	481	16	29	18.1	46.0	61.4	
3A-NEW	3:41	4:09	466	481	15	28	18.7	47.4	63.2	
3A-NEW	4:11	4:47	459	478	19	36	18.9	48.1	64.2	
PERK RATE										
										62.9
4A	4:03	4:33	462	546	84	30	3.6	9.07	12.1	
4A	4:39	5:09	405	492	87	30	3.4	8.76	11.7	
4A	5:11	5:41	440	524	84	30	3.6	9.07	12.1	
PERK RATE										
										12.0

Water Table#	Depth	Water Level	Date
1	2.4	0	OCT. 17/03
2	2.6	0	OCT. 28/03
4	2.4	0	OCT. 28/03

ALLOWABLE TOLERANCE: 2.0 - 23.6 MIN/CM OR 5 - 60 MIN/2.5CM (200MM or 8" Diameter)

Alvin Olchowy
SW 5-52-18-W5M

Oct. 20, 2003

ATTENTION: Alvin Olchowy

RE: Percolation Rates and Ground Water Conditions
SW 5-52-18-W5M

Three of the six percolation test holes did not fall within the allowable rates of 5 to 60 minutes/2.5 cm (or 2 to 23.6 min/cm) for a test hole diameter of 200mm, see attached. The soils conditions varied significantly across the proposed development area. Soils with significant sand, gravel and areas with silty sand as well as silty clay were observed during drilling. It is recommended that more tests be performed to find three additional locations where the soil is more favorable for the proposed septic system.

No water was found in all three water table test holes. The depth of the holes are 2.33m, 1.43m, and 1.74m for water test holes 1,2, and 3, respectively.. The perk test and water table test was performed on October 17, 2003.

Should you have any questions, please call our office at (780) 712-5000. Thank you for using our services.

Sincerely,

Ahmad Elsayed, E.I.T

/attachments

cc Doug Laboucane, EXH Engineering Services Ltd.

PERCOLATION TEST

DATE: OCTOBER 17/2003

TEST HOLE	INITIAL TIME	FINAL TIME	INITIAL HEIGHT (MM)	FINAL HEIGHT (MM)	DROP (MM)	TIME INTERVAL (MIN)	RATE MIN/CM	RATE (6INCHES) MIN/2.5CM	RATE(8INCHES) MIN/2.5CM	AVG.(8inches) MIN/2.5CM
2B	12:11	12:46	448	462	14	35	25.00	63.50	84.67	
2B	12:46	1:23	464	479	15	37	24.67	62.65	83.54	
2B	1:25	2:00	452	465	13	35	26.92	68.38	91.18	
2B	2:02	2:39	432	446	14	37	26.43	67.13	89.50	
PERC. RATE										88.1
1B	1:31	2:09	484	567	83	38	4.58	11.63	15.51	
1B	2:11	2:44	435	511	76	33	4.34	11.03	14.71	
1B	2:46	3:23	445	526	81	36	4.44	11.29	15.05	
PERC. RATE										15.1
1A	12:26	12:54	490	573	83	28	3.37	8.57	11.42	
1A	12:55	1:34	438	557	119	39	3.28	8.32	11.10	
1A	1:37	2:16	435	544	109	39	3.58	9.09	12.12	
PERC. RATE										11.5

Water Table#	Depth	Water Level	Date
1	2.4	0	OCT. 17/03
2	1.4	0	OCT. 17/03
3	1.7	0	OCT. 17/03

ALLOWABLE RANGE: 2.0 - 23.6 MIN/CM OR 5 - 60 MIN/2.5CM (200MM or 8" Diameter)

Note: Water Level measured from existing ground level.

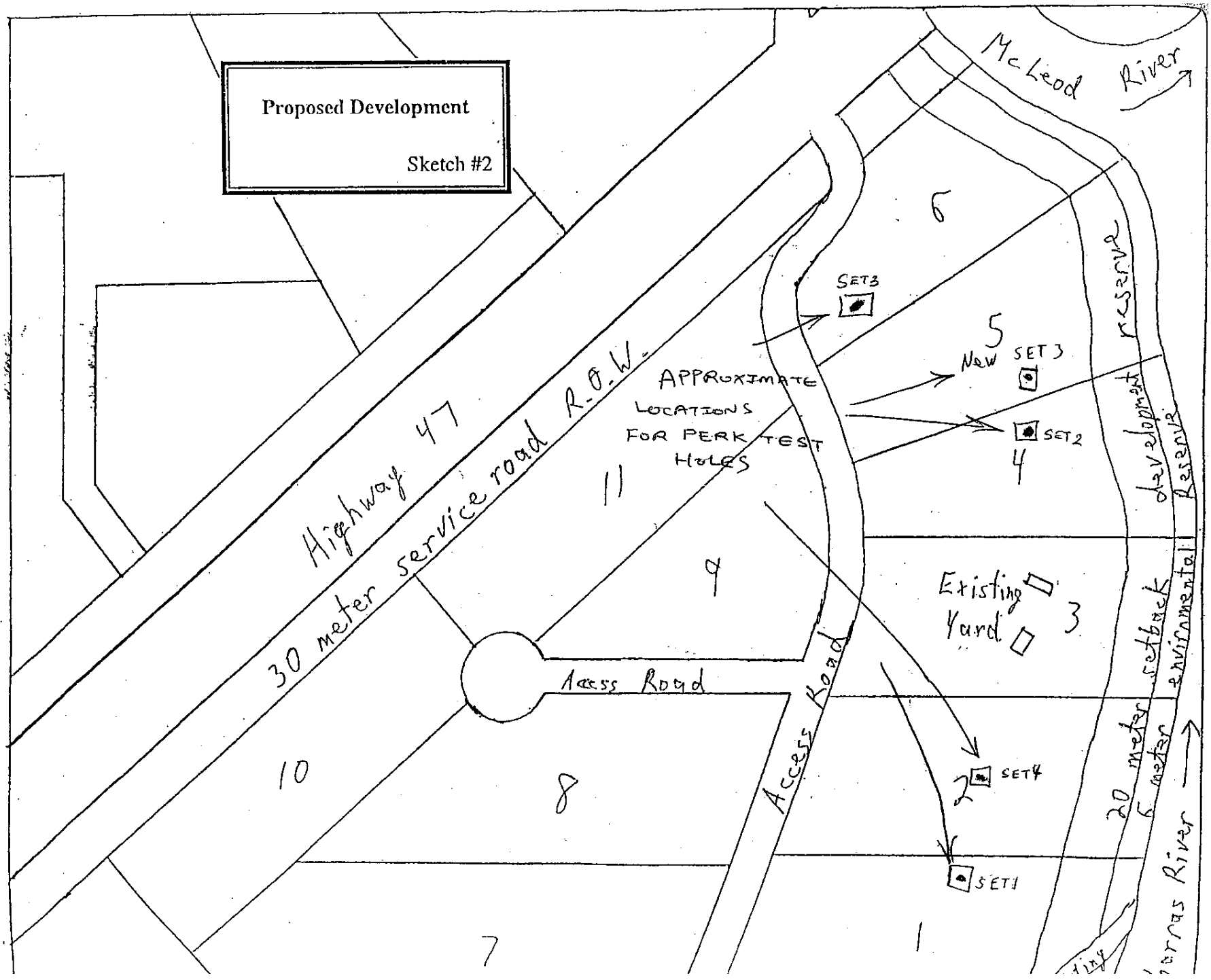
Measurements are in meters.

PERCOLATION TEST

DATE: OCTOBER 17/2003

TEST HOLE	INITIAL TIME	FINAL TIME	INITIAL HEIGHT (MM)	FINAL HEIGHT (MM)	DROP (MM)	TIME INTERVAL (MIN)	RATE MIN/CM	RATE (6INCHES) MIN/2.5CM	RATE(8INCHES) MIN/2.5CM	AVG.(8inches) MIN/2.5CM
3A	11:54	12:37	428	441	13	43	33.08	84.02	112.02	
3A	12:39	1:05	426	433	7	26	37.14	94.34	125.79	
3A	1:06	1:44	411	425	14	38	27.14	68.94	91.92	
3A	1:45	2:21	425	440	15	36	24.00	60.96	81.28	
3A	2:21	2:52	440	450	10	31	31.00	78.74	104.99	
3A	2:52	3:31	450	462	12	39	32.50	82.55	110.07	
3A	3:31	4:01	462	471	9	30	33.33	84.67	112.89	
										109.3
PERC. RATE										
3B	11:59	12:40	430	446	16	41	25.63	65.09	86.78	
3B	12:40	1:10	446	455	9	30	33.33	84.67	112.89	
3B	1:10	1:47	455	467	12	37	30.83	78.32	104.42	
3B	1:49	2:23	435	446	11	34	30.91	78.51	104.68	
PERC. RATE										**107.3**
2A	12:05	12:44	440	458	18	39	21.67	55.03	73.38	
2A	12:44	1:18	458	481	23	34	14.78	37.55	50.06	
2A	1:20	1:57	443	466	23	37	16.09	40.86	54.48	
2A	1:59	2:29	431	447	16	30	18.75	47.63	63.50	
2A	2:29	3:05	447	469	22	36	16.36	41.56	55.42	
2A	3:09	3:43	465	487	22	34	15.45	39.25	52.34	
2A	3:46	4:17	420	439	19	31	16.32	41.44	55.26	
PERC. RATE										**54.3**

ALLOWABLE TOLERANCE: 2.0 - 23.6 MIN/CM OR 5 - 60 MIN/2.5CM (200MM or 8" Diameter)


Proposed Development
Sketch #2
McLeod River
Highway 47
30 meter service road R.O.W.
APPROXIMATE LOCATIONS FOR PERK TEST HOLES
SET3
New SET 3
SET2
SET4
SET1
Existing Yard
Access Road
Access Road
development Reserve
reserve
20 meter setback
5 meter environmental
6
5
4
3
2
1
11
9
8
10
7

APPENDIX 6) Groundwater Potential Assessment

(Prepared by Waterline Resources Inc.)

Waterline Resources Inc.

Waterline Resources Inc.
2024 – 58 Avenue S.W.
Calgary, Alberta
Canada, T3E 1N2
Tel: (403) 243-5611
Fax: (403) 243-5613
Email: info@waterlineresources.com

December 24, 2003
WL04-981

EXH Engineering Services Ltd.
4730 – 3rd Avenue
Edson, Alberta
T7E 1C2

Attention: Doug Laboucane, Area Manager

Dear Mr. Laboucane:

RE: GROUNDWATER POTENTIAL ASSESSMENT, Proposed Alvin Olchowy 11 Lot Residential Subdivision, SW-05-052-18-W5M, Near Edson, Alberta

INTRODUCTION

Waterline Resources Inc. (Waterline) is pleased to present the results of the groundwater potential assessment for a proposed residential development to be located in SW-05-052-18-W5M (the subject property), just west of the confluence of the McLeod and Erith Rivers, and approximately 16 km southwest of the Town of Edson, Alberta (near Alberta Environment Well No. 483589, Figure 1). The developer has proposed a subdivision consisting of 11 residential lots within the subject area. Waterline understands that the proposed subdivision will be developed in 2 stages, with Lots 1 to 6 developed first, and Lots 7 to 11 developed thereafter.

Information sources included the Alberta Environment (AENV) Provincial Water Well Database (December, 2003) and relevant and readily attainable published geology and hydrogeology maps and reports.

INVESTIGATION GUIDELINES

This study was completed in general accordance with the 1994 AENV publication "interim Guidelines For The Evaluation Of Groundwater Supply For Unserviced Residential Subdivisions Using Privately Owned Domestic Water Wells". These guidelines are recommended for use for unserviced residential subdivisions where the water supply will be provided by privately owned domestic water wells and, where the number of residential parcels within one quarter section is six or more.

As stated in the guidelines, the principle of sustainable development should guide the utilization of groundwater resources. Specifically, the guidelines state that: "the threat of groundwater shortages and contamination grows with the density of wells and their collective demand on the local groundwater resources". The guidelines also state that as a component of a General Municipal Plan, groundwater availability could be mapped and used as criteria for locating future unserviced residential subdivisions. In any area, continued development of the groundwater

resource can ultimately exceed recharge of the aquifers causing groundwater mining, which can result in decreasing water levels. A regional assessment would have to be completed by/for regulatory authorities in order to assess these impacts on the aquifer system. The results of this type of study should be adopted into groundwater management criteria for future use in locating and managing other developments within the County. This philosophy has been incorporated into the Act, which came into force January 1, 1999. The Water Act sets up the framework for the future development of "Water Management Plans" within defined watersheds. This approach is also consistent with AENV's move to a wellhead protection and integrated watershed management philosophy.

The Act also addresses household diversions directly under Section 23 (3), which states that a person residing within a subdivision on a parcel of land has the right to commence and continue the diversion of water only if *"a report certified by a professional engineer, professional geologist or professional geophysicist, as defined in the Engineering, Geological and Geophysical Professions Act, was submitted to the subdivision authority as part of the application for subdivision under the Municipal Government Act, and the report states that the diversion of 1,250 cubic metres of water per year for household purposes under section 21 for each of the households within the subdivision will not interfere with any household users, licensees or traditional agriculture users who exist when the subdivision is approved."*

Relevant to the proposed development in the subject area, the Act specifies that the diversion of 1,250 m^3/year per household (household use as defined in the Act) for the proposed new undeveloped lot should not interfere with any household users, licensees or traditional agriculture users who exist when the subdivision is approved. Therefore, the objective of this study is to render a professional opinion, based on a review of readily available information, whether aquifers underlying the proposed 11 undeveloped lots in the subject area can sustain production of 13,750 m^3/year (1,250 m^3/year/lot x 11 lots), equivalent to continuous production of approximately 5.8 imperial gallons per minute (Igpm), and whether managed diversion of that groundwater will negatively impact existing users of the groundwater resource, as defined in the Act.

Waterline's opinion presented herein is based on the assumption that existing domestic users in the area, and users proposed at the site will utilize less than or equal to 1,250 m^3/year/lot obtained at a daily rate of less than or equal to 3.42 m^3/day/lot (1,250 m^3/year/lot ÷ 365 days), or 754 imperial gallons per day per lot. The 1994 AENV publication "Interim Guidelines For The Evaluation Of Groundwater Supply For Unserviced Residential Subdivisions Using Privately Owned Domestic Water Wells" indicates that residential water needs are estimated to be 0.23 - 0.68 m^3/day/person (50 - 150 imperial gallons per day per person). Therefore, a water consumption limit of 3.43 m^3/day/lot is considered conservative for an average family.

GEOLOGY

The surficial geology in the vicinity of SW-05-052-18-W5M, is mapped as including alluvial sand, gravel and silt deposits within the McLeod River and Erith River valleys, and lacustrine clay, silt and sand deposits in areas adjacent to the river valleys (Roed, 1970). Bedrock beneath the site

is mapped as the Paskapoo Formation, which is generally described as including sandstone, siltstone, mudstone, shale and coal (Vogwill, 1983).

Figure 2 presents a geological fence diagram (cross-section) orientated approximately north-south extending through the general site area. The cross-section location is shown on Figure 1. The cross-section includes soil and bedrock stratigraphy data obtained from four water wells completed adjacent to the subject lands [AENV Well ID No. 483597 (Millis), 483592 (Swedberg), 483589 (Brennan) and 399355 (Bremnan)].

The geology recorded on water well completion records listed in the AENV water well database (September, 2003) for the general area is consistent with the regional geologic mapping, and is logged as including clay with/or sand, with/or gravel underlain by layers of sandstone and shale. It is possible that the Erith River is coincident with a fault and that bedrock outcrops on the valley walls. However, for the purposes of the cross-section (Figure 2), the depth of the bedrock surface is depicted as unknown under the Erith River.

HYDROGEOLOGY

AENV Database

The AENV database lists 15 water well records within approximately 2.5 km of SW-05-052-18-W5M, including 4 records in SW-05-052-18-W5M. Of the records listed, only a subset typically represents water wells currently in operation. Information for all records is summarized, in tabular format, in Appendix A. Full records are also provided in Appendix A for water well drilling reports used to construct the geological cross-section (Figure 2). The records indicate that present groundwater use in the area is primarily for domestic consumption. A search of the AENV approvals database did not identify any industrial water users in 05-052-18-W5M.

Area Water Use

Based on the 1994 AENV publication "Interim Guidelines For The Evaluation Of Groundwater Supply For Unserviced Residential Subdivisions Using Privately Owned Domestic Water Wells", residential water needs are estimated to be 0.23 - 0.68 m^3/day/person (50 - 150 imperial gallons per day per person). Therefore, a five-person household may consume 1.15 to 3.40 m^3/day/household (250 to 750 imperial gallons per day per household). Assuming that each of the 15 water well records within approximately 2.5 km of SW-05-052-18-W5M corresponds to an active water well, then the combined current groundwater use in the area is 17 to 51 m^3/d (2.6 to 7.8 lgpm).

Well Completion Depth and Static Water Level

Water wells in the general subject area appear to be completed within 13.7 to 79.2 m below ground level (m bGL) (45 to 260 ft bGL), with a calculated average depth of 33.8 m bGL (111 ft bGL), primarily in sandstone units of the Paskapoo Formation. Static water levels, measured in area wells following construction, were commonly in the 3.7 to 29.9 m bGL (12 to 98 ft bGL), with a calculated average static water level depth of 16.2 m bGL (53 ft bGL). The confluence of

the McLeod and Erith Rivers is located just east-northeast of the property. As such, shallow groundwater flow patterns may flow to the east-northeast towards the McLeod and/or Erith Rivers.

Aquifer Depth and Well Yield

The main water bearing units developed for local water supplies in the general area of the subject site appear to be fractured sandstones of the Paskapoo Formation. The safe yield of wells constructed in 05-052-18-W5M, and in the surrounding river valley areas is mapped as 114 to 455 L/min (25 to 100 Igpm) as sourced from the bedrock, based on flow regime and lithology (Vogwill, 1983). Vogwill (1983) maps the safe yield of Paskapoo Formation bedrock wells in areas adjacent to the river valleys as 23 to 114 L/min (5 to 25 Igpm). The existing hydrogeology data at, and adjacent to the subject property suggests that domestic groundwater supplies in the immediate area of the proposed development have been mainly developed from fractured sandstone aquifers.

Limited duration well tests, completed by the drillers following construction, on wells located within approximately 2.5 km of SW-05-052-18-W5M, have been conducted in the range of 23 to 364 L/min (5 to 80 Igpm), with a calculated average test rate of 114 L/min (25 Igpm). Therefore, the well tests appear to indicate that the single well yields generally fall within, and on the low end of the range of the safe yields mapped for the area.

Groundwater Quality

Based on the Vogwill (1983) report, the regional bedrock groundwater quality in the area is mapped as having a total dissolved solids (TDS) concentration in the order of 500 mg/L, with cations dominated by sodium and potassium, and anions dominated by carbonate and bicarbonate. Eleven AENV water quality reports (AENV, December 2003) for groundwater samples collected on wells located within approximately 2.5 km of SW-05-052-18-W5M were reviewed. Copies of the reports are provided for reference in Appendix A. In the reports, the TDS concentrations range from 332 to 715 mg/L, with the analysis indicating that sodium-bicarbonate groundwater appears to prevail in the study area. Based on the reviewed analysis, the groundwater is considered potable.

CONCLUSIONS AND RECOMENDATIONS

- The groundwater resource development potential appears to be relatively high, and existing water well records support the conclusion that aquifers underlying the proposed development in SW-05-052-18-W5M could meet the estimated groundwater diversion requirement of 13,750 m^3/year, or 5.8 Igpm to supply the proposed residential development without impacting existing users. For example, short-term well tests on existing wells constructed in SW-05-052-18-W5M were completed in the range of 23 to 137 L/min (5 to 30 Igpm), all but one of which exceed the combined water requirement of the proposed subdivision (i.e., assuming that the short-term test results are indicative of long-term well and aquifer performance).

- Should anomalous groundwater results or unexpected drawdown conditions occur during the initial phase of the proposed development (Lots 1 to 6), then comprehensive aquifer testing and analysis should be completed to assess/resolve the impact/anomalous conditions prior to developing Lots 7 to 11.

- This conclusion is based on the assessment of potential impacts on local aquifers while only considering present resource utilization of 17 to 51 m^3/d (2.6 to 7.8 lgpm), and utilization proposed for the subject development. This conclusion assumes that existing and proposed users do not over-exploit the groundwater resource by excessive short-term use and maintain consumption within the residential water needs as presented in the Provincial Guidelines.

- Based on the available data reviewed during this study, the groundwater quality in the study area appears to have a TDS concentration ranging from 332 to 715 mg/L, with the analysis indicating that sodium-bicarbonate groundwater appears to prevail in the study area. Based on the reviewed analysis, the groundwater is considered potable. This evaluation is based on limited available chemistry information and a full suite of chemistry analysis would be needed to further confirm the quality of groundwater at the subject site.

CLOSURE

Consideration should be given to a community water supply for the proposed development to facilitate improved management of peak water consumption and contaminant related issues. The present study should be combined with the results of any future site-specific hydrogeological investigations, should they be completed, to gain a more complete understanding of the site-specific aquifer conditions underlying the study area. This will allow for the results of the present study to be updated, as necessary, and will serve to promote groundwater resource management and protection in the area for current and future users.

The findings presented in this report are based upon a review of published maps and reports, and information available from the AENV water well database. This report is intended for use in support of the application for subdivision under the Municipal Government Act, and should not be considered as a Water Management Plan or as a Phase 1 Environmental Site Assessment. The enclosed study has been carried out in accordance with generally accepted hydrogeological practices. No other warranty is intended or implied.

Respectfully submitted

Waterline Resources Inc.
APEGGA Permit To Practice No. P07329

Reviewed by:

Jamie Wills, M.Sc., P.Geol.
Principal Hydrogeologist

Darren David, M.Sc., P.Geol.
Principal Hydrogeologist