
Parkside Estates

Comprehensive
Development Review
August 2008

William Dyck

Table of Contents

1.0 Introduction4
Regional Context4
Policy Context4
Specific Characteristics5
Green Initiatives5
Design Guidelines5

2.0 Inventory & Analysis5
Existing, On-site land Use5
Proposed Land Use6
Utilities6

3.0 Development Concept6
Primary Objectives6
Conservation6
Sustainability7

4.0 Design Elements.....7
Concept.....7
Subdivision Elements8
Land Use.....9
Municipal Reserve9
Population and School Generation9

5.0 Municipal Services.....9
Traffic Access.....9
Internal Roads.....9
Pedestrian Traffic9
Water Distribution10
Waste Water Treatment10
Storm Water Drainage10
Geotechnical Investigation10
Shallow Utilities11

6.0 Other.....11
Heritage and Environment.....11

Fire and Protective Services 11

Schools and Recreation 11

Hazardous Lands 12

7.0 Staging and Implementation..... 12

8.0 Public Consultation. 12

9.0 Appendix. 13

 Geotechnical Report 13

 Regional Context 38

 Town of Osler..... 39

 Main Concept Plan 40

 Traffic Access Roads..... 41

 Saskatchewan Health Letter 42

 Ministry of Environment 45

 Tamarack Professional Services 47

 Shallow Utilities 48

 Environmental Assessment..... 49

 Saskatchewan Heritage Email 50

 Public Consultation Summary 51

1: INTRODUCTION

1.1 Purpose:

This Comprehensive Development Plan has been prepared by William Dyck on behalf of W.K. Developments Ltd. This review provides a framework for the subdivision and development of Parcel B of SE-29-39-4-W3rd; Plan 101678698. The area consists of 110.73 acres (44.10ha) and is proposed to be developed as a diverse residential community with a range of lot sizes that protects natural landscape features by applying conservation design practices. The property is owned by William and Kathleen Dyck. The proposed name of this new development is Parkside Estates.

1.2 Regional Context:

The subject lands are located within the R.M of Corman Park. The plan area is situated directly northwest of the northern entrance road of the town of Osler. It is situated on the north side of Township Road 394 and directly west of the Carlton Trail Railway Line. The area around Osler is known as the provincial dairy hotspot, but also includes a diverse mix of other farming operations. It is worth noting that the two closest dairies located directly north and west of the proposed development are no longer operational. The properties surrounding Parkside Estates predominantly comprise agricultural and agricultural residential land uses with a mix of farming operations intermingled with many single small 10 acre residential developments.

Directly west of the property and further west are cultivated farmland acres. To the north continues a landscape of rolling hills and a valley similar to what exists on this parcel of land. The proposed development includes landscaping buffers including shelterbelt plantings to maximize the physical and visual separation from adjacent agricultural land uses. The property owner directly north of the development has recently signed an agreement that would allow for the future purchase of land for future expansion of the community. To the east is the railway and directly east of the railway is the remaining portion of SE29-39-4-W3rd. It is a 35 acre parcel of farmland with one residence located on it. Directly east of that parcel is the newly twinned number 11 Provincial Highway. Directly south of this parcel is another small 30 acre parcel of land with one residence. It also contains some low lying areas with water retention ponds.

As for the town of Osler itself, a letter dated August 27, 2007 indicates the following: *“Town Council feels that they can support, in principle, a country residential development on your property but would reserve the right to comment further at the time of public hearing”*. The increase in population associated with this development will benefit the retail services operated in the Osler and surrounding areas and will provide additional participation in community facilities. It is also to be noted that at our public hearing held on November 7, 2007 no subsequent issues were brought forward by the town.

1.3 Policy Context:

This Comprehensive Development Plan has been prepared in accordance with the requirements of the newly created bylaws of the R.M. of Corman Park for Multi-parcel Country Residential Developments. The plan proposes to provide a frame work for the subsequent subdivision and development of the subject lands in accordance with municipal and provincial bylaws.

Responsible planning requires that the developer, community and municipality collaborate, consult and

provide meaningful input into a development. This has been the intent of Parkside Estates from the beginning.

Our past heritage has always maintained that stewardship of the land is of the utmost importance. We take pride in our exceptional location and will make every effort in maintaining the natural beauty of this property. We will make the landscape and natural contours dictate wherein we will allow individual home locations. We have an established commitment to maintaining and respecting the delicate balance of land and nature. Not only are our residential lots spacious, they will each afford a unique picturesque view. We have set a new standard in subdivision design and we will definitely not resemble any other development in the surrounding area.

1.4 Specific Characteristics:

This development will have its own 25 acre park nestled throughout the valley. While strolling on the well maintained natural walking trails you will see nature as it was meant to be. Included in this walk will be access to various types of natural wild flowers, wildlife, as well as an abundance of song birds. The park will also have its own picnic area surrounded by a spray pond and rock garden design.

This community will provide the following:

- **Access to a major city for medical and career purposes.**
- **Country living with the amenities of the city.**
- **A yard large enough for green thumb activities.**
- **A yard large enough for extended family gatherings.**
- **A social circle that can be developed and expanded within the community.**
- **Peace and tranquility of country living within 15 minutes of Saskatoon.**

1.5 Green Initiatives

This development encourages any type of green initiative, but should include Geothermal Heating and Cooling as part of the home construction package.

1.6 Design Guidelines

This development is the culmination of many years of careful thought and planning. We have created this development to be a high quality family community. The developer recognizes the value of this neighbourhood comes from the natural beauty of the valley. It is with these goals in mind that neighbourhood guidelines were developed to protect and enhance each owner's property value.

2: INVENTORY AND ANALYSIS:

2.1 Existing, On-Site Land Use:

This parcel consists of 110 acres. Approximately half was cultivated land with the remaining low lying areas consisting of bush and sloughs used for pasture land. A variety of cultivated crops have been grown over the years. An abundance of wildlife has been observed within the bush areas. This includes ducks, geese, coyotes deer and rabbits. The owner has lived on the property for the past fourteen years. His residence consists of an 1100 square foot house with double attached garage. Also

on the yard site is a 2400 square foot shop and three granaries. The yard is well maintained with an abundance of mature trees and shrubs. The proposal plans on keeping much of the yard site as a country residence of 4.0 acres. The yard has an approach existing from Township Road 394 and plans are to continue utilizing that approach for access.

2.2 Proposed Land Use:

The municipal reserve contains the majority of the bush and slough. The existing bush has all been cleaned and deadfall removed over the past five years. This has created an area that is alive with new growth of trees, but without the unsightly look of dead and falling trees. The majority of the existing bush and natural grasslands will be preserved as it will be contained in the newly created municipal reserves. By maintaining the natural bush and tree areas and with access for wildlife to propel themselves through the main valley it is felt that there will be minimal effect on wildlife patterns. This is the main reason to keep the valley in its natural state, to give the homeowners the ability to observe the wildlife as well as enjoy the abundance of wildflowers throughout the valley. Walking trails have been established throughout the proposed park areas. Two drainage swales have been built on the west side of the property to accommodate drainage from the next quarter of land to the west. Along the east side of the property next to the railway but also on the proposed municipal reserve, two rows of shelterbelt trees were planted in the spring of 2008 with two more rows planned for 2009.

2.3 Utilities:

An abundance of utilities cross this property and discussions are ongoing with the utility companies to accommodate this development with the proper services for each lot. Also at the present time a potable water source has been established. It is with the newly created Intervalley Water Inc. A 4 inch line has been brought to the southern edge of the property next to Township Road 394. Plans are to hook up the subdivision to this line in 2009.

3: DEVELOPMENT CONCEPT

3.1 Primary Objectives:

The primary objective of Parkside Estates has been designed in accordance with the submittal requirements that were forwarded to potential developers in 2006. At that time council was asking for unique and interesting proposals. It is felt that this plan will create a community with a unique sense of place that conserves and values the natural environment above all other development considerations in the context of a rural country residential community.

3.2 Conservation:

The Conceptual plan attached reflects a design that takes into account the natural landscape and ecology and facilitates development while maintaining the most valuable natural features of this site. This plan constitutes many years of thoughtful design that has been utilized over the many years the developer has lived on the property. The main principles for conservation design are:

- flexibility in site design and lot size.
- protection of existing wildlife areas.
- dedicated lands for natural grasslands and wildflowers.
- sustainable stormwater management.

In addition to conserving natural areas, these areas will also be the focal point of public meeting spaces and create opportunities for neighbours and residents to meet and build a community together, a unique sense of belonging. Conservation design offers a variety of recreational prospects which may include organized group activities such as picnics or ball games, biking or walking in natural areas, or observing the plants and wildlife that thrive in preserved habitats. For residences of conservation developments, these amenities can make a noticeable difference in the quality of daily life.

3.3 Sustainability:

Conservation design is one of many tools available to communities committed to implementing sustainable development practices. Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. In regards to municipal policy a septic utility board will be created to address the issue of groundwater contamination and type of septic fields allowed. Also as required a potable water source is available through Intervalley Water Inc. As well, homeowners will be asked to minimize the impact of human activity and development on the natural environment.

4: DESIGN ELEMENTS

4.1 Concept:

Our past heritage has always maintained that stewardship of the land is of the utmost importance. We take pride in our exceptional location and will make every effort in maintaining the natural beauty of this property. We will make the landscape and natural contours dictate wherein we will allow individual home locations. We have an established commitment to maintaining and respecting the delicate balance of land and nature. Not only are our residential lots spacious, they will each afford a unique picturesque view. We have set a new standard in subdivision design and we will definitely not resemble any other development in the surrounding area.

This development is the culmination of many years of careful thought and planning. As homeowners strive to realize their dreams for their new home, we have created this development to be a high quality family community. The developer recognizes the value of this neighbourhood comes from the natural beauty of the valley. It is with these goals in mind that neighbourhood guidelines were developed to protect and enhance each owner's property value.

It is the responsibility of the developer to accommodate creativity and individuality of each home design while maintaining quality standards along with neighbourhood compatibility. The developer will have final say as to the interpretation of these guidelines.

Secondly these guidelines are not intended to take the place of any Provincial or Municipal laws or regulations.

4.2 Subdivision Elements:

Parkside Estates wishes to have a common theme addressed throughout the development which shall include the following:

- All driveway entrances shall provide shrubs and trees which shall be common to each entranceway as well as to the main entrance to the development.
- Walking trails are provided and will be of the natural grass variety, only needing regular mowing to be maintained.
- The main park area and meeting place will be located east of lots 27 thru 29 and west of lots 2 and 5. This area will also contain picnic benches and a play area for children.
- Eight storm water retention ponds are as indicated and can fluctuate from full to dry depending on the type of rainfall and spring runoff.
- The pond in the main park area will be maintained at a constant level as much as possible again depending on water availability. This pond will feature a water spray fountain as well as a walking path contained with solar lighting along the edges of the pond.
- A SaskPower station is proposed near the pond to accommodate electrical requirements for the main park area.
- Two drainage swales on the west side of the property will provide access to the main park area for those homeowners adjacent to these swales.
- Public access to the main park area is provided by a six meter walkway between lots five and six.
- Shelterbelt trees have been planted on the eastern side of the property. This area will also be used for walking trails, but the main purpose of the shelterbelt trees is to provide noise reduction from the highway traffic.
- The layout has been designed in such a way to accommodate walkout basements. At least half of the lots will be able to incorporate this concept.
- The layout also has been designed in such a way as to have each individual lot to back onto green space. All but six lots have this availability.
- Other design elements include the use of architectural standards to be applied as a restrictive building covenant to ensure a high standard of development.

4.3 Land Use:

Parkside Estates proposes to set a new standard for conservation and innovation in country residential development. The development promotes the retention of natural spaces integrated with a sustainable residential community. There are 34 lots proposed for this development with sizes ranging in size from 0.4940 to 2.2020 Ha. Average lot size is 1.016 Ha.

Overall the land use breakdown is as follows:

	Hectares	Acres
Overall	44.81	110.73
Individual Lots	28.61	70.70
Municipal Reserve	10.40	25.70
Roadways	5.80	14.33

4.4 Municipal Reserve:

The development concept proposes 10.40 Ha of land as municipal reserve, an over dedication of 5.91 Ha. In this way all the natural habitat areas will remain protected.

4.5 Population and School Generation:

The projected population for Parkside Estates is 102 persons, assuming 3.0 persons per unit. The resulting school population would be 17 students. The school population generated by Parkside Estates would attend the Prairie Spirit School Division. With the unprecedented growth of other towns nearby it is felt that this school population would have little effect in the overall day to day figures at any one school. At the present time the school populations in Warman, especially the high school is lacking in enough facilities to properly accommodate the tremendous population growth the area is experiencing.

5: MUNICIPAL SERVICES:

5.1 Traffic Access:

Access and egress from Parkside Estates will be from Township Road 394 which has been previously upgraded and clay capped and will not require any additional upgrades to facilitate the development proposed. This section of roadway is presently dust proofed by Mid-Sask Ag. Township Road 394 provides direct access to Provincial Highway No. 11, 300 metres east of the development. This highway has recently been twinned and additional turning lanes have been established at this intersection. A portion of Township Road 394 lying between the railways directly east of the development to the intersection at Highway No. 11 has recently been designated as a truck route by the Town of Osler. It is not readily apparent how many trucks will be using this route, but it is more likely that the newly constructed and paved service road running parallel along the west side of Highway No. 11 will provide for the bulk of truck traffic entering and exiting the Town.

As the entrance to Parkside Estates is near the rail crossing, traffic will be slowing considerably either for the railway or to access the western portion of Osler, which should insure safe access and egress to the site.

5.2 Internal Roads:

This development will feature a looped road system with two accesses from township road 394. The main internal road allowance will be 24 meters on the east and north portion with the west side having a 29 meter road allowance. The actual road width will be 8.3 meters initially gravelled and finally seal coated once the majority of construction is completed. Internally there will be 3 cul-de-sacs with a 20 meter wide road allowance and 8.3 meter wide driving surface. Because of the care taken to sustain natural habit, lots one and two will access directly to Township Road 394.

5.3 Pedestrian Traffic:

The subdivision is designed in such a way as for most residences to access directly to the park area. Only six lots do not have that capability, but are within a short distance of accessing green space. The park area itself contains over 2.5 kilometres of walking trails. Public access to the park is also available from a 6 meter wide walkway between lots five and six.

5.4 Water Distribution:

Intervalley Water Inc. has recently brought a potable water line to the edge of the property to service this development. Plans are to install the potable line into the development in 2009. The route to follow will be along the proposed roadway. This will be a trickle type system with on site storage requirements for each homeowner.

5.5 Waste Water Treatment:

Consistent with developments of a similar nature in Corman Park, this community will be serviced by individual onsite septic disposal systems.

Machibroda Engineering has completed a Geotechnical Investigation in regards to Saskatoon Health Region requirements for this development. Their report states the following on page 9: "*Potential onsite wastewater disposal systems should include holding tanks, pressure chamber systems, Type II pressure mounds or package treatment plants with effluent disposal method*". A complete Geotechnical Investigation as prepared by Machibroda Engineering has been enclosed. Additionally, a letter is attached from the Saskatoon Health Region dated September 4, 2007 indicating their requirements for approval.

In regards to the Town of Osler concerns about septic fields the following is a condensed statement from Brent Latimer of Saskatoon Public Health. "If someone like Greg Plett from Tanksmart is involved with the design of individual septic systems there should be no concern about any type of groundwater contamination". The province at the present time has no courses available to qualify people for septic field design and as such is relying on information obtained from the province of Alberta. This is where Greg Plett has received his qualifications. See attached letter from Ministry of Environment indicating their comments and the responsibility of the local Health Authority.

5.6 Storm Water Drainage:

A storm water drainage study has been prepared by Tamarack Professional Services. A safe building height has been suggested of 513.00 meters. Of some concern are lots 15, 16, 22 and 29. Lots 15 and 16 will be dealt with by excavating the proposed walkway between the two lots and building up the lower portions of the properties with the extra fill. Lots 22 and 29 will have their lowest parts of the lots raised to a safe level from material excavated from the road building process. The owner also has seen this property at its highest level of water retention, and it indicates that the flow travels from north to south. At a certain point a culvert in Township Road 394 will discharge any high access water levels, dismissing any concerns of high water levels on those four lots.

5.7 Geotechnical Investigation:

A site specific preliminary geotechnical investigation was carried out by P. Machibroda Engineering Ltd. Based on a series of sixteen boreholes throughout the site, the report concludes on page 9: "*that septic systems should be designed in accordance with Saskatchewan Health specifications and recommendations*". The details of this report are included within the appendices of this document.

5.8 Shallow Utilities:

As part of the preliminary planning for the development, the various public utilities were contacted and provided with a copy of the concept plan to formulate a design for the extension of shallow utilities to the site including power, gas, telephone and potable water. The results of this plan are attached as an appendix to this document. Intervalley Water Inc. has been contacted in regards to potable water and required capacities and initial indications from all utility companies is that there are no foreseeable design problems anticipated.

6: OTHER

6.1 Heritage and Environment:

The provincial agencies responsible for reviewing these types of applications were contacted for their comments regarding the residential development proposed. Saskatchewan Environment responded, stating the following: *“It is unlikely that this project would require screening by the Environment Assessment Branch”*. A copy of this letter is provided within the appendix of this document.

The following statement was included in the Geotechnical Investigation submitted by P, Machibroda Engineering: *“No detectable evidence of environmentally sensitive materials such as hydrocarbon odour was detected during the actual time of the field test drilling program”*.

The Heritage Resource Branch provided the following comment when contacted for a preliminary review of the project: *“The potential for heritage sites is low and, this office has no further concern with the project proceeding as planned”*. A copy of this correspondence is attached within the appendix of this document.

6.2 Fire and Protective Services:

The Town of Osler currently operates a volunteer fire department which is contracted by the R.M of Corman Park to provide fire services to the development. Past experience suggests that it has been very capable of handling all emergencies to date and as such with Parkside Estates being located next to the town; response time will be minimal for any type of emergency. Fire Chief Brad Banman has responded verbally by saying they have no concerns with this development. They presently have a department with 13 volunteers with a maximum capacity for sixteen.

Protective services will be provided by the Corman Park Police Service along with a local RCMP detachment located within the Town of Warman.

6.3 Schools and Recreation:

The K-9 school in Osler is presently experiencing a slight decrease in enrolment. There has also been some hint of a High School proposed for Osler in the not so distant future, especially once their south expansion plans come into effect within the next couple of years.

Parkside Estates will enhance what Osler is doing in regards to their recreation. Being located nearby I feel our walking trails and park area will be utilized by the town’s people as well as our own residents. This development also has the ability to continue with a unique extension of walking trails and

naturally preserved areas. This is most evident if expansion were to happen directly to the north as that land base has similar physical properties as to what is presently being developed.

6.4 Hazardous Lands:

As indicated within the drainage plan completed by Tamarack Professional Services attached as appendices to this document, there exist some low lying areas that are subject to potential flooding. Mitigation of this situation has been identified Section 5.6 of this document. The owners past experience confirms that the subject property drains to the south once a certain level of water is reached. Also the subject property varies in elevation from 510 to 515 meters with no abrupt areas capable of landslides, erosion or slumping.

7: STAGING AND IMPLEMENTATION:

The proposed development is to be done in four stages as follows:

- Stage One: Lots 1 thru 12
- Stage Two: Lots 20 thru 29
- Stage Three: Lots 13 thru 18 and Lots A, B and C.
- Stage Four: Lots D, E, F and G.

8: PUBLIC CONSULTATION:

Our first presentation to the public was held on October 18, 2007 at the town of Osler Information Night. Indications from that meeting were very positive in regards to our development.

Our specific public consultation meeting was held on November 7, 2007. Enclosed are copies of the following:

- A letter sent to all individual landowners within a one mile radius as well as the town of Osler indicating our intentions.
- A layout of the proposed development.
- A sign in sheet indicating attendance at the meeting.
- Copies of comment sheets returned.

Throughout this entire review process we have not had one negative comment in regards to our development. Our adjacent landowners all entirely support our plans and say this is the best use for this property as it is too stoney to farm. The only concern that has been mentioned is dust control with increased traffic control on Township Road 394.

Two concerns were raised at the public consultation and they were: potable water and dust proofing. Water Distribution has been addressed as follows: Intervalley Water Inc. has recently extended a line to service the property. Dust Proofing: I feel that when the time comes to sealcoat the road in Parkside Estates, if dust is still a problem on 394 past the development then this section should be looked at to sealcoat also.

9: APPENDIX

9.1 Appendix: Geotechnical Report:

	<p>P. MACHIBRODA ENGINEERING LTD.</p>
<p>CONSULTING GEO TECHNICAL GEO ENVIRONMENTAL ENGINEERS AND GEO SCIENTISTS</p>	<p>GEOTECHNICAL INVESTIGATION PROPOSED MULTI-PARCEL SUBDIVISION SE-29-39-4-W3M NEAR OSLER, SASKATCHEWAN PMEL FILE NO. S07-6251 OCTOBER 30, 2007</p>
<p>SASKATOON 2623B FAITHFULL AVENUE SASKATOON, SK S7K 5W2</p>	<p>PREPARED FOR:</p>
<p>PHONE: (306) 665-8444 FAX: (306) 652-2092</p>	<p>MR. BILL DYCK BOX 70 OSLER, SASKATCHEWAN S0K 3A0</p>
<p>E-MAIL: pmel.sk@machibroda.com</p>	
<p>WEB: www.machibroda.com</p>	
<ul style="list-style-type: none">• Geotechnical Engineering• Foundation Design Recommendations• Inspection Services• Earthwork Structures• Slope Stability• Pavement Design• Hydrogeological Studies• Environmental Site Assessments• Site Decommissioning and Clean-up• Test Drilling Services• Piezocone (CPTu) Testing• Soils Testing• Concrete Testing• Asphalt Testing	
	
<p>Member of the Association of Consulting Engineers of Canada</p>	<p>12114A 163 STREET N. W. • EDMONTON, AB • PHONE: (780) 416-6233</p>

TABLE OF CONTENTS

	Page
1.0 INTRODUCTION	1
2.0 SITE CHARACTERIZATION	1
2.1 Site Location, Description	1
2.2 Physiography	1
2.3 Topographic Setting and Local Drainage Characteristics	2
2.4 Geology	2
2.5 Hydrogeology	2
2.6 Groundwater Wells, Dugouts, Water Supply	3
3.0 FIELD INVESTIGATION	3
4.0 FIELD DRILL LOGS	4
4.1 Soil Profile	4
4.2 Groundwater Conditions, Sloughing	4
4.3 Cobblestones and Boulders	6
5.0 LABORATORY ANALYSIS	6
6.0 DESIGN RECOMMENDATIONS	8
6.1 Design Considerations	8
6.1.1 Onsite Wastewater Disposal Systems	8
6.1.2 Foundation Design	9
6.2 Site Preparation	10
6.3 Excavating and Dewatering	11
6.4 Standard Strip or Spread Footings	12
6.5 Drilled, Cast-In-Place Concrete Piles	13
6.6 Floor Slabs	15
6.7 Foundation Walls	17
6.8 Foundation Concrete	18
6.9 Grade Beams	18
6.10 Subdivision Roads and Parking Structures	19
7.0 LIMITATIONS	22

1.0 INTRODUCTION

The following report has been prepared on the results of a geotechnical investigation conducted at the site of the proposed Multi-Parcel Subdivision to be constructed within SE-29-39-4-W3M, near the Town of Osler, Saskatchewan.

The Terms of Reference for this investigation were presented in P. Machibroda Engineering Ltd. (PMEL) Proposal No. 0306-2846.1, dated September 4, 2007. Authorization to proceed with this investigation was provided on September 10, 2007.

The field test drilling and soil sampling were conducted on October 1 and 2, 2007.

2.0 SITE CHARACTERIZATION

2.1 Site Location, Description

The subject property, which consists of farmland and/or slough, is located immediately north of the Town of Osler in the Rural Municipality of Corman Park No. 344, Saskatchewan. Surrounding land use (to the north, east and west) consists of farmland with sparse residential development. The surrounding land usage has been shown on Drawing No. S07-6251-1A – Surrounding Land Use and Registered Water Wells.

2.2 Physiography

The subject property is situated in the physiographic region known as the Saskatchewan Rivers Plain (Acton et. al., 1960). The Saskatchewan Rivers Plain is characterized as gently undulating to rolling glacial lacustrine-alluvial plains (glacial lake plains), aeolian plains (dunes) and till plains. The surficial soil deposits consist of variable textured lacustrine and alluvial sands, silts and clays, aeolian sands, glacial till and local bedrock exposures in the South Saskatchewan River.

P. MACHIBRODA ENGINEERING LTD.

2.3 Topographic Setting and Local Drainage Characteristics

Based on a review of available topographic maps, the elevation of the ground surface at the subject property varies between about 510 to 515 metres. The subject property appears to drain overland to the south, with some localized low areas and drainage swales.

2.4 Geology

The subsurface soil conditions in the area of the proposed development consist of in excess of 90 metres of glacial and stratified drift followed by Cretaceous aged bedrock of the Lea Park Formation (Christiansen, 1967). The subject property is situated directly over the Tyner Valley, a regionally extensive bedrock valley aquifer system.

2.5 Hydrogeology

The primary source of groundwater in the vicinity of the subject property is from drift aquifers above or between glacial till strata, and, the Tyner Valley aquifer. The subject property is situated directly over the Tyner Valley, a regionally extensive bedrock aquifer system situated between the base of the glacial and stratified drift deposits and the bedrock surface.

The South Saskatchewan River is located approximately 7 km southeast of the subject property. The South Saskatchewan River is a discharge receptor for many of the aquifer systems in the Saskatoon area. As such, the expected direction of regional groundwater flow at the site is towards the southeast.

2.6 Groundwater Wells, Dugouts, Water Supply

Review of the Saskatchewan Watershed Authority Groundwater Well Database revealed that there are at least 18 registered water wells located within a 1.5 kilometre radius of the subject property. Sixteen of the wells were small diameter, deep wells completed at depths of about 70 to 120 metres below ground surface, while the other two wells were large diameter, shallow wells completed at depths of approximately 6 to 9 metres below ground surface. The distribution of the registered water wells has been shown on Drawing No. S07-6251-1A – Surrounding Land Use and Registered Water Wells.

3.0 FIELD INVESTIGATION

Sixteen test holes, located as shown on the Site Plan, Drawing No. S07-6251-1, were dry drilled using our truck-mounted, continuous flight, solid stem auger drill rig. The test holes were 100 mm in diameter and extended to a depth of 6.0 metres below the existing ground surface.

Test hole drill logs were compiled during test drilling to record the soil stratification, the groundwater conditions, the position of unstable sloughing soils and the depths at which cobblestones and/or boulders were encountered.

Disturbed samples of auger cuttings, collected during test drilling, were sealed in plastic bags to minimize moisture loss. The soil samples were taken to our laboratory for analysis.

Standard penetration tests (N-index) were performed during test drilling.

Piezometers (slotted, 50 mm diameter PVC pipe) were installed in each Test Hole for groundwater monitoring purposes.

P. MACHIBRODA ENGINEERING LTD.

4.0 FIELD DRILL LOGS

The field drill logs recorded during test drilling have been shown plotted on Drawing Nos. S07-6251-2 to 17, inclusive.

The ground surface elevation at the Test Hole locations was referenced to the top of an iron pin, located as shown on the Site Plan, Drawing No. S07-6251-1. A datum elevation of 100.000 metres was assumed for the top of the iron pin.

4.1 Soil Profile

The general soil profile consisted of organic topsoil overlying glacial till, which extended to a depth of at least 6.0 metres, the maximum depth penetrated with our Test Holes at this site.

4.2 Groundwater Conditions, Sloughing

The Test Holes remained dry and open during and at the completion of test drilling.

A summary of the measured groundwater elevations recorded during this investigation is presented in Table I. An examination of Table I revealed that the depth to groundwater on October 16, 2007 ranged from approximately 3.4 m to greater than 6 metres below grade (relative elevation of 94.6 to less than 92.2 metres).

It should be noted that all piezometers may not have stabilized. Higher and potentially perched groundwater levels should be expected following piezometer stabilization and during or following spring thaw or periods of precipitation.

TABLE I. RECORDED GROUNDWATER LEVELS

Test Hole No.	Ground Surface Elevation (metres)	Piezometer Rim Elevation (metres)	Recorded Groundwater Elevation (metres)	
			Oct. 2, 2007	Oct. 16, 2007
07-101	100.5	101.5	Dry	Dry
07-102	100.4	101.4	Dry	Dry
07-103	100.7	101.7	Dry	Dry
07-104	100.7	101.7	Dry	Dry
07-105	99.3	100.3	Dry	Dry
07-106	98.4	99.4	Dry	92.9
07-107	98.9	99.9	Dry	Dry
07-108	99.1	100.1	Dry	Dry
07-109	98.6	99.8	Dry	Dry
07-110	97.4	98.4	Dry	92.1
07-111	98.0	99.0	Dry	94.6
07-112	99.3	100.3	Dry	94.5
07-113	101.1	102.1	Dry	Dry
07-114	100.3	101.3	Dry	Dry
07-115	98.9	99.9	Dry	Dry
07-116	98.2	99.2	Dry	Dry

4.3 Cobblestones and Boulders

Cobblestones and/or boulders were encountered during test drilling. The depths at which cobblestones and/or boulders were encountered have been shown on Drawing Nos. S07-6251-2 to 17, inclusive.

The glacial till consisted of a heterogeneous mixture of gravel, sand, silt and clay-sized particles. The glacial till strata also contained sorted deposits of the above particle sizes. In addition to the sorted deposits, a random distribution of larger particle sizes in the cobblestone range (60 to 200 mm) and boulder-sized range (larger than 200 mm) should be expected at the subject site.

It should be recognized that the statistical probability of encountering cobblestones and/or boulders in the sixteen small diameter Test Holes drilled at this site was low. Intertill deposits of cobblestones, boulders, boulder pavements and isolated deposits of saturated sand or gravel should be anticipated. The frequency of encountering such deposits will increase proportionately with the number of holes drilled or volume of soil excavated.

5.0 LABORATORY ANALYSIS

The soil classification and index tests performed during this investigation consisted of a visual classification of the soil, water contents, Atterberg limits, unit weights and grain size distribution analysis.

The results of the soil classification and index tests conducted on representative samples of soil have been plotted on the drill logs alongside the corresponding depths at which the samples were recovered, as shown on Drawing Nos. S07-6251-2 to 17, inclusive.

P. MACHIBRODA ENGINEERING LTD.

The results of the grain size distribution analyses have been plotted on Drawing Nos. S07-6251-18 to 33, inclusive, and summarized in Table II.

TABLE II. SUMMARY OF LABORATORY TEST RESULTS

Test Hole No.	Depth (metres)	Grain Size Distribution Analysis (percent)			Saskatchewan Health Soil Texture Classification
		Sand & Gravel	Silt	Clay	
07-101	1.0	43	39	18	Loam
07-102	1.0	42	41	17	Loam
07-103	1.0	63	25	12	Sandy Loam
07-104	1.0	43	40	17	Loam
07-105	1.0	41	40	19	Loam
07-106	1.0	52	33	15	Loam
07-107	1.5	48	34	18	Loam
07-108	1.0	36	45	19	Loam
07-109	1.0	44	38	18	Loam
07-110	1.0	38	45	17	Loam
07-111	1.0	44	37	19	Loam
07-112	1.0	45	39	16	Loam
07-113	1.0	45	36	19	Loam
07-114	1.0	46	38	16	Loam
07-115	1.0	44	39	17	Loam
07-116	1.0	44	39	17	Loam

6.0 DESIGN RECOMMENDATIONS

Based on the foregoing outline of soil test results, the following foundation considerations and design recommendations have been presented.

6.1 Design Considerations

6.1.1 Onsite Wastewater Disposal Systems

The proposed development will consist of approximately 30 residential lots occupying a total land area of approximately 80-acres (~33 hectares) located immediately to the north of the Town of Osler, Saskatchewan.

The subsurface soil stratigraphy at this site consisted of organic topsoil overlying glacial till. Groundwater seepage and sloughing conditions were not encountered during test drilling. The static water levels measured in the standpipe piezometers on October 16, 2007 were in the range of 3.4 to greater than 6 metres below ground surface.

The subject site is situated directly over the Tyner Valley, a regionally extensive aquifer bedrock valley system. The primary source of groundwater in the vicinity of the subject site is from drift aquifers above or between glacial till strata, and, the Tyner Valley aquifer. Based on the available hydro-geological information, it is unlikely that the proposed development will impact the deep aquifers below the subject site.

The South Saskatchewan River is located approximately 7 km southeast of the subject property. The South Saskatchewan River is a discharge receptor for many of the aquifer systems in the Saskatoon area. As such, the expected direction of regional groundwater flow at the site is towards the southeast.

P. MACHIBRODA ENGINEERING LTD.

According to the Saskatchewan Health publication "Saskatchewan Onsite Wastewater Disposal Guide (First Edition 2007)", the proposed development is considered to be a high sensitivity area (16 parcels or greater on a quarter section of land). As such, potential onsite wastewater disposal systems include holding tanks, pressure chamber systems, Type II pressure mounds or package treatment plants with effluent disposal method.

The disposal systems are typically designed on the basis of soil texture classification. A summary of soil texture classification for the subgrade soils encountered at the subject site have been presented in Table II, Section 5.0 – Laboratory Analysis. It is recommended that the disposal systems should be designed in accordance with Saskatchewan Health specifications and recommendations.

6.1.2 Foundation Design

The subsurface soil conditions consisted predominantly of glacial till. The subgrade soils are frost susceptible and the average depth of frost penetration for the subject site area is approximately 1.8 metres. Groundwater seepage and sloughing conditions were not encountered during test drilling.

A shallow foundation system based below the average depth of frost penetration (i.e., approximately 1.8 m for the Osler area) would be based on low to medium plastic glacial till. A shallow foundation should perform satisfactorily for proposed residential structures.

A deep foundation system consisting of drilled, cast-in-place concrete piles could perform satisfactorily for support of at grade residences, garages and decks.

It is anticipated that perched groundwater conditions (which will fluctuate on a seasonal basis with the amount of precipitation, surficial drainage, snow melt, irrigation, etc.), will develop. As such, a perforated drainage pipe (weeping tile) drainage system should be constructed around the exterior of the foundation (for residences with basements).

P. MACHIBRODA ENGINEERING LTD.

Additionally, a continuous layer of clean, granular drainage aggregate should be placed beneath the floor slab and drained to a sump pit(s) for controlled discharge (for residences with basements).

Recommendations have been prepared for site preparation; excavations and de-watering; standard strip or spread footings; drilled, cast-in-place concrete piles; floor slabs; foundation walls; foundation concrete; grade beams and subdivision roads and parking structures.

6.2 Site Preparation

All topsoil, organics and other deleterious materials should be removed from the construction areas. The surface of the subgrade should be levelled and compacted to the following minimum density requirements.

- | | |
|-----------------|---|
| Building Areas | - 96 percent of standard Proctor density at optimum moisture content; |
| Roadway Areas | - 96 percent of standard Proctor density at optimum moisture content; |
| Landscape Areas | - 90 percent of standard Proctor density at optimum moisture content. |

Subgrade fill, if required, should preferably consist of granular material or locally available sand or glacial till soils. The fill should be placed in thin lifts (maximum 150 mm loose) and compacted to a minimum of 96 percent of standard Proctor density at optimum moisture content. The subgrade fill should be approved by the Geotechnical Consultant prior to placement.

The site should be graded to ensure positive site drainage away from the proposed Residences.

P. MACHIBRODA ENGINEERING LTD.

6.3 Excavating and Dewatering

It is anticipated that the proposed excavations at this site will be shallow and completed with unbraced, sloped side walls. The long-term stability of the excavation walls will be affected by wetting and drying of the exposed excavation walls, the depth of excavation, the length of time that the excavation remains open and the consistency and structure (degree of fracturing, slickensiding, etc.) of the subgrade soils. The recommended minimum sideslopes for the excavations extending to depths of not more than 5 metres at this site have been presented in Table III.

TABLE III. RECOMMENDED MINIMUM EXCAVATION SIDESLOPES

Soil Type	*Minimum Safe Sideslope	
	Horizontal	Vertical
Glacial Till	1.5	1

* Slope flattening will be required where groundwater seepage and sloughing conditions are encountered. Dewatering will be required below the groundwater table.

Dewatering of the excavations will be required where the excavation extends below the static groundwater table. Groundwater seepage and precipitation runoff should be collected in a drainage system at the base of the excavation (i.e., drainage ditches/interceptors, sump pits). The drainage system should drain positively to a collection sump(s) equipped with a sump pump(s).

6.4 Standard Strip or Spread Footings

A footing foundation should perform satisfactorily for the proposed residences. For continually heated residences with basements, footings should be constructed on naturally deposited, undisturbed soil a minimum distance of 500 mm above the groundwater table and a minimum of 1.2 metres below finished grade.

The following minimum recommendations should be incorporated into the design of a footing foundation.

1. For a continually heated dwelling with basement, the footings should be founded on naturally deposited, undisturbed soil at a minimum depth of 1.2 metres below finished ground surface. Footings not protected with an interior heat source and 1.2 metres of soil cover should be based below the average depth of frost (i.e., 1.8 metres) or protected with strategically placed rigid polystyrene insulation. In this case, a continuous layer of rigid polystyrene insulation should be placed over the exterior face of the foundation wall, extending vertically a minimum of 300 mm above grade and laterally a minimum distance of 1.2 metres away from the foundation. The insulation should be a minimum of 50 mm in thickness and should be positively sloped away from the foundation to promote drainage. The insulation should be placed a minimum of 300 mm below finished grade.
2. Footings based on naturally deposited, undisturbed glacial till soil may be designed to exert an allowable bearing pressure of 150 kPa. The footing excavations should be hand-cleaned to remove all loose, disturbed soil, and, to expose naturally deposited, undisturbed sand or silt.
3. A minimum strip footing width of 450 mm is recommended. A minimum dimension of 1,000 mm is recommended for square and rectangular footings.

P. MACHIBRODA ENGINEERING LTD.

4. If the subgrade soil is disturbed during excavation below the design depth, then the disturbed soil should be removed to an undisturbed, level surface. Fill, required to raise the subgrade elevation to the underside of the footings, should be concrete.
5. A representative of the Geotechnical Consultant should inspect the excavation prior to the installation of the footings.
6. Footings should not be constructed on desiccated, frozen or wet subgrade soil. Frost should not be allowed to penetrate beneath the footings prior to, during or after construction. In unheated areas, where potential damage due to frost penetration and upheaval could occur, adequate insulation should be installed to prevent frost penetration below the footings. In this case, the Geotechnical Consultant should review the proposed insulation details.
7. The finished grade should be landscaped to provide for positive site drainage away from the residence.

6.5 Drilled, Cast-In-Place Concrete Piles

Drilled, cast-in-place, reinforced concrete piles may be designed on the basis of skin friction only.

The allowable skin friction bearing pressures of the undisturbed soil are as follows:

TABLE IV. SKIN FRICTION BEARING PRESSURES (DRILLED PILES)

Zone (metres)	Allowable Skin Friction Bearing Pressure (kPa)
0 to 2	0
Below 2 (Glacial Till)	40

Notes:

1. To minimize frost heave potential, skin friction piles should be extended to and reinforced to a minimum depth of 6 metres below finished ground surface. The use of a sono-tube form for the uppermost 2 metres of the pile shaft is recommended, as it would significantly reduce the potential for frost-heaving of the straight shaft concrete piles.
2. Piles should be reinforced.
3. A minimum pile diameter of 300 mm is recommended for the primary structural loads. Larger pile diameters may be required to allow for the removal of cobbles and boulders in some pile holes, if encountered.
4. The pile holes should be filled with concrete as soon as practical after drilling.
5. Casing may be required to maintain an open hole for the placement of reinforcing steel and concrete.
6. A minimum centre-to-centre pile spacing of not less than three pile diameters is recommended.
7. A representative of the Geotechnical Consultant should inspect and document the installation of the drilled, cast-in-place concrete piles.

6.6 Floor Slabs

The following minimum provisions should be incorporated into the design of a heated grade-supported, cast-in-place, reinforced concrete slab subject to light floor loading.

1. Prepare the site in accordance with Section 5.2, Site Preparation. For residences with basements, over-excavate the subgrade soil to allow for the placement of a minimum of 200 mm of clean, drainage aggregate below the floor slab. Shape the subgrade surface to allow for free drainage to a sump pit(s). The drainage aggregate should meet the following gradation requirements.

<u>Sieve Designation</u>	<u>Percent Passing</u>
25.0 mm	100
9.5 mm	60 - 100
4.75 mm	44 - 90
2.00 mm	20 - 80
0.850 mm	0 - 53
0.425 mm	0 - 32
0.150 mm	0 - 10
0.071 mm	0 - 3

2. For residences constructed at-grade (i.e., pile foundation system), over-excavate the subgrade soil to allow for a minimum of 100 mm of compacted crushed granular base course material below the floor slab.
3. Excavate soft subgrade areas and replace with suitable, non-expansive fill, placed and compacted to 96 percent of standard Proctor density.
4. Subgrade fill, if required, should preferably consist of granular soil or locally available sand soils, placed in thin lifts (maximum 150 mm loose) and compacted to at least of 96 percent of standard Proctor density at optimum moisture content.

P. MACHIBRODA ENGINEERING LTD.

5. All granular fill placed above the subgrade elevation should be compacted to a minimum of 98 percent of standard Proctor density at optimum moisture content.
6. A sump pit is recommended below basement floor slabs to collect any free water which may accumulate beneath the floor, and, to collect water from the perimeter drainage system. The surface of the subgrade should be positively graded towards the sump pit. The sump pit should be perforated to allow water to drain in from the sub-slab drainage layer.
7. Isolate the slab from foundation walls, columns, etc., by means of separation joints.
8. Reinforce the concrete slab and articulate the slab at regular intervals to provide for controlled cracking.
9. Separate the slab from the fill by means of a polyethylene vapour barrier.
10. Provide positive site drainage away from the building.
11. Floor slabs should not be constructed on desiccated, wet, or frozen subgrade soil, fill or base.
12. Frost should not be allowed to penetrate beneath the floor slab just prior to, during or after construction.
13. If insulation is to be utilized below the floor slab, a minimum of 1 metre of un-insulated space should be provided around the perimeter of the foundation walls to allow heat loss to the underside of the perimeter strip footing/grade beam.

The above recommended floor system should perform satisfactorily if some floor movements resulting in cracking is deemed tolerable.

P. MACHIBRODA ENGINEERING LTD.

Partition walls, staircases and any other structural elements resting on the basement floor slab should be designed to accommodate differential movements without imparting stresses on the upper levels of the Residence.

In unheated structures (i.e., garage), frost heaving is a common cause of differential slab movement and cracking. If some slab movements and cracking is not deemed tolerable, increasing the depth of granular fill, thickness of concrete slab and amount of reinforcing steel could be utilized to minimize floor slab distress. Heating the area to about +5 ° C with adequate air circulation would minimize the depth of frost penetration below the slab. Alternately, strategically placed rigid polystyrene insulation could be utilized to limit frost penetration below floor slabs.

6.7 Foundation Walls

Subsurface foundation walls should be designed to resist lateral earth pressure exerted by the backfill as well as the horizontal pressure induced by any surcharge loading. The lateral earth pressure may be calculated on the basis of an equivalent fluid pressure distribution of 10 kN/m³ for drained conditions. The surcharge loading should be calculated on the basis of actual loads.

The lateral earth pressure loading of 10 kN/m³ assumes that the backfill will be free-draining, uniformly placed around the structure and lightly compacted, and, a perforated drainage pipe will be installed alongside the foundation walls with the invert elevation at or below the base of the foundation. The perforated drainage pipe should be at least 100 mm in diameter and installed on non-woven geotextile capable of transmitting a flow of not less than 50 litres per second per square metre (ASTM D-4491). The geotextile should be placed on naturally deposited, undisturbed soil or free-draining sand as may be required for levelling. The geotextile should be used to encapsulate at least 300 mm of clean, granular drainage aggregate above the invert of the drainage pipe. The clean drainage aggregate should meet the gradation requirements presented in Section 6.7 – Floor Slabs.

P. MACHIBRODA ENGINEERING LTD.

In the zone 300 mm above the invert of the drainage pipe and extending to within 500 mm of ground surface, clean, free-draining granular material with less than 5 percent material finer than the 0.071 mm sieve size should be used. The uppermost 500 mm should consist of clay or other low permeability material.

The lateral earth pressure loading assumes that the backfill will be placed in thin lifts (maximum 300 mm loose), will be lightly compacted and a peripheral (weeping tile) drainage system will be installed alongside the foundation walls with the invert elevation set at the base of the footing elevation.

6.8 Foundation Concrete

Water soluble sulphate salts (gypsum crystals) exist in the geologic deposits in this region. Sulphate resistant (CSA Designation HS) cement is recommended for all foundation concrete in contact with the soil. All concrete at this site should be manufactured in accordance with current CSA standards.

It should be recognized that water soluble sulphate salts combined with moist soil conditions or low pH soils, could render the soil highly corrosive to some types of metal water lines, elbows, connectors, etc., in contact with the soil.

6.9 Grade Beams

The grade beams should be reinforced at both top and bottom throughout their entire length.

6.10 Subdivision Roads and Parking Structures

Suitable borrow soils (i.e., glacial till) exist at the subject site for construction of subdivision roads and parking areas.

It is anticipated that the subdivision roads and parking areas will be subject to predominantly passenger car and light truck traffic and infrequent heavy truck traffic. As a subgrade support, the California Bearing Ratio (CBR) rating of the compacted subgrade soil should be in the order of 5.

Based on the CBR rating, the following pavement and granular surfacing structures have been presented.

TABLE V. THICKNESS DESIGN FOR ACCESS ROADS

Pavement/Granular Structure	Heavy Truck Traffic Wheel Loading (5,400 kg) (mm)		Light Truck/Passenger Vehicle Traffic Wheel Loading (1,830 kg) (mm)	
Surfacing Gravel	-	50	-	50
Asphalt Concrete	100	-	65	-
Granular Base (Min CBR = 65)	150	150	100	150
Granular Sub-Base (Min. CBR = 30)	250	350	135	175
Prepared Subgrade	(150)	(150)	(150)	(150)
Geotextile	*	*	*	*
Total Thickness	500	550	300	375

*Geotextile will be required where soft subgrade soils are encountered. High-strength, permeable, woven geotextile is recommended.

All granular fill placed above the subgrade elevation should be placed in thin lifts (150 mm loose, maximum) and compacted to 98 percent of standard Proctor density. The granular base, sub-base course and surfacing material should meet the following aggregate gradation requirements.

P. MACHIBRODA ENGINEERING LTD.

TABLE VI. AGGREGATE GRADATION REQUIREMENTS

Grain Size (mm)	Percent Passing		
	Surfacing Gravel	Base Course	Sub-Base Course
50.0	--	--	100
25.0	100	100	85 – 100
18.0	--	87 – 100	80 – 100
12.5	--	72 – 93	70 – 100
5.0	45 – 80	45 – 77	50 – 85
2.0	25 – 60	26 – 56	35 – 75
0.900	--	18 – 39	25 – 50
0.400	0 – 30	13 – 26	15 – 35
0.160	--	7 – 16	8 – 22
0.071	--	6 – 11	0 – 13
Plasticity Index (%)	0 – 6	0 – 6	0 – 6
CBR (min.)	--	65	30
% Fracture (min.)	40	50	--

The following minimum general recommendations should be incorporated into the design of the proposed subdivision roads and parking structures.

1. Prepare the site in accordance with Section 5.2, Site Preparation.
2. Excavate soft subgrade areas and replace with suitable soil compacted to a minimum of 96 percent of standard Proctor density at optimum moisture content. Geotextile may be required to reinforce and stabilize the subgrade soils.
3. All borrow material for the subject roadways and parking areas should be placed in thin lifts (maximum 150 mm loose) and compacted to at least 96 percent of standard Proctor density at optimum moisture content.

P. MACHIBRODA ENGINEERING LTD.

4. In cut areas, the subgrade should be scarified (to 150 in light traffic areas and 300 mm in heavy traffic areas) and re-compacted to 96 percent of standard Proctor density.
5. All common borrow used for embankment construction should consist of imported granular material or select, locally available glacial till or silty sand soils.
6. All granular fill should be placed in thin lifts (maximum 150 mm loose) and compacted to at least 98 percent of standard Proctor density.
7. Positive surface drainage is recommended to minimize the potential for moisture infiltration into the subgrade soil. Ditches and culverts should be provided where necessary to provide adequate site drainage. Surface water should be prevented from seeping back under the outer edges of the pavement structure. The final road grade should be elevated a minimum of 600 mm above the average terrain to minimize snow accumulation on the road.
8. For glacial till or sand borrow materials, roadway embankment slopes should be no steeper than 3.0 Horizontal to 1.0 Vertical (3H:1V). Similarly, ditch sideslopes should be no steeper than 3H:1V.
9. Erosion protection is recommended for all embankment sideslopes. The slopes should be covered with topsoil and seeded to encourage vegetation growth. Alternately, erosion control blankets (North American Green S150 or equivalent) or hydromulch could be installed.
10. Periodic maintenance of the granular/pavement surface will be required (i.e., grading of the gravel surface or crack sealing of the pavement surface).

7.0 LIMITATIONS

The presentation of the summary of the field drill logs and foundation design recommendations has been completed as authorized. Sixteen, 100 mm diameter test holes were dry drilled using our truck-mounted, continuous flight auger drill rig. Field drill logs were compiled for the Test Holes during test drilling which, we believe, were representative of the subsurface conditions at the Test Hole locations at the time of test drilling. Variations in the subsurface conditions from that shown on the drill logs at locations other than the exact Test Hole locations should be anticipated. If conditions should differ from those reported here, then we should be notified immediately in order that we may examine the conditions in the field and reassess our recommendations in the light of any new findings.

No detectable evidence of environmentally sensitive materials such as hydrocarbon odour was detected during the actual time of the field test drilling program. If, on the basis of any knowledge, other than that formally communicated to us, there is reason to suspect that environmentally sensitive materials may exist, then additional test holes should be drilled and samples recovered for chemical analysis.

The subsurface investigation necessitated the drilling of deep test holes. The test holes were backfilled at the completion of test drilling. Please be advised that some settlement of the backfill materials will occur which may leave a depression or an open hole. It is the responsibility of the client to inspect the site and backfill, as required, to ensure that the ground surface at each Test Hole location is maintained level with the existing grade.

This report has been prepared for the exclusive use of Mr. Bill Dyck and his agents for specific application to the proposed Multi-Parcel Subdivision to be constructed within SE-29-39-4-W3M within the R. M. of Corman Park No. 344, Saskatchewan. It has been prepared in accordance with generally accepted geotechnical engineering practices and no other warranty, express or implied, is made.

P. MACHIBRODA ENGINEERING LTD.

Any use which a Third Party makes of this report, or any reliance on decisions to be made based on it, are the responsibility of such Third Parties. PMEL accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

The acceptance of responsibility for the design/construction recommendations presented in this report are contingent on adequate and/or full time inspection (as required, based on site conditions at the time of construction) by a representative of the Geotechnical Consultant. PMEL will not accept any responsibility on this project for any unsatisfactory performance if adequate and/or full time inspection is not performed by a representative of PMEL.

We trust that this report fulfills your requirements for this project. Should you require additional information, please contact us.

P. MACHIBRODA ENGINEERING LTD.

Frank Hynes, P.Eng.

Association of Professional Engineers & Geoscientists of Saskatchewan		
CERTIFICATE OF AUTHORIZATION		
P. MACHIBRODA ENGINEERING LTD.		
Number 172		
Permission to Consult held by:		
Discipline	Sk. Reg. No.	Signature
Geotechnical	4955	J. Werbovetski
07-10-30		

Terry Werbovetski, P.Eng.

FH/TW:clb



P. MACHIBRODA ENGINEERING LTD.

9.3 Appendix: Town of Osler Letter



P.O. BOX 190, OSLER, SK S0K 3A0

August 27, 2007

Bill Dyck
Box 70
Osler, SK S0K 3A0

Dear Mr. Dyck:

RE: Multi-Parcel Country Residential Development

Your letter of August 15th was presented to Council as part of the meeting held August 21st. Council has indicated that a letter of support for the overall concept be forwarded to you. The following items are matters that the Council noted in their discussion:

- ✓ The development should have a positive economic impact for local businesses
- ✓ The green space noted in your letter could very easily provide an opportunity to partner with the Town as we are currently making plans with respect to walking trails in the community – these could easily be tied into any trails that you may put in place on your development
- ✓ Unfortunately, at this time, the Town is not in a position to offer any type of support with respect to water and sewer infrastructure, as our current facilities will be at their maximum capacity with the proposed annexations to the south
- ✓ There is a likelihood that this development will add to the student load of the local school – which is a matter that will need to be brought to the attention of the Prairie Spirit School Division (possibly at a meeting being held in Warman in September)
- ✓ The one item that should be noted is that there will be added pressure on our cultural and recreational amenities in the community and that this should be recognized when the Recreation Grant is reviewed by the RM of Corman Park (currently Osler receives \$526 annually)

It should be noted that the Town's Basic Planning Statement, adopted by Bylaw on October 19, 2006, does identify the area north of the grid road (immediately across the tracks from your farm) as having potential to be annexed and used for industrial growth. Council wishes to ensure that you are aware of the ramifications of this or any of the other items set out above.

Council wishes to highlight the fact that they have not seen any type of plan of subdivision and have very limited knowledge as to the proposed layout of the area. However, based on the information available to date, Town Council feels that they can support, in principle, a country residential development on your property but would reserve the right to comment further at the time of the public hearing.

Yours truly,

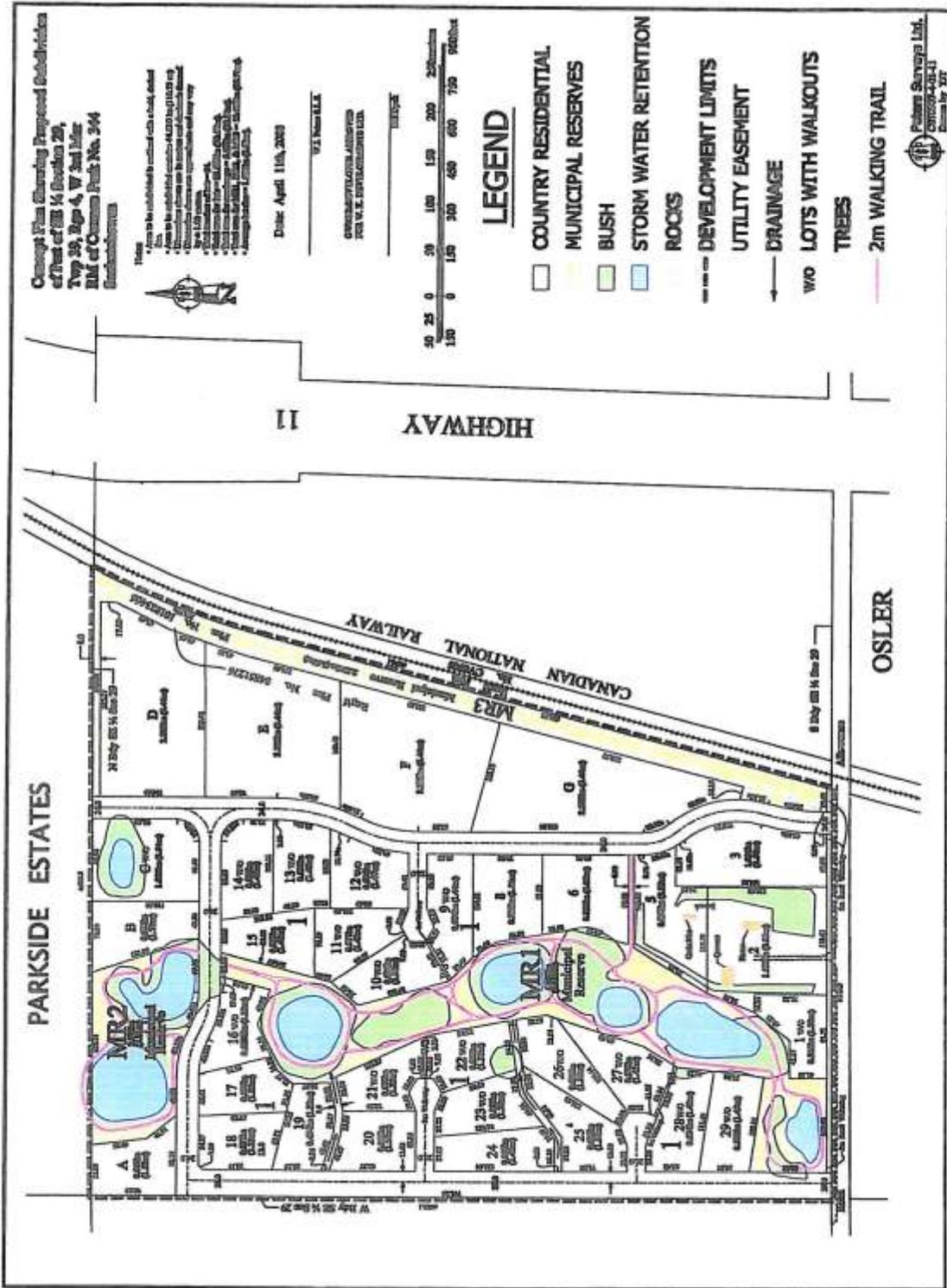
A handwritten signature in cursive script, appearing to read "S MacArthur".

Sandra K. MacArthur, RMA
Administrator

PHONE: (306)239-2155 FAX: (306)239-2194 EMAIL: townofosler@yourlink.ca

13

9.4 Appendix: Main Concept Plan



12

9.6 Appendix: Saskatchewan Health Letter



Saskatoon Health Region
Public Health Services
Safe Communities Department
#101-310 Idylwyld Drive North, SASKATOON SK S7L 0Z2
Phone: 655-4605 Fax: 655-4498

September 4, 2007

Bill Dyck

Dear Sir:

**RE: Proposed Lots - Residential
SE ¼ Section 29-39-4-W3M
Rural Municipality of Corman Park No. 344**

Further to our telephone conversation this morning about what information our office would require to examine your proposal to subdivide. Due to the proposed density and location, we will be requiring a Geotechnical Investigation that would consider the larger scale environmental impact of the development and identify the method of onsite wastewater treatment and disposal. Onsite wastewater disposal options need to consider that soils at this location would be suitable to sufficiently renovate effluent. This report should:

- Identify limiting soil and groundwater conditions. Use the soil test pit or bore hole methodology assess soil water conditions and report soil texture classification.

For soil test pits deep observations holes must be excavated to a minimum depth of 2.8 metres (8 feet). These holes will allow the examination of the site to determine soil structure, any restrictive layer of soil, seasonally saturated soil and ensure that the ground water elevation exceeds 2.8 metres (8 feet). The test pits are to be excavated and ramped in a manner that allows for safe entry for inspection without a ladder.

Particle sizing of soils within each of the test pits will be required. Soil samples are to be collected at 0.91 metres (3 feet) 1.5 metres (5 feet) and 2.8 metres (8 feet) for particle sizing. Particle sizing is to be conducted in a certified soils laboratory utilizing either the pipette or the hydrometer method. The percentages of sand, silts and clays particles and the soil texture classification are to be determined and reported.

A review of the soil structure, horizons, gleyed or mottled soil and any presence of water should be conducted and reported. Document findings and identify soil characteristics that limit the selection of and the long term suitability of an onsite wastewater disposal system. Percolation tests may be conducted but are not required.

16

- Identify topographical limitations such as cuts, banks or slopes considering stability concerns created by a proposed onsite system. Provide topography contour lines at 1.5 metre (5 foot) intervals.
- Report on the density of development in surrounding half-mile area. Provide information on springs, dugouts or wells accessing shallow groundwater for domestic purposes within 0.8 kilometres (0.5 miles) of the proposed subdivision.
- Assess the general suitability of the site for accommodating onsite wastewater disposal systems. Determinants would include but are not limited to:
 - Soil texture and structure
 - Depth of suitable soil
 - Hydraulic capability of soil
 - Soil horizons
 - Depth to water table
 - Topography
 - Flood Plains.
- Identify any documented or projected environmental sensitivities in the area of the subdivision such as:
 - Contaminant or nutrient loading concerns in the area
 - Unconfined aquifers within 500 metres of proposed development
 - Sensitive surface waters or lakefront within 500 metres of the proposed development.
- Assess the potential for unacceptable ground water impacts resulting from the combined use of onsite wastewater disposal systems. Determine:
 - The representative existing background nitrate-nitrogen levels in receiving groundwater
 - That the area is not obviously hydrogeologically sensitive (areas of highly permeable soils, etc.)
 - The most probable lower hydraulic or physical boundary of the groundwater receiving the wastewater (may require hydrogeologic assessment of lands up to 500 metres beyond actual development boundary).

The assessment will benefit builders towards a planned layout in designing and locating onsite wastewater disposal systems. The report will reduce the occurrence of unexpected requirements and limited choices having to be met by anyone constructing an onsite wastewater disposal system. Protection of public health and the environment is important to all of us and can be ensured by safeguarding the site and the region in which you are located.

The installation of all onsite wastewater disposal systems will need to be permitted, inspected, and approved by this department in accordance with the provisions of the Saskatchewan Plumbing and Drainage Regulations, 1996 and the information contained in the Saskatchewan Wastewater Disposal Guide. Applications for permits of onsite wastewater disposal selections are to be made through the Saskatoon Health Region Office and shall be accompanied by design specifics, location details, and evidence that the proposed systems have been designed by a qualified person.

Design specifics are to include information on general site and soil conditions of the disposal field. This would identify the soil texture classification at a depth of at least 0.9 metres (3 feet) or results of percolation tests in minutes per 2.5 cm and evidence of seasonally saturated soils, high water table or restrictive soil layers to a depth of at least 2.4 metres (8 feet). Also necessary will be the estimated daily flow of wastewater generated by the facility being served.

Location details of the proposed disposal site would need to include property size, dimensions, and boundaries. The boundaries of the proposed lots must be clearly and accurately flagged with survey tape. Lot numbers or letters should also be marked on site. To prevent having to accept marginal site conditions for possible future system repairs a proposal for satisfactory replacement area must accompany the plan submission of the original wastewater disposal system. Also, a detailed site plan will need to be provided containing: location of existing and/or proposed dwelling and structures, location of the tank and disposal system, location and set back distances of all property lines, location of wells and watercourses on the property, location of trees that may impact the system, and location of any unsuitable (large fills, steep sloping areas), disturbed, or compacted areas.

Please bear in mind that our approval extends only to those matters governed by the provisions of the Public Health Act and the regulations thereunder. Further, neither this approval nor any inspection nor any error or omission therein does in any way relieve the owners or builders from the need to comply with the applicable provisions of the Public Health Act and the regulations thereunder.

Sincerely,

Dwayne Djkowich
Supervisor, Safe Communities

DD:lc

9.7 Appendix: Ministry of Environment



Ministry of
Environment

070907-4

P.O Box 3003, 6th Fl
800 Central Ave
Prince Albert, SK. S6V 6G1
Ph: (306) 953-3369
Fax: (306) 953-2502

July 2, 2008

File: R602-08S

Peters Surveys Ltd.
1136 8th Street East
Saskatoon, SK. S7H 0S4

Dear Mr. Peters:

**Proposed Subdivision
RM of Corman Park No. 344
SE ¼ Section 29-39-4-W3M
Proposed Residential Development – Parkside Estates**

Further to your application under the Planning and Development Act of May 27th, 2008, I am pleased to provide comments on the above noted proposed subdivision.

Saskatchewan Ministry of Environment recognizes that central water and central sewer systems are typically safer than individual wells and individual sewage systems in new subdivisions and therefore we prefer to see the development of such systems rather than reliance on individual wells, and individual sewage systems. When such systems are installed, the department may regulate them, particularly if the capacity of the systems exceeds 18m³ per day.

If the Ministry of Environment will regulate the proposed water system the Applicant(s) will need to ensure that local municipal regulations are followed and that proper permits to construct are obtained from the Ministry of Environment before installation of the proposed water system should proceed. Applications for Permits to construct can be found on line at <http://www.saskh2o.ca/foroperators.asp>

Some concerns regarding the septic treatment for the proposed subdivision have been identified to the Ministry of Environment. Your local Health Authority administers the review and permitting of individual sewage systems and will be able to provide you with information on the requirements needed to ensure the protection of the environment.

.../over

19

I trust that these comments will be of assistance.

Yours sincerely,



Andy Busse
Environmental Project Officer
Environmental Protection Branch
Ministry of Environment

Cc: Dwayne Djkowich, Saskatoon Health Region
Bill Miller, Manager, Water and Municipal Programs Unit, North, SE
Dylan Sather, Community Planning
William & Kathleen Dyck
Town of Osler
RM of Corman Park No. 344

9.8 Appendix: Tamarack Professional Services



June 5, 2008

Mr. Bill Dyck
Parkside Estates
Box 70
Osler SK S0K 3A0

Dear Mr. Dyck:

Re: Parkside Estates Phase I & II Stormwater Drainage Study

Further to our previous letter we have included the Phase II stormwater drainage in the findings of our report for Phase I. Based upon this new analysis we feel the 1 in 100 storm water runoff from Phases I & II can be contained in an approximate 0.53 metre depth in the municipal reserve lands on the site (M1 & M2). These findings are based upon the following criteria:

Phase I total land area (from Peters Surveys) = 82.89 acres (33.544 Ha)
Phase II total land area (from Peters Surveys) = 21.76 acres (8.806 Ha)
Municipal reserve areas M1 & M2 (from Peters Surveys) = 19.80 acres (8.013 Ha)
Elevation in majority of developed area in Phases I and II is greater than 513
Elevation in areas M1 & M2 ranges from 510 to 513 metres (from Peters Surveys)
Average elevation in M1 & M2 assumed to be 512.25
Assumed negligible storage below elevation 512
1 in 100 year storm = 4 Inches (100 mm) over 24 hours from Sask. Watershed Authority
Runoff from Phase I & II subdivision to areas M1 & M2 = 430 mm depth
Assumed runoff coefficient = 1.0 (this is the worst case, actual coefficient in the order of 0.2)

1 in 100 year water elevation = $512.25 + 0.100 + 0.430 = 512.78$

Based upon our review we recommend any fill material available from excavations onsite be used to build up the lower portions of all lots to elevation 513 and above. The lots with the largest potential ponding areas are Lots 15, 16, 22 and 29. We would recommend the safe building elevation be set at a minimum of 513.25 on these lots.

If you have any questions concerning please contact me at 955-5191. Thank you for your attention to this matter.

Sincerely
Tamarack Professional Services Ltd.

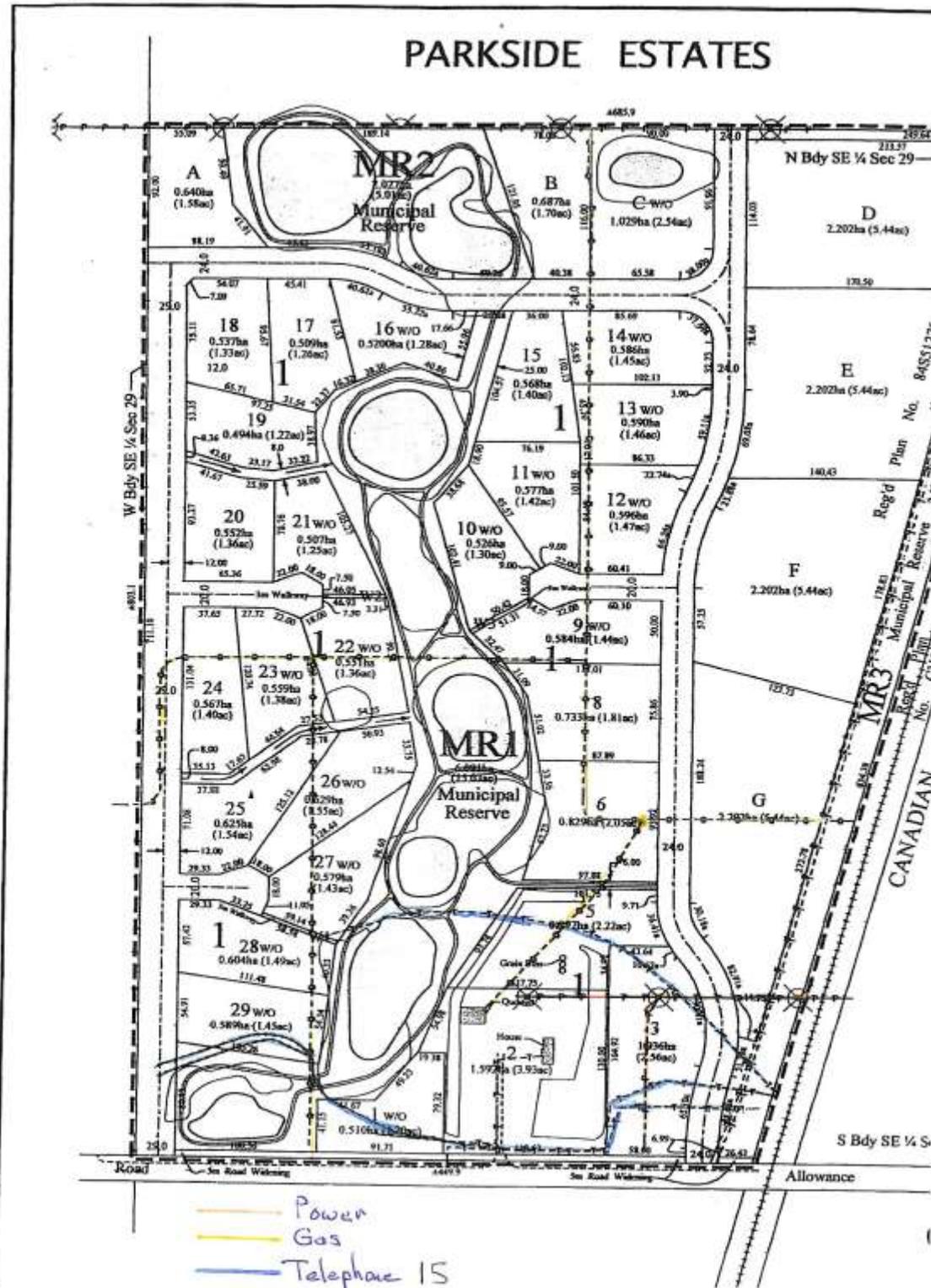


Douglas Thompson, P. Eng.

#1105 - 620 Spadina Crescent East • Saskatoon, Saskatchewan • Canada • S7K 3T5
Phone: (306) 955-5191 • Cell: (306) 222-5191 • Fax: (306) 683-0740 • E Mail: tamarack@sasktel.net

21

9.9 Appendix: Shallow Utilities



9.10 Appendix: Environmental Assessment

Saskatchewan



Saskatchewan
Environment

3211 Albert Street
Regina, Canada
S4S 5W6

June 22, 2007

Mr. Bill Dyck
PO Box 70
OSLER SK S0K 3A0

EAB File: 2007-089

cf: EAB M10-8

Dear Mr. Dyck:

Re: Subdivision proposal for SE 29-39-4 W3

This is in response to your letter of June 18, 2007 regarding a proposal for a 35 lot subdivision on the above property.

As indicated in Diane Livingston's letter to you of December 6, 2002, it is unlikely that this project would require screening by the Environmental Assessment Branch (EAB). If you have not done so already, you should check with Heritage Resources Branch of Saskatchewan Culture, Youth and Recreation to determine whether a heritage resource impact assessment is necessary. A contact person for this is Nathan Friesen, phone number: (306) 787-5774.

Community Planning Branch of Saskatchewan Government Relations circulates subdivision applications to appropriate government departments for comment prior to approving them. They will forward it to us for review if they feel that consideration under *The Environmental Assessment Act* may be necessary.

Thank you for keeping us informed of your plans. Feel free to contact me if you have any questions.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Tom Maher'.

Tom Maher, Project Manager
Environmental Assessment Branch

cc: Gord Grav. Environmental Assessment Branch

9.11 Appendix: Saskatchewan Heritage Email

Page 1 of 1

William Dyck

From: "Ebert, David CYR" <debert@cyr.gov.sk.ca>
To: <wdyck@sasktel.net>
Sent: July 3, 2007 3:49 PM
Subject: Heritage Resource Review

Hello Mr. Dyck

I revisited our previous examination of your subdivision, given the change in land use from golf course to subdivision. The area contains no sites and is a relatively flat featureless plain. Therefore, the potential for heritage sites is low and, this office has no further concern with the project proceeding as planned.

David Ebert

Dr. David Ebert
Senior Archaeologist
Heritage Resources Branch
Department of Culture, Youth and Recreation

9th Floor
1919 Saskatchewan Dr.
Regina SK S4P 4H2

+1(306) 787-2848 (office)
+1(306) 787-0069 (fax)

11

03/07/2007

9.12 Appendix: Public Consultation Summary

MULTI-PARCEL COUNTRY RESIDENTIAL DEVELOPMENT

SE-29-39-4-W3RD (BILL AND KIM DYCK LANDOWNERS)

This letter is to inform you of a proposal put forth to the R.M. of Corman Park to develop the abovementioned property into a multi-parcel country residential development.

The proposal includes subdividing 80 acres of our property into 31 individual lots of approx 1.5 acres in size. The proposal includes a municipal reserve of 18 acres. It will contain natural walking trails, a picnic area as well as a spray pond. Please see enclosed Plan of Proposed Subdivision.

A public meeting will be held on November 8, 2007 @ 7P.M. It will be held at the Osler Community Pioneers Center located @ 208 2nd Street Osler, Sask. Your presence at this meeting would be greatly appreciated. This meeting will give you an opportunity to view this proposal as well as answer any questions you may have regarding this development.

Amongst those present at the meeting to answer any questions or concerns are the following:

Bill and Kim Dyck: Landowners
Jim Forsyth: R.M. Councillor Division 6 —
Glen Grismer: Director of Planning R.M. Corman Park

Also attached is a questionnaire that we ask you to fill out and bring to the meeting. If not able to attend this meeting please forward the completed questionnaire by November 16 to:

Bill Dyck
Box 70
Osler, Sask.
S0K 3A0

Additional information on this development can be obtained at:
www.parksideestates.ca

Thank You

Bill and Kim Dyck

MEETING DATE: NOVEMBER 8, 2007

MULTI-PARCEL COUNTRY RESIDENTIAL DEVELOPMENT
SE-29-39-4-W3RD

Osler
Council

NAME:	LAND LOCATION OR ADDRESS:	PHONE:
Glen Grogan	Box 596 Osler	239-4999
Peter & Helen Thiesse	Box 270 Osler	239-2144
Robert & Lisa Klassen	Box 327 Osler	239-4303
Barb Priebe	Box 142 Osler	239-4722
Glen Newfeld	Box 446 Osler	239-4399
ROBERT PAULS	box 123 OSLER	239-4766
VERN & MARY BIESEN	Box 149 OSLER	239-4822
HARRY & EVA MARTENS	Box 62 OSLER	239-4902
BARRY BOLDT	Box 402 OSLER	239-2071
Bruce Boldt	Box 152 RR4 Saskatoon	239-9811

MULTI-PARCEL COUNTRY RESIDENTIAL DEVELOPMENT
SE-29-39-4-W3RD

NAME: Vern & Mary Friesen

LAND LOCATION OR ADDRESS: Box 149 Osler, SK S0K3A0
SE 29 - 39 - 4 - W3RD

I, THE UNDERSIGNED HAVE RECEIVED OR REVIEWED A LETTER INDICATING A PROPOSAL FOR A MULTI-PARCEL COUNTRY RESIDENTIAL HOUSING DEVELOPMENT ON SE-29-39-4-W3RD.

I HAVE ALSO RECEIVED OR REVIEWED A PLAN OF PROPOSED SUBDIVISION FOR THIS DEVELOPMENT.

AFTER REVIEWING THE ABOVE PROPOSAL:

DO YOU THINK YOU HAVE A CLEAR UNDERSTANDING OF WHAT THE PROPOSED DEVELOPMENT IS AND HOW IT WILL WORK? Yes

HAVE YOU HAD AN OPPORTUNITY TO EXPRESS YOUR VIEWS TO THE DEVELOPER AND DO YOU THINK YOU WERE LISTENED TO? Yes

IF YOU HAVE AN UNRESOLVED CONCERN ARE YOU PREPARED TO WORK WITH THE DEVELOPER TO TRY TO IDENTIFY A MUTUALLY AGREEABLE SOLUTION? Yes

DO YOU HAVE ANY OTHER OPINIONS OR SUGGESTIONS? IF SO PLEASE LIST THEM BELOW OR WRITE TO THE DEVELOPER AND SHARE THEM WITH THE R.M. OF CORMAN PARK AT 111 PINEHOUSE DRIVE, SASKATOON, SASK. S7K 5W1 OF FAX TO 242-6965 BEFORE: NOVEMBER 16, 2007.

I HAVE THE FOLLOWING COMMENTS:

Our concerns are increased traffic
past our residence causing dust.

SIGNATURE: Vern Friesen DATE: Nov 13/07
Mary Friesen

MULTI-PARCEL COUNTRY RESIDENTIAL DEVELOPMENT
SE-29-39-4-W3RD

NAME: Robert & Lisa Klassen

LAND LOCATION OR ADDRESS: SE Section 30, Township 39, Range 4, west of the 3rd

I, THE UNDERSIGNED HAVE RECEIVED OR REVIEWED A LETTER INDICATING A PROPOSAL FOR A MULTI-PARCEL COUNTRY RESIDENTIAL HOUSING DEVELOPMENT ON SE-29-39-4-W3RD.

I HAVE ALSO RECEIVED OR REVIEWED A PLAN OF PROPOSED SUBDIVISION FOR THIS DEVELOPMENT.

AFTER REVIEWING THE ABOVE PROPOSAL:

DO YOU THINK YOU HAVE A CLEAR UNDERSTANDING OF WHAT THE PROPOSED DEVELOPMENT IS AND HOW IT WILL WORK? Yes

HAVE YOU HAD AN OPPORTUNITY TO EXPRESS YOUR VIEWS TO THE DEVELOPER AND DO YOU THINK YOU WERE LISTENED TO? Yes

IF YOU HAVE AN UNRESOLVED CONCERN ARE YOU PREPARED TO WORK WITH THE DEVELOPER TO TRY TO IDENTIFY A MUTUALLY AGREEABLE SOLUTION? Yes

DO YOU HAVE ANY OTHER OPINIONS OR SUGGESTIONS? IF SO PLEASE LIST THEM BELOW OR WRITE TO THE DEVELOPER AND SHARE THEM WITH THE R.M. OF CORMAN PARK AT 111 PINEHOUSE DRIVE, SASKATOON, SASK. S7K 5W1 OF FAX TO 242-6965 BEFORE: NOVEMBER 16, 2007.

I HAVE THE FOLLOWING COMMENTS:

SIGNATURE: [Signature] DATE: Nov. 8, 2007

MULTI-PARCEL COUNTRY RESIDENTIAL DEVELOPMENT
SE-29-39-4-W3RD

NAME: DENNIS BOUDT

LAND LOCATION OR ADDRESS: Box 308 Osloo 50K3A0
SE 24-39-5W3

I, THE UNDERSIGNED HAVE RECEIVED OR REVIEWED A LETTER INDICATING A PROPOSAL FOR A MULTI-PARCEL COUNTRY RESIDENTIAL HOUSING DEVELOPMENT ON SE-29-39-4-W3RD.

I HAVE ALSO RECEIVED OR REVIEWED A PLAN OF PROPOSED SUBDIVISION FOR THIS DEVELOPMENT.

AFTER REVIEWING THE ABOVE PROPOSAL:

DO YOU THINK YOU HAVE A CLEAR UNDERSTANDING OF WHAT THE PROPOSED DEVELOPMENT IS AND HOW IT WILL WORK? _____

HAVE YOU HAD AN OPPORTUNITY TO EXPRESS YOUR VIEWS TO THE DEVELOPER AND DO YOU THINK YOU WERE LISTENED TO? _____

IF YOU HAVE AN UNRESOLVED CONCERN ARE YOU PREPARED TO WORK WITH THE DEVELOPER TO TRY TO IDENTIFY A MUTUALLY AGREEABLE SOLUTION? WATER - YES

DO YOU HAVE ANY OTHER OPINIONS OR SUGGESTIONS? IF SO PLEASE LIST THEM BELOW OR WRITE TO THE DEVELOPER AND SHARE THEM WITH THE R.M. OF CORMAN PARK AT 111 PINEHOUSE DRIVE, SASKATOON, SASK. S7K 5W1 OF FAX TO 242-6965 BEFORE: NOVEMBER 16, 2007.

I HAVE THE FOLLOWING COMMENTS:

Since I have land in the vicinity, I would like to know where your potable water source will come from

SIGNATURE: [Signature] DATE: Nov 1/07

P.S. I will not be at your meeting because I will be on vacation during that time. If convenient meet here before Nov 7 @ 739-4702

29



PART OF THE PROPOSED PARK SETTING



POSSIBLE SKATING POND ON PROPERTY



ONE OF THE SLOUGH BOTTOMS ON PROPERTY



VIEW OF BUSH THRU MIDDLE OF PROPERTY



ONE OF THE MAN-MADE SWALES TO CONTROL SPRING RUN-OFF



VIEW OF ROLLING TOPOGRAPHY AND BUSH



COLORFUL AUTUMN COLORS ON PROPERTY



MORE AUTUMN COLORS ON PROPERTY