172/2000

BEING A BYLAW OF THE MUNICIPAL DISTRICT OF FOOTHILLS NO. 31 TO ADOPT AN AREA STRUCTURE PLAN

WHEREAS the Council of the Municipal District of Foothills No. 31 (hereinafter called the "Council") is empowered by Section 633(1) of the Municipal Government Act, being Chapter M-26.1, to adopt an Area Structure Plan which provides a framework for subsequent subdivision and development of an area of land within the Municipality's boundaries; and

WHEREAS the Council did direct the preparation of an Area Structure Plan for the properties legally described as N.E.13-20-1 W5; and

WHEREAS the Area Structure Plan has been prepared under the direction of the Council;

NOW THEREFORE the Council of the Municipal District of Foothills No. 31 in the Province of Alberta, hereby enacts as follows:

1. This Bylaw may be cited as the "*Sundance Trail Area Structure Plan*".

2. The Sundance Trail Area Structure Plan being Schedule "A" attached hereto and forming part of this Bylaw.

3. That the Sundance Trail Area Structure Plan may be amended by Bylaw from time to time in accordance with the Municipal Government Act, by the Municipal District of Foothills No. 31.

4. This Bylaw comes into full force and effect upon the third and final reading.

FIRST READING: October 26, 2000

Roy R. McLean
Reeve

Municipal Manager

SECOND READING: July 12, 2001

Roy R. McLean
Reeve

Municipal Manager

THIRD READING: July 12, 2001

Roy R. McLean
Reeve

Municipal Manager

PASSED IN OPEN COUNCIL assembled at the Town of High River in the Province of Alberta this 12 day of. July 2001.

Alberta
TRANSPORTATION

Office of the Assistant Deputy Minister
Transportation and Civil Engineering

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Edmonton AB T6B 2X3
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Fax: (780) 415-1268

June 21, 2002

Mr. Roy McLean, Reeve
Municipal District of Foothills
Box 5605
High River AB T1V 1M7

Dear Mr. McLean:

The department has reviewed the Sundance Trail Area Structure Plan (STASP) located in the NE 13-20-1-5 adjacent to Highway 7, west of Okotoks. The STASP meets the department's requirements and is approved to meet the requirements of Section 14 of the Subdivision and Development Regulation.

We support and appreciate the ongoing co-operation of the Municipal District of Foothills on planning matters.

Sincerely,

PP Rob Penny, P.Eng.
Assistant Deputy Minister

cc: Mr. Darrell Camplin
Regional Director - Southern Region

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

A. CERTIFICATE OF TITLE
B. AGROLOGIST REPORT
C. RESTRICTIVE COVENANT
D. GROUNDWATER REPORT
E. PERCOLATION REPORT
F. ACCESS SIGHT LINE DRAWING

1. INTRODUCTION

1.1 PLAN PURPOSE

This Area Structure Plan (ASP) has been prepared pursuant to the provisions of Section 633 of the Municipal Government Act and amendments thereto. The purpose of this Area Structure Plan is to act as a guide to future subdivision and development on the NE 13 – 20 – 01 W5M.

1.2 BACKGROUND TO THE AREA STRUCTURE PLAN

In 1989 12.95 +/- acres was taken from the subject quarter for road widening under Road Plan 8912019. In July of 1998, the Developer purchased the balance of the land and has been residing on the property since that time. In 1998 a subdivision was completed removing one 5.0 +/- acre lot from the NE 13 – 20 – 01 W5M under Plan 9812423. The Developer has recently purchased this lot, Block 1, Plan 9812423. A boundary adjustment application will be made at the redesingnation stage to realign the north boundary of this lot allowing for a continuous 40 metre strip as well as the 30 meter Service Road Dedication as indicated in Figure 1, thereby providing for the development of a service road as per Alberta Transportation. Under the Boundary Adjustment the parcel will maintain the existing acreage.

1.3 APPROVAL PROCESS

After formally submitting the Area Structure Plan to the M.D. of Foothills No. 31 a public hearing will be scheduled. This will allow the Developer and / or agent to formally present the Area Structure Plan to Council. Should Council be in the opinion that the Area Structure Plan is in compliance with the provisions of the Municipal Government Act, the M.D. of Foothills No. 31 Municipal Development Plan and their Land Use By-law, the document will receive first reading. At such time as the Area Structure Plan meets the satisfaction of Alberta Transportation and the M.D. of Foothills No. 31 Council it shall receive third reading and will be adopted by bylaw. The land may then be redesignated to allow for the future subdivision of subject lands. Upon receiving approval for the redesignation, the subject lands may then be subdivided subject to MD approval.

1.4 PLAN IMPLEMENTATION

This Area Structure Plan is in keeping with Country Residential subdivision standards within the M.D. of Foothills No. 31. When Council adopts this Area Structure Plan, in accordance with the provisions of the Municipal Government Act it becomes a Statutory Plan of the M.D. of Foothills No. 31. A copy of the adopting by-law shall form a part of this plan.

Future land use redesignations will be required to redesignate the Plan Area to the appropriate Land Use District prior to subdivision.

1.5 PUBLIC PARTICIPATION

The Developer managed the public participation component of this Area Structure Plan by directly contacting the adjacent landowners on an individual basis. By doing this, the Developer was able to identify and address their concerns. Additionally, the public will have the opportunity to further comment on this proposal when the M.D. of Foothills No. 31 Council holds the public hearing for this Area Structure Plan, pursuant to the provisions of the Municipal Government Act.

1.6 LEGISLATIVE FRAMEWORK

a) The Municipal Government Act

An Area Structure Plan is identified in the Municipal Government Act as a Statutory Plan. Section 633 of the Act reads as follows:

Area Structure Plans

Area structure plan

633(1) For the purpose of providing a framework for subsequent subdivision and development of an area of land, a council may, by bylaw, adopt an area structure plan.

(2) An area structure plan

(a) must describe:

(i) the sequence of development proposed for the area,

(ii) the land uses proposed for the area, either generally or with respect to specific parts of the area,

(iii) the density of population proposed for the area either generally or with respect to specific parts of the area, and

(iv) the general location of major transportation routes and public utilities, and

(b) may contain any other matters the Council consider necessary.

In the process of preparing and adopting this Plan the Council must comply with the provisions of Section 636, 637 and 638 of the Municipal Government Act, which are quoted as follows for easy reference.

Statutory plan preparation

636 While preparing a statutory plan a municipality must

(a) provide opportunities to any person who may be affected by it to make suggestions and representations,

(b) notify the public of the details of the plan preparation process and of the means to make suggestions and representations referred to in clause (a),

(c) notify the school authorities with jurisdiction in the area to which the plan preparation applies and provide opportunities to those authorities to make suggestions and representations,

(d) in the case of a municipal development plan, notify adjacent municipalities of the plan preparation and provide opportunities to those municipalities to make suggestions and representations, and

(e) in the case of an area structure plan, where the land that is the subject of the plan is adjacent to another municipality, notify that municipality of the plan preparation and provide opportunities to that municipality to make suggestions and representations.

Effect of plans

637 The adoption by a council of a statutory plan does not require the municipality to undertake any of the project referred to in it.

Plans Consistent

638 All statutory plans adopted by a municipality must be consistent with each other.

b) The Municipal Development Plan

An Area Structure Plan is defined in the Municipal Development Plan as a statutory plan, adopted by bylaw, which provides a land use strategy for subsequent redesignation, subdivision and development of a specific area of land in the Municipality. Municipal support for an Area Structure Plan is found in Section 5.3.5 of the Municipal Development Plan which reads as follows:

5.3.5 An Area Structure Plan drafted in accordance with the guidelines adopted by the Municipality shall be required as part of a Country Residential proposal that would create 8 new lots or more and for proposals of less than 8 new lots an Area Structure Plan may be required if in the opinion of Council one is necessary, due to:

a) the impact the proposal may have on adjoining lands;
b) the need to review, in greater detail, the infrastructure requirements of this proposal;
c) the proposal being a continuation of an existing subdivision and leads to a density greater than 8 lots per quarter section;
d) the proposal, in the opinion of Council being phase 1 of a development that will create 8 new lots or more.

1.5 INTERPRETATION

In this Plan:

(a) "Act" means the Municipal Government Act 1995 and amendments thereto.

(b) "Council" means the Council of the Municipal District of Foothills No. 31.

(c) "Developer" means the landowners, Lorne Read and Leanne Read as listed on the title.

(d) "Land Use Bylaw" means a Bylaw of the M.D. of Foothills No. 31 passed by Council pursuant to the provisions of the Municipal Government Act and intended to prohibit, regulate and control the use and development of land and buildings within the M.D. of Foothills No. 31.

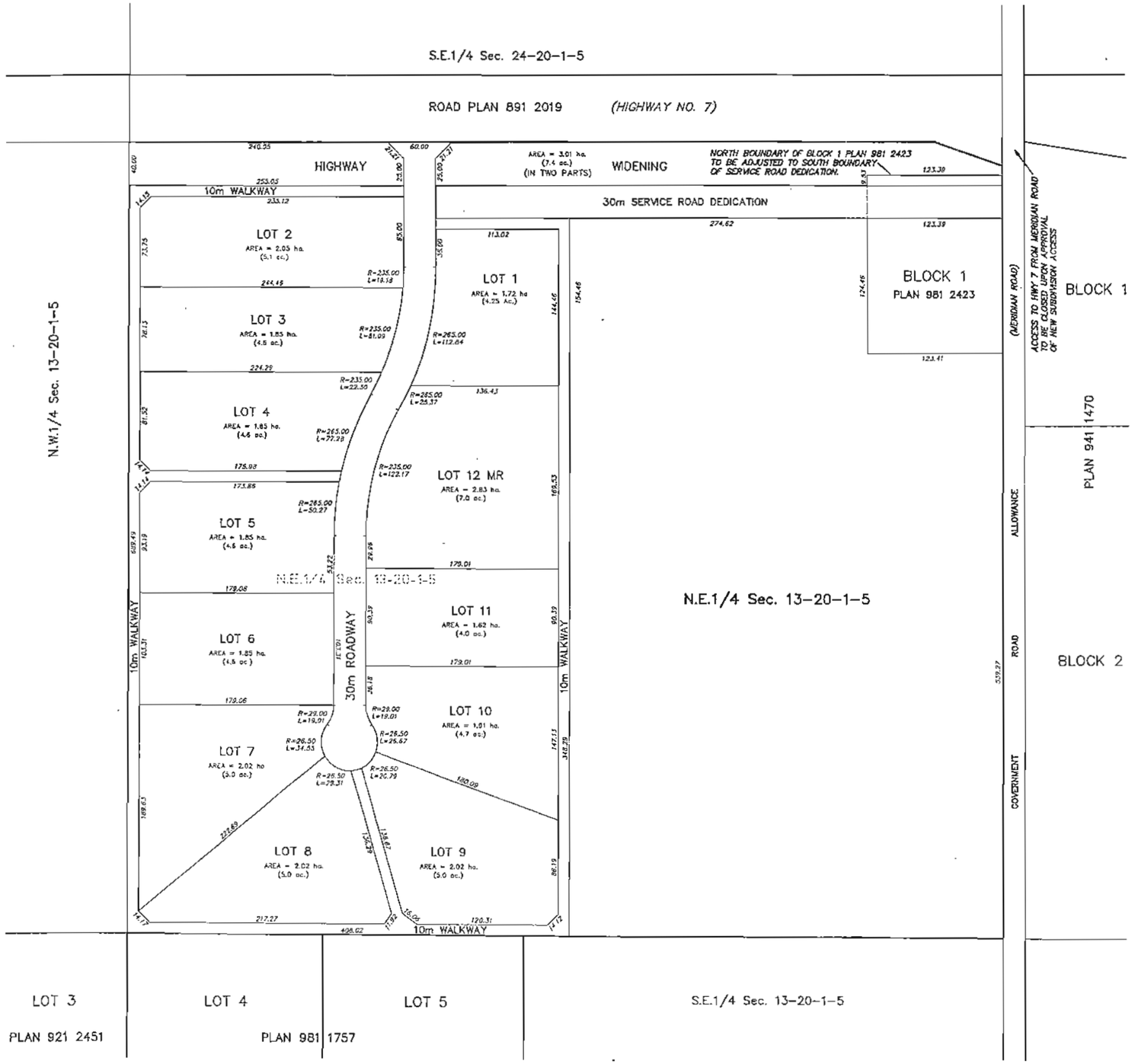
(e) "Municipal Development Plan" means the M.D. of Foothills No. 31's Municipal Development Plan.

(f) "Municipality" means the area bounded and incorporated by the M.D. of Foothills No. 31.

(g) " Plan Area " refers specifically to the lands within the NE 13 – 20 - 01 W5M as shown in Figure 1.

(h) "Subdivision Approving Authority" means the Council of the M.D. of Foothills No. 31.

(i) All other words and expressions have the meanings respectively assigned to them in the Municipal Development Plan, Land Use Bylaw or the Municipal Government Act.



M.D. OF FOOTHILLS No. 31
A L B E R T A

PROPOSED AREA STRUCTURE PLAN
WITHIN THE
N.E.1/4 Sec. 13, Twp. 20, Rge. 1; W.5M.

NOT TO SCALE

NOTES
1. Distances are in metres and decimals thereof.
2. Subject area shown bounded thus _____ and contains 58.89 ha.
3. All roads are 30.0 metres in perpendicular width unless shown otherwise.
4. All walkways are 10.0 metres in perpendicular width unless shown otherwise.

TABLE OF ABBREVIATIONS

ac.	- acre	Rge.	- range
E.	- East	S	- South
ha.	- hectare	Sec.	- section
M.	- meridian	Twp.	- township
MR	- Municipal Reserve	W	- West
N	- North		

AREA TABLE

COUNTRY RESIDENTIAL (CR)	= 20.79 ha.
MUNICIPAL RESERVE (MR)	= 2.83 ha.
ROADS	= 3.43 ha.
WALKWAYS	= 2.35 ha.
30m SERVICE ROAD DEDICATION	= 1.56 ha.
TOTAL DEVELOPABLE LANDS	= 30.96 ha.
HIGHWAY WIDENING	= 3.01 ha.

FIGURE 1: PLAN AREA

CHALLENGER SURVEYS & SERVICES LTD.
CALGARY, ALBERTA
PHONE (403) 253-8101 FAX (403) 253-1935
DRN. BY: MC DATE: APR. 23, 2001 FILE NO.: 113904.SP10

2. THE PLAN AREA

2.1LOCATION/OWNERSHIP

The Plan Area is located on the south side of Highway 7, approximately 1.6 kilometres west of the Highway 7 and Highway 783 junction, south of Okotoks. The Plan Area is more specifically identified as the NE 13 – 20 – 01 W5M excepting thereout 12.95 +/- acres for Road Plan 8912019. Additionally, a 5.00+/- acre lot, Block 1, Plan 9812423 was subdivided from the NE 13 – 20 – 01 W5M. The Developer has recently acquired this lot and incorporated it into the Plan Area. Copies of the Certificates of Title are attached as Appendix A.

2.2 DEFINITION OF THE PLAN AREA

a) Boundaries of the Plan Area

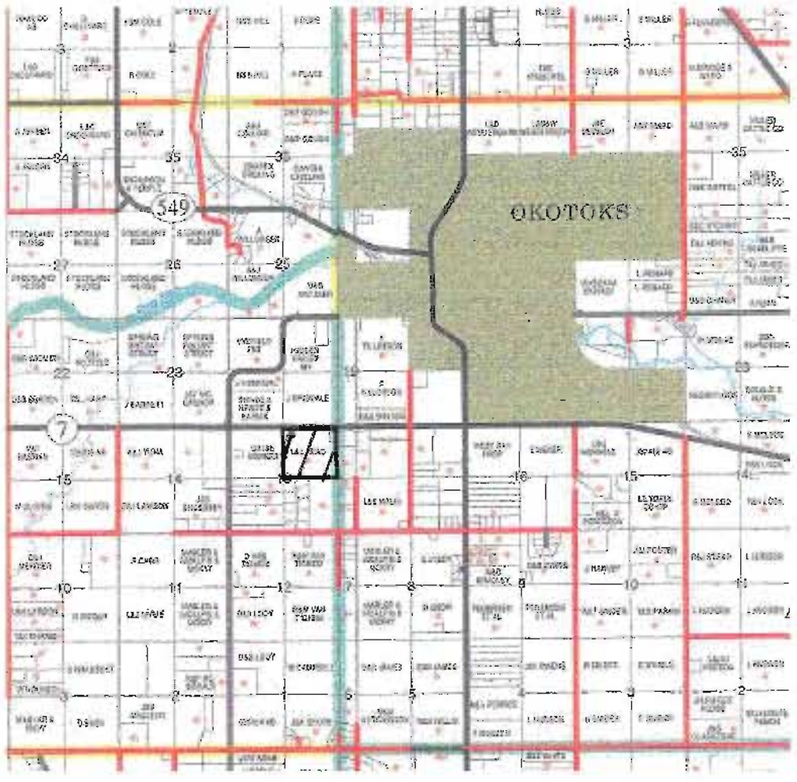
The Plan Area is bound by Meridian Road to the east, and the quarter section line of the NW 13 – 20 – 01 W5M to the west. To the south the Plan Area is bound by the quarter section line of SE 13 – 20 – 01 W5M and Highway 7 bounds the Plan Area to the north. These boundaries are shown in Figure 2.

b) General Physical Description

The Plan Area gently slopes downward from the west side of the quarter section and the land concentrates from all sides to the southeast corner of the quarter section. As per the agrologist report (attached as Appendix B) slopes in the 2-5% range in the north half of the subject land. These slopes then give way to 6-9% slopes on the south half of the quarter section. The agrologist report also indicated that all of these slopes converge towards the southeast corner of the quarter section where the lowest point in the landscape is located.

Vegetation is comprised of native grassland in the southern portion of the quarter section. A portion of the Plan Area has been cultivated with little success. The Developer no longer wishes to farm this land as it is a very expensive process due to excessive stoniness, with little chance of success. The agrologist report confirms this in the conclusion of the report.

Figure 2
LOCATION MAP FOR
NE 13 – 20 – 01 W5M
NOT TO SCALE



SUBJECT AREA

Date: June 29, 2001
File #: 11590
DWN By: BEC

CHALLENGER
GEOMATICS LTD.

CALGARY, ALBERTA
(403 253-8101
FAX 253-1985

3. PLAN GOALS AND OBJECTIVES

3.1 GOALS AND OBJECTIVES

a) To create an attractive multi-lot development comprised of 11 Country Residential lots, that incorporates a Municipal Reserve and a walkway system.

b) To provide an open space walkway system which will enhance pedestrian movement and provide linkage to the Municipal Reserve.

c) To register a restrictive covenant on all Country Residential lots of the Plan Area, to ensure that the lots are developed in a desirable way.

d) To ensure that the development conforms to the goals and objectives of the M.D. of Foothills No. 31 Municipal Development Plan.

e) To create an affordable family environment geared towards community and safety.

3.2 PRINCIPLES OF DEVELOPMENT

a) Community Association

The Developer will create a self-governing community association, comprised of the newly created lot owners of the Plan Area. Membership in this community association will be predetermined, as each new lot owner will be bound to this association by way of a restrictive covenant, which will be placed on the title of each new lot.

The community association will be responsible for the maintenance of the walkway system as well as liability. Additionally, the Developer proposes that the community association approach the M.D. of Foothills No. 31 to utilize the Municipal Reserve parcel for the community. Should Council permit such a request, the community association will undertake the financial responsibility for the care of the Municipal Reserve.

b) Restrictive Covenant

As mentioned, a restrictive covenant will be placed on the title of each new Country Residential lot. This restrictive covenant will require each new landowner to build their dwelling using architectural guidelines. The restrictive covenant outlining the architectural control guidelines is attached as Appendix C. In addition, the restrictive covenant will require that each new landowner participate and contribute to a community association, comprised of all landowners of the Plan Area.

4. DEVELOPMENT PROPOSAL

4.1 THE PLAN CONCEPT

As noted in the objectives, this Plan proposes an attractive 11-lot development, controlled by strict architectural guidelines, which will be registered on the title of each new lot. Lots will range from 4.00 +/- acres to 5.10 +/- acres, creating a very spacious living environment. The Municipal Reserve will be joined to all lots of the Plan Area by a 10-metre walkway system. Participating in the community association will be mandatory for all residents of the Plan Area. The main goal of the community association will be to care for the walkway system and the Municipal Reserve.

The overall concept also provides for a 40-metre setback from Highway 7 for possible future road widening. Additionally, a 30-metre road dedication has been provided to allow for a service road, which will connect to the lands to the east. This dedication has been done, as per Alberta Transportation's request, as is illustrated in Figure 1. The Developer will ensure all the requirements of Alberta Transportation are met in the development of this Area Structure Plan.

4.2 LAND USE COMPONENT

a) Country Residential District

This Area Structure Plan is compatible and consistent with the provisions of the Municipal Development Plan, and the Land Use By-Law. Currently the Plan Area carries an Agricultural District (A) designation in the M.D. of Foothills No. 31 Land Use By-Law. In order to proceed with the subdivision of the Plan Area, the land will first need to be redesignated to Country Residential District (CR).

b) Agricultural District

The balance lands will remain Agricultural in accordance with the provisions of the Land Use By-Law, and the Developer will endorse a restrictive covenant, which will restrict future subdivision of the balance lands.

c) Phasing

This development will be completed in one phase. This phase will include the development and servicing of Lots 1 to 11 and the Municipal Reserve lot, the internal road providing access to these twelve lots, and the walkway system. Additionally this phase will include any work regarding the external road system as per Alberta Transportation's recommendations.

d) Density

As indicated in the M.D. of Foothills No. 31 Municipal Development Plan, a quarter section may contain a total maximum density of 32 lots or one lot or unit per five acres under a Country Residential designation. On the NE 13 – 20 – 01 W5M there will be 11 new Country Residential lots, a Municipal Reserve lot, the existing 5.0 +/- acre lot and the balance. The total developable area of the Plan Area is approximately 147.05 +/- acres, equating to a maximum density of 29 lots. The total density for the Plan Area will be 11 new Country Residential lots, plus the existing lot and the balance, totalling 13 parcels on the quarter. The density ratio is therefore 1:11.3 or one lot per 11.3 acres.

TABLE 1: DENSITY TABLE

Total Number of Lots	13 lots
Total Plan Area	147.05 +/- acres
Total Density	1 lot per 11.3 acres

e) Impact on Adjacent Lands

By utilizing a design that incorporates topography, the existing structures and the external road system, the Developer will reduce the impact the Plan Area will have on the adjacent lands. Additionally, the Developer plans to minimize the impact on adjacent lands through proper storm water management, and architectural controls. These measures will be discussed in detail later in this document.

The lands to the north of the Plan Area will not be impacted greatly because they will be separated from the Plan Area by Highway 7. To the south, southwest, southeast and east of the Plan Area multi-lot subdivisions have already occurred. The land to the west of the Plan Area has also seen some subdivision, with one lot already having been subdivided. The lands to the east will have an improved and safer access situation as a service road has been dedicated, as per Alberta Transportation's requirements.

As mentioned earlier the Developer will take the proper measures to ensure that the Plan Area does not impact the adjacent landowners in a negative way. In this respect, the Plan Area has been designed to fit in with the existing character of the area. Additionally, groundwater tests and percolation testing has been done on the quarter section and a storm water management feasibility study will be completed to ensure that the Plan Area will not affect adjacent landowners.

f) Walkway System

As noted earlier in section 3.0 of this document, one of the goals of this development is to provide an open space walkway system. This walkway system will be 10 metres wide to allow for a range of recreational pursuits, such as horseback riding.

The walkway system has been designed to connect all lots to the Municipal Reserve. This walkway system will be landscaped to ensure both visual and recreational variation to the users. To achieve this the Developer will place shrubs, trees and other features along the walkway system. Additionally, the Developer will fence the walkways, establishing the boundary of the walkway system from the lots within the Plan Area, and providing a buffer to Highway 7.

To ensure that the walkway system is cared for into the future, a community association will be created, involving all landowners of the Plan Area. This community association will collect funds for the care and continuous maintenance of the walkway system.

4.3 ENVIRONMENTAL CONSIDERATIONS

Previous people who have farmed this quarter section have deemed it incapable of agricultural production because it is excessively stony and the damage to the machinery far outweighs any income from the sale of crops taken off this quarter section. An agrologist report completed in February of 1999 (attached as Appendix B) confirms the stoniness in this area. Due to the nature of the soils and the close proximity to Okotoks this area is well suited for Country Residential development.

Wildlife is not abundant in this area and the quarter section is free of features that are typically popular to wildlife. The Developer will strive to complete this subdivision with minimal impact on the environment. The initial steps that have been taken to ensure that this occurs are the completion of various studies, such as a groundwater study and percolation testing. Additionally an agrologist report has been completed, and a storm water management feasibility study will be completed before subdivision approval is given. Explanations of these studies are listed below, as well as further in this Area Structure Plan.

a) Groundwater Study

A preliminary groundwater study was completed by Groundwater Exploration & Research Ltd. in December 1999, to address the feasibility of finding sufficient volumes of groundwater to sustain 20 lots in the NE 13 – 20 – 01 W5M. A copy of this study is attached as Appendix D.

Groundwater Exploration & Research Ltd. utilized information from Alberta Environmental Protection's groundwater database file to undertake this study. A total of 35 well records were available for review from the surrounding eight-quarter sections of land.

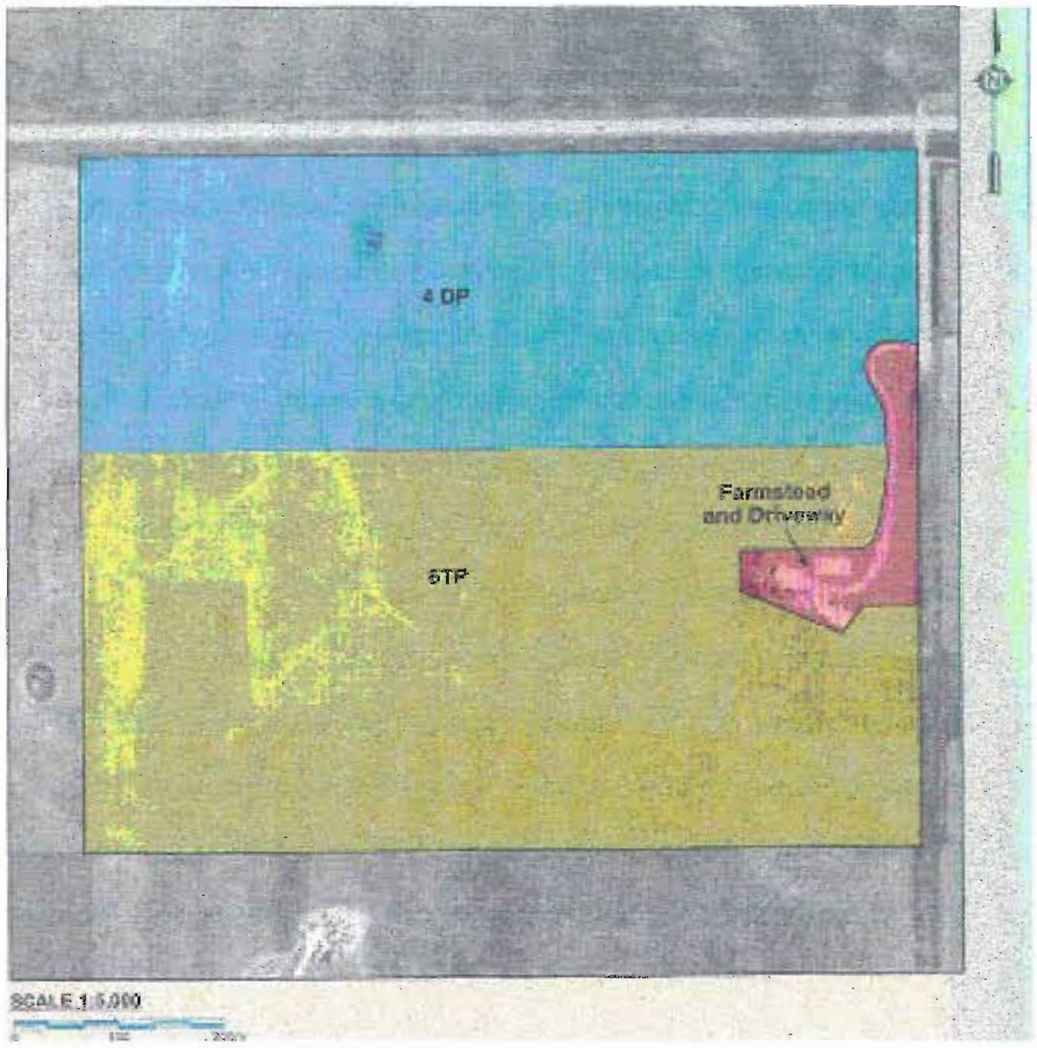
The information provided by Groundwater Exploration & Research Ltd. shows that the water resources in the area could support a minimum of 20 lots.

b) Agrologist Report

On February 11, 1999, Matrix Solutions Inc. was hired to assess the potential for arable agriculture on the NE 13 – 20 – 01 W5M. This report is attached as Appendix B. The site-specific evaluation of the subject property resulted in a rating of Class 4DP for 65 acres across the north half of the quarter section and a rating of Class 6TP for 90 acres across the south half of the quarter section (see Figure 3). The remaining 5.0 +/- acres on the quarter section comprises the farmstead and driveway.

As the agrologist report shows, the NE 13 – 20 – 01 W5M is not suitable for agriculture because of its excessive stoniness. Additionally, the land does not exceed 15% slope. For these reasons, the development going on in this area and the Plan Area's close proximity to Okotoks, development is ideal on this quarter section.

FIGURE 3
SITE SPECIFIC CANADA LAND INVENTORY RATING



Source: Assessment of Arability for the NE ¼ 13 – 20 – 01 W5M, a report prepared by Matrix Solutions Inc., for Lorne Read, February, 1999.

To review the full report, please see Appendix B.

4.4RESERVE LANDS

Under Section 666(1) of the Municipal Government Act the Council may require the owner of a parcel of land that is subject to a subdivision proposal, to provide land for Municipal Reserve or provide money in place of land. For a redesignation or subdivision application, when the reserves to be provided are more than 1.98 acres, a separate lot must be shown on the site plan. The Plan Area will encompass 142.05 +/- acres. However, as indicated on Figure 1, 7.4 +/- acres is to be provided for future road widening as per Alberta Transportation's requirements. Therefore, the Municipal Reserve amount is based upon the total developable area of 28.32 ha. (70.0 ac.), which results in a 7.0 ac. Municipal Reserve parcel being dedicated.

The Municipal Reserve has been located in the centre of the Plan Area to provide easy access to the landowners of the Plan Area and become a main focal area within the development. As indicated in Section 3.2 (a) our intention is to have the Community Association of the Sundance Trail Area Structure Plan apply for use of the Municipal Reserve, from the M.D. of Foothills No. 31, should Council allow. The Community Association would then maintain and care for the Municipal Reserve for their own recreational pursuits.

4.5 TRANSPORTATION

a) Internal Road System

The Developer will construct a high quality road system to Municipal District of Foothills No. 31 Road Construction Standards. The speed limit on the internal road will be set at 40 km per hour.

b) External Road System

i) Subdivision Access Location

A sight distance analysis was completed for the intersection of Highway 7 and Meridian Road. The results of the analysis indicate that the Meridian Road / Highway 7 intersection is not suitable to provide access for the proposed subdivision. Based on the results of the sight distance analysis, the access road to the Plan Area has been located at the approximate center of the NE 13 – 20 – 01 W5M. This location facilitates acceptable sight distances at the new intersection. A summary of the sight distance analysis results is contained in Appendix F.

ii) Subdivision Access Design

Based on analysis and upon discussion with Alberta Transportation a Type III(a) standard at-grade intersection will be required for the access from the Plan Area onto Highway 7. A study completed by IBI Group (attached as Appendix F) ensures that this access will meet all site distances requirements as per Alberta Transportation.

iii) Meridian Road

The new access being proposed will require a roadside development permit. As a condition of this permit Alberta Transportation shall require that the entrance to Meridian Road be closed. Lots to the east of the Plan Area, which have gained access at the Highway 7/Meridian Road intersection will now gain access by way of the service road, mentioned later in this Section. As per Alberta Transportation the MD of Foothills No.31 will be required to make application to close a portion of Meridian Road, to prevent future assess to Highway 7, in order to satisfy the conditions of the roadside development permit.

iv) Road Widening

At this time Alberta Transportation has been unable to confirm plans for the future of Highway 7. However, at the request of Alberta Transportation a 40 metre wide strip has been indicated adjacent to the south boundary of the Highway 7 right-of-way, and is shown in Figure 1. Alberta Transportation has indicated that they may use this land for future road widening of Highway 7. Alberta Transportation will determine the exact use of this land at the time of subdivision. Alberta Transportation has indicated that should other lands within the vicinity of the Plan Area, on the south side of Highway 7, be further developed that they would like to have a similar setback to what has been indicated in Figure 1.

v) Service Road

Provision for future development of a continuous road network that is compatible with the provincial highway system is provided by the 30-metre service road, as requested by Alberta Transportation, as shown in Figure 1. This dedication will enhance the access situation for the landowner to the east by providing a safer access alternative to than Meridian Road.

vi) Highway Buffering

The Developer is aware that this Area Structure Plan proposes a subdivision near a highway system. To reduce the impact that the highway may have on the subdivision various buffering techniques may be used by the landowners of the lots adjacent to the highway. The restrictive covenant that will be placed on the title of each new lot will allow the landowners adjacent to the highway to landscape and place trees along the north boundary of the lots. The placement of trees will meet all required setbacks from the highway. Additionally, building envelopes will be indicated on each lot by way of the restrictive covenant that will exceed the required setbacks from Highway 7. The Developer is also proposing a fenced walkway system that will provide further buffering and protection to all landowners of the Plan Area from Highway 7.

vii) Traffic Implications

With regards to Highway 7, under the *Manual of Geometric Design Standards for Canadian Roads,* published by the Transportation Association of Canada (TAC), this highway has been classified as a rural arterial road. Under this category the allowed traffic volume vehicles per day must be less than 12,000 vehicles per day. Information obtained from the Alberta Transportation and Utilities Program Management Branch *Alberta Primary Highway Traffic Volume History Report (1989-1998)* states the following:

TABLE 2: TRAFFIC COUNTS FOR HIGHWAY 7

Location Description	**1998 – ASDT***
East of Local Road 17 – 20 – 01 W5M	4020
0.8 KM West of 2A and 7 Okotoks	3400
West of 2A and 783 South of Okotoks	3600

* ASDT – Average Summer Daily Traffic – is the average daily two way traffic expressed as vehicles per day for the period of May 1, 1998 to September 30, 1998 (153 days)

It has been estimated that the Plan Area will create an additional 99 vehicle trips per day (9 vehicle trips per day per Country Residential lot). Therefore, the addition of these 11 Country Residential lots will not negatively impact on the existing transportation system.

Currently the north leg of the Meridian Road/ Highway 7 intersection is used to provide private access to the lands to the north. The continued use of this access will not be affected by the Plan Area or the status of Meridian Road to the south.

Furthermore, the proposed Area Structure Plan will reduce the amount of vehicles currently accessing Meridian Road South of Highway 7. This will be a result of the owners of Block 1, Plan 9812423 and the balance of NE 13 – 20 – 01 W5M now having the option to gain access off of the service road. Additionally, the landowners to the east of the Plan Area will be able to gain access off of this service road once it has been developed.

4.6 SERVICING

a) Water Supply

The lots of the Plan Area will be serviced with water using individual wells, which will be drilled on each of the lots. As indicated in the report by Groundwater Exploration & Research Ltd., sufficient water for this development will be available. Wells will be developed in accordance with the recommendations contained in the Groundwater Exploration & Research Ltd. report attached as Appendix D. Additionally, the individual wells shall meet all requirements of Alberta Environmental Protection.

b) Sewage Disposal

The Developer hired Almor Testing Services Ltd. to complete a test of the shallow subsurface conditions (percolation study). Their investigation revealed that the standard disposal field tile systems would be adequate for all locations on the NE 13 – 20 – 01 W5M, excluding one lot as indicated in the report. This lot would require a raised septic field of 1.0 metre to be suitable for a standard disposal field tile system. The Developer will meet all recommendations of Almor Testing Services Ltd. in the report attached as Appendix E. Additionally, the septic systems shall be properly engineered and shall meet all requirements of the Alberta Private Sewage Systems Standard of Practice.

c) Storm Water Management

This design of this subdivision will assist in preventing the Plan Area from negatively affecting the adjacent lands. Additionally, proper ditching and road construction along the internal road will make certain that the Plan Area drains correctly. The Developer shall complete a storm water management feasibility study. The goal of this study will be to determine if any additional measures will need to be taken to ensure that the land drains correctly and that it drains in such a way as to not negatively impact the adjacent landowners. This feasibility study will be prepared to the satisfaction of the Municipality, and as per Alberta Environmental Protection guidelines prior to subdivision approval, and will be forwarded to Alberta Transportation for their review.

4.7 UTILTIES

The Developer, using the appropriate service companies for the area will provide electricity, gas, and telephone services to each lot.

4.8 PROTECTIVE SERVICES

a) Fire Protection

Fire services will be dispatched from Okotoks, which is approximately 3.0 kilometres away from the Plan Area. Easy access to the Plan Area from Okotoks will ensure minimal response times. Tanker trucks will provide water to the Plan Area in event of a fire.

b) Police Protection

Police services will be dispatched from the Okotoks detachment of the RCMP. The Plan Areas close proximity to Okotoks allows for minimum response times to the Plan Area.

5.0 IMPLEMENTATION

5.1 IMPLEMETATION

Before an approval to this Area Structure Plan may be granted from Council, Alberta Transportation must endorse the Area Structure Plan as per section 14 of the Subdivision and Development Regulation.

When Council adopts this Area Structure Plan, in accordance with the provisions of the Municipal Government Act it becomes a Statutory Plan of the M.D. of Foothills No. 31. The Developer shall begin construction of the development upon a redesignation approval from the M.D. of Foothills No. 31 Council.

APPENDIX A
CERTIFICATE OF TITLE

REPORT ID: GSCR1240 | LRIS GATEWAY SYSTEM | DATE: 1999-10-21
DESTINATION: PC0110:KC | LAND TITLE SEARCH | TIME: 15:11:30
REQUEST ID: 682969 | SOUTH ALBERTA LAND REGISTRATION DISTRICT | PAGE: 1
CUST. REF.: 11590 | R 2.2

REF DESCRIPTION: LT: ATS=5~01~020~13~NE, Rights=S

TITLE NUMBER
981 270 312 +1

ANC SHORT LEGAL
127 607 407 5;1;20;13;NE

LEGAL DESCRIPTION
MERIDIAN 5 RANGE 1 TOWNSHIP 20
SECTION 13
QUARTER NORTH EAST
CONTAINING 64.7 HECTARES (160 ACRES) MORE OR LESS
EXCEPTING THEREOUT:

PLAN	NUMBER	HECTARES (ACRES) MORE OR LESS	
ROAD	8912019	5.24	12.95
SUBDIVISION	9812423	2.023	5.00

EXCEPTING THEREOUT ALL MINES AND MINERALS

ESTATE: FEE SIMPLE

MUNICIPALITY: MUNICIPAL DISTRICT OF FOOTHILLS NO. 31

NOTE C.T. ISSUED: NO

REFERENCE NUMBER: 971 188 581

REGISTERED OWNER(S)

REGISTRATION	DATE(Y-M-D)	DOCUMENT TYPE	VALUE	CONSIDERATION
81 270 312	1998-09-03	SUBDIVISION PLAN		

OWNERS

JORNE READ
OF GENERAL DELIVERY
OKOTOKS
ALBERTA T0L1T0

LEANNE READ
OF GENERAL DELIVERY
OKOTOKS
ALBERTA T0L1T0

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (Y-M-D)	PARTICULARS
3' 297	1973-05-08	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. "20 FT STRIP"
861 074 421	1986-05-05	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.
81 313 990	1998-10-08	RESTRICTIVE COVENANT
981 330 312	1998-10-22	MORTGAGE MORTGAGEE - SCOTIA MORTGAGE CORPORATION. C/O THE BANK OF NOVA SCOTIA BOX 1140, OKOTOKS

continued...

ALBERTA TOL1TO
ORIGINAL PRINCIPAL AMOUNT: $221,650

. 279 676 1999-09-27 MORTGAGE
MORTGAGEE - THE BANK OF NOVA SCOTIA.
BOX 1140, OKOTOKS
ALBERTA TOL1TO
ORIGINAL PRINCIPAL AMOUNT: $38,000

*** END OF TITLE - 981 270 312 +1 TOTAL INSTRUMENTS: 5 ***

*** END OF REPORT ***

A. L. T. A.

SOUTH ALBERTA LAND REGISTRATION DISTRICT

REMOTE LAND TITLE SEARCH

SEARCH DATE: 26/07/2001

S LINC	SHORT LEGAL	TITLE NUMBER
0027 607 415	9812423;1	011 129 400

LEGAL DESCRIPTION
PLAN 9812423
BLOCK 1
EXCEPTING THEREOUT ALL MINES AND MINERALS
AREA: 2.023 HECTARES (5 ACRES) MORE OR LESS

ESTATE: FEE SIMPLE
ATS REFERENCE: 5;1;20;13;NE

MUNICIPALITY: MUNICIPAL DISTRICT OF FOOTHILLS NO. 31

REFERENCE NUMBER: 981 313 993

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
011 129 400	11/05/2001	TRANSFER OF LAND	$115,000	$115,000

OWNERS

678921 ALBERTA LTD..
OF SUITE 340, 14 - 900 VILLAGE LANE
OKOTOKS
ALBERTA T0L 1T4

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
731 011 297	08/05/1973	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. "20 FT STRIP"
861 074 421	05/05/1986	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.

(CONTINUED)

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
981 313 990	08/10/1998	RESTRICTIVE COVENANT
981 313 991	08/10/1998	CAVEAT RE : RESTRICTIVE COVENANT
981 313 996	08/10/1998	MORTGAGE MORTGAGEE - ALBERTA TREASURY BRANCHES. BOX 1020, OKOTOKS ALBERTA T0L1T0 ORIGINAL PRINCIPAL AMOUNT: $66,026
011 129 401	11/05/2001	MORTGAGE MORTGAGEE - HOOK'S TRANSPORT (1973) LTD. BOX 4423 PONOKA ALBERTA T2C2B6 ORIGINAL PRINCIPAL AMOUNT: $112,000

TOTAL INSTRUMENTS: 006 *END OF SEARCH * SR# - J629137 /AR1315
YOUR FILE #:

APPENDIX B

AGROLOGIST REPORT

Matrix Solutions Inc.

ASSESSMENT OF ARABILITY
FOR THE
NE1/4 13-020-01 W5M

Report Prepared for:

LORNE READ

Prepared by:

MATRIX SOLUTIONS INC.

Blair Nicholson

Blair Nicholson, P.Ag.
Project Agrologist

February, 1999
Calgary, Alberta

Calgary ♦ Grande Prairie ♦ Lloydminster ♦ Pincher Creek ♦ Zama City ♦ Abu Dhabi

230, 319 - 2 Avenue S.W.
Calgary, Alberta, Canada T2P 0C5

Telephone: (403) 237-0606
Facsimile: (403) 263-2493

1675-402 R 2-99.wpd

TABLE OF CONTENTS

1.0 INTRODUCTION

In response to a request from Mr. Lorne Read, the NE1/4 13-020-01 W5M was inspected on February 11, 1999, by Blair Nicholson, an agrologist with Matrix Solutions Inc. The purpose of the inspection was to assess the property's potential for arable agriculture. This report summarizes the findings of the field inspection.

The subject property is located southwest of Okotoks in the Municipal District of Foothills, No. 31 (Figure 1). It can be accessed from Meridian Street. The north end of Meridian Street, bordering the subject property, has been developed (Photo 1), the remainder of Meridian Street is an undeveloped road allowance (Photo 2). The north side of the subject property is bordered by Highway 7 (386 Avenue W), which is paved (Photo 3). The south side of the subject property is bordered by rangeland and a subdivision (Photo 4). The west side of the subject property is bordered by farmland (Photo 5).

All of the NE1/4 13-020-01 W5M was inspected. At the time of inspection some 50 acres of the subject property was in hay production (Photo 6) with the balance in rangeland (Photo 7). All of the subject property boundaries were fenced except for the west boundary. A number of cross fences divide the quarter section (Photo 8). A farmyard (Photo 9) and driveway (Photo 10) are located along the east boundary of the subject property.

Field inspection for this assessment consisted of walking and driving over the property, describing soil profiles according to the Canadian System of Soil Classification (Agriculture Canada Expert Committee on Soil Survey, 1987), noting landforms, taking slope readings with a clinometer, measuring slope lengths, taking photographs and, in general, looking for any limitations recognized in the two rating systems used to assess agricultural capability. To penetrate the frost layer, a hydraulic drill mounted on a 1 tonne truck was used to provide a soil profile core to the 1 m depth (Photo 11). No soil samples were collected for analysis during the inspection. An airphoto of the subject property, at a scale of 1:10,000, was used for mapping.

2.0 RATING SYSTEMS

The two recognized systems for rating arability of land that were used in this report are the Canada Land Inventory Soil Capability for Agriculture in Alberta (Brocke, 1977); and the Land Capability Classification for Arable Agriculture in Alberta (Alberta Soils Advisory Committee, 1987). Both of these systems recognize seven classes, with the limitations for agriculture becoming progressively greater from Class 1 to Class 7.

The Canada Land Inventory (CLI) rating system was developed in the early 1960s. Fourteen different kinds of limitations are recognized in this system as a result of adverse climate, soil or landscape characteristics. Final class placement is based on the most limiting of these three components. The CLI is an interpretive soil capability classification system derived from extrapolating soil survey data, climatic data and crop data, that rates land for arable agriculture under a dryland management system. Published CLI classifications (Agriculture Canada Soil Research Institute, 1971), at a scale of 1:250,000, exist for the property in question (Figure 2). Field inspections are necessary to confirm these classifications for local or site specific developments.

The Land Capability Classification for Arable Agriculture in Alberta (LCCAAA) was developed in the late 1980s, using all of the basic assumptions and guidelines of the CLI system as well as a system called the Storie Index. It was designed to replace the CLI rating system. The LCCAAA recognized twenty-one different kinds of limitations and utilized updated agro-climatic information and increased specificity of soil characteristics, as compared to those which are included in the guidelines for the CLI. No published maps exist for the LCCAAA rating system. The ratings are designed to be performed on small scale, site specific applications. Use of the LCCAAA is strongly endorsed by the Alberta Soil Survey; Alberta Environmental Protection; Alberta Forests and Wildlife; Alberta Agriculture Food and Rural Development; and Alberta Municipal Affairs.

3.0 GENERAL DESCRIPTION OF THE SUBJECT PROPERTY

3.1 Soil Survey of the Blackfoot and Calgary Sheets

The soils of the subject property are described in the Soil Survey of the Blackfoot and Calgary Sheets (Wyatt et al., 1942). This survey delineates one soil map unit for the NE1/4 13-020-01 W5M (Figure 3). This survey describes the soils as being part of a group of glacial soils referred to as Okotoks Glacial Loams.

The soil map unit delineated for the subject lands is characterized as 3.2.2. This map unit is located in the shallow black soil zone as the number 3, the first numeric within the map unit, reveals. Although these soils have formed under a fairly high annual rainfall, a relatively high evaporation rate has restricted the depth of organic matter accumulation. Thus, a shallow profile along with a shallow black surface horizon has developed.

The second number within the map unit deals with the parent material on which the soil profile developed. Parent material is the name given by the soil scientist to the geological material in which the soil develops. The number 2 refers to unsorted glacial soils, that is, soils which have developed on the unsorted till just as left by the receding ice. These soils are characterized by a rough topography and few to many stones scattered throughout the profile. The texture of these soils is often quite variable.

The third number in the map unit deals with profile variation, and the degree of salinization of the soil. Chemical and physical weathering of the parent material, the movement of soluble substances throughout the soil profile by the percolating rain water, the addition of organic matter due to vegetative growth and the activity of soil microorganisms are some of the agencies that have aided in creating the soil profile. The number 2 in this column refers to soils that are non-saline and have a normal profile development; that is, they are normal for their texture and the amount of rainfall they receive.

In general, Okotoks Glacial Loams are associated with elevated land of gently rolling to rolling topography. A 10 to 20 cm depth of black surface soil is the norm for this unit. Throughout this unit, fairly shallow stony profiles are common. A limey till layer is often encountered at 25 to 40 cm from the surface.

3.2 Site Specific Evaluation

A description of the 160 acres of the NE1/4 13-020-01 W5M based on the February 11, 1999, site specific evaluation follows.

The subject property is characterized by the irregular topography of a glaciated landscape. The till plain surface expression is one of undulating and ridged topography on an inclined landform that increases in strength from north to south. The highest points of land are located in the southwest corner of the quarter section.

Slopes in the 2-5% range dominate the north half of the subject land. These slopes give way to 6-9% slopes on the south half of the quarter section. To a lesser extent, inclines in the 10-15% range are present in this portion of the quarter section as well. All of these slopes converge towards the southeast corner of the quarter section where the lowest point in the landscape is located. From this basin, the excess surface runoff from the uplands exits the quarter section.

As the excess surface runoff moves downslope, off the upland topography, erosion takes place. This erosion process creates a channelled landscape as the excess runoff follows preferential flow lines downslope. The greater the relief, the greater the dissection of the landscape caused by this process. Photos 12 through 14 depict the type of erosional channels found on the subject land.

To capture some of this runoff, a few small dams have been constructed across these erosional channels. Photo 15 depicts one of the dams on the property. As runoff moves off the slopes into the draws, the stony till becomes exposed. The eroded material of the hillsides then collects at the base of the slopes and in basins. The deepest profiles described for the quarter section were found in the lower landscape positions. No wet or poorly drained subsoils were noted on these sites.

Associated with these sloped glaciated landscape is a high concentration of surface and subsurface coarse fragment material. Eight of the eleven boreholes examined had restrictive gravel and/or bedrock within the 1 m depth below surface. During the site specific evaluation concentrated stoniness was encountered throughout the subject property. The surface concentrations were visually observed to be stronger across the quarter section from north to south. As well, the profiles were found to be shallower across the subject property from north to south, reflecting the stronger erosional process at work on the steeper landscape. Coarse fragments of all sizes (gravel <8 cm in diameter; cobbles 8-25 cm in diameter; stones >25 cm in diameter) are present. Photos 16 to 19 depict the concentration of these coarse fragments on the surface of the soil. Photo 20 depicts the heavy concentration of coarse fragments in an erosional channel on the subject property.

4.0 CLI SITE SPECIFIC EVALUATION

The portion of the NE/14 13-020-01 W5M investigated has been classified under the CLI Soil Classification for Agriculture System on Map Sheet 82J Kananaskis Lakes (Agriculture Canada Soil Research Institute, 1971), at a scale of 1:250,000 (Figure 2). This study maps the subject area as Class 3T because of adverse topography (T). However, this information does not constitute a site specific evaluation as ratings are averaged over large areas and were made using airphotos and soil information without extensive ground truthing. Field inspections are necessary to confirm this classification for local or site specific development.

Using the CLI manual, a site specific CLI classification was done for the subject property and is presented as Figure 4. Two areas were mapped for the 160 acres assessed. The site specific evaluation of the subject property resulted in a rating of Class 4DP for 65 acres across the north half of the quarter section and a rating of Class 6TP for 90 acres across the south half of the quarter section. The remaining 5 acres on the quarter section comprises the farmstead and driveway.

The "D" symbol represents structural limitations in the subsoil. This limitation was applied to the north half of the subject property to reflect the structural limitations placed on the agricultural use of the land by shallow bedrock and gravelly subsoils. The "P" symbol represents excessive stoniness. This limitation is applied against soils that are sufficiently stony so as to hinder agricultural activities. The "T" symbol represents adverse topography, both steepness of slopes and pattern. This subclass applies to areas where topography is considered to be a limitation to agricultural use. Assessment of this limitation includes evaluation of the hazards imparted to cultivation by the degree of slopes as well as those due to irregularity of field patterns and lack of soil uniformity as a result of complex landform patterns.

These three characteristics, two landscape (stoniness and topography) and one soils (structure), are the most important factors limiting agricultural activities on the subject property.

In summary, the CLI classification for the 160 acres of the NE1/4 13-020-01 W5M investigated is as follows, with the boundaries as shown on Figure 4. Acreages are approximate. The rating symbol shows class placement and limitation.

5 acres - Farmstead and driveway
65 acres - 4DP
90 acres - 6TP

5.0 LCCAAA SITE SPECIFIC EVALUATION

Using the LCCAAA manual, a site specific LCCAAA classification was done for the subject property and is presented in Figure 5. Again, the overall classification is governed by the most limiting of the three major components (soils, climate and landscape). The landscape and soil factors are the most limiting components on this property as presented in the CLI rating system. The worksheets for the LCCAAA rating system are found in Appendix A. The site specific evaluation for the NE1/4 13-020-01 W5M using the LCCAAA rating system resulted in no changes from the previously outlined CLI site specific classification. The landscape factors of stoniness and topography and the soils factor of structural limitations were again judged to be the most limiting factors for all of the subject property using the LCCAAA. In summary, the LCCAAA classification for the 160 acres of the NE1/4 13-020-01 W5M investigated is as follows, with the boundaries as shown on Figure 5. The rating symbol shows class placement and limitation.

5 acres - Farmstead and driveway
65 acres - 4DP
90 acres - 6TP

6.0 CONCLUSION

The soil capability classification system used in this report is based on several assumptions. Three of these assumptions are: that shrubs, trees and stumps are not considered a limitation unless it is not feasible to remove them; that good soil management practices that are feasible and practical under a largely mechanized system of agriculture are used; and, that this system is based on limitations for agriculture and general productive capacity for common field crops.

In conclusion, the February 11, 1999, site specific evaluation using the most up to date LCCAAA system of rating land (LCCAAA evaluation), places 65 acres of the land inspected within the NE1/4 13-020-01 W5M into Class 4 and 90 acres into Class 6. Class 4 lands are considered marginal for arable agriculture. They have such severe limitations that they are suited only for a very narrow range of crops and the risk of crop failure is high. Class 6 lands have very severe limitations for sustained arable agriculture as well. The severity of the limitations of these soils renders them unsuitable for annual cultivation. They are capable only of producing perennial forage crops. The limitations are so severe that improvement practices are not feasible.

7.0 CERTIFICATION

I certify that I inspected the portion of the NE1/4 13-020-01 W5M identified in this report on February 11, 1999. Using information from the field inspection and information from previously published CLI map sheet Kananaskis Lakes 82J at a scale of 1:250,000, as well as the Soil Survey of the Blackfoot and Calgary Sheets, the classification of the subject property was done using the guidelines for two systems of classification: the Canada Land Inventory (CLI) Soil Classification for Agriculture, and the Land Capability Classification for Arable Agriculture in Alberta (LCCAAA). The subject property is classified by both systems, but the preferred system is the LCCAAA. The classification of that portion of the NE1/4 12-020-01 W5M inspected is, therefore, as follows:

5 acres - farmstead and driveway
65 acres - 4DP
90 acres - 6TP

I certify that I have no undisclosed interest, either actual or contemplated, in the property being inspected, nor is the fee contingent on the conclusions reached.

No legal survey was conducted during the inspection, and area estimates in this report are approximate, derived from dot grid assessments of aerial photographs. Information provided by others and used in this report is believed to be accurate, but that cannot be guaranteed.

This report has been prepared under the Code of Ethics of the Alberta Institute of Agrologists.

MATRIX SOLUTIONS INC.

ALBERTA INSTITUTE OF AGROLOGISTS
BLAIR NICHOLSON, P.Ag.
1914
MEMBER

Blair Nicholson

Blair Nicholson, P.Ag.
Project Agrologist

February, 1999

8.0 REFERENCES

Agriculture Canada Expert Committee on Soil Survey, 1987. "The Canadian System of Soil Classification." 2nd Edition. Agric. Can. Publ. 1646. 164 pp.

Agriculture Canada Soil Research Institute, 1971. "Canada Land Inventory Soil Capability for Agriculture, Kananaskis Lakes Map Sheet Area 82J." Ottawa, Ontario.

Alberta Soils Advisory Committee, 1987. "Land Capability Classification for Arable Agriculture in Alberta (1987)." Edited by W.W. Pettapiece. Alberta Agriculture, Edmonton, Alberta.

Brocke, L.K., 1977. "The Canada Land Inventory Soil Capability for Agriculture in Alberta." Alberta Environment, Edmonton, Alberta.

Wyatt, F.A., Newton, J.D., Bowser, W.E. and Odynsky, W., 1942. "Soil Survey of Blackfoot and Calgary Sheets." University of Alberta. Edmonton, Alberta. Bulletin #39.

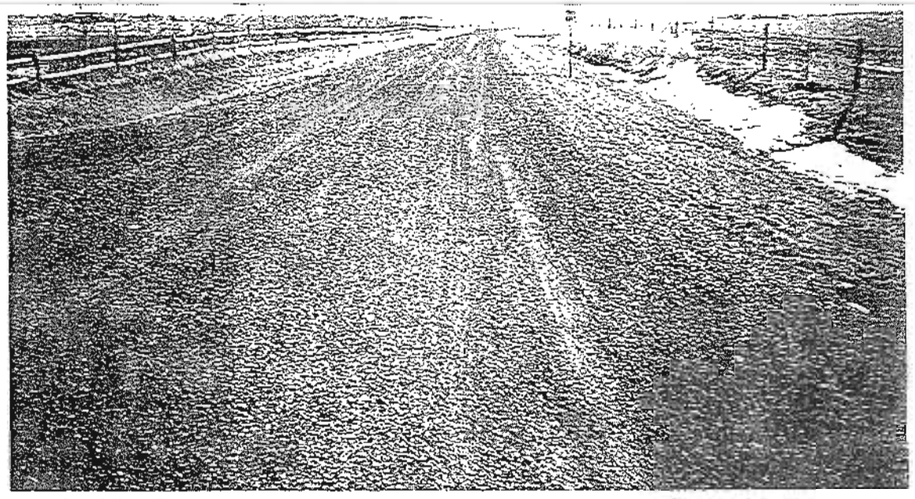


Photo 1. Meridian Street, a gravel road, which borders the east side of the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

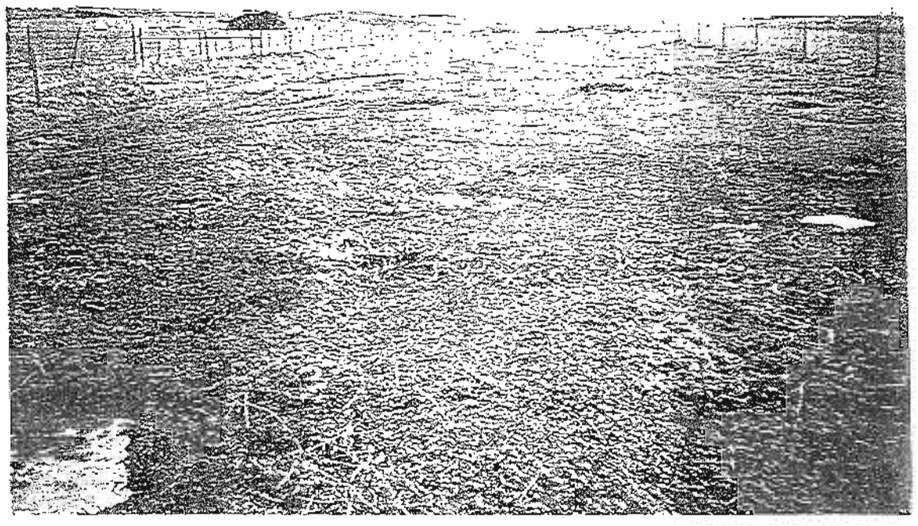


Photo 2. Undeveloped road allowance (Meridian Street) which borders the east side of the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

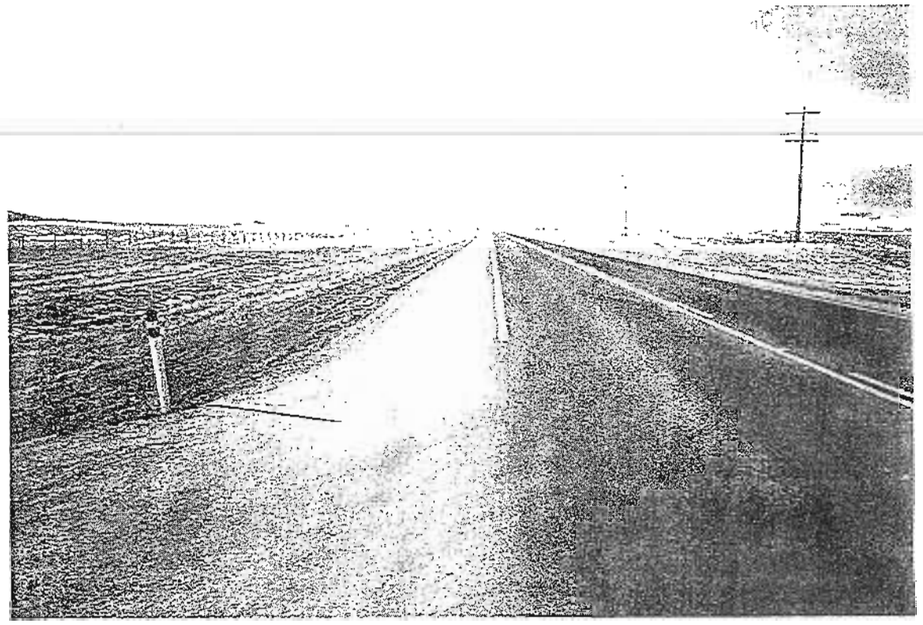


Photo 3. Highway 7 (386 Avenue W), a paved road, which borders the north side of the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

Photo 4. Rangeland and subdivision which borders the south fenceline of the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

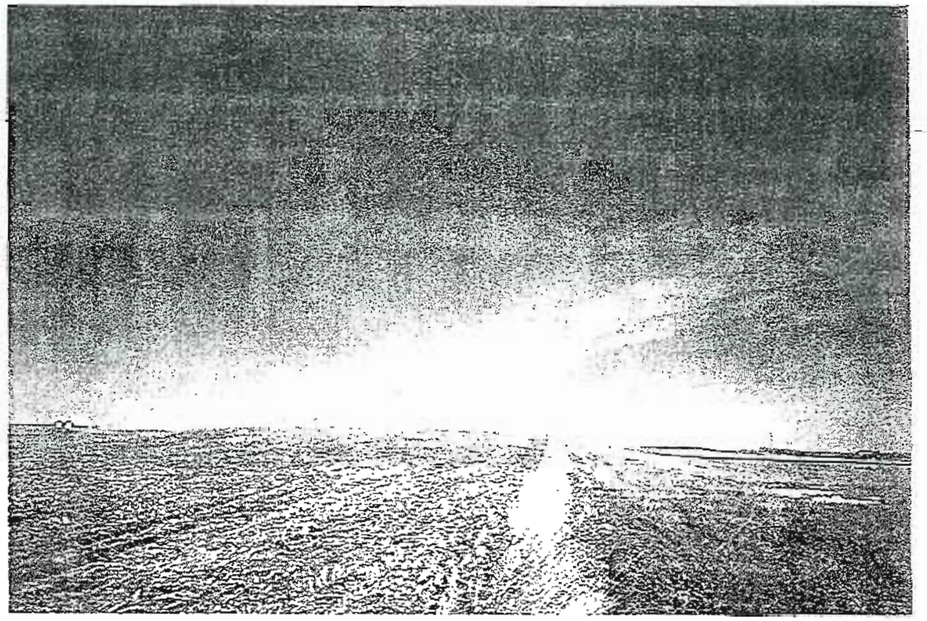


Photo 5. West boundary, which is not fenced, of the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

Photo 6. One of the land uses (hay production) on the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

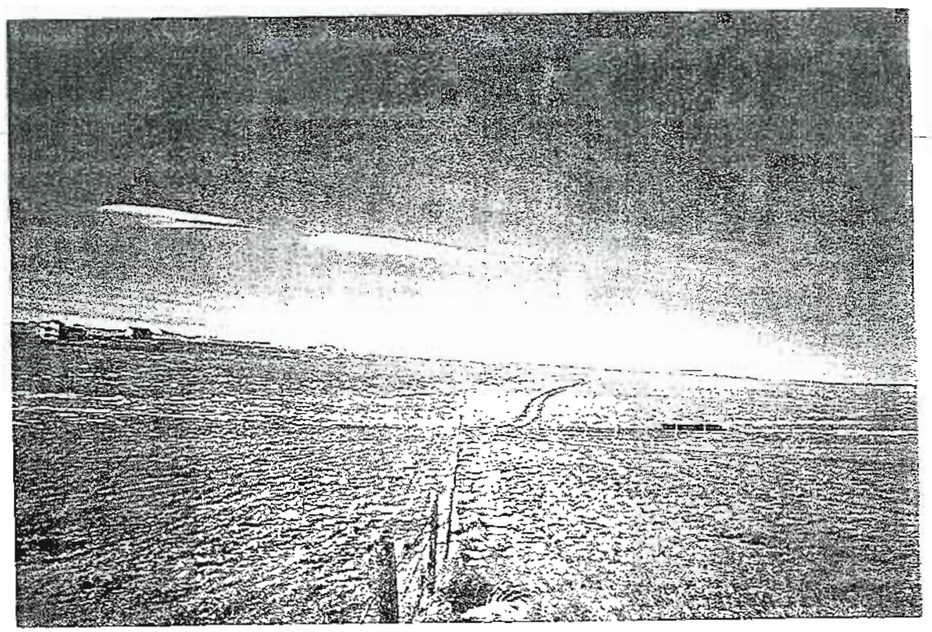


Photo 7. One of the land uses (grazing) on the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

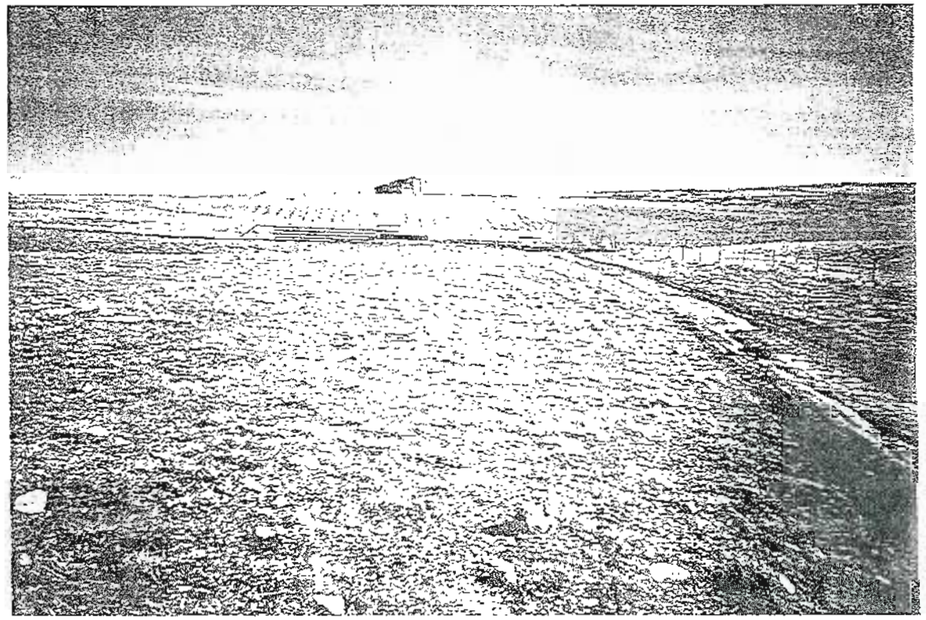


Photo 8. One of the cross fences on the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

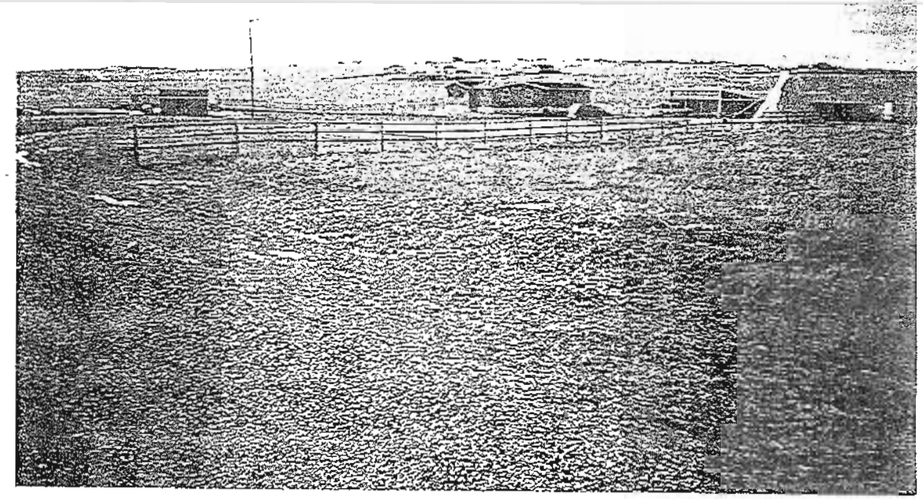


Photo 9. Farmyard on the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

Photo 10. Driveway on the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

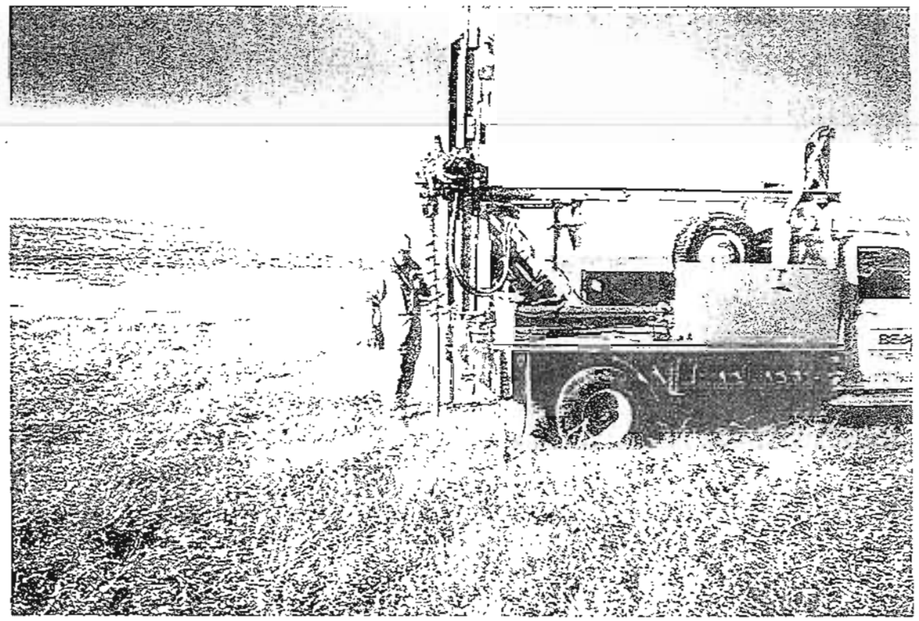


Photo 11. Drill truck used during the site specific evaluation of the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

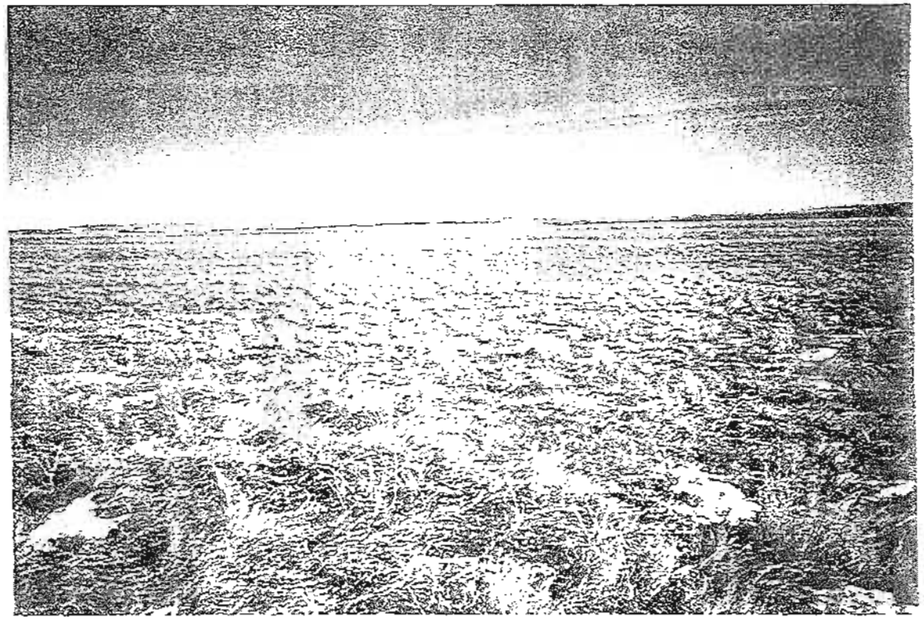


Photo 12. Wave like undulations on the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

Photo 13. Downslope draw on the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

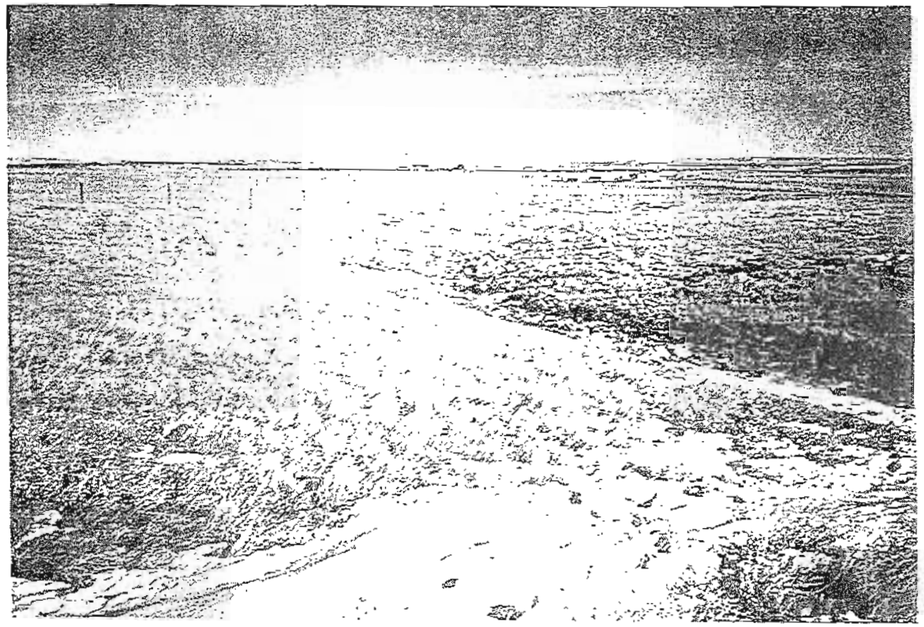


Photo 14. Erosional channel that transports water downslope on the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

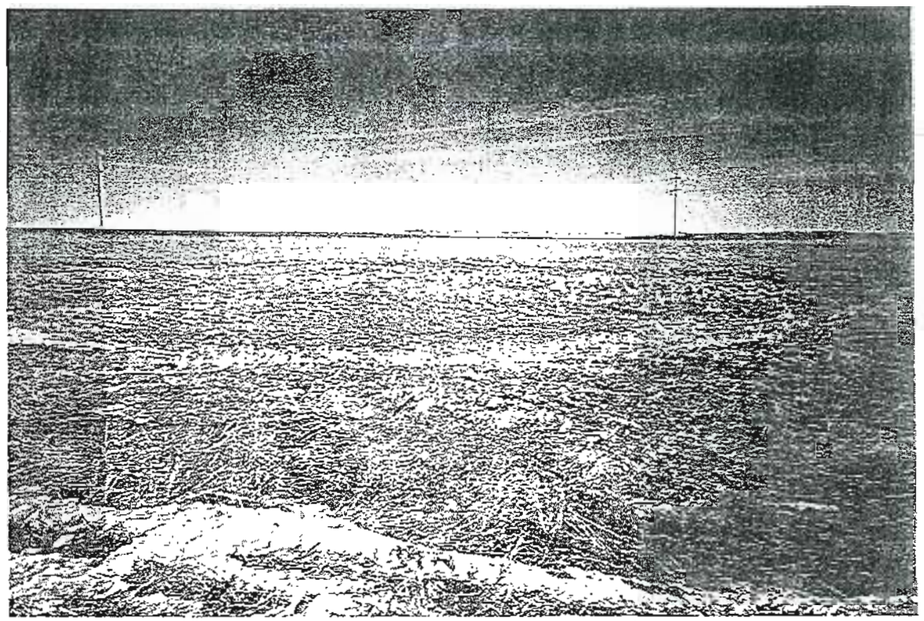


Photo 15. Small dam located on the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

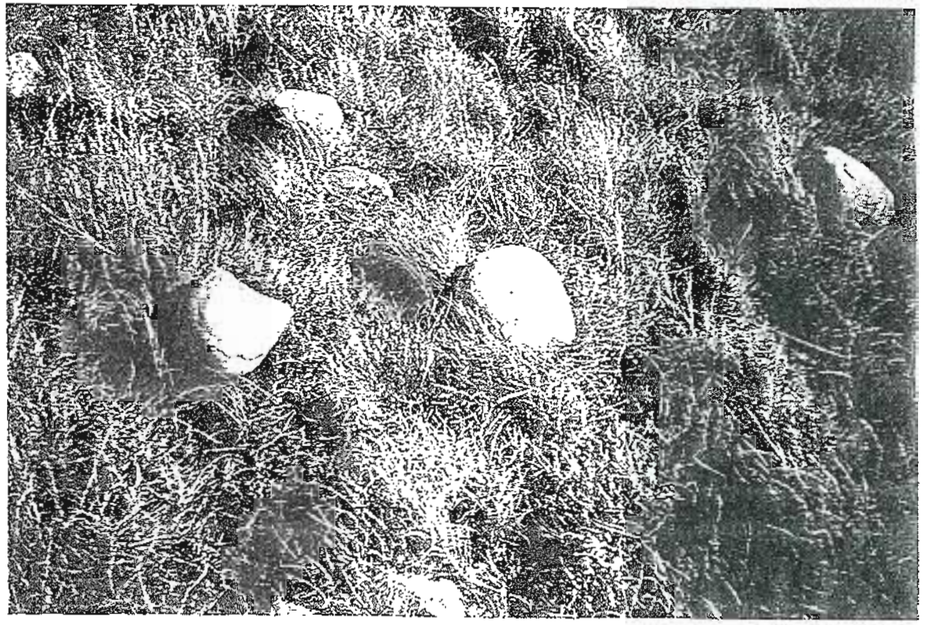


Photo 16. Coarse fragments on the surface of the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

Photo 17. Coarse fragments on the surface of the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

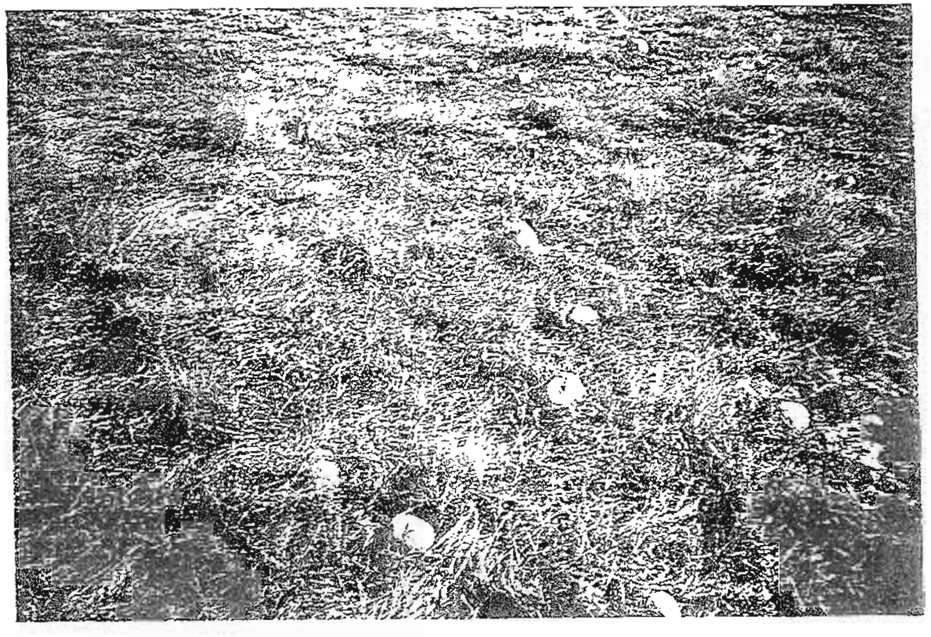


Photo 18. Coarse fragments on the surface of the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

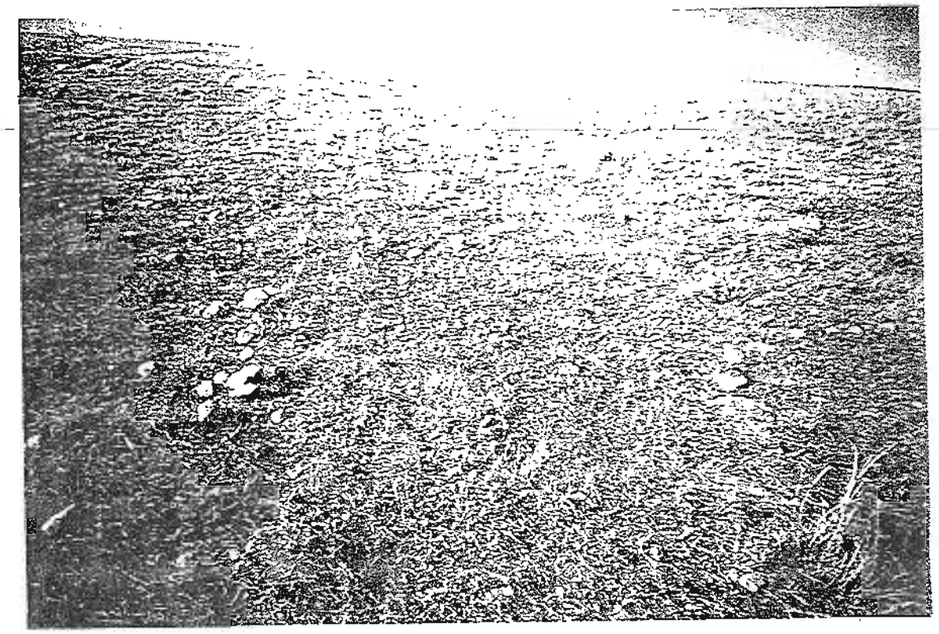


Photo 19. Coarse fragments on the surface of the subject property (NE1/4 13-020-01 W5M). February 11, 1999.

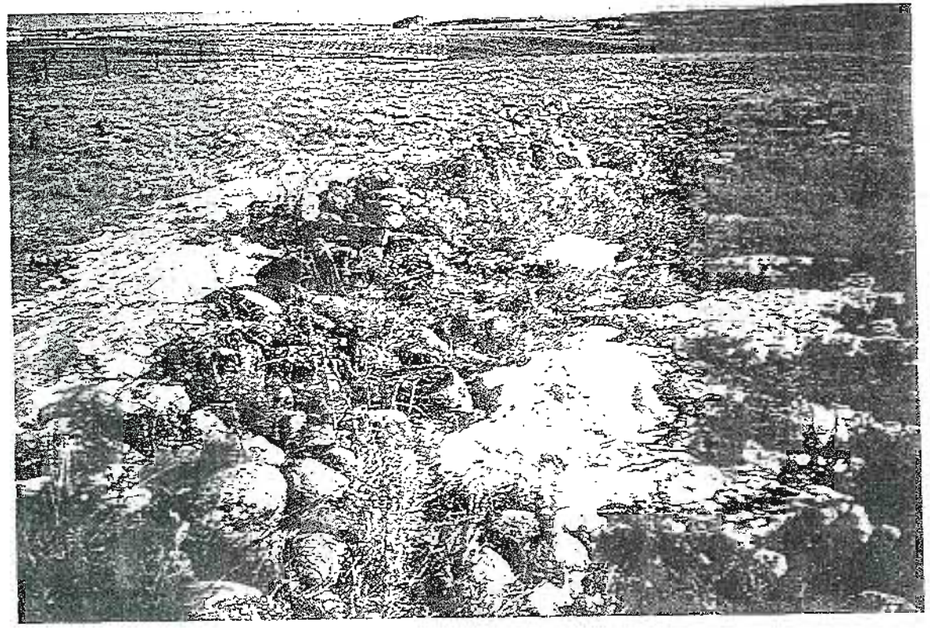
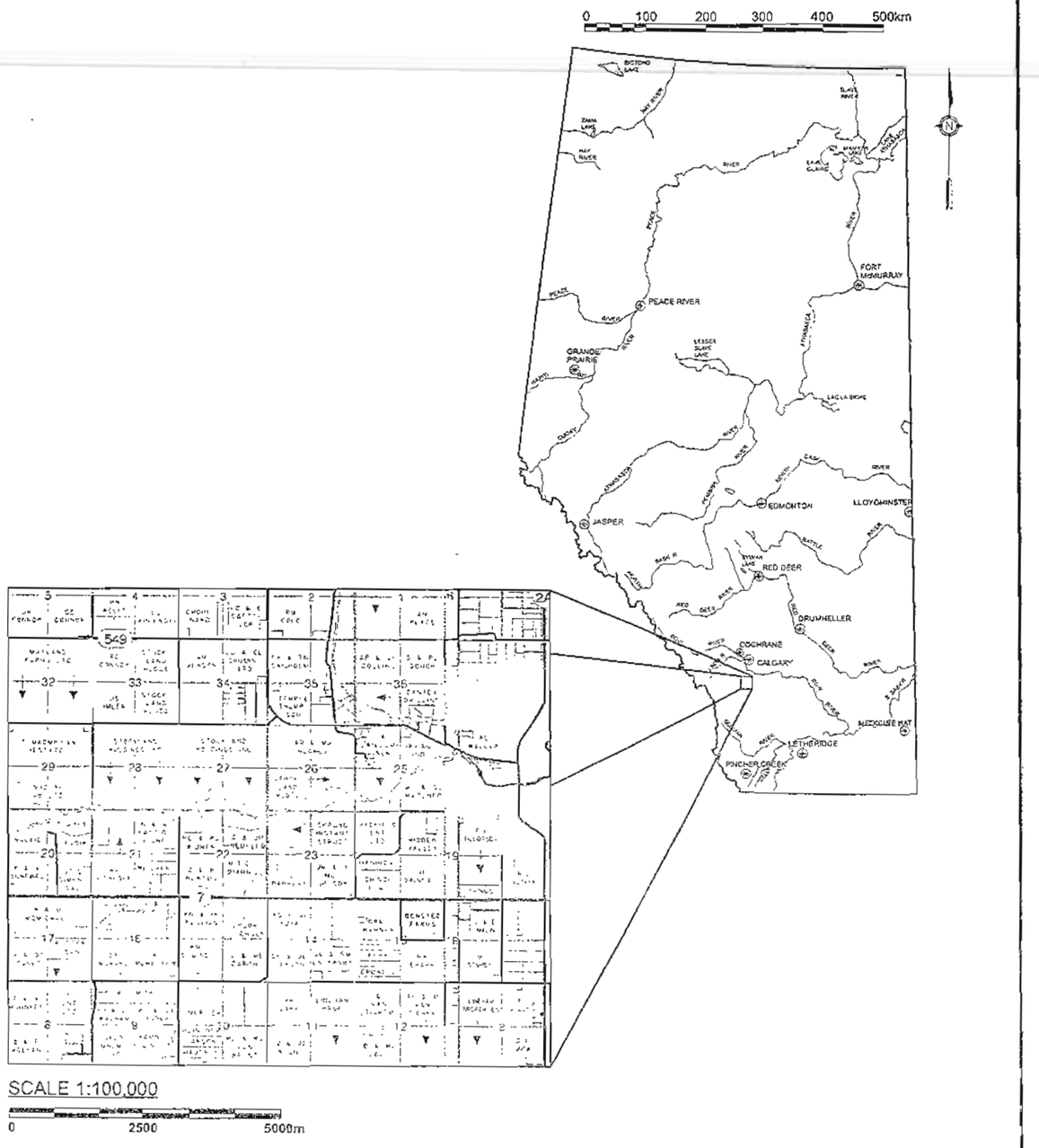
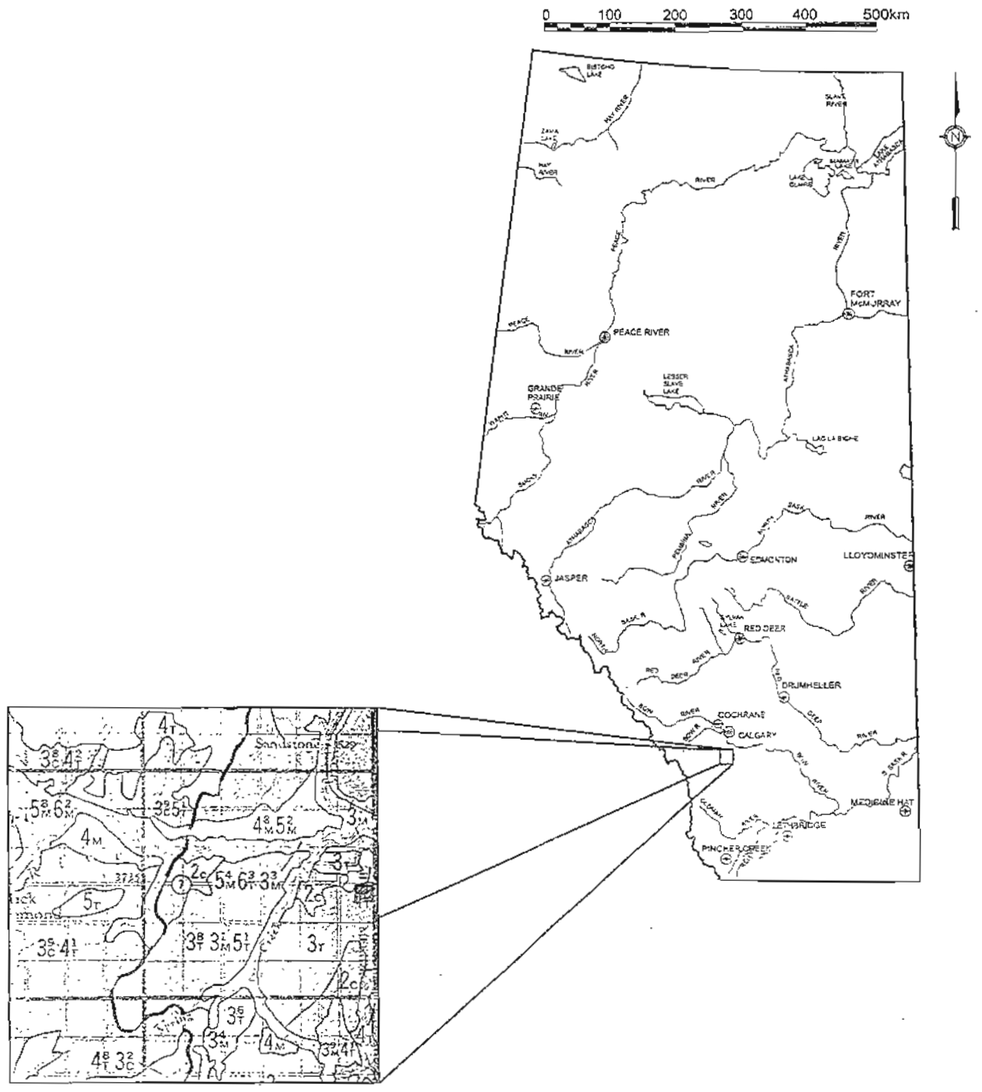


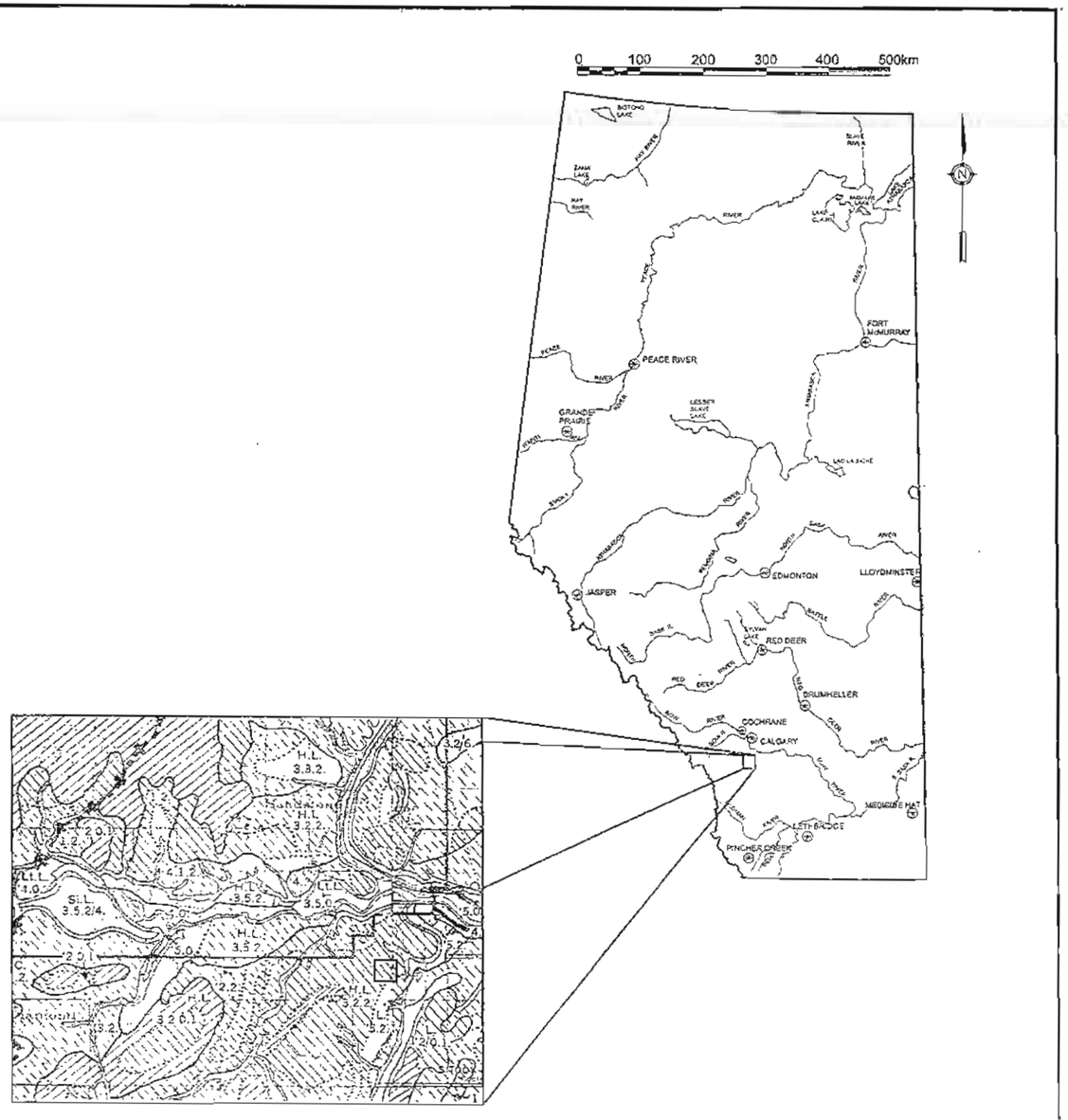
Photo 20. Coarse fragments picked from the surface and deposited in an erosional channel located on the subject property (NE1/4 13-020-01 W5M). February 11, 1999.



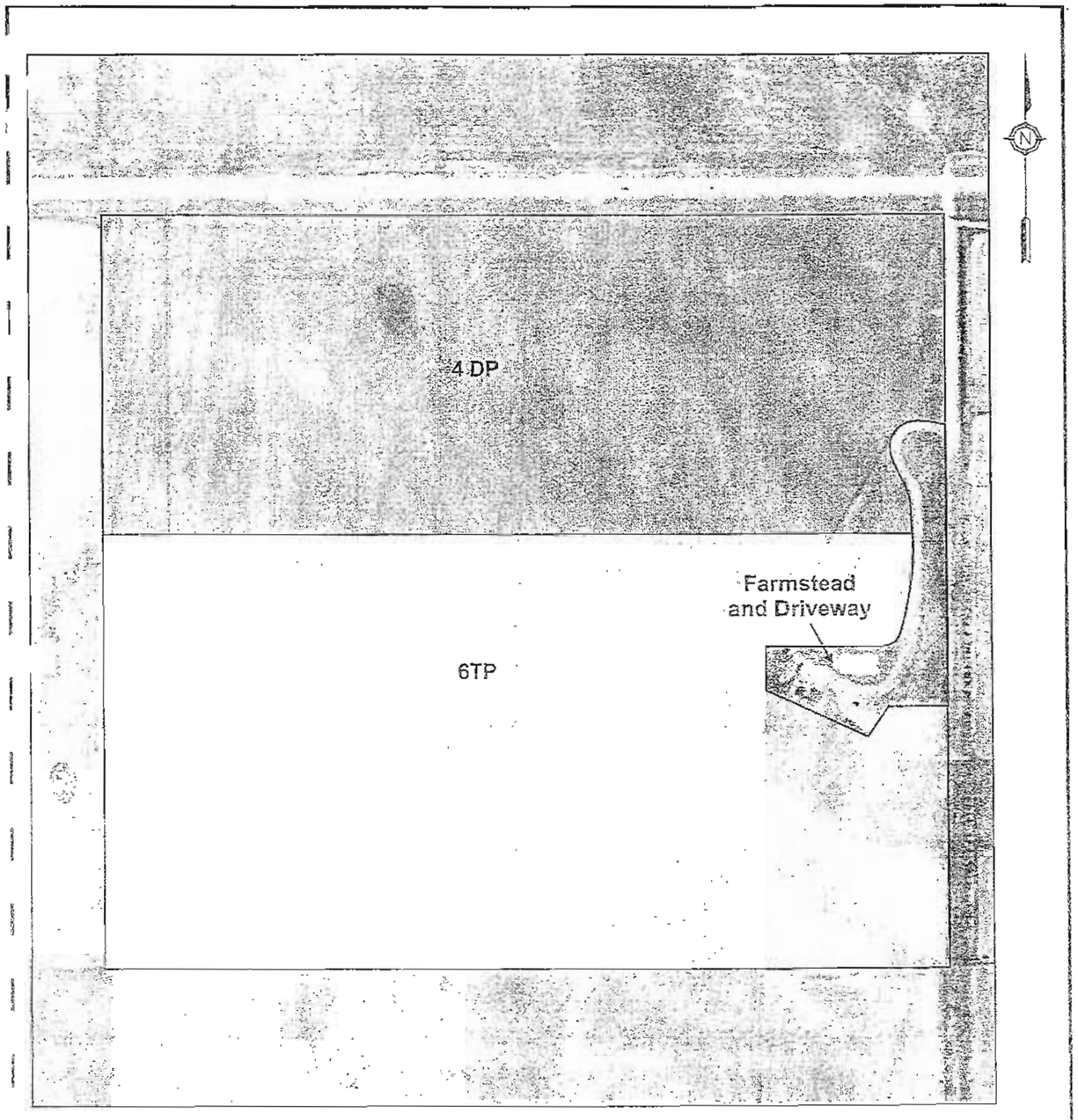
Matrix Solutions Inc.	JOB 1675-402	BY BN	LOCATION OF THE SUBJECT PROPERTY [NE¼ 13-20-1 W5]	FIGURE 1
	DATE 02/17/99	DRWN LMA		
	FILE Figures1-5.cdr	CHKD BN		



Matrix Solutions Inc.	JOB 1675-402	BY BN	MAP SHOWING THE PUBLISHED CLI CLASSIFICATION (CLASS 3T) FOR THE SUBJECT PROPERTY [NE¼ 13-20-1 W5]
	DATE 02/17/99	DRWN LMA	FIGURE 2
	FILE Figures1-5.cdr	CHKD BN	



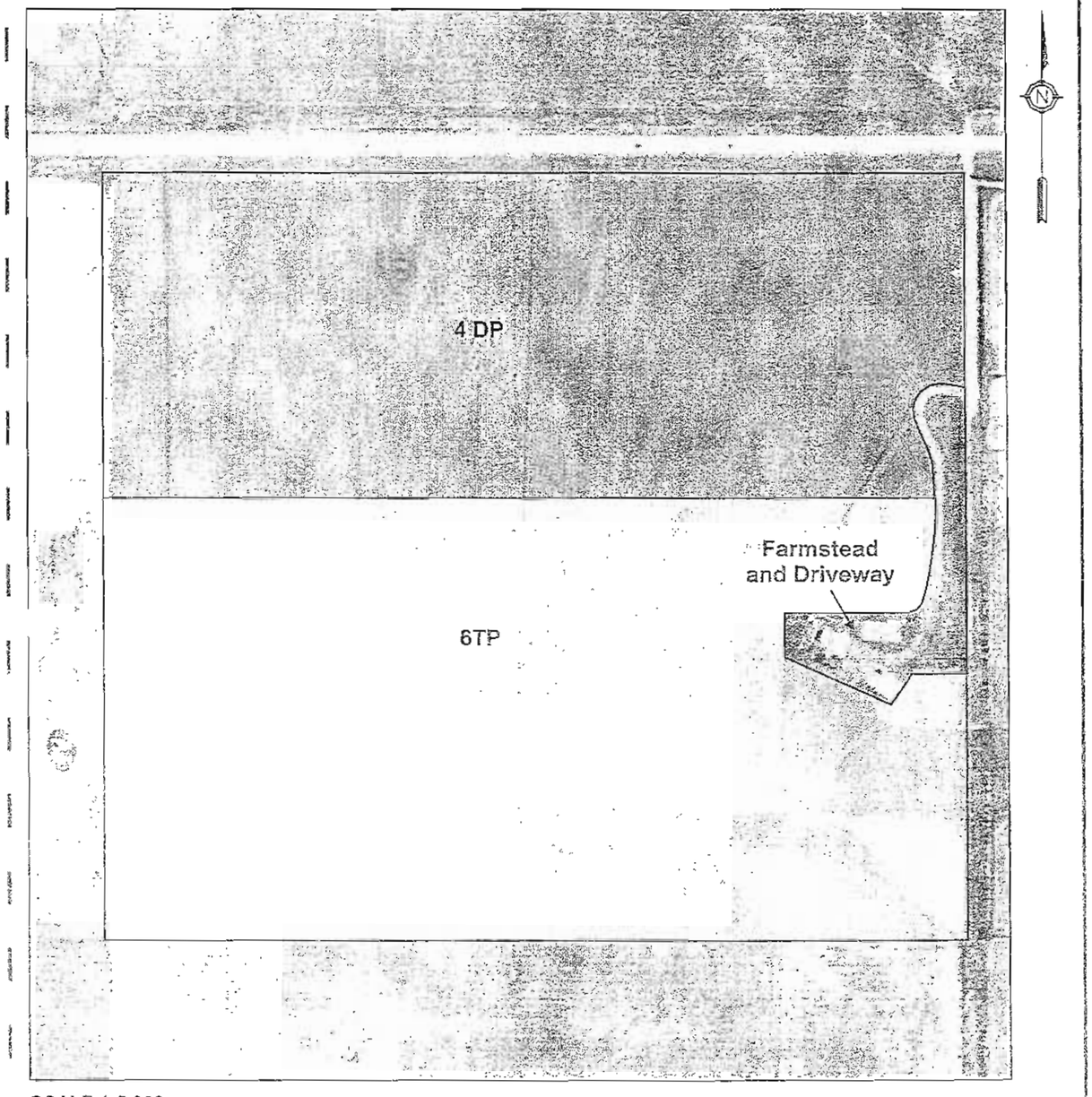
Matrix Solutions Inc.	JOB 1675-402	BY BN	EXCERPT FROM THE SOIL SURVEY OF BLACKFOOT & CALGARY SHEETS SHOWING THE MAP UNIT FOR THE SUBJECT PROPERTY [NE¼ 13-20-1 W5]	FIGURE 3
	DATE 02/17/99	DRWN LMA		
	FILE Figures1-5.cdr	CHKD BN		



SCALE 1:5,000

0 100 200m

Solutions Inc.	JOB 1675-402	BY BN	SITE SPECIFIC CLI RATING OF THE SUBJECT PROPERTY [NE¼ 13-20-1 W5]	FIGURE 4
	DATE 02/17/99	DRWN LMA		
	FILE Figures1-5.cdr	CHKD BN		



SCALE 1:5,000

0 100 200m

Solutions Inc.	JOB 1675-402	BY BN	SITE SPECIFIC LCCAAA RATING OF THE SUBJECT PROPERTY [NE¼ 13-20-1 W5]	FIGURE 5
	DATE 02/17/99	DRWN LMA		
	FILE Figures1-5.cdr	CHKD BN		

APPENDIX A

WORKSHEETS

AGRICULTURAL CAPABILITY RATING WORKSHEET
(NE1/4 13-020-01 W5M)

Class	Index
1	80 -100
2	60 - 79
3	45 - 59
4	30 - 44
5	20 - 29
6	10 - 19
7	0 - 9

AGRO-CLIMATE (C)

Moisture Component (A)	Value		Deduction
P-PE Index	-250		18
A =	100	-	18 = 82

Energy Component (H)

E G D O Index	1100		50
H =	100	-	50 = 50

Basic Climate Rating is the lower of A or H = a) 50

Modifying Factors		(% deduction)
Spring Moisture	-35	2
Fall Moisture	-25	0
Hail	8	3
Fall Frost	0	0

Modification deduction 5% of a) = b) = 2.5

FINAL CLIMATE RATING = a) 50 - b) 2.5 = 47.5

= Class 3, H Subclass

LCCAAA AGRICULTURAL CAPABILITY RATING FORM

Location: NE1/4 13-020-01 W5M			R.BL (Ca) BH 1		O.BL BH 2	
			Value	% Ded.	Value	% Ded.
SOILS (S)	1. SURFACE FACTORS	Texture (M) (P-PE = -250)	Gr.L	23	L	23
		Subsoil texture	Gr.L	0	L-CL	0
		Structure (D)	Gran	0	Gran	0
		Org. Matter (F)	10YR2/2	0	10YR2/2	0
		Depth of Topsoil (cm) (E)	10	10	15	0
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
		Calcareous (K)	10	10	--	--
		Peaty Surface (O)	--	--	--	--
	Basic Soil Rating		57		77	
	2. SUBSOIL FACTORS	Structure (D)	mass	50	SAB	
		Depth (R, D, M) (cm)	70	20		
		Acidity (V)				
		Salinity (N)				
		Sodicity (Y)				
	Subsoil Deduction		50% = 28.5		% =	
	Interim Soil Rating					
	3. DRAINAGE (W)		% =		% =	
	Final Soils Rating		28.5		77	
LANDSCAPE (L) Region 2	1. SLOPE (T)	Steepness (%)	10		5	
		Length (m)	50		100	
		LS Factor	(1.9) 50		(1.0) 40	
	Basic Landscape Rating		50		60	
	2. STONINESS (P)	Stoniness Deduction	(S4) 70 % = 35		(S3) 40 % = 24	
	Interim Landscape Rating		15		36	
	3. PATTERN (J)	Pattern Deduction	( ) % =		( ) % =	
	Final Landscape Rating		15		36	
FINAL RATING			6TP		4TP	

LCCAAA AGRICULTURAL CAPABILITY RATING FORM

Location: NE1/4 13-020-01 W5M			R.BL (Ca) BH 3		O.BL BH 4	
			Value	% Ded.	Value	% Ded.
SOILS (S)	1. SURFACE FACTORS	Texture (M) (P-PE = -250)	L	23	L	23
		Subsoil texture	CL	0	L	0
		Structure (D)	Gran	5	Gran	0
		Org. Matter (F)	10YR2/2	0	10YR2/2	0
		Depth of Topsoil (cm) (E)	14	6	15	0
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
		Calcareous (K)	10	10	--	--
		Peaty Surface (O)	--	--	--	--
	Basic Soil Rating		56		77	
	2. SUBSOIL FACTORS	Structure (D)	mass	0	SAB	0
		Depth (R, D, M) (cm)	14	70		
		Acidity (V)				
		Salinity (N)				
		Sodicity (Y)				
	Subsoil Deduction		70% = 39		% =	
	Interim Soil Rating		17			
	3. DRAINAGE (W)		% =		% =	
	Final Soils Rating		17		77	
LANDSCAPE (L) Region _2_	1. SLOPE (T)	Steepness (%)	10		10	
		Length (m)	50		50	
		LS Factor	(1.9) 50		(1.9) 50	
	Basic Landscape Rating		50		50	
	2. STONINESS (P)	Stoniness Deduction	(S4) 70 % = 35		(S4) 70 % = 35	
	Interim Landscape Rating		15		15	
	3. PATTERN (J)	Pattern Deduction	( ) % =		( ) % =	
	Final Landscape Rating		15		15	
FINAL RATING			6TP		6TP	

LCCAAA AGRICULTURAL CAPABILITY RATING FORM

Location: NE1/4 13-020-01 W5M			R.BL (Ca) BH 5		O.BL BH 6	
			Value	% Ded.	Value	% Ded.
SOILS (S)	1. SURFACE FACTORS	Texture (M) (P-PE = -250)	L	23	L	23
		Subsoil texture	CL	0	L	0
		Structure (D)	Gran	0	Gran	0
		Org. Matter (F)	10YR2/1	0	10YR2/1	0
		Depth of Topsoil (cm) (E)	15	5	15	0
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
		Calcareous (K)	10	10	--	--
		Peaty Surface (O)	--	--	--	--
	Basic Soil Rating		62		77	
	2. SUBSOIL FACTORS	Structure (D)	mass	50	SAB	0
		Depth (R, D, M) (cm)	50	30	60	50
		Acidity (V)				
		Salinity (N)				
		Sodicity (Y)				
	Subsoil Deduction		50% = 31		50% = 38.5	
	Interim Soil Rating		31		38.5	
	3. DRAINAGE (W)		% =		% =	
	Final Soils Rating		31		38.5	
LANDSCAPE (L) Region 2	1. SLOPE (T)	Steepness (%)	3		4	
		Length (m)	75		100	
		LS Factor	(0.4) 25		(0.7) 35	
	Basic Landscape Rating		75		65	
	2. STONINESS (P)	Stoniness Deduction	(S3) 40 % = 30		(S3) 30 % = 19.5	
	Interim Landscape Rating		45		45	
	3. PATTERN (J)	Pattern Deduction	( ) % =		( ) % =	
	Final Landscape Rating		45		45	
FINAL RATING			4DP		4DP	

LCCAAA AGRICULTURAL CAPABILITY RATING FORM

Location: NE1/4 13-020-01 W5M			R.BL BH 7		O.BL BH 8	
			Value	% Ded.	Value	% Ded.
SOILS (S)	1. SURFACE FACTORS	Texture (M) (P-PE = -250)	L	23	L	23
		Subsoil texture	L	0	L	0
		Structure (D)	Gran	0	Gran	0
		Org. Matter (F)	10YR2/1	0	10YR2/1	0
		Depth of Topsoil (cm) (E)	10	10	10	2
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
		Calcareous (K)	--	--	--	--
		Peaty Surface (O)	--	--	--	--
	Basic Soil Rating		67		75	
	2. SUBSOIL FACTORS	Structure (D)	mass	50	SAB	0
		Depth (R, D, M) (cm)	25	50	60	25
		Acidity (V)				
		Salinity (N)				
		Sodicity (Y)				
	Subsoil Deduction		50% = 33.5		25% = 19	
	Interim Soil Rating		33.5		56	
	3. DRAINAGE (W)		% =		% =	
	Final Soils Rating		33.5		56	
LANDSCAPE (L) Region 2	1. SLOPE (T)	Steepness (%)	5		5	
		Length (m)	75		100	
		LS Factor	(0.8) 36		(1.0) 40	
	Basic Landscape Rating		64		60	
	2. STONINESS (P)	Stoniness Deduction	(S4) 70 % = 45		(S3) 40 % = 24	
	Interim Landscape Rating		19		36	
	3. PATTERN (J)	Pattern Deduction	( ) % =		( ) % =	
	Final Landscape Rating		19		36	
FINAL RATING			6PT		4DP	

LCCAAA AGRICULTURAL CAPABILITY RATING FORM

Location: NE1/4 13-020-01 W5M			O.BL BH 9		R.BL BH 10	
			Value	% Ded.	Value	% Ded.
SOILS (S)	1. SURFACE FACTORS	Texture (M) (P-PE = -250)	L	23	L	23
		Subsoil texture	L	0	L	0
		Structure (D)	Gran	0	Gran	0
		Org. Matter (F)	10YR2/1	0	10YR2/1	0
		Depth of Topsoil (cm) (E)	8	12	7	13
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
		Calcareous (K)	--	--	--	--
		Peaty Surface (O)	--	--	--	--
	Basic Soil Rating		65		64	
	2. SUBSOIL FACTORS	Structure (D)	mass	50	mass	50
		Depth (R, D, M) (cm)	75	15	15	70
		Acidity (V)				
		Salinity (N)				
		Sodicity (Y)				
	Subsoil Deduction		50% = 32.5		70% = 45	
	Interim Soil Rating		32.5		19	
	3. DRAINAGE (W)		% =		% =	
	Final Soils Rating		32.5		19	
LANDSCAPE (L) Region 2	1. SLOPE (T)	Steepness (%)	4		10	
		Length (m)	50		40	
		LS Factor	(0.6) 32		(1.7) 45	
	Basic Landscape Rating		69		55	
	2. STONINESS (P)	Stoniness Deduction	(S3) 30 % = 20		(S4) 70 % = 39	
	Interim Landscape Rating		48		16	
	3. PATTERN (J)	Pattern Deduction	( ) % =		( ) % =	
	Final Landscape Rating		48		16	
FINAL RATING			4DP		6TP	

APPENDIX C
RESTRICTIVE COVENANT

SUNDANCE TRAIL SUBDIVISION
ARCHITECTURAL CONTROL GUIDELINES

The lands shall only be used for the purpose of a single family, country residential development with provisions for domestic staff and in-law suites, in accordance with the M.D. of Foothills No. 31 guidelines. No attached or semi-detached dwelling, duplex, mobile home or apartment shall be erected on the said lands.

Formal standards for development will be those as established by the Municipal District of Foothills No. 31 Land Use Bylaw. Conformity with these Guidelines does not supersede the required approval process of the Municipal District of Foothills No. 31.

No Lot or building thereon shall at any time be used for the purposes of any profession, trade or business of any description unless it is permitted under the "Minor Home Based Business" provisions of the Municipal District of Foothills No. 31 Land Use Bylaw.

No equipment, material or supplies will be stored or stockpiled on the property other than as normally and regularly used in conjunction with a single family residence. Such use permits the landscaped/constructed screening in accordance with these Guidelines for the storage of one recreational vehicle, machinery or equipment owned by the occupants of the Lot for their personal residential use.

No lot shall be used for depositing, dumping, burning or storing of any refuse, trash, garbage or discarded building materials. All rubbish, trash, garbage or discarded building materials shall be removed from the property and shall not be allowed to accumulate thereon. Burning of garbage is strictly prohibited. No trucks and related use trailers exceeding one-ton capacity shall be parked or placed on the lands.

No excavation shall be made except for the purpose of construction or improvement of the buildings, gardens or grounds. No person shall alter the existing drainage and all open areas of the said Lots shall be maintained in a dust free condition by landscaping with trees, shrubs, suitable ground cover or undisturbed natural growth. All Lots and buildings thereon shall be maintained in a clean and tidy manner and in good and substantial repair. Garbage containers and receptacles shall be enclosed or screened from view.

Precautions must be taken during the construction period to avoid damage to the natural environment in which their homes are being built. Construction water must be handled with care to avoid damage to the area and must not be released into the natural drainage system.

A suitably sized garbage container must be located at the site during construction to avoid debris and garbage blowing into other areas of the subdivision or into neighboring fields.

Excess fill arising from the basement excavation, etc. must be immediately removed from the site unless it can be incorporated into the site.

The building commitment to construct a home on the Lot is occupancy within 24 months of the Lot purchase. This commitment also includes the completion of the exterior of the structure (i.e. trim, siding, finishing details). However, the Purchaser acknowledges and supports the Covenantor's policy of controlling the design and expediting the diligent construction of homes on the Lands in order to enhance the appearance of the Lands and therefore the value of the Lot.

The purchaser understands that the Developer may continue a further subdivision of the property known as the balance of the NE 13 20 1 W5 and agrees not to restrict the Developer in the pursuit of subdivision or development. The Developer shall conform to all Municipal District of Foothills No. 31 guidelines on any further subdivision of NE 13 20 1 W5.

Animals permitted include and are limited to horses, cattle, sheep, dogs, cats and small birds, excluding pigeons, shall be kept on any lot. No animals shall be permitted to stray from the lot occupied by their owner or keeper. No donkeys shall be allowed at any time. No breeding of pets for sale shall be carried on upon the lots. The number of animals on any lot shall be governed by the regulations set forth in the Land Use Bylaw of the Municipal District of Foothills No. 31. If any resident chooses to have animals of any allowable type or allowable quantity, they must provide proper care and attention to shelter, food storage, feeding procedures and waste removal of the animals. Special consideration must be given to the environmental impact of the area inhabited by the animals as well as the surrounding area. No intensive agricultural use will be permitted.

Setbacks, Sideyards and Building Heights

The location of the home and outbuildings is the prerogative of the Developer subject to all buildings being located within the legal building envelope. All architectural plans, plot plans and related information must be submitted to the Developer prior to construction of any structures. Locations chosen should be complimentary to adjacent properties. It is the intention of the parties hereto that all dwelling houses erected on the said lands shall have as far as possible, a desirable view of the surrounding countryside.

The setbacks, side yards and building heights must adhere to the requirements set forth by the M.D. of Foothills No. 31. All homes must comply with the M.D. Bylaws and Sundance Trail Architectural Guidelines. In some cases siting requirements may exceed the minimum front, side or rear yard setbacks in order to vary the streetscape and enhance the appearance of the community. No outbuildings shall be positioned in front of the primary residence.

The purchaser/builder is responsible for conforming to the M.D. of Foothills No. 31 bylaws, which may be updated form time to time.

Front yard -	a minimum or 50 feet (15m) from the property line
Side yard -	a minimum of 50 feet (15m) or 10% of the width of the lot at the point of measurement, which ever is greater.
Rear yard -	a minimum of 50 feet (15m) from the property line
Building height -	maximum 29.52 feet (9m)

Design Criteria and Guidelines

One material shall predominate the exterior finish on each building on the land, with the maximum of three materials being used on any one building. All buildings on the Lot shall be finished uniformly with the same theme and attention to detail as the main residence. The use of stone and brick is encouraged and if used must be a minimum of 150 square feet on the front elevation.

Acceptable exterior wall finishes include:

> Solid tone vinyl siding in D3, D4, or D5 profiles. From an acceptable colour selection provided by the Developer.
> Hardboard siding.
> The use of stucco is discouraged.

Acceptable roofing materials include:

> A minimum of 20-year asphalt shingle or better, or other suitable material approved by the Developer.

Roof pitch shall be a minimum of 5/12. Steeper, interesting accent rooflines will be encouraged.

Soffit overhangs are to be a minimum of 18"on roof pitches under 8:12 and 12" on roof pitches over 8:12. A 6" aluminum fascia is the minimum requirement. All fascia, rainwater leaders and eavestrough are to match the trim colour and be consistent with each other.

Chimneys and furnace flue's in prominent locations (visible form public spaces) must be boxed and covered with the appropriate predominate siding material. Accent detailing will be encouraged.

All windows must have applicable window treatments (i.e. shutters, grills, battens, etc.) on the front and side elevations and any other elevation directly facing a public space. These details should be of a maintenance free material.

Garage doors shall be finished to match the overall house style and may contain square glass panels only.

Front entrances should be a feature of the home. Homes must contain a minimum verandah on the front entrance of 100 square feet. Strong detailing will be encouraged with elements such as wide stairs, railings, sidelights, transoms, or columns.

All electrical, telephone or other utility services must be installed underground. Septic tank and fields will be the owners' responsibility and must conform to Municipal District of Foothills No. 31 and Alberta Government code requirements.

No signs will be allowed on any lot, either during or after construction. Personal name signage and For Sale are permitted signs not to exceed 24 inches by 36 inches.

All fences on the Lots shall be constructed with the attached detail and guidelines below:

Posts: 5 inch diameter, pressure treated, set 48 inches above ground with a uniform spacing between 8 feet and 12 feet.

Rails: 4 inch pressure treated wood rails. Three rows spaced 12 inches apart. Rails shall be fixed to the posts using bolts and or Aradox spikes with washers. There is to be no stacking or overlapping of rails when joined at posts. Rails should appear as on continuous piece. Rail joints are to be staggered so that each rail runs past 3 posts. No post shall have more than 2 rail joints.

Trees shall be planted in small groupings. No lines of trees will be allowed except on lots adjacent to the highway where lines of trees parallel to the highway can act as a barrier for sight sound, etc.

Personal motorized vehicles will not be allowed on any Municipal Reserves or public green spaces at any time except for the purpose of maintenance.

APPENDIX D
GROUNDWATER REPORT

#99162

Groundwater Supply Feasibility
Reed Property: NE-13-20-01-W5M

Submitted to:

Challenger Surveys & Services Ltd

Prepared by:

Groundwater Exploration & Research Ltd
December 1999

Groundwater
Exploration & Research

Groundwater Exploration & Research LTD

Box 15
Balzac, AB. CANADA T0M 0E0
Phone (403) 226-0330: Fax (403) 226-6593: Email: nowakb@cadvision.com

December 6, 1999
File No: 99162

Challenger Surveys & Services Ltd
#300, 6940 Fisher Road SE
Calgary, AB.
T2H 0W3

Attention: Marcello Battilana

Dear Marcello:

RE: Reed Property: NE-13-20-01-W5M
Area Structure Plan-Groundwater Feasibility Assessment

Enclosed find our report which addresses the groundwater feasibility in the immediate area of the Reed property at NE-13-20-01-W5M in the Municipal District of Foothills.

Background Information

The Reed property is located southwest of the Town of Okotoks. The quarter section of land is adjacent to Highway 7 and the intersection of Meridian Street [see enclosed portion of the MD land ownership map]. A tentative subdivision plan for 20 lots is being proposed for the quarter section. Some country residential subdivision currently exists in the immediate area of NE-13.

In accordance with the Municipal District of Foothills land development regulations, there is a requirement to prepare an Area Structure Plan for subdivisions with 8 or more parcels. This report addresses the feasibility of finding sufficient volumes of groundwater to sustain up to 20 lots at the NE-13-20-01-W5M location.

Geomorphic/Geologic Setting

Much of the land in the area of NE-13-20-01-W5M is characterized by gently rolling topography which slopes northeastward toward the Sheep River drainage system. The Reed property is located on the northeast flank of an upland area trending southwest to northeast and located approximately 4 km to the southwest. The elevation change across the quarter section is approximately 15 meters [Turner Valley sheet 82 J/9; 1:50,000 scale]. There is currently an existing parcel in the northeast corner of the quarter section.

The bedrock in the area [Green, 1970: Geologic Map of Alberta; 1:267,000] is mapped as the Porcupine Hills Formation. The Porcupine Hills Formation consists of pale grey, thick bedded, cherty, calcareous sandstone; and pale grey calcareous mudstone of non-marine origin.

Borneuf [1980: Hydrogeology of the Kananaskis Lake area, Alberta; Alberta Research Council, Report 79-4] maps the area as having a groundwater potential of 33 to 164 m^3/day [5-25 igpm]. The regional groundwater flow is northeastward toward the Bow River drainage basin.

The surficial geology of the site has been mapped as glaciolacustrine sand and silt, with the development of some eolian [sand dunes] deposits in the northeast corner of the quarter section [Shetson: 1987; Quaternary Geology of Southern Alberta; Alberta Research Council, Map 207].

Pertinent Regulations

Country residential subdivision and groundwater supply is regulated by Section 23(3) of the Water Act and stated as follows:

"If, after this Act comes into force, a subdivision of land of a type or class of subdivision specified in the regulations is approved under the Municipal Government Act, a person residing within that subdivision on a parcel of land that adjoins or is above a source of water described in section 21 has the right to commence and continue the diversion of water under section 21 only if

(a) 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 the subdivision under the Municipal Government Act, and the report states that the diversion of 1250 cubic meters 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, and

(b) the diversion of water for each of the households within the subdivision under section 21 is not inconsistent with an applicable approved water management plan.

Water Regulation [AR 205/98]

9(1) **Subject to subsection (2), a type of subdivision of land for the purposes of section 23(3) of the Act is a subdivision that results in 6 or more parcels in a quarter section or in a river lot.**

In essence, Section 23(3) of the Water Act asks two basic questions:

[a] Is there sufficient water to satisfy the maximum requirement of 1250 m^3/year for each lot in the proposed subdivision?

[b] Will the allocated volume of water per lot result in a significant adverse effect on neighbouring wells and licensed users existing at the time of subdivision application?

Groundwater Well Data

A survey of groundwater well data in NE-13 and the surrounding 8 quarter sections of land was undertaken utilizing available information from Alberta Environmental Protection's groundwater database file. A total of 35 well records were available for review. There were no well records on file for the subject property in the NE-13 quarter section. A summary of available water well information is summarized in Table 1, appended to this report.

[1] Well depths vary significantly from 7.6 to 73.2 meters over the nine quarter sections with a maximum range of 51.8 to 73.2 meters being observed in section 13. The range in well depths exceeds the elevation change of approximately 15 meters suggesting that the water wells are not completed in a water bearing zone that is continuous across Section 13. The geometric mean well depth based on the 35 well records is 34 meters.

[2] The depth of the completion interval varies from shallow completions of 6.1 to 7.6 meters [Robichaud, SE-07], to deeper completions of 62.5 to 68.6 meters [Oliverio, SW-13] also providing evidence that there are multiple water bearing zones that are not continuous across the quarter section.

[3] Preliminary flow estimates vary from 13.1 to 196.4 m^3/day [2 to 30 Cgpm]. The high variability in flow rate is typical of discontinuous water bearing zones; and /or aquifer zones controlled by bed geometry, texture and cementation characteristics. Based on 35 preliminary flow rates, the geometric mean flow is 58.3 m^3/day which would support up to 17 lots.

[4] There are no well records on file for the NE-13 quarter section.

[5] Multi-level completions are indicated in a few of the wells [Warner, SW-13]. Multi-level completion is generally indicative of low yield wells.

[6] Two of the highest producing wells are located in the adjacent SW-13 quarter section. Preliminary flow rate data indicates 144.0 to 196.4 m^3/day [22 to 30 Cgpm] which is more than adequate to sustain a 20 lot subdivision.

Licenced Users

There is one licenced users within an 800 meter radius of the proposed country residential subdivision on the Reed property. There are two groundwater allocation licence for a total of 4940 m^3/year [2.1 Cgpm on a continuous flow basis] for stockwatering purposes under the application name of Malin.

Existing Q_{20} Tests

Groundwater Exploration & Research Ltd has undertaken the assessment of four flow tests within the 9 quarter section block. Test results are summarized as follows:

Location	Owner	Transmissive Capacity (m^2/day	Calculated Q_{20} (m^3/day)
SE-13	Sharpe	18.7	26.2
SE-13	Sharpe	272.4	49.1
SE-13	Sharpe	21.8	26.2
NE-07	Roschak	237.0	55.6

The flow test data, to date, indicates a considerable variation in transmissive capacity across the 9 quarter section block. However, the transmissive capacity values are quite high. The variability in transmissive capacity values is consistent with a physical aquifer model consisting of laterally discontinuous water bearing units reflecting bed geometry, texture and cementation characteristics.

In accordance with Alberta Environmental Protection guidelines, water requirements for country residential development vary from a minimum of 1.82 m^3/day [400 gpd/lot] to a maximum of 3.42 m^3/day [753 gpd/lot]. Available Q_{20} test data reflects a flow range of 26.2 to 55.6 m^3/day. The recommended Q_{20} rates do not reflect the maximum well flow capacity, but rather the maximum rate at which the well was tested.

Based on the proposed maximum 20 lot subdivision, the total minimum water requirement would be 36.4 m^3/day [5.6 Cgpm]: and the total maximum water requirement would be 68.4 m^3/day [10.5 Cgpm]. Based on 35 preliminary flow estimates from existing well records, the geometric mean flow rate was 58.3 m^3/day which is slightly less than the maximum water requirement of 68.4 m^3/day [10.5 Cgpm].

With respect to the potential for well interference as indicated in Section 23(3) of the Water Act, a calculation for well interference, neglecting recharge, at any given distance from the pumping well can be determined from:

$$u = r^2S/4Tt \text{ and}$$

$$s = QW(u)/4*pi*T$$

where:

u and W(u)	=	well function parameters
T	=	transmissive capacity in m^2/day calculated from actual pump test data
S	=	coefficient of storage, dimensionless
t	=	20 years of continuous pumping, in days
r	=	distance between pump well and neighbouring well
s	=	projected drawdown at the neighbouring well and assumed to be 1 meter or less
Q	=	maximum pumping rate of 1250 m^3/year or 3.42 m^3/day

The calculation for well interference is based on the general assumption that a maximum projected drawdown of 1 meter, after 20 years of continuous pumping and neglecting recharge, is an acceptable drawdown that would not unduly interfere with a neighbouring wells' performance.

With the above defined criteria, critical values for well separation distance and transmissive capacity [TC] value can be determined. Acceptable combinations of transmissive capacity and well separation distance are tabulated as follows:

Well Separation Distance (m)	Transmissivity (m^2/day)
25	3.5
50	3.0
75	2.5
100	2.5

For a maximum drawdown of one meter, the critical transmissive capacity is 3.5 m^2/day and a well separation distance of 25 meters; This means, that if all of the proposed 13 wells are completed in the same water bearing zone, then as long as the well separation distance is greater than 25 meters and the transmissive capacity exceeds 3.5 m^2/day, then any well interference can be deemed to be acceptable.

Based on existing flow test data in the immediate area, the transmissivity capacity exceeded, by a wide margin, a critical transmissivity capacity value of 3.5 m^2/day.

The transmissive capacity value can only be determined from a pump test conducted on site specific wells drilled on each proposed parcel. Given that the lot sizes are likely to exceed 1.62 hectares [4 acres], a well separation distance exceeding 25 meters is probable.

Summary of Findings

Based on a feasibility assessment of existing water well information, flow tests and geologic information, the following conclusions have been drawn:

[1] Existing well depths, completion intervals and preliminary flow estimates, indicate that there are multiple water bearing zones existing both laterally and vertically.

[2] Based on the three Sharpe [SE-13] flow tests there appears to be sufficient groundwater resources to serve up to 20 lots at the total minimum requirement of 36.4 m^3/day. Thirty-five preliminary flow test estimates across the block of 9 quarter sections, generates a geometric mean flow rate of 58.3 m^3/day, which also exceeds the total minimum water requirement.

[3] Due to the presence of fractured and/or discontinuous water bearing zones, the availability of groundwater needs to be assessed on a well by well basis. From historical well record information, it is anticipated that the well depths for the new subdivision would encompass a range of well depths, with completion in different water bearing zones, thereby reducing well interference on neighbouring wells.

[4] To minimize a concern for well interference, the critical parameters are a minimum transmissive capacity of 3.5 m^2/day and a well separation distance of at least 25 meter. The well separation distance parameter is generally feasible given the anticipated nominal 1.62 hectare lot size.

[5] The transmissive capacity will need to be calculated on an individual well basis. Existing flow test data, in the immediate area of NE-13 indicates that calculated transmisive capacity would exceed a minimum requirement of 3.5 m^2/day. A minimum well test duration of 12 hours pumping and 12 hours of recovery is sufficient to generate the required data.

Closure

If you have any questions or comments regarding the conclusions drawn in this groundwater feasibility assessment, contact the undersigned at your convenience. It should be noted that the assessment of potential groundwater availability is not a guarantee, but rather an indication of the probability of securing a sustainable groundwater supply. Site specific well testing is required to confirm an adequate groundwater supply. Thanking your for the opportunity to have been of service, we remain,

Respectfully yours,
Groundwater Exploration & Research Ltd

Bob Nowak

Bob Nowak; Ph.D., P.Geol.
Groundwater Geologist

PROFESSIONAL GEOLOGIST ALBERTA
ROBERT L NOWAK

Appendix

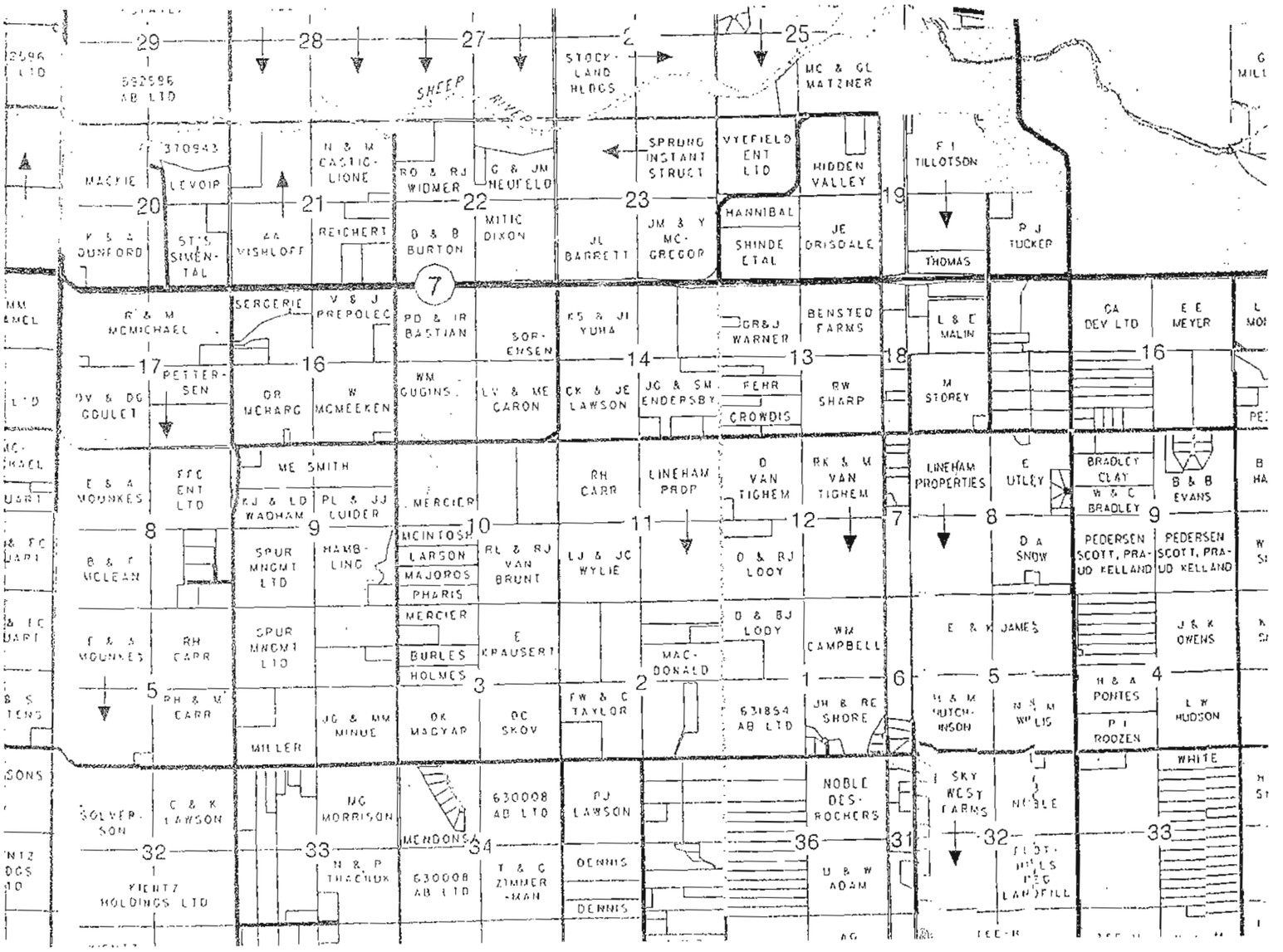

SHEEP RIVER
592596 AB LTD
370943
MACKIE
LEVOIR
N & M CASTIGLIONE
RO & RJ WIDMER
G & JM NEUFELD
STOCKLAND BLDGS
SPRUNG INSTANT STRUCT
VYEFIELD ENT LTD
MC & GL MATZNER
HIDDEN VALLEY
F I TILLOTSON
HANNIBAL
SHINDE ETAL
JE DRISDALE
THOMAS
P J TUCKER
K S A DUNFORD
ST'S SIMENTAL
AA VISHLOFF
REICHERT
D & B BURTON
MITIC DIXON
JL BARRETT
JM & Y MCGREGOR
R & M MCMICHAEL
SERGERIE
V & J PREPOLEC
PD & IR BASTIAN
SORENSEN
KS & JI YUHA
GR&J WARNER
BENSTED FARMS
L & E MALIN
CA DEV LTD
E E MEYER
PETTERSEN
DV & DG GOULET
OR MCHARG
W MCMEEKEN
WM GUGINS
LV & ME CARON
CK & JE LAWSON
JG & SM ENDERSBY
FEHR
CROWDIS
RW SHARP
M STOREY
E & S MOUNKES
FFC ENT LTD
ME SMITH
KJ & LD WADHAM
PL & JJ CUDER
MERCIER
RH CARR
LINEHAM PROP
D VAN TIGHEM
RK & M VAN TIGHEM
LINEHAM PROPERTIES
E UTLEY
BRADLEY CLAY
W & C BRADLEY
B & B EVANS
B & F MCLEAN
SPUR MNGMT LTD
HAMBLING
MCINTOSH
LARSON
MAJOROS
PHARIS
MERCIER
RL & RJ VAN BRUNT
LJ & JC WYLIE
D & RJ LODY
D A SNOW
PEDERSEN SCOTT, PRAUD KELLAND
PEDERSEN SCOTT, PRAUD KELLAND
E & S MOUNKES
RH CARR
SPUR MNGMT LTD
BURLES
HOLMES
E KRAUSERT
MACDONALD
D & BJ LODY
WM CAMPBELL
E & K JAMES
J & K OWENS
RH & M CARR
MILLER
JG & MM MINUE
OK MAGYAR
OC SKOV
FW & C TAYLOR
631854 AB LTD
JH & RE SHORE
M & M HUTCHINSON
N & M WILLIS
H & A PONTES
P I ROOZEN
L W HUDSON
WHITE
SOLVERSON
C & K LAWSON
MG MORRISON
MENDONSA
630008 AB LTD
PJ LAWSON
NOBLE DESROCHERS
SKY WEST FARMS
NOBLE
DENNIS
DENNIS
U & W ADAM
FLOYDHILLS REG LANDFILL
T & C ZIMMERMAN
N & P THIBEAULT
KIENTZ HOLDINGS LTD

Table 1 (continued)
Summary of Groundwater Well Data

Location	Landowner	Date Drilled	Td/Npwl (ft)	Flow Estimate (Cgpm)	Completion Interval (ft)
SE-18	Beatty	Mar 90	125/60	6 Cgpm/2 hrs	85 - 125
SE-18	Hatcher	Jan 71	90/65	unknown	48 - 51 & 56 - 60 & 66 - 72
SE-18	Hruska	Nov 74	81/35	15 Cgpm/?	35 - 70
SE-18	Beatty	Mar 90	125/60	6 Cgpm/2 hrs	85 - 125
SE-18	Wilson	Aug 89	130/75	10 Cgpm/2 hrs	90 - 130
SE-18	Beatty	May 85	100/40	10 Cgpm/3 hrs	40 - 100
NE-18	Wing	May 88	200/120	5 Cgpm/3 hrs	140 - 200
NE-18	Cunningham	Jan 95	215/88	5 Cgpm/2 hrs	175 - 215

ALBERTA ENVIRONMENTAL PROTECTION

COMPUTER GENERATED WATER WELL DRILLER'S REPORT FORM

WELL I.D. 353735

THIS DATA MAY NOT BE FULLY CHECKED; THE PROVINCE DISCLAIMS ALL RESPONSIBILITY FOR ITS ACCURACY:

CONTRACTOR:

NAME: NIEMANS DRILLING (1980) LTD.

ADDRESS: Box 564
High River, Alberta T0L-1B0

LICENCE NO.: 0820 JOURNEYMAN NO.: VA5635

WELL OWNER:

NAME: WARNER, GARRY

ADDRESS: RR1, OKOTOKS

POSTAL CODE: T0L 1T0

WELL LOCATION: IC#: 04

~ OR LSD	SEC	TWP	RGE	W. MER
SW	13	020	01	W5

LOCATION VERIFICATION METHOD: MAP
LOCATION IN QUARTER:

LOT: BLOCK: PLAN:
WELL ELEV: Feet How obtain: NOT OBTAIN

FORMATION LOG DESCRIPTION:

Depth (Feet):	Lithology:
Ground to:	
204	Sandstone
215	Shale
219	Fractured Shale & Sandstone
225	Shale
229	Shale & Sandstone
235	Shale
238	Shale & Sandstone
240	Shale

DRILLING METHOD: ROTARY

TYPE OF WORK: RECONSTRUCTED

FLOWING WELL: No **RATE:**
GAS PRESENT: OIL PRESENT:
DATE OF ABANDONMENT:
MATERIAL USED:
PROPOSED USE: DOMESTIC & STOCK

WELL COMPLETION DATA:

WELL FINISH: CASING/PERFORATED LINER
TOTAL HOLE DEPTH: 240 Feet

CASING TYPE:
SIZE OD: Inch WALL THICKNESS: Inch
BOTTOM AT: Feet

PERFORATED CASING/LINER:
TYPE: PLASTIC
SIZE OD: 4.50 Inch ID: Inch
WALL THICKNESS: 0.214 Inch
TOP AT: 15 Feet BOTTOM AT: 240 Feet
PERFORATED FROM: 130 Feet TO: 160 Feet
190 Feet TO: 230 Feet
Feet TO: Feet

SIZE OF PERFORATIONS: 0.125 Inch X 10.000 Inch
HOW PERFORATED: SAW

SEAL TYPE:
INTERVAL TOP: Feet TO: Feet

GEOPHYSICAL LOG TAKEN:
RETAINED ON FILE:

SCREEN:
MATERIAL:
SIZE ID (CLEAR): Inch SLOT SIZE: Inch
INTERVAL TOP: Feet TO: Feet
Feet TO: Feet

INSTALLATION METHOD:
TOP FITTINGS:
BOTTOM FITTINGS:
PACK TYPE:
GRAIN SIZE: AMOUNT:

PITLESS ADAPTER TYPE:
DROP PIPE TYPE: LENGTH: Feet
DIAMETER: Inch
ADDITIONAL PUMP INFORMATION:

PRODUCTION TEST:
TEST DATE: July 12, 1990 START TIME: 11:00

Elapsed Time in Min:Sec	Depth to Water Level During Pumping	Depth to Water Level During Recovery

WATER REMOVAL RATE DURING TEST: 0 Gal/Min
TEST DURATION: 4 Hours 30 Minutes
TESTING METHOD: BAILER & AIR
DEPTH OF PUMP/DRILL STEM: 240 Feet
WATER LEVEL AT END OF TEST: Feet
NON-PUMPING (STATIC) WATER LEVEL: 148.0 FEET
TOTAL DRAWDOWN: Feet

RECOMMENDED PUMPING RATE: Gal/Min
RECOMMENDED PUMP INTAKE AT: Feet
TYPE OF PUMP INSTALLED:
MODEL: H.P.:

DATE WORK STARTED: July 11, 1990

DATE WORK COMPLETED: July 12, 1990

ADDITIONAL TEST AND/OR PUMP DATA:

CHEMISTRIES TAKEN: N HELD: 1 DOCUMENTS HELD: 2

WELL OWNER'S ANTICIPATED WATER REQUIREMENTS PER DAY:

COMMENTS: Original Well ID? 353734. Had been abandoned.
(Maximum of 9 lines printed)

ALBERTA ENVIRONMENTAL PROTECTION

COMPUTER GENERATED WATER WELL DRILLER'S REPORT FORM

WELL I.D. 380534

THIS DATA MAY NOT BE FULLY CHECKED; THE PROVINCE DISCLAIMS ALL RESPONSIBILITY FOR ITS ACCURACY:

CONTRACTOR:

NAME: NIEMANS DRILLING (1980) LTD.

ADDRESS: Box 564
High River, Alberta T0L-1B0

LICENCE NO.: 0820 JOURNEYMAN NO.: VA5635

WELL OWNER:

NAME: WARNER, GARRY

ADDRESS: OKOTOKS

POSTAL CODE:

WELL LOCATION: IC#:

- OR LSD	SEC	TWP	RGE	W. MER
SW	13	020	01	W5

LOCATION VERIFICATION METHOD: MAP
LOCATION IN QUARTER:

LOT: BLOCK: PLAN:
WELL ELEV: Feet How obtain: NOT OBTAIN

FORMATION LOG DESCRIPTION:

Depth (Feet):	Lithology:
Ground to:	
200	Predrilled
204	Sandstone
215	Shale
219	Fractured Shale & Sandstone
225	Shale
229	Shale & Sandstone
235	Shale
238	Shale & Sandstone
240	Shale

DRILLING METHOD: ROTARY

TYPE OF WORK: DEEPENED

FLOWING WELL: No **RATE:**
GAS PRESENT: No OIL PRESENT: No
DATE OF ABANDONMENT:
MATERIAL USED:
PROPOSED USE: DOMESTIC & STOCK

WELL COMPLETION DATA:

WELL FINISH: PERFORATED CASING/LINER
TOTAL HOLE DEPTH: 240 Feet

CASING TYPE:
SIZE OD: Inch WALL THICKNESS: Inch
BOTTOM AT: Feet

PERFORATED CASING/LINER:
TYPE: PLASTIC
SIZE OD: 4.50 Inch ID: Inch
WALL THICKNESS: 0.214 Inch
TOP AT: 15 Feet BOTTOM AT: 240 Feet
PERFORATED FROM: 130 Feet TO: 160 Feet
190 Feet TO: 230 Feet
Feet TO: Feet

SIZE OF PERFORATIONS: 0.125 Inch X 10.000 Inch
HOW PERFORATED: SAW

SEAL TYPE:
INTERVAL TOP: Feet TO: Feet

GEOPHYSICAL LOG TAKEN:
RETAINED ON FILE:

SCREEN:
MATERIAL:
SIZE ID (CLEAR): Inch SLOT SIZE: Inch
INTERVAL TOP: Feet TO: Feet
Feet TO: Feet

INSTALLATION METHOD:
TOP FITTINGS:
BOTTOM FITTINGS:
PACK TYPE:
GRAIN SIZE: AMOUNT:

PITLESS ADAPTER TYPE:
DROP PIPE TYPE: LENGTH: Feet
DIAMETER: Inch
ADDITIONAL PUMP INFORMATION:

PRODUCTION TEST:
TEST DATE: July 12, 1990 START TIME: 12:00

Elapsed Time in Min:Sec	Depth to Water Level During Pumping	Depth to Water Level During Recovery

WATER REMOVAL RATE DURING TEST: 6 Gal/Min
TEST DURATION: 1 Hours 30 Minutes
TESTING METHOD: BAILER
DEPTH OF PUMP/DRILL STEM: 184 Feet
WATER LEVEL AT END OF TEST: 184 Feet
NON-PUMPING(STATIC) WATER LEVEL: 148.0 FEET
TOTAL DRAWDOWN: 36 Feet

RECOMMENDED PUMPING RATE: Gal/Min
RECOMMENDED PUMP INTAKE AT: Feet
TYPE OF PUMP INSTALLED:
MODEL: H.P.:

DATE WORK STARTED: July 11, 1990

DATE WORK COMPLETED: July 12, 1990

ADDITIONAL TEST AND/OR PUMP DATA:

CHEMISTRIES TAKEN: N HELD: 1 DOCUMENTS HELD: 3

WELL OWNER'S ANTICIPATED WATER REQUIREMENTS PER DAY:

COMMENTS:
(Maximum of 9 lines printed)

DATE FORM PRINTED: November 26, 1999 11:31:33 DATE DATA KEYED: June 29, 1994 GIC56 RG

ALBERTA ENVIRONMENTAL PROTECTION

COMPUTER GENERATED WATER WELL DRILLER'S REPORT FORM WELL I.D. 380534

THIS DATA MAY NOT BE FULLY CHECKED; THE PROVINCE DISCLAIMS ALL RESPONSIBILITY FOR ITS ACCURACY:

CONTRACTOR:

NAME: NIEMANS DRILLING (1980) LTD.

ADDRESS: Box 564
High River, Alberta T0L-1B0

LICENCE NO.: 0820 JOURNEYMAN NO.:

WELL OWNER:

NAME: WARNER, GARRY

ADDRESS: OKOTOKS

POSTAL CODE:

WELL LOCATION: IC#:

- OR LSD	SEC	TWP	RGE	W. MER
SW	13	020	01	W5

LOCATION VERIFICATION METHOD:
LOCATION IN QUARTER:

LOT: BLOCK: PLAN:
WELL ELEV: Feet How obtain:

FORMATION LOG DESCRIPTION:

Depth (Feet):	Lithology:
Ground to:	

DRILLING METHOD:

TYPE OF WORK:

FLOWING WELL: **RATE:**
GAS PRESENT: OIL PRESENT:
DATE OF ABANDONMENT:
MATERIAL USED:
PROPOSED USE:

WELL COMPLETION DATA:

WELL FINISH:
TOTAL HOLE DEPTH: Feet

CASING TYPE:
SIZE OD: Inch WALL THICKNESS: Inch
BOTTOM AT: Feet
PERFORATED CASING/LINER:
TYPE:
SIZE OD: Inch ID: Inch
WALL THICKNESS: Inch
TOP AT: Feet BOTTOM AT: Feet
PERFORATED FROM: Feet TO: Feet
Feet TO: Feet
Feet TO: Feet

SIZE OF PERFORATIONS: Inch X Inch
HOW PERFORATED:
SEAL TYPE:
INTERVAL TOP: Feet TO: Feet
GEOPHYSICAL LOG TAKEN:
RETAINED ON FILE:
SCREEN:
MATERIAL:
SIZE ID (CLEAR): Inch SLOT SIZE: Inch
INTERVAL TOP: Feet TO: Feet
Feet TO: Feet

INSTALLATION METHOD:
TOP FITTINGS:
BOTTOM FITTINGS:
PACK TYPE:
GRAIN SIZE: AMOUNT:

PITLESS ADAPTER TYPE:
DROP PIPE TYPE: LENGTH: Feet
DIAMETER: Inch
ADDITIONAL PUMP INFORMATION:

PRODUCTION TEST:

TEST DATE: July 12, 1990 START TIME: 16:00

Elapsed Time in Min:Sec	Depth to Water Level During Pumping	Depth to Water Level During Recovery

WATER REMOVAL RATE DURING TEST: 6 Gal/Min
TEST DURATION: 1 Hours 30 Minutes
TESTING METHOD: BAILER
DEPTH OF PUMP/DRILL STEM: 184 Feet
WATER LEVEL AT END OF TEST: 184 Feet
NON-PUMPING(STATIC) WATER LEVEL: 148.0 FEET
TOTAL DRAWDOWN: 36 Feet

RECOMMENDED PUMPING RATE: Gal/Min
RECOMMENDED PUMP INTAKE AT: Feet
TYPE OF PUMP INSTALLED:
MODEL: H.P.:

DATE WORK STARTED:

COMMENTS:
(Maximum of 9 lines printed)

DATE WORK COMPLETED:
ADDITIONAL TEST AND/OR PUMP DATA:
CHEMISTRIES TAKEN: HELD: DOCUMENTS HELD:
WELL OWNER'S ANTICIPATED WATER REQUIREMENTS PER DAY:

DATE FORM PRINTED: **DATE DATA KEYED:**

ALBERTA ENVIRONMENTAL PROTECTION

COMPUTER GENERATED WATER WELL DRILLER'S REPORT FORM

WELL I.D. 383924

THIS DATA MAY NOT BE FULLY CHECKED; THE PROVINCE DISCLAIMS ALL RESPONSIBILITY FOR ITS ACCURACY:

CONTRACTOR:

NAME: FOOTHILLS DRLG

ADDRESS:

LICENCE NO.: JOURNEYMAN NO.:

WELL OWNER:

NAME: OLIVERIO, TONY

ADDRESS: 2208-VISTA CRES. NE, CALGARY

POSTAL CODE:

WELL LOCATION: IC#: 00

~ OR LSD	SEC	TWP	RGE	W. MER
SW	13	020	01	W5

LOCATION VERIFICATION METHOD:MAP
LOCATION IN QUARTER:

LOT: BLOCK: PLAN:
WELL ELEV: Feet How obtain: NOT OBTAIN

FORMATION LOG DESCRIPTION:

Depth (Feet):	Lithology:
Ground to:	
14	Clay & Rocks
225	Shale & Sandstone

DRILLING METHOD: ROTARY

TYPE OF WORK: NEW WELL

FLOWING WELL: No **RATE:**
GAS PRESENT: No OIL PRESENT: No
DATE OF ABANDONMENT:
MATERIAL USED:
PROPOSED USE: DOMESTIC & STOCK

WELL COMPLETION DATA:

WELL FINISH: CASING/PERFORATED LINER
TOTAL HOLE DEPTH: 225 Feet

CASING TYPE: STEEL
SIZE OD: 5.50 Inch WALL THICKNESS: Inch
BOTTOM AT: 15 Feet

PERFORATED CASING/LINER:
TYPE: UNKNOWN
SIZE OD: 4.50 Inch ID: Inch
WALL THICKNESS: Inch
TOP AT: Feet BOTTOM AT: 215 Feet
PERFORATED FROM: 205 Feet TO: 225 Feet
Feet TO: Feet
Feet TO: Feet

SIZE OF PERFORATIONS: Inch X Inch
HOW PERFORATED: UNKNOWN

SEAL TYPE:
INTERVAL TOP: Feet TO: Feet

GEOPHYSICAL LOG TAKEN:
RETAINED ON FILE:

SCREEN:
MATERIAL:
SIZE ID (CLEAR): Inch SLOT SIZE: Inch
INTERVAL TOP: Feet TO: Feet
Feet TO: Feet

INSTALLATION METHOD:
TOP FITTINGS:
BOTTOM FITTINGS:
PACK TYPE:
GRAIN SIZE: AMOUNT:

PITLESS ADAPTER TYPE:
DROP PIPE TYPE: LENGTH: Feet
DIAMETER: Inch
ADDITIONAL PUMP INFORMATION:

PRODUCTION TEST:

TEST DATE: START TIME 1:00

Elapsed Time in Min:Sec	Depth to Water Level During Pumping	Depth to Water Level During Recovery

WATER REMOVAL RATE DURING TEST: 3 Gal/Min
TEST DURATION: 2 Hours 0 Minutes
TESTING METHOD: AIR
DEPTH OF PUMP/DRILL STEM: Feet
WATER LEVEL AT END OF TEST: Feet
NON-PUMPING(STATIC) WATER LEVEL: FEET
TOTAL DRAWDOWN: Feet

RECOMMENDED PUMPING RATE: Gal/Min
RECOMMENDED PUMP INTAKE AT: Feet
TYPE OF PUMP INSTALLED:
MODEL: H.P.:

DATE WORK STARTED:

DATE WORK COMPLETED:

COMMENTS: S.W.L. NOT GIVEN IN FILE.
(Maximum of 9 lines printed)

ADDITIONAL TEST AND/OR PUMP DATA:

CHEMISTRIES TAKEN: N HELD: 1 DOCUMENTS HELD: 2

WELL OWNER'S ANTICIPATED WATER REQUIREMENTS PER DAY:

DATE FORM PRINTED: November 26, 1999 11:31:34 *DATE DATA KEYED:* August 17, 1994 GIC56 FO

ALBERTA ENVIRONMENTAL PROTECTION
COMPUTER GENERATED WATER WELL DRILLER'S REPORT FORM

WELL I.D. 350022

THIS DATA MAY NOT BE FULLY CHECKED; THE PROVINCE DISCLAIMS ALL RESPONSIBILITY FOR ITS ACCURACY:

CONTRACTOR:

NAME: AARON/INTERPROVINCIAL WATERWELL DRILLING

ADDRESS: Box 26, Site 9, R.R.1 DeWinton, Alberta T0L-0X0

LICENCE NO.: 0892 JOURNEYMAN NO: VA4995

WELL OWNER:

NAME: SHARPE RAY #3272

ADDRESS: 5118 36 ST S.E. CALGARY ALTA

POSTAL CODE: T2C 2A6

WELL LOCATION: IC#:

% OR LSD	SEC	TWP	RGE	W MER
SE	13	020	01	W5

LOCATION VERIFICATION METHOD: FIELD
LOCATION IN QUARTER:

LOT: BLOCK: PLAN:
WELL ELEV: Feet How obtain: SURVEY-A/R

FORMATION LOG DESCRIPTION:

Depth (Feet)	Lithology
Ground to:	
10	Sandy Clay
17	Brown Shale
22	Gray Shale
26	Gray Sandstone
27	Brown Shale
32	Brown Sandstone
39	Gray Shale
41	Gray Sandstone
55	Gray Shale
60	Gray Water Bearing Sandstone
65	Gray Shale

DRILLING METHOD: ROTARY

TYPE OF WORK: NEW WELL

FLOWING WELL: **RATE:**
GAS PRESENT: No OIL PRESENT: No
DATE OF ABANDONMENT:
MATERIAL USED:
PROPOSED USE: DOMESTIC

WELL COMPLETION DATA:

WELL FINISH: CASING/PERFORATED LINER
TOTAL HOLE DEPTH: 65 Feet

CASING TYPE: STEEL
SIZE OD: 6.62 Inch WALL THICKNESS: 0.188 Inch
BOTTOM AT: 28 Feet

PERFORATED CASING/LINER:
TYPE: PLASTIC
SIZE OD: 5.00 Inch ID: Inch
WALL THICKNESS: 2.190 Inch
TOP AT: 23 Feet BOTTOM AT: 65 Feet
PERFORATED FROM: 55 Feet TO: 65 Feet
Feet TO: Feet
Feet TO: Feet

SIZE OF PERFORATIONS 0.188 Inch x 10.000 Inch
HOW PERFORATED: SAW
SEAL TYPE: DRIVEN
INTERVAL TOP: 26 Feet TO: 26 Feet
GEOPHYSICAL LOG TAKEN:
RETAINED ON FILE:
SCREEN:
MATERIAL
SIZE ID (CLEAR): Inch SLOT SIZE: Inch
INTERVAL TOP: Feet TO: Feet
Feet TO: Feet
INSTALLATION METHOD:
TOP FITTINGS:
BOTTOM FITTINGS:
PACK TYPE:
GRAIN SIZE AMOUNT:

PITLESS ADAPTER TYPE:
DROP PIPE TYPE: LENGTH: Feet
DIAMETER: Inch
ADDITIONAL PUMP INFORMATION:

PRODUCTION TEST:
TEST DATE: September 10, 1997 START TIME: 3:00

Elapsed Time in Hr:Min:Sec	Depth to Water Level During Pumping (Feet)	Depth to Water Level During Recovery (Feet)
1:00	28.90	
2:00	28.94	
3:00	28.97	
5:00		28.87
15:00	28.97	
20:00	29.00	
50:00	29.04	
60:00	29.07	
180:00	29.07	
210:00	29.10	
240:00	29.10	
300:00	29.10	
360:00	29.13	
660:00	29.13	
720:00	29.16	

WATER REMOVAL RATE DURING TEST: 7.5 Gal/Min
TEST DURATION: 12 Hours 0 Minutes
TESTING METHOD: PUMP
DEPTH OF PUMP/DRILL STEM: 60 Feet
WATER LEVEL AT END OF TEST 29 Feet
NON-PUMPING(STATIC) WATER LEVEL: 28.9 FEET
TOTAL DRAWDOWN Feet

RECOMMENDED PUMPING RATE 5 Gal/Min
RECOMMENDED PUMP INTAKE AT: 60 Feet
TYPE OF PUMP INSTALLED:
MODEL: H.P.:

DATE WORK STARTED: September 10, 1997

COMMENTS: (Maximum of 9 lines available)

DATE WORK COMPLETED: September 10, 1997
ADDITIONAL TEST AND/OR PUMP DATA:
CHEMISTRIES HELD: DOCUMENTS HELD: 1
WELL OWNER'S ANTICIPATED WATER REQUIREMENTS PER DAY: 500 Gallons

DATE FORM PRINTED: September 23, 199710:39:23 DATE DATA KEYED: September 23, 1997 GICS BM

ALBERTA ENVIRONMENTAL PROTECTION

COMPUTER GENERATED WATER WELL DRILLER'S REPORT FORM

WELL I.D. 350023

THIS DATA MAY NOT BE FULLY CHECKED; THE PROVINCE DISCLAIMS ALL RESPONSIBILITY FOR ITS ACCURACY:

CONTRACTOR:

NAME: AARON/INTERPROVINCIAL WATERWELL DRILLING

ADDRESS: Box 28, Site 9, R.R.1 DeWinton, Alberta T0L-0X0

LICENCE NO.: 0892 JOURNEYMAN NO.: VA4996

WELL OWNER:

NAME: SHARPE RAY #3270

ADDRESS: 6118 30 ST S E CALGARY ALTA

POSTAL CODE: T2C 2A6

WELL LOCATION: IC#:

¼ OR LSD	SEC	TWP	RGE	W. MER
SE	13	020	01	W5

LOCATION VERIFICATION METHOD: FIELD
LOCATION IN QUARTER:

LOT: BLOCK: PLAN:
WELL ELEV: Feet How obtain: SURVEY-AIR

FORMATION LOG DESCRIPTION:

Depth (Feet):	Lithology:
Ground to:	
2	Topsoil
15	Clay & Gravel
29	Brown Shale
33	Brown Sandstone
44	Gray Shale
45	Gray Sandstone
51	Gray Shale
56	Gray Sandstone
61	Gray Shale
67	Grey Water Bearing Sandstone
76	Gray Shale
80	Gray Sandstone

DRILLING METHOD: ROTARY

TYPE OF WORK: NEW WELL

FLOWING WELL: RATE:
GAS PRESENT: No OIL PRESENT: No
DATE OF ABANDONMENT:
MATERIAL USED:
PROPOSED USE: DOMESTIC

WELL COMPLETION DATA:

WELL FINISH: CASING/PERFORATED LINER
TOTAL HOLE DEPTH: 80 Feet

CASING TYPE: STEEL
SIZE OD: 6.62 Inch WALL THICKNESS: 0.186 Inch
BOTTOM AT: 29 Feet
PERFORATED CASING/LINER:
TYPE: PLASTIC
SIZE OD: 5.00 Inch ID: Inch
WALL THICKNESS: 0.219 Inch
TOP AT: 20 Feet BOTTOM AT: 80 Feet
PERFORATED FROM: 65 Feet TO: 80 Feet
Feet TO: Feet
Feet TO: Feet
SIZE OF PERFORATIONS: 0.188 Inch X 10.000 Inch
HOW PERFORATED: SAW
SEAL TYPE: DRIVEN
INTERVAL TOP: 27 Feet TO: 29 Feet
GEOPHYSICAL LOG TAKEN:
RETAINED ON FILE:
SCREEN:
MATERIAL:
SIZE ID (CLEAR): Inch SLOT SIZE: Inch
INTERVAL TOP: Feet TO: Feet
Feet TO: Feet
INSTALLATION METHOD:
TOP FITTINGS:
BOTTOM FITTINGS:
PACK TYPE:
GRAIN SIZE: AMOUNT:

PITLESS ADAPTER TYPE:
DROP PIPE TYPE: LENGTH: Feet
DIAMETER: Inch
ADDITIONAL PUMP INFORMATION:

PRODUCTION TEST:

TEST DATE: September 10, 1997 START TIME: 3:00

Elapsed Time hr:Min:Sec	Depth to Water Level During Pumping (Feet)	Depth to Water Level During Recovery (Feet)
1:00	26.74	26.67
2:00	26.74	26.77
3:00	26.84	26.54
4:00	26.94	26.57
5:00	26.97	26.48
6:00	26.97	
7:00	27.00	
8:00	27.03	
9:00	27.10	
10:00	27.17	26.41
12:00	27.30	
15:00	27.43	25.94
20:00	27.53	26.25
25:00	27.59	26.16
30:00	27.66	26.15
45:00	27.72	26.06
60:00	27.76	26.05
90:00	27.79	26.02
75:00	27.82	25.88
90:00	27.85	25.95
105:00	27.87	25.91
120:00	27.82	25.95
150:00	27.89	25.81
180:00	26.05	
210:00	28.08	
240:00	28.12	
300:00	28.19	
360:00	28.22	
420:00	28.25	
480:00	28.28	

WATER REMOVAL RATE DURING TEST 4 Gal/Min
TEST DURATION: 12 Hours 0 Minutes
TESTING METHOD: PUMP
DEPTH OF PUMP/DRILL STEM: 75 Feet
WATER LEVEL AT END OF TEST: 28 Feet
NON-PUMPING(STATIC) WATER LEVEL 25.5 FEET
TOTAL DRAWDOWN: 3 Feet

RECOMMENDED PUMPING RATE 4 Gal/Min
RECOMMENDED PUMP INTAKE AT 75 Feet
TYPE OF PUMP INSTALLED:
MODEL: H.P.:

DATE WORK STARTED: September 10, 1997

DATE WORK COMPLETED: September 10, 1997

ADDITIONAL TEST AND/OR PUMP DATA:

COMMENTS: WATER ANALYSIS
(Maximum of 9 lines printed) TDS 410
IRON 0.15
HARD 34

CHEMISTRIES HELD: DOCUMENTS HELD: 1

WELL OWNER'S ANTICIPATED WATER REQUIREMENTS PER DAY: 500 Gallons

DATE FORM PRINTED: September 23, 199710:39:21 DATE DATA KEYED: September 23, 1997 GIC5 BM

ALBERTA ENVIRONMENTAL PROTECTION

COMPUTER GENERATED WATER WELL DRILLER'S REPORT FORM

WELL I.D. 350021

THIS DATA MAY NOT BE FULLY CHECKED; THE PROVINCE DISCLAIMS ALL RESPONSIBILITY FOR ITS ACCURACY:

CONTRACTOR:

NAME: AARON/INTERPROVINCIAL WATER/WELL DRILLING

ADDRESS: Box 29, Site 9, R.R.1 Dewinton, Alberta T0J-0X0

LICENCE NO.: 0892 JOURNEYMAN NO.: VA4996

WELL OWNER:

NAME: SHARPE RAY #3271

ADDRESS: 6118 30 ST S.E. CALGARY ALTA

POSTAL CODE: T2C 2A6

WELL LOCATION: ID#:

¼ OR LSD	SEC	TWP	RGE	W. MER
SE	13	020	01	W5

LOCATION VERIFICATION METHOD: FIELD
LOCATION IN QUARTER:

LOT: BLOCK: PLAN:
WELL ELEV: Feet How obtain: SURVEY-AIR

FORMATION LOG DESCRIPTION:

Depth (Feet)	Lithology
Ground to:	
7	Brown Clay
15	Green Shale
17	Gray Shale
23	Gray Sandstone
27	Brown Shale
40	Brown Sandstone
58	Gray Shale
66	Gray Water Bearing Sandstone
75	Gray Shale

DRILLING METHOD: ROTARY

TYPE OF WORK: NEW WELL

FLOWING WELL: **RATE:**
GAS PRESENT: No OIL PRESENT: No
DATE OF ABANDONMENT:
MATERIAL USED:
PROPOSED USE: DOMESTIC

WELL COMPLETION DATA:

WELL FINISH: CASING/PERFORATED LINER
TOTAL HOLE DEPTH: 75 Feet

CASING TYPE: STEEL
SIZE OD: 6.62 Inch WALL THICKNESS: 0.188 Inch
BOTTOM AT: 38 Feet

PERFORATED CASING/LINER:
TYPE: PLASTIC
SIZE OD: 5.00 Inch ID: Inch
WALL THICKNESS: 0.219 Inch
TOP AT: 35 Feet BOTTOM AT: 75 Feet
PERFORATED FROM: 60 Feet TO: 75 Feet
Feet TO: Feet
Feet TO: Feet

SIZE OF PERFORATIONS: 0.188 Inch X 10.000 Inch
HOW PERFORATED: SAW

SEAL TYPE:
INTERVAL TOP: Feet TO. Feet

GEOPHYSICAL LOG TAKEN:
RETAINED ON FILE:

SCREEN:
MATERIAL:
SIZE ID (CLEAR): Inch SLOT SIZE: Inch
INTERVAL TOP: Feet TO. Feet
Feet TO: Feet

INSTALLATION METHOD
TOP FITTINGS:
BOTTOM FITTINGS:
PACK TYPE
GRAIN SIZE: AMOUNT:

PITLESS ADAPTER TYPE:
DROP PIPE TYPE LENGTH: Feet
DIAMETER Inch
ADDITIONAL PUMP INFORMATION:

PRODUCTION TEST:

TEST DATE: September 9, 1997 START TIME: 3:00

Elapsed Time in Min:Sec	Depth to Water Level During Pumping (Feet)	Depth to Water Level During Recovery (Feet)
0:00	(Static)	
1:00	40.84	41.85
2:00	41.10	41.75
3:00	41.24	41.66
4:00	41.37	41.59
5:00	41.45	41.54
6:00	41.56	41.51
7:00	41.65	41.47
8:00	41.73	
9:00	41.79	
10:00	41.86	41.42
12:00	41.99	
15:00	42.19	41.38
20:00	42.48	41.31
25:00	42.81	41.27
30:00	42.91	41.2
40:00	43.01	41.05
50:00	43.07	40.19
60:00	43.14	40.82
75:00	43.20	40.69
90:00	43.27	40.56
105:00	43.35	40.42
120:00	43.30	40.33
150:00	43.33	40.1
180:00	43.40	
210:00	43.47	
240:00	43.50	
300:00	43.59	
360:00	43.56	
420:00	43.61	

WATER REMOVAL RATE DURING TEST: 4 Gal/Min
TEST DURATION: 12 Hours 0 Minutes
TESTING METHOD PUMP
DEPTH OF PUMP/DRILL STEM: 70 Feet
WATER LEVEL AT END OF TEST: 43 Feet
NON-PUMPING(STATIC) WATER LEVEL: 39.7 FEET
TOTAL DRAWDOWN: 4 Feet

RECOMMENDED PUMPING RATE: 4 Gal/Min
RECOMMENDED PUMP INTAKE AT: 70 Feet
PUMP INSTALLED. H.P.:

DATE WORK STARTED: September 9, 1997

DATE WORK COMPLETED: September 9, 1997

ADDITIONAL TEST AND/OR PUMP DATA:

CHEMISTRIES HELD: DOCUMENTS HELD: 1

WELL OWNER'S ANTICIPATED WATER REQUIREMENTS PER DAY: 500 Gallons

COMMENTS: water analysis
(Maximum of 9 lines printed) TDS 450
IRON 1
HARD 10

DATE FORM PRINTED: September 22, 199716:40:01 DATE DATA KEYED: September 22, 1997 GICS BM

APPENDIX E

PERCOLATION REPORT

ALMOR TESTING SERVICES LTD.

7505 - 40 ST. S.E., CALGARY, ALBERTA T2C 2H5 TELEPHONE (403) 236-8880

2000 01 24 00-088-01-5

Reid Land Development
c/o: Challenger Surveys and Services Ltd.
300, 6940 Fisher Rd SE
Calgary, Alberta T2H 0W3

Attention: Mr. Marcello Battilana

Gentlemen:

Re: Shallow Subsurface Conditions
NE ¼, Sec 13, Twp 20, Rge 1, W5M

Almor Testing Services Ltd. was retained to evaluate the percolation rate of the shallow subsurface soils and groundwater conditions, in accordance with the MD of Foothills and Alberta Environmental Protection guidelines, at the above referenced project. No consideration has been given to specific foundation subsoil conditions, within the building envelopes. The proposed subdivision to be subdivided, is identified by the attached Site Plan.

The field investigation for the water table and percolation rate testing was performed on December 20 and 21, 1999. The percolation test holes and groundwater monitoring test holes, located by our personnel, were advanced by a mobile auger drill. Frost was not present in the test holes.

1.0 SOIL CONDITIONS

The soil conditions at the septic tile field locations (excluding the surficial topsoil and lesser "browns" horizon), consist predominately of light olive silt, with some sand and a trace of clay. The soils are in a damp condition and were of a stiff to very stiff consistency. Natural moisture contents ranged from 3.9% to 13.7% at the 0.9m depth. Soil saturation tests performed on the shallow subsoils yielded a range from 41.1% to 54.1%.

2.0 SEPTIC FIELD - PERCOLATION RATE TESTS

The percolation test holes were advanced at alternate septic field locations throughout the site, to a depth of approximately 0.9m below the depth of native topsoil and the "browns" horizon. Loose materials from the bottom and sides of the test holes were cleaned, prior to filling with water for a minimum depth of 0.45m (18 inches). The water was allowed to soak for a minimum 12 to 24 hour period. The holes were recharged with water and the percolation rates were observed and recorded on December 21, 1999. The results are presented in the attached Table 1.

.../2

3.0 GROUNDWATER CONDITIONS

Free water or saturated soil conditions were not observed, during test hole drilling. Hand-slotted, 30mm PVC standpipe were installed in each test hole, for review of near surface water table. The standpipe were installed to depths ranging from 1.4m to 3.1m below the existing ground surface. Wetted bentonite granules were placed from the ground surface to a depth of 0.3m, to limit surface water infiltration. The standpipes were monitored one week subsequent to installation and groundwater was not present, as noted in Table 2.

TABLE 2
GROUNDWATER CONDITIONS

Test Hole No.	Depth of Standpipe	------ Depth Below Existing Ground Surface (m) ------- At Completion Dec 20/99	Jan 3/00
1	2.55*	dry	dry
2	3.00*	dry	dry
3	3.05	dry	dry
4	1.40*	dry	dry
5	3.10	dry	dry
6	3.00	dry	dry
7	2.50*	dry	dry

* Auger Refusal

Typically, highest groundwater conditions are experienced during the months of June to August, as they are periods of groundwater table recharge. It is apparent, where bedrock is not present, that the near surface water table will be below a vertical distance of 1.5m from the weeping lateral trench bottom, as specified by Alberta Environmental Protection guidelines for location of disposal fields in this time period. However, bedrock is also a consideration in Lot 4. The field should be raised 1.0m.

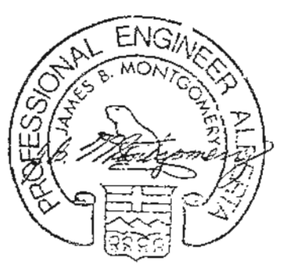
..../3

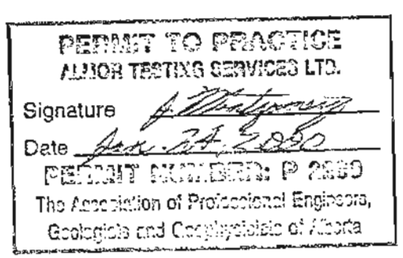
4.0 CLOSING

In review, the percolation rates were recorded to be between 2.0 min/cm and 23.6 min/cm, with the exception of Percolation Hole #4B. The shallow groundwater table is below a minimum 1.5m distance from the weeping lateral trench bottom (2.4m below grade) except for bedrock in Lot 4. We recommend that these field locations, except for Lot 4, are suitable for standard disposal field tile systems. However, Lot 4 requires a raised septic field of 1.0m to be suitable in the field and/or sideslopes.

We trust this meets with your present requirements.

Respectfully submitted,
ALMOR TESTING SERVICES LTD.





J.B. Montgomery, P.Eng.

SD:ms:A99344

Attachments

TABLE 1
PERCOLATION TEST RESULTS

Percolation Hole #1A

Location: Refer to Site Plan

Soil Type: SILT, some sand, trace clay

Time of Reading	min/cm
20 min.	3.0
40 min.	2.9
Hour 1	3.2
80 min.	3.0
100 min.	2.9

Percolation Hole #1B

Location: Refer to Site Plan

Soil Type: Silty fine SAND

Time of Reading	min./cm
20 min.	2.3
40 min.	2.2
Hour 1	2.5
80 min.	2.3
100 min.	2.4
Hour 2	2.4

Percolation Hole #2A

Location: Refer to Site Plan

Soil Type: Silty SAND, trace clay, trace gravel

Time of Reading	min./cm
20 min.	5.2
40 min.	4.5
Hour 1	5.1
80 min.	4.6
100 min.	5.4
Hour 2	4.6

TABLE 1
PERCOLATION TEST RESULTS

Percolation Hole #2B

Location: Refer to Site Plan

Soil Type: SILT, some sand, trace clay

Time of Reading	min./cm
20 min.	8.7
40 min.	6.4
Hour 1	5.1
80 min.	4.4
100 min.	5.4
Hour 2	4.0

Percolation Hole #3A

Location: Refer to Site Plan

Soil Type: Sandy SILT, trace gravel

Time of Reading	min./cm
20 min.	5.2
40 min.	6.4
Hour 1	5.0
80 min.	5.2
100 min.	5.7
Hour 2	5.6

Percolation Hole #3B

Location: Refer to Site Plan

Soil Type: Sandy SILT, trace gravel

Time of Reading	min./cm
20 min.	3.4
40 min.	3.4
Hour 1	3.7
80 min.	3.4
100 min.	5.0
Hour 2	4.4

TABLE 1
PERCOLATION TEST RESULTS

Percolation Hole #4A

Location: Refer to Site Plan

Soil Type: Fine sandy SILT, trace gravel

Time of Reading	min./cm
20 min.	3.5
40 min.	3.3
Hour 1	3.3
80 min.	4.0
100 min.	3.4
Hour 2	3.1

Percolation Hole #4B

Location: Refer to Site Plan

Soil Type: Silty fine SAND, trace gravel

Time of Reading	min./cm
20 min.	1.8
40 min.	1.8
Hour 1	1.9
80 min.	1.8
100 min.	1.8
Hour 2	1.9

Percolation Hole #5A

Location: Refer to Site Plan

Soil Type: SILT, some sand to sandy, trace gravel

Time of Reading	min./cm
20 min.	4.9
40 min.	6.6
Hour 1	6.0
80 min.	5.7
100 min.	6.2
Hour 2	6.4

TABLE 1
PERCOLATION TEST RESULTS

Percolation Hole #5B

Location: Refer to Site Plan

Soil Type: SILT, some sand, trace clay, trace gravel

Time of Reading	min./cm
20 min.	7.9
40 min.	8.5
Hour 1	8.3
80 min.	8.0
100 min.	8.3
Hour 2	8.0

Percolation Hole #6A

Location: Refer to Site Plan

Soil Type: SILT, some fine sand to sandy, some gravel

Time of Reading	min./cm
20 min.	5.0
40 min.	5.4
Hour 1	5.0
80 min.	5.3
100 min.	5.4

Percolation Hole #6B

Location: Refer to Site Plan

Soil Type: SILT, some fine sand to sandy, trace to some gravel

Time of Reading	min./cm
20 min.	4.4
40 min.	4.8
Hour 1	4.7
80 min.	4.9
100 min.	5.0
Hour 2	4.9

TABLE 1
PERCOLATION TEST RESULTS

Percolation Hole #7A

Location: Refer to Site Plan

Soil Type: Fine sandy SILT, trace clay, trace gravel

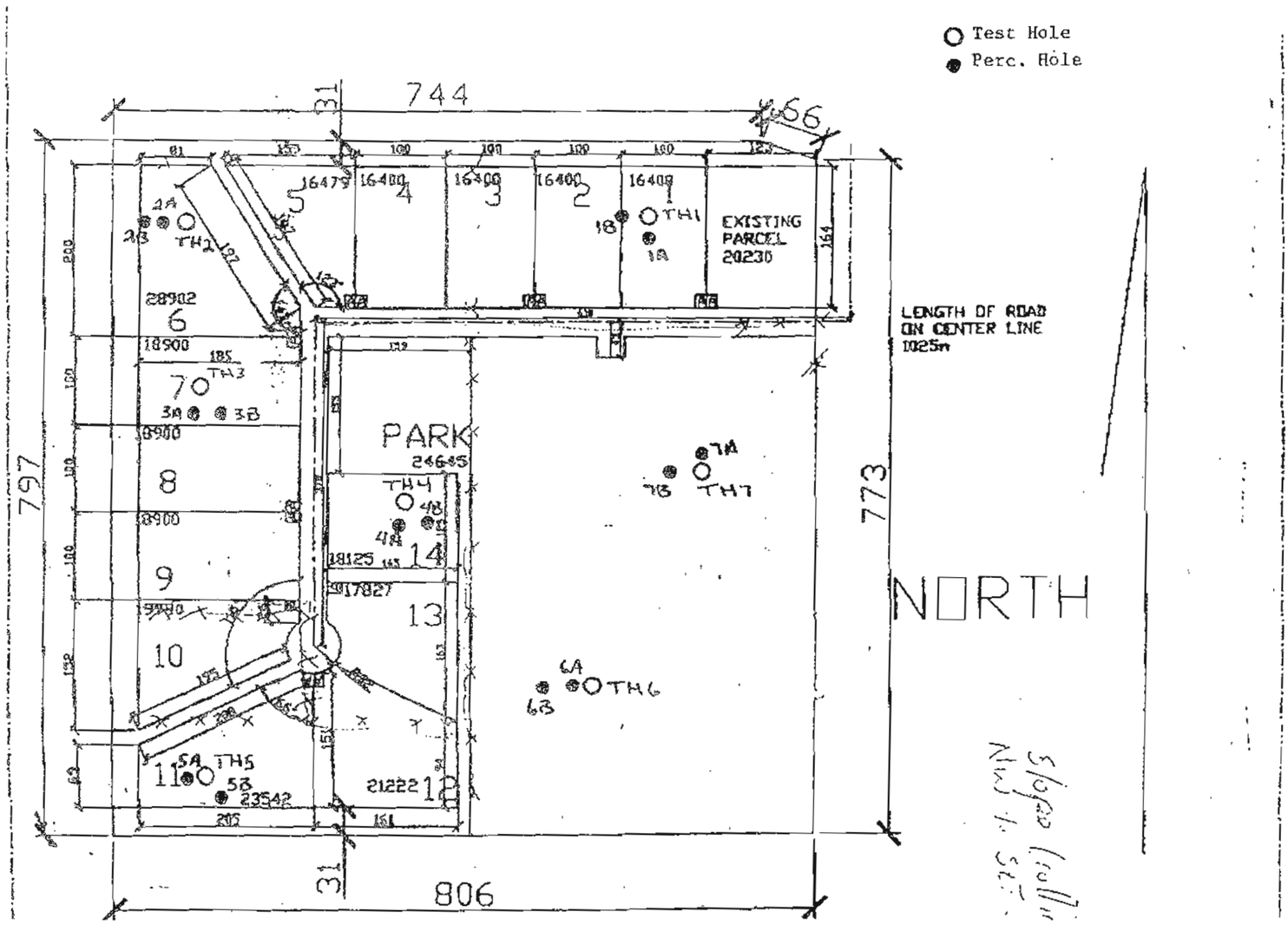
Time of Reading	min./cm
20 min.	2.2
40 min.	2.2
Hour 1	2.1
80 min.	2.1
100 min.	2.2

Percolation Hole #7B

Location: Refer to Site Plan

Soil Type: SILT, some fine sand, trace clay, trace gravel

Time of Reading	min./cm
20 min.	3.3
40 min.	3.1
Hour 1	3.2
80 min.	3.3
100 min.	3.2
Hour 2	3.2


Test Hole
Perc. Hole
744
31
66
797
773
806
31
EXISTING PARCEL 20230
LENGTH OF ROAD ON CENTER LINE 1025m
PARK
24645
NORTH
TH1
TH2
TH3
TH4
TH5
TH6
TH7
16479
16480
16490
16500
16400
28902
18900
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18125
17827
21222
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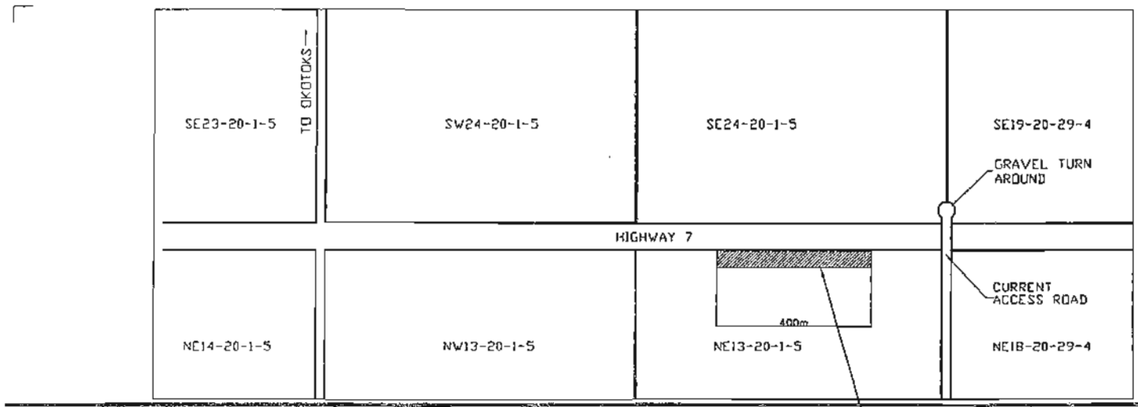
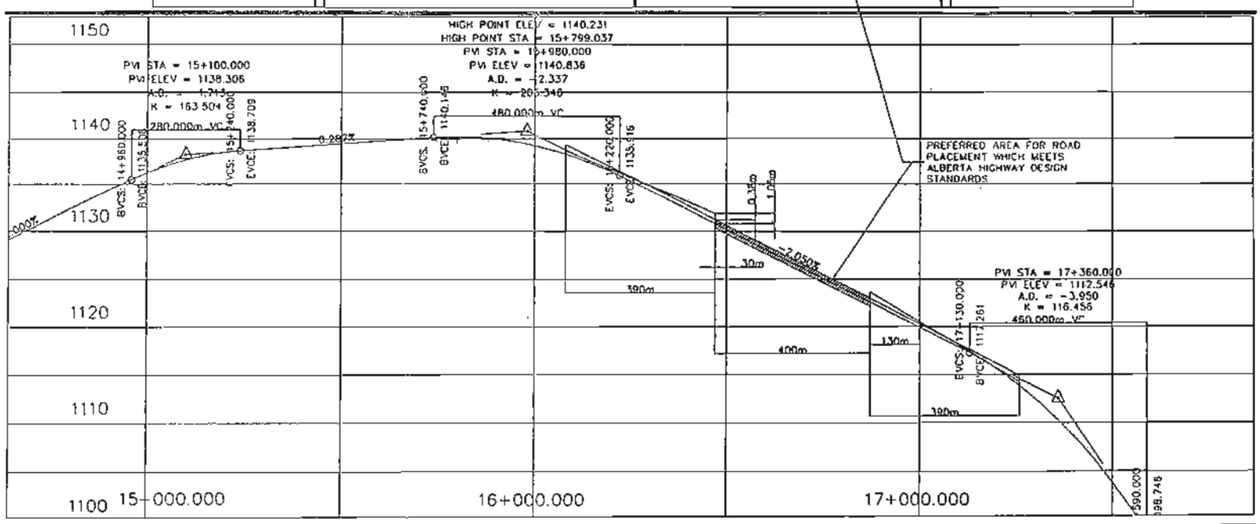
APPENDIX F
ACCESS SIGHT LINE DRAWING





5			
4			
3			
2			
1	PRELIMINARY	JUNE 00	
NO.	DESCRIPTION	DATE	

ISSUE DATES

PERMIT TO PRACTICE
IBI GROUP ARCHITECTS (ALBERTA) INCORPORATED
Signature
Date
PERMIT NUMBER: P 4714
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

5			
4			
3			
2			
1			
NO.	DATE	DESCRIPTION	BY APPROVED

REVISIONS

IBI GROUP
PLANNERS ENGINEERS

DATE	JUNE 2000
DESIGNED BY	A.J.E.
DRAWN BY	A.J.E.
CHECKED BY	J.C.K.
SCALE	H: 1:2000 V: 1:200
APPROVED	
IBI NO.	CD-7902
DRAWING NO.	7900-PRO
SHEET	1 of 1

HWY 7 ACCESS TO NE13-20-1-5
LOCKE ROAD SUBDIVISION