BYLAW 42/2000
(adopted June 22, 2000)

SCHEDULE 'A' FOR BYLAW 42/2000

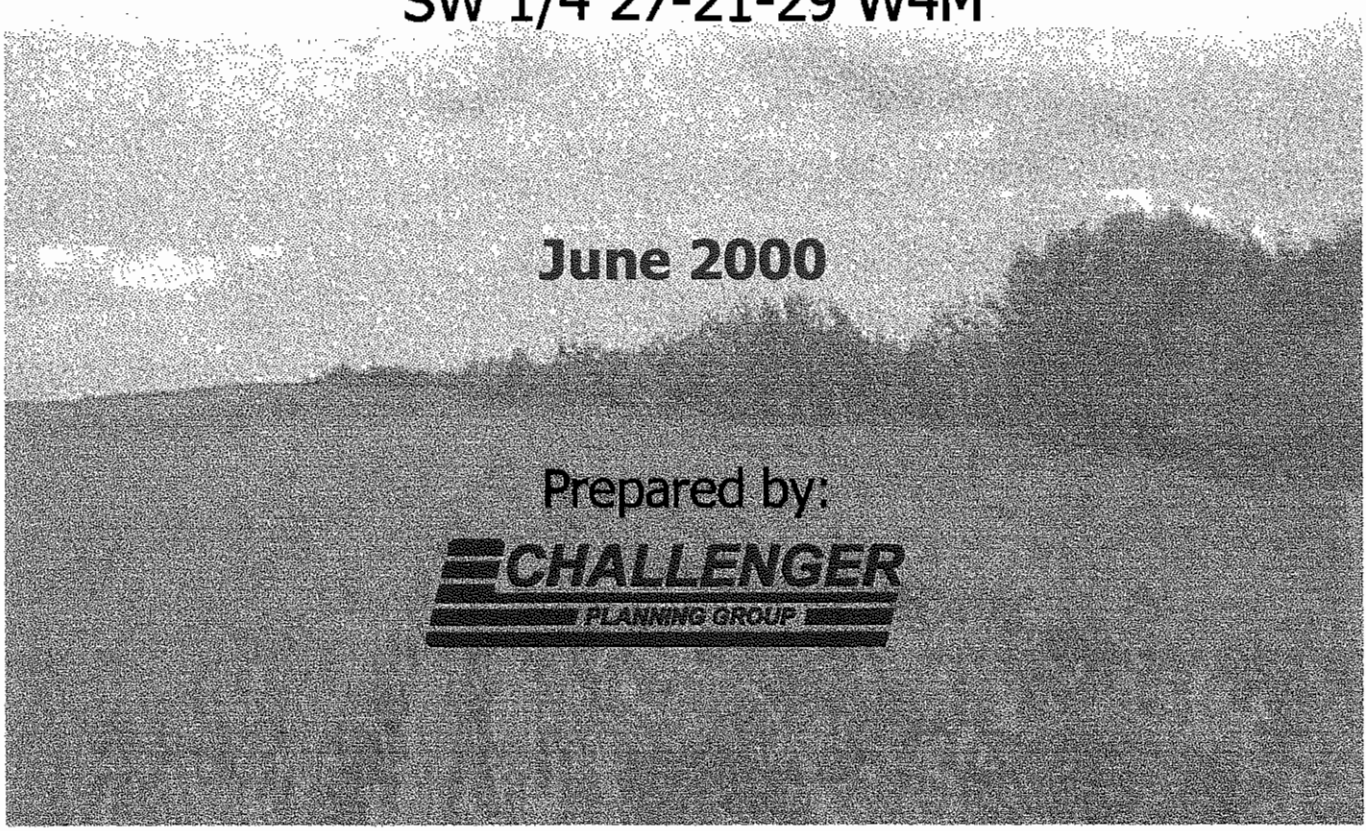
EDWARDS AREA STRUCTURE PLAN

"Norris Coulee Estates"

SW 1/4 27-21-29 W4M

and a Portion of

SW 1/4 27-21-29 W4M



June 2000

Prepared by:

CHALLENGER
PLANNING GROUP

BYLAW 42/2000

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 the149.56-acre portion of SW 27-21-29 W4 and the 56.02-acre portion of SE 27-21-29 W4;

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 "Edwards Area Structure Plan".

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

3. That the Edwards 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: April 13, 2000

Roy R. McLean
Reeve

Municipal Manager

SECOND READING: June 22, 2000

Roy R. McLean
Reeve

Municipal Manager

THIRD READING: June 22, 2000

Roy R. McLean
Reeve

Municipal Manager

PASSED IN OPEN COUNCIL assembled at the Town of High River in the Province of Alberta this 22nd day of June, 2000.

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1. INTRODUCTION

1.1 PURPOSE

This Area Structure Plan (ASP) has been prepared pursuant to the provisions of Section 633 of the Municipal Government Act and amendments thereto. It is intended to act as a guide to future subdivision and development in the SW ¼ 27 – 21 – 29 W4M and a portion of the SE ¼ 27 – 21 – 29 W4M. 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.

1.2 BACKGROUND TO THE AREA STRUCTURE PLAN

In 1997, there were two subdivisions completed in the South ½ 27 – 21- 29 W4M. Two 8.0+/- acre lots were subdivided under Plan 9712103 in 1997. Fifteen 4.0+/- lots were subdivided in 1999, under Plan 9911868. At that time, a Municipal Reserve (MR) of 16.0 acres was dedicated in the Southwest corner of the Southeast quarter of section 27.

Prior to the Developer purchasing the land, an easement was registered in 1989 over the SW ¼ 27 – 21- 29 W4M granting access to Block 1 Plan 8911910. In the NW ¼ 27 – 21- 29 W4M this easement runs along the northerly fifty feet of the westerly 1370 feet. At present the owner of Block 1, Plan 8911910 gains access off 32nd St. East and crosses over the balance of NW ¼ of 27 – 21 – 29 W4M. With the adoption of this Area Structure Plan accommodations have been made to provide this landowner with access off of an internal subdivision road in the Plan Area. A copy of the easement currently registered is provided as Appendix A.

1.3 APPROVAL PROCESS

An Area Structure Plan is identified in the Municipal Government Act as a Statutory Plan. As noted in Section 633 of the Act, the Council may by by-law adopt an Area Structure Plan. 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.

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.

1.4 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 landowner, Gary T. Edwards 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 Council of the M.D. of Foothills No. 31.

(g) " Plan Area " refers specifically to the lands within the SW ¼ 27 – 21 - 29 W4M and a portion of the SE ¼ 27 – 21 – 29 W4M as shown in Figure 2.

(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.

1.5 PUBLIC PARTICIPATION

Public participation was achieved through the direct contact by the Developer, with adjacent landowners on an individual basis. In this regard the adjacent landowners were made aware of the nature of the proposed development and the Developer was able to identify their specific concerns if any, and incorporate provisions within this Area Structure Plan to address those concerns. The public will also have the opportunity to further comment on the Area Structure Plan when the M.D. of Foothills No. 31 Council holds a public hearing pursuant to the provisions of the Municipal Government Act.

2. THE PLAN AREA

2.1 LOCATION/OWNERSHIP

The Plan Area is located 1.6 kilometers East of Highway 2, adjacent to the North side of Secondary Highway 552, as illustrated in Figure 1. The Plan Area is more specifically identified as part of the SW ¼ 27 – 21 – 29 W4M and part of the SE ¼ 27 – 21 – 29 W4M, containing 205.0 +/- acres, as shown in Figure 2. The land is owned by Gary T. Edwards, and the Certificates of Title are attached as Appendix B of this document.

2.2 DEFINITIONS OF THE PLAN AREA

a) Boundaries of the Plan Area

The Plan Area is bounded by Secondary Highway 522 to the South, and 32nd St. East to the West. The North boundary is established by the quarter section boundary of section 27, and to the East the boundary is Plan 9911868.

b) General Physical Description

The Plan Area generally slopes gradually from West to East. An intermittent drainage course runs from the Southwest corner to the Northeast corner. The area of the intermittent drainage course has been retained in a natural state and has not been cultivated. The majority of the existing trees and shrubs in the Plan Area are located in the areas of the intermittent drainage course.

3. PLAN GOALS AND OBJECTIVES

3.1 PLAN GOALS AND OBJECTIVES

a) To create an attractive rural development comprised of 34 lots plus a balance (in total 35 Country Residential lots) ranging from 3.8 to 6.4 +/- acres in size, a Municipal Reserve, an Environmental Reserve, a tree farm, and to maintain the natural features and vegetation of the area.

b) To provide an open space walkway system which will offer a range of recreational pursuits.

c) To ensure that the development conforms to the goals and objectives of the M.D. of Foothills No. 31 Municipal Development Plan and the Land Use By-law.

4. PLAN POLICIES

4.1 THE PLAN CONCEPT

As noted in the objectives, this Plan proposes a development that will be compatible with the existing adjacent Country Residential parcels and will complement the rural character of the area. Lots will range from 3.8 to 6.4 +/- acres in size, creating a very spacious living environment. Enhancing the spacious lots will be a walkway system, which will run throughout the Plan Area. The walkway system has been designed to connect with the existing and proposed Municipal Reserve, Environmental Reserve, and roads.

4.2 LAND USE COMPONENT

a) Country Residential

The land is currently designated as Agricultural District (A) under the MD of Foothills No. 31 Land Use By-Law. In order to proceed with a residential subdivision of 34 lots plus a balance (in total 35 Country Residential lots), the Plan Area must be redesignated to Country Residential District (CR). This development will comply with the provisions of the MD of Foothills No. 31 Municipal Development Plan and the Land Use By-Law.

b) Tree Farm

A small-scale tree farm operation will be located on Lot 52. The intent of the tree farm is to provide an area within the Plan Area for the growing of trees and shrubs that can ultimately be available to future lot owners. Since Lot 52 will carry a Country Residential District designation under the Land Use By-Law, the tree farm would be considered a discretionary use. Therefore, all applicable permits to allow the tree farm will be applied for at the appropriate time. At such a time as the tree farm is no longer feasible, this Area Structure Plan provides for the future break down of Lot 52 into four lots of 4.4 +/- acres each. The subdivision of the tree farm area into four lots will be included in Phase III of this development.

c) Phasing

As indicated in Figure 3, the area will be developed in t. following details how the phasing will take place:

Phase I — The development of lots 20 – 35, which would also in. the Municipal Reserve lots 18 and 19 and the Environmer. Reserve lots 50 and 51.

Phase II — The development of lots 36 – 49 inclusive and lot 52.

Phase III — This phase makes provisions for the future subdivision of lot 36 into two lots, and the future subdivision of the tree farm (lot 52) into four lots.

d) Density

As indicated in the Municipal Development Plan, a quarter section may contain a maximum density of 32 lots or one lot per five acres under a Country Residential designation. The Plan Area will have a maximum of 35 Country Residential lots, equating to a density of one lot per 5.8 +/- acres.

e) Impact on Adjacent Lands

As illustrated in Figure 1, there are a number of subdivisions to the North, West, South and East of the subject lands. The lands to South are a mix of Country Residential and small agricultural parcels. Specifically the parcels located in L.S.D 13 and 14 in the N.W 22-21-29 W4 have over the years experienced surface drainage problems. This Plan addresses that problem and makes provisions to enhance the existing intermittent drainage course. Therefore, this development will have a positive effect on these parcels by providing them with better drainage for their lands.

The quarter to the West of the Plan Area has been subdivided into smaller Country Residential parcels. At present 32nd St. East has an oiled surface, however, as indicated in Section 4.4 (b) this road will be paved up to the subdivision access point. Therefore, the landowners to the West will benefit from the improved road standard.

The lands to the East contained in Plan 991 1868 were developed by the same Developer and will ultimately form a part of this development.

Design factors such as internal roads, lot sizes, layout and walkways were taken into account to ensure that each development would complement the other. The existing lots to the East of the Plan Area were also designed in such a way as to allow for further development to take place on the Plan Area of this Area Structure Plan. The roadways from the existing development will be extended into the Plan Area and the existing development will provide additional access to the Plan Area. The walkway system will also be extended into the Plan Area, making the Municipal Reserve and Environmental Reserve accessible to the existing landowners to the East.

The lands to the North are small agricultural parcels, basically used for grazing of livestock. It is expected that there will not be a negative impact to these lands due to the configuration of the lots and the added buffer provided by the walkway system. Additionally, as described in 1.2 of this Plan, an internal subdivision road system has been designed to provide Block 1 Plan 8911910 to the North with access that will not require an easement.

In general, a second Municipal Reserve parcel is proposed as an extension or expansion to the existing reserve parcel for future school use. The walkway system can be accessed by the adjacent landowners and allows for many recreational pursuits such as horseback riding and walking. As illustrated in Figure 2, the walkways have been designed in such a way as to connect with the Environmental Reserve parcel. This design forms a logical and natural extension to the walkways. The Municipal Reserve land and walkway system is therefore a benefit to all lands in the proximity of this development.

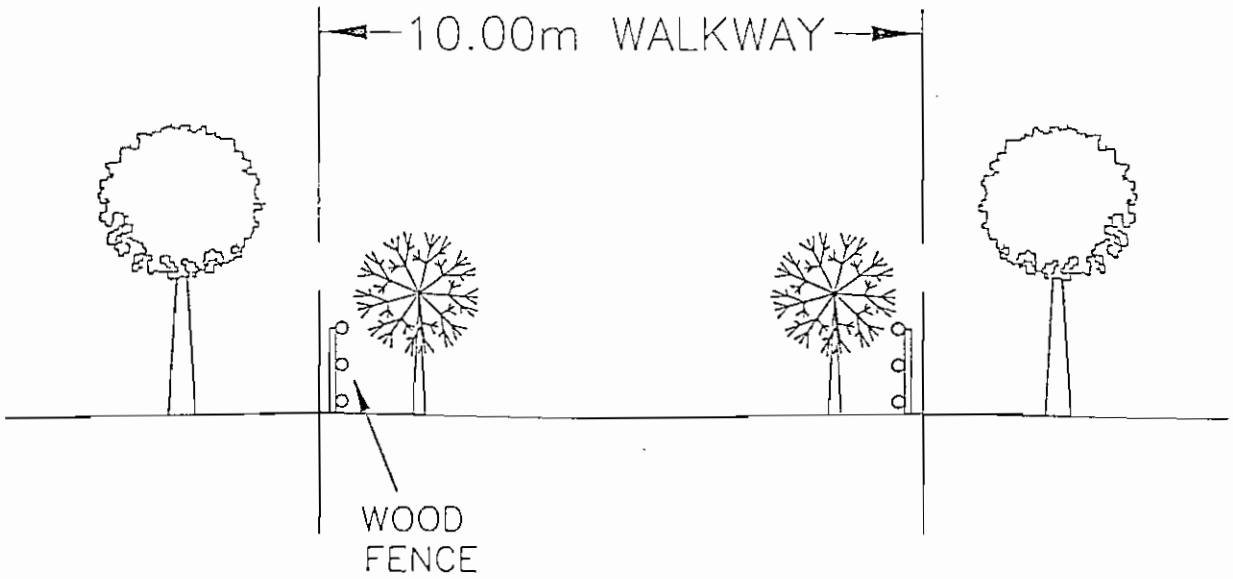
f) Walkway System

As noted earlier in this document, one of the goals of this development is to provide an open space walkway system to facilitate pedestrian and equestrian movements throughout the Plan Area. In keeping with this goal, a 10 metre (32.8ft) wide walkway system has been designed throughout the Plan Area. Figure 4 illustrates a cross section of the walkway system. In linking the internal road system, the Environmental Reserve and the Municipal Reserve lands the Plan Area provides for better and safer pedestrian and equestrian movement. Figure 4 shows a typical cross-section of the walkway system.

The walkway will be landscaped to ensure both a visual and recreational variation for the users. To achieve this, shrubs and trees will be strategically placed along the walkway system. The Developer will

provide rustic rail fencing of the walkway system, further enhancing the walkway system.

To ensure that the walkway system will not be a maintenance liability to the Municipality it is proposed that a Community Association be created, involving all landowners of the Plan Area, as well as the existing lots to the East. With the consent of Council such an association could maintain the walkway system.



WALKWAY DETAIL
N.T.S.

Scale: NTS

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FIGURE 4: WALKWAY CROSS SECTION

4.3 ENVIRONMENTAL CONSIDERATIONS

a) Groundwater Study

A preliminary groundwater study was undertaken by Groundwater Exploration & Research Ltd. in October 1999, to address the feasibility of finding sufficient volumes of groundwater to sustain an additional 36 lots in this area. A copy of this study is attached as Appendix C.

The data for this study covered a nine-section area surrounding Section 27. Utilizing available water well information from Environmental Protection's groundwater database. A total of 53 well records were available for review, including 9 well records from Section 27.

The water information provided by Groundwater Exploration & Research Ltd. shows that the water in the area would support 37 lots, which exceeds what we are proposing in this Area Structure Plan

b) Drainage Ditch Report

As requested by the M.D. of Foothills No. 31, Torchinsky Engineering Ltd. completed a report on the existing drainage ditch. This ditch is intended to drain the water from the adjacent lands through the Plan Area and into the intermittent drainage course, which eventually flows into the Bow River. The purpose of this report was to determine if the existing ditch was draining the area as intended.

Torchinsky Engineering Ltd. discovered that the existing ditch has silted in so that the water will not drain properly through the Plan Area. Torchinsky Engineering Ltd. has recommended changes that will allow the water to flow through the Plan Area as originally intended.

The Developer is prepared to modify the drainage ditch and will follow good engineering practices, based on the recommendations of Torchinsky Engineering Ltd. Additionally, any and all necessary approvals from Alberta Environment will be obtained prior to the Developer making any changes to overland flow related to this drainage ditch. The report completed by Torchinsky Engineering Ltd. is attached as Appendix D.

c) Agrologist Report

In November of 1996 3-D Reclamation Inc. was hired to assess the property's potential for arable agriculture for the S ½ 27 – 21 - 29 W4. The report, attached in Appendix E, determined the following:

> In conclusion, the November, 1996, site specific evaluation using the most up to date information (LCCAAA evaluation) places 35 acres of the S1/2 27-21-29W4 investigated into Class 3H, 46 acres into Class 3HT, 129 acres into Class 4M, 7 acres into Class 4PM, 27 acres into Class 5PM, 4 acres into Class 5W, 8 acres into Class 5DK, 44 acres into Class 6TW and 14 acres into Class 6WN.

Out of the 320 acres, 239 acres are of Class 4 or poorer soils. Sixteen acres of the class 3HT soils were dedicated Municipal Reserve in a previous subdivision. This Area Structure Plan adds an additional 15.8 +/- acres of Municipal Reserve to an existing Municipal Reserve, all of which is class 3HT soils, bringing the total Municipal Reserve on the half section to 31.8 +/- acres, as shown in Figure 5. The remaining 14.2 +/- acres of class 3HT soils and 3H soils form an isolated pocket of land, which does not lend itself to being a viable farming operation.

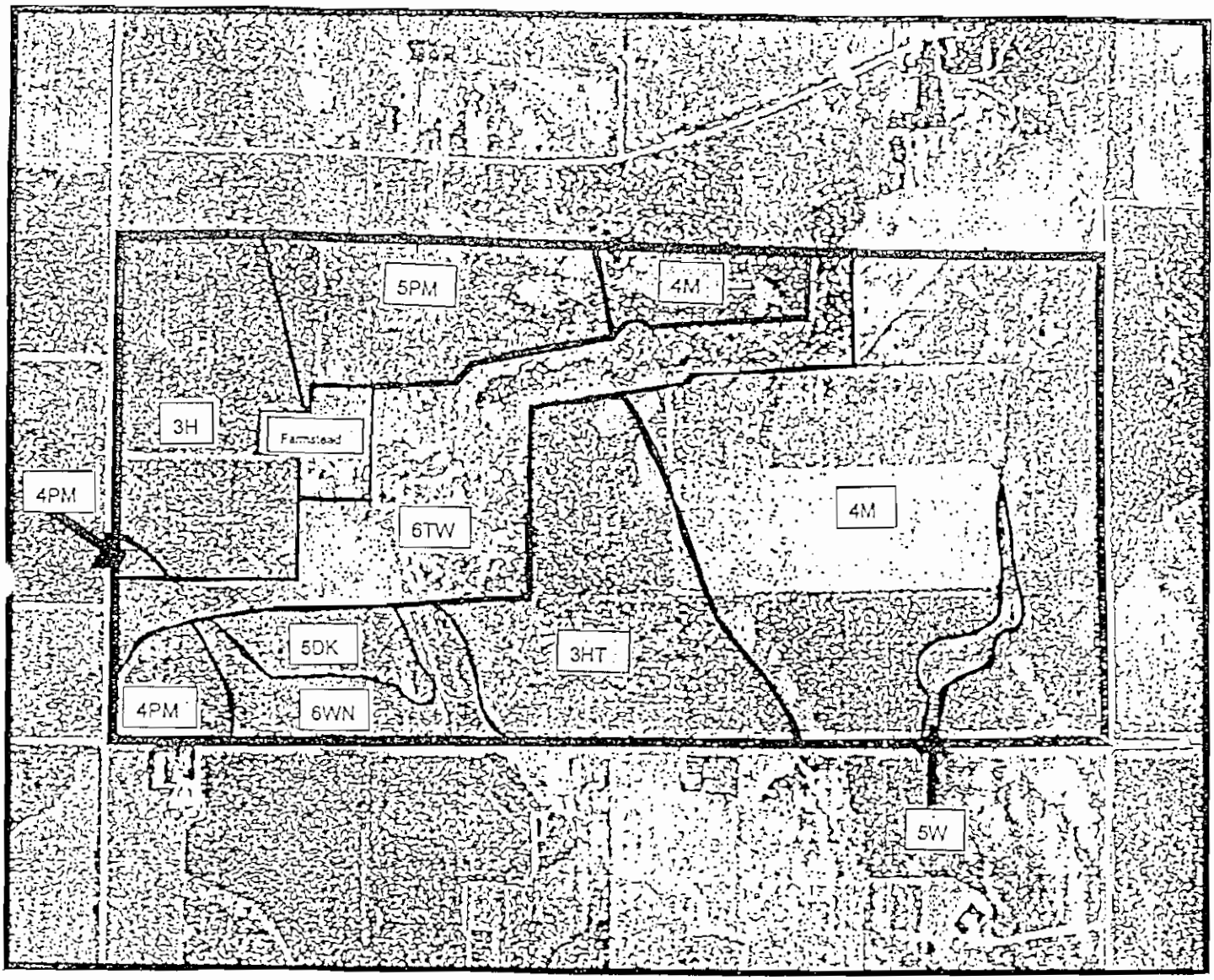


FIGURE 5: SITE SPECIFIC CLI RATING

4.4 RESERVE LANDS

a) Environmental Reserve

A 12.0 +/- acres Environmental Reserve has been created, which will preserve the existing natural features including the intermittent drainage course. The walkway system that has been incorporated into the design of this development connects with the intermittent drainage.

b) Municipal Reserve

In the preparation of the subdivision on the SE of 27 – 21 – 29 W4M, discussions between the Developer and the Municipal Council with regard to the future needs for a large school site were reviewed. Ultimately, the Developer dedicated a large Municipal Reserve parcel, which could be further expanded if and when the SW quarter was developed. This Area Structure Plan reflects these discussions and provides for the expansion of the Municipal Reserve parcel.

As indicated in Table 1, the Developer has set aside 31.8 +/- acres of Municipal Reserve on the southern side of the Plan Area (See Figure 2). The size of the Municipal Reserve facilitates the development of a future school site. The existing roadway system provides good access to the Municipal Reserve parcel. If additional access to the Municipal Reserve is required, an alternate route is provided via the internal road system. Pedestrian traffic from within the development will be able to obtain access through an extensive walkway system that has been incorporated to link all lots to the Municipal Reserve.

TABLE 1 – AREA TABLE

Country Residential (CR)	133.98 acres
Municipal Reserve (MR)	31.80 acres
Environmental Reserve (ER)	16.36 acres
Roads	20.73 acres
Pathways	2.20 acres
TOTAL AREA	**205.07 acres**

4.5 TRANSPORTATION

a) Internal Road System

The Developer will construct a high quality internal road system to the Municipal District of Foothills No. 31 Road Construction Standards. The internal road system has two access locations, one access is to the East of the development, through an existing development which gains access off of 48th St. East. The second access is off of 32 St. East to the West of the development. The speed limit on the internal road will be set at 50km per hour. A curving roadway has been designed throughout the Plan Area to encourage vehicle traffic to travel at this lower speed. As mentioned earlier in this Area Structure Plan, the internal road system will also provide access to Block 1 Plan 8911910 to the North.

b) External Road System

Access to the Plan Area will be via Secondary Highway 552, however, vehicular traffic will not access directly onto the 552. One access point is located off of 32 St. East to the West, and the other access will be through an existing development, which gains access off of 48th St. East. Currently 32nd St. East has an oiled surface, which the Developer will upgrade to a paved surface. Access off 48th St. East will also be a paved surface. All access points offer good sight distances.

The most current traffic volume information provided by Alberta Infrastructure indicates that the Average Annual Daily Traffic count for 1998 was 1980 vehicles per day for the Secondary Highway 552, East of the 2A. According to the Transportation Association of Canada the current standards for a Rural Collector Road, such as the Secondary Highway 552, should typically be less than 5000 vehicle trips per day. This would indicate that this development would not adversely impact on the existing transportation network.

In addition to the above information, a report prepared in 1998 by Stanley Consulting Group Ltd., dealt in part with the upgrading of the Highway 2/Highway 2A Interchange to accommodate the projected 20 year traffic volumes. The report made a number of recommendations to both upgrade and modify the Interchange. In this regard any such upgrading will only have a positive affect on the existing transportation network.

4.6 SERVICING

a) Water Supply

The lots of the Plan Area will be serviced by wells, either on each lot or by communal system. All water supply will be subject to engineers reports that meet or exceed the Water Act and all applicable provincial legislation.

b) Sewage Disposal

All sewage will be handled on site via a septic tank and field.

c) Stormwater Management

The lands to the North of the Environmental Reserve generally slope from the West to the East. This specific area also slopes slightly to the South, with surface water flowing into the intermittent drainage course. An upgrade of the existing drainage ditch will facilitate surface water drainage through the area. All surface drainage will be designed by an engineer in conjunction with the engineering of the road system. The current topography is depicted in Figure 6.

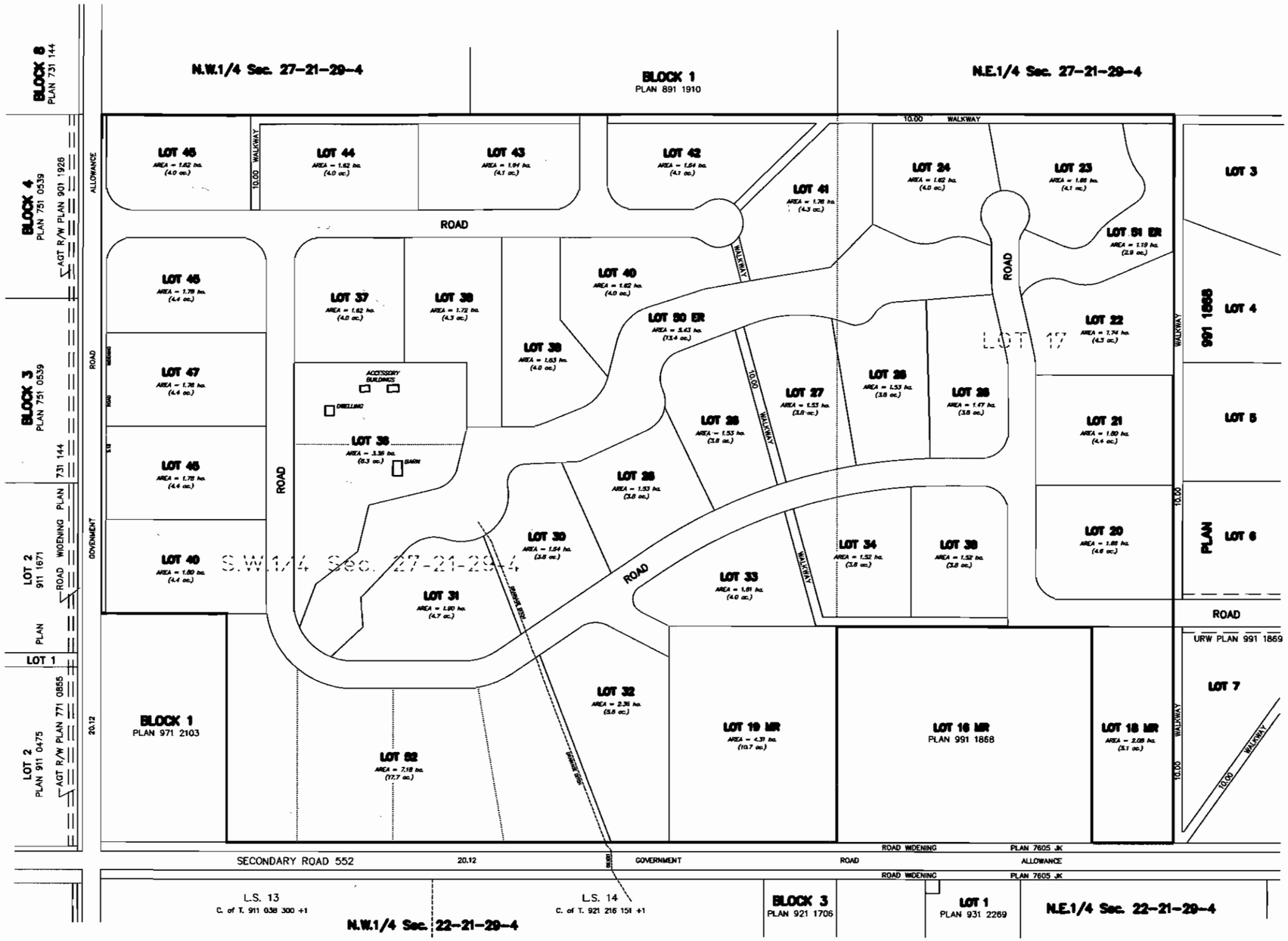
5.0 PLAN ADOPTION

5.1 PLAN IMPLEMETATION

The Area Structure Plan is in keeping with Country Residential subdivision standards within the M.D. of Foothills No. 31. When the Area Structure Plan is adopted by Council in accordance with the provisions of the Municipal Government Act it becomes a Statutory Plan of the M.D. of Foothills No. 31.

Future Land Use By-law Amendments will be required to redesignate the subject parcels to the appropriate Land Use District before the parcels can be subdivided.

APPENDIX A
EASEMENT



M.D. OF FOOTHILLS No. 31
ALBERTA

AREA STRUCTURE PLAN
WITHIN A PORTION OF THE
S.1/2 Sec. 27, Twp. 21, Rge. 29, W.4M.

NOT TO SCALE

NOTES
1. Distances are in metres and decimals thereof.
2. Subject area shown bounded thus ——— and contains 82.99 ha.
3. All roads are 30.0 metres in perpendicular width unless shown otherwise.
4. All lanes are 10.0 metres in perpendicular width unless shown otherwise.
5. All corner cuts are a 29.0 metres radius unless shown otherwise.

TABLE OF ABBREVIATIONS

ac.	– acre	Rge.	– range
E.	– East	S	– South
ER	– Environmental Reserve	Sec.	– section
ha.	– hectare	Twp.	– Township
M.	– meridian	W	– West
MR	– Municipal Reserve		
N	– North		

AREA TABLE

COUNTRY RESIDENTIAL (CR)	= 53.09 ha.
MUNICIPAL RESERVE (MR)	= 12.87 ha.
ENVIRONMENTAL RESERVE (ER)	= 6.61 ha.
ROADS	= 9.00 ha.
WALKWAYS	= 1.42 ha.
TOTAL AREA	= 82.99 ha.
TOTAL DEVELOPABLE LANDS	= 76.37 ha.
TOTAL DEVELOPABLE LANDS INCLUDING ALL SUBDIVISIONS AND ROAD PLANS WITHIN THE S.E.1/4 27, AND S.W.1/4 27	= 122.64 ha.
% OF MR/DEVELOPABLE AREA	= 10.5 %

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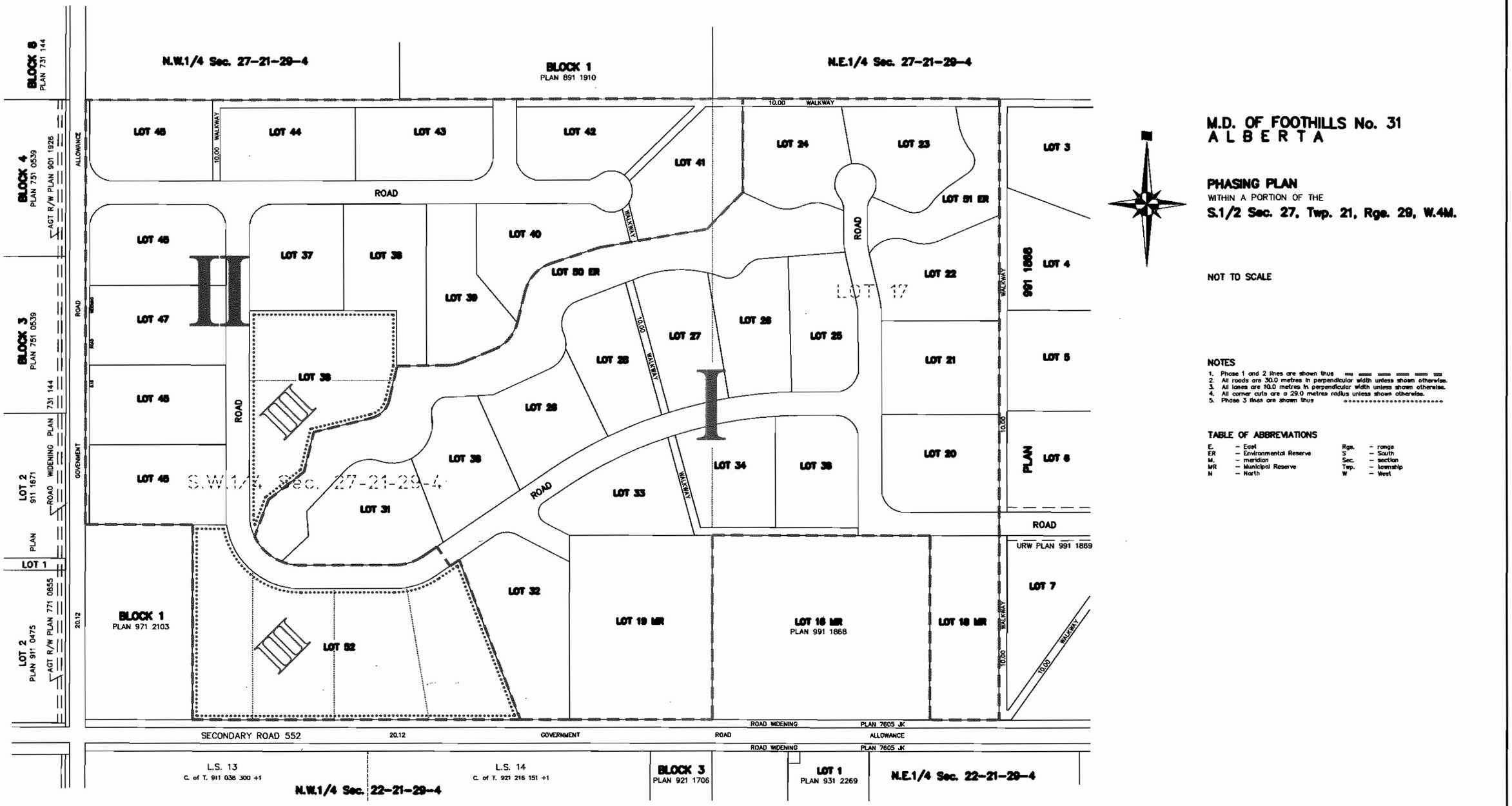
FIGURE 2: PLAN AREA



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

PHASING PLAN

WITHIN A PORTION OF THE

S.1/2 Sec. 27, Twp. 21, Rge. 29, W.4M.

NOT TO SCALE

NOTES

1. Phase 1 and 2 lines are shown thus
2. All roads are 30.0 metres in perpendicular width unless shown otherwise.
3. All lanes are 10.0 metres in perpendicular width unless shown otherwise.
4. All corner cuts are a 29.0 metres radius unless shown otherwise.
5. Phase 3 lines are shown thus

TABLE OF ABBREVIATIONS

E.	– East	Rge.	– range
ER	– Environmental Reserve	S	– South
M.	– meridian	Sec.	– section
MR	– Municipal Reserve	Twp.	– township
N	– North	W	– West

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FIGURE 3: PHASING PLAN

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FAX (780) 424-3837	FAX (403) 253-1985	FAX (306) 545-5008
E-MAIL edmonton@chalsurv.com	E-MAIL chalsurv@cadvision.com	E-MAIL regina@chalsurv.com

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Loc Map

1163

EASEMENT AND RIGHT-OF-WAY AGREEMENT

THIS AGREEMENT made as of the 1st day of December 1989.

B E T W E E N:

CHARLES LESLIE NORRIS, of R.R.1, De Winton, Alberta (Farmer)

(hereinafter called the "GRANTOR")

OF THE FIRST PART

- and -

KENNETH ALEXANDER HUGHES, of 711 - 71st Avenue South West, Calgary, Alberta (Broker)

(hereinafter called the "GRANTEE")

OF THE SECOND PART

- and -

THE MUNICIPAL DISTRICT OF FOOTHILLS NO. 31, a municipal corporation, with an Office at High River, in the Province of Alberta

(hereinafter called the "MUNICIPALITY")

OF THE THIRD PART

WHEREAS the Grantor is the Registered Owner in fee simple of lands and premises situate in the Province of Alberta, more particularly described as:

Lands Subject to the Easement.

THE SOUTH WEST QUARTER OF SECTION TWENTY SEVEN (27) IN TOWNSHIP TWENTY-ONE (21), RANGE TWENTY NINE (29), WEST OF THE FOURTH MERIDIAN, CONTAINING 64.7 HECTARES (160) ACRES MORE OR LESS.

EXCEPTING THEREOUT, ROAD WIDENING ON PLAN 7605 J.K. CONTAINING 0.806 HECTARES (1.99) ACRES MORE OR LESS

EXCEPTING THEREOUT ALL MINES AND MINERALS

(Hereinafter called tha "Servient Tenement")

AND WHEREAS the Grantee is the Registered Owner in fee simple of those lands and premises situate in the Province of Alberta, more particu-

larly known and described as:

BLOCK 1 PLAN 8911910

Lands extended by the Easement

containing 16.16 hectares,

(Hereinafter called the "Dominant Tenement")

AND WHEREAS the Dominant Tenant does not have legal access to an improved municipal road or highway;

AND WHEREAS Land Use Bylaw No. 566, and amendments thereto, passed by the Municipality imposes restrictions upon development of lands which do not have legal access to an improved municipal road or highway;

AND WHEREAS the Municipality has been added as a party hereto so as to ensure that the Easement to be granted hereunder will remain in force for so long as the Dominant Tenement does not have legal access to an improved municipal road or highway;

AND WHEREAS there is a house and out buildings situate on the Dominant Tenement;

AND WHEREAS the Grantor is desirous of granting an Easement and Right-of-Way to the Grantee, the Grantee's personal representatives, successors and assigns and their respective agents, employees, servants, invitees, licencees, and others, along, through and over the Servient Tenement, being described as:

Lands of the Servient Tenement comprising the Right-of- Way

THE NORTHERLY FIFTY (50) FEET THROUGHOUT OF THE WEST THIRTEEN HUNDRED & SEVENTY (1370) FEET, BOTH IN PERPENDICULAR WIDTH THROUGHOUT OF THE SOUTH WEST QUARTER OF SECTION 27, TOWNSHIP 21, RANGE 29, WEST OF THE 4TH MERIDIAN, CONTAINING 1.6 OF AN ACRE MORE OR LESS.

EXCEPTING THEREOUT ALL MINES AND MINERALS.

NOW THIS AGREEMENT WITNESSETH that in consideration of the sum FIVE THOUSAND ($5,000.00) Dollars, the receipt of which and the sufficiency of which is hereby acknowledged, the Grantor and the Grantee agree as follows:

1. The Grantor doth hereby grant, convey and confirm to the Grantee the Grantee's personal representatives, successors and assigns, an Easement and Right-of-Way in perpetuity or for so long as the same shall be required for the purposes hereinafter set out, along through and over the Servient Tenement for the purposes of permitting the assigns and their and each of their respective agents, employees, servants, invitees and licencees and all other persons authorized by the Grantee to enter upon, over or across the Serviant Tenement, together with machinery, including farm and construction equipment and machinery, motor vehicles, livestock domestic, exotic and all other animals, for the purpose of ingress and egress to and from the Dominant Tenement.

2. The Easement and Right-of-Way hereinbefore granted is made with the intent that the burden of the said Easement and Right-of-Way shall run with and bind the Servient Tenement and will be for the sole benefit and use of the Grantee and successors in title to the Dominant Tenement from time to time.

3. The parties hereto agree that the Easement and Right-of-Way herein granted is subject to the following conditions, provisos and obligations:

a) The owner of the property which is the Dominant Tenement will, in exercising his rights hereunder, do so in a careful and prudent manner and will cause or do as little damage and inconvenience to the owner and the occupier, if any, of the property which is the Servient Tenement, as is possible, and the ground upon which any excavation or work shall be undertaken in connection therewith, shall be restored to its former condition;

b) The owner from time to time of the property which is the Dominant Tenement, will indemnify and save harmless, the owner from time to time of the property which is the Servient Tenement in respect of this Easement and Right-of-Way from and against all claims, damages, debts, suits, dues, actions, liabilities, and causes of action, costs or sums of money whatsoever that the owner of the Servient Tenement may suffer or be put to by reason of anything done by the owner of the Dominant Tenement in the exercise of any one or more rights and privileges hereby granted.

c) The Easement hereby granted shall not be extinguished in the event that title to or ownership of the Dominant and Servient Tenements, or any adjoining portion of either of them shall be vested in the same person. Further, and in any event, if any such extinguishment shall occur, and title to the Dominant and Servient Tenements or adjoining portions thereof shall thereafter be divested from such common ownership, then and in such event the successors to and in respect of the Easement and Right-of-Way hereby granted shall thereupon once again be entitled to the benefits thereof as created under and by virtue of this Easement and Right-of-Way.

4. This Agreement and the Easement hereby granted shall not be amended, varied or discharged from the titles to the Dominant Tenement or the Servient Tenement or any portion of either of them without the consent in writing of the Municipality.

5. This Easement and Right-of-Way and the covenants herein contained are and shall be deemed to be covenants running with the land and shall be binding upon and enure to the benefit of the Grantee and the Grantee's r .pective successors to title only while and to the extent that such party shall be registered as owner of the Dominant Tenement or portion thereof from time to time.

6. Where required by the context hereunder, the singular shall include the plural and the masculine gender or neuter gender shall include either the feminine gender or the masculine gender as the case may be, and vice-versa. Should the Grantor or Grantee of the rights of this Easement and Right-of-Way hereby conferred and at any time and from time to time comprise two or more persons, each such person and not one for the other or others, shall be jointly and severally bound with the other or others, for the due performance of the obligations of the Grantor or Grantee of such rights.

IN WITNESS WHEREOF the Grantor and the Grantee have hereunto affixed their respective hands and seals on the date and year first above written.

SIGNED, SEALED AND DELIVERED in the presence of:

______________________ C. L. Norris
Witness to signature of the Grantor

____
Witness to signature of the Grantee

MUNICIPAL DISTRICT OF FOOTHILLS NO. 31

Per: ______________________
Reeve

Per: ______________________
Secretary-Treasurer

A F F I D A V I T O F E X E C U T I O N

C A N A D A)
PROVINCE OF ALBERTA)
T O W I T)

I, JOHN A. S MACDONALD of the City of Calgary in the Province of Alberta Lawyer
Occupation

MAKE OATH AND SAY:

1. THAT I was personally present and did see CHARLES LESLIE NORRIS, named in the within Instrument, who is personally known to me to be the preson named therein, duly sign and execute the same for the purposes named therein.

2. THAT the same was executed at Calgary, in the Province of Alberta, and that I am the subscribing witness thereto.

3. THAT I know the said CHARLES LESLIE NORRIS, and he is in my belief, of the full age of eighteen years.

SWORN BEFORE ME, at the City)
of Calgary, in the Province)
of Alberta, this 15 day)
of December 1989)

M E Norris

A Commissioner for Oaths
in and for the Province of Alberta

MARJORIE E. NORRIS
A Commissioner for Oaths
in and for the Province of Alberta
My commission expires May 19, 1992

AFFIDAVIT OF EXECUTION

CANADA)
PROVINCE OF ALBERTA)
TO WIT)

I JOHN A. S. McDONALD of the City of Calgary in the Province of Alberta Lawyer
Occupation

MAKE OATH AND SAY:

1. THAT I was personally present and did see KENNETH ALEXANDER HUGHES named in the within Instrument, who is personally known to me to be the preson named therein, duly sign and execute the same for the purpoaes named therein.

2. THAT the same was executed at Calgary, in the Province of Alberta, and that I am the subscribing witness thereto.

3. THAT I know the said KENNETH ALEXANDER HUGHES, and he is in my belief, of the full age of eighteen years.

SWORN BEFORE ME, at the City)
of Calgary, in the Province)
of Alberta, this 1st day)
of December 1989)

M. A. Norris

A Commissioner for Oaths
in and for the Province of Alberta

MARJORIE E. NORRIS
A Commissioner for Oaths
in and for the Province of Alberta
My commission expires May 19, 1991

D O W E R A F F I D A V I T

C A N A D A)
PROVINCE OF ALBERTA)
T O W I T)

I, CHARLES LESLIE NORRIS, of R. R. 1 De Winton, in the Province of Alberta (Farmer) MAKE OATH AND SAY:

1. THAT I am the Grantor named in the within instrument;

2. THAT I am not married;

SWORN BEFORE ME at the City of)
Calgary, in the Province of)
Alberta, this 1st day of)
December A.D. 1989)

C. L. Norris
CHARLES LESLIE NORRIS, Grantor

A Commissioner for Oaths
in and for the Province of Alberta
JOHN A. S. McDONALD, Q.C.

891264711 REGISTERED 1989 12 13
EASE - EASEMENT
DOC 6 OF 8 DRR#: 1771346 ADR/VJOOSE
LINC/S: 0012163929 0012165487

Easement over SW 1/4. 27-21-29-4.
for benefit of Blk 1 Plan 8911910 F.S.
(Portion described)

DATED ____________________

MEMORANDUM OF AGREEMENT made as of the
day of 1989

BETWEEN:

CHARLES LESLIE NORRIS, of R.R.1.
DeWinton, Alberta (Farmer)

(hereinafter called the "GRANTOR")

- and -

KENNETH ALEXANDER HUGHES, of 711-71st
Avenue S.W., Calgary, Alberta (Broker)

(hereinafter called the "GRANTEE")

- and -

the M.D. of Foothills No. 31
hereinafter called the "MUNICIPALITY"

GRANT OF RIGHT-OF-WAY

EASE 6-

McDONALD, PLOTKINS, ANDERSON & COMPANY
Barristers and Solicitors
800, 640 - 8th Avenue S.W.
Calgary, Alberta
T2P 1G7

File: 86-7208 JM

APPENDIX B
CERTIFICATE OF TITLE

REPORT ID: GSCR1240
DESTINATION: PC0110:KC
REQUEST ID: 681864
CUST. REF.: 9802

LRIS GATEWAY SYSTEM
LAND TITLE SEARCH
SOUTH ALBERTA LAND REGISTRATION DISTRICT
R 2.2

DATE: 1999-10-19
TIME: 09:29:43
PAGE: 1

JEST DESCRIPTION: LT: PBL=9911868- -17, Rights=S

S

TITLE NUMBER
991 166 191 +16

LINC SHORT LEGAL
0027 978 493 9911868;;17

LEGAL DESCRIPTION
PLAN 9911868
LOT 17
EXCEPTING THEREOUT ALL MINES AND MINERALS
AREA: 22.67 HECTARES (56.02 ACRES) MORE OR LESS

A.T.S. REFERENCE: 4;29;21;27;SE

ESTATE: FEE SIMPLE

MUNICIPALITY: MUNICIPAL DISTRICT OF FOOTHILLS NO. 31

D.C.T. ISSUED: NO

REFERENCE NUMBER: 971 324 877 +2

REGISTERED OWNER(S)

REGISTRATION	DATE(Y-M-D)	DOCUMENT TYPE	VALUE	CONSIDERATION
991 166 191	1999-06-15	SUBDIVISION PLAN		

OWNERS

GARY T EDWARDS
OF BOX 16, SITE 4, RR 1
DEWINTON
ALBERTA T0L0X0

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (Y-M-D)	PARTICULARS
971 016 550	1997-01-16	MORTGAGE MORTGAGEE - 539889 ALBERTA LTD.. 31 MIDLAKE GREEN SE CALGARY ALBERTA T2X1L6 ORIGINAL PRINCIPAL AMOUNT: $625,000
023 846	1997-01-23	CAVEAT RE : OPTION TO PURCHASE CAVEATOR - 539889 ALBERTA LTD.. C/O MERCHANT LAW GROUP 1120, 635-8 AVE SW CALGARY ALBERTA T2P3M3 AGENT - GARTH S BAILEY
971 230 722	1997-08-09	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.
991 166 162	1999-06-15	CAVEAT RE : DEVELOPMENT AGREEMENT PURSUANT TO MUNICIPAL GOVERNMENT ACT

continued...

CAVEATOR - THE MUNICIPAL DISTRICT OF FOOTHILLS NO. 31.
BOX 5605
HIGH RIVER
ALBERTA T1M1M7

*** END OF TITLE - 991 166 191 +16 TOTAL INSTRUMENTS: 4 ***

*** END OF REPORT ***

REPORT ID: GSCR1240
DESTINATION: FC0110:KC
REQUEST ID: 681863
CUST. REF.: 9902

LRIS GATEWAY SYSTEM
LAND TITLE SEARCH
SOUTH ALBERTA LAND REGISTRATION DISTRICT
R 2.2

DATE: 1999-10-19
TIME: 09:26:42
PAGE: 1

QUEST DESCRIPTION: LT: ATS-4-29-021-27-SW, Rights-S

S

TITLE NUMBER
971 324 877 +3

LINC SHORT LEGAL
0027 236 033 4;29;21;27;SW

LEGAL DESCRIPTION
MERIDIAN 4 RANGE 29 TOWNSHIP 21
SECTION 27
QUARTER SOUTH WEST
CONTAINING 64.7 HECTARES (160 ACRES) MORE OR LESS
EXCEPTING THEREOUT:

PLAN	NUMBER	HECTARES	(ACRES)	MORE OR LESS
ROAD	7605JK	0.805	1.99	
SUBDIVISION	9712103	3.42	8.45	

EXCEPTING THEREOUT ALL MINES AND MINERALS

ESTATE: FEE SIMPLE

MUNICIPALITY: MUNICIPAL DISTRICT OF FOOTHILLS NO. 31

D.C.T. ISSUED: NO

REFERENCE NUMBER: 971 016 549 +1

REGISTERED OWNER(S)

REGISTRATION	DATE(Y-M-D)	DOCUMENT TYPE	VALUE	CONSIDERATION
971 324 877	1997-10-29	SUBDIVISION PLAN		

OWNERS

GARY T EDWARDS
OF BOX 16, SITE 4, RR 1
DEWINTON
ALBERTA T0L0X0

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (Y-M-D)	PARTICULARS
731 044 617	1973-08-20	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. "20 FT. STRIP"
891 264 711	1989-12-13	EASEMENT OVER SW 27-21-29-4 FOR BENEFIT OF BLOCK 1 PLAN 8911910 (PORTION DESCRIBED IN INSTRUMENT)
941 041 662	1994-02-16	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. PORTION AS DESCRIBED
971 016 550	1997-01-16	MORTGAGE MORTGAGEE - 539889 ALBERTA LTD.. 31 MIDLAKE GREEN SE CALGARY ALBERTA T2X1L6 ORIGINAL PRINCIPAL AMOUNT: $625,000

continued...

023 846	1997-01-23	CAVEAT RE : OPTION TO PURCHASE CAVEATOR - 539389 ALBERTA LTD.. C/O MERCHANT LAW GROUP 1120, 635-8 AVE SW CALGARY ALBERTA T2P3M3 AGENT - GARTH S BAILEY
971 324 876	1997-10-29	CAVEAT RE : ROADWAY CAVEATOR - THE MUNICIPAL DISTRICT OF FOOTHILLS NO. 31. BOX 5605 HIGH RIVER ALBERTA T1V1M7 AGENT - WILLIAM J ROBINSON
981 319 552	1998-10-15	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.

*** END OF TITLE - 971 324 877 +3 TOTAL INSTRUMENTS: 7 ***

*** END OF REPORT ***

APPENDIX C
GROUNDWATER STUDY

#9982

Groundwater Supply Feasibility
Edwards Property: Area Structure Plan
SW-27-21-29-W4M & a Portion of SE-27

Submitted to:

Challenger Surveys & Services Ltd

Prepared by:

Groundwater Exploration & Research Ltd
October 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

October 18, 1999
File No 9982

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

Attention: Mr. Marcello Battilana:

Dear Sir:

RE: Edwards Property: SW-27-21-29-W4M and a portion of SE-27
Area Structure Plan-Groundwater Feasibility Assessment

Enclosed find our report which addresses the groundwater feasibility in the immediate area of the Edwards property at SW-27-21-29-W4M and a portion of SE-27, in the Municipal District of Foothills.

Background Information

A 32 lot subdivision, each lot approximately 1.62 hectares in size, is being proposed for the Edwards property located southeast of the Hamlet of DeWinton and east of the Okotoks Overpass on Secondary Road SR 552. Extensive acreage subdivision development exists to the west, with a smaller density to the south and southeast of SW-27-21-29-W4M [see enclosed portion of the MD land ownership map].

In accordance with the Municipal District of Foothills 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 an additional 32 lots in the SW-27-21-29-W4M and a portion of SE-27.

Geomorphic/Geologic Setting

Much of the land in the area of SW-27-21-29 is characterized by a flat to gently rolling geomorphology [Dalemead sheet 82 I/13; 1:50,000 scale] with deranged drainage [numerous scattered sloughs that have no outflow]. drainage channel cuts the property in a southwest to northeast direction. The drainage source for this tributary ,which drains into the Bow River system, is the upland area to the southwest of the property. The surface of the land slopes from southwest to northeast with an elevation difference of about 30 meters across the site. Much of the SW-27 quarter occupies a fairly level terrace between two sideslope areas.

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.

Ozoray & Lytviak [1974: Hydrogeology of the Gleichen area, Alberta; Alberta Research Council, Report 74-9] maps the area as having a groundwater potential of 32.7 to 163.6 m^3/day [5-25 igpm]. The regional groundwater flow is northward toward the Bow River drainage basin.

The surficial geology of the site has been mapped as undulating to hummocky, fine sand representing a lacustrine traction load sediment. The west portion of the property consists of a silt till of superglacial mudflow origin overlying the Porcupine Hills Formation [Moran: 1986; Surficial geology of the Calgary Urban area; Alberta Research Council].

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 SW-27 and a portion of SE-27; and the surrounding 8 quarter sections of land was undertaken utilizing available information from Alberta Environmental Protection's groundwater database file. A total of 53 well records were available for review, including 9 well records from Section 27. A summary of available water well information is summarized in Table 1, appended to this report.

[1] Well depths vary significantly from 24 feet to 280 feet over the nine quarter section with the maximum range of 55 feet to 150 feet being observed in section 27.

[2] The depth of the completion intervals suggest that the water bearing zones are not continuous across the quarter section.

[3] A number of abandoned wells have been indicated in SE-28 and NE-28. However, these two quarter sections are associated predominantly with hillslope [steep slope] development.

[4] Preliminary flow estimates vary from 3 to 50 gpm. The high variability in flow rate is typical of discontinuous water bearing zones.

[5] All wells are completed in a shale/sandstone complex. Only one well, the Fitzpatrick well in NE-27 is completed in water bearing clay and sand & gravel.

[6] The depth to bedrock is shallow [4.5 to 7.3 meters] except for the above Fitzpatrick well. The depth to bedrock in the Fitzpatrick well is 35.4 meters [116 feet] and may reflect an erosional low on the bedrock surface.

[7] Where the wells are completed as deep well [60+ meters] the wells tend to have a low available head for drawdown. These wells are typically associated with the areas of sideslope development.

[8] Multi-level completions are indicated in a number of the wells. Multi-level completion is generally indicative of low yield formations.

[9] The groundwater wells along the level terrace covering the S1/2-27 and N1/2-22 have a very consistent depth to water of approximately 6 meters irrespective of well depth. The phenomenon of a consistent non-pumping water level which is independent of depth generally reflects a lateral groundwater flow system.

[10] The water wells tend to be under good artesian pressure resulting in available drawdowns that exceed 11 meters.

Licenced Users

There are no licenced users within an 800 meter radius of the proposed country residential subdivision on the Edwards property. There is a groundwater allocation licence for 1230 m^3/year for a greenhouse operation to the west of the subject property in 03-28-21-29-W4M.

Existing Q_{20} Tests

Groundwater Exploration & Research Ltd has undertaken the assessment of eight 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-27	Edwards	1.84	39.3
SE-27	Edwards	8.89	52.4
SE-27	Edwards	4.82	49.1
NW-22	Peterson	10.38	52.4
NE-22	Cathers	72.33	32.7
NE-22	Cathers	94.78	36.0
NE-28	Irvine	12.34	32.7
SE-28	Dellaire	4.33	25.2
SW-27	Edwards	4.44	37.2
SW-27	Kay	4.99	67.9

The flow test data, to date, indicates a considerable variation in transmissive capacity across the 9 quarter section block. The variability in transmissive capacity values is consistent with a physical aquifer model consisting of laterally discontinuous water bearing unit. As a result, flow rates for water wells need to be assessed on an individual well basis. In accordance with Alberta Environmental Protection guidelines the minumum groundwater requirement to sustain a rural residence is 1.82 m^3/day [400 gpd/lot] and the maximum allowable under the Water Act is 3.42 m^3/day [753 gpd/lot].

Based on a proposed maximum 36 lot subdivision, the minimum water requirement would be 65.5 m^3/day [400 gpd/lot] and the maximum would be 123.1 m^3/day [753 gpd/lot].

Two wells exist on the SW-27 quarter section, one belonging to Gary Edwards [office/shop well] and the other to Gregg Kay. On August 27, 1999 a 2360 minute pump test was undertaken on the Edwards well at a pumping rate of 163.6 m^3/day [25 Cgpm]. The calculated Q_{20} flow rate, based on a factor of safety of 1.5, was 37.2 m^3/day [5.7 Cgpm]. On October 1, 1999 a 1440 minute pump test was undertaken on the Kay well at a pumping rate of 196.4 m^3/day [30 Cgpm]. The calculated Q_{20} flow rate, based on a factor of safety of 1.5, was 67.9 m^3/day [10.4 Cgpm]. Based on the pump test conducted on the Kay well, and the minumum requirement of 1.82 m^3/day per lot, there is a sufficient volume of groundwater available to service up to 37 lot s.

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	=	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 one assumes the addition of a single well will be 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 area, the transmissivity exceeded 3.5 m^2/day for nine of the ten flow tests. The flow test data supports an argument that water wells within the SW-27 quarter section have a better than average potential to yield a minimum transmissivity value of 3.5 m^2/day.

The TC value can only be determined from a pump test conducted on site specific wells drilled on each proposed parcel. Given that the proposed lot size is about 1.62 hectares, a minimum separation distance of 25 meters, on a balance of probabilities, should be achievable.

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] From existing water well information, within the SW-07 quarter section, there exists high capacity wells with potential flow rates up to 196.4 m^3/day.

[2] Based on pump test data from the Kay well, there is a sufficient volume of groundwater from a single well to support the minimum allocation of 1.82 m^3/day [400 gpd/lot] and service up to 37 lots. Because of the discontinuous nature of the water bearing units, the availability of groundwater needs to be assessed on a well by well basis.

[3] 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 proposed nominal 1.62 hectare lot size. Based on the 10 existing flow tests within the 9 quarter block section, there is a high probability of encountering a well which will have a minimum transmissive capacity of 3.5 m^2/day.

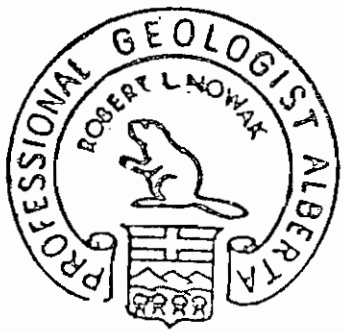
[4] The transmissive capacity will need to be calculated on an individual well basis. A minimum well test duration of 12 hours pumping and 12 hours of recovery is sufficient to generate the required data. It is anticipated, based on existing well record data, that the proposed wells, will not be completed in the same water bearing zone. This reflects an additional factor of safety.

If you have any questions or comments regarding the assumptions and conclusions drawn in this groundwater feasibility assessment, contact the undersigned at your convenience. Thanking your for the opportunity to have been of service, we remain,

Respectfully yours,
Groundwater Exploration & Research Ltd

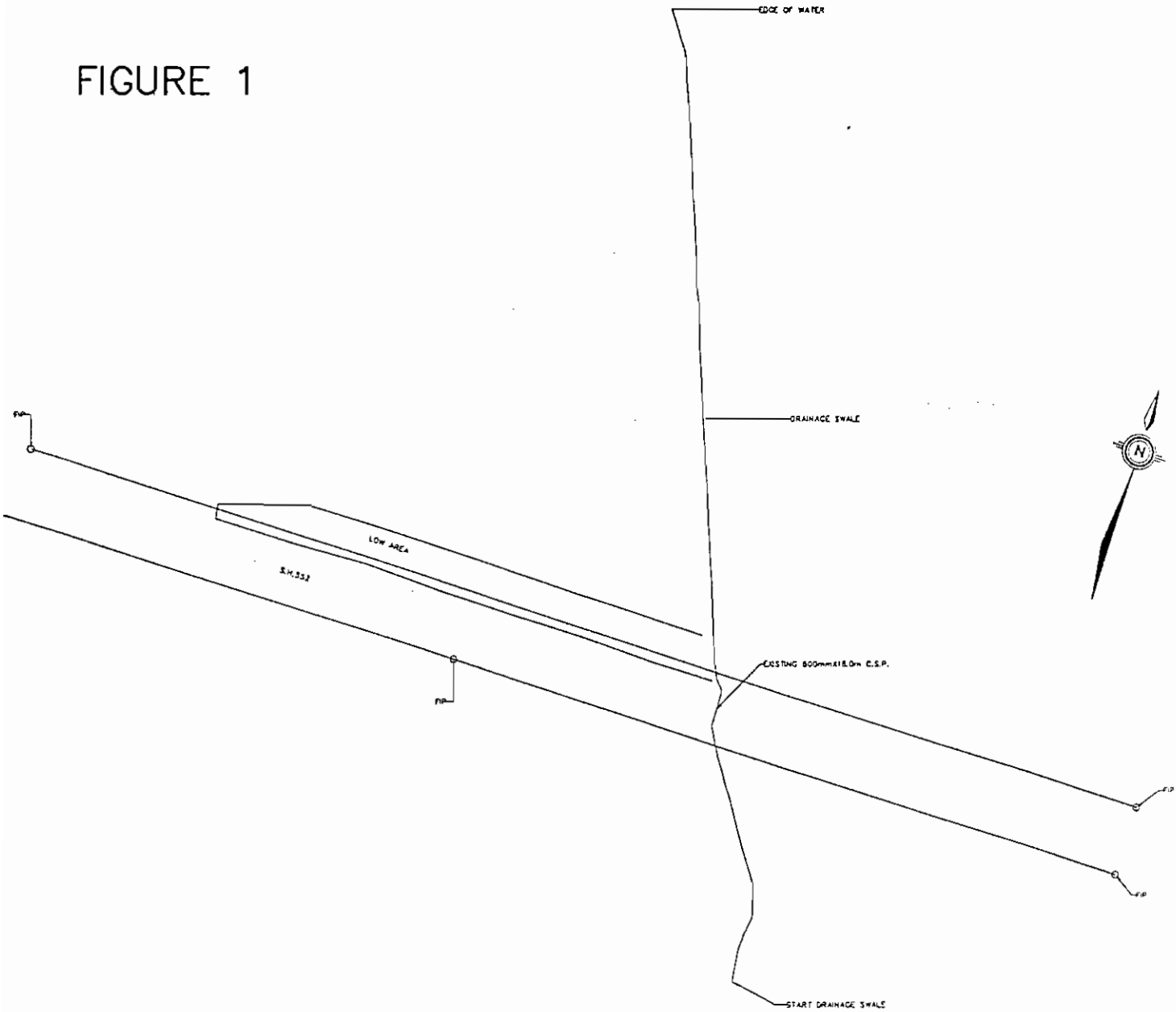
Bob Nowak

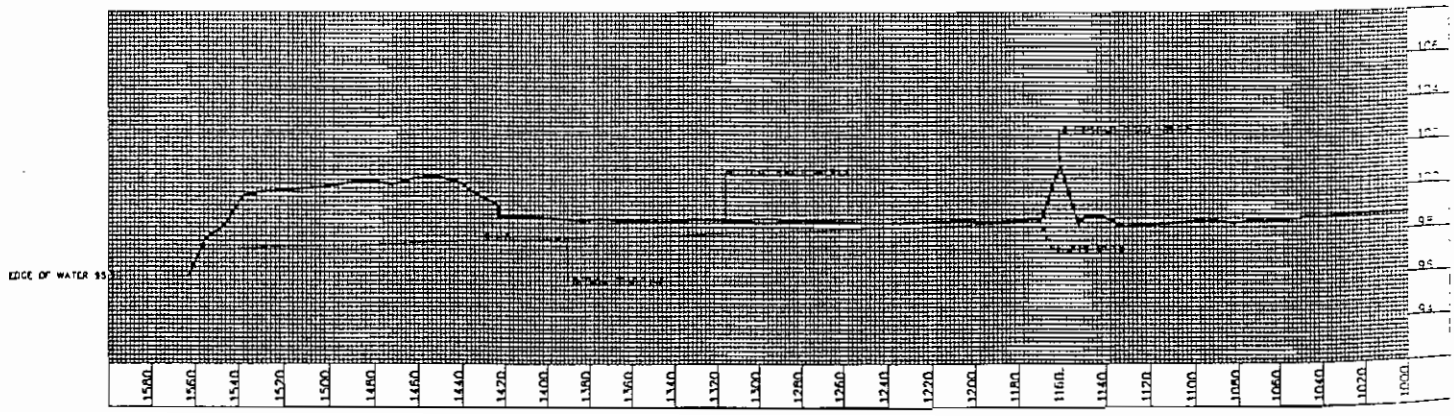
Bob Nowak; Ph.D., P.Geol.
Groundwater Geologist



APPENDIX D
DRAINAGE DITCH REPORT

FIGURE 1


EDGE OF WATER
DRAINAGE SWALE
LOW AREA
S.H.332
EXISTING 600mmx18.0m C.S.P.
FIP
FIP
FIP
FIP
START DRAINAGE SWALE
N


EDGE OF WATER 95
1500
1560
1540
1520
1500
1480
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1320
1300
1280
1260
1240
1220
1200
1180
1160
1140
1120
1100
1080
1060
1040
1020
1000

TORCHINSKY ENGINEERING LTD.
CONSULTING ENGINEERS

206, 610 - 70 Avenue, SE
Calgary, Alberta
T2H 2J6
PHONE : (403) 253-2560
FAX : (403) 258-1016

July 21, 1999

Mr. Gary Edwards
Box 16, Site 4, R.R. 1
Dewinton, Alberta
T0L 0X0

ATTENTION: Mr. Gary Edwards

REFERENCE: Drainage Swale
SW 27-21-29-W4M
(Our File No.: CAR995010)

Dear Sir:

As requested, a survey was completed on the existing drainage swale located in the SW ¼ 27-21-29-W4M. This swale is intended to drain the water from the surrounding area into an unnamed creek that eventually drains into the Bow River. Also note that the existing swale drains the water through a buried ceramic pipe before emptying into the unnamed creek. The purpose of this survey was to determine if the existing swale was draining the surrounding area as intended.

The survey showed that the existing swale has silted in so that the water will not drain properly from the area. The swale will require some excavation to re-establish a proper flow of water. We have designed a grade line for the new swale which will allow the water to flow from the site as intended. We also recommend that the ceramic pipe be replaced with a 900mm CSP or completely removed and to continue the drainage course with an extension of the open swale. Both of these options have been discussed with Mr. Dan Ellice from the M.D. of Foothills No. 31 to ensure that the Municipality will approve either method of repair.

Trusting this is the information you require at this time. Should you have any questions or require additional information, please do not hesitate to contact our office.

Yours truly,
TORCHINSKY ENGINEERING LTD.

Sean Bartnik
Area Manager

APPENDIX E
AGROLOGIST REPORT

Reclamation Inc.

Suite 236, 6715 - 8th St. N.E.
Calgary, Alberta T2E 7H7
Office: (403) 275-8937
Fax: (403) 295-2473

ASSESSMENT OF ARABILITY FOR THE S1/2 27-21-29W4

Prepared for

Gary Edwards

Prepared by

3-D Reclamation Inc.

November, 1996

Reclamation Inc.

A. INTRODUCTION

In response to a request from Mr. Gary Edwards, the S1/2 27-21-29W4 was inspected on November 8, 1996, by Blair Nicholson, an agrologist with 3-D Reclamation Inc. (resume attached). The purpose of the inspection was to assess the property's potential for arable agriculture; that is, the production of cereal crops. This report summarizes the findings of the data collected during the site specific evaluation.

The subject property is located just east of the Okotoks overpass in the Municipal District of Foothills, No. 31 (Figure 1). It can be accessed from Secondary Road 522 (274 Avenue E) (Photo 1) which borders the south side of the subject property as well as 32 Street E, a gravel road, which borders the west side (Photo 2) and 48 Street E, a gravel road which borders the east side of the subject property (Photo 3). The entire S1/2 27-21-29W4 was assessed, approximately 320 acres. At the time of inspection, the subject property was in rough pasture (Photo 4), grain production (Photo 5) and hay production (Photo 6).

The perimeter of the subject property is fenced. Photo 7 depicts the fenced north boundary. The subject lands are fragmented by a coulee, poorly drained and treed areas. The coulee dissects the property diagonally from the southwest to northeast. It is completely enclosed by a fence (Photo 8). Photos 9 and 10 depict the landscapes and vegetative patterns associated with the rough broken area. Photo 11 highlights the drainage ditch on the subject property. Farming patterns on the cultivated portion of the subject property are further disrupted by treed areas (Photo 12) and poorly drained rough broken landscapes (Photo 13). A farmstead is situated in the central portion of the southwest quarter section adjacent to the rough pasture, with poorly drained coulee lands (Photo 14). The long driveway connected to the farmstead also contributes to the fragmentation of the cultivated land on the subject property (Photo 15).

Field inspection for this assessment consisted of walking and driving over the property, describing soil profiles according to the Canadian System of Soil Classification[1] (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. No soil samples were collected for analysis during the inspection. A laser print of an aerial photo of the subject property, at a scale of 1:10,000 was used for mapping.

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

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B. RATING SYSTEMS

The two recognized systems for rating arability of land that were used in this report are the Canada Land Inventory for Soil Capability for Agriculture in Alberta[1] (1977); and the Land Capability Classification for Arable Agriculture in Alberta[2] (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 60's. 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[3] classifications, at a scale of 1:250,000 exist for the property in question (Figure 2). The more recent (1987) soil survey of the Calgary Urban Perimeter[4], mapped at 1:50,000, reflects a finer tuned boundary placement of these same CLI interpretative standards (Figure 3). 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 recognizes twenty-one different kinds of limitations and utilizes 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.

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

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

3 Agriculture Canada Soil Research Institute. 1971. Canada Land Inventory Soil Capability for Agriculture, Gleichen Map Sheet Area 82I. Ottawa, Ontario.

4 MacMillan, R.A. 1987. Soil Survey of the Calgary Urban Perimeter; Alberta Soil Survey Report No. 45. Terrain Sciences Department, Alberta Research Council. Edmonton, Alberta. Pages 79 - 80.

C. GENERAL DESCRIPTION OF THE SUBJECT PROPERTY

1. Soil Survey of the Calgary Urban Perimeter

The soils of the subject property are described in the Soil Survey of the Calgary Urban Perimeter. Five soil series are identified for the subject lands, namely Happy Valley (HPV), Rockyview (RKV), Academy (ADY), Midnapore (MDP) and Eastbow (EBO). In addition, one undifferentiated land unit is identified for the subject lands, namely Rough Broken (RB).

The Happy Valley unit identified is symbolized as HPV2/d. Happy Valley is a weakly developed, rapidly drained, black to dark brown grassland soil formed on sandy to coarse loamy glaciofluvial sediments. These sediments are almost always very strongly calcareous. The stone content is generally low. The HPV2 unit is mapped on inclined sloping or ridged glaciofluvial landscapes. Happy Valley soils are classified as Rego Black. Many Happy Valley profiles are subject to erosion by wind and are further described as an eroded phase. This situation is so widespread that most of the surface of Happy Valley soils has been affected to some degree by wind sorting. The subsoils also have a low clay content.

Agricultural use of this unit is limited by steep slopes, droughtiness and erosion. The letter to the right of the slash mark in the map unit symbol represents slope class limits. The slope class limits represented by the letter "d" are 6-9%.

The Rockyview unit identified is symbolized as RKAD5/c. This map unit symbol reflects the grouping together of two complex mixtures of soils and parent materials. Rockyview is identified in combination with Academy soils in the above map unit symbol.

Rockyview soils are deep, well drained black grassland soils. The parent material is a strongly calcareous aeolian veneer overlying till which usually occurs at depths between 50 cm and 100 cm. This unit (RKAD5) is mapped on slightly rough, undulating, ridged or hummocky morainal landscapes. Rockyview soils are classified as Orthic Black Chernozemics. In situations where the surface horizon is relatively thin, Rego Black profiles are also described. Rockyview is always mapped in associated with Academy soils which lack an aeolian veneer. The thickness and degree of development of soil profiles vary widely in this unit. Weakly developed profiles are common. Agriculturally, soil erosion limits this unit's capability.

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Academy soils are deep, well drained, black grassland soils formed on till. The parent material is fine silty to fine loamy, strongly calcareous till. The landforms range from undulating to ridged. A representative profile of Academy soil has a relatively thin, black loamy surface horizon (13 to 16 cm) underlain by a brown oxidized horizon. The unaltered parent material is encountered at depths between 40 cm and 70 cm. Academy is classified as an Orthic Black Chernozemic soil. The slope class limits represented by the letter "c" in the map unit symbol are 2-5%.

In addition to the Rockyview unit described above, Academy soils are identified on the subject lands in combination with Midnapore and Eastbow soils. The Midnapore-Academy unit is symbolized as MDAD1/d. The Eastbow-Academy unit is symbolized as EBAD1/c. These map unit symbols identify a complex of two soils within a polygon.

Midnapore soils are deep, rapidly drained black grassland soils formed on glaciofluvial sediments. The glaciofluvial parent material is strongly calcareous sandy to coarse loam and contains very few coarse fragments. Midnapore soil is found on nearly level to gently rolling glaciofluvial landscapes. The MDAD1 unit is mapped on smooth landscapes. The glaciofluvial parent material occurs as a thin veneer overlying till. Midnapore soils are classified as Orthic Black Chernozemic soils. MDAD1 areas have a uniform appearance at the surface. The black topsoil is continuous and thick (20 to 30 cm) and most soils have an oxidized subsurface horizon. An agricultural constraint to MDAD1 areas is a low moisture holding capacity. This limitation is partially offset by the presence of till within 1.5 m of the surface. The slope class limits represented by the letter "d" in the map unit symbol are 6-9%.

Eastbow soils are shallow, weakly developed, black grassland soils. On the subject lands this unit (EBAD1/c) is found on smooth, level to gently rolling morainal landscapes. The unit has a complex mixture of parent materials, whose distribution cannot be predicted from readily observable landscape features. The texture of the top 1 m throughout this unit can be expected to vary from sandy loam to silty clay loam. Thin and weakly developed soil profiles predominate, while deep, well developed profiles are not as common. A representative profile of Eastbow soil has a thin, black, loamy surface horizon which rests directly on calcareous parent material. Eastbow soils are classified as Rego Black Chernozemic soils. The agricultural constraints to EBAD1 areas tend to be soil erosion and pockets of droughty soils. The slope class limits represented by the letter "c" in the map unit symbol are 2-5%.

In addition to the above five soil series identified for the subject lands, one undifferentiated land unit, namely Rough Broken is identified within the subject property. The unit is symbolized as RB4/de. The number 4 indicates the possibility of different types of parent material, with varying proportions of bedrock. For RB areas, slope steepness is more important than soil properties or climate in determining limitations for use. This unit is always too steep and irregular for cultivation. Most RB areas are used for pasture. Central drainage channels within the steep valley sides are often imperfectly to poorly drained. The slope class limits represented by the letters "de" in the map unit symbol are 6-15%.

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2. Site Specific Evaluation

A description of the 320 acres of the S1/2 27-21-29W4 evaluated based on the November 8, 1996 site specific evaluation follows. The soils on the subject property have developed in sandy glaciofluvial sediments which are every susceptible to erosion. These glaciofluvial sediments occur irregularly, both as deep deposits and as thin veneer overlying till, and have typically suffered from wind erosion. Photos 7 and 16 depict the ridge that has built up from wind erosion along the north fenced boundary on the subject property. This erosion on the shallow glaciofluvial veneer over the stony till has exposed the surface to a high concentration of coarse fragments. These coarse fragments include gravel (<8 cm in diameter), cobbles (8-25 cm in diameter) and stones (>25 cm in diameter). Photos 17 and 18 highlight the prevalence of cobble and stone size fragments on the surface of the soil. Photo 19 depicts a stone pile on the subject property. The erosion on the deeper glaciofluvial deposits has resulted in eroded and calcareous profiles. Efforts to maintain a fertile surface horizon have brought the less desirable calcareous subsoil closer to the surface. Photo 20 highlights a ridge built up along a former fenceline on the subject property due to wind erosion.

Two different landscapes are associated with the deeper glaciofluvial deposits. On the west side of the subject property, smooth relatively level to gently undulating landscapes are found (Photo 21). On the east side of the subject property the landscape is more undulating and inclined (Photo 22). Where the till parent material is closer to the surface a more undulating, hummocky landscape persists (Photo 23). It is expressed in knolls and irregular ridges. Slopes of up to 6% are common off the ridges and in the 6-9% range on the knolls.

Two wet depressional areas are also found on the subject lands (Photos 6 and 24). On the southwest quarter section, bordered by Secondary Road 522, is a strongly calcareous, saline, poorly drained depression. This level low lying area has a fine clay texture. The surface runoff from the surrounding undulating to hummocky glaciofluvial and morainal landscapes has resulted in Orthic Humic Gleysolic profiles developing that are both calcareous and saline. This occurrence brings about poor profile structure and a resultant limited agricultural use. On the southeast quarter section, bordered by Secondary Road 522, there is a slightly better drained low lying depression (Photo 6). Humic Luvic Gleysolic profiles have developed. Slow downward infiltration of the surface runoff is taking place as evidenced by the presence of the Ae horizon. The productivity of these depressions in cultivated areas is limited by their wetness and susceptibility to flooding.

Considerable variation is found on the subject property in both parent materials and profile development. Profiles vary from weakly to strongly developed. This variation affects both plant growth and the ease with which the land is managed. The Rough Broken area dissecting the subject property further contributes to this considerable variation on the subject lands.

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D. CLI SITE SPECIFIC EVALUATION

As previously mentioned, CLI ratings have been published for the S1/2 27-21-29W4. However, this information does not constitute a site specific evaluation as ratings are averaged over large areas and were made using aerial photos and soil survey information without extensive ground truthing. Field inspections are necessary to confirm these classifications for local or site specific development. The published CLI classifications are provided here for background purposes only.

Published CLI classifications, at a scale of 1:250,000 are presented for the subject property in Figure 2. As well, published CLI classifications at a scale of 1:50,000 are presented for the subject property in Figure 3. The 1:250,000 study delineates one complex unit for the S1/2 27-21-29W4. This particular study rates the property 70% Class 3T, 20% Class 2C and 10% Class 5T. The notation recognizes a complex area rated Class 3 due to adverse topography (T), Class 2 due to climatic conditions (C) and Class 5 due to adverse topography (T). The dominant class appears first in a complex symbol. Of the three components rated, climate is the dryland agriculture factor least easily changed by management.

The most recent published data for the CLI, the 1:50,000 study, identified five areas for the subject property. The EBAD1/c soil-landscape delineation has been given a CLI classification of 70% Class 2E and 30% Class 3M. This classification denotes an area rated Class 2 due to erosion damage (E) and Class 3 due to low available moisture holding capacity (M). The HPV2/d soil-landscape delineation has been given a CLI classification of Class 4MT. This classification denotes an area rated Class 4 due to low available moisture holding capacity (M) and adverse topography(T). The MDAD1/d soil-landscape delineation has been given a CLI classification of 60% Class 3MT and 40% Class 2T. This classification denotes an area rated Class 3 due to low available moisture holding capacity (M) and adverse topography (T) and Class 2 due to adverse topography (T). The RKAD 5/c soil-landscape delineation has been given a CLI classification of 50% Class 2T and 50% Class 3TE. This classification denotes an area rated Class 2 due to adverse topography(T) and Class 3 due to adverse topography (T) and erosion damage (E). The RB4/de soil-landscape delineation has been given a CLI classification of Class 5TI. This classification denotes an area rated Class 5 due to adverse topography (T) and inundation (I).

A site specific CLI classification was done for the subject property using the CLI manual and is presented in Figure 4. The site specific evaluation presents more clearly defined boundaries than the above mentioned two previous studies and allows for improved characterization of the properties soil and landscape qualities.

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1 Agriculture Canada Soil Research Institute. 1971. Canada Land Inventory Soil Capability for Agriculture, Drumheller Map Sheet Area, 82P. Ottawa, Ontario.

Of the three major arability components (soils, climate and landscape) under the CLI rating system, all were found to be limiting on the subject property. The subclass limitations due to unfavorable soil characteristics recognized on the subject property are undesirable soil structure (D), low available moisture holding capacity (M) and excessive salinity (N). The subclass limitations due to unfavorable landscape characteristics recognized on the subject property are erosion damage (E), excessive stoniness (P), adverse topography (T) and excessive wetness (W).

Undesirable soil structure is a subclass limitation applied to the subject lands, due to the considerable variation in profile development which results from the complex mixture of textures and parent materials. Weak profile development is exhibited by the eroded Rego and calcareous profiles found throughout the subject property. The available moisture holding capacity of soils is primarily evaluated on the basis of texture. That is, as the amount of clay decreases, the moisture holding capacity decreases and the degree of limitation increases. The excessive soil salinity limitation applies to soils in which the content of soluble salts is sufficient to adversely affect crop growth. These areas are frequently groundwater discharge areas, and thus the soils are often Gleysolic.

Erosion damage is a subclass landscape limitation which is applied in evaluating soils where actual damage by erosion has resulted in a limitation to agricultural use. Damage is assessed by both the restriction to the range of crops that can be grown, and the mechanical difficulties presented to farming. Excessive stoniness is applied to soils that are sufficiently stony as to hinder agricultural activities. The adverse topography subclass limitation applies to areas where topography, both steepness and pattern of slopes 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 slope as well as those due to irregularity of field patterns and lack of soil uniformity as a result of complex landform patterns. Excessive wetness is a subclass limitation applied to soils where excess moisture is a limitation. The degree of this limitation is dependent on the duration of the period that these soils remain wet, as this affects the timing of cultivation, seeding and harvest.

In summary, the CLI classification for the 320 acres of the S1/2 27-21-29W4 is as follows, with the boundaries as shown in Figure 4. The rating symbol shows class placement and limitation. The acreages are approximations, having been derived from a dot grid assessment.

6 acres - Farmstead
35 acres - Class 2C
46 acres - Class 3T
7 acres - Class 4PD
129 acres - Class 4ME
4 acres - Class 5W
8 acres - Class 5D
27 acres - Class 5PE
14 acres - Class 6WN
44 acres - Class 6TW

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E. 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 site specific evaluation for this property (S1/2 27-21-29W4) using the LCCAAA rating system resulted in only minor changes from that previously outlined in the CLI classification above. The worksheets for the LCCAAA rating system are found in Appendix I.

The LCCAAA rating system also defined all three of the arability components to be limiting on the subject property. Using the up-to-date climatic information available in the LCCAAA rating manual, the subject property was rated Class 3H. The subclass limitation recognized due to climate is the energy factor (H). This climate rating results in a change from that presented under the CLI classification: The area rated Class 2C becomes Class 3H under the LCCAAA rating system; and the area rated Class 3T has the "H" symbol added because it is equally limited by climatic and landscape restraints. Under the LCCAAA system the erosion limitation is included under the adverse topography limitation. The LCCAAA system in addition allows for a further breakdown of the soils limitations thus the use of the "K" symbol to recognize calcareousness.

In summary, the LCCAAA classification for the 320 acres of the S1/2 27-21-29W4 investigated is as follows, with the boundaries as shown in Figure 5. The rating symbol shows class placement and limitation. The acreages are approximations, having been derived from a dot grid assessment.

6 acres - Farmstead
35 acres - Class 3H
46 acres - Class 3HT
7 acres - Class 4PM
129 acres - Class 4M
4 acres - Class 5W
8 acres - Class 5DK
27 acres - Class 5PM
14 acres - Class 6WN
44 acres - Class 6TW

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F. CONCLUSION

The soil capability classification system used in this report has been developed using several assumptions. Three of these assumptions are: That shrubs, trees or 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 upon limitations for agriculture and general productive capacity for common field crops.

In conclusion, the November 8, 1996, site specific evaluation using the most up to date information (LCCAAA evaluation) places 35 acres of the S1/2 27-21-29W4 investigated into Class 3H, 46 acres into Class 3HT, 129 acres into Class 4M, 7 acres into Class 4PM, 27 acres into Class 5PM, 4 acres into Class 5W, 8 acres into Class 5DK, 44 acres into Class 6TW and 14 acres into Class 6WN. Class 3 lands have moderately severe limitations. Under good management they are fair to moderately high in productivity for a fair range of crops. Class 4 lands are 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 5 lands have very severe limitations for sustained arable agriculture. Annual cultivation using common cropping practices is not recommended. The severity of the limitations of these soils renders them unsuitable for annual cultivation. While improvement practices are feasible, their capability is restrictive to the production of perennial forage crops. Class 6 lands have such severe limitations for arable agriculture that cropping is not feasible, even on an occasional basis.

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G. CERTIFICATION

I certify that I inspected the portion of the S1/2 27-21-29W4 identified in this report on November 8, 1996. Using information from the field inspection and information from the Canadian System of Soil Classification and the Soil Survey of the Calgary Urban Perimeter, as well as the Canada Land Inventory Gleichen Map Sheet 82I, the classification of arability 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 the S1/2 27-21-29W4 inspected is, therefore, as follows:

6 acres - Farmstead
35 acres - Class 3H
46 acres - Class 3HT
7 acres - Class 4PM
129 acres - Class 4M
4 acres - Class 5W
8 acres - Class 5DK
27 acres - Class 5PM
14 acres - Class 6WN
44 acres - Class 6TW

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 done 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.

3-D RECLAMATION INC.

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

Blair Nicholson

Blair Nicholson, P.Ag.

November 15, 1996

3D Reclamation Inc.

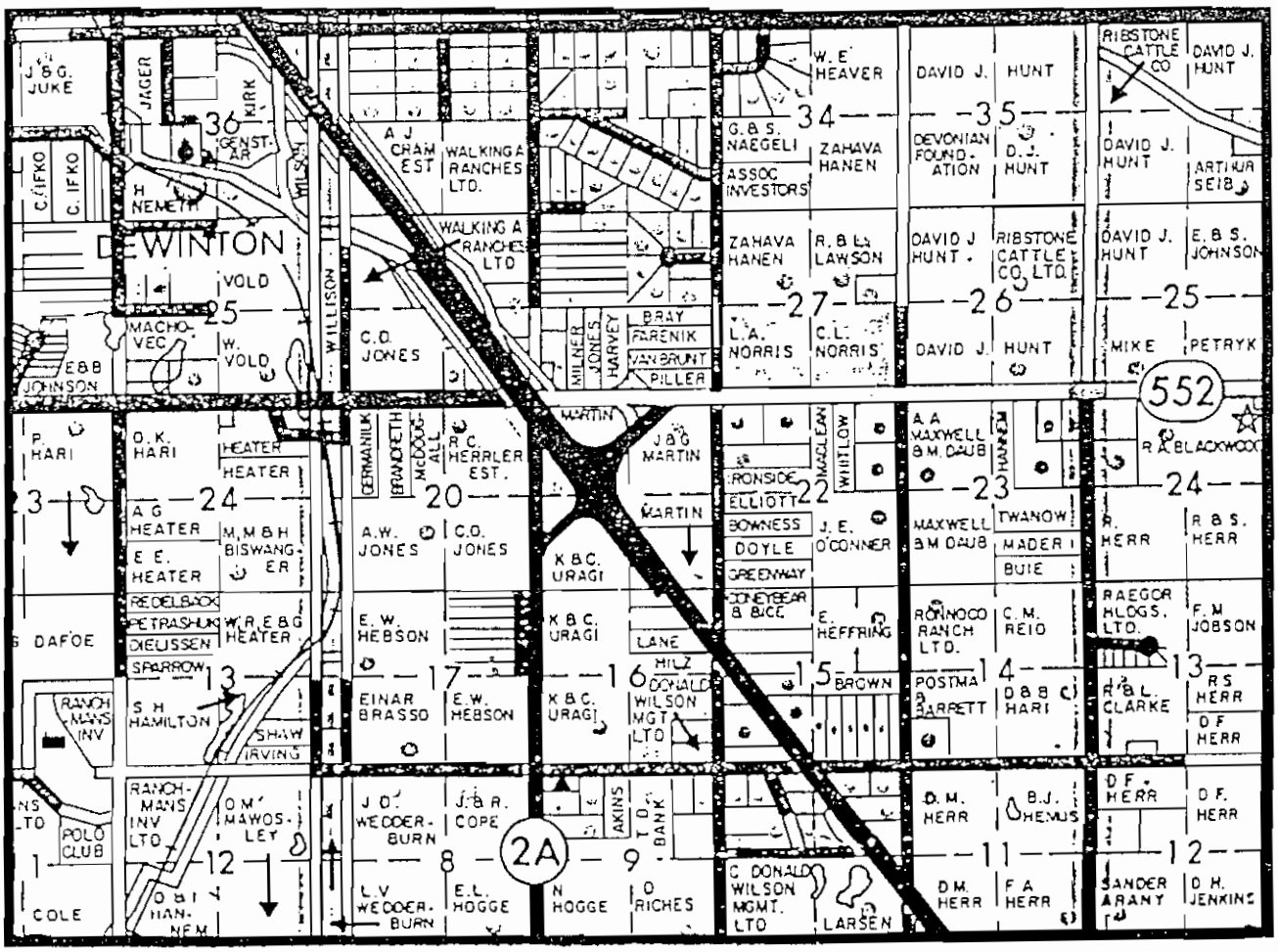
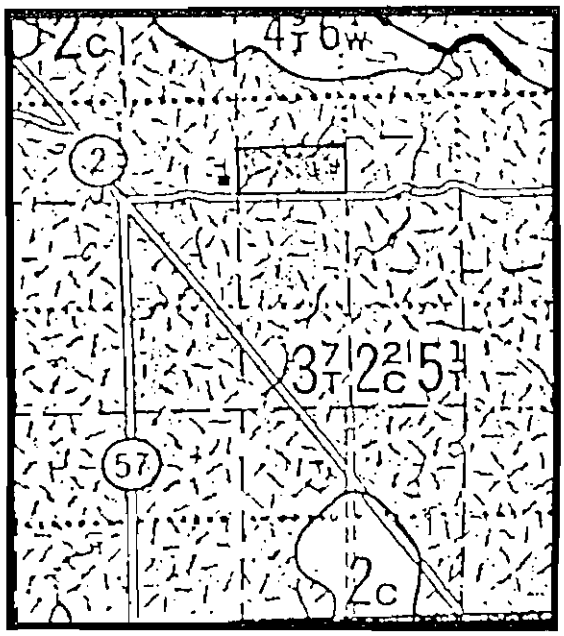
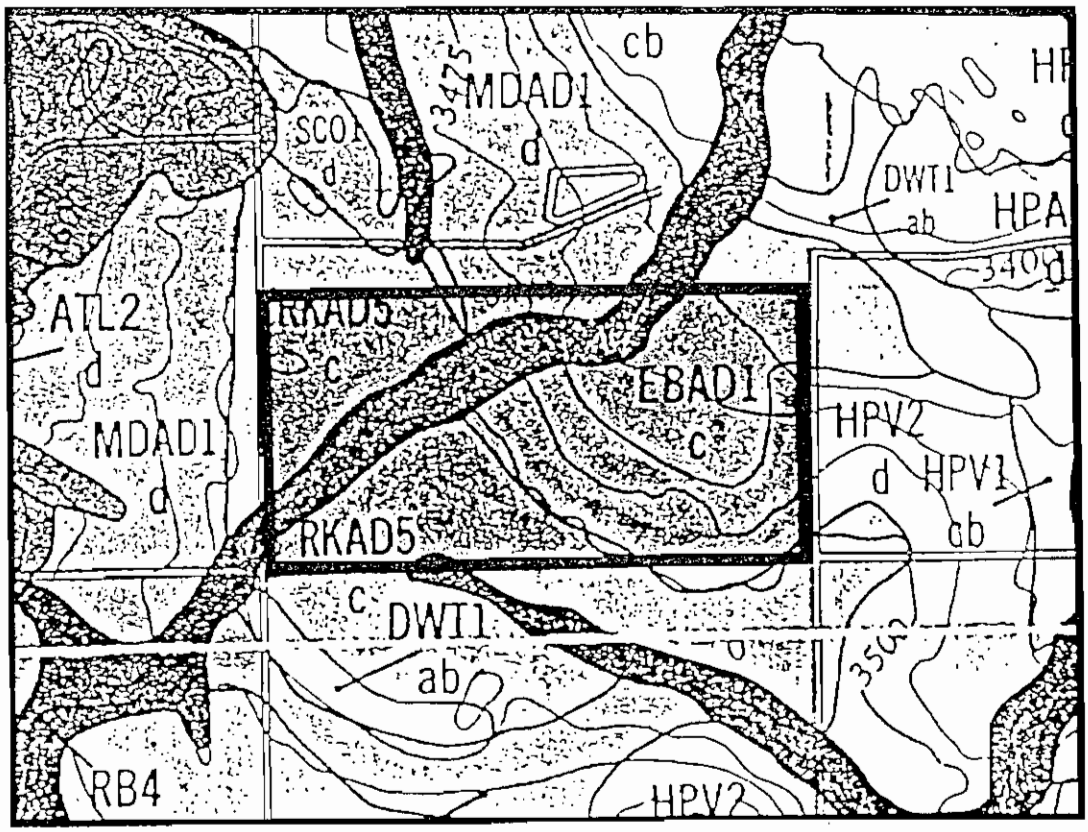


Figure 1. Location of the subject property (S1/2 27-21-29W4).



Legend	
	Class 3, 2, 5

Figure 2. Map showing the published CLI classification for the subject property originally published at a scale of 1:250,000 and enlarged as shown above.



Legend	
	Class 2 and 3
	Class 4
	Class 5

Figure 3. Excerpt from the Calgary Urban Perimeter soil survey showing the soil classification and CLI interpretation for the subject property originally mapped at a scale of 1:50,000 and enlarged as shown above.

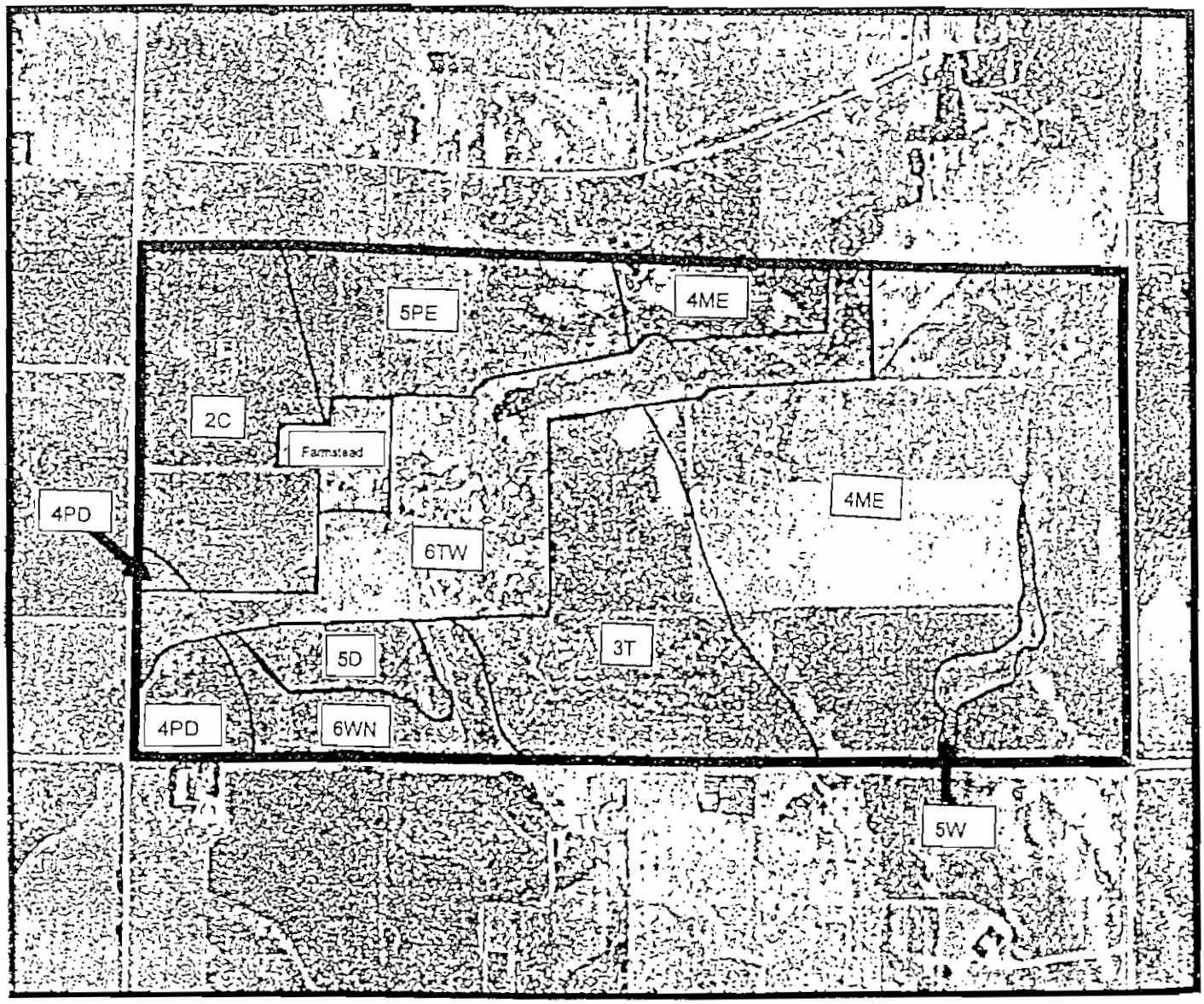


Figure 4. Site specific CLI rating for the subject property (S1/2 27-21-29W4) at a scale of 1:10,000, as of November 8, 1996.

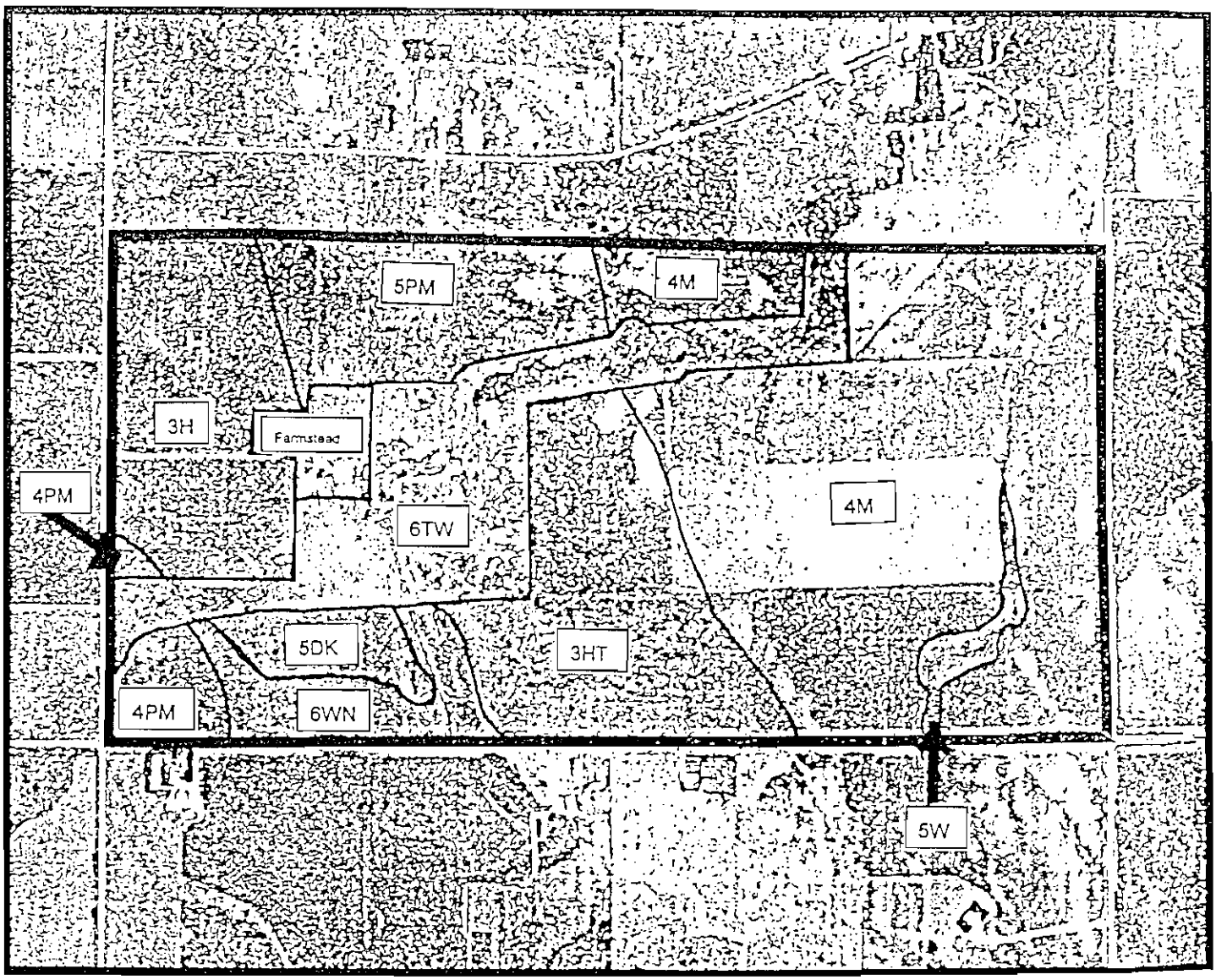


Figure 5. Site specific LCCAAA rating for the subject property (S1/2 27-21-29W4) at a scale of 1:10,000, as of November 8, 1996.

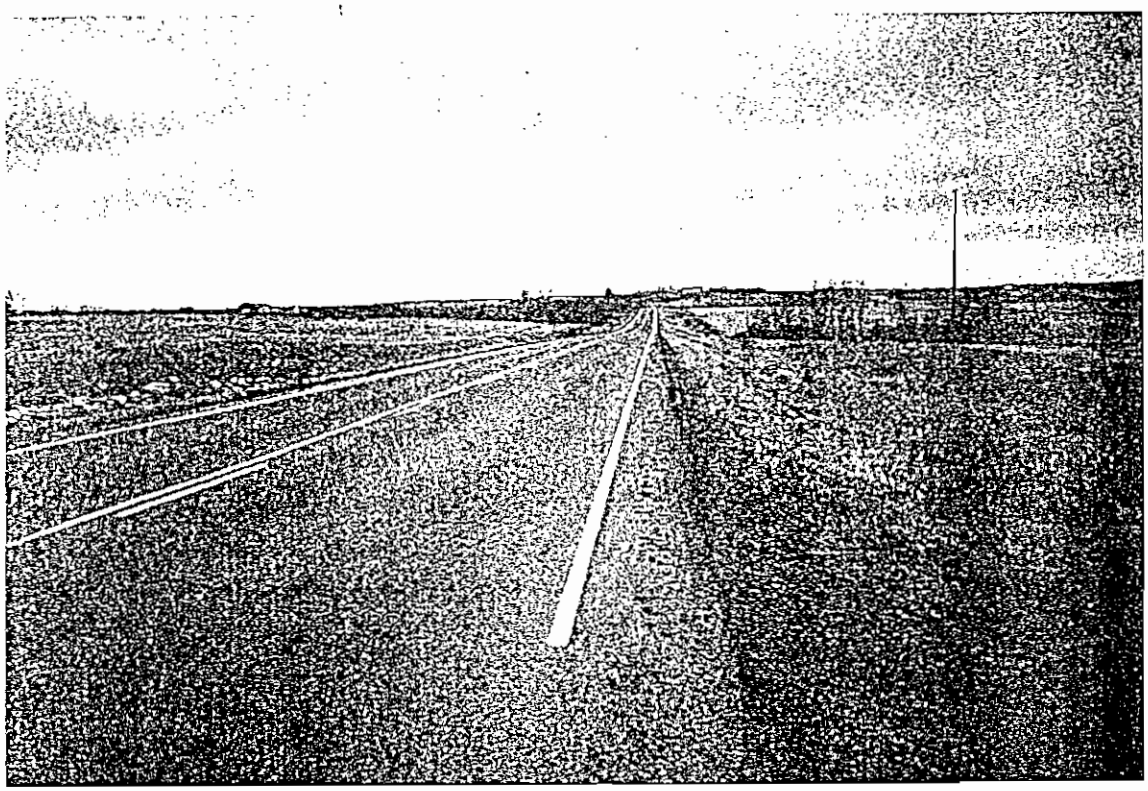


Photo 1. Photo taken on November 8, 1996, of paved road (Secondary Road 522) which borders the south side of the subject property (S1/2 27-21-29W4).

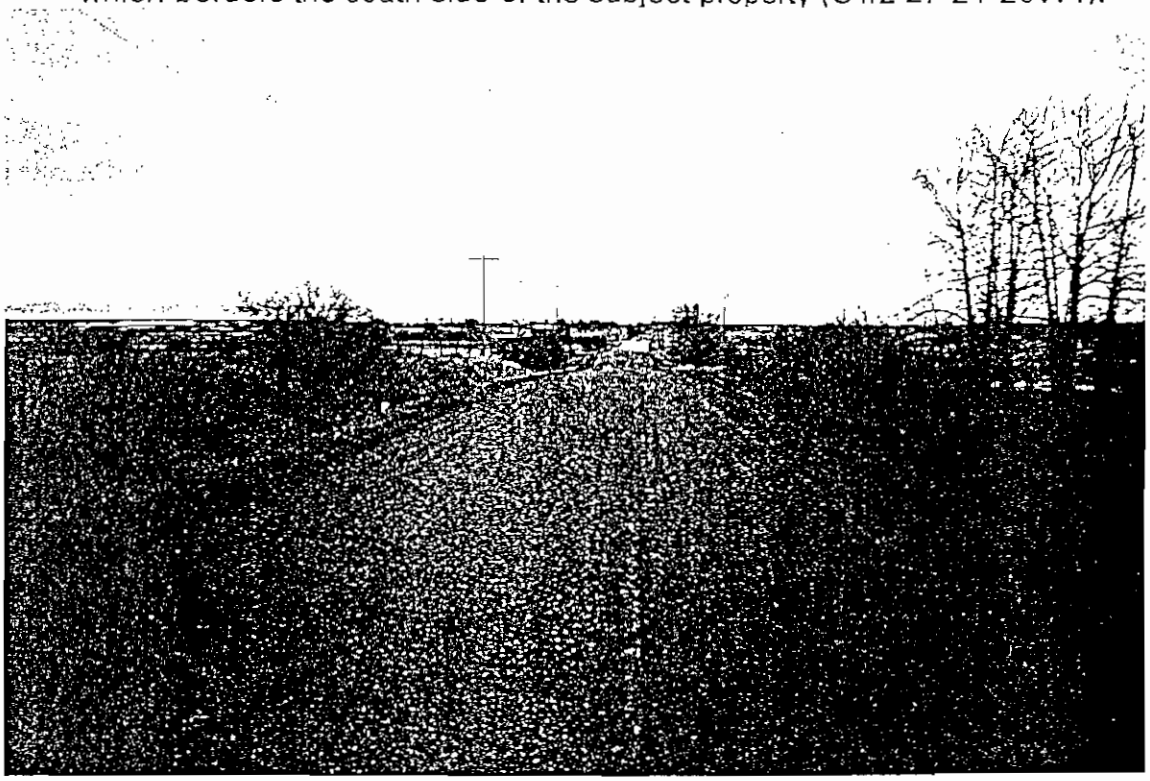


Photo 2. Photo taken on November 8, 1996, of the fenceline and gravel road (32 Street E) which mark the west boundary of the subject property (S1/2 27-21-29W4).

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Photo 3. Photo taken on November 8, 1996, of fenceline and gravel road (48 Street E) which mark the east boundary of the subject property (S1/2 27-21-29W4).

Photo 4. Photo taken on November 8, 1996, depicting one of the land uses (rough pasture) on the subject property (S1/4 27-21-29W4).

Photo 5. Photo taken on November 8, 1996, depicting one of the land uses (grain production) on the subject property(S1/2 27-21-29W4).

Photo 6. Photo taken on November 8, 1996, of poorly drained low area on the subject property (S1/2 27-21-29W4) used for hay production.

Photo 7. Photo taken on November 8, 1996, of the fenceline which marks the north boundary on the subject property (S1/2 27-21-29W4). Also noticeable is a ridge along the north fenceline caused by wind erosion.

Photo 8. Photo taken on November 8, 1996, showing a portion of the fenceline enclosing the coulee perimeter on the subject property (S1/2 27-21-29W4).

Photo 9. Photo taken on November 8, 1996, of the steep slopes associated with the coulee dissecting the subject property (S1/2 27-21-29W4).

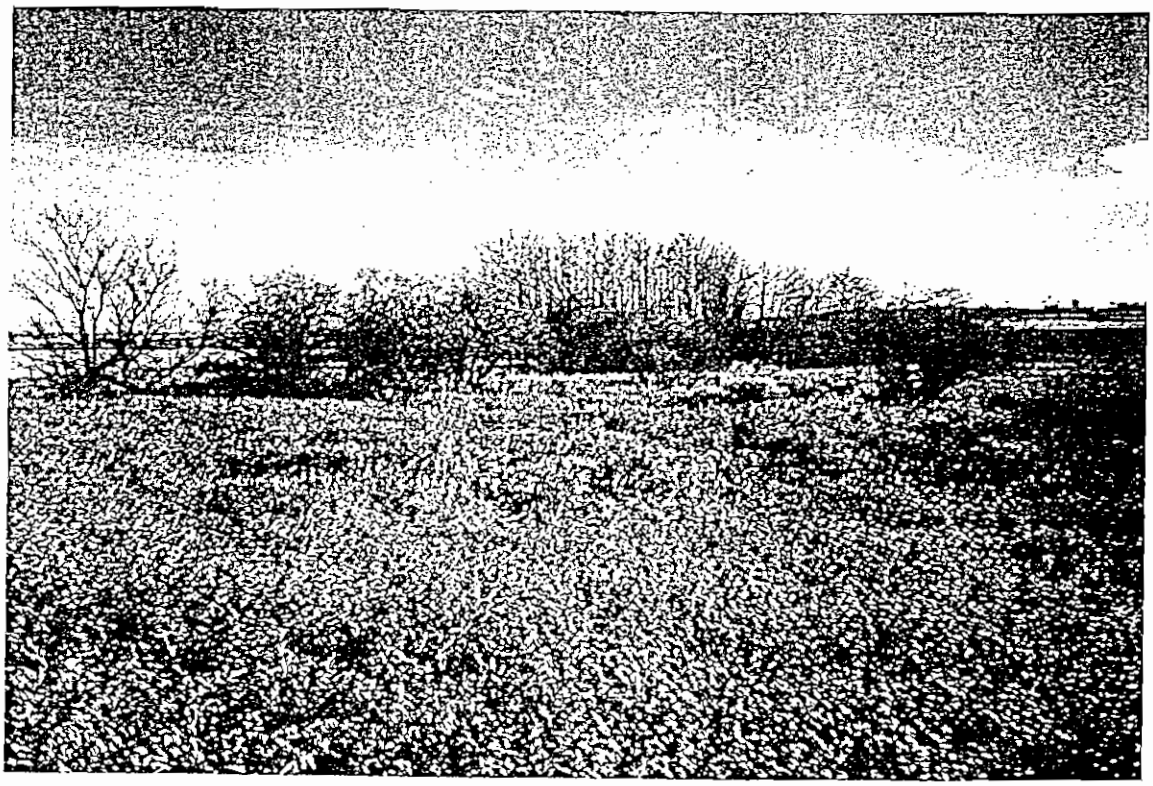

Photo 10. Photo taken on November 8, 1996, of one of the poorly drained treed areas associated with the coulee dissecting the subject property (S1/2 27-21-29W4).

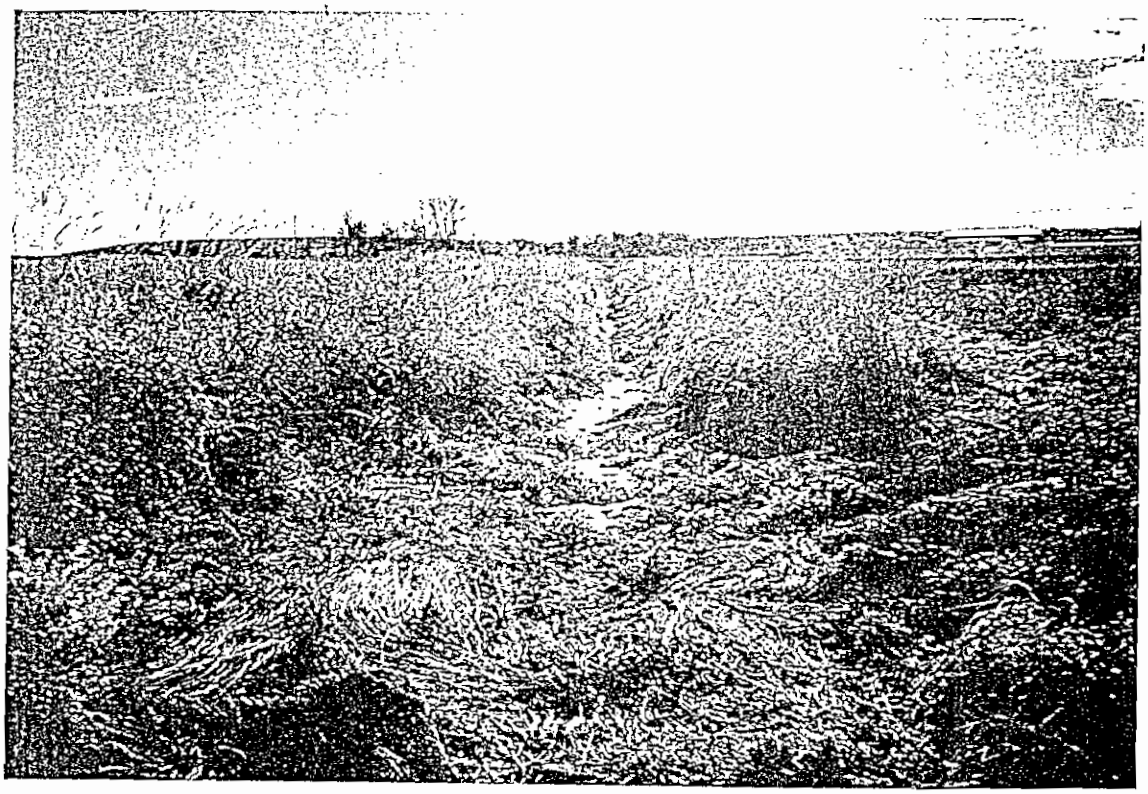

Photo 11. Photo taken on November 8, 1996, of drainage ditch on the subject property (S1/2 27-21-29W4).

Photo 12. Photo taken on November 8, 1996, of treed area disrupting the farming patterns on the subject property (S1/2 27-21-29W4).

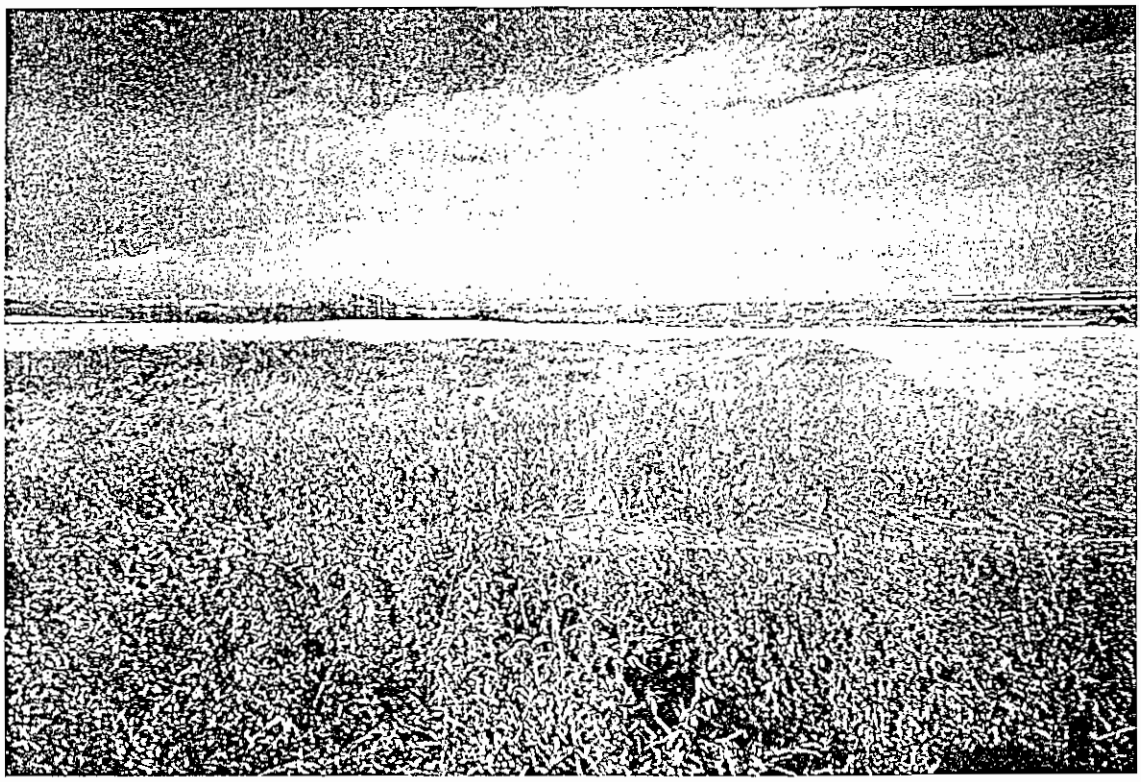

Photo 13. Photo taken on November 8, 1996, of poorly drained area disrupting the farming patterns on the subject property (S1/2 27-21-29W4).

Photo 14. Photo taken on November 8, 1996, of farmstead on the subject property (S1/2 27-21-29W4) adjacent to the rough pasture, poorly drained coulee lands.

Photo 15. Photo taken on November 8, 1996, of driveway to access farmstead on the subject property (S1/2 27-21-29W4).

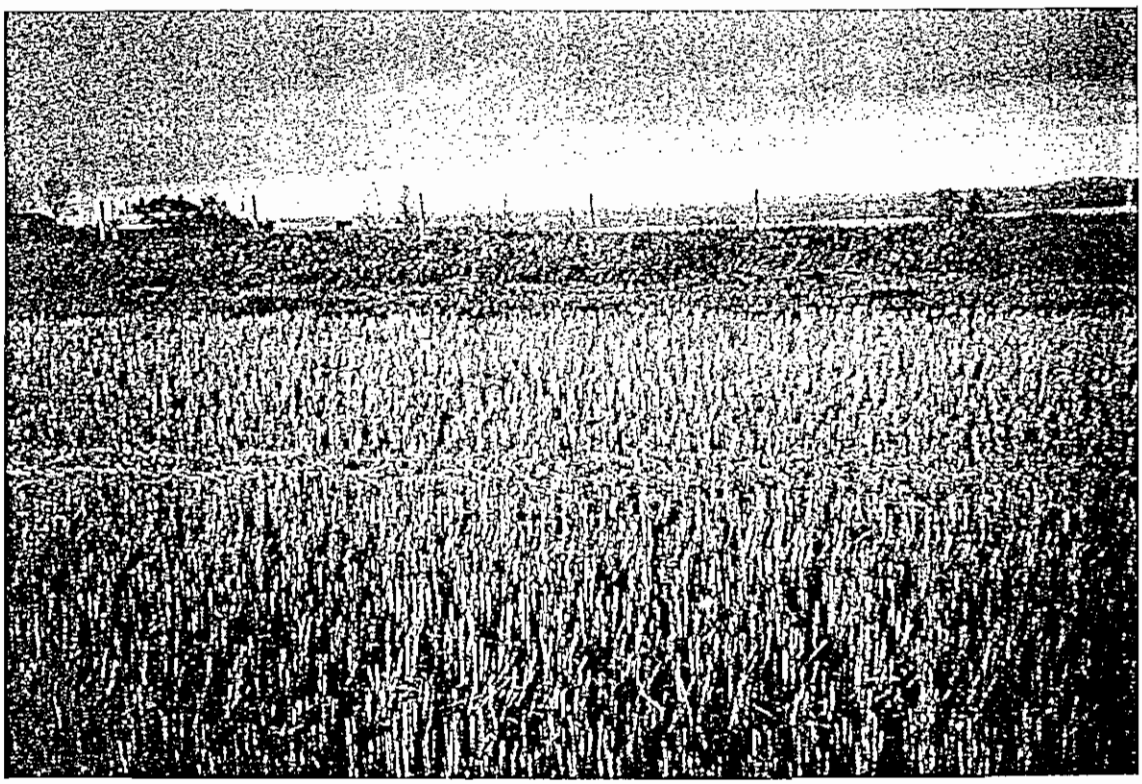

Photo 16. Photo taken on November 8, 1996, of ridge built up along the north fenceline due to wind erosion on the subject property (S1/2 27-21-29W4).

Photo 17. Photo taken on November 8, 1996, of cobble size fragments on the surface of the subject property (S1/2 27-21-29W4).

Photo 18. Photo taken on November 8, 1996, of stone size fragments on the surface of the subject property (S1/2 27-21-29W4).

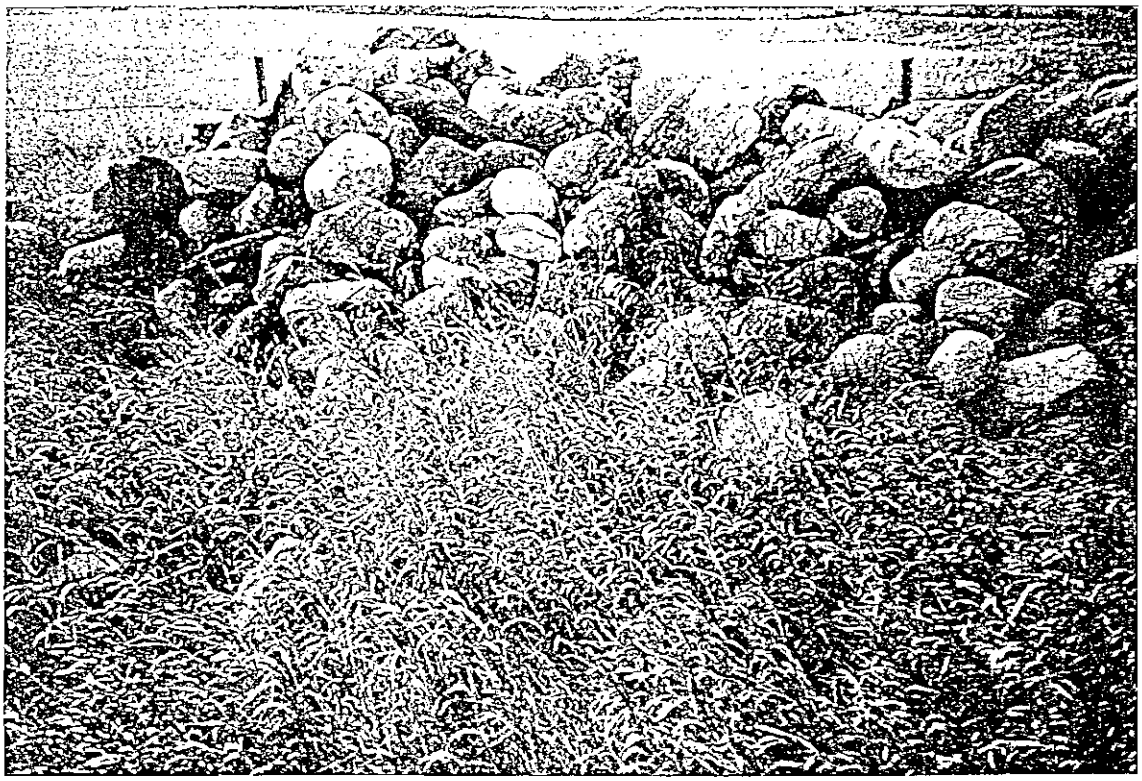

Photo 19. Photo taken on November 8, 1996, of stone pile on the subject property (S1/2 27-21-29W4).

Photo 20. Photo taken on November 8, 1996, of ridge due to wind erosion along former fenceline on the subject property (S1/2 27-21-29W4).

Photo 21. Photo taken on November 8, 1996, of very gently undulating landscapes on the west side of the subject property (S1/2 27-21-29W4).

Photo 22. Photo taken on November 8, 1996, of gently inclined undulating landscape on the east side of the subject property (S1/2 27-21-29W4). On the steeper inclines the landscape is channeled.

Photo 23. Photo taken on November 8, 1996, of undulating hummocky topography expressed in irregular ridges and knolls on the subject property (S1/2 27-21-29W4).

Photo 24. Photo taken on November 8, 1996, of poorly drained level depression that receives runoff from the higher lands surrounding it on the subject property (S1/2 27-21-29W4).

APPENDIX I

WORKSHEETS

Reclamation Inc.

AGRICULTURAL CAPABILITY RATING WORKSHEET
(S1/2 27-21-29W4)

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	-260	20

A = 100 - 20 = 80

Energy Component (H)

E G D D Index	1120	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	--	--

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

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

= Class 3, H Subclass

Reclamation Inc.

LCCAAA AGRICULTURAL CAPABILITY RATING FORM

Location: S1/2 27-21-29W4			O.BL (carb) Site 1		O.BL Site 2	
			Value	% Ded.	Value	% Ded.
SOILS (S)	1. SURFACE FACTORS	Texture (M) (P-PE = -260)	fSL	35	L	25
		Subsoil texture	SL	0	CL	0
		Structure (D)	gran	0	gran	0
		Org. Matter (F)	10YR2/1	0	10YR2/1	0
		Depth of Topsoil (cm) (E)	15	5	20	0
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
		Calcareous (K)	5	5	--	--
		Peaty Surface (O)	--	--	--	--
	Basic Soil Rating		55		75	
	2. SUBSOIL FACTORS	Structure (D)	sab	0	sab	0
		Depth (R, D, M) (cm)	--	--	--	--
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
	Subsoil Deduction		% =		% =	
	Interim Soil Rating		55		75	
	3. DRAINAGE (W)		% =		% =	
	Final Soils Rating		55		75	
LANDSCAPE (L) Region 2-4	1. SLOPE (T)	Steepness (%)	1		3	
		Length (m)	100		15	
		LS Factor	(0.2)		(0.3) 10	
	Basic Landscape Rating				90	
	2. STONINESS (P)	Stoniness Deduction	( ) % =		( ) % =	
	Interim Landscape Rating					
	3. PATTERN (J)	Pattern Deduction	( ) % =		( ) % =	
	Final Landscape Rating					
FINAL RATING			3H		3H	

Reclamation Inc.

LCCAAA AGRICULTURAL CAPABILITY RATING FORM

Location: S1/2 27-21-29W4			O.BL Site 3		Ca.BL Site 4	
			Value	% Ded.	Value	% Ded.
SOILS (S)	1. SURFACE FACTORS	Texture (M) (P-PE = -260)	L	25	L	25
		Subsoil texture	CL	0	CL	0
		Structure (D)	gran	0	gran	0
		Org. Matter (F)	10YR2/2	0	10YR2/2	0
		Depth of Topsoil (cm) (E)	12	1	12	8
		Acidity (V)	–	–	–	–
		Salinity (N)	–	–	–	–
		Sodicity (Y)	–	–	–	–
		Calcareous (K)	–	–	10	10
		Peaty Surface (O)	–	–	–	–
	Basic Soil Rating		74		57	
	2. SUBSOIL FACTORS	Structure (D)	sab	0	sab	0
		Depth (R, D, M) (cm)	40	35	40	35
		Acidity (V)	–	–	–	–
		Salinity (N)	–	–	–	–
		Sodicity (Y)	–	–	–	–
	Subsoil Deduction		30% = 26		35 % = 20	
	Interim Soil Rating		48		37	
	3. DRAINAGE (W)		% =		% =	
	Final Soils Rating		48		37	
LANDSCAPE (L) Region 2-4	1. SLOPE (T)	Steepness (%)	3		3	
		Length (m)	50		80	
		LS Factor	(0.4) 15		(0.4) 15	
	Basic Landscape Rating		85		85	
	2. STONINESS (P)	Stoniness Deduction	(S3) 50 % = 42.5		(S3) 50% = 42.5	
	Interim Landscape Rating		42.5		42.5	
	3. PATTERN (J)	Pattern Deduction	( ) % =		( ) % =	
	Final Landscape Rating					
FINAL RATING			4PM		4PM	

Reclamation Inc.

LCCAAA AGRICULTURAL CAPABILITY RATING FORM

Location: S1/2 27-21-29W4			O.HG (ca & sa) Site 5		R.BL (ca) Site 6	
			Value	% Ded.	Value	% Ded.
SOILS (S)	1. SURFACE FACTORS	Texture (M) (P-PE = -260)	CL	20	CL	20
		Subsoil texture	C	0	CL	0
		Structure (D)	gran	0	gran	0
		Org. Matter (F)	10YR2/1	0	10YR2/2	0
		Depth of Topsoil (cm) (E)	15	5	12	8
		Acidity (V)	--	--	--	--
		Salinity (N)	6	35	--	--
		Sodicity (Y)	--	--	--	--
		Calcareous (K)	10	10	25	30
		Peaty Surface (O)	--	--	--	--
	Basic Soil Rating		30		42	
	2. SUBSOIL FACTORS	Structure (D)	sab-mass	0	mass	50
		Depth (R, D, M) (cm)	--	--	--	--
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
	Subsoil Deduction		30% = 9		50 % = 21	
	Interim Soil Rating		21		21	
	3. DRAINAGE (W)		50% = 10.5		% =	
	Final Soils Rating		10.5		21	
LANDSCAPE (L) Region 2-4	1. SLOPE (T)	Steepness (%)			3	
		Length (m)			15	
		LS Factor	( )		(0.3) 10	
	Basic Landscape Rating				90	
	2. STONINESS (P)	Stoniness Deduction	() % =		(S3) 40% = 36	
	Interim Landscape Rating				54	
	3. PATTERN (J)	Pattern Deduction	( ) % =		( ) % =	
	Final Landscape Rating					
FINAL RATING			6WN		5DK	

Reclamation Inc.

LCCAAA AGRICULTURAL CAPABILITY RATING FORM

Location: S1/2 27-21-29W4			O.BL Site 7		Hu.LG (ca) Site 8	
			Value	% Ded.	Value	% Ded.
SOILS (S)	1. SURFACE FACTORS	Texture (M) (P-PE = -260)	L	25	CL	20
		Subsoil texture	CL	0	CL	0
		Structure (D)	gran	0	gran	0
		Org. Matter (F)	10YR2/2	0	10YR2/1	0
		Depth of Topsoil (cm) (E)	10	2	15	5
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
		Calcareous (K)	--	--	20	20
		Peaty Surface (O)	--	--	--	--
	Basic Soil Rating		73		55	
	2. SUBSOIL FACTORS	Structure (D)	sab	0	platy	50
		Depth (R, D, M) (cm)	--	--	--	--
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
	Subsoil Deduction		% =		% =	
	Interim Soil Rating		73		55	
	3. DRAINAGE (W)		% =		60% = 33	
	Final Soils Rating		73		22	
LANDSCAPE (L) Region 2-4	1. SLOPE (T)	Steepness (%)	7			
		Length (m)	30			
		LS Factor	(0.8) 25		( )	
	Basic Landscape Rating		75			
	2. STONINESS (P)	Stoniness Deduction	(S2) 30% = 22.5		( ) % =	
	Interim Landscape Rating		52.5			
	3. PATTERN (J)	Pattern Deduction	( ) % =		( ) % =	
	Final Landscape Rating					
FINAL RATING			3HT		5W	

Reclamation Inc.

LCCAAA AGRICULTURAL CAPABILITY RATING FORM

Location: S1/2 27-21-29W4			CA.BL Site 9		CA.BL Site 10	
			Value	% Ded.	Value	% Ded.
SOILS (S)	1. SURFACE FACTORS	Texture (M) (P-PE = -260)	fSL	35	fSL	35
		Subsoil texture	SCL	0	fSL	0
		Structure (D)	gran	0	gran	0
		Org. Matter (F)	10YR2/2	0	10YR2/2	0
		Depth of Topsoil (cm) (E)	10	10	10	10
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
		Calcareous (K)	20	20	20	20
		Peaty Surface (O)	--	--	--	--
	Basic Soil Rating		35		35	
	2. SUBSOIL FACTORS	Structure (D)	--	--	--	--
		Depth (R, D, M) (cm)	--	--	--	--
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
	Subsoil Deduction		% =		% =	
	Interim Soil Rating		35		35	
	3. DRAINAGE (W)		% =		% =	
	Final Soils Rating		35		35	
LANDSCAPE (L) Region 2-4	1. SLOPE (T)	Steepness (%)	5		5	
		Length (m)	120		70	
		LS Factor	(1.0)	30	(0.8)	25
	Basic Landscape Rating		70		75	
	2. STONINESS (P)	Stoniness Deduction	(S1) % =		(S1) % =	
	Interim Landscape Rating					
	3. PATTERN (J)	Pattern Deduction	( ) % =		( ) % =	
	Final Landscape Rating					
FINAL RATING			4M		4M	

Reclamation Inc.

LCCAAA AGRICULTURAL CAPABILITY RATING FORM

Location: S1/2 27-21-29W4			R.BL (ca) Site 11		O.BL Site 12	
			Value	% Ded.	Value	% Ded.
SOILS (S)	1. SURFACE FACTORS	Texture (M) (P-PE = -260)	fSL	35	CL	20
		Subsoil texture	SL	0	CL	0
		Structure (D)	gran	0	gran	0
		Org. Matter (F)	10YR2/2	0	10YR2/1	0
		Depth of Topsoil (cm) (E)	12	8	15	0
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
		Calcareous (K)	20	20	--	--
		Peaty Surface (O)	--	--	--	--
	Basic Soil Rating		37		80	
	2. SUBSOIL FACTORS	Structure (D)	--	--	--	--
		Depth (R, D, M) (cm)	--	--	--	--
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
	Subsoil Deduction		% =		% =	
	Interim Soil Rating		37		80	
	3. DRAINAGE (W)		% =		% =	
	Final Soils Rating		37		80	
LANDSCAPE (L) Region 2-4	1. SLOPE (T)	Steepness (%)	3		4	
		Length (m)	75		60	
		LS Factor	(0.4)	15	(0.5)	20
	Basic Landscape Rating		85		80	
	2. STONINESS (P)	Stoniness Deduction	( ) % =		(S2) 30% = 24	
	Interim Landscape Rating				56	
	3. PATTERN (J)	Pattern Deduction	( ) % =		( ) % =	
	Final Landscape Rating					
FINAL RATING			4M		3HT	

Reclamation Inc.

LCCAAA AGRICULTURAL CAPABILITY RATING FORM

Location: S1/2 27-21-29W4			R.BL Site 13		Ca.BL Site 14	
			Value	% Ded.	Value	% Ded.
SOILS (S)	1. SURFACE FACTORS	Texture (M) (P-PE = -260)	fSL	35	L	25
		Subsoil texture	S	15	CL	0
		Structure (D)	gran	0	gran	0
		Org. Matter (F)	10YR2/1	0	10YR2/2	0
		Depth of Topsoil (cm) (E)	20	0	12	8
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
		Calcareous (K)	--	--	10	10
		Peaty Surface (O)	--	--	--	--
	Basic Soil Rating		50		57	
	2. SUBSOIL FACTORS	Structure (D)	mass	50	--	--
		Depth (R, D, M) (cm)	--	--	25	50
		Acidity (V)	--	--	--	--
		Salinity (N)	--	--	--	--
		Sodicity (Y)	--	--	--	--
	Subsoil Deduction		50% = 25		50% = 28.5	
	Interim Soil Rating		25		28.5	
	3. DRAINAGE (W)		% =		% =	
	Final Soils Rating		25		28.5	
LANDSCAPE (L) Region 2-4	1. SLOPE (T)	Steepness (%)			3	
		Length (m)			50	
		LS Factor	( )		(0.4) 15	
	Basic Landscape Rating				85	
	2. STONINESS (P)	Stoniness Deduction	( ) % =		(S3) 60% = 51	
	Interim Landscape Rating				34	
	3. PATTERN (J)	Pattern Deduction	( ) % =		( ) % =	
	Final Landscape Rating					
FINAL RATING			5M		5PM	

Reclamation Inc.

LCCAAA AGRICULTURAL CAPABILITY RATING FORM

Location: S1/2 27-21-29W4			O.BL Site 15			
			Value	% Ded.	Value	% Ded.
SOILS (S)	1. SURFACE FACTORS	Texture (M) (P-PE = -260)	fSL	35		
		Subsoil texture	fSL	0		
		Structure (D)	gran	0		
		Org. Matter (F)	10YR2/2	0		
		Depth of Topsoil (cm) (E)	15	0		
		Acidity (V)	--	--		
		Salinity (N)	--	--		
		Sodicity (Y)	--	--		
		Calcareous (K)	--	--		
		Peaty Surface (O)	--	--		
	Basic Soil Rating		65			
	2. SUBSOIL FACTORS	Structure (D)	--	--		
		Depth (R, D, M) (cm)	--	--		
		Acidity (V)	--	--		
		Salinity (N)	--	--		
		Sodicity (Y)	--	--		
	Subsoil Deduction		% =		% =	
	Interim Soil Rating		65			
	3. DRAINAGE (W)		% =		% =	
	Final Soils Rating		65			
LANDSCAPE (L) Region 2-4	1. SLOPE (T)	Steepness (%)				
		Length (m)				
		LS Factor	( )		( )	
	Basic Landscape Rating					
	2. STONINESS (P)	Stoniness Deduction	( ) % =		( ) % =	
	Interim Landscape Rating					
	3. PATTERN (J)	Pattern Deduction	( ) % =		( ) % =	
	Final Landscape Rating					
FINAL RATING			3H			

3-D Reclamation Inc.

BLAIR NICHOLSON, B.Sc., P.Ag.

GENERAL EXPERIENCE AND EDUCATION

Consultant, 3-D Reclamation Inc., 1996-present.
Consultant, Jim Lore & Associates Ltd., 1993-1996.
Land Classifier, Alberta Agriculture, Land Evaluation & Reclamation Branch, 1980-1993.
Land Use Officer, Department of Primary Industry, Papua New Guinea, 1978-1980.
Soil Technologist, Alberta Agriculture, 1976-1978.
Assistant Agricultural Fieldman County of Forty Mile, 1975.

H_2S Alive. Allstar Safety System Ltd., 1995
WHMIS Fundamentals. Allstar Safety System Ltd., 1995.
B.Sc. in Agriculture. Major: Soil Science. University of Guelph, Ontario. 1974.
St. John Ambulance Standard First Aid and CPR, current.
Handling and Transporting of Dangerous Goods. Tomark Compliance Centre, current.
Reclamation Criteria for Wellsites and Associates Facilities. Petroleum Industry Training Service. 1995.
Pipeline Damage - Prevention Seminar. Energy Resources Conservation Board. 1991.
Terrain Analysis of Western Canada. University of Alberta.
Southern Alberta Bedrock Studies. Alberta Agriculture.
Airphoto Interpretation. University of Alberta.
Salinity Identification. Alberta Agriculture.
Irrigation Systems and Economics. Alberta Agriculture.

PROFESSIONAL EXPERIENCE

Reclamation of the effects of elemental sulphur deposition on agricultural and forest soils.
Detailed and semi-detailed soil surveys.
Assessment of surface soil conditions on and off pipeline rights of way.
Land use potential studies leading to the production of land capability maps.
Level III land classification reports for irrigation feasibility and planning studies.
Level II reports required for irrigation water rights and for identifying land suitable for irrigation.
Classification of land under guidelines of Canada Land Inventory Soil Capability for Agriculture rating system and the Land Capability Classification for Arable Agriculture in Alberta rating system for use in urban planning and country residential development applications.
Soil surveys of proposed pipeline projects in support of applications for development and reclamation approval.
Detailed site assessment reports of wellsite conditions to ensure that all criteria (soil, landscape, vegetation) in support of applications for Wellsite Reclamation Certificates are met.

PROFESSIONAL ASSOCIATIONS

Alberta Institute of Agrologists, P.Ag.
Agricultural Institute of Canada