SE 14-21-01 W5 AND NE 11-21-1 W5 - BOUNDARY ADJUSTMENT

R.M.

852 Mr. Chase moved that Council approve the boundary adjustment whereby 24.22 acres from SE 14-21-1 W5 is consolidated with Plan 7883JK Block 1 in NE 11-21-1 W5, subject to the following conditions:

1. Boundary Adjustment and Consolidation to be effected by Plan of Survey;
2. road widening requirements as deemed necessary by the Public Works Department;
3. arrears of taxes on the existing parcel to be paid prior to finalization of the subdivision;

and furthermore;

it is the applicants' responsibility to ensure that the site plan is surveyed according to municipal requirements.

CARRIED

June 28th/2001

SHORE - AREA STRUCTURE PLAN - S.E. 01-20-01 W5

BYLAW 91/2001

Bylaw 91/2001 was reintroduced into the meeting to adopt the Shore Development Area Structure Plan located in SE 1-20-1 W5.

853 Mr. Laycraft moved second reading.

THE BYLAW WAS PASSED FOR TWO READINGS

Mr. Taylor moved third reading.

THE BYLAW WAS PASSED

SWATZKY/REISER - LAND USE BYLAW AMENDMENT - S.W. 13-19-27 W4

BYLAW 112 /2001

Bylaw 112 /2001 was introduced into the meeting to authorize the amendment of Plan 9911676 Block 2 Lot 5 in SW 13-19-27 W4 from the Residential District land use rules in order to permit the future subdivision of two additional parcels of .165 acres in size.

854 Mr. Top moved first reading.

THE BYLAW WAS PASSED FOR ONE READING

Prior to any further consideration, Council will need to receive the sewer study report presently being conducted in Blackie.

ALDOREE FARMS LTD. - BOUNDARY ADJUSTMENT - S.W. 18-20-26 W4

855 Mr. Laycraft moved that Council approve the boundary adjustment whereby 20 acres from SW 18-20-26 W4 is consolidated with Plan 9411936 Lot 1 in SW 18-20-26 W4, subject to the following conditions:

1. Boundary Adjustment and Consolidation to be effected by Plan of Survey;

COPY

April 25, 2000

Planning Protocol Inc.
c/o Rod Potrie
3916 - 1 St. NE
Calgary, AB T2E 3E3
CANADA

Dear Mr. Potrie:

Re: Area Structure Plan Requirement - PTN: S.E. 01-20-01-W5M

Please be advised that at its April 13, 2000 meeting, Council passed the following resolution:

> MOVED that the landowners be required to prepare a comprehensive Area Structure Plan for any further applications for subdivision in SE 01-20-01-W5M as the additional phase would create more than eight parcels in the quarter-section.

Should you require any further assistance please contact Coreena Carr of our Planning Department.

Sincerely,
MUNICIPAL DISTRICT OF FOOTHILLS NO.31

Judy Gordon
Coordinator/Planning Department

JG/sj

cc: John & Racheal Shore

J. AND R. SHORE - SE 1-20-1 W5

522 Mr. McLean moved that the landowners be required to prepare a comprehensive Area Structure Plan for any further applications for subdivision in SE 1-20-1 W5 as the additional phase would create more than eight parcels in the quarter-section.

CARRIED

SHORE DEVELOPMENT

AREA STRUCTURE PLAN

PREPARED FOR THE

M.D. OF FOOTHILLS NO. 31

BY:

PLANNING PROTOCOL INC.
3916 – 1 Street N.E.
Calgary, Alberta T2E 3E3
Tel: 230-5522, Fax: 230-5924

June 2001

Table of Contents:

1.0 Introduction:

1.1 Purpose of the Plan:

The Shore Development Area Structure Plan has been prepared pursuant to Section 633(1) of the Municipal Government Act and is in accordance with the requirements of the "Guidelines for the Preparation of Area Structure Plans" as adopted by the Municipality by resolution of Council.

This plan provides a level of detail greater than the Foothills General Municipal Development Plan and is intended to guide further subdivision and development in the plan area.

This Plan examines the following issues pertaining to the study area property:

a) the proposed land use
b) the sequence of development
c) the location of proposed and existing roads and public utilities
d) the location of reserves
e) water supply and public sewage provisions
f) the development potential of the land
g) impacts on surrounding land uses

1.2 Background to the ASP:

Council passed a resolution on April 13, 2000, requiring that the landowners be required to prepare a comprehensive Area Structure Plan for any further applications for subdivision in the SE 01-20-01-W5M, as the additional phase would create more than eight parcels in the quarter section. The Shore Development Area Structure Plan was prepared in response to that decision, and outlines specific policies to guide the future subdivision and subsequent development on remaining lands within the SE 01-20-01-W5M.

The parent parcel represents the remaining lands after four previous subdivisions have taken place. These subdivisions are illustrated in Figures 4 through 7. The previous subdivisions are registered with the South Alberta Land Registration District, as summarized by the following table:

Plan	Number	Hectares	Acres More or Less
Roadway	731376	0.405	1.00
Descriptive	9210796	2.02	4.99
Subdivision	9311031	6.22	15.37
Subdivision	9610003	5.04	12.45
Subdivision	0010421	14.5	35.8

(A copy of the remote land title search performed in January 2001 is included in the Appendix.)

The ¼ section is dissected by a wide valley, which lies on the diagonal from the southwest to the northeast. Flanking the valley bottom on both sides is an escarpment or ridge. This ASP proposes to redesignate lands and permit further residential development on the northwestern region of the quarter section.

The area generally has seen a history of redesignation and subdivision. Numerous three and four acre applications, as well as a number of larger of larger applications for subdivision have been applied for, and approved by the M.D. of Foothills Council. This area "The Gore Line" is very desirable because of the great mountain views and proximity to Okotoks. The topography and natural amenities found on this property are suitable for subdivision of the lands into smaller, country residential parcels.

1.3 The Approval Process

The Shore Development Area Structure Plan has been prepared in accordance with of the M.D. of Foothills Municipal Development Plan and pursuant to the Alberta Municipal Government Act (1994). The plan has been circulated to M.D. Planning staff, and has been reviewed and amended accordingly. This plan will be presented to Council as the Shore Development Area Structure Plan, and circulated among various government agencies and adjacent landowners for their feedback. If the ASP is adopted, a Bylaw to redesignate the lands will then be proposed to Council for consideration. If the Bylaw is adopted, the developer will submit an application for subdivision.

1.4 Plan Implementation

The Shore Development Area Structure Plan, adopted by Bylaw in accordance with Section 633 of the Municipal Government Act, shall become a statutory document of the Municipal District of Foothills No. 31.

Pursuant to Section 692(1), (f) of the Municipal Government Act, Council will hold a Public Hearing with respect to the proposed Bylaw.

The Shore Development Area Structure Plan does not supersede, repeal, replace, relegate or otherwise diminish any other statutory plans in effect in the planning area. No development or redevelopment shall be approved unless it conforms to this Plan and any other applicable provisions of any other statutory plan in effect in the planning area.

1.5 Plan Review and Amendment

This ASP is designed to establish long-term planning strategies and guidelines for the Plan Area. Due to this long-term nature, changing economic, social or environmental considerations may require periodic review and occasional amendment to the Plan.

Council should review this Plan from time to time and amend if necessary, and shall hold a public hearing as required by Section 692 (1) of the Municipal Government Act prior to giving second reading to any proposed amendment.

1.6 Legislative Framework

1.6.1 The Municipal Government Act

According to Section 633 (1) (c) of the Municipal Government Act, an Area Structure Plan 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
(v) may contain any other matters the council considers necessary.

1995 c24 s95

1.6.2 The Municipal Development Plan

The Shore Area Structure Plan is prepared in accordance with Bylaw 183/2000 of the Municipal District of Foothills No. 31, and Section 5.3.5 of the Municipal Development Plan, which reads:

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 except where the applicant does not intend to phase their proposal and the balance parcel can not be further subdivided. 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;
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.

1.7 Interpretation

In this plan, the following definitions shall be adopted:

a) "Study Area or site plan" means the property defined by the legally registered boundaries of the site that is subject to the Shore Development ASP
b) "Council" means the Council of the M.D. of Foothills No. 31
c) "Balance Lands" means all the lands within the plan area which are not designated for residential, municipal reserve, roadway, and utility uses by the plan
d) ASP means Area Structure Plan as defined in Section 633 of the Municipal Government Act of the Province of Alberta (1994, Chapter M-26.1)
e) MGA stands for Municipal Government Act (1994, Chapter M-26.1) and applies to the governing planning document for the province of Alberta.
f) "M.D." means the Municipal District of Foothills No. 31
g) "Subdivision Approving Authority" means the Council of the M.D. of Foothills No. 31
h) "Municipal Reserve / Public Reserve" (MR) as defined by section 666(1) of the Municipal Government Act of the Province of Alberta
i) "Environmental Reserve" (ER) as defined by section 664(1) of the Municipal Government Act of the Province of Alberta

2.0 The Plan Area

2.1 Regional / Municipal Location:

The study area is located approximately 3.0 miles due south of Okotoks and 1.5 miles west on 434 Avenue (as shown in Figures 1 and 2).

2.2 Definition of the Plan Area

The subject property includes lands legally described as the balance portion of S.E. 1-20-1 W5M, and Lot 10 from subdivision plan 0010421. The plan area contains 101.87 acres more or less.

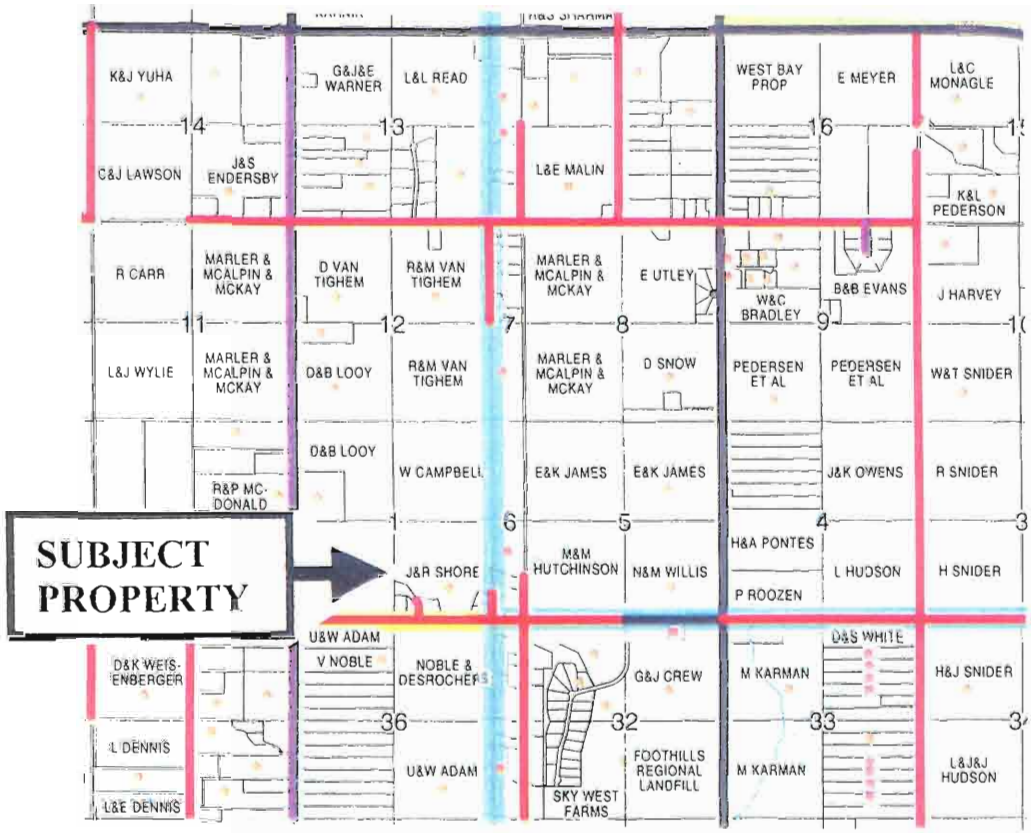
The plan area is shown in Figure 2. The titles for the plan area are included in Appendix II, Land Ownership.

2.2.2 General Physical Description

The land topography is mostly undulating to rolling, with slopes less than 15%. The quarter section is dissected by a wide valley, which lies on the diagonal from the southwest to the northeast. The steeply sloping coulee walls were dedicated as Environmental Reserve during the last subdivision (0010421), as are shown in green in Figure 9. The valley floor is nearly level.

An Agricultural Capability Assessment undertaken by Graecam Inc. in March of 2000 reported that the soils in the areas proposed for country residential parcels are unsuitable for agricultural purposes. The Agricultural Capability Assessment is included in the appendix.

FIGURE 1



JOHN AND RACHEL SHORE

M.D. OF FOOTHILLS NO. 31

PLAN SHOWING

STUDY AREA LOCATOR MAP

AFFECTING

S.E. 1/4, Sec. 1, Twp. 20, Rge. 1, W. 5 M.

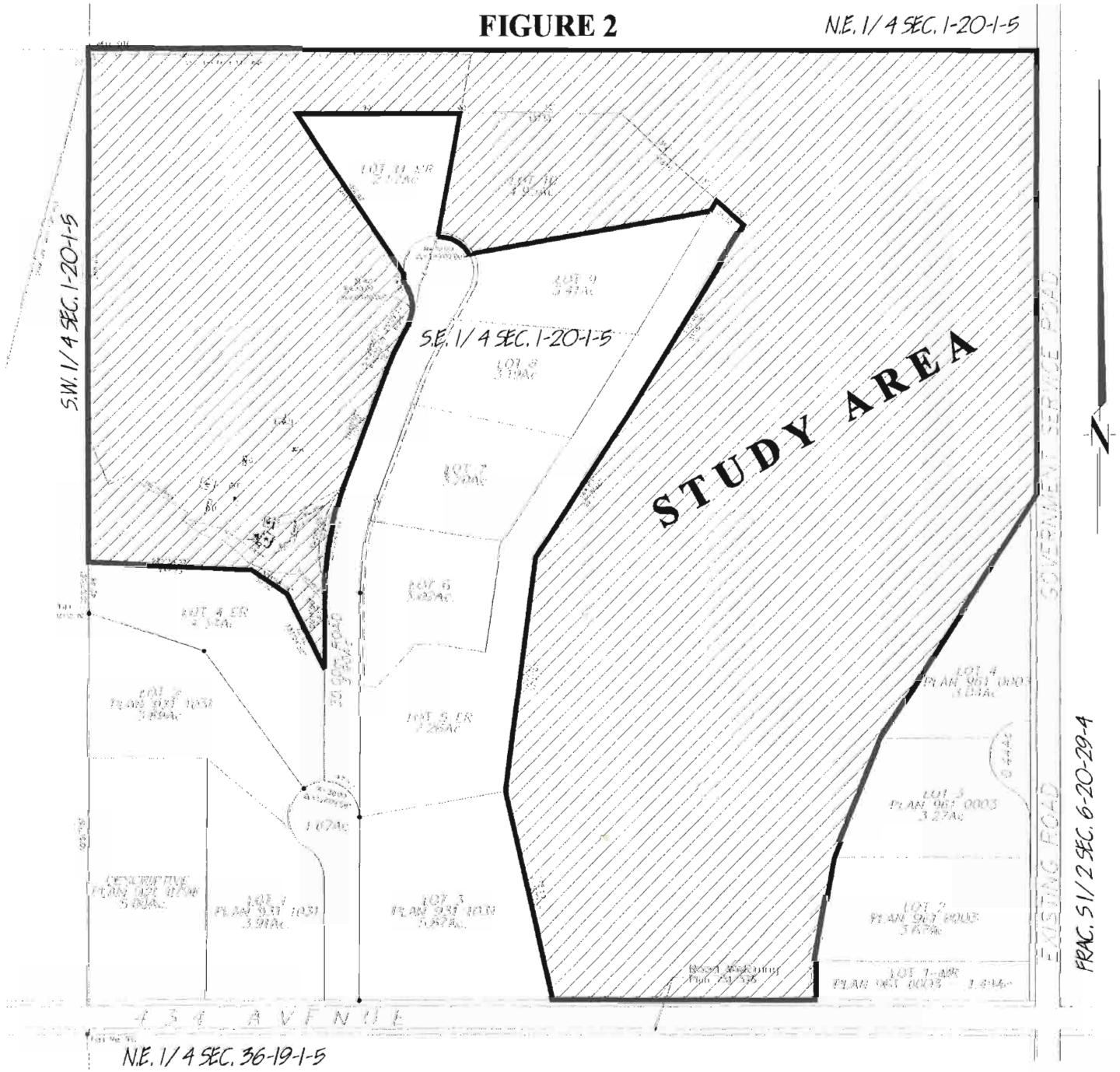
SCALE 1:5000 METRES 0 50 100 150

ALL DIMENSIONS SHOWN ARE IN METRES AND THEREOF SUBJECT TO CONFIRMATION IN FIELD AT LEGAL SURVEY STAGE

		DATE	FILE NO.
DRAWN BY	K.W.	JUNE 16/00	P 110-01
CHECKED BY	M.S.	JUNE 16/00	

PLANNING PROTOCOL INC. PHONE: (403) 230-5522
FAX: (403) 230-5924
316 1st STREET NE CALGARY, ALBERTA T2E 3G5 E-MAIL: lmeacock@telusplanet.net

FIGURE 2



JOHN & RACHEL SHORE

M.D. OF FOOTHILLS NO. 31

PLAN SHOWING

STUDY AREA

AFFECTING

S.E. 1/4, Sec. 1, Twp. 20, Rge. 1, W. 5 M.

SCALE: 1:5000

METRES 0 5 10 20 50 100

ALL DIMENSIONS SHOWN ARE IN METRES AND THEREOF SUBJECT TO CONFIRMATION IN FIELD AT LEGAL SURVEY STAGE

BOUNDARY SHOWN THUS -

		DATE	F.I.L.E. NO.
DRAWN BY	K. WONG	JAN 16/01	P 110-01
CHECKED BY	R. POIRE	JAN 16/01	

PLANNING PROTOCOL INC.
3016 - 1st STREET N.E. CALGARY, ALBERTA T2E 3E3
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E-MAIL: planningprotocol@telusplanet.net

CAD FILE: 20001001

An Alberta Land Surveyor's Real Property Report prepared by Tronnes Surveys shows the existing structures on the balance lands. The buildings included within the balance on the west side of the cul-de-sac roadway include a residential dwelling, 4 horse shelters, a garage, hay barn, and wood shed.

Almost all of the existing residential lots within the quarter section are already occupied by homes. The internal roadway is mostly paved with asphalt surfacing. The shorter cul-de-sac, which begins at the entrance to the subdivision and provides access to lots 1 to 5 is made of gravel. Residential parcels on the western portion of the balance lands would therefore complement the existing development.

The area generally is quite popular because of the great mountain views and proximity to Okotoks. The topography and natural amenities found on this property are also suitable for subdivision of the lands into smaller, country residential parcels.

3.0 Plan Goals and Objectives:

3.1 Goals and Objectives of the Plan Area

The primary objective of the Shore Development Area Structure Plan is to establish a framework for planning and subdivision for the remaining balance of the study area.

More specifically, this plan aims to:

1) To act as a guide under which the Municipal District can review and evaluate specific development proposals.
2) Provide a framework for subdivision and development of the balance lands on S.E. 01-20-01-W5M.
3) To establish policies which will direct proposed land use, population density, an internal transportation system, location and methods of utility servicing, phasing of development, designation and management of environmental and municipal reserve lands, site specific issues such as escarpment and setbacks, and such other matters as Council deems necessary.

3.2 Principles of Development:

The principles of development are:

1) To ensure that all development is in accordance with current statutory policy and municipal standards.
2) To ensure that school and recreational land needs are met through the provision of municipal reserve.

3) Encourage recreational uses that are compatible with the rural setting and take advantage of the unique features of the site, in accordance with the Municipal Development Plan
4) To develop an efficient internal road system, that integrates safely with the existing road system.
5) To phase development in a logical and efficient manner.
6) To ensure that all development on or near environmentally significant areas is in accordance with policies satisfactory to the M.D. of Foothills and Alberta Environment.
7) To provide a design and locate services in a way that eliminates additional costs to the M.D. of Foothills.

4.0 Plan Policies:

4.1 The Plan Concept

Under this plan, additional lands are designated for country residential use, and lot 10 from subdivision 0010421 will be reconsolidated into the balance lands. Four new country residential parcels will be created, ranging in size from 5.99 to 6.50 acres. No additional lands will be designated for Environmental Reserve. Municipal reserve dedication shall be taken to the satisfaction of Council.

Figure 3 conceptually illustrates the proposed land use for the plan area.

4.2 Land Use Component

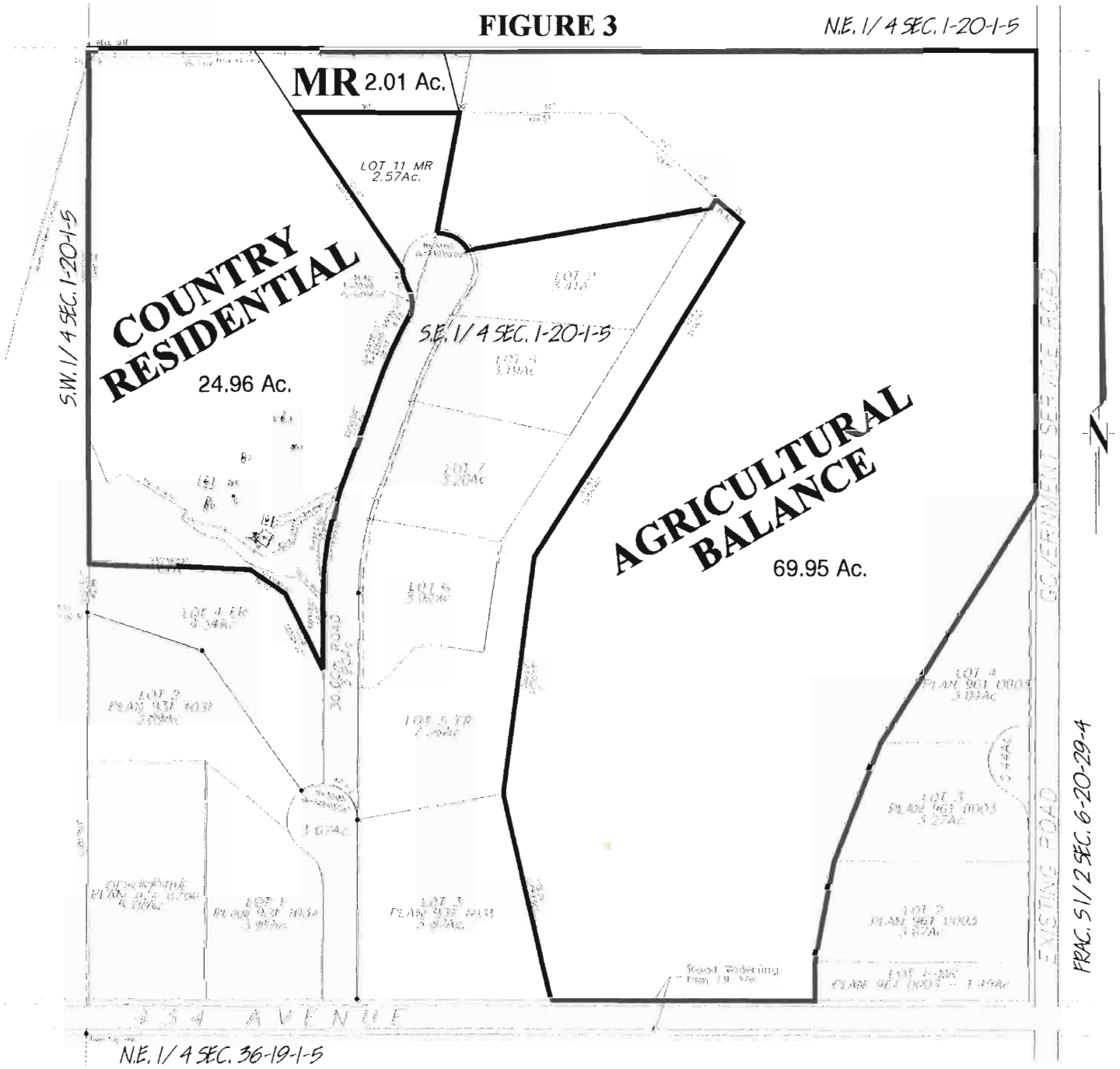
4.2.1 Country Residential

This plan proposes to designate an additional 24.96 acres for country residential land use, and to create 4 additional country residential lots.

Policies:

1) The country residential development shall conform to the provisions of the Land Use Bylaw including the general and specific setback requirements from highways, property lines and internal roads.
2) The country residential lot sizes shall be between 5.99 and 6.50 acres in size.
3) All subdivision and Development shall be in conformity with the provisions of the Municipal Government Act, the Subdivision and Development Regulations.
4) All subdivision and development shall conform to the relevant guidelines of Alberta Environment and Alberta Transportation and Utilities.

FIGURE 3



JOHN & RACHEL SHORE

M.D. OF FOOTHILLS NO. 31

PLAN SHOWING

PROPOSED LAND USE

AFFECTING

S.E. 1/4, Sec. 1, Twp. 20, Rge. 1, W. 5 M.

SCALE: 1:5000 METRES 0 5 10 20 50 150

ALL DIMENSIONS SHOWN ARE IN METRES AND THEREOF SUBJECT TO CONFIRMATION IN FIELD AT LEGAL SURVEY STAGE

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3916 - 1st STREET N.E. CALGARY, ALBERTA T2E 3E3 E-MAIL: planningprotocol@telusplanet.net

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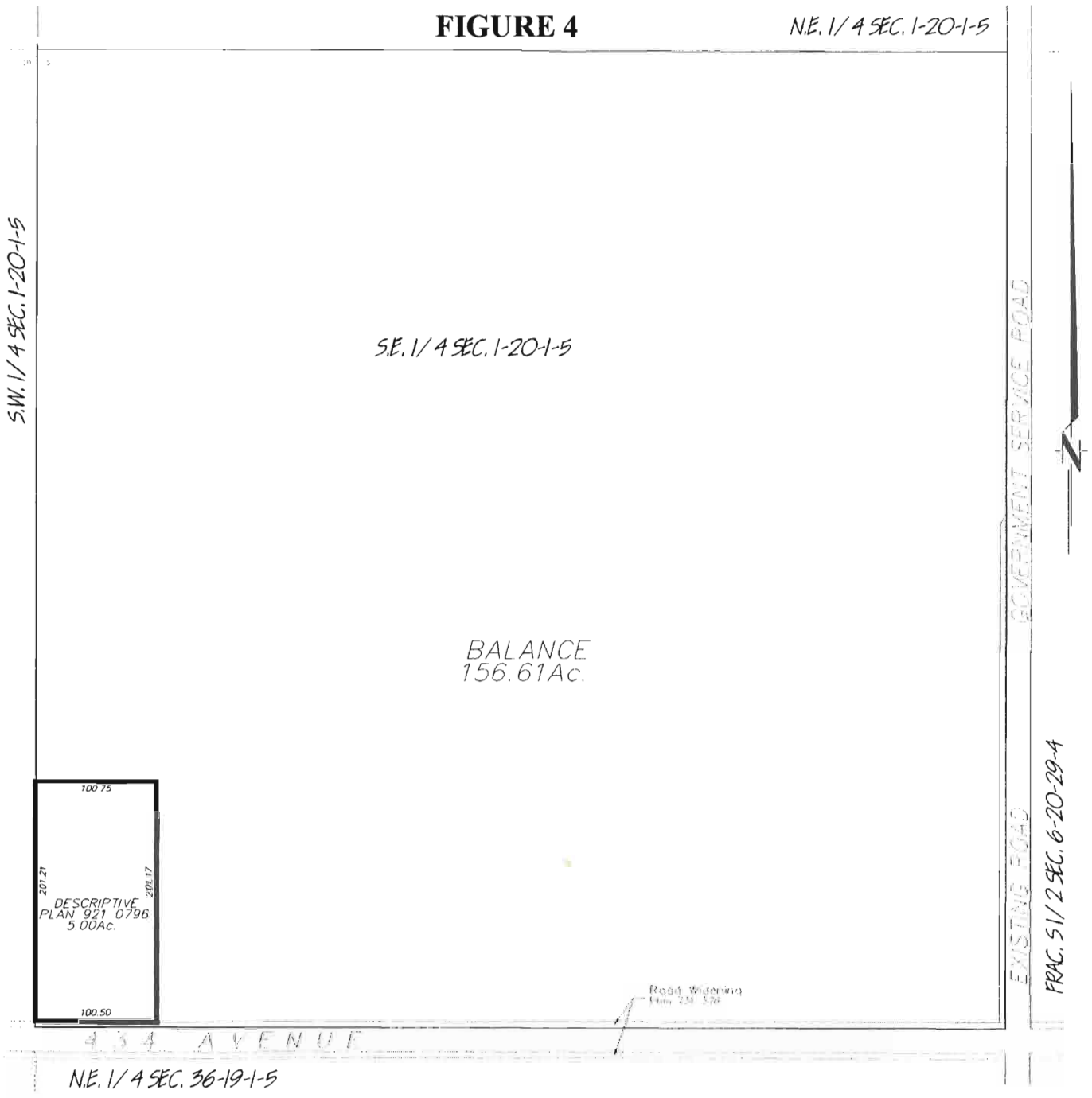
FIGURE 4



JOHN & RACHEL SHORE

M.D. OF FOOTHILLS NO. 31

PLAN SHOWING

PLAN 921 0796 SUBDIVISION LAYOUT

AFFECTING

S.E. 1/4, Sec. 1, Twp. 20, Rge. 1, W. 5 M.

SCALE: 1:5000 METRES 0 5 10 20 50 100

ALL DIMENSIONS SHOWN ARE IN METRES AND THEREOF SUBJECT TO CONFIRMATION IN FIELD AT LEGAL SURVEY STAGE

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PLANNING PROTOCOL INC.
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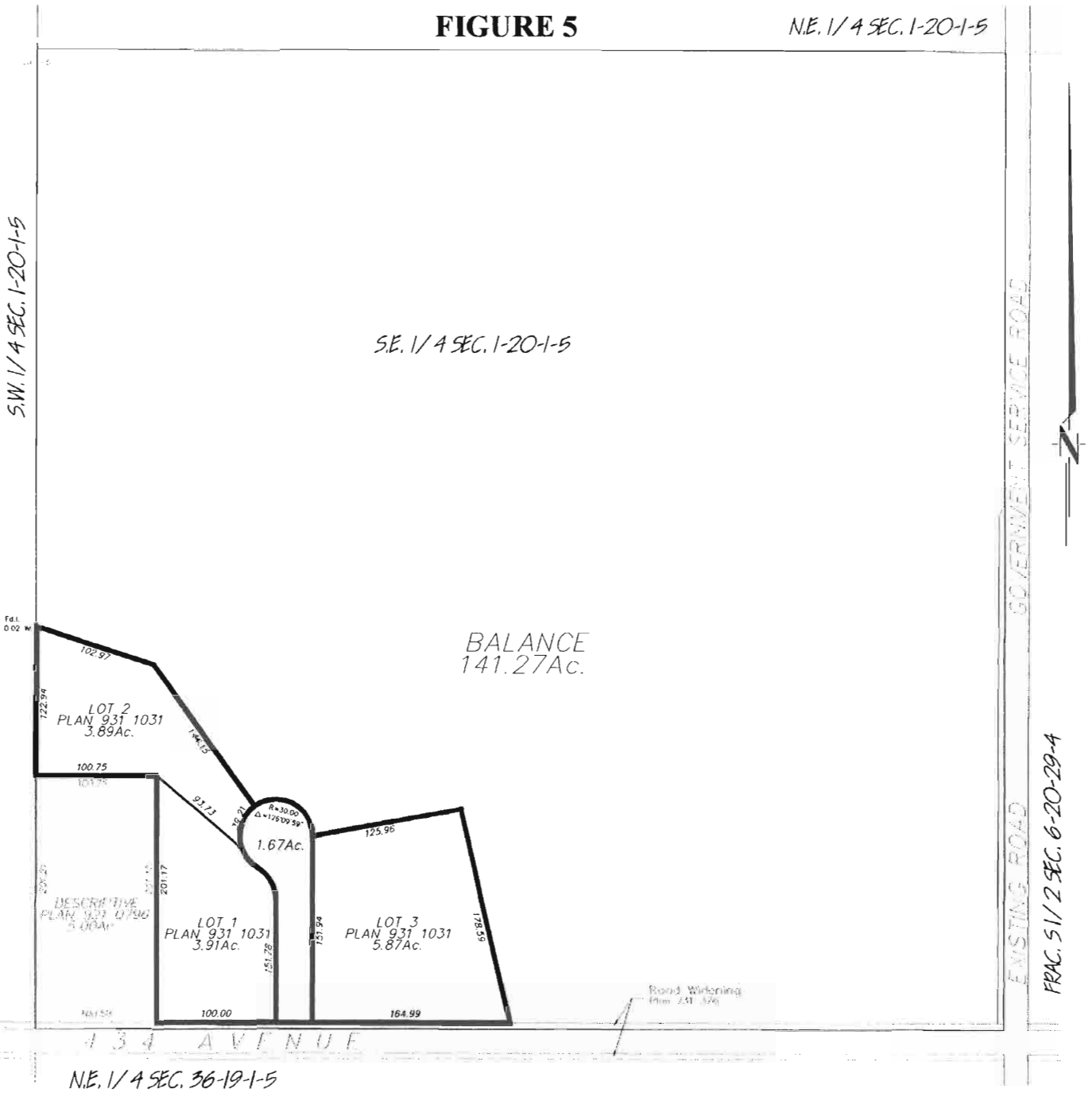
E-MAIL: planningprotocol@telusplanet.net

CAD FILE: 20001001

FIGURE 5



JOHN & RACHEL SHORE

M.D. OF FOOTHILLS NO. 31

PLAN SHOWING

PLAN 931 1031 SUBDIVISION LAYOUT

AFFECTING

S.E. 1/4, Sec. 1, Twp. 20, Rge. 1, W. 5 M.

SCALE: 1:5000 METRES 0 5 10 20 50 150

ALL DIMENSIONS SHOWN ARE IN METRES AND THEREOF SUBJECT TO CONFIRMATION IN FIELD AT LEGAL SURVEY STAGE

BOUNDARY SHOWN THUS -

		DATE	FILE NO.
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CHECKED BY	R. POTRIE	JAN. 16/01	

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3916 - 1st STREET N.E. CALGARY, ALBERTA T2E 3E3 FAX: (403) 230-0335
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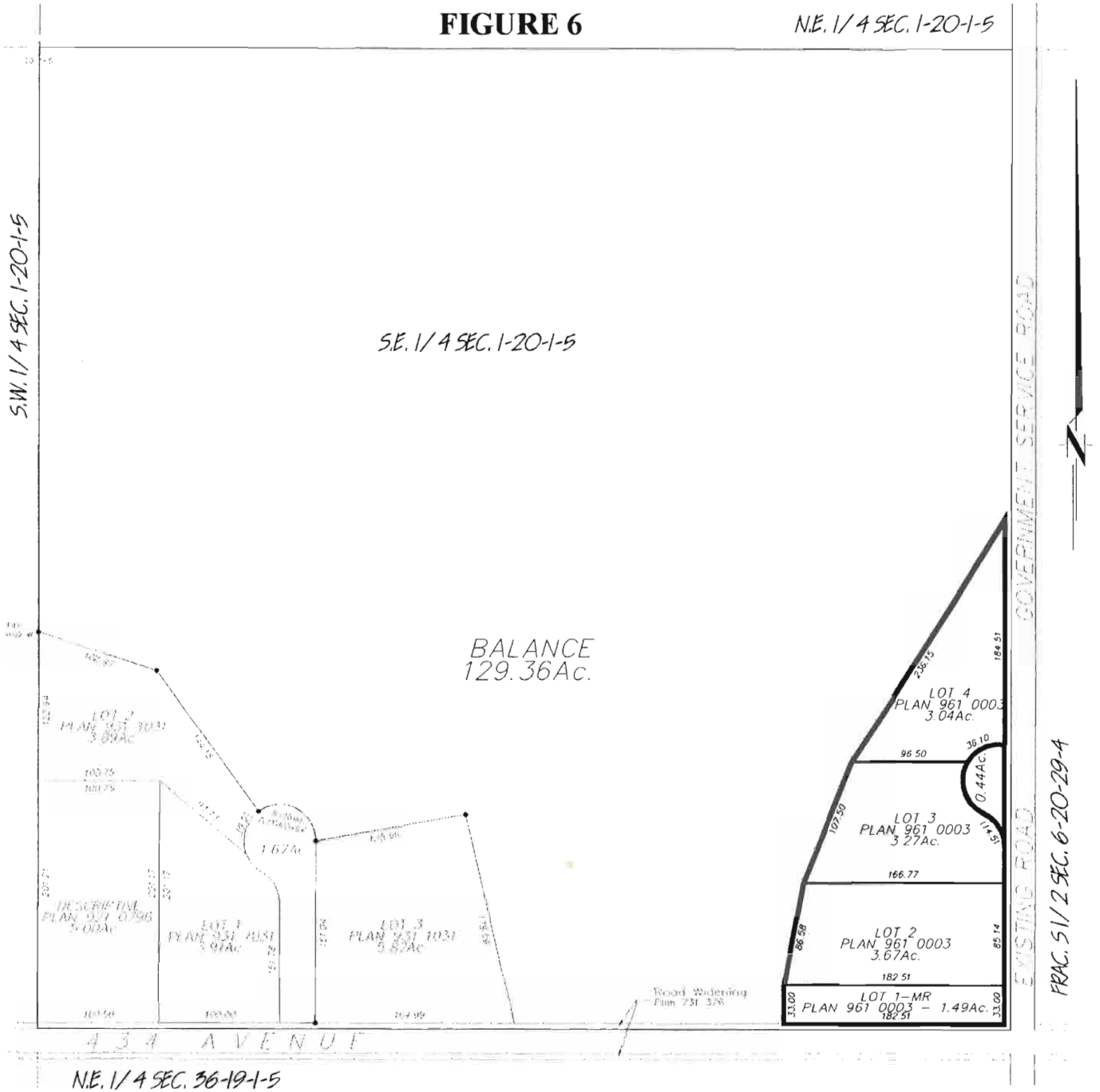
FIGURE 6



JOHN & RACHEL SHORE

M.D. OF FOOTHILLS NO. 31

PLAN SHOWING

PLAN 961 0003 SUBDIVISION LAYOUT

AFFECTING

S.E. 1/4, Sec. 1, Twp. 20, Rge. 1, W. 5 M.

SCALE 1:5000 METRES 0 5 10 20 70 150

ALL DIMENSIONS SHOWN ARE IN METRES AND THEREOF SUBJECT TO CONFIRMATION IN FIELD AT LEGAL SURVEY STAGE

BOUNDARY SHOWN THUS -

		DATE	FILE NO.
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CHECKED BY	R. POTRIE	JAN 16/01	

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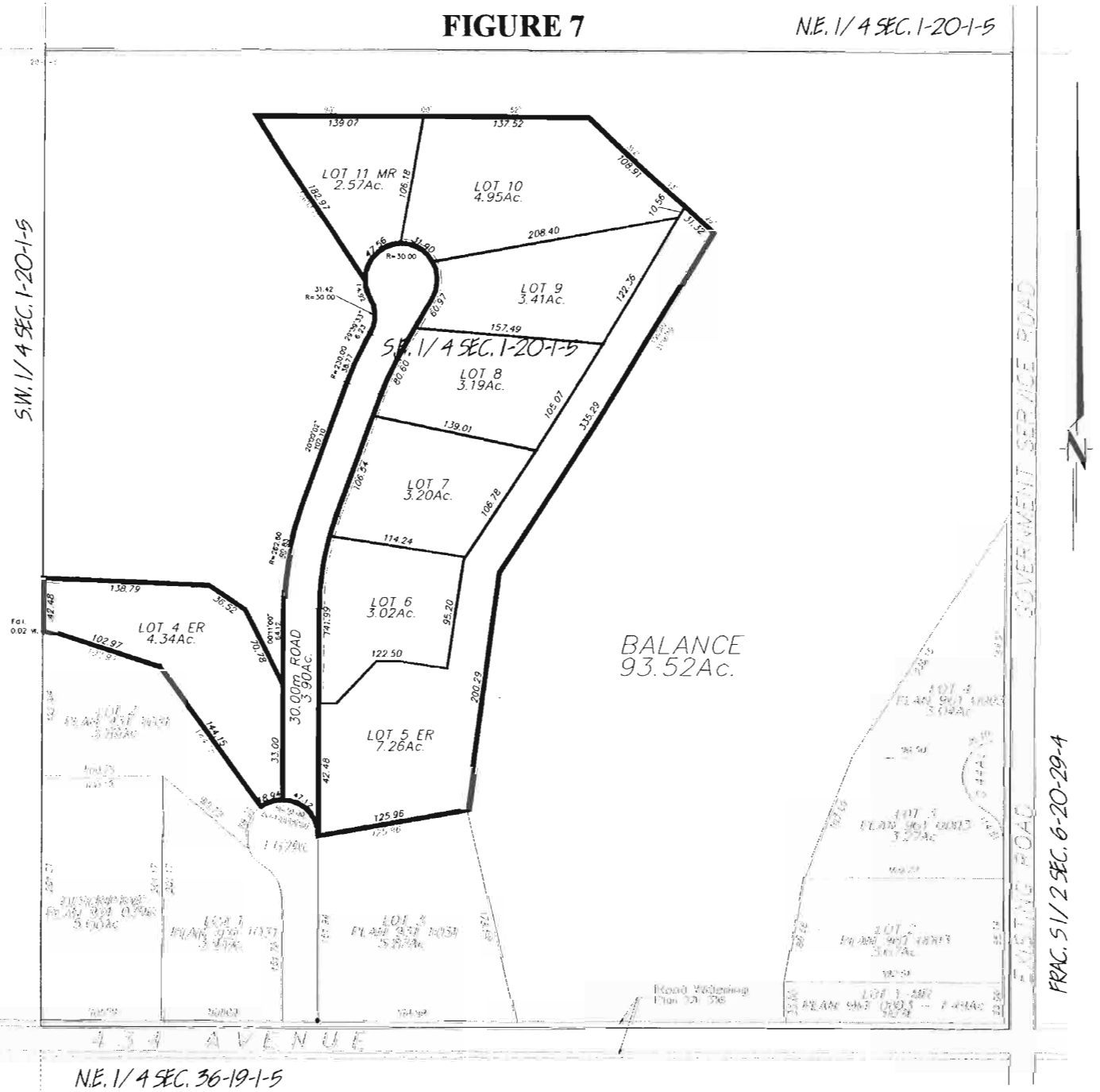
CAD FILE: 20001001

FIGURE 7



JOHN & RACHEL SHORE

M.D. OF FOOTHILLS NO. 31

PLAN SHOWING

PLAN 001 0421 SUBDIVISION LAYOUT

AFFECTING

S.E. 1/4, Sec. 1, Twp. 20, Rge. 1, W. 5 M.

SCALE: 1:5000 METRES 0 50 100 150

ALL DIMENSIONS SHOWN ARE IN METRES AND THEREOF SUBJECT TO CONFIRMATION IN FIELD AT LEGAL SURVEY STAGE

BOUNDARY SHOWN THUS -

		DATE	FILE NO.
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CHECKED BY	R. POTRE	JAN 16/01	

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CAD FILE: 20001001

4.2.2 Agricultural Parcel

Lot 10 from subdivision 0010421 will be reconsolidated into the balance as shown in Figure 3. Further subdivision of the balance lands will be prohibited. A restrictive covenant ensuring no further subdivision will be registered on title for the agricultural balance.

Policies:

1. A Restrictive Covenant will be registered on title prohibiting any further subdivision of the balance lands.
2. A Restrictive Covenant will be registered on title showing the location and boundaries of the building envelope for all structures on the balance parcel.

4.2.3 Maximum Population

The residential density for the plan area will be 0.20 units per acre (excluding road allowances and reserve dedications).

4.3 Environmental Considerations

(The existing ER lands are shown in Figure 9.) No further Environmental Reserve dedications are being proposed under this Area Structure Plan.

4.4 Reserve Lands

4.4.1 Environmental Reserve

The land topography is mostly undulating to rolling, with slopes less than 15%. The quarter section is dissected by a wide valley, which lies on the diagonal from the southwest to the northeast. The steeply sloping coulee walls were dedicated as Environmental Reserve during the last subdivision (0010421), as are shown in green in Figures 8 and 9. No additional Environmental Reserve designations are proposed under the present Area Structure Plan.

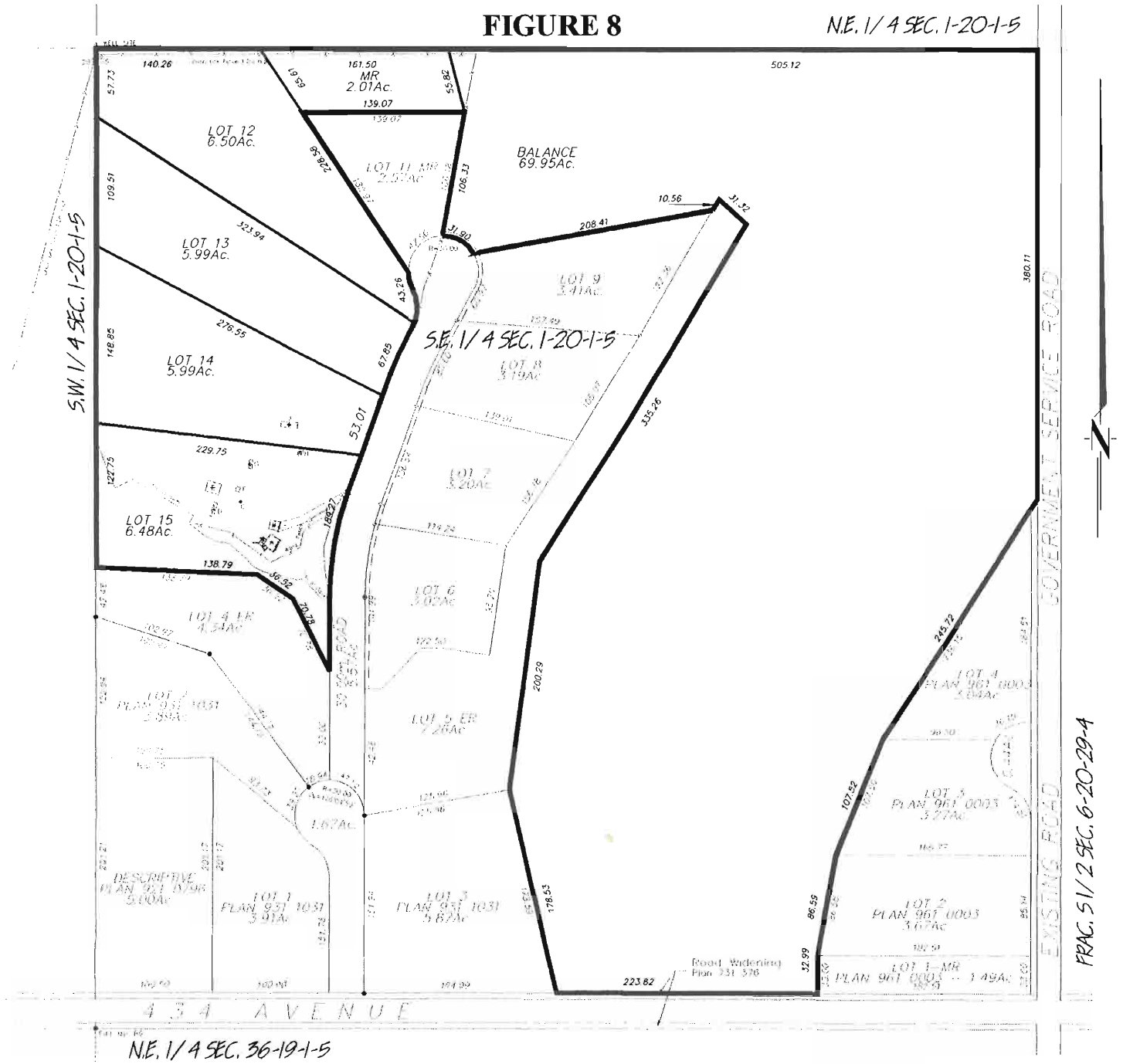
4.4.2 Municipal/School Reserve

The proposed Municipal Reserve is shown in Figures 8 and 9.

Policy:

1. Municipal reserve dedication shall be taken to the satisfaction of Council.

FIGURE 8



JOHN & RACHEL SHORE

M.D. OF FOOTHILLS NO. 31

PLAN SHOWING

PROPOSED SUBDIVISION PLAN

AFFECTING

S.E. 1/4, Sec. 1, Twp. 20, Rge. 1, W. 5 M.

SCALE: 1:5000 METRES 0 30 60 120

ALL DIMENSIONS SHOWN ARE IN METRES AND THEREOF SUBJECT TO CONFIRMATION IN FIELD AT LEGAL SURVEY STAGE

TOTAL ACREAGES

	ACRES(ac)	HECTARES(ha)
LOT 11	6.50	2.63
LOT 12	5.99	2.42
LOT 13	5.99	2.42
LOT 14	6.48	2.62
MR	2.01	0.81
BALANCE	69.95	28.31
TOTAL	96.92	39.21

BOUNDARY SHOWN THUS -

		DATE	FILE NO.
DRAWN BY	K. WONG	JAN 16/01	P 110-01
CHECKED BY	R. FOTRE	JAN 16/01	

PLANNING PROTOCOL INC. PHONE: (403) 230-5522
3019 - 1st STREET N.E. CALGARY, ALBERTA T2E 3E2 FAX: (403) 230-0335
E-MAIL: planningprotocol@telusplanet.net

CAD FILE: 20001001

4.5 Transportation

4.5.1 Internal Roadways

The internal roadway is mostly paved with asphalt surfacing. The shorter cul-de-sac, which begins at the entrance to the subdivision and provides access to lots 1 to 5 is made of gravel. The developer will be responsible for upgrading the unpaved portion of road surface extending from the edge of 434 Avenue to the subject property in accordance with M.D. standards for construction of internal subdivision roads and construction of road allowances, and to the satisfaction of Council.

Policies:

1) To establish a road system that provides safe and efficient movement of traffic through the study area.
2) To ensure that the linkages between the proposed internal road to the existing M.D. of Foothills road system is safe and efficient.
3) To eliminate additional costs to the M.D. of Foothills.

Current setbacks for development from roadways will be in accordance with the municipal district's Land Use Bylaw to ensure safety and access considerations.

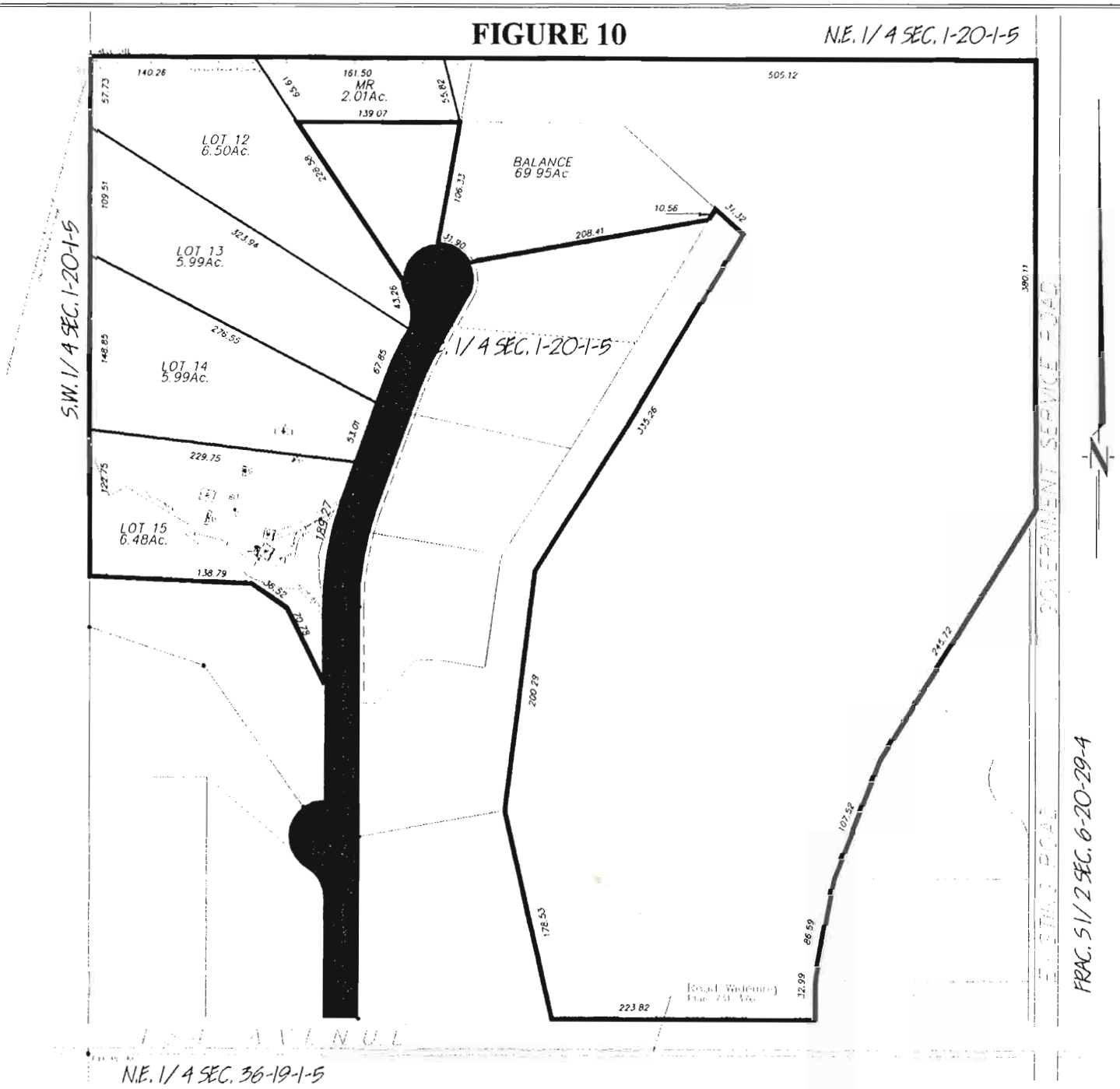
4.5.2 External Roadways

Primary access is via 434 Avenue, which borders the study area to the South. An internal roadway has been constructed to enable access into the existing development. (Please see Figure 3 for the existing private roadway design and location.) A Development Agreement shall be required for the road levy in accordance with Municipal Policy.

Policies:

1) To establish a road system that provides safe and efficient movement of traffic through the study area.
2) To ensure that the linkages between the proposed internal road to the existing M.D. of Foothills road system is safe and efficient.
3) To eliminate additional costs to the M.D. of Foothills.
4) The developer will make the necessary contributions towards upgrading the external roadway accessing the subdivision to meet Municipal Standards and to the satisfaction of Council.
5) The Developer shall enter into a Development Agreement with the M.D. of Foothills to satisfy road levy requirements in accordance with Municipal policy.

FIGURE 10



JOHN & RACHEL SHORE

M.D. OF FOOTHILLS NO. 31

PLAN SHOWING

PROPOSED ROAD LAYOUT

AFFECTING

S.E. 1/4, Sec. 1, Twp. 20, Rge. 1, W. 5 M.

SCALE: 1:5000 METRES 0 50 100 150

ALL DIMENSIONS SHOWN ARE IN METRES AND THEREOF SUBJECT TO CONFIRMATION IN FIELD AT LEGAL SURVEY STAGE

BOUNDARY SHOWN THUS: ———

		DATE	FILE NO.
DRAWN BY	K. WONG	JAN 16/01	P 110-01
CHECKED BY	R. POITRE	JAN 16/01	

PLANNING PROTOCOL INC. PHONE: (403) 230-5522
3016 - 1st STREET N.E. CALGARY, ALBERTA T2E 3E3 FAX: (403) 230-0335
E-MAIL: planningprotocol@shaw.ca

CAD FILE: 20001001

4.6 Servicing

4.6.1 Water Supply:

The new parcels will be supplied water through conventional water wells for each lot. Residences in the area have been utilizing water through the existing wells for a number of years, and the conditions seem to favour continued access of existing water wells in the area. The necessary well testing and Q20 calculations have been undertaken as part of the previous applications (included in Appendix IV). A groundwater evaluation completed in October 1999 for Lot 7, reported that the Q20 rate is capable of supporting up to 30 lots.

Additional well testing and Q20 calculations will be undertaken as part of the redesignation and subdivision application, if deemed necessary by Council, to meet the M.D. guidelines and Provincial Water Act in order to satisfy proof of adequate water.

4.6.2 Sewage Disposal

Each new parcel will be serviced with a septic tank and field system in accordance with the guidelines established by The Alberta Private Sewage Systems Standard of Practice.

4.6.3 Storm Water Management

The developer will ensure that all storm and ground water runoff will be contained on-site and any releases will be released at pre-development flow-rates into the natural drainage courses. Drainage ditches will ensure that storm and ground water is managed on-site.

4.6.4 Garbage Disposal

Residents will be responsible for their own garbage collection and disposal to the Foothills Regional Landfill, located approximately 2 miles S.E. of the study area.

4.7 Utilities

4.7.1 Electricity

Electrical power supply will be available to residents through TransAlta Utilities. Overhead power lines currently supply existing residents with electricity. New residences will be supplied electricity through an extension of the existing infrastructure.

4.7.2 Gas

Natural Gas will be provided to residents through ATCO Gas Company Ltd. Gas infrastructure will follow the existing ROW pattern established by ATCO Gas.

4.7.3 Telephone

Telus Communications will provide telephone and Internet service to residents. Telecommunications infrastructure will be linked to the existing service network in the area.

4.8 Protective Services

Each lot will be clearly marked with a prominent lot number sign to distinguish it from the others, and to enable prompt recognition of individual residences by emergency services. The Plan area is connected to the regional 911 EMS services.

4.8.1 Fire Protection

The M.D. of Foothills has an arrangement between the Town of Okotoks and the City of Calgary Fire Departments for fire protection of this area. Adequate fire protection is currently available by the M.D. of Foothills via this agreement with the Town of Okotoks and the City of Calgary Fire Dept. Response time for fire crews from the Okotoks Fire Department is estimated at approximately 12 to 18 minutes. This response time is comparable to the standard response times experienced by the majority of M.D. residents.

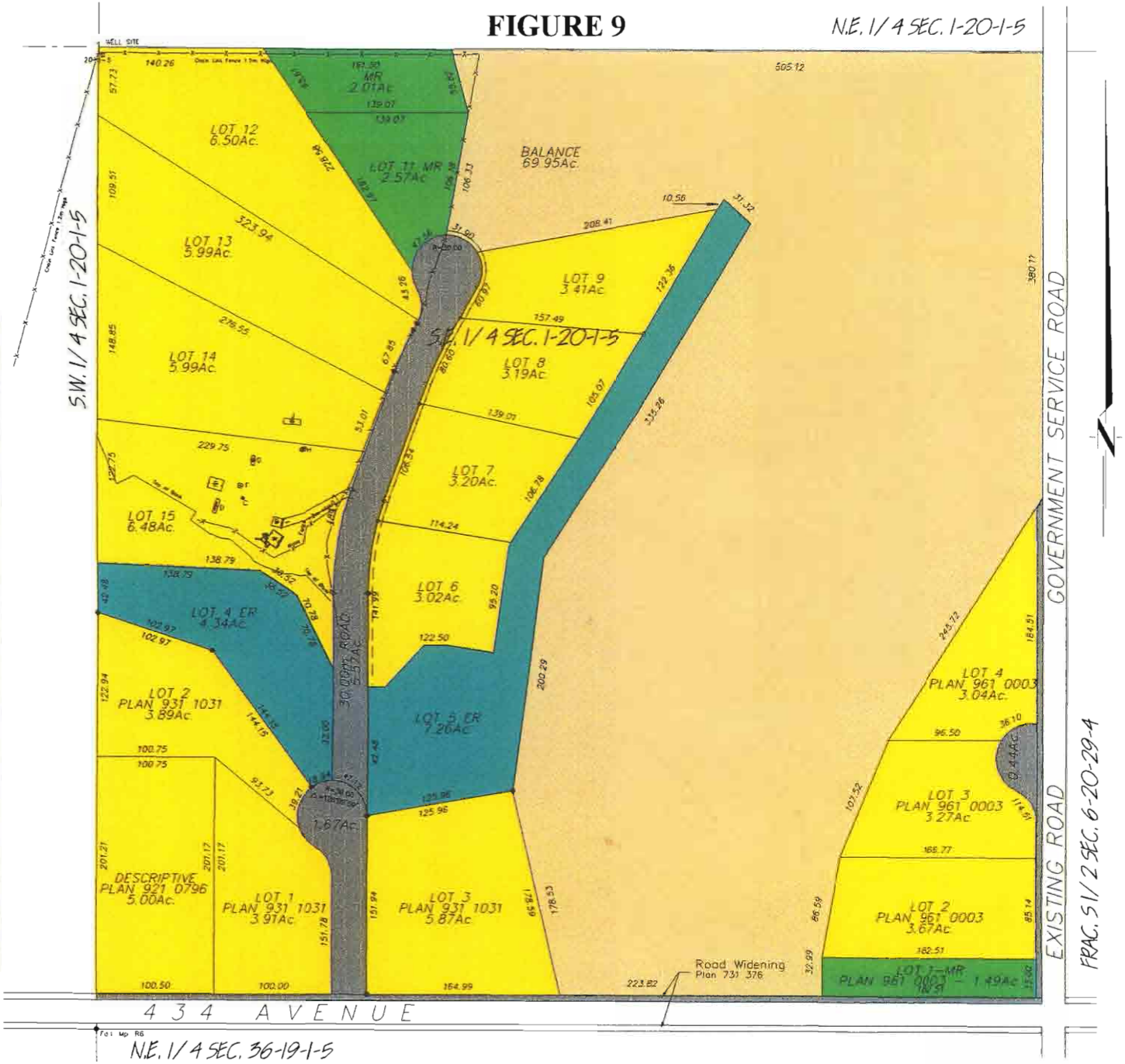
4.8.2 Police Protection

The Okotoks RCMP as well by the M.D. of Foothills Special Rural Constables will provide police services to the plan area.

9.8.3 Ambulance

The Foothills Regional Emergency Services headquartered in Black Diamond provide ambulance services. Emergency hospital care is available in Black Diamond and High River.

FIGURE 9



JOHN & RACHEL SHORE

M.D. OF FOOTHILLS NO. 31

PLAN SHOWING

PROPOSED SUBDIVISION PLAN

AFFECTING

S.E. 1/4, Sec. 1, Twp. 20, Rge. 1, W. 5 M.

SCALE: 1:5000 METRES 0 5 10 25 50 150

ALL DIMENSIONS SHOWN ARE IN METRES AND THEREOF SUBJECT TO CONFIRMATION IN FIELD AT LEGAL SURVEY STAGE

TOTAL ACREAGES

	ACRES(ac)	HECTARES(ha)
RESIDENTIAL(CR)	66.43	26.88
MR	6.07	2.46
ER	11.60	4.69
ROAD	7.68	3.11
BALANCE	69.95	28.31
TOTAL	161.73	65.45

LEGEND

- COUNTRY RESIDENTIAL (CR)
- MUNICIPAL RESERVE (MR)
- ENVIRONMENTAL RESERVE (ER)
- ROAD
- BALANCE

BOUNDRY SHOWN THUS -

		DATE	FILE NO.
DRAWN BY	K. WONG	JAN 16/01	P 110-01
CHECKED BY	R. POTRIE	JAN 16/01	

PLANNING PROTOCOL INC. PHONE (403) 230-5522
2916 1st STREET N.E. CALGARY, ALBERTA T2E 3E3 FAX (403) 230-0335
E-MAIL planningprotocol@shaw.ca

CAD FILE: 2002-001

Appendix I: Soil Report

Graecam Enterprises Inc undertook the following Agricultural Capability Assessment.

Graecam
INCORPORATED

March 23, 2000
File # 00-02

John and Rachel Shore,
Box 16, Site 7
RR #1
Okotoks, Alberta
T0L 1T0

RE: portion of SE 1 - 20 - 1 W5
Agricultural Capability Assessment

Dear Mr. & Mrs. Shore,

The following letter report will present the findings of an Agricultural Capability Assessment on the above noted property. The site was inspected on March 13, 2000.

INTRODUCTION

The following report presents the Agricultural Capability for the above noted property for two assessment procedures. The first procedure is basically that of the Canada Land Inventory (CLI) fashioned after Brocke (1977) and is based upon the site inspections and on a review of the following publications:

> Alberta Environment, 1977. Soil Capability for Agriculture in Alberta. Prepared by L. K. Brocke, Pedology Consultants, Edmonton.
>
> Bowser, W. E. 1967. Agro-Climatic Areas Map of Alberta. Surveys and Mapping Branch, Dept. of Energy Mines and Resources, Ottawa.
>
> Canada Land Inventory, 1971. Soil Capability for Agriculture, Map Sheet 82J, Kananaskis Lakes. Dept. of Regional and Economic Expansion, Ottawa.

The second procedure is based upon field inspections and the Land Capability Classification for Arable Agriculture in Alberta Edited by W.W Pettapiece and reprinted in 1990. This system replaces the 1977 Soil Capability for Agriculture in Alberta and reworks the Agro-Climatic Areas Map of Alberta (Bowser 1967).

The above publications serve as a guide for the assessment of Agricultural Capability in the Calgary area. The maps included in these publications are intended for regional planning purposes and due to their small scale, can be misleading when dealing with small parcels of land such as the property investigated herein.

1712 - 13th Avenue S.W., Calgary, Alberta T3C 0T9
Tel. (403) 244-3556 Fax. (403) 228-9794 Cel. (403) 540-0797
E-mail: graecam@cadvision.com

1977 C L I

CLIMATE ZONE

The property is located in Climate Zone 2H. Bowser describes conditions for Climate Zone 2H as "Areas where the amount of precipitation has usually been adequate but where wheat has suffered some frost damage in approximately 30 percent of the years. The frost free period has averaged between 75 and 90 days".

Soils within a climate zone are initially assessed a capability class equal to the climate zone. Soil and landscape limitations are then employed to further downgrade the soil capability for agriculture where warranted.

SOIL CAPABILITY CLASSIFICATION SYSTEM

The classification system does not consider the following:

1. Shrubs, trees, or stumps are not considered as limitations unless it is not feasible to remove them.

2. The soils will be cropped under a largely mechanized system and with good management practices.

3. Soils considered feasible for improvement by practices that can be made by the farmer himself are classified according to their limitations after the improvements are made. Soils requiring improvements beyond the means of the individual operator are classified to their present condition.

4. Distance to market, kind of roads, location, size of farm, characteristics of land ownership, cultural practices and the skill or resources of the operator are not criteria for capability groupings.

SOILS AND TOPOGRAPHY

The following discussion of soils and capability classes is based on the soil inspections advanced during the course of the project and a review of relevent material.

The property includes 90.4 acres. The dominant upland soils are Orthic Black Chernozems developed on fine loamy textured till which is very to exceedingly stony in places. Lowerlying soils developed in the coulee on the east side of the property are imperfectly drained Gleyed Black Chernozems and poorly drained Humic Gleysols. Topography is for the most part undulating to rolling with slopes in the 2 to 13% range. One area of steeply sloping coulees wall was not included in the previous subdivision, slopes greater than 25%. The coulee floor is nearly level, slopes less than 2%.

Significant portions of the coulee floor were observed to have frozen water on the surface.

AGRICULTURAL CAPABILITY

The distribution of Agricultural Capability Classes according to the 1977 CLI system is provided on the appended map.

The highest capability permitted within Agro-climatic Zone 2 is Agricultural Capability Class 2. The limitations of the soils and landscapes where applicable, are then assessed to adjust the soil capability. Agricultural Capabilities are assessed from the Canada Land Inventory Soil Capability for Agriculture in Alberta (Alberta Environment, 1977).

Upland Black Chernozems located on slopes less than 9% are limited by a shallow surface organic horizon (Ap) which is very to exceedingly stony. These two soil limitations restrict this map unit to Agricultural Capability Class of 3S.

At the intersection of the large eastside coulee and the steeply incised, smaller east west trending coulee is a map unit of Rego Black Chernozems developed on eroded material from the smaller coulee. These soils are slightly higher than the surrounding coulee floor and are somewhat limited for agriculture by excessive wetness (W) to class 3 W.

Upland Black Chernozems on slopes greater than 9% are adversely affected by topography (T) and are rated as class 4 T.

Undifferentiated soils developed on the steeply sloping coulee wall are very severely restricted for agriculture and are rated as class 6 T.

SUMMARY

The distribution of Agricultural Capability Classes as assessed under the 1977 CLI system is presented on Table 1.

In summary, approximately 7.8 acres in two map units or 8.6 % of the property is Class 3. Class 3 soils have moderately severe limitations that restrict the range of crops or require special conservation practices.

Approximately 81 acres in two map units or 90% of the property is rated as Class 4 for agriculture. Class 4 soils have severe limitations that restrict the range of crops that can be grown or require special conservation practices to overcome or both. These soils are generally not suited for annual cultivation.

Table 1. Distribution of Agricultural Capability Classes

Agricultural Capability Class	Number of Map Units	Area (acres)	Percentage of Total Area
3 S	1	4.8	5.3
3 W	1	3.0	3.3
Total Class 3		**7.8**	**8.6**
4 T	1	32.6	36.1
4 W	1	48.5	53.7
Total Class 4		**81.1**	**89.7**
6 T	1	1.5	1.7
Total Class 6		**1.5**	**1.7**
TOTALS		**90.4**	**100**

Approximately 1.5 acres in one map unit or 1.7% of the property is rated as Class 6. Class 6 soils have extremely severe limitations that restrict their capability to producing perennial forage crops and improvements are not feasible.

Over 90% of the property is rated as Class 4 or worse under the 1977 CLI system.

1990 LAND CAPABILITY CLASSIFICATION SYSTEM

BACKGROUND

The Land Capability Classification for Arable Agriculture In Alberta (sponsored by the Alberta Soils Advisory Committee (ASAC) and Edited By. W.W. Pettapiece, 1990) was prepared by representatives of Alberta Agriculture (Land Use Branch), Alberta Energy and Natural Resources (Resource Evaluation and Public Lands Division), Alberta Municipal Affairs (Assessment Services) and Agriculture Canada (Soil Survey). The document was prepared to address concerns that the use of several different systems in the province was leading to unnecessary confusion and conflict. Previous systems employed in the province included the Farmland Assessment Schedule of Municipal Affairs (Department of Municipal Affairs, 1979), the Public Lands System (Storrie (1933) and the CLI - Soil Capability for Agriculture (Brocke 1977, Canada Land Inventory 1965).

The basic concepts of the Canada Land Inventory: Soil Capability for Agriculture (Canada Land Inventory 1965) were adopted, that is a seven class system with Class 1 having the highest capability (least limitations) and Class 7 having the lowest capability (greatest limitations).
The ASAC system was designed to accommodate the three major components of climate, soils and landscape. It was agreed that each of these components by themselves could be limiting to agriculture and therefore each should be considered separately and each should be assessed over the total of 0 to 100 points. The final agricultural capability rating would be based on the most

limiting of the three, not the accumulated total.

The new system retains a close similarity to the older CLI - soil capability for agriculture system (Canada Land Inventory 1965) but attempts to be more quantitative. In both systems land is grouped into seven classes according to their potentialities and limitations for agricultural use. The definition of the classes are essentially the same as previously defined except that a range of index points is now assigned to each class. The first three classes are capable of sustained production of common cultivated crops, while the fourth class is considered marginal.

CLIMATE FACTORS

The two principal climatic variables are the energy factor and the moisture factor, the most limiting of which determines the basic climatic rating. Four climatic modifiers; spring moisture, fall moisture, fall frost and hail occurrence are recognized as having an effect on the climatic assessment of agricultural capability. Climatic data from over 200 locations throughout Alberta were used to generate the climate maps. A major test of the climate factors and maps was conducted using crop choice to define capability classes.

For the property in question the moisture factor is taken as the precipitation minus the potential evapotranspiration and is approximately -220. For this value a deduction of 15 points is made which gives a climatic rating based only on moisture of 85 points or class 1.

The energy component is based on effective growing degree days (EGDD) which incorporates the length of the season, degree days, day length and diurnal temperature range parameters. The start of the growing season is taken as the first occurrence of five consecutive days with a mean temperatures above 5° C after March 15. The end of the growing season is represented by the average date of the first occurrence of 0° C after July 15. Climatic data are taken for the period of 1951 to 1980. Translation of EGDD values to agricultural capability follows:

1500 EGDD	Should be no limitation. deduction = 0 points
1200 EGDD	This is closer to the point where wheat drops to a minor component in a dominantly barley system. This should be class 3. deduction = 40 points
1100 EGDD	This is near the point where annual crops occupy less than 50% of the cultivated area. This is close to marginal or class 4. Deduction = 50 points
950 EGDD	This marks the edge of arable agriculture which should be class 5. Deduction = 70 points
200 EGDD	Has no agricultural potential. Deduction = 100 points.

The map of Effective Growing Degree Days included in Land Capability for Arable Agriculture in Alberta (ASAC 1987) places the property at an EGDD of 1075. This value for Effective Growing Degree Days results in a deduction of 55 points leaving a rating value of 45 points or class 3 based on the climatic energy component only. The reader should note that 45 points is the lower boundary for class 3.

Four climatic modifying factors are available for assessment. Excess spring moisture that delays seeding and therefore shortening the growing season, excess fall moisture which cause a decrease in farming capability, hail index and resultant loss in yield/quality of crops and fall frost which is based on the occurrence of frost prior to the regional average recognized in the EGDD assessment. All of the climatic modifying factors are evaluated as non-limiting and therefore no further deductions that those from the growing season (EGDD) assessment are made.

SOIL CAPABILITY

The Climatic rating has no effect of changing the soil capability class. Classes 3 W and 3 S would change to 3 C and all other classes would remain the same.

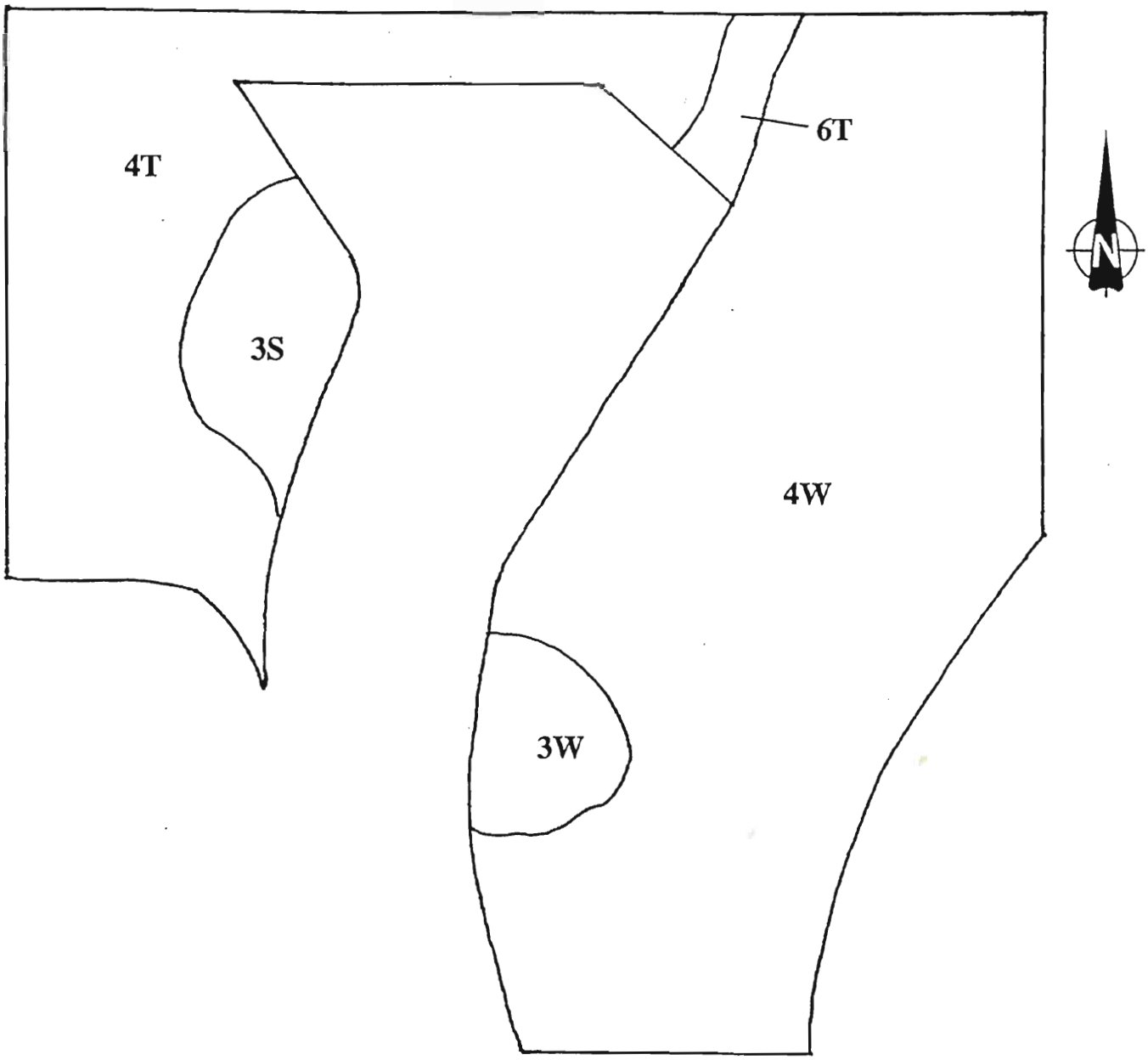
Should you have any questions or require further information please do not hesitate to contact the undersigned.

Yours Truly,

Craig Heath, M.Sc., P. Ag.
-Graecam-
Incorporated

AGRICULTURAL CAPABILITY ASSESSMENT

Portion of SE 1-20-1 W5



Legend

Scale 1:5,000 (Approximately)

Limitations to Agriculture

T Adverse Topography
W Excessive Moisture
S Combination of 2 or more soil limitations

Appendix II: Property Ownership

Land Ownership within the immediate area of the proposed Area Structure Plan is indicated in Figure 7. The registered owners of adjacent lands are as follows:

- W.M. Campbell owns the NE ¼ Section of 1-20-1-5
- D. and B.J. Looy own the NW ¼ Section of 1-20-1-5
- 631854 AB Ltd. owns the SW ¼ Section of 1-20-1-5
- Noble Des-Rochers owns the NE ¼ Section of 36-19-1-5
- Eric and Kaye James own the North Section of 6-20-29-4
- James and Mauna Minue owns the South Section of 6-20-29-4
- W. Paul Stennett owns Plan 921 0796 in the SE ¼ Section of 1-20-1-5
- Peter and Leslie Lawson own Lot 1, Plan 931 1031 in the SE ¼ Section of 1-20-1-5
- Peter Lawson owns Lot 2, Plan 931 1031 in the SE ¼ Section of 1-20-1-5
- Dawn M. Lugowski owns Lot 3, Plan 931 1031 in the SE ¼ Section of 1-20-1-5
- Peter and Carol Smitz own Lot 2, Plan 961 0003 in the SE ¼ Section of 1-20-1-5
- Kimberley Skidmore and Gregory Phillips own Lot 3, Plan 961 0003 in the SE ¼ Section of 1-20-1-5
- Jim and Diane Smillie own Lot 4, Plan 961 0003 in the SE ¼ Section of 1-20-1-5

Appendix III – Remote Land Titles Search

A. L. T. A.

SOUTH ALBERTA LAND REGISTRATION DISTRICT

R E M O T E L A N D T I T L E S E A R C H

SEARCH DATE: 26/01/2001

S

LINC	SHORT LEGAL	TITLE NUMBER
0028 317 261	5;1;20;1;SE	001 053 055 +8

LEGAL DESCRIPTION

MERIDIAN 5 RANGE 1 TOWNSHIP 20
SECTION 1
QUARTER SOUTH EAST
CONTAINING 64.7 HECTARES (160 ACRES) MORE OR LESS
EXCEPTING

PLAN	NUMBER	HECTARES	ACRES MORE OR LESS
ROADWAY	731376	0.405	1.00
DESCRIPTIVE	9210796	2.02	4.99
SUBDIVISION	9311031	6.22	15.37
SUBDIVISION	9610003	5.04	12.45
SUBDIVISION	0010421	14.5	35.8

EXCEPTING THEREOUT ALL MINES AND MINERALS

ESTATE: FEE SIMPLE

M ICIPALITY: MUNICIPAL DISTRICT OF FOOTHILLS NO. 31

REFERENCE NUMBER: 961 001 268 +4

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
001 053 055	28/02/2000	SUBDIVISION PLAN		

OWNERS

JOHN HENRY SHORE

AND
RACHEL ELIZABETH SHORE
BOTH OF:
RR 1
OKOTOKS
ALBERTA T0L 1T0
AS JOINT TENANTS

(CONTINUED)

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
931 097 103	05/05/1993	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.
931 135 954	11/06/1993	MORTGAGE MORTGAGEE - PROVINCE OF ALBERTA TREASURY BRANCHES. P.O. BOX 1020, OKOTOKS ALBERTA ORIGINAL PRINCIPAL AMOUNT: $175,000
991 008 615	12/01/1999	AMENDING AGREEMENT AMOUNT: $200,000 AFFECTS INSTRUMENT: 931135954
991 008 616	12/01/1999	MORTGAGE MORTGAGEE - ALBERTA TREASURY BRANCHES. BOX 1020, OKOTOKS ALBERTA T0L1T0 ORIGINAL PRINCIPAL AMOUNT: $80,000
991 307 101	21/10/1999	MORTGAGE MORTGAGEE - ALBERTA TREASURY BRANCHES. BOX 1020, OKOTOKS ALBERTA T0L1T0 ORIGINAL PRINCIPAL AMOUNT: $161,875
001 053 054	28/02/2000	CAVEAT RE : DEVELOPMENT AGREEMENT PURSUANT TO MUNICIPAL GOVERNMENT ACT CAVEATOR - THE MUNICIPAL DISTRICT OF FOOTHILLS NO. 31. BOX 5605 HIGH RIVER ALBERTA T1V1M7
001 053 058	28/02/2000	CAVEAT RE : DEFERRED RESERVE CAVEATOR - THE MUNICIPAL DISTRICT OF FOOTHILLS NO. 31. BOX 5605 HIGH RIVER ALBERTA T1V1M7
001 097 143	12/04/2000	CAVEAT RE : UTILITY RIGHT OF WAY CAVEATOR - TRANSALTA UTILITIES CORPORATION. 110-12 AVENUE SW, CALGARY

(CONTINUED)

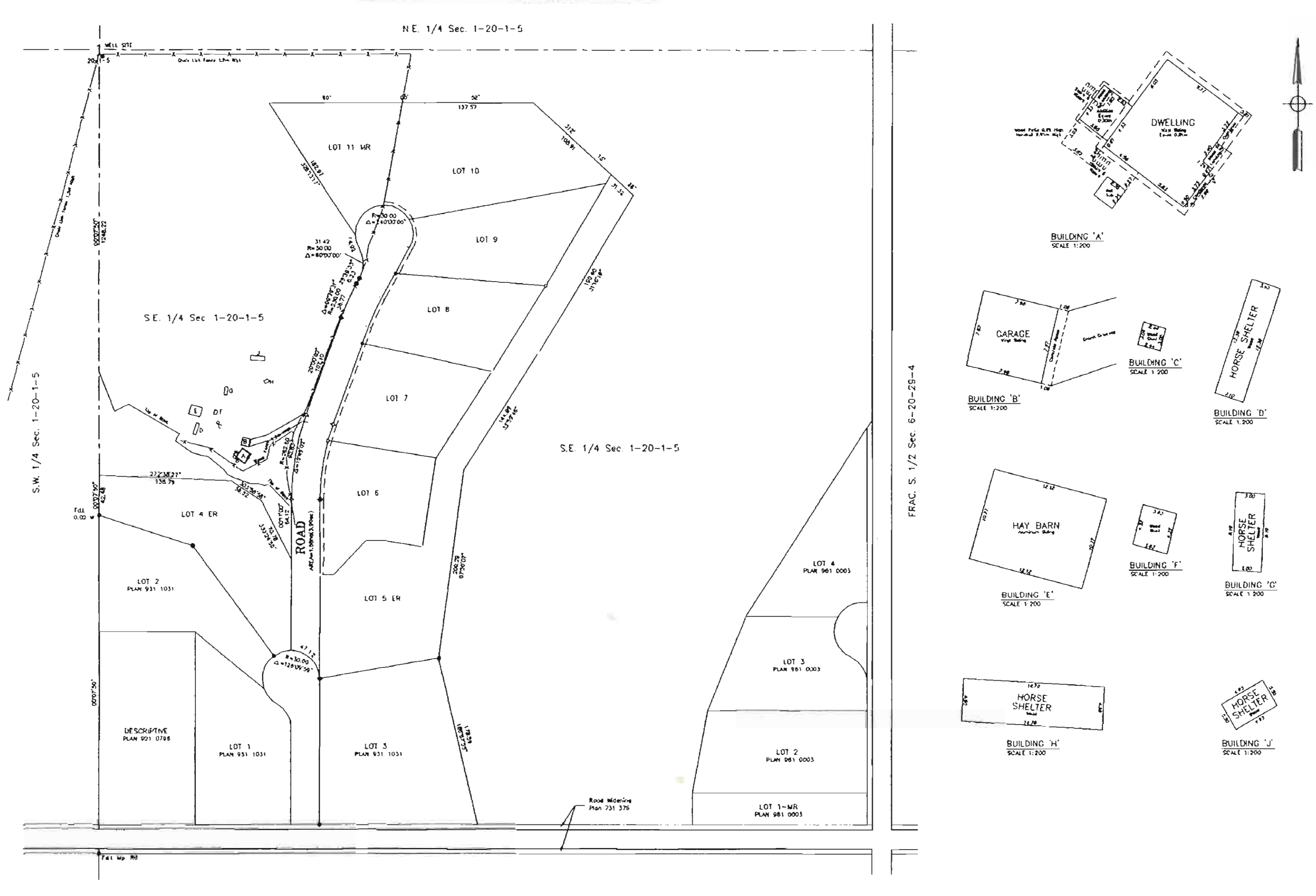
ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS

ALBERTA T2P2M1
AGENT - MARK HAMEISTER

TOTAL INSTRUMENTS: 008 *END OF SEARCH * SR# - J858683 /AR0356
YOUR FILE #:

Alberta Land Surveyor's Real Property Report



TO: Rod Potrie
Planning Protocol

RE: S.E.1/4 Sec. 1, Twp. 20, Rge. 1, W. 5 M.
MD FOOTHILLS, ALBERTA

NOTE:

Date of Survey July 17, 2000
Date of Title Search July 24, 2000, C. of T. No 001 053 055 +8

1. Unless otherwise specified, the dimensions shown relate to distances from property boundaries to foundation walls only at the date of survey.
2. Property is subject to a restrictive covenant registered as No's
   Caveat 001 053 054
   Caveat 001 053 058
   Caveat 001 097 143

LEGEND:

Distances shown are in metres.
Statutory Iron Posts are shown thus: found ● f.d.
"Fd. no mk." denotes found no mark.
Found drill holes are shown thus Ø f.d.
Found metal spike are shown thus △
Power pole are shown as thus Ø pp
Eaves are dimensioned to fascia line.
Fences are within 0.20m of property line unless otherwise noted and are shown thus: -x——x——

Certification: I hereby certify that this Report, which includes the attached Plan and related Survey, was prepared and performed under my personal supervision and in accordance with the Manual of Standard Practice of the Alberta Land Surveyors' Association and supplements thereto. Accordingly within those standards as of the date of this Report, I am of the opinion that:

1. the Plan illustrates the boundaries of the Property, the permanent visible improvements situated thereon (the "improvements"), registered easements, rights-of-way, and other registered instruments affecting the extent of title to the Property;
2. the improvements are entirely within the boundaries of the Property;
3. no visible encroachments exist on the Property from any improvements situated on an adjoining property;
4. no visible encroachments exist on registered easements, rights-of-way or other registered instruments affecting the extent of property.

Purpose: This Report and the related Plan and Survey have been prepared and performed only for the benefit of the Client, the Client's purchaser (if this was prepared to facilitate a sale) and any of their legal advisors and lenders/mortgagees. Copying is permitted only for the benefit of those parties and only if the Plan remains attached to this page. Where applicable, registered easements, utility rights-of-way, and other registered instruments effecting the extent of the property have been shown on the attached Plan. Unless otherwise shown, property corner markers have not been placed during the Survey for this Report. The Plan should not be used to establish property boundaries due to the high degree of risk of the user making an error in measurement.

Dated this 24th day of July, A.D., 2000.

AZIZ M. DHARAMSHI
Alberta Land Surveyor

DRAWN: J.B.C.	
DATE: July 24, 2000	
SCALE: 1:2000 (METRIC)	
FILE NO: 98 - 0097	

TRONNES SURVEYS (1978) LTD.

Appendix IV – Groundwater Supply Evaluation Reports

John and Rachel Shore
Water Well Evaluation
S.E. 1-20-1-W5M
March 1999

Prepared By:

LEE MAHER ENGINEERING ASSOCIATES LTD.

John and Rachel Shore
Water Well Evaluation
S.E. 1-20-1-W5M
March 1999

PERMIT TO PRACTICE
LEE MAHER ENGINEERING ASSOCIATES
Signature _____
Date Nov. 5, 99
PERMIT NUMBER: P 4625
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

Prepared By:

LEE MAHER ENGINEERING ASSOCIATES LTD.

INTRODUCTION

This report is an investigation of the tested wells in the SE 1/4-1-20-1-W5M located in the lot #7, #9 and #10 of the proposed subdivision owned by John Henry Shore and Rachel Elizabeth Shore, see Figure #1. Niemans Drilling (1980) Ltd drilled the wells and conducted the pump test. The wells were drilled between 2/17/99 and 2/22/99. The wells were tested 2/18/99, 2/23/99 and 2/24/99 for the wells located in lot #7, #10 and #9 respectively. The water well drilling report and test data are attached in the Appendix 'A' of this report.

LIMITATIONS OF INVESTIGATION

This hydrogeological investigation is limited to the calculation of the transmissivity and the 20 year safe yield of the aquifer based on test data supplied by the well tester. No well survey or investigation has been performed for this report in terms of identifying surrounding wells or the aquifer in which the well is situated.

The drilling and the testing of this well was not supervised by the writer of this report.

CALCULATIONS

The calculation used to perform this analysis are based on the following:

Transmissivity

$$T = \frac{264\, Q_{pump}}{s}$$

Where:

T =Transmissivity (IGPD/Ft)
Q_{pump} =Pump Rate (IGPM)
s =Change in water level over 1 Log Cycle in Ft

20 Year Safe Yield (Alberta Environment)

$$Q_{20} = \frac{(0.7)\, T H}{2112}$$

Where:

Q_{20} =20 Year safe constant pumping rate (IGPM)
T =Transmissivity (IGPD/Ft)
H =The available head to the top of the aquifer (Ft)

WELL TESTING

The wells were tested for a total of 24 hours each. This included a 12 hour pumping test and a 12 hour recovery period. The pumping rate during the tests were held constant at 0.38 L/s (5 IGPM). The results of the pumping test are presented in Appendix 'A' and were analyzed below.

RESULTS

The results were monitored in the production well only. Drawdown and production curves were produced for each of the pumping tests. These curves are found in Appendix 'A'. The steepest constant logarithmic slopes were selected on each drawdown and recovery curve. These will be used to represent the transmissivity and the 20 year safe yield of the aquifers. The transmissivity for each of these slopes are found below.

The results of the well testing indicated that in all three wells the water level rose during the start of the pumping interval. This could be a factor of the wells not being fully developed at the time of the pump testing. The well in Lot #7 has been omitted due to this factor. The time required for the pumping interval to reach its characteristic logarithmic drawdown curve is in excess of 100 minutes for Lot #7 well. The resultant safe yield would be suspect. The time required to reach its characteristic logarithmic drawdown for the remaining two wells is minimal and resultant transmissivity is found to be of reasonable magnitude.

Well	Available Head (Ft)	Drawdown (IGPD/Ft)	Transmissivity Recovery (IGPD/Ft)	Average (IGPD/Ft)
Lot #9	7.5	1042	925	984
Lot #10	8.62	1584	1722	1653

The 20 year safe yield was calculated for each of the two well and are as follows:

Well	Q_{20}
Lot #9	2.44 IGPM
Lot #10	4.72 IGPM

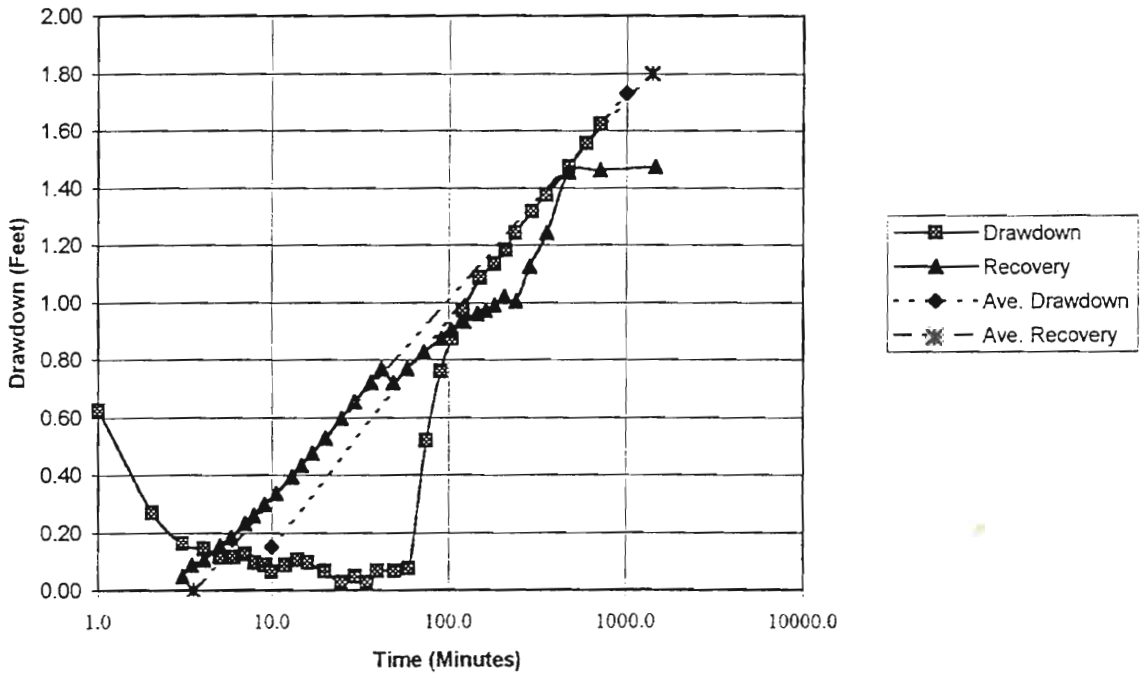
RECOMMENDATIONS

The calculated 20 year safe yield for the two wells are found to be 2.44 IGPM and 4.72 IGPM. The maximum Q_{20} for these wells is recommended to be **2.44 IGPM** production from aquifer.

LEE MAHER

ENGINEERING ASSOCIATES LTD.

Client Name:	John Shore	**Report Date:**	25-Mar-99
Well Test :	Lot #7	**Test Date:**	18-Feb-99
Well Location:	SE-1-20-1-W5	**Well Depth:**	123 Feet
Production Intvl:	82-93 Feet	**Pump Rate:**	5 IGPM
Static Water Level:	43.4 Feet		



DRAWDOWN

		START	END
Time	(Minutes)	10.0	1000.0
Drawdown	(Feet)	0.2	1.7

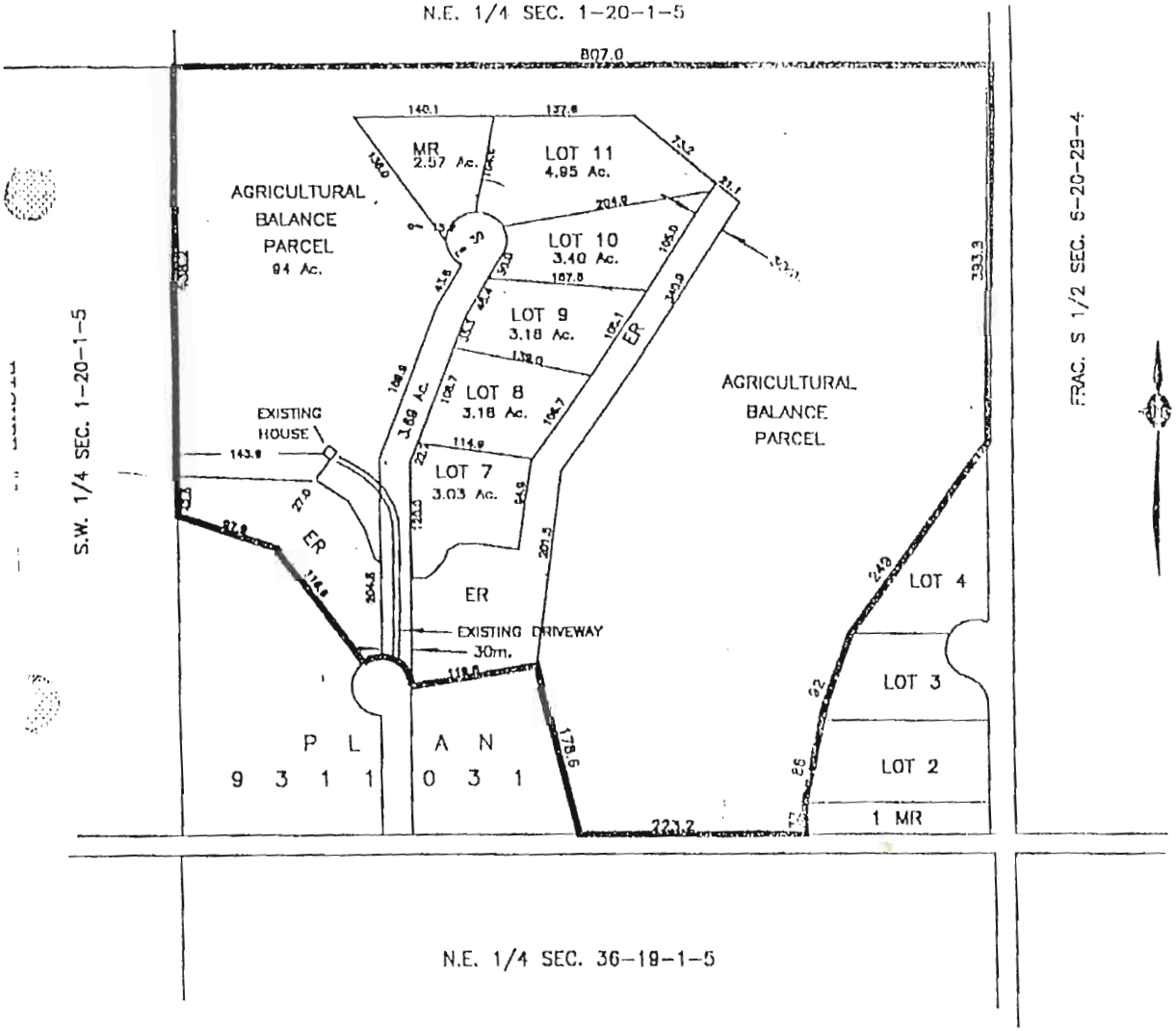
Transmissivity (IGPD/Ft) **1671**

RECOVERY

		START	END
Time	(Minutes)	3.5	1380.0
Drawdown	(Feet)	0.0	1.8

Transmissivity (IGPD/Ft) **1904**

APPENDIX A



M.D. of FOOTHILLS No. 31

CONCEPTUAL PLAN and TENTATIVE PLAN
OF
SUBDIVISION AFFECTING
S.E. 1/4 SEC. 1, TWP 20, RGE. 1, W5M

OWNER

JOHN HENRY SHORE and
RACHEL ELIZABETH SHORE

SCALE 1 : 5000

ALL DIMENSIONS SHOWN ARE IN METRES AND DECIMALS THEREOF
SUBJECT TO CONFIRMATION IN FIELD AT LEGAL SURVEY STAGE

CONCEPTUAL PLAN
AREA TABLE

LOT	AREA (Ac.)	AREA (ha.)
7	3.03	1.23
8	3.18	1.29
9	3.18	1.29
10	3.40	1.38
11	4.95	2.00
ROAD	3.69	1.50
ER	12.10	4.90
BAL	94	38.1
TOTAL	127.53	51.60

SION	DATE
) AND MR	AUGUST 28, 1998

DRAWN BY | DATE
CHECKED BY

PLANNING PROTOCOL INC.
3916 – 1 STREET N.E.
CALGARY, ALBERTA, T2E 3E3
Ph. (403) 230-5522

LEE MAHER

ENGINEERING ASSOCIATES LTD.

PUMP TEST DATA

JOB #

Client Name:	John Shore	**Report Date**	25-Mar-99
Well Test :	Lot #7	**Test Date:**	18-Feb-99
Well Location:	SE-1-20-1-W5	**Well Depth:**	123 Feet
Production Intvl:	82-93 Feet	**Pump Rate:**	5 IGPM
Static Water Level:	43.4 Feet	**Well Type:**	PRODUCTION

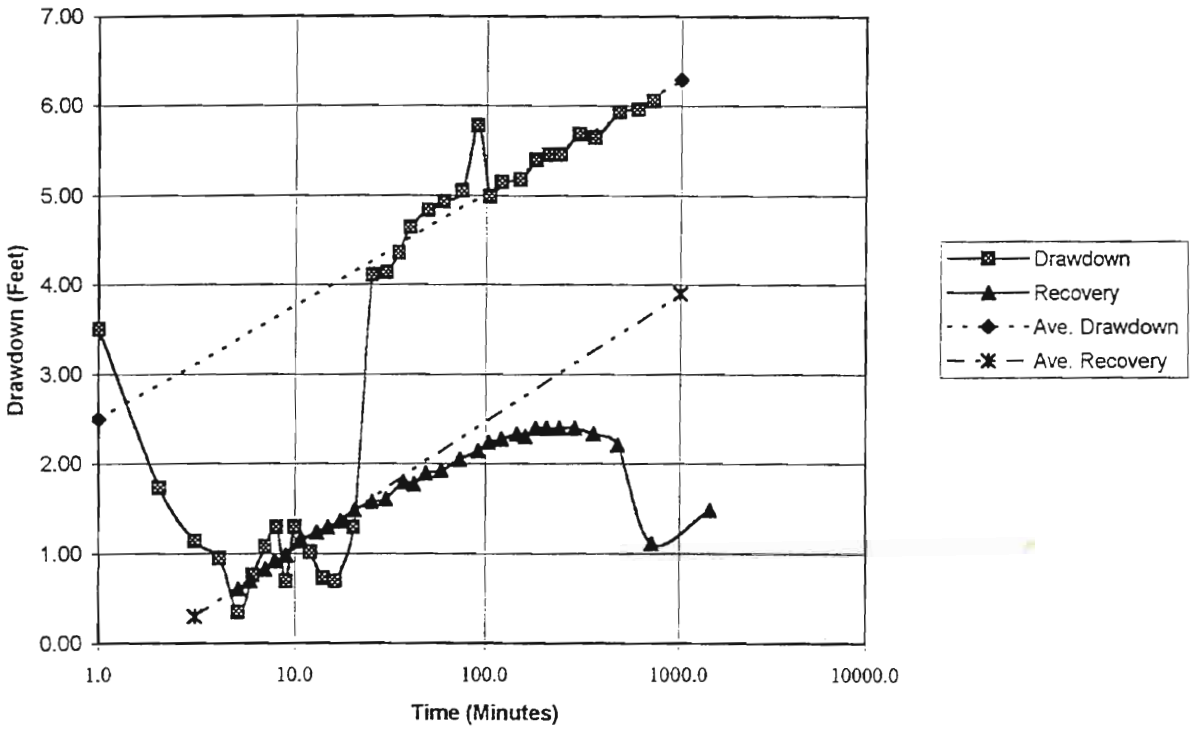
DRAWDOWN		
TIME (Minutes)	DEPTH (Feet)	s (Feet)
(SWL) 0.0	43.40	0.00
1.0	44.03	0.63
2.0	43.67	0.27
3.0	43.56	0.16
4.0	43.54	0.14
5.0	43.52	0.12
6.0	43.52	0.12
7.0	43.53	0.13
8.0	43.50	0.10
9.0	43.49	0.09
10.0	43.47	0.07
12.0	43.49	0.09
14.0	43.51	0.11
16.0	43.50	0.10
20.0	43.47	0.07
25.0	43.43	0.03
30.0	43.45	0.05
35.0	43.43	0.03
40.0	43.47	0.07
50.0	43.47	0.07
60.0	43.48	0.08
75.0	43.92	0.52
90.0	44.16	0.76
105.0	44.27	0.87
120.0	44.37	0.97
150.0	44.49	1.09
180.0	44.53	1.13
210.0	44.58	1.18
240.0	44.64	1.24
300.0	44.72	1.32
360.0	44.77	1.37
480.0	44.87	1.47
600.0	44.95	1.55
720.0	45.02	1.62

RECOVERY			
TIME (Minutes)	t/t'	DEPTH (Feet)	s (Feet)
(STOP) 0.0	1440.0	45.02	1.62
1.0	1441.0	44.87	1.47
2.0	721.0	44.86	1.46
3.0	481.0	44.85	1.45
4.0	361.0	44.64	1.24
5.0	289.0	44.52	1.12
6.0	241.0	44.40	1.00
7.0	206.7	44.42	1.02
8.0	181.0	44.39	0.99
9.0	161.0	44.37	0.97
10.0	145.0	44.36	0.96
12.0	121.0	44.33	0.93
14.0	103.9	44.30	0.90
16.0	91.0	44.27	0.87
20.0	73.0	44.23	0.83
25.0	58.6	44.17	0.77
30.0	49.0	44.12	0.72
35.0	42.1	44.17	0.77
40.0	37.0	44.12	0.72
50.0	29.8	44.05	0.65
60.0	25.0	44.00	0.60
75.0	20.2	43.93	0.53
90.0	17.0	43.88	0.48
105.0	14.7	43.83	0.43
120.0	13.0	43.79	0.39
150.0	10.6	43.74	0.34
180.0	9.0	43.70	0.30
210.0	7.9	43.66	0.26
240.0	7.0	43.63	0.23
300.0	5.8	43.58	0.18
360.0	5.0	43.55	0.15
480.0	4.0	43.51	0.11
600.0	3.4	43.49	0.09
720.0	3.0	43.45	0.05

LEE MAHER

ENGINEERING ASSOCIATES LTD.

Client Name:	John Shore	**Report Date:**	25-Mar-99
Well Test :	Lot #9	**Test Date:**	23-Feb-99
Well Location:	SE-1-20-1-W5	**Well Depth:**	191 Feet
Production Intvl:	64-191 Feet	**Pump Rate:**	5 IGPM
Static Water Level:	56.4 Feet		



DRAWDOWN

		START	END
Time	(Minutes)	1.0	1000.0
Drawdown	(Feet)	2.5	6.3

Transmissivity (IGPD/Ft) **1042**

RECOVERY

		START	END
Time	(Minutes)	3.0	1000.0
Drawdown	(Feet)	0.3	3.9

Transmissivity (IGPD/Ft) **925**

LEE MAHER

ENGINEERING ASSOCIATES LTD.

PUMP TEST DATA

JOB #

Client Name:	John Shore	**Report Date**	25-Mar-99
Well Test :	Lot #9	**Test Date:**	23-Feb-99
Well Location:	SE-1-20-1-W5	**Well Depth:**	191 Feet
Production Intvl:	64-191 Feet	**Pump Rate:**	5 IGPM
Static Water Level:	56.4 Feet	**Well Type:**	PRODUCTION

DRAWDOWN

TIME (Minutes)	DEPTH (Feet)	s (Feet)
(SWL) 0.0	56.40	0.00
1.0	59.90	3.50
2.0	58.13	1.73
3.0	57.53	1.13
4.0	57.34	0.94
5.0	56.75	0.35
6.0	57.16	0.76
7.0	57.47	1.07
8.0	57.69	1.29
9.0	57.09	0.69
10.0	57.69	1.29
12.0	57.41	1.01
14.0	57.12	0.72
16.0	57.09	0.69
20.0	57.69	1.29
25.0	60.50	4.10
30.0	60.53	4.13
35.0	60.75	4.35
40.0	61.04	4.64
50.0	61.23	4.83
60.0	61.32	4.92
75.0	61.45	5.05
90.0	62.18	5.78
105.0	61.38	4.98
120.0	61.54	5.14
150.0	61.57	5.17
180.0	61.79	5.39
210.0	61.86	5.46
240.0	61.86	5.46
300.0	62.08	5.68
360.0	62.05	5.65
480.0	62.33	5.93
600.0	62.36	5.96
720.0	62.46	6.06

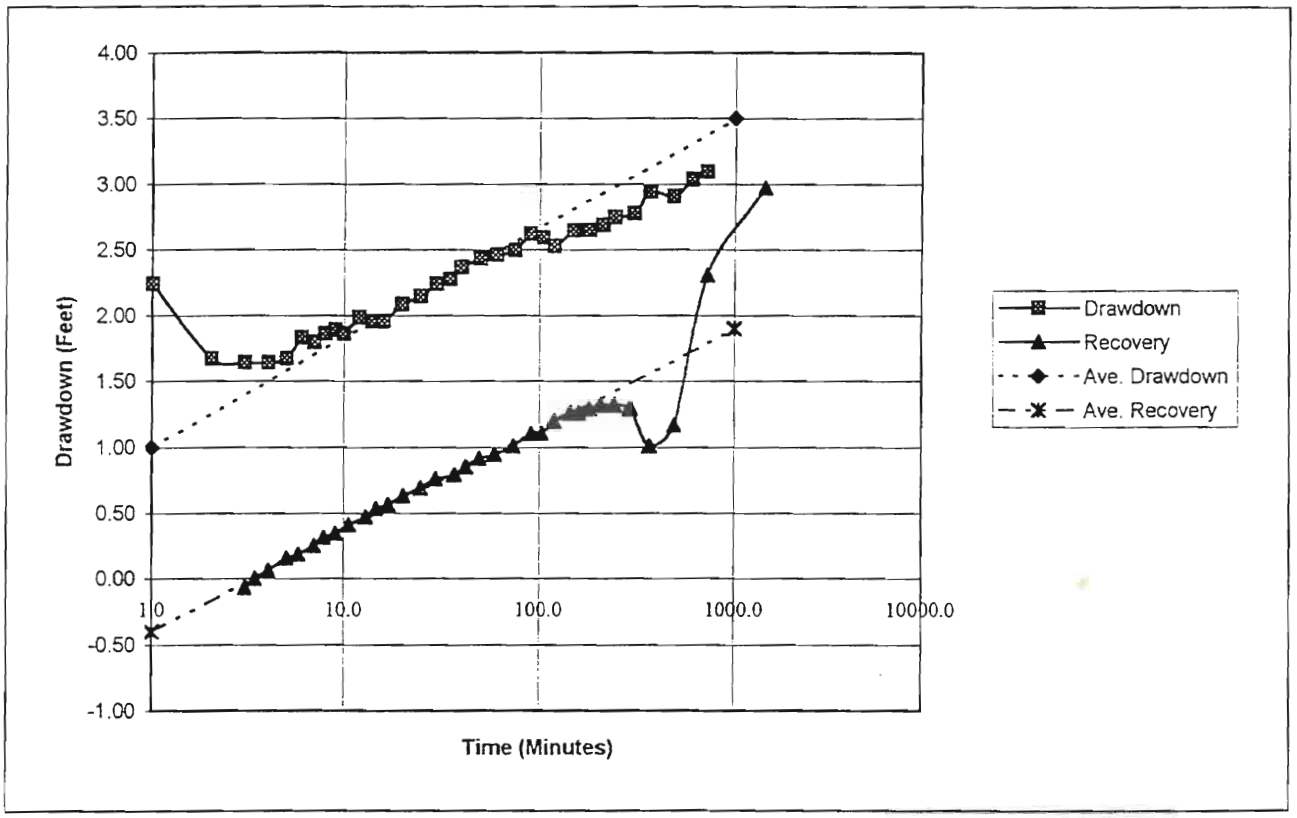
RECOVERY

TIME (Minutes)	t/t'	DEPTH (Feet)	s (Feet)
(STOP) 0.0	1440.0	62.46	6.06
1.0	1441.0	57.88	1.48
2.0	721.0	57.50	1.10
3.0	481.0	58.61	2.21
4.0	361.0	58.73	2.33
5.0	289.0	58.80	2.40
6.0	241.0	58.80	2.40
7.0	206.7	58.80	2.40
8.0	181.0	58.80	2.40
9.0	161.0	58.70	2.30
10.0	145.0	58.73	2.33
12.0	121.0	58.67	2.27
14.0	103.9	58.64	2.24
16.0	91.0	58.54	2.14
20.0	73.0	58.45	2.05
25.0	58.6	58.32	1.92
30.0	49.0	58.29	1.89
35.0	42.1	58.17	1.77
40.0	37.0	58.20	1.80
50.0	29.8	58.01	1.61
60.0	25.0	57.98	1.58
75.0	20.2	57.88	1.48
90.0	17.0	57.76	1.36
105.0	14.7	57.69	1.29
120.0	13.0	57.63	1.23
150.0	10.6	57.53	1.13
180.0	9.0	57.38	0.98
210.0	7.9	57.31	0.91
240.0	7.0	57.22	0.82
300.0	5.8	57.09	0.69
360.0	5.0	57.00	0.60

LEE MAHER

ENGINEERING ASSOCIATES LTD.

Client Name:	John Shore	**Report Date:**	25-Mar-99
Well Test :	Lot #10	**Test Date:**	24-Feb-99
Well Location:	SE-1-20-1-W5	**Well Depth:**	210 Feet
Production Intvl:	100-130 Feet	**Pump Rate:**	5 IGPM
Static Water Level:	49.38 Feet		



DRAWDOWN

		START	END
Time	(Minutes)	1.0	1000.0
Drawdown	(Feet)	1.0	3.5

Transmissivity (IGPD/Ft) **1584**

RECOVERY

		START	END
Time	(Minutes)	1.0	1000.0
Drawdown	(Feet)	-0.4	1.9

Transmissivity (IGPD/Ft) **1722**

LEE MAHER

ENGINEERING ASSOCIATES LTD.

PUMP TEST DATA

JOB #

Client Name:	John Shore	**Report Date**	25-Mar-99
Well Test :	Lot #10	**Test Date:**	24-Feb-99
Well Location:	SE-1-20-1-W5	**Well Depth:**	191 Feet
Production Intvl:	200 Feet	**Pump Rate:**	5 IGPM
Static Water Level:	49.38 Feet	**Well Type:**	PRODUCTION

DRAWDOWN		
TIME (Minutes)	DEPTH (Feet)	s (Feet)
(SWL) 0.0	49.38	0.00
1.0	51.62	2.24
2.0	51.05	1.67
3.0	51.02	1.64
4.0	51.02	1.64
5.0	51.05	1.67
6.0	51.21	1.83
7.0	51.17	1.80
8.0	51.24	1.86
9.0	51.27	1.89
10.0	51.24	1.86
12.0	51.36	1.99
14.0	51.33	1.96
16.0	51.33	1.96
20.0	51.46	2.08
25.0	51.52	2.15
30.0	51.62	2.24
35.0	51.65	2.27
40.0	51.74	2.37
50.0	51.81	2.43
60.0	51.84	2.46
75.0	51.87	2.49
90.0	51.99	2.62
105.0	51.97	2.59
120.0	51.90	2.53
150.0	52.02	2.64
180.0	52.03	2.65
210.0	52.06	2.68
240.0	52.12	2.75
300.0	52.15	2.78
360.0	52.31	2.94
480.0	52.28	2.90
600.0	52.41	3.03
720.0	52.47	3.09

RECOVERY			
TIME (Minutes)	t/t'	DEPTH (Feet)	s (Feet)
(STOP) 0.0	1440.0	52.47	3.09
1.0	1441.0	52.34	2.97
2.0	721.0	51.68	2.30
3.0	481.0	50.54	1.17
4.0	361.0	50.39	1.01
5.0	289.0	50.67	1.29
6.0	241.0	50.70	1.33
7.0	206.7	50.70	1.33
8.0	181.0	50.67	1.29
9.0	161.0	50.64	1.26
10.0	145.0	50.64	1.26
12.0	121.0	50.57	1.20
14.0	103.9	50.48	1.10
16.0	91.0	50.48	1.10
20.0	73.0	50.39	1.01
25.0	58.6	50.32	0.94
30.0	49.0	50.29	0.92
35.0	42.1	50.23	0.85
40.0	37.0	50.16	0.79
50.0	29.8	50.13	0.76
60.0	25.0	50.07	0.69
75.0	20.2	50.01	0.63
90.0	17.0	49.94	0.57
105.0	14.7	49.91	0.53
120.0	13.0	49.85	0.47
150.0	10.6	49.79	0.41
180.0	9.0	49.72	0.34
210.0	7.9	49.69	0.31
240.0	7.0	49.63	0.25
300.0	5.8	49.56	0.19
360.0	5.0	49.53	0.16
480.0	4.0	49.44	0.06
600.0	3.4	49.38	0.00
720.0	3.0	49.31	-0.07

FROM : BILL NIEMANS WATER WELL DRILLING PHONE NO. : 2305924

MAR. 23. 1999 12:27PM P 1
PHONE NO. : 652 7867

Alberta Water Well Drilling Report

ENVIRONMENTAL PROTECTION

This data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

Well I.D.:
Map verified:
Date report received:

1 Contractor & Well Owner Information

Company Name: NIEMANS DRLG. (1980) LTD. Licence No.: 0820.
Mailing Address: BOX 5564, City or Town: HIGH RIVER, AB. Postal Code: T1V 1M6.
Well Owner's Name: JOHN SHORE
Well Owner has a copy of this report: [X] Yes [ ] No
Mailing Address: City or Town: Postal Code:

2 Well Location

1/4 or LSD	Sec	Twp	Rge	West of Meridian
S.E.	1	20	1	5

Location in Quadrant: m/ft from [ ] N [ ] S; m/ft from [ ] E [ ] W
Lot: 10 Block: Plan:

3 Drilling Information

Type of Work: [ ] Testhole [X] New Well [ ] Reconditioned [ ] Deepened
[ ] Reclaimed well Date reclaimed:
Materials Used: [ ] Cement [ ] Bentonite Product [ ] Other
Proposed well use: [X] Domestic [ ] Non Domestic Specify:
Method of Drilling: [ ] Auger [ ] Boring [ ] Cable tool [X] Rotary [ ] Combination [ ] Backhoe [ ] Other
Anticipated requirement per day: 500 [ ] litres [X] gallons

4 Formation Log

Depth from ground level [ ] metres [X] feet

Depth	Lithology Description
0'-58'	CLAY & ROCKS.
58'-210'	SH. + SS. L.

AIR TESTED 15 + G.P.M.

Geophysical Log taken: [ ] Electric [ ] Gamma
Did you encounter: [ ] Mineralized water more than 4000 ppm TDS [ ] Gas
At what depth:
Remedial action taken:

5 Well Completion

Date Started: 99 2 19 Date Completed: 99 2 22
Are measurements in metric or imperial?
Well depth: 210 FT. Borehole diameter: 6" & 5 1/2
Casing type: STEEL. Liner type: P.V.C.
Size OD: 6 5/8" Size OD: 4 1/2"
Wall thickness: .219 Wall thickness: .237
Bottom at: 60 1/2 FT. Top: 50 FT. Bottom: 210 FT.
Perforations: from: 100 FT. to: 130 FT.
from: 170 FT. to: 190 FT.
Perforation size: 1/8" x 8"
Perforated by: [X] Saw [ ] Torch [ ] Machine [ ] Other
Seal: [X] Bentonite product [X] Driven [ ] Cement / Grout [ ] Other
Sealed Interval: from: 0 FT. to: 60 1/2 FT.
Screen type: Size OD:
Intervals: from: to: slot size:
from: to: slot size:
Installation: [ ] Attached to casing [ ] Telescoped
Fittings: Top [ ] Packer [ ] Coupler Bottom [ ] Wash down [ ] Bail [ ] Plug
Pack: [ ] Artificial/Mechanical [ ] Natural
Grain size: Amount:

6 Well Yield

Test Date: 99 2 24 Start Time:
Test method: [X] Pump [ ] Bailer [ ] Air
Are measurements in metric or imperial?
Non pumping static water level: 15.05 M.
Rate of water removal: 5 I.G.P.M.
Depth of pump intake: 200 FT.
Water level at end of test: 15.993 M.
Distance from top of casing to ground level: 2 1/2 FT.

Depth to water level

Pumping	Elapsed Time minutes	Recovery
	0	
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	12	
	14	
	16	
	20	
	25	
	30	
	35	
	40	
	50	
	60	
	75	
	90	
	105	
	120	

Total Drawdown: .943 M.
If water removal was less than 2 hr duration, reason why:
Recommended pumping rate: 5 I.G.P.M.
Recommended pump intake: 150 FT.
Pump installed [ ] Yes Depth:
Type:
Any further pumptest information? [ ] Yes [ ] No

7 Contractor Certification

Driller's Name: TODD NIEMANS.
Certification No.: 23199A.

This well was constructed in accordance with the Water Well Regulation of the Alberta Environmental Protection & Enhancement Act. All information in this report is true.

Signature 99 2 23 (Yr Mo Day)

(ENVIR 3/93) White copy: Environmental Protection Yellow copy: Well Owner Pink copy: Contractor

Alberta Water Well Drilling Report

ENVIRONMENTAL PROTECTION

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

Well I.D.
Map verified
Date report received:

1 Contractor & Well Owner Information

Company Name: NIEMANS DRLG. (1980) LTD. Licence No.: 0820.
Mailing Address: BOX 5564, City or Town: HIGH RIVER, AB. Postal Code: T1V 1M6.
Well Owner's Name: JOHN SHORE Well Owner has a copy of this report: [X] Yes [ ] No
Mailing Address: City or Town: Postal Code:

2 Well Location

1/4 or LSD	Sec	Twp	Rge	West of Mer.
S.E.	1	20	1	5

Location in Quarter: m/ft from [ ] N [ ] S; m/ft from [ ] E [ ] W
Lot 9 Block Plan

3 Drilling Information

Type of Work: [ ] Testhole [X] New Well [ ] Reconditioned [ ] Deepened [ ] Reclaimed well Date reclaimed: Yr Mo Day
Materials Used: [ ] Cement [ ] Bentonite Product [ ] Other:
Proposed well use: [X] Domestic [ ] Non-Domestic Specify:
Method of Drilling: [ ] Auger [ ] Boring [ ] Cable tool [X] Rotary [ ] Combination [ ] Backhoe [ ] Other:
Anticipated requirement per day: 500 [ ] litres [X] gallons

4 Formation Log

Depth from ground level [ ] metres [X] feet

Depth	Lithology Description
0'-53'	CLAY + ROCKS.
53'-64'	GRVL.
64'-191'	SH. + SS.
	AIR TESTED
	± 15 G.P.M.

Geophysical Log taken: [ ] Electric [ ] Gamma
Did you encounter: [ ] Mineralized water more than 4000 ppm TDS [ ] Gas
At what depth:
Remedial action taken:

5 Well Completion

Date Started: 99 2 17 Date Completed: 99 2 19
Are measurements in metric or imperial?
Well depth: 191 FT. Borehole diameter: 6" + 5½"
Casing type: STEEL. Liner type: P.V.C.
Size OD: 6 5/8" Size OD: 4½"
Wall thickness: .203 Wall thickness: .237
Bottom at: 67 FT. Top: 60 FT. Bottom: 130 FT.
Perforations: from: 121 FT. to: 161 FT.
from: to:
Perforation size: 1/8" x 8"
Perforated by: [X] Saw [ ] Torch [ ] Machine [ ] Other:
Seal: [X] Bentonite product [X] Driven [ ] Cement / Grout [ ] Other:
Sealed interval: from: 0 FT. to: 67 FT.
Screen type: Size OD:
Intervals: from: to: slot size:
from: to: slot size:
Installation: [ ] Attached to casing [ ] Telescoped
Fittings: Top [ ] Packer [ ] Coupler Bottom [ ] Wash-down [ ] Bail [ ] Plug
Pack: [ ] Artificial/Mechanical [ ] Natural
Grain size: Amount:

6 Well Yield

Test Date: 99 2 23 Start Time:
Test method: [X] Pump [ ] Bailer [ ] Air
Are measurements in metric or imperial?
Non pumping static water level: 17.2 M.
Rate of water removal: 5 I.G.P.M.
Depth of pump intake: 190 FT.
Water level at end of test: 19.037
Distance from top of casing to ground level: 2 FT.

Depth to water level

Pumping	Elapsed time minutes	Recovery
	0	-
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	12	
	14	
	16	
	20	
	25	
	30	
	35	
	40	
	50	
	60	
	75	
	90	
	105	
	120	

Total Drawdown: 1.837 M.
If water removal was less than 2 hr duration, reason why:
Recommended pumping rate: 5 G.P.M.
Recommended pump intake: 180 FT.
Pump installed [ ] Yes Depth:
Type:
Any further pumptest information? [X] Yes [ ] No

7 Contractor Certification

Driller's Name: TODD NIEMANS.
Certification No.: 23199A.

This well was constructed in accordance with the Water Well Regulation of the Alberta Environmental Protection & Enhancement Act. All information in this report is true.

Signature 99 2 23 Yr Mo Day

Alberta Water Well Drilling Report

ENVIRONMENTAL PROTECTION

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

Well I.D.
Map verified
Date report received:

1 Contractor & Well Owner Information

Company Name: NIEMANS DRLG. (1980) LTD. Licence No.: 0820.
Mailing Address: BOX 5564, City or Town: HIGH RIVER, AB. Postal Code: T1V 1M6.
Well Owner's Name: JOHN SHORE. Well Owner has a copy of this report: ☒ Yes ☐ No
Mailing Address: City or Town: Postal Code:

2 Well Location

Sec.	Twp	Rge	W of Mer
S.E. 1	20	1	5

m/ft from ☐ N ☐ S
m/ft from ☐ E ☐ W
Lot #7

3 Drilling Information

Type of Work: ☐ Testhole ☒ New Well ☐ Reconditioned ☐ Deepened
☐ Reclaimed well Date reclaimed:
Materials Used: ☐ Bentonite Product ☐ Cement ☐ Other
Proposed well use: ☒ Domestic ☐ Non-Domestic Specify:
Method of Drilling: ☐ Augor ☐ Boring ☐ Cable tool ☒ Rotary ☐ Combination ☐ Backhoe ☐ Other
Anticipated requirement per day: 500 ☐ Litres ☒ Gallons

4 Formation Log

Depth from ground level (☐ metres ☒ feet)	Lithology Description
0'-2'	TOP SOIL.
2'-5'	GRL.
5'-54'	CLAY, ROCK + BURS.
54'-61'	SH/L + SS/L.
61'-69'	SS.
69'-87'	SH.
87'-93'	SS.
93'-103'	SH.
103'-108'	SS. + SH/L.
108'-123'	SH.

AIR TESTED
15+ G.P.M.

Geophysical Log taken: ☐ Electric ☐ Gamma
Did you encounter: ☐ Mineralized water more than 4000 ppm TDS ☐ Gas
At what depth:
Remedial action taken:

5 Well Completion

Date Started (Yr Mo Day): 99217
Date Completed: 99217
Are measurements in metric or imperial?
Well depth: 123FT.
Borehole diameter: 6" + 5 1/2"
Casing type: STEEL. Liner type: P.V.C.
Size OD: 6 5/8" Size OD: 4 1/2"
Wall thickness: .219 Wall thickness: .237
Bottom at: 62FT. Top: Bottom: 43FT.-123FT.
Perforations: from: 78FT. to: 103FT.
from: to:
Perforation size: 1/8" x 8"
Perforated by: ☒ Saw ☐ Torch ☐ Machine ☐ Other
Seal: ☒ Bentonite product ☒ Driven ☐ Cement / Grout ☐ Other
Sealed interval: from: 0FT. to: 62FT.
Screen type: Size OD:
Intervals: from: to: slot size:
from: to: slot size:
Installation: ☐ Attached to casing ☐ Telescoped
Fittings: Top ☐ Packer ☐ Collar Bottom ☐ Wash-down ☐ Bail ☐ Plug
Pack: ☐ Artificial Mechanical ☐ Natural
Grain size: Amount:

6 Well Yield

Test Date: Start Time:
Test method: ☒ Pump ☐ Bailer ☐ Air
Are measurements in metric or imperial?
Non pumping static water level: 43.4 FT.
Rate of water removal: 5 I.G.P.M.
Depth of pump intake: 115FT.
Water level at end of test: 45.023FT.
Distance from top of casing to ground level: 2 FT.

Depth to water level

Pumping	Elapsed Time minutes	Recovery
	0	
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	12	
	14	
	16	
	20	
	25	
	30	
	35	
	40	
	50	
	60	
	75	
	90	
	105	
	120	

Total Drawdown: 1.623 FT.
If water removal was less than 2 hr duration, reason why:
Recommended pumping rate: 5 G.P.[illegible]
Recommended pump intake: 110 F[illegible]
Pump installed ☐ Yes Depth:
Type:
Any further pumptest information? ☐ Yes ☐ No

7 Contractor Certification

Driller's Name: TODD NIEMANS.
Certification No.: 23199A.

This well was constructed in accordance with the Water Well Regulation of the Alberta Environmental Protection & Enhancement Act. All information in this report is true.

Signature: Yr Mo Day 99223

(ENVIR 3/93) White copy: Environmental Protection Yellow copy: Well Owner Pink copy: Contractor

NIEMANS DRILLING (1980) LTD.

BOX 8564 HIGH RIVER, AB. T1V - 1M6 652 - 7867

NPWL(M)	43.4 FT.	DISCHARE (GPM)	5
DATE TEST STARTED	2/18/99	TIME TEST STARTED	
PUMPING INTERVAL (MIN)	1	RECOVERY INTERVAL	1
TD(M)		TOP OF AQUIFER (M)	
DEPTH CASING SET (M)		DEPTH TO PUMP (M)	
WELL NAME:	John Shore lot 7	LEGAL DESCRIPTION	

PUMPING INTERVAL

1	44.025	FT.
2	43.669	
3	43.563	
4	43.544	
5	43.515	
6	43.515	
7	43.525	
8	43.496	
9	43.486	
10	43.485	
12	43.486	
14	43.505	
16	43.496	
20	43.467	
25	43.428	
30	43.448	
35	43.428	
40	43.467	
50	43.467	
60	43.476	
75	43.919	
90	44.159	
105	44.274	
120	44.371	
150	44.486	
180	44.534	
210	44.582	
240	44.64	
300	44.717	
360	44.774	
480	44.871	
600	44.954	
720	45.023	

RECOVERY INTERVAL

721	44.871	FT.
722	44.861	
723	44.851	
724	44.64	
725	44.524	
726	44.484	
727	44.419	
728	44.39	
729	44.371	
730	44.361	
732	44.332	
734	44.303	
736	44.274	
740	44.226	
745	44.169	
750	44.121	
755	44.169	
760	44.121	
770	44.053	
780	43.996	
795	43.928	
810	43.876	
825	43.832	
840	43.794	
870	43.736	
900	43.698	
930	43.659	
960	43.03	
1020	43.582	
1080	43.553	
1200	43.505	
1320	43.487	
1440	43.447	

NIEMANS DRILLING (1980) LTD.

BOX 6564 HIGH RIVER, AB. T1V - 1M6 652 - 7867

NPWL(M)	17.2	DISCHARE (GPM)	5
DATE TEST STARTED	2/23/00	TIME TEST STARTED	
PUMPING INTERVAL (MIN)	1	RECOVERY INTERVAL	
TD(M)		TOP OF AQUIFER (M)	
DEPTH CASING SET (M)		DEPTH TO PUMP (M)	
WELL NAME:	John Shore lot #9	LEGAL DESCRIPTION	

PUMPING INTERVAL

1	18.258
2	17.719
3	17.536
4	17.478
5	17.296
6	17.421
7	17.517
8	17.564
9	17.401
10	17.584
12	17.488
14	17.411
16	17.401
20	17.584
25	18.441
30	18.45
35	18.518
40	18.604
50	18.662
60	18.691
75	18.730
90	18.951
105	18.71
120	18.758
150	18.768
180	18.835
210	18.854
240	18.854
300	18.922
360	18.912
480	18.999
600	19.008
720	19.037

RECOVERY INTERVAL

721	17.642
722	17.527
723	17.863
724	17.902
725	17.921
726	17.921
727	17.921
728	17.921
729	17.892
730	17.902
732	17.883
734	17.873
736	17.844
740	17.815
745	17.777
750	17.767
755	17.729
760	17.738
770	17.681
780	17.671
795	17.642
810	17.604
825	17.584
840	17.565
870	17.536
900	17.488
930	17.469
960	17.44
1020	17.401
1080	17.373
1200	
1320	
1440	

NIEMANS DRILLING (1980) LTD.

BOX 5564 HIGH RIVER, AB. T1V - 1M6 652 - 7867

NPWL(M)	15.05	DISCHARE (GPM)	45
DATE TEST STARTED	2/24/99	TIME TEST STARTED	
PUMPING INTERVAL (MIN)	1	RECOVERY INTERVAL	1
TD(M)		TOP OF AQUIFER (M)	
DEPTH CASING SET (M)		DEPTH TO PUMP (M)	
WELL NAME:	John Shore Lot [redacted] 10	LEGAL DESCRIPTION	

PUMPING INTERVAL

1	15.733
2	15.56
3	15.55
4	15.55
5	15.56
6	15.608
7	15.598
8	15.617
9	15.627
10	15.617
12	15.656
14	15.646
16	15.646
20	15.685
25	15.704
30	15.733
35	15.743
40	15.771
50	15.791
60	15.8
75	15.81
90	15.848
105	15.839
120	15.829
150	15.856
180	15.858
210	15.868
240	15.887
300	15.896
360	15.945
480	15.935
600	15.974
720	15.993

RECOVERY INTERVAL

721	15.954
722	15.752
723	15.406
724	15.358
725	15.444
726	15.454
727	15.454
728	15.444
729	15.435
730	15.435
732	15.415
734	15.386
736	15.386
740	15.358
745	15.338
750	15.329
755	15.309
760	15.29
770	15.281
780	15.261
795	15.242
810	15.223
825	15.213
840	15.194
870	15.175
900	15.155
930	15.146
960	15.127
1020	15.107
1080	15.088
1200	15.069
1320	15.05
1440	15.03

#99136

Groundwater Supply Evaluation
Shore well: SE-01-20-01-W5M
Municipal District of Foothills

Submitted to:

Planning Protocol Inc. and
John and Rachel Shore

Prepared by:

Groundwater Exploration & Research Ltd
October 1999

Ground Water Exploration & Research LTD

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

October 20, 1999
File No: 99136

Planning Protocol Inc.
3916 - 1 Street N.E.
Calgary, AB
T2E 3E3

Attention: Rod Potrie

Re: Groundwater Supply Evaluation
Shore well [Lot 7]: SE-01-20-01-W5M

Enclosed find our letter report which summarizes well completion details; includes tables of pump test data; graph of drawdown and recovery data from field test; and makes a recommendation with respect to the calculated Q_{20} for the well at the above captioned location.

Shore well: [Lot 7]

Well Completion Details

Total Depth:	37.50 meters
Static Water Level:	13.23 meters below top of casing
Surface Casing:	168 mm steel set to 18.90 meters; driven bentonite seal
Liner:	114 mm PVC set from 13.11 to 37.50 meters; perforated from 23.78 to 31.40 meters
Drilling Contractor:	Niemans Drilling (1980) Ltd.
Pump Test Contractor:	Niemans Drilling (1980) Ltd.
Date Drilled:	February 17, 1999

Lithology:	0.00 - 0.61 m	topsoil
	0.61 - 1.52	gravel
	1.52 - 16.46	clay, rocks and boulders
	16.46 - 18.60	shale and sandstone ledges
	18.60 - 21.04	sandstone
	21.04 - 26.52	shale
	26.52 - 28.35	sandstone
	28.35 - 31.40	shale
	31.40 - 32.93	sandstone and shale ledges
	32.93 - 37.50	shale

Pump Test Procedures

The pump test was carried out using a submersible pump set at a depth of 35.06 meters. The flow rate was controlled using a 6 US gpm Dole valve. Water level measurements were recorded automatically using a 100 psig pressure transducer and data logger supplied and installed by Niemans Drilling (1980) Ltd.

Aquifer Parameters

The maximum drawdown was observed to be 0.49 meters during the 720 minute test at a pumping rate of 32.73 m^3/day (5.0 Cgpm). After 720 minutes of termination of pumping, the water level in the well had recovered 98.0 percent.

The maximum available drawdown, measured from the non-pumping water level of 13.23 meters, and the top of the perforated interval at 23.78 meters is 10.55 meters.

The pumping water level data graph yields at least three distinct breaks in slope. For the first hour, the pumping water level actually shows a rebound, followed by a drop in water level with the development of a recharge boundary like feature at t = 105 minutes. The initial rebound in water level is attributed to filling the discharge line and removal of sufficient "head" to generate aquifer stress.

Transmissive capacity has been determined graphically using the Cooper and Jacob semilog plot method, with transmissive capacity based usually on the final limb of the curve according to:

$$T = 2.3Q/4*pi*delta\ s$$

where: T = transmissive capacity, in m^2/day
Q = pump rate, in m^3/day
s = drawdown over one log cycle

and the Sheahan Z(u) method according to:

$$Z(u) = W(2u)/W(u)$$

Transmissive capacity, determined from both drawdown and residual drawdown data, is summarized as follows:

Stage	Delta s	Transmissivity
drawdown	0.25	23.97
residual drawdown	0.20	29.97
Z(u) Method		25.49

Based on both drawdown and residual drawdown data and the Z(u) method, the geometric mean transmissive capacity is 26.36 m^2/day. It should be noted that the calculated transmissive capacity value is time dependent, flow rate dependent and reflects the response of an aquifer for the particular time of the year during which the test was conducted.

The 20 year, long term safe yield index (Q_{20}), neglecting well loss, is determined from the equation:

$$Q_{20} = 0.683TH$$

where: Q20 = 20 year, long term safe yield, in m^3/day

T = effective transmissive capacity, in m^2/day

H = available drawdown, in meters

The calculation of the 20 year safe yield index for an aquifer, assuming isotropic, homogeneous conditions is derived by extrapolating a downward trend so that the available drawdown lasts for 20 years. This approach neglects the effects of recharge, and is, therefore, a conservative approach.

It is common practice to adjust the Q_{20} by a safety factor to account for unknown boundary conditions due to test duration, well deterioration, well inefficiency, seasonal variability in non-pumping water level and errors associated with assuming isotropic, homogeneous aquifer conditions.

Based on a factor of safety of 1.5 the calculated Q_{20} is 126.62 m^3/day (19.3 Cgpm). When the calculated Q_{20} exceeds the pump test rate, it is common practice to consider the Q_{20} as the pump test rate. The Q_{20} is, therefore, conservatively taken as 32.73 m^3/day (5.0 Cgpm).

In accordance with Alberta Environment guidelines (June 27, 1994), this volume of water is adequate to meet the needs of domestic requirements currently calculated on an average water consumption of 1.091 m^3/day; 240 igpd/lot; or 0.17 Cgpm on a continuous pumping basis.

If the well is being used to support an application for subdivision, the Q_{20} rate of 32.73 m^3/day (5.0 Cgpm) is capable of sustaining up to 30 lots.

Closure

If you have any questions regarding our conclusions and recommended Q_{20} pump rate, please call at your convenience.

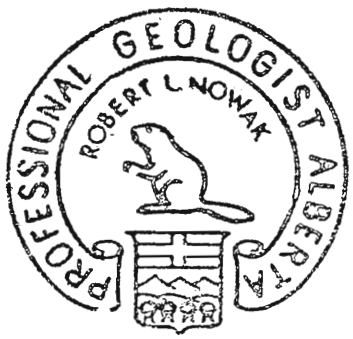
The well owner should be aware, in accordance with Alberta Environment document Interim Guidelines For The Evaluation of Groundwater Supply For Unserviced Residential Subdivisions Using Privately Owned Domestic Water Wells (June 27, 1994) that additional information may be required with this report, particularly bacteriological and chemical analysis for each well water. Of primary concern is any impact on the water quality due to contamination from septic fields, or small agricultural operations.

Thanking you for the opportunity to have been of service to Planning Protocol Inc. and John and Rachel Shore, we remain,

Respectfully yours,
Groundwater Exploration & Research Ltd

Bob Nowak

Bob Nowak; PhD., P. Geol.
Groundwater Geologist



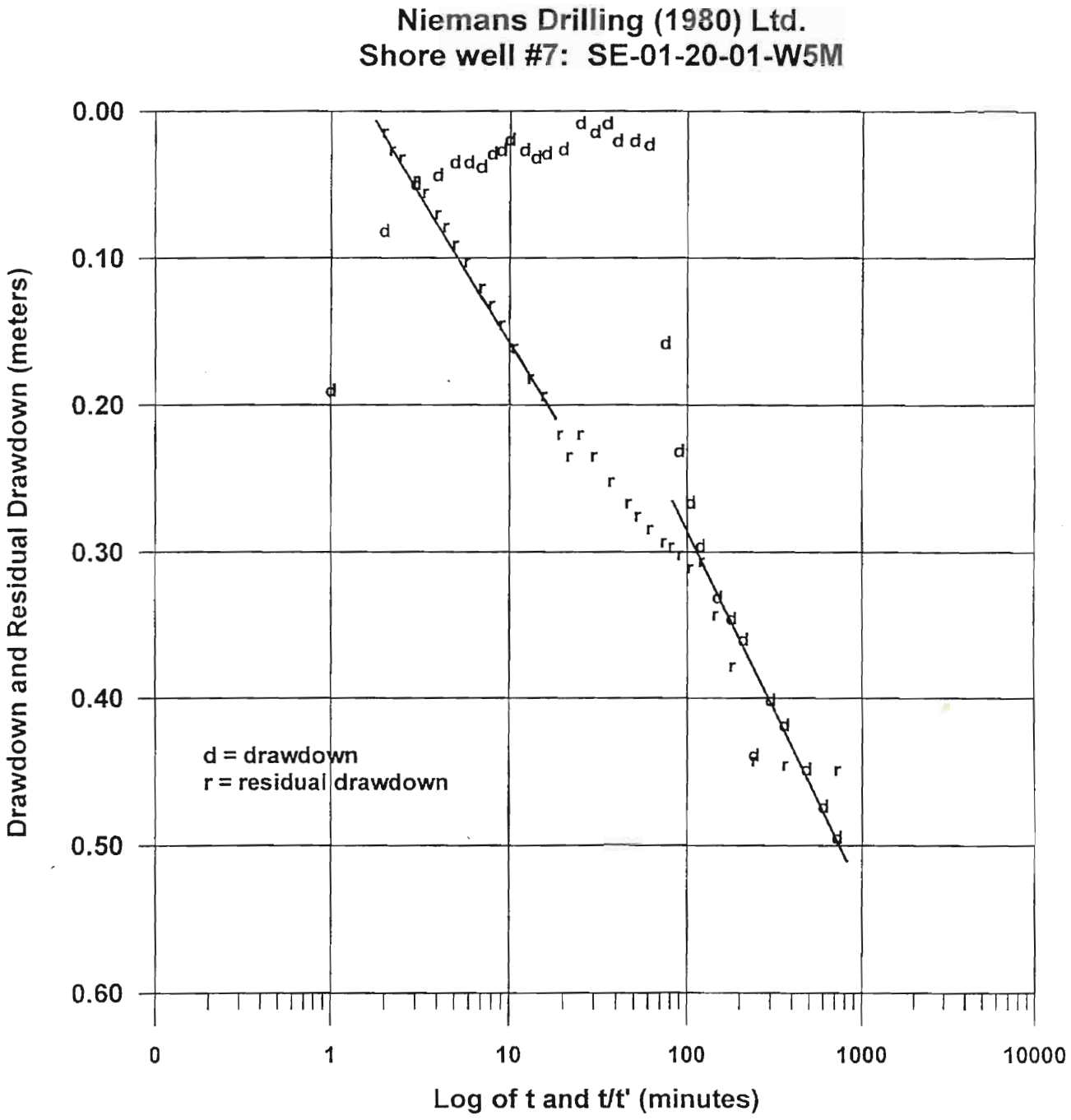
Pump Test Data
Shore well: SE-01-20-01-W5M

Project:	**Shore well**
Date of Test:	**February 18 - 19, 1999**
Non-Pumping Water Level:	**13.23 meter, btc**
Pump Rate:	**32.73 m^3/day (5.0 Cgpm)**
Test Duration:	**720 + 720 minutes**

Elapsed Time t (min)	Drawdown (m)	Elapsed Time t/t' (min)	Residual Drawdown (m)
1	0.19	721	0.45
2	0.08	361	0.45
3	0.05	241	0.44
4	0.04	181	0.38
5	0.04	145	0.34
6	0.04	121	0.31
7	0.04	103.86	0.31
8	0.03	91	0.30
9	0.03	81	0.30
10	0.02	73	0.29
12	0.03	61	0.28
14	0.03	52.43	0.28
16	0.03	46	0.27
20	0.03	37	0.25
25	0.01	29.8	0.23
30	0.01	25	0.22
35	0.01	21.57	0.23
40	0.02	19	0.22
50	0.02	15.4	0.19
60	0.02	13	0.18
75	0.16	10.6	0.16
90	0.23	9	0.15
15	0.27	7.86	0.13
120	0.30	7	0.12
150	0.33	5.8	0.10
180	0.35	5	0.09

Pump Test Data: (continued)
Shore well: SE-01-20-01-W5M

Elapsed Time t (min)	Drawdown (m)	Elapsed Time t/t' (min)	Residual Drawdown (m)
210	0.36	4.43	0.08
240	0.44	4	0.07
300	0.40	3.4	0.06
360	0.42	3	0.05
480	0.45	2.5	0.03
600	0.47	2.2	0.03
720	0.49	2	0.01


Niemans Drilling (1980) Ltd.
Shore well #7: SE-01-20-01-W5M
Drawdown and Residual Drawdown (meters)
0.00
0.10
0.20
0.30
0.40
0.50
0.60
d = drawdown
r = residual drawdown
0
1
10
100
1000
10000
Log of t and t/t' (minutes)

NIEMANS DRILLING (1980) LTD.

BOX 5564 HIGH RIVER, AB. T1V - 1M6 652 - 7867

NPWL~~(M)~~	43.4 FT.	DISCHARE (GPM)	5
DATE TEST STARTED	2/18/99	TIME TEST STARTED	
PUMPING INTERVAL (MIN)	1	RECOVERY INTERVAL	1
TD(M)		TOP OF AQUIFER (M)	
DEPTH CASING SET (M)		DEPTH TO PUMP (M)	
WELL NAME:	John Shore lot 7	LEGAL DESCRIPTION	

PUMPING INTERVAL

1	44.025	FT.
2	43.669	
3	43.563	
4	43.544	
5	43.515	
6	43.515	
7	43.525	
8	43.496	
9	43.488	
10	43.465	
12	43.486	
14	43.505	
16	43.496	
20	43.487	
25	43.428	
30	43.448	
35	43.428	
40	43.467	
50	43.467	
60	43.475	
75	43.919	
90	44.159	
105	44.274	
120	44.371	
150	44.486	
180	44.534	
210	44.582	
240	44.64	
300	44.717	
360	44.774	
480	44.871	
600	44.954	
720	45.023	

RECOVERY INTERVAL

721	44.871	FT.
722	44.861	
723	44.851	
724	44.64	
725	44.534	
726	44.464	
727	44.419	
728	44.39	
729	44.371	
730	44.361	
732	44.332	
734	44.303	
736	44.274	
740	44.226	
745	44.169	
750	44.121	
755	44.169	
760	44.121	
770	44.053	
780	43.995	
795	43.928	
810	43.875	
825	43.832	
840	43.794	
870	43.736	
900	43.698	
930	43.659	
960	43.63	
1020	43.582	
1080	43.553	
1200	43.505	
1320	43.467	
1440	43.447	

TO :
FROM : BILL NIEMANS WAT[illegible] [illegible]ELL DRILLING

[illegible]NE NO. : 2305924

MAR.23.1999 12:29PM P 3
PHONE NO. : 652 7857

Alberta Water Well Drilling Report

ENVIRONMENTAL PROTECTION

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

Well I.D.
Map verified
Date report received:

1 Contractor & Well Owner Information

Company Name: NIEMANS DRLG. (1980) LTD.
Licence No.: 0820.
Mailing Address: BOX 5564, HIGH LEVEL AB. T0H 1Z0 (?)
City or Town:
Postal Code:
Well Owner's Name: JOHN SHORE.
Well Owner has a copy of this report: Yes / No
Mailing Address:
City or Town:
Postal Code:

2 Well Location

1/4 or LSD	Sec	Twp	Rge	W of Meridian
S.E.	1	20	1	5

Location in Quarter: ___ m/ft from [ ] N [ ] S; ___ m/ft from [ ] E [ ] W

Lot: 7 Block: Plan:

3 Drilling Information

Type of Work: [ ] Testhole [X] New Well [ ] Reconditioned [ ] Deepened
[ ] Reclaimed well Date reclaimed: Yr Mo Day
Materials Used: [ ] Bentonite Product [ ] Cement [ ] Other

Method of Drilling: [ ] Auger [ ] Boring [ ] Cable tool [X] Rotary [ ] Combination [ ] Backhoe [ ] Other

Proposed well use: [X] Domestic [ ] Non-Domestic
Specify:

Anticipated requirement per day: 580 [ ] Litres [X] Gallons

4 Formation Log

Depth from ground level ([ ] metres [X] feet)	Lithology Description
0'-2'	TOP SOIL.
2'-5'	GRL.
5'-54'	CLAY, ROCKS & BORS.
54'-61'	SH. + SS.L.
61'-69'	SS.
69'-87'	SH.
87'-93'	SS.
93'-103'	SH.
103'-108'	SS. + SH.L.
108'-123'	SH.

AIR TESTED
15 + G.P.M.

Geophysical Log taken: [ ] Electric [ ] Gamma

Did you encounter: [ ] Mineralized water more than 4000 ppm TDS [ ] Gas

At what depth:

Remedial action taken:

5 Well Completion

Date Started: 99 2 17
Date Completed: 99 2 17

Are measurements in metric or imperial?

Well depth: 123FT.
Borehole diameter: 6 3/4" 5 1/2"

Casing type: STEEL.
Liner type: P.V.C.

Size OD: 6 5/8"
Size OD: 4 1/2"

Wall thickness: .219
Wall thickness: .237

Bottom at: 62FT.
Top: 43FT. Bottom: 123FT.

Perforations: from: 73FT. to: 103FT.
from: to:

Perforation size: 1/8" x 8"

Perforated by: [X] Saw [ ] Torch [ ] Machine [ ] Other

Seal: [X] Bentonite product [X] Driven [ ] Cement / Grout [ ] Other

Sealed Interval: from: 0FT. to: 62FT.

Screen type: Size OD:
Intervals: from: to: slot size:
from: to: slot size:
Installation: [ ] Attached to casing [ ] Telescoped
Fittings: Top [ ] Packer [ ] Cut-out Bottom [ ] Wash down [ ] Bail [ ] Plug
Pack: [ ] Artificial/Mechanical [ ] Natural
Grain size: Amount:

7 Contractor Certification

Driller's Name: TODD NIEMANS.
Certification No.: 23199A.

This well was constructed in accordance with the Water Well Regulation of the Alberta Environmental Protection & Enhancement Act. All information in this report is true.

Signature: 99 2 22 (Yr Mo Day)

6 Well Yield

Test Date: Yr Mo Day Start Time:
Test method: [X] Pump [ ] Bailer [ ] Air

Are measurements in metric or imperial?

Non pumping static water level: 43.4 FT.
Rate of water removal: 5 I.G.P.M.
Depth of pump intake: 115FT.
Water level at end of test: 45.023FT.
Distance from top of casing to ground level: 2 FT.

Depth to water level

Pumping	Elapsed Time minutes	Recovery
	0	
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	12	
	14	
	16	
	20	
	25	
	30	
	35	
	40	
	50	
	60	
	75	
	90	
	105	
	120	

Total Drawdown: 1.623FT.

If water removal was less than 2 hr duration, reason why:

Recommended pumping rate: 5 G.P.M.
Recommended pump intake: 110 FT.
Pump installed [ ] Yes Depth:
Type:
Any further pumptest information? [ ] Yes [ ] No