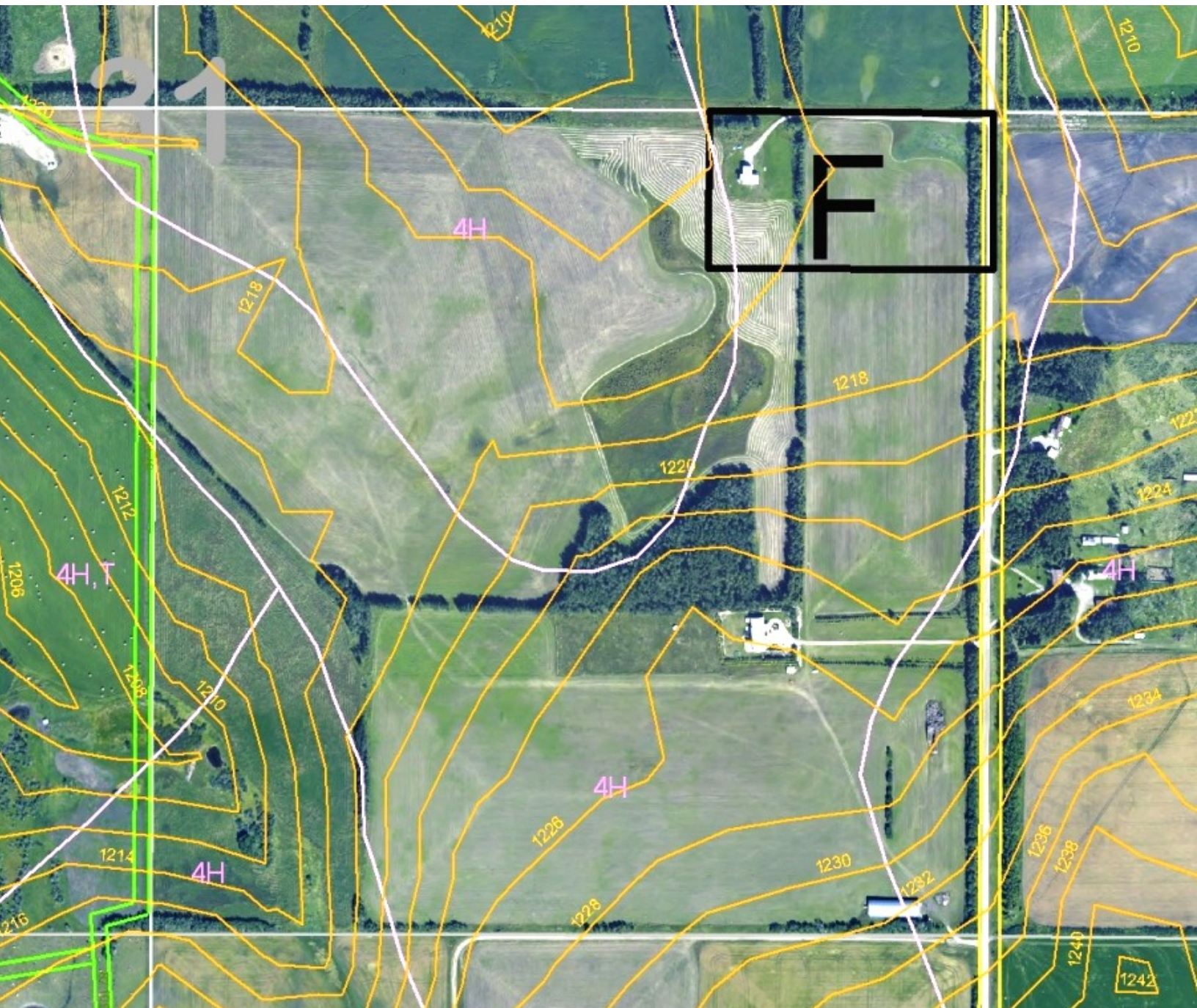


# Soil Classification Map

This is a view of our land showing the land's elevations are in yellow and Soil Classifications are in pink. You will note that the Soil Classification is primarily a 4H although to the west side where it slopes significantly is a 4H,T.

The rectangular section marked F is a 10 acre parcel that was subdivided out several years ago. The remaining land (150 acres) is the subject of this Redesignation Application.



Soil Survey of the  
**Municipal District of  
Rocky View No. 44, Alberta**  
(excluding the Calgary Urban Perimeter)

L.W. Turchenek and M.D. Fawcett

Alberta Soil Survey Report No. 53

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Alberta Research Council  
Environmental Research and Engineering Department  
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**Condensed from the original 131 page report at**

**<http://sis.ear.gc.ca/canis/publications/ab/ab53/intr.html>**

## Preface

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This report and accompanying maps describe the soils and landforms in a portion of the Municipal District of Rocky View, No. 44. The soil survey presented in this report does not include the portion of the M.D. included in an area referred to as the Calgary Urban Perimeter, for which a soil survey was completed in the mid 1980s (MacMillan 1987). Details about the area covered in this survey are provided at the beginning of Part 1 of this report. Users requiring information for areas along the borders of the Calgary Urban Perimeter will need to use both this report and that of MacMillan (1987) for complete coverage with regard to soil survey information.

The purpose of this soil survey is to describe the properties, extent and distribution of soils in the M.D. of Rocky View, as well as to provide interpretations relating to agriculture and soil conservation issues. Soil inventory information had previously been available in the 'Soil Survey of the Rosebud and Banff Sheets (Wyatt et al. 1943) and the 'Soil Survey of the Blackfoot and Calgary Sheets (Wyatt et al. 1942). Both of these were broad scale reconnaissance surveys with maps published at a scale of 1:190 080. The current survey provides considerably more detail than the previous reports and utilizes significant advances in soil classification and mapping procedures developed since completion of the earlier surveys.

## Using the Soil Map and Report

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The soil survey report for the M.D. of Rocky View consists of three main parts, five appendices and seven 1:50 000 scale (1 cm = 1/2 km) soil maps.

The three main parts contain the following information:

- Part 1 Location and physical environment** - Provides an overview of the biophysical characteristics of the M.D. of Rocky View.
- Part 2 The soils and soil mapping** - Presents an overview of soil classification and mapping, and provides descriptions of the major soil types found in the M.D.
- Part 3 Selected soil interpretations** - Provides interpretations for dryland agriculture capability, wind erosion risk, and water erosion risk.

The five appendices include:

- A. Descriptions of soil series in the M.D. of Rocky View.
- B. Composition of soil units in the M.D. of Rocky View soil survey.
- C. Correlation of map units between the M.D. of Rocky View soil survey and the Calgary Urban Perimeter soil survey.
- D. Glossary of terms.
- E. Descriptive legend: M.D. of Rocky View soil survey.

The following steps are guidelines to assist the user with this report:

1. **Locate the specific area on the appropriate map sheet.** Refer to the index map on the following page to determine the appropriate base map for locating the area of interest. (e.g., Section 21, Township 27, Range 2, West of the 5th Meridian is located on base map 5)

2. **Explanation of the map symbol.** Note the map symbol or symbols in the specific area of interest. See the introductory section to Appendix E for explanation of the different components of the symbols.
3. **Detailed description of the individual soil map units.** The soil map unit symbols appear alphabetically and numerically in the soil map unit legend (Appendix E) where detailed descriptions of the parent material, surface form and soil drainage are provided. In addition, major and minor soil subgroups are identified with the commonly associated soil series (the building blocks of soil map units described in detail in Appendix A of this report).
4. **Determine the soil interpretations.** Each soil map unit is interpreted for land capability for dryland agriculture and for erosive risk (Part 3 - Interpretations). Also, a brief explanation is provided to describe the rationale of the various interpretive ratings.

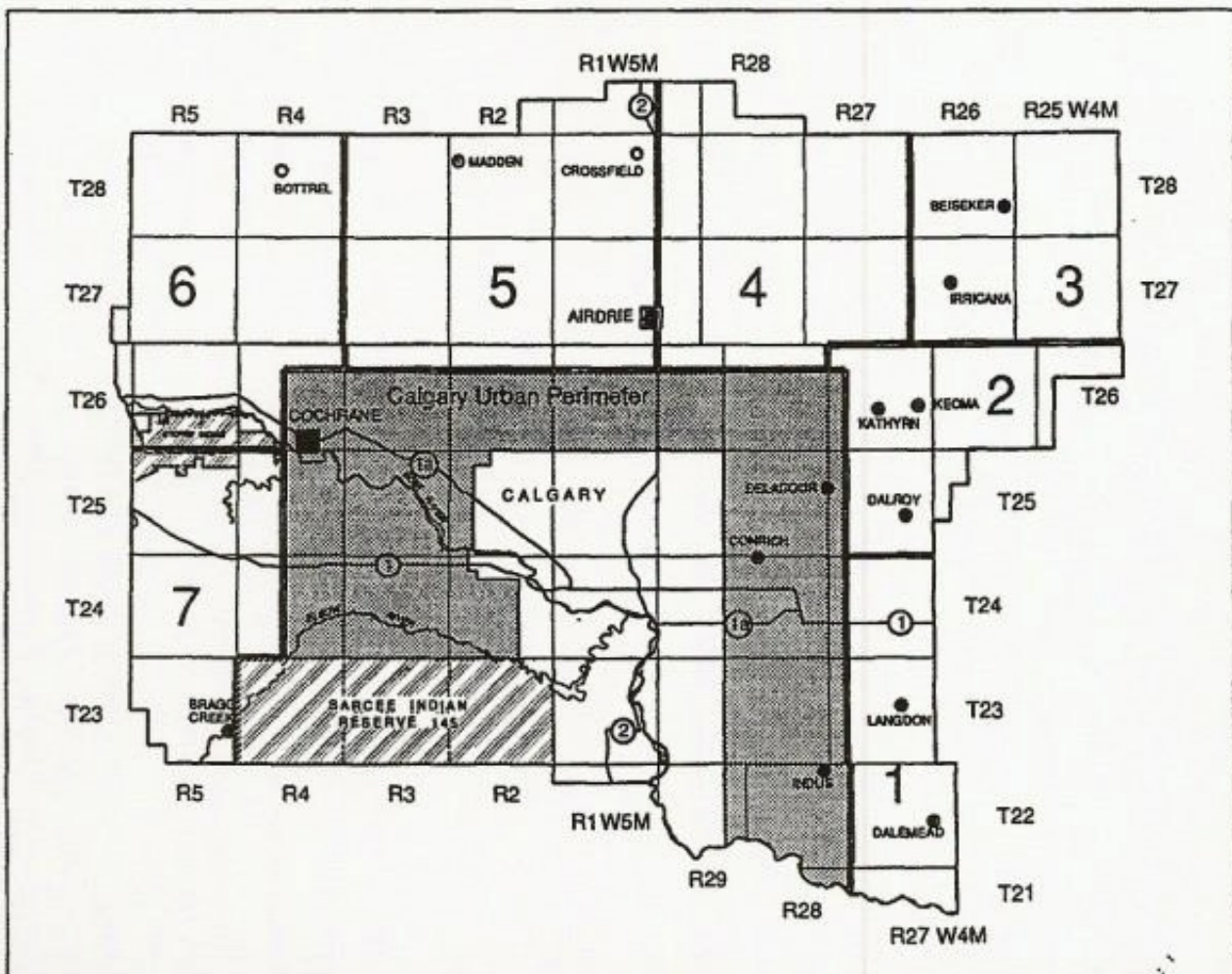


Figure 1. Key map indicating the subdivision of the Municipal District of Rocky View into seven sheets mapped in this survey, and the portion occupied by the Calgary Urban Perimeter.

## Part 1 - Location and physical environment

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### Location and extent

The Municipal District of Rocky View No. 44 is located in south-central Alberta (Figure 2), and borders the east, north and west sides of the City of Calgary. The southernmost and northernmost extents of the Municipal District (M.D.) of Rocky View occur in Townships 21 and 29, respectively, and its eastern and western extremities lie in Range 25, West of the 4th Meridian, and in Range 6, West of the 5th Meridian, respectively. Airdrie, Beiseker, Bragg Creek, Cochrane, Crossfield, Irricana and Langdon are the major towns and cities in the M.D. The M.D. offices are located in the City of Calgary.

Most of the M.D. of Rocky View lies within the Drumheller (82P) and Calgary (82O) 1:250 000 National Topographic Series (NTS) map sheets. Small portions in the south of the M.D. lie within the Gleichen (82I) and Kananaskis Lakes (82J) map sheets.

The total area of the M.D. of Rocky View, based on 1991 Statistics Canada data, is 423 126 hectares (1 045 121 acres). The soil survey presented in this report does not include the portion of the M.D. within an area designated as the Calgary Urban Perimeter (Figure 2). A soil survey of the Calgary Urban Perimeter, produced at a scale of 1:50 000, has recently been produced by MacMillan (1987), and a geological survey has been prepared by Moran (1986). The area of the portion of the M.D. that lies within the Calgary Urban Perimeter is 119 133 hectares (294 258 acres). This is the current area taking into account the redefinition of the City of Calgary boundaries in 1989. The area of the soil survey reported herein is 303,993 hectares (750 863 acres).

### Climate and ecology

The M.D. of Rocky View is characterized by a climatic transition from a semiarid climate in the eastern part of the M.D. to a relatively cooler and

moister climate associated with an increase in elevation and proximity to the Rocky Mountains in the western part of the M.D. Information about various climatic attributes within the M.D. can be found in the Agroclimatic Atlas of Alberta (Dzikowski and Heywood 1990). Climate in relation to soil distribution and land use is discussed in further detail in the section 'Soil zones and soil correlation areas'.

Descriptions of climate and vegetation at a regional level are provided in 'Ecoregions of Alberta' by Strong and Leggat (1992). An ecoregion is defined as an area characterized by distinctive regional climate as expressed by vegetation. The M.D. of Rocky View occurs within five of the thirteen ecoregions recognized in the province, namely (from east to west), the Mixed Grass, Fescue Grass, Aspen Parkland, Montane and Lower Boreal Cordilleran ecoregions. Detailed information about the average temperatures and precipitation, and about the characteristic vegetation of these ecoregions, can be found in Strong and Leggat (1992).

### Physiography and geology

#### Physiography

Physiography refers to the description of the physical nature of the land. It includes topography (the relief and contours of the land), elevation, aspect, slope, surface pattern of landforms, and drainage. Three physiographic regions can be distinguished within the M.D. of Rocky View; the Western Alberta Plains, the Southern Alberta Uplands, and the Rocky Mountain Foothills (Bostock 1970). These physiographic regions have been further subdivided mainly on the basis of landform and elevation (Pettapiece 1986), and a summary description of these is provided in Table 1. The source of this information, namely the map and

mixed arable agriculture, forage production and rangeland, and about one per section in the foothills area where access was relatively limited. Soil observations at each site consisted of identification of classification, parent material, drainage, texture, coarse fragment content, depth to calcareous material, depth to salts, landform and dominant slopes. The naming of soil series and of map units was based on the Soil Survey of the Calgary Urban Perimeter (MacMillan 1987) and on the Alberta Soil Names - Generation 2 (Alberta Soil Series Working Group 1993). Soil samples were taken for characterization by laboratory analysis only in situations where soil series had not previously been identified and named in the region.

Soil maps were produced by digitizing the soils information using the ARC/INFO geographic information system software (Environmental Systems Research Institute 1988) followed by combining this information with digital base maps adapted from the 1:20 000 products of the Land Information Services Division, Alberta Environmental Protection Department. The M.D. was subdivided into seven map sheets (refer to Figure 1) with the soil survey data presented at a scale of 1:50 000.

### **Map accuracy and reliability**

Evaluations of other soil maps that have conformed to the same survey intensity level guidelines applied in the soil survey of the M.D. of Rocky View have indicated that reasonable accuracy levels are generally attained. Recent work in which soil survey accuracy was reviewed from the world literature and in which measures of accuracy were carried out on 1:50 000 maps in Alberta showed that accuracy levels ranged from 50 to 80 percent when 'exact match' approaches were used. Evaluations based on 'degree of similarity' assessments indicated accuracy levels in the area of 90 percent (Nikiforuk et al. 1993).

Thus 1:50 000 soil maps are considered to have relatively high reliability, provided they are used in applications requiring a similar level of detail; e.g., county planning, large farm areas, major catchment basins. Users are cautioned that maps should not be used for site-specific soil characterization and they should not be used in lieu of site investigations. For detailed descriptions of small parcels of land, investigations by specialists should always be made. The information provided in these maps and report, however, can be an effective guide for planning site-specific investigations.

## **Part 3. Selected soil interpretations.**

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### **Land capability classification for arable agriculture**

Agricultural capability ratings were carried out by application of a classification system that rates the climatic, soils, and landscape components separately (Alberta Soils Advisory Committee 1987). These components can limit arable agriculture. The final rating is based on the most limiting component, not an accumulation of the three. The capability classification system uses a combination of classes

and subclasses. The classes indicate the relative degree of limitation to arable agriculture while the subclasses indicate the dominant kind of limitation.

The seven capability classes are:

Class 1: These lands have no significant limitations for crop production.

- Class 2: These lands have slight limitations that restrict the range of crops or require modified management practices.
- Class 3: These lands have moderate limitations that restrict the range of crops or require special management practices.
- Class 4: These lands have severe limitations that restrict the range of crops that can be grown or require special management practices or both.
- Class 5: These lands have very severe limitations for sustained arable agriculture. Annual cultivation using common cropping practices is not recommended.
- Class 6: These lands have such severe limitations for arable agriculture that cropping is not feasible even on an occasional basis.
- Class 7: These lands have no capability for arable agriculture.

The dominant subclasses (limitations) identified in the M.D. of Rocky View are:

- D - adverse subsoil structure
- E - thin and/or eroded Ah or Ap horizon
- H - temperature limiting factor
- M - low moisture supplying capacity
- N - high salinity
- P - surface stoniness
- R - shallow depth to bedrock
- T - steep and/or long, uniform slopes
- V - acidity
- W - poor drainage
- X - deep organic deposit

Example: DVBV9/6 5 T,H,P<sup>70</sup> 6 W<sup>30</sup>

where: 5, 6 = land capability class

T = dominant limitation, class 5 land

H, P = significant limitations, class 5 land

W = dominant limitation, class 6 land

<sup>70</sup>, <sup>30</sup> = percentage of map unit occupied by respective capability classes

### Water erosion risk

The water erosion risk for soil map units in the M.D. of Rocky View was calculated using a modified Universal Soil Loss Equation (USLE) (Tajek et al. 1985). The basic USLE equation is:

$$A = R * K * LS * C * P$$

where: A = annual soil loss

R = rainfall intensity

K = soil erosivity

LS = topography

C = cover

P = conservation practices

The erosion risk was calculated based on bare soil using the R, K, and LS factors only. The cover management factor (C) and the conservation practices factor (P) were not used in calculating the erosion risk. This was done in order to determine the potential soil loss which may occur. The C and P factors are not constant and can be changed from time to time, consequently controlling the amount of erosion which may occur. The R, K, and LS factors cannot be changed and thus represent the erosion risk for a given soil or map unit when it is cultivated and left unprotected. The erosion risk classes and their potential soil losses (A) are shown below.

Class	Category	Potential Soil Loss (t/ha/yr)
1	negligible	< 6
2	slight	6 - 11
3	moderate	11 - 22
4	severe	22 - 33
5	very severe	33 - 55
6	extreme	> 55

### Wind erosion risk

The wind erosion risk was determined using a rating system in which soil texture, soil moisture regime, and map unit composition were used to estimate the erosion risk. The conditions assumed for these ratings are "... an isolated, level, smooth, unsheltered, wide and bare (cultivated, no trash cover) field with a non-crusted surface" (Alberta Agriculture 1985).