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CANADA
DEPARTMENT OF MINES
AND
TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA
WATER SUPPLY PAPER No. 198

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF ROSEDALE NO. 283 SASKATCHEWAN

By
B. R. MacKay and D. C. Maddox

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CANADA

DEPARTMENT OF MINES

BUREAU OF ECONOMIC GEOLOGY

GEOLOGICAL SURVEY

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GROUND WATER RESOURCES OF THE RURAL MUNICIPALITY OF ROSEDALE, NO. 283, SASKATCHEWAN

INTRODUCTION

Lack of rainfall during the years 1930 to 1934 over a large part of the Prairie Provinces brought about an acute shortage both in the larger supplies of surface water used for irrigation and the smaller supplies of ground water required for domestic purposes and for stock. In an effort to relieve the serious situation the Geological Survey began an extensive study of the problem from the standpoint of domestic uses and stock raising. During the field season of 1935 an area of 80,000 square miles, comprising all that part of Saskatchewan south of the north boundary of township 32, was systematically examined, records of approximately 60,000 wells were obtained, and 720 samples of water were collected for analyses. The facts obtained have been classified and the information pertaining to any well is readily accessible. The examination of so large an area and the interpretation of the data collected were possible because the bedrock geology and the Pleistocene deposits had been studied previously by McLearn, Warren, Rose, Stansfield, Wickenden, Russell, and others of the Geological Survey. The Department of Natural Resources of Saskatchewan and local well drillers assisted considerably in supplying several hundred well records. The base maps used were supplied by the Topographical Surveys Branch of the Department of the Interior.

Publication of Results

The essential information pertaining to the ground water conditions is being published in reports, one being issued for each municipality. Copies of these reports are being sent to the secretary treasurers of the municipalities and to certain Provincial and Federal Departments, where they can be consulted by residents of the municipalities or by other persons, or they may be obtained by writing direct to the Director, Bureau of Economic Geology, Department of Mines, Ottawa. Should anyone require more detailed information than that contained in the reports such additional information as the Geological Survey possesses can be obtained on application to the director. In making such request the applicant should indicate the exact location of the area by giving the quarter section, township, range, and meridian concerning which further information is desired.

The reports are written principally for farm residents, municipal bodies, and well drillers who are either planning to sink new wells or to deepen existing wells. Technical terms used in the reports are defined in the glossary,

How to Use the Report

Anyone desiring information about ground water in any particular locality should read first the part dealing with the municipality as a whole in order to understand more fully the part of the report that deals with the place in which he is interested. At the same time he should study the two figures accompanying the report. Figure 1 shows the surface and bedrock geology as related to the ground water supply, and Figure 2 shows the relief and the location and type of water wells. Relief is shown by lines of equal elevation called "contours". The elevation above sea-level

is given on some or all of the contour lines on the figure.

If one intends to sink a well and wishes to find the approximate depth to a water-bearing horizon, he must learn: (1) the elevation of the site, and (2) the probable elevation of the water-bearing bed. The elevation of the well site is obtained by marking its position on the map, Figure 2, and estimating its elevation with respect to the two contour lines between which it lies and whose elevations are given on the figure. Where contour lines are not shown on the figure, the elevations of adjacent wells as indicated in the Table of Well Records accompanying each report can be used. The approximate elevation of the water-bearing horizon at the well-site can be obtained from the Table of Well Records by noting the elevation of the water-bearing horizon in surrounding wells and by estimating from these known elevations its elevation at the well-site.[1] If the water-bearing horizon is in bedrock the depth to water can be estimated fairly accurately in this way. If the water-bearing horizon is in unconsolidated deposits such as gravel, sand, clay, or glacial debris, however, the estimated elevation is less reliable, because the water-bearing horizon may be inclined, or may be in lenses or in sand beds which may lie at various horizons and may be of small lateral extent. In calculating the depth to water, care should be taken that the water-bearing horizons selected from the Table of Well Records be all in the same geological horizon either in the glacial drift or in the bedrock. From the data in the Table

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[1] If the well-site is near the edge of the municipality, the map and report dealing with the adjoining municipality should be consulted in order to obtain the needed information about nearby wells.

of Well Records it is also possible to form some idea of the quality and quantity of the water likely to be found in the proposed well.

GLOSSARY OF TERMS USED

Alkaline. The term "alkaline" has been applied rather loosely to some ground-waters. In the Prairie Provinces, a water is usually described as "alkaline" when it contains a large amount of salts, chiefly sodium sulphate and magnesium sulphate in solution. Water that tastes strongly of common salt is described as "salty". Many "alkaline" waters may be used for stock. Most of the so-called "alkaline" waters are more correctly termed "sulphate waters".

Alluvium. Deposits of earth, clay, silt, sand, gravel, and other material on the flood-plains of modern streams and in lake beds.

Aquifer or Water-bearing Horizon. A water-bearing bed, lens, or pocket in unconsolidated deposits or in bedrock.

Buried pre-Glacial Stream Channels. A channel carved into the bedrock by a stream before the advance of the continental ice-sheet, and subsequently either partly or wholly filled in by sands, gravels, and boulder clay deposited by the ice-sheet or later agencies.

Bedrock. Bedrock, as here used, refers to partly or wholly consolidated deposits of gravel, sand, silt, clay, and marl that are older than the glacial drift.

Coal Seam. The same as a coal bed. A deposit of carbonaceous material formed from the remains of plants by partial decomposition and burial.

Contour. A line on a map joining points that have the same elevation above sea-level.

Continental Ice-sheet. The great ice-sheet that covered most of the surface of Canada many thousands of years age.

Escarpment. A cliff or a relatively steep slope separating level or gently sloping areas.

Flood-plain. A flat part in a river valley ordinarily above water but covered by water when the river is in flood.

Glacial Drift. The loose, unconsolidated surface deposits of sand, gravel, and clay, or a mixture of these, that were deposited by the continental ice-sheet. Clay containing boulders forms part of the drift and is referred to as glacial till or boulder clay. The glacial drift occurs in several forms:

(1) Ground Moraine. A boulder clay or till plain (includes areas where the glacial drift is very thin and the surface uneven).

(2) Terminal Moraine or Moraine. A hilly tract of country formed by glacial drift that was laid down at the margin of the continental ice-sheet during its retreat. The surface is characterized by irregular hills and undrained basins.

(3) Glacial Outwash. Sand and gravel plains or deltas formed by streams that issued from the continental ice-sheet.

(4) Glacial Lake Deposits. Sand and clay plains formed in glacial lakes during the retreat of the ice-sheet.

Ground Water. Sub-surface water, or water that occurs below the surface of the land.

Hydrostatic Pressure. The pressure that causes water in a well to rise above the point at which it is struck.

Impervious or Impermeable. Beds, such as fine clays or shale, are considered to be impervious or impermeable when they do not permit of the perceptible passage or movement of the ground water.

Pervious or Permeable. Beds are pervious when they permit of the perceptible passage or movement of ground water, as for example porous sands, gravel, and sandstone.

Pre-Glacial Land Surface. The surface of the land before it was covered by the continental ice-sheet.

Recent Deposits. Deposits that have been laid down by the agencies of water and wind since the disappearance of the continental ice-sheet.

Unconsolidated Deposits. The mantle or covering of alluvium and glacial drift consisting of loose sand, gravel, clay, and boulders that overlie the bedrock.

Water Table. The upper limit of the part of the ground wholly saturated with water. This may be very near the surface or many feet below it.

Wells. Holes sunk into the earth so as to reach a supply of water. When no water is obtained they are referred to as dry holes. Wells in which water is encountered are of three classes.

(1) Wells in which the water is under sufficient pressure to flow above the surface of the ground. These are called Flowing Artesian Wells.

(2) Wells in which the water is under pressure but does not rise to the surface. These wells are called Non-Flowing Artesian Wells.

(3) Wells in which the water does not rise above the water table. These wells are called Non-Artesian Wells.

NAMES AND DESCRIPTIONS OF GEOLOGICAL FORMATIONS, REFERRED TO IN THESE REPORTS

Wood Mountain Formation. The name given to a series of gravel and sand beds which have a maximum thickness of 50 feet, and which occur as isolated patches on the higher parts of Wood Mountain. This is the youngest bedrock formation and, where present, overlies the Ravenscrag formation.

Cypress Hills Formation. The name given to a series of conglomerates and sand beds which occur in the southwest corner of Saskatchewan, and rests upon the Ravenscrag or older formations. The formation is 30 to 125 feet thick.

Ravenscrag Formation. The name given to a thick series of light-coloured sandstones and shales containing one or more thick lignite coal seams. This formation is 500 to 1,000 feet thick, and covers a large part of southern Saskatchewan. The principal coal deposits of the province occur in this formation.

Whitemud Formation. The name given to a series of white, grey, and buff coloured clays and sands. The formation is 10 to 75 feet thick. At its base this formation grades in places into coarse, limy sand beds having a maximum thickness of 40 feet.

Eastend Formation. The name given to a series of fine-grained sands and silts. It has been recognized at various localities over the southern part of the province, from the Alberta boundary east to the escarpment of Missouri coteau. The thickness of the formation seldom exceeds 40 feet.

Bearpaw Formation. The Bearpaw consists mostly of incoherent dark grey to dark brownish grey, partly bentonitic shales, weathering light grey, or, in places where much iron

is present, buff. Beds of sand occur in places in the lower part of the formation. It forms the uppermost bedrock formation over much of western and southwestern Saskatchewan and has a maximum thickness of 700 feet or somewhat more.

Belly River Formation. The Belly River consists mostly of non-marine sand, shale, and coal, and underlies the Bearpaw in the western part of the area. It passes eastward and northeastward into marine shale. The principal area of transition is in the western half of the area where the Belly River is mostly thinner than it is to the west and includes marine zones. In the southwestern corner of the area it has a thickness of several hundred feet.

Marine Shale Series. This series of beds consists of dark grey to dark brownish grey, plastic shales, and underlies the central and northeastern parts of Saskatchewan. It includes beds equivalent to the Bearpaw, Belly River, and older formations that underlie the western part of the area.

WATER-BEARING HORIZONS OF THE MUNICIPALITY

The rural municipality of Rosedale, No. 283, occupies 360 square miles in south-central Saskatchewan, and includes township 28, range 3, and townships 29, 30, and 31, ranges 3, 4, and 5; all west of the Third meridian. The Saskatoon and Duck Lake branch of the Canadian National Railways passes in a northwesterly direction through the municipality. The town of Hanley, which is located on this line, is about 36 miles south and 10 miles east of Saskatoon. The population of the municipality in 1931 was 1,683, of which 362 were resident in Hanley.

Brightwater creek, a permanent stream, occupies a wide, shallow valley that passes in a direction a little north of west through the municipality. The gradient of the creek valley declines from about 1,900 feet above sea-level near the southern boundary of the municipality to about 1,710 feet above sea-level at the northern boundary. In dry seasons the flow of the creek is very small, but there are pools and deep stretches in the creek valley that usually contain enough water for stock requirements. Salt lake is a small lake that covers about 200 acres in the northern half of sec. 35, tp. 30, range 3, and the southern half of sec. 2, tp. 31, range 3. Water-level in this lake, which in places is 12 feet deep, is about 2,004 feet above sea-level. The southern part of Indi lake, water-level of which is about 1,727 feet above sea-level, extends for about 2 miles into the northwest quarter of township 31, range 4. There is a small lake in sec. 35, tp. 31, range 5, and the southern part of a shallow lake occupies about $\frac{1}{8}$ square mile in secs. 32, 33, and 34, tp. 31, range 5. The northern part of the valley of Brightwater creek, and an area of about 3 square miles in the northwest part of the municipality, are wooded. East of Brightwater creek the land surface rises towards Allan hills to

nearly 2,200 feet above sea-level in the northeast corner of the municipality. West of Brightwater creek the land surface rises very gradually towards the southwest corner of the municipality, where a small hill rises to over 2,100 feet above sea-level.

The unconsolidated deposits that cover this municipality owe their origin to the continental ice-sheet that many thousands of years ago moved across the province of Saskatchewan, to the water derived from the melting ice, and to the further reworking of these deposits by water and wind. As the ice-sheet advanced and retreated it deposited over the municipality a layer of unstratified, stony clay, referred to as glacial till or boulder clay. Where the ice front paused for considerable periods of time during its retreat, a thicker accumulation of boulder clay was deposited, along with pockets of sand and gravel partly sorted by the water issuing from the ice front. Such deposits are characterized by numerous hillocks and undrained depressions and are referred to as "moraine". In some places areas of gravels and sand were deposited and these are termed outwash deposits. Where the damming up of natural drainage channels by the ice occurred, the water resulting from the melting ice collected in these depressions and formed extensive lakes, which remained until drained by outlets uncovered by the disappearance of the ice. The extent of these lakes is indicated by deposits of lake clay and sand, the former representing fine material that was held in suspension in the water and settled in the deeper part of the lakes, and the sands, the coarser sediments deposited in the shallow parts of the lakes and around their margins. Wind action on these lake sands has, in places, rearranged them into the form of sand dunes, and streams have reworked the glacial lake deposits and glacial drift along their channels to form a thin veneer of stream alluvium.

The areas covered by these various deposits in the municipality are shown on Figure 2 of the accompanying map. Moraine covers a hillocky area of approximately 17 square miles in the eastern two-thirds of township 29, range 3, and the northeast corner of township 28, range 3; also an approximate area of 62 square miles in the northeastern part of the municipality, and an area of 20 square miles in township 29, range 5, at the southwestern corner of the municipality.

A discontinuous belt of boulder clay extends along the western border of the moraine, from the northern boundary of the municipality southeasterly to near Hanley, and thence to beyond its eastern boundary. It varies in width from half a mile at the northern boundary to practically nothing north of Hanley, from which place it again gradually increases to over 3 miles at the northern boundary of township 29, range 3. There it divides into two belts, an eastern belt 1½ miles wide, extending to beyond the eastern boundary of township 29, and a western, narrow belt terminating 3 miles south. Boulder clay also covers most of township 28, range 3; a large part of township 29, range 4; the northeastern part of township 29, range 5, and considerable of the southern parts of townships 30, ranges 4 and 5.

Glacial outwash sands and gravels mantle an area of approximately 4½ square miles in the vicinity of Salt lake, and two small areas in secs. 1 and 2, tp. 28, range 3.

Glacial lake deposits underlie the wide valley of Brightwater creek and most of the northwestern part of the municipality. Glacial lake clays underlie the lowest part of this valley, bordering Brightwater creek and a branch depression in which lies Indi lake. Glacial lake sands underlie the remaining lake area in the northwestern part of the municipality lying to the west of Brightwater creek and Indi lake. In the

northern third of township 31, range 5, the lake sands have been reworked by wind action into sand dunes.

Water-bearing Horizons in the Unconsolidated Deposits

Water of good quality is generally found in the dune sands within 30 feet of the surface. That part of this municipality mantled with dune sands is thinly settled, however, and the only record obtained was that of a well 13 feet deep, on sec. 32, tp. 31, range 5, which provided enough water for 25 head of stock. The glacial lake clay generally does not yield any water, but in this municipality several wells up to 30 feet deep obtain small supplies of ground water from sandy beds in the glacial lake clay; the deeper wells obtain water from sand and gravel aquifers in the underlying boulder clay. Also, in the area mantled by glacial lake sands many wells up to 30 feet in depth obtain small supplies of water, whereas in the southern part of this area the wells are 40 to 93 feet deep, and obtain water from the underlying boulder clay. Water is found in the glacial till and the moraine only in irregularly distributed pockets, lenses, or discontinuous beds of sand and gravel enclosed in the boulder clay that forms by far the greater part of these deposits. The aquifers in boulder clay and the moraine are small in extent and their locations are, therefore, difficult to predict. In the moraine-covered area in the northeastern part of the municipality the wells are from 23 to 315 feet deep, and no wells have reached the bedrock. At several farms the supply of water from the shallower wells is used for the house, and water for stock requirements is obtained from the deeper wells. The glacial drift in this area appears to be very thick, as many of the wells 100 to 315 feet deep obtained hard water. Elsewhere in the municipality the wells in the boulder clay and moraine are less than 100 feet deep, and most of them are less than 50 feet deep. The wells in

the area of glacial outwash sands and gravel that surrounds Salt lake are 84 to 143 feet deep, and have passed into the underlying boulder clay.

Water-bearing Horizons in the Bedrock

The Bearpaw formation is thought to underlie the glacial drift over the central and southern parts of this municipality. It consists principally of dark grey shale which was laid down in the Cretaceous sea in the form of mud and has since been consolidated. Most of the beds of shale contain very little water except near the surface where weathering has opened up fractures and cavities in which water may accumulate. Interbedded with the shale, however, there are some beds of sand that in most cases contain water that is soft or salty. The Belly River formation probably underlies the unconsolidated deposits in the northern part of this municipality, and underlies the Bearpaw formation where present in the central and southern parts of the municipality. There are no outcrops of bedrock in this municipality, and the position of the boundary between the two formations is not known. They and the underlying formation are, consequently grouped together on the map under the designation of Marine Shale series. The Belly River formation is thought to be about 200 feet thick in this municipality.

The Lea Park formation that underlies the Belly River consists principally of grey shales that contain little or no ground water, but there are beds of sand in the shale that contain soft or salty water, and many wells in this municipality appear to obtain water from aquifers in the Lea Park formation, but the geological horizon of the bedrock aquifers in many wells is largely conjectural.

Wells have been put down to bedrock in all the townships of this municipality except township 30, range 3, and township 31, range 3, and in many townships the bedrock wells are the chief

source of water. There are two areas of flowing artesian wells in and near the valley of Brightwater creek, the approximate limits of which are shown on the map that accompanies this report. The height to which the water rises in the wells varies widely; in the NE. $\frac{1}{4}$, sec. 10, tp. 29, range 3, the water in the wells rises to a maximum of about 2,000 feet above sea-level, but from this point the water-level declines towards the south, west, and north. In many flowing artesian areas it has been found that the water-level in the wells declines rather rapidly unless the flowing wells, are closed in, and many wells that once flowed now have to be pumped. In some countries the flow of water from such wells is controlled by Government regulations, and instructions for the shutting-in of flowing wells are provided. In this municipality one well at least flows at the rate of about 35 gallons a minute, or 50,400 gallons a day, and only a small proportion of this water is used. It is very unfortunate that such large supplies of water should not be usable for irrigation.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 28, Range 3

Brightwater creek rises in the NE. ¼, section 17, and flows in a general direction a little west of north through the northwest quarter of the township. The valley of the creek in this township is very wide and shallow. The land surface rises gently from the creek valley to the eastern boundary of the township, where elevations of over 2,000 feet above sea-level occur. An area of about 3½ square miles in the northwestern quarter of the township is underlain by glacial lake clay; moraine occupies about 2 square miles in the northeastern corner of the township, and boulder clay underlies the remainder of the township, except two small areas in sections 1 and 2 that are mantled by glacial outwash sands and gravels.

Only two wells, 21 and 48 feet deep, have been put down in that part of this township underlain by glacial lake clay. The well, 48 feet deep, on the NE. ¼, section 30, obtains a large supply of water that is too "alkaline" for drinking; from the boulder clay that underlies the glacial lake clays. The well, 21 feet deep, on the NE. ¼, section 32, yields a small supply of slightly "alkaline" water. In that part of the township underlain by moraine and boulder clay the wells are 11 to 46 feet deep. A dry hole 90 feet deep was put down on the SE. ¼, section 34.

Eight flowing wells in this township, 320 to 569 feet deep, obtain water from aquifers in the bedrock. An aquifer that is about 1,336 feet above sea-level supplies soft water, which contains 1,670 parts per million of dissolved solids, to a well 569 feet deep on the NE. ¼, section 22. An aquifer that is about 1,402 feet above sea-level supplies a well, 486 feet deep, on the SW. ¼, section 5. An aquifer that is about 1,518

to 1,542 feet above sea-level supplies six wells, 320 to 369 feet deep, in the northern two-thirds of the township. The flow of water from the bedrock wells in this township ranges from 1 to 35 gallons a minute, and the water is used for all purposes except irrigation. The water in the well on the SE. ¼, section 15, contains 1,597 parts per million of dissolved solids.

Township 29, Range 3

Brightwater creek flows northwesterly through sections 6 and 7. The land surface rises gradually eastwards from the valley of the creek to the eastern boundary of the township, where some parts are over 2,050 feet above sea-level. Glacial lake clay occupies nearly 13 square miles in the western part of the township, the area being about 3½ miles wide at the southern boundary of the township and a little over 1 mile wide at the northern boundary. An area of about 16 square miles in the eastern two-thirds of the township and an area of about ½ square mile in the northeast corner are underlain by moraine. An irregularly shaped area of boulder clay occupies about 6½ square miles in the northern and eastern parts of the township.

No records of wells in the glacial lake clay of this township were obtained. In that part of the township underlain by moraine and boulder clay the wells are 16 to 93 feet deep. The water in the well, 40 feet deep, on the NW. ¼, section 13, is reported as being soft; the water in the well, 93 feet deep, on the SW. ¼, section 28, is too "alkaline" for drinking; and the water in the wells, 88 and 30 feet deep, on the NE. ¼, section 3, and the NE. ¼, section 24, is "alkaline", but can be used for drinking. The water in the remaining wells in the glacial drift of this township is hard, but is not "alkaline". At three farms the supply of water is not sufficient for local requirements. Six flowing wells and three non-flowing wells obtain water from aquifers in the bedrock. An aquifer that is about 1,445 to 1,490 feet above sea-level supplies four wells on sections 8, 28, 31 and

33, 420, 530, 402, and 445 feet deep, respectively. The water in the wells on sections 31 and 33 contains 1,909 and 2,214 parts per million of dissolved solids, respectively. An aquifer that is about 1,525 to 1,543 feet above sea-level supplies three wells on sections 11, 29, and 31, 485, 407, and 340 feet deep, respectively. An aquifer that is about 1,585 to 1,603 feet above sea-level supplies two wells on sections 4 and 10, 325 and 425 feet deep, respectively. The distribution of the aquifers in this township is irregular and the records of wells in adjacent sections should be studied before new wells are drilled. The wells in the bedrock provide supplies of water that can be used for all purposes except irrigation. The supplies are ample for local requirements.

Township 29, Range 4

Brightwater creek passes through the northeastern part of the township, entering it at the southeast corner of section 13 and crossing the northern boundary of the township a little west of the centre of section 35. From the creek, the land rises very gradually towards the southwest corner of the township, which is about 1,950 feet above sea-level. Boulder clay underlies almost all the western half of the township, and about 5 square miles in the southeastern part of the township. Glacial lake clay underlies the northeast quarter of the township, and about 4 square miles in the southeast quarter. There are very few wells in the area of glacial lake clay, but a well 16 feet deep, on section 24, obtains a small supply of hard water from a sandy bed in the clay. In that part of the township underlain by boulder clay the wells are 14 to 47 feet deep. At three farms in this part the water supply is insufficient for local requirements. In a well 30 feet deep, on section 32, the water is too laxative to be fit for drinking, and in two wells, each 20 feet deep, in sections 2 and 28, the water is

"alkaline", but is used for drinking.

Seven flowing wells and four non-flowing wells in this township obtain soft water from aquifers in the bedrock. The water can be used for all purposes except irrigation. These aquifers at 1,495 to 1,569 feet above sea-level, probably underlie the entire township. The supply of water from the bedrock wells is sufficient or more than sufficient for farm needs, and the flow from the well in section 34 is about 35 gallons a minute. The water in the well in section 21 contains 2,040 parts per million of dissolved solids.

Township 29, Range 5

The southwest quarter of this township is rolling, and some hills are over 2,050 feet above sea-level. From this elevated tract the land slopes gently northwards, and in the northwest the surface is less than 1,850 feet above sea-level. Almost all of the southern third of the township, and about 7 square miles in the northern two-thirds, are mantled with moraine. The remaining northern and northeastern parts of the township are mantled with boulder clay.

In the moraine-covered area in this township the producing drift wells are 10 to 80 feet deep, and a dry hole 113 feet deep was put down on the SW. $\frac{1}{4}$, section 2. The water from the well on section 21 is too laxative to be used for drinking, and that from two wells on sections 2 and 3 is rather "alkaline". The supply of water at five farms is not sufficient for local requirements, and at other farms several wells are necessary to provide an adequate supply.

In the boulder clay area the wells in the glacial drift are 25 to 100 feet deep. The water in three wells on sections 14, 22, and 31, 56, 30, and 100 feet deep, respectively, is too highly mineralized for drinking, and the ground water conditions in this

area are very unsatisfactory.

Eight wells in this township, 240 to 900 feet deep, obtain water from bedrock aquifers. An aquifer that is about 965 feet above sea-level supplies a well 900 feet deep, on section 33, with soft water that contains soda. The water is reported as being used for all purposes. Aquifers that are about 1,262 to 1,333 feet above sea-level supply five wells, 600 to 642 feet above sea-level, in the eastern half and the northwestern quarter of the township. These aquifers probably underlie the entire township. An aquifer that is about 1,609 to 1,612 feet above sea-level supplies two wells on sections 32 and 34, 240 and 262 feet deep, respectively. This aquifer probably underlies at least the western two-thirds of the township. The water in the well on section 34 contains 2,160 parts per million of dissolved solids, of which 1,188 parts per million is common salt. The supplies of water from the bedrock wells that are in use are large, and the water is reported as being used for all purposes except irrigation, although in several wells it is rather salty.

Township 30, Range 3

The land surface in this township slopes gently southwestwards from the northeast corner, which is slightly over 2,100 feet above sea-level, to the southwest corner, which is a little less than 1,850 feet above sea-level. The southern part of Salt lake occupies about $\frac{1}{4}$ square mile in section 35. Glacial lake clay underlies an area of about 4 square miles adjacent to the western boundary of the township. Boulder clay occupies a belt lying east of the lake clay that extends a little east of the Canadian National railways. Moraine underlies all that part of the township east of the boulder clay area except about $3\frac{1}{2}$ square miles in the vicinity of Salt lake, which area is mantled with

glacial outwash sands and gravels.

In the area of glacial lake clay in the southwest part of the township a well 25 feet deep obtains a sufficient supply of hard water for farm requirements. In the area of glacial outwash sands and gravels circling Salt lake, all the wells have been sunk into the underlying glacial drift. In this area and in that part of the township underlain by moraine and by glacial till the wells are 10 to 315 feet deep, but most of them are 30 to 80 feet deep. In three wells in sections 17, 18, and 21, 54, 45, and 60 feet deep, respectively, the water is "alkaline", but is used for drinking. In three wells in sections 11, 12, and 16, 60, 130, and 40 feet deep, respectively, the water is too "alkaline" for use except by stock. The aquifer that supplies the well, 315 feet deep, on the NE. $\frac{1}{4}$, section 12, is thought to be in the glacial drift, as the water in the well is hard. The sand of this aquifer has entered the well and has reduced the supply of water. Aquifers in the glacial drift are difficult to trace over considerable distances, but the following aquifers are probably continuous between the wells mentioned. An aquifer that is about 1,865 feet above sea-level provides large supplies of water to two wells on the SE. $\frac{1}{4}$, section 18, and the NW. $\frac{1}{4}$, section 20, 45 and 75 feet deep, respectively. An aquifer that is 2,020 to 2,035 feet above sea-level supplies three wells on sections 24 and 25, 45 to 62 feet deep, with hard water. An aquifer that is about 1,920 to 1,943 feet above sea-level supplies two wells on sections 32 and 34, 80 and 87 feet deep, respectively, with large quantities of water. On the NW. $\frac{1}{4}$, section 31, the water in a well 60 feet deep rises above the surface, but the area of artesian flow appears to be very restricted.

The supplies of water from the wells in this township are generally quite satisfactory. Many of the wells yield large

supplies, and at farms where the water from the deeper wells is not fit to drink, shallow wells are used to provide water for domestic use. Water is hauled at the farm in the NW. $\frac{1}{4}$, section 30, however.

No wells in this township have reached bedrock. The aquifers that supply the bedrock wells in the adjacent townships to the south and the west, however, probably underlie at least the western part of the township, and should bedrock wells be sunk in the southwest part of the township the water in them would probably rise above the surface.

Township 30, Range 4

Brightwater creek follows a very sinuous course through the township from a point a little west of the centre of the southern boundary of section 2 to the northwest corner of the township; the northern part of the creek valley in this township is wooded. In the southeast quarter of the township there are two intermittent streams that flow into Brightwater creek. From the channel of Brightwater creek the surface rises gently northeastwards, attaining about 1,950 feet above sea-level in the northeast corner of the municipality. West of Brightwater creek the surface falls very gradually northwards from elevations of about 1,850 feet above sea-level at the southern boundary of the township to about 1,725 feet above sea-level in the northwest corner. Boulder clay covers an area of about $4\frac{1}{2}$ square miles in the southwest quarter of the township and an area of about $\frac{3}{4}$ square mile in the northeast corner. Glacial lake sand occupies about 3 square miles in the northwestern part of the township, in a belt about a mile wide that extends to within $\frac{1}{2}$ mile of its northern boundary. Glacial lake clay underlies the remaining 31 square miles of the township.

Most of the wells in this township obtain water from aquifers in the bedrock. In the northeast corner of the township there is a well in the moraine, 80 feet deep, in which the water rises above the surface. The area of artesian flow does not appear to extend far towards the west or southwest, however, as several deep wells in this part did not obtain water from this aquifer. In the area underlain by glacial lake clay four wells on sections 13, 24, 32, and 34, 26, 80, 90, and 67 feet deep, respectively, obtained hard water from the underlying boulder clay. In the area underlain by glacial lake sands a well 80 feet deep, on the NW. $\frac{1}{4}$, section 19, obtained a large supply of hard water also from the underlying boulder clay. Brightwater creek is used by watering stock.

Seven flowing wells and sixteen non-flowing wells in this township obtain water from aquifers in the bedrock. An aquifer that is 1,405 to 1,424 feet above sea-level was tapped by two wells in sections 5 and 10, 450 and 387 feet deep, respectively. The water in the well on section 5 contains 2,160 parts per million of dissolved solids, of which 437 parts were sodium chloride. An aquifer that is about 1,463 to 1,476 feet above sea-level supplies two wells, 298 and 359 feet deep, on the SE. $\frac{1}{4}$, section 6, and NW. $\frac{1}{4}$, section 12. An aquifer that is about 1,515 to 1,555 feet above sea-level supplies eight wells in the southern half of the township, 265 to 330 feet deep. The water from these wells varies considerably in quality; the water in the well on section 3 contains 1,960 parts per million of dissolved solids, of which 297 parts are sodium chloride; the water in the well on the SE. $\frac{1}{4}$, section 12, contains 1,420 parts per million of dissolved solids, of which 582 parts are sodium chloride. An aquifer that is about 1,653 feet above sea-level supplies a well on section 18, 200 feet deep. Aquifers that are about 1,720 to

1,815 feet above sea-level supply nine wells, from 56 to 185 feet deep, in the northern half of the township; the elevation of the aquifer and the water-level in the wells rise towards the northeast. The water of the well 56 feet deep, on the NE. $\frac{1}{4}$, section 31, contains 1,000 parts per million of dissolved solids, of which only 26 parts are sodium chloride. The water of the wells on sections 20, 25, and 27, 96, 185, and 177 feet deep, however, contains 2,040, 2,260, and 2,640 parts per million of total solids, of which 958, 148, and 544 parts respectively, are sodium chloride, the amount of which decreases towards the northeast. The supply of water from the bedrock wells that are in use is adequate for farm requirements and is used for drinking, although the water in some of the wells is not very palatable.

Township 30, Range 5

This township is a plain that slopes very gently to the northwest. Elevations range from about 1,850 to 1,750 feet above sea-level. The valley of Brightwater creek cuts across the northeast corner of section 36. Boulder clay underlies about $7\frac{1}{2}$ square miles of the southern third of the township. Glacial lake clay borders Brightwater creek and underlies less than $\frac{1}{4}$ square mile in the northeast corner of the township. Glacial lake sands mantle over 28 square miles of the township. In that part of the township underlain by boulder clay the wells in the drift are 25 to 37 feet deep, and the water in two of the wells is too highly mineralized to be fit for drinking. In the southern and eastern part of the area underlain by glacial lake sands and gravels, the wells, which are 30 to 90 feet deep, have passed into the underlying boulder clay; in the northwest part several wells 16 to 28 feet deep obtain small supplies of water from the glacial lake sands and gravels.

Six wells in this township obtain water from aquifers in the bedrock. An aquifer that is about 810 feet above sea-level

supplies water that contains 7,120 parts per million of dissolved solids, of which 6,234 parts are sodium chloride, to a well 960 feet deep on the SE. ¼, section 30. No other wells in this municipality have tapped this aquifer, and the water obtained is too salty to justify the expense of drilling to it. An aquifer that is about 1,356 to 1,408 feet above sea-level is tapped by two wells, on sections 25 and 28, 44 and 366 feet deep, respectively, and probably underlies a large part of the township. The water in the well on section 25 contains 8,060 parts per million of dissolved solids, of which 7,399 parts are sodium chloride, and, therefore, the expense of drilling to this aquifer does not appear to be justified. An aquifer that is about 1,455 feet above sea-level supplies a well 300 feet deep, on section 32, with salty water. An aquifer that is about 1,586 feet above sea-level supplies a well 186 feet deep, on the NE. ¼, section 20, with soft water. This aquifer does not appear to extend far north or west of the well site, but it may extend towards the south and the east. An aquifer that is about 1,733 feet above sea-level supplies a well 122 feet deep, on section 4, with water that contains 2,140 parts per million of dissolved solids, of which 611 parts are common salt; this aquifer does not appear to extend far south of the well site, but it may underlie a part of the southern half of the township.

The supply of ground water in this township is not very satisfactory. The water from some of the deeper wells in the bedrock and in the glacial drift is not suitable for drinking, and at four farms water is hauled; dugouts are used at two farms.

Township 31, Range 3

The land surface rises from the southwest corner of the township, which is about 1,950 feet above sea-level, to the northeast corner of the township, which is nearly 2,200 feet above

sea-level. The northern part of Salt lake extends into the southern half of section 2, and an area of about 1½ square miles in the vicinity of the lake is underlain by glacial outwash sands. Moraine underlies the remaining 34½ square miles of the township.

No records of wells in the glacial outwash sands and gravels were obtained. In the moraine-covered area the wells are 20 to 176 feet deep. Dry holes put down on the SW. ¼, section 15, NW. ¼, section 28, and NW. ¼, section 29, were 130, 120 and 20 feet deep, respectively. The upper part of the glacial drift in this township is generally not a good source of water, as the yield from most of the wells less than 20 feet deep is small, but an exception is on the NE. ¼, section 33, and the SW. ¼, section 24, where a bed of sand supplies two wells, 18 and 12 feet deep, respectively, with moderate supplies of water. An area of artesian flow in the glacial drift probably extends for a short distance into the southwest corner of the township, but sufficient information is not available to outline it on the accompanying map.

No wells in this township have reached bedrock, but some of the bedrock aquifers in the adjacent townships probably extend into this township.

The supply of ground water in this township is not satisfactory. At six farms water is hauled, the water from two wells is not used for drinking, and that from four wells is "alkaline" but is used for drinking.

Township 31, Range 4

Brightwater creek passes through the southern part of section 6 and the western part of section 19. The southern part of Indi lake occupies parts of sections 28, 29, 32, and 33. In the west the surface is low and flat, but rises northeastwards to a little over 2,050 feet above sea-level in the northeast corner of the township. Glacial lake clay occupies about 15 square miles

in the southern and western parts of the township. About 3½ square miles in the northwest is underlain by glacial lake sands and gravels. A belt of boulder clay about ½ mile in average width extends southwards from the northern boundary of the township to about the centre of section 11, and boulder clay underlies about ¼ square mile in section 1. About 12 square miles in the eastern part of the township are underlain by moraine.

In the moraine-covered area the wells are 16 to 77 feet deep; the supply of water from four wells is insufficient for local requirements, and the water from two wells is not fit for drinking. In a well 77 feet, in the SE. ¼, section 1, the water rises above the surface, but the extent of the area of artesian flow is not known. In the boulder clay area the wells, which are 98 to 300 feet deep, yield water that is "alkaline", but is used for drinking. In the part of the township underlain by glacial lake clay the wells are 10 to 140 feet deep. The water in one well, 102 feet deep, on section 9, is too "alkaline" for drinking, and in three other wells, 40, 23, and 140 feet deep, on the NW. ¼, section 2, NE. ¼, section 6, and SE. ¼, section 16, respectively, the water is "alkaline" but is used for drinking. Springs on the SE. ¼, section 23, and SW. ¼, section 27, supplement the supply of well water. Five flowing wells and one non-flowing well obtain water from aquifers in the bedrock. The deepest well in the township is the Hanley Development Company's well, now abandoned, on the SE. ¼, section 6. This well is 2,069 feet deep, and in 1935 was discharging salt water and small quantities of gas. Water was reported at depths of 25, 80, and 480 feet. The aquifer encountered at 480 feet, or 1,285 feet above sea-level, in this well may be the same aquifer that supplies the well on section 7 with salty water. An aquifer that is about 1,416 to 1,458 feet above sea-level supplies two wells, 386 and 227 feet deep, on the SW. ¼, section 16, and SW. ¼, section 19, respectively, with salty water; the water in

the well on section 16 contains 3,460 parts per million of dissolved solids, of which 2,755 parts are common salt. An aquifer that is about 1,504 to 1,550 feet above sea-level supplies two wells on sections 19 and 30, 227 and 204 feet deep, respectively, the water in the well on section 30 containing 2,420 parts per million of dissolved solids. The bedrock wells in the northern half of the township provide large supplies of water which are used for all purposes except irrigation.

Township 31, Range 5

Brightwater creek follows a very winding course through the eastern part of this township, entering it at the southeast corner of section 1 and leaving it at the northwest corner of section 36. The valley of the creek is wooded, and the water is used for stock. There is a small lake in the western half of section 35, and the southern part of a shallow lake occupies about $\frac{1}{2}$ square mile in sections 33 and 34. Dune sands mantle about 9 square miles in the northern third of the township. Glacial lake sands occupy an area of about 14 square miles south of the dune sands, and underlie about $\frac{3}{4}$ mile in the northeast part of the township. Glacial lake clay underlies about 12 square miles in the southeastern and eastern parts of the township.

The wells in the unconsolidated deposits of this township are all less than 50 feet deep, and most of them are less than 20 feet deep. In the southern half of the township the wells yield small supplies of water. At many farms several wells are needed to supply sufficient water, and at other farms water is hauled. The dune sand area in the northern half of the township is thinly settled. At one farm shallow wells supply water for domestic use and for watering a few head of stock, and the water of the lake is also used for stock.

Three wells in this township obtain water from aquifers in the bedrock. An aquifer that lies at about 1,349 feet above

sea-level supplies a well 401 feet deep, on section 2, with water that contains 7,000 parts per million of dissolved solids, of which 6,592 parts are common salt. An aquifer that is about 1,540 to 1,532 feet above sea-level, supplies two wells on sections 16 and 23, 200 and 204 feet deep, with water that contains 3,120 and 2,720 parts per million of dissolved solids, of which 2,195 and 843 parts, respectively, are common salt.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL MUNICIPALITY OF ROSEDALE, NO. 283, SASKATCHEWAN

West of 3rd mer.	Township	28	29	29	29	30	30	30	31	31	31	Total No. in Municipality
	Range	3	3	4	5	3	4	5	3	4	5	
Total No. of Wells in Township		17	23	18	44	31	31	36	40	35	38	313
No. of wells in bedrock		8	9	11	8	0	23	6	0	6	4	75
No. of wells in glacial drift		9	14	7	36	31	8	29	40	28	34	234
No. of wells in alluvium		0	0	0	0	0	0	1	0	1	2	4
Permanency of Water Supply												
No. with permanent supply		15	23	17	36	31	30	36	36	35	37	294
No. with intermittent supply		1	0	1	7	0	0	0	0	2	0	11
No. dry holes		1	0	0	1	0	1	0	4	0	1	8
Types of Wells												
No. of flowing artesian wells		8	6	7	0	1	9	0	0	8	3	42
No. of non-flowing artesian wells		1	11	5	18	24	20	19	12	13	5	128
No. of non-artesian wells		7	6	6	25	6	1	17	24	16	29	137
Quality of Water												
No. with hard water		8	13	7	32	31	6	31	35	30	32	225
No. with soft water		8	10	11	11	0	24	5	1	7	5	82
No. with salty water		0	0	0	1	0	1	3	0	2	1	8
No. with "alkaline" water		2	5	3	8	8	2	5	6	12	5	56
Depth of Wells												
No. from 0 to 50 feet deep		8	10	7	27	12	2	25	22	18	34	165
No. from 51 to 100 feet deep		1	4	0	7	15	12	5	11	8	0	63
No. from 101 to 150 feet deep		0	0	0	2	3	2	1	5	3	0	16
No. from 151 to 200 feet deep		0	0	0	0	0	2	1	2	0	1	6
No. from 201 to 500 feet deep		7	8	11	2	1	13	3	0	7	3	55
No. from 501 to 1,000 feet deep		1	1	0	6	0	0	1	0	0	0	9
No. over 1,000 feet deep		0	0	0	0	0	0	0	0	1	0	1
How the Water is Used												
No. usable for domestic purposes		13	22	16	32	26	29	25	32	28	22	245
No. not usable for domestic purposes		3	1	2	11	5	1	11	4	9	15	62
No. usable for stock		15	23	18	40	31	29	33	36	35	37	297
No. not usable for stock		1	0	0	3	0	1	3	0	2	0	10
Sufficiency of Water Supply												
No. sufficient for domestic needs		16	23	16	38	31	30	33	36	34	32	289
No. insufficient for domestic needs		0	0	2	5	0	0	3	0	3	5	18
No. sufficient for stock needs		13	21	14	30	28	30	22	24	27	18	227
No. insufficient for stock needs		3	2	4	13	3	0	14	12	10	19	80

ANALYSES AND QUALITY OF WATER

General Statement

Samples of water from representative wells in surface deposits and bedrock were taken for analyses. Except as otherwise stated in the table of analyses the samples were analysed in the laboratory of the Borings Division of the Geological Survey by the usual standard methods. The quantities of the following constituents were determined; total dissolved mineral solids, calcium oxide, magnesium oxide, sodium oxide by difference, sulphate, chloride, and alkalinity. The alkalinity referred to here is the calcium carbonate equivalent of all acid used in neutralizing the carbonates of sodium, calcium, and magnesium. The results of the analyses are given in parts per million--that is, parts by weight of the constituents in 1,000,000 parts of water; for example, 1 ounce of material dissolved in 10 gallons of water is equal to 625 parts per million. The samples were not examined for bacteria, and thus a water that may be termed suitable for use on the basis of its mineral salt content might be condemned on account of its bacteria content. Waters that are high in bacteria content have usually been polluted by surface waters.

Total Dissolved Mineral Solids

The term "total dissolved mineral solids" as here used refers to the residue remaining when a sample of water is evaporated to dryness. It is generally considered that waters that have less than 1,000 parts per million of dissolved solids are suitable for ordinary uses, but in the Prairie Provinces this figure is often exceeded. Nearly all waters that contain more than 1,000 parts per million of total solids have a taste due to the dissolved mineral matter. Residents

accustomed to the waters may use those that have much more than 1,000 parts per million of dissolved solids without any marked inconvenience, although most persons not used to highly mineralized water would find such waters highly objectionable.

Mineral Substances Present

Calcium and Magnesium

The calcium (Ca) and magnesium (Mg) content of water is dissolved from rocks and soils, but mostly from limestone, dolomite, and gypsum. The calcium and magnesium salts impart hardness to water. The magnesium salts are laxative, especially magnesium sulphate (Epsom salts, $MgSO_4$), and they are more detrimental to health than the lime or calcium salts. The calcium salts have no laxative or other deleterious effects. The scale found on the inside of steam boilders and tea-kettles is formed from these mineral salts.

Sodium

The salts of sodium are next in importance to those of calcium and magnesium. Of these, sodium sulphate (Glauber's salt, Na_2SO_4) is usually in excess of sodium chloride (common salt, NaCl). These sodium salts are dissolved from rocks and soils. When there is a large amount of sodium sulphate present the water is laxative and unfit for domestic use. Sodium carbonate (Na_2CO_3) "black alkali", sodium sulphate "white alkali", and sodium chloride are injurious to vegetation.

Sulphates

Sulphates (SO_4) are one of the common constituents of natural water. The sulphate salts most commonly found are sodium sulphate, magnesium sulphate, and calcium sulphate ($CaSO_4$). When the water contains large quantities of the sulphate of sodium it is injurious to vegetation.

Chlorides

Chlorides are common constituents of all natural water and are dissolved in small quantities from rocks. They usually occur as sodium chloride and if the quantity of salt is much over 400 parts per million the water has a brackish taste.

Iron

Iron (Fe) is dissolved from many rocks and the surface deposits derived from them, and also from well casings, water pipes, and other fixtures. More than 0.1 part per million of iron in solution will settle as a red precipitate upon exposure to the air. A water that contains a considerable amount of iron will stain porcelain, enamelled ware, and clothing that is washed in it, and when used for drinking purposes has a tendency to cause constipation, but the iron can be almost completely removed by aeration and filtration of the water.

Hardness

Calcium and magnesium salts impart hardness to water. Hardness of water is commonly recognized by its soap-destroying powers as shown by the difficulty of obtaining lather with soap. The total hardness of a water is the hardness of the water in its original state. Total hardness is divided into "permanent hardness" and "temporary hardness". Permanent hardness is the hardness of the water remaining after the sample has been boiled and it represents the amount of mineral salts that cannot be removed by boiling. Temporary hardness is the difference between the total hardness and the permanent hardness and represents the amount of mineral salts that can be removed by boiling. Temporary hardness is due mainly to the bicarbonates of calcium and magnesium and iron, and permanent hardness to the sulphates and chlorides of calcium and magnesium. The permanent hardness

can be partly eliminated by adding simple chemical softeners such as ammonia or sodium carbonate, or many prepared softeners. Water that contains a large amount of sodium carbonate and small amounts of calcium and magnesium salts is soft, but if the calcium and magnesium salts are present in large amounts the water is hard. Water that has a total hardness of 300 parts per million or more is usually classed as excessively hard. Many of the Saskatchewan water samples have a total hardness greatly in excess of 300 parts per million; when the total hardness exceeded 3,000 parts per million no exact hardness determination was made. Also no determination for temporary hardness was made on waters having a total hardness less than 50 parts per million. As the determinations of the soap hardness in some cases were made after the samples had been stored for some time, the temporary hardness of some of the waters as they come from the wells probably is higher than that given in the table of analyses.

Analyses of Water Samples from the Municipality of Rosedale, No. 283, Saskatchewan

LOCATION						Depth of well, Ft.	Total dis'vd solids	HARDNESS			CONSTITUENTS AS ANALYSED						Source of Water
No.	Qtr.	Sec.	Tp.	Rge.	Mer.			Total	Perm.	Temp.	Cl.	Alkalinity	CaO	MgO	SO4	Na_2O	
1	SE.	15	28	3	3	369	1,597										* 2
2	NE.	22	28	3	3	569	1,670										* 3
3	NE.	31	29	3	3	402	1,909										* 3
4	NW.	33	29	3	3	445	2,214										* 3
5	NW.	21	29	4	3	333	2,040				394	430					* 2
6	SW.	34	29	5	3	262	2,160	70	15	55	720	430	50	11	603	1,227	* 2
7	NW.	31	30	3	3	60	1,360	650	600	50	18	115	70	101	693	302	* 1
8	SE.	3	30	4	3	276	1,960	35	-	-	180	440	30	11	812	902	* 2
9	SE.	5	30	4	3	450	2,160	45	-	-	265	400	20	11	902	1,020	* 3
10	SE.	12	30	4	3	329	1,420	35			353	410	10	7	234	691	* 2

Analyses of Water Samples from the Municipality of Rosedale, No. 283, Saskatchewan (cont'd)

LOCATION						Depth of well,Ft.	Total dis'vd Solids	HARDNESS			CONSTITUENTS AS ANALYSED						Source of Water
No.	Qtr.	Sec.	Tp.	Rge.	Mer.			Total	Perm.	Temp.	Cl.	Alka-linity	CaO	MgO	SO_4	Na_2O	
11	NW.	15	30	4	3	265	1,820				567	410					* 2
12	NE.	20	30	4	3	96	2,040	140	80	60	580	405	50	29	525	997	* 2
13	NE.	24	30	4	3	80	2,680	800	800	0	80	145	130	187	1,615	768	* 1
14	NW.	25	30	4	3	185	2,260	55			90	455	30	11	1,058	990	* 2
15	NE.	27	30	4	3	77	2,640	110	25	85	330	420	40	25	1,464	1,411	* 2
16	NE.	31	30	4	3	56	1,000	190	120	70	16	235	20	43	508	399	* 2
17	NW.	32	30	4	3	90	2,400	1,200	1,200	0	31	85	310	194	1,476	389	* 1
18	NE.	4	30	5	3	122	2,140	55	-	-	370	400	40	14	836	1,036	* 2
19	SW.	15	30	5	3	48	1,654										* 1
20	NE.	15	30	5	3	40	3,260	1,200	1,100	100	69	80	470	173	2,165	717	* 1

Analyses of Water Samples from the Municipality of Rosedale, No. 283, Saskatchewan (Cont'd)

LOCATION						Depth of well, Ft.	Total dis'vd solids	HARDNESS			CONSTITUENTS AS ANALYSED						Source of Water
No.	Qtr.	Sec.	Tp.	Rge.	Mer.			Total	Perm.	Temp.	Cl.	Alka-linity	CaO	Mgo	SO_4	Na_2O	
21	NE.	25	30	5	3	444	8,060	380	360	20	4,620	135	230	43	0	3,920	* 3
22	SE.	30	30	5	3	960	7,120	260	240	20	4,010	120	180	40	0	3,355	* 3
23	NE.	27	30	5	3	33	500	340	100	240	14	345	90	54	41	70	* 1
24	SW.	16	31	4	3	386	3,460	50	10	40	1,670	395	10	7	238	1,833	* 3
25	SW.	19	31	4	3	227	2,680	45			710	500	30	7	726	1,351	* 3
26	NW.	30	31	4	3	204	2,420				60	460					* 3
27	NE.	2	31	5	3	401	7,000	320	280	40	4,060	170	160	32	12	3,480	* 3
28	SE.	16	31	5	3	200	3,120	110	5	105	1,330	370	70	14	410	1,555	* 3
29	NE.	23	31	5	3	204	2,720	70			511	480	30	14	890	1,261	* 3

Water samples indicated thus, * 1, are from glacial drift or other unconsolidated deposits.
Water samples indicated thus, * 2, are from bedrock, Belly River formation.
Water samples indicated thus, * 3, are from bedrock, Lea Park formation.
Analyses are reported in parts per million; where numbers (1), (2), (3), (4), and (5) are used instead of parts per million, they represent the relative amounts in which the five main constituents are present in the water. Hardness is the soap hardness expressed as calcium carbonate ($CaCO_3$).

Water from the Unconsolidated Deposits

The sediments of the unconsolidated deposits vary widely in composition and in fineness of grain, and, therefore, the composition of ground water from the unconsolidated deposits also varies widely. As a general rule the waters from the dune sands are the least mineralized, whereas the water from the glacial lake clay is the most highly mineralized of the waters from the unconsolidated deposits. The rapidity of circulation of water through the sediments of the aquifers affects the composition of the water, thus water obtained from springs and spring-fed wells or of wells near river valleys is generally less highly mineralized than water from wells in flat-lying areas. Probably due to the slow circulation of water at depth, the water of the deep wells is generally more highly mineralized than that of the shallow wells. Most of the waters from the deeper wells in all the unconsolidated deposits except the dune sands are very hard, and the hardness is not removed by boiling. Sulphates, carbonates, and chlorides are usually present, their relative abundance being in the order given below. Sulphate of calcium ($CaSO_4$) is almost invariably present and is usually accompanied by magnesium sulphate ($MgSO_4$). Sodium sulphate (Na_2SO_4) is present in most of these waters, and in some waters sodium sulphate is more abundant than calcium sulphate.

Sample No. 23 contains an unusually small proportion of dissolved solids. The well, which is 33 feet deep, is in the glacial lake sands and the aquifer that supplies the well may extend to the valley of Brightwater creek. This water can be used for all purposes, and it is not nearly as hard as most waters from the glacial drift. Sample No. 7 is from a flowing well in the moraine; this water is slightly laxative as it contains 957 parts per million of the sulphates of sodium and magnesium. It is very hard and the hardness is not reduced to any appreciable extent by boiling. Samples Nos. 13 and 17 are from wells near the margin of

the glacial lake sand area, and the water probably comes from the boulder clay that underlies the glacial lake sands. Both waters are excessively hard. Sample No. 13 contains 2,161 parts per million of the sulphates of sodium and magnesium, and the water is laxative. Sample No. 17 contains 1,410 parts per million of the sulphates of sodium and magnesium, and is less laxative than sample No. 13. Both waters are used for drinking, but water No. 13 is not suitable for this purpose. Samples Nos. 19 and 20 are from wells 48 and 40 feet deep, in the same section, in the area mantled by glacial lake sands. Sample No. 20 is laxative, as it contains 2,025 parts per million of the sulphates of sodium and magnesium. It is excessively hard and is not used for drinking. No detailed analysis of sample No. 19 is available, but the water is probably slightly laxative, and very hard, although it is not nearly as hard as water No. 20.

Water from the Bedrock

The water from the bedrock aquifers is generally soft and occasionally salty. Sodium sulphate, sodium carbonate, and sodium chloride are the chief salts in solution, but the relative abundance of these salts varies widely. Calcium salts are present only in small proportions. There are several types of bedrock water in this municipality. The water of the first type, represented by samples 1 to 4, 8, 14, 16, and 26 in the list of analyses, contains sodium sulphate, sodium carbonate, and sodium chloride, their relative abundance being in the order given. Waters of this type are very common in the aquifers of the Marine Shale series. The amount of dissolved solids in the waters of this type, in the list of analyses, ranges from 1,000 to 2,420 parts per million, but in five of the waters analysed the amount of dissolved solids is 1,500 to 2,300 parts per million. Waters of this type are generally slightly laxative and have a "soda" taste, which is especially noticeable if the water is not quite cold.

The water of the second type, represented by samples 5, 15, 18, and 29, contains sodium sulphate, sodium chloride, and sodium carbonate, their relative abundance being in the order given. The amount of the dissolved solids ranges from 2,040 to 2,720 parts per million. The waters are more salty than the waters of the first type but the "soda" taste is less noticeable. The third type, represented by samples 6, 11, 12, 24, 25, and 28, contains sodium chloride, sodium sulphate, and sodium carbonate, the relative abundance being in the order given. The amount of dissolved solids ranges from 1,820 to 3,460 parts per million. These waters are salty and slightly laxative, and most of them are fit only for stock use.

In the fourth type represented by samples 21, 22, and 27, sodium chloride is the chief constituent and sodium carbonate and sodium sulphate are quite subordinate in amount. The waters of this type contain 7,000 to 8,160 parts per million of dissolved solids, and are so salty that they are unfit for continuous use, even by stock. Sodium sulphate is the principal laxative constituent in the bedrock waters, and sodium chloride makes the water salty. The types here given are arranged in order of increasing saltiness. The waters of types 1 and 2 are generally not as laxative as the water of types 3 and 4.

The waters from bedrock aquifers are not suitable for irrigation as they contain too much "black alkali" (Na_2CO_3), and "white alkali" (Na_2SO_4). Calcium sulphate ($CaSO_4$) is sometimes added to soft, bedrock waters to counteract the harmful effect of "black alkali" on vegetation. Under favourable conditions of soil and drainage, and by careful control of supply water that contains several thousand parts per million has been successfully used for small-scale irrigation, but in southern Saskatchewan the conditions of soil and drainage are not generally favourable for irrigation.

WELL RECORDS—Rural Municipality of ROSEDALE, NO. 283, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
1	SE.	2	28	3	3	Dug	11	1,950	- 8	1,942	11	1,939	Glacial drift	Soft, stagnant	45	S	Intermittent supply.
2	SW.	5	"	"	"	Drilled	486	1,888	+ 3	1,891	486	1,402	Lea Park ?	Soft, soda	47	D, S	Large flow; 1 gallon a minute.
3	SE.	15	"	"	"	Drilled	369	1,909	+ 8	1,917	369	1,540	Belly River	Soft		D, S	Flows a gallon a minute; #.
4	NW.	18	"	"	"	Drilled	300	1,891	+ 12	1,903	300	1,531	Belly River	Soft, soda, iron	46	D, S	Ample supply.
5	SE.	20	"	"	"	Drilled	352	1,870	+ 20	1,890	352	1,518	Belly River	Soft, soda	45	D, S	Flows 25 gallons a minute.
6	NW.	21	"	"	"	Drilled	320	1,805	+ 20	1,885	320	1,545	Belly River	Soft, soda	46	D, S	Large flow.
7	NE.	22	"	"	"	Drilled	569	1,905	+ 18	1,923	569	1,336	Lea Park	Soft		D, S	Flows 5 gallons a minute; used by neighbours; #.
8	SE.	25	"	"	"	Dug	12	1,990	- 4	1,986	12	1,978	Glacial gravel	Hard, iron	44	D, S	Sufficient for 4 head stock; also 30-foot wel
9	NW.	27	"	"	"	Drilled	350	1,892	+ 5	1,897	350	1,542	Belly River	Soft, iron	46	D, S	Flows 15 gallons a minute. has 15 head stock.
10	NE.	30	"	"	"	Bored	48	1,850	- 15	1,835	48	1,802	Glacial drift	Hard, "alkaline"	42	S	Sufficient; waters 50 head stock; also dam supplied by two flowing wells.
11	NW.	30	"	"	"	Drilled	350	1,871	+ 20	1,891	350	1,521	Belly River	Soft, soda	46	D, S	Yields about 35 gallons a minute.
12	NE.	32	"	"	"	Dug	21	1,870	- 17	1,853	21	1,849	Glacial sand	Hard, iron, slightly "alkaline"	43	D, S	Insufficient for more than 10 head stock.
13	SE.	34	"	"	"	Dug	20	1,940	- 8	1,932	20	1,920	Glacial gravel	Hard	43	D	Just sufficient for house use; 90-foot dry hole; also dam.
14	SE.	36	"	"	"	Bored	46	2,045	- 43	2,002	46	1,999	Glacial drift	Hard	44	D, S	Sufficient for 30 head stock.
15	NE.	36	"	"	"	Dug	18	2,025	- 14	2,011	18	2,007	Glacial sand	Hard		D, S	Sufficient for 25 head stock.
1	NW.	2	29	3	3	Bored	47	1,990	- 17	1,973	47	1,943	Glacial drift	Hard, iron		D, S	Sufficient for 25 head stock.
2	NE.	3	"	"	"	Bored	88	1,960	- 28	1,932	88	1,872	Glacial fine sand	Hard, "alkaline"	44	D, S	Sufficient for 100 head stock.
3	NE.	4	"	"	"	Drilled	325	1,926	+ 25	1,953	325	1,608	Belly River	Soft, soda	47	D, S	Sufficient; waters 100 head stock.
4	NE.	8	"	"	"	Drilled	420	1,880	+ 30	1,910	420	1,460	Lea Park	Soft, soda	47	D, S	Yields 25 gallons a minute.
5	SE.	9	"	"	"	Bored	40	1,920	- 10	1,910	40	1,880	Glacial drift	Hard, iron, "alkaline"	43	D, S	Sufficient; waters 15 head stock.
6	NE.	10	"	"	"	Drilled	425	2,010	- 10	2,000	425	1,585	Belly River	Soft, soda		D, S	Sufficient for 50 head stock.
7	E.½	11	"	"	"	Drilled	485	2,020	- 60	1,960	485	1,535	Belly River	Soft.			
8	SE.	12	"	"	"	Bored	52	2,053	- 38	2,015	52	2,001	Glacial gravel	Hard, slightly "alkaline"	39	D, S	Sufficient for 15 head stock.
9	NW.	13	"	"	"	Bored	40	2,041	- 32	2,009	40	2,001	Glacial quicksand	Soft		D, S	Insufficient; waters 10 head stock.
10	SW.	14	"	"	"	Bored	30	2,015	- 20	1,995	30	1,985	Glacial drift	Hard	40	D, S	Sufficient; waters 35 head stock.
11	NE.	14	"	"	"	Dug	20	2,030	- 18	2,012	20	2,010	Glacial drift	Hard		D, S	Insufficient supply.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of ROSEDALE, NO. 283, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
12	NE.	20	29	3	3	Bored	80	1,910	- 08	1,842	80	1,830	Glacial fine sand	Hard, soda	39	D, S	Sufficient; waters 50 head stock.
13	SE.	24	"	"	"	Bored	32	2,030	- 12	2,018	32	1,998	Glacial gravel	Hard, iron	43	D, S	Sufficient; waters 100 head stock.
14	NE.	24	"	"	"	Bored	30	1,990	- 25	1,965	30	1,960	Glacial gravel	Hard, "alkaline"	44	D, S	Sufficient; waters 12 head stock.
15	SW.	26	"	"	"	Dug	16	1,975	- 14	1,961	16	1,959	Glacial gravel	Hard, iron	40	D, S	Sufficient; waters 150 head stock.
16	SE.	27	"	"	"	Bored	23	1,985	- 21	1964	23	1,962	Glacial sand	Hard	45	D, S	Sufficient; waters 6 head stock.
17	NE.	27	"	"	"	Dug	35	1,965	- 31	1,934	35	1,930	Glacial drift	Hard	42	D, S	Sufficient for 20 head stock.
18	SE.	28	"	"	"	Drilled	530	1,975	- 35	1,940	530	1,445	Lea Park	Soft, soda	47	D, S	Ample supply.
19	SW.	28	"	"	"	Bored	93	1,960	- 90	1,870	93	1,867	Glacial sand	Hard, iron, "alkaline"	43	S	Sufficient; waters 15 head stock; laxative; domestic water hauled.
20	SE.	29	"	"	"	Drilled	407	1,932	+	1,932+	407	1,525	Belly River	Soft			Flowing well.
21	NE.	31	"	"	"	Drilled	402	1,879	+ 7	1,886	420	1,477	Lea Park	Soft, soda	47	D, S	Abundant supply; #.
22	NW.	31	"	"	"	Drilled	340	1,883	+ 10	1,893	340	1,543	Belly River	Soft, soda	47	D, S	Sufficient supply.
23	NW.	33	"	"	"	Drilled	445	1,935	+ 36	1,971	445	1,490	Lea Park	Soft, soda	47	D, S	Sufficient; yields 2 gallons a minute; #.
1	SE.	2	29	4	3	Drilled	368	1,863	+ 10	1,873	368	1,495	Lea Park	Soft, soda	46	D, S	Sufficient; yields a gallon a minute.
2	SE.	6	"	"	"	Dug	20	1,935	- 15	1,920	20	1,915	Glacial sand	Hard, iron, "alkaline"	43	D	Intermittent supply.
3	SW.	6	"	"	"	Dug	35	1,935	- 28	1,907	35	1,900	Glacial sand	Hard, iron	43	D, S	Sufficient for 35 head stock.
4	SW.	8	"	"	"	Drilled	387	1,929	- 70	1,850	387	1,533	Belly River	Soft, soda	44	D, S	Sufficient supply.
5	SW.	14	"	"	"	Drilled	328	1,853	+ 15	1,868	328	1,525	Belly River	Soft, soda	45	D, S	Abundant supply.
6	NE.	16	"	"	"	Drilled	314	1,867	+ 5	1,872	314	1,553	Belly River	Soft	46	D, S	Sufficient for 19 head stock.
7	SE.	17	"	"	"	Dug	14	1,900	- 10	1,890	14	1,886	Glacial gravel	Hard	44	D, S	Sufficient for 35 head stock.
8	SW.	18	"	"	"	Drilled	392	1,920	- 50	1,870	392	1,528	Belly River	Soft, soda	45	D, S	Sufficient for 250 head stock.
9	NW.	21	"	"	"	Drilled	333	1,868	- 2	1,866	333	1,535	Belly River	Soft	46	S	Small supply; place deserted; #. Used for stock by neighbour.
10	NE.	22	"	"	"	Drilled	281	1,850			281	1,569	Belly River	Soft, soda	44	D, S	Flows 15 gallons a minute.
11	NE.	23	"	"	"	Drilled	293	1,850	- 25	1,875	293	1,557	Belly River	Soft, soda	44	D, S	Abundant supply.
12	NW.	24	"	"	"	Dug	16	1,825	- 8	1,817	16	1,809	Glacial drift	Hard	43	D, S	Sufficient for 10 head stock.
13	SW.	27	"	"	"	Drilled	303	1,861			303	1,558	Belly River	Soft	46	D, S	Insufficient since 1921.
14	NW.	27	"	"	"	Bored	47	1,855	- 23	1,832	47	1,808	Glacial drift	Hard	43	D, S	Insufficient; waters only 10 head stock.
15	SW.	28	"	"	"	Dug	20	1,870	- 12	1,858	20	1,850	Glacial drift	Hard, "alkaline"	44	D, S	Insufficient; well will water only 10 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of ROSEDALE, NO. 283, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
16	SE.	31	29	4	3	Drilled	350	1,863	- 9	1,854	350	1,513	Belly River	Soft		D, S	Sufficient; could water 300 head stock.
17	SE.	32	"	"	"	Dug	30	1,870	- 21	1,849	30	1,840	Glacial gravel	Hard, bitter, "alkaline"		S	Abundant supply; drinking water is hauled.
18	NE.	34	"	"	"	Drilled	300	1,826	+ 25	1,851	300	1,526	Belly River	Soft, soda		D, S	Yields 35 gallons a minute.
1	SW.	2	29	5	3	Dug	18	1,975	- 15	1,900	18	1,957	Glacial drift	Very hard	44	D, S	Sufficient for 10 head stock; 113-foot dry hole; dugout for stock.
2	NE.	2	"	"	"	Dug	16	1,985	- 8	1,977	18	1,967	Glacial drift	Hard, "alkaline"	44	D, S	Sufficient supply.
3	SE.	3	"	"	"	Drilled	342	1,975	-118	1,857	642	1,333	Lea Park	Soft, salty, soda	47	D, S	Abundant supply.
4	SW.	3	"	"	"	Dug	22	1,989	- 20	1,969	22	1,967	Glacial drift	Hard, "alkaline"	44	D, S	Sufficient for 5 head stock; 20-foot intermittent well for stock use; 50-foot intermittent well; too "alkaline" for use.
5	NE.	4	"	"	"	Dug	18	1,984	- 15	1,969	18	1,966	Glacial sand	Hard		D, S	Intermittent supply; usually waters 16 head stock; also two intermittent seepage wells, 12 and 14 feet.
6	NW.	6	"	"	"	Bored	90	1,980	- 50	1,930	-90	1,890	Glacial drift	Hard, iron, slightly "alkaline"	45	D, S	Intermittent supply.
7	SW.	7	"	"	"	Bored	46	2,000	- 28	1,972	46	1,954	Glacial drift	Hard, iron	44	D, S	Sufficient for 30 head stock.
8	NE.	7	"	"	"	Bored & Dug	32	1,955	- 30	1,925	32	1,923	Glacial sand	Hard	43	D, S	Sufficiant for 40 head stock.
9	SE.	11	"	"	"	Dug	13	1,940	- 6	1,934	13	1,927	Glacial drift	Hard		D	Sufficient only for house.
10	SW.	13	"	"	"	Dug	40	1,955	- 25	1,930	40	1,915	Glacial sand	Hard, iron	43	D, S, I	Oversufficient for 10 head stock.
11	SE.	14	"	"	"	Bored	56	1,940	- 20	1,920	56	1,884	Glacial sand	Hard, iron, "alkaline"	43	S	Just sufficient for 30 head stock.
12	NE.	14	"	"	"	Drilled	600	1,923	-100	1,823	600	1,323	Lea Park	Soft		N	Second well by dugout; dugout supplies stock.
13	S	15	"	"	"	Dug	18	1,950	- 14	1,930	18	1,932	Glacial drift	Hard, iron	43	D	Sufficient for house; 60-foot well unfit for use; slough for stock.
14	NE.	16	"	"	"	Bored	113	1,945	- 70	1,875	113	1,832	Glacial drift	Soft		D, S	Sufficient; waters 25 head stock.
15	SW.	17	"	"	"	Bored	80	1,955	- 75	1,880	80	1,875	Glacial drift	Hard, iron	44	D, S	Oversufficient for 50 head stock.
16	NE.	17	"	"	"	Dug	10	1,985					Glacial drift	Soft		D	Fair supply of seepage water; drilled well also used for 20 head stock; laxative.
17	SW.	19	"	"	"	Bored	80	1,948	- 60	1,888	80	1,868	Glacial drift	Hard, iron, "alkaline"		D, S	Sufficiant; more than 20 head stock watered; 20-foot well, soft water, unused.
18	NW.	21	"	"	"	Bored	31	1,900	- 10	1,890	31	1,869	Glacial drift	Hard, iron, "alkaline"	43	S	Laxative; cistern of rain water for domestic use.
19	NE.	22	"	"	"	Dug	30	1,915	- 1	1,914	30	1,885	Glacial drift	Hard, iron, "alkaline"	45	S	Insufficient for 8 head stock; intermittent supply; cistern for house use.
20	SE.	24	"	"	"	Bored	28	1,920	- 18	1,902	28	1,892	Glacial drift	Hard, iron	44	D, S	Barely sufficient for 20 head stock.
21	NW.	24	"	"	"	Drilled	604	1,920	- 70	1,850	604	1,316	Lea Park	Soft, soda	44	D, S	Oversufficient for 50 head stock.
22	NE.	27	"	"	"	Bored	25	1,896	- 7	1,889	25	1,871	Glacial drift	Soft		D	Sufficient for house; 30-foot well supplies 10 head stock.
23	NW.	29	"	"	"	Bored	42	1,896	- 15	1,881	42	1,854	Glacial black sand	Hard	44	D, S	Sufficient for 50 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of ROSEDALE, NO. 283, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
24	NE.	30	29	5	3	Dug	36	1,897	- 30	1,867	36	1,861	Glacial drift	Hard	43	D	Just sufficient for house use; 45-foot well waters 30 head stock.
25	SE.	31	"	"	"	Bored	100	1,895	- 20	1,875	100	1,795	Glacial drift	Hard, "alkaline"	43	S	Oversufficient for 80 head stock; 25-foot well supplies house.
26	NW.	31	"	"	"	Dug	40	1,845	- 6	1,839	40	1,805	Glacial drift	Hard, iron	44	D, S	Sufficient for house only during summer; dug-out for stock.
27	NE.	32	"	"	"	Drilled	240	1,849			240	1,609	Belly River	Soft, soda	46	D, S	Abundant supply.
28	SW.	33	"	"	"	Drilled	620	1,895			620	1,275	Lea Park	Soft, soda	46	D, S	
29	NW.	33	"	"	"	Drilled	900	1,865	- 30	1,835	900	965	Lea Park	Soft, soda	48	D, S	Abundant supply.
30	SW.	34	"	"	"	Drilled	262	1,874	- 35	1,849	262	1,612	Belly River	Soft, soda	45	D, S	Abundant supply; #.
31	SE.	35	"	"	"		626	1,888			626	1,262	Lea Park	Soft			Place deserted.
32	SW.	36	"	"	"	Bored	45	1,886	- 10	1,876	+5	1,841	Glacial drift	Hard	43	D, S	Sufficient for 200 head stock.
1	NE.	2	30	3	3	Bored	22	2,015	- 16	1,999	22	1,993	Glacial drift	Hard, iron	43	D, S	Just sufficient for 15 head stock.
2	NE.	4	"	"	"	Bored	80	1,900	- 38	1,922	80	1,860	Glacial drift	Hard	43	D, S	Sufficient for 40 head stock.
3	NE.	6	"	"	"	Bored	25	1,850	- 4	1,846	25	1,825	Glacial drift	Hard	44	D, S	Sufficient supply.
4	NE.	9	"	"	"	Bored	30	1,990	- 24	1,966	30	1,960	Glacial gravel	Hard	43	D	Sufficient only for house; 45-foot well supplies stock.
5	NE.	11	"	"	"	Bored	60	2,040	- 30	2,010	60	1,980	Glacial sand	Hard, "alkaline"	43	S	Sufficient for 50 head stock; not suitable now for house use.
6	SE.	12	"	"	"	Drilled	130	2,075	-100	1,975	130	1,945	Glacial sand	Hard, iron, "alkaline"	42	S	Sufficient for 20 head stock.
7	NE.	12	"	"	"	Drilled	315	2,080	- 90	1,990	315	1,765	Glacial drift	Hard		D, S	Just sufficient; abundant supply till sand came in.
8	SE.	14	"	"	"	Bored	33	2,010	- 24	1,986	33	1,977	Glacial drift	Hard	43	D, S	Sufficient for 20 head stock.
9	SE.	16	"	"	"	Bored	40	1,995	- 10	1,985	40	1,955	Glacial drift	Hard, "alkaline"	44	S	Sufficient for 100 head stock; 30-foot well supplies house.
10	SE.	17	"	"	"	Bored	54	1,945	- 19	1,926	54	1,891	Glacial drift	Hard, iron, "alkaline"	43	D,S	Sufficient for 50 head stock.
11	SE.	18	"	"	"	Bored	45	1,910	- 21	1,889	45	1,865	Glacial drift	Hard, iron, "alkaline"	43	D, S	Sufficient for 75 head stock.
12	NW.	20	"	"	"	Bored	75	1,940	- 40	1,900	75	1,865	Glacial sand	Hard, iron,	43	D, S	Sufficient for 50 head stock.
13	NW.	21	"	"	"	Bored	60	2,000	- 40	1,960	60	1,940	Glacial sand	Hard, iron, "alkaline"	43	D, S	Just sufficient.
14	SW.	22	"	"	"	Bored	105	2,000	- 35	1,965	105	1,895	Glacial sand	Hard, iron	42	D, S	Abundant supply.
15	SE.	23	"	"	"	Bored	36	2,046	- 20	2,026	36	2,010	Glacial sand	Hard		D, S	Sufficient for 25 head stock.
16	NW.	23	"	"	"	Bored	95	2,010	- 25	1,985	95	1,915	Glacial sand	Hard, iron	43	D, S	Abundant supply.
17	NW.	24	"	"	"	Bored	60	2,080	- 30	2,050	60	2,020	Glacial sand	Hard	43	D, S	Ample for 20 head stock.
18	SW.	25	"	"	"	Bored	62	2,090	- 37	2,053	62	2,028	Glacial drift	Hard, iron	42	D, S	Sufficient for 150 head stock.
19	NW.	25	"	"	"	Bored	45	2,080	- 25	2,055	45	2,035	Glacial drift	Hard	45	D, S	Ample supply for 20 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of ROSEDALE, NO. 283, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
20	SW.	26	30	3	3	Bored	100	2,025	- 60	1,965	100	1,925	Glacial drift	Hard, iron	42	D, S	Sufficient for 200 head stock.
21	NE.	27	"	"	"	Bored	143	2,010	- 33	1977	143	1,867	Glacial sand	Hard, iron	43	D, S	Abundant supply.
22	NW.	27	"	"	"	Bored	90	2,020	- 30	1,990	90	1,930	Glacial sand	Hard, iron	43	S	Ample supply.
23	NE.	28	"	"	"	Bored	78	2,038	- 45	1,993	78	1,960	Glacial sand	Hard, iron	41	D, S	Sufficient; waters 15 head stock.
24	NW.	30	"	"	"	Dug	33	1,925	- 6	1,919	33	1,892	Glacial drift	Hard		S	Insufficient; water hauled.
25	NW.	31	"	"	"	Bored	100	1,940	- 10	1,930	100	1,840	Glacial sand	Hard		D, S	Ample supply; also 60-foot flowing well; #.
26	NW.	32	"	"	"	Bored	80	2,000	- 15	1,985	60	1,920	Glacial sand	Hard	43	D, S	Sufficient for 150 head stock.
27	NE.	34	"	"	"	Bored	87	2,030	- 30	2,000	87	1,943	Glacial sand	Hard, iron, "alkaline"	42	D, S	Sufficient for 60 head stock.
1	NE.	1	30	4	3	Drilled	296	1,844	+ 18	1,862	296	1,548	Belly River	Soft, soda		D, S	Ample supply; dugout for cattle.
2	SE.	3	"	"	"	Drilled	276	1,825			276	1,549	Belly River	Soft		D, S	Sufficient supply; #; flowing spring.
3	NE.	4	"	"	"	Drilled	298	1,831			298	1,533	Belly River	Soft, soda		D, S	Sufficient for house and stock; flowing well.
4	SE.	4	"	"	"	Drilled	320	1,835	+ 6	1,841	320	1,515	Belly River	Soft, soda		D, S	Sufficient for house and stock.
5	SE.	5	"	"	"	Drilled	450	1,855			450	1,405	Lea Park	Soft, soda		D, S	Sufficient for house and 7 head stock; originally flowed; #.
6	SE.	6	"	"	"	Drilled	398	1,861	- 15	1,846	398	1,463	Lea Park	Soft, soda		D, S	Sufficient supply.
7	NE.	7	"	"	"	Drilled	330	1,842	- 40	1,802	330	1,512	Belly River	Soft, salt		D, S	Sufficient supply.
8	NW.	10	"	"	"	Drilled	387	1,811			387	1,424	Lea Park	Soft, soda		D,S	Sufficient supply; flowing well.
9	NW.	12	"	"	"	Drilled	359	1,835			359	1,476	Lea Park	Soft, soda		D, S	Sufficient supply; flowing well.
10	SE.	12	"	"	"	Drilled	329	1,852			329	1,523	Belly River?	Soft		D, S	Sufficient; flowing well; waters 29 head stock; #.
11	NE.	13	"	"	"	Bored	2	1,865			26	1,839	Glacial sand, fine	Hard, iron, slightly "alkaline"		D, S	Sufficient for house and stock; creek supplies stock in spring.
12	NW.	14	"	"	"	Drilled	280	1,832	- 8	1,824	280	1,552	Belly River	Soft, soda		D, S	Sufficient for 30 head stock.
13	NW.	15	"	"	"	Drilled	265	1,820	- 20	1,800	265	1,555	Belly River	Soft, soda		D, S	Sufficient for 60 head stock; #.
14	SE.	18	"	"	"	Drilled	200	1,853	- 36	1,817	200	1,653	Belly River	Soft		D, S	Sufficient supply.
15	NW.	19	"	"	"	Bored	80	1,800			80	1,720	Glacial sand	Hard		D, S	Sufficient for 40 head stock; creek also supplies cattle.
16	NE.	20	"	"	"	Bored	96	1,810	- 30	1,780	96	1,714	Belly River	Soft, salty		D, S	Sufficient for 60 head stock; #.
17	NW.	23	"	"	"	Bored	80	1,835	- 12	1,823	80	1,755	Belly River	Soft, soda		D, S	Abundant supply; slightly laxative.
18	NE.	24	"	"	"	Bored	80	1,915	- 37	1,878	80	1,835	Glacial drift	Very hard, iron		D, S	Sufficient; waters 14 head stock.
19	NW.	25	"	"	"	Bored & Drilled	185	1,905	- 55	1,850	185	1,720	Belly River	Soft		D, S	Sufficient supply; #.
20	NE.	26	"	"	"	Bored	135	1,895	- 60	1,835	135	1,760	Belly River	Soft		D, S	Sufficient supply.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of ROSEDALE, NO. 283, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
21	NE.	27	30	4	3	Bored	77	1,830	- 22	1,808	77	1,753	Belly River	Very soft, soda, iron		D, S	Sufficient supply; not very palatable and drinking water often hauled; #.
22	NE.	31	"	"	"	Bored	56	1,780	- 47	1,733	56	1,724	Belly River	Soft, soda		D,S	Sufficient supply; #.
23	SW.	32	"	"	"	Drilled	90	1,790	- 20	1,770	90	1,700	Belly River	Hard		D, S	Sufficient supply; the wellhas become filled to 70 feet with sand.
24	NW.	32	"	"	"	Drilled	90	1,825	- 58	1,767	90	1,735	Glacial fine grey sand	Hard, soda, iron		D, S	Sufficient supply; #.
25	NE.	34	"	"	"	Dug	67	1,860	- 39	1,821	67	1,793	Glacial blue sand	Hard, iron, "alkaline"		D, S	Sufficient supply.
26	NW.	35	"	"	"	Bored	110	1,890	- 50	1,840	110	1,780	Bearpaw?	Soft		D, S	Sufficient for 110 head stock.
27	NE.	35	"	"	"	Bored	90	1,905	- 50	1,855	90	1,815	Bearpaw?	Soft		N	Water hauled; many dry holes to 20 feet.
28	SW.	36	"	"	"	Drilled	158	1900	- 50	1,850	158	1,742	Belly River	Soft, soda		D, S	Sufficient for 30 head stock.
29	NW.	30	"	"	"		80	1,940			80	1,860	Glacial drift	Hard		D, S	Sufficient supply; also similar well.
1	SE.	1	30	5	3	Dug	27	1,850	- 13	1,837	27	1,823	Glacial drift	"Alkaline"			Used for washing; no stock; hauls drinking water.
2	NE.	2	"	"	"	Bored	37	2,445	- 15	2,430	37	2,408	Glacial gravel	Hard, iron		D, S	This and similar well waters house and 20 head stock.
3	SW.	2	"	"	"	Bored	35	1,870	- 19	1,851	35	1,835	Glacial drift	Hard		D,S	Sufficient supply.
4	NE.	3	"	"	"	Bored	38	1,850	- 20	1,830	38	1,812	Glacial drift	"Alkaline"		S	Farm deserted; well in slough, 25 feet deep.
5	NE.	4	"	"	"	Drilled	122	1,855	- 40	1,815	122	1,733	Belly River	Soft		D, S, I	Sufficient for 50 head stock; #.
6	NW.	5	"	"	"	Bored	57	1,840	- 14	1,826	57	1,783	Glacial sand				Also a dugout.
7	NE.	9	"	"	"	Bored	60	1,840	- 40	1,800	60	1,780	Glacial sand	Fairly hard		D, S	Sufficient for house and 35 head stock.
8	NE.	11	"	"	"	Drilled	93	1,825			93	1,732	Glacial fine blacksand	Hard, iron		S	Waters 25 head stock; second well for house use,
9	NE.	14	"	"	"	Bored	30	1,810	- 20	1,790	30	1,780	Glacial drift	Hard		D, S	Sufficient for house and 30 head stock.
10	SE.	14	"	"	"	Bored	42	1,810	- 35	1,775	42	1,768	Glacial drift	Hard		D, S	Ample supply.
11	NE.	15	"	"	"	Bored	40	1,805			40	1,765	Glacial drift	Hard, "alkaline"		S	Sufficient for stock; hauls drinking water; #.
12	SW.	15	"	"	"	Bored	48	1,828	- 28	1,800	48	1,780	Glacial sand	Fairly hard		D, S	Sufficient for 70 head stock; also supplies neighbours; #.
13	NE.	20	"	"	"	Drilled	186	1,772	- 4	1,768	186	1,586	Belly River	Soft			
14	NE.	20	"	"	"	Bored	28	1,772	- 23	1,749	28	1,744	Glacial drift	Hard		N	Trouble with pump; farm unoccupied, shallow well used for house across road.
15	SW.	20	"	"	"	Dug	18	1,850	- 14	1,836	18	1,832	Glacial sand	Hard		D, S	Sufficient for 23 head stock; 18-foot well; unused.
16	SE.	23	"	"	"	Bored	58	1,825	- 46	1,779	58	1,707	Glacial sand	Hard, iron, "alkaline"		D, S	Sufficient for house and 9 head stock.
17	NE.	25	"	"	"	Drilled	444	1,800	- 60	1,740	444	1,356	Lea Park	Soft, salty, gaseous		S	Insufficient for stock; hauls drinking water; creek waters stock; #.
18	NE.	27	"	"	"	Dug	33	1,775	- 14	1,761	33	1,742	Glacial drift	Hard		D	Farm unoccupied; water hauled to another farm; #.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of ROSEDALE, NO. 284, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
19	NE.	28	30	5	3	Drilled	366	1,774	- 30	1,744	366	1,408	Lea Park	Soft, salty		S	Sufficient for stock; shallow well unused; drinking water obtained from adjacent farm; rain water also used.
20	SE.	29	"	"	"		25	1,772	- 17	1,755	25	1,747	Glacial drift			N	Water not suitable for use; water hauled for drinking.
21	SE.	30	"	"	"	Drilled	960	1,770	- 65	1,705	960	810	Lea Park	Soft, salty		N	#.
22	SE.	30	"	"	"	Bored	64	1,770	- 26	1,744	64	1,706	Glacial drift	Hard, "alkaline"		D, S	This and 46-foot well supplies house and 14 head stock; 16-foot well completes the supply needed.
23	NE.	32	"	"	"		28	1,755	- 22	1,733	28	1,727	Glacial drift	Hard		D, S	This and three shallow wells supply house and 35 head stock; 300-foot well in bedrock, salty water.
24	NE.	36	"	"	"	Bored	25	1,740	- 15	1,725	25	1,715	Recent alluvium	Hard		D	Sufficient for house; creek for stock.
1	SW.	2	31	3	3	Bored	84	2,040	- 70	1,970	84	1,956	Glacial drift	Hard, iron	43	S, D	Sufficient for 30 head stock.
2	SE.	5	"	"	"	Bored	64	2,020	- 36	1,984	64	1,956	Glacial sand	Hard, iron	42	D, S	Sufficient for 50 head stock.
3	NW.	9	"	"	"	Bored	60	2,090	- 65	2,025	60	2,010	Glacial sand	Hard, iron	41	D, S	Sufficient for 20 head stock.
4	SW.	10	"	"	"	Bored	60	2,000	- 45	2,015	60	2,000	Glacial sand	Hard, iron	42	D, S	Sufficient for 50 head stock.
5	SE.	12	"	"	"	Bored	60	2,130	- 35	2,095	60	2,070	Glacial drift	Hard		D, S	Sufficient only for 25 head stock; 12-foot well yields good supply.
6	NE.	12	"	"	"	Bored	60	2,150	- 55	2,095	60	2,090	Glacial drift	Hard, iron	42	D, S	Insufficient; waters 4 head stock; 70-foot well used for D. S.; also insufficient.
7	NW.	12	"	"	"	Bored	17	2,142	- 15	2,127	17	2,125	Glacial drift	Hard, "alkaline"	44	S	Insufficient; waters 10 head stock; 23-foot dry hole.
8	SW.	13	"	"	"	Bored	18	2,135	- 15	2,120	18	2,117	Glacial sand	Hard, iron	42	D, S	Oversufficient for 30 head stock.
9	SW.	14	"	"	"	Bored	35	2,123	- 33	2,090	35	2,088	Glacial sand	Hard	41	D, S	Sufficient only for 22 head stock.
10	NW.	14	"	"	"	Dug	13	2,140	- 11	2,129	13	2,127	Glacial sand	Hard	42	D, S	Insufficient; 20-foot well also insufficient.
11	SW.	15	"	"	"	Dug	18	2,110	- 16	2,094	18	2,092	Glacial drift	Hard	43	D, S	Insufficient; 45-foot well also insufficient; 130-foot dry hole.
12	NE.	15	"	"	"	Bored	18	2,125	- 16	2,109	18	2,107	Glacial drift	Hard		D	Sufficient only for house; water for stock hauled.
13	SW.	16	"	"	"	Bored	127	2,105	-107	1,998	127	1,978	Glacial drift	Hard, iron		D, S	Sufficient for 55 head stock.
14	NE.	16	"	"	"	Bored	30	2,115	- 28	2,087	30	2,085	Glacial gravel	Hard, "alkaline"	44	D	Just sufficient for house; stock water hauled.
15	NW.	18	"	"	"	Bored	35	2,000	- 26	1,974	35	1,965	Glacial drift	Hard, iron, "alkaline"	43	D, S	Sufficient for 25 head stock.
16	SW.	19	"	"	"	Bored	70	2,045	- 55	1,990	70	1,975	Glacial drift	Hard, iron, "alkaline"	43	D, S	Sufficient for more than 35 head stock; 40-foot well unused.
17	SW.	20	"	"	"	Bored	100	2,100	- 97	2,003	100	2,000	Glacial gravel	Hard, iron	43	D, S	Sufficient just for house.
18	NW.	20	"	"	"	Bored	112	2,100	-105	1,995	112	1,988	Glacial drift	Hard, "alkaline"	44	D, S	Sufficient for 30 head stock.
19	SW.	21	"	"	"	Bored	112	2,185	-108	2,077	112	2,073	Glacial sand	Hard, iron	42	D, S	Insufficient supply.
20	NE.	23	"	"	"	Dug	18	2,150	- 12	2,138	18	2,132	Glacial sand	Hard, iron	42	D, S	Sufficient for 25 head stock.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of ROSEDALE, NO. 283, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
21	NW.	23	31	3	3	Dug	14	2,150	- 12	2,138	14	2,136	Glacial sand	Slightly hard	44	D, S	Barely sufficient for 12 head stock.
22	SW.	24	"	"	"	Dug	12	2,145	- 9	2,145	12	2,136	Glacial sand	Soft	41	D, S	Sufficient for 30 head stock.
23	NE.	24	"	"	"	Bored	55	2,180	- 40	2,140	55	2,125	Glacial sand	Very hard	42	D, S	Insufficient; waters only 4 head stock; water hauled.
24	NW.	24	"	"	"	Dug	9	2,150	- 7	2,143	9	2,141	Glacial gravel	Hard, iron, cloudy	43	D, S	Sufficient supply; waters 6 head stock.
25	NE.	26	"	"	"		120	2,160									Dry hole; base in glacial drift; hauls water 5 miles.
26	NW.	29	"	"	"		20	2,150									Dry hole, base in glacial drift; hauls all water.
27	SE.	30	"	"	"	Bored	50	2,070	- 43	2,027	50	2,020	Glacial gravel	Hard, iron	44	S	Just sufficient for 8 head stock; 31-foot well used D. S.
28	NE.	30	"	"	"	Bored	60	2,064	- 50	2,035	60	2,025	Glacial gravel	Hard, slightly "alkaline"	43	D, S	Sufficient supply.
29	SE.	31	"	"	"	Bored	32	2,135	- 23	2,112	32	2,103	Glacial drift	Hard	42	D, S	Insufficient; waters only 6 head stock; 170-foot well used only for stock; water hauled.
30	SW.	32	"	"	"	Bored	106	2,130	- 05	2,065	106	2,024	Glacial sand	Hard, iron	42	D, S	Abundant supply.
31	NE.	32	"	"	"	Bored	28	2,147	- 20	2,127	28	2,119	Glacial drift	Hard	42	D, S	Sufficient for 30 head stock.
1	SE.	1	31	4	3	Drilled	77	1,940			77	1,863	Glacial fine sand	Hard, iron		S	Ample; required only for stock.
2	NE.	2	"	"	"	Bored	48	1,925	- 43	1882	48	1,877	Glacial drift	Hard, iron	43	D, S	Insufficient; also 15-foot intermittent supply
3	NW.	2	"	"	"		40	1,920			40	1,880	Glacial drift	Hard, iron, "alkaline"	43	D, S	
4	SW.	4	"	"	"	Bored		1,805	- 15	1,790			Glacial drift	Hard		N	Farm deserted.
5	SE.	5	"	"	"	Dug	50	1,820	- 43	1,777	50	1,770	Glacial sand	Hard, slightly "alkaline"		D, S	Sufficient for needs.
6	NE.	5	"	"	"	Dug	60	1,810	- 39	1,771	60	1,750	Glacial drift	Hard, iron	43	D, S	Sufficient for 16 head stock.
7	SE.	6	"	"	"	Drilled	2069	1,765			480	1,285	Lea Park	Salt, iron			Water at 20 feet, 180 feet and 480 feet.
8	NE.	6	"	"	"	Bored	23	1,795	- 15	1,780	23	1,772	Glacial drift	Hard, iron	42	D, S	Sufficient supply.
9	Centre	7	"	"	"	Drilled	390	1,752			390	1,372	Lea Park	Soft, salty		S	Small flow.
10	NW.	9	"	"	"	Bored	102	1,830	- 50	1,780	102	1,728	Glacial gravel	Hard, iron, "alkaline"	40	S	Sufficient supply; not suitable for human consumption.
11	SE.	11	"	"	"	Bored	70	1,935	- 69	1,866	70	1,865	Glacial drift	Hard, iron		S	Insufficient; waters 3 head stock; domestic water hauled.
12	NW.	12	"	"	"	Bored	22	1,935	- 14	1,921	22	1,914	Glacial sand	Hard, "alkaline"	44	S	Insufficient for 9 head stock.
13	SE.	13	"	"	"	Bored	65	1,980	- 52	1,928	65	1,915	Glacial drift	Hard, iron	43	D, S	Intermittent supply; usually waters 6 head stock.
14	SW.	13	"	"	"	Bored	23	1,924	- 15	1,909	23	1,901	Glacial sand	Hard		D, S	Sufficient supply.
15	SW.	16	"	"	"	Drilled	386	1,802	- 40	1,762	386	1,416	Lea Park	Soft		D	Sufficient only for house use; #. 20-foot well with abundant supply; #.
16	SE.	16	"	"	"	Bored	140	1,849	- 80	1,769	140	1,709	Glacial drift	Hard, iron, "alkaline"		D, S	Sufficient supply; was 240 feet deep, but caved in.
17	NE.	16	"	"	"	Bored	98	1,850	- 50	1,800	98	1,752	Glacial drift	Hard, iron, "alkaline"	43	D, S	Sufficient for 200 head stock.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of ROSEDALE, NO. 283, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
18	NE.	18	31	4	3	Drilled	312	1,770			312	1,458	Lea Park	Soft, soda		D, S	Flowing well supplies 20 head stock.
19	SW.	19	"	"	"	Drilled	227	1,731	+ 22	1,753	227	1,504	Lea Park	Soft, soda	40	D, S	Abundant supply; #.
20	SW.	20	"	"	"	Dug	10	1,779	- 4	1,775	10	1,769	Glacial drift	Hard, iron	42	D, S	Sufficient supply.
21	SE.	23	"	"	"	Bored	60	1,930	- 40	1,890	60	1,870	Glacial drift	Hard, iron, "alkaline"	43	S	Intermittent supply; spring used for house and stock.
22	SE.	24	"	"	"	Bored	25	2,020	- 15	2,005	25	1,995	Glacial sand	Hard, iron	43	D, S	Sufficient for 40 head stock.
23	NW.	27	"	"	"	Drilled	300	1,850	- 19	1,831	300	1,550	Glacial drift	Hard, iron, "alkaline"	41	D, S	Sufficient for 25 head stock; also 127-foot well; unused; spring in pasture.
24	NW.	30	"	"	"	Drilled	204	1,732			204	1,528	Lea Park	Soft, soda	40	D, S	Abundant supply.
25	SE.	33	"	"	"	Dug	3	1,730	- 0	1,730	3	1,727	Recent alluvium	Hard, iron, "alkaline"	44	D, S	Sufficient for 10 head stock.
26	SW.	34	"	"	"	Drilled	112	1,850	- 8	1,842	112	1,738	Glacial drift	Hard, iron, "alkaline"	44	D, S	Insufficient owing to filling in.
27	SE.	35	"	"	"	Bored	40	1,970	- 25	1,945	40	1,930	Glacial sand	Hard, slightly "alkaline"	43	D, S	Sufficient for 15 head stock.
28	SE.	36	"	"	"	Bored	50	2,080	- 45	2,035	50	2,030	Glacial drift	Hard	44	D	Sufficient for house; 16-foot well waters 30 head stock.
29	NW.	36	"	"	"	Bored	40	1,900	- 10	1,950	40	1,920	Glacial drift	Hard	42	D, S	Insufficient; waters 11 head stock.
1	SW.	1	31	5	3	Dug	9	1,740	- 6	1,734	9	1,731	Glacial fine sand	Hard			Insufficient supply; hauls drinking water and stock water in winter.
2	NE.	2	"	"	"	Drilled	401	1,750	- 2	1,748	401	1,349	Lea Park	Soft, salty		S	Sufficient only for stock use; also similar well; drinking water hauled.
3	SE.	4	"	"	"	Dug	14	1,770					Glacial fine sand	Hard		D, S	Insufficient supply; supplies house and small number of stock; five shallow wells supply 10 head stock; water hauled.
4	SE.	5	"	"	"	Dug	15	1,760	- 13	1,747	15	1,745	Glacial drift	Hard, "alkaline"		S	Insufficient; also well in slough and 24-foot well; these wells water 20 head stock; drinking water hauled.
5	SE.	6	"	"	"	Dug	12	1,745	- 11	1,734	12	1,733	Glacial sand	Hard		D	Just sufficient for house use; several dry holes; stock water hauled.
6	SE.	9	"	"	"	Dug	15	1,760	- 14	1,746	15	1,745	Glacial drift	Hard			House deserted.
7	SE.	10	"	"	"	Dug	13	1,750	- 12	1,738	13	1,737	Glacial sand	Hard, slightly "alkaline"		D, S	Used for house and horses; slough and creek for cattle; water hauled in winter.
8	SW.	10	"	"	"	Dug	16	1,755	- 12	1,743	16	1,739	Glacial drift	Hard		D	Sufficient only for house; creek used for stock; water hauled in winter.
9	NE.	12	"	"	"	Dug	16	1,730	- 15	1,730	16	1,714	Glacial gravel	Hard, slightly "alkaline"		D	Barely sufficient for house; creek used for stock; water hauled.
10	SW.	12	"	"	"	Dug	14	1,740	- 11	1,729	14	1,726	Glacial sand	Hard		S	Sufficient for 40 to 50 head stock; 14-foot well for house use.
11	NE.	14	"	"	"	Bored	18	1,730	- 16	1,714	18	1,712	Glacial drift	Hard, "alkaline"		S	Insufficient for local needs; drinking water hauled.
12	NW.	14	"	"	"	Dug	17	1,735	- 15	1,720	17	1,718	Glacial sand	Soft		D	Sufficient only for house use; creek waters 22 head stock.
13	SE.	15	"	"	"	Dug	14	1,740	- 9	1,731	14	1,726	Glacial drift	Hard		S	Ample supply; no house on quarter-section.
14	SE.	16	"	"	"	Drilled	200	1,740			200	1,540	Lea Park?	Soft		S	Waters horses and 22 head cattle; #. Also 16-foot well for drinking.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of ROSEDALE, NO. 283, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
15	SE.	17	31	5	3	Bored	18	1,750	- 7	1,743	18	1,732	Glacial drift	Soft			Used for washing.
16	S..	18	"	"	"	Bored	40	1,740	- 9	1,731	40	1,700	Glacial drift	Hard		D	Sufficient for house use; 11-foot well waters 50 head sheep; several other wells not used.
17	SW.	18	"	"	"	Bored	12	1,740					Glacial quick-sand	Hard		D	Sufficient supply.
18	NW.	18	"	"	"	Dug	27	1,750	- 8	1,742	27	1,723	Glacial sand	Hard		D	Sufficient only for house; creek one mile distant waters stock.
19	S..	18	"	"	"	Dug	12	1,740	- 7	1,733	12	1,728	Glacial sand	Hard			New well.
20	NE.	19	"	"	"	Dug	10	1,740	- 7	1,733	10	1,730	Glacial quick-sand	Hard, slightly "alkaline"		D, S	Sufficient for house and 8 head stock.
21	SW.	19	"	"	"	Dug	11	1,740	- 9	1,731	11	1,729	Glacial sand	Hard		D	Sufficient only for house; similar well and slough supply stock.
22	NE.	23	"	"	"		204	1,736			204	1,532	Lea Park?	Soft			Flowing; fair yield; #.
23	SE.	24	"	"	"	Dug	13	1,730	- 12	1,718	13	1,717	Recent alluvium	Hard		D	Insufficient; creek used for stock; water hauled for house.
24	NW.	32	"	"	"	Dug	13	1,735	- 12	1,723	13	1,722	Recent alluvium	Hard		S	Waters 25 head stock; well in cellar for house; lake completes supply for 200 head stock.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.