CANADA
DEPARTMENT OF MINES
AND
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WATER SUPPLY PAPER No. 183

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF LOREBURN NO. 254 SASKATCHEWAN

By

B. R. MacKay & D. C. Maddox

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BUREAU OF ECONOMIC GEOLOGY

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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 Loreburn, No. 254, covers an area of 377 square miles on the east side of South Saskatchewan river. It comprises eight full townships and five partial townships west of the Third meridian. The eight full townships are: township 25, range 4, township 26, ranges 4 and 5, township 27, ranges 4, 5, and 6, and township 28, ranges 4 and 5. The parts of five townships lying east of South Saskatchewan river are township 25, ranges 5 and 6, township 26, ranges 6 and 7, and township 27, range 7. The Outlook Section of the Canadian Pacific railway runs in a northerly direction, through the central part of the municipality, and on it are located the villages of Elbow, Loreburn, Strongfield, and Hawarden. Loreburn, near the centre of the municipality, is almost 62 miles south of Saskatoon.

South Saskatchewan river forms the western boundary of the municipality.. The water-level of this river falls from about 1,664 feet above sea-level at the southern boundary of the municipality to almost 1,630 feet above sea-level in the northwest corner. The river has cut a rather deep valley, the bottom of which in the vicinity of Elbow lies about 250 feet below prairie level. As the land level slopes to the northwest the river valley becomes gradually shallower, and at the northwest corner of the municipality the valley is only about 125 feet deep. The land surface rises very gently eastward from the edge of the valley of South Saskatchewan river, to the centre of the municipality, where the elevation is a little over 2,000 feet above sea-level. From this high area the land slopes eastward and northeastward to the valley of Brightwater creek and southward towards the valley of Aiktow creek, the mouth of the latter being about a mile southwest of the village of Elbow. The drainage of the municipality is toward South Saskatchewan river and the two above-mentioned creeks.

Glacial lake sands and gravels border the southern boundary of the municipality, and extend northwestwards along the valley of South Saskatchewan river as a belt from 1 to 3 miles wide. Glacial lake clay overlies an area about $\frac{1}{2}$ mile wide and 2 miles long in the southeastern part of the municipality. North of the area of glacial lake sands and clay an irregularly shaped area of boulder clay covers most of the remainder of township 25, range 4, and the southeastern part of township 26, range 4, and extends northwesterly as a narrow belt having an average width of about half a mile, which borders the glacial lake deposits on the east and extends to beyond the northern boundary of township 27, range 7. Boulder clay also underlies about 19 square miles in the northeast corner of the municipality and an area of about a mile in average width which extends for about 2 miles through the northern third of township 27, range 6. Moraine mantles an area of approximately 235 square miles in the central part of the municipality. The Bearpaw formation underlies the glacial drift throughout the entire municipality.

Water-bearing Horizons in the Unconsolidated Deposits

Glacial lake clay in this municipality covers a very small area. It is probably very thin and as far as known does not provide water to any well in this municipality. Throughout the province of Saskatchewan the glacial lake clay is probably the poorest source of ground water of any of the unconsolidated deposits, and especially so should the clay be laid down far from the shore-line of the glacial lake in which it was deposited. Glacial lake sands and gravels usually contain a number of thin porous beds or lenses, but most of the wells in the part of this municipality underlain by glacial lake sands and gravels either obtain only small supplies of waters from the glacial lake sands and gravels, or pass into the underlying boulder clay where they tap aquifers that yield large supplies of water.

The moraine and boulder clay contain water only in beds and pockets of sand and gravel that are scattered irregularly through the nearly impervious clay and sandy clay that makes up the greater part of these deposits. The irregular distribution of these aquifers makes the work of locating water largely a matter of chance, although occasionally water is found at or near the same elevations in several adjacent wells. In such cases it is assumed that the wells of the group obtain water from a common aquifer that extends continuously beneath them, but this assumption cannot always be definitely proved. In this municipality there are a number of deep wells in boulder clay and moraine, in township 25, ranges 5 and 6, and township 26, range 6, that are in a belt that extends back about 4 miles from South Saskatchewan river, and most of them yield water that can be used only for stock. The water in deep wells in the boulder clay and moraine in other parts of the municipality is generally fit for drinking, although there are a few scattered wells that contain water that is highly mineralized.

The upper part of the boulder clay and moraine in this township yields supplies of water to many wells, but the supply of water from most of these wells is small, and at many farms several shallow wells are used. Dugouts and dams are also used as auxiliary sources of water and deep wells are put down to tap aquifers in the bedrock. In addition to the study of the records of adjacent wells the use of the bore-hole auger, the study of local vegetation, the slope of the ground surface, and the presence of springs in the vicinity of the proposed well site, may prove of value in selecting a well site.

Water-bearing Horizons in the Bedrock

Aquifers in the bedrock provide by far the most reliable and abundant source of ground water in this municipality. No records of dry holes in the bedrock were obtained during the course of field

work. The Bearpaw formation consists principally of grey, fine-grained shale or consolidated mud, which was laid down in the Cretaceous sea. This shale is very impervious to water, and yields water to wells only in parts where some porosity has been locally produced by weathering. Interbedded with the shale, however, are layers of sand that are usually fine-grained, but still sufficiently porous to contain water. Many wells in the municipalities south and southeast of the rural municipality of Loreburn obtain from such aquifers water that is soft and is occasionally salty.

The Belly River formation, which underlies the Bearpaw formation, contains a much larger proportion of sand than the Bearpaw. Parts of the sediments were laid down in fresh or brackish water, although some of marine origin occur. Detailed geological logs of the deep wells in this municipality are lacking and the elevation of the contact of the Bearpaw and Belly River formations is not known and hence the geological age of many of the bedrock aquifers is conjectural. It is thought, however, that the contact between these formations slopes very gently towards the south or the southeast. The water in the Belly River formation is generally similar to that in the Bearpaw formation. Nearly all the bedrock wells in this municipality yield large supplies of water that can be used for all purposes, although the water in some wells is rather salty. There are a number of aquifers from 998 to 1,626 feet above sea-level, however, the distribution of which is rather erratic; these aquifers are described in detail in the reports of the townships in which they are found.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 25, Range 4

This township is a plain that slopes very gently southeastwards from 2,000 feet above sea-level in the northwest corner to a little less than 1,900 feet above sea-level at the southern boundary.

Glacial lake sands and gravels underlie the southern and southeastern parts of the township in a strip averaging about a mile wide in the centre and west, but extending northwards along the eastern boundary to the centre of section 24, About half a square mile in sections 12 and 13 is underlain by glacial lake clay. That part of the township north of these glacial lake deposits is underlain by boulder clay, except for about one square mile in sections 31 and 32 which is mantled by moraine.

The glacial lake sands and gravels are not a good source of water, as four wells 15 to 25 feet obtained only a small supply of water from them. The deeper wells in the glacial lake sand areas obtain their water from the underlying boulder clay or the bedrock.

All the wells except two in the boulder clay and moraine are less than 30 feet deep and yield only a small supply of water that is not sufficient for all requirements, so that at five farms water is hauled or dams or dugouts are in use. These facts show that the upper part of the glacial drift in this township is a very poor source of ground water. A well, 60 feet deep, in the SW.¼, section 6, and a well 104 feet deep, in the SE.¼, section 8, obtain water from aquifers that are about 1,830 and 1,826 feet, respectively, above sea-level. It is possible that the aquifers extend continuously between the two wells, but no information is available as to the nature of the water in the deeper of the two wells.

Seven wells in this township, 240 to 593 feet deep, obtain water from aquifers in the bedrock. The elevations of aquifers vary rather irregularly, so that they may not be continuous between the wells of the groups here outlined, but may be detached lenses of sand in the shale. One aquifer that is about 1,364 feet above sea-level supplies a well, 593 feet deep, on the NW.¼, section 7, with water that contains 2,294 parts per million of dissolved solids. What appears to be another aquifer supplies three wells, where it is tapped at elevations of 1,429, 1,482, and 1,452 feet above sea-level, in the SE.¼, section 5, the NW.¼, section 10, and the NW.¼, section 18, at depths of 463, 455, and 535 feet, respectively. The water in the first two of these wells contains 2,340 and 2,308 parts per million of dissolved solids, respectively. An aquifer that is about 1,557 feet above sea-level supplies a well, 375 feet deep, on the SW.¼, section 14, with soft water. An aquifer that is about 1,661 to 1,647 feet above sea-level supplies two wells, in the SE.¼, section 13, and the NW.¼, section 36, 240 and 275 feet deep. The water in the shallower well is slightly hard and contains 2,311 parts per million of dissolved solids. The supply of water in all the bedrock wells in this township is very large, and the water can be used for all purposes except irrigation, so that the expense of drilling to the bedrock aquifers appears to be justified.

Township 25, Range 5

South Saskatchewan river forms the western and southern boundary of the part of this township that is included in the rural municipality of Loreburn. It trends northward and northwesterly from the southwest corner of section 3 to about the middle of the western boundary of section 18. Aiktow creek, which is one of the

tributaries of South Saskatchewan river, passes through section 3 and the southern part of section 10. It has formed valley flats that extend back for about a mile from South Saskatchewan river. In the vicinity of Elbow the valley of South Saskatchewan river is about 250 feet deep, and at the western boundary of the municipality the valley is about 200 feet deep. Back from the river valley the surface rises very gently towards the north and east, attaining a maximum elevation of 2,000 feet above sea-level in the northeast corner of the township.

A belt of glacial lake sands and gravels underlies the southeastern part of the township and borders the north bank of South Saskatchewan river for approximately a mile back from the channel. The remainder of the township is underlain by boulder clay, except an area of about 2 square miles in the northeastern part, which is mantled with moraine.

The glacial lake sands and gravels in this township are not a good source of water, as three wells, 10 to 20 feet deep, obtain only small amounts of water from the glacial lake sands. The remaining wells in this part of the township have passed through the glacial lake sands and obtained their water from sand and gravel pockets and beds in the underlying boulder clay.

The upper part of the boulder clay and the moraine in this township appear to be also a poor source of ground water, as none of the five wells, 10 to 20 feet. deep, sunk into these deposits, obtains sufficient water for local requirements. The lower part of the boulder clay, however, is a fairly good source of ground water, but the water so obtained is mostly too "alkaline" for drinking. The distribution of ground water is rather erratic, but there appear to be a number of common aquifers in the boulder clay and moraine, of which the following are the most prominent: an aquifer that is about 1,815 to 1,820 feet above sea-level supplies two wells, 100 and 120 feet deep, on section 12, with water that is used only by stock; another aquifer that is about

1,833 to 1,850 feet above sea-level supplies three wells, 100 to 115 feet deep, on sections 14 and 15, but the nature and amount of the water in the three wells varies; and an aquifer that is about 1,838 to 1,848 feet above sea-level supplies five wells, 108 to 120 feet deep, on sections 20, 21 and 22 with water that in four of the wells is "alkaline". Another aquifer about 1,867 to 1,875 feet above sea-level supplies three wells 90 to 100 feet deep, on sections 27, 28, and 35, with water that is used only for stock; and an aquifer about 1,845 to 1,852 feet above sea level supplies hard water to two wells 120 and 118 feet deep on the SW.$\frac{1}{4}$, section 32, and the SE.$\frac{1}{4}$, section 33, respectively.

Two wells in this township obtain water from aquifers in the bedrock. One of these aquifers, about 1,480 feet above sea-level, supplied a well 450 feet deep on the SE.$\frac{1}{4}$, section 20, with a large amount of soft water until the well became choked with sand. This aquifer probably underlies the entire township. The other aquifer, which is about 1,582 feet above sea-level, supplied the village of Elbow with soft water, before the Canadian Pacific Railway Company pumped water from South Saskatchewan river for the village supply.

Township 25, Range 6

South Saskatchewan river forms the southwestern boundary of this part of the township. At the eastern boundary the river valley is a little over 200 feet deep, but towards the northwest the banks recede, and at the northern boundary of the township the valley is only about 100 feet deep. The land surface slopes gently southwestwards from about 1,950 feet above sea-level at the northeast corner of the township. Boulder clay is exposed at the surface over a little more than the northeast half of section 36. Glacial lake sands and gravels overlie the boulder clay over the remainder of the township.

Three wells, 12 to 18 feet deep, sunk in the glacial drift of this township, obtain small amounts of moderately "alkaline" water from the glacial lake sands and gravels or from the upper part of the boulder clay. Two wells, each 128 feet deep, on section 36, obtain larger supplies of water that is used only for stock, from an aquifer in the boulder clay that is about 1,802 to 1,827 feet above sea-level.

Only one well, 343 feet deep, on section 26, obtains soft water from an aquifer in the bedrock at about 1,530 feet above sea-level. The amount of water originally yielded by the well was ample for all purposes, but the well is no longer in use. This aquifer probably underlies all of that part of the township included in the rural municipality of Loreburn.

Township 26, Range 4

The surface of this township slopes very gently eastwards from a little over 2,000 feet above sea-level near the western boundary to a little less than 1,950 feet above sea-level at the eastern boundary. Boulder clay underlies an area of about 11½ square miles in the southeastern part of the township; elsewhere moraine mantles the surface.

All the wells in the moraine and the boulder clay of this township are less than 40 feet deep and the supply of water from most of these wells is not sufficient for farm requirements, although the quality of the water is good and not very "alkaline" water is reported in the wells. Water is hauled at three farms, and a dry hole 80 feet deep was put down on section 3; dams or dugouts are in use at seven farms and water is hauled at three farms.

Four wells in this township obtain soft water from the following aquifers in the bedrock: an aquifer that is about 1,347 feet above sea-level supplies a well, 653 feet deep, in section 6; another aquifer that is about 1,432 to 1,392 feet above sea-level supplies two wells on sections 12 and 13, 500 and 540 feet deep, respectively; another aquifer that is about 1,537 feet above sea-level is tapped by a well 463 feet deep on section 16. All four of these wells yield large supplies of water that can be used for all purposes except irrigation. No report as to the amount of water supplied by the well on section 12 was obtained.

Township 26, Range 5

Most of the northwestern half and a small part of the southeastern half of this township lie a little over 2,000 feet above sea-level. The land slopes very gently, however, towards the southwest corner of the township which is not much over 1,950 feet above sea-level. Moraine mantles the entire township except for about one square mile in the southwest, which is underlain by boulder clay.

The glacial drift in this township appears to be very thick, as two wells, 180 and 224 feet deep, on the SE. ¼, section 27, and the SW. ¼, section 30, respectively, obtain hard water, presumably from aquifers in the glacial drift. The upper part of the drift provides water that is of good quality to a large number of wells; although in seven of these wells the supply is inadequate for local needs, and dugouts are used to supplement the supply of well water. At one of these wells, 16 feet deep, on section 26, the water is used only for stock. There are four wells, 52 to 224 feet deep, that obtain water from the lower parts of the drift, and three of these yield moderate supplies of water,

whereas the fourth and deepest well of the group on the SW.¼, section 30, yields an abundant supply of hard water that can be used for all purposes. The aquifer that supplies this well has not been tapped by any other wells in the township so that its areal extent is not known.

Five wells in the township, 560 to 720 feet deep, obtain from several aquifers abundant supplies of soft water that is used for all purposes except irrigation, but which tastes rather salty. One of these aquifers, in section 22, lies about 1,305 feet above sea-level and supplies water to a well 720 feet deep; another about 1,375 feet above sea-level, supplies a well 612 feet deep, on section 5; and a third aquifer that is about 1,414 to 1,436 feet above sea-level supplies three wells, 560, 604, and 608 feet deep, on sections 1, 23, and 34, respectively. The water in the last-mentioned aquifer contains from 2,620 to 2,300 parts per million of total solids, of which the common salt content increases towards the north from 718 to 1,053 parts per million.

Township 26, Range 6

South Saskatchewan river forms the western boundary of the part of this township that is included in the rural municipality of Loreburn. In the south the valley is about 100 feet deep, and the valley slopes are gentle, but in the north the valley is about 175 feet deep and the slopes are rather steep. From the edge of the valley the land surface rises northeastwards to a little over 2,000 feet above sea-level.

Glacial lake sands and gravels underlie the valley of South Saskatchewan river, and extend back from water-level for about 2 miles. A strip of boulder clay, which in the north and the centre is about half a mile wide, and in the south widens out to nearly a mile, margins the glacial lake sands and gravels. Moraine occupies that part of the township lying to the northeast of the belt of boulder clay.

The glacial lake sands in this township do not appear to contain much ground water, as two wells 14 and 12 feet deep, on sections 9 and 21, obtained only small supplies of water from them, and the other wells in this part of the township pass through the glacial lake sands to tap aquifers in the underlying boulder clay. In that part of the township that is underlain by boulder clay and moraine, the wells are 10 to 290 feet deep. It is not known whether the base of the 350-foot well on section 24 is in the glacial drift or in the bedrock. The upper part of the boulder clay and moraine yields small supplies of water to four wells, 10 to 24 feet deep, whereas the lower part of the boulder clay and moraine yields large supplies of water to several wells, 34 to 270 feet deep. The water in some of the deeper wells, however, is so "alkaline" that it is used only for stock, and water for drinking purposes is obtained from shallow wells or is hauled. The water in the boulder clay and moraine is generally very irregularly distributed, but the following aquifers appear to be present: one about 1,800 feet above sea-level supplies two wells, 90 and 70 feet deep, on the SW.$\frac{1}{4}$, section 10, and the SW.$\frac{1}{4}$, section 16, respectively, with water that is "alkaline"; an aquifer that is about 1,840 to 1,825 feet above sea-level supplies two wells, 85 and 80 feet deep, on sections 28 and 32, respectively, with hard water; an aquifer that is about 1,875 to 1,893 feet above sea-level provides three wells, 85, 80 and 62 feet deep, on sections 11, 14, and 15, respectively, with very "alkaline" water; and a fourth aquifer that is about 1,920 to 1,945 feet above sea-level supplies two wells, 80 and 60 feet deep, on section 26, with hard water, the water in the shallower well being used only for stock.

Ground water conditions in this township are not very favourable as water is hauled at four farms. Dugouts are used at six farms. The water in six wells, 12 to 270 feet deep, is used only for stock, and dry holes were put down on the NE.$\frac{1}{4}$, section 22, and the SE.$\frac{1}{4}$, section 26. Farmers near South Saskatchewan river use the river water for stock.

Three wells, 347 to 436 feet deep, obtain water from two aquifers in the bedrock, one of which is about 1,438 feet above sea-level and supplies a well 347 feet deep, on section 18, with soft, "soda" water that is used only by stock. The other, which is about 1,585 feet to 1,570 feet above sea-level, supplies two wells, 395 and 436 feet deep, on the SW.¼, section 13, and the NE.¼, section 26, with soft "soda" water that is used for all purposes except irrigation.

Township 26, Range 7

Only about half a square mile in the eastern halves of sections 25 and 36 of this township is included in the rural municipality of Loreburn. The area is entirely within the valley of South Saskatchewan river and no well records were collected from this part of the township, which is mantled with glacial lake sands and gravels. Ground water conditions are probably similar to those in township 26, range 6.

Township 27, Range 4

This township, the eastern half of which is thinly settled, is a plain that slopes eastwards at a rate of about 15 feet a mile towards the valley of Brightwater creek. Elevations range from a little over 2,000 feet above sea-level in the west, to a little less than 1,950 feet above sea-level in the northeast. Moraine underlies the township except for an area of about one square mile in the northeast corner that is underlain by boulder clay.

The depth of the wells in the glacial drift of this township ranges from 10 to 110 feet, but all these wells except three are less than 30 feet deep. The glacial drift in this township is a very poor source of good water, as fourteen wells, 10 to 23 feet deep, and a

well 40 feet deep, failed to obtain a supply of water sufficient for farm use. The water in four wells, in sections 26, 32, and 18 is too "alkaline" to be fit for drinking. The wells are 12, 16, 78, and 110 feet deep, respectively. Dugouts are used at six farms and rain water for domestic use is obtained from a cistern at a farm on section 9.

Only one well, 604 feet deep, on section 16, obtains water from an aquifer in the bedrock, which at this well is about 1,396 feet above sea-level. The aquifer probably underlies at least the western half of the township. The water is soft, and is used for all purposes except irrigation.

Township 27, Range 5

This township is very flat, and the elevation of the land surface is not far from 2,000 feet above sea-level. The whole of the township is mantled with moraine.

Most of the wells in the glacial drift of this township are less than 30 feet deep, and at many farms the supply of water from the first well put down was too small for local requirements. An additional supply was provided by the sinking of other shallow wells or by dugouts. Water is hauled at four farms. The quality of the water in the shallow wells is good, and in none of the wells is the water too "alkaline" to be unfit for drinking. The water in six out of the seven deeper wells in the glacial drift, ranging from 40 to 195 feet deep, is "alkaline", and in five of these wells the water is too "alkaline" to be suitable for drinking. Three wells, on the NE.¼, section 22, the NW.¼, section 24, and the NE.¼, section 27, 40 to 60 feet deep, obtain water that is used only for stock from an aquifer that is about 1,960 to 1,980 feet above sea-level. The well records do not show the presence of any widespread aquifers in other parts of the township.

Six wells in this township obtain water from aquifers in the bedrock. One of these aquifers is about 1,389 feet above sea-level, and supplies a well, 620 feet deep, on the NE.¼, section 36, with soft, "soda" water that contains 2,400 parts per million of dissolved solids, of which 561 parts are common salt. Another aquifer about 1,411 feet above sea-level supplies the Strongfield village well with water that contains 2,480 parts per million of dissolved solids, of which 851 parts are common salt. The four remaining wells obtain water from aquifers that are from 1,423 to 1,472 feet above sea-level. The supply of water from all the bedrock wells in this township is abundant and the waters are used for drinking, although some of them are rather salty.

Township 27, Range 6

Most of the eastern half of this township is flat and is about 2,000 feet above sea-level. In the western half, however, the surface slopes gently towards the southwest corner of the township, where the edges of the slopes to South Saskatchewan river occur, and where several coulées extend back from the river valley into the township for considerable distances. This southwestern part of the township is underlain by glacial lake sands, which cover about 1½ square miles and are bordered on the east by a narrow band of boulder clay a little less than half a mile in average width. Moraine extends from this belt to the eastern boundary of the township.

Only one well, 6 feet deep, on the SW.¼, section 7, which is probably spring-fed, obtains water from the glacial lake sand and gravel, but there are a number of wells 15 to 163 feet deep that obtain water from sand aquifers in the boulder clay and the moraine. Although no widespread zones of depth to water can be outlined, the following two aquifers are probably continuous under the wells mentioned. The

first of these aquifers is about 1,877 to 1,860 feet above sea-level, and supplies two wells each 90 feet deep, on sections 9 and 16. The second aquifer is about 1,920 to 1,950 feet above sea-level, and supplies three wells 50, 65, and 80 feet deep on sections 15 and 22. The water supply from wells in the glacial drift of this township is not very satisfactory as seven wells, 12 to 50 feet deep, yield supplies insufficient for local requirements. Dams are used at ten farms to supplement the supply of well water for stock, and at the farm on the SW.$\frac{1}{4}$, section 22, the drinking water is hauled.

Two wells in this township have tapped aquifers in the bedrock. One of these aquifers is about 950 feet above sea-level and is tapped by a well 998 feet deep on section 34. The other aquifer is about 1,592 feet above sea-level and is tapped by a 400-foot well on section 27. The water in the deeper well is reported as being fairly soft, whereas the water in the shallower well is soft and is used for all purposes except irrigation.

Township 27, Range 7

South Saskatchewan river forms the western boundary of the part of this township that is included in the rural municipality of Loreburn, and the valley slopes are rather steep in the south but flatten out in the north. The slopes are broken by several coulées, which extend back for considerable distances from the river channel, whereas back from the river valley the surface rises very gently towards the northeast corner of the township, which is about 1,950 feet above sea-level. An area of about 2 square miles in the northeast is under-

lain by moraine and it is bordered on the west by a narrow belt of boulder clay or silt. West of this belt glacial lake sands extend to the valley of South Saskatchewan river.

The glacial lake sands yield small supplies of water to several shallow wells, 14 to 20 feet deep, and dams and springs are in use at these farms to supplement the supply of well water. Most of the wells in the glacial lake sand areas, however, have been deepened to tap aquifers in the underlying boulder clay. An aquifer that is about 1,800 to 1,815 feet above sea-level supplies three wells, 60, 40, and 36 feet deep, on the NW.$\frac{1}{4}$, section 12, the NE.$\frac{1}{4}$, section 14, and the SE.$\frac{1}{4}$, section 23, respectively, with small supplies of hard water. A well, 52 feet deep, on the NW.$\frac{1}{4}$, section 28, obtained water from an aquifer at the base of the drift, and passed into the top of the Bearpaw shale at this point. The wells in the moraine and boulder clay are 15 to 193 feet deep, and the aquifer that supplies water, used only for stock, to the wells 193 and 150 feet deep, on the NE.$\frac{1}{4}$, section 26, and the SW.$\frac{1}{4}$, section 36, respectively, is probably at the base of the glacial drift.

Township 28, Range 4

This township is a plain that slopes very gently and uniformly northeastwards towards the valley of Brightwater creek from elevations of a little over 2,000 feet above sea-level in the southwest to a little over 1,850 feet above sea-level in the northeast. The surface is about equally divided between boulder clay and moraine, the boundary between the two types of deposits being not far from the northwesterly diagonal across the township.

The moraine in this township is not a good source of ground water, as seven out of eight wells, 10 to 22 feet deep, obtained only small supplies of water, and even the deeper wells, 60 and 100 feet deep, on the NW.¼, section 18, and the SE.¼, section 31, respectively, did not obtain a satisfactory supply of water. In the area mantled by boulder clay the principal supply of ground water is obtained by wells that tap aquifers in the bedrock. The records of only two wells in the boulder clay, on the SE.¼, section 2, and the SW.¼, section 7, 13 and 20 feet deep, were obtained; the supply of water in the first-mentioned well was intermittent whereas the water from the second well could not be used even for stock.

Twelve wells in this township, 248 to 570 feet deep, obtain water from several aquifers in the bedrock. The aquifers are as follows: an aquifer that is about 1,414 to 1,430 feet above sea-level supplies two wells 570 and 565 feet deep, on sections 6 and 18, respectively, with soft, "soda" water that is used for all purposes except irrigation. This aquifer probably underlies the western part of the township. Another aquifer that is about 1,501 to 1,535 feet above sea-level supplies eight wells 375 to 459 feet deep, all except one of which are in the eastern two-thirds of the township, with soft, "soda" water. The water in the well on the NW.¼, section 32, contains 2,140 parts per million of dissolved solids. Another aquifer about 1,592 to 1,626 feet above sea-level supplies two wells on the NW.¼, section 23, and the SE.¼, section 35, 325 and 248 feet deep, respectively, with soft water that rises above the surface at the well sites. The water from the well on the NW.¼, section 23, contains 2,000 parts per million of dissolved solids. This aquifer appears to underlie only the northeastern part of the township.

All the wells in the bedrock yield an abundant supply of water. The water is used for drinking and for stock. No dry holes in the bedrock are reported, so that it is advisable to attempt to obtain water from the bedrock when the supply of water from the glacial drift is insufficient for local requirements.

Township 28, Range 5

This township is very flat and most of the land surface is within a few feet of 2,000 feet above sea-level, but in the northeast the surface slopes gently towards the valley of Bright-water creek. The northeast corner of section 36 is about 1,950 feet above sea-level, and in the northwest the southern flank of a small hill rises to about 2,100 feet above sea-level. Moraine mantles the entire township.

Most of the wells in the glacial drift are less than 25 feet deep, and seven of these wells, 15 to 23 feet deep, yield supplies of water too small for farm requirements, whereas in three deeper wells, 43, 35, and 45 feet deep, on sections 22, 27, and 28, the supply of water was small; in a well 112 feet deep, on section 17, the water was too highly mineralized for use. No aquifers in the deeper part of the drift can be outlined.

Five wells 481 to 540 feet deep tap three bedrock aquifers and have obtained abundant supplies of soft water that can be used for all farm purposes except irrigation. One of these aquifers is about 1,340 feet above sea-level and supplies a well 646 feet deep, on section 35; another aquifer about 1,480 to 1,472 feet above sea-level provides two wells, 540 and 529 feet deep, on sections 16 and 23, respectively, with soft water that contains 2,340 and 2,200 parts

per million of dissolved solids; the third aquifer is about 1,527 to 1,544 feet above sea-level and supplies two wells each 481 feet deep, on section 27, with soft water. This aquifer does not seem to underlie a large area, as wells to the north and south of the two last-mentioned wells did not obtain water at or near these elevations.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL MUNICIPALITY OF LOREBURN, NO. 254, SASKATCHEWAN

West of 3rd meridian	Township / Range	25 / 4	25 / 5	25 / 6	26 / 4	26 / 5	26 / 6	27 / 4	27 / 5	27 / 6	27 / 7	28 / 4	28 / 5	Total No. in municipality
Total No. of Wells in Township		35	36	6	35	29	31	30	44	49	23	24	49	391
No. of wells in bedrock		7	2	1	4	5	3	1	6	2	0	12	5	48
No. of wells in glacial drift		28	34	5	31	24	28	29	38	47	23	12	44	343
No. of wells in alluvium		0	0	0	0	0	0	0	0	0	0	0	0	0
Permanency of Water Supply														
No. with permanent supply		26	32	5	19	27	26	20	33	42	22	20	41	313
No. with intermittent supply		9	4	1	15	2	1	10	11	3	1	4	5	66
No. dry holes		0	0	0	1	0	4	0	0	4	0	0	3	12
Types of Wells														
No. of flowing artesian wells		0	0	0	0	0	0	0	0	0	0	1	0	1
No. of non-flowing artesian wells		9	21	3	5	11	16	3	9	33	7	12	8	137
No. of non-artesian wells		26	15	3	29	18	11	27	35	12	16	11	38	241
Quality of Water														
No. with hard water		22	33	5	29	21	24	28	34	41	22	12	37	308
No. with soft water		13	3	1	5	8	3	2	10	4	1	12	9	71
No. with salty water		0	0	0	0	2	0	0	1	0	0	0	0	3
No. with "alkaline" water		2	16	5	1	1	8	3	5	7	6	0	4	58
Depths of Wells														
No. from 0 to 50 feet deep		26	14	3	31	19	14	27	33	36	19	10	44	276
No. from 51 to 100 feet deep		1	9	0	0	3	9	1	3	10	2	1	0	39
No. from 101 to 150 feet deep		1	10	2	0	0	2	1	3	0	1	1	1	22
No. from 151 to 200 feet deep		0	0	0	0	1	0	0	2	1	1	0	0	5
No. from 201 to 500 feet deep		5	3	1	2	1	6	0	0	1	0	10	1	30
No. from 501 to 1,000 feet deep		2	0	0	2	5	0	1	3	1	0	2	3	19
No. over 1,000 feet deep		0	0	0	0	0	0	0	0	0	0	0	0	0
How the Water is used														
No. usable for domestic purposes		28	16	4	33	26	13	24	37	36	18	22	37	294
No. not usable for domestic purposes		7	20	2	1	3	14	6	7	9	5	2	9	85
No. usable for stock		33	31	6	34	28	26	27	44	45	23	23	45	365
No. not usable for stock		2	5	0	0	1	1	3	0	0	0	1	1	14
Sufficiency of Water Supply														
No. sufficient for domestic needs		26	26	5	18	25	24	16	33	37	22	20	37	289
No. insufficient for domestic needs		9	10	1	16	4	3	14	11	8	1	4	9	90
No. sufficient for stock needs		18	23	3	12	19	19	10	20	31	16	17	24	212
No. insufficient for stock needs		17	13	3	22	10	8	20	24	14	7	7	22	167

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 Loreburn, No. 254, Saskatchewan

LOCATION						Depth of Well, Ft.	Total dis'vd solids	HARDNESS			CONSTITUENTS AS ANALYSED						CONSTITUENTS AS CALCULATED IN ASSUMED COMBINATIONS								Source of Water
No.	Qtr.	Sec.	Tp.	Rge	Mer.			Total	Perm.	Temp.	Cl.	Alkalinity	CaO	MgO	SO4	Na_2O	Solids	$CaCO_3$	$CaSO_4$	$MgCO_3$	$MgSO_4$	Na_2CO_3	Na_2SO_4	NaCl	$CaCl_2$	
1	SE.	5	25	4	3	403	2,340				70	500														✱3
2	NW.	7	25	4	3	593	2,294															(2)	(1)	(3)		✱3
3	NW.	10	25	4	3	455	2,308															(2)	(1)	(3)		✱3
4	SE.	13	25	4	3	240	2,311												(4)		(5)	(2)	(1)	(3)		✱2
5	NE.	9	25	5	3													73	58	60						S. Sask. River
6	SW.	1	26	5	3	560	2,740	25			435	675	20	11	980	1,392	2,876	36		23		649	1,450	718		✱3
7	SW.	23	26	5	3	604	2,620	25			629	635	20	14	713	1,360	2,756	36		29		598	1,055	1,038		✱3
8	NE.	34	26	5	3	606	2,800	25			638	610	30	14	689	1,325	2,709	54		29		553	1,020	1,053		✱3
9	SW.	16	27	4	3	604	2,540	20			322	700	30	22	959	1,265	2,676	54		46		626	1,419	531		✱3
10	SE.	26	27	5	3	570	2,480	20			515	640	20	7	791	1,322	2,694	36		15		621	1,171	851		✱3
11	NE.	36	27	5	3	620	2,400	20			340	630	20	14	959	1,262	2,638	36		29		593	1,418	561		✱3
12	NW.	34	27	6	3	163	1,740	550	350	200	39	525	190	65	804	565	1,754	340		136		24	1,190	64		✱1
13	NW.	23	28	4	3	325	2,000				103	565														✱2
14	NW.	32	28	4	3	437	2,140				143	565														✱3
15	NW.	11	28	5	3	16	203											(1)		(2)					(3)	✱3
16	SE.	16	28	5	3	540	2,340				613	540														✱3
17	NW.	23	28	5	3	529	2,200	25			400	580	20	4	668	1,163	2,358	36		8		566	989	759		✱3

Water samples indicated thus, ✱1, are from glacial drift or other unconsolidated deposits.
Water samples indicated thus, ✱2, are from bedrock, Bearpaw formation.
Water samples indicated thus, ✱3, are from bedrock, Belly River 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 ($CaCO_3$).

Analyses Nos. 2, 3, 4, and 15, by Provincial Analyst, Regina; Analysis No. 5 by Canadian Pacific Railway Company.
For interpretation of this table read the section on Analyses and Quality of Water.

Water from the Unconsolidated Deposits

The composition of the water from the unconsolidated deposits varies widely even within short distances. Water that is soft or only moderately hard is mostly obtained from wells in dune sands, from shallow seepage wells, and from springs or spring fed wells. The water in the deeper wells in the boulder clay and moraine, and in the glacial lake sand and clay is generally very hard and in some places it is too laxative to be used for drinking. No analyses of water from the deep wells in the glacial drift in township 25, ranges 5 and 6, and township 26, range 6, are available, but the water in most of these wells is known to be too highly mineralized for drinking. The water in a few scattered, deep wells in other parts of the municipality is not fit for drinking. Calcium sulphate ($CaSO_4$) is the most common constituent of ground water from the glacial drift, and magnesium sulphate ($MgSO_4$) is also usually present, although in smaller proportions than the calcium sulphate. Sodium sulphate (Na_2SO_4) is usually present, and in some waters it is the chief constituent. Calcium carbonate ($CaCO_3$) and magnesium carbonate ($MgCO_3$) are usually present in ground water from the glacial drift. Of these salts, the sulphates of sodium and magnesium are the laxative constituents. Sodium chloride ($NaCl_2$) is usually present in small proportions, whereas calcium chloride ($CaCl_2$) and sodium carbonate (Na_2CO_3) are only occasionally present, also in small proportions.

Sample 5 in the attached list of analyses was taken from South Saskatchewan river. The analysis shows that the water contains less than 200 parts per million of dissolved solids, all of which are compounds of calcium and magnesium. This water is comparatively soft, and it would become quite soft after boiling. The water in the untreated

state is well adapted for all purposes, except for drinking. After being boiled or otherwise sterilized, it is satisfactory for drinking. The composition of the water of South Saskatchewan river changes widely with the season, but the water is never too highly mineralized to be used for all purposes to which water is applied.

Sample 12 is from a well 163 feet deep in the glacial drift. Its analysis shows that it contains no calcium sulphate or magnesium sulphate; the water is very slightly laxative. It contains 1,190 parts per million of sodium sulphate and the water is quite hard, but most of the hardness may be removed by boiling. This water is of unusually good quality to be produced from a well 163 feet deep.

Water from the Bedrock

Most of the ground waters from the bedrock are soft or nearly soft, and the dissolved solids that they contain are chiefly the sulphate, carbonate, and chloride of sodium, the salts of calcium and magnesium being present in very small proportions. The list of analyses shows the presence of two general types of bedrock waters, of which the first type represented by analyses 1 to 4, 9, 11, 14, and 17, contains sodium sulphate, sodium carbonate and sodium chloride, the relative abundance being in the order given. The dissolved solids range from 2,140 to 2,540 parts per million. Of these waters, No. 4 is a little harder than the remaining waters of the group. In the two samples in which the sodium chloride was determined the quantity of this salt ranges from 531 to 561 parts per million. The second type of bedrock water represented by samples Nos. 6, 7, 8, 10, 13, and 16, contains sodium sulphate, sodium chloride, and sodium carbonate, the relative abundance being

in the order stated. The amount of the total dissolved solids ranges from 2,000 to 2,740 parts per million; and the sodium chloride content as determined ranges from 531 to 1,053 parts per million. Most of these waters are more salty than those of the first group. Sodium sulphate is the chief constituent of the waters of both types. The amount of this salt in the waters where it was determined ranges from 989 to 1,450 parts per million or 69.23 to 101.5 grains a gallon. The bedrock waters analysed are not suitable for irrigation, as they contain large proportions of "black alkali" and "white alkali".

WELL RECORDS—Rural Municipality of LOREBURN, NO. 254, 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	SW.	2	25	4	3	Dug	21	1,896	- 6	1,890	21	1,875	Glacial drift	Stagnant			Intermittent, insufficient supply; dugout for stock.
2	SE.	3	"	"	"	Bored	21	1,895	- 6	1,889	21	1,874	Glacial drift	Hard		D, S	Sufficient only for house.
3	SW.	4	"	"	"	Bored	25	1,895	- 20	1,875	25	1,870	Glacial drift	Hard		D, S	Insufficient; water for stock hauled.
4	SE.	5	"	"	"	Drilled	463	1,882	- 60	1,822	490	1,429	Belly River	Soft		D, S	Sufficient for 300 head stock; #.
5	SW.	6	"	"	"	Bored	60	1,890	- 35	1,855	60	1,830	Glacial drift	Hard		D, S	Sufficient for 20 head stock.
6	NW.	7	"	"	"	Drilled	593	1,937	-300	1,637	573	1,364	Belly River	Soft, soda		D, S	Sufficient for 200 head stock; #.
7	SE.	8	"	"	"	Bored	104	1,930	- 10	1,920	104	1,826	Glacial drift	Stagnant			
8	NE.	8	"	"	"	Dug	15	1,935	- 14	1,921	15	1,920	Glacial drift	Hard		D	Intermittent supply; water hauled.
9	NW.	9	"	"	"	Bored	17	1,937	- 10	1,927	17	1,920	Glacial drift	Hard		D, S	Seepage from slough.
10	NW.	10	"	"	"	Drilled	455	1,937	-100	1,837	455	1,482	Belly River	Soft		D, S	Oversufficient for 75 head stock; #.
11	SW.	12	"	"	"	Dug	15	1,900	- 9	1,891	15	1,885	Glacial drift	Stagnant		N	All water hauled.
12	NW.	12	"	"	"	Dug	15	1,906	- 12	1,894	15	1,891	Glacial sand	Soft		D, S	Insufficient; water hauled.
13	SE.	13	"	"	"	Drilled	240	1,901	- 40	1,861	240	1,661	Bearpaw (?)	Hard, iron, "alkaline"		D, S	Oversufficient for 19 head stock; #.
14	SW.	14	"	"	"	Drilled	375	1,932	- 75	1,857	375	1,557	Belly River	Soft, iron		D, S	Sufficient for 300 head stock.
15	SW.	16	"	"	"	Bored	22	1,940	- 10	1,930	22	1,918	Glacial drift	Hard	43	D	Sufficient for drinking; dugout used for stock.
16	SE.	18	"	"	"	Dug	20	1,940	- 11	1,929	20	1,920	Glacial drift	Hard	44	D	Sufficient only for domestic use.
17	NW.	18	"	"	"	Drilled	535	1,967	-225	1,742	515	1,452	Belly River	Soft	44	D, S	Sufficient for 200 head stock.
18	SW.	22	"	"	"	Dug	14	1,955	- 12	1,943	14	1,941	Glacial drift	Hard		S	Intermittent supply; slough waters stock; domestic supply hauled.
19	NE.	23	"	"	"	Dug	12	1,936	- 10	1,926	12	1,924	Glacial drift	Stagnant		N	Intermittent; caved in.
20	SW.	24	"	"	"	Dug	15	1,930	- 8	1,922	15	1,915	Glacial drift	Slightly hard	44	D, S	Sufficient only for domestic use.
21	SW.	25	"	"	"	Bored	25	1,925	- 18	1,907	25	1,900	Glacial gravel	Hard, "alkaline"	43	D	Sufficient only for domestic use; dugout used.
22	NW.	26	"	"	"	Dug	5	1,942	- 3	1,939	5	1,937	Glacial drift	Soft	45	D	Insufficient; intermittent supply.
23	SW.	27	"	"	"	Dug	10	1,956	- 7	1,949	10	1,946	Glacial drift	Hard		D, S	Intermittent supply; dugout for stock; domestic supply hauled.
24	NE.	27	"	"	"	Bored	25	1,950	- 7	1,943	25	1,925	Glacial drift	Soft		D, S	Intermittent supply.
25	NW.	27	"	"	"	Dug	20	1,975	- 15	1,960	20	1,955	Glacial drift	Hard	44	D, S	Sufficient for 85 head stock.
26	SW.	28	"	"	"	Dug	13	1,970	- 4	1,966	13	1,957	Glacial drift	Hard, stagnant	45		Used for house; dugout for stock.
27	NE.	28	"	"	"	Dug	16	1,957	- 6	1,951	16	1,941	Glacial drift	Fairly soft	44	S	Sufficient only for 5 head stock; 20-foot well used for 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 LOREBURN, NO. 254, 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
28	SE.	29	25	4	3	Dug	10	1,974	- 9	1,965	10	1,964	Glacial drift		45	S	Insufficient; intermittent supply.
29	SE.	30	"	"	"	Bored	27	1,970	- 6	1,964	27	1,943	Glacial drift	Soft, stagnant	46	D, S	
30	NE.	30	"	"	"	Dug	15	1,970	- 9	1,961	15	1,955	Glacial drift	Soft, stagnant	44	D, S	
31	NW.	32	"	"	"	Bored	11	1,995	- 9	1,986	11	1,984	Glacial drift	Soft, stagnant	46		Intermittent supply.
32	SE.	33	"	"	"	Bored	18	1,955	- 12	1,943	18	1,937	Glacial drift	Hard	45	D, S	Sufficient at times for house; intermittent; water hauled; also dugout.
33	NE.	34	"	"	"	Dug	13	1,950	- 6	1,944	13	1,937	Glacial drift	Hard	44	S	
34	NE.	36	"	"	"	Drilled	275	1,922	-100	1,822	275	1,647	Bearpaw (?)	Soft		D, S	Abundant supply.
1	SE.	1	25	5	3	Bored	95	1,875	- 45	1,830	95	1,780	Glacial fine sand	Hard, "alkaline"		S	Good supply until cribbing fell in; domestic supply hauled.
2	NE.	1	"	"	"	Dug	10	1,895	- 6	1,889	10	1,885	Glacial drift	Hard, "alkaline"	45	S	Intermittent supply; water hauled at times; also 20-foot well; occasionally used for stoc
3	NE.	2	"	"	"	Bored	20	1,860	- 1	1,859	20	1,840	Glacial drift	Hard	43	D, S	Insufficient; intermittent supply; some water hauled.
4	NE.	11	"	"	"	Drilled	350	1,932	-180	1,752	350	1,582	Belly River	Soft		N	
5	SW.	12	"	"	"	Bored	100	1,915	- 75	1,840	100	1,815	Glacial drift	Hard, "alkaline"		S	Sufficient for 50 head stock; drinking water hauled.
6	NW.	12	"	"	"	Bored	120	1,940	-100	1,840	120	1,820	Glacial gravel	Hard, iron, "alkaline"	43	S	Sufficient for 35 head stock; domestic supply hauled.
7	SE.	14	"	"	"	Drilled	120	1,812	- 60	1,755	120	1,695	Glacial drift	Hard, "alkaline"	43	S	Sufficient for 80 head stock.
8	SW.	14	"	"	"	Drilled	100	1,935	- 65	1,870	100	1,835	Glacial drift	Hard	44	D, S	Ample supply.
9	NE.	14	"	"	"	Bored	100	1,950	- 80	1,870	100	1,850	Glacial drift	Hard, "alkaline", stagnant		N	Dugout for stock; shallow well for house use.
10	NE.	15	"	"	"	Drilled	115	1,948	- 55	1,893	115	1,833	Glacial coarse sand	Hard	43	S	Sufficient for 60 head stock; domestic supply hauled.
11	SW.	19	"	"	"	Dug	14	1,870	- 10	1,860	14	1,856	Glacial drift	Hard, "alkaline"	44	S	Sufficient; waters 10 head stock; laxative.
12	SW.	20	"	"	"	Dug	14	1,825	- 13	1,812	14	1,811	Glacial drift	Hard	46	N	Intermittent supply; poor quality; water hauled.
13	SE.	20	"	"	"	Drilled	450	1,930			450	1,480	Belly River	Soft		D, S	Large supply; until it became plugged with sand; not used now.
14	NE.	20	"	"	"	Bored	108	1,956	- 75	1,881	108	1,848	Glacial sand	Hard	43	D, S	Oversufficient for 25 head stock.
15	SE.	21	"	"	"	Bored	110	1,955			110	1,845	Glacial sand	Hard, "alkaline"		S	Insufficient supply.
16	NE.	21	"	"	"	Bored	118	1,960	- 58	1,902	118	1,842	Glacial gravel	Hard, iron, "alkaline"		D, S	Oversufficient for 16 head stock.
17	SE.	22	"	"	"	Bored	110	1,953	- 70	1,883	110	1,843	Glacial drift	Hard, "alkaline"		S	
18	SW.	22	"	"	"	Bored	120	1,958	- 80	1,878	120	1,838	Glacial drift	Hard, "alkaline"	44	S	Sufficient for 25 head stock; 18-foot well by dugout for house use.
19	NW.	24	"	"	"	Dug	16	1,986	- 12	1,974	16	1,970	Glacial drift	Soft	45	D, S	Insufficient supply; 80-foot intermittent well, unfit for use.

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

WELL RECORDS—Rural Municipality of LOREBURN, NO. 254, 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	NW.	25	25	5	3	Dug	16	1,970	- 14	1,956	16	1,954	Glacial drift	Hard	44	D	Intermittent; insufficient for stock; dugout used.
21	SE.	27	"	"	"	Bored	90	1,958	- 75	1,883	90	1,868	Glacial drift	Hard, "alkaline"	44	S	Sufficient for 30 head stock; 16-foot well for house use.
22	SE.	28	"	"	"	Bored	100	1,967	- 60	1,907	100	1,867	Glacial drift	Hard	45	S	Sufficient for 100 head stock; shallow well for domestic needs.
23	SW.	30	"	"	"	Dug	10	1,910	- 8	1,902	10	1,900	Glacial drift	Hard		D, S	Intermittent supply; a similar well and a dugout.
24	NW.	30	"	"	"	Dug	20	1,925	- 15	1,910	20	1,905	Glacial drift	Hard	45	D, S	Insufficient for 10 head stock; dugout used for stock.
25	SE.	32	"	"	"	Bored & Drilled	204	1,975	- 85	1,890	204	1,771	Glacial drift	Hard, "alkaline"		S	Oversufficient for 15 head stock; 20-foot well for house use.
26	SW.	32	"	"	"	Drilled	120	1,965	- 40	1,925	120	1,845	Glacial drift	Hard	46	D, S	Good supply; waters 20 head stock.
27	SE.	33	"	"	"	Bored	118	1,970	- 35	1,935	118	1,852	Glacial drift	Hard, "alkaline"	43	N	Domestic supply hauled; dugout used for stock.
28	SW.	34	"	"	"	Bored	60	1,970	- 50	1,920	60	1,910	Glacial drift	Hard, "alkaline"		S	Not used now.
29	SW.	35	"	"	"	Bored	100	1,975	- 70	1,905	100	1,875	Glacial drift	Hard, iron, "alkaline"	43	S	Sufficient; laxative.
30	SW.	36	"	"	"	Dug	35	1,980	- 30	1,950	35	1,945	Glacial drift	Hard	44	D, S	Intermittent supply; water hauled in dry seasons.
31	NE.	36	"	"	"	Dug	11	1,990	- 8	1,982	11	1,979	Glacial drift		44		Also a dugout.
1	NW.	24	25	6	3	Dug	16	1,862	- 3	1,859	16	1,844	Glacial drift	Hard, "alkaline"	45	D	Sufficient for house use.
2	NW.	26	"	"	"	Drilled	343	1,873			343	1,530	Glacial drift	Soft, soda		D, S	Supply ample; not used now.
3	NE.	27	"	"	"	Dug	12	1,850	- 6	1,844	12	1,838	Glacial drift	Hard, "alkaline"	50	D, S	Intermittent supply; usually sufficient for 20 head stock.
4	SE.	36	"	"	"	Dug	17	1,950	- 12	1,938	17	1,933	Glacial drift	Hard, "alkaline"	42	D	Sufficient only for house; dugout used for stock.
5	NW.	36	"	"	"	Drilled	128	1,930	- 30	1,900	128	1,802	Glacial quicksand	Hard, "alkaline"	42	S	Sufficient; waters 20 head stock.
6	NE.	36	"	"	"	Drilled	128	1,955	- 30	1,925	128	1,827	Glacial quicksand	Hard, "alkaline"	42	S	Sufficient for 20 head stock; not used for past 5 years.
1	SW.	1	26	4	3	Bored	35	1,940	- 12	1,928	35	1,905	Glacial drift	Stagnant	45	D	Small dam also.
2	SE.	3	"	"	"	Dug	14	1,955	- 7	1,948	14	1,941	Glacial sand	Soft	44	D, S	Place deserted but neighbours use this well; ample supply.
3	SE.	4	"	"	"	Dug	20	1,970	- 5	1,965	20	1,950	Glacial drift	Hard	45	D, S	Intermittent supply; dugout for stock use; 80-foot dry hole.
4	SE.	6	"	"	"	Drilled	653	2,000	-250	1,750	653	1,347	Belly River	Soft, soda, iron		D, S	Sufficient for 200 head stock.
5	NW.	6	"	"	"	Dug	8	2,000	- 5	1,995	- 8	1,992	Glacial drift	Hard		D, S	Intermittent supply; a dugout used; water hauled in winter.
6	NW.	9	"	"	"	Dug	16	1,978	- 13	1,965	16	1,962	Glacial sand	Hard	42	D, S	Sufficient for 7 head stock; dugout used for stock in summer.
7	NW.	10	"	"	"	Bored	26	1,955	- 12	1,943	26	1,929	Glacial sand	Hard, iron	42	D, S	Intermittent supply; 11-foot well gives larger supply of good water.
8	NE.	11	"	"	"	Dug	12	1,940	- 8	1,932	12	1,928	Glacial gravel	Hard, good	42	D, S	Intermittent supply.
9	NE.	12	"	"	"	Drilled	500	1,932	- 70	1,862	500	1,432	Belly River	Soft			
10	SE.	13	"	"	"	Drilled	540	1,932	- 80	1,852	540	1,392	Belly River	Soft, soda	46	D, S	Abundant supply.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of LOREBURN, NO. 254, 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
11	SW.	14	26	4	3	Dug	12	1,942	- 8	1,934	12	1,930	Glacial sand	Hard	42	D, S	Ample supply.
12	SW.	15	"	"	"	Dug	17	1,958	- 6	1,952	17	1,941	Glacial drift	Hard	44	D, S	Intermittent supply.
13	SW.	16	"	"	"	Drilled	463	2,000	-150	1,850	463	1,537	Belly River	Soft, soda		D, S	Abundant supply.
14	SE.	17	"	"	"	Dug	19	2,000	- 12	1,988	19	1,981	Glacial drift	Hard		D, S	Usually sufficient for 6 head stock.
15	NE.	17	"	"	"	Dug	13	2,000	- 0	2,000	13	1,987	Glacial drift	Hard	43	D, S	Sufficient for 9 head stock.
16	NW.	19	"	"	"	Dug	11	2,000	- 10	1,990	11	1,989	Glacial drift	Hard	44	D, S	Intermittent supply.
17	NW.	20	"	"	"	Bored	19	1,990	- 14	1,976	19	1,971	Glacial quick-sand	Hard, "alk-aline"	43	D	Sufficient only for house; also 22-foot intermittent well.
18	NW.	21	"	"	"	Dug	16	1,980	- 2	1,978	16	1,964	Glacial drift	Hard	44	D, S	Intermittent supply; 10-foot seepage well used for drinking.
19	NE.	22	"	"	"	Dug	16	1,965	- 15	1,950	16	1,949	Glacial drift	Hard	45	D	Intermittent supply; at times water hauled.
20	NW.	22	"	"	"	Dug	12	1,965	- 3	1,962	12	1,953	Glacial drift	Soft	45	S	Intermittent supply; domestic supply hauled.
21	SE.	25	"	"	"	Dug	12	1,950	- 8	1,942	12	1,938	Glacial drift	Hard	45	D	Intermittent supply.
22	SE.	27	"	"	"	Dug	18	1,969	- 6	1,963	18	1,951	Glacial drift	Hard	45	D, S	Intermittent supply.
23	SW.	27	"	"	"	Dug	16	1,968	- 6	1,962	16	1,952	Glacial drift		44	D, S	Sufficient for 60 head stock.
24	SW.	28	"	"	"	Dug	15	1,970	- 9	1,961	15	1,955	Glacial drift	Hard	45	D, S	Insufficient, intermittent supply.
25	SW.	29	"	"	"	Dug	35	1,990	- 15	1,975	35	1,955	Glacial drift	Hard	43	D, S	Sufficient only for house; 2 dugouts for stock use.
26	SW.	30	"	"	"	Dug	12	2,000	- 1	1,999	12	1,988	Glacial drift	Hard	44	D, S	Intermittent supply.
27	NE.	32	"	"	"	Dug	12	2,010	- 1	2,009	12	1,998	Glacial drift	Hard	43	D, S	Sufficient for 6 head in summer only; intermittent supply; also dugout.
28	NE.	34	"	"	"	Dug	12	1,990	- 9	1,981	12	1,978	Glacial sand	Hard	43	D, S	Intermittent; usually waters 5 head stock; also 10-foot seepage well.
29	NW.	34	"	"	"	Dug	22	2,000	- 21	1,979	22	1,978	Glacial drift	Hard		D, S	Sufficient supply.
30	NE.	36	"	"	"	Dug	14	1,950	- 1	1,949	14	1,936	Glacial drift	Hard	44	D, S	
1	SW.	1	26	5	3	Drilled	560	1,996	-240	1,756	560	1,436	Belly River	Soft, salty	46	D, S	Abundant supply; #.
2	SE.	2	"	"	"	Bored	21	1,990	- 9	1,981	21	1,969	Glacial drift		42		
3	NW.	2	"	"	"	Bored	25	2,010	- 13	1,997	25	1,985	Glacial drift	Hard	43	D, S	Insufficient in winter; 72-foot well unused; also dugout.
4	SE.	5	"	"	"	Drilled	612	1,987	-260	1,727	612	1,375	Belly River	Soft, soda	45	D, S	Abundant supply.
5	NW.	10	"	"	"	Bored	52	2,035	- 21	2,014	52	1,983	Glacial drift	Hard	43	S	Also 12-foot well near dugout.
6	NE.	11	"	"	"	Dug	17	2,030	- 8	2,022	17	2,013	Glacial drift		43		Also well in dugout used for stock.
7	NW.	12	"	"	"	Dug	11	2,005	- 9	1,996	11	1,994	Glacial drift				Well near dugout.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of LOREBURN, NO. 254, 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
8	NW.	13	26	5	3	Dug	14	2,010	- 8	2,002	14	1,996	Glacial drift	Soft	46		Intermittent supply.
9	SW.	14	"	"	"	Dug	17	2,010	- 5	2,005	17	1,993	Glacial drift		43		
10	SE.	15	"	"	"	Bored	35	2,010	- 8	2,002	35	1,975	Glacial drift	Hard	43	D, S	Limited supply.
11	NE.	15	"	"	"	Dug	8	2,020	- 5	2,015	8	2,012	Glacial gravel	Hard	42	D, S	Sufficient for 25 head stock.
12	NW.	20	"	"	"	Dug	12	2,000	- 8	1,992	12	1,988	Glacial drift	Soft	44	D	Sufficient only for house use.
13	NW.	22	"	"	"	Drilled	720	2,025	-300	1,725	720	1,305	Belly River	Soft, soda	45	D, S, I	Abundant supply.
14	SW.	23	"	"	"	Drilled	604	2,018	-185	1,833	604	1,414	Belly River	Soft, soda		D, S	Abundant supply; #.
15	SW.	25	"	"	"	Dug	14	2,012	- 5	2,007	14	1,998	Glacial drift	Soft	46	D, S	Intermittent supply; dugout for stock.
16	NE.	26	"	"	"	Dug	16	2,020	- 8	2,012	16	2,004	Glacial drift	Hard, "alkaline"	46	S	Insufficient supply; poor quality.
17	SE.	27	"	"	"	Bored	180	2,030	- 30	2,000	180	1,850	Glacial drift	Hard	43	D, S	Sufficient for 18 head stock.
18	NE.	27	"	"	"	Dug	11	2,015	- 8	2,007	11	2,004	Glacial drift		43		
19	SE.	29	"	"	"	Dug	15	2,005	- 13	1,992	15	1,990	Glacial drift	Hard		D	Sufficient only for house; stock water hauled.
20	SW.	29	"	"	"	Dug	28	2,010	- 25	1,985	28	1,982	Glacial drift	Hard	42	D, S	Insufficient supply.
21	SE.	30	"	"	"	Bored	57	2,010	- 47	1,963	57	1,953	Glacial drift	Hard	43	D, S	Sufficient for 6 head stock.
22	SW.	30	"	"	"	Drilled	224	1,990	-154	1,836	224	1,766	Glacial gravel	Hard, iron	44	D, S	Abundant supply.
23	SW.	32	"	"	"	Dug	20	2,005	- 15	1,990	20	1,985	Glacial drift				
24	NE.	34	"	"	"	Drilled	606	2,034	-195	1,839	606	1,428	Belly River	Soft, salty	44	D, S	Oversufficient for 20 head stock; #.
25	SE.	35	"	"	"	Dug	20	2,020	- 6	2,014	20	2,000	Glacial drift	Hard		D, S	Sufficient for 8 head stock; also dugout for stock.
26	NW.	36	"	"	"	Dug	15	2,010	- 9	2,001	15	1,995	Glacial drift				
1	SE.	1	26	6	3	Dug	30	1,960	- 17	1,943	30	1,930	Glacial sand	Hard		D, S	Sufficient; supplies some of the neighbours; also a dugout.
2	NW.	2	"	"	"	Drilled	137	1,915	-107	1,808	137	1,878	Glacial sand	Hard, "alkaline"	42	S	Sufficient; waters 7 head stock.
3	NE.	9	"	"	"	Dug	14	1,890	- 17	1,873	14	1,876	Glacial fine sand	Hard	42	D	Yields 1 barrel a day; also 11-foot well behind dam supplies 10 head stock.
4	NW.	10	"	"	"	Bored	34	1,905	- 22	1,883	34	1,871	Glacial sand	Hard, slightly "alkaline"	42	D, S	Sufficient for 40 head stock.
5	SW.	10	"	"	"	Drilled	90	1,890	- 40	1,850	90	1,800	Glacial drift	Hard, "alkaline"	42	S	Sufficient for 20 head stock.
6	NE.	11	"	"	"	Bored	85	1,960	- 55	1,905	85	1,875	Glacial sand	Hard, "alkaline"	44	S	Sufficient for 18 head stock; drinking water hauled.
7	SE.	12	"	"	"	Bored	150	1,960			150	1,810	Glacial sand	Hard		N	Plugged with sand; dugout and 12-foot well used for stock.
8	SW.	13	"	"	"	Drilled	395	1,980	-200	1,780	395	1,585	Belly River	Soft, soda	44	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 LOREBURN, NO. 254, 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
9	SW.	14	26	0	3	Bored	80	1,960			80	1,880	Glacial sand	Hard, "alkaline"	43	S	Intermittent supply; drinking water hauled; 4 dugouts for stock; water for stock hauled.
10	NE.	15	"	"	"	Dug	62	1,955	- 22	1,933	62	1,893	Glacial drift	Hard		N	Water for stock hauled.
11	SW.	16	"	"	"	Bored	70	1,870	- 50	1,820	70	1,800	Glacial gravel	Hard, slightly "alkaline"	42	D, S	Sufficient supply; 20-foot dam used in dry seasons.
12	NE.	18	"	"	"	Drilled	347	1,785	-.47	1,736	347	1,338	Belly River	Soft, soda	42	S	Abundant supply.
13	SW.	21	"	"	"	Dug	12	1,870	- 8	1,862	12	1,858	Glacial sand	Hard, "alkaline"	42	S	Sufficient for 20 head stock.
14	SW.	22	"	"	"	Dug	10	1,910	- 8	1,902	10	1,900	Glacial drift	Hard		D, S	
15	NE.	22	"	"	"	Drilled	210	1,975	-140	1,835	210	1,765	Glacial(?) drift	Hard, yellow sediment		S	Sufficient supply; several dry holes.
16	NW.	24	"	"	"	Dug	12	2,000	- 8	1,992	12	1,988	Glacial drift	Hard	43	S	Intermittent supply; water hauled; 350-foot drilled well.
17	SE.	26	"	"	"	Bored	80	2,000	- 70	1,930	80	1,920	Glacial sand	Hard	42	D	Sufficient only for domestic needs; 50-foot dry hole; also dugout.
18	NE.	26	"	"	"	Drilled	436	2,006	-160	1,846	436	1,570	Belly River	Soft, soda	42	D, S	Sufficient supply.
19	SW.	26	"	"	"	Bored	60	2,005	- 48	1,957	60	1,945	Glacial gravel	Hard, iron, "alkaline"	44	S	Sufficient for 12 head stock; 24-foot well for house use.
20	NW.	28	"	"	"	Bored	85	1,925	- 80	1,845	85	1,840	Glacial gravel	Hard, iron	40	S	Sufficient for 30 head stock; 20-foot well supplies house.
21	NW.	32	"	"	"	Bored	680	1,905	- 65	1,840	80	1,825	Glacial sand	Hard, iron	42	D, S	Sufficient; supplies 12 barrels a day; 19-foot well; good supply; unused.
22	SE.	33	"	"	"	Drilled	270	1,965			270	1,695	Glacial drift	Hard, iron		S	Ample supply.
1	NW.	4	27	4	3	Dug	13	2,010	- 7	2,003	13	1,997	Glacial drift	Soft	44	D, S	Insufficient; intermittent supply; two similar wells; all the wells supply 11 head stock.
2	SE.	6	"	"	"	Dug	18	2,020	- 15	2,005	18	2,002	Glacial drift	Hard	43	D, S	Sufficient supply.
3	SW.	7	"	"	"	Dug	28	2,020	- 26	1,994	28	1,992	Glacial sand	Hard	44	D, S	Insufficient for 6 head stock; 15-foot seepage well yields good water.
4	NW.	7	"	"	"	Dug	15	2,020	- 12	2,008	15	2,005	Glacial drift	Hard	45	D, S	Insufficient supply.
5	NE.	8	"	"	"	Dug	14	2,006	- 6	2,000	14	1,992	Glacial drift	Hard	43	D	Sufficient only for house; several shallow seepage wells yield small supply.
6	NW.	9	"	"	"	Dug	20	2,000	- 16	1,984	20	1,980	Glacial drift	Hard	44	N	Cistern for house use; dugout for stock.
7	SW.	14	"	"	"	Bored	40	1,975	- 25	1,950	40	1,935	Glacial sand	Hard, iron, "alkaline"	43	D, S	Sufficient only for 7 head stock.
8	SW.	16	"	"	"	Drilled	604	2,000	-140	1,860	604	1,396	Belly River	Soft	42	D, S	Abundant supply for 250 head stock; #.
9	SE.	18	"	"	"	Bored	110	2,006	- 60	1,946	110	1,896	Glacial drift	Hard, iron, "alkaline"	43	S	Sufficient for 12 head stock.
10	SE.	18	"	"	"	Dug	18	2,005	- 15	1,990	18	1,987	Glacial drift	Hard	44	D	Sufficient only for house use.
11	NE.	18	"	"	"	Bored	78	2,025	- 39	1,986	78	1,947	Glacial drift	Hard, "alkaline"	44	S	Sufficient for 15 head stock; domestic supply hauled.
12	SW.	20	"	"	"	Dug	14	2,010	- 11	1,999	14	1,996	Glacial drift	Hard	43	D	Intermittent supply; dugout used for stock.
13	NE.	21	"	"	"	Dug	16	1,995	- 6	1,989	16	1,979	Glacial drift	Hard	45	D, S	Intermittent supply; dugout used for 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 LOREBURN, NO. 254, SASKATCHEWAN.

WELL No.	LOCATION					TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE		PRINCIPAL WATER-BEARING BED			CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
	¼	Sec.	Tp.	Rge.	Mer.				Above (+) Below (−) Surface	Elev.	Depth	Elev.	Geological Horizon				
14	NE.	22	27	4	3	Dug	14	1,975	- 6	1,969	14	1,961	Glacial drift	Hard	44	D	Sufficient only for house use; also a dugout.
15	SW.	26	"	"	"	Dug	12	1,960	- 7	1,953	12	1,948	Glacial drift	Hard	43	S	Intermittent supply; also similar well.
16	SE.	29	"	"	"	Dug	16	2,000	- 13	1,987	16	1,984	Glacial drift	Hard	44	D, S	Intermittent supply; 12-foot well yields constant but small supply.
17	SW.	29	"	"	"	Dug	14	2,000	- 3	1,997	14	1,986	Glacial drift	Hard	43	D, S	Intermittent supply; also dugout.
18	SE.	30	"	"	"	Dug	12	2,012	- 6	2,008	12	2,000	Glacial drift	Hard	44	D	Sufficient for house use; dugout for stock.
19	SW.	31	"	"	"	Dug	12	2,015	- 4	2,011	12	2,003	Glacial drift	Hard	43	N	
20	SW.	32	"	"	"	Dug	16	1,990	- 8	1,982	16	1,974	Glacial drift	Hard	44	S	Not in use at present.
21	NE.	32	"	"	"	Dug	16	1,985	- 12	1,973	16	1,969	Glacial sand	Soft	42	D, S	Sufficient for 15 head stock.
22	SW.	34	"	"	"	Dug	10	1,978	- 6	1,972	10	1,968	Glacial sand	Hard	43	D, S	Intermittent, insufficient supply.
23	NE.	36	"	"	"	Dug	23	1,935	- 20	1,915	23	1,912	Glacial sand	Hard	44	D, S	Intermittent supply; similar well.
1	NE.	3	27	5	3	Dug	14	2,025	- 2	2,023	14	2,011	Glacial drift	Hard	44	D, S	Intermittent supply.
2	SE.	4	"	"	"	Dug	9	2,015	- 6	2,009	9	2,006	Glacial sand	Hard	42	D, S	Sufficient for 20 head stock; 10-foot well yields small supply.
3	SW.	4	"	"	"	Dug	10	2,020	- 7	2,013	10	2,010	Glacial drift	Soft, sulphur	42	D, S	Ample supply.
4	SW.	6	"	"	"	Bored	32	2,020	- 21	1,999	32	1,988	Glacial drift	Hard		S	Oversufficient for 15 head stock; 10-foot well supplies drinking water.
5	NW.	8	"	"	"	Dug	85	2,000	- 79	1,921	85	1,915	Glacial drift	Hard, iron, "alkaline"	42	D, S	Sufficient only for house and 4 head stock; dug out for stock.
6	NE.	10	"	"	"	Dug	13	2,025	- 6	2,019	13	2,012	Glacial drift	Hard	43	D	Intermittent supply; stock water hauled.
7	SW.	12	"	"	"	Drilled	553	2,017	-150	1,867	553	1,464	Belly River	Soft, soda	46	D, S	Abundant supply.
8	SW.	12	"	"	"	Dug	16	2,015	- 8	2,007	16	1,999	Glacial drift	Hard	44	D, S	Used to be ample supply, somewhat smaller now.
9	NW.	13	"	"	"	Drilled	566	2,012	-140	1,872	566	1,446	Belly River	Soft, soda	48	D, S	Abundant supply.
10	NE.	15	"	"	"	Dug	18	2,020	- 9	2,011	18	2,002	Glacial drift	Hard	44	D	Intermittent supply; also a similar 20-foot well.
11	NE.	17	"	"	"	Drilled	606	2,029	-160	1,869	606	1,423	Belly River	Soft, soda	42	D, S	Abundant supply; waters 60 head stock.
12	NW.	19	"	"	"	Bored	40	2,000	- 30	1,970	40	1,960	Glacial drift	Hard	43	D, S	Sufficient for 10 head stock.
13	NE.	19	"	"	"	Bored	120	2,000	-108	1,892	120	1,880	Glacial drift	Hard, "alkaline"	43	S	Sufficient for 35 head stock; 12-foot well for domestic use.
14	NE.	20	"	"	"	Dug	18	2,000	- 13	1,987	18	1,982	Glacial drift	Hard	44	D	Insufficient for domestic needs; another 18-foot well sufficient for 10 head stock.
15	NW.	21	"	"	"	Dug	16	2,040	- 10	2,030	16	2,024	Glacial drift	Hard	44	D, S	Insufficient, intermittent supply; 10-foot well waters 15 head stock.
16	NE.	21	"	"	"	Dug	16	2,040	- 10	2,030	16	2,024	Glacial sand and gravel	Hard	43	D, S	Sufficient for 100 head stock.

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

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of LOREBURN, NO. 254, 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
17	NE.	22	27	5	3	Bored	40	2,020	- 38	1,982	40	1,980	Glacial drift	Hard, iron, "alkaline"	43	S	Barely sufficient for 9 head stock; drinking water hauled.
18	SW.	23	"	"	"	Bored	26	2,005	- 20	1,985	26	1,979	Glacial drift	Hard	43	D, S	Sufficient for 8 head stock.
19	NW.	23	"	"	"	Dug	18	2,010	- 5	2,005	18	1,992	Glacial drift	Soft	42	D, S	Sufficient only for house use; several shallow intermittent wells.
20	NW.	24	"	"	"	Bored	60	2,020	- 30	1,990	60	1,960	Glacial drift	Hard, iron, "alkaline"		S	Used only in winter; waters 24 head stock; laxative.
21	NW.	25	"	"	"	Dug	18	2,040	- 12	2,028	18	2,022	Glacial drift	Hard		D, S	Sufficient only for house; dugout for stock.
22	SE.	26	"	"	"	Drilled	604	2,015	- 70	1,945	604	1,411	Belly River	Soft, soda		D, S	Abundant supply; #.
23	SE.	26	"	"	"	Dug	18	2,015	- 13	2,002	18	1,997	Glacial drift	Hard	43	D	Sufficient only for house; several, shallow, intermittent wells and dugouts.
24	NE.	27	"	"	"	Bored	52	2,020			52	1,968	Glacial drift				16-foot well for domestic needs.
25	NE.	29	"	"	"	Dug	20	2,000	- 14	1,986	20	1,980	Glacial drift	Hard	44	D	Insufficient for house needs; dugout for stock.
26	NE.	32	"	"	"	Drilled	195	2,000	- 80	1,920	195	1,805	Glacial drift	Hard, "alkaline"	43	S	Insufficient for 20 head stock; water hauled.
27	NE.	33	"	"	"	Dug	15	2,030	- 12	2,018	15	2,015	Glacial drift	Soft	44	D	Sufficient for house needs; water for stock hauled.
28	SW.	34	"	"	"	Dug	12	2,025	- 10	2,015	12	2,013	Glacial sand	Soft	44	D	Sufficient only for house; several intermitte wells.
29	NE.	34	"	"	"	Dug	16	2,035	- 14	2,021	16	2,019	Glacial drift	Hard	44	D	Sufficient for house; dugout for stock.
30	SW.	36	"	"	"	Drilled	566	2,038	- 30	2,008	566	1,472	Belly River	Soft, salty, soda		D, S	Abundant supply.
31	NE.	36	"	"	"	Drilled	620	2,009	-140	1,869	620	1,389	Belly River	Soft, soda		D, S	Abundant supply; #.
1	SW.	2	27	6	3	Dug	32	2,022	- 22	2,000	32	1,990	Glacial gravel	Hard	42	D, S	Sufficiant for 30 head stock.
2	SW.	3	"	"	"	Bored	24	1,985	- 23	1,962	24	1,961	Glacial drift	Hard	40	D, S	Insufficient; waters 4 head stock.
3	SE.	4	"	"	"	Bored	52	1,986	- 36	1,950	52	1,934	Glacial quicksand	Hard, iron	42	D, S	Ample supply; 32-foot well fairly soft water.
4	SW.	7	"	"	"	Dug	6	1,850	- 5	1,845	6	1,844	Glacial sand	Hard	52	D, S	Ample supply; used also by neighbours on NW.¼ section 6.
5	NW.	9	"	"	"	Bored	90	1,967	- 50	1,917	90	1,877	Glacial sand	Hard, iron	42	S	Abundant supply; also dugout that goes dry in summer.
6	SW.	12	"	"	"	Dug	35	2,010	- 25	1,985	35	1,975	Glacial sand	Hard, iron, slightly "alkaline"		D, S	Sufficient only for 8 head stock; 12- and 15-foot seepage wells for stock.
7	SE.	14	"	"	"	Dug	27	2,010	- 18	1,992	27	1,983	Glacial sand	Hard	43	D, S	Sufficient for 13 head stock.
8	NW.	14	"	"	"	Dug	16	2,030	- 15	2,015	16	2,014	Glacial drift	Hard		S	Intermittent supply; dam also for stock; several dry holes.
9	NW.	15	"	"	"	Bored	65	2,000	- 35	1,965	65	1,935	Glacial sand	Hard, "alkaline"	43	D, S	Sufficient for 30 head stock.
10	SW.	15	"	"	"	Bored	50	2,000	- 45	1,955	50	1,950	Glacial sand	Hard	44	D, S	Sufficient only for 11 head stock; also a small dugout.
11	SW.	16	"	"	"	Dug	12	1,950	- 11	1,939	12	1,938	Glacial sand	Soft	46	D, S	Sufficient for 20 head stock; 90-foot well yields small supply.
12	SE.	18	"	"	"	Dug	25	1,907	- 22	1,885	25	1,882	Glacial sand and gravel	Hard	40	D, S	Sufficient supply.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of LOREBURN, No. 254, 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
13	NW.	20	27	6	3	Dug	25	1,905			25	1,880	Glacial drift	Hard	42	D, S	Sufficient for 30 head stock; dugout also used.
14	SE.	20	"	"	"	Dug	10	1,955	- 6	1,949	10	1,945	Glacial sand	Soft	48	D, S	Sufficient for 15 head stock.
15	SW.	22	"	"	"	Dug	80	2,000	- 60	1,940	80	1,920	Glacial drift	Hard, "alkaline"	43	S	Sufficient for 50 head stock; drinking water hauled.
16	NE.	24	"	"	"	Bored	28	2,030	- 13	2,017	28	2,002	Glacial sand	Hard, "alkaline"	42	D, S	Sufficient for 20 head stock; also similar well.
17	SW.	25	"	"	"	Bored	60	2,005	- 10	1,995	60	1,945	Glacial sand	Hard	42	D, S	Insufficient for 30 head stock; 12-foot, 30-foot, 85-foot wells used for stock.
18	NE.	26	"	"	"	Dug	12	2,032	- 8	2,024	12	2,020	Glacial drift	Hard, "alkaline"	44	D, S	Intermittent supply; similar well used for stock.
19	SE.	26	"	"	"	Bored	55	2,010	- 35	1,975	55	1,955	Glacial sand	Hard, iron, "alkaline"	40	D, S	Intermittent supply; 4 shallow wells also.
20	NW.	27	"	"	"	Drilled	400	1,992	-200	1,792	400	1,592	Belly River	Soft		D, S	Sufficient supply.
21	SE.	28	"	"	"	Dug	15	1,977	- 3	1,974	15	1,962	Glacial drift	Hard	48	D	Intermittent supply; dugout for stock.
22	SW.	28	"	"	"	Dug	16	1,960	- 10	1,950	16	1,944	Glacial drift	Hard	45	D, S	Sufficient; dugout and second well for stock.
23	NW.	28	"	"	"	Bored	24	1,977	- 12	1,965	24	1,953	Glacial sand	Fairly soft		D, S	Sufficient for 20 head stock; 70-foot dry hole; dugout.
24	NE.	30	"	"	"	Dug	20	1,925			20	1,905	Glacial gravel	Hard, "alkaline"	42	D, S	Sufficient; similar well; dam.
25	SW.	30	"	"	"	Dug	14	1,950	- 12	1,938	14	1,930	Glacial sand	Hard	42	D, S	Sufficient for 30 head stock; dugout that never goes dry.
26	SW.	33	"	"	"	Dug	20	1,990	- 12	1,978	20	1,970	Glacial drift	Hard		D, S	Intermittent supply; dugout for stock; 100-foot well, hard water.
27	NW.	34	"	"	"	Drilled	163	1,948	-100	1,848	163	1,785	Glacial sand	Hard	42	D, S	Abundant supply; #. 998-foot drilled well fairly soft water; dam used at times for stock.
28	NW.	35	"	"	"	Dug	12	2,025	- 8	2,017	12	2,013	Glacial sand	Medium hard	44	D, S	Sufficient for 7 head stock; also dugout.
29	NE.	36	"	"	"	Dug	14	2,027	- 12	2,015	14	2,013	Glacial sand	Hard	40	D, S	Ample supply for 20 head stock; second well for stock; supplies neighbours occasionally.
1	NW.	12	27	7	3	Bored	60	1,860	- 40	1,820	60	1,800	Glacial sand	Hard, iron	42	D,S	Sufficient supply; slough used for stock.
2	NE.	12	"	"	"	Dug	14	1,820	- 10	1,810	14	1,806	Glacial gravel	Hard	42	D, S	Ample supply; also spring in ravine.
3	SE.	13	"	"	"	Bored	28	1,890	- 14	1,876	28	1,862	Glacial sand	Hard, slightly "alkaline"	48	D, S	Sufficient supply.
4	NE.	14	"	"	"	Dug	40	1,855	- 30	1,825	40	1,815	Glacial gravel	Hard, iron	42	D, S	Ample for 30 head stock.
5	NW.	14	"	"	"	Dug	40	1,790	- 35	1,755	40	1,750	Glacial gravel	Hard	42	D, S	Ample for 30 head stock.
6	SE.	23	"	"	"	Bored	36	1,840	- 32	1,808	36	1,804	Glacial drift	Hard	42	D, S	Insufficient for 12 head stock; spring in pasture.
7	SE.	24	"	"	"	Bored	44	1,820	- 36	1,784	44	1,776	Glacial gravel	Hard, "alkaline"	42	D, S	Sufficient supply.
8	NW.	25	"	"	"	Bored	27	1,890	- 17	1,873	27	1,863	Glacial sand	Hard, "alkaline"	42	D, S	Intermittent supply; slough also goes dry in summer.
9	NE.	26	"	"	"	Drilled	193	1,885			193	1,692	Glacial drift	Hard, "alkaline"	42	S	Ample for 36 head stock; also 40-foot well.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of LOREBURN, NO. 254, 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
10	SW.	27	27	7	3	Dug	16	1,815	- 6	1,809	16	1,799	Glacial gravel	Hard	42	D, S	Sufficient for 20 head stock; second well in coulée anddam for stock.
11	NE.	28	"	"	"	Bored	30	1,810	- 23	1,787	30	1,780	Glacial sand	Soft	42	D, S	Just sufficient for 20 head stock.
12	NW.	28	"	"	"	Bored	52	1,810	- 30	1,780	52	1,758	Glacial drift	Hard, iron	42	D, S	Ample supply; yields 150 barrels daily.
13	SE.	34	"	"	"	Bored	48	1,860	- 42	1,818	48	1,812	Glacial drift	Hard, "alkaline"	42	S	Insufficient; waters only 6 head stock; 15-foot well supplies drinking water; dam also used.
14	SW.	34	"	"	"	Dug	20	1,820	- 16	1,804	20	1,800	Glacial drift	Hard	42	D, S	Insufficient; along with similar well waters 12 head stock.
15	NW.	36	"	"	"	Dug	15	1,865	- 12	1,853	15	1,850	Glacial sand	Hard, iron, "alkaline"		D, S	Sufficient for 25 head stock; also slough.
16	SW.	36	"	"	"	Drilled	150	1,900	- 90	1,810	150	1,750	Glacial fine sand	Hard, iron	42	S	Ample for 10 head stock; 36-foot well just sufficient for house.
1	SE.	2	28	4	3	Dug	13	1,940	- 11	1,929	13	1,927	Glacial drift	Hard	43	D, S	Intermittent supply.
2	SW.	2	"	"	"	Dug	19	1,950	- 15	1,935	19	1,931	Glacial gravel	Hard		D	Intermittent supply; water hauled for stock.
3	SW.	6	"	"	"	Drilled	570	2,000	-120	1,880	570	1,430	Belly River	Soft, soda	40	D, S	Abundant supply.
4	SW.	7	"	"	"	Dug	18	2,000	- 12	1,988	18	1,982	Glacial sand	Hard	44	D, S	Oversufficient for 60 head stock.
5	NW.	8	"	"	"	Dug	12	1,970	- 6	1,964	12	1,958	Glacial sand	Hard		D	Intermittent supply; dugout for stock.
6	NE.	9	"	"	"	Dug	20	1,940	- 14	1,926	20	1,920	Glacial gravel	Soft		D, S	Sufficient for 15 head stock.
7	NE.	11	"	"	"	Drilled	407	1,926			407	1,519	Belly River	Soft, soda		D, S	Ample supply.
8	NW.	12	"	"	"	Drilled	394	1,921	- 27	1,894	394	1,527	Belly River	Soft, soda	45	D, S	Abundant supply.
9	NW.	13	"	"	"	Drilled	414	1,915	- 20	1,895	414	1,501	Belly River	Soft, soda	46	D, S	Abundant supply.
10	NE.	14	"	"	"	Drilled	411	1,926	- 30	1,896	411	1,515	Belly River	Soft, soda	46	D, S	Abundant supply.
11	NW.	15	"	"	"	Drilled	415	1,930	- 50	1,886	415	1,521	Belly River	Soft, soda	46	D, S	Abundant supply.
12	SW.	16	"	"	"	Drilled	459	1,963	- 70	1,893	459	1,504	Belly River	Soft, soda		D, S	Abundant supply.
13	NW.	17	"	"	"	Bored	18	1,970	- 15	1,955	18	1,952	Glacial drift	Hard		D	Sufficient for house; stock supply hauled.
14	SE.	18	"	"	"	Drilled	565	1,979	-100	1,879	565	1,414	Belly River	Soft, soda		D, S	Abundant supply.
15	NW.	18	"	"	"	Bored	60	1,970	- 45	1,925	60	1,910	Glacial drift	Hard	44	S	Insufficiant for more than 6 head stock; 18-foot well supplies house.
16	NW.	19	"	"	"	Dug	10	1,990	- 8	1,982	10	1,980	Glacial gravel	Hard	38	D, S	Intermittent supply.
17	NW.	23	"	"	"	Drilled	325	1,917			325	1,592	Belly River	Soft			Flowing; #.
18	SW.	27	"	"	"	Dug	20	1,930	- 15	1,915	20	1,910	Glacial drift	Hard		N	All water hauled.
19	SE.	30	"	"	"	Dug	22	1,990	- 18	1,972	22	1,968	Glacial quick-sand	Hard	44	D, S	Just sufficient for house use; water for stock hauled.

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 LOREBURN, NO. 254, 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.	31	28	4	3	Drilled	101	1,974	- 40	1,934	101	1,873	Glacial drift	Hard, iron	41	D, S	Just sufficient for 10 head stock.
21	NW.	32	"	"	"	Drilled	437	1,939	- 40	1,899	437	1,502	Belly River	Soft, soda	46	D, S	Abundant supply; #.
22	NW.	34	"	"	"	Drilled	375	1,910	- 40	1,870	375	1,535	Belly River	Soft, soda	45	D	Sufficient supply.
23	SE.	35	"	"	"	Drilled	248	1,874	+ 16	1,890	248	1,626	Bearpaw (?)	Soft, soda	46	D, S	Flows about 3 gallons a minute.
1	SE.	2	27	4	3	Dug	15	2,027	- 5	2,022	15	2,012	Glacial drift	Hard	45	D, S	Intermittent supply; several shallow, intermittent wells and dugout.
2	SW.	2	"	"	"	Dug	17	2,025	- 8	2,017	17	2,008	Glacial drift	Hard, iron	43	D	Sufficient for house; dugout.
3	SE.	4	"	"	"	Dug	20	2,040	- 11	2,029	20	2,020	Glacial gravel	Hard, iron, "alkaline"	43	S	Sufficient for 28 head stock; 11-foot well for house and 6 head stock.
4	SW.	4	"	"	"	Dug	18	1,965	- 16	1,949	18	1,947	Glacial drift	Hard	44	D, S	Sufficient for domestic needs; water hauled for 15 head stock.
5	SE.	7	"	"	"	Dug	16	2,000	- 12	1,988	16	1,984	Glacial quicksand	Soft	44	D, S	Sufficient for 4 head stock.
6	SE.	8	"	"	"	Dug	10	2,010	- 8	2,002	10	2,000	Glacial sand	Hard	44	S	Ample supply; 14-foot well of soft water used for house.
7	NW.	10	"	"	"	Dug	12	2,015	- 10	2,005	12	2,003	Glacial sandy gravel	Hard	44	D, S	Sufficient; waters 10 head stock.
8	NW.	11	"	"	"	Dug	16	2,020	- 13	2,007	16	2,004	Glacial drift	Hard	44	D, S	Intermittent supply; #.
9	SE.	14	"	"	"	Dug	10	2,000	- 9	1,991	10	1,990	Glacial gravel	Hard	42	D, S	Sufficient for 50 head stock.
10	NW.	14	"	"	"	Dug	14	2,012	- 12	2,000	14	1,998	Glacial gravel	Hard	44	S	Sufficient for 20 head stock.
11	SW.	15	"	"	"	Dug	24	2,015	- 19	1,996	24	1,991	Glacial drift	Hard	44	D, S	Sufficient only for 6 head stock; 18-foot well for stock.
12	NE.	15	"	"	"	Dug	16	2,020	- 14	2,006	16	2,004	Glacial sand and gravel	Hard		D, S	Just sufficient for house.
13	SE.	16	"	"	"	Drilled	540	2,020	-160	1,860	540	1,480		Soft, soda	47	D, S	Abundant supply for 500 head stock; #.
14	SE.	17	"	"	"	Dug	12	2,020	- 10	2,010	12	2,008	Glacial gravel	Hard	44	D, S	Sufficient for 18 head stock; 112-foot well unsuitable for use.
15	SW.	18	"	"	"	Dug	20	2,020	- 16	2,004	20	2,000	Glacial drift	Soft	44	D	Sufficient for house; stock use dugout.
16	SE.	20	"	"	"	Dug	20	2,003	- 12	1,991	20	1,983	Glacial drift	Hard	44	D, S	Sufficient for house and 20 head stock; 10-foot well also waters stock.
17	NW.	20	"	"	"	Dug	12	2,000	- 4	1,996	12	1,988	Glacial drift	Hard	42	D, S	Sufficient for 12 head stock.
18	NW.	22	"	"	"	Bored	43	2,023	- 35	1,988	43	1,980	Glacial sand	Hard, iron	44	D, S	Insufficient for 7 head stock.
19	NW.	23	"	"	"	Drilled	529	2,001	-132	1,869	529	1,472	Belly River	Soft			Abundant supply; #.
20	SE.	26	"	"	"	Dug	23	2,000	- 22	1,978	23	1,977	Glacial quicksand	Hard	44	D	Intermittent supply.
21	SE.	27	"	"	"	Drilled	481	2,008	-230	1,778	481	1,527	Belly River	Soft, soda	46	D, S	Abundant supply; 35-foot well yields small supply usable for stock.
22	SW.	27	"	"	"	Drilled	481	2,025	- 60	1,965	481	1,544	Belly River	Soft	47	D, S	Abundant supply.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of LOREBURN, NO. 254, 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
23	SE.	28	28	5	3	Bored	45	2,030	- 36	1,994	45	1,985	Glacial drift	Hard, "alkaline"	43	S	Insufficient supply; dugout used; 16-foot well for house use.
24	SW.	28	"	"	"	Dug	23	2,015	- 16	1,999	23	1,992	Glacial fine sand	Hard	43	D, S	Insufficient for 10 head stock.
25	NE.	28	"	"	"	Dug	24	2,000	- 20	1,980	24	1,976	Glacial sand	Hard	44	D, S	Sufficient for 15 head stock.
26	SW.	30	"	"	"	Dug	16	2,000	- 12	1,988	16	1,984	Glacial gravel	Hard, iron	43	D, S	Sufficient for 50 head stock; 16-foot well waters 10 head stock.
27	NW.	30	"	"	"	Dug	12	1,995	- 10	1,985	12	1,983	Glacial sand	Hard, iron, "alkaline"	43	D, S	Sufficient for 8 head stock.
28	NE.	31	"	"	"	Dug	15	1,970	- 13	1,957	15	1,955	Glacial drift	Soft	44	D, S	Sufficient only for house; 19-foot well waters 20 head stock.
29	NW.	31	"	"	"	Dug	10	1,990	- 4	1,986	10	1,980	Glacial drift	Hard, iron, "alkaline"	44	S	Sufficient; waters 30 head stock; 20-foot well for house use.
30	NW.	32	"	"	"	Dug	15	1,990	- 9	1,981	15	1,975	Glacial drift	Hard	44	D, S	Insufficient for stock.
31	NW.	34	"	"	"	Dug	17	1,975	- 10	1,965	17	1,958	Glacial sand	Soft	44	D, S	Intermittent supply; several shallow dry holes.
32	SE.	35	"	"	"	Drilled	646	1,986	-140	1,846	646	1,340	Belly River	Soft	47	D, S	Oversufficient for 250 head stock.
33	NE.	35	"	"	"	Dug	17	1,970	- 11	1,959	17	1,953	Glacial sand	Hard		D, S	Sufficient for 5 head stock.
34	SW.	36	"	"	"	Dug	18	1,990	- 8	1,982	18	1,972	Glacial drift	Hard	44	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.