CANADA

DEPARTMENT OF MINES

AND

TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

WATER SUPPLY PAPER No. 139

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF WHEATLANDS NO. 163 SASKATCHEWAN

By

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

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CONTENTS

Illustrations

GROUND WATER RESOURCES OF THE RURAL MUNICIPALITY OF WHEATLANDS, NO. 163 SASKATCHEWAN

INTRODUCTION

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

Publication of Results

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

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

How to Use the Report

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

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

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

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

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

GLOSSARY OF TERMS USED

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

WATER-BEARING HORIZONS OF THE MUNICIPALITY

The rural municipality of Wheatlands is an area of 324 square miles in southern Saskatchewan and is described as tps. 16, 17, and 18, ranges 1, 2, and 3, W. 3rd mer. The centre of the municipality is about 29 miles west and slightly north of Moose Jaw, 118 miles south and slightly east of Saskatoon, and 71 miles east and slightly north of Swift Current. The main line of the Canadian Pacific railway and No. 1 highway pass through townships 17, ranges 1, 2, and 3, and on them are located Mortlach and Parkbeg, the only villages in the municipality. The Missouri coteau and the gently rolling elevated country to the south and west of it here referred to as the upper plain, occupy a large proportion of the southern, central, and western parts of the municipality. The remainder of the municipality is occupied by a plain that lies several hundred feet below the uplands and slopes gently northeastwards: it is referred to here as the lower plain. The rise from the lower plain to the higher plain is comparatively steep, especially in the southeast and northwest parts of the municipality.

Most of the country occupied by the coteau is rough and hilly and many undrained depressions occur. Several hills are over 2,500 feet above sea-level, and in township 17, range 3, a hill rises to over 2,600 feet above sea-level.

The lower plain slopes gently northeastwards to a low, flat basin near the northeast corner of the municipality which is approximately 1,840 feet above sea-level, and which in wet seasons becomes a marshy lake. Sandy creek east of Mortlach is the only permanent stream in the municipality. In the western part of the lower plain there are several low, flat areas which are sometimes marshy.

The municipality is covered with glacial drift that varies greatly in thickness and character, especially over much of the northern upland part of the municipality. The drift is comparatively

thin in the southeastern part, bedrock being exposed on sec. 17, tp. 16, range 1, at an elevation of 2,200 feet above sea-level, and being less than 10 feet from the surface in two wells in secs. 11 and 12, tp. 16, range 2. The drift increases in thickness northward, and in the lower plain it ranges in thickness from 40 feet in township 17, range 1, to over 135 feet in township 18, range 2.

Most of the southern part of the municipality and much of the northeastern part are underlain by moraine, the surface of which is characterized by numerous boulder-strewn knolls and undrained depressions. These depressions form the sites of numerous lakes and sloughs in wet seasons. In the northeastern part of the municipality a belt of moraine averaging 2 miles in width trends northwesterly from Mortlach. Three large areas mantled by glacial till occur in the lower plain area, in townships 16 and 17, range 1, townships 17, ranges 1 and 2, and township 18, range 2. A 12-square mile area of glacial outwash sand and gravel adjoins the moraine- and till-covered areas in township 18, range 2. Other parts of the municipality are covered by more recent deposits consisting of glacial lake clays, glacial lake sands, and dune sands.

Over the lower plain the Bearpaw formation immediately underlies the glacial drift. The Bearpaw consists chiefly of dark grey marine shale, but sandy beds, which contain ground water that is usually soft, are sometimes interbedded with the shales. In the higher parts of the municipality the Eastend formation overlies the Bearpaw, and at still higher elevations the Whitemud and Ravenscrag formations overlie the Eastend formation. The formations overlying the Bearpaw are erosion remnants of formations that at one time covered the entire municipality. The Eastend, Whitemud, and Ravenscrag formations are chiefly non-marine and are much more sandy than the Bearpaw formation. Most of the sediments composing them are lighter in colour and more porous than the dark grey shales of the Bearpaw formation.

Water-bearing Horizons in the Unconsolidated Deposits

No widespread aquifers in the unconsolidated deposits of this municipality are known to exist, but aquifers of small extent occur in the various types of glacial deposits. In both the moraine and glacial-till covered areas the water occurs largely in lenses and pockets of sand and gravel that are enclosed in impervious clay, and that appear to be more numerous in the upper oxidized part of the till than in the underlying compact blue clay that underlies much of the lowland area.

In the glacial outwash sands and gravels the ground water is more plentiful and is usually found within 15 feet of the surface. Some wells near the margin of the area of outwash sands, however, are 35 to 50 feet deep and probably obtain their water from the underlying boulder clay.

Several large areas of glacial lake clays occur in the northeastern half of the municipality. The largest of these areas surrounds and underlies a depression in township 18, range 1, which in wet seasons forms a large marshy lake. Another area of glacial lake clay, 3 miles in extent, is located a mile north of Parkbeg, and a 5-square mile area exists in township 17, range 1, and the adjacent parts of township 16, range 1. The glacial lake clays are not a good source of well water supplies, but water supplies are often found in sandy lenses in the clay. In this municipality, the glacial lake clays are probably not very thick, and wells have passed through them and into the underlying boulder clay.

Two narrow belts of glacial lake sands trending northwestwards border and probably underlie a belt of dune sands in the northeastern part of the municipality. The southern belt of glacial lake sands curves around the end of a low ridge of moraine near Mortlach and continues as an irregular belt $\frac{1}{2}$ to 3 miles in width that extends northwestwards and westwards from the southeast corner of township 17, range 1, to a point $2\frac{1}{2}$ miles from the western boundary

of the municipality. Ground water is usually found at slight depths in these sands, but in this municipality the sands are comparatively thin.

A northwesterly trending belt of dune sands about 2 to 3 miles wide crosses the northeast part of the municipality. Water is usually found at slight depths in these sands and sand-points are sometimes used instead of dug wells to obtain the water. In this dune sand area, there are 2 wells 40 feet and 44 feet deep respectively, that appear to have passed through the dune sands and into the underlying glacial drift.

Water-bearing Horizons in the Bedrock

An 8-foot well on the NE. ¼, sec. 11, tp. 16, range 2, passed through a thin coal seam and a "brown, hard, clay", and it is assumed that this well obtains its water from the Ravenscrag formation. The water in this well is very hard, is rather highly mineralized, and its composition is similar to that of water from the glacial drift. No other wells in the municipality obtain water from the Ravenscrag formation.

A well, 172 feet deep, on the SE. ¼, sec. 3, tp. 17, range 1, obtain salty water from sands thought to be in the Bearpaw formation. The water-bearing sands struck in this well appear to pinch out towards the west, as three wells 240 to 450 feet deep, in sections 4 and 5 of the same township, were dry holes. The Bearpaw sands do not seem to be a probable source of water of good quality over most of the municipality.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 16, Range 1

Most of the southern two-thirds of this township is occupied by Missouri coteau. The rise from prairie level, which is here at about 2,100 feet above sea-level, is steep and many coulées dissect the northward-facing slopes. Elevations in the coteau country rise to over 2,500 feet above sea-level. There is a group of small shallow lakes in sections 3 and 4 and a small, shallow lake in section 9. Direction of surface drainage in the high parts of the coteau area is southwestward to the lakes mentioned. This part of the township is very sparsely settled. North of the coteau area a plain slopes gently northward to about 2,000 feet above sea-level at and near the northern boundary of the township. Except for three small detached areas along the northern boundary of the township, which are underlain by either glacial lake clays or sands, the township is underlain by boulder clay or till in the low plain area and by moraine in the elevated coteau country.

A group of four wells, 30 to 55 feet deep, in sections 32, 28, and 34, obtain water from an aquifer that is about 1,970 to 1,998 feet above sea-level, the water rising to about 2,005 to 2,110 feet above sea-level. Several of the deeper wells obtain "alkaline" water. The water in some of the shallower wells is soft. All the producing wells except one are less than 35 feet deep. Ground water conditions in sections 31 to 36 are not favourable for obtaining well water supplies; the supply in some wells is small, in some the water is too "alkaline" for human use, and in section 32 a dry hole 140 feet deep was put down. On and near the slopes of the coteau several wells which appear to be stream fed obtain large supplies of water. The coulées in the slopes of the coteau could probably be used for storage of surface run-off.

Township 16, Range 2

In the northeast part of the township the country is comparatively low and flat, but rises gently westward to the coteau, which occupies most of the township and which attains an elevation of over 2,500 feet above sea-level in the northwest corner. Over the southern part of the township the country is flat to gently rolling, the land surface being from about 2,250 feet to about 2,350 feet above sea-level. In sections 20 and 21 there are two small depressions, which during wet seasons become shallow lakes. Drainage and direction of surface run-off are to the undrained lakes and hollows, except in the eastern and northeastern parts of the township. Several of the coulées which dissect the slope from prairie level to the coteau extend back for considerable distances into the highland and could probably be used for storing surface run-off.

The depth of the producing wells in this township ranges from 5 to 118 feet. The water in most of the deeper wells and in several of the shallow wells is "alkaline". In three shallow wells in the southwest quarter of the township the water is soft. In the western half of the township there are several wells from 50 to 85 feet deep. The aquifer and the water level in some of these wells rises towards the northwest and it is probable that the aquifer is an interglacial deposit formed by streams that had their source in highlands to the northwest. Two wells, 118 and 106 feet deep, in sections 2 and 10, respectively, obtain water from an aquifer that is about 2,184 to 2,202 feet above sea-level, but the water of the well in section 2 was too "alkaline" to use, and the water of the well on section 10 is laxative. There are springs or spring-fed wells in sections 9, 10, and 16. A well on the SE. $\frac{1}{4}$, section 13, is reported as passing through gravel from a depth of 3 to 29 feet and gravel is reported in other wells in the western part of the township. The gravel is probably a local deposit formed by streams that flowed from the coteau. In the SE. $\frac{1}{4}$, section 31, soft water is reported in

sand, and water is easily obtained elsewhere in this section. It seems probable that this quarter section also is underlain by a local deposit of sand derived from the highlands to the northwest.

A well on the NE. ¼, section 11, obtained water from an aquifer that is thought to be in the Ravenscrag formation. Several dry holes were put down in the southern third of the township.

Township 16, Range 3

A high area along the northern boundary of the township has an elevation of over 2,500 feet above sea-level. From this area the land surface slopes southwestward to a flat or gently rolling area, most of which is from 2,300 to 2,400 feet above sea-level. A group of small lakes, three of which are less than 2,300 feet above sea-level, occur in sections 23 and 24, and there is another small lake near the northern boundary of section 35. There are no streams in the township; the direction of surface drainage is to the lakes and undrained depressions.

The northern third of this township is not settled and no well records were obtained. In the southern two-thirds of the township the depth of the producing wells ranges from 8 to 30 feet. Two shallow wells in or near the basin in which the shallow lakes lie are flowing wells, and the aquifer is probably a buried alluvial fan of outwash sand that extends southward from the highland to the north. Three wells, each 30 feet deep, two being in section 10 and one in section 14, obtain water from glacial gravel. The aquifer that supplies these wells does not appear to extend far eastward or westward, as dry holes have been put down to 80 feet and 93 feet, respectively, on sections 13 and 9. Several springs appear to discharge into the lakes. Four wells in the southeast obtained soft water. Many of the wells are intermittent and the water supply in the township is not very satisfactory. Nineteen dry holes were put down most of them in the southern third of the township.

Township 17, Range 1

The land surface in this township is flat to very gently rolling. Elevations range from a little less than 1,950 feet above sea-level in the valley of Sandy creek, west of Mortlach, to a little over 2,000 feet above sea-level in the northwest. Sandy creek is a permanent stream which drains a small area in the eastern part of the township; drainage elsewhere is erratic. There is a considerable area of glacial lake sands and drifting soil in the vicinity of Mortlach and in the northeastern corner of the township.

The producing wells in the glacial drift, with three exceptions, are less than 35 feet deep. In the southern third of the township several dry holes were put down and conditions for obtaining ground water supplies are not favourable. In section 6 the ground water is "alkaline". The water in two wells near the low, marshy area in section 18 is also "alkaline". A well on the SE. $\frac{1}{4}$, section 31, obtains a very large supply of water from glacial sand and gravel. The valley of Sandy creek might possibly be used for storage of surface run-off, but the sandy soil might be too pervious to permit of efficient storage of the water.

A well 172 feet deep on the SE. $\frac{1}{4}$, section 3, obtains salty water from sandy beds in the Bearpaw formation. Three other wells, 240 to 450 feet deep, in sections 4 and 5, obtained no water from the Bearpaw formation, and it is probable that the sands in the Bearpaw that supply water to the Darmody-Riverhurst artesian area to the northwest do not extend into the township.

Township 17, Range 2

Most of the southern and western parts of the township are occupied by the Missouri coteau. The rise from the lower plain to the coteau follows a rather irregular line from a point a little west of the southeast corner of the township to the vicinity of Parkbeg, at the western border. The rise is uneven, but in most

places it is comparatively gentle. The coteau country in this township is rolling to hilly, and the highest elevations, of over 2,500 feet above sea-level, are in the southwest corner of the township. The general slopes of the coteau country are to the north, northeast, and east. North and east of the coteau the country is flat to gently rolling; elevations range from about 2,000 feet to about 2,050 feet above sea-level. There is a small, shallow lake in section 4 which receives the local drainage; drainage elsewhere is erratic. The coulées that dissect the rise to the coteau appear to be possible places for the storage of surface run-off.

The depth of the producing wells in this township ranges from 8 to 90 feet. No widespread aquifers are known. Three wells 60 to 90 feet deep, on sections 28 and 29, obtain water from an aquifer that is about 1,950 to 1,960 feet above sea-level. Several dry holes were put down to a depth of 100 feet. The aquifer that supplies a flowing well on the NW. ¼, section 15, is probably a northward-dipping bed of sand in the glacial drift.

Township 17, Range 3

A small area of about 4 square miles in the northeast is comparatively flat, and elevations are less than 2,050 feet above sea-level. The remainder of the township is rough and hilly and is typical of the coteau country. A hill in section 15 rises to over 2,600 feet above sea-level. A large part of the southern half of the township is over 2,400 feet above sea-level, and in the northwestern corner the country rises to elevations of over 2,450 feet above sea-level. The railway follows a comparatively low strip of country between these two elevated areas. There are no streams or permanent lakes in the township. In the northern half of the township and in a small part of the southern half general direction of surface run-off is northeastward to a lake bed, at the northern boundary of the township which is dry most of the year. In the greater part of

the southern half of the township, surface run-off is to undrained hollows and small lakes which are dry except in wet seasons or in the spring and early summer. This township is thinly settled.

All the producing wells except three are less than 35 feet deep. Several of the wells on the northward slope of the rise to the coteau yield large amounts of water, and one of these wells used to flow. In the low area at and near the northern boundary of the township three shallow wells yield "alkaline" water. A well on the NW. ¼, section 36, produces soft water from an aquifer which is probably a buried outwash deposit from the highland to the south, and which occurs between deposits of impervious till.

Township 18, Range 1

Most of this township is a plain which slopes gently northeastwards from the southwest corner, where elevations of about 2,000 feet above sea-level occur, to a low, flat area in the northeast which is marshy in wet seasons and lies at about 1,842 feet above sea-level. An area of about half a square mile in the northeast corner of the township slopes southwestwards to this low, flat area. There are no streams or lakes in the township. Maximum difference in elevations in the township is about 150 feet.

The depth of the producing wells in this township ranges from 7 to 40 feet. Four wells, 13 to 22 feet deep, were put down in the glacial lake clay area; in two of these wells the water was too "alkaline" for human use, and in the other two the supply of water was not sufficient for local use. In the northern belt, underlain by glacial lake sands, the depth of the wells ranges from 7 to 17 feet, but the wells are all near the margin of the lake sand area. In the well on the SE. ¼, section 21, the sand overlying the clay was only 4 feet thick, and it is probable that the deeper wells in this area pass into the underlying boulder clay. In the area underlain by dune sand, the depth of the wells ranges from 9 to 40 feet. At a well on the SE. ¼, section 18, a sand-point was originally driven to a depth

of 15 feet, but the well was afterwards deepened to 40 feet. In two wells close to the eastern margin of the dune sand area, and in two wells close to the southern boundary of the township, the water is reported as "alkaline", but in only one case is it reported as too "alkaline" for human use. In the belt of glacial lake sands in the southeastern part of the township, two wells, 20 feet and 36 feet deep, respectively, were put down. Both wells probably pass through the lake sands to the underlying glacial drift. The well on the SW. ¼, section 7, is 20 feet deep, and has a large supply of water although the water only rose to a point 16 feet below the surface.

Township 18, Range 2

The eastern two-thirds of this township is very flat and elevations range from a little over 2,000 feet above sea-level to a little less than 1,950 feet above sea-level. Three low areas, which are marshy in wet seasons, occur in the central and northern parts of the township and receive the surface run-off of the vicinity. The western third of the township is gently rolling country with elevations that range from a little less than 2,000 feet above sea-level to a little over 2,050 feet above sea-level.

There are no streams or permanent lakes in the township. In the eastern two-thirds of this township the depth of the producing wells ranges from 16 to 135 feet. The well on the SW. ¼, section 13, is reported to have passed through 120 feet of clay into sand and gravel; the aquifer is probably at the base of the glacial drift, but no other wells in the vicinity reached this aquifer.

Township 18, Range 3

A hill that rises to about 2,550 feet above sea-level at the western boundary of the township occupies most of the western half of the township. The eastward slopes of the hill are steep and the western half of the township is thinly settled. There are no streams in the western half of the township, but there is a small lake

in section 6. In the eastern half of the township the country is flat to rolling. Two low, flat areas, which are occasionally marshy, occur at and near the southern boundary and near the centre of the eastern half of this township. The southern part of a permanent lake, about 1,965 feet above sea-level, is near the northern boundary of the township. General direction of surface run-off in the township is eastward or westward to the lake and the depressed areas mentioned.

The depth of the producing wells in this township ranges from 13 to 90 feet. In the southeast quarter of the township several wells produce "alkaline" water. In this quarter of the township there is a bed of sand from which two wells obtain water with the use of sand-points. A well in section 33 passed through 18 feet of gravel, but as a well 20 yards east passed through blue clay to 80 feet the gravel aquifer is probably a small, isolated pocket in the drift.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL MUNICIPALITY OF WHEATLANDS, NO. 163, SASKATCHEWAN

Township	16	16	16	17	17	17	18	18	18	Total No. in Municipality
West of mer. Range	1	2	3	1	2	3	1	2	3	
Total No. of Wells in Township	31	95	49	56	46	22	26	21	24	370
No. of wells in bedrock	0	1	0	4	0	0	0	0	0	5
No. of wells in glacial drift	31	94	49	53	46	22	26	21	24	365
No. of wells in alluvium	0	0	0	0	0	0	0	0	0	0
Permanency of Water Supply										
No. with permanent supply	25	33	23	34	28	17	24	20	21	225
No. with intermittent supply	5	17	7	9	4	3	0	1	1	47
No. dry holes	1	45	19	13	14	2	2	0	2	98
Types of Wells										
No. of flowing artesian wells	0	0	3	0	1	0	0	0	0	4
No. of non-flowing artesian wells	10	21	7	7	13	2	7	3	6	76
No. of non-artesian wells	20	28	20	36	18	18	17	18	16	191
Quality of Water										
No. with hard water	25	43	23	42	30	17	22	21	20	245
No. with soft water	5	7	7	1	2	1	2	0	2	27
No. with salty water	0	0	0	1	0	0	0	0	0	1
No. with "alkaline" water	8	24	5	9	12	5	9	5	2	79
Depths of Wells										
No. from 0 to 50 feet deep	29	60	46	46	26	19	25	20	18	288
No. from 51 to 100 feet deep	1	31	3	3	20	3	1	0	6	68
No. from 101 to 150 feet deep	1	3	0	3	0	0	0	1	0	8
No. from 151 to 200 feet deep	0	1	0	1	0	0	0	0	0	2
No. from 201 to 500 feet deep	0	1	0	3	0	0	0	0	0	4
No. from 501 to 1,000 feet deep	0	0	0	0	0	0	0	0	0	0
No. over 1,000 feet deep	0	0	0	0	0	0	0	0	0	0
How the Water is Used										
No. usable for domestic purposes	18	32	26	28	17	14	15	17	17	184
No. not usable for domestic purposes	12	18	4	15	15	6	9	4	5	88
No. usable for stock	26	44	27	38	30	19	22	19	21	246
No. not usable for stock	4	6	3	5	2	1	2	2	1	26
Sufficiency of Water Supply										
No. sufficient for domestic needs	13	17	19	21	15	11	13	15	16	140
No. insufficient for domestic needs	17	33	11	22	17	9	11	6	6	132
No. sufficient for stock needs	15	22	19	28	18	14	12	16	17	161
No. insufficient for stock needs	15	28	11	15	14	6	12	5	5	111

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 Wheatlands No. 163, Saskatchewan

	LOCATION					Depth of Well, Ft.	Total dis'vd solids	HARDNESS			CONSTITUENTS AS ANALYSED						CONSTITUENTS AS CALCULATED IN ASSUMED COMBINATIONS								Source of Water
	Quarter	Sec.	Tp.	Rge.	Mer.			Total	Perm.	Temp.	Cl.	Alka-linity	CaO	MgO	SO_4	Na_2O	Solids	$CaCO_3$	$CaSO_4$	$MgCO_3$	$MgSO_4$	Na_2CO_3	Na_2SO_4	NaCl	
1	NE.	11	16	2	3	8	4,960	2,000	1,600	400	145	510	210	331	2,759	1,482	4,661	376		113	831		3,112	239	* 2
2	NW.	33	18	1	3	10	4,660	2,800	2,800	0	147	220	450	580	2,800	678	4,245		1,094		1,728	233	947	243	* 1

Water samples indicated thus, * 1, are from glacial drift.
Water samples indicated thus, * 2, are from bedrock, Ravenscrag formation.
Analyses are reported in parts per million.
Hardness is the soap hardness expressed as calcium carbonate ($CaCO_3$).
For interpretation of this table read the section on Analyses and Quality of Water.

Water from the Unconsolidated Deposits

The composition of water from the glacial drift varies widely with the difference in the nature of the sediments and the topographic conditions. In southern Saskatchewan the annual precipitation is small and evaporation in the summer is usually rapid. In the rural municipality of Wheatlands there is no through drainage except for a small area east of Mortlach which drains to Thunder creek. Under these conditions the soluble salts in the soil are not carried away in the waters of streams or rivers but accumulate in the isolated depressions which are especially numerous in the moraine type of glacial deposits, or else the salts are dissolved by the rainfall and the solutions accumulate in the beds of sand and gravel that are found irregularly distributed in the boulder clay which forms so large a proportion of the glacial drift. Most of the ground water in the glacial drift is hard and in most waters the hardness is chiefly due to the presence of calcium and magnesium sulphate in solution, and is not removed by boiling. In those parts of the glacial drift in which ground water circulation is comparatively rapid the ground water is only slightly mineralized. Aquifers that supply springs or aquifers in dune deposits, which are largely composed of coarse grains, yield very little soluble matter to percolating waters. Analysis No. 2 is that of a water that contains a large proportion of dissolved solids, and is extremely hard due to the presence of the sulphates of calcium and magnesium. This water will not be softened by boiling. The water is laxative due to the sulphates of sodium and magnesium, and is probably slightly bitter due to the large proportion of magnesium sulphate. Sodium chloride forms only a little over 5 per cent of the total dissolved solids. The water is not fit for human use, and its continuous use by cattle is not recommended.

Water from the Bedrock

Analysis No. 1 represents water from a well in the Ravenscrag formation. The well is very shallow, however, and it seems probable that the water is largely derived from the glacial drift. This water is extremely hard, but not as hard as that represented by analysis No. 2. A part of the hardness is due to the carbonates of calcium and magnesium and is removable by boiling. The water contains a very large proportion of sodium sulphate and a considerable proportion of magnesium sulphate, and it is quite laxative. The proportion of sodium chloride is very low, being less than 5 per cent of the total solids. This water is not as bitter as that represented by analysis No. 2, but it is unfit for human use, and its continual use by stock would probably cause scouring.

Neither of the waters analysed are well adapted for irrigation as they both contain a large proportion of "white alkali", and water of analysis No. 2 contains a little "black alkali".

WELL RECORDS—Rural Municipality of WHEATLANDS, NO. 163, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
1	SE.	4	16	1	3	Bored	24	2,338	- 14	2,324	24	2,314	Glacial sand	Hard, "alkaline", iron, clear	42	S	Never been dry; used for stock.
2	SE.	17	"	"	"	Dug	4	2,250			4	2,246	Glacial sand	Soft, clear			Abundant supply even in dry season; used by neighbours.
3	NW.	22	"	"	"	Dug	24	2,080	- 11	2,069	24	2,056	Glacial sand	Clear, moderately "alkaline"		D, S	
4	NW.	22	"	"	"	Dug	26	2,150	- 16	2,134	26	2,124	Glacial sand	Soft, clear		D, S	Sufficient for house and 20 head stock.
5	SE.	23	"	"	"	Dug	28	2,200	- 10	2,190	28	2,172	Glacial drift	Very hard, some "alkali"		D, S	Insufficient supply.
6	NE.	23	"	"	"	Dug	16	2,090	- 8	2,082	16	2,074	Glacial sand	Hard, clear	42	D, S	Sufficient supply.
7	NE.	23	"	"	"	Bored	30	2,066	- 10	2,056	30	2,036	Glacial sand	Hard, clear	43	D, S	Insufficient supply.
8	SE.	24	"	"	"	Dug	12	2,150	- 6	2,144	12	2,138	Glacial sand	Hard, clear, "alkaline"		S	Unfit for human consumption.
9	SW.	24	"	"	"	Dug	30	2,180	- 28	2,152	30	2,150	Glacial sand	Hard, clear, slightly "alkaline"		D, S	Sufficient supply.
10	SE.	26	"	"	"	Dug	14	2,050	- 8	2,042	14	2,036	Glacial sand	Hard, clear		D, S	Sufficient supply.
11	NE.	26	"	"	"	Dug	20	2,048	0	2,048	20	2,028	Glacial clay	Hard, clear, slightly "alkaline"		D, S	Also 4 shallow seepage wells, and a dam.
12	NW.	28	"	"	"	Bored	55	2,025	- 20	2,005	55	1,970	Glacial clay	Hard, clear	58	D, S	Dry in dry seasons.
13	SE.	29	"	"	"	Dug	14	2,030	- 8	2,022	14	2,016	Glacial clay and sand	Soft	62	D, S	Sufficient for local needs, with dam.
14	SE.	30	"	"	"	Dug	20	2,040	- 14	2,026	20	2,020	Glacial gravel	Hard, clear	50	D, S	Large, sufficient supply.
15	SW.	30	"	"	"	Bored	30	2,050	- 10	2,040	30	2,020	Glacial sand	Hard, "alkaline"	50	S	Sufficient for stock; laxative; also 2nd shallow well.
16	NE.	31	"	"	"	Dug	18	2,020	- 4	2,016	18	2,002	Glacial quicksand	Hard, clear	48	D, S	Sufficient supply.
17	SE.	32	"	"	"	Bored	32	2,030	- 20	2,010	32	1,998	Glacial clay	Hard, iron	50	D, S	Not nearly sufficient; also a similar inadequate well; also a 140-foot dry hole. Haul water.
18	NE.	32	"	"	"	Bored	32	2,000			32	1,968	Glacial clay	Hard, clear, "alkaline"	49	S	Yields 1 barrel a day; insufficient; 2nd 32-foot well also inadequate.
19	SW.	34	"	"	"	Dug	14	2,024	- 10	2,014	14	2,010	Glacial drift	Hard, clear		S	Insufficient for stock.
20	SW.	34	"	"	"	Bored	30	2,024	- 20	2,004	30	1,994	Glacial sand	Hard, iron, "alkaline"		D	Sufficient only for household; slightly laxative.
21	NW.	34	"	"	"	Bored	30	2,018	- 10	2,008	30	1,988	Glacial sand	Hard, clear		D, S	Increased supply after cribbing gave way. Sufficient for 8 horses.
22	SE.	36	"	"	"	Dug	13	2,060	- 10	2,050	13	2,047	Glacial quicksand	Fairly soft	44	D, S	Insufficient supply.
23	NW.	36	"	"	"	Dug	10	2,009	- 2	2,007	10	1,999	Glacial drift	Soft	50		Small supply; infrequently used.
24	NE.	36	"	"	"	Bored	16	2,028	- 11	2,017	16	2,012	Glacial drift	Clear	42		Place deserted.

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 WHEATLANDS, NO. 163, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE: Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED: Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
1	SE.	1	16	2	3	Dug	10	2,315	- 6	2,309	10	2,305	Glacial drift	Hard, clear, "alkaline"	46	N	Insufficient and intermittent supply.
2	SW.	1	"	"	"	Dug	17	2,300	- 6	2,294	17	2,283	Glacial sand and clay	Hard, clear, lime	48	D, S	Insufficient supply; also similar well less adequate; 10 dry holes.
3	SW.	2	"	"	"	Bored	118	2,320			118	2,202	Glacial sand	Hard, "alkaline"		N	Unfit for use, hence filled in.
4	NE.	2	"	"	"	Dug	30	2,360	- 3	2,357	30	2,330	Glacial drift	Hard, clear	45	D, S	Insufficient supply; several dry holes up to 90 feet deep.
5	NW	4	"	"	"	Dug	16	2,330			16	2,314	Glacial clay and gravel	Hard, clear, "alkaline"		S	Ample supply; also 80-foot dry hole.
6	SE.	4	"	"	"		80										Dry hole.
7	SW.	5	"	"	"	Drilled	12	2,350	- 10	2,340	12	2,338	Glacial drift	Hard		D	Insufficient; reserved for household.
8	SE.	7	"	"	"	Dug	20	2,320	- 0	2,320			Glacial drift	Soft, cloudy	58	D, S	Insufficient, intermittent supply. Also 2 dry holes 80 feet deep.
9	SW.	7	"	"	"	Bored	25	2,350	- 0	2,350			Glacial drift	Hard, clear, "alkaline"	42	D, S	Insufficient, intermittent supply.
10	NE.	7	"	"	"	Dug	18	2,310	- 6	2,304	18	2,292	Glacial drift	Soft, clear	46	D, S	Sufficient supply; also a dry hole.
11	SE.	8	"	"	"	Dug	20	2,320	- 15	2,305	20	2,300	Glacial gravel	Clear		D, S	Insufficient supply; also 2 similar wells.
12	SW.	8	"	"	"	Bored	40	2,325	- 20	2,305	40	2,285	Glacial gravel	Clear	44	D, S	Sufficient supply; also another well 16 feet deep.
13	NE.	8	"	"	"	Bored	50	2,310	- 36	2,274	50	2,260	Glacial sand and gravel	Hard, clear	40	D, S	Ample supply; used by neighbours.
14	SW.	9	"	"	"	Dug	14	2,300	- 12	2,288	14	2,286	Glacial gravel	Soft, cloudy	48	D, S	Ample supply; used by neighbours.
15	SE.	10	"	"	"	Dug	12	2,250					Glacial drift	Clear, "alkaline"		D, S	Insufficient, intermittent supply; also 163-foot well filled in.
16	SW.	10	"	"	"	Bored	106	2,290	0	2,290	106	2,184	Glacial gravel	Hard, iron, "alkaline", sulphur	40	S	Sufficient supply. Slightly laxative water. Spring also used.
17	NE.	11	"	"	"	Dug	8	2,215	0	2,215	8	2,207	Whitemud or Ravenscrag	Hard, clear, "alkaline"	48	S	Encountered 2-inch coal seam; abundant supply for stock. #.
18	SE.	12	"	"	"	Dug	5	2,300	- 2	2,298	5	2,295	Glacial drift	Hard, clear, "alkaline"		D	Base in soapstone; insufficient supply; caved in but used for drinking.
19	SE.	12	"	"	"	Bored	100	2,325	- 50	2,275	100	2,225	Glacial drift?	Hard, iron, soda			Sufficient supply; also 24-foot dry hole.
20	NE.	12	"	"	"	Bored	101	2,250	-100	2,150	101	2,149	Glacial gravel	Clear, iron	48	D	Sufficient for house.
21	SE.	13	"	"	"	Bored	29	2,200	- 5	2,195	29	2,171	Glacial sandy clay	Hard, odour, "alkaline"	42	N	Insufficient, intermittent supply.
22	NW.	13	"	"	"	Bored	85	2,250	- 75	2,175	85	2,165	Glacial gravel	Hard, clear, "alkaline"	43	N	Insufficient, intermittent supply.
23	NW.	13	"	"	"	Bored	25	2,210	- 17	2,193	25	2,185	Glacial drift	Hard, clear, "alkaline"		D, S	Insufficient, intermittent supply.
24	NE.	13	"	"	"	Dug	10	2,100	- 7	2,093	10	2,090	Glacial gravel	Hard, "alkaline"	46	S	Insufficient supply.
25	NE.	14	"	"	"	Bored	65	2,300			65	2,235	Glacial sand	Hard, clear, iron	50	D, S	Insufficient, intermittent supply; also 20 dry holes to 250 feet deep.
26	NW.	15	"	"	"	Bored	72	2,275	- 35	2,240	72	2,203	Glacial drift	Hard, clear, iron, "alkaline"		N	Water hauled; well now filled in.

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 .....

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
27	NE.	15	16	2	3	Dug	22	2,280	- 18	2,262	22	2,258	Glacial drift	Hard, slightly "alkaline"		D	~~Used for drinking; insufficient, intermittent~~ supply; also 80-foot dry hole in SE.¼,sec.1
28	SE.	16	"	"	"	Bored	65	2,300	- 61	2,239	65	2,235	Glacial quicksand	Hard, cloudy, "alkaline"		S	Insufficient supply; water laxative. Water for house hauldd.
29	SW.	16	"	"	"	Dug	10	2,290	- 1	2,289	10	2,280	Glacial drift	Soft, "alkaline"	45	S	Sufficient for stock needs.
30	NW.	16	"	"	"	Bored	60	2,300	- 50	2,250	60	2,240	Glacial sand	Hard, clear, "alkaline"	50	S	Insufficient, intermittent supply.
31	NE.	16	"	"	"	Dug	16	2,250	- 12	2,238	16	2,234	Glacial gravel	Hard, clear		D, S	Sufficient supply; sometimes supplies neighbourhood; also 2 dry holes.
32	SE.	17	"	"	"	Drilled	50	2,300	- 30	2,270	50	2,250	Glacial drift	Hard, clear, "alkaline"	41	D, S	Abundant supply; also 100-foot dry hole.
33	NW.	18	"	"	"	Bored	38	2,300	- 20	2,280	38	2,262	Glacial sand and gravel	Hard, clear, iron, "alkaline"		D, S	Insufficient supply.
34	NE.	18	"	"	"	Bored	60	2,300	- 20	2,280	60	2,240	Glacial sand	Hard, clear, "alkaline"	41	S	Abundant supply for stock; drinking water obtained from 16-foot well.
35	SW.	19	"	"	"	Bored	56	2,300	- 46	2,254	60	2,240	Glacial drift	Hard, clear, iron, "alkaline"	42	S	Sufficient for stock; uses 20-foot seepage well for cooking.
36	NE.	19	"	"	"	Drilled	60	2,310	- 30	2,280	60	2,250	Glacial drift	Hard, clear	42	D, S	Insufficient supply; also dry holes.
37	SE.	20	"	"	"	Bored	85	2,310	- 40	2,270	85	2,225	Glacial drift	Hard, clear, iron, "alkaline"	41	D, S	Sufficient supply.
38	SE.	20	"	"	"	Bored	55	2,285	- 17	2,268	55	2,230	Glacial quicksand	Hard, clear, iron	42	D, S	Sufficient supply.
39	SW.	20	"	"	"	Bored	60	2,330	- 40	2,290	60	2,270	Glacial sand	Hard, clear, "alkaline"	42	S	Sufficient for stock; unfit for man. A 20-foot well for drinking.
40	SE.	22	"	"	"	Dug	14	2,245	- 8	2,237	14	2,231	Glacial gravel	Hard, clear	41	D, S	Also 27-foot dry hole.
41	NE.	23	"	"	"	Dug	30	2,250	- 12	2,238	30	2,220	Glacial gravel	Clear		D, S	Intermittent supply.
42	NE.	24	"	"	"	Bored	56	2,120	- 40	2,080	56	2,064	Glacial gravel	Cloudy, "alkaline"		S	Large supply suitable only for stock.
43	SE.	31	"	"	"	Dug	20	2,410	- 6	2,404	20	2,390	Glacial sand	Soft	42	D, S	Sufficient supply; used by neighbours.
44	NE.	35	"	"	"	Bored	90	2,100	- 26	2,074	90	2,010	Glacial sand	Iron, clear	45	S	Insufficient supply.
45	SW.	36	"	"	"	Bored	80	2,075	- 30	2,045	80	1,995	Glacial gravel	Hard, clear, "alkaline"		D, S	Sufficient supply; also 2 dry holes.
1	NE.	1	16	3	3	Dug	14	2,335	- 10	2,325	14	2,321	Glacial clayey sand	Fairly soft	50	D, S	Sufficient for local needs.
2	NE.	2	"	"	"	Dug	20	2,345	- 12	2,333	12	2,333	Glacial drift	Soft, clear	45	S	Also 5 dry holes about 40 feet deep.
3	NE.	2	"	"	"	Dug	12	2,345	- 6	2,339	12	2,333	Glacial sand	Soft, clear			Insufficient supply.
4	SW.	2	"	"	"	Bored	28	2,370	- 24	2,346	28	2,342	Glacial sandy silt and gravel	Hard, clear, slightly "alkaline"	42	D, S	Sufficient supply.
5	NE.	2	"	"	"	Bored	26	2,340	- 10	2,330	26	2,314	Glacial sand	Hard, clear, bitter	42	D, S	Sufficient supply.
6	SE.	3	"	"	"	Dug	14	2,300	- 5	2,355	14	2,346	Glacial gravel	Soft, cloudy		D, S	Sufficient supply; seepage well.

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 WHEATLAND, NO. 163, 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
7	NE.	3	16	3	3	Dug	13	2,350	- 6	2,344	13	2,337	Glacial sand	Hard, clear		D, S	Sufficient supply; also 2nd well with small supply and 5 dry holes.
8	NE.	4	"	"	"	Dug	16	2,340	- 12	2,328	16	2,324	Glacial gravel	Hard, clear		D, S	Sufficient supply; a few dry holes.
9	NW.	9	"	"	"	Bored	93	2,330									Dry hole; base in glacial blue clay. Also 30-foot wells close by sloughs which go dry in drought seasons.
10	NE.	9	"	"	"	Dug	16	2,320	- 12	2,308	16	2,304	Glacial drift	Hard, slightly "alkaline"	45	D, S	Insufficient, intermittent supply.
11	NW.	10	"	"	"	Bored	30	2,330	- 8	2,322	30	2,300	Glacial gravel	Hard, clear		D, S	Sufficient supply.
12	NE.	10	"	"	"	Bored	30	2,320	- 8	2,312	30	2,290	Glacial gravel	Hard, clear		D, S	Also 36-foot dry hole. Springs also used.
13	SE.	12	"	"	"	Dug	17	2,330	- 15	2,315	17	2,213	Glacial drift	Hard, clear, "alkaline"	45	D, S	Insufficient, intermittent supply. Also 80-foot dry hole.
14	NE.	12	"	"	"	Dug	15	2,315	- 2	2,313			Glacial drift	Hard, "alkaline"			Intermittent supply; now dry.
15	NW.	13	"	"	"	Dug	9	2,310	- 3	2,307	9	2,301	Glacial gravel	Soft, clear	43	D, S	Large supply.
16	NE.	13	"	"	"	Bored	80	2,320									Dry hole; base in glacial red clay; also 30-foot dry hole.
17	SE.	14	"	"	"	Dug	13	2,320	- 5	2,315	13	2,307	Glacial gravel	Hard, clear	44	D, S	Sufficient supply. Springs near well.
18	SW.	14	"	"	"	Bored	30	2,320	- 8	2,312	30	2,290	Glacial gravel	Clear		D, S	Another seepage well 16 feet deep. Sufficien supply.
19	NE.	14	"	"	"	Dug	10	2,300	- 4	2,296	10	2,290	Glacial sand	Fairly soft, slightly "alkaline"		D, S	Sufficient supply.
20	SE.	15	"	"	"	Dug	8	2,310	- 5	2,305	8	2,302	Glacial sand	Hard, clear	41	D, S	Sufficient supply; also 2 shallow dry holes.
21	SW.	16	"	"	"	Dug	18	2,310	- 8	2,302	18	2,292	Glacial quicksand	Soft, clear	45	D, S	Sufficient supply.
22	SE.	17	"	"	"	Dug	17	2,320	- 12	2,308	17	2,303	Glacial drift	Hard		D, S	Sufficient supply.
23	NW.	17	"	"	"	Dug	9	2,300	- 4	2,296			Glacial drift	Hard, clear		D, S	Sufficient supply; several dry holes up to 25 feet deep.
24	SE.	19	"	"	"	Dug	20	2,300	- 18	2,282	20	2,280	Glacial drift	Hard, clear		D	Insufficient supply; very limited amount for stock.
25	SE.	20	"	"	"	Dug	14	2,320	- 6	2,314	14	2,306	Glacial drift	Hard, clear	50	D, S	Intermittent supply; also several wells with very small supply.
26	SE.	21	"	"	"			2,325								M	Good flowing-well; large supply.
27	SE.	22	"	"	"	Dug	8	2,310	- 4	2,306	8	2,302	Glacial sand	Hard, "alkaline"	44	D, S	Sufficient supply; a second shallow seepage well for drinking.
28	SW.	23	"	"	"			2,300									Good flowing well.
29	NW.	24	"	"	"	Dug	8	2,320	+ 3	2,323	8	2,312	Glacial gravel	Hard		D, S	Excellent supply; numerous springs in vicinity
1	SE.	2	17	1	3	Dug	12	1,995	- 10	1,985	12	1,983	Glacial sand	Hard, "alkaline"		D, S	Intermittent, insufficient supply.
2	NE.	2	"	"	"	Dug	11	1,990	- 6	1,984	11	1,979	Glacial sand		45	D, S	Intermittent supply.
3	SE.	3	"	"	"	Bored	172	1,985	- 30	1,955	172	1,813	Bearpaw sand	Salty, clear	43	S	Sufficient for stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WHEATLANDS, NO. 163, 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
4	NW.	3	17	1	3	Dug	15	1,975	- 4	1,971	15	1,960	Glacial sandy clay	Hard, clear	43	D, S	Insufficient supply.
5	SE.	4	"	"	"	Bored	400	1,990									Dry hole; base in bedrock.
6	NE.	4	"	"	"		450	1,985									Dry hole; base in bedrock; also 3 other dry holes, 130, 110, 80 feet, respectively.
7	NE.	5	"	"	"	Bored	240	1,985									Dry hole; base probably in Bearpaw shale.
8	NE.	5	"	"	"	Bored	50	2,000	- 8	1,992	50	1,950	Glacial drift	Hard, clear	42	D, S, I	Sufficient supply; also 60-foot dry hole.
9	SW.	5	"	"	"	Dug	11	1,985	- 6	1,979	11	1,974	Glacial sand and gravel	Stagnant taste, clear	45	D, S	Intermittent supply.
10	SE.	6	"	"	"	Dug	15	1,980	- 7	1,973	15	1,965	Glacial sand	Hard, clear, "alkaline"	41	S	Intermittent supply; also seepage near creek.
11	N½	6	"	"	"	Dug	21	1,995	- 6	1,989	21	1,974	Glacial drift	"Alkaline"	41		Sufficient for local needs.
12	SW.	6	"	"	"	Dug	12	1,965	- 5	1,960	12	1,953	Glacial drift	Hard, clear, "alkaline"	41	D, S	Small supply; also dry hole.
13	SW.	7	"	"	"	Dug	20	2,000	- 4	1,996	20	1,980	Glacial clay	Hard, clear	41	D, S	
14	NW.	7	"	"	"	Dug	24	1,955	- 20	1,935	24	1,931	Glacial gravelly yellow clay	Hard, clear, "alkaline"	45	S	Sufficient for cattle; two dry holes 30 feet and 60 feet deep.
15	NE.	8	"	"	"	Dug	12	1,985	- 9	1,976	12	1,973	Glacial sand	Hard, clear	41	D, S	Insufficient supply.
16	SW.	10	"	"	"	Dug	14	1,980	- 9	1,971	14	1,966	Glacial drift	Hard, clear	42	D, S	Insufficient, intermittent supply; also 2 dry holes.
17	NE.	10	"	"	"	Dug	14	1,995	- 12	1,983	14	1,981	Glacial gravel and quicksand	Hard, clear	42	D, S	Sufficient supply.
18	NE.	10	"	"	"	Dug	16	1,990	- 13	1,977	16	1,974	Glacial quick-sand	Hard	40	N	
19	NW.	10	"	"	"	Dug	20	1,985	- 16	1,969	20	1,965	Glacial quick-sand	Hard, clear	42	D, S	Sufficient for local needs.
20	SW.	12	"	"	"	Dug	14	1,980	- 9	1,971	14	1,966	Glacial sand	Sediment	42	N	In good condition but place deserted.
21	SE.	13	"	"	"	Dug	10	1,962									Dry hole; base in glacial sand.
22	NW.	15	"	"	"	Dug	12	1,980	- 9	1,971	12	1,968	Glacial drift	Soft, clear	42	D, S	Sufficient supply.
23	NE.	16	"	"	"	Dug	15	1,975	- 13	1,962	15	1,960	Glacial drift	Hard, clear	43	D, S	Sufficient supply.
24	SE.	17	"	"	"	Dug	21	1,985	- 18	1,967	21	1,964	Glacial drift	Hard, clear, "alkaline"	42	D	Insufficient, intermittent supply; a 2nd well more "alkaline"
25	SW.	18	"	"	"	Dug	10	1,975	- 5	1,970	10	1,965	Glacial quick-sand	Hard, iron, "alkaline"		S	Unfit for drinking; also 120-foot dry hole.
26	NE.	18	"	"	"	Dug	12	1,975	- 6	1,969	12	1,963	Glacial sand	Hard, clear	40	D, S	Sufficient supply.
27	NE.	19	"	"	"	Dug	16	1,985	- 13	1,972	16	1,969	Glacial sand	Hard, clear	45	D, S	Sufficient supply; also 2nd 8-foot well.
28	SW.	20	"	"	"	Dug	22	1,965	- 17	1,948	22	1,943	Glacial quick-sand	Hard, clear	42	D, S	Sufficient supply.
29	NE.	23	"	"	"	Dug	30	1,960	- 23	1,937	30	1,930	Glacial sand	Hard, clear	47	D, S	Sufficient supply.
30	NE.	23	"	"	"	Dug	13	1,955	- 5	1,950	13	1,942	Glacial sand	Hard	40	D, S	Sufficient supply. Also a 2nd similar well.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WHEATLANDS, NO. 163, 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
31	SW.	24	17	1	3	Dug	8	1,995	- 6	1,989	8	1,987	Glacial gravelly sand	Stagnant	47		Farm deserted.
32	SW.	25	"	"	"	Dug	20	1,990	- 18	1,972	20	1,970	Glacial sand	Hard, clear	43	D, S	Sufficient supply.
33	SW.	27	"	"	"	Dug	22	2,000	- 19	1,981	22	1,978	Glacial sand	Hard, clear	42	D, S, M	Sufficient supply; supplies town of Meyronne.
34	SW.	27	"	"	"	Dug	18	[illegible]	- 16	[illegible]	18	1,982	Glacial sand	Hard, cloudy, stagnant	46	D, S	
35	SW.	27	"	"	"	Bored	55	2,000	- 30	1,970	55	1,945	Glacial sand	Hard, clear		D, S, I	Sufficient supply.
36	NW.	27	"	"	"	Dug	17	1,980	- 9	1,971	17	1,963	Glacial quicksand	Hard, clear, "alkaline"	42	D, S	Sufficient supply.
37	SW.	28	"	"	"	Dug	30	2,000	- 27	1,973	30	1,970	Glacial clay	Hard, clear, "alkaline"	45	S	
38	SE.	30	"	"	"	Dug	14	1,965	- 12	1,953	14	1,951	Glacial quicksand	Hard, clear	41	D, S	Sufficient supply.
39	NW.	30	"	"	"	Dug	10	1,975	- 8	1,967	10	1,965	Glacial sandy clay	Dirty, stagnant	45		
40	SE.	31	"	"	"	Bored	29	2,020	- 10	2,010	29	1,991	Glacial gravel	Hard, clear	43	D, S	Very large supply.
41	SW.	34	"	"	"	Dug	32	1,975	- 20	1,955	32	1,943	Glacial sandy clay	Stagnant	42		
42	NE.	34	"	"	"	Dug	20	1,955	- 14	1,941	20	1,935	Glacial quicksand	Hard, clear	42	D, S	Sufficient supply; also another unused well.
43	NW.	35	"	"	"	Dug	26	1,970	- 22	1,948	26	1,944	Glacial quicksand	Hard, clear	42	D, S	
44	NE.	36	"	"	"	Dug	44	1,975	- 42	1,933	44	1,931	Glacial sand	Hard, stagnant			
1	SE.	1	17	2	3	Bored	60	2,020									3 dry holes; bases in glacial drift.
2	SW.	1	"	"	"	Dug	9	2,000	- 8	1,992	9	1,991	Glacial gravel and clay	Hard, clear	48	D, S	
3	SE.	3	"	"	"	Dug	14	2,200	- 5	2,195	14	2,186	Glacial drift	Stagnant	50		
4	NW.	5	"	"	"	Dug	14	2,440	- 11	2,429	14	2,426	Glacial drift	Soft, clear	42	D	Insufficient supply.
5	SE.	6	"	"	"	Bored	60	2,500	- 50	2,450	60	2,440	Glacial yellow clay	Hard, clear, "alkaline"	50	S	Supply has decreased.
6	SE.	7	"	"	"	Bored	48	2,400	- 20	2,380	48	2,352	Glacial drift	Hard, cloudy, "alkaline"	41	S	Sufficient for stock.
7	SE.	10	"	"	"	Dug	9	2,160	- 8	2,152	9	2,151	Glacial drift	Soft, clear	43	D	
8	NW.	11	"	"	"	Dug	16	2,050	- 2	2,048	16	2,034	Glacial sand	Hard, stagnant, "alkaline"	42	S	Insufficient supply.
9	NW.	12	"	"	"	Bored											4 dry holes 60-foot to 100-foot; bases in glacial drift.
10	NW.	13	"	"	"	Bored	53	2,000	- 43	1,957	53	1,947	Glacial drift		43	S	
11	NE.	14	"	"	"	Bored	70	2,000	- 50	1,950	70	1,930	Glacial sand	Hard, "alkaline"	43	S	Sufficient for stock.
12	SW.	14	"	"	"	Bored	41	2,050	- 36	2,014	41	2,009	Glacial gravel	Hard, iron, "alkaline"	44	D, S	Sufficient supply.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WHEATLANDS, NO. 163, 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.	15	17	2	3	Dug	38	2,150	0	2,150	38	2,112	Glacial sand	Hard, iron, cloudy	42	D, S	Sufficient supply; well flows if not used.
14	SW.	17	"	"	"	Dug	13	2,300	- 8	2,292	13	2,287	Glacial drift	Clear, soda	42	D, S	Another 12-foot well with 6 feet of good wat a 23-foot dry hole.
15	NW.	17	"	"	"	Dug	25	2,225	- 11	2,214	25	2,200	Glacial drift	Hard, clear, "alkaline"	42	D, S	
16	SW.	20	"	"	"	Bored	40	2,150	- 30	2,120	40	2,110	Glacial drift	Hard, clear, "alkaline"	42	S	Insufficient supply; dam with 14-foot water on this property.
17	NW.	20	"	"	"	Bored	42	2,100	- 39	2,061	42	2,058	Glacial gravel	Hard, clear, "alkaline"		S	Uses dam for stock.
18	NW.	22	"	"	"	Bored	30	2,020	- 14	2,006	30	1,990	Glacial sand	Hard, clear	42	N	Also 100-foot dry hole.
19	NW.	23	"	"	"	Dug	8	1,985					Glacial gravelly clay	Hard, clear, "alkaline"	41	D, S	Sufficient supply; a second 14-foot well, hard, "alkaline" water, small supply.
20	NE.	23	"	"	"	Bored	80	2,000	- 20	1,980	80	1,920	Glacial gravel	Hard, clear, iron, bitter	43	S	Abundant supply for stock.
21	SE.	24	"	"	"	Bored	85	2,000	- 70	1,930	85	1,915	Glacial drift	Hard, iron		S	Supplies 1 barrel a day; also 5 dry holes 20 to 100 feet in depth.
22	NE.	24	"	"	"	Dug	20	1,890	- 16	1,874	20	1,870	Glacial sand	Hard, clear		D, S	
23	SW.	25	"	"	"	Dug	45	2,000	- 22	1,978	45	1,955	Glacial quicksand	Hard, clear		D, S	Sufficient for household but not for stock.
24	SE.	26	"	"	"	Dug	25	2,000	- 22	1,978	25	1,975	Glacial gravel	Hard, clear		D, S	Sufficient for household but not for stock.
25	SE.	28	"	"	"	Bored	90	2,050	- 40	2,010	90	1,960	Glacial sand	Hard, clear		D, S	Sufficient supply.
26	NW.	28	"	"	"	Bored	60	2,020	- 30	1,990	60	1,960	Glacial gravel	Hard, clear, iron, soda	43	D, S	Sufficient supply; #.
27	SE.	29	"	"	"	Bored	75	2,025	- 22	2,003	75	1,950	Glacial drift	Hard, clear, "alkaline"	44	S	Insufficient supply.
28	SE.	29	"	"	"	Bored	60	2,055	- 25	2,030	60	1,995	Glacial gravel	Hard, clear, "alkaline"	42	S	Sufficient supply for cattle.
29	SE.	30	"	"	"	Bored	84	2,075	- 35	2,040	84	1,991	Glacial drift	Hard, clear, "alkaline"	42	S	Sufficient supply for cattle.
30	NW.	30	"	"	"	Dug	12	2,000			12	1,988	Glacial gravel	Hard, clear	41	D, S	Sufficient for local needs.
31	SW.	31	"	"	"	Dug	20	2,000	- 11	1,989	20	1,980	Glacial drift	Hard, clear		D, S, M	Supplies town of Parkbeg and railway.
32	NE.	32	"	"	"	Dug	15	2,000			15	1,985	Glacial sand	Hard, clear	43	D, S	Sufficient supply.
1	SE.	6	"	"	"	Dug	14	2,340	- 6	2,334	14	2,326	Glacial gravel	Hard, clear, iron	42	D, S	Also 22-foot dry hole.
2	NW.	7	"	"	"	Dug	18	2,350			18	2,332	Glacial sand	Hard, clear	43	D, S	Insufficient, intermittent supply.
3	SW.	8	"	"	"	Dug	22	2,410	- 15	2,395	22	2,388	Glacial sandy gravel	Hard, clear	42	D, S	Sufficient supply.
4	NW.	9	"	"	"	Dug	13	2,510	- 5	2,505	13	2,497	Glacial sandy and gravelly clay		41	D, S	Supplied neighbours until this year.
5	NE.	13	"	"	"	Dug	14	2,300	- 8	2,292	14	2,286	Glacial drift	Hard, clear	43	D, S	Insufficient, intermittent supply; also 80-foot dry hole.
6	NW.	13	"	"	"	Dug	20	2,290	- 11	2,279	20	2,270	Glacial sand	Hard, clear	41	D, S	Sufficient supply; also used by neighbours; also 7-foot well, good supply.

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WELL RECORDS—Rural Municipality of WHEATLANDS, NO. 163, 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
7	SE.	14	17	3	3	Dug	6	2,340	- 2	2,338	6	2,334	Glacial drift	Clear		D, S	Sufficient supply; also used by neighbours. Also 30- and 25-foot wells.
8	SE.	15	"	"	"	Dug	12	2,540	- 3	2,537	12	2,528	Glacial gravel	Hard, clear, "alkaline"	42	D, S	Also a 2nd 4-foot well.
9	SE.	24	"	"	"	Bored	85	2,240	- 65	2,175	85	2,155	Glacial drift	Hard	43	D, S	Intermittent supply.
10	NE.	24	"	"	"	Dug	59	2,110	- 56	2,054	59	2,051	Glacial quick-sand	Hard, clear, "alkaline"	42	S	Sufficient for stock; also 40-foot domestic well.
11	SE.	33	"	"	"	Dug	14	2,040	- 9	2,031	14	2,026	Glacial quick-sand	Hard, clear, "alkaline"	42	D, S	Sufficient supply.
12	NE.	33	"	"	"	Dug	13	2,000	- 11	1,989	13	1,987	Glacial sand	Hard, clear, "alkaline"	42	D, S	Not very large supply.
13	SW.	35	"	"	"	Dug	3	1,980			3	1,977	Glacial quick-sand	Hard, clear, "alkaline"		D, S	Sufficient supply.
14	NW.	36	"	"	"		45	2,000			45	1,955	Glacial gravel-ly clay	Soft, clear	43	D, S	Sufficient supply; a 2nd 5-foot well.
1	NW.	1	18	1	3	Bored	27	1,960	- 12	1,948	27	1,933	Glacial drift	Hard, clear	42	D, S	
2	SW.	2	"	"	"	Dug	12	1,955			12	1,943	Glacial drift	Hard, clear, "alkaline"	42	D, S	Sufficient supply.
3	SW.	3	"	"	"	Dug	21	1,950	- 15	1,935	21	1,929	Glacial sandy clay	Stagnant	43		Farm deserted.
4	SW.	4	"	"	"	Dug	12	1,960			12	1,948	Glacial drift	Hard, clear, "alkaline"			
5	SE.	5	"	"	"	Dug	13	1,975	- 4	1,971	13	1,962	Glacial yellow clay	Hard, clear	41		Also a 90-foot dry hole.
6	SW.	5	"	"	"	Dug	22	1,980	- 12	1,968	22	1,958	Glacial drift	Hard, clear, "alkaline"	40	D, S	Sufficient supply.
7	SE.	6	"	"	"	Bored	36	1,990	- 10	1,980	36	1,954	Glacial sand	Hard,	40		
8	SW.	7	"	"	"	Dug	20	1,980	- 16	1,964	20	1,960	Glacial quick-sand	Fairly hard	42	D, S	Ample supply.
9	NE.	10	"	"	"	Dug	14	1,925	- 7	1,918	14	1,911	Glacial sand	Hard, clear	43	D, S	Sufficient supply.
10	NW.	11	"	"	"	Dug	7	1,925	- 5	1,920	7	1,918	Glacial sand	Hard, stag-nant	44	S	
11	SE.	12	"	"	"	Dug	17	1,970	- 8	1,962	17	1,953	Glacial drift	Fairly soft	41	D	Insufficient; will not supply stock.
12	NE.	16	"	"	"	Dug	13	1,950	- 7	1,943	13	1,937	Glacial drift	Hard, clear, "alkaline"	44	S	
13	SE.	18	"	"	"	Bored	40	1,990			40	1,950	Glacial sand	Hard, clear	44	D, S	Sufficient supply.
14	SW.	18	"	"	"	Dug	22	1,990	- 20	1,970	22	1,968	Glacial sand	Hard, clear	42	D	
15	SW.	19	"	"	"	Dug	9	1,960	- 6	1,954	9	1,951	Glacial drift	Stagnant	43		
16	NE.	20	"	"	"	Dug	18	1,940	- 16	1,924	18	1,922	Glacial sand and clay	Hard, clear, "alkaline"	42	D, S	Insufficient supply.
17	SW.	21	"	"	"	Dug	12	1,950	- 8	1,922	12	1,938	Glacial sand and clay	Hard, clear	44	D, S	Insufficient supply.
18	SE.	21	"	"	"	Dug	17	1,900	- 13	1,887	17	1,883	Glacial sand and clay	Hard, clear, "alkaline"	43	D, S	Sufficient supply.
19	NW.	29	"	"	"	Dug	13	1,960	- 8	1,952	13	1,947	Glacial drift	Hard, clear	42	S	Insufficient 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 WHEATLANDS, NO. 163, 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	NE.	30	18	1	3	Dug	16	1,960	- 11	1,949	16	1,944	Glacial quick-sand	Hard, clear	42	D	Sufficient for household.
21	SE.	33	"	"	"	Dug	13	1,900	- 9	1,891	13	1,887	Glacial sand	Hard, clear, "alkaline"	42	D, S	Also a 13-foot dry hole.
22	NW.	33	"	"	"	Dug	10	1,910	- 8	1,902	10	1,900	Glacial sand and clay	Very hard, "alkaline"	42	S	#.
23	SW.	34	"	"	"	Dug	22	1,900	- 15	1,885	22	1,878	Glacial sand	Hard, clear	42	D	Sufficient for household.
24	NW.	34	"	"	"	Dug	22	1,860	- 15	1,845	22	1,838	Glacial drift	Hard, clear, "alkaline"	41	S	Insufficient supply.
1	NE.	1	18	2	3	Dug	14	1,960	- 12	1,948	14	1,946	Glacial clay	Hard, clear	41	D, S	Insufficient supply.
2	SW.	2	"	"	"	Dug	20	2,000	- 18	1,982	20	1,980	Glacial drift	Hard, clear	42	D, S	Sufficient supply.
3	SW.	6	"	"	"	Dug	9	1,980	- 6	1,974	9	1,971	Glacial drift	Hard, clear, "alkaline"	42	D, S	Sufficient supply.
4	NW.	6	"	"	"	Dug	42	2,000	- 20	1,980	42	1,958	Glacial sand	Hard, iron, clear	42	D, S	Sufficient supply.
5	SE.	7	"	"	"	Bored	72	1,975	- 38	1,937	72	1,903	Glacial gravel	Stagnant	42	N	Also 11-foot well, 3 feet of water, for household.
6	NW.	9	"	"	"	Dug	20	1,990	- 18	1,972	20	1,970	Glacial gravel	Hard, clear	43	D, S	Sufficient supply.
7	NW.	10	"	"	"	Dug	12	1,960	- 9	1,951	12	1,948	Glacial quick-sand	Hard, clear	44	D, S	Sufficient supply.
8	SE.	12	"	"	"	Dug	14	1,975	- 12	1,963	14	1,961	Glacial sand	Hard, clear		D	Insufficient supply; 10-foot well for stock; 13-foot well in house supplies drinking water only.
9	SE.	13	"	"	"	Dug	14	1,980	- 8	1,972	14	1,966	Glacial sand	Hard, clear	42	S	
10	SW.	14	"	"	"	Dug	15	1,910	- 10	1,900	15	1,895	Glacial sand	Hard, clear	43	D (?)	Elton school well.
11	NE.	17	"	"	"	Dug	16	1,980	- 14	1,966	16	1,964	Glacial drift	Hard, clear, "alkaline"	42	D, S	Sufficient supply.
12	SE.	18	"	"	"	Bored	135	2,025	- 54	1,971	135	1,890	Glacial sand and gravel	Hard, cloudy, "alkaline"	42	D, S	Sufficient supply.
13	NE.	22	"	"	"	Dug	12	1,960	- 8	1,952	12	1,948	Glacial sand and gravel	Hard, clear, "alkaline"	42	D, S	Sufficient supply.
14	NE.	23	"	"	"	Dug	28	1,940	- 22	1,918	28	1,912	Glacial sand and gravel	Hard, clear		D, S	Sufficient supply.
15	NW.	32	"	"	"	Bored	50	2,030	- 40	1,990	50	1,980	Glacial sand	Hard, clear	43	D, S	Sufficient supply.
16	SE.	32	"	"	"	Dug	22	2,040	- 20	2,020	22	2,018	Glacial sand	Hard, slightly "alkaline"	44	D, S	Sufficient supply.
17	NW.	33	"	"	"	Dug	15	2,010	- 10	2,000	15	1,995	Glacial sand and clay	Bad odour, clear			
18	SE.	34	"	"	"	Dug	35	1,950	- 34	1,916	35	1,915	Glacial sand	Hard, clear		D, S	Sufficient supply.
1	SE.	1	18	3	"	Dug	8	1,980			8	1,972	Glacial drift	Soft, clear	42	D, S	Sufficient supply.
2	SE.	2	"	"	"	Dug	16	1,985	- 14	1,971	16	1,969	Glacial quick-sand	Hard, clear	41	D, S	Sufficient supply.
3	SE.	2	"	"	"	Dug	13	1,990	- 11	1,979	13	1,977	Glacial sand	Hard, clear, "alkaline"	42	D, S	Insufficient supply.
4	NE.	3	"	"	"	Dug	14	1,970	- 8	1,962	14	1,956	Glacial sand	Hard, stagnant, "alkaline"	44	S	

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 WHEATLANDS, NO. 103, 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
5	NE.	9	18	3	3	Bored	13	2,080	- 8	2,072	13	2,067	Glacial sand	Soft	42	D, S	Sufficient supply; 2nd 80-foot well used for stock; foul odour.
6	SE.	10	"	"	"	Bored	60	1,990	- 49	1,941	60	1,930	Glacial sand	Hard, iron	43	D, S	Sufficient except at threshing time.
7	NE.	10	"	"	"		35	2,010			35	1,975	Glacial sand	Hard, clear	42	N	Used to give large supply.
8	SW.	10	"	"	"	Bored	90	2,025	- 60	1,965	90	1,935	Glacial drift	Hard, clear, iron	41	S	Sufficient for stock; also 50-foot well used for all purposes; water laxative.
9	SW.	12	"	"	"	Dug	40	2,010	- 20	1,990	40	1,970	Glacial gravel	Hard, clear	42	D, S	Sufficient supply.
10	NW.	13	"	"	"	Dug	11	2,035	- 10	2,025	11	2,024	Glacial quick-sand	Hard, clear	42	D, S	Sufficient supply.
11	NE.	14	"	"	"	Dug	30	2,040	- 29	2,011	30	2,010	Glacial sand	Hard, clear, "alkaline"	43	D, S	Not sufficient for stock.
12	SE.	14	"	"	"	Dug	16	1,985	- 11	1,974	16	1,969	Glacial gravel	Hard, clear	42	D, S	Sufficient supply.
13	SW.	14	"	"	"	Dug	37	2,005	- 33	1,972	37	1,968	Glacial gravel	Hard, clear	42	D, S	Sufficient supply.
14	SW.	23	"	"	"	Dug	18	2,000	- 17	1,983	18	1,982	Glacial drift5	Hard, clear	43	D, S	Small supply.
15	SE.	24	"	"	"	Bored	70	2,055	- 58	1,997	70	1,985	Glacial quick-sand	Hard, clear	44	N	Water hauled for household.
16	SW.	25	"	"	"	Bored	90	2,050	- 60	1,990	90	1,960	Glacial gravel	Hard, clear, iron	43	D, S	Sufficient supply.
17	SE.	28	"	"	"	Bored	40	2,075	- 3	2,072	40	2,035	Glacial aand	Hard, iron		S	Intermittent supply, dark brown colour, unfit for use; hauls water.
18	SW.	33	"	"	"	Dug	24	2,075	- 22	2,053	24	2,051	Glacial gravel and blue clay	Hard, clear	42	D	Sufficient for household; also 15-foot and 80-foot dry holes; dam for stock.
19	NE.	33	"	"	"	Dug	38	2,025	- 36	1,989	38	1,987	Glacial gravelly clay	Hard, clear		D, S	Sufficient supply.
20	NE.	34	"	"	"	Dug	6	2,000	- 4	1,996	6	1,994	Glacial clay and gravel	Hard, clear	44	D, S	Sufficient supply.

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(#) Sample taken for analysis.