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GEOLOGICAL SURVEY OF CANADA

WATER SUPPLY PAPER No. 324

GROUND-WATER RESOURCES OF TOWNSHIPS 1 to 6, RANGES 6 to 9, WEST OF PRINCIPAL MERIDIAN, MANITOBA

(Manitou Area)

By

E. C. Halstead

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Illustration

Townships 1 to 6, ranges 6 to 9, west
Principal meridian, Manitoba:

Figure 1. Geological Map.

2. Map showing topography, location of wells, and source of water.

PART I

INTRODUCTION

The present report is an attempt to assemble the data on ground-water resources in a form that will be useful to well drillers, farmers, municipal authorities, and others interested in obtaining adequate water supplies.

Publication of Results

The essential information pertaining to ground-water conditions is being issued in reports that, in Manitoba, cover a square block of sixteen townships lying between the correction lines and beginning at the Saskatchewan boundary. The reports on the most southerly strip of the province include in addition the two townships lying north of the International Boundary. The secretary-treasurer of each municipality will be supplied with the information covering that municipality, and copies of the reports will also be available for study at offices of the Provincial and Federal Departments. Further assistance in interpreting the reports may be obtained by applying to the Chief Geologist, Geological Survey of Canada, Ottawa.

How to Use the Report

Anyone desiring information concerning ground-water in any particular locality will find the available data listed in the well records, and other pertinent information on the maps of the area. For those unfamiliar with these reports it is, perhaps, advisable that that part dealing with the area as a whole be read first, so as to be in a better position to understand the more particular descriptions of each township that follow. Also, the map accompanying the report should prove a useful source of reference when reading the text.

The map consists of two figures. Figure I shows bedrock and surface geology. The water-bearing properties of the bedrock change from formation to formation, and are referred to in subsequent pages. The type of glacial deposit at the surface may be determined from the map, and its possibilities as an aquifer are also discussed in this report.

Figure 2 shows the location and types of wells in the area, the land relief (topography), and the drainage pattern. Not every well is plotted on the map, but most of those giving pertinent information are shown, and probably include 90 per cent of the wells in the area. Where ground water is not readily available, or carries too much dissolved salts to be used, dugouts often form the only means of supply. The topography is shown by contours, or lines of equal elevation, spaced at vertical intervals of 50 feet.

The well records are compiled from data obtained by interviewing farmers, and in many cases their accuracy depends upon the farmer's memory. Wherever possible data were checked by plumb-line measurement to the nearest foot. The wells are tabulated by townships and sections, and the total depth of the well, depths to the water level at high and low stages, and, where possible, the depth at which the water-bearing horizon occurs, are all listed. The general character of the water is stated, and the use to which it can be put. Wells from which samples were taken for analysis are indicated on the well-record sheets. An idea of how much water a well can be expected to yield is suggested by the number of stock (cattle and horses only) that can be watered at it. One head is assumed to consume between 8 and 10 gallons of water a day. Unless ~~followed by the word "only"~~

the figure for the number of stock watered is not necessarily the maximum yield of the well, but simply the greatest amount that the present user has required. The word "only" indicates that the figure given is the maximum yield of the well. To obtain the position of an aquifer at any given point, the elevation of the point should be determined from the contours on Figure 2 of the map. Elevations of adjacent wells may be found in the well records and the depth to the aquifer can usually be determined from them. By comparing elevations the depth of the aquifer below the unknown point may be estimated. This method is particularly applicable to bedrock wells, but may not be successful where information is too limited, or where the glacial drift is thick and of an irregular character. In such instances a person searching for water should refer to the text for information on the nature of the deposits in that area.

GLOSSARY OF TERMS USED

Alkaline. The term 'alkaline' or 'alkali' water has been applied rather loosely to waters having a peculiar and disagreeable taste, and commonly a laxative effect. The waters so described in the Prairie Provinces are those heavily charged with sulphates of magnesium and sodium (respectively Epsom salts and Glauber's salts) and are more correctly termed sulphate waters. Truly 'alkaline' waters owe that property to the presence of calcium carbonate and calcium bicarbonate. In this report an attempt to adhere to local terminology is made by referring to sulphate waters as 'alkali' in the well records, and the term 'alkaline' is avoided.

Alluvium. Deposits of clay, silt, sand, gravel, and other material in lake beds and in flood plains of modern streams. The term also includes the material in river terraces, which once formed part of the flood plain but are now above it.

Aquifer. A porous bed, lens, pocket, or deposit of material that transmits water in sufficient quantity to satisfy pumping wells and springs.

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.

Bentonite. and bentonitic clays have the property of swelling when water is added to them. They occur as white beds as much as 2 feet thick, but usually much thinner, and are probably formed by the weathering of volcanic ash.

Buried pre-Glacial Stream Channel. A channel eroded into the surface of 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.

Coal Seam. The same as a coal bed. It is 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 ago.

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

Flood Plain. A flat part of a river valley ordinarily above water but submerged when the river is in flood. It is an area where silt and clay are being deposited.

Glacial Drift. A general term that includes all the loose, unconsolidated materials that were deposited by the ice-sheet, or by the waters associated with it. Clay containing boulders usually forms a large part of the glacial drift in an area, and is called glacial till or boulder clay, and is not to be confused with the more general term glacial drift, which occurs in the following several forms:

(1) Terminal Moraine or Moraine. A ridge or series of ridges formed by glacial drift that was laid down at the margin of a moving ice-sheet. The surface is characterized by irregular hills and undrained basins.

(2) Kame Moraine. Assorted deposits of sand and gravel laid down at or close to the ice margin. The topography is similar to that of a terminal moraine.

(3) Ground Moraine. Boulder clay (till) laid down at the base of an ice-sheet. The topography may vary from flat to gently rolling.

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

(5) Glacial-lake Deposits. Sand, silt, and clay deposited in glacial lakes during the retreat of the ice-sheet.

Shoreline. A discontinuous escarpment, with intervening gravel beaches and bars, which indicates the former margin of a glacial lake.

Ground Water. The water in the zone of saturation below the water-table.

Hydrostatic Pressure. The pressure that causes water in a well to rise above the point at which it was first encountered in the well, namely, at the level of the aquifer.

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

Pervious or Permeable. Beds are pervious or permeable when they permit the perceptible passage or movement of ground water, as in the case of sands and gravels.

Pre-Glacial Land Surface. The surface of the land as it existed before the ice-sheet covered it with drift.

Recent Deposits. Deposits that have been laid down by the agencies of water and wind since the disappearance of the continental ice-sheet; for example, alluvium in stream valleys.

Sand Point or Driven Well. A sand point is a piece of perforated and screened pipe 2 or 3 feet long, which ends in a sharp point. It is fastened to lengths of ordinary pipe and forced down into surface deposits of a sandy or gravelly nature. The depth of such a well rarely exceeds 30 feet.

Unconsolidated Deposits. The mantle or covering of alluvium, pre-glacial soils, and glacial drift consisting of loose, uncemented material that overlies the bedrock.

Variegated. Beds so described show different colours in alternating beds or lenses.

Water-table. The upper limit of the part of the ground saturated with water. This may be near the surface or many feet below it. A water-table is said to be perched when a zone of saturated material is separated from the main water-table below by a zone or zones of unsaturated material.

Water-worked Till. Glacial till or boulder clay that has been subjected to water action, usually near the margins of glacial lakes, so that the fine clay has been washed out and a deposit that may be composed mainly of sand and gravel is left behind.

Wells. The term refers to any hole sunk in the ground by any means for the purpose of obtaining water. If no water is obtained they are referred to as dry holes. Wells yielding water are divided into four classes:

(1) Flowing Artesian Wells. Wells in which the water is under sufficient hydrostatic pressure to flow above the surface of the ground at the well.

(2) Non-flowing Artesian (Sub-artesian) Wells. Wells in which the water is under sufficient hydrostatic pressure to raise it above the level of the aquifer, but not above the level of the ground at the well.

(3) Non-artesian Wells. Wells in which the water does not rise above the water-table or the aquifer.

(4) Intermittent Non-artesian Wells. Wells that are generally dry for a part of each year.

GENERAL DISCUSSION OF GROUND WATER

Almost all the water recovered from beneath the earth's surface for both domestic and industrial uses is meteoric water, that is, water derived from the atmosphere. Most of this water reaches the surface as rain or snow. Part of it is carried off by streams as run-off; part evaporates either directly from the surface and from the upper mantle of soil, or indirectly through transpiration of plants; and the remainder sinks into the ground to be added to the ground-water supplies.

The proportion of the total precipitation that sinks into the ground will depend largely upon the type of soil or surface rock, and on the topography; more water will sink into sand and gravel, for example, than into clay; if, on the other hand, the region is hilly and dissected by numerous streams, more water will be immediately drained from the surface than in a relatively flat area. Light, continued precipitation will furnish more water to the underground supply than brief torrential floods, during which the run-off may be nearly equal to the precipitation. Moisture falling on frozen ground will not usually find its way below the surface, and, therefore, will not materially replenish the ground-water supplies. Light rains falling during the growing season may be wholly absorbed by plants. The quantity of moisture lost through direct evaporation depends largely upon temperature, wind, and humidity. Locally these deposits may become very extensive. The water-bearing properties of alluvial deposits are variable, but, in general, such deposits form favourable aquifers. They are porous, and readily yield a part of their contained water, although in places their porosity may be greatly reduced by the presence of fine silt and clay. This type of deposit may be expected to yield moderate domestic supplies through shallow wells, and larger supplies if the deposits are extensive.

In some areas of relatively steep slopes, valleys have been partly filled with sand and gravel, which, in turn, have been covered with impervious clay and silt. These circumstances commonly give rise to artesian conditions in the lower part of the valley.

DISCUSSION OF WATER ANALYSES

Both the kind and quantity of mineral matter dissolved in a natural water depend upon the texture and chemical composition of the rocks with which the water has been in contact. Pollution is caused by contact with organic matter or its decomposition products. Analyses of well waters for mineral content are made by the Department of Health and Public Welfare, Winnipeg, and by the Bureau of Mines, Department of Mines and Resources, Ottawa.

As the ground-water survey of Manitoba progresses an effort is made to secure samples representative of each major aquifer encountered; the purpose of this is to compare the chemical characteristics of waters from the various geological horizons and, thereby, assist in making correlations of the strata in which the waters occur. The mineral content of natural waters is also of interest to the consumers, though the effects of the constituents are usually already apparent. The quantities of the various constituents for which tests are made are given as 'parts per million', which refers to the proportion by weight of each constituent in 1,000,000 parts of water. A salt when dissolved in water separates into two chemical units called 'radicals', and these are expressed as such in the chemical analyses. In one group are included the metallic elements of calcium (Ca), magnesium (Mg), sodium (Na), and iron (Fe), and in the other group are the sulphate (SO_4), chloride (Cl), bicarbonate (HCO_3), carbonate (CO_3), and nitrate (NO_3) radicals. The radicals listed in the analyses tabulated in the second part of this report can be combined to give the actual quantity of the particular salts present in the water, but this is not done here as the radicals alone give enough information to identify the water types. In fact, the sulphate, chloride, and carbonate radicals, plus the hardness, serve to identify a water, and crude field tests on the basis of these constituents were used in some areas to outline more completely zones of the various water types.

The following mineral constituents include all that are commonly found in natural waters in quantities sufficient to have any practical effect on the value of waters for ordinary uses:

Silica (SiO_2) is dissolved in small quantities from almost all rocks. It is not objectionable except in so far as it contributes to the formation of boiler scale.

Iron (Fe) in combination is dissolved from many rocks as well as from iron sulphide deposits with which the water comes in contact. It may also be dissolved from well casings, water pipes, and other fixtures in quantities large enough to be objectionable, but separates as the hydrated oxide upon exposure of the water to the atmosphere. Excessive iron in water causes straining on porcelain or enamelled ware, and renders the water unsuitable for laundry purposes. Water is usually considered not potable if the iron content is more than 0.5 part per million.

Calcium (Ca) in the water comes from mineral particles present in the surface deposits, the chief sources being limestone, gypsum, and dolomite. Fossil shells provide a source of calcium, as does also the decomposition of igneous rocks. The common compounds of calcium are calcium carbonate ($CaCO_3$) and calcium sulphate ($CaSO_4$), neither of which have injurious effects on the consumer, but both of which cause hardness.

Magnesium(Mg) is a common constituent of many igneous rocks and, therefore, very prevalent in ground water. Dolomite, a carbonate of calcium and magnesium, is also a source of the element. The sulphate of

magnesia ($MgSO_4$) combines with water to form 'Epsom salts,' and renders the water unwholesome if present in large amounts.

Sodium(Na) is derived from a number of the important rock-forming minerals, so that sodium sulphate and carbonate are very common in ground waters. Sodium sulphate (Na_2SO_4) combines with water to form 'Glauber's salt' and excessive amounts make the water unsuitable for drinking purposes. Sodium carbonate (Na_2CO_3) or 'black alkali' waters are mostly soft, the degree of softness depending upon the ratio of sodium carbonate to the calcium and magnesium salts. Waters containing sodium carbonate in excess of 200 parts per million are unsuitable for irrigation purposes[1]. Sodium sulphate is less harmful.

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[1]"The extreme limit of salts for irrigation is taken to be 70 parts per 100,000, but plants will not tolerate more than 10 to 20 parts per 100,000 of black alkali (alkaline carbonates and bicarbonates)". Frank Dixey, in 'A Practical Handbook of Water Supply', Thos. Murby & Co., 1931, p. 254.

Sulphates (SO_4) referred to in this report are those of calcium, magnesium, and sodium, and have been mentioned above in referring to these radicals. They are also formed by oxidation of iron sulphides, and, hence, it is not uncommon to find iron in sulphate waters. Sulphates cause permanent hardness in water, and injurious boiler scale. Sodium and magnesium sulphates are laxative when present in quantities of more than 900 parts per million. The writers found that acclimatized people could drink water containing as much as 2,000 parts per million of all three of the principal sulphates, but that when all were present in quantities over 1,500 parts per million the water was commonly laxative to those not accustomed to it.

Chloride (Cl) is a constituent of all natural waters and is dissolved in small quantities from rocks. Waters from wells that penetrate brine or salt deposits contain large quantities of chloride, usually as sodium chloride (common salt) and less commonly as calcium chloride and magnesium chloride. Sodium chloride is a characteristic constituent of sewage, and any locally abnormal quantity suggests pollution from this source. However, such abnormal quantities should not, in themselves, be taken as positive proof of pollution in view of the many sources from which chloride may be derived. Chlorides impart a salty taste to water if present much in excess of 500 parts per million. In southwestern Manitoba waters with as much as 3,000 parts per million of chloride are used domestically, though more than 1,500 parts per million is generally considered undesirable. The following figures apply to chlorides: stock will require less salt if the water bears 2,000 parts per million; more than 5,000 parts per million is unfit for human consumption; more than 8,000 parts per million is unfit for horses; more than 9,500 parts per million is too much for cattle; and more than 15,500 parts per million is excessive for sheep. Magnesium chloride, less common than sodium chloride, is very corrosive to metal plumbing.

Nitrates(NO_3) found in ground water are decomposition products of organic materials; they are not harmful in themselves, but they do point to probable pollution. It is recommended that a bacterial test be made on water showing an appreciable nitrate content, if it is to be used for domestic purposes.

Carbonates (CO_3) in water are indicated in the table of analyses as 'alkalinity'. Calcium and magnesium carbonate cause hardness in water, which may be partly removed by boiling. Sodium carbonate causes softness in waters, and is ~~referred to under 'Sodium' above.~~

Bicarbonates (HCO_3). Carbon dioxide dissolved in water renders the insoluble calcium and magnesium carbonates soluble as bicarbonates. The latter are decomposed by boiling the water, which changes them to insoluble carbonates.

Hardness is a condition imparted to waters chiefly by dissolved calcium and magnesium compounds. It here refers to the soap-destroying power of water, that is, to the amount of soap that must first be used to precipitate the above compounds before a lather is produced. The hardness of water in its original state is its total hardness, and is classified as 'permanent hardness' and 'temporary hardness'. Permanent hardness remains after the water has been boiled. It is caused by mineral salts that cannot be removed from solution by boiling, but it can be reduced by treating the water with natural softeners, such as ammonia or sodium carbonate, or with many manufactured softeners. Temporary hardness can be eliminated by boiling, and is due to the presence of bicarbonates of calcium and magnesium. Waters containing large quantities of sodium carbonate and small amounts of calcium and magnesium compounds are soft, but if the latter compounds are present in large quantities the water is hard. The following table[1] may

[1]Thresh, J.C., and Beale, J.F.: The Examination of Waters and Water Supplies; London, 1925, p. 21.

be used to indicate the degree of hardness of a water:

Total Hardness

Parts per million	Character
0-50	Very soft
50-100	Moderately soft
100-150	Slightly hard
150-200	Moderately hard
200-300	Hard
300 +	Very hard

The above table gives the generally accepted figures for hardness, but the people of southwestern Manitoba have become accustomed to harder waters, and the following table, based on about 800 field determinations of hardness, by the soap method, is more applicable:

Parts per million	Character
0-100	Very soft
100-150	Soft
150-250	Moderately hard
250-350	Hard
350-500	Very hard
500+	Excessively hard

Waters having a hardness of up to 300 parts per million are commonly used for laundry purposes. In southwestern Manitoba, hardness ranges from less than 50 parts per million to more than 2,500 parts per million.

PART II

TOWNSHIPS 1 TO 6, RANGES 6 TO 9, WEST PRINCIPAL MERIDIAN, MANITOBA

(Manitou Area)

Introduction

This is a preliminary report covering a study of the ground-water resources of tps. 1 to 6, rges. 6 to 9, W. Princ. mer. Well inventory work in the area was done in the field season of 1952. The account and map of the glacial geology were supplied by J. A. Elson.

Physical Features

The most conspicuous physiographic feature is the Manitoba escarpment, known as Pembina Mountains. This escarpment, formed by the more resistant beds of the Cretaceous shale, rises abruptly from the featureless plains of the former glacial Lake Agassiz basin to a drift-covered upland area.

A belt of end moraine, averaging 1½ to 2 miles in width, runs parallel with and west of the escarpment. Its hilly surface is wooded and dotted with undrained depressions. Elsewhere the surface is uneven to rolling and is the expression of the irregular bedrock surface mantled with a thin cover of overburden. A major feature of the upland area is Pembina Valley, which is steep sided and terraced. Pembina River, the small stream following the valley, is a remnant of an ancestral stream that carried melt waters from retreating glaciers.

East of the escarpment the surface irregularities were modified by the waters of the former glacial lake and the deposition of silts and clays. A featureless plain sloping east, and inconspicuous beach ridges, were left after the Lake drained.

Geology

Table of Formations

Age	Formation	Character	Thickness (feet)
Recent	Alluvium	Stream-laid mud, silt, sand, and gravel	
Pleistocene	Glacial drift	Till, clay, boulders; assorted sand and gravel in outwash plains and eskers	0-100
Upper Cretaceous	Riding Mountain	Upper beds of medium to light grey, hard, siliceous shale (Odanah shale), with some thin layers of fine, blue sand and bentonite beds; lower beds of slippery clay shale that tend to slump	500 ±
	Vermilion River	Dark grey and black shale, comprising three members: Pembina (dark shale; numerous bentonite bands near base);	80 ±
		Boyne (grey, calcareous shale; non-calcareous dark shale near base);	140 ±
		Morden (calcareous speckled shale overlying dark grey, non-calcareous, blocky shale with thin partings of white sand	190 ±

Upper Cretaceous shales of the Riding Mountain formation underlie the upland area west of the Manitoba escarpment. Although considered to be about 1,000 feet thick, only the lower 300 feet or so of these flat lying beds are present in this area. As seen in outcrops south of Manitou and along creeks tributary to Pembina River, it consists of hard, siliceous grey shale with a slight greenish cast when dry. Commonly, softer bentonitic shale is interbedded with the hard shale and the lower 50 feet or less comprises soft, somewhat waxy, greenish-grey bentonitic shale that tends to slump. These lower beds are the Millwood beds of Tovell.[1]

Sections of the underlying Vermilion River formation are exposed in the valley of Pembina River and in valleys that cut into the Manitoba escarpment. Pembina, Boyne and Morden beds comprise the Vermilion River formation but owing to the fact that the lower beds of the overlying Riding Mountain formation slump easily, the Pembina beds are not well exposed. The Morden beds consist mostly of dark grey, non-calcareous shale. The Boyne beds are mainly medium grey, calcareous, speckled shale with some non-calcareous dark grey shale. Both Morden and Boyne beds contain little bentonite whereas bentonite is characteristic of the uppermost or Pembina beds.

For further information on the bedrock geology including formations older than the Vermilion River, the reader is referred to the report by Wickenden.[2]

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1. Tovell, W. M. : Geology of the Pembina Valley - Deadhorse Creek Area; Preliminary Report 47-7; Province of Manitoba Department of Mines and Natural Resources, Mines Branch, 1951.

2. Wickenden, R. T. D. : Mesozoic Stratigraphy of the Eastern Plains, Manitoba and Saskatchewan; Geol. Surv. Canada, Mem. 239, 1945.

The Manitou area contains two principal types of surface deposits: (1) deposits of glacial Lake Agassiz northeast of the Manitoba escarpment (Pembina Mountains); and (2) deposits of glacial origin on the upland southwest of the Manitoba escarpment. Pembina Valley, which trends sinuously across the south part of the upland from La Riviere to the south half of tp. 1, rge. 6, contains alluvial deposits on several terraces.

The upland occupies over three-quarters of the Manitou area and there the principal deposit is ground moraine forming a layer of sandy-silty till from less than 1 inch to about 40 feet thick. The till overlies the hard siliceous Odanah shale that forms the cores of most hills; the till is thin or absent on some hill-tops. There are several eskers in the ground-moraine area; most of them are low features composed of shaly pebble gravel and poorly sorted sand. A few of them provide satisfactory road metal and all are prospects for supplies of potable ground-water. A belt of end moraine, a broad hummocky ridge of sandy till, extends south from tp. 6, rge. 8, through the central part of the map-area to tp. 2, rge, 7 and thence southeast to the southeast corner of the map-area. This end moraine marks the farthest advance of a lobe of ice from the north and northeast; west of it and underneath it the till is older and was deposited by ice moving from the northwest. The end moraine in tp. 1, rges. 6 and 7, is a different type from that of the long belt just described, and consists of a series of northeast trending ridges with a relief ranging between 8 and 20 feet. These ridges represent a series of small end moraines composed of sandy till. Outwash deposits bordering the long belt of end moraine are located in tp. 1, rge. 6, west of Darlingford, and in the vicinity of Cardinal and Notre Dame de Lourdes. In the last location the outwash contains a large amount of shale gravel but in the south it is composed of silt and clay with only small amounts of sand and gravel. About half-way between Darlingford and Altamont the deposits

of a small lake formed when the ice blocked an eastward flowing drainage system cover the glacial deposits. Next to the moraine the lake deposits are sand but away from the moraine to the west clay and silt predominate. A shallow lake occupied this basin until recently. On the west side of the map-area, in tps. 1 to 4, rge. 9, some areas of clayey silt may be of eolian or outwash origin. This silt is from 1 foot to 5 feet thick and overlies ground moraine.

Pembina Valley contains three distinct types of alluvium, two of which form terraces near the top of the sides of the valley and the third forms the lowest terraces and the flood plain. It has not been possible to show separately the two higher alluvia on a small-scale map. The lower of the two high alluvia forms paired terraces that are well developed on both sides of the valley at heights ranging from 30 to 120 feet above the present river level; these terraces are best developed in and downstream from tp. 1, rge. 8. This alluvium is poorly sorted, sandy, shale-pebble gravel and is 60 or more feet thick. It was deposited during a rise in the level of early glacial Lake Agassiz. The highest alluvium is found on broad terraces in the wide parts of the valley in and downstream from tp. 2, rge. 9. It consists of pebble and cobble gravel that is predominantly shale and should be a good aquifer. This coarse alluvium may be of outwash origin. The lowest alluvium, forming the flood plain of the river, is a poorly sorted sandy silt with local lenses and pockets of sand and gravel.

The northeast corner of the map-area is underlain by lake deposits of medium to fine sand and silt. These deposits increase in thickness eastward from the Manitoba escarpment and are from 50 to 100 feet thick near Graysville. South of township 5 most of the lake deposits below an altitude of 1,050 feet are silt. About 40 per cent of the lake deposits just east of the Manitoba escarpment are buried under a layer of alluvium in the form of alluvial fans built from streams that undergo an abrupt change from a steep to a gentle gradient in

crossing from the escarpment to the plain. The alluvium is sandy-silty clay and at most localities the lake sands or silts are only a few feet below the surface. Alluvium also covers large parts of the wave-cut terraces. These deposits of water-worked drift, mostly a lag concentrate of boulders, overlie till or bedrock over small areas. Areas of bedrock without the veneers of boulders also are included as water-worked drift. Locally the alluvium also covers beach bars. These are ridges of medium to coarse sand and fine gravel up to 300 feet wide and 6 feet high. At an altitude of about 1,050 feet along the base of the scarp extending from Miami to Rosedale one bar is from 15 to 20 feet thick and locally contains good road metal. East of Thornhill beach bars are numerous but only a few were mapped. Though generally thin, some bars are good aquifers and many are sources of road metal.

Water Supply

Aquifers within the Riding Mountain formation offer the best possibilities for the development of ground water in the upland area west of the Manitoba escarpment. Sufficient precipitation as rain or snow-melt penetrates the overburden to recharge with potable water all aquifers within the top 100 feet of the bedrock. This water can be obtained from inexpensive dug wells in those areas where the thickness of overburden is 20 feet or less. Elsewhere bored or drilled wells to bedrock aquifers will yield sufficient water for farm and domestic needs.

Dug wells that penetrate one or more lenses of sand or gravel within the overburden in the upland area will yield at least 10 to 15 gallons of water per minute. A well dug in till without penetrating sand or gravel must be from 4 to 6 feet in diamenter to provide enough wall area for infiltration and storage space for the water between periods of pumping.

Outwash deposits associated with the belt of end moraine extending from Notre Dame de Lourdes to the International Boundary through Darlingford

carry excellent aquifers. Sands deposited, as beaches and bars, that mark the shorelines of glacial Lake Agassiz are also excellent aquifers, from which water can be obtained by installing sandpoints or inexpensive dug wells.

The lake silts and clays east of the escarpment yield very little water. Here only the upper 25 feet or less are permeable; therefore, if no water enters a test hole above this depth, it is advisable to abandon the hole.

Township 1, Range 6. Pembina River crosses the southwest quarter of the township in a valley that is more than a mile wide and up to 300 feet deep. Elsewhere the surface is rolling to uneven with wooded areas.

The maximum thickness of the overburden is 30 feet and it consists of end moraine, outwash, minor ice-contact stratified deposits, and of coarse, alluvium in the valley bottom. Discontinuous lenses of sand and gravel within these deposits yield water. The yield is commonly sufficient for 20 head of stock and the water, although alkali, is potable.

If test holes fail to penetrate aquifers within the overburden, they should be continued into the bedrock for a supply of hard, potable water is usually encountered at the contact of the bedrock and the overburden or in the fractures of the Odanah beds just below the contact. A third aquifer is present at a greater depth in the Millwood beds that underlie the Odanah beds. This aquifer was encountered in two wells, one in SE. ¼ sec. 1, bored 46 feet, and the other in SW. ¼ sec. 3, bored 83 feet. A sample of water from the Millwood aquifer analysed by the Duro Pumps and Softeners Co. Ltd., London, Ontario, has a total hardness of 363 parts per million, of which 170 parts per million was sodium.

Township 1, Range 7. Pembina River in its broad, deep valley makes an arc in the northern part of the township. Elsewhere the surface is uneven to rolling and is dissected by intermittent streams. End moraine, in places more than 80 feet deep, mantles the bedrock. Other surficial deposits are of only minor importance.

Bored wells are common and reach depths of 60 to 180 feet. Discontinuous lenses of sand or gravel within the overburden are water-bearing. Where these lenses are not encountered, wells are bored into the bedrock.

The water is hard and commonly alkali. It is, however, used for both domestic and stock uses. In the southwest quarter of the township softer water is reported. The water was never found to have a pressure head of more than 15 feet in these wells measured.

Township 1, Range 8. Pembina River flows east through the central part of the township in a broad terraced valley that is, in places, more than 3 miles wide. Ground moraine, as much as 60 feet deep, mantles the bedrock in the township except on the terraces, which are covered with alluvium.

Wells are dug or bored an average of 40 feet. Lenses of sand or gravel on or within the ground moraine are common aquifers yielding hard, alkali water. A supply sufficient for 20 to 30 head of stock can be obtained from deeper wells that reach the fractured zones near the surface of the bedrock. At Mowbray wells are dug 15 to 30 feet into the overburden to supply domestic needs.

In NE.$\frac{1}{4}$ and SE.$\frac{1}{4}$ sec. 34, wells are drilled 130 and 125 feet deep respectively. Soft water that does not rise more than 90 feet from the surface of the ground was encountered. The quality of the water, the low hydrostatic pressure, and the elevation of the bottoms of the wells suggest that the aquifer encountered is in the Millwood beds of the Riding Mountain formation.

Township 1, Range 9. Pembina River crosses the northeast quarter of the township in a wide terraced valley. Ground moraine, 4 to more than 40 feet thick, mantles the bedrock except on the terraces that are covered with recent alluvium.

Wells penetrating the ground moraine reach lenses of sand or gravel that are water bearing and commonly yield alkali water. The supply is sufficient but limited as the lenses are discontinuous and the ground moraine has low permeability.

Bored wells 40 to 100 feet deep obtain a supply of relatively soft water from the contact of the overburden and bedrock or within the top 60 feet of the bedrock. The deepest wells are drilled in NE.$\frac{1}{4}$ sec. 3, SE.$\frac{1}{4}$ sec. 10, NE.$\frac{1}{4}$ sec. 14, and SW.$\frac{1}{4}$ sec. 19 to depths of 180, 230, 158, and 138 feet respectively. The water of the deeper wells is soft and the aquifer encountered may be the Millwood beds of the Riding Mountain formation.

At Snowflake, wells are dug 15 to 30 feet into the ground moraine. One well, 127 feet deep, drilled at the Snowflake Hotel penetrated 57 feet of till, 7 feet of boulders, and then shale to the bottom of the well where water entered and rose to a point 27 feet from the surface of the ground.

Township 2, Range 6. The rolling surface of the township is dissected by intermittent and branching Dead Horse Creek. The overburden consists of ground moraine that varies in thickness from 8 to 30 feet. Lake Agassiz covered the northeast quarter of the township and built up beach ridges of sand and gravel.

A sufficient supply of hard clear water is obtained from shallow wells dug into the overburden. Some wells, less than 10 feet, are entirely in beach deposits of Lake Agassiz. Two or more wells are common on each farm and where the supply is limited, especially in summer months, the practice is to dig additional wells or build dug-outs.

Township 2, Range 7. The surface of the township is rolling

to uneven and dissected by channels of intermittent creeks. The overburden varies in thickness from 15 to 100 feet and is not a good aquifer. Wells that are dug or bored less than 50 feet encounter lenses of sand or gravel that commonly yield hard, alkali water.

Wells 178 and 168 feet deep, in SE.$\frac{1}{4}$ sec. 14 and SW.$\frac{1}{4}$ sec. 23 respectively, reach a common aquifer. This yields soft water that is under sufficient hydrostatic pressure to rise to a point 20 feet from the surface of the ground. Soft water also was encountered in wells drilled 220 feet and 110 feet deep in SE.$\frac{1}{4}$ sec. 17 and SE.$\frac{1}{4}$ sec. 34, respectively, but the supply is limited to approximately 15 gallons a day.

In section 24 two wells were drilled; one, in SW.$\frac{1}{4}$, is 110 feet deep, the other, in SE.$\frac{1}{4}$, is 70 feet deep. Both wells obtain water from the upper fractured 10 feet of the bedrock. A third hole, drilled in NE.$\frac{1}{4}$ of the same section, reached bedrock at 45 feet and drilling operations continued to a depth of 290 feet before the hole was abandoned as dry.

Township 2, Range 8. The uneven surface is broken by linear hills in the west half of the township. The overburden varies in thickness from 8 feet on the tops of the hills to more than 50 feet in sections 17 and 22 where test holes drilled 54 and 89 feet, respectively, penetrated 50 feet of 'blue clay', probably ground moraine.

Where the overburden is less than 20 feet thick, wells are dug either to lenses of sand or gravel or to the upper fractured zones of the bedrock. The water, commonly hard and alkali, is usually sufficient for 25 to 30 head of stock.

In NE.$\frac{1}{4}$ sec. 13, sec. 18, SE.$\frac{1}{4}$ sec. 24, SW.$\frac{1}{4}$ sec. 30, and NW.$\frac{1}{4}$ sec. 35, wells are drilled 150, 99, 140, 100, and 85 feet respectively, to aquifers in the bedrock. Those in SW.$\frac{1}{4}$ sec. 18 and SW.$\frac{1}{4}$ sec. 30 yield soft water.

Township 2, Range 9. Pembina River flows south across the east half of the township in a valley that in places is more than 2 miles wide and 250 feet deep. Elsewhere the surface of the township is rolling to uneven.

Thin deposits of outwash silts mantle the ground moraine west of the river but are unimportant as sources of water. Ground moraine varies in thickness from 10 to 30 feet but its aquifers yield only limited supplies of water, More abundant supplies are obtained from the underlying bedrock. One such aquifer is common to sections 16, 17, 19, 20, 28, and 29. Wells in these sections, ranging in depth from 45 to 66 feet, yield a potable water sufficient for domestic and stock needs.

Springs localized at the contact of the Odanah and Millwood beds are present along the side of the west half of the valley.

Township 3, Range 6. Manitoba escarpment trends north-northwest to south-southeast across the central part of this township. Ground moraine mantles the bedrock west of the escarpment, modified drift and lake deposits occur along its flanks, and lake and alluvial silts occur below it. The modified drift represents till that has been worked over by the glacial lake waters with the removal of the fines and consequent concentration of the boulders.

An abundant supply of water is commonly obtained from beach deposits and local pockets of gravel and sand deposited by waters of Lake Agassiz. Wells in these deposits are less than 15 feet deep and commonly supply abundant water, but many such aquifers freeze during winter months and hence may fail at that time.

Elsewhere wells are dug in the overburden and a supply is obtained that is commonly sufficient provided stock supply is augmented by surface waters collected in dugouts.

In SE.$\frac{1}{4}$ sec. 34 two dugouts were made to collect surface runoff for a stock supply when dug test holes failed to reach an aquifer. Salty water was encountered in a well 300 feet deep in SE.$\frac{1}{4}$ sec. 24. In SW.$\frac{1}{4}$ sec. 18, a well 92 feet deep penetrated 'blue clay' to an aquifer at that depth, which yields sufficient water for 60 head of stock.

Township 3, Range 7. Except for some outwash sand and silt

in the southwest corner of the township, the bedrock is mantled by ground moraine and a broken ridge of end moraine trending north-south through the town of Darlingford.

There is a good supply of ground water in this township but it is generally unsuited for domestic purposes. The chief aquifers are reached by dug or bored wells 15 to 50 feet deep. Ground water percolating through the overburden dissolves alkali salts that give the water a disagreeable taste. Shallow wells along the intermittent stream channels commonly yield potable water.

Drilled wells vary in depth from 45 to 148 feet. In NE.$\frac{1}{4}$ sec. 14 and NE.$\frac{1}{4}$ sec. 17 wells drilled 52 and 45 feet deep, respectively, reached a water-bearing gravel in which the water was under sufficient pressure to rise to a point 14 feet from the surface of the ground. Water was also encountered in sand at a depth of 115 feet in a well drilled 138 feet deep in NW.$\frac{1}{4}$ sec. 18. In NW.$\frac{1}{4}$ sec. 17 a well drilled 72 feet reached a water-bearing zone of boulders at a depth of 60 feet. Other drilled wells reach aquifers in the bedrock at depths of 117 to 138 feet.

Township 3, Range 8. The surface of the township is rolling to uneven. Ground moraine averaging 3 to 25 feet in thickness mantles the bedrock. It is overlain in a few areas in the south half of the township by outwash silts.

A supply of hard to moderately soft water is obtained from aquifers in the upper fractured zones of the bedrock. These aquifers are generally reached within feet of the surface. Two or more wells are common on each farm. Drilled wells are found in sections 1, 2, 3, and 15, which reach aquifers at depths of 80, 65, 120, and 90 feet respectively.

Township 3, Range 9. Pembina River crosses the southeast quarter of the township in a broad valley approximately 230 feet deep. Ground moraine 4 to 35 feet thick overlies the bedrock. This is in part overlain by outwash gravels and silts.

Wells 20 to 45 feet deep reach aquifers in the bedrock that yield potable ground water of sufficient quantity on most farms to supply 50 or more head of stock.

Drilled wells are not common. In SE.$\frac{1}{4}$ sec. 6, a well drilled 187 feet reaches an aquifer in which soft alkaline water is under sufficient pressure to rise to a point 12 feet from the surface of the ground. In SW.$\frac{1}{4}$ sec. 8, a well drilled 116 feet reaches an aquifer that yields hard water containing much iron. In NW.$\frac{1}{4}$ sec. 7 and NE.$\frac{1}{4}$ sec. 10, wells drilled 93 and 80 feet deep, respectively, yield hard, alkali water sufficient for 40 head of stock.

Township 4, Range 6. Glacial Lake Agassiz covered most of the township and left beaches of sand and gravel that are excellent aquifers. Elsewhere lake clays and silts are poor aquifers and hence dugouts are needed on each farm to collect and store the surface run-off to supply water for stock. Wells are dug 15 to 35 feet into the lake clays but the water pumped from them is salty or alkali.

No wells have been drilled to the bedrock. An aquifer of potable water may be encountered below the lake clays but there have been no drilling operations to substantiate this assumption.

Township 4, Range 7. The overburden along the western side of the township is till, representing end moraine, except for a thin deposit of silt in the southwestern part that was laid down in a glacial lake. Between this end moraine and the top of the escarpment that crosses the northeast corner of the area is a band of ground moraine. Along the escarpment Cretaceous shales are exposed, in part covered by a mantle of water-worked till. Below the escarpment in the extreme northeast corner of the township the surface deposits are alluvial sands and gravel.

The overburden varies in thickness from 6 to 35 feet but most wells are dug into the bedrock where hard, clear slightly alkali water is encountered. An ample supply is available. Each farm has one or more wells.

Township 4, Range 8. Ground moraine that varies in thickness from 5 to 50 feet overlies the bedrock. Its surface is irregular to rolling.

Most of the aquifers are in the overburden. They are reached by dug wells 15 to 50 feet deep, which commonly bottom on the bedrock. Here the ground water that has percolated downward through the overburden is moving laterally along and within its bottom few feet. Deeper wells drilled to depths of 90, 150, and 100 feet in sections 11, 14, and 27 respectively, reach aquifers in the bedrock that yield soft water.

Township 4, Range 9. The surface of the township is rolling to uneven, wooded, with an intermittent creek flowing southwest across the south half. Ground moraine that averages approximately 25 feet in thickness mantles the bedrock except in the southwest corner of the township where it is overlain by thin deposits of clayey silt, at depths of 20 to 25 feet either in the overburden or in the upper fractured layers of the bedrock. In NW.$\frac{1}{4}$ sec. 21, one well was drilled 122 feet to an aquifer that yields soft water, whereas two other wells bored 60 and 80 feet deep yield hard alkali water.

Township 5, Range 6. The surface of the township is generally flat and slopes to the east. It is crossed by an intermittent creek, Tobacco Creek. The overburden consists of glacial till overlain by sand, gravel, and clay that was deposited during the existence of former Lake Agassiz, which completely covered the township. Beaches of the former lake in the southwest quarter are excellent aquifers. At Miami a beach deposit supplies water for the town from an aquifer less than 20 feet from the surface of the ground. Except for the aquifers in the beach sands and gravels, wells dug into the lake deposits to depths of less than 50 feet commonly yield alkali water.

On those sections where shallow wells have failed dugouts or drilled wells have been made. Notable among these are two test holes drilled in 1943, on NE.$\frac{1}{4}$ sec. 14. One drilled 211 feet supplied 2 imperial gallons per minute from an aquifer of coarse sand encountered

at a depth of 159 to 162 feet. The other, drilled 140 feet, pumped 18 imperial gallons per minute from an aquifer of coarse sand at a depth of 129 to 130 feet. The static water level in the well was 28 feet 7 inches and pumping at 18 imperial gallons per minute showed a stablized water level at 60 feet below the surface. The capacity of the well is approximately ½ imperial gallon per minute for 1 foot of drawdown.

Wells drilled in sections 10 and 11 are 115 and 100 feet deep respectively. The aquifer encountered, which lies at a depth of approximately 108 feet, is a layer of gravel overlain by an impervious layer of lake sediments. In the deeper well the water rises to the ground surface but does not overflow, whereas in the 100-foot well the water rises to a point 2 feet from the surface of the ground. A well drilled 200 feet deep in SE.¼ sec. 31 yields soft water.

Township 5, Range 7. The Manitoba escarpment crosses the township from section 2 to section 32. East of the escarpment the surface is flat and slopes gently eastward. The original drift surface has been modified by waters of glacial Lake Agassiz. Ground water, of sufficient quantity for domestic and stock needs is pumped from aquifers at depths of 15 to 54 feet. The water is hard and commonly has a concentration of sulphates.

West of the escarpment the surface is irregular and wooded. Streams cut the mantle of till overlying the bedrock. Wells are from 18 to 50 feet deep and obtain water from aquifers in the bedrock.

Drilled wells are not common. One, in NE.¼ sec. 9, was drilled 70 feet and penetrated 'blue clay'. The water, which rises to a point 55 feet from the surface of the ground, is hard and contains much iron. In SW.¼ sec. 21, two test holes were abandoned, one was drilled 180 feet and the other bored 60 feet.

Township 5, Range 8. The surface of the township is hilly to uneven. Ground moraine 5 to 25 feet thick mantles the bedrock except for a belt of end moraine that trends northwest from section 1 to

section 33. Surface run-off from the end moraine follows intermittent shallow channels that in places fill closed depressions to form sloughs.

Ground moraine yields only small supplies of water, but locally lenses of stratified sand and gravel within it yield water freely. As the ground moraine is widely distributed, it is an important source of ground water. At most places it will yield sufficient water from inexpensive dug wells for domestic and stock needs.

Outwash sand and gravel and ice-contact stratified drift deposited above and beside the end moraine are excellent aquifers. If wells fail to encounter sufficient water within the overburden, then deeper wells should be bored or drilled to the bedrock where a sufficient supply is commonly encountered in its upper fractured surface.

Township 5, Range 9. The surface of the township is rolling to hilly and the overburden consists of ground moraine that varies in thickness from 15 to more than 50 feet.

A supply of hard water is obtained from inexpensive dug wells that penetrate the overburden. The aquifers are local in extent and consist of lenses of sand and gravel. Glacio-fluvial or outwash deposits of sand and gravel found along abandoned or intermittent stream courses are excellent aquifers. South and west of Somerset, wells penetrate sand at depths of less than 20 feet and yield a supply of potable water. Wells that reach the bedrock yield hard water that is commonly sufficient for domestic and stock needs. Twenty-nine of the 76 wells recorded in this township obtain water from the bedrock.

Township 6, Range 6. The surface of the township is a featureless plain sloping to the east. Boyne River enters the township in section 24, and follows a shallow trench cut into sediments deposited in glacial Lake Agassiz.

Two aquifers are present. The upper one is fine sand and silt which lies within 20 feet of the surface. It yields hard, clear water sufficient for domestic use and can be reached by inexpensive dug wells.

The second aquifer is sand and gravel lying in depressions on the surface of the till and overlain by some 90 feet or more of compact impervious blue clay and by the upper 20 feet of sand and silt. The depression fillings or pockets of sand and gravel are reached by wells drilled to depths of 105 and 272 feet. The supply of water is not abundant as is evidenced by the excessive drawdown during the pumping of each well. An interval of 3 to 4 hours is required for complete recovery of the water level in the well. Fine sand tends to plug the casing and limit the supply. As the supply is variable from such aquifers at depths of 100 feet or more, it is recommended that shallow wells be dug for domestic use and where such supplies are limited dugouts may be built to collect run-off for stock use.

Township 6, Range 7. The Manitoba escarpment trends southeast across the township from section 31 to section 4. East of the escarpment the surface, modified by waters of glacial Lake Agassiz, is flat and slopes to the east. Ground moraine mantles the bedrock west of the escarpment in the southwest corner of the township.

An abundant supply of hard, clear water is obtained to the east of the escarpment by digging wells less than 20 feet deep into the sandy surface deposits. In seasons of less than normal rainfall it may be necessary to build dugouts for a stock supply.

West of the escarpment water is obtained from sand and gravel lenses in the ground moraine. Wells reaching depths of less than 40 feet yield sufficient water for domestic and stock needs.

Township 6, Range 8. Boyne River crosses the township in a narrow valley in places more than 100 feet deep, cut into bedrock. Elsewhere the surface is uneven to hilly. End moraine is the most prevalent surface deposit. There are also some areas of ground moraine, glaciofluvial and outwash deposits.

South of Boyne River wells are dug into the overburden and commonly bottom on bedrock where a supply of potable water is obtained. North of the river where the overburden is thicker wells are dug 30 to

50 feet deep and commonly penetrate sand and gravel lenses in the drift.

In NE.$\frac{1}{4}$ sec. 26, a well drilled 108 feet penetrated glacial till to a zone of gravel where hard water was encountered under sufficient pressure to rise to within 33 feet of the surface of the ground.

Township 6, Range 9. The surface of the township is hilly to uneven. There are some slough lands and intermittent streams. Ground moraine covers most of the township and consists of a sandy-silty till. The thickness of the overburden varies from an average of 5 feet in section 12, to 26 feet in section 18, but nowhere is it more than 40 feet.

In digging a well there are two potential aquifers. The first may be encountered in the overburden where glacio-fluvial deposits may be present as discontinuous lenses of sand and gravel. These aquifers will yield enough water for 20 to 25 head of stock. The water is hard with a concentration of sulphate salts.

The second aquifer may be encountered on reaching the bedrock. Here the downward percolating ground water moves along the contact of the bedrock and overburden. This water is commonly fresh and of sufficient quantity for domestic uses and 50 head of stock. Wells tapping these aquifers average 35 feet in depth.

The possibilities of a supply at greater depth in the bedrock are unknown, but at greater depth it is not uncommon to encounter softer water.

ANALYSES OF GROUND WATERS FROM Tps. 1 to 6, Rges. 6 to 9, West Principal meridian, Manitoba

Sample Number	¼ section	Section	Township	Range	Meridian	Depth of well (feet)	Aquifer[x]	Conductance (Micromhos 25°C)	Hardness (as $CaCO_3$) (parts per million) Carbonate	Noncarbonate	Total	Constituents as analysed (parts per million) Alkalinity (as $CaCO_3$)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulphate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Silica (SiO_2)	Ammonia (NH_4)
1	NE	8	3	6	1st	20	t	4951	780.0	1,689.5	2,469.5	780.0	301.6	417.1	439.8	951.6	2166.1	164.6		184.0	28.0	trace
2	SW	8	5	6	1st	16	s	2513	658.4	721.7	1,380.1	658.4	443.7	66.2	66.0	803.2	327.6	167.4		310.0	26.5	
3	SE	23	6	6	1st	272	s	9129	65.2	2154.5	2,219.7	65.2	596.6	177.4	1132.0	79.5	1625.8	2226.1		17.0	15.7	
4	NE	8	3	7	1st	43	t	1102	377.4	199.2	576.6	377.4	163.2	41.1	11.7	460.4	93.8	92.2		14.0	20.5	
5	SW	21	5	8	1st	17		1350	474.2	0.0	474.2	498.8	109.1	49.0	156.2	608.5	262.1	11.6		24.0	27.5	
6	NE	6	1	9	1st	35	g	3432	494.4	120.4	614.8	494.4	156.4	54.5	558.2	603.2	579.8	488.8		80.0	24.2	
7	NE	19	5	9	1st	17	t	2846	229.2	890.1	1,119.3	229.2	342.7	64.1	152.4	279.6	305.7	516.2		256.0	28.0	

x - Symbols used for aquifers: t - Pleistocene till
s - " sand
g - " gravel

Discussion of Analyses

A general discussion of water analyses will be found on page 5 of this report.

No standards for the chemical composition of potable waters have been established in Canada. In the United States, however, the need for federal control of the quality of water used by interstate water carriers led to the establishment by the American Public Health Service of the following partial list of chemical standards.

Chemical constituent	Maximum concentration permitted (parts per million)	
Dissolved solids	500	(1,000 permitted if necessary)
Chloride	250	
Sulphate	250	
Magnesium	125	
Fluoride	1.5	
Iron and manganese	0.3	

The presence of nitrate in ground water may indicate organic contamination. It is recommended that water containing more than 45 parts per million of nitrate should not be used in feeding infants because of the danger of infant cyanosis (methemoglobinemia) resulting in the so-called blue baby.

Sample No. 3 was taken from a drilled well that obtains water from an aquifer of fine sand below Lake Agassiz sediments. The water is very hard with a concentration of the constituents sodium, sulphate, and chloride. These constituents contribute to the salty taste of the water.

All the samples are hard water but samples Nos. 1 and 7, from Thornhill and Somerset, respectively, are excessively hard. Samples Nos. 4 and 5, from Darlingford and Altamont, respectively, may be regarded as average examples of ground waters from the overburden. Although hard water it can be softened by commercial softeners and detergents.

Sample No. 2, from a well in Miami, is hard water with a concentration of calcium and bicarbonate. This sample, taken from an outwash plain of sand and gravel, is not representative of ground waters percolating through such deposits. Analyses commonly show smaller concentrations of the constituents listed and the water is softer.

Record of Wells

The following table of well records has been prepared from driller's records and data collected by the Geological Survey of Canada. The following abbreviations are used:

Sec.	—	Section
Drl.	—	Drilled well
Brd.	—	Bored well
V.R.	—	Vermilion River formation
R.M.	—	Riding Mountain formation
Dom.	—	Domestic use
Stk.	—	Stock use
Not	—	Not used
Mun.	—	Municipal use
#	—	Well from which a sample was taken

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 1, Range 6

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	SE	Dug	1,455	46	16	16	V.R.	Hard	Dom. Stk.	Sufficient for 20 head
3	SW	Brd.	1,483	83	30	-	V.R.	Hard	Dom. Stk.	" " 25 "
4	NE	Dug	1,505	33	24	33	-	Hard	Dom. Stk.	" " 20 "
7	NE	Dug	1,178	16	-	-	Drift	Hard	Dom. Stk.	Supply not sufficient.
8	NE	Brd.	1,505	48	27	27	V.R.	Soft	Dom. Stk.	Sufficient for 40 head.
9	NW	Brd.	1,504	55	10	20	V.R.	Hard	Dom. Stk.	" " 35 "
10	SW	Brd.	1,482	30	18	12	R.M.	Hard	Dom. Stk.	" " 20 "
11	SW	Drl.	1,487	31	9	10	V.R.	Hard	Dom. Stk.	" " 37 "
12	SW	Brd.	1,469	55	15	16	V.R.	Hard	Dom. Stk.	" " 25 "
13	SW	Dug	1,450	20	14	20	V.R.	Hard	Dom. Stk.	" " 10 "
14	NW	Brd.	1,473	23	13	12	V.R.	Hard	Dom. Stk.	" " 18 "
15	SE	Dug	1,466	24	7	-	-	Hard	Dom. Stk.	" " 35 "
16	NE	Dug	1,488	14	8	8	R.M.	Hard	Dom. Stk.	Three other wells on farm
17	SW	Dug	1,503	20	16	-	Drift	Hard	Dom. Stk.	Sufficient for 20 head
18	NE	Dug	1,492	31	21	-	Drift	Hard	Dom. Stk.	" " 21 "
19	NE	Dug	1,483	24	19	-	-	Hard	S. & R.	- - -
20	SE	Brd.	1,487	60	20	20	V.R.	Hard	Dom. Stk.	Sufficient for 30 head
21	SE	Dug	1,504	24	20	10	V.R.	Hard	Dom. Stk.	" " 40 head
22	SW	Dug	1,483	13	9	10	V.R.	Hard	Dom. Stk.	" " 40 "
24	NE	Dug	1,448	21	18	21	R.M.	Hard	Dom. Stk.	Alkali water
25	NE	Dug	1,410	26	13	26	-	Hard	Dom. Stk.	Sufficient for 30 head
26	SE	Dug	1,467	26	8	14	R.M.	Hard	Dom. Stk.	" " 20 "
27	SW	Dug	1,457	35	32	35	-	Hard	Dom. Stk.	Not sufficient during winter months
28	SE	Dug	1,472	38	14	-	-	Hard	Dom. Stk.	Sufficient for 16 head
29	NE	Drl.	1,499	40	20	-	R.M.	Hard	Dom. Stk.	Also a well 26 ft. deep
30	SW	Dug	1,502	27	9	27	-	Hard	Dom. Stk.	Sufficient for 20 head
31	NW	Brd.	1,500	57	30	20	R.M.	Hard	Dom. Stk.	" " 25 "
32	SW	Dug	1,474	27	9	-	-	Hard	Dom. Stk.	" " 10 "
33	SW	Dug	1,488	14	9	13	R.M.	Hard	Dom. Stk.	" " 18 "

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 1, Range 7

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	SW	Brd.	1,539	90	40	50	V.R.	Hard	Dom. Stk.	Sufficient for 25 head
2	SE	Brd.	1,539	115	35	100	V.R.	Hard	Dom. Stk.	" " 18 "
3	NE	Brd.	1,542	120	100	-	-	Hard	Dom. Stk.	" " 15 "
4	NE	Brd.	1,552	65	20	-	-	Hard	Dom. Stk.	- - -
5	SE	Drl.	1,547	92	13	-	V.R.	Soft	Dom. Stk.	- - -
6	NW	Dug	1,578	20	6	-	Drift	Hard	Not	Alkali water
7	NE	Brd.	1,571	180	120	-	-	Hard	Stk.	Alkali water with much iron.
8	SW	Brd.	1,546	170	70	-	-	Hard	Dom. Stk.	Sufficient supply
9	SW	Brd.	1,559	57	15	40	R.M.	Hard	Dom. Stk.	Sufficient for 20 head
10	NE	Brd.	1,526	55	30	40	V.R.	Hard	Dom. Stk.	" " 30 "
11	SW	Brd.	1,541	63	38	60	V.R.	Hard	Dom. Stk.	" " 35 "
15	NW	Brd.	1,539	80	49	-	V.R.	Hard	Dom. Stk.	" " 30 "
16	SE	Brd.	1,549	95	25	-	Gravel	Hard	Dom. Stk.	Water in gravel at 50ft.
18	SE	Dug	1,569	20	6	10	R.M.	Hard	Dom.	- - -
20	NE	Brd.	1,549	125	90	20	V.R.	Hard	Dom. Stk.	Sufficient for 80 head
21	NW	Brd.	1,534	120	60	80	V.R.	Hard	Dom. Stk.	" " 40 "
24	SE	Brd.	1,486	60	30	-	-	Hard	Dom. Stk.	Sufficient for 25 head
25	SE	Brd.	1,504	67	13	30	V.R.	Hard	Stk.	Also a well bored 40 ft.
28	SW	Dug	1,526	6	4	-	Gravel	Hard	Dom. Stk.	- - -
29	SE	Brd.	1,540	47	23	-	-	Hard	Dom. Stk.	Sufficient for 15 head
32	NE	Dug	1,272	10	4	-	-	Hard	Dom. Stk.	- - -
36	NW	Dug	1,493	14	5	14	V.R.	Hard	Dom. Stk.	- - -
36	NE	Dug	1,492	30	15	-	V.R.	Hard	Stk.	Also a house well 20 ft. deep

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 1, Range 8

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer.	Quality of water	Use	Remarks
1	NW	Brd.	1,581	27	15	-	-	Hard	Dom. Stk.	Also a well 32 ft. deep
2	NE	Brd.	1,563	50	20	30	V.R.	Hard	Dom. Stk.	Sufficient for 30 head
3	SW	Brd.	1,536	60	20	-	-	Soft	Dom. Stk.	" " 20 "
4	NW	Brd.	1,542	75	35	35	V.R.	Hard	Dom. Stk.	Also a well 50 ft. deep
5	NE	Dug	1,547	25	9	-	-	Hard	Dom. Stk.	Sufficient for 15 head
6	NW	Dug	1,547	35	15	10	V.R.	Hard	Dom. Stk.	" " 25 "
7	SW	Brd.	1,553	24	9	14	V.R.	Soft	Dom. Stk.	" " 40 "
8	SW	Brd.	1,550	100	30	-	V.R.	Hard	Dom. Stk.	" " 24 "
9	SE	Dug	1,544	71	60	-	V.R.	Hard	Dom. Stk.	- - -
10	SE	Dug	1,524	31	14	-	-	Hard	Dom. Stk.	- - -
11	SW	Dug	1,405	50	31	-	-	Hard	Stk.	- - -
13	SW	Brd.	1,361	80	25	3	V.R.	Soft	Dom. Stk.	" " 35 "
14	SW	Brd.	1,387	30	28	3	V.R.	Hard	Dom. Stk.	" " 30 "
18	NW	Dug	1,314	18	16	-	Sand	Hard	Dom. Stk.	Also a well 24 ft. deep
22	NW	Brd.	1,234	38	22	5	V.R.	Hard	Dom. Stk.	Also a well 25 ft. deep
23	SW	Brd.	1,404	60	30	2	V.R.	Hard	Dom. Stk.	Sufficient for 30 head
25	NW	Drl.	1,548	60	30	-	Gravel	Hard	Dom. Stk.	" " 17 head
27	SE	Dug	1,311	30	-	5	V.R.	Hard	Dom. Stk.	Well was dry at time of interview
28	NW	Dug	1,540	20	5	-	-	Hard	Dom. Stk.	Also a well 25 ft. deep
29	NE	Dug	1,557	30	10	-	-	Hard	Dom. Stk.	Sufficient for 25 head
30	SE	Brd.	1,294	40	20	2	V.R.	Hard	Dom. Stk.	" " 22 "
31	NW	Dug	1,565	35	17	12	V.R.	Hard	Dom.	Stock well 35 ft. deep
31	NE	Dug	1,550	34	15	15	V.R.	Hard	Dom.	Stock well drilled 90 feet.
32	SE	Brd.	1,574	28	25	5	V.R.	Soft	Dom.	Stock well 29 ft. deep
34	SE	Drl.	1,554	125	92	-	V.R.	Hard	Dom. Stk.	Sufficient for 25 head
35	SW	Brd.	1,575	20	10	-	-	Hard	Dom.	Also a well 26 ft. deep
36	SW	Drl.	1,548	65	20	-	-	Hard	Dom. Stk.	Sufficient for 50 head

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 1, Range 9

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	SE	Dug	1,554	40	10	-	Till	Hard	Dom. Stk.	Sufficient for 20 head
2	NW	Brd.	1,534	38	20	-	Till	Hard	Dom. Stk.	" " 35 "
3	NE	Drl.	1,530	180	-	-	-	Soft	Dom. Stk.	" " 40 "
4	NW	Dug	1,530	30	20	-	Gravel	Hard	Dom. Stk.	- - -
5	NW	Dug	1,542	28	-	-	Gravel	Hard	Dom. Stk.	Sufficient for 30 head
6	NE	Dug	1,545	35	25	-	Gravel	Hard	Dom. Stk.	" " 15 "
7	NW	Brd.	1,559	30	20	-	R.M.	Hard	Dom. Stk.	" " 30 "
8	NE	Brd.	1,545	50	40	35	R.M.	Hard	Dom. Stk.	Also a well 32 ft. deep
9	SW	Dug	1,517	30	15	-	-	Hard	Dom. Stk.	Sufficient for 15 head
10	SE	Drl.	1,541	230	50	-	-	Soft	Dom. Stk.	" " 50 "
11	NW	Brd.	1,527	40	28	-	-	Hard	Dom. Stk.	" " 30 "
12	SW	Brd.	1,516	88	38	-	R.M.	Hard	Dom. Stk.	" " 20 "
13	SE	Brd.	1,549	38	-	10	R.M.	Hard	-	School well
14	NW	Brd.	1,546	90	80	76	R.M.	Hard	Dom. Stk.	Sufficient for 20 head
15	SW	Brd.	1,544	40	30	-	-	Hard	Dom. Stk.	- - -
16	SW	Dug	1,543	26	21	21	R.M.	Hard	Dom. Stk.	Also a well 36 ft. deep
17	NE	Drl.	1,553	40	-	-	-	Hard	Dom. Stk.	Sufficient for 15 head
19	SW	Drl.	1,552	138	-	-	R.M.	Soft	Dom. Stk.	- - -
20	SW	Brd.	1,556	53	33	-	-	Hard	Dom. Stk.	Sufficient for 15 head
21	NE	Dug	1,559	22	16	-	Till	Hard	Dom. Stk.	" " 15 "
22	NW	Brd.	1,547	23	15	-	-	Hard	Dom. Stk.	- - -
26	NE	Drl.	1,263	25	15	-	Gravel	Hard	Dom.	Also a stock well 30 ft. deep
29	SW	Brd.	1,546	20	15	20	-	Hard	Dom. Stk.	- - -
30	NE	Brd.	1,607	66	16	-	-	Hard	Dom. Stk.	- - -
31	SE	Drl.	1,617	110	20	-	-	Soft	Dom. Stk.	Sufficient for 30 head
32	SE	Dug	1,589	31	13	-	-	Hard	Stk.	" " 20 "
33	NE	Dug	1,332	47	37	-	-	Hard	Dom. Stk.	- - -
34	NE	Dug	1,270	35	29	-	Gravel	Hard	Dom.	- - -

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 2, Range 6

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	SW	Dug	1,351	12	10	-	-	Hard	Dom. Stk.	- - -
2	NE	Dug	1,367	20	10	15	V.R.	Hard	Dom. Stk.	Sufficient for 40 head
3	NW	Dug	1,410	11	6	-	-	Hard	Stk.	Also a well 30 ft. deep
4	SE	Dug	1,454	20	5	10	V.R.	Hard	Dom. Stk.	- - -
5	NE	Dug	1,482	20	10	-	Till	Hard	Stk.	Sufficient for 20 head
6	NW	Dug	1,495	11	4	-	Till	Hard	Dom. Stk.	Sufficient for 40 head
8	SE	Dug	1,471	28	12	-	-	Hard	Dom. Stk.	" " 30 "
9	NW	Dug	1,409	27	23	27	-	Hard	Dom. Stk.	" " 30 "
10	NE	Dug	1,295	8	5	8	-	Hard	Dom.	- - -
11	SE	Dug	1,331	28	19	-	Till	Hard	Dom. Stk.	Sufficient for 20 head
12	NW	Dug	1,286	30	29	-	Till	Hard	Stk.	" " 15 "
13	SE	Dug	1,174	9	4	-	Gravel	Soft	Dom. Stk.	" " 35 "
16	NE	Dug	1,405	30	22	-	-	Hard	Dom. Stk.	" " 30 "
17	SE	Dug	1,400	15	6	-	Sand	Hard	Dom.	Well at school
18	NW	Dug	1,457	44	34	-	-	Hard	Dom. Stk.	Sufficient for 25 head
19	NE	Dug	1,406	16	12	-	-	Hard	Dom. Stk.	" " 15 "
20	NW	Dug	1,384	18	16	18	-	Hard	-	- - -
21	SE	Dug	1,311	16	14	16	-	Hard	Stk.	Sufficient for 40 head
22	SW	Dug	1,297	11	6	-	Till	Hard	Dom. Stk.	Two other wells
23	NE	Dug	1,213	12	10	-	Sand	Hard	Dom. Stk.	Sufficient for 30 head
24	SE	Dug	1,165	15	12	-	Gravel	Hard	Dom. Stk.	" " 30 "
25	SW	Dug	1,164	22	11	-	Sand	Hard	Dom. Stk.	" " 30 "
26	NW	Dug	1,360	18	12	-	Sand	Hard	Dom.	Two other wells
28	SW	Dug	1,308	12	8	-	Sand	Hard	Stk.	Sufficient for 30 head
30	SE	Dug	1,386	11	2	-	Sand	Hard	Dom. Stk.	" " 60 "
31	NW	Dug	1,394	28	22	-	Gravel	Hard	Dom. Stk.	" " 10 "
32	SW	Dug	1,350	12	6	-	Till	Hard	Dom. Stk.	" " 20 "
33	NW	Dug	1,323	12	10	-	Sand	Hard	Dom.	Also a well 28 ft. deep
36	SE	Dug	1,111	14	8	14	-	Hard	Dom. Stk.	Sufficient for 25 head

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 2, Range 7

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	NE	Dug	1,505	28	23	-	-	Hard	Dom. Stk.	Sufficient supply
2	NE	Dug	1,519	20	12	-	Till	Hard	Dom. Stk.	Sufficient for 30 head
3	NE	Drl.	1,523	65	-	-	-	Hard	Dom. Stk.	Not sufficient for 20 head
9	SE	Brd.	1,523	56	28	-	Gravel	Hard	Dom. Stk.	Also a well 23 ft. deep
10	NW	Dug	1,555	45	40	-	Till	Hard	Dom. Stk.	Sufficient for 40 head
11	SW	Dug	1,536	45	10	-	-	Hard	Dom. Stk.	Sufficient for 20 head
12	NE	Dug	1,486	16	11	-	Sand	Hard	Dom. Stk.	" " 30 "
13	NE	Dug	1,475	13	10	-	Sand	Hard	Dom. Stk.	" " 20 "
14	SE	Drl.	1,492	178	12	-	V.R.	Hard	Dom. Stk.	Sufficient supply
15	SW	Brd.	1,534	45	18	-	Gravel	Hard	Dom. Stk.	Sufficient for 70 head
16	NW	Dug	1,529	30	10	-	Gravel	Hard	Dom. Stk.	" " 25 "
17	SE	Drl.	1,569	220	70	-	V.R.	Soft	Dom. Stk.	Also a bored well 60 ft. deep
20	NW	Drl.	1,552	140	120	30	V.R.	Hard	Dom. Stk.	" " well 40 ft. deep
21	NW	Dug	1,520	25	13	-	-	Hard	Dom.	Also a well for stock
22	SE	Dug	1,486	36	28	-	Till	Hard	Dom. Stk.	Sufficient for 30 head
23	SW	Drl.	1,489	168	24	103	V.R.	Hard	Stk.	Also a house well dug 14 ft. deep
24	NE	Brd.	1,422	46	27	-	Till	Hard	Stk.	Sufficient for 25 head
25	NE	Dug	1,450	26	17	-	Gravel	Hard	Dom. Stk.	" " 15 "
26	SE	Dug	1,436	37	14	-	Till	Hard	Stk.	" " 40 "
27	NW	Dug	1,489	35	17	33	R.M.	Hard	Dom. Stk.	" " 30 "
28	SW	Dug	1,529	17	13	-	Drift	Hard	Dom.	Also a stock well 25 ft. deep
30	NW	Dug	1,558	25	24	-	Gravel	Hard	Dom. Stk.	Sufficient for 15 head
33	SW	Brd.	1,531	40	15	-	-	Hard	Dom. Stk.	- - -
34	SE	Drl.	1,473	110	-	-	-	Soft	Dom.	Also a stock well 30 ft. deep
35	SE	Drl.	1,454	79	-	-	Drift	Hard	Dom. Stk.	Sufficient for 20 head
36	NE	Dug	1,422	26	13	-	Drift	Hard	Dom.	Also a stock well 78 ft. deep

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 2, Range 8

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
2	NE	Brd.	1,546	16	14	-	Drift	Hard	Dom.	Also a stock well 50 ft. deep
4	SE	Dug	1,572	61	25	15	R.M.	Hard	Dom. Stk.	Sufficient for 30 head
5	NE	Dug	1,582	29	22	-	-	Hard	Dom. Stk.	" " 60 "
6	SW	Dug	1,553	20	12	9	R.M.	Hard	Dom.	Also a stock well 20 ft. deep
7	NW	Brd.	1,586	30	25	-	-	Hard	Dom. Stk.	Sufficient for 15 head
9	SW	Dug	1,582	25	17	-	-	Hard	Dom. Stk.	" " 40 "
10	NW	Dug	1,578	32	12	-	-	Hard	Dom. Stk.	" " 30 "
13	NE	Drl.	1,550	150	25	-	-	Hard	Dom. Stk.	" " 20 "
14	SE	Brd.	1,545	37	20	-	-	Hard	Dom.	Also a stock well
15	NE	Brd.	1,566	55	25	-	-	Hard	Dom. Stk.	Also a well 30 ft. deep
16	NW	Dug	1,578	30	15	8	R.M.	Hard	Dom. Stk.	Also another well 30 ft. deep
17	SE	Dug	1,592	54	30	-	Drift	Hard	Dom. Stk.	Sufficient for 50 head
18	SW	Drl.	1,588	99	59	72	V.R.	Soft	Dom. Stk.	" " 40 "
19	NW	Dug	1,558	35	15	-	-	Hard	Dom. Stk.	Also a drilled well
20	NE	Dug	1,582	19	14	10	R.M.	Hard	Dom. Stk.	Sufficient for 40 head
21	NW	Dug	1,590	20	10	5	R.M.	Hard	Dom. Stk.	Also a well 15 ft. deep
22	SW	Brd.	1,568	80	20	-	R.M.	Soft	Dom. Stk.	Sufficient for 20 head
23	SE	Brd.	1,563	100	60	-	R.M.	Hard	Dom. Stk.	Also a bored well 40 ft. deep
24	SE	Drl.	1,516	140	136	20	R.M.	Soft	Dom. Stk.	Sufficient for 45 head
26	SW	Brd.	1,571	42	22	-	R.M.	Hard	Dom. Stk.	Also a dug well 15 ft. deep
27	SE	Dug	1,572	26	15	-	-	Hard	Dom. Stk.	Sufficient for 25 head
29	NE	Dug	1,587	32	22	-	R.M.	Soft	Not	- - -
30	SW	Drl.	1,561	100	30	5	R.M.	Soft	Dom. Stk.	Also a drilled well 130 ft. deep
32	NE	Dug	1,594	23	12	6	R.M.	Hard	Dom. Stk.	Also a well 17 ft. deep
33	NW	Dug	1,593	20	10	-	-	Hard	Dom. Stk.	Also a well 22 ft. deep
35	NW	Drl.	1,583	85	20	13	R.M.	Hard	Dom. Stk.	Also a well 45 ft.deep
36	NW	Brd.	1,568	60	20	-	-	Hard	Dom. Stk.	Sufficient for 40 head

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 2, Range 9

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	NE	Dug	1,588	21	13	-	-	Hard	Stk.	Sufficient for 60 head
2	NE	Dug	1,423	26	6	20	R.M.	Hard	Dom. Stk.	" " 40 "
3	SW	Dug	1,321	13	8	-	-	Hard	Dom. Stk.	Sufficient supply
4	NW	Brd.	1,569	90	50	30	V.R.	Hard	Dom. Stk.	Sufficient for 30 head
5	SW	Drl.	1,572	144	16	-	V.R.	Soft	Dom. Stk.	" " 45 "
6	SW	Dug	1,562	21	9	-	-	Hard	Dom. Stk.	" " 70 "
10	NW	Dug	1,308	8	7	-	-	Hard	Dom. Stk.	- - -
11	SE	Dug	1,433	60	35	-	-	Hard	Not	Also a drilled well 85 ft. deep
12	NE	Dug	1,579	13	8	6	V.R.	Soft	Dom. Stk.	Sufficient for 25 head
15	NE	Brd.	1,473	76	-	-	-	Soft	Dom. Stk.	" " 35 "
16	NW	Dug	1,549	65	62	20	V.R.	Hard	Dom. Stk.	" " 20 "
17	SW	Brd.	1,561	66	-	-	-	Hard	Dom. Stk.	" " 40 "
18	NW	Dug	1,600	38	12	-	R.M.	Hard	Dom. Stk.	" " 30 "
19	SE	Dug	1,573	25	13	-	Gravel	Soft	Dom. Stk.	" " 30 "
20	SE	Drl.	1,551	47	44	-	-	Hard	Dom.	School well
20	NE	Dug	1,550	52	26	-	-	Hard	Dom. Stk.	Sufficient for 45 head
21	SW	Dug	1,552	51	34	-	-	Hard	Dom. Stk.	" " 15 "
22	NW	Dug	1,543	35	20	33	R.M.	Hard	Stk.	Domestic well bored 45 ft.deep
25	NE	Drl.	1,555	108	26	-	-	Hard	Dom. Stk.	- - -
28	NW	Dug	1,550	22	15	-	-	Hard	Dom. Stk.	Sufficient for 50 head
29	SE	Dug	1,549	45	15	-	-	Hard	Dom. Stk.	" " 50 "
31	SE	Brd.	1,554	26	12	-	Drift	Hard	Dom. Stk.	Dugout for stock
32	NW	Dug	1,563	45	30	40	R.M.	Hard	Dom. Stk.	Sufficient for 30 head
32	SE	Dug	1,560	30	12	-	Drift	Hard	Dom. Stk.	Also a drilled well 150 ft. deep
36	NE	Dug	1,552	60	30	-	R.M.	Hard	Dom. Stk.	Sufficient for 60 head

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 3, Range 6

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
2	NW	Dug	1,184	20	12	-	Sand	Hard	Dom. Stk.	Sufficient for 60 head
3	NW	Dug	1,232	6	3	-	Sand	Hard	-	Lake Agassiz beach sand
4	NE	Dug	1,283	40	30	-	Drift	Hard	Dom. Stk.	Not sufficient for 20 head
5	SW	Dug	1,343	30	15	-	Drift	Hard	Dom. Stk.	Dugout for stock
6	NW	Brd.	1,374	38	-	-	Sand	Hard	Dom. Stk.	Sufficient for 25 head
7	NW	Dug	1,348	14	10	-	Gravel	Hard	Stk.	Also a dugout
10	NE	Dug	1,174	14	8	-	Sand	Hard	Dom. Stk.	Four dug wells on farm
11	NE	Dug	1,128	8	2	-	-	Soft	Dom. Stk.	- - -
12	NE	Dug	1,033	12	10	-	Sand	Hard	Dom.	- - -
13	SE	Dug	1,030	14	8	-	Sand	Hard	Dom. Stk.	Supply not sufficient in winter
14	SW	Dug	1,140	8	4	-	Sand	Hard	Dom. Stk.	Sufficient for 50 head
15	NE	Dug	1,139	40	38	-	Sand	Hard	Dom. Stk.	" " 40 "
16	SW	Dug	1,278	22	20	-	-	Hard	Dom. Stk.	Dugout for stock
17	NE	Dug	1,295	38	36	-	Drift	Hard	Dom. Stk.	Dugout for stock
18	SW	Drl.	1,364	92	-	-	Drift	Hard	Dom. Stk.	Sufficient for 60 head
19	SW	Dug	1,372	12	4	-	Gravel	Hard	Dom.	Dugout for stock
21	SW	Dug	1,273	12	8	-	Drift	Hard	Dom. Stk.	Sufficient for 20 head
22	NE	Drl.	1,097	80	60	-	-	Hard	-	Too salty for drinking water
24	SE	Drl.	1,005	300	-	-	Drift	-	Not	Alkali water
24	NE	Dug	993	12	8	-	Sand	Hard	Dom.	Two other wells
25	NE	Dug	985	20	16	-	Drift	Hard	Stk.	Not sufficient
26	NW	Dug	1,040	7	4	-	Sand	Hard	Dom. Stk.	Dugout for stock
29	SW	Dug	1,515	24	14	-	-	Hard	Dom.	- - -
32	SE	Dug	1,175	14	6	-	-	Hard	Stk.	- - -
35	SW	Dug	1,025	11	10	-	Sand	Hard	-	Also a dugout
36	SW	Dug	993	30	24	-	Sand	Hard	Dom.	Also a well dug 40 ft. deep

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 3, Range 7

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	NW	Dug	1,425	43	17	-	-	Hard	Dom. Stk.	Alkali water
2	NE	Dug	1,432	35	10	-	Sand	Hard	Dom. Stk.	Sufficient for 15 head
3	NW	Dug	1,500	18	13	-	-	Hard	Dom. Stk.	Also a drilled well
5	SE	Brd.	1,553	50	35	-	Drift	Hard	Dom. Stk.	Sufficient for 30 head
8	SW	Dug	1,591	43	18	-	Gravel	Hard	Dom. Stk.	- - -
9	NW	Dug	1,541	27	18	-	Drift	Soft	Dom. Stk.	Sufficient for 50 head
10	SW	Brd.	1,500	32	12	-	Drift	Hard	Stk.	- - -
11	SW	Dug	1,439	18	14	-	Sand	Hard	Dom. Stk.	Sufficient for 40 head
12	SE	Dug	1,379	10	5	-	Sand	Hard	Dom. Stk.	" " 45 "
13	SW	Drl.	1,385	26	14	-	Drift	Hard	Dom. Stk.	" " 15 "
14	SE	Drl.	1,409	43	10	-	Drift	Hard	Dom. Stk.	" " 40 "
15	SE	Brd.	1,454	35	26	-	Drift	Hard	Dom. Stk.	Also a bored well 43 ft. deep
16	SE	Dug	1,509	25	9	-	-	Hard	Dom. Stk.	Sufficient for 20 head
17	SW	Drl.	1,591	66	41	-	Drift	Hard	Dom. Stk.	Also a dug well 50 ft. deep
18	NW	Dug	1,551	19	9	-	-	Hard	Dom. Stk.	Sufficient for 50 head
20	NE	Dug	1,553	19	7	-	Drift	Hard	Dom. Stk.	" " 30 "
22	SE	Dug	1,466	35	15	-	-	Hard	Stk.	- - -
23	NW	Brd.	1,445	45	30	-	-	Hard	Stk.	Sufficient for 70 head
24	SE	Dug	1,379	12	6	-	Drift	Hard	Dom. Stk.	- - -
25	SE	Dug	1,394	118	30	25	V.R.	Hard	Dom. Stk.	Sufficient for 30 head
26	SW	Brd.	1,446	37	25	-	Drift	Hard	Dom. Stk.	" " 20 "
27	NW	Brd.	1,487	4[illegible]	25	2	V.R.	Hard	Dom. Stk.	" " 20 "
28	SE	Dug	1,501	34	18	32	V.R.	Hard	Dom. Stk.	" " 25 "
29	NW	Brd.	1,606	46	25	-	-	Hard	Dom. Stk.	" " 20 "
30	SE	Dug	1,618	20	15	8	V.R.	Hard	Dom.	Also a dug well 30 ft. deep
31	SE	Dug	1,618	40	25	10	V.R.	Hard	Dom. Stk.	" " " " 23 ft. "
32	SE	Brd.	1,604	40	25	-	-	Hard	Dom. Stk.	Sufficient for 35 head
34	SE	Brd.	1,457	35	25	25	V.R.	Hard	Dom.	Also a stock well 30 ft. deep
35	SW	Brd.	1,448	40	20	-	V.R.	Hard	Dom. Stk.	- - -

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 3, Range 8

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	SE	Drl.	1,567	65	30	20	R.M.	Hard	Dom. Stk.	Also a well dug 24 feet
2	SW	Drl.	1,578	65	18	30	R.M.	Hard	Dom. Stk.	Sufficient for 40 head
3	NW	Dug	1,586	120	105	40	R.M.	Hard	Dom. Stk.	Also a bored well 60 ft. deep
4	NW	Dug	1,586	38	32	5	R.M.	Hard	Dom. Stk.	- - -
5	SE	Dug	1,594	34	10	-	R.M.	Hard	Dom. Stk.	Also a well 32 ft. deep
6	SE	Brd.	1,569	32	16	3	R.M.	Hard	Stk.	Also a house well 10 ft. deep
7	SW	Dug	1,589	50	15	10	R.M.	Hard	Dom.	Also a stock well 24 ft. deep
8	NE	Dug	1,588	35	5	20	R.M.	Hard	Dom. Stk.	Sufficient for 15 head
9	NE	Dug	1,616	21	15	12	R.M.	Hard	Dom. Stk.	" " 20 "
10	NW	Dug	1,596	12	8	-	-	Hard	Dom. Stk.	" " 30 "
11	NE	Dug	1,585	28	14	25	R.M.	Hard	Dom. Stk.	Sufficient for 30 head
12	NW	Brd.	1,570	65	10	20	R.M.	Hard	Dom. Stk.	" " 50 "
15	NE	Drl.	1,593	90	-	-	-	Hard	Dom.	Also a well 23 ft. deep
16	NW	Dug	1,618	38	30	-	-	Hard	Dom. Stk.	Also a well 20 ft. deep
17	NW	Dug	1,601	27	19	-	-	Hard	Dom.	- - -
18	NE	Dug	1,597	24	16	12	R.M.	Hard	Dom.	Stock well 61 ft. deep
19	SE	Dug	1,583	30	19	-	-	Hard	Dom. Stk.	Sufficient for 25 head
20	SW	Dug	1,601	30	20	-	-	Hard	Dom.	Stock well 25 ft. deep
21	SW	Dug	1,619	25	17	4	R.M.	Hard	Dom. Stk.	Sufficient for 32 head
23	NW	Dug	1,563	20	12	-	-	Hard	Dom. Stk.	" " 50 "
24	NE	Dug	1,580	39	14	-	-	Hard	Dom. Stk.	" " 30 "
25	SW	Dug	1,571	36	11	-	-	Hard	Dom. Stk.	- - -
26	NE	Brd.	1,633	18	9	-	-	Hard	Dom.	School well
27	NE	Brd.	1,595	30	20	12	R.M.	Hard	Dom.	Also a stock well 27 ft. deep
29	NW	Dug	1,595	20	14	-	-	Hard	Dom. Stk.	Also a well 34 ft. deep
30	NW	Dug	1,611	35	20	-	R.M.	Hard	Dom. Stk.	Sufficient for 25 head
31	SW	Dug	1,616	20	18	-	R.M.	Hard	Dom.	Also a stock well 20 ft. deep
32	SW	Dug	1,590	19	10	7	R.M.	Hard	Dom. Stk.	- - -
33	SW	Brd.	1,595	45	12	-	R.M.	Hard	Stk.	Also a house well 40 ft. deep
35	SW	Dug	1,613	24	12	8	R.M.	Soft	Dom. Stk.	Sufficient for 80 head

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 3, Range 9

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	SE	Dug	1,547	30	20	-	-	Hard	Dom. Stk.	Sufficient for 40 head
2	SE	Dug	1,543	40	25	-	-	Hard	Dom. Stk.	- - -
4	SW	Dug	1,512	17	4	-	-	Hard	Dom. Stk.	Sufficient for 70 head
6	SE	Drl.	1,564	187	12	-	R.M.	Soft	Dom. Stk.	" " 60 "
7	SW	Dug	1,532	48	15	-	R.M.	Hard	Dom. Stk.	" " 40 "
8	SW	Drl.	1,537	116	100	-	R.M.	Hard	Dom. Stk.	" " 20 "
10	NE	Drl.	1,549	80	-	-	R.M.	Hard	Dom. Stk.	" " 40 "
12	SE	Dug	1,542	30	20	-	-	Hard	Dom. Stk.	Also a drilled well 75 ft. deep
13	SE	Brd.	1,593	64	17	35	R.M.	Hard	Dom. Stk.	Sufficient for 25 head
14	SE	Dug	1,598	50	30	-	R.M.	Hard	Dom. Stk.	" " 35 "
15	SE	Dug	1,567	26	12	-	-	Hard	Dom. Stk.	Also a bored well 50 ft. deep
16	SE	Brd.	1,550	28	5	-	-	Hard	Dom. Stk.	- - -
18	SW	Dug	1,544	16	13	-	-	Hard	Dom. Stk.	- - -
19	SW	Dug	1,301	19	16	-	-	Hard	Dom.	- - -
20	NW	Brd.	1,523	26	10	-	R.M.	Hard	Dom. Stk.	Sufficient for 15 head
22	SE	Dug	1,593	25	10	4	R.M.	Soft	Dom. Stk.	Sufficient for 60 head
23	SW	Dug	1,594	28	16	-	R.M.	Hard	Dom. Stk.	" " 40 "
24	SE	Dug	1,583	32	15	-	-	Hard	Dom. Stk.	" " 50 "
25	SE	Dug	1,599	18	8	-	-	Hard	Dom. Stk.	" " 20 "
26	SE	Dug	1,591	35	20	-	-	Hard	Dom. Stk.	" " 40 "
27	NE	Brd.	1,601	60	20	-	-	Hard	Dom. Stk.	Sufficient for 20 head
28	SE	Dug	1,599	30	20	2	R.M.	Hard	Dom.	Also a drilled well 120 feet
29	NE	Dug	1,558	21	8	8	R.M.	Hard	Dom. Stk.	- - -
30	SE	Brd.	1,524	90	45	-	-	Hard	Dom.	Dugout for stock
31	SE	Brd.	1,517	48	37	4	R.M.	Hard	Dom.	- - -
33	NW	Dug	1,576	27	16	5	R.M.	Hard	Dom.	- - -
34	SE	Dug	1,596	29	23	-	-	Hard	Dom.	- - -
35	NE	Brd.	1,603	32	16	12	R.M.	Hard	Dom. Stk.	Also a well 44 ft. deep
36	NW	Dug	1,600	40	8	3	R.M.	Soft	Dom. Stk.	Sufficient for 20 head

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 4, Range 6

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	NE	Dug	965	11	9	-	Drift	Hard	Dom.	Also a stock well 11 ft. deep
3	SE	Dug	1,014	13	5	-	Sand	Hard	Dom. Stk.	Sufficient for 50 head
4	SE	Dug	1,068	20	18	-	Drift	Hard	Stk.	Also a house well 20 ft. deep
5	SE	Dug	1,111	26	14	-	-	Hard	Stk.	Water is alkali
6	SW	Dug	1,339	18	2	-	Drift	Hard	Dom. Stk.	Also a dugout
8	SE	Dug	1,096	12	7	-	-	Hard	Dom. Stk.	- - -
9	NW	Dug	1,088	18	16	-	Drift	Hard	-	Two dugouts for stock
10	SE	Dug	1,005	10	-	-	Drift	Hard	Dom. Stk.	Alkali water
11	NW	Dug	999	12	9	-	Drift	Hard	Stk.	Sufficient for 20 head
13	SE	Dug	958	8	6	-	Gravel	Hard	Dom.	- - -
15	NW	Dug	984	11	-	-	Gravel	Hard	Dom. Stk.	- - -
16	SW	Dug	1,064	10	7	-	Drift	Hard	Dom. Stk.	Sufficient for 50 head
17	SW	Brd.	1,132	20	8	-	Drift	Hard	Stk.	Alkali water
18	NE	Drl.	1,137	32	28	-	Drift	Hard	Dom. Stk.	Sufficient for 30 head
19	NE	Dug	1,036	16	13	-	Drift	Hard	Stk.	- - -
20	SE	Dug	1,070	18	12	-	-	Hard	Stk.	Alkali water
21	NW	Dug	1,054	19	15	-	Sand	Hard	Dom. Stk.	Sufficient for 20 head
22	SE	Dug	987	11	6	-	Gravel	Hard	Dom. Stk.	Sufficient for 12 head
23	NW	Dug	966	22	17	-	Drift	Hard	Not	Also a dugout
27	NW	Dug	1,003	16	10	-	-	Hard	Dom. Stk.	Sufficient for 20 head
28	NE	Dug	1,011	14	11	-	Gravel	Hard	Dom. Stk.	" " 35 "
29	SW	Dug	1,072	25	17	-	Drift	Hard	Dom. Stk.	" " 30 "
30	NE	Dug	1,075	37	27	-	Drift	Hard	Stk.	- - -
31	NE	Brd.	1,067	80	-	-	Drift	Hard	Stk.	Alkali water
32	SW	Dug	1,036	12	10	-	Sand	Hard	Stk.	Sufficient for 30 head
33	SW	Dug	1,018	14	13	-	Drift	Hard	Dom. Stk.	- - -
34	SW	Dug	982	12	5	-	Gravel	Hard	Dom. Stk.	Sufficient for 30 head
35	NE	Dug	956	22	15	-	-	Hard	Dom. Stk.	" " 20 "

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 4, Range 7

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	NE	Dug	1,363	12	8	-	Drift	Hard	Dom. Stk.	- - -
2	SW	Dug	1,449	28	18	-	Gravel	Hard	Dom. Stk.	- - -
3	SW	Dug	1,464	23	8	-	-	Hard	Dom. Stk.	Sufficient for 20 head
4	NW	Dug	1,504	22	11	-	-	Hard	Dom. Stk.	- - -
5	SE	Dug	1,549	30	18	-	-	Hard	Dom. Stk.	Sufficient for 20 head
6	SW	Dug	1,608	30	27	-	-	Hard	Not	- - -
8	SE	Dug	1,527	30	29	-	Drift	Hard	Dom. Stk.	Also a dugout
9	NW	Dug	1,515	22	17	-	Drift	Hard	Dom. Stk.	Sufficient for 30 head
10	NE	Brd.	1,449	24	12	-	Drift	Hard	Dom. Stk.	- - -
12	NW	Dug	1,409	38	10	-	Drift	Hard	Dom. Stk.	Sufficient for 15 head
13	NW	Dug	1,430	20	16	-	Drift	Hard	Dom. Stk.	- - -
14	SE	Dug	1,430	68	28	-	-	Hard	Dom. Stk.	Also a well 20 ft. deep
15	SW	Dug	1,458	25	20	-	-	Hard	Dom. Stk.	Also a well 40 ft. deep
16	SW	Dug	1,516	40	39	8	R.M.	Hard	Dom. Stk.	Not sufficient
17	SE	Dug	1,535	19	11	-	-	Hard	Dom. Stk.	Sufficient for 20 head
20	NE	Dug	1,492	24	5	-	-	Hard	Dom. Stk.	- - -
21	SW	Dug	1,484	24	12	-	-	Hard	Dom. Stk.	Sufficient for 20 head
22	SE	Brd.	1,441	20	15	-	-	Hard	Dom. Stk.	" " 20 "
23	SE	Dug	1,419	30	27	3	R.M.	-	Dom. Stk.	- - -
24	NW	Brd.	1,176	50	48	-	Sand	Hard	Stk.	- - -
27	SE	Dug	1,401	20	13	-	-	Hard	Dom. Stk.	Also a dugout
28	NE	Dug	1,429	22	16	4	V.R.	Hard	Dom. Stk.	Sufficient for 25 head
29	NW	Dug	1,528	32	29	6	V.R.	Hard	Stk.	" " 40 "
30	SW	Dug	1,600	30	20	-	Gravel	Hard	Dom. Stk.	" " 20 "
34	NW	Dug	1,600	40	35	35	V.R.	Hard	Dom. Stk.	" " 20 "
33	SE	Dug	1,406	20	12	4	V.R.	Hard	Dom. Stk.	Also a bored well 28 ft. deep
34	SW	Dug	1,411	20	14	4	V.R.	Hard	Dom. Stk.	- - -
35	SW	Dug	1,314	20	16	-	-	Hard	Dom. Stk.	- - -
36	SW	Dug	1,168	30	24	-	Sand	Hard	Dom. Stk.	- - -

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 4, Range 8

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	SE	Dug	1,632	15	9	-	-	Hard	Dom.	Also a stock well 75 feet deep
3	SE	Dug	1,624	19	10	6	R.M.	Hard	Dom. Stk.	Sufficient for 20 head
4	NW	Dug	1,621	20	9	-	-	Hard	Dom.	Stock well 40 ft. deep
5	SE	Dug	1,611	20	6	-	-	Hard	Dom. Stk.	Sufficient for 40 head
7	SE	Brd.	1,584	57	10	-	-	Hard	Dom. Stk.	" " 10 "
8	SE	Dug	1,599	25	10	-	-	Hard	Dom.	Water at 18 ft.
9	SW	Brd.	1,597	45	30	-	-	Hard	Dom. Stk.	Also a well 55 ft. deep
10	NW	Brd.	1,591	45	15	-	Drift	Hard	Dom.	Also a well 48 ft. deep
11	NE	Drl.	1,621	90	18	85	R.M.	Soft	Dom. Stk.	Sufficient for 20 head
12	NE	Brd.	1,604	23	11	-	Drift	Hard	Stk.	- - -
13	NW	Brd.	1,604	13	10	-	Drift	Hard	Dom. Stk.	Not sufficient
14	SW	Brd.	1,629	40	15	-	Drift	Hard	Dom. Stk.	Sufficient for 20 head
15	SE	Brd.	1,630	26	10	6	R.M.	Hard	Dom.	Also a bored well 70 ft. deep
16	SE	Brd.	1,604	65	25	35	R.M.	Hard	Dom. Stk.	- - -
17	NW	Brd.	1,614	150	12	-	-	Hard	Dom. Stk.	Sufficient for 40 head
18	NE	Dug	1,609	25	6	10	R.M.	Hard	Dom.	Stock well 35 ft. deep
19	NE	Dug	1,640	90	28	12	R.M.	Hard	Stk.	House well 40 ft. deep
20	NW	Dug	1,627	20	12	12	R.M.	Hard	Dom.	- - -
22	NW	Brd.	1,665	80	10	20	R.M.	Hard	Stk.	Two other wells on farm
23	SE	Brd.	1,601	38	8	6	R.M.	Hard	Dom. Stk.	Dugout for stock
24	NW	Dug	1,606	53	7	-	-	Hard	Dom.	School well
25	SW	Dug	1,599	19	12	-	-	Hard	Dom. Stk.	- - -
26	SE	Dug	1,611	41	10	12	R.M.	Hard	Dom. Stk.	- - -
27	NW	Drl.	1,639	117	44	88	R.M.	Soft	Dom. Stk.	- - -
29	SE	Brd.	1,639	20	8	-	-	Hard	Dom.	Also a stock well 23 ft. deep
30	NE	Dug	1,637	22	10	4	R.M.	Soft	Dom. Stk.	Sufficient for 60 head
31	SE	Dug	1,636	18	12	10	R.M.	Hard	Dom. Stk.	- - -
32	SW	Brd.	1,635	60	25	30	R.M.	Hard	Dom. Stk.	Sufficient for 40 head
34	NE	Dug	1,615	39	13	12	R.M.	Hard	Dom.	Also a stock well 52 ft. deep
36	SE	Brd.	1,606	34	8	31	R.M.	Hard	Stk.	- - -

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 4, Range 9

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	SW	Dug	1,631	30	20	5	R.M.	Hard	Dom.	- - -
2	SE	Brd.	1,625	42	20	-	R.M.	Hard	Dom. Stk.	Sufficient for 20 head
4	SE	Dug	1,576	48	-	-	R.M.	Hard	Dom. Stk.	Sufficient for 20 head
5	NE	Dug	1,559	45	15	12	R.M.	Hard	Dom. Stk.	Sufficient for 50 head
7	NE	Brd.	1,536	28	23	-	R.M.	Hard	Dom.	- - -
8	NW	Dug	1,546	26	20	20	R.M.	Hard	Dom. Stk.	Sufficient for 30 head
10	SW	Dug	1,552	12	6	4	R.M.	Hard	Dom. Stk.	" " 30 "
11	SE	Dug	1,621	25	15	-	R.M.	Hard	Stk.	Sufficient for 60 head
12	SW	Brd.	1,626	35	20	8	R.M.	Hard	Dom. Stk.	" " 25 "
13	NE	Dug	1,596	27	16	-	-	Hard	Dom. Stk.	- - -
14	SW	Dug	1,576	28	22	-	-	Hard	Stk.	Sufficient for 50 head
15	SE	Drl.	1,571	135	-	-	R.M.	Soft	Dom. Stk.	- - -
16	NW	Brd.	1,553	45	10	15	R.M.	Hard	Dom. Stk.	Sufficient for 40 head
17	SW	Brd.	1,540	48	28	10	R.M.	Hard	Dom. Stk.	Also a dug well 24 ft. deep
18	SW	Drl.	1,544	42	15	-	Drift	Hard	Dom. Stk.	- - -
19	SE	Dug	1,529	28	25	-	-	Hard	Dom. Stk.	Sufficient for 48 head
20	SW	Brd.	1,534	20	17	-	-	Hard	Dom. Stk.	" " 20 "
21	NW	Drl.	1,594	122	30	-	-	Soft	Dom. Stk.	Two other wells 60 and 80 ft. deep
22	SE	Brd.	1,594	50	25	3	R.M.	Hard	Dom. Stk.	Sufficient for 40 head
24	SE	Dug	1,613	30	12	6	R.M.	Hard	Dom. Stk.	" " 40 "
26	SE	Dug	1,613	29	19	-	-	Hard	Dom. Stk.	" " 30 "
27	NE	Dug	1,622	46	40	20	R.M.	Hard	Dom. Stk.	" " 15 "
29	SE	Brd.	1,583	80	20	-	R.M.	Hard	Dom. Stk.	Also a dug well 30 ft. deep
30	SE	Brd.	1,553	47	17	25	R.M.	Hard	Dom. Stk.	Sufficient for 25 head
31	NE	Dug	1,564	22	16	-	-	Hard	Stk.	- - -
32	NW	Dug	1,563	51	35	30	R.M.	Hard	Dom. Stk.	Also a well 52 ft. deep
33	NW	Dug	1,616	20	12	5	R.M.	Hard	Dom. Stk.	Sufficient for 25 head
34	NE	Dug	1,642	40	15	12	R.M.	Hard	Dom. Stk.	Also a bored well 105 ft. deep

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 5, Range 6

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
2	SE	Dug	957	30	24	-	-	Hard	Dom. Stk.	Sufficient supply
3	NE	Dug	954	11	7	-	Drift	Hard	Dom. Stk.	Sufficient for 15 head
4	NW	Dug	991	15	8	-	Gravel	Hard	Dom. Stk.	Abundant supply
6	NW	Dug	1,064	35	18	-	Gravel	Hard	Dom. Stk.	Sufficient for 80 head
7	NE	Dug	1,033	19	10	-	Sand	Hard	Dom. Stk.	" " 20 "
8	NE	Dug	996	22	19	-	Gravel	Hard	Dom. Stk.	" " 55 "
9	SW	Dug	992	14	9	-	Drift	Hard	Dom. Stk.	- - -
10	SE	Dug	957	115	-	-	-	Hard	Dom. Stk.	- - -
13	NE	Dug	929	54	13	-	-	Hard	Stk.	- - -
14	NE	Drl.	940	140	29	-	Sand	-	-	Water at 130 ft. in coarse sand
15	NW	Dug	957	12	6	-	-	Hard	Stk.	- - -
16	NW	Dug	981	26	17	-	-	Hard	Dom.	Also a well 40 ft. deep
17	SW	Dug	1,009	20	14	-	Sand	Hard	Dom. Stk.	Sufficient for 20 head
18	SW	Dug	1,020	12	6	-	Gravel	Hard	Dom. Stk.	" " 15 "
19	SW	Dug	996	25	10	-	Sand	Hard	Dom. Stk.	" " 35 "
20	SW	Dug	979	13	7	-	-	Hard	Dom. Stk.	" " 40 "
21	SW	Dug	983	21	14	-	Drift	Hard	Stk.	Temp. of water 42° F.
23	NW	Drl.	939	160	40	-	-	Hard	Dom. Stk.	Sufficient for 65 head
24	SE	Drl.	929	112	30	-	-	Hard	Dom. Stk.	" " 50 "
25	SW	Dug	931	24	10	-	-	Hard	Dom. Stk.	- - -
28	SE	Dug	961	18	14	-	Drift	Hard	Stk.	Sufficient for 30 head
29	SE	Drl.	962	117	15	-	-	Hard	Dom. Stk.	Also a well dug 22 ft. deep
31	SE	Drl.	978	200	50	-	Gravel	Soft	Dom.	Not sufficient
32	SE	Dug	967	21	11	-	Drift	Hard	Dom.	- - -
33	SW	Drl.	967	60	30	-	Drift	Hard	Dom. Stk.	Sufficient for 15 head
34	NW	Dug	949	18	1	-	Sand	Hard	Dom. Stk.	" " 15 "
35	NE	Drl.	922	120	33	-	-	Hard	Dom. Stk.	" " 60 "
36	NW	Dug	925	14	11	-	-	Hard	Dom.	Also a drilled well 220 ft. deep

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 5, Range 7

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
2	SE	Dug	1,090	15	9	-	Drift	Hard	Dom. Stk.	- - -
3	NE	Dug	1,198	36	26	-	-	Hard	Stk.	Sufficient for 20 head
4	SE	Dug	1,414	30	25	10	V.R.	Hard	Dom. Stk.	Not sufficient
5	SW	Dug	1,459	26	20	-	Drift	Hard	Dom.	Also a stock well
7	SE	Dug	1,456	38	16	14	V.R.	Hard	Dom. Stk.	Water at 35 ft. in shale
8	NE	Dug	1,406	25	15	12	V.R.	Hard	Dom. Stk.	Sufficient for 30 head
9	SE	Dug	1,336	20	16	-	Drift	-	Stk.	Not sufficient
10	SW	Dug	1,308	29	12	-	-	Hard	Dom. Stk.	- - -
11	SW	Dug	1,147	12	9	-	Drift	Hard	Dom. Stk.	Sufficient for 40 head
13	SE	Dug	1,059	24	19	-	Gravel	Hard	Dom. Stk.	- - -
14	SW	Dug	1,109	20	10	-	-	Hard	Dom. Stk.	Sufficient for 20 head
15	SW	Dug	1,212	22	19	-	-	Hard	Dom. Stk.	" " 30 "
17	NE	Dug	1,405	25	8	-	-	Hard	Dom.	- - -
18	SE	Dug	1,420	50	12	10	V.R.	Hard	Dom. Stk.	- - -
20	SW	Dug	1,412	16	8	-	-	Hard	Stk.	Also a house well dug 14 ft. deep
22	NE	Dug	1,103	20	15	-	Drift	Hard	Dom. Stk.	Sufficient for 35 head
23	SW	Dug	1,111	54	44	-	-	Hard	Dom. Stk.	" " 20 "
25	NW	Dug	998	17	13	-	-	Hard	Stk.	- - -
26	SW	Dug	1,054	26	23	-	-	Hard	Dom. Stk.	Temp. of water 23°F.
28	NE	Dug	1,126	30	25	-	Sand	Hard	Dom. Stk.	- - -
30	NW	Dug	1,427	60	35	-	-	Soft	Dom. Stk.	Sufficient for 25 head
31	SW	Dug	1,390	6	4	-	-	Soft	Dom. Stk.	- - -
32	NW	Dug	1,275	26	16	24	V.R.	Hard	Dom. Stk.	Sufficient for 40 head
34	SW	Dug	1,110	29	22	-	Sand	Hard	Dom. Stk.	Sufficient for 75 head
35	SW	Dug	1,049	35	20	-	Drift	Hard	Dom. Stk.	" " 40 "
35	NW	Dug	959	20	10	-	-	Hard	Dom. Stk.	" " 30 "
36	NE	Dug	990	19	8	-	-	Hard	Stk.	- - -

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 5, Range 8

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
3	NE	Brd.	1,599	56	10	18	V.R.	Hard	Stk.	Sufficient for 50 head
5	SW	Dug	1,644	17	10	-	-	Hard	Dom.	- - -
6	SE	Brd.	1,653	35	20	34	R.M.	Soft	Dom. Stk.	Sufficient for 25 head
7	SW	Dug	1,623	18	7	10	R.M.	Hard	Dom.	Also a stock well 60 ft. deep
8	NW	Dug	1,644	16	14	-	-	Hard	Dom.	Also a drilled well for stock
9	NE	Brd.	1,617	53	23	-	-	Hard	Dom. Stk.	Sufficient for 25 head
13	NE	Dug	1,488	20	17	4	R.M.	Hard	Dom.	Also a stock well bored 45 ft. deep
14	NE	Dug	1,521	28	18	24	R.M.	Hard	Dom.	Also a stock well 19 ft. deep
16	NE	Dug	1,587	28	19	-	-	Hard	Dom. Stk.	Sufficient for 25 head
17	SE	Dug	1,625	30	7	-	-	Hard	Dom. Stk.	- - -
18	SE	Brd.	1,620	63	20	20	R.M.	Hard	Dom.	Also a stock well
18	SW	Dug	1,626	40	5	8	R.M.	Hard	Dom. Stk.	Also a well 32 ft. deep
19	NE	Dug	1,602	45	15	10	R.M.	Hard	Dom. Stk.	Sufficient for 20 head
21	NW	Dug	1,506	35	29	10	R.M.	Hard	Dom. Stk.	Also a well 26 ft. deep
22	SE	Dug	1,579	25	15	-	-	Hard	Dom.	Also a stock well 30 ft. deep
23	NE	Dug	1,464	18	7	-	-	Hard	Not	- - -
24	SW	Dug	1,479	18	11	-	-	Hard	Dom. Stk.	Sufficient for 15 head
26	NE	Dug	1,454	25	10	-	Drift	Hard	Dom.	Also a well 45 ft. deep
27	NE	Brd.	1,500	34	18	15	R.M.	Hard	Dom. Stk.	Sufficient for 30 head
29	SE	Dug	1,549	13	-	-	-	Hard	Dom. Stk.	- - -
30	NE	Dug	1,579	32	20	-	-	Hard	Dom. Stk.	Sufficient for 26 head
31	SE	Dug	1,575	16	12	6	R.M.	Hard	Dom. Stk.	" " 25 "
32	SW	Dug	1,587	21	13	4	R.M.	Hard	Dom. Stk.	" " 15 "
33	NW	Brd.	1,524	20	10	15	R.M.	Hard	Dom. Stk.	" " 30 "
34	SW	Dug	1,505	12	7	-	Drift	Hard	Dom. Stk.	" " 30 "
35	NW	Dug	1,445	32	18	-	-	Hard	Dom. Stk.	- - -
36	SE	Brd.	1,405	27	14	4	R.M.	Hard	Dom. Stk.	Water at 14 ft. in shale

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 5, Range 9

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	NW	Dug	1,620	30	24	-	-	Hard	Dom. Stk.	Also a well 35 ft. deep
2	NE	Dug	1,651	32	31	-	-	Hard	Dom. Stk.	- - -
3	NW	Dug	1,618	30	15	15	R.M.	Hard	Dom. Stk.	- - -
5	SE	Brd.	1,592	80	23	-	R.M.	Hard	Stk.	Sufficient for 18 head
6	NE	Dug	1.569	27	10	-	-	Hard	Dom. Stk.	" " 15 "
7	NE	Brd.	1,584	50	30	-	-	Hard	Dom. Stk.	" " 20 "
8	SW	Dug	1,570	22	10	15	R.M.	Hard	Dom. Stk.	- - -
10	SE	Brd.	1,645	100	30	10	R.M.	Hard	Dom. Stk.	Two other wells 50 and 15 ft. deep
11	NW	Dug	1,654	26	21	10	R.M.	Hard	Dom.	Also a stock well 50 ft. deep
12	NW	Brd.	1.608	60	30	45	R.M.	Hard	Stk.	Also a house well 13 ft. "
13	NE	Dug	1,631	22	15	-	-	Soft	Dom. Stk.	- - -
14	NE	Dug	1,604	30	12	-	-	Hard	Dom. Stk.	Also a well 25 ft. deep
16	SE	Dug	1,646	32	17	6	R.M.	Hard	Stk.	Also a house well 22 ft. deep
17	NE	Brd.	1,546	68	28	25	R.M.	Hard	Dom. Stk.	Sufficient for 20 head
18	SW	Dug	1,537	22	16	-	-	Hard	Stk.	" " 30 "
20	SE	Dug	1,591	45	30	10	R.M.	Hard	Dom. Stk.	Also a well 40 ft. deep
21	SE	Dug	1,649	35	33	8	R.M.	Hard	Dom. Stk.	Also a well 16 ft. deep
23	NE	Dug	1,633	17	15	6	R.M.	Hard	-	Also a well 19 ft. deep
24	NW	Dug	1,612	50	30	8	R.M.	Hard	Dom. Stk.	Sufficient for 18 head
25	SE	Dug	1,646	28	24	10	R.M.	Hard	Dom.	Stock well 25 ft. deep
26	NW	Dug	1,604	26	11	16	R.M.	Hard	Dom. Stk.	- - -
27	SE	Dug	1,604	41	17	-	R.M.	Hard	Dom. Stk.	Sufficient for 25 head
28	SE	Dug	1,625	40	12	6	R.M.	Hard	Dom. Stk.	" " 25 "
29	SW	Brd.	1,564	18	10	-	-	Hard	Dom.	- - -
30	SW	Dug	1,551	41	28	-	-	Hard	Dom. Stk.	- - -
31	SW	Dug	1,564	29	28	12	R.M.	Hard	Dom. Stk.	- - -
32	NW	Dug	1,569	26	21	-	-	Hard	Dom. Stk.	- - -
33	SE	Dug	1,576	38	30	-	-	Hard	Dom. Stk.	Sufficient for 22 head
34	NW	Dug	1,580	21	18	18	R.M.	Hard	Dom.	Also a stock well 22 ft. deep
36	SE	Dug	1,602	23	15	-	-	Hard	Dom.	- - -

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 6, Range 6

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	NE	Drl.	919	190	15	-	-	Hard	Not	Also a bored well 80 ft. deep
2	SE	Drl.	930	110	20	-	-	Hard	Stk.	Also a house well 10 ft. deep
3	SE	Dug	954	18	8	-	-	Hard	Dom.	Also a drilled well over 100 ft. deep
5	SW	Dug	977	16	11	-	Sand	Hard	Dom. Stk.	- - -
6	NE	Dug	978	16	6	-	Sand	Hard	Dom. Stk.	- - -
7	NE	Dug	986	22	12	-	Drift	Hard	Dom. Stk.	Sufficient for 40 head
8	SW	Dug	977	18	15	-	-	Hard	Dom. Stk.	" " 16 "
9	NW	Dug	963	13	10	-	Sand	Hard	Dom. Stk.	" " 25 "
11	NW	Dug	945	16	10	-	-	Hard	Dom. Stk.	- - -
12	NW	Drl.	927	225	27	-	Gravel	Hard	Not	Water in gravel at 225 ft.
13	NE	Drl.	920	105	14	-	-	Hard	Dom. Stk.	Sufficient for 30 head
14	SE	Dug	939	18	7	-	-	Hard	Dom. Stk.	Temp. of water 42° F.
15	SE	Drl.	959	160	12	-	Gravel	Hard	Stk.	Water in gravel at 150 ft.
17	SE	Dug	973	14	6	-	Sand	Hard	Dom. Stk.	Sufficient for 40 head
19	SW	Dug	990	18	8	-	Sand	Hard	Dom. Stk.	" " 80 "
20	SW	Dug	980	24	8	-	Sand	Hard	Dom. Stk.	" " 40 "
21	SW	Dug	965	12	8	-	Drift	Hard	Dom. Stk.	- - -
23	SE	Drl.	938	272	40	-	Sand	Hard	Stk.	Sufficient for 55 head
24	NW	Brd.	921	77	26	-	-	-	-	- - -
26	SE	Dug	913	24	20	-	Drift	Hard	Dom.	- - -
27	SE	Dug	935	12	9	-	Drift	Hard	Dom. Stk.	Sufficient for 35 head
29	NW	Dug	954	12	8	-	Drift	Hard	Dom. Stk.	- - -
30	NW	Dug	986	14	9	-	Sand	Hard	Dom. Stk.	Sufficient for 15 head
31	NW	Dug	984	9	6	-	Sand	Hard	Dom. Stk.	" " 9 "
33	NW	Dug	960	14	9	-	Sand	Hard	Dom. Stk.	" " 40 "
34	SW	Dug	944	13	9	-	Sand	Hard	Dom.	- - -
35	SE	Drl.	935	200	29	-	-	Hard	Stk.	Sufficient for 50 head
36	SE	Dug	934	22	6	-	Drift	Hard	Stk.	" " 35 "

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 6, Range 7

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	NE	Dug	988	21	10	-	-	Hard	Dom. Stk.	- - -
2	NW	Dug	996	13	8	-	-	Hard	Dom. Stk.	- - -
3	SW	Dug	1,036	14	11	-	Drift	Hard	Dom.	School well
5	NW	Brd.	1,263	40	24	-	Sand	Hard	Dom. Stk.	- - -
6	SE	Brd.	1,279	38	33	-	Sand	Hard	Dom. Stk.	- - -
10	SE	Dug	1,007	10	7	-	-	Hard	Dom. Stk.	- - -
11	NW	Dug	1,000	20	15	-	-	Hard	Stk.	- - -
12	SE	Dug	988	18	10	-	Sand	Hard	Dom. Stk.	- - -
13	NE	Dug	988	14	10	-	Sand	Hard	Dom.	- - -
14	SE	Dug	998	14	10	-	Sand	Hard	Dom. Stk.	Sufficient for 75 head
15	NE	Dug	1,007	18	12	-	Drift	Hard	Dom. Stk.	" " 25 "
16	NW	Dug	1,036	15	12	-	Drift	Hard	Dom. Stk.	" " 20 "
17	NE	Dug	1,048	16	8	-	Sand	Hard	Dom. Stk.	" " 60 "
18	NW	Dug	1,098	18	16	-	Gravel	Hard	Dom. Stk.	- - -
20	NE	Dug	1,014	14	10	-	Drift	Hard	Dom. Stk.	Sufficient for 50 head
21	NE	Dug	1,009	16	13	-	Drift	Hard	Dom. Stk.	- - -
22	SW	Dug	1,008	16	12	-	Sand	Hard	Dom. Stk.	- - -
23	NW	Dug	1,002	23	12	-	Sand	Hard	Dom. Stk.	" " 80 "
24	NW	Dug	992	25	10	-	Sand	Hard	Dom. Stk.	" " 40 "
25	SE	Dug	989	11	10	-	-	Hard	Stk.	- - -
26	NE	Dug	993	9	5	-	Drift	Hard	Dom. Stk.	Water is a yellow colour
27	NW	Dug	1,002	14	12	-	Sand	Hard	Dom. Stk.	- - -
28	NE	Dug	1,009	12	10	-	Drift	Hard	Dom. Stk.	- - -
32	SW	Dug	1,031	14	12	-	Drift	Hard	Dom. Stk.	Not sufficient
33	SW	Dug	1,011	14	10	-	Sand	Hard	Dom. Stk.	Sufficient for 30 head
34	SE	Dug	973	17	14	-	-	Hard	Dom. Stk.	" " 20 "
35	NE	Dug	991	8	7	-	Sand	Hard	Dom. Stk.	- - -
36	SE	Dug	986	11	9	-	Sand	Hard	Dom. Stk.	- - -

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 6, Range 8

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	SE	Dug	1,329	15	10	14	V.R.	Hard	Dom. Stk.	Sufficient for 30 head
3	NE	Dug	1,423	31	23	-	-	Hard	Dom. Stk.	" " 15 "
4	NE	Dug	1,480	30	10	-	-	Hard	Dom.	- - -
5	SE	Dug	1,529	28	17	20	V.R.	Hard	Dom. Stk.	" " 23 "
6	NE	Dug	1,545	21	15	10	V.R.	Hard	Dom. Stk.	" " 15 "
7	SW	Dug	1,556	20	15	-	-	Hard	Dom. Stk.	" " 15 "
8	SE	Dug	1,533	31	14	-	-	Hard	Dom. Stk.	" " 30 "
9	SE	Dug	1,464	18	14	-	Drift	Hard	Dom.	Well at St. Lupicin Store
10	SW	Dug	1,460	20	18	-	Drift	Hard	Dom. Stk.	- - -
11	SE	Dug	1,345	27	20	-	-	Hard	Dom.	- - -
12	NE	Dug	1,282	35	25	-	Sand	Hard	Dom. Stk.	- - -
13	SW	Dug	1,130	15	10	-	Gravel	Hard	Dom.	- - -
14	NE	Dug	1,272	14	6	-	Drift	Hard	Dom. Stk.	Not sufficient for 10 head
15	NE	Dug	1,330	9	2	-	Drift	Hard	Dom. Stk.	Sufficient for 50 head
17	SW	Dug	1,500	32	19	-	-	Hard	Dom. Stk.	- - -
18	NW	Dug	1,519	39	19	-	-	Hard	Dom. Stk.	- - -
19	NE	Dug	1,512	28	23	-	Drift	Hard	Dom. Stk.	Sufficient for 15 head
21	SW	Dug	1,513	35	25	-	-	Hard	Dom. Stk.	" " 10 "
22	NW	Dug	1,398	28	20	-	Sand	Hard	Dom. Stk.	- - -
26	NE	Drl.	1,252	108	33	-	Gravel	Hard	Dom. Stk.	Sufficient for 33 head
27	NW	Dug	1,350	10	5	-	Gravel	Hard	Dom. Stk.	" " 22 "
28	SE	Dug	1,382	47	40	-	-	Hard	Dom. Stk.	" " 30 "
30	SE	Dug	1,538	38	34	-	Drift	Hard	Dom. Stk.	" " 15 "
31	NW	Dug	1,551	18	11	-	Sand	Hard	Dom. Stk.	" " 35 "
32	NW	Dug	1,503	40	35	-	-	Hard	Dom. Stk.	" " 25 "
33	SE	Dug	1,345	19	13	-	-	Hard	Dom. Stk.	- - -
34	SW	Dug	1,539	18	8	-	Drift	Hard	Dom. Stk.	Sufficient for 20 head
36	SE	Dug	1,121	8	4	-	Sand	Hard	Dom. Stk.	" " 20 "

REPRESENTATIVE WELL RECORDS, MANITOU AREA, MANITOBA

Township 6, Range 9

Sec.	¼	Type of well	Elev. (feet)	Depth (feet)	Depth to water (feet)	Depth to bedrock (feet)	Aquifer	Quality of water	Use	Remarks
1	NE	Dug	1,574	22	18	11	R.M.	Hard	Dom.	Also a stock well 36 ft. deep
3	SE	Dug	1,574	28	8	-	R.M.	Hard	Dom. Stk.	Sufficient for 15 head
4	SW	Dug	1,574	30	20	-	-	Hard	Dom. Stk.	- - -
5	SE	Dug	1,562	30	24	-	-	Hard	Dom. Stk.	Sufficient for 30 head
6	SE	Dug	1,598	36	18	-	-	Hard	Dom. Stk.	" " 20 "
7	SW	Dug	1,543	50	-	-	-	Hard	Dom. Stk.	" " 30 "
8	NE	Dug	1,557	43	19	-	-	Hard	Dom. Stk.	" " 20 "
12	NW	Dug	1,544	20	15	5	R.M.	Hard	Dom.	Also a stock well 30 ft. deep
13	SE	Dug	1,544	25	17	12	R.M.	Soft	Dom. Stk.	- - -
13	SW	Dug	1,537	35	10	9	R.M.	Hard	Dom.	Also a bored well 32 ft. deep
14	SE	Dug	1,547	34	24	9	R.M.	Hard	Dom. Stk.	- - -
15	NE	Dug	1,570	22	12	-	-	Hard	Dom. Stk.	Sufficient for 15 head
16	SE	Dug	1,570	40	25	-	Gravel	Hard	Dom. Stk.	" " 15 "
17	NW	Brd.	1,552	22	18	-	-	Hard	Dom. Stk.	" " 30 "
18	SE	Dug	1,546	25	11	-	Drift	Hard	Dom. Stk.	Two other wells 26 and 12 ft. deep
19	NE	Dug	1,548	21	16	-	-	Hard	Dom. Stk.	- - -
20	SW	Dug	1,554	33	29	12	R.M.	Soft	Dom. Stk.	Sufficient for 30 head
21	NW	Dug	1,568	31	19	20	R.M.	Hard	Dom. Stk.	- - -
22	SW	Dug	1,592	34	29	-	-	Hard	Dom. Stk.	Sufficient for 25 head
23	SW	Dug	1,523	44	14	14	R.M.	Hard	Stk.	- - -
24	SE	Dug	1,510	35	25	-	Sand	Hard	Dom.	- - -
25	NW	Dug	1,527	30	15	6	R.M.	Hard	Dom. Stk.	Sufficient for 30 head
27	SE	Dug	1,560	25	18	-	R.M.	Hard	Dom. Stk.	" " 25 "
28	NW	Dug	1,546	27	14	-	-	Hard	Dom. Stk.	- - -
29	SE	Dug	1,573	33	24	26	R.M.	Hard	Dom. Stk.	- - -
30	SW	Dug	1,565	30	20	10	R.M.	Hard	Dom. Stk.	Sufficient for 30 head
31	SE	Dug	1,535	16	14	12	R.M.	Hard	Dom.	- - -
32	SW	Dug	1,556	35	33	20	R.M.	Hard	Dom. Stk.	Also a well bored 90 ft. deep
34	NW	Dug	1,568	22	15	-	-	Hard	Dom.	Also a stock well 36 ft. deep
36	SE	Dug	1,570	48	37	-	-	Hard	Dom. Stk.	Sufficient for 15 head