



**GROUNDWATER EVALUATION –
CHINOOK RIDGE LODGE AND
GOLF COURSE, SE-31-28-3-W.5**

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Executive Summary

Chinook Ridge Lodge and Golf Course has carried out a drilling and testing program to identify and license sufficient groundwater for year-round operation of a lodge and restaurant, with additional water to be used for irrigation of the greens during the summer months. An aquifer test was conducted consisting of 24-hours pumping at 98.2 cubic metres per day (18.0 U.S. gallons per minute) followed by 24-hours of recovery, measuring the time-drawdown effects in the production well and in two monitoring wells at 49 and 50 m distance in different directions. The test has shown that the aquifer has a transmissive capacity of $62.6 \text{ m}^2/\text{day}$. It was observed that the well is completed in a confined aquifer, which is not under the influence of surface water.

The Moell method for estimating long-term sustainable yield show that the well is theoretically capable of pumping about 64.4 cubic metres per day. However, the well can be pumped for short periods of up to several days at a time at rates up to $98.2 \text{ m}^3/\text{day}$ in summer when needed for irrigation. Conversely, in the cooler part of the year, rates would need to be correspondingly lower than $64.4 \text{ m}^3/\text{day}$ in order to not exceed the annual total of $64.4 \times 365 = 23,506 \text{ m}^3/\text{year}$. This annual total is to meet the needs of the lodge, restaurant and for irrigation. The interference caused by this diversion, if it were to be continuous for 20 years and without recharge, would be less than 1 m at the wells of the nearest other well-owners. Considering the amount of available head in neighbouring wells completed in the same hydrostratigraphic zone, this interference may be ignored.

Water samples were analyzed for routine potability, metals and bacterial parameters. None of the routine chemical parameters exceed the Canadian Drinking Water Guideline. However, the water is very hard, and softening should be considered for certain uses, in order to minimize or avoid buildup of deposits in water lines and water heaters. All metals are below the standard, and no bacterial parameters are present.

The aquifer completed and tested at this location is confined by over 9 m of confining clay, shale and interbedded shale/sandstone strata. The hydrogeological context of the well and its behaviour during the aquifer test both indicate that the groundwater in this aquifer is not under the influence of surface water. Thus there should be no problem for licensing of a diversion for commercial purposes in this area.

The location of the lodge and golf course is almost exactly on the axis of the Alberta Geosyncline, where compressive tectonic forces predominate. Hence aquifers are generally of low capacity and limited size, as in the case of this location. Despite the indication that the water supply is adequate, according to the requirements of the *Groundwater Evaluation Guideline*, it is recommended to use all reasonable and prudent means of making efficient use of groundwater and reducing waste to a minimum.

It was noticed that recovery was incomplete at the end of testing in all three of the wells used in the testing. Thus it is essential to use all possible prudence in water use and to monitor very closely the groundwater levels and production during the first two years of full operation of the facility.

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1.0 Introduction

1.1 BACKGROUND INFORMATION

Chloe Cartwright is planning to develop a year round lodge and seasonal golf course, to be located in SE-31-28-3-W.5. This location is about 6 km southeast of Cremona, Alberta. The area partially wooded and could be described as gently hilly in topography. The intention of the developer of this complex is to obtain enough groundwater for servicing the lodge. The lodge will include 20 rooms plus a restaurant, which will be open all year. The estimated water demand for these purposes is 10.0 m³/day based on unit water demand figures provided in Table 5.1 of Alberta Environment's "Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems". Any additional groundwater available which is surplus to these needs will be available for use when irrigation of the golf course is considered necessary. The application amount is therefore 23,360 m³/year.

This report and the field investigations described therein have been carried out in order to support an application to Alberta Environment to divert the quantity of groundwater required to operate the complex up to this amount. Should additional water be needed for irrigation purposes, it will be the subject of a separate application to divert surface water.

Figure 1.1 is a regional site plan, showing the location of the project in relation to nearby communities.

1.2 GEOMORPHIC AND GEOLOGIC SETTING

The geological materials at the land surface are Pleistocene till deposits in the form of draped moraine. These are an unconsolidated mixture of blue and brown clay, silt, sand and gravel with some boulders. These deposits may be up to 30 m thick, and are draped over the underlying bedrock strata. The topography is gently undulating (Shetsen, 1990). Several minor meltwater channels intersect the area. There are several minor irregularly shaped hills also of ice-thrust moraine.

Below the till is the Paleocene Paskapoo Formation, which consists of grey to greenish grey thick-bedded calcareous cherty sandstone, grey and green siltstone and mudstone, minor conglomerate, thin limestone, coal and tuff beds. The formation was deposited in a non-marine environment (*Hamilton, et al, 1999*).

In terms of geologic structure, the area is about 8 km east of the so-called disturbed belt, where the strata are fractured and faulted at the beginning of the foothills of the Rocky Mountains. The area is located almost exactly in the trough of the Alberta Geosyncline, where the sediments are the thickest and compressive geologic forces predominate over tensional forces.

The Paskapoo Formation present here has been subdivided by geologists into several members. In this area, the Dalehurst Member is present just below the till. It consists mainly of interbedded shale and siltstone, with lesser sandstone, bentonite and coal. Siltstones, mudstones and shales are light grey to olive green. Few of the primary sedimentary structures are preserved, except for rare planar and ripple cross-lamination. Plant fragments are abundant. Sandstones are very fine to medium grained, light grey to yellowish-brown weathering, planar and wavy bedding common. Coal is thin and argillaceous but invariably present. The strata are dipping westward. The Dalehurst Member is about 800 m thick in this area.

The more recent regional groundwater evaluation carried out for County of Rocky View in 2002 indicates that individual wells in this area would yield between 5 and 30 cubic metres per day, and that the water would be mainly of a sodium sulfate type. Total dissolved solids are expected to be between 500 and 1,000 mg/L, sulfate mainly above 400 mg/L, and chloride under 50 mg/L. The depth to the base of groundwater protection is considered to be about 600 to 700 m deep. This is the depth at which groundwater attains a total dissolved solids level of 4,000 mg/L, and is therefore considered unfit for human consumption. Fluoride is reported to be below the standard in most samples and chloride is generally below 10 mg/L.

The area of the facility is considered to be a recharge area and historical groundwater levels are reported to have dropped between 0 and 5 m, according to available records.

1.3 WELL COMPLETION DETAILS

Wild Rose Water Wells Ltd. was retained by the developer to carry out an exploration program and well testing program on the property. An existing well previously drilled by another contractor near the east side of the property, for which no drilling record was ever prepared, was tested by Wild Rose, and a test hole was also drilled to the north of the residence. The locations are shown in Figure 1.2. Wild Rose also drilled an additional test hole, the new production well and two monitoring wells west of the residence, near the quarter-section line. Figure 1.3 shows schematically the construction of the new production well and the two adjacent monitoring wells.

Figure 1.4 is a west to east hydrogeologic profile through the pumping well used in the aquifer test, as well as wells to the west and east of the property.

1.4 FIELD VERIFIED SURVEY

Table 1.1 is a summary of the characteristics of all known water wells within approximately 1.5 km of the site, based on well records in the Alberta Environment database. The locations of these wells identified are shown in Figure 1.5. However, the owner of the proposed development also verified in the field the existence of wells actually in existence and in use. This information is detailed in Table 1.2. It also shows the location of the profile of Figure 1.4. The well records have been included in Appendix B.

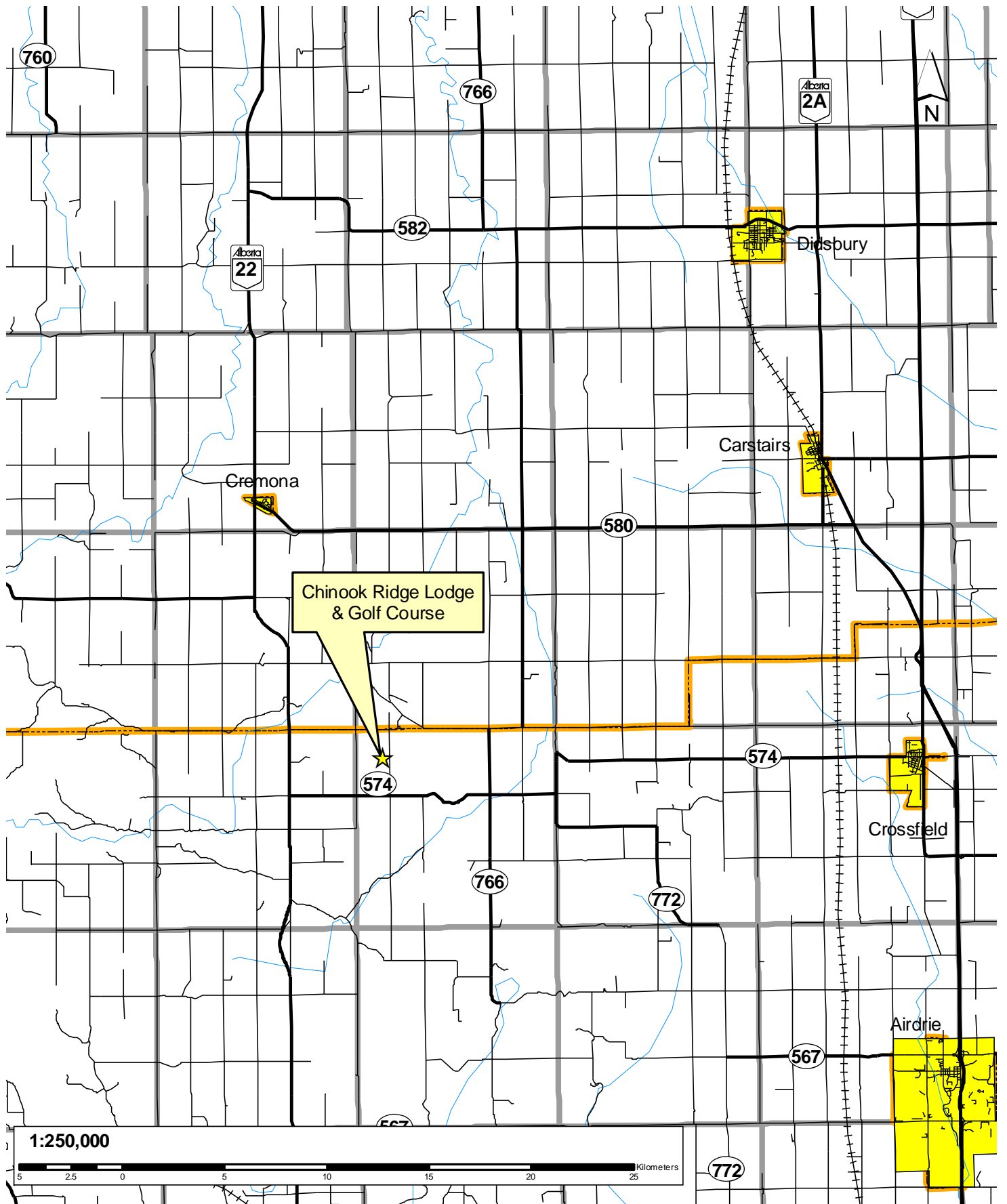


FIGURE 1.1
 CHINOOK RIDGE LODGE &
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 LOCATION MAP

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FIGURE 1.2
CHINOOK RIDGE LODGE &
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DETAILS OF GOLF
COURSE AREA

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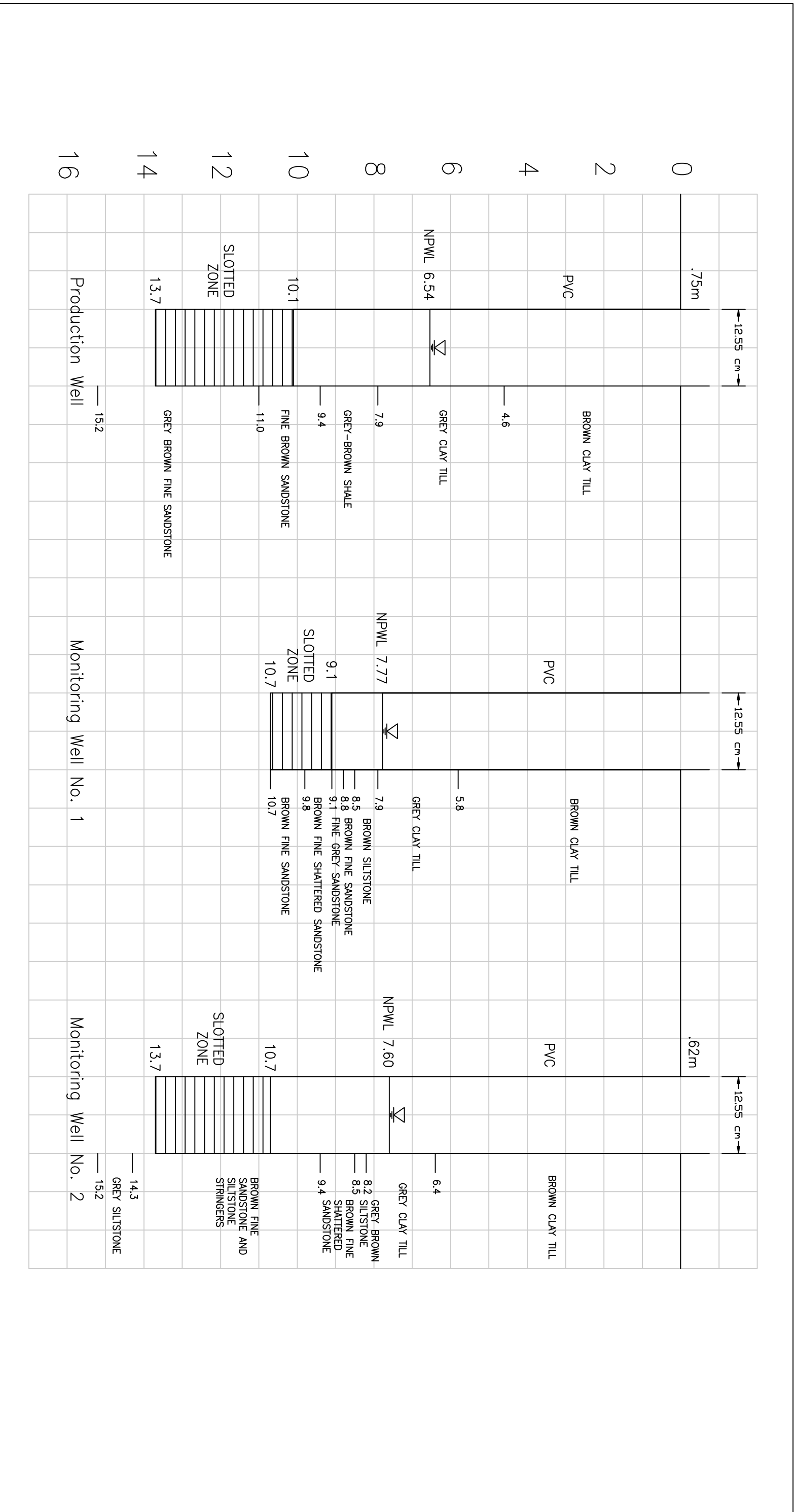


FIGURE 1.3

CONSTRUCTION OF WELLS

NOTES:
 VERTICAL SCALE: 1:10
 HORIZONTAL SCALE:
 VERTICAL EXAGGERATION 1X

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FIGURE 1.4

HYDROGEOLOGIC PROFILE - WEST TO EAST

NOTES:
 VERTICAL SCALE 1:10
 HORIZONTAL SCALE:
 VERTICAL EXAGGERATION 1X

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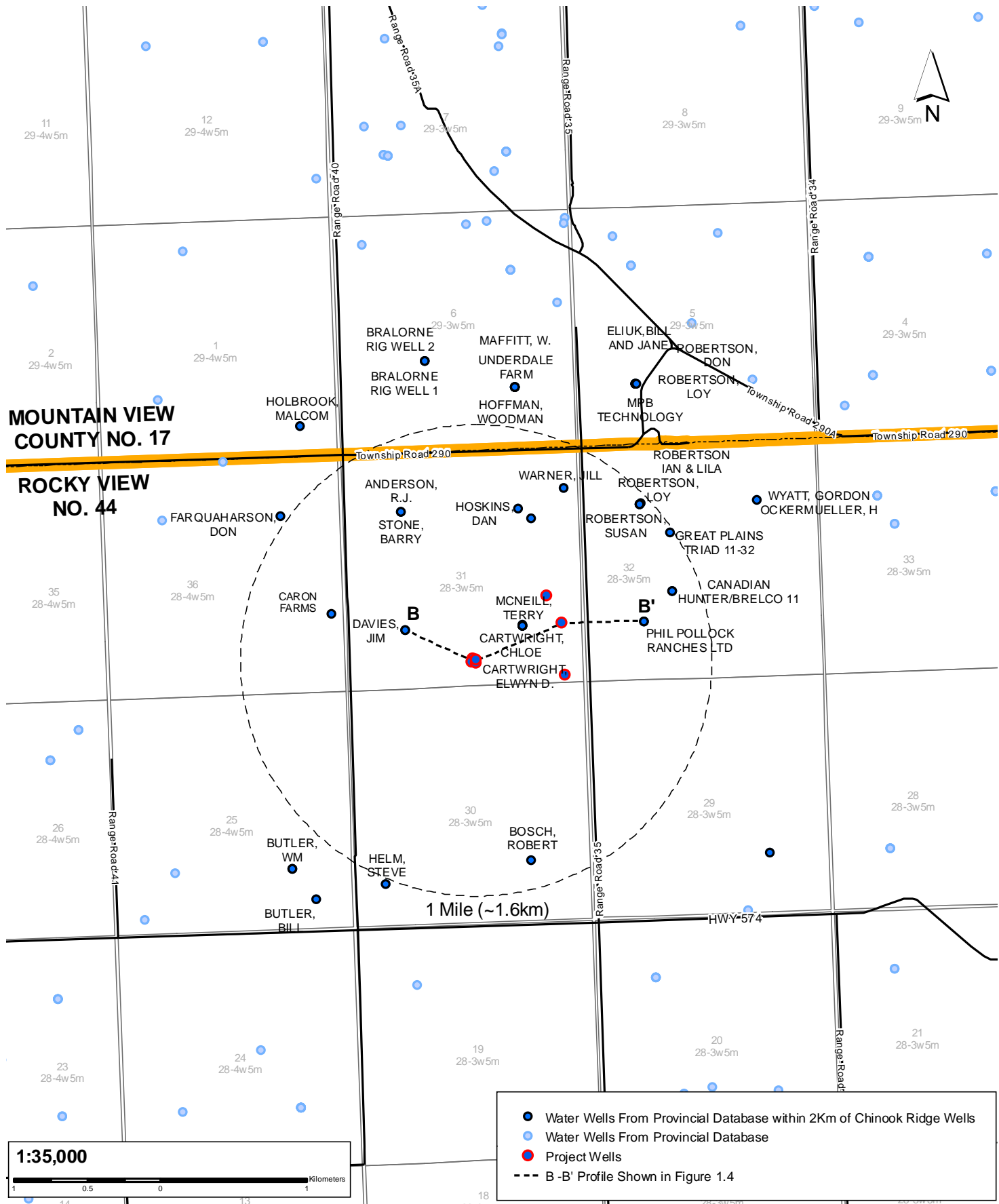


FIGURE 1.5
CHINOOK RIDGE LODGE & GOLF COURSE
 LOCATIONS OF WELLS NEAR CHINOOK RIDGE LODGE & GOLF COURSE

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Table 1.1
Office verified survey of wells within approximately 1.6 km radius

AENV ID	Location					Owner	Driller	Year Drilled	Total Depth (m)	Completion Zone (from)	Completion Zone (to)	Non-pumping Water Level	Available Head	Discharge, L/min
	LSD	SEC	TWP	RGE	M									
2022563	SE	1	29	4	5	Holbrook, Malcom	A&W Drilling	2006	42.7	9.1 30.5	15.2 39.6	16.21 16.21	0 14.27	13.64
2097503	SE	1	29	4	5	Holbrook, Malcom	Wild West Drilling	2009	64.0	54.9	64.0	26.76	28.1	60.57
402919	SW	5	29	3	5	Robertson, Donald	Parsons Drilling	1976	32.3	23.8	31.7	22.56	1.21	68.14
402920	SW	5	29	3	5	Robertson, Loy	Parsons Drilling	1989	19.8	12.2	18.9	10.36	1.83	45.46
402923	SW	5	29	3	5	-	Smith Warren C	1957	45.7	-	-	-	-	11.36
467213	SW	5	29	3	5	MPB Technology	Hertz Drilling Company Ltd.	1996	29.0	16.8	29.0	7.89	8.87	77.28
499425	SW	5	29	3	5	Robertson, Donald	Alken Basin Drilling Ltd.	2001	30.5	9.1	18.3	9.14	0	36.37
1130140	SW	5	29	3	5	Eliuk, Bill & Jane	Big Iron Drilling Ltd.	2003	36.6	30.5	36.6	3.72	26.76	18.18
351583	SE	6	29	3	5	Underdale Farm	Parsons Drilling	1990	15.2	4.9	14.6	4.27	0.61	136.38
402924	SE	6	29	3	5	Hoffman, W.	Parsons Drilling	1968	42.7	-	-	26.52	-	5.91
402925	SE	6	29	3	5	Maffitt, Walter	Unknown Driller	-	61.0	-	-	-	-	-
402926	SE	6	29	3	5	Hoffman, Woodman	Parsons Drilling	1964	78.6	-	-	0	-	94.64
402927	SE	6	29	3	5	Maffitt, Walter	Parsons Drilling	1980	91.4	48.8	90.8	60.96	0	9.09
402928	SE	6	29	3	5	Maffitt, W.	Unknown Driller	-	42.7	-	-	29.26	-	-
402929	SW	6	29	3	5	Bralorne #Rig Well 1	Mid-West Water Wells Ltd.	-	30.5	-	-	6.4	-	94.64
402930	SW	6	29	3	5	Bralorne #Rig Well 2	Mid-West Water Wells Ltd.	-	18.3	-	-	5.49	-	151.42
													0	
376846	SW	30	28	3	5	Helm, Steve	Den-Alta Drilling Ltd.	1994	22.9	16.8	22.9	15.24	1.52	54.55
492979	SE	30	28	3	5	Bosch, Robert	Taks&Sons Drilling Ltd.	1998	45.7	33.5	45.7	28.96	4.57	31.42
391999	SE	31	28	3	5	Cartwright, Elwyn D.	Unknown Driller	-	79.5	-	-	-	-	-
392000	SW	31	28	3	5	Davies, Jim	Parsons Drilling	1981	54.0	29.9	53.3	29.87	0	15.14
392001	SW	31	28	3	5	Davies, Jim	Den-Alta Drilling Ltd.	1985	16.8	10.7	16.8	12.19	0	75.71
392003	NW	31	28	3	5	Stone, Barry	Parsons Drilling	1967	23.8	11.3	22.9	16.46	0	37.85
399551	SE	31	28	3	5	Cartwright, Chloe	Parsons Drilling	1994	45.7	25.7	44.2	28.56	0	4.55
399552	SE	31	28	3	5	Cartwright, Chloe	Parsons Drilling	1994	66.1	24.4	65.2	24.38	0	3
404736	NE	31	28	3	5	Warner, Jill	Den-Alta Drilling Ltd.	1995	45.7	33.5	45.7	24.38	9.15	30.28
416469	SE	31	28	3	5	McNeill, Terry	Interprovincial Drilling Contract	1975	18.3	13.7	16.8	9.14	4.58	15.14
416470	SE	31	28	3	5	McNeill, Terry	Interprovincial Drilling Contract	1975	79.3	19.8	24.4	24.38	0	11.37
										54.9	59.4	24.38	30.48	11.37
443049	NE	31	28	3	5	Hoskins, Dan	Parsons Drilling	1995	38.1	30.5	36.6	23.16	7.32	45.46
2023705	SE	31	28	3	5	Cartwright, Chloe	Well Done Water Wells Inc.	2008	128.0	82.3	126.5	77.02	5.28	13.64
352190	SW	32	28	3	5	Canadian Hunter/Brelco 11	Alken Basin Drilling Ltd.	1990	67.1	42.7	61.0	47.85	0	45.42
352191	SW	32	28	3	5	Canadian Hunter/Brelco 11	Alken Basin Drilling Ltd.	1990	91.4	12.2	42.7	15.85	0	113.56
										48.8	54.9	15.85	32.92	113.56
										61.0	67.1	15.85	45.11	113.56

Table 1.1
Office verified survey of wells within approximately 1.6 km radius

367887	NW	32	28	3	5	Robertson, Susan	Unknown Driller	-	15.2	-	-	-	-	-
392004	NW	32	28	3	5	Robertson, Loy J.	Parsons Drilling	1974	15.2	9.8	14.3	8.84		113.56
392005	NW	32	28	3	5	Robertson, Loy J.	Unknown Driller	-	12.2	-		-	-	-
392006	NW	32	28	3	5	Robertson, Loy J.	Unknown Driller	-	12.2	-		7.62	-	-
392007	NW	32	28	3	5	Robertson, Loy J.	Parsons Drilling	1989	42.7	35.1	42.1	22.56	12.49	27.28
392008	NW	32	28	3	5	Great Plains # Triad 11-32	Unknown Driller	-	2827.0	-		-	-	-
491257	SW	32	28	3	5	Phil Pollock Ranches Ltd.	M.E. Lawson Water Wells	1998	8.5	-		2.74	-	18.93
491258	SW	32	28	3	5	Phil Pollock Ranches Ltd.	M.E. Lawson Water Wells	1998	35.1	22.9	33.5	12.8	10.06	30.28
2022505	NW	32	28	3	5	Robertson, Ian & Lila	A&W Drilling	2004	33.5	18.3	30.5	12.6	5.69	12
1240002	SE	36	29	4	5	Carron Farms	Den-Alta Drilling Ltd.	2005	41.2	35.1	41.2	25.3	9.75	27.28

Table 1.2
Field-verified survey of wells within approximately 1.6 km radius

Owner	Well Owner's Name	Legal	Well ID/Reg. No.	Source	Use	Status
Section 1, Twp 29						
	Wilson, FC	SW, S1, T29, R4, W5	415312	Well	Domestic	Registered
Holbrook, Malcolm/Serena	Holbrook, Malcolm	SE, S1, T29, R4, W5	2097503	Well	Unknown	Registered
	Holbrook, Malcolm	LSD,1, S1, T29, R4, W5	2022563	Well	Domestic	Registered
	Fike, Gordon	S1, T29, R4, W%	00161360-00-00	Well	Unknown	Licensed
Section 6, Twp 29						
	Bralorne Rig #1	LSD6, S6, T29, R3, W5	402929	Well	Industrial	Registered
	Bralorne Rig #2	LSD6, S6, T29, R3, W5	402930	Well	Industrial	Registered
Wylie, Al & Pat	Hoffman, W	SE, S6, T29, R4, W5	405924	Well	Livestock	Registered
	Hoffman, Woodman	SE, S6, T29, R4, W5	402926	Well	Domestic	Registered
	Maffitt, Walter	SE, S6, T29, R3, W5	402925	Well	Domestic	Registered
	Maffitt, Wally	SE, S6, T29, R3, W5	402927	Well	Domestic & Livestock	Registered
	Maffitt, W.	SE, S6, T29, R3, W5	402928	Well	Domestic	Registered
	Underdale Farm	SE, S6, T29, R3, W5	351583	Well	Livestock	Registered
Section 5, Twp 29						
Robertson, Donald	Robertson, Don	SW, S5, T29, R3, W5	499425	Well	Domestic	Registered
	Robertson, Don	SW, S5, T29, R3, W5	402919	Well	Domestic & Livestock	Registered
	Robertson, Donald	S5, T29, R3, W5	Doc. 00172178-00-00			Licensed
	Dogpound Transfer Station	S5, T29, R3, W5	Doc. 00074389-00-00			Licensed
	Geekie, Stewart & Donna	S5, T29, R3, W5	Doc. 00161987-00-00			Licensed
	MacKenzie, Ward & Dixi	S5, T29, R3, W5	Doc. 00157138-00-00			Licensed
	Robertson, Loy	SW, S5, T29, R3, W5	402920	Well	Domestic & Livestock	Registered
	Eliuk, Bill and jane	SW, S5, T29, R3, W5	1130140	Well	Domestic	Registered
	MPB Technology	SW, S5, T29, R3, W5	467213	Well	Domestic	Registered
Sec 36, Twp 28						
Farquaharson, Don	Farquaharson, Don	NE, S36, T28, R4, W5	387769	Well	Livestock	Registered
	Farquaharson, Don	NW, S36, T28, R3, W5	387767	Well	Domestic	Registered
	Ramsey, Tex	LSD15, S36, T28, R4, W5	404740	Well	Domestic	Registered
Sec 31, Twp 28						
Bates	Stone, Barry	NW, S31, T28, R3, W5	392003	Well	Domestic	Registered
Hoskins, Dan & Barb	Hoskins, Dan	NE, S31, T28, R3, W5	443049	Well	Domestic	Registered
Watson, Robert & Elaine	Warner, Jill	LSD16, S31, T28, R3, W5	404736	Well	Livestock	Registered
	Watson, Elaine	S31, T28, R3, W5	00182772-00-00			Licensed
Davies, Jim (see attached)	Davies, Jim	SW, S31, T28, R3, W5	392000	Well	Domestic & Livestock	Registered
	Davies, Jim	SW, S31, T28, R3, W5	392001	Well	Livestock	Registered
	Davies, Jim & Chris	S31, T28, R3, W5	00165668-00-00			Licensed
Carter, Brad & Dawne	Cartwright, Chloe	SE, S31, T28, R3, W5	399551	Well	Domestic	Registered
	Cartwright, Chloe	SE, S31, T28, R3, W5	399552	Well	Domestic	Registered
Cartwright, Chloe	Cartwright, Chloe	SE, S31, T28, R3, W5	2023705	Well	Domestic	Registered
	McNeill, Terry	SE, S31, T28, R3, W5	416470	Well	Domestic & Livestock	Registered
	McNeill, Terry	SE, S31, T28, R3, W5	416469	Well	Domestic & Livestock	Registered
Driller failed to report	Cartwright, Chloe	SE, S31, T28, R3, W5	Bill Martin	Well	Domestic	flow tested & in process
	Cartwright, Chloe	SE, S31, T28, R3, W5	Wild Rose	Well	Domestic	in process
Sec 32, Twp 28						
Robertson, Ian & Susan	Robertson, Ian & Lila	NW, S32, T28, R3, W5	2022505	Well	Domestic	Registered
	Robertson, Susan	NW, S32, T28, R3, W5	367887	Well	Domestic	Registered
	Robertson, Loy	NW, S32, T28, R3, W5	392007	Well	Domestic & Livestock	Registered
	Robertson, Loy	Nw, S32, T28, R3, W5	392006	Well	Domestic	Registered

Table 1.2
Field-verified survey of wells within approximately 1.6 km radius

	Robertson, Loy	NW, S32, T28, R3, W5	392004	Well	Livestock	Registered
	Robertson, L.J.	NW, S32, T28, R3, W5	392005	Well	Domestic	Registered
	Great Plains Triad	LSD11, S32, T28, R3, W5	392008	Well	Industrial	Registered
McArthur, Jim & Dorothy	Phil Pollock Ranches	SW, S32, T28, R3, W5	491258	Well	Domestic	Registered
	Phil Pollock Ranches	SW, S32, T28, R3, W5	491257	Well	Domestic	Registered
	Canadian Hunter/Brelco 11	LSD6, S32,T28, R3, W5	352190	Well	Industrial	Registered
	Canadian Hunter/Brelco 11	LSD6, S32,T28, R3, W5	352191	Well	Industrial	Registered
	Wyatt, G/Ockermueller, H	NE, S32, T28, R3, W5	354778	Well	Domestic	Registered
	Ian & Susan Robertson	S32, T28, R3, W5	Doc.00181222-00-00			Licenced
	McAurthur, James & Dorothy	S32, T28, R3, W5	Doc. 00172637-00-00			Licenced
	Havens, Nancie	S32, T28, R3, W5	Doc. 00163602-00-00			Licenced
McArthur, Jim & Dorothy	Herbert, Barry & Mackie	SW, S32, T28, R3, W5		Well		Unreported
				Well		Unreported
Note: Bill Martin reported	drilling 4 - 6 wells at the request of	Barry & Mackie Herbert (da	ughter). They will not	Well		Unreported
	respond to requests for informati	on or allow access.		Well		Unreported
Sec. 25, Twp. 28						
Butler, Bill	Butler, Bill	LSD1, S25, T28, R4, W5	1240167	Well	Domestic	Registered
Butler, Bill	Butler, Bill	SE, S25, T28, R4, W5	387113	Well	Livestock	Registered
	Butler, Glenda	S25, T28, R4, W5	Doc. 00035647-00-00			Licenced
	Butler, William	S25, T28, R4, W5	Doc. 00035647-00-00			Licenced
	Butler, William	S25, T28, R4, W5	Doc. 00137075-00-00			Licenced
	Butler, William	S25, T28, R4, W5	Doc. 00204651-00-00		Stock Watering	Licenced
	Bun, Ron	SW, S25, T28, R4, W5				
Sec. 30, Twp 28						
Farquharson Farms	Steve Helm	LSD4, S30,T28, R3, W5	376846	Well	Domestic & Livestock	
	Farquharson Farms	S30, T28, R3, W5	Doc. 00157175-00-00			Licenced
Bosch, Robert & Betty	McAurthur	S30, T28, R3, W5	Doc. 00172637-00-00			Licenced
		SE, S30, T28, R3, W5	492979	Well	domestic	Registered
Harnack, Norman	Harnack, Norman	S30, T28, R3, W5	Doc.00160733-00-00			Licenced
	Harnack, Norman	S30, T28, R3, W5	Doc. 00217480-00-00			Licenced
Sec. 29, Twp 28						
P.A. Singer Transport	Singer, Pat	SW29, T29, R3, W5	1240306	Well	Domestic	Registered
Sec. 24, Twp 28						
Harnack, Norman	Harnack, Norman	S29, T28, R3, Wf	Doc. 00160733-00-00			Licenced
	MacKenzie, Divi	NW, S20, T28, R3, W5	354370	Well	Domestic	Registered
	Robertyson, Ray (sp. error)	NW, S20, T28, R3, W5	391975	Well	Livestock	Registered
	Robertson, Ray	NW, S20, T28, R3, W5	391976	Well	Domestic & Livestock	Registered
	Robertson, Bruce	NW, S20, T28, R3, W5	351569	Well	Domestic	Registered
	Smith, Craig	S20, T28, R3, W5	Doc. 00169586-00-00			Licenced
	Smith, Craig	LSD4,S20, T28, R3, W5	1240018	Well	Domestic	Registered
	Smith, Craig	LSD4,S20, T28, R3, W5	1240071	Well	Domestic	Registered
	Pedersen, William & Laurel	S20, T28, R3, W5	Doc. 00170738-00-00			Licenced

1.5 EXISTING LICENSED DIVERSIONS

Table 1.3 is a summary of all licensed and registered groundwater diversions within the section in which the pumping well is located, as well as in the nine other sections around it. Traditional Agricultural Registrations (TAR's) are diversions which were not licensed at the time of drilling, because there was no requirement to do so at that time. However it became possible later on to register them up to a cutoff date in 1999, with their priority of use dating from the year of first use. This was done by means of a simple application only and protects older traditional users of water for stock-watering and pesticide applications by means of a grandfathering clause.

A license, on the other hand, is obtained through a formal technical study such as this one, which must be prepared by a qualified groundwater specialist who is a member of the Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA). This study must show that the desired amount of water is available for a minimum of 20 years, and that the diversion of this water will not harm any other water well owners in the immediate area. In the future, if the license holder no longer uses or needs his allocation, the license may be cancelled so that the water may become available to other applicants.

The authorized diversion shown in Table 1.3 is not necessarily the amount being diverted, but rather the maximum amount that the owner may divert in a year. Generally the actual diversion is lower than the authorized volume, although it varies from one year to the next.

Table 1.3
Licenses and registrations near Chinook Ridge Lodge and Golf Course

Applicant	Interim Licence Number	Approval ID	Water Allocation ID	File Number	Lsd	Qua	Sec	Twp	Rng	Mer	Quantity (m ³)	Specific Purpose	Type	Licensed Date	Expiry Date	Upper Prod'n Interval (m)	Lower Prod'n Interval (m)
FIKE, GORDON	00161360 00 00	161360	49938	161360	SW	1	29	4	5	5	1433	REGISTRY	WAREG	26-Feb-2002			6.1
FIKE, GORDON	00161360 00 00	161360	49930	161360	SW	1	29	4	5	5	737	REGISTRY	WAREG	26-Feb-2002			10.7
RICHARD & VARNITA HEWITT	00166889 00 00	166889	44775	166889	NE	25	28	4	5	5	184	REGISTRY	WAREG	8-Mar-2002			
RICHARD & VARNITA HEWITT	00166889 00 00	166889	44776	166889	NE	25	28	4	5	5	636	REGISTRY	WAREG	8-Mar-2002			
FARGUHARSON, HOWARD	00157508 00 00	157508	50004	157508	NE	36	28	4	5	5	1070	REGISTRY	WAREG	27-Feb-2002			15
FARGUHARSON, HOWARD	00157508 00 00	157508	50008	157508	NE	36	28	4	5	5	24	REGISTRY	WAREG	27-Feb-2002			15
IAN & SUSAN ROBERTSON	00181222 00 00	181222	79684	181222	NW	32	28	3	5	5	164	REGISTRY	WAREG	22-Mar-2002			15.2
IAN & SUSAN ROBERTSON	00181222 00 00	181222	79687	181222	NW	32	28	3	5	5	651	REGISTRY	WAREG	22-Mar-2002			15.2
WARD & DIXI MACKENZIE	00157138 00 00	157138	44348	157138	SE	5	29	3	5	5	435	REGISTRY	WAREG	6-Feb-2002			6.1
WARD & DIXI MACKENZIE	00157138 00 00	157138	44349	157138	SE	5	29	3	5	5	241	REGISTRY	WAREG	6-Feb-2002			24.4
FARQUHARSON FARMS	00157175 00 00	157175	48450	157175	SW	30	28	3	5	5	535	REGISTRY	WAREG	25-Feb-2002			19
HARNACK, NORMAN	00160733 00 00	160733	50223	160733	NE	30	28	3	5	5	864	REGISTRY	WAREG	27-Feb-2002			18.3
JAMES & DOROTHY MCAUTHUR	00172637 00 00	172637	72920	172637	SW	32	28	3	5	5	245	REGISTRY	WAREG	18-Mar-2002			18.3
FARGUHARSON, HOWARD	00157508 00 00	157508	50006	157508	NE	36	28	4	5	5	2071	REGISTRY	WAREG	27-Feb-2002			12
STEWART & DONNA GEEKIE	00161987 00 00	161987	48570	161987	NE	5	29	3	5	5	406	REGISTRY	WAREG	25-Feb-2002			27.4
WARD & DIXI MACKENZIE	00157138 00 00	157138	44350	157138	SE	5	29	3	5	5	483	REGISTRY	WAREG	6-Feb-2002			15.9
BUTLER, WILLIAM	00137075 00 00	137075	110207	137075	SE	25	28	4	5	5	3021	REGISTRY	WAREG	27-Feb-2003			25
STEWART & DONNA GEEKIE	00161987 00 00	161987	48568	161987	NW	5	29	3	5	5	407	REGISTRY	WAREG	25-Feb-2002			32
DAVIES, JIM & CHRIS	00165668 00 00	165668	48731	165668	SW	31	28	3	5	5	1472	REGISTRY	WAREG	25-Feb-2002			54
DAVIES, JIM & CHRIS	00165668 00 00	165668	48734	165668	SW	31	28	3	5	5	1803	REGISTRY	WAREG	25-Feb-2002			15.2
ROBERTSON, DONALD	00172178 00 00	172178	70551	172178	SW	5	29	3	5	5	985	REGISTRY	WAREG	15-Mar-2002			30.5
BUTLER, WILLIAM	00137075 00 00	137075	110208	137075	SE	25	28	4	5	5	300	REGISTRY	WAREG	27-Feb-2003			61
JAMES & DOROTHY MCAUTHUR	00172637 00 00	172637	72926	172637	SE	30	28	3	5	5	232	REGISTRY	WAREG	18-Mar-2002			61
HARNACK, NORMAN	00217480 00 00	217480	144737	160733	NE	30	28	3	5	5	1260	STCKWT	WALIC	8-Mar-2005	9-Mar-2030	37.8	45.7
HAVENS, DOUG	00218673 00 00	218673	145822	182542	SE	29	28	3	5	5	920.5	STCKWT	WALIC	20-Sep-2005	19-Sep-2030	30.5	42.7
BUTLER, WILLIAM	00204651 00 00	204651	178578	137075	SE	25	28	4	5	5	266.7	STCKWT	WALIC	14-Jul-2006	13-Jul-2031		