

NOTES:
 1. UTM COORDINATES OBTAINED WITH A HAND HELD GPS USING NAD83 SYSTEM AND ARE CONSIDERED TO BE ACCURATE TO 10.0 m, APPROXIMATELY.

○ 30 m RADIUS FROM WATER WELL FOR CONSIDERATION OF PROXIMITY TO POTENTIAL CONTAMINANT SOURCES.

No.	DESCRIPTION	DATE	APPROVED
0	ISSUED FOR CLIENT REVIEW	DD/MM/YY	XXX
REVISION			

EBA Engineering Consultants Ltd.

DESIGNED BY: R. MARTIN
 DRAWN BY: J. BU'YCK
 DATE: JUNE 2005
 SCALE: AS SHOWN
 PROJECT No.: 1260002.001
 ACAD FILENAME: 001-WHITEHORSE REGION

CLIENT:
 Highways and Public Works
 Property Management Branch

SMALL PUBLIC WATER SYSTEMS ASSESSMENT
 WHITEHORSE REGION

GOVERNMENT OF YUKON
 HIGHWAYS & PUBLIC WORKS

CARMACKS FORESTRY OFFICE
 BUILDING 6542
 SITE LOCATION DIAGRAM
 WELL ID: 6542

REVISION	ISSUE
0	0
DRAWING No.	
FIGURE 6542A	

LEGEND



PUMP



PRESSURE GAUGE



GATE VALVE



CHECK VALVE



SOLENOID

#2

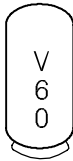
COMPONENT ID. No.
(SEE TABLE ON FOLLOWING PAGE)



FLOW METER



WATER FILTER
(CARTRIDGE TYPE)

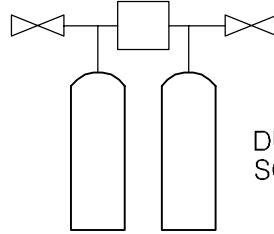


PRESSURE TANK



CL₂

CHLORINE RESERVOIR AND
INJECTION PUMP

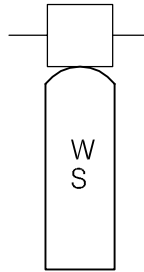


DUPLEX WATER
SOFTENER



SP

WELL WITH
SUBMERSIBLE PUMP



ACTIVATED
CARBON

Z:\0201\Drawings\1260002 Water Assessment YTG\001 - Whitehorse Region\1260002003 Whitehorse Schematic_LEGEND.dwg, 4/11/2006 10:28:07 AM, Adobe PDF, jbuyck



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PROJECT SMALL PUBLIC WATER SYSTEMS ASSESSMENT
WHITEHORSE REGION

CLIENT



TITLE

SCHEMATIC SYSTEM
LEGEND

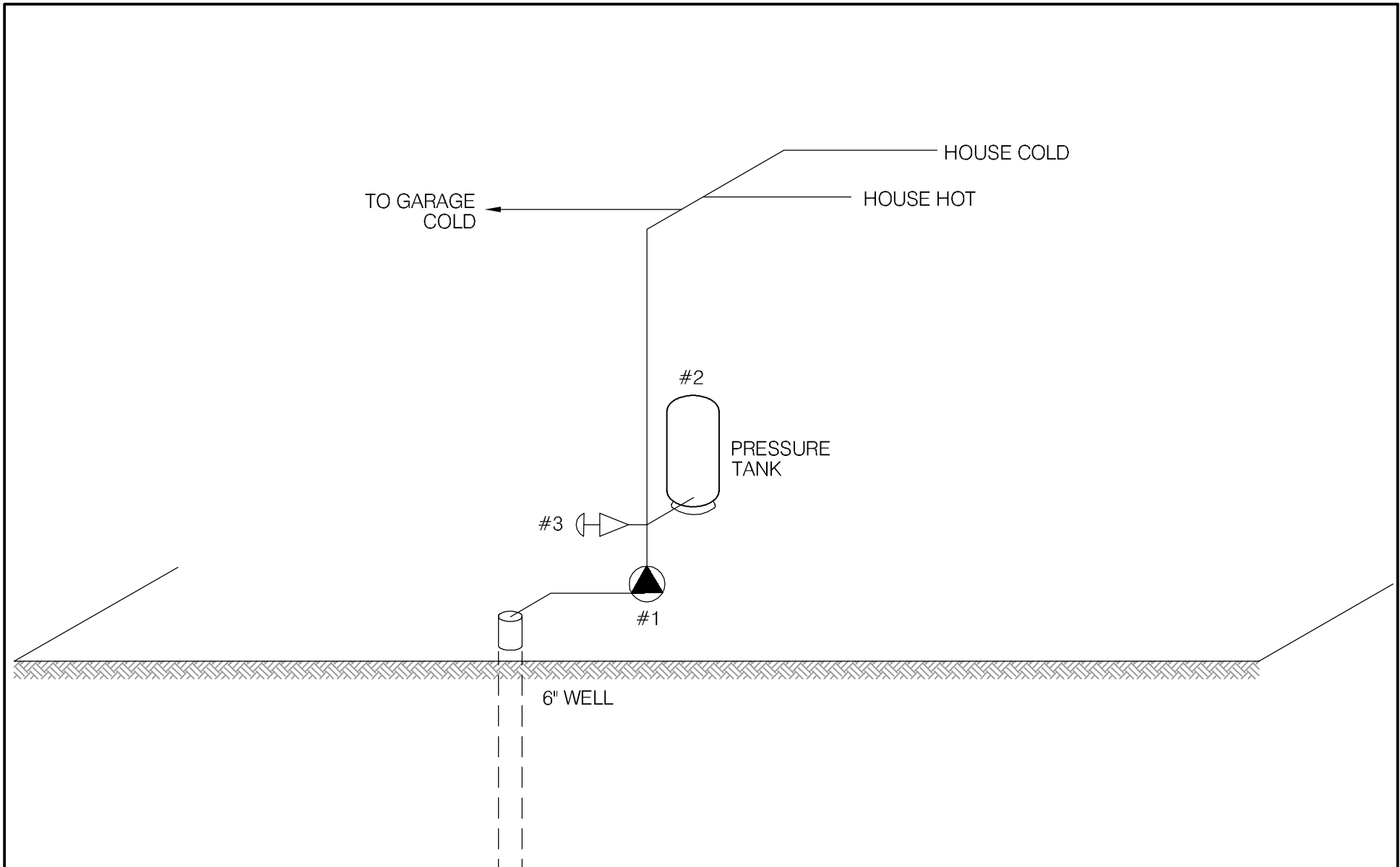
DATE APRIL 2006

DWN. JSB



CHKD. RMM

FILE NO. 1260002

DRWG. LEGEND



SCHEMATIC PRODUCED BY BERT ALBISSER OF AQUA TECH SUPPLIES & SERVICES LTD.

 EBA Engineering Consultants Ltd.		PROJECT SMALL PUBLIC WATER SYSTEMS ASSESSMENT WHITEHORSE REGION	
CLIENT 		TITLE WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: 6542 CARMACKS FORESTRY OFFICE	
DATE	APRIL 2006	DWN.	JSB
CHKD.	FMM	FILE NO.	1260002.001
		DWG.:	FIGURE 6542B

Whitehorse Region – District Office
Building # 6542

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	JET Pump	NO MONARCH	R120		782	1" x 1/2 Hp.
2	PRESSURE TANK	PNEUMATIC TANK	STEARCE	30FG.		
3	PRESSURE SWITCH	SER. D	FSG-2			
4						
5						
6						
7						
8						
9						
10						

TABLE 6542-1: SUMMARY OF BACTERIOLOGICAL RESULTS

		Number of Sampling Events	Time Period over which Sampling was Done	Any Positive Total Coliform Results? (yes or no)	Fraction of Positive Total Coliform Results vs. Total Sampling Events	Any positive E.Coli results? (yes or no)	Most Recent Sampling Event Available for EBA Review	Is Most Recent Result Positive?
Building #	Building Name							
6542	District Office	2	Apr-05 to May-05	no	0/2	no	May 05	no



Table 6542-2: Water Quality Results

SOURCE:		Building 6542 - Forestry District Office			GCDWQ Criteria		
Location/ Resident Address		Carmacks					
Treatment		No					
Source of Water		On-Site Well					
Purpose of Sampling		Baseline	Additional Sampling	Baseline			
Sample Location		Washroom Tap					
Date Sampled		5-Oct-04	13-May-05	6-Jul-06	Lower Limit	Upper Limit	
Physical Tests (ALS)					AO	MAC	AO
Colour (CU)	5		<5				15
Conductivity (uS/cm)	309		376				
Total Dissolved Solids	213		225				500
Hardness CaCO3	197		181		AO >200 = poor, > 500 unacceptable ^A		
pH	8.0		8.25		6.5		8.5
Turbidity (NTU)	1.2		1.23			1	5
UV Absorbance		<0.0010					
Dissolved Anions (ALS)							
Alkalinity-Total CaCO3	189		199				
Chloride Cl	2		1.18				250
Fluoride F	0.21		0.168			1.5	
Sulphate SO4	18.3		19.3				500
Nitrate Nitrogen N	<0.1		<0.10			10	
Nitrite Nitrogen N	<0.05		<0.10			1	
Ammonia Nitrogen N							
Total Metals (ALS)							
Aluminum T-Al	<0.02		<0.010			0.1	
Antimony T-Sb	0.0008		<0.0005			0.006	
Arsenic T-As	0.001		0.00103			0.025	
Barium T-Ba	0.723		0.073			1	
Boron T-B	<0.02		<0.010			5	
Cadmium T-Cd	<0.0002		<0.0002			0.005	
Calcium T-Ca	55.7		53.4				
Chromium T-Cr	0.0011		<0.0020			0.05	
Copper T-Cu	0.002		<0.0010			1	
Iron T-Fe	0.149		0.149				0.3
Lead T-Pb	0.0002		<0.0010			0.01	
Magnesium T-Mg	12.3		11.6				
Manganese T-Mn	0.022		0.025				0.05
Mercury T-Hg	<0.0002		<0.0002			0.001	
Potassium T-K	2.3		2.06				
Selenium T-Se	<0.0004		<0.0010			0.01	
Sodium T-Na	6		6.6				200
Uranium T-U	0.0011		0.00106			0.02	
Zinc T-Zn	<0.004		<0.050				5
Dissolved Metals							
Aluminum D-Al						0.1	
Antimony D-Sb						0.006	
Arsenic D-As						0.025	
Barium D-Ba						1.0	
Beryllium D-Be							
Boron D-B						5	
Cadmium D-Cd						0.005	
Calcium D-Ca							
Chromium D-Cr						0.05	
Cobalt D-Co							
Copper D-Cu							1.0
Iron D-Fe							0.3
Lead D-Pb						0.01	
Lithium D-Li							
Magnesium D-Mg							
Manganese D-Mn							0.05
Mercury D-Hg						0.001	
Molybdenum D-Mo							
Nickel D-Ni							
Selenium D-Se						0.01	
Silver D-Ag							
Sodium D-Na							200
Thallium D-Tl							
Titanium D-Ti							
Uranium D-U						0.02	
Vanadium D-V							
Zinc D-Zn							5.0
Polycyclic Aromatic Hydrocarbons							
Acenaphthene							
Acenaphthylene							
Acridine							
Anthracene							
Benzo(a)anthracene							
Benzo(a)pyrene						0.00001	
Benzo(b)fluoranthene							
Benzo(g,h,i)perylene							
Benzo(k)fluoranthene							
Chrysene							
Dibenz(a,h)anthracene							
Fluoranthene							
Fluorene							
Indeno(1,2,3-c,d)pyrene							
Naphthalene							
Phenanthrene							
Pyrene							
Quinoline							
Extractable Hydrocarbons							
EPH10-19							
EPH19-32							
LEPH							
HEPH							
Field Chemistry (EBA)							
pH		7.89			6.5		8.5
TDS		182					500
EC (uS/cm)		358					
Temperature		6.6					
Free Available Chlorine							

Notes:
 A. Guidelines indicated for hardness are not CDWQ, rather they are general aesthetic guidelines - exceedences are indicated in yellow highlighting.
 Shading indicates exceedence of Proposed MAC guideline (arsenic).
Bold Underline with Yellow shading indicates exceedence of CDWQ MAC
 Results are expressed as milligrams per litre except for pH and Colour (CU), Conductivity (umhos/cm), Temperature (°C) and Turbidity (NTU)
 < = Less than the detection limit indicated.
 AO = Aesthetic Objective
 MAC = Maximum Acceptable Concentration (Health Based)



**Table 6542-3: Summary of Well Assessment Results
SMALL PUBLIC DRINKING WATER SYSTEMS**

Well Identification and Location					
Building #	Building Name	Location	Northing (+/- 10 m)	Easting (+/- 10 m)	Grade Elevation (+/- 10 m)
6542	District Office	Carmacks	6884838	432758	534

Well Details							
Well Casing Diameter (mm)	Year Well Installed	Well Log?	Well Depth (m bg)	Reported Low Permeability Protective Layer?	Pump Setting (m bg)	Well Capacity - Tested, or Reported by User	Static Water Level Below Ground (m-btwc)
150	1973	Yes	12.20	No, shallow well	?	?	1.52

Well Construction Details				
Wellhead Above ground (m)	Well Cap	Well Screen	Surface Seal	Apron Grading
1.2 below grade	Split Cap Gasket	Yes 1.5m perforated	Unlikely	Inside building

**Table 6542-4: Potential Contaminant Sources
Building 6542 – Carmacks Forestry District Office**

Potential Contaminant Source	Potential Contaminants	Distance from Water Source	Northing	Easting
Dump or Landfill	<i>Organic</i> and inorganic chemicals.	1300 m		
Cemetery	<i>Biological</i> ¹ , inorganic ² and organic parameters.	450 m		
Sewage lagoon	<i>Biological</i> , inorganic and organic parameters.	>300 m		
Sewage lines, tanks and lift stations	<i>Biological</i> , inorganic and organic parameters.	Unknown		
Septic fields	<i>Biological and Inorganic</i> parameters.	>150 m		
Gas stations	<i>Organic and Inorganic</i> parameters.	200 m		
Undergrounds Fuel Storage Tanks (USTs)	<i>Organic</i> parameters.	>>30 m		
Above ground storage tanks (ASTs)	<i>Organic parameters.</i>	5 m and 24 m	6884835 6884839	432764 432736
Naturally occurring sources of contamination	<i>Radionuclides, Bacteria and Viruses from surfacewater sources.</i>	100 m		

Notes: *Bold highlighting of distances indicates non-compliance with proposed guidelines*

1- Biological parameters include: bacteria, viruses, protozoa (parasitic organisms), helminthes (intestinal worms), and bio aerosols (inhalable moulds and fungi).

2 – Inorganic contaminants could include arsenic in embalming chemicals (prior to early 1900’s), and heavy metals in caskets.

Required Setback Distances Draft Guidelines for Part III – Small Public Drinking Water Systems:

300 m (1,000 ft) from a sewage lagoon or pit and manure heaps

120 m (400 ft) from a solid waste dump or a cemetery

30 m (100 ft) from any other potential source of contamination

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SMALL PUBLIC WATER SYSTEM ASSESSMENT

PART A: EBA Site Inspection

Inspector: Ryan Martin
Luke Leber

Date May 13, 2005

WELL ID #	Owner	Location Description
<u>6542</u>	<u>YTG</u>	<u>Carmacks Forestry District Office</u>

1. Well Location and Potential Contaminant Sources

- a. General location of well: (Community, Subdivision, etc.)
Carmacks
- b. Specific location: (Road or street, Building number, name of owner and/, legal description,
Carmacks Forestry District Office
- c. GPS location: 432758 Easting, 6884838 Northing, 534m elev. ± 9m
- d. Is there electric power? Yes No
- e. Does the well system have:
- 15 or more service connections to a piped distribution system? If so how many _____
well serves both buildings on site
- 5 or more delivery sites on a trucked distribution system? If so how many _____
- f. Nearest building, specify Forestry office, attached to basement
inside
- g. Distance from well to building _____
- h. If there is an effluent disposal field, is its location known? Yes No
- i. Distance from well to nearest point of known field: N/A
- j. Well location relative to field: upslope downslope lateral
N/A

- Well serves both building on-site
- some use for drinking water
- get water from store usually
- but some drink from well.

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k. Is there any part of a sewage disposal system(s) or other potential sources of pollution that may pose a health and safety risk within 30 m? Yes No

l. Is the well located within 300 m from a sewage lagoon or pit? Yes No

m. Is the well located within 120 m from a solid waste site or dump, cemetery? Yes No
Solid waste dump ~1km away

n. Is the infrastructure protecting the wellhead, pumphouse, storage tank and/or water treatment plant designed and secured to prevent:

Unauthorized access by humans? Yes No *Located inside forestry building. Buildings can be locked*
Entrance by animals? Yes No *Nothing to prevent animals. no traces, however*

o. Is well site subject to flooding? Yes No
no evidence

p. Is the well site well drained? Yes No
No apparent water staining

q. Is there a buried fuel tank on the property? Yes No *unlikely*

If yes, is it in use abandoned

Is the location known? Yes No

Distance from the well to known buried tank _____

r. Are there any other known contaminant sources on the property?

Yes No Describe _____

If yes, specify the source: dump sewage lagoon cemetery other

Potential Source 1: FAST 7 ; Distance from well to Potential Source 1: 5m *inside same building on the basement*

Potential Source 2: AST 6 ; Distance from well to Potential Source 2: 24m

Potential Source 3: septic manhole 1 ; Distance from well to Potential Source 3: 21m

Potential Source 4: septic manhole 2 ; Distance from well to Potential Source 4: 40m

s. Are there other wells on this property? Yes No
RCMP wells nearby ~80m and ~100m

How many? _____ in use abandoned require proper sealing

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2. Well and Wellhead information:

- a. When was well installed? Year 1973 Month August
- b. Type: drilled dug sand point other _____
- c. Is there a drillers log for the well: Yes No
- d. Is there a surface seal to 6 m Yes No unknown unlikely
- e. Surface casing: Yes Diameter 6 No
- f. Well casing: Diameter 6" Material: steel plastic concrete
- g. Depth of well: 40ft measured (if possible) reported from log
- h. Static water level below ground: 5ft at time of drilling
 measured (if possible) reported from log flowing
- i. (If granular) Is the well completed: open end casing with a well screen
 with slotted pipe unknown other _____
- j. (If bedrock) Does the well have a liner? yes No steel plastic
- k. If there is a well screen: length 5ft slot size(s) perforated
Location of screen: from 29ft to 34ft from log reported
- l. Is there a sump below the screen? Yes No unknown
- m. Is the well head: in pumphouse in pit pitless adaptor in a building
 in a wooden enclosure other, describe _____
- n. If the well head is located in a wooden enclosure,

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- i. Is the well head below grade? describe in detail AT PERMANENT 4 FT BELOW
- ii. Are there signs of ponding on the enclosure(e.g. water stains, etc.)? Yes No
- iii. Is the wellhead enclosed by fiberglass insulations? Yes No
- iv. Any evidence of rodents? Specify No
- v. Does the well casing have a proper seal cap? Yes No

If no, describe condition _____

3. Water Supplying This Well:

- a. By definition is the water from a surface water source or under the direct influence of surface water?
 Yes No farther investigation required.

If yes is there treatment Yes No

Explain (filtration, disinfection etc...) _____

4. Aquifer Supplying This Well:

- a. The aquifer is: bedrock granular sediment unknown
- b. Does water level and/or well capacity show seasonal fluctuation? Yes No
unlikely, no reports of

5. Pump Installation:

- a. Is the well equipped with a pump? yes No
- b. Type of pump: hand electric submersible jet
 shallow well centrifugal other, _____
- c. Description: Manufacturer _____ Model _____
horsepower _____ capacity _____ voltage _____

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d. Date installed: 8/7/1973 By: [Signature]

e. For submersible pump, depth of setting below surface 25 ft

f. Drop pipe for submersible pump: steel plastic

g. Pump delivers water to: pressure tank elevated tank other

h. Are there automatic pump controls: Yes No

i. Is there provision for taking water samples before water reaches storage? Yes No

j. Is there a water meter on the system? Yes No

k. Is the pump and piping protected from freezing? Yes No
The well is located in the basement of a heated building, however there is no insulation or heat trace on the piping or well
If yes, describe: well

l. Comments on pump installation: _____

6. Conclusions

a. Comments on overall installation:

b. Recommendations: _____

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PART B: EBA Site Inspection

Inspector: _____

Date _____

WELL ID #	Owner	Location Description
6SA2	YTG	CARMAKES FORESTLY Compound DISTRICT OFFICE

6. Water Treatment

- a. Is well water treated? Yes No; Type of treatment:
- chlorination iron and or manganese removal other _____
- b. Is water entering plumbing or piped distribution system treated with chlorine or another treatment that is as effective as chlorine used to achieve disinfection throughout the system?
- Yes No If so how _____
- c. If treated with chlorine, is the free residual chlorine concentration less than 0.2 mg/L
- Yes No _____ reading.
- Tested at _____ (location)
- d. Is testing for chlorine residual concentration done at the tap (eg. Kitchen faucet) or from representative points in a piped distribution system, including a point from tap at the end line
- Yes No If yes how often? _____
- e. If the drinking water is being transported by water delivery truck does it have a minimum chlorine free residual of 0.4 mg/L at the time of fill. Yes No

7. Water Quality (observations):

- a. Does the water stain plumbing? yes No slight severe

Type of stain: brown red black

- b. Does the water contain sediment? Yes No occasional constant

- c. Is there an unpleasant odour? Yes No H₂S Other _____

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- d. Is there an unpleasant taste? Yes No brackish Other _____
- e. Is there a history of bad bacterial analyses? Yes No *N/A*
- f. Is there a chemical analysis? Yes No adequate incomplete *N/A*
- g. Is there analysis of trihalomethanes (THMs) where the water source is a surface water supply or a well under the direct influence of surface water? Yes No
- h. Is the drinking water tested daily with an accurate reading chlorine test kit capable of reading in the range 0 to 3.5 mg/L of free chlorine residual in increments of 0.1mg/L? Yes No unknown
- i. If yes is the test performed in accordance with manufactures directions? Yes No unknown
- j. Is a record of the date, time, name of person performing the test and results of the drinking water sample kept? Yes No

TANK AND PIPING DETAILS

Tank Room

Is there a water tank? Yes No Details: *PRESSURE TANK 30FG*

Where is it located?
Comments: *BASEMENT*

Is the room in which the water tank is located heated to maintain an optimum temperature of 4°C for stored water?

YES NO
Comments: _____

Are there windows in the add-on that may allow direct sunlight onto the water holding tank? YES

NO
Comments: _____

Are there other heat sources near the tank? YES NO
Comments: _____

Is there waterproof flooring with a sealed base to contain spills? YES NO
Comments: _____

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Overall Tank

What are the tank size and dimensions?

What material is the tank constructed of? _____

Is tank and associated piping constructed of safe materials (i.e. CSA approved and material that does not affect the taste of the water)? YES NO

Comments: _____

Tank Inlet, Outlet and Lid

Is there adequate access on the tank for cleaning (i.e. min 15" access lid)? YES NO

Does the lid have a tight seal and is it watertight when closed? YES NO

Does the tank have an overflow or high level whistle? YES NO

Is the water tank drain accessible? YES NO

WATER TANK AND WATER QUALITY CONDITION

Are there signs of staining or biofouling? YES NO

Comments: _____

Is there any sediment or scum in bottom of tank? YES NO

Comments: _____

Is there any odour associated with the water or tank? YES NO

Have there been any bacteriological analyses conducted previously? YES NO

Does the tank appear that it has been cleaned recently? YES NO

Are the tanks easily assessed for the purpose of cleaning and disinfection? YES NO

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8. Conclusions

a. Comments on overall installation:

THIS SYSTEM IS TOTALLY OBSOLETE. THE EQUIPMENT IS 20 YEARS +, THE WELL IS NOT ACCESSIBLE FOR SERVICING.

b. Recommendations:

DRILL A NEW WELL AND REPLACE THE WATER SYSTEM TO SUIT NEW REGS.



Driller's Report 109010066

Location: New Forestry House Well Lot 12 Parcel C-1 CRMK

NAD 83 Zone 8 Easting 432699 Northing 6884857 Elevation ASL 1716 ft.

Location Accuracy: Horizontal 300-1000 (topo) Purpose of well: Municipal - residences and other grouped structures
 Vertical 30.5 metres (100ft)

Permafrost encountered? No

LOG OF OVERBURDEN AND BEDROCK MATERIALS						
Layer	From	To	General Colour	Most Common Material	Secondary Material	General Description
1	0	1	ft.	Sandy CLAY	Gravel	
2	1	15	ft.	SAND and GRAVEL		
3	15	17	ft.	SAND		
4	17	22	ft.	SAND and GRAVEL	Cobbles	
5	22	26	ft.	SAND and GRAVEL		wet
6	26	27	ft.			hard pan
7	27	29	ft.	SAND and GRAVEL		water
8	29	32	ft.		Cobbles	hard pan
9	32	40	ft.	SAND and GRAVEL		

WELL CONSTRUCTION

Well No. 1090100661 Completion date 8/7/1973 Drilling method Air Rotary (conventional) Well type Overburden

Casing: OS Diameter 5 in. Material Steel Wall thickness Depth to 40 ft.

Comments Bottom of casing is closed

Surface/Env'l seal: Material Diameter Depth from to Volume

Gravel Pack ? Material Diameter Depth from to

Well Screen Information

OS Diameter Material Screen Type Comments

Perforated

Screen Sections

Section	From	to	Slot size/ perforation diameter
1	25	30	ft.

WELL DEVELOPMENT AND STATUS

Well ID 1090100661 Developed by Air lifting Wellhead completion None Adapter depth Static water level 5 ft. Yield Estimate 50 gpm Estimate method Bailing

Final Status New, in use for intended purpose

No



Photo 0155: 6542 Forestry District Office (wellhead located inside underneath)



Photo 0023: 6542 Jet Pump



Photo 0020: 6542 Wellhead



Photo 0022: 6542 Pressure Tank