



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

EBA Engineering Consultants Ltd.

DESIGNED BY: R. MARTIN
 DRAWN BY: J. BUYCK
 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

TANTALUS SCHOOL
 BUILDING 6511
 SITE LOCATION DIAGRAM
 WELL ID: 6511

REVISION ISSUE
 0

DRAWING No.
 FIGURE 6511A

LEGEND



PUMP



PRESSURE GAUGE



GATE VALVE



CHECK VALVE



SOLENOID

#2

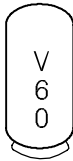
COMPONENT ID. No.
(SEE TABLE ON FOLLOWING PAGE)



FLOW METER



WATER FILTER
(CARTRIDGE TYPE)

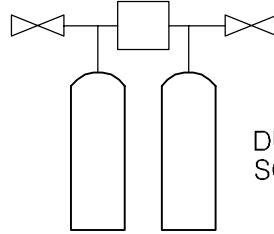


PRESSURE TANK



CL₂

CHLORINE RESERVOIR AND
INJECTION PUMP

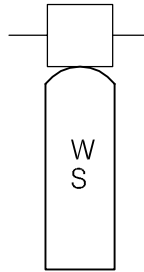


DUPLEX WATER
SOFTENER



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



EBA Engineering Consultants Ltd.

PROJECT SMALL PUBLIC WATER SYSTEMS ASSESSMENT
WHITEHORSE REGION

CLIENT



TITLE

**SCHEMATIC SYSTEM
LEGEND**

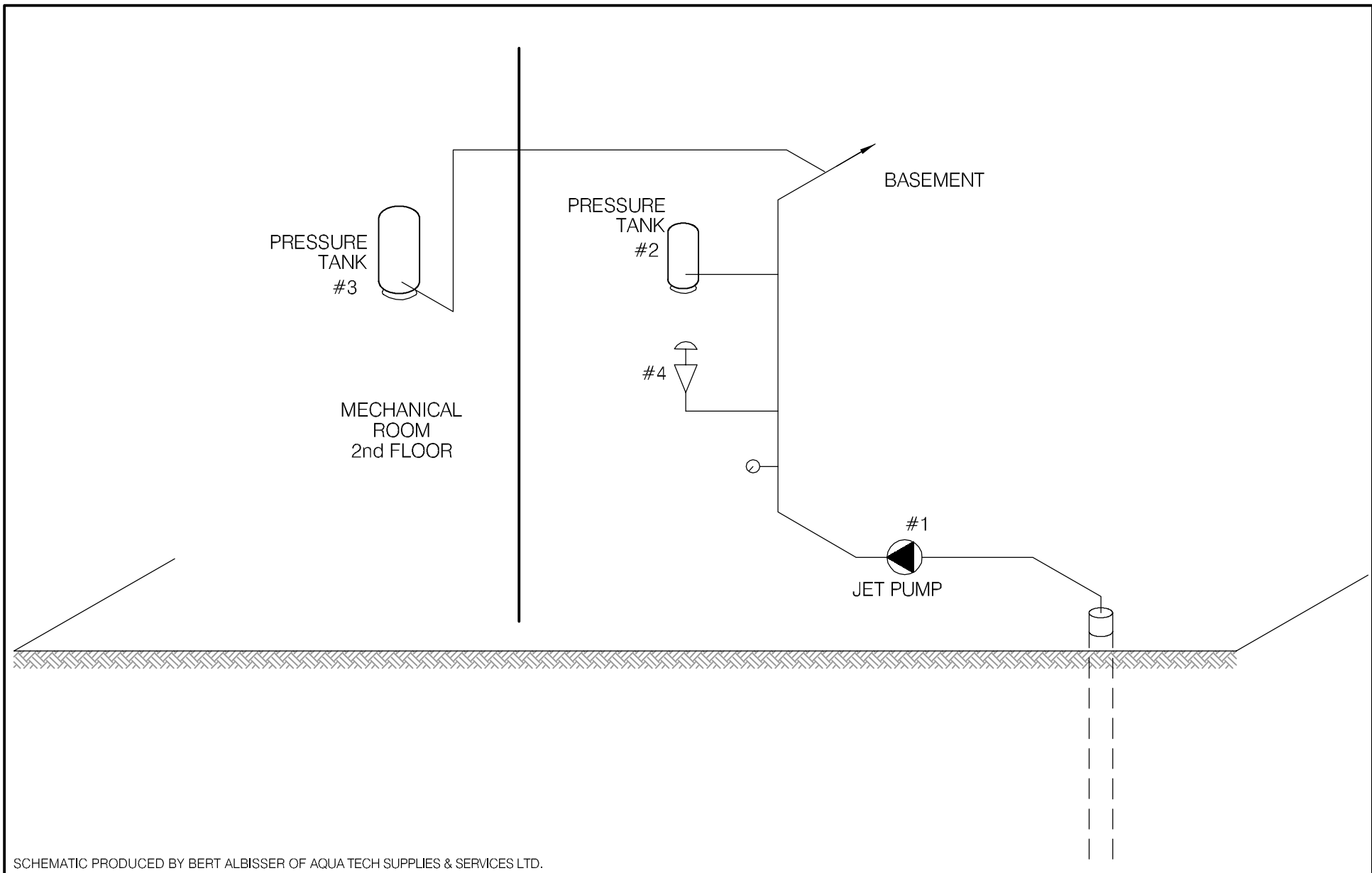
DATE APRIL 2006

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.: 6511 TANTALUS SCHOOL - CARMACKS, YT.	
DATE	APRIL 2006	DWN.	JSB
CHKD.	RMM	FILE NO.	1260002.001
		DWG.:	FIGURE 6511B

**Whitehorse Region – Tantalus School
Building # 6511**

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	JET PUMP	GRUNDFOS	JPF-4A.			1" X 1 HP.
2	PRESSURE TANK #1	WELLYTROL	WX-102			3/4" ASGA.
3	PRESSURE TANK #2	WELLYTROL	WX-600-1			
4	PRESSURE CONTROL	HONEYWELL				1/4 FIPT.
5	WATER FILTER	CUNO	NO INFORMATION ON PIPING SCHEMATIC			
6						
7						
8						
9						
10						

TABLE 6511 - 1: SUMMARY OF BACTERIOLOGICAL RESULTS

Building #	Building Name	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?
6511	Tantalus School	8	Sept-04 to Mar-05	no	0/8	no	2-Mar-05	no



Table 6511-2: Water Quality Results

SOURCE:		Building 6511 - Tantalus School		GCDWQ Criteria		
Location/ Resident		Carmacks				
Address		Lot 12-6 Group 903				
Treatment		Filtration				
Source of Water		On-Site Well				
Purpose of Sampling		Baseline	Additional Sampling			
Sample Location		Home Ec. Room				
Date Sampled		5-Oct-04	13-May-05	Lower Limit		Upper Limit
Physical Tests (ALS)				AO	MAC	AO
Colour (CU)		5				15
Conductivity (uS/cm)		333				
Total Dissolved Solids		223				500
Hardness CaCO3		208		AO >200 = poor, > 500 unacceptable ^A		
pH		7.9		6.5		8.5
Turbidity (NTU)		0.3			1	5
UV Absorbance			<0.0010			
Dissolved Anions (ALS)						
Alkalinity-Total CaCO3		197				
Chloride Cl		2				250
Fluoride F		0.21			1.5	
Sulphate SO4		20.6				500
Nitrate Nitrogen N		<0.1			10	
Nitrite Nitrogen N		<0.05			1	
Total Metals (ALS)						
Aluminum T-Al		<0.02			0.1	
Antimony T-Sb		0.0007			0.006	
Arsenic T-As		<0.0004			0.025	
Barium T-Ba		0.0634			1	
Boron T-B		<0.02			5	
Cadmium T-Cd		<0.0002			0.005	
Calcium T-Ca		60.1				
Chromium T-Cr		<0.0008			0.05	
Copper T-Cu		0.052			1	
Iron T-Fe		0.022				0.3
Lead T-Pb		0.0004			0.01	
Magnesium T-Mg		13.2				
Manganese T-Mn		0.013				0.05
Mercury T-Hg		<0.0002			0.001	
Potassium T-K		2.3				
Selenium T-Se		<0.0004			0.01	
Sodium T-Na		6				200
Uranium T-U		0.0012			0.02	
Zinc T-Zn		<0.004				5
Polycyclic Aromatic Hydrocarbons						
Acenaphthene		<0.000050				
Acenaphthylene		<0.000050				
Acridine		<0.000050				
Anthracene		<0.000050				
Benzo(a)anthracene		<0.000050				
Benzo(a)pyrene		<0.000010				
Benzo(b)fluoranthene		<0.000050				
Benzo(g,h,i)perylene		<0.000050				
Benzo(k)fluoranthene		<0.000050				
Chrysene		<0.000050				
Dibenz(a,h)anthracene		<0.000050				
Fluoranthene		<0.000050				
Fluorene		<0.000050				
Indeno(1,2,3-c,d)pyrene		<0.000050				
Naphthalene		<0.000050				
Phenanthrene		<0.000050				
Pyrene		<0.000050				
Quinoline		<0.000050				
Extractable Hydrocarbons						
EPH10-19		<0.30				
EPH19-32		<1.0				
LEPH		<0.30				
HEPH		<1.0				
Field Chemistry (EBA)						
pH		7.83		6.5		8.5
TDS		191				500
EC (uS/cm)		375				
Temperature		11.0				

Notes:
A. Guidelines indicated for hardness are not CDWQG, 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 CDWQG 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 6511-3: 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)
6511	Tantalus School	Carmacks	6884714	432684	530

Well Details							
Well Casing Diameter (mm)	Year Well Installed	Well Log?	Well Depth (m bg)	Reported Low Permeabilty Protective Layer?	Pump Setting (m bg)	Well Capacity - Tested, or Reported by User	Static Water Level Below Ground (m-btwc)
150	?	No	16.470	No	?	1hp jet pump Size of pump meets needs	?

Well Construction Details				
Wellhead Above ground (m)	Well Cap	Well Screen	Surface Seal	Apron Grading
1.7 below grade	Split Cap Gasket	?	Unlikely	Inside building

**Table 6511-4: Potential Contaminant Sources
Building 6511 – Tantalus School**

Potential Contaminant Source	Potential Contaminants	Distance from Water Source	Northing	Easting
Dump or Landfill	<i>Organic</i> and inorganic chemicals.	1200 m		
Cemetery	<i>Biological</i> ¹ , inorganic ² and organic parameters.	275 m		
Sewage lagoon	<i>Biological</i> , inorganic and organic parameters.	>300 m		
New Well	<i>Biological and Inorganic</i> parameters.	175	6884762	432784
Irrigation Well	<i>Biological and Inorganic</i> parameters.	61 m	6884664	432640
Sewage lines, tanks and lift stations	<i>Biological</i> , inorganic and organic parameters.	<30 m to service lines		
Septic fields	<i>Biological and Inorganic</i> parameters.	>150 m		
Gas stations	<i>Organic and Inorganic</i> parameters.	225 m		
Undergrounds Fuel Storage Tanks (USTs)	<i>Organic</i> parameters.	>>30 m		
Above ground storage tanks (ASTs)	<i>Organic parameters.</i>	1 m	6884714	432685
Naturally occurring sources of contamination	<i>Radionuclides, Bacteria and Viruses from surfacewater sources.</i>	>150 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

SMALL PUBLIC WATER SYSTEM ASSESSMENT

PART A: EBA Site Inspection

Inspector: Ryan Mandin
Luke Lebel

Date May 13, 2005

WELL ID #	Owner	Location Description
6511	YIG	Tantalus School

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,

Tantalus School

c. GPS location: 432684 Easting 6884714 Northing 530m elevation ± 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 _____
Services Tantalus School in Carmacks

5 or more delivery sites on a trucked distribution system? If so how many _____

f. Nearest building, specify Located within Tantalus school off
of one of the mechanical rooms. Is underground outside, however.

g. Distance from well to building 1km

h. If there is an effluent disposal field, is its location known? Yes No

i. Distance from well to nearest point of known field: _____

j. Well location relative to field: upslope downslope lateral

39
61
Carmacks

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

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

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 Entrance by animals? Yes No
well is located off of a mechanical room in the basement of the school there are no signs of animals

o. Is well site subject to flooding? Yes No
NO evidence of water around well. It is within a concrete encasement

p. Is the well site well drained? Yes No

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

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: AST; Distance from well to Potential Source 1: ~1m

Potential Source 2: _____; Distance from well to Potential Source 2: _____

Potential Source 3: _____; Distance from well to Potential Source 3: _____

Potential Source 4: _____; Distance from well to Potential Source 4: _____

s. Are there other wells on this property? Yes No

How many? 2 in use abandoned require proper sealing

1 in use for irrigation (6in), 1 new not yet in use

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

2. Well and Wellhead information:

- *a. When was well installed? Year _____ Month _____
- 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 _____ No
- f. Well casing: Diameter 18cm Material: steel plastic concrete
- g. Depth of well: 14.770 measured (if possible) reported from log
- h. Static water level below ground: Not possible - pump on - check others on property
 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 _____ slot size(s) _____
Location of screen: from _____ to _____ from log reported
- *l. Is there a sump below the screen? Yes No
- m. Is the well head: in pumphouse in pit pitless adaptor in a building
well head is located off from a basement mechanical room inside the school
 in a wooden enclosure other, describe _____
- n. If the well head is located in a wooden enclosure,

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

- i. Is the well head below grade? describe in detail The well head is 1.6m below grade
- 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 apparent evidence
- 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

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 _____

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

d. ✕ Date installed: _____ By: _____

e. For submersible pump, depth of setting below surface _____

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
Although these raw sample are filthy, Deep Brown coloration to the water due to sagrant pipe

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

k. Is the pump and piping protected from freezing? Yes No
No Heat trace. The well is off of a heated mechanical room. No Insulation. The pump is in the mech room, concrete walls
If yes, describe: _____

l. Comments on pump installation: _____

6. Conclusions

a. Comments on overall installation:

b. Recommendations: _____

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

PART B: EBA Site Inspection

Inspector: _____

Date _____

WELL ID #	Owner	Location Description
6511	YTC	TANTALUS SCHOOL

6. Water Treatment

a. Is well water treated? Yes No; Type of treatment:

chlorination iron and or manganese removal other Automatic Backwash Filter
TYPE: ?

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 _____

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

- d. Is there an unpleasant taste? Yes No brackish Other _____
- e. Is there a history of bad bacterial analyses? Yes No
- f. Is there a chemical analysis? Yes No adequate incomplete
- 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

Where is it located?
Comments: NEXT TO PUMP / ADDITIONAL IN MECH ROOM

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: _____

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

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

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

8. Conclusions

a. Comments on overall installation:

THE INSTALLATION MUST BE UPGRADED.
THE WELL HEAD MUST BE SEALED BETTER.
A DUPLEX PUMP SYSTEM FOR CONTINUOUS
WATER SUPPLY MUST BE PROVIDED.

b. Recommendations:

INSTALL A NEW DUPLEX WATER SUPPLY.
INSTALL FILTRATION AND PROPORTIONATE
CHLORINATION SYSTEM. CHECK THE
FILTER SYSTEM AND UP GRADE
AS NECESSARY.

TANTALUS IRRIGATION WELL



Driller's Report 109010049

Page 1 of 1

Location: Carmacks School Well Lot 12-6 CRMK

NAD 83 Zone 8 Easting 432650 Northing 6884726 Elevation ASL 1762 ft.

Location Accuracy: Horizontal 100-300 (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	26	ft.	GRAVEL	Sand, Silt and Cobbles	
2	26	49	ft.	SILT	Gravel and Sand	
3	49	53	ft.	SILT		
4	53	59	ft.	SAND	Gravel with some Silt	
5	59	61	ft.	GRAVEL	Sand	

WELL CONSTRUCTION

Well No. 1090100491 Completion date 8/9/1991 Drilling method Air Rotary (conventional) Well type Overburden
 Casing: OS Diameter 6 in. Material Steel Wall thickness Depth to 58 ft.
 Comments

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
 Continuous Wire Wrap

Section	From	to	Slot size/ perforation diameter
1	58	61	ft. 30 Thou.

WELL DEVELOPMENT AND STATUS

Well ID 1090100491 Developed by Air lifting Wellhead completion None Adapter depth Static water level 13.5 ft. Yield Estimate 30 gpm Estimate method Air lifting
 Final Status New, in use for intended purpose
 No



Photo 0162: 6511-A Main School Wellhead (underneath panel at center) and Above Ground Fuel Storage Tank (right)



Photo 0160: 6511-A Wellhead



Photo 0161: 6511-A Jet Pump and Pressure Tank



Photo 0159: 6511-C New Well Wellhead

Photo 0158: 6511-C Irrigation Well Wellhead

