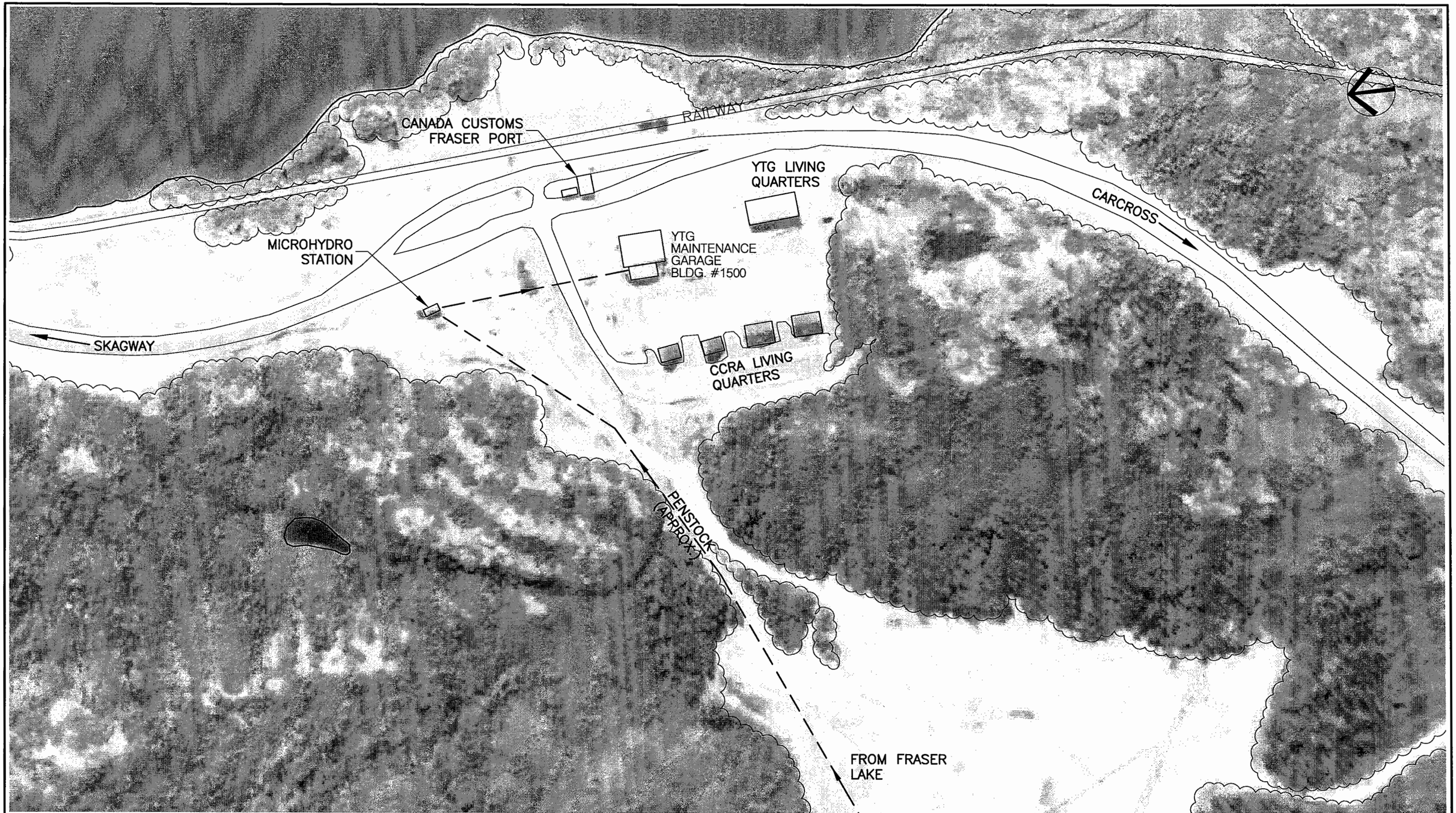


NOTES:

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. BUYCK
DATE:	JUNE 2005
SCALE:	AS SHOWN
PROJECT No.:	1260002.001
ACAD FILENAME:	00 WHITEHORSE REGION FRASER CAMP.dwg

CLIENT: Yukon — Highways and Public Works, Property Management Branch

SMALL PUBLIC WATER SYSTEMS ASSESSMENT
WHITEHORSE REGION

GOVERNMENT OF YUKON
HIGHWAYS & PUBLIC WORKS

FRASER CAMP
SITE 1500
SITE LOCATION DIAGRAM

REVISION ISSUE: 0

DRAWING No.: FIGURE 1500A

Z:\0201Drawings\1260002 Water Assessment YTG\001 - Whitehorse Region\fraser\12600002 Fraser Overall Plan.dwg, 6/10/2005 11:24:19 AM, \\whi-eb-dc001\WHI201COMMON

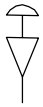
LEGEND


PUMP

PRESSURE GAUGE


GATE VALVE


CHECK VALVE

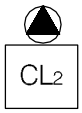

SOLENOID

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

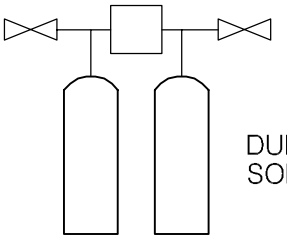
FLOW METER

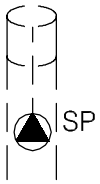
WATER FILTER
(CARTRIDGE TYPE)

PRESSURE TANK

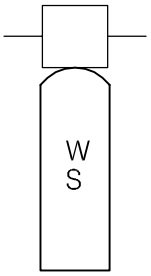


CHLORINE RESERVOIR AND
INJECTION PUMP


DUPLEX WATER
SOFTENER

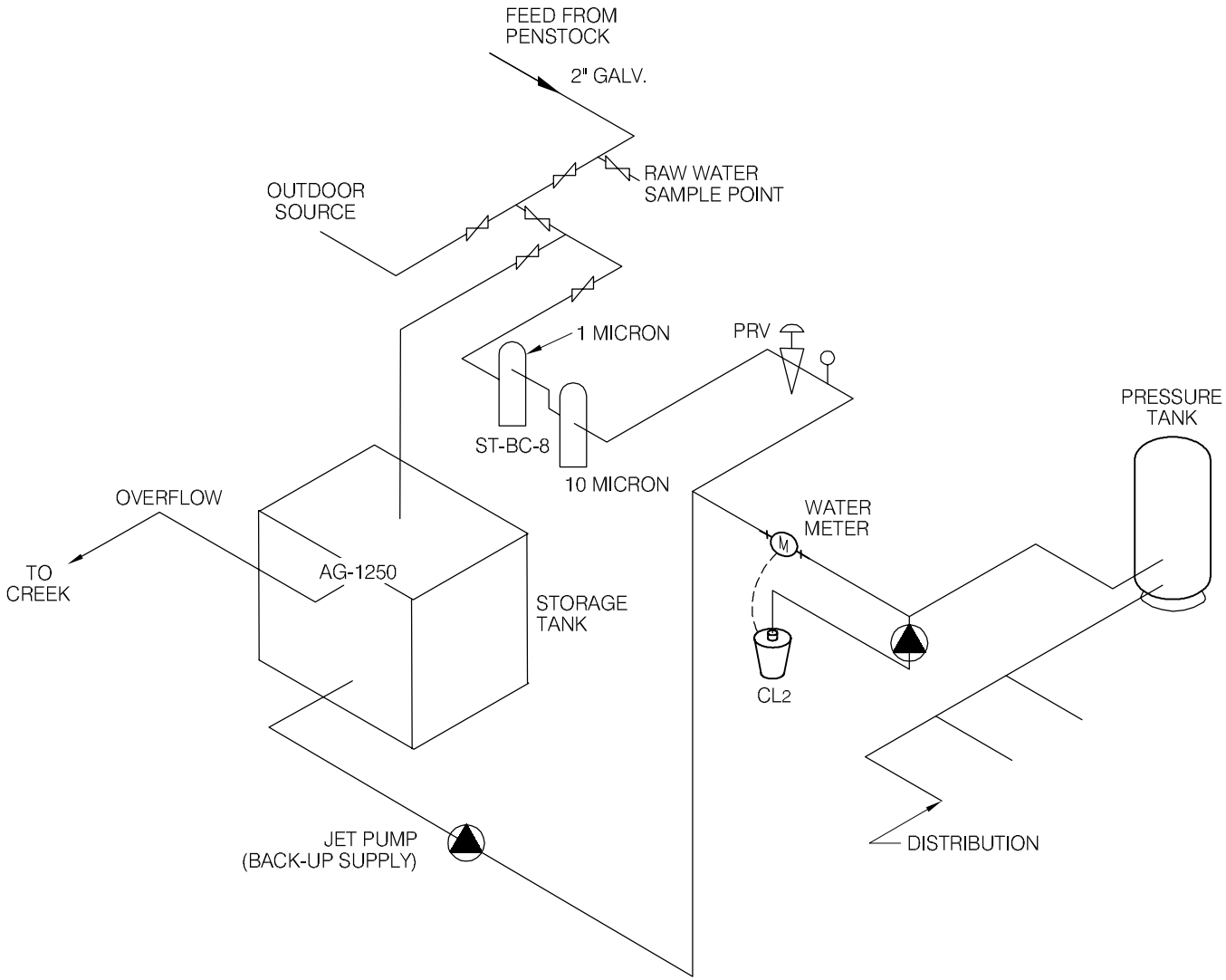


WELL WITH
SUBMERSIBLE PUMP



ACTIVATED
CARBON

EBA Engineering Consultants Ltd.			PROJECT	SMALL PUBLIC WATER SYSTEMS ASSESSMENT WHITEHORSE REGION	
CLIENT Yukon Highways and Public Works Property Management Branch			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 Yukon Highways and Public Works Property Management Branch			TITLE	WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: 1500 FRASER CAMP	
DATE APRIL 2006	DWN. JSB	CHKD. RMM	FILE NO. 1260002.001		DWG.: FIGURE 1500B

Z:\0201Drawings\1260002 Water Assessment YTG\001 - Whitehorse Region\fraser\1260002 Schematic 1500 Fraser.dwg, 4/6/2006 10:00:35 AM, Adobe PDF, jbuyck

Whitehorse Region – Fraser Camp
Building # 1500

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	PRESSURE CONTROL	WATTS	BUAG25			2"
2	PRIMARY FILTER	HARMSCO	ST-BC-8	PD-10-20	1560606-07-01)	2" X 20"
3	SECONDARY FILTER	HARMSCO	ST-BC-8	PD-10-20	156066-06-07-01	2" X 20"
4	CHLORINE INJECTION	LMI	A771-358SI		HYZ3638649	3/8"
5	FLOWMETER PULSER	LMI	RFP-20			
6	CHLORINE SOLUTION TANK	LMI.	30 GALLON			30 GALLON
7	WATER TANK.		AG1250			1250 GALLON
8	JET PUMP.	MONARCH	JKS-S4		9004	1HP.
9	PRESSURE TANK.	THERMEX	JOB # 7341		CREG E8463-1	600 GALLON
10						

TABLE 1500 - 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?
1500	Fraser Camp	6	Sept-04 to Mar-05	**yes**	1/6	no	2-Mar-05	no

Table 1500-2: Water Quality Results

SOURCE:	Building 1500 - Fraser Camp		GCDWQ Criteria		
Location/ Resident	Fraser				
Address					
Treatment	Chlorination and Filtration				
Source of Water	Frasier Lake, Microhydroelectic Generating Station				
Purpose of Sampling	Baseline	Additional Sampling			
Sample Location		Laundry Sink Tap in Truck Garage			
Date Sampled		11-May-05	**Lower Limit**	**Upper Limit**	
Physical Tests *(ALS)*			**AO**	**MAC**	**AO**
Colour (CU)		<5.0			15
Conductivity (uS/cm)		43.2			
Total Dissolved Solids		22			500
Hardness CaCO3		19.8	AO >200 = poor, > 500 unacceptable[A]		
pH		7.71	6.5		8.5
Turbidity (NTU)		0.14		1	5
Dissolved Anions *(ALS)*					
Alkalinity-Total CaCO3					
Chloride Cl		<0.50			250
Fluoride F		0.105		1.5	
Sulphate SO4		2.28			500
Nitrate Nitrogen N		<0.10		10	
Nitrite Nitrogen N		<0.10		1	
Total Metals *(ALS)*					
Aluminum T-Al		<0.010			
Antimony T-Sb		<0.00050		0.006	
Arsenic T-As		<0.00010		0.025	
Barium T-Ba		<0.020		1	
Boron T-B		<0.10		5	
Cadmium T-Cd		<0.00020		0.005	
Calcium T-Ca		6.77			
Chromium T-Cr		<0.0020		0.05	
Copper T-Cu		0.277		1	
Iron T-Fe		0.035			0.3
Lead T-Pb		<0.0010		0.01	
Magnesium T-Mg		0.71			
Manganese T-Mn		<0.0020			0.05
Mercury T-Hg		<0.00020		0.001	
Potassium T-K		0.28			
Selenium T-Se		<0.0010		0.01	
Sodium T-Na		<2.0			200
Uranium T-U		0.00103		0.02	
Zinc T-Zn		<0.050			5
Trihalomethanes					
Bromodichloromethane		<0.0010			
Bromoform		<0.0010			
Chloroform		<0.0010			
Dibromochloromethane		<0.0010			
Total Trihalomethanes		<0.0040		0.1	
Haloacetic Acids					
Bromoacetic Acid		<0.0020			
Bromochloroacetic Acid		<0.0020			
Chloroacetic Acid		<0.020			
Dibromoacetic Acid		<0.0020			
Dichloroacetic Acid		<0.0020			
Trichloroacetic Acid (TCA)		<0.0020			
Field Chemistry (EBA)					
pH		8.27	6.5		8.5
TDS		17			500
EC (uS/cm)		37			
Temperature		8.1			
Free Available Chlorine		0.01			250

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 (^{o}C) and Turbidity (NTU)

< = Less than the detection limit indicated.

AO = Aesthetic Objective

MAC = Maximum Acceptable Concentration (Health Based)

Table 1500-3: 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)**
1500	**Fraser Camp**	**Fraser**	6619679	497323	848

Table 1500-4: Potential Contaminant Sources
Building 1500 – Fraser Camp

Potential Contaminant Source	Potential Contaminants	Distance from Water Source	Northing	Easting
Dump or Landfill	***Organic*** and inorganic chemicals.	>>120 m		
Cemetery	***Biological***[1]***,*** inorganic[2] and organic parameters.	>>120 m		
Sewage lagoon	***Biological,*** inorganic and organic parameters.	>>300 m		
Sewage lines and lift stations	***Biological,*** inorganic and organic parameters.	>>30 m		
Septic tanks and fields	***Biological and Inorganic*** parameters.	>>30 m		
Gas stations	***Organic and Inorganic*** parameters.	>>30 m		
Undergrounds Fuel Storage Tanks (USTs)	***Organic*** parameters.	>>30 m		
Above ground storage tanks (ASTs)	***Organic*** *parameters.*	>>30 m		
Naturally occurring sources of contamination	***Radionuclides, Bacteria and Viruses from surfacewater sources.***	Water system utilizes surface water source.		

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 Martin, Luke Lebel Date May 11, 2009

WELL ID #	Owner	Location Description
1500	YTG	Fraser Camp

1. Well Location and Potential Contaminant Sources

a. General location of well: (Community, Subdivision, etc.)
Fraser

b. Specific location: (Road or street, Building number, name of owner and/, legal description,
Fraser Camp, Alaska Highway, Whitepass summit

c. GPS location: 497323 Easting; 6619679 Northing; 848m elev., ± 7m

d Is there electric power? ☒ Yes ☐ No

e. Does the well system have: The water is piped from surface water source in a nearby lake

☐ 15 or more service connections to a piped distribution system ? If so how many_____
Services maintenance camp, customs, and residences

☐ 5 or more delivery sites on a trucked distribution system? If so how many_____

f. Nearest building, specify Any building is >>60m away from the surface water source

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: It is very unlikely that there is an effluent disposal field within 150m of the water source

j. Well location relative to field: ☐ upslope ☐ downslope ☐ lateral

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

o. Is well site subject to flooding? ☐ Yes ☐ No

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?
Unlikely anywhere near the water source
☐ Yes ☐ No Describe _____

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

Potential Source 1:_____; Distance from well to Potential Source 1:_____
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?_____ ☐ in use ☐ abandoned ☐ require proper sealing

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 _____ Material: ☐ steel ☐ plastic ☐ concrete

g. Depth of well: _____ ☐ measured (if possible) ☐ reported ☐ from log

h. Static water level below ground: _____

☐ 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

☐ in a wooden enclosure other, describe _____

n. If the well head is located in a wooden enclosure,

i. Is the well head below grade? describe in detail_____

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_____

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.

The water is taken directly from a surface water source

If yes is there treatment ☒ Yes ☐ No

Explain (filtration, disinfection etc...) LMI proportional feed chlorinator

---

4. Aquifer Supplying This Well:

a. The aquifer is: ☐ bedrock ☐ granular sediment ☐ unknown

The water is directly from a surface water source

b. Does water level and/or well capacity show seasonal fluctuation? ☐ Yes ☐ No

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 _____

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

j. Is there a water meter on the system? ☒ Yes ☐ No
combination flow meter pulser for the chlorination system
FP-20 2788800 Gal(U.S.)

k. Is the pump and piping protected from freezing? ☐ Yes ☐ No
unknown, likely

If yes, describe: _____

l. Comments on pump installation: _____

6. Conclusions

a. Comments on overall installation:
This system is not from a well, but is rather from a surface body of water, Fraser Lake. The water is piped down to run a hydroelectric generating station, and water is taken from that to supply the system. There is a LMI proportional feed chlorinator used to treat the water.

b. Recommendations: _____

PART B: EBA Site Inspection

Inspector: _____ Date _____

WELL ID #	Owner	Location Description
1500	YTG	FRASER MAINTENANCE CAMP

6. **Water Treatment** PENSTOCK FEED

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 .01 reading.

Tested at WASHROOM TAP (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 N/A.

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 ☐ H_2S ☐ Other _____

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:

Where is it located?
Comments: WATER 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: OVERHEAD FORCED AIR UNIT

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: _____

Overall Tank

What are the tank size and dimensions?

AG 1250

What material is the tank constructed of? FIBRE GLASS.

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 NEEDS CLEANING.

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 UNKNOWN

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

8. Conclusions

a. Comments on overall installation:

THE SYSTEM HAS ALL THE NECESSARY COMPONENTS TO PROVIDE SAFE DRINKING WATER TO THE FACILITY.

b. Recommendations:

A REGULAR STORAGE TANK CLEANING SCHEDULE SHOULD BE INITIATED.
CHLORINE RESIDUAL TESTING SHOULD BE SCHEDULED WITH PROPER RECORDS OF TEST RESULTS.
THE LARGE PRESSURE TANK SHOULD BE FLUSHED WITH 200PPM CHLORINE SOLUTION ANNUALLY.

Environment Canada / Environnement Canada

Enforcement and Emergencies Section
91782 Alaska Highway, Whitehorse, YT Y1A 5B7
PH: 867.667.3400 FAX: 867.667.7962

Spill Report Information

Spill #	7907
Jurisdiction	Yukon
Community	Fraser Camp
Address	
Highway	
Milepost	
Feature	Fraser Camp
Location and Cause	WPYR Pipeline - rupture caused by damage done by cat during snow removal operations
Latitude	59.716667
Longitude	-135.066667
Incident Date	4/27/1979 6:00:00 AM
Lead Agency	Environment Canada - Environmental Protection Service
Other Agency	Department of Indian Affairs and Northern Development
Company(s)	White Pass & Yukon Route
Amount	41958
Units	Litres
Quantity	Estimate
Release Description	Leaked
Additional Quanitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Diesel
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	fuel spilled on ice surface of alpine lake - sorbent boom used and fuel pumped off - remaining burned - suggested contaminated snow be removed

Environment Canada Environnement Canada

Enforcement and Emergencies Section
91782 Alaska Highway, Whitehorse, YT Y1A 5B7
PH: 867.667.3400 FAX: 867.667.7962

Spill Report Information

Spill #	9036
Jurisdiction	Yukon
Community	Fraser Camp
Address	
Highway	
Milepost	
Feature	Fraser Camp
Location and Cause	leak from fuel source for locomotive train - over 6 M of track inside Canada border - started in Alaska, USA
Latitude	59.716667
Longitude	-135.066667
Incident Date	6/8/1990
Lead Agency	Environment Canada - Environmental Protection Service
Other Agency	
Company(s)	White Pass & Yukon Route
Amount	76
Units	Litres
Quantity	Estimate
Release Description	Leaked
Additional Quanitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Diesel
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	no recovery was attempted as fuel escaped into railbed ballast over 6 M of track

Environment Canada Environnement Canada

Enforcement and Emergencies Section
91782 Alaska Highway, Whitehorse, YT Y1A 5B7
PH: 867.667.3400 FAX: 867.667.7962

Spill Report Information

Spill #	9423
Jurisdiction	Yukon
Community	
Address	
Highway	Klondike Highway
Milepost	
Feature	Fraser
Location and Cause	YTG Highway Maintenance Camp - discharge of contaminated water and sludge from garage sump - spills at refueling area
Latitude	59.71635842
Longitude	-135.04431478
Incident Date	3/10/1994
Lead Agency	Provincial / Territorial - other
Other Agency	
Company(s)	YTG Highways
Amount	
Units	
Quantity	Unknown
Release Description	Chronic Discharge
Additional Quanitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Hydrocarbons
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	contaminated water and sludge being dumped outside on ground - ground around fueling station contaminated - runoff into creek - advised BC MOE

Photo 0111: 1500 Maintenance Garage with access to Water Equipment Room

Photo 0112: 1500 Hydroelectric Generating and Penstock Station

Photo 0484: 1500 Water Storage Tanks

Photo 0486: 1500 Filter System, 1 Micron Filter (left) and 10 Micron Filter (right)

Photo 0485: 1500 LMI Clorinator

Photo 0109: 1500 Jet Pump and Backup Water Resevoir

Photo 0489: 1500 Pressure Tank

Photo 0487: 1500 Penstock Feed