14.0 BUILDING 5650: MAYO WILDLIFE WORKSHOP

14.1 Description of Existing Water Supply System

The Mayo Wildlife Workshop (Building 5650) water system is supplied by a well located in a pit below grade approximately 4 m east of the wildlife workshop. A site plan is provided as Figure 5650-A in Appendix A14. The coordinates of the wellhead, as measured by a handheld GPS device, were recorded as:

- UTM ZONE 8
- Northing: 7053891
- Easting: 456556

This system is equipped with an inline filter; however, there is no other treatment and no disinfection for the system. A schematic detailing the water supply system is provided as Figure 5650-B in Appendix A14. Photos of the well and water system are also included at the back of this appendix.

14.2 Description of Existing Wastewater Systems

There is a septic tank located on the west side of the wildlife workshop, and septic effluent is discharged to the west of the tank. The septic tank is located approximately 16 m west of the well and the in-ground effluent disposal field is located between approximately 16 m and 28 m from the well. The location of the septic system is indicated on Figure 5650-A.

14.3 Water Quality Results

14.3.1 Water Quality Results from Previous Sampling

Bacteriological

Eight samples were collected from the Mayo Wildlife Workshop water system between October 2004 and June 2005, which were tested for total coliform and *E. coli* by Yukon Environmental Health Services using the presence/absence test method. Results are tabulated in Table 5650-1 in Appendix A14. Two of the eight samples were rejected due to high turbidity, and coliform bacteria and *E. coli* were reported as absent in each of the other six samples.

Potability

YTG representatives for detailed potability analysis collected water samples on September 27, 2004 and June 8, 2005. The samples were submitted to Northwest Labs in Surrey BC and ALS Environmental in Vancouver BC. Results are summarized in Table 5650-2 in Appendix A14. EBA reviewed the analytical results for comparison with the Canadian Drinking Water Quality Guidelines (CDWQG) to observe general water quality; to identify and recommend additional sampling and analytical; and to identify potential indicators of contamination. Details are summarized below:

- At 96.1 NTU during the first sampling event and 92.7 NTU during the second sampling event, the turbidity exceeded both the CDWQG MAC of 1.0 NTU and aesthetic objective (AO) of 5.0 NTU;
- The barium concentration of 1.53 mg/L during the first sampling event and 1.38 mg/L during the second sampling event exceeded the CDWQG MAC of 1.0 mg/L;
- At 0.0087 mg/L during the first sampling event and 0.0142 mg/L during the second sampling event, the arsenic concentration was below the current CDWQG MAC of 0.025 mg/L, but above the proposed MAC of 0.005 mg/L;
- At 6.53 mg/L during the first sampling event and 4.3 mg/L during the second sampling event, the total iron concentrations exceeded the CDWQG AO of 0.3 mg/L;
- At 0.683 mg/L during the first sampling event and 0.626 mg/L during the second sampling event, the total manganese concentrations exceeded the CDWQG AO of 0.05 mg/L;
- The first sampling event reported colour to be greater than 60 CU, which is above the CDWQG AO of 15 CU;
- The water quality results indicated that all other health based and AOs were met for the parameters analyzed;
- The water quality results indicated that the groundwater from which this system receives its water supply is likely a calcium magnesium bi-carbonate sulphate chloride type water; and,
- The hardness (as $CaCO_3$) was 273 mg/L during the first sampling event and 280 mg/L during the second sampling event, and is considered very hard.

14.3.2 Identification of Additional Analytical Testing Required

Additional analytical for the Mayo Wildlife Workshop that was identified to be included during the water system assessments is detailed below:

- UV absorbance and UV transmissivity, as well as tannins and lignin, to determine potential for UV treatment as a disinfection option for this water system;
- Total and dissolved metals;
- Phosphate, silica, to determine the potential for a point of entry arsenic removal system;
- Total organic carbon (TOC); and,
- Measurements in the field for total dissolved solids, conductivity, pH, and temperature.

Additional Analytical Results

A water sample was obtained by EBA during the water system assessment on August 17 2005 and was submitted to ALS Environmental in Vancouver BC for analysis of the selected parameters indicated above. These results are summarized in Table 3440-2 in Appendix A14 and the laboratory reports are included in Appendix B. The following points regarding the water quality results are of significance:

- Total and dissolved barium concentrations were in exceedence of CDWQG MACs at 1.44 and 1.31 mg/L respectively;
- Total iron (5.5 mg/L) were above the CDWQG AO of 0.3 mg/L while dissolved iron was below the laboratory detection limit of 0.03 mg/L indicating that the elevated iron concentration is most likely attributed to elevated turbidity;
- Total and dissolved manganese concentrations at 0.677 and 0.657 mg/L respectively were in exceedence of CDWQG AOs; and
- The total arsenic concentration at 0.00828 mg/L was above the proposed MAC of 0.005 mg/L while the dissolved arsenic concentration (0.00177 mg/L) is below the proposed MAC indicating that elevated arsenic can be partially attributed to elevated turbidity.

14.3.3 Indicators of Potential Contamination

Chloride, nitrate and nitrite concentrations can indicate impacts from surficial sources of contamination such as septic waste. Chloride concentrations in water samples collected from this system were slightly higher than expected background concentrations for the Mayo area. It should be noted that the Grader Station property, which is inferred to be upgradient of the site, also had elevated chloride concentrations in the shallow aquifer. Bulk salt storage on the Grader Station site may be the cause of the elevated chloride observed in the shallow aquifer in this area. Nitrate and nitrite concentrations are low and are within the normal background ranges for groundwater in the area. Although impact by septic discharge cannot be definitively ruled out, based on bacteriological results and low nitrate and nitrite, it does not appear that septic wastes were impacting on water quality in this well at the time of sampling.

14.4 Conceptual Hydrogeology

A driller's well log was not available for review for this well. Examination of well logs in the Mayo area show that well completion depths and lithology in the area is highly variable. Wells are completed at various depths, ranging from shallow dug wells to wells drilled to depths greater than 150 m. The Mayo area has been affected by one or more glaciations, sediments in the Village of Mayo area tend to consist of recent alluvium overlying fine-grained silts with varying interbedded sand and gravel. Sediment deposits are generally underlain by metamorphic bedrock, which is exposed in much of the upland areas. Widespread discontinuous permafrost is known to exist in the Mayo area and has been noted in several of the well logs examined.

Shallow groundwater flow generally occurs in the overlying alluvial deposits in the Village of Mayo area. Based on topography and proximity to surface water sources, the groundwater flow direction is inferred to be in the range of south to west towards the Mayo and/or Stewart River. The construction of the wellhead enclosure made the wellhead inaccessible to measurements for depth, and no information pertaining to the completion of the well is available.

14.5 Potential Contaminant Sources

Details and photographs of potential contaminant sources observed during the site investigation are compiled in Appendix A14.

Potential contaminant sources within 30 m of the wellhead are:

- A septic tank at 16 m; the septic field is between 16 m and 28 m;
- An above ground fuel storage tank (AST) at 7 m; and
- Vehicle parking at 2 m.

14.5.1 Spills Records and Contaminated Sites Search Results

It was reported by Environment Canada that three spills occurred in the 1970's at the White Pass and Yukon Route tank farm (WPYR) which is approimately 350 m northwest of the site. The first spill resulted in approximately 1600 L of furnace oil being discharged due to a machanical faliure. Reportedly the spill was contained and hydrocarbon impacted soils were disposed of off-site. Later in the decade two other spills resulted in dicharges of 3700 L of fuel oil and 1600 L of gasoline respectively. Spill records are inclued in Appendix A11.

Another spill was reported in 1991 at the WPYR site when an unknown quantity of fuel caught fire and a truck exploded. 756, 000 L of water was used during fire supression and reportedly, runoff was contained.

Two reported spills also occurred at the North 60 Petroleum Tank Farm in 1997 and 1999 due to the overfilling of a storage tank. Approximately 1000 L of diesel was spilled, however no record of remediation was reported.

The Government of Yukon Environmental Programs Branch and Environment Canada Environmental Protection Branch did not identify any other recorded spill events or contaminated sites issues for this site or neighbouring sites in close proximity.

14.6 Identified Water System Deficiencies and Associated Risk

14.6.1 High and Medium Risk Deficiencies

High and medium risk deficiencies identified during this study include:

- Poor surface completion of the wellhead (located in a pit below grade, evidence of sediment build-up on the base of the enclosure due to flooding);
- There is no surface sanitary seal (grout or bentonite seal as required by the Canadian Groundwater Association's Guidelines for Water Well Construction);
- There is no well log available to review well construction and lithology;
- By definition of the Draft Yukon GUDI Assessment Guideline, the well is potentially under the direct influence of surface water because it does not meet the requirements of the Guidelines for Water Well Construction);
- The well is located within 30 m of potential contaminant sources, including a septic field, an AST, and vehicle parking;
- The barium concentration is above the CDWQG MAC;
- The turbidity is above both the CDWQG MAC and AO; and
- There is no disinfection system present.

14.6.2 Low Risk Deficiencies

- The arsenic concentration, although not in exceedence of the current CDWQG MAC, has been reported above the proposed MAC of 0.005 mg/L;
- The iron concentration has been in exceedence of the CDWQG AO;
- The manganese concentration has been in exceedence of the CDWQG AO; and,
- The colour has been previously been in exceedence of the CDWQG AO.

14.7 Mitigative Options for Deficiencies

Mitigative options were developed to address the deficiencies identified in the previous section. Deficiencies are categorized by recommended level of priority (with Priority 1 being most critical).

The existing well is not considered suitable for a drinking water source based on the water quality, and proximity to contaminant sources. The options of a replacement water well at a safe location on the site with respect to potential contaminant sources, or water delivery from a treated source at the Village of Mayo are presented below for comparision.

14.7.1 Priority 1

Regardless of which option is ultimately chosen, water from this well should not be used for human consumption until Priority 2 upgrades are completed. In the interim, until one of the options presented below is selected and implemented, YTG should provide bottled water and post suitable advisories. PMA should consult with Environmental Health and Social Services (EHSS) regarding appropriate advisories.

14.7.2 Priority 2

Option 1:

The first option presented involves drilling a new well that would be sited and constructed in consideration of the following:

- The well should be equipped with a surface seal to at least 6 m and a pitless unit should be installed with the casing raised above grade (500 mm);
- The well must be located at a distance greater than 30 m and upgradient from any potential source of contamination;
- The well should be at least 15 m in depth;
- The water from the new well must meet all CDWQG health based guidelines. If there are any exceedences in the CDWQG health-based guidelines then a treatment system must be designed and installed as necessary. A treatment/disinfection system would likely consist of a filtration system (to 1 micron absolute) followed by a UV disinfection system. Pretreatment would likely be required.

A shallow well at this site is not considered to be a safe option given the land-use on adjacent properties and at the Grader Station. It should be noted that groundwater obtained from deep wells in this area is typically highly mineralized and generally has aesthetically poor water quality. Water from a deep well in this vicinity would likely require treatment for hardness and possibly arsenic, iron and manganese.

Option 2:

The second option would involve disconnecting the existing well from the domestic system and converting to bulk water delivery with UV disinfection and filtration. This option would involve the least risk, and the least capital cost, but would result in higher operation and maintenance costs for the long-term.

14.7.3 Priority 3:

Following Priority 2 upgrades, the existing well should be properly decommissioned. It is anticipated that Priority 1 and 2 upgrades would mitigate all health risks.

14.8 Cost Estimates for Mitigative Options

Engineering costs for mitigative options are estimated to be 20% of construction costs, and would include inspection and completion reporting. The costs for materials and labour (not including engineering) are provided in the sections below. An additional contingency allowance of 20% is suggested for budgetary purposes.

14.8.1 Priority 1

- A bottled water station would cost in the order of **$250** and bottled water would cost approximately $10 per 20 L bottle.

14.8.2 Priority 2

Option 1:

- A new well, assuming that it is drilled to approximately 50 m in depth through overburden deposits, would likely cost in the order of **$40,000** to drill, test, and connect (including pump, drop pipe and freeze-protected underground piping);
- The materials and labour costs for a treatment/disinfection system (based on water quality from other deep wells in the area) would likely cost in the order of **$7,700**; assuming **$600** for the duplex filtration system, **$4,000** for a duplex softening system, **$2,400** for the NSF/ANSI 55 certified UV disinfection, and **$700** for a dedicated Reverse Osmosis system.

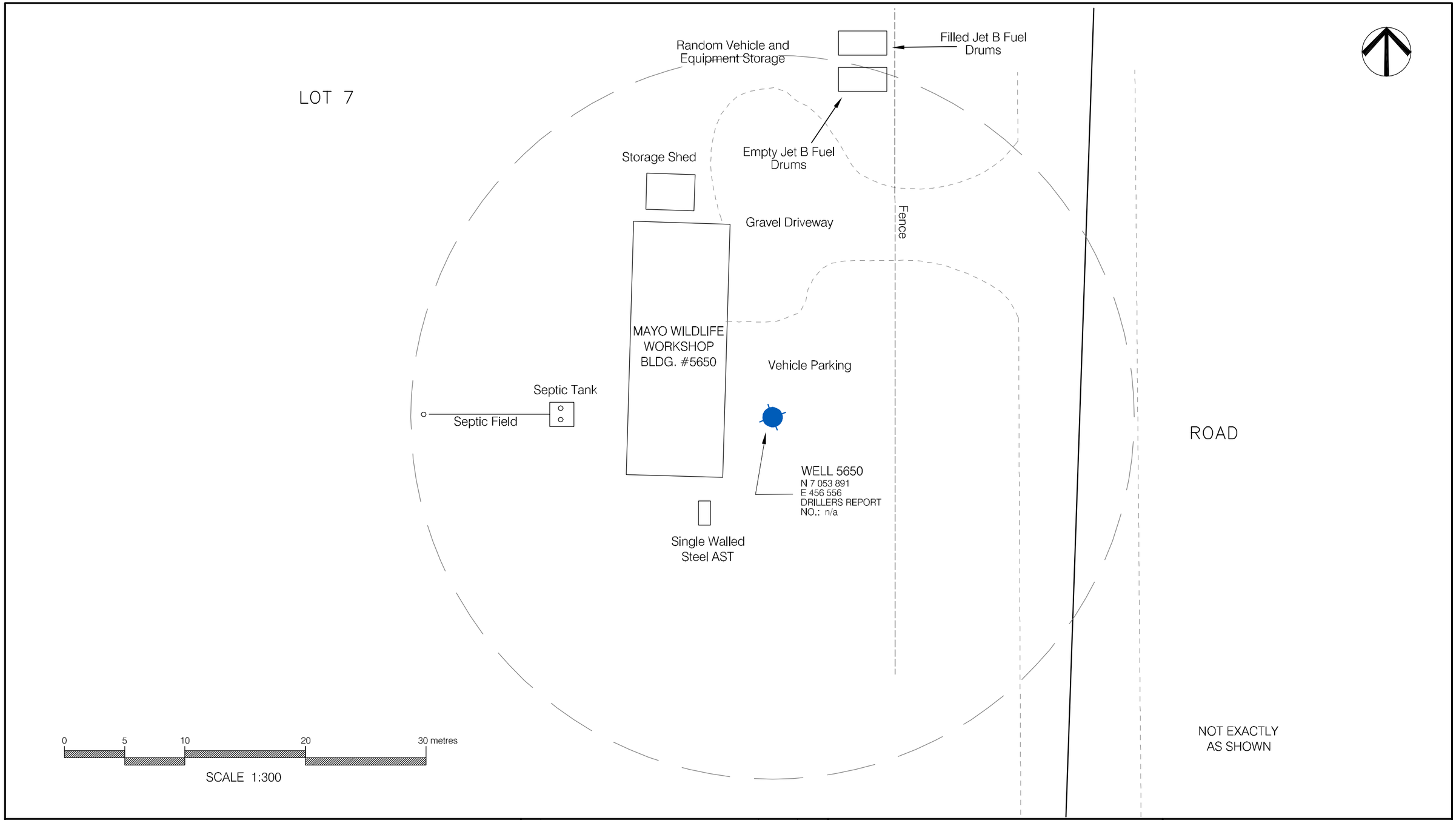
Option 2:

To supply and install a water storage tank, new jet pump and connect to existing plumbing would likely cost in the order of **$3,450**. A filtration and NSF/ANSI certified UV system would also cost in the order of **$3,000** installed. Therefore, the capital cost for this option would be approximately **$6,450**. The Na Cho Nyak Dun First Nation currently provides water delivery in the area from a treated source operated by the Village of Mayo. Delivery costs should be considered when comparing life cycle costs of this option with Option 1.

14.8.3 Priority 3

Decommissioning of the existing well would cost approximately **$1,000.** Consideration should be given to completing this work at the same time as Priority 2 work to save on mobilization/demobilization costs.

In consideration of Priority 1, 2 and 3 recommended upgrades for both options, the total cost for a replacement well and required treatment would likely be in the order of **$44,350** for materials and labour. Reconfiguring the water system for water delivery and back-up treatment (in consideration of low residual chlorine concentrations being observed at other buildings on water delivery) would cost in the order of **$7,700** for materials and labour. Delivery charges should be considered when evaluating life cycle costs to compare each of these options.



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:	SEPT. 2005
SCALE:	AS SHOWN
PROJECT No.:	1260002.004
ACAD FILENAME:	004–NORTHERN REGION

CLIENT: Yukon
Highways and Public Works
Property Management Branch

SMALL PUBLIC WATER SYSTEMS ASSESSMENT
NORTHERN REGION

GOVERNMENT OF YUKON
HIGHWAYS & PUBLIC WORKS

MAYO WILDLIFE WORKSHOP
BUILDING # 5650
SITE LOCATION DIAGRAM
WELL ID: 5650

REVISION ISSUE 0

FIGURE No. FIGURE 5650–A

Z:\0201Drawings\1260002 Water Assessment YTG\004 - Northern Region\mayo\1260002004 Mayo Wildlife Workshop_5650A Site Plan.dwg, 4/6/2006 11:03:00 AM, Adobe PDF, jbuyck

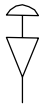
LEGEND


PUMP


PRESSURE GAUGE


GATE VALVE


CHECK VALVE

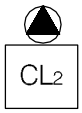

SOLENOID

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

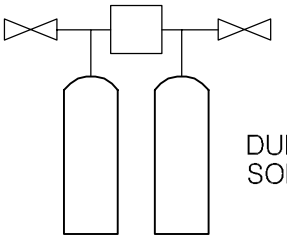
FLOW METER

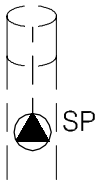
WATER FILTER
(CARTRIDGE TYPE)

PRESSURE TANK

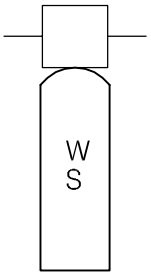


CHLORINE RESERVOIR AND
INJECTION PUMP


DUPLEX WATER
SOFTENER

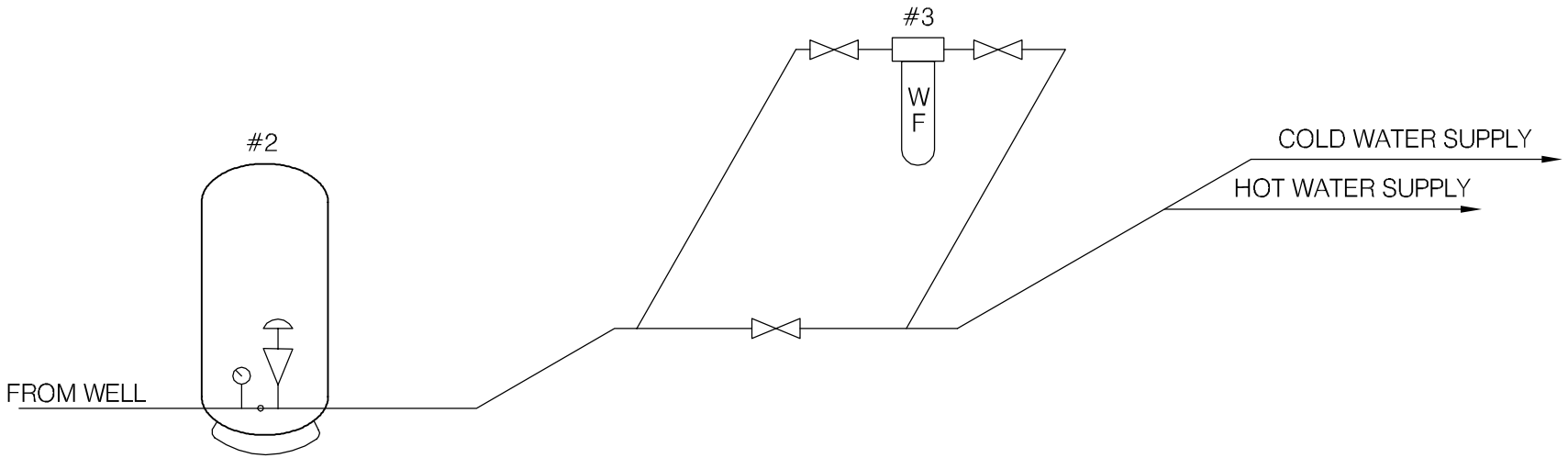


WELL WITH
SUBMERSIBLE PUMP



ACTIVATED
CARBON

EBA Engineering Consultants Ltd.			PROJECT	SMALL PUBLIC WATER SYSTEMS ASSESSMENT WESTERN 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



DRAWING IS BASED UPON SCHEMATIC PROVIDED BY BERT ALBISSER OF AQUA TECH SUPPLIES AND SERVICES LTD.

EBA Engineering Consultants Ltd.			PROJECT	SMALL PUBLIC WATER SYSTEMS ASSESSMENT NORTHERN REGION	
CLIENT Yukon Highways and Public Works Property Management Branch			TITLE	WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: 5650 WILDLIFE WORKSHOP - MAYO, YT.	
DATE SEPT. 2005	DWN. JSB	CHKD. RMM	FILE NO. 1260002.004		DWG.: FIGURE 5650-B

Z:\0201Drawings\1260002 Water Assessment YTG\004 - Northern Region\mayo\1260002004 Mayo Wildlife Workshop_5650B Schematic.dwg, 4/5/2006 2:48:02 PM, Adobe PDF, jbuyck

Northern Region – Mayo Wildlife Workshop
Building # 5650

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	SUB PUMP	?				?
2	PRESSURE TANK	WELL X TROL	WX-201			
3	INLINE FILTER	AMETEK	10" BB			10" x 1"
4						
5						
6						
7						
8						
9						
10						

TABLE 5650 - 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?
5650	Mayo Wildlife Workshop	8	Oct-04 to Jun-05	no	0/8**	no	9-Jun-05	no

* Two out of eight samples were rejected due to high turbidity

Table 5650 - 2: Water Quality Results

SOURCE:	Building 5650 - Mayo Wildlife Workshop			GCDWQ Criteria		
Location/ Resident	Mayo					
Address						
Treatment	Filtration					
Disinfection	None					
Source of Water	On-site well					
Purpose of Sampling	Base Line	Base Line	Additional Sampling			
Sample Location			Kitchen faucet			
Date Sampled	27-Sep-04	8-Jun-05	17-Aug-05	Lower	Upper Limit	
Physical Tests *(ALS)*				**AO**	**MAC**	**AO**
Colour (CU)	**>60**	<5.0				15
Conductivity (uS/cm)		638				
Total Dissolved Solids	338	354				500
Hardness CaCO3	273	280	282	AO >200 = poor, > 500 unacceptable[A]		
pH	8.01	8.14		6.5		8.5
Turbidity (NTU)	**96.1**	**92.7**			1	5
UV Absorbance			0.046			
% UV Transmittance			90			
Dissolved Anions *(ALS)*						
Alkalinity-Total CaCO3	268	269				
Chloride Cl	12	13.9				250
Fluoride F	0.09	0.1			1.5	
Silicate SiO4			8.4			
Sulphate SO4	41.8	44.9				500
Nitrate Nitrogen N	0.01	<0.10			10	
Nitrite Nitrogen N	<0.005	<0.10			1	
Ammonia Nitrogen N						
Total Phosphate PO4			0.0072			
Total Metals *(ALS)*						
Aluminum T-Al	<0.005	<0.010	<0.010		0.1	
Antimony T-Sb	<0.0002	<0.00050	<0.00050		0.006	
Arsenic T-As	*0.0087*	*0.0142*	*0.00828*		0.025	
Barium T-Ba	**1.53**	**1.38**	**1.44**		1	
Boron T-B	0.011	<0.10	<0.10		5	
Cadmium T-Cd	<0.00001	<0.00020	<0.00020		0.005	
Calcium T-Ca		87.9	90			
Chromium T-Cr	0.0018	<0.0020	<0.0020		0.05	
Copper T-Cu	0.002	<0.0010	<0.0010		1	
Iron T-Fe	**6.53**	**4.3**	**5.5**			0.3
Lead T-Pb	0.0003	<0.0010	<0.0010		0.01	
Magnesium T-Mg		14.6	14.3			
Manganese T-Mn	**0.683**	**0.626**	**0.677**			0.05
Mercury T-Hg		<0.00020	<0.00020		0.001	
Potassium T-K		12.6	16.8			
Selenium T-Se		<0.0010	<0.0010		0.01	
Sodium T-Na		9.3	9.5			200
Uranium T-U	0.0006	0.00081	0.00051		0.02	
Vanadium T-V			<0.030			
Zinc T-Zn	0.004	<0.050	<0.050			5
Dissolved Metals						
Aluminum D-Al			<0.010		0.1	
Antimony D-Sb			<0.00050		0.006	
Arsenic D-As			0.00177		0.025	
Barium D-Ba			**1.31**		1.0	
Boron D-B			<0.10		5	
Cadmium D-Cd			<0.00020		0.005	
Calcium D-Ca			89.7			
Chromium D-Cr			<0.0020		0.05	
Copper D-Cu			<0.0010			1.0
Iron D-Fe			<0.030			0.3
Lead D-Pb			<0.0010		0.01	
Magnesium D-Mg			14.2			
Manganese D-Mn			**0.657**			0.05
Mercury D-Hg			<0.00020		0.001	
Potasium D-K			16.8			
Selenium D-Se			<0.0010		0.01	
Sodium D-Na			9.5			200
Uranium D-U			0.00051		0.02	
Vanadium D-V			-			
Zinc D-Zn			<0.050			5.0
Organic Parameters						
Tannin and Lignin			0.38			
Total Organic Carbon C			4.04			
Field Chemistry (EBA)						
pH			7.88	6.5		8.5
TDS (ppm)			291			500
EC (uS/cm)			580			
Temperature (°C)			7.88			
Free Available Chlorine						

Notes:

A. Guidelines indicated for hardness are not CDWQG, rather they are general aesthetic guidelines - exceedences are indicated in yellow highlighting.

Italics and underline indicates exceedence of proposed MAC (ie. arsenic)

Bold with Yellow highlighting indicates exceedence of CDWQG Aesthetic Objective (AO)

Bold Underline with Yellow highlighting 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)

eba

EBA Engineering Consultants Ltd.
Creating and Delivering Better Solutions

SMALL PUBLIC WATER SYSTEM ASSESSMENT

PART A: EBA Site Inspection

Inspector: Ryan Martin, Luke Lebel Date August 17, 2005

WELL ID #	Owner	Location Description
5650	YTG	Mayo wildlife workshop

1. Well Location and Potential Contaminant Sources

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

b. Specific location: (Road or street, Building number, name of owner and/, legal description,

c. GPS location: N 7053891 E 456556 elv 511m ±8m

d Is there electric power? ☒ Yes ☐ No

e Is there outside water access? ☐ Yes ☒ No

f. Does the well system have:

☐ 15 or more service connections to a piped distribution system ? If so how many_____
Mayo wildlife workshop

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

g. Nearest building, specify wildlife workshop

h. Distance from well to building ~4m

i. If there is an effluent disposal field, is its location known? ☒ Yes ☐ No

j. Distance from well to nearest point of known field: ~6m to tank, Field between 6m and 28m

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

l. 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

---

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

n. Is the well located within 120 m from a solid waste site or dump, cemetery? ☐ Yes ☒ No unlikely

o. 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 Unlocked enclosure

Entrance by animals? ☐ Yes ☒ No Access possible

p. Is well site subject to flooding? ☒ Yes ☐ No enclosure damp

q. Is the well site well drained? ☒ Yes ☐ No

r. 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 _____

s. 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: Jet fuel Drums; Distance from well to Potential Source 1: ~34m

Potential Source 2: AST; Distance from well to Potential Source 2: ~7m

Potential Source 3: Vehicle Parking (Roads); Distance from well to Potential Source 3: ~2m

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

t. 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 unknown 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 15 cm Material: ☒ steel ☐ plastic ☐ concrete

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

h. Static water level below ground: unknown

☐ 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 unknown slot size(s) _____
Location of screen: from _____ to _____ 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,

i. Is the well head below grade? describe in detail ~1.0m bg

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 styrofoam

iv. Any evidence of rodents? Specify Access possible

v. Does the well casing have a proper seal cap? ☒ Yes ☐ No

If no, describe condition split gasket cap

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 or disinfection ☒ Yes ☐ No

Explain (filtration, disinfection etc...) filtration

---

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 _____

d. Date installed: _____ By: _____

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

f. Drop pipe for submersible pump: ☐ steel ☒ plastic likely

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

If yes, describe: Heat trace + insulation

l. Comments on pump installation: _____

_____

6. Conclusions

a. Comments on overall installation:

_____

_____

_____

_____

_____

_____

_____

b.Recommendations: _____

_____

_____

_____

_____

_____

_____

_____

PART B: EBA Site Inspection

Inspector: BERT ALBISSER Date AUG 17/05

WELL ID #	Owner	Location Description
5650	YTG	MAYO WILDLIFE SHOP

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 ☐ 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: PRESSURE TANK

Where is it located?
Comments: SHOP AREA

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: _____

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

8. Conclusions

a. Comments on overall installation:

THE INSTALLATION IS SATISFACTORY
THE PRESSURE TANK IS WATER LOGGED - IT NEEDS TO BE REPLACED.

b. Recommendations:

Environment Canada Environnement Canada

Enforcement and Emergencies Section
91782 Alaska Highway, Whitehorse, YT Y1A 5B7
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Spill Report Information

Spill #	7613
Jurisdiction	Yukon
Community	Mayo
Address	
Highway	
Milepost	
Feature	Mayo
Location and Cause	WPYR tank farm - failure of loading hose
Latitude	63.6133333333333
Longitude	-135.879166666667
Incident Date	8/26/1976 10:00:00 PM
Lead Agency	Department of Indian Affairs and Northern Development
Other Agency	
Company(s)	White Pass & Yukon Route
Amount	1512
Units	Litres
Quantity	Actual
Release Description	Spilled
Additional Quanitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Furnace Oil
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	spill dyked off immediately - contaminated area 15' x 150' - cleaned-up (contaminants removed to Mayo dump)

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Spill Report Information

Spill #	7718
Jurisdiction	Yukon
Community	Mayo
Address	
Highway	
Milepost	
Feature	Mayo
Location and Cause	tank farm - tank overfilled
Latitude	63.6133333333333
Longitude	-135.879166666667
Incident Date	8/22/1977 9:00:00 AM
Lead Agency	Environment Canada - Environmental Protection Service
Other Agency	Department of Indian Affairs and Northern Development
Company(s)	White Pass & Yukon Route
Amount	3742
Units	Litres
Quantity	Actual
Release Description	Spilled
Additional Quanitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Fuel Oil
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	no fuel recovered - possible contamination of groundwaters but not known - suggests action be taken as too many spills with no recovery in area

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Spill Report Information

Spill #	7727
Jurisdiction	Yukon
Community	Mayo
Address	
Highway	
Milepost	
Feature	Mayo
Location and Cause	tank farm - tank overfilled
Latitude	63.6133333333333
Longitude	-135.879166666667
Incident Date	3/28/1977 9:00:00 AM
Lead Agency	Environment Canada - Environmental Protection Service
Other Agency	
Company(s)	White Pass & Yukon Route
Amount	1512
Units	Litres
Quantity	Actual
Release Description	Spilled
Additional Quanitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Gasoline
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	spill within dyke - none reported outside dyke - cleaned-up

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Spill Report Information

Spill #	9130
Jurisdiction	Yukon
Community	Mayo
Address	
Highway	
Milepost	
Feature	Mayo
Location and Cause	White Pass yard - garage caught on fire - explosion ensued
Latitude	63.6166666666667
Longitude	-135.884444444444
Incident Date	11/26/1991
Lead Agency	Yukon Government - Fire Marshall
Other Agency	
Company(s)	White Pass
Amount	
Units	
Quantity	Unknown
Release Description	Burned
Additional Quanitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Hydrocarbons
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	fuel or propane truck exploded inside building - building consumed - used 756,000L water - water runoff contained in ditch - oil and fuel in water

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Spill Report Information

Spill #	9703
Jurisdiction	Yukon
Community	Mayo
Address	
Highway	
Milepost	
Feature	Mayo
Location and Cause	North 60 Petroleum Bulk Plant - overfill of bulk storage tank - miscommunication between truck operator and plant operator
Latitude	63.6134
Longitude	-135.8793
Incident Date	1/15/1997 6:40:00 PM
Lead Agency	Yukon Government - Public Safety
Other Agency	Environment Canada - Environmental Protection Service
Company(s)	North 60 Petroleum
Amount	1000
Units	Litres
Quantity	Estimate
Release Description	Spilled
Additional Quanitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Diesel
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	300 L recovered - EC recommended excavation of contaminated soil and installation of monitoring wells - fuel discrpency of 22,000 L reported by Mayo plant - not verified

Environment Canada Environnement Canada

Enforcement and Emergencies Section
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Spill Report Information

Spill #	9947
Jurisdiction	Yukon
Community	Mayo
Address	
Highway	
Milepost	
Feature	Mayo
Location and Cause	North 60 Petroleum Tank Farm - overfill of storage tank
Latitude	63.6134
Longitude	-135.8793
Incident Date	12/10/1999 5:10:00 PM
Lead Agency	Environment Canada - Environmental Protection Service
Other Agency	
Company(s)	North 60 Petroleum
Amount	
Units	
Quantity	Unknown
Release Description	Spilled
Additional Quanitit	negligible amount
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Diesel
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	overfill caused product to run down sides of tank and small amount to ground at base of tank within berm - no loss noted in records check - minimal amount spilled - no action

Photo 033: 5650 Wildlife Workshop (northeast side of building).

Photo 057: 5650 On site AST.

Photo 056: 5650 Wellhead enclosure.

Photo 194: 5650 Water system. (pressure tank and filter)