14.0 BUILDINGS M0092: WATSON LAKE RCMP DETACHMENT

14.1 Description of Existing Water system

Building M0092, the Watson Lake RCMP Detachment, is served by a water system that delivers water from a 15.9 m deep well located in a pit approximately 2 m from the rear of the detachment. There is also an abandoned well located in a concrete enclosure off from the basement of the detachment building. The location of the wells and other details about the surrounding area are provided as Figure M0092-A in Appendix A14. The coordinates of the wellhead measured using a hand held GPS device were:

- UTM ZONE 9
- Northing: 6657662
- Easting: 518256

There is no treatment or disinfection system present on the water system. In addition to serving the detachment, this well also serves the RCMP Gym (building M0084). A schematic detailing the water system is provided as Figure M0092-B in Appendix A14.

14.2 Description of Existing Wastewater Systems

There is a septic field that is used commonly by both the RCMP detachment and the RCMP gym. This field is located approximately 35 m east of the main well. Figure M0092-A, provided in Appendix A14, shows the location of the septic system.

14.3 Water Quality Results

14.3.1 Results from Water Quality Analysis

Bacteriological

Two samples were collected from the M0092 Watson Lake RCMP Detachment water system between May and June 2005 and were tested for total coliform and *E. coli* by Yukon Environmental Health Services using the presence/absence test method. Results are tabulated in Table M0092-1 in Appendix A14. Coliform bacteria and *E. coli* were reported as absent in both samples for which results were provided.

Potability

This site was only recently added as one of the YTG maintained facilities and as such baseline water quality had not been obtained prior to the assessment. A sample was taken by a YTG representative at approximately the time as the water system assessments.

Measurements in the field for total dissolved solids, conductivity, pH, and temperature were taken at the time of the assessment. Results of the baseline and additional analytical sampling are summarized in Table M0092-2 in Appendix 14 and the laboratory results are included in Appendix B.

- Water quality results indicate that the groundwater supplying this system is calcium-bicarbonate type with high hardness.
- All health-based and aesthetic objectives were met for the parameters analyzed.

14.3.2 Indicators of Potential Contamination

Chloride, nitrate and nitrite concentrations can indicate impacts from surface water sources or septic waste. Chloride concentrations, although were not high, are likely above the normal background ranges for groundwater in the area. Nitrate and nitrite concentrations for this sample are low and would likely be within the normal background ranges for groundwater in the Watson Lake area.

14.4 Conceptual Hydrogeology

The log for M0092A indicates that the well is completed at a depth of 15.9 m in an unconfined sand aquifer with no significant confining material, the static water level measured at 9.16 m below grade. The log for M0092A is consistent with the lithology of most wells in the area, which are completed at depths of less than 30 m within surficial morainic and colluvial deposits. These deposits are described as gravel, sand and silt, with occurrences of silty till sediments. This well is located on the north side of a groundwater flow divide near an area of groundwater discharge. The interpreted flow direction is likely northeasterly towards an unnamed lake.

14.5 Potential Contaminant Sources

Potential contaminant sources observed during the site investigation are described in field notes in Appendix A14. Photos of potential contaminant sources are provided in Appendix A14.

A summary of potential contaminant sources within 30 m of the main RCMP detachment well is provided below:

- An adjacent abandonned well at approximately 1 m;
- Underground fuel storage tank at approximately 17 m; and,
- Two above ground fuel storage tanks at approximately 17 m and 27 m.

14.5.1 Spills Records and Contaminated Sites Search Results

The Government of Yukon Environmental Programs Branch and Environment Canada Environmental Protection Branch did not identify any recorded spill events or contaminated sites issues for this property or neighbouring properties.

14.6 Identified Water System Deficiencies and Associated Risk

14.6.1 High and Medium Risk Deficiencies

- The well is located within 30 m of potential sources of contamination, including an abandoned well that has not been properly decommissioned and is not equipped with a proper cap;
- The well is located 17 m from an underground fuel storage tank, as well as 17 m and 27 m from two above ground fuel storage tanks;
- Poor surface completion of the well (located in a pit below grade);
- The well is not equipped with a surface sanitary seal as required by the Canadian Groundwater Association's Well Construction Guidelines;
- By definition of the Draft Yukon GUDI Assessment Guideline, the well is potentially under the direct influence of surface water because it is a vulnerable type (unconfined aquifer), and does not meet the requirements of the Guidelines for Water Well Construction; and,
- There is no treatment or disinfection system present.

14.6.2 Low Risk Deficiencies

There were no low-risk deficiencies identified for this site. All deficiencies are considered high-risk.

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).

Considering that some of the wells in the RCMP complex in Watson Lake may show signs of potential impacts from surface water or septic sources, it is proposed that a community water distribution system be installed to serve the entire RCMP complex, and would obtain its water from the existing well at this site.

14.7.1 Priority 1

The following recommendations are provided in order to mitigate deficiencies that are of immediate concern for the M0088 Watson Lake RCMP Detachment:

- The well should be superchlorinated;
- Additional assessment, including a pumping test, should be done on the detachment well to determine its yield and other construction details. Although this is not considered a high risk issue, this information will be necessary to determine the course of action for other Priority 1 upgrades (e.g. to determine sizing for disinfection system);
- There are two options available for the type of disinfection system to be installed for the proposed water distribution system, and are outlined below:

  Option 1:

  - An NSF/ANSI 55 certified UV disinfection system (preceded by NSF-61 certified filtration to 1 micron absolute) should be installed at a centralized location on the water system in the basement on the RCMP detachment; or,

  Option 2:

  - A chlorine disinfection system with suitable retention should be installed at a centralized location on the water system in the basement on the RCMP detachment.
- The abandoned well in the basement of the detachment should be properly decommissioned in accordance with Guidelines on Water Well Construction; and,

- The existing underground fuel storage tank should be removed and all contaminated soil (if any) should be removed and properly disposed of.

These are conceptual design recommendations based on the information available for planning and budgeting purposes. Engineering input will be required for final system specifications.

14.7.2 Priority 2

- The wellhead construction should be improved, including extending the well to at least 500 mm above grade and installing a commercial pitless unit. A surface sanitary seal (grout or bentonite) to at least 3 m below grade should be retrofitted around the well and the ground surface should be graded to promote surface drainage away from the wellhead;
- If the well is deemed suitable to meet the requirements of all buildings in the complex, a low-flow/ low pressure water distribution line should be installed to service each building. Service lines should be run to M0086, to one of M0087 or M0088 (existing piping can be used to connect to the other), to one of M0126 or M0127 (existing piping can be used to connect to the other), and existing piping between the detachment and the RCMP gym can be used to serve the gym; and,
- The existing above ground fuel storage tanks should be removed and replaced with double walled EnviroTanks with secondary containment.

14.7.3 Priority 3

There are no Priority 3 recommendations for this site.

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.

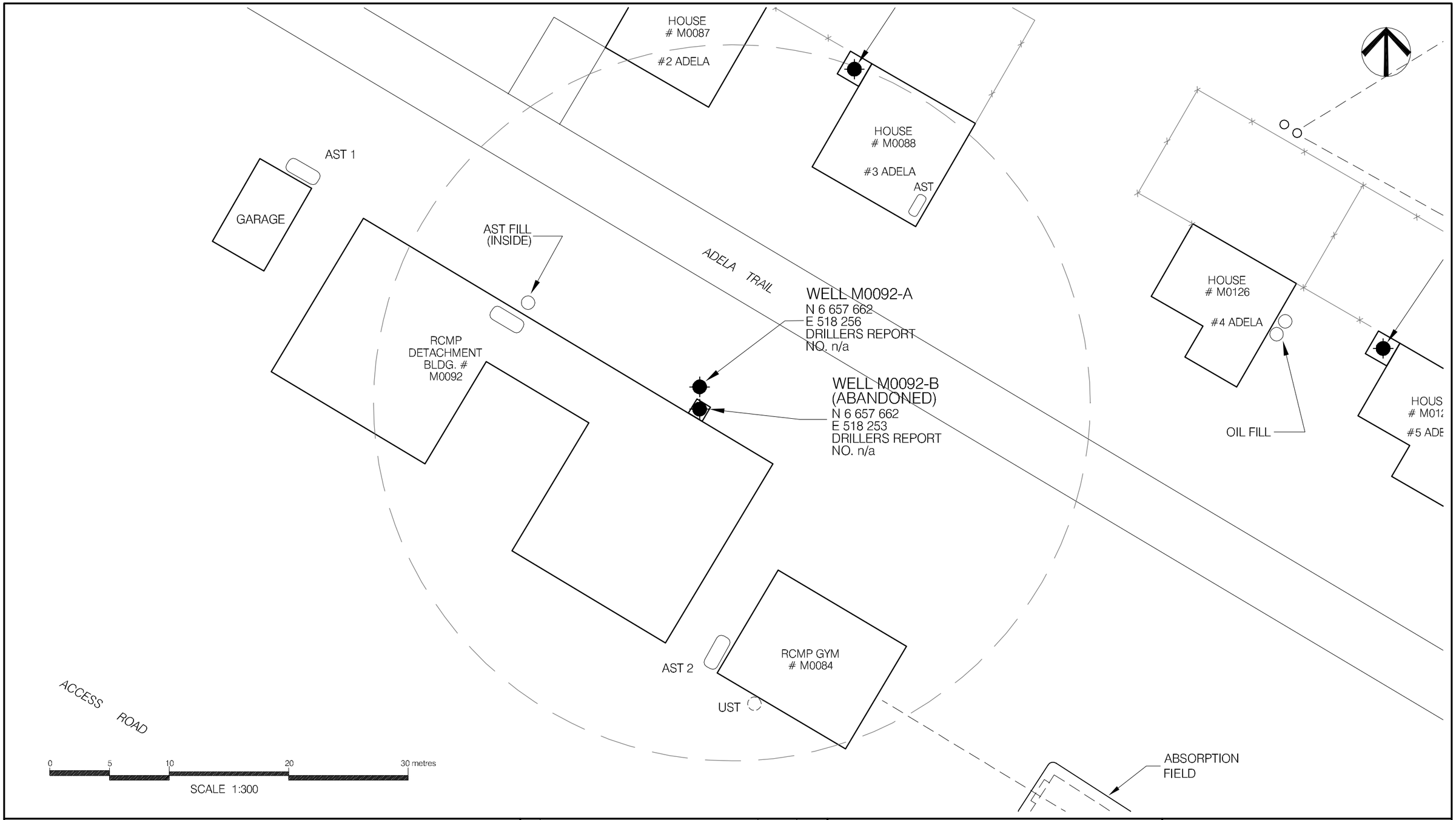
14.8.1 Priority 1

- The required additional well assessment, including a short-term pump test, would cost in the order of **$2,000**; and,
- Shock chlorinating the well would cost in the order of **$100**;

- An adequate treatment system, sized to meet the future demands of all buildings at the site would likely cost in the order of **$8,000**;
- To properly decommission the abandoned well would cost in the order of **$1,000**; and,
- To remove the underground fuel storage tank should cost approximately **$3,000**.

14.8.2 Priority 2

- Standard wellhead upgrades would cost approximately **$5,000**;
- New double walled EnviroTanks would cost approximately **$2,600** each.



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:	JULY 2005
SCALE:	AS SHOWN
PROJECT No.:	1260002.002
ACAD FILENAME:	002-EASTERN REGION

CLIENT: Yukon
Highways and Public Works
Property Management Branch

SMALL PUBLIC WATER SYSTEMS ASSESSMENT
EASTERN REGION

GOVERNMENT OF YUKON
HIGHWAYS & PUBLIC WORKS

WATSON LAKE RCMP HOUSE
BUILDING # M0092
SITE LOCATION DIAGRAM
WELL ID: M0092-A

REVISION ISSUE: 0

FIGURE No.: M0092-A

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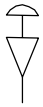
LEGEND


PUMP


PRESSURE GAUGE


GATE VALVE


CHECK VALVE

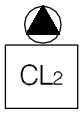

SOLENOID

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

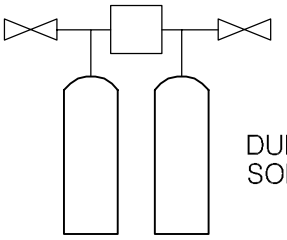
FLOW METER

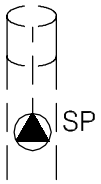
WATER FILTER
(CARTRIDGE TYPE)

PRESSURE TANK

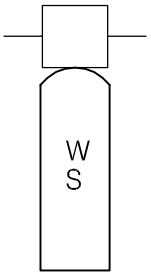


CHLORINE RESERVOIR AND
INJECTION PUMP


DUPLEX WATER
SOFTENER

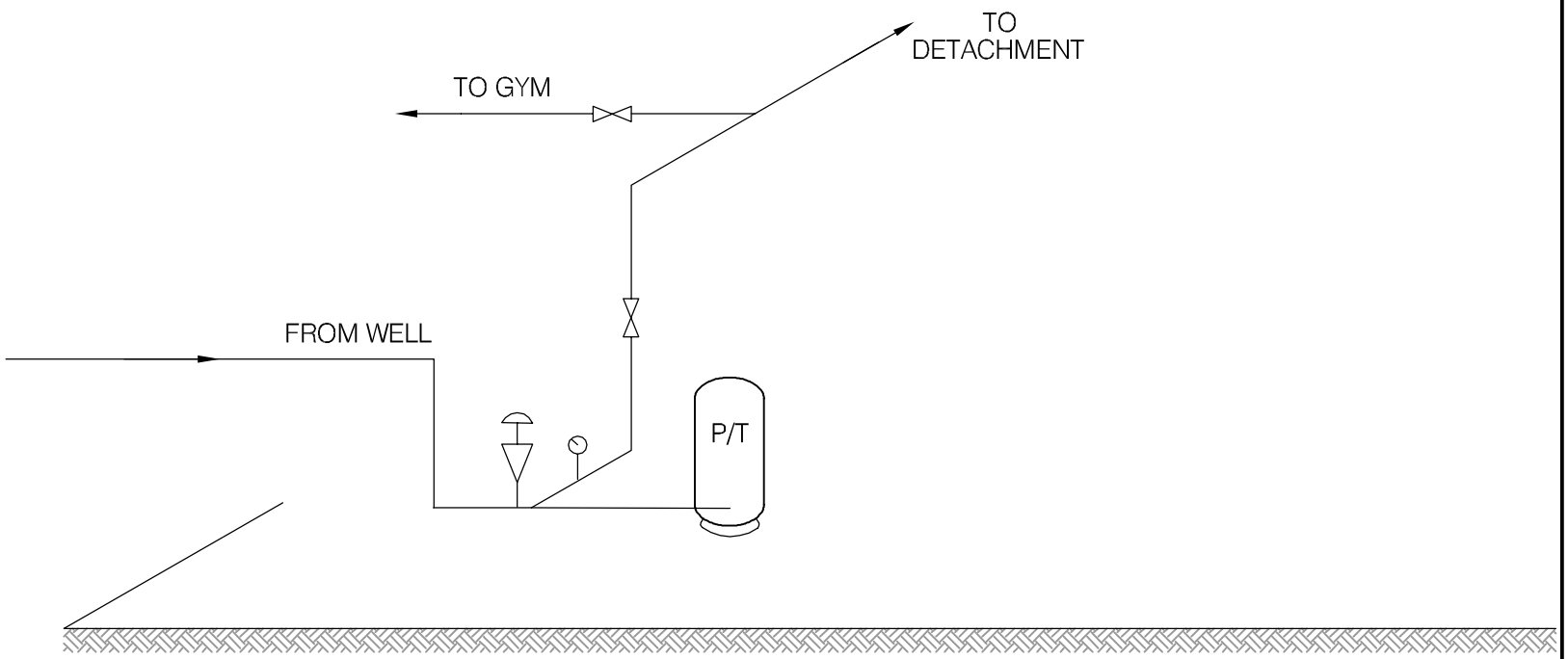


WELL WITH
SUBMERSIBLE PUMP



ACTIVATED
CARBON

EBA Engineering Consultants Ltd.			PROJECT	SMALL PUBLIC WATER SYSTEMS ASSESSMENT EASTERN 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 EASTERN REGION	
CLIENT Yukon Highways and Public Works Property Management Branch			TITLE	WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: M0092 WATSON LAKE RCMP DETACHMENT	
DATE JULY 2005	DWN. JSB	CHKD. RMM	FILE NO. 1260002.002		DWG.: FIGURE M0092-B

Z:\0201Drawings\1260002 Water Assessment YTG\002 - Eastern Region\watson\Schematics\1260002 RCMP Detach_M0092 Schematic.dwg, 7/20/2005 5:28:47 PM, Adobe PDF

TABLE M0092- 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?
M0092	R.C.M.P Detachment	2	May -05 to Jun-05	no	0/2	no	23-Jun-05	no

Table M0092-2: Water Quality Results

Location/ Resident	Watson Lake		GCDWQ Criteria		
Address					
Treatment	Water Softener				
Disinfection	No				
Source of Water	On-Site Well				
Purpose of Sampling	Baseline	Additional Sampling			
Sample Location					
Date Sampled	21-Jun-05	21-Jun-05	**Lower Limit**	**Upper Limit**	
Physical Tests *(ALS)*			**AO**	**MAC**	**AO**
Colour (CU)	<5.0				15
Conductivity (uS/cm)	386				
Total Dissolved Solids	228				500
Hardness CaCO3	187		AO >200 = poor, > 500 unacceptable[A]		
pH	7.94		6.5		8.5
Turbidity (NTU)	0.37			1	5
Dissolved Anions *(ALS)*					
Alkalinity-Total CaCO3	206				
Chloride Cl	14.2				250
Fluoride F	0.022			1.5	
Sulphate SO4	3.21				
Nitrate Nitrogen N	0.19			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	0.00040			0.025	
Barium T-Ba	0.194			1	
Boron T-B	<0.10			5	
Cadmium T-Cd	<0.00020			0.005	
Calcium T-Ca	63.7				
Chromium T-Cr	<0.0020			0.05	
Copper T-Cu	0.0386			1	
Iron T-Fe	<0.030				0.3
Lead T-Pb	<0.0010			0.01	
Magnesium T-Mg	6.70				
Manganese T-Mn	<0.0020				0.05
Mercury T-Hg	<0.00020			0.001	
Potassium T-K	1.25				
Selenium T-Se	<0.0010			0.01	
Sodium T-Na	9.4				200
Uranium T-U	0.00026			0.02	
Zinc T-Zn	<0.050				5
Field Chemistry (EBA)					
pH		7.88	6.5		8.5
TDS (ppm)		192			500
EC (uS/cm)		384			
Temperature (°C)		7.0			

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

Table M0092A-3: Summary of Well Assessment Results
SMALL PUBLIC DRINKING WATER SYSTEMS

Well Identification			GPS Coordinates		
Building #	**Building Name**	**Location**	**Northing (+/- 10 m)**	**Easting (+/- 10 m)**	**Grade Elevation (+/- 10 m)**
M0092-A	**R.C.M.P. Detachment**	**Watson Lake**	665766	518256	694

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	1992	Yes	15.9	None reported		25 gpm at time of drilling	8.0 m below grade at time of drilling

Potential Contaminant Sources					
M0086, M0087, M0088 septic field	2	Greater than 60 m	AST 1	27 m	UST at 25 m
M0092 septic field at 35 m			AST 2	17 m	4 other wells on property at approximately 85 m, 25 m, 1m (abandonned), and 70 m
M0126 and M00127 septic at 55 m					

Well Construction Details					
Wellhead Above ground (m)	**Well Cap**	**Well Screen**	**Surface Seal**	**Apron Grading**	**Comments**
1.15 below grade	Split seal gasket cap		Unlikely	Slight slope away from well	Well services both the M0092 RCMP detachment and the M0084 RCMP gym

Table M0092B-3: Summary of Well Assessment Results
SMALL PUBLIC DRINKING WATER SYSTEMS

Well Identification			GPS Coordinates		
Building #	**Building Name**	**Location**	**Northing (+/- 10 m)**	**Easting (+/- 10 m)**	**Grade Elevation (+/- 10 m)**
M0092-B	**R.C.M.P. Detachment**	**Watson Lake**	6657662	518253	693

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)**
100		No		Unlikely		Well no longer in use	9.16

Potential Contaminant Sources					
M0086, M0087, M0088 septic field at 40 m	Located inside basement	Greater than 60 m	AST 1	27 m	UST at 25 m
M0092 septic field at 35 m			AST 2	17 m	4 other wells on property at approximately 85 m, 25 m, 1m (abandonned), and 70 m
M0126 and M00127 septic at 55 m					

Well Construction Details					
Wellhead Above ground (m)	**Well Cap**	**Well Screen**	**Surface Seal**	**Apron Grading**	**Comments**
Approximately 1.6 m below grade	No		Unlikely	Slight slope away from well	Well is no longer in use.

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 June 21, 2005

WELL ID #	Owner	Location Description
M0092-A	RCMP	watson Lake RCMP Detachement

1. Well Location and Potential Contaminant Sources

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

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

c. GPS location: N 6657662 E 518256 elv 694 m ± 7m

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
Services detachement (M0092) and Gym (M0094)

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

g. Nearest building, specify RCMP Detachement

h. Distance from well to building ~2m

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

j. Distance from well to nearest point of known field: ~35m

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
All RCMP complex septic systems @ ~35m, ~40m, and ~55m

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

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

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 Entrance by animals? ☒ Yes ☐ No
unfastened lid over pit

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

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

r. 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 ~25m

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: AST 1 ; Distance from well to Potential Source 1: 27m
Potential Source 2: AST 2 ; Distance from well to Potential Source 2: 17m
Potential Source 3: _____ ; Distance from well to Potential Source 3: _____
Potential Source 4: _____ ; Distance from well to Potential Source 4: _____

t. Are there other wells on this property? ☒ Yes ☐ No

How many? 4 ☒ in use (2) ☒ abandoned (1) ☒ require proper sealing N6657662 E518253

2. Well and Wellhead information:

a. When was well installed? Year 1992 Month June

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 15cm Material: ☒ steel ☐ plastic ☐ concrete

g. Depth of well: 52ft ☐ measured (if possible) ☐ reported ☒ from log

h. Static water level below ground: 26ft -

☐ 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 5 ft slot size(s) 40 Thou slot
Location of screen: from 47 ft to 52 ft 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
@ 110 cm fibreglass culvert

☐ 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 115cm 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

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 ☐ 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

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: _____

l. Comments on pump installation: _____

_____

6. Conclusions

a. Comments on overall installation:

_____

_____

_____

_____

_____

_____

_____

b.Recommendations: _____

_____

_____

_____

_____

_____

_____

EBA Engineering Consultants Ltd.
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SMALL PUBLIC WATER SYSTEM ASSESSMENT

PART A: EBA Site Inspection

Inspector: Ryan Martin Date June 21, 2005

WELL ID #	Owner	Location Description
M0092-B	RCMP	Watson Lake RCMP Detachment - Abandonned well

1. Well Location and Potential Contaminant Sources

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

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

c. GPS location: N6657662 E518253

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_____
Abandonned

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

g. Nearest building, specify Located in basement of RCMP Detachment

h. Distance from well to building _____

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

j. Distance from well to nearest point of known field: ~35m

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
An RCMP complex septic systems @ ~35m, ~40m, and ~55m

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

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

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 Entrance by animals? ☒ Yes ☐ No
inside RCMP detachment

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

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

r. 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 ~25m

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: AST 1 ; Distance from well to Potential Source 1: 27m
Potential Source 2: AST 2 ; Distance from well to Potential Source 2: 17m
Potential Source 3: _____ ; Distance from well to Potential Source 3: _____
Potential Source 4: _____ ; Distance from well to Potential Source 4: _____

t. Are there other wells on this property? ☒ Yes ☐ No

How many? M0092-A ☐ in use ☐ abandoned ☐ require proper sealing

N6657662
E518256

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 10cm Material: ☒ steel ☐ plastic ☐ concrete

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

h. Static water level below ground: 9.160m

☒ 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 unknown

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
off from basement of detachment

☐ 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 ~1.6 m 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

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

If no, describe condition No, no seal 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 ☐ Yes ☒ No

Explain (filtration, disinfection etc…)

---

4. Aquifer Supplying This Well:

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

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 n/a

☐ shallow well centrifugal ☐ other, _____

c. Description: Manufacturer _____ Model _____

horsepower _____ capacity _____ voltage _____

d. Date installed: n/a By: _____

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

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

g. Pump delivers water to: ☐ pressure tank ☐ elevated tank ☐ other
n/a - Does not produce water

h. Are there automatic pump controls: ☐ Yes ☒ No
n/a

i. Is there provision for taking water samples before water reaches storage? ☐ Yes ☐ No
n/a

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

k. Is the pump and piping protected from freezing? ☐ Yes ☐ No
n/a

If yes, describe: _____

l. Comments on pump installation: well is abandonned

6. Conclusions

a. Comments on overall installation:

b.Recommendations:

PART B: EBA Site Inspection

Inspector: BERT ALBISSER Date JUNE 21/05

WELL ID #	Owner	Location Description
M0092	~~YG~~ RCMP	RCMP DETACHMENT WATSON LAKE.

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: _____

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:

REASONABLE INSTALLATION PIPING FROM WELL IS A BIT SLOPPY.
INTERIOR PIPING IS ACCORDING TO CODE.

b. Recommendations:

INSTALL TREATMENT IF NECESSARY TO SUIT UV INSTALLATION.
INSTITUTE BI-ANNUAL WATER WELL & PIPE SYSTEM SHOCK CHLORINATION.

Field Report 201020051

MIDNIGHT SUN DRILLING CO. LTD. WHITEHORSE Y.T.

13 MacDONALD ROAD
WHITEHORSE, YUKON
Y1A 4L1

PHONE (403) 633-3070
TELEX 036-8496

Started. June 6 19 92

Completed. June 9 19 92

NAME AND ADDRESS OF CLIENT	DESCRIPTION OF WORK	LOCATION OF WORK
Nason Contracting	W / W	RCMP Project
		Watson Lake.
	92-1A-15	

FORMATION LOG FROM	TO	FORMATION	DESCRIPTION OF WORK	TIME DATE	FROM	TO	HOURS
			MOVE				
			Loading	June 6	11:00	2:00	3
			Loading	June 8	8:00	9:00	1
			Travel	"	9:00	5:00	8
			move on set up	"	5:00	7:00	2
0	52	Gr.	sand odd cob. some silt	June 9	7:30	10:00	2.5
			set screen	"	10:00	10:30	0.5
			Develop	"	10:30	1:00	2.5
			Move off	"	1:00	2:00	1
			Travel to Whse	"	3:00	11:00	8

crd. of Casing & Pipe Size	Type	Size	Type
6"			
Feet	Inch	Feet	Inch
51'		6'	
		21'	
		21'	

Remarks: 25 GPM
1- odex shoe
40 slot screen
2' riser Pipe
K Packer
5 7/8" bit Pin

Static Level		Total Rig Time	hrs.
Ground Level	26'	Total Standby	hrs.
Top Of Casing		Drilling Mud	sacks

SIGNATURES

MIDNIGHT SUN..... CLIENT LAURIE A NASON

TITLE..... TITLE PROJECT MANAGER

Stillow Printers

Midnight Sun Drilling Co. Ltd.

DATE Nov 2/92

PAGE NO

PROJECT

RCMP WELL WATSON LAKE

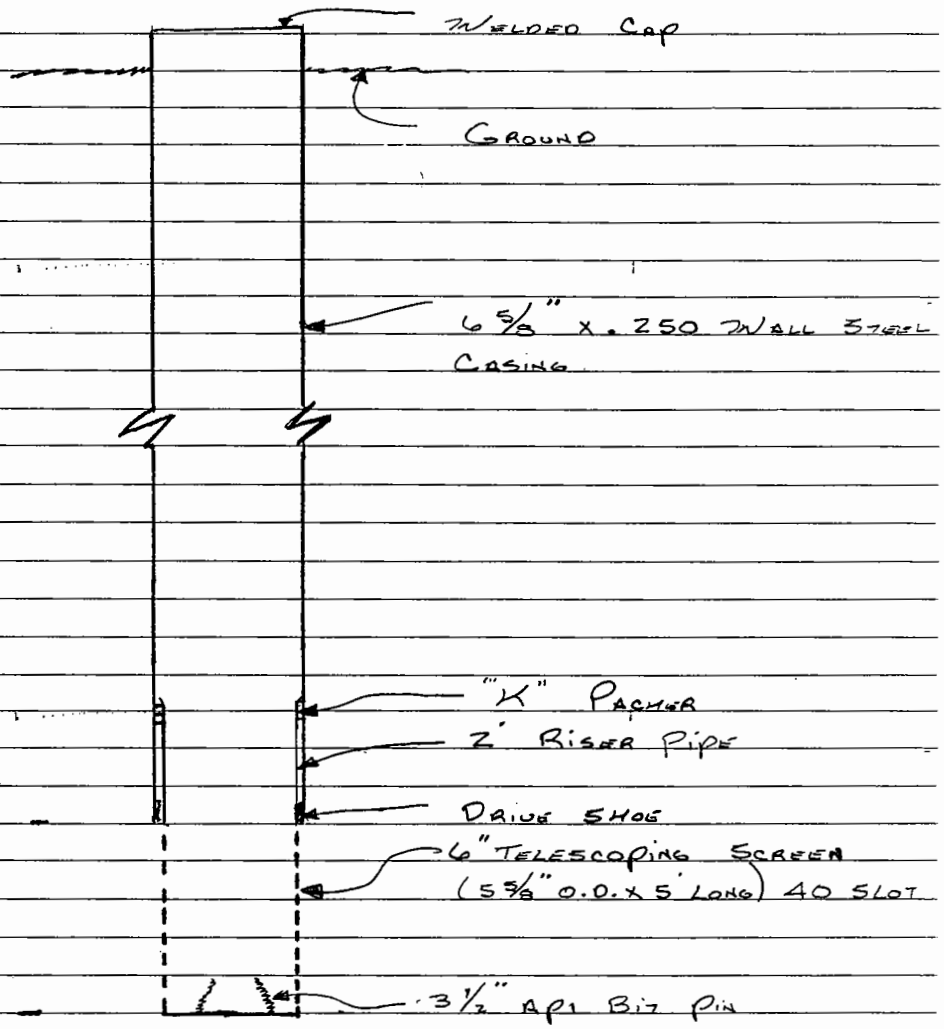

Photo 0281: M0092-A Wellhead in pit

Photo 0282: M0092 Above ground fuel storage tank

Photo 0285: M0084 (RCMP gym, left) Above ground fuel storage tank (centre)

Photo 0283: M0092 Potential underground fuel storage tank (centre), RCMP detachment building (left)

Photo 0022: M0092 Pressure tank

Photo 0277: M0092-B Wellhead in enclosure off from basement of RCMP detachment