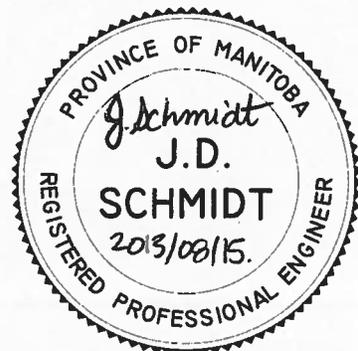


Manitoba Environment Act Proposal RM of Pembina

August 2013

Jaimee Schmidt, P.Eng



Environment Act Proposal Form

Name of the development: Rural Municipality of Pembina Water Supply System Expansion	
Type of development per Classes of Development Regulation (Manitoba Regulation 164/88): Transportation and Transmission	
Legal name of the proponent of the development: Rural Municipality of Pembina	Mailing address: Box 189, Manitou, MB R0G 1G0
Location (street address, city, town, municipality, legal description) of the development: RM of Pembina -Connection at Manitou WTP (SW 30-03-08 W) to service RM of Pembina	
Name of proponent contact person for purposes of the environmental assessment: Jaimee Schmidt, P.Eng.	
Phone: 204-726-6766 Fax: 204-726-7196	Mailing address: The Manitoba Water Services Board P.O. Box 22080, 2010 Currie Blvd. Brandon, MB R7A 6Y9
Email address: jaimee.schmidt@gov.mb.ca	
Webpage address:	
Date: August 15, 2013	Signature of proponent, or corporate principal of corporate proponent:  Printed name: Jaimee Schmidt, P.Eng.

A complete Environment Act Proposal (EAP) consists of the following components:

- Cover letter
- Environment Act Proposal Form
- Reports/plans supporting the EAP (see "Information Bulletin - Environment Act Proposal Report Guidelines" for required information and number of copies)
- Application fee (Cheque, payable to Minister of Finance, for the appropriate fee)

Submit the complete EAP to:

Director
Environmental Assessment and Licensing Branch
Manitoba Conservation
Suite 160, 123 Main Street
Winnipeg, Manitoba R3C 1A5

For more information:

Phone: (204) 945-7100
Fax: (204) 945-5229
Toll Free: 1-800-282-8069, ext. 7100
<http://www.gov.mb.ca/conservation/ea>

Per Environment Act Fees Regulation (Manitoba Regulation 168/96):	
Class 1 Developments	\$500
Class 2 Developments	\$5,000
Class 3 Developments:	
Transportation and Transmission Lines.....	\$5,000
Water Developments	\$50,000
Energy and Mining.....	\$100,000

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Executive Summary

The RM of Pembina requested The Manitoba Water Services Board (MWSB) to prepare an Environment Act Proposal for a Class 2 Development License under the Manitoba Environment Act for an expansion of the rural water supply.

The RM of Pembina is located in southern Manitoba surrounding the Town of Manitou. The RM currently has a population of approximately 1,600 people. Water for the system is supplied by the Town of Manitou Water Treatment Plant (WTP). The Manitou WTP receives raw water from the Mary Jane Reservoir approximately 10 km northwest of the Town. The Town currently operates the WTP and distribution system. Upgrades to the WTP are planned for the future to meet Manitoba's Drinking Water Safety Act (DWSA). Pipeline extensions to the RM of Pembina would potentially service approximately 85 households in Darlingford and 65 households in the rest of the RM.

The proposed development includes the construction of approximately 69,000 metres of pipeline, 85 service connections in the Community of Darlingford and 65 connections in the rest of the RM, a pressure reducing station, and a pumphouse/reservoir in Darlingford. A preliminary pipeline route is included in Appendix A.

The projected treated water demand for the Town of Manitou is 6.51 L/s as listed in the Manitou WTP upgrading study. With a projected 25% reject for the treatment system, the total raw water demand for the town and the RM are approximately 14 L/s.

The Town of Manitou will be responsible for operation and maintenance of the WTP. The RM of Pembina will be responsible for maintaining the rural water pipelines. An operator is required to periodically inspect flushouts, air releases, water meters, pressure reducing stations, etc. to ensure system performance is maintained. In addition, the operator will be required to submit bi-weekly water samples for bacteriological testing in accordance with the Manitoba *Drinking Water Quality Standards Regulation*. An operator will also be required to read water meters on a quarterly basis and respond to maintenance issues related to the system.

The Little Pembina River and the Deadhorse Creek run through the RM. There are 4 waterway crossings involved with the proposed pipeline.

List of Acronyms

AO	Aesthetic Objective
DBP	Disinfection By-Product
DWSA	Drinking Water Safety Act
EAP	Environment Act Proposal
GCDWQ	Guidelines for Canadian Drinking Water Quality
GUDI	Groundwater Under Direct Influence of Surface Water
MWSB	Manitoba Water Services Board
ODW	Office of Drinking Water
RM	Rural Municipality
TDS	Total Dissolved Solids
THM	Trihalomethane
TOC	Total Organic Carbon
UV	Ultraviolet
WTP	Water Treatment Plant

1.0 Introduction

The RM of Pembina requested The Manitoba Water Services Board (MWSB) to prepare an Environment Act Proposal for a Class 2 Development License under the Manitoba Environment Act for the construction of a rural water supply system in the RM of Pembina. This document provides the compiled information required on Manitoba Conservation's Environment Act Proposal Report Guidelines and Supplementary Guidelines for Municipal Water Supply Systems. This Environment Act proposal includes components for rural distribution pipelines and an expansion of the RM's raw water supply.

1.1 Background Information

The RM of Pembina is located in southern Manitoba surrounding the Town of Manitou. The RM currently has a population of approximately 1,600 people. Water for the system is supplied by the Town of Manitou Water Treatment Plant (WTP) which was originally constructed in 1963/64 by the Manitoba Water Supply Board who operated it until the early 2000's. The Manitou WTP receives raw water from the Mary Jane Reservoir, which was constructed on the Mary Jane Creek by the Prairie Farm Rehabilitation Administration (PFRA), and is approximately 10 km northwest of the Town. The Town currently operates the WTP and distribution system. Pipeline extensions to the RM of Pembina would potentially service approximately 85 households in Darlingford and 65 households in the rest of the RM.

1.1.1 Previous Studies

The MWSB completed a pipeline feasibility study for the RM of Pembina in January 2013. The report reviews existing infrastructure, design criteria, the proposed pipeline network and gives a cost estimate.

An engineering assessment for the Town of Manitou was conducted by AECOM in February 2009 to assess and review the existing infrastructure and water supply system in the Town of Manitou. The engineering assessment recommended major upgrades to the WTP in order to meet regulations.

A Water Treatment Plant Upgrading Study was written by MWSB in January 2012 for the Town of Manitou, to investigate the water supply system, water quality, design considerations and cost estimates for an upgrade to the existing treatment system.

1.1.2 Population

Based on 2011 Census data, the RM of Pembina has an estimated population of 1,561. This has decreased from 1,712 in 2006. Although the population of the RM of Pembina has shown to be in decline, some allowance for a future population should be designed in the system. The RM has estimated there will initially be 150 service connections on the water system. Assuming 3 people per household, this equates to approximately 450

people. Assuming an annual population growth rate factor of 0.5% per year over 20 years equates to a future population of approximately 500 for the rural system.

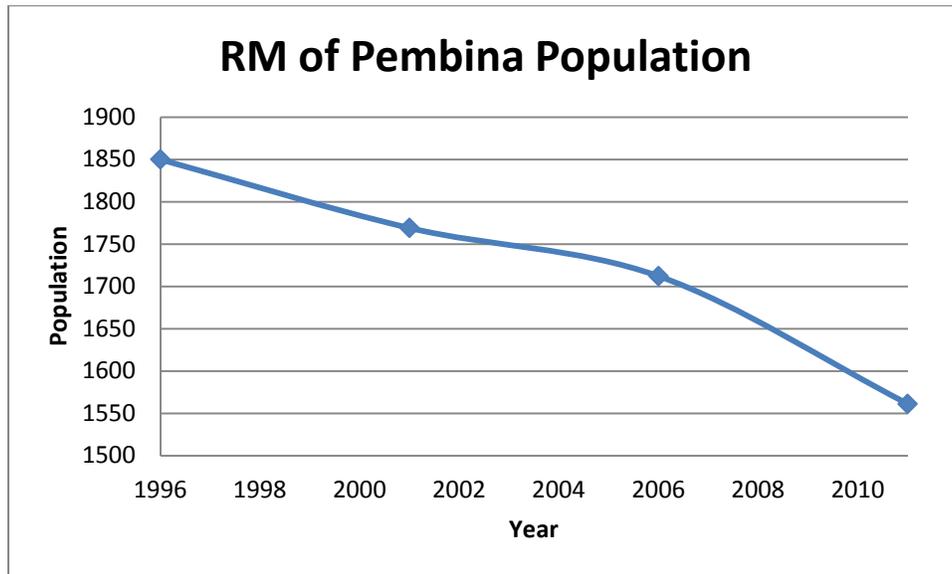


FIGURE 1 – RM OF PEMBINA POPULATION TRENDS

1.1.3 Current and Projected Water Use

A WTP is designed based on peak day demand. When calculating water consumption, typical average daily water usage ranges from 250 L/person/day to 300 L/person/day and peak day usage (peak day factor) is typically 1.5 to 2.0 times greater. Consumptions of 250 L/person/day and a peak day factor of 2.1 were used for this study. The projected treated water demands are summarized in Table 1.1. The projected treated water demand for the Town of Manitou is 6.51 L/s. With a projected 25% reject for the treatment system, the total raw water demand for the town and the RM are approximately 14 L/s.

TABLE 1.1 – FUTURE 20 YEAR WATER DEMANDS

	Units	
RM of Pembina Anticipated Connections		150
Equivalent Population (x3)		450
20 Year Future Population (@0.5%/yr)		500
Consumption/capita/day	L/c/day	250
Average Day Consumption	L/day	125,000
Peak Day Factor		x 2.1
Peak Day Consumption	L/day	262,500
Peak Day (20 hour operating day)	L/s	3.65

1.1.4 Raw Water Source

The Mary Jane Reservoir located at NE 9-4-9 W is reported to have approximately 1,150 acre-feet of storage with an average annual inflow of 295 acre-feet from the surrounding watershed. The Town has a Water Rights Act Licence to withdraw 95 acre-feet of water from the reservoir annually. Raw water from the reservoir initially flows by gravity via a 250 mm (10") diameter pipeline to a wet-well located below the raw water pumphouse. Raw water is pumped from the wet-well via two alternating submersible pumps to the WTP via a 150 mm (6") diameter asbestos cement pipeline. Two submersible pumps with a rated power of 3.7 kW (5 HP) are located in the wet-well at the pumphouse.

A concrete overflow weir is located along the south shore of the reservoir. The reservoir level is regulated as excess water flows into the overflow weir and drains to a stream on the opposite side of the berm.

The reservoir is equipped with aeration equipment that operates during the winter to keep a portion of the reservoir free of ice.

1.1.5 Water Rights Act

The Town of Manitou *Water Rights Act* Licence No. 2009-085 indicates the maximum rate at which water may be diverted shall not exceed 5 L/s and the total quantity of water diverted in any one year shall not exceed 117.18 cubic decametres.

It is estimated that the Town of Manitou currently uses approximately 79 dam³/year and pumps at a rate of approximately 6.3 L/s on a peak day.

In order to meet peak day demands from a rural water system in the RM of Pembina as well as the projected 20 year population for the Town of Manitou an amendment to the current *Water Rights Act* Licence will be required. It is estimated that a raw water pumping rate of 14 L/s will be required and a yearly withdrawal of 138 dam³. These numbers will be verified when final design of the WTP is complete.

1.1.6 Water Quality

The Office of Drinking Water (ODW) currently conducts annual audits of all public water systems which includes sampling and chemistry analysis every three years for secure groundwater sources and once per year for surface water and GUDI supply systems. The following table outlines water quality parameters of concern which include hardness, iron, manganese, trihalomethanes (THM), total dissolved solids (TDS), total organic carbon (TOC), colour, and turbidity. In addition the operator tests chlorine residuals daily on the treated water.

The raw water has high hardness, turbidity, total dissolved solids and total organic carbon. The existing treatment system does not reduce all parameters below the maximum acceptable concentration or the aesthetic objective. The proposed treatment system upgrade will address all the parameters that exceed the GCDWQ. Treated water quality parameters exceeding the GCDWQ include THM, total dissolved solids, and turbidity.

Table 1.2 Water Quality Results (2009-2010 ODW Sampling)

Parameter	Unit	Raw Water	Treated Water	GCDWQ
Hardness (Total) as CaCO ₃	mg/L	301-358	170-213	≤ 200/500 ^a
Iron	mg/L	0.107-0.056	<0.02	≤ 0.3
Manganese	mg/L	0.299-0.253	0.003-0.0116	≤ 0.05
THMs	µg/L		149-198	≤ 100^b
Total Dissolved Solids	mg/L	584-638	560-652	≤ 500
Total Organic Carbon	mg/L	6.4-10.5	5.6-13.5	
True Colour	CU	30-60	<5.0-5.0	≤ 15
Turbidity	NTU	3.10-1.82	0.75-0.21	≤ 0.3 / 0.1^c

^a Hardness levels greater than 200 are considered poor but tolerable. Hardness levels greater than 500 are generally considered unacceptable

^b THM based on average of quarterly samples

^c Turbidity limits as follows: 1.0 NTU for slow sand or diatomaceous earth filtration, 0.3 NTU for chemically assisted filtration, and 0.1 NTU for membrane filtration

1.1.7 Compliance Plan

An engineering assessment was completed by AECOM in February 2009. The assessment concluded that the raw water source is generally good and only exceeds the potable water standards for turbidity, colour and manganese. Bacteriological standards are being met. The operating licence states that the compliance plan should be updated and re-submitted to address:

- a) total trihalomethanes and bromodichloromethane in the distribution system.
- b) 99.9% (3-log) reduction or inactivation of *Cryptosporidium* oocysts and *Giardia lamblia* cysts.
- c) turbidity

2.0 Description of Proposed Development

2.1 Project Description

The proposed development includes the construction of approximately 69,000 metres of pipeline, 85 service connections in the Community of Darlingford and 65 connections in the rest of the RM, a pressure reducing station, and a remote pumphouse/reservoir in Darlingford. The rural water pipeline will be constructed on provincial and municipal road right of ways as well as private easements if required. A preliminary pipeline route is included in Appendix A.



FIGURE 2.1- LOCATION OF WTP

2.1.1 Operation and Maintenance

The Town of Manitou will be responsible for operation and maintenance of the WTP. The RM of Pembina will be responsible for maintaining the rural water pipelines. An operator is required to periodically inspect flushouts, air releases, water meters, pressure reducing stations, etc. to ensure system performance is maintained. In addition, the operator will be required to submit bi-weekly water samples for bacteriological testing in accordance with the Manitoba *Drinking Water Quality Standards Regulation*. An operator will also be required to read water meters on a quarterly basis and respond to maintenance issues related to the system.

2.2 Certificate of Title

It is proposed to locate the rural water pipeline partially within municipal and provincial road right of ways which are owned by the Crown. If necessary, private easements will be obtained to accommodate the pipeline.

2.3 Existing and Adjacent Land Use

The proposed land for the development will be on municipal and provincially owned land in road right of ways. Adjacent land is used for agriculture. Existing and adjacent land use will not change as a result of this development.

2.4 Land Use Designation and Zoning

Zoning designation for the pipelines on municipal owned land is not applicable.

2.5 Project Schedule

The project is scheduled to commence and be completed in the 2014/2015 construction year depending on funding and the receipt of all approvals.

2.6 Project Funding

This project is eligible for cost sharing between the MWSB and the RM of Pembina subject to all approvals in place and availability of funding.

2.7 Regulatory Approvals

The following branches/departments will be provided with copies of plans and specifications for information purposes and for the purposes of approvals and agreements:

Manitoba Conservation and Water Stewardship
Office of Drinking Water
Manitoba Infrastructure and Transportation

The contractor will be required to contact MTS, Hydro and gas utilities for utility locations and approvals.

2.8 Public Consultation

A public consultation will be held in the near future to discuss the proposed rural water distribution system to the citizens of the RM of Pembina. It is not expected that there will be major concerns forwarded to the Municipality regarding the upgrades.

2.9 Storage of Petroleum Products and Other Chemicals

Fuel will not be stored on-site at any time or location along the proposed construction route or near any water source. Fuel will be supplied by fuelling trucks which are regulated under The Storage and Handling of Petroleum Products and Allied Products Regulation. Records of fuel volumes and an emergency response plan which includes spill prevention, notification and response will be implemented. No fuelling activities will be permitted within 100 m of watercourses during construction. During construction, the contractors will be required to ensure that all equipment is properly maintained to prevent leaks of fuel and motor fluids.

There will be no storage of petroleum products or other chemicals at the reservoir during operation of the proposed development. Maintenance activities for the reservoir do not require refuelling on-site. Chemicals associated with the operation of the plant (sodium hypochlorite & sodium hydroxide) will be stored in designated areas within the plant complete with spill containment. General household cleaning products will also be stored at this site.

3.0 Physical Environment

3.1 Physiographic Setting and Climate

The RM of Pembina is located in southern Manitoba surrounding the Town of Manitou. The RM includes the community of Darlingford which will be serviced by the rural water pipeline. The topography of the area has small elevation changes varying between 457 m and 495 m. Due to elevation changes a pressure reducing station will be located south of Darlingford.

Based on Environment Canada climatic data, the mean annual temperature in the area is 5.1 degrees Celsius with below zero average daily temperatures from November through March. Mean annual precipitation as recorded at Morden, MB is approximately 350 mm.

3.2 Hydrogeology

The investigations of the hydrogeology of the area have identified the main aquifer as Odanah shale in the Darlingford and Manitou North area. Test holes show the presence of clay, till, clay till, shale and sand. The three aquifer types in this area include bedrock shale, sand and gravel in the drift, and sand and gravel in a bedrock channel. The whole area in Manitou North is underlain by Odanah shale (Pedersen, Arnie).

3.3 Hydrology

The Little Pembina River and the Deadhorse Creek run through the RM. There are 4 waterway crossings involved with the proposed pipeline.

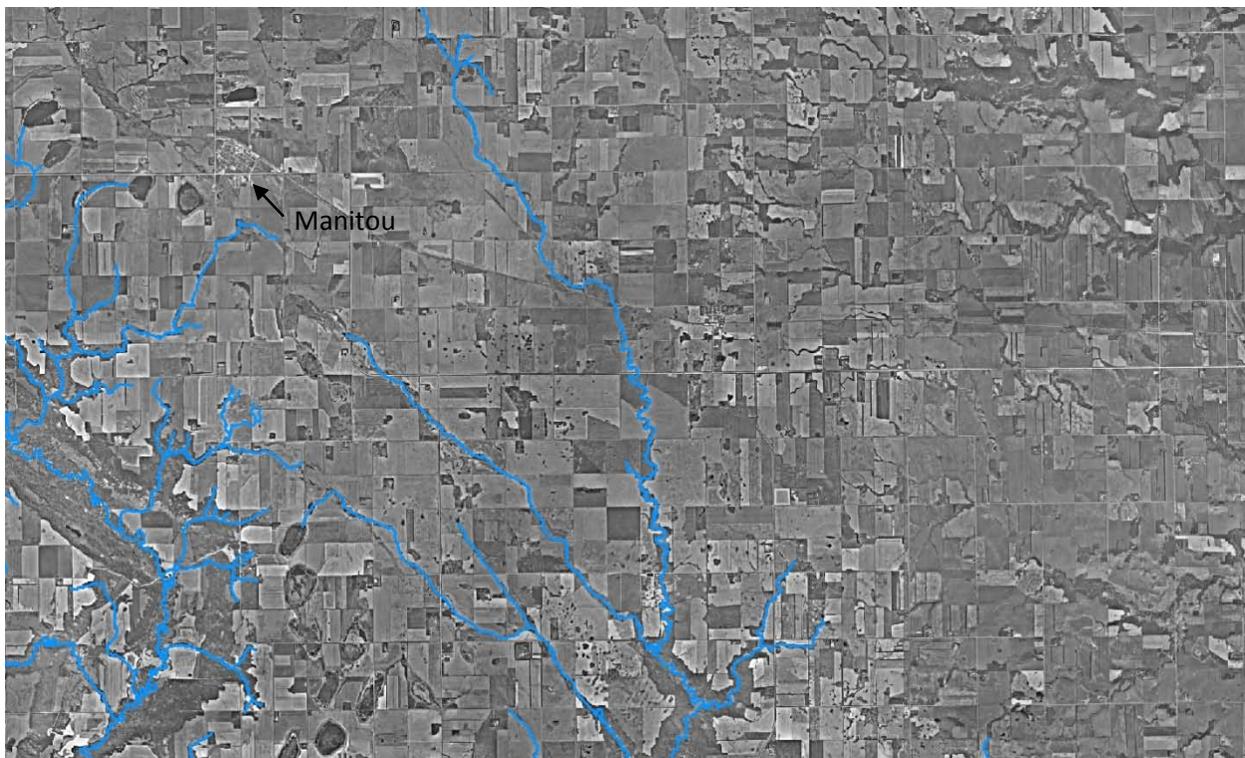


FIGURE 3.1- HYDROLOGY IN THE RM OF PEMBINA

3.4 Fish and Fish Habitat

Potential fish habitat in the project area includes the Little Pembina River, the Deadhorse Creek and associated tributaries. A list of fish species found in the Little Pembina River and the Deadhorse Creek has been included in Appendix B.

3.5 Wildlife Habitat and Vegetation

The project area is located within the Prairie Ecozone of the Southwest Manitoba Uplands and Aspen Parkland ecozones (Agriculture and Agri-Food Canada). The climate is continental, subhumid to semiarid with short hot summers, long cold winters, low levels of precipitation, and high evaporation. The Aspen Parkland is associated with groves of trembling aspen, balsam poplar, intermittent grasslands, and Black Chernozemic soils. The relatively high natural fertility and good moisture-holding capacity of the area's Chernozemic soils make them highly productive for agriculture. Characteristic mammals include mule deer, white tail deer, elk, coyote, pronghorn antelope, badger, white-tailed jack rabbit, Richardson's ground squirrel, and northern pocket gopher. Bird species include ferruginous hawk, Swainson's hawk, American avocet, and burrowing owl. Other birds include great blue heron, black-billed magpie, northern oriole, veery, and brown thrasher. (National Ecological Framework Report).

3.6 Socioeconomic

The project area is located within the RM of Pembina. The RM has an area of approximately 1,114.76 km² and a population of approximately 1,561 (2011 Census). Urban centres include the Town of Manitou and the Community of Darlingford. The main economic base is agriculture.

3.7 Heritage Resources

Most project activities will occur in previously disturbed municipal and provincial right of ways. The proponent will work with Heritage Resources Branch to mitigate any concerns as required.

4.0 Potential Environmental Effects

An environmental effect includes any change that the project may cause to the environment. Environmental effects were identified from interactions between proposed project activities and environmental components. Mitigation measures and follow-up activities were identified for environmental effects determined to be adverse.

4.1 Air Quality

During construction, dust will be raised by construction equipment and there will be gaseous and particulate emissions from the construction equipment. Water spraying is an important, common and practical procedure that would be applied as required to alleviate potential dust problems. Emissions of gases and particulates would be minimized by keeping machinery in good working order. Any effects would be localized, temporary and insignificant. During operation of the development there will be no releases of pollutants to the air.

4.2 Soils

During construction, there is a risk of fuel or lubricant spills from heavy equipment and vehicle operation. The storage of fuel or lubricants within the area of the raw water reservoir will not be allowed. Therefore, the potential spills will be very small in size and standard construction spill clean-up procedures, including the removal of any impacted soil, will be used to prevent impact.

During operation, project activities are limited to regular monitoring and maintenance activities that have a negligible effect on soil disturbance and compaction because of low vehicle traffic and the use of established routes to access the reservoir and water treatment plant. Regular monitoring and maintenance activities will have a negligible effect on soil contamination since fuel trucks and other hazardous substances will not be brought on-site on a regular basis. The potential adverse effect on soil quality is assessed to be minor.

4.3 Surface Water, Fish and Fish Habitat

Minor and short term impacts on surface water may occur as a result of construction activity in road allowance ditches during runoff events. The impact on surface water would include sediment that may be eroded from excavation activities, minor engine leaks and potential fuel spills should runoff events occur during construction. Horizontal directional drilling will be conducted to install the pipeline at the drain and river outlets. This will eliminate excavation within the riparian zone and minimize impacts. There is potential for some loss of drilling mud to surface water. Impacts to fisheries and fish habitat are considered minor.

4.4 Water Quality

Raw water quality can be impacted by surface activities. Mitigation measures are necessary to protect water quality during construction activities. The proposed activities are unlikely to result in adverse changes to water quality.

4.5 Groundwater Levels

Since the water source is surface water, no groundwater monitoring is required.

4.6 Vegetation

Construction will occur primarily within municipal right of ways or easements that are previously disturbed, regularly managed and comprised primarily of grasses. As the areas are already disturbed, they are unlikely to contain rare plant species. The amount of vegetation disturbance is expected to be minimal.

During operation, monitoring and maintenance activities including access to the well sites will be restricted to designated and previously disturbed areas. Potential effects to vegetation are considered to be negligible.

4.7 Wildlife Habitat and Vegetation

The construction and operation activities associated with this project will be limited to areas already developed for hydro lines or urban or agricultural uses. The potential adverse effects of wildlife habitat loss were assessed to be negligible to minor.

4.8 Noise and Vibration

During the construction phase of the project, there will be several sources of sound emissions including equipment used for construction. The types of noises heard due to construction are dominated by equipment engines. However, miscellaneous short term impact noises (ie: dump truck gates, back hoe buckets) are often heard. The noise will be in addition to regular community and highway activities, and the effects are considered minor.

Scheduling of various site activities can minimize the impact of noise. This would include scheduling construction for day-time hours to avoid sleep disturbance and the disruption of evening domestic activities. All equipment used on site will be fitted with appropriate mufflers and will be maintained in good working order to minimize noise levels.

4.9 Employment/Economy

Socio-economic implications are not expected as a result of environmental impacts as impacts are considered minor and short-term. Some economic implications may exist for the Municipality due to the costs of developing the water system, however, the Municipality will have a sustainable potable water supply to meet future demands. There may be some local economic benefit during construction. The potential effects of the project on employment and the economy were assessed to be positive.

4.10 Human Health and Well Being

The potential adverse effects of the project on human health are assessed to be negligible to minor. Short term temporary increases in noise and dust emissions will occur during construction that are considered to be minor effects. During operation, there will be a minor increase in vehicular traffic associated with monitoring and maintenance activities. The potential effects are considered minor.

The project will result in the construction of a water treatment plant designed and operated to produce a treated water supply to meet current water quality standards. The effects of this on human health and well being are considered positive.

4.11 Climate Change

There are no predicted impacts to climate as a result of the project activities.

5.0 Environmental Management Measures

Environmental management practices proposed to prevent or mitigate environmental effects that were determined to be adverse are identified and described below.

5.1 Air Quality

Emissions resulting from construction and transportation equipment may be mitigated by the utilization of well maintained vehicles while reducing unnecessary vehicle idling.

The impact of dust may be mitigated by the use of an approved dust suppressant, limiting construction during high wind periods, and re-establishment of vegetation as soon as possible.

5.2 Soils

Mitigation to potential impacts to soil by contamination from petroleum products include preparation of an emergency response plan for potential spills, use of spill clean-up equipment and materials, using properly maintained equipment, and using appropriate fuelling equipment.

Re-establishment of vegetation as soon as possible after disturbance will limit loss of soil due to wind or water erosion. Backfilling with soil stockpiles as soon as possible and minimizing the amount of soil disturbance can be implemented.

5.3 Surface Water

Mitigation of surface water issues may be achieved by limiting open cut trenching to within 30 m ahead or behind the pipe laying, redirecting surface water runoff, pumping accumulated water to adjacent ditches and providing erosion control measures as required.

Petroleum leaks or spills will be mitigated by use of properly maintained equipment, use of spill clean-up equipment and materials, and use of appropriate fuelling equipment. A prepared emergency response plan can be implemented in the event of a significant spill. In the event of a reportable spill, Manitoba Conservation and Water Stewardship will be notified through the emergency response line and appropriate measures will be taken according to Manitoba Conservation and Water Stewardship requirements.

A 100 m setback to watercourses will be maintained for fuelling activities. Horizontal directional drilling will be implemented at watercourse crossings. Vehicles will avoid entering the riparian zones. Re-establishment of vegetation will occur as soon as possible on areas of disturbed soil.

The availability of surface water usage for this proposal and potential future users will be assessed through the Water Rights Act Licensing process.

Chlorinated water used to disinfect pipelines will be de-chlorinated and not released to surface waters.

5.4 Groundwater

Mitigation of potential groundwater impacts from petroleum products can be mitigated as described in Section 5.3.

5.5 Vegetation and Wildlife

Re-establishment of vegetation will occur as soon as possible on disturbed areas. Impacts to wildlife habitat can be limited by minimizing the area of construction, soil disturbance and vegetation disturbance. Other impacts resulting from dust or smoke will be minimized as previously indicated. Noise disturbance will be limited by use of muffling vehicles and equipment, limiting idling and limiting the construction area.

5.6 Fisheries

Fisheries impacts will be minimized by implementing practices to reduce soil and contaminate runoff as previously mentioned in Sections 5.3 and 5.5. In addition, horizontal directional drilling will occur under all watercourses containing water. The required excavation needed to introduce the drilling equipment will be maintained outside watercourse riparian zones.

5.7 Noise and Vibration

Limiting any noise-creating activities, including regular maintenance and monitoring activities to normal working hours, and limiting unnecessary long-term idling can mitigate any potential increased noise and vibration effects.

5.8 Water Conservation

Water conservation measures include metering and pricing of water. Water conservation information in water bill mailings can be implemented. Leak detection will consist of reconciling on a quarterly basis the volume of water pumped and charged to ratepayers. Since these services are metered, abnormalities can be identified and rectified.

5.9 Socio-Economic Implications

There are no known negative environmental socio-economic impacts that need mitigation. Since the proposed development would provide a reliable healthy drinking water supply, it would be expected to enhance quality of life and economic viability for the Municipality. The proposed project may provide some economic benefits to the area for local businesses and employment opportunities during construction phase.

6.0 References

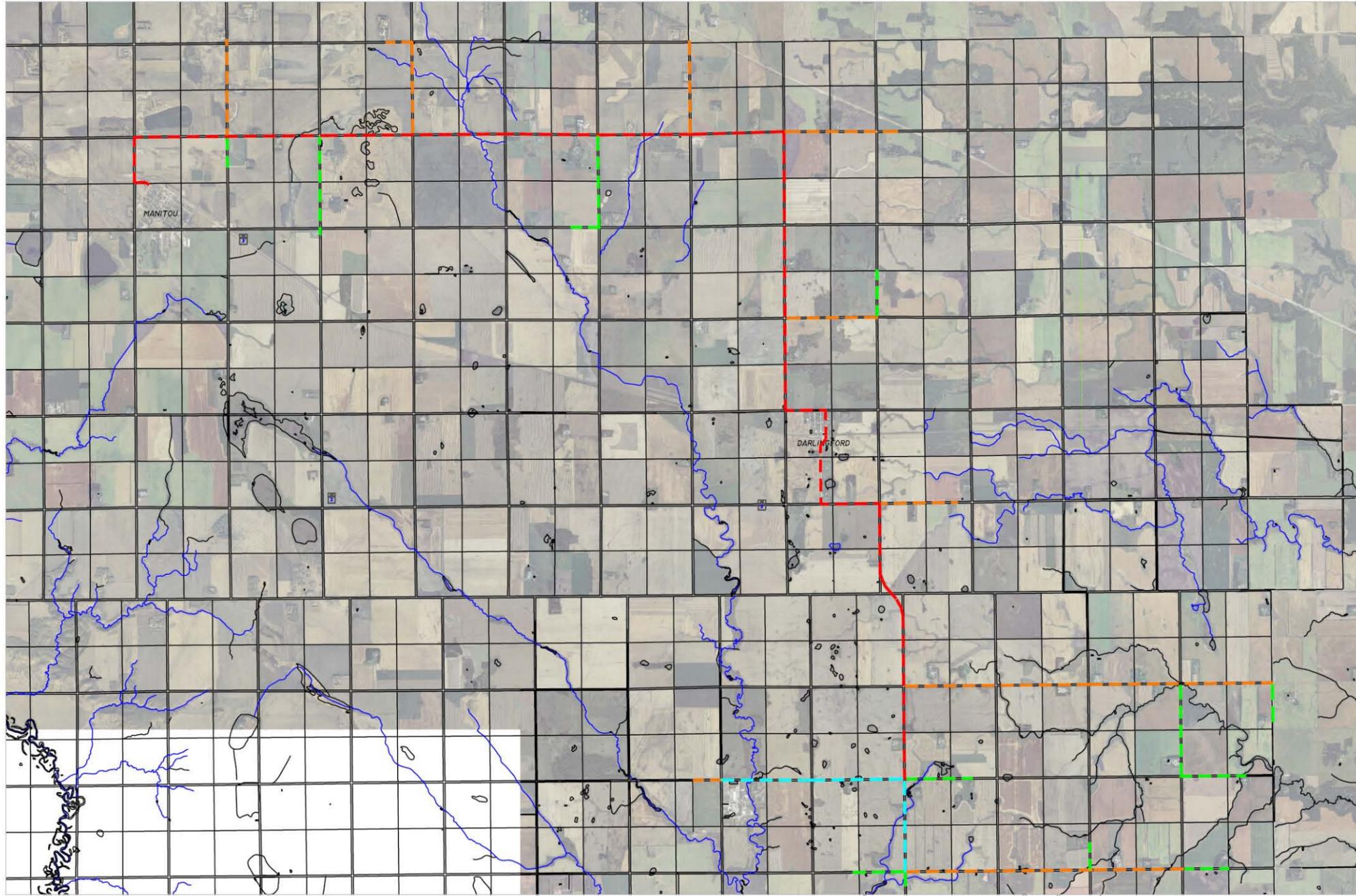
Agriculture and Agri-Food Canada. A National Ecological Framework for Canada 06 May 2013
<<http://sis.agr.gc.ca/cansis/nsdb/ecostrat/index.html>>

Ecological Framework For Canada. National Ecological Framework Report. 1995.
<<http://sis.agr.gc.ca/cansis/publications/ecostrat/intro.html>>

Pedersen, Arnie, P.Eng. RM of Pembina Test Drilling Report. Manitoba Water Services Board files, 2005.

Appendix A

Preliminary Pipeline Route



PIPELINE PLAN 

- 150 mm WATER PIPELINE - - - - -
- 100 mm WATER PIPELINE - - - - -
- 75 mm WATER PIPELINE - - - - -
- 50 mm WATER PIPELINE - - - - -

NO.	DESCRIPTION	BY	DATE



PROVINCE OF MANITOBA	
THE MANITOBA WATER SERVICES BOARD	
MANITOBA LOCAL GOVERNMENT	
DESIGNED: R. NASON	APPROVED:
DRAWN: L. CIAPALA	DATE:
CHECKED:	GENERAL MANAGER:
REVIEWED:	DATE:

RM OF PEMBINA RURAL WATER PIPELINES	
2012 COST ESTIMATE	
SCALE AS SHOWN	DATE 12-08-13
PROJECT NUMBER	REVISION
SHEET	OF

Appendix B

Fish Species in the Little Pembina River and Deadhorse Creek

Waterbody: Deadhorse Creek

Provincial Waterbody Id # 2574.00	Watershed 5OCC	Region Central	District Morris	Map Sheet 62H03	Latitude: 49 14 42 Longitude: 97 22 50
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BIOLOGY

BLACK CRAPPIE <i>Pomoxis nigromaculatus</i>	Unknown
BLACKNOSE DACE <i>Rhinichthys atratulus</i>	Unknown
BROOK STICKLEBACK <i>Culaea inconstans</i>	Common
CREEK CHUB <i>Semotilus atromaculatus</i>	Common
FATHEAD MINNOW <i>Pimephales promelas</i>	Common
LAKE CHUB <i>Couesius plumbeus</i>	Common
NORTHERN PIKE <i>Esox lucius</i>	Unknown
SILVER REDHORSE <i>Moxostoma anisurum</i>	Unknown
WALLEYE <i>Stizostedion vitreum</i>	Common
WHITE SUCKER <i>Catostomus commersoni</i>	Unknown

Creel

Year	Species	Catch/Unit Effort*
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*Catch/Unit Effort = Catch/Hour



Waterbody: Little Pembina River

Provincial Waterbody Id # 2242.00 Watershed 5OBA Region Western District Manitou Map Sheet 62G01 Latitude: 49 5 1
 Longitude: 98 22 36

BIOLOGY

BLACKNOSE DACE <i>Rhinichthys atratulus</i>	Common
BROOK STICKLEBACK <i>Culaea inconstans</i>	Common
CENTRAL MUDMINNOW <i>Umbra limi</i>	Unknown
COMMON SHINER <i>Notropis cornutus</i>	Unknown
CREEK CHUB <i>Semotilus atromaculatus</i>	Common
FATHEAD MINNOW <i>Pimephales promelas</i>	Common
NORTHERN PIKE <i>Esox lucius</i>	Unknown
PEARL DACE <i>Semotilus margarita</i>	Unknown
WHITE SUCKER <i>Catostomus commersoni</i>	Unknown

Creel

Year	Species	Catch/Unit Effort*
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*Catch/Unit Effort = Catch/Hour

Water Chemistry

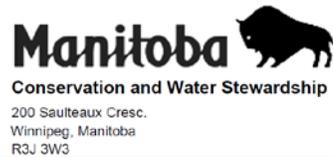
Code	Samples	Low	High	Average	MSWQO LO	MSWQO HI	CWQG LO	CWQG HI
Sample Dates: 2004-06-04								
Inorganic								
Dissolved Oxygen	1			6.7200			5.000 mg/L	9.500 mg/L
Ph (Ph Units)	1			7.5500	6.500 unit	9.000 unit	6.500 unit	9.000 unit
Physical								
Conductivity (mho/cm)	1			613.0000				
Tempurature (C)	1			17.1000				
Turbidity (NTU Or JTU)	1			0.0000				
Sample Dates: 2003-06-05								
Inorganic								
Dissolved Oxygen	1			6.1600			5.000 mg/L	9.500 mg/L
Ph (Ph Units)	1			8.1300	6.500 unit	9.000 unit	6.500 unit	9.000 unit
Physical								
Tempurature (C)	1			16.8000				
Turbidity (NTU Or JTU)	1			3.9100				
MSWQO = Manitoba Surface Water Quality Objectives CWQG = Canadian Water Quality Guidelines								

Appendix C

Water Rights Licence

MG-14853 (English)

**Licence to Use Water for
Municipal
Purposes**



Project: Manitou, The Town of

Issued in accordance with the provisions of
The Water Rights Act and regulations made thereunder.

Licence No.: **2009-085**
(Original Lic. No.: 64-008)
U.T.M.: Zone 14 527698 E
5459913 N

Know all men by these presents that in consideration of and subject to the provisos, conditions and restrictions hereinafter contained, the Minister of Water Stewardship for the Province of Manitoba does by these presents give full right and liberty, leave and licence to **The Town of Manitou** of the **Rural Municipality of Pembina** in the Province of Manitoba (hereinafter called "the LICENSEE") to divert and impound water in the **Mary Jane Reservoir** for **municipal** purposes by means of a pumping installation and any other appurtenances (hereinafter called "the WORKS"), the WORKS to be placed on the following described lands:

the Northeast Quarter of Section 9, in Township 4 and Range 9, West of the Principal Meridian in Manitoba,

and more particularly shown on a plan file in the office of the Executive Director, Regulatory and Operational Services Division, a copy of which is hereto attached and marked Exhibit "A".

This licence is issued upon the express condition that it shall be subject to the provisions of The Water Rights Act and Regulations and all amendments thereto and, without limiting the generality of the aforesaid, to the following terms and conditions, namely:

1. The water shall be used solely for **municipal** purposes.
2. The WORKS shall be operated in accordance with the terms herein contained.
3. a) The maximum rate at which water may be diverted pursuant hereto shall not exceed **0.005 cubic metres per second (0.2 cubic feet per second)** .
b) The total quantity of water diverted in any one year shall not exceed **117.18 cubic decametres (95.00 acre feet)** .
4. The LICENSEE does hereby remise, release and forever discharge Her Majesty the Queen in Right of the Province of Manitoba, of and from all manner of action, causes of action, claims and demands whatsoever which against Her Majesty the LICENSEE ever had, now has or may hereafter have, resulting from the use of water for **municipal** purposes.
5. In the event that the rights of others are infringed upon and/or damage to the property of others is sustained as a result of the operation or maintenance of the WORKS and the rights herein granted, the LICENSEE shall be solely responsible and shall save harmless and fully indemnify Her Majesty the Queen in Right of the Province of Manitoba, from and against any liability to which Her Majesty may become liable by virtue of the issue of this Licence and anything done pursuant hereto.
6. This Licence is not assignable or transferable by the LICENSEE and when no longer required by the LICENSEE this Licence shall be returned to the Executive Director, Regulatory and Operational Services Division, for cancellation on behalf of the Minister.
7. Upon the execution of this Licence the LICENSEE hereby grants the Minister or the Minister's agents the right of ingress and egress to and from the lands on which the WORKS are located for the purpose of inspection of the WORKS and the LICENSEE shall at all times comply with such directions and/or orders that may be given by the Minister or the Minister's agents in writing from time to time with regard to the operation and maintenance of the WORKS.
8. This Licence may be amended, suspended or cancelled by the Minister in accordance with The Water Rights Act by letter addressed to the LICENSEE at **Box 280, Manitou, MB, R0G 1G0, Canada** and thereafter this Licence shall be determined to be at an end.
9. Notwithstanding anything preceding in this Licence, the LICENSEE must have legal control, by ownership or by rental, lease, or other agreement, of the lands on which the WORKS shall be placed and the water shall be used.
10. The term of this Licence shall be **twenty (20) years** and this Licence shall become effective only on the date of execution hereof by a person so authorized in the Department of Water Stewardship. The LICENSEE may apply for renewal of this Licence not more than 365 days and not less than 90 days prior to the expiry date.
11. This Licence expires automatically upon the loss of the legal control of any of the lands on which the WORKS are located or on which water is used, unless the Licence is transferred or amended by the Minister upon application for Licence transfer or amendment.
12. The LICENSEE shall keep records of daily and annual water use and shall provide a copy of such records to the Executive Director, Regulatory and Operational Services Division, not later than February 1st of the following year.
13. The LICENSEE shall install and maintain, on the pumping WORKS, a water measuring device acceptable to the Executive Director, Regulatory and Operational Services Division, that will accurately measure the instantaneous water flow and the accumulated annual volume of water diverted from the water source.

14. The LICENSEE shall comply with all instructions and specifications that may be issued by Fisheries and Oceans Canada under the fish habitat protection provisions of Canada's Fisheries and Oceans Act concerning the construction, maintenance, and operation of the WORKS.
15. The LICENSEE shall hold and maintain all other regulatory approvals that may be required and shall comply with all other regulatory requirements for the construction, operation, or maintenance of the WORKS or to divert or use water as provided by this Licence.

In witness whereof I the undersigned hereby agree to accept the aforesaid Licence on the terms and conditions set forth therein and hereby set my hand and seal this _____ day of _____ A.D. 20 ____ .

SIGNED, SEALED AND DELIVERED
in the presence of

_____ } _____ (Seal)
Witness Licensee

Canada, PROVINCE OF MANITOBA To Wit:

I, _____ of the _____
of _____ in the Province of Manitoba, MAKE OATH AND SAY:

1. That I was personally present and did see _____ ,
the within named party, execute the within Instrument.
2. That I know the said _____
and am satisfied that he/she is of the full age of eighteen years.
3. That the said Instrument was executed at _____
aforesaid and that I am subscribing witness thereto.

SWORN BEFORE me at the _____
in the Province of Manitoba this _____ day of _____ A.D. 20 ____ .

_____ } _____
A COMMISSIONER FOR OATHS
in and for the Province of Manitoba
Witness

My Commission expires _____

Issued at the City of Winnipeg, in the Province of Manitoba, this _____ day of _____ A.D. 20 ____ .

The Honourable the Minister of Conservation and Water Stewardship

Appendix D

MWSB Guidelines for Watercourse Crossings

WATERCOURSE CROSSINGS

Mitigation Measure

1. All watercourse crossings will be directionally drilled.
2. A minimum undisturbed buffer zone of 15 metre will be maintained between directional drill entry/exit areas and banks of watercourse.
3. Heavy equipment (caterpillars, tractors) shall not be allowed within the buffer zone.
4. Enforce measures regarding fuelling or servicing equipment within 100 metre of watercourse.
5. Waste drill mud and cuttings will be prevented from entering surface water.
6. Should erosion control measures be implemented, post construction monitoring shall be conducted to ensure effectiveness.
7. Further erosion control measures will be implemented as necessary.

Reclamation

1. Restore all disturbed areas to original contours.
2. Install erosion control measures, if warranted, and maintain until vegetation becomes established.

Pressure Loss/Fluid Loss Response

To avoid or minimize the potential for drilling fluids and drill cuttings from entering watercourses because of a frac-out, the following monitoring and response plan will be followed:

1. A record of drilling progress will be maintained to always know the location of the drill head relative to the point of entry.
2. A record of drilling component usage (type and quantity) will be maintained throughout each drilling operation.
3. A record of drilling fluid volume used and returned will be maintained to detect any significant fluid losses. Drilling fluid pump pressure will be continuously monitored. Abnormal loss of returned fluids or loss of fluid pressure that may be indicative of a frac-out will be reported immediately to MWSB/PFRA construction field supervisor.
4. At watercourse crossings where water clarity permits, a view of the stream bottom, an observer will continuously check for signs of mud escapement to the watercourse.

Loss of Fluid and Frac-out Response Plan

1. If an abnormal loss of fluid, drop in pressure or visible plume is observed indicating a frac-out or possible frac-out, drilling is to stop immediately.

2. The contractor will notify the MWSB/PFRA construction field supervisor of the frac-out condition or potential condition and decide on the appropriate action as follows:
 - a) Assign a person to visually monitor for the presence of muddy plume.
 - b) Make adjustments to the mud mixture; add lost circulation material (LCM) to the drilling fluid in an attempt to prevent further loss of fluid to the ground formation and/or watercourse.
 - c) Where conditions warrant and permit (i.e., shallow depth, clear water, low water velocity, potentially sensitive habitat) and where a frac-out has been visually detected, attempt to isolate the fluid release using a large diameter short piece of culvert.
 - d) Under circumstances where a frac-out has occurred, and where conditions do not permit containment and the prevention of drilling fluids release to the watercourse, attempts to plug the fracture by pumping LCM are not to continue for more than 10 minutes of pumping time.
 - e) If the frac-out is not contained within this time, MWSB/PFRA construction supervisor will halt any further attempts until a course of action (either abandon directional drilling or further consultation with MWSB engineers) is decided upon.