Profile: Morden

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Friends of the Earth
Be True to Blue
Water Soft Path Project

Supported by:

RBC Blue Water Project™

Manitoba

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PROFILE: MORDEN

BACKGROUND

This profile for the Town of Morden (situated in the Rural Municipality (RM) of Stanley) complements a Pembina Valley Conservation District (PVCD) wide practical application of Standard Demand Management (SDM) and Water Soft Path (WSP) measures for water and watershed management and planning[1]. Part of the "*Be True to Blue*" project, which combines public outreach with the planning processes for water management, this joint Friends of the Earth (FOE)-PVCD venture was supported financially by Manitoba Water Stewardship and the Royal Bank of Canada (RBC) Blue Water Project.

INTRODUCTION

Water management is a key component of the operational responsibilities of municipalities. Fresh water, essential for life, is a valuable and threatened resource around the world, especially for quality and quantity. When we view water as a ubiquitous and abundant "product", we often take it for granted, abuse it and ignore other ways of providing the service (i.e., waste management, cooling) other than using water. Water soft path, an innovative approach looking at how water is used in homes, businesses, institutions, industries, by communities and for agriculture, offers alternatives to and builds on SDM and water conservation measures, and urges thinking about water differently. Water soft path principles include thinking of water as providing a service and asking if there are other ways to provide that service without using as much or any water.

Population and economic growth often are the drivers for increased consumption of resources, and this includes water. How does a municipality respond to a perceived increase in demand for this precious resource? By investing huge amounts of funds into costly infrastructure for water treatment, delivery and wastewater handling to meet this demand? Or by looking at ways to reduce or even eliminate water use and the need for larger treatment facilities? WSP provides opportunities to save water and money by rethinking how water is used. This can be summarized by asking several "why" questions.

- **Why** do we use the amount of water we do for tasks?
- WSP also encourages people to consider ways to match the quality of water to the job at hand. For example, flushing toilets does not require drinking water and yet this is how most water systems are designed. Building on this principle is the second why: **why** do we use the quality of water we do?
- And **why** do we use water at all for some tasks. This can lead to implementing waterless or near waterless alternatives.

[1] Pembina Valley Conservation District (PVCD) (Manitoba): Water Soft Path Analysis and Outreach Program. Be True to Blue 2010-2011. Friends of the Earth Canada and PVCD.

With the spectre of climate change impacts (that in the case of Manitoba indicate wetter winters and springs and drier summers), and concerns around the health of freshwater watersheds combining to threaten water resources, WSP offers opportunities and approaches to ensure future sustainable water use. WSP views water as a basic ecosystem resource and human activities as part of the larger environmental water cycle, from source to source (e.g., water taking to wastewater treatment and recharge (where allowed) into a watershed). Putting the ecosystem first, another WSP principle, asks practitioners to protect the watershed first to sustain aquatic life and ecosystem services and ensure a sustainable water future for all.

Water soft path builds on the efficiency and conservation from standard supply and demand management methods and adds decisions and dimensions that take the ecosystem into consideration.

Another WSP principle is to look at planning long term (from 20-50 years) and to use a concept called backcasting to plan how water and watershed management planning could unfold. By looking at a future goal and planning backwards and scheduling when to implement, for example, feasibility studies, how to engage the public (another keystone principle of WSP), policy changes (e.g., to bylaws, policies, building codes, regulations, best management practices (BMPs), Standard Operation Procedures (SOPs)), and putting in place new practices, WSP provides a roadmap (and like Google maps, several route options or scenarios in the case of WSP) on how to reach that ideal water future.

For the PVCD, to match three cycles of the Pembina River watershed planning process, this project used 30 years for WSP planning. While PVCD residents tend to be frugal with water, this profile (and the PVCD project) show how WSP can contribute to water and watershed planning for the future to maintain and build on PVCD's excellent watershed work and good water ethics. Comparing scenarios for Business as Usual (BAU), SDM and WSP over the selected 30 year period, this project and profile (which includes information not in the main document for the project) found that WSP measures will benefit the residents and watersheds of the PVCD.

SETTING THE SCENE FOR THE TOWN OF MORDEN

The Town of Morden (Figure A), situated in the RM of Stanley, with a population of 7400 (2009) has grown by over 1200 people since 2001 (20%). The projected population by 2040 is around 15,000. The town has active commercial, tourism and institutional districts and is home to a number of small businesses: accommodations, restaurants, stores, a state-of-the art community centre which houses the Fossil Museum and active industrial and commercial sectors which includes: 3M, Décor Cabinets, South End Truck Wash, Manitoba Hydro and Farm King, all high water users. The town is also home to the famous Morden Agriculture Research Station, once home to the world-renowned rose hardy rose breeding program.

WATER SOURCES AND WATERSHED PLANNING

Morden draws its water from Lake Minnewasta, which is a reservoir created by a dam on Deadhorse Creek (See Figure B). The Lake is also used for recreation (boating and swimming) and as the source of water for the Golf Course.

Water systems

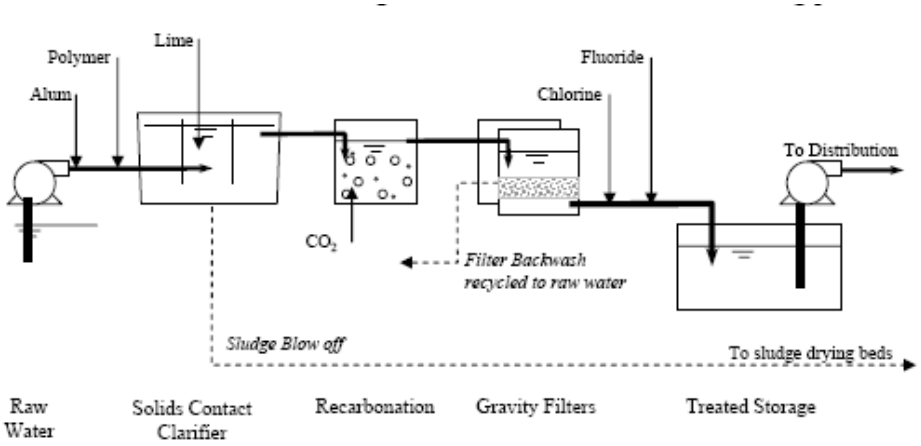
Morden's water system draws water from Lake Minnewasta and consists of a raw water intake system, a water treatment plant, and a water distribution system. The system also includes approximately 260 fire hydrants, and the overall cost of the system was $8,000,000. The plant services around 90% of the Town's requirements, with the remaining 10% of demand supplied by Pembina Valley Water Co-op (PVWC).

The water distribution pipeline of approximately 68 kilometres primarily consists of asbestos cement pipe, new pipe (since the 1980's) is PVC. The Town reports a concern over a high number of pipe failures primarily due to corrosion of the valves.

Water treatment

The water treatment plant, constructed in 1999, has the capacity to produce 9 litres per second (l/s), or 1.71 million imperial gallons (7773 m^3) per day. The plant has two treatment trains (45 l/s per train) that use lime soda-ash softening, filtration, chlorination and fluoridation.

Treated water is pumped to two on-site above ground storage tank reservoirs, one an elevated tower constructed in the early 1960's, the other a standpipe constructed in the 1980's. Combined, these tanks have a capacity of 3.41 dam^3 and distribute water to meet peak hour water demands and limited fire protection. The Town reports that the tanks will likely require replacement within ten years.



The 10% that comes from the PVWC (Figure above) comes from the Red River via the Letellier water treatment plant, which can produce up to 100 lps of treated water. The storage capacity is 2,450,000 litres or 540,000 gallons. The plant is a typical lime softening plant

found throughout the Manitoba prairies and is used to treat water from the Red River. (See the schematic below.) The current process consists of a screened raw water intake located off of the Red River that pumps to an off stream storage reservoir beside the plant which is then pumped directly to the solids contact clarifier. The cold lime softening clarifier then reduces hardness and turbidity. The subsequent recarbonation step stabilizes the clarifier effluent and the gravity filters polish the water for final turbidity and pathogen reduction. The filtered water is then dosed with chlorine for disinfection and fluoride for dental maintenance.

Wastewater treatment

All residences, commercial and industrial facilities in Morden are on the sewer line except for about five houses on the outskirts of town. There is a five-cell lagoon with a 1,150,000 imperial gallon (5230 m^3) capacity.

The Town's sewage is collected and transported by gravity collection mains and four lift stations, which carry the effluent to a stabilization pond (lagoon). The system was installed in the 1950s and over time, the town has been replacing the clay tile with PVC pipe. The older system was prone to leaks, and the Town has a sewer main relining program to identify and repair leaks. The estimated cost of the sewerage system is $7,000,000.

The Town's recent rate study, filed in support of its rate application, reviewed water consumption from 2003 to 2007, and noted that the rate of unaccounted for water has ranged from a low of 6.8%, in 2003, to a high of 18.3%, in 2006.

The town has applied for a $750,000 grant for the upgrade and expansion for the construction of two new aerated primary treatment cells and an additional secondary cell for the existing wastewater treatment facility (constructed in stages from 1955 to 1992). The facility is overloaded with industrial waste and has marginal hydraulic storage capacity. The upgrade will provide protection to this capacity and the environment.

The RM of Stanley is currently undergoing a study for a regional wastewater treatment facility that would service Morden, Winkler and portions of Stanley. The installation of sewer services has been discussed for the corridor between Morden and Winkler, as well as Reinfeld and Schanzenfeld, although an action plan has yet to be determined.

Water use

The Town has 2,609 utility customers - 19 are 'water only' customers, 98% are residential or small commercial, and the remaining 2% large volume users. The Town reports per capita domestic consumption of approximately 50 gallons/capita/day, or 227 litres/capita/day; slightly above the provincial average of 223 litres/capita/day (Table 1). Another estimate for residential use only is 185 l/p/d. Domestic use varies by season with higher usage in the summer due to lawn watering.

One billing cycle (2009) gives an idea of the uses by Morden (in m^3/day): 1470 domestic, 263 commercial, 161 public, 88 institutions, 10 bulk sales or around 70% residential, 26% institutional and commercial and 4% industrial. Estimates for the scenario building were

based on population growth and coefficients for number of employees and a survey of Chamber of Commerce registrants and the Morden Website.

Table 1. Personal water use by location

Municipality	Personal water use (lpd)
RM Roblin, Cartwright RM Lorne, RM Louise, Crystal City	100
Pilot Mound	116
RM Stanley, Winkler	157
RM Thompson, Miami, Morden, Swan Lake FN	216
RM Pembina, Manitou	240
Manitoba average	227
Canadian average	329

The golf course irrigates directly from Lake Minnewasta. They have an expired licence (up for renewal) that authorized a withdrawal of 43.17 dam^3/year.

One large water user is the Morden Agriculture Research Station, which uses between 400,000-1,200,000 imperial gallons (1820-5455 m^3) per month and on average 10 million gallons (45455 m^3) or about 124 m^3/day. About 95% of this is used for heating and cooling and 5% for regular washroom, and laboratory use. There is a fluxuation of water use, higher in the winter and lower in the summer (due to the greenhouse cooling). The station plans to go to a closed loop cooling system that would dramatically reduce their water consumption.

The Manitoba EcoNetwork Water Caucus recently completed a project in Morden, Protect Our Water, in partnership with local stakeholders (and 19 households) to look at ways to reduce home water use and other water related practices. Household changes included: switching to green cleaners, reduced home and garden water use, reduced shower times, installation of low-flow showerheads, installation of rainbarrels and toilet dams as well as checking for leaks.

SCENARIO BUILDING

Preliminary scenarios were built for Business as Usual (BAU), Standard Demand Management (SDM) and Water Soft Path (WSP) using a selection of targets and measures, as described below. These scenarios are for illustrative and discussion purposes. Municipalities may wish to use them or parts of them and are encouraged to test measures and combinations of measures that they think would be a good fit for their water systems and to build multiple WSP scenarios for consideration.

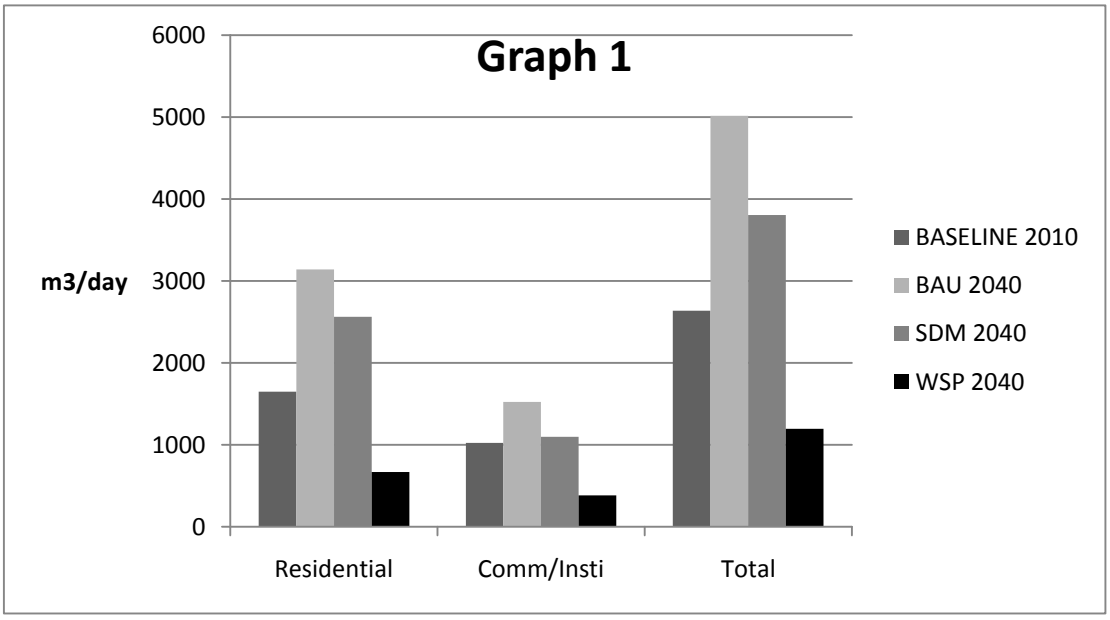
Projected business-as-usual (BAU) water use increases are estimated by population changes (about 1.7% per year) over the 30 year period. Table 2 and Graph 1 show highlights

of the numbers (for a more detailed break-out of the uses, refer to Appendix A). While no explicit target was set, one way to look at efficient and ecosystem-friendly water use for the 30 year period would be to aim to have no new water use (match the baselines 2010 number) by the end of the time period (2040).

Table 2. Scenarios building for BAU, SDM and WSP

Category	Baseline 2010	BAU 2030	BAU 2040	SDM 2040	WSP Measures	WSP 2040
Residential	1650	2310	3140	2563	Rooftop collection, education and promotion for conservation, xeroscaping	670
Commercial/ institutional	1025	1314	1524	1100	Rooftop collection. Greywater systems	385
Industry	184	302	350	141		141
TOTAL	2635	3230	5014	3804		1196

Unless stated, values are in m^3



In the scenario building for Morden, the measures selected (and note that others could be selected and modelled) (refer to Table 3 for more details on assumptions and savings) were:

- SDM: low flow showerheads, low-flow toilets, front-loading washers
- WSP: rooftop water collection, xeroscaping for residences, greywater systems for commercial and institutional buildings.

For example, using toilets (Table 3), under SDM, toilets would be switched from high volume to lower volume, which results in on average, 46% savings in water use. The assumption made is that by 2030, about 45% of toilets would be changed out with about 70% by 2040.

In the WSP scenario, toilets would be changed to composting toilets with a 100% savings in water use. More modest implementation rates are proposed (due to cost and that the technology is still being developed) at 5 and 20% respectively for 2030 and 2040.

Table 3. Assumptions for savings for scenario building

SDM	SAVINGS	SDM 2030	SDM 2040	WSP	WSP SAVINGS AND IMPLEMENTATION		
Measure	%	% Implementation		Measure	Savings	2030	2040
Toilets: changing from hi volume (13l) to dual flush (4l)	70	25	40			5% implementation	20% implementation
Laundry: switch to front-loading washers	45	30	50				
Showers: switch to low-flow showerheads	50	60	90				
Faucets: switch to low-flow appliances	15	60	90				
Dishwashers: low flow appliances	45	30	50				
Leaks : detecting and fixing	15	45	70				
Outdoor	10	60	90				
				Rooftop water collection		10% savings Overall	40% savings Overall
				Xeroscaping		100% of outdoor lawn and watering use	100% of lawn and watering use
				Greywater use for commercial /institutional		10%	40%
				Education and promotion		5% savings Overall	10% savings Overall

When conservation and efficiency measures (some fairly stringent and ambitious) are applied for the SDM scenarios (measures that deal with, for example, the reduction of water use) residential water use can be held at around the 2010 baseline for 2040. While SDM deals primarily in what could be considered low-level “engineering” measures that reduce the amount of water by using standard devices (such as installing water saving devices such as low-flush toilets, low-flow showerheads and front-loading washing machines), Water Soft Path steps beyond that to build on the SDM efficiency model to include concepts that result from rethinking how tasks are done and how water use can be modified to save water or

eliminate its use and to look at ways to utilize the WSP principle of matching the water quality to the service.

Application of SDM measures for residential uses will not match the baseline values. When the WSP measures are applied, all sectors drop well below 2010 values. Reduction of the need for treated water will reduce the costs for the town for chemicals and other inputs for water treatment.

Opportunities for greywater (collecting, for example, water from showers and baths and redistributing it for uses such as toilet flushing) use, in this case, are applied to only the commercial and institutional sectors. Should there be an interest in developing greywater systems for new home or multi-residential, investigation of greywater systems be a good move into water soft path implementation (as long as building codes, bylaws and provincial policies to support installations) and could, in part, offset possible increases in outdoor water use in the predicted drier summer climate for southern Manitoba over the next several decades. Other WSP measures that could be put in place (but are not included in the scenarios) are: using sump pump water for non-potable uses, capturing red water (the water that runs down the drain while waiting for your water to heat up for a shower, for example), installing rainbarrels.

Xeroscaping, the use of mulches (e.g., river stone) and/or drought resistant ground-covers, flowers and shrubs, (i.e., instead of grass) can reduce outdoor water use considerably. One suggestion has been that towns set up a “demonstration xeroscape garden” as a council project, perhaps even a PVCD-wide contest.

Opportunities to further enliven WSP principles in Morden will complement the ongoing work of the PVCD office that works on projects to manage and protect sources (watersheds). The work of the PVCD fits well with the WSP principle to shift away from large central management and hard infrastructure to make water management decisions locally.

BACKCASTING, TARGETS AND TOOLS

The process of backcasting (another WSP principle) means looking from the future to the present and involves planning and scheduling the steps and processes to get to the target. Tasks and tools to get to the target include: education and promotion, writing of any bylaws needed to support the projects, applying for licenses, purchasing decisions and developing and putting in place rebate and incentive programs and where appropriate setting or raising water rates. For example, to put roof water collection systems into play, there may need to be sufficient time to ensure that local bylaws support installations. For greywater systems, building codes, bylaws and other municipal and, in some cases, provincial guidelines and regulations may need to be put into place. Time and finances to put in place incentive or rebate programs must be carefully scripted. Education and promotion need to be in place to support projects and should be planned early on in the program.

Outreach and follow-up to present results to the communities involved is also important. Public involvement is another key WSP principle. Planning and front-end requirements

could take 5-10 years before, for example, a demonstration roof water collection or greywater system was installed and longer before greywater systems become economical and feasible for widespread use. Show homes and new commercial building would be one step in this process. Table 4 demonstrates one possible backcasting result for Morden, based on the scenarios described.

Table 4. Backcasting targets, tools and timelines

Use	Conservation targets	Conservation measures	2010						2040
Residential indoor and outdoor			0	5	10	15	20	25	30
Toilets	Conversion to low-flow toilets	Rebates, incentives, education, bylaws where needed							
Laundry	Conversion to high efficiency washers	Rebates and subsidies, bylaws as needed							
Showers	Conversion to low-flow fixtures	Rebates, handouts, education							
Faucets	Conversion to low flow fixtures	Rebates, handouts, education							
Dishwashers	Conversion to high efficiency fixtures	Rebates, incentives							
Softeners	No action planned								
Household leaks	Leak program designed and implemented in each home	Audits, education							
Other measures	Rooftop water collection								
Outdoor use	Xeroscaping								
Industrial/commercial/Institutional (ICI)									
Heating/cooling process water, indoor and outdoor ICI use	Reductions based on efficiencies and rooftop water collection systems and greywater systems	Incentives, rebates.							
System losses									

ACTIVITIES IN PROGRESS	
ACTIVITIES IMPLEMENTED	

Water pricing

Water pricing can be one tool to encourage conservation and changes in water habits. In Morden every sector is metered. In April 2009, Morden was granted permission to put in places new rates for water and sewer by the Public Utilities Board[3]. Effective June 2009, there was a 34% hike in water rates. The town implements a two-step rate structure with a higher rate (per thousand gallons (4.5 m^3) at $10.40 total ($7.28 for water and $3.16 for sewer) for the first 100,000 gallons (455 m^3) per quarter consumed and a much lower rate over that volume ($4.40 total, $3.45 for water and 0.98 for sewer). In addition there is a minimum quarterly charge to customers based on the size of the hook-up pipe with the minimum charge increasing with the size of the pipe. For example for a 3/8 meter, the minimum charge is for 3000 gallons (13.6 m^3) per quarter at $48.80, which includes a service charge and rates for water and sewer (See Appendix B for By-law excerpt). The town proposed a special consideration for the Morden Research Station.

Table 5. Examples of water pricing in Manitoba

Location	Sample[2] of cost/m^3
Winnipeg	$1.34
Cartwright, Manitou	$3.30
Swan Lake St Leon	$2.00-2.80 $1.60
RM Stanley	$1.65
RM Thompson	$1.40
Morden	$2.30 (includes sewage)
Winkler	$2.40 (includes sewage)
Rural PVCD	No charge
Canadian average	$1.26 (includes waste treatment)

The by-law states: *"Notwithstanding Commodity Rates and Minimum Charges set forth, Morden Research Station shall be charged the following rates: Commodity Rates - at the water and sewer rate set forth in the Commodity Rates for the first 1,000,000 gallons per quarter and at the applicable water rate only for all consumption in excess thereof."*

[2] This is a sample because in municipalities often charge different rates based on the size and type of connection.
[3] PUB is a government agency responsible for reviewing and regulatory operation for utility rates (e.g., water and sewer). There is local concern about this provincial water utility controlling this local resource.

Item	2008 Est.	2009	2013
Administration & Engineering	$ 177,991	$ 196,551	$ 212,753
Water Production Costs	395,378	461,285	499,310
Water Purchases	116,918	119,257	129,087
Water Distribution Cost	108,654	129,327	139,987
Sewer	99,564	132,555	143,482
Subtotal	$ 898,505	$ 1,038,975	$ 1,124,619
Contingency/Reserve Fund			
Water Production Contingency	$ 45,000	$50,000	$ 50,000
Water Distribution Contingency	20,000	50,000	50,000
Sewer Contingency	50,000	50,000	50,000
Reserve Fund	250,000	250,000	250,000
Capital Improvements			
Sewer Main Re-lining Program	$ 200,000	$ 250,000	$ 250,000
Water Meter Replacement	0	50,000	50,000
Capital Upgrades	0	30,000	30,000
Subtotal	$1,463,505	$1,768,975	$1,854,619
Other Revenue			
Hydrant Rental	($ 31,200)	($ 31,200)	($ 31,200)
Other	(20,000)	(20,000)	(20,000)
Penalties	(5,000)	(5,000)	(5,000)
Connection Revenues	(5,000)	(5,000)	(5,000)
Total	**$ 1,402,305**	**$ 1,707,775**	**$ 1,793,419**

Accordingly, on average the Station would be expected to pay the wholesale water rate for two-thirds of their consumption. The Town advised that 60 – 65% of the water used by the Research Station is not returned to the sewer system. The Town's water and sewer budget (2008-2013 projected) indicates that the town runs a deficit but plans to cover the costs in the near future with the higher water rates.

The rate study projected annual revenue and expenditures for the period from 2009 to 2013, as follows:

	2009	2010	2011	2012	2013
Total Revenues	$1,746,714	$1,783,589	$1,820,635	$1,857,856	$1,895,045
Total Expenditures	-1,768,974	-1,789,754	-1,810,949	-1,832,568	-1,854,619
Surplus /(Deficit)	**($22,260)**	**($6,164)**	**$9,686**	**$25,289**	**$40,426**

The Town indicated that, assuming no significant changes, the proposed rates, if approved, should be adequate to cover utility operation and maintenance costs (including the costs expected for the rehabilitation and improvement of the utility) for the next five years.

WATER CONCERNS: ROLE OF WSP

The main water concerns for Morden will continue to be water treatment and supply as the community grows. Implementation of some of the WSP measures suggested will help alleviate the need for as much treated water and the move also to matching quality of water to the service will also provide innovation to the town. Other issues include flooding.

The WSP principle regarding putting the ecosystem first urges that the amount of water withdrawn should be determined by the natural environment and should not impair the healthy functioning of ecosystems and their ability to perform beneficial services. At present, it is estimated that human activities in Manitoba take about 0.2% of the runoff (the main source of water in the province). Predictions are the amount of runoff will decrease in the

next few decades and therefore, the amount of water that can be withdrawn and maintain the ecosystem will decrease. Therefore, with WSP intervention, the amount of water withdrawn can be reduced substantially.

CONSULTATION

The purpose of this document is to summarize information on water use, watershed health, water treatment and wastewater treatment based on available data and to present sample scenarios for business-as-usual, standard demand management and water soft path management actions.

Meetings with representatives from the municipalities and PVCD representatives held in April 2012 reviewed the results from the CD level analysis and relevant RM/town/city profiles with discussion and input. In addition, a public lecture (*Blue Treasure*), presented in Morden, touched on the importance of water for life and the economy and summarized the results and goals for future water management in the PVCD.

The purpose of the consultation was to:

- check the information and data used and to update it to current values and with up-to-date information.
- discuss the measures, actions and tools suggested in the scenarios.
- collect advice on what steps the community/RMs see as the best ways to implement water soft path and provide that to planners in the final report for consideration as the community looks to the future of the water and wastewater management and public engagement opportunities in the RM, as well as the need for changes in bylaws, regulations and other government devices (e.g., education, incentive programs).

General points gleaned and discussed included:

- Leadership. The CD and members need to take ownership of and the leadership for the future of water planning and follow-up for this project at the local level, both through watershed planning and municipal water and wastewater management. Water management in the Pembina Valley has always been an important issue and will continue to be in the future. Wastewater issues, which this WSP analysis included in the broader view of water management from source to source (holistic approach), are also major in the region and affect water management decisions. The PVCD has an opportunity in the promotion of the results of this project to provide a strong leadership role for other CDs in Manitoba and conservation authorities in other provinces. The people of the PVCD have indicated an interest to share their experiences of water soft path analysis.

- Wastewater: some lessons learned. With the goal of Water Soft Path to reduce water use comes the issue that wastewater volumes may also drop. In some cases, this may cause a problem for flow (e.g., slope is not sufficient). The discussions concluded that if go to low flow, then need to adapt the system (e.g., add a lift station) or with routine updating and repairs, change the slope of the piping. Another wastewater issue that needs to be

addressed is the discharge of treated water and the need for effective, economical and ecological solutions.

- Water pricing. Some agreed that need to charge more for water. Others discussed the concept of billing for raw water (e.g., water from wells or surface water that is not treated or metered). Noted that BC bills at the provincial level for raw water. Some of the water rates in the CD are highest in Canada and are coming close to reflecting the true cost of water supply.

- Water systems. A need to reconsider design of water systems was identified. At the moment, treated water is used for most domestic and industrial uses but there are many uses that could be served by untreated water or by recycling greywater. Need to consider how to manage that end, serve the needs for both treated and untreated water and build the requirements (e.g., codes, regulations and so on) to support this move.

-Match water quality to use. Following from the above, there was some discussion about how to implement the water soft path principle of matching water quality to the use. Some mentioned that not all livestock need treated water and so water from lagoons could be used and outdoor water use should not use treated water (unless necessary for machinery or livestock health)
.
- Adaptation and flexibility. The concept of adapting was a common theme, whether in dealing with a low-flow of wastewater as a result of conservation of water, to drought conditions, to finding and integrating innovations in the future for water management.

- Education and youth. The importance of youth involvement was stressed, they are the future of water management. The need for education, as well as incentives to encourage changes in water use patterns was also identified as key.

- Constructed (and natural) wetlands. There is interest in trying this out in Manitoba. Other Prairie, Canadian communities and businesses and locations around the world are using constructed wetlands to effect. One use could be as a means to treat overflow from a lagoon (this could also include use of existing natural wetlands where this is ecologically beneficial) .

- Discharge of treated water into the ecosystem. Some wastewater systems treat water to a quality that could be discharged directly into the ecosystem. There was some concern registered that the Province of Manitoba is taking too conservative an approach to this and not allowing any such discharge and that it is not promoting innovation in this area.

Path forward

- The Be True to Blue analysis provides a snapshot and preliminary analysis of water use, watershed planning and wastewater management. Scenarios presented are for demonstration only. Municipalities should develop more scenarios and test out other targets and measures and tailor them to their own unique water management challenges and needs.
- Consider the measures that have been proposed and how they could be implemented and whether there are others you would like to integrate.

- Develop a public outreach plan to get farmers, businesses and residents involved

The measures and the challenge:

At the consultations, several measures, challenges and projects were suggested and discussed. The following are some of the measures that should be considered into the future for the PVCD and members:

- Education and information sharing
- Roofwater harvesting
- Composting toilets
- Others: rainbarrels, natural shade and solar-powered AC, sump pump water recycling, collecting and reusing other water (red water), xeriscaping, greywater systems, constructed wetlands

These are the projects (with a focus on getting communities involved and getting concepts into the public arena) suggested:

- Xeric gardening contest between municipalities (demo gardens)
- Rainwater harvesting. Back to the future (rainbarrels and roofwater harvesting (bring back or rejuvenate your cistern) campaign
- Composting toilets (Let's move to composting toilets campaign (rural areas))
- Low flow toilet campaign
- Agriculture water use (make info on water efficient devices available)
- Constructed wetlands – research into feasibility and needs
- Greywater – what needs to be done to implement in Manitoba.
- School outreach about water conservation, water security, protecting their watersheds

Other issues discussed at the consultations on the CD wide basis included:

- that another project should include a demonstration house and yard with some of the measures put in place (e.g., roofwater harvesting, rain barrels, greywater systems)

- regulatory and incentive approaches suggested in the report should be investigated and tried (e.g., ban sale of high water consumption appliances as an example discussed).
- Wet industry. There has been a general approach in the PVCD to not encourage wet industry due to the water volumes available and the discussion is that this approach should be continued, unless the systems are recirculating water or can use reject water (for example from the new RO plants).

Other issues (Morden level) discussed are:

- Slope and low-flow on wastewater systems. Winkler identified this as a potential problem and indicated that there may be a need to flush the system if the flow is too low. Other suggestions were to add a lift station. Discussion included the need for the system to adapt and compensate to low-flow conditions.

- Concern about water volume reductions in watershed sources into the future as well as the cost of water. Discussion about charging the true cost of water and that some PVCD towns

are closer to this than many other locations in Canada. There is a dilemma for water suppliers, in that they have come to rely on increased water volume to cover their costs. The water systems that service Morden and other PVCD locations (e.g., through the PVWC) are already maxed out and would be stressed in drought conditions.

RESOURCES FOR MORE INFORMATION

- Pembina Valley Conservation District (PVCD) (Manitoba): Water Soft Path Analysis and Outreach Program. *Be True to Blue* 2010-2011. Friends of the Earth Canada and PVCD.
- Manitoba Order No. 35/09, The Public Utilities Board Act, April 2, 2009, Town of Morden, Revised Water and Sewer Rates, Effective June 1, 2009
- PVWC 2007 Annual report
- Groundwater resource in Morden, Stanley, Thompson, Winkler Planning District 1979
- Genivar report

FIGURE A. MAP OF MORDEN AND AREA

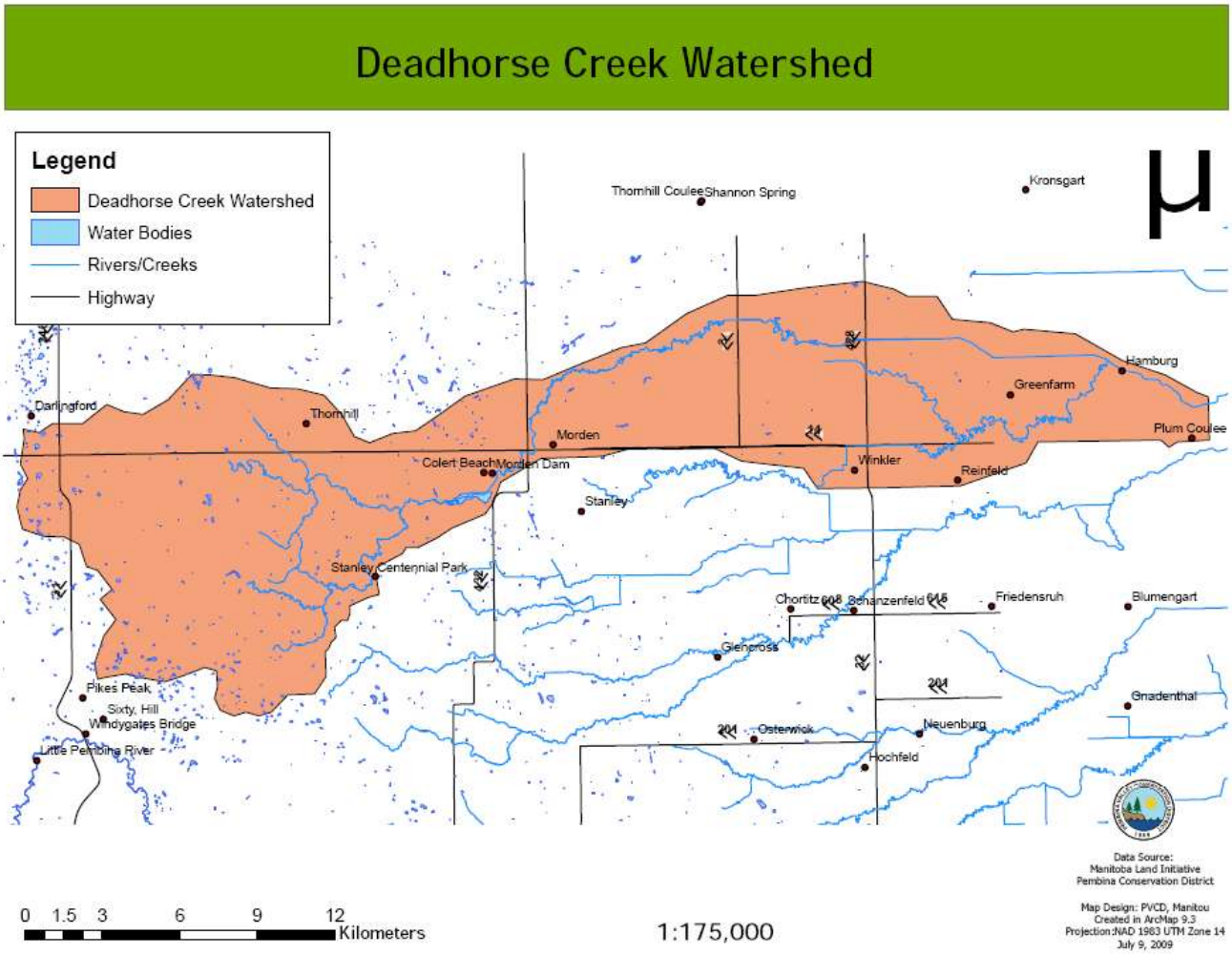
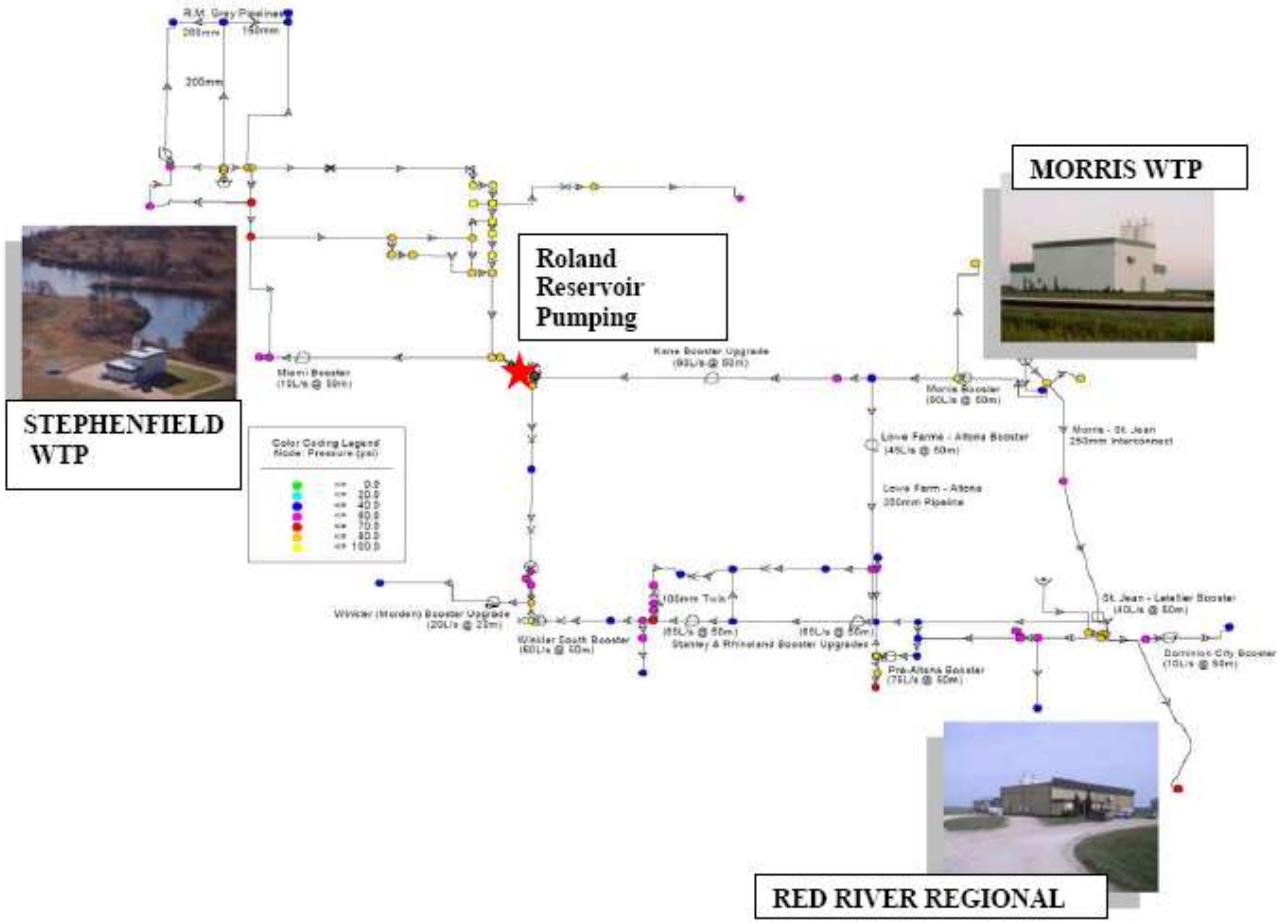


FIGURE B. PVWC WATER SYSTEM

Figure 1 (not to scale) is a model of the PVWC distribution system, including the three water treatment plants.

Figure 1 – PVWC Distribution System



APPENDIX A. Table I. SCENARIO DATA

MORDEN	% USE	PM BASELINE 2010	BAU 2020	BAU 2030	BAU 2040	savings/implementation SDM 2030	multiplier for savings and implementation	SAVINGS	SDM 2030	Savings/implementation sdm 2040	multpliers	savings2	sdm 2040	WSP MEASURE	SAVINGS/IMPLEMENTATIONwsp 2030 1	MULTIPLIER	SAVINGS3	WSP 2030 1	SAVINGS/IMPLEMENTATION WSP 2040 1	MULTIPLIER4	SAVINGS5	WSP2040 1
Population		7400	8810	10360	14060																	
Average daily water use/household (m3		0.67	0.67	0.67	0.67																	
RESIDENTIAL																						
Residential (indoor) (m3/d)																						
Toilet	27	446	532	624	**848**	70/25		112	512	70/40	0.28	237	611								611	
Laundry	22	363	433	508	550	45/30	0.14	71	**437**	45/50	0.22	121	429									
Showers	17	281	335	393	430	50/60	0.3	118	275	50/90	0.45	194	236									
Baths	2	33	39	46	50	0/0	0	0	46	0/0	0	0	11									
Faucets	16	264	315	370	400	15/60	0.09	33	337	15/90	0.14	56	344									
Dishwasher	1	17	20	23	25	45/30	0.15	3	20	45/50	0.28	7	18									
Softener	2	33	39	46	50	0/0	0	0	46	0/0	0	0	50									
Leaks	13	215	256	300	330	15/45	0.07	21	279	15/70	0.1	33	297									
Total indoor	100	1320	1580	1850	2510			358	1952			648	1996									
Residential (outdoor) (m3/d)																						
														Xeroscape and rainwater								
Lawn watering	80	260	310	370	500	10//60	0.06	16	354	10//90	0.1	50	450	collection	100/100	1	354	96	100/100	1	450	
Driveway and vehicle cleanin	20	70	80	90	130	10//60	0.06	4	86	10//90	0.1	13	117									
Total outdoor		330	390	460	630			20	440			63	567									
TOTAL RESIDENTIAL	100	1650	1970	2310	3140			378	2392			711	2563					1679				670
														Rooftop collection	10% overall	0.1	239		40% overall	0.4	1025	
														Education and promotion	5% overall	0.05	120		10% overall	0.1	256	
TOTALS WITH WSP IMPLEMENTATION																	713	1679			1893	
																						670
COMMERICIAL AND INSTITUTIONAL																						
Golf courses (CA value)		5	6	8	10	15	0.15	0	8	15	0.15	2	8									
Stores (other than grocery)		115	147	189	219	15	0.15	28	161	15	0.15	33	186									
Schools		36	46	59	68	9	0.09	5	54	9	0.09	6	62									
Carwash		6	8	10	11	15	0.15	0	10	15	0.15	2	9									
Research station		125	160	205	238	90	0.9	180	25	90	0.9	214	24									
Personal care homes		6	8	10	11	40	0.4	4	6	40	0.4	4	7									
Hospitals/Medical centres		10	13	16	19	40	0.4	6	6	40	0.4	8	11									
Hotels		193	247	317	367	14	0.14	44	273	14	0.14	51	316									
Restaurants		53	68	87	101	28	0.28	24	63	28	0.28	28	73									
Cabinet makers		1	1	2	2	15	0.15	0	2	15	0.15	0	2									
Rinks		12	15	20	23	15	0.15	3	17	15	0.15	3	20									
community centres (additional to rinks)		27	35	44	51	15	0.15	7	37	15	0.15	8	43									
day cares		4	5	7	8	9	0.09	1	6	9	0.09	1	7									
grocery stores		11	14	18	21	15	0.15	3	15	15	0.15	3	18									
banks and offices		46	59	75	87	19	0.19	14	61	19	0.19	17	70									
agricultural retail		5	6	8	10	15	0.15	1	7	15	0.15	2	8									
churches and other places of worship		5	6	8	10	15	0.15	1	7	15	0.15	2	8									
hairdressers		4	5	7	8	15	0.15	1	6	15	0.15	1	7									
construction companies		10	13	16	19	15	0.15	2	14	15	0.15	3	16									
auto repair		27	35	44	51	15	0.15	7	37	15	0.15	8	43									
gas station		4	5	7	8	15	0.15	1	6	15	0.15	1	7									
funeral home		7	9	11	13	15	0.15	2	9	15	0.15	2	11									
museums		12	15	20	23	15	0.15	3	17	15	0.15	3	20									
camps		20	26	33	38	15	0.15	5	28	15	0.15	6	32									
Other		57	73	93	108	15	0.15	14	79	15	0.15	16	92									
TOTAL COMMERICAL AND INSTITUTIONA		801	1025	1314	1524			356	954			424	1100					764				385
WSP IMPLEMENTATION																						
														Rooftop collection	10% overall	0.1	95		40% overall	0.4	440	
														Greywater use	10%(Morden and Winkler)	0.1	95		25% overall for Morden	0.25	275	
																	190	764			715	
																						385
INDUSTRY																						
Truckwash		95	122	156	181	75	0.75	117	39													
Potato processing plant		30	38	49	57	90	0.9	44	5													
Cabinet makers		16	20	26	30	0	0	0	26													
Foundries								0	0													
Concrete works								0	0													
Printing and graphics companies																						
Trailer manufacturer								0	0													
wind turbines								0	0													
other		43	55	71	82			0	0	71												
TOTAL INDUSTRIAL		184	235	302	350					141			141					141				141
TOTAL ICI		985	1260	1616	1874					1095			1241					905				526
OVERALL TOTAL (WITHOUT AGRICULTUR		2635	3230	3926	5014					3487			3804					2584				1196

APPENDIX B. MORDEN BY-LAW

TOWN OF MORDEN
WATER AND SEWER RATES
BY-LAW NO. 2-2009

1. COMMODITY RATES - Effective June 1, 2009

Two-Step Rate Structure	Rates per thousand gallons		
	Water	Sewer	Water & Sewer
First 100,000 gallons per quarter	$7.25	$3.15	$10.40
Over 100,000 gallons per quarter	$3.45	$0.95	$4.40

2. MINIMUM CHARGES PER QUARTER - Effective June 1, 2009

2.1. Water and Sewer Customer

Notwithstanding the commodity rates set forth in Section 1 hereof, all customers with water and sewer service shall pay the applicable minimum charge set out below, which will include water allowance indicated:

Meter Size	Group Capacity Ratio	Minimum Quarterly Consumption	Service Charge	Commodity Rates Water	Sewer	Minimum Quarterly Charges
5/8"	1	3,000	$17.60	$21.75	$9.45	$48.80
3/4"	2	6,000	$17.60	$43.50	$18.90	$80.00
1"	4	12,000	$17.60	$87.00	$37.80	$142.40
1 1/4	7	21,000	$17.60	$152.25	$66.15	$236.00
1 1/2"	10	30,000	$17.60	$217.50	$94.50	$329.60
2"	25	75,000	$17.60	$543.75	$236.25	$797.60
3"	90	270,000	$17.60	$1,311.50	$476.50	$1,805.60
4"	170	510,000	$17.60	$2,139.50	$704.50	$2,861.60