SUMMARY OF COMMENTS/RECOMMENDATIONS

PROPONENT: **City of Winkler**

PROPOSAL NAME: **City of Winkler - Water Supply Upgrading**

CLASS OF DEVELOPMENT: **Two**
TYPE OF DEVELOPMENT: **Water Development and Control**
CLIENT FILE NO.: **5393.00**

OVERVIEW:

The Proposal was received on March 4, 2009. It was dated March 4, 2009. The advertisement of the Proposal was as follows:

"A Proposal has been filed by W. L. Gibbons and Associates Inc. on behalf of the City of Winkler for the construction and operation of a water supply upgrade for the City. The proposed system would retain the ten existing supply wells which withdraw water from the freshwater component of the Winkler Aquifer and their associated raw water pipelines. Up to ten additional deeper wells would be constructed over the next 20 years. These wells would be located adjacent to existing wells, and would withdraw lower quality water from the bottom of the freshwater component of the aquifer. A new water treatment plant would be constructed in 9-3-4W on the north side of the City to provide reverse osmosis treatment to the blended water supply. Reject water from the treatment plant containing elevated levels of iron, sodium, chloride and dissolved solids would be discharged to the storage cells of the City's wastewater treatment lagoon and eventually discharged to Deadhorse Creek. Construction of the project is proposed to commence in 2009."

The Proposal was advertised in the Winkler Times on Friday, March 13, 2009. It was placed in the Main, Millennium Public Library (Winnipeg), Manitoba Eco-Network and the South Central Regional Library (Morden) registries. It was distributed to TAC members on March 9, 2009. The closing date for comments from members of the public and TAC members was April 14, 2009.

COMMENTS FROM THE PUBLIC:

Frank Render I point out that while a Provincial employee I have worked on the Winkler Aquifer several times. My aim has always been to ensure that the hydraulic and chemical stability of the freshwater zone was preserved and that the aquifer continues to provide maximum benefits to the citizens of the area. The pool of some 200,000acre feet

of freshwater stored in the aquifer is a large water supply and safeguard against prolonged drought or other special needs. When I first heard of this Reverse Osmosis approach to improved water supply for Winkler I felt it could be beneficial to the water supply situation in the area. However I never dreamt that it would be approached by a scheme to pump from directly under the main fresh water body; where the brackish water zone is thin. Also I never thought that the RO waste would be discharged to the surface water. I currently am not affiliated or work for anyone – my concern is for the longevity of the Winkler aquifer freshwater supply and long term sustainable water supplies for the region.

Comments:

1) I find that a serious flaw in this proposal for using Reverse Osmosis to provide additional water for the City of Winkler water system is that no work was done to try and determine a place to dispose of the waste brine from the RO unit. To allow the disposal of RO saline waste into the sewage system which is eventually discharged to the surface water system sets a serious president. I do not see how Winkler could go ahead and build the expensive water treatment plant and all the infrastructure involved with the possibility they then, at some time, could be told due to RO waste disposal, they could not use it? Test work could have been done on discharging the RO waste to deep saline underlying carbonate aquifers. If that is not feasible the possibility of injection into the Swan River Sandstone aquifer miles removed from the Winkler Aquifer; so that very little hydraulic pressure would be increased shoving saline water from the Swan River aquifer into the Winkler Aquifer. Similarly, though less desirable, the deeper sand deposits to the east of the Winkler aquifer could have been evaluated. Even if it was possible to sell the RO waste to a salt company there should be a back up disposal system for when sales are not feasible. I suggest that until work is done to provide a long term comprehensive disposal for the RO waste fluids that this scheme be held in abeyance.

2) The decrease in groundwater salinity during groundwater pumping at the Winkler Bible Camp swimming pool well is mentioned as a key event and foundation for all of this proposal and the presentation.

   It is not hard to fathom or in fact expect that the salinity of the water would decrease during pumping at this well. The lower brackish zone (greater than 250 mg/l chloride ion) is thin (estimated currently at 40 feet) underneath the Winkler Bible Camp and immediate areas. The screen length for the Bible Camp swimming pool well given on the drillers log as thirty feet or about three times longer than the screen lengths shown on fig.s 24 &31 of the Groundwater Development Plan. The drillers log screen takes up a good portion of the brackish water zone thickness. Thus when the well is pumped, even at the small rate of 50 gpm, the freshwater/ brackish water interface zone moves downward due to the hydraulic forces and lower TDS value water enters the well screen. However; as the well was only designed to be used for a short time interval and small water amount each year the original usage situation has little or no effect on the fresh water capacity of the aquifer. In the Groundwater Development document Fig. 25 shows that near the end of the initial pumping at 50 gpm in 2007

the pumped water TDS had receded to about 1000ppm. Unfortunately there apparently were no other tests until sometime after pumping was restarted at 50 gpm in late February 2008. Therefore no one knows what the aquifer water chemistry in the vicinity of the Winkler Bible Camp swimming pool well screen did over the none pumping period and for that matter a good length of time into the 2008 pumping events. Thus it is improper to show the chemistry of the water produced from the well as being unchanged between the last 2007 sample and the first sample in April 2008. Considering how important the groundwater chemistry in this well was to the proposed Reverse Osmosis water supply pumping scheme; the first thing I would have wanted to know before starting the 2008 pumping was what was the water quality after a long standby interval. The TDS values taken over the 2008; 50 gpm and 100 gpm pumping intervals are presented on figure No. 25. It is noted that some 40 days after pumping stopped a sample showed a significant increase in TDS. From a review of the drillers log, and the pumping and TDS values presented in this document it would appear that the information for the Winkler Bible Camp swimming pool well rather than presenting a technical case for pumping from under the Winkler Aquifers freshwater zone, presents information indicating that pumping of the brackish water from areas with thin brackish water zones would result in actually drawing freshwater from the lower sections of the freshwater zone. This would of course be the converse of the whole idea of Winkler establishing a Reverse Osmosis water treatment system to provide more potable water while maintaining as much as possible the Winkler Aquifer freshwater reserve.

While it is recognized that the occurrence of ground water pumping can move water of various qualities and densities from place to place. The test sites that over the years discovered more intense brackish water in the Winkler Bible Camp swimming pool well area were not sited exactly at the Winkler Bible Camp swimming pool well site. Considering the irregularities of the aquifer bottom and associated water chemistry it is possible that a new test at exactly the old test site now would still discover similar water quality values.

It is my opinion that the so called deep pumping wells proposed for this scheme north of Winkler in the thin brackish water zone underlying the main fresh water body will eventually be basically pumping from the freshwater zone. Of course more extensive testing would have looked at this prospect.

3) Rather than proceeding northerly into the area where the fresh water extends close to the bottom of the aquifer. It would seem sensible to have examined developing brackish groundwater supplies from the aquifer zones southerly from Winkler. In this part of the aquifer the brackish water zone is thickest and would have presented a system where the pumping of brackish water only could be assured; with as little impact on the body of freshwater as possible. In regard to going south from Winkler in developing brackish water supply wells, it is likely that is the area were the Swan River groundwater is mostly flowing into the Winkler Aquifer. Another situation to be considered is that during glaciation and the Lake Agassiz inundation water pressures would have been forcing fresh water through the aquifer back into the bedrock formations. During those times the whole Winkler Aquifer would have been filled with freshwater. Since the draining of Lake Agassiz, these glacial waters

followed by the formation waters have been flowing back into the aquifer; slowly and gradually forcing the freshwater out. The freshwater recharge through the now exposed northern end of the aquifer appears to have at some point prior to the 1960s come into equilibrium with the bedrock aquifer water pressures. In fact the 250 isochlor shown on the profile of the aquifer (Fig. 8) has a very similar shape to that shown along sea coastlines where fresh water is overlying saline water. Developing brackish water pumping wells to the south of Winkler would remove some of the saltier water where it is most prominent and have the least tendency to affect the freshwater supply.

By suggesting moving to the north where the underlying brackish water zone is thinner there is a high possibility of drawing fresher water down into the brackish water zone while pumping and mixing the two together. Thus damaging quantities of freshwater. Also as shown by the Winkler Bible Camp Swimming Pool well data there is a high probability of drawing fresh water from the bottom of the fresh water zone.

4) It seems strange that there were no investigations of the possibilities of the eastern lower sections of the aquifer structure to be used in this brackish groundwater development approach

5) Groundwater Recharge: In looking at the long term usage of the aquifer it must be remembered that on the overall it is the long term average annual water replenishment that counts most. It is true that the Winkler aquifer made a good recovery during the years from 1992 to the peak in the flood year of 1997. While the estimated pumpage did not show any decreases it must be considered that the pumpage rates shown on various charts are estimates. Obviously during good precipitation years, especially rain during the summer season, total pumpage decreases. I do not think many Manitobans have to be told there have been some above normal precipitation years during the last 15. Despite this it can be seen that following the 1997 surge, the water level record for observation well G0OB005; Fig.2, started drawing down again and continued to do so until after the estimated pumping rate graph shows a dramatic decrease in pumping.

6) The presenters compare the Winkler Aquifer water levels to various other aquifer situations in Manitoba. The aquifers used in the comparisons are completely different in scale, structure, hydraulics and recharge potentials. The Sandilands Aquifer is stated to be undeveloped. This aquifer is part of, and provides recharge to, the various aquifer systems that supply water to the area of Manitoba, east of the Red River, south of the Trans Canada Highway and into the Winnipeg area. As such it has actually been under development for over 100 years.

7) The presenters state that M. Rutulis via an internal Manitoba government memorandum of June 6, 1968 gives recharge rates (he used term " sustainable yield") for the Winkler Aquifer of 2600 and 4000 acre feet per year. On the first number, the Rutulis document states an arbitrary recharge area of 40 square miles lying to the west of the Winkler Aquifer (no map showing the area is provided) and a long term average recharge rate of 0.1 feet per annum. Obviously, this was a rough

estimate based on what was known about the aquifer at that time. While it is possible to outline an area on the surficial sand zone to the west of the Winkler Aquifer and assign it a recharge rate; as Mr. Rutulis did, producing a postulated recharge rate many times the long term annual recharge rate estimated later on close analysis. The problem that arises is that the water has to travel slowly easterly through the surficial sand aquifer and enter the Winkler Aquifer. When the slope of the water table, the permeability of the surficial sand zone, the thickness of the surficial aquifer and the width where its groundwater can enter the Winkler Aquifer is considered; actually very little of this surficial sand aquifer water can enter the Winkler Aquifer. The flow into the aquifer is further interfered with by the fact the top and sides of the Winkler aquifer are in most places covered with clays and/or tills. The simplistic hydrogeology diagram shown in fig. 5, of the document occurs, if at all, at very few places. Most of the water recharged to this surficial aquifer sand zone lying to the west of the Winkler Aquifer appears to return to the surface through evapotranspiration processes and/or seepage into the small streams that drain the area.

The value of 4000 acre feet mentioned in the presentation as given in the Rutulis 1968 document refers to the water that Mr. Rutulis postulated could be pumped, without undue brackish water upconing , from a network of 40 wells pumping 50 I.P.G.M each; screened in the upper parts of the northern fresh water zone on ½ mile spacing. This amounts to a total of 2000 I.G.P.M. or nearly 4000 acre feet annually. Fortunately, in my opinion, it was never tried. Such pumping would remove fresh water at a much greater rate than it would be replaced and the declining freshwater levels would allow the brackish water to move gradually northerly and up under this fictional well field. However the main point is that the number of 4000acre feet mentioned by Rutulis, June 6, 1968 has nothing to do with an estimate of the long term average recharge rate to the Winkler Aquifer.

8) The ideas stated in the documents pertaining to artificial recharge using surface water are 4 decades or more old. They are so obvious that they have been discussed many times; but never carried out. Besides the effects on adjacent properties, stream hydraulics, Fisheries and Oceans concerns and other incidentals the procedures, especially the idea of draining surface water into “Paterson Pit”, would be injecting polluted surface water directly into the pristine aquifer.

9) Aquifer testing for brackish/saline Reverse Osmosis water supply source. – This would appear to have been an ideal time to carryout further studies of both the aquifer hydraulics and the effects of the proposed brackish water pumping on the aquifer water quality functions. Very little seems to have been done. No observation wells were set at various directions, distances and depths within the aquifer from it; prior to the starting of the long term pumping of CoW2 deep well. I believe this is necessary work in order to explain what is happening to the various waters within the aquifer at this location. No calculations and detailed interpretations of what occurred during the pumping seem to have been included. Even in the vicinity of the supposedly critical Winkler Bible Camp swimming pool well no additional groundwater level and quality observation wells appear to have been installed. No calculations or interpretations of why the swimming pool well water chemistry changed were found. In short, for such a major water supply conversion and monetary investment by the

City of Winkler it appears the test work and interpretations undertaken are inadequate.

10) No aquifer testing of any kind appears to have been done in the brackish aquifer water body to the south of Winkler.

11) When one reviews Groundwater Development Plan Fig. 37 water quality plot for the well called CoW2Deep, showing a TDS downward change, during the interval Sept.5/08 to Jan 23 /09, a decline in the TDS values is not surprising. However when one also reads the drill log available from Manitoba Water Stewardship Department one notes that the annulus of the CoW2deep well borehole does not appear to have been grouted. If this is the case this permeability opening would certainly affect the water quality coming out of the well. There is no discussion of what various previous well and test holes, in this area, may have done to the local aquifer vertical permeability. This might provide an explanation of the differences in brackish water up coning between production wells CoW 1 and CoW 2; and add to the interpretation of the water quality results from CoW2Deep.

12) No detailed test work, calculations or interpretations of the effects of the proposed new deep wells appears to have been done along the proposed line of deep wells extending northerly from the CoW2 site. One would appreciate seeing what would be the probable water level and water quality effects of prolonged pumping at these proposed wells. Just waiting to see what the wells create; when put into operation, and then trying to fix problems does not seem sufficient.

13) The postulation that the brackish water in the lower and southern parts of the aquifer originated mostly from sitting in silica, carbonate and shale granular deposits for 10,000 years, when directly underneath parts of the Winkler Aquifer brackish zone there is a bedrock sandstone formation containing saline water, that it would be incredible if it was not at various places in contact with the bottom of the Winkler Aquifer; is asking a lot of the reader. Further the fact that there is a pressure gradient in the saline Swan River sandstone aquifer towards the Winkler Aquifer, that sections of sandstone have been drilled into under the aquifer; and it has been estimated that some 175 acre feet of saline water flow out of the sandstone into the bottom zone of the Winkler Aquifer per annum; all lead to the conclusion that the Swan River Formation aquifer has had and continues to have a significant effect on the water quality in the Winkler Aquifer.

14) Section 5.6.2 of the groundwater document presents a discussion of how the brackish and freshwaters flow about amongst each other. While the wording is awkward one has the feeling these postulated processes must be somewhat unusual. No maps or profiles are presented showing these pathways. No charts or plans are presented to show how this works. One of the basics of freshwater overlying brackish or saline water is the Ghyben-Herzberg relationship. Nowhere in this section or for that matter anywhere else in the presentation is this basic theory mentioned.

15) There are several mentions of the postulation that the Swan River Sandstone aquifer waters are not significantly discharging into the Winkler Aquifer. While there will be some reduction in discharge due to the increased elevation of the Winkler Aquifer freshwater potential surface the Swan River is still discharging saline water into the bottom of the aquifer. Everyone can be assured that if the total aquifer pumping increases beyond the long term average annual recharge then the gradual decline in fresh water hydraulic head will cause an increase in discharge from the Swan River aquifer both because of the hydraulic gradients and the Ghyben-Herzberg effects. Of course if there was pumpage of brackish water from the south end of the aquifer the direct removal of brackish quality water will tend to reduce the effects of the increased flows from the Swan River aquifer.

Errata:

While it is a non-technical subject; the documents listed as references presented in the Groundwater Development Plan are really a bibliography of documents related to the Winkler Aquifer. Most of these documents do not appear to have been referenced in the presentations. Seeing as many of the documents are from old internal government or personal files it would have been considerate of the applicants to have included copies of them.

Again a nontechnical matter; the verbosity and duplication, even extending to some figures, of both documents, is almost overwhelming and verges on being an insult to the reader.

Disposition:

Most of these comments can be addressed through licence conditions.

COMMENTS FROM THE TECHNICAL ADVISORY COMMITTEE:

Manitoba Conservation – Sustainable Resource Management Branch

The Sustainable Resource & Policy Management Branch no objection to the current water infrastructure development proposal of installing deep pumping wells to access the Winkler Aquifer.

However, the City of Winkler Integrated Water Sourcing Plan (IWSP) attached to the Class 2 Development License Proposal still lists Sandilands as a potential future water source for the city under IWSP Section C. 2(b). This Branch continues to have concerns regarding this option, and asks for the opportunity to review this plan should it go forward in the future. Our comments on the previous proposal (file 5156) submitted February 6, 2006, and additional comments follow:

- Protected areas proposals covering over 165,000 hectares have been developed in Natural Region 5c, which includes the Sandilands, and are ready for external consultation. Ten proposed ecological reserves and one proposed addition to an existing ecological reserve have also been identified. Many of these sites have

been chosen for their valuable wetland habitats, and may be adversely affected by changes to aquifer function.

- Water Stewardship staff should confirm that no significant effects from construction and operation of the water supply project are considered likely on proposed or existing protected areas including Pocock Ecological Reserve and the Watson P. Davidson Wildlife Management Area.

Disposition:

The comments on the Pembina Valley Water Cooperative proposal do not relate directly to the present proposal. These comments will be placed on the file for the other project for consideration if it is re-activated in the future.

Manitoba Conservation – Environmental Operations, Central Region

The proposal states that the RO Permeate, and the RO Reject Water, will be directed to the existing wastewater facility. Based upon their projections, this would cause the storage capacity of the facility to be exceeded by 2018. This would mean significant upgrades to the facility may be required in only 9 years. The proponent needs to ensure that this is taken under consideration.

Disposition:

Reject water disposal was discussed with the proponent prior to the preparation of the Proposal. The proponent was advised that the disposal of reject water in the City's wastewater treatment system was a short term solution only that would have to be addressed differently within a few years as pumping and therefore reject water volumes increased. This can be addressed as a licence condition.

Manitoba Conservation – Parks and Natural Areas Branch No comments.

Manitoba Water Stewardship – Planning and Coordination

Manitoba Water Stewardship has reviewed the referenced file, forwarded for comment on March 9, 2009. The Department has the following comments:

Introduction

In response to a request to review and comment on a proposal for a Class 2 Development Licence under *The Environment Act* (City of Winkler Water Supply Assessment and Upgrading Program, February 2009), the Groundwater Management Section has carried out a review of the Proposal, the associated Groundwater Development Plan which was submitted to the Water Use Licencing Section to support licencing of the project under *The Water Rights Act*, and other pertinent reports, publications and information.

The City is proposing to develop up to an additional 10 groundwater supply wells installed into the deeper parts of the Winkler aquifer over the next 10 years and to

gradually increase its extraction of groundwater from the aquifer from its current rate of about 550 acre feet per year to about 1510 acre feet per year by 2029. It is proposed to install 7 additional wells through 2016 followed by a comprehensive review of the impacts of this additional development in 2018, prior to a potentially significant increase in pumping beginning in 2019 when the City's existing contract to obtain water from the Pembina Valley Water Cooperative expires. Since the proposal is that the increased withdrawal will be through extraction of brackish water from the base of the aquifer, the proposal also includes the construction and operation of a water treatment plant based on reverse osmosis technology.

In carrying out this review we have examined whether the proposal is likely to be successful as outlined and whether it is sustainable, although the definition of sustainability is subject to interpretation. We have also examined the proposal to determine whether it is backed by firm science, what uncertainties exist, and whether there has been a consideration of other options within the broad framework of what is being proposed.

In providing our comments we note that the review we have undertaken is more lengthy and comprehensive than is normal for such proposals, to the extent that many of the comments and analyses go beyond what is needed for an Environment Act review. This has been undertaken because the supporting documents for the proposal include a re-assessment of the hydrogeology of the aquifer which has lead the proponent to the conclusion that the aquifer can be sustainably pumped at up to 1,510 acre feet per year to supply water to the City of Winkler (somewhat higher if we consider all users of the aquifer). This is considerably in excess of the current estimate of the long-term sustainable fresh water yield of about 400 acre feet per year based on recharge estimates made in the late 1980's. In view of this, we felt that detailed commentary on the proponent's analysis was needed to provide the background to our conclusions and recommendations.

As a final introductory comment, while the City is currently the only licenced groundwater user on the aquifer, other users of either the fresh water or saline/brackish water component of the aquifer may apply for licences in the future should continued evaluations show that the sustainable fresh/brackish/saline water yield of the aquifer exceeds that allotted to the City. Evaluation of this proposal must be done in light of the potential for other future users. Water quality impacts from the proposed development, while they may be acceptable to the proponent with their use of a reverse osmosis treatment process, may not be acceptable to future users who may wish to abstract only fresh water from the aquifer.

Conclusions and Recommendations

It should be recognized that, despite more than 40 years of study, there continue to be significant and even fundamental aspects of the hydrogeology of the aquifer that are not well understood. As well, many aspects of the current proposal have not been subject to

any rigorous analysis (for instance, the development of a digital model of the aquifer and simulations of the proposal and other development scenarios), nor have alternate development scenarios or variations on the current development scenario been presented (for instance, higher rates of brackish water development in areas where the brackish water zone is thickest or increased development of fresh water in conjunction with enhanced/artificial recharge). It should also be pointed out that the proposed rates of groundwater withdrawal from the aquifer by the City and other users over the next 20 years will significantly exceed estimates of rates of recharge to the aquifer that have been presented in the literature or observed in parts of the 40-year record of monitoring, including much of the period from the late 1970's through to the early 1990's. Development of the aquifer at these proposed rates relies on the water level declines that will occur in the drier years being compensated for by periodic spells of very substantial recharge during wetter periods (as happened in the mid-1990's), by an increased influx of saline water, or through enhanced (artificial) recharge.

It must also be clarified that the proposed development of as much as 1120 acre feet per year of "brackish" groundwater from the aquifer is "smoke and mirrors". The saline, brackish and fresh water components of the aquifer are fully inter-related and grade from one to the other. It is not possible to withdraw brackish water from many parts of the aquifer without also withdrawing a fresh water component from the aquifer – the brackish water is mostly fresh water with a minor saline water component and pumping from the brackish water zone will create flow lines that will draw fresh water down into well screens set in the brackish water zones. This situation will change and evolve over time. Consequently, one cannot licence the withdrawal of specific volumes of brackish water as a discrete entity separate from fresh water for much of the northern part of the aquifer where the brackish water zone is relatively thin, as is presented in this proposal. Brackish water could however be withdrawn as a separate component in areas where the brackish zone is very thick or where the entire aquifer thickness is occupied by brackish or saline groundwater.

To address the concerns and comments outlined below with respect to the sustainability of the proposal and the gaps in understanding of the hydrogeology of the aquifer, we would recommend the following as conditions of any licence:

- Licencing of additional groundwater withdrawal as proposed be initially for a period of 3 years (installation of 3 wells) and that initial development occur in areas where the thickest zones of brackish water are thought to exist. Licencing of development beyond the initial 3 year period should be dependent on submission of a new or supplementary proposal which summarizes monitoring results from the initial development and presents an analysis of further development options supported by modeling studies.

- The proponent be required to provide a detailed proposed groundwater monitoring program setting out the objectives of monitoring and how the proposed program will meet those objectives. In particular, the proposed groundwater monitoring program should address what additional monitoring

would be needed to observe water quality impacts from development of the deeper zones of the aquifer. This monitoring program should be submitted to the province for review and approval prior to the installation or pumping of any deep wells. Discussion among interested parties is encouraged in the development of the monitoring program so that continued operation of the existing monitoring network by Water Stewardship is incorporated into a broader monitoring program. Any agreements should be in writing and attached to the Licence.

- That the City participate with other partners to plan and conduct additional applied research to gain greater understanding of the aquifer and an enhanced ability to predict expected water level and water quality responses to development of the aquifer as it proceeds.

- That the City participate in the development of a digital groundwater model to allow simulation of the impacts of future development and a better understanding of the overall groundwater conditions (this was originally proposed by F. Render in 1987 and was included as a recommendation in the 2008 City of Winkler Water Sourcing Plan). This model should be developed, calibrated and applied within the recommended initial 3-year licence period.

- That by the end of the third year of development (3 wells into the "brackish water zone and withdrawals not to exceed 306 acre feet per year) the proponent will provide an evaluation of various reasonable scenarios for continued development, including the installation of new wells into the saline water portion of the aquifer.

- That by the end of the third year, quantitative assessments be made of current enhanced recharge efforts to the aquifer to evaluate their effectiveness. Within this 3-year period the proponent should also provide a thorough evaluation of the potential for enhanced recharge of fresh water by mechanisms suggested in the proposal (and other reasonable methods), including the use of a digital groundwater model in this evaluation.

Given the complexity of groundwater monitoring and that monitoring of both water levels and water quality is required, it is recommended that monitoring conditions be included in the licence under the Environment Act.

Groundwater Monitoring, Applied Research, and Development of a Digital Model – Interaction between the Proponent and the Groundwater Management Section of Manitoba Water Stewardship

The current proposal has raised a number of issues that in part relate to the applied research work the Department has carried out on the aquifer for the past several decades and the development and operation of a groundwater monitoring network within the

aquifer. Interaction between the proponent and the Groundwater Management Section would be valuable in a number of areas, including:

- **Groundwater Monitoring:** The proponent has reviewed the current groundwater monitoring network for the Winkler aquifer and has concluded that this network would generally be adequate to monitor impacts from the proposed additional development. The Department is not necessarily in agreement with this assessment as the existing network was set up to observe impacts from fresh water development from shallow well while the current proposal would result in the installation of 10 additional wells withdrawing brackish water from the deep part of the aquifer. Consequently the Department has requested a more thorough monitoring proposal be developed. The proponent has suggested that the province continue to operate the existing observation network and install additional observation wells to undertake "research" but should the proponent decide that additional monitoring is needed to observe near-field effects or perhaps 3rd party effects from the development that the City would install and operate these wells. The province would continue to provide Winkler with the results from our groundwater monitoring and these results may/would be included in the annual monitoring summary the proponent would provide to Manitoba Conservation and Water Stewardship to satisfy monitoring requirements that are expected to be included in the licence.

  Since both the proponent and the province share an interest in continued monitoring at both the local and aquifer scales, responsibilities for current and additional monitoring made necessary by further development should be shared. Discussions should be held among all interested parties and a formal written agreement on monitoring should be developed within the proposed 3-year initial licence period and attached to the Licence.

- **Digital Groundwater Model:** The development of a groundwater model for this aquifer may prove very useful in providing an improved understanding of recharge and fluid flow plus water quality issues and would also provide a mechanism for examining long-term impacts from this or other groundwater development schemes. A model would also be very useful in evaluating options for development, not only for the option currently on the table, but other development options as well. Consequently, the City and the Province share a common interest in the development and application of a digital groundwater model.

  The province has verbally committed to developing a digital groundwater model for this aquifer within the next 2-3 years and is prepared to proceed on this time scale. Discussions between the City and the Province on this issue should be undertaken with the intention to come to an agreement on the need for a model and shared responsibility for model development and application.

- **Additional Applied Research:** Additional applied research is needed to address science gaps as described in more detail below. The province is committed to additional study of the overall dynamics of the aquifer since, by studying this very

complex aquifer and its responses to development in greater detail, we will learn how to address similar issues (sustainable development under changing climatic conditions; responses to fresh water and/or saline water development; etc) with other aquifers and other development proposals. Since the City is expected to be the major groundwater user on the aquifer and, should this proposal proceed, they will be undertaking a very complex development of a large part of the aquifer, the Department considers it appropriate that the City be participants in the development and implementation of additional research programs.

Comments on the Scientific Aspects of the Proposal

In this part of the review we will provide comments on the scientific/technical components of the proposal in order to give some background to the recommendations and policy questions presented above and also to point out areas where significant scientific issues remain or where weaknesses in the current proposal may exist. We would like to say in presenting these comments that the review and analysis of aquifer conditions by the proponent's consultant was well done and has resulted in an improvement of our overall understanding of the aquifer.

Integrated Nature of Fresh and Brackish Water

Although brackish to saline water is found at the base of the Winkler aquifer throughout much of its extent, this brackish or saline water should not be regarded as a "separate" component of the groundwater system. In the same way that saline water may upwell beneath the existing shallow fresh water pumping wells, fresh water will also form a component of any brackish water pumping that will occur. This occurs in two ways: first, the brackish water is a mixture of fresh and Swan River Formation water and secondly some of the flow lines converging on a well screen installed in the deeper part of the aquifer will originate in the fresh water zone. There is no uniform composition to the brackish water – its quality varies naturally from location to location and will also vary over time as pumping proceeds. Consequently, one cannot separate out the licencing of fresh water withdrawal from the licencing of brackish water withdrawal nor can one examine the sustainable yield of the aquifer without considering the withdrawal of both fresh and brackish groundwater. The proposal is to withdraw 400 acre feet of "fresh" water and 1,100 acre feet of "brackish" water by the end of development; however, since the fresh and brackish water are part of a continuous system there would appear no reasonable way to withdraw one or the other, particularly since the proposal indicates that many of the "brackish" water wells will be installed in areas with relatively thin "brackish" water zones.

Source of the Brackish to Saline Groundwater

In a number of places in the reports the proponent refers to brackish groundwater quality developing as a consequence of the residence time of the water in the aquifer – brackish waters developing through long residence times. For most major dissolved constituents

in groundwater in a sand and gravel aquifer such as this we find that rock/water equilibrium is established fairly quickly and, unless the groundwater comes into contact with other soluble geologic units, the general water quality and total dissolved solids content will remain relatively stable. Brackish to saline groundwaters in the Winkler aquifer should be considered to originate through direct influx of groundwater from the Swan River Formation followed by subsequent mixing with fresh groundwater. While the brackish groundwaters may in fact tend to be older than the fresh groundwaters, the elevated dissolved solids content is not a consequence of the age of the water. It should be noted that the component of Swan River Formation water in the brackish groundwaters found at the base of the aquifer is relatively small – most of this brackish groundwater originated as fresh water recharge to the aquifer.

No Analysis of Joint Pumping Situation

The proposal to install a deep brackish water well very close to a fresh water well and pump both at the same time or at different times was not fully addressed. If both wells are pumped at the same time the flow lines surrounding each well will be very different from the flow lines developed when one or the other well is pumped independently. Water quality from each of the two wells would then be expected to be quite different if pumped together or pumped separately. For instance, by pumping both wells at the same time the potential for upwelling of brackish water due to pumping of the shallow well may be significantly reduced. At the same time there may be a lessening of the influx of fresh water to the deep well. This type of pumping scheme, where both wells are pumped simultaneously, may enhance the ability of the two water types to be extracted with a minimization of mixing of groundwaters of various qualities in the aquifer.

Test Pumping Near City of Winkler Well #2

The improvement in water quality noted in the installation and pumping of the deep well near City Well 2 in 2008 is explained as a removal of brackish water and its replacement with fresh water. Obviously the pumping of brackish water results in a loss of that water from the system which can be replaced by fresh water but in areas where broad regions of brackish to saline water are present, the water quality improvement observed during pumping from depth in the aquifer is likely a local effect related to flow lines from the upper fresher water portion of the aquifer converging on the well screen as well as flow lines from the poor water quality zone. Essentially the pumping is inducing a withdrawal of both fresh and brackish water which is resulting in the water quality change. While this results in local addition of fresh water to the brackish water system in the vicinity of the well screen this is a different view than is presented by the proponent of more wholesale water quality changes occurring in the system.

Management of Water Quality by Pumping Adjustments

As discussed in the reports, the current method of maintaining water quality in the 10 well system is by making adjustments in individual well pumping durations while closely monitoring water quality. These adjustments are necessary since the wells are subject to

water quality deterioration over time due to upwelling of brackish water at depth. It is proposed to continue a similar process with the addition of up to 10 additional "brackish" water wells, each of which will likely have their own characteristic original water quality and changing water quality with time. Maintenance of system water quality will be considerably more complex with up to 20 wells in the system. In addition, if both shallow and deep wells are pumping the time-varying water quality characteristics of each of the wells may be quite different than if one or the other well is pumping. The current proposal is to get the system running and figure it out later. This seems a bit cavalier – including in the proposal some discussion about developing a more science or engineering based method to control system water quality would seem appropriate. For instance, development of a software system with sensors monitoring the water quality being produced from each well may be a very worthwhile way to go to minimize water quality fluctuations in the system.

Potential for Enhanced (Artificial) Recharge

There are a number of areas of the proposal where reference is made to "simple and inexpensive" methods for enhancing the amount of fresh water recharge to the aquifer, including the current snow trapping in part of the primary recharge area. While conceptually simple, no estimates of the amount of enhanced recharge that may occur or demonstration that this recharge would be available for withdrawal from the existing and proposed well network has been provided (except in the case of the snow trapping experiment where a potential recharge enhancement number has been provided but there has been no detailed work undertaken to determine whether this experiment has in fact been successful and, if so, what actual additional amount of recharge has occurred to the aquifer and the variability of additional recharge from year to year). While it is perhaps unreasonable to expect presentation of firm numbers at this time, since these recharge enhancement measures are being presented as a future solution to lower water levels we should have some reasonable measure of assurance that the proposals will in fact be effective. Some commitment to investigate these proposed recharge enhancement schemes in additional detail over some years as part of additional applied research is recommended.

Winkler Bible Camp Deep Well

A considerable emphasis has been placed on the freshening of groundwater that has been observed during pumping of the Bible Camp deep well used to fill the swimming area. A test hole drilled in 1975 (at a time when water levels in the aquifer were high) found saline water at the base of the aquifer (indicating a "direct" connection with the Swan River Formation) very near this well yet when the deep Bible Camp well was drilled the water at the base of the aquifer was only somewhat brackish and became fresh during pumping. The proponent has proposed that fresh water recharging at or near Deadhorse Creek has somehow moved downward and displaced the saline water at depth and that this has occurred as a result of the installation of City of Winkler supply wells 7 to 10. A very unusual local flow system is proposed. Age dating by the province using tritium (pre- or post-1953) has in fact found tritiated waters to near the base of the aquifer near Deadhorse Creek diversion which, while puzzling, may support the flow model being

proposed. Nonetheless, there are very large unanswered questions in this model such as how the saline water has been removed from the aquifer, why no additional saline water has entered the aquifer assuming this is an area with a very direct connection between the Swan River Formation and the Winkler aquifer. If this was the case then a large volume of saline water should have entered the aquifer in this area between the late 1970's and the early 1990's when water levels were low. The loss of the saline water would indicate a very active influx/outflow system for the saline water. Why then, if the pumping of the City wells is inducing fresh water flow over large distances in the deeper parts of the aquifer (indicating a lowering of head at depth) hasn't saline water continued to intrude as pumping occurs? While the proponent has suggested an innovative answer to these questions, some additional quantitative study or examination of this proposal would be well worth the effort as part of additional applied research on the aquifer.

Deadhorse Creek and Diversion

The discussion on pages 18 and 19 of the Groundwater Development Plan examines the role of Deadhorse Creek and the Deadhorse Creek Diversion on aquifer recharge and discharge. While a surface water/groundwater connection very likely exists in this area, it appears that the role of these surface water bodies has been overly-emphasized. Recharge and discharge from relatively short reaches of the creeks will likely have only local impact in most years. If Deadhorse Creek and the Diversion are the main avenues for groundwater to discharge from the aquifer and the base of these water bodies are about elevation 271-272, then why did we see a continued decline in groundwater levels in the aquifer to about 269.5 m in the early 1990's? This could reflect water level declines due to pumping but the proponent has indicated that long-term water level changes are a response to changes in precipitation patterns and are not significantly influenced by pumping. An examination of recharge and discharge rates from the base of the creek using direct flow measurement devices would be a useful addition to our understanding as well as examination of the role of the Creek and Diversion using a digital groundwater model.

Recharge and Aquifer Sustainability

The proponent has presented a lengthy discussion of recharge to the aquifer which merits comment and discussion. Fresh water recharge estimates have ranged from about 190 acre feet per year during pre-development conditions to 338 acre feet per year in the late 1980's (Render, 1987) while in the late 1960's Rutulis had made much less justifiable estimates of potential recharge rates (or groundwater development rates) in the range of 2,000 – 4,000 acre feet per year. Render (1987) also included estimates of saline water recharge to the base of the aquifer, derived from a water balance argument. In this proposal the proponent has chosen to focus on the much more optimistic numbers given by Rutilus rather than the estimates by Render which are much less than the requested withdrawal rates for year 20 of 1,510 acre feet per year.

Past management practices have roughly equated fresh water recharge to the aquifer with sustainable yield but difficulties have arisen with this approach since long-term hydrographs have shown that recharge rates to the aquifer vary considerably from year to

year and in fact may show lengthy periods of little recharge or very significant recharge. As pointed out by the proponent, managing withdrawals from the aquifer based on estimates of average annual recharge rates may not be an optimum approach as, even after long periods of water level decline, the aquifer can "fill up" during periods when recharge is plentiful. This was observed in 1992-1997 when water levels in OB-005 recovered above 272 m after 18 years of almost continual decline. This water level recovery took place during a time when the estimated fresh water withdrawal from the aquifer ranged from 900-1,100 acre feet per year – recharge rates to the aquifer must have been substantially higher than pumping rates for water levels to rise about 0.4 m/yr during this period. Conversely, during the period from about 1975 to 1992 water levels in the aquifer were in a state of almost continuous decline. In many years there was only a very small rise in water level during the spring, indicating that recharge rates were very low, likely approaching no recharge at all in some years and groundwater withdrawals were significantly in excess of the natural recharge rate.

Pages 16 and 17 of the Groundwater Development Plan discuss whether long-term trends in water levels in the aquifer are primarily related to pumping or to changes in precipitation patterns. While on the one hand arguments have been made in the Plan that there is very limited natural discharge from the aquifer, implying that the primary manner in which groundwater is lost from the system is through pumping, the similarity of the OB-005 hydrograph with the hydrograph from the Sandilands (no significant groundwater development) is used to say the opposite – that pumping impacts are relatively small ("pumping of the Winkler Aquifer is not having a significant effect on groundwater levels within that aquifer"). This would indicate that large volumes (much greater than pumping rates) of water can discharge from the aquifer naturally. Hydrograph response does appear to support this premise to some degree, through both long-term and shorter term trends. There would appear to be some fundamental lack of understanding of groundwater dynamics in the aquifer if this is the case – we cannot treat the aquifer as a bathtub that overflows on occasion. Unfortunately, this also implies that we cannot estimate recharge rates to the aquifer based on pumping volumes during periods when water levels in the aquifer are more or less stable (ie: we cannot estimate the natural discharge component).

Some additional comments on the recharge/discharge arguments presented in the proposal include:

- If the primary natural discharge location for the aquifer is Deadhorse Creek at elevation 272 m, and we accept the argument on page 17 that pumping has little impact on groundwater levels in the aquifer, how do we discharge large volumes of water that must have been lost from the system between 1976 and 1990 when water levels in the aquifer were below 272 m but water levels receded (except during 1986/87). We also see a fairly rapid decline after recharge peaks during this period, comparable to what we see when water levels are above 272 m. This would seem to imply that very active natural discharge can continue even when water levels at OB-005 are around 269 m. We don't know whether the water level stabilization from 1989-1992 was as a result of a cessation of natural recharge or from a balance between recharge and natural/pumping discharge.

- The long-term period of recession from the mid-1970's through to the early 1990's indicates that under the climatic conditions of that period, significant amounts of additional recharge were not induced into the aquifer as a consequence of low water levels. In fact, the lack of spring water level rises in some years indicates that very little if any recharge occurred. This does not support the proponent's argument that a water level decline in the aquifer would allow more recharge water to enter the aquifer and therefore increase average recharge rates. This can occur in those years when recharge conditions are good but as we have seen, there can be very extended periods where little recharge may occur and, if pumping withdrawals are in fact the major component of groundwater loss from the aquifer, increasing pumping rates to 1,000+ acre feet per year during an extended period of low recharge may result in water level declines below 269 m. Refilling the aquifer should this happen may require an extended period of highly favourable recharge conditions.

- The comment that the aquifer "rejects recharge" when water levels are high is an unfortunate phrase in that it implies that the aquifer does not allow recharge to occur during these periods. In fact, even when water levels were at historical recorded highs during the late 1960's we observe very significant recharge peaks in many years. This recharge is lost through natural outflow, pumping withdrawals, and evapotranspiration where the water table is very near the ground surface. The aquifer would only "reject recharge" during those times and at those locations where the water table actually rises to ground surface and infiltration cannot occur.

The conclusion developed by the proponent is that the withdrawal of brackish and fresh water from the aquifer at a rate of 1,500 acre feet per year would be "conservative and safe". This assessment is based on several arguments. However, the water level or sustainable water withdrawal part of the argument (ignoring influx to or outflow from the Swan River Formation) draws primarily from the observation that, even though withdrawal from the aquifer was ~900-1,100 acre feet per year from 1993-1997, water levels during that time recovered close to pre-development elevations (1960's levels) following almost 20 years of decline from 1974 to 1992. It should be noted that precipitation during 6 of these 7 years from 1992-1998 was above the long-term average (not a return to "normal" levels of precipitation as stated in the reports). Recharge to the aquifer during this period of water level recovery must therefore have been greater than the withdrawal rate (*i.e.* more than 1,000 acre feet per year). Whether the recharge rate was in fact 1,500 or more acre feet per year during this period was not addressed. It should also be noted that water levels in the aquifer have remained close to or above 272 m since 1996 even though pumping withdrawal is estimated to have been about 1,000 acre feet per year through 2001. Depending on how much natural discharge may be occurring during this period, average recharge must certainly be 1,000 acre feet or more.

In summary then, recharge rates to the aquifer are highly variable on a year to year and even decade to decade basis. There continues to be debate as to the relative importance of natural precipitation fluctuations vs. pumping withdrawals in controlling long-term water level changes in the aquifer. Understanding these issues is important in assessing the long-term sustainability of the project. A much improved understanding of aquifer dynamics and responses to future climatic variations under increasing artificial

groundwater withdrawals could be addressed very well by use of a properly developed digital groundwater model.

Water Quality Impacts

The proponent has stated in a number of instances that water quality deterioration in the aquifer has been localized and no broader water quality deterioration has occurred even in response to 18 years of generally declining water levels from the 1970's to the early 1990's. Our interpretation of the existing water quality information is somewhat different and was presented in a paper in 2007. We note that there is considerable evidence for water quality degradation during the 1980's that, even after 15 years of water level recovery, has not yet returned to 1960's conditions. As well, much of the existing monitoring network was established in the 1990's and so can only provide us with information on what has occurred during a period of generally elevated water level and recharge conditions. It would appear that water level declines do result in increased salinity in at least parts of the aquifer. The proponent may be able to address the salinity increase through pumping of the lower aquifer zone but this would require a quite sophisticated approach to monitoring and pumping, something which the current proposal does not include.

Variations on a Theme – Other Options For Saline Water Development

The proposal includes the development of up to 10 brackish water wells with each of the 10 wells proposed to be located near an existing shallow municipal well. It is assumed that the water quality at each of the deep brackish water wells will be similar to that found at Deep Well #2 although it is recognized that this is presented for planning purposes only and distinct differences in water quality may occur and are in fact expected at different sites. The proposal also states that each of the deep wells will be constructed in a similar manner and pumped at 6.4 L/s.

Given that the hydraulic conductivity of the lower aquifer materials will vary from site to site as will the vertical fluid conductivity distribution (and thickness of the brackish water zone), this "one size fits all" approach is questionable and some attempts at optimization should be considered. Optimization could be defined as a process where pumping is done in a manner that most efficiently allows brackish water wells to withdraw brackish water and fresh water wells to withdraw fresh water with the least mutual interference, or a process that minimizes cost while achieving the objectives. Optimization in the context of what is being proposed could include higher pumping rates in those areas where a thicker or more permeable brackish water zone may exist, installing the deep wells only in those areas where the thickest brackish water zones exist and not installing deep wells where only thin brackish zones are found, or analysing the optimum design of fresh water and brackish water wells. Optimization could be approached through analysis based on current understanding and the drilling of additional test wells at proposed deep well locations to gather information on water quality and permeability distribution. Rather than the approach being "let's put the wells in and we'll figure it all out later", we recommend that more effort be put in at the start. The development and use of a digital model of the aquifer would be a very positive approach in this regard.

Another option would be to install at least some of the brackish water wells into the saline part of the aquifer. These wells would produce water of a consistent quality making decisions about how to achieve an overall water quality within the range acceptable for efficient operation of the RO unit much easier to make. Such wells would also remove the considerable uncertainty that continues to exist about conjunctive fresh water and saline water development in the northern part of the aquifer.

- *The Water Rights Act* indicates that no person shall control water or construct, establish or maintain any "water control works" unless he or she holds a valid licence to do so. "Water control works" are defined as any dyke, dam, surface or subsurface drain, drainage, improved natural waterway, canal, tunnel, bridge, culvert borehole or contrivance for carrying or conducting water, that temporarily or permanently alters or may alter the flow or level of water, including but not limited to water in a water body, by any means, including drainage, OR changes or may change the location or direction of flow of water, including but not limited to water in a water body, by any means, including drainage. If a proposal advocates any of the aforementioned activities, an application for a Water Rights Licence to Construct Water Control Works is required. Application forms are available from any office of Manitoba Water Stewardship.

    - The *Environment Act* Proposal indicates a proposed installation of a water control structure in Deadhorse Creek to elevate surface water levels within the creek and provide recharge to the aquifer or the diversion of North Shannon Creek to an existing pit (Patterson Pit) which would recharge the aquifer. Prior to commencing construction of a "water control work," the proponent is required to submit an application for a Water Rights Licence to Construct Water Control Works, including the submission of an engineered drainage plan, prepared by a Professional Engineer, registered to practice in the Province of Manitoba.

        - A contact person is Mr. Geoff Reimer C.E.T., Senior Water Resource Officer, Water Control Works and Drainage Licensing, Manitoba Water Stewardship, Box 4558, Stonewall, Manitoba R0C 2Z0, telephone: (204) 467-4450, email: geoff.reimer@gov.mb.ca.

- The proponent needs to be informed that if the proposal in question advocates any construction activities, erosion and sediment control measures should be implemented until all of the sites have stabilized.

- The Department may provide comments pertaining to hazard lands at a later date. Currently, the Department's hazard land personnel are seconded to the emergency flood coordination efforts.

- Pipeline Construction:

- One section of the proposal indicates that none of the proposed project works will occur within 100 metres of water body, stream or wetland. This implies that none of the proposed pipeline will cross any of the surface waters within the project area. Deadhorse, Shannon and Buffalo Creeks and Hespeler and Rosenheim drains are the more significant surface waters in the area. While the proposal indicates these creeks/drains provide marginal fish habitat as they have been extensively channelized and other than during spring there is minimal flow; they can and do provide spring spawning and nursery habitat when flows are high enough and of a long enough duration. The Department needs verification pertaining to stream crossings in this project. If stream crossing are planned, then the following conditions would apply:

    - The Department prefers that any crossing—for a defined channel with water throughout the year or enough water during the spring runoff to provide spawning and nursery habitat—is directionally drilled: regional fisheries staff have found watercourse crossings that are trenched are often difficult to stabilize and result in ongoing erosion and sedimentation.

    - If stream crossings are trenched, this activity shall occur outside of the spring spawning window of April 1st to June 15th and not during other "wet" periods.

    - The creek/drain bank and bed must be returned to pre-construction elevation.

    - Appropriate erosion and sediment control measures are to be utilized before, during and after construction until the sites are stabilized.

    - The crossings need to adhere to Operational Statements of the Department of Fisheries and Oceans Canada or be reviewed by the Department of Fisheries and Oceans Canada.

- The *Environment Act* Proposal notes that the proponent will conduct long term monitoring of wastewater treatment facility and its discharge to verify a lack of impact on water quality.

    - Details of this proposed monitoring plan should be provided by the consultant. In particular, the impact of the reject water on salt levels in the wastewater being discharged, should be fully evaluated. Elevated salt levels in the downstream waterways could impact any downstream irrigation users. The proposal has not presented information on expected changes in water quality in the wastewater effluent. Opportunities to

minimize nutrient loading from the wastewater treatment facility should be fully investigated.

- Water conservation measures should be implemented fully to both minimize aquifer withdrawal, and to reduce the loading of reject water to the wastewater treatment facility and the subsequent receiving environment.

- The City of Winkler has applied for a Water Rights Licence to withdraw water from the brackish lower zone of the aquifer in the amounts stated in the *Environment Act* Proposal.

- If one of the licensing conditions in an *Environment Act* Licence is to monitor "salinity" concentrations in the raw water at the individual well heads, the Department requests that an *Environment Act* Licence shall include the following requirement:

    - Monitor temperatures in the raw water stream at the individual well heads (before the water enters a pipeline).

Disposition:
Recommendations concerning licence conditions can be addressed as suggested.

Historic Resources Branch No concerns. If at any time however, significant heritage resources are recorded in association with these lands during development, the Historic Resources Branch may require that an acceptable heritage resource management strategy be implemented by the developer to mitigate the affects of development on the heritage resources.

Disposition:
These comments were provided to the consultant for information.

Mines Branch No concerns.

Infrastructure and Transportation - Highway Planning and Design Some components of the proposed development are located adjacent to PTH 3, 14 and 23 and Provincial Road (PR) 428. As such , the proponent should be informed that any new, modified or relocated access connections onto PR 428 and PTH 3, 14 and 23 will require a permit from Manitoba Infrastructure and Transportation (MIT) (including changed use in access). A permit will also be required for any construction (above or below ground level) within 38.1 m (125 ft) or for any plantings within 15.2 m (50 ft) from the edge of right-of-way of PR 428 and 76.2 metres from the edge of right-of-way of PTH 3 and 14.

A water line agreement will be required from MIT prior to placing and water supply lines within the right-of-way. MIT prefers that an underground agreement be obtained prior to tendering any proposed installation. Detailed design drawings will be required to be submitted for the department's review.

If additional information or clarifications on these requirements are required, the applicant can contact Karen Toews, A/Senior Access Management Analyst at telephone number (204) 945-0324 or Mr. Prokopis Papadimitropoulos, Regional Technical Services Engineer at telephone number (204) 781-7586.

Disposition:

These comments were provided to the proponent's consultant for information.

Intergovernmental Affairs – Community Planning Services Branch

No comments or concerns.

Canadian Environmental Assessment Agency I have completed a survey of federal departments with respect to determining interest in the project noted above. I can confirm that the project information provided has been reviewed by all federal departments with a potential interest. I am enclosing copies of all the responses for your file.

Based on the responses to the federal survey, the application of the Canadian Environmental Assessment Act (the Act) may be required for this project. Through the delivery of the Communities Component of the Building Canada, Western Economic Diversification (WD) may provide federal funding to this project. In addition, Fisheries and Oceans Canada (DFO) requires further information on surface water flow and level impacts to major creeks and drains as well as fish and fish habitat surveys on noted creeks and drains to determine their environmental assessment responsibilities for this project.

Please also note the following:

- Environment Canada (EC) has provided comments for consideration in the federal and provincial environmental assessment review processes. (See attached letter).

- Health Canada (HC) possesses specialist advice that may be relevant to the project, if specifically requested (letter attached).

- Natural Resources Canada (NRCan) may provide pertinent expertise to a Responsible Authority if requested in writing as outlined in the letter attached.

Environment Canada – Environmental Protection Operations, Prairie and Northern Region:

Environment Canada (EC) received a copy of the above proposed project from the Canadian Environmental Assessment Agency for review. EC has no trigger under section 5 of CEAA, however, is providing comments in the provincial review of the proposed project consistent with the intent of Clause 62 of the new Canada-Manitoba Agreement on Environmental Assessment Co-operation.

Environment Canada has reviewed the above project description proposed by City of Winkler for the construction and operation of a water supply system upgrade for the City.

EC provides the following comment:

The Environment Assessment stated that Reject water from the treatment plant containing elevated levels of iron, sodium, chloride and dissolved solids would be discharged to the storage cells of the City's wastewater treatment lagoon and eventually discharged to the Deadhorse Creek. The proposal did not specify any mitigation measures or treatment to address this increase in iron, sodium, chloride and dissolved solids concentration in the reject water. Discharge of the reject water without treatment will likely cause an increase of ion concentration in the Deadhorse Creek. There are technologies available to reduce or eliminate such loading from reject water before its discharge to a receiving water body.

The proponent should be aware that section 36(3) of the Fisheries Act states that: "Unless authorized by federal regulation, no person shall deposit or permit the deposit of deleterious substances of any type in water frequented by fish, or in any place under any conditions where the deleterious substance, or any other deleterious substance that results from the deposit of the deleterious substance, may enter any such water".

Disposition:

The disposal of reject water from the Development can be addressed through licence conditions.

ADDITIONAL INFORMATION:

Additional information was requested on May 8, 2009 concerning the reject water pipeline from the proposed water treatment plant. A satisfactory schematic showing the location of the pipeline was received the same day.

PUBLIC HEARING:

As no requests were received for a public hearing, a public hearing is not recommended.

RECOMMENDATION:

All comments received on the Proposal requiring follow up have been provided to the proponent's consultant for information or can be addressed as licence conditions. It is recommended that the Development be licensed under The Environment Act subject to the limits, terms and conditions as described on the attached Draft Environment Act Licence. It is further recommended that enforcement of the Licence be retained by the Environmental Assessment and Licensing Branch, to be reviewed following approval of the project assessment report after three years of operation of the Development.

Update: following a review of Technical Advisory Committee comments on the draft Licence, several clauses were modified to reflect suggestions by the Central Region and Manitoba Water Stewardship. Where practicable, suggestions were incorporated as received. Some suggestions were not followed where they conflicted with normal practice or other regulatory jurisdictions. All issues noted will be reviewed by the Environmental Assessment and Licensing Branch as operating data and performance information becomes available.

PREPARED BY:
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