Questions from the RM of Springfield re the Floodway Expansion Environmental Assessment

1. Pre-existing agreements

No information is provided on the pre-existing agreements that facilitated construction of the original Floodway. As a consequence, it is not possible to make any judgments as to the degree to which the obligations under those agreements have been discharged and how the proposed project fits within that framework. Please provide copies of the relevant agreements among Canada – Manitoba and the municipalities that abut the route, along with an analysis of the degree of compliance with those agreements.

2. Cumulative Effects

The methodology employed for the EIS was to consider the impacts of expansion only. It stated that *"Existing or past projects ---- were considered as part of the evolving 'baseline',* hence no consideration was given to pre-existing effects. This is an important consideration since it minimizes the scope of consideration of the cumulative effects in that the expansion is considered as an isolated, stand-alone project, not incorporating any of the pre-existing or ongoing impacts of the original project.

This approach appears to be counter to the intent of CEAA and the EIS Guidelines, which state that the EIS should examine (p. 1A-7):

> "*Cumulative effects of the Project that are likely to result from the Project when its effects are considered in combination with the effects of other projects or activities that* ***have been*** [italics added for emphasis] *or will be carried out".*

The CEAA Practitioners Guide, as quoted on p. 2-7, outlines that:

> "*Cumulative effects are changes to the environment that are caused by an action in combination with other past, present and future human actions –".*

By ignoring the contribution of past and future human actions in constructing the Existing Floodway and expanding it in the future, the EIS presents a very narrow and simplistic overview of project impacts, particularly with respect to the groundwater systems and the resulting physical and socio-economic impacts. The interpretation of cumulative effects adopted for this EIS is unusually narrow and does not allow full interpretation of the project impacts. This is of critical importance to the consideration of groundwater issues, particularly since the environmental impact of the project has never been examined in a formal fashion.

Please provide the regulatory precedents for justification of the narrow interpretation of the scope of cumulative effects and demonstrate how they are applicable to consideration of the regional groundwater and other impacts of this project.

3. Blowouts and Groundwater Discharges

The current conditions along the channel are described in the EIS (App N p. 1-6) as follows:

> *"The thickness of lacustrine clay below the Channel Invert is up to 10 m (33 ft) near the Floodway Inlet, decreasing to 1 or 2 m thick locally between Highway 59 south and Trans-Canada Highway crossings.* ***The till unit is exposed in the Floodway Channel bottom for a 2 km section from south of Highway 15 (Station 25+000) to Cook's Creek, a 2 km section north of the Keewatin rail bridge and extensively downstream (north) of the Dunning Road crossing. In these areas, blowouts and groundwater discharge were observed during the original construction****."* [Bold added for emphasis]

These blowouts created a series of springs that perennially discharge groundwater into the channel both upstream and downstream of Dunning Crossing. As a result, the aquifer system in the vicinity was heavily impacted by construction of the Existing Floodway in 1962-1968.

Modeling, calibrated to match the observed drawdown in the late 1960's after Floodway construction (App N p. 4-2, sec 4.2), estimated that the drawdown cone reached to Anola with 4 to 6 m of drawdown at the Floodway between the Trans-Canada Highway and Spring Hill. A drawdown of 4 to 5 m was estimated from the Trans-Canada Highway to Spring Hill, with isolated areas of higher drawdown up to 6 m estimated at the Trans-Canada Highway and Highway 15. This simulation correlates with local views that groundwater impacts from initial construction were severe and will persist into the future.

The groundwater regime in the vicinity of the channel was permanently altered (see Figure 5.4.1) by the uncontrolled discharge of groundwater into the channel. Woodbury (1995) estimates groundwater flow in the area south of Birds Hill to be 1000 USGPM. This correlates with a published 2003 winter measurement of 1000 Igpm. This volume of flow represents a 15% increase from post-initial-construction conditions (App N) and is very significant by comparison with the reported extraction of 700 Igpm in the St. Boniface area and 270 Igpm (on an annual basis) in the Ft. Garry area.

The increased seepage flow is attributed largely to the lower invert of the 2003 surveyed Low Flow Channel as a result of scour in the channel. This perennial flow represents an uncontrolled loss of a scarce and valuable resource; a number of riparian users were impacted, necessitating wells to be modified or replaced. Without mitigation, this loss will continue unabated and will probably increase with time, however only one groundwater flow measurement in the channel has been published, and no information is presented on the location or characteristics of the springs within the channel. In view of this dearth of important information it is requested that the following be provided:

- A full characterization of the existing springs over the entire length of the channel, including:
    i. Location, geo-referenced to project mapping control;
    ii. Stratigraphy;
    iii. Areal extent and history;

iv. Hydraulic characteristics including piezometric head at the source, formation permeability and flow; and
v. Water quality.

- Groundwater flow measurements at sufficiently frequent intervals (in both time and space) along the channel to enable a rational determination as to the quantity and chemistry of flow and the contributing reaches; and,
- A similar comprehensive characterization of the reach from Dunning Crossing to the outlet since a rational validated treatment of the groundwater losses in that reach has not been addressed in the EIS.

4. Groundwater Consumption

The EIS acknowledges that the Manitoba Floodway is a major regional consumer of groundwater in that it has caused uncontrolled release of groundwater to the environment. In view of this, please provide:

- Details of current licenses or other authorization under which this groundwater extraction and discharge is currently taking place;
- An assessment of the degree to which MFEA is in compliance with exiting groundwater legislation, permits, licenses or other authorizations;
- The current MFEA management policies, protocols and processes which govern groundwater management and extraction; and
- Details of current monitoring and how monitoring results and analysis are communicated to regulatory agencies and to stakeholders, including the rural municipalities that abut the Floodway.

5. Uncontrolled Seepage Discharge into Channel

The EIS acknowledges the presence of uncontrolled springs that resulted from initial Floodway construction and subsequent erosion of the low flow channel. Long-term uncontrolled discharge of groundwater through unconsolidated sediments is not a sustainable engineering approach. Ongoing scour and piping can be expected, resulting in increasing flows and further dewatering of the aquifers with time. Examination of the long-term impacts of this approach is absent from the documents. Please provide an analysis of the expected long-term (100 to 1000 years is not unreasonable since this facility is expected to be a permanent modification of the landscape) impacts of uncontrolled seepage into the channel. Provide, also, a mitigation plan to address the expected adverse impacts.

6. Time Effects

The EIS focuses on the impacts of the construction case and the short-term flood condition. No consideration is provided for the longer term conditions which may entail, for example, increased seepage flow (as discussed in 5. above) or the cumulative effects of long term loss of regional groundwater resources to Floodway seepage combined with ongoing

development in the Rural Municipalities. Please provide an analysis of the cumulative regional groundwater impacts of anticipated growth in the Rural Municipalities and the Winnipeg Metropolitan Area over the next 50 to 100 years, combined with the continuing (and probably increasing) extraction of groundwater by the Floodway. Recommended mitigative measures should also be provided.

The documents attribute the 15% increase in flow to ongoing erosion of the Low Flow Channel (it may also be due to progressive development of the subsurface seepage pathways but no data are presented to support either view). Given that erosion occurred to this degree in the past, it is reasonable to assume that it will continue in the future. The sensitivity analysis should consider the long-term (>100years) groundwater impacts of channel erosion. Please provide such an analysis and the measures recommended to mitigate its occurrence.

7. Model Simulation

The regional simulations of seepage and contaminant transport are based on the assumption of uniform conditions along the Floodway. Uniform discharge of groundwater along the length of the channel is assumed. It is also assumed the channel geometry will be fixed and remain so for the foreseeable future, ignoring natural processes that are recognized to be occurring presently. Please provide, for comparison with currently available simulations:

- Simulations where discharges occur at locations of actual current springs. Intrusion of floodwater should be modeled assuming "open" channel-bottom conditions that must exist in the spring areas and in the areas downstream from Dunning Road where the aquitards protecting the bedrock aquifer may be discontinuous.
- Simulations of long-term impacts as discussed in 6. above.

8. Intrusion Into and Retreat from the Aquifer

Experience of well contamination from previous floods indicates that pollution of wells can endure for considerable time. Simulations provided in the EIS focus on analysis of the intrusion and retreat of solutes in the aquifer and are based on the assumption that once the solute is reduced to meet water quality objectives, no further impacts will be experienced. No mention is made of pathogens, and particularly the migration and survival of persistent pathogens in the bedrock aquifer. It is conceivable that such pathogens may be moved progressively further into the bedrock aquifer by successive flood-retreat events. Please provide further analysis of the mechanisms of migration of both solutes and persistent pathogens in the aquifers, an evaluation of risk to current and probable future groundwater users, and a mitigation plan to address this impact.

9. Impact on Active Pump Wells

Local pumping effects are ignored in evaluation of infiltration impacts although it is recognized that (App P, p.4-2, sec 4.1):

> *" Pumping from the four municipal wells in the Bird Hill sand and gravel aquifer along Oasis Road will form local drawdown cones, with the overall averaging influence monitored in the vicinity observation wells. There is some interconnection to the underlying aquifer, with a minor overall imposed hydraulic gradient that is not anticipated to impact on the rate of intrusion of the surface water".*

Given the importance of the Oasis Road well installation to the residents of East St. Paul and the sensitivity of that location to contamination by infiltration, further evaluation is required before potential impacts can be dismissed. Please provide detailed simulation of floodwater intrusion into the Oasis Road well installation and the nearby private wells, incorporating the condition of maximum well field drawdown during a flood event.

10. Compensation for Diverted Groundwater Resource

Diversion of groundwater will continue to deprive the Rural Municipalities of a natural advantage in attracting investment and development over the long term. This impact needs further evaluation and a course of compensation for that ongoing loss proposed. Please provide such an evaluation.

11. Unresolved Issues

The development of the overall mitigation strategy for potential groundwater impacts during the final design for the Floodway Expansion Project construction and post construction periods is identified as an unresolved issue. This is a core issue for the Rural Municipalities and their citizens. Please provide the anticipated process for resolution of this issue, including criteria, consultation, decision-making process and the deciding authority.

12. Monitoring

While mentioned several times, there is no definitive commitment to long-term post-construction monitoring, groundwater management and impact mitigation. Please provide a conceptual monitoring and management plan that includes a commitment to community involvement, shared decision-making and full transparency.

13. Institutional Framework and Funding for "Adaptive Management Strategy"

An undefined "adaptive management strategy" for impact mitigation is proposed. Please provide definition of that strategy, a description of how it will be implemented, including the agency(ies) responsible, how it will be funded in the very long term and how mitigation decisions will be made.

14. Deepening of the Channel

The EIS (Sec4.3.3.2, p.4-19) states that: "While channel deepening cannot be abandoned completely until completion of final design, there are no issues at present that are known that could reverse the decision to abandon Floodway Channel expansion by deepening." The EIS text also speaks of a maximum deepening of 2 feet. In view of the implied assurance that the only impact will be a proportional increase in seepage into the channel due to the increased channel width, please provide an undertaking that, if deepening is required in any section of the channel, full analysis of groundwater impacts will be undertaken and comprehensive consultations with stakeholders held prior to application for approval to construct the project.

15. Construction Impacts on Existing Wells

Construction impacts on existing groundwater users (e.g. turbidity in wells adjoining construction areas, among others) are not addressed. Please provide an evaluation of construction-related hazards to existing wells and how they will be monitored and mitigated.

16. Contaminant Migration to Wells

Contaminants can be expected to migrate at differing rates, and in different directions, depending on the water table conditions adjacent to the floodway, and water levels in the floodway. Please provide additional analysis of contaminant migration to wells when flood conditions are superimposed on low water table conditions such as exist after a prolonged drought when gradients can be expected to be greatest. Conversely, what would be the impact of extreme high groundwater levels on channel stability and bottom blow-in?

17. Increased Flooding in the Prairie Grove Area

The public consultation process, and meetings with the MFEA, revealed that the Seine River diversion structure has placed Prairie Grove in jeopardy. Flows up to 1997 levels will create backup over the Seine River diversion drop structure and into the Seine River diversion channel, the old Prairie Grove drain and the Vanderkeere drain. Flows up to 1 in 700 year flood levels will create levels higher than the 1997 flood and again will result in backflow over the structure, upstream in the diversion channel, Prairie Grove drain and Vanderkeere drain. Suggested considerations include the installation of traps on the Prairie Grove drain near the diversion, blocking the Vanderkeere drain close to the culverts on the Prairie Grove

drain (near the diversion) to prevent backflow into the Vanderkeere drain, and modification of the diversion drop structure to prevent backflow into the diversion channel. Due to the immediate risk to Prairie Grove residents, these actions should be undertaken prior to spring 2005. Relative to the Prairie Grove area, please provide specific detail as to the geographic extent and location of the area potentially affected by flooding at this time and following the floodway expansion, at various flood levels ranging from 1997 levels to the 1 in 700 year level. Also, please respond to the actions suggested above, and identify any mitigation measures that were considered in the planning/design stage of the expanded floodway, which were considered to be feasible, and the reasons why measures have not been proposed.