



Screening Report Red River Floodway Expansion Project

Prepared for
Infrastructure Canada

Submitted by
**Gartner Lee Limited
Falk Environmental Inc.**

May 2005

Screening Report Red River Floodway Expansion Project

Prepared for
Infrastructure Canada

In association with
Falk Environmental Inc.

May 2005

Reference: **GLL 41221/50330**

Distribution:

- 1 Infrastructure Canada**
- 1 Gartner Lee Limited**
- 1 Falk Environmental Inc.**

Completion of the Screening Report of the Proposed Red River Floodway Expansion Project

A screening of the proposed Red River Floodway Expansion Project (the Project) has been conducted in accordance with the *Canadian Environmental Assessment Act* (the Act). This assessment is required pursuant to section 5 of the Act, before the responsible authorities, Infrastructure Canada, Fisheries and Oceans Canada and Transport Canada, can respectively provide financial assistance or issue an approval under the *Fisheries Act* or *Navigable Waters Protection Act* that would enable the Project to proceed.

The scope of the Project that has been assessed includes: expanding the existing floodway channel, modifying the existing West Dyke and East Embankment, enlarging the existing Floodway Outlet Structure, improving the existing Inlet Control Structure, modifying the existing Seine River Syphon and City of Winnipeg Aquaducts, modifying or replacing rail and highway bridges, electrical transmission lines and miscellaneous infrastructure crossings of the existing Floodway Channel, fortifying riverbank protection and replacing or modifying culverts and drainage structures in select locations, and associated works.

In accordance with subsection 18(3) of the Act, the responsible authorities are making the Screening Report and other assessment documents available for public review and comment before they determine a course of action in respect of the Project.

Copies of the Screening Report, in both official languages, are also available for review during normal business hours in the public registries maintained by Manitoba Conservation at the following locations beginning May 20, 2005:

Conservation and Environment Library
Main Floor, 123 Main St
Winnipeg

Centennial Public Library
251 Donald St
Winnipeg

Legislative Library
200 Vaughan St
Winnipeg

Manitoba Eco-Network
2nd Floor, 70 Albert St
Winnipeg

Selkirk & St. Andrews Regional Library
303 Main St
Selkirk

Jake Epp Public Library
255 Elmdale St
Steinbach

An electronic version of the Screening Report can be found at the Canadian Environmental Assessment Registry website:

http://www.ceaa.gc.ca/050/Viewer_e.cfm?SrchPg=1&CEAR_ID=5146

The entire federal public registry for the Project can be reviewed by contacting the Prairie Office of the Canadian Environmental Assessment Agency, as detailed at the end of this notice.

Screening Report – Red River Floodway Expansion Project

Written comments, in either official language, are invited. **The deadline for the receipt of public comments is: 5:00 pm on June 22, 2005.** Comments received will be placed on the public registry for the Project.

Please direct any comments or enquiries to:

Gerry Tessier, Senior Program Officer,
Canadian Environmental Assessment Agency (**Prairie Office**)
Suite 445, 123 Main Street, Winnipeg, Man. R3C 4W2.
Telephone: (204) 984-8020. Fax: (204) **983-1878**
Internet: gerry.tessier@ceaa-acee.gc.ca

The Screening Report and comments received from the public prior to the deadline will be taken into consideration before the responsible authorities take a course of action on this Project.

Executive Summary

The Manitoba Floodway Authority (MFA) and the Government of Manitoba are proposing to expand and operate the Red River Floodway, located adjacent to the City of Winnipeg in southern Manitoba. As an integral component of Manitoba's flood protection system, the Floodway is designed to divert flood waters around the City of Winnipeg. The existing Floodway was constructed between 1962 and 1968 and potentially protects Winnipeg from a flood of a 1 in 90 year return period.

The Project involves the expansion of the hydraulic capacity of the existing Floodway to increase Winnipeg's reliable security against floods up to a magnitude of 1 in 700 year return period. Expansion of the hydraulic capacity is proposed to be achieved through the widening of the existing Floodway Channel and by modifying various other associated bridges and infrastructure. The Project includes:

- o Expansion of the existing floodway channel;
- o Restoration armouring of the low flow channel;
- o Expansion of the opening in the East Embankment on the east side of Grande Pointe;
- o Increasing the freeboard of the existing West Dyke;
- o Replacing 7 and rehabilitating 6 bridges over the existing floodway channel;
- o Enlarging the existing Outlet Structure;
- o Fortifying and protecting the riverbank at and downstream of the Outlet Structure;
- o Replacement/rehabilitation of 7 drains along the east bank of the floodway channel;
- o Modifications to the Seine River Syphon;
- o Modifications to the City of Winnipeg aqueducts crossing the floodway channel;
- o Extending a number of electrical transmission lines that cross the floodway channel;
- o Replacing a number of miscellaneous infrastructure crossings of the floodway channel;
- o Improving the existing Inlet Control Structure, and
- o Ancillary works such as construction staging areas, modifying and replacing culverts.

The Government of Manitoba has established the Manitoba Floodway Authority and has charged it with the responsibility to design and construct the project, and to own and maintain the Province's Floodway assets. Operation of the Floodway after the expansion will continue to be the responsibility of Manitoba's Water Stewardship Department.

The Government of Canada has announced the contribution of \$120 million in funding towards the expansion of the Red River Floodway. Funds would be provided through the Canada Strategic Infrastructure Fund. Additional federal contributions may also be provided at a later date. Infrastructure Canada (INFC), having identified that it may provide funding to enable the project to be carried out, Fisheries and Oceans Canada (DFO) having determined that the project would cause habitat losses requiring an authorization under subsection 35(2) of the *Fisheries Act* and Transport Canada (TC) having determined that the Project will require the issuing of a formal approval

Screening Report – Red River Floodway Expansion Project

under the *Navigable Waters Protection Act* are required to ensure that an environmental assessment be completed in accordance with the requirements of the *Canadian Environmental Assessment Act* (CEAA), prior to providing the funding or issuing the authorizations or approvals.

The Project also requires a license under the Province of Manitoba *Environment Act* and thus Manitoba is required to conduct an environmental assessment of the project. Given the need for both the federal and provincial governments to conduct an environmental assessment of the Project and given that Canada and Manitoba signed the Canada-Manitoba Agreement on Environmental Assessment Cooperation on May 8, 2000, Canada and Manitoba agreed that a cooperative environmental assessment, led by Manitoba would be undertaken for the Project. In accordance with the cooperative environmental assessment process, the federal departments with responsibilities under the CEAA have developed this screening report, consistent with the requirements of the federal Act and in consultation with other federal departments and agencies (Environment Canada, Health Canada, Natural Resources Canada, Parks Canada, Public Works and Government Services, Indian Affairs and Northern Development, Canadian Environmental Assessment Agency and the Canadian Transportation Agency).

This report fulfills Infrastructure Canada's, Fisheries and Oceans Canada's and Transport Canada's obligations as responsible authorities under the CEAA. The report presents the results of the assessment of the effects of the Project on the environment, in accordance with the requirements of CEAA. This assessment has considered the effects of the Project on the Physical Environment (water regime, groundwater, erosion and sedimentation, drainage, ice processes, climate, air quality and noise, physiography and soils); the Aquatic Environment (surface water quality, fish and clam populations and aquatic species at risk); the Terrestrial Environment (vegetation, wildlife and wildlife habitat and plant and animal species at risk); the Socio-economic Environment (resource use, economy, infrastructure and services, health, personal, family and community life); and navigation. The assessment also considered the effects caused by potential accidents and malfunctions, effects of the environment on the Project and the cumulative effects that the project, combined with other projects or activities is likely to have on the environment.

The assessment outlines and considers the measures proposed by the MFA to mitigate any adverse environmental effects caused by the Project, as well as the monitoring and follow-up programs proposed by the MFA. Throughout the EIS and Supplemental Filings, the MFA have proposed the development of a range of plans for mitigating, monitoring and follow-up, as a means of ensuring that the adverse effects associated with the Project are properly addressed. In order to ensure that these plans are developed in a comprehensive and coordinated way, that they achieve the results desired and that the responsible and federal authorities are able to review and respond to the plans in a timely way, the responsible authorities will require the MFA to develop an overall environmental management plan (EMP) for the Project. The purpose of the EMP will be to describe how all of the environmental commitments (including but not

Screening Report – Red River Floodway Expansion Project

limited to mitigation, monitoring and follow-up) outlined in this screening report, the EIS, Supplemental Filings and other documents provided by the MFA will be met during all phases of the Project. The EMP will identify roles and responsibilities for ensuring that the EMP and its component parts are developed and completed and for ensuring the implementation of the required management actions to address potential adverse effects. The EMP will also identify an overall action plan for the preparation and submission of the required plans and other documents for review and approval. This action plan shall incorporate sufficient time for responsible authorities and appropriate federal authorities to review and discuss the plans with the MFA and other stakeholders as appropriate.

The responsible authorities consider that the approach to environmental protection must also include appropriate oversight during construction of the Project. Such oversight will help to ensure that mitigation measures are implemented according to plan and timely action can be taken to address unforeseen or unexpected situations during construction. The MFA will be required to develop an Environmental Inspection Plan, as a component of the Environmental Management Plan. The Environmental Inspection Plan shall outline in sufficient detail to demonstrate adequacy and effectiveness, how during the construction phase of the Project, the MFA intends to ensure compliance with the various environmental commitments outlined in this screening report, the EIS, Supplemental Filings and other documents submitted.

An important element of the overall environmental management plan for the Project will be the ongoing reporting of environmental performance. This reporting will provide responsible authorities and other interested stakeholders with a level of confidence that the effects predictions contained in this screening report and in the MFA's submissions were accurate, that the mitigation measures proposed are effective.

Considering the proposed mitigation measures and follow-up program, the commitments made by the MFA and the additional measures required by the responsible authorities, Infrastructure Canada, Fisheries and Oceans Canada and Transport Canada, have found that the proposed project, as defined in the scope of the project, is not likely to cause significant adverse environmental effects.

Table of Contents

Letter of Transmittal	<i>i</i>
Executive Summary	<i>a</i>
	Page
1. Introduction.....	1
1.1 The Project.....	1
1.2 Environmental Assessment Requirements.....	1
1.3 Report Organization.....	4
2. Environmental Assessment Process	6
2.1 Introduction.....	6
2.2 Canadian Environmental Assessment Act	6
2.3 Federal Participation in the Cooperative Environmental Assessment Process	7
2.4 Clean Environment Commission Public Hearing	7
2.5 Development of the Federal Environmental Assessment Screening Report	8
2.6 Post Screening Determination.....	9
3. Scope.....	12
3.1 Introduction.....	12
3.2 Scope of the Project	12
3.3 Scope of the Assessment.....	13
3.4 Temporal and Geographic Scope.....	14
3.5 Cumulative Environmental Effects.....	14
4. Project Description	15
4.1 Project Definition.....	15
4.2 Project Overview	15
4.3 Existing Floodway Facilities.....	18
4.4 Schedule and Sequencing of Construction	20
4.5 Operation of the Project	22
4.6 Alternatives	26
4.6.1 Environmental Impact Statement.....	26
4.6.2 Responsible Authority Conclusion	28
5. Environment Description	29
5.1 Introduction.....	29
5.2 Physical Environment	29
5.2.1 Floodway Study Region.....	29
5.2.2 Regional Geology	29
5.2.3 Groundwater	31
5.2.4 Surface Water	31
5.3 Aquatic Environment.....	32
5.3.1 Fish	32

5.3.2	Lower Trophic Levels.....	33
5.4	Terrestrial Environment.....	34
5.4.1	Ecological Areas.....	34
5.4.2	Vegetation.....	34
5.4.3	Wildlife.....	34
5.5	Socio-Economic Environment.....	35
5.5.1	Resource Use.....	35
5.5.2	Economy.....	36
5.5.3	Infrastructure and Services.....	38
5.5.4	Personal, Family and Community Life.....	39
5.5.5	Heritage Resources.....	41
5.6	Navigation.....	41
6.	Public Consultation.....	44
6.1	Introduction.....	44
6.2	Public Consultation and Involvement Plan (PIP).....	44
6.3	Approaches.....	45
6.4	Key Public Issues During Development of the EIS.....	45
6.5	Key Issues Raised in Comments on the EIS, Supplemental Filings and the CEC Public Hearing.....	47
7.	Aboriginal Communications and Consultation.....	48
7.1	Manitoba Floodway Authority.....	48
7.2	Cooperative Environmental Assessment Process.....	49
7.3	Responsible Authorities.....	50
7.4	Key Issues Raised in Comments on the EIS, Supplemental Filings and the CEC Public Hearing.....	50
8.	Summary of the Environmental Effects Analysis.....	52
8.1	Approach.....	52
8.2	Physical Environment.....	54
8.3	Water Regime.....	54
8.3.1	Introduction.....	54
8.3.2	Summary of Effects – Surface Water Regime.....	54
8.3.2.1	Construction.....	54
8.3.2.2	Operation – Inactive.....	55
8.3.2.3	Operation – Active.....	55
8.3.3	Proposed Mitigation, Monitoring and Follow-up.....	58
8.3.4	Responsible Authority Conclusion.....	59
8.4	Groundwater.....	61
8.4.1	Introduction.....	61
8.4.2	Summary of Effects - Groundwater.....	61
8.4.2.1	Construction.....	61
8.4.2.2	Operation - Inactive.....	62
8.4.2.3	Operation – Active.....	63
8.4.3	Proposed Mitigation, Monitoring and Follow-up.....	64
8.4.4	Responsible Authority Conclusion.....	64

8.5	Erosion and Sedimentation	66
8.5.1	Introduction.....	66
8.5.2	Summary of Effects – Erosion and Sedimentation	66
8.5.2.1	Construction	66
8.5.2.2	Operation – Inactive.....	69
8.5.2.3	Operation – Active	69
8.5.3	Proposed Mitigation, Monitoring and Follow-up	70
8.5.4	Responsible Authority Conclusion	70
8.6	Drainage.....	73
8.6.1	Introduction.....	73
8.6.2	Summary of Effects - Drainage	73
8.6.2.1	Construction	73
8.6.2.2	Operation – Inactive.....	73
8.6.2.3	Operation – Active	73
8.6.3	Proposed Mitigation, Monitoring and Follow-up	73
8.6.4	Responsible Authority Conclusion	74
8.7	Ice Processes	76
8.7.1	Introduction.....	76
8.7.2	Summary of Effects – Ice Processes.....	76
8.7.2.1	Construction	76
8.7.2.2	Operation – Inactive.....	76
8.7.2.3	Operation – Active	76
8.7.3	Proposed Mitigation, Monitoring and Follow-up	76
8.7.4	Responsible Authority Conclusion	76
8.8	Climate, Air Quality and Noise	78
8.8.1	Introduction.....	78
8.8.2	Summary of Effects – Climate, Air Quality and Noise	78
8.8.2.1	Construction	78
8.8.2.2	Operation – Inactive.....	79
8.8.2.3	Operation – Active	79
8.8.3	Proposed Mitigation, Monitoring and Follow-up	79
8.8.4	Responsible Authority Conclusion	79
8.9	Physiography, Geology and Soils	81
8.9.1	Introduction.....	81
8.9.2	Summary of Effects – Physiography, Geology and Soils.....	81
8.9.2.1	Construction	81
8.9.2.2	Operation – Inactive.....	81
8.9.2.3	Operation – Active	81
8.9.3	Proposed Mitigation, Monitoring and Follow-up	81
8.9.4	Responsible Authority Conclusion	81
9.	Aquatic Environment	83
9.1	Surface Water Quality	83
9.1.1	Introduction.....	83
9.1.2	Summary of Effects – Surface Water Quality	83
9.1.2.1	Construction	83

	9.1.2.2	Operation – Inactive	84
	9.1.2.3	Operation – Active	85
	9.1.3	Proposed Mitigation, Monitoring and Follow-up	85
	9.1.4	Comments on the Environmental Impact Statement, Supplementary Filings and Clean Environment Commission Public Hearings.....	86
	9.1.5	Responsible Authority Conclusion	86
9.2		Fish and Fish Habitat	88
	9.2.1	Introduction.....	88
	9.2.2	Summary of Effects – Fish and Fish Habitat	88
	9.2.2.1	Construction	88
	9.2.2.2	Operation – Inactive.....	97
	9.2.2.3	Operation – Active	98
	9.2.3	Proposed Mitigation, Monitoring and Follow-up	100
	9.2.4	Responsible Authority Conclusion	100
9.3		Lower Trophic Levels and Invertebrates	105
	9.3.1	Introduction.....	105
	9.3.2	Summary of Effects – Lower Trophic Levels and Invertebrates	105
	9.3.2.1	Construction	105
	9.3.2.2	Operation – Inactive.....	106
	9.3.2.3	Operation – Active	106
	9.3.3	Proposed Mitigation, Monitoring and Follow-up	106
	9.3.4	Responsible Authority Conclusion	106
9.4		Aquatic Species at Risk	107
	9.4.1	Introduction.....	107
	9.4.2	Summary of Effects – Aquatic Species at Risk	107
	9.4.2.1	Construction	107
	9.4.2.2	Operation - Inactive.....	110
	9.4.2.3	Operation-Active.....	110
	9.4.3	Proposed Mitigation, Monitoring and Follow-up	110
	9.4.4	Responsible Authority Conclusion	110
10.		Terrestrial Environment	112
10.1		Vegetation.....	112
	10.1.1	Introduction.....	112
	10.1.2	Summary of Effects - Vegetation	112
	10.1.2.1	Construction	112
	10.1.2.2	Operation – Inactive.....	113
	10.1.2.3	Operation – Active	113
	10.1.3	Proposed Mitigation, Monitoring and Follow-up	114
	10.1.4	Responsible Authority Conclusion	114
10.2		Wildlife and Wildlife Habitat	117
	10.2.1	Introduction.....	117
	10.2.2	Summary of Effects – Wildlife and Wildlife Habitat	117
	10.2.2.1	Construction	117
	10.2.2.2	Operation – Inactive.....	119
	10.2.2.3	Operation – Active	119

	10.2.3	Proposed Mitigation, Monitoring and Follow-up	119
	10.2.4	Responsible Authority Conclusion	119
10.3		Species at Risk	122
	10.3.1	Introduction.....	122
	10.3.2	Summary of Effects – Species at Risk.....	122
	10.3.2.1	Construction	122
	10.3.2.2	Operation – Inactive.....	122
	10.3.2.3	Operation – Active	122
	10.3.3	Proposed Mitigation, Monitoring and Follow-up	123
	10.3.4	Responsible Authority Conclusion	123
11.		Socio-Economic Environment.....	125
11.1		Resource Use	125
	11.1.1	Introduction.....	125
	11.1.2	Summary of Effects – Resource Use	125
	11.1.2.1	Construction	125
	11.1.2.2	Operation – Inactive.....	126
	11.1.2.3	Operation – Active	126
	11.1.3	Proposed Mitigation, Monitoring and Follow-up	127
	11.1.4	Responsible Authority Conclusion	127
11.2		Economy	130
	11.2.1	Introduction.....	130
	11.2.2	Summary of Effects - Economy.....	130
	11.2.2.1	Construction	130
	11.2.2.2	Operation – Inactive/ Operation – Active	130
	11.2.3	Proposed Mitigation, Monitoring and Follow-up	132
	11.2.4	Responsible Authority Conclusion	132
11.3		Infrastructure and Services	133
	11.3.1	Introduction.....	133
	11.3.2	Summary of Effects – Infrastructure and Services	133
	11.3.2.1	Construction	133
	11.3.2.2	Operation – Inactive.....	135
	11.3.2.3	Operation – Active	136
	11.3.3	Proposed Mitigation, Monitoring and Follow-up	136
	11.3.4	Responsible Authority Conclusion	136
11.4		Personal, Family and Community Life.....	139
	11.4.1	Introduction.....	139
	11.4.2	Summary of Effects – Personal, Family and Community Life.....	139
	11.4.2.1	Construction	139
	11.4.2.2	Operation – Inactive and Active.....	140
	11.4.3	Proposed Mitigation, Monitoring and Follow-up	143
	11.4.4	Responsible Authority Conclusion	143
11.5		Health.....	146
	11.5.1	Introduction.....	146
	11.5.2	Summary of Effects - Heath	146
	11.5.3	Responsible Authority Conclusions.....	147

12.	Heritage Resources	150
12.1	Introduction.....	150
12.2	Summary of Effects – Heritage Resources	150
	12.2.1 Construction.....	150
	12.2.2 Operation – Inactive.....	151
	12.2.3 Operation – Active.....	151
12.3	Proposed Mitigation, Monitoring and Follow-up	151
12.4	Responsible Authority Conclusion	151
13.	Navigation.....	154
13.1	Introduction.....	154
13.2	Summary of Effects - Navigation	154
	13.2.1 Construction.....	154
	13.2.2 Operation – Inactive.....	156
	13.2.3 Operation – Active.....	157
13.3	Proposed Mitigation, Monitoring and Follow-up	158
13.4	Responsible Authority Conclusion	159
14.	Cumulative Effects Assessment	162
14.1	Introduction.....	162
14.2	Summary of Cumulative Effects.....	162
14.3	Responsible Authority Conclusion	163
15.	Effects of Accidents and Malfunctions.....	165
15.1	Introduction.....	165
15.2	Summary of Effects – Accidents and Malfunctions	165
15.3	Proposed Mitigation, Monitoring and Follow-up	166
15.4	Responsible Authority Conclusion	167
16.	Effects of the Environment on the Project	169
16.1	Introduction.....	169
16.2	Summary of Effects	169
16.3	Proposed Mitigation, Monitoring and Follow-up	170
16.4	Responsible Authority Conclusion	170
17.	Sustainability	171
17.1	Introduction.....	171
17.2	Summary of Effects - Sustainability	172
17.3	Responsible Authority Conclusion	172
18.	Summary of Mitigation Measures and Follow-up Actions	173
19.	Conclusion	175
20.	References.....	176
21.	GLOSSARY OF TERMS AND ACRONYMS/ABBREVIATIONS.....	178

List of Figures

Figure 1. Project Location..... 3
Figure 2. Cooperative Environmental Assessment and Licensing Process..... 10

List of Tables

Table 1. Key Milestones in the Environmental Assessment Process 8
Table 2. Summary of Peak Water Levels Along the Red River Under Flood Scenarios..... 56

Appendices

- A. Guidelines for the Preparation of an Environmental Impact Statement For the Red River Floodway Expansion Project**
- B. Summary of Public and Agency Comments – EIS, Supplemental Filing and CEC Hearings**
- C. Summary of Mitigation/Compensation/Follow-up and Reporting Requirements**

1. Introduction

1.1 The Project

The Manitoba Floodway Authority (MFA) and the Government of Manitoba are proposing to expand and operate the Red River Floodway, located adjacent to the City of Winnipeg in southern Manitoba. The existing Floodway, constructed between 1962 and 1968 and located on the east side of the City of Winnipeg, protects the City of Winnipeg to a flood of a 1 in 90 year return period. The proposed Red River Floodway Expansion Project (the Project) is intended to increase Winnipeg's reliable security against floods up to a magnitude of 1 in 700 years (Manitoba Floodway Authority, 2004).

The existing Floodway is aligned in a general north-south direction, with a length of approximately 48 km (29.5 miles) from its inlet south of St. Norbert to its outlet north of Lockport (Figure 1). The Project involves an expansion of the hydraulic capacity of the existing Floodway, by widening the existing floodway channel and by modifying various associated bridges and other infrastructure. As an integral component of Manitoba's overall flood protection system, the Floodway is designed to divert flood waters around the City of Winnipeg (Manitoba Floodway Authority, 2004a).

The Government of Manitoba has established the MFA and has vested it with the responsibility to design and construct the Project, and to own and maintain the Province's Floodway assets. Operation of the Floodway after the expansion will continue to be the responsibility of Manitoba's Water Stewardship Department (Manitoba Floodway Authority, 2004a). The MFA is the proponent of the project for the purposes of this environmental assessment.

1.2 Environmental Assessment Requirements

On April 3, 2003 the Government of Canada and the Province of Manitoba announced that they would each contribute \$80 million towards the expansion of the Red River Floodway. Infrastructure Canada subsequently committed an additional \$40 million, for a total federal contribution of \$120 million. Additional federal contributions to the Project may be provided at a later date.

Federal funds are being provided through the Canada Strategic Infrastructure Fund. The Project matches the description of a physical work set out in the *Canadian Environmental Assessment Act* (CEAA or the federal Act) and, in combination with the decision to fund the Project, it requires that an environmental assessment be completed in accordance with the requirements of the federal Act. The CEAA also requires that a determination be made that the Project is unlikely to cause significant adverse environmental effects taking into account the

Screening Report – Red River Floodway Expansion Project

implementation of required mitigation measures prior to the funds being released. Infrastructure Canada (INFC), having identified that it may provide funding to enable the project to be carried out, is a responsible authority under the federal Act. The Department of Fisheries and Oceans (DFO) may have statutory responsibilities pursuant to subsection 35(2) of the *Fisheries Act* with respect to some portions of the Project and is therefore also a responsible authority. Transport Canada has also identified that approvals under the *Navigable Waters Protection Act* will likely be required for the Project and is also likely to be a responsible authority.

On August 6, 2003, the Manitoba Floodway Authority (MFA) filed a Proposal under *The Environment Act* with the Environmental Approvals Branch of Manitoba Conservation, initiating the provincial environmental assessment process. The Project is a Class 3 development in the *Classes of Development Regulation* under *The Environment Act* (the provincial Act). As such, the Project requires a license under the provincial Act prior to the commencement of its construction and operation (Project Administration Team, 2004).

Given the need for both the federal and provincial governments to conduct an environmental assessment of the Project and given that Canada and Manitoba signed the *Canada-Manitoba Agreement on Environmental Assessment Cooperation* on May 8, 2000, Canada and Manitoba agreed that a cooperative environmental assessment, led by Manitoba, would be undertaken for the Project. Canada and Manitoba agreed to cooperate in the environmental assessment process in a manner that meets the regulatory requirements of both parties (Project Administration Team, 2004). As a result, a federal-provincial Project Administration Team¹ and a Technical Advisory Committee² were established for the Project.

In July 2004, the Project Administration Team released a document entitled “Cooperative Environmental Assessment Process Concerning the Red River Floodway Expansion Project”. The document sets out the steps to be taken to ensure the cooperative administration of the environmental assessment of the Project. The steps taken in the cooperative environmental assessment are described in Chapter 2 of this screening report.

In accordance with the cooperative environmental assessment process, the federal departments with responsibilities under the CEAA have developed this screening report, consistent with the requirements of the federal Act.

¹ Project Administration Team (PAT) – pursuant to the Cooperative Agreement, means a “team made up of senior representatives with an environmental assessment responsibility for a project”. PAT is responsible for making required decisions during the administration of the cooperative environmental assessment for the Project.

² Technical Advisory Committee (TAC) – means an advisory committee to the PAT consisting of members representing provincial and federal departments and agencies that contribute to the cooperative environmental assessment.

Screening Report – Red River Floodway Expansion Project

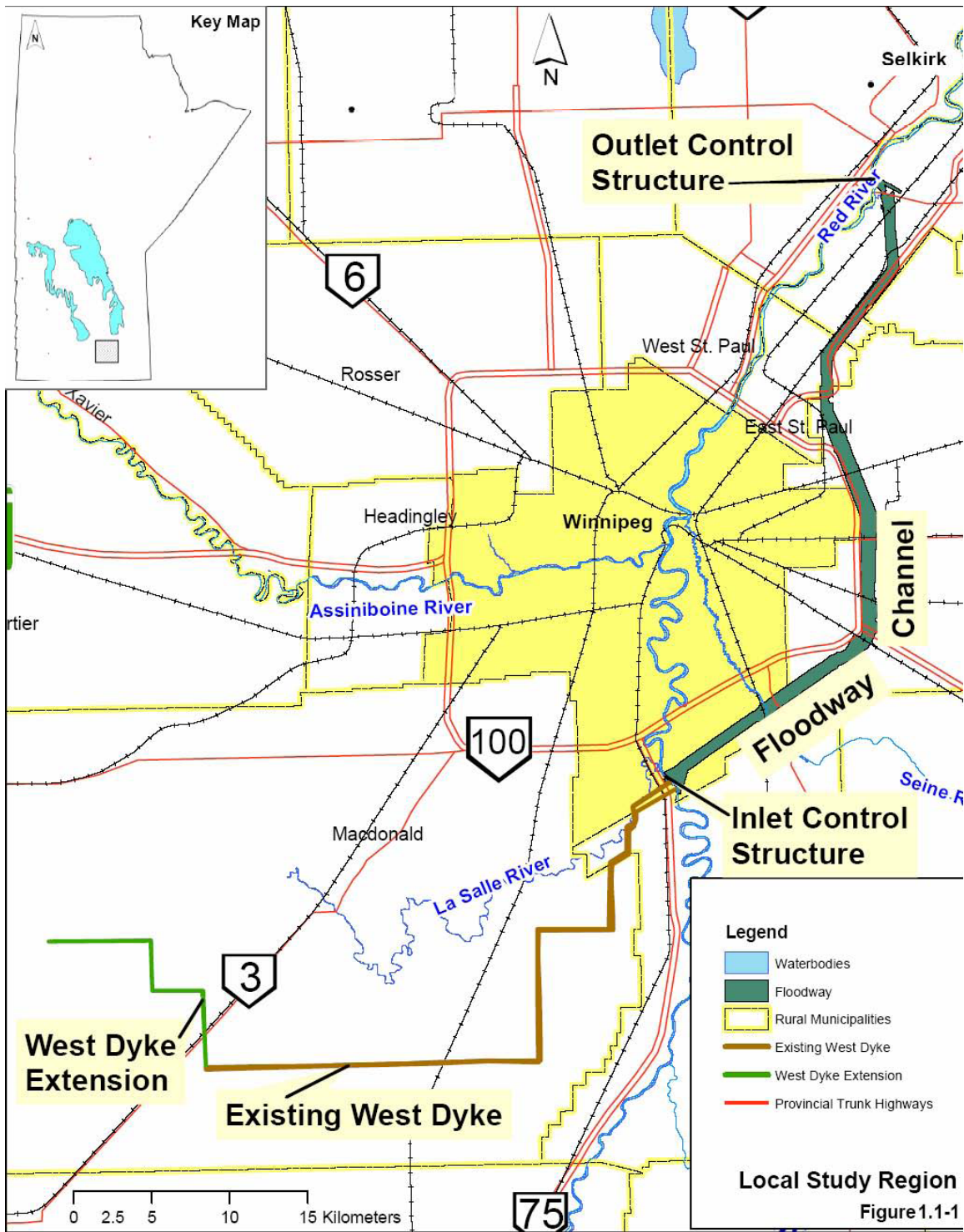


Figure 1. Project Location

1.3 Report Organization

This screening report documents the results of the federal environmental assessment of the Project. The report is organized in the following manner:

Introduction

Background information on the Project is provided. The purpose of this environmental assessment and its relationship to the cooperative environmental assessment process is outlined and the report organization is described.

Environmental Assessment Process

The process for developing this screening level environmental assessment report is described. The nature of federal involvement, including the federal decisions expected in relation to the Project, is also outlined.

Scope

The scope of the Project and environmental assessment, as established by the responsible authorities, is described. The scope is described in accordance with the requirements of the CEAA.

Project Description

The Project is described in both general and specific terms. Project need, purpose and alternatives are also described. For the purposes of the environmental assessment, the Project is subdivided into phases, components and activities.

Environment Description

The existing environment is described in both general and specific terms. For the purposes of the environmental assessment, the environment is subdivided into physical, aquatic, terrestrial, socio-economic and heritage resource components and attributes.

Public Consultation

The public consultation program that has been carried out in conjunction with the environmental assessment of the Project is described. The nature of and results from the consultation activities are presented. Comments received during the review of the Project are summarized.

Aboriginal Communications and Consultation

The communication and consultation activities that have been carried out with aboriginal people in conjunction with the environmental assessment of the Project are described. The nature of and results from the discussions are presented. Comments received during the review of the Project are summarized.

Summary of Environmental Effects Analysis

The potential environmental effects of the Project are identified. Measures to mitigate those effects are identified and considered, follow-up³ requirements are described and the potential significance of any residual effects are identified and evaluated.

Summary of Mitigation Measures and Follow-up Actions

Measures to mitigate adverse environmental effects of the Project and activities required for follow-up purposes are described and summarized.

Conclusion

The responsible authorities' conclusions on the significance of any residual environmental effects from the Project are presented.

³ Follow-up Program- As defined in the *Canadian Environmental Assessment Act*, means a program for verifying the accuracy of the environmental assessment of a project and determining the effectiveness of any measures taken to mitigate the adverse environmental effects of the project.

2. Environmental Assessment Process

2.1 Introduction

This environmental assessment screening report on the proposed Red River Floodway Expansion Project has been prepared to address the requirements of CEAA, following a cooperative environmental assessment process led by the Province of Manitoba. The cooperative process was conducted in accordance with the *Canada-Manitoba Agreement on Environmental Assessment Cooperation* (Government of Canada and Government of Manitoba, 2000) and as described in the document “*Cooperative Environmental Assessment Process Concerning the Red River Floodway Expansion Project, July 2004*”. Key features of the Canada-Manitoba Agreement include:

- An intent to meet the environmental assessment obligations of each jurisdiction through the cooperative process.
- The identification of the Province as the lead party for proposed projects within its provincial boundary and not on federal land;
- The coordination of information requirements;
- Provision for either party to seek additional information if required, and
- The opportunity to coordinate the announcement of each jurisdiction’s respective decisions.

2.2 Canadian Environmental Assessment Act

The *Canadian Environmental Assessment Act* (CEAA) identifies responsibilities and procedures for the assessment of projects that involve the federal government. Given that the Project, as described by the MFA, meets the definition of a project contained in the CEAA and the Government of Canada has agreed to provide financial assistance to the proponent and is likely to exercise regulatory duties (i.e. issuing licenses, permits or approvals for the Project or components thereof) that are included in the *Law List Regulations* under the federal Act for the purpose of enabling the Project to be carried out, the environmental assessment process provided in the CEAA applies. The project is not of a type that is described in the *Comprehensive Study List Regulations*. Therefore, the Project is subject to the screening provisions of that federal Act.

Financial assistance is being provided for the Project by Infrastructure Canada through the Canada Strategic Infrastructure Fund. It is likely that authorizations under the *Fisheries Act* (Department of Fisheries and Oceans) and permits under the *Navigable Waters Protection Act* (Transport Canada) will be also be required. The Department of Fisheries and Oceans and Transport Canada participated in the assessment as responsible authorities for those aspects of the Project for which they might respectively issue authorizations under the *Fisheries Act* and

the *Navigable Waters Protection Act* and which trigger CEAA. In accordance with the provisions of the CEAA, Infrastructure Canada, the Department of Fisheries and Oceans, and Transport Canada are responsible authorities. As such, these authorities are required to ensure that an environmental assessment of the proposed Project is carried out in accordance with the CEAA.

The Department of Fisheries and Oceans and Transport Canada also provided specialist or expert advice to Infrastructure Canada in relation to fish and fish habitat and to navigation, navigation safety and rail safety respectively for those aspects of the Project for which they are not triggered under CEAA. Other federal authorities possessing specialist or expert information or knowledge in relation to the Project have also participated in the environmental assessment process, including the Canadian Transportation Agency, Canadian Environmental Assessment Agency, Environment Canada, Health Canada, Natural Resources Canada, Parks Canada Agency, and Public Works and Government Services Canada.

2.3 Federal Participation in the Cooperative Environmental Assessment Process

Consistent with the Canada-Manitoba Agreement on Environmental Assessment Cooperation, Manitoba established and chaired a Project Administration Team (PAT). Membership on the PAT included representatives from Infrastructure Canada, the Department of Fisheries and Oceans, Transport Canada and the Canadian Environmental Assessment Agency. The PAT was responsible for making required decisions during the administration of the cooperative environmental assessment process for the proposed Project.

The Cooperative Environmental Process Concerning the Red River Floodway Expansion Project (Government of Canada and Government of Manitoba, 2004) describes the steps and activities undertaken to complete the cooperative environmental assessment. Figure 2 illustrates these steps. The cooperative process ensured that federal departments and agencies were directly involved in the key steps in the process (primarily through the activities of the PAT and the Technical Advisory Committee (TAC). Federal members of the PAT included Infrastructure Canada, the Department of Fisheries and Oceans Canada, Transport Canada and the Canadian Environmental Assessment Agency. Table 1 outlines the key milestones in the cooperative process.

2.4 Clean Environment Commission Public Hearing

On January 14 2005, the Chair of PAT wrote to the Chair of the Manitoba Clean Environment Commission (CEC), encouraging the CEC to convene a public hearing on the Project at the earliest opportunity.

Screening Report – Red River Floodway Expansion Project

The CEC initiated its public hearing process on February 14, 2005. The CEC process was conducted over 16 hearing days, concluding on March 10, 2005. Weekly summaries of the proceedings were posted on the Commission web site. Information provided through the CEC hearing process has been considered in the development of this screening report.

2.5 Development of the Federal Environmental Assessment Screening Report

A key purpose of the cooperative environmental assessment process was the development of the information necessary to meet the requirements of the CEAA. Subsequent to the Chair of PAT referring the Project to the CEC, the responsible authorities wrote to the MFA indicating that there were outstanding information requirements in relation to comments provided by the responsible and federal authorities on both the EIS and Supplementary Filings. The responsible authorities requested that this information be provided so that the screening could be completed in a timely manner. The MFA submitted additional information in response to the request on April 21, 2005.

Table 1. Key Milestones in the Environmental Assessment Process	
Submission of an <i>Environment Act</i> Proposal (Project Description)	August 2003
Development of draft Environmental Impact Statement (EIS) Guidelines by the PAT	August 2003
TAC and public review of the draft EIS Guidelines	October 2003
PAT review and disposition of TAC and public comments on the draft EIS Guidelines	February 2004
Release of final EIS Guidelines by the PAT	February 2004
Submission of the EIS by the Manitoba Floodway Authority (MFA)	August 2004
TAC and public review of the EIS submitted by the MFA	October 2004
PAT review and disposition of public comments on the EIS	October 2004
PAT request for supplemental information	November 2004
Submission of the Supplemental Filings by the MFA	November and December 2004
TAC and public review of the Supplementary Filings	January 2005
Chair of PAT recommends Manitoba Clean Environment Commission (CEC) proceed with a Public Hearing	January 2005
Federal departments request further information	February 2005
CEC Public Hearing commences	February 2005
CEC Public Hearing concludes	March 2005
MFA submits additional information in response to RA request	April 2005
Public review of the Federal Screening Report	May/June 2005

Table 1. Key Milestones in the Environmental Assessment Process	
CEC report submitted to provincial Minister of Conservation	May/June 2005
Federal environmental assessment decision	Expected mid-2005
Coordinate announcements of federal and provincial environmental assessment decisions	Expected mid-2005

In late February 2005, the responsible authorities and the MFA met to discuss how the information required for the completion of the screening report would be obtained and provided by the MFA. Subsequent meetings were held during March and April 2005 to discuss the information provided. Responsible authorities incorporated the additional information received from the MFA into the screening report. All information provided by the MFA was also placed on the public registry for the Project, as required under the CEAA.

2.6 Post Screening Determination

Responsible authorities completed the screening report in late May 2005 and released the report for a 30-day public comment period ending in late June 2005. Following receipt and consideration of public comments, responsible authorities will make their respective decisions under Section 20 of CEAA, taking into account the screening report and comments received from the public. Section 20 of CEAA provides responsible authorities with the following courses of action in respect of a project after taking into consideration the screening report and any public comments filed pursuant to subsection 18(3) of CEAA:

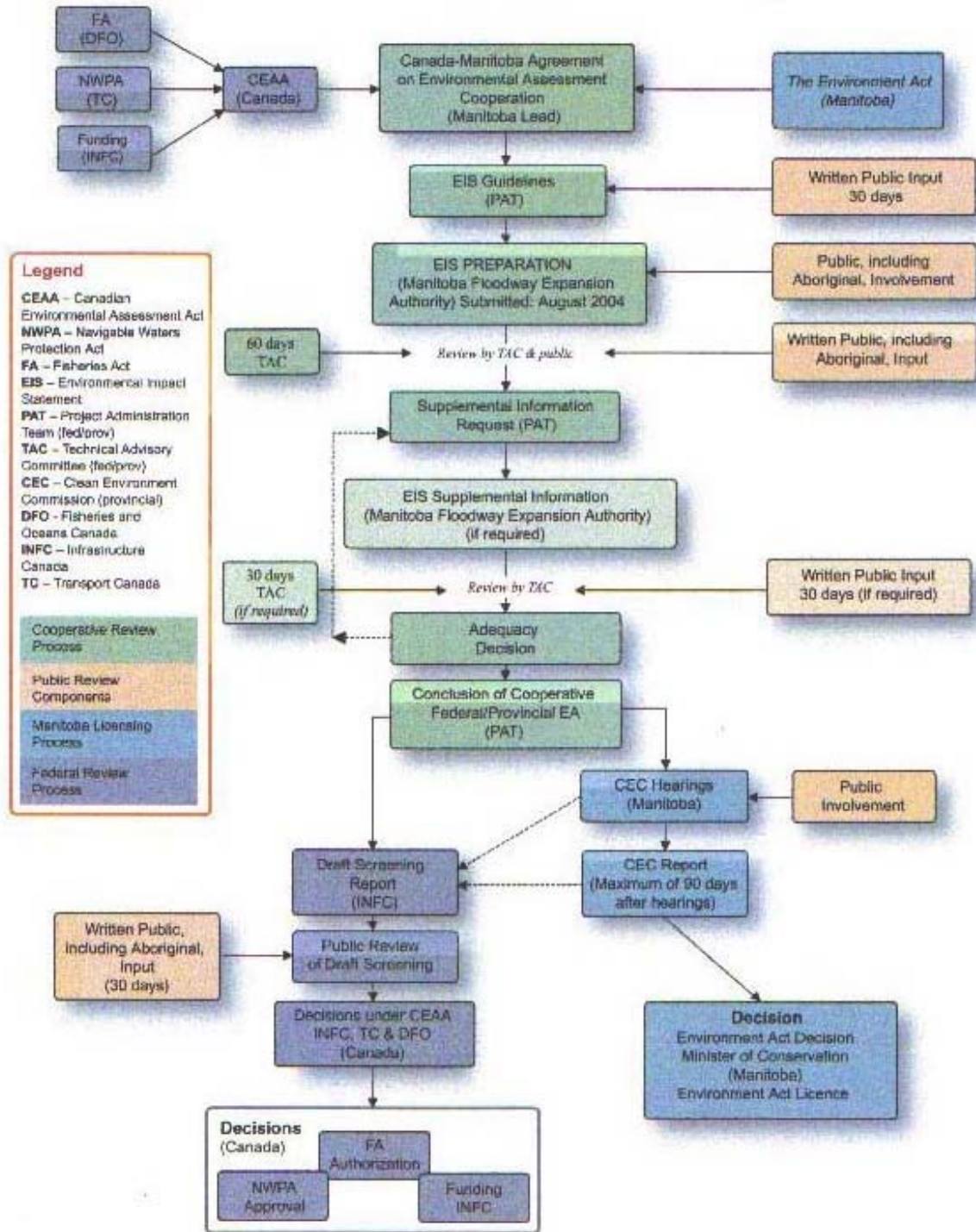
“(a) Subject to subparagraph (c)(iii), where, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, the project is not likely to cause significant adverse environmental effects, the responsible authority may exercise any power or perform any function that would permit the project to be carried out and shall ensure that any mitigation measures that the responsible authority considers appropriate are implemented;

(b) where, taking in to account the implementation of any mitigation measures that the responsible authority considers appropriate, the project is likely to cause significant adverse environmental effects that cannot be justified in the circumstances, the responsible authority shall not exercise any power, duty or function conferred on it by or under any Act of Parliament that would permit the project to be carried out in whole or in part; or

(c) where

- (i) it is uncertain whether the project, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, is likely to cause significant adverse environmental effects,

Figure 2. Cooperative Environmental Assessment and Licensing Process



Screening Report – Red River Floodway Expansion Project

- (ii) the project, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, is likely to cause significant adverse environmental effects and paragraph (b) does not apply, or
- (iii) public concerns warrant a reference to a mediator or a review panel,

the responsible authority shall refer the project to the Minister for a referral to a mediator or a review panel in accordance with section 29.”⁴

If it is determined that the project can proceed, with mitigation, the responsible authorities are required to ensure the implementation of mitigation, monitoring and follow-up measures deemed necessary. The mechanism(s) for addressing this responsibility will be determined through consultation with Manitoba. In addition, pursuant to the terms and conditions of the contribution agreement between INFC and Manitoba a federal-provincial oversight committee will verify that the work is proceeding in accordance with the approval under CEAA as a condition of release of any funds.

⁴ Statutes of Canada 1992. Canadian Environmental Assessment Act.

3. Scope

3.1 Introduction

The purpose of this Chapter of the Screening Report is to outline the scope of the assessment conducted by the federal responsible authorities (RAs) in relation to the Red River Floodway Expansion Project (the Project). The scope of the environmental assessment includes both the scope of the Project (those project components, undertakings and activities that are the subject of the environmental assessment) and the scope of the assessment (the factors to be considered in the environmental assessment and the scope of those factors, including their temporal and geographic extent). The scope has been established in accordance with Sections 15 and 16 of the *Canadian Environmental Assessment Act* (CEAA).

The scope follows from that described in the *Guidelines for the Preparation of an Environmental Impact Statement for the Red River Floodway Expansion Project* (Project Administration Team, 2004). These EIS Guidelines are provided in Appendix A.

3.2 Scope of the Project

The scope of the Project established for the purposes of this environmental assessment comprise the various components of the Project as described by the Manitoba Floodway Authority in the Red River Floodway Expansion Project Description (July, 2003), the Environmental Impact Statement (August 2004), the Supplemental Filings (November, December, 2004) and the undertakings, activities and works described in this document.

The scope of the Project includes the site preparation, construction, operation, maintenance and final disposition of all components of the Red River Floodway Expansion Project and, more specifically, the following works and activities:

- expansion of the existing floodway channel;
- restoration/armouring of the low flow channel;
- expansion of the opening in the East Embankment on the east side of the Grande Pointe Drop Structure;
- increasing the freeboard of and extending the existing West Dyke;
- modifying the bridges over the existing Floodway Channel;
- enlarging the existing Floodway Outlet Structure;
- fortifying and protecting the riverbank at and downstream of the Floodway Outlet Structure;
- replacing drainage structures, where necessary, along the east bank of the Floodway Channel;

- modifications to the Seine River Syphon;
- modifications to City of Winnipeg aqueducts crossing the Floodway Channel;
- extending a number of electrical transmission lines that cross the Floodway Channel;
- replacing a number of miscellaneous infrastructure crossings of the Floodway Channel;
- improving the existing Floodway Inlet Control Structure, and
-
- ancillary works such as construction staging areas, modifying and replacing culverts.

Not included within the scope of project for the purposes of this environmental assessment is the potential recreational use of the lands along the floodway channel and operation of the floodway in situations other than that provided in Rules 1 to 4 as these are not considered likely at this time. However, if there are substantial changes to the Project as assessed, in these or other respects, the responsible authorities will consider such changes in light of section 15(3) and 24(1) of CEAA.

3.3 Scope of the Assessment

The scope of the assessment of the Project includes the consideration of changes to the environment that may result from the Project, including but not limited to, consideration of:

- The environmental effects of the Project, including the environmental effects of malfunctions or accidents that may occur in connection with the Project and any cumulative environmental effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out;
- The significance of these effects;
- Comments from the public;
- Measures that are technically and economically feasible and that would mitigate any adverse environmental effects of the Project;
- The implications of the Project with respect to climate change;
- Alternative means of carrying out the Project that are technically and economically feasible and the environmental effects of any such alternative means;
- The need for and requirements of any follow-up program in respect of the Project; and
- The capacity of any renewable resources that are likely to be significantly affected by the Project.

The environmental effects of the Project includes any change that the Project may cause in the environment and any effect of any change in the environment on health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes by aboriginal persons, or any structure, site or thing that is of historical,

archaeological, paleontological or architectural significance. In addition, consideration is also given to any change to the Project, which may be caused by the environment.

3.4 Temporal and Geographic Scope

For screening purposes, consideration has been given to potential environmental effects that may be associated with the Project during construction-and operation and maintenance. As the floodway is intended to operate over a prolonged period in the future, decommissioning/abandonment is not considered likely and have consequently not been considered in the screening. However, final disposition of certain project components such as temporary crossings during construction have been taken into account. Specific temporal boundaries have been identified, as appropriate, for each environmental component, based on the expected or predicted interaction between components of the Project and the environment.

The geographic scope included the local areas directly affected by the undertakings associated with the Project, the regional area within which there may be environmental effects of a more regional or global nature, and the area within which cumulative environmental effects may be expected to occur. Specific geographic boundaries have been identified, as appropriate, for each environmental component, based on the expected or predicted interactions between the Project and environmental components.

3.5 Cumulative Environmental Effects

The cumulative effects assessment for the Project included consideration of the cumulative effects that are likely to result from the Project in combination with the effects of other projects or activities that have been or will likely be carried out in the reasonably foreseeable future. The assessment of cumulative effects included consideration of existing and proposed projects and activities within the regional assessment area. The effects of existing projects and activities including those of the existing Red River Floodway were considered as being part of baseline conditions.

4. Project Description

4.1 Project Definition

The description of the Project contained in this environmental assessment is presented as proposed by the Manitoba Floodway Authority (MFA) in its Project Description document (July 2003), Environmental Impact Statement (August 2004), the Supplementary Filings (November and December 2004) and various other documents. It also includes changes and clarifications made to the Project by the MFA through the cooperative environmental assessment process and the Clean Environment Commission public hearing.

The MFA proposes to expand the hydraulic capacity of the existing Red River Floodway, by widening the existing floodway channel and by modifying various associated bridges and other infrastructure. The Floodway, an integral component of the overall Manitoba flood protection system, is designed to divert flood waters around the City of Winnipeg. Subject to approval, construction of the Project is expected to commence in 2005, with substantial completion of the construction in 2009.

This screening level environmental assessment report has been prepared based on the engineering design information available at the time of drafting. Final engineering design commenced in the fall of 2004 and is expected to continue through to early 2009, as the various components of the Project are tendered for construction. As this engineering proceeds and as the Project is further discussed with regulators, improvements in Project design may be identified that result in changes to the final project description that would eventually receive licences, authorizations or permits. Should a major change occur to the Project during final engineering, the responsible authorities will determine whether the environmental assessment screening report requires an amendment.

4.2 Project Overview

The design objective for the expansion of the Red River Floodway is the requirement for the passage of a flood with a probability of being equaled or exceeded once in every 700 years. This flood magnitude is also referred to as the “1 in 700-year flood”, and represents the “design flood” for the Project. The design criterion of the Expanded Floodway to handle a flood of this magnitude is that this operating performance must be achieved at a maximum water level of 237.13 m (778 feet above sea level) at the Floodway entrance (Manitoba Floodway Authority, 2004a).

The primary components of the Project include:

Floodway Channel Excavation

- Widening of the channel in varying amounts up to as much as 60 m (200 ft) per side
- No deepening of the channel is proposed
- A volume of excavation of approximately 20,900,000 m³ (27,300,000 yd³)
- Re-vegetation of all areas where bare soil will be exposed by the excavation

Restoration/armouring of the Low Flow Channel

- Infill and excavation of previously eroded zones of the Low Flow Channel
- Placement of armouring along approximately 60% of the length of the Low Flow Channel (previously eroded zones) to protect against future erosion

Expansion of the opening in the east embankment on the east side of the Grande Point Drop Structure

- Removing approximately 400 m (1,300 ft) of the east embankment (existing spoil pile)
- Excavation of existing fill down to El. 235 m (771 ft)

Replacement of seven bridges

- St. Mary's Road Bridge, including realignment of road works
- CPR Emerson Rail Bridge
- Provincial Trunk Highway (PTH) 59 South (Southbound)
- Trans Canada East
- PTH 15
- PTH 59 North
- PTH 44

Rehabilitation of six bridges (including raising elevation of girders where needed)

- PTH 59 South (Northbound)
- CNR Sprague rail bridge
- GWWD rail bridge
- CPR Keewatin rail bridge
- CNR Redditt rail bridge
- CEMR Pine Falls rail bridge

Enlargement and improvement of the Outlet Control Structure

- Increase width (laterally across the channel) by approximately 50 m (164 ft)
- Enlargement of the stilling basin and improvement in its capability to dissipate energy by using energy absorbing appurtenances
- Rip-rapping (new) approximately 1.2 km along the west bank of the Red River downstream of the Outlet to protect the shoreline from erosion and repairing approximately 0.3 km of existing rip-rap.

Replacement/rehabilitation of drainage structures that discharge local runoff into the Floodway Channel

- Centreline Drain – replacement
- North Bibeau Drain – replacement
- Cook’s Creek Diversion – repair (retains 1 in 50 year capacity)
- Springfield Road Drain – replacement
- Shkolny Drain – replacement
- Ashfield Drain – replacement
- Transcona Storm Sewer Outlet – replacement

Modification of the two water supply aqueducts, the Deacon drain line, owned by the City of Winnipeg, the two RM of East St. Paul waterlines and the Seine River Syphon

Modification of seven electrical transmission line crossings

Replacement of utility lines

- 2 Manitoba Hydro fiber-optic communication lines
- 10 crossings or parallel natural gas lines
- 5 buried MTS cables
- 5 MTS cables on modified bridges

Replacement of two oil pipelines

Increase in height and length of the West Dyke to protect against wind effects during major floods

- Extension in length by 15 km (9 miles)
- Increase in height by up to 2.7 m (8.9 ft)
- Fill quantities totaling 4,600,000 m³ (6,000,000 yd³)

Improvement in protection and reliability of the Floodway Inlet Control Structure

- Erosion protection on the upstream and downstream surfaces of the embankments adjacent to the Inlet Control Structure
- Installation of a fire protection system in the control room and equipment room
- Improvements in redundant features in the gate systems
- Improvements to hoists

As noted in the Project Scope (Chapter 3), this environmental assessment considers all undertakings in relation to these project components (site preparations, construction, operations, modifications, maintenance and disposition as appropriate). More detailed

descriptions of these project components are provided in the EIS and Supplemental Filings. The information provided in this section of the screening report is intended to provide an overview and to focus on those project components and activities that may interact with the environment and for which environmental effects are predicted to occur.

4.3 Existing Floodway Facilities

The existing Red River Floodway consists of four components – The Floodway Channel, the Inlet Control Structure, the East and West Dykes, and the Outlet Structure. The existing floodway was completed in 1968 and first operated during a spring flood in 1969 (Manitoba Floodway Authority, 2004a).

Existing Floodway Diversion Channel

The existing floodway channel is an approximately 48-kilometre long, grass-lined diversion channel. The channel conveys a portion of Red River flow around the east side of the City of Winnipeg and discharges this floodwater back into the Red River via the outlet structure immediately downstream of Lockport (Manitoba Floodway Authority, 2004a).

The average depth of the channel is 9.1 metres, except through Bird's Hill Ridge, where the depth reaches 20.1 metres. The upstream end of the channel is equipped with an earthen lip, with a crest 2.1 metres above the channel bottom. The lip functions as an obstacle to keep river ice out of the channel, allowing river ice to break up and flow through the City of Winnipeg before flows rise enough to begin entering the channel. River ice is not desired in the channel as it can jam against bridge crossings over the channel, potentially resulting in damage to the bridges and a reduction of the capacity of the channel (Manitoba Floodway Authority, 2004a).

The existing channel has a longitudinal slope of 8.6 cm/km (0.5 feet/mile) upstream of Bird's Hill and a steeper slope of 16 cm/km downstream of Bird's Hill. In order to address concerns of erosion within the channel, the maximum design water velocity is 1.5 m/s (Manitoba Floodway Authority, 2004a).

The existing Floodway Channel was designed to convey a flow of 1,700 m³/s (60,000 cfs) while maintaining a water surface elevation on the Red River at the channel entrance of 234.77 metres. Thirteen bridges cross the channel and were designed to have a maximum cumulative hydraulic impact on the channel water levels of 0.3 metres at a design flow of 1,700 m³/s (60,000 cfs). The ultimate capacity of the channel, assuming the bridges were not in place, was estimated to be 2,800 m³/s (100,000 cfs), with a corresponding elevation of the water surface at the channel entrance of 237.13 m and a minimum freeboard along the floodway channel embankments of 0.6 metres. This represents the maximum water level south of the

Screening Report – Red River Floodway Expansion Project

structure that could be allowed without potential overtopping of the West Dyke or the Floodway embankments (Manitoba Floodway Authority, 2004a).

On the basis of discharge metering data collected between 1969 and 1999, the Floodway Channel capacity was re-estimated to be 1,700 m³/s (61,500 cfs) when the surface water elevation at the channel entrance is 234.77 m. In addition, the roughness coefficient of the channel was reduced to reflect the actual existing channel performance. The channel capacity with the bridges in place is estimated to be 2,500 m³/s (90,000 cfs) for a level of 237.13 m at the channel entrance. The MFA estimates that, if the bridge crossings were removed or raised, the ultimate capacity of the channel would be 2,800 m³/s (100,000 cfs). This increase in capacity could be gained if only the seven most upstream bridges were raised or removed (Manitoba Floodway Authority, 2004a).

Existing Inlet Control Structure

The entrance to the Floodway is located in the eastern bank of the Red River near St. Norbert. An earth-fill weir at the entrance ensures that flows below flood level continue down the Red River. The inlet control structure is located on the Red River just downstream of the floodway inlet. The purpose of the structure is to regulate the flow between the natural channel of the Red River and the Floodway Channel, during the period of high water levels. The gates of the control structure are normally in a submerged position with about 1.8 metres of water over them in the summer months (Manitoba Floodway Authority, 2004a).

The Inlet Control Structure consists of two independent steel gates housed within a monolithic concrete structure. Each gate has its own flow channel and is separated by a central concrete pier that supports the inlet control structure bridge deck and control room. The Inlet Control Structure constricts the Red River to approximately half of its width when the gates are down. Through controlled raising and lowering of the flow control gates, the inlet control structure regulates the water level in the Red River at the entrance of the floodway channel, controlling how much of the Red River's flow is allowed to pass through Winnipeg and how much is diverted to flow through the floodway channel. During non-flood conditions, the gates rest in a fully down position with the top of the gates at elevation 728 feet at the river bottom. In summer months the elevation of the surface of the Red River is normally about 734.35 feet (Manitoba Floodway Authority, 2004a and 2004b). This water level is maintained by the St. Andrews Lock and Dam (just upstream of the existing Floodway Outlet Structure) during the open water season.

Existing Outlet Structure

The purpose of the Outlet Structure is to dissipate the differential energy in the water from the Floodway Channel at its point of reentry into the Red River near Lockport, preventing damage and erosion to the channel and to the River. The difference in water level over the

entire reach of the Floodway Channel from inlet to outlet is about 5 metres under design conditions. The corresponding difference in elevation along the Red River between those two points is about 10 metres. The Outlet Structure is founded on bedrock and is constructed of concrete with an uncontrolled rollway, a crest length of 160 feet and a stilling basin 120 feet in length. The design capacity of the existing Outlet Structure is 1,700 m³/s (60,000 cfs) (Manitoba Floodway Authority, 2004).

Existing West and East Dykes

Floodwaters are retained on either side of the Inlet Control Structure by dykes. East of the Red River, the East Dyke is incorporated into the embankment created by the Floodway Channel. This dyke extends parallel to the Floodway Channel and on its west base for a distance of 9.7 km. West of the Red River, the West Dyke extends about 32 kilometres from the Inlet Control Structure to a point where the natural ground elevation is above the design flood elevation. The West Dyke contains the floodwaters of the Red River from the southwest and prevents the flow from passing into the LaSalle River watershed, where it could bypass the Inlet Control Structure. During the 1997 Flood, the West Dyke was raised and extended an additional 25 kilometres to prevent floodwaters from bypassing the structure and entering the City (Manitoba Floodway Authority, 2004).

4.4 Schedule and Sequencing of Construction

The EIS indicates that the construction of the expanded floodway and associated works is proposed to take place over about a four-year time period, commencing in the summer of 2005 and extending until the summer of 2009. The schedule is intended to achieve a reasonable balance between utilizing local resources, minimizing the disruption of traffic flows over bridges that require modifications and completing the work in an acceptable timeframe. Each year of construction will achieve an incremental increase in the capacity of the Floodway to handle large floods. The construction schedule is premised on the receipt of approval in the early summer of 2005 (Manitoba Floodway Authority, 2004a).

Channel Expansion

Construction of the Low Flow Channel is scheduled to occur in the late fall or early winter, when flows are low. Excavation and erosion protection of the Main channel will occur between April and November each year (depending upon weather and Spring runoff), commencing in 2005 and concluding in 2009 (Manitoba Floodway Authority, 2004a). The MFA also indicates that the construction schedule could be advanced and the expansion of the channel could occur within a shorter timeframe.

Rail Bridges

Construction work on the rail bridges would occur over a 4-year period, commencing in 2005 and concluding in 2009. Work duration ranges from 6 months for the CEMR Pine Falls Bridge to 15 months for the CNR Sprague and Redditt and CPR Keewatin bridges. The schedules reflect work continuing through the winter and during April and May when the Floodway Channel is inaccessible. Work during these time periods will be focused on the substructure and superstructure. Work in April and May will only be undertaken on elements of the Project that do not require access to the main Floodway Channel (Manitoba Floodway Authority, 2004a).

Highway Bridges

Work on the highway bridges would extend over a four-year period and would proceed during the winter and April and May on components of the bridges which do not require access to the Floodway Channel. Duration of work ranges from 18 months for the St. Mary's Road Bridge to 29 months for the TCH No. 1 East Bridge and PTH 15 Bridge (Manitoba Floodway Authority, 2004a).

Utilities/Transmission Lines

The timing of utility and transmission line work spans 4 construction seasons and generally reflects the latest dates by which the relocations can be completed without interfering with work associated with the Floodway Channel (Manitoba Floodway Authority, 2004a).

Outlet Structure

The proposed modifications to the Outlet Structure would be undertaken in three phases, over two years, commencing in mid-2007. In the first phase, a new east wall and new east rollway section would be constructed while the existing outlet structure remains in place and operational. During the second phase, the existing west structure would be isolated and modified, while the new east structure remains operational. In the final phase, excavation of earth and rock, and subsequent construction of the remaining rollways would take place (Manitoba Floodway Authority, 2004a).

West Dyke

Construction of an expanded West Dyke is projected to take two to three years commencing in 2006, with each construction season spanning the months of May to November. This construction is relatively independent of all other construction activities (Manitoba Floodway Authority, 2004a).

Aqueduct Modifications

The Aqueduct relocation schedules must be integrated with the construction of the proposed Water Treatment Plant and other City of Winnipeg regional water supply upgrading

programs. The work is scheduled for completion during 2006, in the months of October and November, when flows are at their seasonal lows and weather conditions are favourable (Manitoba Floodway Authority, 2004a).

Drain Replacements

The construction activities associated with drain replacements would be coordinated with the earthwork activities in the Floodway Channel.

RM of East St. Paul Water lines

The construction activities associated with the two water lines would be coordinated with the earthwork activities in the Floodway Channel.

Seine River Syphon

Modifications to the Seine River Syphon are scheduled to occur from June to November 2007.

Floodway Inlet Control Structure

Erosion protection measures above the normal water level at the Inlet Control Structure are proposed for the early fall of 2006 and modifications to the control gates and operation systems are proposed to be undertaken in the late fall or early winter of 2005, when the risk of a flood is minimal.

4.5 Operation of the Project

The Floodway is operated according to a “state-of-nature” discharge-rating curve developed using conditions in Winnipeg following the 1950 flood and before the development of the major flood control works (Red River Floodway, Portage Diversion, Shellmouth Dam and Reservoir and the Winnipeg’s primary dykes) and a set of operating rules updated after the 1997 flood (Manitoba Floodway Authority, 2004a). An updated “state-of-nature” discharge-rating curve was developed following the 1997 flood and using current computer based hydraulic analysis. This updated “state-of-nature” discharge-rating curve was used to determine the baseline condition for the purposes of the environmental assessment and is used to calculate the “natural” elevation of water at the Inlet Control Structure. This “natural” elevation is the level in the Red River immediately upstream of the Inlet Control Structure that would occur if the major flood control works did not exist.

The original policy of operation of the Floodway, established in March of 1970, stated:
“The Red River Floodway will be operated to provide maximum protection for the Metropolitan Area of Winnipeg but, at the same time, the interests upstream of the Floodway should not be adversely affected. In order to accomplish this, the water levels upstream of the Inlet Control

Screening Report – Red River Floodway Expansion Project

Structure shall be maintained at the elevation which would have been obtained under natural conditions except as noted...” (Red River Floodway Program of Operation, 1970 in Manitoba Floodway Authority, 2004b).

Detailed operating rules were developed in October 1984 to assist in achieving compliance with this policy. In 1997, following the flood, the Province of Manitoba appointed the Red River Floodway Operations Review Committee to review the rules and criteria for operation of the Red River Floodway. The changes recommended by the Operations Review Committee were accepted by the Province in April 2000 and are incorporated into the current operating rules.

Four main operating rules govern the operation of the Floodway, three of which apply to spring conditions and the fourth to non-spring emergency operations:

Rule 1 – Normal Operations

The Floodway should be operated to maintain “natural” water levels on the Red River at the entrance to the Floodway Channel, until the water surface elevation at the James Avenue gauge in downtown Winnipeg (also known as James Avenue Pumping Station Datum or JAPSD) reaches an elevation of 24.5 feet JAPSD, or the river level anywhere along the Red River within the City of Winnipeg reaches 2 feet below the Flood Protection Level of elevation 27.8 feet JAPSD. Zero (0) feet at JAPSD is 727.57 feet above sea level and is associated with the normal river ice level.

Rule 2 – Major Flood Operation

Once the river levels in Winnipeg reach the limits described in Rule 1, the level in Winnipeg should be held constant while river levels south of the Inlet Control Structure continue to rise. Furthermore, if forecasts indicate that river levels south of Winnipeg will rise more than 2 feet above natural, the City must proceed with emergency raising of the dykes and temporary protection measures on the sewer systems in accordance with the flood levels forecasts within Winnipeg. The water levels in Winnipeg should be permitted to rise as construction proceeds, but not so as to encroach on the freeboard of the dykes or to compromise the emergency measures undertaken for protecting sewer systems. At the same time, the Province should consider the possibility of an emergency increase in the height of the Floodway embankments and the West Dyke. At no time will the water level at the Floodway Channel's entrance be allowed to rise to a level that infringes on the allowable freeboard on the Floodway West Embankment (Winnipeg side) and the West Dyke.

Rule 3 – Extreme Flood Operation

For extreme floods, where the water level at the Floodway Channel's entrance reaches the maximum level that can be held by the Floodway West Embankment and the West Dyke,

Screening Report – Red River Floodway Expansion Project

the river level must not be permitted to exceed that level. All additional flows must be passed through Winnipeg (Manitoba Floodway Authority, 2004a).

The Floodway has been operated in response to spring flood events in 22 years since it was commissioned in 1968.

Rule 4 – Emergency Operation

In November 2004, Manitoba Water Stewardship adopted a formal rule governing decisions to carry out emergency operation of the Floodway to reduce sewer back-up in Winnipeg during non-spring periods, given that there will likely be circumstances in the future where there are significant rainstorms forecasted while river levels are elevated above normal levels.

Rule 4, entitled “Rules for Emergency Operation of the Red River Floodway to Reduce Sewer Backup in Winnipeg”, includes specific criteria related to water levels and the use of the Floodway after the spring crest from snowmelt runoff at Winnipeg, whenever high river flows substantially impact the capacity of Winnipeg’s combined sewer system. Rule 4 indicates that as long as the Department of Water Stewardship forecasts that river levels for the next 10 days will be below 14 feet James Avenue Pumping Station Datum (JASPD), then the Floodway control structure would not be operated. When river levels are forecasted to rise to 14 feet JASPD or higher, then the Department of Water Stewardship must prepare a report describing:

- o River level forecast basis and risk assessment;
- o Risks of basement flooding, including predicted peak river levels in the next 10 days, length of time forecasts levels to be at 14 feet JASPD or higher and risk of intense rainfall in the next 10 days;
- o Benefits and costs of floodway operation, including
 - o Extent of basement flooding and property damage expected;
 - o Risk to health of Winnipeg residents due to sewer back-up;
 - o Economic losses and damages expected;
 - o Impacts of operation of the floodway on fish and wildlife;
 - o Risks and costs of riverbank instability caused by operation of the floodway;
 - o Other benefits and costs as appropriate
- o Measures that may be taken to mitigate those costs and benefits including minimizing the rate at which river levels are changed both upstream and downstream and providing means to assure fish passage;

The Rule also indicates that the Department will not recommend operation of the Floodway unless the expected benefits of doing so clearly and substantially outweigh the

Screening Report – Red River Floodway Expansion Project

expected costs. The Department's report and recommendation are provided to the Minister of Water Stewardship, who will make a decision respecting Floodway operation based on consideration of the report, subject to the following conditions.

The Floodway Control Structure will operate under Rule 4 to raise river levels immediately upstream of the Inlet Control Structure to an elevation no higher than 760 feet above sea level (to maintain river levels below the top of the riverbank), to achieve a river level of no less than 9 feet JASPD or except in circumstances of extreme urgency, to lower river levels no more than 1 foot per day.

The new Rule 4 also includes provision for Manitoba Water Stewardship to maintain a program of compensation for property damages incurred by property owners arising from flooding caused by floodway operation under this rule and for notification of the public regarding the pending use of the floodway (Manitoba Floodway Authority, 2004b).

In 1993, higher than normal summer water levels occurred in July in combination with heavy thunderstorms. Extensive basement flooding damage due to sewer backups occurred within Winnipeg primarily due to the fact that emergency operation of the Floodway was not performed. Total damages were estimated at over \$100 million. When the Red River is high the, combined sewers are not able to provide relief from large rainstorms because gravity discharge is significantly reduced or eliminated. Flood Pumping Stations, which are typically activated to lift the wastewater into the River, were overwhelmed as they were designed for smaller spring rainstorms and have much less capacity than gravity discharge.

The Floodway has been used in an emergency on two occasions during the summer, as discussed below. In the April 2005 submission, the MFA indicate that the conditions necessary to operate the Floodway under Rule 4, occurred in the past less than 45% of the time.

The Floodway was operated during the period of July 5 to August 4, 2002 as an emergency measure to reduce the potential for widespread basement flooding in Winnipeg and the resulting risk to health and property damage. As a result of Floodway operation, the Province provided compensation to property owners upstream of Winnipeg who suffered damage as arising from artificial flooding (Manitoba Floodway Authority, 2004b).

Use of the Floodway was also authorized between June 10 and July 30, 2004, again as an emergency measure to reduce the probability of widespread basement flooding in Winnipeg and the resulting risk to health and damage to property. The Province also made compensation available to local governments, individuals, farm and market garden operations, small businesses and non-profit organizations that had incurred losses or damages as a result of the operation of the Floodway (Manitoba Floodway Authority, 2004b).

4.6 Alternatives

4.6.1 Environmental Impact Statement

The conceptual definition of the proposed Floodway Expansion Project was developed through a series of studies that began after the flood of 1997. The EIS reviewed the various studies and reports, and the alternatives to the Project that were considered.

The International Joint Commission (IJC) announced the appointment of the International Red River Basin Task Force in 1997 to examine a range of alternatives to prevent or reduce future flood damage. The Task Force undertook and commissioned a series of studies and, in 1999, commissioned a study of the flood risks in Winnipeg and possible means of reducing those risks. The results of this study were reported to the IJC Task Force in 1999, and in 2000 (Flood Protection in Winnipeg; KGS Group 1999, Part I, II, and III) concluded that the preferred options to provide a major increase in flood protection for Winnipeg were the Ste. Agathe Detention Structure and the Floodway Expansion.

The selection process that led to these two preferred alternatives included examination of a wide range of alternatives that included:

- channel improvements to the Red River in Winnipeg and the river reach north of Winnipeg to increase the discharge capacity of the river
- diversion of the eastern tributaries of the Red River around the City to re-enter the Red River North of the existing Floodway Outlet
- a detention structure on the Red River upstream of Winnipeg near Ste. Agathe where some of the flood waters of the Red River would be detained temporarily during an extreme flood
- raising the primary dikes in Winnipeg on a permanent basis to permit more flow to safely pass through the river during a flood
- installing of a massive pumping plant at the inlet to the floodway to mobilize the large discharge capacity of the floodway at high water levels
- increase the freeboard on the west dike and modify the operation rules to permit more frequent and higher water levels upstream of the floodway inlet
- remove a portion of the east embankment of the floodway to permit more efficient entrance of floodwaters into the floodway
- removal of the outlet control structure on the floodway
- removal of the entrance weir at the inlet of the floodway
- raise the bridges along the floodway channel to increase the hydraulic capacity at high water levels

Screening Report – Red River Floodway Expansion Project

- construct a twin floodway to the existing channel to increase the discharge capacity of the diversion
- construct a separate new floodway channel to the west of Winnipeg
- increase the capacity of the Portage Diversion thereby reducing the potential for the Assiniboine River to exacerbate flood levels in Winnipeg
- increase the height of the Shellmouth Dam to develop more storage capacity that could further reduce the contribution of flood waters from the Assiniboine River
- expand the existing floodway to increase its discharge capacity and continue with the operating rules

Further studies on flood protection alternatives were conducted. During 2001, the two preferred options were investigated in terms of biophysical and socio-economic effects, legal considerations, operational risks, flood management, implementation schedule and other matters without selecting a preferred option. Manitoba conducted concurrent consultations with the public regarding the project alternatives. The Manitoba Clean Environment Commission then held a series of public meetings in early 2002 in the flood study region and reported on the public issues raised during the meetings. An all-party committee of the Manitoba legislature reviewed the technical and public consultation information. The Manitoba Government subsequently selected the Floodway Expansion as the preferred flood protection alternative for the City of Winnipeg. The Federal Government supported this decision, which resulted in a Canada – Manitoba cost sharing agreement in December 2003.

The planning and environmental assessment process considered alternative means for carrying out the Project within the defined site (e.g. widening vs. deepening of the existing channel, retrofit vs. new higher bridges) and resulting refinements to the Project definition. Alternative means were considered for all major Project components including the Floodway channel, inlet and outlet structures, drainage structures, bridge and utility crossings, west dike enhancements, etc. Detailed information on the alternatives considered and the rationale for the selected alternative are provided in Chapter 2 of the EIS.

In addition, with respect to alternative mitigation strategies, e.g. erosion control and sediment transport mitigation during construction, the MFA referred to environmental protection plans, which would be completed after final design is approved and before project construction commences. Alternatives considered in the EIS for riverbank erosion mitigation included rip rapping, planting of adaptive vegetation and a combination of the two.

A summary of the comments received on the issue of alternatives during the review of the EIS, Supplemental Filings and at the CEC hearing is provided in Appendix 2.

4.6.2 Responsible Authority Conclusion

Taking into account the information contained in the EIS and the comments received from government agencies and the public, the responsible authorities conclude that there has been adequate consideration of the issue of alternatives. Furthermore, the responsible authorities recognize that further consideration to alternative mitigation strategies will be given during the final design of the Project and in the preparation of Environmental Protection Plans and other follow-up plans. This will include, but not be limited to:

- alternative culvert designs to provide for fish passage/navigation;
- alternative drop structure designs;
- alternative erosion minimization measures;
- alternative sediment control measures;
- alternative construction material, fuel and hazardous goods storage and handling practices;
- alternative timing and sequencing of construction activities, and
- alternative mitigation strategies for groundwater protection.

5. Environment Description

5.1 Introduction

The Guidelines for the Preparation of an Environmental Impact Statement (EIS) for the Red River Floodway Expansion Project (EIS Guidelines) (Appendix A) required that the Manitoba Floodway Authority (MFA) describe the environmental setting for the Project including a broad overview of the local area and the spatial and temporal zones within which there may be environmental effects either regional or global in nature (Project Administration Team, 2004). The EIS Guidelines also required that a description of any deficiencies or limitations in the existing environmental data base be reported and any plans to collect required additional data be described.

Specific requirements were detailed in the EIS Guidelines for the physical, aquatic, terrestrial and socio-economic components of the environment. The EIS was organized based on those environmental components (Manitoba Floodway Authority, 2004). The following environmental description is adapted from the EIS (Manitoba Floodway Authority, 2004a), the Final Report on Flood Protection Studies for Winnipeg (KGS Group, 2001) and supporting references.

5.2 Physical Environment

5.2.1 Floodway Study Region

An overall Floodway Study Region was defined for the Project to include all environmental components based on the maximum geographic extent to which the Project may be expected to have discernable biophysical effects. The Region extended through the Red River Valley from just north of the Town of Morris in the south to the southern tip of Lake Winnipeg in the north based on the extent to which water levels and flows may be affected by the Project during different flood events. Eastward, the Region extended to Highway 12 and then followed the southern boundary of the RM of Taché. Westward, the Region extended to the eastern border of the Rural Municipality (RM) of St. Francis Xavier and included the West Dyke expansion in the RM of Macdonald.

5.2.2 Regional Geology

The Red River Floodway is located within the glacial Lake Agassiz clay plain of the Manitoba Lowlands physiographic region, with topographic relieve generally less than 25 feet, rising slowly eastward and westward away from the Red River.

Surficial sediments overlying the Paleozoic carbonate bedrock are composed of glaciolacustrine clays and an underlying calcareous silt till. Depth to bedrock is variable in the

Screening Report-Red River Floodway Expansion Project

City of Winnipeg area, with a thick cover of overburden in areas to the south and southwest. The Bird's Hill glaciofluvial complex is part of a larger complex of esker ridges, kames and kettle holes that extends northward to Lake Winnipeg.

Bedrock beneath the City of Winnipeg consists of gently westerly dipping Paleozoic strata. Ordovician-aged carbonate rocks underlie the area and consist predominately of dolomite, argillaceous dolomite, calcareous shales and mottled dolomite limestone commonly referred to as "Tyndall Stone". Typically, the bedrock at shallower depths in the Winnipeg region shows some degree of fracturing, confined by the overlying till and clay units.

Overlying the bedrock is an assemblage of glacial sediment, deposited by ice during multiple Pleistocene glaciations. Calcareous silt till, situated directly on the bedrock, is 3 to 30 feet in thickness. The till surface is fluted in many places with ridges that are generally oriented northwest to southeast and are up to several feet in areas southeast of the City. Glaciofluvial sediments northeast of Winnipeg, in the Bird's Hill area, consist of sands and gravels 50 to 100 feet thick that were deposited in ice contact by glacial meltwater. There are several poorly-graded sand and gravel beaches, spit complexes, and nearshore sand and gravel bars around the periphery of the glaciofluvial core of Bird's Hill.

Lake Agassiz deposition of the glaciolacustrine clay resulted in sediments 30 to 50 feet in thickness near Winnipeg and thinner sediments from Bird's Hill to Lockport. In many areas, massive clay to silty clay is overlain by laminated silt to clayey silt, which is lighter in colour and is typically found from the surface to shallow depths in the Winnipeg area. These deposits may also include fine sand and silt in areas adjacent to Bird's Hill. The base of the clay sequence is often inter-bedded with the underlying silt till. The variable texture of these upper Lake Agassiz clay plain sediments has resulted in site-specific variability in geochemical and shallow groundwater signatures.

The overburden along the Floodway Channel consists primarily of high plasticity lacustrine clay overlying an uncemented to cemented silt till and Paleozoic limestone. The bedrock forms the regional confined upper carbonate aquifer. The existing main channel cuts into the glacial till intermittently for approximately 28% or 13 kilometres (8 miles) of the 47 kilometre Floodway length. The Low Flow Channel cuts into till for approximately 38% or 18.3 kilometres (11.4 miles). The channel also cuts through 1.5 kilometres (1 mile) of sand and gravel outwash complex at Bird's Hill.

Lacustrine clay is up to 10 metres (33 feet) in thickness near the Floodway Inlet, decreasing to 1 or 2 metres thickness locally between Highway 59 south and Trans-Canada Highway crossings. The till unit is exposed in the Floodway Channel between Highway 15, the CNR Redditt Rail Bridge and Cook's Creek, for 2.5 kilometres south of the CPR Keewatin Rail Bridge, and extensively downstream of the Highway 59 North crossing.

5.2.3 Groundwater

Regionally, there are two main aquifers, the unconfined aquifer which is located in a sand and gravel deposit above the bedrock, and a confined upper carbonate aquifer located within 15 and 30 metres of dolomite and limestone bedrock which is covered by clay/till overburden. Groundwater flow direction in the Greater Winnipeg region typically reflects the topographic gradient of the land surface. The principal recharge area for the bedrock aquifer is through the till unit, where the till is not covered by clay, as in the east of the Town of Anola. Recharge to the bedrock aquifer also occurs through the glaciofluvial sand and gravel deposits such as the Bird's Hill aquifer because the clay is absent. To the east of the Red River, groundwater flow in the bedrock aquifer is generally from east to west with groundwater discharging to the Red River. In the unconfined aquifers, groundwater flow directions radiate from the highest area of the mound towards the edge. On both the clay plains and at the sand and gravel mounds, vertical hydraulic gradients are downward towards the bedrock aquifer. Upward vertical gradients occur at the large surface water drainage features such as the Red, Assiniboine and Seine rivers and at the bottom of the Floodway, where groundwater discharges to become surface water.

Groundwater in the carbonate bedrock near the Floodway is generally high in dissolved solids (>500 mg/L), reflecting the natural carbonate hardness. Lower dissolved solids are found in the carbonate bedrock at Bird's Hill. The chloride values have been measured at 140 and 146 mg/L between St. Mary's Road and St. Anne's Road and generally decrease further north. Chloride values in bedrock at Bird's Hill were less than 25 mg/L reflecting freshwater recharge from the granular aquifer. Analysis for trace metals has shown that bedrock water quality exceeds the aesthetic objective for iron in most of the provincial water quality tests, and manganese has exceeded the objective in the Spring Hill area.

5.2.4 Surface Water

The Red River originates near the North Dakota/South Dakota border and flows north for 550 miles into the south end of Lake Winnipeg. The drainage basin encompasses approximately 107,000 square miles, including much of northern Minnesota and North Dakota, southeast Saskatchewan and southern Manitoba. The Assiniboine River, which converges with the Red River in downtown Winnipeg, accounts for approximately 59,000 square miles of the total drainage area. At Lockport, 45% of the flow originates from Manitoba, 46% from the United States and 9% from Saskatchewan.

The Red River flows through glaciolacustrine deposits that aggraded within glacial Lake Agassiz. The River has a fairly uniform, continuous descent northward, averaging less than 0.5 feet/mile; consequently water velocities are low. It is a typical lowland zone stream, consisting of oxbows and meanders, highly turbid waters, and substrates composed of silt/sand and/or gravel/cobble. In general, substrates from St. Adolphe to the north end of the City of Winnipeg are primarily composed of silt, clay, sand and/or gravel. From the north end of the City

downstream to Selkirk, substrates are composed primarily of limestone boulders and cobble. Substrates return to silt, mud and clay as the River approaches Netley Marsh at the south end of Lake Winnipeg.

Flows on the Red River have fluctuated over time with seasons and precipitation. Since the Floodway was constructed, peak river flows have occurred in 1974, 1979, 1996 and 1997, with the latter being the largest flood ever in recent history. Other extreme flood events have occurred in 1826 and 1950. Some 75% of the Red River basin's 50 cm of annual precipitation falls between April and September, with about two-thirds of that falling in May to July. Elevated flows occur from April to late May each year and range from 600 to 2,900 m³/sec. Precipitation, ice break up, and spring runoff all contribute to the high flows observed during the spring months. Flow rates tend to taper off in June and are sometimes followed by a slight increase during July due to precipitation events from thunderstorms in the watershed. Relatively constant flows of 100 to 250 m³/sec occur during the remainder of the year.

Flooding is a frequent occurrence in the Red River Basin, usually in the spring as a result of heavy precipitation the previous fall, hard and deep frost prior to snowfall, substantial snowfall during the winter months, and sudden thaws or heavy precipitation during break up. The low absorptive capacity of clay soil in the basin is also a contributing factor. Ice jams north of Winnipeg are also a cause of spring flooding. Early records indicated several major floods in the 1800s with the most notable in 1826, 1852 and 1861. Over the past 100 years, major floods have occurred in 1950, 1966, 1979, 1996 and 1997. The flows for the major flood events ranged from 3,058 m³/sec in 1950 to 4,587 m³/sec in 1997, and to 6,371 m³/sec in 1826.

The Red River water quality is relatively well understood. The City of Winnipeg, the Province of Manitoba and Environment Canada test water quality in the Red River on a regular basis and have long-term water quality databases. Water quality of the River is characterized by high levels of turbidity, total suspended solids (TSS) and nutrients. Turbidity and TSS levels are related to discharge and are generally highest during the spring freshet in April and lowest during the winter. Manitoba's Water Quality Standards, Objectives and Guidelines for Total Suspended Solids (TSS), phosphorus, ammonia and fecal coliforms. Many of these exceedences are related to low flows during the winter and drought conditions.

5.3 Aquatic Environment

5.3.1 Fish

At least 57 native fish species are known to inhabit the Manitoba portion of the Red River and its tributaries. An additional 9 fish species have been introduced to the River system. Some 18 species are commonly caught by anglers along the Red River in Manitoba. The most common species are reported to be goldeye, channel catfish, walleye, white sucker, sauger, carp, freshwater drum, golden redhorse, silver redhorse, shorthead redhorse, mooneye and northern pike. There are no species currently designated as endangered or threatened;

however, the bigmouth buffalo, big mouth shiner, silver chub and chestnut lamprey are listed as Species of Concern on Schedule III to the *Species at Risk Act* (SARA). The Lake Sturgeon is presently being considered for listing under SARA.

The majority of the Red River fish species spawn during the spring when discharges are high and water temperatures are rising. A few species such as channel catfish, freshwater drum, carp and goldeye and a number of Cyprinid species, spawn during late spring and into early summer. None of the fish species found in the Red River upstream of Lockport spawn in the Red River or its tributaries during the fall. Lake whitefish spawn in the late fall off rock/gravel shoreline areas of Lake Winnipeg. Burbot is the only known winter spawner in the Red River. Specific spawning locations within the main stem of the River are largely unknown; however, tributaries and tributary mouths are known to provide important spawning habitat for many fish species.

Red River fish populations tend to be highly mobile during open-water periods. Fish tagged in Winnipeg have been recaptured 256 miles south at Halstad, Minnesota, and 153 miles north at Dogwood Point on Lake Winnipeg. Fish in the River have been shown to travel up to 34 miles in two days and 250 miles in 14 days. A large portion of the fish within Winnipeg's perimeter appears to leave the City during the fall. Fish that remain within the City limits during winter remain relatively stationary in the deeper reaches of the River.

5.3.2 Lower Trophic Levels

Over 200 species of plankton occur in the Red River and are generally grouped as either zooplankton or phytoplankton. Six main types of algae occur in the Red River: blue-green algae, green algae, diatoms, euglena silicoflagellates and Cryptophyta. Green algae and diatoms comprise 90% of the algae in the River. Other algae and zooplankton make up less than 1% of the volume of plankton in the Red River. Each species of algae has a period of accelerated growth or "bloom" season in which the population increases and then decreases. Consequently, the total algae biomass varies seasonally and annually.

The benthic invertebrate community in the Red River is diverse with species representing six main Phyla: Annelida (segmented worms), Arthropoda (insects and crustaceans), Mollusca (bivalves and snails), Nematoda (round worms), Cnidaria, and Platyhelminthes (flat worms). Approximately 50 families within these Phyla have been identified to occur historically in the Red River. Lower trophic level and aquatic invertebrate sampling has not occurred in the Floodway Channel or ditches and drainage channels associated with the West Dyke.

Approximately 32 species of freshwater clams and mussels occur or potentially occur in the Red River, of which 23 species are considered common. Clams and mussels are of special concern because the Red River has the most diverse assemblages of freshwater clam species in any Canadian River. Also, general habitat degradation and destruction within the

Red River over the past 20 to 30 years has resulted in a decline in the abundance of all clam species, and most mussel species present are at the limit of their range and any further degradation of habitat would be difficult to rebound from. The occurrence of clams along the Red River substrate is usually patchy and discontinuous due to their specialized habitat requirements.

5.4 Terrestrial Environment

5.4.1 Ecological Areas

The Floodway Study Region occurs within the Prairie, Boreal Plains and Boreal Shield ecozones of southern Manitoba. The ecozones within this Region are subdivided into three ecoregions (Lake of the Woods, Lake Manitoba Plain and Interlake Plain), which collectively contain nine ecodistricts. Within these ecodistricts are areas specially designated for wildlife management and wildlife and/or ecosystem protection including, 21 provincial parks, 21 wildlife management areas, three important bird areas, three heritage marshes, one special conservation area, and one provincial park reserve.

5.4.2 Vegetation

Most of the Region is part of the Winnipeg Ecodistrict which occurs in a transitional zone between the grassland biome and aspen-oak forest. The aspen parkland zone encompassing most of the Region is bordered by a zone of native prairie to the southwest and by deciduous forest to the north and east. Remnant strands of aspen parkland and native prairie have been highly modified by agriculture. Native vegetation, which originally consisted of aspen-oak forest and tall grass prairie and meadow grass associations, has been largely replaced by cultivated cropland.

Native woods commonly occur along stream channels and as isolated tree communities in the agricultural areas. Trembling aspen and bur oak are normally the dominant tree species. Common understory species include snowberry, red osier dogwood and goldenrod. Balsam poplar usually occurs in moister locations. Elm, basswood, cottonwood, green ash, and willow are typically confined to alluvial deposits and floodplains. Landscape plantings and treed shelterbelts are relatively common at farmsteads and rural residential properties throughout the Region.

5.4.3 Wildlife

Certain ecodistricts within the Floodway Study Region and specially designated areas within these ecodistricts are recognized for their provision of suitable habitat for a variety of wildlife species. These areas along with rural and urban landscapes provide a mosaic of habitats that may support a diverse number of wildlife species. It is estimated that over 250 bird

species, 62 mammal species and 17 amphibian/reptile species may occur in the Region. There are also thousands of species of terrestrial insect and other invertebrates and microorganisms.

A number of waterfowl species, namely ducks, presently occurs within the Floodway and West Dyke areas. The Floodway Channel is generally more likely to support waterfowl in years when water is present in the Channel throughout the spring, summer and fall seasons. Water levels within the Floodway are an important factor in determining waterbird usages of the Low Flow Channel. Dabbling ducks have been noted foraging within ditches of the West Dyke during the spring and may have been nesting in the area.

Among the most productive and sensitive wildlife habitats in the Region are river bottom forests, which normally maintain high biodiversity and typically support larger wildlife populations. A variety of mammal species utilizes the Floodway during the spring, summer and fall. White-tailed deer forage within the alfalfa/brome haylands along the spoil banks and side slopes, as well as within the willow and herbaceous plant mix covering the base of the Floodway Channel. Small mammals including jackrabbit are attracted to the Channel base which in turn attract predators such as coyote and red fox. The surrounding area typically harbours Richardson ground squirrel, thirteen-lined ground squirrel, white-tailed jack rabbit and some ground-nesting bird species. The Floodway also provides habitat for beaver moving up the Red River and/or Seine River.

Amphibian habitat occurs predominately within the Floodway Channel and along ditches of the West Dyke. These habitats support a number of amphibian species, including wood frogs, boreal chorus frogs, leopard frogs, and American/Canadian toads. The habitat located within the Floodway and West Dyke is not expected to support large numbers of reptile species.

5.5 Socio-Economic Environment

5.5.1 Resource Use

Resource use in the Floodway Study Region is diverse and encompasses a range of activities including commercial land and resource use, residential land use, and traditional land and resource use by Aboriginal communities.

Commercial Land Use

The Region includes the most active commercial area of the Province including the City of Winnipeg and surrounding municipalities. Commercial land uses include industrial production, manufacturing, construction services and retail businesses. Most of these activities are concentrated in the City of Winnipeg and other adjacent urban centres. The primary form of commercial resource use in the Region is agriculture.

Residential Land Use

The 1997 Red River flood had a considerable impact on land and resource use in the Floodway Study Region. Approximately 1,200 homes in seven municipalities south of Winnipeg were directly affected by the flood waters. Other recent floods have also had effects on residential land use, notably the 1997 flood for residents downstream of the Floodway Outlet. In 1996, approximately 66% of all occupied dwellings in Manitoba were located in one of the communities in the Region. The majority of these dwellings (~89% of the Region and 59% of Manitoba) were located in the City of Winnipeg. The total number of occupied dwellings in the Region communities increased by approximately 3% between 1996 and 2001. This was generally in line with the increase in owned private dwellings in the rest of the Province. Housing values for the Region tend to be higher on average than for Manitoba as a whole.

Aboriginal Land and Traditional Resource Use

The Floodway Study Region and the Red River Valley in particular have been important locations for Aboriginal communities and resource use. Three Aboriginal communities have been identified as having either potential land or resource interests in the Region. These are the Brokenhead Ojibway Nation, the Métis Nation and the Peguis First Nation. The Brokenhead Ojibway Nation is located near Lake Winnipeg in the northeast portion of the Region. The Métis Nation has a long, historical connection to land and resource use in the Red River Valley. While the Peguis First Nation community is located outside the Region, the First Nation has historical connections to the Red River Valley and has several reserve parcels along the Red River north of Selkirk. In addition claims against Canada for outstanding treaty land entitlement and the St. Peter's Reserve are currently under negotiation with the Peguis First Nation in the Region.

5.5.2 Economy

The economy of the Floodway Study Region is diverse and encompasses a range of economic sectors and industries. The Region includes the City of Winnipeg and much of the Capital Region of Manitoba.

Employment

A majority of the communities in the Region experienced an increase in labour force participation rates from 1996 to 2001. However, the Village of St. Pierre-Jolys, the RM of Taché, the RM of East St. Paul, the RM of Hanover and the Peguis First Nation had decreasing participation rates over this period. The total participation rate for the Region increased from 67.3% to 68.7% from 1996 to 2001. This is somewhat higher than the total participation rate for Manitoba as a whole. Generally, total employment rates for the communities in the Region increased from 1996 to 2001 with the exception of the above-mentioned communities.

Education

For the Floodway Study Region, the percent of population in all major highest level of schooling categories decreased from 1996 to 2001 except for trade certificates or diploma categories which increased from 3.2% in 1996 to 11.5% in 2001, and bachelors' degrees or

post-grad categories which increased from 14.3 to 17.1%. For the Province of Manitoba, all major categories decreased or were unchanged from 1996 to 2001 except for trade certificates or diploma categories which increased from 3.3% in 1996 to 11.7% in 2001, and bachelors' degrees or post grad categories higher which increased from 11.6% to 14.3 %.

Income

Average personal income increased in all communities in the Floodway Study Region and Manitoba as a whole from 1996 to 2001. In the Region, the average personal income increased from \$24,044 in 1996 to \$28,305 in 2001. In both years, the average personal income was somewhat higher than for Manitoba. The RM of East St. Paul had the highest average personal income in 1996 while the RM of West St. Paul had the highest in 2001.

Business and Industry

The top employers by industry type for the City of Winnipeg in 1996 were manufacturing (13.3%), retail trade (12.1%), and health and social services (12.0%). Manufacturing, retail trade, and health and social services were also the top employers by industry type in the Region excluding Winnipeg. In 2001, the top employers by industry sector for the City of Winnipeg and the Floodway Study Region were manufacturing, health care and social services, and retail trade. Agriculture, forestry, fishing and hunting were also important industry sectors for employment in the Region excluding Winnipeg.

For areas in the northern part of the Region, both the RMs of St. Andrews and St. Clements characterized the southern portion of the municipalities as having a number of smaller home-based businesses. The economy of the central or more northern portions of the municipalities are characterized as being a mix of agriculture and recreation or cottage country-related businesses near Lake Winnipeg. The City of Selkirk has a more diverse economy with some industry, government services and a trend toward becoming more of a commercial service centre.

For the eastern part of the Region, the economy of the RM of Springfield is characterized as being diverse, with no single firm being notable as the most important employer. Notable segments of Springfield's economy include agriculture, aggregate and an industrial area. Agriculture and medical services are the most important sectors for the RM of Taché.

Communities in the south portion of the Region generally include agriculture, agricultural services and manufacturing. The economy of the RM of Ritchot is characterized as being predominately related to residence-based businesses and service industries. Agriculture and Trans-Canada Pipeline compressor at Île-des-Chênes are also important for the local economy. The economy of the Village of St. Pierre-Jolys is characterized as largely service-oriented. Agriculture, industry and manufacturing are generally important for communities in the south.

5.5.3 Infrastructure and Services

Infrastructure and services in the Floodway Study Region include transportation and roads, water supply, utilities, police, fire, ambulance and emergency services, and other community services. This infrastructure and these services were affected by the 1997 flood and subsequent flood protection measures, and are continuing to develop over time.

Highways and Bridges

The Region's infrastructure includes a number of major highway and bridge crossings at the existing Floodway, and provincial and municipal roads that form part of the West Dyke. The major Provincial Trunk Highway is No. 75 from Winnipeg to the United States border at Emerson. The six highway bridges spanning the existing Floodway are the following:

- St. Mary's Road Bridge
- Provincial Trunk Highway No. 59 South Bridge
- Trans-Canada Highway No. 1 East Bridge
- Provincial Trunk Highway No. 15 Bridge
- Provincial Trunk Highway No. 59 North Bridge
- Provincial Trunk Highway No. 44 Bridge

Rail bridges that span the existing Floodway include:

- Canadian Pacific Railway – Emerson
- Canadian National Railway – Sprague
- Greater Winnipeg Water District Railway
- Canadian National Railway – Redditt
- Canadian Pacific Railway – Keewatin
- Central Manitoba Railway – Pine Falls

Dunning Road

The Dunning Road crossing is a low-level crossing located in the RM of St. Clements. The principal purpose of the crossing is to provide access for emergency vehicles between the fire hall on the west side of the Floodway and the Pine Ridge Trailer Park on the east side. There is also local use of the connection. The crossing is closed whenever there is flow in the Floodway or sometimes following significant summer precipitation events.

West Dyke

The West Dyke extension involves some raising of the existing structure as well as raising or modifying portions of certain roads in the RM of Macdonald.

Water Supply

Most areas in the City of Winnipeg are covered by the municipal water system with the major water source being Shoal Lake. The City of Selkirk is serviced by a municipal water

system with groundwater being its source. All urban areas within the RM of Macdonald are served by a municipal water system from La Salle River. In the RMs of Ritchot and Ste. Agathe, the Red River Drive area and some rural areas are supplied by an artesian well municipal water system. The RM of Springfield is serviced by a municipal water system and by individual wells. All developed areas in the RM of East St. Paul are covered by a municipal well-water system while the RM of St. Clements is entirely supplied by private wells.

Utilities

Manitoba Hydro serves all Regional communities with electricity. Its subsidiary, Centra Gas, is the major natural gas distributor in Manitoba and the utility delivers natural gas to most urban communities in the Region. MTS provides telecommunication services to commercial and residential customers in the Region.

Police, Fire and Ambulance Services

All communities in the Region have access to and are served by ambulance, fire and police services. Ambulance service is generally provided out of one or two urban centres in each of the municipalities. Fire Hall service includes both professional and volunteer fire departments. Police service is provided by municipal police forces or by the RCMP. In some communities, RCMP service is supplemented by a municipal safety officer. It is noted that the construction of the Floodway in the 1960s resulted in the division of the service zones, which remains a concern for some Rural Municipalities.

Emergency Response

Under provisions of *The Emergency Measures Act*, every local authority is responsible for developing an emergency preparedness, response and recovery plan to ensure protection of people, property and the environment within their municipal boundary. The Manitoba Emergency Measures Organization (EMO) assists with the preparation, review and enhancement of emergency preparedness programs.

5.5.4 Personal, Family and Community Life

Population and Demographic Characteristics

The Floodway Study Region includes fifteen municipalities and two First Nations ranging in size from about 200 to 300 residents to the City of Winnipeg with approximately 640,000 residents. Métis residents are included in the total population figure for the Region. The total population of the Region in 2001, including members of the Peguis First Nation, is estimated between 716,000 and 734,000 residents for about 64% of Manitoba's overall population

Recreation and Travel

There are a number of summer and winter recreational opportunities in the areas along the Red River and Floodway. The main recreational activities include sport fishing and hunting. Other winter recreational activities include cross-country skiing, downhill skiing, tobogganing

and snowmobiling. Other summer recreational activities include canoeing and paddling, rowing and motorized boating, and trail walking.

Aesthetics

The Floodway Study Region is located in the Red River Valley which is characterized by glacial Lake Agassiz and is consequently described as being relatively flat agricultural land with urban communities and exurban development throughout. The aesthetic character of the existing Floodway can be seen by people from several roads and bridges which cross the channel, by residents who work and live within sight of the facility, and by residents who make use of the Floodway at various locations.

Health and Well-Being

Health services in Manitoba are provided by Regional Health Authorities (RHAs) that have the responsibility for administering health services in specified geographic areas. Overall, when compared with the rest of Manitoba, health status indicators show that the population of the Floodway Study Region is healthy with very few health or social issues that stand out as unique to the area.

Perspectives from local health providers generally confirm that communities in the Region are in good health and typically healthier on the whole than those in the rest of Manitoba. Despite these positive factors, health care providers indicate that there are several issues create barriers to achieving better health within certain parts of the Region. These issues include; mental health, hypertension, declining and aging population, rapid growth in bedroom communities, groundwater quality, and other environmental conditions.

Way of Life, Culture and Spirituality

The cultural origins of the Floodway Study Region are grounded in the rich Aboriginal history of trading, the buffalo hunt and seasonal travel as well as the immigration of settlers from other countries during the mid to late 1800s and early 1900s. For thousands of years, Winnipeg, at the junction of the Red and Assiniboine Rivers, was a popular summer spot for Aboriginal people to camp, celebrate and trade. Since then, the Red River Valley has developed into a culturally diverse region with Aboriginal and immigrant communities pursuing lifestyles engrained in their history and the geographic climate of the region.

The ways of life in municipalities adjacent to the City of Winnipeg and within the Red River Valley today generally fall into three groupings of communities and residential lifestyles, namely rural communities, bedroom communities and urban areas and rural residential. Demographic changes over time illustrate the trend toward growth in the Floodway Study Region occurring mainly in the bedroom communities and rural residential areas surrounding Winnipeg.

After-effects of the 1997 flood have been the subject of much research and assessment, with key findings regarding how flooding has affected the way of life for many in the Region.

Residents of the RMs of Ritchot, Taché, Macdonald and Morris have expressed a diminished sense of safety in homes and communities, disparity among communities in flood response, and dissatisfaction with compensation.

5.5.5 Heritage Resources

Aboriginal peoples have inhabited Manitoba, including the Floodway Study Region, for several thousand years before the start of historical records related to their initial contact with European traders in the 1600s and 1700s. Rival external trading interests began to influence activities in the Region by the later 1700s. By the 1800s, the Red River Métis had emerged as a distinct Aboriginal people, and settlement was being sponsored in the Red River area. In 1870, Hudson Bay Company administration and occupancy of the Region ended and Manitoba entered Confederation (with its area restricted initially to the “postage stamp area” focused on the Red River valley). The settled portion of the area defined then as Manitoba was populated by approximately 12,000 people in 1870 and was predominately Métis. Settlement accelerated in subsequent years and many Métis dispersed to areas north and west of Manitoba’s then border. Treaties were signed with the First Nations during the 1870 to 1912 period.

Archaeological records and surveys conducted as part of the site assessments determine that archaeological or other heritage resource sites are not present along the West Dyke or at any of the potential borrow locations. Examination of areas surrounding abutments of Floodway crossings which may require reconfiguration as a result of Channel widening found no areas of undisturbed ground that would contain archaeological or other heritage sites. The known sites at the Outlet Structure are south of the limits of construction and outside the areas of likely impact from the project although effects might occur from sightseers and casual visitors. One new archaeological site was recorded on the west bank of the Red River. A heritage resource impact assessment was not required for the Floodway Channel due to its location and relatively recent disturbance.

5.6 Navigation

A wide range of activities occurs on the Red River within the Flood Study Region. Commercial operators include Paddlewheel and River Rouge Tours, water bus and water taxis as well as fishing guides and tour operators. Recreational or private users include canoeing, rowing and fishing enthusiasts, the Winnipeg Rowing Club, Redboine Boating Club and the Royal Manitoba Yacht Club.

On the Red River, boats are generally put into the water after the ice has melted and water levels have decreased in the spring, and taken out of the water by the middle of October. Kayaks are generally the first boats on the water in the spring and the majority of boats are launched within the City of Winnipeg at various public boat launches (St. Vital Park being the

Screening Report-Red River Floodway Expansion Project

most highly utilized facility). The main destination for boats on the Red River is the Forks Historic Site at the confluence of the Red and Assiniboine Rivers. Within the City of Winnipeg there is a controlled speed zone, authorized under the Boating Restriction Regulation of the *Canada Shipping Act* and enforced by the City of Winnipeg River Patrol (a division of the Winnipeg Police Service).

It is estimated that approximately 150 boats are docked at private boat club facilities and another 150 boats are at private individual facilities. During the summer season, it is estimated that the number of boats on the River averages between 400 and 500 on any given day. The July 1st fireworks at the Forks can attract up to 1,200 boats. Discussions with major users of the River suggests that the number of boats navigating the River has decreased over the past few years. Many boats also travel downstream, through the locks at St. Andrews Lock and Dam (SALD) and then onto Selkirk and Lake Winnipeg. Traffic varies seasonally and in the spring the traffic between SALD and Selkirk is estimated to be between 50 and 150 boats, with fewer boats on the River during the summer months and the fall season being the busiest (with some 400 to 500 boats on the River at that time). Records from Public Works and Government Services on the operation of the SALD indicate that the number of boats passing through the SALD has declined since the early 1990s. In the 1985 to 1990, an average of 2,000 to 2,250 boats per year passed the locks. In recent years, the number of boats passing the locks has dropped to 500 to 700 per year.

On the Seine River, the Save Our Seine River Environment Inc. hosts between two and four organized paddling events per year, with some 30 to 40 participants per event. These events take place on the Seine River, within the City of Winnipeg. There are also two or three private outfitters within Winnipeg, who offer guided paddling activities on the Seine River within the same regional area. These activities cater to smaller groups, but use the river more frequently (evenings and weekends). It is also reported that there are many other individual users of the Seine River, although their number has not been quantified. The City of Winnipeg River Patrol has placed a Boating Restriction on the Seine River under the *Canada Shipping Act* that prohibits use of motorized craft on the Seine River.

At the Inlet Control Structure, boats can and do pass through the Structure when the gates are in the down (fully open) position. Very few boats go through the Structure and travel upstream, as the River is shallow and the channel unmarked. However smaller boats are able to use the River upstream of the Inlet Control Structure.

At the Outlet Structure, the channel is used for fishing at different times of the year, although the channel is not accessible during low flow periods and typically is only accessible by boat during high water conditions. The Red River downstream of the SALD and Outlet Structure is an internationally renowned fishing location and attracts numerous boats for that reason. Strong currents and severe turbulence occur in the channel immediately downstream of the Structure when flows are being discharged. A fatality occurred in 1993, when a boat was operating near the Structure while water was flowing over the Outlet Structure. Although no

Screening Report-Red River Floodway Expansion Project

fatalities have been reported at the SALD, a number of rescues have been necessary in the past. The record flows which occurred in the 1997 Flood changed the bathymetry of the outlet channel and, as a result, the channel is not accessible by boat, except under high water conditions.