Report - Standing Policy Committee on Property and Development - October 5, 2004

Item No. 18 Urban Fisheries Enhancement – Riffle Structures in the Seine River - Memorandum of Understanding Agreement with Save Our Seine River Environment Inc.
File PR-4.4

STANDING COMMITTEE RECOMMENDATION:

On October 20, 2004, the Executive Policy Committee concurred in the recommendation of the Standing Policy Committee on Property and Development and submits the following to Council:

1. That the Memorandum of Understanding Agreement with the Save Our Seine River Environment Inc. dated October 1, 2003, attached as Schedule "A" to the report from the Director of Planning, Property and Development dated August 27, 2004, be approved.

2. That the Release of Liability and Permit Forms for City-owned lands be amended and signed by the City Solicitor/Manager of Legal Services.

3. That the proposal from Save Our Seine Environmental Inc. to install riffle structures within the Seine River be approved in accordance with the description of works contained in the report from the Director of Planning, Property and Development dated August 27, 2004.

4. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

Report - Standing Policy Committee on Property and Development - October 5, 2004

DECISION MAKING HISTORY:

EXECUTIVE POLICY COMMITTEE:

On October 20, 2004, the Executive Policy Committee concurred in the recommendation of the Standing Policy Committee on Property and Development and submitted the matter to Council.

STANDING COMMITTEE RECOMMENDATION:

On October 5, 2004, the Standing Policy Committee on Property and Development concurred in the administrative recommendation and submitted the matter to the Executive Policy Committee and Council.

Re: Urban Fisheries Enhancement – Proposal to Construct Riffle Structures in the Seine River and to Enter Into a Memorandum of Understanding Agreement with Save Our Seine River Environment Inc.
Riel Community
Various Wards

For submission to: Standing Policy Committee on Property and Development

Original report signed by: Director of Planning, Property and Development

Report date: August 27, 2004

Recommendation(s):

1. That the Memorandum of Understanding Agreement with the Save Our Seine River Environment Inc., dated October 1, 2003, attached as Schedule "A", be approved.
2. Subject to the approval of Recommendation No.1 above, that the Release of Liability and Permit Forms for City-owned lands be amended and signed by the City Solicitor/Manager of Legal Services.
3. Subject to the approval of Recommendation No. 1 above, that the proposal from Save Our Seine Environmental Inc. to install riffle structures within the Seine River be approved in accordance with the description of works contained herein.
4. That the Proper Officers of the City be authorized to do all things necessary to implement the intent herein.

REPORT SUMMARY

KEY ISSUES:

Save Our Seine River Environment Inc. (SOS) wishes to proceed with the installation of riffle structures in the Seine River in the Winter/Spring of 2004/05.

The proposed installation of (9) nine structures affects (1) one privately owned and (8) eight City-owned properties.

Consensus has been achieved between the City and SOS pertaining to the Memorandum of Understanding Agreement.

Denis Andrews Consulting Ltd., has advised that the SOS has obtained all of the necessary approvals to install the riffle structures (the Federal Department of Fisheries and Oceans, Provincial Conservation Department, the City Water and Waste Department, the City Waterways Engineer and the City Naturalist).

The Department has reviewed the Release of Liability and Permit Forms and recommends it be executed pending the approval of this project and agreement. The private property owners will be required to execute similar Release of Liability and Permit Forms.

Implications of the Recommendation(s):

General implications:

	None
	For the organization overall and/or for other departments
X	**For the community and/or organizations external to the City of Winnipeg**
	Involves a multi-year contract

Comment(s):
SOS is involved in various Seine River projects and wishes to undertake the installation of the riffle structures as one of several river enhancement projects.

Policy implications:

X	**No**
	Yes

Comment(s):

Environmental implications:

	No
x	**Yes**

Comment(s):
The proposed installation of riffle structures will improve the Seine River by improving the in-stream health for fish by adding oxygen to the water, encouraging more aquatic invertebrates, and creating pools for resting and spawning during high water flows. A side effect of the riffles is to improve the water quality by decreasing the odour.

Human resources implications:

X	**No**
	Yes

Comment(s):

Financial implications:

X	Within approved current and/or capital budget
	Current and/or capital budget adjustment required

Comment(s):

REASON FOR THE REPORT:

5234

The Planning, Property and Development Department is seeking Council approval for a Memorandum of Understanding Agreement and authority to consent to the implementation of the project.

HISTORY:

At its meeting held on March 18, 1999, the Riverbank Management Committee considered a proposal from the Save Our Seine River Environment Inc. (SOS) to construct riffle structures in the Seine River and it passed the following motion:

"That the Riverbank Management Committee endorse the S.O.S. Riffle proposal, and that the City commit staff resources to assist in the development and implementation of the S.O.S. project, grant access across City property in order to construct the riffle structures subject to the following conditions:

a) That the S.O.S. provide a Hydraulic and Backwater Analysis to the satisfaction of the Water and Waste Department and the Waterways Authority;
b) That the S.O.S. obtain approval for an application to construct (Application for Licence for Dam) from the Province's Water Resources Branch;
c) That the S.O.S. comply with all Provincial and Federal legislation, including the Navigable Waters Act and Environmental Reviews and Licensing requirements;
d) That the S.O.S.'s Engineering Consultant designing the structures maintain industry standard professional liability insurance to cover error, omission, or mistake of a professional or technical nature, satisfactory to the City's Insurance Branch and the City Solicitor/Manager of Legal Services;
e) That the S.O.S. secure to the satisfaction of the City Solicitor/Manager of Legal Services, owner approval for those properties that will be immediately impacted by the riffle structures;
f) That in light of the current City commitment of funding, the S.O.S. seek out other sources of capital to complete the project;
g) That contractors constructing the riffle structures provide insurance coverage to the satisfaction of the City's Insurance Branch and the City Solicitor/Manager of Legal Services;
h) That the S.O.S. budget and commit to (through their Green Teams or Annual Greening Events), the restoration of property damaged due to the construction of the riffle structures;
i) That works proceed subject to the issuance of a Waterway Permit pursuant to By-Law No. 5888/92."

At a meeting held on December 11, 2002, Denis Andrews Consulting Ltd., representing the SOS, requested City approval to install riffle structures in various locations within the Seine River. These structures are constructed with rock and are strategically placed in a water stream to increase aeration. These structures improve the in-stream health for fish by adding oxygen to the water and encourage more aquatic invertebrates by creating pools for resting and spawning

during high water flows. A side effect of the riffles is to improve the water quality by decreasing the odour.

SOS have been actively working with the Manitoba Conservation Department, Federal Department of Fisheries and Oceans, City Naturalist, City Waterways Engineer, the City's Community Services, Public Works and Water and Waste Departments to develop an Urban Fisheries Enhancement project for the Seine River involving the installation of riffle structures. SOS intends to construct (9) nine riffle structures within the boundaries of the Seine River. Eight (8) of the structures are located within properties owned by the City and one (1) of the riffle structures is located on land owned by two private property owners. The SOS submitted its plans to the City's Waterways Engineer, Water and Waste Department, Federal Department of Fisheries and Oceans and the Provincial Conservation Department for review and approval. The SOS subsequently received the required approvals to construct the riffle structures from the above referenced agencies. The SOS intends to construct the riffle structures in the Winter/Spring of 2004/05 at a total project cost of $75,000.00. Current funding for the project has been estimated at $42,000.00, which is comprised of a $25,000 grant from the Fisheries Enhancement Initiative and $17,000 in pre-purchased materials.

During the period between January and August 2003, the SOS and the Administration met to discuss the project and to develop a form of agreement to facilitate the development of the riffle structure project.

By letter dated October 2, 2003, the Planning, Property and Development Department provided SOS with proposed terms and conditions for a Memorandum of Understanding Agreement.

The SOS accepted the proposed terms and conditions for a Memorandum of Understanding Agreement on June 2, 2004.

DISCUSSION:

The particulars of the subject City-owned properties are as follows:

Riffle Structure No.2

Owner:	City
Location:	North of Dubuc Street & South of Deniset Street
Legal Descriptions(s):	Lots 1 – 6, Plan 1098; Lot 1, Blk 9, Plan 1839
Misc. Plan:	12097
Zoning:	PR 1
Purpose:	Fisheries Enhancement – Installation of Riffle Structures

Riffle Structure No.3

Owner:	City
Location:	North of Guilbault Street & East of Seine Street
Legal Descriptions(s):	Lot 13, Blk 2, Plan 1915; Lot 45, Plan 29091
Misc. Plan:	12098
Zoning:	PR 2 & PR 1

Purpose: Fisheries Enhancement – Installation of Riffle Structures

Riffle Structure No.4
Owner: City
Location: Morier Park/ St Boniface Golf Course, South of Morier Avenue
Legal Descriptions(s): Lot 5, Plan 23818; Pt Lot 316, Plan 433
Misc. Plan: 12099
Zoning: PR 1 & PR 2
Purpose: Fisheries Enhancement – Installation of Riffle Structures

Riffle Structure No.5
Owner: City
Location: South of Clonard, East of Egerton Road
Legal Descriptions(s): Pt Lot 318, Plan 433; Lots 1 – 4, Plan 1182
Misc. Plan: 12100
Zoning: PR 2 &PR 1
Purpose: Fisheries Enhancement – Installation of Riffle Structures

Riffle Structure No.6
Owner: City
Location: North of Fermor Avenue, West of Iroquois Bay
Legal Descriptions(s): Public Park Plan 6142; Fermor Avenue Right of Way
Misc. Plan: 12101
Zoning: PR 1 & PR 2
Purpose: Fisheries Enhancement – Installation of Riffle Structures

Riffle Structure No.9
Owner: City
Location: East of Beliveau St E, North of Melville Drive
Legal Descriptions(s): Lots 1-11, Block 2, Plan 1703; Block 4, Plan 34145
Misc. Plan: 12102
Zoning: PR1; RM4
Purpose: Fisheries Enhancement – Installation of Riffle Structures

Riffle Structure No.10
Owner: City
Location: East of Richfield Avenue, South of Bishop Grandin
Legal Descriptions(s): Lot A, Plan 32060; Lot 4, Block 8
Misc. Plan: 12103
Zoning: PR 1
Purpose: Fisheries Enhancement – Installation of Riffle Structures

Riffle Structure No.11
Owner: City
Location: East of St Anne's Road, North of John Bruce Road
Legal Descriptions(s): Lots 34 - 37, Block 19, Plan 1776; PR 29850
Misc. Plan: 12104

Zoning: PR 1
Purpose: Fisheries Enhancement – Installation of Riffle Structures

The particulars of the subject privately owned properties involving the one riffle are as follows:

Riffle Structure No. 14
Owner: Michelle Watts
Location: 180 Creek Bend
Legal Descriptions(s): Lot 23, Plan 2321
Misc. Plan: 12105
Zoning: A 5
Purpose: Fisheries Enhancement – Installation of Riffle Structures

Owner: Eric and Donna Hnatiuk
Location: 240 Creek Bend
Legal Descriptions(s): Lot 25, Plan 20519
Misc. Plan 12105
Zoning: A 5
Purpose: Fisheries Enhancement – Installation of Riffle Structures

Proposed Memorandum of Understanding Agreement (Schedule "A"):
The Planning, Property and Development, Public Works, Water and Waste Department(s) and Legal Services Division have reviewed the proposed project and potential forms of agreement. A Memorandum of Understanding Agreement was prepared and accepted by the SOS (see Schedule "A").

The summary of proposed terms and conditions of the Agreement are as follows:

Group: Save Our Seine River Environment Inc.
Directors/ Officers – B. Sawchuk/ D.Watson
Owner: City
Location(s): (9) nine structures as referenced above.
Term: (3) Three years
Commencement Date: January 1, 2004
Responsibilities:

SOS

Provide detailed design and specifications for riffle structures;

Obtain all Federal, Provincial and Municipal Government approvals for the project;

Provide a plan identifying locations of riffle structures;

Obtain approval and Release of Liability from any private property owners adjacent to the riffle structures and provide same to the Planning, Property and Development Department prior to commencing construction;

Confirmation of Project Funding;

Enter into contracts with private contractors to perform works in a manner satisfactory to the City Solicitor;

Ensure that Contractors obtain and maintain insurance coverage as required by the City's Insurance Branch;

Obtain and register discharges of any builders' liens that are registered against the project;

Repair damage to adjoining City-owned lands during construction; Be responsible for the maintenance of structures during the first three years following the completion of installation. Indemnify the City until such time as the responsibility for the inspection and repair of the riffle structures is assumed by the City

City of Winnipeg

Approve and monitor the riffle projects;

Provide staff person to support implementation of the project;

Approve materials and methods of construction; and

Maintain after initial three-year period. (Maintenance: During the first three years following the completion of the last riffle structure referenced herein, the Save Our Seine River Environment Inc. will perform the maintenance requirements for the riffle structures. At the end of the three-year period, the Public Works Department is prepared to assume the responsibility for maintaining the riffle structures.)

Indemnify the SOS after assuming the responsibility for the inspection and maintenance of the riffle Structures.

Release of Liability and Permit from City as Landowner:

In addition to negotiating an agreement, the Planning and Land Use Division and Legal Services Division have obtained signed Release of Liability and Permit(s) from the Save Our Seine River Environment Inc. for each proposed riffle structure location.

The particulars of the properties and Release of Liability and Permit are as follows:

Owner: City
Locations: 2,3,4,5*,6,9,10 and 11
Commencement Date: November 30, 2001
Expiry Date: March 31, 2004
Release and Liability and Permit Clauses:

The SOS releases and forever discharges any and all claims, demands, actions, suits or other proceedings which the SOS may have in any manner whatsoever when on the said lands during construction, including any claims or demands for loss of or damage to machines or other equipment brought upon the lands, pursuant to this permission and regardless of whether such loss, damage, injury or death is due to any negligence of the City, its servants or agents otherwise.

In further consideration of the said permission, SOS hereby covenants to indemnify and save harmless the City from any and all expenses, costs, claims, demands, actions, suits or other proceedings arising out of the said permission and regardless of whether there is any negligence on the part of the City its servants, agents, or otherwise. Without limiting the generality of the foregoing such indemnity shall include any expenses, costs, claims, demands, actions, arising out of injury or death to persons or animals who gain access to the lands as a result of said permission.

*It should be noted that the Release and Liability Permit for Location No. 5 will need to be signed by the SOS and the City.

Subject to the approval of this report, the Legal Services Division will arrange for the execution of the Release of Liability and Permit forms on behalf of the City.

Release of Liability and Permit from City Tenant:

Pursuant to the condition of the Riverbank Management Committee approval of March 18, 1999 as follows:

"That the S.O.S. secure to the satisfaction of the City Solicitor/Manager of Legal Services owner approval for those properties that will be immediately impacted by the riffle structures;"

The SOS also obtained the approval from the St Boniface Golf Club located at 100 Youville Street. The Club leases the City-land, which abuts riffle structure No. 4 (Morier Park).

Subject to approval of this report, the Legal Services Division will arrange for the execution of the Release of Liability and Permit forms on behalf of the City.

Release of Liability and Permit from Private Landowners:

Pursuant to the condition of the River Management Committee approval of March 18, 1999 as follows:

"That the S.O.S. secure to the satisfaction of the City Solicitor/Manager of Legal Services owner approval for those properties that will be immediately impacted by the riffle structures;"

The SOS obtained the approval from two private property owners abutting Riffle Structure No. 14 (south of Creek Bend Road). The Owners of 180 and 240 Creek Bend Road have signed Release of Liability and Permit Forms, which expired on March 31, 2004.

Given the passage of time and proposed timing of the riffle structure construction project, it will be necessary to amend the term of the above referenced Release and Liability Permits to extend the expiry date to March 31, 2006 in order to facilitate riffle structure construction.

IN PREPARING THIS REPORT, THERE WAS CONSULTATION WITH AND CONCURRENCE BY:

Legal Services Division
Planning and Land Use Division
Water and Waste Department
Waterways Engineer
City Naturalist

This report submitted by:

Planning, Property and Development Department
Division: Real Estate
Prepared by: D.Armstrong
PPD File #: 5743/2

Document name: o:\reports directive\real estate\leasing\(da) riffle structuresvarious projects .doc

Financial Impact Statement

Date: August 25, 2004

COMMENTS:

The City Naturalist advises that the Public Works Department is unlikely incur any ongoing maintenance costs as the riffle structures will become part of the Seine River Waterway and riffles structures, generally, do not require annual maintenance after the initial warranty period of three years. As such, no financial impact is being projected at this time.

"Original Signed By"
Mike McGinn, CA
Manager of Finance

October 1, 2003

Memorandum of Understanding Between the Save Our Seine River Environment Inc. and the Public Works Department
For The Installation of Riffle Structures within the Seine River

The following procedures will govern the activities of Save Our Seine River Environment Inc. and the City of Winnipeg in their understanding towards the installation of Riffle Structures. The procedures will be in effect for the 2003/6 Calendar years.

1.0 Basic Precepts

1.01 Legal Jurisdiction of The City Owned Property along the Seine River

The Property will remain under the legal jurisdiction of the City of Winnipeg. By executing this memorandum of understanding, the City is providing Save Our Seine River Environment Inc. with access to City - owned lands adjacent to all Riffle Structure locations as referenced in Schedule "A".

1.02 Obtaining Approval and Release of Liability from any Private Property Owners adjacent to a Riffle Structure Location

Save Our Seine River Environment Inc. agrees to obtain approval and release of liabi lity from any Private Property Owners adjacent to a riffle structure location and to provide same to the Planning, Property and Development Department prior to commencing construction of a riffle structure project.

1.02 Preservation Of The Seine River Corridor

The Riffle Structure P rojects undertaken by Save Our Seine River Environment Inc. in conjunction with the Public Works Department will in no way compromise the natural state of the Seine River Corridor.

2.0 Roles Of The Respective Partners

2.01 Role Of Save Our Seine River Environment Inc.

Save Our Seine River Environment Inc.will undertake the installation of Riffle Structures in the following manner:

- Engage the services of Riffle Structure experts to design and prepare detailed plans and specifications for riffle structures;

- Obtain all federal, provincial and municipal approvals to install the

4.0 Selection Of Projects

Endorsement of Projects

4.01 All Riffle Structure projects undertaken in the Seine River will be selected and endorsed by Save Our Seine River Environment Inc. and approved by the Public Works Department (specifically the City Naturalist), prior to any work being undertaken in the Seine River.

4.02 Consistency With Provisions Of Master Plan

All approved projects must fall within the provisions of the Seine River Greenway Plan.

5.0 Implementation of Projects

5.1 Project Materials

All materials used in the completion of projects must be approved by the Public Works Department prior to those materials being utilized.

6.0 Monitoring Of Projects

Save Our Seine River Environment Inc. and the Public Works Department will meet on a regular basis to review progress on the approved projects. Modifications to the approved project plans must be approved by the Public Works Department and endorsed by Save Our Seine River Environment Inc.

7.0 Insurance

Save Our Seine River Environment Inc. will ensure that the Riffle Structure Expert and Contractors obtain and maintain such insurance requirements as are deemed necessary by the City of Winnipeg Claims and Insurance Branch.

9.0 Recognition

The efforts of Save Our Seine River Environment Inc. towards the installation of Riffle Structures will be recognized in a manner as approved by the Save Our Seine River Environment Inc. and the Public Works Department.

#10., #11., #12. Attached – See Page 3A.

riffle structures and provide evidence of same to the Public Works Department;

- Provide a plan identifying t he locations for the proposed riffle structures;

- Provide confirmation of funding to construct the riffle structures prior to the commencement of construction;

- Engage and enter into contracts to construct and install riffle structures within the Seine River all in a form satisfactory to theCity Solicitor and to the Public Works Department;

- Repair and damage to City -owned lands incurred during the construction process;

- Shall promptly and at its sole cost, effort and expense obtain and register discharges of any Builders' Liens that are registered as a result of the project; and

- Arrange and pay for the maintenance of the riffle structures for a period of three years following completion of constructionThe maintenance period will begin upon the receipt of written notification to the City Naturalist from Save Our Seine River Environmental Inc. that the last riffle structure has been constructed, inspected and approved.

2.02 Role Of The Public Works Department

The Public Works Department will assist Save Our Seine River Environment Inc. in the Seine River Riffle Structure project, in the following manner;

- approval and monitoring of the Riffle projects in conjunction with Save Our Seine River Environment Inc.; and,

- provision of a staff person to provide support to the implementation of the Riffle Structure Project

3.0 Location Of Activities

All activities will be undertaken within the boundaries of the Seine River, as listed below:

-

- Riffle Structure Locations:
- See attached Figures 1, 2 and 3

Addendum to Memorandum of Understanding between Save our Seine River Environment Inc. and the Public Works Department for the Installation of Riffle Structures within the Seine River
October 1, 2003

10. Indemnification

1. During the period from the effective date of this Memorandum of Understanding until such time as The City assumes responsibility for the inspection and maintenance of the Riffle Structures, Save Our Seine River Environment Inc. hereby covenants and agrees to indemnify and save harmless The City of Winnipeg from any and all expenses, costs, claims, demands, actions, suits or other proceedings arising during that period, as a result of the design, installation, construction, inspection and/or maintenance of the Riffle Structures, except as may be attributable to the gross negligence of The City of Winnipeg, its employees or agents.

2. Upon the City assuming responsibility for the inspection and maintenance of the Riffle Structures, The City of Winnipeg hereby covenants and agrees to indemnify and save harmless Save Our Seine River Environment Inc. from any and all expenses, costs, claims, demands, actions, suits or other proceedings arising after that date as a result of the design, installation, construction, inspection and/or maintenance of the Riffle Structures, except as may be attributable to the gross negligence of Save Our Seine River Environment Inc, its employees or agents.

3. The above noted indemnifications are in addition to any other indemnification agreements between The City of Winnipeg and Save Our Seine River Environment Inc, related to the Riffle Structures, including but not limited to any applicable **Release and Permit**.

11. Riffle #12

Riffle #12. will not be built. It is excluded from this agreement.

12. Insurance Requirements

The City of Winnipeg shall clarify the requirements "deemed necessary" as noted in Clause 7.0 of this Agreement.

:

B Sawchuk

B.Sawchuk, President
Acknowledged and Approved and I have Authority to bind the Save Our Seine River Environment Inc.

David Watson

D.Watson, Vice President
Acknowledged and Approved and I have Authority to bind the Save Our Seine River Environment Inc.

Dated this 2 day of June

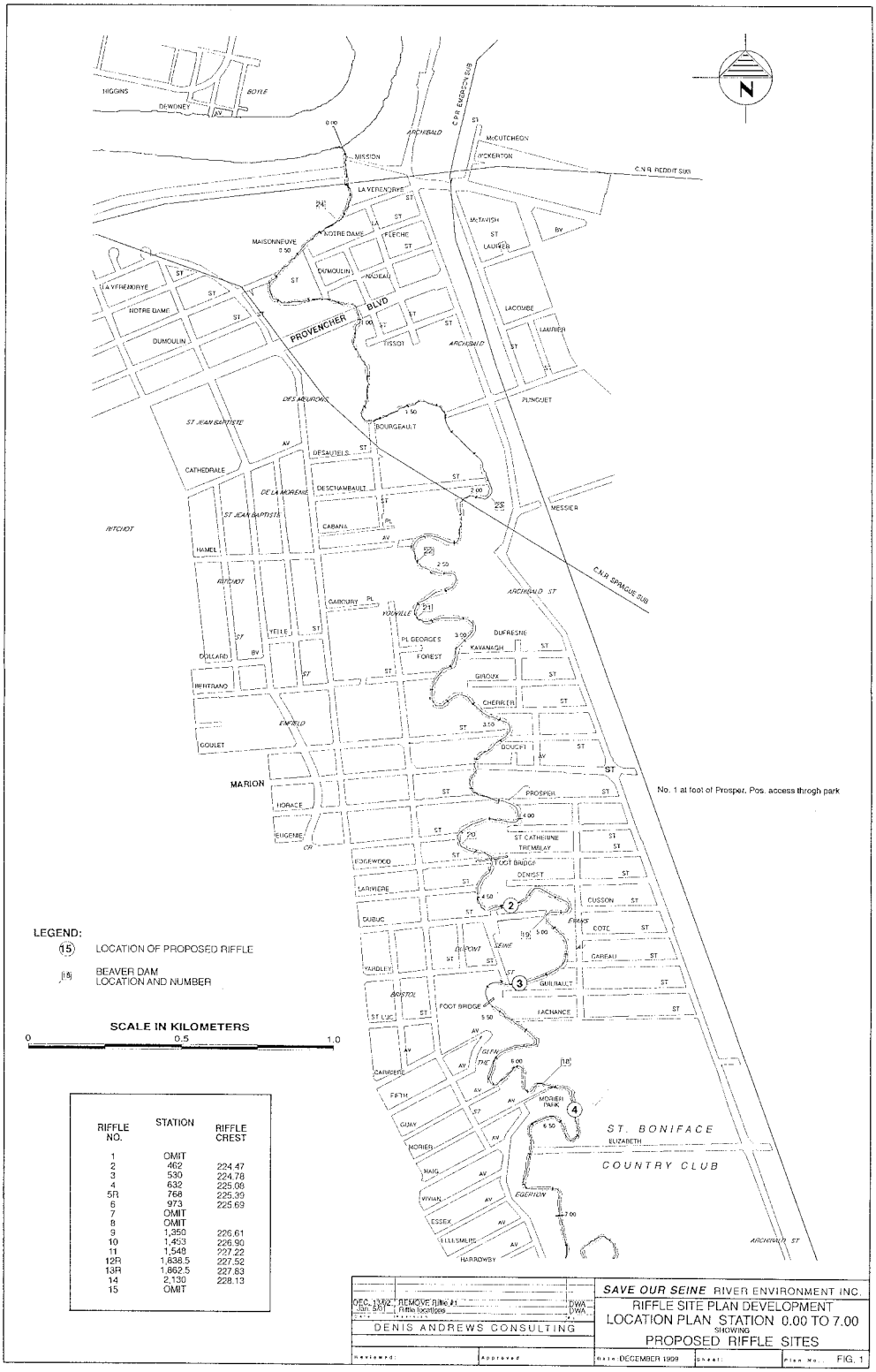
Cheryl Fleming

Director of Public Works

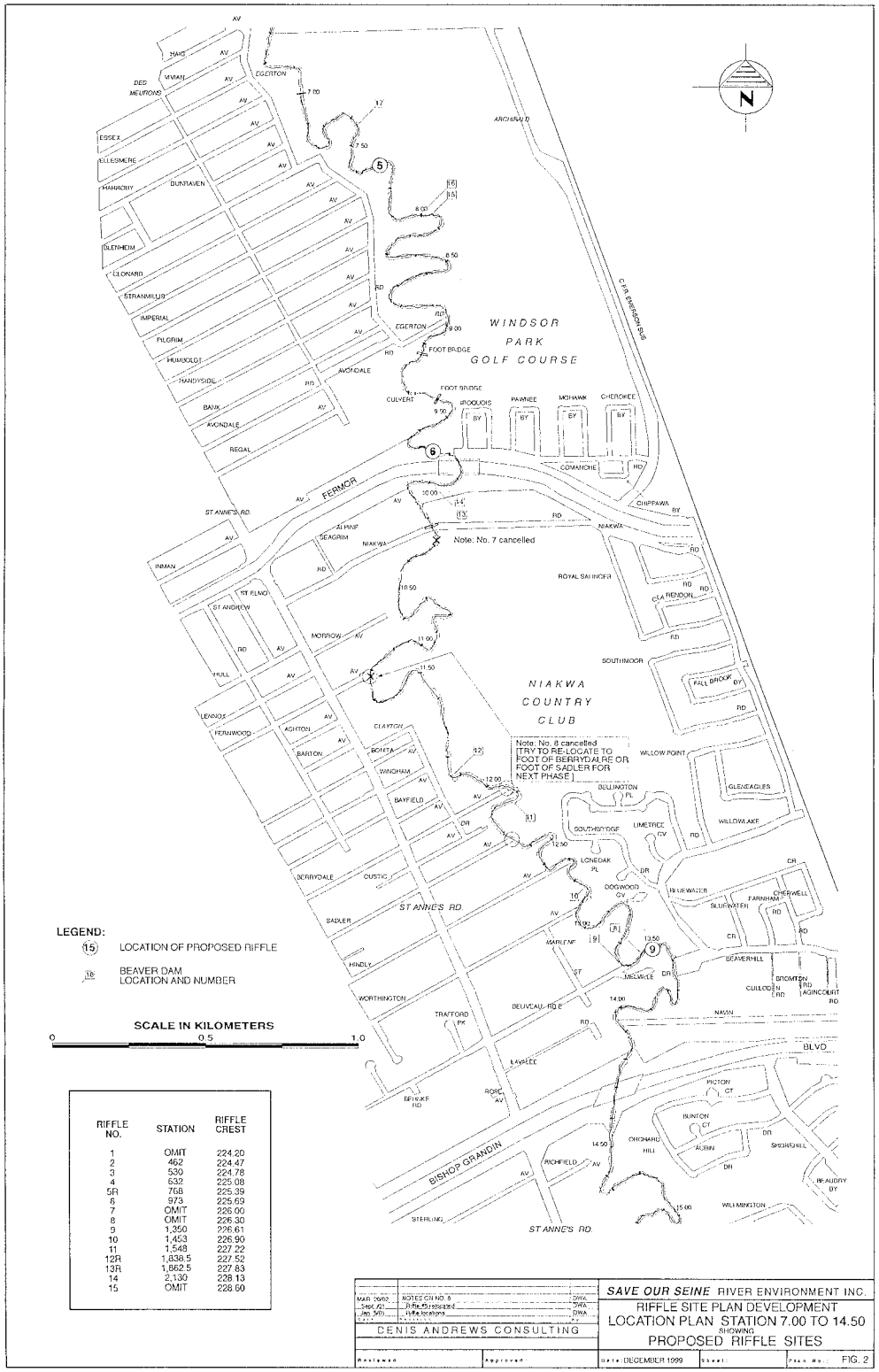
pls.

Dated this 2 day of June .

The subject terms and conditions fora Memorandum of Understanding Agreement are subject to Standing Policy Committee on Property and Development and/or Council Approval



RIFFLE NO.	STATION	RIFFLE CREST
1	OMIT	
2	462	224.47
3	530	224.78
4	632	225.06
5R	768	225.39
6	973	225.69
7	OMIT	
8	OMIT	
9	1,350	226.61
10	1,453	226.90
11	1,548	227.22
12R	1,838.5	227.52
13R	1,862.5	227.83
14	2,130	228.13
15	OMIT	



RIFFLE NO.	STATION	RIFFLE CREST
1	OMIT	224.20
2	462	224.47
3	530	224.78
4	632	225.08
5R	758	225.39
6	973	225.69
7	OMIT	226.00
8	OMIT	226.30
9	1,350	226.61
10	1,453	226.90
11	1,548	227.22
12R	1,838.5	227.52
13R	1,862.5	227.83
14	2,130	228.13
15	OMIT	228.60

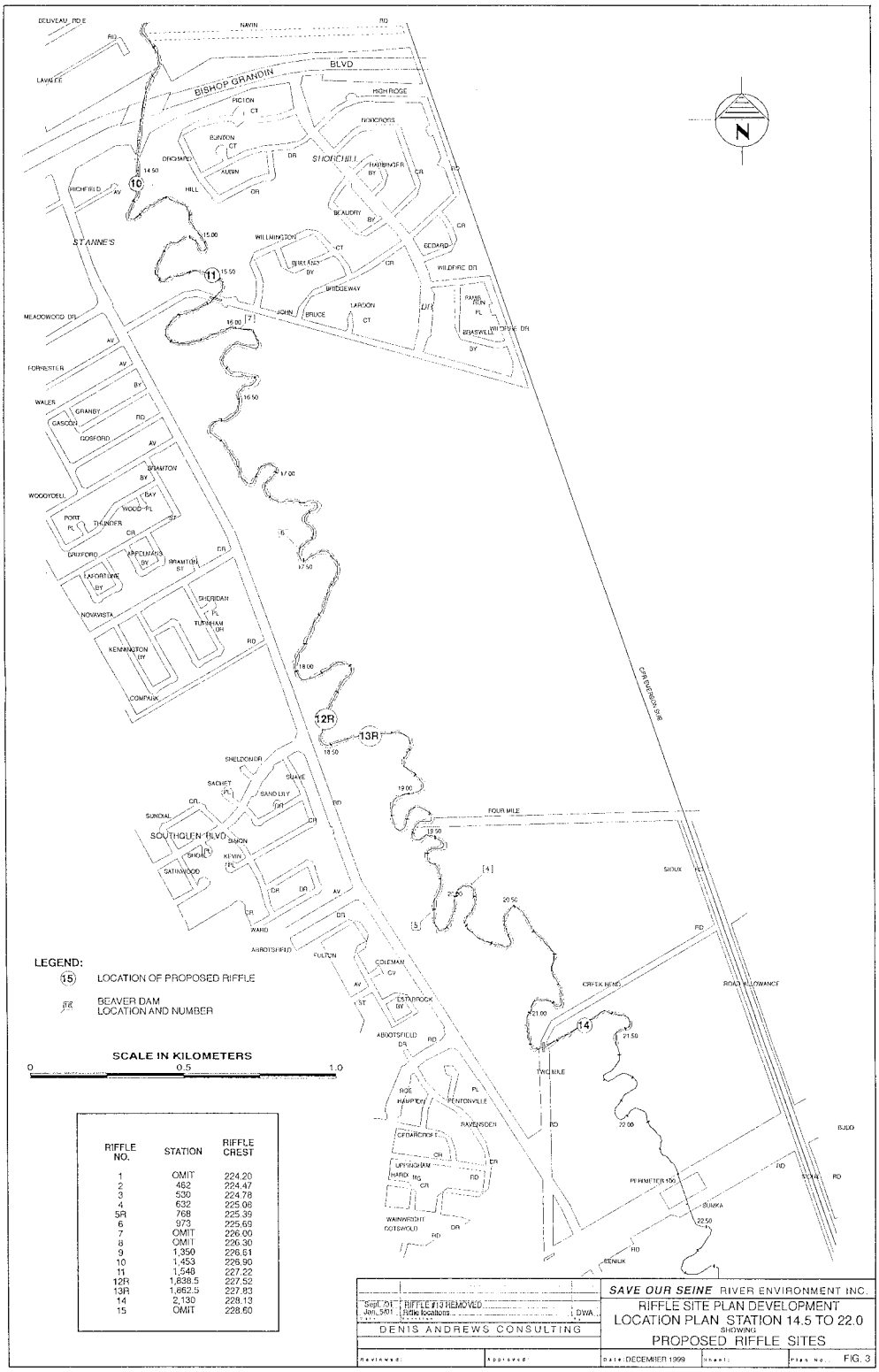
MAR. 26/02	NOTES ON NO. 8	DWA
Sept. 01	Riffle #5 relocated	DWA
Jan. 5/01	Riffle locations	DWA

DENIS ANDREWS CONSULTING

SAVE OUR SEINE RIVER ENVIRONMENT INC.

RIFFLE SITE PLAN DEVELOPMENT
LOCATION PLAN STATION 7.00 TO 14.50
SHOWING
PROPOSED RIFFLE SITES

Reviewed | Approved | Date: DECEMBER 1999 | Sheet: | Plan No.: FIG. 2



RIFFLE NO.	STATION	RIFFLE CREST
1	OMIT	224.20
2	462	224.47
3	530	224.78
4	632	225.08
5R	768	225.39
6	973	225.69
7	OMIT	226.00
8	OMIT	226.30
9	1,350	226.61
10	1,453	226.90
11	1,548	227.22
12R	1,838.5	227.52
13R	1,662.5	227.83
14	2,130	228.13
15	OMIT	228.60

Sept. /01 Jan. 5/01 | RIFFLE #13 REMOVED Riffle locations | DWA

DENIS ANDREWS CONSULTING

Reviewed: | Approved:

SAVE OUR SEINE RIVER ENVIRONMENT INC.

RIFFLE SITE PLAN DEVELOPMENT
LOCATION PLAN STATION 14.5 TO 22.0
SHOWING
PROPOSED RIFFLE SITES

Date: DECEMBER 1999 | Sheet: | Plan No.: FIG. 3