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Environmental Screening Follow-up Report

FRASER RIVER FLOOD CONTROL PROJECT No.19

**Nicomen Island Bank Protection
Quaamitch Slough**

September , 1985

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**Inland Waters Directorate
Pacific and Yukon Region
Vancouver, B.C.**



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INLAND WATERS DIRECTORATE
PACIFIC AND YUKON REGION

ENVIRONMENTAL SCREENING FOLLOW-UP REPORT

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Environment Canada

September, 1985

DEPARTMENT OF
THE ENVIRONMENT

SEP 24 1985

INLAND WATERS DIRECTORATE

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ABSTRACT

This report documents the environmental surveillance undertaken, during and after construction of bank protection works at Quaamitch Slough (Fraser River, British Columbia), under the Federal-Provincial Fraser River Flood Control Program. The surveillance was in accordance with the Environmental Assessment Review Process (EARP) Guidelines Order-In-Council and the Environmental Conservation Service (ECS) Environmental Screening Guidelines which require the initiator to ensure necessary mitigation is incorporated into the implementation of an activity. The report demonstrates that all mitigation measures identified by government resource agencies, during the environmental screening process, were conformed with and were observed to be effective.

RESUME

Ce rapport présente la surveillance environnementale qui fut entreprise durant et après la construction de travaux de protection des berges du fleuve Fraser près du marécage Quaamitch en Colombie-Britannique, sous le programme fédéral-provincial de lutte contre les inondations du Fraser. La surveillance fut en conformité avec le décrit sur les lignes directrices visant le processus d'évaluation et d'examen en matière d'environnement (PEEE) et, avec la directive d'examen environnementale par le Service de la Conservation de l'Environnement (SCE) qui exige le responsable du projet d'assurer que les mesures d'atténuation nécessaires soient prises lors de la réalisation du projet. Le rapport souligne que toutes les mesures d'atténuation qui ont été soulevées par les agents gouvernementales au cours de l'examen environnementales furent respectées et se montrèrent effectives.

NICOMEN ISLAND BANK PROTECTION

QUAAMITCH SLOUGH

ENVIRONMENT SCREENING FOLLOW-UP REPORT

This follow-up report is in support of the EARP Guidelines Order-In-Council and the Environmental Conservation Service (ECS) Environmental Screening Guidelines which requires the initiator to ensure that mitigation (and/or compensation) measures and monitoring requirements, identified during the screening, are incorporated into the implementation of the activity. The report documents the environmental surveillance undertaken, during project construction and after project completion, to ensure conformance to mitigation identified during the environmental screening process.

PROJECT SCREENING NO.: WPM-0002

DATE PRELIMINARY SCREENING COMPLETED: April 2, 1985

CONSTRUCTION ACTIVITY: Stabilization of an eroding overbank to protect an inshore dyking system by placement of quarry tailings to achieve an appropriate bank alignment and placement of a quarried rock riprap blanket over the riverside slope.

TIME OF CONSTRUCTION: February 28 to May 9, 1985

SITE VISITS: March 7 & 29, May 2 & 17, August 16, 1985

SITE MAP: Attachment 1

PROJECT PLAN: Attachment 2

PHOTO(S): Attachment 3

The Project

The project is, located on Nicomen Island near the outlet of Quaamitch Slough (Attachment 1) and it involved bank protection works at an area of rapid overbank erosion. This erosion, which was a threat to the existing flood control dyke of the area, had been occurring only since 1980 and was due to changes in the river regime.

Aerial views of the project area are shown in Plates 1 to 3 of Attachment 3 and illustrate the erosion problem, its proximity to the existing dyke, and the flow pattern of the Fraser River in the area. In particular, Plate 3 shows the scouring activity of the river and the breaching of the Slough as evident by the discontinuation of a line of trees and shrubs on the south side of the Slough. A close-up photo of this breach taken on March 7, 1985 is shown in Plate 4 and it illustrates the progressing erosion as noted by the eroding channel into the mud flat of the Slough.

The details of the bank protection works are given in Attachment 2. This proposal was reviewed by federal and provincial resource agencies and some mitigation measures were identified. The mitigation and the conformance to it are described below.

Required Mitigation and Conformance

1. Mitigation:

The Department of Fisheries and Oceans (DFO) recommended that the

area impounded by the bank protection works and the eroded north overbank should be filled progressively downstream during construction so to avoid trapping juvenile migrating salmon.

Conformance:

The project area was first visited on March 7, 1985 with construction well underway (Plate 5). The bank protection was started from the downstream end of the project area with end dumping of quarry tailings in an upstream direction across the scour hole. The decision to start from the downstream end was for logistic and cost factors. The existing dyke provided direct access to the downstream end of the project while the upstream end, preferred by DFO, would have required building of an access road across some private property. This also would have resulted in added cost and possible undesirable construction delays as the project had to be completed before the spring freshet. Subsequent discussions with DFO regional office lead to agreement on the change provided that any fish in the impoundment area had an escape route before the area was sealed off from the river. In conformance with this recommendation the impoundment behind the newly placed bank protection works (Plate 6) was also back-filled from the downstream end and moved upstream to allow water and any fish species to escape via the upstream end of the impoundment.

2. Mitigation:

DFO recommended that the final elevation of the back-filled impoundment should be at least even with the adjacent Quaamitch Slough so that the area would be self draining to the Slough.

Conformance:

Plates 6 to 9 illustrate back-filling of the impoundment area during and at the end of the construction period. The elevation of the fill immediately adjacent to the Slough was level or slightly higher than the Slough (Plate 8), while the area adjacent to the eroded overbank was raised to elevation of 4.8 m (Plate 9), thus ensuring self draining of the impoundment area to the Slough.

3. Mitigation:

DFO requested that the normal outlet of Quaamitch Slough be left open to allow natural outflow to the Fraser River. The opening was also to be protected with rip-rap and the channel immediately upstream was to be graded to allow free flow for all receding waters.

Conformance:

The normal outlet of Quaamitch Slough before and after construction is shown in Plates 10 to 13. The overbank on either side of the mouth of the outlet was excavated to elevation 4.8 and rip-rapped with 1 m minus quarried rock. A portion of the channel immediately upstream of the mouth was also protected but with smaller rocks of approximately 0.5 m or less. This channel connecting the Slough and the river was dredged with a back-hoe starting at elevation of approximately 3.0 m at the Slough (Plate 12) and sloped gently by 0.5 m to the mouth thus allowing freeflow for receding waters.

Observations

1. The bank protection alignment on the eastern end of the project was extended further upstream of that which is shown on the design plan of Attachment 2 (ie. the extension is shown by a broken line on the plan). It was extended to an area slightly above the convergence of the two side channels of the river (Plate 14). This decision was made during construction as overbank erosion in that area became evident (Plate 15). However, this additional construction did not raise any additional environmental concerns.
2. Most of the instream work of end dumping of quarry tailings and the dredging of the toe of the alignment for riprap placement was done during the month of March 1985. During this time the Fraser River stage was very low and the discharge at Hope ranged from a daily mean of 764 to 864 m³/sec. Therefore the potential impact of increased suspended sediment being transported to the Fraser River by these construction activities was much reduced. During the March 7 site visit, end dumping was observed to produce only a localized increase in sediment with no visible increase in turbidity downstream of the construction activities.

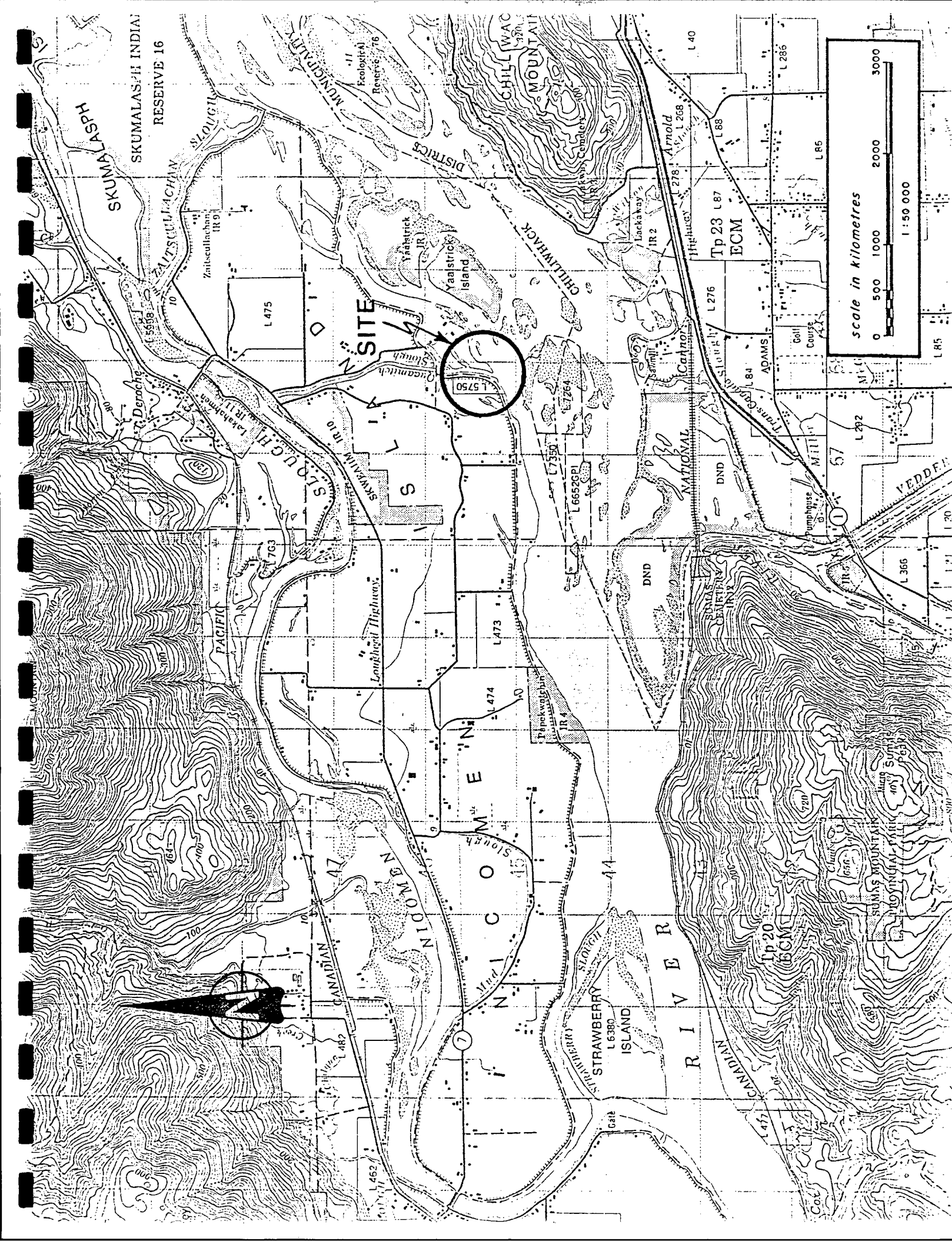
Follow-up Summary

Environmental surveillance of the project documented that the mitigation measures identified by government resource agencies during

preliminary screening were conformed with and implemented in the construction of the protective works. However, as the protective works were designed to be topped during an average freshet and it was topped during this June, 1985 spring freshet, the project area was visited once the spring flood waters had receded to ensure that the mitigation was effective. Of particular concern was that no pools or depressions capable of trapping fish had been left over the impoundment area or in the dredged channel. Following the receding of flood waters these areas were found to have drained satisfactorily (Plates 16 and 17).

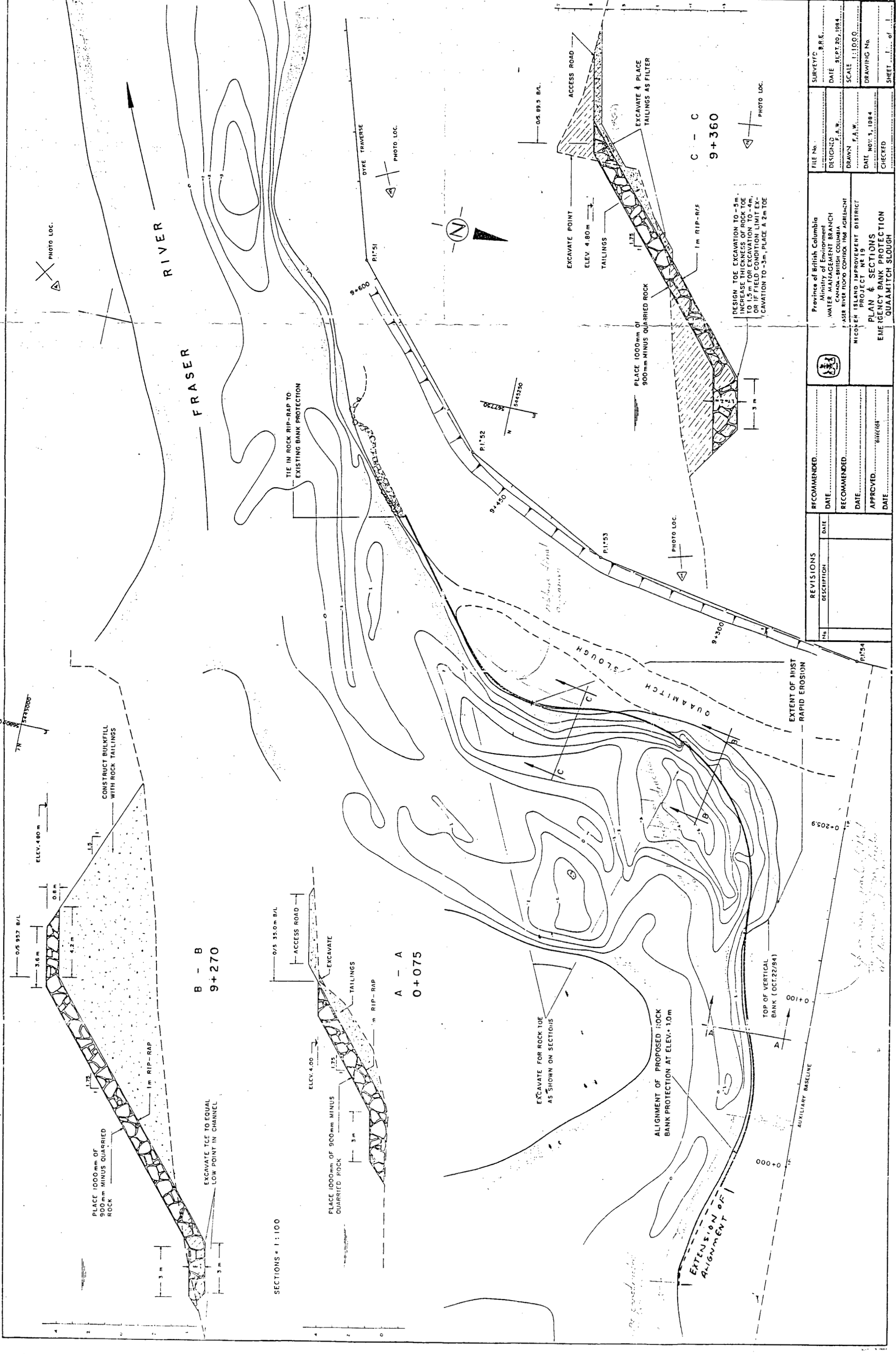
ATTACHMENT 1

Location Map



ATTACHMENT 2

Quaamitch Slough Bank Protection Plan and Sections



REVISIONS		RECOMMENDED	
No.	DESCRIPTION	DATE	

Province of British Columbia Ministry of Environment WATER MANAGEMENT BRANCH CANADA-BRITISH COLUMBIA FRASER RIVER FLOOD CONTROL 1984 AGREEMENT	FILE No. _____ DESIGNED A.W. DRAWN F.A.W. DATE NOV. 5, 1984 CHECKED _____	SURVEYED B.R.E. DATE 9/27/20, 1984 SCALE 1:1000 DRAWING No. _____ SHEET 1 of 1
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Province of British Columbia Ministry of Environment WATER MANAGEMENT BRANCH CANADA-BRITISH COLUMBIA FRASER RIVER FLOOD CONTROL 1984 AGREEMENT	FILE No. _____ DESIGNED A.W. DRAWN F.A.W. DATE NOV. 5, 1984 CHECKED _____	SURVEYED B.R.E. DATE 9/27/20, 1984 SCALE 1:1000 DRAWING No. _____ SHEET 1 of 1
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ATTACHMENT 3

Pre-Construction, Construction and Post-Construction Photographs
of the Quaamitch Slough Bank Protection Works

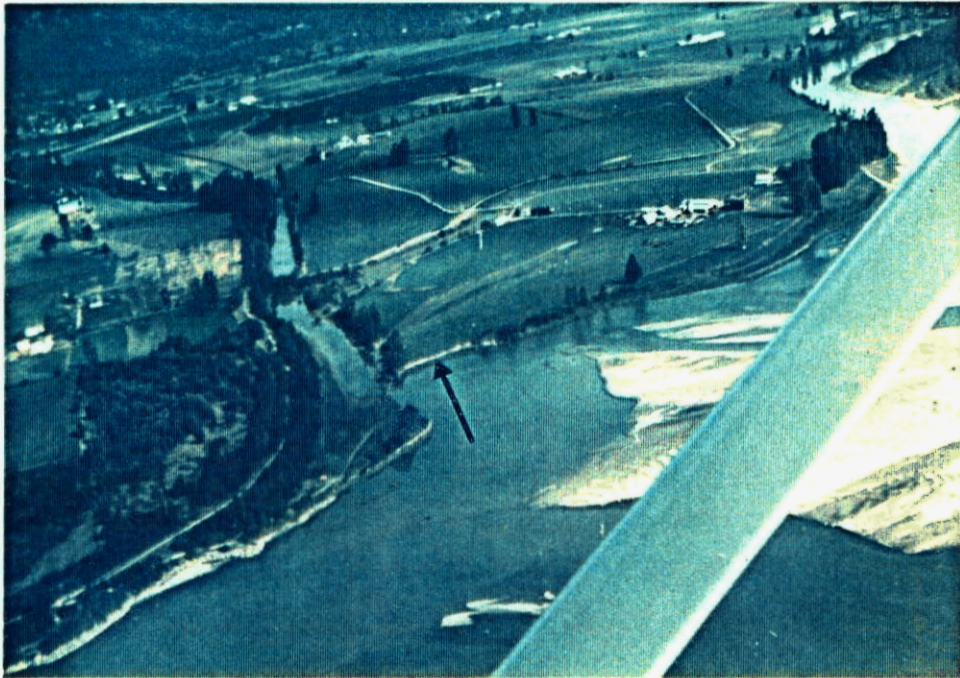


Plate 1 Aerial view of Quaamitch Slough and the overbank erosion problem (arrow), looking north above the Fraser River (September 19, 1984 with Fraser River discharge at Hope of $2480 \text{ m}^3/\text{s}$).



Plate 2 Aerial view of overbank erosion (arrow) near mouth of Quaamitch Slough. Note the flow pattern of the Fraser River in the erosion area (September 19, 1984).

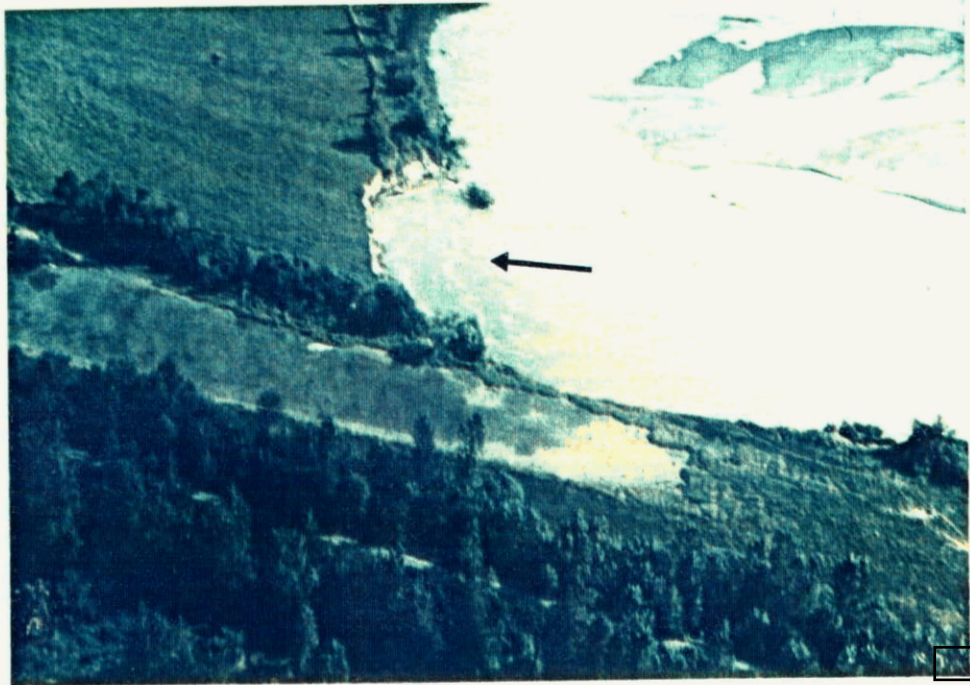


Plate 3 Close-up of the overbank erosion (arrow) near the mouth of Quaamitch Slough (September 19, 1984).



Plate 4 Close-up of the eroding channel cutting into Quaamitch Slough (March 7, 1985 with Fraser River discharge at Hope of $782 \text{ m}^3/\text{s}$). The flood control dyke is immediately behind the background row of trees.



Plate 5 View of Quaaamitch Slough (left) and the start of the bank protection works looking north from the western end of project area (March 7, 1985 with Fraser River discharge at Hope of $782 \text{ m}^3/\text{s}$).



Plate 6 View of the impoundment area remaining between the bank protection work alignment and the eroded overbank, looking south from the eroded overbank on March 7, 1985.



Plate 7 View of the back-filled impoundment area on May 2, 1985 when the Fraser River at Hope was at 2170 m³/s discharge. Note the higher ground elevation of the impoundment area relative to the Slough.



Plate 8 Backfilled impoundment area on May 2, 1985 viewed from the mouth of Quaamitch Slough and looking north.



Plate 9 View of backfilled impoundment area at termination of construction, looking north from the Slough on May 17, 1985 when Fraser River discharge at Hope was $4010\text{m}^3/\text{s}$. The new elevation of the impoundment area adjacent to previously eroding overbank ensures self drainage to the Slough. Note the Slough is being filled with back-up water from Fraser River.



Plate 10 Outlet of Quaamitch Slough (arrow) prior to construction, on March 7, 1985 with Fraser River discharge at Hope of $782 \text{ m}^3/\text{s}$.



Plate 11 Outlet of Quaamitch Slough at the termination of construction on May 17, 1985 with Fraser River discharge at Hope of $4010 \text{ m}^3/\text{s}$. Note the rip-rap protection of the outlet and the dredged channel connection to the Slough.



Plate 12 Looking south at the dredged outlet connection of the Slough to the river after project completion (May 17, 1985).



Plate 13 Looking north at the dredged outlet of the Slough to the Fraser River, after project completion (May 17, 1985).



Plate 14 Looking west on the extension of the eastern end of the project area. Note the extension is visible by a difference in the shade of riprap (May 2, 1985).



Plate 15 Overbank erosion of eastern end of project area prior to extension of the bank protection alignment (March 29, 1985).

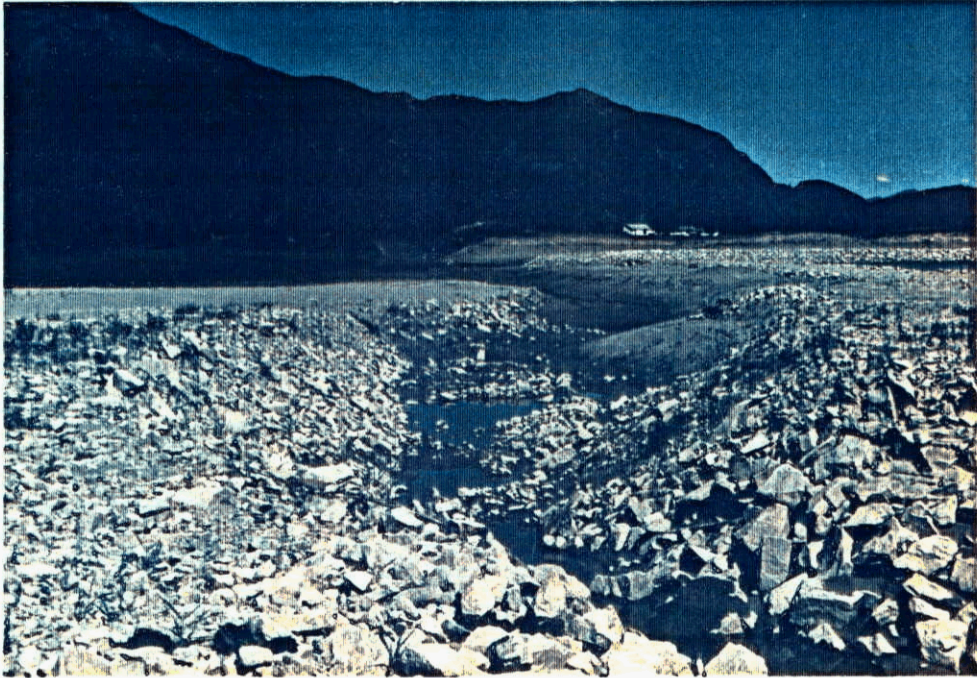


Plate 16 Outlet of Quaamitch Slough after the receding of spring freshet waters, August 16, 1985.

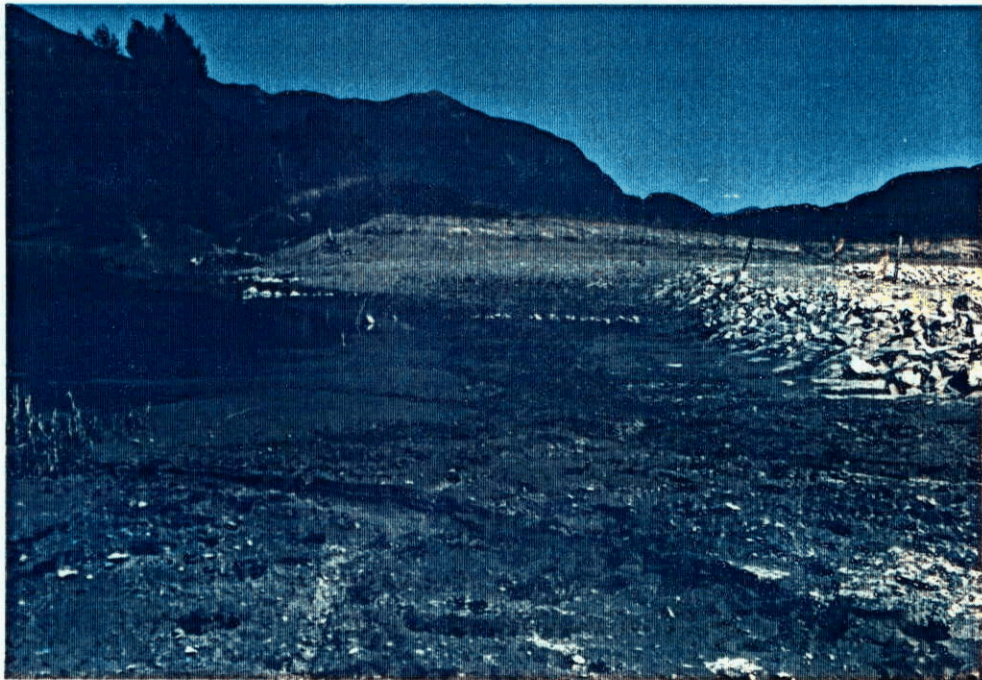


Plate 17 Looking north on the backfilled impoundment area after the receding of spring freshet waters, August, 16, 1985.