

2002 TAC Environmental Award Nomination

St. John's Outer Ring Road

Dept. of Works, Services, & Transportation
Government of Newfoundland & Labrador

Submission To :

The Transportation Association Of Canada
Environmental Achievement Award Review Committee

Project:

St. John's Outer Ring Road, Trans Canada Highway,
St. John's, Newfoundland and Labrador
- A Model for Highway Environmental Planning

From:

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1. Project Overview

The Department of Works Services and Transportation (WST), Government of Newfoundland and Labrador, began conceptual planning for the St. John's Outer Ring Road in the early 1970's. The project would be an extension of the Trans Canada Highway. It would consist of the construction of 21 kilometers of four lane high speed highway (Rural Arterial Divided 100 km/hr), and a 2 kilometer major link road (Bifurcation Road) into the main commercial portion of the city. The work would include ten interchanges connecting with major urban roads requiring overpass/ underpass structures and construction of other structures over minor roads.

The road construction would take place in the northern portion of St. John's and through an area of urban/ institutional parkland known as the C.A. Pippy Park. The original planned routing was not within the park, but the park boundaries were expanded to include a much larger land area which encompassed much of the road right of way. The park contains many hiking trails, undisturbed natural areas, and public open space. Also, the many trout streams to be crossed during construction through this area have some of the highest unit biomass of brown trout found anywhere in the world. These factors, combined with a significant amount of public concern about the project, dictated a need for a high level of environmental protection and good public relations if the project was to proceed.

A professional / technical team within WST were assigned to the project. Team members consisted of senior design and project management engineers, senior policy and environmental planners, and associated technical staff. The environmental planning and assessment for the project were scrutinized judicially stemming from a submission to the Federal Court challenging the project. The Court judgement concurred with WST and the project, and work proceeded.

2. Environmental Planning, Assessment, and Studies

A. Early Environmental Planning Assessment and Public Input

Detailed environmental planning for the project began in 1984. Early planning for routing allowed for strategic development control in areas along the route and within the right of way and allowed considerable time for the acquisition of private land and relocations required for the road. The project was registered for both Federal and Provincial Environmental Assessment. The assessment process involved producing a comprehensive Environmental Impact Statement (EIS). Public hearings into the project were conducted wherein verbal and written submissions were received from the public and interested groups. The project moved through the Environmental Assessment process and was approved. The construction of the St. John's Outer Ring Road commenced in the spring of 1994. Public opposition to the project ceased and a broad base of public support for the project became widely evident. The project is now close to completion with final contracts to be completed in 2003.

B. Environmental Component Studies

Stemming from the Environmental Impact Statement, over the next several years through the preparation

of specific detailed terms of reference, comprehensive component studies of major areas of environmental concern were produced. This included such components as: 1. landscape assessment and rehabilitation, 2. wetlands, watercourses, and fish habitat, 3. noise reduction and traffic volumes, 4. social/ economic, and other studies and research work.

The component studies included the following:

- Historic Resources Overview Assessment, (Tuck, March 1984)
- Aquatic Habitat Assessment (LGL, June/86)
- St. John's Outer Ring Road Traffic Study, (DelCan, May, 1986)
- Water Quality Report, (DelCan, December 1987)
- The Environmental Impact Statement, St. John's Outer Ring Road, (DelCan, Dec. 1987) and Addendum (Dept. of Transportation, Sept. 1988).
- Outer Ring Road Social and Economic Initial Environmental Evaluation, (LeDrew, Fudge, & Associates Ltd.)
- St. John's Outer Ring Road Landscape Rehabilitation and Noise Mitigation Plan, @. Seypka and Associates, October, 1990.)
- Waterways and Wetlands of the St. John's Outer Ring Road, (LGL Ltd., February 1995)
- Botanical Surveys, Outer Ring Road, (Memorial University of Newfoundland).

These studies would form a broad basis of reference for the planning, design, and construction of the road.

C. Environmental Protection Plans & Construction Surveillance

Each major road construction contract included an Environmental Protection Plan (EPP) as part of the contract documents. Each of these nine EPP's was a comprehensive field usable document specific for each section of road under contract for construction. It provided detailed instructions to the contractors and site personnel on environmental protection measures prior to, during, and after construction. To ensure that all workers were fully informed of these matters an Environmental Awareness Session of four to six hours covering all of the EPP was conducted for the contractor's employees, WST field personnel, and representatives of regulatory agencies, prior to each of the nine major work contracts.

A process of consistent and extensive environmental surveillance and construction site monitoring and reporting was implemented and carried out during all phases of the project. This was done by an Environmental Officer / Planner who was assigned to the project reporting to a Senior Environmental Planner, WST. The surveillance and monitoring was also carried out in cooperation with a public advisory group of representatives interested in protecting the environment and the public park through which the road would be constructed.

3. Public Involvement

Stemming from the public meetings which were held in the early planning stages of the project to receive submissions and hear from concerned individuals and groups, it was recommended that an advisory committee of public representatives be formed. Some representatives were opposed to the project and held

strong views regarding environmental protection. Many were not well informed regarding WST's plans as to how the road could be built to afford necessary environmental protection. WST decided that an open forum for discussion of the public's concerns would best address these issues. As a result, the Minister of WST appointed a committee known as the St. John's Outer Ring Road Environmental Advisory Committee. The Committee consisted of twelve members comprising broad representation of public interest groups and was chaired by the Director of Policy and Planning, WST. Their mandate was to advise WST on environmental issues regarding the road project. The committee began meeting in 1994 and has worked closely with WST over the past nine years. **Many of the Committee's recommendations have been taken into consideration and implemented during the course of the work to the overall benefit of the project.** Environmental concerns raised were addressed through considerable discussions including many site visits. **The process has been generally a setting aside of adversity in favor of mutual cooperation and working together in an effective process toward common shared goals of good environmental management. It is now being examined for broad application to development consultation within the region.**

4. Key Environmental Protection Components Addressed

The Environmental Impact Statement and Addendum identified several key areas of required environmental protection strategies:

A. Protection of Watercourses, Water Quality, and Fish Habitat

Extensive planning, design, and effective construction procedures and methods were employed to ensure a maximum level of protection for all watercourses for fish habitat and water quality. WST worked cooperatively with Fisheries and Oceans Canada (DFO) in adopting a policy of "not net loss of fish habitat". Compensatory works were installed at many locations. Fish migration parameters were provided at all habitat locations throughout the project. This often involved the installation of **stepped baffled pipes** and **large outlet pools**. **Fish habitat was compensated or enhanced throughout the project involving 25 installations of culverts or bridges on watercourses, resulting in no net loss of fish habitat.** Specialized construction methods and equipment operations were planned and implemented during all watercourse alteration work to ensure water quality and fish habitat protection. **There were no fish mortalities resulting from the project.**

An extensive water quality monitoring program was implemented prior to the start of the project and was conducted for ten years. Water sampling and testing for many routine parameters at streams along the route provided data on any potential impacts from the road project on water quality.

The results of the long term water sampling program have found no significant negative impacts attributable to the road project.

B. Protection of Wetlands

1. Fogarty's Wetland

A natural bog area in the central portion of Pippy Park known as Fogarty's Wetland fell within the right of way of the road. The wetland is of special importance for sensitive downstream areas in regard to hydrology and water quality. The Fluvarium, a unique facility for public displays and interpretation of trout habitat and natural water resources relies on source water from the drainage basin of this area of the road for its displays.

Specialized construction procedures and protection measures were planned and implemented to afford protection to this and other sensitive areas during road construction. This involved such aspects as:

1. Reduction of groundwater levels, (unwatering and pre-basin drawdown) through strategic ditching and pumping operations prior to opening of cut zones.
2. Equipment operations being confined to unwatered areas only.
3. The installation and maintenance of mud basins and silt fencing during grubbing operations.
4. The routing and collection of runoff from the construction zones into settling basins to drop mobilized sediments,
5. Pumping and water release into designated areas for vegetation absorption and groundwater recharge.

WST formed a partnership with the C.A. Pippy Park Commission and Ducks Unlimited Canada to further protect and improve Fogarty's Wetland, and develop it as an interpretive natural wetland for educational purposes. An environmental restoration of the wetland was carried out including a general cleanup of the area. Various access and interpretive installations were provided by WST. The Provincial Minister of Environment and Minister of WST addressed an official opening ceremony for the wetland during Environment Week in June/2002. The wetland is now a special protected area within Pippy Park where Ducks Unlimited and educational organizations bring school groups for instruction on ecology and the significance of wetlands habitat.

2. Lundrigan's Marsh

Lundrigan's Marsh is the largest cattail marsh in eastern Newfoundland and home to many unusual bird species. The proposed routing of the most easterly section of the Outer Ring Road, which is through an industrial zoned area, was changed to avoid crossing this wetland. **A major rerouting of the eastern two lane portion of the road was carried out in order to avoid any in-filling or adverse impact on this marsh.** The road alignment is now well removed from the wetland with a substantial buffer. WST took the lead to secure the long term protection of the marsh. **WST persuaded interested citizens groups to form a committee concerned with long term protection strategies.** The Nature Conservancy of Canada, Ducks Unlimited, and the Eastern Habitat Joint Venture were invited to become involved. As a result there have been land acquisitions for conservation, and recently the marsh has been identified by the City of St. John's for long term protection from adjacent industrial development.

C. Balanced Grading Design and Reduced Road Footprint

The design concept incorporated a balanced approach in the initial design grading in determining the extent of road cut and fill zones so that suitable road building materials (overburden and rock) were garnered from the cut areas and laid down in fill zones. This approach was adopted to reduce the need of imported materials for constructing the road and reduce off site impacts resulting from the opening of new borrow pits. **As a result of this design approach, no new borrow pits were required for the project.**

The design required that there be a minimum of cutting and clearing within the 90 m road right of way to accommodate the road. In many areas steeper road embankment slopes were created and stabilized to reduce the width of the road footprint.

D. Excess and Waste Soils Management

Innovative project planning was implemented to find improved disposal methods and alternate beneficial usages for excess and waste soils generated during the construction/ grading contracts. Many areas of Pippy Park and the region were identified where the placement of waste overburden, grubbing, and organic soils would create improvements. (See Section 5 - Environmental/ Beneficial Spinoffs for Region)

E. Landscape Rehabilitation

Other elements of landscape rehabilitation were implemented stemming from the landscape rehabilitation plan component study and horticultural study. All topsoil was saved and reapplied to back slopes and road embankments, and hydro seeded to form stable, attractive, vegetated zones along the route of the road. Special environmentally sensitive areas, such as locations where trout streams were to be crossed, and as well, aesthetically important areas, were designated for naturalization involving plantings of native herbaceous plants, shrubs, and trees.

F. Traffic Noise Attenuation

Stemming from a traffic noise impact assessment study, road design features were included to reduce the impact of traffic noise on areas adjacent the road. Road elevation and grade were reduced where possible in areas where traffic noise could pose negative impacts on adjacent residential areas. Back embankment slopes were designed and constructed to deflect sound upwardly and away from adjacent residential receptors. Sound berms were constructed to isolate adjacent residential areas from the road right of way and provide further sound deflection.

5. Environmental / Beneficial Spinoffs for the Region

With the large mobilization of equipment and labor force associated with each of the road construction contracts, there were opportunities afforded for other environmental improvements. This was identified at an early environmental planning stage. Each of the nine grading contracts were examined in advance of construction to determine where environmental benefits including off site work could be achieved. As a result many beneficial spinoffs were accomplished for the area surrounding the project and for the region through a very cooperative work approach involving environmental planning strategies in liaison with WST

contractors, public groups, and WST project team members. Some of these are as follows:

A. Horticultural Research and Development

- WST removed large numbers of young native trees, shrubs, and herbaceous plants from where the road would be constructed. These were held over for use in revegetation and beautification at disturbed areas along the road route.
- Native trees, shrubs, and herbaceous plants from the road corridor were provided to the MUN Botanical Gardens, the Grand Concourse Authority, school groups, and trail improvement groups for revegetation projects throughout the city and region.
- In the process of routine environmental surveillance monitoring along the corridor of the road., WST discovered an extensive site of a large, new orchid (*Dactyloriza Majalis Praetermissa Junialis*) for the Province, and possibly North America. This site and species has received much interest from abroad. The site, involving a large acreage, has now been given special protection in Pippy Park
- WST assisted with funding for cooperative research projects with the MUN Botanical Gardens to develop expertise in hydro seeding methods, land reclamation/ naturalization, and assembling a manual on handling and planting methods. **These applied scientific research projects have helped establish horticultural methods and uses of many native species of trees, shrubs, and herbaceous plants. Benefits here have been far reaching into the community** including work for Parks Canada in Terra Nova National Park

B. Fish Habitat Diversification/ Improvement

- At all of the stream crossings associated with the road construction there were large deep pools installed at the outlets of the large pipes. This created trout overwintering habitat and habitat diversification / improvement.
- Trout present in areas where construction was to take place were carefully relocated either elsewhere in the stream system, or, through cooperation with Fisheries and Oceans Canada, to new areas of marginal trout populations for stock improvement and expansion. A new spawning channel was installed within a section of the road right of way adjacent the Virginia River for habitat improvement in this system.
- Fish migration works were installed at Juniper Ponds Dam, Bifurcation Road, to rectify a physical trout migration barrier existing from many years ago.

C. Removal of Debris/ Car Wrecks from Pippy Park and Area

- A large amount of debris including 110 car wrecks and other illegal disposals were removed from

the road route, adjacent areas, and wetlands, to improve the quality of the environment in these areas in proximity to the road. This was addressed as either a bid item in the tender documents or was paid to the contractors through contingency.

D. Land Reclamation/ Improvements Using Excess Road Material

- In Pippy Park rehabilitation of old abandoned road sections was carried out. This was done using grubbing or other organic soils which were excess from the project.
- Excess road gravels stripped from temporary ramps were used to improve parking areas, gravel roads, and walking trails along the route of the project.
- As part of the plan for excess waste soil management, three large gravel pits were identified for reclamation. Through the spreading of excess soils and grubbing material from the road project along with hydro seeding, these areas were restored and revegetated.
- A large expansion was provided to the Pippy Park Trailer Park Overflow Area using excess material from the road project to construct new trailer sites and a protective berm planted with native vegetation.

E. Organic Soils Used Off-Site

Other strategies of soil management included beneficial use of excess organic soils such as topsoil and peat.

- 1.6 km of an abandoned electric transmission route was rehabilitated and revegetated.
- One thousand tons of excess topsoil was made available to the City of St. John's and the Grand Concourse Authority for public open space and trail development projects at Bowring Park, Mundy Pond Park, and Kenney's Pond Park.
- Large amounts of agricultural grade peat and other organic based soils were trucked and placed in designated areas to enrich agricultural, public, and private land in the region..

The forgoing items D, and E, were carried out by the road building contractors at no cost to WST or the land owners. This was accomplished largely by virtue of the proximity of these locations to the road construction sites. As this allowed less hauling for trucks, shorter runs and less expense than hauling to regional disposal sites, it proved economically beneficial for the contractor to remediate these sites. This was a highly successful collaborative arrangement between WST Environmental Planning Section and the road building contractors.

F. Trail System Access and Improvements

- Seven pedestrian underpasses were installed in the road to allow unimpeded movement of hikers

and skiers on the trail systems. WST carried out improvements to numerous hiking and ski trails in proximity to the underpasses in the road, particularly in Pippy Park, which included rerouting several existing trails to better locations.

6. Summary

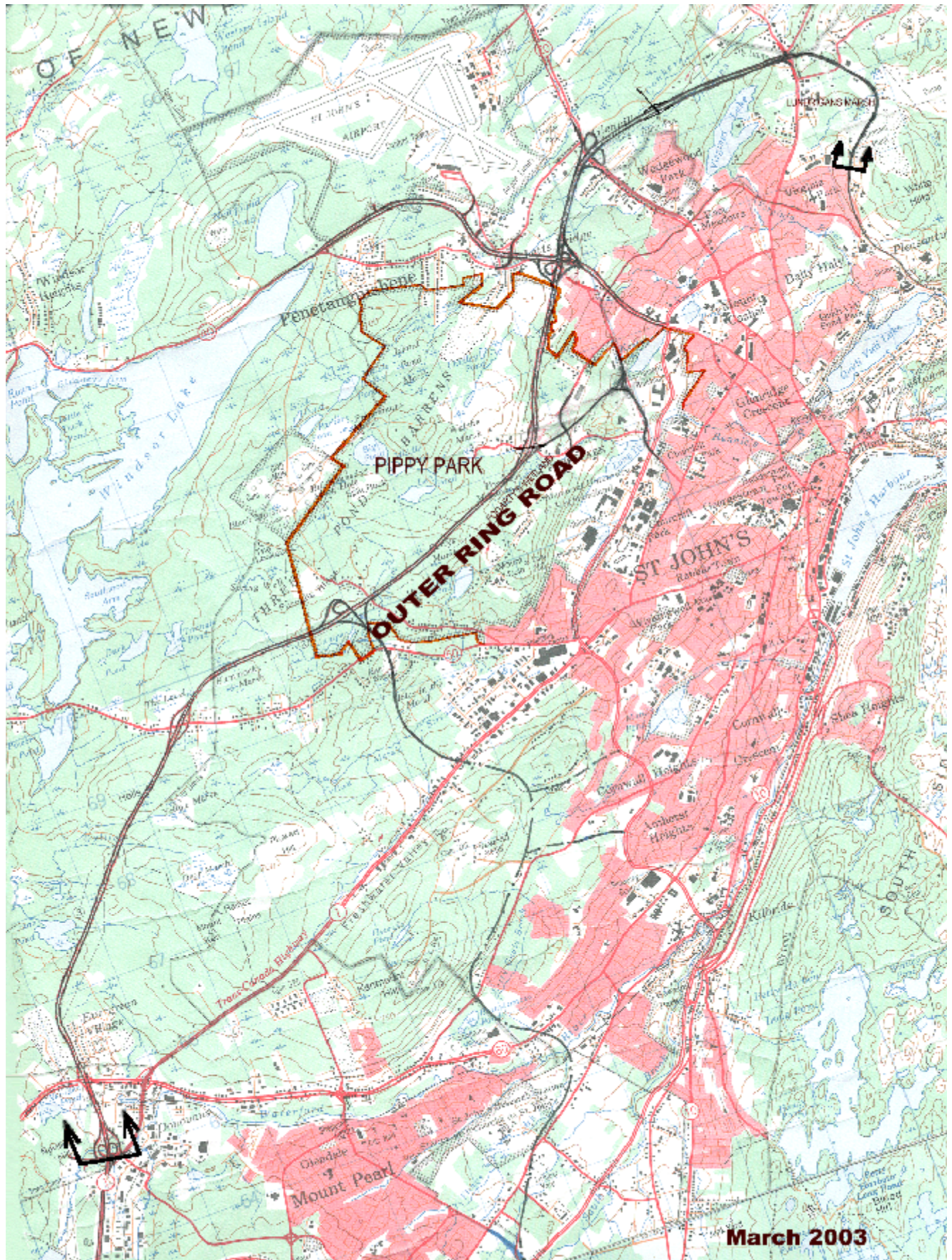
The foregoing has provided an overview of the nature of the planning and design implemented to ensure an exceptional level of environmental protection and enhancement for the St. John's Outer Ring Road Project. It has demonstrated that the project is unique in several regards:

1. the extent and quality of environmental planning and design carried out for the project,
2. the high degree of success achieved in both protecting and enhancing the environment,
3. the innovative methods of construction and equipment operations employed,
4. the many beneficial environmental spinoffs resulting from the project for the region, and
5. the relative low cost of the project for the volume of work accomplished.

The project has been completed within budget allocations. Land acquisition costs for acquiring private property for the route was approximately \$12 million. This was quite low and is attributable, despite some court cases, to a policy of early planning and long term development control along the proposed route. Construction cost was \$68 million. The portion of the total project costs attributable to environmental planning and protection has been negligible (<2%). Environmental management and protection in this project was found not to be a significant additional cost but simply a commitment to a more comprehensive management process.

This process has proven to be a highly successful melding of design engineering and environmental protection components which have exceeded what was initially conceived and mandated. By producing many environmental beneficial spinoffs, which were of considerable real value, the environmental process for this road construction project has actually resulted in "value added".

The St. John's Outer Ring Road Project may be viewed as a model project for new highway construction projects in combining effective environmental planning, protection, and improvement strategies with appropriate highway design and construction methods in a forum of cooperative public relations. In view of the degree of success achieved and the significance of applying this process to other projects in other urban regions of Canada, the project was considered to be worthy of national recognition.





USM being placed in an abandoned pit near Oxen Pond Road to cover up graffiti rock face and re-establish original grades.



Extensive mobilization of heavy equipment, grubbing, topsoil stripping, USM & OM removal.



Large settling basin provided to contain and settle out silted water prior to release.



Large pools constructed at all culvert outlets Bremigan's Pond Brook.



Topsoil saved where encountered.
Being loaded and hauled to storage site.



Silted water confined to construction zone in area of high ground water. Grubbing and infilling proceeding simultaneously.



Silt fabric holding back runoff of turbid water during rain event.

Surface runoff confined. Equipment operating "in the dry".





Booth Memorial High School teachers and parents relocating native trees & shrubs from road R.O.W. to school grounds.



Nfld. & Labrador Conservation Corps Green Team planting out new channel at Juniper Brook West.



Nagles Brook, below the falls. New channel being restored through plantings of native trees, shrubs, and herbaceous plants, May/96



Nagles Brook, below the falls, October/96