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Federal Environmental
Assessment Review Office

CP Rail Rogers Pass Development

Glacier National Park

Final Report of
the Environmental
Assessment Panel

August 1983

Canada

PANEL REPORTS TO THE MINISTER OF THE ENVIRONMENT ON THE PANEL PROJECTS

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18. Banff Highway Project (km 13 to km 27). Alberta (April, 1982)
19. Beaufort Sea Hydrocarbon Production Proposal (Interim Report) (April, 1982)
20. CP Rail Rogers Pass Development (Preliminary Report) (April, 1982)
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Federal Environmental Assessment Review Office
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K1A 0H3

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August, 1983



Government
of Canada

Gouvernement
du Canada

Environmental
Assessment Review

Examen des évaluations
environnementales

Hull, Quebec
K1A 0H3

The Honourable John Roberts, P.C., M.P.
Minister of the Environment
Ottawa, Ontario
K1A 0H3

Dear Minister:

In accordance with the mandate you provided on February 24, 1982 the Environmental Assessment Panel has completed its review of CP Rail's proposed development project in Rogers Pass. We are pleased to submit the Panel's report for your consideration and advise you that CP Rail's proposal could be acceptable, subject to certain conditions.

The proposed second main track in Glacier National Park was the subject of an April 1982 preliminary report recommending that certain activities could proceed, but that further information was required on issues of major concern. CP Rail subsequently commenced construction in mid 1982. Access roads along the proposed surface route were constructed and portal structures started for the Rogers Pass tunnel.

This current review is based upon additional information provided by CP Rail in April and June 1983 as well as public and technical agency comment. Public meetings were held by the Panel in Revelstoke, Golden and Calgary in June 1983.

In 1982 the Panel recommended that further study be carried out on an alternative location for the tunnel ventilation shaft as the original proposal was unacceptable in a National Park setting. The Panel has found the visual impact of the structure in the location now proposed by CP Rail to be acceptable, provided certain conditions are met.

Using additional information from the 1982 surface route access road, a track alignment was selected by CP Rail. It is recommended that CP Rail and Parks Canada work together to improve the design before construction proceeds. Revegetation of disturbed areas to meet stringent standards will be required.

The installation of work camps in the Park at Beaver and Flat Creek could be permitted, provided operational experience is satisfactory at a trial camp, and that only presently cleared areas are used.

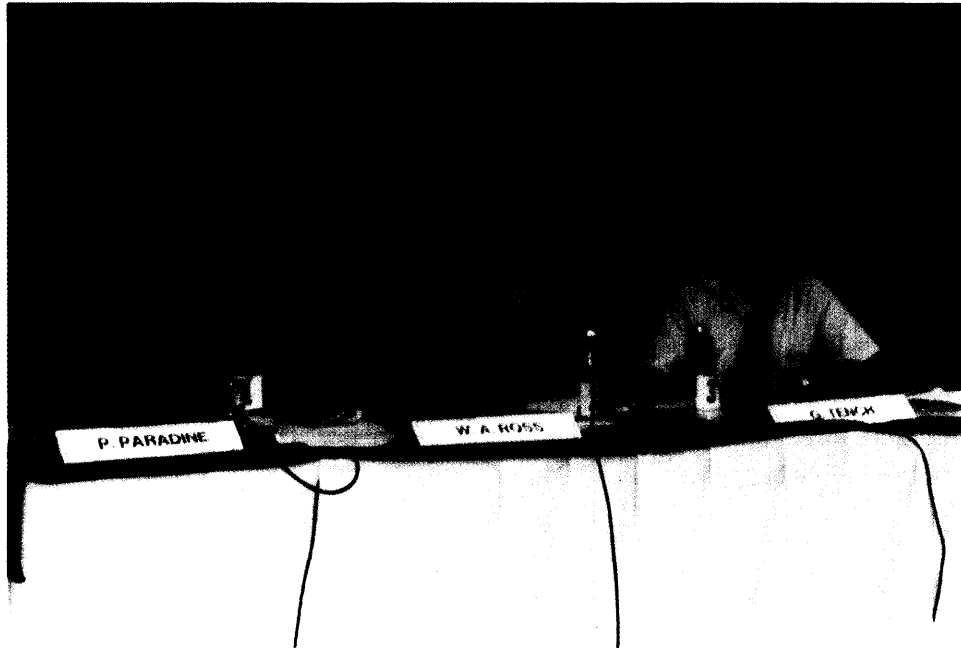
To ensure that the impact of the project on the environment is minimized and that the project can proceed expeditiously, a suitably qualified Project Manager should be appointed to represent Parks Canada on all aspects of the project. The Project Manager should work with existing committees to ensure that the recommendations of this report and of the Panel's preliminary report are implemented.

Respectfully yours,

P. J. Paradine
Chairman
Rogers Pass
Environmental Assessment Panel

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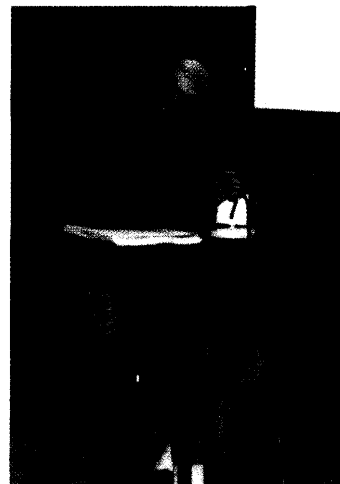
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"Glacier National Park and Rogers Pass are spectacular monuments that attest to the awesome power and beauty of nature. The environmental effects of CP Rail's project to twin the existing railway track through Rogers Pass, however, will demonstrate the fragility of this mountain environment for years to come. The range of concerns, the amount of information and the number of documents before us is a testament to the enormous scale and widespread implications of this project."

D. Cockerton

*National and Provincial Parks
Association of Canada*



CHAPTER 1

PROJECT AND REVIEW PERSPECTIVE



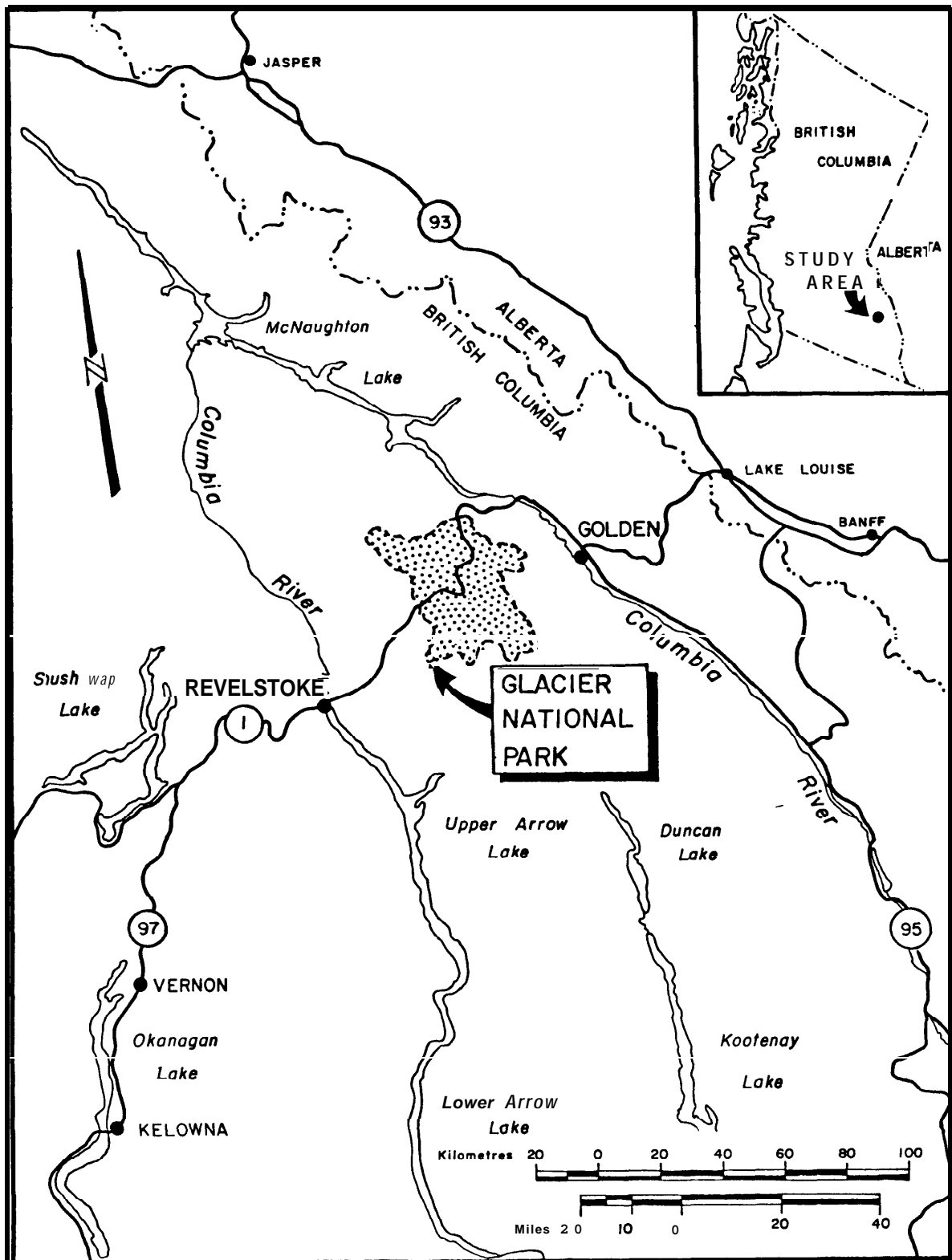


Figure 1 - Location of Glacier National Park

1. PROJECT AND REVIEW PERSPECTIVE

1.1 Introduction

This report sets out the findings of the Environmental Assessment Panel concerning a proposal by CP Rail to construct a second main track, from Rogers B.C. south and west through Glacier National Park (see Figures 1 and 2). This current review is consequent to an April 1982 preliminary Panel report, which advised that certain activities could proceed in 1982, but required CP Rail to provide further information on issues of major concern.

The project setting and background were described in detail in the preliminary Panel report and are included in Appendix A. The recommendations of that report are in Appendix B.

1.2 Project Description

In Summer 1982, CP Rail commenced construction of a second main track. Access roads along the proposed surface route were constructed and portal structures started for the tunnel at Rogers Pass. The ventilation shaft site was cleared and an access road installed.

Using additional information obtained from the 1982 surface route access roads, a track alignment was selected by CP Rail. For the 13 km from Rogers to Stoney Creek, this involved extensive cuts and fills as well as 2.8 km of retaining walls. West of Stoney Creek, the railway would be placed on a 2.2 km trestle before entering the 1.8 km (short) tunnel. After exiting from the short tunnel under the Trans Canada Highway, the route would continue for 1.5 km, crossing Connaught Creek, to the base of Mount MacDonald. It would then enter the 14.5 km Rogers Pass tunnel. At the western end of the tunnel it would use the portal built in 1982 to cross under the Trans Canada Highway. The remaining 4.7 km to the Park boundary will be double-tracked within the existing right-of-way (ROW). While the alignment selected by CP Rail still generally follows that approved by the Canadian Transport Commission (CTC) in 1981, the ROW width now requested by CP Rail averages over 95 m as opposed to the approximately 60 m approved by the CTC.

The size of the work camps now proposed by CP Rail within the Park has increased from two 250 person camps in 1982, to 420 and 460 at Flat Creek and Beaver respectively (see Figure 2). An alternative site at Glacier was proposed by CP Rail for the 420 person camp (see Figure 3). Other facilities include a 34 500 volt power line from Revelstoke, a standby power supply, fan houses, bridges, concrete plants, and storage areas. Total cost of construction is estimated at approximately \$600 million with project completion scheduled for 1988 based upon a 1984 start.

1.3 Environmental Review Process

1.3.1 Referral and Previous Review

On February 24, 1982, the Minister of the Environment requested the Executive Chairman of the Federal Environmental Assessment Review Office (FEARO) to form an Environmental Assessment Panel to review the environmental and related social impacts of the proposed Rogers Pass Development Project. The terms of reference issued for the review are provided in Appendix C.

During April 1982, the Panel held public meetings in Vancouver, Revelstoke, Golden and Calgary and submitted a preliminary report to the Minister of the Environment. The Panel advised that certain activities could proceed in 1982, but required CP Rail to conduct further studies in order to address several identified issues of major concern. These included the noise and visual effects of the proposed tunnel ventilation shaft, terrain and visual impacts along the surface route, reclamation of the proposed right-of-way, work camps and social issues.

1.3.2 Environmental Assessment Panel

The members of the Panel are Philip Paradine (chairman), William Ross and George Tench. All members served throughout the present and the previous review. Biographies of Panel members are contained in Appendix D.

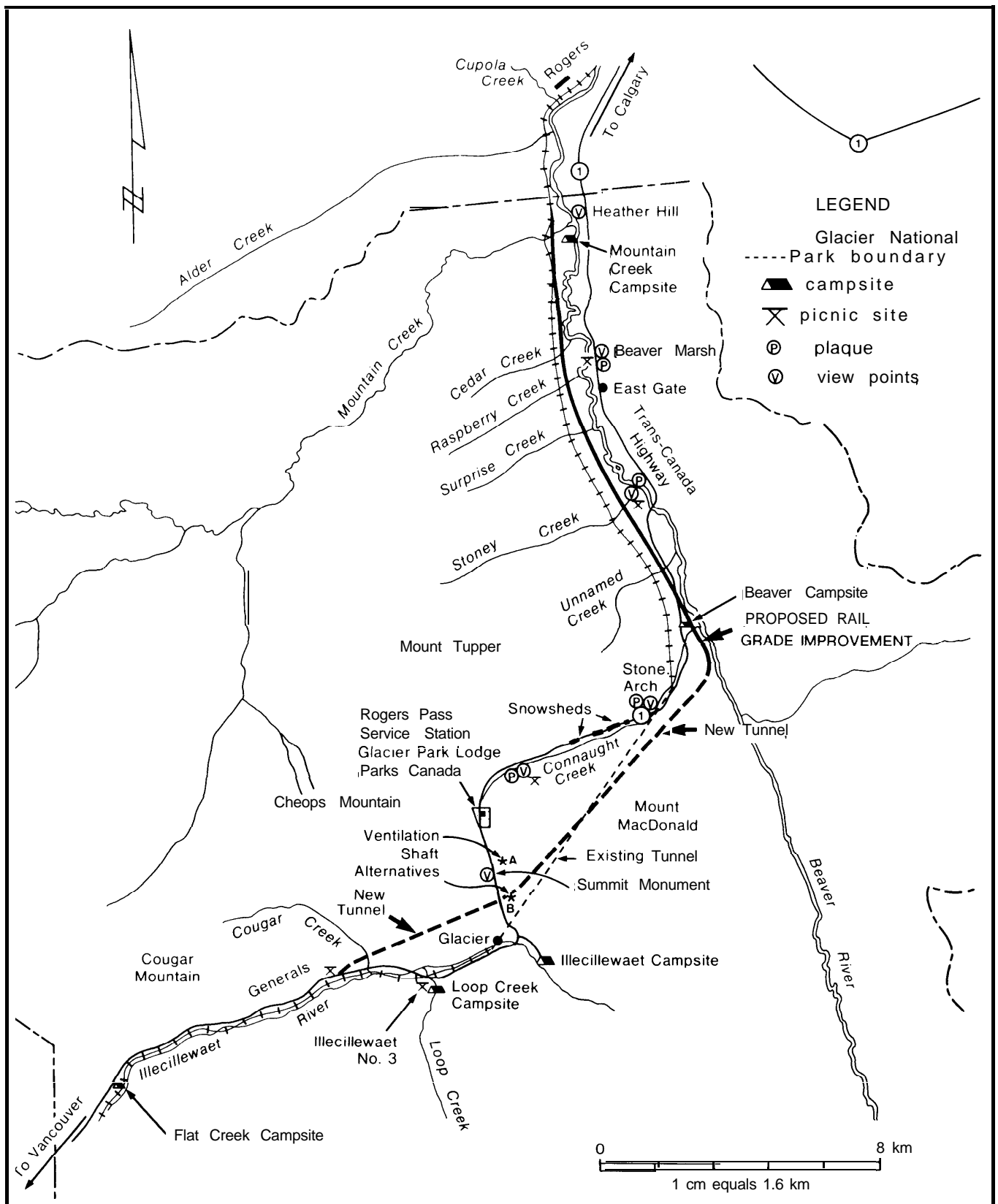


Figure 2 - Location of CP Rail Rogers Pass Development

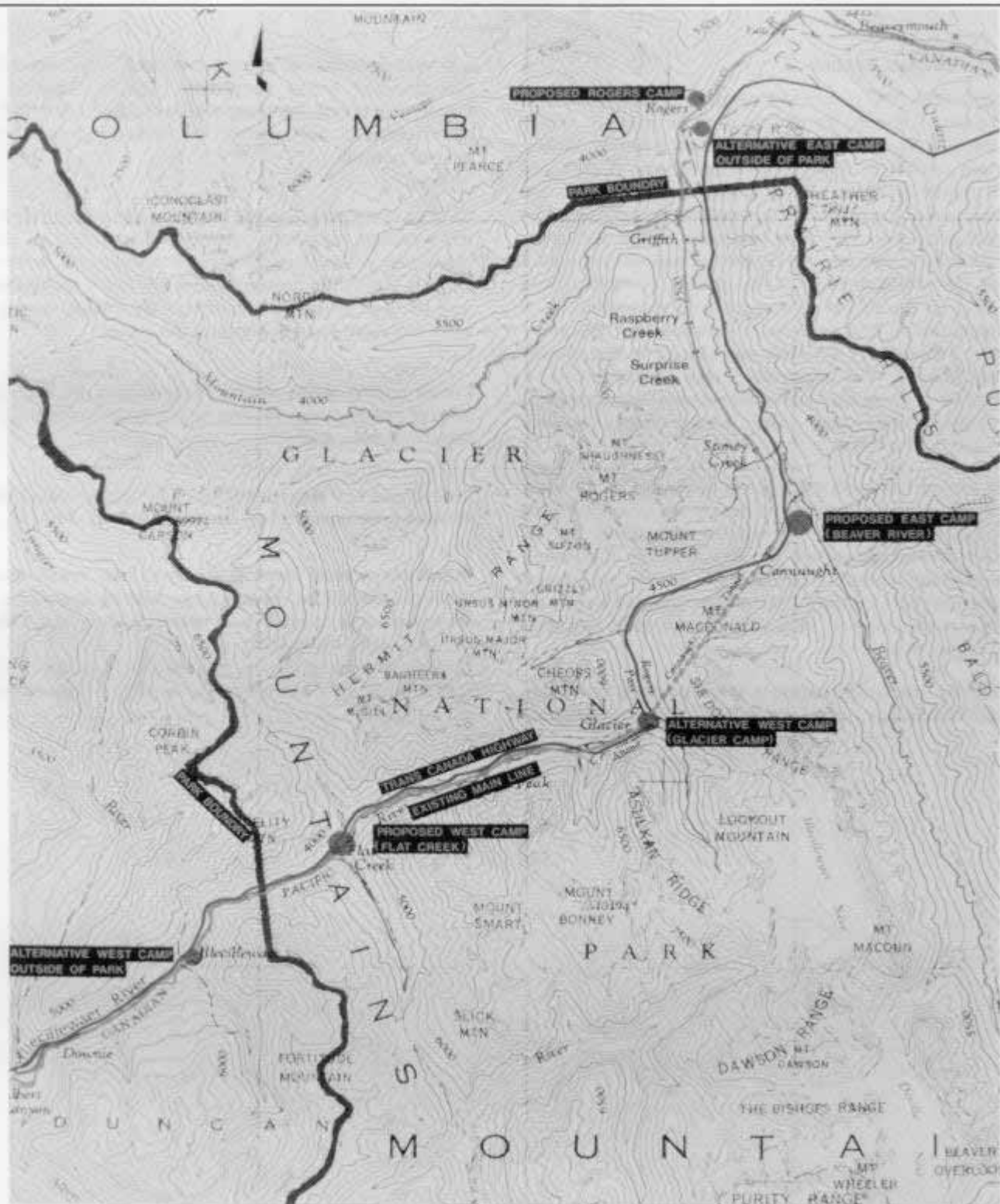


Figure 3 - Plan View of Camp Locations

1.3.3 Current Review

In April 1983, the proponent supplied copies of studies addressing some of the issues of major concern raised by the Panel as well as other studies covering further matters raised by Parks Canada. These documents were made available to the public and notice of the resumption of the review advertised. As part of the information program, the Panel secretary visited the communities of Revelstoke and Golden as well as Calgary. A series of advertisements were placed in newspapers advising on the nature of the review and availability of documentation. The secretariat ensured that the information provided by CP Rail was placed in community public libraries. This information was also provided to interested individuals, non-government organizations, government agencies, and independent experts engaged by the Panel.

After having reviewed the material provided by CP Rail, the Panel noted a number of issues for which CP Rail had failed 'to provide information requested in the Panel's preliminary report. On request from the Panel, this information was provided in early June in the form of a Submittal from CP Rail. The public meetings were held in Revelstoke (June 8, 1983), Golden (June 9) and Calgary (June 10 and 11).

During the meetings, sessions were devoted to terrain impact, hydrology, visual impact assessment, revegeta-

tion and reclamation, work camp details and acoustical evaluation of tunnel ventilation. At each session the Panel, proponent, intervenors and the audience had the opportunity for participation in extensive question and answer periods.

CP Rail and Parks Canada were represented throughout the meetings by senior officials and both groups made numerous presentations. Private consultants who had contributed to the preparation of CP Rail's studies were also present for sessions dealing with specific issues, as were technical experts hired by the Panel.

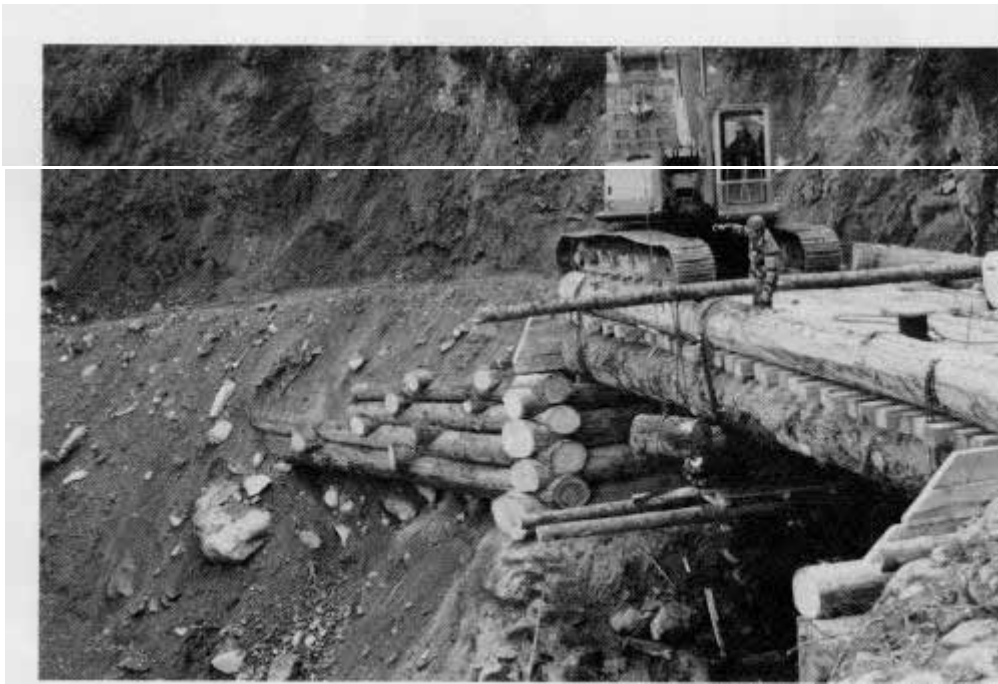
Those having made written submissions to the Panel and/or made presentations at the public meetings are listed in Appendix E.

Transcripts of the proceedings (678 pages) were placed in viewing centres and are available through FEARO.

From the written material received and presentations made at the public meetings, as well as site visits, the Panel was able to acquire an understanding of the range of technical information and public opinion on this project. A bibliography is attached in Appendix F. The following chapter discusses the specific issues of greatest concern.

CHAPTER 2

ISSUES



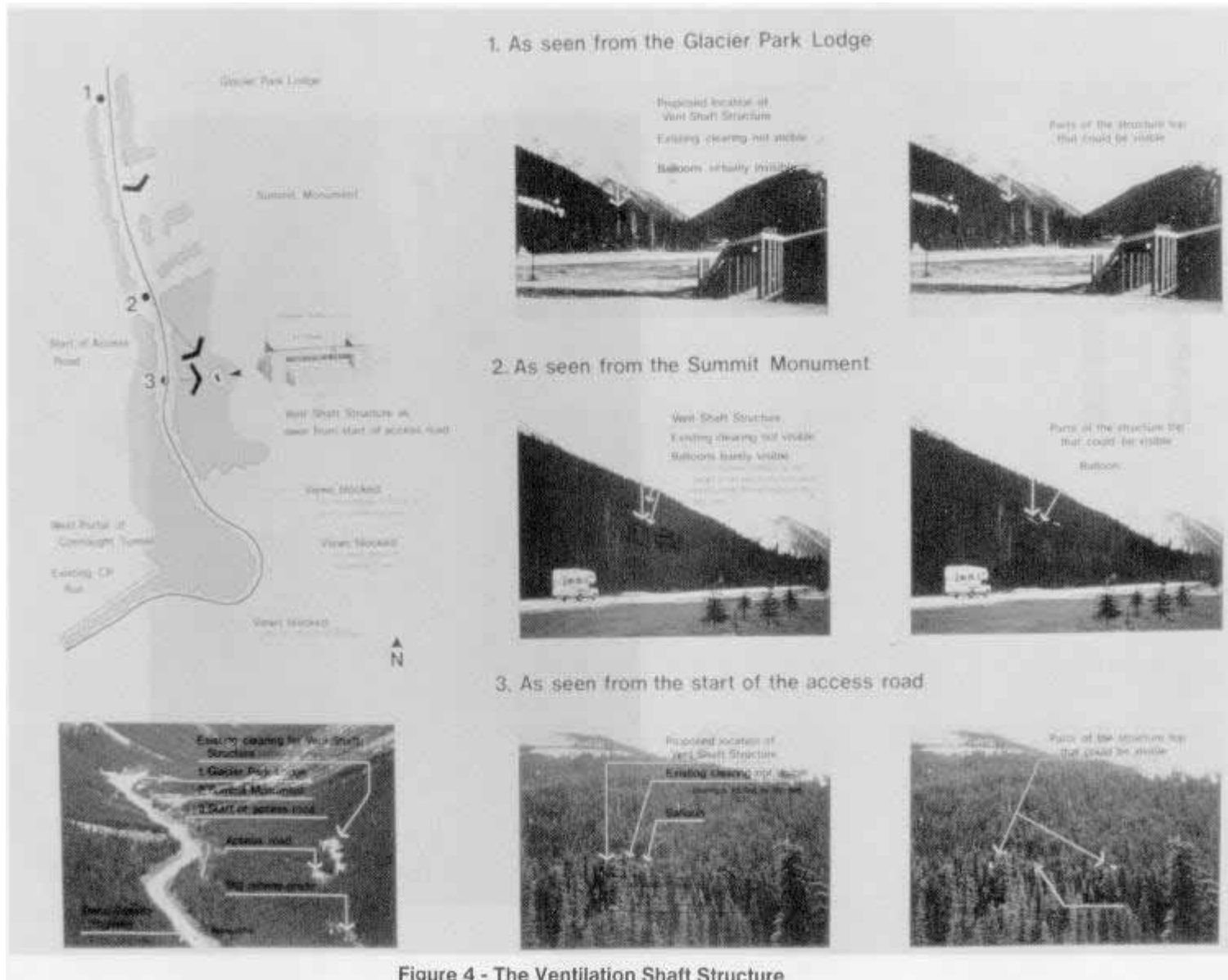


Figure 4 - The Ventilation Shaft Structure

2. ISSUES

As mentioned in the previous chapter, CP Rail provided considerable information and made commitments on many matters during the conduct of this review. This included matters requested in the Panel's preliminary report and in response to requests from Parks Canada. This chapter addresses remaining issues of major concern that require resolution. The recommendations on organization contained in Section 2.4.2 are intended to ensure the implementation of those studies and mitigation measures that were identified by CP Rail, as well as the specific recommendations of the Panel.

2.1 Ventilation Shaft

CP Rail's 1982 proposal involved the construction of a ventilation shaft exiting from the Rogers Pass tunnel approximately at its mid-point. This is to provide air flow through the tunnel to cool the train engines, maintain a safe air quality within the tunnel and allow purging of pollutants after the train passage. The Panel recognized the need for the ventilation requirements proposed by CP Rail. However, the Panel believed that the proposed ventilation shaft with a large surface structure could present an unacceptable visual intrusion to the natural splendour of Rogers Pass.

CP Rail originally proposed locating the surface structure about 430 metres from the Trans Canada Highway opposite the Rogers Pass Summit Monument (location A, Figure 2), on the face of Avalanche Mountain (Mount MacDonald). At this location, the structure would have been highly visible to the thousands of visitors who annually stop at the Summit Monument to view the beauty of the area. Concern regarding the location of the proposed siting led CP Rail to examine another area, approximately 900 metres to the south of location A, but closer to the Trans Canada Highway (location B, Figure 2). CP Rail stressed that this alternative would have less visual impact than the original proposal, since it would be further from the Monument and located in a treed area.

In the Panel's preliminary report, it was recommended that further study should be carried out on the alternative location for the ventilation shaft. The Panel required

information on the visual impact, noise, disposal of excavated material, avalanche protection requirements, structure details and the location and nature of the access to the ventilation shaft.

Since the public meetings in 1982, the ventilation shaft and its associated structure have been the subject of a series of investigations by CP Rail to finalize location, access and building design.

In June, 1982, CP Rail conducted a geotechnical and hydrogeologic investigation of location B for the ventilation shaft. CP Rail concluded that the thickness and nature of the overburden material and potentially difficult groundwater conditions would have significantly increased the costs of sinking a shaft at this site. A new location B for the ventilation shaft was subsequently selected approximately 200 metres upslope. The final location places the surface structure out of avalanche zones in a heavily forested area 2 200 metres west of Glacier Park Lodge, 380 metres from the Trans Canada Highway and 800 metres from the Summit Monument (see Figure 4). This change in ventilation shaft location required rerouting the tunnel alignment with a slight curvature, and thus required an extra 180 metres of tunnelling. Material from the ventilation shaft excavation would be removed from the Park.

2.1.1 Visual Impacts

In the Panel's preliminary report CP Rail was requested to demonstrate its claim that the surface structure could be completely screened from the highway, the Summit Monument and Glacier Park Lodge. In CP Rail's subsequent release of its visual impact assessment report (March, 1983), only brief mention was made of the potential visual impacts of the structure. In early May, the Panel again requested the information from CP Rail who responded by providing the results of a consultant's study. The study consisted of observing red helium-filled weather balloons that were fixed at measured heights above the ground surface in the existing clearing for the structure. Ground surveys of vegetation heights were also conducted to verify the results. The study concluded that the structure will be virtually

imperceptible from the Glacier Park Lodge, will have small visual impact on the view from the Summit Monument, and will have minimal visual impact from the Trans Canada Highway.

Parks Canada approved construction of an access road and site clearing in late 1982 to allow further groundwater and foundation investigations at the new location B. At the public meetings held in June, 1983, Parks Canada took the position that CP Rail had selected the best location for the ventilation structure, and that CP Rail was planning to build a structure that would be sympathetic to Parks Canada's concerns.

It was noted that the present tree cover is essential to ensuring that the visual impact at the new location B is minimized. During the meetings the Panel heard concerns regarding deforestation due to natural causes. Should this occur, the structure would be highly visible from the Summit Monument, the Lodge, and the Trans Canada Highway.

The Panel concluded that the visual impact of the new location B would be acceptable provided that clearing was limited to approximately the present area. If necessary, new trees should be planted to maintain continuity of the visual screen in the future.

In view of its potential visibility within a National Park setting, the building must be designed with sensitive architectural treatment and a careful selection of exterior materials. The Panel recommends that the location of the ventilation structure proposed by CP Rail is acceptable provided detailed plans and specifications are submitted to Parks Canada for approval. Parks Canada should obtain architectural services to assist with its review.

Finally, there is a continuing need to prevent erosion from the site and its access road. This will require revegetation as well as drainage control measures to be undertaken as soon as possible. The access road needs to be completed and maintained in a manner acceptable to Parks Canada.

2.1.2 Noise

At the first set of public meetings there was concern expressed as to the noise level that would exist at various locations used by Park visitors (e.g. certain nearby hiking trails, the Summit Monument). At that time, CP

Rail had not conducted measurements of the existing sound levels and therefore it was not possible to predict accurately the noise impact in the area of the ventilation shaft structure. In its preliminary report, the Panel required further information on anticipated noise levels from the structure as well as recommending that existing background levels be measured.

CP Rail provided an acoustical evaluation of the Rogers Pass tunnel ventilation system in April, 1983. Background noise levels were measured at Glacier Park Lodge, the Summit Monument and at an intermediate distance between the highway and the ventilation shaft. The study addressed the control measures of the noise emanating from the proposed mid-tunnel ventilation building and East Portal fan building. Noise levels around the proposed buildings were assessed and recommendations of noise control measures were presented. Using practicable technology, it was claimed that the worst case noise level at a distance of 60 metres from the structure would be 65 decibels, adjusted (dBa). Consequently a Day-Night Sound Level (Ldn) of 55 dBa would not be exceeded except within 250 metres of the ventilation equipment. CP Rail maintained that there would be no significant environmental degradation due to noise level increases except within 250 metres of the ventilation equipment, and that the resultant noise levels at key locations would not be a cause of annoyance to Park users.

At the public meetings held in June, 1983, the Panel's technical expert generally agreed with CP Rail's acoustical evaluation. He stated that if the objectives noted by CP Rail's consultant could be achieved, ventilation shaft noise would not be a problem at the Summit Monument or Glacier Park Lodge. Under worst conditions, in some directions from the vent, and at certain times, noise would be audible up to 600 metres away. It was recognized that the design was conservative and that further mitigation was possible if necessary. Although noise from the east portal was a lesser concern, it is proposed that the same criteria apply.

The Panel concludes that although there will be a residual noise impact, the area involved is limited and not of special significance. CP Rail's proposal for noise level reduction is therefore acceptable, but monitoring should be carried out during operation to ensure that the design criteria have been met. Further measures to minimize impact on the environment must be taken if unacceptable conditions occur.

2.2 Surface Route

In December 1981, the CTC approved a surface route ROW approximately 60 metres wide. In 1982, CP Rail's proposal for an access road to obtain design information involved 30 metre wide clearing. The Panel approved the construction of an access road and identified further surface route information requirements including: details of the proposed design; complete description of the terrain impacts and the mitigation measures necessary to reduce the undesirable effects to a minimum; a detailed reclamation plan; visual impacts of the cuts and fills and bridge structures; avalanche hazards, hydraulic capacity of creeks to be crossed, possibility of landslides and debris torrents, bridge foundation details; maintenance of access roads in the event the project was delayed; numbers, seasonal movement and use of the surface route by ungulates; plans for emergency containment and removal of toxic spills which could enter the marsh ecosystems; and implications of burying all or part of the electrical transmission line.

The access road was built by CP Rail during 1982, and further information was submitted to the Panel in April 1983. Additional details were also provided in CP Rail's June, 1983 Submittal, including the fact that burial of the electrical transmission line within the Park is now proposed.

The remaining issues of concern are presented in the following sections.

2.2.1 Terrain Disturbance and Visual Impacts

CP Rail's 1983 proposal was for an average clearing width in the order of 48 metres with the legal ROW at approximately 95 metres. However, the steep and gullied terrain resulted in a highly variable clearing requirement, reaching over 120 metres in places (see Figures 5, 6, 7, 8). Since the legal ROW did not follow the cleared area closely, this resulted in the additional ROW request.

Although the planned 2.8 km of retaining walls reduces somewhat the width of cut and fill areas, there will remain large disturbed slopes visible to Park users along the surface route between Rogers and Stoney Creek. Beyond Stoney Creek the use of over 2 km of trestle significantly reduces both terrain and visual impacts in what otherwise would have been the most severely scarred portion of the surface route. However the use of a trestle was not proposed by CP Rail for other areas of

significant visual or terrain impact. In areas subject to landslides, CP Rail proposes flattened side slopes to ensure stability.

In response to concerns expressed by Parks Canada, CP Rail had modified the design prior to presentation to the Panel. Parks Canada noted however that it lacked technical expertise. It felt that consideration of further options to minimize terrain impact was required and assistance was needed to conduct technical reviews of specific designs to be submitted by CP Rail.

Discussion took place at the public meetings on whether the large terrain disturbances involved in this project had been minimized. CP Rail estimated that to reduce the disturbed area to within the ROW granted by CTC would require an additional expenditure of approximately \$50 million. It did not believe that the saving was justified but was willing to consider additional retaining walls in certain locations such as those proposed by the Panel's technical expert.

CP Rail provided a detailed visual impact assessment including computer generated photomontages. This provided an excellent prediction of the magnitude of particular areas that would be visible from the highway. Although CP Rail has made efforts to reduce the impacts of the surface route, the Panel concludes that there will be significant visual and terrain impacts for at least a decade. The Panel notes that further reductions in impacts are technically possible and, with the exception of landslide areas, that objections to these are financial. CP Rail and Parks Canada should work together to try to improve the design to mitigate these impacts before construction proceeds. Parks Canada needs access to appropriate expertise to assist it in judging the point at which the design has minimized the terrain disturbance and visual impact. Parks Canada would be justified in opposing extension of the ROW beyond that approved by CTC until it is satisfied with the design.

Disposal of waste material is a further issue. Excavated rock from the tunnels will be placed along the ROW between the tunnels and used to construct the surface route to the western Park boundary. Surplus rock material from the main tunnel would be removed from the Park. An approximate balance of cut and fill material is proposed along the remainder of the surface route. However, some unsuitable material from the surface route may need to be disposed of. There is a need for an agreement between Parks Canada and CP Rail on whether this practice is acceptable within the Park,

and if so at what locations, in what quantities, and under what conditions. Parks Canada has opposed borrowing construction material within the Park.

2.2.2 Reclamation and Revegetation

A major concern expressed by Parks Canada both prior to and during the final public meetings involved the potential effectiveness of reclamation and revegetation plans. Parks Canada indicated that it had doubts as to the likely success of CP Rail's plans based upon experience with past reclamation/revegetation efforts along the existing CP Rail line at Mountain Creek Bridge and at Lake Louise in Banff National Park. Parks Canada stressed that effective revegetation is crucial in ensuring both minimal visual impacts and minimal surface erosion.

CP Rail's reclamation plan, estimated to cost \$2 million, was presented at the meetings. The two stated objectives of the program are to revegetate exposed erodible materials, and to ameliorate the visual impacts of the cuts and fills. These objectives would be reached by

developing suitable rooting media and seed beds for germination, establishing an erosion-controlling grass/legume cover, and subsequently establishing a permanent cover of native woody species that would fit into the successional process of the surrounding forest. Initially, maintenance of the reclaimed sites would be required to ensure success. It was noted that a period of up to ten years would be required to obtain a self-sustaining vegetation cover.

Technical experts to the Panel proposed that reclamation standards dealing with plant density, vegetative canopy cover, densities of woody species and erosion control be adopted by CP Rail and Parks Canada in the form of an agreement. Adoption of reclamation standards could provide a clear understanding of expected results. It was suggested that a reclamation bond be posted so that in the event of CP Rail defaulting on the agreement, Parks Canada would have sufficient funds to reclaim the area. CP Rail generally agreed with the proposed standards, although it rejected the idea of bonding, claiming to be governed on this matter by the Railway Act.

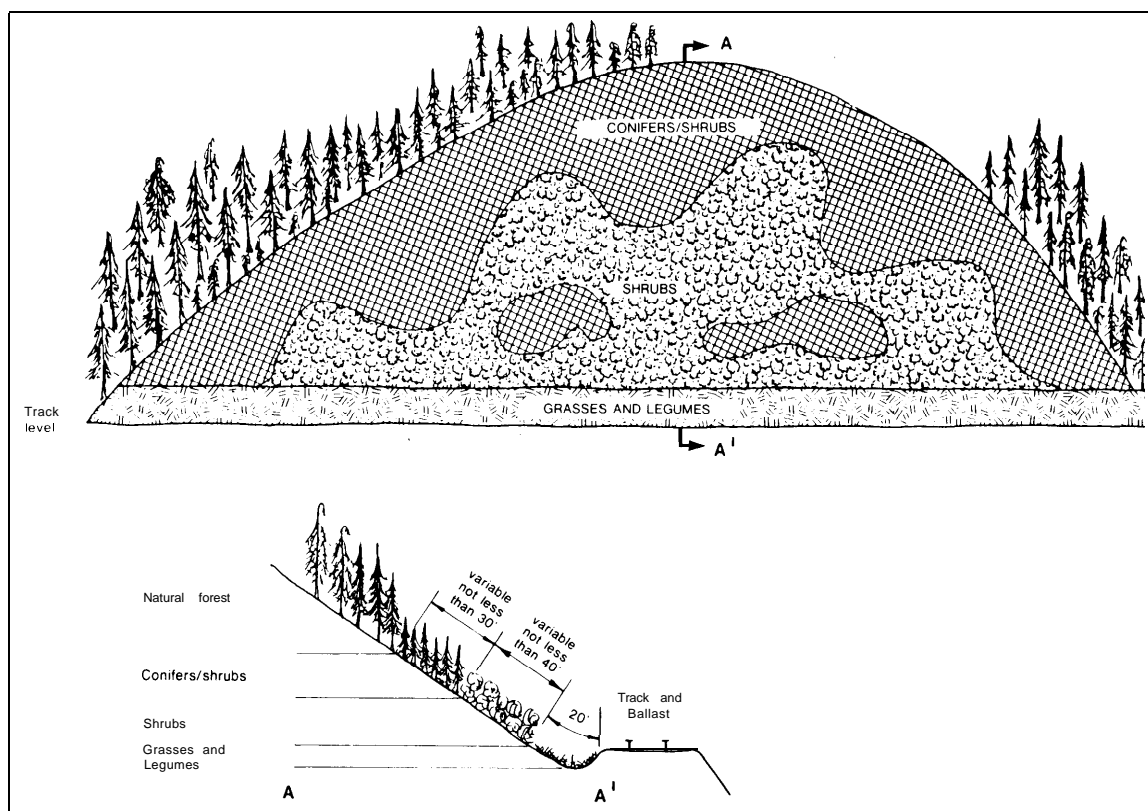


Figure 5 - Typical Cut Slope Revegetation Plan

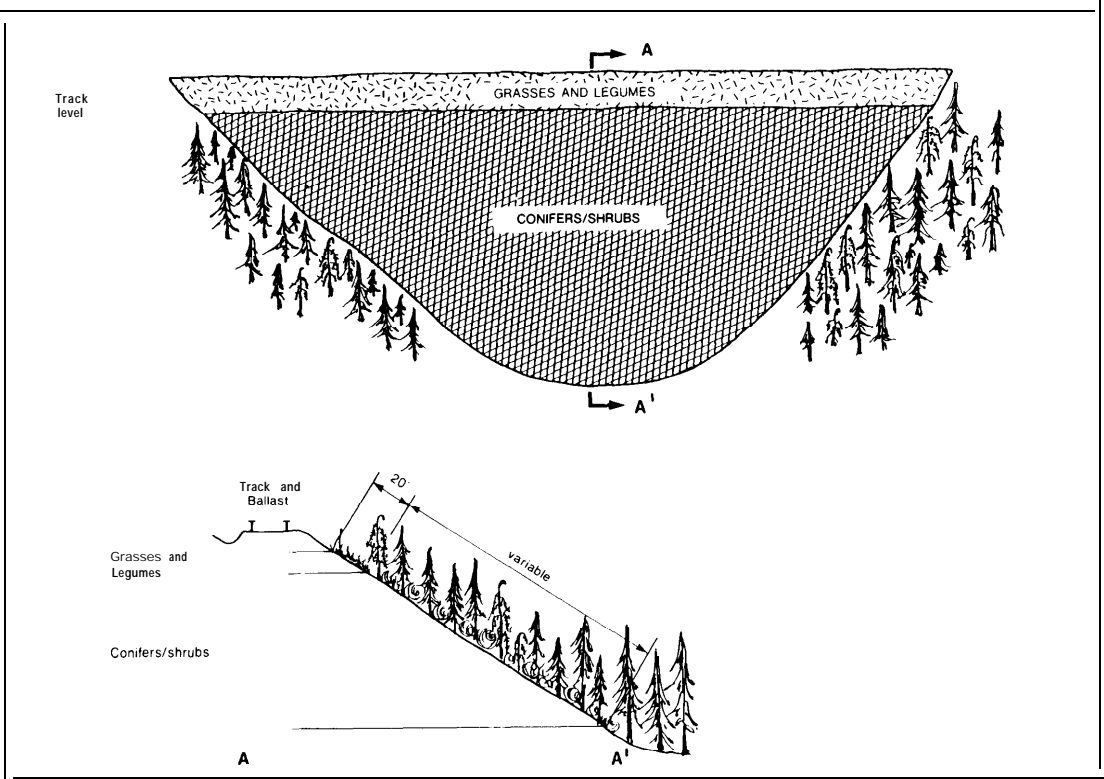


Figure 6 - Typical Fill Slope Revegetation Plan

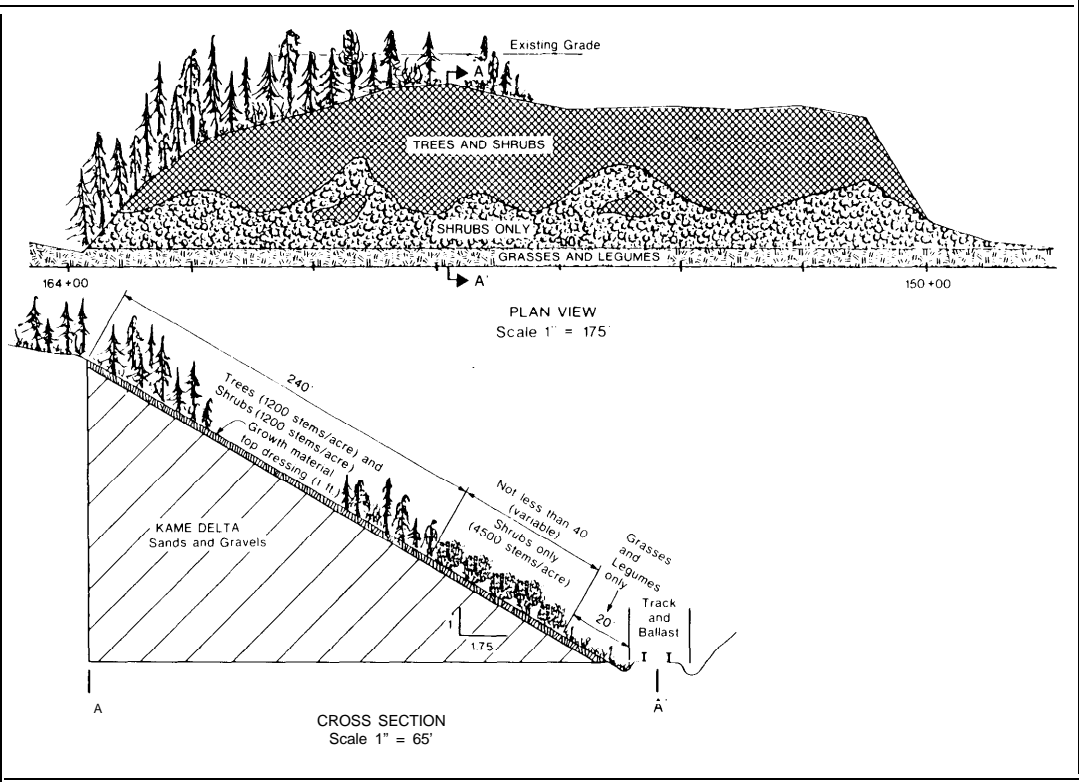


Figure 7 - Reclamation Plan for Mountain Creek Pit Cut

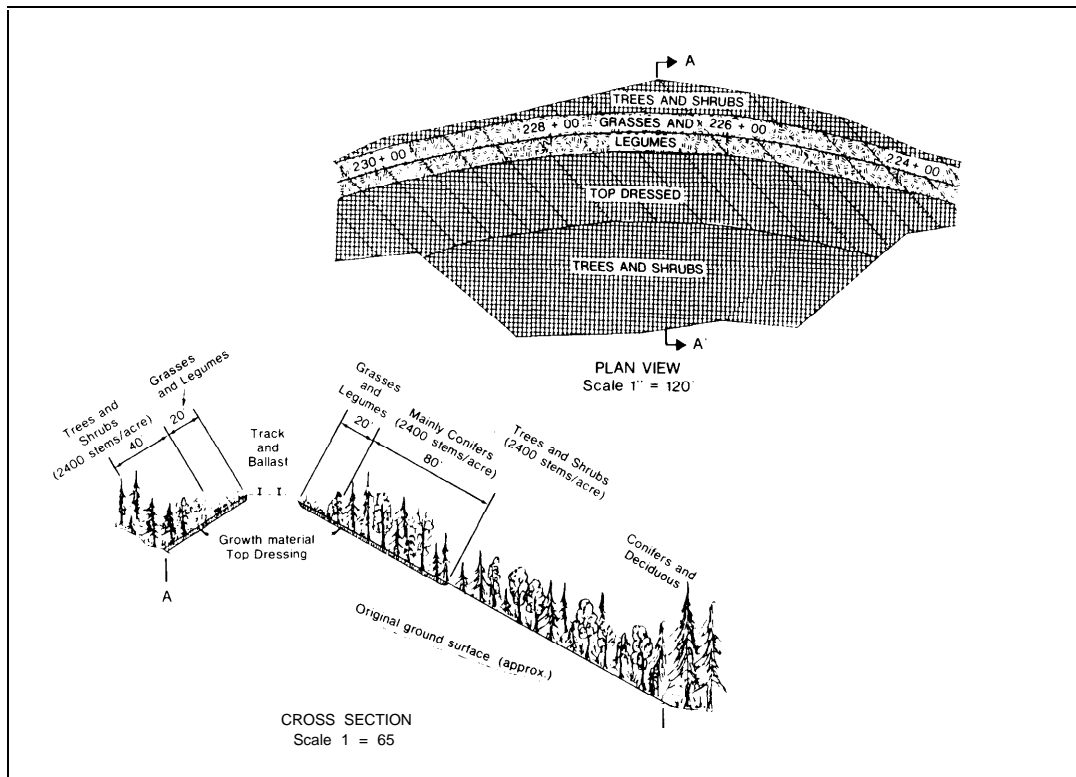


Figure 8 - Reclamation plan for fill between Griffiths and Un-named Slides

The difficulties of revegetating on steep slopes was discussed at the meetings. It was noted that flatter slopes increased the prospects of successful revegetation. Based on experience elsewhere, revegetation experts felt confident that, given sufficient effort, CP Rail could succeed, albeit with difficulty, in reclaiming the disturbed areas to the standards discussed. There is a need to revegetate exposed areas as soon as possible in order to reduce erosion. An area of immediate concern is the extremely steep slopes along the access road between Stoney Creek and the east portal of the short tunnel. CP Rail has plans to begin reclamation on this area during 1983.

The Panel concludes that revegetation of disturbed areas to meet stringent standards will help to mitigate the impact of the surface route. Both prompt attention and continuing effort will be necessary to ensure a successful revegetation of disturbed areas. The criteria presented at the public meetings should serve as a basis for determining the standards to be used in judging the success of revegetation (see Appendix G). Parks Canada should seek a formal undertaking from CP Rail to ensure that the stringent standards agreed to by the parties will

be met. Appropriate expertise will be needed by Parks Canada to finalize the standards and to assess the success of revegetation in disturbed areas.

2.2.3 Hydrology

Hydrology issues discussed at the 1983 public meetings included the required diversion at Cedar Creek, siltation of Park water courses, and wastewater from tunnel construction.

At Cedar Creek, the level of the proposed track makes a diversion structure necessary. CP Rail's proposal was to divert the Creek into an old channel on the west side of the fan. However, Parks Canada was concerned because this would divert water away from a productive marsh ecosystem downstream. At the public meetings, CP Rail proposed an alternative that would involve training the creek in its present location. This further proposal was acceptable to Parks Canada and the Panel's technical experts and is endorsed by the Panel.

During construction of the railway some exposed material will wash directly into the streams. The Panel's

"Full appreciation does not appear to have been given to the fact that reclamation of other similar disturbances in the mountain regions of Western Canada have required lengthy periods of intensive management"

D Walker
Panel Technical Expert

"I recommend that a construct/on schedule be set up site specific for each problem area, taking into account the best weather information and I realize that is difficult in Glacier National Park when setting the timing for each one"

C MacDonald
Panel Technical Expert

"I cannot over-emphasize the importance which Parks Canada places on this subject [of reclamation] and I alert the proponent of the determination and diligence Parks Canada will exercise in seeking satisfactory reclamation of disturbed environments"

B Leeson
Parks Canada

"In order to fully appreciate the potent/a/ visual implications of the new surface route in the Beaver River Valley, we undertook what is probably the most comprehensive visual impact assessment ever done in Canada."

J Fox
CP Rail

"We would also ask what alternatives have been considered in location of ma/or cuts and fills which might reduce right-of-way width requirements"

L Hurwitz
Panel Technical Expert

technical experts noted a detailed materials handling schedule is required to anticipate and avoid, rather than react to problems. Site specific erosion control measures are also required.

Drainage issues should receive careful consideration during the detailed project review stage because of the potential for terrain disturbance. One area has already suffered a slippage which is believed to have resulted from a drainage problem.

CP Rail proposed settling ponds and oil separators to treat wastewater from the tunnels. Details of locations have to be agreed to by Parks Canada and the adequacy of the design needs confirmation by Environment Canada.

2.3 Work Force

2.3.1 Work Camps

CP Rail's original proposal called for three work camps for 1982: two within the Park, Beaver and Flat Creek, and one outside the Park at Rogers (see Figure 3). Flat

Creek and Beaver were each to contain approximately 30 people in 1982. After considering the information presented at the 1982 public meetings, the Panel concluded that the Beaver work camp should be permitted for portal construction crews, subject to prior provision of adequate precautions and approved design and subject to a careful monitoring program. The Panel stated that if monitoring indicated satisfactory results at Beaver, the Flat Creek camp could be installed as early as Fall 1982. If problems had been encountered at the Beaver camp, the Panel would have required further information on sites outside the Park in order to reach a final conclusion on work camp locations for the duration of the project.

CP Rail commenced portal construction in 1982 shortly after the first public meetings but did not construct a work camp within the Park. A small work crew of approximately 40 men was located at the Glacier Park Lodge for a few months. Parks Canada arranged for a Royal Canadian Mounted Police officer to be stationed in the area during summer weekends. The Panel was informed by CP Rail and by representatives of Glacier Park Lodge that some problems had arisen regarding the conduct of the workers.



Figure 9 - The East Camp (Sketch)

CP Rail has expanded the proposed population of its two main camps from 250 persons each to 420 persons at Flat Creek and 460 persons at Beaver (see Figures 9, 10, 11). A site at Glacier was proposed by CP Rail as an alternative to the Flat Creek camp (Figure 3). The numbers had been revised following CP Rail discussions with tunnel contractors, and visits to projects of similar magnitude. Along with the tunnel and ventilation shaft crews, there would be supervisory staff for the various contractors, and CP Rail's own project staff. CP Rail now intends to operate the camps.

At the 1983 public meetings, CP Rail maintained that it was important to locate the work camps within the Park. It estimated the increased project cost at \$33-38 million should the camps be located outside the Park. This estimate was based upon increased travelling time for workers. A risk of encountering delays was also mentioned.

In 1982, Parks Canada was willing to approve CP Rail's work camp proposal. However in 1983, Parks Canada requested CP Rail to withdraw its proposal to locate work camps within Glacier National Park. Among the reasons given were that the camps would be contrary to National Parks policy, contrary to the National Park Plan for Glacier Park, that there would be damaging physical impacts on the Park, that there were no redeeming merits for Glacier National Park, and that alternative sites exist close to but outside the Park boundaries.

Some of the specific concerns identified involved site disturbance outside camp boundaries, displacement of trailheads, aesthetics, social concerns, wildlife conflicts and pollution. A particular concern with regard to the Glacier site related to avalanches. In particular Parks Canada expressed concern about the possibility of clearing beyond the presently disturbed sites and possible future requests from workers for parking areas.

The issue of worker parking was also raised by members of the public as an unresolved concern. CP Rail mentioned that further clearing would not be required as it was its intention not to provide worker parking.

During the 1983 review, most public concern on CP Rail's proposal related to the issue of work camps. Some were opposed to Park work camps because of conflict with the role of National Parks, others because of specific concerns. A number were in favour of one or more camps within the Park.

2.3.1.1 Bears

The Panel identified potential human-bear conflicts as a major concern in its preliminary report. Parks Canada and public concern was expressed again at the 1983 meetings regarding worker-bear conflicts. Both grizzly and black bears could be attracted to the work camps which could result in danger to the occupants and the need to trap, remove or destroy the bears. The Panel stated in 1982 that measures such as special fences, careful disposal of garbage, fume incinerators, training of workers and various other precautions could be tried at Beaver. Monitoring the effectiveness of the precautions was recommended and information on alternative camps outside the Park requested if any problems arose.

Since 1982, CP Rail studies had concluded that problems with bears could result if the camps were placed in the Park and not managed properly. It was recommended that the surest way to minimize these problems would be to use multiple levels of protection. This would include an electrified fence around each camp, bear-proof food and garbage storage and cooking areas, good garbage management, worker training and cooperation, and inspections by the Environmental Coordinator. However, CP Rail plans to fence the garbage compactor, loading dock and storage room access only. Arguments against full-perimeter fencing given by CP Rail included the cost, experience elsewhere without perimeter fences, fence maintenance problems given the heavy snowfall and space restrictions. CP Rail also plans to have resident camp managers to enforce rules and operational guidelines, and thus minimize worker-bear confrontations.

CP Rail is now better prepared to deal with human-bear problems of work camps, but issues remain which can only be resolved through field trials.

2.3.1.2 Sewage Treatment and Water Supply

In 1982, CP Rail planned to obtain water from nearby streams and discharge effluents from sewage treatment plants into Connaught Creek and Illecillewaet River. The Panel stated that the acceptability of CP Rail's water and sewage treatment methods required investigation prior to camp installation. Detailed information respecting the 1983 work camp proposals was provided by CP Rail in its June Submittal.

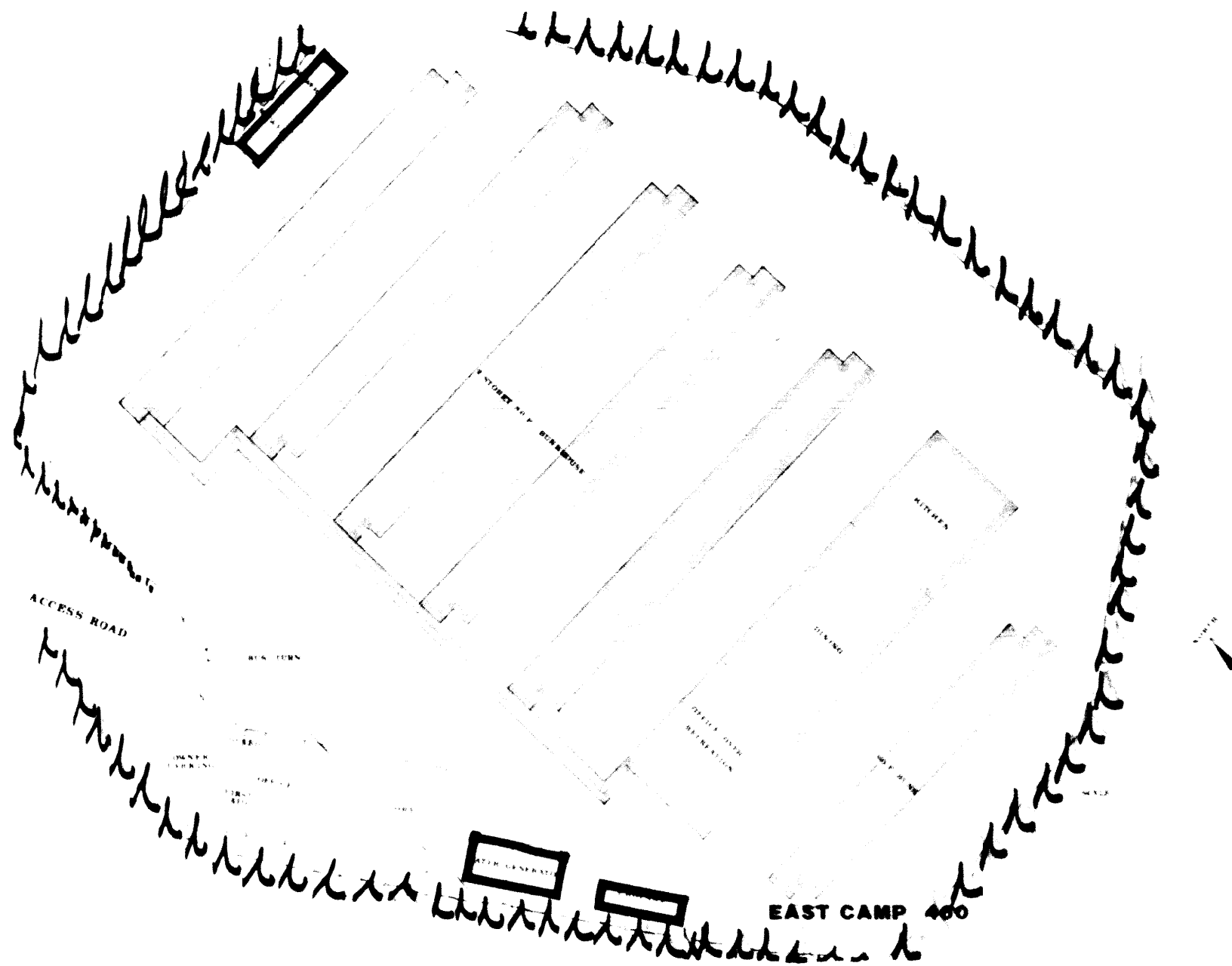


Figure 10 - The East Camp (Plan)

"As the Beaver site was used in the construction of Highway number 1 and is still visible, it would seem to be acceptable for the railway construction. Bear problems would be minimal at this location."

C. Schiesser
Big Bend Resource Society

"My other concern about the camps in the park is, like I say, it is like having two big Hilton Hotels at each end of the park, and I do not think you can control their social activities, and I do not think the bear problems are going to be as controlled as CP Rail and Parks Canada feel they might be. So you know, it is a park, the park should come first."

W McCrory
Valhalla Wilderness Society

"I assume I will be working in that CPR tunnel, and how will I get home to see my family at night if I am working 35 miles out of town? I would like to commute back and forth in my own vehicle if I am going to see my family. I do not think I want to be held hostage for five days in the camp or 24 days, whatever the work schedule is going to be, so how do you intend to go about that problem?"

R. Armstrong
Revelstoke

"I would recommend that the basic acoustical criterion from this point on should be to achieve 65 dBA or less if possible at 200 feet from the ventilation buildings. Given CP's assurance that the ventilation system will be constructed to achieve this, then the resultant noise should be compatible with the Park environment."

D Kennedy
Panel Technical Expert

"If [the workers] choose to take in some other course of entertainment and flood our establishment, it would be nice to know that there would be somebody willing to do something about it if there was a problem in that area."

D Jorgenson
Glacier Park Lodge



Figure 11 - Proposed Site of East Camp (Beaver)

Rotating biological contactors would be installed to meet Environment Canada's wastewater treatment guidelines. The sewage plants would be enclosed within the camps, and effluent would be monitored by the camp maintenance team to ensure adherence to the standards.

For water supply, CP Rail now plans to use wells at the camp sites. If this proves to be insufficient, water will be drawn from adjoining creeks.

2.3.1.3 Social Concerns

During the 1983 review, worker preferences with regard to work camps was raised as a substantial issue. The confined area available for work camps within the Park does not allow for worker cars. Parks Canada was concerned that there would be requests for worker parking although CP Rail maintained that buses would be used for transporting workers. The feasibility of providing camps without workers' personal transport was questioned by environmental groups and workers. CP Rail noted that its proposal required the cooperation of the unions, but that if Parks Canada had a policy of no worker parking, then that would be a condition under which CP Rail would operate the camps.

A further concern was the impact of the large number of workers on Park users and Lodge employees and facilities. Some intervenors opposed work camps within the Park because of potential conflicts. CP Rail noted that as it would be operating the camps, it would be able to police the camps directly. The Panel had requested monitoring during the 1982 construction period. Some accounts were given of problems but CP Rail was not aware of all incidents mentioned.

In addition to CP Rail's proposal to police the work camp itself, Parks Canada may also be expected to have to apply some resources to deal with particular problems that may occur. The Panel concludes that there will be a need for close cooperation between the three responsible organizations (Parks Canada, CP Rail, and the RCMP) in order to minimize potential social problems. The Panel recommends that based on experience to date, RCMP officers should be located within the Park during construction.

2.3.1.4 Summary

Work camps are not generally desirable in National Parks, and alternatives are available just outside the

Park at increased cost to CP Rail. However, given the scale of the overall project, the relative degree of disturbance to be caused by the work camps does not justify exclusion from the Park, provided they can be operated in a manner satisfactory to Parks Canada. This is particularly so since the areas to be used are already disturbed sites. (Beaver was a worker campsite during Trans Canada Highway construction, Flat Creek a conservation corps camp in the 1970's.)

The Panel notes that many of the arguments presented to it in 1983 were similar to those presented in 1982, although the scale has increased in some aspects.

The Panel recommends installation of one campsite on a trial basis within the Park. The site at Beaver is recommended for this trial on the basis that it is least susceptible to further environmental damage. A camp at Flat Creek could be installed if experience at Beaver proves to be satisfactory to Parks Canada. All designs should be subject to approval by Parks Canada, and only presently cleared areas should be used. Following completion of use of the sites, they should be completely rehabilitated to Parks standards.

The Panel believes that provision of worker parking within the Park would result in unacceptable environmental impacts. It notes, however, that there are social benefits to allowing workers to easily leave the Park for family or personal reasons. The Panel believes that CP Rail should arrange for adequate means of alternative transportation for workers to enter and leave the Park.

2.3.2 General Social Concerns

Regarding the employment of local workers, CP Rail stated that the contractors will employ union personnel. It indicated that if qualified union personnel are obtainable from the Golden-Revelstoke area, they will in all probability be hired.

CP Rail does not propose to set up any compensation fund for either Revelstoke or Golden. It considers itself to be the major source of employment in the area as well as a taxpayer. Thus CP Rail believes that it has done and is doing its part as a responsible corporate citizen.

In its preliminary report the Panel requested CP Rail to liaise with local communities to help mitigate some of the impacts of the project on them. These impacts could include visiting workers, their families coming to live in the area, car parking, effects of the project on business

and services, and employment. An information program was carried out in 1982 but now that the site activity will be intensifying, it is necessary that CP Rail open an immediate and continuing dialogue with nearby communities.

2.4 Responsibility for Mitigation Measures and Monitoring

2.4.1 Monitoring

This section discusses the need for detailed monitoring of mitigation measures including noise, bear problems, reclamation and revegetation, and water and air quality control measures.

A monitoring program for noise in the vicinity of the ventilation shaft and the east portal was not detailed during the 1983 review, although CP Rail intended to ensure that the ventilation equipment met the requirements. As recommended in Section 2.1.2, monitoring should be carried out during operation to ensure the design criteria have been met. Details of the monitoring program should be developed by the environmental committee.

The monitoring of any bear problems around work camps was considered by CP Rail to be a role for the Environmental Co-ordinator. The need for advice from bear management experts was also mentioned. The monitoring of a trial work camp was recommended in Section 2.3.1.4. In addition to the requirement for the monitoring of social, bear conflict, and other environmental problems during the trial period, continuing surveillance will be necessary. Parks Canada should specify any monitoring requirements to determine whether camps within the Park can be operated satisfactorily.

CP Rail's proposed monitoring of reclamation and visual impact mitigation efforts involved the presence on-site of an expert reclamation inspector and a landscape architect. While the general roles of the individuals have been described, the standards by which the quality of work will be assessed, as well as the CP Rail response to any problems identified, is not specified. Although some areas will require professional judgments the Panel was informed by its technical expert of criteria that could be applied as guidance (see Appendix G).

The length of time for which the landscape architect and reclamation inspector should be at the work site was also questioned. It was suggested that both were

required on-site more frequently than CP Rail proposed. It was also suggested that assessment of the success of the reclamation plan should be undertaken by someone independent of the interested parties. These matters should be contained in the agreement recommended in Section 2.2.2 to meet Parks Canada's requirements. The reclamation inspector should be on-site at all times when construction is being carried out.

A monitoring program for stream sediment load was proposed in studies provided by CP Rail in April, 1983 but no detailed commitments were contained in the June, 1983 Submittal. It was pointed out at the meetings that the program should be supplemented by a standard as proposed by the Panel's technical expert and by a detailed set of responses to be implemented in the case of problems. The environmental committee should establish a monitoring program based upon the information provided by CP Rail's consultant and the Panel's technical expert.

CP Rail proposed a detailed program for monitoring the quality of the tunnel wastewater effluent. This would detect any problems with the quality of water coming from the tunnel construction process or with the oil separation and sediment pond mitigation measures. The June 1983 CP Rail Submittal provided details of the properties to be monitored, the frequency of measurement, the tolerance limits and of CP Rail's response if the limits are exceeded. Parks Canada and technical witnesses concurred with this proposal. Proposals for monitoring the sewage treatment process in the work camps were similarly detailed. These programs should be implemented as proposed.

At the meetings, CP Rail agreed to provide monitoring of the air quality in the vicinity of the concrete batch plant to ensure that appropriate air quality standards were maintained. Water quality monitoring is also required. Although air quality from the ventilation shaft is not considered likely to be a problem, CP Rail was willing to discuss monitoring requirements further with Environment Canada and Parks Canada.

The Panel believes the costs of monitoring, as well as the costs of additional resources required by Parks Canada (identified in the next section) should be considered a legitimate charge against the project.

2.4.2 Organization

In 1982, the Panel proposed a committee concentrating on environmental issues as well as an on-site Environ-

mental Co-ordinator. The committee was to consist of representatives from the Environmental Protection Service of Environment Canada, Parks Canada and CP Rail, with the Environmental Co-ordinator reporting to the committee. The responsibilities of the environmental committee were detailed in the Panel's preliminary report and are provided in Appendix H.

Shortly after April 1982 an Environmental Co-ordinator was appointed. In early June of 1982, four committees were formed: Steering, Design, Environmental and Implementation. The Environmental Co-ordinator has been serving as the day-to-day contact to ensure that construction operations are carried out using good environmental practices and in accordance with the agreements reached by the committees.

Parks Canada and CP Rail stated that they believed the committees to have been beneficial and endorsed the continuance of these arrangements. However, both parties noted the need for additional expertise to deal with environmental concerns that would arise during implementation of the project.

The Environmental Co-ordinator plays a very important role in ensuring that the project proceeds in an environmentally satisfactory manner. The present Environmental Co-ordinator indicated that the most difficult aspects of his job involved enforcing good environmental standards on the contractors. A need for clarification of enforcement mechanisms was mentioned. It was also suggested at the 1983 meetings that a much more extensive briefing both of contractors and of workers would reduce on-site and camp problems. The role of

the Environmental Co-ordinator should be continued and his authority for enforcement should be clarified by the environmental committee. As the workload increases, additional resources should be provided.

The magnitude of this project is such that there will be many questions of detailed design and implementation that will arise. The existing structures need adjustment to ensure that the requirements of Park protection as well as CP Rail's desire to proceed expeditiously are fulfilled. The Panel concludes that during full-scale project implementation, the existing mechanisms for overseeing the environmental aspects should be adjusted and strengthened. The Panel recommends the appointment of a suitably qualified Project Manager with authority to speak on behalf of Parks Canada on all aspects of the project. A Project Manager should have had experience in both environmental science and construction and would require access to appropriate expertise, support staff and budget. The Project Manager will need to be in place before further project decisions are taken as this position is essential to implement the recommendations of this report.

Formal evaluations of the effectiveness of the proposed mitigation measures as well as the necessity for any improvements should be prepared. On an annual basis, reports should be prepared on the manner in which the Panel's recommendations and the Proponent's commitments are being implemented. Site visits should be offered by CP Rail at least once a year for representatives of interested public groups. It should be the responsibility of the Project Manager to ensure that these measures are taken.

*"This dedication to **the** various mitigation **measures** outlined in this report will continue throughout the construction phase and subsequent reclamation. An extensive monitoring program, erosion contingency measures and adherence to the highest standards of environmental protection will assure construction of a second track that respects the natural integrity of Glacier National Park"*

J Fox
CP Rail

"When the Panel's work is all finished and whatever is approved is approved, then we, that is Parks Canada, will be faced with the need to examine the site specific proposals, and once again we will find ourselves short of technical ability to evaluate whether what is being proposed is the best or not, and I would ask the Panel's consideration of what we ought to do in this circumstance and perhaps your comments about what is done in other projects where you face situations of a similar magnitude, and whether or not the Panel has the inclination wherewithall or the mandate to continue to provide Parks Canada with some kind of ass/stance so that we can look after ourselves in future weeks"

B Leeson
Parks Canada

"Environmental inspection is a/so a concern to us. It is not reasonable to expect an Environmental Coordinator can inspect all construction activities Crisis type problems a/one will occupy the Environmental Coordinator a/most fulltime Should construction involve two and possibly even three work shifts, one Environmental Inspector would be run off his feet"

K Adam
Panel Technical Expert

CHAPTER 3

SUMMARY OF MAJOR CONCLUSIONS

The Panel concluded that:

1. The visual impact of the ventilation structure in the location now proposed by CP Rail would be acceptable provided clearing was limited to approximately the presently disturbed area.
2. The area in which there will be a residual noise impact from the ventilation shaft is limited and not of special significance.
3. There would be a need for close cooperation between Parks Canada, CP Rail and the Royal Canadian Mounted Police to ensure an appropriate level of policing during construction.
4. There will be significant visual and terrain impacts along the surface route for at least a decade following construction.
5. Stringent revegetation standards should be applied to reclamation of disturbed areas along the surface route.
6. Given the scale of the overall project, the relative degree of disturbance to be caused by the work camps does not justify exclusion from the Park, provided they can be operated in a manner satisfactory to Parks Canada, and provided that only presently cleared areas are used.
7. During full-scale project implementation, the existing committee mechanisms for overseeing the environmental aspects would need adjustment and strengthening.

"The Beaver pond habitats in the Beaver Valley are very important for a number of reasons. They provide nesting and feeding habitat in the Park for migrating water fowl and shore birds, nesting and rearing habitat for some water fowl and shore birds. They are a primary habitat for beavers and muskrats, of course. They also provide a significant hunting habitat for semi-aquatic fur bearers such as otter and mink which prey on the beavers, muskrats, birds and so on, and they are also a spring feeding habitat for bears, a breeding habitat for at least four species of amphibians and they provide foraging opportunities for moose."

Hollibaugh
CP Rail Consultant

W Ross (Panel Member) "I have a quote from your report, essentially referring to the trestle structure which indicates

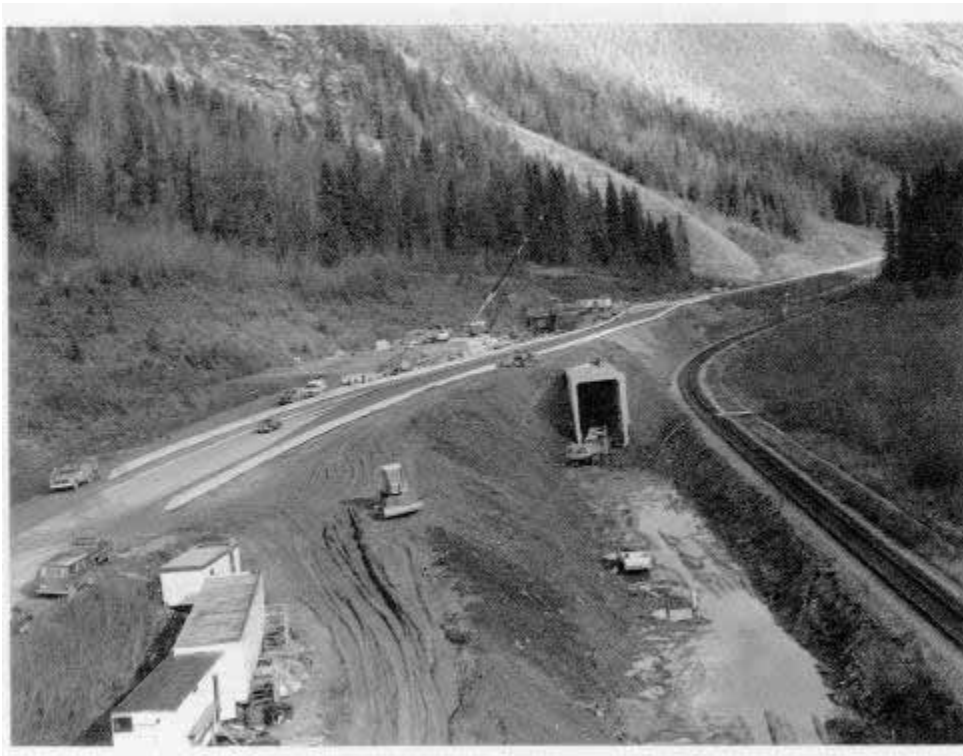
"What would have been by far the largest scar along the whole surface route has been turned through that structure to a little more than a subtle band across the forest."

The obvious question persists why not use that technique more frequently?"

J. McGregor (CP Rail Consultant): "Cost."

G Trench (Panel Member), "Could we have some idea of the relevant costs, Mr Fox, between running the trestle and, say, an average cut and fill section?"

J. Fox (CP Rail): "The cut and fill section, they average about half the cost of a bridge structure, and you are looking at something in the order of \$8,000 a foot for a structure."



West Portal Tunnel Construction

CHAPTER 4

SUMMARY OF MAJOR RECOMMENDATIONS

The Panel recommends that:

1. The ventilation structure would be acceptable in the location proposed by CP Rail provided the design is sensitive to the National Park setting.
2. The noise level from the ventilation shaft will be acceptable provided the design criteria proposed by CP Rail are met.
3. It would be desirable that Royal Canadian Mounted Police officers be located in the Park during construction.
4. CP Rail and Parks Canada should work together to try to improve the surface route design before construction proceeds.
5. Parks Canada should seek an undertaking from CP Rail to ensure revegetation to agreed standards along the surface route.
6. The installation of proposed CP Rail work camps in the Park could be permitted provided operational experience at a trial camp at Beaver is satisfactory to Parks Canada, and all designs are approved by Parks Canada.
7. A Project Manager be appointed with authority to represent Parks Canada on all aspects of the project. The Project Manager should work with existing committees to ensure that the recommendations of this report and those of the Panel's preliminary report are implemented.

ROGERS PASS

ENVIRONMENTAL ASSESSMENT PANEL

A handwritten signature in black ink, reading "P. J. Paradine". The script is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

P. J. Paradine
(Chairman)

A handwritten signature in black ink, reading "W.A. Ross". The script is cursive, with the first letters of the first and last names being capitalized and prominent.

W.A. Ross

A handwritten signature in black ink, reading "G.D. Tench". The script is cursive, with the first letters of the first and last names being capitalized and prominent.

G.D. Tench

APPENDIX A

PROJECT SETTING AND BACKGROUND

Glacier National Park is located in the Selkirk Mountains in the province of British Columbia. The Park is dedicated to the preservation of a magnificent area of mountain peaks and massive glaciers. It contains more than 400 glaciers, few of which are visible to travellers along the Trans Canada Highway, except for the Rogers Pass area. High snowfall maintains these glaciers and also creates the renowned avalanche phenomenon in Rogers Pass. The Columbia Rain Forest in the Park is becoming a more precious natural resource as its extent is being reduced by resource development elsewhere in British Columbia. The Park is also famous for its grizzly bears whose habitat is being reduced outside the Park.

The dominant uses in the Park are recreation and transportation. The pass was discovered by Major General A.B. Rogers in 1881 in his search for a route for the railway and has been used as a transportation corridor ever since. Glacier National Park was created in 1886. During the 1950's, the Trans Canada Highway was constructed through the Park.

The nearest communities to the east and west of the Park are Golden (population 3,300) and Revelstoke (population 4,900) respectively. Golden's economy is based on forestry operations, transportation (CP Rail and Highway maintenance) and tourism. Transportation, tourism and service industries constitute the main economic base in Revelstoke.

CP Rail's capacity analysis has led it to conclude that the forecast traffic demand by 1985/86 will be greater than the present potential operating capacity of the mainline. The Railway Transport Committee of the Canadian Transport Commission, in its decision in March 1982 approving this project, was strongly convinced of the necessity of the project.

The present rail configuration in the Rogers Pass area which consists of a single track and grades of up to 2.6 %, is not capable of handling projected demand. CP Rail's examination of alternatives to increase the rail capacity has led to the proposal to construct a second main track for westward bound trains at a maximum grade of 1 %. The reduced grade and the additional section of double track would provide an increase in the capacity of the CP Rail system. In view of the Canadian Transport Commission decision and the terms of reference provided by the Minister the Panel has not examined the project rationale further.

APPENDIX B

RECOMMENDATIONS OF PRELIMINARY REPORT

1. Construction of the east and west portals be allowed to commence in 1982. Additional study is required prior to further tunnel construction.
2. Further study should be carried out on an alternative location for the ventilation stack as the original location is considered unacceptable in a National Park setting.
3. Further studies on terrain impact and development of a detailed reclamation plan are required prior to construction of the proposed 30 m right-of-way. However, clearing for an access road along the surface grade can proceed in 1982 provided it is generally limited to 15 m, detailed plans are reviewed and strict supervision is imposed.
4. A work camp for the portal construction crews be permitted at the Beaver site subject to prior provision of adequate precautions and approved design.
5. An Environmental Committee be established and an Environmental Co-ordinator be on-site prior to any construction. The Committee would consist of representatives from the Environmental Protection Service of Environment Canada, Parks Canada and CP Rail with the Environmental Co-ordinator reporting to the Committee. The role of the Committee is outlined in section 3.6 and would include approval of detailed plans. The responsibilities of the Environmental Co-ordinator are also provided in section 3.6 and include supervision of construction activities.
6. No construction activities, other than those found acceptable in this report for the 1982 construction program, should be permitted until the further studies requested have been submitted by CP Rail and reviewed by the Panel.

APPENDIX C

TERMS OF REFERENCE FOR THE ROGERS PASS ENVIRONMENTAL ASSESSMENT PANEL ISSUED BY THE MINISTER OF THE ENVIRONMENT

Mandate

The Environmental Assessment Panel is to undertake a review of the environmental and related social impacts of the proposed Rogers Pass Development Project.

Scope of the Review

The Panel should examine the environmental and related social impacts of the project and of associated facilities within and affecting Glacier National Park. The proposal includes the construction of 18 km of new surface track, 16 km of tunnel and thirteen bridges. Two work camps with facilities for 250 men each are proposed within the Park. The proposal also calls for the supply of electrical power to the tunnel.

Review Process

In recognition of the urgency associated with completing the environmental assessment review, and in order to avoid delaying the project, the procedures normally followed by Environmental Assessment

Panels have been altered. The procedures to be used for this review include but are not necessarily limited to the following:

1. Preparation of a preliminary report to identify the activities which may be undertaken immediately and the issues of major concern which require further study;
2. Preparation of a final report to the Minister which will recommend the best way for the project to proceed in order that the effects on the environment can be minimized including such specific mitigative measures deemed necessary;
3. Convening of meetings by the Panel to receive public input prior to the preparation of its reports;
4. Existing and additional information requested by the Panel should be available to the public in order to allow the public to participate in the review;
5. The Panel shall publish detailed procedures on its plans for conducting the review.

APPENDIX D

BIOGRAPHY OF PANEL MEMBERS

Mr. Philip J. Paradine, Chairman

Mr. Paradine graduated with a B.Sc. (Civil Engineering) and later completed a M.Eng. (Water Resources) at the University of Ottawa.

He joined the Public Service of Canada in 1967 and held positions as a professional engineer with Transport Canada, the National Capital Commission and Environment Canada. Since 1973 he has specialized in environmental protection and assessment.

In 1978, Mr. Paradine joined the Federal Environmental Assessment Review Office (FEARO) and has been responsible for the administration of several Panel reviews, including the Banff Highway project (km O-13) and (km 13-27)

Since 1979 he has been chairing Panel reviews in the Atlantic area and is currently a Director of Panel Operations with FEARO.

Dr. William A. Ross

Dr. Ross graduated with B.Sc. Degree (Manitoba) and subsequently obtained a Ph.D. in Physics from Stanford in 1970.

After doing post-doctoral research work at McGill University, Dr. Ross joined the Faculty of Environmental Design, University of Calgary, in 1973.

Since that time he has been working extensively in the field of environmental science with particular interest in environmental management and energy conservation. He is currently Professor of Environmental Science and Associate Dean, Faculty of Environmental Design, University of Calgary.

He was a member of the Environmental Assessment Panel that reviewed the Banff Highway Project (km O-13) and (km 13-27).

Dr. Ross has lectured on various aspects of environmental sciences including environmental impact assessment. He has also directed environmental research and published numerous papers.

Mr. George D. Tench

Mr. Tench completed his degree in Architecture in Durham, England in 1951.

Mr. Tench was employed as an architect with the Department of Indian Affairs and the Department of Public Works in Ottawa, prior to 1956 when he moved to the Edmonton district office of Public Works. He transferred to Vancouver in 1957, was appointed Regional Architect for Public Works in 1966 and Regional Manager, Design and Construction, in 1972. In this capacity, Mr. Tench was responsible for DPW's Marine, Building and Highway programs in British Columbia and Yukon. He served as a member of the Shawkwak Highway Environmental Assessment Panel which completed its review in 1978.

He retired from DPW in December 1980 and is now consulting in the construction field.

APPENDIX E

PARTICIPANTS IN PUBLIC REVIEW

1. Participants at Public Meetings

A. Groups

1. Big Bend Resource Society
2. CP Rail (Proponent)
3. Glacier Park Lodge
4. National and Provincial Parks Association of Canada
5. Valhalla Wilderness Society

B. Government Agencies

1. Parks Canada (Initiator)
2. Canadian Transport Commission

C. Individuals

- K. Adam (Panel Technical Expert)
- R. Armstrong
- G. Buck (A.2 Consultant)
- D. Cockerton (A.4)
- J. Dunster
- J. Fox (A.2)
- W. Gallacher (B. 1)
- E. Haggerstone (A.2 Consultant)
- D. Hatler (A.2 Consultant)

- S. Herrero (A.2 Consultant)
- T. Holli baugh (A.2 Consultant)
- L. Hurwitz (Panel Technical Expert)
- T. Jandali (A.2 Consultant)
- D. Jorgensen (A.3)
- D. Kennedy (Panel Technical Expert)
- M. Klassen (A.2)
- J. Krahn (A.2 Consultant)
- B. Leeson (B. 1)
- S. Levy (A.2 Consultant)
- C. MacDonald (Panel Technical Expert)
- W. McCrory (A.5)
- J. McGregor (A.2 Consultant)
- M. McKnight (B.I)
- J. O'Neil (A.2 Consultant)
- D. Polster (A.2 Consultant)
- C. Schiesser (A. 1)
- G. Soul (A.3)
- K. Tikkanen (B.2)
- D. Walker (Panel Technical Expert)

2. Written Briefs Submitted to the Panel prior to, during and after Public Meetings

A. Groups

1. Federation of British Columbia Naturalists
2. National and Provincial Parks Association of Canada
3. Valhalla Wilderness Society

B. Government Agencies

1. Parks Canada (Initiator)

C. Individuals

- K. Adam/L. Hurwitz (Panel Technical Experts)
- J. Dunster (B.C. Ministry of Forests)
- D. Kennedy (Panel Technical Expert)
- W. McCrory (Valhalla Wilderness Society)
- S. Pilkington
- T. Sterner (Canadian Forestry Service)
- D. Walker (Panel Technical Expert)

3. Presentations to the Panel at the Public Meetings

A. Groups

1. Big Bend Resource Society
2. CP Rail (Proponent)
3. National and Provincial Parks Association of Canada
4. Valhalla Wilderness Society

B Government Agencies

1. Parks Canada (Initiator)

C Individuals

- K. Adam (Panel Technical Expert)

G. Buck (A.2 Consultant)	J. Krahn (A.2 Consultant)
D. Cockerton (A.3)	B. Leeson (B. 1)
J. Fox (A.2)	S. Levy (A.2 Consultant)
W. Gallacher (B. 1)	C. MacDonald (Panel Technical Expert)
E. Haggerstone (A.2 Consultant)	W. McCrory (A.4)
D. Hatler (A.2 Consultant)	J. McGregor (A.2 Consultant)
S. Herrero (A.2 Consultant)	M. McKnight (B.1)
T. Holli baugh (A. 2 Consultant)	J. O'Neil (A.2 Consultant)
L. Hurwitz (Panel Technical Expert)	D. Polster (A.2 Consultant)
T. Jandali (A.2 Consultant)	C. Schiesser (A. 1)
D. Kennedy (Panel Technical Expert)	D. Walker (Panel Technical Expert)

APPENDIX F

BIBLIOGRAPHY

DOCUMENTATION AVAILABLE PRIOR TO INITIAL PUBLIC MEETINGS

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- Preliminary Geotechnical Evaluations: Surface Grade, Rogers Pass Revision, November 1978 (Thurber Consultants Ltd.) prepared for CP Rail.
- Rogers Pass Tunnel Conceptual Ventilation Study, April 1980 (Parsons, Brinckerhoff, Quade and Douglas Inc.) prepared for CP Rail.
- Rogers Pass Tunnel 1980 Geotechnical Investigation, January 1981 (Thurber Consultants Ltd.) prepared for CP Rail.
- Revised Air Quality Assessment, Rogers Pass Tunnel, December 1981 (Environmental Sciences Ltd.) prepared for CP Rail.
- Parks Canada Position Statement, Dated December 16, 1981, in the Matter of CP Rail Application to the Canadian Transport Commission for Rail Grade Improvements Rogers to Cougar Creek.
- Letter Dated March 9, 1982, to the Panel Secretary, Guy Riverin, from M.S. Wakely, Regional Engineer, CP Rail outlining the proposed work in 1982.
- Various press releases and information notices associated with the review.

DOCUMENTATION AVAILABLE AFTER INITIAL PUBLIC MEETINGS

- CP Rail Rogers Pass Development: Preliminary Report of the Environmental Assessment Panel, April 1982 (FEARO).
- Rogers Pass Grade Improvement Project-Surface Route Conceptual Design Evaluations, December 1982 (EBA Engineering Consultants Ltd.), prepared for CP Rail.
- Rogers Pass Surface Route Evaluation of Landslides, February 1983 (EBA Engineering Consultants Ltd.), prepared for CP Rail.

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- Rogers Pass Revision, Volume 1-Geology, Geomorphology and Hydrology, February 1983 (Thurber Consultants Ltd.), prepared for CP Rail.
 - Rogers Pass Revision, Volume 2-Hydrology and Debris Flow Potential, February 1983 (Thurber Consultants Ltd.), prepared for CP Rail.
 - Rogers Pass Revision, Volume 3-Reclamation Plan, February 1983 (Norecol Environmental Consultants), prepared for CP Rail.
 - Rogers Pass Revision, Volume 4-Earthworks Design, Recommendations, Drainage and Erosion Control, Borrow and Aggregates, February 1983 (Thurber Consultants Ltd.), prepared for CP Rail.
 - Rogers Pass Revision, Volume 5 (Parts 1,2 & 3)-Beaver Valley Grade 1982 Route Investigation, February 1983 (Thurber Consultants Ltd.), prepared for CP Rail.
 - Rogers Pass Revision, Volume 6-Bridge Foundation Investigations, February 1983 (Thurber Consultants Ltd.), prepared for CP Rail.
 - Rogers Pass Revision, Volume 7-Earth Retaining Structures, Alternative Designs, February 1983 (Thurber Consultants Ltd.), prepared for CP Rail.
 - Rogers Pass Revision, Volume 8-Ventilation Shaft Site Investigations, February 1983 (Thurber Consultants Ltd.), prepared for CP Rail.
 - Rogers Pass Revision, Volume 9—Ventilation Shaft Fan House Foundation Investigation, February 1983 (Thurber Consultants Ltd.), prepared for CP Rail.
 - Rogers Pass Tunnel Ventilation System-Acoustical Evaluation and Design, February 1983 (Parsons, Brinckerhoff, Quade and Douglas Inc.), prepared for CP Rail.
 - Assessment of Impact of Air Emissions from Ventilation of Rogers Pass Tunnel, March 1983 (Environmental Sciences Limited), prepared for CP Rail.
 - Concerns for Caribou and Bears Related to Construction Camps at Beaver and Flat Creek, March, 1983 (MacLaren Plansearch), prepared for CP Rail.
 - Environmental Concerns-Double Tracking West Portal to Mile 91.8, March 1983 (MacLaren Plansearch), prepared for CP Rail.
 - Treatment of Wastewater from Tunnel Boring Operations, Rogers Pass Project, March 1983 (MacLaren Plansearch), prepared for CP Rail.
 - Construction-Related Erosion and Downstream Aquatic Environment, Rogers Pass Project, March 1983 (MacLaren Plansearch), prepared for CP Rail.
 - Vegetation and Wildlife along Surface Route Prior to Clearing June 1982, March 1983 (MacLaren Plansearch), prepared for CP Rail.
 - Visual Impact Assessment, Rogers Pass Project, March 1983 (MacLaren Plansearch), prepared for CP Rail.
 - Review of Proposed Acoustical Design for Rogers Pass Tunnel Ventilation System, April 27, 1983 (Harford, Kennedy, Wakefield Ltd.), prepared for Rogers Pass Environmental Assessment Panel.
 - Comments on the Rogers Pass Environmental Impact Statement, April 27, 1983 (I.D. Systems Ltd.), prepared for Rogers Pass Environmental Assessment Panel.
 - Technical Review of the Rogers Pass CP Rail Revision, Reclamation Plan, April 27, 1983 (David Walker and Associates Ltd.), prepared for Rogers Pass Environmental Assessment Panel.

- Panel letter to CP Rail, Dated May 9, 1983, requesting additional information.
 - Concerns for Ungulate Collision Mortality along New Surface Route, Rogers Pass Project, May 1983 (MacLaren Plansearch) prepared for CP Rail.
 - Parks Canada Position Statement, Dated May 11, 1983.
 - Observations and Recommendations on CP Rail's Reclamation Plan, May 16, 1983 (David Walker and Associates Ltd.), prepared for Rogers Pass Environmental Assessment Panel.
 - Rogers Pass Project: Submittal to Federal Environmental Assessment Review Office, June 1983 (CP Rail).
 - Addendum to Review of Proposed Acoustical Design for Rogers Pass Tunnel Ventilation System, June 1, 1983 (Harford, Kennedy, Wakefield Ltd.), prepared for Rogers Pass Environmental Assessment Panel.
 - Parks Canada Position Statement, Dated June 6, 1983.
 - Second Technical Review of the Rogers Pass CP Rail Revision, Reclamation Plan, June 7, 1983 (David Walker and Associates Ltd.), prepared for Rogers Pass Environmental Assessment Panel.
 - A Brief Related to Terrain and Hydrology Impacts and Other Environmental issues, CP Rail Rogers Pass Grade Improvement, June 10, 1983 (I.D. systems Ltd.), prepared for Rogers Pass Environmental Assessment Panel.
 - Parks Canada Position Statement, June 23 1983.
 - Transcripts of Public Meetings held in Revelstoke June 8, 1983, Golden June 9, 1983, and Calgary June 10 and 11, 1983.
 - Compendium of briefs presented by the public.
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APPENDIX G

RECLAMATION CRITERIA

1. Plant Density

10 plants per m² average within any area
10m x 10m
and minimum frequency of 90%

2. Vegetative Ground Cover (Canopy cover)

Average 80 % canopy cover including detritus within any area 10m x 10m

3. Stocking Density of Woody Species

Average 1200 plants/acre growing at not less than 20% rate of adjacent natives

4. Erosion Control

Not more than 100 tonnes/hectare/year

APPENDIX H

THE ROLE OF THE ENVIRONMENTAL COMMITTEE

The role of the Environmental Committee would be to:

1. Ensure that the conditions established by the Panel are adhered to and that further studies are carried out as recommended.
 2. Approve environmental aspects of plans and specifications in accordance with Panel recommendations and Parks Canada's responsibilities.
 3. Ensure that the commitments made by the proponent in the IEE and other documents and stated during public meetings are followed.
 4. Establish detailed monitoring plans.
 5. Ensure the provision of information to the public.
 6. Seek policy guidance from designated senior personnel when policy matters require resolution.
 7. Provide direction to an Environmental Co-ordinator.
 8. Resolve environmental construction problems that cannot be solved by the Environmental Co-ordinator.
 9. Ensure that contractors receive briefings on environmental requirements prior to and during construction.
 10. Ensure that avalanche safety precautions are implemented.
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APPENDIX I

ACKNOWLEDGEMENTS

The Panel would like to thank all those who participated in this review, and in particular the following individuals:

Mr. G. Riverin, Panel secretary
Ms. S. Latour
Mr. J. Clarke, and
Ms. C. Parent