

A P P E N D I XESTIMATES OF COST

Before estimates of cost could be prepared, it was necessary for the Commission to decide on the standard of road it would recommend for the Alaska Highway.

Estimates of the 1931 International Fact Finding Committee were based on a road width of from fourteen to sixteen feet, and which conformed to the type of road then existing in interior and northern British Columbia. Since that time roads have been greatly improved in the Province, and are well adapted to the type and volume of traffic which they bear.

It was the opinion of the Commission, however, that a considerably higher standard of road should be adopted for the Alaska Highway. Not only would it be an International route of great importance, but its southern extremity would connect with modern roads in the United States of very high standard. It would consequently not be advisable to construct a highway that would, when opened to traffic, suffer in comparison with connecting roads as regards width, alignment, and other engineering features.

As a result estimates are based on a roadway twenty-four feet wide with necessary ditching and with gravel surfacing twenty feet wide. The twenty-four foot grade will permit the laying of paving later on to a width of twenty feet. No cost figures have been included for the eventual paving of the highway, as these did not seem necessary at the present time.

While the cost estimates which were prepared by reconnaissance engineers and which are included in the appendix, form the basis of the final estimate figures, it was necessary for the Commission to carefully review these and modify them where necessary so that they would be "on all fours" in regard to location and construction standards and also fairly reflect the character of the country traversed.

In the case of larger bridges, cost figures cover structures of a permanent or semi-permanent type. Simple bridges and culverts will also be of similar type, except in cases where local conditions might render it advisable to install temporary structures utilizing local native timber, where available.

The Commission calls attention to the fact that the estimates of cost are based on wages for various classes of work and costs of material and construction machinery that prevailed in April, 1940. Since that time there have been moderate increases in production costs of materials and machinery and which at the present time (May, 1941) are approximately, as follows:

Construction Machinery... increase from 8% to 10% in production costs.
 Steel..... increase from 2% to 5% in fabrication costs.
 Lumber..... increase of about \$1.00 per M. in production costs.

If materials and machinery to be used in the construction of the highway were subject to war taxation costs, cement, steel, and lumber would be subject to an 8% sales tax in the present year (1941) and road machinery would be subject to sales tax of from 8% to 10% depending on the type.

As it would be impossible for the Commission to include taxation figures and keep their estimates up to date, all construction estimates given are exclusive of sales tax or other war taxation that may be imposed in future.

STATISTICS OF PRINCE GEORGE ROUTEFiled by G.H.T.Perry on behalf of Prince George Board of TradeMILEAGE ADVANTAGES:1. Prince George to Alaska boundary

Hazelton Route "A"	1,442 miles
Summit Lake - Finlay, Route "B"	1,223 "
"B" saves	209 miles

2. Vancouver to Alaska

"A"	1,968 miles
"B"	1,759 "
"B" saves	209 miles

3. Manson Creek Road via Finlay, as Alternative to Summit Lake

Prince George to Alaska boundary	1,361 miles
Summit Lake	1,233 "
Summit "B" saves	128 miles

4. New Construction Required in British Columbia

"A"	610 miles, via Hazelton
"B"	562 miles from Summit Lake - Prince George
	48 miles less new construction

ELEVATION ADVANTAGES OF SUMMIT ROUTE "B"

Pass Elevations:	<u>Hazelton "A"</u>	<u>"B" Summit-Finlay</u>	<u>Manson</u>
	4,230 feet	Summit Lake 2,500 feet	Manson 4,900 ft
	5,176 "	Sifton 3,000 "	Gaffney 3,500 "
	5,405 "	Liard 1,650 "	
	5,000 to	Arctic-	
	6,000 feet	Bering 3,150	

Summary - Highest -	Hazelton,	5,000 to 6,000 feet
	Manson	4,900 "
	Gaffney	3,500 (this is cut off from Manson)
Lowest -	Summit Lake	3,150 feet

6. Lower Costs

Shorter mileages - Lower passes ensure lower cost of construction and maintenance

7. More Resources

Minerals - coal, chiefly at Hazelton; precious metals on "B" route (which is in Pre-Cambrian range)

More agricultural lands

More timber

8. Alberta Connection

Another connection to Alberta is afforded at Finlay Forks, Route "B".

9. Better Air Route

Thereby affording more business along Highway "B".

 Finally:

1. We submit that there are only two routes that can fill the purposes of an Alaska highway, if we exclude defence as a reason for the highway in so far as we are arguing.
2. That as between the Hazelton route "A" and the Prince George - Summit Lake - Finlay route "B", we submit the latter has the following distinct advantages:
 - First: A shorter mileage, 209 miles, appealing therefore to tourist traffic to Alaska.
 - Second: Lower elevations - less snowfall it is said.
 - Third: Lower costs per mile in construction and in total mileage. Lower maintenance costs.
 - Fourth: Greater resources available in precious minerals, agricultural lands and timber.
 - Fifth: An extra route is afforded, Alberta to Alaska, at Finlay.
 - Sixth: It is the Air Lane route, permitting more business to be done this way.

MILEAGES:

Prince George to Sinclair Mills	62 miles
Prince George to Longworth	74 "
Prince George to Penny	83 "
Prince George to McBride	160 "
McBride to Tête Jaune	43 "
Tête Jaune to Alberta boundary (through Park)	51 "
McBride to Valemount	60 "
Valemount to Albreda (or British Columbia boundary)	18 "
Albreda to Blue River (approximately)	40.8 "
Prince George to Alberta boundary	254 Miles

DESCRIPTION OF ROUTE THROUGH BRITISH COLUMBIA TO ALASKA
VIA HAZELTON AND KITWANGA

By P.M.Monckton

Submitted by E.T.Kenney, M.L.A. on behalf of Hazelton District
Chamber of Commerce

We have to-day a highway running north as far as Hazelton and Kitwanga, both on the banks of the Skeena river. For the most part this road is in very good condition, and its ultimate objective will be Prince Rupert.

Mr Monckton has covered all of the intervening space between Kitwanga and Hazelton to Whitehorse on the Yukon River, following the valley immediately to the east of the coast range, and states that "the most logical place for the junction for the Alaska road would be at Kitwanga about twenty-five miles west of Hazelton.

Leaving the Skeena at Kitwanga, the road would ascend the valley of the Kitwancool as far as the village of Kitwancool and a short distance further on skirt the shores of Kitwancool lake; just beyond the lake an imperceptible divide is crossed and we are in the headwaters of the Cranberry river. Here we pass through easy burnt-off country, and directly ahead while the mountains look forbidding, across the Nass river a fairly easy pass will allow a branch road to connect up with Alice Arm.

At 51 Mile Post from Kitwanga, another branch road south for about twenty miles would connect with Aiyansh, the centre of the fertile Nass valley.

Leaving the Cranberry at the 51 Mile post and bearing north westerly through a region of level gravelly benches lightly timbered with jack pine and birch, follow the Nass river for fifty miles, crossing where it is constricted in a canyon with an island in the centre, and necessitating the use of two short bridge spans both under 100 feet long.

After crossing the Nass, a change in the character of the country is noted; we find heavier timber, mostly balsam and considerable growth of underbrush. This denotes greater precipitation and deep snow, which continues as far north as Iskut Cabin. However, the construction is easy and seven miles beyond the Nass

Crossing, brings the route to the Hanna River. Just across the Hanna river is the foot of an outlying spur of the coast range. At this point another branch road could turn immediately west and after passing Meziadin lake cross the coast range through the Bear Pass, and give access to Stewart forty-five miles from Hanna river; Bear Pass is the most remarkable pass to be found on the coast range, the highest elevation at this particular section being not over 2000 feet above sea level. Stewart is about 150 miles from Kitwanga, and two miles beyond Stewart the international boundary would be crossed and Alaska entered at Hyder. Fifteen miles beyond Hyder is the Premier Mine.

Continuing north with the main highway from the point of diversion to enter Stewart, the road would follow the slow-flowing Hanna river to the summit at an elevation of about 1750 feet, and cross Surveyors Creek and continuing on for a few miles would cross Bowser river, a wide sluggish river with its outlet in Bowser lake. Leaving Bowser lake and travelling along about twenty miles of undulating country to the crossing of a large stream known as Treaty creek. Treaty Creek can be crossed by a twenty-foot span at a narrow canyon and one mile further on brings the road across a timbered flat to the bank of the Bell Irving or the west fork of the Nass.

The next ten miles will probably be the most expensive of the whole route as the country is somewhat mountainous; from this point the route would come to the slow-flowing Teigen creek and passing through about two miles of beaver meadows, it would contact the Yukon Telegraph Line, where it crosses Snowbank Creek, which would be followed to its summit.

At the contact with the Telegraph Line, the distance would be about 160 miles from Kitwanga, and at no time would there be an elevation to cross over 1900 feet above sea level, whereas the Telegraph Line has come 248 miles from Hazelton, crossed several summits, some of which are 5000 feet elevation.

From this point the route would follow the Yukon Telegraph Line through a nearly level pass of about ten miles and an elevation of about 2050 feet.

Crossing the divide and leaving the watershed of the Nass, we enter the shed of the Stikine, parallelling the Ningunsaw and down a gentle grade to the flat

country where it joins the Iskut river. The pass just travelled is an easy one with very little rock work but somewhat swampy.

Leaving the Ningunsaw and turning due north to ascend the valley of the Iskut, the main valley of this river between its mountain walls is ten miles wide. A branch down the Iskut for thirty-five miles would reach the head of navigation and a ferry connection to the town of Wrangell, Alaska, be made.

The route now (main route) enters a country of different character as it bends slightly to the eastward further up the Iskut. Here we are leaving the Coast range and coming into a drier climate and lighter snowfall. The valleys open out and there is choice of several routes for a highway. An easy pass through the next range of mountains follows the Little Iskut, while another route somewhat longer but more beautiful, follows the forty mile chain of Lakes, Minaskan, Tatogga, Eddontenajon and Kluachon. These two routes meet on the Klastline or the second fork of the Stikine.

A decision will now have to be made as to whether to follow open bunchgrass country up the Morchua creek and cross the Stikine above the great canyon, or to follow down the valley of the Klastline and cross the plateau at Buckley lake, and after a sharp descent of 2000 feet cross the Stikine at the town of Telegraph Creek.

North of the Stikine the country is of a much easier nature, and the choice of several routes is available; either the Tuya or the Tuya may be ascended where a summit of about 3000 feet would be crossed in either route. Once over this divide the route would be on the waters of the Taku and another branch road would give access to Juneau, Alaska's capital, by using twenty-five miles of a ferry from the head of Taku Inlet.

Approximately 180 miles from Telegraph Creek, an existing road would be joined, and keeping near the eastern shore of Atlin Lake, the largest lake in British Columbia, the town of Atlin will be reached. A branch road from across Atlin lake, along the old Fantail Trail, could be built to the coast at Skagway.

Leaving Atlin and travelling along the margin of the lake another thirty miles would bring the route to the 60th parallel of latitude, which is the

northern boundary of British Columbia and the southern boundary of the Yukon Territory. Sixty miles of very easy construction past Little Atlin lake and Marsh lake, and the road would be at Miles Canyon where the Yukon is compressed into a narrow rocky cleft, which makes bridging very easy. Two miles further on the town of Whitehorse lies at the head of navigation for the steamers plying the river Yukon to Dawson. The proposed road would then head westward for Kluane lane and Alaska.

The cost of construction would vary over the portion above outlined from Hazelton-Kitwanga to Whitehorse from \$3000 per mile in the easier parts to \$20,000 per mile for a few miles along the Bell Irving river; it might average \$5000 per mile from Kitwanga to Whitehorse, or an approximate cost of \$300,000; to this must be added the cost of bridges which would approximate \$1,500,000, or a total of \$5,000,000 exclusive of the branch roads mentioned.

From Kitwanga to Iskut the road passes a somewhat wet and snowy climate, while north of Iskut the climate is exceedingly dry and game is very abundant.

Such a road would also give access to a great and almost unknown mineral belt lying along the eastern contact of the coast batholith which is so expensive to penetrate that it is impossible for the average prospector. The wealth of one new mine along the proposed route, such as the Premier, would repay more than the cost of construction of the whole road. This can best be verified by the fact that the Premier Mine, which is in the same formation, has paid the estimated cost of such a road several times over. The gas tax from the tourist traffic alone should take care of maintenance and up-keep of such a highway.

OUTLINE OF FACTUAL DATA PERTAINING TO THE
FEASIBILITY OF THE WESTERN ROUTE NORTH FROM HAZELTON

Submitted on behalf of the Hazelton District Chamber of Commerce.

A prime difficulty in drafting an advocative brief such as this lies in the choice between length with great detail and brevity with a risk of omissions. However, it is felt that an accurate and explanatory map used in conjunction with information already available and reference to certain records, such as the Report of the Commission to Study the proposed Highway to Alaska (1933), allows us to be brief with a minimum loss of detail.

Therefore we trust that generous use will be made of such maps and records which will disprove adverse statements recently made through the press: (e.g. see Vancouver Daily Sun, issue Friday, June 23rd, 1939, page 5, column 4, in part "On the Commission's maps the Hazelton proposal is marked the "A" route, and the Finlay Forks the "B" route. Which route - it will be the Commission's most delicate task to recommend as between the two routes. The "A" route through Hazelton is nearer the coast but runs up through some river-cut country and over a 6000 feet high level".) We have gone into this matter in considerable detail and believe the Vancouver Daily Sun or its informants are grossly mistaken, as we have no knowledge of any 6000 feet level to be crossed on our proposed route.

Quoting Col. J. M. Rolston, page 53, Appendix B. extract from his Report to the Commission to study proposed Highway to Alaska (1933) - "That portion of the Telegraph Trail from Kispiox to Cabin No. 9, I could find no maps covering, and it was therefore necessary to go over this portion and get data for grades, cost, etc."

Six years later the same condition exists, for no topographical survey has ever been made of the section Col. Rolston mentions. Nevertheless from reliable sources of information we have been able to locate on the available

maps of northern British Columbia, a route for such a highway which is entirely feasible physically, as proved by pack-train traverse, and of greatest desirability economically.

On page 57 of the 1933 Report, Col. Rolston further states:

"Skeena River - From the junction of the Kilankis and Skeena Rivers any route to Hazelton would of necessity be forced to follow down the Skeena River through a deep narrow valley for approximately 50 miles. The Skeena valley will be expensive construction, as the river is in canyons a great deal of the time, and a route would have grades up the side hills over these canyons."

This we know to be an unintentional mis-statement of fact as apparently Col. Rolston was never apprised of the fact that a very good route over a low divide is available by following the Kispiox river thence to the East fork of the Nass river, the existence of which route the attached map will show. As this route practically parallels the Skeena route, it naturally can be used to reach Hazelton. This criticism, therefore, does not apply to the route herein outlined.

Our map will show the most favourable route lies up the valley of the Kispiox river to the low-lying table-land on which streams flowing in opposite directions have their source in a group of small lakes. North from this point no survey, or other published reports being available, we referred for our information to game guides, native trappers, etc., named in the appendix hereto, and are informed of two alternative routes. One of these continues north over the table-land, crossing the Nass river at or near the junction of Vile Creek, thence north crossing the West Fork of the Nass at a point about eight miles below (south) No 7 Cabin on the old Yukon Telegraph trail. The other route follows the Nass river from Vile Creek to Sixth Cabin, thence north along the Telegraph trail to the point eight miles below No 7 Cabin where it meets the first described route.

Leaving the Telegraph Trail at this point the route follows the Nass river - Anthony Creek valley through a low pass to Beirnes creek which it

crosses and proceeds to the upper Skeena valley at a point near the junction of Caribou Creek.

At this point we are again able to refer to Col. Rolston on page 58 (1933 Report), where he states that further consideration should be given to a route which coincides with the route herein recommended from this point. We quote,

"Route No. 3. following the main Skeena river past Courier Creek and Beirnes creek to the summit between the Skeena and the Spatsizi, thence north to either the Klappan Valley, via the Little Klappan, or more northeasterly via the Spatsizi river to Cold Fish Lake and into the Klappan over a low divide." Referring to this route on page 58, and of route 2, Col. Rolston states, "I consider that the following route should be given further consideration and be thoroughly explored before any definite route is accepted." Again on page 59, Col. Rolston states in part, "the upper Skeena appears to be more or less open bench country with jack pine and open meadows."

Leaving the Spatsizi River valley about halfway between Buckinghorse creek and Mink creek, the route turns westward via an unnamed valley to the Eaglenest Creek valley which it follows to the Klappan river, and down the Klappan valley to a point in line with Ealue lake, thence westward again into the Klastline valley. This watercourse is then taken to its junction with the Stikine which is followed and crossed at a point just above the confluence of the Tahltan river and joins here the present road between Telegraph Creek and Dease lake.

Alternatively from Ealue lake lower altitudes may be found on a route paralleling the west shore of this lake and the east shore of Eddontenajon lake, rejoining the first outlined route at Kluachon lake.

A further alteration in the route as outlined might prove advantageous in many ways, which only a reconnaissance survey will show. In any case, its length can be reduced some twenty-five miles by leaving the Spatsizi at Indian creek, which is followed across a low divide to the Little Klappan river, which valley is taken to the confluence of Eaglenest creek on the

first described route. This cut-off has the whole-hearted endorsement of our previously mentioned guides and trappers, and of it, Col. Rolston (page 56, 1933 Report) says:

"I found this valley a first-class route. The cost of construction would be comparatively light, as the valley consists of jack-pine benches or many open meadows, very similar in character to the Chilcotin country. It is interesting to note that all horses used by the big pack-trains pulling out of Telegraph Creek are wintered in the Spatsizi river, as the Spatsizi and Klappan areas produce bunch grass which the horses winter on very well.... The general elevation of the Klappan Valley runs from 2,600 feet at its junction with the Stikine to 4500 feet at the summit, a rise of about 2000 feet in some 80 miles. In fact the river is navigable for canoes for about 40 miles above the crossing." And refer again to his statement on page 58, already quoted herein.

Also, on page 59, Col. Rolston states: "Big game parties, leaving Hazelton and proceeding by pack-trail, invariably go into the area which would be touched by this route, i.e., the head of the Skeena and Groundhog Mountains. This is a marvellous big game-hunter's paradise."

On page 61, Col. Rolston again states: "The Klappan Valley, however, is about one mile wide and consists of gravel benches and rocky side-hill slopes. It is much drier than the Nass valley and of a much more open nature. Jack-pine replaces the spruce of the upper Nass valley and the side hills are in many cases open ground covered with bunch grass."

Also, on page 61, quote, "From mile 248 to the end of the section, mile 283, the route follows jackpine ridges, affording very cheap construction. This last section represents the cheapest portion of the route to construct, as the Klappan valley widens to about two miles and falls gradually to the Stikine river at elevation of 2600 feet."

The above quotations refer to that portion of the entire route we have outlined, extending from Beirnes Creek to Eddontenajon lake, from which point our route solves some difficulties which Col. Rolston mentions in connection with the Stikine river canyon, by avoiding same until it is crossed near the

Tahltan confluence at 800 feet.

The physical advantages of this route are many. Among them are features which make for economical construction and maintenance; the route lies along valleys which afford low altitudes and easy grades, providing at the same time an abundance of materials for construction, such as timber and gravel. Climatically, the route lies sufficiently far east to be in a region of light precipitation and yet by virtue of its westerly location introduces many advantages of an economic nature.

Many economic reasons justifying construction of such a highway are to be found in Chapter VI, page 23 of the 1933 Report, and while these cover more specifically advantages to Alaska and the United States, parallels may be drawn with regard to benefits to Canada. In fact, because nine-tenths of the road lies in Canada, the advantages would be even greater.

Enlarging upon the specific advantages of the western route, considerable worth lies in the fact that construction could proceed from at least five points at once, by taking advantage of approaches to the route (at water freight rates) on the southern end (Hazelton), 176 miles from tide-water; Telegraph Creek (construction two directions), also 176 miles from tide-water; and Whitehorse (construction two ways), 110 miles from the coast at Skagway. The advantages of such a feature are self-evident, with regard both to construction of the primary road and feeders to the British Columbia coast and Alaskan coast line, of which at least five could be built economically to serve the coast communities. This allows for rapid construction of the main highway by permitting economical importation of materials and supplies other than those located on the route, while allowing employment of five times as much labour, with a proportionate reduction in the time required for completion as compared to any other route having only one starting point.

In addition to the economies effected by this mode of construction, are those resulting from the fact that this route requires less new construction by a matter of 300 miles than any other route.

Briefly some economic advantages to be derived only from the western route include:

- (1) Service to that part of British Columbia north of the Canadian National Railway most densely settled, resulting in greater traffic volume and subsequent tourist expenditures.
- (2) Use of the greatest possible amount of already-existing highway, serving a present permanent population through a region of known and developed agricultural value.
- (3) Provision of transportation facilities for development of a country known to be rich in mineral and timber values, as well as the famous Groundhog anthracite coal area, to which only this route would allow easy access, and unlimited water power.
- (4) A tourist highway unexcelled anywhere for scenic attraction, hunting and fishing, is afforded by this route, and we are again able to quote Col. Rolston's 1933 Report, page 69, in part: The scenery is unsurpassed - the open mountains of the Upper Skeena, Klappan, etc. provide a wonderful area for big game. Moose, caribou, mountain sheep and goat, are very plentiful in this area and attract a large number of hunters from all over the world. A thirty-day hunting trip costs about \$3,000, which gives some idea of the pay-roll provided by the big-game hunters."

Topography and Geography in General

Because no survey has ever been made in the neighbourhood of this route, including the alternatives mentioned, no official records are available of altitudes, etc. Our authorities, however, among whom we must include air pilots, are unanimous that at no point must elevations exceeding 4000 feet be coped with, and where such altitudes are met, they are gradually approached on water courses. This fact combined with the sufficiently easterly location of the entire route, beyond the region of heavy precipitation, precludes any possibility of difficult construction or maintenance due to said precipitation, regardless of the season.

By providing such alternative routes over short distances as are shown, we believe that a survey will prove the absolute feasibility of this route insofar as topography and climatic conditions are concerned, which, with such economic and geographic advantages as we can point out, will prove beyond question the superiority of this over any other route which might be proposed. The route is as far west as will allow of minimum precipitation, and as far east as it can possibly be to serve the primary purposes of any highway which might be projected to Alaska; service to British Columbia and Alaskan coast; development of northern interior of British Columbia; opening of vast mineral, coal areas and pulpwood stands; rapid movement of military function in circumstances requiring coast defence by communication with coast on navigable rivers; and as previously mentioned, connection up of developed communities between Fairbanks and Vancouver, of which only a few exist north of 55° east of this route to the Alberta - British Columbia boundary.

Telegraph Creek - Atlin

Our resume to this point covers only the first 300 miles north of Hazelton, taking us to Telegraph Creek, because we have first-hand knowledge of this section of the route and are positive with regard to its feasibility. Of the section north to Atlin and Whitehorse, we have some authentic information, but feel that more specific and valuable data on this section can and will be presented by the local proponents in that district.

Nevertheless, our presentation cannot be considered complete until Atlin is reached. Therefore we refer here to our available sources and believe no reasonable objections can be proved against either on a basis provided by a survey.

Quoting Mr George B. Ball of Telegraph Creek:

"Following up the Tahltan river 28 miles to head Salmon creek, following Sheslay river to Macdonald party, 15 miles below Sheslay (Egnell) Station, via east side Heart Mountain to Nahlin, continuing to Atlin, via west side

Spruce Mountain and right limit of Little Nakina river, or to Teslin Lake, via east side of Spruce Mountain. Highest point under 3000 feet, sufficiently light snowfall."

The 1933 Report again serves to corroborate this route. Mr J.H.Gray, in Appendix C, page 72, says in part: "Only by a line up the Tahltan and Little Tahltan rivers from a Stikine river crossing near Tahltan mouth (800 feet above sea level), via Klastline river, or some such route, from Klappan Valley, would consideration be given to a route via this portion of Telegraph Trail."

"The Little Tahltan river, 10 miles from the flats, turns abruptly northerly into the mountains. The summit or divide between this stream and Salmon or Hackett river is scarcely noticeable, the maximum height booked being 2,240 feet:

"At Camp 3 on Hackett or Salmon river, 15 miles from Tahltan Flats, elevation 1,980 feet, the first kodaks were taken. Views 1 and 2 show, respectively, the stamp and class of country passed through on the flats for 15 miles between Tahltan Flats and three miles back of Egnell (Sheslay). View 2 also shows the nature of side hill, from a point at extreme right of view and some three miles east of Egnell, that must be utilized along Egnell Creek (faintly shown on extreme left of view) in order to reach the plateau level some 2,100 feet above Egnell.

"Stream crossings and drainage generally would be light over this stretch, in fact more favourable conditions could not be expected. The snowfall is from 2 to 2½ feet (Indian report).

"At Egnell, 1890 feet above sea level, I took a day for the examination of Sheslay river and Egnell Creek.

"Sheslay river, 1890 feet at this point and poorly shown in view 3, bearing N.53° W., could be easily descended for about 15 miles, whence a mountain pass bearing northeasterly could be utilized back to the Telegraph Creek (probably meant 'Trail') country about Dudidontu river, some 22 miles north of Egnell.

"The examination of Egnell Creek was satisfactory. A 150-foot span in canyon would cross at an elevation of 2,900 feet, followed by fair side hill for another three and a half miles to plateau level. The work on this six and a half miles would be heavy, but in my opinion more favourable than on the Sheslay river detour."

From these two reports, there seems to be no doubt as to the feasibility and ease of construction of the proposed highway to Atlin. Altitudes and precipitation are covered in these quotations, and the scenery which is world-renowned, is mentioned by Col. Rolston on page 70. We quote: "The northern portion of this area consisting of Teslin, Surprise and Atlin Lakes, offers wonderful scenery. Atlin has taken advantage of this and provided first-class tourist hotel with every convenience, including guides, motor launches, etc."

To attempt to outline the route beyond Atlin would be to allow our statements to degenerate from fact to hearsay, which is of no value, and we are convinced therefore that our presentation should properly be concluded at this point. That this route can be continued northward with similar economy and advantage, we are sure, and feel that the most suitable location will be thoroughly outlined by those more favourably situated to do so.

Authorities for this Route

George B. Ball, Telegraph Creek, B.C.

Charles Barrett, Barrett Lake, B.C.

George M. Beirnes, Hazelton, B.C.

F. M. Dockrill, Telkwa, B.C.

All these men have been in the country since 1898, in the various capacities of prespector, surveyor, game guide, pack-train operator and winter mail carrier, and all have travelled the route herein described at all seasons of the year.

Stan. McMillan, Canadian Airway Limited pilot, stated on more than one occasion that the lowest passes north to Telegraph Creek lie on the route outlined.

Mileages - Hazelton to Telegraph Creek

Hazelton to First Cabin	40
First Cabin to Vile Creek	66
Vile Creek to Nass Crossing	20
Nass Crossing to Beirnes Creek	20
Beirnes Creek to Caribou Creek	9
Caribou Creek to Indian Creek	23
Indian Creek to Eaglenest Creek	46
Eaglenest Creek to McEwan Creek	12
McEwan Creek to Klastline River	24
Klastline River to Stikine	<u>24</u>
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Notes: The map referred to in this Brief is filed with the records of the British Columbia - Yukon - Alaska Highway Commission.

The "1933 Report" referred to above is the Report of the Commission to Study the Proposed Highway to Alaska, The Department of State, Conference Series No 14, U.S. Government Printing Office, Washington: 1933.

NOTES RE BRITISH COLUMBIA - ALASKA HIGHWAY

By Noel Humphrys, Vancouver

There are, in my opinion, which opinion is based upon personal knowledge generally of the country through which such a highway would pass, gained during some thirty years' experience in surveying, exploring, etc. in British Columbia, two reasonable and feasible routes for the proposed Alaska-British Columbia highway. Both of these routes would naturally centre on Prince George, from which point southward to the boundary line a generally good gravelled and partly surfaced highway is already in existence. From Prince George northerly there are two alternative routes generally speaking; each of which have minor alternatives here and there. Both alternatives should in my opinion, as well as leaving Prince George, have for their next common objective Dease Lake, for reasons that will be explained later.

The distance from Prince George to Dease Lake (which section I am considering first) over either route is much the same, though the westerly route which I will call the Hazelton route as marked on the accompanying map of British Columbia in green and numbered (1) is the shortest. The matter of distance, though of importance, is however only one of the things we have to consider, and in the case of a through highway such as this, as in the matter of a railway, there are a number of other considerations of equal or greater importance to consider:

- (1) Distance from one given point to the next.
- (2) Character of country traversed from the construction viewpoint - whether mountainous or rocky, obstacles such as mountain lakes (the usual type of British Columbia lake), streams and rivers to cross, etc.
- (3) The commercial side of the question, resources which the road would tap and open up, the chief of which are doubtless in order of importance in northern British Columbia, Yukon and Alaska, mining, lode and placer; agricultural, timber resources, and scenic value in connection with the tourist trade.

(4) And of very great importance from the maintenance standpoint possibility of continuous year round use, climatic conditions, particularly with regard to snow in winter as well as rainfall in summer months.

I will now refer again to what I consider are the only two (from all standpoints) feasible and reasonable routes:

The westerly or Hazelton route (with variations) number (1) on map, coloured green, with variations marked (1A) and green (1B) and the Telegraph Creek route marked dark purple, and (1C) marked blue, a variation on route (1B). The other alternative I term the Fort St James - Omineca route and this is marked (2) and coloured red with variations brown and marked (2A).

I append herewith an approximate table of distances of existing road and road to be built, together with totals, Osoyoos on the United States boundary to Dease Lake being the first section considered here:

(1B) Prince George - Hazelton - Dease Lake, via Telegraph Creek:

Prince George to Hazelton (existing road)	302.0 miles
Hazelton to Dease Lake (approximately)	420.0 "
Built - Telegraph Creek to Dease Lake (rough road), about	(70) "
Existing highway, Prince George - Osoyoos	<u>553</u> "
	1,275 miles

(1C) Prince George - Hazelton - Dease Lake via Kinaskan Lake (avoiding Telegraph Creek)

Prince George - Hazelton, existing road	302.0 miles
Hazelton - Dease Lake via Kinaskan Lake, to build	400.0 "
Existing highway, Prince George - Osoyoos	<u>553.0</u> "
Total to Dease Lake	1,255 miles

(1) Prince George - Hazelton - Dease Lake via Klappan RiverThis route recommended

Prince George - Hazelton, existing road	302.0 miles
Hazelton - Dease Lake via Klappan river	310.0 "
Prince George - Osoyoos, existing highway	<u>553.0 "</u>
(the shortest route) and	1,165.0 miles
(1A) a diversion of above for possible lower grade and lower maximum elevation via Skeena River would be about 40 miles longer or a total of	1,205 miles.

(2) The Fort St James - Omineca Route

This route would be over existing highway from Prince George to Fort St James at easterly end of Stuart Lake, approximate distance	115 miles
Fort St James - Manson Creek, partly built, approximately	120 "
To Dease Lake via Omineca river, approximately	<u>390 "</u>
Total, Prince George - Dease Lake	625 miles
Prince George - Osoyoos, existing highway	<u>553 "</u>
Total - United States boundary - Dease Lake	1,178 miles

(2A) Fort St James - Omineca - Findlay River - Fort Graham - McConnell Creek - Stikine River - Dease Lake (marked light brown on map and termed (2A))

Prince George to Fort St James	115 miles
Fort St James to Manson Creek	120 "
Manson Creek - Omineca River - Findlay River - Fort Graham, McConnell Creek - Dease Lake, approximately	<u>480 "</u>
Total this route, Prince George - Dease Lake	715 miles
Plus United States boundary to Prince George	<u>553 miles</u>
	1,268 miles.

There have been some suggestions that the highway in question should go via Finlay river to its headwaters at Sifton Pass, thence down the Kechika river on the Liard watershed and presumably to the junction of the Kechika with the Turnagain river, and then westerly via Deadwood Lake and McDame Creek, Hudson's Bay post on the Dease river, and so up the Dease to the north

end of Dease lake. This route is in my opinion not to be recommended. It is a good deal longer, it is too far east and being along the Finlay to Sifton Pass in the "Rocky Mountain Trough" will encounter deep winter snow, extreme cold and later spring, as well as high elevations, and will have no advantages in the way of tapping resources over the other routes, and is in fact I think not so useful in this regard.

I consider that in connection with the necessary preliminary investigation to be followed by reconnaissance surveys it is not necessary nor desirable to pay any attention to any other than the two routes with their variations as outlined above. From the standpoint of resources, both have much to recommend them.

Following is a summary of conditions as applied to each route above, being the points referred to in the first part of this statement and numbered (1) to (4).

Climatic Conditions

Before citing that which I think it advisable to consider generally, the well known fact that, regarding climatic and meteorological conditions the Coastal trough, that is the depression immediately behind the Coastal mountains and which may be said to extend parallel to the Pacific Coast line more or less continuously from the Mexican border to the Alaskan, is the dryest and most arid area of the Pacific.

The reason for this is well known to meteorologists, that is, that the moisture-laden movements which originate generally in the north Pacific and bring practically all our precipitation here, meet the Coastal mountains and precipitate most of their moisture, then pass easterly high up over the Coastal trough, causing the dry belt of British Columbia. Compare the annual precipitation in the Okanagan Valley at Kamloops, Ashcroft, Lillooet and so on with the precipitation at similar latitudes in the Cascade and Rocky Mountain trough, for instance, the latter of which is the wettest and has by far the heaviest snowfall. I give the following examples:

Dry Belt (Coastal trough). Ashcroft, average annual precipitation about 7 inches, Vernon, 15.24, Kelowna, 12.74, Penticton, 10.64; Oliver, 7.94, and with practically, as far as highways are concerned, no snowfall; and further north Lillooet, 13 inches with average of only 19.5 inches snow, Quesnel, 18 inches, of which 44.3 inches is snow; Prince George, 19.23 with snow, 61.5; Hazelton, 18.49, and snow, 42.1. (Please observe greater proportion of snow the further easterly you go); Atlin, 11.16 with 54.7 inches of snow; Mayo, 10.98 with 43 inches snow; and Dawson, Yukon Territory, 12.60 with 51.7 of it in snow.

Middle Belt, (being Selkirk or Rocky Mountain trough) Revelstoke, 43 inches with 141.4 snow; Nelson, 45 and snow, 80; Blue River (North Thompson), 36.54 with snow, 159 inches; Parkerville, east of Quesnel, 46 inches with snow, 184; McBride, 23 with 76 inches snow, etc.

Above being so it appears obvious if other conditions on easterly route are similar, that the Coastal trough is the right one to follow.

I will now consider the routes as outlined above separately, in view of the conditions (1) to (4) set out in the first part of this statement.

Route 1 Prince George, Dease Lake via Hazelton and Klappan river. This route (1) is the shortest and a fair highway already exists from the boundary line to Hazelton and up the Kispiox valley 25 or so miles. (2) It is an admitted fact that road construction along the dry belt is not only easier and cheaper by nature of the large gravelly and sandy plateaus and open valleys found there, but maintenance cost to keep roads open the year around by reason of lower precipitation, is less. Also I think anyone who knows the country will admit that the winters are neither so severe or so long in the Coastal trough as farther east. (3) Resources. The proposed route (1) follows roughly from Hazelton north-westerly the eastern contact of the Coast Batholith which is known to be one of the most fertile if not the most fertile area from a mining standpoint. Such a road will pass close to the fairly well-known anthracite

coal field of Groundhog mountain area, and will traverse a country which is known to be rich in placer possibilities. This route also traverses a generally fertile country from the agricultural viewpoint, and will follow many beautiful valleys with good soil and good grazing areas, such as for instance the Kispiox valley to mention but one.

From the standpoint of timber, there are many large areas of quite well timbered country along this route. It is a veritable paradise for the hunter and fisherman, which condition applies equally to either of the two routes or their alternatives.

There are no high summits to cross on this route and remarkably little rock work. No great difficulties regarding river crossings (Stikine river excepted) which any route must cross, and no rock and mountain surrounded lakes to encounter.

Route 1B A variation of the Hazelton route going to Telegraph Creek and using the existing road, Telegraph Creek to Dease Lake. This route is longer than (1) and I do not recommend following the present highway along the northerly side of Stikine from Telegraph Creek to Dease Lake, as it is steep and climbs high above the Stikine Canyon.

Also following, as it more or less would, the route of the old Yukon Telegraph trail, it crosses minor summits which are avoided on route (1). It would cross Raspberry Pass, elevation 4,800 feet, whereas there appears no reason why route (1) should rise much higher than 3,000 feet with easy grades throughout.

From the resources viewpoint, 1B is equally good with (1). Conditions, therefore, to compare are:

No. 1. Distance. Route 1B is some 110 miles longer.

No 2. Character of Country. 1B will cross higher summits and will I think encounter probably more rock work though this is not excessive.

No 3. Resources. Mining. Both routes will traverse a country with great potential lode and placer mining possibilities, both tap a country with good areas in places, of agricultural and grazing lands and they are about

equal as far as timber resources are concerned, as also from a scenic and tourist and sportsman's viewpoint.

Route 1A is a minor variation from Route 1, designed to follow the Skeena valley in order to avoid elevation, and is equally good as 1 but some 40 miles longer.

Route 1C is a variation of 1B to avoid Telegraph Creek and higher elevation along Telegraph Trail, and designed to go via Kinaskan Lake. It is longer than Route 1 but should be investigated. Comparing with (1):

1. Distance. About 40 miles longer. (2) Character of Country. Compares favourably with (1) and on survey may prove the better, but there are no undue obstacles, heavy rock work, bad summits, etc. to encounter, and climatically compares very favourably with route 1. (3) Resources. Route 1C will tap a country equally rich in mining and agricultural wealth in my opinion, and one which compares favourably and equally with others from the sportsman's or tourist's angle.

All of the above, however, before any decision as to route is made, should be covered at least by a reconnaissance survey.

Route 2. Fort St James - Omineca. Following existing highway westerly to Vanderhoof thence northerly via present highway to Fort St James at end of Stuart lake, thence northerly to Manson Creek along the present partly built roadway. As far as this or at least as Stuart Lake, this route has much to recommend it. It traverses a good country, the precipitation is light (average 15.52 inches with average snowfall 53 inches at Fort St James). From thence northwesterly I think anyone who is acquainted with the Liard river area will agree that this is to be avoided, and that the route via Fort St James and Omineca should also, as the others, head more or less for the Dease Lake country. Our highway then, via Manson Creek and Germansen should follow up the Omineca more or less to its headwaters, along part of the Sustut river to Dease lake. This route would traverse country comparatively

easy from a construction standpoint, though, I submit the precipitation and snowfall will be found heavier than farther west. It will tap a country known to be rich in placer fields and with good possibilities for mining generally. From the scenic, tourist and sportsman's viewpoint its resources are doubtless unsurpassed. So, to compare as before from our four viewpoints:

(1) Distance. This is one of the shortest routes. Approximately 1178 miles from United States boundary to Dease Lake, practically the same as route (1).

(2) Character of Country from construction angle. The country is generally gravelly bench and plateau or open valley. But little rock work should, or need, be encountered and there should be no expensive or difficult bridging problems.

(3) Commercial and Resources. From the mining viewpoint, this route traverses probably one of the most important potential gold placer areas in British Columbia. From the lode mining angle, I do not think this route will be as useful as the westerly route via Hazelton. It is farther away from the Eastern Contact of the Coast Batholith.

Agriculturally, there are many areas of good agricultural lands, but I think it will be found that along this route the seasons are shorter, the country more subject to summer frosts, and therefore not so suitable for crops, though there are many good areas of grazing lands where stock will thrive. There will be found a good many areas of quite good timber, though I do not think as good as the westerly route, while from the scenic and sporting viewpoint it is, I am sure, unexcelled.

(4) Maintenance. Climate. As already stated it will, I think, be found that the average elevation of this route is higher than the more westerly ones, the precipitation will average more, and snowfall considerably so, while the winters are longer farther east and spring breakup later. Compare, for instance, further south, Barkerville with Quesnel.

Route 2A. Alternative via Fort St James - Manson Creek. As has been frequently suggested, to go down, not up, the Omineca to the Finlay River

valley, leaving the Finlay valley at the Ingenica, up the Ingenica to McConnell creek to headwaters Stikine river and across to joint route 1 south of Stikine and thence along Route 1 to Dease lake. To compare:

(1) Distance. This route is approximately 100 miles longer than either route 1 or 2.

(2) Character of Country. From construction viewpoint, it compares I think favourably with the others. No heavy rock work or grades appear necessary, nor bridging problems.

(3) Commercial. This route also will traverse a country rich in placer mining possibilities. Will tap a well-known interesting lode mining area along the Ingenica and farther. Provides also access to some excellent agricultural lands on the Finlay, Ingenica, while from the tourist and sportsman's angle it also is doubtless unexcelled. There is a certain amount of good timber also, although the good stand of timber along the Findlay has been badly injured and much destroyed by fire.

(4) Climatic Conditions. This route will encounter much heavier average precipitation than the westerly route with in many places, very heavy winter snows. It has also a shorter summer and longer winter season also.

The other route so much spoken of via Sifton Pass (headwaters of Finlay river) is not in my opinion to be even considered. It follows the Rocky Mountain trough with its very heavy snow. Has high elevations. Trends too far easterly and leads to the Liard river via its branch, the Kechika river. The whole route will be too far east. The country in the vicinity of Liard more rocky and mountainous, making for very expensive construction, while the heavy snowfall and long winters will make maintenance for any length of time almost prohibitive.

I do believe, however, that before any final decision is made, or any actual ground surveys commenced, that an aerial and photographic survey of all possible routes with ground control parties for each aerial should be made, with particularly attention to obtain all possible detail on routes (1) and (2) and their variations. This work whether finally along the route

adopted for the highway or not is well worth while, since the information obtained will be of great value both from a mining and general resource survey standpoint. This work could, at comparatively small cost, be readily completed this year with proper organization, giving opportunity during the winter to make a detailed study and general decision as to the best route; which would facilitate an actual start of detailed location and construction early in 1940.

In closing this memorandum I think I should call attention to one quite important consideration in connection with the construction and maintenance of the proposed highway, that is, convenience at the present time to transportation for supplies, machinery, etc. required. The Hazelton or westerly route undoubtedly is superior here: Access at its (unconstructed) southerly end by both rail and highway at Hazelton. Again in summer months by boat by way of Stikine River to Telegraph Creek - Dease Lake, and again farther north via White Pass and Yukon Railway to the Yukon at Lake Bennet and the Atlin Lake country. It must be admitted that these three points of attack will prove a real factor in cutting construction cost; also, after construction, access to the northwesterly-southeasterly Mexico to Alaska trunk road (of which the Alaska highway is an important link) from coastal cities, ports and points is much to be desired.

The easterly route is too far away for this, at least for many years. The last point is of the very greatest importance from the commercial viewpoint as anyone must readily see and admit, and should therefore be given careful consideration before deciding on the adoption of any route farther easterly than necessary.

I therefore maintain that the westerly or Hazelton route No (1) is:

- (1) The only one practical to serve coastal connection either in British Columbia, Yukon or Alaska.
- (2) It will traverse a country which is the best settled and needs such a road most urgently and with best reason.
- (3) It provides all-Canadian communication just behind the Coast range and

and would avoid the necessity of crossing the Alaskan Panhandle.

- 4) Access to coast readily provided, in addition to existing access at Prince Rupert, at Stewart, B.C., and Hyder, Alaska, at Wrangell, Juneau and Skagway.
- 5) Follows more existing highway which only requires improving.
- 6) Obvious advantages of ready coast communications in wartime, having the dual advantage of protection from the coast by the Coast range and at the same time, ready communication to coastal points.
- 7) Can on account of more favourable climate, be kept open in spring.
- 8) For visitors and tourists, as well as business men who want access to the northern interior or to interior Yukon or Alaska, access at different coastal points would avoid the long drive to Prince George or Hazelton.

This memorandum is respectfully submitted with the wish, in which I am sure most people who know the country concur, that unless some very much more cogent reason than heretofore set out is given for adopting the easterly route or routes, that the proposed highway will follow the westerly route, which has all the advantages of the easterly and none of its disadvantages, and will without doubt be the cheapest and quickest to construct, as well as providing the lowest maintenance cost.

Respectfully submitted

(Signed) NOEL HUMPHRYS

Vancouver, British Columbia,

May 3rd, 1939.

Note: The map referred to in the above memorandum is filed with the records of the British Columbia - Yukon - Alaska Highway Commission.

Yukon Section of Highway

In the first part of my memorandum re the proposed British Columbia - Alaska Highway, I have confined my remarks to the section from the international boundary to Dease Lake, British Columbia. There is not, I think, much argument nor controversy as to the balance of the route to connect with existing United States road system in Alaska interior.

There is no difficulty from Dease Lake on to Atlin Lake, the country generally being fairly open with rolling hills and quite wide valleys, with good terrain for road construction and no obstacles which cannot be readily avoided. This section of the highway as is quite well known will traverse a country rich in gold placer potentialities as well as lode mining. It appears evident that probably the shortest and most useful route will be from Dease Lake to Teslin Lake and thence westerly to Atlin Lake, with a considerable local choice of good routes. From the Atlin Lake district the road would continue on northerly to Carcross, to Whitehorse and to Dawson and from there northwesterly to join the Fairbanks road south from Fairbanks. The distance from Dease Lake to Fairbanks will be upwards of 1000 miles. It would be shorter not to cross westerly from Teslin to Atlin Lake, but to follow up the Houtalinqua (Teslin) river. The other route via Atlin, however, would traverse the Whitehorse-Dawson road and some construction cost would be saved here.

In any event the Yukon section of the highway presents no difficulties and will, generally speaking, be cheaper construction than will the British Columbia section though maintenance costs will be just as great or greater on account of course of the longer winters in the north.

I think that it would be advisable to follow the Teslin Lake and Teslin river route to Carmacks as this will serve a more useful purpose, and the Atlin Lake route is already served to some extent by the existing road, to which the other would be connected in any event.

Total Length of Highway, International Boundary to
Fairbanks, Alaska, via Hazelton, Dease Lake, Teslin
Lake and River, etc.

(Approximate distances)

<u>Section</u>	<u>Existing Road</u>	<u>To Build</u>	<u>Total</u>
United States boundary to Dease Lake, British Columbia	855	310	1,165
Dease Lake to Fairbanks, via Teslin Lake and River	150 (approximate)	870	1,020
<u>T o t a l s</u>	1,005	1,180	2,155 miles

Bearing in mind of course that a very great part of the existing highway requires regrading and surfacing, in many places complete revision might be advisable.

Respectfully submitted.

(Signed) NOEL HUMPHRYS

Vancouver, British Columbia

May 16th, 1939.

MEMORANDUM ON ROUTE "B"

By F.C.Green,
Surveyor-General of British Columbia

The following notes are offered as a contribution toward future discussions of this project, and they deal only with suggested Route "B" - the Rocky Mountain trench route.

The distance following river valleys from Finlay Forks to Pelly Crossing is about 827 miles, and is about equally divided between British Columbia and Yukon.

We have contour maps from Summit Lake to Finlay Forks, secured during the Pacific Great Eastern Railway Resources survey of 1929, and from these maps and from other information, it can be said with certainty that the route via Crooked, Pack and Parsnip rivers to Finlay Forks is feasible and of light construction, and has a maximum altitude of 2,500 feet at Summit Lake.

On the suggested route to Finlay Forks, via Fort St James, Gaffney Creek and Manson Creek, information is less complete, but it is no doubt feasible, and has a maximum elevation of about 3,800 feet at the head of Gaffney Creek.

From Finlay Forks northerly along Finlay river valley, the Surveys Branch (British Columbia) has a triangulation net to a point north of the mouth of the Ingenica river, but has only sketch topography, while from Ingenica northward through Sifton Pass, down the Kechika river, up the Liard river and its tributaries and down the Pelly river, no surveys have been made and we are dependent for information on sketch maps by Swannell to Whitewater, Inspector Moodie (waggon road to Klondike, 1898), Hart and Dr Dawson, these together covering the entire route but only in a very general manner.

Aerial photography and the topographical mapping of a strip would seem to offer the most speedy, certain and cheapest way to guard against costly

errors in location, and would greatly reduce the cost to the Public Works Department of the final location survey. The Surveys Branch of the Department of Lands is best equipped to carry on triangulation and topographic mapping, and the engineers of the Public Works Department to make the actual location.

Aerial photography without triangulation and topographic control loses most of its value, as in itself it offers no satisfactory way of getting elevations or the true scale of the photographs, and for best results the topographers should have air photos with them. The aerial photography and main triangulation should preferably be carried out one season in advance of topography.

Along the valleys of the Finlay, Fox and Kechika rivers it would be advisable to photograph a strip ten miles wide, taking in five miles on each side of the river channels, and on approaching the main Liard river, a wider area south of the river might be necessary. The 412 miles between Finlay Forks and the point where the Liard crosses the 60th parallel would, according to the above, require about 5,000 square miles of aerial photography. Photography from altitude 15,000 feet with six inch cone would, for the average valley altitude of 2,500 feet, give photographs at the scale $1/25,000$, this being about 2,100 feet, or 32 chains to the inch. Photographs would require a sixty per cent overlap fore and aft, and a twenty per cent lateral overlap, for use in the stereoscope. Photography such as the above, covering 5,000 square miles, could be contracted for at about \$16,000, whereas by day work it might cost much less or more, depending on the frequency of perfectly cloudless and smokeless days.

The Surveys Branch (British Columbia) has no appropriation to cover aerial photography, but if air photographs could be secured, two triangulation and six photo-topographical survey parties could, in two seasons, produce a map on a scale of one-half mile to the inch, showing

one hundred foot contours, and covering a ten mile strip following the rivers from Finlay Forks to the 60th parallel. To accomplish this it would be necessary to add \$20,000 per annum to the present surveys vote, or a total increase of \$40,000 for the two years. The resulting topographic map would be of high quality and of permanent value for general purposes.

(Signed) F.C.Green

Surveyor General

Victoria,

British Columbia,

April 26, 1939

MEMORANDUM RE FOREST CONDITIONS ON ROUTE OF ALASKA HIGHWAY

By W.E.D. Halliday
 Dominion Forest Service
 Department of Mines and Resources
 Ottawa

Proposed routes for the British Columbia to Alaska highway pass through portions of three forest regions. The general forest conditions of areas tributary to the two proposed routes are as follows:

Route "A" Hazelton to Dawson City via Kispiox, Skeena and Stikine rivers, Teslin and Atlin lake areas, and Lewes river.

British Columbia

1. Hazelton-Kispiox-Skeena rivers. This division falls within the western portion of the transition section of the Montane forest region. The forests consist mainly of Engelmann spruce, with intrusion of two coast forest species, western hemlock and western red cedar. The former species occurs on specialized sites, usually about 2000 feet elevation, and the latter on the upper benches of the rivers in small quantities suitable for poles.

Alpine fir increases in abundance towards timber line and black cottonwood is noticeable along the flood plains of the rivers. As the result of heavy burns there are some areas of lodgepole pine, and poplar mixed with spruce; and white spruce has been reported from the district.

The Kispiox valley is of rather an open nature, with large meadow areas, and is of fair agricultural value.

2. Upper Skeena river The forests of this valley come within the sub-Alpine forest region. Engelmann spruce and alpine fir are the principal species, with the fir increasing in abundance at higher elevations. Lodgepole pine follows burn, and there is some black cottonwood along the river banks.

In the northern parts of the valley timber conditions deteriorate and stands become patchy. About seventy-four per cent of the area is made up of non-

productive barrens or alpine scrub.

3. Stikine-Tuya rivers North of the divide the Stikine plateau section of the Boreal forest region is encountered, and which is characterized by a dry climate.

This plateau is sparsely forested, with a cover of white spruce, lodgepole pine, aspen, and white birch. The trees are often of a stunted nature. In addition, black cottonwood is found along the banks of the rivers.

There has been considerable burning of the forest with a consequent second growth of willow, aspen, lodgepole pine, and scattered spruce. Alpine fir occurs more especially towards the headwaters of the rivers, and around the timber-line.

The upper slopes of the valleys and the plateau in general show grassy alpine conditions, and it is estimated that over 80 per cent of the area is above the line of merchantable timber.

British Columbia - Yukon Territory

4. Atlin - Teslin lake areas - Lewis river - Pelly Crossing - Dawson

This portion of the route comes within the Yukon section of the Boreal forest region. The climate is dry and cool.

The southern parts are rather flat in nature, with a scattered growth of white and black spruce, the latter mostly on swampy ground. The trees are generally scrubby in size but individuals may reach fair proportions. Patches of lodgepole pine occur and there is some scrubby black cottonwood along the rivers.

The northern parts are more irregular in nature, but with much the same growth of timber. Grassy areas are common for the whole area and are reported to be characteristic of south and west facing slopes. North and east facing slopes, however, are usually well timbered. Alpine fir appears to be scarce in or absent from the country contiguous to the route.

Estimates

Recent estimates for merchantable timber are available only for a small portion of the route. There are none for the Yukon Territory, and those for the Stikine drainage basin include portions of the Coast forest region in the lower reaches of this basin and which could not properly be considered tributary to the route. Species found here are western hemlock and Sitka spruce. It must be clearly understood that estimates given are of a very general nature.

British Columbia

<u>Drainage Basin</u>	<u>Merchant-able acreage</u>	<u>Western hemlock</u>	<u>Thousand Spruce</u>	<u>Fir</u>	<u>Board Feet Lodgepole Pine</u>	<u>Total</u>
Upper Skeena and Kispiox ¹	474,200	1,650,200	1,145,100	1,566,100	254,300	4,595,700
Stikine-Unuk ²	707,840	1,189,440	1,058,720	384,640	99,840	2,612,640
Atlin ²	96,000	-	134,400	19,200	38,400	192,000
	1,278,040	2,819,640	2,318,220	1,869,940	392,540	7,400,340

- Notes: 1. The Forest Resources of British Columbia. F.D.Mulholland, 1937.
 2. Forests of British Columbia, H.N.Whitford and R.D.Craig. Commission of Conservation (Ottawa), 1918.

Route "B" Prince George to Dawson City via Salmon, Parsnip, Finlay, Kachika, Liard, Frances and Pelly rivers

British Columbia

1. Prince George - Salmon river. This country comes within the Transition section of the Montane forest region.

The principal forest type is a mixture of spruce and alpine fir with, at lower elevations, Douglas fir. The latter species appears to have been more abundant at one time, and small areas in a nearly pure state may be found. The spruce has usually been considered to be Engelmann spruce, but recent investigation indicates that in the lower altitude forests a large proportion may be white spruce.

As the result of fire, large areas are occupied by lodgepole pine. On patches of heavier soil this species is replaced by poplar.

2. Parsnip river This well-timbered drainage basin is usually considered as part of the sub-Alpine forest region, but more detailed information may show portions to belong more properly to either the Montane transition section above, or to the Boreal forest region.

Engelmann spruce and alpine fir form the principal forest type, with the fir increasing in abundance toward timber-line. Fires have replaced considerable areas of this type by one of lodgepole pine. There is a small quantity of Douglas fir on very warm sites, mixed with the spruce, or in small pure stands. Investigation may also show white spruce to be of some importance in the river valleys.

Of the total area, thirty-nine per cent is considered to be non-productive. This figure covers barrens, scrub, swamp and water.

3. Finlay river. Like the last unit, this basin has been considered as within the sub-Alpine forest region, but recent information indicates that at least the northern half is properly within the Boreal forest region.

Over half the area is classed as above merchantable timber-line, and eighty-four per cent of the total area is considered as unproductive.

Much of the forest has been burnt so that lodgepole pine now covers considerable ground. Engelmann spruce and alpine fir types are present the latter species forming the main sub-Alpine type at higher elevations. Over a great deal of the valley, however, the Boreal white spruce is the characteristic tree, together with aspen, balsam poplar and black spruce.

4. Kachika - Liard rivers This division comes within the Boreal forest proper and constitutes the Upper Liard section.

Like the preceding unit, over half the area is above merchantable timber-line.

The dominant species is white spruce, mixed with alpine fir more especially as the tree-line is reached. Lodgepole pine follows burning, and tamarack and black spruce occur on swamp lands. Aspen, balsam poplar, and white birch, are present, often in some quantity but reported to be of poor quality, and there is said to be a large amount of "fire made" prairie.

Yukon Territory

5. Frances river This unit also comes within the Upper Liard section of the Boreal forest region. The main valley is reported to be well wooded though much burnt.

White spruce is the characteristic species and reaches diameters of 24 inches. Alpine fir mixes with it in places and becomes prominent towards timber-line. White birch and balsam poplar are both present, black spruce and tamarack grow on swampy ground, and lodgepole pine follows burn.

6. Pelly river - Dawson The route now comes within the Yukon section of the Boreal forest region, where climatic conditions are drier than in the previous units. The river valleys are wide and, although forested, there is usually considerable difference in character between the south and south-west facing slopes and those opposite them. On the former, tree cover is sparse and grassy areas general; on the latter, forests are relatively well developed.

White spruce and black spruce are the most abundant trees. The former may reach to 24 inches in diameter but with reduced height growth. On the

average the timber is small. Aspen, balsam poplar and white birch mix with the white spruce and form small groves; lodgepole pine occurs on gravelly terraces, and black spruce in swampy areas. Tamarack has a scattered representation but is mostly found in the upper Pelly drainage, while alpine fir becomes dominant towards tree-line but does not seem to occur much farther west than the junction of the Pelly and Macmillan rivers.

Estimates

Recent merchantable timber estimates are available for territory adjacent to the route in British Columbia. No estimates are obtainable for the Yukon Territory. In respect to the Finlay Forks - Hudson Hope drainage basin, over half this area can not be considered as tributary to the route.

<u>Drainage Basin</u>	<u>Merchant-able acreage</u>	<u>Douglas Fir</u> (Thousand Board feet - log scale)	<u>Spruce</u> (Thousand Board feet - log scale)	<u>Fir</u> (Thousand Board feet - log scale)	<u>Lodgepole Pine</u> (Thousand Board feet - log scale)	<u>Total</u>
Salmon river	116,600	35,800	396,800	55,400	208,300	696,300
Parsnip river	587,100	108,200	2,874,000	941,400	399,900	4,323,500
Finlay Forks - Hudson Hope	321,700	-	1,713,400	474,900	321,400	2,509,700
Omenica river	42,400	-	95,500	69,600	43,000	218,100
Finlay river	176,500	-	831,200	191,800	66,200	1,089,200
	1,244,300	144,000	5,910,900	1,733,100	1,038,800	8,826,800

(Signed) W.E.D. Halliday

November 14th, 1939

Note:

A map accompanying Mr Halliday's Memorandum is filed with the records of the British Columbia - Yukon - Alaska Highway Commission.

FOREST LAND CLASSIFICATION (IN SQUARE MILES)

D B Area No.	Drainage	Capable of Producing Commercial Timber				Total Pro- ductive Area	Per Cent of Total Area	Incapable of Producing Commercial Timber	Per Cent of Total Area	Total Area
		Merchantable	Immature	Not Satis- factorily Stocked						
A 1.	Upper Skeena River	741	103	310	1,154	18	5,086	82	6,240	
2.	Upper Stikine River	239	1,557		1,796	15	10,178	85	11,974	
3.	Atlin Region	150	431		581	6	8,752	94	9,333	
Total		1,130	2,401		3,531	13	24,016	87	27,547	

Estimates for drainage basins 2 and 3 taken from
Commission of Conservation Report - Dated 1917.

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MERCHANTABLE TIMBER (IN THOUSAND BOARD FEET)

D B Area No.	Drainage	Merchantable Acres	Species				Total
			Hemlock	Spruce	Balsam	Lodgepole Pine	
A 1.	Upper Skeena River	474,000	1,630,000	1,145,000	1,566,000	255,000	4,596,000
2.	Upper Stikine River	153,000	--	383,000	230,000	152,000	765,000
3.	Atlin Region	96,000	--	135,000	19,000	38,000	192,000
Total		723,000	1,630,000	1,663,000	1,815,000	445,000	5,553,000

Note: Cedar suitable for poles has not been quoted in the above estimates. Small volumes of this species occurs on the Upper Skeena Drainage in the vicinity of Hazelton. Large black Cottonwood are found along all main water courses.

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Estimates for drainage basins 2 and 3 taken from Commission of Conservation Report - dated 1917.

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FOREST LAND CLASSIFICATION (IN SQUARE MILES)

D B Area No.	Drainage	Capable of Producing Commercial Timber				Total Pro- ductive	Per Cent of Total Area	Incapable of Producing Commercial Timber	Per Cent of Total Area	Total Area
		Merchantable	Immature	Not Satis- factorily Stocked						
B 1.	Parsnip River	988	2,026	1,967	5,001	51	4,716	49	9,717	
2.	Omineca River	66	453	303	822	20	3,344	80	4,166	
3.	Finlay River	277	611	776	1,664	14	10,195	86	11,859	
4.	Dease, Kachika River	46	4,294		4,340	24	13,654	76	17,994	
TOTAL		1,377	10,450		11,827	27	31,909	73	43,736	

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Estimates for drainage basin 4 taken from
Commission of Conservation Report-dated 1917.

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MERCHANTABLE TIMBER (IN THOUSAND BOARD FEET)

D B Area No.	Drainage	Merchantable Acres	Species				Total
			Fir	Spruce	Balsam	Lodgepole Pine	
B 1.	Parsnip River	633,000	108,000	3,079,000	990,000	429,000	4,606,000
2.	Omineca River	42,000	--	95,000	70,000	43,000	208,000
3.	Finlay River	177,000	--	831,000	192,000	66,000	1,089,000
4.	Dease, Kachika River	29,000	--	58,000	15,000	72,000	145,000
TOTAL		881,000	108,000	4,063,000	1,267,000	610,000	6,048,000

Note: In addition to the above estimates, there is reported to be 144,000 M.B.M. of black cottonwood on the Parsnip and Finlay River drainages. The estimate for this species, which occurs along the main water courses, should be considered low.

Estimates for drainage basin 4 taken from Commission of Conservation Report-dated 1917

Forest Surveys Division. 5/2/38

FOREST ECONOMICS
DIVISION
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THE UNITED STATES - ALASKA HIGHWAY

A Suggested alternative for the Section between Hazelton and
the Yukon Telegraph Trail

By Marius Barbeau

At the request of the Secretary of the British Columbia - Yukon - Alaska Highway Commission, I have prepared the following statement as to the possibility of building a section of the United States - Alaska highway via Hazelton, on the Skeena river, the Kispiox river, a tributary of the Skeena, northwards to the upper Nass river, following the upper Nass river to the Yukon Telegraph Trail, joining it at a point between the Ninth Cabin and Telegraph Creek.

I find in my notes on the Indian hunting grounds of the Nass and Skeena river tribes, that the Kispiox and the adjacent Nass river territories were all occupied as hunting grounds and trap lines, and that the Indians passed from one river to the other, following a trail.

As the maps for this area are stated by the Indians to be incomplete and incorrect, they give only an approximate idea of the country. I am not sure whether the trail passes from the Kispiox river to the Nass river tributary flowing down from Brown Bear lake, or whether there is only a trail connecting the Kispiox river with the Cranberry river, an important tributary of the Nass. The Kispiox river trail to the Nass, such as it is, was not considered a difficult one by the Indians, except for a log bridge crossing the headwaters of the Kispiox at one point. One of the Indians, whose hunting grounds were at the headwaters of the Kispiox, stated that this was a flat country. There is a waggon road now reaching up, I believe, to the First Cabin.

More precise information was obtained from John Brown, an old Kispiox Indian. Beaver Lake, which is Harey's hunting ground, has an outlet into the Nass. It is not connected with the Kispiox river, but the headwaters of the Kispiox come close to it. It is all level ground there. Harey's hunting grounds are about fifteen miles square.

Some time late this autumn, I had an opportunity to revisit Hazelton and to have long conversations with Mr R.S.Sargent, the Hazelton merchant, who is an old timer. He came there for the Hudson's Bay Company in 1891 and is a man whose opinions I consider dependable. When I told him that one of the officials investigating the matter last summer was inclined to consider the opinion of Mr Beirnes as too partial to his own plan, he came out emphatically with his own views, which seem to me to be correct.

The point is that it has been known for many years in the country that the path followed by the Yukon Telegraph trail over to the headwaters of the Skeena had not been wisely selected in the first place, and that there have been many suggestions since that it should be changed to that of the Kispiox Trail to the Nass. The well-known fault of the Telegraph Trail and Kispiox over Poison Mountain and the Skeena is that it goes over mountains 5,000 feet high and through a country where the snow is deep in the winter and the climate very cold. 11

The advantage of the Nass river trail is that it keeps to the lower grounds, that there is no more snow there than, say, at Hazelton, that the climate is no more severe, and that it travels into easier country. From my own sources with the Indians and many accounts and tales of big game hunters and Indians, I am inclined to think that this view should carry weight. Besides, the highway would go through a territory which might be developed after it was made accessible - the upper Nass, Lake Medziaden, which is now the best sockeye spawning lake in the district.

As I spent the winter of 1921 at Hazelton, I had an opportunity to realize that the climate is much milder than ours here (Ottawa); and at no time was there more than about twelve inches of snow. The road from Hazelton to Kispiox was easy to travel, as there were no noticeable snowdrifts.

Last autumn I had an opportunity to travel in a motor car with two friends from Hazelton to Prince George, down the Fraser through Ashcroft, down the canyons of the Thompson and Fraser rivers to Vancouver. I may

say that the road we followed has been improved tremendously since 1926, when it was travelled in a motor car by Mr Sargent and some others. Now there is a very decent highway which we travelled at fifty to sixty miles an hour. The only difficulty was that some sections of it near Burns Lake were of gumbo. There had been rain and one had to be careful. Below Prince George, and particularly Quesnel, the road is heavily travelled, and many large dray-wagons are often encountered. While the road along the canyons of the Thompson and the Fraser is spectacular, it is perched so high on the face of the cliffs, and so long (nearly sixty miles), that it is bound to remain rather difficult and narrow, and it cannot easily be widened in places. A more important road would be down from Ashcroft, through the Okanagan, to the United States.

When travelling along the Cariboo road I heard Mr Lanning, a commercial traveller for a Vancouver biscuit company, say that he is in the habit of travelling in a motor car in the winter along the Cariboo road, as many others do; that there is not much snow there and that the road is kept open. The only inconvenience in case of accident, is that it is cold and one may have to travel on foot a good long way before getting relief.

Note: A map accompanying Mr Barbeau's Memorandum is filed with the records of the British Columbia - Yukon - Alaska Highway Commission.