



Frontier to Freeway

A short illustrated
history of the roads
in British Columbia



BRITISH
COLUMBIA

Ministry of Transportation
and Highways

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View on Cariboo Road, a few miles north of Yale, B.C., c 1867.

Frontier to Freeway

A History of Highways in British Columbia

Travel in British Columbia in the early days was a story of people with a purpose, pushing through heavy forest, climbing sheer canyon walls and finding hidden passages through seemingly impassable mountain ranges. Fighting cold, loneliness, bleak wilderness and even one another, they blazed hard won paths to reach gold fields and fertile valleys.

In most of the province, the original trail builders were members of British Columbia's First Nations, whose people used these routes for millennia. They were followed by explorers and fur traders from the Hudson's Bay Company and the North West Fur Trading Company. Then came the Gold Rush of the mid-1800s. The mad dash for riches made road building such an urgent necessity that many difficult natural obstacles were overcome.

The trails blazed then were the forerunners of today's highways, which span the wide interior plains of British Columbia, climb the mountains and skirt the inland waterways.

One of the most famous of these early roads was the Cariboo Highway, which was built by the Royal Engineers in 1862-63. Today, this route still follows the same path that 20-mule teams drove over more than 100 years ago.

Historian Judge Howay described the Cariboo Highway this way:

"Reaching from Yale, the head of navigation, to the mines of the Cariboo, a distance of nearly 400 miles, and solidly and substantially constructed by our infant colony in less than three years, this road was the pride of British Columbia, and a source of wonder and admiration to its visitors, who were loud in their expressions of surprise at the daring conception and skillful execution of the work...."



BC Archives Photo #H-07229

This picture, taken in 1914, shows the Cariboo Road in the Fraser Canyon.

Building British Columbia's Road System

The development of British Columbia's road system can be traced through seven phases. The seven development phases overlapped in time, but each was distinct and a response to different social factors and challenges.

PHASE I: First Nations Trails

The perception of the early aboriginal peoples picking berries or sitting by a stream waiting for salmon is a fallacy. The fact is, life for the Neolithic food gatherers of North America was full of toil and their social system and culture were extremely sophisticated. Trade was a crucial part of their life because not all their needs could be satisfied locally. For instance, the Interior First Nations peoples had to get their salt from the coast while obsidian for arrowheads and spearheads came from Mount Waddington. Successful trade meant they needed to build trails.

Many of the trails built by First Nations over the centuries included structures to overcome the obstacles presented by British Columbia's challenging terrain. Sometimes



BC Archives Photo # A-96048

The first Hagwilget Bridge (1872) was built by the Hagwilget Indians using wooden poles tied together with cedar bark.

this involved something as simple as a log felled to cross a creek. Other times, more complex timber structures, such as stairways and dry bridges, were needed.

The most elaborate structure on record was built in the 19th century. This was the famed Hagwilget Bridge over the Bulkley River at Hazelton in northern British

Columbia. This bridge, constructed of wooden poles tied together by telegraph wire, supported a 1.8-m (6 foot) wide pathway across a span of 45.7 m (150 feet), joining cliffs some 30.5 m (100 feet) above the river. For nearly 50 years, this bridge carried a stream of hunters, prospectors, traders, explorers, and settlers across the deep canyon.

The bridge was partly made possible by an abandoned project. An engineer named Colonel Bulkley was commissioned to build an overland telegraph line to Europe via the United States, British Columbia, the Aleutians and Siberia. The venture was given up with the laying of the first Atlantic cable. The miles of telegraph wire meant for the ill-fated line were dumped and abandoned in the Hazelton area. It was this wire the Indians of Hagwilget used to tie the poles together when they built the famous bridge.

PHASE 2: Fur Trails

The second phase in the development of British Columbia's road system began with the arrival of the land-based fur traders in 1805. Traders used the fur trails, sometimes known as 'brigade' trails, to bring in supplies and pack out furs west to the sea or east to the Northwest Territories. Some of these trails were existing paths created by aboriginal peoples; others were new paths following routes seldom used by First Nations. Water routes also played a part in these fur trails. On land, the fur traders cleared trees and brush but did little bridge construction.



Second phase of the Hagwilget Bridge (1890s), reinforced with wooden poles and abandoned telegraph cable.

BC Archives Photo # A-00783

PHASE 3: Gold Trails

Settlement in British Columbia was sparse until the 1840s. Europeans had visited the coast regularly since Captain Cook's arrival in 1778 and there had been intermittent settlement at Nootka since 1788, but it wasn't until 1805 that land-based traders first began to settle permanently at Fort Nelson and Fort McLeod.

The Hudson's Bay Company administered government until 1850, when Richard Blanshard was appointed governor. He soon found the traditional authority of the Hudson's Bay Company was stronger than his own as governor, and he left the colony a year later. He was succeeded by a new governor, James Douglas, who was a veteran employee of the Hudson's Bay Company.

Early expenditures for transportation were on trails and roads in the vicinity of



Pack trail bridge in northeastern B.C. in the 1920s.

BC Archives Photo #C-08818

Victoria, largely to serve the farming settlement. The mainland was still primarily fur country but mining was also starting to become important. By this time, coal was being mined at Nanaimo and the Thompson River Indians were mining small quantities of gold. Word that gold was being found in the area soon spread, and by 1857 miners began pouring into the Fraser Canyon country.

The loss of the Columbia River country was a hard lesson. Governor Douglas concluded that positive steps were needed to preserve the mainland for the British Crown. One such step was to develop adequate trails north of the 49th parallel to provide greater accessibility to the mining areas than American routes did. The first such trails were constructed between 1858 and 1861, from Spuzzum to Yale (the head of navigation on the Fraser), Hope to Similkameen (towards the Rock Creek goldfields) and Harrison to Lillooet (to access the Cariboo and Thompson River).



BC Archives Photo # B-02518

Edgar Dewdney (left) was a major road builder in the Colony of British Columbia. In 1872, he was elected to the House of Commons from the Yale riding. In 1879, he became the Indian Commissioner for the Northwest Territories; he was appointed Lieutenant-Governor and Commissioner of the Territories in 1881; and from 1888 to 1892 he was the Dominion representative for East Assiniboia (Manitoba). After serving as Lieutenant-Governor of British Columbia from 1892 to 1897, he worked as a mining broker in Victoria until his death.



BC Archives Photo # A-1724

Richard Clement Moody was the first Chief Commissioner of Lands and Works in the Colony of British Columbia, and served as Lieutenant-Governor from 1858 to 1863. He was also a colonel in the Royal Engineers. Following his service in British Columbia, he returned to England and was promoted to the rank of major general in 1866. He died on March 31, 1877.

On October 29, 1858, Secretary of State Lytton instructed Colonel Moody “to regard with a military eye the best position for such towns and cities as for the engineering of roads and passes or laying the foundation of any public works ... All that belongs to comprehensive survey and public works must belong to the labour of the Royal Engineers.”

The sappers received a mixed allowance for their work on the Harrison-to-Lillooet road in 1859 – 10 per cent in cash, 10 per cent in rations valued at \$1 per day, 80 per cent in rural land around Queensborough (New Westminster), and free passage from that city to Port Douglas on the northeast end of Harrison Lake.



BC Archives #PDP-03686

The Royal Engineers. 1858 to 1863. The illustration shows a sergeant and two sappers. Dress for the officer was a scarlet tunic with dark blue trousers featuring a scarlet strip along the seams; yellow cord on the shoulder straps, collar and sleeve cuffs; blue collar and cuffs; blue pill-box hat with a yellow band and red piping; and a buff white belt. The sappers wore gray shirts with their uniform.

PHASE 4: Wagon Roads

While the gold trails served their purpose well and played a large part in keeping the mainland British, Governor Douglas soon saw that the high costs involved limited their usefulness in moving freight.

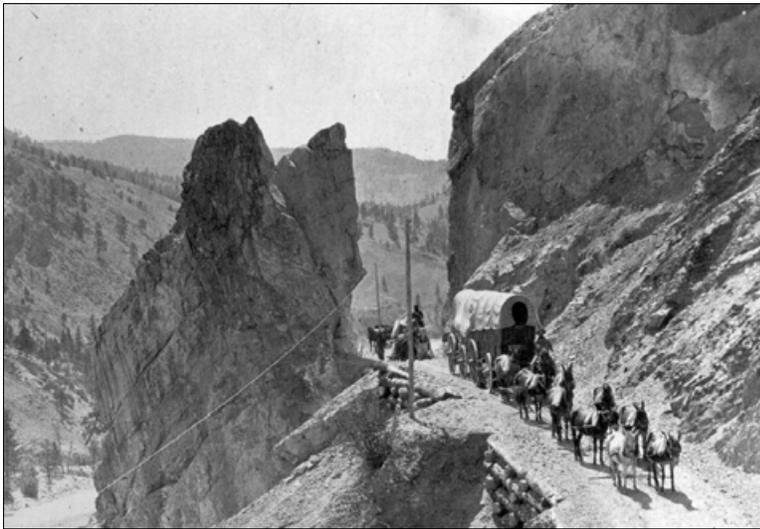
A start was made on improving the land sections of the Harrison-Lillooet Trail to wagon road calibre. However, the route was soon abandoned because freight-handling costs were greatly increased by the trail's four water sections and the short horse-drawn railway at Seton Portage.

Freighting on the Cariboo Road around 1870. The wagon road was built by Royal Engineers and traversed sections of the rugged Fraser and Thompson canyons.



BC Archives Photo # A-09604

The governor's next decision was to develop the Cariboo wagon road from Yale. The work took three years. At 5.5 m (18 feet) wide, the completed road to Barkerville was wide enough for two teams to pass.



Freight wagons at Great Bluff, Thompson River, 88 miles above Yale around 1867.

Other wagon roads followed, notably North Road from New Westminster to Port Moody (built by Royal Engineers), and in 1861 the first 49 km (25 miles) of a road from Hope to Skagit. The latter was the first and last section of a wagon road to the Rock Creek goldfields as the Rock Creek rush petered out and the miners headed for the Cariboo. In

1866, another wagon road was built from Cache Creek to Savona, providing access to the Columbia River goldfields above Revelstoke.

Although the emphasis until about 1870 was on building roads to gold mines, the first wagon road was, in fact, Craigflower Road in Victoria, built in 1854 to connect agricultural areas.

PHASE 5: Trunk Roads

By the time the depression of 1866 hit, it was obvious that furs and gold were not an adequate base for ongoing prosperity. The road work of the previous two decades had responded to specific needs but it hadn't produced the coherent network necessary to support general development, particularly agricultural settlement, in the province.

In 1873, the Province of British Columbia, under Chief Commissioner of Works Robert Beaven, embarked on a new policy to encourage agricultural settlement and logging.

Trunk road development was an essential element of this policy.

After the Cariboo Road, the first



Cariboo Road in the Fraser Canyon, built by the Royal Engineers in the 1860s.

elements built in the trunk system were a road from Savona to Kelowna and another from New Westminster to Hope via Langley and Sumas. Soon after, roads were built from Victoria to Nanaimo, Kamloops to Nicola, O’Keefe to Enderby, and Nicola to Spence’s Bridge.

Because of the tremendous cost involved in building roads to cover the great distances in the province, the trunk network took many decades to come to full fruition. In addition, the good start made on the trunk system slowed in the 1880s when the province was caught up by railway fever. The building of the CPR destroyed portions of the Cariboo Road in the Fraser Canyon, and building of the CNR in the early 1900s destroyed more. As a result, the Fraser Canyon section of the road was not reopened until 1926.



BC Archives Photo #C-07377

Cariboo Road, 1860s.

PHASE 6: Modern Engineered Highways

Building roads in various parts of the province proceeded slowly during the early part of the 20th century and there was no cohesive system. It was impossible to cross the province by road and the only route into the central and northern interior was the Cariboo Road, very much in the same form in the 1920s as it had been in the 1800s.

For British Columbia, as for most parts of North America, the 1920s could be called the real start of the automobile age. In 1920, there were 28,000 motor vehicles registered in British Columbia. By 1925, this had grown to 56,427. The total reached 98,938 in 1930 and stayed at that level until 1935. At that point, automobile buying was further curtailed by the Depression.



BC Archives Photo #A-04691

Construction, Fraser Canyon Highway, 1928.

In the 1930s, a fair amount of hard surface paving was done, but it didn’t keep pace with demand. Many long sections of major routes remained unpaved. Between 1939 and 1945, as vehicle registrations inched up to 135,000, little paving was done. After 1945, increasing prosperity brought an explosive increase in automobile ownership and travel. It was obvious that the standards of much of the trunk system were inadequate to meet the needs of modern automobiles, buses and trucks.

It was not until after the Second World War that any attempt was made to bring the various isolated parts of British Columbia together by road. This started the modern age of highway building to match the phenomenal growth of the province's economy, its population and its motor vehicle registration.



BC Archives Photo #B-04968

Bridges figured significantly in the early wagon roads. The elaborate truss bridge shown above was over the Thompson River. The suspension bridge built in 1863 was the first of three Alexandra Bridges to be built over the Fraser River, about 22.5 km north of Yale. The first bridge (shown below) was replaced in 1926 by a newer suspension bridge. The present steel arch span was completed in 1962.



BC Archives Photo #A-03928

Meanwhile, the number of vehicles continued to climb. In 1950, there were 270,000 vehicles. By 1959, the total rose to 541,363.

In the 1950s and '60s, a major program was launched to upgrade alignment and pave the rural trunk system. The federal government participated financially in the Trans-Canada Highway and some northern roads, but the assistance was small compared with the expenditure covered by the province.



BC Archives #HP-29769

Motoring on the Malahat near Victoria in 1918.



BC Archives Photo #C-03264

(Left) Switchback motor road on the way to Yoho Valley, Yoho National Park, 1920s.



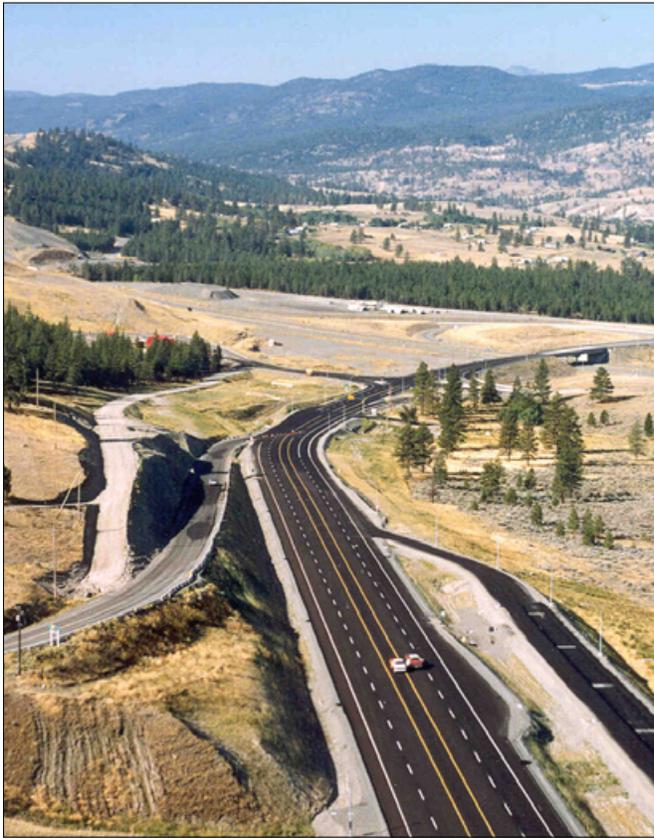
BC Archives Photo #B-01820

(Above) The rock cut between Lytton and Lillooet on the Cariboo Road in the 1920s.

PHASE 7: Multi-lane Highways

By the 1950s, traffic volume began taxing the capacity of the province's two-lane urban road system. The multi-lane building phase began, overlapping with the continuing development of modern highways in less heavily travelled parts of the province.

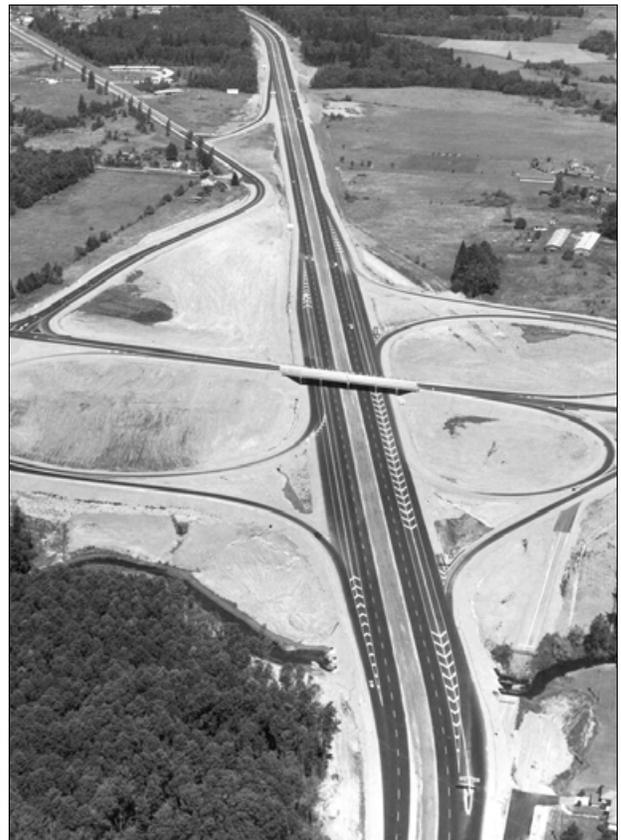
Multi-laning first began in the Vancouver area with the Burnaby and Vancouver/Blaine freeways and associated major structures such as Second Narrows, Port Mann and Oak Street bridges, and the Massey (Fraser River) Tunnel. Other more conventional facilities such as the Lougheed Highway and southwest Marine Drive were also multi-laned. Some cities, especially Vancouver and Victoria, had multi-lane streets for some time.



MoTH Photo

*Okanagan Connector,
just prior to opening in
1990.*

*Vancouver to Blaine Freeway, Campbell River
Road Interchange, Highway 99.*



BC Archives Photo

Appropriation, Taxes and Tolls

Paying for the road system has gone through many changes over the years. The first official appropriation for road building was \$500 in 1854. By 1954, appropriation had risen to \$36 million. By 1984, it was \$570 million, and in 1989 it was more than \$1 billion.

The first appropriation was raised mainly by a tax on liquor, but this was inadequate to cover the heavy expenditures in the wagon road phase and later phases.

Bonded issues and tolls paid for the Cariboo Road. The tolls remained in place for many years. Some of those tolls were collected directly by the contractors building particular sections of the road, as part of the payment for their work.

From 1860 to 1866, statute labour was required even though the original English law had been repealed many years before. Under this system, settlers had to spend six days a year on road work for no pay, or pay the government the financial equivalent. This unpopular measure was repealed in 1866 and replaced with a road tax of \$2 per year from each resident male and non-resident property owner. Arrears were charged at 18 per cent interest.

Tolls were again revived in the 1950s to assist in constructing large, expensive bridges and tunnels but were removed in the 1960s. An exception is the Coquihalla Highway, which has had tolls since its opening in 1986. The money collected goes to the province's general revenue from which, since the 1950s, highways expenditures are drawn.



Coquihalla Toll Booth

Mike Boissennault Photo

The Ferry— a Testament to Ingenuity

Waterways have always been an integral part of British Columbia's road system. In the early days, the cheapest and simplest method of crossing British Columbia's thousands of water barriers was by ferry. Yale had a ferry in 1859, a makeshift barge hauled by hemp cable strung between two trees on opposite banks of the Fraser River. In 1858, a ferry operated farther north across the Fraser, where Alexandra Bridge now stands. Another ferry, this one across the Thompson River, was discontinued when Spence's Bridge was built in 1864.

There were no schedules then. Travellers sometimes had to wait a whole day for the ferryman to return from a hunting trip before they could obtain passage.

The broad mouth of the Fraser River, where the Pattullo Bridge now stands, was originally crossed by a ferry called the K de K, which began operation in 1884. Rates were 25 cents for a person, 50 cents for a person on horseback, and \$1.75 for a wagon and team.

The 'reaction' ferry provided an ingenious method for crossing swifter rivers. A permanent cable running over the river held the vessel against the current while it tacked like a sailboat from bank to bank. Some of these are still in use today in the more remote parts of the province.

Accidental destruction of one of the reaction ferries at Big Bar, 40 miles north of Lillooet, led to the first aerial ferry. A Cariboo rancher named Shorty Schrader hooked a sort of bosun's chair to the still intact cable and pulled himself across with his arms. This ferry was used for two years and may have led to the design of the famous North Bend aerial ferry, which operated from 1940 until 1986 when it was replaced by a bridge. The North Bend aerial



BC Archives Photo #H-26309

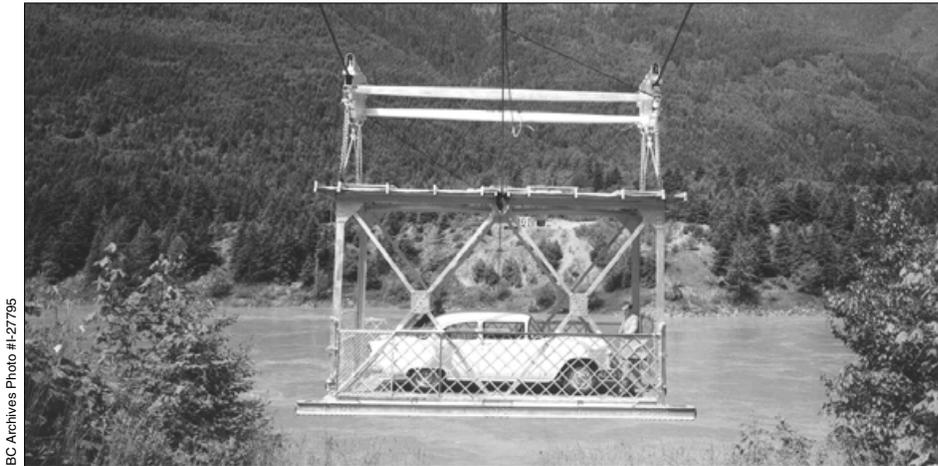


BC Archives Photo #E-04410

(Above) This tug and barge ferry operated on Francois Lake between 1914 and 1920.

Big Bar reaction ferry on the Fraser River in 1920. Over the years, the basic design of this type of ferry has not changed. In 2001 there were still six in use throughout the province.

ferry's cable car ran 25 m above the river on two 4.4-cm steel cables. Although its capacity was just one car, or 40 passengers, in 1984 it carried an amazing 96,271 vehicles between Boston Bar and North Bend.



BC Archives Photo #I-27795

The famed North Bend aerial ferry over the Fraser River joined the communities of Boston Bar and North Bend, about 64 km east of Hope on Highway 1. In its 45 years of operation, it carried 2,037,579 vehicles, 6,092,434 people and made 1,610,789 round trips.

The first ferry across Okanagan Lake, running from Kelowna to Westbank (where a new floating bridge was built in 1958), was a scow propelled by oars and capable of carrying three heavy horses or five packhorses.

Many famous old sternwheelers, similar to the southern United States' renowned Mississippi River boats, sailed in British Columbia's lakes. One such vessel now serves as a landlocked historical marker and restaurant in Penticton, while another is in Kaslo.

In 2000, the ministry commissioned a new ferry, the M.V. Osprey 2000. This 80-car, 250-passenger ferry travels Kootenay Lake between Balfour and Kootenay Bay.



McTH Photo

M.V. Osprey, commissioned in 2000.

Some elements that were designed into this vessel include a low-wake hull to reduce waves, a dual fuel (natural gas/diesel) system which reduces harmful emission levels and will extend the life of the engines, and an environmentally friendly marine sanitation device called the Owens Kleen Tank System. The system provides a high level of secondary treatment and, to avoid the use of chemicals, it uses ozone to destroy bacteria.

More People, More Cars, More Roads

Since World War II, phenomenal increases in industrial activity, population and motor vehicle registration have made highway construction and maintenance a huge undertaking.

From 1952 to 2000, motor vehicle registrations went from 405,000 to 6.8 million. British Columbia has consistently had the highest ratio of cars to people in Canada, as reflected by the traffic on some of B.C.'s major roads. A random sampling shows that the average daily summer traffic on the Trans-Canada Highway at the Ironworkers Memorial Second Narrows Crossing in Vancouver was 36,000 in 1965, 58,000 in 1970, 103,126 in 1990 and 120,000 in 1999.

In 2000, the British Columbia highway system consisted of 84,225 kilometres of road and approximately \$400 million was invested just to maintain the system. In 1946, the highway system consisted of 34,606 kilometres. The entire budget for all ministries in British Columbia that year was \$37 million.



BC Archives Photo #E-01407



BC Archives Photo

(Above) Patullo Bridge over the Fraser at New Westminster under construction around 1933.

(Left) Mount Sir Donald in Rogers Pass, Trans-Canada Highway.

The Modern Age of Highway Building Begins

The post-war highway construction boom included the John Hart Highway, a fairly low-standard gravel road which joined Prince George to the Peace River area by about 1950. The Hope-Princeton Highway, completed about the same time, was the first modern highway to be built into the interior from the coast.

Highway 1

The Trans-Canada Highway

One of the most important early events in this period was the completion and opening of the new Rogers Pass section of Highway 1 between Revelstoke and Golden, built under the Trans-Canada Highway Agreement on a cost-sharing arrangement with the federal government.



BC Archives Photo

This 147-kilometre section of highway cost \$50 million in all and opened up some of the most beautiful and spectacular mountain country on the continent. Apart from the tourism aspect, the new route cut about 160 kilometres and seven hours of travelling time off of the old Big Bend loop. When the new highway was opened on July 30, 1962, traffic counts immediately increased tenfold. Traffic counts have continued to increase since that time.

(Above) Trans-Canada Highway, Rogers Pass, 1960s.

(Right) Yale Tunnel, Fraser Canyon, 1960s.



BC Archives Photo

The first of the long and extremely difficult work on the Fraser Canyon section of Highway 1 was completed in the late 1960s. The final two tunnels through the rock bluffs were opened to traffic in 1966. A major rock scaling project was carried out in 1974 and 1975 at Hells Gate and further improvements and construction of additional lanes have continued since that time. There are seven tunnels in all, ranging in length from 91 metres to 640.5 metres.

The new Alexandra Bridge over the Fraser River, opened in 1962, was significant in that the 35,000-pound load limit was eliminated, allowing trucks to travel at legal loads through this section of Highway 1. Some of the most difficult and expensive highway work in Canada was undertaken in this spectacular Fraser Canyon gorge, the same general route used by the Royal Engineers to build the Cariboo Highway in the 1800s.

The year 1964 saw another important event in British Columbia's highway development with the opening of the Port Mann Bridge and the remaining section of Highway 1 (then called Route 401) in the Lower Mainland.

Officially opened June 12, 1964, the total length of the sections – from the Second Narrows Bridge to Mount Lehman

Interchange, and the "C" Street interchange to the Vedder River – was 75 kilometres, with an additional 89 kilometres of interchange connections and frontage roads. It was built at a cost of some \$77 million (1964 dollars), and there were 63 separate contracts in this section, involving 40 private contractors.



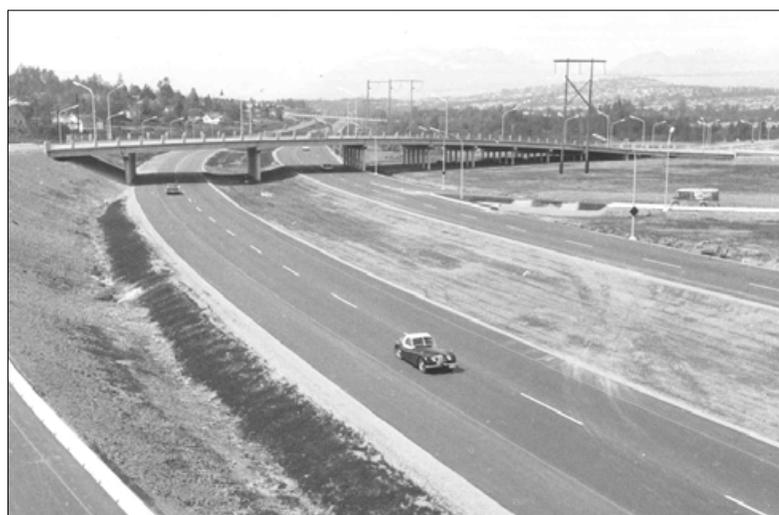
Hell's Gate Project, drilling for removal of fractured rock.

MoTH Photo



Port Mann Bridge, under construction.

MoTH Photo



Trans-Canada Highway, Burnaby in the 1960s.

MoTH Photo

Three sections – Taylor Way to Second Narrows Bridge, Mount Lehman to "C" Street, and Vedder River to Agassiz junction – were opened earlier.

The total length from Taylor Way to Agassiz Junction, including these sections, is 121 kilometres plus 105 kilometres of interchange connections and frontage roads. The total cost was about \$125 million.

During the '70s, other improvements to the Trans-Canada were carried out, including a new four-lane section just north of Victoria, new four-lane sections on Vancouver Island between Victoria and Nanaimo, reconstruction from Horseshoe Bay to Taylor Way in West Vancouver, additional lanes on sections through the Fraser Canyon and east to Kamloops and completion of the Kamloops Bypass.

In 1990, construction began on the eagerly-awaited Cassiar Connector, a \$115-million project designed to provide better movement of traffic along the Trans-Canada Highway between Vancouver and the North Shore, and to provide access to the federal Port of Vancouver.

Work included upgrading a 2.3-kilometre stretch of the highway south of the Ironworkers Memorial Second Narrows Crossing to full freeway standard, construction of seven overpasses, 20 retaining walls, a pedestrian bridge, two major interchanges and a 730-metre tunnel. This was the largest individual tender for roadworks in the history of the ministry.

Completion of the Cassiar Connector in 1992, along with construction of two interchanges on the North Shore, provided travellers free movement from the Alberta border to Horseshoe Bay. The Lonsdale interchange was completed in 1991 at a cost of \$22 million. The Westview interchange was finished in 1997 at a cost of \$33.9 million.

In 1996, the completion of the \$105-million Barnet/Hastings express and HOV lanes expanded the Barnet Highway from St. Johns in Port Moody to Hastings Street at Inlet Drive in Burnaby to four lanes.

In the Kamloops area, a series of projects improved traffic flow on the Trans-Canada,



(Above) Cassiar Connector, under construction.

(Below) The Cassiar Connector completed in 1992, speeds the movement of traffic along the Trans-Canada Highway between Vancouver and the North Shore, and provides improved access to the federal Port of Vancouver.





MoTH Photo

Trans-Canada Highway HOV lanes.

including new four-lane sections east of Kamloops, from Barnhartvale to Campbell Creek, in Salmon Arm and from Canoe to Ann's Bay.

In 1999, the Monte Creek interchange at the junction of the Trans-Canada Highway and Highway 97 became fully operational. The Monte Creek project capped a \$44-million series of highway improvements along the stretch of the Trans-Canada Highway from the Monte Creek interchange to Kamloops. The improvements included \$18.4 million to build the Tumbleweed interchange and \$10.1 million to build the Growers' Market interchange.

In 1998, construction of high occupancy vehicle (HOV) lanes, was completed on the Trans-Canada Highway from Grandview to Cape Horn. This \$62-million project was part of the ministry's "Go Green" initiative designed to promote the use of HOV lanes

to move more people, not more cars, along a major commuter route.

One of the challenges on this project was maintaining the flow of traffic. During construction, more than 100,000 motorists used the Trans-Canada Highway between Grandview and Cape Horn each day. Traffic flow was maintained by doing most of the construction at night.

Coquihalla Highway

Between 1979 and 1990, a new and even more ambitious route was built into the Interior from Hope through the Coquihalla Pass.

The Coquihalla Highway was built in three phases. Phase I, from Hope to Merritt, was completed in 1986. This involved some 137 kilometres of heavy construction through a mountain pass and hill country. Phase II, from Merritt to Kamloops, opened in September 1987.

The third phase, the Okanagan Connector, running from Merritt to Peachland, represented a major construction and engineering challenge. Completed in 1990 at a cost of \$225 million (1987



MoTH Photo

Great Bear Snow Shed on the Coquihalla Highway.

dollars), the route climbs to a summit of 1,740 metres and drops quickly down a mountainside through the Trepanier Valley to Peachland.

The total cost of all three phases of the Coquihalla was \$955 million. By 2000, more than 29 million passenger vehicles had passed through the Coquihalla's toll booths.

Southern Routes

In 1962, the Vancouver/Blaine Freeway (then called Deas Tunnel Throughway) from Oak Street Bridge to the United States border was officially opened. This four-lane, 40-kilometre divided freeway, including the Massey Tunnel, cost approximately \$57 million.



MoTH Photo

Deas Tunnel, renamed Massey Tunnel.

Also in the '60s, the first major obstacle on Highway 3 was overcome when the road section from Christina Lake to Castlegar opened in October 1962. This 74-kilometre highway replaced the mountain gravel road that had been the old Cascade route and its alternative, a 118-kilometre trip through the United States via Kettle Falls. Other work on Highway 3 included widening and paving portions of the Hope-Princeton Highway and installing passing lanes on long grades.

An important completion in 1964 was the Salmo-Creston section of Highway 3, the southern trans-provincial highway. This 67-kilometre section attains the highest elevation of any arterial highway in Canada, an altitude of 1,769 metres. This is a "short cut" in the truest sense of the word and provides an alternative to the 160-kilometre route through Nelson and along Kootenay Lake.



This turbine-powered blade snow plow, shown here on the Salmo-Creston section of Route 3, was the only one of its kind in the world. The machine, now out of service, was built by Ministry of Highways mechanics. It could drive up a seven per cent grade at 70 km/h while plowing snow!

In 1965, the new Richter Pass route from Keremeos to Oliver was opened, shortening the trip through Kaleden and Okanagan Falls by 32 kilometres. Other sections of Highway 3 were also rebuilt from Greenwood to Grand Forks, Kitchener to Cranbrook, and several areas between Cranbrook and the Alberta boundary at Crowsnest Pass.

Highway 3A between Castlegar and Nelson was completely rebuilt and a new route from Castlegar to Thrums, including bridges across the Columbia and Kootenay Rivers, was also



BC Archives Photo

The Richter Pass section of Highway 3, between Keremeos and Osoyoos, passes through the beautiful dry-belt section of British Columbia's interior region.



BC Archives Photo #F-21329

The Columbia River Bridge at Castlegar is one of several innovative designs used on B.C.'s highway system. The bridge is 336 metres long and 60 metres high.

(Below) Glen Rosa interchange under construction in 1999.

finished. This route enabled motorists to bypass the Castlegar-Robson Ferry. The completion of the \$5-million Highway 3 / Highway 22 interchange in 1999 further improved traffic flow on the two highways.

In the late 1980s and the 1990s, a number of projects were completed on Highway 97 from the U.S. border to the Trans-Canada Highway, including Highways 97A and 97B. These included widening Highway 97 to four lanes from Kaleden to Vernon, four-lane reconstruction through Summerland and Winfield, the Vernon 32nd Street Extension and a new four-lane highway through Vernon, as well as the completion of the \$15-million Glen Rosa interchange in Westbank.



Helene Cyr Photo

Sea to Sky



BC Archives Photo

(Above) Squamish Highway winds along Howe Sound coastline. (Right) Renamed the Sea to Sky Highway, this scenic route is used extensively by tourists and skiers to reach resort areas north of Vancouver.



Tom W. Parkin Photo

The scenic Sea to Sky Highway follows the coastline along Howe Sound, with the BC Railway below. In the early 1960s, the cost for building just 34 kilometres on this route was \$11 million.

A new access road from Squamish, at the head of Howe Sound, to Pemberton was built and paved in the '70s. Covering a distance of about 91 kilometres, this highway provides access to Garibaldi Park, Alta Lake, Whistler and other features of the valley. The 84-kilometre-long Duffey Lake Road, connecting the Pemberton area to Lillooet, was upgraded to a hard surface highway.

Vancouver Island

In the mid-1960s, a new 50-kilometre section of the Island Highway between Campbell River and Kelsey Bay was finished. Kelsey Bay was the original terminal of the Prince Rupert ferry route inaugurated by BC Ferry Corporation in May 1966. In 1970, work began on a new 49-kilometre link to connect Kelsey Bay with the northern part of Vancouver Island via Woss Lake and the Nimpkish Valley to Port McNeil and Port Hardy. By 1978, this was completed, along with a new ferry terminal at Bear Cove for the Prince Rupert service and a three-kilometre connection road.

By 1982, a new 14-kilometre section was completed north of



BC Archives Photo #1-12122

Section of Highway 19 between Campbell River and Port Hardy on Vancouver Island, completed in 1978.

Nanaimo between Wellington and Nanoose. A new bypass and bridge had also been built at 17th Street in Courtenay. Other sections of the Island Highway north of Nanaimo had been expanded to four lanes and the first phase of a new four-lane Parksville-Qualicum Bypass was opened to traffic.

During the 1980s, traffic on Vancouver Island increased by 55 per cent, twice the provincial average. The growth in traffic and population led to the \$1.2-billion Vancouver Island Highway project, a combination of new road construction and major improvements to the existing highway. Construction began in 1993 on four main components:

- a new 128-kilometre inland highway from Parksville to Campbell River;
- a new 20-kilometre parkway that bypassed the downtown core of Nanaimo;
- upgrading of the highway between Nanaimo and Goldstream Provincial Park;
- upgrading of 11 kilometres of highway approaching Victoria to four-lane freeway and expressway standards.

The project included 90 new bridges, 150 kilometres of new highway and more than 80 kilometres of upgraded highway and many environmental

features including wildlife fencing, passages for wildlife and equestrian use and the construction of fish habitats. Perhaps the greatest testament to the focus on the environment during construction of the Vancouver Island Highway Project is the Tsable River Bridge.

The bridge was built to have as little impact as possible on the sensitive environment that it spans. Built high above the river and valley, the 400-metre-long and 60-metre-high bridge is the largest on the highway. Below the bridge in the Tsable River valley, hummingbirds, warblers, bald eagles and blue herons live along the banks. Bear, elk and cougar feed along the 22-kilometre river course and it is an important salmon and trout producing system.



Tom W. Parkin Photo



(Above) Malahat Highway 1 through Goldstream Provincial Park, 1989.

(Left) Under Construction, the Tsable River Bridge is the largest bridge on the Vancouver Island Highway. It was built to have as little impact as possible on the sensitive environment it spans.

MOTH Photo

Central and Northern Routes

In the '60s and early '70s, work was completed on two of British Columbia's largest highway projects – the extension of Highway 16 east from Prince George to McBride with reconstruction to the Alberta border, and the reconstruction of Highway 5 from Kamloops to Tete Jaune Cache.



BC Archives Photo

(Above) Yellowhead South Highway 5 along the North Thompson River near Valemount.

(Below) Section of Yellowhead Highway 16 between Hazelton and Moricetown. The highway runs 1,104 kilometres from Prince Rupert to the Alberta border.



BC Archives Photo

Covering a total distance of about 704 kilometres, these projects involved many highway and bridge contracts with a total cost of about \$97 million.

In 1964, major reconstruction of Highway 16 began between Prince George and Prince Rupert. Of the total 728 kilometres of highway, most was reconstructed, and all of it was paved.

Further upgrading of the portion of Highway 5 just north of Kamloops continued and late in 1984 a new four-lane bridge over the North Thompson River was officially opened. Costing \$16.3 million, this impressive 450-metre structure provides a connection from North Kamloops to Highway 5.

In 1987, British Columbia and the federal government signed a three-year, \$36-million cost-sharing agreement to improve safety on Yellowhead Highway 16 and Highway 5. This included reducing steep grades, widening sections of the highways and eliminating a number of sharp curves.

In 1991, as part of the provincial and federal governments' cost-sharing agreement, more than \$18 million dollars was spent upgrading Highway 5 to four-lanes from Raleigh to Heffley Creek. As well, the Carnaby Crossing project west of Hazelton was completed at a cost of \$9.3 million. The project involved constructing 9.2 kilometres of new highway to replace an old, inferior highway alignment.

After an extensive 10-year reconstruction program, paving was completed on the 409-kilometre John Hart Highway between Prince George and Dawson Creek in 1976. A new road and a bridge over the Peace River were also built to connect Chetwynd and Hudson's Hope, and the road from Hudson's Hope to Fort St. John was rebuilt and paved.

In 1988, work began on a major new crossing of the Beatton River to assist farm-to-market and industrial traffic in the North Peace region of British Columbia. The \$22-million Beatton Crossing project involved construction of 11 kilometres of two-lane road, six bridges and a climbing lane for trucks. The new route replaced a portion of Road 103 south of the Beatton River.



Looking south at the John Hart Bridge and North Nechako Interchange.

Since 1990, new construction and upgrades to the Nisga'a Highway have been underway. The Nisga'a Highway connects with Highway 16 just west of Terrace then runs north to the Nass Valley. Work has included replacing old log stringer bridges with new concrete bridges, raising sections of the existing roadway to the 50-year flood elevation, various paving, widening and realigning.

North to Alaska

In 1972, the 638-kilometre link-up of the Stewart-Watson Lake Highway was completed. Designated Route 37, it continues south from Meziadin Lake to Kitwanga. Beginning at Kitwanga Junction on Highway 16, Highway 37 North runs north to Meziadin Junction where Highway 37A leads to Stewart then continues north to Dease Lake through



Highway 37A and Meziadin Lake.

northwest British Columbia up to the Yukon border, making it a major alternative to the Alaska Highway. During the 1990s, more than 500 kilometres of the highway were upgraded and more than 100 kilometres of new construction was completed. In addition, eight bridges along this route were rebuilt.

A circuit can now be made via Highways 37, 97 and 16 to the point of commencement. Further upgrading and paving of this major alternative to the Alaska Highway has continued.

In June 1984, history was made when the \$80-million Liard Highway was officially opened. Running nearly 400 kilometres from the Alaska Highway near Fort Nelson to the McKenzie Highway near Fort Simpson in the Northwest Territories, the huge project was a joint



Highway 37 North, 1986.

federal/provincial undertaking. British

Columbia built the 137-kilometre section from Fort Nelson to the northern border at a cost of \$26 million. The federal government built the 255-kilometre Northwest Territories section at a cost of \$55 million.

1992 marked the 50th anniversary of the Alaska Highway. According to the federal-provincial agreement, British Columbia is responsible for 133.3 kilometres of the Canadian portion of the highway, which starts at Dawson Creek, with the federal government responsible for the remaining 850 kilometres.

Overcoming Nature's Obstacles

British Columbia's topography means highway building must include bridges, tunnels and, above all, ingenuity. Its varied landscape and numerous waterways truly make this bridge country, with more than 2,700 crossings in the highway system. Since 1989, many of the 600 bridges that are over 40 years old or made of wood have been replaced by modern concrete structures in an ongoing bridge replacement program. In addition, bridges built before modern earthquake-resistant design specifications were in place have been identified for retrofitting.

Over the past 40 years, the ministry has built more than 1,800 bridges. On Highway 1 alone, the ministry built, among others, the 300-metre Columbia River Bridge at Revelstoke, the 488-metre Alexandra Bridge in the Fraser Canyon, the 213-metre Nine Mile Canyon Bridge standing 92 metres above the river, and the 137-metre Spuzzum Creek Bridge.

The Port Mann Bridge is a spectacular structure with an overall length of 2,100 metres – the first high-level, stiffened, tied-arch bridge in North America to have an orthotropic plate deck. The orthotropic deck is made up of a thin solid-steel plate stiffened by u-shaped troughs welded beneath. The cost in 1964 was \$25 million; today, it would be more than \$100 million.



MoTH Photo

Modern standards of highway construction demand a minimum degree of curve, good grades and adequate width. To achieve these standards in mountainous country, engineers have to solve some intricate problems.

The Fraser Canyon section of Highway 1 north of Yale includes seven highway tunnels up to 640 metres long. Cut through solid rock bluffs, the tunnels have concrete-lined arch roofs, roadway surfaces that extend to 8.15 metres wide, plus sidewalks and lighting. Where the old road went around obstacles, the new one must go through them to meet the required standard.



Tom W. Parkin Photo

(Above) Port Mann Bridge.

(Left) Ferabee tunnel at Hell's Gate in the Fraser Canyon.

Between Lytton and Spence's Bridge, maintenance of a reasonable standard presented another problem. The old road was sandwiched in between the railway and the river. In order to widen it to proper specifications, contractors had to move out into the river using



Trans-Canada Highway, Sailor Bar Tunnel concrete forms.

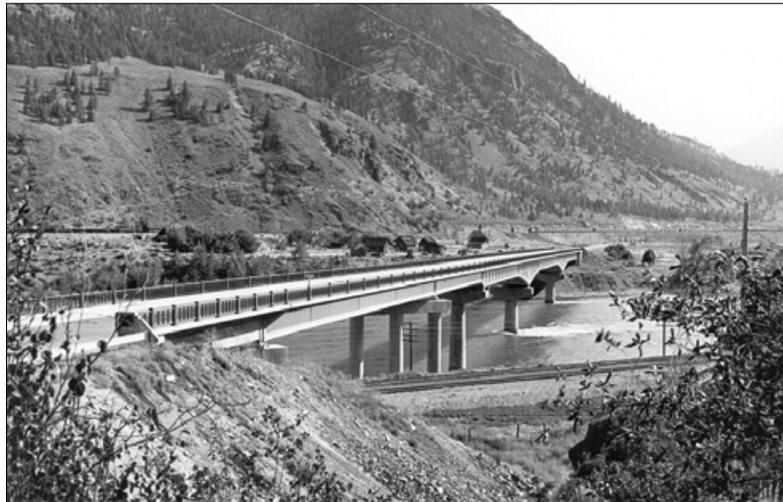
retaining walls. In the 22-kilometre section from Tank Hill to Spence's Bridge, there are 27,900 square metres of steel-bin wall and 26,740 cubic metres of concrete. This section runs for about 1,372 metres and the retaining wall varies in height up to 9.75 metres. In another section, 1,470 metres of retaining wall is required at a long curve of the river. About 19,100 cubic metres of concrete was needed here.

Six of the longest bridge crossings were built originally for the British Columbia Toll Highways and Bridges Authority, a provincial government agency long since dissolved. These structures are now administered by the Ministry of Transportation and Highways and have not had tolls on them since the 1960s. Among them is the four-lane, 780-metre tunnel under the Fraser River at Deas

Island connecting Vancouver to the United States border via Highway 99.

Opened in 1959 at a cost of around \$25 million, the George Massey Tunnel was the first of its kind in North America and among the first to use the method of construction in which concrete sections are built in a dry-dock, floated into position, sunk in a prepared trench and joined together. The tunnel is capable of handling

7,000 cars an hour. In 1989, a counterflow system was introduced to meet increasing traffic demand in the tunnel. During rush hour, three lanes operate in the peak direction, with one lane taking the opposing traffic flow.



Use of the single-column pier is shown in the design of this highway bridge over the Thompson River near Spence's Bridge. Angled across the river to maintain the 90 km/h alignment, the bridge is on the Trans-Canada Highway, 304 km east of Vancouver.



Tom W. Parkin Photo

(Above) Disappearing under the Fraser River, the George Massey Tunnel was the first of its kind in North America.

(Right) Oak Street Bridge, 1990.

The Oak Street Bridge was opened in June 1957. The structure is 1,840 metres long with four lanes and the cost was around \$9 million. The bridge connects Vancouver to Lulu and Sea islands. When first opened, it was carrying average daily traffic of about 18,000 cars. By 2000, it was carrying more than 85,000 cars daily.

The Agassiz-Rosedale Bridge was opened in November 1956. This two-lane, cantilevered bridge across the Fraser River 96 kilometres east of Vancouver is 1,869 metres long and cost about \$5 million.

The 1,293-metre, six-lane Second Narrows Bridge across Burrard Inlet opened in 1960. The bridge was renamed the Ironworkers Memorial Second Narrows Crossing in 1994 in memory of the 23 workers who died building the structure.



Helene Cyr Photo



McT-H Photo

Lions Gate Bridge, Vancouver.

In late 1957, the 629-metre cantilevered Nelson Bridge across the west arm of Kootenay Lake at Nelson was opened. Cost of this bridge was about \$4 million.

In 1954, the Lions Gate Bridge, crossing between Vancouver and the North Shore, was purchased from the Guinness companies which had built it. In 2000, construction began to widen and improve the bridge deck.

Using a unique system of upgrading the bridge in sections allowed for minimal closures of the bridge. Old sections of the bridge were removed and lowered using a “jacking traveller,” a gantry-like structure. The jacking traveller then hoisted the new pre-fabricated bridge sections into place. In



MoTH Photo

Knight Street Bridge under construction c 1973.

all, 54 sections of the bridge were replaced this way.

Two other large crossings of the Fraser River in the Lower Mainland area were built in the 1970s: the Knight Street Bridge, opened in January 1974, and the Mission Bridge in July 1973.

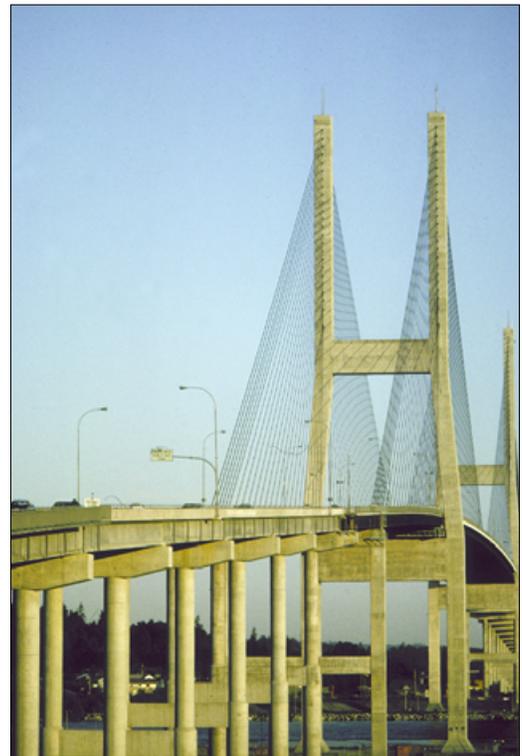
The Knight Street Bridge is actually two separate bridges with a combined length of 1,436 metres. Travelling south from Vancouver, motorists first cross a 238-metre, pre-stressed concrete span over the north branch of the Fraser River North Arm to Mitchell Island. This part of the crossing is six lanes with the two outside lanes joining off and on-loops for Mitchell

Island. Then the second part of the bridge, a 1,198-metre structure of pre-stressed concrete, crosses over the south branch of the Fraser River North Arm from Mitchell Island to Lulu Island where it joins the existing road network.

The Mission Bridge is 1,127 metres long, crossing the Fraser River southwest of Mission and east of Matsqui Island. It is a four-lane structure with full navigational clearance for river traffic and consists of three orthotropic steel box-girder flanking spans and 12 pre-stressed concrete girder approach spans, each 41 metres long. In 1984, a new \$6.7-million railway overhead at Mission became part of the Mission Bridge system.

Among the many bridges built during the late 1970s and early '80s were the Foothills Boulevard at Prince George, the McPhee Bridge over St. Mary's River near Cranbrook, the 400-metre Fort Nelson Bridge on the Liard Highway and the famed Bridge of 23 Camels over the Fraser River at Lillooet, which replaced an old suspension bridge built in 1911. In addition, several concrete bridges were built on the Squamish Highway.

In 1986, the Alex Fraser Bridge, was completed as part of a new Fraser River crossing system at Annacis Island. Built at a cost of \$58 million, the bridge has a main span of 465 metres and runs 2,525 metres in length. Each of its towers stands about 50 stories high. To build the connecting roads and freeways that feed the bridge, some seven million cubic metres of sand had to be dredged from the Fraser River. The complete Annacis system includes 33 kilometres of multi-lane highway (Highway 91) connecting New Westminster with Highway 99 to



Tom W. Parkin Photo

Alex Fraser Bridge.

Richmond, 37 bridges and overpasses, 13 complete or partial interchanges and another 16 kilometres of connecting roads.

Other large bridges built in the mid- to late 1980s included the Dry Gulch, Ladner and Niclum Creek bridges on the Coquihalla Highway, the Alexander Creek Bridge on Highway 3 east of Hope, the Clayhurst Bridge over the Peace River and the Yellowhead-Fraser Bridge on Highway 16 at Prince George.

The \$6.3 million Savona Bridge was completed over the Thompson River in 1993. The new bridge replaced an older structure and was part of improvements to the Trans-Canada Highway.



Peace River Bridge on Highway 29 near Hudson's Hope.

BC Archives Photo



BC Archives Photo # I-06218

(Above) Paulson Bridge on Highway 3 is between Grand Forks and Castlegar. Crossings of deep canyons are unavoidable in British Columbia's highway system.

(Below) This section of the Trans-Canada Highway along the Thompson River swings out on high fill in order to maintain alignment and overpass the railway.



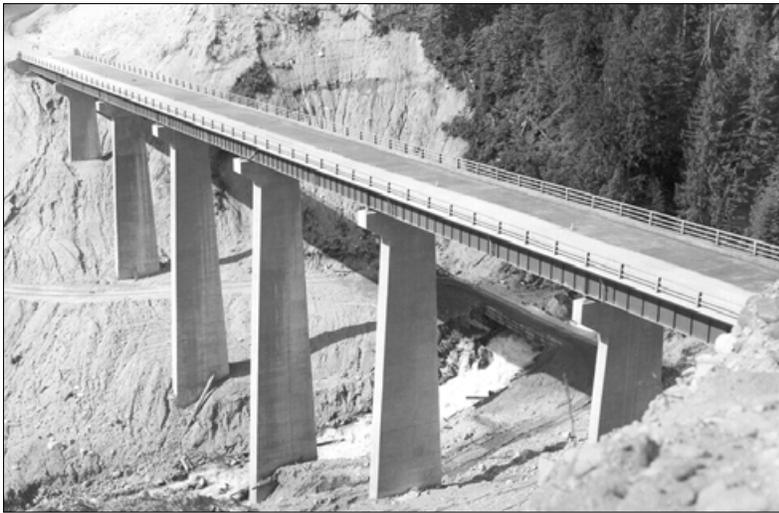
BC Archives Photo

In 1994, the Castlegar-Robson Bridge over the Columbia River replaced the Castlegar-Robson Ferry.

In 1995, work was completed on the Gitwinksihlkw Bridge over the Nass River north of Terrace. The single-lane bridge was built at a cost of \$4 million and represented a vital link for Gitwinksihlkw, a community in the Nass Valley. Prior to the construction of the bridge, the only access was via a foot-bridge.

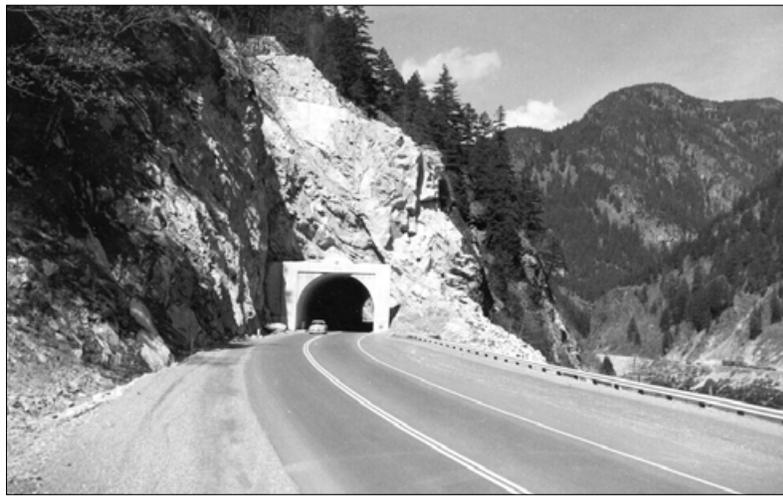
1997 saw the completion of two projects that improved traffic flow in the Lower Mainland: the \$18.9-million Annacis Channel West Bridge, which was part of the Fraser River Crossing and Connector project, and the \$13-million

BC Archives Photo



(Above) Silver Tip Falls Bridge, Revelstoke-Mica Creek Highway. Overall length is 624 feet.

(Right) Saddle Rock Tunnel, Fraser Canyon.



BC Archives Photo

(Below) Tsable River Bridge.



MoTH Photo

counterflow system for the Pitt River bridges.

In 2000, the West Fernie Bridge and the Leo T. Nimsick Bridge were opened in Fernie, improving safety and traffic flow into the community.

Planning, Developing and Maintaining the Highway System

In this province, highways and transportation are a diverse responsibility.

The Ministry of Transportation and Highways is responsible for planning, developing and maintaining British Columbia's highway system including inland ferry routes.

One of the ministry's major responsibilities is to oversee road and bridge maintenance. This includes pavement patching, snow removal, roadside mowing and brushing, litter collection, bridge cleaning and highway accident response. In 1988, these services were privatized with the aim of ensuring the safety of the travelling public, providing the service more efficiently and creating local employment opportunities.

A competitive bidding process was developed to select qualified private contractors in each of the highway service areas. The ministry monitors the performance of each maintenance contractor to ensure strict standards are met in each of the contract areas.

While many of the maintenance services are privatized, some services are carried out by ministry employees. Each year, ministry line marking crews and avalanche crews work long hours to ensure the safety of the public. In the summer months, the line crews travel the province marking out high-visibility centre and shoulder lines. During winter months, the provincial avalanche crews use high-tech equipment and explosives to keep the travelling public safe from avalanches.



MoTH Photo

Highway maintenance and construction is carried out by private contractors around the province.



Helene Cyr Photo

Careful monitoring and avalanche control are required to keep B.C.'s highways open during avalanche season. Here, crews use a cannon to initiate a controlled avalanche.



MoTH Photo

Protecting Our Future



Over the years, there have been many changes in modern road building. In British Columbia, one change has been the role of the environment in the design and building of this province's roadways.

Highways are now designed in ways that are intended to have the least amount of impact on the environment. As well, efforts are taken to protect fish and wildlife and, in some cases, to provide additional habitat.

Consideration of the environment begins early, well before any construction. Qualified biologists may participate in the highway design, with review and input from provincial and federal environmental agencies. This process ensures the highway project is following government policies and legislation for protection of the environment.

Construction may be required to take place during limited "environmental windows." These pre-determined time frames are adjusted to accommodate variations in local conditions as part of the ongoing process of minimizing the effects of construction on local habitat.

Wherever construction has the potential to impact sensitive environmental areas, an environmental monitor is employed to ensure the contractor is meeting contractual obligations in the design for protection of the environment. The environmental monitor is also a resource for construction methods performed in sensitive areas. Monitors report to environmental coordinators who must understand the scope of the project, certify that recommendations match ministry policy and provide accountability for the project team on environmental issues.

Post-construction monitoring is also an extremely important component of environmental stewardship, and ongoing review is undertaken by the ministry and the federal Department of Fisheries and Oceans.

Some of the environmental plans in place include wildlife fencing, wildlife reflectors, and fish habitat creation.

As of 2000, there were more than 350 kilometres of wildlife fencing along some of the busiest highways. This type of fencing prevents wildlife from walking out onto the highway and guides the animals to wildlife passages. Statistics show the fencing works in saving animals and reducing accidents.



Elk and fencing



MOTH Photo