



Kawkawa Lake Road Bridge (KLRB) Frequently Asked Questions

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Note to the Reader

This is a “living” document. Its purpose is to summarize the best information we have at any given point in time in the form of questions and answers. As new questions or new or updated information is received, it will be added. You can see which version of the document you are reading by looking at the revision number in the upper right hand corner of each page. The latest revision will be available at the District of Hope Office and at on the district website www.hope.ca/governance.php.

General

Why should I care about the Kawkawa Lake Road Bridge?

1. *It's a pocketbook issue.* Fixing or replacing the bridge will cost money. We can choose to go it alone on the expense or we can choose to take advantage of a grant that is currently available.
2. *It's a quality of life issue.* Decrepit infrastructure will not attract new residents or industry to Hope. This bridge is not a frivolous option. It connects two halves of our community.
3. *It's a public safety issue.* The existing bridge is at its end of life. Sooner or later it will fail unless we take action.

Why is the council supporting a new bridge?

Council are not so much pushing a new bridge as trying to make progress on an issue that has been growing in urgency for a long time.

Council's mandate is to listen to, and execute the wishes of the electorate. The job of the district staff is to execute the will of the council. Beyond that, their jobs are to do what is best for the community using the facts at hand and their best judgement.

Most agree that something must be done about the current Kawkawa Lake Road Bridge. It is fast approaching its end of life. At some point, it will become a public safety issue, if it is not already at that point. Many district voters want to see some action taken on the bridge and have communicated that desire to their elected officials. The challenge for council has been deciding what action to take.



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Council, in conjunction with consulting engineers, have examined various bridge options. Having weighed all the pros and cons, and having secured the guarantee of grant funding, council has determined that building a new bridge on a new alignment in partnership with the provincial and national governments is in the community's best interests in terms of cost-effectiveness and public safety.

How did the District arrive at the time-frame for seeking resident approval for the borrowing by-law through over the Christmas holiday?

That this issue became controversial over the Christmas season was not the result of a conspiracy or a plan to pull a fast one. The district was trying to move things along so that we could borrow in spring 2010 in order to get the project moving. We are restricted in our borrowing through the Municipal Finance Authority to twice a year, spring, and fall. The district was trying to make the spring borrowing cycle so that we could enter flood season 2011 with a new bridge. If the referendum is approved, we can still make that schedule, but only just.

Existing Bridge

Describe the existing bridge

The existing bridge is a three-span, two-pile, timber bridge approximately 73m (240-ft) long. The main span is a Howe through-span, 39.6m (130-ft) in length. Both the east (lake) side (16.6m, 54'6") and west (town) side (14m, 46-ft) approach spans are glulam-supported structures. Decking is timber, overlaid by asphalt. The bridge (narrowly) accommodates two traffic lanes, within a curb-to-curb deck width of 5.5m (18-ft). The bridge includes a cantilevered pedestrian walkway on the downstream side. The bridge is restricted currently to a gross vehicle weight (GVW) of 21 metric tonnes.

It is interesting to note that the Howe truss design was patented in 1840 and was widely used in railway bridges until about 1870.

When was the existing bridge built?

The bridge was built in the 1950s by the BC Ministry of Transport. It is between 50-60 years old, very old for a wooden bridge in an environment soaked by ~2000mm of precipitation per year.

What's wrong with the existing bridge?

The district commissioned two bridge studies in recent years. The first, by Associated Engineering (AE) [www.ae.ca], resulted in their report of Sep 2004, *Kawkawa Lake Road Bridge Repair & Replacement Options Report*. This study was prompted by persistent failure of the asphalt wearing surface. AE was approached to "...recommend a repair method for the cracking and asphalt deterioration on the east end of the truss span...and to a lesser extent of the east approach span." AE pointed out that the wearing surface will be affected by "...thickness and strength of the [asphalt] overlay, deflection of the timber deck, rot in the timber deck, and bond of the wearing surface to the deck." AE laid out several options for repair of the wearing surface, but stated that, "...the construction, condition, and age of the bridge indicate that the end of its life expectancy is being reached....The District should begin to consider the long-term approach for this bridge." Since the issuance of this report the district public works department has acted to effect the immediate, short-term recommendations specified in the report.

More recently, in Jun 2008, MMM Group Ltd. Consulting Engineers (MMM) [www.mmm.ca] issued a report to the district entitled *Kawakawa Lake Road Bridge Visual Inspection & Load Rating Evaluation*. MMM found that corrosion of the bridge's steel tension rods and an accumulated asphalt load have compromised the bridge's carrying capacity. They went on to say that, despite the bridge's posted 21 tonne loading capacity, that trucks of up to 48 tonnes were seen to be using the bridge. They noted that, "This represents a serious overloading, and there is a serious risk of bridge failure." They concluded by noting that "...replacement [of the bridge] will likely be required in the near future."



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What is the BC Transport assessment of the existing bridge?

BC's Ministry of Transportation and Infrastructure has not inspected the bridge. The district has requested an inspection in order to gain an impartial perspective on the bridge and perhaps more input on options. It is not yet clear that the MOTI will agree to examine the bridge.

How much does it cost the district to maintain the existing bridge?

The Public Works Department estimates that it costs roughly \$50K per year to maintain the existing bridge. The annual cost of maintenance will continue to rise at an ever increasing rate as the bridge ages. Eventually it will have to be rebuilt or replaced.

What are the plans for the existing bridge? Can we save demolition costs by allowing it to remain if we build a new bridge?

It is possible to retain the present bridge for use as a pedestrian footpath/bicycle crossing. Some in the community have voiced their desire to see the bridge remain for historical reasons.

Responding to this community sentiment, council asked MMM Group to cost out several alternatives for the old bridge. This they did in a memo of 21 Sep 2009:

- A.** Raise [above 200-year floodplain] and retain the entire bridge structure including the approach spans for use by pedestrians and cyclists only. This would cost about \$240K.
- B.** Raise and retain the Howe Truss only, with removal of the approach spans. This would cost about \$170K.
- C.** Demolish the approach spans and move the Howe Truss to a dry-land location within 200m of its existing location. This would cost about \$100K.

As the estimated cost of demolishing the bridge is ~\$200K, it is initially cheaper to move just part of the bridge or demolish only a part of it. The relatively high cost of demolition is due to disposal costs. The reason is creosote, an environmentally hazardous substance. Bridge timbers must be transported to a certified disposal site for treatment. Saving the bridge does not eliminate this expense, it merely defers it, as the bridge remains will continue to decay. Beyond that, for liability reasons, a saved truss will most likely have to be enclosed inside a chain-link barrier.

While saving the old bridge would be nice, it would also be expensive and would require on-going maintenance. If it were moved to a nearby location, it likely would end up like the gold mill adjacent to the Hope Visitor's Centre: decaying and unvisited behind its chain-link fencing barrier.

How much will it cost to demolish the existing bridge?

District estimates are that it would cost approximately \$200,000 to safely demolish the bridge.

This figure is in line with rule-of-thumb costs published by the Florida Department of Transportation (the only source to be found with rule-of-thumb costs for bridge demolition). They estimate that bridge demolition costs from USD20-50 per square foot. Given that our existing bridge has a width of 5.5m and a length of 73m, total decking area is ~400m² or ~4300-ft². This results in an estimated range of from CAD91-228K for demolition, in line with our estimate.

[Source: FDOT, *Bridge Costs*, www.dot.state.fl.us/planning/policy/costs/Bridges.pdf]

As an alternative, the district is in discussion with the Canadian Army Engineers who may agree to dismantle the existing bridge at no or minimal cost as a training exercise.

For optimal cost-effectiveness, the plan is that, if a new bridge is constructed, the demolition of the existing bridge would occur along with that construction. This is to: a) avoid a second round of required permitting from the Ministry of the Environment and from Fisheries, and b) do the work when a construction company is on the scene with workers and heavy equipment.



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Proposed Bridge

What current cost estimate is the referendum amount of “up to \$5M” in borrowings based on?

The following table reflects the latest cost estimate available:

MMM Group Estimate + Project Management & Property Acquisition Estimates ¹					
Cost Type	Estimate Description	Estimate	Estimate Class	Contingency Included (%)	Contingency Included (\$)
Engineering	Engineering Costs	\$538,000	N/A	10%	\$53,800
	Liaison & consultation requirements specified by project funding or regulatory agencies	TBD	N/A	N/A	N/A
	Costs associated with an Archaeological Overview Assessment & follow-up archaeological work as required	TBD	N/A	N/A	N/A
	Costs associated with contaminated sites/hazardous waste investigations & remediation	TBD	N/A	N/A	N/A
	Cost associated with noise/acoustic assessments	TBD	N/A	N/A	N/A
	Costs associated with compensatory aquatic or terrestrial habitat	TBD	N/A	N/A	N/A
	Design of any modifications or demolition to the existing bridge	TBD	N/A	N/A	N/A
	Sub-total		\$538,000		
Project Mgt & Admin	Project Management	\$50,000	N/A	N/A	N/A
Construction	Bridge Structure, Retaining Walls, Riprap	\$3,900,000	B	10%	\$390,000
	Roadways & Approaches	\$2,100,000	C	20%	\$420,000
	Existing Bridge Demolition ²	\$200,000	C	20%	\$40,000
	Utilities rerouting, electrical	\$1,000,000	C	30%	\$300,000
	Sub-total		\$7,250,000		
Land Acquisition	Property purchase(s) for approach roads ²	\$500,000	N/A	N/A	\$0
Legal	Legal Expenses ²	\$50,000	N/A	N/A	\$0
Total Estimated Cost With Contingencies		\$8,388,000			\$1,203,800
Total Estimated Cost Less Contingencies		\$7,184,200	Hope District will be liable for ineligible expenses of from \$710-750K. Contributions from BC & Canada range from \$2546K each (high) to \$2145K (low).		
Total, Grant Ineligible (High)		\$750,000			
Total, Grant Ineligible (Low)		\$710,000			
Hope District Expense (High)		\$3,296,000			
Hope District Expense (Low)		\$2,868,067			
Notes: 1) Estimate based on <70% design completion; 2) Ineligible for grant funding					



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If the province is giving us a grant of \$3,345,833 and the federal government is giving us a grant of \$3,345,833, for a total of \$6,691,666 and the bridge will cost \$8,338,000, the difference is \$1,646,334. Where did the \$5,000,000 number in the referendum come from?

The provincial and federal grants are matching grants, up to a maximum of ~\$3.3M from each. That means that they will not grant us a dollar unless we expend a dollar. If we were to spend \$3,345,833 on eligible bridge expenses, then we would expect grants of \$3,345,833 from each. If we spend less, we will get correspondingly less in grant funding. Assume the bridge was to cost exactly \$8,338,000. Each party's one-third share would be \$2,762,667. However, some expenses are not eligible for grant funding. Two large expenses that are not eligible include land acquisition, currently estimated at \$500K, and existing bridge demolition (demolition is under negotiation with grant sources), currently estimated at \$200K. These two items alone would ramp our share up from \$2.8 to \$3.2M. As costs cannot be nailed down in advance to the penny, the district is using a very high figure of "...up to \$5M..." in the language of the referendum. **If passed, we would then be able to negotiate a loan of up to this amount, and then draw on it as needed. We would not be obliged to borrow the full \$5M.**

Are there rules-of-thumb for estimating bridge construction costs?

The cost of building a bridge is dependent on many local factors such as geology, geography, stream and floodplain characteristics, remoteness, traffic volumes, archaeological factors, environmental considerations, and so forth.

We have used three sources of data to sanity-check the estimate made by the MMM Group. One is the Alberta DOT *Unit Price Averages Report*. Between 2007 and 2009, Alberta recorded cost actuals for 13 bridges (bridges less than 100 metres in length). The cost per square metre (of the final deck area) of those bridges ranged from \$2871 to \$7445, with a weighted average being \$4055. In 2009 bridge cost per square metre ranged from \$2871 to \$4995. The wide range is attributable to such variables as whether the bridge substructure is steel or concrete, site characteristics, etc. [Source: Alberta Department of Transportation, *Unit Price Averages Report*, www.transportation.alberta.ca/Content/docType257/Production/UnitPriceList.pdf]

The Florida Department of Transportation, which builds between 100-200 bridges per year, has published some rule-of-thumb bridge costs in order to assist local municipalities with planning. They estimate that that a bridge described as "Segmental Concrete Box Girders - Cantilever Construction, Span Range from 150-ft to 280-ft" built in 2009 would cost roughly USD175 per square foot (~CAD2020/m²). This estimate does not include local site work such as construction of retaining walls, riprap fill, approach lanes, utility rerouting, nor does it include engineering and design, land acquisition, environmental remediation, etc. This estimate is on the low side compared with our other figures, perhaps due to the relatively benign Florida landscape (flat, loose, uniform soil conditions, etc.) [Source: FDOT, *Bridge Costs*, www.dot.state.fl.us/planning/policy/costs/Bridges.pdf]

Lastly, one B.C. engineering consultant uses the preliminary figure of \$4000 per square metre of deck area when costing pile-supported bridges. [Source: Hyde Project Management Services, Ltd.]

As the MMM Group report done for the district in 2008 describes a replacement bridge as consisting of a "two lane bridge with sidewalks on either side, and with a final deck area of approximately 700 square metres...[based on a later, ~70% completed plan, the deck area of the bridge was increased to ~1000 m²]", [Source: MMM Group, *Kawkawa Lake Road Bridge Visual Inspection & Load Rating Evaluation*, www.hope.ca/upload/dcd939_2008_Kawkawa_Lake_Bridge_MMM_Group_Inspection.pdf, p.17]

The table below estimates the cost of such a bridge using rule-of-thumb cost estimates noted above:



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Source of Rule-of-Thumb Cost Estimate	Rule-of-Thumb Cost/m ²	Decking Surface Area (m ²)	Estimates Applied to KLRB Construction
Alberta DOT (High)	\$4,995	1000	\$4,995,000
Alberta DOT (Low)	\$2,871		\$2,871,000
FL DOT	\$2,020		\$2,020,000
B.C. Consultant	\$4,000		\$4,000,000

The current estimate for our three-span bridge structure is \$3,900,000, which includes contingencies. This works out to ~\$3900 per square metre. This estimate is based on an early design. As the design nears completion we expect that our numbers will become more refined.

Bear in mind that we are comparing apples and oranges here. The figures in the table are derived from completed projects. We have no idea what the original estimates may have been. Our \$3.9M estimate is intentionally designed to provide an upper bound for construction costs to be used for planning purposes. All our working estimates have contingencies built in to allow for worst-case scenarios, while the rule-of-thumb numbers are based on cost actuals.

Remember also that these figures do not include the costs of site work, land acquisition, design, and engineering, utilities relocation, environmental, and other associated costs.

Why most of your rules-of-thumb from Alberta and Florida? Why not from BC?

For the simple reason that rule-of-thumb numbers are not easy to come by. In general, organisations and agencies hate to give out numbers like this because so many variables are involved. So one must take what is available. Rule-of-thumb cost as not to be taken as Biblical pronouncements. They are merely one more data point used to size the expected costs.

Isn't the cost of this bridge outrageous? Didn't the government just build a brand new school in Coquitlam with all the environmental perks for just \$15 million? [Posted on the Hope Standard]

You are referring to the new Glen Elementary School which opened in January. The \$14.8 million, high-efficiency school has been built for 80 kindergarten and 400 Grade 1 to 5 students. Upon completion, the old school it replaces is to be demolished.

Not to belittle this achievement, but it is not clear what the connection is between a bridge and a school. Note that a) no land acquisitions were involved in this project, b) the school required no new roads and the design was not required to be overtly site-specific, whereas bridges are be tailored to their immediate locations, factoring in floodplains, access, environmental, etc., c) many of a school building's components can be purchased COTS (Commercial-Off-The-Shelf) whereas many bridge components are site-specific one-offs, d) replacing a school building on the same site as the building it replaces does not require the same degree of urgency as does a chokepoint such as a bridge. Speedy construction translates into higher labour costs.

Can't we get this done cheaper? The Bissette Creek Bridge was awarded to Ruskin Construction, for \$2,956,542.00. They "replaced the existing wooden trestle and glulam bridge with a 52m double lane clear span trapezoidal steel stringer, concrete bridge deck including a sidewalk and associated site works." [Posted on the Hope Standard]

The Bissette Creek Bridge (Hwy 2 near Pouce Coupe BC) replacement project was awarded to Ruskin Construction. Ruskin will replace the existing trestle and glulam bridge with a 52m double lane, clear span, trapezoidal steel stinger, concrete bridge deck including sidewalk and associated site work. Also bidding were Formula Pile & Bridge Construction, Ltd., \$3,041,189, and Concreate USL Ltd, \$3,053,835. These same contractors may well bid on our bridge project should the referendum pass and funding become available.



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According to Blair Lekstrom, MLA for Peace River South, this is a \$3,481,380 project when completed. Ruskin's award is only part of the expense picture. The project is managed by B.C. MOTI, meaning that project management, governmental liaison, legal, tendering, etc., are not counted as out-of-pocket project costs. They are in-house expenses your provincial taxes pay for regardless of the project they support. [Source: <http://www.blairlekstrommla.bc.ca/EN/3877/85554?PHPSESSID=0a617b4c5e9504fe376117d0356ac8ff>]

Will land purchases be required? If so, how much land and at what cost?

If a new bridge is to be built upstream from the old, land must be purchased in order to realign road access. This amounts to roughly 2640 m² on the east (lake) side of the river and roughly 1140 m² on the west (town) side. The exact cost of the required land purchases is still undetermined. For planning purposes a ballpark figure of \$500K is being used.

Isn't the proposed bridge "gold-plated"?

The district estimate is based on a "three span, precast concrete, box girder bridge, consisting of two 3.6 m lanes with 1.5m sidewalks on either side, with a final deck area of approximately 700 square metres." It is a fairly typical design tailored to the location.

It may be useful to compare our proposed bridge with some other bridges on the drawing board or near completion. The Nicomekl River Bridge is to be built in Langley starting this spring 2010. The Bissette Creek Bridge was started in Jul 2009 and will be completed in spring 2010. The table below shows a comparison of the Kawkawa Lake Road Bridge, new and proposed, with those bridges, new and proposed.

Keep in mind that it can be very misleading to compare the costs of completed projects with forecasts for a planned project. The latter will always have contingencies built in to cover worst case scenarios whereas actual cost figures do not. The expected lifespan of the new bridge is between 75 to 100 years with proper maintenance.

Comparison of Existing Bridges			
Existing Bridge Feature	Nicomekl River Bridge ¹	Existing KLRB	Bissette Creek Bridge ²
Channel width, metres	14	~45	~16
Bridge type	Timber trestle, timber decking, no overlay	Timber truss, timber decking, asphalt overlay	Timber glulam girders, asphalt overlay
Date built	1960	~1950s	1965
Width, metres	2 lane	5.5	9.7
Length, m	unk	73	67.8
Pilings	trestle	2	19 in P7&8, 8 in P6
Spans	N/A	3	11
Main span length, m	N/A	39.6	21.03
E approach span length, m	N/A	16.6	4.6
W approach span length, m	N/A	14	4.6
Maximum height limit, m	None	4.58	None
Weight limit, GVW, tonnes	unk	21	Std transportation loading including 85 tonne
Sources: ¹ Doug Hyde, Project Manager, Nicomekl R. Bridge. ² Lisa Miller, Project Manager, Bissette Creek B., MOTI			



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Comparison of Proposed Bridges			
New or Proposed Bridge Feature	Nicomekl River B.	Proposed KLRB	Bissette Creek B.
Bridge type	clear span, concrete	3 span, precast concrete box girder	clear span, trapezoidal steel girder, concrete deck
Length, metres	45	~85	52
Width, m	19.4	12.7	13.7
Lanes	4	2	2
Bike Path	Yes	Two 1.5m shoulders	None
Sidewalks	2	One 1.5m	1
Lower chord freeboard > 200-yr flood, m	0.43	1.5 minimum	2.4
Deck freeboard > 200-yr flood, deck, m	2	~3.1	4.16
Construction model employed	Design-Build	Design-Tender	MOTI-Managed
Alignment	No change	New improved	Slight improvements
Land acquisition required	No	2640m ² E side 1140m ² W side	No
Road closure	No (nominally 4-5 months), temp bridging	None (with traffic management)	No
Construction time, months	14	14-15 overall, 5 const phase	10 overall, 3 const phase
Funding sources	City of Langley Gov of Canada Province of BC South Coast Trans Authority (TransLink)	Hope District Gov of Canada Province of BC	BC MOTI
Current Cost Estimate	\$9,065,000	\$8,338,000	\$3,481,380

The Nicomekl Bridge is shorter and wider than is our proposed bridge. Total decking area in both cases is roughly comparable, and the total cost of construction is roughly the same in spite of the fact that the Nicomekl Bridge requires no land acquisition or new access roads.

The Bissette Creek Bridge is ~20m shorter than our proposed bridge with a total surface area roughly 25% smaller. It requires no pilings, no land acquisition, no design costs, no utility rerouting, no new roadways and approaches, no retaining walls or riprap, no project management costs, and minimal demolition. Total out-of-pocket costs now total ~\$3.5M.

Would it be cheaper to use a “design-build” construction model?

Employing a design-build construction model does not inherently result in lower cost.

Design-build is a construction project delivery system where, in contrast to "design-tender", the design and construction aspects are contracted for with a single entity known as the "design-builder" or "design-build contractor".

The district is using the design-tender delivery model. Here is the logic for that choice:

Renovating the existing bridge or building a new one is beyond Hope's means in the absence of supporting grants. In order to win grants, municipalities must submit fairly detailed project plans in order to show the necessity for, and viability of, the project.



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To illustrate, the following is a partial list of the supporting materials required in order to apply for a grant from the Building Canada Fund (the source of our grants):

- Project Drawings
- Detailed project cost breakdown including quotes or cost estimates
- Confirmation of sources of project funds, i.e., bank statements, approved bank loan documentation, letters of commitment (or copies of cheques) from funding contributors, approved referendum (or a council resolution to hold a referendum to borrow for the project).
- Approvals of land use required prior to construction proceeding, i.e. Agricultural Land Reserve, right of ways, federal and/or provincial assets, etc.
- Land lease agreement, if applicable
- Information on measurable project benefits
- Short term employment hours during construction & creation of full time permanent jobs (job title), if applicable;
- Details on the incremental impact of funding (e.g.: should BCF-CC funding not forthcoming, would the project be reduced, delayed (months/years) or not proceed.
- Details on how the project will minimize the negative impacts on the environment.
- Details on how the project will reduce the greenhouse gas emissions through best practices...

[Source: www.th.gov.bc.ca/BCFCC/documents/local_road.pdf]

If we were to have taken the design-build route, we would have ended up with quotes for designing and building a new bridge, but not necessarily with enough information to support a grant application.

In order to create the engineering documents required in support of a grant application, a municipality must engage an engineering firm unless it has engineering staff on board. Hope does not have an engineering department. Thus it turned to MMM Group Consulting Engineers for the development of sufficient project plans to enable us to win grants from the Building Canada Fund.

One thing it is essential to have when embarking on a design-build project is a fairly clear idea of what is to be built. In a design-build scenario a contractor cannot bid on vague ideas. To explore options, come up with alternatives, and respond to what-ifs requires a designer hired on a consultative basis.

As it stands right now, MMM Group's bridge plans are at 70% completion. They will soon be at 100% completion (mid-Feb). If the referendum is approved, the next step will be to prepare tender documents for all prospective bridge builders. MMM Group can assist us in developing a short-list of pre-qualified bidders.

[Sources: http://www.schiffhardin.com/binary/designer_led_adv_draw.pdf;
http://www.shk.ca/docs/Design_BuildTurnkeyContractsProsandCons.pdf]

What are the engineering costs involved?

The MMM Group estimate is \$538,000 for engineering costs and construction supervision. This is the figure that has been used for planning purposes. This number does not include some potential charges, such as consultation with regulatory agencies.

Bridge Options

What options were examined by the Hope District Council?

Over the past decade the district has had two bridge studies done. Their results are summarized in the table below. Each study addresses options ranging from short- to long-term.

The district public works department regularly applies short-term fixes to the existing bridge. These cost taxpayers about \$50,000 per year. These costs rise each year and cannot continue indefinitely. At some point, we will be forced to settle on a long-term fix.



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A long-term fix comes down basically to one of two options: building essentially a new bridge on the site of the old bridge, or building a new bridge adjacent to the old bridge. In either case, we are obliged to follow guidelines as specified in the *Canadian Highway Bridge Design Code CAN/CSA S6-06* and its provincial supplements.

Study 1: Associated Engineering, <i>Kawkawa Lake Road Bridge Repair & Replacement Options Report, Sep 2004</i>					
Fix Type	Description	Estimated Cost (2004)	Cost in 2009 \$ ¹	Bridge Closure?	Notes
Short term	Hot mix asphalt patch. 50mm	not estimated	N/A	Yes: days	Assumption: funded from Public Works budget. Current expenditures are ~\$50K annually
	Anchored asphalt patch				
	Asphalt patch with partial asphalt overlay				
Medium term	Repave with asphalt	\$30-40K	\$33-44K	Yes: week	Remove existing asphalt; install 50-65mm asphalt lift
	Resurface with concrete deck	\$75K	\$82K	Yes: weeks	Estimate is for approach spans only; significant strengthening of the truss span would be required to support increased dead loading
	Resurface with timber deck	\$20-30K	\$22-33K	Yes: weeks	
Long term	Staged span replacement: truss span	\$650-750K	\$708-817K	Yes: months	Does not include demolition costs
	Staged span replacement: approach spans	\$500-600K	\$545-654K	Yes: month	
	Bridge replacement on same alignment	\$800K-1M	\$871K-1.1M	Yes: months	
	Bridge replacement on parallel alignment	\$1.3-1.5M	\$1.4-1.6M	Minimal	2-lane, 12m wide deck. Does not include demolition of existing bridge. Does not include roadwork realignment, property acquisition, engineering, utilities

1) Bank of Canada Inflation Calculator, www.bankofcanada.ca/en/rates/inflation_calc.html

Study 2: MMM Group Limited, <i>Kawkawa Lake Road Bridge Visual Inspection & Load Rating Evaluation, Jun 2008</i>					
Fix Type	Description	Est Cost (2008)	Cost in 2009 \$	Bridge Closure?	Notes
Term Medium	a) Replace central steel tie-rods of the Howe truss; b) retrofit the lake-side glulam approach with new tie-rods; c) remove asphalt and resurface	\$440-550K	\$446-557K	Yes, weeks	Includes \$40-50K engineering
Long term	Three-span pre-cast, concrete I-girder bridge, 2 lane with sidewalks, deck area of 700SM	\$2.5-4M	\$2.5-4M	No	Engineering, land acquisition, demolition not included

Why can't we refurbish the existing bridge and buy ourselves a few years until the economy picks up? [Posted to the *Hope Standard*]

This is essentially the approach we have taken since 2004, when the first bridge study was done. We took no action. In terms of bridge replacement we have followed a "do nothing" strategy. It is only a



Kawkawa Lake Road Bridge (KLRB) Frequently Asked Questions

matter of time until we will be forced to take action. When that day comes, it may be forced on us by loss of life or serious injury. As a community we must determine a course of action and follow through with it.

What will be the load limit of a new bridge?

In accordance with the *Canadian Highway Bridge Design Code CAN/CSA S6-06* and provincial supplements, the bridge must be capable of accommodating a CL-625 truck (625 kilonewtons) which in B.C. translates into a Gross Vehicle Weight (GVW) of 63.5 tonnes. This is akin to a building code requirement and has nothing to do with grant funding.

Could we install a temporary Bailey bridge if we wanted to renovate the existing bridge?

Bailey bridges typically span distances up to about 60m maximum. The existing bridge spans a distance of 72m, so this might not be as straightforward as simply plunking down a bridge. This option has not been explored in depth. Temporary roadway approaches would be an issue.

The existing bridge had new footings poured that will hold a new concrete deck and are up to government standards. Why not just build on the present bridge? [Posted on the *Hope Standard*]

In 2004, Associated Engineering, Ltd., conducted a study of the bridge and laid out options. One option they investigated was resurfacing the existing bridge with a concrete deck. Due to the weight of the concrete superstructure, they concluded that significant strengthening of the truss span would be required. In their words, "Strengthening would probably be required to simply support the weight of the concrete."

They also considered replacing the bridge on the same alignment and said this:

As the existing piers are in good condition, it appears feasible to replace the structure only on the existing piers. Some work would be required to the piers to suit the replacement bridge configuration. In addition to utilizing the piers, the extent of road works required is minimized if the current alignment is followed.

Replacing the bridge on the existing alignment will have an impact on local traffic. It would be necessary to detour all traffic via the Coquihalla Highway for the duration of the project. The construction schedule would be on the order of 8 weeks minimum and possibly longer.

A replacement superstructure utilizing the existing piers would probably consist of a multiple steel girder bridge with a concrete deck. With a conventional superstructure the future bridge width would be limited to two lanes and a sidewalk. To achieve a wider bridge deck, the pier would have to be widened.

An order of magnitude cost estimate to replace the existing bridge on the same alignment and utilizing the existing piers is \$0.8 to 1.0 Million. This estimate does not include demolition of the existing bridge. An allowance of \$50,000 to \$150,000 may be needed, depending on acceptable durations of road closures.

What AE did not address is raising the bridge above 200-year floodplain on existing piers. Even if we were permitted to build on the existing piers, the project would not be eligible for grant funding as it would not meet the specifications laid out in the *Canadian Highway Bridge Design Code CAN/CSA S6-06* and its provincial supplements.

Will the grade and approaches to the proposed bridge be changed?

If the new bridge is built, new approach roads will have to be constructed and the grade level of those roads will change. The approach grade for westbound traffic will be reduced from 6.85% to ~6%, for eastbound traffic the approach grade will increase from 5.2% to ~6.2%, and the grade of the Union Bar Rd. approach will be increased to approximately 6.5%.

I have heard that a new bridge will require a cloverleaf to provide access to Union Bar Road. Is this true?

No. Access to Union Bar Road will be via a standard intersection.



Kawkawa Lake Road Bridge (KLRB) Frequently Asked Questions

I have heard that the district is in possession of a full set of completed bridge plans that were drawn up several years ago. Is this true? If so, why do we need to redesign a bridge?

This is not so. Plans are being finalized now.

Grants & Funding

Where will we borrow the money for this project?

The money will be borrowed through the Municipal Finance Authority of BC [www.mfa.bc.ca].

If we were to borrow now, what interest rate would we pay?

Interest rates fluctuate daily. Go to www.mfa.bc.ca/marketrates.htm to see the latest rates. Look under *Indicative Market Rates* at 20- and 25-year terms.

How much are the grants that have been pledged to date?

The governments of Canada and British Columbia will each invest up to a maximum of \$3,345,833 for a project total of \$6,691,666. These are matching, reimbursement grants. That is, the District of Hope must take the lead and invest one dollar to receive two dollars. The district is seeking approval in the referendum to borrow up to \$5M instead of just its nominal share of \$3.3M. This is in order to cover additional costs such as land acquisition. Approving the referendum does not mean that the district will borrow \$5M. It means that the district has voter approval to borrow up to that amount. The district will draw on that approved amount for the exact funding required. Borrowed money, once it has been borrowed, cannot be returned, even if it is in excess of our needs. Nor can it be diverted to other projects. Current estimates indicate that the sum we will actually need to borrow in the neighbourhood of \$3M.

Grant funding is contingent on successful project completion. We cannot stop short of successful completion and expect to receive grant funding.

Do our grants come with strings attached?

Yes. For example, some costs are eligible expenses, some are not. Below is a list of eligible and ineligible costs as outlined in the *Building Canada Fund On-line Program Guide* which can be found at <http://www.buildingcanada-chantierscanada.gc.ca/alt-format/pdf/bcfguide-fccmanuel-pe-eng.pdf>

Eligible Costs

- a. Capital costs of acquiring, constructing, or renovating a tangible capital asset
- b. Costs of joint communications activities and road signage recognition
- c. All planning (including plans and specifications) and assessment costs such as the costs of environmental planning, surveying, engineering, architectural supervision, testing and management consulting services, to a maximum of 15% of total eligible costs
- d. The costs of engineering and environmental reviews, including environmental assessments and follow-up programs...and the costs of remedial activities, mitigation measures and follow-up identified in any environmental assessment
- e. Costs of project-related signage, lighting, project markings, and utility adjustments
- f. Costs of Aboriginal consultation
- g. Costs of developing and implementing innovative techniques for carrying out the project
- h. Recipient audit and evaluation costs
- i. Other costs that, in the opinion of Canada, are considered to be direct and necessary for the successful implementation of the project and have been approved in writing prior to being incurred

Ineligible Costs

- a. Cost of developing a business case or proposal for funding
- b. Cost of purchasing land and associated real estate and other fees
- c. Financing charges and interest payments on loans



Kawkawa Lake Road Bridge (KLRB) Frequently Asked Questions

- d. Leasing land, buildings, equipment and other facilities [e.g., bridge rental]
- e. Legal fees
- f. Reimbursable PST, GST

Taxes and Debt

How much will a new bridge cost me yearly in taxes?

This depends on four things:

1. The amount borrowed by the district
2. The term (length) of the loan
3. The interest rate of the loan
4. The appraised value of your dwelling

The table below shows approximately how much it would cost Hope taxpayers to pay back loans of \$3-4-5M over a term of 20-years at interest rates of 5% and 6%. Increased taxes per \$100,000 of assessed value would range from \$14.27 to \$35.39 per year.

How much might this cost the average homeowner? According to Statistics Canada, in 2006, the latest date for which numbers are available, the average owned dwelling in Hope was appraised at \$228,001.00. The table below shows what the owner of that average dwelling would see in increased taxes per year for a hypothetical mix of amounts, terms, and interest rates. What the table shows is that the owner of the average \$218,000 house would see his or her property tax rates increase by a figure ranging from a low of \$32.54 to a high of \$80.69 per year depending on the amount borrowed and the terms of the loan.

Impact of Borrowing per \$100K Assessment and on Average Hope Home (2006 Average Assessed Value: \$228,001.00)					
Loan Amount	Years	Rate	Annual Payment	Addition to taxes per \$100K assessment/year	Total increase per average Hope household/year
\$ 3,000,000	20	5.0%	\$175,745	\$14.27	\$32.54
		6.0%	\$190,745	\$15.49	\$35.32
\$ 4,000,000	20	5.0%	\$234,327	\$19.03	\$43.39
	20	6.0%	\$254,327	\$20.65	\$47.08
\$ 5,000,000	20	5.0%	\$401,213	\$32.58	\$74.28
		6.0%	\$435,923	\$35.39	\$80.69

Sources: (1) Statistics Canada, www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/details/Page.cfm?Lang=E&Geo1=CSD&Code1=5909009&Geo2=PR&Code2=59&Data=Count&SearchText=Hope&SearchType=Begins&SearchPR=01&B1=All&Custom= (2) Municipal Finance Authority of BC, www.mfa.bc.ca/amortschedules.htm

Note that, if you consult the amortization tables at www.mfa.ca, you will see slightly lower rates for the same amounts and terms. That is because the MFA requires a 1% contribution to their Debt Reserve Fund. This contribution is returned to the municipality when the debt is retired.



Kawkawa Lake Road Bridge (KLRB) Frequently Asked Questions

Aren't taxes in Hope already excessive?

Hope's tax rate falls roughly in the middle of similarly sized municipalities.

There are eight municipalities in BC with a population between 5000-8000 inhabitants (2006 census). Total tax rates (aggregate of school, district, RCMP, etc.) are shown below. Hope ranks 5th on the list, placing it slightly above the tax rate average for BC communities of similar size.

Taxes and Charges on a Representative House - 2009		
Municipality	Pop (2006)	Total Tax¹ Rate
Revelstoke	7230	6.1478
Kimberley	6139	6.2183
Ladysmith	7538	6.8865
Castlegar	7259	6.9990
Hope	6185	8.3561
Trail	7237	8.9572
Merritt	6998	8.9731
Smithers	5217	10.4368
Averages	6725	7.8719
¹ Total Tax Rate includes hospital, municipal, regional district, school, & other taxes		
Source: www.cd.gov.bc.ca/lgd/infra/statistics_index.htm		

Hope's council is committed to enlarging the community tax base, thus spreading our expenses over more taxpayers, as evidenced by the newly published Hope District *Economic Development Plan*. [<http://www.hopebc.ca/hopebc-economic-dev-plan.pdf>]

Isn't Hope District's debt out of control?

No. Every municipality in B.C. has a liability (debt) servicing limit set by the provincial government's conservative accounting regulations. Our liability limit based on last year's revenue is \$2,083,625.75. Our annual servicing cost before bridge borrowing is \$504,338.00 (*please note this number has been revised from version V11C of this FAQ*). If we were to borrow \$5M, which we won't because we won't need \$5M for the bridge, our total annual servicing would increase to \$924,338.00, well within the permitted range. We are already approved to borrow up to that amount. We don't like debt, but sometimes debt is necessary.

Traffic Impact

If we build a new bridge or renovate the old, will we still be able to drive across the river?

Consider two scenarios:

1. Construction of a new bridge upstream of the existing bridge, as is proposed.
2. Repair or replacement of the existing bridge

If a new bridge is built upstream of the existing bridge on a new alignment, the existing bridge will be available during the construction period. As new approach roads will have to be constructed, there will be some traffic disruption, but no bridge closures. There will be traffic management required (flaggers, single lanes, etc.)



Kawkawa Lake Road Bridge (KLRB) Frequently Asked Questions

If we were to replace the existing bridge on its existing alignment, there would be no way to cross the river for some period of time. How long? "...Eight weeks minimum and possibly longer...." according to the AE study.

If the bridge were to be closed, how will we get to downtown Hope?

Motorists will have no option but to travel in and out via Othello Road and Hwys 5 and 3. The distance from the east side of the existing bridge to 6th Avenue is ~0.6km. The same trip via the detour is ~20.4km. Obviously, this is an inconvenient distance for motorists, an impractical distance for bicyclists, and an impossible distance for pedestrians.

If there is no bridge across the Coquihalla either for short or long periods of time, there will be no way for pedestrians to cross the river. Schoolchildren from the Richmond/Mallard area will not be able to walk to school except by using the CN Bridge, which is illegal. Isn't this a public safety issue? And what about fire trucks and first responders?

Yes, these are issues. It is one of the factors that council and staff considered in proposing the new bridge. One advantage of building a new bridge is that it keeps the existing bridge open.

If we have to close the river crossing during construction or, at a minimum, slow traffic down, doesn't it make sense to do it in the summer, when schools are not in session? This, of course, will hurt Kawakawa Lake tourism.

The timing of construction will have to be carefully timed to minimize its impact on residents and visitors.

If a new bridge is built, will it not encourage Nestlé to run water trucks over the bridge?

No. Nestlé's corporate policy is not to run trucks through residential areas for safety reasons. In addition, the district has a written agreement with Nestlé that ensures that Nestlé will continue to use its current route to transport bottled water even if a new bridge with adequate weight limits were to be constructed.

Does a new bridge mean more traffic through the Kawkawa Lake residential area?

No increased traffic is expected as a result of a new bridge. Most of the traffic is residential. There will be a significant reduction in traffic delays.

Flooding & Bridge Elevation

Is it true that a new bridge would have to be constructed to withstand a 200-year flood?

Yes. Federal and provincial regulations require it.

What is a 200-year flood?

A 200-year flood is one that can be expected to occur, on average, once every 200 years. A floodplain map delineates the area that can be expected to flood, on average, once every 200 years. This is called the 200-year flood. A 200-year flood can occur at any time in any given year; the indicated flood level may be exceeded; and portions of the floodplain can flood more frequently.

Floodplain maps show the location of the normal channel of a water course, surrounding features or developments, ground elevation contours, flood levels and floodplain limits (the elevation and horizontal extent of the high water marks of a 200-year flood).

You can see 200-year flood plain maps for our area at:

Coquihalla River near Hope: http://www.env.gov.bc.ca/wsd/data_searches/fpm/reports/bc-floodplain-maps/CoquihallaR_Hope/1-85-27-1.pdf



Kawkawa Lake Road Bridge (KLRB) Frequently Asked Questions

Fraser River near Hope: http://www.env.gov.bc.ca/wsd/data_searches/fpm/reports/bc-floodplain-maps/FraserR_SilverhopeCrk/1-87-1-1.pdf

How high would the water rise in a 200-year flood?

That depends on local topography. See the floodplain maps referenced above. But to give you some idea of how high the water would be, here is a comment from a study made after the Nov 1990 flood:

“The CN Rail Bridge [roadway] is expected to be overtopped, or nearly overtopped during the 200-year flood.” [Source: Northwest Hydraulic Consultants, Ltd., *Coquihalla River Flood Hazard Management Study Final Report*, Mar 1994, p.12]

We’ve had floods in the past. How high did they get, what damage did they do?

Year	Month	Estimated Return Frequency (Years)	Damage
1932	Feb	unk	Flooding down Hudson’s Bay, Fort, Wallace Sts. to the Fraser River
1948	unk	unk	unk
1967	unk	unk	unk
1980	Dec	20	Partial collapse of one CN Bridge pier
1984	unk	30	unk
1989	Nov	unk	unk
1990	Nov	50	Kawkawa Lake Rd bridge piers damaged by scouring

Can we lower the river, thus lowering the 200-year floodplain level, by removing gravel? [Posed in a *Hope Standard* editorial]

This is best answered by quoting from the *Coquihalla River Flood Hazard Management Study Final Report* of March 1994:

We do not recommend a gravel removal or dredging program to manage flood hazard along the Coquihalla River, for the following reasons:

There is no evidence of general bed aggradation [the raising of stream beds or flood plains by deposition of sediment eroded and transported from upstream]...and the channel appears stable,... typical gravel deposits that accumulate along the river are mobilized and transported before the peak of the flood wave and have little impact on raising water levels during the peak of the flood,... The Coquihalla River is steep and gravels are mostly deposited near its mouth, or at the junction with the Fraser River. Removing gravels at the mouth only affects water levels locally, extending perhaps as far back as the Golf Course Bridge, and has no impact on water levels upstream of the CN Rail bridge where the most severe flooding is expected.

A gravel removal program...would be strongly opposed by the fisheries agencies.

There may be some justification for gravel removals to reduce bank erosion where accumulation of coarse sediment has forced the low flow channel against one bank or the other, causing erosion. Gravel removals provide a relatively low-cost method of reducing bank erosion, although this would only apply...downstream of the Golf Course Bridge.



Kawkawa Lake Road Bridge (KLRB) Frequently Asked Questions

Source: www.hope.ca/upload/dcd610_Northwest_Hydraulic_Coquihalla_RiverFlood_Hazard_Mgmt_1994_Study.pdf

I have heard that, if federal funding used for this bridge that federal guidelines will have to be followed. One of these guidelines means that we will have to design the new bridge with 200-year floods in mind. Wouldn't this require the bottom of the new bridge to be at the level of the top of the truss on the old bridge?

In the current design the roadway of the new bridge would be almost 3 metres higher than the old.

If you look at the floodplain map showing the 200-year floodplain, you can see that it extends nearly all the way to the BC Hydro sub-station on Kawkawa Lake Road near the playing fields. If all this is underwater during a heavy flood and the bridge can't be used anyway, why is it important that it be built to 200-year flood standards?

One point of building to the 200-year standard is so that we don't lose the bridge. During the flood of Nov 1990, judged to be a 50-year flood, water reached the bottom chord of the existing bridge and almost swept it away.

Archaeology and First Nations

Have archaeology studies in the area been completed?

A preliminary assessment confirms that the area of the bridge is not historically sensitive. This is to be confirmed in collaboration with the Sto:lo nation. Early indications are that this will not be an issue.

Utilities

Are any utilities involved in either the new construction or a rehab or demolition of the old?

Gas, electricity, and telephone are impacted.

A Terasen gas line runs under the existing bridge beneath the cantilevered walkway. On the town side, the line crosses to the upstream side of the bridge, and then disappears underground.

BC Hydro electric lines and Telus telephone lines cross the river suspended on poles just upstream of the existing bridge.

Were a new bridge to be constructed on a new alignment, these utilities would need to be rerouted. Preliminary estimates for this work are as much as \$200,000.00 and they are included in the Engineering Costs Estimate.

Water and sewer lines passing under the river will not be affected by construction.

The Referendum

Where and when can I vote?

Advance voting will be held on Wednesday, 3 Mar, and Wednesday, 10 Mar from 8AM to 8PM at the District Office, 325 Wallace Street.

General voting will be held on Saturday 13 March from 8AM to 8PM at the Coquihalla Elementary School, 455 6th Avenue.

What is the question that will be put at the referendum?



Kawkawa Lake Road Bridge (KLRB) Frequently Asked Questions

"Are you in favour of the District of Hope adopting Kawkawa Lake Bridge Loan Authorization Bylaw No.1288, 2009 to authorize the borrowing of up to \$5,000,000 for the District's share of costs to construct a new Kawkawa Lake Road bridge?"

How much will the referendum cost?

A maximum of \$23,000.00 was requested of local council for this referendum. Local council has approved an expenditure of up to this amount.

This amount is broken down as follows:

Expense Type	Estimated Cost
Wages	\$12,000
Supplies	\$1,300
Communications	\$5,000
Ballot Printing	\$3,000
Rental	\$900
Legal	\$1,000
Total:	\$23,000

Some explanation of these costs:

In BC, procedures for elections and other voting are set out by the *Local Government Act* (see link below), not by local communities. These procedures dictate when and how voting is to be conducted. Local officials cannot decide to hold a vote "on the cheap".

For example, our referendum vote must provide for:

- Legal notices in local media (some require two separate insertions) to inform the public of the proposition to be voted, voting venues, dates and times, and all other pertinent information
- *Advanced Voting Opportunities* for persons who will not be present on voting day, 13 Mar. Our advanced voting opportunities are scheduled tentatively for 3 Mar and 10 Mar.
- *Special Voting Opportunities* for those unable to travel to a voting place (the aged, infirm, incapacitated). For instance, teams of Hope election officials will travel to the hospital, Hope Lodge, Riverside Manor, and the Park Street Manor on voting day. Election workers are not permitted to work singly and must be part of a team of 2-3 persons. This requires adequate staff.
- Design of ballots by the voting machine company so that they can be read accurately. The machines read proprietary markings that eliminate ballot tampering.
- Programming and auditing of voting machines
- Printing of ballots by a certified printer
- Rental of voting places and voting machines (if required)
- Miscellaneous items such as office supplies, batteries for voting machines, ballot boxes, etc.
- Legal review as required

[Source: See the BC *Local Government Act*, Sections 3 & 4, at www.bclaws.ca/Recon/document/freeside/--%20I%20--/local%20government%20act%20%20rsbc%201996%20%20c.%20323/00_act/96323_03.xml]

What are the ground rules for declaring the outcome of the referendum? Two-thirds majority? Simple majority? Other?

A simple majority of votes will carry the day, either for or against.

What happens if the referendum fails, i.e., is not approved by voters?

If the referendum fails, then this project will go back on the shelf as a "shovel-ready" project. The shelf-life of our grant funding is until 2016. The district will have to pay for sunk costs expended to date on this project. Grant funding, contingent as it is on successful project completion, will not help us defray any of these costs.



Kawkawa Lake Road Bridge (KLRB) Frequently Asked Questions

When will we know the results of the referendum?

As the election is automated, we will know the results as soon as the voting closes at 8PM on 13 Mar.

Timeline

Date	Event
~18 Feb	Completion of 100% bridge design plans by MMM Group
18 Feb	Public Meeting
3 Mar	First Advanced Voting opportunity
10 Mar	Second Advanced Voting opportunity
13 Mar	Official Date of Referendum