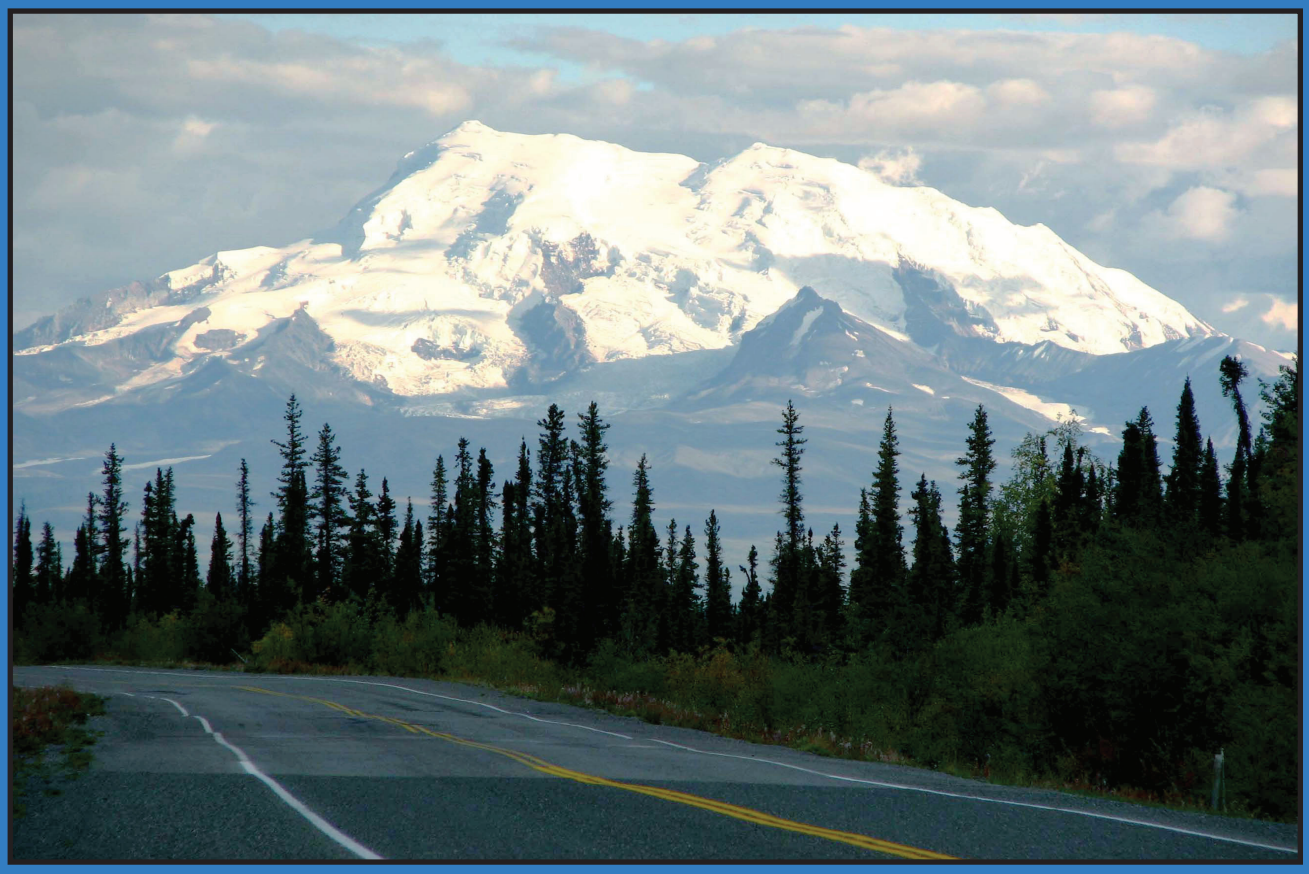
Eastern Alaska Highway Bridges



FHWA Competitive Highway Bridge Program Grant Application

2018

Alaska Department of Transportation & Public Facilities

All Photos by DOT&PF Staff.

Cover Photo: Wrangell Mountains and Mount Drum from the Richardson Highway near dusk.

Overleaf:

Photo 1: Historical photo of the Rock Creek Bridge. DOT&PF Archives.

Photo 2: The Gulkana River Bridge. DOT&PF Archives.

Eastern Alaska Rural Deficient Bridge Upgrades

Project Abstract

The Alaska Department of Transportation and Public Facilities (DOT&PF) requests $11,358,043 from the FHWA Competitive Highway Bridge Program for the Eastern Alaska Rural Deficient Bridge Upgrades Project. This project will rehabilitate one bridge in poor condition and replace two bridges in poor condition located in the same general vicinity of Eastern Alaska, a remote, high-cost location of the state.

- The **Gulkana River Bridge**, located at Milepost (MP) 127 on the Richardson Highway is in poor condition due to advanced deterioration of the deck. The un-crashworthy bridge railing constitutes a major safety defect. It will receive will receive deck rehabilitation and crash-tested bridge railing, increasing the NBI rating from "poor" to "good."
- The **Rock Creek Bridge** is located at MP 25 of the Denali Highway. The substructure is in poor condition. This bridge will be replaced with a new facility constructed in the same general traffic corridor, increasing the NBI rating from "poor" to "good."
- The **Chokosna River Bridge** is located at MP 60.6 of Edgerton Highway/McCarthy Road. Both the deck and substructure are in poor condition. This bridge will be replaced with a new facility constructed in the same general traffic corridor, increasing the NBI rating from "poor" to "good."

Although the population of these regions is low, these roads have significant economic, national security, and life-safety value. Alaskans living in remote locations rely heavily on DOT&PF transportation infrastructure for access to subsistence, commerce, employment, schools and medical care. Moreover, this corridor provides important connections for the military, the visitor industry, freight haulers, and the Trans-Alaska Pipeline System (TAPS) maintenance crew.

DOT&PF will implement both technical and project delivery innovations to improve bridge durability and accelerate project delivery. The project will also reduce long-term maintenance expenses of the subject bridges.

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Department of Transportation & Public Facilities
Statewide Design & Engineering Services Division
Phone: 907-465-8890
Fax: 907-465-3124

MEMORANDUM

TO: Kenneth J. Fisher, P.E.
Chief Engineer

DATE: November 19, 2018

FROM: Richard Pratt, P.E.
Chief Bridge Engineer

SUBJECT: Competitive Highway Bridge Program Grant Proposal Authorization

The Competitive Highway Bridge Program is a one-time funding opportunity available to states with low population densities. We have developed three proposals for funding under this grant program, one for each of the three regions:

Region	Proposal Name	Project Budget	Proposal Amount
Central	South Seward Highway Bridges	$17,456,514	$15,880,190
Northern	Eastern Alaska Rural Deficient Bridge Upgrades	$12,485,482	$11,358,043
Southcoast	Ketchikan Bridge Rehabilitation and Replacement Project	$14,419,466	$13,117,388
	Total	$44,361,462	$40,355,621

Your authorization is required for grant submission. By submitting the grant applications through the Federal online portal, Grants.gov, your signature will be attached to the following forms:

- SF-424: Application for Federal Assistance
- SF-424D: Assurances for Construction Programs
- SF-LLL: Disclosure of Lobbying Activities

Please sign below to indicate your approbation of these three proposals:

Kenneth J. Fisher, P.E. 11-19-18
Date

cc: Marc Luiken

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2018

Alaska Department of Transportation and Public Facilities

FHWA Competitive Highway Bridge Program Grant Proposal

Eastern Alaska Rural Deficient Bridge Upgrades Project

State Priority Ranking	**2 of 3**
Previously Incurred Project Eligible Costs	**$2,260,442**
Future Eligible Project Costs	**$15,085,040**
Total Project Cost	**$17,345,482**
Program Grant Request Amount	**$11,358,043**
Federal (DOT) Funding Including Program Funds Requested	**$15,779,185**

Proposal:
Rehabilitate the Gulkana River Bridge and replace the Chokosna River and Rock Creek Bridges. The poor condition of these three structures threatens military, freight, industrial, and visitor access to key parts of Alaska's territory. These roads provide the only access to important subsistence hunting, fishing, and gathering resources that thousands of Alaskans rely on to feed their families.

This funding will ensure continued maintenance access to over 300 miles of the Trans-Alaska Pipeline System, as well as providing critical primary or secondary access to seven of Alaska's military bases. Bundling these projects will reduce project costs by 5.4 percent.

Table of Contents

Appendices

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Section 1: Project Narrative

a. Project Description

Eligibility

The Alaska Department of Transportation and Public Facilities[1] (DOT&PF) requests $11,358,043 from the FHWA Competitive Highway Bridge Program for the Eastern Alaska Rural Deficient Bridge Upgrades Project. The Federal/State funding ratio for Alaska is 90.97 percent/9.03 percent in accordance with 23 U.S.C. 120(b),[2] and the State commits to providing this match, anticipated to be $1,127,439. For the Department's Funding Commitment Letter see Appendix F. Bundling creates cost savings of $715,041, 5.4 percent of the unbundled total.

All documents and data referenced in this proposal are available at the DOT&PF Competitive Highway Bridge Program website.

This project will rehabilitate one bridge in poor condition and replace two bridges in poor condition located in the same vicinity of Eastern Alaska, a remote, high-cost location of the state.[3] The three bridges are located on public roads on the federal-aid highway system, and all are fully eligible for the National Highway Performance Program (NHPP). The Richardson Highway is classified as a "Minor Arterial." Edgerton Highway/McCarthy Road and Denali Highway are listed as "Rural Major Collector" roads. All meet the definition of a "highway" under 23 U.S.C. 101(a)(11) and a "public road" under 23 U.S.C 101(a)(22).

- The **Gulkana River Bridge**, located at Milepost (MP) 127 on the Richardson Highway is in poor condition due to advanced deterioration of the deck.[4] It will receive deck rehabilitation and crash-tested bridge railing, increasing the National Bridge Inventory (NBI) rating from "poor" to "good."
- The **Rock Creek Bridge** is located at MP 25 of the Denali Highway. The substructure is in poor condition.[5] This bridge will be replaced with a new structure constructed in the same general traffic corridor, increasing the NBI rating from "poor" to "good."
- The **Chokosna River Bridge** is located at MP 60.6 of Edgerton Highway/McCarthy Road. Both the deck and substructure are in poor condition.[6] This bridge will be replaced

[1] The sponsoring agency, the Alaska Department of Transportation and Public Facilities, is a cabinet-level department of the State of Alaska, a member of the FHWA formula program, and eligible to receive these grant funds. The State of Alaska is listed as eligible under Section C of the Notice of Funding Opportunity for the Competitive Highway Bridge Program.
[2] Form SF-424C requires use of a whole number percent for Federal match, causing a discrepancy from actual values found in this narrative.
[3] "Poor," "fair," and "good" condition as used in this proposal meet the definitions in 23 CFR 490.409(b). "Bridge" meets the definition in 23 CFR 650.305. "Rehabilitation" and "replacement" used in accordance with definitions in 23 CFR 650.405.
[4] DOT&PF Structure Inventory and Appraisal Sheet – Gulkana River Bridge (574).
[5] DOT&PF Structure Inventory and Appraisal Sheet – Rock Creek Bridge (684).
[6] DOT&PF Structure Inventory and Appraisal Sheet – Chokosna River Bridge (1193).

with a new structure constructed in the same general traffic corridor, increasing the NBI rating from "poor" to "good."

Table 1 summarizes the National Bridge Inventory data for the three bridges scheduled for rehabilitation or replacement, including an overview of the condition rating, load posting information, functional classification, current AADT, and current AADT-truck information demonstrating the need for the work detailed later in this report.

Table 1. Bridge Information for the Eastern Alaska Rural Deficient Bridge Upgrades Project

	Gulkana River	Rock Creek	Chokosna River
NBI Structure No.	574	684	1193
Deck Rating (Item 58)	**4**	**6**	**4**
Superstructure Rating (Item 59)	**6**	**5**	**5**
Substructure Rating (Item 60)	**7**	**4**	**4**
Load Restricted[7]	No	No	Yes
Load Limited[7]	No	Yes	Yes
Current Load Rating	HS22.2 (deck)	HS16.0 (girder)	HS12.0 (floorbeam)
Roadway Functional Classification	Minor Arterial	Rural Major Collector	Rural Major Collector
Current AADT[8]	999	100	80
Percent Trucks (%)	23	14	11
Work Planned	Rehabilitation	Replacement	Replacement

All three bridge projects are currently included in the Statewide Transportation Improvement Program (STIP), and the Department has begun the process of amending the STIP by combining all three bridges into a single bundled project under STIP Need ID: 32027.

The **Gulkana River Bridge** is currently included in the STIP Need ID: 29812 as part of a larger rehabilitation and widening of the Richardson Highway between MP 115-148. The construction phase of this project is not programmed in the near funded years of the 2018 – 2021 STIP and instead shows in the STIP as 'After 2021.'

The **Rock Creek Bridge** is listed in the STIP under Need ID: 27524 for replacement. The construction phase of this project is not programmed in the near funded years of the 2018 – 2021 STIP and instead shows in the STIP as 'After 2021.'

[7] "Load restricted" meets the definition in the Notice of Funding Opportunity that Item 41 in the NBI is Code P, E or D according to the *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges*. "Load limited" indicates a capacity restriction per *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges*, Item 41 Code P, E, D, or R. In the case of the Rock Creek Bridge, restriction of traffic from 2-lanes to 1-lane allowed bridge to avoid load posting.

[8] Alaska Department of Transportation and Public Facilities, *2017 Annual Average Daily Traffic (AADT) GIS Map*. Transportation Data Programs. Accessed November 2018.

The **Chokosna River Bridge** is listed in the STIP under Need ID: 27525 for replacement. The construction phase of this project is not programmed in the funded years of the 2018 – 2021 STIP and instead shows in the STIP as 'After 2021.'[9]

Following is a description of the bridge conditions, emphasizing the deficiencies that will be addressed through replacement or rehabilitation.

Gulkana River Bridge (NBI Bridge No. 574)

The **Gulkana River Bridge**, built in 1974, is a 3-span steel girder bridge with a cast-in-place reinforced concrete deck. It is 35 feet wide and 405 feet long with an approach roadway width of 31 feet. The bridge has had no significant alterations since original construction. Maintenance activities conducted by DOT&PF crews over the years include scour repair, debris removal around piers, and deck repairs. The most recent Gulkana River Bridge routine inspection[10] took place on July 14, 2017.

Figure 1. The Gulkana River Bridge

The bridge deck has been recommended for rehabilitation since 2003. Since that time, its NBI Condition Rating for Item 58 – Deck has deteriorated to a 4. At this point, Maintenance and Operations crews must routinely blast and chip deteriorated concrete down to well below the top mat of reinforcing steel during their annual patching of the bridge deck.

In addition, the bridge railing is not MASH-compliant; in fact, this style of bridge railing has not been crash-tested under any safety standard. This is particularly concerning for a bridge on the

[9] A discussion of funding challenges for these types of projects within the STIP is outlined within the Project Location section.
[10] 2017 Routine Bridge Inspection Report: Bridge No. 574, Murray.

Richardson Highway, a 65-mph facility with tens of thousands of commercial passenger and freight trips per year. The current structure lacks curbs to help prevent vehicles from leaving the deck, and its side-mounted rails resist less impact before yielding than modern rails.

Rehabilitation: To address challenges presented by the deck deterioration, DOT&PF will conduct a partial-depth deck replacement, repairing concrete damage and placing polyester concrete to protect the deck from further deterioration. To address safety risks, the bridge rails will be replaced with modern, MASH-compliant rails and curbs.[11] DOT&PF will also install new approach and transition rails compliant with modern roadway design and safety standards.

Gulkana River Bridge Condition after Proposed Work	
Deck – NBI Item 58	**7, Good**
Superstructure – NBI Item 59	**6, Satisfactory**
Substructure – NBI Item 60	**7, Good**

- Bridge overall rating returned to "good" condition.
- Deck rehabilitation will extend the life of structure for decades.
- Approach and bridge railings will meet modern safety standards.

Rock Creek Bridge (NBI Bridge No. 684)

The **Rock Creek Bridge,** built in 1955, is a single-span steel girder bridge with a timber deck. It is 20 feet wide and 61 feet long with a 20.1-foot roadway. This bridge is supported by piles constructed from recycled railroad rails. It has seen repairs but no significant alterations since its original construction. The most recent Rock Creek Bridge Routine Inspection[12] took place on July 14, 2017.

DOT&PF has been monitoring settlement and installing temporary repairs on the foundation since 1999. The near end abutment has pushed back into the approach fill, and as a result, the near end downstream corner of the bridge appears to be about one foot higher than the other three corners.

Inadequate superstructure capacity resulted in a load posting in 2011. Although the bridge was designed for two-lane traffic, it is now restricted to a single lane. As a two-lane bridge, its load rating had deteriorated to approximately HS12; as a single-lane bridge, the rating increased to HS16.

[11] The MASH-compliant system intended to be used on this bridge is in final crash testing at the Texas Transportation Institute. Testing is anticipated to be complete by January 1, 2019.
[12] 2017 Routine Bridge Inspection Report: Bridge No. 684, Murray.

Figure 2. Rock Creek Bridge

The 2017 routine inspection found the downstream girder overhanging the pile cap by more than 2 feet, and the backwall is out of plumb by 6.5 inches. Cracks have formed in pile welds and in the rail piles themselves. Despite efforts to stabilize this bridge's foundation, the near end backwall and bearings continue to move.

The bridge lacks a crash-tested bridge and approach rails.

Replacement: The proposed work replaces the existing bridge with a single-span, two-lane concrete bridge. The new structure will have "Alaska-style" decked bulb tee girders, and the foundation will be replaced with H-piles or Concrete Filled Steel Tube Substructure Units depending on what the final foundation investigation shows regarding liquefaction potential.

Riprap and fill will be placed below ordinary high water for stability and revegetation. The nominal amount of approach work, sufficient to connect to the existing roadway and return the gradeline to an attainable touchdown point in accordance with good design practice, includes up to an 8-foot rise in highway grade to accommodate the new two-lane bridge and widened, tapered approaches. No significant horizontal alignment changes are anticipated.

Figure 3. Rock Creek Backwall and Typical Rail Pile

An existing pullout located northwest of the bridge is proposed as a staging area and may be expanded during construction. A portion of this pullout is within the DOT&PF right-of-way (ROW). A temporary bridge will be installed on the north side of the road to maintain traffic access during construction and to provide additional work space when traffic is not present.

Rock Creek Bridge Condition after Proposed Work	
Deck – NBI Item 58	**9, Excellent**
Superstructure – NBI Item 59	**9, Excellent**
Substructure – NBI Item 60	**9, Excellent**

- Bridge overall rating returned to “good” condition.
- Steel bridge railing, approach rails, and transition rails will meet modern safety and design standards.
- Bridge will meet appropriate standards for seismic zone.

Chokosna River Bridge (NBI Bridge No. 1193)

The **Chokosna River Bridge** is a single span steel pony truss bridge with a timber deck. The deck and roadway are both 20 feet wide and 103 feet long; this bridge is fracture critical. The bridge was originally constructed in 1942 at Tazlina River and relocated to its present location in 1973. The most recent Chokosna River Bridge Routine Inspection took place on August 15, 2017.[13]

Every major structural component shows significant deterioration. NBI Condition Ratings for Items 58 (Deck) and 60 (Substructure) are both 4 "poor," and Item 59 (Superstructure) is rated at 5 "fair." The bridge was load posted in 2006 and has continued to deteriorate since then. Routine inspections have recommended replacement since 2015.

Figure 4. Chokosna River Bridge Foundation

The timber deck is worn and damaged, with rot initiated in the soffit. Numerous truss members have been gouged, bent, torn, and repaired. The upstream lower chord is bent at three of the four panel points. Laminar rust has initiated on the floorbeams. Visible distortion and rust is evident throughout the structure.

The near end abutment appears to be supported by timber mudsills (i.e. no deep foundation support). This abutment has significantly settled for at least the last 20 years, resulting in the need for shims under the bearings (as shown in Figure 4). The sheet pile portions of the abutments are torn and leaning up to 15 degrees. Holes have formed behind the backwalls. The bearings are failing, rotated in multiple axes with bent anchor bolts.

Replacement: The project will construct a 120-foot long, 24-foot wide replacement bridge on an alignment adjacent to the current structure and within the existing ROW. The current bridge will be used for handling traffic during construction work and then removed. The project area is approximately 0.5 miles long within existing ROW and a material source/staging area is located within an existing permitted materials site. Replacing the bridge will likely involve a minor

[13] 2017 Routine Bridge Inspection Report: Bridge No. 1193, Levings.

realignment to keep the facility within existing right-of-way, allowing the new bridge to be constructed parallel to the existing bridge eliminating the need for a detour structure during construction.

Figure 5. Chokosna River Bridge

The proposed work includes drainage improvements and roadside hardware, including potential repairs at a Chokosna Tributary culvert near MP 27.2 required to tie the new roadway into the existing McCarthy Road. The approach and bridge railings would be upgraded to MASH-compliant standards. The new structure will use "Alaska-style" decked bulb tee girders.

Chokosna River Bridge Condition after Proposed Work	
Deck – NBI Item 58	**9, Excellent**
Superstructure – NBI Item 59	**9, Excellent**
Substructure – NBI Item 60	**9, Excellent**

- Bridge overall rating returned to "good" condition.
- Steel bridge railing, approach rails, and transition rails will meet modern safety and design standards.
- Bridge will meet appropriate standards for seismic zone.

b. Project Location

The DOT&PF Eastern Alaska Rural Deficient Bridge Upgrades Project is located in the Valdez-Cordova Census Area, a sparsely populated region of Alaska which is more than 40,000 square miles in size. The geospatial bridge locations are listed in in the table below.

Bridge	Longitude	Latitude
Gulkana River Bridge	-145° 23’ 5.0”	62° 16’ 11.0”
Rock Creek Bridge	-146° 06’ 24.0”	63° 04’ 12.0”
Chokosna River Bridge	-143° 45’ 50.0”	61° 27’ 19.0”

Alaska has a relatively low population and immature transportation network with little redundancy. With many competing priorities, improvement projects are routinely evaluated and difficult programming decisions must be made to align projects with a modest transportation budget.

Projects that make improvements to the National Highway System (NHS), especially in those areas with higher traffic, often rise to the top and may be programmed into the STIP more quickly than other projects. Projects on the Alaska Highway System (AHS) are also recognized as important to the state because of their role in connecting communities, but with often lower traffic levels, improvement projects (beyond basic maintenance and resurfacing) often need to wait significantly longer before they are programmed in the STIP.

The roads in this area tend to be lightly used, when compared to traffic volumes elsewhere in the state. As a result, projects here tend to

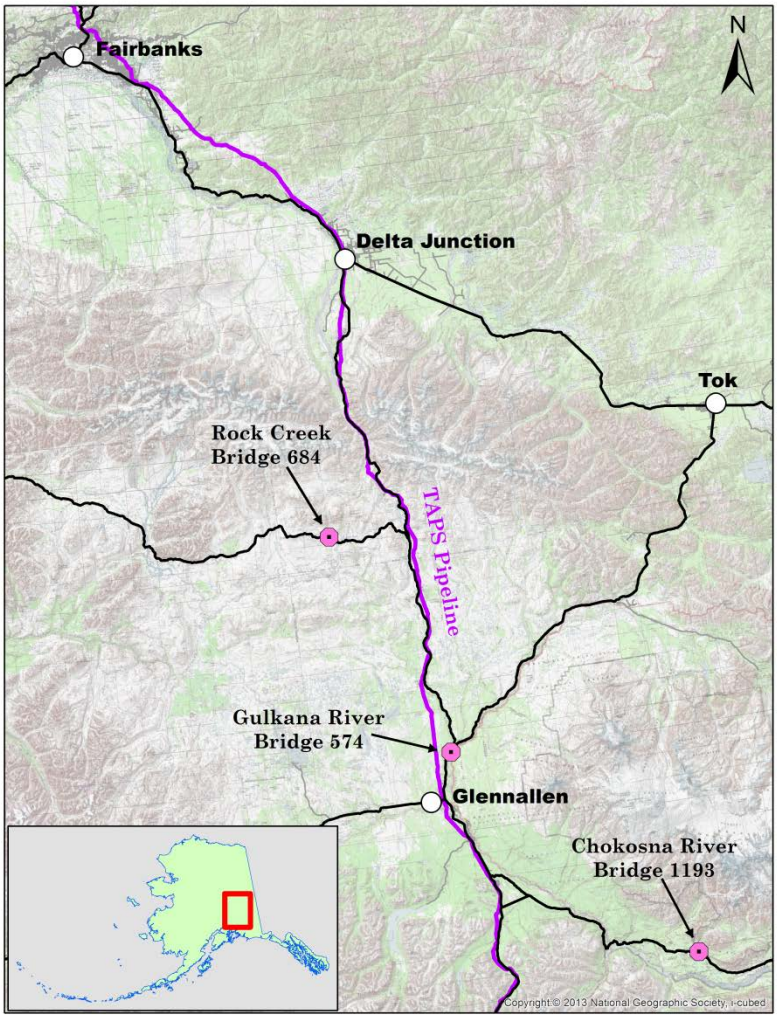

Figure 6. Project Location

fare poorly against other transportation needs and languish unfunded. Both the Rock Creek and Chokosna River Bridges are at a disadvantage compared to higher traffic and NHS bridges. The deficient nature of the bridges does merit attention, and design work for bridge improvements is underway as a result. It is likely that without grant funding, the bridges will continue to be monitored, but the project improvements will not occur for several years.

Region

This area is not incorporated into any borough or municipality, so no local government exists for most of the communities affected by this project; nevertheless, the proposed work will protect access to a transportation corridor of national importance. **Figure 6** on the previous page is a map of the general project location with each of the bridges indicated. **Figure 7** shows the Denali Highway and its approximate reference to other major population centers. **Figure 8** shows the Edgerton Highway and McCarthy Road with its approximate reference to other major population centers. **Figure 9** shows the Richardson Highway.

Like much of Alaska's rural transportation network, roads in the project area lack redundancy. Only two of the three bridges have an alternate route available, and detour length reaches up to 713 miles. The third bridge, Chokosna River Bridge, provides the only land access to the community of McCarthy, Alaska.

Although the population of this region is low, these roads have significant economic, national security, and life-safety value. Alaskans living in remote locations rely heavily on DOT&PF transportation infrastructure for access to subsistence, commerce, employment, schools and medical care. Moreover, this corridor provides important connections for the military, the visitor industry, freight haulers, and the Trans-Alaska Pipeline System (TAPS) maintenance forces.

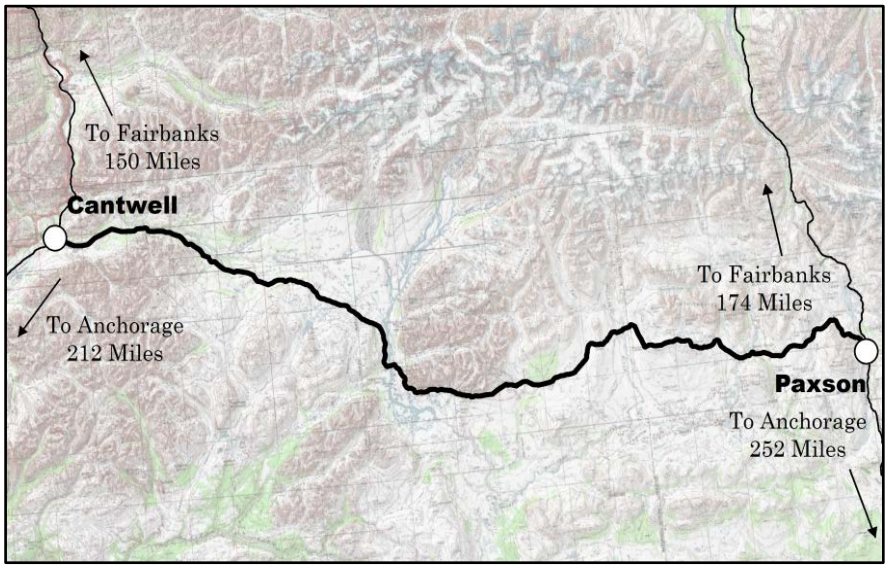

Figure 7. Denali Highway

Project Area

The **Denali Highway** (Alaska Route 8) is a 135-mile seasonal road linking the Parks and Richardson Highways, classified as a Rural Major Collector. From October to May, the highway is open but not maintained by DOT&PF.

At MP 135, the Richardson and Denali Highways meet; Paxson, Alaska (pop. 40)[14] is located at this junction. Year-round Paxson residents are dog mushers, lodge and restaurant owners, or otherwise associated with the tourism and service industries. The Bureau of Land Management operates a 50-site campground along the Richardson Highway nearby. Denali Highway has a number of public and private recreational amenities located around the Tangle Lakes Archaeological District, including lodges.

The other end of the Denali Highway junctions with the Parks Highway at the Native Village of Cantwell[15] (pop. 219)[16] located about 30 miles south of the Denali Park & Preserve and 210 miles north of Anchorage. A technical paper produced in 2000 for the National Park Service on subsistence practices by Cantwell residents found that almost 70 percent of the adult population held wage-earning jobs for an average of 9.3 months of the year.[17] Wildlife harvesting practices include spring and summer fishing either locally or traveling to fish for salmon, late summer hunting for Dall sheep or moose, and caribou hunting in the fall and winter.

The Denali Highway is paved for 21 miles from Paxson and from 3 miles from Cantwell; the rest is a gravel surface. It had an AADT of 100 in 2017, with 14 percent of that being truck traffic.

The **Edgerton Highway** (Alaska Route 10) is a 33-mile paved road at the junction of the Richardson Highway (Alaska Route 4) and Copper Center (pop. 328). The Edgerton Highway leads to the Native Village of Chitina (pop 126).

The last town before the Copper River, Chitina is a staging place for the dip-net fishery that annually draws thousands of personal use and subsistence fishermen to the area.[18] Coming from as far away as

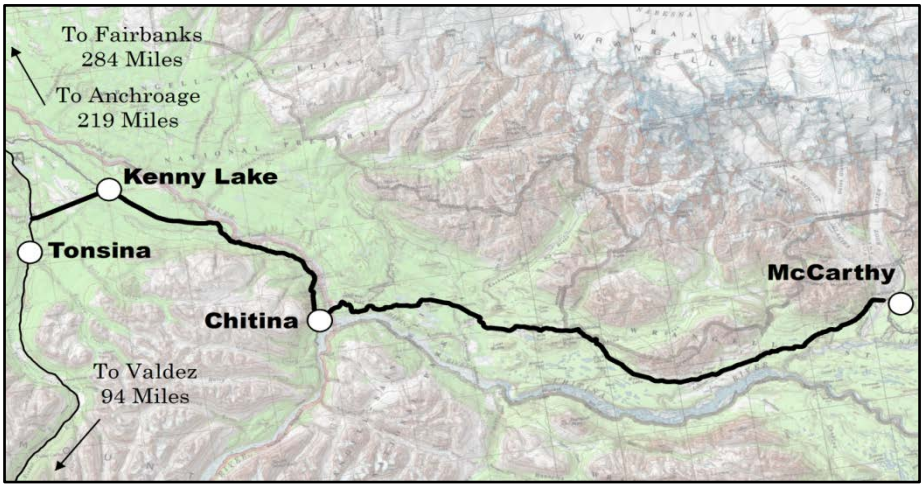

Figure 8. Edgerton Highway / McCarthy Road

[14] Paxson, Alaska: Alaska Department of Commerce, Community and Economic Development (DCCED) Community Database Online. Accessed November 29, 2018.
[15] The Native Village of Cantwell is a federally recognized Indian tribe.
[16] Cantwell, Alaska: DCCED Community Database Online. Accessed November 29, 2018. See Sec. B for more detailed discussion on a "mixed" subsistence economy.
[17] Wild Resource Harvests and Uses by Residents of Cantwell, Alaska, Simeone. 2000 (p-3).
[18] Chitina Personal Use Salmon Fishery. ADF&G website. Accessed October 15, 2018.

Anchorage and Fairbanks, the June – September season sees heavy traffic along this stretch of the highway as residents attempt to harvest enough salmon to sustain their dependents through the coming winter.

McCarthy Road continues for 58 miles after the end of the Edgerton Highway, dead-ending just short of the village of McCarthy, Alaska (pop. 28).[19] A narrow gravel road generally following the abandoned Copper River and Northwestern Railway rail bed, McCarthy Road is not maintained in the winter months from October to May, depending on the severity of the winter. It is the only access road for residents who live there year-round. The road ends just before a foot bridge over the Kennicott River.

Travelers can continue past the footbridge, where they will have shuttle bus and foot access to the Kennicott Mines National Historic Landmark and the Wrangell-St. Elias National Park and Preserve. Tourism and the service industry are important parts of the local economy in McCarthy. DOT&PF maintains one of the two gravel airstrips there.

The **Richardson Highway** (Alaska Route 4) is a 366-mile paved surface that links Valdez in Prince William Sound with Fairbanks in the Interior. It junctions with the Edgerton Highway, the Glenn Highway, the Tok Cut-Off, the Denali Highway, the Alaska Highway, the Parks Highway, the Steese Expressway/Steese Highway, and parallels the nationally vital Trans-Alaska Pipeline for most of its route.

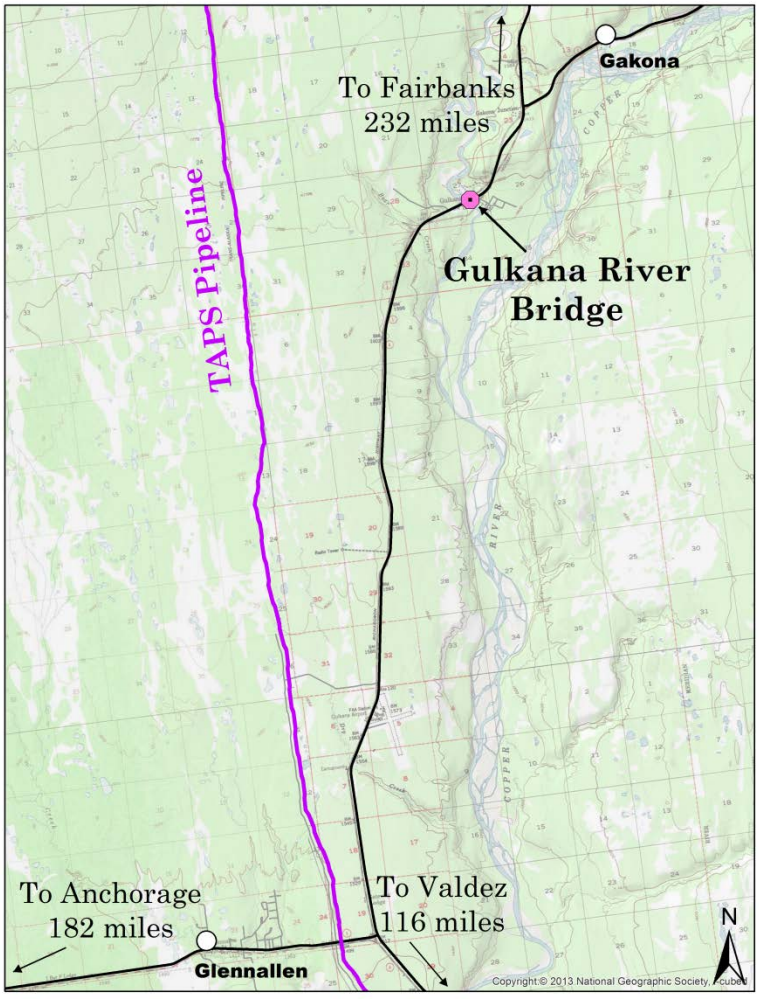

Figure 9. Richardson Highway Project Area

c. Project Parties

The Department has no project partners due to the advanced stage, the unincorporated status of the project area, the lack of utilities, and the fact that the project is

[19] McCarthy, Alaska: Alaska Department of Commerce, Community and Economic Development Community Database.

completely contained within existing State of Alaska right-of-way.

The Alaska Department of Transportation and Public Facilities Northern Region is responsible for the project direction and oversight. DOT&PF will provide the following services in support of the project:

- Primary contact with FHWA to ensure compliance with federal funding requirements
- Primary contact with federal, state and local permitting agencies
- Project management
- Professional engineering and environmental staffing
- Construction contracting administration

This project enjoys widespread support from local and statewide organizations, federal stakeholders and Alaska's Congressional Delegation. Letters of support are found in Appendix B.

d. Grant Funds, Sources, and Uses of Project Funds

Project Costs: Based on engineer's estimates of the project costs as of October 2, 2018, project bundling saves $715,041, 5.4 percent of the unbundled total cost. The total bundled project cost for this grant request will be $12,485,482. Of the total cost, the Alaska DOT&PF is requesting $11,358,043 in federal grant funding. The table below shows each project's cost estimate as a bundled project, and the share of the grant funds dedicated to each bridge.

The table below list a breakdown of costs for the combined project and the grant portion of the funds, not including the previously expended funds listed above. Alaska uses a sliding scale funding formula of 90.97 percent FHWA funds to 9.03 percent state match. Please see Appendix A: Budget Detail for supplemental information.

Grant Apportionment		
	Total Project Cost	**Grant Share**
Gulkana River Bridge	$2,334,013	$2,123,252
Rock Creek Bridge	$4,817,515	$4,382,494
Chokosna River Bridge	$5,333,954	$4,852,298
All Bridges	***$12,485,482***	***$11,358,043***

Funding: As of October 2, 2018, the Alaska Department of Transportation and Public Facilities has spent a total of $2,260,442 on projects related to the bridges bundled into the Eastern Alaska Rural Deficient Bridge Upgrades Project. All costs included in this amount are eligible for Federal participation. DOT&PF proposes to use grant funds for construction activities only; any remaining eligible design costs will be supported by traditional FHWA STIP funds that have already been programmed.

Of this, DOT&PF spent $1,973,849 on the Richardson Highway MP 115-148 Rehabilitation (Project No. Z606380000/0713016). This is a combined roadway rehabilitation and realignment project that formerly included rehabilitating the Gulkana River Bridge. That figure includes both FHWA funds and state match.

As of the same date, DOT&PF has spent $158,076 on the Rock Creek Bridge Replacement project (Project No. NFHWY00128/0750015), including both state and FHWA funds.

DOT&PF has spent $128,517 on the Chokosna River Bridge Replacement project (Project No. NFHWY00125/085028), including state and federal funds. These have been design funds.

The State of Alaska pledges to provide the 9.03 percent non-Federal matching funds. These will be provided from State General Funds as specified in Appendix F: Funding Commitment Letter.

Budget: The following table provides an overall budget for the bundled project. Costs have been consolidated by major budget categories based on engineer's estimates. Detailed budget information is included as Appendix A: Budget Detail.

Bridge Upgrades Budget Summary				
Cost Classification	Project Cost	FHWA Grant Funds	Grant Funded Construction Costs ($)	(%)
Administrative and legal expenses	$445,480	$405,253	$405,253	100%
Land, structures, rights-of-way, appraisals, etc.	$0	$0	$0	0%
Relocation expenses and payments	$0	$0	$0	0%
Architectural and engineering fees	$114,427	$104,094	$104,094	100%
Other architectural and engineering fees	$179,363	$163,167	$163,167	100%
Project inspection fees	$1,063,154	$967,151	$967,151	100%
Site work	$96,000	$87,331	$87,331	100%
Demolition and removal	$331,473	$301,541	$301,541	100%
Construction	$6,544,760	$5,953,768	$5,953,768	100%
Equipment	$1,037,000	$943,359	$943,359	100%
Miscellaneous	$990,000	$900,603	$900,603	100%
Contingencies	$1,683,825	$1,531,776	$1,531,776	100%
Total Project Costs	$12,485,482	***$11,358,043***	***$11,358,043***	***100%***

Section 2: Selection Criteria

a. Innovation

The Eastern Alaska Rural Deficient Bridge Upgrades Project takes advantage of innovations in technology and project delivery; this project does not implement innovative financing strategies. The innovations used will improve bridge conditions, add bridge capacity, improve bridge durability, and expedite project delivery.

Technical Innovation

The anticipated benefits of the Technical Innovations to be implemented will extend the life of the Gulkana River Bridge, remove the load postings on the Rock Creek and Chokosna River Bridges, reduce ongoing maintenance costs for the entire project area, reduce required construction time, and improve construction quality.

Due to Alaska's size, short building season, high seismicity, permafrost, and extreme temperature swings, Alaska DOT&PF has invented, refined, and institutionalized a number of technical and project delivery innovations.[20] While several of these are associated with Accelerated Bridge Construction (ABC) practices used around the country, Alaska has seen processes and materials that are effective in the Lower 48 fail quickly under the extreme conditions of "Alaska normal."

As a result, since the 1960's DOT&PF has developed and maintained an active research portfolio[21] to identify, test, adapt, and prove whether promising methods and materials can stand up to Alaskan extremes. Several of the innovations planned for this project are the result of this process of invention and reinvention.

Each of the Technical Innovations used in this project is the product of one or more Alaskan research studies. Details about each Technical Innovation listed in the summary are available in Appendix C on the DOT&PF Competitive Highway Bridge Program website.

Technical Innovation Summary		
	Benefits	**Bridge(s)**
Concrete-Filled Steel Tube Substructure Units	• Eliminates formwork, reducing construction time and expense • Higher seismic capacity	Potentially Rock Creek
"Alaska-style" Decked-Bulb Tee Girders	• Reduces formwork, construction time • Fewer workers needed, reducing	Rock Creek, Chokosna

[20] Daugherty, L. Challenges of Designing and Building Bridges in Alaska. International Bridge Conference 13-63. 2013 (p-3).

[21] Alaska DOT&PF invests nearly $1 million annually on transportation research projects to develop or adapt innovative ideas to our harsh environment. The 2018 DOT&PF research portfolio includes over $2 million spent or pledged to seven multi-year bridge projects. (*See:* Alaska DOT&PF Current Bridge Research Projects 2018.)

Technical Innovation Summary		
	Benefits	**Bridge(s)**
	construction expenses • Higher quality and strength concrete • Higher quality fabrication, due to controlled factory conditions • Lower maintenance	River
Cold-Climate Polyester Concrete	• Reduced traffic impact due to faster cure • Extended deck life due to imperviousness to water	Gulkana River

Project Delivery Innovation

Alaska DOT&PF anticipates that the Project Delivery Innovations to be implemented will provide the following benefits to the project: expedited project delivery, improved project quality, and reduced project risk.

Project Delivery Innovation Summary		
Innovation	**Benefits**	**Bridge(s)**
NEPA Primacy	• Takes ¼ of the time to achieve environmental documents decreasing cost and risk to project	All
Project Delivery Teams	• Quickly respond to changed conditions reducing project risk • Higher quality project due to improved communication among disciplines	All

National Environmental Policy Act (NEPA) Primacy

Alaska is one of seven states that have assumed NEPA authority from FHWA. The provision in the last two transportation bills that allowed a state to assume NEPA authority has been viewed as a streamlining effort to assist in faster infrastructure project delivery. By reducing the time needed to complete the NEPA process there will also be some fiscal savings as well. The state now takes the place of FHWA in most of the environmental negotiations, mitigation discussions, environmental permitting and NEPA document approvals.

Since the NEPA Assignment Program MOU was signed in November 2017, Alaska DOT&PF has approved 107 NEPA Documents, and the average time to develop the documents and approve them was 45 days. Under the traditional NEPA model that Alaska previously worked under, the average turnaround time on an environmental document was commonly six months.

At this writing, Alaska lacks adequate data to fully assess time and financial savings from this initiative. However, the program is modeled after a similar initiative that has been used by the California Department of Transportation since 2007; their program was found to decrease time to

draft and final Environmental Assessments by 10.9 months and to Environmental Impact Statements by 11.7 years. [22]

This environmental review model will be utilized during the environmental re-evaluation for all bridges in this bundled project.

Project Delivery Teams

Project Delivery Teams are an organizational model used in the Northern Region Alaska DOT&PF to capitalize on many of the benefits seen with Contract Manager/General Contractor (CMGC), such as knowledge transfer and utilizing multi-discipline team members capable of managing all aspects of project risk.

This model differs from the traditional "relay model" of project development, where a project is advanced to a stage and then "handed off" to support groups (e.g. environmental or right-of-way acquisition) for the next stage to be accomplished. DOT&PF found that this historically led to struggles with competing priorities, delayed timelines as new staff absorbed information and an overall reduced quality of work due to the lack of comprehensive knowledge of the project.

Project Delivery Teams consist of design, utility, right-of-way (acquisitions and engineering), drafting, environmental and construction staff reporting to a team leader. This delivery model allows for flexible assignment of work and focused priorities to ensure delivery timelines are met and project quality is optimized. This model allows for knowledge transfer between specialists and encourages team members to see the full picture of the project development process, improving the overall quality of the program. For example, several design staff in the first year of delivery team model spent the summer working in construction. Project delivery teams were started in April 2017 with two pilot teams, and have been expanded to the entire Northern Region Preconstruction & Construction divisions as of October 2018.

While delivery teams have not been in place long enough to provide clear project performance data, a recent success was advancing to construction a complex urban project that had been in the design phase for over three decades. The project involved railroad coordination, significant utility relocations and right-of-way acquisition and was an FHWA Project of Division Interest. The segment of the project sent to construction for 2018 included reconstructing the busiest intersection in Fairbanks. Through a coordinated effort of the delivery team's design & construction staff, utility engineer, and right-of-way agent the intersection was reconstructed this year and will significantly improve safety, travel time, and reliability for Fairbanks motorists.

Financing Innovation

DOT&PF will not implement any innovative funding or financing activities to complete this project.

[22] The California Department of Transportation (Caltrans) 2016 Report to the Legislature: NEPA Assignment July 2007-June 2014. Caltrans Division of Environmental Analysis. Jan. 1, 2016 (p-6).

b. Support for Economic Vitality

The proposed bundled project will enhance the economic vitality of rural Eastern Alaska by supporting the continued flow of essential goods and services, including access to subsistence hunting, military access, support of the Trans-Alaska Pipeline (TAPS), and facilitating the tourism industry.

Flow of Goods and Services

Dual Economy: It is impossible to understand the importance of this transportation infrastructure without understanding that Alaska's vast rural areas have two economies. There is the "cash" economy familiar to the rest of the nation, and there is "subsistence," which means relying on hunting, fishing, and gathering to provide food and other necessities. This proposed project takes place in a part of Alaska where these systems thrive symbiotically.

In the traditional "subsistence" economy, harvesting fish, game, and other edibles to feed a family and sustain a way of life is the norm. For example, an Alaska Department of Fish and Game survey of Cantwell, Alaska found that nearly *all* households in subsistence regions reported engaging in some form of traditional harvesting or gathering.[23]

The subsistence economy is comparable in scope to the cash economy, with over 33 million pounds of fish and game harvested each year statewide; information on the quantity of wild plants (berries, roots, etc.) harvested is not available. In addition, most adults engaged in subsistence also keep some level of connection to the cash economy through paid work or running a small, often seasonal, business to supply what the land cannot provide.[24] The residents of the Valdez-Cordova Census Area follow this typical combination of employment and subsistence.

Military Access: Of the 10 military bases in Alaska, seven have primary or secondary land access through this transportation corridor. The Missile Defense Command at Fort Greely is situated near Delta Junction, directly to the north of the project area. Further north, Eielson Air Force Base and Fort Wainwright Army Base are located in the Fairbanks area. The Army, Air Force, and U.S. Coast Guard all maintain significant presences in the Anchorage area. The roads in the project area provide direct land access between these bases and the U.S. Coast Guard Marine Safety Unit in Valdez, Alaska, as well as important secondary land routes to these bases both from Anchorage and Seward in the south and Canada to the east.

Freight: Overland trucking supplies much of the military and civilian freight needed in this region. Over 35,000 individual commercial vehicle trips were completed just along the Richardson Highway portion of this project area in 2014, and by 2035, this number is expected

[23] Simeone, p-48.
[24] Subsistence in Alaska, a Year 2014 Update. ADF&G. 2016 (p-3).

to jump to more than 46,000.[25] This is one of a very few major freight corridors in the State, and Alaska's future development depends on its continued safety and reliability.

TAPS Maintenance: The Trans-Alaska Pipeline System delivers over 500,000 barrels of crude oil per day from the North Slope to the world market through the Port of Valdez.[26] Through most of the project area, TAPS parallels the Richardson Highway, and several TAPS pump stations are located along the route. Pipeline maintenance crews rely on this route for routine and emergency access to roughly 350 miles of the pipeline.

Economic Importance of Tourism

In the summer of 2016, Alaska's visitor industry welcomed over 1.8 million people to the State, resulting in nearly $2 billion in revenue.[27] Each of the bridges in the project area directly or indirectly supports this economic engine. More than 70,000 people visit the 13.2 million acre Wrangell-St. Elias National Park & Preserve and the Kennecott Mines National Historic Landmark[28] on average each year, and McCarthy Road provides the only road access to the Park in the project area.[29] Dozens of small local businesses rely on DOT&PF transportation resources to provide access for customers visiting these attractions.

The Bureau of Land Management and Alaska Department of Natural Resources jointly maintain the Tangle Lakes Archaeological District, which is accessed via the Denali Highway. The Tangle Lakes Archaeological District contains some of the most important cultural and historic sites in the nation. The 225,000-acre district is located near the Rock Creek Bridge and was visited by over 40,000 users in FY 2018.[30] Lodges and restaurants in the Paxson and Cantwell areas at the ends of the Denali Highway provide important income for seasonal and year-round residents. In the event of closure of the Rock Creek Bridge, travelers could have to go up to 460 miles to connect back to their origination point.

Summary Results of the Benefit-Cost Analysis (BCA)

The results of the Benefit-Cost Analysis are described in more detail in Section 3, but overall, the finding was that the bundled project will have a positive net economic benefit and has a benefit-cost (B/C) ratio greater than one. These are detailed in Appendix D-1: Benefit-Cost Analysis Memorandum and Appendix D-2: Benefit-Cost Analysis Spreadsheet prepared by Northern Economics is attached to this application. It is important to note that the BCA approach is conservative, and other benefits exist when avoiding the baseline bridge closure scenario, though they are sometimes difficult to quantify.

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[25] AADT Information provided from Eastern Alaska Bridges Design Designation Reports found at CHBP Website.
[26] Trans-Alaska Pipeline System 40th Anniversary: Energy Fact & Opinion. Center for Strategic & International Studies. June 19, 2017.
[27] Alaska Visitor Statistics Program 7: Summer 2016. McDowell Group, May 2017 (p1-2).
[28] National Park Service Visitation Report, 2007-2017. Downloaded November 2018.
[29] Outside the project area, the Nebesna Road provides the only other land access to the Wrangell-St. Elias NPP.
[30] Tangle Lakes Visitor Data. Inter-Agency Communication: C. Larson/BLM and C. Snow at Alaska Department of Natural Resources. November 2018.

The BCA focused on increased travel distances due to bridge closures, but does not include the number of travelers who may shorten or cancel their visit to the region in the event of a bridge closure. Additionally, the BCA determined detour routes based on the locations of population centers that generate the most trips. These distances are generally more conservative (i.e. less far) than the actual distances as defined by Item 19 of the *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges*. For example, the BCA assumed maximum detour lengths of 557 miles for the Gulkana River Bridge and 324 miles for the Rock Creek Bridge. However, the actual maximum detour length for Gulkana River Bridge is up to 525 miles in the summer and 713 miles in the winter, and actual detour length for the Rock Creek Bridge is up to 460 miles.

Impacts to the subsistence economy of the region are not quantified in the BCA, even though the majority of residents in the project area depend on subsistence for food acquisition. Food availability is highly dependent on access to the right locations at the right times, so a bridge closure could cut them off from an important hunting, fishing, or gathering area at a time when it is possible and legal to harvest.

c. Life-Cycle Costs and State of Good Repair

Condition of the Bridges

All three of the bridges included in this application need rehabilitation or replacement; technical data about existing bridge condition is detailed earlier in the project narrative. As noted previously, the Gulkana River Bridge and the Chokosna River Bridge have decks in poor condition with widespread deficiencies. The Rock Creek Bridge and the Chokosna River both have substructures rated as "Poor".

Anticipated Cost Savings through Project Bundling

DOT&PF can realize savings of 5.4 percent by bundling the three bridges into a single project and bidding the items to a single contractor. The savings are detailed in the tables listed below. The table "Bundling Bridges Cost Comparison" includes the total estimated cost of all projects calculated separately and then bundled. Tables for each specific bridge are included thereafter.

Bundled Bridges Cost Comparison		
Cost Classification	**Individual Projects**	**Bundled Project**
Administrative and legal expenses	$470,993	$445,480
Land, structures, rights-of-way, appraisals, etc.	$0	$0
Relocation expenses and payments	$0	$0
Architectural and engineering fees	$162,952	$114,427
Other architectural and engineering fees	$350,069	$179,363
Project inspection fees	$1,132,217	$1,063,154
Site work	$96,000	$96,000

Bundled Bridges Cost Comparison		
Cost Classification	**Individual Projects**	**Bundled Project**
Demolition and removal	$331,473	$331,473
Construction	$6,544,760	$6,544,760
Equipment	$1,268,234	$1,037,000
Miscellaneous	$1,160,000	$990,000
Contingencies	$1,683,825	$1,683,825
Total Project Costs	***$13,200,523***	***$12,485,482***

Chokosna River Bridge Bundled Project		
Cost Classification	**Individual Project**	**Bundled Project**
Administrative and legal expenses	$206,402	$191,981
Land, structures, rights-of-way, appraisals, etc.	$0	$0
Relocation expenses and payments	$0	$0
Architectural and engineering fees	$65,082	$45,086
Other architectural and engineering fees	$150,127	$75,000
Project inspection fees	$507,036	$475,600
Site work	$40,000	$37,200
Demolition and removal	$100,800	$110,152
Construction	$2,586,530	$2,490,000
Equipment	$627,000	$507,068
Miscellaneous	$692,500	$592,500
Contingencies	$809,366	$809,366
Total Project Costs	***$5,784,843***	***$5,333,954***

Rock Creek Bridge Bundled Project		
Cost Classification	**Individual Project**	**Bundled Project**
Administrative and legal expenses	$174,858	$173,555
Land, structures, rights-of-way, appraisals, etc.	$0	$0
Relocation expenses and payments	$0	$0
Architectural and engineering fees	$62,214	$45,001
Other architectural and engineering fees	$150,127	$78,000
Project inspection fees	$444,396	$418,658
Site work	$56,000	$58,800
Demolition and removal	$62,325	$52,973
Construction	$2,460,130	$2,636,384
Equipment	$465,000	$383,455

Rock Creek Bridge Bundled Project		
Cost Classification	**Individual Project**	**Bundled Project**
Miscellaneous	$347,500	$292,500
Contingencies	$678,191	$678,191
Total Project Costs	***$4,900,741***	***$4,817,515***

Gulkana River Bridge Bundled Project		
Cost Classification	**Individual Project**	**Bundled Project**
Administrative and legal expenses	$89,733	$84,944
Land, structures, rights-of-way, appraisals, etc.	$0	$0
Relocation expenses and payments	$0	$0
Architectural and engineering fees	$35,656	$25,000
Other architectural and engineering fees	$49,815	$25,000
Project inspection fees	$180,785	$169,600
Site work	$0	$0
Demolition and removal	$168,348	$168,348
Construction	$1,498,100	$1,418,376
Equipment	$176,234	$146,477
Miscellaneous	$120,000	$100,000
Contingencies	$196,268	$196,268
Total Project Costs	***$2,514,939***	***$2,334,013***

DOT&PF anticipates saving $151,234 in mobilization and demobilization costs by bundling the three projects and an additional $150,000 in associated meals and lodging. Some additional savings will be realized through non-duplicative SWPPP, PIP, and CPM schedules and fewer required project vehicles. An additional $288,294 will also be saved through efficiencies in project administration. Supporting documentation for these tables is found in Appendix A.

d. Project Readiness

Project Feasibility

DOT&PF has already completed several tasks that increase the feasibility of completing this project by September 1, 2023.

Engineering and design phases: All three proposed bridges have complete environmental documents. The Gulkana River Bridge is at approximately 35-percent design level, and the Rock Creek and Chokosna River Bridges are at approximately 15-percent design level.

Basis for cost estimate: DOT&PF maintains a database of actual project costs, and these were used to estimate most cost categories. Since only a small number of previous projects used polyester concrete, costs were established by a combination of prior actual costs and additional industry research. The cost estimates provided are based on recent historic bid data for projects of similar scope and in similar locales (2016 Denali Highway Seattle Creek Bridge, 2015 Edgerton Highway/McCarthy Road – Lakina River Bridge, 2016 Parks Highway Bridge Deck Rehabilitation).

The estimate includes $1.2 million in contingency funds, which is appropriate for the size, location, design phase, and risks of the project.

Rock Creek and Chokosna River, foundation soils investigations are needed to determine the final amounts of large cost components such as bridge piling. Additionally, final geometric design and need for a detour structure will also have an impact on final costs.

The design of the Gulkana River Bridge is much more advanced, and the work proposed is very similar to the 2016 Parks Highway Bridge Deck Rehabilitation project; therefore, a lower contingency was utilized in determining the construction cost estimate. However, the contingency recognizes uncertainties involved in working on an existing structure and addresses the potential for general cost inflation as the project will not construct for another two years.

Project Schedule

The following timeline details the project schedule and identifies major project milestones, many of which were completed prior to submitting this application. The anticipated construction timeline is two years, with approximately seven months allocated for project closeout activities. The majority of construction work will be completed in two years.

Milestone Schedule			
	Gulkana River	**Rock Creek**	**Chokosna River**
Environmental Document Approved	3/29/17	8/14/17	8/14/18
FHWA Authority to Proceed to Final Design Received	4/13/17	8/24/17	12/31/18
Local Planning Approval	N/A	N/A	N/A
STIP Approval Granted (State Planning Approval)	4/30/19	4/30/19	4/30/19
95% Design Review	3/16/20	3/16/20	3/16/20
Final Stamped Plans • **Design Completion** • **Approval of Plans, Specifications &**	9/1/20	9/1/20	9/1/20

Milestone Schedule			
	Gulkana River	**Rock Creek**	**Chokosna River**
Estimates			
Permits Issued • **US Army Corps of Engineers** • **NWP** • **ADF&G Fish Habitat**	N/A	9/1/20	9/1/20
ROW Acquired	N/A	N/A	N/A
Utility Agreements Executed	N/A	N/A	N/A
FHWA Authority to Advertise Received (Obligate Funds)	10/1/20	10/1/20	10/1/20
Construction Contract Awarded	3/1/21	3/1/21	3/1/21
Physical Construction Complete	9/1/23	9/1/23	9/1/23
Project Closed	3/1/24	3/1/24	3/1/24

Section 3: Benefit-Cost Analysis

The BCA for this project determined that there will be a cost savings by implementing the bridge projects. All bridges except Chokosna River were found to have a positive net present value (NPV) and benefit-cost ratio greater than one. However, cost savings and a positive NPV are realized for the combined project case, justifying the bundled project. The table below summarizes the findings from the BCA. The Benefit Cost Analysis Memorandum is Appendix Item D-1. The Benefit Cost Analysis Spreadsheet with data and formulas is Appendix Item D-2. Both are also located at the DOT&PF Competitive Highway Bridge Program website.

Project	Present Value of Estimated Benefits	Present Value of Estimated Costs	Net Present Value	B/C Ratio
Gulkana River	$2,162.20	$2.15	$2,160.04	1,005
Rock Creek	$76.32	$3.88	$72.44	20
Chokosna River	$2.19	$4.73	($2.55)	0.46
Total (*as separate projects*)	$2,240.70	$10.77	$2,229.93	208
Total (as *bundled*)	$2,240.70	$10.18	$2,230.52	220

The lack of detour routes or excessively long detour routes can greatly impact the NPV and B/C ratio due to the excessive costs associated with the “no build” case. However, these excessively high values underscore the importance of improving the capacity and lifespan of these bridges. Furthermore, the BCA demonstrates that there is a savings by bundling the bridges in one project.

Section 4: Assessment of Project Risks and Mitigation Strategies

The overall risk of this project is low. Based on a risk assessment conducted by design, planning, and construction staff for the bundled project, a Risk Register was compiled that identifies the material risks to the bundled project and to each specific bridge project. The risk register calculates a "risk rating" based on the risk matrix below. The risk assessment also identified strategies to mitigate each of the identified risks. The Risk Register is included in Appendix E and on the DOT&PF Competitive Highway Bridge Program website.

Risk Matrix

Definition of Impacts and Probability of Occurrence for Risk Register			Probability of Occurrence				
			Rare	**Unlikely**	**Possible**	**Likely**	**Almost Certain**
			Highly infrequent or unlikely event	May occur but not frequently or likely	Approximate 50% chance of occurrence	Higher chance of occurring or occurring frequently	At least 90% chance of occurring or likely to occur frequently
Impact	**Catastrophic**	All-encompassing that cannot be avoided	Medium	Medium	High	Very High	Extreme
	Major	Impact threatens to serious damage or delay	Low	Medium	Medium	High	Very High
	Moderate	Noticeable impact with material effect on resource	Low	Medium	Medium	Medium	High
	Minor	Noticeable impact, but not a significant one	Low	Low	Low	Medium	Medium
	Insignificant	Almost no impact	Low	Low	Low	Low	Medium

Project environmental approvals are complete for all three proposed bridges (all categorical exclusions), and regulatory permits required are minor in nature, with typical timelines of 2 weeks to 6 months from submission of application to approval based on similar work and permits acquired recently in Northern Region.

Project design is proposed with predominantly in-house resources, giving the Department full control over costs and allocation of resources to ensure timelines are met.

The nature of the work involves minimal earthwork materials and all necessary materials are routinely used in Alaska, with the exception of polyester concrete which was used successfully in Northern Region in 2016 (Parks Hwy Bridge Deck Rehabilitation project).

Citations

The following list contains links to each report and external website referred to in the proposal.

Footnote	Citation
4	Gulkana River Bridge (574) Structure Inventory and Appraisal Sheet. DOT&PF Bridge Section. Accessed November 29, 2018.
5	Rock Creek Bridge (684) Structure Inventory and Appraisal Sheet. DOT&PF Bridge Section. Accessed September 26, 2018.
6	Chokosna River Bridge (1193) Structure Inventory and Appraisal Sheet. DOT&PF Bridge Section. Accessed September 26, 2018.
7	*Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges*. FHWA Report No. FHWA-PD-96-001. Office of Engineering Bridge Division. December 1995.
8	Alaska Department of Transportation and Public Facilities, *2017 Annual Average Daily Traffic (AADT) GIS Map*. Transportation Data Programs. Accessed November 2018.
10	Gulkana River Routine Inspection Report. DOT&PF Bridge Section. July 14, 2017.
12	Rock Creek Routine Inspection Report. DOT&PF Bridge Section. July 14, 2017.
13	Chokosna River Routine Inspection Report. DOT&PF Bridge Section. August 15, 2017.
14	Department of Commerce, Community and Economic Development Community Database Online. Accessed November 29, 2018. Database conversion underway: Paxson, Alaska (prior to 1/7/2019); Paxson, Alaska (after 1/7/2019.
16	Department of Commerce, Community and Economic Development Community Database Online. Accessed November 29, 2018. Database conversion underway: Cantwell, Alaska (prior to 1/7/2019); Cantwell, Alaska (after 1/7/2019).
17	W.E. Simeone. Wild Resource Harvests and Uses by Residents of Cantwell, Alaska 2000. ADF&G Division of Subsistence Technical Paper No. 272. Prepared for Denali National Park and Preserve.
18	Chitina Personal Use Salmon Fishery. Alaska Department of Fish & Game website. Accessed October 15, 2018.
19	Department of Commerce, Community and Economic Development Community Database Online. Accessed November 29, 2018. Database conversion underway: McCarthy, Alaska (prior to 1/7/2019); McCarthy, Alaska (after 1/7/2019).
20	Research Report: Challenges of Designing and Building Bridges in Alaska. L. Daugherty, International Bridge Conference, 2013 (p-3).
21	Current Bridge Research Projects 2018. Unpublished Report, prepared by DOT&PF Research, Development & Technology Transfer Section.
22	*The California Department of Transportation (Caltrans) 2016 Report to the Legislature NEPA Assignment -- July 2007-June 2014*. Caltrans Division of

	Environmental Analysis. January 1, 2016 (p-6).
23	Simeone, p-48.
24	Subsistence in Alaska: A Year 2014 Update. Alaska Department of Fish & Game. Division of Subsistence. R.J. Wolfe, J.A. Fall. December 2016 (p-3).
25	Design Designation Report: Richardson Highway. Richardson Highway MP 115-148 Rehabilitation. DOT&PF. September 1, 2015.
25	Design Designation Report: McCarthy Road. McCarthy Rd. MP27 Chokosna River Bridge. DOT&PF. September 1, 2017.
25	Design Designation Report: Denali Highway. Denali Hwy MP 25 Rock Creek Bridge Replacement. DOT&PF. October 3, 2018.
26	Stanley, A., et.al. *"Trans-Alaska Pipeline System's 40th Anniversary"* CSIS Newsletter. Center for Strategic & International Studies. June 19, 2017.
27	Alaska Visitor Statistics Program 7: Summer 2016. The McDowell Group, Inc. Prepared for the Alaska Department of Commerce, Community & Economic Development and the Alaska Travel Industry Association. May 2017 (p-1-2).
28	National Park Service Visitation Report: 2007-2017. National Park Service, Social Science section. Downloaded November 2018.
30	Inter-Agency Communication: Tangle Lakes User Data. McRae, M. DOT&PF, Alaska Department of Natural Resources, Division of Mining, Land and Water and US Bureau of Land Management. November 9, 2018.

Appendix A

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All Bridges (No.'s 1193, 684, 574)	
Cost Classification	Total Cost ($)
1. Administrative and legal expenses	$ 445,480
2. Land, structures, rights-of-way, appraisals, etc.	$ -
3. Relocation expenses and payments	$ -
4. Architectural and engineering fees	$ 114,427
5. Other architectural and engineering fees	$ 179,363
6. Project inspection fees	$ 1,063,154
7. Site work	$ 96,000
8. Demolition and removal	$ 331,473
9. Construction	$ 6,544,760
10. Equipment	$ 1,037,000
11. Miscellaneous	$ 990,000
12. SUBTOTAL (sum of lines 1-11)	$ 10,801,657
13. Contingencies	$ 1,683,825
14. SUBTOTAL	$ 12,485,482
15. Project (program) income	$ -
16. TOTAL PROJECT COSTS (subtract #15 from #14)	$ 12,485,482

Bridge No. 1193 Chokosna River	
Cost Classification	Total Cost ($)
1. Administrative and legal expenses	$ 266,981
2. Land, structures, rights-of-way, appraisals, etc.	$ -
3. Relocation expenses and payments	$ -
4. Architectural and engineering fees	$ 45,086
5. Other architectural and engineering fees	$ -
6. Project inspection fees	$ 475,600
7. Site work	$ 37,200
8. Demolition and removal	$ 110,152
9. Construction	$ 2,490,000
10. Equipment	$ 507,068
11. Miscellaneous	$ 592,500
12. SUBTOTAL (sum of lines 1-11)	$ 4,524,588
13. Contingencies	$ 809,366
14. SUBTOTAL	$ 5,333,954
15. Project (program) income	$ -
16. TOTAL PROJECT COSTS (subtract #15 from #14)	$ 5,333,954

Bridge No. 574 Gulkana River	
Cost Classification	Total Cost ($)
1. Administrative and legal expenses	$ 109,944
2. Land, structures, rights-of-way, appraisals, etc.	$ -
3. Relocation expenses and payments	$ -
4. Architectural and engineering fees	$ 25,000
5. Other architectural and engineering fees	$ -
6. Project inspection fees	$ 169,600
7. Site work	$ -
8. Demolition and removal	$ 168,348
9. Construction	$ 1,418,376
10. Equipment	$ 146,477
11. Miscellaneous	$ 100,000
12. SUBTOTAL (sum of lines 1-11)	$ 2,137,745
13. Contingencies	$ 196,268
14. SUBTOTAL	$ 2,334,013
15. Project (program) income	$ -
16. TOTAL PROJECT COSTS (subtract #15 from #14)	$ 2,334,013

Project	Total Cost ($)
Chokosna River Bridge No. 1193	$ 5,333,954
Rock Creek Bridge No. 684	$ 4,817,515
Gulkana River Bridge No. 574	$ 2,334,013
All Bridges	$ 12,485,482

Project	Total Cost ($)
All Bridges As Separate Projects	$ 13,200,523
All Bridges As Combined Project	$ 12,485,482
Total Savings	$ 715,041

Bridge No. 684 Rock Creek	
Cost Classification	Total Cost ($)
1. Administrative and legal expenses	$ 251,555
2. Land, structures, rights-of-way, appraisals, etc.	$ -
3. Relocation expenses and payments	$ -
4. Architectural and engineering fees	$ 45,001
5. Other architectural and engineering fees	$ -
6. Project inspection fees	$ 418,658
7. Site work	$ 58,800
8. Demolition and removal	$ 52,973
9. Construction	$ 2,636,384
10. Equipment	$ 383,455
11. Miscellaneous	$ 292,500
12. SUBTOTAL (sum of lines 1-11)	$ 4,139,324
13. Contingencies	$ 678,191
14. SUBTOTAL	$ 4,817,515
15. Project (program) income	$ -
16. TOTAL PROJECT COSTS (subtract #15 from #14)	$ 4,817,515

Standalone Bridge Projects Summary

Category	Work Item	Pay Unit	Chokosna River Bridge Replacement			Rock Creek Bridge Replacement			Gulkana River Bridge Rehabilitation			Combined Bridge Project		Remarks on Savings
			Unit Price	Plan Quantity	Plan Amount	Unit Price	Plan Quantity	Plan Amount	Unit Price	Plan Quantity	Plan Amount	Plan Quantity	Plan Amount	
7	Clearing and Grubbing	Lump Sum	All Required	All Required	$ 30,000.00	All Required	All Required	$ 30,000.00	All Required	All Required	$ -	All Required	$ 60,000.00	
8	Removal of Existing Bridge No. 684	Square Foot	$ 35.00	2880	$ 100,800.00	$ 45.00	1385	$ 62,325.00	$ -	0	$ -	4265	$ 163,125.00	
9	Roadway Excavation	Cubic Yard	$ 13.50	4000	$ 54,000.00	$ 10.00	5000	$ 50,000.00	$ -	0	$ -	9000	$ 104,000.00	
9	Borrow	Cubic Yard	$ 22.00	6500	$ 143,000.00	$ 20.00	25000	$ 500,000.00	$ -	0	$ -	31500	$ 643,000.00	
9	Structural Fill	Cubic Yard	$ 35.00	750	$ 26,250.00	$ 40.00	1070	$ 42,800.00	$ -	0	$ -	1820	$ 69,050.00	
9	Controlled Low Strength Material	Cubic Yard	$ -	0	$ -	$ -	0	$ -	$ 1,250.00	4	$ 5,000.00	4	$ 5,000.00	
9	Surface Course	Cubic Yard	$ 200.00	1300	$ 260,000.00	$ 100.00	1500	$ 150,000.00	$ -	0	$ -	2800	$ 410,000.00	
9	Structural Plate Pipe	Linear Foot	$ 1,250.00	100	$ 125,000.00	$ -	0	$ -	$ -	0	$ -	100	$ 125,000.00	
9	Class A Concrete	Cubic Yard	$ 2,000.00	100	$ 200,000.00	$ 1,750.00	100	$ 175,000.00	$ -	0	$ -	200	$ 375,000.00	
9	Precast Concrete Member	Each	$ 87,500.00	4	$ 350,000.00	$ 75,000.00	5	$ 375,000.00	$ -	0	$ -	9	$ 725,000.00	
9	Reinforcing Steel	Pound	$ 2.25	17000	$ 38,250.00	$ 2.25	16740	$ 37,665.00	$ -	0	$ -	33740	$ 75,915.00	
9	Epoxy-Coated Reinforcing Steel	Pound	$ 2.50	8500	$ 21,250.00	$ 2.75	10460	$ 28,765.00	$ -	0	$ -	18960	$ 50,015.00	
9	Furnish Structural Steel Piles (HP14X117)	Linear Foot	$ 150.00	960	$ 144,000.00	$ 150.00	1200	$ 180,000.00	$ -	0	$ -	2160	$ 324,000.00	
9	Drive Structural Steel Piles (HP14X117)	Each	$ 15,000.00	8	$ 120,000.00	$ 10,000.00	10	$ 100,000.00	$ -	0	$ -	18	$ 220,000.00	
9	Temporary Structure	Lump Sum	All Required	All Required	$ -	All Required	All Required	$ 340,000.00	All Required	All Required	$ -	All Required	$ 340,000.00	
8	Removal of Concrete Bridge Deck	Square Foot	$ -	0	$ -	$ -	0	$ -	$ 12.00	14029	$ 168,348.00	14029	$ 168,348.00	
9	Bridge Deck Repair	Square Foot	$ -	0	$ -	$ -	0	$ -	$ 281.00	100	$ 28,100.00	100	$ 28,100.00	
9	Expansion Joint, Strip Seal	Linear Foot	$ -	0	$ -	$ -	0	$ -	$ 400.00	81	$ 32,400.00	81	$ 32,400.00	
9	Bearing Replacement	Each	$ -	0	$ -	$ -	0	$ -	$ 30,000.00	20	$ 600,000.00	20	$ 600,000.00	
9	Polyester Concrete Overlay	Cubic Yard	$ -	0	$ -	$ -	0	$ -	$ 8,000.00	29.7	$ 237,600.00	29.7	$ 237,600.00	
9	Steel Bridge Railing	Linear Foot	$ 250.00	320	$ 80,000.00	$ 300.00	280	$ 84,000.00	$ 500.00	850	$ 425,000.00	1450	$ 589,000.00	
9	Parallel Guardrail Terminal	Each	$ 5,000.00	4	$ 20,000.00	$ 5,000.00	4	$ 20,000.00	$ -	0	$ -	8	$ 40,000.00	
9	Transition Rail	Each	$ 5,000.00	4	$ 20,000.00	$ 5,000.00	4	$ 20,000.00	$ 5,000.00	4	$ 20,000.00	12	$ 60,000.00	
9	Riprap, Class I	Cubic Yard	$ 350.00	500	$ 175,000.00	$ -	0	$ -	$ -	0	$ -	500	$ 175,000.00	
9	Riprap, Class II	Cubic Yard	$ -	0	$ -	$ 115.00	1300	$ 149,500.00	$ -	0	$ -	1300	$ 149,500.00	
9	Riprap, Class III	Cubic Yard	$ 300.00	2000	$ 600,000.00	$ -	0	$ -	$ -	0	$ -	2000	$ 600,000.00	
9	Standard Sign	Square Foot	$ 140.00	27	$ 3,780.00	$ 170.00	20	$ 3,400.00	$ -	0	$ -	47	$ 7,180.00	
7	Seeding	Pound	$ 200.00	50	$ 10,000.00	$ 130.00	200	$ 26,000.00	$ -	0	$ -	250	$ 36,000.00	
9	Approaches	Each	$ 2,000.00	3	$ 6,000.00	$ 2,000.00	2	$ 4,000.00	$ -	0	$ -	5	$ 10,000.00	
10	Mobilization And Demobilization	Lump Sum	All Required	All Required	$ 500,000.00	All Required	All Required	$ 400,000.00	All Required	All Required	$ 151,234.00	All Required	$ 900,000.00	Reduced mobilization distance between Chokosna and Bear Creek
11	Worker Meals and Lodging	Lump Sum	All Required	All Required	$ 300,000.00	All Required	All Required	$ 150,000.00	All Required	All Required	$ 50,000.00	All Required	$ 350,000.00	Economy of scale
11	Erosion, Sediment & Pollution Control (ESCP)	Lump Sum	All Required	All Required	$ 150,000.00	All Required	All Required	$ 100,000.00	All Required	All Required	$ 10,000.00	All Required	$ 260,000.00	One SWPPP
11	Construction Surveying	Lump Sum	All Required	All Required	$ 75,000.00	All Required	All Required	$ 40,000.00	All Required	All Required	$ 15,000.00	All Required	$ 130,000.00	
9	Traffic Maintenance	Lump Sum	All Required	All Required	$ 100,000.00	All Required	All Required	$ 100,000.00	All Required	All Required	$ 150,000.00	All Required	$ 350,000.00	
9	Traffic Control	Lump Sum	All Required	All Required	$ 100,000.00	All Required	All Required	$ 100,000.00	All Required	All Required	$ -	All Required	$ 200,000.00	
11	Public Information	Lump Sum	All Required	All Required	$ 10,000.00	All Required	All Required	$ 10,000.00	All Required	All Required	$ -	All Required	$ 10,000.00	One PIP
11	Field Office	Lump Sum	All Required	All Required	$ 150,000.00	All Required	All Required	$ 40,000.00	All Required	All Required	$ 40,000.00	All Required	$ 230,000.00	
10	Curing Shed	Lump Sum	All Required	All Required	$ 7,000.00	All Required	All Required	$ 5,000.00	All Required	All Required	$ 5,000.00	All Required	$ 17,000.00	
10	Vehicles	Lump Sum	All Required	All Required	$ 120,000.00	All Required	All Required	$ 60,000.00	All Required	All Required	$ 20,000.00	All Required	$ 120,000.00	One set of vehicles for job
11	Training Program, 1 Trainees/Apprentices	Labor Hour	$ 5.00	500	$ 2,500.00	$ 5.00	500	$ 2,500.00	$ -	0	$ -	1000	$ 5,000.00	
11	CPM Scheduling	Lump Sum	All Required	All Required	$ 5,000.00	All Required	All Required	$ 5,000.00	All Required	All Required	$ 5,000.00	All Required	$ 5,000.00	One CPM schedule
13	Contingency				$ 809,366			$ 678,191			$ 196,268		$ 1,683,825	
	Department Construction Administration		15%		$ 722,245	16%		$ 656,737	12%		$ 266,256	13%	$ 1,356,944.00	Economy of scale, one closeout process, one manager, etc.
1	ICAP	3.70%			$ 206,402			$ 174,858			$ 89,733		$ 445,480	
				Total	$ 5,784,843		Total	$ 4,900,741		Total	$ 2,514,939	Total	$ 12,485,482	

Construction Administration Breakdown by Work Category

6	Project inspection	$ 507,036.00	$ 444,396.00	$ 180,785.00	$ 1,063,154.00
4	Architectural and engineering	$ 65,082.00	$ 62,214.00	$ 35,656.00	$ 114,427.00
5	Other architectural and engineer	$ 150,127.00	$ 150,127.00	$ 49,815.00	$ 179,363.00

Combined Project Summary by Category

1	$	445,480
2	$	-
3	$	-
4	$	114,427
5	$	179,363
6	$	1,063,154
7	$	96,000
8	$	331,473
9	$	6,544,760
10	$	1,037,000
11	$	990,000
12	$	-
13	$	1,683,825

Combined Bridge Project Breakdown by Bridge

Category	Work Item	Pay Unit	Unit Price	Chokosna		Rock Creek		Gulkana	
				Plan Quantity	Plan Amount	Plan Quantity	Plan Amount	Plan Quantity	Plan Amount
7	Clearing and Grubbing	Lump Sum	All Required	All Required	$ 30,000.00	All Required	$ 30,000.00	All Required	$ -
8	Removal of Existing Bridge No. 684	Square Foot	$ 38.25	2880	$ 110,152.40	1385	$ 52,972.60	0	$ -
9	Roadway Excavation	Cubic Yard	$ 11.56	4000	$ 46,222.22	5000	$ 57,777.78	0	$ -
9	Borrow	Cubic Yard	$ 20.41	6500	$ 132,682.54	25000	$ 510,317.46	0	$ -
9	Structural Fill	Cubic Yard	$ 37.94	750	$ 28,454.67	1070	$ 40,595.33	0	$ -
9	Controlled Low Strength Material	Cubic Yard	$ 1,250.00	0	$ -	0	$ -	4	$ 5,000.00
9	Surface Course	Cubic Yard	$ 146.43	1300	$ 190,357.14	1500	$ 219,642.86	0	$ -
9	Structural Plate Pipe	Linear Foot	$ 1,250.00	100	$ 125,000.00	0	$ -	0	$ -
9	Class A Concrete	Cubic Yard	$ 1,875.00	100	$ 187,500.00	100	$ 187,500.00	0	$ -
9	Precast Concrete Member	Each	$ 80,555.56	4	$ 322,222.22	5	$ 402,777.78	0	$ -
9	Reinforcing Steel	Pound	$ 2.25	17000	$ 38,250.00	16740	$ 37,665.00	0	$ -
9	Epoxy-Coated Reinforcing Steel	Pound	$ 2.64	8500	$ 22,422.34	10460	$ 27,592.66	0	$ -
9	Furnish Structural Steel Piles (HP14X117)	Linear Foot	$ 150.00	960	$ 144,000.00	1200	$ 180,000.00	0	$ -
9	Drive Structural Steel Piles (HP14X117)	Each	$ 12,222.22	8	$ 97,777.78	10	$ 122,222.22	0	$ -
9	Temporary Structure	Lump Sum	All Required	All Required	$ -	All Required	$ 340,000.00	All Required	$ -
8	Removal of Concrete Bridge Deck	Square Foot	$ 12.00	0	$ -	0	$ -	14029	$ 168,348.00
9	Bridge Deck Repair	Square Foot	$ 281.00	0	$ -	0	$ -	100	$ 28,100.00
9	Expansion Joint, Strip Seal	Linear Foot	$ 400.00	0	$ -	0	$ -	81	$ 32,400.00
9	Bearing Replacement	Each	$ 30,000.00	0	$ -	0	$ -	20	$ 600,000.00
9	Polyester Concrete Overlay	Cubic Yard	$ 8,000.00	0	$ -	0	$ -	29.7	$ 237,600.00
9	Steel Bridge Railing	Linear Foot	$ 406.21	320	$ 129,986.21	280	$ 113,737.93	850	$ 345,275.86
9	Parallel Guardrail Terminal	Each	$ 5,000.00	4	$ 20,000.00	4	$ 20,000.00	0	$ -
9	Transition Rail	Each	$ 5,000.00	4	$ 20,000.00	4	$ 20,000.00	4	$ 20,000.00
9	Riprap, Class I	Cubic Yard	$ 350.00	500	$ 175,000.00	0	$ -	0	$ -
9	Riprap, Class II	Cubic Yard	$ 115.00	0	$ -	1300	$ 149,500.00	0	$ -
9	Riprap, Class III	Cubic Yard	$ 300.00	2000	$ 600,000.00	0	$ -	0	$ -
9	Standard Sign	Square Foot	$ 152.77	27	$ 4,124.68	20	$ 3,055.32	0	$ -
7	Seeding	Pound	$ 144.00	50	$ 7,200.00	200	$ 28,800.00	0	$ -
9	Approaches	Each	$ 2,000.00	3	$ 6,000.00	2	$ 4,000.00	0	$ -
10	Mobilization And Demobilization	Lump Sum	All Required	All Required	$ 428,068.35	All Required	$ 342,454.68	All Required	$ 129,476.98
11	Worker Meals and Lodging	Lump Sum	All Required	All Required	$ 210,000.00	All Required	$ 105,000.00	All Required	$ 35,000.00
11	Erosion, Sediment & Pollution Control (ESCP)	Lump Sum	All Required	All Required	$ 150,000.00	All Required	$ 100,000.00	All Required	$ 10,000.00
11	Construction Surveying	Lump Sum	All Required	All Required	$ 75,000.00	All Required	$ 40,000.00	All Required	$ 15,000.00
9	Traffic Maintenance	Lump Sum	All Required	All Required	$ 100,000.00	All Required	$ 100,000.00	All Required	$ 150,000.00
9	Traffic Control	Lump Sum	All Required	All Required	$ 100,000.00	All Required	$ 100,000.00	All Required	$ -
11	Public Information	Lump Sum	All Required	All Required	$ 5,000.00	All Required	$ 5,000.00	All Required	$ -
11	Field Office	Lump Sum	All Required	All Required	$ 150,000.00	All Required	$ 40,000.00	All Required	$ 40,000.00
10	Curing Shed	Lump Sum	All Required	All Required	$ 7,000.00	All Required	$ 5,000.00	All Required	$ 5,000.00
10	Vehicles	Lump Sum	All Required	All Required	$ 72,000.00	All Required	$ 36,000.00	All Required	$ 12,000.00
11	Training Program, 1 Trainees/Apprentices	Labor Hour	$ 5.00	500	$ 2,500.00	500	$ 2,500.00	0	$ -
1	CPM Scheduling	Lump Sum	All Required	All Required	$ 1,666.67	All Required	$ 1,666.67	All Required	$ 1,666.67
13	Contingency	Lump Sum	All Required		$ 809,366		$ 678,191		$ 196,268
	Subtotal				$ 4,547,953		$ 4,103,969		$ 2,031,136
	Department Construction Administration				$ 595,686		$ 541,657		$ 219,600
1	ICAP	3.70%			$ 190,315		$ 171,888		$ 83,277
				Total	$ 5,333,954	Total	$ 4,817,515	Total	$ 2,334,013

Construction Administration Breakdown by Work Category

6	Project inspection	$ 475,600	$ 418,658	$ 169,600
4	Architectural and engineering	$ 45,086	$ 45,001	$ 25,000
1	Other architectural and engineer	$ 75,000	$ 78,000	$ 25,000

1		$ 266,981	$ 251,555	$ 109,944
2		$ -	$ -	$ -
3		$ -	$ -	$ -
4		$ 45,086	$ 45,001	$ 25,000
5		$ -	$ -	$ -
6		$ 475,600	$ 418,658	$ 169,600
7		$ 37,200	$ 58,800	$ -
8		$ 110,152	$ 52,973	$ 168,348
9		$ 2,490,000	$ 2,636,384	$ 1,418,376
10		$ 507,068	$ 383,455	$ 146,477
11		$ 592,500	$ 292,500	$ 100,000
12		$ -	$ -	$ -
13		$ 809,366	$ 678,191	$ 196,268

Category	Work Item	Pay Unit	Unit Price	Plan Quantity	Plan Amount
7	Clearing and Grubbing	Lump Sum	All Required	All Required	$ 30,000.00
8	Removal of Existing Bridge No. 1193	Square Foot	$ 35.00	2880	$ 100,800.00
9	Roadway Excavation	Cubic Yard	$ 13.50	4000	$ 54,000.00
9	Borrow	Cubic Yard	$ 22.00	6500	$ 143,000.00
9	Structural Fill	Cubic Yard	$ 35.00	750	$ 26,250.00
9	Controlled Low Strength Material	Cubic Yard		0	$ -
9	Surface Course	Cubic Yard	$ 200.00	1300	$ 260,000.00
9	Structural Plate Pipe	Linear Foot	$ 1,250.00	100	$ 125,000.00
9	Class A Concrete	Cubic Yard	$ 2,000.00	100	$ 200,000.00
9	Precast Concrete Member	Each	$ 87,500.00	4	$ 350,000.00
9	Reinforcing Steel	Pound	$ 2.25	17000	$ 38,250.00
9	Epoxy-Coated Reinforcing Steel	Pound	$ 2.50	8500	$ 21,250.00
9	Furnish Structural Steel Piles (HP14X117)	Linear Foot	$ 150.00	960	$ 144,000.00
9	Drive Structural Steel Piles (HP14X117)	Each	$ 15,000.00	8	$ 120,000.00
9	Temporary Structure	Lump Sum	All Required	All Required	$ -
8	Removal of Concrete Bridge Deck	Square Foot		0	$ -
9	Bridge Deck Repair	Square Foot		0	$ -
9	Expansion Joint, Strip Seal	Linear Foot		0	$ -
9	Bearing Replacement	Each		0	$ -
9	Polyester Concrete Overlay	Cubic Yard		0	$ -
9	Steel Bridge Railing	Linear Foot	$ 250.00	320	$ 80,000.00
9	Parallel Guardrail Terminal	Each	$ 5,000.00	4	$ 20,000.00
9	Transition Rail	Each	$ 5,000.00	4	$ 20,000.00
9	Riprap, Class I	Cubic Yard	$ 350.00	500	$ 175,000.00
9	Riprap, Class II	Cubic Yard		0	$ -
9	Riprap, Class III	Cubic Yard	$ 300.00	2000	$ 600,000.00
9	Standard Sign	Square Foot	$ 140.00	27	$ 3,780.00
7	Seeding	Pound	$ 200.00	50	$ 10,000.00
9	Approaches	Each	$ 2,000.00	3	$ 6,000.00
10	Mobilization And Demobilization	Lump Sum	All Required	All Required	$ 500,000.00
11	Worker Meals and Lodging	Lump Sum	All Required	All Required	$ 300,000.00
11	Erosion, Sediment & Pollution Control (ESCP)	Lump Sum	All Required	All Required	$ 150,000.00
11	Construction Surveying	Lump Sum	All Required	All Required	$ 75,000.00
9	Traffic Maintenance	Lump Sum	All Required	All Required	$ 100,000.00
9	Traffic Control	Lump Sum	All Required	All Required	$ 100,000.00
11	Public Information	Lump Sum	All Required	All Required	$ 10,000.00
11	Field Office	Lump Sum	All Required	All Required	$ 150,000.00
10	Curing Shed	Lump Sum	All Required	All Required	$ 7,000.00
10	Vehicles	Lump Sum	All Required	All Required	$ 120,000.00
11	Training Program, 1 Trainees/Apprentices	Labor Hour	$ 5.00	500	$ 2,500.00
1	CPM Scheduling	Lump Sum	All Required	All Required	$ 5,000.00
13			Contingency	20%	$ 809,366
			Basic Bid		**$ 4,856,196**
6	Department Construction Administration			15%	$ 722,245
1			ICAP	3.70%	$ 206,402
			Phase 4 Total Cost		**$ 5,784,843**

Category	Work Item	Pay Unit	Unit Price	Plan Quantity	Plan Amount
7	Clearing and Grubbing	Lump Sum	All Required	All Required	$ 30,000.00
8	Removal of Existing Bridge No. 684	Square Foot	$ 45.00	1385	$ 62,325.00
9	Roadway Excavation	Cubic Yard	$ 10.00	5000	$ 50,000.00
9	Borrow	Cubic Yard	$ 20.00	25000	$ 500,000.00
9	Structural Fill	Cubic Yard	$ 40.00	1070	$ 42,800.00
9	Controlled Low Strength Material	Cubic Yard		0	$ -
9	Surface Course	Cubic Yard	$ 100.00	1500	$ 150,000.00
9	Structural Plate Pipe	Linear Foot		0	$ -
9	Class A Concrete	Cubic Yard	$ 1,750.00	100	$ 175,000.00
9	Precast Concrete Member	Each	$ 75,000.00	5	$ 375,000.00
9	Reinforcing Steel	Pound	$ 2.25	16740	$ 37,665.00
9	Epoxy-Coated Reinforcing Steel	Pound	$ 2.75	10460	$ 28,765.00
9	Furnish Structural Steel Piles (HP14X117)	Linear Foot	$ 150.00	1200	$ 180,000.00
9	Drive Structural Steel Piles (HP14X117)	Each	$ 10,000.00	10	$ 100,000.00
9	Temporary Structure	Lump Sum	All Required	All Required	$ 340,000.00
8	Removal of Concrete Bridge Deck	Square Foot		0	$ -
9	Bridge Deck Repair	Square Foot		0	$ -
9	Expansion Joint, Strip Seal	Linear Foot		0	$ -
9	Bearing Replacement	Each		0	$ -
9	Polyester Concrete Overlay	Cubic Yard		0	$ -
9	Steel Bridge Railing	Linear Foot	$ 300.00	280	$ 84,000.00
9	Parallel Guardrail Terminal	Each	$ 5,000.00	4	$ 20,000.00
9	Transition Rail	Each	$ 5,000.00	4	$ 20,000.00
9	Riprap, Class I	Cubic Yard		0	$ -
9	Riprap, Class II	Cubic Yard	$ 115.00	1300	$ 149,500.00
9	Riprap, Class III	Cubic Yard		0	$ -
9	Standard Sign	Square Foot	$ 170.00	20	$ 3,400.00
7	Seeding	Pound	$ 130.00	200	$ 26,000.00
9	Approaches	Each	$ 2,000.00	2	$ 4,000.00
10	Mobilization And Demobilization	Lump Sum	All Required	All Required	$ 400,000.00
11	Worker Meals and Lodging	Lump Sum	All Required	All Required	$ 150,000.00
11	Erosion, Sediment & Pollution Control (ESCP)	Lump Sum	All Required	All Required	$ 100,000.00
11	Construction Surveying	Lump Sum	All Required	All Required	$ 40,000.00
9	Traffic Maintenance	Lump Sum	All Required	All Required	$ 100,000.00
9	Traffic Control	Lump Sum	All Required	All Required	$ 100,000.00
11	Public Information	Lump Sum	All Required	All Required	$ 10,000.00
11	Field Office	Lump Sum	All Required	All Required	$ 40,000.00
10	Curing Shed	Lump Sum	All Required	All Required	$ 5,000.00
10	Vehicles	Lump Sum	All Required	All Required	$ 60,000.00
11	Training Program, 1 Trainees/Apprentices	Labor Hour	$ 5.00	500	$ 2,500.00
1	CPM Scheduling	Lump Sum	All Required	All Required	$ 5,000.00
13			Contingency	20%	$ 678,191.00
			Basic Bid		**$ 4,069,146.00**
6			Department Construction Administration	16%	$ 656,737.00
1			ICAP	3.70%	$ 174,857.67
			Phase 4 Total Cost		**$ 4,900,740.67**

Category	Work Item	Pay Unit	Unit Price	Plan Quantity	Plan Amount
7	Clearing and Grubbing	Lump Sum	All Required	All Required	$ -
8	Removal of Existing Bridge No. 684	Square Foot		0	$ -
9	Roadway Excavation	Cubic Yard		0	$ -
9	Borrow	Cubic Yard		0	$ -
9	Structural Fill	Cubic Yard		0	$ -
9	Controlled Low Strength Material	Cubic Yard	$ 1,250.00	4	$ 5,000.00
9	Surface Course	Cubic Yard		0	$ -
9	Structural Plate Pipe	Linear Foot		0	$ -
9	Class A Concrete	Cubic Yard		0	$ -
9	Precast Concrete Member	Each		0	$ -
9	Reinforcing Steel	Pound		0	$ -
9	Epoxy-Coated Reinforcing Steel	Pound		0	$ -
9	Furnish Structural Steel Piles (HP14X117)	Linear Foot		0	$ -
9	Drive Structural Steel Piles (HP14X117)	Each		0	$ -
9	Temporary Structure	Lump Sum	All Required	All Required	$ -
8	Removal of Concrete Bridge Deck	Square Foot	$ 12.00	14029	$ 168,348.00
9	Bridge Deck Repair	Square Foot	$ 281.00	100	$ 28,100.00
9	Expansion Joint, Strip Seal	Linear Foot	$ 400.00	81	$ 32,400.00
9	Bearing Replacement	Each	$ 30,000.00	20	$ 600,000.00
9	Polyester Concrete Overlay	Cubic Yard	$ 8,000.00	29.7	$ 237,600.00
9	Steel Bridge Railing	Linear Foot	$ 500.00	850	$ 425,000.00
9	Parallel Guardrail Terminal	Each		0	$ -
9	Transition Rail	Each	$ 5,000.00	4	$ 20,000.00
9	Riprap, Class I	Cubic Yard		0	$ -
9	Riprap, Class II	Cubic Yard		0	$ -
9	Riprap, Class III	Cubic Yard		0	$ -
9	Standard Sign	Square Foot		0	$ -
7	Seeding	Pound		0	$ -
9	Approaches	Each		0	$ -
10	Mobilization And Demobilization	Lump Sum	All Required	All Required	$ 151,234.00
11	Worker Meals and Lodging	Lump Sum	All Required	All Required	$ 50,000.00
11	Erosion, Sediment & Pollution Control (ESCP)	Lump Sum	All Required	All Required	$ 10,000.00
11	Construction Surveying	Lump Sum	All Required	All Required	$ 15,000.00
9	Traffic Maintenance	Lump Sum	All Required	All Required	$ 150,000.00
9	Traffic Control	Lump Sum	All Required	All Required	$ -
11	Public Information	Lump Sum	All Required	All Required	$ -
11	Field Office	Lump Sum	All Required	All Required	$ 40,000.00
10	Curing Shed	Lump Sum	All Required	All Required	$ 5,000.00
10	Vehicles	Lump Sum	All Required	All Required	$ 20,000.00
11	Training Program, 1 Trainees/Apprentices	Labor Hour		0	$ -
1	CPM Scheduling	Lump Sum	All Required	All Required	$ 5,000.00
13			Contingency	10%	$ 196,268
			Basic Bid		**$ 2,158,950**
6			Department Construction Administration	12%	$ 266,256
1			ICAP	3.70%	$ 89,733
			Phase 4 Total Cost		**$ 2,514,939**

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Appendix B

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LISA MURKOWSKI
ALASKA

COMMITTEES:
ENERGY AND NATURAL RESOURCES
CHAIRMAN

APPROPRIATIONS
SUBCOMMITTEE ON INTERIOR, ENVIRONMENT, AND RELATED AGENCIES
CHAIRMAN

HEALTH, EDUCATION, LABOR, AND PENSIONS

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(907) 225–6880

851 EAST WESTPOINT DRIVE, SUITE 307
WASILLA, AK 99654–7142
(907) 376–7665

November 27, 2018

The Honorable Elaine L. Chao
Secretary of Transportation
US Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Dear Secretary Chao:

I am writing to express support for three Competitive Highway Bridge Program (CHBP) grant proposals from the Alaska Department of Transportation & Public Facilities (DOT&PF). These proposals target the rehabilitation or replacement of bridges in Alaska which are listed in the National Bridge Inventory as "structurally deficient" or have otherwise outlived their service life. Please see pertinent details on each of the affected bridge projects within the enclosed fact sheets describing each grant proposal.

The CHBP is provided for under Division L of the Consolidated Appropriations Act of 2018 (Public Law 115-141) and intended to assist states with a population density of less than 100 people per square mile. Alaska's transportation system generally lacks the redundancy which Lower 48 states enjoy and so many of our roadways serve as a "lifelines" in the truest sense. These bridge projects are critical to the transportation infrastructure, as well as the local economies of the Alaskan communities surrounding these vital, often exclusive, transportation links.

Thank you in advance to FHWA staff for their careful consideration of DOT&PF's CHBP grant proposals. Consistent with all relevant rules, laws, and regulation, I respectfully request that all due consideration be given to all eligible Alaska-based applications. Thank you for the opportunity to bring these applications to your attention.

Sincerely,

Lisa Murkowski
United States Senator

DAN SULLIVAN
ALASKA

SUITE 702
HART SENATE OFFICE BUILDING
WASHINGTON, DC 20510

United States Senate

November 30, 2018

COMMITTEES

ARMED SERVICES
COMMERCE, SCIENCE, AND TRANSPORTATION
ENVIRONMENT AND PUBLIC WORKS
VETERANS' AFFAIRS

The Honorable Elaine Chao
US Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Dear Secretary Chao,

As you may know, the Alaska Department of Transportation & Public Facilities (DOT&PF) has recently applied for federal grant funding under the Competitive Highway Bridge Program (CHBP). Our nation's transportation infrastructure is critical to this country's economic growth and our way of life, particularly in rural Alaska. The CHBP will provide flexibility from federal one-size-fits all mandates for several proposals put forth by Alaska's DOT&PF.

It is to my understanding that the DOT&PF proposals target the rehabilitation and replacement of bridges in Alaska that the National Bridge Inventory has listed as "structurally deficient." The bridges in need of repairs span from Eastern Alaska, to Ketchikan and to Seward where bridges are vital to connect rural communities.

So many of Alaska's roadways serve as lifelines in the truest sense. These bridge projects are critical to the transportation infrastructure, as well as the local economies of the Alaskan communities surrounding these vital, often exclusive, transportation links. For example, the bridge projects in Eastern Alaska will allow native communities to continue subsistence activities and provide safer travel for those who support the Trans-Alaska Pipeline System. In Seward, modernizing the Seward Highway, a critical transportation corridor, will provide a link for goods shipped from the Port of Alaska located in Anchorage. And in Ketchikan, communities rely on a dependable transit network to support tourism and fishing, which bolster the local economy.

I am honored to represent all Alaskans, and I ask that you give all due consideration to any Alaskan organization being considered for these grants. Thank you for considering funding this project, and consistent with all relevant rules, laws and regulations, I respectfully ask that all due consideration be given to this request.

Sincerely,

Dan Sullivan
United States Senator

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United States Department of the Interior
NATIONAL PARK SERVICE

Wrangell-St. Elias National Park & Preserve
Mile 106.8 Richardson Hwy. P.O. Box 439
Copper Center, AK 99573-0439
907 822 5234 Fax 907 822 3281
http://www.nps.gov/wrst

IN REPLY REFER TO:

D30 (WRST-AD)

November 2, 2018

Commissioner Marc Luiken
3132 Channel Drive #300
Juneau, AK 99801-7898

Commissioner Luiken:

Wrangell-St. Elias National Park and Preserve hosts an average of more than 70,000 visitors every year, and the majority of these users cross at least one of the bridges in the Eastern Alaska Rural Deficient Bridges Upgrade project. Under this project, three structurally deficient bridges, including two that are load-posted, will be replaced or rehabilitated. I write today in support of this project.

The Eastern Alaska Rural Deficient Bridge Upgrade project will enhance visitor safety and enjoyment of the resources in and around Wrangell St. Elias National Park and Preserve. The road system supported by these bridges is a critical link for visitors to get access to the recreational, historic, and subsistence resources within the Park, as well as natural resources adjacent to the Park, including:

- Almost 15,000 square miles of designated wilderness area – America's largest National Park.
- Both subsistence and personal use access to the Copper River salmon fishery, providing hundreds of thousands of pounds of food for Alaskan families.
- Tangle Lakes Archaeological District: 10,000 years of cultural history, with over 600 specifically identified sites of interest.
- Dozens of local businesses catering to the visitor trade, including hotels, lodges, and guides.

The importance of this corridor cannot be overstated when it comes to safety of Park visitors and our neighbors in the communities in the area. While the NPS has highly skilled Park Rangers ready to provide emergency assistance, any major medical event that takes place within the Park and Preserve will require evacuation to the closest hospital, and these roads and bridges are the vital land connection to help. In addition, load posted bridges are impediments to the free flow of equipment during the summer wildfire season.

Sincerely,

Ben Bobowski
Superintendent
Wrangell-St. Elias National Park and Preserve

Alaska Trucking Association, Inc.
3443 Minnesota Drive · Anchorage, Alaska 99503 · Phone (907) 276-1149 · Fax (907) 274-1946
www.aktrucks.org
The authoritative voice of the trucking industry in Alaska

November 2, 2018

Commissioner Marc Luiken
Alaska Department of Transportation and Public Facilities
3132 Channel Drive #300
Juneau, AK 99801

To Whom it May Concern:

The Alaska Trucking Association (ATA) has served the Alaska trucking industry for over 60 years, and we know that trucking is the lifeblood of Alaska's everyday economy. Whether you are talking about keeping food in grocery stores during the winter or moving seafood inland to customers, commercial highway trucks are a vital link in Alaskan commerce. And commercial trucking depends on safe, unrestricted, and open roads to do our job.

For these reasons and on behalf of the 200 member company ATA, I support the Alaska Department of Transportation and Public Facilities' grant application to the Federal Highway Administration for the Eastern Alaska Rural Deficit Bridge Upgrades Project. Funds for this project will be used to replace the Rock Creek and Gulkana Bridges and rehabilitate the Chokosna River Bridge, all three of which are in poor condition. The Chokosna River Bridge is also load-posted.

As you are aware, Alaska has many communities with only one access road, and detours are expensive, driving up costs for basic commodities. The Chokosna River Bridge is totally non-redundant, and detour lengths for Rock Creek and Gulkana are about 500 miles. Given how isolated these communities are, it is especially critical to plan improvements rather than wait for emergencies.

I appreciate the Department addressing the issue of load-posted bridges and looking ahead to avoid possible closures. I encourage the FHWA to approve your grant application and fund the Eastern Alaska Rural Deficit Bridge Upgrades Project.

Sincerely,

Aves Thompson
Executive Director

ALASKA TRUCKING ASSOCIATION

ASSOCIATED GENERAL CONTRACTORS of ALASKA

8005 SCHOON STREET, SUITE 100 • ANCHORAGE, ALASKA 99518
TELEPHONE (907) 561-5354 • FAX (907) 562-6118

November 13, 2018

Commissioner Marc Luiken
Alaska Department of Transportation & Public Facilities
P. O. Box 112500
Juneau, AK 99811-2500

Commissioner Luiken,

The Associated General Contractors (AGC) of Alaska is a construction trade association representing over 640 contractors, specialty contractors, suppliers and manufacturers in Alaska. For seventy years, we have represented the industry through many aspects that help support the overall economy of the State.

Alaska is both blessed and cursed by its geography: blessed by the abundant beauty and natural resources; cursed, because as a young state, our transportation system has many shortcomings. We offer strong support for the Alaska Department of Transportation and Public Facilities' grant application to the Federal Highway Administration for the Eastern Alaska Rural Deficit Bridge Upgrades Project. As with so many places in Alaska, the existing roads in this region are either non-redundant or require detours of hundreds of miles in the event of closure.

Because these bridges are used by a relatively small number of people, they tend to score poorly against other transportation needs. But they provide a critical lifeline for Alaskans who use these historic roads for subsistence activities, as well as crews maintaining the Trans Alaska Pipeline.

On behalf of AGC of Alaska, our 640 members and our 70 years representing the industry, we urge the Federal Highway Administration to fully fund the Eastern Alaska Rural Deficit Bridge Upgrades Project.

Sincerely,

John MacKinnon, Executive Director
Associated General Contractors of Alaska

DON YOUNG
CONGRESSMAN FOR ALL ALASKA
WASHINGTON OFFICE:
2314 RAYBURN BUILDING
WASHINGTON, DC 20515
202–225–5765

Congress of the United States
House of Representatives
Washington, D.C. 20515

COMMITTEE ON
NATURAL RESOURCES
CHAIRMAN EMERITUS

COMMITTEE ON
TRANSPORTATION & INFRASTRUCTURE

REPUBLICAN
POLICY COMMITTEE

CANADA–U.S.
INTER-PARLIAMENTARY GROUP

November 27, 2018

The Honorable Elaine L. Chao
Secretary of Transportation
US Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Dear Secretary Chao:

I am writing to express support for three Competitive Highway Bridge Program (CHBP) grant proposals from the Alaska Department of Transportation & Public Facilities (DOT&PF). These proposals target the rehabilitation or replacement of bridges in Alaska which are listed in the National Bridge Inventory as "structurally deficient" or have otherwise outlived their service life. Please see pertinent details on each of the affected bridge projects within the enclosed fact sheets describing each grant proposal.

The CHBP is provided for under Division L of the Consolidated Appropriations Act of 2018 (Public Law 115-141) and intended to assist states with a population density of less than 100 people per square mile. Alaska's transportation system generally lacks the redundancy which Lower 48 states enjoy and so many of our roadways serve as "lifelines" in the truest sense. These bridge projects are critical to the transportation infrastructure, as well as the local economies of the Alaskan communities surrounding these vital, often exclusive, transportation links.

Thank you in advance to FHWA staff for their careful consideration of DOT&PF's CHBP grant proposals. Consistent with all relevant rules, laws, and regulations, I respectfully request that all due consideration be given to all eligible Alaska-based applications. Thank you for the opportunity to bring these applications to your attention.

Sincerely,

Don Young

DON YOUNG
Congressman for All Alaska

Enclosures

CC: Sandra Garcia-Aline, Division Administrator, Alaska Division, FHWA
Brandye Hendrickson, Acting Federal Highway Administrator, FHWA
Marc Luiken, Commissioner, DOT&PF

VISIT OUR WEBSITE
HTTP://DONYOUNG.HOUSE.GOV

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CALL TOLL-FREE
1–866–990–5979

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Appendix C

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Appendix C - INNOVATIVE TECHNOLOGIES

The Alaska Department of Transportation and Public Facilities is a recognized leader in remote, cold climate, and seismic bridge engineering. Our current $2.6 million research portfolio includes partnerships with North Carolina State University, Texas A&M Transportation Institute, and the University of Alaska, with project topics ranging from material properties to examination of shear capacity of longitudinal keyways in decked bulb-tee girders.[1]

This emphasis on investigation stems from the fact that bridge design in Alaska's environment must consider multiple concurrent severe hazards and limitations. This combination of challenges makes extremes the "Alaska normal." Out of necessity, Accelerated Bridge Construction (ABC) has been standard practice in Alaska for decades. The challenges of design and construction in Alaska are presented below followed by summaries of the innovations applied to this project to address these challenges.

Alaska Challenges

Geography. Alaska DOT&PF manages an inventory of approximately 1,000 bridges, spread over 570,641 square miles; to put this in perspective, total land area of the next three largest states combined (California, Montana, and Texas) is only 562,557 square miles.[2] Many bridges are in communities only reachable by air or water; even those on the main NHS road system might be several hundred miles from the nearest gas station or other commercial services.

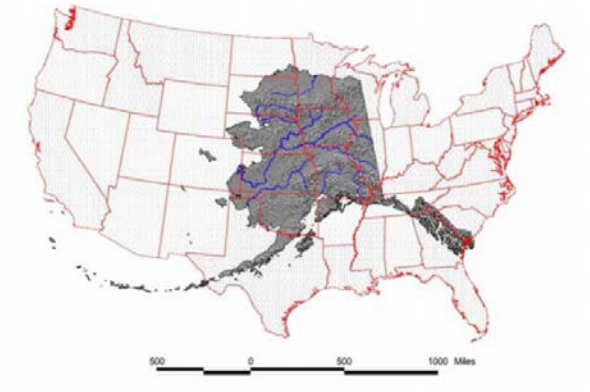

Figure 1 Alaska Superimposed on Contiguous U.S.

Extreme Seismicity. Alaska has the highest seismicity in the nation: epicenters of 9 of the 10 largest earthquakes in the North America since 1900 are in Alaska.[3]

Non-Redundancy. Most of Alaska's highways – and therefore, communities – do not have detour routes, because there is generally only one road in or out. When a bridge is out of service, traveling hours out of the way is the best case scenario; the worst case involves chartering a plane or helicopter or simply waiting until water has frozen thick enough for an ice road.

Short Construction Season. Excluding the most extreme areas, the Alaskan construction season is approximately May through September. Cold weather construction – generally considered to

[1] See Alaska DOT&PF Current Bridge Research Projects 2018. Unpublished Report, Prepared by DOT&PF Research, Development & Technology Transfer Section.
[2] Land area from U.S. Census Bureau, "State Area Measurements and Internal Point Coordinates", Accessed November 15, 2018.
[3] Research Query: Largest North America Earthquakes since 1900. USGS Earthquake Catalog. Accessed November 13, 2018.

be after October or before April – increases the costs of work to such an extent that contractors avoid it when possible. This is one of the prime reasons that Alaska is at the forefront of research and implementation of Accelerated Bridge Construction innovations.

Environmental Constraints. Alaska produces the highest volume of fish and seafood of any state in the United States.[4] Subsequently, protection of streams is critical to the economy, but permitted "fish windows" – time periods during which in-stream work is allowed – also constrain the amount of time contractors can accomplish in-stream work.

Climate. According to the National Oceanic and Atmospheric Administration, Alaska's record low temperature (-80° F) occurred less than 150 miles from its record high temperature (100° F),[5] and as a result, DOT&PF bridge design practice calls for standard temperature ranges of up to 160° F.[6] Material properties can change over a temperature range of this magnitude, which is particularly relevant to seismic design.

For example, frozen soils behave differently from unfrozen soils, changing the location of the plastic hinge in pile foundations. Permanently frozen soils often underlie unfrozen or seasonally frozen soils, and each soil scenario alters seismic demand and response.

Limited Industrial Capacity. Alaska has no steel manufacturing, a small skilled labor pool, and limited options for construction equipment and materials.

DOT&PF design and construction staff regularly addresses all of these factors, and the innovations described below represent some of the resulting adaptations. Both the ABC and Every Day Counts initiatives have identified Prefabricated Bridge Elements (PBEs) as key tools for reducing construction time. Alaska DOT&PF has been using PBEs for decades and likely leads the nation in use of precast, prestressed concrete decked bulb-tee girders with installations at more than 300 locations.

[4] *Fisheries of the United States 2016*. NOAA National Marine Fisheries Service. August 30, 2017 (p-12).
[5] State Climate Extremes Committee. NOAA National Centers for Environmental Information. Accessed November 16, 2018.
[6] *Alaska Bridges and Structures Manual*. DOT&PF Bridge Section. Chapter 19: Expansion Joints and Bearings. September 2017 (p 19-1, Table 19-1).

Appendix C - INNOVATIVE TECHNOLOGIES

Innovative Technology: Concrete-Filled Steel Tube (CFST) Substructure Units

Summary of Benefits
• Expedited project delivery – typically requires less than half the time required to construct a conventional pier in a waterway • Expedited project delivery – eliminates need for cofferdams • Expedited project delivery – reduces environmental impacts, and thus permitting time, when compared to conventional cofferdam column-footing pier construction • Added bridge capacity – excellent ductile response to seismic demands and resistance to liquefaction

This innovation will be applied to the following structure in this project: potentially Rock Creek (NBI Bridge No. 684)

Description

CFST Substructure Units consist of large diameter (24-inch to 48-inch) steel piles with a reinforced concrete pier cap and eliminating the need for a traditional concrete footing at the groundline. Piles are filled with reinforced concrete and designed to establish a ductile connection to the capacity-protected reinforced concrete cap.

Figure 2 Typical CFST Substructure Units

Capacity to Implement

Alaska pioneered the use of large-diameter Concrete-Filled Steel Tube Substructure Units as a rapid-build, low-cost, and environmentally appropriate substitute for traditional column-footing foundations. This innovation addresses several challenges faced by bridge designers in the state: short construction seasons, remote and high-cost build locations, relatively high rate of environmentally sensitive fish streams, and extremely high seismicity and liquefaction potentials.

Alaska began development of the CFST Substructure Unit concept for high seismic regions in the 1990s in collaboration with University of California at San Diego. This full-scale test program resulted in a design procedure and structural detailing that ensure ductile performance under seismic loading. Later work with the Oregon State University resulted in the development of design software that greatly increases efficiency and accurately captures nonlinear soil structure interaction, including the effects of frozen soil. Research conducted in 2013 at North Carolina State University documented that the concrete and steel in the piles act compositely.[7] DOT&PF has completed hundreds of CFST Substructure Units for both piers and abutments, but AASHTO only added concrete-filled steel tubes to the *LRFD Bridge Design Specifications* in the 8th edition released in 2018.

Over time, research and experience have shown CFST Substructure Units provide excellent lateral resistance to seismic loading and are designed to resist settlement from liquefaction. The design has been found to use concrete and reinforcing steel highly efficiently when compared to a traditional column-footing system.

Without a concrete footing, the permitting and construction costs associated with cofferdams are eliminated. This change alone has been found to lower costs by more than 64 percent (approximately $1 million) when used at piers and reduce construction time by about two-thirds.

At abutments, DOT&PF installs CFST Substructure Units when additional seismic capacity is needed due to liquefiable soils. At these locations, costs are similar to other deep foundation options.

[7] Brown, N.K., Kowalsky, M., Nau, J. "Strain Limits for Concrete Filled Steel Tubes in AASHTO Seismic Provisions", Report No. FHWA-AK-RD-13-05. August 2013.

Appendix C - INNOVATIVE TECHNOLOGIES

Innovative Technology: Precast Prestressed Concrete Decked Bulb-Tee Girders (DBTs)

Summary of Benefits
• Expedited project delivery – saves 50% to 75% of deck construction time compared to a conventional Cast-In-Place concrete bridge decks • Expedited project delivery – design, fabrication and construction standards are mature in Alaska • Added bridge capacity – superior overload capacity (operating load rating) due to zero tension design standard • Improved bridge durability – high quality plant-cast concrete eliminates inadequate reinforcing cover, the leading cause of premature deck deterioration in the state

This innovation will be applied to the following structures in this project: Rock Creek (NBI No. 684), Chokosna River (NBI No. 1193)

Description

Precast, prestressed concrete decked bulb-tee girders leverage traditional technology into a single innovation addressing multiple construction challenges. A standard precast concrete bulb-tee girder is fabricated with the final deck installed. Edge girders are cast with curb hardware.

Decked bulb-tee girders are connected by a combination of cast-in-place concrete diaphragms, welded steel connection “tabs” embedded in the edges of the top flanges, and grouted keyway longitudinal joints. “Alaska-style” DBT decks can be used as a riding surface as soon as the grout cures, or a waterproofing membrane with asphalt overlay can be added.

DOT&PF design policy further extends the advantages of DBTs. Girders are designed for zero tension under all loads which results in very high operating load ratings in flexure. To optimize these capacities, enough additional reinforcing is provided so the shear operating rating is roughly equal to the flexure rating resulting in efficient girders with optimal overload capacity.

Capacity to Implement

Alaska DOT&PF first used prototype DBTs in the late 1970s, and since then, they have become the most commonly used bridge superstructure in the state. DBTs are almost always the lowest cost bridge type in Alaska when geometric limitations can be met. Maximum DBT span lengths are typically limited 120 to 140 feet due to shipping and handling concerns.

Figure 3 "Alaska-Style" Prestressed Girder Installation

Example Financial and Time Savings

DBT bridges can be two to three times faster to construct than structures with conventional cast-in-place concrete decks. A comparison of typical deck construction sequences is detailed below.

Construction Time Comparison			
Conventional CIP Deck		**Decked Bulb-Tee Girders**	
Construct soffit forms	2 weeks	Place girders with integral deck	0.5 weeks
Place reinforcing steel	2 weeks	Weld & grout keyways	0.5 weeks
Place & cure concrete	1 week	Form & cast diaphragms & curbs	1 week
Strip forms	1 week	Install waterproofing membrane & asphalt overlay	0.5 weeks
Total	**6 weeks**	**Total**	**2.5 weeks**

Appendix C - INNOVATIVE TECHNOLOGIES

Innovative Technology: Cold-Climate Polyester Concrete

Summary of Benefits
• Expedited project delivery – allows traffic flow to resume after 4 hour cure time, instead of the 7 days required for traditional concrete • Added bridge capacity – compressive strength roughly twice as strong as required for Class A concrete, coupled with a lower unit weight • Improved bridge durability – impermeable, protect steel reinforcement from chlorides and road salts

This innovation will be applied to the following structures in this project: Gulkana River (NBI No. 574)

Description

States like Washington, Nevada, and California with much higher traffic volumes than Alaska have successfully used polyester concrete for decades. However, Alaska has seen effective materials from the Lower 48 fail quickly in the extreme cold climate, so additional testing and modifications are often necessary to establish whether the material will survive "Alaska normal."

Polyester concrete is composed of a polyester resin binder and select aggregate material, and its use is typically limited to thin bridge deck overlays. The concrete is rapid-setting, high-strength, and impermeable. It is routinely specified at 10,000 psi, compared to 4,000 psi specified strength of Portland cement concrete. Polyester concrete can be opened to traffic in 4 hours, compared to conventional concrete that must be cured for 7 days according to DOT&PF specifications. Polyester is impervious to water, protecting reinforcing steel from the heavy use of road salts, prolonging deck life.

Capacity to Implement

To date, DOT&PF has implemented four polyester concrete projects: three deck rehabilitations and one full-depth approach slab. The full-depth approach slabs were part of an experimental feature project to test new ABC polyester concrete applications. They are performing well, but did not offer sufficient benefit/cost advantages to be practical for widespread applications.

DOT&PF has also sponsored a research project that is testing polyester concrete in the longitudinal girder joints of DBTs. So far polyester concrete shows promise as a replacement for grout, meaning further time savings because the joint could be placed concurrently with a thin overlay. The monolithic polyester concrete placement would replace the three-step process of grouting joints, placing a waterproofing membrane, and asphalt paving of the deck. While the

research will not be completed in time for the bridges in the project, it could be tested within the next 2 years. If feasible, it would be the first use of this combination of ABC materials.

Appendix D

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Memorandum

Date: November 21, 2018

To: ADOT&PF

From: Patrick Burden and Leah Cuyno

Re: Benefit-Cost Analysis of Northern Region Bridge Rehabilitation and Replacement

This memorandum is provided in support of the Alaska Department of Transportation and Public Facilities (ADOT&PF) Bridge Section's application for grant funding for the FHWA's Competitive Highway Bridge Program for Fiscal Year 2018.

This memorandum describes the benefit-cost analysis (BCA) conducted for the proposed bridge rehabilitation projects in ADOT&PF's Northern Region. A BCA spreadsheet model was developed to determine the net present value of the expected benefits of three proposed bridge projects in the Northern Region. The analysis also considered the cost effectiveness of bundling the projects during construction to generate cost savings.

Net Present Value (NPV) and Benefit-Cost (B/C) Ratio

The following table summarizes the expected outcomes with respect to benefits and costs of the three proposed bridge projects in the ADOT&PF Northern Region. Constructing the three bridge rehabilitation projects as a bundle would be more cost effective, with an estimated construction cost savings of about $715,000.

Table 1. Expected Net Benefits (in millions of 2018 $) and B/C Ratio of the Proposed Northern Region Bridge Rehabilitation Projects

Northern Region Projects	Present Value of Estimated Benefits	Present Value of Estimated Costs	Net Present Value	B/C Ratio
Gulkana River (574)	$2,162.11	$2.15	$2,160.04	1,005
Rock Creek (684)	$76.32	$3.88	$72.44	20
Chokosna River (1193)	$2.19	$4.73	($2.55)	0.46
Total (*separate projects*)	$2,240.61	$10.77	$2,229.93	208
Total (*bundled*)	$2,240.61	$10.18	$2,230.52	220

Source: Northern Economics estimates based on the B/C model developed for this study.

Proposed Bridge Rehabilitation and Replacement Projects in the Northern Region

The proposed project will upgrade three structurally deficient rural bridges in the ADOT&PF Northern Region: Gulkana River Bridge No. 574 on the Richardson Highway, Rock Creek Bridge No. 684 on the Denali Highway, and Chokosna River Bridge No. 1193 on the McCarthy Road. All three bridges are located on historic roads.

The Richardson Highway connects Valdez, Alaska to communities along the highway and ultimately to Alaska's second largest city, Fairbanks, while providing direct maintenance and emergency response access to the Trans-Alaska Pipeline (TAPS). Load limitations on any

880 H Street, Suite 210 | Anchorage, AK 99501
1455 NW Leary Way, Suite 400 | Seattle, WA 98107
E-mail: mail@norecon.com | www.northerneconomics.com
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bridge along the Richardson stretch increase the cost of goods and services in the region. Rehabilitation of the Gulkana River Bridge will prolong the life of the structure, reducing risk of load posting or full bridge replacement on this commercial trucking route.

The Denali Highway is a seasonal road that connects the Parks and Richardson Highways and provides access to recreational and subsistence resources along its length. The Denali Highway connects the remote communities of Cantwell and Paxson on either end. The Rock Creek Bridge is remote and in the event of a structure failure, travelers could have to go several hundred miles out of the way to reach their destination. Replacement of this deficient structure will ensure continued access to recreational and subsistence resources along the Denali Highway.

The McCarthy Road is a seasonal road that winds through the Wrangell St. Elias National Park and connects the remote community of McCarthy to the main highway system in Alaska. The McCarthy Road provides access to recreational and subsistence resources along its length, including access to the Kennecott Mine which is a National Historic Landmark. The remote Chokosna River Bridge is a critical node along the McCarthy Road and in the event of structure failure residents of McCarthy would only have air access to get goods and supplies or access medical attention. Replacement of this deficient structure will ensure continued access to recreational and subsistence resources, as well as emergency road access to McCarthy, along the McCarthy Road.

Assumptions and Values of Key Input Parameters

All benefits and costs in the analysis are presented in 2018 dollars. The analysis uses 2018 as the base year and all future benefits and costs are discounted to 2018 dollars using a 7 percent real discount rate. The Alaska Consumer Price Index (CPI) is used as the cost deflator. [The Alaska CPI and the 2018 Deflator is shown in the *Alaska CPI* tab of the BC spreadsheet model].

General model assumptions used in the BCA are shown in Table 2 below.

Table 2. General Model Assumptions used in the Benefit Cost Analysis

B/C Model Parameters	Value
Year of dollar values in the model	2018
Discount Rate (Real), percent	7
Design Life of New Bridge, # of years	75
Design Life of Rehabilitated Bridge, # of years	50
Occupancy rate for personal vehicles, # of persons	1.7
Occupancy rate for buses, # of persons	10.7
Occupancy rate for commercial vehicles, # of persons	1.0
Replacement Year for Polyester Concrete Overlay	30
Operating Period for this Analysis, # of years	30

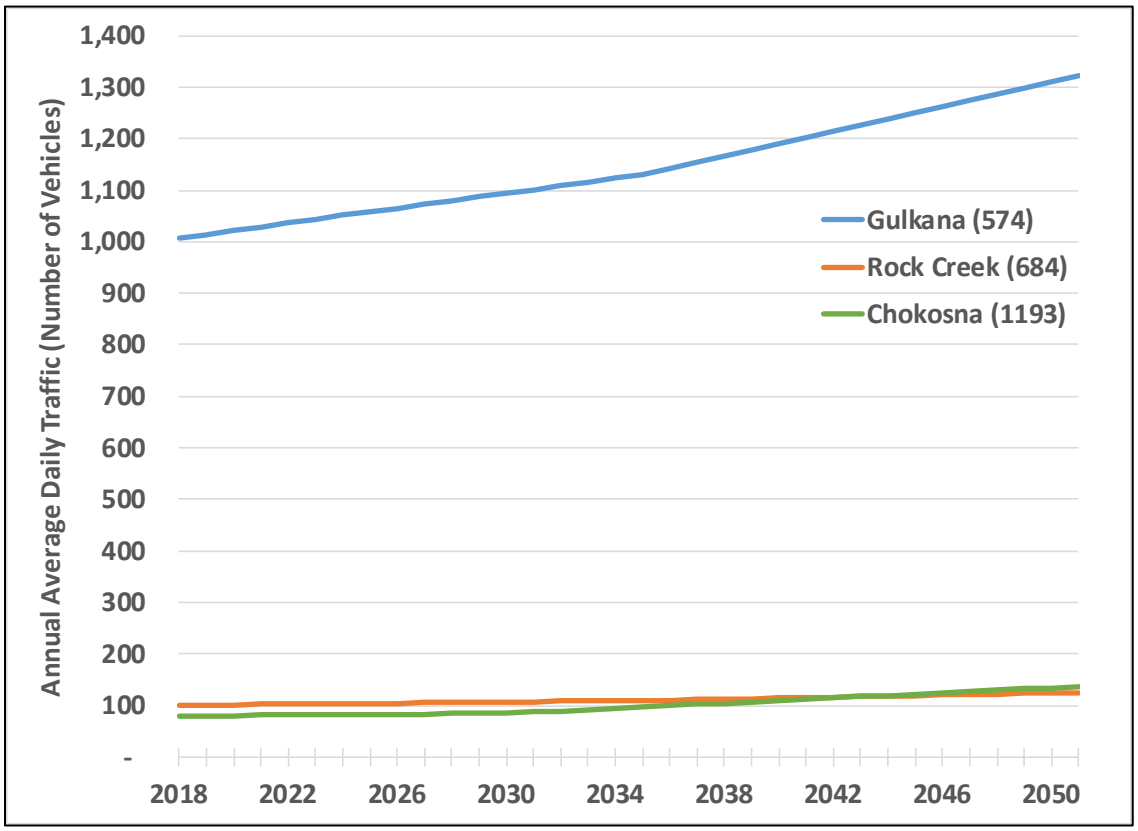
Sources:

1) Discount rate is based on the Office of Management and Budget Circular A-94.
2) Occupancy rates for personal vehicles and for buses are from "Average Vehicle Occupancy Factors for Computing Travel Time April 2018." https://www.fhwa.dot.gov/tpm/guidance/avo_factors.pdf. Accessed on Oct. 20, 2018.

3) Design life of a new/rehabilitated bridge is based on AASHTO Bridge code, provided by ADOT&PF.

The projected traffic volumes, measured as annual average daily traffic (AADT), used in this BCA analysis were provided by ADOT&PF. Traffic counts were measured on Milepost 127 of the Richardson Highway (Gulkana Bridge), Milepost 25 of the Denali Highway (Rock Creek Bridge), and Milepost 27 of the McCarthy Road (Chokosna Bridge).

Figure 1. Projected Annual Average Daily Traffic on the Gulkana, Rock Creek, and Chokosna Bridges



Source: Alaska Department of Transportation and Public Facilities.

The total projected AADT counts shown above were allocated to different types of vehicles according to the percentages shown in the table below.

Table 3. Allocation of Traffic Volume per Type of Vehicle, Percent of Annual Average Daily Traffic

Types of Vehicles	Gulkana Bridge	Rock Creek Bridge	Chokosna Bridge
Commercial vehicles			
Trucks (Classes 5-13)	22.4	14.0	10.8
Buses (Class 4)	0.6	0.5	0.2
Other Business Travel	4.6	7.0	10.4
Personal	72.4	78.5	78.6

Sources:

1) Commercial vehicle estimates are from the Alaska Department of Transportation and Public Facilities.
2) Other Business Travel vehicle estimates are based on 2016 estimate for local business travel.

Baseline (No Build) Description

The following describes the baseline conditions, which is the basis for determining or quantifying the effects of the no build case— load limits, single-lane operations, and eventual bridge closures.

The assumptions and calculations associated with the baseline conditions are shown in the 574 Baseline tab, 684 Baseline tab, and the 1193 Baseline tab.

Gulkana River Bridge 574

The bridge was originally constructed in 1974, with no significant alterations since original construction. Maintenance activities over the years have included scour repair, debris removal around piers, and deck repairs. The current bridge railing does not meet current standards for crashworthiness. The reinforced concrete deck has deteriorated over the years to a condition rating of 4, even with routine patching, with severe delamination and deck cracking present. The deck condition has been rated poor for over 10 years, despite maintenance activities to address the most severe deck deficiencies.

Given this current NBI rating, the following are assumed under the Baseline for this analysis:

- The bridge deck will have 2.6 years at NBI rating 3 before closure at NBI rating 2.
- The bridge deck will fall to rating 3 at the next inspection in 2019.
- Load limits are imposed the year after a rating 3 is reached (Year 2020).
- In the third year of the NBI rating 3 (year 2022), single lane operations will be put in place. Single lane operations will result in an average delay of 6 minutes per vehicle.
- The bridge will be closed at the end of year 2023.

Rock Creek Bridge 684

This bridge was built in 1955, with no significant alterations since its original construction. The bridge was load posted in 2011 to allow for single lane traffic only due to deterioration of the superstructure. The downstream bridge abutment and backwall have moved significantly, leading to cracks in the abutment piles.

The Rock Creek Bridge substructure has exceeded its expected service life. Its current NBI rating is a 4.

Given this current NBI rating, the following are assumed under the No Build Baseline:

- The substructure will have an expected 4 years at NBI rating 3 before closure at rating 2
- The substructure will drop to rating 3 at the next inspection in 2019
- At NBI rating 3, load limits are imposed in year 2020.
- In the third year of the NBI rating 3 (2022), single lane operations will be put in place.
- The bridge will be closed at the end of 2022.

Chokosna River Bridge 1193

This bridge was constructed in 1973, with no significant alterations done since it was built. The bridge was load posted in 2006 and has continued to deteriorate since then. The timber deck is damaged with holes in areas, the bearings are failing and there is surface rust throughout the structure. The timber abutments are decaying and sloughing and the sheet pile walls are leaning. The bridge floor beams are bowed and missing bolts in locations.

The bridge deck and the substructure have exceeded their service life; they currently have an NBI rating of 4. However, the bridge deck is estimated to have a shorter time at NBI rating 3 (2.6 years compared to 4 years) so the bridge deck is the controlling component for replacement.

Given this current NBI rating, the following are assumed under the No Build Baseline:

- The bridge deck will have 2 more years at rating 4 (years 2019-2020).
- The bridge deck will have 2.6 years at rating 3 before it closes at rating 2.
- At NBI rating 3, additional load limits are imposed (2021).
- In the third year of the NBI rating 3 (2023), single lane operations will be put in place. Single lane operations will result in an average delay of half a minute per vehicle.
- Bridge 1193 will be closed at the end of year 2024.

Project Benefits

The benefits of the project are evaluated based on the avoided costs associated with imposing the no build or baseline conditions described above.

1) **Avoided Costs of Load Limits**

Load limits imposed on the bridges will result in an increase in truck traffic by 4 percent, as some loads will have to be split between trucks to stay within the load limits. This increases operating costs and travel time of affected trucks.

The marginal costs of operating a truck per hour are based on the published report by the American Transportation Research Institute (ATRI)-- *An Analysis of the Operational Costs of Trucking* released in October 2018. The operating costs include fuel, repair and maintenance, insurance, permits/licenses, and tires. [Assumptions and calculations for vehicle operating costs are shown in *Vehicle Opg Cost* tab in the BC spreadsheet model].

The value of travel time for truck drivers are based on hourly compensation of heavy and tractor-trailer and light truck or delivery service drivers as published by the Bureau of Labor Statistics (BLS). [Wage and income data are shown in the *Wage & Income* tab in the BC spreadsheet model].

Load limits on the 574 and 684 bridges are in effect from 2020 through 2022 and load limits on the 1193 bridge are in effect in years 2021 through 2024.

Table 4. Estimated Net Effects of Load Limits Imposed on Bridge 574, in 2018 $

Category	Net Present Value	2019	2020	2021	2022
Increased Truck Operating Cost	$1,201,946	$0	$486,778	$490,219	$493,660
Increased Driver Travel Time	$855,078	$0	$346,299	$348,747	$351,195
Total	**$2,057,024**	**$0**	**$833,077**	**$838,966**	**$844,855**

Source: Northern Economics estimates based on the BC model developed for this study.

Table 5. Estimated Net Effects of Load Limits Imposed on Bridge 684, in 2018 $

Category	Net Present Value	2019	2020	2021	2022
Increased Truck Operating Cost	$66,169	$0	$26,839	$26,985	$27,132
Increased Driver Travel Time	$66,687	$0	$27,049	$27,197	$27,345
Total	**$132,856**	**$0**	**$53,888**	**$54,182**	**$54,477**

Source: Northern Economics estimates based on the BC model developed for this study.

Table 6. Estimated Net Effects of Load Limits Imposed on Bridge 1193, in 2018 $

Category	Net Present Value	2019 to 2020	2021	2022	2023	2024
Increased Truck Operating Cost	$48,172	$0	$16,174	$16,251	$16,327	$16,403
Increased Driver Travel Time	$48,108	$0	$16,153	$16,229	$16,305	$16,382
Net Effect of Load Limits	$96,280	$0	$32,327	$32,480	$32,632	$32,785

Source: Northern Economics estimates based on the BC model developed for this study.

2) Avoided Costs of Single Lane Operations

Single lane operations will take effect for the Bridges 574 and 684 in year 2022 and in years 2023 and 2024 for Bridge 1193.

Single lane operations will cause a 6-minute delay on Bridge 574, a 1-minute delay on Bridge 684, and half a minute delay on Bridge 1193. The time delay was quantified for each type of vehicle using the appropriate compensation or wage data for the type of travel [see *Wage & Income* tab in the BC spreadsheet model].

Table 7 presents the estimated effects of the single lane operations imposed on the various bridge projects.

Table 7. Net Present Value of the Estimated Effect of Single Lane Operations on Bridges 574, 684, and 1193, in 2018 $

Type of Travel	Gulkana (574)	Rock Creek (684)	Chokosna (1193)
Truck Drivers	$248,079	$2,556	$1,436
Bus Drivers	$5,647	$68	$22
Bus (Passengers)	$49,111	$588	$190
Other Business Travel Time	$55,003	$1,384	$1,492
Personal Travel Time	$1,005,087	$17,988	$13,089
Total	**$1,362,927**	**$22,584**	**$16,229**

Source: Northern Economics estimates based on the BC model developed for this study.

3) Avoided Costs of Bridge Closures

As noted in the baseline description above, Bridges 574 and 684 will be closed at the end of year 2022 and Bridge 1193 will be closed at the end of year 2024. These bridge closures will then prevent any road traffic passing through since there are no alternate bridge crossings that can be used. The following travel scenarios are therefore assumed following the bridge closures:

Bridge 574 Closure

The analysis assumes that vehicles are traveling a distance of 153 miles between Glenallen and Delta Junction on the Richardson Highway which takes about 2.7 hours. In the event of the bridge closure, vehicles will have to travel 557 miles to use the alternate route (detour) via Wasilla and Fairbanks. This detour is estimated to take 9 hours and 29 minutes.

Bridge 684 Closure

The analysis assumes that vehicles are traveling a distance of 136 miles between Cantwell and Paxson on the Denali Highway which takes about 3.4 hours. In the event of the bridge closure, vehicles will have to travel 324 miles to use the alternate route (detour) via Fairbanks. This detour is estimated to take 5 hours and 29 minutes.

Bridge 1193 Closure

There are no alternate routes that can be taken in the event of bridge closure. Hence, the bridge closure will result in people traveling by air.

The costs that motorists will have to incur after the bridge closure, using the alternate mode of travel (air), were quantified using current fares from Gulkana to McCarthy and the travel time delays (associated with the detours) and gain (via air travel) were also quantified. Note that the air fares used here are associated with a route that is supported by a U.S. Postal Service mail delivery contracts and are much less than other air taxi services. The fares are thought to approach the incremental cost of the service.

The avoided costs were determined based on the incremental costs associated with the project, hence only the net effects are quantified. For example, the incremental effect in terms of vehicle miles traveled on the 574 bridge route is 404 miles (which is the difference between the miles associated with the detour (557 miles) and the miles on the bridge route (153 miles)). The net effect in terms of travel time is 6.8 hours (which is 9 hours and 29 minutes on the detour route minus the 2.7 hours on the bridge route.

The net effects of the closure of Bridge 1193 include the benefits of using air travel instead of driving on the bridge route-- eliminated costs of operating the different types of vehicles and the travel time savings. These values are negative values since they represent a benefit (instead of a cost). The net effect of the bridge closure in present value terms is estimated to amount to $1.68 million (2018 $).

Table 8 and Table 9 show the net present values of the estimated costs of the bridge closures.

Table 8. Net Present Value of Estimated Effect of the 574 and 684 Bridge Closures, *in millions* of 2018 $

Category	Gulkana (574)	Rock Creek (684)
Increased Truck Operating Cost	$344.09	$9.86
Increased Truck Driver Travel Time	$232.91	$4.44
Increased Bus Operating Cost	$9.17	$0.31
Increased Bus Driver Travel Time	$5.10	$0.11
Increased Bus Passenger Travel Time	$44.33	$0.98
Increased Other Business Vehicle Operating Cost	$29.96	$2.10
Increased Other Business Travel Time	$49.65	$2.31
Increased Personal Vehicle Operating Cost	$471.48	$23.54
Increased Personal Travel Time	$907.32	$30.05
Total:	**$2,094.006**	**$73.712**

Source: Northern Economics estimates based on the BC model developed for this study.

Table 9. Net Present Value of Estimated Effect of the 1193 Bridge Closure, *in millions* of 2018 $

Category	Net Present Value
Increased Bus Passenger Travel Cost	$0.61
Eliminated Bus Operating and Driver Cost	($0.13)
Decreased Bus Passenger Travel Time	($0.33)
Increased Other Business Vehicle Travel Cost	$3.25
Eliminated Other Business Vehicle Operating Cost	($1.64)
Decreased Other Business Travel Time	($2.63)
Increased Personal Travel Cost	$41.79
Eliminated Personal Vehicle Operating Cost	($12.39)
Decreased Personal Travel Time	($23.07)
Eliminated Truck Driver Travel Time	($3.79)
Total:	**$1.683**

Source: Northern Economics estimates based on the BC model developed for this study.

The assumptions, data, and calculations for the various avoided costs (and benefit) associated with the bridge closures are provided in the *574 Baseline* tab, *684 Baseline* tab, and the *1193 Baseline tab* in the BC spreadsheet model.

4) Avoided Baseline Maintenance and Operating Costs

Table 10 shows the net present values and the future avoided maintenance and operating costs for the three bridges. The baseline costs are quantified only until the last year the bridges will be open to motorists. The data, assumptions, and calculations are shown in the *M&O* tab in the BC spreadsheet model.

Table 10. Net Present Value of the Estimated Baseline Maintenance and Operating Costs for Bridges 574, 684, and 1193, in 2018 $

Bridge/Cost Category	NPV	2019	2020	2021	2022	2023	2024
Gulkana (574)							
Pavement	$122	$0	$0	$0	$160	$0	$0
Bridge	$11,021	$0	$0	$3,725	$3,725	$3,725	$3,725
Total	$11,142	$0	$0	$3,725	$3,885	$3,725	$3,725
Rock Creek (684)							
Timber Deck	$15,326	$0	$0	$0	$0	$0	$23,000
Bridge	$753	$0	$0	$254	$254	$254	$254
Total	$16,079	$0	$0	$254	$254	$254	$23,254
Chokosna (1193)							
Timber Deck	$7,646	$0	$0	$5,000	$0	$5,000	$0
Bridge	$10,213	$0	$0	$3,452	$3,452	$3,452	$3,452
Total	$17,860	$0	$0	$8,452	$3,452	$8,452	$3,452

Source: Northern Economics estimates based on the BC spreadsheet model developed for this study; ADOT&PF provided historical maintenance costs for the bridges.

5) Residual Value of Bridge

The residual values for the bridges were quantified and included in the BCA. For this calculation, it is assumed that the value (=capital cost) of the bridge depreciates in a linear manner over its service life. The design life for a rehabilitated bridge is 50 years and the design life of a new bridge is 75 years, while the operating period assumed for this analysis is 30 years. The discounted residual values for the three bridges are shown in the table below.

Table 11. Estimated Discounted Residual Values of Bridges 574, 684, and 1193, in 2018 $

Bridge	Present Value
Gulkana (574)	$71,917
Rock Creek (684)	$294,689
Chokosna (1193)	$372,202

Source: Northern Economics estimates based on the BC spreadsheet model developed for this study; ADOT&PF provided capital costs of the bridge rehabilitation and replacement projects.

6) Avoided Emissions Costs

This analysis evaluated the net costs of emissions under the baseline conditions (without the bridge projects) and with the projects. This includes the differences in emissions associated with the detour route and the bridge route for the Bridges 574 and 684.

The costs of emissions are based on the recommended monetized values provided in the U.S. DOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs. The Guidance only

provided monetized costs for volatile organic compounds (VOCs), nitrogen oxides (NO_x), particulate matter (PM), and sulfur dioxide (SO_2). According to the document, DOT does not currently have a recommended value for the damage costs from CO_2 emissions; hence CO_2 emissions cost were not monetized). SO_2 emissions were also not monetized since there no data were found on SO_2 emissions from passenger vehicles and trucks. Aircraft emissions factors are also not available (small aircraft engines are not covered by current EPA regulations) thus emissions costs associated with the Chokosna Bridge project were not quantified.

The data, assumptions, and calculations for the costs of emissions are in provided in the *574 Emissions* tab and the *684 Emissions* tab of the BC spreadsheet model.

Table 12. Estimated Effects of Net Emissions, in 2018 $

Bridge	Net Present Value
Gulkana(574)	$65,452,362
Rock Creek (684)	$2,141,403
Chokosna (1193)	--

Source: Northern Economics estimates based on the BC spreadsheet model developed for this study

Project Costs

Total project costs in this BCA include the estimated costs of upgrading and replacing the bridges, as well as the future maintenance and operations of the bridges.

1) Capital Costs

The undiscounted project capital costs for each bridge project are shown in Table 13. The table also compares the total costs for all the bridges if they were implemented separately versus the total costs for all the bridges if they were implemented together (or bundled).

Table 13. Estimated Project Costs of the Bridges 574, 684, and 1193, Undiscounted, in 2018 $

Bridge	Amount: Stand-Alone	Amount: Bundled
Gulkana (574)	$2,514,939	$2,334,013
Rock Creek (684)	$4,900,741	$4,817,515
Chokosna (1193)	$5,784,843	$5,333,954
Total	**$13,200,523**	**$12,485,482**

Source: Alaska Department of Transportation and Public Facilities (ADOT&PF).

The BC spreadsheet model provides a detailed break-down of the cost information in the *Construction Cost Estimate* tab.

2) Maintenance and Operations Costs

New bridges in Alaska are designed to be resilient structures with limited maintenance due to logistical challenges associated with short construction seasons and remote locations. Besides wearing surface replacement and minor upkeep, maintenance and operations work is assumed to be minimal. The table below shows the discounted estimated maintenance costs of the new and upgraded bridges.

Data, assumptions, and calculations are provided in the *M&O* tab in the BC spreadsheet model.

Table 14. Present Value of Maintenance & Operating Costs of the New 574, 684, and 1193 Bridges, in 2018 $

Bridge/Cost Category	Present Value
Gulkana (574)	
Pavement	$84,544
Bridge	$13,948
Total	**$98,492**
Rock Creek (684)	
Pavement	$8,832
Bridge	$1,937
Total	**$10,769**
Chokosna (1193)	
Pavement	$9,141
Bridge	$3,282
Total	**$12,423**

Source: Based on Alaska Department of Transportation and Public Facilities (ADOT&PF) Transportation Asset Management Plan and historical data on maintenance and operating costs, and Northern Economics assumptions about minor annual activities.

Summary Results: Benefit-Cost Analysis

The BCA results of the proposed bridge projects in the Northern Region are presented in Table 15. The Gulkana and Rock Creek bridge projects have a B/C ratio greater than 1 while the Chokosna Bridge project has a B/C ratio of 0.5 (which means the estimated costs are higher than the estimated project benefits. As a bundle, the estimated cost savings in present value terms amount to $580,000 (2018 $). The bundled projects have a B/C ratio of greater than 1.

Table 15. Net Present Values of Proposed Northern Region Bridge Projects' Benefits and Costs

Category	Net Present Value (millions)				
Project Benefits	Gulkana	Rock Creek	Chokosna	All Bridges (Separate)	All Bridges (Bundled)
Avoidance of Load Limit Costs	$1.20	$0.13	$0.10	$1.43	$1.43
Avoidance of Single Lane Operation	$1.36	$0.02	$0.02	$1.40	$1.40
Avoidance of Bridge Closure	$2,094.01	$73.71	$1.68	$2,169.40	$2,169.40
Avoidance of M&O Costs until Bridge Closure	$0.01	$0.02	$0.02	$0.05	$0.05
Residual Value of Bridge	$0.07	$0.29	$0.37	$0.74	$0.74
Avoided Emissions Costs	$65.45	$2.14	$0.00	$67.59	$67.59
Total Project Benefits	$2,162.11	$76.32	$2.19	$2,240.61	$2,240.61
Project Costs					
Capital Expenditures	$2.05	$3.87	$4.72	$10.64	$10.06
M&O Expenditures	$0.10	$0.01	$0.01	$0.12	$0.12
Total Project Costs	$2.15	$3.88	$4.73	$10.77	$10.18
Net Benefits	$2,159.95	$72.44	-$2.55	$2,229.84	$2,230.43
B/C Ratio	1,005	20	0.5	208	220

Source: Northern Economics estimates based on the BC spreadsheet model developed for this study.

Appendix D-2 can be found at the Competitive Highway Bridge Program grant page.

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Appendix E

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Risk Register						
Bridge No(s).	**Risks**	**Mitigation Strategy**	**Probability (1 low/5 high)**	**Severity (1 low/5 high)**	**Risk Rating**	**Category**
574, 684, 1193	Competing support group resources impact project schedule (e.g. can't get Statewide Foundations out in time)	If project is selected, discuss with Regional Preconstruction Engineer and applicable Statewide resource heads to prioritize project for Statewide and Regional resources due to funding timeline requirements. Utilize consultant support if needed.	2	3	Medium	Other Risks
574, 684, 1193	Legislative approval not granted.	Keep Commissioner apprised of grant application and status and utilize PIO as needed for messaging to Legislators if questions arise.	1	5	Medium	Funding Uncertainties
574, 684, 1193	Material escalation due to tariffs or inflation.	Utilize appropriate contingency in programming estimates to ensure project cost does not exceed grant program allocation. Evaluate cost estimate for major cost components up front and monitor those elements for potential inflation as project design progresses. Communicate with Statewide Planning early on any project cost element that may require STIP funds to cover grant funding differences to ensure funds are available to obligate project on time.	3	3	Medium	Cost Uncertainties
574, 684, 1193	State funds not available for match.	Keep Commissioner apprised of grant application and status and utilize PIO as needed for messaging to Legislature on importance of capturing grant funding.	1	5	Medium	Funding Uncertainties
574, 684, 1193	Cost inflation due to lack of information (e.g. no foundation drilling conducted yet or utility impacts not known).	Utilize appropriate contingency in programming estimates (typically 15-20%) to ensure project cost does not exceed grant program allocation.	2	2	Low	Cost Uncertainties
574, 684, 1193	Cost negotiations with design consultant delay NTP and subsequent advertise date.	Utilize in house resources, Northern Region has adequate staffing to support the current project. No project element requires special expertise outside Department capabilities.	1	3	Low	Cost Uncertainties
574, 684, 1193	Individual USACE permit or USCG permit required.	Monitor potential for changes in NWP requirements. Project is currently a FHWA CE so worst case under current NWP program is NWP 23.	1	3	Low	Environmental Uncertainties
574, 684, 1193	Material escalation due to limited suppliers and competing work.	Utilize appropriate contingency in programming estimates to ensure project cost does not exceed grant program allocation. Advertise project with sufficient time for material suppliers to balance workload (typically winter advertising ideal).	1	3	Low	Cost Uncertainties
574, 684, 1193	Other (e.g. STIP or State) funds required for portions of work that do not meet grant program requirements (e.g. significant roadway realignment needed to meet geometric standards).	Coordinate with Statewide Planning to ensure additional funds are available if needed, and communicate overall reduction in STIP impact as project is currently 100% STIP. Project is shown in NR funding plan for construction year 2021 using STIP funds currently.	1	3	Low	Funding Uncertainties
574, 684, 1193	Project located in area of high environmental scrutiny or with special environmental/regulatory area of concern (e.g. 4(f) resources, T&E species)	Refine design to remain within existing ROW if detailed design indicates some work falls outside the existing ROW.	1	3	Low	Environmental Uncertainties
574, 684, 1193	Utility relocation required.	Identify utility relocation requirements early and coordinate with Delivery Team utility engineer to prioritize relocation schedule.	1	3	Low	Construction Risks
574, 684, 1193	Insufficient material available (quality and/or quantity).	Evaluate existing materials site information and update permits as required.	1	2	Low	Construction Risks
574, 684, 1193	Cost inflation due to real estate price increase.	N/A	0	0	None	Cost Uncertainties
574, 684, 1193	Project environmental document not approved in time.	N/A	0	0	None	Environmental Uncertainties

Risk Register							Bridge No. 1 - Gulkana River Bridge No. 574, Richardson H
Bridge No(s).	**Risks**	**Mitigation Strategy**	**Probability (1 low/5 high)**	**Severity (1 low/5 high)**	**Risk Rating**	**Category**	**Remarks**
574	State funds not available for match.	Keep Commissioner apprised of grant application and status and utilize PIO as needed for messaging to Legislature on importance of capturing grant funding.	1	5	Medium	Funding Uncertainties	
574	Legislative approval not granted.	Keep Commissioner apprised of grant application and status and utilize PIO as needed for messaging to Legislators if questions arise.	1	5	Medium	Funding Uncertainties	Some potential for this to occur as these bridges are all in one legislative district, however rare that legislature would pass up 90/10 split funds.
574	Material escalation due to limited suppliers and competing work.	Utilize appropriate contingency in programming estimates to ensure project cost does not exceed grant program allocation. Advertise project with sufficient time for material suppliers to balance workload (typically winter advertising ideal).	2	3	Medium	Cost Uncertainties	Polyester concrete overlay is specialty and typically requires subcontractor from Washington or East Coast to complete.
574	Competing support group resources impact project schedule (e.g. can't get Statewide Foundations out in time)	If project is selected, discuss with Statewide Bridge Design to prioritize efforts to meet fixed timeline.	1	3	Low	Other Risks	Bridge Design is only support group resource needed for this project.
574	Material escalation due to tariffs or inflation.	Utilize appropriate contingency in programming estimates to ensure project cost does not exceed grant program allocation. Evaluate cost estimate for major cost components up front and monitor those elements for potential inflation as project design progresses. Communicate with Statewide Planning early on any project cost element that may require STIP funds to cover grant funding differences to ensure funds are available to obligate project on time.	1	3	Low	Cost Uncertainties	Majority of work items are superstructure repairs, predominant cost item is polyester concrete overlay, low probably of inflation issues with this work.
574	Cost inflation due to lack of information (e.g. no foundation drilling conducted yet or utility impacts not known).	N/A	0	0	None	Cost Uncertainties	Nature of work does not require information beyond what is available in routine inspection reports.
574	Cost inflation due to real estate price increase.	N/A	0	0	None	Cost Uncertainties	No ROW acquisition
574	Cost negotiations with design consultant delay NTP and subsequent advertise date.	N/A	0	0	None	Cost Uncertainties	In-house design
574	Individual USACE permit or USCG permit required.	N/A	0	0	None	Environmental Uncertainties	No permits required.
574	Other (e.g. STIP or State) funds required for portions of work that do not meet grant program requirements (e.g. significant roadway realignment needed to meet geometric standards).	N/A	0	0	None	Funding Uncertainties	Rehabilitation project (no non-bridge work), all work is eligible.
574	Project environmental document not approved in time.	N/A	0	0	None	Environmental Uncertainties	Project environmental document complete.
574	Project located in area of high environmental scrutiny or with special environmental/regulatory area of concern (e.g. 4(f) resources, T&E species)	N/A	0	0	None	Environmental Uncertainties	Rehabilitation work is all programmatic and no permits required. No adverse affect 106 finding.
574	Utility relocation required.	N/A	0	0	None	Construction Risks	No utility work involved.
574	Insufficient material available (quality and/or quantity).	N/A	0	0	None	Construction Risks	Current design would require specialized materials imported to project site (e.g. polyester concrete aggregate) eliminating risk that local materials wouldn't suffice.

Risk Register

Bridge No. 2 - Rock Creek Bridge No. 684, MP 25 Denali H

Bridge No(s).	Risks	Mitigation Strategy	Probability (1 low/5 high)	Severity (1 low/5 high)	Risk Rating	Category	Remarks
684	Competing support group resources impact project schedule (e.g. can't get Statewide Foundations out in time)	If project is selected, discuss with Regional Preconstruction Engineer and applicable Statewide resource heads to prioritize project for Statewide and Regional resources due to funding timeline requirements. Utilize consultant support if needed.	2	3	Medium	Other Risks	Foundation drilling likely to be delayed until 2019 season, ROW needs unknown at this time. Bridge has foundation report from 1995 that can be used for making reasonable assumptions on foundation requirements.
684	Legislative approval not granted.	Keep Commissioner apprised of grant application and status and utilize PIO as needed for messaging to Legislators if questions arise.	1	5	Medium	Funding Uncertainties	Some potential for this to occur as these bridges are all in one legislative district, however rare that legislature would pass up 90/10 split funds.
684	Material escalation due to tariffs or inflation.	Utilize appropriate contingency in programming estimates to ensure project cost does not exceed grant program allocation. Evaluate cost estimate for major cost components up front and monitor those elements for potential inflation as project design progresses. Communicate with Statewide Planning early on any project cost element that may require STIP funds to cover grant funding differences to ensure funds are available to obligate project on time.	3	3	Medium	Cost Uncertainties	Potential for steel price to escalate significantly (piling, rebar).
684	State funds not available for match.	Keep Commissioner apprised of grant application and status and utilize PIO as needed for messaging to Legislature on importance of capturing grant funding.	1	5	Medium	Funding Uncertainties	
684	Utility relocation required.	Identify utility relocation requirements early and coordinate with Delivery Team utility engineer to prioritize relocation schedule.	2	3	Medium	Construction Risks	Utility relocation needs not known at this time.
684	Cost inflation due to lack of information (e.g. no foundation drilling conducted yet or utility impacts not known).	Utilize appropriate contingency in programming estimates (typically 15-20%) to ensure project cost does not exceed grant program allocation. Base estimates on recently constructed projects in the area (Seattle Creek Bridge 2016) and historical geotechnical information.	2	2	Low	Cost Uncertainties	Utility impacts unknown at this time
684	Cost negotiations with design consultant delay NTP and subsequent advertise date.	Utilize in house resources, Northern Region has adequate staffing to support the current project. No project element requires special expertise outside Department capabilities.	1	3	Low	Cost Uncertainties	Environmental document and permitting work done by consultant on a term agreement with limited funds. Use of in-house resources recommended if available.
684	Individual USACE permit or USCG permit required.	Monitor potential for changes in NWP requirements. Project is currently a FHWA CE so worst case under current NWP program is NWP 23.	1	3	Low	Environmental Uncertainties	USCG permit not required, NWP anticipated for USACE authorization.
684	Material escalation due to limited suppliers and competing work.	Utilize appropriate contingency in programming estimates to ensure project cost does not exceed grant program allocation. Advertise project with sufficient time for material suppliers to balance workload (typically winter advertising ideal).	1	3	Low	Cost Uncertainties	Girders are manufactured by only 2 entities in state (and 1 has had quality issues).
684	Other (e.g. STIP or State) funds required for portions of work that do not meet grant program requirements (e.g. significant roadway realignment needed to meet geometric standards).	Coordinate with Statewide Planning to ensure additional funds are available if needed, and communicate overall reduction in STIP impact as project is currently 100% STIP. Project is shown in NR funding plan for construction year 2021 using STIP funds currently.	1	3	Low	Funding Uncertainties	At this time all project elements appear eligible for grant funding.
684	Project located in area of high environmental scrutiny or with special environmental/regulatory area of concern (e.g. 4(f) resources, T&E species)	Refine design to remain within existing ROW if detailed design indicates some work falls outside the existing ROW.	1	3	Low	Environmental Uncertainties	Project is adjacent to archaeological district and closest Materials Sites proposed have had environmental challenges historically. There are numerous materials sites along the Rich Hwy however.
684	Insufficient material available (quality and/or quantity).	Evaluate existing materials site information and update permits as required.	1	2	Low	Construction Risks	All proposed material is from existing materials sites. Road is gravel surface, no paving aggregate required.
684	Overrun of piling during construction resulting in the need for deeper piles and more time for construction	Add funds and include in contingency.	2	1	Low	Procurement Delays	In general, the uncertainty that accompanies most bridge construction projects is applicable to this bridge.
684	Cost inflation due to real estate price increase.	N/A	0	0	None	Cost Uncertainties	Adjacent land interests in the project area are government (Alaska DNR or BLM), which are no cost land transfers.
684	Project environmental document not approved in time.	N/A	0	0	None	Environmental Uncertainties	Environmental document complete.

Risk Register

Bridge No. 3 - Chokosna River Bridge No. 1193, MP 27 Mc

Bridge No(s).	Risks	Mitigation Strategy	Probability (1 low/5 high)	Severity (1 low/5 high)	Risk Rating	Category	Remarks
1193	Competing support group resources impact project schedule (e.g. can't get Statewide Foundations out in time)	If project is selected, discuss with Regional Preconstruction Engineer and applicable Statewide resource heads to prioritize project for Statewide and Regional resources due to funding timeline requirements. Utilize consultant support if needed.	2	3	Medium	Other Risks	Foundation drilling has not been completed and historical data for foundation information has not been found yet. Anticipate water aspect to be minimal (SW Hydraulic work could be handled by region if needed). ROW and utility support not needed.
1193	Legislative approval not granted.	Keep Commissioner apprised of grant application and status and utilize PIO as needed for messaging to Legislators if questions arise.	1	5	Medium	Funding Uncertainties	Some potential for this to occur as these bridges are all in one legislative district, however rare that legislature would pass up 90/10 split funds.
1193	Material escalation due to tariffs or inflation.	Utilize appropriate contingency in programming estimates to ensure project cost does not exceed grant program allocation. Evaluate cost estimate for major cost components up front and monitor those elements for potential inflation as project design progresses. Communicate with Statewide Planning early on any project cost element that may require STIP funds to cover grant funding differences to ensure funds are available to obligate project on time.	3	3	Medium	Cost Uncertainties	Potential for steel price to escalate significantly (piling, rebar).
1193	Other (e.g. STIP or State) funds required for portions of work that do not meet grant program requirements (e.g. significant roadway realignment needed to meet geometric standards).	Coordinate with Statewide Planning to ensure additional funds are available if needed, and communicate overall reduction in STIP impact as project is currently 100% STIP. Project is shown in NR funding plan for construction year 2021 using STIP funds currently.	2	3	Medium	Funding Uncertainties	Potential for culvert replacement of Chokosna Tributary to be not eligible. Project is currently a STIP project so we would just be reducing the STIP impact with the bridge grant funding so not terribly concerned.
1193	State funds not available for match.	Keep Commissioner apprised of grant application and status and utilize PIO as needed for messaging to Legislature on importance of capturing grant funding.	1	5	Medium	Funding Uncertainties	
1193	Cost inflation due to lack of information (e.g. no foundation drilling conducted yet or utility impacts not known).	Utilize appropriate contingency in programming estimates (typically 15-20%) to ensure project cost does not exceed grant program allocation. Base estimates on recently constructed projects in the area (Lakina River Bridge 2015) and historical geotechnical information.	2	2	Low	Cost Uncertainties	Centerline investigation, M.S. investigation, and reconnaissance reporting available from 1968 and 1974 for project area.
1193	Individual USACE permit or USCG permit required.	Monitor potential for changes in NWP requirements. Project is currently a FHWA CE so worst case under current NWP program is NWP 23.	1	3	Low	Environmental Uncertainties	USCG permit not required, NWP anticipated for USACE authorization.
1193	Material escalation due to limited suppliers and competing work.	Utilize appropriate contingency in programming estimates to ensure project cost does not exceed grant program allocation. Advertise project with sufficient time for material suppliers to balance workload (typically winter advertising ideal).	1	3	Low	Cost Uncertainties	Girders are manufactured by only 2 entities in state (and 1 has had quality issues and other may be retiring).
1193	Insufficient material available (quality and/or quantity).	Evaluate existing materials site information and update permits as required.	1	2	Low	Construction Risks	All proposed material is from existing materials sites. Road is gravel surface, no paving aggregate required.
1193	Overrun of piling during construction resulting in the need for deeper piles and more time for construction	Add funds and include in contingency.	2	1	Low	Procurement Delays	In general, the uncertainty that accompanies most bridge construction projects is applicable to this bridge.
1193	Cost inflation due to real estate price increase.	N/A	0	0	None	Cost Uncertainties	Not applicable, project does not propose ROW acquisition.
1193	Cost negotiations with design consultant delay NTP and subsequent advertise date.	N/A	0	0	None	Cost Uncertainties	Project will be completed with in house resources.
1193	Project environmental document not approved in time.	N/A	0	0	None	Environmental Uncertainties	Environmental document complete.
1193	Project located in area of high environmental scrutiny or with special environmental/regulatory area of concern (e.g. 4(f) resources, T&E species)	N/A	0	0	None	Environmental Uncertainties	Environmental document documents this is a low scrutiny area.
1193	Utility relocation required.	N/A	0	0	None	Construction Risks	No utilities present.

Appendix F

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THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Transportation and Public Facilities

OFFICE OF THE COMMISSIONER
Marc Luiken, Commissioner

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November 21, 2018

The Honorable Elaine L. Chao
Secretary, United States Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Dear Secretary Chao:

This letter serves as evidence of assurance by the State of Alaska Department of Transportation and Public Facilities (ADOT&PF) that matching funds for the Competitive Highway Bridge Program application "Eastern Alaska Rural Deficient Bridge Upgrades" submitted by ADOT&PF are committed and will be provided.

ADOT&PF's matching share of the Competitive Highway and Bridge Program request is approximately $1,130,000. We are committed to providing the 9.03% matching funds to the Federal funds awarded.

Sincerely,

Marc Luiken
Commissioner

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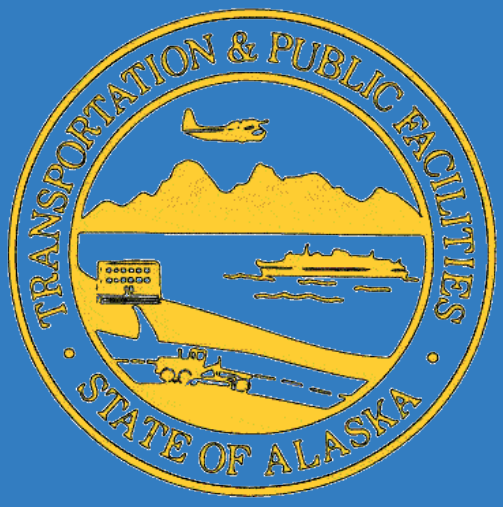
This document was produced inhouse by DOT&PF staff.



Alaska Department of Transportation & Public Facilities