Knik Arm Tunnel Feasibility Study

Updated Bridge Alternative Cost Estimates

June 9, 2025

Prepared for: Alaska Department of Transportation and Public Facilities

Prepared by: Stantec and Hemenway Consulting

PSA No.: 25251013

Hemenway Consulting

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List of Acronyms

Acronym	Definition
AADT	Average Annual Daily Traffic
ADOT&PF	Alaska Department of Transportation and Public Facilities
AK CPI-U	Alaska Consumer Price Index for all Urban Consumers
Anchorage	Municipality of Anchorage
CAPEX	Capital Expenditure(s)
CER	Cost Estimate Review
CFR	Code of Federal Regulations
CPI-U	Consumer Price Index for all Urban Consumers
DB	Design, Build
DBM	Design, Build, Maintain
DEIS	Draft Environmental Impact Statement issued under the NEPA
DOD	Department of Defense
ESA	Endangered Species Act of 1973, as amended
ETC	Electronic Toll Collection
FEIS	Final Environmental Impact Statement issued under the NEPA
FHWA	Federal Highway Administration
ICAP	Indirect Cost Allocation Plan (as approved by FHWA)
IFP	Initial Financial Plan
JBER	Joint Base Elmendorf-Richardson
KABATA	Knik Arm Bridge and Toll Authority

Acronym	Definition
KAC	Knik Arm Crossing Project (or Project)
Mat-Su	Matanuska-Susitna Borough
MMPA	Marine Mammal Protection Act of 1972, as amended
MOA	Municipality of Anchorage
NEPA	National Environmental Policy Act of 1969, as amended
NHCCI	National Highway Construction Costs Index
NRSRO	Nationally Recognized Statistical Rating Organization
O&M	Operations and Maintenance
ORT	Open Road Tolling (also known as “free-flow tolling”)
P3	Public-Private Partnership
POA	Port of Alaska (formerly the Port of Anchorage)
PPIACO	Producer Price index All Commodities
PV	Passenger Vehicles
R&R	Renewal and Rehabilitation
RFID	Radio Frequency Identification
ROD	Record of Decision issued under the NEPA
ROW	Rights of Way
SME	Subject Matter Expert
T&R	Traffic and Toll Revenue
TIFIA	Transportation Infrastructure Finance and Innovation Act credit program
TIGER	Transportation Investment Generating Economic Recovery grant
TSIO	Tolling Systems Integrator-Operator
YOE	Year of Expenditure

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Executive Summary

Introduction

The purpose of this document is to provide a cost estimate update for a bridge alternative to the *Knik Arm Tunnel Feasibility Study*. A bridge crossing the Knik Arm of Upper Cook Inlet, connecting Anchorage and the Matanuska-Susitna Borough has been considered for over 100 years. Most recently, the Knik Arm Crossing (KAC) Project was extensively studied by the Knik Arm Bridge and Toll Authority (KABATA), a public corporation formed under the Alaska Department of Transportation and Public Facilities (ADOT&PF) by the Alaska Legislature in 2003.

After investing approximately $100 million in the KAC Project, it was shut down and mothballed through a June 2016 Administrative Order (AO) issued by then Governor Walker. In 2019, Governor Dunleavy signed an AO rescinding the 2016 shutdown AO and potentially allowing the KAC to move forward. Hemenway Consulting was then engaged by ADOT&PF to complete a study and prepare a report to make recommendations for restarting the project. The resulting report, titled "Knik Arm Crossing Project: Analysis for Moving Forward to Financing and Construction," was completed in September 2019. The Covid-19 pandemic struck in early 2020 shortly after the report was released, resulting in no significant work on the KAC being subsequently performed by the State through 2024. That comprehensive report identified 16 elements to address to restart the KAC Project and continue moving it forward to financing and construction. The report is out of date but provides a relevant reference resource and blueprint to start from should ADOT&PF determine to move forward with a bridge alternative.

Bridge Alternative Cost Update Report Scope

The scope of this report is limited to updating the KAC Capital Expenditures (CAPEX) construction cost estimates for purposes of providing a bridge alternative comparator and to provide cost estimates for appurtenant connecting roadway work, Rights of Way (ROW) and utilities relocations common to either the tunnel or bridge alternative for the Knik Arm Tunnel Feasibility Study. In addition, this report addresses the Operations and Maintenance (O&M), Renewal and Rehabilitation (R&R) CAPEX, and tolling operations cost estimates for the bridge alternative post opening to traffic service. Hemenway Consulting is acting as a subconsultant to the global engineering firm Stantec for this element of the Knik Arm Tunnel Feasibility Study.

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KAC Project Description

Alaskans first considered a bridge crossing of the Knik Arm of Upper Cook Inlet as early as 1923 when railroad engineers gazed across the Knik Arm thinking about a more direct railroad route to the interior shortly after Anchorage was established. Most recently, a bridge project crossing the Knik Arm of Upper Cook Inlet was initiated under the direction of KABATA, established by the Alaska Legislature in 2003 in Senate Bill 213. KABATA, in coordination with ADOT&PF, oversaw project development from 2003 through mid-2016. In December 2010, the Federal Highway Administration (FHWA) issued a "Build" Record of Decision (ROD) on the Final Environmental Impact Statement (FEIS), selecting a preferred alternative for the KAC bridge and appurtenant facilities.

Figure 1 - Aerial Rendering of the Knik Arm Crossing

The bridge crossing alternative, if built, is expected to achieve the following as summarized from the Project's purpose and need statement:

- Improve regional transportation infrastructure to meet population growth
- Regional transportation connectivity for the movement of people and goods
- Safety and transportation system redundancy
- Access between regional airports, ports, hospitals, fire, police and for disaster relief

In addition, the Project is expected to support economic growth and jobs in Alaska. KAC Phase 1 construction is forecast to generate approximately 5,000 annual full time equivalent jobs over four years of construction and facilitate continued jobs for Alaskans post opening.

Knik Arm Tunnel Feasibility Study

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KAC Bridge Alternative Construction Cost Estimates Summary Results

The KAC is conceived in two phases in the FEIS and ROD, each with "operational independence" as that term is applied by FHWA. Phase 1 consists of 9 interconnected Segments over 18.6 miles for a two-way, two-lane highway and bridge facility initial configuration, as described in more detail under the *Phase 1 KAC Project Description and Scope of Work* section of this report. Phase 2 consists of capacity improvements along the Phase 1 alignment to a controlled access four-lane divided highway and the addition of a second connection in Anchorage to Ingra and Gambell streets, as described under the *Phase 2 KAC Project Scope of Work* report section.

Significant engineering work developing the 35% design and cost estimates for the KAC Project was accomplished over the thirteen years from the formation of KABATA in 2003 until the project was shut down in 2016. The engineering design work had to address constructability given environmental concerns along the alignment and, especially for in-water work due to the presence of extreme tidal fluctuation, ice, floes, active seismic conditions, and the presence of marine mammals and anadromous fish runs. The Cook Inlet stock of beluga whales, present in the bridge alignment, was listed under the Endangered Species Act (ESA) in 2008. In addition, the KAC Project was conceived as a tolled facility to raise revenue to assist in financing it and to pay for all of its operations and maintenance, and cost estimate studies were therefore required to be "bankable." As a result, previous cost estimates developed are very detailed and conservative in nature. *Table 3 - Selected Prior Cost Estimates, Reports, and* Studies in the *Cost Estimate Update Methodology* section of this report provides a selected sample of those cost estimates and studies.

The bridge alternative total CAPEX cost estimate in June 2025 nominal dollars is $2.4 billion, including Phases 1 and 2 as defined in the ROD. This is an increase of $1.1 billion, or 87% over the September 2013 estimate of $1.3 billion. Since Phases 1 and 2 have operational independence and traffic forecast indicate Phase 2 won't be required for about ten years after opening Phase 1 to traffic, Phases 1 and 2 CAPEX were separately estimated. Additionally, Phase 2 is planned to be entirely financed by toll revenue, while Phase 1 will require State, Federal or other funding sources in addition to toll revenue financing.

The CAPEX cost estimate for Phase 1 of the KAC is $1,560 million in June 2025 dollars, compared to $839 million for the September 2013 estimate, or an increase of 86%. The Phase 1 CAPEX estimate workup by Section is discussed in more detail under the report

section titled *Bridge Alternative Construction Costs Estimate - Phase 1 Initial Construction* section of this report.

For Phase 2 of the KAC, the total CAPEX estimate is $877 million in June 2025 dollars, compared to $465 million for the September 2013 estimate, or an increase of 89%. The Phase 2 CAPEX estimate workup by Section is discussed in more detail under the *Bridge Alternative Construction Costs Estimate - Phase 2 Capacity Improvements and Project Extension* section of this report.

Figure 2 - Bridge Alternative Cost Estimate Update Summary

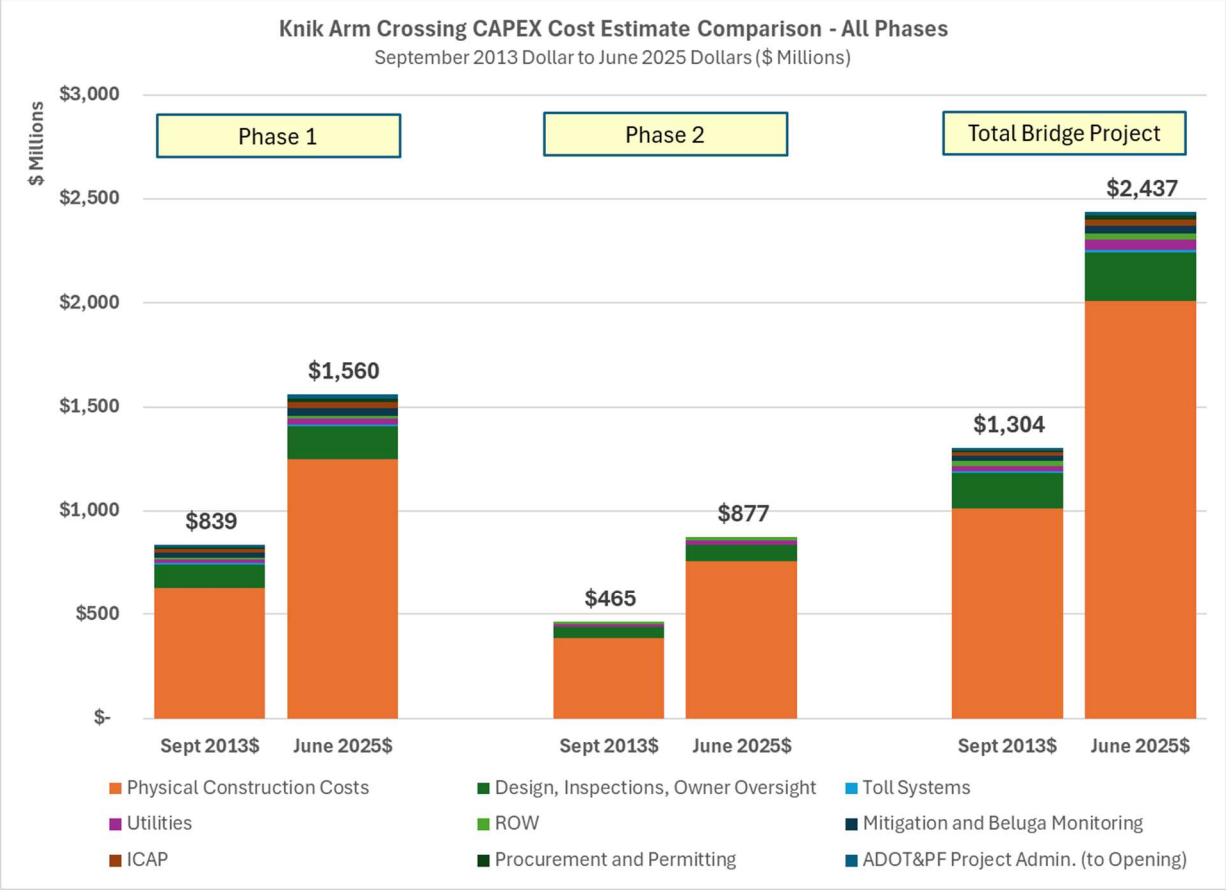


Figure 2 - Bridge Alternative Cost Estimate Update Summary graphically shows the CAPEX estimate results for Phases 1 and 2 and the total Project in both September 2013 and June 2025 dollars. Major categories of costs are shown as elements of each stacked bar summing to the totals. The underlying figures for each CAPEX category, Phase and nominal dollars year of estimation are used to generate the bar chart comparison are shown in the following *Table 1 - Bridge Alternative Cost Estimate Update* Summary.

Knik Arm Crossing Project Bridge Alternative Phase 1, Phase 2, and Total Cost Escalation to June 2025 Dollars						
	Phase 1		Phase 2		Total Project	
Capital Cost Category	Sep 2013$	Jun 2025$	Sep 2013$	Jun 2025$	Sep 2013$	Jun 2025$
Physical Construction Costs	$ 630,955,049	$ 1,249,105,995	$ 383,665,653	$ 759,545,499	$ 1,014,620,702	$ 2,008,651,493
Design, Inspections, Owner Oversight	113,361,273	156,668,345	56,654,430	78,297,954	170,015,703	234,966,299
Toll Systems	7,687,250	10,623,987	-	-	7,687,250	10,623,987
Utilities	15,000,000	29,695,602	10,000,000	19,797,068	25,000,000	49,492,670
ROW	8,832,404	11,158,486	14,253,375	19,698,550	23,085,779	30,857,036
Mitigation and Beluga Monitoring	27,000,000	37,314,730	-	-	27,000,000	37,314,730
ICAP Overhead	15,614,826	29,172,625	-	-	15,614,826	29,172,625
Procurement and Permitting	7,700,000	18,568,568	-	-	7,700,000	18,568,568
ADOT&PF Project Admin. (to Opening)	12,855,320	17,766,400	-	-	12,855,320	17,766,400
Total KAC Bridge Project	**$ 839,006,122**	**$ 1,560,074,737**	**$ 464,573,458**	**$ 877,339,071**	**$ 1,303,579,580**	**$ 2,437,413,808**
Percent Increase (12 Years)		**85.9%**		**88.8%**		**87.0%**

Table 1 - Bridge Alternative Cost Estimate Update Summary

KAC Bridge Alternative O&M and R&R Cost Estimates Summary Results

Understanding O&M and R&R Cost is relevant to the lifecycle cost of the infrastructure, in this case, the KAC bridge and appurtenant facilities. The bridge structure, with proper maintenance and rehabilitation, is expected to have a 100-year asset life. It is also expected users, through toll revenue, would pay for all of the O&M and R&R cost over the project life. For purposes of this bridge alternative cost estimate update, 2015 nominal dollar cost estimates prepared by Wilbur Smith Associates and PND were escalated to 2025 dollars using CPI-U as the inflation factor. The original WSA and PND O&M and R&R cost estimates differentiated between Phase 1 base costs and a Phase 2 increment over 41 years. That estimate also considered the wide range of R&R CAPEX costs from year-to-year based on the expected activities, such as pavement resurfacing, bridge railing replacement, and other costs which are predictably intermittent in nature.

The report section *Bridge Alternative Operations, Maintenance, and Renewal and Rehabilitation Costs Forecast* predicts **total owner oversight and O&M costs over 41 years of $114 million and total R&R CAPEX of $143 million, both in June 2025 dollars. This compares to $84 million and $75 million for O&M and R&R, respectively, in 2015 dollars**. O&M is escalated using Consumer Price Index for all Urban Consumers (CPI-U) and R&R is escalated using the National Highway Construction Cost Index (NHCCI) published by FHWA for this estimate.

Table 2 - Estimated Average, Minimum and Maximum Annual O&M in *2025 Dollars* shows the average, minimum, and maximum annual O&M and R&R in 2025 nominal dollars during the 41-year period.

KAC Bridge Alternative Indicative Annual O&M and R&R Cost estimate Range in 2025 Dollars *			
Description	**Average**	**Minimum**	**Maximum**
Owner Oversight and O&M Costs:			
ADOT&PF Oversight G&A	$ 958,849	$ 958,849	$ 958,849
O&M Phase 1	$ 1,628,804	$ 1,408,915	$ 1,860,744
O&M Phase 2 Increment	$ 189,272	$ -	$ 346,872
Combined Oversight & O&M	**$ 2,776,924**	**$ 2,367,764**	**$ 3,090,799**
Renewal and Rehabilitation CAPEX:			
R&R Phase 1	$ 2,918,511	$ 53,670	$ 22,684,011
R&R Phase 2 Increment	$ 568,208	$ -	$ 4,745,102
Combined R&R	**$ 3,486,719**	**$ 53,670**	**$ 27,429,114**
Combined Oversight, O&M and R&R Costs	**$ 6,263,643**	**$ 2,421,434**	**$ 25,591,630**
* Excludes tolling operations and renewal capital costs. Combined Minimum and Maximium may not foot due to year of min or max subcomponents.			

Table 2 - Estimated Average, Minimum and Maximum Annual O&M in 2025 Dollars

Tolling Operations and Maintenance Summary Discussion

Tolling operations costs are highly variable. That variability is driven by many factors, including traffic volumes, demand elasticity, toll policy and rate setting, collection methodology, etc. Because of that variability, a point estimate for tolling operating costs is not provided. The *Tolling Systems Capital and Operating Costs* section of this report provides a two-lane traffic scenario of costs and revenues with a $5 dollar one-way initial toll for passenger vehicles in *Figure 18 - KAC Hypothetical Net Toll Revenue Over 35 Years* and in *Table 10 - KAC Tolling Operations Cash Flow Projection Two-Lane Facility.* This scenario was the foundation of an application for a Transportation Infrastructure Finance and Innovation Act (TIFIA) Loan for the KAC Project submitted in 2015. The salient point of the tolling discussion is the power of user fees in the form of toll charges to generate revenue for construction cost financing and to pay for capacity improvements, project extensions, and operations and maintenance. That same user fee principle is applicable to ether a tunnel or bridge alternative for crossing the Knik Arm between anchorage and the Matanuska-Susitna Borough.

Cost Estimate Update Methodology

The approach for this KAC bridge alternative cost update undertook the following steps:

1. Research and review historical KAC Project background information.
2. Review reports and evaluate underlying information and data for prior KAC project cost estimates, emphasizing the studies performed under the KABATA and ADOT&PF during the period 2003-2016.
    a. Determine the most recent high quality cost estimate prepared by KABATA/ADOT&PF and subjected to an FHWA Cost Estimate Review (CER) to be used as a baseline.
3. Review inflation and cost escalation indices to determine appropriate factors for updating the cost estimate identified under 2.a. above and consider whether any other changes impacting that cost estimate review need to be evaluated and incorporated into the update.
4. Correlate, Compare and Contrast the bride alternative cost estimate update with the tunnel alternative (*to be performed under separate cover when tunnel alternative cost estimates are developed and available*).

Review of Prior KAC Cost Estimates

Cost estimates for a bridge crossing the Knik Arm of Upper Cook Inlet have been prepared going back decades. In the 1980s, the ADOT&PF prepared a Draft Environmental Impact Statement (DEIS) for a bridge crossing but abandoned the project when oil prices crashed. More recently, the Alaska Legislature established the KABATA in 2003 to develop and construct a bridge crossing the Knik Arm of Upper Cook Inlet. KABATA, their Subject Matter Expert (SME) consultants, FHWA and ADOT&PF prepared multiple cost estimates and updates to cost estimates between 2003 and 2016, when the KAC Project was shut down by Administrative Order under then Governor Walker.

Table 3 - Selected Prior Cost Estimates, Reports, and Studies provides a selected subset listing of the many cost estimates and related studies for construction of Phases 1 and 2, facility O&M and R&R, and tolling systems capital and operations estimates and updates prepared during KABATA's tenure over the KAC Project.

Table 3 - Selected Prior Cost Estimates, Reports, and Studies

Issue Date	Title/Description	Prepared By and SME Team	Notes
CAPITAL COST ESTIMATES AND REPORTS			
Nov-05	Knik Arm Crossing Cost Estimate for DEIS	HDR, PND Engineers, Inc., Armeni	Phase 1 and Phase 2 cost estimates for Draft Environmental Impact Statement
Mar-06	Knik Arm Crossing Proposed Alignment and Initial Construction Costs - 35% Design Update	PND Engineers, Inc.	Phase 1, Segments 1-9. 8,200' Bridge concept with 48" battered pile foundation
Apr-06	FHWA Major Projects Cost Estimate Review 2006	PBS&J, FHWA, ADOT&PF, KABATA, HDR, PND, Rise, Shannon & Wilson	Phase 1 and Phase 2 probabilities-based cost estimate range in YOE dollars.
Jun-06	Knik Arm Crossing Development Concepts	PND Engineers, Inc.	Phase 1, Segments 1-9. 8,200' Bridge concept with 48" battered pile foundation
Oct-08	Knik Arm Crossing Construction Cost Estimate - 35% Design Update	PND Engineers, Inc.	Phase 1, Segments 2-9. 8,200' Bridge concept with 48" battered pile foundation (Segment 1 under construction by Mat-Su Borough).
Jan-09	Knik Arm Crossing Conceptual Cost Estimate	National Constructors Group	Independent cost estimate for Phase 1, Segments 2-9 contracted by ADOT&PF
May-09	FHWA Major Projects Cost Estimate Review 2009	FHWA, PND Engineers, Inc., NCG, KABATA, ADOT&PF	Phase 1 and Phase 2 probabilities based cost estimate range in YOE dollars.
Aug-11	KAC Design Study Report	HDR, KABATA	Overview of technically feasible alternative solutions; engineering characteristics of roads, approaches and bridge; constructability; and potential impacts and opportunities

Issue Date	Title/Description	Prepared By and SME Team	Notes
Aug-11	Knik Arm Crossing Phase II Development Concepts and Cost Estimates	PND Engineers, Inc.	Phase II Development Concepts focused on Ship Creek Viaduct to Ingra and Gambell Streets and Segment 1 Point MacKenzie Road upgrade to a four lane controlled access divided highway.
Mar-14	Comparison of Public Private Partnership & Public Sector Comparator Project Delivery Method Risk Analysis	HDR	Report on risk analysis comparison between a P3 and public sector comparator delivery method workshop
Jun-14	FHWA Major Projects Cost Estimate Review 2014	FHWA, KABATA, HDR, ADOT&PF	Phase 1 only probabilities based risk analysis and cost estimate range in YOE dollars. FHWA OINCC determination for Phase 1
OPERATIONS AND MAINTENANCE AND RENEWAL AND REHABILITION COST ESTIMATES AND REPORTS			
Feb-11	KABATA Capital Expenditures Report - Maintenance, Operations and CAPEX Estimates	Wilbur Smith Associates, PND Engineers, Inc.	M&O, Administration and R&R Costs Estimates for Phase 1 and 2 operations post construction and opening to service (exclusive of tolling operations)
TOLLING SYSTEMS CONCEPTS, COSTS ESTIMATES AND REPORTS			
Jan-07	Knik Arm Bridge Toll Collection System - Concept of Operations	Wilbur Smith Associates	ORT/ETC tolling concepts, capital costs, and operations and maintenance cost
Jan-15	Knik Arm Crossing Tolling Business Rules	CDM Smith	ETC/ORT Tolling Proposed Business Rules
Jul-15	Knik Arm Crossing Toll Maintenance and Operating Cost White Paper	CDM Smith	ORT/ETC tolling capital costs, and operations and maintenance cost estimates

The review of prior cost estimates focused on the more recent studies prepared under the direction of the KABATA. The basis of capital cost estimates for Phases 1 and 2 in this report

primarily relied on the June 2014 FHWA Major Projects Cost Estimate Review report and the underlying data, cost estimates, workpapers, and other information that were evaluated in the CER workshop. For bridge and roadway O&M and R&R costs, the February 2011 O&M and Maintenance CAPEX report prepared by Wilbur Smith Associates in conjunction with PND Engineers, Inc. served as the foundation for updating those costs to June 2025 dollars for the bridge alternative. That report estimated O&M and R&R costs over forty-one years in 2015 dollars. For tolling CAPEX and O&M, the reports by CDM Smith published in 2015, along with owner oversight estimates prepared by ADOT&PF/KABATA for a tolled facility served as the basis of information for providing that section of this report.

In addition to the cost estimates listed in

Table 3 - Selected Prior Cost Estimates, Reports, and Studies*,* numerous financial analysis and iterations of financial plans using forms of these costs estimates were prepared by KABATA for FHWA Major Projects Initial Financial Plans (IFP), TIFIA Loan Applications, Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant Program Applications, and for obtaining ratings from Nationally Recognized Statistical Ratings Organizations (NRSROs) to support financing of the KAC Project. The acceptance of these cost estimates for financing applications and grant programs like TIGER, as well as issuance of "investment grade" ratings opinions by NRSROs is a testament to the quality and level of development of cost estimates for the KAC Project bridge alternative.

For tolling systems capital and operating costs, various studies and white papers on the subject prepared by CDM Smith (formerly Wilbur Smith Associates) were reviewed and evaluated. Particular emphasis was afforded the "Knik Arm Crossing Toll Maintenance and Operating Cost White Paper" dated July 2015. CDM Smith also prepared "investment grade" traffic and toll revenue studies, most recently the "Comprehensive Traffic and Revenue Study for the Knik Arm Crossing Project" issued September 30, 2015. Traffic and Toll Revenue (T&R) studies are important to understanding the user fee revenue potential for the KAC Project and for developing the costs of operating the tolling system but are beyond the scope of this initial bridge alternative cost estimate review and update.

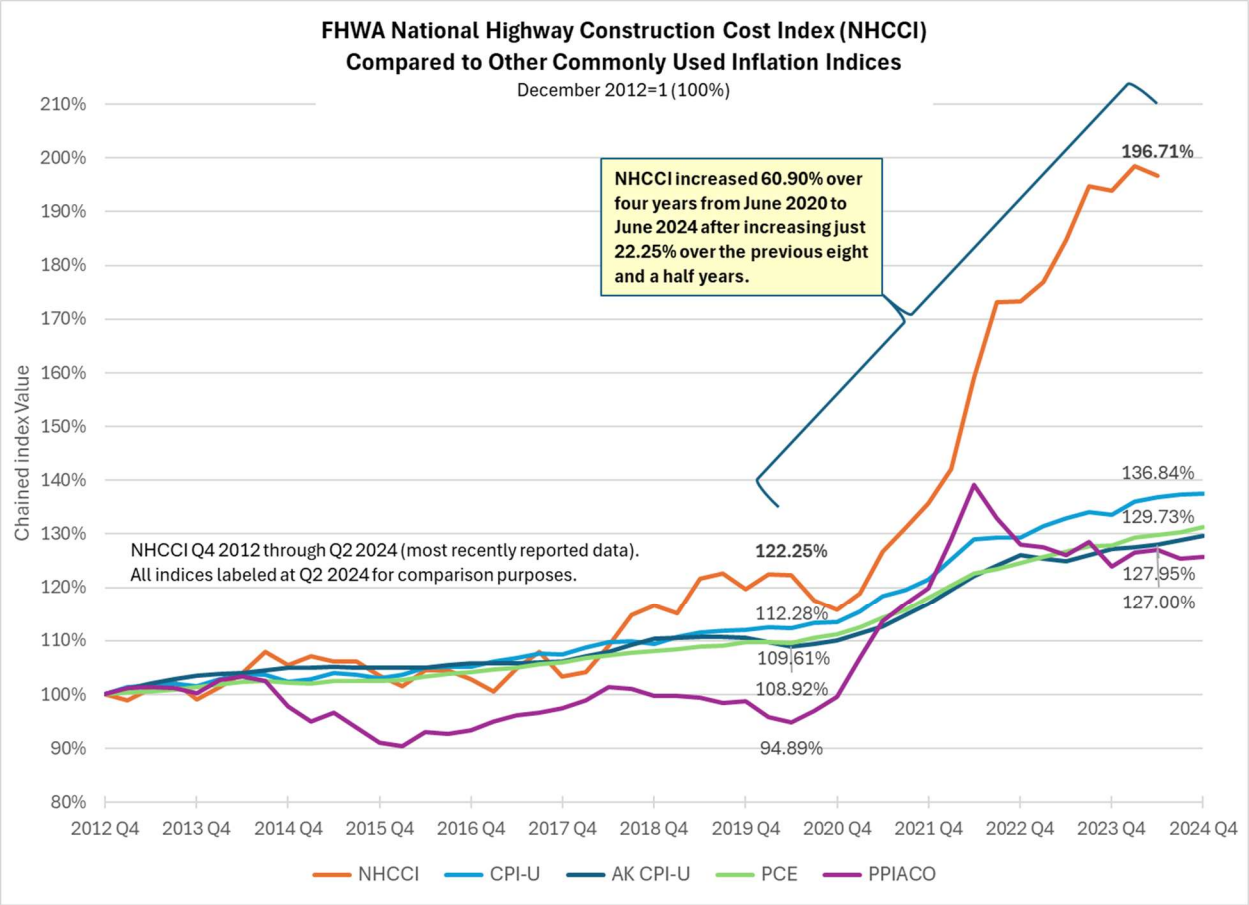
Inflation and Costs Escalation Factors

Because of the maturity of the bridge design and previous cost estimates and the limited scope of this cost estimate update, the primary factor considered in this bridge alternative cost estimate update is inflation for cost escalation estimation. The FHWA publishes the National Highway Construction Cost Index (NHCCI) as a chained index with a base of

2003=100. NHCCI is a weighted composite index that considers inputs to highway construction costs including asphalt; base stone; bridges; concrete; drainage/electrical; grading/excavation; traffic control; and utilities, erosion control, clearing, painting, and equipment. The NHCCI is the main factor used in this cost estimate update to escalate the bridge alternative (including appurtenant connecting roadway facilities) to a June 2025 cost estimate for comparison to a tunnel alternative cost estimate. For certain indirect construction costs and tolling systems, the Consumer Price Index for All Urban Consumers (CPI-U), as compiled and published by the Bureau of Labor Statistics, is considered to be a more indicative measure of cost escalation. The same NHCCI and CPI-U factors were used to escalate O&M and R&R operating costs for the post construction period to capture a full picture of lifecycle cost for the bridge alternative.

Figure 3 - NHCCI and Other Inflation Indices 2012-2024 compares the NHCCI to other commonly referenced inflation indices, including CPI-U, Alaska CPI-U (AK CPI-U), Personal Consumption Expenditures Price Index (PCE), and the Producer Price Index for All Commodities (PPIACO). All indices have been adjusted to December 2012 = 1 (100%) to compare the trends over time since the last ADOT&PF construction estimate update at September 2013 dollars and the most recently completed FHWA Major Projects Cost Estimate Review (CER) issued in November 2014. FHWA Major Projects guidance suggests that CERs required under 23 CFR § 106(h)(3)(A) be updated periodically to address changes in underlying conditions and assumptions, to minimize the risk of unexpected changes in the financial condition of the project, and for making key decisions in the public interest that rely on current and accurate estimates. No updated CER has been conducted beyond the 2014 CER since the KAC Project was shut down in June 2016 (as discussed in more detail under Historical Cost Estimates and Studies). FHWA CER Guidance calls for project expenditures in Year of Expenditure (YOE) dollars. This bridge alternative cost estimate update develops a point cost estimate at June 30, 2025 dollars rather than YOE dollars and therefore does not qualify as a Major Projects CER update because of the scope limitations. In addition, because the Knik Arm Tunnel alternative is in the early feasibility stage of development and neither the tunnel or bridge alternative is ready to move forward to procurement and construction, a construction schedule start date cannot be readily determined as would be required for calculating YOE costs.

Figure 3 - NHCCI and Other Inflation Indices 2012-2024



The NHCCI has escalated well beyond other commonly used inflation index indicators in recent years. For the four years from June 2020 through June 2024, NHCCI increased 60.9% after increasing 22.3% for the eight and one-half years from December 2012 through June 2020. By contrast, CPI-U increased 21.9% over the four years ended June 2024 on a chained index basis. NHCCI increases have been led by asphalt, bridge, concrete, grading and excavation during the time period for the recent steep increases during the Covid-19 pandemic and an economy reemerging post-pandemic as they are driven by oil, steel and concrete prices and demand.

Figure 4 - Annual Inflation Rates Comparison 2013-2024

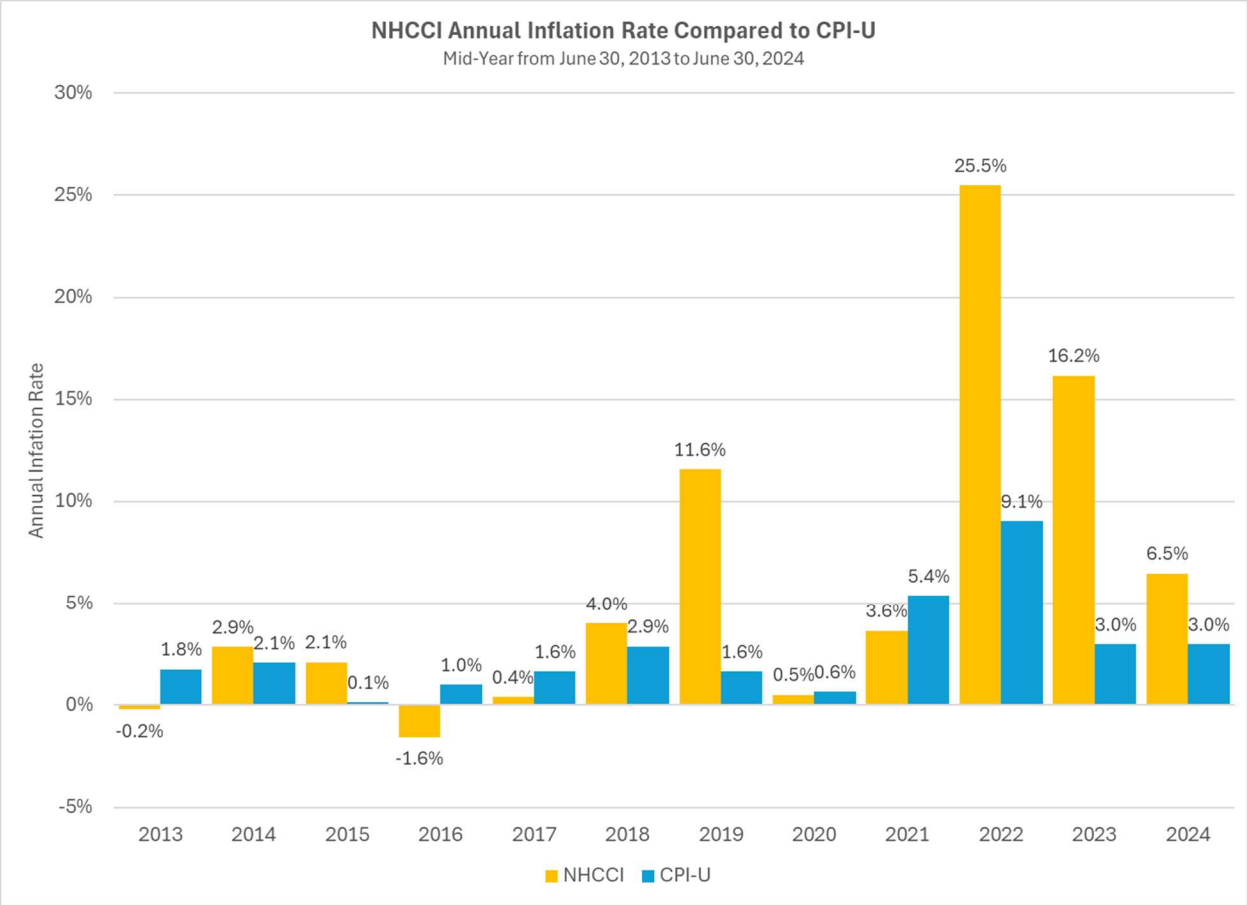


Figure 4 - Annual Inflation Rates Comparison 2013-2024 compares the annual percentage increases for the NHCCI and CPI-U indices at June (mid-year) from 2013 through 2024. The last CER update prior to project shutdown in 2016 was completed in 2014. The assumption was made that NHCCI and CPI-U will return to historical average inflation rates of 2.5%-3.5% per annum. A 3% inflation rate was used for this bridge alternative cost estimate update to escalate for the year after the most recently reported NHCCI period to a mid-point 2025 estimate. Although more recent CPI-U index data is available, there are nearly always revisions made, so the June 30, 2024 CPI-U index as published was used in the calculation, consistent with the method for NHCCI.

Table 4 - Cost Escalation Factors Calculations reveals the calculation of the escalation factors used for bringing construction CAPEX costs, and O&M and R&R costs estimates to a base year estimate at June 2025.

Table 4 - Cost Escalation Factors Calculations

KAC Bridge Alternative

Capital, O&M, and R&R Cost Escalation Factors Calculations

2013 Base Phase 1 and 2 Capital

	9/30/2013	6/30/2024	6/30/2024 Factor	**6/30/2025 Factor**
NHCCI	164.48%	316.13%	192.20%	**197.97%**
CPI-U	234.15%	314.18%	134.18%	**138.20%**

2015 Base O&M and R&R

	6/30/2015	6/30/2024	6/30/2024 Factor	**6/30/2025 Factor**
NHCCI	170.48%	316.13%	185.43%	**191.00%**
CPI-U	238.64%	314.18%	131.65%	**135.60%**

Notes:

1 Phases 1 and 2 capital costs are escalated to June 2025 from a base cost estimate of September 2013 used in the 2014 FHWA Cost Estimate Review. (Phase 2 September 2013 costs were provided but not included in the CER).

2 O&M and R&R operating cost estimates are escalated to June 2025 from a base estimate of June 2015 developed by Wilbur Smith Associates and PND Engineers, Inc. for their 2011 report on KAC operating costs.

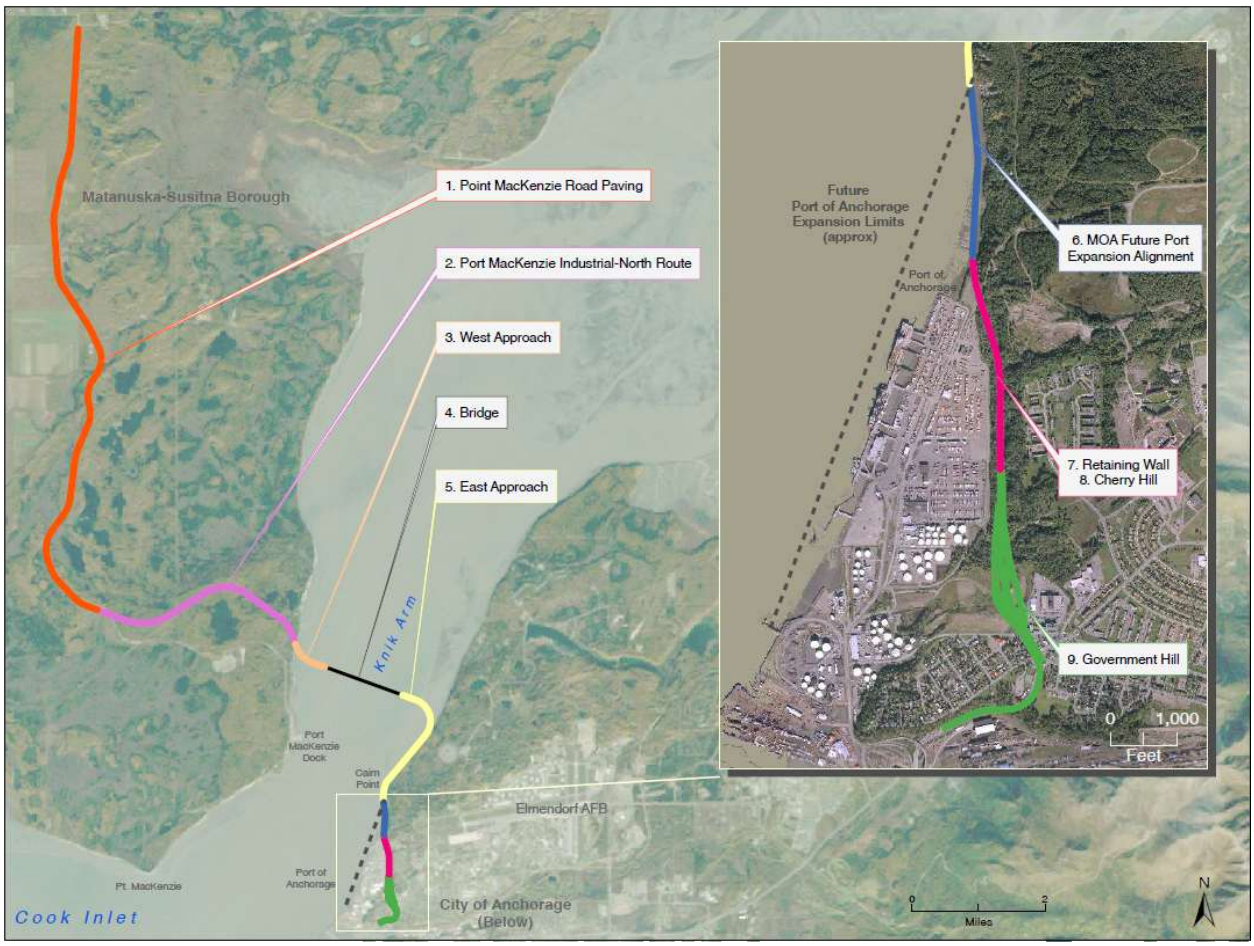
3 An inflation assumption of 3% for the one-year period from July 2024 through June 2025 for both NHCCI and CPI-U was used for escalation through June 2025 as the most recently available NHCCI is June 2024 and CPI-U recent data is subject to revisions. Inflation has slowed in recent months.

Bridge Alternative Construction Costs Estimate - Phase 1 Initial Construction

Introduction to Phase 1

The KAC Project is defined in two phases in the Final Environmental Impact Statement (FEIS) and the "Build" Record of Decision (ROD) signed by FHWA in December 2010. The total alignment for Phase 1 as defined by the FEIS and ROD is approximately 18.6 centerline miles long, starting from Point MacKenzie Road near Burma Road in the Mat-Su Borough and continuing south and eastward, crossing the Knik Arm of Upper Cook Inlet north of Port MacKenzie and the Port of Alaska (POA) and continuing south through Government Hill in Anchorage, connecting to the A/C Couplet.

Figure 5 - KAC Project Alignment – Phase 1



Segments 1-9 for Phase 1 were developed individually by alignment section considering their unique construction requirements. For example, Segment 1 represents the upgrade, realignment and paving of an existing road carrying Port MacKenzie and other traffic, while Segment 2 is a new roadway component to connect to the west bridge abutment north of Port MacKenzie in the Matanuska-Susitna Borough. Segments 3, 4 and 5 are in the water or tidewater work for the approaches and the 9,200-foot-long bridge. Segments 6, 7, 8 and 9 are crossing through the bustling Port of Alaska (POA), along the edge of the Joint Base Elmendorf-Richardson (JBER) high security military base, and under the Government Hill neighborhood via a cut-and-cover tunnel with utilities and urbanized area traffic management considerations.

In addition to the Segments to be physically constructed, other KAC Project Phase 1 capital costs are considered, including (but not limited to):

- Toll systems for user fee-based revenue capture,
- National Environmental Policy Act (NEPA) and other permitting requirements,
- Rights of Way (ROW),
- Utilities relocations,
- Environmental mitigation,
- Beluga whale monitoring for in-water works,
- Procurement and design cost,
- Owner oversight and inspection costs.

The following report section *Phase 1 KAC Project Description and Scope of Work* provides a more detailed description of each of Segments 1-9 and related capital construction cost elements for Phase 1 scope of the KAC bridge alternative.

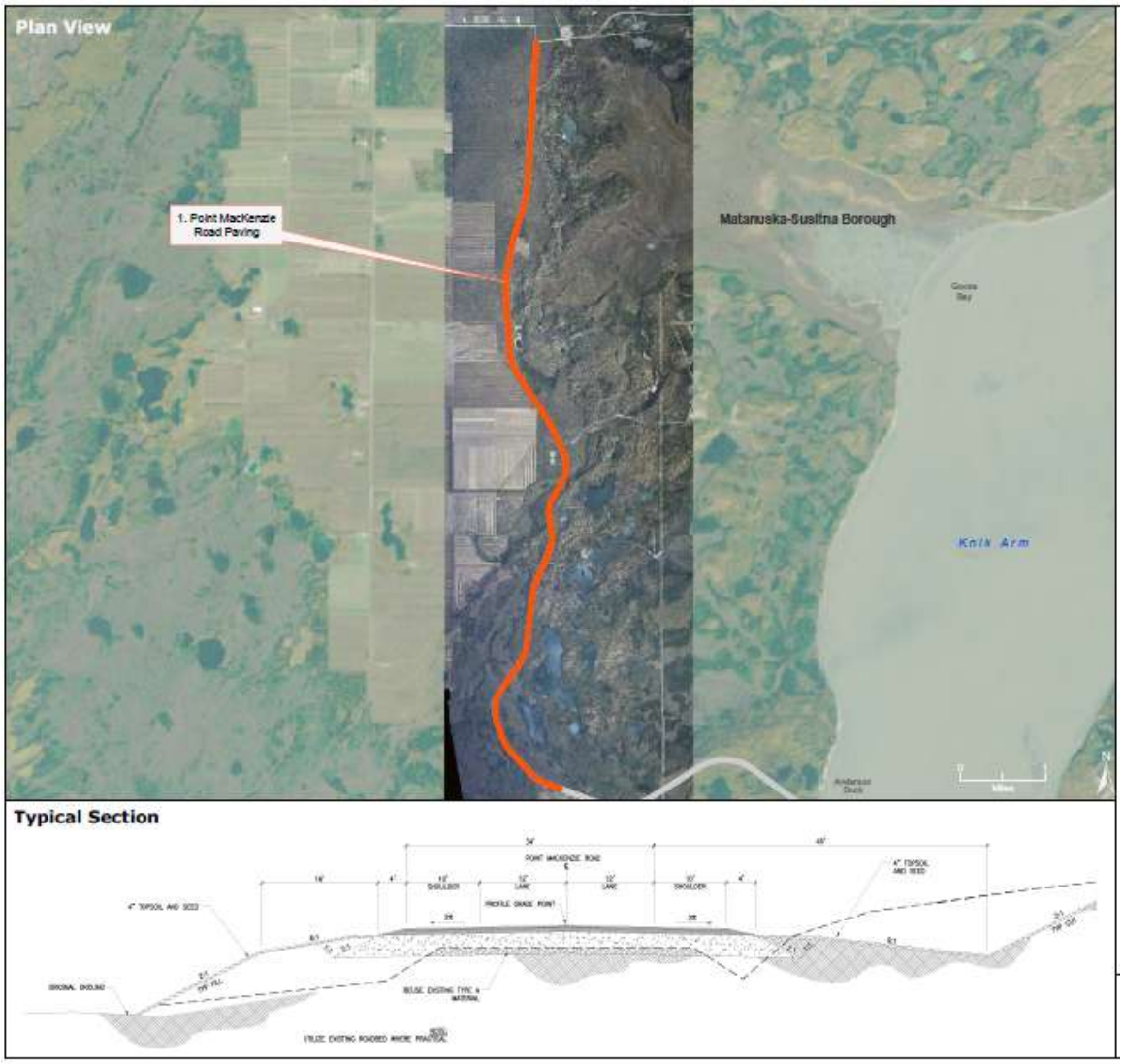
Phase 1 KAC Project Description and Scope of Work

Segment 1 – Point MacKenzie Road

The upgrade and paving of the existing 9.6 miles of Point MacKenzie Road to a two-lane initial configuration was completed in 2009 by the Matanuska-Susitna Borough using an Alaska Department of Commerce, Community and Economic Development grant for a total cost of $15.4 million. In Phase 2, this segment is planned to be upgraded to a four-lane controlled access highway under the “Build” ROD. Segment 1 is assumed to be a common element under either a tunnel or bridge alternative. *Figure 6 – Segment 1 - Point*

MacKenzie Road, depicts the alignment and a typical section drawing for this Segment of the project.

Figure 6 – Segment 1 - Point MacKenzie Road

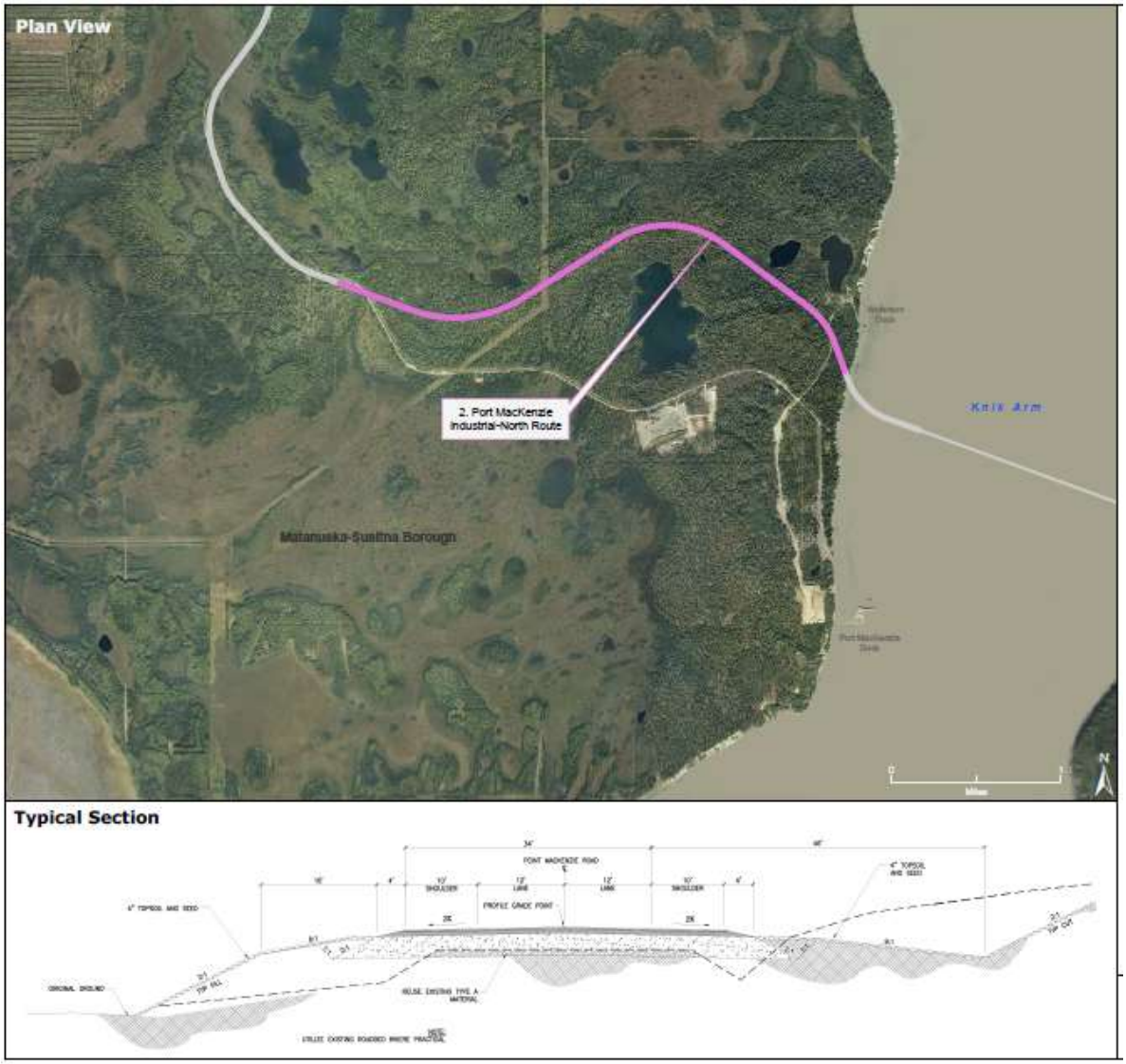


Segment 2 – Port MacKenzie Industrial Route North

Segment 2, as shown in *Figure 7 – Segment 2 -Port MacKenzie Industrial Route North*, is a planned new alignment of approximately 3.5 miles departing from Point MacKenzie Road and connecting to the bridge approach on the west side of the Knik Arm, creating a dedicated highway route for bridge traffic separated from port and associated industrial

area traffic. ROW has been acquired from the Matanuska-Susitna Borough sufficient for the initial two-lane configurations and for future expansion to a four-lane controlled access highway when growing traffic demand requires it. This segment is considered to be substantially common to either a tunnel or bridge crossing alternative, although transition to a tunnel portal vs. a bridge connection will require alternative engineering and construction at that point in the segment.

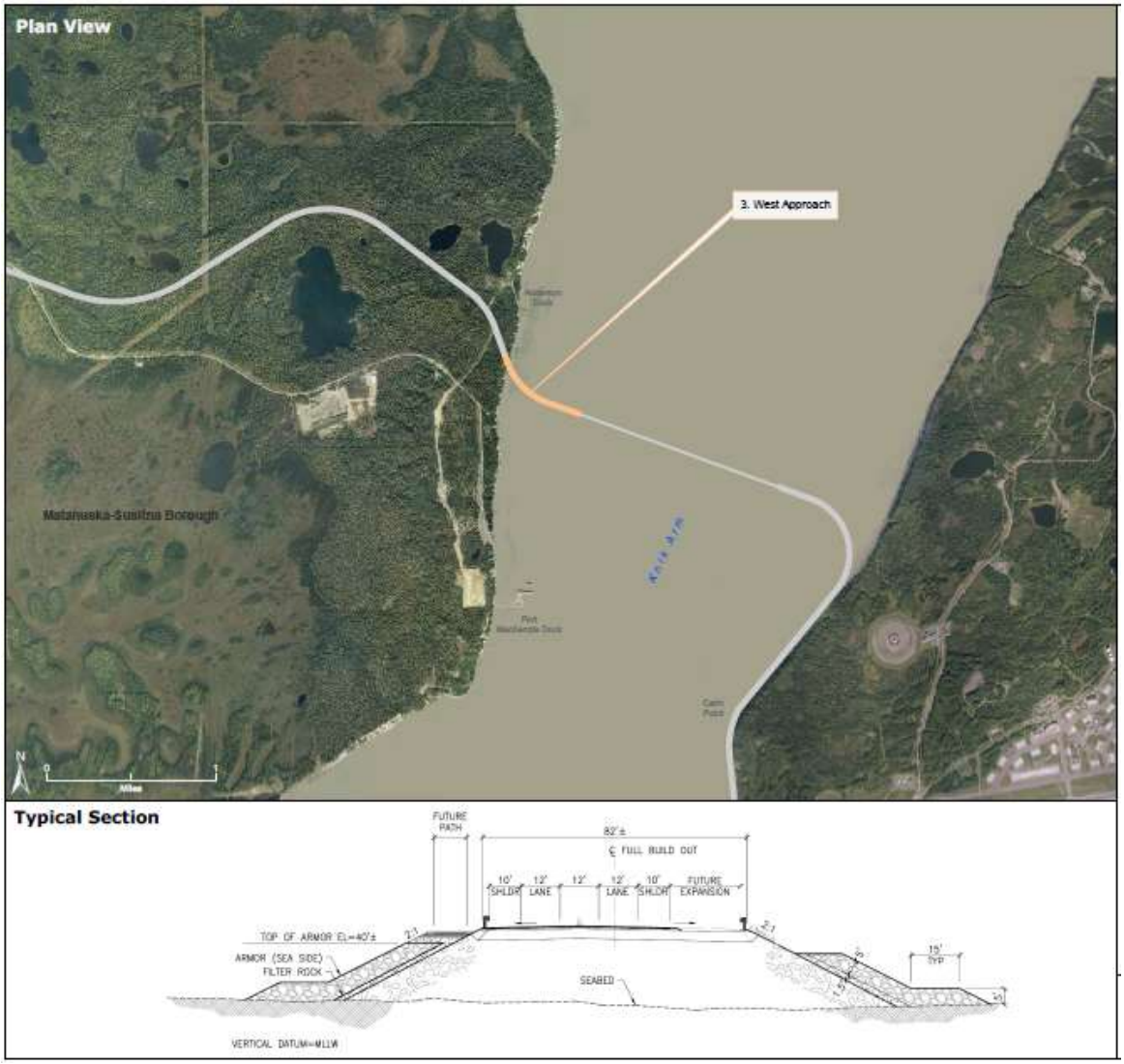
Figure 7 – Segment 2 -Port MacKenzie Industrial Route North



Segment 3 – West Approach

The west approach to the bridge begins where the KAC alignment intersects the western bluff of Knik Arm, extending into the water for approximately 0.45 miles. The fill is planned to comprise gravel, filter rock and armor rock for protection against wave action and ice floes. The foundation will be constructed wide enough in Phase 1 to accommodate expansion from two to four lanes in Phase 2 of the KAC Project without having to reenter the tidelands and water for construction of the lane additions to accommodate growing traffic volumes. Partial applicability of Segment 3 to the tunnel option will depend on west side portal design and placement.

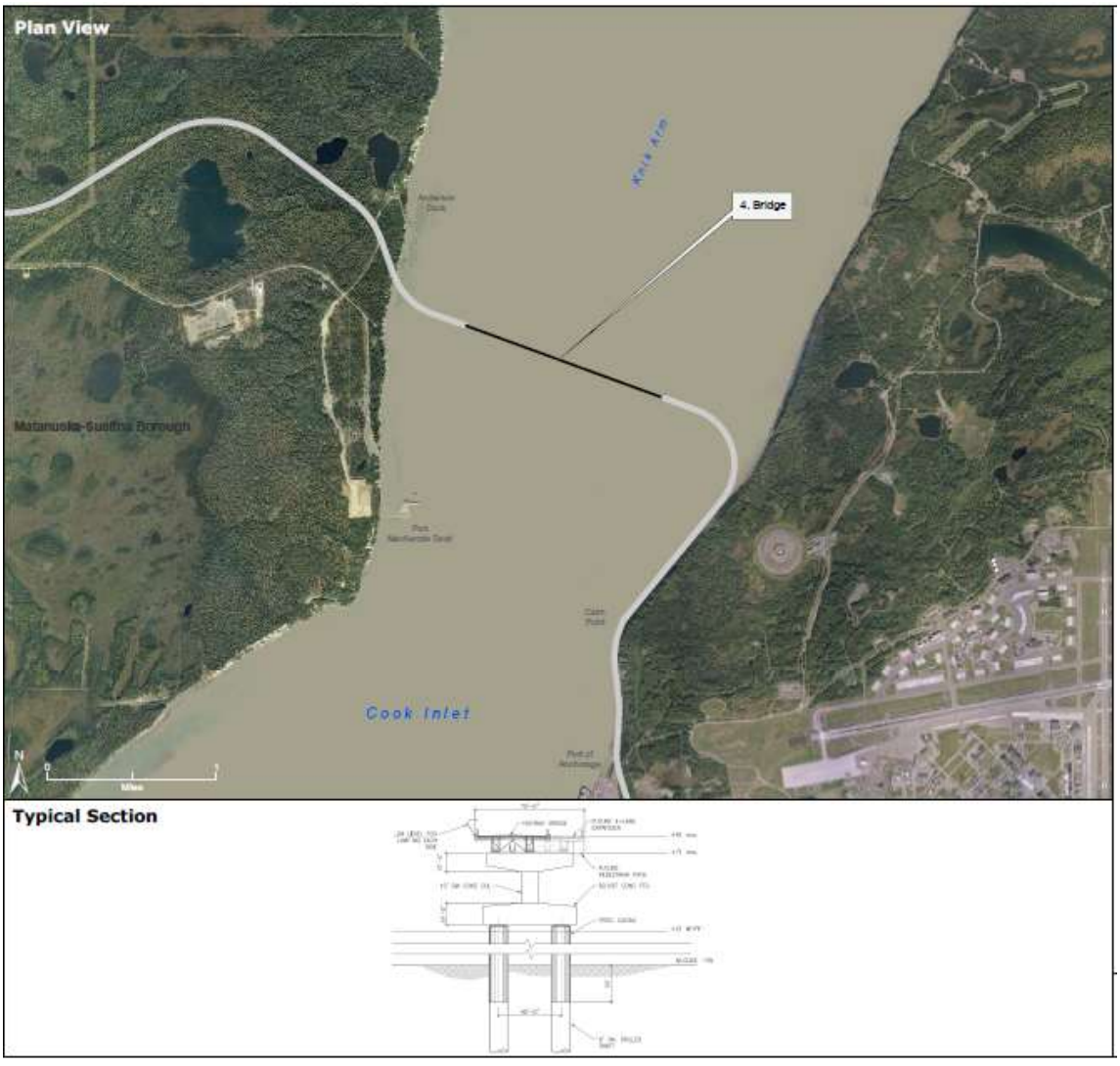
Figure 8 – Segment 3 - West Approach



Segment 4 – 9,200' Bridge

The bridge alternative is planned as a pier supported structure with a minimum span spacing of 250 feet. A 50-foot minimum clearance at high tide is required for marine vessel passage and lighting is required for navigational aids. The construction method for piling installation is anticipated to use oscillated drilled shaft installation of 96" pipe piles (as opposed to pounding in driven piles) to minimize noise impact on marine mammals, in particular the ESA listed Cook Inlet stock of beluga whales. A four-lane foundation with an initial two-lane deck superstructure will eliminate the need for heavy marine construction subsurface for Phase 2 four-lane bridge capacity improvements. Subsurface ROW has been acquired from the Matanuska-Susitna Borough for borough owned lands and an

Figure 9 – Segment 4 - 9,200' Bridge

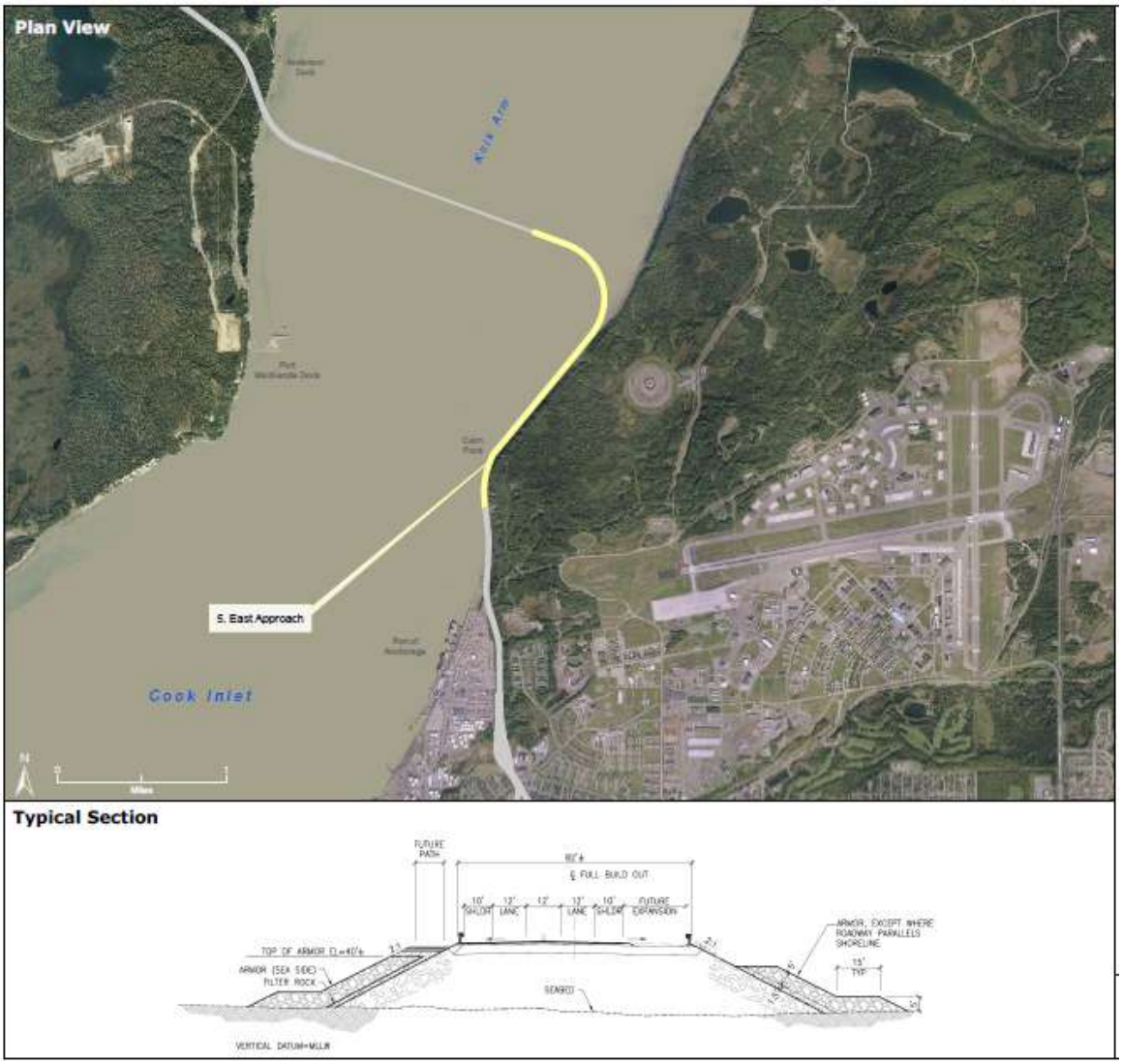


easement granted by the Alaska Department of Natural Resources for State of Alaska submerged lands. The bridge is unique to the bridge crossing alternative. The bridge alignment location and connections to the east and west approaches is shown in *Figure 9 – Segment 4 - 9,200' Bridge*.

Segment 5 – East Approach Fill

The east approach to the bridge is 1.95 miles long, following the shore line north of Knik Arm north of the Port of Alaska (POA) before taking a tangent into the inlet to connect to the east bridge abutment. Fill will consist of gravel, filter rock and armor rock for protection from wave action and ice floes. It will be constructed with a wide enough substructure in

Figure 10 – Segment 5 - East Approach Fill

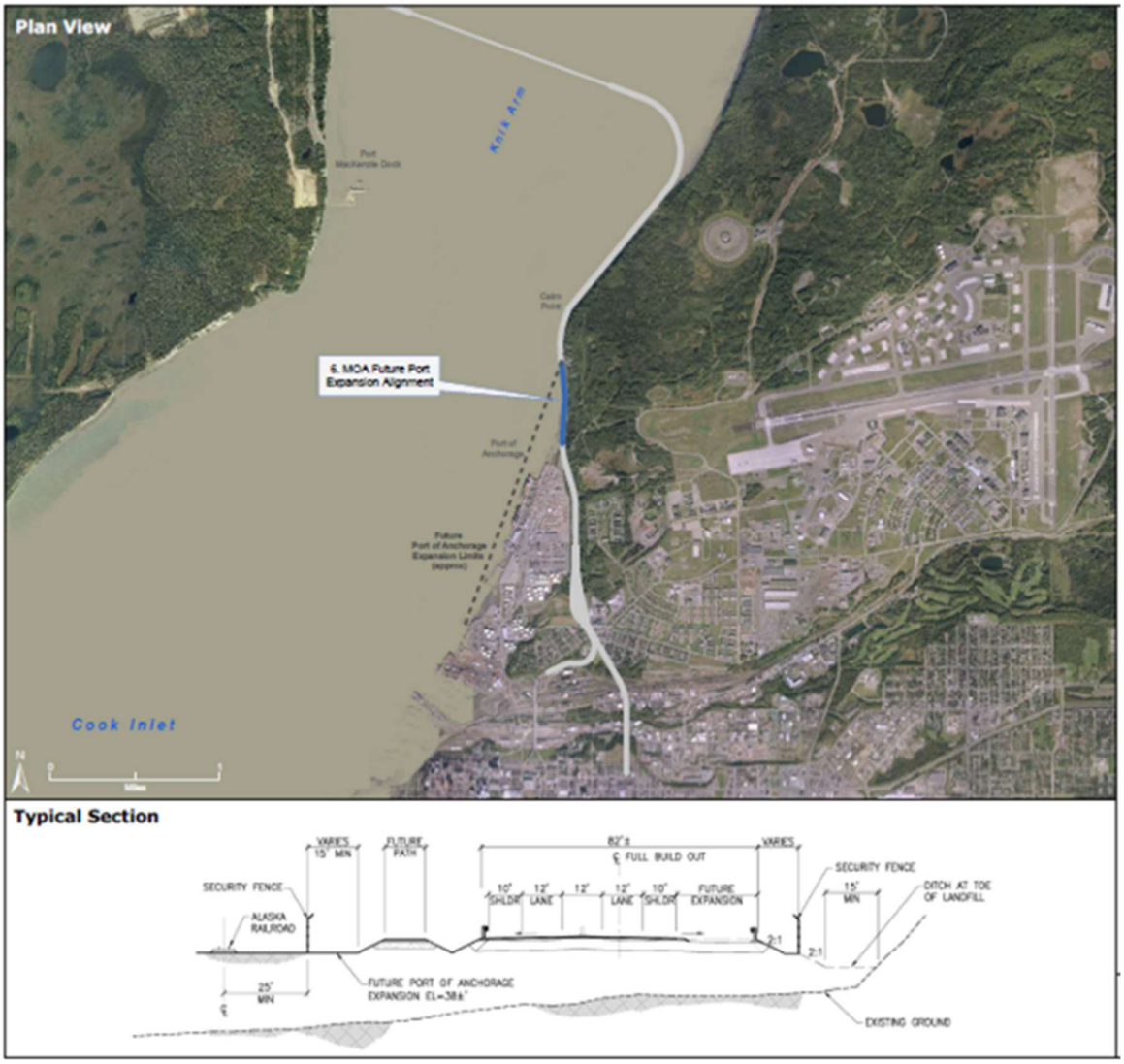


Phase 1 to accommodate expansion from the two-lane initial configuration to a four-lane configuration in Phase 2 to support forecast traffic volume increases without requiring additional in-water work. A ROW easement has been granted by the Alaska Department of Natural Resources for this segment's tidelands. Segment 5 may or may not be common in part with a tunnel alternative, depending on the east tunnel portal design and alignment contemplated in the preliminary design for that alternative.

Segment 6 – Port of Alaska Expansion (formerly Port of Anchorage)

The Port of Alaska Expansion segment is approximately 0.60 miles long and will be constructed atop the Port of Anchorage fill expansion parallel to the bluff. Sufficient space

Figure 11 – Segment 6 - Port of Alaska



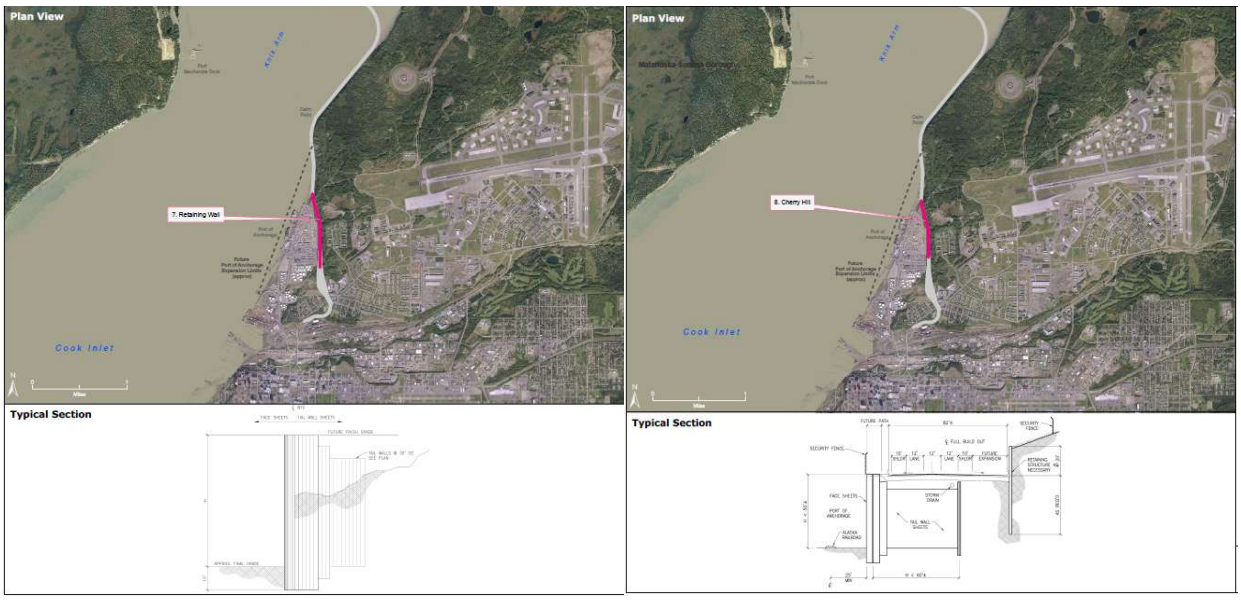
will be provided in the Phase 1 configuration to allow expansion from two to four-lanes to accommodate forecasted future traffic growth. Much of the tidelands now comprising the POA were conveyed to the MOA in 1992 by the State of Alaska. That conveyance included a floating easement to support a future crossing of Knik Arm. ADOT&PF (through KABATA) has agreed to compensate the POA for the improvements along the ROW and any damage to the port incurred during construction. Segment 6 is considered a common element with a tunnel alternative, at least in part and depending on the east tunnel portal design and placement along the alignment.

Segments 7 and 8 – Cherry Hill Retaining Wall and Roadway

Segment 7 represents a 0.9 mile long retaining wall, and Segment 8, a 0.65 mile long roadway, along Cherry Hill straddled between JBER, a Department of Defense (DOD) military base, and the POA. ROW for Sections 7 and 8 are on DOD and POA property. JBER has indicated it will provide a permanent easement for the project but did not complete the process before the KAC Project was shut down in 2016. These Segments are expected to be common elements between either the tunnel or bridge alternative.

The retaining wall (Segment 7) is intended to provide security between JBER and the POA, which has been designated one of 22 DOD strategic ports because of its proximity to JBER and importance to military unit and equipment deployment. The security wall will also provide soil stability for soft, seismically sensitive soils along the alignment. It will be

Figure 12 – Segment 7 and 8 - Cherry Hill Retaining Wall and Roadway



placed to accommodate future capacity improvements from the two-lane Phase 1 configuration to the four-lane Phase 2 configuration.

The 0.65 mile long roadway will be constructed on the east side of the retaining wall and is designed to be expanded to four-lanes when traffic volume warrants the capacity improvement (projected to be about 10 years after opening based on the last traffic and toll revenue forecast). Provisions are incorporated into the design to collect and direct the drainage of ground water seepage and storm water runoff.

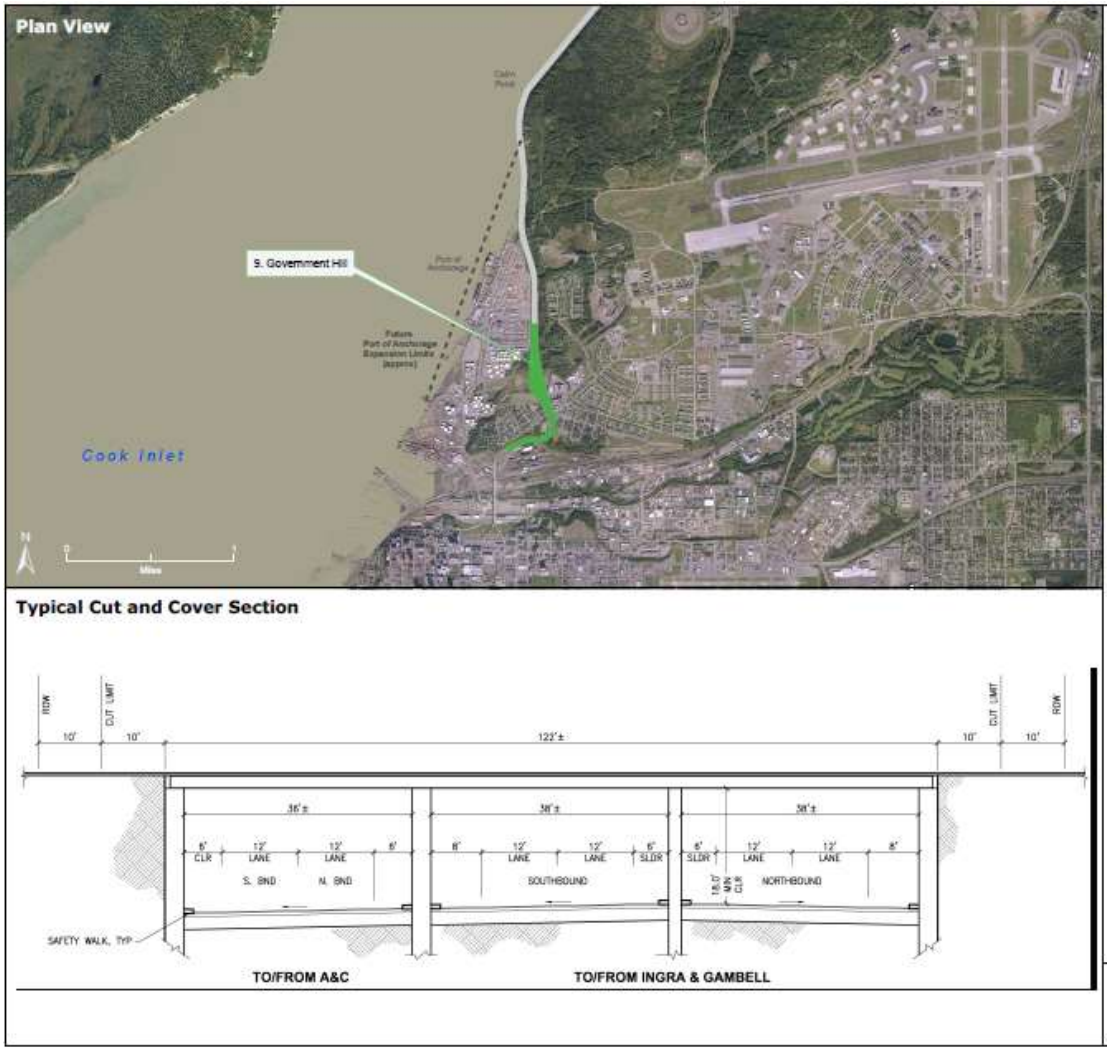


Figure 13 – Segment 9 - Government Hill

Segment 9 – Government Hill

Government Hill represents the final mile of the KAC Project for Phase 1. It includes a six-lane 800' cut-and-cover tunnel under Government Hill to maintain neighborhood cohesiveness and to avoid reconstruction for future capacity improvements and a second connection into Anchorage to Ingra and Gambel Streets when traffic demand warrants construction. The tunnel alignment is 30 feet below Erickson Steet. Access for ingress and egress to the Government Hill Neighborhood will be provided. East Loop Road will be modified to connect into the A-C Couplet in Anchorage. All private parcels on Government Hill necessary for ROW have been acquired by ADOT&PF. There are remaining properties to be acquired for ROW owned either by the Alaska Railroad Corporation (ARRC) or the Municipality of Anchorage (a portion of Sunset Park on the south side of the planned tunnel). Segment 9 is assumed to be a common element for either of the tunnel or bridge crossing alternatives. *Figure 13 – Segment 9 - Government Hill* appears on the previous page.

Tolling Systems Capital and Operating Costs

In addition to these routine construction and operating costs, tolling systems capital and operating costs were also considered as toll revenues is expected to be used as a means of financing, in part, project capital costs and all of the O&M and R&R costs over the lifecycle of the KAC Project. Toll revenue could be used as a funding source for either the Knik Arm Tunnel or bridge alternative. *Table 9 - Toll Systems Cost Estimate for initial Installation* in the *Tolling Systems Capital and Operating Costs* section of this report details the tolling CAPEX for Phase 1.

Other Phase 1 Scope *Items*

Engineering design work, construction inspections, owner design oversight, and utilities are included in the construction scope of work for Phase 1 cost estimation. Phase 1 will also require beluga whale monitoring during in-water construction and mitigation for wetlands and providing a fish camp for the Knik and Eklutna tribes. For Phase 1, ICAP overhead is expected to apply to approximately 1/3 of total CAPEX to be funded by State and Federal highway funds. Approximately 2/3 of Project CAPEX is expected to be funded by state bonds and a TIFIA loan backed by toll revenue user fees and not subject to ICAP overhead charges. Changes to the funding sources assumptions for Phase 1 construction would impact the ICAP overhead estimate.

Phase 1 Construction and Pre-Construction Costs Estimates

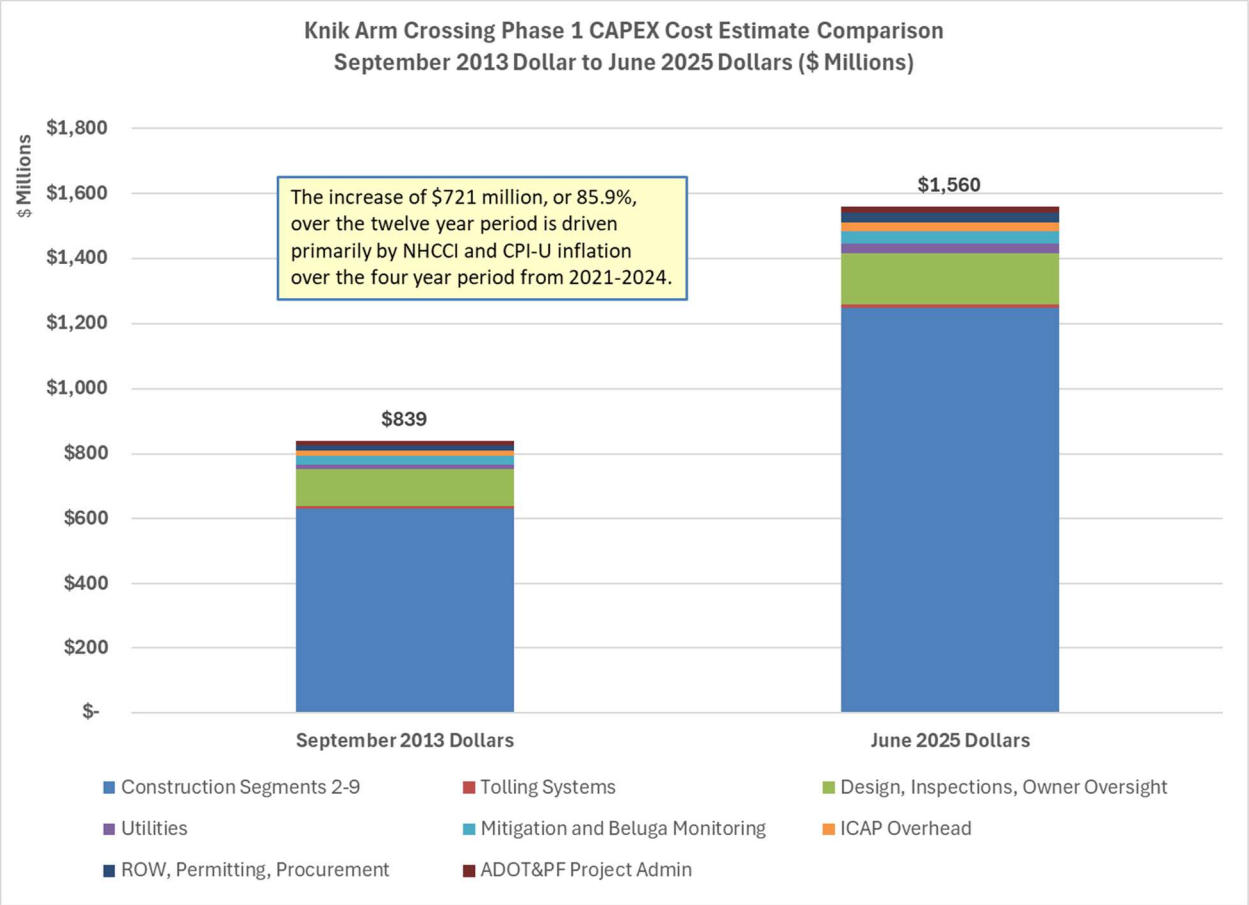
NHCCI and CPI-U cost indices were applied to the September 2013 estimate for Phase 1 capital cost estimate provided to the FHWA CER workshop for the 2014 review. In general, NHCCI was used as the escalation factor for physical construction elements, including Segments 2-9 and utilities. For tolling technology and other soft capital costs, CPI-U was used. For the cost estimate results in June 2025 nominal dollars, the approximately $100 million previously invested in project development, ROW acquisitions, and Segment 1 Point MacKenzie Road upgrading and paving are excluded as sunk cost. As shown in *Table 5 - Bridge Alternative Phase 1 Cost Estimate in 2025* Dollars, **total Phase 1 cost estimated in 2025 nominal dollars is $1,560 million. This is a $721 million increase over the 2013 estimate of $839 million, or 85.9%.** The only significant change to the 2013 cost estimate other than inflation that was identified is a $10 million rough estimate to bring the NEPA and permitting documents up to date. This is $7.5 million more for this component than estimated in the September 2019 report "Knik Arm Crossing Analysis for Moving Forward to Financing and Construction" by Hemenway Consulting. NHCCI was determined to be the most relevant index for 93% of the Phase 1 cost elements, driving the significant 85.9% increase for June 2025 over September 2013 estimates. YOE dollars are not provided as determining a construction start year is beyond the scope of this cost estimate update.

Table 5 - Bridge Alternative Phase 1 Cost Estimate in 2025 Dollars

Knik Arm Crossing Project Bridge Alternative Phase 1 Cost Escalation to June 2025 Dollars						
Segment	Description	Escalation Factor	Total Sept 2013$	Escalated Total June 2025$	Cost Increase	Percent Increase
Construction Segments 2-9 Estimates:						
2	Port MacKenzie Northern Route	NHCCI	$ 14,865,418	$ 29,429,170	$ 14,563,751	98.0%
3	West Approach	NHCCI	40,364,525	79,909,925	39,545,399	98.0%
4	Bridge	NHCCI	305,680,840	605,158,434	299,477,594	98.0%
5	East Approach	NHCCI	111,107,161	219,959,602	108,852,440	98.0%
6	MOA Port Expansion Alignment	NHCCI	9,004,610	17,826,488	8,821,878	98.0%
7	Retaining Wall	NHCCI	15,304,959	30,299,331	14,994,372	98.0%
8	Cherry Hill	NHCCI	35,716,745	70,708,683	34,991,938	98.0%
9	Government Hill	NHCCI	98,910,790	195,814,362	96,903,572	98.0%
	Subtotal Construction Segments Cost		**630,955,049**	**1,249,105,995**	**618,150,946**	**98.0%**
Other Construction Costs Estimates:						
	Tolling Technology	CPI-U	7,687,250	10,623,987	2,936,737	38.2%
	Contractor Design Engineering	CPI-U	34,008,382	47,000,503	12,992,122	38.2%
	Construction Inspection	CPI-U	45,344,509	62,667,338	17,322,829	38.2%
	Owner Design Oversight	CPI-U	5,668,064	7,833,417	2,165,354	38.2%
	Owner Construction Phase Services	CPI-U	28,340,318	39,167,086	10,826,768	38.2%
	Utilities	NHCCI	15,000,000	29,695,602	14,695,602	98.0%
	Beluga Monitoring	CPI-U	12,000,000	16,584,325	4,584,325	38.2%
	Mitigation	CPI-U	15,000,000	20,730,406	5,730,406	38.2%
	ICAP	Pro-Rata	15,614,826	29,172,625	13,557,799	86.8%
	Subtotal Other Construction Related Costs		**178,663,349**	**263,475,289**	**84,811,940**	**47.5%**
	Total Construction Estimate - Phase 1		**809,618,398**	**1,512,581,283**	**702,962,885**	**86.8%**
Phase 1 Preconstruction Estimate:						
	Rights of Way Acquisitions	CPI-U (adj)	8,832,404	11,158,486	2,326,082	26.3%
	Permitting Costs and NEPA	Fixed Est.	1,500,000	10,000,000	8,500,000	566.7%
	Procurement and Stipends	CPI-U	6,200,000	8,568,568	2,368,568	38.2%
	Total Phase 1 Preconstruction Estimate		**16,532,404**	**29,727,054**	**13,194,650**	**79.8%**
ADOT&PF/KABATA Project Administration (to Opening)		CPI-U	**12,855,320**	**17,766,400**	**4,911,080**	**38.2%**
TOTAL REMAINING PHASE 1 CAPITAL COST ESTIMATE			**$ 839,006,122**	**$ 1,560,074,737**	**$ 721,068,615**	**85.9%**

Figure 14 - Phase 1 CAPEX Cost estimate Comparison 2013 to 2025 on the following page shows graphically the summarized cost estimates included in *Table 5*. Segments 2-9, representing physical construction costs, were escalated to June 2025 nominal dollars using the NHCCI index, contributing substantially to the 85.9% increase over the September 2013 estimate.

Figure 14 - Phase 1 CAPEX Cost estimate Comparison 2013 to 2025



Bridge Alternative Construction Costs Estimate - Phase 2 Capacity Improvements and Project Extension

Introduction to Phase 2

The "Build" ROD anticipates that the KAC would be built in two phases and that Phase 1 has independent utility as a stand-alone functional two-lane facility. The KAC Project ROD anticipates Phase 2 would occur when traffic demand requires capacity improvements to a four-lane controlled access highway and a project extension for a second connection into Anchorage at Ingra and Gambel Streets through construction of a new viaduct over the Ship Creek area, as depicted in *Figure 15 - Phase 2 Ingra-Gambell Viaduct Connection*. In addition, Phase 2 calls for a multi-use bicycle and pedestrian path for the length of the alignment.

Figure 15 - Phase 2 Ingra-Gambell Viaduct Connection

The last Traffic and Toll Revenue Forecast prepared by CDM Smith titled "Comprehensive Traffic and Revenue Study for the Knik Arm Crossing Project – September 11, 2015" indicated that traffic demand would grow to a level requiring a four-lane facility and a second connection in Anchorage approximately ten years after opening to maintain a reasonable level of service for a tolled highway facility. Certain elements of Phase 2 were considered in developing Phase 1 to limit future in-water works and disruptions to the

Government Hill Neighborhood, JBER and the POA, as described by Segment under the *Phase 1 KAC Project Description and Scope of Work* section of this report.

Phase 2 could be accelerated to the initial build in Phase 1 with sufficient financing, but given constrained financial resources and the State's intent to partially fund the Project with user fees in the form of tolls, Phase 2 was separated and anticipated to be constructed when traffic demand requires it and toll revenue is sufficient to back financing to fund all of the Phase 2 capacity improvements and the Ingra-Gambell project extension.

Phase 2 KAC Project Scope of Work

Phase 2 capacity improvements from a two-lane, two-way facility to a controlled access four-lane, divided highway facility and project extension by means of constructing a second viaduct over Ship Creek will likely be constructed under several contracts over multiple years. Phase 2 is predicted to begin to be required about ten years after opening of Phase 1 to traffic based on the most recent Comprehensive T&R study by DM Smith published in September 2015. The scope of work contemplated for Phase 2 of the KAC bridge alternative includes the following:

Segments 1 and 2, Point MacKenzie Road and the Point MacKenzie Industrial Route North

These Segments will be upgraded to a controlled access four-lane divided highway with grade separated interchanges in Phase 2. Substantially all ROW required for these segments has already been acquired by ADOT&PF from the Matanuska Susitna Borough.

Segment 3 – West Approach

The west bridge approach four-lane footprint is included in the Phase 1 scope of work to avoid or minimize in-water work during Phase 2 in the environmentally sensitive Cook Inlet Knik Arm tidelands. Two lanes will be added to the prepared four-lane foundation to bring it to a four-lane divided highway section on the west side of the bridge.

Segment 4 – Additional Bridge Deck

Bridge superstructure to support two additional lanes will be added to the bridge pier foundation. The pilings and pier structure are planned to be constructed to support the expansion to four lanes during Phase 1 to avoid/minimize additional in-water work in consideration of the ESA listed beluga whales and minimizing expensive marine construction during Phase 2.

Segment 5 – East Approach

The east approach four-lane footprint along the bluff and Knik Arm tidelands on the Anchorage side is included in the Phase 1 scope of work to avoid or minimize in-water and tidelands work during Phase 2 in the environmentally sensitive Knik Arm of Upper Cook Inlet. Two lanes will be added to the prepared four-lane foundation to bring it to a four-lane highway section on the east side of the bridge and along the bluff to the north end of the Port of Alaska.

Segments 6-8 – Port of Alaska and Cherry Hill

These Segments are to be constructed to a four-lane foundation in Phase 1 because of the constricted work area between the Port of Alaska and JBER and active port operations. Phase 2 scope will be to pave these sections to a four-lane highway.

Segment 9 – Government Hill Cut-and-Cover Tunnel

The cut-and-cover tunnel under Government Hill will be constructed to the full six-lane configuration to minimize disruption to the neighborhood and to accommodate four-lane traffic for the entire KAC alignment and provide a means of connection to a new Phase 2 viaduct over Ship Creek connecting into Ingra and Gambell Streets in Anchorage, as discussed below. Traffic control during construction of the other segments will likely be the main work in this Segment during Phase 2.

Segment 10 – Ship Creek Viaduct to Ingra and Gambell Streets

The Ship Creek viaduct is a new project extension providing a second connection from the south end of the Government Hill tunnel into the Anchorage road network at Ingra and Gambell Streets as depicted in *Figure 15 - Phase 2 Ingra-Gambell Viaduct Connection*. This component represents nearly one-half of Phase 2 total estimated costs.

Multi-Use Pedestrian and Bicycle Pathway

The ROD calls for construction of a multi-use pedestrian and bicycle path to be constructed in Phase 2 along the approximately 20 mile long length of the completed Phases 1 and 2 alignment.

Other Phase 2 Scope Items

Engineering design work, construction inspections, owner design oversight, and utilities are included in the scope of work for Phase 2 cost estimation. Phase 2 will also require the acquisition of additional ROW for the Ship Creek Viaduct and Ingra-Gambell Couplet and for Erickson Street near the south end of the Government Hill Tunnel. Phase 2 is not

expected to have the ICAP overhead rate applied as it is planned to be financed entirely with toll revenue and not use state or federal highway funds.

Phase 2 Construction Costs Estimates

NHCCI and CPI-U cost indices were applied to escalate the September 2013 estimate for Phase 2 provided to the FHWA CER workshop for the 2014 review. The same methodology as described for Phase 1 cost estimation was used. As shown in *Table 6 - Bridge Alternative Phase 2 Cost Estimate in 2025* Dollars, **total Phase 2 cost estimated in 2025 nominal dollars is $877.3 million. This is a $412.8 million increase over the 2013 estimate of $464.6 million, or 88.8%.** No significant changes to the 2013 cost estimate other than inflation were identified as requiring consideration in the Phase 2 cost estimate update to June 2025 dollars. NHCCI was determined to be the most relevant index for 93% of the Phase 2 cost elements, driving the significant 88.8% increase for June 2025 over September 2013 estimates. YOE dollars are not provided as determining a construction start year is beyond the scope of this cost estimate update.

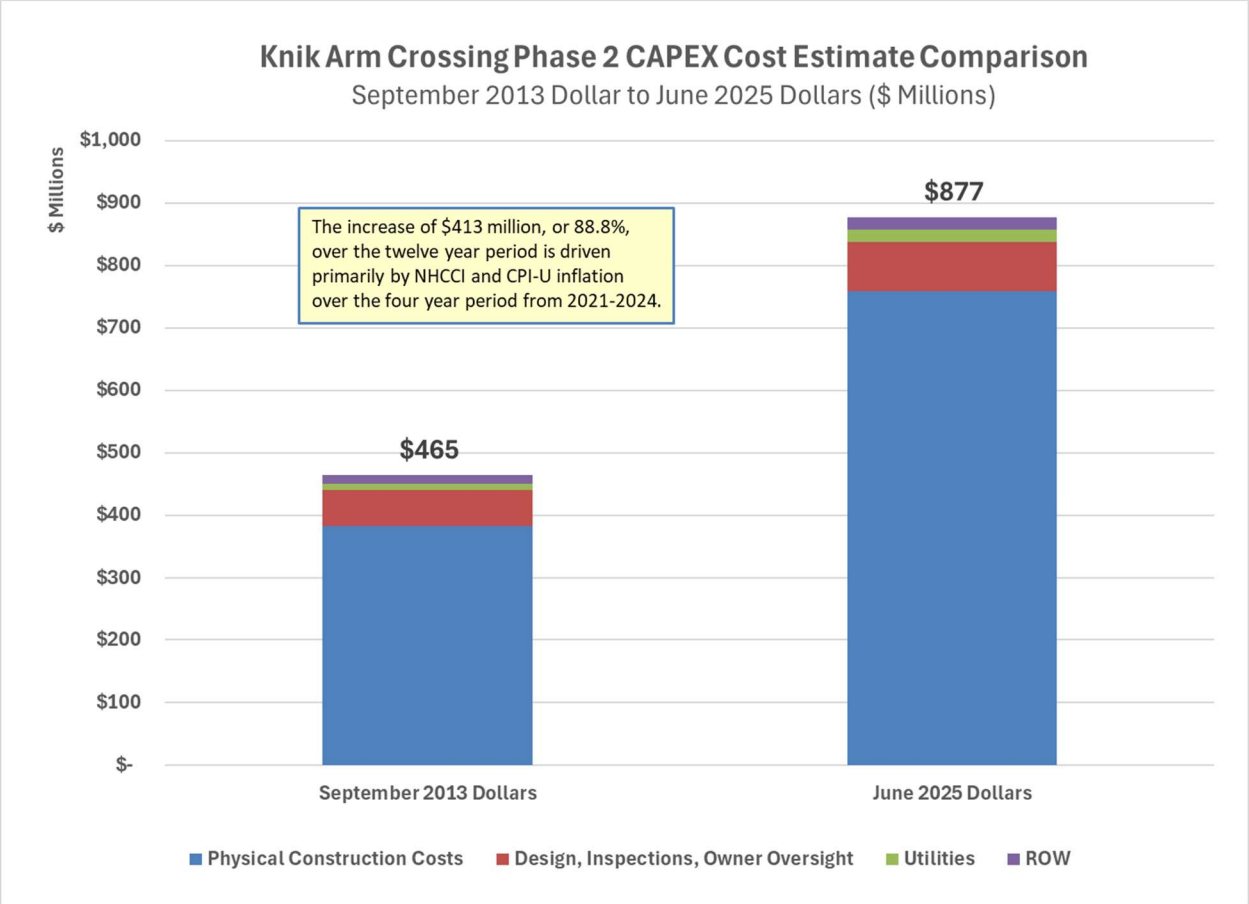
Knik Arm Crossing Project
Bridge Alternative Phase 2 Cost Escalation to June 2025 Dollars

Segment	Description	Escalation Factor	Total Sept 2013$	Escalated Total June 2025$	Cost Increase	Percent Increase
1	Point MacKenzie Road	NHCCI	$ 59,737,893	$ 118,263,512	$ 58,525,619	98.0%
2	Point MacKenzie Industrial Route North	NHCCI	20,077,830	39,748,216	19,670,386	98.0%
3	West Approach	NHCCI	595,840	1,179,588	583,748	98.0%
4	Additional Bridge Deck	NHCCI	92,984,148	184,081,349	91,097,201	98.0%
5	East Approach	NHCCI	1,684,295	3,334,411	1,650,116	98.0%
6	MOA Port Expansion Alignment	NHCCI	529,169	1,047,600	518,431	98.0%
8	Cherry Hill	NHCCI	858,801	1,700,173	841,373	98.0%
10	Ship Creek Viaduct to Ingra-Gambell	NHCCI	197,235,350	390,468,162	193,232,812	98.0%
	Pedestrian and Bicycle Pathway	NHCCI	9,962,327	19,722,487	9,760,160	98.0%
	Subtotal - Segment Construction Costs		**$ 383,665,653**	**$ 759,545,499**	**$ 375,879,845**	**98.0%**
	Contractor Design Engineering	CPI-U	19,995,681	27,634,572	7,638,891	38.2%
	Construction Inspection	CPI-U	16,663,068	23,028,810	6,365,742	38.2%
	Owner Design Oversight	CPI-U	3,332,614	4,605,762	1,273,148	38.2%
	Owner Construction Phase Services	CPI-U	16,663,068	23,028,810	6,365,742	38.2%
	Utilities	NHCCI	10,000,000	19,797,068	9,797,068	98.0%
	Ingra-Gambell Couplet ROW	CPI-U	9,263,230	12,802,034	3,538,804	38.2%
	Erickson Phase 2 ROW	CPI-U	4,990,145	6,896,515	1,906,370	38.2%
	ICAP	n/a	-	-	-	0.0%
	Total Phase 2 Cost Estimate		**$ 464,573,458**	**$ 877,339,071**	**$ 412,765,612**	88.8%

Table 6 - Bridge Alternative Phase 2 Cost Estimate in 2025 Dollars

Figure 16 - Phase 2 CAPEX Cost estimate Comparison 2013 to 2025 displays graphically the summarized comparison of the September 2013 Phase 2 CAPEX cost estimate to the June 2024 nominal dollar estimate revealing the $413 million cost estimate increase from $465 million in 2013 to $877 million in 2024. Note that the majority of inflation for NHCCI and CPI-U occurred in the post-Covid-19 pandemic period from 2021 to 2024 as shown in *Figure 3 - NHCCI and Other Inflation Indices* 2012-2024. For NHCCI, 61% of the increase occurred during this four-year period which totaled 97% for the twelve-year period from 2013 to 2025, and for CPI-U, the index increased by 22% for the same period. 88.8% of the escalated costs represent highway road and bridge construction elements escalated using the NHCCI factor for the period between 2013 and 2025.

Figure 16 - Phase 2 CAPEX Cost estimate Comparison 2013 to 2025



Bridge Alternative Operations, Maintenance, and Renewal and Rehabilitation Costs Forecast

Introduction to O&M and R&R Costs

There are four key elements of the proposed operations and maintenance scheme for the Knik Arm Crossing Bridge Alternative:

1. Roadway and Bridge Operations and Maintenance (O&M)
2. Roadway and Bridge Renewal and Rehabilitation Capital (R&R)
3. Toll Collections and Operations
4. Owner's Oversight Costs (for managing the preceding three categories)

All four elements of O&M costs are anticipated to be paid for by user fees in the form of toll revenue as the highest priority use of that user fee revenue. Toll revenue could also be used for the tunnel alternative, and it is assumed that capital, operations, and maintenance costs for toll systems and toll collection costs would be similar for the tunnel alternative. Each of the four elements of O&M and R&R costs for the bridge alternative post-opening to service have been forecast for a 40-year period in 2025 dollars and are discussed in more detail below.

Roadway and Bridge Operations and Maintenance

This category of operations costs includes Bridge and roadway operations and maintenance (O&M), including bridge inspections, snow removal, lighting, repairs, landscape maintenance, etc., including the incremental O&M cost for Phase 2 when it is constructed and placed into service, assumed to be approximately 10 years after the KAC Project opens to services based on the most recently produced traffic and toll revenue demand forecast for the Project.

ADOT&PF and/or KABATA will be responsible for operations and maintenance of the roadway and bridge once it is opened to service. These O&M activities could be provided either directly by the owner or subcontracted to service providers as appropriate. The direct costs of these activities have been estimated for ADOT&PF by Wilbur Smith Associates (Now CDM Smith) and PND Engineers, Inc. in 2015 dollars as published in the "Knik Arm Bridge & Toll Authority Capital Expenditures Report – Maintenance, Operations and CAPEX Estimates" (February 2011). Those 2015 cost estimates were escalated to June 2025 dollars using CPI-U as the primary inflation factor. These routine O&M cost estimates do not include owner's general and administrative oversight costs for tolling and associated

high-quality system management expected by toll road users, which have been estimated separately by ADOT&PF and are discussed later in this Bridge Alternative Operations, Maintenance, and Renewal and Rehabilitation Costs Forecast section. O&M is expected to be carried out at a high level of quality standard compared to routine highway operations in order to maintain customer satisfaction for toll paying users.

Renewal and Rehabilitation Capital (R&R)

Renewal work includes the maintenance, repair, reconstruction, rehabilitation, restoration, renewal and replacement of any element of the KAC Project that is not routine maintenance normally included in the annual O&M budget. Providing these items could be included through a DBM contract as a fixed annual, quarterly, or monthly fee for maintenance term options or provided directly by ADOT&PF at its discretion. Regardless of how it is provided, the capital R&R work will require being provided timely to provide a high-level service quality that toll paying users of the facility will expect as customers.

Toll Collections and Operations

This category of operating costs includes toll system operations, maintenance, customer care, account management, and billing and collection. Toll collections and operations costs are likely to be very similar for either the tunnel or bridge alternative. Factors driving toll collections and operations costs include (among others):

- Method of tolling (ETC/ORT, barrier system, hybrid).
- Toll rates setting and demand impact/elasticity of rates.
- Traffic volume and traffic mix for commercial and passenger vehicles.
- Tolling business rules adopted by ADOT&PF.
- Outsourced vs. in-house tolling provisioning, customer care, collection, violation enforcement, etc.
- Volume and mix for prepaid vs post-paid accounts, video tolling, violation enforcement, etc.
- Number and types of customer service locations and kiosks.
- Pace of technology changes and system refresh rate.

Alaska does not presently have embedded tolled highways and tolling systems (other than the Whittier Tunnel cash booth barrier toll system). Because of the variables driving an operating cost estimate for tolling operations, tolling is addressed separately from bridge and roadway post-opening costs in this report under the *Tolling Systems Capital and Operating Costs* section of this report.

Owner's Oversight Costs

Owner's oversight costs include ADOT&PF's general, administrative, accounting, auditing, contract compliance monitoring, and management costs to ensure that the owner's goals and contractual terms are being achieved for the operation and maintenance of the infrastructure. Some examples of oversight costs include:

- Procuring the capital R&R work and ensuring it is performed at the standards required by toll paying customers and contractual terms for providing those services.
- Auditing and accounting for toll transactions and toll revenue proceeds from the facility being collected by the Toll Systems Integrator-Operator (TSIO) on behalf of the owner under contract.
- Monitoring and ensuring compliance with customer care standards and other contract terms for the toll system front and back-office operations.
- Supporting toll collection enforcement requirements.
- Procuring and managing other third-party contracts for the provision of O&M services, such as snow removal, landscape maintenance, utility bills for lighting, etc.

These oversight activities are assumed to be provided by ADOT&PF during the operations and maintenance period for the bridge and appurtenant facilities over the lifecycle of the Knik Arm Crossing Project. The level of these oversight costs would vary significantly depending on whether the bridge and roadway is operated as a tolled highway or as a conventional non-tolled highway, as the administrative oversight for tolling represents a significant increment above and beyond managing the roadway only.

The O&M figures presented at the end of this section include owner's oversight costs for roadway and bridge operations only, consistent with the "Knik Arm Bridge and Toll Authority Capital Expenditure Report Maintenance, Operations and CAPEX Estimates" dated February 2011 and prepared by Wilbur Smith Associates and PND Engineers, Inc. The incremental owner's oversight costs for managing toll operations are included separately under Tolling Systems Capital and Operating Costs in the next section of this report.

Operations & Maintenance Expense and Renewal & Rehabilitation CAPEX Estimates - 2025 Dollars

The O&M and R&R costs for the bridge, both the Phase 1 initial two-lane configuration and Phase 2 capacity improvements and Project extension, were estimated in 2015 dollars by

WSA and PND in their report titled "Knik Arm Bridge and Toll Authority Capital Expenditure Report Maintenance, Operations and CAPEX Estimates," published in February 2011. Those estimates were used in several FHWA Major Projects Initial Financial Plan updates, TIFIA loan and TIGER grant applications, and subjected to evaluation under the FHWA Major Projects Cost Estimate Review process, most recently in 2014. They were also evaluated by the NRSROs Standard and Poor's and DBRS Limited in 2016, resulting in "investment grade" ratings opinions by both agencies for the 2015 TIFIA Loan application financing plan submitted for the Project. Based on the thorough vetting of this operating cost estimate study, it is relied upon as the basis for estimating O&M and R&R costs for the bridge alternative in 2025 dollars over a 41-year period.

Table 7 - Projected R&R and O&M Costs in 2015 and Escalated 2025 Dollars shows the 2015 values from the WSA and PND report and the annual amounts escalated to 2025 nominal dollars. For the R&R cost escalation, the NHCCI index factor from mid-2015 to mid-2024 and assuming a 3% inflation rate for the final year was applied to the 2015 estimates to calculate the projected 2025 nominal dollar value over the 41-year forecast period. For ADOT&PF Oversight G&A and O&M costs, the 2015 estimates were escalated using the CPI-U factor for the same period to calculate the projected ADOT&PF Oversight G&A and O&M nominal dollar values over the 41-year forecast. The calculations for the NHCCI and CPI-U factors used for R&R and O&M inflation, respectively, are shown in *Table 4 - Cost Escalation Factors* Calculations. Nominal dollars are used for comparison purposes to a KAC Tunnel alternative operating cost profile. If they were to be used for financing or long-range projections and budgeting, they would be shown in YOE (inflated) dollars. YOE dollars would require an assumption about the construction period and date opened to traffic, which is beyond the present scope of this report.

O&M cost, in nominal dollars, are relatively constant over the 41 year forecast term. R&R on the other hand is very cyclical, as shown in *Table 7 - Projected R&R and O&M Costs in 2015 and Escalated 2025* Dollars. This cyclical volatility in R&R costs is normal and expected. Examples of periodic costs driving the spikes due to the nature of major repairs and/or rehabilitations they represent. Among the higher cost periodic R&R item examples are the following:

- Pavement resurfacing (mill and fill) at five-year intervals.
- Bridge deck repair at 25 years.
- Bridge paint at 12-13 year intervals.
- Bridge deck joint replacement at pier locations at approximately 10-year intervals.

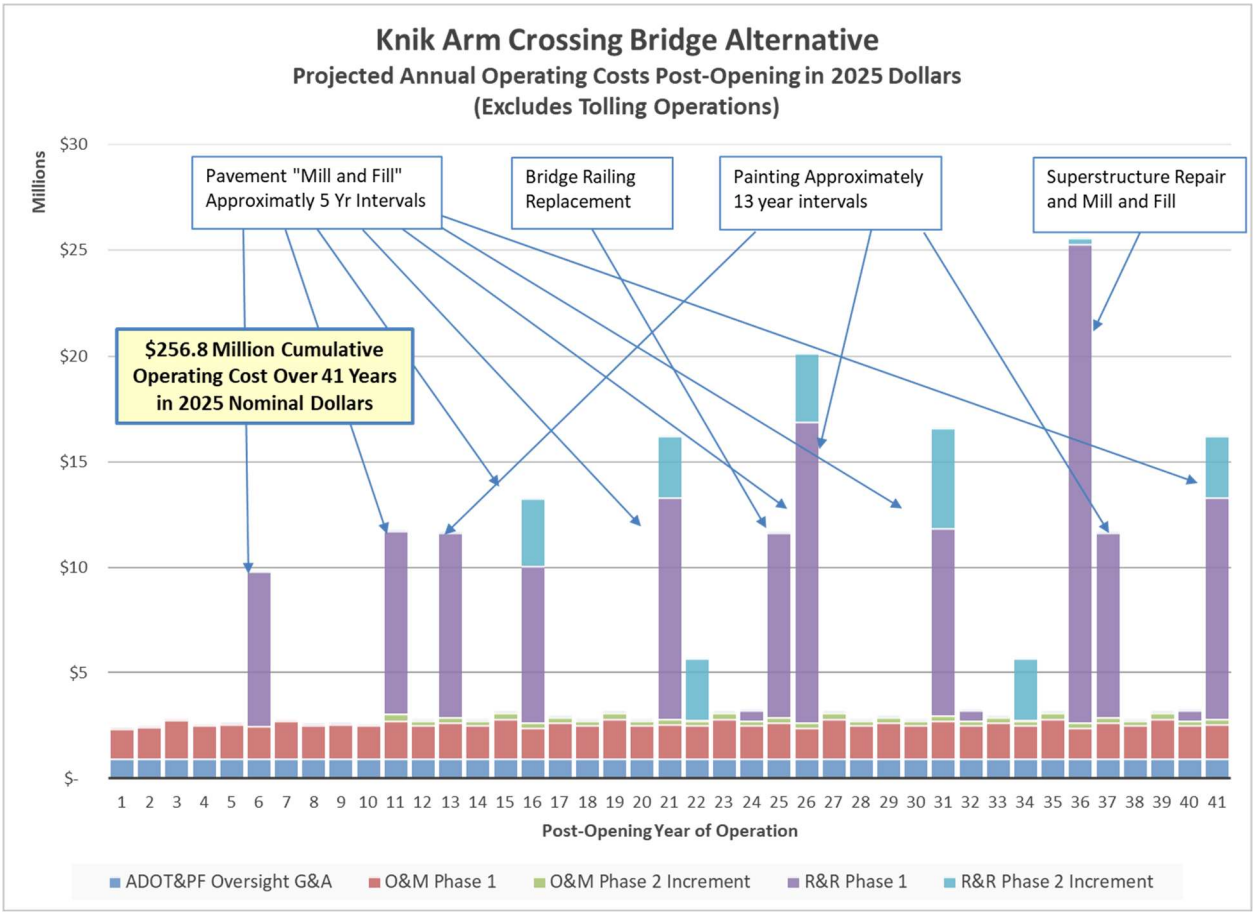
- Bridge superstructure repair at year 36.
- Bridge railing replacement at year 25.

Table 7 - Projected R&R and O&M Costs in 2015 and Escalated 2025 Dollars

Years After Opening	2015 Dollars - 41 Years				Escalated to 2025 Dollars - 41 Years			
	Renewal and Rehablitation	ADOT&PF Oversight G&A	Operations and Maintenance	Total Oversight and O&M	Total R&R and O&M	191.00% Renewal and Rehablitation	135.6% ADOT&PF Oversight G&A	135.6% Operations and Maintenance	135.6% Total Oversight and O&M	Total R&R and O&M
41 Yr Totals	**$ 74,847,400**	**$ 28,991,100**	**$ 54,970,100**	**$ 83,961,200**	**$ 158,808,600**	**$ 142,955,474**	**$ 39,312,797**	**$ 74,541,096**	**$ 113,853,893**	**$ 256,809,367**
Yr 1	$ 28,100	$ 707,100	$ 1,039,000	$ 1,746,100	**$ 1,774,200**	$ 53,670	$ 958,849	$ 1,408,915	$ 2,367,764	**$ 2,421,434**
Yr 2	$ 28,100	$ 707,100	$ 1,100,400	$ 1,807,500	**$ 1,835,600**	$ 53,670	$ 958,849	$ 1,492,175	$ 2,451,024	**$ 2,504,694**
Yr 3	$ 28,100	$ 707,100	$ 1,334,400	$ 2,041,500	**$ 2,069,600**	$ 53,670	$ 958,849	$ 1,809,486	$ 2,768,335	**$ 2,822,005**
Yr 4	$ 28,100	$ 707,100	$ 1,141,600	$ 1,848,700	**$ 1,876,800**	$ 53,670	$ 958,849	$ 1,548,044	$ 2,506,892	**$ 2,560,562**
Yr 5	$ 28,100	$ 707,100	$ 1,198,800	$ 1,905,900	**$ 1,934,000**	$ 53,670	$ 958,849	$ 1,625,609	$ 2,584,457	**$ 2,638,127**
Yr 6	$ 3,865,000	$ 707,100	$ 1,110,500	$ 1,817,600	**$ 5,682,600**	$ 7,381,992	$ 958,849	$ 1,505,871	$ 2,464,720	**$ 9,846,712**
Yr 7	$ 28,100	$ 707,100	$ 1,300,600	$ 2,007,700	**$ 2,035,800**	$ 53,670	$ 958,849	$ 1,763,652	$ 2,722,501	**$ 2,776,171**
Yr 8	$ 59,800	$ 707,100	$ 1,141,600	$ 1,848,700	**$ 1,908,500**	$ 114,216	$ 958,849	$ 1,548,044	$ 2,506,892	**$ 2,621,108**
Yr 9	$ 28,100	$ 707,100	$ 1,198,800	$ 1,905,900	**$ 1,934,000**	$ 53,670	$ 958,849	$ 1,625,609	$ 2,584,457	**$ 2,638,127**
Yr 10	$ 28,100	$ 707,100	$ 1,141,600	$ 1,848,700	**$ 1,876,800**	$ 53,670	$ 958,849	$ 1,548,044	$ 2,506,892	**$ 2,560,562**
Yr 11	$ 4,551,700	$ 707,100	$ 1,563,100	$ 2,270,200	**$ 6,821,900**	$ 8,693,561	$ 958,849	$ 2,119,610	$ 3,078,459	**$ 11,772,020**
Yr 12	$ 33,500	$ 707,100	$ 1,309,700	$ 2,016,800	**$ 2,050,300**	$ 63,984	$ 958,849	$ 1,775,992	$ 2,734,841	**$ 2,798,825**
Yr 13	$ 4,583,500	$ 707,100	$ 1,436,600	$ 2,143,700	**$ 6,727,200**	$ 8,754,298	$ 958,849	$ 1,948,072	$ 2,906,921	**$ 11,661,219**
Yr 14	$ 33,500	$ 707,100	$ 1,309,700	$ 2,016,800	**$ 2,050,300**	$ 63,984	$ 958,849	$ 1,775,992	$ 2,734,841	**$ 2,798,825**
Yr 15	$ 33,500	$ 707,100	$ 1,572,200	$ 2,279,300	**$ 2,312,800**	$ 63,984	$ 958,849	$ 2,131,950	$ 3,090,799	**$ 3,154,782**
Yr 16	$ 5,585,800	$ 707,100	$ 1,235,700	$ 1,942,800	**$ 7,528,600**	$ 10,668,650	$ 958,849	$ 1,675,646	$ 2,634,495	**$ 13,303,144**
Yr 17	$ 33,500	$ 707,100	$ 1,436,600	$ 2,143,700	**$ 2,177,200**	$ 63,984	$ 958,849	$ 1,948,072	$ 2,906,921	**$ 2,970,905**
Yr 18	$ 33,500	$ 707,100	$ 1,309,700	$ 2,016,800	**$ 2,050,300**	$ 63,984	$ 958,849	$ 1,775,992	$ 2,734,841	**$ 2,798,825**
Yr 19	$ 33,500	$ 707,100	$ 1,572,200	$ 2,279,300	**$ 2,312,800**	$ 63,984	$ 958,849	$ 2,131,950	$ 3,090,799	**$ 3,154,782**
Yr 20	$ 33,500	$ 707,100	$ 1,309,700	$ 2,016,800	**$ 2,050,300**	$ 63,984	$ 958,849	$ 1,775,992	$ 2,734,841	**$ 2,798,825**
Yr 21	$ 7,030,700	$ 707,100	$ 1,362,600	$ 2,069,700	**$ 9,100,400**	$ 13,428,350	$ 958,849	$ 1,847,726	$ 2,806,575	**$ 16,234,925**
Yr 22	$ 1,550,500	$ 707,100	$ 1,309,700	$ 2,016,800	**$ 3,567,300**	$ 2,961,392	$ 958,849	$ 1,775,992	$ 2,734,841	**$ 5,696,233**
Yr 23	$ 33,500	$ 707,100	$ 1,572,200	$ 2,279,300	**$ 2,312,800**	$ 63,984	$ 958,849	$ 2,131,950	$ 3,090,799	**$ 3,154,782**
Yr 24	$ 265,200	$ 707,100	$ 1,309,700	$ 2,016,800	**$ 2,282,000**	$ 506,521	$ 958,849	$ 1,775,992	$ 2,734,841	**$ 3,241,362**
Yr 25	$ 4,583,500	$ 707,100	$ 1,436,600	$ 2,143,700	**$ 6,727,200**	$ 8,754,298	$ 958,849	$ 1,948,072	$ 2,906,921	**$ 11,661,219**
Yr 26	$ 9,169,400	$ 707,100	$ 1,235,700	$ 1,942,800	**$ 11,112,200**	$ 17,513,179	$ 958,849	$ 1,675,646	$ 2,634,495	**$ 20,147,674**
Yr 27	$ 33,500	$ 707,100	$ 1,572,200	$ 2,279,300	**$ 2,312,800**	$ 63,984	$ 958,849	$ 2,131,950	$ 3,090,799	**$ 3,154,782**
Yr 28	$ 33,500	$ 707,100	$ 1,309,700	$ 2,016,800	**$ 2,050,300**	$ 63,984	$ 958,849	$ 1,775,992	$ 2,734,841	**$ 2,798,825**
Yr 29	$ 33,500	$ 707,100	$ 1,436,600	$ 2,143,700	**$ 2,177,200**	$ 63,984	$ 958,849	$ 1,948,072	$ 2,906,921	**$ 2,970,905**
Yr 30	$ 33,500	$ 707,100	$ 1,309,700	$ 2,016,800	**$ 2,050,300**	$ 63,984	$ 958,849	$ 1,775,992	$ 2,734,841	**$ 2,798,825**
Yr 31	$ 7,126,700	$ 707,100	$ 1,498,200	$ 2,205,300	**$ 9,332,000**	$ 13,611,706	$ 958,849	$ 2,031,604	$ 2,990,453	**$ 16,602,158**
Yr 32	$ 265,200	$ 707,100	$ 1,309,700	$ 2,016,800	**$ 2,282,000**	$ 506,521	$ 958,849	$ 1,775,992	$ 2,734,841	**$ 3,241,362**
Yr 33	$ 33,500	$ 707,100	$ 1,436,600	$ 2,143,700	**$ 2,177,200**	$ 63,984	$ 958,849	$ 1,948,072	$ 2,906,921	**$ 2,970,905**
Yr 34	$ 1,550,500	$ 707,100	$ 1,309,700	$ 2,016,800	**$ 3,567,300**	$ 2,961,392	$ 958,849	$ 1,775,992	$ 2,734,841	**$ 5,696,233**
Yr 35	$ 33,500	$ 707,100	$ 1,572,200	$ 2,279,300	**$ 2,312,800**	$ 63,984	$ 958,849	$ 2,131,950	$ 3,090,799	**$ 3,154,782**
Yr 36	$ 12,019,700	$ 707,100	$ 1,235,700	$ 1,942,800	**$ 13,962,500**	$ 22,957,136	$ 958,849	$ 1,675,646	$ 2,634,495	**$ 25,591,630**
Yr 37	$ 4,583,500	$ 707,100	$ 1,436,600	$ 2,143,700	**$ 6,727,200**	$ 8,754,298	$ 958,849	$ 1,948,072	$ 2,906,921	**$ 11,661,219**
Yr 38	$ 33,500	$ 707,100	$ 1,309,700	$ 2,016,800	**$ 2,050,300**	$ 63,984	$ 958,849	$ 1,775,992	$ 2,734,841	**$ 2,798,825**
Yr 39	$ 33,500	$ 707,100	$ 1,572,200	$ 2,279,300	**$ 2,312,800**	$ 63,984	$ 958,849	$ 2,131,950	$ 3,090,799	**$ 3,154,782**
Yr 40	$ 265,200	$ 707,100	$ 1,309,700	$ 2,016,800	**$ 2,282,000**	$ 506,521	$ 958,849	$ 1,775,992	$ 2,734,841	**$ 3,241,362**
Yr 41	$ 7,030,700	$ 707,100	$ 1,362,600	$ 2,069,700	**$ 9,100,400**	$ 13,428,350	$ 958,849	$ 1,847,726	$ 2,806,575	**$ 16,234,925**

Figure 17 - Projected Annual Operating Costs in 2025 Dollars graphically illustrates the uneven nature of R&R costs and relatively constant nature of owner's oversight and O&M costs in 2025 nominal dollars (without escalation to YOE).

Figure 17 - Projected Annual Operating Costs in 2025 Dollars



O&M and R&R Cost Estimate Summary in 2025 Dollars (41 Years)

Total owner's oversight G&A, R&R and O&M on a combined basis is estimated at $256.8 million – 61.7% higher than the previous estimate in 2015 dollars. Cumulative owner's oversight G&A costs are estimated at $39.3 million in 2025 nominal dollars compared to the previous estimate of $29.0 million in 2015 dollars – a 35.6% increase using CPI-U for inflation. Total O&M costs is projected to be $74.5 million in 2025 nominal dollars over a 41 year period – an increase of 35.6% over the $55.0 million over the previous estimate in 2015 dollars also using CPI-U as the inflation factor. Total R&R forecast in 2025 nominal dollars is $143.0 million over the same 41-year period. This represents a 91% increase over the same costs estimated in 2015 dollars due to inflation using the NHCCI index. *Table 8 - Oversight, O&M and R&R Cost Summary Over 41* Years compares the cost estimates in 2025 nominal dollars to the previous estimate in 2015 dollars.

Table 8 - Oversight, O&M and R&R Cost Summary Over 41 Years

KAC Bridge Alternative Oversight, O&M, and R&R Cost Estimates Over 41 Years in June 2025 Dollars			
Description	**Phase 1**	**Phase 2 Increment**	**Total G&A, O&M and R&R**
Operations Cost Estimate in 2025$ *			
ADOT&PF Oversight G&A	$ 39,312,797	$ -	$ 39,312,797
O&M	$ 66,780,944	$ 7,760,152	$ 74,541,096
R&R	$ 119,658,939	$ 23,296,535	$ 142,955,474
Total O&M and R&R 2025$	**$ 225,752,680**	**$ 31,056,687**	**$ 256,809,367**
Operations Cost Estimate in 2015$ *			
ADOT&PF Oversight G&A	$ 28,991,100	$ -	$ 28,991,100
O&M	$ 49,247,400	$ 5,722,700	$ 54,970,100
R&R	$ 62,650,000	$ 12,197,400	$ 74,847,400
Total O&M and R&R 2015$	**$ 140,888,500**	**$ 17,920,100**	**$ 158,808,600**
Percent Increase 2015 to 2025			
ADOT&PF Oversight G&A	**35.6%**	**n/a**	**35.6%**
O&M	**35.6%**	**35.6%**	**35.6%**
R&R	**91.0%**	**91.0%**	**91.0%**
Weighted Average Percent Increase 2015-2025	**60.2%**	**73.3%**	**61.7%**

* Excludes tolling related ADOT&PF Oversight G&A, O&M and R&R.

Tolling Systems Capital and Operating Costs

Introduction to Tolling - User Fees as a Means of Supporting Project Cost

Tolling highways, bridges, and tunnels is a potential source of revenue used around the world to fund, at least in part, construction costs of transportation infrastructure and its O&M and R&R costs. The Alaska Legislature explicitly intended funding of the Knik Arm Crossing to be supported in part by user fees in the form of tolls, as evidenced by the establishment of the Knik Arm Bridge and Toll Authority under AS 19.75 to develop and operate the KAC in 2003. Tolling as a means of generating project revenue is equally applicable to either the bridge or tunnel alternative to a Knik Arm Crossing. In addition, toll technology has additional potential uses for the State of Alaska to consider, including parking garages and law enforcement applications, among others.

Overview of Modern Open Road Tolling

Modern Open Road Tolling (ORT) and Electronic Tolling Collection (ETC) permit user revenue capture at barrier free highway speeds. ORT/ETC transaction capture uses Radio Frequency Identification (RFID) tags, backed up by video tolling for non-account users of the facility. ORT has rapidly replaced old fashioned cash booth barrier tolling because of its lower cost, unimpeded traffic flow, and elimination of cash handling. Tolling is a unique customer service activity involving account provisioning, toll transaction billing and collection, video tolling processing, toll violation enforcement, and customer care. It involves lane capture equipment and back-office hardware and software, along with front office activities for provisioning and customer care. Various studies and reports on ORT/ETC implementation for the Knik Arm Crossing Project have been published by CDM Smith (formerly Wilbur Smith Associates) and are available for review by ADOT&PF. However, tolling specifics and implementation are beyond the scope of this report.

Since Alaska does not presently have embedded tolling systems (other than the Whittier Tunnel cash booth barrier toll system), it is recommended that ADOT&PF consider procuring a highly qualified and experienced TSIO to provide these services should the Department determine that user fees are an important part of project financing for either the tunnel or bridge crossing alternative. The TSIO would be responsible for both implementation of toll systems capital assets for the front office and back-office systems and toll capture equipment on the roadway and, post-opening, operating the system on behalf of the owner. Tolling related recommendations are discussed with a degree of

specificity in the report "KNIK ARM CROSSING PROJECT Analysis for Moving Forward to Financing and Construction" (Hemenway Consulting, August 2019).

Tolling Capital Costs Estimate

Tolling capital costs for initial implementation include toll zone equipment, back-office equipment, communications, IT hardware and software, installation services, etc. which would be provided and installed through a TSIO contract. Civil works for the capture point gantry and backup power facilities would be provided through the DB contractor in coordination with the TSIO to ensure requirements come together seamlessly. Cost in *Table 9 - Toll Systems Cost Estimate for initial* Installation are included in Phase 1 CAPEX.

KNIK ARM CROSSING TOLL SYSTEMS INITIAL CAPEX			
Toll Capital Category	**September 2013 Dollars**	**CPI-U Escalation Factor**	**June 2025 Dollars**
Toll Zone Lane Equipment	$ 782,600	1.382	$ 1,081,574
Back Office Equipment	274,000	1.382	378,675
Common Equipment	350,000	1.382	483,709
Communications System	325,000	1.382	449,159
System Software	1,670,000	1.382	2,307,985
Spare Equipment	189,200	1.382	261,480
Equipment Installation	80,000	1.382	110,562
Other Systems Integrator Services	1,250,000	1.382	1,727,534
Civil Costs	816,000	1.382	1,127,734
Other/Miscellaneous	413,000	1.382	570,777
Subtotal Toll CAPEX	6,149,800		8,499,190
Contingency (25%)	1,537,450		2,124,797
Total Toll System CAPEX Estimate	**$ 7,687,250**		**$ 10,623,987**

Notes:
1. Source: "Knik Arm Crossing Toll Maintenance and Operating Cost" - CDM Smith, July 2, 2015.
2. Adjustments were made via Other/Miscellaneous category to reconcile to the September 2013 data used for the 2014 FHWA CER. Not material to estimate.
3. CPI-U factor is used to escalate to June 2025 dollars. Civil Costs would more likely be correlated to NHCCI, but impact is not material to the estimate.

Table 9 - Toll Systems Cost Estimate for initial Installation

Toll capital costs for initial installation are based on the "Knik Arm Crossing Toll Maintenance and Operating Cost White Paper" prepared by CDM Smith, July 2, 2015, as reconciled to the September 2013 toll costs used in the 2014 FHWA CER. Capital refresh for toll systems is driven by technological advances for hardware and software, changes in traffic volume, and other factors not directly related to phased construction for the bridge and roadway elements of the KAC Project, and are considered in the Tolling Operations and Maintenance Cost Estimate section, following.

Tolling Operations and Maintenance Cost Estimate

Tolling operations and maintenance is significantly different in nature from road and bridge O&M and R&R. Tolling systems operations costs include maintenance, customer care, account management, billing and collection, and technology refresh and replacement. Toll collections and operations costs are likely to be very similar for either the tunnel or bridge alternative. As discussed under Bridge Alternative Operations, Maintenance, and Renewal and Rehabilitation Costs Forecast, the factors driving toll collections and operations costs include (among others):

- Method of tolling (ETC/ORT, barrier system, hybrid).
- Toll rates setting and demand impact/elasticity of rates.
- Traffic volume and traffic mix for commercial and passenger vehicles.
- Tolling business rules adopted by ADOT&PF.
- Outsourced vs. in-house tolling provisioning, customer care, collection, violation enforcement, etc.
- Volume and mix for prepaid vs post-paid accounts, video tolling, violation enforcement, etc.
- Number and types of customer service locations and kiosks.
- Pace of technology changes and the system refresh rate.

As a result of these numerous assumptions and input variables, it is beyond the scope of this cost estimate update to update the forecast of tolling operations. However, extensive indicative work in support of TIFIA loan financing, TIGER Discretionary grant applications, and for planning the implementation of the KAC tolling regime has been performed.

For illustrative purposes, a tolling cash flow schedule showing the anticipated revenue from a two-lane constrained facility and the required tolling operations costs based on that and other assumptions is provided to provoke thought on the topic of tolling. *Table 10 - KAC Tolling Operations Cash Flow Projection Two-Lane* Facility was developed for the last TIFIA

loan application submitted by KABATA to the FHWA Build America Bureau in 2015 before the KAC Project was shut down in mid-2016.

Table 10 - KAC Tolling Operations Cash Flow Projection Two-Lane Facility shows a projected toll revenue and operations costs scenario used with a 2015 TIFIA loan application filing and under the following assumptions and inputs:

- The cash flow projection assumed that 2020 was the first full year of operations. Average Annual Daily Traffic (AADT) for Passenger Vehicles (PV) and Commercial Vehicles (CV) are derived from the CDM Smith "Comprehensive Traffic and Revenue Study for the Knik Arm Crossing Project" report dated December 5, 2014. AADT was assumed to be for the two-lane structure capacity to match the TIFIA Loan financing at the time it was developed.
- Initial tolls are assumed to be $5.00 per PV and $13.00 per CV (2.6x the PV toll rate on average), escalating at 2.5% annually (to conservatively match the historic Anchorage CPI-U long-term average of 2.6%). A $5.00 PV toll would be closer to $7.00 at June 2025 based on actual CPI-U inflation experienced.
- The revenue days assumption is 344 days per year.
- Leakage is an estimate of unreadable or unmatched RFID and video transactions plus uncollectible accounts (bad debts).
- Merchant fees represent an estimate of charges for credit card payments of toll revenues billed or prepaid. Most of the toll transactions are expected to be paid via credit card.
- Toll systems O&M costs and capital renewal costs are per CDM Smith and escalated at a 3% annual rate to YOE dollars.
- Agency costs are based on estimates provided by ADOT&PF/KABATA for overseeing tolling operations, auditing toll revenue, administration, and related G&A costs, escalated at a 3% annual rate to YOE dollars.
- Various other assumptions underly the projection, all of which would require updating for a current view and which is beyond the scope of this cost estimate update.

The cumulative result of the cash flow projection is $2.8 billion of net revenue margin over 25 years, demonstrating the revenue generation potential of tolling for either of the bridge or tunnel alternatives.

Table 10 - KAC Tolling Operations Cash Flow Projection Two-Lane Facility

Knik Arm Crossing - Tolling Operations and Maintenance Cash Flow Projection - Two-Lane Constrained Facility											
Year	AADT Passenger Vehicles	AADT Commercial Vehicles	Total AADT	Gross Annual Revenue (344 Revenue Days)	Leakage	Merchant Fees (Credit Cards)	Toll Systems O&M Costs	Toll Systems Lifecycle (Capital Renewal) Costs	Net Revenue after Toll Ops Costs	Agency Costs (input from ADOT)	Net Cash Flow
2020	3,200	300	3,500	$ 7,498,770	$ 618,752	$ 124,430	$ 2,374,284	$ -	$ 4,381,305	$ 2,248,961	$ 2,132,344
2021	4,900	400	5,300	$ 11,393,392	$ 824,686	$ 194,195	$ 2,584,932	$ -	$ 7,789,580	$ 2,311,334	$ 5,478,246
2022	6,900	600	7,500	$ 16,480,772	$ 1,033,143	$ 288,517	$ 2,917,684	$ 756,075	$ 11,485,352	$ 2,825,582	$ 8,659,771
2023	9,300	800	10,100	$ 22,548,641	$ 1,084,964	$ 406,595	$ 3,108,844	$ 710,363	$ 17,237,874	$ 2,441,774	$ 14,796,100
2024	12,000	1,100	13,100	$ 29,915,819	$ 1,140,010	$ 553,784	$ 3,439,852	$ 728,122	$ 24,054,051	$ 2,509,985	$ 21,544,066
2025	13,600	1,200	14,800	$ 34,249,080	$ 1,024,014	$ 648,151	$ 3,541,841	$ 746,325	$ 28,288,749	$ 2,580,290	$ 25,708,459
2026	15,200	1,400	16,600	$ 39,268,543	$ 1,035,246	$ 757,602	$ 3,579,392	$ 764,983	$ 33,131,319	$ 3,159,251	$ 29,972,068
2027	16,400	1,500	17,900	$ 43,296,356	$ 1,121,453	$ 839,173	$ 3,704,747	$ -	$ 37,630,982	$ 2,727,516	$ 34,903,466
2028	17,600	1,700	19,300	$ 48,133,433	$ 1,245,630	$ 933,107	$ 3,821,850	$ -	$ 42,132,847	$ 2,804,614	$ 39,328,232
2029	18,700	1,800	20,500	$ 52,432,542	$ 1,357,034	$ 1,016,426	$ 3,986,304	$ 800,978	$ 45,271,800	$ 2,880,412	$ 42,391,388
2030	19,900	1,900	21,800	$ 57,123,983	$ 1,478,727	$ 1,107,330	$ 4,105,014	$ 921,203	$ 49,511,709	$ 3,528,321	$ 45,983,387
2031	21,000	2,100	23,100	$ 62,420,128	$ 1,614,197	$ 1,210,244	$ 4,281,270	$ 865,508	$ 54,448,908	$ 3,038,260	$ 51,410,648
2032	21,800	2,200	24,000	$ 66,574,258	$ 1,721,138	$ 1,290,857	$ 4,441,387	$ 887,146	$ 58,233,730	$ 3,120,426	$ 55,113,304
2033	22,700	2,300	25,000	$ 71,125,265	$ 1,839,205	$ 1,379,053	$ 4,528,746	$ 909,325	$ 62,468,935	$ 3,204,832	$ 59,264,104
2034	23,500	2,400	25,900	$ 75,639,277	$ 1,955,263	$ 1,466,669	$ 4,694,765	$ -	$ 67,522,581	$ 3,933,132	$ 63,589,449
2035	24,300	2,500	26,800	$ 80,315,586	$ 2,076,094	$ 1,557,360	$ 4,866,358	$ -	$ 71,815,774	$ 3,380,613	$ 68,435,161
2036	25,100	2,600	27,700	$ 85,211,504	$ 2,201,623	$ 1,652,432	$ 5,014,069	$ 952,111	$ 75,391,270	$ 3,472,117	$ 71,919,153
2037	25,700	2,700	28,400	$ 89,719,352	$ 2,317,529	$ 1,739,940	$ 5,283,599	$ 1,188,601	$ 79,189,683	$ 3,566,117	$ 75,623,565
2038	26,300	2,800	29,100	$ 94,443,370	$ 2,438,773	$ 1,831,671	$ 5,457,918	$ 1,028,817	$ 83,686,190	$ 4,384,802	$ 79,301,388
2039	27,000	2,900	29,900	$ 99,590,023	$ 2,571,134	$ 1,931,570	$ 5,643,834	$ 1,054,538	$ 88,388,946	$ 3,761,888	$ 84,627,058
2040	27,600	3,000	30,600	$ 104,689,259	$ 2,701,695	$ 2,030,628	$ 5,829,473	$ 1,080,901	$ 93,046,561	$ 3,863,800	$ 89,182,761
2041	28,200	3,100	31,300	$ 109,939,813	$ 2,836,938	$ 2,132,524	$ 6,020,954	$ -	$ 98,949,397	$ 3,968,497	$ 94,980,900
2042	28,600	3,200	31,800	$ 114,788,906	$ 2,960,335	$ 2,226,834	$ 6,205,276	$ -	$ 103,396,460	$ 4,888,804	$ 98,507,657
2043	28,900	3,200	32,100	$ 118,650,251	$ 3,060,803	$ 2,301,609	$ 6,382,749	$ 1,131,761	$ 105,773,329	$ 4,186,550	$ 101,586,779
2044	29,300	3,300	32,600	$ 123,824,592	$ 3,193,081	$ 2,402,169	$ 6,577,950	$ 1,412,873	$ 110,238,519	$ 4,300,066	$ 105,938,453
2045	29,700	3,300	33,000	$ 128,297,807	$ 3,310,185	$ 2,488,699	$ 6,773,087	$ 1,222,941	$ 114,502,895	$ 4,416,686	$ 110,086,209
2046	30,000	3,300	33,300	$ 132,591,143	$ 3,421,300	$ 2,571,913	$ 6,966,627	$ 1,253,514	$ 118,377,788	$ 5,451,252	$ 112,926,536
2047	30,000	3,300	33,300	$ 135,996,196	$ 3,508,494	$ 2,638,044	$ 7,143,184	$ 1,284,852	$ 121,421,623	$ 4,659,581	$ 116,762,042
2048	30,000	3,300	33,300	$ 139,428,298	$ 3,597,356	$ 2,704,580	$ 7,324,216	$ -	$ 125,802,147	$ 4,786,034	$ 121,016,113
2049	30,000	3,300	33,300	$ 142,986,304	$ 3,689,177	$ 2,773,593	$ 7,509,837	$ -	$ 129,013,696	$ 4,915,948	$ 124,097,748
2050	30,000	3,300	33,300	$ 146,660,110	$ 3,783,828	$ 2,844,872	$ 7,700,165	$ 1,345,308	$ 130,985,938	$ 6,078,984	$ 124,906,953
2051	30,000	3,300	33,300	$ 150,355,372	$ 3,878,862	$ 2,916,589	$ 7,895,318	$ 1,679,462	$ 133,985,141	$ 5,248,247	$ 128,736,894
2052	30,000	3,300	33,300	$ 154,176,538	$ 3,976,857	$ 2,990,784	$ 7,895,318	$ 1,679,462	$ 137,634,117	$ 5,396,598	$ 132,237,519
2053	30,000	3,300	33,300	$ 158,123,608	$ 4,077,811	$ 3,067,457	$ 8,300,592	$ 1,490,034	$ 141,187,713	$ 5,542,447	$ 135,645,266
2054	30,000	3,300	33,300	$ 162,097,726	$ 4,180,434	$ 3,144,534	$ 8,510,968	$ 1,527,285	$ 144,734,505	$ 6,789,145	$ 137,945,361
2055	30,000	3,300	33,300	$ 166,197,749	$ 4,286,016	$ 3,224,089	$ 8,726,677	$ -	$ 149,960,966	$ 5,846,176	$ 144,114,791
Totals	**n/a**	**n/a**	**n/a**	**$ 3,276,183,763**	**$ 87,161,789**	**$ 63,388,024**	**$ 197,139,083**	**$ 27,422,486**	**$ 2,901,072,380**	**$ 142,219,042**	**$ 2,758,853,338**

Figure 18 - KAC Hypothetical Net Toll Revenue Over 35 Years

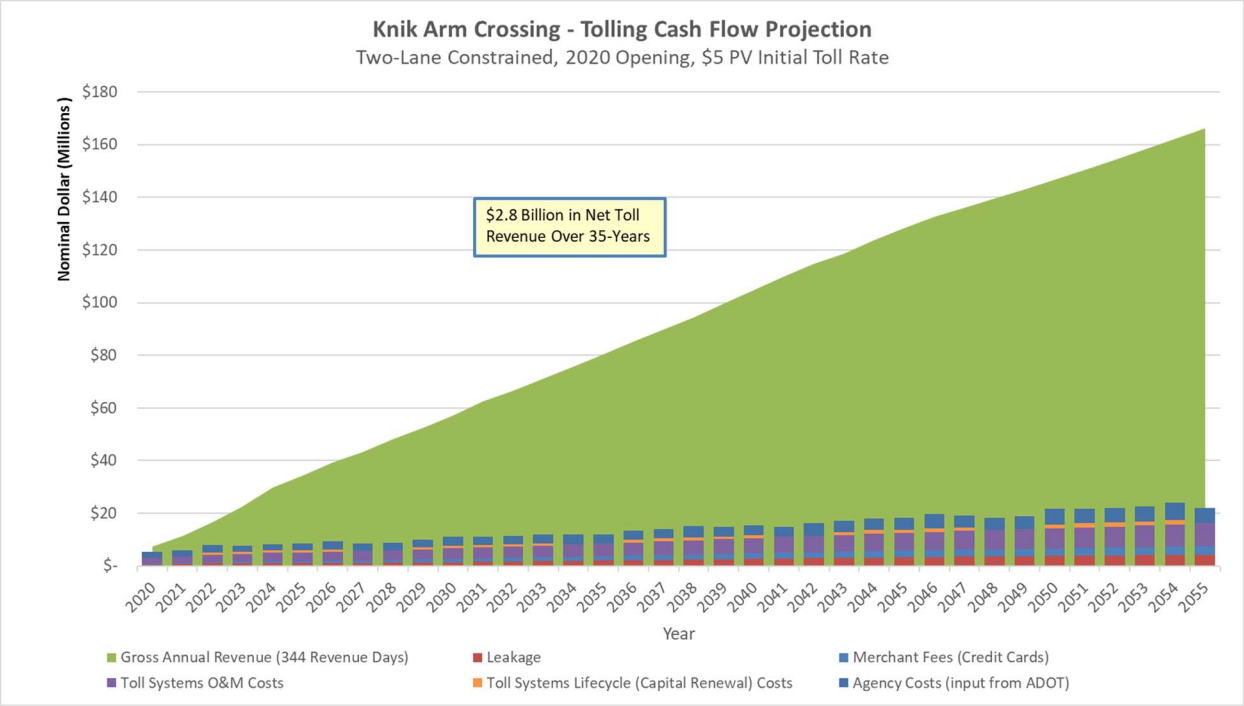


Figure 18 depicts the tolling operations cash flow projection scenario graphically. Tolling can be a powerful tool to help finance major projects like the KAC bridge or tunnel and to pay for their operations and maintenance over the facility's lifecycle.

Knik Arm Tunnel Feasibility Study

Updated Bridge Alternative Cost Estimates

June 9, 2025

Appendix A – Phase 1, Phase 2, and Total Project Detailed Capital Cost Estimates

Knik Arm Crossing Project Bridge Alternative Phase 1, Phase 2, and Total Cost Escalation to June 2025 Dollars												
			Phase 1			Phase 2			Total Project Phases 1 & 2			
Segment	Description	Escalation Factor	Sept 2013$	June 2025$	Increase	Sept 2013$	June 2025$	Increase	Sept 2013$	June 2025$	Increase	
Construction Segments 1-9 Estimates:												
1	Point MacKenzie Road	NHCCI	$ -	$ -	$ -	$ 59,737,893	$ 118,263,512	$ 58,525,619	$ 59,737,893	$ 118,263,512	$ 58,525,619	
2	Port MacKenzie Northern Route	NHCCI	14,865,418	29,429,170	14,563,751	20,077,830	39,748,216	19,670,386	34,943,248	69,177,386	34,234,137	
3	West Approach	NHCCI	40,364,525	79,909,925	39,545,399	595,840	1,179,588	583,748	40,960,365	81,089,513	40,129,148	
4	Bridge	NHCCI	305,680,840	605,158,434	299,477,594	92,984,148	184,081,349	91,097,201	398,664,988	789,239,784	390,574,796	
5	East Approach	NHCCI	111,107,161	219,959,602	108,852,440	1,684,295	3,334,411	1,650,116	112,791,457	223,294,013	110,502,556	
6	MOA Port Expansion Alignment	NHCCI	9,004,610	17,826,488	8,821,878	529,169	1,047,600	518,431	9,533,780	18,874,089	9,340,309	
7	Retaining Wall	NHCCI	15,304,959	30,299,331	14,994,372	-	-	-	15,304,959	30,299,331	14,994,372	
8	Cherry Hill	NHCCI	35,716,745	70,708,683	34,991,938	858,801	1,700,173	841,373	36,575,546	72,408,856	35,833,310	
9	Government Hill	NHCCI	98,910,790	195,814,362	96,903,572	-	-	-	98,910,790	195,814,362	96,903,572	
10	Ship Creek Viaduct to Ingra-Gambell	NHCCI	-	-	-	197,235,350	390,468,162	193,232,812	197,235,350	390,468,162	193,232,812	
	Pedestrian and Bicycle Pathway	NHCCI	-	-	-	9,962,327	19,722,487	9,760,160	9,962,327	19,722,487	9,760,160	
	Subtotal Construction Segments Cost		**630,955,049**	**1,249,105,995**	**618,150,946**	**383,665,653**	**759,545,499**	**375,879,845**	**1,014,620,702**	**2,008,651,493**	**994,030,791**	
Other Construction Costs Estimates:												
	Tolling Technology	CPI-U	7,687,250	10,623,987	2,936,737	-	-	-	7,687,250	10,623,987	2,936,737	
	Contractor Design Engineering	CPI-U	34,008,382	47,000,503	12,992,122	19,995,681	27,634,572	7,638,891	54,004,063	74,635,076	20,631,012	
	Construction Inspection	CPI-U	45,344,509	62,667,338	17,322,829	16,663,068	23,028,810	6,365,742	62,007,577	85,696,148	23,688,571	
	Owner Design Oversight	CPI-U	5,668,064	7,833,417	2,165,354	3,332,614	4,605,762	1,273,148	9,000,677	12,439,179	3,438,502	
	Owner Construction Phase Services	CPI-U	28,340,318	39,167,086	10,826,768	16,663,068	23,028,810	6,365,742	45,003,386	62,195,896	17,192,510	
	Utilities	NHCCI	15,000,000	29,695,602	14,695,602	10,000,000	19,797,068	9,797,068	25,000,000	49,492,670	24,492,670	
	Beluga Monitoring	CPI-U	12,000,000	16,584,325	4,584,325	-	-	-	12,000,000	16,584,325	4,584,325	
	Mitigation	CPI-U	15,000,000	20,730,406	5,730,406	-	-	-	15,000,000	20,730,406	5,730,406	
	ICAP	Pro-Rata	15,614,826	29,172,625	13,557,799	-	-	-	15,614,826	29,172,625	13,557,799	
	Subtotal Other Construction Related Costs		**178,663,349**	**263,475,289**	**84,811,940**	**66,654,430**	**98,095,022**	**31,440,592**	**245,317,779**	**361,570,311**	**116,252,532**	
	Total Construction Estimates		**809,618,398**	**1,512,581,283**	**702,962,885**	**450,320,083**	**857,640,521**	**407,320,438**	**1,259,938,481**	**2,370,221,804**	**1,110,283,323**	
Phase 1 Preconstruction Estimate:												
	Rights of Way Acquisitions	CPI-U (adj)	8,832,404	11,158,486	2,326,082	14,253,375	19,698,550	5,445,175	23,085,779	30,857,036	7,771,257	
	Permitting Costs and NEPA	Fixed Est.	1,500,000	10,000,000	8,500,000	-	-	-	1,500,000	10,000,000	8,500,000	
	Procurement and Stipends	CPI-U	6,200,000	8,568,568	2,368,568	-	-	-	6,200,000	8,568,568	2,368,568	
	Total Preconstruction Estimates		**16,532,404**	**29,727,054**	**13,194,650**	**14,253,375**	**19,698,550**	**5,445,175**	**30,785,779**	**49,425,604**	**18,639,825**	
ADOT&PF Direct Project Administration (to Opening)		CPI-U	**12,855,320**	**17,766,400**	**4,911,080**	**-**	**-**	**-**	12,855,320	17,766,400	4,911,080	
TOTAL CAPITAL COST ESTIMATES			**$ 839,006,122**	**$ 1,560,074,737**	**$ 721,068,615**	**$ 464,573,458**	**$ 877,339,071**	**$ 412,765,612**	**$ 1,303,579,580**	**$ 2,437,413,808**	**$ 1,133,834,228**	
PERCENT INCREASE OVER 12 YEARS					**85.9%**			**88.8%**			**87.0%**	