ALASKA STATE LEGISLATURE

LEGISLATIVE BUDGET AND AUDIT COMMITTEE

Division of Legislative Audit

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March 7, 2013

Members of the Legislative Budget
and Audit Committee:

In accordance with the provisions of Title 24 of the Alaska Statutes, the attached report is submitted for your review.

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
KNIK ARM BRIDGE AND TOLL AUTHORITY
KNIK ARM CROSSING PROJECT

March 7, 2013

Audit Control Number
25-30068-13

This performance audit evaluates the Knik Arm Bridge and Toll Authority activities related to the Knik Arm Crossing Project development, financing, and projections of traffic and toll revenues.

The audit was conducted in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Fieldwork procedures utilized in the course of developing the findings and recommendations presented in this report are discussed in the Objectives, Scope, and Methodology.

Kris Curtis, CPA, CISA
Legislative Auditor

TABLE OF CONTENTS

OBJECTIVES, SCOPE, AND METHODOLOGY

In accordance with Title 24 of the Alaska Statutes and a special request by the Legislative Budget and Audit Committee, we have conducted a performance audit of the Knik Arm Bridge and Toll Authority (KABATA), Knik Arm Crossing (KAC) Project.

Objectives

The objectives of this audit were to:

1. Provide a historical summary of major KAC Project milestones;
2. Identify significant changes to the project scope;
3. Evaluate the adequacy of public participation;
4. Provide a detailed summary, by source, of KAC authorized, expended, and remaining funds, including the level of funding necessary to complete the project;
5. Ascertain the reasonableness of KAC toll and revenue projections and the KAC projected financial plan (financial plan);
6. Evaluate the KAC private-public-partnership (P3) agreement; and
7. Outline the balance of risks and rewards between public and private partner entities outlined in the P3 agreement.

Scope

This audit report is on KABATA activities related to the KAC Project's FY 03 through December 2012 development, financing, and traffic and toll revenue projections.

Scope Limitation

The risks and rewards in totality as outlined in the P3 agreement could not be evaluated because the agreement has not been finalized and is subject to further changes. Our evaluation of the agreement was limited to the general agreement structure defined by KABATA's governing board.

Methodology

To address the audit objectives, we:

- Reviewed KABATA's statutes, regulations, and by-laws as well as the proposed legislation introduced to the 27th Legislature to understand KABATA's powers, duties, and responsibilities.

- Researched federal laws, regulations, and notices related to constructing and financing highway projects to gain an understanding of the federal-aid highways

program, the *National Environmental Policy Act*, and the *National Historic Preservation Act*.

- Interviewed management and/or staff from KABATA, the Federal Highway Administration (FHWA) Alaska, the Department of Transportation and Public Facilities (DOTPF), the University of Alaska's Institute of Social and Economic Research (ISER), and the Matanuska-Susitna Borough to obtain information regarding the KAC Project.

- Analyzed pertinent KABATA documents to identify key project milestones, significant project changes, and to determine the extent of public participation in the project, including but not limited to:

  - *Knik Arm Crossing Scoping Summary Report: Comments, Issues, and Alternatives* (November 2005).

  - *Knik Arm Crossing Draft Environmental Impact Statement and Draft Section 4(f) Evaluation (*August 2006).

  - *Knik Arm Crossing Final Environmental Impact Statement and Final Section 4(f) Evaluation* (December 2007).

  - *Record of Decision Knik Arm Crossing Project* (December 2010).

  - The United States Army Corps of Engineers' *Hydrodynamic Simulations and Sediment Transport Potential Analysis of the Knik Arm Crossing Causeway Design Alternatives (*Duncan B. Bryant et al., November 2011).

  - KABATA loan requests under the *Transportation Infrastructure Finance and Innovation Act* submitted to the FHWA.

- Examined KABATA's September 2003 through February 2012 board meeting minutes to understand board actions. Tested online public notices for the 19 board meetings held during calendar years 2009 through 2011 to determine whether notices were in accordance with State laws and regulations.

- Examined requests for proposals issued by KABATA management for major contracts (greater than $500,000) during FY 04 through December 2012 to determine whether public notices were published in accordance with the *State Procurement Act*.[1]

- Generated accounting reports, using the state accounting system, to determine FY 03 through FY 12 KAC Project expenditures and funding. The amounts were traced to

[1]Alaska Statute 36.30.130.

KABATA's financial records and agreed to its audited financial statements. The funding sources were identified through analyzing state and federal appropriations.

- Assessed the control procedures related to public notifications.

- Analyzed KABATA contractors' studies and documents to determine the reasonableness of traffic and toll revenue projections. The studies and documents included, but were not limited to the:

  - ISER *Memorandum on the Economic and Demographic Impacts of a Knik Arm Bridge* (Scott Goldsmith, September 2005);

  - *Knik Arm Bridge Preliminary Traffic and Toll Revenue Study* (Wilbur Smith Associates, November 2005);

  - *Knik Arm Toll Bridge Anchorage Alaska MSA Traffic and Toll Revenue Investment Grade Study, Independent Economic Overview and Development Forecast* (Insight Research Corporation, May 2007);

  - *Knik Arm Toll Bridge Stated Preference Travel Survey* (Resource Systems Group, Inc. prepared for Wilbur Smith Associates, June 2007);

  - Letter to KABATA's deputy executive director concerning the "*Knik Arm Bridge – Toll Sensitivity Analysis*" (Wilbur Smith Associates, July 2007);

  - *Technical Memorandum, Proposed Knik Arm Bridge Origin and Destination Study* (Wilbur Smith Associates, August 2007);

  - *Proposed Knik Arm Bridge Final Traffic and Toll Revenue Forecast* (Wilbur Smith Associates, September 2007);

  - Letter to KABATA's deputy executive director concerning the "*Knik Arm Bridge – Toll Revenue Assurance Discussion*" (Wilbur Smith Associates, September 2007);

  - *Proposed Knik Arm Crossing Traffic and Toll Revenue Study Update* (Wilbur Smith Associates, August 2011);

  - *Updated Projection of the Travel, Fuel Use, and Carbon Dioxide (CO_2) Emission Impacts of Trips Directly Affected by the Construction of the Knik Arm Crossing Project* (Wilbur Smith Associates, October 2011);

- Memorandum to KABATA's chief financial officer concerning the "*Draft Simplified Documentation of Traffic and Revenue Analyses for KABATA"* (CDM Smith,[2] May 2012); and

- Memorandum to KABATA's chief financial officer concerning the "*Traffic and Revenue Update Assuming Year 2017 Opening for the Proposed Knik Arm Crossing*" (CDM Smith, August 2012).

- Reviewed state, regional, and borough planning documents as a basis for comparing the KAC transportation model data and assumptions. The reviewed documents included the:

  - DOTPF *Statewide Transportation Improvement Plans* for 2006-2008, 2006-2009, 2010-2013, and 2012-2015;

  - *2035 Metropolitan Transportation Plan* (Anchorage Metropolitan Transportation Solutions, May 2012);

  - *2012 Density Study Overview*, May 2012 and the *Port MacKenzie Master Plan Update* (Matanuska-Susitna Borough, February 2011); and

  - Matanuska-Susitna Borough transportation model update data provided by DOTPF.

A consultant was hired by the Division of Legislative Audit to help ascertain the reasonableness of the KAC Project traffic and toll revenues. The consultant was provided the studies and documents listed above and had access to the documents available on KABATA's website. The consultant's evaluation also included:

- Interviewing the senior project manager at CDM Smith, the company that modeled and developed the KAC Project traffic and toll revenue projections.

- Providing CDM Smith with written follow-up questions for areas that needed clarification. The CDM Smith senior project manager responded to the questions in writing.[3]

- Analyzing an Excel spreadsheet provided by CDM Smith that contained the projected data for employment, households, and population by traffic area zones within the study area for the years 2020, 2025, 2030, and 2035.

- Reviewing the following additional reports and data:

[2]In 2011, Wilbur Smith Associates was acquired by CDM Smith.
[3]A memorandum concerning "*Answers to Issues for Clarification*" (CDM Smith, October 18, 2012).

- ISER's *Economic and Demographic Projections for Alaska and Greater Anchorage 2010 – 2035* (Scott Goldsmith, December 2009);
- DOTPF's Central Region *Annual Traffic Volume Report* (2011);
- U.S. Census Bureau's *2010 Census*; and
- KABATA's August 2012 and December 2012 KAC financial plans.

The most recent, December 2012 KAC financial plan was evaluated for reasonableness and to determine the level of funding necessary to complete the project. The evaluation also included examining the proposed schedule of funding sources and uses in the financial plan as well as the schedules of projected cash flows for: KABATA, the private partner under a P3 agreement, and the proposed State Reserve Fund.

To understand the use of public-private partnerships for delivery of transportation infrastructure projects, we reviewed:

- Publications and information on the Federal Highway Administration, Innovative Program Delivery website, including the:
  - *Public-Private Partnership Concessions for Highway Projects: A Primer.*
  - *Financial Structuring and Assessment for Public-Private Partnerships: A Primer.*
  - *Risk Assessment for Public-Private Partnerships: A Primer.*
  - *Value for Money Assessment for Public-Private Partnerships: A Primer.*
  - Information concerning the federal financing programs: the *Transportation Infrastructure Finance and Innovation Act* loan program; the *Transportation Investment Generating Economic Recovery Act* discretionary grant program; and tax-exempt private activity bonds.
- The National Conference of State Legislatures publication, *Public-Private Partnerships for Transportation, A Toolkit for Legislators.*

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ORGANIZATION AND FUNCTION

In 2003, the Alaska State Legislature established the Knik Arm Bridge and Toll Authority (KABATA) as a public corporation and an instrumentality of the State of Alaska within the Department of Transportation and Public Facilities (DOTPF). KABATA has a separate and independent legal existence from the State. Alaska Statute 19.75.011 states KABATA's purpose is:

> *To develop, stimulate, and advance the economic welfare of the state and further the development of public transportation systems in the vicinity of the Upper Cook Inlet with construction of a bridge to span Knik Arm and connect the Municipality of Anchorage and the Matanuska-Susitna Borough.*

In furtherance of this purpose, KABATA has the authority to own, acquire, construct, develop, create, reconstruct, equip, operate, maintain, extend, and improve the Knik Arm Bridge and its adjoining facilities. Additionally, KABATA may enter into partnerships or contracts with private entities for the financing, design, construction, maintenance, improvement, or operation of its facilities, properties, or projects.

As shown in Exhibit 1, KABATA is governed by a seven-member board of directors, consisting of: DOTPF and the Department of Revenue (DOR) commissioners, three public members appointed by the governor, and two non-voting members (a representative appointed by the speaker of the house and a senator appointed by the president of the senate). Of the three public members, one must be a resident of the Matanuska-Susitna Borough with knowledge of local transportation issues, another a resident of the Municipality of Anchorage with knowledge of local transportation issues and the third must be a resident of the State.

Exhibit 1

Knik Arm Bridge and Toll Authority
Board Members as of
January 31, 2013

Michael L. Foster P.E.
Chairman and Public Member

Dave Haugen
Public Member

Janet Kincaid
Public Member

Patrick J. Kemp, P.E.
DOTPF Commissioner

Angela Rodell
DOR Designee

Representative Mark Neuman
State House of Representatives Designee

Vacant
State Senate Designee

KABATA has seven filled positions: an executive director; a deputy executive director for project development; a chief financial officer; a government and public affairs manager; a liaison officer; an administrative manager; and an office assistant.

KABATA's FY 13 $1.4 million operating budget is funded with federal and state general funds.

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BACKGROUND INFORMATION

The Knik Arm Bridge and Toll Authority's (KABATA) bridge project is known as the Knik Arm Crossing (KAC) Project. The KAC includes a 9,200 foot toll bridge and approximately 18 miles of two-to-four-lane approaches, connector roads, associated facilities, and an approximately 800-foot, cut-and–cover tunnel through Anchorage's Government Hill community.

The KAC is expected to be constructed in two phases to allow for increased capacity as traffic volume grows. Phase I includes a two-lane approach road on each end of the bridge with a six-lane, cut-and-cover tunnel through Government Hill and a 9,200 foot bridge structure. The Phase I bridge structure will have a four-lane foundation but only a two-lane build out. Phase II will be completed incrementally. By 2030, KABATA estimates that traffic growth will warrant the completion of Phase II expansion that widens the bridge and the approaches to four lanes.

Below is a conceptual rendering of the KAC Project provided by KABATA.

Source: *KABATA*

Summary of KAC planning and development

KABATA has followed the standard highway construction project planning process which consists of planning, project development, and right-of-way acquisition. The purpose and need for a bridge was identified as part of planning. Project development included an environmental review and selection of a preferred alternative through an environmental impact statement (EIS). Exhibit 2 describes the EIS process. An EIS is required[4] before federally funded transportation projects with significant environmental impacts can begin construction. After an EIS is complete, the necessary right-of-ways are acquired from public and private owners; subsequently, a contractor is procured to build the project.

In early 2005, KABATA began planning and project development activities for the KAC. KAC planning and development activities are described in the following pages.

Environmental Impact Statement

An EIS requires "*diligent effort*" in soliciting public participation in the process and in documenting the public's involvement. In January 2005, the Federal Highway Administration (FHWA) published a notice of intent to prepare an EIS for the KAC. The EIS phases are: (1) scoping; (2) draft EIS; (3) final EIS; and (4) record of decision (ROD). The last three phases must be approved by the FHWA upon completion.

Scoping: *Scoping* is defined as "*an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to the proposed action.*"[5] Scoping includes soliciting input from the general public, agencies, and others about issues and the range of alternatives to address in the

Exhibit 2

Environmental Impact Statement Process

Federal law requires that an EIS be prepared for any federally reimbursed transportation project with significant environmental impacts. The process of preparing an EIS is specified in federal regulation and requires input from multiple state and federal agencies as well as the public.

An EIS is a full disclosure document which details the process of developing the transportation project. The completed document must include: consideration of a range of reasonable alternatives; an analysis of the potential environmental, social, and economic impacts of each alternative; and a demonstration of how each alternative complies with applicable environmental laws and executive orders. An EIS also documents the entirety of the decision making process to select the project's preferred alternative.

Sections of the EIS include the purpose and need for action, alternatives considered, and multiple sections on environmental consequences and impacts along with social and economic impacts. When the process is complete, a state submits a final EIS to the FHWA for approval. An ROD is issued if the project plan and preferred alternative is accepted by the FHWA.

[4]*National Environmental Protection Act of 1969* as amended (42 U.S. Code 4321 et. Seq.), 40 CFR 1500 – 1508, and FHWA regulations (23 CFR 771,772,774,777).
[5]*Title 40 of the Code of Federal Regulations, Part 1501, Subpart 7.*

EIS. The KAC scoping phase was conducted over a nine-month period. KABATA published a summary report of the scoping activities in November 2005.[6]

Draft EIS: The draft EIS phase includes completing: information gathering, the appropriate technical studies, and the evaluation of findings. This work was conducted by the FHWA in conjunction with KABATA and its contractors. KABATA's contractors conducted technical studies[7] through February 2007. Approximately 36 technical reports were issued.

The FHWA approved the draft EIS in September 2006. The approved draft EIS was available for comment by the public, agencies, and others from September through mid-November 2006. The draft EIS included controversial issues raised by the public and agencies. The primary issues related to sedimentation, land use, community cohesion, traffic, travel patterns, wetlands, water body modification, wildlife, and essential fish habitat. These issues were addressed by KABATA and the FHWA in the final EIS.

The draft EIS report also identified one major unresolved issue that required additional technical analysis. The United States Army Corps of Engineers (USACE) expressed concerns about increased sedimentation in the Port of Anchorage since 1999. The USACE was concerned that KAC construction would worsen the sedimentation issue. In order to address this issue, additional refinements in the USACE hydrodynamic and sedimentation model were needed. Based on subsequent refinements of the USACE model, it was recommended that the bridge structure be extended by 1,000 feet. The current project scope incorporated the change, and the bridge length was changed from 8,200 feet to 9,200 feet.

Final EIS: The FHWA used draft EIS comments in its decision-making process when evaluating KAC alternatives and in developing mitigation measures. The FHWA and KABATA assessed and considered the comments received, both individually and collectively, from circulation of the draft EIS and responded to the comments. All substantive comments received along with responses were attached to the final EIS. The recommended alternative for the KAC is presented in the final EIS which was approved by KABATA management and the FHWA in December 2007.

A public ROD, issued by the FHWA in December 2010, identified the Northern Access – Erickson Alternative as the selected project location "*based directly on economic and technical/engineering considerations and impacts while meeting the project's purpose and need*." The ROD included public and agency comments received on the final EIS and the FHWA's responses to those comments.

The ROD concludes that the final EIS conforms with applicable federal regulatory provisions and satisfactorily addresses the anticipated environmental impacts that will result from the KAC under the selected alternative. The issuance of the ROD allowed KABATA to move

[6]*Knik Arm Crossing Scoping Summary Report: Comments, Issues, and Alternatives* (November 2005).

[7]Contractors' technical studies related to in-water crossing design options, land use and transportation forecasting, social environment, physical environment, cultural environment, assessment of cumulative effects, natural environment, and engineering.

forward with the environmental permitting, right-of-way acquisition, and procurement (final design, financing, and construction) for the project.

Permitting and Right-of-way Acquisitions

The final EIS includes eight environmental and three land-use permits. Since ROD approval, KABATA applied to the State's Department of Environmental Conservation (DEC) for a *Clean Water Act* 401 permit. DEC issued the permit in September 2012. In 2012, KABATA management also applied for the *Clean Water Act* 404 permit, the *Rivers and Harbors Act* 9 and 10 permits, and a multi-year permit from the National Marine Fisheries Service for the disturbance of beluga whales during in-water construction activities. These applications are pending, and KABATA intends to apply for the remaining environmental permits in Phase II of the project. Two of the land use permits will be addressed through the right-of-way acquisition process, while the remaining land use permit is not needed until Phase II.

Most of the right-of-ways required for the KAC are owned by public entities. Private parties own nine residential structures, four businesses, and two undeveloped lots that are needed for the project. During FY 12, KABATA acquired one residential property and one business property for approximately $2.5 million. Of the eight remaining residential properties, one is expected to be acquired in 2013; the other seven residential properties will be acquired as Phase II construction commences. The three remaining commercial properties are expected to be acquired and relocated in 2013. Federal and state general fund match funding for right-of-way acquisitions totals approximately $16 million.

Procurement of a Private Partner

The authority for KABATA to enter into a private-public-partnership (P3) agreement was added to the Alaska Statutes in 2006. P3 agreements are becoming increasingly common nationwide as a means for financing, constructing, and/or operating large-scale transportation projects. As of December 2010, 29 states and Puerto Rico had enacted legislation to authorize the use of P3s for transportation projects.[8]

The P3 project delivery differs from traditional procurements where the public sponsor controls each phase of the transportation infrastructure development process – design, construction, finance, operations and maintenance. With a P3, a single private entity, which may be a consortium of several private companies, assumes responsibility for more than one development phase, accepts the associated risks, and seeks rewards in terms of return on investment.

Project risks must be identified, evaluated, and managed throughout a project's life for the project to be successful. P3s are considered to be a form of risk management since the public sponsor and private partner seek to achieve optimal risk allocation in order to minimize overall project risks.

[8]The National Conference of State Legislatures publication, *Public Private Partnerships for Transportation, a Toolkit for Legislators*.

P3 agreements encompass a variety of contractual structures, with various degrees of risk transfer to the private entity. KABATA chose the design-build-finance-operate-maintain (DBFOM) P3 agreement structure in which the private entity is responsible for the project's design, construction, operations, maintenance, and provision of private financing.

Under a DBFOM P3 structure, the private entity invests its own funds (known as *equity*) and borrows additional funds (known as *debt*) to pay for project construction. The private entity maintains and operates the project for a specified period and expects to be repaid for its investment in the project over the term of the agreement. Repayment provisions are referred to as *compensation arrangements*.

The three most common compensation arrangements in P3 agreements are as follows.

- *Toll Concessions*. The private entity receives compensation by obtaining the right to collect tolls on the facility.

- *Shadow Toll Concessions*. The private entity receives a predetermined payment from the public sponsor, called a *shadow toll,* for each vehicle that uses the facility.

- *Availability Payment Concessions.* The private entity receives a periodic availability payment from the public sponsor based on the availability of the facility at a specified performance level.

At the April 2011 board meeting, KABATA's board of directors approved the P3 procurement under an availability payment compensation arrangement. Under this arrangement, compensation payments to the private entity are not dependent on toll revenues. The availability payment arrangement may be used if a public sponsor wishes to retain the traffic risk to attract more bids, or because the private sector would otherwise demand a high risk premium return on its investment in the project.

On toll-based projects, availability payments eliminate the risk of a private entity potentially reaping windfall profits if toll revenues are higher than anticipated. Alternatively, under this arrangement, the risk that toll revenues fall short of expectations lies with the public sponsor. In KABATA's expected availability payment arrangement, lower than expected toll revenues could necessitate the need for additional funding as the availability payments must be paid to the private partner regardless of how much the bridge is used. Projections of toll revenues are a key consideration when evaluating the financial feasibility of the KAC's P3 agreement.

The KAC procurement is structured as a 35-year term DBFOM agreement.[9] KABATA issued the most recent request for qualifications (RFQ) in July 2011. The RFQ resulted in the identification of three qualified consortiums to bid on a subsequent request for proposal

[9]The 35 year term begins from the date the KAC is open and available for use. The agreement will also provide three to five years to construct the KAC.

(RFP) for the concession agreement. Under KABATA's procurement regulations, a payment may be paid to each unsuccessful proposer that submitted a responsive proposal to the RFP. KABATA management anticipates issuing an RFP in 2013 and plans to pay a stipend of approximately $2 million to each of the two unsuccessful proposers. Since the RFP has not been issued, the final terms of the proposed P3 agreement could not be reviewed as part of this audit. A listing of significant KAC Project milestones is included in Appendix A.

The KAC projected financial plan (financial plan) identifies various funding sources.

In general terms, a financial plan for a P3 project produces indicators that help private bidders determine the potential value of the project, helps lenders check the project's capacity to repay debt, and helps public agencies determine the value of the concession or the amount of public subsidy that might be needed. A public agency, such as KABATA, may use the financial plan to determine if the project's financial feasibility is acceptable from the public agency's point of view. For P3 agreements involving availability payments, the plan may also be used to calculate the availability payment required to cover capital expenditures (known as *capex*), operating expenditures, debt service, and return on investment.

The KAC financial plan was developed by KABATA's financial advisory firm. The financial plan provides:

- Sources and uses of funds for KAC construction. (See Exhibit 3 on page 19.)
- Assumptions for debt service.
- Cash flows for KABATA. (See Exhibit 4 on page 24.)
- Cash flows for the private partner under the P3 agreement. (See Appendix B.)
- State Reserve Fund cash flows which is assumed to be funded by a $150 million legislative appropriation. (See Appendix C.)

The financial plan is KABATA's best estimate of expected financial activity; however, the plan is subject to change upon procurement of the private partner. As with many P3 projects, the KAC financial plan is reliant on federal financial programs, such as: the *Transportation Infrastructure Finance and Innovation Act* (TIFIA) loan program; the *Transportation Investment Generating Economic Recovery Act* (TIGER) discretionary grant program; and tax-exempt private activity bonds (PAB). These programs are managed by the FHWA.

The KAC financial plan indicates that the private partner will obtain tax-exempt PABs. The private partner is obligated to repay the bonds with a portion of the availability payments received from KABATA. TIFIA direct loan financing is also included in the financial plan as a funding source. The TIFIA loan will be the private partner's obligation and will also be repaid through a portion of the availability payments. No TIGER grants were included in the current financial plan because KABATA's TIGER grant applications have been denied.

The financial plan also includes bonds, state grants, and municipal contributions as funding sources. In October 2007, the United States Department of Transportation provisionally

allocated up to $600 million[10] of the $15 billion national limitation on the aggregate amount of PABs for highway projects. This provisional allocation expires two and a half months after the execution of a P3 agreement for the KAC. KABATA will act as the conduit for the private partner to access the PAB allocation.

Projected toll revenues are used to estimate cash flows.

The Schedule of Cash Flows is an important part of the KAC financial plan because it is used to demonstrate how expected revenues will be used to meet expected expenses. Toll revenues identified in the Schedule of Cash Flows originate from projections of traffic volume. A transportation model is used to project traffic demand. In order to develop a transportation model, the KAC study area was subdivided into traffic analysis zones (TAZ).[11] The following data was obtained and input into the computer model by TAZ: population; number of households and dwelling units; level of employment; income levels; land use characteristics; the current roadway network; and any planned future improvements to the network.

The transportation model data along with additional data sources, such as origin and destination trip surveys, estimations of the value of time, and vehicle operating costs, was used to determine:

1. *Trip Generation* – The number of trips being produced from and attracted to each TAZ in the study area for purposes such as employment, leisure, and shopping.
2. *Trip Distribution* – The origin and destinations of travelers.
3. *Modal Choices* – Group and individuals' options for their trips (e.g., bus, car, rail, personal car, etc.).
4. *Route Assignment* – Identifies the path the travelers will take for trips.

After the traffic demand for trip routes using the KAC was projected, toll fees were multiplied by projected traffic to project expected toll revenues. Expected toll revenues are part of the Schedule of Cash Flows for KABATA in Exhibit 4, on page 24. The assumption that traffic demand will be higher at lower toll rates and lower at higher toll rates (also known as *demand elasticity*) was considered when projecting toll revenues. Additionally, KABATA estimated possible variations in traffic and toll revenue projections. Using different levels of economic assumptions and a statistical analysis of probable number of revenue days, the traffic and toll revenues projections were generated at the probability values of 5, 25, 50, 75, and 95 percent. KABATA selected the traffic and toll revenue projections with a 50 percent probability value as the baseline (also known as the *base case*) to the financial plan.

[10]Alaska Statute 19.75.211 states that KABATA may issue bonds in an aggregate amount not to exceed $500 million. KABATA introduced legislation to increase this limit to $600 million but the change was not enacted.
[11]The KAC transportation model subdivided the study area into approximately 600 TAZs which reflect the major roadway boundaries or physical barriers such as rivers, railways, etc.

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REPORT CONCLUSIONS

In an effort to provide legislators with the knowledge necessary to make informed decisions on future KABATA-related legislation, an audit of the KAC Project was requested. The audit objectives were to:

1. Provide a historical summary of major KAC Project milestones;
2. Identify significant changes to the project scope;
3. Evaluate the adequacy of public participation;
4. Provide a detailed summary, by source, of KAC authorized, expended, and remaining funds, including the level of funding necessary to complete the project;
5. Ascertain the reasonableness of KAC toll and revenue projections and the KAC projected financial plan (financial plan);
6. Evaluate the KAC private-public-partnership (P3) agreement; and
7. Outline the balance of risks and rewards between public and private partner entities outlined in the P3 agreement.

The audit concludes that KAC toll and revenue projections are unreasonably optimistic, and the projected cash flows to the State are likely overstated as a result. These are important considerations for policymakers since the P3 compensation arrangement requires KABATA to make payments to the private partner regardless of the project's ability to generate toll revenues. The deficiencies in KABATA's methodology for generating toll and revenue projections are addressed in Recommendation No. 1.

KABATA's FY 03 through FY 12 expenses total $70.4 million and authorized funding totals $131 million. The project is expected to require an additional $1.4 billion from a variety of sources including bonds, loans, grants, and private equity. A discussion of key project planning and development milestones is provided as part of this report's Background Information section. Appendix A provides a list of significant KAC Project milestones.

The audit was unable to fully outline the balance of risks and rewards embodied in the final P3 agreement because the procurement process is not complete, and the P3 agreement has not been finalized. However, the general structure of the P3 agreement has been defined by KABATA's governing board and provides that the State will bear the risk of lower-than-expected toll revenues.

It is important to note that a final P3 agreement will also contain rewards and additional risks that are not addressed in this report due to the scope limitation already discussed. This report is not concluding whether or not this specific risk is justified when considering the P3 agreement's balance of risks and rewards for the agreement as a whole. The risk of lower-than-expected toll revenues is an important aspect of understanding the potential effect of deficiencies in projections and should be considered in that context.

Detailed report conclusions are presented below.

Approximately $1.4 billion in funding is needed to complete the KAC Project.

KABATA management, with assistance from a financial advisory firm, developed the KAC financial plan.[12] The total, necessary projected KAC funding is identified in the financial plan as approximately $1.6 billion. (See the schedule of proposed sources and uses in Exhibit 3 on page 19.) This estimate includes both phases of construction. Phase I is scheduled to begin immediately, and Phase II will be completed incrementally. Per Exhibit 5 on page 25, KABATA has secured $131 million of the $1.6 billion necessary for the project. The remaining unsecured funding sources of $1.4 billion are discussed in detail below.

Bonds ($846.9 Million – 52 Percent of Proposed Funding)

According to the KAC financial plan, the private partner will borrow $350.7 million of the total projected private bond funding of $516 million through a private activity bond (PAB) bond issuance for Phase I of the project. The remaining private and public bond financing in the plan ($496.2 million) for Phase II of the project will need to come from other sources. According to KABATA management, potential bond sources may be secured through KABATA (tax exempt municipal revenue bonds or TIFIA loans) or through the private partner (a syndicated bank credit facility, TIFIA loans, or taxable corporate bonds).

TIFIA Loan ($356.7 Million – 22 Percent of Proposed Funding)

In 2005, KABATA management pursued TIFIA funding on behalf of the future private partner by filing a loan request without success. Since 2005, eight separate applications have been unsuccessful. In July 2012, the United States Congress enacted[13] several changes to the TIFIA program. Changes increased funding levels, increased federal participation in eligible project costs from 33 percent to a 49 percent ceiling, and eliminated subjective selection criteria.

[12]The financial plan referred to in this report is the December 2012 version KABATA for a credit rating.
[13]Public Law 112-141.

Exhibit 3

Knik Arm Crossing Project
Proposed Funding Sources and Uses

	Total Private Financing	Total Public Investment	KAC Project Total	Percent of Total Funding
Proposed Funding Sources				
Bonds	$516,094,545	$330,790,000	$ 846,884,545	52%
TIFIA Loan	356,747,052	0	356,747,052	22%
P3 Private Partner Equity	96,912,560	0	96,912,560	6%
Public Funds:				
1) Federal	0	112,572,342	112,572,342	7%
2) State Match	0	17,324,917	17,324,917	1%
3) State Grant (Reserve Fund)	0	150,000,000	150,000,000	9%
4) State Commerce Grant	0	15,000,000	15,000,000	1%
5) Municipality Contribution	0	26,000,000	26,000,000	2%
Total Proposed Funding Sources	$969,754,157	$651,687,259	$1,621,441,416	100%
Proposed Funding Uses				
Construction	$860,272,443	$378,898,963	$1,239,171,406	
Right-of-Way	0	15,250,000	15,250,000	
KABATA P3 Construction Oversight Costs	0	11,826,000	11,826,000	
Port MacKenzie Road Upgrade	0	15,000,000	15,000,000	
KABATA Project Costs Prior to P3 Award	0	77,402,246	77,402,246	
State Reserve Fund for Toll Revenue Shortfalls	0	150,000,000	150,000,000	
Capitalized Interest	60,815,537	0	60,815,537	
Prepaid Interest	848,868	0	848,868	
Debt Service Reserve	35,072,500	0	35,072,500	
Cost of Bond Issuance	6,928,575	1,653,950	8,582,525	
Underwriter's Discount	2,671,325	1,653,950	4,325,275	
Financial Advisory Firm Fee	3,144,857	0	3,144,857	
P3 Agreement (Shortfall)/Surplus	0	0	0	
Contingency	52	2,150	2,202	
Total Proposed Funding Uses	$969,754,157	$651,687,259	$1,621,441,416	

Source: KABATA December 2012 Financial Plan

In August 2012, KABATA management submitted a TIFIA loan request for $500 million at a 49 percent participation rate in eligible costs. In a letter to KABATA, dated September 25, 2012, the Federal Highway Administration (FHWA) pended reviewing the request stating that:

- KABATA's loan request "*did not present a compelling justification*" for providing assistance above a 33 percent participation level.

- The request cannot be considered further until the $150 million reserve fund is appropriated by the State or it becomes clear that the funding is "*reasonably likely*" to be appropriated.

State Grant - Reserve Fund ($150 Million – Nine Percent of Proposed Funding)

KABATA intends to capitalize a reserve fund through a general fund appropriation of $150 million. Legislation was unsuccessfully introduced for the appropriation during the 27th Legislature and has been re-introduced during the 28th Legislature. If an appropriation is approved, the funds, along with interest earned on the funds, will be used to cover the net deficiencies in projected toll revenues for 2017 through 2030. According to the State Reserve Fund cash flows schedule in Appendix C, additional appropriations totaling $41.2 million will be needed to replenish the fund for 2031 through 2035 (State Replenish column in Appendix C of the State Reserve Fund cash flows).

Municipality of Anchorage Contribution ($26 Million – Two Percent of Proposed Funding)

Both the KAC plan and the 2035 Anchorage Metropolitan Area Transportation Solutions (AMATS) plan include an Ingra-Gambell couplet connection project. The $26 million identified in the financial plan is the amount the municipality expects to spend on the project in conjunction with KABATA and has included the project in its AMATS plan. However, the $26 million is not funded by the Municipality of Anchorage at this time.

P3 Private Partner Equity ($96.9 Million – Six Percent of Proposed Funding)

As discussed earlier, the procurement of the P3 partner has not resulted in an RFP; however, KABATA has identified three prequalified prospective P3 partners through the request-for qualification process. The private partner will invest equity of $96.9 million to construct the KAC and operate the project for a specified amount of time.

KABATA's Schedule of Cash Flows shows a net surplus of $2.2 billion for the KAC Project.

KABATA's Schedule of Cash Flows is included as Exhibit 4 on page 24.[14] The purpose of a Schedule of Cash Flows is to demonstrate how the flow of expected revenues will be used to meet expected expenditures. KAC traffic and toll revenue projections for 2017 through 2035 are based on a transportation model produced by KABATA's traffic and toll consultant. These projections include capacity improvements including the Ingra-Gambell connector and upgrading the road and bridge to four lanes. Projections for 2036 through 2061, a period covering 60 percent of total cash flows, were performed internally by KABATA management. This approach was taken because KABATA did not expect further growth in traffic volume for the KAC after 2040. KABATA's traffic volume projections for 2035

[14]The Schedules of Cash Flows presented in Exhibit 4 on page 24 and Appendices B and C use the base case traffic and toll revenue projections. This base case is discussed in the Background Section and used by KABATA for the KAC's financial plan.

through 2040 include an approximately 12 percent increase for personal vehicles and nine percent increase for commercial vehicles.

The toll revenue projections for 2041 through 2061 include toll fee increases based on a 2.5 percent annual inflation factor. Private vehicle toll fees would increase from $8.82 per crossing in 2040 to $14.82 per crossing in 2061, while commercial vehicle toll fees would increase from $31.76 per crossing to $53.25 per crossing for the same period.

The 2041 through 2051 annual *"net surplus"* on the Schedule of Cash Flows are primarily due to increases in toll fees. After 2051, the availability payments to the private partner would end, and KATABA would incur the toll collection costs which would result in higher annual net surplus amounts. The Schedule of Cash Flows in Exhibit 4 shows that 92 percent of the net surplus for the project would occur from 2051 through 2061.

The analysis of toll revenues raises concerns that toll revenues are overstated in KABATA's Schedule of Cash Flows. Overstated toll revenues overstate the net surplus amount identified in KABATA's Schedule of Cash Flows and may lead to a shortfall rather than a net surplus.

Deficiencies in the assumptions and inputs used by KABATA for the toll and revenue projections likely overstate projected cash flows.

Accuracy of the traffic and toll revenue projections is paramount to the success of the KAC Project. Under the anticipated P3 agreement, KABATA must pay the private partner availability payments totaling $3.3 billion over the life of the agreement (through 2051). These payments must be made regardless of the level of collected toll revenues.

An analysis of key assumptions and inputs used in KABATA's modeling process was performed in conjunction with an independent consultant hired by the Division of Legislative Audit (DLA). A complete copy of the consultant's report is included in Appendix E. Appendix F contains the consultant's professional qualifications. The KABATA consultant's review of the DLA consultant's report and further responses by the consultants are documented in Appendices G through I.

The DLA consultant's report identified several concerns regarding the validity of assumptions and inputs used as a basis for projecting toll revenues. The most important concern was the potential for the KAC traffic volume to be overstated based on overly optimistic assumptions for household and employment levels. Overstating traffic volume in KABATA's modeling process has the effect of overstating projected toll revenues.

Households and Employment. Two inputs that drive demand for the transportation system are (1) the number of households and (2) the level of employment. Population levels impact both of these inputs. DLA's consultant concluded that KABATA's estimated growth rate and 2035 household levels were higher than the rate and levels projected by the University of Alaska's Institute of Social and Economic Research (ISER). KABATA's estimate of employment growth rate compared to the rate forecast by ISER was also higher – however to

a lesser degree. To help understand the source of the differences and to further support this conclusion, DLA's consultant compared KABATA's estimated population growth rates and 2035 population levels with ISER and the State of Alaska, Department of Labor and Workforce Development's estimations. This comparison supported a lower forecast of households and employment.

Lower forecasts of households and employment are further supported by consultants that conducted Matanuska-Susitna Borough (MSB) planning studies. In 2012, the MSB, with the assistance of a consultant, produced a density and build-out study that projects future land use and predicts population and housing quantities. Also in 2012, the MSB, in conjunction with DOTPF, updated its transportation model which included estimated population and employment data. When MSB planning staff noted that MSB population and employment projections were lower than KABATA's estimates from the KAC transportation model, MSB staff directed their consultant to evaluate and report on the differences. The consultant produced a summary document outlining the conceptual differences between the MSB and KABATA. The summary is included as Appendix D. Key differences that support lower forecasts include: density basis using the MSB rather than Anchorage; nominal water and sewer availability in the Knik Goose Bay (KGB) Corridor; lower population and employment in Port MacKenzie (Port); limited retail in the Port; limited office land use to serve local industrial concerns; less extensive and longer term upgrades to the KGB Corridor and the Point MacKenzie road.

Compared to independent sources discussed above, KABATA's assumptions and inputs for households and employment are overly optimistic. (See Recommendation No. 1.)

KABATA's projected traffic growth rate, the KAC market share, the split for commercial traffic, and the economic growth in the Point MacKenzie area are not supported by independent sources.

DLA's consultant evaluated the reasonableness of KABATA's traffic projections using the Glenn Highway as an indicator of the current and potential market for the KAC. The Glenn Highway is currently the only effective route into and out of Anchorage for trips to and from the MSB. The average actual traffic growth rate for the Glenn Highway, calculated by DOTPF for 2001 through 2011, was 2.5 percent. Average projected traffic growth rates for the KAC, produced by KABATA for 2021 through 2040, is significantly higher at five percent. The five percent traffic growth rate does not appear to be supported by household growth rates or population growth rates. Additionally, DLA's consultant concluded that KABATA projects the KAC's market share to be approximately 50 percent. No evidence was found to support the 50 percent market share.

Furthermore, KABATA's estimate of a 12 percent split for commercial vehicle traffic is outdated and much higher than actual traffic count data supports. Updated traffic count data provided by DOTPF suggests a range of 4.9 to 6.6 percent. This is troubling given that commercial vehicles pay a higher toll. Overestimating the split for commercial traffic has the effect of overestimating projected toll revenues.

Additionally, DLA's consultant concluded that the validity of KABATA's employment projections was dependent on strong growth in the Point MacKenzie area. Our review of MSB planning documents indicates KABATA's employment growth projections for the Point MacKenzie area are inconsistent with MSB projections and plans.[15] The 2012 MSB transportation model data projects the employment level in the Point MacKenzie area to be 4,515 in 2035. The KAC's transportation model projects the employment level in the Point MacKenzie area to be 14,337 in 2035. Of this total, 13,828 relates to the employment level in the Port.

To help evaluate the reasonableness of KABATA's projected economic development of the Port, the projected development was compared to the MSB plan for the Port and the related regulations[16] for the Port area. The plan and regulations do not allow for the type of development that supports KABATA's employment projections. (See Recommendation No. 1.)

KABATA's risk analysis was too limited to provide assurance of achieving projected toll revenues.

Risk analyses are an important component of traffic and toll revenue projections. When conducted properly, risk analyses shed considerable light on the likelihood of achieving different levels of traffic and toll revenues. KABATA did not conduct a risk analysis with its original traffic and toll projections in 2007. The 2011 projections[17] evaluated as part of this audit did include a risk analysis. However, DLA's consultant concluded that the set of variables used in the risk analysis was too limited to provide a useful analysis.

[15]The MSB 2012 traffic model update and the *Port MacKenzie Master Plan Update* (February 2011).
[16]*Matanuska Susitna Borough Code*, Chapter 17.23: Port Mackenzie Special Use District.
[17] *Proposed Knik Arm Crossing Traffic and Toll Revenue Study Update (*Wilbur Smith Associates, August 2011).

Exhibit 4

KABATA Cash Flows from KAC for Calendar Years 2017 – 2061

Date	Toll Revenues	Total Availability Payments	KABATA Administrative Costs	Phase II KABATA Bonds Debt Service	KABATA Toll Collection Costs	KABATA O&M/ CAPEX Costs	Net Surplus/ (Shortfall)	Cumulative Net Surplus/ (Shortfall)
Totals	$6,715,668,795	($ 3,303,670,307)	($ 261,345,664)	($ 645,550,500)	($ 130,310,614)	($ 142,768,535)	$2,232,023,175	$ 0
12/1/2017	16,024,000	(33,712,500)	(3,019,041)	0	0	0	(20,707,541)	(20,707,541)
12/1/2018	24,543,000	(37,461,000)	(3,103,849)	0	0	0	(16,021,849)	(36,729,390)
12/1/2019	32,007,000	(43,279,440)	(3,191,057)	0	0	0	(14,463,497)	(51,192.887)
12/1/2020	38,457,000	(45,170,618)	(3,280,734)	0	0	0	(9,994,352)	(61,187,239)
12/1/2021	43,317,000	(51,137,442)	(3,372,949)	0	0	0	(11,193,391)	(72,380,630)
12/1/2022	47,428,000	(53,182,940)	(3,467,776)	0	0	0	(9,222,716)	(81,603,346)
12/1/2023	51,689,000	(55,310,257)	(3,565,289)	0	0	0	(7,186,546)	(88,789,892)
12/1/2024	56,124,000	(57,522,668)	(3,665,563)	0	0	0	(5,064,231)	(93,854,123)
12/1/2025	60,778,000	(59,823,575)	(3,768,680)	0	0	0	(2,814,255)	(96,668,378)
12/1/2026	67,251,000	(62,216,518)	(3,874,718)	(21,519,500)	0	0	(20,359,736)	(117,028,114)
12/1/2027	73,444,000	(64,705,178)	(3,983,762)	(21,520,500)	0	0	(16,765,440)	(133,793,554)
12/1/2028	79,882,000	(67,293,385)	(4,095,897)	(21,519,000)	0	0	(13,026,282)	(146,819,836)
12/1/2029	86,556,000	(69,985,121)	(4,211,212)	(21,519,500)	0	0	(9,159,833)	(155,979,669)
12/1/2030	93,560,000	(72,784,526)	(4,329,797)	(21,516,250)	0	0	(5,070,573)	(161,050,242)
12/1/2031	99,229,000	(93,471,010)	(4,451,746)	(21,518,750)	0	0	(20,212,506)	(181,262,747)
12/1/2032	106,822,000	(96,524,957)	(4,577,155)	(21,516,000)	0	0	(15,796,112)	(197,058,860)
12/1/2033	114,681,000	(99,700,175)	(4,706,122)	(21,517,500)	0	0	(11,242,797)	(208,301,657)
12/1/2034	122,930,000	(103,000,203)	(4,838,750)	(21,517,250)	0	0	(6,426,203)	(214,727,860)
12/1/2035	131,459,000	(106,433,775)	(4,975,143)	(21,519,500)	0	0	(1,469,418)	(216,197,278)
12/1/2036	137,619,000	(108,671,194)	(5,115,408)	(21,518,250)	0	0	2,314,148	(213,883,130)
12/1/2037	144,232,000	(110,968,570)	(5,259,657)	(21,517,750)	0	0	6,486,023	(207,397,107)
12/1/2038	151,137,000	(113,325,323)	(5,408,003)	(21,517,000)	0	0	10,886,674	(196,510,433)
12/1/2039	158,254,000	(115,740,909)	(5,560,563)	(21,520,000)	0	0	15,432,528	(181,077,905)
12/1/2040	165,550,000	(118,209,819)	(5,717,458)	(21,520,500)	0	0	20,102,223	(160,975,683)
12/1/2041	169,688,750	(120,746,912)	(5,878,811)	(21,517,500)	0	0	21,545,527	(139,430,156)
12/1/2042	173,930,969	(123,346,094)	(6,025,781)	(21,520,000)	0	0	23,039,094	(116,391,062)
12/1/2043	178,279,243	(126,011,639)	(6,176,426)	(21,516,500)	0	0	24,574,678	(91,816,384)
12/1/2044	182,736,224	(128,742,533)	(6,330,837)	(21,516,000)	0	0	26,146,854	(65,669,529)
12/1/2045	187,304,630	(131,537,799)	(6,489,108)	(21,517,000)	0	0	27,760,723	(37,908,806)
12/1/2046	191,987,245	(134,411,504)	(6,651,335)	(21,518,000)	0	0	29,406,406	(8,502,400)
12/1/2047	196,786,927	(137,351,768)	(6,817,619)	(21,517,500)	0	0	31,100,040	22,597,640
12/1/2048	201,706,600	(140,362,414)	(6,988,059)	(21,519,000)	0	0	32,837,127	55,434,767
12/1/2049	206,749,265	(143,451,979)	(7,162,761)	(21,515,750)	0	0	34,618,775	90,053,542
12/1/2050	211,917,996	(146,618,387)	(7,341,830)	(21,516,250)	0	0	36,441,529	126,495,071
12/1/2051	217,215,946	(131,458,175)	(7,525,375)	(21,518,500)	0	0	56,713,896	183,208,967
12/1/2052	222,646,345	0	(7,713,510)	(21,520,500)	(11,631,364)	(12,221,421)	169,559,550	352,768,517
12/1/2053	228,212,503	0	(7,906,347)	(21,520,250)	(11,922,148)	(12,526,956)	174,336,802	527,105,319
12/1/2054	233,917,816	0	(8,104,006)	(21,520,750)	(12,220,202)	(12,940,806)	179,132,052	706,237,371
12/1/2055	239,765,761	0	(8,306,606)	(21,519,750)	(12,525,707)	(13,166,455)	184,247,243	809,484,614
12/1/2056	245,759,906	0	(8,514,271)	0	(12,838,850)	(18,485,367)	205,921,418	1,096,406,032
12/1/2057	251,903,903	0	(8,727,128)	0	(13,159,821)	(13,922,721)	216,094,233	1,312,500,265
12/1/2058	258,201,501	0	(8,945,306)	0	(13,488,817)	(14,597,231)	221,170,147	1,533,670,412
12/1/2059	264,656,538	0	(9,168,939)	0	(13,826,037)	(14,634,413)	227,027,149	1,760,697,561
12/1/2060	271,272,952	0	(9,398,163)	0	(14,171,688)	(14,890,614)	232,812,487	1,993,510,048
12/1/2061	278,054,775	0	(9,633,117)	0	(14,525,980)	(15,382,551)	238,513,127	2,232,023,175

Source: KABATA December 2012 Financial Plan

KABATA's FY 03 through FY 12 expenditures total approximately $70.4 million.

KABATA received preliminary planning funds through congressional appropriations. The federal funds are administered by the FHWA and matched with $10 million of state general funds. Additionally, DOTPF provided $8.5 million in general fund monies to cover costs that are not allowed for participation under the FHWA federal-aid highway program. This includes a DOTPF $7 million general fund "*loan*" for P3 procurement costs not covered by the federal program. The DOTPF commissioner approved the general fund loan of $7 million to KABATA in 2006. KABATA expended $2.5 million of the loan by the end of FY 12. In September 2012, DOTPF's commissioner determined that the department did not have the legal authority to make loans to itself. (KABATA is organizationally located within DOTPF.) The commissioner forgave the loan and allowed the $2.5 million expenditures and the $4.5 million unexpended balance to be funded by DOTPF's existing general fund appropriations.

Exhibit 5 provides a schedule of KAC authorized, expended, and remaining funds through June 30, 2012.

Exhibit 5

Knik Arm Crossing Project
Authorized, Expended, and Remaining Funds
FY 03 through FY 12

	Authorized	Expended	Remaining
Federal Funds	$ 112,572,342	$ 61,425,631	$ 51,146,711
State General Funds	18,494,082	8,957,202	9,536,880
Total	$ 131,066,424	$ 70,382,833	$ 60,683,591

Public participation in the environmental impact statement (EIS) and the pre-construction phases complied with federal and state requirements.

As discussed in the Background Information section, the KAC planning process included input and participation by federal, state, and local agencies; any affected native groups; and the general public. Various planning documents were publicly noticed per federal requirements. Public comments were considered when finalizing the EIS preferred alternative and the record of decision.

Additionally, KABATA management publicly noticed its board meetings in accordance with the *Open Meetings Act*.[18] Requests for proposals for major contracts (greater than $500,000) issued by KABATA management during FY 04 through February 2012 were publicly noticed in accordance with the *State Procurement Act*.[19]

[18]Alaska Statute 44.62.310-312.
[19]Alaska Statute 36.30.130.

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FINDINGS AND RECOMMENDATIONS

Recommendation No. 1

Knik Arm Bridge and Toll Authority (KABATA) management should revise traffic and toll revenue projections to address deficiencies.

The audit of key assumptions and inputs used in KABATA's transportation modeling process identified several deficiencies regarding the validity of assumptions and inputs used as a basis for projecting toll revenues. Deficiencies are as follows.

- The household levels and growth rate KABATA projected for 2035 were overly optimistic when compared to the household growth rates and levels projected by University of Alaska's Institute of Social and Economic Research and the State's Department of Labor and Workforce Development. The discrepancy stems from KABATA's economic growth rate projections in the Point MacKenzie region, specifically in the Port MacKenzie (Port) area.

- KABATA's estimated traffic growth rate of five percent is significantly higher than the actual growth rate of 2.5 percent based on the Department of Transportation and Public Facilities' traffic counts. The differences are partially caused by the anticipated growth in population and employment in the Point MacKenzie area.

- A projected 50 percent KAC market share of traffic is unsupported.

- The estimate of a 12 percent split for commercial vehicle traffic for the KAC is high compared to actual traffic count data for the Glenn Highway which indicates a split of 4.9 to 6.6 percent. KABATA's 12 percent split is based on DOTPF's 2003 through 2006 traffic data. Since then, DOTPF has improved its traffic data collection methodology and now reports much lower traffic count splits that better reflect the actual count between personal and commercial vehicles.

- KABATA's projected 2035 Point MacKenzie area employment level of 14,337 is significantly higher than the level noted in the Matanuska-Susitna Borough plan of 4,515. A majority of KABATA's employment (13,828) is based on projected Port economic development which is inconsistent with the Port's master plan and regulations.

All of the above concerns have the effect of overstating traffic volume. Overstated traffic volume in KABATA's modeling process has the effect of overstating projected toll revenues.

The Federal Highway Administration's (FHWA) guidelines for P3s[20] state:

> *Inaccurate or overly optimistic traffic projections and underestimated project costs can lead to the development of pro forma financials that appear to justify the investment decision, but that do not reflect the project's actual ability to repay debt or to meet equity investor's return requirements.*

Under KABATA's planned P3 arrangement, lower than expected toll revenues would necessitate the need for additional funding as availability payments must be paid to the private partner regardless of how much the bridge is used.

In recognition of the risk that overstated toll revenues pose to the State, we recommend KABATA management revise the traffic and toll revenue projections to address noted concerns.

[20]The FHWA's Innovative Program Delivery, *Risk Assessment for Public-Private Partner ships: A Primer*, September 10, 2012.

Appendices

Appendix A – Key Knik Arm Crossing Project Milestones

The significant Knik Arm Crossing (KAC) Project milestones were identified and discussed in the Background Information section. Appendix A provides a chronological listing of those milestones.

Appendix B – Private Partner Cash Flows Schedule

Appendix B is the schedule of the projected cash flows for the private partner which is part of the financial plan. The Knik Arm Bridge and Toll Authority's (KABATA) KAC financial plan is discussed in the Background Information section.

Appendix C – State Reserve Fund Cash Flows Schedule

Appendix C is the schedule of the projected cash flows for the State Reserve Fund which is part of the financial plan. The schedule assumes the State Reserve Fund will receive a $150 million legislative appropriation. KABATA's KAC financial plan is discussed in the Background Information section.

Appendix D – Conceptual Differences between Matanuska-Susitna Borough and CDM Smith Population and Employment Estimates as Interpreted by Western Demographics

The Matanuska-Susitna Borough (MSB) consultant, Western Demographics, Inc., compared the borough's population and employment estimates with KABATA's projections. Appendix D is the consultant's summary of the conceptual differences between the borough and KABATA. The consultant's summary supports lower forecasts for MSB population and employment growth than KABATA forecasts.

Appendix E – Division of Legislative Audit Consultant's Report

A review of key assumptions and inputs used in KABATA's modeling process was performed in conjunction with an independent consultant hired by the Division of Legislative Audit (DLA), Timothy James and Associates (TJ&A). TJ&A's report reviews KABATA's traffic and toll revenue projections.

The following is a correction to the consultant's report. The average growth rate in annual average daily traffic 2001 through 2011 for the Glenn Highway in Eklutna Flats should be 2.5 percent on the consultant's pages 3, 18, 24, and 26 of the report.

Appendix F – The DLA Consultant's Resume

Appendix F contains TJ&A's professional qualifications. A complete copy of the TJ&A's report is included in Appendix E.

Appendix G – The KABATA Consultant's February 15, 2013, Response to the DLA Consultant's December 22, 2012, Report

KABATA management requested their consultant, CDM Smith, to review and respond to the TJ&A's report on KABATA's traffic and toll revenue projections. CDM Smith's response: reaffirmed the economic assumptions utilized in support of its underlying data for the KAC, noted that the development of the project was an important economic driver of the traffic forecasted, and refuted the notion that its projections of traffic and toll revenues are optimistic.

CDM Smith's response in Appendix I gives DLA permission to include their February 15, 2013, response in this report.

Appendix H - The DLA Consultant's February 27, 2013, Response to the KABATA Consultant's February 15, 2013, Response

DLA management requested TJ&A, to review and comment on CDM Smith's February 15, 2013, response. On February 27, 2013, TJ&A provided a point-by-point analysis of KABATA's response to TJ&A's December 22, 2012, report. Some clarification was provided in CDM Smith's response; however, TJ&A generally reiterated the concern that modeling deficiencies persisted.

Appendix I – The KABATA Consultant's March 6, 2013, Response to the DLA Consultant's February 27, 2013, Response

CDM Smith provided additional information pertaining to the disagreement with TJ&A regarding the data utilized for projections and the risk analysis conducted for the project.

Appendix A

Key Knik Arm Crossing
Project Milestones

Date	Significant Knik Arm Crossing (KAC) Project Milestones
Jan-2005	The Federal Highway Administration (FHWA) issues a notice of intent to prepare the environmental impact statement (EIS).
Aug-2005	The *Transportation Infrastructure Finance and Innovation Act* (TIFIA) loan letter of interest (LOI) is submitted for $100 million.
Nov-2005	The FHWA approves the Scoping Summary Report.
Jun-2006	SLA 2006 authorizes Knik Arm Bridge and Toll Authority (KABATA) to enter into a public-private partnership (P3) agreement, issue bonds up to $500 million, and obtain TIFIA loans.
Sep-2006	The FHWA approves the draft EIS.
Dec-2006	The request for qualifications (RFQ) is issued for a P3 private partner.
Mar-2007	The Special Experimental Project No. 15 (SEP-15) application is submitted to obtain waivers of certain TIFIA procedures.
Mar-2007	There are two qualified responders to the RFQ for a P3 private partner.
Jun-2007	The FHWA approves the SEP-15 application.
Jul-2007	The FHWA, Department of Transportation and Public Facilities (DOTPF) and KABATA sign the SEP-15 agreement for waivers from certain TIFIA procedures.
Aug-2007	The TIFIA loan application is submitted for $278.7 million.
Oct-2007	The United States Department of Transportation approves a $600 million provisional bond allocation.
Dec-2007	The FHWA approves the final EIS.
Apr-2008	The August 2007 TIFIA loan request is denied.
Dec-2009	The TIFIA loan competitive selection process is changed.
Mar-2010	A TIFIA loan LOI is submitted for $279.3 million.
Aug-2010	The *Transportation Investment Generating Economic Recovery Act* (TIGER) TIFIA loan LOI is submitted for $290.4 million.
Aug-2010	A TIGER grant application is submitted for $15 million.
Sep-2010	The March 2010 TIFIA loan LOI is not awarded.
Sep-2010	KABATA applies for and receives National Marine Fisheries Services letter of authorization environmental permit related to beluga whale disturbances.
Oct-2010	The TIGER TIFIA August 2010 loan and grant requests are not awarded.
Dec-2010	The FHWA issues a record of decision.
Mar-2011	A TIFIA loan LOI is submitted for $306 million.
Apr-2011	KABATA cancels December 2006 RFQ for a P3 private partner.
Jul-2011	The March 2011 TIFIA loan LOI is not awarded.
Jul-2011	An RFQ for a P3 private partner is issued.
Sep-2011	KABATA applies for a United States Army Corps of Engineers 404 environmental permit.
Oct-2011	A TIGER TIFIA loan LOI is submitted for $310 million.
Oct-2011	A TIGER grant application for $45 million is submitted.
Oct-2011	Three consortiums are selected as qualified to bid on the request for proposal for the P3 agreement.
Dec-2011	The TIGER TIFIA October 2011 loan and grant requests are not awarded.
Dec-2011	A TIFIA loan LOI is submitted for $308 million.
Feb-2012	KABATA acquires one residential property.
Mar-2012	A TIGER TIFIA loan LOI is submitted for $307 million.

Appendix A

Key Knik Arm Crossing
Project Milestones
(*Continued)*

Date	Significant KAC Project Milestones
Mar-2012	A TIGER grant application is submitted for $20 million.
Apr-2012	The December 2011 TIFIA loan LOI is not awarded.
Apr-2012	KABATA acquires one business property for $2.2 million.
Jun-2012	The TIGER TIFIA March 2012 loan and grant requests are not awarded.
Jul-2012	The TIFIA loan selection criteria is changed to a non-competitive process.
Jul-2012	The change in the TIFIA loan section process negates the July 2007 SEP-15 agreement.
Aug-2012	A TIFIA loan LOI is submitted for $500.5 million.
Aug-2012	KABATA applies for a United States Coast Guard Section 9 environmental permit.
Sept-2012	The Section 401 Water Quality Certificate is issued by Alaska's Department of Natural Resources.
Dec-2012	A credit rating review of the project financial plan commences.

Appendix B

Private Partner Cash Flows for Concession Term Years 2017 through 2051

Date	Total Availability Payments	Interest Earnings	O&M Costs	Toll Operations Costs	Renewal Capex Costs	Private Activity Bonds Debt Service	TIFIA Debt Service	Phase II Developer Debt Service	Phase II Developer O&M/ Capex Costs	Net Cash Flows
Totals	$3,303,670,307	$58,220,350	($122,228,257)	($196,731,032)	($112,054,850)	($739,490,327)	($802,219,951)	($335,801,340)	($ 25,198,855)	$1,028,166,045
12/1/2017	33,712,500	1,052,175	(1,908,268)	(1,746,600)	(889,193)	(20,652,900)	0	0	0	9,567,714
12/1/2018	37,461,000	1,052,175	(2,219,973)	(1,952,625)	(890,084)	(21,501,769)	0	0	0	11,948,725
12/1/2019	43,279,440	1,052,175	(2,070,627)	(2,143,275)	(898,535)	(21,501,769)	0	0	0	17,717,410
12/1/2020	45,170,618	1,052,175	(2,198,735)	(2,319,575)	(900,343)	(21,501,769)	0	0	0	19,302,372
12/1/2021	51,137,442	1,052,175	(2,159,774)	(2,472,300)	(901,316)	(21,501,769)	(17,129,318)	0	0	8,025,140
12/1/2022	53,182,940	1,052,175	(2,457,230)	(2,616,825)	(1,216,140)	(21,666,769)	(17,125,318)	0	0	9,152,832
12/1/2023	55,310,258	1,052,175	(2,330,510)	(2,766,475)	(1,217,173)	(23,368,453)	(17,121,318)	0	0	9,558,504
12/1/2024	57,522,668	1,052,175	(2,630,133)	(2,924,325)	(2,464,241)	(23,787,265)	(17,117,318)	0	0	9,651,561
12/1/2025	59,823,575	1,052,175	(2,472,437)	(3,089,350)	(2,464,473)	(25,641,790)	(17,113,318)	0	0	10,094,381
12/1/2026	62,216,518	1,052,175	(2,774,865)	(3,289,225)	(2,465,602)	(27,177,558)	(17,109,318)	0	0	10,452,125
12/1/2027	64,705,178	1,052,175	(2,623,009)	(3,496,275)	(2,458,082)	(29,157,314)	(17,105,318)	0	0	10,917,355
12/1/2028	67,293,385	1,052,175	(2,840,533)	(3,713,575)	(2,459,279)	(30,902,216)	(17,101,318)	0	0	11,328,639
12/1/2029	69,985,121	1,052,175	(2,782,750)	(3,940,100)	(1,206,974)	(33,963,294)	(17,097,318)	0	0	12,046,859
12/1/2030	72,784,526	1,052,175	(3,223,756)	(4,178,925)	(1,208,244)	(35,677,598)	(17,093,318)	0	0	12,454,859
12/1/2031	93,471,010	1,052,175	(2,848,581)	(4,407,500)	(1,209,552)	(38,153,723)	(17,089,318)	(16,788,640)	(986,463)	13,039,407
12/1/2032	96,524,957	1,052,175	(3,197,045)	(4,634,025)	(1,962,682)	(39,536,459)	(17,085,318)	(16,790,090)	(1,011,124)	13,360,389
12/1/2033	99,700,175	1,052,175	(3,132,011)	(4,870,800)	(1,964,070)	(41,946,598)	(17,081,318)	(16,791,080)	(1,036,403)	13,930,071
12/1/2034	103,000,203	1,052,175	(3,628,366)	(5,119,875)	(1,965,499)	(43,992,396)	(17,077,318)	(16,790,290)	(1,062,313)	14,416,321
12/1/2035	106,433,775	1,052,175	(3,322,750)	(5,379,200)	(2,055,333)	(46,721,918)	(17,073,318)	(16,791,400)	(1,088,870)	15,053,160
12/1/2036	108,671,194	1,052,175	(3,478,155)	(5,685,675)	(3,844,095)	(46,792,788)	(16,969,318)	(16,787,760)	(1,116,092)	15,049,486
12/1/2037	110,968,570	1,052,175	(3,525,104)	(5,955,250)	(4,944,285)	(47,384,480)	(17,069,318)	(16,788,050)	(1,143,994)	15,210,263
12/1/2038	113,325,323	36,124,675	(4,083,758)	(6,238,150)	(4,945,894)	(76,959,732)	(17,065,318)	(16,790,290)	(1,172,594)	22,194,262
12/1/2039	115,740,909	0	(3,739,783)	(6,534,375)	(4,947,551)	0	(66,767,630)	(16,792,500)	(1,201,909)	15,757,161
12/1/2040	118,209,819	0	(4,049,921)	(6,841,875)	(4,860,896)	0	(68,315,105)	(16,787,700)	(1,231,957)	16,122,365
12/1/2041	120,746,912	0	(3,828,253)	(7,165,944)	(3,075,409)	0	(71,703,326)	(16,789,240)	(1,262,756)	16,921,985
12/1/2042	123,346,094	0	(4,596,306)	(7,505,363)	(2,226,345)	0	(73,571,420)	(16,789,480)	(1,294,325)	17,362,855
12/1/2043	126,011,639	0	(4,209,159)	(7,860,859)	(2,340,144)	0	(75,634,049)	(16,791,110)	(1,326,683)	17,849,636
12/1/2044	128,742,533	0	(4,558,221)	(8,233,192)	(2,342,065)	0	(77,231,160)	(16,791,490)	(1,359,850)	18,226,554
12/1/2045	131,537,799	0	(4,465,497)	(8,623,162)	(2,344,044)	0	(61,258,537)	(16,787,980)	(1,393,846)	36,664,733
12/1/2046	134,411,504	0	(5,011,714)	(9,031,603)	(2,346,082)	0	(115,000)	(16,792,940)	(1,428,692)	99,685,473
12/1/2047	137,351,768	0	(4,737,446)	(9,459,390)	(6,626,429)	0	0	(16,792,740)	(1,464,410)	98,271,353
12/1/2048	140,362,414	0	(5,130,318)	(9,907,439)	(9,064,843)	0	0	(16,789,410)	(1,501,020)	97,969,385
12/1/2049	143,451,979	0	(5,025,956)	(10,376,710)	(9,067,070)	0	0	(16,789,650)	(1,538,545)	100,654,048
12/1/2050	146,618,386	0	(5,822,461)	(10,868,208)	(9,069,363)	0	0	(16,789,500)	(1,577,009)	102,491,845
12/1/2051	131,458,175	0	(5,144,852)	(11,382,987)	(9,213,520)	0	0		0	105,716,816

Source: KABATA December 2012 Financial Plan

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Appendix C

State Reserve Fund Cash Flows for 2014 through 2061

Date	Beginning Balance	Excess Revenues	Interest @ 3.000%	State Replenish	Draw on Reserve	General Surplus Withdrawals	Ending Balance
Totals	$150,000,000	$2,448,220,452	$90,200,527	$41,186,141	($ 216,197,278)	($ 2,513,409,842)	$ 0
12/1/14	150,000,000	0	4,500,000	0	0	0	154,500,000
12/1/15	154,500,000	0	4,635,000	0	0	0	159,135,000
12/1/16	159,135,000	0	4,774,050	0	0	0	163,909,050
12/1/17	163,909,050	0	4,917,272	0	(20,707,542)	0	148,118,780
12/1/18	148,118,780	0	4,443,563	0	(16,021,849)	0	136,540,494
12/1/19	136,540,494	0	4,096,215	0	(14,463,497)	0	126,173,212
12/1/20	126,173,212	0	3,785,196	0	(9,994,351)	0	119,964,057
12/1/21	119,964,057	0	3,598,922	0	(11,193,392)	0	112,369,587
12/1/22	112,369,587	0	3,371,088	0	(9,222,715)	0	106,517,959
12/1/23	106,517,959	0	3,195,539	0	(7,186,547)	0	102,526,951
12/1/24	102,526,951	0	3,075,809	0	(5,064,232)	0	100,538,528
12/1/25	100,538,528	0	3,016,156	0	(2,814,254)	0	100,740,430
12/1/26	100,740,430	0	3,022,213	0	(20,359,734)	0	83,402,908
12/1/27	83,402,908	0	2,502,087	0	(16,765,441)	0	69,139,555
12/1/28	69,139,555	0	2,074,187	0	(13,026,282)	0	58,187,459
12/1/29	58,187,459	0	1,745,624	0	(9,159,833)	0	50,773,250
12/1/30	50,773,250	0	1,523,198	0	(5,070,573)	0	47,225,875
12/1/31	47,225,875	0	1,416,776	6,407,492	(20,212,506)	0	34,837,637
12/1/32	34,837,637	0	1,045,129	17,092,608	(15,796,112)	0	37,179,262
12/1/33	37,179,262	0	1,115,378	11,282,105	(11,242,797)	0	38,333,948
12/1/34	38,333,948	0	1,150,018	6,020,842	(6,426,203)	0	39,078,605
12/1/35	39,078,605	0	1,172,358	383,094	(1,469,418)	0	39,164,639
12/1/36	39,164,639	2,314,147	1,174,939	0	0	0	42,653,726
12/1/37	42,653,726	6,486,023	1,279,612	0	0	0	50,419,360
12/1/38	50,419,360	10,886,674	1,512,581	0	0	0	62,818,615
12/1/39	62,818,615	15,432,528	1,884,558	0	0	(13,066,466)	67,069,236
12/1/40	67,069,236	20,102,224	2,012,077	0	0	(25,196,099)	63,987,438
12/1/41	63,987,438	21,545,527	1,919,623	0	0	(26,632,756)	60,819,832
12/1/42	60,819,832	23,039,093	1,824,595	0	0	(24,779,365)	60,904,155
12/1/43	60,904,155	24,574,678	1,827,125	0	0	(26,318,006)	60,987,951
12/1/44	60,987,951	26,146,855	1,829,639	0	0	(27,886,631)	61,077,814
12/1/45	61,077,814	27,760,724	1,832,334	0	0	(29,501,280)	61,169,592
12/1/46	61,169,592	29,406,406	1,835,088	0	0	(31,147,116)	61,263,970

Appendix C

State Reserve Fund Cash Flows for 2014 through 2061
(*Continued*)

Date	Beginning Balance	Excess Revenues	Interest @ 3.000%	State Replenish	Draw on Reserve	General Surplus Withdrawals	Ending Balance
12/1/47	$ 61,263,970	$ 31,100,040	$ 1,837,919	$ 0	$ 0	$ (32,845,750)	$61,356,179
12/1/48	61,356,179	32,837,127	1,840,685	0	0	(34,582,704)	61,451,288
12/1/49	61,451,288	34,618,775	1,843,539	0	0	(45,565,697)	52,347,904
12/1/50	52,347,904	36,441,530	1,570,437	0	0	(90,359,871)	0
12/1/51	0	56,713,896	0	0	0	(56,713,896)	0
12/1/52	0	169,559,550	0	0	0	(169,559,550)	0
12/1/53	0	174,336,801	0	0	0	(174,336,801)	0
12/1/54	0	179,132,052	0	0	0	(179,132,052)	0
12/1/55	0	184,247,243	0	0	0	(184,247,243)	0
12/1/56	0	205,921,417	0	0	0	(205,921,417)	0
12/1/57	0	216,094,233	0	0	0	(216,094,233)	0
12/1/58	0	221,170,146	0	0	0	(221,170,146)	0
12/1/59	0	227,027,149	0	0	0	(227,027,149)	0
12/1/60	0	232,812,487	0	0	0	(232,812,487)	0
12/1/61	0	238,513,127	0	0	0	(238,513,127)	0

Source: KABATA December 2012 Financial Plan

Appendix D

Conceptual Differences Between Mat-Su* & CDM Smith Population & Employment Estimates As Interpreted by Western Demographics, Inc.*** - 4/30/12**

Mat-Su Pop / Employment Estimates	CDM Smith Pop / Employment Estimates
Purpose - To Plan and Time Capital Improvements Focusing on Roads Throughout the Mat-Su Borough	Purpose - To Estimate Bridge Toll Revenue from Crossings
Local Micro Economic Model	Regional Macro Economic Model
Traditional Job Growth Model Linked to Local Conditions	Regional Model Based on Anchorage / Mat-Su Regional Statistical Area (RSA) Environment
Verified with Local Information from Business People, Realtors, Bankers, Land Use and Transportation Planners. Borough Ordinances and Community Plans	Derived from Expected Spill-over of Anchorage Growth Expectations Given Housing Cost Differential and Housing and Industrial Land Shortages in Anchorage
Reconciles to 2035 ISER Over-all Mat-Su Growth Control Totals	Reconciles to 2035 ISER Control Totals with Growth Emphasis on Southwest Quadrant
Density Basis - Mat-Su Borough	Density Basis - Anchorage
Nominal Domestic Water and Sewer Availability in KGB Corridor. Estimates Based on On-site Well / Septic and Small-scale Utility Districts Similar to Settler's Bay	Assumes Domestic Water and Sewer Availability Will Develop to Suit Prescribed Density
Smaller Amounts of Residential in KGB Corridor	Larger Amount of Residential in KGB Corridor
Smaller Population and Employment in Port MacKenzie	Larger Population and Employment in Port MacKenzie
Smaller Population and Employment in Greater Port MacKenzie	Larger Population and Employment in Greater Port MacKenzie
Limited Retail in Port District	Larger-scale Retail in Port District - Estimates Predated Port Plan and Regulations
Limited Office Land Use to Serve Local Industrial Concerns	More Extensive Office Land Uses
Less Extensive and Longer-Term Upgrades to KGB and PMR (Point MacKenzie Road) Proposed	More Extensive and Shorter-Term Upgrades to KGB and PMR (Point MacKenzie Road) Potentially Necessary
Linkage of PMR to North Assumed to be Burma Rd. North Big Lake Rd.	Linkage of PMR to North Undefined

*Mat-Su * - Mat-Su traffic model estimates predominantly developed and refined by Mat-Su Traffic Modeling Consultant - HDR, Inc.*

*CDM Smith ** - Formerly Wilbur Smith and Associates (WSA) - Estimates developed for KABATA*

*Western Demographics, Inc.*** - Mat-Su Borough Build-out and Demographic Consultant (WDI)*

WDI Interviewed most parties involved in the development of the two estimates during April of 2012 and observed the listed conceptual differences.

Source: Document provided by Mat-Su Borough Planning Department

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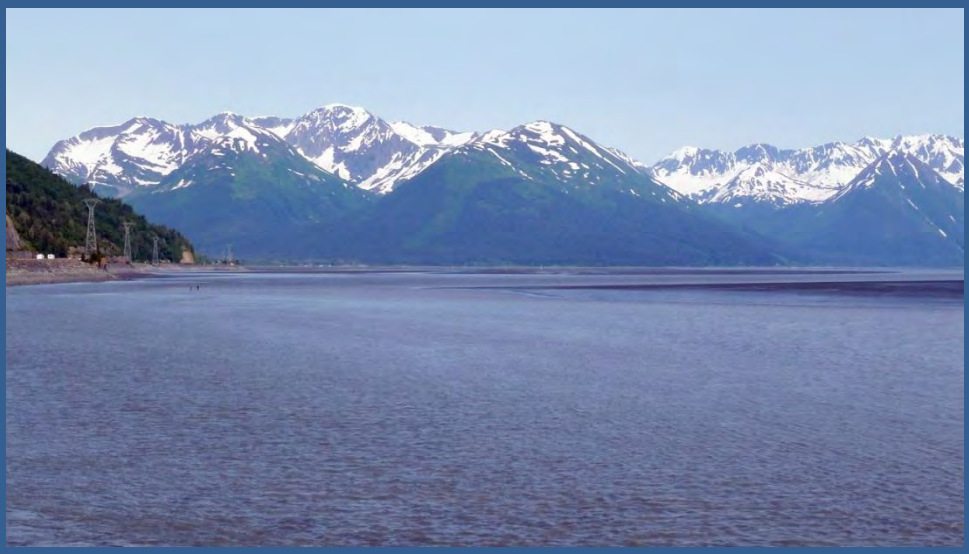
THE KNIK ARM CROSSING: AN INDEPENDENT REVIEW OF TRAFFIC AND TOLL REVENUE PROJECTIONS



December 21, 2012

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Executive Summary

The purpose of this report is to objectively review the 2017-2051 traffic and toll revenue projections for the Knik Arm Crossing (KAC) presented by Knik Arm Bridge and Toll Authority (KABATA).[1] The traffic and toll revenue projections for 2017-2036 were developed by Wilbur Smith Associates (WSA).[2]

This review evaluates the projected traffic and toll revenues for the KAC as summarized in WSA's 2011 report Proposed Knik Arm Bridge: Traffic and Toll Revenue Forecast (2011), and an August 2012 memorandum assuming a 2017 launch date, including their process of derivation from earlier WSA studies.

Based on the various WSA reports, the review concludes that the traffic and toll revenue projections for KAC are optimistic.

This review recommends implementation of eight changes to the assumptions, inputs and modeling used in the current projections. These are:

- Examine road conditions such as instance delay minutes on alternative trip assignments) in the MSA throughout the study period as traffic levels rise.
- Update the origin-destination pairings.
- Revise downwards the forecast growth in households during the study period in line with ISER growth rates.
- Revise downwards the forecast growth rate in employment during the study period in line with ISER growth rates.
- Update the gasoline prices used in vehicle operating cost estimates, and give additional consideration to alternative scenarios for future gasoline price levels throughout the study period.
- Adjust value of time estimates for changes in real income over the study period.
- Enhance the risk analysis, to include a wider set of input variables with well-specified distributions in the Monte Carlo simulations.
- Commission an independent organization to produce traffic and toll revenue projections based on modeling for the period 2037 through 2051.

This review suggests six clarifications for the current projections. These are:

- The high dependence of the traffic and toll revenue projections on strong economic development and population growth in the Point MacKenzie area, north of it, and to the south and west of Wasilla and Houston.

[1] KAC Pro Forma Financial Model, August 20 2012.
[2] In 2011 WSA was acquired by CDM Smith.

- The disparity between average annual growth rate in the base 2012 memorandum projections post-2020[3] (5.0%) and the average growth rate in AADT 2001-2011 for Glenn Highway at Eklutna Flats is (1.93%). The 1.93% amount noted has been retracted. The average growth rate in AADT 2001-2011 for the Glenn Highway in Eklutna Flats should be 2.5 percent.
- The disparity between the commercial vehicle/passenger vehicle split used in the studies (approximately 12%) and the traffic count data for Glenn Highway at Eklutna Flats (approximately 5%).
- The constant commercial vehicle/passenger vehicle split used in the studies throughout the study period.
- The optimality of a constant real toll of $5 throughout the study period.
- The difference in implicit elasticities between the 2007 and 2011 reports and the usage of the 2007 report elasticities in the 2011 projections.

[3] After the "ramp-up" period has ended.

CONTENTS

1. Scope and Method

1. The purpose of this report is to objectively review the 2017-2051 traffic and toll revenue projections for the Knik Arm Crossing (KAC) presented by Knik Arm Bridge and Toll Authority (KABATA).[4] The traffic and toll revenue projections for 2017-2036 were developed by Wilbur Smith Associates (WSA).[5] This is an essential prerequisite, prior to the appointment of a DBFO contractor by the KABATA, to design, build, finance, operate and maintain the Knik Arm Crossing (KAC).

2. In particular, it considers the reasonableness of the projected traffic and toll revenues for the KAC as summarized in the following two reports:

   - Proposed Knik Arm Bridge: Traffic and Toll Revenue Forecast (2011), Wilbur Smith Associates
   - Memorandum: Traffic and Revenue Update Assuming Year 2017 Opening for the Proposed Knik Arm Crossing, CDM Smith, August 23, 2012

3. The evaluation also encompasses the projections, and the process of their derivation, in the Proposed Knik Arm Bridge: Traffic and Toll revenue Forecast (2007), Wilbur Smith Associates, and a preliminary report published in 2005. All sources are listed in the Principal Sources section of this report.

4. Beginning with a brief description of the KAC project, which is currently in the pre-construction phase, this review offers a summary description of the methods employed by WSA to produce the projections in 2011, alongside a general evaluation of the modeling framework and its internal consistency.

5. The validity of the assumptions and inputs used in the modeling process are then examined. These include actual and planned road improvements, current population/household levels and forecast growth rates, employment levels and forecast growth rates, vehicle operating costs (VOC), value of time (VOT), and, revenue days.

6. An examination and evaluation of WSA's 2011 traffic and toll revenue forecasts is provided, using Glenn Highway as a good indicator of the size of the current[6] potential "market" for the KAC. Reference is also made to the forecast growth in the Matanuska-Susitna area, identified by WSA's 2005 report as the KAC's core trip attraction target market, and WSA's toll elasticity calculations.

7. The risk analysis input variables employed by WSA as part of a Monte Carlo simulation are examined, including their specification and profile.

8. A series of recommendations and clarifications which, if implemented, could enhance the validity of WSA's 2011 report are made.

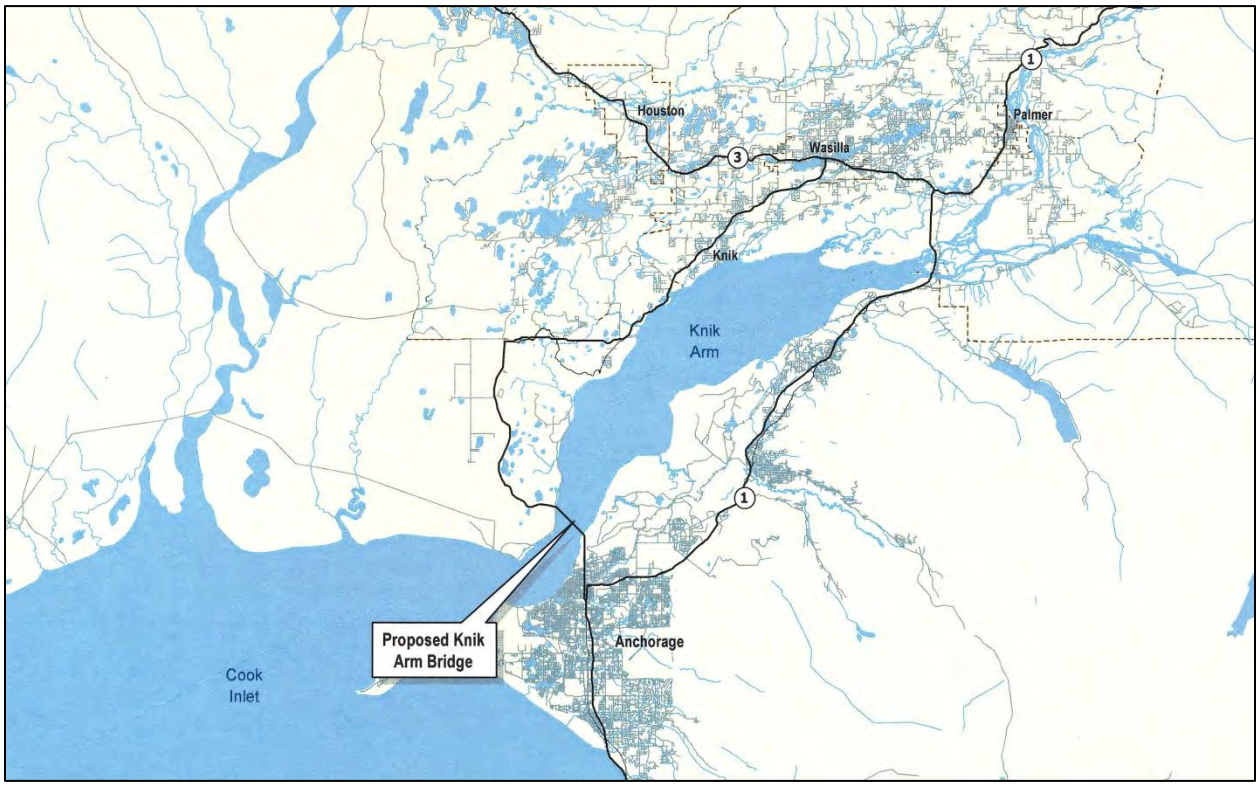
[4] KAC Pro Forma Financial Model, August 20 2012.
[5] In 2011 WSA was acquired by CDM Smith.
[6] "Current" in the sense of absent significant population growth in the Port MacKenzie area.

9. It is important to note that access to WSA's models and modeling framework used to produce the 2011 traffic and toll revenue projections was not granted as part of this independent review. Sufficient information is available in the reports available, however, to perform this review.

2. The Knik Arm Crossing (KAC) Project

10. The Knik Arm Crossing is a 2.7 mile vehicular toll bridge which would span the Knik Arm of Upper Cook Inlet, approximately one mile north of the Port of Anchorage. First mooted in the 1950s, the proposed bridge would connect the Port of Anchorage to Point MacKenzie in Matanuska-Susitna Borough –the 35th fastest growing county in the United States. The two locations are currently separated by 90 miles of road, but the proposed 2.7 mile bridge would support freight-mobility, and improve regional operations serving airport, military and consumer needs.[7]

Figure 1: Knik Arm Crossing Area Base Map



11. The Port of Anchorage is a critical link between the U.S. and Alaska, providing an estimated 90% of the merchandise cargo to 80% of Alaska's populated areas. It also provides essential fuel supplies to the Anchorage and south-central area, and is the entry point for many goods and cargos distributed to rural Alaskan communities. The Port is located just north of Ship Creek near downtown Anchorage on the Knik Arm of the Cook Inlet of the Pacific Ocean.[8]

[7] Source: http://www.knikarmbridge.com
[8] Sources: http://www.knikarmbridge.com and Wikipedia (http://en.wikipedia.org/wiki/Port_of_Anchorage).

12. Anchorage has a population of 291,825, consisting of 107,332 households and 70,554 families. The racial makeup of Anchorage is 66% White, 5.6% Black or African American, 7.9% Native American, 8.1% Asian, 2.0% Pacific Islander, 2.3% other races, and 8.1% two or more races.[9]

13. Approximately one third of Anchorage households include children under the age of 18. 48.4% contain married couples living together, 11.7% a female householder with no husband present, and 34.3% non-families. 24.9% of all households have single occupants, and 4.9% have someone living alone aged 65 or older. The average household size is 2.64 and the average family size is 3.19.[10]

14. The age profile of Anchorage is 26% under the age of 18, 16.9% in their twenties, 13.8% in their thirties, 14.4% in their forties, 14.1% in their fifties, and 7.2% 65 years of age or older. The median age is 32.9 years. For every 100 females, there are 103.2 males.[11]

15. Matanuska-Susitna Borough (often referred to as the Mat-Su Borough) is one of the few agricultural areas of Alaska. It has a population of 88,995, consisting of 31,824 households and 22,579 families (US Census Bureau, 2010). The borough seat is Palmer and the largest city is Wasilla. The racial makeup of Mat-Su Borough is 84.9% White, 1% Black or African American, 5.5% Native American, 1.2% Asian, 0.2% Pacific Islander, 0.7% other races, and 6.5% two or more races.[12]

16. Approximately 35.3% of Mat-Su Borough households include children under the age of 18. 56.6% of households contain married couples living together, 8.7% a female householder with no husband present, and 29.1% non-families. 22.3% of all households have single occupants, and 5.6% have someone living alone aged 65 or older. The average household size is 2.75 and the average family size is 3.23.[13]

17. The age profile of Mat-Su Borough's population is 28.9% under the age of 18, 12.2% in their twenties, 13.1% in their thirties, 14.9% in their forties, 15.3% in their fifties, and 7.90% 65 years of age or older. The median age is 34.8 years. For every 100 females, there are 107.18 males.[14]

18. Historically, in the absence of a connection across the Knik Arm, growth in the region has been northeasterly along the east side of the inlet, and also along the Parks Highway in Wasilla. Growth in Point MacKenzie to date has not been realized.[15]

[9] Source: U.S. Census Bureau, *2010 Census*.
[10] Source: U.S. Census Bureau, *2010 Census*.
[11] Source: U.S. Census Bureau, *2010 Census*.
[12] Source: U.S. Census Bureau, *2010 Census*.
[13] Source: U.S. Census Bureau, *2010 Census*.
[14] Source: U.S. Census Bureau, *2010 Census*.
[15] Source: Wilbur Smith Associates (2005), *Knik Arm Bridge Preliminary Traffic and Toll Revenue Study*.

3. KAC Traffic and Toll Revenue Projection Framework – Summary and Evaluation

19. WSA used a four-stage classical urban transportation planning framework to produce the various traffic and toll revenue projections, including the 2007 and 2011 variations.

This is an industry-standard, ubiquitous framework employed for this area of transportation planning/engineering.

20. In general, the four step transportation planning framework contains the following sequential elements:

- **Trip generation**: this focuses on need creation, to estimate the number of trips made by a range of purposes, such as employment, leisure, shopping, etc.
- **Trip distribution**: this analyzes the origins and destinations of trips.
- **Modal choice**: this considers the range of options open to groups and individuals for their journeys (e.g. bus, car, rail, personal car, etc.).
- **Route assignment**: this evaluates the most cost-effective means of travel, in terms of both time and cost, which does not always equate to the shortest route available.

21. WSA's model for developing the traffic and toll revenue projections is based on the HDR Alaska, Inc. regional transportation model which seems to date to 2000. This is itself based upon two prior transportation models – the Anchorage Metropolitan Area Solutions (AMATS) and the Mat-Su travel demand models.

The scope of this review did not include the HDR Alaska, Inc. regional transportation model or its precedents.

22. The HDR regional transportation model was built in TransCad but converted into CUBE Voyager by WSA for use with toll algorithms.

TransCad and CUBE Voyager are both well-known and respected transportation planning software.

23. The study area used was the Anchorage Metropolitan Statistical Area (MSA).

This is wholly appropriate since the majority of traffic using the current road transportation system, or indeed likely to use it given the building of the KAC, would be drawn from this geography.

24. The WSA model divides the MSA into approximately 600 Traffic Analysis Zones (TAZ).

This seems appropriate and the TAZs seem well-defined.

25. The representation of the road transportation network in the study area was developed using the HDR regional transportation model from 2000 as a base. The various sources were then updated to create a 2005 network representation in the base WSA model. The representation was updated in both the 2007 and 2011 to reflect proposed and actual changes to the road transportation network over the study periods. The WSA model assumes the KAC and accessing roadways would be expanded from 2 to 4 lanes in 2030.

The information sources consulted for this updating seem comprehensive and appropriate.

26. The representation of the road conditions evident on the road transportation network in the study area appear entirely based on a 2005 base year. Although WSA seem to have made strenuous efforts in this regard, it must be noted that speed, delay and congestion conditions may well have changed significantly over the intervening seven year time span.

This may make some of the parameters within the model related to network conditions questionable.

27. Using the HDR regional transportation model from 2000 as a starting point, WSA calibrated their model for their base year of 2005 mainly using an origin-destination travel survey conducted during that year.

Given the vintage of this calibration, some of the parameters relating to origin-destination pairings within the model may be questionable due to the long-run nature of the projections. For example, particular zones may mutate over the study period to become strong attractors of trips if entertainment or retailing opportunities are enhanced in those TAZs. WSA's modeling is industry-standard – this is a deficiency of the general approach.

28. The primary inputs in trip generation and trip distribution steps of WSA's model are the number of households and the level of employment by TAZ. Essentially the WSA model uses some simple regression analysis to estimate the relationship among trips in the study area (as the dependent variable) and households and employment. The resulting estimated relationship is then used to forecast trips based on predictions of households and employment. Clarification was sought[16] of the nature of the regression analysis conducted but the information provided in the CDM Smith memorandum of October 18, 2012 was insufficient to evaluate the regression analysis performed. Forecast total trips are then allocated to TAZ by a Fratar (adapted growth factor) method. The updating is done for 5-year increments, with interpolation for the intervening years.

Model updates were thus reliant on the quality of the estimated regression equation about which insufficient information was made available.

29. WSA did not pay any attention to modal choice during the creation of their model – that is, Step 3 in the generic four step transportation planning framework described above.

[16] In the process of this review through contact with CDM Smith.

Given the nature of the modal splits for the study area, this is appropriate.

30. Step 4 (route assignment) in the WSA approach is reliant on accurate road transportation network modeling, value of time and vehicle operating costs inputs.

No assessment can be made of the way in which these were incorporated into the modeling because the actual WSA models were not available for auditing.[17]

31. The study period for the 2007 version of the traffic and toll revenue projections was 2012 through 2030. For the 2011 version, the study period was 2016 through 2035. The traffic and toll revenue projections for the period 2036 through 2051 were directly produced by KABATA.

This is somewhat troublesome since the independence of the forecasting and the expertise with which it was produced could be questioned.

[17] However, the time and distance savings estimated associated with the bridge/no bridge scenarios in the 2007 report seem curious. More explanation of how these were derived would be useful. Take, for example, Table 17 in the 2007 report for a journey between Knik Fairview Area and the Eagle River Area in 2012. Data presented on this particular journey suggests an average speed "With Bridge" of approximately 43mph (52.6 miles in 73.4 minutes) whereas "No Bridge" has an average speed associated with it of approximately 31mph (39.6 miles in 76.5 minutes). Thus for this specific origin-destination pairing, despite the fact that "No Bridge" entails a journey that is shorter by 13 miles than the "With Bridge" journey, there is a time saving in favor of the "With Bridge" journey of 3.1 minutes.

4. Assumption Validity

32. This section examines the validity of the assumptions/inputs used in the modeling process. The inputs examined were actual and planned road network improvements, population/household levels and forecast growth rates, employment levels and forecast growth rates, vehicle operating costs (VOC) and value of time.

4.1 Actual and Planned Road Network Improvements

33. WSA's 2007 report consulted 5 primary sources to compile a list of transportation network improvements up to and including 2030. These were:

- Anchorage Metropolitan Area Transportation Solutions (AMATS) Transportation Improvement Plan (TIP), 1998-2000.
- Municipality of Anchorage TIP 2005-2009.
- Municipality of Anchorage Long Range Transportation Plan (LRTP), 2010-2025.
- Mat-Su LRTP, 2025.
- Confirmation of Projects from Alaska Department of Transportation (DOT).

These are all reputable sources.

34. This resulted in the identification of 40 projected improvements within the Municipality of Anchorage and 5 projected improvements in Mat-Su Borough.

This seems appropriate and well-defined.

35. Two of the improvements originally modeled to occur in 2005 were completed by the time of WSA's 2011 review – the 15th Avenue reconstruction and Arctic Road expansion in the Municipality of Anchorage. Since that time, 8 of the 9 projects listed for 2012 in the Municipality of Anchorage TIP have been completed. The one exception appears to be the Independence Drive extension. This is based on Table 4-1 of the 2035 Metropolitan Transportation Plan. Completion of the local street reconstruction in the vicinity of the proposed KAC site, identified in the Municipality of Anchorage LRTP 2010-2025, is also unconfirmed.

This generally supports the accuracy of the network improvements identified by WSA for 2012.

36. Work on other network improvements, originally identified by WSA to occur in or by 2015 have either started or occasionally been completed. These include the Old Seward Highway reconstruction (404), the Dowling Road extension (416), the Boniface Parkway extension (604), and at least part of the 100th Avenue extension (418).

37. WSA appears to have overlooked the Muldoon Road improvements (Tudor Road to Glenn Hwy), the Arctic Boulevard surface rehabilitation (Fireweed Lane to International Airport Road) and the reconstruction of the Lake Otis Parkway/Tudor Road intersection in its original network assumptions.

Some minor modifications are needed to update and enhance the accuracy of WSA's network improvement assumptions, post-2012.

4.2 Socioeconomics (Households and Employment)

38. The two inputs used by WSA to drive demand (total trips) for the transportation system in the study area are the number of households and the level of employment. Forecasts for these two variables were generated in a common framework and are therefore discussed together in this section.

39. Numerous sources were consulted to construct the household and employment forecasts used in both the 2007 and 2011 reports. These included the Institute of Social and Economic Research at the University of Alaska, Anchorage, Northern Economics, the Alaska Department of Labor and Workforce Development and Woods and Poole Economics.

These are all reputable sources.

40. These base sources were analyzed and supplemented by a study carried out by Insight Research Corporation in 2007. The socioeconomic variables were updated in the 2011 report to reflect more recent evidence on population and employment. Tables 1 and 2 below summarize the forecasts from various sources, including the two WSA studies for households and employment in the event that the KAC was built.

Table 1: Households

	Households			
	ISER 2005	**ISER 2009**	**WSA 2007 Report**	**WSA 2011 Report**
2010-2035 Growth Rate		1.60%		1.70%
2010-2030 Growth Rate	1.50%		2.20%	
2035 Levels		199,700		217,300
2030 Levels	207,100		225,585	

41. A comparison of the 2035 and 2030 levels in Table 1 shows that the 2007 report had inflated estimates of the likely number of households in the study area for 2030. Although the forecast growth rate for the number of households in the study area was revised downwards in the 2011 report, it was still above the ISER forecast by at least 17,000.

The forecast growth for households during the study period in the study area seems optimistic.

42. A comparison of the ISER's employment growth rate forecast with the 2007 study also suggests a level of optimism. The 2011 study adjusted the growth rate of employment downwards to 1.2%, but this was still above the growth rate forecast by the ISER.

Table 2: Employment

	Employment			
	ISER 2005	**ISER 2009**	**WSA 2007 Report**	**WSA 2011 Report**
2010-2035 Growth Rate		1.10%		1.20%
2010-2030 Growth Rate	1.31%		1.60%	
2035 Levels		307,100		250,900
2030 Levels	231,100		246,300	

The 2011 report forecast growth rate in employment seems slightly optimistic.

43. The previous comments relating to the forecast levels of employment and the number of households in over the study period are reinforced by an examination of the population forecasts produced by the ISER and the Alaska Department of Labor and Workforce Development. Table 3 below illustrates.

Table 3: Population

	Population				
	ISER 2005	**ISER 2009**	**WSA 2007 Report**	**WSA 2011 Report**	**AK Labor Dept. 2011**
2010-2035 Growth Rate		1.40%		1.60%	1.30%
2010-2030 Growth Rate	1.70%		2.20%		
2035 Levels		522,100		557,100	517,452[18]
2030 Levels	550,500		613,200		

44. Table 3 clearly demonstrates that the ISER and Alaska Department of Labor and Workforce Development broadly agree on the population growth rate in the study area over the study period and, indeed, the absolute level in 2035. WSA's forecast population in the study area in 2030, presented in their 2007 report, was over 90,000 more than the ISER and Alaska Department of Labor and Workforce Development for 2035. In their 2011 report, WSA reduced the forecast population growth, but it still remained optimistic. This was reflected in the household and employment forecast growth rates in the study area used to generate WSA's projections.

[18] Estimate is for 2034.

4.3 Vehicle Operating Costs (VOC)

45. VOC estimates were derived from National Energy Information Administration and American Automobile Association (AAA) data. The principal elements used to calculate the VOC were the price of gasoline, average fuel economies and other vehicle maintenance costs.

These sources are appropriate.

46. The information used to derive VOC estimates dates to 2009 and 2010.[19] Neither the 2007 nor the 2011 reports contained any mention of using forecasts for the price of gasoline, changes in average fuel economies or other vehicle maintenance costs over the study period.

This seems inappropriate given the importance of VOC in route assignment.

4.4 The Value of Time (VOT)

47. The VOT estimates used in the WSA model were derived from a stated preference study (carried out by Resource Systems Group, Inc. (RSG)) which took place between April and June 2007. VOT derived from stated preference studies is quite common. However, there is an ongoing debate as to the reliability of the stated preference estimates of VOT generally.

While the stated preference study carried out appears to have been appropriately conducted (and is not part of the scope of this review), the accuracy of the VOT estimates cannot be confirmed until revealed preference data is available. The availability of this data is critical, given the importance of VOT estimates in WSA's model.

48. The VOT estimates for 2007 and the updates used in the 2011 study were compounded annually to account for inflation. However, VOTs are also somewhat dependent on real income.

WSA's estimates of VOT make no allowance for changes in real income over the study period among the different income groups within the study area.

[19] In the 2011 version.

5. Traffic and Toll Revenue Examination

49. This section evaluates the actual traffic and toll revenue projections in a 2012 update[20] of WSA's 2011 report, based on an examination of the projections themselves and indirect indicators from other sources of likely traffic levels in the study area.[21] This evaluation lacks some detail since access to WSA's actual models was not granted.

5.1 Traffic Projections

50. Table 4 details the estimated annual average daily traffic (AADT) projections in the 2012 memorandum. Putting these annual average daily traffic projections into context is useful.

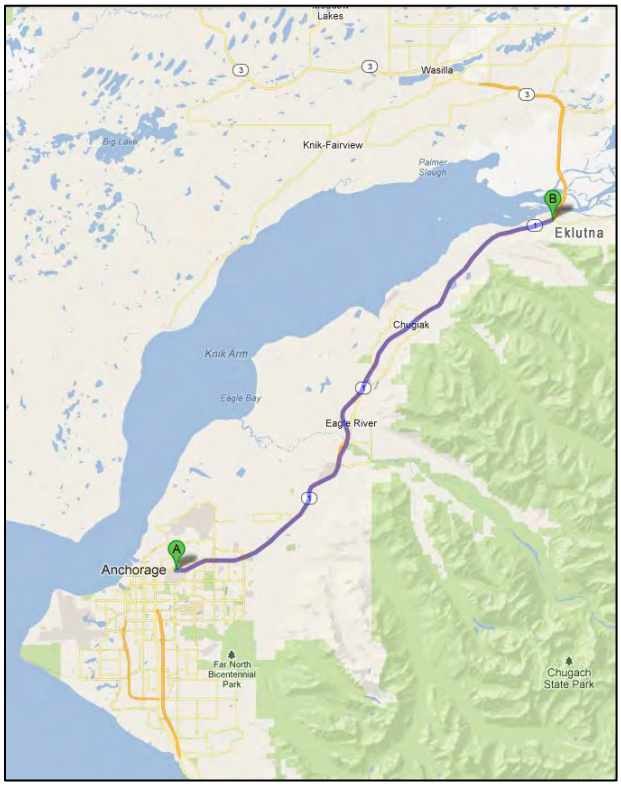
Table 4: WSA 2012 KAC Estimated Annual Average Daily Transactions (AADT)

Year	Passenger Car	Commercial Vehicle	Total Transactions[22]	Growth Rate
2017	5,900	800	6,700	
2018	8,800	1,200	10,000	49.3%
2019	11,300	1,500	12,800	28.0%
2020	13,100	1,800	14,900	16.4%
2021	14,300	2,000	16,300	9.4%
2022	15,400	2,100	17,500	7.4%
2023	16,500	2,200	18,700	6.9%
2024	17,600	2,300	19,900	6.4%
2025	18,700	2,400	21,100	6.0%
2026	19,800	2,700	22,500	6.6%
2027	21,000	2,900	23,900	6.2%
2028	22,200	3,100	25,300	5.9%
2029	23,400	3,300	26,700	5.5%
2030	24,600	3,500	28,100	5.2%
2031	25,900	3,500	29,400	4.6%
2032	27,100	3,700	30,800	4.8%
2033	28,300	3,900	32,200	4.5%
2034	29,500	4,100	33,600	4.3%
2035	30,700	4,300	35,000	4.2%
2036	31,700	4,300	36,000	2.9%
2037	32,400	4,400	36,800	2.2%
2038	33,100	4,500	37,600	2.2%
2039	33,800	4,600	38,400	2.1%
2040	34,500	4,700	39,200	2.1%

[20] In a memorandum from CDM Smith on August 23, 2012, "Traffic and Revenue Update Assuming Year 2017 Opening for the Proposed Knik Arm Crossing".
[21] This discussion references the 2011 study and 2012 update interchangeably as the 2012 update is based on the 2011 study.
[22] There is a "ramp-up" factor in operation in the table for the years 2017 through 2019.

51. Glenn Highway is currently the only effective route into and out of Anchorage for trips to and/from Matanuska-Susitna and all other destinations to the north of Anchorage, as illustrated in Figure 2 below.

Figure 2: Eklutna to Anchorage Route



52. Glenn Highway is therefore a good indicator of the size of the **current**[23] potential "market" for the KAC. Traffic count data was provided in the 2011 Annual Traffic Volume Report (Central Region) produced by the Alaska Depart of Transportation and Public Facilities for Glenn Highway at Eklutna Flats.[24] Table 5 below illustrates AADT data for Glenn Highway at Eklutna Flats for the period 2001 through 2011.

[23] "Current" in the sense of absent significant population growth in the Port MacKenzie area.
[24] At this traffic count location, there are no intersections to make interpretation complex.

Table 5: AADT Glenn Highway at Eklutna Flats, 2001 - 2011

Year	AADT	Growth Rate
2001	23,079	
2002	24,600	6.59%
2003	25,782	4.80%
2004	26,249	1.81%
2005	27,028	2.97%
2006	27,570	2.01%
2007	28,506	3.39%
2008	27,454	-3.69%
2009	28,495	3.79%
2010	29,644	4.03%
2011	29,572	-0.24%

53. Taking the 2020 KAC memorandum projections for AADT (14,900) and comparing it with the analogous 2011 traffic count data (29,572) gave a "market share" of over 50% for KAC. It is important to note that these AADT figures are **not completely comparable**. Inevitably, the AADT figures for Glenn Highway at Eklutna Flats will grow and, of course, building the KAC will engender growth in population and employment in the Point MacKenzie area.

Nevertheless this illustrates how attractive the KAC would need to be to generate the AADT in the 2012 projections. This also suggests that WSA's projections may be somewhat optimistic.

54. AADT's growth rates in the two series were more comparable. The average annual growth rate in the base 2012 AADT memorandum projections post-2020[25] was 5.0%. The average growth rate in AADT 2001 through 2011 for Glenn Highway at Eklutna Flats was 1.93% in the count data. One possible explanation for the strong growth rate in the 2012 memorandum projections was the forecast household growth rate of 3.8% in Mat-Su. However, this was still below the 2012 memorandum projections growth rate of 5.0%. The 1.93% amount noted has been retracted. The average growth rate in AADT 2001-2011 for the Glenn Highway in Eklutna Flats should be 2.5 percent.

This requires some intuitive explanation. Once the KAC has been completed and in operation for some years, it is difficult to see traffic growing at a much higher rate than for the current route.

55. To assess the market for the KAC, the 2005 report was very instructive. It pointed out that "Wasilla is beyond the area of influence for the bridge"[26], and that "Houston is a pivot point"[27]. This indicated that the core area for trip attraction for the KAC would lie to the south and west of the Wasilla/Houston area.[28] Current route journeys and times, plus the KAC alternatives, are shown in Figures 3 and 4.

[25] After the "ramp-up" period has ended.
[26] See page 3 and Figure 5.
[27] See page 3 and Figure 4.
[28] This makes the locations used to carry out the origin-destination survey in 2007 curious. The question would be why locations within the target area were not used.

Figure 3: Houston to Anchorage Current and KAC Routes

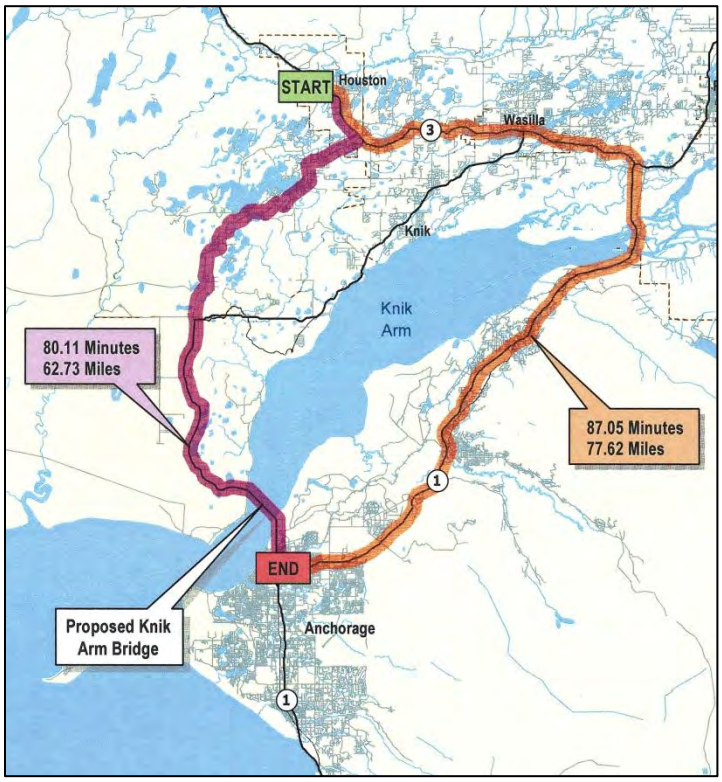
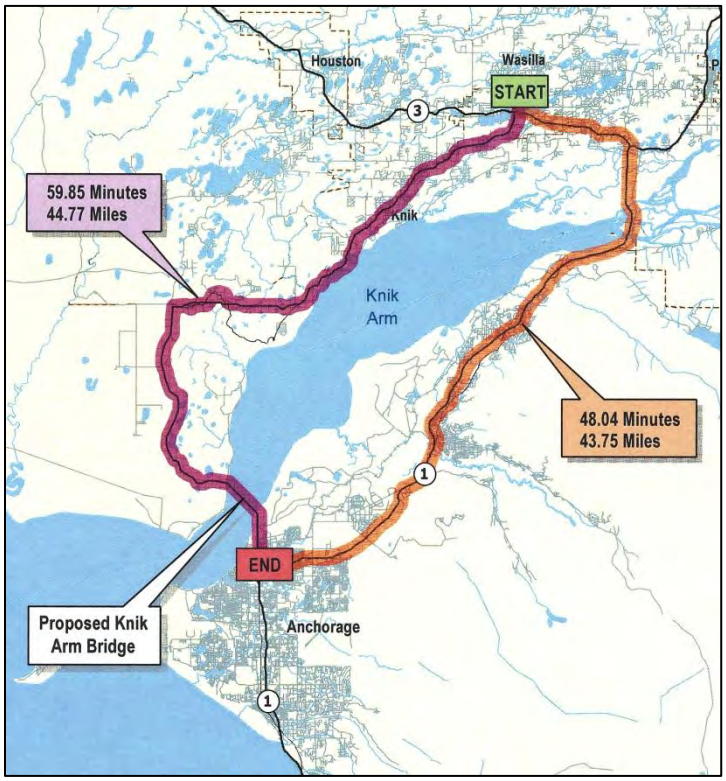


Figure 4: Wasilla to Anchorage Current and KAC Routes



56. Assuming TAZs 59, 96-104, 107, 124 and 591-597 are representative of this area, information about the expected number of households and their growth in the study period was provided by WSA in a communication in 2012.[29] Table 6 below details the estimates.

Table 6: WSA Household Estimates in Target TAZs and Study Area

	2020	2025	2030	2035
Point MacKenzie Target TAZs	10,115	15,312	19,180	22,763
Study Area	168,123	189,123	202,452	217,309

57. While there was obviously strong growth estimated predicated on the opening of the KAC, the forecast total households in Point MacKenzie target TAZs compared to the study area as a whole remains small. The 2012 memorandum and 2011 report projections for traffic and toll revenues were therefore dependent to a large extent on economic development in the target TAZs.

Essentially the traffic and toll revenue projections are highly dependent on growth in the Point MacKenzie area south and west of Wasilla and Houston.

58. Examination of the 2012 memorandum projections showed an approximate 12% split for commercial traffic for the KAC in the expected, low and high scenarios and across the entire study period.[30] No explanation of the derivation of the 12% figure was provided in the 2011 report, or its constant nature. A split of traffic count data was provided in the 2011 Annual Traffic Volume Report (Central Region) produced by the Alaska Depart of Transportation and Public Facilities for Glenn Highway at Eklutna Flats. This data suggested that the proportion of commercial traffic ranged from 4.91 to 6.62% in 2011.

Given the much higher toll to be paid by commercial vehicles, the disparity between WSA's figure and the 2011 traffic count observations is troubling and requires explanation/investigation.

5.2 Toll Projections

59. To determine projections for toll revenue, WSA's 2011 report performed a series of traffic assignment runs using toll rates ranging from $3-$7 for passenger vehicles, 2015 – 2035.[31] WSA's preference for a $5 optimal passenger vehicle toll implicitly assumed that the toll elasticity for that price was unity.[32]

One troubling aspect, however, is that this figure was constant throughout the study period. It is more likely that the optimal real toll will vary throughout the study period in response to travel changes influenced by income and population fluctuations in the study area, and the availability of substitute routes. It would be useful for WSA to explain their reasoning behind a constant real toll of $5.

[29] Excel spreadsheet Knik Arm Updated SE Data Zonal_(Base) for Kabata + Legis.xlsx supplied by Kazem Oryani, CDM Smith.
[30] Even in the "ramp-up" period of 2016 through 2018.
[31] Presumably the same process was carried out for the 2012 memorandum projections of toll revenue.
[32] By definition in Economics.

60. The 2007 report contained a series of toll elasticities based on the outturns of traffic assignment runs similar to those used in the 2011 report, all of which were less than unity. This suggested that the revenue maximizing toll level in the 2007 report should have been above the maximum $6 input in those runs. WSA's apparent failure to reach maximum toll revenue was illustrated by Figures 28 and 29 in their 2007 report, where toll revenue continued to rise above the $6 passenger vehicle level.

There needs to be some explanation of the difference in implicit elasticities between the 2007 and 2011 studies and WSA's use of the 2007 report's elasticities in the 2011 projections.

6. Risk Analysis Evaluation

61. Risk analyses are an important component in any traffic and toll revenue projection study. When conducted appropriately, they shed considerable light on the likelihood of achieving different levels of traffic and toll revenues.

6.1 Extent of Monte Carlo Simulation

62. The 2007 report did not include a risk analysis. The 2011 report included a Monte Carlo simulation-based risk analysis, apparently using the following variables:

- Base, low and high traffic levels derived from the three household and employment growth scenarios.
- The value of time.
- Revenue days.

63. The Monte Carlo simulation was run for each five-year incremental projection to generate a probabilistic profile for traffic and toll revenue over the study period.

This seems to be a very limited set of variables to examine a risk analysis of this nature. A fuller risk analysis would include the critical input variables that formed part of the models used in generating the traffic projections.

6.2 Input Variable Specifications

64. The 2011 report offered very little explanation of the way in which the base, low and high traffic levels were used in WSA's Monte Carlo simulation. The report implied that three points in the traffic distribution were used for each risk analysis year, but does not specify the nature of the distribution. In a subsequent memorandum of October 18, 2012 CDM Smith explained that they had generated four traffic projections (one each for the base, low and high socio-economic variables and one for a VOT at 70% of that used in the base case), assumed a normal distribution and then calculated the mean and standard deviation for the traffic projection distribution that was used in the Monte Carlo simulations using this in conjunction with the revenue days input variable. Using a single "reduced form" traffic projection distribution as one of just two input variables rather than household and employment growth as input variables in the risk analysis inevitably restricts the variance of the traffic and toll revenue estimates generated. Revenue days were specified as a truncated normal distribution, ranging from a minimum of 300 to a maximum of 365, and a mean of 331.8.

The two input variables in the Monte Carlo simulation are not well specified and inevitable restrict the variation the distribution of traffic levels in the outputs exhibits.

6.3 Monte Carlo Simulation Risk Profiles

65. The Monte Carlo simulation outputs exhibit normal distributions with means that are approximately the same as those for the base case traffic scenario (as would be expected). The variance of the normal distributions generated was interesting since it indicates that the high and low traffic level scenarios used as inputs were approximately one standard deviation either side of the mean.[33] Table 7 below compares projections developed in the three scenarios on the left-hand side with the outcome of the Monte Carlo simulation on the right-hand side for 2020 and 2035.

Table 7: Projections and Risk Analysis Comparisons

Scenarios			Risk Analysis
	2035 Transactions		
Low	9,964,500	11,522,500	25%
Expected	13,140,000	13,135,600	50%
High	15,184,000	14,774,400	75%
	2020 Transactions		
Low	5,219,500	5,387,400	25%
Expected	5,949,500	5,946,100	50%
High	6,789,000	6,488,100	75%

66. The lack of variation in the risk analysis and its similarity to the expected, low and high projections in the scenarios is an indirect indication that insufficient variables were used to generate the risk analysis.

In its current specification, the risk analysis adds little to the study beyond that provided in the base, low and high traffic and toll revenue projections.

[33] For a standard normal distribution one standard deviation on either side of the mean would capture approximately 68% of the distribution around the mean.

7. Recommended Changes and Clarifications

7.1 Recommended Assumption and Modeling Changes

67. To add validity to the forecasts, the following changes to WSA's assumptions/inputs and modeling procedure are recommended:

- If feasible, road conditions (for instance delay minutes on alternative trip assignments) in the study area should be examined throughout the study period as traffic levels rise.
- An updating of the origin-destination pairings may be appropriate given the vintage of the original study.
- An independent organization should produce traffic and toll revenue projections based on modeling for the period 2037 through 2051.
- The forecast growth in households during the study period used in the modeling should be revised downwards in line with ISER growth rates.
- The forecast growth rate in employment during the study period used in the modeling should be revised downwards in line with ISER growth rates.
- Gasoline prices are an important component of VOC estimates. These should be updated, and additionally consideration be given to alternative scenarios for future gasoline price levels throughout the study period.
- VOT estimates should be adjusted for changes in real income over the study period among the different income groups within the study area.
- The risk analysis is inadequate and should include a wider set of input variables with well-specified distributions in the Monte Carlo simulation.

7.2 Clarifications

68. To demonstrate the robustness or otherwise of WSA's projections, the following clarifications are recommended:

- The high dependence of the traffic and toll revenue projections on strong economic development and population growth in the Point MacKenzie area, north of it, and to the south and west of Wasilla and Houston.
- The disparity between average annual growth rate in the base 2012 memorandum projections post-2020[34] (5.0%) and the average growth rate in AADT 2001-2011 for Glenn Highway at Eklutna Flats is (1.93%). The 1.93% amount noted has been retracted. The average growth rate in AADT 2001-2011 for the Glenn Highway in Eklutna Flats should be 2.5 percent.
- The disparity between the commercial vehicle/passenger vehicle split used in the studies (approximately 12%) and the traffic count data for Glenn Highway at Eklutna Flats (approximately 5%).

[34] After the "ramp-up" period has ended.

- The constant commercial vehicle/passenger vehicle split used in the studies throughout the study period.
- The optimality of a constant real toll of $5 throughout the study period.
- The difference in implicit elasticities between the 2007 and 2011 reports and the usage of the 2007 report elasticities in the 2011 projections.

8. Summary Conclusions

69. Based on the WSA reports as they are currently drafted, this review concludes that the traffic and toll revenue projections for KAC seem optimistic.

70. This independent review suggests six clarifications. These are:

- The high dependence of the traffic and toll revenue projections on strong economic development and population growth in the Point MacKenzie area, north of it, and to the south and west of Wasilla and Houston.
- The disparity between average annual growth rate in the base 2012 memorandum projections post-2020[35] (5.0%) and the average growth rate in AADT 2001-2011 for Glenn Highway at Eklutna Flats is (1.93%). The 1.93% amount noted has been retracted. The average growth rate in AADT 2001-2011 for the Glenn Highway in Eklutna Flats should be 2.5 percent.
- The disparity between the commercial vehicle/passenger vehicle split used in the studies (approximately 12%) and the traffic count data for Glenn Highway at Eklutna Flats (approximately 5%).
- The constant commercial vehicle/passenger vehicle split used in the studies throughout the study period.
- The optimality of a constant real toll of $5 throughout the study period.
- The difference in implicit elasticities between the 2007 and 2011 reports and the usage of the 2007 report elasticities in the 2011 projections.

71. This independent review makes eight recommendations to enhance the validity of WSA's reports and KABATA's post-2036 projections. These are:

- Examine road conditions such as instance delay minutes on alternative trip assignments) in the MSA throughout the study period as traffic levels rise.
- Update the origin-destination pairings.
- Revise downwards the forecast growth in households during the study period in line with ISER growth rates.
- Revise downwards the forecast growth rate in employment during the study period in line with ISER growth rates.
- Update the gasoline prices in VOC estimates, and give additional consideration to alternative scenarios for future gasoline price levels throughout the study period.
- Adjust VOT estimates for changes in real income over the study period.
- Enhance the risk analysis, to include a wider set of input variables with well-specified distributions in the Monte Carlo simulation.
- Commission an independent organization to produce traffic and toll revenue projections based on modeling for the period 2037 through 2051.

[35] After the "ramp-up" period has ended.

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Appendix F

Resume

Timothy Jon JAMES

CURRENT POSITIONS

Research Professor - Department of Economics, Arizona State University
Director of Research and Consulting - L. William Seidman Research Institute, Arizona State University

QUALIFICATIONS

B.A. Economics (University of Warwick)
M.A. Economics (University of Warwick)
Ph.D. Economics (University of Southampton)
International Teachers' Programme (Bocconi University)
Cert.Ed. (University of Sheffield)

CAREER HIGHLIGHTS

Director, Economics and Business Solutions - Halcrow Group Ltd.
Associate Consultant (part-time) - Oxford Economic Research Associates (OXERA)
Research Fellow - Advanced Railway Research Centre
Lecturer (Professor) in Economics - University of Sheffield, UK
Associate Consultant (part-time) - Maxwell Stamp, PLC
Lecturer (Professor) in Economics - Loughborough University, UK
Lecturer (Professor) in Economics - University of Stirling, UK
Visiting Researcher - Transport Studies Unit, University of Oxford
Professor of Economics - Lyon Graduate School of Business, France

Advisor to: the Prime Minister of the UK, the European Commission, the BBC, the Commonwealth Secretariat and the Rail Passengers Council.

SELECTED RELEVANT PROJECT WORK

Evaluating PPPs in the US - Pew Center on the States, USA
Principal advisor to the Pew Center on the merits of PPP deals conducted in the US and their global comparators.

Design and evaluation of a P3 for New Jersey State Turnpike and Garden State Parkway – State of New Jersey, USA
Principal advisor to the State of New Jersey on the design of a P3 for four major roads in the State of New Jersey.

Arizona's Infrastructure Requirements and Funding Alternatives: 2008-2032 - Arizona Investment Council, USA
Director of a project examining Arizona's infrastructure requirements in water, energy, transportation and telecommunications over the 25 years from 2008.

I-69/TTC Chief Economist (TxDOT), USA - Chief Economist
Chief Economist on a ($50m) P3 project to build a transport and utilities corridor with private sector participation in Texas.

Due Diligence on $1bn P3 Concession Contract (Goldman Sachs), Chicago, USA – Principal Economist

Demand forecasting (including panel data econometrics) and the construction/validation of a financial evaluation model.

TTC-35 Rail Proposal (P3) Validation (TxDOT), USA - Principal Economist
Evaluated a private sector proposal (P3) for the construction of rail infrastructure on the TTC-35 corridor.

SouthWestern Franchise Rail Franchise (P3) Re-Letting (DfT Rail), UK – Team Leader
Extensive advisory role to the DfT on its re-franchising of SouthWest Trains and Island Line. Work involves evaluation of the current franchise, preparation of the definition of the future franchise and evaluation of all franchise bids.

Financial Appraisal - Iraq Grand Port (Hanna Sheikh Holding Corporation), Dubai – Project Manager
Evaluation of the financial case for the construction a new port in southern Iraq with a capital cost of up to $13bn.

Funding the Railways: Looking Years Ahead (Rail Passengers Council), UK – Project Manager
This work involves writing two reports on the future prospects for British railways and includes detailed modelling of the funding required to sustain potential growth over the next twenty years.

The Development of Market Models for Increased Competition in Railroad Passenger Traffic (SJ and Oxford University), Sweden – Principal Consultant
Development of market models for increased competition in railroad passenger traffic and their use in the assessment of the options for the Swedish rail system.

British Multi-Modal Transport Model (Oxford Economic Research Associates), UK – Principal Consultant
Involved the construction of a strategic level multi-modal transport model for Britain including air, bus, coach, rail and road. Model employed by policymakers and commercial enterprises in forming strategic business plans and policy.

A Railway Renaissance? (Institute of Public Policy Research), UK – Project Manager and Director
Entailed the assessment of the prospects for the British rail industry of proposed re-franchising of passenger train operating companies through wide consultation with government, regulatory authorities and members of the railway industry.

British Railway Modelling and Assessment (BBC), UK – Project Manager and Director
The project entailed the detailed modelling of the British railway system and an assessment of its current and future performance. The outputs were used in a number of BBC TV and radio programmes.

Competition Policy Briefing (Commonwealth Secretariat), Commonwealth – Project Manager
Preparation of a competition policy briefing document for use at the Commonwealth finance ministers Ottawa meeting.

Passenger Demand Forecasting Handbook Update (Rail-OR), UK – Project Manager
Modelled and estimated passenger demand for the entire UK rail network using state-of-the-art econometrics. The study provided a major input to the Passenger Demand Forecasting Handbook (PDFH) produced by Rail-OR for use by all new passenger TOCs in Britain.

Transport Regulation and Environmental Analysis (ESRC), European Union – Principal Consultant
Comparative study of the transport regulatory environment in the UK, Holland and Germany over a period of six months.

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February 15, 2013

~~CONFIDENTIAL~~

Mr. Michael L. Foster, P.E.
Chairman of the Board
Knik Arm Bridge and Toll Authority
820 East 15th Avenue
Anchorage, Alaska 99501

CDM Smith's response in Appendix I gives DLA permission to include this February 15, 2013, response in this report.

Subject: Response to the Independent Review of Traffic and Toll Revenue Projections by Timothy James & Associates

Dear Mr. Foster:

Thank you for the opportunity to help respond to the confidential draft management letter summarizing the legislative audit's preliminary findings. This management letter was directed to you from Ms. Danna Moser, CPA, of the Legislative Budget and Audit Committee, Division of Legislative Audit, dated February 1, 2013. Our response is to the report titled "The Knik Arm Crossing: An Independent Review of Traffic and Toll Revenue Projections," prepared by Timothy James & Associates, dated December 21, 2012, and included in the letter as Attachment D.

Many of the issues contained in this independent review pertain to the assumptions that CDM Smith used to prepare the traffic and toll revenue estimates. Some of the issues raised are centered on our assumptions and inputs to the travel demand model. We hope to clarify the reasons behind the assumptions we made and to demonstrate the reasonableness and conservative nature of our assumptions and approach. Toward that end, while we have many technical and nontechnical comments and reactions to this independent review, we will limit our responses to the "suggested clarifications" and "recommendations" presented in the concluding section. We first present the comments directly from the independent review in italics, followed by our response.

Suggested Clarifications from Timothy James & Associates

- *The high dependence of the traffic and toll revenue projections on strong economic development and population growth in the Point MacKenzie area, north of it, and to the south and west of Wasilla and Houston.*

  The traffic and toll revenue estimates associated with the Knik Arm Crossing (KAC) are by design highly dependent on socio-economic conditions in the Point MacKenzie area. This area is expected to experience a growth spurt once the KAC opens to traffic.

The KAC will connect the Municipality of Anchorage and Matanuska-Susitna (Mat-Su) Borough at Point MacKenzie. Lower Mat-Su Borough is essentially an undeveloped "greenfield," that will grow rapidly as a consequence of the KAC. Travel between the two areas, within eyesight of each other, currently requires up to a 90 mile trip by road around the Knik Arm of the Upper Cook Inlet. Construction of the KAC will significantly reduce travel times and have a major impact on socio-economic development in lower Mat-Su Borough and Point MacKenzie in particular. This area will be transformed from largely open land into a much more developed area with residential, commercial, industrial and retail activity. There are already a number of on-going and planned developments (including the Port, the rail link and correctional center) anticipating the KAC opening. Over time, land development will be reoriented from the recent historic pattern along the upper west side of the Knik Arm of Cook Inlet in the Knik-Fairview area to Mat-Su Borough near the KAC. The opening of the KAC will help resolve the shortage of industrial and residential land in the Anchorage bowl.

The influence of the KAC on land development patterns has been recognized since project inception. Transportation planners have prepared land development plans with and without the KAC. In 2007, CDM Smith employed the services of an independent economist, Insight Research Corporation, to prepare forecasts of development. Their work was based on earlier studies performed by Northern Economics and the Institute of Social and Economic Research (ISER) at the University of Alaska. The chief economist for Insight Research Corporation visited Anchorage and interviewed local decision makers, planning directors and real estate experts. This research was an important part of our study. In 2011, CDM Smith updated the results to reflect more recent information on population and employment. In addition to those traveling to the lower Mat-Su Borough, the KAC will also serve through trips and act as a reliever for congested roads on the other side of the Inlet, specifically the Glenn Highway.

- *The disparity between average annual growth rate in the base 2012 memorandum projections post-2020 [after the "ramp-up" period has ended] (5.0%) and the average growth rate in AADT 2001-2011 for Glenn Highway at Eklutna Flats is (1.93%).*

  In order to clarify this point, Table 1 shows historical traffic counts on Glenn Highway at Eklutna Flats and traffic forecasts for the KAC. The average annual percent change (AAPC) between 2001 and 2011 is 2.5%; not 1.93%. Also, since this time period includes the effects of the Great Recession, the average annual growth rate between 2001 and 2007 was 3.6% per year. This is perhaps more representative of the period.

  Typically traffic volumes on start-up facilities grow faster than traffic volumes on more mature, established roadways. This is almost always true in percentage terms, since the volumes are low to start and the same amount of growth will be a higher percent. This is frequently true in absolute terms, since it takes time for the advantages of a new toll road to be realized (referred to as the "ramp-up" period) and it takes even longer time for people to

adjust their location patterns in response to the new transportation facility. The KAC will serve as an alternative route for some traffic currently using the Glenn Highway. It will also serve a rapidly growing share of traffic between Anchorage and lower Mat-Su Borough.

Table 1
Average Daily Traffic
at Glenn Highway and Proposed Knik Arm Crossing

	KAC		Glenn Highway		Screen Line		
Year	Traffic	Increase	Traffic	Increase	Total	AAPC	KAC Share
Traffic Counts							
2001			23,079		23,079		
2002			24,600		24,600	6.6	
2003			25,782		25,782	4.8	
2004			26,249		26,249	1.8	
2005			27,028		27,028	3.0	
2006			27,570		27,570	2.0	
2007			28,506		28,506	3.4	
2008			27,454		27,454	-3.7	
2009			28,495		28,495	3.8	
2010			29,644		29,644	4.0	
2011			29,572		29,572	-0.2	
Traffic Projections							
2020	14,900		29,300		44,200	4.6	34%
2025	21,100	6,200	34,900	5,600	56,000	4.8	38%
2030	28,100	7,000	41,900	7,000	70,000	4.6	40%
2035	35,000	6,900	46,500	4,600	81,500	3.1	43%
AAPC							
2001-2007			3.6%		3.6%		
2001-2011			2.5%		2.5%		
2011-2020			-0.1%		4.6%		
2020-2025	7.2%		3.6%		4.8%		
2025-2030	5.9%		3.7%		4.6%		
2030-2035	4.5%		2.1%		3.1%		

AAPC is "average annual percentage change"

The table also shows a summary of the forecasts of traffic on the KAC and the Glenn Highway at the same location as the counts. This is a "screen line" that runs across the Inlet. After the "ramp-up" period, the expected average annual growth rate on the screen line between 2020 and 2025 is 4.8% per year or an increase of 11,800 vehicles per day over the five year period, with most of the growth happening on the KAC (7.2% per year or 6,200 vehicles per day) and less on Glenn Highway (3.6% per year or 5,600 vehicles per day). The expected average annual growth rates between 2025 and 2030 are lower at 4.6% per year for the screen line or 14,000 vehicles per day over the five year period. Between 2030 and 2035, the expected annual growth rates are lower, at 3.1% for the screen line, as the pace of development subsides. Once again, most of the growth occurs on the KAC. Traffic volumes are always higher on the Glenn Highway during the forecast period. It is important to note that growth rates on start-up facilities are typically higher in percentage terms than the growth rates on established roadways because the starting values are lower.

- *The disparity between the commercial vehicle/passenger vehicle split used in the studies (approximately 12%) and the traffic count data for Glenn Highway at Eklutna Flats (approximately 5%).*

The 2007 Proposed Knik Arm Bridge Study analysis was based upon available vehicle classification data provided by Alaska Department of Transportation and Public Facilities (DOT&PF) from its permanent recorder stations. Table 2 shows the vehicle classification data from the station on the Glenn Highway at Eklutna Flats, which was available from 2003 through 2006. For this analysis, commercial vehicles consist of Classes 4 through 13, i.e., all vehicles with three or more axles including two axle vehicles towing single axle trailers. On this basis, commercial vehicles were 12.2% of the traffic in 2003, 11.5% in 2004, 13.6% in 2005 and 15.5% in 2006. CDM Smith developed a regional average commercial vehicle percentage of 12% based on this location and other locations on the Glenn Highway and Parks Highway. When this analysis was updated in 2011, vehicle classification data for that year was not yet available. Moreover, no new vehicle classification count had been conducted on the Glenn Highway at Eklutna Flats since the 2007 Study. The assumption of 12% commercial vehicles is reasonable.

The forecast of commercial vehicles using the KAC includes both traffic diverted from the Glenn Highway and the additional traffic representing movements between Anchorage and the lower Mat-Su Borough. Based on socioeconomic growth estimates, significant demand by commercial vehicles for the KAC is expected to be generated from within Anchorage. This includes commercial vehicle traffic from the Port of Anchorage, as well as construction vehicles, delivery trucks, recreational vehicles and campers traveling to the Mat-Su Borough. Because of their lower fuel economy, higher cost of vehicle maintenance and the cost of driver wages, commercial vehicles are in many cases less sensitive to the KAC toll than are passenger cars in order to take advantage of the time and distance savings (even though

Table 2
Historical Vehicle Classification Counts
Glenn Highway at Eklutna Flats

Year	Dir [1]	Month	Days Counted	Total Vehicles	Passenger Cars Class 1	Passenger Cars Class 2	Passenger Cars Class 3	Light Trucks Class 4	Light Trucks Class 5	Light Trucks Class 6	Light Trucks Class 7	Single-Trailer Trucks Class 8	Single-Trailer Trucks Class 9	Single-Trailer Trucks Class 10	Multi-Trailer Trucks Class 11	Multi-Trailer Trucks Class 12	Multi-Trailer Trucks Class 13	% Total Cmrcl Vhcls
2006	1	1	30	337,825	0.1%	52.1%	32.6%	0.3%	13.0%	0.6%	0.0%	0.2%	0.7%	0.2%	0.0%	0.0%	0.3%	15.2%
	1	2	28	320,499	0.1%	50.9%	32.9%	0.3%	13.5%	0.7%	0.0%	0.2%	0.7%	0.3%	0.0%	0.0%	0.3%	16.1%
	1	3	31	397,676	0.1%	50.8%	32.7%	0.3%	13.6%	0.8%	0.0%	0.3%	0.8%	0.5%	0.0%	0.0%	0.2%	16.4%
	1	4	30	394,516	0.1%	52.9%	31.8%	0.3%	13.0%	0.5%	0.0%	0.3%	0.7%	0.2%	0.0%	0.0%	0.2%	15.2%
	1	5	31	450,323	0.1%	53.8%	30.7%	0.3%	12.2%	0.7%	0.0%	0.4%	0.9%	0.6%	0.0%	0.0%	0.3%	15.4%
	1	6	30	485,235	0.1%	53.3%	31.1%	0.3%	12.3%	0.7%	0.0%	0.5%	0.9%	0.5%	0.0%	0.0%	0.4%	15.6%
	1	7	31	498,259	0.1%	53.1%	31.3%	0.3%	12.5%	0.6%	0.0%	0.5%	0.8%	0.4%	0.0%	0.0%	0.4%	15.5%
	1	8	30	501,732	0.1%	53.8%	30.9%	0.3%	12.0%	0.7%	0.0%	0.4%	0.9%	0.5%	0.0%	0.0%	0.4%	15.2%
	1	9	30	463,300	0.1%	53.8%	30.9%	0.3%	11.7%	0.8%	0.0%	0.4%	1.1%	0.6%	0.0%	0.0%	0.3%	15.2%
	1	10	31	420,909	0.1%	52.1%	31.2%	0.2%	12.7%	0.9%	0.0%	0.3%	1.1%	0.9%	0.0%	0.0%	0.4%	16.5%
	1	11	30	364,558	0.0%	52.4%	32.5%	0.3%	13.0%	0.4%	0.0%	0.2%	0.7%	0.3%	0.0%	0.0%	0.2%	15.0%
	1	12	30	348,861	0.1%	51.1%	33.5%	0.2%	13.5%	0.4%	0.0%	0.2%	0.6%	0.2%	0.0%	0.0%	0.2%	15.4%
Total			304	4,983,692	0.1%	52.6%	31.7%	0.3%	12.7%	0.7%	0.0%	0.3%	0.8%	0.4%	0.0%	0.0%	0.3%	15.5%
2005	1	1	25	263140	0.1%	55.8%	32.0%	0.1%	10.4%	0.5%	0.0%	0.2%	0.5%	0.1%	0.0%	0.0%	0.3%	12.2%
	1	2	27	305218	0.1%	55.6%	32.0%	0.1%	10.6%	0.5%	0.0%	0.2%	0.5%	0.1%	0.0%	0.0%	0.3%	12.4%
	1	3	31	380471	0.2%	56.1%	30.9%	0.1%	10.4%	0.7%	0.0%	0.4%	0.8%	0.2%	0.0%	0.0%	0.3%	12.9%
	1	4	30	386997	0.2%	57.1%	30.3%	0.1%	10.2%	0.8%	0.0%	0.3%	0.6%	0.2%	0.0%	0.0%	0.3%	12.4%
	1	5	8	110017	0.1%	57.6%	29.4%	0.1%	10.4%	0.7%	0.0%	0.4%	0.6%	0.2%	0.0%	0.0%	0.4%	12.8%
	1	6	28	444961	0.2%	55.4%	30.6%	0.2%	10.9%	0.7%	0.1%	0.5%	0.5%	0.4%	0.0%	0.0%	0.5%	13.9%
	1	7	31	503630	0.2%	55.3%	30.6%	0.2%	10.9%	0.7%	0.1%	0.6%	0.5%	0.4%	0.0%	0.0%	0.5%	13.9%
	1	8	20	329396	0.2%	55.4%	30.8%	0.2%	10.8%	0.7%	0.1%	0.6%	0.6%	0.4%	0.0%	0.0%	0.4%	13.7%
	1	11	19	207058	0.1%	50.4%	33.6%	0.3%	13.8%	0.5%	0.0%	0.2%	0.7%	0.2%	0.0%	0.0%	0.2%	16.0%
	1	12	31	364579	0.1%	51.2%	33.2%	0.3%	13.4%	0.5%	0.0%	0.2%	0.7%	0.3%	0.0%	0.0%	0.2%	15.6%
	Total		250	3,295,467	0.2%	55.0%	31.3%	0.2%	11.1%	0.6%	0.0%	0.4%	0.6%	0.3%	0.0%	0.0%	0.4%	13.6%
2004	1	2	28	309859	0.2%	57.6%	30.5%	0.1%	10.0%	0.6%	0.0%	0.2%	0.5%	0.1%	0.0%	0.0%	0.3%	11.8%
	5	2	15	168872	0.4%	65.9%	25.3%	0.0%	8.7%	0.7%	0.0%	0.1%	0.5%	0.2%	0.0%	0.0%	0.2%	8.5%
	1	3	30	361345	0.2%	57.8%	30.0%	0.1%	10.0%	0.6%	0.0%	0.2%	0.6%	0.2%	0.0%	0.0%	0.3%	12.0%
	1	4	26	327865	0.1%	58.0%	29.8%	0.1%	9.9%	0.6%	0.0%	0.3%	0.6%	0.2%	0.0%	0.0%	0.3%	12.1%
	1	5	30	420701	0.1%	56.2%	30.5%	0.2%	10.4%	0.8%	0.0%	0.5%	0.7%	0.3%	0.0%	0.0%	0.4%	13.1%
	5	5	19	241961	0.2%	70.0%	23.1%	0.1%	4.3%	0.8%	0.1%	0.3%	0.6%	0.3%	0.0%	0.0%	0.3%	6.8%
	1	6	30	480302	0.2%	55.5%	30.6%	0.1%	10.8%	0.8%	0.1%	0.6%	0.5%	0.4%	0.0%	0.0%	0.5%	13.7%
	1	7	16	256849	0.1%	59.9%	27.8%	0.1%	9.6%	0.6%	0.1%	0.5%	0.4%	0.3%	0.0%	0.0%	0.4%	12.1%
	1	8	9	156789	0.1%	57.0%	29.8%	0.2%	10.3%	0.5%	0.1%	0.5%	0.5%	0.4%	0.0%	0.0%	0.6%	13.1%
	1	9	15	222062	0.1%	58.1%	29.8%	0.2%	9.9%	0.6%	0.0%	0.3%	0.6%	0.2%	0.0%	0.0%	0.3%	12.0%
	5	9	7	89676	0.3%	66.8%	25.4%	0.1%	4.0%	0.9%	0.0%	0.2%	0.8%	0.2%	0.0%	0.0%	0.3%	7.5%
	1	10	19	237762	0.3%	55.9%	30.5%	0.1%	10.1%	1.1%	0.0%	0.3%	0.8%	0.4%	0.0%	0.0%	0.3%	13.2%
	5	10	5	66210	0.3%	69.4%	23.7%	0.1%	3.7%	0.8%	0.0%	0.2%	1.1%	0.6%	0.0%	0.0%	0.3%	6.7%
	1	11	8	86191	0.3%	58.0%	29.6%	0.1%	9.8%	0.7%	0.0%	0.2%	0.7%	0.1%	0.0%	0.0%	0.4%	12.1%
	1	12	31	352060	0.1%	55.7%	32.0%	0.1%	10.4%	0.6%	0.0%	0.2%	0.5%	0.1%	0.0%	0.0%	0.3%	12.2%
	5	12	16	185972	0.1%	68.9%	25.3%	0.0%	4.1%	0.5%	0.0%	0.1%	0.6%	0.1%	0.0%	0.0%	0.3%	5.8%
	Total		304	3,964,526	0.2%	59.2%	29.1%	0.1%	9.2%	0.7%	0.0%	0.3%	0.6%	0.3%	0.0%	0.0%	0.4%	11.5%
2003	1	8	5	97109	0.2%	59.6%	28.7%	0.1%	9.2%	1.0%	0.0%	0.3%	0.5%	0.2%	0.0%	0.0%	0.1%	11.5%
	5	8	3	54628	0.3%	66.0%	24.3%	0.1%	6.3%	1.6%	0.0%	0.2%	0.7%	0.2%	0.0%	0.0%	0.2%	9.3%
	1	9	30	420006	0.3%	58.3%	28.5%	0.1%	9.7%	1.2%	0.0%	0.4%	0.7%	0.3%	0.0%	0.0%	0.2%	12.9%
	1	10	24	317928	0.4%	58.5%	28.7%	0.1%	9.5%	1.3%	0.0%	0.4%	0.7%	0.2%	0.0%	0.0%	0.2%	12.5%
	1	11	30	319698	0.2%	58.8%	29.3%	0.1%	9.8%	0.7%	0.0%	0.2%	0.5%	0.1%	0.0%	0.0%	0.2%	11.8%
	1	12	11	123249	0.1%	58.5%	29.6%	0.1%	10.0%	0.6%	0.0%	0.2%	0.6%	0.1%	0.0%	0.0%	0.2%	11.9%
	Total		103	1,332,798	0.3%	58.9%	28.7%	0.1%	9.5%	1.1%	0.0%	0.3%	0.6%	0.2%	0.0%	0.0%	0.2%	12.2%
2000	5	1	7	62,265	0.0%	53.3%	31.8%	0.4%	12.0%	0.3%	0.0%	1.3%	0.6%	0.2%	0.0%	0.0%	0.1%	14.9%

[1] Direction: 1 = Northbound, 5 = Southbound.
Source: Traffic Volume Reports, Alaska Department of Transportation and Public Facilities

truck tolls are higher). For these reasons, the assumption of 12% commercial vehicles is perhaps conservative.

- *The constant commercial vehicle/passenger vehicle split used in the studies throughout the study period.*

  CDM Smith assumed that the proportion of commercial vehicles in the KAC traffic stream would remain constant over time. It has been our experience on other "greenfield" projects across the country that the proportion of commercial vehicles increased gradually after opening. Once commercial and industrial activities have been established in the lower Mat-Su Borough, the KAC will experience an increase in local truck traffic. Given that the initial proportion averaged 12%, CDM Smith decided that the conservative approach would be to hold it constant. The definition of commercial vehicles includes two-axle vehicles towing a single axle trailer (a boat or camper).

- *The optimality of a constant real toll of $5 throughout the study period.*

  During the 2007 analysis, CDM Smith performed sensitivity tests to prepare our recommendation on toll rates. This analysis established that the revenue-maximizing toll rate for passenger cars would be just under $6.00 each way in 2005 dollars. We recommended that the initial toll rate be set at a lower value, $5.00 each way in 2017 dollars, allowing some room for a productive increase in toll revenue if necessary. Commercial vehicles pay higher tolls which are set according to the (N-1) formula, in which N represents the number of axles. Customers in future years would pay higher tolls, with the amount increasing at 2.5% per year to account for expected inflation. This rate is slightly lower than the historic consumer price index for Anchorage.

  The toll sensitivity analysis in future years demonstrated that the revenue-maximizing toll rate grew faster than inflation. Over the long run, the growth in disposable income has generally been faster than inflation, i.e., there have been real increases in disposable income. In model terms, the value of time (VOT) increases at a rate faster than the rate at which tolls would increase. CDM Smith has observed this phenomenon in many traffic and revenue studies. So, holding the real passenger car toll rate constant (inflating the nominal rate at the expected rate of inflation) is a conservative assumption, as over time the "head room" between the planned toll rate and the revenue-maximizing toll rate would increase.

- *The difference in implicit elasticities between the 2007 and 2011 reports and the usage of the 2007 report elasticities in the 2011 projections.*

  As stated before, CDM Smith performed toll sensitivity tests as part of the 2007 analysis using the travel demand models. From these, we developed estimates of toll elasticity. By

comparing these elasticities to results from models in other locations, we demonstrated that the models for the KAC were working properly.

In the 2011 analysis, we updated the travel demand models with recent information on socio-economic conditions and forecasts as well as updates on planned transportation network improvements. As expected, there were slight changes in the elasticities resulting from the model update. The elasticity curves were adjusted slightly to account for redistribution effects of the bridge.

The final traffic and toll revenue estimates were nevertheless developed from the updated model, not from the elasticities. That is, the elasticities from the 2007 analysis were not used to produce the 2011 traffic and toll revenue estimates.

Recommendations from Timothy James & Associates

- *Examine road conditions such as instance delay minutes on alternative trip assignments) in the MSA throughout the study period as traffic levels rise.*

  The suite of travel demand models used to produce the KAC traffic and toll revenue estimates contains an equilibrium traffic assignment routine. This traffic assignment model includes features to make sure that the travel time increases with the volume on network links. Heavily traveled links have an appropriate level of delay built in. At equilibrium, all trips are assigned to the shortest path in the network (including congestion delay). No traveler can find a shorter path. This process is part of the travel demand models in the validation year and in all forecast years.

- *Update the origin-destination pairings.*

  Up-to-date information is critical to the creation of valid travel demand models and more data is always better than less data. CDM Smith is unclear as to the intent of this recommendation, since origin-destination data is expensive to obtain and only used as part of model calibration/validation. Some explanation may help.

  The suite of models used in the KAC traffic and revenue study contains a trip distribution model. The purpose is to estimate the number of trip interchanges (movements between places) as a function of the number of trip productions (origins), the number of trip attractions (destinations) and the generalized cost of travel between those places. Origin-destination information is obtained through a survey of travelers about their trips. This would typically include a number of characteristics including the origin and destination of each trip. The result of this survey is used as a reference to make adjustments in the trip distribution model so that the synthesized pattern of trip interchanges in the calibration year looks more like the observed pattern. Once the adjustments are completed, the model is ready for application in forecasts. For the KAC, CDM Smith conducted origin-destination

surveys in 2007 and applied this information to the model calibration year 2005. This information was used to validate the model and to gain an understanding of the current demand that might divert to the KAC.

The pattern of trip interchanges produced by the model in future years depends on the pattern of trip productions, trip attractions and the generalized cost of travel between places at that future time. The pattern of "origin-destination pairings" is a product of the travel demand model and always updated in future years based on assumed land-use patterns and transportation network. There is no need to update the "origin-destination pairings" unless the whole model was to be reconstructed to a new calibration year.

- *Revise downwards the forecast growth in households during the study period in line with ISER growth rates.*

  To clarify the next issues, we present historical information about population (Table 3), households (Table 4) and employment (Table 5). The growth rate in households used by CDM Smith was 3.8% per year in the Mat-Su Borough and 1.0% per year in the Municipality of Anchorage. As shown in Table 4, these are lower than the long term historical growth rates in households of 6.1% per year in the Mat-Su Borough and 1.9% per year in Anchorage. The growth rates in households used by CDM Smith is also below the observed growth rates during the recent decade 2000 to 2009 (including the effects of the Great Recession) when the Mat-Su Borough grew by 4.9% per year and Anchorage by 1.2% per year.

  The ISER growth rates for the period of 2010-2035 for households is 1.5% per year for the entire study area with a 3.2% per year rate for Mat-Su Borough and 0.9% per year for Anchorage, shown in Table 6.

  It should be noted that ISER underestimated the 2010 Mat-Su Borough population by 8,696 persons (9.8% of the total) and the Anchorage population by 2,626 persons (0.9% of the total) compared to the 2010 Census. This probably has to do with the fact that these estimates were prepared during the Great Recession. Taking these underestimates near the forecast base year into consideration and making an adjustment, the ISER 2035 projections would be close to the estimates used by CDM Smith. The forecast growth in households is the result of detailed analysis and is reasonable. Taking into account the anticipated effects of the KAC opening, the forecasts are perhaps conservative.

- *Revise downwards the forecast growth rate in employment during the study period in line with ISER growth rates.*

  CDM Smith used an annual growth rate in employment for 2010-2035 for Anchorage of 0.8% per year. This is identical to the growth rate produced by ISER, as shown in Table 6. For the Mat-Su Borough, CDM Smith used a growth rate for employment of 3.1% per year; higher

than the ISER growth rate of 2.8% per year. Given that historical employment growth in the Mat-Su Borough has been 4.8% per year during the period 1990-2009, CDM Smith believes that the slightly higher growth rate for employment is reasonable given the anticipated developments planned with the construction and opening of the KAC.

Table 3
Historical Population

Geography	Historical Year				Average Annual Percent Change			
	1980	1990	2000	2009	'80-'90	'90-'00	'00-'09	'80-'09
Anchorage Municipality	174,400	226,300	260,300	286,200	2.6%	1.4%	1.1%	1.7%
Matanuska-Susitna Borough	17,800	39,700	59,300	88,400	8.4%	4.1%	4.5%	5.7%
Study Area	192,200	266,000	319,600	374,600	3.3%	1.9%	1.8%	2.3%
Alaska	401,900	550,000	626,900	698,500	3.2%	1.3%	1.2%	1.9%
United States	226,545,800	248,709,900	281,421,900	307,006,600	0.9%	1.2%	1.0%	1.1%

Source: United States Census Bureau; rounded to the nearest 100

Table 4
Historical Households

Geography	Historical Year				Average Annual Percent Change			
	1980	1990	2000	2009	'80-'90	'90-'00	'00-'09	'80-'09
Anchorage Municipality	61,200	83,300	95,100	106,100	3.1%	1.3%	1.2%	1.9%
Matanuska-Susitna Borough	5,800	13,500	20,800	31,900	8.8%	4.4%	4.9%	6.1%
Study Area	67,000	96,800	115,900	138,000	3.7%	1.8%	2.0%	2.5%
Alaska	133,100	190,200	222,300	255,600	3.6%	1.6%	1.6%	2.3%
United States	80,824,800	92,315,400	105,836,900	118,560,300	1.3%	1.4%	1.3%	1.3%

Source: Woods and Poole, 2010; rounded to the nearest 100

Table 5
Historical Employment

Geography	Historical Year				Average Annual Percent Change			
	1980	1990	2000	2009	'80-'90	'90-'00	'00-'09	'90-'09
Anchorage Municipality	#N/A	116,600	133,500	144,300	#N/A	1.4%	0.9%	1.1%
Matanuska-Susitna Borough	#N/A	15,800	26,800	38,500	#N/A	5.4%	4.1%	4.8%
Study Area	#N/A	132,400	160,300	182,800	#N/A	1.9%	1.5%	1.7%
Alaska	170,800	251,000	299,300	332,100	3.9%	1.8%	1.2%	1.5%
United States	99,303,000	118,793,000	136,891,000	139,877,000	1.8%	1.4%	0.2%	0.9%

Source: Bureau of Labor Statistics (Local Area Unemployment Statistics for AK and the Current Population Survey for the US); rounded to the nearest 100

Table 6
Base Case Projections by Source (CAAGR)

Projections by Source (CAAGR) - Base Case										*Updated* Projections (CAAGR)		
Source	ISER, UAKA* ('10-'35)			AK Labor Department**('09-'34)			2007 Study*** ('10-'30)			'10-'35		
Geography	Pop	HH	Employ't	Pop	HH	Employ't	Pop	HH	Employ't	Pop	HH	Employ't
Municipality of Anchorage	0.8%	0.9%	0.8%	0.9%	#N/A	#N/A	1.0%	1.0%	1.0%	0.9%	1.0%	0.8%
Mat-Su Borough	3.1%	3.2%	2.8%	2.4%	#N/A	#N/A	4.9%	4.9%	4.4%	3.5%	3.8%	3.1%
Study Area	1.4%	1.5%	1.1%	1.3%	#N/A	#N/A	2.2%	2.2%	1.6%	1.6%	1.7%	1.2%

- *Update the gasoline prices in VOC estimates, and give additional consideration to alternative scenarios for future gasoline price levels throughout the study period.*

  Using the same methodology for estimating vehicle operating cost (VOC) as was used in 2011. The Anchorage area VOC was updated for 2012 with the latest available data. Table 7 provides a comparison of the updated VOC assumptions and calculations:

Table 7
Comparison of 2011 and 2012 Vehicle Operating Cost Assumptions and Calculations

Value	Estimated 2011 VOC (As estimated in the 2011 Study)	Estimated 2012 VOC
Average Cost of Gasoline per Gallon	$3.34	$3.96
Fuel Economy Average Miles per Gallon	22.91 Sedan - 17.31 SUV/Van	23.69 Sedan - 19.29 SUV/Van
Average Cost of Gas / Mile	$0.1458 Sedan - $0.1930 SUV/Van	$0.1672 Sedan - $0.2053 SUV/Van
Maintenance Costs	$0.0454 Sedan - $0.0491 SUV/Van	$0.0447 Sedan - $0.0464 SUV/Van
Tire Costs	$0.0083 Sedan - $0.0087 SUV/Van	$0.0100 Sedan - $0.0104 SUV/Van
Average Vehicle Cost per Mile	$0.1996 Sedan - $0.2507 SUV/Van	$0.2219 Sedan - $0.2621 SUV/Van
Percent of SUV/Van	69.0 Percent	69.4 Percent
Average Weighted Vehicle Cost per Mile	$0.2348	$0.2498

As shown in Table 7, the average cost of gasoline in the Anchorage area increased by 18.6% between 2011 and 2012. This was counterbalanced by an increase in fuel economy. Average fuel economy increased from 19.0 miles per gallon in 2011 to 20.6 miles per gallon in 2012, an increase of 8.4%. Vehicle maintenance and tire costs remained roughly the same. As a

result, estimated VOC increased 6.4% between 2011 and 2012. Much of this increase was born by sedans, as the average VOC for sedans increased by $0.03 while the average cost for SUV/Vans increased by $0.01.

As part of a 2012 study of another proposed toll facility, CDM Smith conducted a sensitivity test to estimate the impact of higher gasoline prices on estimated revenues. CDM Smith assumed gasoline prices of $3.00 per gallon in 2015 under the base case scenario with annual increases in proportion to inflation thereafter. Under the sensitivity test scenario, gasoline prices of $5.00 per gallon were assumed in 2015, with increases in proportion to inflation thereafter. Additionally, it was assumed that $5.00 gasoline prices would also result in a reduction in total regional travel of approximately 4.0%. The higher gasoline price scenario resulted in an estimated reduction in toll revenues of 5.9% in 2015.

Based on these analyses, it is clear that the price of gasoline is a major component in the calculation of vehicle operating costs and will play an important role in potential transactions and revenue on the KAC. Significant fluctuations in the price of gasoline, as were experienced nationwide in the summer of 2008, can increase vehicle operating costs and bias travelers towards choosing shorter distance trips. The results of the above referenced sensitivity test may not be indicative of potential gasoline price impacts for the KAC due to the significant distance savings offered by the bridge. Increased gasoline costs increase the cost of driving per mile. As the cost per mile increases, toll facilities providing a shorter route become more attractive compared to the toll-free alternative. Therefore, although the region might experience a decline in overall trips, the KAC may not necessarily lose trips as it provides significant distance savings for those traveling from Anchorage to the Mat-Su Borough, and therefore has the result of significantly offsetting vehicle operating costs that can be experienced with fuel price surges. It should also be noted that CDM Smith vehicle operating costs assume an overall average growth rate of 2.5% reflecting the long term forecast for the facility. The vehicle operating cost during individual years throughout the forecast can and will vary with the volatility of fuel prices. The estimates used in the analysis of traffic and toll revenue for the KAC are certainly reasonable.

- *Adjust VOT estimates for changes in real income over the study period.*

  There are two issues to discuss: the initial values of time (VOT) and the changes in VOT over time. In the case of KAC, the VOT for a work trip was estimated at $15.60 per hour in the year 2010. This estimate is a result of a stated preference (SP) survey, conducted in 2007 by Resource Systems Group (RSG), an independent firm that specializes in this type of work. As shown in Table 8, CDM Smith compared the VOT used for the KAC with estimates used in other recent traffic and revenue studies. The VOT estimate used for KAC is in line with the values in these other studies.

Table 8
Value of Time (VOT-Dollars per hour) Comparison

Study	Peak		Off-Peak		Aggregate	Year
	Work	Non-Work	Work	Non-Work		
Knik Arm Crossing, 2007 Study, SP Survey	$15.60	$12.00	$15.60	$12.00	$13.80	2010 [1]
Knik Arm Crossing, 2011 Study	$15.78	$12.15	$15.78	$12.15		2010 [2]
Grand Parkway (Houston)	$14.22	$14.22	$12.42	$12.42	$13.20	2011
Express Travel Choices Study (SCAG)	$13.54	$7.43		$13.00		2010 VOT for HH income of $62,500 [3]
Triangle Expressway	$13.44	$13.44	$10.68	$10.68	$13.20	2011
US 36, Denver Colorado	$11.58	$11.14	$11.01	$10.39		2010
SR 520 Bridge, Washington State	$10.72	$7.60	$10.62	$11.61	$10.40	2010
Monroe Connector/Bypass	$9.36	$9.36	$9.36	$9.36		
Garden Parkway	$9.00	$9.00	$9.00	$9.00		

[1] Median Household income via stated preference survey was 62,700 in 2007
[2] Based on Median Household income for the region
[3] VOT for business related trips is $14.34

In an update performed by CDM Smith in 2011, a value of $15.78 per hour was derived using the median household income. As shown in Table 9, the median household income in 2010, for the Municipality of Anchorage was $73,746 and for Mat-Su Borough was $67,703.

Table 9
Household Median Income by City and State Comparison

City/Region	2010	State	2010	Project
Anchorage	$ 73,746	Alaska	$ 66,614	Proposed Knik Arm Bridge
Mat-Su Borough	$ 67,703	Alaska	$ 66,614	Proposed Knik Arm Bridge
Houston	$ 55,644	Texas	$ 50,149	Grand Parkway (Houston)
Los Angeles	$ 58,480	California	$ 59,529	Express Travel Choices Study
Raleigh	$ 51,625	North Carolina	$ 44,693	Triangle Parkway
Durham	$ 49,496	North Carolina	$ 44,693	Triangle Parkway
Denver	$ 60,585	Colorado	$ 55,752	U.S. 36
Seattle	$ 65,079	Washington	$ 57,387	SR 520 Bridge
U.S.	$ 51,625			

Sources: U.S. Census Bureau, Department of Numbers, 2010 Median Household Income
U.S. Census Bureau, American Community Survey, 2006-201 as listed in Alaska Economic Trends, August 2012, Page 15

In another study by CDM Smith for the Grand Parkway in Houston, Texas, the VOT for peak-hour work trips was estimated at $14.22 per hour. This VOT is about 90% of the value used for KAC work trips. This is in a context of a metropolitan area median household income of $55,644 for Houston, which is about 75% of median household income for Anchorage and 82% of median household income for the Mat-Su Borough. This comparison indicates that, while VOT is higher for the KAC, the median household income is also proportionally higher. This relationship indicates proportional affordability for paying tolls by patrons of the bridge.

A comparison can also be made with a large SP survey of 3,600 records, conducted by CDM Smith in Southern California. The VOT for work trips in southern California was estimated at $13.54. This value is about 86% of the VOT for KAC work trips. The regional median household income for the Los Angeles was $58,480, or about 80% of the median household income in Anchorage and 86% of the median household income in the Mat-Su Borough.

There is a similar comparison with the VOT estimates for the Triangle Expressway, in Raleigh-Durham, North Carolina. VOT for work trips during the peak period is estimated to be $13.44 per hour. This VOT is about 85% of VOT estimated for the KAC. Median household income for Raleigh-Durham is $50,560 which is about 69% of the median household income in Anchorage and 75% of the median household income in Mat-Su Borough.

As these comparisons show, estimated VOT, used in the modeling of traffic and revenue estimates for the proposed Knik Arm Bridge, is consistent with other recent T&R studies. This becomes more evident when the median household income for the project area is taken into account. This analysis shows that the initial estimates of VOT are reasonable.

CDM Smith has assumed that VOT keeps pace with inflation. This is a conservative assumption, in that real income has historically increased at a faster rate. In which case, travelers would place a higher value on the time savings achieved by using the KAC, resulting in higher traffic estimates.

- *Enhance the risk analysis, to include a wider set of input variables with well-specified distributions in the Monte Carlo simulation.*

  CDM Smith produced a robust analysis of traffic and toll revenue risk for the project in accordance with industry standards. The risk analysis generated probabilities associated with the full range of outcomes for further financial analysis. As with other "greenfield" projects, the assumptions about future land uses are the most important factors influencing the traffic and toll revenue estimates. So, socio-economic variables (the number of households and employment) were at the center of the risk analysis. Assumptions about the value of time (VOT) and the factors used to convert the daily estimates from the travel demand model into annual estimates were also included in the risk analysis. No other variables were suggested. Neither were any other probability distributions. The variables

that were used are clearly the most relevant to the potential variation in the KAC traffic and toll revenue. CDM Smith has used the same variables in the risk analysis of other similar toll road projects and produced meaningful results.

- *Commission an independent organization to produce traffic and toll revenue projections based on modeling for the period 2037 through 2051.*

  CDM Smith used travel demand models to produce traffic and then toll revenue estimates for the KAC in the model years 2020, 2025, 2030 and 2035. The traffic and toll revenue estimates in between these years are linear interpolations of the traffic volumes. The traffic and toll revenue estimates after 2035 are extrapolations. Transportation planning data and models are not available after this time frame and do not normally cover longer time periods.

  While CDM Smith has provided traffic and toll revenue estimates through this period (with relatively small traffic growth in the outer years), it is our understanding that the financial plan is based on the assumption that there would be no growth in traffic after the year 2040, but an inflationary 2.5% per year increase in toll rate. CDM Smith considers this a reasonable, even conservative, assumption.

Summary Conclusions from Timothy James & Associates

- *Based on the WSA reports as they are currently drafted, this review concludes that the traffic and toll revenue projections for KAC seem optimistic.*

  After carefully considering the points that were raised in the independent review, CDM Smith disagrees with the characterization of the traffic and toll revenue as being optimistic. Based on our experience with many "greenfield" toll road projects, we consider the traffic and toll revenue estimates for the KAC as reasonable forecasts and appropriate for use in project financing.

Unlike transportation planning studies which are designed to identify and prioritize potential improvements across an entire metropolitan area, traffic and revenue studies focus clearly on the proposed toll facility. The purpose of a T&R study is to determine: 1) the overall demand in the project corridor, 2) the growth in that demand over time, 3) the proportion of demand that will use the proposed toll facility and 4) the toll travelers are willing to pay. Stated simply, the goal is to establish reliable estimates of future traffic and toll revenue on the proposed toll facility.

CDM Smith prepared a comprehensive traffic and toll revenue study for the Knik Arm Crossing. We obtained extensive data on existing traffic conditions, including traffic counts, origin-destination surveys and travel time/delay studies. This data and analysis is documented in our report. We employed an independent specialist to help us prepare an assessment of present socio-economic conditions and reliable estimates of future conditions. This work involved a careful review of prior studies, interviews with local experts and decision makers and original analysis, all documented in

our report. We also conducted a stated preference survey to establish an appropriate local value of time (willingness to pay toll). The data and results are documented in our report.

CDM Smith collected data for a project-specific travel demand model, with a traffic analysis zone and network representation of the existing transportation system. This model incorporates other study products (existing traffic and socio-economic data). We went through an extensive model calibration/validation process. After obtaining and assessing local transportation improvement plans, we created future year networks and related zonal data for multiple future years (2017, 2020, 2025, 2030 and 2035). CDM Smith then applied the valid travel demand model to those future conditions, creating traffic estimates for the KAC. We carefully reviewed the resulting forecasts for reasonableness, not only on the KAC but elsewhere in the region. We performed sensitivity tests to make sure that the model was working properly and that the results made sense. We also created a toll revenue model for the KAC. CDM Smith spent time looking at the toll sensitivity on the KAC. From this analysis, we calculated toll elasticities from the model and compared them to observed toll elasticities from other places. Since all T&R studies involve some element of uncertainty, we performed a robust analysis of the full range of outcomes. This included analysis of the main sources of risk (household and employment levels, value of time and yearly variations). All of this work is documented in our report.

CDM Smith specializes in T&R studies, having performed hundreds of similar studies across the country. The traffic and toll revenue estimates for the Knik Arm Crossing were prepared in accordance with industry standards. Once again, thank you for the opportunity to participate in this project. Please let us know if you have questions or require further information.

Sincerely,

Scott A. Allaire

Scott A. Allaire
Vice President
CDM Smith Inc.

Grant R. Holland
Vice President
CDM Smith Inc.

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MEMORANDUM

From: Timothy James and Associates (TJ&A)

To: Division of Legislative Audit, State of Alaska, Anchorage, AK 99503

Date: 2/27/2013

Response to CDM Smith letter (henceforth referred to as "the letter") of February 15 2013 to Mr. Michael L. Foster, P.E., Chairman of the Board, Knik Arm Bridge and Toll authority

General

The importance of accurate T&R forecasts is illustrated by the independent studies produced by Standard and Poor's, JP Morgan, and the National Cooperative Highway Research Program criticizing T&R consultants for failing to make clear their assumptions, estimated values and modeling methods.[1] This can result in overly optimistic forecasts, particularly during the first 5-15 years of a toll road.

The 6 clarifications and 8 recommendations detailed by TJ&A in its report were produced to suggest improvements to the modeling and thus reliability of the forecasts produced and to increase the transparency and external understanding of CDM Smith's 2007 and 2011 KAC T&R forecasts.

Throughout the letter CDM Smith make the point they believe they are using "conservative" assumptions. Whether they are conservative or not is certainly open to debate. However, the aim of any T&R study should be to use reasonable (central) and not conservative assumptions. The primary purpose of the risk analysis associated with any T&R forecast (based on the reasonable central assumptions and specified probability distributions around these) is to reflect the likelihood of pessimistic and optimistic traffic and revenue outcomes.

This response reproduces the original requests for clarifications and recommendations in the original order of the TJ&A report as a way of framing the discussion following the CDM Smith letter.

[1] For a summary evaluation of these studies, please see Prozzi et al (2009), "Actual vs. Forecasted Toll Usage: A Case Study Review, for the Texas Department of Transportation."

Timothy James & Associates

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1. Clarifications

- **The high dependence of WSA's traffic and toll revenue projections on economic population growth in the Point Mackenzie area, north of it, and to the south and west of Wasilla and Houston.**

TJ&A strongly endorses the fact that the KAC traffic and toll revenue estimates are by design highly-dependent on socio-economic conditions in the Point Mackenzie and Lower Mat-Su Borough areas.

To allow a full and transparent assessment of the validity of these forecast socio-economic conditions, the clarification requested is a statement of households, population and employment by TAZ, including a detailed list of the key factors that give rise to the changes, rather than the more generic presentation offered in Figures 1-10 of CDM Smith's 2011 report. Forecast land use assumptions (by TAZ) employed should also be made explicit. These should be made available in conjunction with any T&R studies in a format that a layperson can engage with.

- **The disparity between annual growth rate in the base 2012 memorandum projections post-2020 (5%) and the average growth rate in AADT 2001-2011 for Glenn Highway at Eklutna Flats (1.93%).**

The error in the calculation of the AAGT for 2001-11 for Glenn Highway at Eklutna Flats made in the TJ&A report is noted. *This figure should be 2.5% and not 1.93%.*

However, the point about the disparity in the *post-ramp-up period* traffic growth rates between the KAC and Glenn Highway still holds. CDM Smith note the disparity in the traffic growth rates in the forecasts for the two facilities in the letter.

- **The disparity between the commercial vehicle/passenger vehicle split used in the studies (approximately 12%), and the traffic count data for Glenn Highway at Eklutna Flats (approximately 5%).**

We acknowledge CDM Smith's 2011 forecasts were produced prior to the release of the 2011 Annual Traffic Volume Report (Central Region) produced by the Alaska Department of Transportation and Public Facilities for Glenn Highway at Eklutna Flats.

However, the subsequent publication of a 4.91%-6.62% commercial traffic figure quoted in the 2011 Annual Traffic Volume Report for Glenn Highway at Eklutna Flats should encourage CDM Smith to revisit and, if necessary, revise its commercial vehicle/passenger vehicle split figures.

- **The constant commercial vehicle/passenger split used in the studies throughout the study period.**

CDM Smith (in the letter) confirm usage of this assumption, characterizing it as conservative.

However, in light of the much higher toll for commercial vehicles this assumption seems unreasonable. For example, NCHRP concluded that commercial vehicle forecasts can exhibit more variability than passenger car forecasts, with larger trucking firms more likely to pay a toll than independent truckers.[2]

We believe that CDM Smith's T&R forecasts would benefit from a detailed analysis of the characteristics of the trucking community pertinent to the area and their propensity to use the KAC.

- **The optimality of a constant real toll of $5 throughout the study period.**

CDM Smith's letter notes the non-optimality of the constant (in real terms) $5 toll rate used throughout the study period.

- **The difference in implicit elasticities between the 2007 and 2011 reports, and the usage of the 2007 report elasticities in the 2011 projections.**

The response in the letter is confusing and not illuminating

In discussing the previous and indeed this clarification in the letter, CDM Smith noted they decided on the $5 constant real toll using the 2007 analysis (and thus the elasticities generated therein) yet the response to this clarification notes "… elasticities from the 2007 analysis were not used to produce the 2011 traffic and toll revenue estimates."

We have no idea what an "elasticity curve" is. It is worth noting optimal toll rates imply toll elasticities of -1.

2. Recommendations

- **Examine the road conditions (such as delay minutes on alternative trip assignments) in the MSA throughout the study period as traffic levels rise.**

[2] See NCHRP Synthesis 364 (2007), Estimating Toll Road Demand and Revenue, published by the Transportation Research Board and available at: http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_364.pdf.

- **Update the origin-destination pairings.**

The issues raised in points 26 and 27 in the TJ&A report are related and so will be dealt with jointly here.

As CDM Smith note accurate O-D parings road conditions are critical to the creation of valid travel demand models. The O-D pairings and road conditions used for calibration in the KAC studies were estimated in 2005 and 2007 and are thus 6 – 8 years out of date. This is noted in point 27 in the original TJ&A report.

One possible way of illustrating the critical nature of the assumptions inherent in the CDM Smith approach would be for CDM Smith to provide forecast land use patterns for the relevant TAZs to the north of the proposed KAC and forecast network conditions (possibly at 10 year intervals) in their reports. It would then be possible for stakeholders to engage more fruitfully in discussion.

- **Revise downwards the forecast growth in households during the study period in line with ISER growth rates.**
- **Revise downwards the forecast growth rate in employment during the study period in line with ISER growth rates.**

CDM Smith's noting of the inaccuracy of the ISER forecasts for 2010 for population is accepted. However, an interesting test of the robustness of CDM Smith's own employment, household and population forecasting method would be a comparison of *their* forecasts for Anchorage and Mat-Su Borough for 2010 which were employed in the 2007 Study. This comparison could well provide some insight into whether their forecast growth rates are optimistic.

Transparency might be added to the CDM Smith analysis if the growth in employment and households forecast by them were split into that due to "base" growth (without the bridge) and the addition due to the provision of the KAC. Further it would be instructive to all involved if the employment and population growth (and associated growth rates) in the relevant TAZs to the north of the proposed KAC were reported by CDM Smith.

While acknowledging that the historical growth rates for the greater Anchorage area are in excess of the forecast growth rates used by CDM Smith, the response itself (see page 9) again illustrates the fact that all other forecasts of population and household and employment growth rates for both Anchorage and Mat-Su Borough for 2010-2035 are *below* those used by CDM Smith. In light of this, a reasonable approach would be to use the ISER are growth rates.

- **Update the gasoline prices in VOC estimates, and give additional consideration to alternative scenarios for future gasoline price levels throughout the study period.**

It would be useful if the origin of the data and the calculations carried out to construct table 7 were more available. It is worth noting that tire costs appear to have risen significantly while vehicle maintenance costs fell slightly for the between 2011 and 2012 according to table 7. This does not accord with the statements on these issues at the bottom of page 10.

The discussion in the last two paragraphs of this section is largely-speaking based on a sensitivity test performed as part of another study. The relevance of this to the KAC studies is questionable.

At the end of the final paragraph in this section CDM Smith note they employ a constant VOC annual growth rate of 2.5%. It is unclear whether this is real or nominal. What is clear from the CDM Smith discussion is CDM Smith accept gasoline prices are volatile and have a significant effect on travel behavior. The potential effects of this real VOC growth and its volatility are not reflected in the core assumptions of the KAC studies or the limited risk analyses conducted.

- **Adjust VOT estimates for changes in real income over the study period.**

The comments in the letter are mostly about the level of the base VOTs employed in the studies done by CDM Smith. The issue was *not* the original level of VOT used but rather the need for VOTs to be updated throughout the forecasting period to reflect changes in real income.

However, CDM Smith's response in the letter does raise some further concern. Specifically, tables 8 and 9 that offer some examples of VOTs and associated income levels for similar projects. One question that occurs on examination of these tables is why no VOT differential is used in the KAC studies between peak and off-peak time periods when it is for all other studies. A second issue relates to the relationship between the VOTs and the median income levels. It is clear that the VOTs for the KAC study area are higher than all the others used in similar studies. CDM Smith note the generally positive relationship between median income levels and VOTs (in a somewhat extensive discussion) which is to be expected. However, it is curious to note that the aggregate VOT for KAC is 32.7% higher than that for the SR 520 Bridge yet household median income for the KAC study area is just 16.1% higher than that for the SR 520 Bridge study area. Thus the comparisons offered in the letter offer a mixed message and cast some doubt on the CDM Smith assertion in the letter concerning the reasonabless of the base VOTs employed.

The last paragraph in this section of the letter confirms CDM Smith believe that rises in real income

would affect traveler behavior but also that CDM Smith have not allowed for the expected increases in real income in their studies.

- **Enhance the risk analysis, to include a wider set of input variables with well-specified distributions in the Monte Carlo simulation.**

CDM Smith's letter repeats the descriptions of their risk analyses in the KAC studies. The risk analyses they have carried out are very limited. The results of the risk analysis do not currently provide any more insight into the inherent risk profile of the KAC than the base, low and high cases produced for the forecasts. As such, it is inadequate. If this is systemic as CDM Smith claim, then it is a systemic failing.

The recommendations in TJ&A to specify appropriate distributions around the included variables and include a wider set of variables stands. With access to the models employed by CDM Smith and appropriate resources TJ&A would be happy to produce a fuller risk analysis and risk profile for the T&R forecasts.

- **Commission an independent organization to produce traffic and toll revenue projections based on modeling for the period 2037 through 2051.**

CDM Smith's letter notes that the traffic and revenue estimates produced after 2035[3] are extrapolations are not based on modeling. The forecast of zero traffic growth and constant real revenue for the post 2035/7 period is obviously suspect. The recommendation made stands.

Tim James

[3] There may be some confusion here since the 2011 update ends in 2037 rather than 2035.

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March 6, 2013

Mr. Michael L. Foster, P.E.
Chairman of the Board
Knik Arm Bridge and Toll Authority
820 East 15th Avenue
Anchorage, Alaska 99501

Subject: Response to Further Comments from Timothy James & Associates Regarding the Independent Review of Traffic and Toll Revenue Projects

Dear Mr. Foster:

Thank you for the opportunity to reply to the recent memorandum from Ms. Danna Moser, CPA, of the Division of Legislative Audit (DLA), dated February 27, 2013, concerning KABATA's response to the earlier management letter. On February 15, 2013, CDM Smith provided a letter responding to a request for "clarifications" and "recommendations" contained in *The Knik Arm Crossing: An Independent Review of Traffic and Toll Revenue Projections* by Timothy James & Associates (TJ&A). We have sent a copy of that letter suitable for public release with the condition it be released in its entirety along with this further response. In this letter, our comments are directed to the memorandum from TJ&A to DLA, dated February 27, 2013, and included as Attachment #1 in the recent memorandum to you from DLA. We will follow the order of points raised in the original report and try not to repeat ourselves. The original points are in italics.

Clarifications

- *The high dependence of the traffic and toll revenue projections on strong economic development and population growth in the Point MacKenzie area, north of it, and to the south and west of Wasilla and Houston.*

  In the recent memorandum, TJ&A now requests "a statement of households, population and employment by TAZ..."On October 18, 2012 we provided TJ&A, by email, detailed future land use forecasts, at the level of traffic analysis zone (TAZ), beginning in 2020 and running in five year intervals through 2035. As we have done in literally hundreds of T&R studies, CDM Smith provided thematic maps showing the location and density of future land uses at an appropriate level of detail. These appear in Figures 1 through 10 of our report titled *Proposed Knik Arm Crossing: Traffic and Toll Revenue Update*, dated August 31, 2011. Even more detail was included in the work of Insight Research Corporation. We have provided TJ&A all of the information requested.

- *The disparity between average annual growth rate in the base 2012 memorandum projections post-2020 [after the "ramp-up" period has ended] (5.0%) and the average growth rate in AADT 2001-2011 for Glenn Highway at Eklutna Flats is (1.93%).*

  After acknowledging the error in the calculation of the growth rate, TJ&A still thinks that the traffic on the Knik Arm Crossing (KAC) would grow at the same percentage rate, after the ramp up period, as the traffic on a mature facility such as the Glenn Highway at Eklutna Flats. We simply don't agree. The KAC will open up significant development opportunities that will occur over time. Also, there is every reason to expect higher traffic growth rates on the KAC because the numbers start with a lower value. This is simply arithmetic.

- *The disparity between the commercial vehicle/passenger vehicle split used in the studies (approximately 12%) and the traffic count data for Glenn Highway at Eklutna Flats (approximately 5%).*

  We do not agree. A value of 5% commercial vehicles would be too low. The traffic and toll revenue forecasts anticipate that a significant portion of the truck movements originating in the Port of Anchorage will divert from the Glenn Highway to the KAC and Point MacKenzie Road. The Port of Anchorage receives about 90% of the container freight arriving in Alaska and serves 85% of the population. Nearly half of that freight goes north to Fairbanks, the interior and the North Slope. Given the location of the Port at the southern terminus of the KAC, and the direct access from the Port to the KAC, it is reasonable to assume that the easier trip north would be on the KAC rather than through the streets of Anchorage and up the Glenn Highway. Further, with the relatively low traffic volumes on the KAC to start, this will be a high percentage of KAC traffic.

  The forecasts for the KAC also envision significant commercial vehicle demand that will be generated from within Anchorage. This includes commercial vehicle traffic from the Port of Anchorage, as well as delivery trucks, recreational vehicles and campers travelling between Anchorage and Mat-Su Borough. Remember, for this purpose, commercial vehicles include all vehicles with three or more axles including two axle vehicles towing a single axle trailer.

  In addition, the KAC will facilitate the expansion and further development of Port MacKenzie, which will greatly increase the level of commercial traffic in and through the Mat-Su Borough. Existing developments (such as the Goose Creek Correctional Center) and future industrial land development in the Mat-Su Borough are additional reasons for the anticipated proportion of commercial vehicles on the KAC. The shortage of industrial land in Anchorage has been established.

  Similarly, there is a well-documented shortage of residential land in the Anchorage Bowl. Once the KAC opens, there will be a large area of industrial and residential land ready for development. The Port MacKenzie industrial district has 8,942 acres (about 14 square miles) less than five miles from Anchorage. Construction activities from these land development

activities alone will generate a substantial volume of commercial vehicles on the KAC. The traffic and toll revenue forecasts also anticipate intermodal commercial vehicle activity, especially once the second route to the Parks Highway is constructed. The proximity of the ports, rail and the industrial district will lead to commercial vehicle use of the KAC.

The 2007 Proposed Knik Arm Bridge Study analysis was based upon available vehicle classification data provided by the Alaska Department of Transportation and Public Facilities (DOT&PF) from their permanent traffic recorder stations. We did not rely exclusively on the vehicle classification counts from the permanent recorder station on the Glenn Highway at Eklutna Flats, reported earlier. Other relevant count locations were on the Glenn Highway at Kepler Drive and on the Parks Highway at Willow. Commercial vehicle shares on the Glenn Highway at Kepler Drive ranged from 8.9% to 11.4% between 2003 and 2009. Commercial vehicle traffic on the Parks Highway at Willow ranged from 14.7% to 21.2% between 2005 and 2011. The value that CDM Smith used for proportion of commercial vehicles in the traffic stream (12%) generally reflected experience on these locations and the anticipated role of the KAC connecting the Mat-Su Borough to Anchorage.

- *The constant commercial vehicle/passenger vehicle split used in the studies throughout the study period.*

  We explained our considerable experience from other "greenfield" projects, in which the proportion of commercial vehicles increased gradually over time. Given that for the purposes of this study, the definition of commercial vehicles includes all vehicles with three or more axles including two axle vehicles towing a one axle trailer, we think that the 12% commercial vehicles is a reasonable starting value and that holding that number constant over time is also reasonable, if not a conservative forecast assumption.

- *The optimality of a constant real toll of $5 throughout the study period.*

  Our toll sensitivity analysis demonstrated that the revenue-maximizing toll rate for passenger vehicles was $6.00 in 2005 dollars. CDM Smith does not recommend toll rates at the very top of the toll sensitivity curve (the "optimal" toll rate) in order to allow for productive future toll rate increases once the facility is open to operation. In our 2011 update of the analysis, we assumed an opening year passenger vehicle toll rate of $5.00 in 2016 dollars, which allows even more "headroom" between the opening toll rate and the revenue-maximizing rate. This is normal practice in pricing a new toll facility.

- *The difference in implicit elasticities between the 2007 and 2011 reports and the usage of the 2007 report elasticities in the 2011 projections.*

  The updated travel demand model, used in the 2011 analysis, was run under a range of toll rates with a diversion curve coded into the assignment process. In this way, the travel demand model takes into consideration the toll rate, time savings and distance savings

between each origin and destination pair within the traffic assignment process. The results of these runs were presented in the toll sensitivity curves from which a toll rate for passenger vehicles was selected. TJ&A's apparent confusion may be due to the lack of experience in travel demand modeling particularly the toll diversion process and toll sensitivity analysis normally incorporated into traffic and revenue studies.

Recommendations

- *Examine road conditions such as instance delay minutes on alternative trip assignments) in the MSA throughout the study period as traffic levels rise.*
- *Update the origin-destination pairings.*

  As explained in our original response, all travel demand models are validated to data from a historic year and then applied to the future. This includes historic roadway conditions and "O-D pairings." CDM Smith constructed and documented a valid travel demand model for the KAC and then used that model to produce traffic and toll revenue estimates. This is the processes used for every travel and demand modeling study, whether for a regional planning study or for a traffic and revenue study.

  The TJ&A suggestions are difficult to understand. CDM Smith has already "provided forecast land use patterns for the relevant TAZs to the north of the proposed KAC and forecast network conditions (possibly at 10 year intervals)." We have actually done this at 5 year intervals and reported the results.

- *Revise downwards the forecast growth in households during the study period in line with ISER growth rates.*
- *Revise downwards the forecast growth rate in employment during the study period in line with ISER growth rates.*

  TJ&A's proposal to test the reliability of short term forecasts made before the Great Recession is just not very reasonable or constructive. CDM Smith provided the forecasts of employment and households by TAZ in an email to Timothy James on October 18, 2012.

  We disagree with TJ&A's recommendation of using ISER growth rates in the forecasts of KAC traffic and toll revenue. Significant, detailed effort went into the development of land use forecasts specifically constructed to reflect the impact that the KAC will have on the Mat-Su Borough and Anchorage. This level of effort is simply not part of many general transportation planning studies, including ISER's.

  Also, as part of the risk analysis, CDM Smith produced a range of traffic and toll revenue forecasts with assigned probabilities, not just a single forecast. The primary source of risk was future socio-economic conditions. The effect of lower household and employment

growth were reflected in this part of our analysis. We understand that KABATA used this information as part of their financial planning for the KAC.

- *Update the gasoline prices in VOC estimates, and give additional consideration to alternative scenarios for future gasoline price levels throughout the study period.*

  A basic assumption in all of our toll studies is that the long term increase in gasoline prices will not substantially outpace inflation. There will be fluctuations year to year, but our forecasts are developed focusing on long term assumptions and trends and not short term volatility. CDM Smith has extensive experience with testing the impacts of significant fuel price surges and has reviewed impacts on other facilities we monitor through the surges experienced over the last decade. Short term negative toll revenue impacts as a result of testing fuel price surges have been in the 5% range. However, since the crossing will result in considerable savings in distance, a sizable increase in fuel prices may actually make the KAC more attractive to cars and particularly trucks. The additional savings in fuel costs would offset a larger portion of the toll. In our opinion, higher long-term fuel prices are not a significant risk to the KAC traffic and toll revenue projections.

- *Adjust VOT estimates for changes in real income over the study period.*

  We stated in our initial response that there were two issues: the initial value of time (VOT) and the changes in VOT over time. We understand that TJ&A's comment was about "the need for VOTs to be updated throughout the forecasting period to reflect changes in real income." As we explained, over the long term increases in real income are indeed quite likely. These will, however, reduce the impact of the toll on travelers. CDM Smith did not allow for expected increases in real income as a conservative approach to traffic and toll revenue estimation. Additional data was provided in our previous response as background on the general relation between VOT and median household income.

- *Enhance the risk analysis, to include a wider set of input variables with well-specified distributions in the Monte Carlo simulation.*

  CDM Smith has no further comment, except to point out that TJ&A has not suggested any other variables (except possibly VOC) or any other probability distributions.

- *Commission an independent organization to produce traffic and toll revenue projections based on modeling for the period 2037 through 2051.*

  CDM Smith confirms that 2035 was the last model year. Beyond this time period, the underlying socio-economic forecasts and transportation planning information does not exist. Regional transportation plans do not go out further into the future. There is no need to commission anyone to forecast traffic and toll revenue for this time period. The approach taken by the Authority was to assume no traffic growth after the year 2040, but an

inflationary 2.5% per year toll rate increase. CDM Smith considers this a reasonable, even conservative, assumption that is in line with toll industry practice.

Once again, thank you for the opportunity to participate in the Knik Arm Crossing project. Please let us know if you have questions or require further information.

Sincerely,

Scott A. Allaire

Scott A. Allaire
Vice President
CDM Smith Inc.

Grant R. Holland
Vice President
CDM Smith Inc.

Enclosure: Response to the Independent Review of Traffic and Toll Revenue Projections by Timothy James & Associates, February 15, 2013

AGENCY RESPONSES

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THE STATE of ALASKA
GOVERNOR SEAN PARNELL

Department of Transportation and Public Facilities

OFFICE OF THE COMMISSIONER
Patrick J. Kemp, P.E., Commissioner

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March 22, 2013

Kris Curtis, CPA, CISA
Division of Legislative Audit
Alaska State Legislature
PO Box 113300
Juneau, AK 99811-3300

Dear Ms. Curtis:

The Department of Transportation and Public Facilities has reviewed the preliminary audit report on:

Department of Transportation and Public Facilities, Knik Arm Bridge and Toll Authority, Knik Arm Crossing Project, March 6, 2013.

The Department has no comments as the only finding is specific to the Knik Arm and Bridge Authority.

Sincerely,

Patrick J. Kemp, P.E.
Commissioner
Department of Transportation and Public Facilities

Cc: Gary Hogins
Kim Rice
Mary Siroky
Andrew Niemiec
Roger Healy
June Gotschall

(Intentionally left blank)

THE STATE of ALASKA
GOVERNOR SEAN PARNELL

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RECEIVED
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LEGISLATIVE AUDIT

April 1, 2013

Members of the Legislative Budget
and Audit Committee,

Re: Response to Preliminary Audit Report - Department of Transportation and Public Facilities, Knik Arm Bridge and Toll Authority, Knik Arm Crossing Project. Audit Control No. 25-30068-13.

Thank you for the opportunity to respond to the March 7, 2013 Audit Report issued by the Division of Legislative Audit (DLA). The Knik Arm Bridge and Toll Authority (KABATA) welcomes the Legislature's review of the work performed by and on behalf of the Authority, and the review of project development activities accomplished in order to deliver this legislatively mandated project.

RESPONSE SUMMARY

We have reviewed the Audit Report prepared by Danna Moser and Linda Day at DLA and find that the audit objectives have not been met and the audit is incomplete. DLA's justification for limiting the scope of this audit is flawed. This Committee deserves a comprehensive accounting of the numerous benefits and safeguards incorporated into the actual contract for this project. As our legal team observed, "The Report's sole focus on the traffic and revenue risk fails to convey a complete picture of the overall risk and reward calculus for this project and in doing so leaves an astonishingly incomplete and distorted assessment of the proposed project." The Nossaman LLP letter dated April 1, 2013 is hereby incorporated into our response in Attachment 1.

We disagree with the *Audit Report Conclusions* and with *Recommendation No. 1.* This recommendation relies on MatSu Borough (MSB) studies that assume that there will be no change to the traditional population and economic growth conditions in the Point Mackenzie area after the KAC is built. While this assumption may be appropriate for a local study that is updated every few years, it is an entirely inappropriate assumption for the KAC traffic model.

Evaluating traffic and revenue risk can be achieved by using the KAC financial risk analysis. The risk analysis is a decision making tool designed to evaluate the risk associated with a range of toll revenue outcomes. It will be relied upon by the rating agencies, lenders and investment bankers as they evaluate this project for investment reliability, and it is an appropriate tool for legislative decision making. DLA should have considered the various outcomes, quantified them and weighed them against the balance of benefits and risks established in the KAC P3 agreement. Failure to carry out this important aspect of the audit objectives deprives the legislators of a comprehensive assessment from which to make informed decisions.

Some of our responses in the following Audit Report Evaluation are critical of the DLA audit process. These responses are intended to express our concern with the conduct of the DLA throughout this audit. Due to the confidential nature of previous interaction with DLA, we are unable to divulge comprehensive evidence of DLA's lack of professionalism, their consistent demonstration of a one-sided perspective and the lack of objectivity in their work. However, the pervasive nature of this behavior extends to this Audit Report. For example, in the opening 2 page summary of this report the DLA admits they did not complete their audit and did not review the KAC P3 agreement. Following this admission, DLA errs by saying KABATA's Board determined the State will bear the risk of lower than expected revenue, when in fact the Board's decision established that many of the risks normally retained by the state in conventionally delivered federal aid transportation projects will be shifted to the private sector. Without balance and objectivity, this conduct is a breach of the duties and ethical standards of the CPA profession. Chapter 1 of the *Government Auditing Standards*, entitled *Government Auditing: Foundation and Ethical Principles* is provided in Attachment 2.

We recommend that the Committee ask questions of DLA and of KABATA to ensure that the Final Audit Report provides an accurate understanding of the project, the balance of risks and benefits and that accurate information is presented. We have serious concerns regarding the motives and methodology employed by DLA throughout this audit process. We believe the Committee has a duty to ensure that procedures followed and the work produced by the Division meets the standards established by the American Institute of Certified Public Accountants and the government auditing standards established by the U.S. General Accounting Office.

AUDIT REPORT EVALUATION

KABATA has developed and continues to advance the KAC project with the highest professional standard of care. We are supported by a professional team of consultants who are recognized experts in their respective fields. Their credentials are provided in Attachment 3. It is a disservice that this incomplete Audit Report does not provide a comprehensive analysis of the risks and rewards offered by the Knik Arm Crossing project with the objectivity that should be expected from DLA and relied upon by the Legislature.

The Audit was requested on January 22, 2012 giving DLA more than a year to compile their findings. Since February 2013, DLA has been rushing through the audit process and has scheduled hearings with your committee without providing an appropriate period of time to receive and review our responses. We find that there are many significant errors and misrepresentation of several topics critical to an accurate accounting of this complex project. KABATA's requests for additional time to respond were denied by DLA. Providing 14 days to respond to this Audit Report is insufficient given the incomplete nature of the audit. We are unable to provide a complete response in the time allotted to us. However, in an effort to provide you with information that DLA did not, we are including letters from our team of experts that will serve to give you a broader picture of the KAC P3 agreement.

These letters provide discussion of the overall cost-benefit of the project, the effect on the availability payment of capital cost variations, the value to the State of cost and schedule certainty afforded by the agreement structure, and the flexibility to change course during the term of the contract should future decision makers desire. They also discuss how traffic and revenue studies and financial models are used in the municipal bond and P3 contract market. These letters are incorporated into this response as Attachment 1.

Limiting the Scope of the Audit is Inappropriate. The Audit Objectives require DLA to *"evaluate the KAC private-public-partnership (P3) agreement"* and *"outline the balance of risks and rewards between public and private partner entities outlined in the P3 agreement."* DLA has admittedly not reviewed the KAC P3 agreement and has elected to limit the scope of their work to a review of general, published primers on public private partnerships, contending that *"since the RFP has not been issued, the final terms of the proposed P3 agreement could not be reviewed as part of this audit."* Although the P3 agreement is not in final form, there are a number of important risk-reward factors that are inherent in the general structure of an availability payment public private partnership that could and should have been discussed in the report. A finalized agreement is not needed to understand and explicate these factors.[1]

The KAC P3 agreement was provided to DLA on March 3, 2012. Over the past year, KABATA has provided evidence to DLA of the specific terms in the P3 contract that were developed to safeguard the best interest of the State over the life of the agreement. Contracts developed for infrastructure projects are all unique, and public private partnerships and their compensation arrangements are highly complex See Attachment 4. The KAC P3 agreement contains significant information detailing the balance of risks and rewards between the public and private partner that is necessary for a proper evaluation. In choosing not to review the KAC P3 agreement, DLA also chose to ignore everything in our responses that is particular to this agreement. This intentional act of disregarding evidence provided by KABATA and our consultants resulted in misleading and incorrect information that is pervasive throughout DLA's report. The consequence is that the Committee will not have the benefit of accurate information on which to deliberate.

[1] Nossaman LLC April 1, 2013.

The Audit Report Fails to Outline the Balance of Risks and Rewards in the Contract. There are numerous benefits associated with an availability payment P3 contract structure that should have been provided in this report even under the limited scope constraint. Attachment 1 discusses the effect of DLA's failure to illustrate the overall cost-benefit of the KAC project. While the cost of financing is a factor, the design-build capital cost is by far the single biggest component of the availability payment. Availability payment P3 bids on projects procured in the US have come in 23% to 42% lower than the owners estimate.[2]

The benefits of the project to the future state economy, not to mention just the Anchorage region, are manifest, well documented and orders of magnitude larger than the potential appropriations needs under even the most pessimistic toll revenue scenario.[3] DLA's failure to complete the audit objectives, and instead choosing to focus on a single state retained risk (traffic and toll revenue) results in a skewed and biased audit that appears to support a predetermined outcome.

Confidentiality Issues and Misleading Information: DLA has been previously cautioned that they cannot publish confidential information. Footnote 12 on page 18 of the Audit Report must remove the name of the NRSRO who prepared the project credit rating. Publishing this name could be damaging to the project and to the Alaska Department of Revenue. In addition, Appendix A of the Audit Report lists property purchase prices that pursuant to 49 C.F.R. §9(b) and AS 40.25.120(a)(5) are confidential.

DLA Mischaracterizes the $26 million "Municipality Contribution": AMATS is the acronym for Anchorage Metropolitan Area Transportation Solutions, the federally recognized Metropolitan Planning Organization (MPO). AMATS is a multiagency (ADOT, ADEC, MOA) team that works together to plan and fund the transportation system in the Anchorage Bowl and Chugiak-Eagle River areas when federal funds are being used. Although labeled as "Municipality Contribution", the $26 million is expected to come from federal funds with state match intended for use within Municipality of Anchorage boundaries, not from municipal funds.

KABATA's Operating Budget: KABATA's FY13 operating budget does not have a general fund component.

Misleading Audit Conclusions Demonstrate Bias: As a result of their choice to limit the scope of work, DLA has elected to keep evidence gathered out of the Audit Report. The Audit Report conclusions are misleading, and we request that the analysis be put in context of the project delivery method and the phased schedule for future improvements.

DLA ignores evidence regarding the KAC P3 funding structure. DLA was tasked with providing the level of funding necessary to complete the project. The conclusion that $1.4 billion is needed to

[2] Nossaman LLC April 1, 2013.
[3] Nossaman LLC April 1, 2013

complete the KAC incorrectly implies that upgrading the initial construction of a two lane roadway to four lanes, reconstructing 9.5 miles of the existing Point Mackenzie Road to four lanes, and constructing a 4 lane viaduct between Government Hill and the Ingra-Gambell couplet is part of the KAC P3 contract. It is misleading for DLA to imply that it is the State's responsibility to come up with the full amount of funding shown.

The P3 contract only obligates the private partner to construct the initial two-lane bridge and roadway between Anchorage and Port Mackenzie (Phase I). The decision to widen Phase I to 4 lanes and construct other roadway additions and improvements (Phase II) remains entirely within State control. Funding for these future phases of the project will be secured based on the known operational status, traffic volumes and revenues of the project if and when Phase II is desired. If traffic is less than anticipated, Phase II can be deferred or foregone entirely at the State's discretion.

Mischaracterization of the TIFIA Loan Program: DLA's characterization of federal financing programs is one example of the apparent ignorance of the programs and bias against this project that they have displayed throughout the audit process. Rather than conveying the value of TIFIA financing, the cost to the State without TIFIA, and the critical role that the legislation plays in securing this valuable financing, DLA chose to point out that the project did not receive a past TIGER grant (even though TIGER is not part of the current financial plan), misrepresents the status of the current Letter of Interest for TIFIA (the FHWA did not stipulate any particular funding level in the reserve account), and implies that federal financing programs are unlikely to be available by making statements like *"KABATA's loan request did not present a compelling justification for providing assistance above a 33 percent participation level"* rather than acknowledging that the pro forma KAC financial plan assumes 33% participation. The use of implicit criticism, speculation and innuendo is pervasive throughout the Audit Report.

The Knik Arm Crossing project qualifies for consideration of 49% TIFIA participation, and securing the highest rate of TIFIA participation possible should be a common goal. Even at 33% participation, TIFIA will provide excellent value for the State. KABATA will continue to pursue the maximum TIFIA loan achievable for the project. Under the amendments made to the program by the most recent federal transportation reauthorization, MAP21, passage of the pending legislation makes obtaining TIFIA financing for the project highly probable.

DLA demonstrates skepticism regarding KABATA's schedule of cash flows: DLA incorrectly states that KABATA does not expect further growth in traffic after 2040. It is reasonable to expect that traffic will grow until the roadway reaches its full capacity; however, it is not the industry standard to project traffic growth beyond the transportation network planning horizon for the overall area. The financial plan conservatively assumes zero traffic growth beyond 2040, and includes the cost of updating traffic and revenue projections on a regular basis (every 4 years) within the KABATA operating costs. Even after providing this explanation, DLA's consultant finds the assumption of zero traffic growth "obviously suspect" and recommends commission of an independent organization to produce traffic and

toll revenue projections for the period 2037 to 2051 based on traffic modeling. Although DLA and their consultant reviewed the 2035 Metropolitan Transportation Plan, they fail to recognize that traffic modeling relies on these plans to provide planned roadway network improvement in the future. Modeling traffic beyond the provisions of the regional network plans would be highly unreliable.

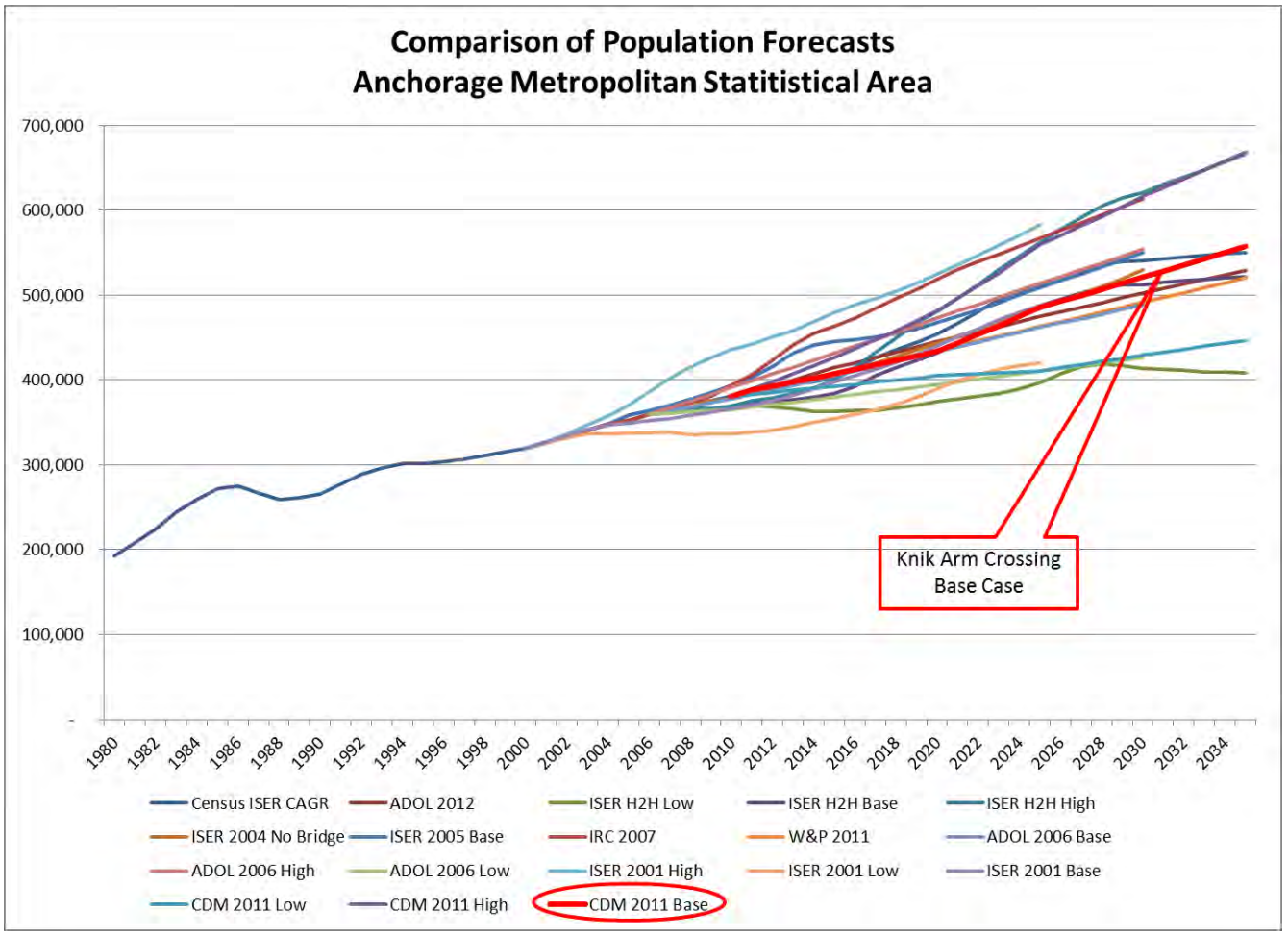
DLA's implicit skepticism is illustrated in this section. Discussing the toll price in 2061 dollars lends nothing to the analysis of the schedule of cash flows. Projecting those toll rates back to current value would reveal a $5 toll for passenger vehicles. We appreciate that DLA recognizes the $2.2 billion surplus expected by 2061, but rather than discuss the value to the State of revenue generated that can only be spent on transportation projects, they speculate that it could become a shortfall.

Throughout the audit process, DLA has repeatedly called attention to revenue projections beyond 2040 performed "internally" by KABATA management rather than performed by our consultants. Illustrating the revenue stream and toll rates beyond 2040 sounds dramatic, but this analysis provides little benefit to the questions being asked today in order to deliver the project. DLA either lacks the fundamental knowledge of the development and use of P3 financial plans and traffic and revenue forecasting, or they are trying to discredit the integrity of the Authority. Either way, there is little value in this analysis.

DLA misrepresents the value of the MSB Model: The economic model used for the referenced MSB studies does not consider the Anchorage land shortage or the anticipated economic growth that will occur at Port Mackenzie as a result of the KAC. While the assumptions used for these studies may be appropriate for their intended use in the short term, they are not appropriate for application to the KAC traffic model. Traffic model assumptions for long term financing projects must consider the long term socioeconomic trends, and should be the result of an independently conducted socioeconomic study. The work performed for the MSB studies would not be sufficient for the financial community.

What DLA fails to explain is that local planning organizations typically update their plans every four to six years. Each update will be based on known changes that occurred over the past several years; changes in the roadway network, changes in economic development and changes in local regulations. The MSB will go through this process again shortly after the KAC opens to traffic.

Developing the key assumptions and inputs for a traffic model starts with population forecasting, which is an inexact science. DLA has selected a single ISER forecast, among many, to use as a comparison. This would be inadequate for the KAC traffic model, as a single forecast does not illustrate the long term trend. The following graph compares several population forecasts prepared for the Anchorage Metropolitan Statistical Area by a number of different forecasters, many of which were conducted by ISER.



Contrary to the Audit Report conclusion, the base case (expected) population forecast for the KAC is not unreasonable. The high, base and low population projections performed all fall within the range of other forecasts, and the base case, shown in red, is right on the long term trend line for the Anchorage MSA.

After forecasting population growth, traffic modeling distributes population by household within the study area and utilizes an economic model to predict employment levels and distribution. Appendix D of the Audit Report and Attachment 6 herein consists of a document prepared by Western Demographics, Inc. (WDI) which lists the conceptual differences between the 2012 MSB traffic model assumptions prepared by WDI and the KAC model assumptions. In the Audit Report, DLA only identifies the differences found in Appendix D that "support lower forecasts," and neglects to acknowledge the primary key difference, the chosen Economic Model.

WDI points out in Appendix D that the 2012 MSB traffic model used a "Local Micro Economic Model" that assumes "Traditional Job Growth Linked to Local Conditions." These assumptions confirm that the 2012 MSB traffic model does not take into consideration the economic influx from Anchorage that can be expected when the KAC is constructed. This might also explain why the draft 2012 MSB traffic

model predicts only 4,515 jobs in the Point Mackenzie area (2035) when a 2009 ISER study entitled "Benefits of the Cook Inlet Ferry to the Municipality of Anchorage" concludes that the introduction of ferry service alone would generate 6,866 jobs by 2040[4]. ISER estimates the high case employment at 12,822 jobs for the Point Mackenzie area in that study.

The Audit Report is particularly critical of the KAC employment assumptions for Port Mackenzie, stating that they are "inconsistent with the Port's master plan and regulations." The 2011 KAC traffic model included the assumption of some retail development within Port Mackenzie boundaries. In July 2012, a year after the KAC traffic model was completed, the MSB Assembly enacted legislation creating a Port Mackenzie Special Purpose District which now restricts retail development in the Port, making the 2011 KAC retail assumption "inconsistent with the Port's master plan and regulations." However, the Port Mackenzie Master Plan Update identifies 1,021 acres as a new Port Commercial District (PCD).[5] The PCD is intended for non-retail commercial and light industrial uses, with dense commercial development encouraged north of Lake Lorraine. In order to verify that the employment assumptions used for the KAC traffic model were still valid, we evaluated areas in Anchorage that have non-retail commercial and light industrial uses. Employment data from the AMATS traffic model illustrates that an employment density of 6-25 jobs per acre can be expected for the prescribed land use. The KAC model estimates about 10 jobs per acre in this area of the port by 2035, which is consistent with the current intended land use in the PCD. The MSB model estimates about 1 job per acre in this area (MSB model information provided by ADOT). It is also reasonable to assume that retail development will occur outside the Port Mackenzie boundaries in the Point Mackenzie area.

It is important to note that on March 21, 2013, the MatSu Borough Chief of Planning confirmed that the 2012 MSB traffic model is not complete. A fully calibrated traffic model does not exist. She stated that ADOT needs to amend the consultant contract, and estimates that it will be a month or two before the work product is released for public review.

KABATA has independent verification of key traffic model variables. The Audit Report incorrectly claims that KABATA's projected traffic growth rate, percent commercial vehicle assumption and economic growth in the Point MacKenzie area are not supported by independent sources.

In March 2006, HDR Alaska, Inc. (HDR) prepared a *Transportation Planning Model Technical Report* as part of the Environmental Impact Statement process for the Knik Arm Crossing. Appendix I to that report is titled *Land Use and Transportation Forecasting* which discusses the KAC traffic model developed by HDR (see Attachment 5). The complete report can be found on our website.

HDR's 2006 traffic model, which assumed a 2010 opening date for the bridge, forecasts 46,652 vehicles per day on the bridge in 2030, 12% commercial vehicles, and 27,046 vehicles per day on Point

[4] *Benefits of the Cook Inlet Ferry to the Municipality of Anchorage, ISER, 2009*
[5] *Port Mackenzie Master Plan Update, Matanuska Susitna Borough, 2011*

Mackenzie Road beyond the Port Mackenzie boundary. The difference between traffic on Point Mackenzie Road and the traffic on the bridge (a difference of 19,606 vehicles per day) illustrates the expected traffic traveling between Anchorage and Point Mackenzie in response to strong economic growth in the Point Mackenzie area, particularly within the Port Mackenzie boundaries. Simply stated, HDR forecasted that 42% of the traffic on the bridge is expected to consist of trips back and forth between Anchorage and Point Mackenzie in 2030. This is a completely different paradigm than the current Glenn Highway traffic pattern.

The KAC traffic model prepared by CDM Smith is the result of an independent economic and demographic study prepared to provide a corroborating examination of the assumptions and inputs on which the HDR 2006 model was based, offering a cross check on local forecasting methodologies and strengthening the reliability of the forecasted traffic volumes.[6] This is an essential exercise when developing an investment grade traffic and toll revenue study. Over the years, rating agencies have become increasingly skeptical about relying upon the economic projections made by regional planning organizations. Historically, these models have been subject to parochial factors that have tended to either inflate or deflate actual growth projections. As a result, rating agencies, and through them the financial community, have looked for an independent analysis of the economic factors that influence traffic and revenue studies used to support revenue based financings. This information is equally valuable to project owners who retain revenue risk. In the last 15 to 20 years, no start-up toll facility has received an investment grade rating based solely on the economic forecasts from local and/or regional planning agencies.

DLA's incorrectly concludes that the estimate of a 12 percent split for commercial vehicle traffic for the KAC is high compared to actual traffic count data for the Glenn Highway, contending that the 12 percent estimate is based on DOTPF's 2003 to 2006 traffic data. CDM Smith evaluated traffic recorder information from 2001 through 2011 from three traffic recorder sites in the region. In addition, they anticipate an influx of commercial traffic created from connecting the land-constricted Anchorage Bowl with vast tracts of industrial land at Port Mackenzie. This connection provides ready access to commercial and industrial lands in proximity to the Port of Anchorage, from which approximately 90% of the container freight to Alaska lands is distributed. This information is included in Appendix I of the Audit Report. CDM Smith's responses to DLA's consultant are incorporated herein as Attachment 7.

CDM Smith's commercial vehicle estimate is corroborated by the earlier study performed by HDR which used *The Quick Response Freight Manual,* September 1996, Federal Highway Administration to estimate commercial vehicle traffic for the study area. From the HDR study, commercial vehicle traffic is expected to be 14.2% within Port Mackenzie and 12% on the Knik Arm Bridge. HDR's methodology considered Vehicle Class 5-13 to be commercial vehicles, while CDM Smith's estimate also includes Class 4 vehicles among commercial vehicles.

[6] *Knik Arm Toll Bridge, Anchorage Alaska MSA, Traffic and Toll Revenue Investment Grade Study, Independent Economic Overview and Development Forecast, Insight Research Corporation, May 2007.*

Traffic projections for the KAC were not simply based on a market share of Glenn Highway traffic in either study performed for the KAC, because both studies anticipate that land shortages in Anchorage will create additional traffic between Anchorage and the Port Mackenzie area once the bridge is built. This is traffic that would otherwise remain within the Anchorage Bowl, so it is not appropriate to predict KAC traffic volumes based solely on a simple percentage of the existing Glenn Highway traffic. The simple "market share" methodology was employed by DLA's consultant, whose study does not address land shortages in Anchorage or recognize the 14 square miles of industrial land that Port Mackenzie has to offer.

The KAC financial risk analysis is a valuable decision making tool. DLA concludes that KABATA's risk analysis was too limited to provide assurance of achieving projected toll revenues, and too limited to provide a useful analysis.

A risk analysis is not intended to provide assurance to any single outcome. It is a decision making tool that assigns probabilities in order to give decision makers a basis for making informed decisions. A robust traffic and revenue study and associated risk analysis is expected by rating agencies, lenders, equity investors and underwriters as they evaluate projects for investment reliability. CDM Smith understands the level of work required to withstand the critical assessment of rating agencies, lenders and investment bankers. It is unclear how DLA can conclude that the risk analysis performed for the KAC project is somehow not useful.

The KAC risk analysis models multiple revenue outcomes, reflective of lower and higher traffic volumes, available for use in decision making. KABATA and its advisors have utilized the base (expected) revenue forecast for its base financial model and for determining the level of project reserve funding necessary. Since this is the expected case derived from an extensive traffic and revenue forecasting effort, it is an appropriate basis for a legislative request.

Selecting a lower revenue forecast would indicate a higher initial level of capital contributions, but the likelihood of additional appropriations in the future would be lower. Selecting a higher revenue forecast would indicate a smaller level of capital contributions, but the likelihood for additional legislative appropriations in the future would be higher. We have analyzed and presented to DLA multiple traffic and toll revenue outcomes, and believe a legislative request should be made on the expected outcome, or base case. DLA should have considered the various outcomes, quantified them and weighed them against the balance of benefits and risks established in the KAC P3 agreement and the value of the project to Alaskans. Failure to carry out this important aspect of the audit objectives confirms that this audit is incomplete.

CONCLUSIONS

Recommendation No. 1 suggests manipulating a valid traffic model, built on the independent socio-economic data required by rating agencies and the financial marketplace, to an improbably conservative case while disregarding the financial risk analysis performed. It is illogical and irresponsible to consider an economic model that assumes that there will be no change to the traditional population and employment growth conditions in the Point Mackenzie area after the KAC is built.

Testimony has been given to the legislature by the mayors of Anchorage, Wasilla and the MatSu Borough attesting to the shortage of developable land in Anchorage, the desire to route northbound trucks over the KAC rather than through the urban centers of Anchorage and Wasilla, and the need for an alternative to the Glenn Highway for safety and redundancy in Alaska's most populous region. The MatSu Borough is responding in anticipation of the KAC through the recent establishment of two new town centers in the Point Mackenzie area, and the Port Mackenzie Master Plan Update identifies the need to reserve land for future water and wastewater treatment facilities to serve the growing needs of the Point Mackenzie area.

DLA's stated purpose for this Audit is *"to provide legislators with the knowledge necessary to make informed decisions on future KABATA-related legislation."* Comprehensive, unbiased information is critical to achieving this purpose. By DLA's own admission, they have not reviewed the KAC P3 agreement and they were unable to outline the balance of risks and rewards of the project. The incomplete nature of the audit and the unprofessional conduct of the Division raise serious concerns regarding the integrity of the legislative Audit process. Publishing DLA's incomplete audit and misleading information is not in the public's interest.

We encourage you to ask the hard questions of DLA and of KABATA to ensure the Final Audit Report provides an accurate understanding of the project and provides accurate information to the public. A comprehensive accounting of the balance of risks and benefits provided by the terms of the KAC P3 agreement is critical to this understanding. The potential damage to the State by publishing incomplete and misleading information will reach far beyond the Knik Arm Crossing project.

The Knik Arm Bridge and Toll Authority will continue to advance the Knik Arm Crossing project with the highest professional standard of care.

Sincerely,

Michael L. Foster, P.E.
Chairman
Knik Arm Bridge and Toll Authority

Knik Arm Bridge and Toll Authority
Knik Arm Crossing Project
Response to Preliminary Audit Report
Audit Control No. 25-30068-13
April 1, 2013

List of Attachments

Attachment 1 – Letters of Clarification from KABATA's Consulting Team

Attachment 2 – Government Auditing Standards, December 2011, Chapter 1, USGAO

Attachment 3 – KABATA's Consulting Team Credentials

Attachment 4 – Tables of Contents from the Knik Arm Crossing Contract Documents

Attachment 5 – Transportation Planning Model Technical Report, Appendix I - *Land Use and Transportation Forecasting*, HDR 2006

Attachment 6 – Model Comparison, Western Demographics, Inc., 2012

Attachment 7 – CDM Smith's responses to DLA consultant

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MEMORANDUM

TO Andrew Niemiec, Executive Director
Kevin Hemenway, Chief Financial Officer

FROM H. David Prior

DATE March 21, 2013

RE Knik Arm Bridge and Toll Authority (KABATA) - Use of Traffic and Revenue Projections and Financial Models

---

You have asked me, as KABATA's bond counsel, to explain how traffic and revenue studies and financial models (TRS) are used in the municipal bond market to support the marketing and sale of toll revenue bonds.

By way of background, I am a partner at Ballard Spahr LLP, a national law firm of over 500 lawyers. We have a public finance department of over 50 lawyers with clients throughout the United States. I have over 40 years of experience as a bond lawyer and have worked on hundreds of revenue bond issues, including bond issues for toll roads and toll bridges. I have represented both issuers and underwriters of tax exempt municipal bonds, and federal agencies lending credit to transportation agencies like KABATA.

I have prepared this memorandum to assist KABATA in responding to information requested by the Alaska State Legislature, Legislative Budget and Audit Committee, Division of Legislative Audit.

You have asked me to comment on how owners of toll roads and bridges have used TRS and how they are considered by the municipal bond market, namely the rating agencies, lenders and investment bankers, who rate, provide credit and underwrite revenue bonds issued for transportation projects.

Revenue bonds are evaluated based upon financial forecasts or projections prepared by recognized national experts who develop forecasting models based upon reasonable, stated assumptions and a wide range of potential outcomes. Airport revenue bonds are evaluated by airport feasibility consultants, water and sewer bonds by engineering feasibility consultants and toll revenue bonds by traffic and revenue consultants who prepare TRS. Traffic and revenue consultants, like CDM Smith (formerly Wilbur Smith & Associates), the consultant employed by KABATA to prepare the TRS for the Knik Arm Crossing (KAC) project, prepare their forecasts and projections to help the owner or

sponsor of a toll project determine the feasibility of the project based upon projected population growth, employment, utilization and other demographic and socio-economic trends. A firm like CDM Smith, who is a market leader in its field, ultimately helps the owner or sponsor of a project determine the reasonableness of its assumptions and most probable outcomes using various models and scenarios.

Since traffic and revenue consultants forecast the future realization of a project to produce tolls over many years (including the early ramp-up years of a new facility and the later years of the project), a whole range of outcomes are considered before deciding on the most probable outcome on which to base a sound financial plan.

Any TRS needs to be carefully reviewed by the owner or sponsor and be properly vetted before it is finalized and presented to the rating agencies to rate the debt for a project, used in disclosure documents to obtain credit, or incorporated in an offering statement to underwrite revenue bonds sold in the public bond market. The owner or sponsor of the project must be confident that the assumptions underlying the forecasts and projections are reasonable and provide a sound basis for the conclusions reached. Usually issuers require that their traffic and revenue consultants prepare a wide range of models and run stress tests which demonstrate and show a variety of best, worst and most likely cases.

KABATA proposes to develop the KAC with a public-private partnership (P3) and use an "availability payments" structure. The risks and rewards associated with the KAC project will be shared as agreed upon, in a negotiated P3 agreement with the P3 developer selected.

Under the "availability payments" structure, the State of Alaska will make payments to the P3 developer for making the KAC project available to the public. The "availability payments" will be shadowed by the toll revenues forecast and projected to be collected from vehicles crossing the KAC over the period of its useful life.

The rating agencies, who will rate the bonds issued by KABATA to fund the KAC, will critically review and examine the TRS for the KAC and will need to be convinced that the assumptions used in the TRS are reasonable and achievable. The toll collections will "backstop" the "availability payments" committed by the State to service the debt on the bonds.

If the toll revenues are insufficient in the early (or later) years, the State of Alaska will be obligated to pay the difference between toll revenues collected and payments made. If the toll revenues collected exceed the "availability payments" committed, the excess or surplus can be used to repay any state reserve fund established and appropriated by the State or may be used to fund additional capacity improvements and project extensions which support the KAC.

The TRS, along with other factors, including the appropriation by the Alaska Legislature of $150 million to fund a state reserve fund for the KAC, and the soundness of the financial plan, will be a key factor in KABATA obtaining investment grade ratings for the KAC project.

The TRS will also be a key to KABATA obtaining credit assistance for the KAC project from the United States Department of Transportation and a TIFIA loan. The TIFIA joint program office will carefully review the TRS. As a federal lender, the TIFIA office will probably hire another traffic and revenue consultant, at its expense, to do an independent peer review of the TRS prepared by CDM Smith.

If private activity bonds are issued by KABATA to fund the project, as expected, the TRS will also most likely be used by the underwriter to obtain an investment grade rating on the bonds and to market the bonds. KABATA and the underwriter will probably use the final TRS prepared by CDM Smith in the official statement to publicly market the bonds to investors.

It is important for KABATA to choose a nationally recognized traffic and revenue consultant, such as CDM Smith, which has a long history of expertise in the municipal bond market and whose name is familiar with the rating agencies, lenders and investment bankers, as they rate, provide credit for and underwrite revenue bonds.

If you or the Division of Legislative Audit have any questions about the development of the TRS or the expected use of the TRS in the proposed financing of the KAC, please do not hesitate to contact me. I will be happy to answer any questions or help in any way I can.

H. David Prior
Partner
Ballard Spahr LLP

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April 1, 2013

Mr. Michael L. Foster, P.E.
Chairman of the Board
Knik Arm Bridge and Toll Authority
820 East 15th Avenue
Anchorage, Alaska 99501

Subject: Response of CDM Smith to comments from Timothy James and Associate Regarding the Independent Review of Traffic and Toll Revenue Projects

Dear Mr. Foster:

In this letter we do not intend to respond to the same comments/questions we have already answered in great detail since this Legislative Audit was initiated. Instead, this letter attempts to describe the history of CDM Smith's toll services and to demonstrate our breadth of knowledge and experience with the toll industry and our responsibility to provide independent and objective forecasts for our clients.

CDM Smith's Transportation Finance and Technology Group (TFT) is the nationally recognized leader in traffic, revenue and operations studies for toll industry clients. Our revenue forecasts have been used in support of more than $88 billion in toll facility finance throughout United States and worldwide. CDM Smith has worked in virtually every major metropolitan area in the country. In terms of geographical coverage, CDM Smith has tolling experience in 46 states, with bonds issued using CDM Smith studies in 25 states. CDM Smith maintains an entire division of 85 professionals dedicated almost exclusively to toll facility planning and finance. Resources in that division, referred to as the Transportation Finance and Technology Group (TFT), includes engineers, transportation economists, traffic and revenue experts, travel demand modelers and toll technology and operations specialists.

We have been developing traffic and revenue (T&R) forecasts for more than five decades. From the beginning, CDM Smith has recognized our responsibility to provide reasonable, and fully independent, forecasts of traffic and revenue. We also recognize the need to inform users of our products as to the potential range of outcomes through the use of extensive sensitivity testing and risk analysis simulation.

CDM Smith has supported 50% of U.S. toll bond deals over the past decade, providing T&R estimates for more than 300 separate bond issues totaling more than $88 billion. We have more than five decades of experience in preparing and presenting T&R forecasts to rating agencies, rendering opinions about T&R projections, interfacing with public and private institutions regarding legal requirements under trust indentures and participating in peer reviews. Our reputation for exemplary T&R services, as well as the demonstrated accuracy of those forecasts, has led to CDM Smith studies supporting half of all U.S. toll bond deals over the past 10 years. In addition, we have provided trust indenture services for many clients over the years.

CDM Smith upholds a strong rapport and credibility with rating agencies and bankers. When the rating agencies recently wanted to learn more about how T&R forecasts are conducted, they visited our New Haven office for a series of presentations on investment grade studies and managed lanes by our staff from around the country. The financial community recognizes CDM Smith as the foremost experts on T&R.

Recent History on Start-up Facility Forecasting - Since 1995, 27 start-up toll facilities were completed and open to traffic based on CDM Smith forecasts. For 13 projects, average revenue over the first five years of operation came in above the CDM Smith expected estimate, while 14 came in below. Only 4 of the 27 projects came in more than 25 percent below base-line estimate, and 19 of the 27 came in within 25 percent of base-line estimate overall.

There are a range of inherent uncertainties in any forecast of the future and start-up toll facilities are most certainly no exception. However, our overall stable track record, and the fact that we have almost the same number of projects which come in above our base-line forecast as those which came in below, provides a strong indication of the absence of any optimism bias on the part of CDM Smith.

Additional Background:

- **A range of possible outcomes** - Traffic and revenue forecasts are based on a series of assumptions made at the time of study, which may cover a host of items, including the adopted toll rates and toll policies, capital improvement programs, socioeconomic forecasts, project interchanges, and many others factors. These assumptions and forecasts can be made 5 years before the new project is even opened. Rigorous sensitivity testing is always undertaken as part of our study process to demonstrate the revenue sensitivity to changes in key influential variables and the inherent risk of a project. Although it is custom to present a base case forecast, the traffic and revenue results are best considered as a range of possible outcomes. In the case of Knik Arm Crossing estimate, CDM Smith has provided a range of outcomes using base, low and high population and employment assumptions, lower value of time and the number of revenue days in our projections.
- **Part of a larger process** - CDM Smith's forecasting studies are part of a much larger process in determining the financing of transportation infrastructure projects. The studies undergo extensive and rigorous review by many public, private, and financial agencies that each undertake their own independent due diligence reviews of the proposed traffic and revenue and project financing assumptions. We view our contribution to the process as one of many considerations that an agency must address in deciding to proceed with a significant infrastructure investment.
- **Independent reviews** - CDM Smith has always encouraged and endorsed independent reviews of our work by other industry professionals. We welcome peer reviews of key assumptions and trends influencing the toll revenue potential of proposed projects. All

forward-looking statements and parameters are vetted through a wide range of experts to determine the suitable and reasonable range of possible outcomes.

- **Long term working relationship with Toll Agencies** - CDM Smith has been providing toll and revenue services for many toll agencies for decades. This includes the New Jersey Turnpike, Pennsylvania Turnpike Commission, North Texas Tollway Authority, and Illinois State Toll Highway on multi-years assignments. In addition, CDM smith has been providing services for the South Jersey Transportation Authority, Maine Turnpike, North Carolina Turnpike Authority, Harris County Toll Road Authority, Port Authority of New York and New Jersey, Delaware River Port Authority and many more in the form of repeat business covering numerous types of projects and assignments.

In this letter we briefly described our breadth of study experience, acknowledgement that there is a range of possible outcomes, our independence and objectivity, and our longevity and leading role in providing toll services for tolling agencies across U.S.

Please let us know if you require additional information about performance of CDM Smith services for the toll industry.

Sincerely,

Scott A. Allaire

Scott A. Allaire
Vice President
CDM Smith Inc.

Grant R. Holland
Vice President
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Refer To File #: 290795-0001

April 1, 2013

Mr. Michael L. Foster, P.E.
Chairman of the Board
Knik Arm Bridge and Toll Authority
820 East 15th Avenue
Anchorage, Alaska 99501

Re: Response to Preliminary Audit Report, Division of Legislative Audit, Audit Control Number: 25-30068-13

Dear Mr. Foster:

Thank you for the opportunity to assist KABATA in responding to the above-referenced Preliminary Audit Report, entitled "*Department of Transportation and Public Facilities Knik Arm Bridge and Toll Authority Knik Arm Crossing Project*, dated March 7, 2013 (the "Report"). The Legislative Budget and Audit Committee has requested KABATA's response to the Report. This letter is intended to serve as part of KABATA's response, and is suitable for public release.

We comment on aspects of the Report and the project procurement that are within this law firm's expertise and experience in procuring and negotiating public private partnership agreements for public agencies.

The Report states that two of its objectives are to evaluate the public-private partnership agreement for the project and the balance of risks and rewards between public and private partner entities under the public-private partnership agreement.[1] The Report does not, however, address these important topics, stating:

> "The risks and rewards in totality as outlined in the P3 agreement could not be evaluated because the agreement has not been finalized and is subject to further changes. Our evaluation of the agreement was limited to the general agreement structure defined by KABATA's governing board."

While it is true that the P3 agreement is not in final form, there are a number of important risk-reward factors that are inherent in the general structure of an availability payment public-private partnership that could and should have been discussed in the Report. A finalized agreement is not needed to understand and explicate these factors. The Report's sole focus on the traffic and revenue risk fails to convey a complete picture of the overall risk and reward

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[1] Report, p. 1

calculus for this project and in doing so leaves an astonishingly incomplete and distorted assessment of the proposed project. We address these factors here.

Overall Cost-Benefit of Project

The Report focuses on the revenue risk over a 35-year operating period. To examine the merits of a major transportation project by looking only at risks to its internal economics ignores the larger economic costs and benefits of transportation infrastructure development. As KABATA has pointed out throughout the course of pursuing the project on behalf of the State, it has much larger socio-economic impacts over the same 35-year period and beyond. The benefits of the project to the future state economy, not to mention just the Anchorage region, are manifest, well documented and orders of magnitude larger than the potential appropriations needs under even the most pessimistic toll revenue scenario. The failure of the Report to examine the cost-benefit analyses that KABATA has done represents a significant deficiency. Socio-economic studies and cost-benefit analysis of the project benefits to the public are available on the KABATA website.

Capital Cost Estimation

Any impartial examination of the potential risk and reward of this proposed availability payment public-private partnership entails analysis of two fundamental parts: (1) revenue and (2) cost. The Report ignores the latter.

The most significant driver of the size of availability payments is the capital cost of designing and building the project. While the cost of funds is an important factor, recovery of the design-build capital cost is by far the single biggest component of availability payments.

Availability payment public-private partnerships are past the fledgling stage in the United States and steadily gaining momentum. We now have four highway and bridge projects successfully procured and financed under the availability payment structure, with more on the way. The track record on the capital cost for these projects is impressive and bodes well for the Knik Arm project (assuming it can be pursued during the current low-inflationary economic conditions). A relevant measure is to compare the owner's pre-bid capital cost estimate (including contingencies and estimates of supplemental work) to the actual pricing in the successful bids. The data is set forth in Table 1:

Table 1

Project	Location	Type of Delivery Method	Owner's Estimate	Bid	Percent Below Owner's Estimate	Successful Bidder
Presidio Parkway	San Francisco, California	Avail. Payment P3	$471	$272	42.3%	Flatiron/Kiewit
I-595	Broward County, Florida	Avail. Payment P3	$1,900	$1,300	32.6%	ACS/Dragados
Ohio River Bridges: East End Crossing	Louisville, KY/ Southern Indiana	Avail. Payment P3	$987	$763	22.7%	Walsh
Ohio River Bridges: Downtown Crossing	Louisville, KY/ Southern Indiana	Design-Build	$950	$860	9.5%	Walsh

Availability payment P3 bids came out 23% to 42% less than owners' estimates. The two Ohio River Bridges illustrate a comparison between design-build and availability payment P3. These projects were procured fairly contemporaneously and are the most recent examples. The East End Crossing reached commercial close in December 2012 and financial close on March 28, 2013. The design-build bid for the Downtown Crossing was 10% lower than the owner's estimate, while the availability payment P3 for the East End Crossing contained a capital cost price 23% lower than the owner's estimate.

All these projects went through the same process for estimating the capital costs as KABATA has used for the Knik Arm Crossing. That process is mandated by federal regulations whenever federal-aid funds are to be used for construction. We are informed that the owners' estimates for the projects listed in Table 1 were adjusted to take into account the P3 method of project delivery. This means that the resulting capital cost estimates were lower than if they were run for the traditional design-bid-build method of delivering projects, where the public sector takes most risks and cost and schedule escalation over the original low bid is commonplace. In other words, the comparison is between the owners' P3 capital cost estimate and the actual P3 pricing. In KABATA's case, we are informed that its cost estimates assumed a traditional design-bid-build approach.

Results from these other projects are not a guarantee of the same result for the Knik Arm project. They do provide, however, concrete, highly relevant evidence that the capital cost estimates in KABATA's financial model may be materially higher than the pricing that KABATA will obtain from the winning proposer. The results from these projects are highly relevant not only because they are U.S. availability payment projects, but because the winning prices for two of the projects – Presidio Parkway and I-595 – came from design-build contractors that are on two of the three short listed teams for the KABATA procurement. The magnitude of the differential suggested by these other availability payment projects, coupled with the fact that KABATA's estimate has not been adjusted downward to account for the public-private partnership method of project delivery, could result in availability payments far lower than those

assumed in KABATA's financial model. Such an outcome would provide KABATA and the State substantial cushion against any alleged overly optimistic revenue projections.

Cost and Schedule Certainty

Whatever the level of uncertainty over future revenue performance one accepts from reading the Report and KABATA's critique of it, there can be no dispute that the same level of revenue uncertainty must be assumed for the project if delivered via conventional means.

On the cost side of the risk/reward analysis, however, there is a vast difference in the levels of certainty between traditional project financing, delivery, operations and maintenance and an availability payment public-private partnership methodology. Because the public owner keeps most risk regarding project delivery under the traditional approach, the ultimate capital cost to KABATA would not be quantifiable with certainty until the project is substantially completed. Thereafter, the public owner bears complete risk regarding the future cost of operations and maintenance. Price fluctuations, traffic demand, unexpected incidents and events, and the like can and will reshape operating and maintenance costs, including rehabilitation costs. As a result, when making a decision whether to proceed with the project using traditional financing and contracting methods, KABATA and the State would face relatively high uncertainty whether future toll revenues would recoup the government's design, construction, financing, operations and maintenance costs of the project.

By contrast, a key attribute of an availability payment public-private partnership is that it delivers to the public owner a considerably higher degree of cost and schedule certainty, and it does so early in the life of a project. This structure shifts many design, construction, operating and maintenance risks to the private party and therefore embeds the cost of these risks in the pricing offered at inception. Competitive tension induces proposers to price these risks efficiently. The public sector obtains relatively high pricing certainty not only for the costs to design and build the project, but for a 35 year period thereafter.

Flexibility to Change Course

The procurement documents and public-private partnership agreement will provide KABATA three important protections against the risk that the project could fall short of the economics set forth in KABATA's pro forma financial plan.

First, the request for proposals will set forth maximum aggregate availability payments that KABATA is willing to accept. If proposers cannot live with these aggregate caps, they will no doubt inform KABATA and KABATA will then decide whether to change project scope or requirements or to cancel the procurement. KABATA will have the absolute right to cancel the procurement at any time before contract execution (subject to paying partial stipends upon an early cancellation).

Second, as KABATA points out in its letters responding to the Report, it will have complete discretion under the public-private partnership agreement regarding whether and when to proceed with expansion of the first phase of the project. There will be no adverse consequence to KABATA, no remedy available to the private developer against KABATA, if KABATA decides not to direct the private developer to proceed with project expansion. In

addition, extensions of the project, such as the Ingra-Gambell connector, will be entirely outside the scope of the public-private partnership agreement. As a result, any decision to proceed with expansion and/or extension will be in the control of future public leaders and decision makers. Those future decisions can be made based on the then record of actual traffic demand and toll revenues and the then project costs and cost of financing. If traffic demand and toll revenues are below that projected in the CDM Smith traffic and revenue study, it will naturally mean that traffic conditions do not yet warrant expansion or extension of the project.

It is therefore misleading and confusing for the Report to lump together the two phases of the project as if the revenue risk encumbers the full project. It does not.

Third, KABATA and the State will have additional flexibility via a right to terminate the public-private partnership agreement for public convenience at any time. The exercise of this right will require KABATA to buy out the private developer's interest, as it will have sunk costs, project indebtedness to repay, and invested equity and return thereon to recover. The option to pay a lump sum buy-out price will, however, give KABATA and the State an exit strategy if a future legislature were to conclude that this is a better alternative than to continue to fund availability payments.

Very truly yours,

Fredric W. Kessler
of Nossaman LLP

FWK/

United States Government Accountability Office

GAO

By the Comptroller General of the United States

December 2011

Government Auditing Standards

2011 Revision

GAO-12-331G

Government Auditing: Foundation and Ethical Principles

Introduction

1.01 The concept of accountability for use of public resources and government authority is key to our nation's governing processes. Management and officials entrusted with public resources are responsible for carrying out public functions and providing service to the public effectively, efficiently, economically, ethically, and equitably within the context of the statutory boundaries of the specific government program.

1.02 As reflected in applicable laws, regulations, agreements, and standards, management and officials of government programs are responsible for providing reliable, useful, and timely information for transparency and accountability of these programs and their operations.[1] Legislators, oversight bodies, those charged with governance,[2] and the public need to know whether (1) management and officials manage government resources and use their authority properly and in compliance with laws and regulations; (2) government programs are achieving their objectives and desired outcomes; and (3) government services are provided effectively, efficiently, economically, ethically, and equitably.

1.03 Government auditing is essential in providing accountability to legislators, oversight bodies, those charged with governance, and the public. Audits[3] provide an independent, objective, nonpartisan assessment of the stewardship, performance, or cost of government policies, programs, or operations, depending upon the type and scope of the audit.

[1]See paragraph A1.08 for additional information on management's responsibilities.

[2]See paragraphs A1.05 through A1.07 for additional discussion on the role of those charged with governance.

[3]See paragraph 1.07c for discussion of the term "audit" as it is used in chapters 1 through 3 and corresponding sections of the Appendix.

Purpose and Applicability of GAGAS

1.04 The professional standards and guidance contained in this document, commonly referred to as generally accepted government auditing standards (GAGAS), provide a framework for conducting high quality audits with competence, integrity, objectivity, and independence. These standards are for use by auditors of government entities and entities that receive government awards and audit organizations performing GAGAS audits. Overall, GAGAS contains standards for audits, which are comprised of individual requirements that are identified by terminology as discussed in paragraphs 2.14 through 2.18. GAGAS contains requirements and guidance dealing with ethics, independence, auditors' professional judgment and competence, quality control, performance of the audit, and reporting.

1.05 Audits performed in accordance with GAGAS provide information used for oversight, accountability, transparency, and improvements of government programs and operations. GAGAS contains requirements and guidance to assist auditors in objectively acquiring and evaluating sufficient, appropriate evidence and reporting the results. When auditors perform their work in this manner and comply with GAGAS in reporting the results, their work can lead to improved government management, better decision making and oversight, effective and efficient operations, and accountability and transparency for resources and results.

1.06 Provisions of laws, regulations, contracts, grant agreements, or policies frequently require audits be conducted in accordance with GAGAS. In addition, many auditors and audit organizations voluntarily choose to perform their work in accordance with GAGAS. The requirements and guidance in GAGAS apply to audits of government entities, programs, activities, and functions, and of government assistance administered by contractors, nonprofit entities, and other nongovernmental entities when the use of GAGAS is required or is voluntarily followed.[4]

1.07 This paragraph describes the use of the following terms in GAGAS.

a. The term "auditor" as it is used throughout GAGAS describes individuals performing work in accordance with GAGAS (including audits and attestation engagements) regardless of job title. Therefore, individuals who may have the titles auditor, analyst, practitioner, evaluator, inspector, or other similar titles are considered auditors in GAGAS.

b. The term "audit organization" as it is used throughout GAGAS refers to government audit organizations as well as public accounting or other firms that perform audits and attestation engagements using GAGAS.

c. The term "audit" as it is used in chapters 1 through 3 and corresponding sections of the Appendix refers to financial audits, attestation engagements, and performance audits conducted in accordance with GAGAS.

[4]See paragraphs A1.02 through A1.04 for discussion of laws, regulations, and guidelines that require use of GAGAS.

1.08 A government audit organization can be structurally located within or outside the audited entity.[5] Audit organizations that are external to the audited entity and report to third parties are considered to be external audit organizations. Audit organizations that are accountable to senior management and those charged with governance of the audited entity, and do not generally issue their reports to third parties external to the audited entity, are considered internal audit organizations.

1.09 Some government audit organizations represent a unique hybrid of external auditing and internal auditing in their oversight role for the entities they audit. These audit organizations have external reporting requirements consistent with the reporting requirements for external auditors while at the same time being part of their respective agencies. These audit organizations often have a dual reporting responsibility to their legislative body as well as to the agency head and management.

Ethical Principles

1.10 The ethical principles presented in this section provide the foundation, discipline, and structure, as well as the climate that influence the application of GAGAS. This section sets forth fundamental principles rather than establishing specific standards or requirements.

1.11 Because auditing is essential to government accountability to the public, the public expects audit organizations and auditors who conduct their work in accordance with GAGAS to follow ethical principles. Management of the audit organization sets the tone for

[5]See paragraph 1.19 for a discussion of objectivity and paragraphs 3.27 through 3.32 for requirements related to independence considerations for government auditors and audit organization structure.

ethical behavior throughout the organization by maintaining an ethical culture, clearly communicating acceptable behavior and expectations to each employee, and creating an environment that reinforces and encourages ethical behavior throughout all levels of the organization. The ethical tone maintained and demonstrated by management and staff is an essential element of a positive ethical environment for the audit organization.

1.12 Conducting audit work in accordance with ethical principles is a matter of personal and organizational responsibility. Ethical principles apply in preserving auditor independence,[6] taking on only work that the audit organization is competent[7] to perform, performing high-quality work, and following the applicable standards cited in the auditors' report. Integrity and objectivity are maintained when auditors perform their work and make decisions that are consistent with the broader interest of those relying on the auditors' report, including the public.

1.13 Other ethical requirements or codes of professional conduct may also be applicable to auditors who conduct audits in accordance with GAGAS. For example, individual auditors who are members of professional organizations or are licensed or certified professionals may also be subject to ethical requirements of those professional organizations or licensing bodies. Auditors employed by government entities may also be subject to government ethics laws and regulations.

[6]See paragraphs 3.02 through 3.59 for requirements related to independence.

[7]See paragraphs 3.69 through 3.81 for additional information on competence.

1.14 The ethical principles that guide the work of auditors who conduct audits in accordance with GAGAS are

a. the public interest;

b. integrity;

c. objectivity;

d. proper use of government information, resources, and positions; and

e. professional behavior.

The Public Interest

1.15 The public interest is defined as the collective well-being of the community of people and entities the auditors serve. Observing integrity, objectivity, and independence in discharging their professional responsibilities assists auditors in meeting the principle of serving the public interest and honoring the public trust. The principle of the public interest is fundamental to the responsibilities of auditors and critical in the government environment.

1.16 A distinguishing mark of an auditor is acceptance of responsibility to serve the public interest. This responsibility is critical when auditing in the government environment. GAGAS embodies the concept of accountability for public resources, which is fundamental to serving the public interest.

Integrity

1.17 Public confidence in government is maintained and strengthened by auditors performing their professional responsibilities with integrity. Integrity includes auditors conducting their work with an attitude that is objective, fact-based, nonpartisan, and nonideological with regard

to audited entities and users of the auditors' reports. Within the constraints of applicable confidentiality laws, rules, or policies, communications with the audited entity, those charged with governance, and the individuals contracting for or requesting the audit are expected to be honest, candid, and constructive.

1.18 Making decisions consistent with the public interest of the program or activity under audit is an important part of the principle of integrity. In discharging their professional responsibilities, auditors may encounter conflicting pressures from management of the audited entity, various levels of government, and other likely users. Auditors may also encounter pressures to inappropriately achieve personal or organizational gain. In resolving those conflicts and pressures, acting with integrity means that auditors place priority on their responsibilities to the public interest.

Objectivity

1.19 The credibility of auditing in the government sector is based on auditors' objectivity in discharging their professional responsibilities. Objectivity includes independence of mind and appearance when providing audits, maintaining an attitude of impartiality, having intellectual honesty, and being free of conflicts of interest. Maintaining objectivity includes a continuing assessment of relationships with audited entities and other stakeholders in the context of the auditors' responsibility to the public. The concepts of objectivity and independence are closely related. Independence impairments impact objectivity.[8]

[8]See independence standards at paragraphs 3.02 through 3.59.

Proper Use of Government Information, Resources, and Positions

1.20 Government information, resources, and positions are to be used for official purposes and not inappropriately for the auditor's personal gain or in a manner contrary to law or detrimental to the legitimate interests of the audited entity or the audit organization. This concept includes the proper handling of sensitive or classified information or resources.

1.21 In the government environment, the public's right to the transparency of government information has to be balanced with the proper use of that information. In addition, many government programs are subject to laws and regulations dealing with the disclosure of information. To accomplish this balance, exercising discretion in the use of information acquired in the course of auditors' duties is an important part in achieving this goal. Improperly disclosing any such information to third parties is not an acceptable practice.

1.22 Accountability to the public for the proper use and prudent management of government resources is an essential part of auditors' responsibilities. Protecting and conserving government resources and using them appropriately for authorized activities is an important element in the public's expectations for auditors.

1.23 Misusing the position of an auditor for financial gain or other benefits violates an auditor's fundamental responsibilities. An auditor's credibility can be damaged by actions that could be perceived by an objective third party with knowledge of the relevant information as improperly benefiting an auditor's personal financial interests or those of an immediate or close family member; a general partner; an organization for which the auditor serves as an officer, director, trustee, or employee; or an organization with which the auditor is negotiating concerning future employment.

Professional Behavior

1.24 High expectations for the auditing profession include compliance with all relevant legal, regulatory, and professional obligations and avoidance of any conduct that might bring discredit to auditors' work, including actions that would cause an objective third party with knowledge of the relevant information to conclude that the auditors' work was professionally deficient. Professional behavior includes auditors putting forth an honest effort in performance of their duties and professional services in accordance with the relevant technical and professional standards.

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Ballard Spahr LLP is a national firm of more than 500 lawyers in 13 offices across the country. Our attorneys provide counseling and advocacy in more than 40 areas within intellectual property, litigation, business and finance, real estate, and public finance. We represent a diverse cross-section of clients, ranging from large public companies and privately held corporations to government agencies and nonprofit organizations. Our practices span the life sciences and technology, energy, health care, and other sectors that are driving innovation and growth in today's marketplace.

The firm's mission is straightforward: to provide nothing less than excellence in every legal representation. Our client focus is absolute. We help clients achieve success as they define it. We respect and anticipate their needs, take action to keep them informed, and devise forward-thinking solutions to get the most favorable results. This is Ballard Spahr's pledge.

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Public Finance Department

Ballard Spahr ranked 13th in the nation in 2011 as bond counsel, with 91 transactions totaling more than $4.2 billion; we were ranked 12th nationally as underwriter's counsel, with 65 transactions totaling more than $4.1 billion.

Ballard Spahr's public finance attorneys have been helping build the nation since the 1940's, when a handful of lawyers initiated a practice that has grown into a complex, multifaceted enterprise, recognized as one of the premier public finance groups in the country. We have the skills, resources, and experience necessary to handle any public finance project. Our public finance clients include state and local governments and authorities throughout the country as well as underwriters, borrowers, financial institutions, nonprofit organizations, trustees, and investors.

Ballard Spahr has been listed continuously since 1958 as a nationally recognized bond counsel firm in The Bond Buyer's *Municipal Marketplace* (the "Red Book"). Since 1987, we have participated in the issuance of more than $250 billion of tax-exempt obligations in all states, the District of Columbia, and American territories.

We are consistently ranked among the top 20 firms in the country each year for the amount of securities issued with our bond counsel opinion. In 2011, *Thomson Reuters* ranked Ballard Spahr 13th in the nation. In that same year, we were ranked 12th by *Thomson Reuters* as underwriter's counsel. We are regularly ranked 1st in Pennsylvania, Utah, and New Mexico for bond counsel services.

Our Lawyers

Ballard Spahr has the depth and breadth of experience to assist clients with financings from the simplest to the most complex. Nearly 50 lawyers devote almost all of their practice to public finance matters. Ballard Spahr enjoys a national reputation for experience in the field of taxation and has six lawyers who concentrate their practice in the municipal bond tax area (including tax controversies arising from tax-exempt financings). Tax Group Chair Frederic L. Ballard, Jr., is the author of *ABC's of Arbitrage* (American Bar Association, 2011 edition), a reference work currently used by many public officials, attorneys, and investment bankers. Ballard Spahr also has more than 50 lawyers nationwide who practice in the federal securities law area.

Ballard Spahr lawyers are active members and several hold leadership positions in the National Association of Bond Lawyers. Our public finance practice concentrates the resources and abilities of our lawyers in many different legal disciplines to which lawyers in all of our offices contribute.

These legal disciplines include municipal law, taxation, securities, real estate, housing, environmental and natural resources, public utilities, energy, health care, education, banking, administrative practice, legislative, and corporate law.

Types of Financings

Ballard Spahr's public finance lawyers have served as bond counsel or underwriter's counsel in connection with every form of traditional municipal debt, including general obligation, municipal revenue, special assessment, and tax increment bonds, as well as tax, revenue, grant, and bond anticipation notes, and certificates of participation in lease-purchase and installment purchase obligations.

We have also participated in every kind of private activity financing, including:

- Utility revenue bonds
- Industrial development revenue bonds
- Sports arena revenue bonds
- Hospital and health care revenue bonds
- Continuing care retirement community bonds
- Pollution control bonds
- Resource recovery and solid waste disposal revenue bonds
- University bonds
- Military housing bonds
- Airport revenue and special facilities bonds
- Port facilities bonds
- Pension bonds
- Single-family mortgage bonds
- Multifamily housing bonds
- Student loan bonds
- Student housing bonds
- Cultural facilities bonds

Our public finance lawyers have handled tax-exempt and taxable financings, new money issues, all forms of refinancing (including current refundings, advance refundings, cross-over refundings, conversions from variable to fixed rates of interest, and tender offers for outstanding obligations), and financings involving many forms of credit enhancement. We seek to provide innovative solutions to our clients' unique problems and challenges.

Areas of Concentration

Ballard Spahr's public finance practice encompasses numerous specialty areas, including education, health care, multifamily and single-family housing, public finance derivatives, military housing, project finance, student loans, and transportation. A brief summary of a few of the most relevant areas is listed below.

Project Finance

The firm is a national leader in the utilization of public debt offerings in the development of major projects. We represent underwriters, public issuers, and purchasers in a full range of tax-exempt public debt offerings for major projects such as:

- Solid waste disposal facilities
- Water and wastewater facilities
- Pulp de-inking facilities
- Light rail
- Utilities
- Power plants that use a variety of waste fuels including
  - Municipal waste
  - Waste coal
  - Wood waste
- Toll roads
- Stadiums
- Gencos
- Electric cooperatives
- Renewable energy facilities
- Qualified portions of:
  - Conventional plants
  - Nuclear power plants
  - Oil refineries

We have successfully structured financings that combine publicly or privately issued taxable debt, bank debt, or leveraged leases with tax-exempt debt. We provide a full range of counseling on the tax issues arising from tax-exempt debt, including arbitrage rebate calculations and advice on tax audits of debt issues. Additionally, we help projects take advantage of a wide variety of tax incentives, including tax-exempt bonds, Clean Renewable Energy Bonds, Gulf Opportunity Zone Bonds, solar and clean coal investment tax credits, New Markets Tax Credits, and renewable energy production tax credits.

We also have related experience that helps to facilitate the execution of complex project development, including initial and secondary public offerings, Rule 144A offerings, shelf offerings, high-yield debt offerings, and private placements. We are also experienced in specialized finance structures, including synthetic leases, securitization of stranded assets, and royalty trusts.

Public Finance Derivatives

Ballard Spahr actively advises clients on the use of interest rate swaps and related derivative products in the public finance sector. Interest in this innovative financing area has grown rapidly in response to the demands of market participants to manage their investment portfolios, to hedge interest rate and other market risks, and to access interest rate markets unavailable or unattractive with traditional debt structures.

Ballard Spahr has developed in-depth experience in transactions involving municipal derivative products, including floating-to-fixed and fixed-to-floating interest rate swaps; swaptions; basis swaps; and interest rate caps, collars, and floors. We deal with a variety of such derivative products in primary market transactions involving original bond issues, as well as secondary market securitization transactions involving the issuance of custodial receipts, tender option bonds, and other synthetic securities. Ballard Spahr advises both public and private market participants on derivative products. We also serve as counsel to a major credit enhancement provider that requires the use of interest rate hedges as part of both its primary market and its negotiated transaction secondary market securitization programs. Ballard Spahr regularly advises clients in using a variety of derivative-related products to assist clients in tax planning matters where applicable.

In addition, we have represented municipal finance clients in litigation against swap counterparties, notably in connection with the Lehman Brothers bankruptcy.

Transportation

Ballard Spahr has a long history of structuring innovative finance plans for large-scale transportation projects across the country. In the past 25 years, we have been engaged as issuer's counsel, bond counsel, underwriter's counsel, borrower's counsel, credit enhancer counsel or special tax counsel in more than 450 transportation financings, aggregating more than $43 billion throughout the United States.

Our transportation practice brings together multi-disciplinary teams of lawyers with knowledge critical to a successful transportation financing, including a strong transactional practice as well as extensive experience in mergers and acquisitions, tax, structured finance, governmental regulation, environmental law, securities law, labor, energy, and real estate.

We have served as bond counsel or underwriter's counsel for a number of airport facility issues, including the Denver International Airport, Salt Lake City International Airport, Philadelphia International Airport, and metropolitan Washington, DC airports.

We have represented lead lenders, subordinate lenders, equity investors, and borrowers in syndicated project financings worth billions of dollars and have some of the nation's leading attorneys in this field. Ballard Spahr is experienced in a wide range of innovative financing structures and techniques currently used in transportation transactions, including TIFIA (Transportation and Infrastructure Financing and Innovation Act) financings, GARVEE bonds, intermodal financings, airport financings, highways and bridge projects, P3 financings, mass commuting, and docks, and seaports financings.

Municipal Securities Practice

Our Securities Group has a significant national presence and provides legal advice to issuers, borrowers, investment banking firms and lenders in a broad range of public offerings, private placements and direct purchases of municipal securities, including offerings under Regulation D and Rule 144A as well as offshore offerings under Regulation S. Several lawyers in the firm's Securities Group previously served as staff members at the SEC, providing a unique perspective and invaluable experience in guiding our clients through the regulatory requirements and exemptions of federal and state securities laws. Ballard Spahr's Public Finance lawyers are active in NABL's standing Securities Law Committee one of our partners, and have actively participated in a number of NABL's ad hoc Securities Law subcommittees and task forces, including the committee tasked with drafting the SEC's secondary market disclosure rules. Members of our Securities Group work with municipal market clients to assist them in developing policies and procedures and drafting disclosure and underwriting agreements to assure compliance with all SEC and MSRB Rules applicable to municipal securities.

P3/Infrastructure Practice

Ballard Spahr attorneys understand the political, financial, environmental, securities law, and investment impacts of the many types of P3 transaction structures.

The stakes are high and access to capital is limited. Across the country, and around the globe, the need to repair critical infrastructure, improve social structures, and build for the future exceeds the availability of public funds. Public-private partnerships (P3) provide a creative way to bridge the funding gap and keep the nation moving.

Ballard Spahr's P3/Infrastructure practice brings together attorneys from a wide range of legal disciplines including public finance, government relations, mergers and acquisitions, environmental law, securities law, labor and employee benefits, energy, transportation, tax, and real estate. Our team is prepared to evaluate potential P3 projects, develop supporting policies, regulations, procedures, and legislation, structure innovative and implementable financing plans, and answer any type of legal issue associated with these multi-faceted projects.

Any long-term contractual relationship between a state or local government entity and a private entity is a highly complex and delicate undertaking. The lawyers and financial advisers involved in the process must at all times be aware of both the policy objectives and the commercial and legal constraints that apply to state and local government entities. Ballard Spahr is a national firm with clients in all 50 states. We have attorneys familiar with the laws of each state, including laws specifically applicable to actions by state and local governments, and we have worked with governmental entities on the federal, state, and local level.

We have also worked with international and domestic private entities, including investment banks, developers, engineering and construction firms, and concessionaires. We understand the perspective and objectives of both public sector and private sector participants. As a result, we also understand the wide range of possible P3 arrangements, including concession and franchise agreements, management agreements, long-term leases, government "availability" payment structures, and arrangements combining multiple sources of financing (e.g., private equity, bank debt, taxable and tax-exempt debt issued through the public markets, government contributions, and TIFIA- and government-backed debt).

We have assessed structured, and negotiated P3 projects that include:

- Surface transportation – bridges; roads; high occupancy toll (HOT) lanes; high speed rail lines
- Social infrastructure – public buildings, jails, parking facilities
- Water, wastewater, and sewer
- Seaports and harbors
- Public housing
- Airports, railroad terminals, and transit hubs
- Hospitals, medical centers, and long-term care facilities
- Stadiums and entertainment complexes
- Military bases and housing
- Primary, secondary, and higher education

Ballard Spahr attorneys work with federal, state and local governments as well as private sector developers, lenders and investors to gain the advantages of the latest innovations in P3 structures and financing.

As our experience working on some of the largest and most successful domestic P3 projects attests, Ballard Spahr's P3/Infrastructure Group has the skills to navigate the intersection of government and industry and steer a successful P3 project from concept to completion.

Our P3/Infrastructure practice is supported by several department and practice groups within the firm including:

- Public Finance
- Energy and Project Finance
- Environmental
- Government Relations, Regulatory Affairs, and Contracting
- Real Estate
- Health Care
- Higher Education
- Housing
- Military Installation Finance

Additional information on the firm and the specific practice areas that support our P3 group can be found on our website: www.ballardspahr.com.

RECENT EXPERIENCE WITH TOLL ROADS AND P3 PROJECTS

Knik Arm Toll Bridge. Ballard Spahr currently serves as finance and bond counsel to the Knik Arm Bridge and Toll Authority (KABATA) for the Knik Arm Bridge Project, a public-private partnership toll bridge in Anchorage, Alaska. The finance plan for the Knik Arm Bridge Project includes a concession agreement, private activity bonds (PABs), and an availability payment structure, which will benefit the private developer to be selected. KABATA has received a $600 million federal PAB volume cap allocation and has recently re-applied for a conditional TIFIA loan that, if approved, will likely be used by a P3 developer to be selected by KABATA later this year.

Ballard Role: Bond and Finance Counsel
Size:
Citi: Financial advisor to KABATA
Closing Date: Ongoing

Virginia I-95 High Occupancy Toll Lanes Project. Ballard Spahr recently served as special counsel to the Office of the Attorney General for Privatization Matters of the Commonwealth of Virginia. During the course of this engagement, Ballard Spahr represented VDOT in its I-95 PPTA High Occupancy Toll (HOT) Lanes Project (I-95 Project) under Virginia's Public-Private Transportation Act of 1995. The project involved the design, construction, renovation, financing, and operation of HOT lanes and related improvements.

The I-95 Project is funded by a combination of bonds, federal loans, and private capital from a joint venture between Transurban DRIVe and Fluor Enterprises Inc. Construction of the HOV/HOT lanes is estimated at $925 million. The private investors will contribute $292 million. Those funds, along with $263 million in tax-exempt bond proceeds (including investment earnings) and a $71 million contribution from VDOT, will serve as initial financing for the project. In addition, the developers will receive $300 million in credit assistance through TIFIA

The Ballard Spahr legal team spearheaded the drafting of a comprehensive agreement and related agreements laying out the rights and obligations of VDOT and the private entity, 95 Express Lanes LLC, a joint venture between affiliates of Transurban Group and Fluor Corporation, reviewed financing arrangements and contracts as well as capital markets disclosure statements, helped obtain USDOT approval of documents. Construction is scheduled for completion in 2014.

Ballard Role: P3 Counsel
Size: $965 million (including $263 tax-exempt bonds and $300 million TIFIA)
Citi: N/A
Closing Date: July 2012

Colorado US 36 Managed Lanes. Ballard Spahr served as special counsel to the Colorado Department of Transportation's High Performance Transportation Enterprise in connection with a 2011 TIFIA loan for the US 36 Project. The US 36 Project consists of the redevelopment and construction of high-occupancy managed toll lanes on US 36 between Denver and Boulder. The US 36 Project will be funded by a combination of a TIFIA loan, TIGER Discretionary Grant from the

U.S. Department of Transportation, and state and local funding. The US 36 Project is being built by the Colorado Department of Transportation in conjunction with the Regional Transportation District, which will run Bus Rapid Transit along the managed lanes.

Ballard Role: Special Counsel
Size: $54 million
Citi: N/A
Closing Date: September 2011

Pennsylvania Turnpike. Ballard Spahr lawyers represented the Commonwealth of Pennsylvania in then Governor Edward G. Rendell's proposed privatization of the Pennsylvania Turnpike (the Pennsylvania Turnpike Project). In May 2008, the project reached commercial close when the Commonwealth accepted a bid of $12.8 billion to lease the Pennsylvania Turnpike from a consortium consisting of Abertis and Citigroup. Ultimately, the Pennsylvania Legislature did not pass the legislation to accept the bid and proceed with the project, but the bid remains the highest ever for a P3 in the United States.

The scope of Ballard Spahr's Pennsylvania Turnpike engagement was extremely broad. We provided Governor Rendell's Office and the Pennsylvania Department of Transportation with advice on a host of issues, including enforceability of multi-year contracts; waivers of sovereign immunity; dispute resolution procedures; the enforcement of contracts against governmental entities; procurement requirements and policies; federal, state, and local tax issues; pension and employee benefits transition issues; real estate, condemnation, and zoning issues; transportation issues; environmental issues; bankruptcy issues; litigation issues; police and security matters; intellectual property issues; and federal and state constitutional issues. With co-counsel, our lawyers prepared a comprehensive concession agreement that defined the respective rights and responsibilities of the private sector and the public sector in connection with the acquisition of the Pennsylvania Turnpike facilities, as well as for operations, maintenance, and capital projects.

Ballard Role: P3 Counsel
Size: $12.8 billion
Citi: Private Consortium Partner
Closing Date: May 2008

Arizona Toll Road Projects. In 1995, the Arizona Legislature enacted legislation which authorized the Arizona Department of Transportation ("ADOT") to enter into agreements for the construction and operation of Arizona roadway facilities by private entities. Ballard Spahr acted as primary counsel for a consortium of professional firms, which proposed comprehensive tolling alternatives for U.S. 95, the South Mountain Connector and U.S. 60. In the course of the representation, the consortium dealt with a variety of legal, commercial and technical issues, including the following, for which Ballard Spahr attorneys developed and drafted proposed concession agreements; established the technical and financial feasibility of each project by independent experts; determined the specific tolling technology to be utilized; developed a system for enforcement of state highway laws on private roadways; and developed a funding structure, including tolls and possible legislative

amendments to enable the State to commitment a portion of its highway user revenues as security, and a method for sharing net revenues with the State of Arizona.

Ballard Spahr has since served as Underwriter's Counsel for four issuances of Grant Anticipation Notes.

Ballard Role: Underwriter's Counsel
Size: $45,825,000
Closing Date: May 2012
Citi: Underwriter

Size: $158,585,000
Closing Date: January 2012
Citi: N/A

Size: $180,000,000
Closing Date: October 2010
Citi: N/A

Size: $440,000,000
Closing Date: June 2009
Citi: N/A

Denver Union Station. In 2010, Ballard Spahr served as special counsel to the Federal Railroad Administration (FRA) for a Railroad Rehabilitation & Improvement Financing Loan (RRIF Loan), which provides funds to redevelop and rehabilitate the Denver Union Station Project that closed in July 2010. The Denver Union Station Project is a 50-acre intermodal transit public-private development in lower downtown Denver that will serve as a regional multimodal hub, improve transportation, and reduce congestion in the Denver area. Transportation elements include an underground bus terminal with 22 bays, a light rail station for current and future light rail routes, a commuter rail station that will serve Amtrak and possibly a ski train, and public plazas to integrate transit service. The RRIF Loan was a subordinate loan to a TIFIA loan that was closed simultaneously with the RRIF Loan. The RRIF Loan was backed by a bond from the Regional Transportation District as well as a moral obligation commitment from the City of Denver. During the course of our representation, we restructured the intercreditor arrangements between the various lenders involved and drafted various documents required, including the Master Indenture, RRIF Loan Agreement, and promissory note.

Ballard Role: Special Counsel
Size: $300 million (FRA loan $145,600,000 | TIFIA loan $155,000,000)
Citi: N/A
Closing Date: July 2010

EXPERIENCE WITH FEDERAL FUNDING PROGRAMS

TIFIA. Ballard Spahr served as special counsel to the Transportation and Infrastructure Financing and Innovation Act Joint Program Office (TIFIA JPO) for many of the original TIFIA loans. We are thoroughly familiar with the program and its requirements. TIFIA established a federal credit program for eligible transportation projects of national or regional significance under which the U.S. Department of Transportation (USDOT) provides different forms of credit assistance, such as secured (direct) loans, loan guarantees and standby lines of credit, with an eye toward leveraging federal assistance with substantial private and other non-federal co-investment. We have assisted several clients in applying for TIFIA loans. Our engagements by TIFIA JPO include the following projects:

- The Farley-Penn Station Project in New York City, which included the rehabilitation and expansion of the Farley Post Office and Pennsylvania Railroad Station, involving the New York and New Jersey Port Authority, Amtrak and the United States Postal Service;

- The $2.1 billion Central Texas Turnpike project in Austin, Texas, which included a $916 million subordinated TIFIA loan, completed with the Texas DOT and Texas Turnpike Authority. This financing was awarded "Deal of the Year" in the Southwest by The Bond Buyer in 2002;

- The proposed San Francisco – Oakland Bay Bridge Seismic Retrofit project with the California Department of Transportation (CalTrans) and the California Infrastructure and Economic Development Bank;

- The LA-1 Toll Bridge replacement project on the Louisiana Gulf Coast near Grand Isle with the Louisiana DOT. The bridge is critical to serving the ports which supply the oil and gas drilling towers off the Gulf Coast. This financing was awarded "Deal of the Year" in the Southeast by The Bond Buyer in 2005;

- The second Central Texas Turnpike Project (Texas 183-A) in Austin, Texas funded by the Central Texas Regional Mobility Authority. This financing was awarded "Deal of the Year" in the Southwest by The Bond Buyer in 2005; and

- The Warwick Intermodal Project in Warwick, Rhode Island, an intermodal project facility which includes a new Amtrak and light rail station and a consolidated rental car center, being developed by the Rhode Island Airport Corporation and the Rhode Island Economic Development Authority at the T.F. Green Airport.

Federal Transit Administration. Ballard Spahr lawyers represented the New Jersey Transit Corporation in a Master Lease Agreement payable solely from Federal Transit Administration grants. The transaction involved the issuance by New Jersey Transit of $253,470,000 subordinated certificates of participation. The proceeds were used to purchase 131 multi-level rail cars and spare parts and are repayable through future appropriations from the Federal Transit Administration.

Federal Railroad Administration. In 2010, Ballard Spahr served as special counsel to the Federal Railroad Administration (FRA) for a Railroad Rehabilitation & Improvement Financing Loan (RRIF Loan), which provides funds to redevelop and rehabilitate the Denver Union Station Project that closed in July 2010. The Denver Union Station Project is a 50-acre intermodal transit public-private development in lower downtown Denver that will serve as a regional multimodal hub, improve transportation, and reduce congestion in the Denver area. Transportation elements include an underground bus terminal with 22 bays, a light rail station for current and future light rail routes, a commuter rail station that will serve Amtrak and possibly a ski train, and public plazas to integrate transit service. The RRIF Loan was a subordinate loan to a TIFIA loan that was closed simultaneously with the RRIF Loan. The RRIF Loan was backed by a bond from the Regional Transportation District as well as a moral obligation commitment from the City of Denver. During the course of our representation, we restructured the intercreditor arrangements between the various lenders involved and drafted various documents required, including the Master Indenture, RRIF Loan Agreement, and promissory note.

Garvee Bonds. Ballard Spahr has one of the leading Garvee Bond practices in the country. The Garvee (Grant Anticipation Revenue Vehicle) bond program has two key advantages: (1) it enables a State DOT borrower to borrow against future Federal Highway Trust Funds; and (2) it is a financial tool that enables the borrower to address current transportation needs at today's costs thereby avoiding future inflationary prices.

- **New Mexico.** Ballard Spahr developed the first Garvee Bond program done in the United States. Working with New Mexico and the Federal Highway Administration, our firm served as bond counsel in connection with the Garvee Bonds issued in 1996 by the New Mexico Finance Authority for the New Mexico Department of Transportation. We were also bond counsel for subsequent New Mexico Garvee bonds issued in 1998 and as special tax counsel in 2004, in connection with a $1.2 billion refunding of various Garvee Bonds and New Mexico state transportation revenue bonds.

- **Rhode Island**. Ballard Spahr served as underwriter's counsel to Citigroup Global Markets Inc. (Citigroup) in 2003 for the first Rhode Island Garvee Bond issue and Motor Fuel Tax Revenue Bond issue done by the Rhode Island Economic Development Corporation for the Rhode Island Department of Transportation. Ballard Spahr also served as underwriter's counsel to UBS for the second Rhode Island Garvee Bond issue and a companion Motor Fuel Tax Revenue Bond issue which closed in March 2006.

- **Kentucky**. Ballard Spahr also served as underwriter's counsel to Citigroup for the first Kentucky Garvee Bond issue done in May 2005. In that transaction, Ballard Spahr assisted Kentucky's bond counsel in the development of the bond and program documents which were modeled on Rhode Island.

- **Idaho**. Ballard Spahr led by David Prior and Fred Olsen, a partner in our Salt Lake City office, served as bond counsel with Richard Skinner of Boise, Idaho for the Idaho Transportation Department's first Garvee Bond issue which closed in May 2006.

EXPERIENCE DEVELOPING LEGISLATION AND IMPLEMENTATION GUIDELINES

Pennsylvania. We helped to prepare associated exhibits, documents, forms of security documents, and agreements. We also drafted proposed legislation making the changes necessary under Pennsylvania law to accommodate the proposed privatization, including environmental provisions, bid protest provisions, and indemnification provisions. During the process, we participated in multiple meetings with the Governor's Office and legislators.

Virginia DOT Public-Private Partnership Implementation Manual. Brian Walsh worked with VDOT and the Virginia Attorney General's Office to develop a new implementation manual and guidelines for the Virginia Public-Private Transportation Act. The new guidelines represented a joint effort among Virginia state government representatives, program consultants, financial consultants, and attorneys. The recurring policy objective throughout the guidelines is to develop and maintain competition throughout the process of identifying potential P3 projects, moving to prioritize and screen the projects, and then developing and procuring the projects. Mr. Walsh reviewed the guidelines as a whole and also helped draft and develop the project implementation portions of the guidelines.

Maryland. Ballard Spahr has been involved in the preparation of legislation enabling P3 structures in Maryland. Our attorneys helped the State review proposed P3 legislation, and David Winstead testified before the Blue Ribbon Commission and before the Maryland legislature.

Indemnification. The public sector's ability to indemnify is limited by constitutional law. We have drafted legislation that permits indemnification in appropriate circumstances.

California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA): Ballard Spahr attorneys recently provided our opinion to CAEATFA on the validity of their Qualified Energy Conservation Bonds (Redwood Renewables, LLC Project) Series 2011 as "qualified energy conservation bonds" within the meaning of Section 54D of the Internal Revenue Code of 1986. Ballard Spahr attorneys also served the Orange County Transportation Authority (OCTA) in an advisory capacity regarding railroad operating and corridor relocation matters, and as a project management consultant to OCTA for the MetroLink expansion. Ballard Spahr has assisted in the issuance of over 42 bond issues totaling over $2.1 billion in the State of California since January 1, 2008.

Practice Areas

- Public Finance
- Climate Change and Sustainability
- Health Care
- Housing
- P3/Infrastructure
- Higher Education

Education

- University of Notre Dame Law School J.D. 1969
- Providence College B.A. 1966

Admitted To Practice

- Pennsylvania 1969

H. David Prior
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H. David Prior is a partner in the Public Finance Department and a member of the Health Care, Housing, Higher Education, and P3/Infrastructure Groups, and the Climate Change and Sustainability Initiative. Mr. Prior has litigation and corporate finance experience, but has concentrated in public finance since 1970 and has extensive experience as bond counsel and underwriter's counsel in virtually every kind of tax-exempt financing. He has devoted substantial time to developing Ballard Spahr's tax-exempt health care and housing practice and has represented a number of state agency and local issuers of hospital and housing bonds throughout the United States.

Mr. Prior has had primary responsibility for the firm's engagements by several regional and national hospital systems, including the Lehigh Valley Health System and the Geisinger Health System in Pennsylvania, and the Franciscan Sisters of the Poor and CSJ Health System, in their nationwide financings. He has represented the Idaho, Utah, Pennsylvania, Maryland, and Puerto Rico housing agencies as bond counsel and has served as underwriter's counsel for the financings of the Oregon, Idaho, Rhode Island, and Massachusetts housing agencies.

Mr. Prior has extensive experience with the City of Philadelphia and its issuing agencies and has served as bond counsel to the City of Philadelphia, the Philadelphia Water Department, and the Philadelphia International Airport. He also has served as special finance counsel to the Southeastern Pennsylvania Transportation Authority. Mr. Prior clerked for the Honorable William H. Hastie, Chief Judge of the U.S. Court of Appeals for the Third Circuit, from 1969 to 1970.

Mr. Prior is a member of the National Association of Bond Lawyers, the American Bar Association, the Pennsylvania Bar Association, and the Philadelphia Bar Association. He is the former president of the National Leased Housing Association and is a member of the National Housing Council. He is also the former chairman of the Board of Governors of the Pennsylvania Economy League. Mr. Prior is a frequent lecturer at public finance, health care, and housing conferences.

Practice Areas
- Public Finance
- P3/Infrastructure
- Energy and Project Finance
- Health Care
- Transactional Finance
- Higher Education

Education
- Georgetown University Law Center J.D. 1982
- Harvard College A.B. 1972

Admitted To Practice
- Pennsylvania 1982

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Brian Walsh is a partner in the Public Finance Department, Practice Leader of the P3/Infrastructure Group, and a member of the Energy and Project Finance, Health Care, Transactional Finance, and Higher Education Groups. Mr. Walsh has acted as bond counsel, underwriter's counsel, borrower's counsel, trustee's counsel, and counsel to banks providing credit enhancement in taxable and tax-exempt financings for energy projects, sports arenas, geothermal facilities, cogeneration facilities, secondary schools, and industrial development projects.

Mr. Walsh has a wide range of experience in developing and financing projects domestically and in the Caribbean and the Middle East. He advises clients on all phases of transportation and infrastructure projects.

- Co-leads the Ballard Spahr team representing the Philadelphia Gas Works in the proposed privatization of the nation's largest municipally owned utility
- Led the Ballard Spahr team representing the Commonwealth of Virginia in the I-95 HOT Lanes Project
- Co-led the team of Ballard Spahr lawyers who represented the Governor's Office of the Commonwealth of Pennsylvania and the Pennsylvania Department of Transportation (PennDOT) in the proposed privatization of the Pennsylvania Turnpike

Mr. Walsh's representations have involved using senior and subordinated tax-exempt securities, along with commercial bank debt and leveraged leases, to finance a domestic power plant, and taxable bonds, tax-exempt bonds, and bank debt to finance a power plant in the Caribbean. He has extensive experience negotiating intercreditor arrangements among senior creditors, mezzanine creditors, and subordinated creditors.

Mr. Walsh is a member of the National Association for Bond Lawyers (NABL) and the Pennsylvania Association of Bond Lawyers, and has spoken at NABL seminars. He is also a member of both the Pennsylvania and American Bar Associations. He served on the Board of Directors of the National Adoption Center.

Practice Areas
- Public Finance
- Climate Change and Sustainability
- Energy and Project Finance
- P3/Infrastructure
- Tax
- Tax Credits

Education
- Georgetown University Law Center LL.M. Taxation 1979
- Emory University School of Law J.D. 1975
- Emory University B.A. 1969

Admitted To Practice
- District of Columbia 1980
- Georgia 1975

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Charles S. Henck is a partner in the Public Finance Department and a member of the Energy and Project Finance, Tax, Tax Credits, and P3/Infrastructure Groups, and the Climate Change and Sustainability Initiative. Before joining Ballard Spahr, Mr. Henck was an attorney in the Office of Chief Counsel of the Internal Revenue Service.

Mr. Henck has counseled clients on a variety of tax aspects of municipal and corporate financing for utility, industrial, and infrastructure facilities. He has served as bond counsel, underwriter's counsel, special tax counsel, and company counsel in revenue bond, private activity bond, general obligation bond, and leveraged lease financings. He has extensive experience in the issuance and restructuring of project- and revenue-based tax-exempt financings for solid waste disposal and resource recovery facilities. He also has been involved as counsel to the borrower and the issuer in a number of IRS audits of bonds issued to finance utility, industrial, and infrastructure facilities, and is a frequent lecturer and panelist in national conferences on federal tax matters relating to financings of these facilities.

Mr. Henck is a fellow of the American College of Bond Counsel and a member of the American Bar Association Section of Taxation and the National Association of Bond Lawyers (NABL). He served on the Board of Directors of NABL and for several years served as head of NABL's Solid Waste Task Force. He also served as Chair of its Arbitrage and Education Committees and as Chair of the 1994 Bond Attorneys Workshop. He is listed in the 2008 through 2013 editions of *The Best Lawyers in America* for public finance law.

Mr. Henck is a graduate of Emory University (B.A. 1969), Emory University School of Law (J.D., with honors, 1975), and Georgetown University Law Center (LL.M., taxation, 1979).

Practice Areas

- Public Finance
- P3/Infrastructure
- Health Care
- Higher Education
- Korea
- Securities
- Transactional Finance

Education

- University of Pennsylvania School of Law J.D. 2006
- Dartmouth College B.A. 1998

Admitted To Practice

- Pennsylvania 2006

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Associate

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Steve T. Park is an associate in the Public Finance Department and a member of the P3/Infrastructure, Health Care, Higher Education, Securities, and Transactional Finance Groups, as well as the Korea Initiative. Mr. Park advises issuers, underwriters, borrowers, and purchasers in connection with the structuring, issuance, offering, placement, remarketing, and restructuring of tax-exempt and taxable municipal securities and other debt instruments and derivatives. He serves as bond, borrower's, and underwriter's counsel to various clients, including investment banking firms, higher education institutions, health care institutions, school districts, and municipalities.

Mr. Park also advises clients in all phases of transportation and infrastructure projects. Some notable engagements include:

- Virginia Department of Transportation – I-95 HOT Lanes Project – Serves as special counsel to the Department in a public-private partnership for the development of HOT Lanes on I-95 in northern Virginia.
- Commonwealth of Pennsylvania – Pennsylvania Turnpike – Represented the Commonwealth in connection with the proposed privatization of the Pennsylvania Turnpike.
- Colorado Department of Transportation – US 36 Managed Lanes Project – Served as TIFIA Counsel in connection with a TIFIA Loan to redevelop and construct high-occupancy managed toll lanes on US 36 between Denver and Boulder.
- Commonwealth of Pennsylvania – Southport Project – Represented the Commonwealth and the Philadelphia Regional Port Authority in connection with the development of a new marine container terminal facility in Philadelphia.
- Federal Railroad Administration – Denver Union Station – Represented the FRA in connection with an RRIF Loan to redevelop and rehabilitate Denver Union Station.

Before joining the firm, Mr. Park worked in several capacities serving the needs of underprivileged, special-education, and at-risk children and teenagers. He is an active participant in election monitoring with the Committee of Seventy and AALDEF.

Mr. Park is a member of the National Association of Bond Lawyers, Philadelphia Bar Association, National Asian Pacific American Bar Association, Asian Pacific American Bar Association of Pennsylvania, and Pennsylvania Association of Bond Lawyers. He serves on Ballard Spahr's Hiring Committee and is a Board Member of the Country Day School of the Sacred Heart, serving also on the school's Finance Committee.

Speaking Engagements

- "Current State of PABs, RRIF and TIFIA Programs," The Bond Buyer Transportation Finance/P3 Conference, November 29, 2012

Mr. Park is a graduate of Dartmouth College (B.A. 1998) and the University of Pennsylvania Law School (J.D. 2006), where he served as a Senior Editor of the *Journal of International Economic Law*.

CDM Smith Public Private Partnership and Traffic and Revenue Services

Public Private Partnerships

As government agencies continue to bear the fiscal challenges created in today's economy, public agencies are looking to the private sector to leverage existing public assets and meet the increased demand for new infrastructure. These "public private partnerships" (P3) can be powerful and effective tools to achieve public policy objectives. They require clearly defined goals, a balancing of risks, a transparent procurement process, and the negotiation of a fair and enforceable agreement. CDM Smith's P3 portfolio includes the first two conduit financings, the first managed lane project, and the first two truck-only lane projects in the US, as well as the first major privatization valuation study of an existing toll system and the three largest concession sales in North America.

As the premier technical consulting partner in the public-private partnership market, CDM Smith has been involved in more than 40 public-private partnerships, providing project management, revenue forecasting, economic, technical, and engineering services. Currently, we are the only firm advising Virginia and Texas, the two states with the most active P3 programs in the country.

Using an effective business case to identify an appropriate P3 model, we open the door for a competitive, fair, and transparent procurement process which maximizes market interest and fosters trust of elected officials, stakeholders, and the public. CDM Smith has worked with investment bankers, debt holders, rating agencies, and equity participants for more than 50 years, assisting public and private clients to place more than $85 billion of revenue-based financings and resulting in unparalleled credibility with today's financial markets. This experience enhances our ability to help clients achieve their objectives. Coupled with our solid engineering services to deliver and monitor P3 agreements, we provide preliminary and final designs as well as oversight of design and construction to ensure successful project completion. Well-designed public-private partnerships establish clear, enforceable operational and maintenance requirements. CDM Smith can develop these plans to optimize clients' long-term policy objectives.

Our P3 services include the following:

PROGRAM
- Legislative support
- Rules and regulations
- Guidelines
- Project evaluations and development
- Public Outreach

PROCUREMENT SUPPORT
- Technical provisions
- Program management
- Environmental/NEPA permitting
- Condition assessment
- Valuation and negotiation support

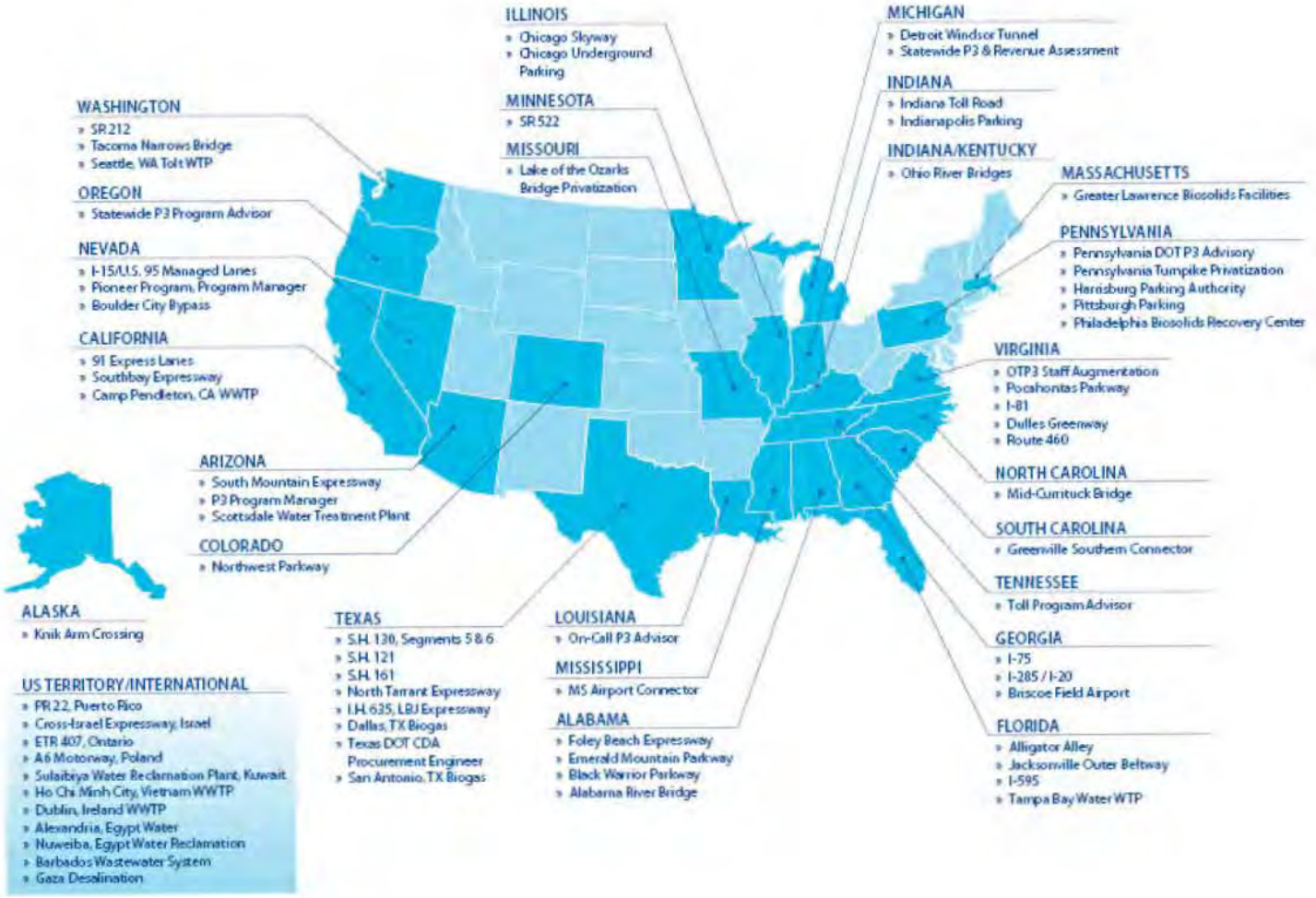
FINANCIAL SUPPORT
- Revenue and demand studies
- Investor and rating agency support
- Risk analysis
- Rating Agency Support

PROJECT EVALUATIONS AND DEVELOPMENT
- Revenue and Cost
- Financial feasibility
- Risk analysis
- Benefit/cost
- Carbon reduction and sustainability
- Design

CONSTRUCTION SUPPORT
- Highway design
- Transit/ BRT design
- ITS and Toll System design
- Independent Engineer
- Construction engineering and inspection

OPERATIONS SUPPORT
- Operations and maintenance planning
- Life cycle costing
- Toll system and cash collection systems specifications
- Back room operations
- Revenue enforcement

CDM Smith P3 Experience



Public Private Partnership Project Experience

Project	Location	Client Type	Procurement Support	Financial Support	Construction Support	Operations Support
Knik Arm Bridge	AK	Public	♦	♦		♦
Foley Bridge Expressway	AL	Private		♦		
Emerald Mountain Parkway	AL	Private		♦		
Black Warrior Parkway	AL	Private		♦		
Alabama River Bridge	AL	Private		♦		
South Mountain Expressway	AZ	Private		♦		
91 Express Lanes	CA	Private		♦		
Southbay Expressway	CA	Private		♦		
Northwest Parkway	CO	Private		♦		
Alligator Alley	FL	Private		♦		
Jacksonville Outer Beltway	FL	Public		♦		
I-595	FL	Public	♦			
I-75	GA	Private		♦		
I-285/I-20	GA	Private		♦	♦	
Chicago Skyway	IL	Public	♦	♦		
Chicago Underground Parking	IL	Private	♦	♦	♦	♦
Indiana Toll Road	IN	Public	♦	♦		
Cross-Israel Expressway	Israel	Private		♦		
Detroit Windsor Tunnel	MI	Private		♦		
SR 522	MN	Private		♦		♦
MS Airport Connector	MS	Private			♦	
Mid-Currituck Bridge	NC	Public	♦	♦		
I-15/US 95 Managed Lanes	NV	Public	♦	♦		♦
ETR 407	ON	Public		♦		
Penn Turnpike Privatization	PA	Public	♦			
A6 Motorway	Poland	Both		♦		
PR 22	PR	Private		♦		
Greenville Southern Connector	SC	Private		♦	♦	♦
SH 130 Segments 5&6	TX	Public	♦	♦		
SH 121	TX	Public	♦	♦		
SH 161	TX	Public	♦	♦		
North Tarrant Expressway	TX	Public	♦	♦		
IH 635, LBJ Expressway	TX	Public	♦	♦		
TTC 35	TX	Public	♦	♦		
Pocahontas Parkway	VA	Private		♦		
I-81	VA	Private		♦	♦	
Dulles Greenway	VA	Private		♦		
Route 460	VA	Private		♦	♦	♦
SR 212	WA	Private		♦		♦

Traffic and Revenue Studies

The successful planning and financing of a toll road, bridge, or tunnel relies heavily on credible traffic and revenue forecasts. As a world leader in traffic and revenue forecasting and toll operations, CDM Smith conducts studies ranging from exploratory assessments and preliminary traffic and revenue studies to the more comprehensive traffic and revenue studies used in the financing process. In addition, our services involve road pricing, managed lanes, and time-of-day pricing in conjunction with electronic toll collection to manage demand and mitigate congestion in urban areas. CDM Smith is currently one of only two firms in the U.S. recognized by the financial markets for the provision of investment grade traffic and revenue forecasts. CDM Smith has consulted on seven of the eight operational managed toll lane facilities in the nation.

Preliminary feasibility studies include traffic and toll revenue estimates, often using existing traffic models, and may include estimated total project costs and operations and maintenance expenses; investment grade studies incorporate detailed estimates based on extensive data collection, stated preference surveys, independent economic analysis, base traffic and revenue forecasts, and sensitivity analyses. CDM Smith also provides ongoing support to operating agencies once a toll facility is brought on line.

For example, changes in facility operations often require certification by traffic engineers regarding the need for the change and its ability to provide sufficient traffic and revenue to meet bond coverage requirements. Other ongoing services include annual toll revenue forecasts, annual reports and certifications, and implementation of traffic management techniques often required as toll facilities mature. Traffic and revenue services include:

- General traffic and revenue consulting
- Exploratory feasibility assessments
- Preliminary feasibility studies
- Investment grade traffic and revenue studies
- Toll facility finance
- Traffic and revenue studies
- HOT and managed lanes
- Value pricing

Traffic & Revenue Project Experience

		Tasks Performed													
Project Name/Client/Description	**Complete**	**Traffic Counts/Data Collection**	**Speed & Delay**	**OD Survey**	**Stated Preference Survey**	**Economic Growth Forecast**	**Toll Model Development/Calibration Operations Analysis/Simulation**	**Toll Sensitivity**	**T&R Forecast**	**Risk Analysis**	**T&R Report**	**Rating Agency Presentations**	**Bond Support (including OS)/ PPP Support**	**Traffic Engineer's Certification**	**Rating Agency Bond Rating (Moody's; S&P; Fitch)**
Triangle Turnpike IG T&R Study / North Carolina Turnpike Authority IG T&R study for greenfield triangle turnpike	2007	♦	♦	♦	♦		♦	♦	♦		♦	♦	♦	♦	Aa2; AAA; AA
Maine Turnpike 2007 IG T&R Study / Maine Turnpike Authority IG & T&R forecast for the Maine Turnpike issuance of new bond debt	2007	♦				♦		♦	♦		♦		♦	♦	AAA; Aaa; Aaa
Illinois Tollway IG T&R Study / Illinois State Toll Highway Authority Developed IG T&R estimates. Prepared report and provided support for financing. Also provided updates for subsequent bond sales.	2007	♦	♦				♦	♦	♦		♦	♦	♦	♦	Aa3; AA-; AA-
Sam Rayburn Tollway (SH 121) IG Study / N. Texas Tollway Authority Major northeast/southwest roadway in Collin/Denton Counties in DFW area	2007	♦	♦				♦	♦	♦		♦	♦	♦	♦	A2; A-; NR
President George Bush Turnpike Eastern Extension IG Study / N. Texas Tollway Authority Eastern extension of PGBT in DFW Area	2008	♦	♦				♦	♦	♦		♦	♦	♦	♦	A2; A-; NR
DRPA 2008 T&R Study / Delaware River Port Authority IG study new bonds	2008	♦	♦			♦		♦	♦		♦				Aa3; AAA; NR
Maine Turnpike 2009 IG T&R Study / Maine Turnpike Authority IG T&R forecast for the Maine Turnpike issuance of new bond debt.	2009	♦				♦		♦			♦		♦	♦	Aa3; A+; AA-
North Texas Tollway Authority System IG Study / N. Texas Tollway Authority NTTA System comprises of DNT, PGBT, PGBT EE, SRT, AATT, MCLB and LLTB	2009	♦	♦				♦	♦	♦		♦	♦	♦	♦	A2; A-; NR
Dulles Toll Road T&R Services / Metro Washington Airports Authority IG T&R in support of Dulles Corridor Enterprise (Dulles Metrorail)	2009	♦	♦	♦	♦	♦	♦	♦	♦		♦	♦	♦	♦	A2; A ; NR
Intercounty Connector (ICC) IG T&R Study / Maryland Transportation Authority IG T&R study for new all electronic 17 mile toll road in Montgomery County Maryland.	2009	♦	♦	♦	♦		♦	♦	♦		♦	♦	♦	♦	AA; NR;NR
HCTRA System IG T&R Study / Harris County Toll Road Authority 5-Year update including the impact of two future system expansions	2009	♦	♦	♦	♦		♦	♦	♦		♦				NR
TO18 Monroe Conn/Bypass Comp T&R Study / North Carolina Turnpike Authority IG T&R study for the greenfield Monroe Bypass.	2009	♦	♦	♦	♦		♦	♦	♦		♦	♦	♦	♦	Aa2; AA; NR

		Tasks Performed													
Project Name/Client/Description	**Complete**	**Traffic Counts/Data Collection**	**Speed & Delay**	**OD Survey**	**Stated Preference Survey**	**Economic Growth Forecast**	**Toll Model Development/Calibration Operations Analysis/Simulation**	**Toll Sensitivity**	**T&R Forecast**	**Risk Analysis**	**T&R Report**	**Rating Agency Presentations**	**Bond Support (including OS)/ PPP Support**	**Traffic Engineer's Certification**	**Rating Agency Bond Rating (Moody's; S&P; Fitch)**
HCTRA IG T&R Study 2009 / Harris County Toll Road Authority 5-Year update, 40 year systemwide forecast including the impact of two future system expansions	2010	♦	♦	♦	♦		♦	♦	♦		♦				
MDX IG T&R Study / Miami Dade Expressway Authority Systemwide IG T&R study	2010	♦				♦	♦	♦	♦		♦	♦	♦	♦	Aa3; AAA; NR
TO 23 Garden Parkway Comp T&R Study / North Carolina Turnpike Authority IG T&R study for the greenfield Garden Parkway	2010	♦	♦	♦	♦		♦	♦	♦		♦	♦	♦	♦	NR
Tyler Loop 49 Comprehensive T&R Study / Texas DOT Developed IG T&R estimates.	2011	♦	♦				♦	♦	♦		♦				NR
President George Bush Turnpike Western Extension (SH 161) IG Study / N. Texas Tollway Authority Western extension of existing PGBT in DFW Area	2011	♦	♦				♦	♦	♦	♦	♦	♦	♦	♦	NR; AA; AA-
THCEA Comprehensive T&R 2009 / Tampa-Hillsborough Expressway Authority IG Study for Possible Refinancing including new system expansion	2011	♦	♦	♦	♦		♦	♦	♦		♦	♦	♦	♦	NR
SR 520 IG T&R Study / Washington DOT T&R IG forecast for tolling the existing SR 520 bridge and tolling of the proposed replacement bridge	2011	♦	♦	♦	♦	♦	♦	♦	♦		♦	♦	♦	♦	Aa1; AA+; AA+
Colorado US 36 Managed Lanes IG T&R Study / Colorado DOT IG study for managed lanes on US 36	2011	♦	♦		♦	♦	♦	♦	♦	♦	♦	♦	♦		NR
Chisholm Trail Parkway IG Study / N. Texas Tollway Authority Major north/south roadway in Tarrant/Johnson Counties in DFW area	2011	♦	♦				♦	♦	♦	♦	♦	♦	♦	♦	NR; AA; AA-
Oklahoma Turnpike Authority Letter Updates / Oklahoma Turnpike Authority Oklahoma Turnpike System T&R updates	2011					♦			♦			♦	♦		Aa3; AA-; AA-
North Texas Tollway Authority System IG Study - 2011 / N. Texas Tollway Authority NTTA System comprises of DNT, PGBT, PGBT EE, SRT, AATT, MCLB and LLTB	2011	♦	♦	♦	♦		♦	♦	♦		♦	♦	♦	♦	A2; A-; NR
Maine Turnpike 2012 IG T&R Study / Maine Turnpike Authority IG T&R forecast for the Maine Turnpike issuance of new bond debt.	2012	♦				♦		♦			♦		♦	♦	Aa3; AA-; AA-

Team Expertise

Grant Holland: As the national practice leader for innovative project delivery, Grant is our leading expert in alternative funding methods such as public-private partnerships and design-build. He has over 30 years of experience and specializes in managing complex P3 projects and teams of legal, financial and technical advisors. Having led projects with an estimated value of over $30 billion, Grant's work is well-known throughout the industry. Aside from serving as the advisor for the Knik Arm Crossing project, his work includes serving as project manager for the Arizona Department of Transportation Public-Private Partnership Program; the senior advisor for Michigan Department of Transportation's Statewide P3 and Revenue Assessment Plan; and as the project manager for the Nevada Department of Transportation's first P3 project, the I-15 Demonstration Project. When complete, this project will provide 19 miles of managed lanes on I-15 and U.S. 90 through the heart of Las Vegas' resort corridor. Grant is responsible for overseeing all aspects of the project including legal, financial, engineering, traffic and revenue, public relations, and operations. He is also supporting NDOT's efforts for statutory authority to complete the Demonstration Project.

Scott Allaire: Mr. Allaire is a vice president, group leader and project manager for CDM Smith's Transportation, Finance, and Technology group. His major project experience includes all levels, phases, and components of traffic and toll revenue feasibility studies, such as data collection, development and use of toll travel demand modeling techniques, managed lane analysis and forecasting, All Electronic Tolling (AET), economics, sensitivity testing and risk analysis, and presentations to rating agencies in support of project financing. His resume includes completed complex traffic and toll revenue feasibility studies in Connecticut, Texas, Colorado, Florida, New Hampshire, Maryland, California, Canada, Alabama, and Washington.

Kazem Oryani: With more than 26 years of experience, Dr. Oryani has led transportation modeling teams, and provides highly specialized skill in the correlation between land use and large-scale transportation. He also provides extensive experience in toll road modeling, and travel-demand-transit analysis. In Dr. Oryani's PhD dissertation, "Analysis of Optimization and Behavioral Spatial Allocation Models of Land Use and Transportation," he analyzed the structure, formulation, data requirement, and applicability of DRAM-ITLUP, a behavioral model, and TOPAZ, a nonlinear optimization model. His recent project work includes serving as the project manager for the Express Travel Choices Study for the Southern California Association of Government, which involved evaluating 11 pricing scenarios and a route choice assignment procedure to recognize pricing. He also served as the project manager and modeling expert for the First Coast Outer Beltway Planning-Level Traffic and Revenue Analysis in Florida, where he estimated a planning-level toll traffic forecast for six alternatives using various toll rates.

Kris Wuestefeld: Mr. Wuestefeld is a vice president. His toll industry experience began in 1984 when the New Haven office hired him to test newly developed toll systems. As a leading expert in toll technology efforts around the world from design through deployment and operations oversight, he is currently responsible for the tolls/parking and ITS practices. He specializes in leading-edge technologies including electronic toll collection, video enforcement, vehicle detection and tracking, various toll payment methods, and high-occupancy travel lanes using dynamic pricing. Mr. Wuestefeld commonly manages

toll collection systems, electronic toll collection systems, open road tolling, electronic road pricing system, intelligent transportation system, and parking system design for the firm's clients. Major areas of project experience include ETC, ORT, and ERP system planning, evaluation, design, development of specifications, contractor selection, and implementation oversight. He is also experienced in overall contract and project management, system design documentation review, factory and field testing of systems, system implementation planning, and system performance evaluation.

February 15, 2013

Knik Arm Bridge and Toll Authority

Citi Public-Private Partnership Qualifications

Strong P3 Credentials

- Citi is not a newcomer to P3s
  - Citi has served as both buy- and sell-side financial advisor and/or underwriter for more than 100 P3s completed in the US over the past 30 years
- Citi has played a leading role in many of the landmark P3 transactions completed in the US
  - Lead underwriter for the $1.4 billion Chicago Skyway acquisition, the first US brownfield toll road P3 completed in the US
  - Lead arranger for SR-91, the first US greenfield lanes P3 financing
  - Lead arranger and underwriter for American Roads LLC, first US brownfield toll road portfolio financing
- Citi has considerable recent experience on US transportation P3 financings
  - Citi is currently serving as sole sell-side financial advisor to Knik Arm Bridge and Toll Authority on the financing of a greenfield toll bridge in Anchorage, AK and to the Regional Transportation Commission on the financing of the greenfield Boulder City Pass
  - Citi is leading financing teams for other greenfield P3s currently in the market, the Goethals Bridge Replacement Project in NYC, LA Metro in Los Angeles, Mid-Currituck Bridge in North Carolina, and the North Tarrant Express in Fort Worth

US P3 Pipeline

Awaiting Financial Close	Deal Size	Risk	Citi Role
Ohio State University Parking	$483 million	Demand	None
Puerto Rico—Airport Lease	$600 million	Demand	Represented Losing Bidder

Procurement Underway	Deal Size	Risk	Citi Role
Goethals Bridge	$1.6 billion	Availability	Representing Bidder
East End Bridge	$1.4 billion	Availability	None
Harrisburg Parking	$200 million	Demand	Represented Losing Bidder
Knik Arm Bridge	$1.1 billion	Availability	Sell-side Advisor
North Tarrant HOT Lanes Phase 2	$1.5 billion	Demand	Senior Manager
Mid-Currituck Bridge	$800 million	Demand/Availability	Senior Manager
Frederick Co., MD Waste to Energy	$500 million	Demand	Senior Manager
LaGuardia Central Terminal	$3.6 billion	TBD	Representing Bidder
Virginia Port Authority	$3.5 billion	Demand	Representing Bidder

Announced Deals	Deal Size	Risk	Citi Role
LA Metro (California)	$700 million	Availability	Representing Bidder
New Jersey Transit Parking	$750 million	Demand	Too early in process
Yonkers (New York) Schools	$700 million	Availability	Too early in process
US 36 (Colorado)	$140 million	Demand	None
Indiana University Parking	$480 million	Demand	Too early in process
Ohio Turnpike	$2.4 billion	Demand	Too early in process
I-4 Managed Lanes	$2.1 billion	Availability	Too early in process
Midway Airport	$2 billion	Demand	Too early in process

Industry Leading Transportation Franchise

Citi offers unparalleled credentials in tax-exempt and transportation finance.

- #1 underwriter of tax-exempt debt
- #1 underwriter of US private toll road bonds
- #1 underwriter of tax-exempt transportation bonds
- #1 underwriter of tax-exempt toll road bonds
- #1 underwriter of Private Activity Bonds (PABs)
- #1 arranger of TIFIA loans
- #1 in bringing inaugural tax-exempt transportation credits to market
- #1 underwriter of tax-exempt variable and auction rate bonds
- Highly experienced banking team
- Citi's unparalleled platform – one of the largest and strongest financial services firm in the world

Representative Clients

Citi's KABATA Team

Name/Title	Biography & Transaction Experience
David Livingstone *Managing Director* Head of P3 Finance Group Work: +1 (212) 723-5638 Email: david.livingstone@citi.com	• David Livingstone is the head of Citi's Public Finance P3 Finance Group. • In his 25-year tenure at Citigroup, David has served as buy or sell side advisor to more than 40 completed public-private partnerships representing more than $15 billion in value. His work has included completed transactions in surface and air transportation, energy schools, hotels, water and wastewater sectors. • He served as lead banker for on the groundbreaking $1.8 billion Chicago Skyway acquisition and $1.4 billion capital markets financing for Cintra and Macquarie. • Given the sea change in the financial and equity markets since the financial crisis, he has significant current P3 experience, including sell side underwriter for ongoing concession processes for Goethals Bridge, NY, North Tarrant Express and LA Metro, CA and buy side advisor for the Knik Arm Toll Bridge in Anchorage and Boulder City Bypass near Las Vegas, NV. • He is an expert in combining tax-exempt debt with public-private partnerships. • David has a BS degree in Civil Engineering from Brown University and was a registered Professional Engineer.
Brett Padgett *Director* Infrastructure Finance Work: +1 (312) 876-5332 Email: brett.padgett@citi.com	• Brett Padgett is a Director in the Infrastructure Group of the Public Finance Department with over 16 years of experience. He focuses on public-public and public-private partnerships (sell-side and buy-side) for airports, toll roads and bridges, utilities, and parking facilities as well as general infrastructure municipal underwriting. He is currently involved as sell-side advisor to the Knik Arm Bridge and Toll Authority and as underwriter on two large public-private transactions involving private activity bonds • In the past he has been involved with public-public and public-private partnership teams for the City of Indianapolis water and sewer systems, Indiana Toll Road, Chicago Parking Garages, Midway Airport and Illinois Lottery. • With general municipal underwriting, he has been involved in transactions including airports, surface transportation, water and sewer, stadiums and convention centers, general obligation, lease appropriation, tax increment, school districts, higher education and public power issues • Brett graduated from the University of Texas at Austin with a B.S. degree in Aerospace Engineering

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We are required to obtain, verify and record certain information that identifies each entity that enters into a formal business relationship with us. We will ask for your complete name, street address, and taxpayer ID number. We may also request corporate formation documents, or other forms of identification, to verify information provided.

Any prices or levels contained herein are preliminary and indicative only and do not represent bids or offers. These indications are provided solely for your information and consideration, are subject to change at any time without notice and are not intended as a solicitation with respect to the purchase or sale of any instrument. The information contained in this presentation may include results of analyses from a quantitative model which represent potential future events that may or may not be realized, and is not a complete analysis of every material fact representing any product. Any estimates included herein constitute our judgment as of the date hereof and are subject to change without any notice. We and/or our affiliates may make a market in these instruments for our customers and for our own account. Accordingly, we may have a position in any such instrument at any time.

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Citi believes that sustainability is good business practice. We work closely with our clients, peer financial institutions, NGOs and other partners to finance solutions to climate change, develop industry standards, reduce our own environmental footprint, and engage with stakeholders to advance shared learning and solutions. Highlights of Citi's unique role in promoting sustainability include: (a) releasing in 2007 a Climate Change Position Statement, the first US financial institution to do so; (b) targeting $50 billion over 10 years to address global climate change: includes significant increases in investment and financing of renewable energy, clean technology, and other carbon-emission reduction activities; (c) committing to an absolute reduction in GHG emissions of all Citi owned and leased properties around the world by 10% by 2011; (d) purchasing more than 234,000 MWh of carbon neutral power for our operations over the last three years; (e) establishing in 2008 the Carbon Principles; a framework for banks and their U.S. power clients to evaluate and address carbon risks in the financing of electric power projects; (f) producing equity research related to climate issues that helps to inform investors on risks and opportunities associated with the issue; and (g) engaging with a broad range of stakeholders on the issue of climate change to help advance understanding and solutions.

Citi works with its clients in greenhouse gas intensive industries to evaluate emerging risks from climate change and, where appropriate, to mitigate those risks.

efficiency, renewable energy and mitigation

OVERVIEW OF NOSSAMAN'S TRANSPORTATION P3 PRACTICE

As lead outside legal advisor on over $100 billion in projects, Nossaman's Infrastructure Practice Group (IPG) works in more than 30 U.S. states and select foreign countries on large high profile projects and infrastructure challenges. With more than 30 attorneys, IPG's specialty is serving public agencies pursuing transportation public-private partnerships ("P3s") and design-build contracting. We are the leading law firm in representing the public sector on P3 programs and projects, which provides us with a sophisticated understanding of public sector needs, namely maximizing the value of P3s while simultaneously protecting the public interest.

Our extensive project work, lessons learned and broad precedent library allow us to work efficiently and cost effectively. Many Nossaman innovations in P3 procurements and contracting are today's U.S. best practices. We have provided testimony and legislative drafting to Congress and state legislatures, and have drafted P3 legislation in over 20 states. We rendered key assistance to Congress on changes in TIFIA law, tolling and environmental streamlining enacted under MAP-21. Our experience enables us to help clients understand different P3 models and select the P3 suitable to project needs and goals.

Our services go beyond administering procurements, doing legal research, drafting documents and negotiating contracts. We strategize and provide policy support, including review of existing laws, identification of opportunities for improvements, and assistance with federal requirements and financing opportunities. We help clients establish organizational structures and programmatic platforms for a multi-project pipeline, draft P3 policies and procedures for programs, and develop procurement and contract document templates. Our clients tell us they particularly value our ability to integrate our expertise with that of engineers, financial advisors and other outside consultants.

Leader in P3 Best Practices. Nossaman has been an industry leader in developing tools and procedures for procuring P3s and contract terms that optimize client objectives. We have drawn from P3 programs in the UK, Canada, Australia and various European countries, as well as U.S. best procurement practices, to arrive at procurement methods and contract provisions that reflect the special needs of our U.S. clients in implementing their P3 projects. We advise on how to manage and address the unique U.S. overlay of federal regulations and agencies with state-specific procurement laws, issues and stakeholders. Nossaman's innovations, now part of best practices in the U.S. transportation industry, include use of:

- Availability payment ("AP") P3s. Nossaman helped to introduce such P3s in the U.S. on Florida DOT's I-595 Corridor Improvements and Port of Miami Tunnel projects and Caltrans' Presidio Parkway. We recently reached commercial close on the latest U.S. availability payment P3, Indiana's East End Crossing, and are now advising on other such projects, including Florida DOT's I-4 AP P3s. ***We are not aware of any closed or active AP highway P3 project in the U.S. that we have not acted as the public agency's counsel***;

- Best value evaluation and selection;

- Toll concessions, first introduced in California, Washington, Virginia and Minnesota in the 1990s, and first transformed into the modern, international approach in Virginia and Texas, all represented by Nossaman;

- Alternative technical concepts, one-on-one meetings with shortlisted proposers to discuss RFP documents and post-selection negotiations;

- Revenue sharing agreements and refinancing gain sharing arrangements;

- Hybrid procurements with hard money project phases plus phases developed under pre-development agreements;

- Inclusion of TIFIA financing, private activity bond ("PABs") and tolling into P3 projects and procurements; and

- Contract documents that achieve price and schedule certainty for public agencies through cost-efficient risk transfers while capturing financial terms that almost universally exceeded the expectations of our clients.

Unrivalled U.S. Transportation P3 Experience. Nossaman has had the privilege of working for public agencies on the significant majority of P3 transportation projects that reached commercial close in the United States within the past 3 years and in assisting public agencies in developing and implementing P3 programs. Current and recent clients benefiting from Nossaman's "lessons learned" database when developing P3 programs and projects include Indiana, Nevada, California, Florida, Georgia, Illinois, Michigan, Alaska, Arizona, Georgia, North Carolina, Texas, Virginia and other states.

Understanding the Private Sector. Nossaman has deliberately and carefully chosen to focus its transportation industry practice on public agency representation in the U.S. This produces several distinct advantages that we know from experience are highly valued by our clients:

- We have a broader perspective on major P3 players than other firms can possibly obtain. Through hundreds of interactions with multiple proposers – at one-on-one meetings, in post-selection negotiations, in negotiation of P3s under pre-development agreements (PDAs), and by analyzing thousands of written questions/comments from proposers – Nossaman has unique insight into the thinking of equity investors, design-build contractors, sureties, underwriters and lenders representing the P3 industry. We help clients sort through and distinguish private sector needs from private sector wants. We have a broad contact base across virtually all the firms and organizations that our clients are likely to see participating in its P3 procurements.

- We understand the private sector is not uniform; proposers vary greatly in issues they view as key. One proposer's deal killer may be irrelevant to another proposer. Our immersion in the myriad issues that the private sector presents in P3 procurements positions Nossaman to assist our clients with decision-making.

- International experience, while valuable and instructive, has to be adapted to U.S. laws and practices. We have a unique federal system; a unique tax-exempt bond market (tax-exempt financing exists nowhere else); unique federal credit assistance (TIFIA); and procurement laws, rules, policies and objectives that vary across the 50 states. Nossaman has been the leader to adopt and adapt international P3 practices to the special circumstances of the U.S. This work resulted in the kinds of P3 procurements and contracts that you see throughout the country today.

- Nossaman does not have conflicts with its public clients because of current representation of concessionaires, contractors, equity investors or lenders. Our dedication to public agencies minimizes the potential for conflicts and avoids the political difficulties that emerge from conflict.

Thorough Experience with Full Range of P3 Models. Nossaman has in-depth experience with multiple types of P3 and procurement approaches and knows the benefits and obstacles of each. Knowing which type of procurement will draw private sector interest while advancing clients' goals enables projects to start in a timely manner and avoid unnecessary delays. Our team has experience in procuring and closing a variety of P3 agreements, including AP agreements, toll concessions and PDAs, as well as design-build (including DBM, DBOM and DBF). We are experts with different approaches to proposal requirements, evaluation criteria, selection methods, stipends and other innovative procurement tools. Nossaman brings knowledge of best practices to the strategic planning process for procurements and competitions, including how best to approach negotiations, auctions, best value selection and best development/finance plan.

Tolled P3 Experience. Nossaman has developed successful P3 procurements for numerous tolling arrangements, including barrier-free facilities using maximum toll rates, managed/express lanes and facilities that combine tolled and toll-free segments. We have handled projects where the agency performs tolling functions, where these functions are turned over to the private partner, and where these functions are performed by a third party agency. We have put in place the detailed trust, custodial, funding and interoperability arrangements to assure proper application, handling, use and accounting of toll revenues, essential to attracting debt and equity financing. Nossaman provides counsel on electronic toll collection systems addressing privacy issues, enforcement, revenue sharing opportunities, field equipment installation, front office/back office services, intellectual property issues and long-term service and maintenance.

Key Federal Programs/Innovative Finance Experience. P3 projects often require key federal approvals and access to important federal programs. These include credit assistance from the TIFIA program; USDOT concurrence in eligibility of funding sources for availability payments; waivers under FHWA's SEP-14/15 programs; allocations under the USDOT's PABs Program; approval of Project Management Plans/Financial Plans for Major Projects; and, for toll concessions, the right to toll interstates and federal-aid highways. Nossaman has unmatched experience, supported by a strong D.C. office, working with USDOT, FHWA, EPA and other regulatory agencies on P3 programs. Nossaman has played a leadership role on multiple federal transportation programs, most recently demonstrated through heavy involvement with the development of MAP-21.

- **Federal Policy/Legislation**. Nossaman has contributed heavily to federal policy and laws crucial to P3s and the financing and procurement methods on which P3s rely. We were the first law firm to obtain low-cost, subordinated federal lines of credit and loans, which later formed the basis for the TIFIA program. We worked on the original TIFIA legislation and later amendments. At Congressional request, Nossaman provided recommendations and language on key MAP-21 provisions involving TIFIA, tolling, environmental streamlining, the expansion of authority to toll new interstate construction and reconstruction, bridge reconstruction/replacement and HOV lane conversions, and removal of requirements for tolling agreements with FHWA, all of which are now in MAP-21.

- **TIFIA/PABs.** Nossaman has successfully assisted on numerous TIFIA loans, advising on letters of interest and applications and helping negotiate term sheets/credit agreements. We have worked with the TIFIA Joint Program Office to coordinate FHWA underwriting and closings with P3 procurements so that P3 proposers can include TIFIA in proposals and close financing after selection. Nossaman helped secure the first use of PABs in a procurement and almost $3 billion in PABs allocations, more than half of the $5.3 billion currently allocated by USDOT.

- **Toll Approvals.** Nossaman has helped clients successfully apply for and obtain approvals to toll federal/interstate highway capacity under all of FHWA's demonstration programs, including the first Value Pricing Pilot Program approval.

SAMPLE P3 PROJECTS

The descriptions below provide an overview of only a portion of our P3 experience.

Client & Project	Dollar Size	P3 Type	Project Description
California Department of Transportation – Presidio Parkway Improvement Project	Deal value (in millions, nominal) $1,100	Availability Payment Contract	Nossaman served as the lead outside legal advisor on the $1.1 billion AP concession project, a 6-lane reconstruction/seismic retrofit that will replace Doyle Drive, the southern access point of the Golden Gate Bridge that travels through key historical and recreational areas. The 30-year concession term was financed through a combination of equity, bank debt, and TIFIA loans. The deal reached financial close occurred on June 14, 2012. Nossaman prepared and advised on the procurement and contract documents and advised on contract administration, litigation, and financing aspects of the Project. Nossaman also successfully represented San Francisco County Transportation Authority before the California Supreme Court in litigation challenging the PPP legal authority for the project.
Florida Department of Transportation - I-595 Corridor Roadway Improvements	Deal value (in millions, nominal) $1,800	Availability Payment Contract	Nossaman has been the key outside legal advisor on the AP concession PPP for redevelopment of a 10.5-mile section of the I-595 corridor in the Ft. Lauderdale area. The project includes the resurfacing of existing roads and new reversible express toll lanes. The $1.8 billion, 35-year AP concession reached financial close in March 2009, making it the 1st U.S. transportation AP

Client & Project	Dollar Size	P3 Type	Project Description
Project			concession PPP. Financing included a $781 million bank loan, $678 million TIFIA loan, and $208 million in private equity. Our work included drafting procurement and contract documents, facilitating the financing structure, and leading contract negotiations. ARTBA named the project 2009 Project of the Year and Project Finance Magazine named it 2009 North American Transport Deal of the Year.
Florida Department of Transportation - Port of Miami Tunnel	Deal value (in millions, net present value) $903 Construction costs (in millions, net present value) $607	Availability Payment Contract	Nossaman is the key legal advisor for the AP concession PPP to design and construct a bridge and tunnel linking Port of Miami facilities on Dodge Island with MacArthur Causeway and I-395. The $903 million project with a 35-year term financially closed in October 2009. Financing included $80 million in private equity, $100 million in FDOT funds and $723 million in debt. This was only the 2nd AP contract executed in the U.S. Our work has included drafting procurement and contract documents, facilitation of the private sector financing, and leading contract negotiations. The project was named 2009 Global Deal of the Year and North American PPP Deal of the year by Project Finance Magazine and 2010 Nontraditional Financing Deal of the Year by The Bond Buyer.
Georgia Department of Transportation – West by Northwest Project	Deal value (in millions, net present value) $2,300	Availability Payment Contract	Nossaman is acting as PPP legal advisor in connection with a $2.3 billion, 29-mile, 60-year concession to design, construct, finance, operate and maintain a managed lane system on segments of I-75 and I-575 and a pre-development agreement for an additional 27-mile segment of managed lanes along I-285 West and I-20 West. This will be Georgia's first PPP transaction under its new 2009 legislation.
High Desert Corridor Joint Powers Authority - High Desert Corridor	Construction costs (in millions, net present value) $4,000	Potential Pre-Development Agreement	Nossaman is advising the agency on the development, construction, financing, and procurement of a PPP for a new $4 billion 50-mile highway between Palmdale and Victorville in Southern California. Also assisting the agency, comprised of the Counties of San Bernardino and Los Angeles as well as five local cities, to obtain PPP authority for the project.
Indiana Finance Authority – East End Crossing	Deal value (in millions, net present value) $1,300	Availability Payment Contract	Nossaman is advising on the procurement of an availability payment contract for design, build, finance, operation, and maintenance of the East End Crossing that will connect Kentucky to Indiana over the Ohio River. The project includes a new 6-lane East End Bridge, approaches on both sides of the bridge, including a 2,000-foot tunnel under historic property. On December 27, 2012, commercial close was achieved on the 35-year AP contract with financial close set for the 1st quarter of 2013. Nossaman is lead counsel and assisted IFA with structuring the procurement, drafting and finalizing the RFP documents, developing and overseeing the RFQ and RFP evaluation processes and negotiating the PPP agreement with the selected proposer.

Client & Project	Dollar Size	P3 Type	Project Description
Massachusetts Highway Department and Executive Office of Transportation and Construction - Route 3 North Transportation Improvement Project	Construction costs (in millions, net present value) $385	Availability Payment Contract	Nossaman served as special counsel to the Commonwealth, developing an innovative DBFOM program for the reconstruction and long-term operation of a 21-mile highway. We assisted in workshops to determine procurement strategy and allocation of risk, prepared procurement and contract documents, assisted in the industry review process, and assisted in evaluation of statements of qualifications and proposals. The contract for this $385 million project utilized developer-assisted "subject-to-appropriations" financing, requiring formation of a 63-20 corporation to issue bonds secured by a future stream of payments.
Michigan DOT – M-21 Bridge Project		Design-Build-Finance	Nossaman advised on the development of a design-build-finance project implemented on the M-21 over I-75 bridge replacement project located in Flint, Michigan. The bridge is one of Michigan's first PPPs. Commercial and financial closing has occurred, and construction is underway.
Minnesota DOT – Interstate 494, TH 212 and I-35W St. Anthony Falls Bridge Projects	See description	Design-Build-Finance	Nossaman advised MNDOT with regard to the development of a design-build program, including the design-build contract for the $135 million I-494 Project (7.8-mile widening and bridge replacement project); the $238 million TH 212 Design-Build Project and the $234 million I-35W St. Anthony Falls Bridge Project.
New South Jordan Bridge		Toll Concession	Nossaman served as legal advisor to an investor, performing project due diligence and negotiating engineering, procurement and construction, operations and maintenance, and toll systems installation and customer service agreements for a replacement toll bridge structure along the East Coast.
North Carolina DOT – I-77 HOT Lanes	Deal value (in millions, net present value) $600	Toll Concession	Nossaman is assisting the Department with the structuring and administration of a procurement of a toll concession PPP for $600 million high occupancy toll lanes along the I-77 corridor near Charlotte, North Carolina. Nossaman is drafting the procurement documents and developing the evaluation process and has also advised the Department on legislative changes and environmental/regulatory issues related to the project and its PPP program. NCDOT has shortlisted four teams.
North Carolina Turnpike Authority - Mid-Currituck Bridge	Deal value (in millions, net present value) $693 Construction costs (in millions, net present value) $636	Pre-Development Agreement; Toll Concession	Nossaman serves as outside legal advisor on the procurement for a new seven-mile tolled bridge facility over Currituck Sound to the Outer Banks. The project is estimated to cost $659 million to complete and will be developed as a PPP under a pre-development agreement, which was executed in April 2009. The developer will perform certain key design, engineering and development functions for the project in concert with NCTA, in exchange for the right to negotiate the State's first toll concession agreement to design, build, finance and operate the project. Nossaman is currently in the process of advising NCTA in connection with the negotiation of the PPP concession agreement with the

Client & Project	Dollar Size	P3 Type	Project Description
			developer.
North Carolina Turnpike Authority - Triangle Expressway	Construction costs (in millions, net present value) $101	Pre-Development Agreement	Nossaman advised on procurement matters for the Triangle Expressway in the Raleigh/Durham area - the state's first toll road - as well as on the potential use of PPP structures for the development and financing of other toll projects in the state, including the Mid-Currituck Bridge to the outer banks.
Texas Department of Transportation - LBJ Express Project (I-635)	Deal value (in millions, net present value) $2,700 Deal Value (Equity) $664 Deal Value (TIFIA Loan) $850 Deal Value (PABs) $615 Deal Value (Public funds) $489	Toll Concession	Nossaman served as key outside legal advisor in connection with the procurement and financing of a P3 toll concession to design, build, finance and operate this $2.8 billion, 17-mile express lanes project in Dallas. The largest greenfield P3 highway project in U.S. history includes the construction of new managed lanes and improvement of existing facilities. Financing includes $489 million in public funds, $664 million in equity, federal credit assistance in the form of a conditional $850 million TIFIA loan commitment and reservation of funding, as well as $615 million in private activity bonds. The project, awarded to LBJ Infrastructure Group (led by Cintra), reached financial close in June 2010. Nossaman continues to assist the Department with contract administration. ARTBA named the project the joint 2010 Co-Project of the Year. Nossaman currently is assisting the Department with contract administration.
Texas Department of Transportation - North Tarrant Express Managed Lanes Project	Construction costs (in millions, net present value) $2,040 Deal Value (Debt) $400 Deal Value (Equity) $420 Deal Value (TIFIA Loan) $650 Deal Value (Public funds) $570	Toll Concession; Pre-Development Agreement	The $4.7 billion 36-mile North Tarrant Express Managed Lanes Project is a PPP to design, build, finance, operate and maintain managed lanes and upgrade existing facilities in the Dallas area. The 1st 13-mile, $2 billion segment was procured as a toll concession concession. The project reached commercial close in June 2009, with financial close for the 1st segment on December 17, 2009. Financing includes $570 million of state funds, $400 million of senior bond debt, a $650 million TIFIA loan and $420 million of private equity. Infrastructure Journal named the project its 2009 Global Transport Deal of the Year and the ARTBA named it the joint 2010 PPP Project of the Year. Construction is underway. The other 23 miles are being developed through a pre-development agreement and negotiations have reached completion for the next segments, 3A & 3B. Commercial close is expected in March 2013.
Texas Department of Transportation - SH 130, Segments 5&6	Deal value (in millions, net present value) $1,360 Contract Terms (Length in Years) 50	Toll Concession	Nossaman served as outside legal advisor on the negotiation of an agreement to design, build, finance, operate and maintain a 41-mile toll road between San Antonio and Austin. The SH 130 Concession Company, LLC (a consortium of Cintra and Zachry) is developing the project under a 50-year comprehensive development agreement, the first toll concession agreement in Texas history and at the time only the third financed in the United States in the previous 10 years. The project reached financial close on March 7, 2008 with a total project value of $1.36 billion. The firm continues to assist with the administration of the concession agreement, including issues relating to contract interpretation, potential change orders, and performance

Client & Project	Dollar Size	P3 Type	Project Description
			security. Prior to the procurement, TxDOT estimated that it would have to spend over $500 million in public funds to deliver the toll project conventionally and project delivery would be delayed 15 years. As a result of the toll concession procurement, the project was opened in December 2012 and the developer paid TxDOT over $100 million for the concession right.
Virginia Department of Transportation - Midtown Tunnel Project	Deal value (in millions, net present value) $1400	Toll Concession	Nossaman advised VDOT on the 58-year toll concession PPP procurement to design, build, finance, operate, and maintain the Downtown Tunnel/Midtown Tunnel/MLK Freeway Extension Project in Norfolk and Portsmouth, VA, comprised of a new 2-lane tunnel parallel to the existing Midtown Tunnel, improvements to the existing Midtown and Downtown Tunnels, and extension of the MLK Freeway. The Project involves tolling of the existing and newly-constructed assets. Financing included a $422 million TIFIA loan, $663.75 million of PABs, $310 million in VDOT contribution and an equity contribution of up to $272 million from the private partner.
Virginia Department of Transportation - Pocahontas Parkway Long Term Lease		Toll Concession	Nossaman assisted in negotiating and closing an asset transfer and refinancing of this project with Transurban LLC under a 99-year P3 concession agreement. The new $611 million financing paid back the original bonds and recouped for VDOT all its prior capital, operating, and maintenance expenses. In addition, VDOT was relieved of liability for future expenses. The transaction also included a commitment from Transurban to design, construct, operate, and maintain an approximately $50 million connector road to the Richmond Airport, using proceeds of a TIFIA refinancing. Nossaman assisted VDOT with all aspects of the transaction, including negotiation and preparation of the P3 concession agreement and related documentation, tax structuring to accommodate Transurban's tax position, TIFIA relations, and financial closing.
Washington State Department of Transportation – Tacoma Narrows Bridge.	$849 million	Pre-Development Agreement	Nossaman negotiated a comprehensive development agreement with a Bechtel affiliate for design, build, finance, operation, and maintenance (DBFOM) of a new toll bridge span over the South Puget Sound, as well as highway improvements at the approaches and seismic strengthening and reconfiguring of the existing bridge. Following execution of this agreement and legislative amendments shifting the financing from a PPP structure to public financing, Nossaman assisted WSDOT with negotiating the project design-build contract, the state's first such contract. The $849 million second Tacoma Narrows Bridge is the first major suspension bridge in the United States in thirty years. The new span opened on July 16, 2007.
British Columbia Ministry of Transportation	Construction costs (in millions, net present value)	Availability Payment Contract	Nossaman advised on a P3 procurement for a 25-year, CDN$600 million (US$510 million) design-build-finance-operate concession contract for highway improvements along the 62-mile Sea-to-Sky Highway, in anticipation of the 2010 Winter Olympics in Vancouver. Improvements

Client & Project	Dollar Size	P3 Type	Project Description
and Partnerships British Columbia - Sea-to-Sky Highway Improvement Project	$510		included highway widening and straightening, improved sightlines, additional passing lanes, and other design innovations and measures to reduce hazards, shorten travel times, and increase capacity. In 2005 the project won a National Award for Innovation and Excellence, Gold Award for Project Financing from the Canadian Council for P3s and in 2006 Public Private Finance named it Best Global Project to Reach Financial Close.
Golden Ears Bridge Project (Vancouver, British Columbia)	Cdn $1 billion	Availability Payment Contract	Yukiko Kajima, a partner on Nossaman's ODOT team, was a primary member of the team that advised the successful proponent in respect of the Cdn $1 billion Golden Ears Bridge Project in Vancouver, British Columbia, which won numerous awards, including North American PPP Deal of the Year from Project Finance and North American Deal of the Year from *PFI Magazine* (2006) and *Infrastructure Journal*'s Global Deal of the Year (2007). Ms. Kajima advised on financing for the project.

CREDENTIALS OF KEY ASSIGNED ATTORNEYS

Fred Kessler

Mr. Kessler is the leader of Nossaman's KABATA team and responsible for all Nossaman's services and advice to KABATA. Among his functions, Mr. Kessler focuses on the terms and drafting of the P3 agreement and related agreements for the transaction

Mr. Kessler has practiced law at Nossaman for his full 34 year legal career. He is a nationally recognized leader in the field of public-private partnerships and has been at the foundation of public sector P3 representation since P3s were first introduced in the U.S. in the early 1990s. Mr. Kessler is adept at structuring successful concessions and advising on the strategic business decisions behind them. He has pioneered the domestic application of international PPP best practices and has extensive experience with innovative procurement and project delivery methods, and negotiated agreements. His precedent setting transactional work for public agencies has been instrumental in the success of high profile P3 projects such as TxDOT's LBJ Express, North Tarrant Express and SH 130, Segments 5&6 projects, Caltrans' Presidio Parkway project, WSDOT's Tacoma Narrows Bridge and VDOT's Pocahontas Parkway.

Mr. Kessler frequently speaks and writes about PPPs at key industry conferences and in professional publications. He assisted Congressional staff with writing the TIFIA and tolling provisions of MAP-21. He served on a blue ribbon panel to develop national policy recommendations for transportation financing and is listed in *Chambers USA 2008* as one of the nation's top infrastructure attorneys.

Evan Caplicki

Mr. Caplicki is responsible for the procurement terms, instructions, forms, exhibits and procedures for KABATA, assisting Mr. Kessler with this essential function.

Mr. Caplicki focuses his practice on innovative contracting and finance for infrastructure project development. His experience spans the project development process, from advising regarding project delivery options, through procurement and contracting, to contract administration and claims resolution. His 15 years of experience as both transactional and litigation counsel for the myriad parties involved in the process provides a strong platform for structuring projects to meets the client's needs.

Representative P3 work includes the Presidio Parkway P3 project, TxDOT's LBJ Express project, and Indiana Finance Authority's East End Crossing.

REQUEST FOR PROPOSALS
TO DESIGN, CONSTRUCT, FINANCE, OPERATE AND MAINTAIN

THE KNIK ARM CROSSING

THROUGH A PUBLIC-PRIVATE AGREEMENT

VOLUME I
INSTRUCTIONS TO PROPOSERS

A PROJECT OF THE

KNIK ARM BRIDGE AND TOLL AUTHORITY

INDUSTRY REVIEW DRAFT ISSUED DECEMBER 9, 2011

Knik Arm Bridge and Toll Authority
820 E. 15th Avenue
Anchorage, AK 99501

CERTAIN KEY DATES

EVENT	**DATE**
Issue Final Request for Proposals	_____, 2012 [Release Date (RD)]
Proposal Due Date	_____, 2012 [RD + 150 days]
Anticipated Date of Agreement Award, Execution and Delivery (unless extended pursuant to Section 1.6.3)	_____, 2012 [RD + 285 days]

TABLE OF CONTENTS

EXHIBITS

FORMS

PUBLIC-PRIVATE AGREEMENT

KNIK ARM CROSSING

Between

Knik Arm Bridge and Toll Authority

and

_____

Dated _____, 2013

TABLE OF CONTENTS

LIST OF EXHIBITS

Knik Arm Bridge and Toll Authority
Knik Arm Crossing

April 4, 2012
Industry Review Draft
Technical Provisions

This draft of the Technical Provisions remains subject to legal review and revisions for coordination of its provisions and terminology with the Agreement. Proposers are reminded to consult Section 1.2 of the Agreement for order of precedence.

TABLE OF CONTENTS

List of Tables

Appendices

KNIK ARM CROSSING

FINAL

Land Use and Transportation Forecasting

Appendix I:

FINAL

Transportation Planning Model Technical Report

AGREEMENT NO: P 42070
FEDERAL PROJECT NO: ACSTP-0001(277)
AKSAS PROJECT NO: 56047

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March 2006

Table of Contents

List of Tables

List of Figures

1.0 INTRODUCTION

A base year project travel demand model was developed to evaluate the traffic impacts anticipated with the proposed Knik Arm bridge which would provide improved access between Anchorage and the Port McKenzie area of the Matanuska-Susitna Borough (Mat-Su). Development of a regional model was required because neither the Anchorage Metropolitan Area Transportation Solutions (AMATS) nor the Mat-Su travel demand models can address regional travel that crosses jurisdictions. The AMATS and Mat-Su models were developed as part of their respective Long Range Transportation Plans (LRTP) and are specific to their jurisdictional boundaries and local needs.

The AMATS and Mat-Su planning models are adjacent to one another with the Glenn Highway serving as an external roadway between each of them. Modeling of an external roadway for a base year travel demand model is typically based on traffic counts. Future traffic forecasts on external roadways are typically based on a larger regional model or factored up by historical and/or assumed growth rates. A travel improvement that occurs between the models, such as the inclusion of a new Knik Arm crossing, cannot be regionally addressed in either of the localized models since there is no land use or travel behavioral interaction between them.

To accurately reflect the regional travel interaction between the local jurisdictions, a regional travel demand model was developed. The Knik Arm Crossing (KAC) project travel demand model was developed by utilizing information from both the AMATS and Mat-Su models to ensure consistency between them. The following documents the development process and validation of the base year project travel demand model, and summarizes the modeling completed for the project.

2.0 PROJECT TRAFFIC MODEL

The Knik Arm project traffic model was developed with the most recent available version of the TransCAD travel demand software (version 4.7) which was used to pull together the travel demand models of AMATS and the Mat-Su. The AMATS model was developed with the TransCAD software and the Mat-Su model utilizes the Quick Response System II (QRSII) software.

The AMATS travel model base year is 2002 and the base year travel model for the Mat-Su is year 2000. Since the base years were relatively close together in time and a considerable amount of data gathering had been recently completed for each of their respective model updates, the KAC project model utilized and combined the available information from each of these two models. This information included roadway functional classification, number of lanes, speeds, traffic counts, etc.

At the initial onset of the KAC project travel model development, both the AMATS and Mat--Su travel models were in the final stages of being developed and updated as part of their respective

LRTPs. Both regional agencies provided their current available base year models to the KAC team as part of assisting in developing a KAC project model.

3.0 KNIK ARM CROSSING PROJECT MODELING PROCESS

The KAC project model is a representation of the Anchorage and Mat-Su area's transportation facilities and travel patterns of trips using these facilities. The project traffic model contains inventories of the existing roadway facilities and socioeconomic variables by traffic analysis zones (TAZs) which were input from the two local travel models. Because the AMATS model was more robust, and TransCAD software has greater analysis capabilities, information from the Mat-Su model was converted to TransCAD. In addition, information on base year employment and housing in the Mat-Su was supplemented with more current data, and corrections to some roadway network attributes were made by KAC team members.

Generally, the model process consists of several steps including deriving the daily number of person trips by TAZ, distribution of trips between these TAZs, conversion of person trips to vehicle trips, and finally assignment of trips to the model roadway network. The model is then calibrated and validated to traffic counts within acceptable ranges of error. Once the model is validated, future traffic forecasts can then be performed. The modeling process includes the following components:

- Roadway Network
- Socioeconomic Data
- Trip Generation and Distribution
- Base Year Traffic Assignment and Validation

A description of the modeling items is described below.

4.0 ROADWAY NETWORK

The roadway network in the project model was developed by joining each of the AMATS and Mat-Su roadway networks. Roadway link attributes from each of the local models, which had just recently been updated by the local jurisdictions, were incorporated in the KAC project model. **Attachment 1** illustrates the base year model road network. Primary link attributes that were populated in the roadway network database are shown in **Table 1**. These link attributes were imported directly from the two local models.

Table 1. KAC Model Roadway Link Attributes

TransCAD Link Field Name	Description
FunClass_K	1 = Freeway 2 = Expressway 3 = Major Arterial 4 = Minor Arterial 5 = Collector 6 = Local 7 = On-Ramp 8 = Off-Ramp 9 = Centroid Connectors 10 = Frontage Roads 11 = Unpaved Roads
AreaType_K	1 = Central Business District (CBD) 2 = Commercial/Industrial 3 = Fringe 4 = Rural 5 = Limited Direct Access 6 = No Direct Access 8 = Residential 9 = Centroid Connector
Speed_K	Free Flow Speed (mph)
Lanes_K	Total Number of Lanes
Median_K	0 = No Median?? 1 = Median??
LaneCap_K	Lane Capacity (see Table 2)
_Capacity_K	Directional Capacity
Alpha	Volume Delay Coefficient
Beta	Volume Delay Coefficient
_Time	Directional Travel Time
_Count	2000/2002 24-Hour Counts

4.1 Link Capacity

Link capacity is expressed in terms of vehicles per day by direction for each link. The link capacities used in the KAC project model were based on the AMATS model for consistency. **Table 2** represents the roadway link capacities used for the project model. Link capacities are used in the model to gauge the relative congestion on roadway links for assigning trips and in the volume to capacity analysis used in the analysis.

Table 2. KAC Model Daily Lane Capacities

Roadway Classification Number	Facility Type	Area Type (Number)										
		CBD(1)		Comm/ Industrial(2)		Fringe(3)		Rural(4)		Limited Direct Access(5)	No Direct Access (6)	Residential(8)
		No Median	Median	No Median	Median	No Median	Median	No Median	Median			
1	Freeway	-	-	-	-	-	-	-	-	-	19,500	-
2	Expressway	-	-	-	-	-	-	-	-	15,000	-	-
3	Major Arterial	8,300	9,200	8,300	9,200	8,300	9,200	7,400	9,200	-	-	-
4	Minor Arterial	7,500	8,300	7,500	8,300	7,500	8,300	6,200	8,300	-	-	-
5	Collector	6,500	-	6,500	-	6,500	-	5,000	-	-	-	5,000
6	Local	5,500	-	5,500	-	5,500	-	5,500	-	-	-	5,000
7,8	On/Off-Ramp	-	-	-	-	-	-	-	-	-	12,000	-
10	Frontage Road	9,000	-	9,000	-	9,000	-	9,000	-	-	-	-
11	Unpaved	-	-	-	-	-	-	-	500	-	-	-

4.2 Turn Restrictions

As part of the travel modeling, turn restrictions and penalties are typically coded into the model to prevent illogical (or illegal/impossible) movement of traffic in the modeled network network (e.g. U-turns from a freeway on ramp). Turn restrictions were applied at locations where turn movements are physically restricted (barrier median) or not allowed. Within the Knik Arm model, turn restrictions were applied at interchange locations where left turns are not allowed. In locations where one-way roads are coded in the model, TransCAD automatically prohibits travel in the wrong direction. Additionally, TransCAD does not permit through movement of traffic through a zone centroid, therefore, turn prohibitions were not required for those cases.

5.0 SOCIOECONOMIC DATA

5.1 TAZ Structure

Traffic analysis zones (TAZ) were developed based on the zones developed for the AMATS and Mat-Su modeling efforts. The zone structures were retained to provide consistency for the base and future year traffic forecasts year between the KAC model and the local models.

For the AMATS model area, the original TAZ structure was retained, however, several of the zones were combined, particularly south of the Glenn Highway. In the Mat-Su area, the KAC TAZ structure was expanded southwest to include the Point MacKenzie area to capture and model the anticipated indirect affects area for growth, as well being expanded to the north along

Glenn Highway to capture new development occurring that direction. **Attachment 2** illustrates the traffic analysis zones used for the KAC.

5.2 Socioeconomic Data

The socioeconomic data for the AMATS model area within the KAC model was used after the trip generation process. That is, trip generation was performed with the AMATS model and the resultant trips were incorporated in the KAC model. The AMATS model utilizes a very detailed trip generation process that comprises 20 land use and demographic classifications, 24 special generators (including externals), four cross-classification methods, and eight different trip purposes. Rather than create a more generalized trip generation process for the KAC model in the Anchorage area (and risk loosing some of the robustness of the Anchorage model), the trip generation process was utilized from the AMATS model. Trip generation was run with the AMATS model and the resultant "Production and Attraction" trips were used as an input in the KAC model. This not only provides consistency, but also retained the more detailed trip generation process in the Anchorage area.

The AMATS trips were then aggregated to the KAC zone structure and also to the five (5) trip purposes as described below.

The socioeconomic data in the Mat-Su was retained from their previous modeling efforts. The MSB data included data from the following data by TAZ:

- Households
- Household Income
- Retail Employment
- Non-Retail Employment

The Mat-Su socioeconomic data was reviewed and updated. Additionally, data was collected by the above categories for the new TAZs developed in the Point MacKenzie area and north of Palmer.

5.3 Trip Generation and Distribution

Trip generation outside of the AMATS area for the KAC model was determined by using cross classification of the number of households by household income similarly to the process used by the Mat-Su model. Trip rates were initially used from local modeling efforts and adjusted to reflect improved validation of traffic assignments.

5.4 Trip Purposes

The previous Mat-Su modeling was based on three trip purposes which were retained for the KAC model. For the AMATS area, the previous model's trip purposes were aggregated to the following purposes:

- HBW (Home-Based Work)
- HBO (Home-Based Other)
- NHB (Non-Home Based)

- SINGLE (Single-Unit Trucks)
- COMBI (Combination Trucks)

Table 3 lists the trip rates used in the KAC model in the Mat-Su area by trip purpose. As mentioned earlier, trip generation for the Anchorage area in the KAC model utilized the AMATS model.

Table 3. Production Trip Generation Rates

Trip Purpose	Total Trips	Percent Trips	Average Trip Length (minutes)
Home-Based Work	45,163	21.2%	10.89
Home-Based Other	127,560	50.0%	8.87
Non-Home Based	73,354	28.8%	7.43

As noted in the AMATS area, the commercial truck generation was retained. However, modeling commercial truck activity was not applied in the Mat-Su area. For the KAC model, the commercial truck model was developed utilizing the methodology from the *The Quick Response Freight Manual*, September 1996, Federal Highway Administration. The Federal Highway Administration (FHWA) vehicle classification standards for Classes 5-7 were used for Single-Unit Trucks and Classes 8-13 for Combination Trucks, as similarly used in the AMATS model. Trip generation rates for trucks in the KAC model were used from the *QRFM* methodology. **Table 4** presents the final truck generation rates used in the KAC model.

Table 4. Truck Trip Generation Rates

Trip Purpose	Households	Retail Employees	Non-Retail Employees
Single-Unit Trucks	0.099	0.253	0.143
Combination Trucks	0.038	0.065	0.036

Source: *The Quick Response Freight Manual*, September 1996, Federal Highway Administration

To estimate truck traffic in the Port MacKenzie TAZs (anticipated to have an especially high number of truck trips), the study team based the estimates on truck traffic estimates available for the AMATS model from the industrial area of central Anchorage (between Old Seward Highway, Minnesota Drive, Diamond Blvd, and International Airport Road. This area has heavy industrial land uses, and is characterized by truck traffic serving gravel distribution, businesses, and warehousing. The study team assumed that Port MacKenzie would have a similar mix of land uses and truck trip generation/traffic. This AMATS truck information was evaluated against employment estimates for Port MacKenzie, port related trip generations rates from the Institute of Transportation Engineers and the Port of Anchorage truck generation rates to identify truck generation rates for Port MacKenzie.

The Port MacKenzie TAZ is estimated to have 14.2% of the trips as truck trips, with 12% on the KAC. **Figure 1** shows a screen capture from the traffic model showing the truck trip percentages in the modeled network in the vicinity of the crossing. Overall, about seven percent of the trips in the modeled network are truck trips

Figure 1: Modeled Truck Traffic as a Percent of ADT

5.5 Trip Distribution

With the above trip generation, the number of trips generated by each TAZ is then distributed between all zones. Trip distribution is the process that links the productions (households) to attractions (employment) for each zonal pair. It is these trip demands that must be accommodated by the transportation system, and which are modeled on the roadway network.

The trip distribution process utilizes a gravity (the most common trip distribution model) model to define the trip interchanges between zones. Trips are distributed by each of the five trip purposes. A summary of trips by purpose and average trip length from the model is shown in **Table 5**.

Table 5. Vehicle Trip Summary

Trip Purpose	Total Trips	Percent Trips	Average Trip Length (minutes)
Home-Based Work	176,006	20.7%	17.47
Home-Based Other	380,315	44.8%	7.87
Non-Home Based	238,998	28.1%	7.87
Single-Unit Trucks	39,121	4.6%	11.10
Combination Trucks	14,755	1.7%	13.80

6.0 BASE YEAR TRAFFIC ASSIGNMENT AND VALIDATION

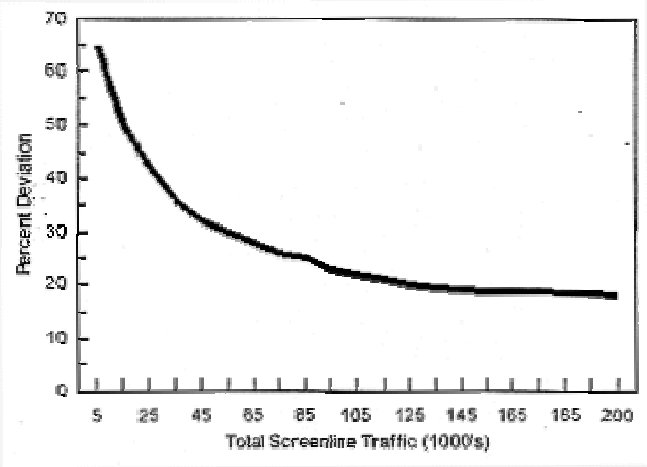
The transportation model was calibrated and validated to existing conditions against recent traffic counts from published DOT&PF and Anchorage and Mat-Su traffic data. The estimated model traffic volumes were compared against the ground counts to ensure the model's ability to reasonably replicate existing traffic conditions. The model validation includes several performance measures and established guidelines for allowable errors that include screenlines, percent assignment error, and root mean square error (RMSE).

6.1 Screenline Analysis

Screenlines or cordon lines are lines that cross a number of network links and are used to evaluate major trip movements across the roadway network. Screenline analysis examines differences between existing traffic counts and the base year modeled assignment of trips to determine the overall accuracy of the model.

The NCHRP Report Number 255 cites acceptable levels of error based on screenlines and maximum desirable deviation. **Figure 2** graphically presents this percent deviation. As can be seen, the deviation is higher on low volume roads where a large percentage of deviation will not have major traffic implications. Conversely, for higher volume facilities a smaller deviation of modeled levels to actual counts is required.

Figure 2: Maximum Desirable Deviation in Total Screenline Volume



Source: NCHRP Report #255 p.41 (cited in *Calibration and Adjustment of System Planning Models*, 1990, FHWA)

For the KAC model, 21 screenlines were created. **Attachment 3** illustrates the screenline locations. **Table 6** reports the screenline results and shows that all of the screenlines are within the FHWA guidelines.

Table 6. Screenline Analysis Summary

Screenline Number	Traffic Count	Model Volume	% Difference	FHWA Allowable % Deviation
1	58,545	56,875	-3%	21%
2	67,884	59,257	-13%	19%
3	76,552	76,832	0%	16%
4	175,621	169,606	-3%	15%
5	107,633	98,444	-9%	15%
6	147,310	141,628	-4%	15%
7	116,211	118,686	2%	15%
8	201,117	192,848	-4%	15%
9	19,390	19,760	2%	37%
10	25,363	28,802	14%	28%
11	195,504	211,765	8%	15%
12	229,440	212,444	-7%	15%
13	95,233	92,500	-3%	15%
14	34,768	29,967	-14%	25%
15	26,989	26,943	0%	28%
16	16,358	18,058	10%	37%
17	17,870	22,123	24%	37%
18	23,846	27,537	15%	28%
19	35,358	39,685	12%	25%
20	32,602	30,194	-7%	25%
21	15,500	15,728	1%	37%
Total	1,719,094	1,689,682	-1.7%	

6.2 Performance Measures

The Federal Highway Administration (FHWA) report *Calibration and Adjustment of System Planning Models*, 1990, was relied upon establishing acceptable error limits in the KAC model. The FHWA acceptable error limits for daily volumes by facility type (modeled volumes verses actual volumes) are shown in **Table 7**.

Table 7. Percent Error Difference for Daily Traffic Volumes by Facility Type

Facility Type	FHWA Acceptable Error Limits
Freeway	± 7%
Major Arterial	± 10%
Minor Arterial	± 15%
Collector	± 25%

Source: *Calibration and Adjustment of System Planning Models, 1990, FHWA*

Table 8 shows the acceptable error and actual error for actual traffic counts versus model assignment of trips for the different facility types. Although the KAC model comprises slightly different facility types than shown in **Table 8**, the KAC classifications were regrouped to provide a comparison to the FHWA error limits. Based on this table, the travel demand model is within the FWHA acceptable error limits for facility types.

Table 8. Acceptable Error Versus Actual Error

Facility Type	FHWA Acceptable Error Limits	Actual Error
Freeway	± 7%	-1%
Major Arterial	± 10%	-10%
Minor Arterial	± 15%	-11%
Collector	± 25%	-17%
Overall	N/A	-10%

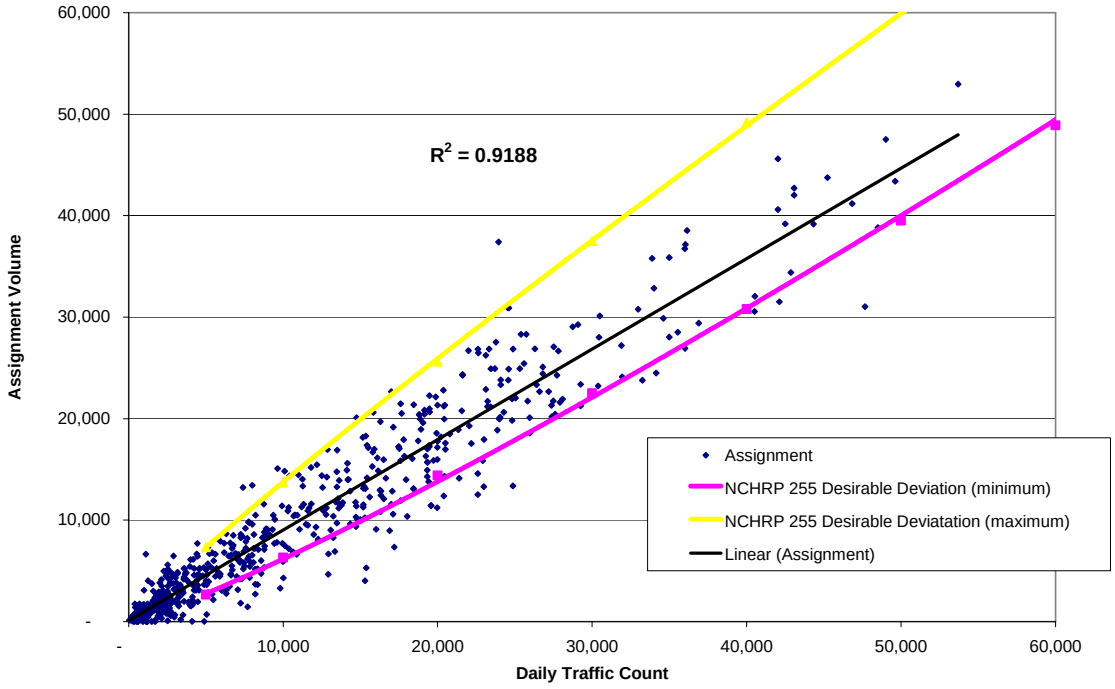
Another useful performance measure for gauging the validity of a traffic model is the Root Mean Square Error (RMSE). The RMSE measures the deviation between the actual traffic counts and modeled traffic assignments. Although there are no modeling guidelines for this measure, good practice includes calibrating and validating a model with a RMSE of 35% or lower. The overall RMSE by facility type is shown in **Table 9**. The overall RMSE for the KAC model is approximately 29%, which is considerably lower than the commonly accepted practice of 35% and is reflective of how well the model is validated.

Table 9. Percent Root Mean Square Error

Facility Type	Percent RMSE
Freeway	10.4%
Major Arterial	22.8%
Minor Arterial	34.8%
Collector	54.6%
Overall	28.6%

Another performance measure for model accuracy is the coefficient of deviation or R^2. This measure compares the overall linear regression between the actual traffic counts and model assignment volumes. Federal guidelines indicate that the R^2 value be 0.88 or higher. The **Figure 3** scattergram illustrates the traffic counts versus model assignment in addition to the FHWA desirable deviation curves based on **Figure 2**. The R^2 for the KAC model is 0.92 which exceeds the federal guidelines.

Figure 3: Model Assignment vs. Traffic Counts



Based on the above statistical measures, the model was considered to be validated and future traffic forecasts were developed. **Attachment 4** shows the base year traffic volumes and volume over capacity ratios.

7.0 FUTURE YEAR TRAFFIC FORECASTS

Next, traffic forecasts were developed using the validated base year KAC travel model. There are two primary components used in the travel demand model to develop forecast traffic volumes 1) programmed and planned roadway improvements and 2) socioeconomic forecasts distributed by TAZ. The following methodology describes the process used to derive the traffic forecasts and for testing various Knik Arm crossing improvements.

Two forecast horizon years were developed; 2025 and 2030. The 2025 forecast was created because both the Mat-Su and AMATS current LRTP's are based on this horizon year. This allowed testing of the KAC project alternatives with the other planned improvements which had already been forecast as being needed for the two respective LRTPs. For the KAC study, a 2030 horizon year was required as part of the EIS (20 years past the anticipated opening date of 2010).

7.1 Roadway Network Forecasts

The KAC modeled roadway network was updated to reflect planned and programmed roadway improvements based on available information from each of the local jurisdiction's proposed

2025 LRTP's. The KAC base model was similarly updated to reflect these planned improvements including new roadway facilities, upgraded roadway classifications, and also roadway widening with additional lanes based on the LRTPs.

Because no long range roadway plans are in place beyond 2025, the 2025 planned roadway networks for each jurisdiction were relied upon for the 2030 forecasts. However, the socioeconomic conditions reflect an additional 5-year growth period from 2025 to 2030 beyond what the networks are currently planned to accommodate by the local governments.

7.2 Socioeconomic Forecasts

ISER forecasts of population and employment were relied upon for regional control totals in developing the future TAZ socioeconomic data. See the Scenario Development Technical Report (NEI 2005) and the population and employment forecasts prepared for the project (ISER 2005 – Appendix G) for more details. Two separate forecasts were developed for each horizon year (one with a KAC crossing and one without a KAC crossing). A 'with' and 'without' Knik Arm crossing were derived since the accessibility between the Point McKenzie, Mat-Su, and Anchorage would influence shifts in land use growth patterns and population, and consequently travel patterns and volumes.

Utilizing the ISER regional forecasts, the regional population and employment forecasts were allocated into the TAZs. See the *Constraint Mapping Methodology (Appendix D) and the Knik Arm Land Use Allocation Procedures Memorandum, and Memorandum, Documentation of Mat-Su Land Use Estimation Process (Appendix H)*.

7.3 Traffic Forecasts

After the 2025 and 2030 distribution of housing and employment were input into the TAZ structure of the KAC project model and the 2025 planned roadway networks were added, the various KAC project corridors and alternatives which were under consideration were incorporated to produce forecasts for both 2025 and 2030. The project forecasts were used to evaluate logical termini, define project design needs (e.g. numbers of lanes, ramps, etc.), and evaluate the performance of the options under consideration for reasonableness. This section describes the modeling evaluation process for the No Action and the build alternatives under consideration.

7.3.1 KAC No Action Alternative

The 2030 No Action alternative was developed using the 2025 LRTP networks from each local jurisdiction with traffic based on 2030 socioeconomic projections without the crossing, **Figure 4 and Figure 5**.

Because a Knik Arm Ferry is programmed to be operational in 2007 and the Borough indicates a second ferry is likely to operational within the 2030 time horizon, a Knik Ferry was incorporated into the KAC model for the forecasted No Action alternative. To replicate the ferry crossing, a link was incorporated into the travel model with a travel time of 30 minutes to reflect the ferry crossing time estimated by the Mat-Su. The demand on that crossing was calibrated to reflect the planned capacity of the Borough's two-boat system (approximately 25-30 vehicles per ferry).

7.3.2 KAC Build Scenarios

The 2030 build forecasts were developed using the 2025 LRTP networks from each local jurisdiction with traffic based on 2030 socioeconomic projections with a crossing.

Mat-Su Approach

Logical Termini and Engineering Refinement. The KAC traffic model was first used to determine the logical termini of the project and then to help refine the engineering requirements to accommodate the anticipated 20 years of growth. To refine the termini of the project on the Mat-Su side of the crossing, the project was first modeled with no improvements to Point MacKenzie Road. From the modeling results it was evident that additional lanes were going to be needed and that the project would need to be extended beyond the boundary of Port MacKenzie.

Figures 4 and 5 show a screen clip from the model runs showing Point MacKenzie Road overcapacity (red roadway segments) when run through the model as a two-lane facility.

Figure 4:
Initial 2025 Travel Forecast

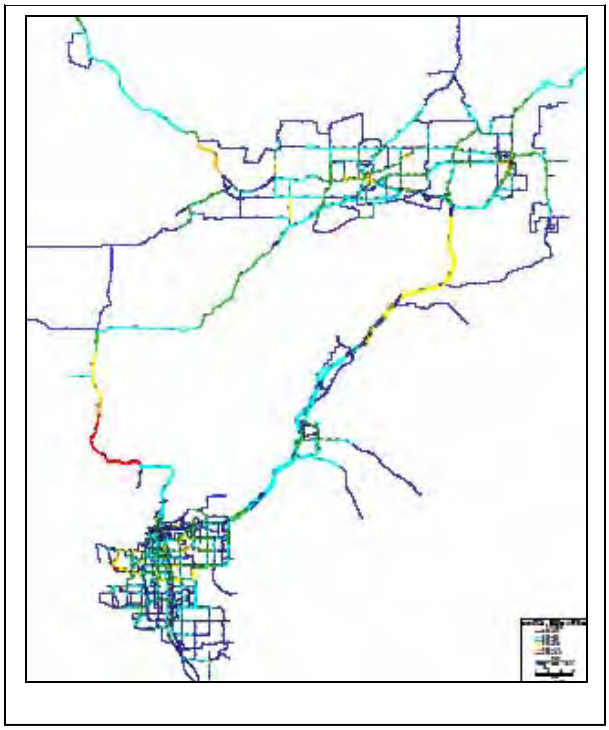
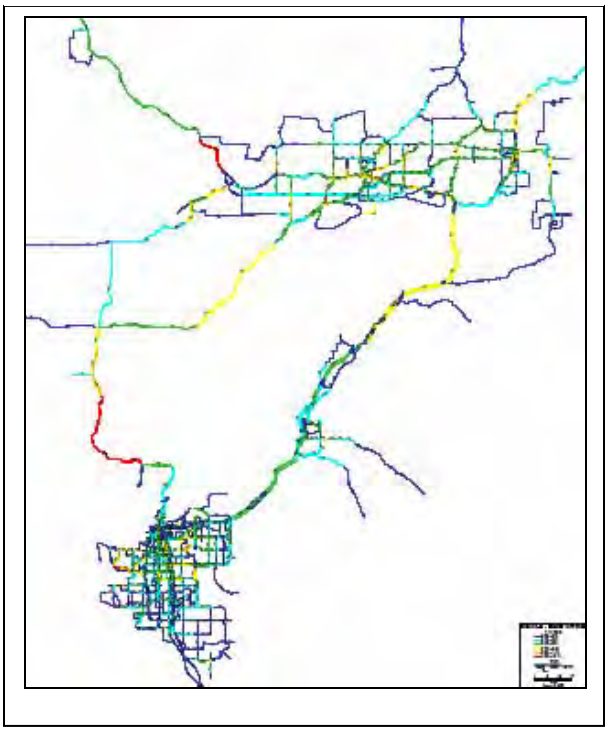


Figure 5:
Initial 2030 Travel Forecast

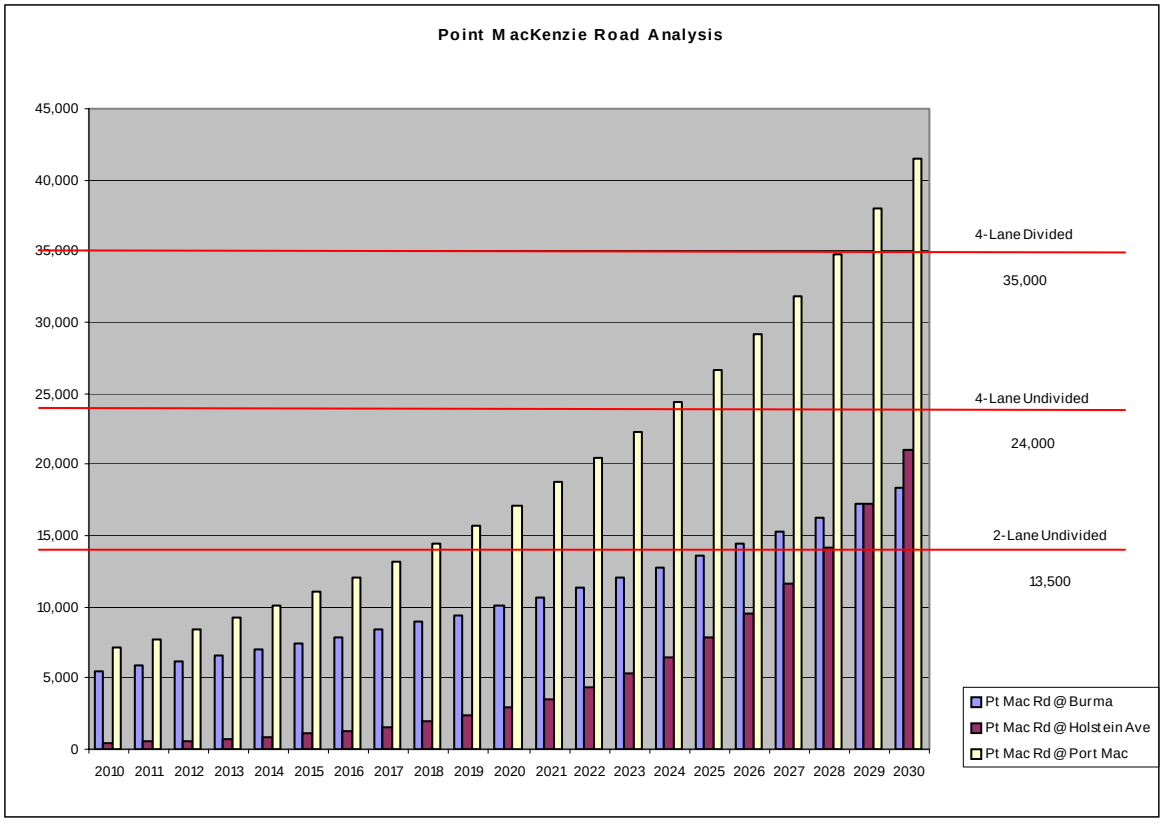


Essentially the capacity compared to the forecast volumes on Point MacKenzie Road would be insufficient by 2025 if only 2 lanes were provided. Due to the level of congestion along Point MacKenzie Road as 2-lane facility, KABATA decided to upgrade the roadway to 4 lanes as part of the project.

Moreover, Figure 5 indicates how far north along Point MacKenzie Road the congestion would be forecast to occur if the facility were to remain 2 lanes through 2030. It was, in part, this analysis that lead to the decision to plan the facility for four lanes and to move the termini of the project to the intersection of Point MacKenzie Road and Burma Road.

Figure 6 shows an analysis along Point MacKenzie Road assuming that growth occurs in an exponential manner. The red horizontal lines indicate planning-level roadway capacities of Point MacKenzie Road given various potential improvements. Forecast traffic levels at three locations along the road are plotted as bars; in the Port MacKenzie District (yellow), Holstein Avenue i.e. midway between the port and Burma Road (maroon), and at Burma Road (blue). Where the growth in traffic (bars) crosses the capacity levels, the anticipated year when the facility is forecast to have reached capacity can be determined. The graph indicates that a 4-lane undivided facility will have sufficient capacity for the entire project except within the Port District proper starting in about 2024 to 2025. At that time additional capacity may be required. Based on this analysis and consultation with the Mat-Su, KABATA agreed to plan for a divided roadway and frontage roads to fully accommodate the forecast in travel through the Port District.

Figure 6:
Point Mackenzie Road Capacity Analysis



Additionally, the KAC model was also tested with the incorporation of the "Willow Connector" to determine if that route would affect the corridor demand in a major way and also whether this route would alleviate the potential congestion forecast for Point MacKenzie Road. The "Willow Connector" was based on the Corridor 3 alignment from the *Matanuska Susitna Borough Rail Corridor Study*, June 2003, Tryck Nyman Hayes, Inc. This corridor traverses north-south from Port MacKenzie to the Parks Highway west of Willow. The resulting model forecasts of this route indicated low vehicular travel demand along this facility and in subsequent discussions with ADOT and the Mat-Su, it was determined that this road would not be anticipated to be funded within the 2030 horizon year of the KAC project, nor would it be included in the Mat-Su's LRTP. Therefore, the Willow Connector was not included as part of the KAC forecast model.

Anchorage Approaches

Initial Screening. Seven connection alternatives were modeled on the Anchorage side. These connections were initially coded in the KAC model based on general corridor alignment assumptions and were refined as additional engineering information and modeling results became available. Several of the corridors have minor alignment deviations (variants). Based on the limited sensitivity of the travel demand model to these relative minor variations in alignment, it was determined it was not necessary to model each one separately. For example, the model is not sensitive to whether the routing on the Anchorage approach occurs below the bluff or above the bluff, and these variants were therefore combined in the modeling process. Similarly, variants that traversed through Port MacKenzie and variants in the approaches to the A-C Viaduct were not modeled separately, but were modeled using a representative alignment.

The following seven initial connections were modeled on the Anchorage approach:

- A-C Connection
- Ingra-Gambell Connection
- Ingra-Gambell and A-C Connection
- Post Road Corridor
- Boniface Parkway Corridor
- Muldoon Road Corridor
- Hiland Road Corridor

Screening analysis information was generated out of the model for a variety of factors which had been identified from the purpose and need statement for the project. For more information on the screening process, development of factors, and alternatives see the Scoping Summary Report (KABATA 2005).

Attachment 5 shows the model runs of these initial corridors for 2030 and the measures of effectiveness that were generated from the model.

Logical Termini. Initial modeling was performed to help confirm the logical termini on the Anchorage Approach. KABATA initially proposed connecting to the A-C Street Viaduct (because it is part of the National Highway System). In advance of the model being ready, KABATA performed intersection analysis at the potential receiving intersection on the

Anchorage side of the project to identify whether there would be intersection capacity available. The analysis was performed to identify the threshold at which the intersections breakdown. By 2030, in the p.m. peak hour, connections to A-C alone will only accommodate 20,000 ADT on the Knik Arm Crossing, assuming no other improvements to the street network. A-C intersections have capacity for up to 35,000 vehicles by adding some turn pockets. The Ingra/Gambell Extension, begins to fail in 2010 with only 10,000 ADT on the Knik Arm Crossing.

After the traffic model was ready, it was run to determine whether that roadway system had sufficient capacity to accommodate the demand forecast out to 2030. **Figure 7** shows a screen clip from the model run showing that the A-C viaduct would be overcapacity (red roadway segments) when run through the model with no additional improvements. Essentially the capacity compared to the forecast volumes would be insufficient if no improvements were provided. Due to the forecast level of congestion on the A-C Viaduct, KABATA decided to include a connection to Gambell and Ingra Streets as part of the project.

Figure 7:
Initial Travel Forecast: A-C Viaduct Analysis

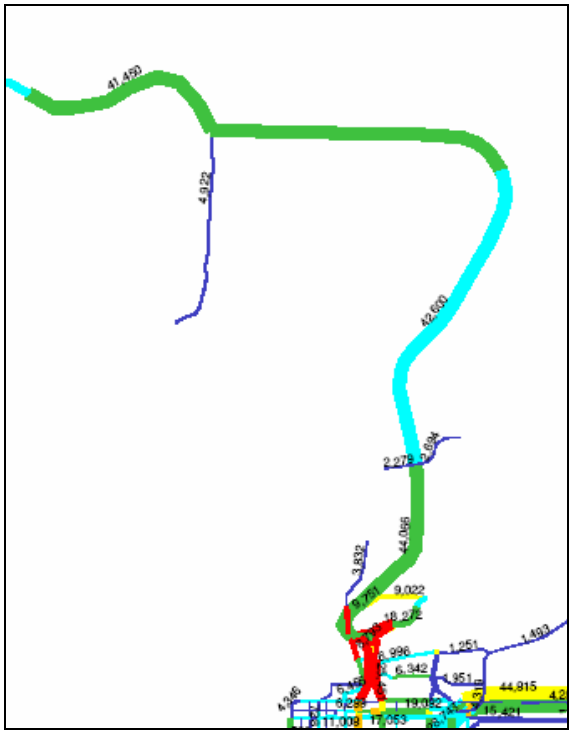
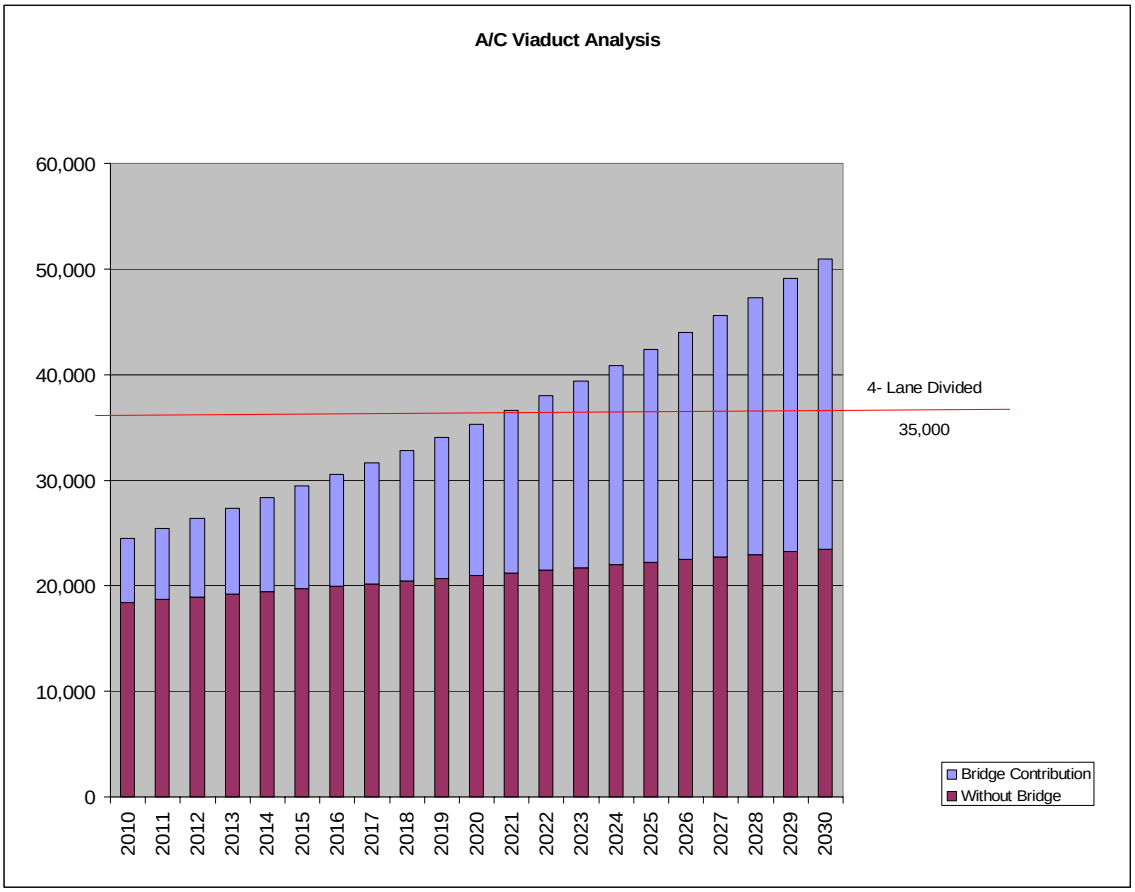


Figure 8 shows an analysis of the anticipated timing of when such an improvement would be needed assuming an exponential growth of traffic on the A-C Viaduct. The red horizontal line indicates a planning-level roadway capacity of the A-C Viaduct (which is a 4-lane divided roadway). Forecast traffic levels are plotted as bars; with the viaduct's background traffic plotted in maroon and the contribution of the KAC project added to that traffic in blue. Where the growth in traffic (bars) crosses the red capacity line, the anticipated year when the facility is forecast to have reached capacity can be determined. The graph indicates that a 4-lane divided viaduct will have sufficient capacity though the year 2021—at that time additional capacity would be required. Based on this analysis and consultation with AMATS and the MOA, KABATA agreed to include an ultimate connection across a viaduct to Gambell and Ingra Streets in the EIS.

Figure 8:
A-C Viaduct Capacity Analysis



7.3.3 Reasonable Alternatives Forecasts

After the logical termini were determined and engineering refinement was completed on the alternatives that were selected for detailed analysis in the EIS final model runs were developed[1]. The model runs of the engineered, reasonable alternatives included more detail on ramping and intersection configuration and the final lane configurations and connections. These model runs were used in analysis of noise impacts, air quality impacts, traffic analysis, and other impact analyses in the EIS. The alternatives of the reasonable alternatives are presented in **Attachments 6 and 7** for the alternatives carried forward for the years 2025 and 2030, respectively.

[1] It should be noted that these subsequent model runs slightly changed the forecasts between what is shown in Figures 7 and 8 and the forecast ultimately depicted in the EIS. The reason for this is that as engineering decisions were added to subsequent model runs (lanes added, speed limits changed, etc) demand predicted through the model also changed, The changes may affect the timing of when additional capacity improvements might be needed, but not the overall capacity required to have an efficiently operating roadway system.

Conceptual Differences Between Mat-Su* & CDM Smith Population & Employment Estimates As Interpreted by Western Demographics, Inc.*** - 4/30/12**

Mat-Su Pop / Employment Estimates	CDM Smith Pop / Employment Estimates
Purpose - To Plan and Time Capital Improvments Focusing on Roads Throughout the Mat-Su Borough	Purpose - To Estimate Bridge Toll Revenue from Crossings
Local Micro Economic Model	Regional Macro Economic Model
Traditional Job Growth Model Linked to Local Conditions	Regional Model Based on Anchorage / Mat-Su Regional Statistical Area (RSA) Environment
Verified with Local Information from Business People, Realtors, Bankers, Land Use and Transporation Planners. Borough Ordinances and Community Plans	Derrived from Expected Spill-over of Anchorage Growth Expectations Given Housing Cost Differential and Housing and Industrial Land Shortages in Anchorage
Reconciles to 2035 ISER Over-all Mat-Su Growth Control Totals	Reconciles to 2035 ISER Control Totals with Growth Emphasis on Southwest Quadrant
Density Basis - Mat-Su Borough	Density Basis - Anchorage
Nominal Domestic Water and Sewer Availability in KGB Corridor. Esimates Based on On-site Well / Septic and Small-scale Utility Districts Similar to Settler's Bay	Assumes Domestic Water and Sewer Availability Will Develop to Suit Prescribed Density
Smaller Amounts of Residential in KGB Corridor	Larger Amount of Residential in KGB Corridor
Smaller Population and Employment in Port MacKenzie	Larger Population and Employment in Port MacKenzie
Smaller Population and Employment in Greater Port MacKenzie	Larger Population and Employment in Greater Port MacKenzie
Limited Retail in Port District	Larger-scale Retail in Port District - Estimates Predated Port Plan and Regulations
Limited Office Land Use to Serve Local Industrial Concerns	More Extensive Office Land Uses
Less Extensive and Longer-Term Upgrades to KGB and PMR (Point MacKenzie Road) Proposed	More Extensive and Shorter-Term Upgrades to KGB and PMR (Point MacKenzie Road) Potentially Necessary
Linkage of PMR to North Assumed to be Burma Rd. North Big Lake Rd.	Linkage of PMR to North Undefined
*Mat-Su * - Mat-Su traffic model estimates predominantly developed and refined by Mat-Su Traffic Modeling Consultant - HDR, Inc.*	
*CDM Smith ** - Formerly Wilbur Smith and Associates (WSA) - Estimates developed for KABATA*	
*Western Demographics, Inc.*** - Mat-Su Borough Build-out and Demographic Consultant (WDI)*	
WDI Interviewed most parties involved in the development of the two estimates during April of 2012 and observed the listed conceptual differences.	

CDM Smith
900 Chapel Street, Suite 1400
New Haven, CT 06510
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fax: 203 624-0484

February 15, 2013

CONFIDENTIAL

Mr. Michael L. Foster, P.E.
Chairman of the Board
Knik Arm Bridge and Toll Authority
820 East 15th Avenue
Anchorage, Alaska 99501

Subject: Response to the Independent Review of Traffic and Toll Revenue Projections by Timothy James & Associates

Dear Mr. Foster:

Thank you for the opportunity to help respond to the confidential draft management letter summarizing the legislative audit's preliminary findings. This management letter was directed to you from Ms. Danna Moser, CPA, of the Legislative Budget and Audit Committee, Division of Legislative Audit, dated February 1, 2013. Our response is to the report titled "The Knik Arm Crossing: An Independent Review of Traffic and Toll Revenue Projections," prepared by Timothy James & Associates, dated December 21, 2012, and included in the letter as Attachment D.

Many of the issues contained in this independent review pertain to the assumptions that CDM Smith used to prepare the traffic and toll revenue estimates. Some of the issues raised are centered on our assumptions and inputs to the travel demand model. We hope to clarify the reasons behind the assumptions we made and to demonstrate the reasonableness and conservative nature of our assumptions and approach. Toward that end, while we have many technical and nontechnical comments and reactions to this independent review, we will limit our responses to the "suggested clarifications" and "recommendations" presented in the concluding section. We first present the comments directly from the independent review in italics, followed by our response.

Suggested Clarifications from Timothy James & Associates

- *The high dependence of the traffic and toll revenue projections on strong economic development and population growth in the Point MacKenzie area, north of it, and to the south and west of Wasilla and Houston.*

  The traffic and toll revenue estimates associated with the Knik Arm Crossing (KAC) are by design highly dependent on socio-economic conditions in the Point MacKenzie area. This area is expected to experience a growth spurt once the KAC opens to traffic.

The KAC will connect the Municipality of Anchorage and Matanuska-Susitna (Mat-Su) Borough at Point MacKenzie. Lower Mat-Su Borough is essentially an undeveloped "greenfield," that will grow rapidly as a consequence of the KAC. Travel between the two areas, within eyesight of each other, currently requires up to a 90 mile trip by road around the Knik Arm of the Upper Cook Inlet. Construction of the KAC will significantly reduce travel times and have a major impact on socio-economic development in lower Mat-Su Borough and Point MacKenzie in particular. This area will be transformed from largely open land into a much more developed area with residential, commercial, industrial and retail activity. There are already a number of on-going and planned developments (including the Port, the rail link and correctional center) anticipating the KAC opening. Over time, land development will be reoriented from the recent historic pattern along the upper west side of the Knik Arm of Cook Inlet in the Knik-Fairview area to Mat-Su Borough near the KAC. The opening of the KAC will help resolve the shortage of industrial and residential land in the Anchorage bowl.

The influence of the KAC on land development patterns has been recognized since project inception. Transportation planners have prepared land development plans with and without the KAC. In 2007, CDM Smith employed the services of an independent economist, Insight Research Corporation, to prepare forecasts of development. Their work was based on earlier studies performed by Northern Economics and the Institute of Social and Economic Research (ISER) at the University of Alaska. The chief economist for Insight Research Corporation visited Anchorage and interviewed local decision makers, planning directors and real estate experts. This research was an important part of our study. In 2011, CDM Smith updated the results to reflect more recent information on population and employment. In addition to those traveling to the lower Mat-Su Borough, the KAC will also serve through trips and act as a reliever for congested roads on the other side of the Inlet, specifically the Glenn Highway.

- *The disparity between average annual growth rate in the base 2012 memorandum projections post-2020 [after the "ramp-up" period has ended] (5.0%) and the average growth rate in AADT 2001-2011 for Glenn Highway at Eklutna Flats is (1.93%).*

In order to clarify this point, Table 1 shows historical traffic counts on Glenn Highway at Eklutna Flats and traffic forecasts for the KAC. The average annual percent change (AAPC) between 2001 and 2011 is 2.5%; not 1.93%. Also, since this time period includes the effects of the Great Recession, the average annual growth rate between 2001 and 2007 was 3.6% per year. This is perhaps more representative of the period.

Typically traffic volumes on start-up facilities grow faster than traffic volumes on more mature, established roadways. This is almost always true in percentage terms, since the volumes are low to start and the same amount of growth will be a higher percent. This is frequently true in absolute terms, since it takes time for the advantages of a new toll road to be realized (referred to as the "ramp-up" period) and it takes even longer time for people to

adjust their location patterns in response to the new transportation facility. The KAC will serve as an alternative route for some traffic currently using the Glenn Highway. It will also serve a rapidly growing share of traffic between Anchorage and lower Mat-Su Borough.

Table 1
Average Daily Traffic
at Glenn Highway and Proposed Knik Arm Crossing

	KAC		Glenn Highway		Screen Line		
Year	Traffic	Increase	Traffic	Increase	Total	AAPC	KAC Share
Traffic Counts							
2001			23,079		23,079		
2002			24,600		24,600	6.6	
2003			25,782		25,782	4.8	
2004			26,249		26,249	1.8	
2005			27,028		27,028	3.0	
2006			27,570		27,570	2.0	
2007			28,506		28,506	3.4	
2008			27,454		27,454	-3.7	
2009			28,495		28,495	3.8	
2010			29,644		29,644	4.0	
2011			29,572		29,572	-0.2	
Traffic Projections							
2020	14,900		29,300		44,200	4.6	34%
2025	21,100	6,200	34,900	5,600	56,000	4.8	38%
2030	28,100	7,000	41,900	7,000	70,000	4.6	40%
2035	35,000	6,900	46,500	4,600	81,500	3.1	43%
AAPC							
2001-2007			3.6%		3.6%		
2001-2011			2.5%		2.5%		
2011-2020			-0.1%		4.6%		
2020-2025	7.2%		3.6%		4.8%		
2025-2030	5.9%		3.7%		4.6%		
2030-2035	4.5%		2.1%		3.1%		

AAPC is "average annual percentage change"

The table also shows a summary of the forecasts of traffic on the KAC and the Glenn Highway at the same location as the counts. This is a "screen line" that runs across the Inlet. After the "ramp-up" period, the expected average annual growth rate on the screen line between 2020 and 2025 is 4.8% per year or an increase of 11,800 vehicles per day over the five year period, with most of the growth happening on the KAC (7.2% per year or 6,200 vehicles per day) and less on Glenn Highway (3.6% per year or 5,600 vehicles per day). The expected average annual growth rates between 2025 and 2030 are lower at 4.6% per year for the screen line or 14,000 vehicles per day over the five year period. Between 2030 and 2035, the expected annual growth rates are lower, at 3.1% for the screen line, as the pace of development subsides. Once again, most of the growth occurs on the KAC. Traffic volumes are always higher on the Glenn Highway during the forecast period. It is important to note that growth rates on start-up facilities are typically higher in percentage terms than the growth rates on established roadways because the starting values are lower.

- *The disparity between the commercial vehicle/passenger vehicle split used in the studies (approximately 12%) and the traffic count data for Glenn Highway at Eklutna Flats (approximately 5%).*

  The 2007 Proposed Knik Arm Bridge Study analysis was based upon available vehicle classification data provided by Alaska Department of Transportation and Public Facilities (DOT&PF) from its permanent recorder stations. Table 2 shows the vehicle classification data from the station on the Glenn Highway at Eklutna Flats, which was available from 2003 through 2006. For this analysis, commercial vehicles consist of Classes 4 through 13, i.e., all vehicles with three or more axles including two axle vehicles towing single axle trailers. On this basis, commercial vehicles were 12.2% of the traffic in 2003, 11.5% in 2004, 13.6% in 2005 and 15.5% in 2006. CDM Smith developed a regional average commercial vehicle percentage of 12% based on this location and other locations on the Glenn Highway and Parks Highway. When this analysis was updated in 2011, vehicle classification data for that year was not yet available. Moreover, no new vehicle classification count had been conducted on the Glenn Highway at Eklutna Flats since the 2007 Study. The assumption of 12% commercial vehicles is reasonable.

  The forecast of commercial vehicles using the KAC includes both traffic diverted from the Glenn Highway and the additional traffic representing movements between Anchorage and the lower Mat-Su Borough. Based on socioeconomic growth estimates, significant demand by commercial vehicles for the KAC is expected to be generated from within Anchorage. This includes commercial vehicle traffic from the Port of Anchorage, as well as construction vehicles, delivery trucks, recreational vehicles and campers traveling to the Mat-Su Borough. Because of their lower fuel economy, higher cost of vehicle maintenance and the cost of driver wages, commercial vehicles are in many cases less sensitive to the KAC toll than are passenger cars in order to take advantage of the time and distance savings (even though

Table 2
Historical Vehicle Classification Counts
Glenn Highway at Eklutna Flats

Year	Dir [1]	Month	Days Counted	Total Vehicles	Passenger Cars Class 1	Passenger Cars Class 2	Passenger Cars Class 3	Light Trucks Class 4	Light Trucks Class 5	Light Trucks Class 6	Light Trucks Class 7	Single-Trailer Trucks Class 8	Single-Trailer Trucks Class 9	Single-Trailer Trucks Class 10	Multi-Trailer Trucks Class 11	Multi-Trailer Trucks Class 12	Multi-Trailer Trucks Class 13	% Total Cmrcl Vhcls
2006	1	1	30	337,825	0.1%	52.1%	32.6%	0.3%	13.0%	0.6%	0.0%	0.2%	0.7%	0.2%	0.0%	0.0%	0.3%	15.2%
	1	2	28	320,499	0.1%	50.0%	32.9%	0.3%	13.5%	0.7%	0.0%	0.2%	0.7%	0.3%	0.0%	0.0%	0.3%	16.1%
	1	3	31	397,676	0.1%	50.6%	32.7%	0.3%	13.6%	0.8%	0.0%	0.3%	0.8%	0.5%	0.0%	0.0%	0.2%	16.4%
	1	4	30	394,515	0.1%	52.9%	31.8%	0.3%	13.0%	0.5%	0.0%	0.3%	0.7%	0.2%	0.0%	0.0%	0.2%	15.2%
	1	5	31	450,323	0.1%	53.8%	30.7%	0.3%	12.2%	0.7%	0.0%	0.4%	0.9%	0.6%	0.0%	0.0%	0.3%	15.4%
	1	6	30	485,235	0.1%	53.3%	31.1%	0.3%	12.3%	0.7%	0.0%	0.5%	0.9%	0.5%	0.0%	0.0%	0.4%	15.6%
	1	7	31	498,259	0.1%	53.1%	31.3%	0.3%	12.5%	0.6%	0.0%	0.5%	0.8%	0.4%	0.0%	0.0%	0.4%	15.5%
	1	8	30	501,732	0.1%	53.8%	30.9%	0.3%	12.0%	0.7%	0.0%	0.4%	0.9%	0.5%	0.0%	0.0%	0.4%	15.2%
	1	9	30	463,300	0.1%	53.8%	30.9%	0.3%	11.7%	0.8%	0.0%	0.4%	1.1%	0.6%	0.0%	0.0%	0.3%	15.2%
	1	10	31	420,900	0.1%	52.1%	31.2%	0.2%	12.7%	0.9%	0.0%	0.3%	1.1%	0.9%	0.0%	0.0%	0.4%	16.5%
	1	11	30	364,558	0.0%	52.4%	32.5%	0.3%	13.0%	0.4%	0.0%	0.2%	0.7%	0.3%	0.0%	0.0%	0.2%	16.0%
	1	12	30	348,861	0.1%	51.1%	33.5%	0.2%	13.5%	0.4%	0.0%	0.2%	0.6%	0.2%	0.0%	0.0%	0.2%	15.4%
Total			304	4,983,692	0.1%	52.6%	31.7%	0.3%	12.7%	0.7%	0.0%	0.3%	0.8%	0.4%	0.0%	0.0%	0.3%	15.5%
2005	1	1	25	263140	0.1%	55.8%	32.0%	0.1%	10.4%	0.5%	0.0%	0.2%	0.5%	0.1%	0.0%	0.0%	0.3%	12.2%
	1	2	27	305218	0.1%	55.6%	32.0%	0.1%	10.6%	0.5%	0.0%	0.2%	0.5%	0.1%	0.0%	0.0%	0.3%	12.4%
	1	3	31	380471	0.2%	56.1%	30.9%	0.1%	10.4%	0.7%	0.0%	0.4%	0.8%	0.2%	0.0%	0.0%	0.3%	12.8%
	1	4	30	386997	0.2%	57.1%	30.3%	0.1%	10.2%	0.8%	0.0%	0.3%	0.6%	0.2%	0.0%	0.0%	0.3%	12.4%
	1	5	8	110017	0.1%	57.6%	29.4%	0.1%	10.4%	0.7%	0.0%	0.4%	0.6%	0.2%	0.0%	0.0%	0.4%	12.6%
	1	6	28	444961	0.2%	55.4%	30.6%	0.2%	10.9%	0.7%	0.1%	0.5%	0.5%	0.4%	0.0%	0.0%	0.5%	13.0%
	1	7	31	503630	0.2%	55.3%	30.6%	0.2%	10.9%	0.7%	0.1%	0.6%	0.5%	0.4%	0.0%	0.0%	0.5%	13.0%
	1	8	20	329306	0.2%	55.4%	30.8%	0.2%	10.8%	0.7%	0.1%	0.6%	0.6%	0.4%	0.0%	0.0%	0.4%	13.7%
	1	11	19	207058	0.1%	50.4%	33.6%	0.3%	13.6%	0.5%	0.0%	0.2%	0.7%	0.2%	0.0%	0.0%	0.2%	16.0%
	1	12	31	364579	0.1%	51.2%	33.2%	0.3%	13.4%	0.5%	0.0%	0.2%	0.7%	0.3%	0.0%	0.0%	0.2%	15.6%
	Total		250	3,295,467	0.2%	55.0%	31.3%	0.2%	11.1%	0.6%	0.0%	0.4%	0.6%	0.3%	0.0%	0.0%	0.4%	13.6%
2004	1	2	28	309859	0.2%	57.6%	30.5%	0.1%	10.0%	0.6%	0.0%	0.2%	0.5%	0.1%	0.0%	0.0%	0.3%	11.8%
	5	2	15	168872	0.4%	65.9%	25.3%	0.0%	6.7%	0.7%	0.0%	0.1%	0.5%	0.2%	0.0%	0.0%	0.2%	8.5%
	1	3	30	381345	0.2%	57.8%	30.0%	0.1%	10.0%	0.6%	0.0%	0.2%	0.6%	0.2%	0.0%	0.0%	0.3%	12.0%
	1	4	26	327895	0.1%	58.0%	29.8%	0.1%	9.9%	0.6%	0.0%	0.3%	0.6%	0.2%	0.0%	0.0%	0.3%	12.1%
	1	5	30	420701	0.1%	56.2%	30.5%	0.2%	10.4%	0.8%	0.0%	0.5%	0.7%	0.3%	0.0%	0.0%	0.4%	13.1%
	5	5	19	241061	0.2%	70.0%	23.1%	0.1%	4.3%	0.8%	0.1%	0.3%	0.6%	0.3%	0.0%	0.0%	0.3%	6.8%
	1	6	30	480302	0.2%	55.5%	30.6%	0.1%	10.8%	0.8%	0.1%	0.6%	0.5%	0.4%	0.0%	0.0%	0.5%	13.7%
	1	7	16	256849	0.1%	59.9%	27.8%	0.1%	9.6%	0.6%	0.1%	0.5%	0.4%	0.3%	0.0%	0.0%	0.4%	12.1%
	1	8	9	156780	0.1%	57.0%	29.8%	0.2%	10.3%	0.5%	0.1%	0.5%	0.5%	0.4%	0.0%	0.0%	0.6%	13.1%
	1	9	15	222062	0.1%	58.1%	29.8%	0.2%	9.9%	0.6%	0.0%	0.3%	0.6%	0.2%	0.0%	0.0%	0.3%	12.0%
	5	9	7	89676	0.3%	66.8%	25.4%	0.1%	4.9%	0.9%	0.0%	0.2%	0.8%	0.2%	0.0%	0.0%	0.3%	7.5%
	1	10	19	237762	0.3%	55.9%	30.5%	0.1%	10.1%	1.1%	0.0%	0.3%	0.8%	0.4%	0.0%	0.0%	0.3%	13.2%
	5	10	5	66210	0.3%	69.4%	23.7%	0.1%	3.7%	0.8%	0.0%	0.2%	1.1%	0.6%	0.0%	0.0%	0.3%	6.7%
	1	11	8	86101	0.3%	58.0%	29.6%	0.1%	9.8%	0.7%	0.0%	0.2%	0.7%	0.1%	0.0%	0.0%	0.4%	12.1%
	1	12	31	352080	0.1%	55.7%	32.0%	0.1%	10.4%	0.6%	0.0%	0.2%	0.5%	0.1%	0.0%	0.0%	0.3%	12.2%
	5	12	16	185972	0.1%	68.9%	25.3%	0.0%	4.1%	0.5%	0.0%	0.1%	0.6%	0.1%	0.0%	0.0%	0.3%	5.8%
	Total		304	3,964,526	0.2%	59.2%	29.1%	0.1%	9.2%	0.7%	0.0%	0.3%	0.6%	0.3%	0.0%	0.0%	0.4%	11.5%
2003	1	8	5	97109	0.2%	59.6%	28.7%	0.1%	9.2%	1.0%	0.0%	0.3%	0.5%	0.2%	0.0%	0.0%	0.1%	11.5%
	5	8	3	54628	0.3%	66.0%	24.3%	0.1%	6.3%	1.6%	0.0%	0.2%	0.7%	0.2%	0.0%	0.0%	0.2%	9.3%
	1	9	30	420096	0.3%	58.3%	28.5%	0.1%	9.7%	1.2%	0.0%	0.4%	0.7%	0.3%	0.0%	0.0%	0.2%	12.9%
	1	10	24	317928	0.4%	58.5%	28.7%	0.1%	9.5%	1.3%	0.0%	0.4%	0.7%	0.2%	0.0%	0.0%	0.2%	12.5%
	1	11	30	319698	0.2%	58.8%	29.3%	0.1%	9.8%	0.7%	0.0%	0.2%	0.5%	0.1%	0.0%	0.0%	0.2%	11.8%
	1	12	11	123249	0.1%	58.5%	29.6%	0.1%	10.0%	0.6%	0.0%	0.2%	0.6%	0.1%	0.0%	0.0%	0.2%	11.9%
	Total		103	1,332,798	0.3%	58.9%	28.7%	0.1%	9.5%	1.1%	0.0%	0.3%	0.6%	0.2%	0.0%	0.0%	0.2%	12.2%
2000	5	1	7	62,265	0.0%	53.3%	31.8%	0.4%	12.0%	0.3%	0.0%	1.3%	0.6%	0.2%	0.0%	0.0%	0.1%	14.9%

[1] Direction: 1 = Northbound, 5 = Southbound.
Source: Traffic Volume Reports, Alaska Department of Transportation and Public Facilities

truck tolls are higher). For these reasons, the assumption of 12% commercial vehicles is perhaps conservative.

- *The constant commercial vehicle/passenger vehicle split used in the studies throughout the study period.*

  CDM Smith assumed that the proportion of commercial vehicles in the KAC traffic stream would remain constant over time. It has been our experience on other "greenfield" projects across the country that the proportion of commercial vehicles increased gradually after opening. Once commercial and industrial activities have been established in the lower Mat-Su Borough, the KAC will experience an increase in local truck traffic. Given that the initial proportion averaged 12%, CDM Smith decided that the conservative approach would be to hold it constant. The definition of commercial vehicles includes two-axle vehicles towing a single axle trailer (a boat or camper).

- *The optimality of a constant real toll of $5 throughout the study period.*

  During the 2007 analysis, CDM Smith performed sensitivity tests to prepare our recommendation on toll rates. This analysis established that the revenue-maximizing toll rate for passenger cars would be just under $6.00 each way in 2005 dollars. We recommended that the initial toll rate be set at a lower value, $5.00 each way in 2017 dollars, allowing some room for a productive increase in toll revenue if necessary. Commercial vehicles pay higher tolls which are set according to the (N-1) formula, in which N represents the number of axles. Customers in future years would pay higher tolls, with the amount increasing at 2.5% per year to account for expected inflation. This rate is slightly lower than the historic consumer price index for Anchorage.

  The toll sensitivity analysis in future years demonstrated that the revenue-maximizing toll rate grew faster than inflation. Over the long run, the growth in disposable income has generally been faster than inflation, i.e., there have been real increases in disposable income. In model terms, the value of time (VOT) increases at a rate faster than the rate at which tolls would increase. CDM Smith has observed this phenomenon in many traffic and revenue studies. So, holding the real passenger car toll rate constant (inflating the nominal rate at the expected rate of inflation) is a conservative assumption, as over time the "head room" between the planned toll rate and the revenue-maximizing toll rate would increase.

- *The difference in implicit elasticities between the 2007 and 2011 reports and the usage of the 2007 report elasticities in the 2011 projections.*

  As stated before, CDM Smith performed toll sensitivity tests as part of the 2007 analysis using the travel demand models. From these, we developed estimates of toll elasticity. By

comparing these elasticities to results from models in other locations, we demonstrated that the models for the KAC were working properly.

In the 2011 analysis, we updated the travel demand models with recent information on socio-economic conditions and forecasts as well as updates on planned transportation network improvements. As expected, there were slight changes in the elasticities resulting from the model update. The elasticity curves were adjusted slightly to account for redistribution effects of the bridge.

The final traffic and toll revenue estimates were nevertheless developed from the updated model, not from the elasticities. That is, the elasticities from the 2007 analysis were not used to produce the 2011 traffic and toll revenue estimates.

Recommendations from Timothy James & Associates

- *Examine road conditions such as instance delay minutes on alternative trip assignments) in the MSA throughout the study period as traffic levels rise.*

The suite of travel demand models used to produce the KAC traffic and toll revenue estimates contains an equilibrium traffic assignment routine. This traffic assignment model includes features to make sure that the travel time increases with the volume on network links. Heavily traveled links have an appropriate level of delay built in. At equilibrium, all trips are assigned to the shortest path in the network (including congestion delay). No traveler can find a shorter path. This process is part of the travel demand models in the validation year and in all forecast years.

- *Update the origin-destination pairings.*

Up-to-date information is critical to the creation of valid travel demand models and more data is always better than less data. CDM Smith is unclear as to the intent of this recommendation, since origin-destination data is expensive to obtain and only used as part of model calibration/validation. Some explanation may help.

The suite of models used in the KAC traffic and revenue study contains a trip distribution model. The purpose is to estimate the number of trip interchanges (movements between places) as a function of the number of trip productions (origins), the number of trip attractions (destinations) and the generalized cost of travel between those places. Origin-destination information is obtained through a survey of travelers about their trips. This would typically include a number of characteristics including the origin and destination of each trip. The result of this survey is used as a reference to make adjustments in the trip distribution model so that the synthesized pattern of trip interchanges in the calibration year looks more like the observed pattern. Once the adjustments are completed, the model is ready for application in forecasts. For the KAC, CDM Smith conducted origin-destination

surveys in 2007 and applied this information to the model calibration year 2005. This information was used to validate the model and to gain an understanding of the current demand that might divert to the KAC.

The pattern of trip interchanges produced by the model in future years depends on the pattern of trip productions, trip attractions and the generalized cost of travel between places at that future time. The pattern of "origin-destination pairings" is a product of the travel demand model and always updated in future years based on assumed land-use patterns and transportation network. There is no need to update the "origin-destination pairings" unless the whole model was to be reconstructed to a new calibration year.

- *Revise downwards the forecast growth in households during the study period in line with ISER growth rates.*

To clarify the next issues, we present historical information about population (Table 3), households (Table 4) and employment (Table 5). The growth rate in households used by CDM Smith was 3.8% per year in the Mat-Su Borough and 1.0% per year in the Municipality of Anchorage. As shown in Table 4, these are lower than the long term historical growth rates in households of 6.1% per year in the Mat-Su Borough and 1.9% per year in Anchorage. The growth rates in households used by CDM Smith is also below the observed growth rates during the recent decade 2000 to 2009 (including the effects of the Great Recession) when the Mat-Su Borough grew by 4.9% per year and Anchorage by 1.2% per year.

The ISER growth rates for the period of 2010-2035 for households is 1.5% per year for the entire study area with a 3.2% per year rate for Mat-Su Borough and 0.9% per year for Anchorage, shown in Table 6.

It should be noted that ISER underestimated the 2010 Mat-Su Borough population by 8,696 persons (9.8% of the total) and the Anchorage population by 2,626 persons (0.9% of the total) compared to the 2010 Census. This probably has to do with the fact that these estimates were prepared during the Great Recession. Taking these underestimates near the forecast base year into consideration and making an adjustment, the ISER 2035 projections would be close to the estimates used by CDM Smith. The forecast growth in households is the result of detailed analysis and is reasonable. Taking into account the anticipated effects of the KAC opening, the forecasts are perhaps conservative.

- *Revise downwards the forecast growth rate in employment during the study period in line with ISER growth rates.*

CDM Smith used an annual growth rate in employment for 2010-2035 for Anchorage of 0.8% per year. This is identical to the growth rate produced by ISER, as shown in Table 6. For the Mat-Su Borough, CDM Smith used a growth rate for employment of 3.1% per year; higher

than the ISER growth rate of 2.8% per year. Given that historical employment growth in the Mat-Su Borough has been 4.8% per year during the period 1990-2009, CDM Smith believes that the slightly higher growth rate for employment is reasonable given the anticipated developments planned with the construction and opening of the KAC.

Table 3
Historical Population

Geography	Historical Year				Average Annual Percent Change			
	1980	1990	2000	2009	'80-'90	'90-'00	'00-'09	'80-'09
Anchorage Municipality	174,400	226,300	260,300	286,200	2.6%	1.4%	1.1%	1.7%
Matanuska-Susitna Borough	17,800	39,700	59,300	88,400	8.4%	4.1%	4.5%	5.7%
Study Area	192,200	266,000	319,600	374,600	3.3%	1.9%	1.8%	2.3%
Alaska	401,900	550,000	626,900	698,500	3.2%	1.3%	1.2%	1.9%
United States	226,545,800	248,709,900	281,421,900	307,006,600	0.9%	1.2%	1.0%	1.1%

Source: United States Census Bureau; rounded to the nearest 100

Table 4
Historical Households

Geography	Historical Year				Average Annual Percent Change			
	1980	1990	2000	2009	'80-'90	'90-'00	'00-'09	'80-'09
Anchorage Municipality	61,200	83,300	95,100	106,100	3.1%	1.3%	1.2%	1.9%
Matanuska-Susitna Borough	5,800	13,500	20,800	31,900	8.8%	4.4%	4.9%	6.1%
Study Area	67,000	96,800	115,900	138,000	3.7%	1.8%	2.0%	2.5%
Alaska	133,100	190,200	222,300	255,600	3.6%	1.6%	1.6%	2.3%
United States	80,824,800	92,315,400	105,836,900	118,560,300	1.3%	1.4%	1.3%	1.3%

Source: Woods and Poole, 2010; rounded to the nearest 100

Table 5
Historical Employment

Geography	Historical Year				Average Annual Percent Change			
	1980	1990	2000	2009	'80-'90	'90-'00	'00-'09	'90-'09
Anchorage Municipality	#N/A	116,600	133,500	144,300	#N/A	1.4%	0.9%	1.1%
Matanuska-Susitna Borough	#N/A	15,800	26,800	38,500	#N/A	5.4%	4.1%	4.8%
Study Area	#N/A	132,400	160,300	182,800	#N/A	1.9%	1.5%	1.7%
Alaska	170,800	251,000	299,300	332,100	3.9%	1.8%	1.2%	1.5%
United States	99,303,000	118,793,000	136,891,000	139,877,000	1.8%	1.4%	0.2%	0.9%

Source: Bureau of Labor Statistics (Local Area Unemployment Statistics for AK and the Current Population Survey for the US); rounded to the nearest 100

Table 6
Base Case Projections by Source (CAAGR)

Projections by Source (CAAGR) - Base Case										*Updated* Projections (CAAGR)		
Source	ISER, UAKA* ('10-'35)			AK Labor Department**('09-'34)			2007 Study*** ('10-'30)			'10-'35		
Geography	Pop	HH	Employ't	Pop	HH	Employ't	Pop	HH	Employ't	Pop	HH	Employ't
Municipality of Anchorage	0.8%	0.9%	0.8%	0.9%	#N/A	#N/A	1.0%	1.0%	1.0%	0.9%	1.0%	0.8%
Mat-Su Borough	3.1%	3.2%	2.8%	2.4%	#N/A	#N/A	4.9%	4.9%	4.4%	3.5%	3.8%	3.1%
Study Area	1.4%	1.5%	1.1%	1.3%	#N/A	#N/A	2.2%	2.2%	1.6%	1.6%	1.7%	1.2%

- *Update the gasoline prices in VOC estimates, and give additional consideration to alternative scenarios for future gasoline price levels throughout the study period.*

  Using the same methodology for estimating vehicle operating cost (VOC) as was used in 2011. The Anchorage area VOC was updated for 2012 with the latest available data. Table 7 provides a comparison of the updated VOC assumptions and calculations:

Table 7
Comparison of 2011 and 2012 Vehicle Operating Cost Assumptions and Calculations

Value	Estimated 2011 VOC (As estimated in the 2011 Study)	Estimated 2012 VOC
Average Cost of Gasoline per Gallon	$3.34	$3.96
Fuel Economy Average Miles per Gallon	22.91 Sedan - 17.31 SUV/Van	23.69 Sedan - 19.29 SUV/Van
Average Cost of Gas / Mile	$0.1458 Sedan - $0.1930 SUV/Van	$0.1672 Sedan - $0.2053 SUV/Van
Maintenance Costs	$0.0454 Sedan - $0.0491 SUV/Van	$0.0447 Sedan - $0.0464 SUV/Van
Tire Costs	$0.0083 Sedan - $0.0087 SUV/Van	$0.0100 Sedan - $0.0104 SUV/Van
Average Vehicle Cost per Mile	$0.1996 Sedan - $0.2507 SUV/Van	$0.2219 Sedan - $0.2621 SUV/Van
Percent of SUV/Van	69.0 Percent	69.4 Percent
Average Weighted Vehicle Cost per Mile	$0.2348	$0.2498

As shown in Table 7, the average cost of gasoline in the Anchorage area increased by 18.6% between 2011 and 2012. This was counterbalanced by an increase in fuel economy. Average fuel economy increased from 19.0 miles per gallon in 2011 to 20.6 miles per gallon in 2012, an increase of 8.4%. Vehicle maintenance and tire costs remained roughly the same. As a

result, estimated VOC increased 6.4% between 2011 and 2012. Much of this increase was born by sedans, as the average VOC for sedans increased by $0.03 while the average cost for SUV/Vans increased by $0.01.

As part of a 2012 study of another proposed toll facility, CDM Smith conducted a sensitivity test to estimate the impact of higher gasoline prices on estimated revenues. CDM Smith assumed gasoline prices of $3.00 per gallon in 2015 under the base case scenario with annual increases in proportion to inflation thereafter. Under the sensitivity test scenario, gasoline prices of $5.00 per gallon were assumed in 2015, with increases in proportion to inflation thereafter. Additionally, it was assumed that $5.00 gasoline prices would also result in a reduction in total regional travel of approximately 4.0%. The higher gasoline price scenario resulted in an estimated reduction in toll revenues of 5.9% in 2015.

Based on these analyses, it is clear that the price of gasoline is a major component in the calculation of vehicle operating costs and will play an important role in potential transactions and revenue on the KAC. Significant fluctuations in the price of gasoline, as were experienced nationwide in the summer of 2008, can increase vehicle operating costs and bias travelers towards choosing shorter distance trips. The results of the above referenced sensitivity test may not be indicative of potential gasoline price impacts for the KAC due to the significant distance savings offered by the bridge. Increased gasoline costs increase the cost of driving per mile. As the cost per mile increases, toll facilities providing a shorter route become more attractive compared to the toll-free alternative. Therefore, although the region might experience a decline in overall trips, the KAC may not necessarily lose trips as it provides significant distance savings for those traveling from Anchorage to the Mat-Su Borough, and therefore has the result of significantly offsetting vehicle operating costs that can be experienced with fuel price surges. It should also be noted that CDM Smith vehicle operating costs assume an overall average growth rate of 2.5% reflecting the long term forecast for the facility. The vehicle operating cost during individual years throughout the forecast can and will vary with the volatility of fuel prices. The estimates used in the analysis of traffic and toll revenue for the KAC are certainly reasonable.

- *Adjust VOT estimates for changes in real income over the study period.*

There are two issues to discuss: the initial values of time (VOT) and the changes in VOT over time. In the case of KAC, the VOT for a work trip was estimated at $15.60 per hour in the year 2010. This estimate is a result of a stated preference (SP) survey, conducted in 2007 by Resource Systems Group (RSG), an independent firm that specializes in this type of work. As shown in Table 8, CDM Smith compared the VOT used for the KAC with estimates used in other recent traffic and revenue studies. The VOT estimate used for KAC is in line with the values in these other studies.

Table 8
Value of Time (VOT-Dollars per hour) Comparison

Study	Peak		Off-Peak		Aggregate	Year
	Work	Non-Work	Work	Non-Work		
Knik Arm Crossing, 2007 Study, SP Survey	$15.60	$12.00	$15.60	$12.00	$13.80	2010 [1]
Knik Arm Crossing, 2011 Study	$15.78	$12.15	$15.78	$12.15		2010 [2]
Grand Parkway (Houston)	$14.22	$14.22	$12.42	$12.42	$13.20	2011
Express Travel Choices Study (SCAG)	$13.54	$7.43		$13.00		2010 VOT for HH income of $62,500 [3]
Triangle Expressway	$13.44	$13.44	$10.68	$10.68	$13.20	2011
US 36, Denver Colorado	$11.58	$11.14	$11.01	$10.39		2010
SR 520 Bridge, Washington State	$10.72	$7.60	$10.62	$11.61	$10.40	2010
Monroe Connector/Bypass	$9.36	$9.36	$9.36	$9.36		
Garden Parkway	$9.00	$9.00	$9.00	$9.00		

[1] Median Household income via stated preference survey was 62,700 in 2007
[2] Based on Median Household income for the region
[3] VOT for business related trips is $14.34

In an update performed by CDM Smith in 2011, a value of $15.78 per hour was derived using the median household income. As shown in Table 9, the median household income in 2010, for the Municipality of Anchorage was $73,746 and for Mat-Su Borough was $67,703.

Table 9
Household Median Income by City and State Comparison

City/Region	2010	State	2010	Project
Anchorage	$ 73,746	Alaska	$ 66,614	Proposed Knik Arm Bridge
Mat-Su Borough	$ 67,703	Alaska	$ 66,614	Proposed Knik Arm Bridge
Houston	$ 55,644	Texas	$ 50,149	Grand Parkway (Houston)
Los Angeles	$ 58,480	California	$ 59,529	Express Travel Choices Study
Raleigh	$ 51,625	North Carolina	$ 44,693	Triangle Parkway
Durham	$ 49,496	North Carolina	$ 44,693	Triangle Parkway
Denver	$ 60,585	Colorado	$ 55,752	U.S. 36
Seattle	$ 65,079	Washington	$ 57,387	SR 520 Bridge
U.S.	$ 51,625			

Sources: U.S. Census Bureau, Department of Numbers, 2010 Median Household Income
U.S. Census Bureau, American Community Survey, 2006-201 as listed in Alaska Economic Trends, August 2012, Page 15

In another study by CDM Smith for the Grand Parkway in Houston, Texas, the VOT for peak-hour work trips was estimated at $14.22 per hour. This VOT is about 90% of the value used for KAC work trips. This is in a context of a metropolitan area median household income of $55,644 for Houston, which is about 75% of median household income for Anchorage and 82% of median household income for the Mat-Su Borough. This comparison indicates that, while VOT is higher for the KAC, the median household income is also proportionally higher. This relationship indicates proportional affordability for paying tolls by patrons of the bridge.

A comparison can also be made with a large SP survey of 3,600 records, conducted by CDM Smith in Southern California. The VOT for work trips in southern California was estimated at $13.54. This value is about 86% of the VOT for KAC work trips. The regional median household income for the Los Angeles was $58,480, or about 80% of the median household income in Anchorage and 86% of the median household income in the Mat-Su Borough.

There is a similar comparison with the VOT estimates for the Triangle Expressway, in Raleigh-Durham, North Carolina. VOT for work trips during the peak period is estimated to be $13.44 per hour. This VOT is about 85% of VOT estimated for the KAC. Median household income for Raleigh-Durham is $50,560 which is about 69% of the median household income in Anchorage and 75% of the median household income in Mat-Su Borough.

As these comparisons show, estimated VOT, used in the modeling of traffic and revenue estimates for the proposed Knik Arm Bridge, is consistent with other recent T&R studies. This becomes more evident when the median household income for the project area is taken into account. This analysis shows that the initial estimates of VOT are reasonable.

CDM Smith has assumed that VOT keeps pace with inflation. This is a conservative assumption, in that real income has historically increased at a faster rate. In which case, travelers would place a higher value on the time savings achieved by using the KAC, resulting in higher traffic estimates.

- *Enhance the risk analysis, to include a wider set of input variables with well-specified distributions in the Monte Carlo simulation.*

CDM Smith produced a robust analysis of traffic and toll revenue risk for the project in accordance with industry standards. The risk analysis generated probabilities associated with the full range of outcomes for further financial analysis. As with other "greenfield" projects, the assumptions about future land uses are the most important factors influencing the traffic and toll revenue estimates. So, socio-economic variables (the number of households and employment) were at the center of the risk analysis. Assumptions about the value of time (VOT) and the factors used to convert the daily estimates from the travel demand model into annual estimates were also included in the risk analysis. No other variables were suggested. Neither were any other probability distributions. The variables

that were used are clearly the most relevant to the potential variation in the KAC traffic and toll revenue. CDM Smith has used the same variables in the risk analysis of other similar toll road projects and produced meaningful results.

- *Commission an independent organization to produce traffic and toll revenue projections based on modeling for the period 2037 through 2051.*

  CDM Smith used travel demand models to produce traffic and then toll revenue estimates for the KAC in the model years 2020, 2025, 2030 and 2035. The traffic and toll revenue estimates in between these years are linear interpolations of the traffic volumes. The traffic and toll revenue estimates after 2035 are extrapolations. Transportation planning data and models are not available after this time frame and do not normally cover longer time periods.

  While CDM Smith has provided traffic and toll revenue estimates through this period (with relatively small traffic growth in the outer years), it is our understanding that the financial plan is based on the assumption that there would be no growth in traffic after the year 2040, but an inflationary 2.5% per year increase in toll rate. CDM Smith considers this a reasonable, even conservative, assumption.

Summary Conclusions from Timothy James & Associates

- *Based on the WSA reports as they are currently drafted, this review concludes that the traffic and toll revenue projections for KAC seem optimistic.*

  After carefully considering the points that were raised in the independent review, CDM Smith disagrees with the characterization of the traffic and toll revenue as being optimistic. Based on our experience with many "greenfield" toll road projects, we consider the traffic and toll revenue estimates for the KAC as reasonable forecasts and appropriate for use in project financing.

Unlike transportation planning studies which are designed to identify and prioritize potential improvements across an entire metropolitan area, traffic and revenue studies focus clearly on the proposed toll facility. The purpose of a T&R study is to determine: 1) the overall demand in the project corridor, 2) the growth in that demand over time, 3) the proportion of demand that will use the proposed toll facility and 4) the toll travelers are willing to pay. Stated simply, the goal is to establish reliable estimates of future traffic and toll revenue on the proposed toll facility.

CDM Smith prepared a comprehensive traffic and toll revenue study for the Knik Arm Crossing. We obtained extensive data on existing traffic conditions, including traffic counts, origin-destination surveys and travel time/delay studies. This data and analysis is documented in our report. We employed an independent specialist to help us prepare an assessment of present socio-economic conditions and reliable estimates of future conditions. This work involved a careful review of prior studies, interviews with local experts and decision makers and original analysis, all documented in

our report. We also conducted a stated preference survey to establish an appropriate local value of time (willingness to pay toll). The data and results are documented in our report.

CDM Smith collected data for a project-specific travel demand model, with a traffic analysis zone and network representation of the existing transportation system. This model incorporates other study products (existing traffic and socio-economic data). We went through an extensive model calibration/validation process. After obtaining and assessing local transportation improvement plans, we created future year networks and related zonal data for multiple future years (2017, 2020, 2025, 2030 and 2035). CDM Smith then applied the valid travel demand model to those future conditions, creating traffic estimates for the KAC. We carefully reviewed the resulting forecasts for reasonableness, not only on the KAC but elsewhere in the region. We performed sensitivity tests to make sure that the model was working properly and that the results made sense. We also created a toll revenue model for the KAC. CDM Smith spent time looking at the toll sensitivity on the KAC. From this analysis, we calculated toll elasticities from the model and compared them to observed toll elasticities from other places. Since all T&R studies involve some element of uncertainty, we performed a robust analysis of the full range of outcomes. This included analysis of the main sources of risk (household and employment levels, value of time and yearly variations). All of this work is documented in our report.

CDM Smith specializes in T&R studies, having performed hundreds of similar studies across the country. The traffic and toll revenue estimates for the Knik Arm Crossing were prepared in accordance with industry standards. Once again, thank you for the opportunity to participate in this project. Please let us know if you have questions or require further information.

Sincerely,

Scott A. Allaire

Scott A. Allaire
Vice President
CDM Smith Inc.

Grant R. Holland
Vice President
CDM Smith Inc.

Attachment A

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March 6, 2013

Mr. Michael L. Foster, P.E.
Chairman of the Board
Knik Arm Bridge and Toll Authority
820 East 15th Avenue
Anchorage, Alaska 99501

Subject: Response to Further Comments from Timothy James & Associates Regarding the Independent Review of Traffic and Toll Revenue Projects

Dear Mr. Foster:

Thank you for the opportunity to reply to the recent memorandum from Ms. Danna Moser, CPA, of the Division of Legislative Audit (DLA), dated February 27, 2013, concerning KABATA's response to the earlier management letter. On February 15, 2013, CDM Smith provided a letter responding to a request for "clarifications" and "recommendations" contained in *The Knik Arm Crossing: An Independent Review of Traffic and Toll Revenue Projections* by Timothy James & Associates (TJ&A). We have sent a copy of that letter suitable for public release with the condition it be released in its entirety along with this further response. In this letter, our comments are directed to the memorandum from TJ&A to DLA, dated February 27, 2013, and included as Attachment #1 in the recent memorandum to you from DLA. We will follow the order of points raised in the original report and try not to repeat ourselves. The original points are in italics.

Clarifications

- *The high dependence of the traffic and toll revenue projections on strong economic development and population growth in the Point MacKenzie area, north of it, and to the south and west of Wasilla and Houston.*

  In the recent memorandum, TJ&A now requests "a statement of households, population and employment by TAZ..."On October 18, 2012 we provided TJ&A, by email, detailed future land use forecasts, at the level of traffic analysis zone (TAZ), beginning in 2020 and running in five year intervals through 2035. As we have done in literally hundreds of T&R studies, CDM Smith provided thematic maps showing the location and density of future land uses at an appropriate level of detail. These appear in Figures 1 through 10 of our report titled *Proposed Knik Arm Crossing: Traffic and Toll Revenue Update*, dated August 31, 2011. Even more detail was included in the work of Insight Research Corporation. We have provided TJ&A all of the information requested.

- *The disparity between average annual growth rate in the base 2012 memorandum projections post-2020 [after the "ramp-up" period has ended] (5.0%) and the average growth rate in AADT 2001-2011 for Glenn Highway at Eklutna Flats is (1.93%).*

  After acknowledging the error in the calculation of the growth rate, TJ&A still thinks that the traffic on the Knik Arm Crossing (KAC) would grow at the same percentage rate, after the ramp up period, as the traffic on a mature facility such as the Glenn Highway at Eklutna Flats. We simply don't agree. The KAC will open up significant development opportunities that will occur over time. Also, there is every reason to expect higher traffic growth rates on the KAC because the numbers start with a lower value. This is simply arithmetic.

- *The disparity between the commercial vehicle/passenger vehicle split used in the studies (approximately 12%) and the traffic count data for Glenn Highway at Eklutna Flats (approximately 5%).*

  We do not agree. A value of 5% commercial vehicles would be too low. The traffic and toll revenue forecasts anticipate that a significant portion of the truck movements originating in the Port of Anchorage will divert from the Glenn Highway to the KAC and Point MacKenzie Road. The Port of Anchorage receives about 90% of the container freight arriving in Alaska and serves 85% of the population. Nearly half of that freight goes north to Fairbanks, the interior and the North Slope. Given the location of the Port at the southern terminus of the KAC, and the direct access from the Port to the KAC, it is reasonable to assume that the easier trip north would be on the KAC rather than through the streets of Anchorage and up the Glenn Highway. Further, with the relatively low traffic volumes on the KAC to start, this will be a high percentage of KAC traffic.

  The forecasts for the KAC also envision significant commercial vehicle demand that will be generated from within Anchorage. This includes commercial vehicle traffic from the Port of Anchorage, as well as delivery trucks, recreational vehicles and campers travelling between Anchorage and Mat-Su Borough. Remember, for this purpose, commercial vehicles include all vehicles with three or more axles including two axle vehicles towing a single axle trailer.

  In addition, the KAC will facilitate the expansion and further development of Port MacKenzie, which will greatly increase the level of commercial traffic in and through the Mat-Su Borough. Existing developments (such as the Goose Creek Correctional Center) and future industrial land development in the Mat-Su Borough are additional reasons for the anticipated proportion of commercial vehicles on the KAC. The shortage of industrial land in Anchorage has been established.

  Similarly, there is a well-documented shortage of residential land in the Anchorage Bowl. Once the KAC opens, there will be a large area of industrial and residential land ready for development. The Port MacKenzie industrial district has 8,942 acres (about 14 square miles) less than five miles from Anchorage. Construction activities from these land development

activities alone will generate a substantial volume of commercial vehicles on the KAC. The traffic and toll revenue forecasts also anticipate intermodal commercial vehicle activity, especially once the second route to the Parks Highway is constructed. The proximity of the ports, rail and the industrial district will lead to commercial vehicle use of the KAC.

The 2007 Proposed Knik Arm Bridge Study analysis was based upon available vehicle classification data provided by the Alaska Department of Transportation and Public Facilities (DOT&PF) from their permanent traffic recorder stations. We did not rely exclusively on the vehicle classification counts from the permanent recorder station on the Glenn Highway at Eklutna Flats, reported earlier. Other relevant count locations were on the Glenn Highway at Kepler Drive and on the Parks Highway at Willow. Commercial vehicle shares on the Glenn Highway at Kepler Drive ranged from 8.9% to 11.4% between 2003 and 2009. Commercial vehicle traffic on the Parks Highway at Willow ranged from 14.7% to 21.2% between 2005 and 2011. The value that CDM Smith used for proportion of commercial vehicles in the traffic stream (12%) generally reflected experience on these locations and the anticipated role of the KAC connecting the Mat-Su Borough to Anchorage.

- *The constant commercial vehicle/passenger vehicle split used in the studies throughout the study period.*

  We explained our considerable experience from other "greenfield" projects, in which the proportion of commercial vehicles increased gradually over time. Given that for the purposes of this study, the definition of commercial vehicles includes all vehicles with three or more axles including two axle vehicles towing a one axle trailer, we think that the 12% commercial vehicles is a reasonable starting value and that holding that number constant over time is also reasonable, if not a conservative forecast assumption.

- *The optimality of a constant real toll of $5 throughout the study period.*

  Our toll sensitivity analysis demonstrated that the revenue-maximizing toll rate for passenger vehicles was $6.00 in 2005 dollars. CDM Smith does not recommend toll rates at the very top of the toll sensitivity curve (the "optimal" toll rate) in order to allow for productive future toll rate increases once the facility is open to operation. In our 2011 update of the analysis, we assumed an opening year passenger vehicle toll rate of $5.00 in 2016 dollars, which allows even more "headroom" between the opening toll rate and the revenue-maximizing rate. This is normal practice in pricing a new toll facility.

- *The difference in implicit elasticities between the 2007 and 2011 reports and the usage of the 2007 report elasticities in the 2011 projections.*

  The updated travel demand model, used in the 2011 analysis, was run under a range of toll rates with a diversion curve coded into the assignment process. In this way, the travel demand model takes into consideration the toll rate, time savings and distance savings

between each origin and destination pair within the traffic assignment process. The results of these runs were presented in the toll sensitivity curves from which a toll rate for passenger vehicles was selected. TJ&A's apparent confusion may be due to the lack of experience in travel demand modeling particularly the toll diversion process and toll sensitivity analysis normally incorporated into traffic and revenue studies.

Recommendations

- *Examine road conditions such as instance delay minutes on alternative trip assignments) in the MSA throughout the study period as traffic levels rise.*
- *Update the origin-destination pairings.*

  As explained in our original response, all travel demand models are validated to data from a historic year and then applied to the future. This includes historic roadway conditions and "O-D pairings." CDM Smith constructed and documented a valid travel demand model for the KAC and then used that model to produce traffic and toll revenue estimates. This is the processes used for every travel and demand modeling study, whether for a regional planning study or for a traffic and revenue study.

  The TJ&A suggestions are difficult to understand. CDM Smith has already "provided forecast land use patterns for the relevant TAZs to the north of the proposed KAC and forecast network conditions (possibly at 10 year intervals)." We have actually done this at 5 year intervals and reported the results.

- *Revise downwards the forecast growth in households during the study period in line with ISER growth rates.*
- *Revise downwards the forecast growth rate in employment during the study period in line with ISER growth rates.*

  TJ&A's proposal to test the reliability of short term forecasts made before the Great Recession is just not very reasonable or constructive. CDM Smith provided the forecasts of employment and households by TAZ in an email to Timothy James on October 18, 2012.

  We disagree with TJ&A's recommendation of using ISER growth rates in the forecasts of KAC traffic and toll revenue. Significant, detailed effort went into the development of land use forecasts specifically constructed to reflect the impact that the KAC will have on the Mat-Su Borough and Anchorage. This level of effort is simply not part of many general transportation planning studies, including ISER's.

  Also, as part of the risk analysis, CDM Smith produced a range of traffic and toll revenue forecasts with assigned probabilities, not just a single forecast. The primary source of risk was future socio-economic conditions. The effect of lower household and employment

growth were reflected in this part of our analysis. We understand that KABATA used this information as part of their financial planning for the KAC.

- *Update the gasoline prices in VOC estimates, and give additional consideration to alternative scenarios for future gasoline price levels throughout the study period.*

  A basic assumption in all of our toll studies is that the long term increase in gasoline prices will not substantially outpace inflation. There will be fluctuations year to year, but our forecasts are developed focusing on long term assumptions and trends and not short term volatility. CDM Smith has extensive experience with testing the impacts of significant fuel price surges and has reviewed impacts on other facilities we monitor through the surges experienced over the last decade. Short term negative toll revenue impacts as a result of testing fuel price surges have been in the 5% range. However, since the crossing will result in considerable savings in distance, a sizable increase in fuel prices may actually make the KAC more attractive to cars and particularly trucks. The additional savings in fuel costs would offset a larger portion of the toll. In our opinion, higher long-term fuel prices are not a significant risk to the KAC traffic and toll revenue projections.

- *Adjust VOT estimates for changes in real income over the study period.*

  We stated in our initial response that there were two issues: the initial value of time (VOT) and the changes in VOT over time. We understand that TJ&A's comment was about "the need for VOTs to be updated throughout the forecasting period to reflect changes in real income." As we explained, over the long term increases in real income are indeed quite likely. These will, however, reduce the impact of the toll on travelers. CDM Smith did not allow for expected increases in real income as a conservative approach to traffic and toll revenue estimation. Additional data was provided in our previous response as background on the general relation between VOT and median household income.

- *Enhance the risk analysis, to include a wider set of input variables with well-specified distributions in the Monte Carlo simulation.*

  CDM Smith has no further comment, except to point out that TJ&A has not suggested any other variables (except possibly VOC) or any other probability distributions.

- *Commission an independent organization to produce traffic and toll revenue projections based on modeling for the period 2037 through 2051.*

  CDM Smith confirms that 2035 was the last model year. Beyond this time period, the underlying socio-economic forecasts and transportation planning information does not exist. Regional transportation plans do not go out further into the future. There is no need to commission anyone to forecast traffic and toll revenue for this time period. The approach taken by the Authority was to assume no traffic growth after the year 2040, but an

inflationary 2.5% per year toll rate increase. CDM Smith considers this a reasonable, even conservative, assumption that is in line with toll industry practice.

Once again, thank you for the opportunity to participate in the Knik Arm Crossing project. Please let us know if you have questions or require further information.

Sincerely,

Scott A. Allaire

Scott A. Allaire
Vice President
CDM Smith Inc.

Grant R. Holland
Vice President
CDM Smith Inc.

Enclosure: Response to the Independent Review of Traffic and Toll Revenue Projections by Timothy James & Associates, February 15, 2013

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LEGISLATIVE AUDITOR'S ADDITIONAL COMMENTS

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ALASKA STATE LEGISLATURE
LEGISLATIVE BUDGET AND AUDIT COMMITTEE
Division of Legislative Audit

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April 3, 2013

Members of the Legislative Budget
and Audit Committee:

We have reviewed the Knik Arm Bridge and Toll Authority's (KABATA) response to this audit, and except for highlighting two pieces of potentially confidential information, nothing contained in the response causes us to revise or reconsider the report's conclusions and recommendation. In response to concerns over confidentiality of specific information, the credit rating agency name in footnote 12 on page 18, and the amount KABATA paid for acquiring each right-of-way property noted in Appendix A were redacted. We appreciate being informed of this concern.

Upon review of KABATA's response to the preliminary report, we reaffirm the report conclusion that the toll and traffic projections are based on economic assumptions and data that are unreasonably optimistic. There is inadequate support for key assumptions in the Knik Arm Crossing (KAC) proposed plans; this includes support related to household levels and growth rates, traffic growth rates, the KAC's market share of traffic, the split between personal and commercial vehicle traffic over the KAC, and the proposed economic development of the Point MacKenzie area and the Port of MacKenzie. These concerns, in totality, overstate the KAC projected cash flows. We reaffirm our recommendation that KABATA management should revise traffic and toll revenue projections to address deficiencies. Since both the transportation model and the financial model are computer based, performing "*what if*" changes in underlying assumptions and data, and evaluating their effect on outcomes should not be overly burdensome.

We concur that the audit did not fully address the audit objectives in regards to assessing the balance of risks and rewards embodied in the KAC private-public partnership (P3) agreement. This scope limitation is reported in both the Objectives, Scope and Methodology and the Report Conclusions sections of the audit report in accordance with governmental auditing standards issued by the Comptroller General of the United States. After being informed by KABATA that the P3 agreement was confidential and publicly disclosing the agreement could have a detrimental effect on the project and compromise the integrity of the procurement process, we agreed not to address the audit objective related to the P3 risks and rewards. Although we did not concur that the agreement was a confidential part of the procurement process, it was clear that the terms of KABATA's P3 agreement were subject to further changes and, consequently, should not be audited.

KABATA's response to the audit implies that inclusion of Phase II in our analysis of the financial plan confuses funding needs for the P3 agreement. They explained that the potential P3 agreement only commits the private partner to Phase I of the project, and they emphasize that Phase II improvements are entirely at the discretion of the State. We disagree; funding needs should be inclusive of both phases to meet the audit objectives. The schedule of cash flows on page 24 includes increased toll revenues associated with the KAC's Phase II expansion which is anticipated to begin 2025 – over 25 years before the P3 agreement is expected to terminate.

KABATA's response also raises concerns that the audit report mischaracterizes the federal *Transportation Infrastructure Finance and Innovation Act* and the *Transportation Investment Generating Economic Recovery* financing programs by pointing out KABATA's unsuccessful attempts to obtain assistance from these programs. We disagree. Identifying key project milestones was an audit objective. The attempts to obtain federal assistance are important events in developing the project and, as such, are considered key milestones and should be included in the report.

In summary, we reaffirm the report conclusions and recommendation.

Kris Curtis, CPA, CISA
Legislative Auditor