

Benefits of the Cook Inlet Ferry to the Municipality of Anchorage

prepared for:

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Contents

1. Introduction.....	1
2. Two Municipalities, One Regional Economy.....	1
3. Potential Benefits of the Cook Inlet Ferry	2
4. Economic Impacts on Anchorage of Industrial Development at Port MacKenzie	5
5. Conclusion	10
References.....	12
Appendix: Notes on Methodology.....	13

Tables and Figures

Table 1. Estimated number within range of using the Ferry to commute to Anchorage	3
Table 2. Economic impact of Point MacKenzie industrial development, 2013-2017	7
Table 3. Anchorage residents' shares of economic impacts from Point MacKenzie industrial development, 2013-2017.....	8
Table 4. Summary of projected jobs and income from Point MacKenzie industrial development	8
Figure 1. Anchorage residents' share of economic impacts during 2013-2017 (base case scenario).....	7
Figure 2. Employment (base case scenario), 2010-2063	9
Figure 3. Labor income (base case scenario), 2010-2063	10

1. Introduction

The purpose of this study is to examine the economic benefits of the Cook Inlet Ferry to the Municipality of Anchorage. The Cook Inlet Ferry is currently being built at the Ketchikan, Alaska shipyard. The U.S. Navy has financed construction of the ferry as a prototype military landing craft for northern, ice-filled waters. The Matanuska-Susitna Borough paid for Ferry engineering, design, and outfitting with federal transit monies. Following short-term Navy testing of the craft, it will be transferred to the Borough to provide ferry service in Cook Inlet. The Borough will provide operating and maintenance information to the Navy on an ongoing basis. The Borough will operate the ferry, which will provide regular service between Anchorage and Port MacKenzie as well as service to other points on Cook Inlet. The Ferry is expected to be operational by 2010.

2. Two Municipalities, One Regional Economy

The Matanuska-Susitna (Mat-Su) Borough and the Municipality of Anchorage (Anchorage) have always had strong economic ties. The Mat-Su Borough has historically served as a “bedroom community” for Anchorage. Relatively higher wages in Anchorage and lower-cost housing in the Mat-Su Borough are largely responsible for this economic relationship. In 2008, 32 percent of employed Mat-Su residents worked in Anchorage.¹ Recently, there has been a noticeable “deepening” of the Mat-Su economy as many commercial operations, business services, and health care facilities have located in the Valley to serve a much larger local market or to take advantage of better communications and a larger labor pool in addition to inexpensive land. This maturing of the Mat-Su economy has contributed significantly to the regional economy.

Industrial development at Point MacKenzie has the potential to further develop the symbiotic economic relationship between the Mat-Su and Anchorage. This development will create an economic industrial center just a few miles from downtown Anchorage. The Cook Inlet Ferry System (Ferry) will connect and contribute to the development of the economic centers of downtown Anchorage and Point MacKenzie.

The available industrial and residential land at Point MacKenzie presents an economic opportunity to increase the overall level of regional economic activity. According to a study released by the Anchorage Economic Development Corporation, Anchorage is expected to have a significant shortage of industrial land in the coming years. The study asserted that “Anchorage will continue to have a resource and logistics driven economy for the foreseeable future. It is necessary to protect land to facilitate industrial development in the MOA supporting these key industries.” The study continues to recommend prohibiting retail and other uses of industrial land in order to suppress land prices.² Intentionally suppressing land prices by restricting potential land use will create economic inefficiencies and directly reduce the property tax base.

¹ Fried, Neal, Alaska Department of Labor and Workforce Development, *The Latest Valley Numbers*, Presentation to Palmer Greater Chamber of Commerce. March 18, 2009.

² Economic and Planning Systems Inc. *Anchorage Industrial Land Assessment*. Prepared for Anchorage Economic Development Corporation, Municipality of Anchorage. March 2009.

If the industrial land at Point MacKenzie is made accessible then the industrial land parcels in both localities can be developed to their highest value. Denser development will take place in Anchorage while less dense industrial development will take place at Point MacKenzie. Developing industrial land in Anchorage and at Point MacKenzie to its highest-value uses will maximize the overall economic growth of the entire region.

Industrial development at Point MacKenzie can contribute to the evolution of the combined Mat-Su and Anchorage regional economy beyond a one-way commuting pattern. A more complex regional economy that includes Point MacKenzie will increase the customer base served by Anchorage businesses and create more employment opportunities for Anchorage residents. The Ferry, therefore, has the potential to further enhance the many economic linkages that already exist between the Mat-Su and Anchorage areas.

3. Potential Benefits of the Cook Inlet Ferry

This section discusses the many different benefits Anchorage can expect with the development of the Ferry. The largest benefits are expected to come from meeting Anchorage's industrial land needs, increasing employment opportunities for Anchorage residents, and decreasing the time and cost of commuting between the Mat-Su and Anchorage. In the following section we estimate the amount of economic benefits from industrial development at Point MacKenzie and the share of those benefits that flows to Anchorage. Here, we consider the overall range of benefits. While many of these cannot be readily quantified, they are all likely to be significant for both Anchorage and Mat-Su residents.

Ferry access to industrial land at Point MacKenzie will enable more economic growth in Anchorage by making additional land available and accessible. Industrial space is an important component of economic growth and Anchorage is not expected to have enough in the coming years.³ Ferry access to industrial lands at Point MacKenzie will allow Anchorage land currently zoned for industrial use to be used for higher-value residential, commercial, or other uses, thus maximizing Anchorage's total economic output, property value, and property tax base.

The Ferry will provide access to Point MacKenzie jobs for Anchorage residents, allowing them to work at Point MacKenzie while still living in Anchorage. The industrial development of Point MacKenzie will provide many jobs for Anchorage workers, as well as Borough workers. These job opportunities may be partially filled by workers that otherwise would have to commute elsewhere. Workers living full-time in Anchorage have a larger economic impact on Anchorage than workers who live part time in Anchorage and part time at their place of work (e.g., oil field workers, commercial fishermen). Anchorage residents working at Point MacKenzie would spend their income in Anchorage and their homes would expand the Anchorage property tax base.

In addition to supporting industrial operations at the Port area of Point MacKenzie, the Ferry will also allow Anchorage residents to more easily work at the new Goose Creek Correctional Center.

³ Ibid.

The correctional center is a \$240 million, 1,536 bed, medium-security facility expected to employ 500 workers during construction and 350-400 workers during operation.⁴ These jobs are high-paying, with an average annual wage of \$48,000 (the Anchorage year 2007 average wage was \$46,300). The Ferry would provide for these jobs to be more easily held by Anchorage residents. The Ferry could also allow Anchorage businesses to capture a larger share of the facility's requirements for supplies and services.

Almost 3,000 commuters currently living in western Mat-Su would have a shorter commute to Anchorage if they used the Ferry. While not all of these commuters work in Anchorage, almost all pass through enroute to jobs (North Slope, remote mines, fishing grounds). Thus the Ferry provides a significant opportunity to shorten a large number of commutes. Shorter commutes create valuable time savings as well as reductions in regional air pollution. Table 1 illustrates, by region, the potential number of current commuters that could benefit from the Ferry. Commuting by ferry is likely to grow significantly as road access to the port area is improved through projects such as major upgrades to the Burma Road.

Table 1. Estimated number within range of using the Ferry to commute to Anchorage

	Year 2008 population	Year 2008 number of workers	Year 2000 % of workers commuting	% of commuters in Ferry range	Year 2008 commuters in Ferry range
Big Lake	3,191	1,332	41%	100%	540
Houston	1,755	742	36%	100%	265
Knik-Fairview	12,989	5,470	38%	40%	838
Meadow Lakes	7,106	3,021	39%	60%	714
Point MacKenzie	279	68	26%	100%	18
Tanaina	7,218	3,228	46%	10%	147
Wasilla City	7,176	3,218	44%	15%	212
Willow	2,142	820	37%	40%	120
Total	41,856	17,899			2,855

- notes:
1. Year 2008 workers from AKDOWLD local and regional information
 2. Year 2000 % of workers commuting from U.S. Census

Sources: Northern Economics, Inc. Knik Arm Ferry: Socioeconomic Impacts, 2003; State of Alaska, Department of Labor and Workforce Development; ISER calculations. Year 2000 % of workers commuting based on U.S. Census.

Point MacKenzie residents commuting to Anchorage by Ferry will bring economic benefits with lower costs. Those who bring their cars on the Ferry will use alternative routes (different roads, different directions, at different times) than existing Mat-Su commuters. They will stay off crowded routes, reducing congestion and air pollution. In addition, some Ferry commuters will use public transport, walk, or bicycle to work once they are in Anchorage. All of these Ferry

⁴ Matanuska-Susitna Borough, *Goose Creek Correctional Center Website*. Available at: <http://ww1.matsugov.us/prison/>.

commuters will generate the same economic benefits for Anchorage as traditional Mat-Su commuters but without the congestion and road maintenance costs.⁵

The Ferry dock constructed in Anchorage could be used by other vessels. The Ferry would stay at Point MacKenzie while not in use leaving space at the Anchorage dock available for temporary use by tugboats or other tie-ups. Additional space at the Anchorage Ferry dock may also be created for more permanent users.

The Ferry would contribute to the effort to develop the Ship Creek area by increasing the passenger traffic to the area. The Alaska Railroad is creating an Intermodal Transportation Center at Ship Creek whose purpose is to “facilitate connections between transportation modes (rail, air, marine, public transit, taxi, private vehicle, bicycle and pedestrian) and to improve links to the downtown Anchorage business district to meet passenger transit needs over the next 30 years.”⁶ The Ferry is able to enhance the Alaska Railroad’s plans for Ship Creek by providing another means of transportation as well as significantly increasing passenger traffic. The Ferry could also increase passenger traffic to Ship Creek by becoming a tourism attraction much like the Washington State Ferry System.⁷

The Ferry will connect Tyonek to Anchorage. Tyonek and Beluga will have new, affordable access to the Anchorage labor market and its products, services, and amenities. This will result in more shopping, business, and medical trips to Anchorage. The Ferry would also allow Tyonek people a cost-effective way to offer tourism products and services to the large number of tourist Visitors who spend money while in Anchorage. Cultural tourism is a fast-growing segment within the tourism industry.

Ferry operations will directly boost the regional economy. Ferry operations will result in \$1-1.5 million in annual spending in Anchorage and employ approximately 15 people, many of whom would likely live in Anchorage.⁸ All operational funds will be administered by the Mat-Su although many of the associated economic benefits will occur in Anchorage.

The Ferry would greatly increase Anchorage residents’ access to Point MacKenzie’s snowmachine trails, lakes, rivers. In the winter the Ferry will offer Anchorage residents much quicker access to trails and terrain for snowmachining and skiing. In the summer Anchorage residents can access the region’s rivers and lakes for fishing and trails for hiking and camping. The HDR Cook Inlet Ferry Demand Analysis estimates that as many as 7,800 recreation trips may be taken per month in the winter and 7,000 trips per month in the summer.⁹ This is a considerable amount of recreation trips, particularly in the winter when local recreational opportunities are limited for Anchorage residents, particularly snowmachiners.

⁵ Tom Brigham, HDR Alaska Inc. Personal Communication. June 10, 2009.

⁶ Alaska Railroad Corporation. *Ship Creek Intermodal Transportation Center, Project Facts*. Available at: <http://www.akrr.com/arrc202.html>.

⁷ Seattle Washington 365. Available at: <http://www.seattlewashington365.com/2008/08/seattle-washington-state-ferries.html>.

⁸ Madden, Lewis D. *Personal Communication*. June 24, 2009.

⁹ HDR Alaska Inc. *Cook Inlet Ferry Demand Analysis*. Prepared for Matanuska-Susitna Borough and Tryck Nyman Hayes. February 2005.

The Ferry could help support oil and gas operations. The Ferry also has the potential to service Cook Inlet oil and gas platforms at lower costs than current transportation options. This could reduce the cost of producing hydrocarbons in Cook Inlet and potentially result in extended service lifetimes of some high cost platforms.

The Ferry could replace the existing hovercrafts for emergency operations. The hovercrafts, currently being used for emergency operations, are expensive to operate and unreliable. The Ferry would be the best rescue option and increase the chance of saving lives in the case of plane crash or shipwreck in Cook Inlet.

The residents of Anchorage and Mat-Su have indicated that they support the development of a Ferry system in Cook Inlet. This expression of support is a good measure of the direct benefits of the Ferry to its users. The Cook Inlet Ferry Demand Analysis found that 76% of Anchorage residents and 77% of Mat-Su residents support the concept of the Ferry. The demand analysis further found that potential Ferry users would benefit so much that the rates they would be willing to pay would be enough to fully fund the annual operating costs (not including capital) of Ferry service between Point MacKenzie and Anchorage.¹⁰ Since the operating costs are covered by user fees, these costs will not be an “economic drag” that might offset the additional benefits not directly captured by users -- such as reduced congestion, higher tax bases, and future growth. Instead, all of these broader benefits will directly contribute to the development and growth of the Anchorage and Mat-Su economies.

4. Economic Impacts on Anchorage of Industrial Development at Port MacKenzie

The Ferry will allow Anchorage to participate in and benefit from the industrial development at Point MacKenzie. Anchorage is the commercial and financial center of the state and will receive a significant share of economic benefits of the industrial development at Point MacKenzie. Downtown Anchorage is in close proximity to Point MacKenzie and this close proximity allows Anchorage businesses and contractors to profit from the industrial development at Point MacKenzie.

The industrial development at Point MacKenzie is highly dependent on the Ferry being operational. Also, an operational Ferry system will increase the economic flows from Point MacKenzie industrial activity to Anchorage. In the absence of a Ferry, Anchorage would likely experience a small fraction of the potential economic impact of industrial development at Point MacKenzie.

To estimate the benefits to Anchorage of the Ferry and industrial development at Point MacKenzie, we created a quantitative model. The model estimates the economic impacts of industrial development at Point MacKenzie and the share of the impacts that would flow to Anchorage. We used as inputs the results of the industrial land forecast for Point MacKenzie and

¹⁰ HDR Alaska Inc. *Cook Inlet Ferry Demand Analysis*. Prepared for Matanuska-Susitna Borough and Tryck Nyman Hayes. February 2005.

Anchorage performed by Northern Economics Inc.¹¹ and Economic & Planning Systems Inc.,¹² respectively. The model itself is based on the IMPLAN input-output modeling system.¹³ More discussion of the methodology is provided in the appendix to this report.

The Ferry is expected to significantly increase both the *overall development* of industrial activity in the Point MacKenzie area and *Anchorage's share* of the economic benefits of that industrial activity. Although the Ferry is critical for Anchorage to receive much of the economic benefits, this model does not attempt to identify the exact portion of those benefits attributable to the Ferry's existence.

We built our model on existing projections of future leased land at Point MacKenzie. We first estimated how much economic production would be generated by new industrial development on the leased land. We then assumed that 20% of the direct employment and labor income goes to Anchorage residents commuting to Point MacKenzie to work, so that 20% of the direct jobs would be held by Anchorage residents and 20% of the direct labor income would go to them.

Our estimates are based on projections by Northern Economics, Inc. which include the following assumptions, all of which would occur by 2013:

1. The Ferry is operating.
2. The Alaska Railroad extension to Port MacKenzie is built and operating.
3. There will be significant growth in overall demand for industrial/commercial land from Anchorage economic growth (base case and high case only).
4. The barge dock expansion is in place.
5. The deep water extension is complete and working.
6. There is firm demand for bulk storage, warehousing, industrial and commercial sites beyond that arising from Anchorage economic growth.
7. The Goose Creek Correctional Center is built and staffed.

Our model projects economic impacts from 2013-2063. We created base case, high case, and low case scenarios to provide a range of likely outcomes. These scenarios were based on different growth rates and the existence of different industries at Point MacKenzie.

The near-term estimated economic impacts for the three scenarios (base, low, and high cases) are reported in Table 2. Under the base case scenario we expect Anchorage residents to gain 730 average annual jobs and \$50 million of annual income during the near term period from 2013-2017 as a result of industrial development at Point MacKenzie. Production and sales¹⁴ that occurs within Anchorage, a broad measure of economic activity, would increase by \$68 million.

¹¹ Northern Economics Inc. *Point MacKenzie Industrial Lease Forecast*. Produced for Matanuska-Susitna Borough. Not yet published.

¹² Economic and Planning Systems Inc. *Anchorage Industrial Land Assessment*. Prepared for Anchorage Economic Development Corporation, Municipality of Anchorage. March 2009.

¹³ MIG, Inc. IMPLAN™ Professional Version 2.0.1001 Social Accounting and Impact Analysis Software. Minnesota Implan Group. Stillwater, MN.

¹⁴ The technical term for production and sales is "value of shipments." The value of shipments associated with a particular item can go up or down depending on how many times the components of that item are bought and sold before it reaches the final consumer. Hence, this measure of economic activity, while useful, is not as precise as

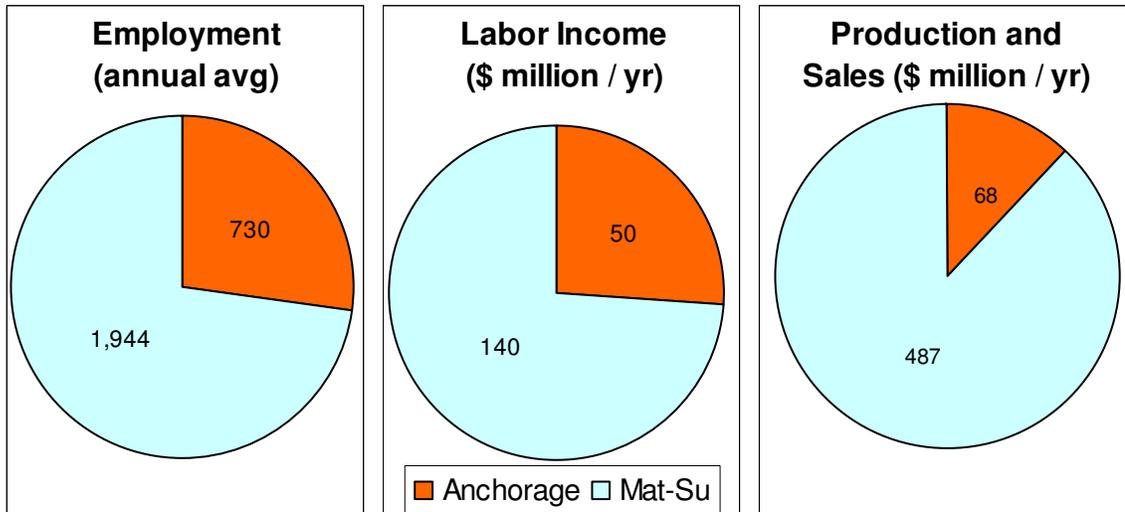
Table 2. Economic impact of Point MacKenzie industrial development, 2013-2017

	Anchorage			Total (Anchorage + Mat-Su)			Mat-Su		
	Low	Base	High	Low	Base	High	Low	Base	High
Employment (annual avg)	474	730	1,271	1,737	2,674	4,628	1,264	1,944	3,357
Labor Income (\$ million per yr)	32	50	87	123	190	329	91	140	242
Production & Sales (\$million per yr)	43	68	125	355	554	1,051	312	487	925

Note: Employment and labor income are by place of residence: Anchorage employment means employment of Anchorage residents. Production and sales are by location of economic activity.

Figure 1 shows that with the Ferry in place, Anchorage can expect to capture 27% of the employment and 26% of the income from the projected industrial development at Point MacKenzie in the base case scenario. It is important to note that the Anchorage share of employment and income is much higher than its share of production and sales. This is a logical result of our assumptions that with a Ferry, 20% of the direct jobs at Point MacKenzie would be held by workers commuting from Anchorage.

Figure 1. Anchorage residents’ share of economic impacts during 2013-2017 (base case scenario).



employment or income. In our model, “Anchorage production and sales” means production and sales occurring within Anchorage.

Table 3 shows the portion of the economic impacts that will accrue to Anchorage residents for all three scenarios during the near-term period from 2013-2017. The key point of this table is that Anchorage residents receive the same share of the employment and income benefits in each scenario.

Table 3. Anchorage residents' shares of economic impacts from Point MacKenzie industrial development, 2013-2017

	Anchorage Share		
	Low	Base	High
Employment (annual avg)	27%	27%	27%
Labor Income (\$ million)	26%	26%	26%
Production & Sales (\$ million)	12%	12%	12%

Table 4 shows the range of projected future jobs and income under all three scenarios and throughout the study period. In the base case, Anchorage residents' employment associated with Point MacKenzie industrial activity grows to more than three thousand jobs during the next 50 years. In the high case, almost 6,000 new jobs are created. Even in the low case, Anchorage residents are projected to gain almost 600 jobs and \$41 million in income from this activity.

Table 4. Summary of projected jobs and income from Point MacKenzie industrial development

	2017	2040	2063
Base Case			
Employment			
Anchorage	826	1,877	3,047
Total	3,025	6,866	11,154
Labor Income (\$ million)			
Anchorage	56	129	209
Total	215	491	798
Low Case			
Employment			
Anchorage	480	489	595
Total	1,762	1,796	2,186
Labor Income (\$ million)			
Anchorage	33	33	41
Total	125	127	155
High Case			
Employment			
Anchorage	1,447	3,514	5,792
Total	5,275	12,822	21,172
Labor Income (\$ million)			
Anchorage	99	241	398
Total	375	491	798

Figures 2 and 3 show the pattern of projected employment and income growth over time. The projected future impacts are based on the current structure of the economy and the actual impacts five decades in the future will likely be different due to the structural change that always comes with development. Despite this limitation, Figures 2 and 3 are useful for conveying the significant amount of likely future growth due to industrial development at Point MacKenzie. Much of this growth is attributed to demand originating in the Anchorage economy. Absent Point Mackenzie industrial lands this “crossover demand” either could not be met by land within the Anchorage Bowl or it would have to displace some other economic activity.

Figure 2. Employment (base case scenario), 2010-2063

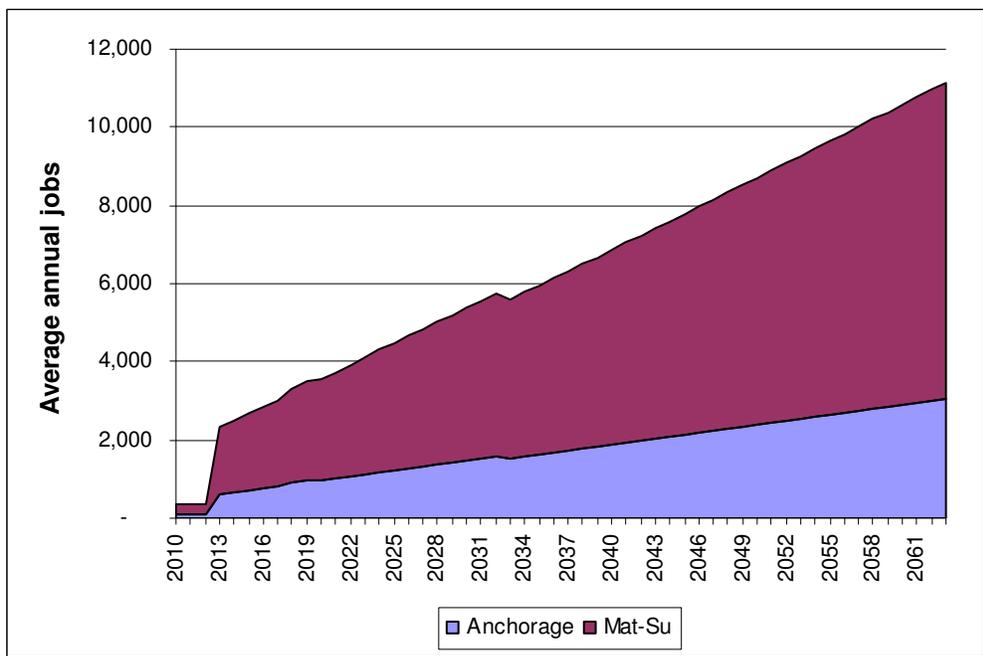
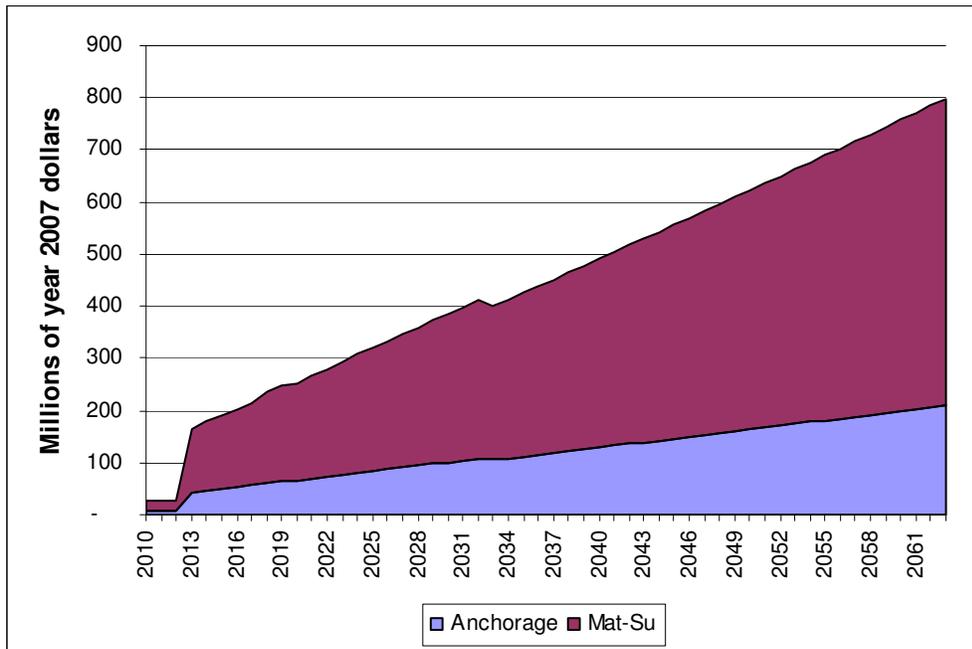


Figure 3. Labor income (base case scenario), 2010-2063



5. Conclusion

The Municipality of Anchorage and the Mat-Su Borough are two municipalities that increasingly belong to one regional economy. The Cook Inlet Ferry System has the potential to further develop the existing economic ties between Anchorage and Mat-Su while benefiting people in both places. Together with the Ferry, industrial development at Point MacKenzie can contribute to the evolution of the Anchorage/Mat-Su regional economy beyond one-way commuting. A more complex regional economy that includes Point MacKenzie will increase the customer base of Anchorage businesses and create more employment opportunities for Anchorage residents. The Ferry has the potential to further enhance other economic linkages between the Mat-Su and Anchorage areas, creating additional overall economic growth and additional opportunities for everyone to share in the benefits of that growth.

The Ferry is expected to generate many benefits that will directly contribute to the development and growth of the Anchorage economy. The largest benefits to Anchorage are expected to be: meeting Anchorage's industrial land needs, increasing employment opportunities for Anchorage residents, and decreasing the length and cost of commuting between the Mat-Su and Anchorage.

The Ferry will allow Anchorage to participate in and benefit from industrial activity at Point MacKenzie. In the Base Case Scenario, by 2017 Anchorage residents are expected to gain 826 new jobs and \$56 million in additional annual labor income associated with this development.

These benefits are projected to increase over time: By 2040 Anchorage residents would gain 1,877 jobs and \$129 million of income, and by 2063 the figures are 3,047 jobs and \$209 million of additional income.

Ferry service between Anchorage and Point MacKenzie provides a significant opportunity to increase the overall level of regional economic activity. The Ferry will also increase the flow to Anchorage of economic benefits created by industrial development at Point MacKenzie. In the absence of a Ferry Anchorage will only experience a small fraction of the potential economic impact of the development at Point MacKenzie.

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Seattle Washington 365. Available at: <http://www.seattlewashington365.com/2008/08/seattle-washington-state-ferries.html>.

Appendix: Notes on Methodology

Conceptually, it makes sense to estimate the economic benefits of the Cook Inlet Ferry to Anchorage in four steps. Step 1 is to estimate the total direct economic impacts of industrial development at Point MacKenzie. Step 2 is to allocate a share of these direct impacts to residents of Anchorage. Step 3 is to use a regional economic model to trace out the indirect and induced impacts on Anchorage that follow from the direct impacts. Step 4 is to ascribe some portion of the above benefits to the presence of the Ferry.

We built a quantitative economic model to carry out steps one through three. Our model estimates the potential benefits of Point MacKenzie industrial development to Anchorage assuming that the Ferry is in place to connect the two areas. We used IMPLAN economic impact assessment software as part of this model. Separately, to carry out step 4, we considered how the Cook Inlet Ferry would significantly increase both the overall development of industrial activity in the Point MacKenzie area *and an increase in Anchorage's share* of the economic benefits of that industrial activity.

Northern Economics, Inc. (NEI) produced a forecast of industrial leases in the Point MacKenzie area. We used that forecast to generate an estimate of their economic impact. A portion of their forecast is based on the Anchorage Economic Development Corporation's 2009 "Industrial Land Assessment" produced by Economic & Planning Systems, Inc. (EPS). Portions of the analysis in the EPS Assessment are also used in our model.

NEI forecasted industrial leases in the Point MacKenzie region through 2063. Four different industrial land uses are forecast as well as commercial leases (gas stations, convenience stores, etc.). Our model does not include commercial leases as a specific input to our economic impact analysis. The commercial leases forecasted by NEI are expected to directly serve the industrial sector and its employees and, therefore, the activities occurring on these leases are accounted for as indirect and induced impacts stemming from the direct effects of the industrial activity.

The four categories of industrial land and example industries are:

Industrial Flex: office space, mixed commercial/industrial

Industrial Services/Assembly/Manufacturing: auto repair, light industrial, storage, cabinet making, sales-service

Miscellaneous Industrial: metal processing, petroleum refining, mineral storage, fabrication shops

Warehouse/Distribution: wholesale distributors, tank farms

IMPLAN was used to estimate the regional (Mat-Su Borough and Municipality of Anchorage) economic impacts of each industrial land type. We assumed that each industrial land type was being used by five economic sectors considered to be representative of that type. These five economic sectors were weighted by their relative economic output in the region and combined to represent the expected economic output of each industrial land type.

The industrial land types and their representative industries, including their relative portion of each land type, are:

	Industry Share
Industrial Services/Assembly/Manufacturing	
Maint & repair construct of residential struc	10%
Support activities for oil and gas operations	57%
Automotive repair and maintenance- except car	19%
Electronic and precision equipment repair and	6%
Commercial and industrial machinery and equip	7%
Warehouse/Distribution	
Wholesale trade businesses	53%
Transport by water	6%
Transport by truck	23%
Transport by pipeline	17%
Warehousing and storage	2%
Miscellaneous Industrial	
Mining gold- silver- and other metal ore	20%
Ready-mix concrete manufacturing	14%
Plastics material and resin manufacturing	27%
Medicinal and botanical manufacturing	17%
Plate work and fabricated structural product	22%
Industrial Flex	
Commercial and industrial machinery and equip	6%
Architectural- engineering- and related servi	68%
Management- scientific- and technical consult	13%
Environmental and other technical consulting	8%
Scientific research and development services	5%

The direct economic output and labor income per employee for each representative industry using a land type was estimated using IMPLAN.

EPS used forecasted Anchorage employment and estimated ratios of employment to land use for each industrial land type to forecast the demand for industrial land in Anchorage. We used the EPS ratios of employees per acre of land by industrial land type to estimate the amount of employment that industrial development in the Point MacKenzie area would generate. ISER assumed that the employee to land density would be the same in Point MacKenzie as in Anchorage for the high scenario, 75% as dense for the base scenario, and 50% as dense for the low scenario. A lower density is consistent with the notion that industrial land would be less expensive at Point MacKenzie and so entrepreneurs would use relatively more of it in their production processes.

Following are the ratios of employees per acre in Point MacKenzie for each of the three scenarios as well as in Anchorage:

	Base	High	Low	Anchorage
	Jobs per Acre	Jobs per Acre	Jobs per Acre	Jobs per Acre
Industrial Flex	23	31	16	31
Industrial Services/Assembly/Manufacturing	8	11	5	11
Miscellaneous Industrial	3	4	2	4
Warehouse/Distribution	3	5	2	5

The employees per acre estimates were multiplied by NEI's industrial lease forecast to forecast the amount of direct employment associated with industrial development at Point MacKenzie. The amount of direct economic output and direct labor income per direct employee for each industrial land type was estimated using IMPLAN. We did this by combining the impacts of the representative industries associated with each land type.

We assumed that all of the *direct* economic output generated by industrial development at Point occurs in the Mat-Su Borough. We then assumed that 20% of direct employment and labor income was for Anchorage residents commuting to Point MacKenzie to work, so that 20% of the direct jobs would be held by Anchorage residents and 20% of the direct labor income would go to them.

To estimate the indirect and induced impacts on Anchorage, we grouped each IMPLAN economic sector into six general industries. We estimated what share of indirect economic impacts associated with the industrial development would occur in Anchorage by general industry. The general industries and Anchorage's share of the indirect impacts are:

General Industry Category from which purchases are made by industrial firms operating at Pt MacKenzie	Share of indirect impacts occurring in Anchorage
Construction and Real Estate	10%
Industrial	25%
Regional industry not in Anchorage	0%
Professional Services	50%
Retail	10%
Statewide Industry (e.g. oil and gas)	50%

The remaining share of indirect economic impact is expected to occur in the Mat-Su. For example, because many of the industrial enterprises are expected to be headquartered in Anchorage, 50% of the indirect impacts (or purchases) of professional services are expected to occur in Anchorage. Meanwhile, a much smaller share of the total purchases of construction and real estate services is expected to occur in Anchorage because the Mat-Su Borough's economy is expected to supply the majority of those services. Indirect employment and labor income is allocated to Anchorage in the same proportions as economic output. For example, if Anchorage supplies 10% of the purchased construction and real estate output, then 10% of the resulting employment and income is allocated to Anchorage.

The induced impacts are allocated to Anchorage in two parts. First, all of the induced impacts of the labor income already allocated to Anchorage residents is expected to stay in Anchorage. That

is, Anchorage residents who receive income directly or indirectly from the industrial development at Point MacKenzie are expected to spend all of their income in Anchorage. Meanwhile, Mat-Su residents are expected to spend a smaller proportion of their income in Anchorage.

Industry on which direct and indirect income is spent	Share of Mat-Su Direct and Indirect Income spent in Anchorage
Construction and Real Estate	100%
Industrial	100%
Not in Anchorage	100%
Professional Services	100%
Retail	100%
Statewide Industry (e.g. oil and gas)	100%

Industry on which direct and indirect income is spent	Share of Mat-Su Direct and Indirect Income spent in Anchorage
Construction and Real Estate	10%
Industrial	25%
Not in Anchorage	0%
Professional Services	50%
Retail	25%
Statewide Industry (e.g. oil and gas)	50%

The direct, indirect and induced impacts of the industrial development at Point MacKenzie on Anchorage are added together to estimate the total economic impact on Anchorage. NEI forecasted the demand for industrial land to 2063 and the ISER model is capable of projecting the economic impacts over the same. This is because economies change and develop over time, making it unlikely that the economic impacts that occur far into the future are accurate if they are based on the current regional economic structure. It is perhaps most useful to look at the average economic impact for the five-year period from 2013-2017.

According to the base case estimates, Anchorage can expect an additional \$60 million in annual economic output, \$44 million in labor income and an additional 645 jobs associated with the industrial development at Point MacKenzie.

Our estimates are based on projections by Northern Economics, Inc. which include the following assumptions:

1. The Ferry is operating.
2. The Alaska Railroad extension to Port MacKenzie is built and operating.
3. There will be significant growth in overall demand for industrial/commercial land from Anchorage economic growth (base case and high case only).
4. The barge dock expansion is in place.

5. The deep water extension is complete and working.
6. There is firm demand for bulk storage, warehousing, industrial and commercial sites beyond that arising from Anchorage economic growth.
7. The Goose Creek Correctional Center is built and staffed.

It is not possible to identify the change in total economic impact or the Anchorage share of that impact absent the Ferry. However, it is clear that the overall growth of industrial development is highly dependent on the Ferry being operational. Also, an operational Ferry system will increase the economic flows from Point MacKenzie industrial activity to Anchorage. Without the Ferry, it is likely that Anchorage would receive only a small fraction of the economic benefits from the (reduced!) overall levels of industrial activity at Point MacKenzie.