Purpose

This is the third of three information sheets on critical pieces of work related to the preliminary design and business plan development for the Third Crossing.

This information sheet provides an overview of the economic feasibility of the project and how it has been considered and included in the city’s long-term financial plans. It also gives an overview of the cost-benefit, economic impact and the procurement options analyses done for the Third Crossing. The results of these studies are used to support whether the project represents a good investment for the Kingston community.
Introduction

The business plan covers the need for the Third Crossing and gives consideration to the technical and economic feasibility of the project. The results of the feasibility analyses provide evidence to support whether the project represents a good investment for both the funding partners and the community. This business plan is also being developed in a way that is consistent with business plans for other large-scale North American capital infrastructure projects.

The first information sheet outlined the strategic case for the Third Crossing, how it is defined in other city plans, why it’s needed and how it’s considered in the city’s strategic plan. The second information sheet outlined the technical feasibility of the project and the progression of the conceptual design from the environmental assessment to the current preliminary design and associated construction, operation, and maintenance cost estimates.

This information sheet describes the economic feasibility of the project and provides a more focused view into the financial aspects of building a Third Crossing and how it is integrated into the City’s long-term financial plans. The business plan also includes a cost-benefit analysis, economic impact analysis, and procurement options analysis, all of which provides further information to support city council in deciding on the next phase of the Third Crossing Action Plan. The business plan can also be a central document when the city emphases for the project with the other levels of government and the financial considerations.
How will the city pay for the construction of the Third Crossing?

The second information sheet on the preliminary design and cost estimate provides a total project cost of $180M based on construction in 2019. The funding for the bridge is based on an equal contribution from the federal, provincial and municipal governments. Figure 1 breaks down the projected funding with the Government of Canada and the Province of Ontario each contributing $60M for a total of $120M in grant funding which is aligned with senior level government priorities for shovel-ready infrastructure. The city would also contribute $60M of which $30M will be funded from development charges (DCs) and $30M from municipal taxes.

Development charges are fees the city collects for new growth and development within the city. DC’s have been collected since 1999 for municipal services and infrastructure including the Third Crossing. If construction starts in 2019, the city will have collected $20M in development charges for the bridge by the end of construction, with the balance of $10M to be collected from development occurring beyond that timeframe.

The city will pay its share of the $30M through a combination of 50 per cent “pay-as-you-go” in cash and the remaining 50 per cent through debt issuance.

No tax increase is required to pay for the Third Crossing.
How will the city pay for the on-going operation and maintenance of the Third Crossing over its service life?

The annual operating and the maintenance costs for the crossing considers the costs for both the bridge structure and the roadway elements on both sides of the Cataraqui River. Like any piece of infrastructure the city owns and maintains, various elements of the bridge will require maintenance, repair and replacement over the course of its 100 year life.

The on-going operating costs for the bridge, which includes snowplowing, street sweeping, line painting, and landscaping to name a few, will be included within the existing annual operating budget for the city’s entire transportation network. The on-going repair and replacement costs will be included within the asset management capital funding envelope for the city’s transportation infrastructure, which is funded from the Municipal Capital Reserve Fund.

Operating and capital maintenance costs are factored into the long-term financial plans as part of the city’s overall transportation network and no tax increase is required. If considered exclusively, total debt charges and ongoing operations and maintenance costs for the Third Crossing would equate to approximately $18 to $20 annually or approximately $1.50 per month for an average residential household over the asset life.

The Economic Impact Analysis, discussed later in this information sheet, discusses the potential for the Third Crossing to be a catalyst to facilitate and accelerate employment and residential land development in surrounding areas. Accelerated build-out will also contribute to assessment growth projections, thereby increasing the tax base and reducing pressure on future property taxes to fund costs related to this and other operating and capital investments.

COST-BENEFIT ANALYSIS

A cost-benefit analysis (CBA) is an industry standard approach to help determine whether an investment is a good use of resources. The Third Crossing CBA examined the costs of building, operating and maintaining the bridge against the benefits that the project generates for society.

<table>
<thead>
<tr>
<th>Socioeconomic impact</th>
<th>Description</th>
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<tbody>
<tr>
<td>Capital and operating costs</td>
<td>The costs to plan, design, construct, operate and maintain the Third Crossing over the analysis period (30 years).</td>
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<tr>
<td>User and non-user travel time savings</td>
<td>The change in the amount of time for road network users travelling in the Kingston.</td>
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<tr>
<td>Vehicle operating costs</td>
<td>Changes to travel time and distances affect vehicle operating costs including vehicle maintenance, depreciation and fuel consumption.</td>
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<tr>
<td>Traffic accidents</td>
<td>Changes to travel distance affect the probability of traffic accidents occurring and resulting fatalities, injuries and property damage.</td>
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<tr>
<td>Vehicle emissions</td>
<td>Changes to vehicle emission outputs for road network users across the City of Kingston.</td>
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<tr>
<td>Emissions from construction</td>
<td>The emission output from the construction of the Third Crossing.</td>
</tr>
<tr>
<td>Emergency response time</td>
<td>Changes to travel distance affects emergency response times in the road user network for fire and paramedic services.</td>
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The CBA identifies, calculates and compares the social and economic impacts of the project (both costs and benefits) and places a dollar value on these impacts (monetize) to enable an “apples-to-apples” comparison, in monetary terms. The socioeconomic impacts of the Third Crossing that have been monetized and included in the CBA are described in Table 1.

The industry standard to developing a cost-benefit analysis for major transportation infrastructure projects typically uses a 30 year period. All of these socioeconomic impacts that are accrued to the project over the 30 years are then discounted (i.e.: brought forward) to a common year to enable a comparison of the total cost versus the total benefit that is calculated in 2017 dollars. The result of this comparison is called a cost-benefit ratio outlined later in this document.

**USER AND NON-USER BENEFITS**

The CBA for the Third Crossing considers both the user and non-user benefits. Users are defined as people using the bridge for trips within the city’s transportation network. Benefits users of the bridge receive include shorter travel time and travel distance while providing options of using active transportation and transit for their trips throughout Kingston.

Non-users are defined as people making trips within Kingston’s transportation network but are not using the crossing for their trips. Non-users also benefit since the crossing provides a more direct route for users and therefore non-users benefit from shorter travel times and decreased congestion on their routes throughout Kingston.

Benefits users of the bridge receive include shorter travel time and travel distance while providing options of using active transportation and transit for their trips throughout Kingston.

**TABLE 2 – TRANSPORTATION MODEL VALUES- PEAK TRAVEL HOUR**

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<tr>
<th></th>
<th>Time (Hours)</th>
<th>Distance (Km)</th>
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<tbody>
<tr>
<td><strong>Third Crossing users</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without Third Crossing</td>
<td>900</td>
<td>33,500</td>
</tr>
<tr>
<td>With Third Crossing</td>
<td>550</td>
<td>21,500</td>
</tr>
<tr>
<td><strong>Overall Savings</strong></td>
<td><strong>350</strong></td>
<td><strong>12,000</strong></td>
</tr>
<tr>
<td><strong>Third Crossing non-users</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without Third Crossing</td>
<td>12,000</td>
<td>695,000</td>
</tr>
<tr>
<td>With Third Crossing</td>
<td>11,500</td>
<td>690,000</td>
</tr>
<tr>
<td><strong>Overall Savings</strong></td>
<td><strong>500</strong></td>
<td><strong>5,000</strong></td>
</tr>
</tbody>
</table>

Non-users also benefit since the crossing provides a more direct route for users and therefore non-users benefit from shorter travel times and decreased congestion on their route throughout Kingston.
Without a Third Crossing, the remaining travel route options for all trips across the Cataraqui River is 900 hours during the afternoon peak travel hour with a cumulative travel distance of 33,500 kilometers. With the Third Crossing in place, the total travel time for all trips drops to 550 hours and the total travel distance is lowered to 21,500 kilometers. This represents an overall travel time savings for users of 350 hours and 12,000 fewer kilometers travelled every day. For the average person using the Third Crossing, their trip would be about 5 kilometers shorter and save them 8 minutes in travel time. For all other trips in the transportation network during the afternoon peak travel hour, the total travel time is 12,000 hours with a cumulative travel distance of 695,000 kilometers without the Third Crossing. This compares with 11,500 hours and 690,000 kilometers with the Third Crossing in place. As a result, non-users of the Third Crossing will benefit from reduced congestion in the transportation network with total overall travel time savings of 500 hours for the non-users and 5,000 fewer kilometers travelled every day. When these values are considered over a year, the benefits for both the users and non-users are a combined estimate of over 60 million fewer kilometers travelled with an overall time saving of approximately 3.5 million hours.
The cost-benefit ratio (CBR) is a key indicator typically used to assess whether the project is a good use of resources. A CBR with a value greater than 1.0 means the benefits outweigh the costs of the project. The Third Crossing Cost Benefit Analysis calculates a CBR over a 30 year period that considers both the user and non-user and also isolates the benefits for the users of the bridge.

A discount rate is used to represent the present value of future costs and benefits to provide an “apples-to-apples” comparison into 2017. When applying a discount rate of five per cent, the present value of the cumulative costs for the Third Crossing over the 30 year period is estimated to be approximately $180M and includes the initial cost of construction and operation and maintenance over the 30 year period. The present value of the cumulative benefits over the same period for both the users and non-users of the Third Crossing is estimated to be approximately $1,300M over the same period. When isolating just the user benefits the present value of the total benefits for this group alone is approximately $560M. These benefits are primarily provided through decreased travel time and reduced vehicle operating expenses.

As a result, the Third Crossing CBR shows a range between 5.5 to 7 when considering both the user and non-user benefits combined, and a range of discount rates from five per cent to seven per cent used for the CBA. When isolating the user benefits, the Third Crossing CBR shows a range between 2.5 to 3.

A general assessment and comparison of the crossing with other major transportation projects in Canada and the United States was also done to gauge the strength of the CBR against other projects. The Third Crossing CBA used similar discount rates as the other projects and although a wider range of discount periods was used by the other projects, the Third Crossing CBA’s 30 year period is an appropriate horizon since population, employment, and traffic information is less reliable beyond 30 years. Figure 2 shows the Third Crossing compares favourably to other transportation projects across North America and can be considered a good use of resources. The results of the CBA indicate that the Third Crossing has a “pay back” period within 10 years at which point the cumulative benefits exceed the costs of the project and subsequent years thereafter.
ECONOMIC IMPACT ANALYSIS

The objective of the economic impact analysis (EIA) is to assess the economic impact of the Third Crossing on the city and broader region using standard measures of economic activity.

An EIA is a widely accepted, rules-based and standard approach to measure how spending tracks through and impacts an economy – in this case, the economy of the city of Kingston and the surrounding area as defined by the Kingston Census Metropolitan Area (Kingston CMA). For infrastructure projects such as the Third Crossing, there are two broad types of economic impacts:

- **One-time impacts** from the construction of the crossing that is significant in the short term while the project is being developed, but ultimately dissipates after project completion.

- **On-going impacts** generated from economic activity the Third Crossing stimulates such as the development of employment or residential lands.

Economic impacts are generally estimated for the following standard measures of economic activity:

- **Gross output** is the gross value of all business revenue. This is the broadest measure of economic activity and indicates the total sales and transactions triggered by operations.

- **Value-added or Gross Domestic Product (“GDP”)** is the value added to the economy or the unduplicated total value of goods and services. GDP includes only final goods in order to avoid double counting of products sold during an accounting period. So, for instance, if a producer of widgets sells each widget for $100 and purchased $40 of goods from suppliers to produce the widget then the value-added or GDP impact would be $60 for each widget sold.

- **Wages and salaries** equal the total value of wages and salaries associated with employment impacts occurring from the project. Labour income is a smaller measure of economic activity and comprises an important part of GDP.

- **Employment** refers to the number of jobs created or supported due to the project and is expressed as the total number of part-time and full-time jobs.

- **Government tax revenues** are the amount of total tax revenues generated (Federal, Provincial and Municipal) from the project occurring.

Economic impacts are typically estimated at the direct, indirect and induced levels for both one-time and ongoing impacts:

- **Direct impacts** are changes that occur in “front-end” businesses such as the bridge construction company that initially receive expenditures and operating revenue as a direct consequence of operations and activities conducted.

- **Indirect impacts** arise from changes in activity for suppliers of the front-end business commonly known as the supply chain process. For example, the bridge contractor requires the purchase of rebar from a steel product manufacturer which requires purchase of refined steel from a steelmaker.

- **Induced impacts** occur when employees, from businesses and jobs stimulated by direct and indirect expenditures, spend their personal income on consumer goods and services.

The total economic impact equals the sum of the direct, indirect and induced economic impacts. Table 3 shows the results of the EIA when considering the one-time impacts of construction on the Kingston CMA. The one-time impacts during construction are estimated to generate $10M in GDP and 89 jobs on an average annual basis in Kingston over the construction period of three years.
During the development of the EIA, interviews with various business organizations and leaders within the community suggested that the development of the Third Crossing would provide on-going economic impacts to the Kingston community following the implementation of the project.

Many of those surveyed suggested the Third Crossing would be a catalyst to facilitate and accelerate employment land development within east side of the City and along the John Counter Boulevard corridor. Particular focus was given to the east side St. Lawrence Business Park, where employment land development was not reaching its potential due to limited access to the rest of the City.

Similar recommendations were presented as part of the Employment Land Strategy Review completed in 2015 and formed the basis of several policy changes in the Five Year Update to the City’s Official Plan. The Employment Land Strategy indicated that given the somewhat isolated location of the St. Lawrence Business Park in the east end of the City, the construction of an additional crossing across the Cataraqui River in the location as shown on Schedule 4 of the Official Plan would largely enhance the marketability of those employment lands while also providing critical direct access to those lands for the surrounding labour force.

The same would also be true related to the enhanced marketability of undeveloped commercial and residentially designated lands in the east side of the City. A third crossing of the Cataraqui River has the potential to have a synergetic effect on both the east end and Old Industrial areas of the City by creating a more dynamic, inter-connected urban environment serviced by active transportation linkages and express transit.

The EIA considered the full build-out and development of the St. Lawrence Business Park as a standalone scenario which produced an estimated 276 jobs paying total salaries and wages of approximately $21M per year, and approximately $29M in local GDP added on an annual basis.
PROCUREMENT OPTIONS ANALYSIS

A review of various procurement options has been carried out as part of the business plan for the Third Crossing. This review was intended to assist in determining the preferred design and construction administration to be used by the city. The review considered both traditional models including design-bid-build (DBB) and design-build (DB), and non-traditional models including various forms of public private partnerships (P3). The examination of procurement options typically relies on the combined findings of a quantitative and qualitative analysis with the objective of selecting the procurement option that maximizes both value and efficiency while protecting the City from risk.

The first analysis involved a comparison of a traditional DBB model against a non-traditional private public partnership model. The city has extensive experience with using DBB models on many of our capital projects such as road reconstruction and bridge infrastructure projects. The next step was to determine the appropriate (P3) model ranging from a design-build-finance (DBF) model up to and including options for operation and maintenance functions (DBFOM). The operations and maintenance functions were not considered to be viable components for a possible P3 model for the Third Crossing. Therefore, the DBF model was the preferred P3 model measured against a DBB in a value-for-money analysis.

A value-for-money (VfM) analysis is an approach commonly used to undertake a quantitative assessment that identifies, evaluates, and monetizes all of the potential risks associated with the project for a DBB versus a DBF. The VfM analysis also helps identify whether the project risks are retained by the City, transferred to the constructor, or shared between them. The results of the VfM’s quantitative analysis indicated the DBB provided more risk to the City when compared to the DBF model and therefore the DBB was eliminated from further consideration. It is important to note the VfM analysis is one of many tools used to inform the decision-making process as to whether a project should proceed with a DBF.

The project team has also widened its consideration to include alternative models for large construction procurements that have been developed to complete projects with both cost containment and risk mitigation. Integrated project delivery (IPD) is a model for construction which has been developed over the last decade for large scale construction projects. A design-build IPD is an approach to projects that integrates project participants in a collaborative manner but does not represent an “outsourcing” of the contract.

Through a multi-party agreement that ensures fiscal transparency and shared financial risk and reward, collaboration is encouraged through payment for team participation and liability waivers to mitigate litigation fears. The Design-Build IPD model increases cost predictability, schedule predictability, and risk allocation which has been shown to complete complex projects both ahead of schedule and under budget.

At this point in time, the city is continuing its due diligence to provide stakeholders with information that supports the merits of both the design-build IPD model and the DBF (P3) model as the preferred models for the construction of the Third Crossing.
Conclusion

The project team is currently finalizing the business plan report for the Third Crossing that will be presented to council in June 2017. The business plan is the overarching document that builds on the strategic case and the need for the Third Crossing proving it is a viable and technically feasible project for the city to do. It also demonstrates that the preliminary design is achievable while meeting environmental protection requirements and considerations.

The Third Crossing like several other large capital infrastructure projects has been included in the city’s strategic vision and is factored into the city’s long-term financial plans. This means no tax increase is required to pay for the construction or the on-going operating and maintenance of the crossing.

The draft reports on the strategic case, preliminary design and business plan for the Third Crossing will be available on the city’s website in early May, 2017.

For more information, please visit the Third Crossing website: CityofKingston.ca/ThirdCrossing

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