City of Calgary
Zero Based Review (ZBR)
Roads Business Unit
Final Report

September 25, 2014

Western Management Consultants

ISL Engineering and Land Services

Inspiring sustainable thinking

EXECUTIVE SUMMARY

Introduction

In 2013, Western Management Consultants and ISL were contracted to undertake a Zero-Based Review (ZBR) of the City of Calgary's Roads Business Unit municipal programs and services. The ZBR program evaluates services on the basis of effectiveness and efficiency.

During the Phase 2A high level analysis, a review of each of Road's thirty-two sub-service's: rationale; level and scope; effectiveness; efficiency; and, funding was undertaken. Based on this assessment, the consultant identified seven sub-services for in-depth analysis in accordance with the ZBR Method Guide. The outcome of the in-depth analysis (Phase 2B) was the identification of opportunities for change that would be formalized into specific Business Cases in Phase 3 of the ZBR to either confirm the status quo or illustrate opportunities for change in either service efficiency or effectiveness.

As a result of the in-depth reviews, recommendations were made to develop business cases for the following five sub-services.

Street Light Maintenance	Pavement **Marking**	**Sign** Manufacturing	Gravel Crushing	Pavement Rehabilitation
• *To explore alternative approaches to improve service efficiency and effectiveness of street light maintenance.*	• *To investigate the feasibility and benefits of contracting out pavement marking to the private sector.*	• *To examine the commercial viability of expanding Sign Shop services to other customers and clients or concentrating on core sign manufacturing processes.*	• *To investigate the feasibility and benefits of contracting gravel mining and crushing operation to a private sector operator.*	• *To compare the merits of self-performing versus contracting out pavement rehabilitation services.*

Business Case Recommendations

The five business cases developed in Phase 3 have resulted in the following recommendations to improve service levels and or reduce service costs.

1. Street Light Maintenance

Out-source street light maintenance to multiple maintenance service providers for different quadrants of the City with clearly identified maintenance performance measures.

Rationale: The primary benefit from issuing a new public tender for street light maintenance for different quadrants of the City stems from the fact that there has been a steady decline in performance from the current service provider which has had a historical monopoly on street light maintenance. Other service providers exist in the Calgary market which creates a competitive environment for street light maintenance resulting in improved effectiveness through the attainment of established service standards. More than one service provider gives the City the opportunity to assess contractor performance in achieving service level standards in different areas of the city. The consultant is not able to quantify cost savings from introducing new service providers however conventional thinking suggests that introducing a new competitive environment into the service delivery environment will foster better service responsiveness translating into more effective service delivery aligned with performance expectations. Introducing better contract administration at the business unit level will also contribute to improved service delivery by improving accountability for results.

2. Pavement Marking

Maintain the present state relative to pavement marking services using Roads Business Unit staff and equipment.

Rationale: Based on the financial analysis, there would be modest cost savings in the range of $175K per annum if the City were to contract line painting to the private sector. This savings would be offset by the fact that a limited number of private service providers operating in the Calgary market may actually result in less competition in a strong economy. Maintaining the current service delivery model is therefore recommended.

3. Sign Manufacturing

Focus on production of core signs and graphics related to traffic and roadway signs – regulatory signs, informational signs, detour signs, street name blades, side/overhead and parks signs. Specialty graphics such as engravings and vehicle wraps could be purchased from the private sector.

Rationale: Assuming the current level of production, costs, revenues, and recoveries, the elimination of non-core signs and graphics would allow the Sign Shop to achieve near full cost recovery. Minor changes in resourcing or operational efficiencies have the capability to

allow the Sign Shop to achieve full cost recovery. The effort to produce and deliver non-core sign products clearly consumes resources without a corresponding return on expenditures. An additional benefit of eliminating non-core production is that some of the specialized equipment required exclusively for vehicle / bin wraps, specialty graphics, or large format signs could be disposed. If the equipment is sold or depreciated, it will reduce the financial risk of equipment replacement costs, and will provide savings from ongoing maintenance. Annual cost savings would amount to approximately $450k per annum.

4. Gravel Crushing

Endeavor to improve efficiency, i.e. reduce costs of the mining, crushing and stockpiling of gravel at Spyhill by implementing industry standard cost control measures. Should such measures prove ineffective, contracting out the operation by soliciting tenders or competitive proposals for the best available combination of price and performance may be the best alternative.

Rationale: Efficiency can be significantly improved by implementing industry standard measures for cost control. Applying such measures would allow the City to:

- Forecast and establish projected unit costs prior to beginning the yearly program;
- Monitor costs and unit costs as they are incurred on a weekly basis and take corrective action if and when needed; and
- Use the unit costs as the basis for internal cost recovery, especially for "specialty" products that have historically been produced on request at a higher cost with cost recovery being at an overall average cost.

The reduced recovery represents a bargain price to the business unit using the product and a significant increase in cost for the gravel mining and crushing operation. Cost control requires that the crusher supervisor be empowered on a rational basis to accept or reject charges from others that are coded to the operation within the accounting system. Roads should see a twenty to thirty percent improvement in efficiency or savings of $600,000 to $900,000 per annum via cost control within three years. If savings are not experienced then Roads should move to strategic procurement of the service from private sector operators.

5. Pavement Rehabilitation

Endeavor to improve efficiency, i.e. reduce unit costs, by implementing industry standard measures for cost control. Should these measures prove ineffective, all Pavement Rehabilitation may be contracted out by soliciting competitive tenders or proposals for the best available combination of price and performance.

Rationale: Efficiency can be significantly improved by implementing industry standard measures for cost control. Applying cost control measures would allow the City to:

- Forecast and establish projected unit costs prior to beginning the yearly program;
- Monitor costs and unit costs as they are incurred on a weekly basis and take corrective action if and when needed; and
- Use the unit costs as the basis for comparing efficiency to private industry or contracting out.

Roads could see a ten percent improvement in efficiency or save up to $1.5 Million per annum via cost control within three years. If they do not experience such savings then Roads should consider moving to strategic procurement of the entire pavement rehabilitation service. The strategy would need to address how the current advantages enjoyed by Roads self-performing could be provided by contracting.

6. Other Considerations

The five business case analyses and subsequent recommendations, lead to the development of various implementation considerations. Further details surrounding these can be found in the businesses cases themselves, as well as the implementation consideration sections.

Service	Other Considerations
Street Light Maintenance	• Examine 30 day service level agreement tool and data. • Analyze inventory costs. • Automate dispatch and completion tasks.
Pavement Marking	• Automate performance monitoring of maintenance marking. • Lengthen pavement marking notice times. • Review and revise resource allocations based on new marking request trends.
Sign Manufacturing	• Review potential vendors for specialty signs. • Review equipment utilization and phase out equipment for non-core signs. • Identify/confirm staff and resource impacts to discontinue non-core services. • Establish a new work order type to track production of Parks signs.
Gravel Crushing	Roads should engage a consultant familiar with industry standards for cost control and seek assistance in developing and implementing the system. The system will report the results of improving efficiency and should the result not be satisfactory, Roads could then implement outsourcing of the service.
Pavement Rehabilitation	Roads should engage a consultant familiar with industry standards for cost control and seek assistance in developing and implementing the system. The system will report the results of improving efficiency and should the result not be satisfactory, Roads could then implement outsourcing of the service.

TABLE OF CONTENTS

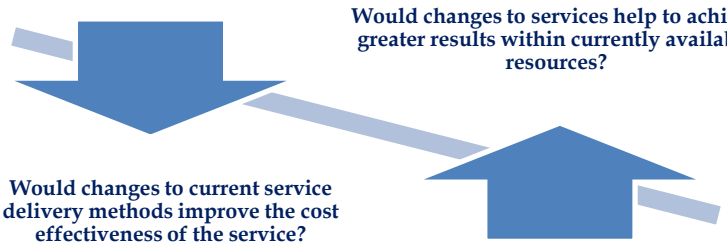
Table of Figures

Table of Tables

1.0 INTRODUCTION

1.1 Project Objective

The Zero-Based Review (ZBR) Program is intended to raise the care and attention paid to restraining expenditures and seeking efficiencies in the delivery of the City of Calgary's municipal programs and services. The Zero-Based Review Method Guide describes a zero-based review as an evaluative process through which a business unit's services are systematically reviewed to determine the most appropriate way to provide the services and at what level. The goal of the process is to provide options and recommendations dealing with the effectiveness (the relationship between outputs and outcomes) and efficiency (the relationship between inputs and outputs in terms of costs) of services. In particular the process focuses on finding answers to two key questions:



1.2 Project Scope

As a result of the Phase 2B in-depth reviews, recommendations were made to develop business cases for five of the seven sub-services identified in Phase2B of the ZBR process and methodology.

Street Light Maintenance	Pavement **Marking**	**Sign** Manufacturing	Gravel Crushing	Pavement Rehabilitation
• *To explore alternative approaches to improve service efficiency and effectiveness of street light maintenance.*	• *To investigate the feasibility and benefits of contracting out pavement marking to the private sector.*	• *To examine the commercial viability of expanding Sign Shop services to other customers and clients or concentrating on core sign manufacturing processes.*	• *To investigate the feasibility and benefits of contracting gravel mining and crushing operation to a private sector operator.*	• *To compare the merits of self-performing versus contracting out pavement rehabilitation services.*

2.0 ROADS ZBR BUSINESS CASES

2.1 Business Case #1: Street Light Maintenance

Description of Sub-Service
This Roads sub-service includes the following: **Asset Inventory and Planning** ▪ Plan for and manage the inventory of street lighting and traffic sign assets. ▪ Retain external contractor to maintain city's street lighting system. ▪ Review, approve and process maintenance invoices for streetlight maintenance. ▪ Collect and manage information pertaining to traffic signs, road marking, traffic signal and street lighting assets maintained by Transportation Operations. This information provides knowledge on what the assets are, where they are, and condition. **Customer Service and Maintenance** ▪ Respond to 311 service requests. ▪ Contact citizens as required to update on maintenance schedule etc. ▪ Update and maintain contract rates in Hansen for contractor billing **Utility Locates** ▪ Supply streetlight, and traffic signal records for utility locates purposes. ▪ Coordinate and address utility hit investigations with contract locator & city claims department (i.e. traffic signals & street lighting underground utilities etc.). ▪ Review, approve and process utility locates invoices for streetlight and traffic signals. **General Administration** ▪ Address elected official and Director escalations / concerns regarding traffic maintenance. ▪ Create annual requisitions for PO's. ▪ Post and interview positions (i.e. FTE & summer etc.).

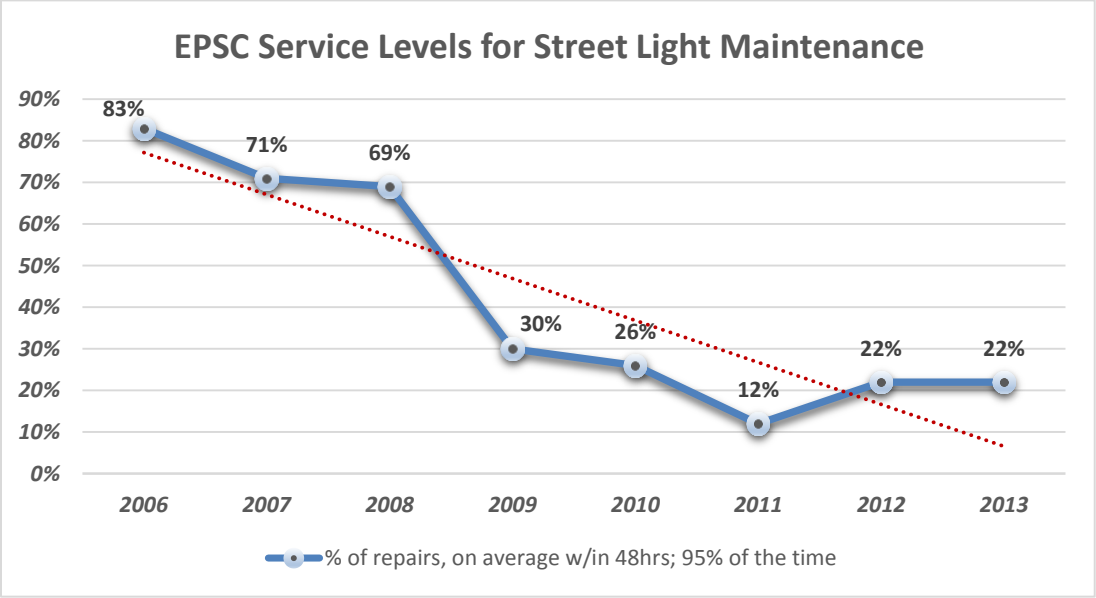
This sub–service includes processes to replace non-functioning street lights and emergency response repairs to street lights. The process addresses only street lights and does not include replacement or emergency response repairs for LRT signals or traffic signals. Street lighting for construction / development sites are the responsibility of the contractors / developers (and are repaired within the contractor's / developer's warranty) and are not in-scope for this Roads ZBR review. Street light replacement does not apply to Deerfoot or Stoney Trails as these repairs are managed by a maintenance contractor on behalf of the Province of Alberta. Roads are responsible only for maintaining roadway lighting on City right-of-ways.

Issue Identification

Enmax Power Services Corporation (EPSC) has had a historical monopoly on the provision of street light maintenance services. Field Operations is presently renegotiating the street light maintenance contract with EPSC. It should be recognized that since 2006 service levels have

deteriorated significantly. The decline in street light maintenance performance under the EPSC contract between 2006 and 2013 is illustrated in Figure 1 below.

Figure 1: EPSC Service Levels for Street Light Maintenance



Expected Outcome

The goal of this business case is to examine opportunities to improve service efficiency and effectiveness of street light maintenance either through enhancements to the current contract with EPSC or through contracting out to multiple private sector service providers.

Options Analysis

Three options for the maintenance of City of Calgary street lights were identified for review.

Option #	Description
1. Continue contract relationship with EPSC	Maintain contract relationship with EPSC but with changes to the identification, performance tracking and management of outcome measures against which service delivery can be monitored, penalized and or incentivized.
2. Managed Competition	Under a managed competition environment the Roads Business Unit would be permitted to compete with the private sector for the provision of street light maintenance functions.
3. Out-source to Multiple Service providers	Out-source street light maintenance to multiple maintenance service providers in different quadrants of the City with clearly identified maintenance performance measures.

Option 1: Continue Contract Relationship with EPSC

Under this option the Roads Business Unit would negotiate a new contract with EPSC to maintain the City's inventory of street lights. Going forward, it is crucial that the City identify and enforce performance measures against which to monitor success. The contract should also provide penalties for failure to meet performance expectations. Alternatively, the City could arrange for other service providers to be engaged to respond to service requests if EPSC fails to respond within agreed upon timelines and standards.

Pros:	Cons:
• The primary benefit of this option would be to continue the previous working relationship with EPSC. EPSC is familiar with the street light inventory and there would be minimal service impact by maintaining the current working relationship. • The business unit could also benefit from enhanced contract administration aimed at identifying service deficiencies sooner in the process such that performance is not allowed to degrade below service contract objectives.	• The consultant believes that where a service is obtained from a single provider the possibility of market competition leading to improved service or at least maintaining a high level of service is challenging. • There would likely be no major cost savings under this option.

Option 2: Managed Competition

Baker Tilley International (2012) defines managed competition as "a process used by local governments to identify the most cost-effective method for quality service delivery. It calls for carefully comparing the costs and benefits of contracting with private business or another government entity against the costs and benefits of providing the service in-house. It is important to note that managed competition is not the same as privatization. Privatization assumes that private business can always do a better job of providing services; managed competition considers the current provider (government employees) as a viable, long term provider of services in a fiscally constrained environment. According to one estimate, managed competition has the potential to produce annual savings of 10 – 30 percent.

Managed competition can be a powerful tool for governments to improve service delivery and reduce costs in a resource-constrained environment. However, if not managed properly, managed competition can also create a hostile environment and waste valuable time and resources. Careful consideration must be given when developing a managed-competition program. For example:

- **Time and resources:** The process can take several months to several years. Factors include but are not limited to the complexity of the service provided, availability of information, time allowed, and the structure of the review and approval process.

- **Fully loaded cost calculations:** Agreeing on the method for calculating government service costs is a common sticking point for managed competition. Information to make these calculations is also required.

- **Estimating risk:** Costs such as rehiring laid-off staff or repurchasing equipment should be taken into consideration if the business unit is outsourced.

- **Comparison to best-in-class services:** Often, it is more realistic for governments to compare service levels and costs to comparable entities. Striving for best-in-class services may outweigh the benefits.

- **Stakeholder cooperation:** Successful managed competition requires cooperation and buy-in from political officials, managers, staff, and unions.

When executed properly, managed competition can result in significant cost savings, high citizen satisfaction, and a sense of pride for government staff able to "beat out" their competition."[1]

Under this option the Roads business unit would compete with other service providers including EPSC for the maintenance service contract. A competitive bid would need to be developed for submission under the City's procurement processes.

Pros:	Cons:
• **Best-value services:** Enables cities to find solutions where they can get the most "bang for the buck" or where the expectation of services may be reset so that the jurisdiction can reduce the overall cost of service by meeting a slightly lowered delivery schedule. • **Empower front-line employees:** Provides current staff an opportunity to come up with solutions and changes, softening the transition process. It also helps to mitigate harsh community reaction to privatization by objectively looking at the cost of services.	• Accurately identifying a fully loaded cost of service: Some public agencies do not have the cost accounting systems in place to tie specific internal costs (labour, commodities, and equipment) with performance and service levels. • Getting people to change their idea of service delivery: People can be resistant to change and it can be difficult to get buy-in for these types of programs. • Staff reductions: If internal costs are high, the internal work group bidding on the services may have to consider layoffs or wage cuts in order to be competitive with the market.

[1] Baker Tilley International, May 2012. **Managed Competition for Cost Effective Service Delivery** **Av**ailable: http://www.bakertilly.com/Managed-Competition-for-Cost-Effective-Service-Delivery

Pros:	Cons:
• **Encourage innovation:** Challenges current system, fosters creativity, and engages employees. It also allows employees to begin thinking out of the box in terms of service delivery, demand, and employee availability. • **Encourage partnerships:** Managed competition provides an opportunity for labor and management to work together. It focuses on partnerships and looks to provide the best solution given fiscal constraints. • **Reward competitive thinking:** Some governments have developed gain-sharing programs to reward employees with part of any savings generated out of managed competition. Incentives such as these can further reinforce increases in performance and lead to future gains	• Employee morale: There may be a negative impact on labor relations and employee morale if employees lose a bid. However, some jurisdictions utilizing managed competition have seen the work group or bargaining unit come back in future years with a more competitive proposal to win back the work and retain it in the long term.

Option 3: Out-source Street Light Maintenance to Multiple Service Providers in Different Quadrants of the City

Under this option the Roads Business Unit would issue a public tender for street light maintenance for different quadrants of the City. Having multiple service providers working across the City would conceivably reduce costs and improve efficiency in maintenance functions. Under this option, EPSC would be eligible to submit a competitive quotation in response to the City's street light maintenance terms of reference and service level requirements.

Pros:	Cons:
• In the long term, increased competition will improve effectiveness and efficiency of street light maintenance functions. • Enhanced contract administration aimed at identifying service deficiencies sooner in the process such that performance is not allowed to degrade below service contract objectives.	• Managing multiple service contracts will require extra administrative effort. • Certain areas of the City may be seen as less desirable from a service bidding perspective. • Additional costs associated with increased contract administration.

Evaluation

Evaluation of Efficiency

The inability of the current contractor to fully deliver maintenance services under the terms of the existing service level agreement and Roads dissatisfaction with the service level suggests service is inefficient. If a new contract is negotiated with EPSC the next agreement should include some retributive clauses which allow Roads to engage other external parties to perform street light repairs in the event that EPSC cannot consistently deliver on its service level agreement for street light maintenance or, at the very least, allow Roads to collect a refund of its payment to Enmax for services not performed within the service level agreement.

Evaluation of Effectiveness

Street light maintenance (for both reported outages and emergency outages) is performed by EPSC. The agreement outlines the service levels for EPSC to restore roadway lighting, which is currently set at 30 days following the receipt of the Service Request Report from the Hansen system. EPSC does not regularly meet this service level, with the replacement timeframe generally between 60 and 90 days.

Notwithstanding the degradation of EPSC service levels as noted in Figure 1 above the Annual Roads Satisfaction survey identified the following public satisfaction levels. While these satisfaction levels may appear acceptable the public would not generally be aware of the implications of reduced service levels to infrastructure or required roads lighting standards.

Street Lighting – Main Roads	**Avg.**	**2012**	**2011**	**2010**	**2009**	**2008**	**2007**	**2006**	**2005**
	88%	88%	-	90%	-	84%	-	87%	92%
Street Lighting – Neighbourhood Roads	**Avg.**	**2012**	**2011**	**2010**	**2009**	**2008**	**2007**	**2006**	**2005**
	88%	-	89%	-	87%	-	86%	-	88%

The following table illustrates the expected outcome from each of the identified options.

Option	Efficiency	Effectiveness	Recommendation
1. Continue contract relationship with EPSC	⇔	⇩	Not recommended due to past performance of EPSC as a single source maintenance service contractor
2. Managed competition	⇧	⇧	Not recommended due to lack of readiness of Roads Business Unit for this type of service delivery model

Option	Efficiency	Effectiveness	Recommendation
3. Outsource to Multiple Service Providers	⇔	⇧	**Recommended to achieve short and long term service improvements that can be tracked over time**

⇧ Positive Impact; ⇩ Negative Impact; ⇔ No Impact/Neutral Impact

Business Case Recommendation

Out-source street light maintenance to multiple maintenance service providers in different quadrants of the City with clearly identified maintenance performance measures.

Implementation Considerations

The current contract with EPSC expires in 2016. Discussions with EPSC, which are currently underway, should stress the importance of adhering to City street light maintenance service standards. If the recommendation in this Business Case to issue the maintenance tender more broadly is approved, EPSC should be advised that a competitive bidding process for street light maintenance is being pursued and that EPSC will have the opportunity to submit a competitive bid.

The process review conducted in Phase 2B also identified several considerations for street light maintenance both from a contract administration and internal service point of view.

1. Roads should examine how to accurately measure the 30 day service level agreement, and identify the correct tool and data which will best track the agreed upon 30 day service level agreement. Currently, this is done via a mix of work orders and service requests, but this creates challenges when service requests are re-opened and re-closed, as this action "re-sets" the clock on the date of the request which introduced inaccuracies into the measurement of the service level agreement. A clear definition of when the timing begins on a service request, and when the timing ends must be established / negotiated with EPSC. Once identified, appropriate systems should be utilized to track these service level agreements so that a quantitative record of missed service level agreements can be supplied to EPSC.

2. The Roads business unit absorbs inventory costs related to the on-site storage of light equipment and supplies. These inventory costs should be analyzed in greater detail to determine what options are available to Roads to reduce / eliminate these inventory costs (e.g., allow contractors to purchase pre-approved supplies and invoice those costs to Roads as part of the repairs).

3. Overall, Roads must examine options for making this process less manual and paper-based, both for dispatch and completion tasks. Other functions within the City use more automation, for example, scanning bar codes to record codes for materials and labour. Introducing more automation into this process, where applicable and appropriate, will certainly improve efficiency and will very likely reduce costs.

Risks and Mitigation

The following risks have been identified relative to the recommended option in this business case.

Risk	Mitigation Strategy
Managing performance of additional service providers may prove challenging to the business unit.	• Develop a change management strategy which identifies how business unit staff will interface with multiple service providers. • Ensure service contracts have clear performance objectives and means by which performance will be evaluated.
Street light maintenance activities in some areas of the City may be more problematic in terms of maintenance expectations which may result in contractors not submitting bids to provide street light maintenance services.	• The business unit should conduct an evaluation of the unique challenges that different areas of the City may present and determine if incentives would be applicable to entice competitive bidding.

2.2 Business Case #2: Pavement Marking

Description of Sub-Service
This Roads sub-service includes the application and maintenance of all lane-line, centerline, stencils and crosswalk marking on city roadways. The Lane Line Program consists of the maintenance of longitudinal markings that delineate the travel lanes for motorists. The Crosswalk Program consists of transversal markings that delineate the travel of pedestrians across roadways. The Durable Road Marking Program (typically maintenance-free for four to five years) consists of markings that delineate travel lanes for motorists by using Epoplex's epoxy LS60 (slow cured), and preformed tape.

Issue Identification

While pavement marking is a core service for the efficient and safe operation of the road network, legislation does not specifically require the City to provide pavement marking services. Technical guidelines and safety are the key drivers for pavement marking standards.

Many urban municipalities contract out the majority of their pavement marking services. As private sector businesses in Calgary can also provide these services, alternative service delivery options exist for provision of the service.

In addition, because the City operates specialized pavement marking equipment that requires significant maintenance, and this service has experienced low satisfaction rates relative to other City services, this is an opportune time to consider potential changes. Furthermore, pavement marking services have not been reviewed in the past five years.

Expected Outcome

The goal of this business case is to decrease maintenance costs and improve service efficiency and effectiveness.

Options Analysis

The following two options are covered under this Business Case:

Option #	Description
1. Present State	Maintain the present state by continuing to provide pavement marking services within Roads business unit staff and equipment.
2. Outsource Service	Contract pavement marking services to an external third party provider through a competitive bidding process.

Option 1: Maintain the present state by continuing to provide pavement marking services with Roads business unit staff and equipment

Under this option the Roads Business Unit would continue to provide pavement marking services using existing equipment and manpower. Specialty services could be contracted if and when required.

Pros:	Cons:
• The division has considerable expertise with this service which could be continued, including hand painting functions.	• Aging equipment would pose a risk to mechanical breakdown and thus reducing the timeliness of pavement marking services. • As the City continues to grow, the complexity of providing these services will also increase (lack of backup trucks, storage space and dispatch locations are rising concerns). • The cost of equipment and maintenance, as well as investing in new technology, is high.

Option 2: Contract Pavement Marking Services to External Third Parties through a Competitive Bidding Process

Under this option the Roads Business Unit would issue a public tender for pavement marking services to the private sector.

Pros:	Cons:
• Eliminating long term fleet cost by disposing of existing paint trucks that require significant maintenance upkeep. • Contractors could work outside of normal work hours thus reducing impact on motorists and other citizens.	• Local market conditions impact the predictability of the costs associated with a third party provider; therefore, the private sector may be more expensive than providing the services in-house. • Third party providers may be less effective for small scale projects that do not offer a high market price. • Short notice requests which are a hazard of the conditions Roads operate will also increase costs.

Evaluation

Evaluation of Efficiency

The consultant was able to identify the cost per meter of pavement marked through the process mapping exercise and through the use of output and input data provided by Roads for this service. The internal cost per meter of pavement marked is 67 cents. This is approximately equal

to the weighted average for a third party provider. Therefore, providing the service internally is just as efficient as contracting out pavement marking operations.

The following table provides a breakdown of Road's total annual expenditures for pavement markings of $2,779,652.

Table 1: Roads' Total Expenditures for Pavement Markings

Roads Pavement Marking Internal Cost Categories	*Reported Costs*
Vehicles & Equipment	*$255,693*
Materials & Supplies	*$720,986*
Salary, Wages, & Benefits	*$1,802,974*
TOTAL	***$2,779,652***

The following table estimates the City of Calgary's costs if it were to contract out its current pavement marking services. The quantities below were provided by the Roads Business Unit and reflect their current service requirements. The associated estimated costs to contract out similar services were calculated using provincial data.

***Table 2: Estimated Costs for Contractor Delivery of Pavement Marking**

Pavement Markings	*Quantity*	*Estimated Costs*	*Estimated Cost Per Unit*
Solid Line	*522,308 m*	*$344,723*	*$0.66*
Double Solid Line	*783,461 m*	*$658,108*	*$0.84*
Skip Line	*1,305,769 m*	*$365,615*	*$0.28*
Crosswalks	*451,357 m*	*$297,896*	*$0.66*
HOV Stencils	*750*	*$56,250*	*$75.00*
Turn Signal Stencils	*3,500*	*$945,000*	*$270.00*
Cycling Stencils	*750*	*$105,000*	*$140.00*
TOTAL		***$2,772,592***	

Source: Alberta Transportation and PreMark by Flint

**The labour cost of maintenance is reflected in Table 2, but marking truck replacement costs have not been included.*

The following tables compare current internal costs against the estimated costs outlined above. Contracting pavement marking services would not provide the Roads Unit with significant additional savings as they are able to provide these services at approximately the same cost.

Table 3: Comparison of Total Costs for Internal vs. Contractor Provided Pavement Marking Services

Cost Comparison of Internal vs Contractor Delivered Pavement Marking	
	Total Cost
Cost of Pavement Marking Performed Internally	*$2,779,652*
Cost of Pavement Marking Performed by Contractors	*$2,772,592*
Difference for Internally Provided Services	*7,060*

Roads' Pavement Marking service invests substantial resources to painting truck / equipment maintenance. The table below factors in the additional annual labor cost for truck / equipment maintenance, to then compare to the costs of pavement markings provided by contract services.

Table 4: Cost Comparison including Roads' Annual Labour Costs for Truck/Equipment Maintenance

Cost Comparison of Internal vs Contractor Delivered Pavement Marking	
	Total Cost
Cost Pavement Marking Performed Internally	*$2,779,652*
Total Annual Labor Cost for Equipment Maintenance	*$167,213*
Combined Internal Cost of Pavement Marking/Maintenance	*$2,946,865*
Cost of Pavement Marking Performed by Contractors	*$2,772,592*
Difference for Internally Provided Services	*$174,273*

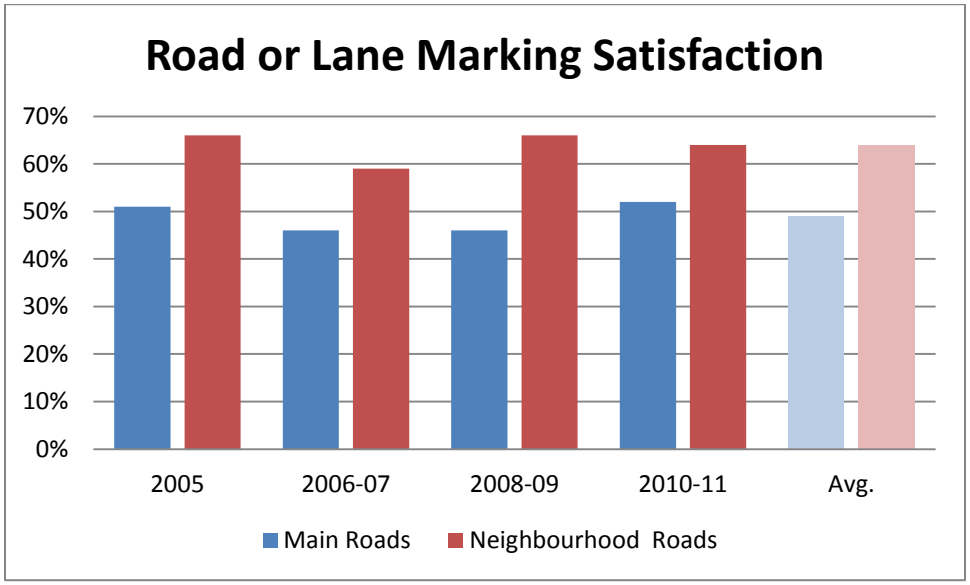
Evaluation of Effectiveness

There are a limited number of 3rd party grinding and marking contractors/competitors, which may impact competitive bidding. Third party providers may also be less effective for small scale projects that do not offer a high market price. Furthermore, contracting pavement marking services would decrease flexibility and response times for urgent service requests that arise from time to time. A potential 6% saving in costs on this service may not compensate for the loss of flexibility or service response times. Delivering the service internally will also help to manage the risk that a competitive market may pose to the City in the form of increased cost of service or less responsiveness to City pavement marking needs.

In addition, the Roads 2012 Annual Survey revealed the following satisfaction levels with road or lane markings on main and neighbourhood roads. The survey captures satisfaction data in alternate years.

Road or Lane Marking - Main Roads	Avg.	2012	2011	2010	2009	2008	2007	2006	2005
	49%	52%		52%		46%		46%	51%
Road or Lane Marking - Neighbourhood Roads	**Avg.**	**2012**	**2011**	**2010**	**2009**	**2008**	**2007**	**2006**	**2005**
	64%	-	64%	-	66%	-	59%	-	66%

Figure 2: Road or Lane Marking Satisfaction



These figures demonstrate that Roads has experienced generally consistent satisfaction levels with pavement marking on neighbourhood roads. A review of comparator municipalities did not reveal greater citizen satisfaction levels with third party pavement marking service providers. Furthermore, while the level of citizen satisfaction for pavement marking is lower than other services delivered by the Roads business unit, this may be the result of the service type itself, as well as tracking mechanisms, which are complaint based. Moreover, it was determined through the peer review process that other municipalities consider satisfaction levels in terms of paint quality, as opposed to citizen satisfaction for this service.

The following table illustrates the expected outcome from each of the identified options.

Option	Efficiency	Effectiveness	Recommendation
1. Present State	⇔	⇔	**Recommended**
2. Contract Services	⇔	⇩	**Not Recommended**

⇧ Positive Impact; ⇩ Negative Impact; ⇔ No Impact/Neutral Impact

Based on the evaluation criteria, it is recommended that the Roads Business Unit continue to provide pavement marking services using City resources as illustrated in the cost analysis conducted with Roads Business Unit staff by the consultant during Phase 2B of the project.

Business Case Recommendation

Maintain the present state relative to pavement marking services using Roads Business Unit staff and equipment.

Implementation Considerations

As this recommendation reflects the present state, no major immediate implementation initiatives are required. There are however, several actions identified in the Phase 2B report that would enhance the service delivery model, and are recommended for long-term consideration. These process improvements can be implemented by Roads operations staff and would have a positive impact on service delivery. Furthermore, the department is required to report back on any implementation in accordance with the ZBR guidelines.

1. On-going monitoring of maintenance marking is a highly manual, paper-based process. Roads should examine the availability and use of automated or semi-automated tools to perform the on-going monitoring of maintenance marking. The goal of evaluating and eventually replacing paper-based monitoring with more automation is to more accurately and consistently track the completion status of maintenance marking. This will provide a more precise understanding of how much work is done, how much is left, and whether the maintenance is trending ahead or behind the planned schedule. This has a direct correlation to costs as delayed work often requires overtime of the hiring of 3rd party contractors.

2. Notice of required pavement markings from Project Managers (via work orders) is often too short. The ideal time is 10 days' notice, which provides enough time for the marking to be correctly planned and scheduled. But the road marking team often receives notification only 1-2 days before the marking is required, and with the pressure to re-open a roadway. This has an impact on cost and schedule as crews are re-assigned from their planned

activities in order to complete the markings requested by Project Managers. Other complicating factors in this area (which contributes to potential cost increases and schedule delays) are changes from the roadway's design to the actual as-built (which may require modifications to the road marking plan/schedule), and roadway construction delays without extension of the roadway's opening date (which compresses the schedule available to the road marking crews to complete their work, with a potential for increased labour costs).

3. New marking requests, submitted via work orders, continually affect the regular maintenance schedule, but must be completed due to the safety issues of non-marked roadways. In addition to the schedule and cost impacts already noted, new markings then become part of the on-going annual maintenance inventory and schedule. The volume of road marking maintenance, therefore, increases continually, but the budget, staff, equipment, and timelines for completing the maintenance schedule remain relatively unchanged. While the Roads Business Unit has been increasingly efficient to date, this cannot be maintained over the long-term. This increases the risk of additional costs (overtime, longer maintenance season, etc.) and risk of maintenance remaining incomplete.

Risks and Mitigation

The following risks have been identified in association with this recommended option and above business case evaluation.

Risk	Mitigation Strategy
Potentially high financial risk given the age of the trucks and pavement marking equipment.	• Annual maintenance reviews. • Technology watch for new tools.
Increasing frequency of line painting due to continued city growth.	• Budget allocation for new equipment.
Schedule risk due to the lack of backup painting trucks.	• Invest over the long-term in automated performance measurement tools.
There is an increasing cost associated with the materials currently used.	• Review innovative practices of comparable cities, for example, Alaska Low VOC paint, MMA spray plastic and cold plastic inlay.
Storage space for pavement marking materials and supplies is becoming a concern.	• Invest over the long-term in additional storage space as required.
The marking crews begin work from a centralized location. This creates an issue with travel times, especially if schedules are changed at the last minute, and may affect the ability to complete work as scheduled.	• Review the possibility of multiple starting locations. This could be analyzed as more storage space is required. • Invest over the long-term in automated performance measurement tools.

Risk	Mitigation Strategy
Virtually all the road marking staff (currently 30 FTEs) are seasonal (with the exception of the marking truck drivers).	• Develop incentives for returning seasonal workers based on the collective agreement in consultation with union representatives. • Streamline training processes.

2.3 Business Case #3: Sign Manufacturing

Description of Sub-Service
This sub-service manufactures signs, decals, large format graphics, banners, vehicle wraps, building signage and a variety of specialty items. The operation provides signs for the City of Calgary Roads Business Unit, and on occasion, signs and graphics for other city business units and smaller municipalities in the Calgary region.

Issue Identification

The in-depth review identified that the City sign shop is a generally well-managed service which provides products and services to other City Departments and to a limited group of external municipalities. Although the Sign Shop does not receive significant direct tax support from the municipality, it does produce signs and graphics for other City Departments for which it receives recoveries. Sign shop employees are dedicated professionals with unique artistic skills that make them well suited to deliver sign shop products and services. The sign shop's core service is to produce traffic / roadway signs and it performs this function well. The sign shop also performs several "non-core services" such as vehicle / bin wrapping, engraving, signs for Parks, and producing specialty (non-traffic) signs and graphics.

The primary issue observed within the Sign Shop is that the services it now provides have grown from the initial objective of traffic sign production to include what can be considered "non-core" services noted above. (This expansion of service beyond the core function of traffic sign production has introduced some cost, efficiency, and effectiveness impacts to the Sign Shop. Furthermore, the rationale that production of non-core signs allows staff to remain occupied outside of periods when core signs are being produced may be an indication that the Sign Shop is currently overstaffed.

The consultant estimated the amount/type of work that could be classified as core and non-core as shown in the table and figure below:

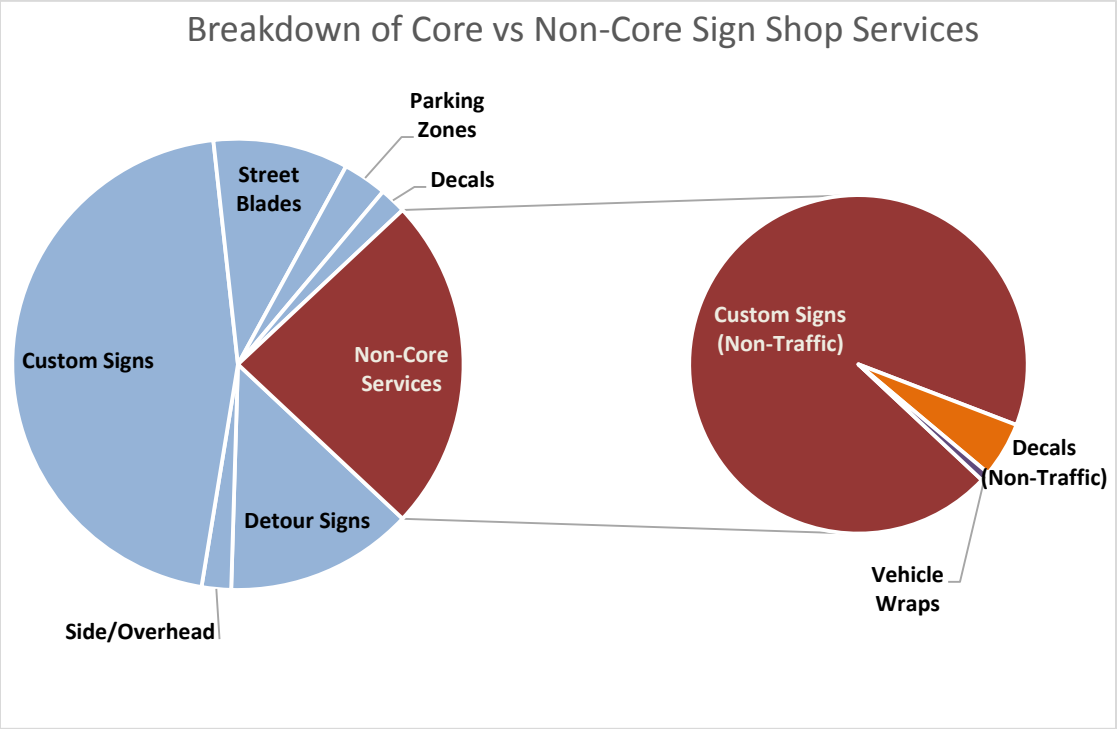
Table 5: Percentage of Signs - Estimated Breakdown of Core vs Non-Core Signs

Product/Service Provided	Estimated Classification	
	% Core	% Non-Core
Detour Signs	100%	0%
Side/Overhead Signs	100%	0%
Custom Signs	67%	33%
Street Blades	100%	0%
Parking Zones	100%	0%
Decals	60%	40%
Bin/Vehicle Wraps	0%	100%

Note: The product/service breakdown shown above is based on the work order categories created by the Sign Shop. Parks signs are not tracked by specific work orders, and therefore the volume, production costs, and recoveries for signs produced for Parks signs are embedded in the remaining sign products and work orders shown.

If Parks signs (which are considered non-core) continue to be produced by the Sign Shop a new work order type to track these types of signs should be considered. This will allow the Sign Shop to accurately capture sign volumes and costs of production to ensure recoveries for these Parks signs are sufficient and appropriately accounted.

Figure 3: Sign Shop Core vs Non-Core Breakdown



The focus on, and evaluation of, non-core services was identified and driven by an analysis of the production process costs of each type of Sign Shop deliverable. Following a detailed process analysis of each type of deliverable, and an estimate of the labor costs for each type of product, it became clear that the non-core products (for example custom signs and wraps) had the highest cost per unit (figure below) and hence became a focus for additional analysis and possible cost savings.

Figure 4: Process Costs of Sign Shop Products

Expected Outcome

The goal of this business case is to achieve the ZBR's stated goals of efficiency, effectiveness, and /or cost reduction.

Options Analysis

Four options for future operation of the City Sign Shop were identified by the consultant.

Option #	Description
1. Maintain Present State Production Regime	Maintain the present state where the sign shop would continue to manufacture the same products and services as it presently does. The sign shop would produce core products (traffic / roadway signs) as well as non-core custom signs and graphics such as engravings, vehicle wraps, bin wraps, etc., utilizing the same processes, equipment, and resources currently in place.
2. Focus production of core sign and signage products only	Focus only on core products and services. The sign shop would continue to operate using its existing processes and practices, but would focus on the manufacture of traffic and roadway signs (regulatory signs, informational signs, detour signs, street name blades, and side/overhead signs). Custom signs and graphics (including signs for Parks, vehicle wraps, garbage bin wraps, large format signs, certain types of decals, and certain categories of custom signs) would be discontinued and procured from third party providers when required.
3. Expand Commercial Offerings beyond current internal and external customers	Expand the Sign Shop's commercial offerings to provide the Sign Shop's products and services to additional private and / or municipal customers beyond the City of Calgary.

Option #	Description
4. Discontinue Current Sign Production and Purchase Signs and Signage Products from Private Sector Providers	Transition to vendor supplied traffic and roadway signs, procured from private vendors and no longer produced internally by the Sign Shop. The vendor would be expected to supply traffic / roadway signs only and would not be needed or required to supply custom-type signs (vehicle / bin wraps, engraving, large format signs, etc.).

Each of the four options will have a different focus and potential impact on production considerations. The consultant recommendation at the end of this business case aims to improve the financial position of the City's sign procurement services, as well as focus on core products and services in order to meet the City's demand in the most cost effective manner possible.

Option 1: Maintain Present State Production Regime

Under the present state, the Roads Business Unit would continue to manufacture traffic and parks signs and custom graphics internally using Sign Shop equipment and staff.

Pros:	Cons:
• Maintains existing operational stability, with all required resources, materials, and processes understood and fully operational. • Responsiveness to internal business unit / Roads customer sign and graphics requirements. • Allows for a wide variety of project types allowing employees to fully apply their artistic training, which leads to increased job satisfaction.	• Time, staff, and financial resources expended on non-core services. • Potential overlap / duplication of services with Creative Services. • Production of non-core products requires its own equipment. This additional, and often specialized, equipment contributes to the Sign Shop's maintenance and asset depreciation costs (which would not be incurred if non-core products and services were not produced.

Evaluation

At the outset the consultant notes that this option is not recommended because under current conditions, it is cost negative, with the costs incurred to produce the signs and graphics higher than the recoveries and revenues as shown in Table 6.
In addition, existing sign shop resources deliver non-traffic, non-core products not related to traffic or regulatory signs. The delivery of these "non-core" products and services indicates the Sign Shop's efficiency and effectiveness can be improved.

Table 6: Costs and Revenue Summaries of the City of Calgary Roads Sign Shop (2012)

Cost/Revenue Category	Amount
Vehicles & Equipment	$9,787
Materials & Supplies	$1,017,084
Salary, Wages and Benefits	$1,090,206
Miscellaneous Expenses	($243,027)
Total Expenditures for Sign Shop	**$1,874,051**
Revenue *(Scrap sales, other revenue)*	$61,827
Recoveries *(Traffic control, and constructed inventory)*	$1,226,685
Total Revenues & Recoveries	**$1,288,512**
Surplus/Shortfall	**($585,538)**

Table 7: Category and Quantity of Signs Produced (2012)

Sign Type Category	Quantity Produced
Detour Signs	817
Side/Overhead	48
Custom Signs	18,733
Street Blades	1,883
Parking Zones	5,603
Decals	46,289
Vehicle Wraps	551
Inventoried Signs	29,258

Option 2: Focus Production on Core Sign and Signage Products Only

Under this option the Sign Shop would focus strictly on signs for traffic, roadway, regulatory, detour, parking, and street name signs only. The Sign Shop would discontinue production of any non-core products and services such as bin and vehicle wraps, large format graphics, Park signs, engravings, etc. which could be supplied by Creative Services or purchased from private sector vendors.

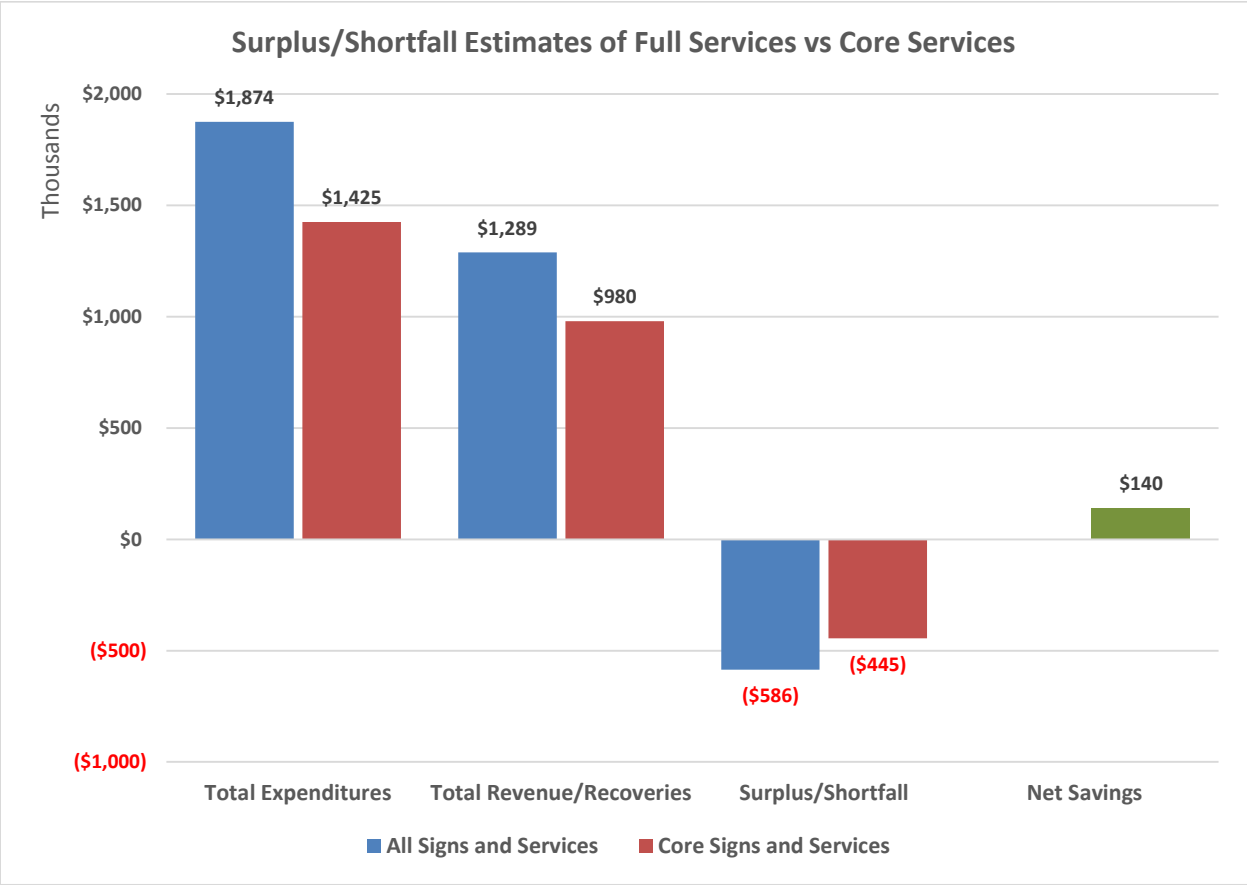
Pros:	Cons:
• Has the potential to improve cost recovery of the Sign Shop near-term within existing product quantities. • Ability to phase out specialized equipment not required for traffic signs, resulting in equipment and maintenance cost savings. • Reduces the financial risk of equipment replacement for equipment no longer needed. • Refocuses the Sign Shop operations on its core services of producing traffic signs. • Potential for cost savings as equipment and/or staff reductions are realized.	• Does not reduce the risk of aging equipment requiring detailed and on-going maintenance. • There may be some impact with employee satisfaction as the more "artistic" non-core products are phased out. • Potential reduction of Sign Shop staff as non-core production is phased out.

Evaluation

As previously noted, the Sign Shop produces various products other than traffic, roadway, and regulatory signs. The manufacture of other products including wraps, engravings, and large format graphics may detract from the core service of producing traffic and regulatory signs.

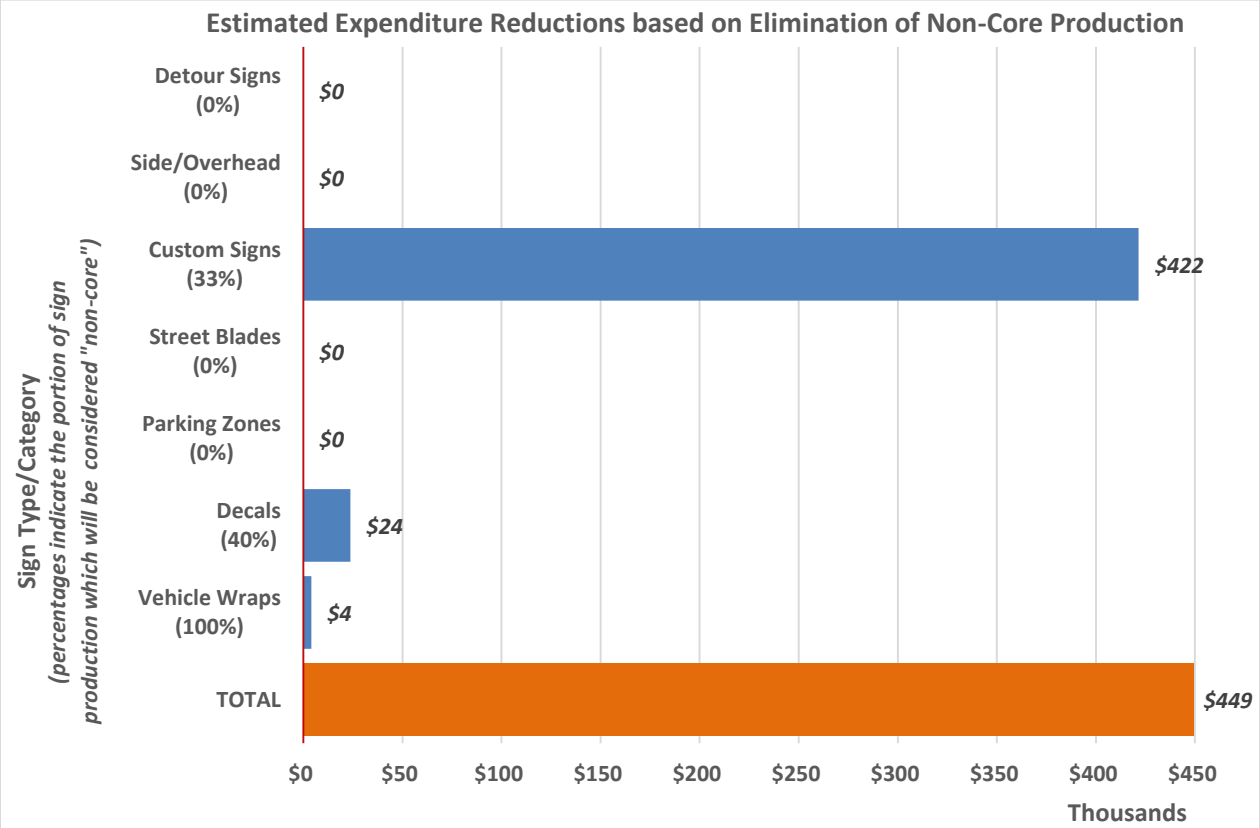
The consultant recommends that the City consider phasing out the production of non-core products and service based on the following cost analysis.

Figure 5: Comparison of Expenditures and Revenues based on Core and Non-core Products and Services



The total revenue/recoveries for production of core signs and services is derived by taking the current recoveries ($1.289M) and allocating a revenue/recovery amount to each type of sign category, its portion of the total volume of signs, and the estimated classification of core/non-core as shown in Figure 5 above. Consequently, any revenue/recovery for non-core signs has been "deducted" from the original recovery amount.

Figure 6: Estimated Expenditure Reductions due to the Elimination of Non-core Products and Services



Assuming the current level of production, costs, revenues, and recoveries, the elimination of non-core signs and graphics would allow the Sign Shop to recover a greater portion of its costs. The effort to produce and deliver non-core sign products clearly consumes resources without a corresponding return on expenditures.

An additional benefit of eliminating non-core production is that some of the specialized equipment required exclusively for vehicle / bin wraps, specialty graphics, or large format signs could be disposed. If the equipment is sold or depreciated, it will reduce the financial risk of equipment replacement costs, and will provide savings from reduced maintenance.

As noted previously, the Sign Shop is staffed with dedicated professionals with unique artistic skills. Most often, the artistic skills are utilized during the production of non-core products and services (custom, non-traffic signs, vehicle and bin wraps, and specialty graphics). If a decision is made to phase out these non-core products and services, there is likely to be an impact to employee morale and satisfaction, which should be anticipated.

Conversely, if the decision is made to eliminate non-core products and services specialized artistic skill sets of existing staff may not be required. This may allow a reduction of labor costs for the Sign Shop as more highly skilled resources are no longer required to produce standard traffic and parks signs.

Option 3: Expand Sign Manufacturing Operations beyond Current Internal and External Customer Base

Under this option, the sign shop would expand its commercial offerings to private sector and other municipal customers. To maintain the broadest product offerings possible, the Sign Shop would maintain production of non-core signs and graphics.

Pros:	Cons:
• Expansion may provide the possibility to generate additional revenues, helping to achieve full cost recovery. • Maintains existing operational stability, with all required resources, materials, and processes understood and fully operational.	• Requires significant increases in production volumes to achieve near full cost recovery. • Would require more staff to absorb the increased production quantities and to manage sales and marketing functions. • Little or no commercial / sales and marketing expertise within the Sign Shop. • May hasten the breakdown of existing equipment, resulting in accelerated capital costs to replace equipment. This could be addressed via a detailed pricing analysis to ensure that equipment costs are absorbed into the product pricing (which the Sign Shop does not currently perform). • Limited space and resourcing may make this a non-viable option.

Evaluation

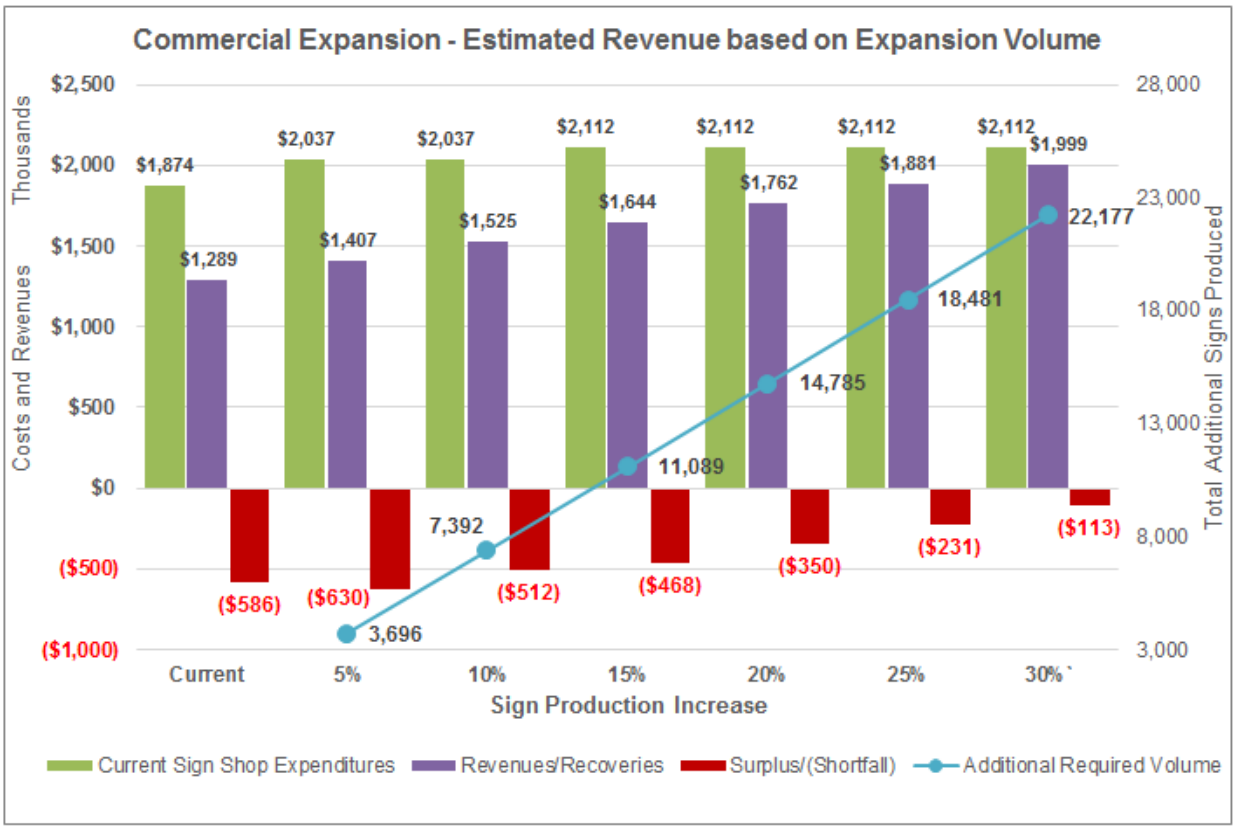
On the surface, this option seems viable. Here, the Sign Shop would provide all the products and services currently provided (both core and non-core) to maintain a broad-based set of product and service offerings that the marketplace may demand and require. In order to maximize the product and service offerings to the marketplace, this option suggests that all types of products and services (traffic / roadway signs, vehicle / bin wraps, engraving, large format signs, etc.) would be produced by the Sign Shop. With this option the Sign Shop, in addition to fulfilling its primary role of providing sign products and services to The City of Calgary would become a private vendor to other customers or municipalities.

The consultant recognizes this option would require additional Sign Shop resources to support the expansion. In addition to more staff (to support the delivery of a higher quantity of signs), at least one new resource/FTE, focused on sales and marketing activities would be required as part of the expansion. Private-sector sales and sales to municipalities other than the City of Calgary sales would permit the Sign Shop to include a margin in their prices to absorb the costs of additional materials and to facilitate cost recovery. The margins for private-sector vendors of

signs is estimated to be between 20% - 25%, but the Sign Shop may accept a lower margin to allow their product pricing to be competitive in the marketplace.

Following the consultant's analysis, expansion of the sign shop's commercial offerings may not offer the expected benefits. For commercial expansion to approach full cost recovery, a significant increase in the quantity of signs and graphics produced (estimated at 30%) would be required. This translates to an additional 22,000 signs and graphics annually. Although this increase does account for the additional resources required to support the commercial expansion (1 new sales and marketing FTE, and between 1 and 2 manufacturing FTEs, depending on the size of the increase), even a 30% increase does not fully achieve cost recovery for the Sign Shop.

Figure 7: Estimated Revenues, Recoveries, and Sign Quantities from Commercial Expansion



In addition to the financial consideration, the increased level of production would put additional pressure on the Sign Shop's existing resources, namely the aging sign production equipment. As the equipment requires on-going care and maintenance, any increase in production may hasten the end of the useful life of the equipment and require new capital investment to support the commercial expansion.

Finally, there is limited commercial and marketing expertise in the Sign Shop, and it has not operated in an open, competitive market. The lack of market experience may slow the ability to achieve the estimated revenues of commercial expansion. Furthermore, there is a very limited market for traffic signs and the lack of experience coupled with a limited market may adversely affect commercial expansion and is therefore not recommended.

Option 4: Discontinue Current Sign Production and Purchase Signs and Signage Products from Private Sector Providers

Under this option the Roads Business Unit would procure traffic and roadway signs from private sector providers.

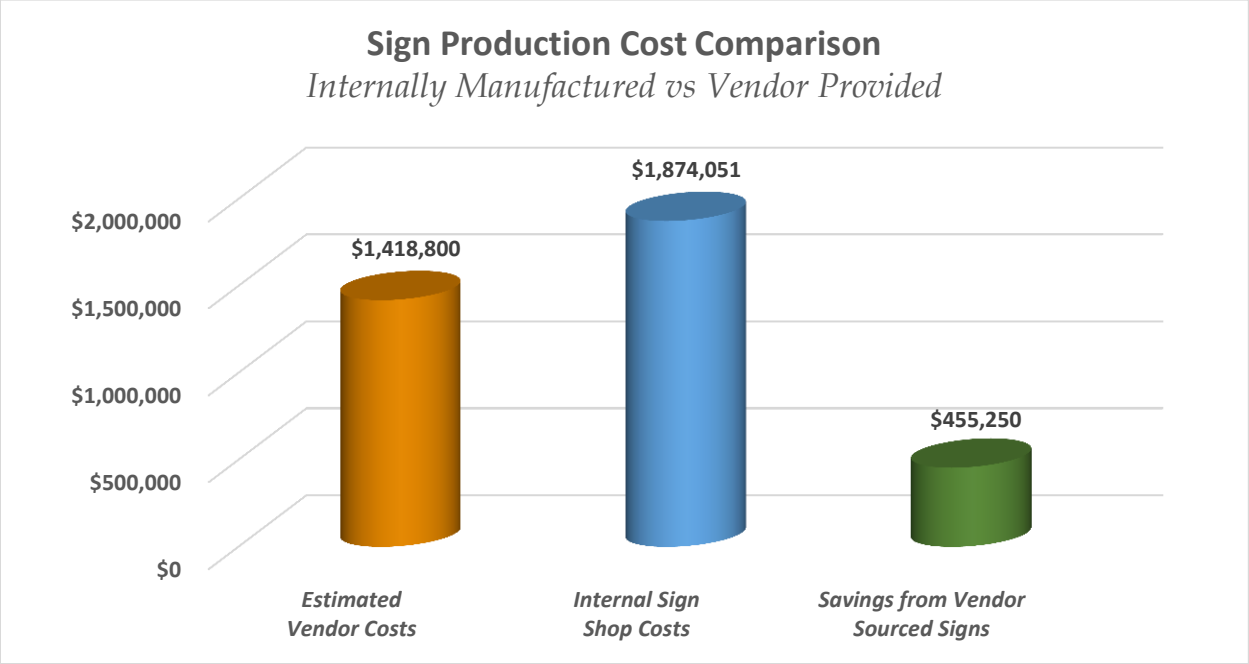
Pros:	Cons:
• Based on analysis, vendors can provide the same quantity of signs at an expected lower cost. • Elimination of equipment maintenance, service, and replacement costs. • Transfer of risk from the City's Sign Shop to vendors, by outlining contractual obligations for the vendor to meet Roads' sign requirements in the timeframes. • Ability to introduce and enforce performance requirements for the vendors, with financial compensation for non-performance. • Focused on providing core products and services (traffic / roadway signs) • Elimination of inventory stocking issues.	• Sign production is shifted to an external provider, which may introduce a lack of direct control over sign production. • Potential risk of the vendor's ability and speed to respond to emergency sign requests. • Potentially limited number of vendors who can provide the level and volume of service required by Roads. • May be some longer-term financial risk if vendors increase sign pricing once Roads has discontinued its internal sign production.

Evaluation

From a strictly financial perspective, moving to vendor supplied signs appears to be a viable option to consider. This option transitions the manufacture and procurement of traffic signs from the Sign Shop to private vendors. Vendors would provide only "core" signs (traffic, regulatory, informational, detour).

The following chart shows an estimated comparison between the costs of vendor supplied signs versus the cost to produce the signs internally, by the Sign Shop. The comparison was derived by using the Sign Shop's actual 2012 production volumes (by sign type) and applying an average price for vendor supplied signs (as shown in Appendix A). The total cost was then compared to the actual, net expenditures of the Sign Shop for 2012.

Figure 8: Sign Production Cost Comparison



Based on a preliminary analysis of vendor available signs, all categories of signs required by the City of Calgary can be provided by private vendors. At present there are at least four major sign manufacturing businesses operating in the Calgary market. Given the City's current sign requirements, vendors can provide the same sign categories and volumes for the City at potentially lower cost. Vendors can also provide the required hardware and accessories, so there would be very limited, if any, differences in what can be produced internally or procured externally.

For reference purposes, sign vendor pricing has been included in Appendix A. Although the selected prices were provided by an American vendor and are listed in USD, they are generally indicative of the Canadian market, as Canadian vendors were wary of providing prices due to competitive pressures. The consultant also determined that at least two new non-Alberta based sign manufacturing ventures are targeting Alberta municipalities.

Notwithstanding the financial benefits of this option, there are some operational risks that are introduced by outsourcing the manufacture of signs to external vendors. One is the loss of direct control over the manufacture of City of Calgary traffic signs and the responsiveness of vendors to emergency situations/requirements. Although Roads can attempt to mitigate these risks via contractual/performance requirements, the loss of direct oversight and control over sign production is a major issue. Furthermore, the long-term financial risk may be higher if vendors introduce price increases after Roads has discontinued its Sign Shop, leaving Roads exposed to vendor-mandated pricing.

The following table illustrates the expected outcome from each of the identified options.

Option	Efficiency	Effectiveness	Result
1. Present State	⇩	⇔	**Not Recommended**
2. Focus on Core Products	⇔	⇧	**Recommended**
3. Commercial Expansion	⇩	⇔	**Not Recommended**
4. Vendor Supplied	⇧	⇔	**Recommended if Option 2 is not successful**

⇧ Positive Impact; ⇩ Negative Impact; ⇔ No Impact/Neutral Impact

Business Case Recommendation

Focus on production of core signs and graphics related to traffic and roadway signs – regulatory signs, informational signs, detour signs, street name blades, side/overhead and parks signs. Specialty graphics such as engravings and vehicle wraps could be purchased from the private sector.

Implementation Considerations

Discontinuing non-core services may lead to less variety of complex work which may require a review of the job classifications and training/education requirements for Sign Shop staff. The potential for the greatest impact is with Sign Manufacturers Level 2 which has requirements for graphic design. Phasing out non-core products and services could result in reduction of Sign Manufacturers Level 2 pay classifications or elimination of these positions.

Ceasing non-core production may also result in some staff reductions in the Sign Shop, especially for those staff primarily focused on non-core production. However, we do not expect that this will have a significant adverse effect on core, traffic sign production. Even with staff reductions, the Sign Shop should still be able to produce core traffic/roadway signs in a timely manner, at current levels.

Risks and Mitigation

The following risks have been identified in association with the recommended option to focus on production of core sign products.

Risk	Mitigation Strategy
Equipment Age and Reliability (for internally produced signs).	• Continue to perform the same level of on-going maintenance on existing equipment. • Lower production volumes may extend the lifespan of equipment. • Reinvest revenue from sale of obsolete equipment on preventative maintenance.
Non-local vendors for specialty signage products.	• Clear supply agreement with quality, quantity and timeframes for production and delivery. • Detailed annual plan for Roads for sign production, installation, and replacement. • Review and re-negotiation of Supply Management inventory levels/requirements. • Agreements with multiple vendors.
Potential for reduced employee satisfaction	• Clear communication/notification plans for Sign Shop employees. • Re-deployment of affected staff to other City Departments/Business Units (e.g. Creative Services)

2.4 Business Case #4: Gravel Crushing

Description of Sub-Service
This sub-service operates the Spyhill Crushing Plant. The Spyhill Crushing Plant is part of the Manchester Asphalt Plant Operation. The crushing plant mines and crushes rock to produce gravel to supply the Manchester Asphalt Plant and for the sanding chips blending operation. It also sells gravel products to internal and external clients. It operates six days a week with two crews during crushing season, from April to December. In conjunction with the Waste and Recycling business unit (WRS) the Spyhill operation creates air-space for the landfill operation. Costs for common site work are shared with WRS under a Relationship Agreement. Employees at both plants are part of the Roads Labour Pool.

Issue Identification

Industry comparable costs for similar services were estimated from available data and found to be $6 to $8 per tonne versus $10 per tonne at Spyhill. Comparators were derived from Alberta Transportation's 2012 tender results and a 2012 price list for the two major suppliers provided by the City via calculations detailed in Appendix B. This represents a 20% to 30% premium.

Issues identified as contributing to the higher cost of production included annual re-training of forces, manufacture of small quantities of specialty products for other Business Units, and services provided to other Business Units without cost recovery. It is expected application of industry standard methods of cost control could abate or significantly reduce the resulting higher costs from these issues. Alternately should the issues not be resolved, contracting out of gravel crushing could be used to control cost and scope of the mining and crushing. The excavation and creation of airspace at all other City landfills is accomplished via contracting out, so this could be accomplished at the Spyhill Landfill.

A previous consulting report completed in 2012 indicated that contracting of the gravel crushing operation was viable. Contracting would need to respect various performance expectations such as producing air space for land filling operations and meeting requirements of the Relationship Agreement between Waste & Recycling Services and Roads for cost sharing of joint development work at the Spyhill site. While the gravel plant has been responsive to the unique specifications and requirements of other business units (e.g., specific gravel required for sewer bedding), the gravel plant should attempt to guide the specifications (especially for smaller quantities) to products that are regularly produced and readily available.

This may help ensure that the gravel plant maximizes full cost recovery of its production, especially for smaller product quantities. The gravel plant operation also faces challenges in dealing with three separate unions representing the Operators, Forman, and Asphalt and Gravel Plant Technician. In addition, foremen are assigned based on seniority rather than

qualifications. This lack of labour flexibility and inexperienced staff appear to have an impact on the efficiency of gravel production.

Cost tracking should also be implemented in a manner similar to private industry and costs should continue to improve toward being within range of industry averages. Industry standard cost control measures include:

- Defining scope and developing a budget according to plans and estimated costs;
- Weekly reporting / review of variable costs adjusting operations to improve efficiency;
- Empowerment of responsible staff to control assignment of costs to their operation; and
- Review of variable and fixed costs at completion to improve efficiency next time.

It is most important to use the cost control as the informer of management decisions and not as the motivator to improve operational efficiency.

Expected Outcome

The goal of this business case is to maintain a sound relationship with Waste and Re-Cycling while delivering obligations under the agreement for mining gravel and reduce costs associated with mining, crushing and stockpiling, i.e. improve efficiency. It is expected that at the very least by implementing industry standard approaches the additional costs will at least be clearly identified and controlled via a decision making process as to their value. At best the cost of mining and crushing could be reduced to be within a reasonable measure of private operations.

Options Analysis

Two options to improve efficiency of the gravel mining and crushing operation were identified by the consultants.

Option #	Description
1. Industry Standard Cost Control	Improve efficiency via application of industry standard approaches for cost control.
2. Contract Services	Improve efficiency by contracting the mining, crushing and stockpiling to industry via soliciting tenders or competitive proposals.

Option 1: Industry Standard Cost Control

Under this option the Roads Business Unit would continue to deliver it obligations under the Relationship Agreement between Waste & Recycling Services and Roads for cost sharing of joint development work at the Spyhill site while self-performing the mining, crushing and stockpiling of gravel to create airspace for the Spyhill Landfill site. Efficiency can be

significantly improved by implementing industry standard measures for cost control. Applying such measures would allow the Roads to: 1) Forecast and establish projected unit costs prior to beginning the yearly program; 2) Monitor costs and unit costs as they are incurred on a weekly basis and take corrective action if and when needed; and, 3) Use the unit costs as the basis for internal cost recovery, especially for "specialty" products that have historically been produced on request at a higher cost with cost recovery being at an overall average cost. The reduced recovery represents bargain price to the business unit using the product and a significant increase in cost for the gravel mining and crushing operation. Cost control requires that a responsible supervisor be empowered on a rational basis to accept or reject charges from others that are coded to the operation within the accounting system.

Pros:	Cons:
• Full flexibility in the selection and delivery of products produced throughout the season. • Minimal disruption of existing services and staff. • Empowers and thereby engages frontline supervision. • City recovers its significant investment in crushing plant and equipment.	• Significant effort is require by accounting staff to develop and maintain the system. • Other City Business Units may face increased costs via more accurate recoveries. • City continues to have significant investment in crushing plant and equipment.

Option 2: Contract Mining, Crushing and Stockpiling Services to External Third Parties through a Competitive Bidding Process

Under this option the Roads Business Unit would continue to deliver its obligations under the Relationship Agreement between Waste & Recycling Services and Roads for cost sharing of joint development work at the Spyhill site while contracting for the mining, crushing and stockpiling of gravel to create airspace for the Spyhill Landfill site. The crushing Supervisor and Materials Technician would continue to plan the yearly program in concert with Waste and Recycling to deliver the desired airspace and bottom grades required for the landfill. They would also identify the quantities of each product desired by the City and develop plans for the product delivery. Such plans would be incorporated and provide the basis for a competitive tender or proposal call for mining, crushing and stockpiling to suit the Roads requirements.

The nature of such tenders is that scope of product to be produced must be reasonably fixed, i.e. within plus or minus of 15% of the quantity for each product to be produced, and there is little or no flexibility after the contract is let. The form of the Tender or Request for Proposals is most crucial in terms of obtaining competitive pricing. It would be natural for the operation to place all of the risks the City currently undertakes on the mining, crushing and stockpiling of gravel on the Contractors invited to submit prices. This could result in placing risks on the Contractors beyond their control and driving up the prices. A thorough pre-tender "Risk Analysis" should be performed so as to not drive up prices by assigning unmanageable risks to Contractors.

Pros:	Cons:
• Fixes City's cost for a pre-determined scope. • Requires more rigorous planning in advance. • City liquidates its significant investment in crushing plant and equipment and has no large capital outlays in future for such plant.	• No flexibility in the selection and delivery of products produced throughout the year. • Disruption of existing services and staff. • City loses insight to an important industry. • Prices may be higher or lower than expected due to fluctuations in the market.

Evaluation

The options were evaluated based on efficiency and effectiveness criteria.

Evaluation of Efficiency

Either option can lead to improved unit cost performance. Should the Roads chose to contract out for the mining, crushing and stockpiling of gravel it would by definition enjoy and live with the lowest market based price for this service. There is no guarantee that such a price would be lower than current costs at any given time. In the long term market variations from high to low tend to average out to a competitive norm. Most times and places where multiple specialty service providers are available for contracting, those vendors become increasingly efficient within their market. Contracting out for this service would also allow the City to recover some of its investment in crushing plant and avoid such capital investment outlays in future.

The adjusted cost of mining, crushing and stockpiling to suit the Roads requirements at Spyhill is 20% to 30% higher than similar services procured through Tendering in the current market. Allowing a Status Quo option is not really an option in this situation, nor is there any desire on the part of the Supervision or Management at Roads to continue in the absence of improved cost performance. Either option outlined herein can and will result in cost saving properly implemented. Contracting out relies on a market based procurement to obtain the best price (cost) in the long term, while self-performing the work relies on management. The market and hence prices quoted for such services in Calgary can vary dramatically in the Alberta market.

Evaluation of Effectiveness

Operational effectiveness of the mining, crushing and stockpiling has been considered and recently judged positively in an earlier assessment conducted by another consultant. Nothing within that assessment suggested that the mining, crushing and stockpiling to suit the Roads requirements was ineffective. In fact recent improvements by the new generation of supervision and an expressed desire to see continual improvement causes this consultant to believe effectiveness of Roads operations at Spyhill will continue to improve its effectiveness.

The following table illustrates the expected outcome from each of the identified options.

Option	Efficiency	Effectiveness	Result
1. Industry Standard	⇧	⇔	Recommended
2. Contract Services	⇧	⇔	Not Recommended in the short-term

⇧ Positive Impact; ⇩ Negative Impact; ⇔ No Impact/Neutral Impact

Business Case Recommendation

Endeavor to improve efficiency, i.e. reduce costs of the mining, crushing and stockpiling of gravel at Spyhill by implementing industry standard cost control measures. Should such measures prove ineffective, contracting out the operation by soliciting tenders or competitive proposals for the best available combination of price and performance may be the best alternative.

Implementation Considerations

Roads should see a twenty to thirty percent improvement in efficiency or savings of $600,000 to $900,000 per annum via cost control within three years. If savings are not experienced then Roads should move to strategic procurement of the service from private sector operators.

Going forward, Roads should engage a consultant familiar with industry standards for cost control measures and seek assistance in developing and implementing the system. The system will report the results of improving efficiency and should the result not be satisfactory, Roads could then implement the outsourcing of the service. Procurement of the service will require a well thought out strategy developed by specialists in procuring contracted services. While these specialists are available within Roads, review of the strategy by an outside consultant familiar with the industry should be obtained in advance of any tender or proposal call. A Managed Competition or Best Value Procurement and Project Management as promulgated by the Arizona State University[2] may be better strategic solution to obtaining the best combination of price and service for this option.

[2] Kashiwagi, D. "Best Value Procurement/Performance Information Procurement System Development" 2010. Available: http://pbsrg.com/app/wp-content/uploads/publications/papers-intro/Case-Study-Best-Value-Procurement-Performance-Information-Procurement-System-Development.pdf

Risks and Mitigation

Option 1: Industry Standard Cost Control

Risk	Mitigation Strategy
The primary risk is an inability to implement industry standard cost control due to differing authorities over process or other constraints that inhibit change in the organization.	Engage a consultant familiar with industry standard measures for cost control and skilled in strategizing organizational change needed to plan, develop, and implement the system.

Option 2: Contract Out

Risk	Mitigation Strategy
The primary risk is that once the contracting option is selected, Roads losses the ability to self-perform mining, crushing and stockpiling of gravels for all practical purposes.	The choice to contract-out should assess and evaluate the non-tangible benefits Roads enjoys from the operation to ensure it is truly to the City`s advantage to contract out.

2.5 Business Case #5: Pavement Rehabilitation

Description of Sub-Service
This sub-service administers the Pavement Management Application program [HPMA] which is used to identify locations for pavement rehabilitation to extend the service life of roads. Paving work is divided up for City crews and contracts based on annual budgets. Contract work includes concrete repairs affecting drainage, adjustment of appurtenances to final profile, base repairs as required, milling for profile, paving with specified materials, and lane marking. Coordination with internal & external stakeholders is required. City paving crews perform similar functions as described for contractors above including residential, collector and major roadways. Paving crews also do work for internal clients such as Transportation Infrastructure (Major Arterials), Recreation (Parking Lots), Transit/LRT (Parking Lots), and Roads Maintenance (Permits paving). Roads self-performs about 60% of the Pavement Rehabilitation Program. Paving employees are part of the Labour Pool and transferred from Roads Maintenance to Roads Construction during the paving season which goes from June to early October. Thereafter, they return to Roads Maintenance for SNIC and Spring Clean-up. Pavement Rehabilitation sub-services are delivered through Contracted Services and Construction Services, informed by Materials & Research.

Issue Identification

This Business Case compares the relative merits of self-performing versus contracting out for this service. The cities of Edmonton, Winnipeg and Ottawa contacted during the benchmarking review contract out the vast majority of their pavement rehabilitation services which works quite successfully for these jurisdictions. Underlying consideration of the self-perform versus contracting choice is the utilization of the City's labour pool. Essentially the labour pool balances the City's unionized human resources with the seasonal work required to be done.

Comparable costs for similar services contracted by the City were available for the year 2012 and found to be $16 per tonne (10%) lower than the City's after adjusting for Detours and Project Management. Issues identified as contributing to the higher cost included annual re-training of forces, weekend work, and an artificially higher cost of hot mixed asphalt from the City's plant in Manchester. With the exception of the cost of hot mixed asphalt, contractors face similar issues and therefore their effect on the City's cost is discounted in the comparison.

Noting that unit cost comparisons were only available for 2012, when Roads did an internal cost comparison exercise, it is expected application of industry standard methods of cost control could abate or significantly reduce the resulting higher costs from these issues. Alternately should the issues not be resolved, contracting out could be used to control cost and scope. Roads contracts out the majority of its paving to industry and will be able to do so for the rest of the paving. Whether the City should get out of the business of laying pavement is a strategic decision. Industry standard cost control records would help inform the decision when taken.

The Roads business unit has improved performance of their Pavement Rehabilitation operation starting in 2012 from the point of view of working within annual budgets. This is seen as the

"Scope Control" portion of a cost control system. Cost tracking and performance improvement should also be implemented in a manner similar to private industry to improve costs toward being within range of industry averages. Industry standard cost control measures include:

- Defining scope and developing a budget according to plans and estimated costs;
- Weekly reporting / review of variable costs adjusting operations to improve efficiency;
- Empowerment of responsible staff to control assignment of costs to their operation; and
- Review of variable and fixed costs at completion to improve efficiency next time.

It is most important to use the cost control as the informer of management decisions and not as the motivator to improve operational efficiency. At the same time it can inform a management decision as to what it costs to self-perform paving, which is a strategic operational advantage.

Expected Outcome

The goal of this business case is to improve efficiency of the Pavement Rehabilitation to be comparable on a consistent basis to other pavement rehabilitation services already contracted out by the City. It is expected that at the least by implementing industry standard approaches any cost premium will be identified and controlled via a decision making process for value. At best the City's cost could be reduced to be within a reasonable measure of private operations.

Options Analysis

Two options for Pavement Rehabilitation were identified by the consultant.

Option #	Description
1. Industry Standard Cost Control	Improve efficiency via application of industry standard approaches for cost control.
2. Outsource Pavement Rehabilitation	Improve efficiency by contracting out to industry via soliciting tenders or competitive proposals.

Option 1: Industry Standard Cost Control

Under this option the Roads would continue to deliver Pavement Rehabilitation services by self-performing the work. Efficiency may be significantly improved by implementing industry standard measures for cost control. Applying such measures would allow the City to:

1. Forecast and establish projected unit costs prior to beginning the yearly program;
2. Monitor costs and unit costs as they are incurred on a weekly basis and take corrective action if and when needed; and

3. Use unit cost records as the basis for comparing efficiency to private industry or contracting out.

Cost control requires that a responsible supervisor be empowered on a rational basis to accept or reject charges from others that are coded to the operation within the accounting system.

Pros:	Cons:
• Flexibility in managing the risk allocation of various projects throughout the City. • Minimal disruption of existing services and staff and City receives benefit of Labour Pool. • Empowers and thereby engages frontline supervision. • By placing the asphalt it produces with its own gravel the City realizes the value of the gravel resource that it owns at Spyhill.	• Significant effort is required by Roads and City staff to develop and maintain the system. • City staff and/or services that historically may have been charged to the operation will come under scrutiny and be re-evaluated. • City continues to have significant investment in asphalt plant and paving equipment.

Option 2: Outsource All Pavement Rehabilitation Services to External Third Parties through a Competitive Bidding Process

Under this option the Roads Business Unit would contract out all Pavement Rehabilitation services to private sector contractors. The nature of tenders is that scope must be reasonably fixed, i.e. within plus or minus of 15% of the quantity for each item, and there is little or no flexibility after the contract is let. The structure of risk presented to industry by the invitation to tender or propose prices is most critical in terms of obtaining competitive pricing. Roads contracts out a significant portion of its workload and the staff have solid experience in this approach to delivering projects.

Pros:	Cons:
• Fixes City's cost for a pre-determined scope. • Requires more rigorous planning in advance. • Empowers and thereby engages frontline supervision. • City liquidates its significant investment in equipment and has no large capital outlays in future for such equipment.	• Reduced flexibility in the selection and delivery of projects as the year progresses. • Disruption of existing services and staff. • City closes one window into an important industry. • Prices are subject to market variations and may sometimes be higher than expected.

Evaluation

Evaluation of Efficiency

Either option 1 or 2 will lead to improved unit cost performance. Should the Roads business unit choose to contract out all pavement rehabilitation it would by definition enjoy and live

with the lowest market based price for the service. There is no guarantee that such a price would be lower than current costs at any given time. In the long term market variations from high to low tend to average out to a competitive norm. Most times and places where multiple specialty service providers are available for contracting, those vendors become increasingly efficient within their market. Contracting out for this service would also allow the City to avoid capital investment outlays for specialized paving equipment in future.

The adjusted cost of self-performing Pavement Rehabilitation is about 10% higher than other similar work contracted by the City. While significant savings could be realized in theory by contracting out such work it must also be recognized the cost savings may not be realized due to the differing ways in which contractors and the City evaluate and make provision for risk. The Contractor builds it into their price in advance and the City incurs an additional cost should it occur. The contractor is driven by a desire to not lose money and make provision for such costs in advance in the price quoted.

Evaluation of Effectiveness

Operationally the pavement rehabilitation program has evolved over the years to adapt to particular realities of the City's Labour Pool and its collective bargaining agreements.

The resources applied are generally as effective in delivering the work as those available through contracting out. One consideration in effectiveness is the management of risk by self-performing the work. Certain risks will be assessed a premium price in the market place as they can significantly impact the cost of performing the work. Low probability risks with a high cost if they actually occur are recognized by contractors and priced significantly higher in a good market. Such risks may have a low probability of occurring especially when recognized in advance with mitigating strategies in place. So these risks are typically discounted by agencies self-performing such work by identification in advance and installing mitigating strategies.

This allows the City to undertake projects with certain particular risks at a lower cost than if they were contracted out. This is a very effective use of self-performance.

The following table illustrates the expected outcome from each of the identified options.

Option	Efficiency	Effectiveness	Result
1. Industry Standard Cost Control	⇧	⇔	**Recommended**
2. Outsource All Pavement Rehab	⇧	⇩	**Not Recommended in the short-term**

⇧ Positive Impact; ⇩ Negative Impact; ⇔ No Impact/Neutral Impact

Business Case Recommendation

Endeavor to improve efficiency, i.e. reduce unit costs, by implementing industry standard measures for cost control. Should these measures prove ineffective, all Pavement Rehabilitation may be contracted out by soliciting competitive tenders or proposals for the best available combination of price and performance.

Implementation Considerations

Roads could see a ten percent improvement in efficiency or savings of $1.5 Million per annum within three years using industry standard cost control measures outlined above. If such savings are not realized Roads should consider moving to strategic procurement of the service. The strategy would need to address how the current advantages enjoyed by Roads self-performing could be provided by contracting.

Roads should engage a consultant familiar with industry standards for cost control and seek assistance in developing and implementing the system. The system will report the results of improving efficiency and should the result not be satisfactory, Roads could the implement the outsourcing of the service. Procurement of the service will require a well thought out strategy developed by specialists in procuring contracted services. While these specialists are available within Roads, review of the strategy by an outside consultant familiar with the industry should be obtained in advance of any tender or proposal call. A Managed Competition or Best Value Procurement and Project Management as promulgated by Arizona State University[3] may be better strategic solutions to obtaining the best combination of price and service for this option.

[3] Kashiwagi, D. "Best Value Procurement/Performance Information Procurement System Development" 2010. Available: http://pbsrg.com/app/wp-content/uploads/publications/papers-intro/Case-Study-Best-Value-Procurement-Performance-Information-Procurement-System-Development.pdf

Risks and Mitigation

Option 1: Industry Standard Cost Control

Risk	Mitigation Strategy
The primary risk is an inability to implement industry standard cost control due to conflict over process or other constraints that inhibit change in the organization.	Engage a consultant familiar with industry standard measures for cost control and skilled in strategizing organizational change to plan, develop, and implement the system.

Option 2: Outsource All Pavement Rehabilitation Services

Risk	Mitigation Strategy
The primary risk is that once the contracting option is selected, Roads losses the ability to self-perform and thereby the effectiveness of the operation may be adversely effected.	Implement a Managed Competition or Best Value Procurement strategy combined with a project management strategy to address the potential loss of effectiveness.

APPENDIX A: SIGN VENDOR PRICING

Selected Prices for Vendor-Provided Signs (USD)

	Cost is USD	CDN $ (@$.92)
Regulatory		
Stop Sign, 30" Diamond Grade	$72.50	$78.30
Stop Sign, 36" Diamond Grade	$112.50	$121.50
Yield Sign, 30" Diamond Grade	$56.50	$61.02
Yield Sign, 24" Diamond Grade	$40.50	$43.74
Speed Limit, 30x36, HI Prismatic	$62.50	$67.50
No Passing, 30", HI Prismatic	$54.50	$58.86
Average Price	**$71.82**	

	Cost is USD	CDN $ (@$.92)
Directional		
No Turn, 30" HI Prismatic	$46.50	$50.22
No Turn, 36" HI Prismatic	$72.50	$78.30
Directional Turns, 24x30, HI Prismatic	$42.50	$45.90
Median Ahead, 24x30, HI Prismatic	$42.50	$45.90
Median Ahead, 30x36, HI Prismatic	$54.50	$58.86
Do Not Enter, 30x36, HI Prismatic	$72.50	$78.30
No Trucks, 30", HI Prismatic	$46.50	$50.22
One Way, 36x12, HI Prismatic	$38.50	$41.58
One Way, 54x18, HI Prismatic	$68.50	$73.98
Average Price	**$58.14**	

	Cost is USD	CDN $ (@$.92)
Street Name Blades		
6" One Sided, Extruded	$24.60	$26.57
6" Two Sided, Extruded	$30.60	$33.05
9" One Sided, Extruded	$49.60	$53.57
9" Two Sided, Extruded	$55.60	$60.05
Average Price	**$43.31**	

	Cost is USD	CDN $ (@$.92)
Informational		
Lane Directional, 21x15	$30.50	$32.94
Lane Ends, 21 x 15	$30.50	$32.94
Lane Begins, 21x15	$30.50	$32.94
Bike Route, 24x18	$34.50	$37.26
Pedestrian Route	$20.50	$22.14
Average Price	**$31.64**	
	Cost is USD	**CDN $ (@$.92)**
Parking		
Parking Info, 24x18, HI Prismatic	$24.50	$26.46
Average Price	**$26.46**	

	Cost is USD	CDN $ (@$.92)
Warning ***(left turn, right turn, curve, winding)***		
18" HI Prismatic	$29.50	$31.86
24" HI Prismatic	$38.50	$41.58
30" HI Prismatic	$46.50	$50.22
36" HI Prismatic	$72.50	$78.30
Average Price	**$50.49**	

	Cost is USD	CDN $ (@$.92)
Detours		
24" HI Prismatic	$38.50	$41.58
30" HI Prismatic	$46.50	$50.22
36" HI Prismatic	$72.50	$78.30
48" HI Prismatic	$118.50	$127.98
Average Price	**$74.52**	

(Source: http://trafficsignstore.com/)

Note: This price list was available online and represents a complete commercial signs price list not generally available from Canadian sign manufacturers. In those situations sign prices are typically issued as quotations for specific sign inventory requirements.