Reconstructing Edmonton's Neighbourhoods

Marlis Foth, P.Eng., M.Sc., Director Open Space Planning and Design, City of Edmonton

Jeff Ward, P.Eng, Director Building Great Neighbourhoods Infrastructure Delivery, City of Edmonton

Paper prepared for presentation
at the Investing in Road Construction: Building Canada's Economy session.

At the 2017 conference of the
Transportation Association of Canada
St. John's, NL

ABSTRACT

As part of Edmonton's Neighbourhood Renewal Program, the City balances a variety of work including preventative maintenance, overlays and reconstructions. Of the City's 300 neighbourhoods, approximately 100 require full reconstruction. A long term plan to address these neighbourhoods has been established which is the focus of this paper. This program is unique to Edmonton and is leading the way for neighbourhood renewal in Canada.

From 1995 to 2016, 34 neighbourhoods have been reconstructed and currently there are plans to complete or start reconstruction on more than 60 by 2028. To finance this work various funding sources are utilized including local improvements paid by property owners, general city taxes and other government funding for a total of approximately $100-$120 million dollars per year depending on a specific year's reconstruction program.

To deliver the neighbourhood construction portion of this program, the City of Edmonton enters into long term contracts with contractors that are typically six years in length consisting of three neighbourhoods per contract. These contracts were developed in consultation with the Alberta Roadbuilders and Heavy Construction Association (ARHCA) and contain clauses that address the fluctuations of rack oil price and other industry pricing within the custom developed Neighbourhood Renewal Price Index (NRPI). To assist in delivering such a large program each year and over the long term, financial incentives through site occupancy assessments are also included in each contract. This ensures that the overall commitments in a neighbourhood are met.

In 2017, there will be work in twelve neighbourhoods through eight active long term contracts and one standalone contract with overall project budgets totaling approximately $120 million. Depending on the size of a neighbourhood, reconstruction will be scheduled over two or three years. The scope of work includes removal and replacement of sidewalks, curb and gutter, streetlights and roadway reconstruction typically through full depth reclamation. Other neighbourhood improvements that consider all modes of transportation are also implemented as part of the program such as missing link sidewalks, bike corridors, school zone safety features and traffic calming measures.

The program provides many benefits to a wide range of stakeholders. This includes the City as a whole through improvement of City assets, residents through improvements directly adjacent to their properties and to their communities and the consultants and contractors involved in the work by providing secure work into the future.

INTRODUCTION

The City of Edmonton has led neighbourhood renewal within Canada by establishing a unique long term, sustainable program that directly addresses the need for infrastructure renewal within Edmonton's mature neighbourhoods. The program was developed with input from stakeholders including the Alberta Roadbuilders and Heavy Construction Association (ARHCA). To facilitate the delivery of the approximately $120 million annual program long term contracts were established. The program as it is today was established in 2008 and continues to be improved in development and delivery of the reconstruction of each neighbourhood.

BACKGROUND

The City of Edmonton began to realize that neighbourhood roadway, sidewalk, drainage and streetlight infrastructure was deteriorating at a faster rate than it could be renewed. In 2008 a plan to address this issue was brought forward to council with a goal to ensure that there would be good quality infrastructure in all existing neighbourhood and have no neighbourhoods with ratings of poor or very poor by 2039. Between 1995 and 2016 34 neighbourhoods went through reconstruction and there are more than 60 others that are currently planned to either be completed or started by 2028.

To accomplish this goal approximately $154 million dollars per year would be required. The funding would start from three sources which include a neighbourhood tax levy, local improvement levy and provincial Municipal Sustainability Initiative (MSI) dollars. With the realization that grant funding would not be a long term solution for the funding, an increase of approximately two percent per year of dedicated neighbourhood renewal tax levy was requested from 2009 to 2015 to be fully funded. Each one percent of tax levy for the City of Edmonton represents approximate $7.5 million. In 2011 the levy was decreased to 1.5 percent and the period was extended until 2018 for the tax increase at which time the program would be fully funded (Cepas and Aguiar, 2011).

The funding that is collected for the neighbourhood renewal program (NRP) is used on a number of different types of projects related to neighbourhoods including, but not limited to, industrial rehabilitation, collector rehabilitation, microsurfacing, asphalt overlays and neighbourhood reconstruction which will be the focus of this paper. The Capital funding allocated to the neighbourhood reconstructions is approximately $120 million per year.

PROGRAM DETAILS

With so many neighbourhoods within the City of Edmonton requiring renewal the neighbourhoods that are selected for rehabilitation or reconstruction are based on condition ratings and the lifecycle management of the assets in conjunction with one another. For example if the roadways in a neighbourhood are in poor condition but the sidewalks are in good condition the roadway would be overlaid and sidewalks would go through maintenance

treatment as required. In Edmonton, approximately one quarter of the roadways are assessed on a yearly basis to determine the asset conditions.

Typical construction sequencing of a neighbourhood reconstruction project is as follows. First, the streetlights are replaced with new bases being drilled and poured (Figure 1), conduit is directionally drilled, new poles and luminaires installed and finally the old poles and bases are removed. Next is the removal (Figure 2) and replacement of all concrete in the road right-of-way which includes curb and gutter, sidewalk, curb ramps and any private drop curbs (Figure 3 and Figure 4). Typically a portion of private walks, driveways and landscaping need to be removed to facilitate the construction process and any changes to grades that may be required (Figure 5). Finally all of the roadways are reconstructed or provided some type of treatment based on their condition and structural strength. The typical treatment for roadways is full depth reclamation (FDR) (Figure 6) with an asphalt overlay (Figure 7). Some roads will be reconstructed through the full replacement of the pavement structure but only if the in-situ materials are not suitable for FDR or positive drainage flow off the lots cannot be maintained. The change from what the roadway looked like before reconstruction (Figure 8) and after reconstruction (Figure 9) is a transformation.

With all of the infrastructure within the road right-of-way being removed and replaced, the opportunity to make changes is available. As such, through internal project evaluations, design and community engagement, a number of other enhancements are evaluated and incorporated including missing link sidewalks, bicycle corridors, school zone safety features and traffic calming measures.

The Building Great Neighbourhoods Capital Program (BGNCP) is one program that works closely with the Neighbourhood Renewal Program. This is a long term program that develops and delivers on community identified projects which are typically not on road right-of-way. Work developed through the BGNCP and completed in conjunction with neighbourhood reconstructions include shared use paths through parks and other open spaces, pathway lighting and tree planting.

UTILITY COORDINATION

Neighbourhood reconstruction scheduling is planned approximately ten years in advance of the work. This ensures that the program funding and project sequencing can be monitored and reviewed as required. Review of the drainage system is the first work that is completed in a neighbourhood that is scheduled. All of the manholes, catch basins, mainlines and service connections are televised, inspected and reviewed to determine any issues with the pipes that may need to be addressed prior to the roadway and sidewalk reconstruction happening. The investigation of the condition generally occurs two to three years in advance of the neighbourhood reconstruction with the rehabilitation work consisting of open cut and relining of pipes occurring one to two years in advance of the neighbourhood reconstruction.

In the project development phase, the City meets with all utility companies to review what work is scheduled in the future so that they can review their utility networks and identify any parts of their system that require work prior to reconstruction.

PUBLIC COMMUNICATION

As part of the current communication plan with the neighbourhoods going through reconstruction, meetings are held at each of the concept, design and build stages. The concept meeting is held approximately 18 months prior to neighbourhood reconstruction beginning. This meeting typically includes the Community League and the purpose of the meeting is to share the neighbourhood reconstruction process, what the community can expect moving forward and begin to gather local knowledge on the neighbourhood. The design phase meeting is approximately 12 months prior to construction starting and is open to all of the residents and property owners in the area. At this meeting the neighbourhood reconstruction process is presented along with the preliminary design of the neighbourhood which may include roadway and intersection realignment, missing link sidewalk connections and alternative mode accommodation. The public is able to provide feedback and input into the design. These comments are reviewed and incorporated into the design as appropriate. The build phase meeting is held three to six months prior to construction beginning and includes the same audience as the design phase meeting. The final design is presented and the construction and local improvement process is explained. The purpose of this meeting is mainly sharing of information and as such, comments are welcome but few changes can be made as construction begins just months after. To further communicate with residents during construction, information is also provided through bulletins and the City's website (COE 2017).

The City of Edmonton has recently adopted a new Public Engagement Policy. This new policy identifies four spectrums of engagement including advise, refine, create and decide. With this new policy and corporate direction on public engagement, the Building Great Neighbourhoods (BGN) branch is reviewing the manner in which communications are currently done, what can be improved and how future changes can align with the new policy. This includes an active effort to update the current Communications Plan and Public Involvement Plan that are currently utilized.

CONSTRUCTION CONTRACTS

To be able to deliver the neighbourhood reconstruction projects each year it was decided to implement long term contracts that were either five or six years in length depending on the size of the neighbourhoods in the contract. Typically two or three neighbourhoods will be included in one contract. Depending on the size of a neighbourhood typically they will be scheduled for completion over two to three years. These long term contracts have an option for the City to cancel at year three providing some flexibility for the City. There is no option for the contractor to opt out of the contract.

In development of the program the Alberta Roadbuilders and Heavy Construction Association (ARHCA) identified two areas where they were most at risk - the fluctuation of the costs from year to year that typically are reflected in unit prices and the cost of oil. To address these two concerns the Neighbourhood Renewal Price Index (NRPI) was created and an adjustment for the change in rack oil price was also added.

NRPI (NEIGHRBOUHOOD RENEWAL PRICE INDEX

Typically the Consumer Price Index (CPI) produced by statistics Canada is used to measured inflation in Canada based on a general basket of products. Through initial trials, it was determined that the CPI did not adequately represent the work occurring in neighbourhood reconstruction. Thus the Neighbourhood Renewal Price Index (NRPI) was created by the City of Edmonton in consultation with industry partners to better calculate price adjustments related to the neighbourhood reconstruction work. The development and use of the NRPI also provides the City and industry with other information such as:

- Measuring the actual inflation cost to neighbourhood reconstruction projects,
- Allowing the costs of construction to be more clearly identified,
- Historical and current pricing direction related to neighbourhood reconstruction and
- Justification of funding required in capital budgeting.

The methodology used to develop the NRPI was to first determine the categories within neighbourhood reconstruction work that should be considered and the appropriate weight for each. Then the appropriate inflation factor for each construction category would be determined. After this information is gathered the NRPI is calculated by summing the product of each construction category's weight and inflation rate. The formula is:

$$NRPI = \sum_{i=1\ldots n} \left[\sum_{i=1\ldots m} Y_m(Z_m/Z)\right](W_n/W)$$

Where:

Ym	=	Price Charge for factor input *m*
W_n/W	=	Weight of construction category n in the City's Neighbourhood Renewal Program
NRPI	=	Neighbourhood Renewal Price Index
Z_m/Z	=	Weight of factor input *m* in the construction category *n*

The NRPI has been in use since 2011 and is currently being reviewed by the City and stakeholders to ensure that it continues to reflect the changes in the market. Table 1 shows the seven categories that have been developed with the weights assigned and the factor inputs for labour, equipment and materials in each category (Rose and Kahara 2016).

Table 1 NPRI Categories and Factors (Rose and Kahara 2016)

Category	Overall Weight	Factor Inputs (%)		
		Labour	Equipment	Materials
Asphalt	14.7	20	20	60
Base Work - Sidewalk	19	30	30	40
Base Work - Full Depth Reclamation (FDR)	17	30	30	40
Concrete	29.7	50	10	40
Drainage/Underground	4.5	35	40	25
Excavation	11.6	50	50	0
Landscaping	3.5	45	45	10

RACK OIL

The rack oil price can fluctuate from month to month and as such, the price can vary significantly over the period of the contract. To bid and manage contracts of multiple years a rack oil adjustment was incorporated into the contract. The contractor is paid the increase or decrease of the design virgin asphalt cement content by the tonne according to the rack oil price at the time the mix is placed compared to the price of the rack oil at the time of tender closed.

CONTRACT AWARD

With these construction contracts being large, long term contracts and completion is imperative on a yearly basis to ensure the planned program targets can be completed and maintained over time. It is also imperative that the contractors who are awarded these contracts have the resources, experience and capability to complete the work. As such, the award of the contracts are weighted - 80 percent price and 20 percent technical weighting.

The technical review of the contract has three stages which are: Mandatory Requirements, Bid Distribution and Technical Scoring Methodology. The mandatory requirements include items such as bonding, insurance and Worker's Compensation Board clearance and others. Bid Distribution includes the splitting of the financial and technical portions of the bid form and evaluating each separately and independently. The Technical Scoring Methodology is the final step to bring all of the technical scores and weighting together.

The 20 percent of the technical component is divided into two categories Part A - Project Team and Equipment and Part B - References on Previous Similar Jobs. Table 2 shows each

category that the contractor is evaluated on and Table 3 shows the rating scale used for the evaluations. For a contractor to make it to the final evaluations they must receive minimum rates of 2 out of 5 in each category and must have a minimum score of 10 from Part A and Part B combined. The technical component is reviewed by an evaluation team and is completed independently from the review of the pricing.

Table 2 Evaluation Weighting

Evaluation Criteria	Weighting
Project Team and Equipment List	
Project Key Personnel / Organizational Chart/Resumes	4
Project Manager / Superintendent Concrete Superintendent/Foreman	5
Detailed Equipment list	1
Reference for Previous Similar Project(s)	
Performance on neighbourhood renewal project(s)	5
Similar projects in size and scope	5

Table 3 Rating Definitions

	Rating	Definition
5	Excellent	Exceeds expectations; clearly understands the requirement; excellent probability of success.
4	Above Average	Somewhat exceeds expectations; high probability of success.
3	Average	Meets expectations; good understanding of requirement; good to fair probability of success.
2	Poor/Fair	Somewhat meets expectations; some weakness or deficiencies; fair to low probability of success.
1	Very Poor	Does not meet expectations or demonstrate understanding of the requirement, low probability of success.
0	Non Responsive	Lack of response or complete misunderstanding or requirement, no probability of success.

As these contracts provide security on a large amount of work for multiple years a number of contractors who currently have a limited amount of experience in this type of work are looking to gain experience to meet the minimum requirements in the technical categories. This experience

can be gained through completing smaller reconstruction projects which typically only include a portion of the neighbourhood. By executing these projects efficiently and by adhering to a well prepared schedule and showing that they are able to work directly in front of homes provides the required confidence that a contract can perform well on a long term contractor

SITE OCCUPANCY

To assist in delivering such a large program each year and over the long term, financial incentives through site occupancy assessments are also included in each contract. If the contractor completes the full year's scope of work, with the exception of some seasonal deficiencies the contractor is awarded a five percent payment on the dollar value of the work completed that year. If the contractor has not completed the work by the date indicated in the contract they must pay the City five percent on the dollar value of the work not completed. If the work is completed on the completion date included in the contract there is no payment made by either party for site occupancy.

LOCAL IMPROVEMENTS

A local improvement is a construction project that is completed near or adjacent to a property which is deemed to be more beneficial to the area than the City as a whole. Local improvements are governed by the *Municipal Government Act*, RSA 2000, c. M-26 (the "MGA"). For neighbourhood reconstruction, local improvement is one source of funding that is used. The sidewalk local improvement is initiated by the City of Edmonton and it is a 50-50 cost share between the property owners and the City as a whole. The 2017 unit rate for sidewalk local improvement assessments is $204.21/m. Property owners have two options to pay the local improvement tax; they can either pay the amount in a lump sum; or, it can be amortized over 20 years and paid through taxes. If the property is sold within the amortization period the remaining amount on the local improvement stays with the property.

Under the MGA, local improvements can also be initiated by citizens through the use of a formal petition process. In Edmonton the neighbourhood reconstruction process includes a budget to replace the streetlights with a standard streetlight consisting of a galvanized pole with a LED luminaire. The opportunity for the standard streetlights to be replaced with decorative streetlights can be facilitated through a request for a local improvement. The City of Edmonton has developed an Expression of Interest (EOI) process that provides the City with enough confidence that the majority of property owners would like the improvement prior to moving forward with the decorative streetlight local improvement. Similar to the sidewalk local improvement the decorative street light local improvement can be paid as a lump sum or amortized. However, streetlights are amortized over 15 years rather than 20 years. As the City budgeted for the standard streetlights in the neighbourhood reconstruction, the property owners are only responsible for the incremental cost of the decorative streetlights through a local improvement tax.

Local improvements can be assessed in various ways and for the sidewalk and decorative streetlight local improvements they are assessed based on dimensions of the lot. If the front and back dimensions are equal then the amount assessed is the front dimension. If they are not the same, and the lot is a pie or an odd shaped lot then an average of the front and back dimensions is taken into account when calculating the “frontage”. The rear dimension is determined by taking a perpendicular line from the short side to the long side.

Under the MGA, property owners after they receive the formal local improvement notice with the estimated local improvement taxes can petition against the local improvement during the 30 day petition period. Typically each neighbourhood is divided into geographic projects with approximately four to six projects to complete in each year. If 50% plus one of the owners within a project petition against the local improvement during the formal petition period, the project will be defeated and will not be included in the local improvement bylaw that City Council approves. If a sidewalk project is defeated, the sidewalk will have maintenance treatments such as grinding, mudjacking or patching applied and if a decorative streetlight local improvement is defeated then standard streetlights will be installed. Regardless of the outcome of the local improvement processes, the City will proceed with rehabilitation of the roadway (COE 2017).

LESSONS LEARNED

As the neighbourhood renewal program has been in progress for a number of years, there have been a number of lessons learned. As mentioned earlier there is a significant amount of coordination that is completed with various utility companies and even within other City departments. This coordination was not well established at the outset resulting in the removal or cutting into the newly constructed infrastructure shortly after it was constructed. A three year no cut policy was implemented to stop this from occurring and now the only way to complete work within these areas within the three year time frames is with an exemption.

The implementation of the three phase evaluation system to award a contract was implemented in 2013. Prior to this system being implemented it was still a weighted tender however it was much more subjective. With the criteria and weighting clearly indicated the process is more transparent to those bidding.

As all stakeholders have become more familiar and experienced in the program many enhancements and efficiencies have been incorporated. These include the planning and financing of the work, development of a 100mm straight face curb, construction staging, the equipment that is used, working around mature trees and many more. This has led to a consistent program delivery, of a quality product on time and on budget.

FUTURE PROGRAM

The additional funding that has been added each year through the dedicated neighbourhood tax levy has assisted in maintaining the level of funding that is required to sustain the program in the long term while reducing the required level of other funding sources such as grant funding.

As Council has debated budgets, often the dollars that are required to deliver the program are reviewed.

In 2017 there are eight long term contracts that are active. Two of these long term contracts and one standalone two year contract went through the tender process in 2017 and were awarded. The approximate capital cost for the 2017 planned work is approximately $120 million.

The City of Edmonton is currently going through a transformation of how it delivers projects. In October 2016 the Integrated Infrastructure Services Department which sees all capital projects through concept, design and build was created. In 2016 the Building Great Neighborhoods Branch was also created. The vision of this Branch is to be able to look at a neighbourhood in a holistic manner to continue to deliver on the successes while enhancing the scope. Everything from not just the typical assets that have been covered under the traditional neighbourhood reconstruction contracts such as roadways, sidewalk and streetlights but everything for infrastructure in a neighbourhood. Expertise from multiple sections of the City came together to build the Building Great Neighbourhoods branch to be able to deliver all infrastructure and types of projects in a neighbourhood.

CONCLUSION

The City of Edmonton developed the Neighbourhood Renewal Program with the objective of having no neighbourhoods within the City having ratings of poor or very poor by 2039. To reach this goal long term funding strategy was developed that included a dedicated tax levy and funding from a City initiated local improvement. As part of the program there are currently three meetings with the neighbourhoods that will go through reconstruction, this is the community's opportunity to provide input. The long term construction contracts that were developed in conjunction with the ARHCA addressed two major risks which included the change in unit prices due to inflation and the ever changing price of oil. The City recently has gone through a transformation and the Neighbourhood Renewal Program is part of the Building Great Neighbourhood Branch who in the future will be looking at all aspects of neighbourhoods going through renewal with a holistic lens.

REFERENCES

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3. Rose, J. and Kahara, G. 2016. *Neighbourhood Renewal Price Index*. City of Edmonton.

FIGURES

Figure 1 Streetlight Replacement

Figure 2 Concrete Removal

Figure 3 Hand Concrete Sidewalk Replacement

Figure 4 Machine Concrete Sidewalk Replacement

Figure 5 Private Connector Replacement and Landscape Cutback

Figure 6 Roadway Reconstruction, Full Depth Reclamation

Figure 7 Roadway Paving

Figure 8 Before Reconstruction

Figure 9 After Reconstruction