
Stormwater Integrated Resource Planning (SIRP) – Update Report to Utility Committee February 23rd, 2018

Report Purpose –Discussion and Project Update

This report is presented for discussion purposes at Utility Committee and to provide an update on the transition to a Stormwater Integrated Resource Planning approach for stormwater management in Edmonton. The report provides additional background on Integrated Resource Planning techniques, how the planning work completed to date will be incorporated, and the recommended approaches for risk prioritization development, industry engagement efforts and how public and stakeholder engagement will be incorporated in the planning efforts.

1. Project Overview

EPCOR committed to City Council as part of the transition of the Drainage utility to EPCOR to implement their Integrated Resource Planning (IRP) approach to enhance the planning, engineering and operations of the stormwater system in Edmonton. EPCOR has successfully utilized the IRP in the identification and implement of improvements to the Water system and Wastewater treatment facilities within the City of Edmonton.

Integrated Resource Planning methodology takes a holistic approach that integrates environmental and social externalities; operational, planning and infrastructure responses; risk assessment and management; financial analysis; and an open participatory process that incorporates continuous improvement.

The approach builds upon and integrates earlier City Drainage planning work, infrastructure condition assessments and environmental improvement initiatives with external perspectives and is aligned with active City initiatives addressing Climate Change Adaptation.

A key component of the SIRP will be the development of a Risk methodology Framework to facilitate a systematic approach to assess the impact of different capital and operational alternatives and to prioritize the implementation of these improvements to the stormwater system.

SIRP Development Activities

The development of the SIRP over the last five months has been focused on four areas:

- Consolidation of the historical reports and recommendations on Stormwater improvements
- Development of the Risk methodology framework to support improvement prioritization
- Industry engagement to ensure incorporation of external perspectives and alignment of SIRP with industry best practices for stormwater management.

- Working with the City of Edmonton to define the public engagement processes for future flood mitigation activities

Additional detail on these activities is provided in the following sections of this report.

2. Consolidation of Historical Reports

Prior to the transition to EPCOR the Drainage utility approach to Flood mitigation had focused on the identification of capital infrastructure investments to renew the existing infrastructure to a targeted design standard, with different levels of investment proposed based on four theoretical storm scenarios. The City Wide Flood Mitigation studies encompassed all neighbourhoods that were not previously assessed for flood mitigation investment. Excluded from this analysis were neighbourhoods built post 1989, these neighbourhoods were designed to a higher flood protection standard. Also excluded were neighbourhoods that had previous flood mitigation improvements identified after the 2004 storms in the Edmonton Region, some of these previously recommended improvements are still to be constructed and need to be consolidated with the more recent City Wide Flood mitigation alternatives. Separate analyses were also completed to assess the impact of river flooding on the river valley residential neighbourhoods and to define the infrastructure improvements to reduce the risks of underpass flooding.

Independent of the Flood mitigation work within the Drainage utility there were also a number of asset management capital investment plans that supported the renewal of the stormwater and combined sewer network based on asset condition investigations and historical maintenance records of infrastructure failure. The timing for these proposed improvements was based on a combination of asset condition rankings and ability to leverage coordination with planned paving activities within Integrated Infrastructure Services.

Additional infrastructure investment plans have also been identified from an environmental perspective through the River for Life commitments with Alberta Environment and Parks with a particular focus on improving the quality of water reaching the environment through the various stormwater management facilities and the outfalls into the creeks and rivers within the Edmonton region.

As part of the transition into EPCOR these historical disparate planning recommendations are being brought together through the SIRP process to support the prioritization of infrastructure investments moving forward. EPCOR has developed a single Geospatial Information System (GIS) layer providing the details and locations of the proposed improvements to allow improved coordination as the engineering designs are completed for active construction projects to capture all three aspects (capacity, condition and environment) in the recommended final design.

Recognizing that we are in a transition to the SIRP methodology for planning infrastructure investment, the 2018 capital projects proposed for the stormwater network have also had additional reviews to confirm that they are considering the recommendations of different planning perspectives. The capital program progress is presented in the reporting review report from EPCOR.

EPCOR has also completed a technical review of the storm scenarios used in the City Wide modelling reports to confirm that the monitoring data that was used for the design storm assumptions represents the more recent intense storms seen in the Edmonton region.

Separate from the development of the SIRP, but aligned with the historical reviews, EPCOR has also been supporting the City of Edmonton Urban Form department in the development of the approach to manage the impact to neighbourhood amenities caused by the introduction of a dry pond into a community. This approach was presented to City Council Community Services committee in November 2017. Appendix A of this report provides more detail on the process that EPCOR expects to utilize in partnership with the City Administration for future dry pond discussions with the community.

3. Risk Methodology Framework Development

Communities around the world are recognizing that with the climate change impacts that are occurring traditional engineering approaches for infrastructure development are not able to fully protect the community from the impacts of changing weather patterns. There are two elements to this change that communities need to consider as they are developing their plans for the future – Climate Trends and Climate Hazards.

Climate trends are the longer term permanent shifts in the climate for a particular region that impact the ecosystem and temperatures in the area. Climate change modelling can assist in predicting the speed of this change and the extent of the shift that could occur in a region. For Edmonton, the City of Edmonton Climate Change Adaptation project has developed a series of predictions of how these trends could impact the City over the next 30 to 50 years.

Climate Hazards are the short duration intense climate events that occur in communities today. This includes events such as intense rainstorms, extended heat waves, extreme snow events, etc. For the City of Edmonton, the Climate Change Adaptation project has identified seventeen climate hazard scenarios that are expected to change as the climate trends continue in the local environment. Four of these hazards relate to stormwater management directly; Urban Flooding, River Flooding, Rain on Snow and Hail. The difference that climate change is making to these events is that the frequency and/or the duration of these events are intensifying. These changes in

historical patterns are resulting in communities having to change their traditional approaches to planning to manage these events in their community.

EPCOR as part of the SIRP development has been working closely with the City Environmental Strategies group as they are leading the vulnerability analysis of the impacts of Climate Trends and Climate Hazards within the broader Edmonton community. EPCOR has been and will continue to participate over the next year on a number of fronts in this City led project, including:

- The provision of technical information on the vulnerability of the water, drainage and electrical networks to the different hazards and trends,
- Participation in the community sector workshops to increase our understanding the impacts of stormwater related events on the community from the perspective of direct damages, indirect service and direct service impacts on each sector
- Incorporation of the community related impacts into the risk prioritization analysis to support the identification of infrastructure investment and operational enhancements to the drainage network.
- Alignment of the analysis of the Economic, Social, Environmental and Health and Safety community risk assessments for the different community sectors with the Drainage planning prioritization analysis that has traditionally been completed from the utility perspective.

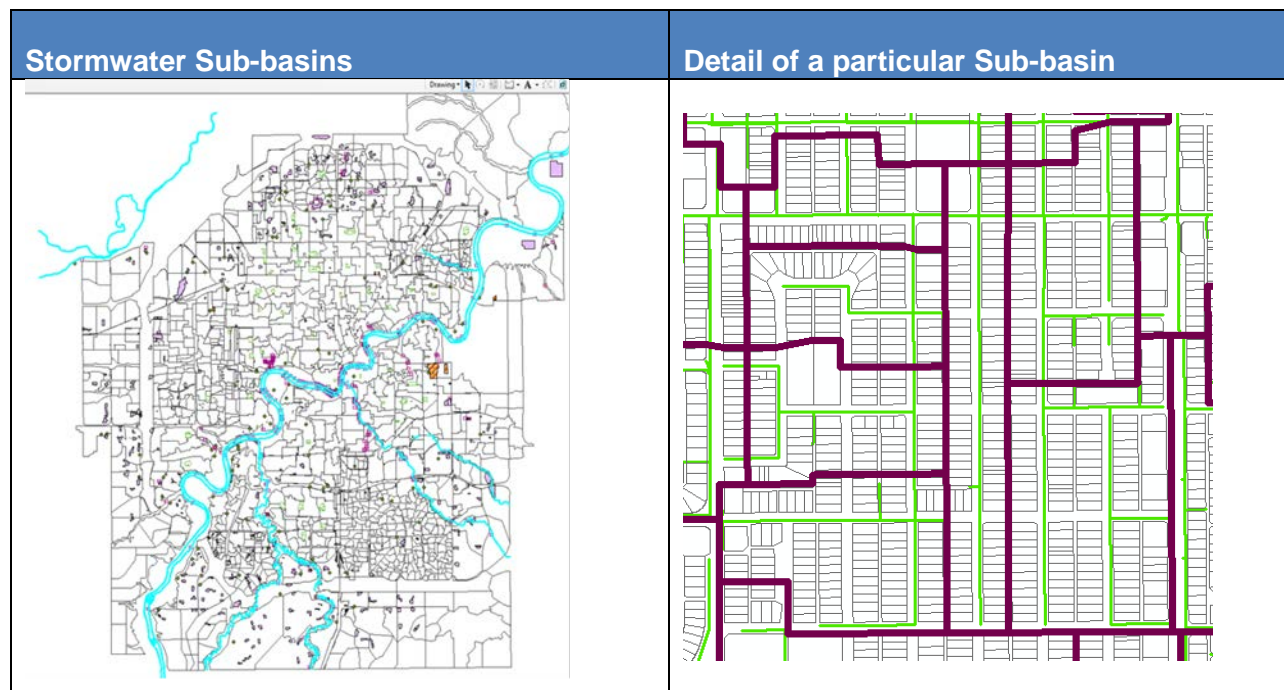
One example of how this approach could have an impact on the traditional prioritization of an initiative to reduce the impact of a climate change hazard in a particular neighbourhood of Edmonton relates to the assessment of whether it is better to initially install a pipe or tunnel to rapidly move storm water from a neighbourhood directly to the river or to work with the private property owners and City of Edmonton open spaces to implement measures that capture and retain stormwater using green infrastructure to reduce the intensity of the storm on the piped network.

Through the Climate Change Adaptation workshops hosted by the City in late January, there was clear identification that additional green infrastructure also provides additional mitigation to support climate hazards such as heat waves, and can help to contribute to reducing the overall climate trend in a community. Aligning the SIRP with the Climate Change Adaptation initiative allows the SIRP to capture and quantify these additional benefits as the investments are prioritized.

The Climate Change Adaptation project is assessing the City of Edmonton from an overall perspective. The vulnerability analysis will provide an overall risk assessment for the region, with some focused predictions such as in the River Valley for risks from river flooding or wildfires.

EPCOR in parallel to the City wide assessment will be developing as part of the SIRP a more granular assessment of the risks and vulnerabilities at the stormwater sub-basin level. Through the consolidation of the different hydraulic modelling completed to date on the entire network there are approximately 1200 stormwater sub-basins that cover the entire City.

The following figures show the stormwater sub-basins that have been identified along with a more detail view of how a stormwater sub-basin has been defined through a review of pipe catchment areas.



EPCOR as part of the SIRP will develop a risk framework that allows each sub-basin to be risk ranked from three perspectives for both the Urban Flooding and River Flooding Climate hazard perspective:

- Capacity
- Condition (including Environmental objectives)
- Social Impacts

The types of indicators that we expect to include in each of these three perspectives are discussed in more detail below. The Capacity and Condition risk ranking will be developed from

the perspective from the Utility and the Social Risk Ranking will be developed from the broader community perspective leveraging the work being completed this year by the Climate Change Adaptation project.

The framework will be developed in a format to allow for evaluation of various weightings between the three components and between the components captured in each of the three categories. We expect to work with City Council and the broader community including Insurance agencies, disaster relief agencies, community representative and the general public in determining the final risk weights to determine the level of infrastructure investment to reduce this risk level in the community.

Capacity Risk Ranking

The most recent City Wide analysis work completed by the Drainage planning group evaluated the capacity of the Drainage network for four scenarios in each of the Urban Flooding and River Flooding hazard situations. The following table summarizes these scenarios

Climate Hazard	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Urban Flooding	1:100 year storm impacting 20 km ²	1:100 year storm impacting 5 km ²	1:50 year storm impacting 20 km ²	1:50 year storm impacting 5 km ²
River Flooding	1:10 year River Water Level	1:25 year River Water Level	1:50 year River Water Level	1:100 year River Water Level

For purposes of the capacity risk ranking, rather than focusing on selecting a design standard target for the two different climate hazard events, each stormwater sub-basin will be risk ranked on whether they are at risk of flooding based on the number of scenarios where they experience flooding. (i.e. for urban flooding a stormwater sub-basin that floods under all four scenarios will be ranked as a higher risk and one that floods under none will be lowest). This approach also has the advantage of being flexible to accommodate changing climate hazard events in the future as the climate evolves in the Edmonton area.

For the stormwater sub-basins not included in the most recent City wide modelling assessments a combination of additional technical analysis and qualitative assessments of flooding risk will be developed based on an assessment of the design standards in place at the time the area was originally developed.

For the river flooding scenarios we will also be expanding the analysis to incorporate the flooding risk analysis that has been completed previously within EPCOR for the three treatment plants also located in the river valley.

What is the meaning of a 1:100 or 1:50 year event when evaluating a particular scenario? The Alberta Water Portal has developed a good summary of what this means from a layperson perspective. This available at the following link and paraphrased below. <https://albertawater.com/how-are-flood-maps-created-in-alberta/what-is-a-1-100-year-flood>

In flood hazard assessments the terms 1:100 or 1:50 are used to help illustrate risk and assist communities in planning for the possibility of flooding. Frequently the meaning of 1:100 is mis-interpreted as meaning a flood will occur in the highlighted area only once every 100 years. 1:100 is actually a statistical designation meaning that in any given year there is a 1 % chance a flood risk area will flood- see table below. Every year there is a risk that a flood hazard area may experience a flooding event, some areas may not be affected by floods for decades, while others may see multiple floods in one particular year. Historical records from monitoring in a particular location are used to develop the different 1:100, 1:50 probabilities for a particular community and will change over time as there are changes in the environment.

Scenario	Percent chance occurrence in any given year at a particular location
1:250	0.4%
1:100	1%
1:50	2%
1:10	10%

Condition Risk Ranking

The condition ranking will be developed through the analysis of the historical inspection and operational and maintenance information available for each of the asset categories that compose the stormwater network. This includes the asset types of trunks, local pipes, manholes, catch basins, outfalls, pump stations, control gates and stormwater management facilities. The condition of each of the assets will be risk ranked based on the consequences and likelihood of the infrastructure failing within a particular stormwater basin.

The impact of an asset condition failure will be considered from the economic, environment, social and health and safety perspectives considered in the Climate Change Adaptation project for the community areas impacted by the failure and from the financial, environmental , health and safety and service delivery perspective from within the utility.

Social Risk Ranking

The social ranking will be developed to align with Climate Change Adaptation project currently underway. This project is determining the segments of the community that are most impacted by climate change events including Urban and River Flooding events. EPCOR will be doing a deeper analysis of the social impacts of flooding on each stormwater sub-basin through a GIS analysis of the location of these community assets within each sub-basin.

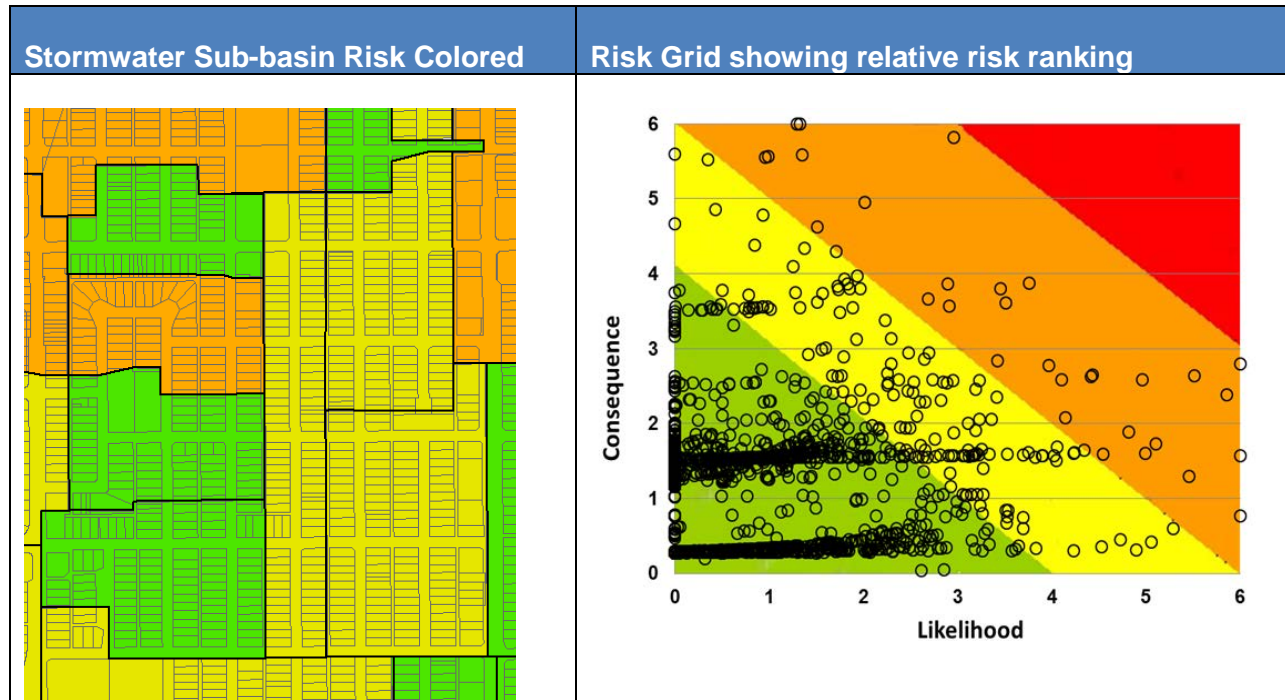
The following table lists the community segments captured in the Climate Change Adaptation project. For the segments that are identified as being most vulnerable to the flooding risk scenarios a Social risk ranking will be incorporated in the individual sub-basin ranking.

Climate Change Adaptation Community Segments		
Economy	Road Transportation	Emergency Management
Community and Culture	Rail (includes LRT)	Information and Communications
Urban Agriculture and Food	Fuel Supply	Electricity
Natural Environment	Waste Management	Public Health and Safety
Buildings, Land and Property	Drainage	Water (includes watershed)

Overall SIRP Risk Ranking

The output from this analysis will be a Risk Framework tool that includes a GIS map and a risk grid showing the relative risks of each sub-basin in Edmonton. The tool will be used to illustrate the impacts of changes to the weightings between the different risk factors to support the stakeholder engagement activities. The Risk Framework tool will also be used to illustrate the impact of different flood mitigation infrastructure assessments to illustrate the overall reduction to flood risks in Edmonton. The tool will also be set up to allow presentation of a single risk component to support the evaluation of the mitigation alternatives.

The following figures provide an example of what a color coded GIS map and risk grid would look like after the completion of the analysis. Note: that these figures are for illustrative purposes only and do not reflect actual risk analysis for a particular sub-basin.



This technique for mapping the individual risk ranking is also useful to determine the types of infrastructure investments that will be required within each sub-basin. Other utilities and municipalities that have used this technique have typically defined zones of the risk grid as being;

- Intolerable requiring immediate intervention – High Consequence \ High Likelihood
- Increased Monitoring required – Low consequence \ High Likelihood
- Increased Contingency planning required – High Consequence \ Low Likelihood
- Annual review to confirm risk ranking – Low Consequence \ Low Likelihood

EPCOR will work with City Council Utility Committee to determine the appropriate cut off points for these scenarios through the future submissions for utility budgets.

4. Industry Engagement

EPCOR as part of the SIRP development has reached out to a different communities and industry organizations to ensure that as the SIRP is developed it is encompassing the latest best practice trends for utilities and municipalities. We have joined a number of research projects to allow us to participate and obtain access to the research prior to publication. Examples include participation in the Intact Center for Climate Change Adaptation research from the University of Waterloo and participation in the Water Research Foundation Risk and

Resiliency Research currently underway. We have reaffirmed Drainage's membership in the Canadian Water and Wastewater Association Climate Change working group.

In addition to this external community perspective, EPCOR will continue to engage with the local engineering consultants that have been supporting Drainage in the identification of the technical design of infrastructure enhancements to the overall stormwater network. EPCOR has met with each of these consultants to obtain their perspective on the additional data monitoring and analysis that will be required to support future analysis in the face of what had historical been a stable risk of climate induced flooding. EPCOR will work closely with the Urban Development Institute as updates to the Design and Construction standards are reviewed, similar to the process currently used for both EPCOR Water and Power. This design review is covering both storm and sanitary design assumptions.

EPCOR is also a part of a broader leadership group through our participation in the Canadian Water Network and the Canadian Leadership Group that is part of the CWN mandate. Our project lead for the SIRP also serves a Board member for CWN and will be leading a discussion on the balance between Utilities, Insurers and Disaster recovery at the Blue Cities conference in May of this year.

In particular it should be noted that the Insurance Bureau of Canada has indicated that they will work closely with EPCOR and the City of Edmonton in the coming years to help improve the overall awareness of the role of insurance in the community and how municipal and utility initiatives to reduce risk help to benefit the individual property owner. IBC has indicated that they are also available to present directly to City Council if this is desired.

EPCOR also recognizes that the City of Edmonton is a diverse organization of multiple departments and priorities with different perspectives on how to approach climate change adaptation. Through our active participation and support of the City Climate Change Adaptation initiative we will ensure that these multiple perspectives are captured in the analysis. When specific projects are identified for implementation, a more focused partnership engagement with the City will be utilized to meet the community needs. The following section provides more information on how EPCOR proposes to manage community engagement.

5. Public Engagement and Decision Making

The SIRP process will result in a series of recommended investments, operational improvements and design standards. The City of Edmonton is the key decision maker for approving the overall risk methodology and goals, and for approving Drainage rate filings and capital plans.

EPCOR's engagement process proposed for the SIRP integrates public and stakeholder input into building the recommendation on the overall approach to risk mitigation, and into the concept design and detailed design for specific infrastructure projects. This section provides more detail on the principles EPCOR will follow when engaging or communicating with the public and

stakeholders, and an example of how the process will be implemented for one type of infrastructure (dry ponds) is included in Appendix A.

EPCOR’s consultation approach was developed with reference to the Canadian Standards Association’s Q850: Risk Management Guidelines for Decision-makers, and the core values and public participation spectrum of the International Association for Public Participation (IAP2). These establish a corporate standard for effectively working with stakeholders and stakeholder groups, and for training and working with project teams and consultants.

The IAP2 spectrum (inform, consult, involve, collaborate, empower) referenced in EPCOR’s procedures maps to the City of Edmonton’s public engagement spectrum (advise, refine, create, decide) as illustrated in this table:

EPCOR Public Consultation Process	City of Edmonton Council Initiative on Public Engagement
<p>Inform To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.</p>	<p>Communicate Inform, listen and learn.</p>
<p>Consult To obtain public feedback on analysis, alternatives and/or decisions. We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.</p>	<p>Advise The public is consulted by the City to share feedback and perspectives that are considered for policies, programs, projects, or services.</p>
<p>Involve To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered. We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.</p>	<p>Refine The public is involved by the City to adapt and adjust approaches to policies, programs, projects, or services.</p>
<p>Collaborate To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution. We will look to you for advice and information in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.</p>	<p>Create The public collaborates with the City to develop and build solutions regarding policies, programs, projects, or services. This can include community initiated engagement.</p>
<p>Empower To place final decision making in the hands of the public. We will implement what you decide.</p>	<p>Decide The public is empowered to make decisions directly or on behalf of the City about policies, programs, projects, or services.</p>

EPCOR is integrating public and stakeholder input into building the recommendation on the overall approach to risk mitigation – work that will provide a foundation for the prioritization of projects and public involvement in the concept design and detailed design for specific infrastructure projects.

The SIRP risk methodology is incorporating public feedback gathered through the two phases of public engagement work that was conducted between November 2016 and June 2017 by the City of Edmonton. The input gathering techniques included an online survey with the City of Edmonton's Insight Community, two public opinion surveys, community discussion groups including input gathered through a discussion guide, and focus groups.

Public feedback gathered during the first phase included:

- Edmontonians need more information on flood risk levels
- Citizens and community groups recognize the importance of improving Edmonton's drainage system
- Opinions are mixed on the best approach to mitigate flood risk and how to pay for it
- Edmontonians need more information about drainage ponds
- Edmontonians are willing to accept construction if done with proper considerations.

Public feedback gathered during the second phase included:

- It is important to improve Edmonton's drainage system to reduce the risk of overland flooding.
- Underpasses, and residential areas should be prioritized over industrial areas
- Faster construction schedules are preferred; and,
- The majority of Edmontonians consider adding dry ponds to parkland and/or sports fields to be an environmentally friendly solution for flood mitigation.

EPCOR is also working with the City and stakeholders to develop other social inputs for the risk model. For example, the social ranking for drainage flood basins will be developed with reference to the Climate Change Adaptation project work which will define the segments of the community that are most impacted by Urban and River Flooding events. Through GIS analysis of the location of these community assets a Social risk ranking can be applied to each stormwater sub-basin. Through membership in the working committee for the University of Waterloo/Intact Insurance best practices for flood resiliency, insurance industry perspectives will also be incorporated.

Additional Public Research

EPCOR plans to gather additional public input in Q3 2018 as part of the process for refining the recommended risk model. A Conjoint Analysis Survey targeted at the Edmonton public will be

designed based on the draft SIRP Risk Model, and used to test and validate public preferences for risk allocation. Conjoint Analysis is a survey technique that establishes the preferences of the survey respondents by identifying their implicit valuation of different product or policy attributes. The risk model will then be refined to incorporate this additional feedback, and the public input will form part of the final report on the risk recommendation.

EPCOR may complement this research with the development of Expert and Public Mental Models for particular infrastructure types. Interviews would be conducted to develop a Mental Model of how stakeholders develop judgements about flood mitigation impacts and trade-offs. Both an Expert Mental Model and a Public Mental Model would be developed. Mental Models are generally described as the webs of belief all people draw upon to interpret and form opinions about issues that come to their attention. They take the form of influence maps that illustrate the hierarchy of inputs that go into forming a judgement, and the relationship between these inputs. This tool has the potential to help the consultation teams learn more about differences in how experts and the public develop their understanding and judgments. The interviews would include the interests, priorities and concerns of stakeholders regarding flood impacts, flood mitigation alternatives, and the relative roles of infrastructure changes, insurance, and disaster relief.

6. SIRP Utility Committee Reporting Timelines

EPCOR will continue to engage City Council Utility Committee as the SIRP is fully developed.

The proposed timeline for SIRP updates requiring input from City Council are shown below.

April 2018 – Presentation on Insurance Perspective on Risk Mitigation – jointly with Insurance Bureau of Canada

June 2018 – Risk Framework Working model – confirmation of the components included in the Condition, Capacity and Social risk ranking

October 2018 – Stakeholder Engagement results to inform weighting decision for different risk components

April 2019 – Capital and Operational investment scenarios supporting Accelerated Flood mitigation efforts. The results will also include an assessment of stormwater rate approaches to support the increased investment levels.

In addition, overall progress on the SIRP will continue to be provided in the regular reporting provided with other initiatives within the Drainage utility. Active stormwater capital programs will be also be reported through the Drainage utility updates.

APPENDIX A

An Example of Public Engagement in Infrastructure Development: Dry Ponds

Once the City of Edmonton has established its preferred approach to risk management, packages of work will come forward for implementation. One early area for action is expected to be dry pond development. This section illustrates EPCOR's approach to public engagement in infrastructure development by outlining in detail how the public engagement process is expected to work for dry pond development and construction.

Current State and Future Development

Dry ponds play two roles in our communities: during heavy rain events they reduce flood impacts by temporarily storing stormwater, and when dry, they provide public amenities such as sports fields, naturalized sites, and mixed-use space.

Specific amenities are designed based on the site capabilities, community needs and input, and Edmonton's Breathe Strategy, which prioritizes ecology, celebration and wellness uses for Edmonton's open spaces.

There are currently 84 dry ponds in Edmonton, four under construction (in Tweddle Place, Tawa Park, and Elmwood), and two in design. Flood mitigation studies conducted for the City over the past several years have identified a growing role for dry ponds as an affordable way to manage stormwater volumes and reduce the impact of extreme rain events.

A total of 71 additional potential dry pond sites have been evaluated to the "concept" stage, with 20 of these sites rejected, primarily due to technical limitations. The remaining 51 sites are spread across 11 storm basins, with clusters in the northwest, downtown and west Edmonton. As part of the Stormwater Integrated Resource Plan, work is underway to create a priority ranking of these sites that is linked to a risk ranking of each storm sub-basin. The priority rankings will become the basis of a recommended multi-year development plan, which will facilitate public engagement at the regional and site-specific level.

Public Engagement and Council Decision-Making

The ultimate build-out of the dry pond network is expected to occur over a 25-year period, with two to three new locations beginning the design process each year. Each dry pond typically takes from three to four years to develop, from initial design to completion of construction.

The following table illustrates the public engagement and Council decision-making process during this planning and development cycle, as well as the stages of information sharing and communication.

Public Engagement During Dry Pond Development

Dry ponds are one example of the infrastructure investments, operational improvements and design standards that will flow from the Stormwater Integrated Resource Plan. While the public engagement process outlined below is specific to dry ponds, similar approaches to public engagement would be used for other major infrastructure decisions. Prior to the steps outlined below, a Risk Methodology Framework will be recommended to the City of Edmonton – and once established, will guide the prioritization of sites and scale of investment.

<i>Phase 1: Site Prioritization</i>			
Project Milestone	EPCOR Role	City of Edmonton Role	Public Engagement
1. Site Prioritization	Through the SIRP approach, complete a risk-ranking for each storm sub-basin based on capacity, condition and social impacts, and recommend priority projects. Inputs include technical studies and public engagement results.	Identify and engage on City policies and objectives that should be incorporated into the risk ranking, including the open space strategy (Breathe), the developing Recreation Master Plan, and the assessments being developed through the Climate Change Adaptation initiative.	Public engagement has been completed to the Consult / Advise level, and focused on the role for dry ponds, how mitigation priorities should be set, and preferences for speed of implementation.
2. Decision: Approve projects to proceed to concept development and public engagement	Recommend a list of priority projects and their expected impact on managing stormwater, and develop an engagement process for concept design and detailed design.	Recommended investments are incorporated into the review and approval of Performance Based Rates filings by City Council's Utilities Committee.	Public involvement to the Communicate level, with EPCOR providing clear information on how projects were prioritized, their expected benefits, and the future consultation plans.

Phase 2: Concept Design and Detailed Design

Following site prioritization, an EPCOR-led engagement team will be established for each dry pond project or regional groupings of projects. The team will work through the life-cycle of the development and finalization of both the Concept Design and the Detailed Design of the dry pond projects, and provide a single point of contact for the community that integrates multiple EPCOR and City functions. Based on ownership of the decisions at each stage of the engagement, either EPCOR or the City of Edmonton will be the lead face to the public within the overall engagement process.

<i>Phase 2: Concept Design and Detailed Design</i>			
Project Milestone	EPCOR Role	City of Edmonton Role	Public Engagement
3. Pre-Design: Information gathering about technical requirements and consultation design	Obtain detailed community-level data on flooding history, to help define the technical requirements of the concept design phase. Identify community preferences on consultation process design.	The City provided historic flooding data and consultant studies on flood mitigation improvements through the Drainage transfer. Additional community-level data will be provided at the pre-design stage, identifying future plans, the timing of road works and open space renewal, and other technical constraints that could impact the design.	Engagement Lead: EPCOR Public engagement to the Consult / Advise level, focused on obtaining site-specific flooding data and preferences for consultation process.
4. Concept Design	Support the public engagement and concept design decision making processes through the development of options, technical studies, cost-benefit analysis, and information on how different concept designs align with the City's risk methodology framework.	The City evaluates the options for the dry pond concept design, taking into account technical requirements, public input, cost-benefit analysis, risk analysis, and relationships to the competing or complementary objectives of other City policies and initiatives. The final 'trade off' decision between any competing objectives rests with the City. Options and draft reports are shared through the engagement process, with the City's final report incorporating feedback from this iterative process.	Engagement Lead: City of Edmonton Public engagement is conducted to the Involve / Refine level. The focus of engagement is on identifying the values and interests in the affected communities, understanding views on the trade-offs available within concept and final design (e.g. which types of amenities are valued or preferred) and the trade-offs between dry ponds and other mitigation approaches. Where multiple sites are proposed in a community, regional engagement may be conducted as a supplement to site-specific engagement.

<i>Phase 2: Concept Design and Detailed Design</i>			
Project Milestone	EPCOR Role	City of Edmonton Role	Public Engagement
5. Decision: Approve concept design.	Concept design decisions made by the City are incorporated into the overall dry pond capital budget, and the remaining work is re-prioritized in alignment with the Performance Based Rates approved by City Council's Utilities Committee.	The City selects its preferred concept design for the dry pond, or for a regional grouping of dry ponds. The City identifies how the concept decision incorporated public input, the budget implications, any net amenities impacts, and trade-offs made in the design selection.	Public involvement to the Communicate level, with the project team providing clear information on how the concept design decision was made, and how public input was incorporated.
6. Detailed Design	EPCOR develops a final design, capital budget and construction plan for the project. Design options and drafts are shared through the engagement process, with EPCOR's final design incorporating feedback from this iterative process.	Provides input on ways the detailed design could be adapted to better meet the City's open space strategy (<i>Breathe</i>), the Recreation Master Plan, and other related policies.	Engagement Lead: EPCOR Public engagement is conducted to the Involve / Refine level. The focus of engagement is on optimizing the design, layout and infrastructure at a site-specific level, with directly affected stakeholders, and identifying and addressing construction-related impacts.

Phase 3: Construction

With the detailed design in place, public engagement scales back from the peak levels (Involve/Refine) to a focus on Communications during construction, including a two-way process for neighbours to identify construction-related impacts and have them addressed.

<i>Phase 3: Construction</i>			
Project Milestone	EPCOR Role	City of Edmonton Role	Public Engagement
7. Action: Construction	The dry pond project enters construction. EPCOR provides ongoing communication of construction and project progress, and addresses any implementation issues.	EPCOR coordinates any transportation or utility impacts with the City of Edmonton.	Engagement Lead: EPCOR Public involvement to the Communicate level, with the project team providing clear information on the construction timelines, community impacts, and mitigation of impacts, as well as a mechanism for community comments or complaints.
8. Completion and Opening	The project is complete and operating. The engagement team for this project disbands. Operationalization of the project includes ongoing communication and coordination with the City of Edmonton and the community with respect to dry pond operation and maintenance.		