COMMON COUNCIL REPORT

	2020-39
Report Date	January 23, 2020
Meeting Date	January 27, 2020
Service Area	Public Safety Services

SUBJECT: **Emergency *Response Simulation Theatre Project***

This matter is to be discussed in open session of Common Council.

AUTHORIZATION

Primary Author	Commissioner/Dept. Head	City Manager
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RECOMMENDATION

It is recommended that Common Council:

- Approves the proposed renovations to the soon to be vacated Fire Prevention Division located in the second level office space next to the Saint John Emergency Operations Centre (EOC) for the purpose of establishing an emergency planning, preparation, response and testing simulation theatre.

- Award a contract as presented by ADMS simulation (Attachment C) for the purpose of providing the City of Saint John with simulation equipment that will support the development of a comprehensive emergency planning, preparation, response and testing simulation theatre.

- Approves the adjustment to the 2020 Capital Budget for the purchase of the Emergency Planning, Preparedness, Response Testing Simulation Project based on the appropriateness of the attached business case for a total of $571,385.

- Approves the local acquisition of the furniture, monitors and other related electronic equipment necessary for the simulation theatre from the CAER contribution received from Canaport LNG.

EXECUTIVE SUMMARY

Planning for emergencies is mandated by the Emergency Measures Act of the Province of New Brunswick and is mirrored in the City of Saint John Emergency Measures By-law. All CSA standards relevant to emergency preparedness and response such as CSA Z731 and CSA Z1600 have imbedded a section that

requires training and exercises to evaluate the effectiveness of emergency response plans. Without affirmation that emergency response plans will be effective, the plans created for compliance by stakeholders become only administrative. One challenge within the City of Saint John is the unprecedented number and diversity of industrial and weather-related hazards within the community that require tailored training and exercising to promote a successful response to a hazard event. Therefore, effective planning, preparedness, and response to emergencies are dependent on the ability of the community to validate its various emergency response plans and identify improvement opportunities, ultimately increasing public safety.

Council through numerous resolutions has supported the fire service's Community Awareness Emergency Response (CAER) concept. CAER advocates for a structured methodical approach to emergency preparedness base on principles of High Reliability Organizations – HRO (attachment A), The creation of an Emergency Planning, Preparedness, Response and Testing Simulation Theatre is a critical step in ensuring emergency responses competence is at a level this community expects.

The Simulation Theatre Project is being advanced during this significant period of austerity as a result of the following opportunity and rational:

1. The new deal with Pt Lepreau provides the financial resources and enriches the collaborative approach between industry and municipality on emergency plans. NB Power and Canaport LNG are models for other entities requiring emergency plan affirmation. Pt Lepreau and CanaPort could be the catalyst for enriching the planning, preparation and response capability of this community.
2. Changes to the Environmental Emergencies Regulations present an opportunity for further voluntary participation of industry and additional revenue.
3. Municipal restructuring dictates a more efficient/more effective approach to emergency planning, preparation and response testing. SJFD/SJEMO will be adopting one format/one model for conducting and participating in emergency response plans review.
4. Introduces SJEMO/Saint John Fire Emergency Response Planning format to the community.

The Emergency Planning, Preparedness, Response, Testing Simulation Theatre project has three main components.

1) Renovation of space at No. 1 Fire Station ($172,714)
2) Purchase of the Advanced Disaster Management Simulator (ADMS) computer/software components ($386,921 – Net HST after rebate)
3) Council support to use a portion ($32,545) of CanaPort CAER donation ($45,000) to acquire furniture, monitors and electronics for the simulation theatre.

The Financial and Public Safety Business Case for advancing this project are valid.

- Revenue:
  - Actual Pt Lepreau $1,489,811
- Expense:
  - Debenture Pymts $631,380

- Safer community and more effective use of emergency planning resources.

It is important to note that Saint John Fire Department representatives made an urgent appeal to NB Power for an even higher value within the backup fire response agreement. NB Power considered the appeal; however, after review, they offered that the proposed amount of $142,163 was as high as they could go and that they could not extend any further on the value. NB Power did share that all six of the nuclear facilities across Canada have some level of backup response agreement with their neighbouring communities. Of the six facilities only two pay a fee for the backup fire response support; and the new amount as tentatively agreed between Saint John and Pt Lepreau represents the highest cost that any of the facilities are paying on a per reactor basis.

The Advanced Disaster Management (ADMS) Simulator

ADMS was selected through an RFP process to provide highly effective training for relevant scenarios resulting in better knowledge of Standard Operating Procedures and Command and Control skills for multi-agency response and coordination. ADMS is an interactive and dynamic virtual reality training platform utilizing artificial intelligence, and physics-based effects and models embedded in the system. Real-time insight into the effects of participants' decisions is immediately identified as the simulation demonstrates the consequences of their decisions. This higher-level experience makes ADMS an effective tool for planning, rehearsing, assessing, and enhancing the skills of the participants required to manage incidents and disasters. The principle advantages of ADMS include:

- Decreased operational and training costs
- Increased learning retention and on-scene performance
- Ability to train anytime without disruption to daily operations
- Reduced safety concerns for trainees, staff, and the environment
- Ability to create scenarios based on exact circumstances
- Structured and objective scoring and assessment capabilities
- Control over the entire exercise process by the instructional staff
- Increase the efficiency of training more people, more frequently, for more incidents

The simulation technology examined as part of this RFP process is capable of replicating hundreds of emergency environments including human, accidental or intentional acts; natural weather events; industrial incidents at fixed sites; or across the whole transportation network be it roads, rail, marine, or air traffic.

The simulation theatre can provide numerous emergency planning, preparedness and response testing environments specific to Saint John including threats to public facilities like the City Market/City Hall, Hospitals, Schools, High Rise properties, Nursing Homes, and Public Assembly Events like the night market or public assembly events at Harbour Station or Imperial Theatre to name a few.

PREVIOUS RESOLUTION

Since 1982 Common Council has approved through a resolution the long-standing agreement with NB Power to provide backup emergency response to the Pt Lepreau Nuclear Generator facility. In addition to an enhanced fee for service, the new agreement presented today provides greater opportunity for Saint John Firefighters to maintain the necessary competence to respond to the Nuclear Generating Facility. The incremental change in the agreement presents a significant opportunity to enhance community safety.

The **City of Saint John Work Plan received by Council February 20th, 2017** - the Fire Department's immediate objective is to more fully engage key stakeholders, particularly industry and businesses, to introduce CAER, a community-based initiative to enhance public safety through more effective emergency response planning and preparation.

In **April of 2017 Common Council resolved** to authorize the Saint John Fire Department to approach the community's industrial stakeholders to determine their interest in becoming a Saint John Fire Department CAER Partner.

In **November 2019 Common Council approved** the relocation of the Fire Prevention Division for the purpose of advancing the Community Awareness Emergency Response Initiative. The goal of this particular project is to utilize simulation technology to enable first responder and industry collaboration in a pressurized environment to test the effectiveness of emergency response plans as well as the competence of the emergency responder decision-makers. It is proposed that the ideal location for the CAER simulation theatre is the office space adjacent to the Emergency Operation Centre (EOC) in Fire Station 1 on Leinster Street. This space is currently occupied by the Fire Prevention and Investigation Division.

January 13th, 2020 Council received during open session staff work priorities for 2019 and noted the following. Plans were underway on the development of a more robust emergency management policy / a complete risk assessment of city facilities and work places is complete and / that work was beginning on doing a risk assessment of public facilities and communities. The simulation project provides significant support to each of these noted priorities.

REPORT

The City of Saint John has experienced a diverse list of emergency incidents during recent years. The emergency events have occurred across the broad spectrum of incident types (Wind, Ice, snow, flood, and industrial incidents) have pushed this community to the limit over the past five years. Severe weather events are looming as the "new norm" for much of Eastern Canada. Indeed, the Federal Government's focus on climate change adaptation plans is another indicator that we need to be prepared for the new reality.

Meanwhile, Saint John City Council's recognition of the need for a safe and secure workplace emphasizes the concern that we need to be prepared for threats that occur as a result of human behaviour. Confirmation of this important diligence has been tragically highlighted through recent incidents in Fredericton and Moncton.

The business case for supporting the creation of an emergency planning, preparedness, and response simulation theatre is founded on the combination of recent and historical emergency incidents as well as changes to climate and human behaviour. This community does not have to rely on extreme probabilities as a motivation to host a better planning and preparation environment for emergency incidents; this community simply needs to look at recent history to understand the urgency in having our first responders and community properly prepared for the hazard/risk profile that exists within the Saint John landscape.

In addition to the concern about weather and human behaviour incidents, The City of Saint John has an industrial hazard risk profile unlike any other city in Atlantic Canada. In fact, it has a greater industrial hazard risk profile than many other larger urban Centres across Canada. Accessibility to tidal waters and the natural proximity to the North American East Coast market provided much of the incentive for the industrial investment that represents much of our community's diverse hazard risk profile. The 1967 amalgamation of three separate urban planning Centres along with the unabridged urban encroachment near established industrial centres has helped create the hazard/risk landscape that exists within the Saint John Community. The hazard/risk profile is not only diverse but further complicated in that the hazard/risk facilities are integrated within the urban setting. This reality presents numerous challenges with respect to emergency planning, preparation and response competence at the strategic and tactical levels.

Our current emergency planning and preparation efforts as it relates to the natural, human and industrial risk profile, needs to be advanced using modern technology, such that a more strategic, structured, methodical, and integrated approach to the emergency planning, preparation and response meets the expectations of our community.

Why Simulation Technology At This Time?

During periods of austerity, it is critical to identify opportunities to align efficiency decisions with effectiveness decisions. If indeed emergency services are reduced as a result of the restructuring exercise that the City has undertaken, it will be even more important for emergency officials to have an effective planning, preparation and responses exercise regime. Simulation technology is proven as a realistic and cost-effective means to properly prepare for random emergency events. The frequency of emergency incidents is increasing, and the need for communities to properly plan and prepare to ensure a competent response, is a cornerstone to the role of municipal leaders.

Simulation technology with artificial intelligence provides municipal Emergency Management Officials with an emergency planning and preparation environment that truly replicates reality. Participants in simulation testing are challenged on their knowledge with respect to a given emergency response plan and are further tested on their ability to make decisions in a time-pressured urgent environment. The simulation technology examined as part of this RFP process is capable of replicating hundreds of emergency environments including human accidental or intentional acts; natural weather events; industrial incidents at fixed sites; or across the whole transportation network be it roads, rail, marine, or air traffic.

The renewal of the long-standing emergency response agreement with NB Power provides the financial resources to attain the identified simulation technology. The incremental revenue from the new agreement will cover the full cost of the simulator theatre across the term of the agreement. It is important to note that in preparing their revenue projection for 2020, the fire service did not budget for any revenue from the expired NB Power contract given the possibility that the agreement would not be renewed. To this end, the full amount of the yearly contract is unplanned revenue moving forward, far exceeding the cost of the simulation theatre project.

In addition to the revenue solution from the NB Power contract, recent changes to the Canadian Environmental Protection Act places significant emphasis on hazard facilities to sustain emergency response plans and to create an appropriate emergency exercise calendar. This is a significant change for a number of these municipal hazard sites. To this end, Saint John Fire/Saint John Emergency Measures Organization are developing specialized exercise design competence (Per CSA Standard) to complement our extraordinary Emergency Scene Command and Control experience (Using Incident Command System Canada Ideology). The combination of exercise design competence, proven emergency management experience, and the proposed simulation theatre presents an emergency planning, preparation and response consumer package unequal in Eastern Canada. We have already received expressions of interest to be engaged (for a fee) with our proposed program. Our modest estimate on potential annual revenue from providing a comprehensive emergency planning, preparation and exercise testing solution begins at $100,000.

THE SIMULATION THEATRE PROJECT

The Simulation Theatre Project as a whole has an estimated cost of $603,930. There are three components to the simulation theatre that council is being asked to consider:

1) Renovation of the soon to be vacated fire prevention office at No 1 Fire Station located next to the City of Saint John Emergency Operations Centre. The Architectural estimate is $172,714 (Attachment B)
2) Purchase of Advanced Disaster Management Simulator (ADMS) components at a cost of $386,921 – after HST rebate (Attachment C)
3) As part of the project endorse the local acquisition of furniture, monitors and other related electronic equipment ($32,545) necessary for the simulation theatre from the $45,000 CAER contribution received from Canaport LNG. (Attachment E)

PAYING FOR THE SIMULATOR THEATRE PROJECT

A cash flow analysis clearly indicates that the stream of revenue created by the NB Power Agreement will cover the obligations as presented by issuing a debenture through the Province. Further explanation of the cash flow component of the project provides the following,

1) Issue a five year debenture through the Province. Finance and Fire reviewed the cost proposed to lease to own the equipment or to borrow for the equipment. Based on a very conservative borrowing estimate of 3.5 % over 5 years, it was clear that borrowing would be the most fiscal option. By borrowing the money to facilitate the simulation theatre project the City is going to save more than $25,000 as opposed to entering into a lease agreement.
2) The NB Power revenue stream (protected from CPI and wage settlements) exceeds the full cost of borrowing for the simulator theatre project by $850,000 See table on next page.
3) The emergency planning, preparedness and response simulator has great potential to provide training income. SJFD/SJEMO projects $100,000 of new revenue (annual beginning 2021) as a result of providing emergency planning, preparedness and response exercises through the simulation theatre.

	5 yr Debenture for Simulation Theatre Project: $571,385 at 3.5 %	NB Power Pt LePreau Revenue Received (1% CPI Adjustment each Year)

		Response	Training
2020	0	64,620 (10 months)	53,849 (10 months)
2021	134,276	78,319	65,265
2022	130,276	79,102	65,918
2023	126,276	79,893	66,577
2024	122,276	80,692	67,243
2025	118,276	81,499	67,915
2026	0	82,314	68,594
2027	0	83,137	69,280
2028	0	83,969	69,973
2029	0	84,808	70,672
2030	0	14,276	11,896
	631,380	812,629	677,182
			812,629
			$ 1,489,811
			$ 631,380
NET			$ 858,431

IMMERSION SIMULATION & ADMS-COMMAND TRAINING SYSTEM

Immersive Simulations

The Justice Institute of British Columbia (JIBC) defines emergency management exercises as a simulation of an emergency event used to validate capabilities, plans, processes, policies, and procedures. Immersive simulations are exercises that use technology to realistically model how an emergency scenario would unfold in response to the participant's decision-making. They are scalable, allowing individuals, teams, agencies, and industry stakeholders to exercise together, thus promoting interoperability. Advancements in technology have enabled immersive simulations to reduce costs associated with the number of resources, both personnel and equipment, needed to facilitate realistic multi-stakeholder environments. Immersive simulations are becoming mainstream because they:

- Decrease the learning curve for participants when facing a real emergency
- Provide a venue for participants to practice their responses
- Recreate specific situations on demand
- Provide a means for all staff to be trained in a consistent way
- Validate and augment training in a specific skill set or procedure

Advanced Disaster Management Simulator (ADMS)

ADMS was selected through an RFP process to provide highly effective training for relevant scenarios resulting in better knowledge of Standard Operating

Procedures and Command and Control skills for multi-agency response and coordination. ADMS is an interactive and dynamic virtual reality training platform utilizing artificial intelligence, and physics-based effects and models embedded in the system. Real-time insight into the effects of participant's decisions is immediately identified as the simulation demonstrates the consequences of their decisions. This higher-level experience makes ADMS an effective tool for planning, rehearsing, assessing, and enhancing the skills of the participants required to manage incidents and disasters. The principle advantages of ADMS include:

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- Increase the efficiency of training more people, more frequently, for more incidents

Currently, the City of Saint John is faced with a multitude of possible emergency scenarios with varying degrees of stakeholder preparedness and inconsistent formats of emergency response plans. The only way to ensure these plans will be effective is through realistic training scenarios utilizing simulation. The ADMS training system would facilitate the validation of stakeholder emergency response plans in a cost-effective manner, supporting compliance and increasing public safety.

STRATEGIC ALIGNMENT

Recent council resolution with respect to safe facilities

Aligned to safe communities, effective service delivery, financial growth and community confidence.

SERVICE AND FINANCIAL OUTCOMES

The simulator theatre project is tightly aligned to the new backup fire response agreement as adopted with NB Power. The new 10-year agreement with NB Power is valued at over $1,420,000 (cost escalation protected) and provides the complete funding for the simulation theatre project.

Emergency plans, preparedness and exercises are critical part of numerous hazard sites, spaces or public assembly, and various levels of commerce and government. The City of Saint John Emergency Planning, Preparing, Response and Exercise simulation theatre will be a centre of excellence and a one-stop shop for those who must meet the rigor of being prepared for unlikely incidents.

We will be promoting the simulation theatre as a centre of excellence for everything related to emergency preparedness. Our revenue model for third party users will incorporate the cost to acquire the asset and the cost to replace the asset as well as the full operating cost.

Once the simulation theatre is fully functional we will be approaching many of our local hazard sites to share in the acquisition expense upfront. To this end, those who share in the acquisition price will not have the acquisition price included when they wish to utilize the facility for their emergency planning and preparedness needs.

INPUT FROM OTHER SERVICE AREAS AND STAKEHOLDERS

- The Finance Department has reviewed the financial representations and can attest to the accuracy of the report, as well as ensuring the Capital Budget and Debt Management Policy guidelines are being followed.

- The Legal Department will review the Pt. Lepreau contract as it has done in the past prior to it being submitted to Common Council.

- The Purchasing Department coordinated the issuance of the RFP for the simulation assets and worked with the fire service in evaluating the proposals as submitted

ATTACHMENTS

Attachment A- High Reliability Organizations
Attachment B- Engineer's Estimate to conduct renovations to the simulation theatre location
Attachment C- ADMS SIMULATION proposal
Attachment D - Furniture, Monitors and related Equipment Estimate

Attachment A

5 Principles of HROs

High Reliability Organizations (HROs) are anomalies. They exist in the kind of very complex, fast-evolving environments where you would expect chaos to prevail. But it doesn't. HROs are able to cope successfully with unexpected conditions. That's what makes these unusual organizations so attractive to researchers.

What can we learn from them?

Knowledge about HROs is rooted in what we call "heroic" organizations like aircraft carriers and air traffic control systems where a thousand things must go right every moment or someone dies. People like Karl Weick and Kathleen Sutcliffe, two of the most prominent scholars in the field, are beginning to stretch the concepts developed by evaluating HROs to apply to less heroic settings like banking, healthcare and manufacturing.

Weick and Sutcliffe use the phrase "mindful organizing," which entails "sense-making, continuous organizing, and adaptive managing" to summarize the approach taken by HROs. [i] They identify 5 principles that make up the body of mindful organizing found in successful HROs, and in organizations that aspire to that continuously high reliability.

1. Preoccupation with Failure

Systems in modern organizations are complicated, and they experience failures. HROs focus like a laser on failure; they give "continuous attention to anomalies that could be symptoms of larger problems. "The basic insight here is that big problems don't emerge fully formed in an instant.

They are almost always preceded by smaller problems or anomalies, or evidence that would point to the big problem if it were given proper attention.

What HROs do NOT do is assume that if a control in place succeeds in containing a failure, everything is right. They look deeper into an incident to find underlying causes. They also do not lump a failure with common elements to another into a class that all are alike. Evidence is gathered and evaluated.

2. Reluctance to Simplify

Complexity means that organizations have numerous potential sources of failure, and HROs do not apply generalized terms to describe them. It is a common and convenient response to a problem to name a general kind of cause and consider it a solution, e.g., 'the bank has a state of the art alarm system' so the failure of the alarm can be fixed by replacing it. What if the alarm's failure is caused by something deeper? What specifically was the cause? In HROs, the occurrence of a failure is taken as an opportunity to dig deeply into the details of the system involved to find a real cause. You differentiate the details within those broad, convenient generalizations.

3. Sensitivity to Operations

Operations happen in real time. They include both discrete components and the system they compose. As such, operations generate outcomes that we can observe. The HRO continuously evaluates outcomes to determine if they are in fact serving the objectives of the organization. They do not assume that the continuous outcomes will be the same as planned, assumed, or hoped for. Operations are what an organization does. In this sense, HROs treat them as hands-on experiences from which lessons about the organization can be taken to further improve function in real time.

4. Commitment to Resiliency

"The signature of the high reliability organization is not that it is error-free, but that errors don't disable it." HROs are essentially adaptable, learning organizations. They can experience a failure but continue operating under degraded conditions while marshalling resources to restore capacity.

To operate like this, HROs can recognize emerging anomalies despite prior beliefs, experiences, or plans. In large part, this requires both open-minded observation and a willingness to react appropriately even under unanticipated condition.

5. Deference to Expertise

The fact that an HRO must be open-minded rather than judgmental leads to the idea that the culture of the HRO defers to expertise. The key point, however, is that the "expert" involved is the person with hands-on knowledge of the operation at the point of a failure, not the "expertise" conferred by hierarchical authority.

In the HRO, the expert has access to upward reporting, and there is no intimidation from authority to impede the communication. The openness required for the HRO to succeed depends on accurate information from every source.

Not every organization will adapt every HRO principle, at least in the short term. Many organizations can improve continuous operational reliability by adapting the pieces that fit. Over time, more and more of the organization can be improved this way, moving toward the "perfect reliability" objective of the HRO.