



**Klohn Crippen Berger**

## **City of Edmonton**

### **River Rescue and Backup Fire Rescue in the Central Core**

#### ***Environmental Screening Assessment and Site Location Study***

April 12, 2013

Project Management and Maintenance Services  
Community Services  
City of Edmonton  
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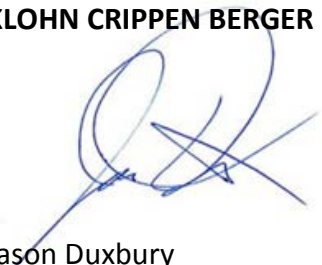
Dear Mr. Richards:

**River Rescue and Backup Fire Rescue in the Central Core  
Environmental Screening Assessment and Site Location Study  
Intermediate Submission**

Please find enclosed the Intermediate Submission which outlines the initial review of the five potential sites for the River Rescue boat launch in terms of their ability to meet River Rescue boat launch criteria and fire operations requirements.

Please feel free to call me should you have any questions.

Yours truly,  
**KLOHN CRIPPEN BERGER LTD.**



Jason Duxbury  
Project Manager

DL:cd

# City of Edmonton

## River Rescue and Backup Fire Rescue in the Central Core

### *Environmental Screening Assessment and Site Location Study*

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## 1 INTRODUCTION

### 1.1 Project Understanding

The City of Edmonton (City) is working to develop a staffed Fire Rescue Services River Rescue Station that will also provide backup Fire Rescue Services to the Central Core and house specialized emergency response equipment (the Project). The establishment of a trained River Rescue crew in a facility at the edge of the North Saskatchewan River will resolve potential issues with the current delivery model, provide a staffed facility in the Central Core, and proactively resolve other Fire Rescue operational issues.

Five sites have been identified as potential Project locations by the City:

- Rossdale: 9315 101 Street (Station 21 existing location);
- Cloverdale: 9812 96a Street (Rafters Landing);
- Queen Elizabeth Park: 10370 Queen Elizabeth Park Road (Dantzers Hill east of Walterdale Bridge);
- Riverdale: 10296 87 St. north of Dawson Bridge; and
- North Rossdale: approximately at 9903 Rossdale Road at James McDonald Bridge.

The North Saskatchewan River Valley Area Redevelopment Plan - Bylaw No. 7188 (ARP) sets out a process for considering major public facilities within the River Valley. This Project is required to meet the requirements of Section 3.5.3 of the ARP along with other City objectives.

### 1.2 Study Objective and Scope

Klohn Crippen Berger (KCB) was commissioned by the City to assist in the evaluation of the five identified sites. KCB was to assemble existing information to be used by the City as assessment criteria for the purpose of short-listing the potential sites (Phase 1). Subsequent to the short-listing process, KCB is to complete environmental impact assessment (EIA) (Phase 2). The EIA will provide site specific information that City Council requires to make an informed decision for the location of a boat launch and downtown Fire Rescue support services prior to approving Project funding (Phase 2). The specific activities associated with each Phase are as follows:

- Phase 1:
  - ♦ Define the general characteristics of a good boat launch site, including key criteria through which to assess the characteristics, and, based on existing available information, rank the five locations first, based on the boat launch site criteria and, secondly, on the ability of the locations to meet the operational needs of the rescue truck; and
  - ♦ Review the EBA Study (2001) on the Fire Station #21 site.

- Phase 2:
  - ◆ Complete a more detailed site location study and EIA on the short-listed sites.

This “intermediate submission” presents the findings of the first component of Phase One. The remainder of this submission is structured as follows:

- Section 2: Methodology
- Section 3: Study Activities
- Section 4: Key Findings
- Section 5: Closing

## 2 METHODOLOGY

The methodology utilized for the Phase 1 short-listing site ranking included the following activities:

- Meetings with City staff and winter site visit;
- Review of documentation;
- Discussions with other municipalities with similar facilities;
- Development and review of evaluation criteria and a criteria ranking system;
- Development and completion of the site ranking matrix; and
- Discussion of findings.

The level of data available (i.e., existing information and information gathered during the site visit), was sufficient for use as a basis for criteria development. The level of data was also suitable for planning level (i.e., scoping) comparisons between the sites, but additional assessment of the short-listed sites and completion of an updated site ranking matrix is required prior to the final site selection. The assessment and ranking in Phase 1 was based on qualitative and, where available, quantitative information and focused on identifying potential constraints at any of the sites that would restrict that site from advancing to the short-list and undergoing more detailed assessment. Other than the winter site visit, no field work was undertaken during Phase 1. Phase 2 is to involve a more detailed assessment of the short listed sites



### 3 STUDY ACTIVITIES

#### 3.1 Meetings with City staff and site visit

On January 28, 2013, KCB met with City staff to discuss the Project and with members of Fire Rescue from Station 6, the Station currently responsible for operation of the emergency boat. The meeting was held at Station 21 to discuss their “on the ground” experience regarding what makes a good location for a boat launch and any challenges that they may be facing at the existing location. Key items identified by the Fire Rescue personnel were:

- Site location (e.g., sheltered, easy access to river);
- Water depth
- Siltation build-up;
- Proximity to publically accessible, elevated viewpoint above site; and
- Proximity to areas with higher existing/anticipated call volume.

This informal meeting was followed by a visit to four of the five sites with City staff. The Queen Elizabeth Park site was not accessible due to construction of the new Waltherdale Bridge. The purpose of the site visits was to gain an understanding of the sites in terms of location and potential constraints on and around the sites. As the ground was snow covered and the river was partially frozen, it was not possible to observe the actual shoreline or water conditions at the sites.

#### 3.2 Review of Documentation

Literature related to boat launch sites was reviewed to identify and rank criteria relative to each potential site. The information included reports and unpublished data from the City, along with Federal and Provincial approval requirements.

##### 3.2.1 Literature Related to Boat Launch Sites

The following literature related to boat launch sites was reviewed:

- The City of Edmonton - About Fire Rescue Services, accessed on February 12, 2013 ([http://www.edmonton.ca/for\\_residents/about-fire-rescue-services.aspx](http://www.edmonton.ca/for_residents/about-fire-rescue-services.aspx)).
- Shore Coastal: Capes Region Boating Strategy, accessed on February 12, 2013 (<http://www.reba.org.au/Capes%20Region%20Boating%20Strategy%20January%202011.pdf>).
- Aviva Community Fund, accessed on February 12, 2013 (<http://www.avivacommunityfund.org/ideas/acf16325>).
- The Bridge River Lillooet News, accessed on February 12, 2013 (<http://www.lillooetnews.net/article/20121121/LILLOOET0101/311219994/-1/lillooet/still-time-to-vote-for-boat-launch-project>).

- GMS Works #37, Reservoir Access Along Williston Lake and Peace River, Mackenzie Landing Document.
- Shores Coastal. 2011. Capes Region Boating Strategy: for Shire of Busselton and Shire of Augusta-Margaret River, Final Report. January 2011.
- Oregon State Marine Board. 2011. Design Guidelines for Recreational Boating Facilities, Third Edition. September 2011.
- BC Parks: Park Design Guidelines & Data. Day-Use Areas: Boat Launches.
- State of California Department of Boating and Waterways. 2005. Layout and Design Guidelines for Marina Berthing Facilities, July 2005.
- State of California Department of Boating and Waterways. 1991. Layout, Design and Construction Handbook for Small Craft Boat Launching Facilities, March 1991.

### 3.2.2 Information Provided by the City

Information provided by the City for review and consideration in the assessment included:

- North Saskatchewan River Valley Area Redevelopment Plan - Bylaw No. 7188;
- Figure showing the location of summer river rescue calls 2009 to 2011;
- General site location maps;
- Aerial imagery;
- 4 minute and 8 minute rescue response zone figures;
- Rescue Truck site suitability document; and
- City of Edmonton Strategic Plan ([http://www.edmonton.ca/city\\_government/city-vision-and-strategic-plan.aspx](http://www.edmonton.ca/city_government/city-vision-and-strategic-plan.aspx))

### 3.2.3 Federal and Provincial approval requirements

Regulatory governance for the construction and operation of a boat launch on the North Saskatchewan River falls under both Federal and Provincial jurisdictions. To determine approval requirements and potential temporal constraints to construction, the following information was reviewed.

- Federal
  - ♦ *Fisheries Act* (RSC 1985, c F-14);
  - ♦ *Navigable Waters Protection Act* (R.S.C., 1985, c. N-22); and
  - ♦ *Migratory Birds Convention Act*, 1994 (SC 1994, c 22),.
- Provincial
  - ♦ *Public Lands Act* (RSA 2000, c P-40);

- ♦ *Water Act, Environmental Protection and Enhancement Act,*
- ♦ *the Historical Resources Act* (RSA 2000, c H-9);
- ♦ *Alberta's Wildlife Act* (RSA 2000, c W-10); and
- ♦ *Fisheries Act.*

### 3.3 Discussions with Other Municipalities

Attempts were made to contact a number of other municipalities with emergency boat launch facilities to discuss their experience with the facilities and contact was successful with:

- City of Saskatoon Fire and Protective Services (S), Personal Communication. Dave Bykowsky, Assistant Chief of Staff and Development Safety. Phone number: 1-306-975-2520. Contacted on February 25, 2013 at 2:30pm PST.
- City of Prince George Fire and Rescue Services (PG), Personal Communication. Chief James Sweet, Chief Training Officer. Phone number: 1-250-561-7667. Contacted on February 27, 2013 at 11:10am PST.

Both City of Saskatoon and City of Prince George representatives were asked about their experience with their respective existing facility and the factors that, in their experience, are important in locating an emergency boat launch. Key items identified were:

- Good vehicular accessibility (PG);
- Boat launch and related, necessary accessories quickly and easily accessible throughout all seasons (S);
- Concrete boat launch (S);
- Site exposure – site not prone to siltation (i.e. boat launch not located in an area prone to sand/soft soil deposits) (PG);
- Site Exposure - waves and swells (i.e. high water river conditions are not too high and/or fast for safe boat launch access) (PG);
- Boat launch not located on a bend in the river, but on 'straightaway' (S, PG);
- Located in an area free from hazards which may damage boats and equipment (i.e. not located amidst a rocky beach) (PG); and
- Central location close to city services (i.e. health care resources) and/or emergency resources. (PG).

### 3.4 Criteria and Ranking

In Phase 1, the five sites were assessed on a series of criteria related to engineering, First Nations and Archaeology, socio-economic, and environment. A mix of qualitative and quantitative assessments was used to rank the potential sites.

#### 3.4.1 Criteria Identification and Ranking System Development

Based on the activities described in Section 3.1, Section 3.2 and Section 3.3 as well as professional experience, a list of criteria for a good location for a boat launch and rescue truck were developed. In addition to the general list of criteria, a listing of key criteria, which was a sub-set of the general criteria, was prepared.

A ranking system was also developed and generally used to assist in ranking the sites. The system provided for each criterion to be ranked on a relative 4-point scale, with:

- 4. = No issues; "best" condition;
- 3. = Mild-moderate issue; may require additional cost, design or mitigation measures but is not a hindrance;
- 2. = Moderate issue; will require additional cost or mitigation measures, but could be made to work; and
- 1. = A negative in choosing the site.

The criteria and associated ranking system are provided in Table 1.

#### 3.4.2 Review with the City

Once the draft criteria and ranking system were developed, they were discussed with the City and revised to incorporate the feedback.

### 3.5 Development and completion of an assessment matrix

Once the criteria and ranking system were developed, a matrix was prepared and the five potential sites were ranked on both:

- The River Rescue boat launch criteria; and
- The criteria provided by Fire Rescue Services regarding the suitability of the sites for a base for a Rescue Truck.

The matrix for the five sites is presented in Table 2 with key criteria being presented in red font. The findings of the assessment are discussed in Section 4.

Table 1 Criteria and Associated Ranking System

ATTRIBUTE	SUITABILITY CRITERIA			
	4	3	2	1
General Measures	No significant issue; "best" condition	Mild-moderate issue; may require additional cost, design or mitigation measures but is not a hindrance	Moderate issue; will require additional cost or mitigation measures, but could be made to work.	A negative in choosing this site
ENGINEERING				
Boat Launch				
Launch Access	River edge is 0-25 m from potential building site	River edge is 26-50 m from potential building site	River edge is 51-100 m from potential building site	River edge is >100 m from potential building site
Topography	Gentle slope	Moderately sloped site	Moderately sloped site	Steeply sloped site
Geotechnical	Stable foreshore slope	Rare and minor morphological changes expected to foreshore slope	Regular but manageable morphological changes expected to foreshore slope	Slopes are active and require engineering controls.
Boat Launch	Exists or requires minor upgrading	Score value not used	Score value not used	Does not exist
Support buildings	Exists or requires minor upgrading	Score value not used	Score value not used	Does not exist
Infrastructure to access river from site	Existing or minor upgrades	Construction of a short ramp is required	Construction of a long ramp or boathouse and pier is required.	Construction of a bridge is required due to an intersection with a public path.
Room for vehicle and boat maneuverability	Unlimited area for a vehicle and boat trailer to maneuver safely and back down the ramp.	Suitable area for a vehicle and boat trailer to maneuver safely and back down the ramp.	Area for a vehicle and boat trailer to maneuver safely and back down the ramp requires high skill.	Limited area for maneuvering trailer and boat with a chance of incident occurring.
Can accommodate a double wide boat launch	Yes	Score value not used	Score value not used	No
Proximity to structures and Navigation Hazards	No evident hazards	Some in river hazards (i.e., rocks)	Some in river hazards (i.e., rocks)	The site is proximate to bridges or utilities
Low Water Conditions	Meets depth requirements during all seasons	Shallow areas around which the boat can be navigated.	Shallow water near launch that may ground boat.	Sandbars present and extend distance to suitable water depth.
High Water Conditions	Water levels and velocity always suitable for safe launching or landing	Water levels and velocity normally suitable for safe launching or landing	Occasional high water conditions are too high or fast for safe launching or landing	Regularly occurring high water conditions that are too high or fast for safe launching or landing
Location relative to High Level bridge	Closest to High Level Bridge	Closer to High Level than Dawson	Closer to Dawson than High Level	Closest to Dawson Bridge
Sight lines	Located on straight section	Score value not used	Located on river bend	Score value not used
Confluence turbulence	Site is not near the confluence of a stream or outfall	Score value not used	Score value not used	Site is near the confluence of a stream or outfall
Flooding	Riverbanks are high and site is protected from flooding	Riverbanks are high and only 1 in 100 flood levels are expected to affect the site	Riverbanks are high and only 1 in 25 flood levels are expected to affect the site	Riverbanks are low and frequent flooding could be problematic
Substrate conditions	Site is not in an area prone to siltation or scour (i.e. not located in an area prone to sand/soft soil movements)	Score value not used	Score value not used	Site not prone to siltation given river bed conditions.
Lighting	Waiting for City input	Waiting for City input	Waiting for City input	Waiting for City input
Launching and Landing	Site is protected from wind exposure and infrastructure such as a parallel wharf or pontoon floats are not required and is located on the inside bend	Inside bend	Straight section	Outside bend
Public Overlook	Public cannot see on-site activities.	Score value not used	Score value not used	Elevated viewpoint that is accessible to the public would allow for viewing of rescue operations on site.
Site Protection	Score value not used	Site will not require a breakwater or foreshore armoring	Site will require a breakwater or foreshore armoring	Score value not used
Vehicle Access and Site Characteristics				
Access Road Construction	Minimal Upgrades	Some upgrades or short relocation	Moderate upgrades and relocation	New road construction
Support buildings	Exists or requires minor upgrading	Score value not used	Score value not used	Does not exist
Access for operations and maintenance	Two way access and egress	Score value not used	Score value not used	One way road
Distance to Arterial Road/East West	Shortest local street	Relatively second shortest	Score value not used	Longest local street
Bridge Crossings	No crossings	Score value not used	One crossing	Two crossings
Maneuverability on local roads/constrictions	No constrictions	Some constrictions	More than one area of constriction.	More than one area of constriction with traffic flow impediments.
Site size	At least 1.5 acres	Less than 1.5 acres and City owned property available to reach required size	Less than 1.5 acres and private property required to reach required size	Less than 1.5 acres and uncertainty as to whether any additional land is available
ARCHEOLOGICAL AND FIRST NATIONS				
HRIA	Not Required	Required	Score value not used	Score value not used
SOCIO-ECONOMIC				
Visual Quality	Little to no change in visual quality	Score value not used	Some change in visual quality	Major change in visual quality
Construction	Minimal disturbance to neighborhood	Some disturbance to neighborhood	Major disturbance to neighborhood	Score value not used
Current site use	No change	Score value not used	Score value not used	Major change
Ongoing public use	No or minimal effect on existing public use	Some change but most activities can continue	Change to the character of the area	Major change to the character of the area
Change in emergency truck traffic numbers	Score value not used	Increase of 200 to 250 truck trips annually	Increase of 240 to 300 truck trips annually	Score value not used
Impact on other Community Initiatives	None	Score value not used	Some conflict	Key conflict in use/planning
Impact of other initiatives on the station (demand in area of station)				
Impact of other initiatives on the station (response time)	None or positive	Some conflict/effect on response time	Major conflict (e.g., increased river use in the area of the station, increased traffic reducing response time)	Score value not used
ENVIRONMENTAL				
Riverbank	No damage to riverbank from ongoing boat use	Intermittent damage	Ongoing damage	Constant, major damage to riverbank from ongoing boat use
Wildlife and Vegetation	Use of existing cleared area	Little to no clearing required; connectivity of wildlife corridors is not expected to be significantly altered.	Moderate clearing required; connectivity of wildlife corridors is not expected to be significantly degraded because suitability of habitat is low.	A major amount of clearing required within important wildlife movement corridor habitat.
Fisheries	Site not located to Class A Watercourse	Class A Watercourse identified near site location	Class A Watercourse is adjacent to site location	Site is located within a Class A Watercourse
Permitting	Permitting underway	New permits required	New permitting with challenges	Acquisition of permits unlikely
Site Maintenance	Site location will not require maintenance or emergency clearing	Clearing of built up sediment and floating debris would require minimal maintenance	Clearing of built up sediment and floating debris would require moderate maintenance	Clearing of built up sediment and floating debris would require intensive maintenance

Table 2      Site Matrix with Key Technical/Permitting Criteria

OPTION	North Rosedale	Cloverdale	Riverdale	Queen Elizabeth Park	Rosedale
Engineering					
Boat Launch					
Launch Access (distance to river from boat storage location)	3	1	2	3	2
Topography	3	1	3	1	3
Geotechnical					
Boat Launch	1	1	1	1	4
Support buildings	1	1	1	1	4
Infrastructure required to access river from site	3	1	3	2	4
Room for vehicle and boat maneuverability	3	4	4	4	4
Can accommodate a double wide boat launch	4	4	4	4	4
Proximity to in-river structures	1	1	3	2	4
Low Water Conditions	3	1	1	3	2
High Water Conditions					
Location relative to High Level Bridge	3	2	1	4	3
Sight lines	3	4	3	4	3
Confluence turbulence	4	4	4	4	3
Substrate Conditions					
Flooding	2	4	2	4	3
Lighting					
Launching and Landing	2	3	2	2	3
Public Overlook	1	3	1	1	2
Site Protection	2	3	2	2	3
Vehicle Access and Site Characteristics					
Access Road Construction	3	3	2	2	4
Support buildings	1	1	1	1	4
Access for operations and maintenance in all required	4	4	4	1	4
Distance to Arterial Road/East West movement	4	4	3	4	2
Bridge Crossings	4	3	4	1	4
Maneuverability on local roads/constrictions	3	4	1	4	3
Site size	1	4	4	4	4
Archaeological and First Nations					
HRIA	3	3	3	3	3
Socioeconomic					
Visual Quality	1	1	1	2	4
Construction	2	3	2	3	4
Current site use	1	1	1	1	4
Ongoing public use	2	2	1	2	4
Change in emergency truck traffic	2	2	2	2	3
Impact on other community initiatives	1	1	2	1	4
Impact of other initiatives on the station (demand)					
Impact of other initiatives on the station (response time)	3	4	3	2	3
Environmental					
Riverbank					
Wildlife and Vegetation	2	1	2	2	4
Fisheries	4	4	3	4	4
Permitting	3	3	2	3	4
Site Maintenance	3	2	3	3	2

Key criteria are denoted in red font

## 4 KEY STUDY FINDINGS

The total score of each potential site was determined by adding the individual scores for each of the criterion. Various combinations of criteria ranking were contemplated given the consideration of both the boat launch criteria and the rescue truck criteria as follows:

- All boat launch criteria;
- All boat launch and truck criteria;
- Key boat launch technical criteria; and
- Key boat launch technical, social, and environmental criteria.

The total scores and rankings of the five sites are presented in Table 3.

The existing site, Station 21, ranks highest in each of the combinations of criteria ranking identified above. Certain criteria have not been ranked and this may change the totals and rankings but it is not anticipated that the rankings would change sufficiently to move Station 21 from a high ranking overall. The remaining sites rank similarly across the combinations based on available information.

This ranking is based on site screening based on available information and provides planning level findings. More detailed technical information on the various sites, such as that which will be gathered in Phase 2, will be required prior to recommending the preferred option.

**Table 3 Site Scores and Rankings**

OPTION	North Rosedale	Cloverdale	Riverdale	Queen Elizabeth Park	Rosedale
<b>Total Points</b>					
All Criteria Boat Launch	66	65	62	70	94
All Criteria Boat Launch and Truck	86	88	81	87	119
Key Boat Launch Technical and Permitting Criteria	21	16	20	21	24
The Above Criteria Plus Key Socio-economic Criteria	27	23	26	28	40
<b>Relative Rankings</b>					
All Criteria Boat Launch	3	4	5	2	1
All Criteria Boat Launch and Truck	4	2	5	3	1
Key Boat Launch Technical and Permitting Criteria	2	5	4	2	1
The Above Criteria Plus Key Socio-economic Criteria	3	5	4	2	1
Aggregate Score (lowest values are higher ranked sites)	12	16	18	9	4

## 5 CLOSING

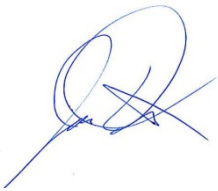
This Phase I submission is submitted in confidence and its contents may not be divulged to third parties without express written consent of Klohn Crippen Berger Ltd.

If you have any questions, please contact the undersigned at 604-251-8448 or dlamash@klohn.com.

### KLOHN CRIPPEN BERGER LTD.



Debra Lamash  
Director, Socio-Environment



Jason Duxbury, PhD, P.Biol.  
Project Manager



## **APPENDIX I**

### **Ranking Assumptions and Explanations**

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Ranking Assumptions and Explanations

Criteria	Data Used for Ranking	Assumptions/Basis for Ranking	Considerations
Engineering			
Boat Launch			
Launch Access	Distance to river edge from approximate boat storage location as determined through measurements made using Google Earth with 2011 imagery. No site was within 25 m of the river edge.	Ranking based on distance measured.	Response Time
Topography	Based on publicly available photos of the sites taken from the river or from across the river.	Ranked based on height and slope of bank.	Cost, Environment
Geotechnical	Not ranked as information was not available		Cost, Environment
Boat Launch	Presence or absence of existing boat launch	The existing infrastructure at Rossdale would require much less capital investment. It would also cause less environmental disturbance relative to the development of a new site.	Cost, Environment
Support buildings	Presence or absence of existing support buildings	The existing infrastructure at Rossdale would require much less capital investment. It would also cause less environmental disturbance relative to the development of a new site.	Cost, Environment
Infrastructure required to access river from site	Maps and imagery. Based on proximity of support infrastructure to boat launch location and infrastructure required to access boat launch site.	Bridge construction would be required where the launch access intersects with public trails or pathways. The Cloverdale site received the lowest ranking based on the expected requirement to build a footbridge over the boat launch ramp. Similar to the Rossdale site. Due to the steepness of the bank at the Queen Elizabeth Park site, a long ramp or the construction of a boathouse would be required.	Cost, Response Time, Environment
Room for vehicle and boat maneuverability	Current maps, imagery and planning information from the City.	Distance from potential boat launch site to existing or planned in-river structures. Based on site size and potential available space to allow for unimpeded vehicle and boat maneuverability. It is expected that all site designs would take this into consideration. However, the overall space available at the North Rossdale site is expected to be smaller than the rest of the sites; therefore, it received a lower ranking.	Response Time
Can accommodate a double wide boat launch	Maps and imagery.	Ability or inability of site to accommodate a double side boat launch. It is expected that all site designs would take this into consideration.	Response time
Proximity to in-river structures	Maps and imagery. Distance from potential boat launch site to existing or planned in-river structures.	All sites with the exception of Rossdale are downstream from a bridge or pier (Cloverdale).	Safety
Low Water Conditions	Maps and imagery	Sandbars would extend the distance to access the water. The inside bends of rivers where back-eddies form would have the greatest potential for sandbar formation and these areas were ranked lower. Imagery available on Google Earth was used to determine if sandbars have been present historically. Google Earth imagery indicates sandbar presence at Cloverdale (2008 imagery), Riverdale (2007, 2008 imagery). Rossdale is located on the inside of a bend in the river, but no images of a sandbar have been found to date. Thus it received a slightly higher ranking than Cloverdale and Riverdale.	Cost, Response Time
High Water Conditions	Not ranked as information was not available	Not ranked as information was not available.	Safety, Cost, Response Time
Location relative to High Level Bridge	Maps and imagery	Distance from potential boat launch site to High Level Bridge. Important because of effect of river current on response time to areas with higher call volumes.	Response Time
Sight lines	Maps and imagery	Ranked based on being on a river bend (more limited sight lines) or on a straight section of the river.	Safety
Confluence turbulence	Maps and imagery	A stormwater outfall is located <100 m upstream from the Rossdale location. It received a slightly lower value.	Safety
Substrate Conditions	Area is or is not in an area prone to siltation. Not ranked as information was not available.	Area is or is not in an area prone to siltation. Not ranked as information was not available.	Safety, Cost, Response Time
Flooding	Estimated based on the photos provided in the photo tab and on the brief site visits.	All sites fall within the estimated 1:100 year flood level ( <a href="http://www.envinfo.gov.ab.ca/FloodHazard/">http://www.envinfo.gov.ab.ca/FloodHazard/</a> ). Raw data (1994) from Alberta Environment and Sustainable Resource Development for the 1:25 high water levels for the North Saskatchewan River Valley within the limits of the City of Edmonton has been obtained. The data has been submitted to a KCB hydrologist for modeling. The current rankings are based on publicly available photos of the sites taken from the river or from across the river.	Safety, Cost, Response Time
Lighting	Not ranked as information was not available	Not ranked as information was not available.	Cost, Safety
Launching and Landing	Maps, imagery, and professional opinion.	Location on river - e.g., inside bend, outside bend, straight section. Safety of launches and landings are based on expected relative water velocities.	Safety
Site Protection	Maps, imagery, and professional opinion.	Location on river - e.g., inside bend, outside bend, straight section. Based on relative water velocities and momentum, more scouring is expected along outside of bends relatively to straight sections. More scouring is expected along straight sections relative to the inside of bends.	Cost, Environment

Vehicle Access and Site Characteristics			
Access Road Construction	Current maps and imagery	All sites with the exception of Rosssdale would require the construction of new access roads. The parking access to the riverboat in Cloverdale and the park access at North Rosssdale were considered to be pre-existing advantages.	Cost
Support buildings	Current maps and imagery	Presence or absence of existing support buildings. The existing infrastructure at Rosssdale would require much less capital investment. It would also cause less environmental disturbance relative to the development of a new site.	Cost, Environment
Access for operations and maintenance in all required seasons	Current maps and imagery	All sites with the exception of the Queen Elizabeth Park site have two-way access. Queen Elizabeth Park has only one-way access leaving the site; northbound across the Walterdale Bridge.	Response Time
Distance to Arterial Road/East West movement	Current maps and imagery	The longest distance from a site to an arterial road is found at Rosssdale. Community street access is also required at Riverdale, but the distance is not as far as that found at Rosssdale.	Response Time
Bridge Crossings	Current maps and imagery	Cloverdale has access to both the Low Level and James MacDonald bridges. The Queen Elizabeth Park site has immediate access to the Walterdale Bridge, but if the bridge becomes impassible, no other access across the river is available due to one-way traffic. The other sites have immediate access to one bridge and can travel in two directions.	Response Time
Maneuverability on local roads/constrictions	Current maps and imagery	Riverdale received the lowest rank based on one-way traffic issues and narrow, constricting access roads. Rosssdale requires travel through relatively narrower neighbourhood streets, but two-way access is available. North Rosssdale roadways are not constricting, but some 90 degree turns are required for egress.	Response Time
Public Overlook	Current maps and imagery	The Queen Elizabeth Park site could be viewed from the Walterdale Bridge, Riverdale from the Dawson Bridge, and North Rosssdale from the James MacDonald Bridge. The launch at Rosssdale can be viewed from the footbridge, but the potential crowd would be smaller than would could gather on a major bridge. The Cloverdale site is approximately 200 upriver from the footbridge spanning the river. The sightlines to rescue operations would be limited.	Safety
Site size	Current maps, imagery and planning information from the City.	All sites with the exception of North Rosssdale have sufficient space for construction a desired site plan. Currently, the North Rosssdale is relatively smaller.	Response Time
Archeological and First Nations			
HRIA	Alberta Culture Regulations	Alberta Culture has noted that any ground disturbance at any of the sites will require an HRIA due to the sensitivity of historical and archaeological sites along the river.	Environment
Socioeconomic			
Visual Quality	Degree of change in visual quality around the site, proximity of potential site to residences	North Rosssdale, Cloverdale and Queen Elizabeth Park would change the visual quality of current park space. Rosssdale already exists, so there would be no change in visual quality.	Environment
Construction	Anticipated level of disturbance to the neighbourhood during construction based on new infrastructure required	Cloverdale is the farthest removed from residences. Rosssdale would require the least construction activity.	Environment
Current site use	No change or change to existing site use	Rosssdale would not see a change is the use of the site.	Environment
Ongoing public use	Potential effect on public use of the area around the proposed site.	Rosssdale would not see a change in public use of bike paths along the river due to the pre-existing foot bridge. All other sites would conflict with city park use. Riverdale received the lowest rating because the boat launch would displace current dragonboat access to the river.	Environment
Change in emergency truck traffic	Change in the number of emergency truck trips based on estimates from the City	Rosssdale would have the lowest relative increase in truck trips.	Environment
Impact on other community initiatives	Potential effect on other initiatives in the community - based on information provided by the City	North Rosssdale master planning includes residential developments to the proposed property line of the fire and rescue site. The master plan for the Queen Elizabeth Park conflicts with the development of a fire and rescue station. Proposed LRT bridge construction is expected to conflict with the construction of a fire and rescue station at the Cloverdale site. The magnitude of the conflict between dragonboat activities the construction of a station at the Riverdale site is not considered to be equal to what would be expected at the Queen Elizabeth Park and Cloverdale sites.	Environment
Impact of other initiatives on the station (demand)	Ranking based on whether new community initiatives would result in an increase in demand around the propose site location.	To be determined.	Response Time
Impact of other initiatives on the station (response time)	Ranking based on whether new community initiatives would affect response time.	Increased park traffic subsequent to the redevelopments in Queen Elizabeth Park and around the North Rosssdale site may add traffic congestion. Community traffic in the neighbourhoods of Rosssdale and Riverdale would pose potential delays in response time. No changes to the Cloverdale site are expected to potentially affect station activity. The greatest change in traffic is expected to be associated with improvements made to the Queen Elizabeth Park.	Response Time

Environmental			
Riverbank	To be determined	Not ranked as information was not available.	Cost, Environment
Wildlife and Vegetation	Google Earth Imagery and aerial photography, professional opinion.	The Cloverdale site would require a long swath of habitat removal to get access to the river. The habitat in the area is relatively intact and would be considered important wildlife corridor habitat in the river valley. No or minimal additional alteration of wildlife habitat is required at Rossdale. The other sites may require some habitat removal but the extents are short and or the current suitability of habitat is relative low.	Environment
Fisheries	Alberta Water Codes of Practice maps.	Class A watercourse as per the Alberta Water Codes of Practice is located a few hundred metres downstream from the Riverdale site. The other sites are all equivalent with respect to fish habitat.	Environment
Permitting	Alberta and Canada regulations	Permit applications have been submitted for Rossdale to maintain use until the completion of the site location study and potential construction of a new launch at a different location. The permits will be applicable to potential construction and operation activities at the site. The permitting requirements will be similar for all other sites with the exception of Riverdale. The proximity of the Class A Watercourse may make permit acquisition more challenging.	Environment
Site Maintenance	Google Earth Imagery and aerial photography, professional opinion.	Assumed that inside bend with would have back-eddies and would deposit sediments. Outside bends have the highest potential for floating debris to get hung up. The Rossdale and Cloverdale sites are located on the inside bend of the river and received a lower rating than the other three sites that are located on straight sections of the river.	Cost, Environment, Response Time

Key criteria are denoted in red font