

**CHAPTER 1**  
**APPENDIX 1B**

**Assessment Of**  
**Potential Hydroelectric Sites**  
**Concept Phase Study – Executive Summary**



## EXECUTIVE SUMMARY

In August of 2007, Yukon Energy Corporation (YEC) retained KGS Group to perform a concept study on several potential hydroelectric generation projects located in Yukon and B.C. Wilson Hydrotechnical was also retained by YEC to examine storage potential in the Southern Lakes region as well as to act as an advisor to YEC on hydro development.

The intent of the study is to identify hydroelectric development schemes that offer the potential to develop 20 to 50 GWh of new generation in time to meet anticipated upcoming energy load demands on the YEC system.

Working closely with YEC, Intergroup, and Wilson Hydrotechnical, KGS Group investigated the various potential sites and affirmed the feasibility of the developments. The results and conclusions presented in this report remain, however, those of KGS Group.

There have been many previous studies of the various potential sites. The scope and extent of these previous studies varies, but most were desktop studies with limited site reconnaissance. As was typical for the time (generally late 1980's to early 1990's) the hydroelectric developments envisioned in the previous studies in most cases would be very challenging to license in the regulatory environment of today. The approach used for this study was to try and develop projects with a high potential to be licensed in a timely manner, with potential environmental issues identified and wherever possible mitigated or minimized.

The initial sites to be examined included:

- Mayo and Mayo B
- Mayo Lake
- Tutshi
- Moon
- Atlin storage
- Primrose
- Drury

Review of the Gladstone Creek diversion to Aishik G.S. was subsequently added as the study proceeded, along with a site reconnaissance of the Morley River site. Review of the McNaughton Creek was added in November of 2007 and remains underway. The results of that study will be provided shortly for review, and would be added to the final draft of this report.

KGS performed two phases of site investigations of the various development schemes, the initial site reconnaissance was performed in August of 2007 while a follow up geotechnical reconnaissance was performed in October of 2007.

The study reviewed the potential developments based on their flows, costs, storage and generation at the site or the enhanced generation provided at one of the existing YEC hydro facilities. The assessment of each site is presented in the main report, while detailed information on the geotechnical aspects, costs, and energy production is presented in several appendices.

The study concluded there are feasible options that could provide additional power. The projects that had the shortest anticipated implementation time and appeared the most technically feasible were those related to existing facilities, such as Gladstone Diversion, Atlin Storage, and the enhancements to the Mayo Lake and River system.

The most feasible project options for each site are summarized below, along with the capacity cost and the equivalent capital cost divided by the annual and winter energy. As is noted in the report, only the Drury site was deemed to not be technically feasible to develop, due to the many concerns regarding the slope stability and permafrost related concerns.

### Summary of Development Schemes Reviewed in 2007

Project	Option on Drawings	Plant Capacity in kW	Total Annual Incremental Energy in GWhr	Total Incremental Winter Energy in GWhr	2007 Capital Cost in \$/kw	2007 Capital Cost in Annual Energy \$/GWhr	2007 Capital Cost in Incremental Winter Energy in \$/GWh
Tutshi A (Existing Outlet)	B	4248	30.3	22.2	19,890	3.50	3.80
Tutshi B (Windy Arm)	C	5856	39.4	28.3	18,462	3.25	3.82
Atlin	A	0	18.0	18.0	3,438	0.76	0.76
Moon Lake	A1	5758	32.9	20.3	13,000	2.28	3.70
	C1	4922	28.1	17.3	11,300	1.98	3.21
Primrose Upper G.S.	1A	12359	70.1	26.0	16,500	2.90	7.83
Primrose Lower	D	3708	21.0	7.8	21,300	3.75	10.11
Mayo Lake	A						
	B	845	6.7	3.0	15,400	1.94	4.34
	B	845	6.7	4.0	15,400	1.94	3.26
Upgrade Existing Mayo	A1	5536	0.0	0.0		0.00	
	A2	5536	3.5	7.8	0	0.00	0.00
	A3	7689	11.5	10.3	2,000	0.29	1.47
	A3	7689	13.9	14.5	6,700	0.33	1.23
	A3	7689	15.0	17.8	7,100	0.35	1.07
Mayo B	B1	9374	22.2	10.2	12,100	1.83	11.13
	B2	13019	41.9	16.1	9,200	1.46	7.45
	B3	13019	41.9	16.1	10,100	1.60	8.16
	C1	9944	7.7	4.2	10,800	2.26	25.50
Drury B	2	2436	19.8	9.8	24,700	3.04	6.16
Gladstone	A		18.0	18.0		1.53	1.53