

DRAFT

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ATTACHMENTS

1. Site Coverage Estimate Review
2. NLH Existing Repeater Sites
3. NLH Potential Repeater Sites
4. NP Existing Repeater Sites
5. NLH & NP Site Summary
6. Joint NLH & NP Mobile Facility Cost Estimates

1. Introduction

- .1 Newfoundland and Labrador Hydro (NLH) is seeking internal approval to upgrade its mobile radio network due to the unavailability of maintenance spares required to keep the existing network at an acceptable level of maintainability.
- .2 The existing Mobile Radio System is also shared with the Provincial Department of Works, Services, and Transportation (WST). Due to the complementary seasonal site traffic activity of NLH and WST, minimum conflict is experienced for repeater access throughout the year.
- .3 It was decided to investigate the possibility of expanding the mobile upgrade to include Newfoundland Power (NP) as a third joint user on the newly upgraded mobile radio networks, in order to reduce maintenance costs, through a shared cost approach.
- .4 A meeting was held between NP and NLH to assess the interest of NP for joint use of the mobile radio upgrade infrastructure. It was agreed, by NP, that cost estimates be completed to assess the viability of NP becoming a third joint user of the new mobile radio system upgrade.
- .5 In the event joint use with NP is determined desirable, it will be necessary to work closely with Industry Canada to meet Policy requirements for a shared mobile network.

2. Methodology

- .1 Following the initial technical meeting with NP, it was agreed that NP technical personnel meet with NLH personnel to complete a general assessment of the sites required by both parties. This Report includes the results of the general site assessment required by both NLH, WST, and NP.
- .2 An assessment of potentially redundant sites and ownership status of both parties is compiled, in this Report, to determine what cost estimates produced savings by joint use of mobile radio facilities across Newfoundland, and, if feasible, at a later date in Labrador. The results of the site review is found in **Attachment 1 - Site Coverage Estimate Review**.
- .3 It was found - **refer to Attachment 1** - that several sites were redundant in provisioning of mobile repeater equipment to provide mobile radio coverage to both NLH and NP.

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- .4 To complete necessary Cost Estimates for a joint radio system, results of **Attachment 1 - Site Coverage Estimate Review** was used to allocate facilities which are required to serve NLH, and NP, jointly.
 - .5 The information from **Attachment 1** is combined with **Attachment 2 - NLH Existing Repeater Site List**, **Attachment 2 - NLH Potential Repeater Site List**, and **Attachment 3 - NP Existing Repeater Site List**, resulting in **Attachment 4 - NLH and NP Site Summary**, which proposes the optimum combination of sites from both Corporate Site Lists. The NLH and NP Summary is then used for preparation of Estimates - refer to **Attachment 6 - Joint Mobile Facility Cost Estimates** - for common facility provisioning.
 - .6 NLH sites, to be newly provisioned, are used whenever possible to co-locate both NP and NLH mobile facilities currently located at third party sites, such as NewTel, and AT&T, thereby saving rental costs of sites and associated backhaul circuit annual costs, where NLH and NP currently have common mobile repeater sites, or site adjacency, providing approximately equivalent radio coverage.
 - .7 NLH's new microwave system is planned to accommodate sufficient bandwidth to carry all joint mobile radio circuits back to the Energy Control Centre (ECC) at Hydro Place, St. John's.
 - .8 Three conditions must be satisfied for feasible joint use of the NLH Mobile Radio System between NP & NLH as follows:
 - .1 Minimum impact on NLH Operations, such as exists with WST Joint Use.
 - .2 Cost Savings, and/or service improvements, to NP Customers.
 - .3 Joint Use meets Industry Canada Policy for Common Use; which, tentatively means joint ownership, pending discussions with Industry Canada.

3. General Site Review

- .1 **Attachment 5 - NLH & NP Site Summary** contains sites which are required by both NP and NLH throughout the Island. Sites which can be optimized for joint use by NP and NLH for mobile radio facilities are identified to determine, in **Attachment 6 - Joint Mobile Facility Cost Estimates**, for joint use by NP and NLH. Sites which NP own, and which WST can utilize, are tagged for potential

negotiation between NP and WST, as it is not within the direct Scope of this Report to cost these specific non-NLH requirements, however, common central infrastructure capacity/costs, such as the LTR Switch, require cost estimates for the additional non-NLH sites, since shared use of the common switch facility of the NLH proposed Logic Trunked Radio Network (LTRN), is a fundamental requirement of NLH, WST, and NP joint use.

4. Cost Estimates

- .1 Cost estimates are based on budgetary costing from suppliers, standard costing from similar projects of the Writer, and known costs previously incurred within NLH for items, such as mux equipment, backhaul equipment, spares requirements, and are subject to the assumptions following.
- .2 The following assumptions are made in determining the joint use cost estimates:
 - .1 Adequate bandwidth exists on the microwave, or alternately, leased facilities are provided between the sites and the ECC, where the LTR Central Switch is assumed located.
 - .2 Industry Canada license fees are not included.
 - .3 Industry Canada will approve the Joint use of the NLH Mobile, and Microwave Networks of NLH, for joint use by NP.
 - .4 NP shall review site upgrade estimates for their own, or rented, non-NLH sites since estimates to upgrade are not included in the cost estimates of this Report.
 - .5 NP is responsible for upgrading, or arrange for upgrade of sites identified as being currently used by them as part of the selected joint use sites indicated in **Attachment 5 - NLH & NP Site Summary**.
 - .6 User equipment is not included in Cost Estimates, rather only common infrastructure, and fixed equipment, as indicated - **Attachment 5 & 6**.
 - .7 Cost estimates, in this Draft Report, are prepared without the benefit of detailed coverage maps which must ultimately be completed to insure estimate assumptions are valid, and represents the actual network configuration

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- .8 Due to the preliminary nature of this Report, no detailed point to point link design has been completed. It is anticipated that fixed links will further reduce rental lines back to the NLH ECC, and will also facilitate other services required from remote sites to NLH & NP Control Centers in St. John's and other reporting centers.
 - .9 This Report assumes that existing VHF antennae are acceptable to use, and can be multiplexed to any additional channels required to accommodate NP LTR repeaters, using a C2037, or equivalent multicoupler.
 - .10 VHF frequencies, required to expand the joint use system are available from NP to be pooled with existing NLH frequencies for Island-wide optimization.
 - .11 Antenna structures are adequate to facilitate joint use site requirements.
 - .12 Building space is available for accommodating site equipment for which estimates are provided, including power supply, repeater/controller, multicouplers.
 - .13 Telco ("leased") line rentals are not included in cost estimates, as indicated.
 - .14 NP participation must be concurrent with NLH site expansion for NLH mobile radio system upgrade, otherwise additional startup costs will be incurred.

5. Comments/Recommendations

- .1 Cost Estimates be reviewed by Newfoundland Power and an internal analysis be completed to determine if it is feasible to share a joint use Mobile Radio Network with NLH.
- .2 Once joint use is agreed to in principal, traffic usage, as well as Industry Canada requirements can be reviewed to determine if there are any major obstacles to be overcome, and if so, do any obstacles present a detriment to the concept of joint use by Newfoundland Power.
- .3 Assuming positive results, Newfoundland Power, and Newfoundland and Labrador Hydro, may need to present a joint support case to the Public Utility Board to proceed with funding approval towards completing the System Design, and provisioning.

- .4 Further discussions, and cost estimate refinements be completed when coverage maps are finalized.
- .5 Mutually acceptable Implementation Schedule be completed, and a Team assigned representing NLH & NP personnel in the event a positive response to joint venture is decided.

Site Name	Owner	Availability	Site Users	Common Infrastructure							Notes:	
				Bldg. Ext.	Tower	Power	Link	Ant.Syst*	LTR Rpt/Cntd	Mux/Link		
Arnieopsquitch	RCMP?	Exists (NLH)	NLH	Sect 4.12	Sect 4.11		Sect 4.8	Sect 4.10				Repl by Granite Canal?
Bay d'Espoir Hill	NLH	Exists (NLH)	NLH/WST	NLH	Exists	NLH						*Add ant. filtering
Bay l'Argent	NT	Exists (NLH)	NLH/NP/WST	Sect 4.12	Exists	NT		5000	25000	Rental		
Blue Grass Hill	NLH	Exists (NLH)	NLH/NP/WST	NLH	NLH	Add UPS?	Partial/Exists	5000	25000		3500	Coverage Plot req'd
Bale Verte	NT(NP)	Exists (NLH)	NLH/NP/WST	NLH	Exists	NT	Line Rental	5000	25000	Rental		Brent's Cove??
Blue Mountain	NLH	Exists (NLH)	NLH	NLH	Exists	NLH						
Bonne Bay	NTM	Exists (NLH)	NLH/WST	Sect 4.12	Exists	NTM	Line Rental					see Deer Lake??
Brent's Cove	NTM	Exists (NLH)	NLH/WST	Sect 4.12	Exists	NTM	Line Rental					see Bale Verte above
Bull Arm	NLH	2002 (NLH)	NLH/NP/WST	NLH	Planned	Planned		5000	25000		3500	
Bunt Dam	NLH	2003 (NLH)	NLH	NLH	Planned	Planned						
Cammanville	NTM	Exists (NLH)	NLH	Sect 4.12	Exists	NTM	Line Rental					
Cape Broyle	NT	Exists (NP)	NP/WST	Sect 4.12	Exists	NT	Line Rental	5000	25000			benefits WST.
Cat Arm Intake	NLH	Exists (NLH)	NLH	NLH	NLH	NLH						Coverage Plot req'd
Shoal Harbour	NLH	2003 (NLH)	NLH/NP/WST	NLH	Planned	Planned		5000	25000		3500	
Codroy	NTM	Exists (NLH)	NLH/WST	Sect 4.12	Exists	NTM						
Corner Brook	NTM	Exists (NLH)	NLH/NP/WST	Sect 4.12	Exists			5000	25000		3500	
Deer Lake	NLH	Immediately (NLH)	NLH/NP/WST	NLH				5000	25000		3500	Coverage Plots req'd.
Gamboc	NP	Immediately (NP)	NLH/NP/WST	NP	Exists			5000	25000		3500	Future NLH uWave?
Glovertown	NLH	2003 (NLH)	NLH/NP/WST	NLH	Planned			5000	25000		3500	
Godalrich Hill	NLH	Exists (NLH)	NLH/NP/WST	NLH	Exists			5000	25000		3500	
Grandy Brook	NLH	2002 (NLH)	NLH/WST	NLH	Planned							
Grand Bank	NP	Immediately	NLH/NP/WST	NP	Exists			5000	25000		3500	NLH Canagra Pennin
Granite Canal	NLH	2003	NLH	NP	Planned							
Four Mile Hill	NLH	2002	NLH/NP/WST	NLH	Planned			5000	25000		3500	
Flagstaff Hill (PaB)	CBC (NP)	Immediately	NLH/NP/WST	NP Exists	Exists			5000	25000		3500	NP has building only
Gull Pond Hill	NLH	Immediately	NLH/NP/WST	NLH	Exists			5000	25000		3500	
Chapel/Sorated	NLH	2002	NLH/NP/WST	NLH	Planned			5000	25000		3500	
Hemblage	NTM	NTM	NLH/NP/WST	Sect 4.12	Exists			5000	25000		3500	
Jackson's Arm	NTM	NTM	NLH/NP/WST	Sect 4.12	Exists			5000	25000		3500	
Johnathan's Pond	NLH	2003	NLH/NP/WST	NLH	Planned			5000	25000		3500	
Lamsline	NT(NP)		NP/WST	Sect 4.12	Exists			5000	25000		3500	WST can benefit.
Lockston	NT(NP)		NP/WST	Sect 4.12	Current Neg.			5000	25000		3500	
Lumaden	NT(NP)		NP/WST	Sect 4.12	Exists			5000	25000		3500	
Mary March	NLH	Immediately	NLH/NP/WST	NLH	Needs VHF.			5000	25000		3500	

Marystown (Tolt?)	NT(NP)NP		NLH/NP/WST	??	Exist/Now			5000	25000		3500	Potential Tolt Joint Dev
Mount Margaret	NTM		NLH/NP/WST	??	Exists (NLH)			5000	25000		3500	
Torbayman's Pd	NP	Immediately	NP/NLH/WST	NP	Exists			5000	25000		3500	
Peter's River	NP				Exists			5000	25000		3500	
Patty Hr. Long Pd.	NLH	2002	NLH/NP/WST	NP	Planned			5000	25000		3500	
Pine Tree Ridge (Sv)	DOT (NP)		NP/WST/NLH	??	Exists			5000	25000		3500	
Placantia	CBC(NP)		NP/WST	NP	Exists			5000	25000		3500	WST can benefit.
Port Saunders	NTM (NLH)		NP/NLH/WST	??	Exists			5000	25000		3500	
Portland Creek	NTM (NLH)		NP/NLH/WST	??	Exists			5000	25000		3500	
Red Cliff	NTM (NLH)		NP/WST	??				5000	25000		3500	
Red Cliff - SJ East	NP		NP/NLH/WST	NP				5000	25000		3500	
Rose Blanche	NT		NP/WST	??				5000	25000		3500	
Sandy Brook Hill	NLH	Immediately	NLH/NP/WST	NLH				5000	25000		3500	
			Johnathan's Pd	NT								Coverage for NP?
			Rattling Bk?	NP								Coverage for NP?
			Sandy Bk	NP								
Rocky Ridge	NTM		NLH/NP/WST	??				5000	25000		3500	
Chapel Arm	NLH	2002	NLH/NP/WST	NLH				5000	25000		3500	
Sheffield	NTM		NLH/NP/WST	Exists				5000	25000		3500	
Southwest Brook	NLH	2003	NLH/NP/WST					5000	25000		3500	
St. Anthony	NTM		NLH/NP/WST					5000	25000		3500	
Stephanville	NTM		NLH/NP/WST					5000	25000		3500	
Twillingate Area	Currently Unserved		NP/WST									

Sub Totals			
LTR Switch Expansion	\$210,000	\$1,050,000	\$136,500
Mobile Data Switch Expansion/Add	250000	Incd	Incd
Building & Tower Upgrades	350000	Incd	Incd
User Equipment	Not Included	Not Included	Not Included
Link Radio System Capital	Not Included	Not Included	Not Included
Link Radio (Adjac. Site) Engrg/PathDsn	Not Included	Not Included	Not Included
Engineering Design	21000	105000	13850
Coverage Plots for Detailed Design	8000	Incd	Incd
Installation	21000	105000	13850
Spare	10500	52500	6825
Training	23000	50000	5000
Contingency	63000	315000	40950

Total Capital (less HST): \$2,847,575

Annual Charges:			
Maintenance @ 6%	12600	63000	8190
Industry Canada Licenses:	Not Included		
Rented (Leased) Lines	Not Included		

Total Annual: \$83,790