

Nalcor Energy – Lower Churchill Project



Construction Management Plan

LCP-PT-MD-0000-CS-PL-0001-01

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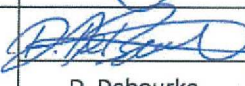

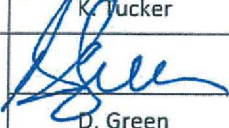
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1.0 EXECUTIVE SUMMARY

At the most basic level, the objectives of the construction management function are simple but focused. They are to complete all construction work:

- Safely;
- In conformance with technical drawings and specifications;
- Meeting environmental obligations;
- Within budget;
- On schedule; and
- To provide an optimum level of protection against controllable risks
- Seek out and leverage strategic opportunities

This *Construction Management Plan* addresses the delivery of the Nalcor Energy – Lower Churchill Project (NE-LCP or the Project), specifically the Muskrat Falls Generation, Labrador Transmission Assets and the Labrador-Island Transmission Link sub-projects, in accordance with these objectives. Due to the execution of work under largely under EPCI approach, the SOBI Crossing component of the Labrador –Island Transmission Link is excluded from this Plan.

At this stage of the Project (*late stages of Gateway Phase 3*), the overall Project Delivery Model, in the form of an EPCM approach has been selected and implemented, and the contract packages have been defined and documented in the overall Package Dictionary.

As specified in the EPCM Services Agreement, detailed construction management and execution plans will be produced by the EPCM Consultant. As such, this *Construction Management Plan* does not detail how construction activities at site will be managed, rather it serves as a bridging document providing the overall guidance and clarity on Nalcor/EPCM/Contractor organizations, responsibilities and interrelationships to meet Nalcor’s stated construction management objectives.

The general approach to construction will be to optimize the number of contractors working on site in consideration of contractor capability, the number of interfaces created, risk distribution and the accommodation of market conditions. Common resources and infrastructure will be shared and managed by the EPCM Consultant resulting in cost saving and consistency.

The development of contract packages has been heavily focused, where possible, on EPC and lump sum type of contracts. Where necessary, unit price type contracts are considered, with emphasis on establishing firm quantities prior to contract award. Packaging has been optimized with respect to interfaces and optimal risk allocation.

The EPCM Consultant will provide construction management services at the construction sites. Their primary roles include:

1. Contract administration to ensure that work is carried out according to approved contracts, specifications, drawings and schedules, within authorized budgets and in compliance with safety and environmental standards.
2. Management of interface between contract packages so as to ensure timely completion and avoidance of claims.
3. Oversee the smooth operation of jobsites, and for Muskrat Falls Generation the provision of camp and site services.
4. Respond prompt to issues and requests for information from the contractors and to minimize exposure for potential claims arising from contractors.

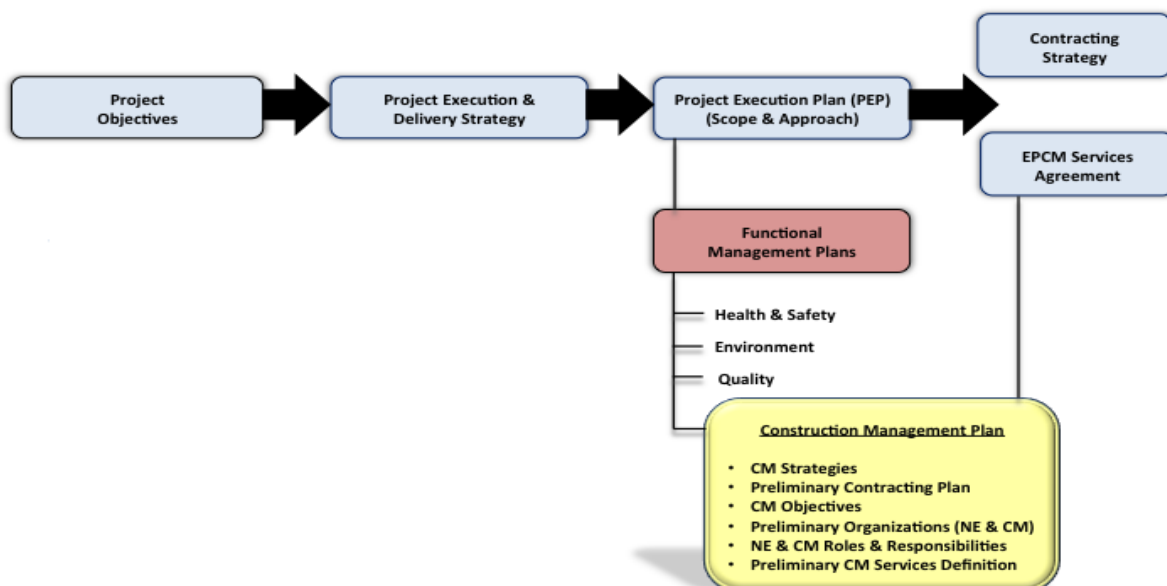
As a huge and diverse project, with many limiting climatic and location challenges, two special focus areas will require early attention:

1. Clear communication of the project’s safety expectations and goals and working diligently with contractors to ensure their safety plans are aligned, and are practiced on a day-to-day basis.
2. Creating an environment which will attract sufficient quantities of skilled labour whilst understanding the drivers which will have the most beneficial impact on productivity.

This *Construction Management Plan* has been developed following several years of technical definition, input from the power industry, consultants, and suppliers and numerous strategy workshops, all focused on project delivery, including contracting strategies, organizational roles and responsibilities, lessons learned and execution goals and guidelines.

The relationship of the Construction Management Plan to other critical project documents is provided below.

Figure 1: Construction Management Plan Relationships



2.0 Purpose

This *Construction Management Plan* provides the framework and approach for **how** Nalcor will plan, manage and execute the construction of the Lower Churchill Project so as to complete all work safely, meeting environmental obligations, in conformance with specified technical requirements, within budget, on schedule and to provide maximum protection against controllable risks, for Phase I of the development of the lower Churchill River.

Its purpose is to:

- Provide direction to ensure a consistent execution strategy and approach to the planning, organizing, directing and controlling of construction activities.
- Provide a basis to develop detailed construction management plans and procedures in support of project delivery.
- Provide a means of communicating the overall construction management plan to the broader project team, EPCM consultant, contractors, Nalcor management and other stakeholders as appropriate.

This *Construction Management Plan* is not intended to serve as an Execution Plan which defines the sequence and approach for physically constructing the Project.

This *Construction Management Plan* should be read in conjunction with documents [LCP-PT-MD-0000-PM-PL-0001-01 Project Execution Plan \(Scope and Approach\)](#), [LCP-PT-MD-0000-PM-ST-0002-01 Overarching Contracting Strategy](#), and all project functional management plans. These documents form part of the LCP Project Management System and provide considerable information on the project which will not be repeated here.

Construction management plans and construction execution plans will be produced by the EPCM Consultant. As such, this *Construction Management Plan* (CMP) does not detail how construction activities at site will be managed, rather it serves as a bridging document providing the overall guidance and clarity on Nalcor/EPCM/Contractor organizations, responsibilities and interrelationships to meet Nalcor's stated construction management objectives.

This *Construction Management Plan* will be monitored for effectiveness and accuracy and will be updated accordingly. In addition, it will be revised to ensure alignment and clarity of roles, responsibilities and execution strategies following the receipt of approved CMP's from the EPCM Consultant and major construction contractors.

3.0 Application and Scope

This *Construction Management Plan* is applicable to the Project during Phase 3 of the [Gateway Process, LCP-PT-MD-0000-PM-PR-0001-01](#) covering pre-construction, construction and mechanical completion of the following “Sub-Projects” of the LCP Phase I:

- Muskrat Falls Generation
- Labrador Transmission Assets
- Labrador – Island Transmission Link

Although part of the Labrador – Island Transmission Link, the construction of Strait of Belle Isle (SOBI) Crossing is not considered in this document. At the time of preparation of this document, all SOBI marine and land-based construction is being executed under EPC and EPCI type contracts. Accordingly, this *Construction Management Plan* is considered not applicable, although certain functions including HS&E, quality surveillance and progress measurement will be carried out within the context of those EPC/EPCI contracts.

Another important element of the overall Lower Churchill Project is the Maritime Link Sub-Project, to which the concepts contained herein are applicable and directly transferable. ***At this time, however, and due to the early level of definition of this element of the work, and the fact that other Stakeholders are involved in its execution, this Construction Management Plan excludes specific details on the construction of the Maritime Link .***

4.0 Roles and Responsibilities

NE-LCP Project Director	Approver of the <i>Construction Management Plan</i> . Responsible to verify that this <i>Plan</i> accurately reflects the selected management approach for the Project and that it is implemented consistently across the Project.
NE-LCP General Project Manager	Approver of this <i>Construction Management Plan</i> . Responsible for day-to-day leadership and management of Nalcor and contractor project teams in accordance with the objectives, targets and values set out in the <i>Project Execution Plan</i> .
NE-LCP Project Managers	Responsible for delivery of their respective areas of responsibility, including the Muskrat Falls Generation, Switchyards and HVdc Specialities, and Overland Transmission in accordance to the principals set forth in this <i>Construction Management Plan</i> .
Site Manager – Muskrat Falls Generation	<p>Reporting to the Project Manager – Muskrat Falls Generation, the Site Manager – Muskrat Falls Generation will provide direction, supervision and guidance to the EPCM Consultant as well as liaise with all disciplines to ensure the proper organization and controls are in place at Muskrat Falls for project delivery.</p> <p>With a focus on project delivery, the Site Manager will be the Nalcor Energy representative at the Muskrat Falls Generation site, including the HVdc Converter and associated switchyard.</p>
NE-LCP SPV Business Managers	Responsible to the respective PM(s) who will deliver the work associated with the SPV. They will, however, have a responsibility to the General Project Manager to ensure that proper business ethics and processes are being followed with respect to the delivery of the SPV scope.

NE-LCP Functional Managers Responsible to develop and implement functional management plans that are aligned with this *Construction Management Plan*.

NE-LCP Team Members Responsible to understand the content and adhere to this *Construction Management Plan*.

5.0 Definitions

Component	The initial framing of the LCP considered three major work elements, Power Generation, HVdc Specialties and Overland Transmission, which are referred to as “Components.” These distinct work elements helped to focus attention on the engineering and technical competencies required to deliver the overall Project.
Decision Gates	A Decision Gate is a predefined moment in time where the Gatekeeper has to make appropriate decisions whether to move to the next stage, make a temporary hold or to terminate the project. The option to repeat and modify the current stage is considered an undesirable option unless caused by changes in business conditions.
EPC Contract	<p><u>E</u>ngineer, <u>P</u>rocure, <u>C</u>onstruct (sometimes referred to as Turnkey or Design-Build)</p> <ul style="list-style-type: none">□ Involves an owner contracting all work (engineering, construction, supply and installation activities) for implementation of an entire project, or of a specific part of that project, to an EPC Contractor.□ Owner provides only a conceptual layout of the project and a statement of the minimum requirements, typically in the form of an extensive functional specification, leaving the optimization and subsequent detailed design to the EPC contractor.
EPCM Contract	<p>EPCM – Engineering, Procurement, Construction Management</p> <ul style="list-style-type: none">□ Involves an owner contracting with an <u>E</u>ngineering, <u>P</u>rocurement and <u>C</u>onstruction <u>M</u>anagement contractor who is responsible for the engineering, design and technical specifications for the project (either itself or through its sub-consultants), for the procurement on behalf of the owner of multiple contracts between the owner and contractors and suppliers for construction, equipment, materials and supplies, and for the administration and management of those contracts. The contracts tendered by the EPCM Contractor on behalf of the owner may include EPC Contracts for specific items, typically major equipment packages such as turbines and generators, transformers, gates, etc.□ EPCM Contractor can also be authorized by the owner to act as the Owner’s Agent (e.g. to allow the EPCM Contractor to execute contracts and change orders in its own name as Owner’s Agent for and on behalf of the owner). <u>Note: This is not the case for the LCP.</u>
Project	Sub-division of the LCP Projects contained in the Work Breakdown Structure into components to assist with the planning, executing and controlling of the work. Projects include: Muskrat Falls Generation,

	Labrador – Transmission Assets, Labrador – Island Transmission Link, and Maritime Link.
Project Management Team	The Project Management Team (PMT) is led by the Project Director and is made up of project leaders and key functional representatives. The PMT meets periodically to identify issues that may affect cost and schedule and to determine how such issues should be resolved.
Risk	An uncertain event or condition that, if it occurs, has a positive or negative effect on a project’s objectives.
Special Purpose Vehicle (SPV)	Is a legal entity (usually a limited company or some type) created to fulfill narrow, specific or temporary objectives. SPVs are typically used by companies to isolate the firm from financial risk. A company will transfer assets to the SPV for management or use the SPV to finance a large project thereby achieving a narrow set of goals without putting the entire firm at risk. SPVs are also commonly used in complex financings to separate different layers of equity infusion. In addition, they are commonly used to own a single asset and associated permits and contract rights (such as an apartment building or a power plant), to allow for easier transfer of that asset.
Time and Materials Contract	Provides for acquiring supplies or services on the basis of direct labor hours at specified hourly rates that include raw rate, indirect rates and profit; expenses are reimbursed at actual cost, plus any agreed upon mark-up or profit on expenses. Resembles cost-reimbursement contracts because they pay the contractor for actual hours worked and for all allowable expenses.
Unit Price Contract	A fixed-price form of contract where a contractor will be paid at an agreed upon unit rate for services performed. For example, bulk excavation will be paid for at the unit price agreed upon. Often used as a means to ensure costs can be controlled and predicted in situations where final quantities may vary depending on final design or on field conditions encountered.

6.0 Reference Documents and/or Associated Forms

LCP-PT-MD-0000-PM-LS-0001-01	Project Dictionary
LCP-PT-MD-0000-PM-PR-0001-01	Gateway Process
LCP-PT-MD-0000-PM-PL-0001-01	Project Execution Plan (Scope and Approach)
LCP-PT-MD-0000-PT-ST-0002-01	Overarching Contracting Strategy
LCP-SN-CD-0000-PM-LS-0001-01	LCP Master Package Dictionary
LCP-PT-MD-0000-QA-PL-0001-01	Quality Management Plan
LCP-PT-MD-0000-HS-PL-0004-01	Emergency Response Plan
LCP-PT-MD-0000-RI-PL-0001-01	Project Risk Management Plan
LCP-PT-MD-0000-CM-PI-0001-01	Completions and Commissioning Plan
LCP-PT-MD-0000-PM-PL-0004-01	Handover to Operations and Project Closure Plan

7.0 Abbreviations and Acronyms

DG3	Decision Gate 3
EA	Environmental Assessment
EMP	Environmental Management Plan
EMS	Environmental Management System
EPC	Engineer, Procure & Construct
EPCI	Engineer, Procure, Construct & Install
EPCM	Engineering, Procurement, and Construction Management
EPP	Environmental Protection Plan
ERP	Emergency Response Plan
LCP	Lower Churchill Project
NE	Nalcor Energy
NE-LCP	Nalcor Energy Lower Churchill Project
PMT	Project Management Team
SPV	Special Purpose Vehicle
SOBI	Strait of Belle Isle

8.0 Project Delivery Approach

8.1 Project Delivery Strategy

The Lower Churchill Project (LCP or the “Project”) is a large and complex megaproject. Accordingly, Nalcor has divided the Project into Sub-Projects for ease of execution, cost effectiveness and management effectiveness. In terms of overall management however, Nalcor, through the NE-LCP PMT, retains responsibility.

For Muskrat Falls Generation, Labrador Transmission Assets and Labrador – Island Transmission Link Projects, the day-to-day management responsibility for the work has been assigned to the EPCM Consultant (EPCM), under the overall management responsibility of NE-LCP PMT.

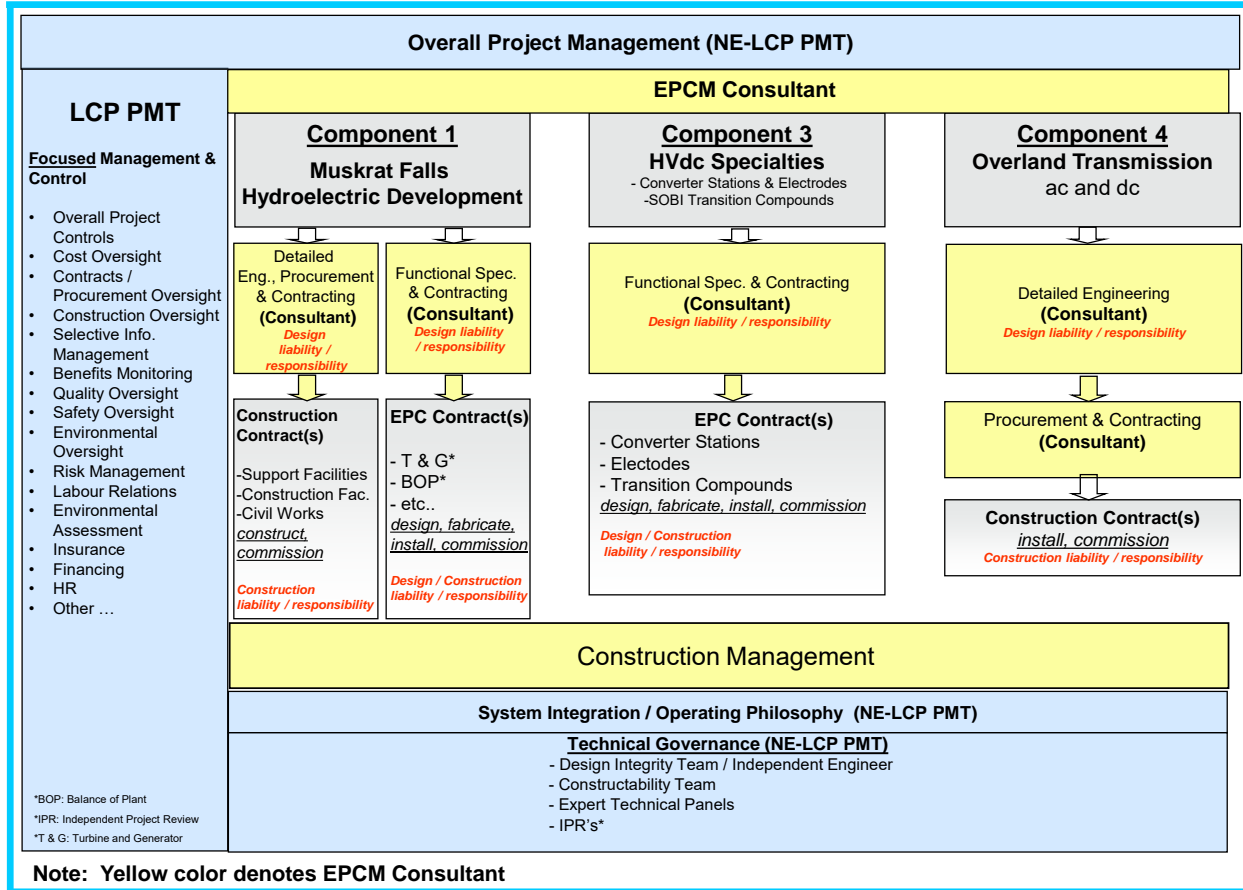
In this model, the EPCM is responsible for the completion of all project engineering and detailed design, construction execution planning, procurement of permanent plant equipment, issue and management of all supply and construction contracts, and overall construction management for the Project, including custodian for the Project work sites, and Project Completions. The construction contractors will be responsible for the safe and successful execution of their work in accordance with their contracts and approved safety programs, while the suppliers are responsible for delivery of goods and services for the Project.

The scope under EPCM’s responsibility has been divided into three components:

- Component 1: Muskrat Falls Hydroelectric Development
- Component 3: HVdc Specialties, including converter stations and transition compounds
- Component 4: Overland Transmission – both HVac to CF and HVdc to Soldier’s Pond

This delivery model, including the interfaces between NE-LCP PMT, EPCM consultant and construction contractors, is displayed in Figure 2 below.

Figure 2: Overall NE-LCP / EPCM Consultant Interfaces and Responsibilities



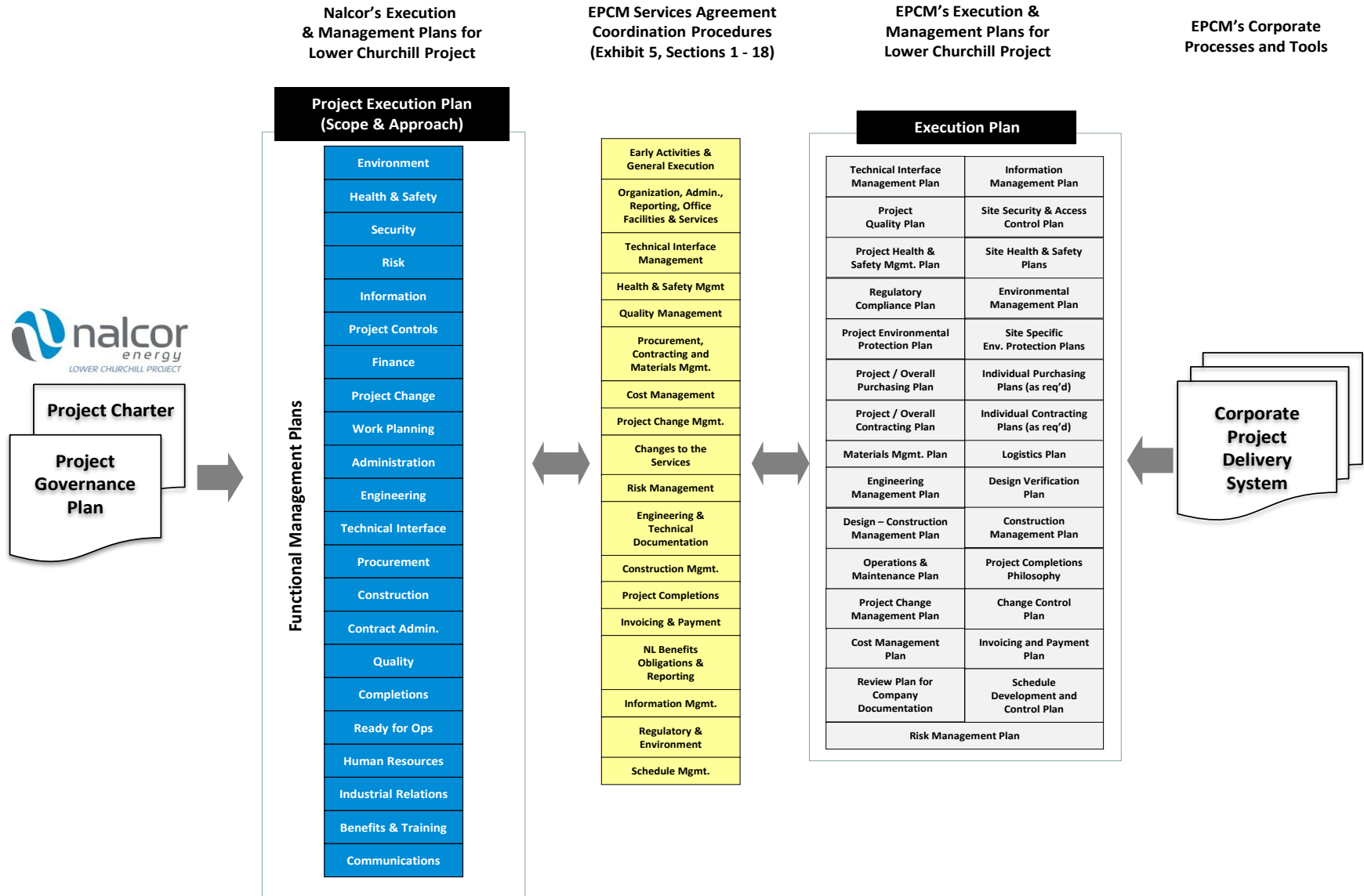
8.2 Overview of NE-LCP / EPCM Consultant Relationships

As typical for all projects executed under an EPCM approach, the role of Nalcor as Owner and developer includes many overarching areas that are outside the expertise of the EPCM Consultant. Accordingly, NE-LCP PMT will be responsible for a significant number of strategic functions throughout the construction of the Project.

In the case of the EPCM consultant, coordination procedures forming part of the Services Agreement with the consultant detail this working relationship, as captured by Figure 3.

A matrix showing the division of responsibilities between NE-LCP PMT and the EPCM Consultant is provided in Attachment B.1 of the Project Execution Plan, document no. LCP-PT-MD-0000-PM-PL-0001-01.

Figure 3: Project Management and Coordination Mechanisms



8.3 Construction Execution and Contracting Plan

A detailed description of the Project’s scope of work, construction plan and preliminary work sequencing is provided in the [Project Execution Plan](#), document no. [LCP-PT-MD-0000-PM-PL-0001-01](#).

The general approach to construction will be to optimize the number of contractors working on site in consideration of contractor capability, the number of interfaces created, and to accommodate market conditions. Individual contracts will be established for each SPV as sub-projects within the overall execution approach, with a sharing of common resources and infrastructure managed by the EPCM Consultant (e.g. accommodations, transportation services, fuel, etc.).

A description of the planned supply and construction contract packages for the Project is provided in [LCP Master Package Dictionary](#), document no. [LCP-SN-CD-0000-PM-LS-0001-01](#). A summary listing of these packages is provided in Attachment B.2 of the [Overarching Contracting Plan](#), document no. [LCP-PT-MD-0000-PM-ST-0002-01](#).

A current summary of the packages by notional contract form is provided below in Table 1. This table groups the packages by major construction contracts, major procurement packages, and other packages (includes smaller value purchase orders and various service packages).

Table 1: Package Contract Count by Notional Contract Form

(Note: Current list can be located in [LCP Master Package Dictionary](#), [LCP-SN-CD-0000-PM-0001-01](#))

SPV	Major Construction Contracts by Type			Major Procurement Packages	Other Packages	Total
	Lump Sum	Combination Lump Sum & Unit Price	Unit Price			
Muskrat Falls Generation	6	7	4	3	45	65
Labrador Transmission Assets	n/a	3 (1,2)	n/a	9 (1,2)	3	15
Labrador – Island Transmission Link	3 (1,2)	8(1,2)	n/a	9 (1,2)	7	27
Common (3)	n/a	1	n/a	n/a	11	12
Total	9	20	4	21	65	119

(1) Packages will have provision for award of separate contracts by geographical location which could result in additional contracts. Division of packages will not result in additional interface issues due to separate geographical locations.

(2) In some cases, packages may also be split to differentiate scope between SPV’s.

(3) Contracts which span all Projects and which are inappropriate to split between SPV’s are classified as Common

9.0 Construction Management Objectives and Strategies

Within the context of Nalcor's overall objectives set out for the LCP and the selected delivery approach, the Owner's Construction Management function must fulfill three (3) primary objectives:

1. To ensure that work is carried out according to approved contracts, specifications, drawings and schedules, within authorized budgets and in compliance with safety and environmental standards.
2. To manage the interfaces between various contract packages so as to ensure timely completion and to avoid claims.
3. To oversee the smooth operation of jobsites, and for Muskrat Falls Generation, the provision and operation of camp and site services.
4. Respond prompt to issues and requests for information from the contractors and to minimize exposure for potential claims arising from contractors.

Construction Management Strategies are the key strategic choices and approaches that NE-LCP PMT have determined will be used to manage the construction works, and achieve the above objectives. These strategies, and their underlying philosophies, predicated this *Construction Management Plan* have been established following several years of technical definition, input from the power industry, consultants, and suppliers and numerous strategy workshops, all focused on project delivery, including contracting strategies, organizational roles and responsibilities, lessons learned and execution goals and guidelines.

Accordingly, the following sub-sections provide a compendium of the strategies that NE-LCP PMT has elected to adopt for the management of the construction of the work.

9.1 Decision Making and Communication

- A complete set of management plans will be produced based on NE corporate and project requirements. These plans will set the foundation for how construction work will be executed and managed.
- A level of financial approval and decision making authority will be necessary at site offices (i.e. Muskrat Falls) in order to facilitate the efficient administration of the Owner's contractual responsibilities.
- For those sites where Nalcor does not have a full-time representative, a level of financial authority may be delegated to the EPCM Consultant.
- All contract changes will require approval of the Nalcor.
- Timely decision making and responding to contractor queries, requests and clarifications is imperative to avoid delay claims from the contractors.

- Nalcor’s representatives on-site, rather than the EPCM, will hold the financial approval and ultimate decision making authority, with the EPCM consultant providing the decision recommendation.
- Nalcor site team representatives will be responsible to facilitate interpretation of NE-LCP policies.
- Clear lines of communications to be established between contractors, EPCM, Nalcor, including home office.
- Nalcor’s site team is a small, flexible group that is keeping abreast of the entire project and can proactively advise NE-LCP PMT at Home Office of impending changes, concerns and difficulties.
- Nalcor’s Project Managers have cradle-to-grave accountability for their Project / Area, hence they must have influence and oversight on the overall construction progress.
- NE-LCP liaison will be with person’s counterpart in EPCM site organization and not “up the line” through either organization. This is key to facilitate organizational effectiveness and ensure issues are addressed on a timely basis.
- Nalcor is responsible for overall Emergency / Incident Management and for all stakeholder reporting/consultation and public relations activities.
- The organization structure adopted for the Project is based upon defined roles and reporting relationships, such that each individual has a clear description of their authority, responsibility and accountability necessary for the project to succeed.

In an effort to provide the maximum possible clarity over the allocation of authority for key decision-making responsibilities at the Muskrat Falls construction sites, a decisions and authority framework has been developed (reference Table 2.0). It is intended that this matrix can be adopted for all work fronts of the entire Project, with adjustments to reflect the particular organizational structure.

The matrix indicates the key responsibilities for each decision in accordance to the following actions:

- P** Prime Responsibility for Initiating Action
- R** Reviews / Validates
- A** Responsible for Final Approval
- I** Right to be Informed

Table 2: Decision and Authority Matrix for Muskrat Falls Generation

Decision	Nalcor				EPCM Consultant			
	Project Manager MF	Site Manager - MF	Contract Administrator EPCM Contract	SPV Business Manager	Construction Manager - MF	Component Project Manager	Contract Administrator	Area Manager
Contractor Invoice Processing	A	R		R	R	I	P	I
Instructions/Correspondence with Contractors	I	R		I	A	I	P	I
Instructions to SLI wrt CM Scope of Services	R/A	R/A	P	I				
Contract Change Orders & Amendments (Constr'n Contracts)	I	R		R	A	I	P	I
Site Progress Reporting	I	A		R	P	R	I	I
Management of Site & Facilities	I	R		I	A	I	P	I
Visitors to Site	I	A		I	I	I		
Site Expenditures	I	A		I	P	I		
Labour Agreement Management	R	A		I	P	I	I	I
CM Organization & Personnel	R	A		R	P	R		I
Settlement of Contractor Claims	R	A		R	P	R		I
Incentive Programs	R	A		R	P	R	R	R
Community Relations	R	P/A		I	I	I		
CM Procedures	R	A		I	P	R		R
Construction Schedule/Milestones	A	R		R	P	R		R
Cost/Schedule Forecasts for Publication	A	R		R	P	R		R
Communication with External Entities on Project Status/Issues	A	R						
Major Decisions on Plans & Strategies to Maintain Control and Coordination of Work	A	R		R	P	R	I	R
Decisions on Contract Packaging	A	R		R	P	R		R
Management Strategy for Mitigating Construction risks	A	R		R	P	R		R
Resolution Strategy for Contract Disputes	A	R		R	P	R		R

9.2 Constructability

- Emphasize the incorporation of construction knowledge into planning, engineering, procurement and construction execution activities through integration of construction staff during design and through constructability reviews. Accepted ideas to be monitored to ensure follow-up/implementation.
- Utilize the services of external agencies and specialists for periodic risk and cold eye reviews (e.g. design verification and constructability reviews).
- Schedule for early completion of construction activities and, where cost effective, implement acceleration of construction programs to assure schedule objectives are met.

-
- Consider options/strategies for the execution of work facing extremes, including winter conditions, inaccessibility, harsh terrain and ice. This will include planning for winterization measures to facilitate safe and productive work execution.
 - Openness to concessions from contractors – they have the expertise in building; however deviations from standards, specification or codes must be approved by engineering through a site query mechanism.
 - Complete engineering as much as practical so as to maximize firm price construction contracts.
 - Offsite fabrication/modularization/pre-assembly to be exploited.
 - Ensure that engineering deliverables are correct and complete (not issued because the time was up and we needed to get them out) to minimize field changes later.
 - Provide adequate time & resources to complete constructability reviews and allow early contractor involvement.
 - Review and simplify processes, procedures and specifications and ensure they are industry standard so as to avoid a constant stream of deviation requests.
 - Limit exposure of personnel to elements by maximizing the work under controlled environment. Productivity in a controlled atmosphere (workshop) is higher than field.
 - Determine the order of preparation of engineering documents into work packages so as avoid site delays
 - Incorporate appropriate advances in construction technology into the design and construction planning
 - Develop methods to minimize labor intensive operations, including simplification of work and reduction of hazardous activities
 - Optimize plant layout, access, site services and utilities related to site operations
 - Optimize construction materials in consideration of the construction site and available labor
 - Ensure that all engineering deliverables, equipment and material are assigned Required On Site (ROS) dates, consistent with project completion milestones
 - CM team to ensure all related functional plans address construction requirements. These include HSE, Quality, Training, Industrial Relations

9.3 Contracting & Procurement

- Hold discussions with key construction contractors to seek their views as input to the contracting strategy.
- To the maximum extent practicable, assign execution risk to the contractors (e.g. lump sum and fixed unit price contract forms). Hold the contractor accountable and impose liquidated damages.
- Contractors will be responsible for execution of the physical works. EPCM to ensure contractor adheres to its responsibilities as contained in the contract.
- Contractors shall be selected through a thorough qualification process which ensures they are capable and have the capacity to do the work in compliance with Project health, safety, environmental and quality requirements.
- Contractors are expected to utilize their own processes and tools to deliver their contractual commitments. Procurement of permanent equipment and NE-LCP free-issued of material executed from Home Office.
- Maintain flexibility in construction contracting options to capture potential cost efficiencies and synergies of combining work into larger packages.
- Bid major construction contracts worldwide to attract large, high quality contractors and to fully capture positive effects of competitive bidding.
- To the maximum extent possible, contracts will be bid based on AFC engineering documents.
- Construction work will, as much as practical, be packaged on an SPV basis.
- Reduce the number of construction packages so as to minimize interfaces requiring management.
- Award contracts to contractors with proven and applicable experience, sound safety records and financial stability.

9.4 Free-Issue of Goods and Services to Contractors

- NE-LCP / EPCM Consultant will operate the MF site and provide general site services, including camp, catering, security, etc.
- Catering contractor will manage the accommodations complex in a hotel-style check-in / check-out fashion.

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- Contractors will be responsible for all aspects of the transmission line construction workforce and services.
 - Contractors are responsible for provision of construction bulks, including management of fuel and concrete provided under NE-LCP frame agreements.
 - EPCM or Freight Forwarder will be responsible for the management of the free-issued material from marshaling yards on the Island and in Labrador. Contractor is responsible for transport from marshaling yards to worksite

9.5 Industrial Relations

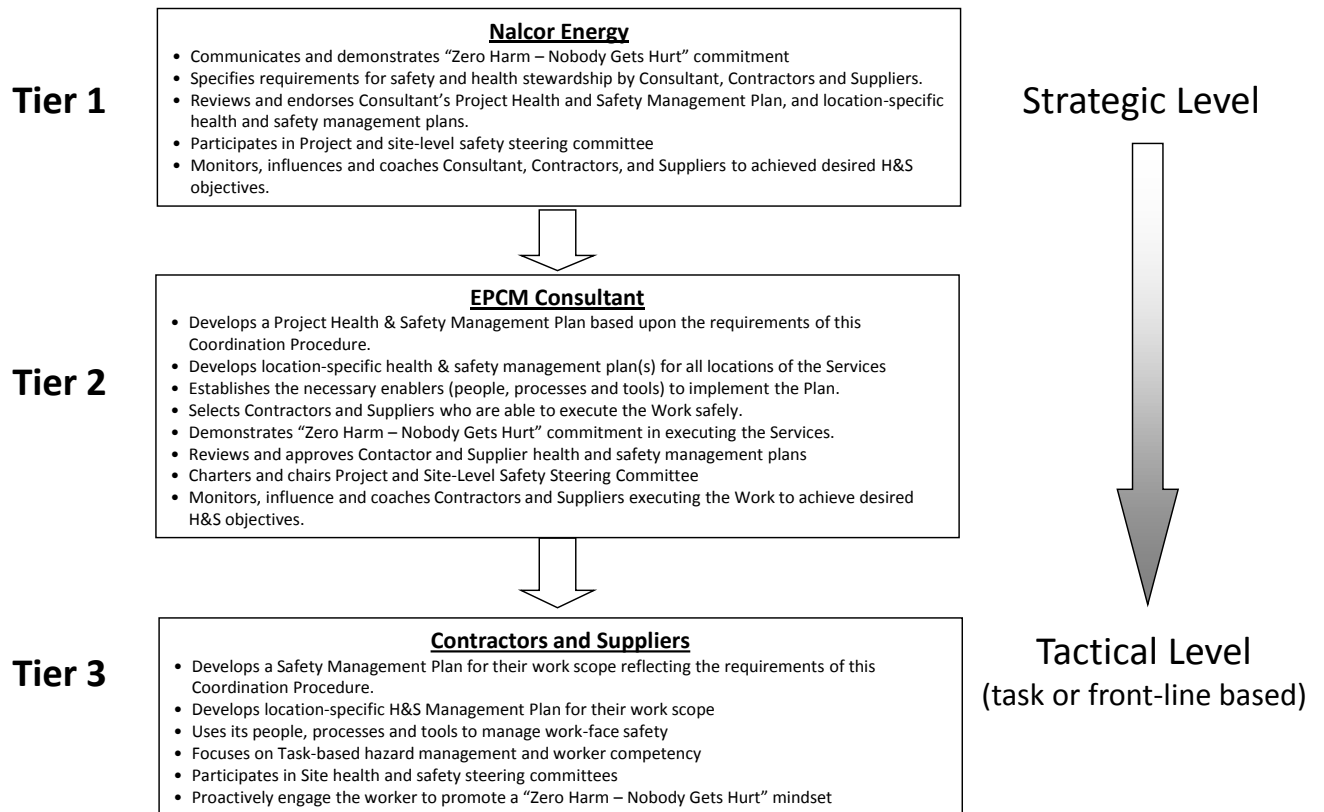
- Project will have multiple labour agreements that address the varying work scopes.
- NE-LCP and contractors are members of the employer's association.
- Contractors are responsible for securing and managing labor under the terms of the labor agreement.
- Labor needs and expected short falls will be determined. Among other actions, this information will be used to support the development of training programs which will address labor needs and associated issues.
- Focus on productivity enhancement wherever possible, including site living conditions, compensation, turnaround cycle, union alignment, and labor agreement.
- Nalcor and EPCM will not directly employ skill sets that are part of the bargaining unit.
- Hiring of construction workers will be done by contractors through union halls as per the terms of the collective agreement.
- According to the approved Nalcor LCP policy, pre-employment medical and drugs screening may be undertaken.
- Liaison committee will be used to facilitate both productive and safety management initiatives with union.

9.6 On-Site Safety and Security

- Desire to focus on preventative measures, while having the ability to respond to incidents should they occur.

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- Management commitment and leadership drive worker involvement to focus on incident prevention processes. In the event that an incident does occur, the learning's shall be applied to continuously improve.
 - Each individual is responsible for safety. Line Management has the additional responsibility to ensure enforcement of the safety program and, where appropriate, for guidance and encouragement of all site staff to create a safe working environment
 - From an H&S legal obligations viewpoint, the EPCM Consultant is considered the prime contractor.
 - Actively manage construction safety by selection of contractors with records of safe work performance and effective safety programs.
 - Focusing on coaching and guiding contractors in safety excellence.
 - Project-wide Behavioral Based Safety programs are effective on construction sites to enact cultural change.
 - Nalcor intends to clearly communicate project safety expectations and goals to contractors and aggressively monitoring contractor's safety program performance.
 - Contractors as the entity responsible for construction activities, contractors have the prime responsibility for workplace safety related to their scope of work.
 - Contractors must maintain at-site a H&S Manager and safety inspectors.
 - Nalcor is responsible for overall Emergency / Incident Management. For all Muskrat Falls activities, MF Site Manager shall assume the role of Incident Commander for Level 1 incidents (reference [Emergency Response Plan](#), document no. [LCP-PT-MD-0000-HS-PL-0004-01](#) for clarification of incident levels).
 - Medical clinic will be established at Muskrat Falls, with medical services supplied through a services contract. Medical services provider will have a strong focus on case management and early and safe return to work program.
 - Security Management at Muskrat Falls will be the responsibility of the EPCM, while a security services provider will provide security officers.
 - Security services firm shall provide personnel training in firefighting.
 - Contractors responsible for medical and security services at other work site locations (i.e. other than Muskrat Falls).
 - With reference to Figure 5, as the entity responsible for construction activities, contractors have the prime responsibility for workplace safety related to their scope of work.

Figure 5: Health and Safety Management Roles and Responsibilities



9.7 Environmental Management

- Compliance to permitting requirements, laws and regulations is the responsibility of the contractors.
- Construction permits will be acquired by Nalcor. Permits for temporary facilities required for contractor’s activities (e.g. erection of a workshop, temporary fuel depot) are the responsibility of the contractor.
- Contractors must adhere to the requirements of the NE-LCP Environmental Protection Plan, and submit an Environmental Management Plan for approval prior to the commencement of work.
- EPCM Area Managers must ensure that this EMP is followed, with on-site environmental advisors providing the enabling support.

- The will be an overall spill management plan to support the management of any environmental incidents related to the discharge of harmful products.

9.8 Contractor Oversight

- Administration of all contracts to ensure that work is carried out according to approved contracts, specifications, drawings and schedules, within authorized budgets and in compliance with safety and environmental standards. This will require a continual watch over contractor's quality and progress.
- Nalcor / EPCM must manage the interface between contract packages so as to ensure timely completion and avoid claims.
- Communication lines with contractors to be very clear, with communication directed through the EPCM Consultant.
- Adopt a "claims avoidance" mindset but, where conditions warrant, include a program of data collection (e.g. weather, site conditions, progress, etc.) so as to defend against claims and minimize financial impacts to Nalcor. To that effect, a claims avoidance plan and support resources will be nominated.
- Ensure contractors meet project expectations and contract/specification requirements through experienced construction management site teams.
- Once awarded, EPCM team deals with appropriate levels within the contractor's organization to see that all elements of the contract are adhered to (e.g. manpower, mobilization, supervision, progress reporting, etc.).
- If a dispute occurs between the contractor and the EPCM consultant, the contractor may request that the dispute be taken up with the Owner.
- For all major construction contracts, pre-construction reviews will be conducted to verify readiness to begin construction activities before contractors mobilize to site. Focus will be on safety, material availability, technical readiness, interfaces, and infrastructure, including camp facilities.
- Significant portions of the contracts will be Unit Rate based, hence a need to have a focus on quantity verification. Technology will be fully leveraged to support this process (i.e. provide CATIA model to powerhouse contractor).
- Nalcor / EPCM site organizations generally intended are "lean and efficient"
 - Optimize size of site organizations in consideration of Home Office support, experience of contractors, value achieved and common industry practice.

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- CM site organization to expand with requirements and will take advantage of synergies so as to keep site team size to an optimal level.
 - Site team manpower planning to consider turnaround cycles so as to ensure continuous support for key activities.
 - Organizations and processes to be focused on quick resolution/turnaround of issues and information to contractors.
 - To the extent possible, field engineering positions shall be staffed by personnel who have been involved in the design.
 - Construction Management organization manages all materials management facilities and activities, ensuring free-issued materials will be available to contractor when required.

9.9 On-Site Quality Control

- NE-LCP / EPCM provide Quality Control oversight of all contractors.
- All Construction activities conducted on the Project shall be documented and conducted in accordance with the NE-LCP [Quality Management Plan](#), document [LCP-PT-MD-0000-QA-PL-0001-01](#).
- Quality Control is the responsibility of the contractor who must submit a Quality Plan, Inspection and Test Plan, and copies of test results.
- Contractor's must maintain at-site a Quality Manager, quality inspectors and testing facilities.
- Each of the EPCM Consultant's Area Managers is responsible for Quality Assurance.
- In principal, all permanent works completed by contractor or supplier / installer gets the approval of Owner or its designated representative (i.e. EPCM consultant). Examples include:
 - Examination of foundations and approval by the EPCM of the quality of foundations before any earthwork or concreting can be done.
 - Approves all concrete pours before pour is undertake by contractor.
 - Quality checks of concrete at the mixing plant.
 - Request and approves of remedial work.
- Quality assurance will be injected at the earliest possible stage.

- Pre-testing concrete materials before they arrival at the batch plant.
- Offsite fabrication QC surveillance requirements to be determined via inspection plan driven by a criticality assessment and adjusted based on contractor performance.
- Laboratory work will be contracted out to a firm specializing in this type of work. These firms report directly to the engineers in charge of the separate areas rather than through their head offices.
- Fabricated items which require on-site welding are subjected to non-destructive testing. Testing will be done by specialized firms under the contractor's direction.
- A system for the collection, consolidation, accurate and timely reporting of Quality metrics, used to indicate Quality performance. Shall be implemented. These shall include audit & surveillance program implementation and effectiveness and open NCR's.

9.10 Progress and Performance Management

- Contractor progress and performance measurement methodology to be reviewed and accepted by EPCM Consultant, in accordance with Nalcor's requirements.
- Progress and performance information will be evaluated during contractor evaluations and will be required in contractors bids.
- Progress cutoff dates will be stipulated by EPCM and will support the project's overall progress reporting calendar and invoicing requirements
- Progress to be measured at the lowest practical level of work execution and will allow roll-up of progress in line with project WBS. The focus will be towards striking the right balance between the value of the information versus the cost to generate the information. Focus will be directed towards early trending and change mitigation.
- Contractor productivity will be measured and if possible, reported by contractor and reviewed by EPCM Consultant. Contractor productivity to be used to evaluate forecasts of progress.
- Progress to be reported by contractors on a weekly basis unless otherwise stipulated.
- Completions and Commissioning progress to be captured using a Completions system acceptable to the project.
- All physical work elements constructed will be measured and form part of the contractors progress statement, including subcontractors and suppliers scope of work.

9.11 EPCM Site Organization

- Optimize size of site organizations in consideration of Home Office support, experience of contractors, value achieved and common industry practice.
- Each of Muskrat Falls, Overland Transmission, and HVdc Specialties and Switchyards will have its own construction management team headed by a Construction Manager reporting to the General Construction Director and respective Project Manager and Area Managers. The General Construction Director ensures a consistent approach with respect to industrial relations, H&S, environmental management, etc. The Construction Manager is responsible to support the Area Managers in delivering their scope from engineering through completions.
- Identify and agree day-to-day interface with NE-LCP and develop interface protocols.
- Construction work sites will be staffed with experienced personnel on behalf of Nalcor, largely through the EPCM consultant. Where warranted, integrated teams will be assembled to take advantage of experience and to assure timely resolution of issues.
- Administration of all contracts to ensure that work is carried out according to approved contracts, specifications, drawings and schedules, within authorized budgets and in compliance with safety and environmental standards. This will require a continual watch over contractor's quality and progress.
- Manage the interface between contract packages so as to ensure timely completion and avoid claims.
- Oversee the smooth operation of jobsites, in particular for the provision of camp and site services.
- Site team manpower planning to consider turnaround cycles so as to ensure continuous support for key activities.
- Organizations and processes to be focused on quick resolution/turnaround of issues and information to contractors. Liaison will be with person's counterpart in Nalcor site organization and not "up the line" through either organization. This is key to facilitate organizational effectiveness and ensure issues are addressed on a timely basis.
- CM site organization to expand with requirements and will take advantage of synergies so as to keep site team size to a minimum level.
- To the extent possible, field engineering positions shall be staffed by personnel who have been involved in the design.
- Construction Management organization manages all materials management facilities and activities, ensuring free-issued materials will be available to contractor when required.

9.12 Construction Processes and Tools

- EPCM Consultant to develop comprehensive Construction Management Plans for managing construction activities, including pre-construction, with an emphasis on constructability and quality management. In addition, site specific plans must be prepared where circumstances require additional planning and preparations.
- Contractors are expected to utilize their own processes and tools to deliver their contractual commitments to Nalcor.
- Interfaces will be coordinated through a formal interface management process to assure effective communication and planning.
- Construction performance indicators (KPI's) will be established and data collected and assessed regularly.
- At the appropriate time, and leading up to the start of mechanical completion activities, interface meetings will be held with the commissioning organization and key equipment suppliers, so as to enhance mechanical completion planning in preparation for commissioning.
- Interface early with responsible entities at Churchill Falls and Soldiers Pond so as to optimize planned construction work at those sites and reduce interface risk with contractors.
- EPCM QA focus is to provide an "acceptable" level of confidence that the work meets or exceeds requirements. This will be accomplished, in part, through a keen focus on contractor QA programs prior to award, audits, and day-to-day monitoring of contractors quality programs.
- Execution and management to accommodate progress and status reporting by SPV.

9.13 Application of Communication and Management Information Systems Technology on Site

- The Project will leverage technology applications in order to facilitate "optimizing" site team and facilitate effective communication.
- The EPCM Consultant will leverage a computerized project management tool to provide the construction management team with full support for contract administration including change orders and amendments, progress measurement for payment and productivity, document control, safety/incident reporting, procurement and logistics support including site warehousing with online receipt of material and issue to contractors.

- A computer-based Completions system will be implemented to track and document system / equipment Mechanical Completion, Preservation, handover for commissioning, commissioning and turnover to Operations. This system will also form the basis for the stages of Company's acceptance of the equipment and infrastructure.
- Use of other productivity enhancing tools (e.g. iPads) for construction planning, inspection and support will be encouraged.

9.14 Productivity Management

- Productivity is considered a key issue.
- In unit price contracts, contractors will wish to price in productivity risk so as to minimize their downside exposure. We need to avoid this to the maximize degree possible.
- Given the complexity of this multiple faceted issue, it must be tackled on all fronts via strategic interjection. The following are considered the key productivity drivers for construction works.
 1. Front-End Loading / Workface Planning – Site Layout, job preparation, competency
 2. Concept of Constructability and Productivity drives design and execution approach
 3. Union alignment and labour relations
 4. Worker Motivation, Morale & Retention
 5. Establishing a Safety Culture
 6. Effective Supervision – Quantity and Quality
 7. Avoid Silos – Manage Interfaces
 8. Management of Change / Minimize late change
 9. Maximize completion of engineering definition prior to starting construction
 10. Communication of information – leverage IT and information management technologies to facilitate flow of information
 11. Engineering support on-site to support construction
 12. Materials and logistics management – goods and materials ready when required.
 13. Cold Weather / Winterization
 14. Craft labour skills / competency
 15. Fatigue / Management of Overtime / Unplanned Overtime

9.15 Change Management

- Design / Project Change and Scope Creep must be avoided.
- All change must follow the Change Management Process.
- Change Management Process must be timely and efficient to support construction.
- A level of change approval will be required at the work sites.

- Site Query process is key to heading off late change.
- Project Team will be continuing to proactively look for change that may be originating a site so as to minimize any potential impact.
- During the construction phase, and due to the importance of timely assessment and processing of contractor based changes, emphasis will be placed on clear organizational responsibilities for processing change.

9.16 Post Design Technical Support / Field Engineering

- Engineering will participate in constructability reviews and will, throughout the construction phase, actively carry out verification of design compliance through reviews and site inspections.
- Fundamental intention is to award contracts with AFC drawings and designs, hence limited design uncertainty at commencement of work by contractors.
- Contractors shall have their own construction engineering capacity.
- A basic field engineering / technical competency will be required on-site to support construction. This function should be able to address day-to-day technical queries, while more expansive queries will be routed by them to the home office for support.
- Responding of detailed technical queries will be done at home office, through a technical query management process.
- Any design work, including production of drawings, required for design changes will be done from home office.
- Technical Queries from the field will be made to Engineering located at the home office.
- Solutions to problems will be provided to contractors via Field Work Instructions.
- Contractors will be responsible for providing “red lined” markups of engineering documents to illustrate the as-built condition of the work. Home office engineering will be responsible for incorporation of this information into final “as-built” issued documents.

9.17 Site Administration and Control

- Nalcor with EPCM, will administer the overall Muskrat Falls site, including managing the provision of key services to contractors (e.g. camp).

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- For other sites, contractors are responsible for provision of services, including accommodations, utilities, telecoms, etc.
 - Access to contractor controlled sites will be via contractor.
 - Catering contractor will be responsible for total administration of accommodations complex.
 - Contractors will provide their own offices at Muskrat Falls.
 - Central fuel supply and dispensing infrastructure and service will be available at Muskrat Falls that contractors will be expected to utilized under a frame agreement pricing strategy.

9.18 Construction Equipment

- All construction equipment will be supplier by contractors.
- EPCM will inspect all equipment before mobilization on-site.
- Contractors will provide their own equipment maintenance shops.

9.19 Risk Management

- Proactive risk awareness and management is a key enabler of “flawless execution.”
- Fully support the implementation of a risk management plan in accordance with the [Project Risk Management Plan](#), document no. [LCP-PT-MD-0000-RI-PL-0001-01](#).
- CM must be continuously aware of project risks, and if appropriate, consider them in the development of execution strategies and work plans.
- Risk avoidance and mitigation must be key focus areas throughout the construction planning and execution phase
- Contractors will be required to implement risk management programs for their respective scopes. This will provide early warning to the CM team for mitigation actions to be taken.
- A complete listing of current project risks are provided in the Sub-Project Risk Registers and Key Risk Register.

10.0 EPCM's Construction Management Responsibilities

Consistent with the construction management strategies above and working under NE-LCP PMT's overall management, the EPCM Consultant will carry out the activities listed in the following sub-sections.

10.1 Overarching Construction Management Activities

Overarching Construction Management activities will include the following:

- (i) Development and implementation of the detailed construction execution and management plans and support schedules for the Project;
- (ii) Development and implementation of all construction management processes and procedures;
- (iii) Overall management of Project Site(s), including provision of all support services and infrastructure (e.g. accommodations complex, medical facilities, security services, etc.) required by Contractors performing the Work;
- (iv) Overall management and oversight of all Work performed by Contractors at Site(s);
- (v) Administration of all Contracts for the Work;
- (vi) Overall management of Company's labour agreement used by Contractors;
- (vii) Overall management and oversight of all Project-related fabrication activities at all locations;
- (viii) Overall management and oversight of all Project-related transportation and logistics activities at all locations;
- (ix) Overall management and oversight of all Project-related installation activities at Site(s);
- (x) Overall management and oversight of Mechanical Completion, Preservation, and handover for commissioning, and provision of support services for commissioning and turnover to Operations activities at Site(s) required to implement the Project; and
- (xi) Implementation of all best practices, productivity improvement initiatives, risk mitigation, and lessons learned.

10.2 Construction Management Activities during the Pre-Construction Phase

Construction Management activities associated with the pre-construction phase of the Project include the following:

- (i) Development and implementation of construction execution and management plans including all strategies, organization, cost estimates, logistics, labor and work scheduling considerations;
- (ii) Development and implementation of Project constructability-related processes, with consideration to the incorporation of industry best practices, productivity issues, risk issues, and lessons learned;
- (iii) Constructability reviews of the design, including reviews for the incorporation of construction safety elements logistics, location, & seasonality constraints, industry best practices, productivity issues, risk issues, and lessons learned;
- (iv) Development of construction contracting strategy and Project contract packages;
- (v) Completion of Contractors' and Suppliers' competency evaluations, including assessment of their Quality systems for capacity and capability to perform to the requirements stated;
- (vi) Development of cost estimates for the construction Work in order to establish the Project Budget;
- (vii) Development of detailed construction and Completions schedule;
- (viii) Development of overall productivity action plan for the Work in order to ensure that the Project is planned and executed with productivity as a key driver of success;
- (ix) Development of a logistics and materials movement plan;
- (x) Development and implementation of program to assess and address potential productivity issues and gaps in critical construction labor and supervision;
- (xi) Completion of modularization / prefabrication analysis for relevant Project components;
- (xii) Completion of a Project-level construction hazards analysis and mitigation plan that considers all physical safety and environmental hazards that may be encountered during construction, and Completions;

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- (xiii) Industrial Relations (IR) planning and negotiations planning / labour estimates in conjunction with Company;
 - (xiv) Establishment of construction safety targets and safety management programs for incorporation into Contracts;
 - (xv) Establishment of construction environmental targets and environmental management programs for incorporation into Contracts;
 - (xvi) Development of construction period staffing plan, roles and responsibilities, reporting structure;
 - (xvii) Production and management of required construction management related procedures;
 - (xviii) Development of strategies for overall construction progress, performance management and cost management;
 - (xix) Provision of support to Company in the negotiation of labor collective agreements for the LCP;
 - (xx) Provision of support to Company in the placement of Company's insurance program for the Project; and
 - (xxi) Provision of input to, support for, and participation in the Newfoundland and Labrador Benefits program.

10.3 Construction Management Activities during the Construction Phase

Construction Management activities during the construction phase of the Project include the following:

- (i) Guidance and leadership of multifunctional teams to advance the preparation and planning required to commence the main construction Work at the earliest possible opportunity in order to meet or exceed the Project Control Schedule and Project Budget;
- (ii) Management of the effort required to provide the engineering, procurement, commercial and environmental deliverables required to be able to place purchase orders, award contracts and commence and execute the main construction Work in accordance with the Project Control Schedule;
- (iii) Selection, hiring, training and deployment of Consultant's Site teams that will monitor and direct the Work performed by Contractors;

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- (iv) Overall management and coordination of the Site teams, development of Site procedures to administer the Work by the Site Contractors;
 - (v) Overall management of the Site(s) including the coordination and management of all common services (e.g. accommodations, medical facilities, etc.) provided by the Consultant, on behalf of the Company, to Contractors;
 - (vi) Completion of the construction Work safely, on time and within budget respecting all environmental and other requirements and provisions;
 - (vii) Ensure that the construction Work is delivered in accordance to Company's Quality objectives;
 - (viii) Ensuring compliance with commitments made in Impact and Benefits Agreement during the planning/preparation phase and during the construction Work;
 - (ix) Ensuring compliance with all Newfoundland and Labrador Benefits obligations; and
 - (x) Day to day management, with construction Contractors, of labour agreements for Company.

10.4 Specific Construction Phase Responsibilities

Specific construction phase responsibilities include the following:

(i) General

- Pre-mobilization planning;
- Development and deployment of Site teams – all disciplines and functions;
- Overall Site coordination / Site offices management;
- Permits management, including acquisition and oversight;
- Approval of Contractors' methods / plans / plant / Personnel;
- Overall management of the Site;
- Management of Site access;
- Management of communication systems;
- Assignment of measuring methods;
- Reporting & establishment of reporting requirements;

- Stewardship of management meetings;
- Rejection of Work / replacement of defective Work;
- Extra Work authorization / management of design changes & impacts on cost & schedule;
- Support of the management of Company's insurance program for the Project; and
- Establishment and provision of off-site warehousing, staging areas, and logistics offices necessary for the Project and for use by Company Personnel.

(ii) Health and Safety Management

- Overall Project-level safety management including Site(s) safety oversight & coordination;
- Development and implementation of safety management programs;
- Review and approval of Contractors' safety management plans;
- Review and consolidation of safety statistics reported by Contractors, Subcontractors and Suppliers;
- Establish and maintain medical, emergency response, fire protection facilities and services at each Site(s);
- Emergency response management and coordination at Site(s);
- Coaching of Contractors to achieve the desired safety performance;
- Chair the site-level safety steering committee; and
- Establish and administer Site orientations for all Personnel, including diversity awareness and training.

(iii) Security Management

- Development and implementation of Project and Site(s) security plan; and
- Overall management of Site(s) security.

(iv) Environmental Management

- Development and implementation of Environmental Management Plan for construction Works for approval by Company;
- Environmental oversight / monitoring, coordination and management of Site(s);
- Management of restrictions on construction operations; and
- Development and implementation of environmental mitigations and rehabilitation plan for use during and post the construction Work.

(v) Site Technical & Engineering Interface

- Assessment of excavated foundations / determination of foundation treatment and support requirements;
- Interface with home office engineering / queries / expedite design decisions;
- Timely issuance of approved for construction documents;
- Review / approval of Contractors' drawings;
- Management of changed Site conditions;
- Management of rock support requirements;
- Management of alterations / additions;
- Review / approvals of alternates; and
- Timely / prompt response to Contractor queries, information requests, Change Requests, and decision making.

(vi) Quality Assurance

- Overall responsibility for Construction Quality;
- Ensuring that construction and installation activities are conducted in accordance with drawings, specifications and any special Supplier installation procedures;
- Ensuring that all applicable Standards, codes and jurisdictional regulations are observed and adhered to by Contractors;
- Providing oversight of Contractors' Quality assurance plans, including verification (through checking, surveillance and audits) that the procedures used and the results obtained are in compliance with Project's Quality requirements;

- Quality control, including quality control at Site(s) and fabrication plants;
- Providing attendance at factory acceptance testing (FAT) and system integration testing (SIT);
- Establishment of survey control system and necessary survey control points;
- Participation at inspection and tests;
- Approval of planned concrete Work prior to placement of concrete;
- Approval of completed Work, including all foundations, prior to covering up; and
- Operation of Site laboratories (soils / concrete / photography etc..).

(vii) Verification Activities

- Verification of Contractors' systems for:
 - management of Requests for Information (RFI) / queries from Contractors and Suppliers;
 - maintenance of change logs;
 - most current design information being constructed; and
 - design Standards and codes being used and any requests for deviations from applicable codes, Standards or specifications.

(viii) Logistics and Materials Management

- Overall logistics management for the Site(s);
- Oversee the provision of common logistics and materials management services at Site(s);
- Management of Company supplied items, if applicable;
- Management of storage / laydown areas and staging areas, at the Site and off-site;
- Site material management as required (commodities / receiving / OS&D / surplus / scrap / spares / etc.);
- Management of temporary facilities; and
- Preservation of materials and equipment and storage, shipping and handling in accordance with associated Company approved methods and procedures.

(ix) Contracts Management

- Contract coordination and management in accordance to Contract conditions and Consultant's processes;
- Oversight of Contractors' procurement activities;
- Warranty and claims management;
- Conducting periodic audits of Contractors' files;
- Settlement / resolution of disputes / claims in conjunction with Company; and
- Management of Contractor change requests.

(xi) Schedule Management

- Management of overall Project Milestone Schedule and of discrete construction schedules;
- Approval of Contractors' schedules ensuring alignment among Contractors and with overall Project Milestone Schedule;
- Development and implementation of processes and procedures to monitor schedule(s) and to address issues;
- Development and implementation of reporting protocols for Company's acceptance;
- Development and implementation of progress verification methods and procedures to include all payment methods, progress measurements, quantity survey and verification, progress payments, payment measurement methods, and verification methods;
- Regular reporting of progress and performance against the Project Milestone Schedule and Services Budget and Project Budget; and
- Development of recovery schedules in case of actual or forecast schedule slippage of critical path activities.

(xii) Cost Management

- Measurement and reporting of project costs including committed, incurred and earned cost against the Services Budget and Project Budget;
- Identifying and management of all cost and schedule trends;

- Monthly forecasting of estimate-at-completion for the Project and the Services; and
- Management of Project contingency in conjunction with Company;

(xiii) Productivity Management

- Leading effort to maximize productivity on the Site(s) and to engrain a productivity mentality into the Site(s) culture; and
- Measurement of actual productivity, and development of productivity improvement initiatives.

(xiii) Risk Management

- Development and implementation of risk identification and management program including roll-out and full engagement / usage of all Contractors in accordance with Consultant's Risk Management Plan;
- Development and implementation of risk challenge process to preclude usage of contingency funds as a first line of defense to address risk issues;
- Development and implementation of process for identification of emerging risk issues; and
- Stewardship of Contactors' risk monitoring and management processes and plans.

(xiv) Document Management

- Overall document management function at the Site(s) including document control, document transmittal capability and document status reporting;
- Implementation of a disaster recovery plan for all documentation and data;
- Regular audit of Contractors' systems / documents; and
- Management / stewardship of as-built documentation.

(xv) Labour Management

- Development and implementation of processes and procedures to manage, report on, and analyze labour usage and productivity;
- Implementation of remedial actions to address issues regarding critical skills gaps;

- Oversight of Project labour agreements, in particular being used by construction contractors;
- Administration of dispute resolution mechanisms as outlined in Project labour agreements; and
- Implementation of policies and procedures related to Personnel on site.

(xvi) Newfoundland and Labrador Benefits

- Specification of requirements for Newfoundland and Labrador Benefits reporting in Contracts;
- Oversight of Newfoundland and Labrador Benefits reporting for Contractors within Company processes and systems; and
- Monitoring of Newfoundland and Labrador Benefits, in conjunction with Company, and manage all corrective actions.

10.5 Mechanical Completion, Preservation and Handover

A Project Completions Philosophy will be prepared providing a concise set of guidelines for the execution of mechanical completion, preservation and handover activities.

The overall goal of Project Completions is to verify and document that all equipment/systems/infrastructure are fabricated and installed as specified, and tested to ensure they function as designed. Safety will govern all decisions.

Contractors and Suppliers, under the management of the EPCM Consultant, are responsible for performing installation and Mechanical Completion, Preservation, and handover for commissioning activities. Contractors and Suppliers are responsible for development of documentation related to Mechanical Completion including procedures, manuals and other documents required for the Mechanical Completion activities. A computer-based Completions system will be implemented.

Additional information regarding mechanical completion, preservation, handover for commissioning, commissioning and turnover to Operations, are contained in the [Completions and Commissioning Plan LCP-PT-MD-0000-CM-PL-0001-01](#) and the [Handover to Operations and Project Closure Plan LCP-PT-MD-0000-PM-PL-0004-01](#).

11.0 Construction Management Organization

11.1 Organizational Model

In order to achieve the three (3) construction management objectives, the following three (3) major job site management functions must be provided by or on behalf of Nalcor (i.e. by the EPCM):

1. Contract Management – Including inspection, progress management (not measurement) and contract administration
2. Administrative Support and technical assistance – HSE, resident engineer / technical support, quality assurance, etc.
3. General Jobsite Management – Including camp, site services, labor relations, public relations.

As detailed in Section 7.0, Nalcor has selected an EPCM approach for the delivery of the Muskrat Falls, Labrador Transmission Assets and Labrador – Island Transmission Link Projects (excluding SOBI Crossing). Although the EPCM will be responsible for the provision of all construction management services, including the day-to-day management of the work, Nalcor retains overall responsibility for the project, including delivery, system integration and stewardship on the basis of the SPV's set up for project financing.

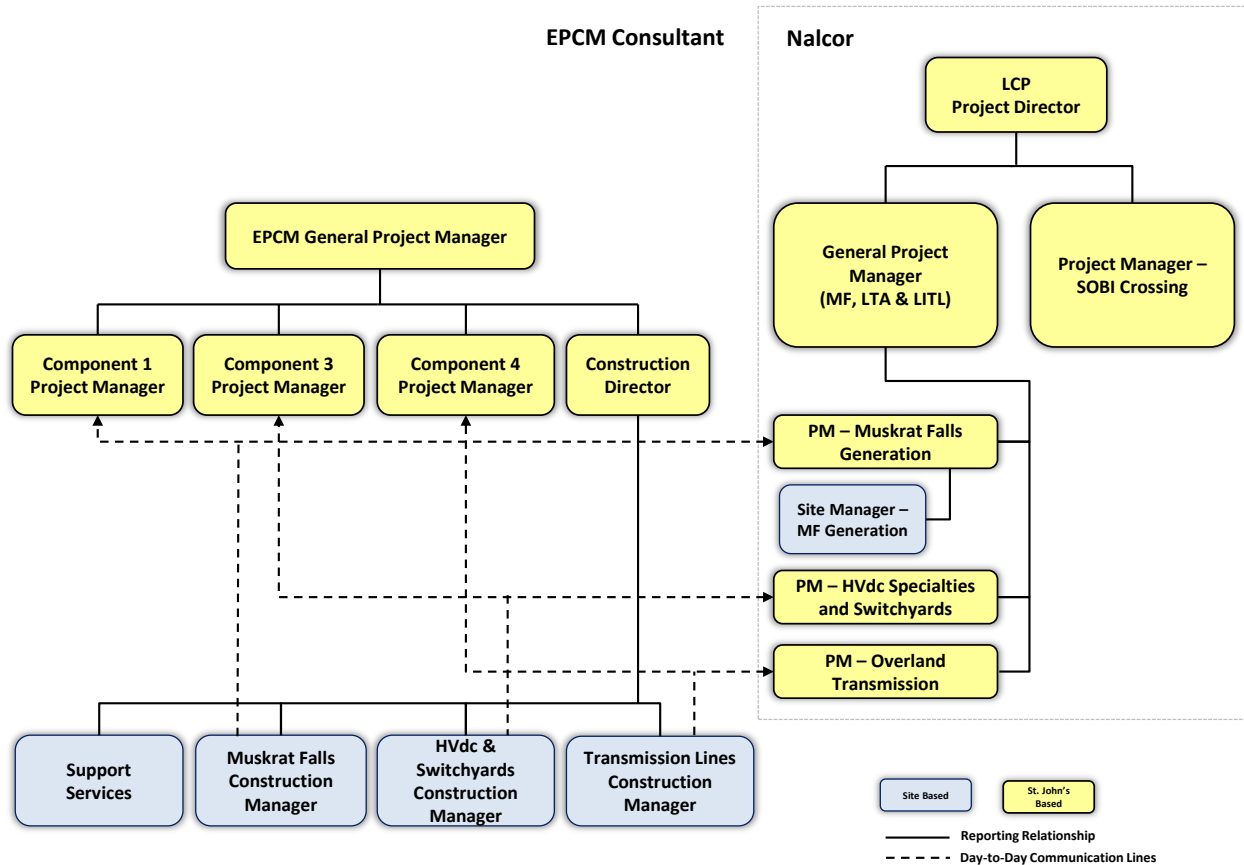
In the context of construction management, the key roles of each of the NE-LCP Project Director, NE-LCP PMT EPCM contractor and the suppliers and contractors, are as follows:

- NE-LCP Project Director has overall delivery accountability for the Project and interfaces with NE Corporate and Steering Committee.
- NE-LCP PMT establishes the Project Master Schedule, policies, processes and procedures for the site teams. Home Office functional groups provide support to the site teams on an as-required basis.
- The NE-LCP PMT manages the EPCM Consultant in accordance with the terms of the contract.
- NE-LCP Project Management Team reviews and accepts the EPCM's Consultants Construction Management and Execution Plans and associated organization.
- The EPCM Consultant manages and coordinates contractors and suppliers on behalf of Nalcor.
- Contractors and suppliers maintain the responsibility and liability for the completion of their work to specified requirements.

An important feature of chosen delivery approach is the concept of **area-based management** in both the EPCM and Nalcor project teams. This approach and associated reporting relationships between the organizations is illustrated in Figure 6 below. Project Managers are responsible for the overall delivery, including scope, cost and schedule of a project component,

extending throughout all phases of the Project, while this responsibility is driven down to Area Managers within the EPCM Consultant’s organization.

Figure 6: Construction Reporting Relationships

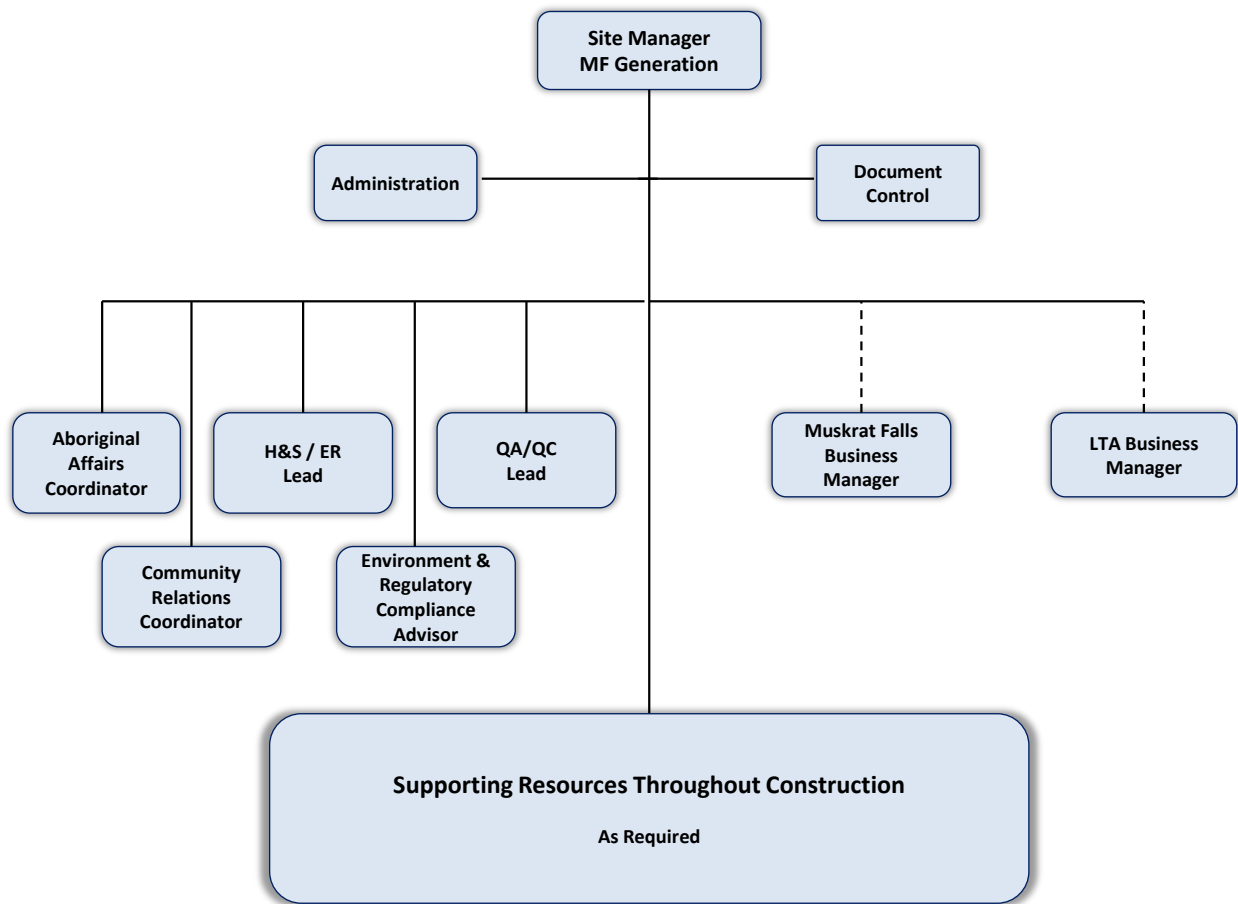


Within the context of the above, a conceptual planning organization for the NE-LCP’s Site Team is shown below in Figure 7. Key considerations include:

- NE-LCP Site Team to facilitate NE-LCP interpretation of NE-LCP policies, make decision making and oversee the activities of the EPCM consultant.
- NE-LCP team is a small, flexible group that can advise NE-LCP Management at Home Office of impending changes or difficulties.
- NE-LCP Project Managers have cradle-to-grave accountability for their scope, hence they must have direct influence and oversight on the construction activities
- NE-LCP liaison will be with his/her opposite / counterparty in SLI and not up the line through his/her organization. This is key to facilitate organizational effectiveness and ensure issues are addressed on a timely basis.
- The EPCM Consultant will be responsible for producing all progress reports and maintaining the overall integrated schedule – big focus on quantity tracking and performance trending.

Field progress reporting to be done on a weekly basis. The purpose is to leave NE-LCP management free of detail so that they can devote their energies to management of the Project. They try to anticipate problems before they occur.

Figure 7: Conceptual NE-LCP Site Organization – Muskrat Falls



The Nalcor Muskrat Falls Site Organization includes the following positions:

Site Manager – Muskrat Falls Generation

- Under the authority of the Project Manager – Muskrat Falls Generation, the **Site Manager – Muskrat Falls Generation** will provide direction, supervision and guidance to the EPCM Consultant as well as liaise with multiple disciplines such as Project Quality, Safety,

Permitting, Environment to ensure the proper organization and controls are in place at Muskrat Falls for project delivery.

- The incumbent will have Nalcor's authority for day-to-day decision making, including financial approval authority, in order to Nalcor's responsibilities at the MF Site. This position will also be responsible to facilitate interpretation of NE-LCP policies in order to resolve issues and facilitate project delivery.
- The incumbent will provide project execution leadership and direction throughout the development and execution phases of the Project. The incumbent will be a key member of the Project Management Team and will interface extensively with the Project Manager – Muskrat Falls Generation, as well as with the team's senior personnel.

SPV Business Managers (MF & LTA)

- The SPV Business Managers are directly responsible to the respective PM(s) who will deliver the work associated with the SPV. They will, however, have a responsibility to the General Project Manager to ensure that proper business ethics and processes are being followed wrt the delivery of the SPV scope.
- The Business Manager coordinates with the Nalcor/EPCM planning, cost and supply chain groups.

Document Control

- Provide "official" receipt and distribution of documents not otherwise handled by EPCM. E.g. Site EPCM to NE-LCP Site. (Timesheets, expenses, invoice approval, site instructions, etc.)

H&S/ER Lead; QA/QC Lead; Environment & Regulatory Compliance Advisor

- Functional expertise to provide oversight of EPCM with respect to Nalcor's requirements.
- Extension of NE-LCP home office organizations.

Aboriginal Affairs Coordinator

- Responsible for on-site administration of the commitments underneath the Innu Nation IBA.
- Addresses all aboriginal training and coordination issues that must occur on-site.

Community Relations Coordinator

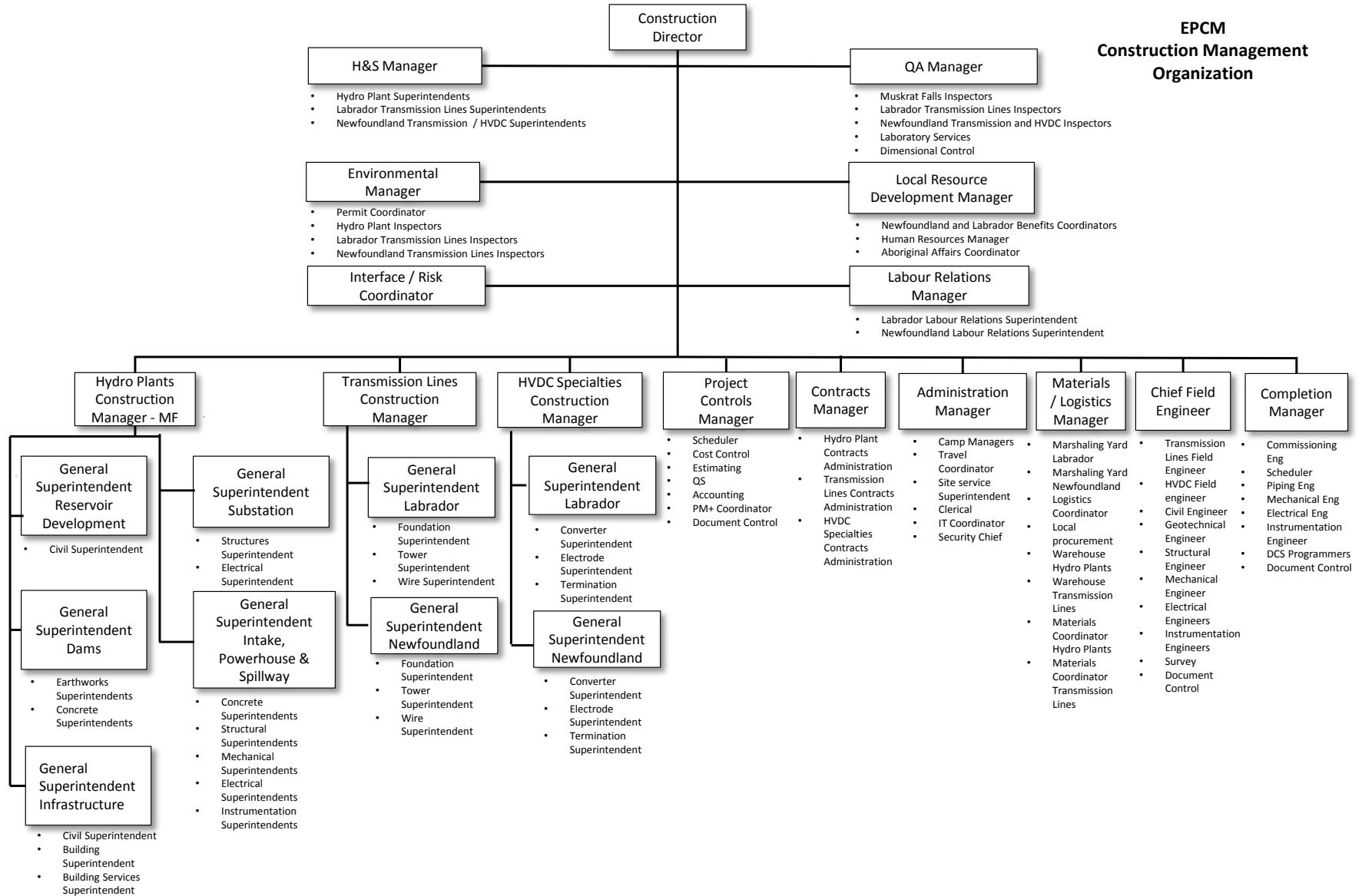
- As part of the broader Nalcor communications team, this position will be located at the HVGB Office, this position will provide support to the Nalcor organization with respect to community relations and stakeholder management.

NE-LCP's expectations for an EPCM CM organization are shown in Figure 8. The required organization recognizes the plans, objectives, strategies and approaches to the work identified

in Section 9.0 and is focussed on verifying that construction contractors meet their contractual obligations, with an emphasis on safety and quality. The EPCM organization is expected to be lean, and optimized in light of Home Office support, as well as the award of the work to well qualified construction contractors who will take responsibility for completion of their respective scopes.

Staffing of the EPCM Site Construction Management Team(s) shall be finalised following evaluation by NE-LCP PMT to ensure there is effective coverage for all Project activities and to ensure optimum staffing levels. Consideration will be given to the extent of Home Office support, criticality of the activity, synergies and industry practice. **Nalcor and the EPCM will give strategic consideration the integration of Nalcor staff into the EPCM site organization.**

Figure 8: EPCM CM Organization



A.0 Activity Flowchart (Excel Format)

A.1 N/A

B.0 Attachments/Appendices

B.1 N/A