



CONSTRUCTION MANGEMENT PLAN

Nalcor Doc. No. LCP-PT-MD-0000-CS-PL-0001-01

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Inter-Departmental / Discipline Approval (where required)

| Department | Department Manager Approval | Date |
|------------------|---------------------------------------|--------------|
| Project Director | <i>P. Harrington</i> P. Harrington | 2 APR. 2014. |
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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;
- Provide an optimum level of protection against controllable risks; and
- Seek out and leverage strategic opportunities.

This *Construction Management Plan* addresses the delivery of the Lower Churchill Project (LCP or the Project), specifically the Muskrat Falls Generation, Labrador Transmission Assets and the Labrador-Island Transmission Link sub-projects by the Lower Churchill Management Corporation (LCMC) on behalf of the LCP Special Project Vehicles (SPVs).

This *Construction Management Plan* does not detail how construction activities for each of these three (3) sub-Projects will be managed, rather it serves overarching philosophy and strategy document providing the overall guidance and clarity on the Lower Churchill Management Corporation (LCMC) and contractor organizations, responsibilities and interrelationships to meet LCMC’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 LCMC 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.

LCMC will provide construction management services at the construction sites. Their four (4) primary responsibilities are:

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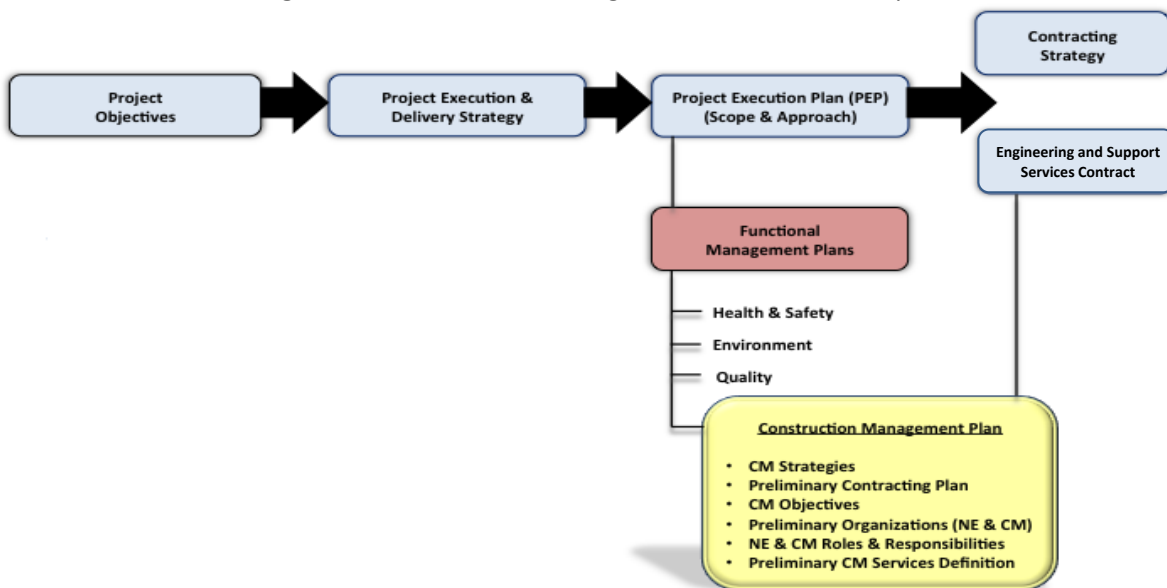
1. Contract administration to ensure that work is carried out according to approved contracts, specifications, drawings and schedules, within authorized budgets and in compliance with safety and environmental standards.
2. Management of interface between contract packages so as to ensure timely completion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

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.

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

Figure 1: Construction Management Plan Relationships



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2.0 Purpose

This *Construction Management Plan* provides the framework and defines the philosophies and enabling strategies of **how** LCMC 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. Specifically its purpose is to:

- Provide direction to ensure a consistent execution strategy and approach to the planning, organizing, directing and controlling of construction activities.
- Communicate underlying construction management strategies that have been adopted by LCMC for management of the LCP.
- 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, Nalcor Energy and its affiliates, contractors, 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.

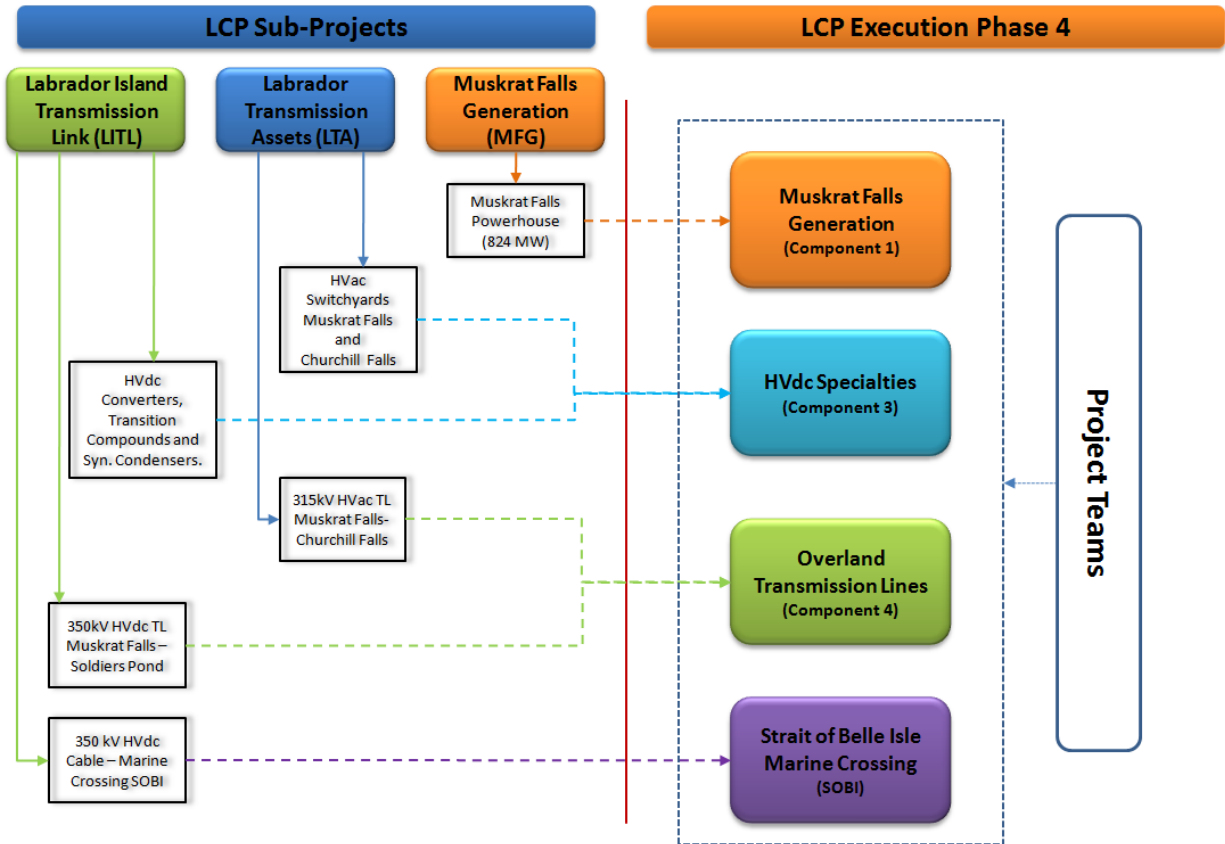
This *Construction Management Plan* should be read in conjunction with documents [LCP-PT-MD-0000-PM-PL-0001-01 Project Execution Plan \(Scope and Approach\)](#), [LCP-PT-MD-0000-PM-ST-0002-01 Overarching Contracting Strategy](#), and all project functional management plans. These documents form part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

Component-specific construction management plans and construction execution plans will be produced by each of the respective four (4) Components illustrated in Figure 2. 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 LCMC and contractor organizations, responsibilities and interrelationships to meet LCMC’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 each of the four (4) components and major construction contractors.

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Figure 2: Sub-projects and Project Teams Matrix



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3.0 Application and Scope

This *Construction Management Plan* is applicable to the Project during Phase 4 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

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 .

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4.0 Roles and Responsibilities

Project Director Approver of the *Construction Management Plan*. Responsible to verify that this *Plan* accurately reflects the selected management approach for the Project and that it is implemented consistently across the Project.

General Project Manager Approver of this *Construction Management Plan*. Responsible for day-to-day leadership and management of LCMC’s construction management activities in accordance to the strategies contained in this *Construction Management Plan*.

Component Project Managers Responsible for delivery of their respective areas of responsibility, including the Muskrat Falls Generation, Switchyards and HVdc Specialities, Overland Transmission, and SOBI Crossing` in accordance to the principals set forth in this *Construction Management Plan*.

Site Manager With a focus on project delivery, the Site Manager will be the senior on-site representative for a particular project site (i.e. Muskrat Falls).

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

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

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5.0 Definitions

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

Engineer, Procure, Construct (sometimes referred to as Turnkey or Design-Build)

- 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.

Lump Sum Contract

A fixed-price form of contract where a contractor agrees to perform all services and work as specified by the contract for a fixed amount. The type of contract may vary from constructing or supplying equipment to a detailed design and specification provided by the owner to a turn-key arrangement such as an EPC Contract where the contractor is also responsible for detailed design and guarantees quality, quantity and yield on a process plant or other installation.

Project

Refers to the Lower Churchill Project, specifically encompassing the following sub-Projects: 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.

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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.

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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-PT-MD-0000-FI-PR-0001-01 | Capital Expenditure Authorization Procedure |
| LCP-SN-CD-0000-PM-LS-0001-01 | LCP Master Package Dictionary |
| LCP-PT-MD-0000-QM-PL-0001-01 | Overarching 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 |
| LCP-PT-MD-0000-SC-PR-0035-01 | Procedure for Post Award Contract Administration |

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 |
| EPP | Environmental Protection Plan |
| ERP | Emergency Response Plan |
| LCMC | Lower Churchill Management Corporation |
| LCP | Lower Churchill Project |
| NE | Nalcor Energy |
| PMT | Project Management Team |
| SPV | Special Purpose Vehicle |
| SOBI | Strait of Belle Isle |

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8.0 Construction Management Objectives and Strategies

Within the context of Nalcor Energy's overall objectives for the LCP and the selected delivery approach, the LCMC's Construction Management function must fulfill four (4) 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 and Churchill Falls activities, the provision and operation of camp and site services.
4. Respond promptly to issues and requests for information from the contractors and minimize exposure for potential claims.

Construction Management Strategies, or the key strategic choices and approaches to be adopted by the LCMC PMT, have determined to guide the construction works in order achieve these four (4) objectives. These strategies are grouped under the following fourteen (14) themes:

1. Decision Making and Communication
2. Constructability During Design
3. Contracting & Procurement
4. Site Administration and Control
5. Health, Safety and Security
6. Environmental and Regulatory Compliance
7. Contractor Oversight and Contract Administration
8. On-Site Quality Control
9. Progress and Performance Management
10. Management of Change
11. Industrial Relations
12. Construction Processes and Tools

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- 13. Post Design Technical Support / Field Engineering
- 14. Risk Management

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, contractors, 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 under these fourteen (14) themes that LCMC has elected to adopt for the management of the construction of the work.

8.1 Decision Making and Communication

- In accordance to the Project Execution Plan, a complete set of Management Plans will be produced based on LCMC’s governance framework. These Management Plans 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 remote site offices (i.e. Muskrat Falls) in order to facilitate the efficient administration of the LCMC’s contractual responsibilities.
- All contract changes will require approval of the LCMC in accordance with the Authorization Matrix defined in [Capital Expenditure Authorization Procedure, LCP-PT-MD-0000-FI-PR-0001-01](#).
- Timely decision making and responding to contractor queries, requests and clarifications is imperative to avoid delay claims from the contractors.
- LCMC site team representatives will be responsible to facilitate interpretation of any relevant LCMC and Nalcor Energy policies.
- Clear lines of communications to be established between LCMC site and home office teams and the contractor.
- LCMC’s site team is a small, flexible group that is keeping abreast of the entire project and can proactively advise LCMC PMT at Home Office of impending changes, concerns and difficulties.
- LCMC’s Component Project Managers have cradle-to-grave accountability for their Project / Area, hence they must have influence and oversight on the overall construction progress.

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- Home Office liaison will be with person’s counterpart in 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.
- LCMC Home Office 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 “sample-only” decisions and authority framework has been developed (reference Table 1.0). 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

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Table 1: Decision and Authority Matrix – “Sample Only for Muskrat Falls Site”

| Decision or Approval | Project Delivery Team Member | | | | | |
|--|------------------------------|--------------|-----------------|--------------------------------|--|------------------------|
| | Project Manager | Area Manager | MF Site Manager | Component Construction Manager | Area Construction Manager - Infrastructure | Contract Administrator |
| Issue of Daily Site Progress Reports | I | I | A | I | P | R |
| Decisions wrt Management of Site & Facilities | I | I | A | R | P | I |
| Approval Construction Mgmt Organization & Personnel | A | R | R | R | P | I |
| Decision wrt Construction Mgmt Procedures | R | R | R | P | R | R |
| Major Decisions on Plans & Strategies to Maintain Control and Coordination of Work | A | R | R | R | P | R |
| Decisions wrt Management Strategy for Mitigating Construction Risks | A | R | R | R | P | I |
| Approval Site Expenditures | I | I | A | I | P | R |
| Approval of Contractor's Work Schedule | R | R | A | R | P | R |
| Approval of Contractor's Progress Reports | R | R | R | R | A | P |
| Approval of Contractor's Daily Time & Material Reports | | | A | | P | I |
| Approval of Contractor Payment Certificates | I | I | R | R | R | P |
| Decisions wrt Day-to-Day Management Direction to Contractors | R | I | A | I | P | I |
| Issue of Notices to Contractors (as defined under Exhibit 3 of the Agreement) | A | R | R | R | R | P |
| Approval of Field Work Instructions | I | I | A | I | P | R |
| Approval of Concession Requests from Contractors | I | R | A | I | P | R |
| Approval of Contract Changes and Amendments | A | R | R | R | R | P |
| Decisions wrt Resolution Strategy for Major Contract Disputes | A | R | R | R | P | R |
| Approval of Visitors to Site, including regulators | I | | A | | R | |
| Decisions wrt Community Relations | R | | P/A | | I | |
| Approval of Communication with External Entities on Project Status/Issues | A | | R | | | |

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8.2 Constructability during Design

- 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, design review boards, 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 the concession process.
- 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.

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- 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.
- Construction Management team to ensure all related functional plans address construction requirements. These include HSE, Quality, Training, Industrial Relations.

8.3 Contracting & Procurement

- Seek strategic input from key construction contractors to seek their views as input to confirm the planned 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. LCMC 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 LCMC 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.

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- 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 awarded using on AFC engineering documents.
- Construction work will, as much as practical, be packaged on an SPV basis. Special cases of course will apply.
- 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.

8.4 Site Administration and Control

- For Muskrat Falls only, LCMC will operate the Site and provide general site services to all contractors, including accommodations, security, fuel services, medical services, local ground transportation.
- Catering contractor will manage the accommodations complex in a hotel-style check-in / check-out fashion.
- Individual contractors will be responsible for all aspects of the transmission line construction workforce and services, including camps and catering.
- Contractors are responsible for provision of construction bulks.
- LCMC will be responsible for the management of the free-issued material from marshaling yards on the Island and at Happy Valley – Goose Bay. The transmission line contractors are responsible for transport from marshaling yards to worksite.
- 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.

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8.5 Health, Safety and Security

- As the entity responsible for construction activities, contractors have the prime responsibility for workplace safety related to their scope of work. They must produce a H&S Management Plan that is scope and site specific and be accountable for construction safety. LCMC will audit contractor’s implementation activities for quality and completeness. Contractors should implement their safety “tool box”; if they do not have an adequate tool, then LCMC will provide them with the tool.
- Desire to focus on preventative measures, while having the ability to respond to incidents should they occur.
- 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. H&S Advisors (or Subject Matter Experts – SMEs) will be available to support line management in the implementation of the LCMC safety program.
- From an H&S legal obligations viewpoint, the LCMC is considered the prime contractor under Newfoundland and Labrador’s Occupational Health and Safety Act. As such, we need to ensure timely response to all notices issued by NL OHS, as well as focusing alignment with this key regulatory stakeholder.
- Actively manage construction safety by selection of contractors with records of safe work performance and effective safety programs.
- Focusing on coaching and guiding contractors to achieve safety excellence.
- A project-wide H&S safety steering committee, modeled after the Nalcor Energy Loss Management Leadership Team forum, with a focus on ensuring senior management strategic engagement on the shaping of the Project’s health and safety program (Plan-Do-Check-Act or ISO Management Review approach).
- Project-wide Behavioral Based Safety programs are effective on all construction sites to enact cultural change.

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- LCMC 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 an appropriate amount of H&S advisors to implement their scope and site-specific H&S Plan. Generally contractors will be expected to have one (1) full-time designated H&S resource for every twenty-five (25) employees on-site.
- LCMC 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).
- A 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 LCMC, while a security services provider will provide security officers.
- Ideally LCMC security services contractor shall provide personnel training for firefighting response at Muskrat Falls.

For other the Muskrat Falls site, contractors responsible for their medical and security coverage as it required to meet legislative requirements.

8.6 Environmental and Regulatory Compliance

- Compliance to permitting requirements, laws and regulations is the responsibility of the contractors.
- All regulatory permits will be acquired by LCMC on behalf of Nalcor Energy, including those for construction and for temporary facilities.
- Contractors must adhere to the requirements of the LCP Environmental Protection Plan, and submit both a Environmental Management Plan and Waste Management Plan for approval prior to the commencement of work.

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- LCMC Area Construction Managers must ensure that this EMP is followed, with on-site environmental advisors providing the enabling support.
- There will be an overall spill management plan to support the management of any environmental incidents related to the discharge of harmful products.

8.7 Contractor Oversight and Contract Administration

- 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 an appropriate level of surveillance contractor’s activities.
- All post-award contract administration activities across all Components and all sites will be done in a consistent and common fashion, adhering to the requirements set forth in [Procedure for Post Award Contract Administration, LCP-PT-MD-0000-SC-PR-0035-01](#).
- Aconex Construction Management Instance will be used as the central database for all contract administration records post award.
- LCMC must manage the interface between contract packages so as to ensure timely completion and avoid claims. A project-wide interface management process and interface schedule will be established to assist.
- Communication lines with contractors to be very clear, with communication directed through LCMC .
- 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 the SPV. 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, LCMC 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.). For key high-value contracts, Executive Steering Committees will be established between LCMC and the contractor using established Key Performance Indicators (KPIs) to evaluate performance.

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- 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).
- LCMC site organizations generally intended will be “lean and efficient”
 - Optimize size of site organizations in consideration of Home Office support, experience of contractors, value achieved and common industry practice.
 - 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 maximum extent possible, technology shall be leveraged to support expedite resolution of issues.
- To the extent possible, field engineering positions shall be staffed by personnel who have been involved in the design. Field engineering shall have a direct line of communication to the Home Office follow-on engineering team.
- Optimize size of site organizations in consideration of Home Office support, experience of contractors, value achieved and common industry practice.
- The Component Management Team will be one-team, with both site-based and home office-based personnel. There will be no duplication of roles, rather the team shall operate as one-team.
- CM site organization to expand with requirements and will take advantage of synergies so as to keep site team size to a minimum level.
- Quality staff are to produce construction quality surveillance reports.

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- Construction Management organization manages all materials management facilities and activities, ensuring free-issued materials will be available to contractor when required.

8.8 On-Site Quality Control

- All Construction activities conducted on the Project shall be documented and conducted in accordance with the [Overarching Quality Management Plan](#), document [LCP-PT-MD-0000-QM-PL-0001-01](#).
- Quality Control is the responsibility of the contractor who must submit a Quality Plan, Inspection and Test Plan for approval by LCMC.
- LCMC will provide oversight of all contractors activities using a risk-based criticality assessment. LCMC 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.
- Contractor’s must maintain at-site a Quality Manager, quality inspectors and testing facilities.
- Line Management is responsible for Quality Assurance.
- In principal, all permanent works completed by contractor or supplier / installer gets the approval of LCMC. Examples include:
 - Examination of critical foundations (dams, powerhouse, and other key structures) and approval by the LCMC of the quality of foundations before any earthwork or concreting can be done.
 - For all critical works, approves all concrete pours before pour is undertake by contractor.
 - Quality checks of concrete at the mixing plant.
 - Request and approves of remedial work.
- Laboratory work will be contracted out to a firm specializing in this type of work and managed by LCMC. These firms report directly to the Site Technical Service group in charge of the separate areas rather than through their head offices.

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- 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.

8.9 Progress and Performance Management

- All contractors are responsible for declaring their progress and substantiating its basis as part of its regular status reports and as part of its Payment Certificates.
- Progress and performance information will be evaluated during contractor evaluations and will be required in contractors bids.
- Immediately post-award a contractor progress and performance measurement methodology to be used on the Project is be presented by the contractor for review and acceptance by LCMC. Such methods shall meet the requirements set forth in the contract coordination procedures.
- All physical work elements constructed will be measured and form part of the contractors progress statement, including subcontractors and suppliers scope of work.
- Progress cutoff dates will be stipulated by LCMC 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.
- Progress to be reported by contractors on a weekly basis unless otherwise stipulated.
- LCMC will monitor contractor’s productivity against plan, using the results to facilitate forecasting and, where necessary, corrective actions.
- Productivity management is considered a strategic issue that must be proactively managed by LCMC.

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- 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.
 - Front-End Loading / Workface Planning – Site Layout, job preparation, competency
 - Concept of Constructability and Productivity drives design and execution approach
 - Union alignment and labour relations
 - Worker Motivation, Morale & Retention
 - Establishing a Safety Culture
 - Effective Supervision – Quantity and Quality
 - Avoid Silos – Manage Interfaces
 - Management of Change / Minimize late change
 - Maximize completion of engineering definition prior to starting construction
 - Communication of information – leverage IT and information management technologies to facilitate flow of information
 - Engineering support on-site to support construction
 - Materials and logistics management – goods and materials ready when required.
 - Cold Weather / Winterization
 - Craft labour skills / competency
 - Fatigue / Management of Overtime / Unplanned Overtime

8.10 Management of Change

- All Project Delivery Team members are responsible early identification and flagging of potential change, working within the team to mitigate potential negative consequences.
- Design / Project Change and Scope Creep must be avoided.
- All change must follow the Project’s all-encompassing Change Management Process, in particular all potential change, whether at site or home office, shall be flagged by a Deviation Alert Notice.
- 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.

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- 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.

8.11 Industrial Relations

- The Project will have multiple collective agreements that address the varying work scopes. LCMC Project Delivery Team members are exempt.
- LCMC and all contractors are members of the employer’s association.
- Contractors are responsible for securing and managing labor under the terms of the labor agreement. Hiring of construction workers will be done by contractors through union halls as per the terms of the collective 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.
- LCMC will place significant focus and resources directed towards productivity enhancement wherever possible, including site living conditions, compensation, turnaround cycle, union alignment, and labor agreement.
- According to the approved LCMC policy, pre-employment medical and drugs screening will be undertaken.
- A liaison committee will be used to facilitate both productive and safety management initiatives with union.
- Weekly status review of all issues, including grievances, under the collective agreements will be a priority focus for the Project Delivery Team. Visibility is paramount.

8.12 Construction Processes and Tools

- Contractors are expected to utilize their own processes and tools to deliver their contractual commitments.

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- 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.
- LCMC 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.
- The Project will leverage technology applications in order to facilitate “optimizing” site team and facilitate effective communication. Use of other productivity enhancing tools (e.g. IPads) for construction planning, inspection and support will be encouraged.
- 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 LCMC’s acceptance of the equipment and infrastructure.

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8.13 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.
- Site Queries from the field will be made to Engineering located at the home office.
- Solutions to problems will be provided to contractors via Site 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.

8.14 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](#).

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- LCMC’s site teams must be continuously aware of project risks, and if appropriate, consider them in the development of execution strategies and work plans. This includes risk related to safety, environment, cost, quality, schedule, and reputation.
- 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.

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9.0 LCMC’s Construction Management Responsibilities

Consistent with the construction management strategies above, the LCMC Project Delivery Team will carry out the following activities during the construction-phase of the Project.

9.1 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 LCMC’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.

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9.2 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 site teams that will monitor and direct the Work performed by contractors;
- (iv) Overall management and coordination of the Site teams, development of Site procedures to administer the Work by the 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 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 LCMC’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 the Employer’s Association.

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9.3 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 LCMC’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 LCMC Personnel.

(ii) Health and Safety Management

- Overall Project-level safety management including Site(s) safety oversight & coordination;

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- 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;
- 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;

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- 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

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- 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 LCMC 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 LCMC approved methods and procedures.

(ix) Contracts Management

- Contract coordination and management in accordance to Contract conditions and LCMC’s processes;
- Oversight of contractors’ procurement activities;
- Warranty and claims management;

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- Conducting periodic audits of contractors’ files;
- Settlement / resolution of disputes / claims in conjunction with LCMC; 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 LCMC’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.

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(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 LCMC’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 Contractors’ 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;

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- 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 LCMC processes and systems; and
- Monitoring of Newfoundland and Labrador Benefits, in conjunction with Benefits Team, and manage all corrective actions.

9.4 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 LCMC, 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](#).

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A.0 Activity Flowchart (Excel Format)

A.1 N/A

B.0 Attachments/Appendices

B.1 N/A