

Lower Churchill Management Corporation



PROJECT CONTROL MANAGEMENT PLAN

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

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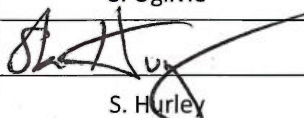

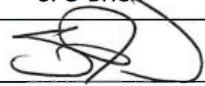
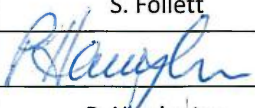
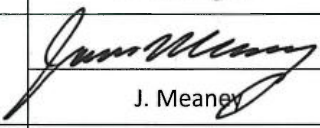
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Note: 1. "LCP" coded documents require all Project Managers' approval.

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1 PURPOSE

The purpose of this plan is to encompass the people, processes and tools used to plan, manage and mitigate cost and schedule issues and any risk events that may impact a project.

Project controls are the data gathering, management and analytical processes used to predict, understand and constructively influence the time and cost outcomes of a project or program; through the communication of information in formats that assist effective management and decision making. This will be achieved through the establishment of principles, methodologies and requirements to be implemented and used to perform the project controls functions during the execution stage of the Lower Churchill Project (LCP) and Sub-Projects.

The Lower Churchill Management Corporation (LCMC) recognizes that a key element for a successful delivery of the LCP Project is to have strong project controls teams supported by appropriate processes, procedures, tools and systems defined and described in an effective Project Controls Management Plan (PCMP).

Based in the recommend practice No. 60-R10 from the Association for the Advancement of Cost Engineering (AACE), the purpose of this LCP PCMP includes guidelines to:

- Define the LCP and Sub-Projects control deliverables, expectations and management of the scope of work.
- Implement an integrate work processes, procedures and applications to plan, monitor, execute and control the scope of work of the LCP and Sub-Projects.
- Implement and integrated suite of applications to support project controls functions during the execution stage of the LCP and Sub-Projects.
- Identify the roles, responsibilities and accountabilities for the project controls team members of the LCP and Sub-Projects

Although the PCMP lays a foundation for LCP scope, cost and schedule control requirements, it is not intended that this document be issued to EPC contractors that may be engaged in the execution of Project. Accordingly, all such contracts will include detailed coordination procedures to translate the requirements of this management plan into specific contractual requirements.

2 SCOPE

This procedure applies to all LCP Sub-Projects that, for execution purposes, have been structured by Components as:

- Muskrat Falls Generation (MFG)
- HVdc Specialties (DCS)

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- Overland Transmission Lines (OTL)
- Strait of Belle Isle (SOBI) Marine Crossing

3 DEFINITIONS

The [Project Dictionary](#), reference document No. [LCP-PT-MD-0000-PM-LS-0001-01](#) is the approved dictionary of definitions for LCP.

Accrual	This represents the estimated value of all goods and services provided to the Project up to a point in time (e.g. month end), but not recorded in the Project’s financial system(s). The value of Incurred Cost less recorded cost represents an accrual for Project purposes. As part of the month end close out process, this value is recorded in both PM+ and JD Edwards.
Actual Cost	Actual value of costs charged to the Project and recorded in the financial records. Also referred to as Booked Cost.
Allowance	Costs added to the base estimate, based on experience, for identified but un-quantified items. EXAMPLE: An allowance may be established in the budget for a Rewards and Recognition program.
Authorization for Expenditure	The mechanism used to facilitate management approval and subsequent control of capital appropriations against approved LCP Budgets.
Analogous Estimate	An estimate based on previous similar projects.
Base Estimate	Reflects most likely cost for known and defined scope associated with Project’s specifications and execution plan.
Baseline	In project control, the reference plans in which cost, schedule, scope and other project performance criteria are formally compared against for assessment of progress and performance, and the comparison benchmark for identifying cost and schedule deviations.
Budget Holder	Person accountable for developing, scheduling, controlling, forecasting and delivering against a particular Project scope.

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Budgeting A process to develop a cost plan by allocating estimated costs or prices for an approved work plan to controllable cost accounts or activities and time phasing the cost in accordance with the approved Project schedule.

Cash Flow The estimate of time phased expenditure in the payment of invoices against the Project

Current Control Budget The Original Control Budget plus the estimated value of any approved scope additions or deletions.

Current Forecast See Forecast Final Cost definition.

Code of Accounts A Code of Accounts is an index to facilitate finding, sorting, compiling, summarizing, or otherwise managing information associated with that code.

Committed Cost The estimated value of an obligation made by the Project for the provision of goods or services; represented by a Financial Commitment.

Corrective Action A term used to describe an action which restores the course of a project in line with the plan. This term is generally associated with a Quality function that strives to keep a project delivering to plan. Corrective Action(s) can have an impact on project resources (Schedule, Budget) as these resources may be required to cause a corrective action to occur. Corrective Action(s) are not considered to be a part of the change management process as they represent the level of effort required to deliver **according** to plan and not the effort needed to change from plan.

Corrective Action is not a Deviation or Project Change as these actions represent intentional departures from (or) change in the project plan.

Cost Breakdown Structure The breakdown of Project cost which integrates the Work Breakdown Structure and Cost Control Account together into a standard numerical presentation.

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- Cost Control Account** The Cost Control Account is a unique code applied against each item of cost for the Project.
- Cost Element** A unit of cost, typically in the form of non-manual labour (engineering and staffing), materials, fabrication, subcontracts, construction equipment or direct construction labour.
- Cost Flow** The projection of how the budgeted costs will be incurred, time phased over the duration of the Project.
- Decision Gate** A Decision Gate is a predefined moment in time where the Gatekeeper has to make a decision whether to move to the next stage, make a temporary hold, recycle, or to terminate the Project.
- Deviation Alert Notice** The Mechanism used to alert that a deviation or change to the Project plan is anticipated. A deviation can be a scope, cost, schedule, or execution plan change from a baseline or source document.
- Earned Value** A method of analysis used in the performance management of a Project. Earned value uses current Project budgets and progress-to-date to demonstrate whether the incurred costs are in line with the budget and/or whether the tasks are ahead or behind the baseline plan. A method for comparing Project productivity and performance against an established plan. It compares the amount of work that was performed with the effort actually expended to determine if cost and schedule progress was achieved as planned.
- Escalation** Provision (or allowance) for changes in price levels driven by economic conditions, including inflation.
- Estimating** A process of evaluating all the costs and durations of the elements of a project or effort as defined by an agreed-upon scope and includes an indicator of accuracy (e.g., order of magnitude estimate, budget estimate or definitive estimate).

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Estimate Contingency Provision made for variations to the basis of an estimate of time or cost that are likely to occur, that cannot be specifically identified at the time the estimate is prepared but, experience shows, will likely occur. Contingency does not cover scope changes outside the Project’s parameters, events such as strikes or natural disasters, escalation or foreign currency impact.

Estimate Contingency Rundown Is the estimated drawdown of the Estimate Contingency into the project costs as the Project progresses and Project definition improves.

Forecast Final Cost The anticipated cost of a project or cost control account when the associated work is complete. It represents the value of the Incurred Costs plus the estimated value of work left to complete, including any approved trends. Also referred to as Estimate at Completion (EAC).

Financial Commitment A legal agreement (agreement, WTO or PO) between LCP and a third party which authorizes LCP to proceed with the award/instruction to the third party to provide goods and/or services for an agreed price or in accordance with an agreed pricing structure. The value of the Financial Commitment is represented by the cumulative value of the original amount and any approved variation orders to the contracts or change orders to the purchase order (which may or may not be a Project scope change).

Financial Commitment Authorization The process of providing approval to proceed with a Financial Commitment. Such approval is secured using a Requisition.

First Power A point in time at which a power generation facility produces first commercial power.

FOREX Foreign exchange

Frontline Method for visually representing progress on a bar chart schedule by filling of the bar to indicate the progress as of a specific reporting period.

Full Power The point in time at which a power generation facility is capable of sustaining full nameplate capacity for ten (10) consecutive days.

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- Gatekeeper** Individual responsible for making the decision at a Decision Gate of the Gateway Process.

- Incurred Cost** The total estimated cumulative value of all goods and services provided to the Project up to a point in time. For physical construction works, also referred to as Work-in-Place. Incurred Cost is the sum of all approved invoices and/or payment certificates, and accruals against each code of account.

- Inflation** General changes in price levels caused by changes in the value of currency and other broader monetary impacts.

- JD Edwards** Nalcor Energy’s corporate financial control and accounting system.

- Management Reserve** Approved capital budget held in reserve and controlled by Gatekeeper, which is used to provide a higher confidence cost level (i.e. comfort factor). The management reserve is not reported at the project reporting level.

- Original Control Budget** The budget that represents the original approved scope of work and work plan following the project gateway process.

- Organizational Breakdown Structure** Hierarchical structure designed to identify the area of an organization that is responsible for each part of a Project.

- Physical Component** A breakdown or boundary of major physical elements or systems identified/associated with the Project. (Also referred to as Area)

- Position Register Database** A data base which records every position that exists or is planned for the Project together with a unique position identification number and information relevant to the organization breakdown structure, cost and contractual details. Also referred to as Manpower Forecast Loading (MFL)

- PRISM** Is a cost control tool used by Project Controls to record, track and report on Project Owner’s costs including salaries and staffing expenses, legal & commercial, environmental & aboriginal affairs and project financing costs. The project uses a number Prism modules including cost management, procurement and invoice management.

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PM+ Project Cost Control tool used by the Project Controls to track all budgets, budget changes, and report commitments, incurred cost, and final forecast cost. Reference LCP-PT-MD-0000-PC-PR-0005-01 Procedure for Cost Control, and LCP-PT-MD-0000-PC-PR-0011-01 Procedure for Incurred Cost.

Project Change A deviation which represents a change or departure from the Project baseline scope, budget, schedule, intended plant quality, HSE targets, project policy, or execution plan that causes an addition or reduction to the Original Control Budget or baseline Project Control Schedule including correction for scope / estimate omissions, or change in execution approach.

Project Change Notice A mechanism used to facilitate the processing of Project Changes.

Project Key Dates A Major Project Milestone as defined in the [Integrated Project Schedule](#), reference document No. [LCP-PT-MD-0000-PC-SH-0001-01](#).

Project Milestone A schedule event with zero duration and no effort (there is no work associated with a milestone) that signifies the completion of a goal, event or a decision point in the Project.

Project Scope A concise and accurate description of the end products or deliverables to be expected from the Project and that meet specified requirements as agreed between the Project Stakeholders. It represents the combination of all Project goals and tasks and the resources and activities required to accomplish them.

Requisition Documents the internal review and approval process; to be secured prior to procuring goods and services. A requisition form initiates the purchasing or contracting process, which will result in the issue of a purchase order or an agreement. Also called purchase requisition.

Risk An uncertain event or condition that, if it occurs, has a positive or negative effect on the Project’s objectives.

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Scope Change A Project Change that results due to the addition of deletion of scope to meet functional requirements or due to regulatory requirements. Scope Change Deviations within the project boundaries cause the need to adjust the control budget through allocation of estimate contingency to support the implementation of the scope change, therefore impacting the Current Control Budget. In the case of Scope Change Deviations outside the project boundaries, Management Reserve must be allocated to support implementation of this scope change.

Tactical Risk Refers to risks associated with the base capital cost estimate as a result of uncertainties with the four (4) components of the estimate: (1) Project definition / scope, (2) construction methodology and schedule, (3) price or (4) performance. It excludes escalation and inflation.

Trend The outcome of a cost, schedule analysis which indicates the potential future state of the Project based on actual and past performance overlaid on approved Project baselines.

Work Breakdown Structure A grouping of work elements that organizes and defines all components of the Project. The WBS is a multi-level framework that organizes and graphically displays elements representing work in logical relationships. It divides the entire Project into its component elements in order to establish a framework for effective management control of the Project scope, schedule and budget.

4 ABBREVIATIONS AND ACRONYMS

The [Project Dictionary](#), reference document No. [NE-LCP-PT-MD-0000-PM-LS-0001-01](#) provides a complete listing. Below are relevant abbreviations to this Management Plan

- AACE Association for the Advancement of Cost Engineering
- AC Actual Cost
- AFE Authorization for Expenditure
- CCA Cost Control Account
- CAPEX Capital Expenditure
- CBS Cost Breakdown Structure
- CCB Current Control Budget
- CCE Current Control Estimate
- COA Code of Accounts

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CS	Control Schedule
CSBD	Control Schedule Baseline Development
DCS	High Voltage DC Specialties - Component
EAC	Estimate at Completion
EPC	Engineer, Procure & Construct
EPCM	Engineering, Procurement and Construction Management
FCN	Forecast Change Notice
FFC	Final Forecast Cost
FOREX	Foreign Exchange
GI	Gull Island
IC	Incurred Cost
IL	Island Link
IPS	Integrated Project Schedule
LCMC	Lower Churchill Management Corporation
LCP	Lower Churchill Project
MFG	Muskrat Falls Generation - Component
ML	Maritime Link
MOC	Management of Change
MSS	Management Summary Schedule
NOC	National Occupation Classification
OBS	Organization Breakdown Structure
OCB	Original Control Budget
OPEX	Operating Expenditure
OTL	Overland Transmission Lines - Component
PBS	Package Breakdown Structure
PCN	Project Change Notice
PCS	Project Control Schedule
PEP	Project Execution Plan
PCMP	Project Controls Management Plan
PMT	Project Management Team
PO	Purchase Order
SDCP	Schedule Development Control Plan
SOBI	Strait of Belle Isle
WBS	Work Breakdown Structure
WTO	Work Task Order

5 REFERENCE DOCUMENTS

LCP-PT-MD-0000-PM-PL-0001-01	Project Execution Plan (Scope and Approach)
LCP-PT-MD-0000-FI-PL-0001-01	Project Finance and Accounting Management Plan
LCP-PT-MD-0000-PC-LS-0001-01	Project Work Breakdown Structure and Code of Accounts
LCP-PT-ED-0000-EN-RP-0001-01	Lower Churchill Project – Basis of Design

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LCP-PT-MD-0000-FI-PR-0001-01	Capital Expenditure Authorization Procedure
LCP-PT-MD-0000-PM-LS-0001-01	Project Dictionary
LCP-PT-MD-0000-PC-SH-0001-01	Integrated Project Schedule
LCP-PT-MD-0000-RI-PL-0001-01	Risk Management Plan
LCP-PT-MD-0000-PM-PR-0001-01	Lower Churchill Project Gateway Process
LCP-PT-MD-0000-PM-PR-0005-01	Project Change Management Procedure
MSD-PJ-005	LCP Progress and Performance Measurement Guideline
34R-05	Basis of Estimate (AACE)
31R-03	Reviewing, Documenting the Estimate (AACE)
60R-10	Developing the Project Control Plan (AACE)

6 PROJECT CONTROLS PHILOSOPHY

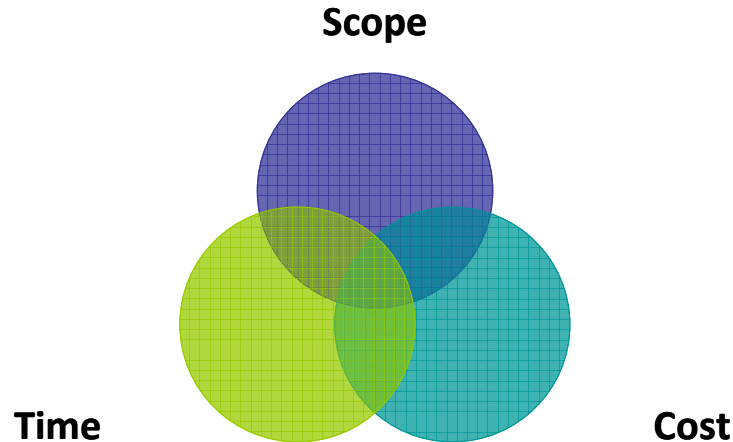
Project Controls is a process for controlling the investment of resources in an asset. The basic function of Project Controls can best be described as control or stewardship of scope, cost and schedule for a Project as indicated in Figure 1.

Stewardship is a structured process for establishing management control and achieving cost and schedule optimization. The overall objectives of the stewardship process are to:

- Reinforce Cost and Schedule Stewards’ accountability and responsibility to identify cost drivers and improvement opportunities;
- Foster continuous communication, alignment and teamwork;
- Meet schedule milestones;
- Control scope creep;
- Reduce cost growth, potentials;
- Identify and capture cost and schedule reduction opportunities;
- Identify and mitigate cost and schedule vulnerabilities;
- Eliminate cost and schedule surprises; and
- Enable fact based decision making relative to scope, cost and schedule trade-offs.

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Figure 1: Stewardship of 3 Core Areas



The Project control philosophy or approach for the LCP Project is rooted in the following guiding principles:

- Scope, cost and time (schedule) are intricately linked and therefore must be holistically managed as one.
- “Project Control” is a line management responsibility and not the responsibility of the Project Controls Team. The Project Controls Team provides the ability to capture, analyse and report data needed to control the Project.
- One of the keys to an effective Project control system is the quality of the information it uses and how that information flows. Good Project information is wasted if it is not communicated quickly, correctly and consistently.
- In order to effectively control the Project, the data must be controlled and should be based on a hierarchical structure; for LCP Project it shall be the Work Breakdown Structure and Cost Code of Accounts.
- Responsibility for control should be with those best able to influence and control the Project. LCP PMT will maintain key Project control competencies; however Contractors, Subcontractors and Suppliers are to manage their part of the Project at a more detailed level.
- LCP PMT is to provide clear responsibilities to, Contractors, Subcontractors and Suppliers for Project control. LCP PMT will also work closely with them, using a coaching and guiding approach and be prepared to get involved at whatever level of detail is required to effectively manage the Project.
- Exercise control at an optimum level – strike the right balance between the levels of detail to which stewardship is being performed and the ability to provide effective Project control as an Owner. When considering to what level and extent control should be applied, a number of factors should be considered. These include Project size and complexity, level of definition,

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level of risk associated with the Project and the number and complexity of internal and external interfaces.

- Focus on front-end planning in order to establish a realistic cost and schedule baseline for the Project’s scope.
- Baselines against which cost and time will be monitored must be established and clearly communicated.
- A Trend analysis (i.e. the perceived sequence of deviations from the baseline) should be used for forecasting cost and time. The basis for forecasting must be verifiable and consistently applied.
- Ensure seamless flow of processes and data between Cost Control and Accounting in order to support the business needs (e.g. accurate and timely accruals).
- Work with the LCP Contractors, Subcontractors and Suppliers to establish and implement consistent standards and expectations.
- Adopt a continuous improvement mindset; leverage lessons learned.
- Recognize that change is inevitable throughout the course of the Project, however proactively forecasting change is a key Project control function.
- Cost and schedule estimates should be structured and sufficiently detailed to facilitate the timely establishment of control baselines.
- Escalation will be managed as a risk fund using a separate cost account in the Control Budget that is managed using Change Management.

7 PROJECT CONTROL OBJECTIVES

The LCMC recognizes that no organization can be strategic without being quantitative. It is through quantitative measures that the LCP Project and Sub-Projects can be tracked, measured, assessed and controlled. The Association for the Advancement of Cost Engineering (AACE) defines Project Control as a process for controlling the investment of resources in an asset when investments are made through the execution of a project.

For the LCP Project and Sub-Project the objectives of the project control process have been defined as:

- Implementing a proper project planning process including the establishments of project cost and schedule baselines.
- Measuring project performance.
- Comparing measurements against the project plans
- Taking corrective, mitigation or improvement action as may be determined through forecasting and further planning activities.
- Assessing, tracking and monitoring project risks to ensure that risks have been identified, status is reported and response plans are being executed.

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- Providing information to support project status reporting, progress measurement and forecasting.
- Providing forecast to update current cost and schedule information.
- Monitoring implementation of approved changes.

7.1 INTEGRATED PROJECT CONTROL PROCESS

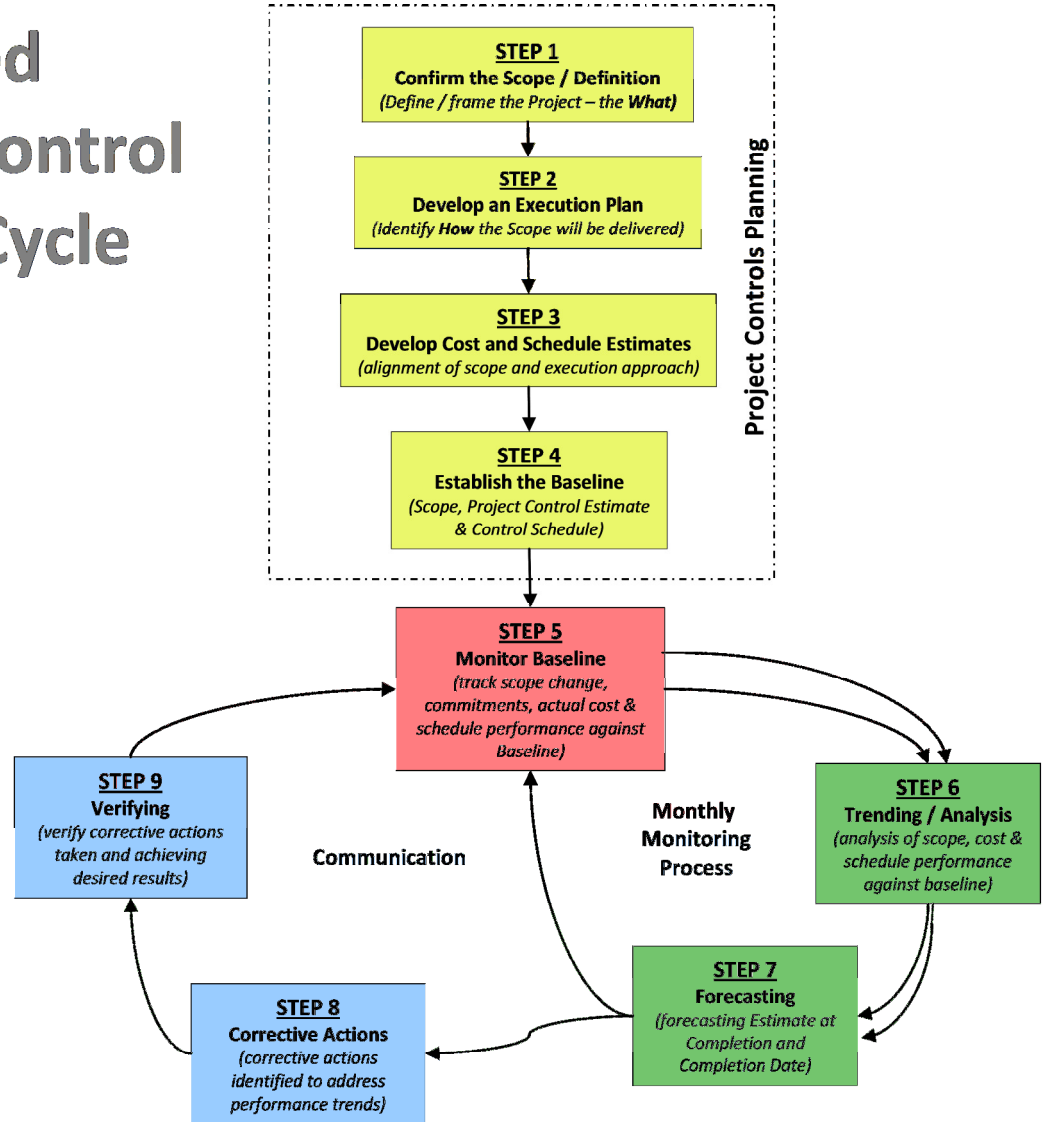
With consideration of the Stewardship Process and the above Guiding Principles, an Integrated Project Control Process Cycle, depicted in Figure 2, has been adopted for the Project. This Project control cycle is a quality driven, continuous improvement model rooted in the following four (4) basic elements:

- **Plan** – establish a plan and budget for a given work scope
- **Do** – carry out the planned work and measure performance
- **Check** – compare the measured performance against the plan
- **Assess/Act** – take corrective, mitigating or improvement action as required

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Figure 2: Integrated Project Control Process Cycle

Integrated Project Control Process Cycle



Through these four (4) basic elements, the Project Controls function facilitates:

- The provision of accurate and relevant information to the LCP PMT so that effective and efficient decision making can occur, thereby allowing the Project to be delivered in accordance to the stated objectives.
- Provide critical cost and schedule performance data so that the Project can be proactively managed to achieve the stated business objectives.

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7.1.1 Stewardship Process: Steps 1 through 9

This Integrated Project Control Process Cycle (see Figure 4) comprises the following nine (9) primary steps, with Steps 1 through 4, the Project Controls Planning phase, required to establish the scope, cost and schedule baseline from which progress will be monitored. As a cycle, Steps 5 to 9 are repeated on a regular basis until the Project is complete. Step 4 may be repeated if it is necessary to adjust the plan or budget (i.e. re-baseline). These nine (9) steps are described below.

Step 1 – Confirm the Scope / Project Definition (the “WHAT”)

The quality of Project information often depends upon the extent of the definition of the scope of work – the “WHAT” has to be done (i.e., the features and functions that characterize a physical equipment or service to be delivered by the Project). If the scope of work is loosely defined, every piece of information derived from it (i.e., cost estimates and schedules) is likely to be suspect. This merely serves as a warning that all subsequent information needs to be verified and, of course, the more that this has to happen, the more inefficient the whole execution process will be.

The [Lower Churchill Project – Basis of Design](#), reference document No. [LCP-PT-ED-0000-EN-RP-0001-01](#) provides the physical scope and definition of the Project, while supporting Key Deliverables from the Gateway Process provide context of the non-physical deliverables required in support of the Project (e.g., release from Environmental Assessment).

Step 2 – Develop an Execution Plan (the “HOW”)

The second key scope component is the “HOW,” of how the “WHAT” will be achieved (i.e., the strategy that will be used by the Project to deliver the WHAT).

In consideration of the Scope / Definition of the Project or the respective deliverables for either Gateway Phase 3 or 4, an execution plan will be prepared to detail how the scope of work will be executed / delivered. Included within this Execution Plan will be the strategy for management, design, procurement, construction and completion of the work, as well as organization roles, responsibilities and interfaces. During this process the WBS, OBS and COA are determined, as contained in the [Project Work Breakdown Structure and Code of Accounts](#), reference document No. [LCP-PT-MD-0000-PC-LS-0001-01](#).

At the start of Project Execution an outline of the full PEP should be in place covering all of the above elements. Detail for each section of the PEP should be developed as a rolling process as each stage of the Project is approached. This provides clarity for all of the stakeholders regarding their scope of work as well as their roles and responsibilities in achieving their Project objectives. It also describes how change will be evaluated, managed and, only where absolutely necessary, incorporated into the Project.

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The [Work Planning Management Plan](#), reference document No. [LCP-PT-MD-0000-PM-PL-0003-01](#) provides guidance of how execution / work plans shall be prepared for the Project.

Step 3 – Develop Cost and Schedule Estimates

Cost estimates and schedules for the respective Project component or Gateway Phase will be developed that ensure alignment of the scope and execution approach defined in the previous two (2) steps. These cost estimates and schedules will be developed considering the input of the appropriate detail scope steward, / Budget Holder, LCP Consultants, Contractors, Subcontractors and Suppliers, as applicable for the relevant Project component and structured (reflecting the WBS, OBS and CCA) and sufficiently detailed to facilitate the timely establishment of control baselines.

Step 4 – Establish the Baseline

The next step of the process is to establish a baseline budget and schedule for each of Gateway Phases 3 and 4 of the Project. Cost and Schedule Stewards will monitor the cost and schedule performance of each component of the Project against the baselines established.

The Original Control Budget (OCB) is the baseline budget and the Project Control Schedule (PCS) the schedule baseline, either of which can only be modified by approved scope changes as described in the [Project Change Management Procedure](#), reference document No. [LCP-PT-MD-0000-PM-PR-0005-01](#).

Step 5 – Monitor Baseline

This step involves development of timely reports providing actual performance data including progress, productivity and expenditure data; all compared to the control baselines. It involves collection of data from a variety of sources, including LCP Consultants, contractors, subcontractors and suppliers cost reports, finance reports, communication with the LCP PMT. Its primary purpose is to detect early deviations from the Baseline.

The Current Control Budget will be developed based on the Original Control Budget and the all scope changes to the OCB under the [Project Change Management Procedure](#), reference document No. [LCP-PT-MD-0000-PM-PR-0005-01](#).

Step 6 – Trending / Analysis

This step entails the analysis of cost and schedule performance to-date based on the information collected in Step 5. This task involves:

- Reconciliation of actual data with the baselines;
- Identification of significant Trends;
- Review identified Deviation Alert Notices;
- Review all pending Project Change Notices; and
- Investigation and understanding of Trends.

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Step 7 – Forecasting

This step is to develop a forecast of remaining work. A forecast predicting the Project’s final cost and schedule shall be developed based on demonstrated performance to-date and assessments incorporated for future work.

Forecasted overruns could often initiate corrective actions, while forecast under-runs should be tested for their validity. This task involves working with the LCP PMT to explore corrective actions, if necessary.

Monthly Reports will be prepared to keep the PMT informed of Project cost and schedule performance (analyses) and forecasts.

Step 8 – Corrective Actions

If an adverse Trend is identified during analysis and forecasting, corrective actions shall be identified and implemented with the goal of bringing performance in line with expectations.

The Project Controls Manager and Project Control Leads shall bring any significant deviations in Trends to the attention of LCP PMT. To the extent possible, the Project Controls Manager and Leads shall identify and explore corrective actions for management’s consideration.

Management shall review those Trends that need immediate correction, develop action plans and assign responsibilities. Once consensus on the corrective action plan is reached, the plan will be implemented.

Step 9 – Verifying

The results of corrective actions implemented shall be checked to verify rectification of the Trend and improvement to the Project’s cost and schedule performance. If a corrective action is put in place, the same performance data will be monitored further to assure that adverse Trends do not reoccur.

The verification step completes the control cycle by tying back to Step 5 of the cycle – “Monitor Baseline”.

Steps 3 through 9 will be discussed within the context of each of the respective areas of cost and schedule management.

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7.1.2 Elements of the Stewardship Process

The process's major work elements include:

- Setting reasonable cost and schedule targets based on competitive benchmarking data and Project and sub-Project optimization opportunities;
- Enforcing management control through weekly status and issues management processes;
- A formal monthly Cost, Schedule and Change Management Stewardship Meeting;
- Senior Project Management interacting directly with Cost and Schedule stewards; and
- Keeping multi-functional teams focused on effective planning and risk mitigation.

The Cost and Schedule Stewardship Process culminates into monthly meetings with Senior Management. These meetings will be chaired by the Projects Controls Manager and Leads. For additional detail refer to section 9.9.3 of this document.

7.2 BREAKDOWN STRUCTURES

There are many ways in which the Project can be categorized - organizational, package or procurement, facility or system or asset based. The Project will use the Work Breakdown Structure or WBS as the primary structure for controlling cost. This allows the full application of cost, time and scope alignment to the Project.

This is the primary structure required to execute the Project efficiently.

7.2.1 Work Breakdown Structure

The Work Breakdown Structure (WBS) is a hierarchical coding structure established for the LCP Project and Sub-Projects that categorizes it into logical components that require normal Project execution activities to be performed by various disciplines such as engineering, procurement and construction. The summary levels of the WBS could, in essence be considered sub-projects and Project execution strategies could be formulated for each sub-project. On any large project activities, such as Project Management, are undertaken that cover multiple components and sub-projects. A general WBS allocation is created for each level of the WBS. It is organized at an appropriate level to formulate basis of design, estimate, track cost and progress and manage change. The WBS is one of the fundamental linkages between cost and schedule information on the Project.

The WBS is also a code which is associated with every cost control account. It facilitates the analysis and reporting of cost and progress information by sorting and grouping parameters within PRISM.

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The WBS is one method used to control the execution of the Project and to provide Project related cost and schedule information. The WBS is used as a roll up structure for:

- Project Control Estimate and Budget
- Project Schedules and updates
- Contract plans, compensation and invoicing
- Progress measurement and reporting

Updates to the WBS may be required after issuance of the approved WBS due to changes in the LCP Project and Sub-Projects work scope, changes in Project organization and/or development of the contract control schedule. All WBS changes will be approved through the change management process.

Details of the WBS for the Project are contained in the [Project Work Breakdown Structure and Code of Accounts](#), reference document No. [LCP-PT-MD-0000-PC-LS-0001-01](#).

The first level of the WBS designates the Project. The LCP Project in its entirety is very large and involves a number of significant Sub-Projects. The Project level of the WBS is defined as follows:

Code	Description
1	NE- Shared Costs/Services
2	NE- Gull Island
3	NE - Muskrat Falls Co.
4	NE - Labrador Island Link Partnership Limited
5	NE - Maritime Link
6	NE - Labrador Transmission Co.
7	NE - Transition to Operations (TTO)
8	TL Construction Bay D'Espoir to Western Avalon
9	NE - Financing and Non LCP Work Scopes

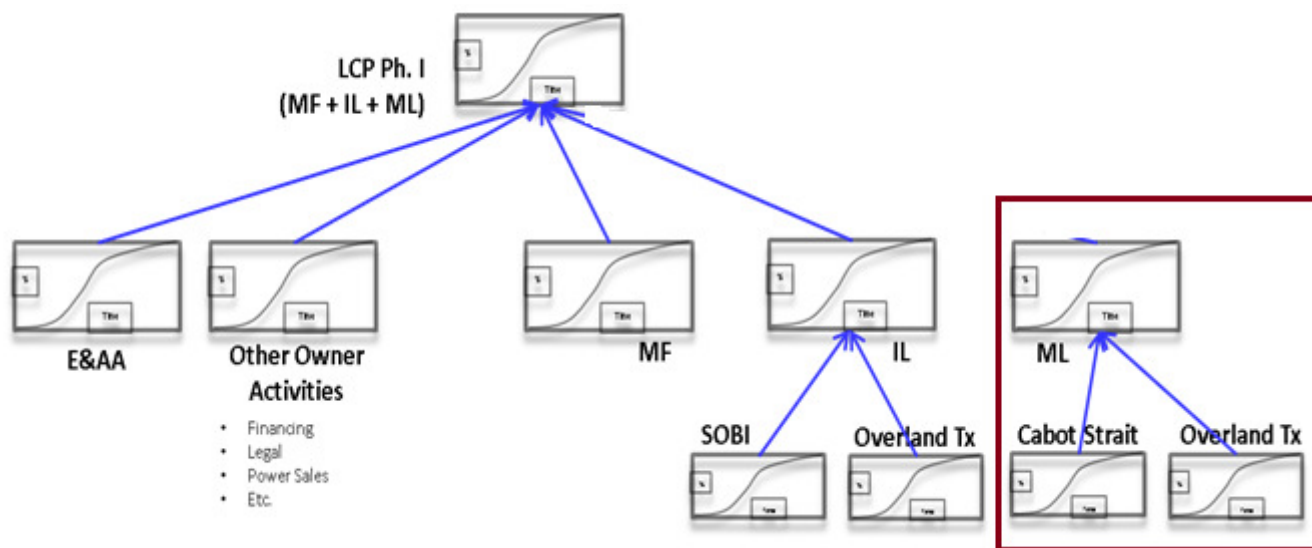
Level 1 –LCP General comprises costs associated with various aspects of each of the remaining sub-projects. Costs associated with 1 – LCP General will be appropriately allocated to sub-projects 2 to 9, in accordance with the Project’s allocation methodology, to arrive at the final cost of each of sub-projects 2 – 9 inclusive.

The first 3 levels of the WBS are outlined in Figure 3 for the sub-projects undertaken in Phase 1 of the Project and include 1 - NE-Shared Costs/Services, 3 - Muskrat Falls Generation, 4 – Labrador Island Link Partnership Ltd., 5 - Maritime Link, Labrador Transmission Company, 8 – Construction Bay D’Espoir to Western Avalon, and 9 – Financing and Non LCP Worksopes.

Figure 5 translates this overall WBS into the Stewardship Process that will be used for Phase I of the Lower Churchill Project. The WBS is outlined in Figure 4. The Maritime Link project follows a separate project controls structure.

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Figure 3: Lower Churchill Project Phase I - Project Control Stewardship Roll-up



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Figure 4: Work Breakdown Structure (WBS)

Code		Description
Level 1	Level 2	
1000		Support Facilities - General
	1100	Access – General
	1200	Other Permanent Facilities
	1300	Construction Power - General
	1400	Construction Telecommunications - General
	1500	Accommodation Complex/Temporary Buildings
	1700	Housing Facilities
	1800	Offsite Logistics, Infrastructure and Support - General
	1900	Project Vehicles
2000		Reservoir, Diversion, Dam and Spillway - General
	2100	Reservoir - General
	2200	Diversion Tunnels - General
	2300	Dams and Cofferdams – General
	2400	Spillway – General
	2800	North Spur – General
3000		Power Facilities
	3100	Powerhouse Channels (Including Plugs and/or Cofferdams)
	3200	Intake & Penstocks - General
	3300	Powerhouse
	3400	Power Generation
4000		Switchyards – General
	4100	Churchill Falls Extension
	4200	Gull Island Switchyard
	4300	Muskrat Falls Switchyard
	4400	Taylor's Brook Switchyard
	4500	Soldiers Pond Switchyard
	4600	Maritime Switchyard
	4700	Bottom Brook Switchyard
	4800	Granite Canal Switchyard
	4900	Bay d'Espoir to Western Avalon Switchyard Extensions
6000		Overland Transmission - General
	6100	HVAc Overland Transmission
	6200	HVdc Overland Transmission
	6300	Electrode Lines
	6400	230 kV Bay d'Espoir to Western Avalon Transmission Line
7000		System Upgrades – General
	7100	Island System Upgrades East
	7200	Island System Upgrades West
	7300	Maritimes System Upgrades
	7400	Quebec System Upgrades
	7500	Labrador System Upgrades
	7600	Synchronous Condenser Facility at Soldiers Pond
8000		HVdc Specialties
	8100	dc Specialties – Marine Crossings
	8200	dc Specialties – Converter Stations
	8500	dc Specialties – Transition Compounds
	8600	dc Specialties - Electrodes
9000		Other Specialties - General
	9100	Other Specialties - Habitat Compensation
	9200	Operations Telecommunications Systems
	9300	Community Impacts

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7.2.2 Organizational Breakdown Structure

The Organizational Breakdown Structure (OBS) is used to identify the organizational groups that will perform various tasks in executing the Project. The OBS is closely linked to the functional group outlined in the Code of Accounts structure. The OBS is also a code that will be applied to each cost code in the code of accounts to facilitate the analysis and reporting of cost and progress information by sorting and grouping parameters within the project controls software.

Updates to the OBS may be required after issue of the approved OBS due to changes in the LCP Project work scope, , changes in Project organization and/or development of the contract control schedule. All OBS changes will be approved through the change management process.

Details of the OBS for the Project are contained in the [Project Work Breakdown Structure and Code of Accounts](#), reference document No. [LCP-PT-MD-0000-PC-LS-0001-01](#). The OBS is outlined in Figure 5.

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Figure 5: Organizational Breakdown Structure (OBS)

Code		Description
Level 1	Level 2	
0		Administration – General
	10	Project Controls
100		Project Management – General
	110	Project Management – External Support
	120	Project Management – NE-LCP PMT General
	130	QHSE - General
	140	Information Management – General
	150	Project Controls – General
	160	Controller and Accounting – General
	170	Supply Chain Management – General
	180	Stake Holder Management - General
200		Engineering – General
	210	Management
	220	Civil Power Generation
	230	Civil Transmission
	240	Mechanical
	250	Electrical
	260	Operations/Energy Analysis
	270	Loss Control
	280	Environmental
	290	Deliverables
300		Environmental Management – General
	310	Management
	320	EIS Generation
	330	EIS Transmission (Island Link)
	340	EIS Transmission (Maritime Link)
	350	Permits, Licenses & Authorizations
	360	Regulatory Compliance
	370	Land Acquisition
400		Impacts & Benefits Agreement – General
	410	Management
	420	Innu Nation & Benefits Agreement
	430	Other Aboriginal Groups
500		Construction – General
	510	Construction Management
	520	Construction Discipline
	590	Facility Operations
600		EPCM Services
	610	Project Management
	620	Engineering
	630	Construction Management
700		Operations – General
	710	Operations Management
	720	Operations Discipline
	730	System Integration
	760	Completions Management
	770	Completions Discipline
800		Power Sales & Market Access – General
	810	Power Sales & Market Access Management
	820	Regulatory – General
900		Project Financing – General
	910	Project Financing - Financial Consulting General
	920	Commercial Agreements
	930	Independent Reviews
	940	Insurance
	950	Debt Financing – Other Direct Costs
	960	Quebec Recovery
	970	Close Out
	980	Project Financing – AFUDC
	990	Contingency

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7.2.3 Cost Breakdown Structure

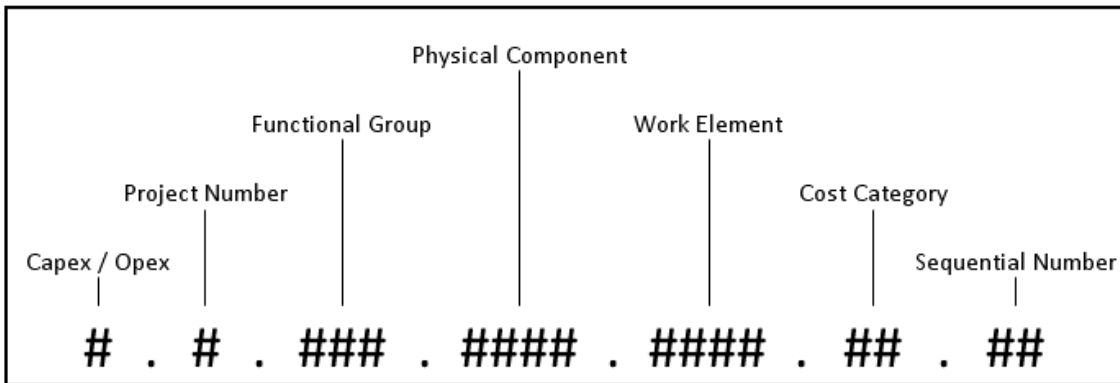
The cost breakdown structure is used to control the execution of the Project and to provide Project related information to various Project stakeholders to suit their needs.

The Cost Control Account (CCA) is a code which is established for each scope of work or cost associated with the execution of the Project and is deemed to require a single account for effective stewardship. The goal of Project Controls is to establish control accounts at an appropriate level to effectively manage the Project.

The control accounts should not be at such a low level that an inordinate amount of effort is required to effectively manage the Management of Change process for each control account. A control account must have a single steward, a clear description of what is included in the account, an established baseline budget and a baseline timeline for execution.

The CCA structure is shown in Figure 6.

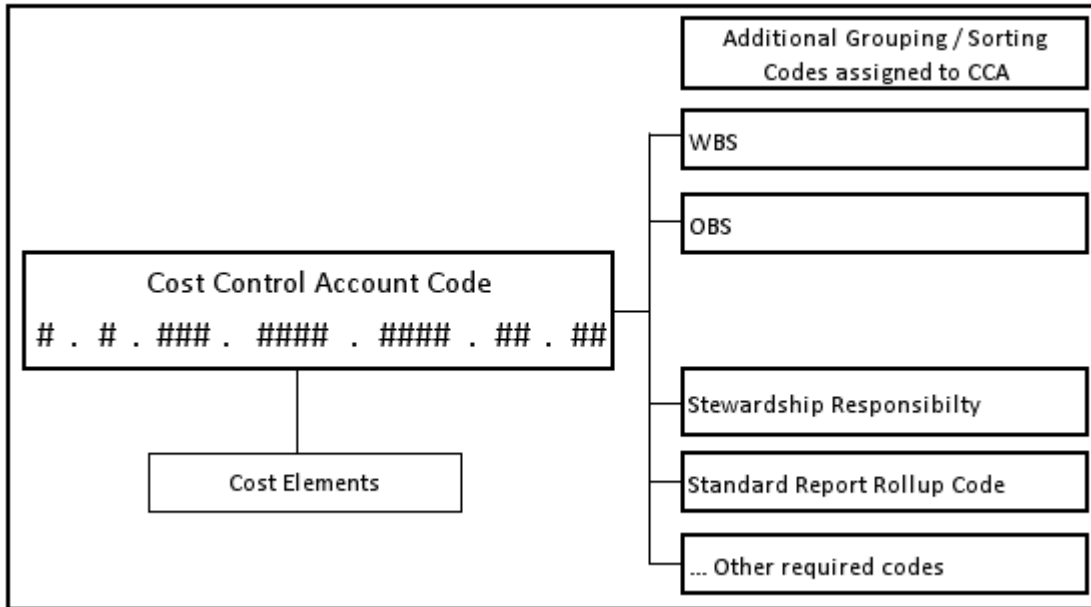
Figure 6: Cost Control Account Structure



Each control account will have additional codes assigned to them within PRISM. These codes will include the WBS, OBS, stewardship responsibility, reporting roll up codes and any others that may be required to effectively manage cost. These additional codes will be used to facilitate the reporting of the Project in a variety of ways to provide as much clarity of the Project’s status to management, as is possible and practical. Additionally, within each control account a cost element code is available to break a control account’s cost into lower level elements of the cost associated with the control account such as labour, materials, or equipment. This breakdown is illustrated in Figure 7.

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Figure 7: CCA, WBS and OBS Relationship



Cost control accounts are created from the lists of codes established for the Project. Details of the Cost control account coding and cost categories for the LCP Project are contained in the [Project Work Breakdown Structure and Code of Accounts](#), reference document No. [LCP-PT-MD-0000-PC-LS-0001-01](#).

Updates to the CCA’s and / or its structure may be required after issue of the approved CCA listing due to changes in LCP Project and Sub-Projects organization and/or development of the contract control schedule.

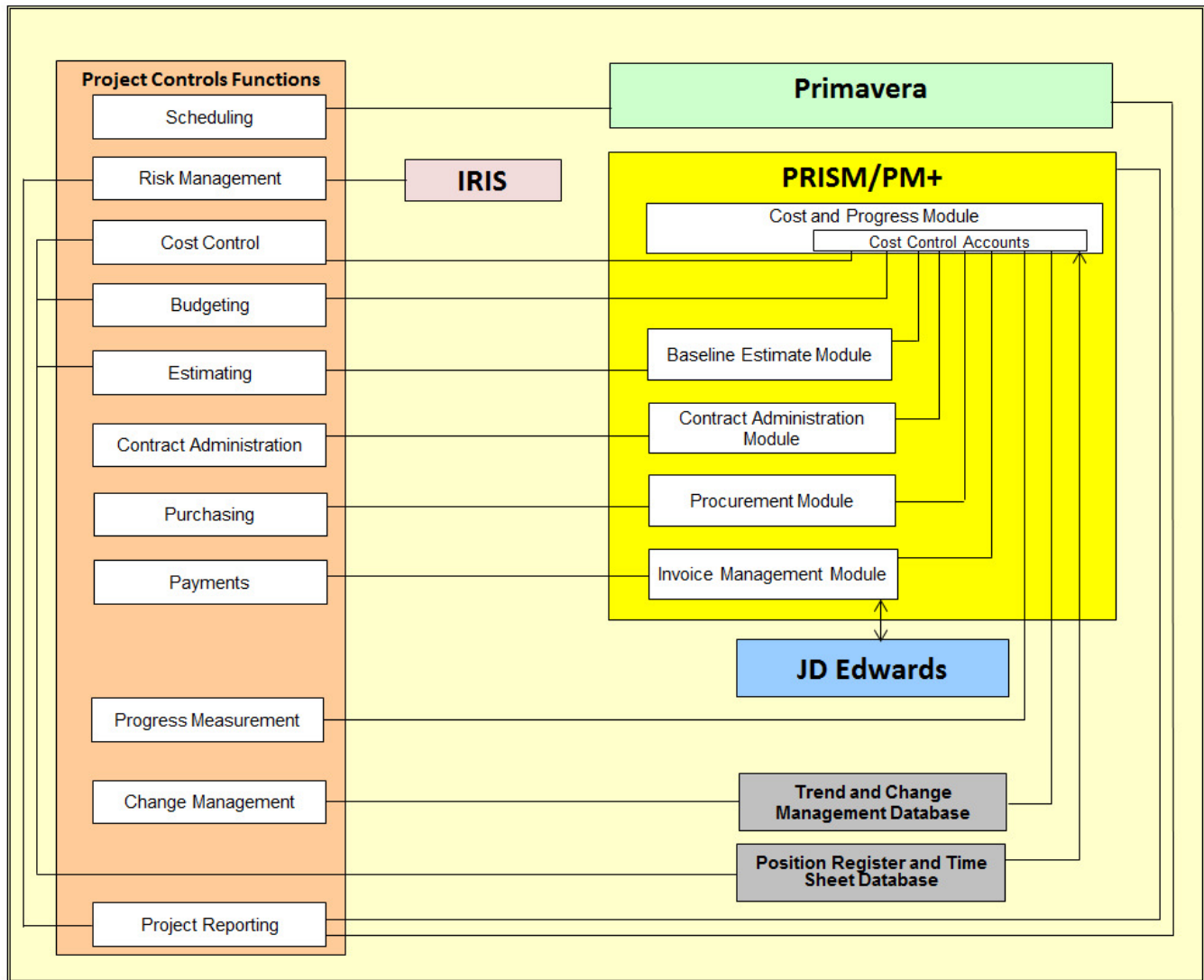
7.3 TOOLS AND SYSTEMS

In order to perform its primary functions, as shown on the left of Figure 8 below, Project Controls utilizes a number of different tools including Oracle’s Primavera, PRISM Project Manager from Ares Corporation, JD Edwards and a number of in-house developed MS-Access databases and reporting tools.

Note: LCP Consultants and Contractors will utilize LCP Tracker database and their own processes and systems and where required, will interface with Project Controls systems. This interface will be either by hard or soft linkage.

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Figure 8: Interface of suite of Project Controls Tools



Primavera is used to manage Project planning and scheduling as well as track work progress.

PRISM Project Manager is a cost control tool used by Project Controls to record, track and report on Project Owner’s costs including salaries and staffing expenses, legal & commercial, environmental & aboriginal affairs and project financing costs. The project uses a number Prism modules including cost management, procurement and invoice management.

PM+ is a project cost control tool used by Project Controls to track and report on all Project budgets, budget changes, and report commitments, incurred cost, and final forecast cost.

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JD Edwards is the Nalcor corporate financial management system. In conjunction with PRISM it tracks Project costs and is the system through which payments are made on behalf of the Project by Nalcor. It is also the system that Nalcor employees enter their time so that time costs can be transferred back to PRISM. At this time the data transfer between JDE and PRISM involves a monthly download of JDE data which is and manually entered into PRISM by Project Controls. Similarly data that needs to be transferred from PRISM to JDE also involves a manual process.

In addition to these three (3) main tools, Project Controls has also developed an in-house database and reporting tools called **LCP Tracker**. This database manages:

- *“Position Register”* which maintains organizational information including position numbers, staff assignments, rates and position history.
- *“Timesheet Management”* in which all contract employees enter their time on a weekly basis. These timesheets are used to calculate actual personnel costs as well as forecast future costs related to contract employees.
- *“Trend and Change Management Database”* which is used to record Project Trends and change requests.

The cost control function is supported with PM+ proprietary application of SNC Lavalin and interface with the LCP Control process is depicted in Figure 24.

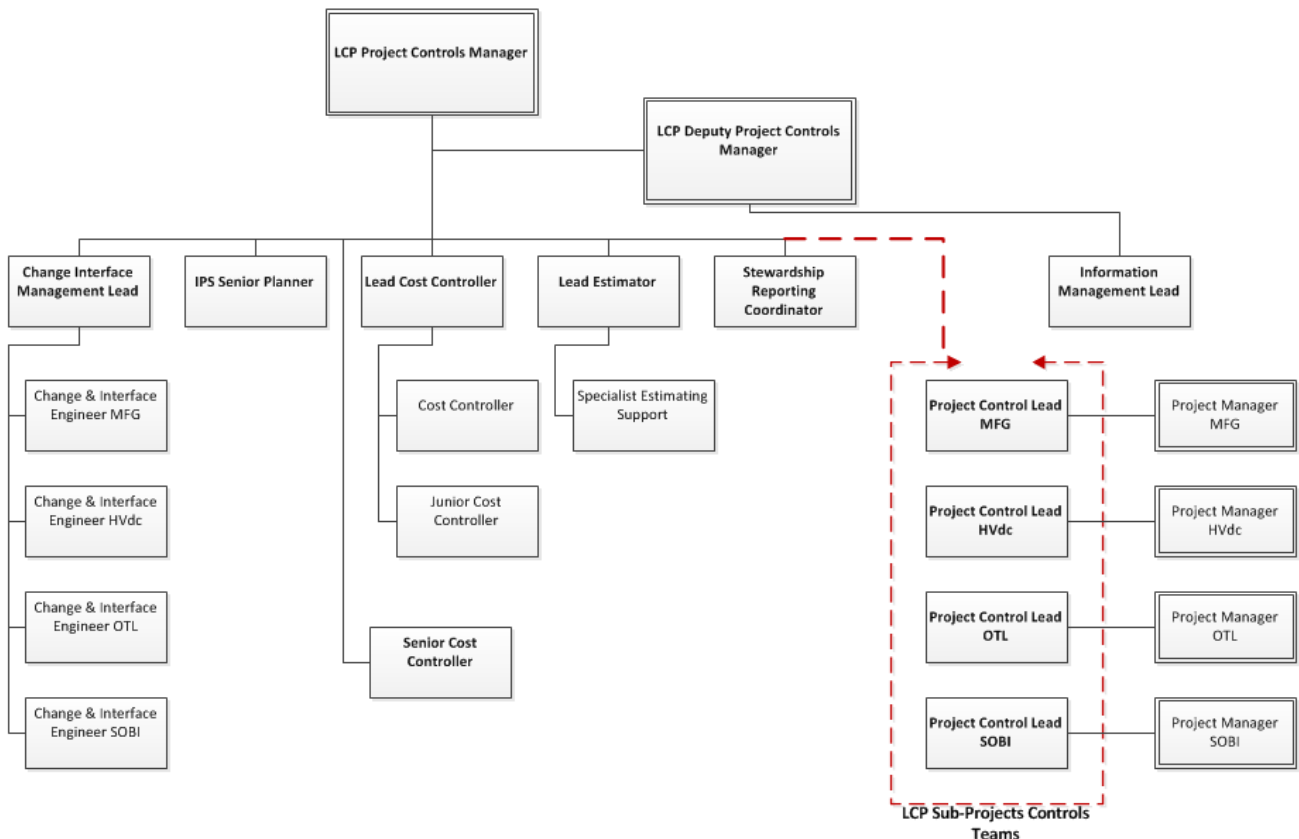
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8 ORGANIZATION, ROLES AND RESPONSIBILITIES

8.1 LCP PROJECT CONTROLS ORGANIZATION

The Project Control Team working within the LCP Project Delivery Team and led by the LCP Project Controls Manager, will assume the lead role in the consolidation of information and the co-ordination of the planning and scheduling, cost estimating, and cost control. The Project Controls Team will provide the LCP PMT with decision-making information by establishing appropriate levels of monitoring systems to ensure that control information is clearly defined and that roles and responsibilities of all participants are understood. Figure 9 provides the organization structure of the LCP Project Controls team.

Figure 9: Project Controls Team Organization Structure – Gateway Phase 4



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8.2 ROLES AND RESPONSIBILITIES

The functional responsibilities of LCP Project and Sub-Projects Control teams are as follows:

General

- Monitoring and supporting adherence to control processes and structure;
- Establishing and maintaining the project cost and schedule baselines;
- Coordinating the project work plan and budget authorizations;
- Reporting performance relative to appropriate baselines including the preparation of monthly reports and special progress reports;
- Supporting the change management process implementation;
- Provide detailed, day to day, (planning, budgeting & cost control) services for all components of the project.
- Developing and maintaining the Project Work Breakdown Structure (WBS) and Code of Accounts (COA);
- Producing and maintaining the PCMP;
- Establishing and maintaining the project management information system;
- Providing clarity on Project Controls requirements to all levels of management
- Defining specific Project Control interface and reporting requirements for LCP contractors, subcontractors and suppliers;
- Defining any special analysis or reporting requirements to conform with contractual terms;
- Implementing control tools necessary to support the LCP Project and Sub-Projects.

Cost

- Preparation of consolidated cost reports
- Maintaining up to date forecasts of remaining work;
- Facilitating the release of work by ensuring that authorizations are in place;
- Reconciling closeout costs and asset costs in preparation for turnover.
- Coordinating the preparation of project estimates.

Planning & Scheduling

- Developing an overall integrated project schedule based on detailed schedules of all elements of the Project;
- Provide schedule overview, including integrity reviews,
- Work across all Project elements to ensure the identification of critical issues which may impact progress; and
- Ensuring that all Project elements work plans recognize interfaces with other elements.

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The general Project Control responsibilities within the LCP PMT are outlined below, while detailed Role Descriptions for the Project Control Team are contained within the Role / Scope Descriptions within the Project’s online information portal.

Project Director – Generation/ General Project Manager Transmission Link Accountable for overall Project delivery against sanctioned cost, schedule and scope.

Component (Sub-Project) Project Manager Reporting to the General Project Manager Transmission Link or Project Director - Generation, are accountable for the delivery of the LCP Sub-Project in accordance to the Project’s Governance and Management Plans. These individuals have Area Managers reported to them for which they have delegated delivery responsibility.

Area Managers Area Managers are LCP PMT members who have direct responsibility, accountability and ownership for budgets and specific components of the Project. Project control responsibilities include:

- Management of costs and schedules associated with the execution of the Project.
- Review and agree to the cost, schedule, progress measurement and management of change plans submitted by contractors and ensure they meet the overall requirements and are properly executed as defined in this plan.
- Progress measurement and achievement of milestones.
- Provide stewardship of their respective Project component responsibilities.
- Input to monthly reports and meet all other reporting requirements as needed.
- Identify cost and schedule drivers and optimization opportunities.
- Examine Deviation Alert Notices and PCNs for comprehensiveness, accuracy and the ‘knock-on’ effect from other elements prior to presentation to the Change Control Board.
- Review and provide input to the analysis of Project performance and cost and schedule forecasts as developed by LCP Consultants, Contractors, Sub-Contractors and Suppliers and the LCP PMT.
- Ensure that cost reduction is actively pursued within their sphere of

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influence.

- Ensure that initiatives originating from their Project component responsibilities are promptly and clearly communicated to other areas that may be impacted.
- Ensure that initiatives originating from other areas of the Project (such as corrective actions to stop unfavorable Trends) will not adversely impact their Project component responsibilities.

LCP Project Controls Manager

- Accountable for the effective execution control of the LCP Project and Sub-Projects, including the provision of Project Control functional support to the LCP PMT.
- Owner of this plan with overall responsibility and authority for establishing, monitoring, communicating and verifying its effectiveness.
- Approval of all changes to the Project Final Forecast Cost.
- With the Project Director Generation and General Project Manager Transmission Link, approves the Project Monthly Status Report.

Component (Sub-Project) Project Controls Leads

- Lead the provision of Project Controls expertise and services to support management of the LCP Component (Sub-Project).
- Responsible for the preparation of estimates, budgets, schedules and plans necessary for the effective control of the LCP Sub-Project.
- Responsible to implement the PCMP.
- Coordinate communication of the procedures outlined in this plan to LCP Sub-Project personnel and arrange training, as required.
- Responsible for ensuring Project Management is fully appraised of up-to-date cost and schedule status.
- Chair Monthly Project Cost and Cost Stewardship meetings at the Sub-Project level.
- Involved in preparation of the overall cost and progress control system.
- Coordinate preparation of the Monthly Status Report – Sub-Project level.
- Coordinate the collecting, consolidating, analyzing and reporting of Project cost and schedule control information provided by the Project Managers to ensure overall Project status is assessed and potential problem areas are identified. Prepares overall cost forecasts and cost analyses.
- Active participation in the Project Change Management process including updating of the Approved Budget and the Control Schedule and periodically publishing a Change Management Log.
- Ensure cost and progress control processes are established and implemented by contractors and that analysis of performance is reported to enable all LCP Sub-Project Team members to take effective control of

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costs and progress.

- Coordinate the gathering, compiling, analyzing and reporting all areas of the LCP Sub-Project progress.
- Agree to contractor's progress measurement system. Ensure that all known activities are included in the basis for progress measurement.
- Monitor LCP Consultants, Contractors, Subcontractors and Suppliers progress control and reporting systems for accuracy of information and compliance with the contract requirements
- Provide progress information to the LCP Sub-Project Manager on a monthly basis.

Lead Estimator

- Develop overall cost estimate preparation plan for the Project.
- Lead the preparation of the Class 3 Project Sanction Estimate.
- Work with the LCP Project Delivery Team to develop overall Project cost estimates consistent with the Project’s definition / scope.
- Develop all Project cost estimates.
- Participate in all estimate assurance reviews.
- Work with Cost Engineers to translate approved Gate 3 cost estimate into Original Control Budget.
- Review of all bids against Gate 3 cost estimate.

Lead Cost Controller

- Coordinate the development and implementation of the cost management processes and systems to effectively and efficiently manage the LCP budget.
- Ensure accurate recording of incurred values and forecast information.
- Translate the Gate 3 cost estimate into the Original Control Budget.
- Collect, consolidate, analyze and report Project cost and potential problem areas identified.
- Conduct extension performance trending analysis from which DANs – PCNs will be prepared.
- Prepare overall cost forecasts and cost analyses.
- Recommend all changes to the Project’s Final Forecast Cost.
- Develop cash forecasts as determined by Controller’s requirements.
- Prepare the Project Monthly Cost Report.
- Work with the Change Management Lead to administer the Change Management process including updating of the Current Control Budget and final forecast cost.
- Mentoring / coaching Cost Controllers – Cost Engineers.

IPS Senior Planner

- Developing and maintaining the LCP Integrated Project Schedule (IPS) and Master Summary Schedule (MSS).

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- Establish, maintain and report performance relative to LCP Project schedule baseline and Project progress monitoring baseline.
- Oversee scheduling and progressing efforts of the LCP Consultants and EPC Contractors to support LCP Project Delivery Team management of the Project.
- Provision of overall progress reporting for the Project.
- Provide interpretation of the contractor schedules and progress information as well as forecasts for remaining work.
- Provide schedule and progress visibility.
- Oversee the provision of planning support the Area Managers.
- Mentoring / coaching LCP Sub-Projects’ Planners.

Change Management Lead

- Fully responsible to ensure all activities related to the Project’s Change Management process are carried out. Responsibilities include operation of the Deviation Alert Notification system (DANs), Change Log Project change notification system (PCNs), follow up and change closeout logs. This position reports to the Project Controls Manager.

General Manager, Finance LCP

- Responsible for all financial activities for the Project including accounting, reporting, project performance controls and financial systems.
- Appoints the Project Controller and works with him/her to establish the overall accounting and financial controllership function within the Project.

Project Controller

- Responsible for the controllership function of the Project and acts as financial advisor to the General Manager Finance – LCP on all matters relating to the Project.
- Responsible to establish and lead the management of the Controllers function for the Project, including the addressing of all accounting, finance, tax, treasury and audit requirements for the Project.
- Ensure that consistent and sound procedures exist for timely and quality financial reporting which contributes to effective policy and decision making.
- Interface with LCP Stakeholders to facilitate the provision of effective accounting, forecasting, controls, reporting and the accounts payable functions for the Project.
- Track foreign currency gains and losses and provide to Project Controls.
- Monthly accrual calculations using incurred cost provided by Project Controls.
- Preparing project AFE’s for approval and monitoring performance against the AFE’s.

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- Each LCP Project Delivery Team Member**
- Control costs and schedules within their Project component responsibilities.
 - Identify possible cost reduction opportunities and schedule savings.
 - Identify Trends and potential Trends that will aid in the control and forecasting of scope, cost and schedule changes.

9 FUNCTIONAL APPLICATIONS OF PROJECT CONTROLS

The Lower Churchill Management Corporation (LCMC) recognizes that a key element contributing to a successful delivery of the Lower Churchill Project (LCP) and Sub-Projects is a strong Project Controls Team as part of LCP Delivery Team.

This section of the LCP Project Controls Management Plan describes the functional applications of the project controls process incorporating the best lessons learned within the LCP Project Delivery Team and industry standards, some of the sources include the Project Management Institute (PMI), Construction Industry Institute (CII) and the Association for the Advancement of Cost Engineering (AACE).

The LCP Project Controls is comprised of functional applications and processes in order to ensure that approved scope of work is delivered at its expected cost, schedule and quality. The functional applications described in this section are indicated in Figure 10.

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Figure 10: LCP Functional Applications of Project Controls



9.1 PLANNING AND SCHEDULING

A plan and schedule are tools that facilitate measuring, analyzing and controlling the sequence and progression of work to accomplish an intended functionality with the most efficient use of resources. Development and maintenance of Project schedules for the LCP will be the accountability of the Project Controls Manager with all Project Team members having responsibility for content and adherence. This section of the Project Controls Management Plan describes planning objectives and strategies for the PMT and lays out plans for their achievement.

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Planning and scheduling objectives for the Project can be summarized as follows:

- Divide the Project into manageable sub-projects with their own execution plans that efficiently represent the work and minimize interface conflicts. Figure 18 indicates the breakdown of the Project into sub-projects or assets.
- Identify Project Target Milestones and Key Dates which will be significant Project functionality.
- Establish a baseline for gauging delivery of Project Target Milestones and Key Dates that is consistent across the Project.
- Establish an analysis and reporting mechanism of actual performance against the baseline that serves to align the PMT and is forward looking enough to permit timely intervention to avoid or correct undesirable events.

9.1.1 General Strategies

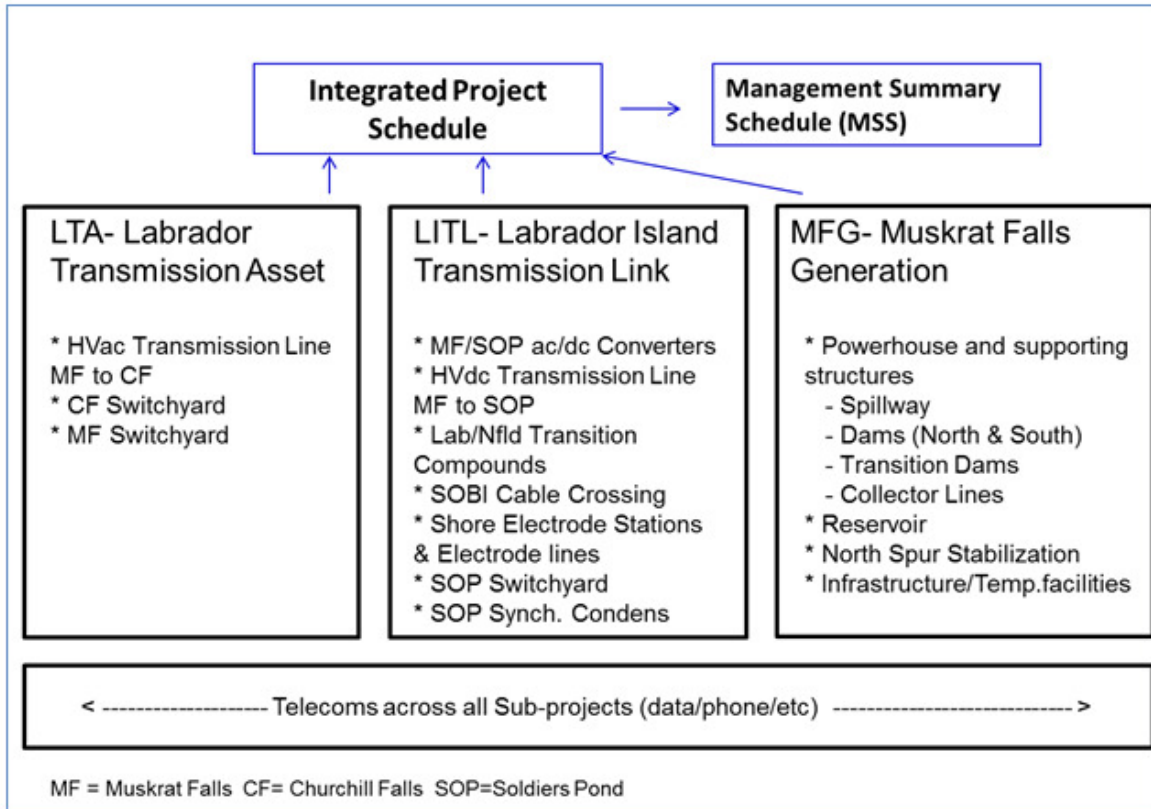
The central strategy for achieving the planning and scheduling objectives noted above is for the LCP PMT to develop project schedules that support the achievement of key planning dates established for the Project and endorsed by Executive Management. The [Integrated Project Schedule \(IPS\)](#), reference document No. [LCP-PT-MD-0000-PC-SH-0001-01](#) define and establish these key planning dates for the Project upon which the Project Execution Plan and detailed work programs endeavor to facilitate.

The LCP PMT will use a high level plan for reporting and alignment needs and a more detailed schedule for control purposes. The [Management Summary Schedule \(MSS\)](#) will be used for management alignment and reporting, while the [Integrated Project Schedule \(IPS\)](#), also provides more detailed schedule, for control purposes and detail reporting.

With reference to Figure 11, Component Planners-Schedulers will develop detailed schedules which will integrate the various contractors and suppliers detailed schedules, with the lowest level of detail being developed and held by the contractors and suppliers.

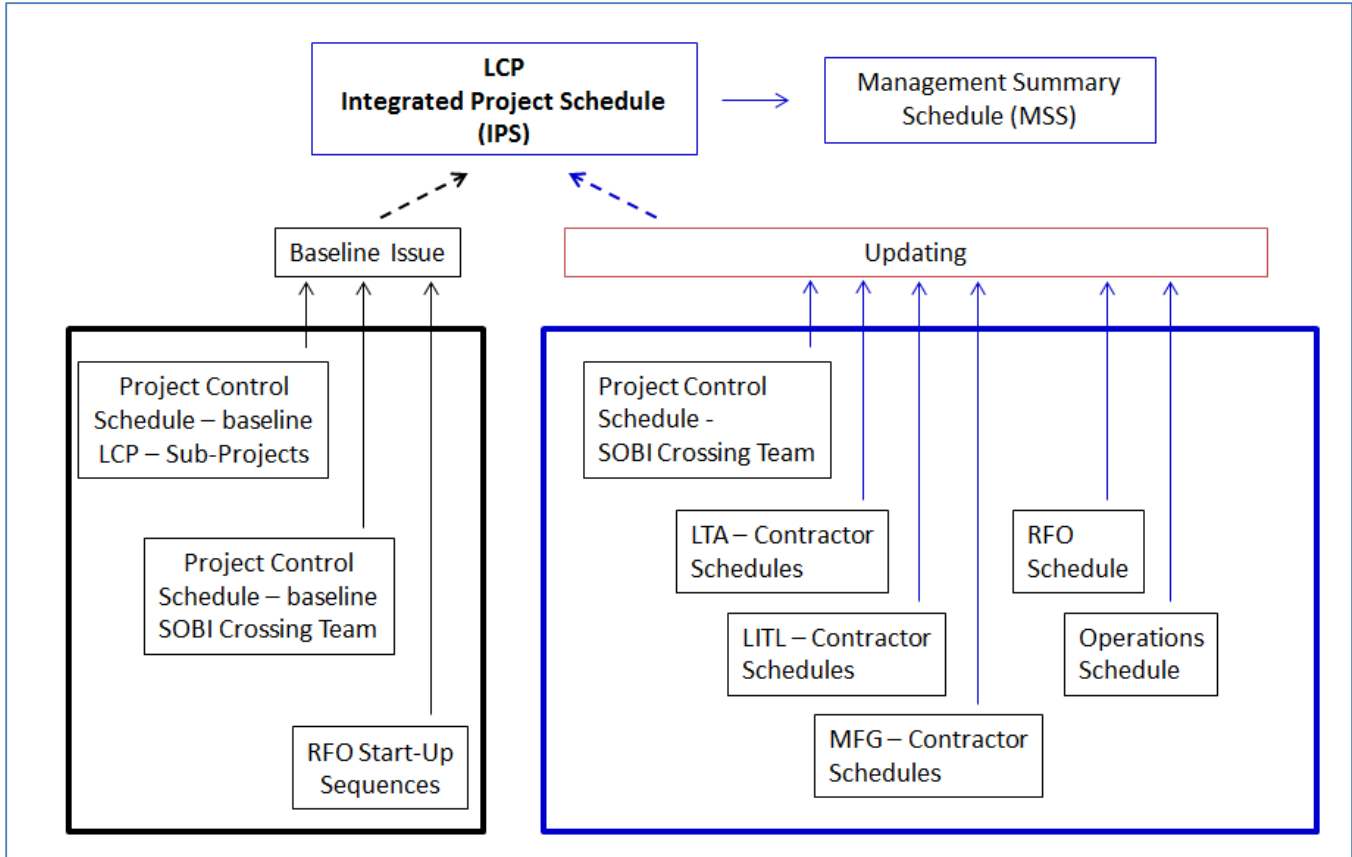
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Figure 11: LCP Schedule – Project Division for Planning



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Figure 12: LCP Schedule Breakdown and Roll-up – Schedule Hierarchy



9.1.2 Baseline Development

The Integrated Project Schedule (IPS) is a Critical Path Method network derived from the various project participant schedules sources tied together with the Ready for Operation start-up sequences.

The IPS initial baseline information was sourced from the following:

- Target Milestones
- LCP-Project Control Schedule: no longer in use
- SOBI Marine Crossing Schedule
- RFO Start-up Sequences (series of block diagrams indicating sequence)

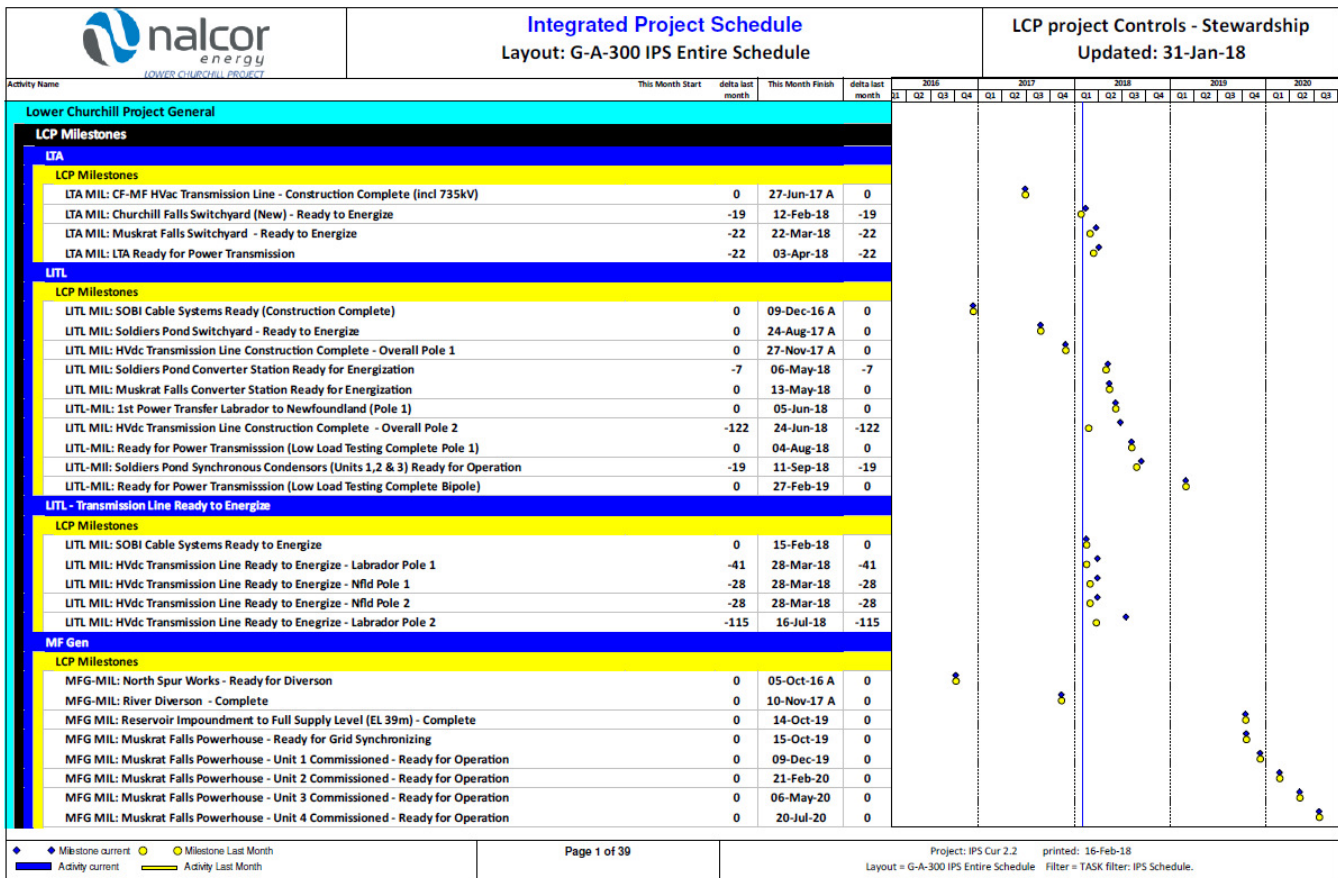
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9.1.3 Target Milestones

The Target Milestones defines all Project Milestones that have been agreed at Decision Gate 3. The Target Milestones will form the execution planning basis and are included in the IPS. Along with other planning documents, these Target Milestones will be updated monthly in order to forecast timelines based upon project activity. This may include a re-baseline of the project, should it be necessary.

Figure 13 illustrates the Target Milestones format.

Figure 13: LCP Project Target Milestones



9.1.4 Management Summary Schedule

The Management Summary Schedule (MSS) will include major Milestones and key dates. This schedule will contain the major Project components section which depicts:

- Entire scope of the Project

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- Project Milestones
- Project Key Dates (dates to be monitored that are not Project Milestones)
- Summarized durations for key activities
- Critical path(s)

The MSS will provide:

- Overall Project status visibility
- Schedule summary for monthly reports and meetings
- Schedule summary for internal/external presentations

The MSS will not provide:

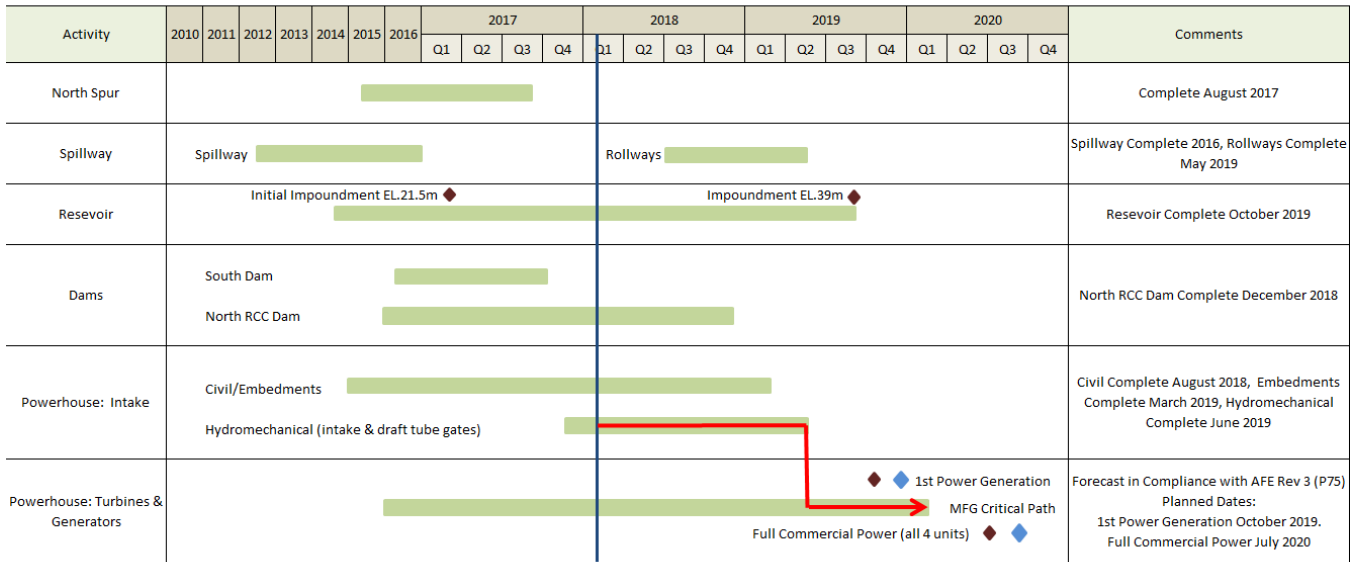
- Forecasts (only frontline status on the baseline based on information from the progress measurement system)
- Resource curves/progress curves (these curves will be provided from the progress measurement system).

A sample Management Summary Schedule is shown below as Figure 14.

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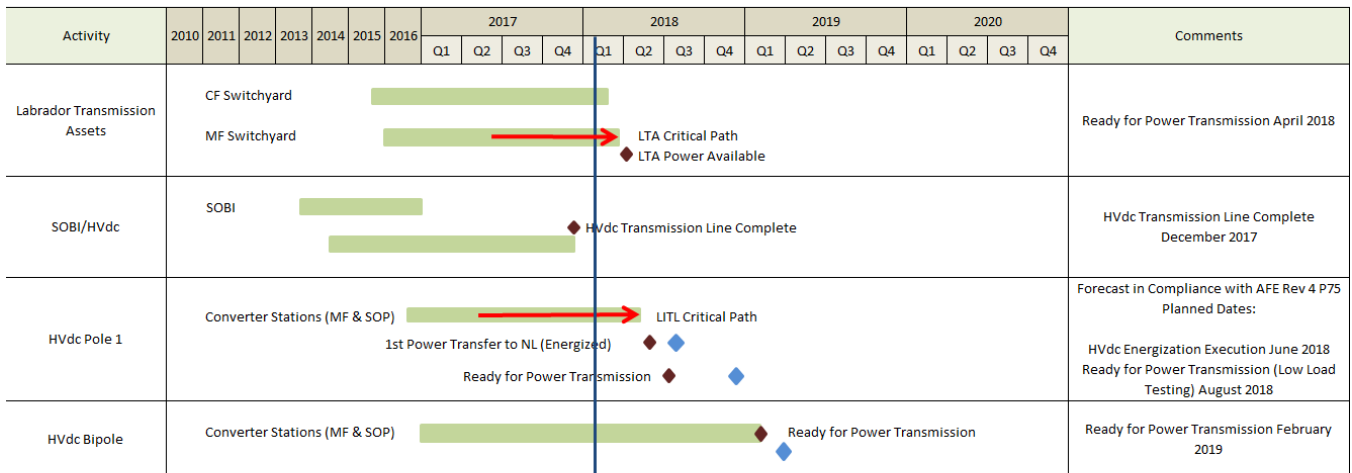
Figure 14: Management Summary Schedule

**Power Development Summary Schedule
Current Forecast (January 2018)**



Legend: ◆ Current Forecast (January 2018) ◆ Planned Dates (June 2017 AFE Rev 5)

**Power Supply Summary Schedule
Current Forecast (January 2018)**



Legend: ◆ Current Forecast (January 2018) ◆ Planned Dates (June 2017 AFE Rev 4)

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9.1.5 Integrated Project Schedule (IPS)

The Integrated Project Schedule will include Target Milestones, Key Dates and activities. The schedule will contain the following for each major Sub-Project:

- Activities representing the sub-Projects entire scope of work for construction and commissioning
- Key Dates (dates to be monitored which are not milestones)
- Critical & sub-critical paths
- Logic, both internal and between Sub-Projects
- Start-up sequence

The LCP-IPS will:

- Roll up to mirror the LCP-MSS
- Be the PMT main schedule tool
- Be structured to reflect major Project interactions
- Provide float analysis for internal and between Sub-Projects
- Be a basis for running scenarios
- Be a forecasting tool for dates and progress

The IPS will not provide:

- Contractor engineering activities
- Manufacturing/supplier activities
- Resource curves / progress curves (provided by reporting system)
- Progress on activity bars (current versus last month comparison will be utilized)
- % complete on activity bars (current versus last month comparison will be utilized)

This schedule will primarily represent elements which appear at the physical component number position in the Work Breakdown Structure. A sample site in the Integrated Project Schedule is shown below as Figure 15.

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Early after award:

SDCP - Schedule Development and Control Plan (includes progress measurement method)

CS - Control Schedule (also known as baseline schedule)

CSBD - Control Schedule Baseline Document

9.2 ESTIMATING AND THE COST BASELINE

This section of the LCP Project Control Management Plan (PCMP) sets forth the approach that will be used to develop control level cost estimates for the Sub-Projects, various components and Gateway Phases of the Project (e.g. Island Link, Muskrat Falls). These estimates will be used to establish the control baseline. Securing estimate approval is the responsibility of LCP General Project Manager.

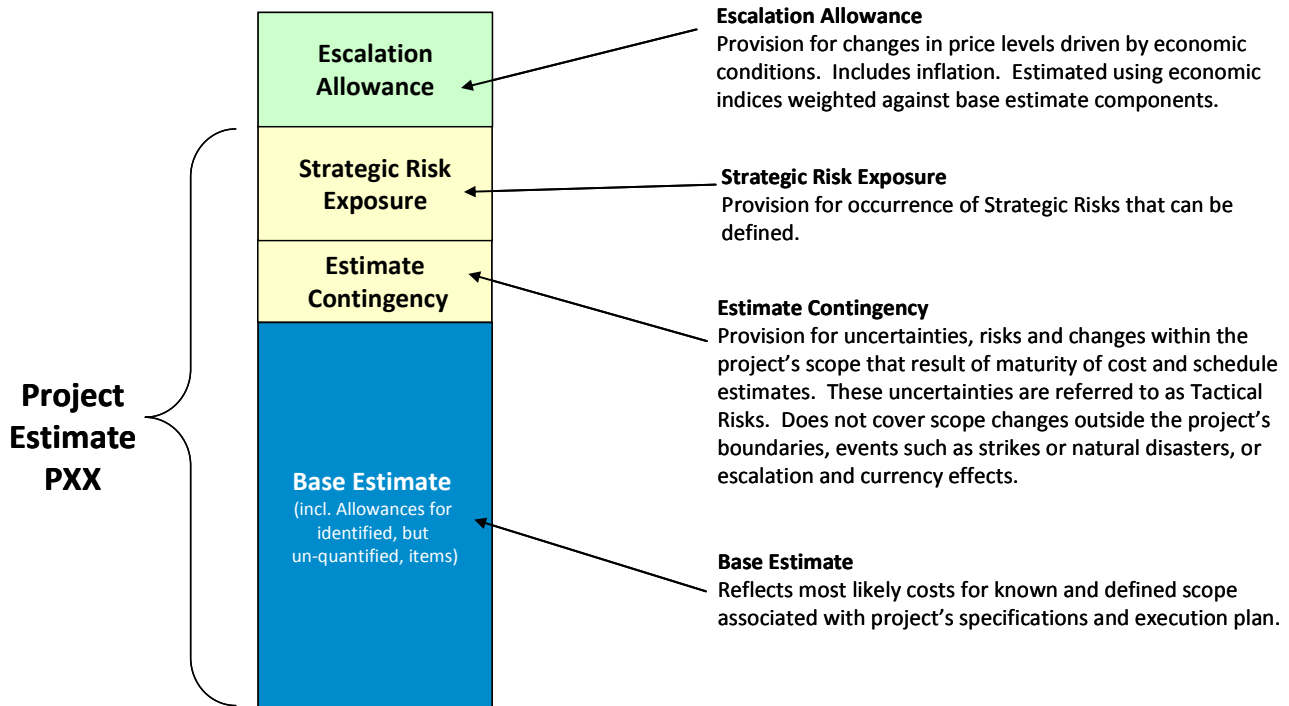
Estimates shall be handled as a secure document as described in the [Information Management Plan](#), reference document No. [LCP-MD-PT-0000-IM-PL-0001-01](#).

9.2.1 Estimate Components

Figure 16 presents the nomenclature used by the LCP PMT when describing the components of all cost estimates and defining the responsibilities for the production of cost estimates. The Project Estimate is shown on a probabilistic (Pxx) basis determined as a factor of investment risk tolerance and class of estimate ([Risk Management Plan](#), reference document No. [LCP-PT-MD-0000-RI-PL-0001-01](#)).

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Figure 16: Project Cost Estimate Components



9.2.2 Estimate Class, Accuracy and Contingency Setting

A cost estimate is a forecast of costs for a given set of conditions, which include scope of work, schedule and execution plans. The accuracy of an estimate is subject to the details known at the time and provided as input to the estimate. Different classes or types of estimates are required to evaluate capital and other work programs, at various stages of the Project. Estimates are classified in terms of quality, or known accuracy, which improves as the Project or work program proceeds as illustrated in Figure 17.

Table 1, illustrates a typical probabilistic scheme for estimating and setting the budget baseline. For the LCP a probabilistic estimating basis will be used in line with the Association for the Advancement of Cost Engineering Recommended Practice 42R-08 using P10 for low side and P90 for high side basis. Estimate Contingency provision will be adjusted based on engineering maturity and consistent with principles found in AACE document entitled: Risk .03, John K. Hollmann, 2007. Probabilistic estimating may be carried out under the Owner's supervision with assistance from Consultants, Contractors, Subcontractors and Suppliers using commercial tools such as "At Risk" software and databases such as Aspen Kbase and Richardson and Means.

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Figure 17: Cost Estimate Maturity Model

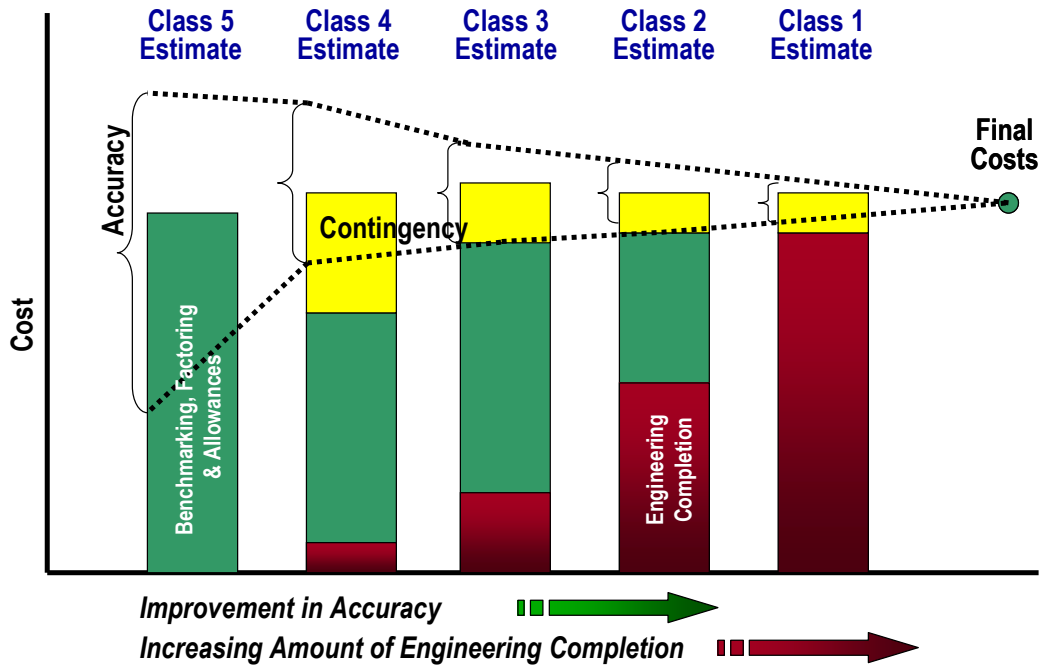


Table 1: Estimate Class and Accuracy

Estimate Class	Engineering Complete	Typical Estimate Contingency	Typical Estimate Accuracy	Purpose of Estimate	Required For Decision Gate
5	Minimal	*	± 50%	<ul style="list-style-type: none"> Evaluation Screening 	1
4	1 – 10 %	15 – 25 %	- 15% + 30%	<ul style="list-style-type: none"> Concept Selection Business Case Determination 	2
3	10 – 25 %	10 – 15 %	- 10% + 15%	<ul style="list-style-type: none"> AFE Sanction Decision Control Estimate 	3
2	30 – 80 %	5 – 10 %	- 5% + 10%	<ul style="list-style-type: none"> Re-forecast of Class 3 	**
1	80 – 100 %	5 – 10 %	- 3% + 7%	<ul style="list-style-type: none"> Final Control Estimate Re-forecast of Class 2 	**

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Note: * Class 5 estimates are typically prepared based on benchmark data and factors that include contingency.

** Class 2 and Class 1 estimates are not required to proceed through Decision Gates of Gateway Model. These classes of estimates are prepared during the execution stage of a project.

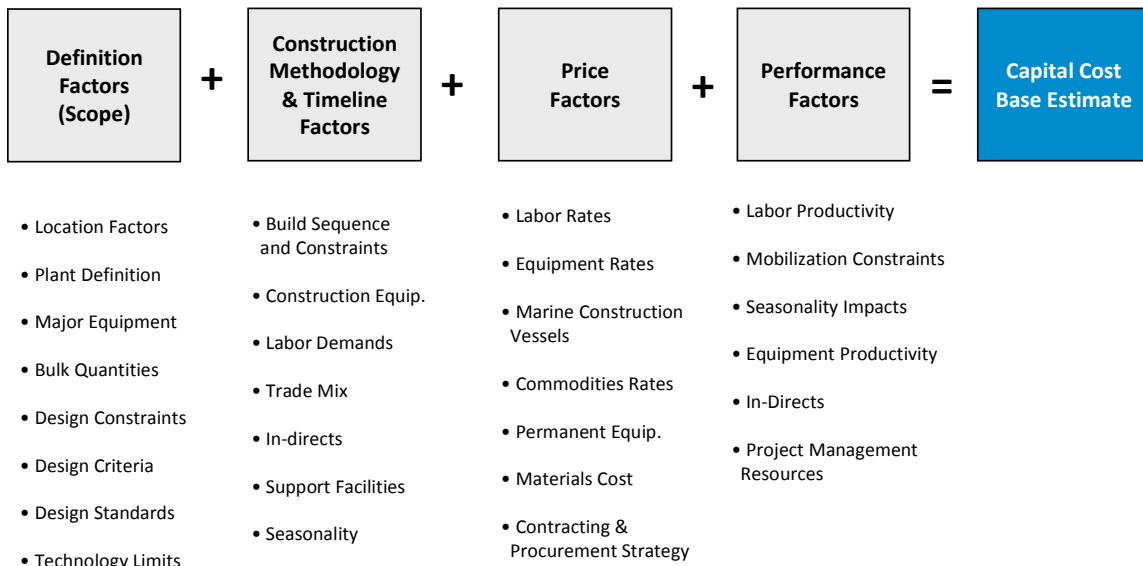
9.2.3 Estimating Methodology

Cost estimates for all Gateway Phases of the Project will be prepared consistent with the Work Breakdown Structure and translated into the respective CCA’s to facilitate development of an accurate Original Control Budget.

The Class 3 estimate required for the Project at a Decision Gate was prepared from a bottom up estimate using the four (4) elements detailed in Figure 18.

In the case of the Island Link (excluding SOBI) and Muskrat Falls, the LCP Project Delivery Team (PDT) was responsible for conducting the required engineering, construction planning and procurement market intelligence in order to produce a Base Estimate that meets the criteria of a Class 3 estimate. Probabilistic variances of the base estimate elements detailed in Figure 17, together with any specific Project elements that are determined as having a high cost risk and high potential for occurrence will be run as outlined in Section 9.2.2 above. P10 and P90 estimate accuracies will be used for reporting and controlling purposes together with probabilistic estimate contingency allowances.

Figure 18: Base Estimate Elements



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9.2.4 Estimate Structure

The Class 3 estimate was developed in a structured manner to allow analysis of quantities and costs for all Project components. Guiding principles and practices for the structure of the estimate include:

- Cost estimates will be prepared consistent with the Work Breakdown Structure and translated into the respective CCA to facilitate establishment of an accurate Original Control Budget.
- The estimate will show direct costs and indirect costs separately, with both costs developed in detail. The estimate will be broken out into standard cost elements consisting of labor, equipment usage, materials, process equipment, Subcontracts, freight, expenses and funding.
- The estimate will have a hierarchical structure, with cost details developed at the lowest levels of the WBS, with the ability to roll up or summarize the estimate at higher levels.
- The estimate coding will allow summarization by any coding structure, (e.g. Project, physical component, functional group, work element)
- The estimate will be integrated with the Project schedule (e.g. by physical component or major package of work) to allow cost flows to be developed.
- The estimate will follow the Project coding structure to eliminate external mapping of codes between LCP Stakeholders' coding structure and the LCP Project coding structure.

The Class 3 estimate was developed in sufficient detail to allow the following deliverables to be produced and monitored:

- Estimate summary report with detailed Basis of Estimate including allowance (probabilistic) consistent with [Association for the Advancement of Cost Engineering Recommended Practice No. 34R-05 Basis of Estimate](#).
- Estimate summary by Project, sub-project and physical component in constant dollars
- Expenditure summary by currency
- Commitment profile
- Cost and cash flow of estimate by currency
- Cost and cash flow of estimate by commodity
- Labor histograms by NOC code
- Probabilistic estimate contingency and estimate contingency rundown curve
- Escalation allowance
- Other pertinent information

9.2.5 Foreign Currencies within the Cost Estimate

Many elements of the estimate were quoted in foreign currencies (e.g. USD, Euro, NOK) which was translated to a Canadian dollar equivalent value using a (fixed) set of exchange rates provided by Nalcor Investment Evaluation, with Nalcor Treasury, for the purposes of calculating the Project cost estimate. During the development of the base estimate all price quotes in foreign currency were

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captured in PRISM in the base currency in order to facilitate foreign currencies requirements and as well as foreign currency exposure to the Project.

9.2.6 Benchmarking

Resource stewardship would mandate relative benchmarking against industry. Hydroelectric projects are well documented in industry databases. Major cost elements (such as concrete in place, transmission line, subsea cable installation, generators) will be referenced against industry norms to validate estimating and categorization of funds.

9.2.7 Escalation Estimating

As indicated in Figure 10, escalation allowance is a key element of the overall Project cost estimate. Escalation represents changes in price levels driven by economic conditions. It includes economic conditions that prevail in a micro-economy or micro-industry (e.g., Newfoundland, hydro) such as:

- Industry productivity and technology
- Industry and regional market conditions (such as demand, labor shortages, margins)

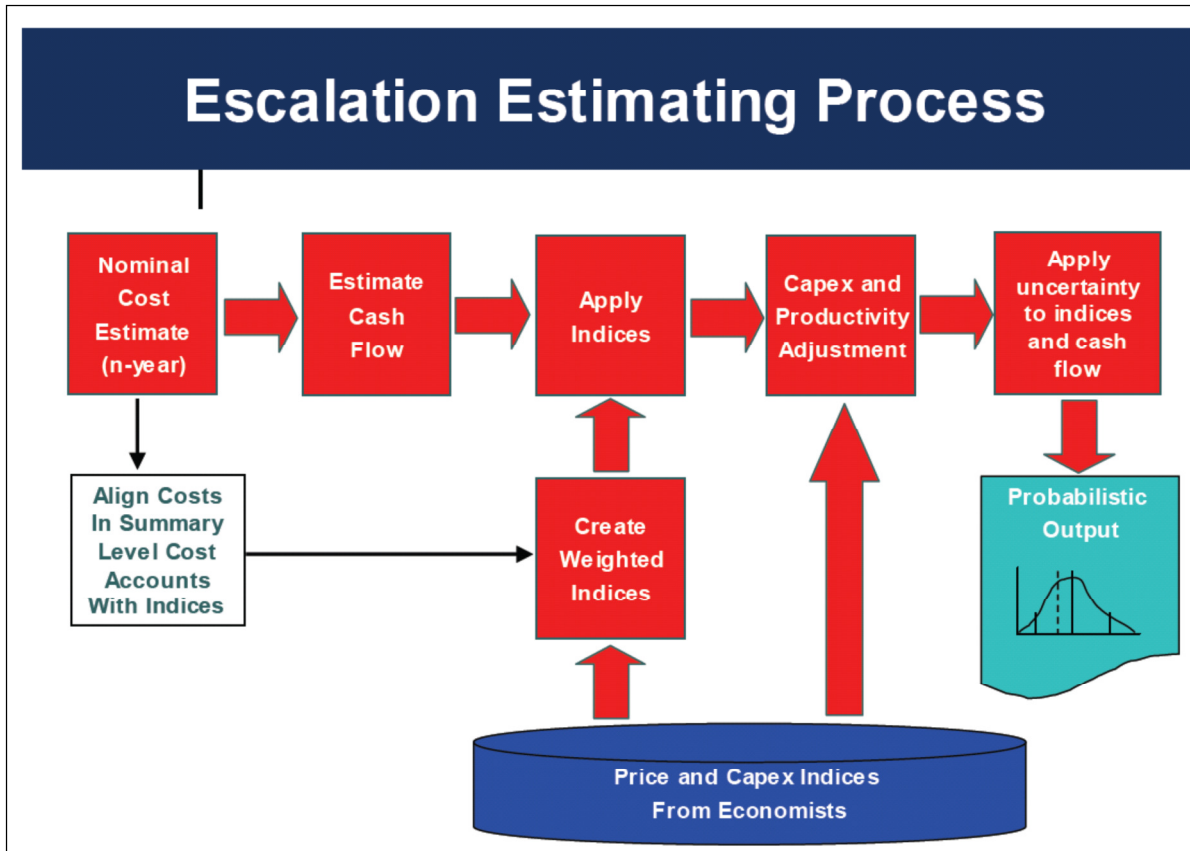
Escalation includes, but differs from inflation, which is caused by debasement of a currency. It varies for different cost items, regions and procurement strategy.

For reliable escalation estimating and control, the cash flow of the base estimate must reflect prices and conditions for a single reference point in time (i.e. Jan 2010) was used for determination of an appropriate escalation allowance. Where possible standard base escalation indices have been used for determination of escalation of various components of the estimate, while for specialty items (e.g. turbines, generators, labor, subsea cable) external market intelligence was gathered to support the development of custom escalation indices to forecast future price levels.

The Project Controls Team developed an overall estimate of the escalation provision that should be provided on the base cost in order to reflect the changes in price conditions using industry best-practice as depicted in Figure 19.

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Figure 19: Escalation Estimating Process



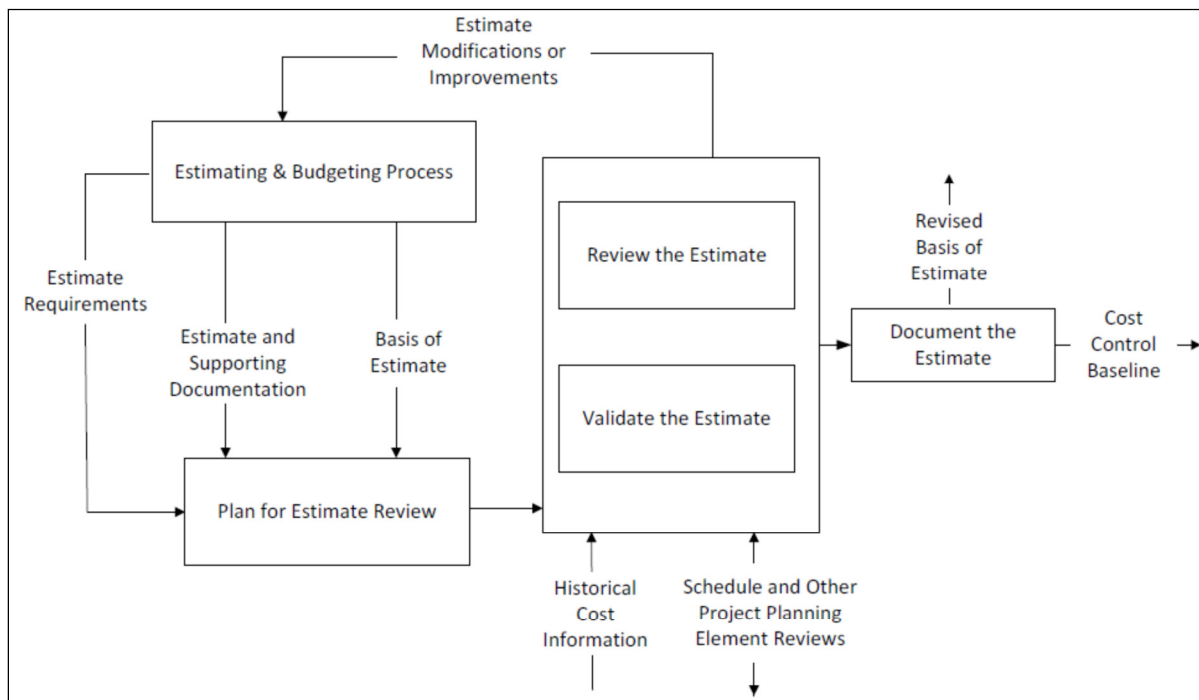
9.2.8 Estimate Review Process

Estimate review is an important step in the cost estimating and budgeting process. A review process is required to ensure that the estimate meets Project requirements, in terms of estimate quality, accuracy and documentation.

The estimate review process as shown in Figure 20 may be iterative in practice, with modification or improvements made to the estimate as a result of the review.

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Figure 20: Estimate Review Process



As outlined in [Association for the Advancement of Cost Engineering Recommended Practice 31R-03 Reviewing, Validating and Documenting the Estimate](#), the estimate review process has three main steps:

1. **Review** – typically qualitative in nature and focused on ensuring that the estimate technically meets requirements. This quality review determines if the estimate covers the entire Project scope, was developed using required practices, is structured and presented in the required format and is free from errors and omissions.
2. **Validation** – typically quantitative in nature and focused on ensuring that the estimate meets the Project requirements in regard to its accuracy, appropriateness and competitiveness. The estimate is typically benchmarked against various cost metrics, including third party published data, similar completed projects or past detailed estimates. A validation process should be completed even if the review team also prepared the estimate, Preference should be given to having an independent third party complete the validation process.
3. **Documentation** – the end result of the estimate review process should be a set of clear, consistent and reliable documentation that follows industry standards or best practices and has Project Team concurrence. Any recommended changes to the estimate should be documented and the Basis of Estimate should be updated to reflect these changes.

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The estimate review process can be applied to the overall estimate, but may be applied to portions of the estimate separately, with specialized scope review by specialist experts. The estimate review typically involves four phases:

Phase 1 – Technical / Scope Review

The first estimate review should be held with the Technical Team (i.e., those who developed the technical documents). This team evaluates whether the estimate accurately represents the Project scope. The core members of the technical team are key participants in this review, along with the Lead Estimator and Estimating Team. One of the critical items to review is the listing of all drawings, specifications and other technical deliverables used in preparing the estimate to ensure that it is complete and up-to-date.

Phase 2 – Estimating Team Review

The next review is typically conducted by the Estimating Team that prepared the cost estimate. An initial screening will assess whether the scope was quantified completely, ensuring that the estimate is documented correctly and is consistent with the Basis of Estimate. This is generally followed by mathematical validation of the Basis of Estimate. Another consideration would be to establish a “peer review” team, comprising other experienced estimators.

Phase 3 – Project Manager/Project Team Review

Once the estimate has been reviewed by the Technical and Estimating Teams, it is ready for review by the PMT. The objective is to gain the approval of the PMT for the estimate. This is the first point where the estimate should be able to pass overall validation tests, in addition to a quality review. The first part of this review involves examination by the Project Team and Project Manager of the estimate documentation, including the Basis of Estimate, the estimate summary and estimate detail pages. The purpose is to ensure that the estimate is presented in a clear manner and that it is complete and consistent.

Phase 4 – Management Review

The final review is usually completed by Corporate Management (i.e. Gatekeeper). This review is typically presented at a summary level and usually does not involve the details of the estimate. As with the Project Manager review, estimate validation is a key element of the Corporate Management review. It is important to be able to explain and demonstrate that metrics for the current estimate are in line with data from other similar projects. It is also important to clearly and concisely explain the probabilistic nature of the estimate and how recommended contingency and escalation amounts were developed. When reviewing the risk analysis, it is important to discuss significant risk drivers and what has been done to mitigate those risks.

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9.3 COST CONTROL

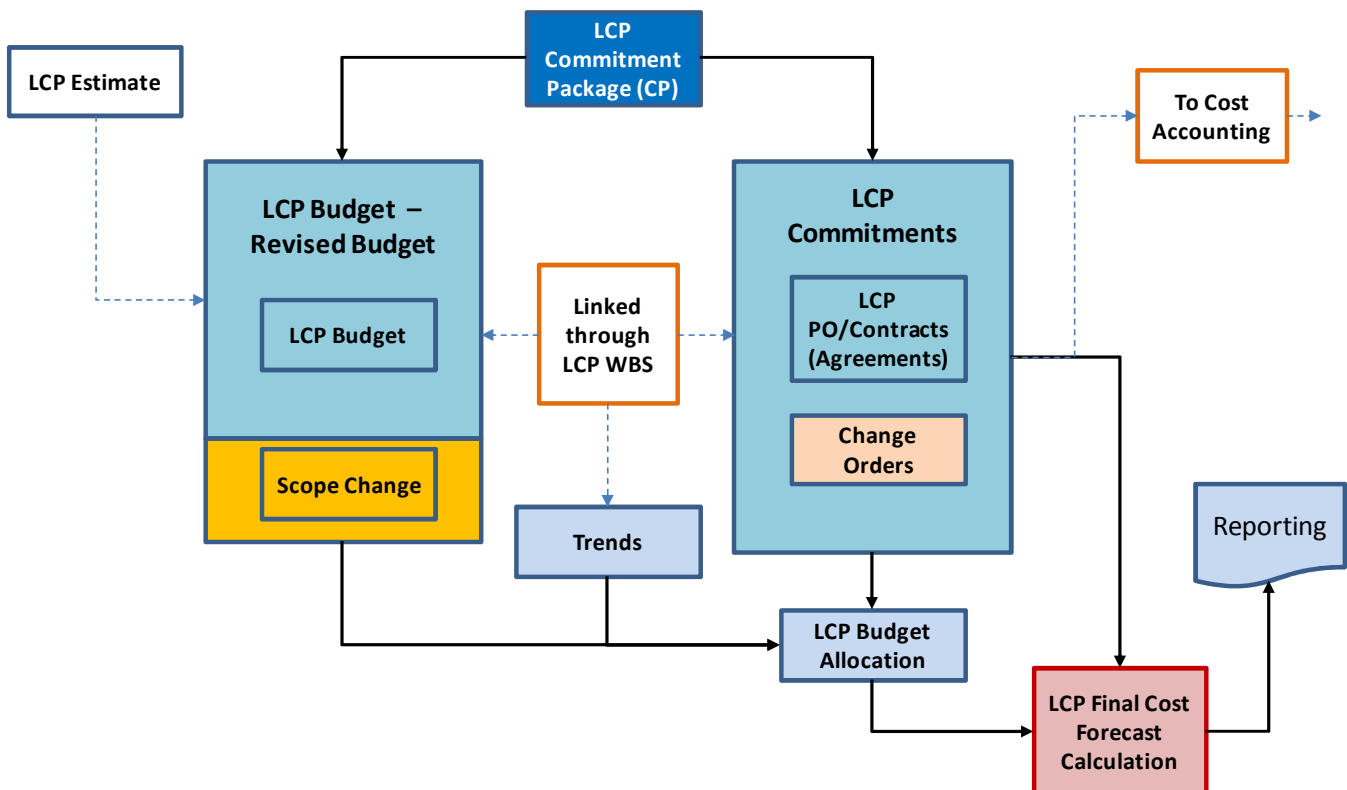
The LCMC promotes the basic principle that the success of any project management, engineering, procurement, and construction organization depends upon organization’s ability to complete its projects safely, on time, within budget and with the highest level of quality.

The mandate of the Cost Control team is to provide the LCP Project Management Delivery Team with timely updated information on the LCP project cost status for analysis and control to deliver the LCP Project within budget. Major activities performed as part of this mandate include:

- Budgeting;
- Reporting Commitments and actual status;
- Trending and Forecasting final cost;
- Explanation of variances and
- Identification of potential issues for initiation of corrective actions as required.

The major elements involved in the cost control process are indicated in Figure 21.

Figure 21: LCP Cost Control – Main Elements



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LCP Project Cost Control is a continuous operation, beginning with the planning and conceptual engineering stage. Monitoring and trending procedures are applied throughout design phases and continue through the procurement and construction stages.

The LCP Project Controls Manager and Sub-Projects Controls Leads have accountability for the development and maintenance of Project budgets and control of monetary commitment for the Project. All Project Team members have responsibility for content and adherence.

This section of the Project Controls Management Plan describes cost control objectives and strategies for the LCP Project Delivery Team and lays out plans for their achievement. It should be noted that full implementation of the objectives and strategies contained in this section will not be accomplished until post Gate 3; following award of most major contracts.

Budgeting and Cost Control objectives for the Project can be summarized as follows:

- Divide the Project into manageable sub-projects with their own budget Code of Accounts, funding authority and funding release mechanism.
- Identify key date and milestone events which will be universally accepted as significant Project funding commitment events and link them into the Integrated Project Schedule (IPS).
- Establish and maintain a baseline for estimating and budget consistent with accepted practice for probabilistic funding scenarios and standardize across the Project.
- Establish a benchmark for gauging cost efficiency of delivery.
- Establish an analysis and reporting mechanism of actual performance against the base-line that serves to align the PMT and is forward looking enough to permit timely intervention to avoid or correct undesirable events.
- Forecast and ensure funding levels are sufficient to meet Project commitments without incurring cost of capital penalties.

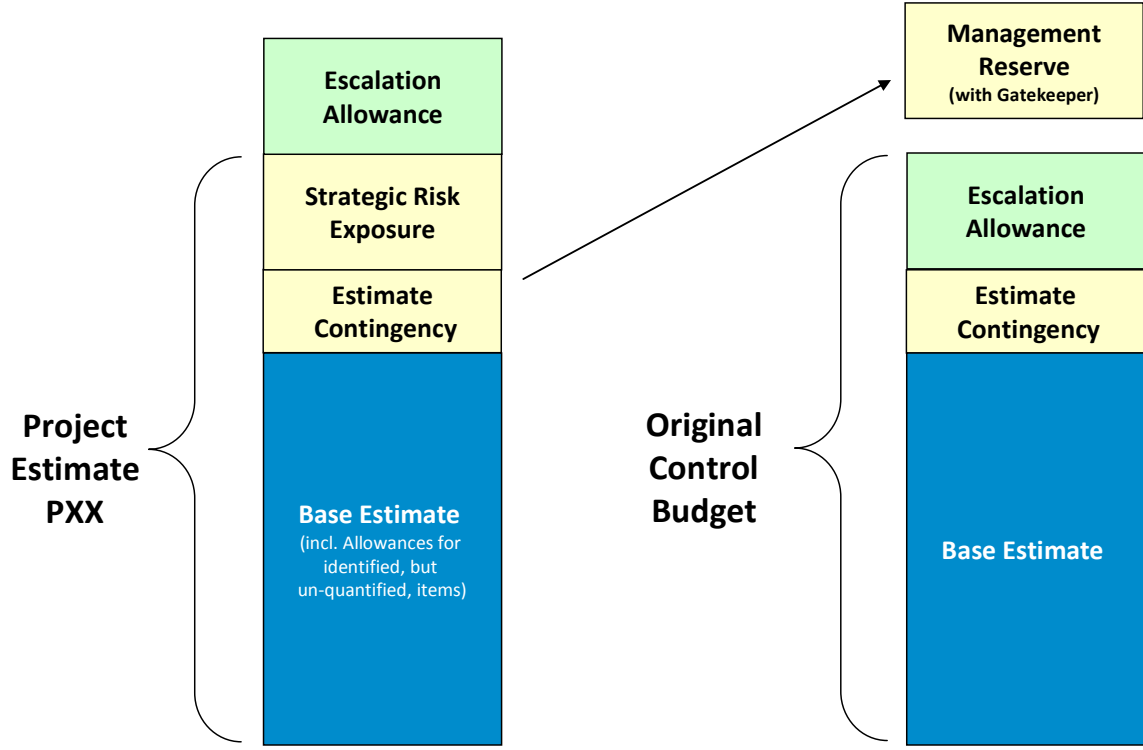
9.3.1 General Strategies

The general strategies to achieve the cost control objectives are:

- The Original Control Budget (OCB) is the Project’s Decision Gate 3 estimate as defined by the Project Design Basis and Project Control Schedule. It covers all known Project costs and contains estimate contingency for developmental changes and estimate errors and omissions. It is the baseline tool that Project cost is measured against and will be divided appropriately among all contracts for the work and their respective sub-projects. It also corresponds to Project funding. Figure 22 illustrates the process by which the OCB is developed from the Project’s cost estimate.

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Figure 22: Establishing the Original Control Budget



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- The structure of the OCB will be aligned with the cost breakdown structure (Code of Accounts) in accordance with the [Project Work Breakdown Structure and Code of Accounts](#), reference document No. [LCP-PT-MD-0000-PC-LS-0001-01](#).
- The OCB will be fixed with provisions for updating in accordance with the [Change Management Procedure](#), reference document No. [LCP-PT-MD-0000-PM-PR-0005-01](#).
- Initially, the OCB and Current Control Budget (CCB) are identical, however as the Project progresses, scope changes will be processed, developmental change will occur and perhaps errors and / or omissions will be discovered within the OCB. These adjustments will be documented and reflected in the CCB. Contingency rundown and budget transfers will also affect the CCB. Therefore, $CCB = OCB - Contingency\ Rundown + Approved\ Scope\ Changes + Budget\ Transfers$. Figure 23 illustrates OCB, CCB and Forecast build-ups.
- LCP Consultants, Contractors, Subcontractors and Suppliers to the Project will align their Project cost reporting with the Cost Breakdown Structure which will be governed by the Coordination Procedures (Ref: RFP LC-G-02 - Request for Proposal, Exhibit 5, Section 7)
- The Project Controls Team will focus on active trend monitoring and maintain a Trend Register which will be the primary information source in assessing and recommending changes to the Final Forecast Cost.
- The LCMC will standardize (where feasible) on cost estimating norms, factors and allocations prior to contract onset for both comparative benchmarking and change management control.
- The LCMC will control against a 30-60-90 day Trend analysis which will feed into cash forecasting, hedging facilities, contingency draw down, accruals, escalation and Commitment forecasting.

9.3.2 Appropriation of Capital

Capital for funding of the Project and sub-projects will be secured by approval of an Authorization for Expenditure (AFE), with authority delegated to a Budget Holder in accordance with the Project Approval Authority Limits as outlined in the [Capital Expenditure Authorization Procedure](#), reference document No. [LCP-PT-MD-0000-FI-PR-0001-01](#) .

Projects and sub-projects will be planned against an execution plan which will include a plan for funding requirements. Work plans will be developed for groups of work (controlled by Work Breakdown Structures) that have logical synergies. Funds will be released (or amended) for each work plan by the Budget Holder once approved. Additional details of this process may be found in the [Work Planning Management Plan](#), reference document No. [LCP-PT-MD-000-PM-PL-0003-01](#).

9.3.3 Commitment Control

A Financial Commitment is a legal agreement (agreement, WTO or PO) between the LCMC and a third party which authorizes LCP to proceed with the award/instruction to the third party to provide goods and/or services for an agreed price or in accordance with an agreed pricing structure. Committed cost

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is captured when a Financial Commitment is made and its value is based upon the original estimate for that Financial Commitment. Area Managers have responsibility for control of all Project commitments with support from the Project Controls Team. Additional details of the process for initiation and approval of Financial Commitments may be found in the [Capital Expenditure Authorization Procedure](#), reference document No. [LCP-PT-MD-0000-FI-PR-0001-01](#).

9.3.4 Incurring Cost

Costs will be incurred on a monthly basis in accordance with the cost reporting schedule. The primary source of incurred cost data will be the LCP Contractors and Suppliers cost reports, however will include a number of other sources including, but not limited to contractor time and material reports, invoice cost, transfer costs from Nalcor Energy and personnel costs from the timesheet database. Once all incurred costs have been entered into PRISM/PM+ the reporting period is closed and the monthly report is produced.

9.3.5 Changes to the Original Control Budget

As the Project matures, scope changes may occur to the facilities, execution and estimating bases used to prepare the Gate 3 estimate. As shown in Figure 23, the Original Control Budget will include Estimate Contingency that will be used to fund approve Project Scope Changes as well as cost variance due to performance trends and underestimating of final cost.

The [Change Management Procedure](#), reference document No. [LCP-PT-MD-0000-PM-PR-0005-01](#), provides a means to ensure Project Scope Changes are reviewed by the appropriate parties prior to implementation, and hence provide the means to facilitate the allocation of funds from Estimate Contingency to Control Accounts for executing an approved Project Scope Change. The LCP EPC contractor’s change management process will provide interface with LCP process, feeding the Deviation Alert Process.

The Change Management Lead shall maintain a log of all Deviation Alert Notices and pending Project Changes, which such indicate whether these are Scope or Non-Scope related changes, status, potential cost and schedule impacts, and other information as required. On a weekly basis (or as deemed necessary by Project change management activity), the Change Management Lead will issue a report to the PMT containing the following information:

- **Potential Changes** – Changes that have been identified (initiated) but not rigorously estimated or reviewed by all affected Scope / Area Managers.
- **Pending Changes** – Changes that have been initiated and subject to further investigation (through the stewardship process), but not yet approved for implementation. Typically the cost impacts of these changes have been estimated.

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- **Approved Changes** – Changes that have been approved by the appropriate level of management. These changes will be included in the CCB and current forecast.
- **Cancelled Changes** – Changes that have been rejected. When this occurs, the reason for not approving the change should be noted on the change form and it should be communicated to the originator and any others who reviewed the change.

The LCP cost control system will provide additional reporting which documents potential, pending and approved changes out of its change management process. These reports may also be used to steward the forecast relative to cost growth and contingency usage.

For all Non-Scope Changes, the Project’s change management process will include provision for adjustment of the final estimated Project cost or completion dates and it will be the principal mechanism for adjusting the Project’s Final Forecast Cost (FFC).

9.3.6 Final Forecast Cost Reporting

The Lead Cost Controller will update the LCP Project Final Forecast Cost on a regular reoccurring basis, using the collective input from the LCP Sub-Projects Controls Team, and substantive input from the LCP Contractors and Suppliers.

The FFC will be driven by both Project Changes and Trends which will trigger Approved Trends. The LCP Project Controls Teams, will place significant effort towards identifying and analyzing scope, cost and schedule Trends that may influence the FFC or forecasted completion date. The process of establishing Trends for forecasting purposes involves timely examination of various reports that provide progress, productivity and expenditure data consistent with the Project’s control baselines. The sources of data include the following:

- Purchase orders
- Contracts
- Actionable bids
- Project change and contract change registers
- Engineering and construction progress and productivity reports
- Staffing plans
- Material take-offs
- Material status reports
- Verification results of previous corrective actions taken
- Expenditure reports
- Other sources of information provided to the Project Controls team

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The monthly progress, productivity and expenditure data produced by the LCP contractors, subcontractors and suppliers will be analyzed by the Project Controls Team to identify any deviations from the planned baselines in order to establish Trends, which may affect the FFC. It is expected that the LCP Project Controls Teams and contractors/suppliers will utilize appropriate forecasting methods that align with those developed by the LCP Project. In the event that they do not, the LCP Project Controls personnel will coach their personnel regarding industry best practices and Project expectations until they have implemented acceptable forecasting methods.

The Project Controls Team will maintain a Trend Register that shall capture all Trends and include the following information for each:

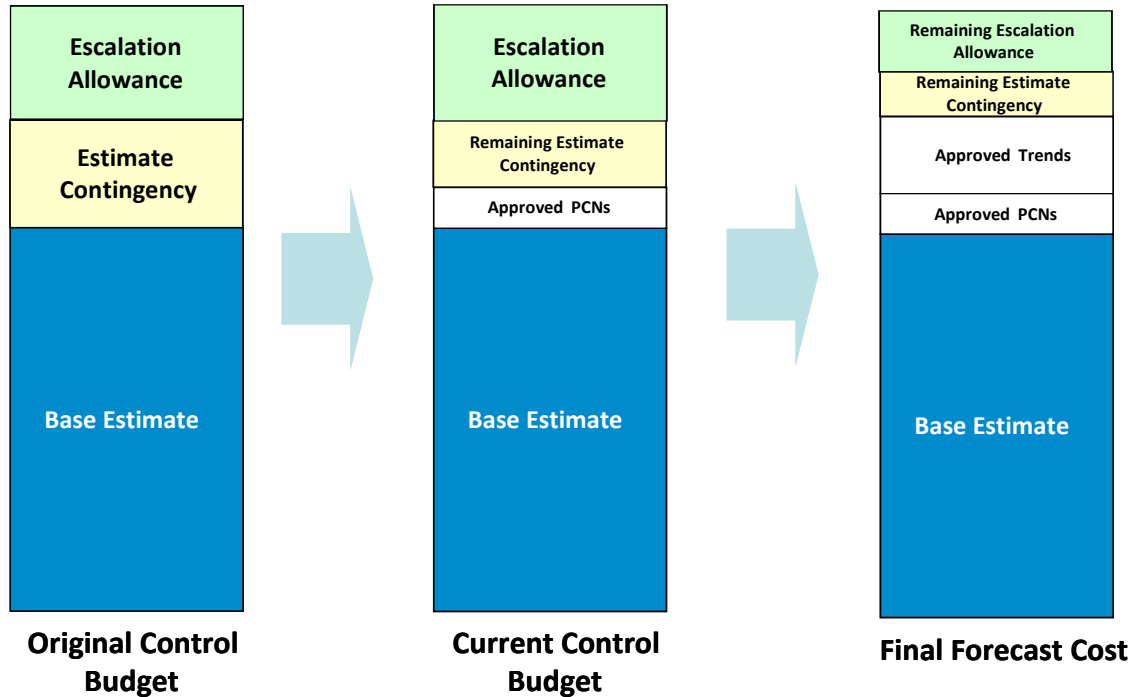
- Trend unique identifier
- Cost control account(s) cross reference
- Description
- Source and Basis
- Estimated cost and / or schedule impact
- Status

Upon receipt of the monthly performance data, the Project Controls Team will produce a preliminary monthly forecast based on the Actual Cost of work performed to-date plus an estimate of the work remaining. The latter shall include approved, potential and pending changes plus a cost assessment of Trends following analysis of reported performance on the factors listed above. The FFC will be reviewed and approved by Area Managers, Component Managers, and Senior Project Management on a monthly basis.

Figure 23 illustrates the concepts upon which the OCB becomes the CCB and from which the FFC is generated.

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Figure 23: OCB, CCB and FFC Concepts



9.3.7 Cash Flow Management

Monthly cash flow forecasting is required to ensure that sufficient financial resources are available to meet upcoming financial obligations. This information will be prepared by the Lead Cost Controller with input from each of the Sub Projects Cost Controllers. Quality input and assurance is required from each Budget Holder to ensure that the recorded information is the most accurate available.

The cash flow forecast will be used to support the Project’s monthly cash requirements. The Lead Cost Controller (as applicable for the relevant Sub-Project), will work with the Project Accountant in order to produce a rolling forecast of cash requirements by currency, in order to ensure effective cash management.

Funding limits may be established by quarter, fiscal year or calendar year. The LCP PMT is responsible for operating within these limits. Cash flow information will be compared to any funding constraints to identify when additional funds will be required and appropriate approvals obtained or if adjustments to the work plan are required to stay within approved funding limits.

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9.3.8 Reconciliation

The Cost Engineer / Controllers(s) will produce a monthly reconciliation of changes to Actual Costs (expenditures + accruals), CCB and FFC. The latter shall include approved, potential and pending changes plus a cost assessment of Trends following analysis of reported monthly performance factors. The monthly reconciliation will be presented to the respective Project Scope / Area Manager for their assessment and agreement.

Reconciling monthly changes between committed actual costs / work-in-progress / CCB serves the following:

- Highlight the data from approved / pending changes
- Highlight results of cost analysis and trending
- Explain any differences in real Project terms
- Help focus management attention on potential problem areas

In addition, the reconciliation data can assist in evaluating the future estimate accuracy and contingency levels.

9.3.9 Estimate Contingency Rundown

“Estimate Contingency Rundown” curves will be developed to forecast the usage of estimate Contingency over the Project life. The shape of the curve will not be driven by the base estimate cost flow profile, rather by the view on the materialization of key estimate uncertainties or tactical risks; as such the contingency rundown curve may have quite a different profile than the base estimate cost flow profile.

An “Estimate Contingency Rundown” curve will be prepared for each sub-project and a “Total Estimate Contingency Rundown Curve” will be prepared from the aggregate of the sub-projects. Once curves are established, they should remain fixed until close-out unless schedule duration forecasts change by a month or more - at which time the x-axis should be altered.

9.3.10 Escalation

Similar to estimate Contingency, the escalation allowance estimated for the Project will be managed as risk fund within a separate cost control account of the Original Control Budget (OCB) for the Project using the Project’s change management process. The escalation was estimated and embedded in the OCB as part of each LCP Commitment Package budget.

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9.3.11 Foreign Exchange Losses and Gains

Foreign exchange rates will be established (and fixed) for use in project budgeting of all non-Canadian dollar expenditures. The Cost Controllers will document both the non-Canadian dollar commitments made by the Project, while the Project Controller will monitor the actual foreign exchange rates experienced in paying invoices for these commitments, and provide the exchange rate gain/loss to the Cost Controllers. Overall exchanges gains and losses will be tracked by the Project Controller and provided to the Lead Cost Controller for the production of the Project's Monthly Cost Report.

The Lead Cost Controller will be responsible for forecasting the impact of any projected deviations from these fixed Project exchange rates (upward or downward) in the regular production of the Project's FFC as part of the on-going trending.

Further details on this process are contained in [the Project Finance and Accounting Management Plan](#), reference document No. [LCP-PT-MD-0000-FI-PL-0001-01](#).

9.3.12 Cost Reporting

Cost reporting is required for two main purposes:

- Expenditure monitoring – to provide information to the LCP PMT regarding the pace of Project expenditure relative to the plan.
- Budgetary control – to provide information and recommend corrective action to ensure the total Project expenditure remains within approved levels.

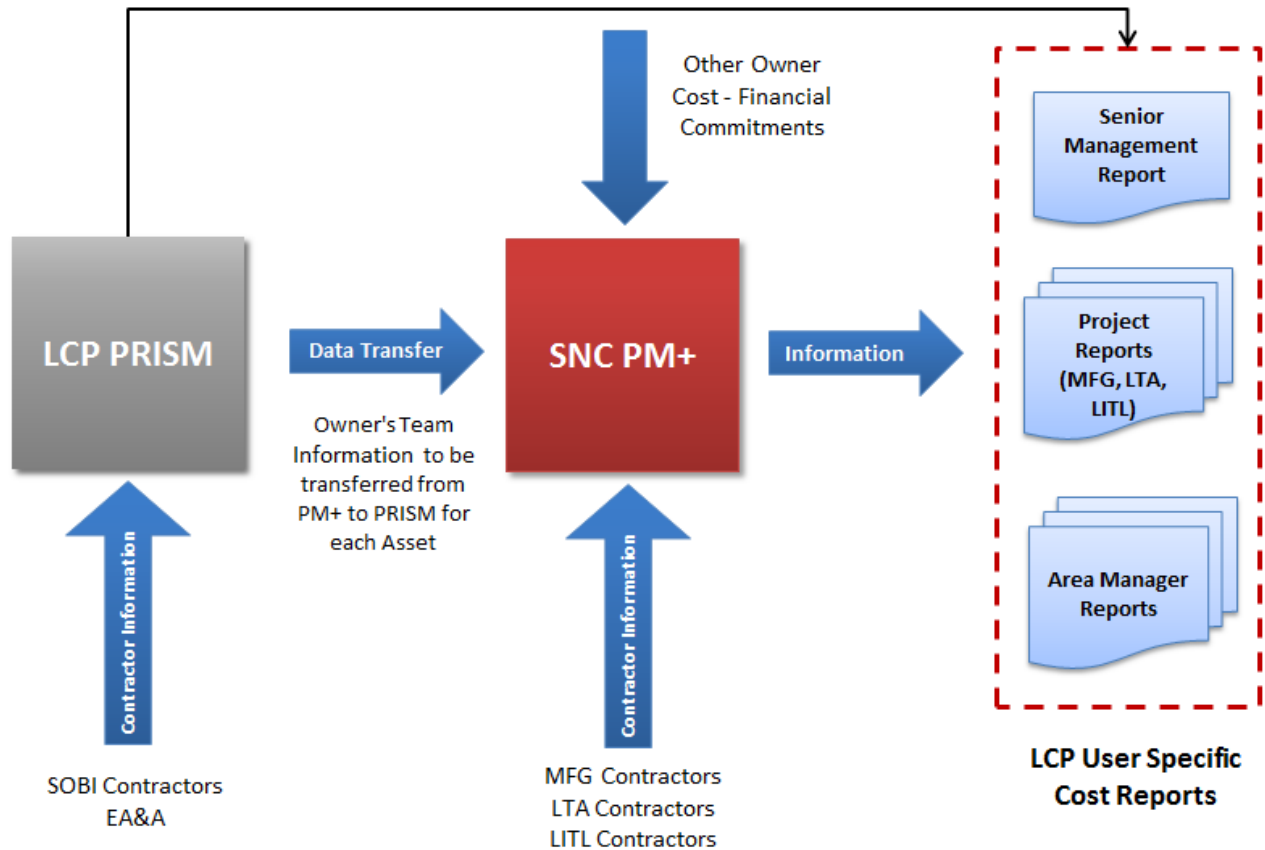
Figure 24 highlights the approach that is planned to be used to roll-up the various sources of cost information to support overall project cost reporting.

Individual Project Team members should review the results of costs analysis and propose remedial cost control steps to management as necessary. Management will review the results of the update cycle at monthly Cost and Schedule Stewardship meetings. At this venue, they can review the interactive effect of all AFE's on the Project total cost and assess any corrective control actions required.

The monthly report serves as the primary tool for the Area Manager to steward costs against AFE's and Project goals and objectives. Shown below are examples of the Project's monthly cost reporting. Cost reports will be produced as required to meet the LCP PMT's requirements.

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Figure 24: Overall Project Cost Reporting – Roll-up from LCP Consultant and EPC Contractors



9.3.13 Invoicing

The [Finance and Accounting Management Plan](#), reference document No. [LCP-PT-MD-0000-FI-PL-0001-01](#) provides details on invoicing as well as the process for monthly calculation of accruals.

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Figure 25: Overall LCP Phase I Cost Report (Representative Only)

Description	Budget			Total Commitment	Outstanding Changes	Trends	Unawarded Scope (Unallocated Budget)	Incurred this Period	Incurred to Date	Current Forecast	Variance (Budget - Forecast)
	Original	Scope Changes & Transfers	Revised								
Muskrat Falls Generation											
Commitment Packages - Construction											
Commitment Packages - Purchase											
Commitment Packages - Services											
Labrador Transmission Assets											
Commitment Packages - Construction											
Commitment Packages - Purchase											
Commitment Packages - Services											
Labrador Island Transmission Link											
Commitment Packages - Construction											
Commitment Packages - Purchase											
Commitment Packages - Services											
SOBI											
LCP Miscellaneous Commitment Packages											
Owner Cost											
Contingency											
Feasibility Engineering											
Environmental and Regulatory Compliance											
Aboriginal Affairs											
Commercial and Legal											
Grant Total	6,202,489,666	787,924,584	6,990,414,250	5,531,735,007	9,841,076	96,148,444	1,350,689,723	156,255,264	2,025,569,680	6,990,414,250	0

9.4 PROGRESS AND PERFORMANCE MANAGEMENT

A key element to reporting LCP Project and Sub-Projects status is accurate progress and performance data. Progress and performance reporting is required to provide Project Management with information to judge whether:

- The schedule milestones are likely to be met
- Additional actions are necessary to document the value of work performed
- Potential problem areas or delays need to be highlighted

Progress curves represent quantified and time-scaled summaries of the schedule which provide a means to identify areas of the LCP Project and Sub-Projects that may require corrective action or re-planning. Progress measurement is a comparison of the actual work performed against an estimated progress methodology. Deviations may exist due to the estimations taken and should be considered as part of the review if a problem area exists.

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9.4.1 General Strategies

All contractor schedules in support of the IPS shall have an objective based, systematic method for collecting progress on planned activities. The contractors will be tasked with planning, measuring and reporting physical progress and performance of the Project, including engineering, procurement and construction activities, to the Component Project Controls Lead consistent with the WBS. The method by which they will achieve the above will be explained and agreed with project team in the SDCP - Schedule Development and Control Plan which is a contractual document.

Progress is represented by the physical completion of work, whether that work is physical construction work, engineering design, component fabrication, field studies or any other work associated with a project. Progress is not the amount of time, money or hours spent, but an objective measure of the work completed. It is important, however, to measure these various elements (time, money and hours) as they provide critical pieces of data to support performance analysis.

Progress measurement will be based upon physical progress with a weighting system factor. Elements of the Project are determined to contribute towards the overall Project (weight factor). Each element is then progressed based upon physical completion of work (progress). The arithmetic sum of the weight factor and progress of the element is the weighted progress of that element.

Earned progress is calculated based on achievements related to physical completion of work. Work hours and costs are used only for weighting purposes. Indirect work hours associated with home office, support functions (such as Project Management, Procurement, Project Controls, Engineering Management, HSE Management, Document Control, and indirect craft support functions) are to be excluded from the contractor’s calculated progress.

Progress measurements will be made in such a manner that the physical progress can be captured and related easily to the IPS. Progress shall be evaluated on discrete, identifiable deliverables for each major Project activity and weighted by budgeted work-hours or other measurable quantity to determine a total percent for each activity.

9.4.2 Planned and Forecast Progress

Planned Progress

Planned Progress is determined at site level in the IPS.

Weight factors between all sites are determined by the cost breakdown per site. This breakdown is applied to IPS sites activities using a distribution profile which is site specific thus providing planned percent per month per site. The final single progress curve for each site is determined by choosing between the early and late curves.

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The planned progress is then summarized to determine sub-project and overall planned progress. See Table 2.

Forecast Progress

Forecast Progress is determined at site level in the IPS and reported at sub-project level only. Forecasts always begin with last months earned progress and distribute the remaining work per month according to the current schedule.

Contractor based planned/forecasts progress

As contractor control schedules are approved and the planned progress curves in the CSBD - Control Schedule Baseline Document become available, these contractor curve will replace the IPS derived planned/forecast information.

9.4.3 Earned Progress – Overall Project Progress Calculation

Progress Measurement will be performed at three levels of detail, with lower levels rolling up to higher levels:

1. Overall Summary level
2. Sub-Project level
3. Site level

Overall summary level progress will be for the Project in its entirety, spanning both Project phases and all Sub-Projects.

Sub-Project level progress will be based upon weighting and progress reporting at the site level and totaled for the sub-project level.

Site level progress will be based upon weighed progress reported by Contractors/Suppliers.

The LCP Project and Sub-Projects weighted progress roll-up method is shown in Tables 2 to 4 below.

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Table 2: Overall Summary (Sub-Project weighted progress)

LCP - Overall 2018 January									
This Reporting Period									
	Weight Factor % A	Period %			Cumulative %				
		Plan	Earned	Variance	Plan	Earned	Variance	Forecast (Next Period)	
		B	C	C-B	E	F	F-E	G	
Labrador Transmission Asset (LTA)	9.8%	0.0%	0.2%	0.2%	100.0%	99.4%	-0.6%	99.8%	
Labrador Island Transmission Link (LITL)	43.9%	0.8%	0.7%	-0.1%	99.2%	98.4%	-0.8%	99.1%	
Muskrat Falls Generation (MFGen)	46.3%	0.6%	0.9%	0.3%	79.7%	78.9%	-0.8%	79.6%	
LCP-Overall	100.0%	0.6%	0.7%	0.1%	90.2%	89.4%	-0.8%	90.1%	
Last Reporting Period (December)									
	Weight Factor % A	Period %			Cumulative %				
		Plan	Earned	Variance	Plan	Earned	Variance		
		B	C	C-B	E	F	F-E		
Labrador Transmission Asset (LTA)	9.8%	0.0%	0.1%	0.1%	100.0%	99.2%	-0.8%		
Labrador Island Transmission Link (LITL)	43.9%	1.5%	1.0%	-0.5%	98.4%	97.7%	-0.7%		
Muskrat Falls Generation (MFGen)	46.3%	1.1%	1.1%	0.0%	79.1%	78.0%	-1.1%		
LCP-Overall	100.0%	1.2%	0.9%	-0.3%	89.6%	88.7%	-0.9%		

Table 3: Sub-Project Based (Site weighted progress)

MFGen Progress Table 2018 January									
This Reporting Period									
	Weight Factor % A	Period %			Cumulative %				
		Plan	Earned	Variance	Plan	Earned	Variance	Forecast (Next Period)	
		B	C	C-B	E	F	F-E	G	
MFG Access Rd/Accom	8.9%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	100.0%	
MFG Reservoir Preparation	5.8%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	100.0%	
MFG Spillway & Gates	12.2%	0.7%	0.2%	-0.5%	94.0%	85.5%	-8.5%	85.5%	
MFG North Spur Stabilization	3.9%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	100.0%	
MFG North Dam (incl Cofferdams/Trans Dam)	5.7%	0.0%	0.0%	0.0%	64.6%	57.3%	-7.3%	57.3%	
MFG Powerhouse & intake	61.3%	0.8%	1.4%	0.6%	71.8%	72.9%	1.1%	74.0%	
MFG South Dam (incl South Trans Dam)	1.1%	0.0%	0.0%	0.0%	100.0%	99.2%	-0.8%	99.2%	
MFG Misc	1.1%	0.0%	0.0%	0.0%	78.0%	75.5%	-2.5%	75.5%	
MFGen TOTAL	100.0%	0.6%	0.9%	0.3%	79.7%	78.9%	-0.8%	79.6%	
Last Reporting Period (December)									
	Weight Factor % A	Period %			Cumulative %				
		Plan	Earned	Variance	Plan ⁽¹⁾	Earned	Variance		
		B	C	C-B	E	F	F-E		
MFG Access Rd/Accom	8.9%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%		
MFG Reservoir Preparation	5.8%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%		
MFG Spillway & Gates	12.2%	0.4%	0.0%	-0.4%	93.3%	85.3%	-8.0%		
MFG North Spur Stabilization	3.9%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%		
MFG North Dam (incl Cofferdams/Trans Dam)	5.7%	0.7%	0.0%	-0.7%	64.6%	57.3%	-7.3%		
MFG Powerhouse & intake	61.3%	1.8%	1.8%	0.0%	71.0%	71.5%	0.5%		
MFG South Dam (incl South Trans Dam)	1.1%	0.0%	0.0%	0.0%	100.0%	99.2%	-0.8%		
MFG Misc	1.1%	0.0%	0.0%	0.0%	78.0%	75.5%	-2.5%		
MFGen TOTAL	100.0%	1.1%	1.1%	0.0%	79.1%	78.0%	-1.1%		

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Table 4: Site Based (Contractor reported progress)

Muskrat Falls - Generation (MFGen)							
MFG-3-3000	MFG-3-3000: POWER FACILITIES (Power House)						
CH0006-001	C1	8.1%	100.0%	100.0%	complete	8.1%	
CH0007-001(3000, 3350 & 2360)	C1	71.0%	88.4%	89.6%		63.6%	
CH0009	C1	0.5%	1.1%	1.1%		0.01%	
CH0030	C1	3.8%	6.6%	8.5%		0.3%	
CH0031	C1	9.5%	2.2%	4.2%		0.4%	
CH0032	C1	7.0%	2.0%	5.4%		0.4%	
CH0033	C1	0.1%	50.0%	50.0%		0.0%	
CH0034	C1	0.0%	0.0%	0.0%		0.0%	
						100.0%	72.9%

9.5 CHANGE MANAGEMENT

To function effectively, a project team must understand the basics of change management and have a plan in place that establishes the strategy to be used for the project team to identify, screen, and incorporate changes to the baseline, including the project delivery model. On the Lower Churchill Project (LCP), by adopting a disciplined approach to managing potential changes, negative impacts to project goals and objectives are minimized and positive opportunities can be realized.

This plan provides the overall strategy for change management on the LCP, definition with respect to what constitutes change, the scope of change management for the Project, an overview of the process, and a breakdown of the roles and responsibilities of those accountable for its implementation. The details of the process used to implement this plan are provided in the associated [Change Management Procedure](#), reference document No. [LCP-PT-MD-0000-PM-PR-0005-01](#). Individual contractors must have their own change management plans that align and comply with this.

9.5.1 General Strategies

Change management has both process and cultural aspects. As a **process** it is a disciplined approach to anticipating and managing potential changes / modifications / alterations from established Project *guidelines, plans, or intentions* with particular emphasis on the accepted Project Baseline – scope, budget, schedule, delivery approach, etc.

NOTE: Although it forms an essential element of the change management process, the administrative task of processing contract change orders should not be confused with the process of managing project change.

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The goal is to establish a disciplined team with a ***balanced change culture***. A team with a cost-conscious attitude that is alert to change issues and has developed disciplined methods for maximizing beneficial – value-added change and minimizing negative change.

In this light it is important for the team to ***recognize*** deviations and act quickly to define them, their potential impact on the project and the actions required to minimize their negative impact and maximize their positive impact.

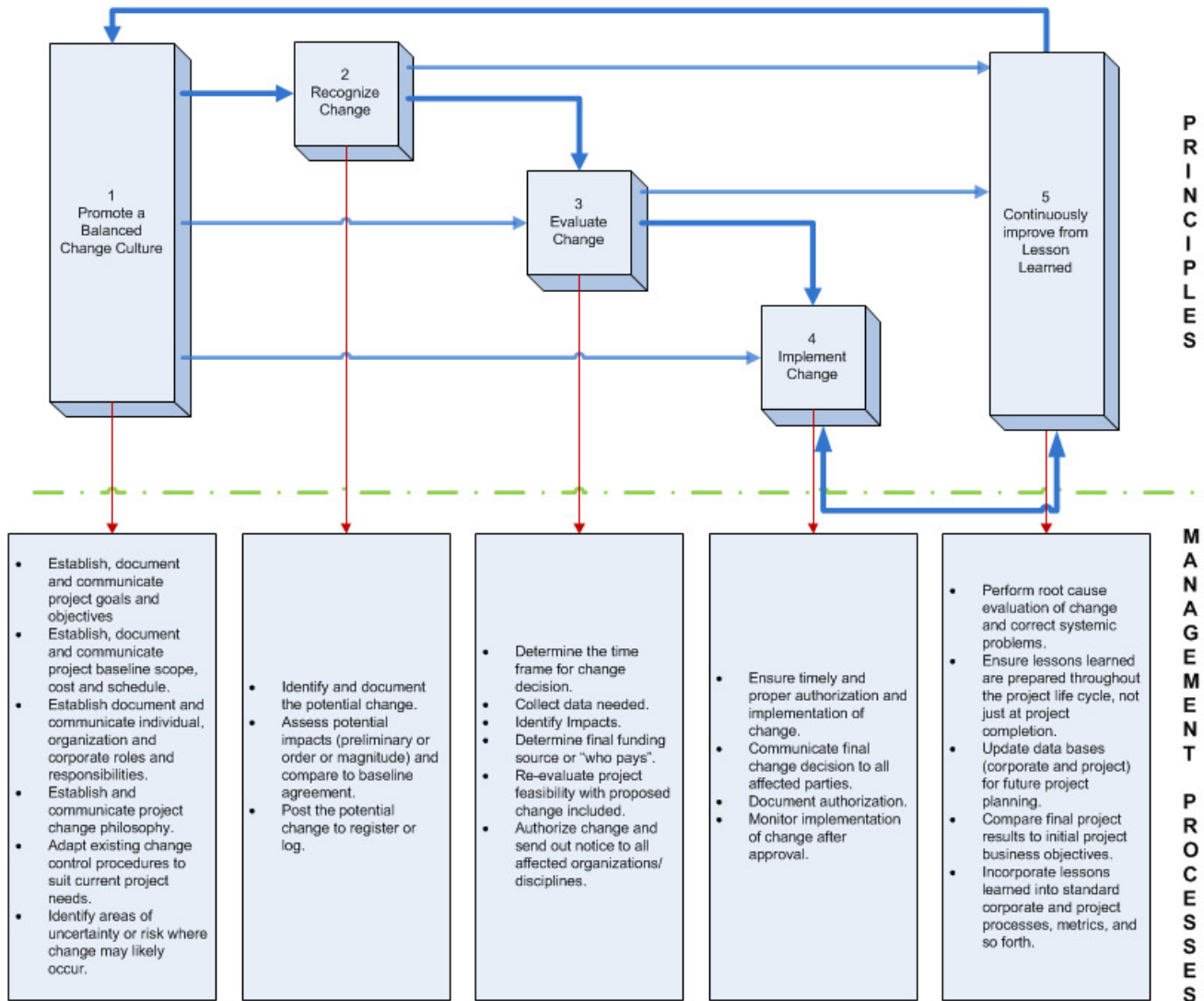
The ***evaluation of change*** must occur with consideration of the requisite data, budget (and appropriate sourcing), and the appropriate authorizations.

Effective ***implementation of change*** must be timely while both documentation and communication of the change are both important aspects.

It is equally important for the team to understand the root cause of each potential change and apply learnings in order to ***continuously improve*** the change management process. This includes not just the source and type of change but also the conditions that generated the change, e.g. faulty planning, ambiguous direction, improved technology, site conditions, etc., whether those conditions will continue to be a threat or a benefit to the project, and what appropriate actions might be taken to control the risk of change from these sources.

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Figure 26: Change Management Principles - Processes



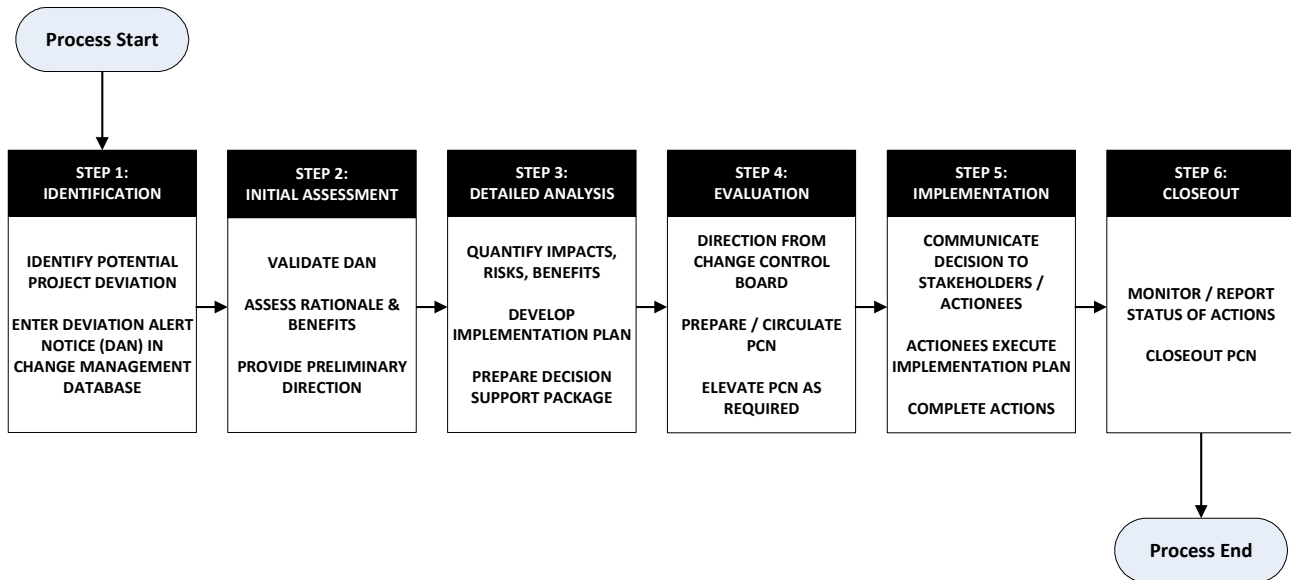
Source: Construction Industry Institute (CII)

9.5.2 Change Management Process Overview

Figure 27 below provides a high level summary of the change management process that has been developed for the Lower Churchill Project, Phase I comprising the six (6) distinct steps.

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Figure 27: High Level Change Management Process Flow



In order to understand this change management process and how it is applied, it is essential to distinguish between **“Deviation”** and **“Project Change”**. As defined in Section 3.0 *Definitions*, a Deviation is a change / modification / alteration from established Project *guidelines, plans, or intentions*. In order for a Deviation that is either anticipated or is under consideration to be assessed it must be documented in the form of a Deviation Alert Notice (DAN).

Only a deviation that is confirmed to represent a change from the project baseline can be classified as a “Project Change”. In order for a Deviation to be confirmed as a Project Change the DAN must be reviewed and understood and the actions necessary to implement or accommodate the change clearly identified. Until such time it is an unresolved change issue and an appropriate resolution should be aggressively sought by the Project Team. When a DAN has been reviewed, understood and verified to represent a Project Change, a Project Change Notice (PCN) must be prepared for review and acceptance by the CCB. The PCN shall contain details including justification / rationale for the change; its impact on the project with respect to cost, schedule, design and other areas; project risk exposure; and an implementation plan including the actions necessary to implement the change.

Change management meetings will be scheduled on regularly occurring basis as well as on an ad hoc basis as deemed necessary by the Change Management Lead. These meetings will include the Change Control Board members and will be used to discuss Deviation Alert Notices and Project Change Notices, establish further understanding of them, and determine whether they should be progressed or rejected.

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9.5.3 Basis of Change

There are a number of conditions that may result in change that are likely to be encountered during the Project. The more common changes to scope, cost, and schedule baselines such as additions, deletions, quantity variations, are typical, easily recognized, and easily controlled. In addition to these are a number of more obscure or subtle change causal factors – some of which may first manifest themselves as trends. These will require close scrutiny in order to determine whether they require additional attention through change management processes, particularly by the Scope / Project Managers.

Table 5: Basis of Change

Basis	Description
Scope Creep	Scope creep results from minor scope element changes which culminate in a significant change generally resulting from poorly defined scope of work and Work Breakdown Structure.
Quality Creep	Changes resulting from a lack of understanding of or adherence to the Project’s quality standards and specifications that are documented in the Overarching Quality Management Plan , reference document No. LCP-PT-MD-0000-QM-PL-0001-01 , will result in Non-Conformance and Corrective Actions issued by the Quality department.
Level of Effort	Level of effort change is produced by continual refinement of alternatives, unknown obstacles and inaccurate data.
New Technology / Tools	The adoption of new technology or tools may result in an alteration of normal project deliverables and thereby impact cost and schedule.
Performance / Site Conditions	Performance and site conditions produced by the lack of details about the site – especially the “hidden” details such as underground obstacles or an inadequate understanding of all of the performance conditions such as local environmental conditions, access, space and work rules: all of which could affect performance.
Project Risks	The process of identifying and assessing potential change is enhanced if the PMT has identified and understands the risks involved in the Project, its delivery and the impacts that those risks - if realized - would have on the Project Baseline.
Lessons Learned	Understanding the experiences of others performing similar projects is a means of better understanding and preparing for the changes that may occur on the Project.

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Basis	Description
Contract Change	Contract change outlines any changes to the contractor’s scope and/or contract’s terms and conditions.
Engineering /Design	In practice design changes can occur at every stage of the design process, from the stage at which the project deliverables are defined, to when the design is proven fit for delivery, commissioned and operated.
Estimating	Estimating changes shall be consistent with the basis upon which the Project was sanctioned. Adjustments for inflation, escalation and currency exchange in the estimate shall be pointed out to the CCB.
Planning and Scheduling	Schedule changes shall be consistent with the basis upon which the Project was sanctioned. Adjustments to float and critical path shall be pointed out to the CCB.

9.5.4 Approval of Change

The Lower Churchill Project change management process defines a system for controlling project scope and ensuring that Project Changes are reviewed and approved at the appropriate organizational level.

Figure 28 below, which illustrates the Project Change Approval Hierarchy, has been developed in order to provide clarity as to the level of authority required to approve or reject a proposed Project Change. In general, approval of a Project Change follows a vertical process, with those changes having larger cost, schedule, and risk implications, requiring higher level of approval. In addition Project Changes that alter the Project’s boundaries, objectives, key philosophies, or delivery approach must be approved by the Project’s Gatekeeper.

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Figure 28: Project Change Approval Hierarchy

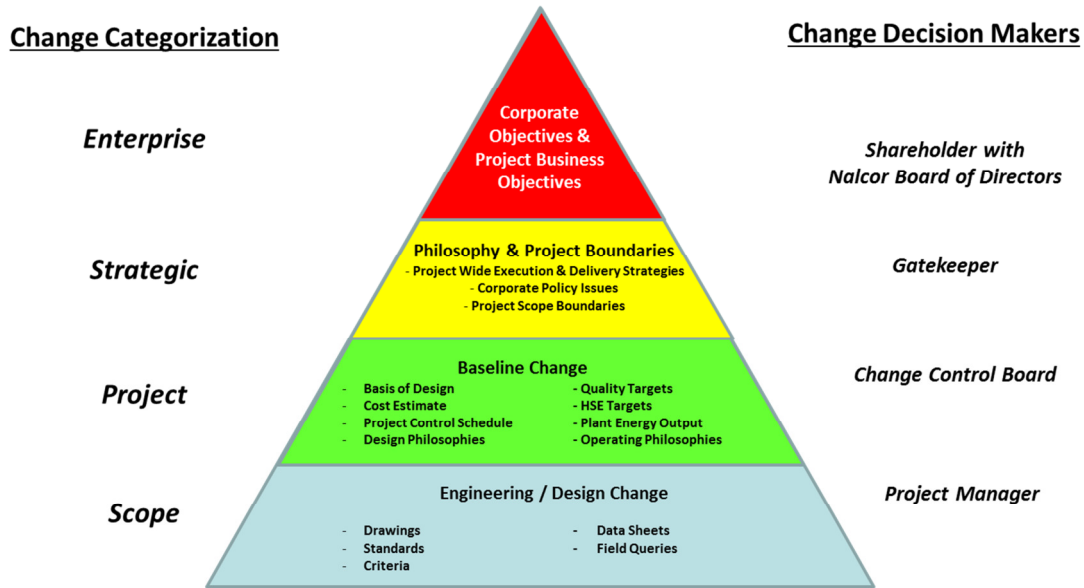


Table 6 below provides the project specific authority for approval of change that has cost, schedule or risk impact.

Table 6: Change Management Approval Matrix

Project Specific Authority				
Decision Level	Risk Impact	Schedule	Specifications	Cost Limit
Gatekeeper	High Risk Zone*	Unlimited	Unlimited	Unlimited
Project VP	High Risk Zone*	>2 weeks	Unlimited	As per AAL
Project Director	Medium Risk Zone**	<2 weeks	Unlimited	As per AAL
General Project Manager	N/A	<1 week	Unlimited	As per AAL
Project Manager	N/A	N/A	Technical & Construction Specs	As per AAL

* If the risk screening of a PCN indicates the introduction of a high risk the Gatekeeper and Project VP must approve the change.

** If the risk screening of a PCN indicates the introduction of a medium risk the Project Director must approve the change.

The [Capital Expenditure Authorization Procedure](#), reference document No. LCP-PT-MD-0000-FI-PR-0001-01 provides additional detail on change approval authorization. Further details on risk classification are provided in the [Project Risk Management Plan](#), reference document No. LCP-PT-MD-0000-RI-PL-0001-01.

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9.6 INTERFACE MANAGEMENT - TECHNICAL

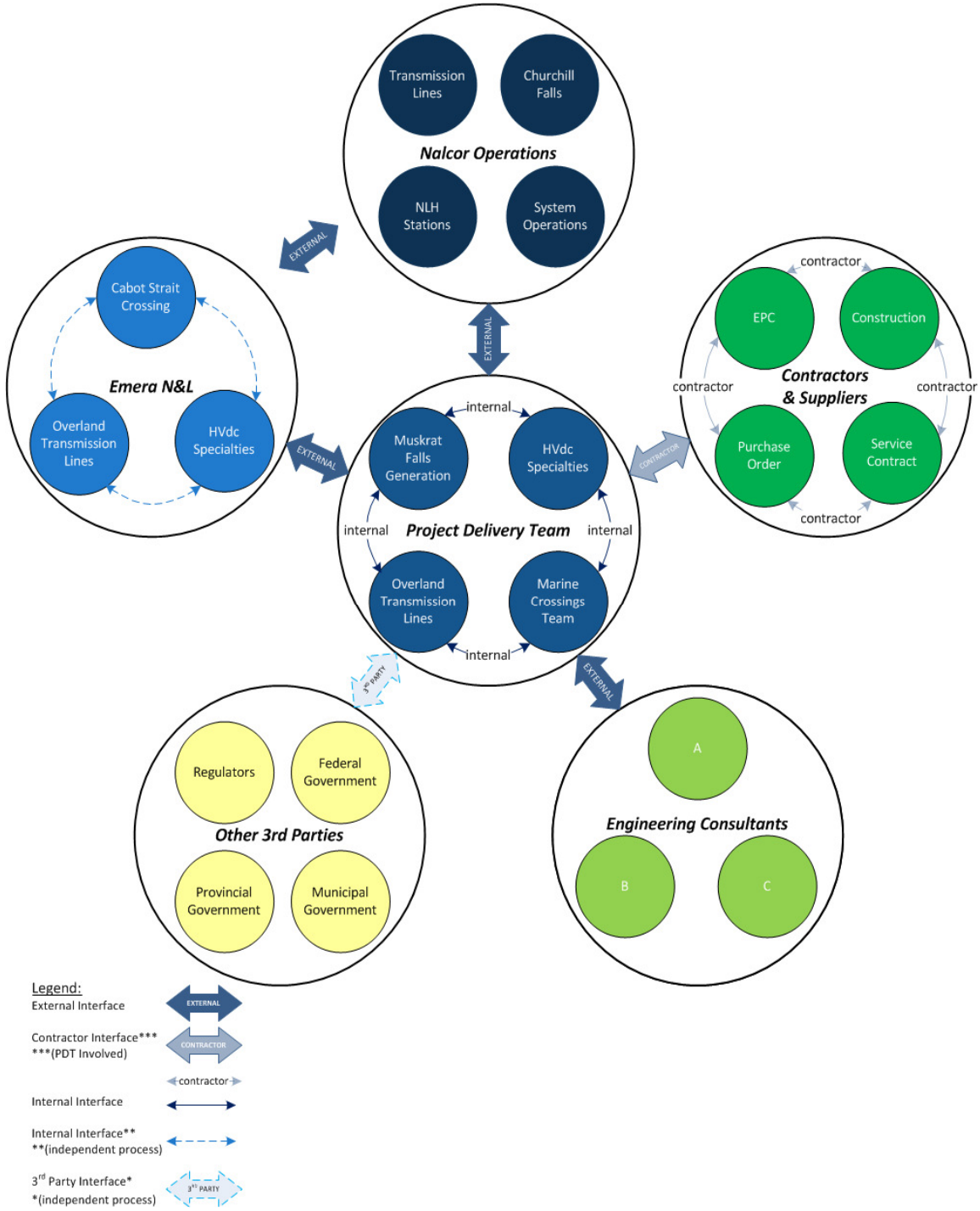
Technical Interface Management creates a collaborative environment in order to reduce risks, errors, and re-work on the Lower Churchill Project. A multi-faceted project requires controlled and structured management of technical interface issues between the various groups responsible for each commitment package, component, and existing asset. Success is dependent upon clarity, simplicity, and visibility of process such that implementation provides the desired objectives without imposing unnecessary complexity. It is imperative that Technical Interface Management is understood and applied effectively by all Lower Churchill Project (LCP) team members, other Nalcor business units involved in the project, and Nalcor co-venture partners. Engineering, Procurement and Construction (EPC) contractors must have their own technical interface management plans that align with this.

There must be a process for management of technical interfaces including identification, evaluation, approval, documentation, monitoring and closeout. It is not intended to circumvent or supplement the document control process although that process may be used to provide deliverables as appropriate. Nor is it intended to discourage or complicate the routine informal exchange of information between project groups. It is applicable to all major technical interface issues. Any interface deemed significant enough by either party to require formal recognition and tracking due to the potential to impact cost, schedule, or scope, shall be subject to the process described herein.

Technical interfaces on the LCP fall into the specific categories of Requests for Information (RFIs), Technical Queries (TQs) as well as both Internal and External Technical Interfaces. This process will be used for all hard and soft technical interfaces that exist among the various project groups including, but not limited to: Muskrat Falls Generation; Transmission Lines; HVdc Specialties; Nalcor co-venture partners; EPC Contractors; Subcontractors; and other Consultants, Contractors, and Suppliers. Figure 29 below provides an illustration of some of the key groups between which and within which technical interfaces will exist. Examples of both external and internal interfaces are provided. The process does not address construction and contracting interfaces which are managed through the various Project planning processes and mechanisms. Nor does it address design questions identified during the construction phase of any scope of work which are to be managed through use of the [Site Query Procedure](#), reference document No. [LCP-PT-MD-0000-CS-PR-0001-01](#).

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Figure 29: LCP Technical Interface Information Flow



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9.6.1 General Strategies

Technical Interface Management requires the support of the Project Management Team, the participation of the Project Delivery Team, and full engagement of those principal players described in the Responsibilities section. Success is reliant upon an understanding of the process and specific responsibilities (the system) as well as the identification of the Technical Interfaces that exist within the Project. The Technical Interface Management Lead must ensure that this has been addressed. It is also critical that the technical interface process and responsibilities are maintained in order to be current with the demands of the Project as it evolves.

The Project requirement for management of Technical Interfaces includes the provision of a procedure that addresses the scope of the Project Delivery Team. The procedure shall describe the system to be used to identify, evaluate, approve, document, monitor, and close all Technical Interfaces including internal, external, Technical Queries, and Requests for Information. The forms to be utilized, the details required, the responsibilities of those involved, and the means for reporting and stewarding effective closure shall be described in this procedure.

In order to ensure that the identification and maintenance of all Technical Interfaces is carried out in a thorough manner, a strategy for this must be in place. The Project strategy for identification of technical interfaces includes several techniques including interviews with representatives of the commitment packages to assemble a summary list, workshops between commitment packages to review and validate interfaces, engagement with planning representatives to confirm critical interfaces are captured in Project schedules, meetings between Project components and Area Managers to address Technical Interface challenges, and empowerment of the Interface Engineers to lead and facilitate the identification, registration, and as required review of Technical Interfaces within their areas of responsibility.

Each Contractor shall also be responsible for complying with the principles of Technical Interface Management. They shall have their own internal procedure for managing their internal technical interfaces. For those contracts, such as the Engineering, Procurement, and Construction (EPC) type, that will have technical interfaces with other scopes / contracts there will be a requirement to not only comply with these requirements but to use the associated procedure to manage their Contractor Technical Interfaces. Specifically, as per the requirements of the contract, “Contractor shall manage external interfaces with other organizations involved in the LCP, including Company Representative, Company's Other Contractors and their subcontractor(s) and vendor(s) of every tier, Authorities and other entities associated with the Work.”

Just as important to the success of technical interface management is the identification and management of Project Technical Interfaces with existing Nalcor Operations and assets. This includes awareness of the impact of the Project on Operations, the need to understand Operations requirements from the Project, compliance with standards, maintaining an effective relationship with activities and changes in Operations’ own plans, and in general, recognizing that the Project is a deliverable to existing Nalcor Operations and must therefore accommodate the currently existing

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assets. In order to achieve this it will be necessary for Project team members to establish functional relationships with key stakeholders within the Operations team to identify, monitor, and provide timely feedback on this aspect of technical interface management.

The Maritime Link is an element of the Lower Churchill Project that is being managed by another organisation, Emera Newfoundland and Labrador (ENL). It is important to recognise that although the same principles of Technical Interface Management apply to technical interfaces between the rest of the Project and Maritime Link, ENL also has its own procedure to address its particular interface issues within its scope and with other parties.

Finally, there may be additional third party interests that require consideration from a Technical Interface perspective. Included in this group are government bodies at municipal, provincial, or federal levels and other utilities that may either provide or require technical input that would impact the Project. This group may be more difficult to define and may require additional support from the Project to manage inputs on their behalf. It may also require more diligence to identify such interfaces as the parties involved will not be familiar with the Project's requirements and certainly not the processes we have in place to address these requirements. With this in mind the system used by the Project Delivery Team may not be appropriate for managing these third party Technical Interfaces and there may be a requirement to be more creative to ensure they are neither over-looked nor properly managed. It will not always be practical to establish an Interface Coordinator within another organisation to facilitate the process. A detailed description of the LCP interface process is indicated in the Technical Interface Management Plan, LCP-PT-MD-0000-PM-PL-0006-01

9.7 RISK MANAGEMENT

Project risk management addresses the uncertain events or conditions that, if they occur, it will have negative (threat) or positive (opportunity) effects in the LCP Project objectives: cost, schedule, quality, safety, environment and reputation.

A risk event may have one or more causes and one or more effects. Primarily the effects would be on the LCP Project triple constraint: scope, cost and schedule. These effects also extend to cover all defined LCP Project's objectives. Risk management seeks to protect the LCP Project in fulfilling its objectives by developing mitigation strategies and related actions plans.

For LCMC risk management is going to be pursued as an integral part of the LCP Project management process. Risks are going to be managed in a concerted effort by the LCP Project and Sub-Projects Management Team and identified members of LCP Project Delivery Team (PDT).

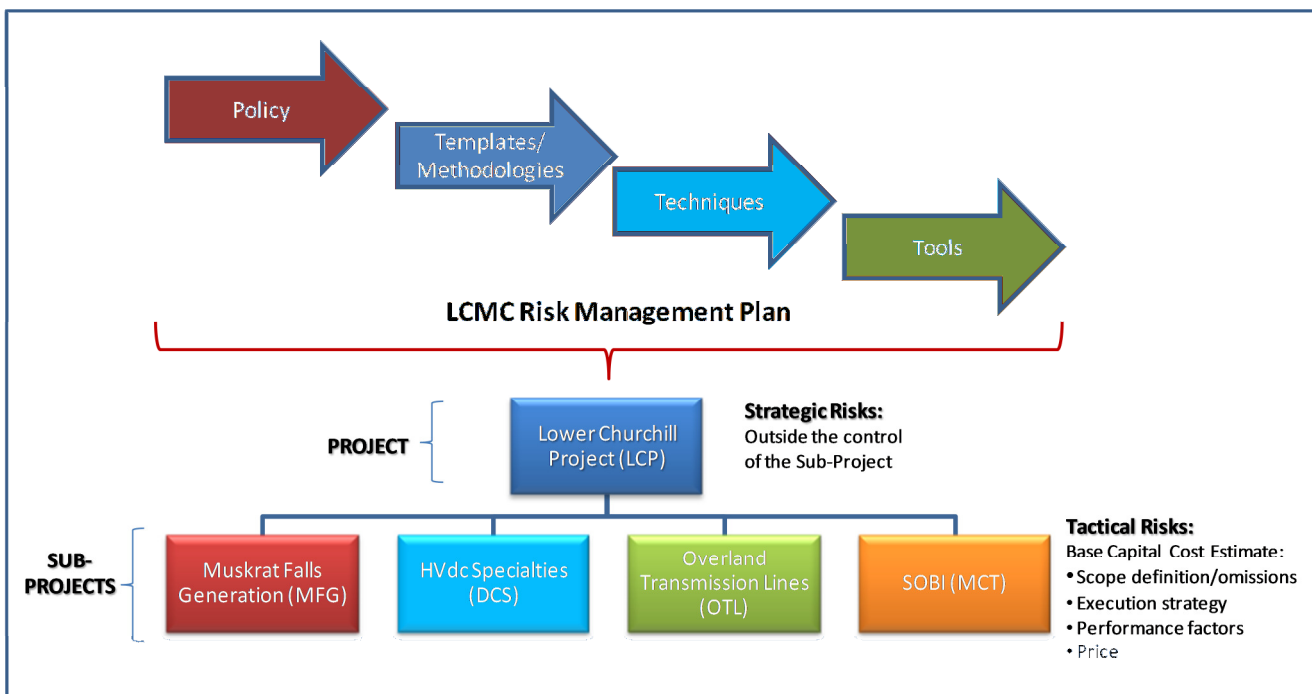
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9.7.1 General Strategies

LCMC is committed to follow established risk management practices for LCP Project and Sub-Projects proactively investing in the deploy of the risk management methodology ensuring that LCP Project requirements and high expectations are going to be achieved.

Strategies to implement a LCP risk management framework from policy to implementation is depicted in Figure 30.

Figure 30: Risk Management from Policy to Implementation



- **Strategic Risks:** applies to LCP Project and basically related to external issues like: (these risks are largely outside the control and management of the Sub-Project using their own resources)
 - Enterprise – corporation level issues
 - Governance
 - Financial markets
 - Stakeholders
 - Hyperinflation
 - Regulatory approvals

These risks are largely outside the control and management of the Sub-Project using their own resources

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- **Tactical Risks:** applies to LCP Sub-Projects and basically related to internal issues; these risks are under the control and management of the Sub-Projects using their own resources. For LCP, tactical risks are associated with the Base Capital cost estimate and cover the uncertainty of the following four estimate’s elements: (it doesn’t include price escalation).
 - Sub-Project definition and scope omission
 - Construction Methodology and execution
 - Performance factors
 - Price

9.7.2 Key Success Factors

LCMC recognizes that organizational culture is a key success factor for effective risk management within the LCP Project and Sub-Projects. The goal is to develop a culture that:

- Supports a honest, realistic and open recognition of LCP Project and Sub-Project risk even if they indicate problems with the project;
- Encourages talking about risk realistically, with no penalty for people who do so openly with the LCP risk management process;
- Promotes discussion in an atmosphere where there are no risks are out-of-bounds for discussion and no enforcement of bureaucratic hierarchy in meetings where risk identification and assessment is discussed and;
- Maintains commitment to collecting realistic and high-quality data about risk. Risk data are often based on the judgment and expertise of informed individual within the LCP Project Delivery Team (PDT).

9.7.3 Risk Management Process Cycle

The risk management process used to effectively manage risks during the planning and execution stages of the Lower Churchill Project (LCP) and Sub-Projects is depicted in Figure 31.

This risk management process is comprised of four main steps which combine to form an ongoing cycle and it is a cyclical and iterative process performed throughout the project development cycle that for LCP refers to the gateway process as indicated in the [LCP Project Execution Plan](#), reference document No. [LCP-PT-MD-0000-PM-PL-0001-01](#).

A detail description of the LCP risk management process is indicated in the [Project Risk Management Plan](#), reference document No. [LCP-PT-MD-0000-RI-PL-0001-01](#).

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Figure 31: LCP Risk Management Process Cycle



Step 1 – Risk Identification and Organization

All risks are captured on Sub-Projects risk registers. The risks are then organized by major activity and type of risk; this organization facilitates both efficiency and effectiveness handling of the risks.

Step 2 – Risk Assessment and Prioritization

Each risk is given a “first-cut” priority ranking which is a function of the risk’s likelihood of occurrence and its potential consequence. From there, approximately 15-20 of the more complex and high impact-likelihood profile risks (Key Risks) are selected to be overseen by the Risk Resolution Team. Risk qualitative assessments are performed to evaluate both the individual and collective impacts of risks on the project, and to provide insight into the value of possible risk mitigations.

Step 3 – Risk Response

Each Key Risk is managed using a Response Plan which is recorded in the LCP risk management tool – Iris Intelligence. The Response Plan will detail the recommended strategy for managing the risk (i.e., avoidance, transfer, mitigation, or acceptance). The majority of risks are not elevated to Key Risk status and are managed using Action Plans within the LCP risk management tool which are reflected on the sub-project risk registers. Each risk’s Risk Owner is responsible for leading the development and implementation of that risk’s response or action plans.

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Step 4 – Risk Monitoring and Control

The response and action plans are reviewed on a regular basis and are adjusted as conditions warrant promoting optimal outcomes. The frequency of reviews ranges from monthly to quarterly depending on the organizational entity involved in the review.

9.8 PROJECT DOCUMENT CONTROL MANAGEMENT

One of the key enabling components of a successful project is a well-planned and executed Information Management (IM) – project document control management process. Information Management is an encompassing term that includes the people, processes, and tools within an organization that are required to manage information throughout its life cycle; from its creation to its ultimate disposition.

All decisions made during the life of the project during the course of business are the only permanent record of the information required to make those decisions. Therefore these information assets must be managed and controlled.

9.8.1 General Strategies

General strategies related to the management of the LCP records are supported with best practices oriented to implement a LCP Document Control Team performing its function in an efficient and effective way; for maintaining a controlled environment for the preparation, approval and oversight of the LCP documentation. It will ensure that only the properly authorized LCP documents are distributed to the LCP Project Delivery Team and Internal – External stakeholders for use, which keeps track of all documentation, systems and procedures, to keep everyone using the correct and most current documentation, and implements a system of records and regulations whereby control is maintained over the origination, reproduction, transmission, receipt and disposition of LCP classified documents.

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Figure 32: Best Practices – Document Control Management



These best practices and standards applied to the document control function during the implementation – execution of the LCP Project shall include but not limited to:

- Defining the role of LCP Document Control as a department and function.
- Implementing general practices for the management of technical, contractors/suppliers and administrative/correspondence documents.
- Establishing the LCP Document Control organization.
- Implementing an Electronic Document Management System (EDMS) during the execution phase of the LCP Project and Sub-Projects for managing, distributing and controlling of technical, contractors/suppliers and administrative/correspondence LCP Project and Sub-Projects documents.
- Classifying LCP Project and Sub-Project documents and producing a comprehensive and accurate archives for both legal and reference purposes upon project completion.
- Transferring of project documents and integration requirements with the Operational Organization of the LCP Project.

In addition to general strategies indicated above, the following general guiding principles are considered for the LCP Project and Sub-Projects:

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- Electronic document usage shall conform to the normal course of business of the project.
- The project must maintain records in a systematic and consistent manner.
- Project documentation must be readily accessible to the entire Project Delivery Team.
- The EDMS used by the Project Delivery Team must have an authorizing person responsible for the integrity of the system.
- The EDMS used by the Project Delivery Team must be auditable and testable, and proof of the integrity of the system must be maintained so that it can be presented at any time.
- All records maintained by the EDMS must be secure, and all personnel maintaining and using the system must be authorized.
- Project records shall not only be accurate and detailed, but should also reflect the correction of ambiguities in project documentation, including those received from other participants. Where the document controller or project team member identifies errors or ambiguities, they shall immediately be returned to the originator of the document for correction.

9.8.2 Objectives of Project Document Control

Objectives of the LCP Project document control function for project records, transmittal control, engineering review, administrative/correspondence control, tracking of issues, development of final deliverables, and to create an audit trail are:

- To organize the LCP Project and Sub-Projects documents consistently
- To facilitate the LCP Project and Sub-Project engineering review process.
- To reduce duplication and storage requirements.
- To make LCP Project and Sub-Projects documents easy to locate and retrieve.
- To provide a secure controlled access.
- To share LCP Project knowledge with the required Project Delivery Team
- To make LCP Project and Sub-Projects documentation available anywhere.
- To prevent misplacement or loss of LCP Project information.

9.8.3 Document Types

The different document types identified for the different phases of the LCP Project following the gateway process are indicated in Table 7.

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Table 7: Document Types

Type	Origin	Examples	Responsible
Technical	LCMC internal Technical documents including engineering documents prepared by LCMC Consultants.	Engineering deliverables, e.g. drawings, specifications, technical requirements, LCP specifications and standards. Management System Documents (plans, procedures, forms, etc.).	Document Control.
Contractors/Suppliers	LCP Suppliers and Contractors	Equipment fabrication and installation-construction documents.	Document Control.
Administrative/Correspondence	Various	Letters, faxes, e-mails, memos, invoices, procurement documents.	Document Control. Procurement Administrative Assistants.

Technical Documents:

- Technical documents are engineering deliverables produced internally by LCP Delivery Team.
- Document revision control is essential for this type of documents.
 - Management System Documents
 - Pre-bid
 - Bid
 - Construction
 - As-built
- Technical documents are issued to many parties for information and to acknowledge that these technical documents have reached a specific status.
- Transmittal of technical documents must include:
 - Document Status.
 - Purpose of the document (why the attached document are being sent to the recipient, e.g. internal review, company review comments).
 - Action to be performed in the document.

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Contractors/Suppliers Documents

- These are documents expected from LCP Contractors and Suppliers as specified by the LCP Technical – Project Delivery Team.
- These documents are received by LCP Document Control from Contractors and Suppliers.
- Internal transmittals are used to issue Contractors/Suppliers documents to LCP Technical – Project Delivery Team for review and comments.
 - Version control is essential for these documents.
 - Document statuses are used for approval tracking (e.g. reviewed, incorporate comments, etc.).
 - Legal liability remains with the Contractors/Suppliers.
- Transmittal of Contractors/Suppliers documents are used to return to Contractors/Suppliers contractual documents that require further actions and must include:
 - Purpose of the document indicating the reason for sending the attached documents to the LCP Suppliers/Contractors (e.g. information, incorporate comments, etc.).
 - Status of the document, used for approval tracking. Indicates the level of approval for LCP Suppliers/Contractors documents.
 - Action to be performed by the recipient of the document.

Administrative/Correspondence Documents

- Administrative documents must be registered and archived for both legal and reference purposes.
- In general administrative documents do not use submittal numbering.
- If required revision number will be indicated; some administrative documents may evolve during the life of the project (e.g. organizational charts.)
- Not all administrative documents need a transmittal (e.g. documents issued with a letter don't need a transmittal).

9.8.4 Electronic Document Management System (EDMS)

With the intent to take advantage of the latest approved technologies and best practices to control project documents, for the execution of the LCP Project and Sub-Projects an Electronic Document Management System (EDMS) – Aconex has been implemented in order to enhance capabilities of this technology for the use of electronic documents as normal course of business for the LCP Project.

A key element related to the EDMS tools is the management of metadata. Metadata is captured in order to enable LCP Project records to be understood and to support their management and use. Such descriptive information ensures that reliable, meaningful and accessible records are preserved and

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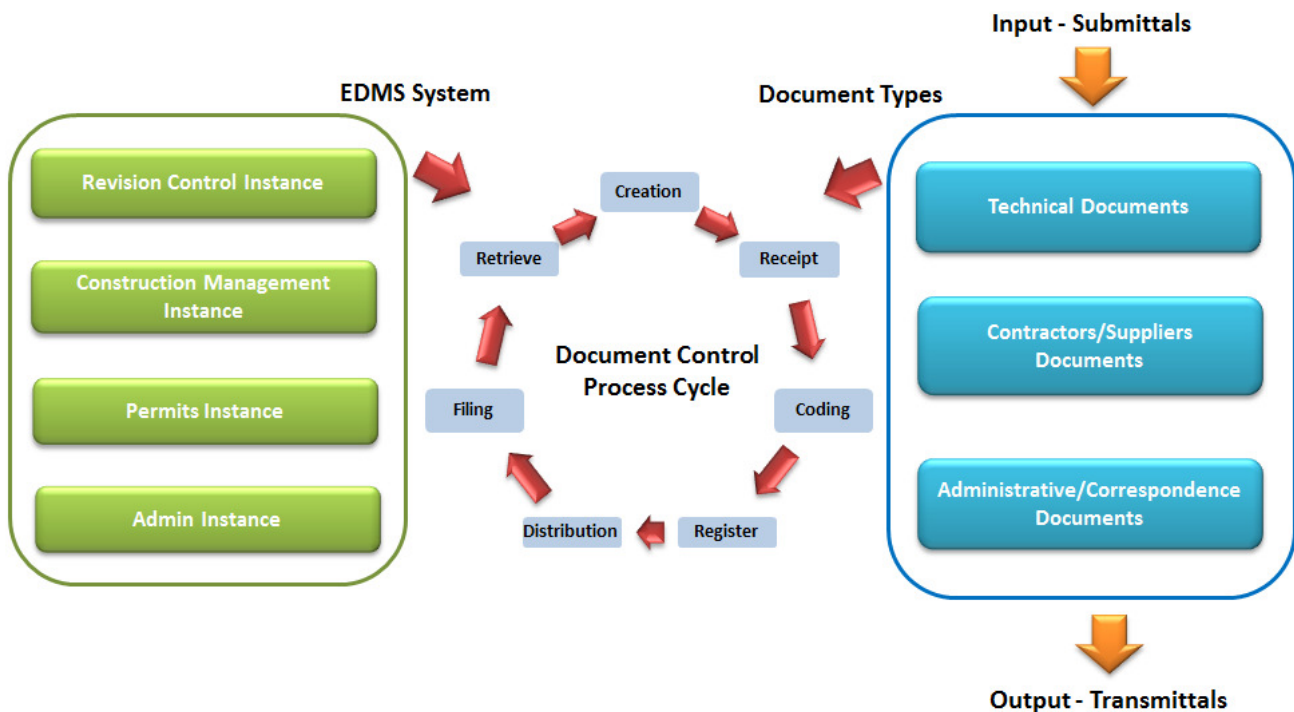
carried forward through time to satisfy LCP Project requirements and to facilitate document disposition.

Some of the processes supported for a proper metadata management are:

- Identification and description of documents.
- Classification of documents.
- Search of and retrieval of documents.
- Viewing and reproduction of documents.
- Workflow and version control of documents.
- Establishment of relationship between documents.
- Security of and access to documents
- Management of documents throughout their life cycle.

EDMS – Aconex is the most widely-used online collaboration platform for construction, infrastructure, energy and resources projects. It is a secure online platform for storing, managing and distributing all project information. It can be accessed via internet connection, 24 hours-a-day, 7 days-a-week.

Figure 33: LCP Document Control Process – EDMS System



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For a detail description of this functional application, please refer to the [Information Management Plan](#), reference document No. [LCP-PT-MD-0000-IM-PL-0003-01](#).

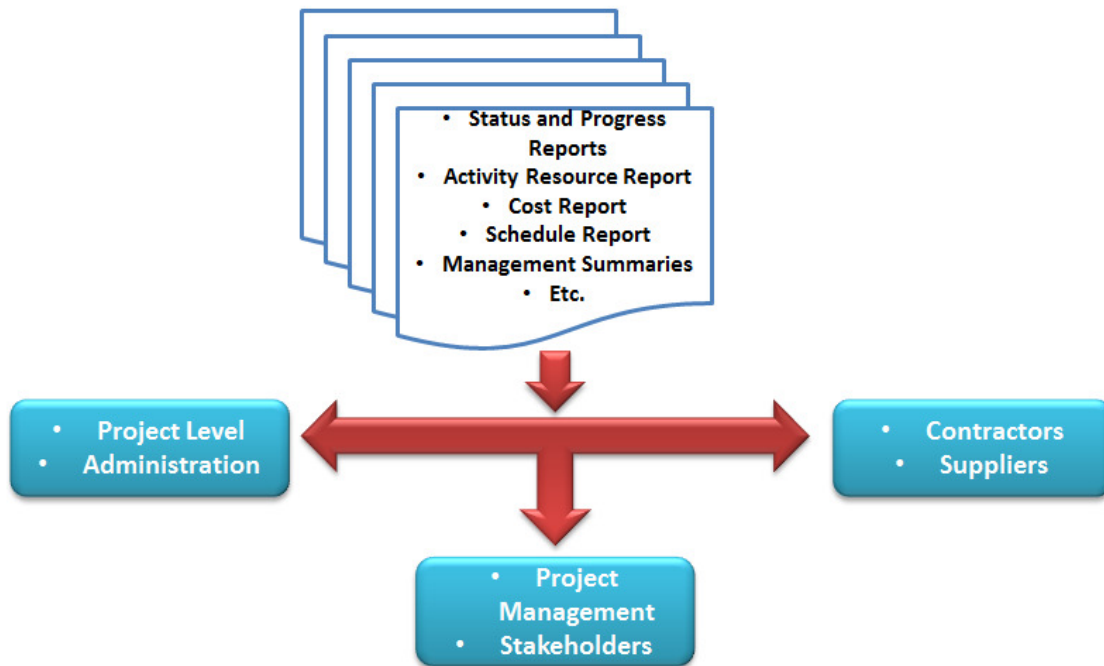
9.9 REPORTING

During Phase 4 of the LCP Project and Sub-Projects execution, the LCP PMT, Project Delivery Team and Stakeholders will share information using a variety of communications mechanism as depicted in Figure 34.

The reporting process will principally include but not limited to:

- Project Status meetings.
- Meeting notes – Minutes of Meetings.
- Status and progress reports.
- Executive meetings.
- Steering committee meetings.

Figure 34: Project Reporting



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9.9.1 General Strategies

For the LCP Project and Sub-Projects, the reporting process covers: project status that refers to the state of the project at a given date; project progress that refers to the performance of the project since the last status date and the project forecasting that refers to the expected project performance from this status date to the next status date and to the end of the project.

During internal coordination meetings at the Component – Sub-project level, the Project Manager will review with the Project Delivery Team the project’s parameters, specifically scope, cost, schedule, quality, interfaces, change management, risks, etc. Discussions among the Project Delivery Team will also focus on what is expected to be accomplished to the next status date and to the end of the project. This may trigger the process to re-estimate activities and re-assess risks.

In general the project progress report should contain the following elements:

- The project status: “where are we at”.
- The project progress: “what have we done since the last status”.
- The project forecast: “what we expect to do until the next status and to the end of the project”.

For LCP Project; different reports will be produced to provide status, progress-performance and forecast information of the project to internal and external stakeholders. A list of these key reports are indicated in Table 8.

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Table 8: LCP Reporting Matrix

Report (Output)	Purpose and brief description	Frequency	Audience / Recipients
Cash Flow Forecast (to end of Project)	*Provided to Emera, Province and Federal Gov't to facilitate funding to the Project.	Monthly	Finance Team
Incurred Cost Report	*Facilitate preparation of accrual file	Monthly	Finance Team/Project Controls Team
EPCM and Owners Accrual	*Facilitate accrual process with JD Edwards and assist in reconciliation of the three systems - Prism, PM+ and JD Edwards	Monthly	Finance Team
Project Controls Monthly Summary	*To provide monthly project controls overview (includes cost, schedule and risk), and facilitate meeting to discuss	Monthly	LCP Senior Management
Monthly Cost Overview Data-Compilation of Separate files from Project Controls Monthly Summary, including Cost Reports, Curves, Contingency Drawdown, Narrative & Highlights	*To provide monthly project cost overview once approval provided, for integration into Monthly Reporting Deliverables for the current period	Monthly	Compiled into multiple reporting deliverables and distributed as indicated
Cost Flow	*To facilitate financial reporting requirements	Monthly	Finance Team
Construction (Lenders) Reports	* Completion of two separate reports (Muskrat/LTA, and LIL) based on requirements of Financing Agreements * Report outlines project budget, provides cost analysis of current and to date planned/incurred cost, cost to complete and forecast cost, overview of construction progress and milestone dates, status of material project documents (contracts), and any material disputes *Facilitate funding request	Monthly	LCP Senior Management Government of Canada Government of NL Oversight Committee Independent Engineer Legal Counsel Collateral Agent
LCP Executive Summary (Dashboard) Report	*High level summary of the monthly report outlining Cost, Progress & Schedule Performance, Health & Safety, Environment, and construction highlights for the period	Monthly	Project Controls Leads Finance Team LCP PMT LCP Senior Management Government of NL Oversight Committee
Additional Material Documents and Monthly Progress Reports as outlined on the Material Project Document Monthly Report Status	* Requirement within the Financing Agreements to provide 1.) copies of all Additional Material Documents listed in the agreement as they become executed; and 2.) copies of the Contractor's Monthly Progress Report for each Material Document	As available	Independent Engineer Government of NL Oversight Committee
Material Project Document Monthly Report Status	*To provide an overview of the availability and distribution of Contractor Monthly Reports for the Material Project Documents as outlined within the Financing Agreements	Monthly	LCP Senior Management Independent Engineer Government of NL Oversight Committee Government of Canada
Material Contracts Monthly Cost Summary	*To provide a monthly project cost overview for the list of Material Contracts	Monthly	Independent Engineer Government of NL Oversight Committee Government of Canada
Integrated Project Schedule (IPS)	* To provide summary and detail by scope and activity level of current LCP Integrated Project Schedule with any adjustments to timeline during the period	Monthly	Various members of LCP PDT Project Controls Planners LCP Senior Management Independent Engineer Government of NL Oversight Committee Government of Canada
LCP Corporate Plan Performance Report	* To provide LCP project status for update against corporate initiatives	Monthly	LCP Senior Management Nalcor Energy Executive Leadership
LCP Monthly Progress Report	* Keep LCP Project Management Team and key stakeholders informed on a monthly basis of project activities, status of completion, milestones achieved and progress against LCP baselines (cost & schedule) * Includes planned, incurred and forecast values and action taken or planned as required to maintain the project objectives * The report contains all essential information and updates for all assets and components, along with all other functional areas including, Health & Safety, Environment, Quality, Project Controls, Labour Relations, Supply Chain Management, and Human Resources	Monthly	Various members of LCP PDT LCP PMT LCP Senior Management Nalcor Executive Leadership Government of NL Oversight Committee Government of Canada Independent Engineer
LCP Board Presentations	*To provide the LCP Board of Directors overview of current status of the Project; consistent with reporting to all stakeholders (Nalcor CEO, Independent Engineer, Government of NL Oversight Committee, and Government of Canada)	As per schedule set out for LCP Board Meetings prior to start of calendar year	LCP Senior Management Nalcor Executive Leadership Nalcor Energy Board of Directors

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9.9.2 Overall Monthly Progress Report

The Monthly Progress Report is a key vehicle for information transfer to all Project stakeholders and facilitates timely and consistent communication of data and forecasts. The purpose of this report is to document and communicate key aspects of Project status and outlook throughout the Project life. Charts, graphs and photos will be included, as appropriate. The Monthly Progress Report will be compiled by the Stewardship Reporting Coordinator, verified by the Project Controls Manager and approved by the Project Director of Generation and the General Project Manager Transmission Link.

A typical table of contents for a Monthly Progress Report follows:

- Executive summary (including overall cost, schedule and progress).
- Health, Safety and Security.
- Environment – Regulatory Compliance.
- Quality Assurance.
- Change Management.
- Technical Interface Management.
- Risk Management.
- Human Resources / Information Systems.
- Labour Relations.
- Cost and Schedule.
- Components status.
- Attachments.

9.9.3 Monthly Cost and Schedule Stewardship Meeting

A focal point of the Cost and Schedule Stewardship Process is a monthly meeting to communicate cost and schedule activity to the LCP PMT. These meetings will be chaired by the Project Controls Manager and facilitated by the Projects Controls Leads. Prior to the meeting, a package will be prepared and distributed that will contain cost, schedule and progress information. See attachment 11.1 for typical format. This package is then approved by the PMT prior to finalizing any project reports

The objectives of the monthly cost and schedule stewardship meeting will be to:

- Discuss the cost and schedule status as presented in the meeting package
- Identify and quantify cost and schedule drivers.
- Identify opportunities and vulnerabilities.
- List and assign action items.
- Foster an environment to make the best general interest decisions.
- Execute the Project in an active, cost conscious environment.

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- Eliminate cost and schedule surprises.
- Review risks and determine if cost risk profile is a cause for concern when compared to available funds in the AFE.
- Review contingency drawdown and raise any alerts on trends.

Cost Review

The Project Controls Manager will discuss the Project's overall status, as well as details of each of the sub project components. These discussions will include the following:

- Summary charts at the Project and Sub-Project levels that show the cumulative effect of monthly changes.
- Trends, such as contingency rundown versus change activity and forecast growth.
- The effect of cost reduction on achieving cost targets and the estimate-to-complete.
- Commitments, work-in-place, expenditures and current forecast compared to AFE totals.
- Review of current contingency status, including both short and long term expected contingency draws and returns.
- Overall cost performance against budget
- Risks and opportunities
- Other pertinent issues that may arise

The process entails communicating both what the cost drivers are and an awareness of early indicators for opportunities to capture and / or risk areas to mitigate.

The cost review section will address schedule impacts that drive cost. These differences include management of interfaces, critical path management and overall Project progress as well as schedule recovery if required.

Schedule/Progress Review

These discussions will include the following:

- Variations to milestones
- Progress
- Critical and sub-critical path(s)
- Front-lined schedules
- Schedule effects due to current changes
- Risks and opportunities

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9.9.4 Monthly Meetings with Sub-Project Management

Monthly meetings will be held with Sub-Project management teams to discuss all elements of Project Controls.

9.9.5 Change Management Stewardship Meeting

The Change Control Board, established by the Project Director, will serve to determine the validity and impacts of potential/pending (outstanding) PCN’s. Assessments will be made by the Change Control Board to determine whether consideration of each outstanding PCN is to be further progressed beyond its current status, implemented or rejected. For PCN’s considered to merit ongoing consideration, assessments of the impacts will also be made by the Change Control Board.

10 PROJECT CLOSE-OUT

10.1 CONTRACTOR CLOSE-OUT REPORTS

Following LCP Sub-Project (Component) requirements and as applicable, it is recommended that no later than sixty (60) days after contract completion date, each contractor will prepare and submit a final contract report for their portion of the work. The detailed contents and format of this report shall be agreed between the contractor and LCP PMT. To the extent practical, the final contract report will build on the standard report which the contractor might typically prepare for its internal documentation. One section of this report will be devoted to an analysis of overall job execution citing those actions by both contractor and LCP PMT that:

- enhanced performance or
- interfered with or detracted from achieving desired results.

It should contain photographs depicting significant activities and general progress at all work sites. Care should be taken to ensure that the preparation of the final contract report is an ongoing activity during the life of the Project.

10.2 PROJECT MANAGEMENT CLOSE-OUT REPORT

In addition to the close-out reports developed by each of the contractors, the LCP PMT will prepare a Project Management close-out report. This report will document the results of the efforts of the LCP PMT and all contracted resources used in carrying out the Project. It will also describe the evolution

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(technical, execution, cost and schedule) of the Project from the Gate 3 estimate through to completion.

The purpose of this report is to:

- capture actual results,
- provide reconciliation against earlier estimates and
- provide support for development of estimates for future projects.

The report will summarize the entire Project including items such as lessons learned, cost, and progress. Each LCP Sub-Project and functional areas is responsible for capturing the information and data, archiving it as the Project progresses and submitting it to the Project Controls Manager in the form of a completed summary for the applicable portion of the Project. The Project Controls Manger is responsible for collecting input from the various areas and publishing the final report.

The report will include the following:

- Summary – business purpose of the Project
- Project history – overview of Project evolution
- Lessons learned – by function or component
- Facilities – brief description of what was constructed
- Schedule – summary bar chart schedule of actual vs. planned
- Cost – budget history and actual information
- Organization / manpower – organizational charts during all Gateway Phases
- HSE performance
- Quality – quality program summary and results
- Engineering – brief description of engineering effort and drawings produced during each phase
- Procurement / materials management – scope of materials management program, procurement strategy
- Contracting – final WBS, contracts issued, change orders, performance results
- Construction – key methods employed, results, design changes, innovations
- Start-Up – overview of start-up planning, production rates
- Financial – update on the Project economics, changes and major drivers
- Controls / audit / accounting – project control systems used and results
- Regulatory – overview of regulatory and permitting activities
- Operations – operations philosophy
- Joint venture agreements – chronology of events
- Project reviews – dates and brief summary of findings

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11 ATTACHMENTS

11.1 MONTHLY COST AND SCHEDULE STEWARDSHIP MEETING

Cost Approval Form

Period Ending:		MF	LITL	LTA	LCP	LCP (Previous Month)
CCB (Excluding Contingency)	A					
Budgeted Contingency	B					
AFE	C = A+B	\$0	\$0	\$0	\$0	\$0
Committed						
Incurred	D					
FTC (Excluding Contingency)	E					
Forecasted Contingency	F					
FFC	G = D+E+F	\$0	\$0	\$0	\$0	\$0
FFC - AFE	G - C	\$0	\$0	\$0	\$0	\$0

Prepared by:	Name	Signature	Date
Lead Cost Controller			
Reviewed by:			
Project Controls Manager			
Approved by:			
Deputy Project Director - Generation			
Project Director - Generation			
General Project Manager - Transmission			

MF Budget and Contingency Allocation

C.P.	BUDGET					CONTINGENCY				
	Budget Allocation This Period	Budget Allocation This Period Description	Unallocated Budget	Unallocated Budget Description	Unallocated Budget at AFE	Contingency Allocation This Period	Contingency Allocation This Period Description	Unallocated Contingency	Unallocated Contingency Description	Unallocated Contingency at AFE
CH0007										
CH0008										
CH0009										
CH0024										
CH0029										
CH0030										
CH0031										
CH0032										
CH0033										
CH0034										
CH0049										
CH0052										
CH0068										
PH0014										
PH0015										
PH0016										
PH0036										
PH0058										
PH0070										
SH0018										
SH0019										
SH0020										
SH0022										
SH0040										
SH0041										
SH0051										
SH0069										
SH0071										
SH0072										
SH0081										
SM0705										
XXSMFG										
SM0701										
SM0709										
XF0001										
XX0002										
SM0706										
SM0707										
XX0100										
XX0300										
XX0400										
XX0900										
ZZ0999										
CD0509										
CD0510										
CD0568										
CT0319										
PT0351										
SD0560										
General										
	0		0		0	0		0		0

Expected Contingency Draw Down (MF)

PCN #	Description	Value (\$)	Status	Target Commitment Date	Comments
AFE Rev5 Contingency (end of Jun 2017)					
Available Contingency (1)					
Short Term Issues					
PCN #	Description	Value (\$)	Status	Target Commitment Date	Comments
DAN #	Description	Value (\$)	Status	Target Commitment Date	Comments
Required Contingency for Short Term Issues (2)		0			
Long Term Issues					
PCN #	Description	Value (\$)	Status		Comments
DAN #	Description	Value (\$)	Status		Comments
Required Contingency for Long Term Issues (3)		0			
Required Contingency considering all known Issues (4 = 2 + 3 -1)		0			

MFG Risk Register

Risk - Expected Value if Risk Items Materialize											
Risk Code	Title	Current Cost EV (\$)	Current Probability	Previous Period Cost EV (\$)	Previous Period Probability	Original Cost EV (\$)	Original Probability	Value Included in AFE (\$)	Risk Owner	Mitigation Actions	Comments
	Total CH0007 - Intake & Powerhouse, Spillway & Transitions Dams Construction	-		-		-					
	Total CH0009 - North & South Dams	-		-		-					
	Total CH0030 - Turbines & Generators Supply/Install	-		-		-					
	Total CH0031 - Mechanical & Electrical Supply/Install	-		-		-					
	Total CH0032 - Hydro-Mechanical Equipment Supply/Install	-		-		-					
	Total CH0052 - Habitat Compensation Works	-		-		-					
	Total CH0068 - MF Construction Power	-		-		-					
	Total MFG General	-		-		-					
	Risk - Expected Value	-		-		-					

Opportunity - Expected Value if Items Materialize					
Code	Title	Cost EV	Probability	Previous Period Cost EV	Previous Period
	Opportunities - Expected Value	-		-	

LCP Phase I - Muskrat Falls Generation Cost Highlights

**LCP Phase I - Muskrat Falls Generation
Cost Highlights**

Key Issues / Opportunities Under Study > (+/- \$1M) (Not in FFC - Early Stage/ Low Accuracy regarding Strategy and Cost Impact)

- 1
- 2
- 3
- 4
- 5

Key Issues / Opportunities Under Study > (+/- \$1M) (Part of FFC - Early Stage/High Accuracy regarding Strategy and Cost Impact)

- 1
- 2
- 3
- 4
- 5

FFC Monthly Variance

- 1
- 2
- 3

**LCP Phase I - Muskrat Falls Generation
Incurred Highlights**

1. Monthly Incurred

Planned Incurred:
Incurred:
Variance:

Main Causes:

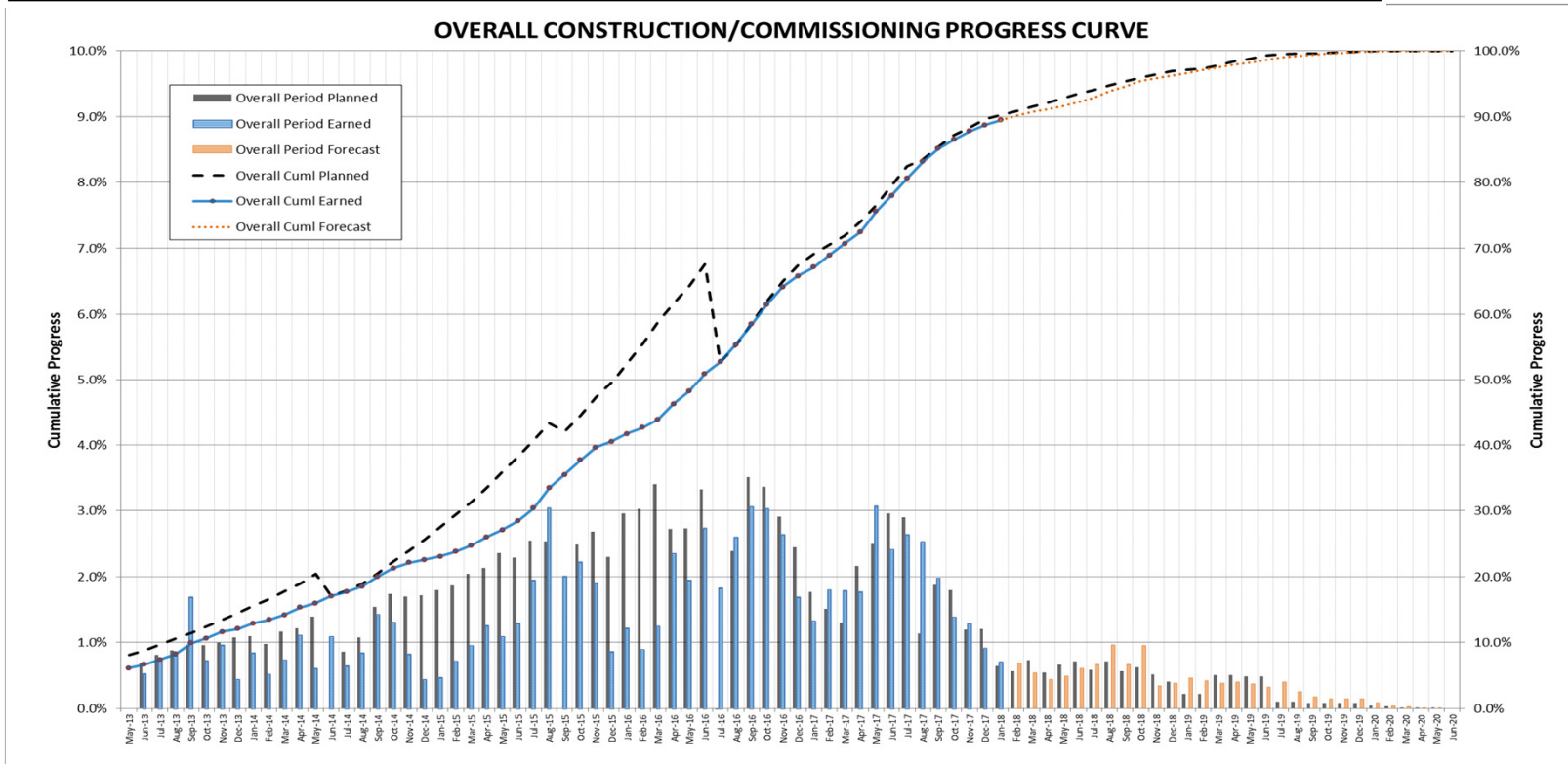
2. Yearly Incurred

Planned Incurred for 2018:
Incurred Yearly to Date:
Forecast for 2018:
Variance (Forecast vs Planned):

Main Causes:

LCP - Overall 2018 January								
This Reporting Period								
	Weight Factor % A	Period %			Cumulative %			
		Plan B	Earned C	Variance C-B	Plan E	Earned F	Variance F-E	Forecast (Next Period) G
Labrador Transmission Asset (LTA)	9.8%	0.0%	0.2%	0.2%	100.0%	99.4%	-0.6%	99.8%
Labrador Island Transmission Link (LITL)	43.9%	0.8%	0.7%	-0.1%	99.2%	98.4%	-0.8%	99.1%
Muskrat Falls Generation (MFGen)	46.3%	0.6%	0.9%	0.3%	79.7%	78.9%	-0.8%	79.6%
LCP-Overall	100.0%	0.6%	0.7%	0.1%	90.2%	89.4%	-0.8%	90.1%

Last Reporting Period (December)								
	Weight Factor % A	Period %			Cumulative %			
		Plan B	Earned C	Variance C-B	Plan E	Earned F	Variance F-E	
Labrador Transmission Asset (LTA)	9.8%	0.0%	0.1%	0.1%	100.0%	99.2%	-0.8%	
Labrador Island Transmission Link (LITL)	43.9%	1.5%	1.0%	-0.5%	98.4%	97.7%	-0.7%	
Muskrat Falls Generation (MFGen)	46.3%	1.1%	1.1%	0.0%	79.1%	78.0%	-1.1%	
LCP-Overall	100.0%	1.2%	0.9%	-0.3%	89.6%	88.7%	-0.9%	



“SCHEDULE "F"”

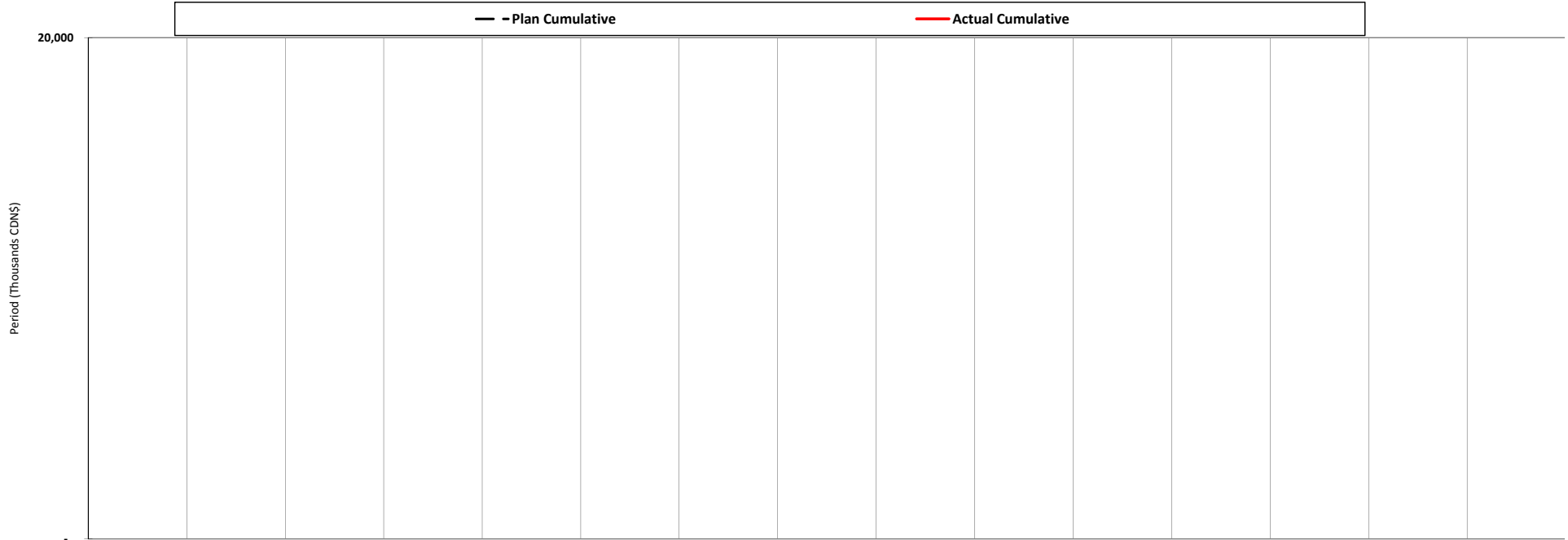
Part I - MF Plant Construction Progress

Milestone Description	Initial Project Schedule	Planned AFE Rev 5	Forecast Jan 2018	Forecast Feb 2018	Variance From Last Month
Project Sanction					
North Spur Works Ready for Diversion					
River Diversion Complete					
Reservoir Impoundment Complete (to 39m)					
First Power from Muskrat Falls					
Powerhouse Unit 1 Commissioned - Ready for Operation					
Powerhouse Unit 2 Commissioned - Ready for Operation					
Powerhouse Unit 3 Commissioned - Ready for Operation					
Powerhouse Unit 4 Commissioned - Ready for Operation					
Full Power from Muskrat Falls					



LCP Phase I - Muskrat Falls Generation
Project Contingency Drawdown (CDN \$000)

For Period Ending:



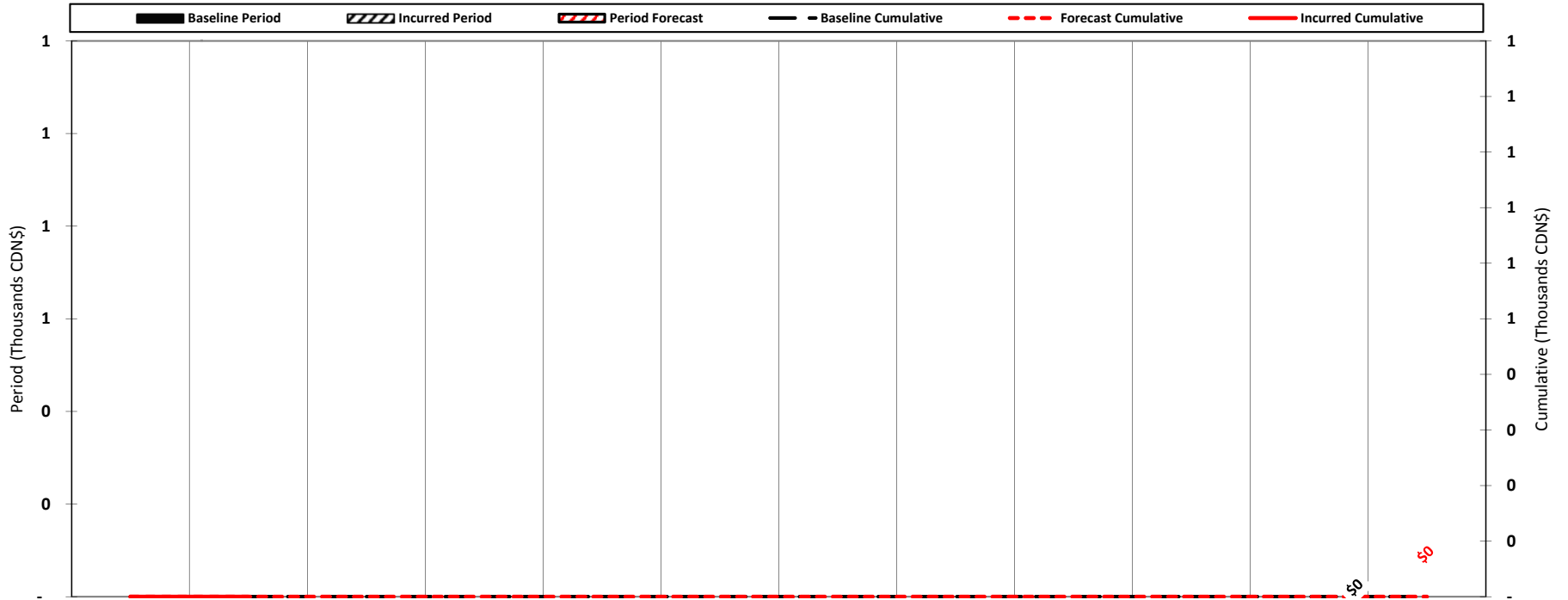
Period	Q2-2017	Q3-2017	Q4-2017	Q1-2018	Q2-2018	Q3-2018	Q4-2018	Q1-2019	Q2-2019	Q3-2019	Q4-2019	Q1-2020	Q2-2020	Q3-2020	Q4-2020
Plan (AFE rev5)															
Consumed															
Cumulative															
Plan (AFE rev5)															
Actual Budget															

Note : AFE rev5 = Authorization for Expenditure approved by Nalcor Energy Board of Directors on June 2017



LCP Phase I - Muskrat Falls Generation Current Year Control Budget, Incurred and Forecast Cost (CAPEX)

For Period Ending:



Period	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Baseline												
Incurred												
Forecast												
Cumulative	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Baseline (1)	-	-	-	-	-	-	-	-	-	-	-	-
Incurred	-	-	-	-	-	-	-	-	-	-	-	-
Forecast	-	-	-	-	-	-	-	-	-	-	-	-

(1) This baseline represents the 2017 revised AFE approved by Nalcor board on June 2017

Owner's Cost - Muskrat Falls Generation

For Period Ending:

ITEM #	SUBCATEGORY	AFE 5.0 Current Control Budget (CCB)	Incurred Costs		Final Forecast Cost (FFC)	C= B - A Variance from CCB	Remarks
			Current Period	Project-to-Date			
100-1	Fee and Services						
100-1.2	LCP Communications						
100-1.3	LCP Labour Relations External 3rd Party						
100-1.5	Safety Incentive Program						
100-1.6	Team Building						
100-1.7	Torbay Road Lease						
100-2	Helicopter Services						
100-3	Funding						
100-6	Information Technology						
100-7	Lease/Rent/Renovations						
100-10	General Expenses/Office Supplies						
100-12	Training and Conferences						
100-14	Utilities						
100-16	Integrated Commissioning Support Service						
100-17	Costs related to Protest Activities						
100-18	Costs from Agreement with Aboriginal Groups (Protest)						
SUB Total 1		\$0	\$0	\$0	\$0	\$0	
100-1.1	Fees and Services (EPCM Salaries Up to 31-Dec-2013)						
100-5	Historical Cost to End of 2007						
100-8	Membership/Dues						
100-9	Office Equipment						
100-11	Salaries						
100-13	Travel and Accommodations						
100-15	Temporary Materials						
SUB Total 2		\$0	\$0	\$0	\$0	\$0	
Total		\$0	\$0	\$0	\$0	\$0	