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NEWFOUNDLAND and LABRADOR HYDRO

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1.0 Purpose

This Project Management Approach and Contracting Strategy document sets out the overall post-Gate 2 project management approach and execution philosophy for the Lower Churchill Project (LCP) outlining the boundaries that enable the detailed execution plans, particularly contracting and procurement plans, for each project component to be determined.

The strategy provides the framework for the organizational design for the execution of the LCP post-Gate 2 and is fundamental to the development of the project schedule, cost breakdown and management structures that are crucial to the project's success. The strategy will retain flexibility to allow the project to review options should the need arise.

This strategy document has been developed with consideration of outcomes from workshops / meetings held with LCP project personnel, input from outside consultants, data from Independent Project Analysis Inc. (IPA), review of lessons learned from other projects, and current market intelligence.

2.0 Scope

This strategy can be considered a basis for the development of the overall post-Gate 2 Project Management philosophy and detailed Contracting and Procurement Plans for the LCP which will:

- identify contract work scopes in detail
- identify potential contractors and groups of contractors
- identify contract types with compensation
- propose a selection process for each contract
- provide a schedule for contracting and procurement activities

The project contemplated for the purposes of this strategy document is Gull Island generation and associated transmission. It's applicability to Muskrat Falls development would be reviewed when appropriate.

3.0 Definitions

In this document the following terms shall have the meanings set forth below and for clarity are shown with all letters capitalized. The definitions cover the singular as well as the plural.

E&O Insurance	Errors and Omissions Insurance
EPC	Engineering, Procurement, Construction
EPCm	Engineering, Procurement and Construction with Management not
Construction	Management
EPCM	Engineering, Procurement and Construction Management
FEL	Front End Loading
IBA	Impact Benefit Agreement
IPA	Independent Project Analysis Inc.
LCP	Lower Churchill Project
Owner/NLH	Newfoundland and Labrador Hydro
Phase 3	Develop Selected / Preferred Alternative
Phase 4	Detailed Engineering, Procurement, Construction and Commissioning
T's and C's	Terms and Conditions
WTO	Work Task Order

4.0 Project Description

In summary, the project contemplated for the purposes of this strategy document is Gull Island generation, overland transmission, sub sea transmission to the island with the ability to extend transmission sub sea to the Maritimes and Muskrat Falls transmission.

The project consists of hydroelectric generating facilities at Gull Island, and interconnecting transmission lines to the existing Labrador grid. The Lower Churchill Project will include engineering design and marketing studies conducted along with the environmental assessment. As part of the environmental assessment, alternative means of carrying out the project will be evaluated including capacity, design, layout, and technology. The project, as currently planned, will require optimization to reflect current market and business opportunities. Such changes and refinements will not be significant, and will be consistent with the normal process leading to final project sanction.

The Gull Island facility will consist of a generating station with a capacity of approximately 2,250 MW and will include:

a) 35 km of access roads, including upgrading and new construction.
b) A 2,000 person construction camp.
c) Reservoir clearing
d) A 100M high x 1400 m long concrete faced rock fill dam (CFRD), with upstream and downstream cofferdams, including:
   - 1,440,000 m^3 of foundation overburden excavation, and 11,200,000 m^3 of earth/rock fill,
   - 31,000 m^3 of concrete in a slurry diaphragm wall (maximum depth to bedrock +/- 50 m),
   - 44,000 m^3 of concrete in upstream face, and
   - 240,000 m^3 of roller compacted concrete (RCC) in two interface dams.
e) River diversion designed for 4,800 m^3/s flow, including:
   - 2,350,000 m^3 of overburden and 1,040,000 m^3 of open cut rock excavation,
   - 26,000 m^3 concrete and 4 vertical lift gates at inlet portal,
   - 2 tunnels, 14 m wide x 20.5 m high inverted “U” with 528,000 m^3 of tunnel rock excavation, and
   - A fish compensation flow facility in one tunnel.
f) Spillway – capacity of 20,800 m^3/s, including:
   - Approach and discharge channels, a flip bucket and plunge pool,
   - 7 vertical lift gates,
   - 2,260,000 m^3 of overburden and 5,430,000 m^3 of open cut rock excavation, and
   - 93,000 m^3 of concrete.
g) Intake and penstocks, including:
   - 5 intakes with gates and trash racks,
   - 67,000 m^3 of open cut rock excavation,
   - 81,000 m^3 of concrete,
   - 5 tunnel penstocks,
   - 74,000 m^3 of tunnel rock excavation, and
   - 30,000 m^3 of concrete lining and partial steel lining.
h) Powerhouse and tailrace, including:
   - 5 turbine generator units at 450 MW with associated ancillary electrical/mechanical and protection/control equipment,
   - 5 power transformers, located on a rock bench above the powerhouse,
   - 2 overhead cranes,
   - 880,000 m^3 of overburden and 560,000 m^3 of open cut rock excavation,
   - 120,000 m^3 of concrete, and
   - 2,600 tonnes of structural/miscellaneous steel and metal cladding.

i) Split AC Switchyard, including:
- 2 multi-circuit incoming 230kV connector lines (3+2) from powerhouse,
- 2 outgoing 230 kV lines, and
- 2 outgoing 735 kV lines.

The interconnecting transmission line system will consist of high voltage direct current transmission systems specialty installations and high voltage overhead transmission lines as follows:

a) HVdc Converter Stations:

i.) Gull Island HVdc Converter Station
- 230 kV ac to ±450 kV dc Converter Station
- Operational as a rectifier and an inverter for bi-directional power flow
- 1600 MW continuous rating (800 MW per pole)
- Higher rating required for overload conditions
- Sea Electrode located in Lake Melville connected to the Converter Station

ii.) Soldiers Pond Converter Station
- ±450 kV dc to 230 kV ac Converter Station
- Operational as a rectifier and an inverter for bi-directional power flow
- 800 MW continuous rating (400 MW per pole)
- Higher rating required for overload conditions
- Sea Electrode located in Conception Bay connected to the Converter Station

b) HVdc Switchyards:

i.) Taylor's Brook Switchyard
- Junction of bi-polar lines between Gull Island, Soldiers Pond, and Maritimes to support a multi-terminal scheme

ii.) Strait of Belle Isle Submarine Cable Terminations Switchyards
- One switchyard for each side of the Strait of Belle Isle Submarine cable crossing
- Associated switch works to manage the junction of multiple submarine cables and the overhead transmission line.

iii.) Cabot Strait Submarine Cable Switchyards
- One switchyard for each side of the Cabot Strait Submarine cable crossing
- Associated switch works to manage the junction of multiple submarine cables and the overhead transmission line

c) HVdc Submarine Cables:

i.) Strait of Belle Isle
- Submarine Cables capable of carrying 1600 MW continuous rating
- Higher rating required for overload conditions
- Corridors ranging from 28 km to 35 km in length
- Physical protection scheme required

ii.) Cabot Strait
- Submarine Cables capable of carrying 800 MW continuous rating
- One corridor up to 480 km in length
- Physical protection scheme required

d) High Voltage Alternating Current (Hvac) Overhead Transmission Lines:

i.) 735 kV ac Transmission Line from Gull Island to Churchill Falls
- Three phase, quad bundle conductor
- galvanized lattice steel V-guyed suspension and rigid angle towers

- 200 km long

ii.) 735 kV ac Transmission Line from Gull Island to the Quebec Border
- Three phase, quad bundle conductor
- galvanized lattice steel V-guyed suspension and rigid angle towers
- 170 km long

iii.) 230 kV ac double circuit Transmission Line from Muskrat Falls to Gull Island
- Three phase, double bundle conductor
- galvanized lattice steel guyed suspension and rigid angle towers
- 60 km long

e) High Voltage Direct Current (HVdc) Overhead Transmission Lines:

i.) ±450 kV dc Transmission Line from Gull Island Converter Station to Soldiers Pond Converter Station (near St. John's, NL)
- bipolar line, single conductor
- galvanized lattice steel guyed suspension and rigid angle towers
- 1100 km long

ii.) ±450 kV dc Transmission Line from Taylor's Brook (near Deer Lake) to Cape Ray (near Port Aux Basques)
- bipolar line, single conductor
- galvanized lattice steel guyed suspension and rigid angle towers
- 290 km long

The project master schedule is described in Appendix 1 herein.

As noted in section 2.0, work associated with development of the Muskrat Falls Hydroelectric Development is not included in the scope of this document.

5.0 Strategy Evaluation Process

The process of developing the LCP PM approach and contracting strategy began with a review of the various aspects of the project and development of a discussion document to be reviewed by the various stakeholders. Workshops with internal project personnel and an outside consultant were held to discuss, review and evaluate the options and to propose a strategy for the LCP. The workshop presentation "Contracting Strategy – General Overview" is attached in Appendix 2.

The process used to select the preferred PM approach and contracting strategy is represented in the flow diagram Figure 1 below:

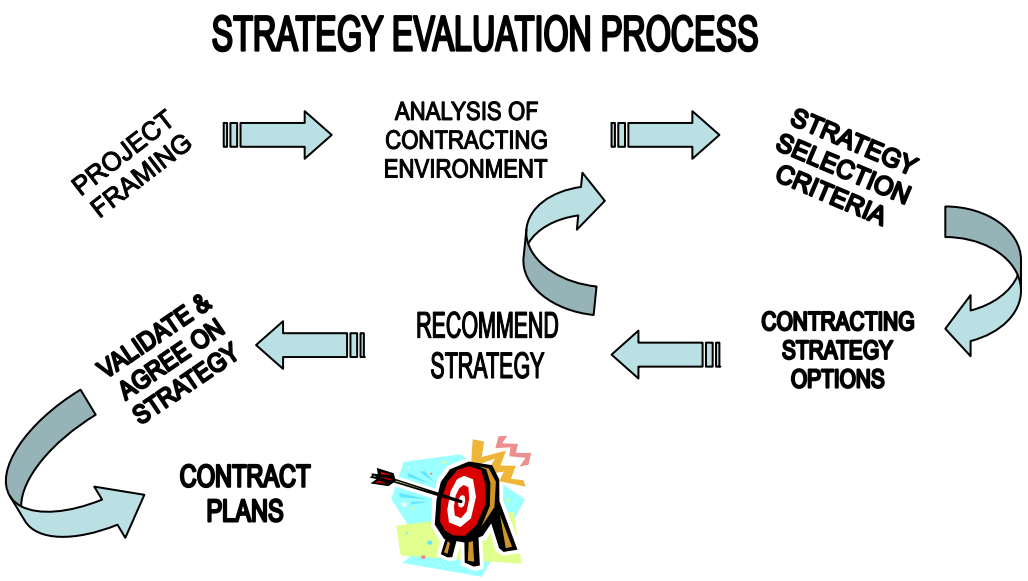


Figure 1: PM Approach & Contract Strategy Evaluation Process - Flow Diagram

The Strategy Evaluation Process involved an analysis of the current contracting environment, review of past lessons learned, input from outside consultants, IPA data and market intelligence. Based on the review of the various aspects of project, the project was framed into three (3) discrete work streams (see Figure 2 below). In parallel to collecting market intelligence and lessons learned the project developed a set of project drivers or selection criteria, defined some basic strategy options and tested each of them against the drivers. The various contracting strategy options were reviewed to determine if they met the selection criteria and if they did not, a plan to mitigate the risks would need to be put in place in the validation stage. The recommended strategy was then presented to project and executive management for approval.

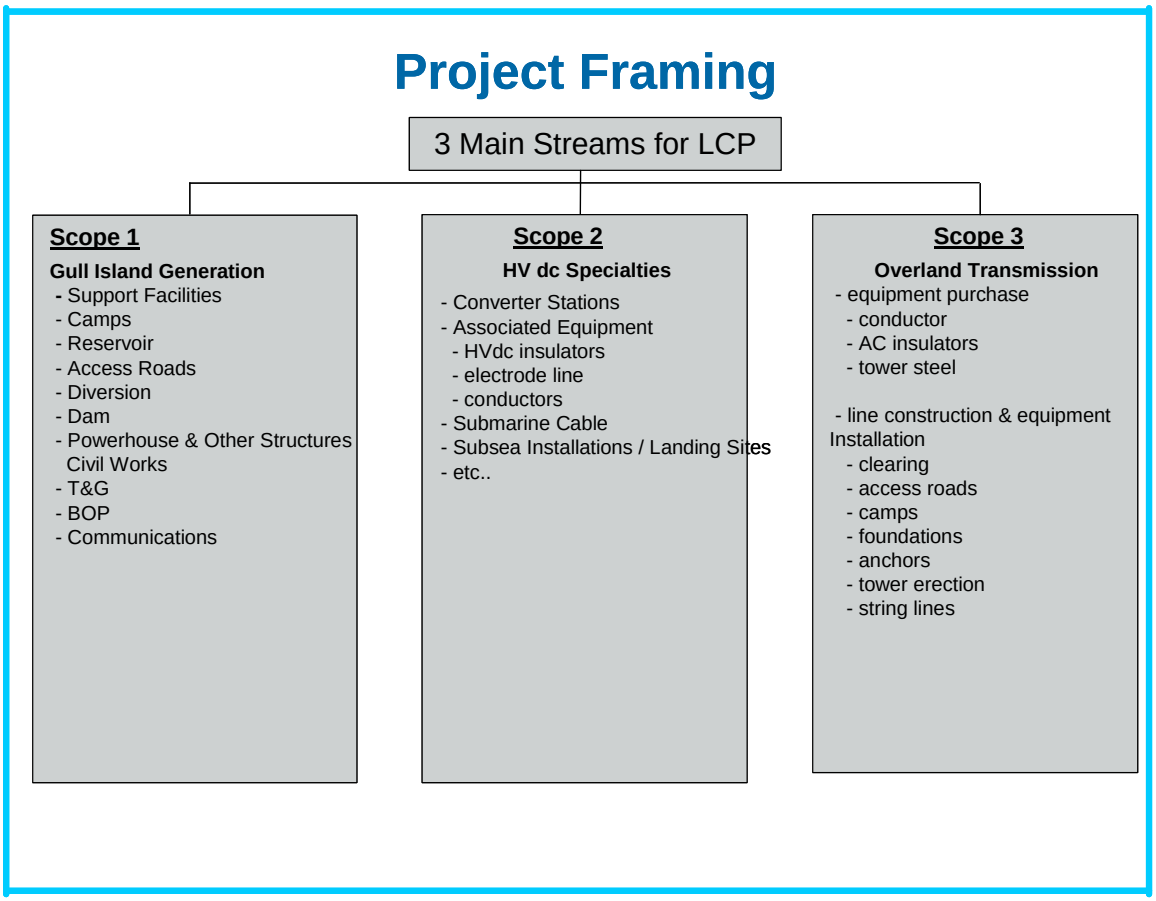


Figure 2:Project Framing

It was intended that once the strategy was approved the contracts plan would be finalized. To progress the plan in parallel to overall strategy development a series of meetings were held with the project team consisting of engineering, contracts, project controls and management to review the overall project scope and to determine a uniform breakdown of the project into work scopes or packages that would lead to the Contracts Plan. The outcome was a Responsibility Matrix/Contracts Plan that outlines the various discrete work scopes, identifies who would perform the preliminary and detailed design, the procurement function, and the construction, and identifies the applicable contracting option. A draft “Responsibility Matrix/Contracts Plan” is included in Appendix 3 and is representative of the work in progress towards final development of the detailed Contracts Plan.

Another tool that was utilized to assist with developing the PM approach and contracting strategy was the Decision Matrix which listed questions from different groups regarding the strategy for the project. As the strategy was developed, each of these questions were either answered or kept opened as reminders for issues to manage. The Contract Strategy Decision Matrix is included in Appendix 4.

6.0 Other Factors for Consideration

Other factors for consideration do exist for the PM approach and contracting strategy but will not be the main focus in its selection. Many impact the more detailed contracting plan and are focus items that will exist for execution regardless of which strategy we select.

Individual project areas and work packages present their own unique characteristics and challenges in terms of executing the work. A “one size fits all” approach is unlikely to be the best strategy given the variables of cost, schedule and construction safety. As a result, the following additional considerations exist for future plans:

- Clear alignment between contracting strategy and value drivers for the project
- Stakeholder buy-in
- Understand the implications of the Benefits Plan
- Comprehensive contracting procedures ready for execution phase
- Project work is never delayed by Owner Contracting activity
- Contracting lessons from other projects are learned
- Contract execution is well tracked and controlled - "no surprises"
- Contracting risks are well understood and managed
- Commitments made in IBA
- Realistic and agreed requirements of financiers

7.0 Analysis of Contracting Environment

To ensure that the strategy selected based on the drivers is executable in the current mega project environment it is imperative that it be tested against 1) Relevant Mega-Project lessons learned and Industry trends and 2) market intelligence/supply community desires.

7.1 Lessons Learned and Industry Trends

For LCP purposes we have considered:

- Newfoundland Labrador (and Atlantic Canada) mega project execution lessons learned
- Hydro development project lessons learned from across Canada
- Recent international Hydro mega project lessons from Iceland
- Hydro industry trends in Canada through participation in the Canadian Electrical Utilities Project Management Network Group
- Mega-project Industry trends through the involvement of Independent Project Analysis Inc.

All Lessons Learned and Trends/Best Practices are captured in the LCP Lessons Learned database and processed according to our approved procedure. However, given the crucial role of this Project Management Approach and Contracting Strategy a supplemental analysis of the lessons learned applicable to this decision has taken place and is attached as Appendix 5 to this document.

Some of the key lessons considered are:

- Owner involvement / direction / control is paramount
- Integrated teams are more successful / team integration drives predictability
- Ensure contract size is manageable and does not exceed contractor capability, put interface risk in correct place
- Rigorous Contractor selection process necessary
- Robust Front End Loading (FEL) is a key driver for project success
- Avoid managing contractor- Owner managed preferable
- Avoid one strategy fits all for the contracting packages in the plan
- Contractor alignment required

- Process (Gates) need to be followed

Some of the recent industry trends are:

- Recent high oil prices stimulated significant oil sands developments, combined with other mega projects across Canada have resulted in a tight contractor and engineering supply market
- Smaller packages work better
- Large EPC Lump Sums have a significant disadvantage in cost and will continue to do so over the next few years
- Harsh T's and C's will limit bidders and drive costs up
- Mixed commercial strategy recommended - shared risk management between Company and Contractor
- Consolidation of major hydro equipment suppliers
- In more recent years, to reflect market reality that engineering companies do not now have the wherewithal for full EPCM services (most personnel utilized by eng. companies are project hires / consultants or JV partners), trend is for the Owner organization to become more of an EPCM organization for mega (including hydro) projects.

7.2 Market Intelligence/Supply Community Desires

Throughout discussions with recent Hydro projects and informal communications with the supply community, the desires of major engineering and construction companies in Newfoundland Labrador and abroad have been tested regarding desire to participate in various aspects of the project.

The general and front end engineering and project management functions appear to be well represented with major players such as SNC-Lavalin, Hatch Energy and MWH Harza expressing interest with specialist support from companies like Stattnett for sub sea engineering and RSW for transmission work.

In the more detailed contract plan, for specific packages such as sub sea cable installation, diversion tunnels, transmission, a market check has been carried out at various levels of detail dependant upon the criticality and long lead demands of the package concerned. This preliminary analysis will form a vital part of the detailed contract plan and each individual package strategy. A draft is attached as Appendix 6.

8.0 Project Drivers

During the various workshops and consultations considerable time was spent on identifying the project drivers and selection criteria for the Project Management Approach and Contracting Strategy. These were debated and ranked in importance to the success of the project. The following is a list of drivers and selection criteria that will be used to select and validate the LCP strategy:

- Project management by Owner / integrated team approach
- Alignment with financing strategy & agreed requirements of financiers
- Cost and Schedule Predictability
- Achievement of project definition through high Front End Loading (FEL)
- Optimal allocation of risk
- Alignment with market conditions such as contractor availability & capability
- Alignment with provincial policies

- Alignment with IBA Agreement
- Maintain flexibility for development of alternate concepts when change is required

9.0 Project Management Approach and Contracting Strategy

9.1 Strategy Alternatives Considered

During the strategy evaluation process, the following options were reviewed and tested against the drivers and selection criteria. A comparison of the alternatives against the drivers is attached in Appendix 7.

- **Option 1 Owner's Integrated Management Team**. Fully integrated project management team consisting of Owner, engineering / project support contractor(s), consultants and partners to manage the 3 streams. Effectively an Owner's EPCM arrangement. Responsible for delivery of all EPCM functions to the degree dictated by each contract package plan. Bid for Project Support Contractors (PSC).
- **Option 2 Owner managed + EPCM**. Bid EPCM contract with Owner team managing /monitoring the EPCM contractor for phases 3 and 4.
- **Option 3 EPC(s) (Design Build variation) – Phases 3 and 4**

Figure 3 below provides a pictorial representation of the options considered in the process.

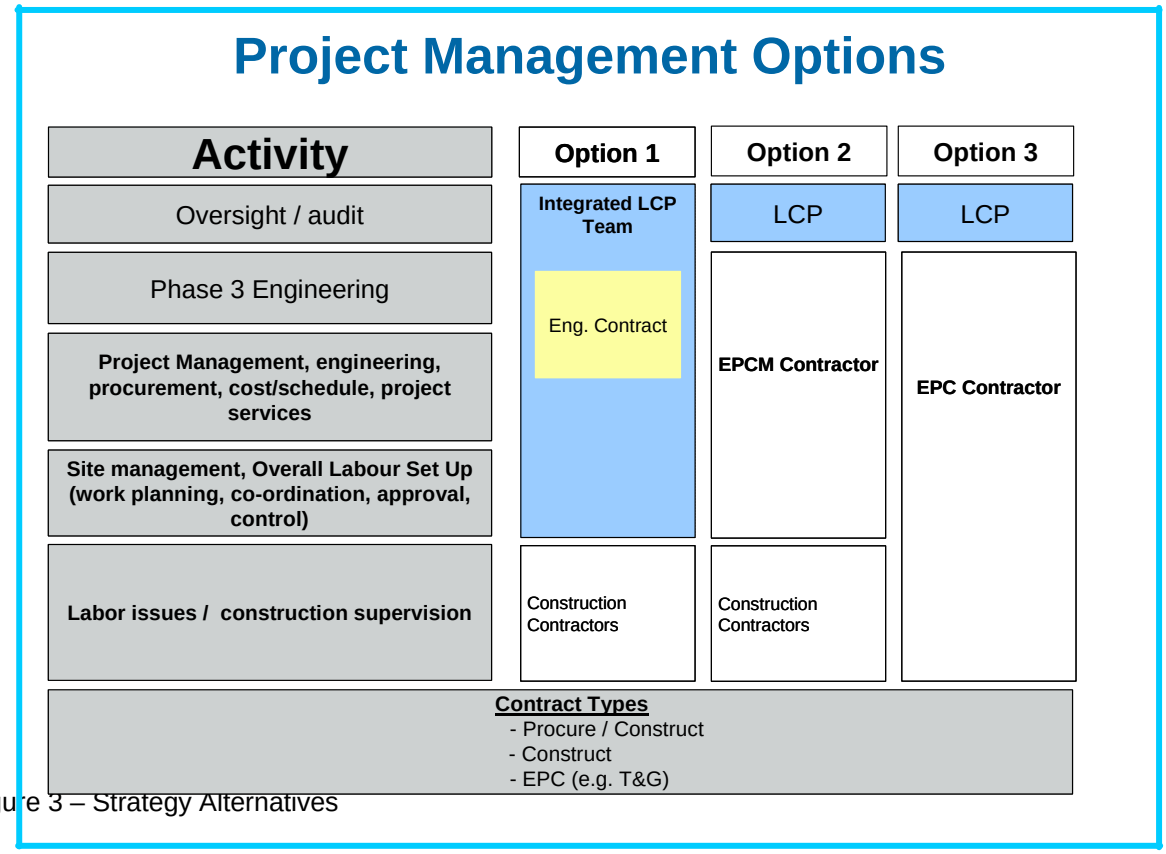


Figure 3 – Strategy Alternatives

9.2 Recommended Strategy

Utilizing the strategy evaluation process described above the team determined that the best Project Management Approach and Contracting Strategy for the LCP is Option 1 i.e. a fully integrated project management team consisting of the Owner / consultants and an engineering / project support contractor(s) (PSC). The services of the engineering / project support

contractor(s) would be competitively bid and compensation would be based on a combination of reimbursable unit rates and fixed fee components.

This integrated team would complete all activities, including engineering, for Phases 3 and 4 that was required to bid and carry out the contract plan. In some cases this will require full detailed engineering (e.g. Gull Island civil works, overland transmission lines, etc...) and in other cases conceptual design / functional specifications (e.g. T&G, HVdc converter stations, etc.). The integrated team would perform the procurement and contracts function as well as construction management of the various construction packages as required to meet the individual package contract plan, which would be competitively bid separately. Some packages may lend themselves to turn key EPC type operations (Refer to Section 11.0 herein) which will mean a contract management and monitoring role only for the integrated team. Others will be more construction or fabrication oriented with the integrated team providing the engineering deliverables, doing some procurement and managing the construction.

The Responsibility Matrix/Contracts Plan in Appendix 3 outlines the breakdown of the project and the appropriate contract strategy for the individual packages. This will be constantly reviewed and modified as required as the project progresses.

Figure 4 below provides an overview of the proposed integrated team model.

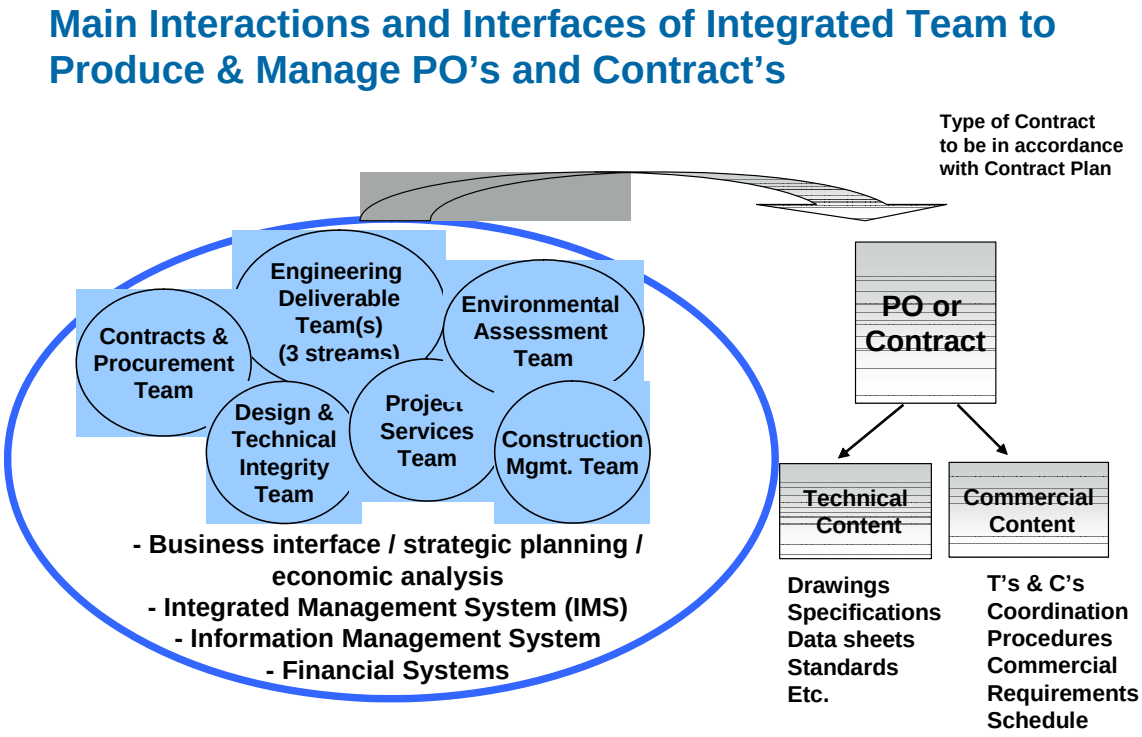


Figure 4 – Integrated Project Management Team Model

9.3 Recommended Strategy versus Project Drivers

One aspect of the evaluation process was to test the contracting strategy against the project drivers / selection criteria. The following outlines the main drivers and how the recommended contracting strategy aligns with the drivers. If the strategy doesn't fully meet the driver, the resultant risks are identified and the project will ensure that mitigating plans are put in place to minimize or eliminate the risks.

9.3.1 Owner Managed

One of the main drivers for Newfoundland and Labrador Hydro (NLH) is to use this project to develop the project management capability necessary to allow NLH to manage or participate in

other energy projects that might arise in the future. The recommended Project Management and Contract Strategy allow NLH staff to actively participate as part of an integrated team to manage all phases of the LCP. The team will consist of NLH personnel and experienced contractors working side by side throughout the project. This option provides the most opportunity to develop the internal skill sets relative to the others evaluated. In addition, the strategy allows for ability to include experienced plant (operations) personnel in the picture at all times.

9.3.2 Financing Strategy

The LCP has engaged a financial consultant to review the various financing options available to the project. This group is reviewing the project and the execution strategy to ensure the project can get the necessary financing from the lending community.

The consultants past experience has been that financiers require that Owners team must get a firm lump sum price from contractors and shift all the risk to the contractors by utilizing a design build or EPC lump sum type contracting strategy. Independent studies and lessons learned show that this strategy is less than optimal in today's mega project market and greatly increases the rate of failure leading to higher cost and longer projects. Contractors are busier and more educated on risk and are building in premiums that see lump sums come in at 30% over other models on average. Another factor is that there are very few EPC contractors with the financial ability to take on the complete project and it is doubtful if any of these would want to, considering the financial exposure.

The recommended strategy will allow the Owner to be part of all the decisions; ensure that the design is done correctly the first time; competitively bid the various construction contracts; manage the schedule; install stringent cost control procedures and identify mitigation plans for any issues as they arise.

To mitigate the potential impact on financing, detailed lessons learned, Independent reviews and sound project management through the use of a gated process will be used to help educate financiers and alleviate any concerns they have. Financial close requirements dictate that most contracts and PO's will need to be in place by mid-2010, with creditworthy entities. The projects financial consultants believe the project is financially viable under this model.

9.3.3 Achieving Cost and Schedule Predictability

One of the critical success factors for any project is a strong Project Controls group. The processes put in place by this group will ensure the effective management of cost and schedule throughout all phases of the project. The recommended contract strategy ensures that the Owner is part of the team responsible for this function thus providing hands on "real-time" control that minimizes exposure to cost overruns and delays getting out of hand before being discovered. Through the integrated team estimates can be vetted and estimate assurance built into the process rather than having to depend on external consultants, thus increasing the comfort level and predictability of all estimates. Absolutely clear business and project objectives, which improve cost and schedule performance, are best achieved with Owner driven Integrated Team which provides a clear understanding of what we are trying to achieve.

Recent statistics for lump sum EPC's for example show that costs tend to overrun considerably removing the predictability once perceived to be inherent in EPC lump sums.

Monitoring and controlling the total project costs comprised of internal and external engineering services, procurement of major equipment and materials, and provision of construction services will be accomplished by:

- Providing input into the projects work breakdown structure (WBS)
- Defining budgets and budget owners
- Increasing cost stewardship, awareness and reporting
- Identifying and reporting all deviations from approved budgets
- Maintaining a current final forecast for the total project cost
- Controlling cost development against cost budgets

- Strong management of change process and procedures

9.3.4 Ensure High Front End Loading (FEL)

FEL is a key driver for any mega project. A key success factor to any project is doing as much preparatory work up front and having the right resources to execute the work. High Front End Loading:

- Drives cost predictability
- Drives schedule certainty
- Drives cost performance
- Reduces operability problems

Some of the components of FEL are:

- Ensure a definitive level of project execution planning
- Use highly experienced personnel to make key decisions regarding design and construction
- Constructability reviews throughout FEL period
- Ensure complete project framing and definition
- Understand labor environment, availability, cost and productivity
- Understand environment and permitting requirements and taking appropriate actions
- Develop stringent and robust project controls processes and procedures
- Develop a comprehensive project management system
- Design necessary contract strategies
- Utilize independent project reviews

The strategy taken means that LCP can set the schedule and define the level of definition that best fits moving through each gate or the type of contracting strategy for each package in the Contract Plan. EPC or EPCM strategies hand much of this decision making over to the contractor and inevitably results in lower preparation levels traded for schedule which costs more and ironically takes longer in many cases.

9.3.5 Optimal Allocation of Risk

The recommended strategy will result in balanced / optimal allocation of risk and liability, which is realistic in today's market. Forcing contractors to assume all financial risks / liabilities will preclude them bidding. Strategy will require the Owner to accept much of the execution cost and schedule risk for the engineering and construction management of LCP. However, risk for errors in design and actual construction and fabrication of components will be passed down to contractors for each package in the Contract Plan, or to the engineering / Project Support Contractor where possible, i.e. E & O Insurance. As well, the standard insurable type risks can still be managed in the same manner as if a traditional contracting approach were being taken. The project Risk Philosophy and Risk Management Strategy can be referenced to better understand this.

Overall mega project performance in recent years has been poor as a result of claims, cost overruns and delays. By taking the route of an integrated team LCP can keep tight controls on project execution without depending on another contractor who will not necessarily be aligned with LCP goals and will try and claim back for any issues they themselves create.

IPA shows (see lessons learned in Appendix 6) that functionally integrated teams are less likely to experience claims.

- Only 15 percent of integrated teams experience claims.
- Nearly 35 percent of non-integrated teams experience claims
- All mega projects without integrated teams have claims

This approach also allows the Owner to control risk mitigation through hiring appropriate staff to manage the interfaces, implementing comprehensive processes and procedures around risk management, and implementing mitigation plans to avoid costly cost and schedule impacts. The

approach will allow for the flexibility to respond to changing design and construction execution such that problems are addressed appropriately before they have a significant impact. Technical risk can be further mitigated with the employment of Independent Engineer / Expert Review Panels.

9.3.6 Understanding market considerations such as contractor availability and capability

The ability of the supply community and labour markets to support the project can have a considerable effect on the contracting strategy. These factors were considered and the contracting strategy designed accordingly. Throughout consultations with other hydro projects, discussions with consultants, review of data collected by IPA and gathering of market intelligence from contractors, it is apparent that we would have trouble attracting contractors to bid on a design build or EPC lump sum contract for the whole project.

Indeed given the diverse and different work elements of the project one EPC contractor would require expertise in a wide range of fields such as:

- Reservoir clearing
- Camp
- Civil works
- Turbines and generators
- Major hydro electrical and mechanical equipment
- AC transmission
- HVDC converters
- Submarine cable

There is no appetite for assuming this risk without substantial additional cost premiums. As well, even where contractors may express interest, the capability of companies in this overheated market is drastically reduced as supported by recent poor project performance statistics.

The recommended Project Management and Contract Strategy allows the Owner to be part of the team and have major input into the execution of the project and input into any mitigation plans to reduce project risks. The strategy allows for the project to be broken down into smaller packages so as to attract sufficient contractors to competitively bid on the work to ensure best value for the Owner. This approach will require more project management by the Owners team and will improve the likelihood of a successful project from a quality, cost and schedule perspective.

9.3.7 Alignment with IBA Agreement and local benefits obligations (Provincial Policies)

The LCP will be entering into an Impact and Benefits Agreement (IBA) with the Innu Nation of Labrador. This agreement will require the project to give preference to qualified Innu businesses wishing to provide goods and services to the project. Some of the provisions are:

- First opportunity for Innu businesses to bid on selected contracts and negotiate the terms of the contract
- Bid evaluations are to include evaluation of Innu content
- Potential packaging of contracts, where commercially reasonable to do so, to assist Innu businesses to access business opportunities.

The project will have to comply with other provincial policies including providing full and fair opportunity for Newfoundland and Labrador companies to supply goods and services on a competitive basis. In addition, consideration should be given to local hiring and equal employment opportunities for qualified residents of Newfoundland and Labrador and Innu.

The recommended contracting strategy allows for the best opportunity to achieve these commitments as the Owner is part of the team developing the execution strategy; participates in the decision making process and will have input into risk mitigation plans.

9.3.8 Maintain flexibility for development of alternate concepts when change is required

Management of Change on a Mega Project is a critical factor to success. Change is inevitable on a mega project such as LCP. In this market one must be able to adapt to an environment of constant technical changes, supply, resource and social issues. As the project progresses the ability to react to change will be a critical risk mitigation tool. Under this model the early design can be flexible, as there will be no contractual impacts to changes until construction contracts are entered into. Under more traditional models changes, even at the early stages result in claims and delays whether real, perceived or confirmed.

10.0 Project Support Contract(s)

For the purposes of obtaining, through the services of engineering / project support contractors, the required engineering expertise necessary to encompass all elements of the Lower Churchill Project, the Request for Proposal (RFP) for the project support contract will be structured to align with the project framing. Bids will be received to cover the three (3) discrete work streams / scopes briefly described below. (The actual Request for Proposal for the Project Support Contract will contain more detailed breakdowns of the composition of the 3 main work streams / scopes.)

1 - Gull Inland Generation

- support facilities
- construction facilities
- civil works
- turbine / generator (T&G) and associated work
- Balance of Plant (BOP)
- Transformers

2 – HVdc Specialties

- HVdc converter stations
- HVdc submarine cables
- HV DC switchyards
- Electrode installations

3 – Overland Transmission

- HVac overhead transmission lines
- HVdc overhead transmission lines

This 3 stream approach will help ensure that the LCP team will be able to acquire the necessary expertise by providing the opportunity to contract with more than one company. However each company that bids will have the opportunity to bid on all 3 scopes.
From a design liability perspective, the PSC contractors will be responsible for the engineering design for the particular scope. For engineering for packages for EPC type contracts, the detailed design responsibility will lie with the EPC contractors.

In addition to engineering expertise, the engineering / project support contractors will provide other personnel required to bolster the LCP team in all functional areas, as follows:

- Project Management
- Project Controls (consisting of estimating, cost control, planning and scheduling).
- Contracts and Procurement
- Benefits Monitoring
- Information Management

- Office Management
- Quality Management
- Safety Management
- Environmental Management
- Risk Management
- Labour Relations
- Human Resources
- Construction Management / Constructability Expertise

The LCP team organizational composition will follow other mega projects in style and the “best person” for the position in these areas will be selected regardless of whether they are Owner or contractor personnel.

Figure 5 below provides a pictorial overview of the potential scope streams for the LCP and provides potential definition and interfaces for the project support contractor(s).

Figure 6 below provides an overview of the integrated team model indicating the integration of the PSC personnel in to the LCP team.

Figure 5 – PSC Scope Definition and Interfaces

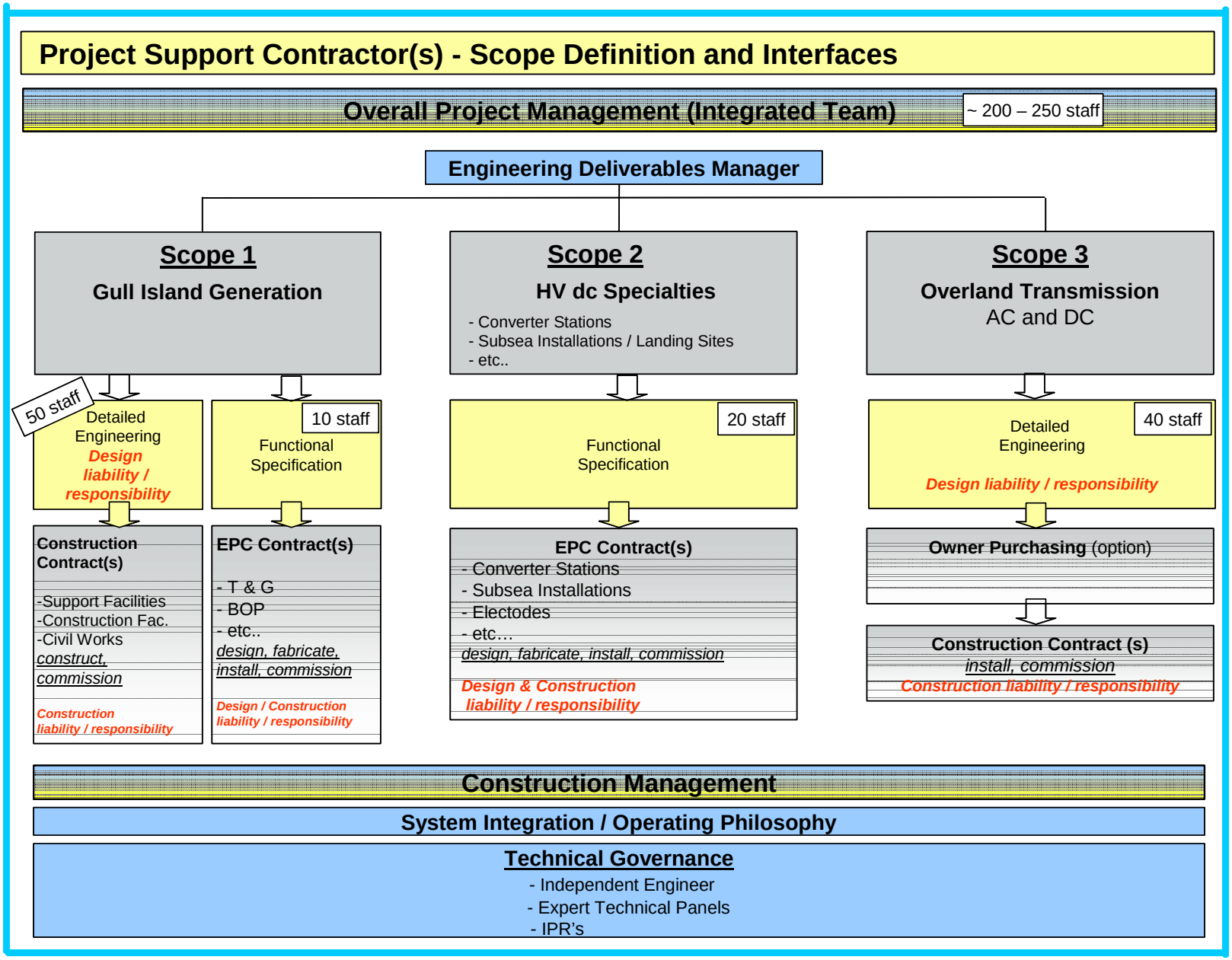
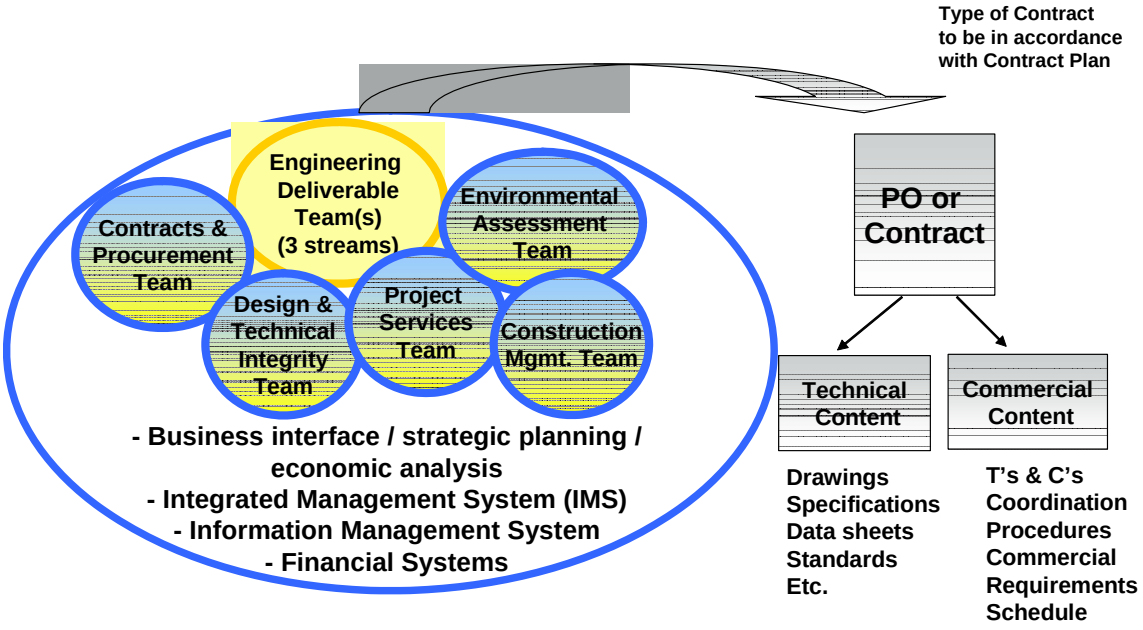


Figure 6 – Integrated Team Model with PSC



11.0 Contracting Plan

A draft Contracting Plan will be prepared to provide detail around the activities and tasks required to execute the Contracting activities and will be used primarily by the Contracting team as a tracking tool but will be shared by all end users. The plan will outline each major contract, description, compensation method, duration etc. The contracting plan will be reviewed and agreed by all stakeholders. A draft is attached as Appendix 8.

12.0 Provision of Labour

Labour will be the ultimate responsibility of the construction contractors. However, given the labour history in Newfoundland Labrador and the difficulty in attracting sufficient resources in this market it is imperative that LCP set up the labour structure with contractors and participate in high level management at the employers' association level. The LCP Labour Relations Strategy supports this approach and the recommended Contract Strategy is aligned with it through direct involvement with the integrated team thereby removing an EPCm or EPC contractors from acting in the middle.

13.0 Detailed Organization Charts

Detailed organization charts, reflecting the anticipated organizational structure for the Integrated Project Management Team for project phases 3 and 4, are provided in Appendix 9. It is recognized that the actual organization that gets put in place, as the project moves forward, may vary from that shown.

14.0 Contract Packages

A Contract Package List has been developed based on the various project work scope reviews and is provided in Appendix 8. This is a “live” document and will be subject to revision throughout the life of the Project.

A.0 Appendices

Appendix 1 – Lower Churchill Project Master Plan

APPENDIX 1

Lower Churchill Project Master Plan

This Master Plan is subject to revision and has been included for information purposes only. The latest revision of the Project Master Schedule (Doc. No. GEN-PJ-001) is available from the LCP Document Control office.

A.0 Appendices

Appendix 2 – Lower Churchill Project Contracting Strategy General Overview

APPENDIX 2

Lower Churchill Project Contracting Strategy General Overview

This Contracting Strategy overview is subject to revision and has been included for information purposes only – check with Commercial Services Manager for latest revision.

A.0 Appendices

Appendix 3 – Lower Churchill Project Contract Packages

APPENDIX 3

Lower Churchill Project Responsibility Matrix / Contracts Plan

This Responsibility Matrix / Contracts Plan listing is subject to revision and has been included for information purposes only – check with Commercial Services Manager for latest revision.

A.0 Appendices

Appendix 4 – Lower Churchill Project Contract Strategy Decision Matrix

APPENDIX 4

Lower Churchill Project
Contract Strategy Decision Matrix

This Contracting Strategy Decision Matrix is subject to revision and has been included for information purposes only – check with Commercial Services Manager for latest revision.

A.0 Appendices

Appendix 5 – Lower Churchill Project Lessons Learned

APPENDIX 5

Lower Churchill Project Lessons Learned

This Lessons Learned compilation is subject to revision and has been included for information purposes only – check with Project Services Manager for latest compilation of Lessons Learned.

Lessons Learned

1.1 Atlantic Canada Projects

There have been five (5) mega projects executed in Atlantic Canada, four (4) offshore and one (1) onshore experiencing varying degrees of success, listed below please find the lessons learned from these projects:

- Poor engineering quality, lack of completeness and a lack of follow-through accountability has an enormous impact on the later stages of the project.
- The cost impact of poor engineering can be much greater than the cost of the engineering itself.
- Timely delivery of engineering is essential.
- Strong and timely operations, construction and commissioning input are required to minimize late changes during detail design and construction.

The following table elaborates on each project contracting strategy and some of the lessons learned and mitigative actions that have been considered for the Lower Churchill Project.

Project: HIBERNIA
Contracting Strategy:
• GBS Lump-Sum cancelled then target bonus reimbursable
• Topsides-Unit Price converted to lump sums in 4 locations
Outcome: Over Budget and Over Schedule
Key Lessons considering Lower Churchill Project:
• Ensure contract size is manageable and does not exceed contractor capability, put interface risk in the correct place.
• Lack of FEL
• Poor contractor selection,
• Lack of Constructability and operability input,
• Late and poor quality engineering deliverables,
• Need for strong Owner direction,
• Recognize technology issues for Lower Churchill Project
• Good labour relations management plan.
Application for the Lower Churchill Project:
• Base case for a single EPC contractor to satisfy financiers, will limit number of capable bidders, to execute project and drive up costs to cover contingency and risk. Following the planned contract strategy LCP will conduct market research and analysis to ensure contractor appetite, schedule risk analysis and a risk sharing analysis prior to packaging the contracts. This will be executed in phase 3.
• The adequacy of FEL is both subjective and quantifiable in terms of an IPA FEL Index. The project team will ensure that it understands the IPA requirements and will request an IPA or cold eyes review to ensure FEED scope of work is complete.
• A rigorous prequalification and bid evaluation process will be established to avoid poor contractor selection.
• Operations and Construction input will be sought early to ensure no late changes as a result of Operational, or Constructability reviews.
• In recognition of the risks associated with late and poor quality design deliverables, the Lower Churchill Project will work as an integrated team with a Project Support Contractor(s) to bolster the LCP Team and expedite the execution of the work.

Engineering and Procurement activity will be monitored to coincide with marketing efforts and the sale of surplus power.
• The project will quickly eliminate design alternatives to allow the engineering contractor to concentrate on the planned design.
• A Project Support Contractor will provide or complement the LCP team and also provide personnel for Construction Management services and support, while keeping Operational personnel responsible for making project – critical decisions.
• Selection of Construction Contractors will use rigorous criteria around dam / civil construction with emphasis on civil and dam construction planning experience.
• Starting early detailed design and ensuring early and continuous constructability input should provide schedule contingency to avoid issues with quality and the schedule of engineering deliverables.
• Recognizing the size and complexity of the work and understanding the market place and the contractor's appetite for work and the inherent uncertainty of the labour market and productivity the Owner will divide up the packages to manageable sizes where interfaces can be minimized, or are not dependent upon one another.

Project: TERRA NOVA
Contracting Strategy: Alliance
Outcome: Over Budget, Over Schedule
Key Lessons considering Lower Churchill Project:
• Endeavour to get contractor A Team assigned, especially front line supervision.
• Strong Owner team lacking, including operations. Properly resource to monitor and manage contractors.
• Alliance partners with differing drivers will not work-must maintain ability to be "Best In Class"
• Lack of FEL
• Inadequate schedule and cost contingency
Application for Lower Churchill Project:
• Provision of experienced contractor personnel will be the major selection criteria for contract award(s).
• Will not pursue alliances owner managed team will manage interfaces.
• Owner / Integrated team will be well staffed prior to FEED, and used to develop a well thought out plan for executing the work during FEED and Detail Design.
• Owner will have key role in project critical decisions, Pre-FEED studies to be completed by Owner, and will form the basis of a solid foundation for FEED and Detail Design, and will guide the contractor to work directly and efficiently on FEED Deliverables.
• Integrated Construction input during design to minimize rework and proper sequencing of work, thus an ability to validate cost and schedule probabilities and contingency.
• Owner will undertake extensive cost and schedule risk analysis to ensure provision of adequate contingencies.

Project: White Rose
Contracting Strategy: (4) Lump Sum EPC's with Managing Contractor
Outcome: Close to Schedule and Budget despite extensive claims and removal of Managing Contractor
Key lessons considering Lower Churchill Project:

• Establish clear roles and responsibilities internally and with contractors, avoid a Managing Contractor.
• Adequate and proper FEL loading
• Do not deploy one contracting strategy fits all mindset. Maintain open mind, as White Rose adopted a lump sum strategy for all regardless of project drivers.
Application for Lower Churchill Project:
• No Managing Contractor, Owner Managed.
• Owner to maintain an organization that is empowered to make key decisions during Engineering and Construction execution.
• Staged / Phased award of Contracts to ensure that the scopes of work are well defined that allow opportunities for award of lump sum segments of work where clear definition and firm scope is understood, and risk(s) and interfaces are minimized. Where synergies can be derived from bundling the work this will be considered.

Project: Sable Gas Project
Contracting Strategy: Alliance of 7 Contractors and Owner
Outcome: Start-Up 22 months after Sanction on Schedule. On Budget, coatings failures not included.
Key Lessons considering Lower Churchill Project:
• Start-Up reliability problems likely due to robustness taken out of project through rigorous process simplification and value engineering.
Application for Lower Churchill Project:
• Do not pursue Alliance Strategy.
• Owner managed interfaces with mixed strategy.
• FEED reimbursable no incentivized cost cutting or over ambitious equipment reduction or rationalization.
• Ease of Maintenance and accessibility to be considered in all aspects of design and constructability.
• Construction Planning / Executability closely integrated with design development to ensure the overall design and construction is well understood and sustained as the work progresses.

1.2 Independent Project Analysis (IPA)

IPA has produced several publications over the last couple of years and has recently met with the project team in October 2007 to present their seminar Successful Mega Projects.
The information provided by IPA can be used to give direction, at least statistically to projects for their contracting strategy. The data has been broken down into two main categories, lessons learned over the last few years and current trends.

IPA Lesson Learned	Description	Lower Churchill Position
Poor Front End Loading (FEL)	Poor FEL has a direct correlation to a poorly performing project.	LCP is preparing to resource load in a timely manner to have individuals on board early. IPA will be performing an analysis and scoring the LCP team of the status prior to

		Sanction.
Poor use of Lump Sums	Using lump sums despite poor scope definition compounded by the belief that lumps sums need fewer resources.	The LCP strategy will be to move toward lump sums later on in the project as the scope is well defined. We do not expect to reduce resourcing as a result of the lump sum execution.
Lack of Alignment on Objectives	Recent projects that have had alignment issues with their contractors have not performed well. One of the main causes appears to be incentives for contractors that do not align with the Owner's goals.	LCP will not use incentives for FEED; however will use incentives in the later stages of execution where the benefits will be greater than the risk(s).
Lack of Owner Involvement	Lack of Owner involvement through hands-off mindsets in lump sums or the use of Managing Contractors has proven quite costly according to IPA stats.	THE LCP Owner team will take direct involvement in the project management, as can be seen in the Pre-FEED execution of the early work whereby we are directing the contractors and maintain the power of decision making.
Process (Gates) not followed.	Recent experience has shown that ignoring or improper use of the gated process results in a poor outcome.	The LCP team will follow the gated process already established for the project and will be subject to independent cold eye reviews, including a review by IPA to ensure that the gated process is being followed.
Incomplete assessment of Contractor Capabilities	During the bid evaluation stage it is imperative that the contractors' capabilities be fully assessed, including technical, safety, quality, management and project control matters. IPA data has shown that contracts awarded primarily on a cost basis have failed much more often.	The plan for LCP is to award based upon technical, safety, quality, management and project controls issues as well as cost. The LCP team is currently working with NLH and the NL Government to ensure that competent contractors are awarded work on the full installed cost basis that considers all of these parameters in the analysis.
Continuation of FEED Contractor to EPC	IPA studies suggest no statistical evidence to indicate that continuation of FEED contractor into Detailed Design produces a better technical product due to continuity.	The LCP team is considering an approach that utilizes a Project Support Contractor(s) that will supplement and integrate with the LCP team as required to become the Owners Engineer. This will allow the Owner to maintain full control of the engineering effort and should eliminate rework as we will have an opportunity to monitor the work day by day.

1.3 Current IPA Trends

The current high oil prices have created a tight supply market for construction in the industry that can be expected to continue for the foreseeable future. Some points that the LCP team are aware of and monitoring for mitigation opportunities are:

- Difficult to obtain contractors, some potential contractors may choose not to bid on the work scopes due to the fact they are to busy.
- Input costs are up
- Spot market costs have risen
- Harsh or onerous Terms and Conditions will drive contingencies higher and likewise costs and may force potential contractors not to bid as the trend is to be risk adverse in the current marketplace.
- EPC Lump Sum has a significant disadvantage in the near future and will likely remain until such time as the overall construction activity diminishes.
- Smaller packages in this market work better.

IPA recommends a mixed strategy of reimbursable and lump sum elements that graduate to the latter without using incentives as the scope and risks become more defined.

1.4 Lessons Learned by Manitoba Hydro and BC Hydro, Oct. 01-4, 2007

During the meetings between Newfoundland & Labrador Hydro and BC Hydro and Manitoba Hydro in Winnipeg, Manitoba between October 01 and 04, 2007
The following was noted.

- Longer term agreements with the Aboriginal Groups should be sought to cover all future construction not single construction projects. **LCP will base the terms of the IBA only to cover the length of the project.**
- Agreement was made with the unions to bring in individuals from foreign countries due to the shortage in the work force, to maintain schedule. **Early planning by LCP team and Contracting community should dictate the need to supplement the available workforce with foreign workers as required, this is no different than other mega projects in the region.**
- Agree upon a CBA for site civil works. Manitoba did note that they do not use CBA's for Transmission work. **LCP plans to utilize a CBA for the site work.**
- On site counselors for Aboriginal peoples, **this will be considered for LCP.**
- More control on Direct Negotiated Contracts with Aboriginals to ensure contractual compliance and reporting. **To be considered by LCP.**
- **Bid Camp Supply outside of Aboriginal Agreement. At present this supply has been considered inside the IBA agreement additional consideration should be made regarding this supply to ensure the marketplace is fully considered, as at present there are no manufacturer's of camps in Labrador.**
- Bid proper Camp from the "get go" avoid temporary camps. **LCP's early plans are to purchase the correct camp configuration from the start and to avoid temporary construction camps as our supply basis.**
- Use of Letter of Credits vs. Bonds. **LCP to review and consider this option with legal and consultants.**
- Both BC Hydro and Manitoba Hydro expressed the importance of selling the project to the marketplace to develop interest. **LCP has already embarked on a Market Intelligence survey for major equipment items visiting the Turbine Generator Manufacturers, Camp Suppliers, Transformer Suppliers and Cable Suppliers in Europe. This is an ongoing process and will be continued through the award of all major equipment items.**
- Aboriginal Contracts should be limited to non-critical path activities. **LCP to consider accordingly.**

- BC Hydro is using Risk Reward contracts, while Manitoba Hydro uses mainly unit rate contracts with the exception of the Main Civil which is a Target Reimbursable Contract. **LCP notes these opportunities and they will be considered based upon market intelligence and LCP vs. Contractor's appetite(s) for risk.**

1.5 Lessons Learned from the Visit to the Karahnjukar Hydroelectric Project

Members of the LCP Project Team visited the Karahnjukar Hydroelectric Project in Iceland between November 21 and 26, 2007; listed below please find the Lessons Learned from that project and the applicability to the LCP Project.

- Use of Foreign Workers necessary to complete the project in a timely fashion (70% of the workforce where Chinese) however they had 40 different nationalities on site. European workers had a high turnover of 65% while the Chinese had a turnover of only 1%. **LCP to consider this necessity in the planning phases and make appropriate applications to the applicable government bodies well in advance of the need to ensure no delays to the project as a part of the overall labour strategy for the project.**
- Late procurement of Camp and Installation mobilization problems and construction not fast enough to suit influx of workers. **LCP already considering early procurement of Camp as Base Case.**
- Not enough engineering staff in the field during peak construction to accelerate responses to field engineering questions or requests for information. **LCP to ensure the availability of suitable field staff with the right skill set prior to award to engineering contractor.**
- Winter Construction and cold temperatures and high winds were a factor. **LCP to consider winter activities in the overall schedule and review productivity factors and suitable equipment and installation methods to accelerate winter concrete pours and placement, ongoing activity.**
- Contractors to have on site spare parts available due to remote location of our jobsite. **LCP to write into Contract.**

1.6 Lessons Learned from Market Intelligence Visits

It was clear during the Market Intelligence visits to the major equipment suppliers that the LCP Project has a long history in the Market Place and many are skeptical that the project is full steam ahead. The Team will need to do a good job selling the project to the market place to ensure that a fair resemblance of the market is interested in the project to achieve competitive pricing. Some of the factors affecting the equipment lead-times are as follows:

- The affects of the Chinese Construction Boom, incidentally this is affecting all industries not only Hydro Electricity.
- The shortage of raw materials.
- Plant closures, (ie) GE Lachine.
- Boom in the Brazilian Hydro Electricity Market in South America
- Retrofit Projects replacing or increasing capacity of Hydro Electric facilities in Canada, Europe and USA, replacing equipment at its end of life expectancy.
- Contractors already busy and do not have an appetite for risk.
- Shrinking of the marketplace, company mergers.
- Sales growth of 20 to 30 % in recent years and no slowdown anticipated.
- In Canada alone the affects of the Alberta Construction boom plays a large affect in the labour force availability, outward migration to Alberta from Atlantic Canada.

The Marketplace is asking for longer bidding periods to ensure that they have sufficient time to secure firm pricing from their subcontractors and suppliers. The Marketplace is also feeling the affects of a lack of skilled workers, and have partnered with universities to attract and mentor students into considering careers.
The Marketplace dictates that we need to be out for bid earlier than in the past and schedule more time to negotiate more reasonable terms and conditions of contract, and assume more owners risk than historically has been the case.

1.7 Lessons Learned Summary

In summary the Project Team has reviewed the lessons learned from recent Atlantic Canada Mega Projects, the findings from the consultant Independent Project Analysis on Mega Projects, BC Hydro and Manitoba Hydro recent project experiences, our visit and findings from the Karahnjukar Hydroelectric Project, in Iceland and the market intelligence gathered by our consultant Hatch and the information directly from visits to major equipment suppliers in the months of November and December 2007 and summarized below. The LCP Project Team has already adapted some of these findings in the execution of the work and will ensure the other findings are considered in the development of the individual contracts plans and continually tested throughout the execution of the Lower Churchill Project.

- Front End Loading, (FEL) the right people in the right place at the right time, interview contractors proposed candidates for key positions and accept only qualified candidates up front.
- Sound Selection of Contractors to ensure people, systems, project management and experience fit the planned scope of work.
- Contracts packaged in manageable sizes to meet contractor capabilities and proper allocation of interface risks.
- Owner Involvement, avoid Managing Contractor, serves no purpose other than a middle man.
- Develop Contracting Strategies for each segment of the work (Contract Package) one strategy does not always fit all segments of the work be flexible.
- Aboriginal Contracts ensure proper owner involvement and controls are in place to monitor progress and ensure timely execution/completion.
- Process Gates, establish them early and follow the criteria prior to passing each gate, personnel, processes and procedures in place.
- Review Contracting Terms and Conditions to maximize participation from the marketplace.
- Labour Shortages, Technical and Skilled Labour work with unions to identify requirements and establish work around plans in advance if foreign workers are required.
- Sell the project to the market place establish an interest in advance of RFP releases, either through procurement symposiums, in the Aboriginal community and major functions such as Canadian Dam Association.
- Planning, allow extra time for bidding and Contractor proposal development, the market place is busy.

Avoid temporary measures, like Construction Camps go straight for the final Camp configuration, and have it ready in advance and available for the arriving workforce.

A.0 Appendices

Appendix 6 – Lower Churchill Project Market Intelligence Information

APPENDIX 6

Lower Churchill Project
Market Intelligence Information

This Market Intelligence Information compilation is subject to revision and has been included for information purposes only – check with Commercial Services Manager for latest information.

A.0 Appendices

Appendix 7 – Lower Churchill Project Contract Strategy Alternatives

APPENDIX 7

Lower Churchill Project
Contract Strategy Alternatives

A.0 Appendices

Appendix 8 – Lower Churchill Project Contract Package List

APPENDIX 8

Lower Churchill Project Contract Package List

This Contracting Package listing is subject to revision and has been included for information purposes only – check with Commercial Services Manager for latest revision.

Appendix 9 – Lower Churchill Project Organization Charts

APPENDIX 9

Lower Churchill Project Organization Charts

These Organization Charts are subject to change and are included for information purposes only - check with LCP Document Control office for latest versions.

Detailed Organization Charts

Detailed organization charts, reflecting the anticipated organizational structure for the Integrated Project Management Team for project phases 3 and 4, are provided in Appendix 9.

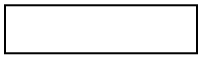
It is recognized that the actual organization that gets put in place, as the project moves forward, may vary from that shown.

The Color Coding that has been applied in the organization charts indicates where the people will come from to fill the positions.

NLH Staff 

Project Support Contractor 

Independent Consultant 

Other 

PHASE 3

Technical & Design Integrity Group – Roles and Responsibilities

- Overall technical and design integrity responsibility
- Participate in the technical assessment of suppliers and manufacturers as part of pre-qualification and contract review process / participate in bid evaluations
- General Design Basis / Design Criteria definition and maintenance
- Final approval of all design briefs
- Interface with PSC Engineering contractors throughout engineering phases / acceptance of engineering documentation produced by PSC engineering contractors
- Liaison with Corporate Engineering group for technical consistency and maintenance of standards
- Liaison with Operations Department for the provision of operational support / inputs to design basis
- Facilitate technical reviews and audits including by third parties / participate in project audits
- Development of staff engineering resources within the Project and succession planning
- Participate in FAT's etc. of all major (and other) equipment supplies representing Operations
- Define / organize / manage Independent engineers / technical panel / expert panels programs
- Engineering / environmental interface
- Energy model
- Operations and Maintenance Philosophies
- Site representation in general
- Facilitate Operations personnel participation, with defined roles, in specific Engineering and site installation activities
- Establish Commissioning and Start-up Philosophy
- participate in production of commissioning procedures / participate in commissioning - interface / align with suppliers commissioning engineers
- produce Operations Philosophy / operating procedures
- steward implementation of Lessons Learned / Value Improvement Practices in engineering design / steward Life Cycle Value reviews
- Steward Life Cycle Value Analysis implementation in engineering
- Establish handover responsibilities / interfaces
- Steward operability reviews on the overall project design and configuration.
- Operations strategy agreed between LCP and ECNL and its subsidiaries.
- Establish sparing strategy

Engineering Deliverables Team - Roles and Responsibilities

- ensuring list of engineering deliverables are produced, reviewed / agreed as appropriate
- ensuring engineering schedules / deliverables are delivered to meet project requirements / contracts plan
- agreement with PSC resource estimates
- ensuring engineering teams are resourced / approval of resourced personnel
- overall responsibility for engineering quality
- coordinating Operations / T & DI interface with PSC engineering groups
- coordinating interfaces with other PSC contractors
- coordination of design inputs (from T & DI, Construction, etc.)
- coordination of MOC for engineering changes
- identification / production management of required engineering procedures (or acceptance of PSC contractor procedures)
- signing off / approving engineering procedures
- preparation of project engineering plan (interface with contracts' plan) and including quality activities (in conjunction with Project Services group)
- stewardship of project engineering tools requirements
- establishing engineering reporting requirements
- ensuring design briefs are identified, produced, and approved by T & DI group
- defining requirements (types, schedule) for engineering reviews and ensuring requirements are met. Engineering reviews include:

    - Life Cycle Value Assessment Reviews
    - EH&S Reviews
    - Peer Reviews
    - Quality Control Reviews
    - Design Reviews
    - Technical Reviews
    - Cross-functional (Squad) Check
    - Process Hazard Analysis
    - Failure Mode, and Effects Analysis
    - Plot Plan (Plant Layout) Reviews
    - Constructability Reviews
    - Cold Eyes Reviews
    - 3D Model Milestone Reviews
    - P&ID Reviews
    - SIL Assessments
    - HAZOP Reviews

PSC Contractor - Engineering Roles and Responsibilities

- detailed definition of engineering scope
- production and maintenance of engineering schedules and budgets c/w resource requirements (in conjunction with Project Services)
- staffing of engineering resources required to deliver scope
- design responsibility
- production of engineering deliverables (drawings, documents, specifications, MTO's, other technical content) for inclusion in contract and procurement packages
- application of technical standards provided by T & DI group / interfacing with T & TI group
- package engineering / follow-on engineering
- signing off on and implementation of engineering processes and procedures
- identification and control of applicable codes and standards
- production of design briefs
- specialized studies (e.g. 3D flow models) is support of engineering design
- provision of specialized engineering software / training for engineering software when necessary
- interfacing with Contracts and Procurement group
- site engineering / response to technical queries
- interfacing with constructability group / incorporation of constructability input into engineering deliverables
- interfacing with other PSC contractors
- QA execution of their engineering documents
- reporting as per project requirements

PHASE 4

Construction Management

Construction Management – essentially once the construction phase commences, construction management is essentially management of the project execution as a whole.

Any failure of construction contractors to deliver will have severe implications on the successful outcome of the entire project.

Key Personnel - Qualifications

a) General Construction Manager – Senior manager with 20 – 25 years management experience in mega-project execution. Extensive strategic knowledge of latest industry trends regarding mega project construction execution. Demonstrated proficiency in application of construction management techniques.

b) Gull Island – Site Manager: Experienced hydroelectric construction engineer with 20 – 25 years site experience on major hydroelectric projects.

c) Construction Manager HVdc Installations: 15 – 20 years experience in construction management for major projects. Experience with marine installation activity including experience in marine installation of electrical power transmission cabling. Knowledge heavy civil and mechanical works. Experience in management of multiple work fronts.

d) Construction Manager Overland Transmission: 15 – 20 years experience in construction management with focus on electrical power transmission and civil works. Experience in management of multiple work fronts.

Roles and Responsibilities

1.0 Design Period / Pre-construction Phase

- constructability reviews of the design, including reviews for the incorporation of construction safety elements / project constructability plan / best practices
- construction contracting strategy
- contractors' competency evaluations
- involvement in development, reviews and approval of construction schedule
- consultant for productivity issues
- modularization / prefabrication analysis
- Industrial Relations (IR) planning / labour estimates
- establish construction safety targets for incorporation into contracts
- management of construction contingency fund

- development of construction period staffing plan / roles & responsibilities
- produce and manage required construction related procedures

2.0 Construction Phase

2.1 General

- pre-mobilization planning
- development and deployment of site teams – all disciplines and functions
- overall site coordination / site offices management
- permitting oversight
- approval of contractors' methods / plans / Plant / personnel
- management of site access
- management of communication systems
- assignment of measuring methods
- reporting & establishment of reporting requirements
- stewardship of management meetings
- rejection of work / replacement of defective work
- extra work authorization / management of design changes & impacts on cost & schedule
- management of handovers / takeovers / involvement in commissioning
- settlement of disputes / claims
- need to stay "close to the action"

2.2 Safety

- site safety oversight & coordination
- safety programs wrt deep excavations

2.3 Environmental

- construction environmental plan / requirements
- site environmental oversight & coordination
- management of restrictions on construction operations
- environmental monitoring

2.4 Site Technical & Engineering Interface

- assessment of excavated foundations / determination of foundation treatment and support requirements
- interface with home office engineering / queries / expedite design decisions
- issue timely AFC documents
- review / approval of contractor drawings
- management of changed site conditions
- management of rock support requirements
- management of alterations / additions
- review / approvals of alternates

2.5 Contracts Management

- contracts' coordination
- management of Owner supplied items
- management of Owner's storage / laydown areas

- oversight of contractors' procurement activities
- warranty management
- audit of contractors' files
- site material management as required (commodities / receiving / OS&D / surplus / scrap / spares / etc.

2.6 Security
- project security plan
- security oversight & coordination

2.7 Logistics
- logistics oversight / management
- temporary facilities management

2.8 Risk
- require contactors to produce Risk Monitoring and Management Plans / emerging risk issues
- ensure monitoring process is in place
- monitor status / champion challenge process to preclude usage of contingency funds as a first line of defense
- weekly meetings

2.9 Schedule Management
- management of overall project / construction schedule
- approval of contractors schedules / alignment among contractors
- review in weekly meetings
- drive / monitor any actions to regain slippage
- reporting

2.10 Progress Verification Management
- payment methods / progress payments / measurement for payment / verification methods

2.11 Cost Management
- overall cost process
- management of construction contingency funds
- management of overall project cost estimate / cost risks
- reporting

2.12 Quality Assurance
- overall responsibility for Construction quality
- ensure that construction and installation activities are conducted in accordance with drawings, specifications and any special vendor installation procedures
- ensure that all applicable standards, codes and jurisdictional regulations are observed
- oversight of contractors QM plans
- quality control – site / fabrication plants – attendance at FAT's
- surveying / control points

- inspection and tests
- approval of planned concrete work prior to concreting
- approval of completed works prior to covering up
- laboratories (soils / concrete etc..)

2.13 Document Management

- overall document management function
- regular audit of contractors' system / documents
- management / stewardship of as-builts
- meetings

2.14 Verification Activities

- verification of contractors systems for
    - mgmt. of Requests for Information (RFI's) / queries from subs / suppliers
    - maintenance of change logs
    - most current design information being constructed
    - Design Standards and Codes being used

2.15 Labour

- receipt / analysis of labor usage against planned
- drive remedial actions for any problem areas

2.16 External Relations

- management of relations with external parties
- visitors / local community
- media
- overall benefits reporting

Labrador Hydro Project

Level 0 Project Master Plan

Rev 9

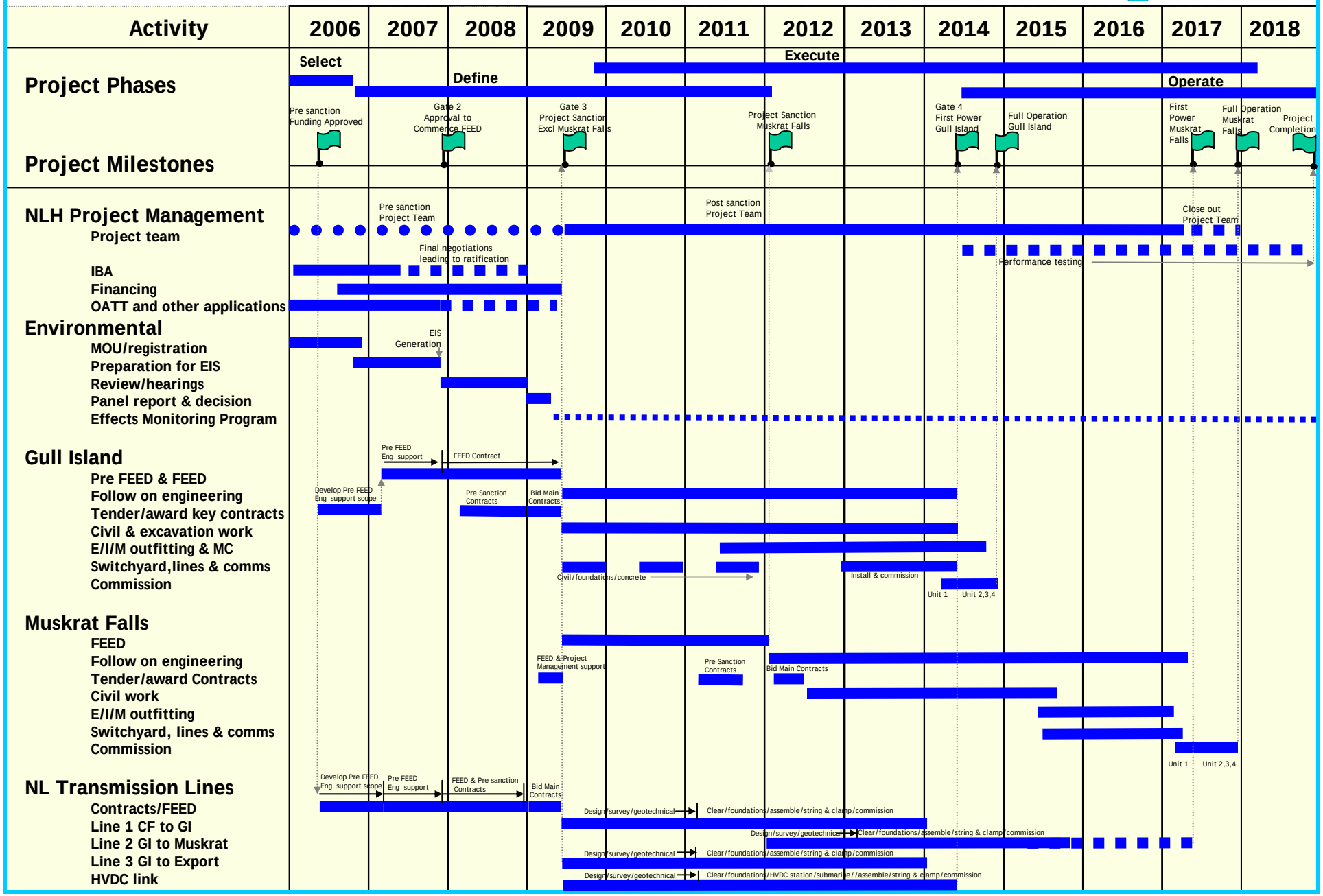
1 February 2007

Assumptions & basis for Project Master Plan

1. The full project scope includes
   - Gull Island (and associated transmission); Muskrat Falls (and associated transmission); HVDC link. Export transmission is assumed to be via Quebec
2. The timing of First Power from Muskrat Falls is 3 years after First Power from Gull Island
3. The Gull Island and Muskrat Falls FEED's are shown with a three year gap to balance out engineering resource demand
4. Transmission upgrades and associated environmental tasks outside of NL are not included
5. The HVDC link is shown to be complete for First Power from Gull Island
6. Gull Island to Muskrat Falls line shown as early finish 2016 and late finish 2017
7. Basis for activity duration's are studies performed from 1999 by consulting companies
8. Activities associated with IBA and Project financing are an integral part of the NLH Project Management task

Lower Churchill Project Master Plan

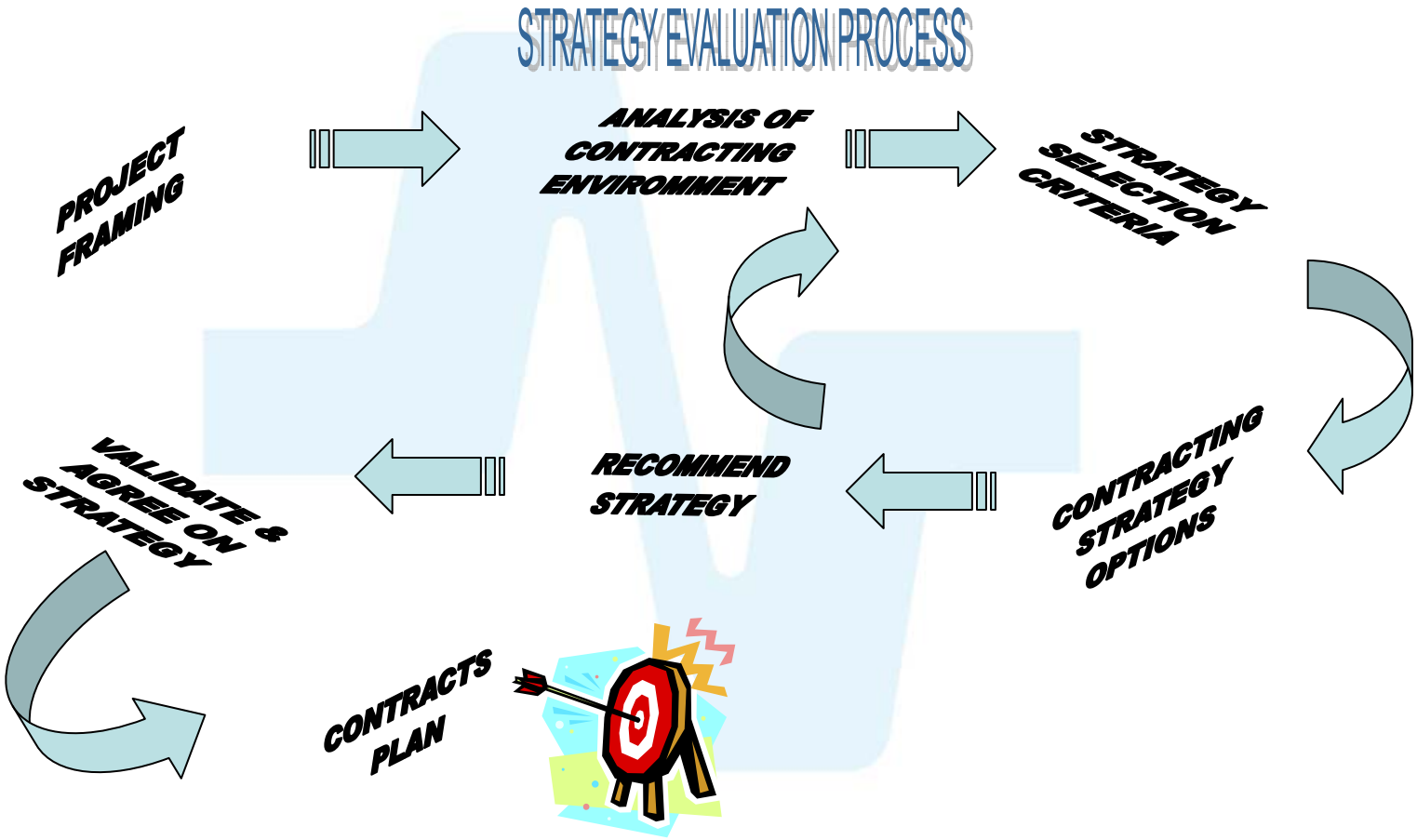
Draft Rev 9 1 February 2007



HYDRO
THE POWER OF COMMITMENT

Contracting Strategy

General Overview
18 Oct 07
P. Hussey


STRATEGY EVALUATION PROCESS
PROJECT FRAMING
ANALYSIS OF CONTRACTING ENVIROMMENT
STRATEGY SELECTION CRITERIA
CONTRACTING STRATEGY OPTIONS
RECOMMEND STRATEGY
VALIDATE & AGREE ON STRATEGY
CONTRACTS PLAN

Risks Affecting Contracting Strategy

- Market Access
- Resources (people)
- Remote Location
- Availability of qualified contractors
- Aboriginal Negotiations
- Environmental Assessment

- Note: Lessons learned from IPA/NL & Hydro mega projects will be considered

Analysis of Current Contractor Market

- Current Trends
  - Difficult to obtain contractors
  - Input costs up
  - Spot market costs have risen
  - Harsh T&C's will see high prices
  - EPC LS have significant disadvantages for the near future
  - Smaller packages in this market work better
  - IPA recommends mixed strategy of reimbursable & LS

Project Drivers & Selection Criteria

- Project Management by Owner
- Financing Strategy
- Cost & Schedule predictability
- Driven by provincial policies
- Driven by IBA agreement
- Achieve project definition through high FEL
- Optimal allocation of risk

Project Drivers & Selection Criteria

- Maintain flexibility for development of alternate concepts when change is required
- Understanding market conditions such as contractor availability & capability

Contracting Options - FEED

- FEED (What is FEED?)
  - Develop project definition to get us through gate
  - What are FEED deliverables? DBM, Design Criteria, Performance or detail specs
  - Multiple or single FEED contracts based on work scope?
  - Do we bid FEED work or continue WTO system
  - Continue with FEED contractors into Detail design (what information is required with FEED bid to ensure commercial certainty)?
  - Stop after FEED and bid EP?
  - Will FEED contractor be allowed to bid EP?
  - Possible Compensation Model
    - Reimbursable rates
    - Reimbursable rates + fixed fee + incentives
- When does FEED need to be awarded?

Purpose of Overview

- Update on Contracting Strategy process
  - where we are
  - how we got there
- Review Contracting Strategy Responsibility Matrix
- **Open discussion and feedback**
- Next Steps
  - Incorporate feedback from today's session
  - Prepare RFP for FEED??
  - Present project & opportunities to Market
  - Gather market intelligence - ongoing
  - Budget Pricing & Delivery information
  - Engineering scope definition

RESPONSIBILITY MATRIX								
Activities		**Preliminary Engineering**	**Detail Engineering / Performance Specifications**	**Procurement Document**	**Construct / Install / Supply**	**Start-Up and Commissioning**	**Comments**	**Colour Legend**
EPC								
EPCM								
Contractor Traditional								
Aboriginal Involvement								
								IBA Implications
CAMP Infrastructure								Packages could be linked together
Accommodation (Buildings)		OE	OE	OE / NLH	EPC	EPC	IBA, part of FEED 1	Packages could be linked together
Utilities Power, Water, Sewer, Sewage Treatment, Telephone and Internet		OE	OE	OE / NLH	EPC or Contractor	EPC or Contractor	IBA, part of FEED 1	Packages could be linked together
Decommission Camp Facility and Site Restoration		OE	OE	OE / LCP	Contractor	N/A	IBA, part of FEED 1	Packages could be linked together
								Packages could be linked together
CAMP Operations / Maintenance								
Catering / Janitorial		OE	OE	OE / LCP	Contractor	N/A	IBA, part of FEED 1	
Facility Maintenance		OE	OE	OE / LCP	Contractor	N/A	IBA, part of FEED 1	
Snow Clearing / Access / Utility / Maintenance		OE	OE	OE / LCP	Contractor	N/A	IBA, part of FEED 1	
Other Temporary Facilities								
Construction Power and Distribution		OE	OE	OE / LCP	Contractor	Contractor	NLH decision, part of FEED 1	Yes, provide power to predetermined amount, by Contractor, at fixed rate power consumption above at premium.
Fuel Depot (Centralized)		OE	OE	OE / LCP	Contractor	Contractor	NLH decision, IBA, part of FEED 1	Yes, in lieu of Contractors all with individual fuel supply, potential for fuel tax relief.
Decommission & Site Restoration		OE	OE	OE / LCP	Contractor	N/A	IBA, part of FEED 1	
Roads & Bridges								
Access Roads		OE	OE	OE / LCP	Contractor or EPC	N/A	FEED 3	
Bridges		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3	
Reservoir								
Surveying		OE	OE	OE / LCP	Contractor	N/A	IBA, FEED 3	
Clearing and Grubbing		OE	OE	OE / LCP	Contractor	N/A	IBA, FEED 3	
Reservoir Clearing		OE	OE	OE / LCP	Contractor	N/A	IBA, FEED 3	
Collection of Materials		OE	OE	OE / LCP	Contractor	N/A	IBA, FEED 3	
Marketing of Materials		OE	OE	OE / LCP	Contractor	N/A	IBA, FEED 3	
Disposal of Waste		OE	OE	OE / LCP	Contractor	N/A	IBA, FEED 3	
Debris Management through two yrs Operation		OE	OE	OE / LCP	Contractor	N/A	IBA, FEED 3	
Preliminary Dam Works								
Survey Work		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, review by engineering	
Site Clearing and Grubbing		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, review by engineering	
Diversion Tunnel Rock Bolting etc.		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, review by engineering	
Works including gates, overburden excavation, and concrete head works.		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, review by engineering	
Coffer Dam(s)		OE	OE	OE / LCP	EPC or Contractor	N/A	Review by Engineering? FEED 3	
Tunnel Closure		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, review by engineering	
Dam Civil Works								
Concrete Cut-Off Wall		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, sheet piled	
Bulk Excavation		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, review by engineering	

Activities		Preliminary Engineering	Detail Engineering / Performance Specifications	Procurement Document	Construct / Install / Supply	Start-Up and Commissioning	Comments	Colour Legend
Dam Construction		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, review by engineering	
Foundation Preparation		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, review by engineering	
Switchyard Civil Works		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, review by engineering	
Concrete Structures								
Intake		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, review by engineering	
Embedded Parts and Grounding								
Penstocks		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, review by engineering	
Spillway		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, review by engineering	
Powerhouse Building		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, review by engineering	
Structure Excavation		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, review by engineering	
Permanent Accommodations		OE	OE	OE / LCP	EPC or Contractor	N/A	FEED 3, review by engineering	How many do we need to accommodate or in separate location????
Powerhouse Electrical/Mechanical							Could be assigned to civil work or separate	
Turbines / Generators		OE	OE	OE / LCP	EPC	EPC	FEED 3	
Balance of Plant		OE	OE, functional	OE / LCP	EPC or Contractor(s)	EPC or Contractor(s)	FEED 3	
Powerhouse Cranes		OE	OE, functional	OE / LCP	EPC or Contractor(s)	EPC or Contractor(s)	FEED 3	
Powerhouse E & M Services		OE	OE, functional	OE / LCP	EPC or Contractor(s)	EPC or Contractor(s)	FEED 3	
Gates and Hoists		OE	OE	OE / LCP	EPC	EPC	FEED 3	
Transformers (15 / 230 KV)		OE	OE	OE / LCP	EPC	EPC	FEED 3	
Switchyard(s) Structure and Electro-Mechanical Equipment		OE	OE	OE / LCP	EPC or Contractor	EPC or Contractor	Review engineering, FEED 2	
AC Transmission								
Overhead Transmission Line(s)								
Surveying		OE	OE	OE / LCP	Contractor or EPC	N/A	Review engineering, FEED 2, if cost & schedule benefits	
Line Clearing and Access Roads		OE	OE	OE / LCP	Contractor or EPC	N/A	Review engineering, FEED 2, if cost & schedule benefits	
Procure Conductor		OE	OE	OE / LCP	Contractor or EPC	N/A	Review engineering, FEED 2, if cost & schedule benefits	
Procure Insulators		OE	OE	OE / LCP	Contractor or EPC	N/A	Review engineering, FEED 2, if cost & schedule benefits	
Procure Transmission Tower Hardware		OE	OE	OE / LCP	Contractor or EPC	N/A	Review engineering, FEED 2, if cost & schedule benefits	
Procure Foundations and Anchors								
Install Foundations and Anchors								
Procure Towers		OE	OE	OE / LCP	Contractor or EPC	N/A	Review engineering, FEED 2, if cost & schedule benefits	

Activities		Preliminary Engineering	Detail Engineering / Performance Specifications	Procurement Document	Construct / Install / Supply	Start-Up and Commissioning	Comments	Colour Legend
Construction and Installation of any Electrical Equipment and outfitting including but not limited to transformers, switchgear PT's and CT's etc.								
Line Construction		OE	OE	OE / LCP	Contractor or EPC	N/A	FEED 2	
Termination of Conductors								
Modification to Existing Bldg's @ Churchill Falls.								
Testing of Installed Equipment								
Site Restoration/Habitat Mitigation		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Line Camps (Permanent)		OE	OE	OE / LCP	Contractor	N/A	IBA FEED 1	
DC Transmission								
Surveying Lydar and Trad.								
Line Clearing and Access Roads								
Converter Station		OE	OE	OE / LCP	EPC	EPC	FEED 2	
Converter Building		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Electro Mechanical Equip.		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Civil Works		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Synchronous Condensers		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Taylor Brook Station		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
String Overhead Transmission Line(s)		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Procure Conductor		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Procure HVDC Insulators		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Procure Transmission Tower Hardware		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Procure Towers		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Line Construction		OE	OE	OE / LCP	Contractor or EPC	N/A	FEED 2	
Installation of all Insulators, etc.								
Electrode Line		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Electrode Sites		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
OPG OPW Conductors								
Line Camps (Permanent)								
Submarine Cables							FEED 2	
Surveying		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Landing Sites (Everything)		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Procure Cables		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Install / Lay Subsea Cables, including submerged rock trenching		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Termination Equipment								
Construct Termination Bldg's								
Cable Storage Faciltiy								
Testing and Mechanical Completion Work.								
Site Restoration / Habitat Mitigation		OE	OE	OE / LCP	Contractor	N/A	FEED 2	
Remote Operation								
Communication System		OE	OE	OE / LCP	EPC	EPC	NLH standardization, requirements may come into play, operations, Integration concerns, CFLCO. ABB, SCADA or similar type Cos	

Contract Strategy Decision Matrix						
	Decided	Dependent on				
		Further Study	IBA	Market	Ongoing	Timing
Will the project be Owner managed	*					
Will the Owner utilize the services of a Project Services Contractor	*					
Competitively bid project EPC	*					
Competitively bid one reimbursable FEED	*					
Competitively bid multiple reimbursable FEED's	*					
Option for FEED contractor to carry on through Phase 4 (EP)	*					
Stop after FEED and bid EPCM	*					
EPC Compensation models	*					
Location for FEED		*		*		
Location for Detail Design & Procurement	*					
FEED contractor will be allowed to tender for EP scope	*					
Prequal will reflect E and P as well as FEED	*					
Who will buy critical equipment	*					
Subcontracts and PO's on whose paper	*					
How to maintain competition for work with limited NL bidders list	*					
Is overall decision based on value drivers	*					
Will LCP utilize Contractor incentives		*		*		
Phase 4 strategy confirmation	*					
Cost plus percentage mark-up rate rather than a fixed schedule of rates for FEED		*		*		
Develop plans to transition from FEED to detail design through risk analysis	*					
Consider lessons learned	*					
Confirm scope from WBS	*					
Do we need to justify Owner managed	*					
What do we need for Gate 2	*					
When is FEED to be awarded	*					
What market analysis can we do and when	*				*	

Contract Strategy Alternatives								
Drivers / Selection Criteria	**Ranking**	**OWNER MANAGED + PSC** Fully Integrated project management team consisting of Owner and engineering contractor(s), consultants and partners responsible for delivery of all EPCM functions to the degree dictated by each contract package plan. Bid for PSC	**WTO's + Bid Phase 4 EPCM** Perform Phase 3 engineering with existing feasibility study contractors through the Work Task Order (WTO) system + Competitive bid Phase 4 EPCM who would execute most of the contract plan.	**Multiple Contracts** Bid multiple Phase 3 engineering contracts + Option to carry on to Phase 4 or stop and bid Phase 4 EPCM	**Owner managed + EPCM** Bid EPCM contract with Owner team managing /monitoring the engineering contractor for phase 3 and 4.	**EPC'(s) (Design & Build variation) - Phase 3 and 4**		
Owner Managed	1	4	1.5	1.5	3	0		
Financing strategy	1	0	2.5	1	2.5	4		
Cost & Schedule predictability	1	4	1.5	1.5	3	0		
Driven by Provincial policies		4	2	1	3	0		
Driven by IBA agreement	1	4	2	1	3	0		
High FEL		4	2	1	3	0		
Optimal allocation of risk	1	4	3	2	1	0		
Maintain flexibility for development of alternative concepts when change is required		4	3	1	2	0		
Understand market conditions such as contractor availability & capability		4	2	2	2	0		
TOTAL		32	19.5	12	22.5	4		

Market Intelligence Information

Equipment	Vendor	Manufacturing time	Shop Loading	Mftg. Location
Camp	Atco	5 -7 months engineering	have capacity	Alberta
		7 months manufacturing		
	PTI	12 months	booked until Oct 2008	Alberta
	Kent	2-4 mos engineering / 6mos mftg		Eastern Canada
Turbines & Generators	Voith Siemens	53 months includes	have capacity	
		12 mos model testing; 27 mos engineering (incl 12 - 18 mo for casting delivery); 12 mos fabrication; 2 mos shipping; 4 mos comm. Per unit		
	Alstom Hydro Power	52 months 1st unit (+3 mo per unit)	have capacity	
Submarine cable	ABB	3 months	booked until Feb 2009	Sweden
Transformers & Shunt Reactor	Pauwels	20 - 23 months	have capacity	
	Areva T&D Canada	20 months	have capacity	
	ABB	24 - 26 months	have capacity	
Converter Stations	Areva	33 - 36 months	have capacity	UK & Europe
		(incl 18 - 20 mos on site)		
	ABB	not supplied		Sweden
Transmission Line Towers	Locweld	4 months design + mftg	35,000 tonnes capacity	Quebec
	Fabrimet	8-12 months	25,000 tonnes capacity	
Transmission Line Conductor	Nexans	24 months (150km per month)	have capacity	Canada
	Alcan	20 months (200 km per month)		

Equipment	Vendor	Manufacturing time	Shop Loading	Mftg. Location
Switchyard Equipment	Areva	6-8 months	have capacity	
	ABB	12 months	have capacity	Sweden
MV & LV Switchgear	Eaton/Cutler Hammer	4 mos drawing approval + 7 mos mftg	have capacity	US
		4 mos drawing approval + 9 mos mftg		US
Protection/Control/	ABB	16-18 months	have capacity	Burlington, ON
SCADA		24 months	have capacity	US
Overhead Crane	Kone	12 - 14 months	have capacity	

Contract Strategy Alternatives								
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Owner Managed	1	4	1.5	1.5	3	0		
Financing strategy	1	0	2.5	1	2.5	4		
Cost & Schedule predictability	1	4	1.5	1.5	3	0		
Driven by Provincial policies		4	2	1	3	0		
Driven by IBA agreement	1	4	2	1	3	0		
High FEL		4	2	1	3	0		
Optimal allocation of risk	1	4	3	2	1	0		
Maintain flexibility for development of alternative concepts when change is required		4	3	1	2	0		
Understand market conditions such as contractor availability & capability		4	2	2	2	0		
TOTAL		32	19.5	12	22.5	4		

Lower Churchill Project - Contract Packages

Rev. B1, April 15, 2008

No.	Description	Contract Strategy	Commence Procurement Activities	Award Date	Mobilization / Delivery	Required On Site	Comments
A-001	CAMP, Including Buildings 2000 person	Lump Sum Contract & Unit Rates	1-Apr-08	1-Jan-09	2 months	1-Mar-10	Dates reflect RFP issue in accordance with IBA agreement if process to issue for open bid to Market process is much longer and there is a need to start earlier. Camp Delivery 12 months ARO. There is interest in the marketplace by Camp Operators to provide a fully maintained camp whereby we would lease beds and be charged by the day per person / per bed / meals included). If PSC Contractor not on board early we may need to commence this work under a WTO.
A-002	CAMP, Underground Infrastructure	Lump Sum Contract	1-Apr-08	1-Nov-09	2 months	1-Jan-10	Work a part of A-001 for bid puposes
A-003	CAMP, Removal of previous undergrounds	Reimburseable	1-Apr-08	1-Nov-09	2 months	1-Jan-10	Work a part of A-001 for bid puposes
A-004	Temporary and Long Term Office Trailers not included in the Camp Accommodation pkg. wash cars, lunch rooms	Lump Sum PO		1-Jul-09	6 months	1-Jan-10	Could form part of Camp supply A-001, or separate provider of rental units, project decision whether this is a part of Contractor supply or Company supply.
A-005	Permanent Personnel Facility (40 beds)	Contractor Lump Sum	15-Jan-10	1-Jul-10		1-Jul-15	Should we construct early and house LCP Management??
C-001	North and South Access Roads to Camp, River and Construction Bridge.	Contractor Lump Sum	1-Feb-09	1-Nov-09	2 months	1-Jan-10	Review possible grouping with packages C-001, C-002, C-003 and C-004.
C-002	Construction Bridge (Bridge Only)	Lump Sum PO	15-Jan-09	1-Jul-09	N/A	1-Jul-10	Supply Only and the provision of Construction Supervision. Delivery 9-12 Months
C-003	Construction of Construction Bridge (Civil Works), including a barge to move equipment to south side of river to construct south side pier.	Contractor Lump Sum	1-Jul-09	1-Apr-10	3 months	1-Jul-10	
C-004	Diversion Tunnel including the following: Excavation, tunnelling, Concrete Inlet Portal, Engineered and bulk Rebar. Including the Site Clearing of any Borrow Pits and Disposal Areas. Potentially bring their own small concrete batch plant.	Contractor with unit rate contract	1-Aug-09	1-Apr-10	3 months	1-Jul-10	Mob depends upon equipment requirements. (2 years work) must be complete by the end of spring flood season 2012.
C-005	Sediment Settling Pond	Contractor Lump Sum or unit rate contract	1-Aug-09	1-Apr-10	3 Months	1-Jul-10	New package suggested by Marian Organ could be added to first individual contractor that requires sediment control (Diversion Tunnel Contract).
C-006	Large Batch Plant for Site	Contractor with unit rate contract	15-Nov-09	1-May-10	4 months	1-Sep-10	Depends whether Central Concrete Supply Philosophy adopted? Check leadtime
C-007	Phase I Excavation of Spillway and Plunge pool, Intake and Powerhouse Structure excavated to Penstock entry level to avoid overbreak problem. Including the Site Clearing of any Borrow Pits and Disposal Areas.	Contractor with unit rate contract	1-Sep-09	1-Jun-10	2 months	1-Aug-10	BB believes that C-007 and C-008 should be one contract to avoid double handling of materials for Dam Construction. Reason for two phases was to overcome overbreak concerns between C-007 and C-009.

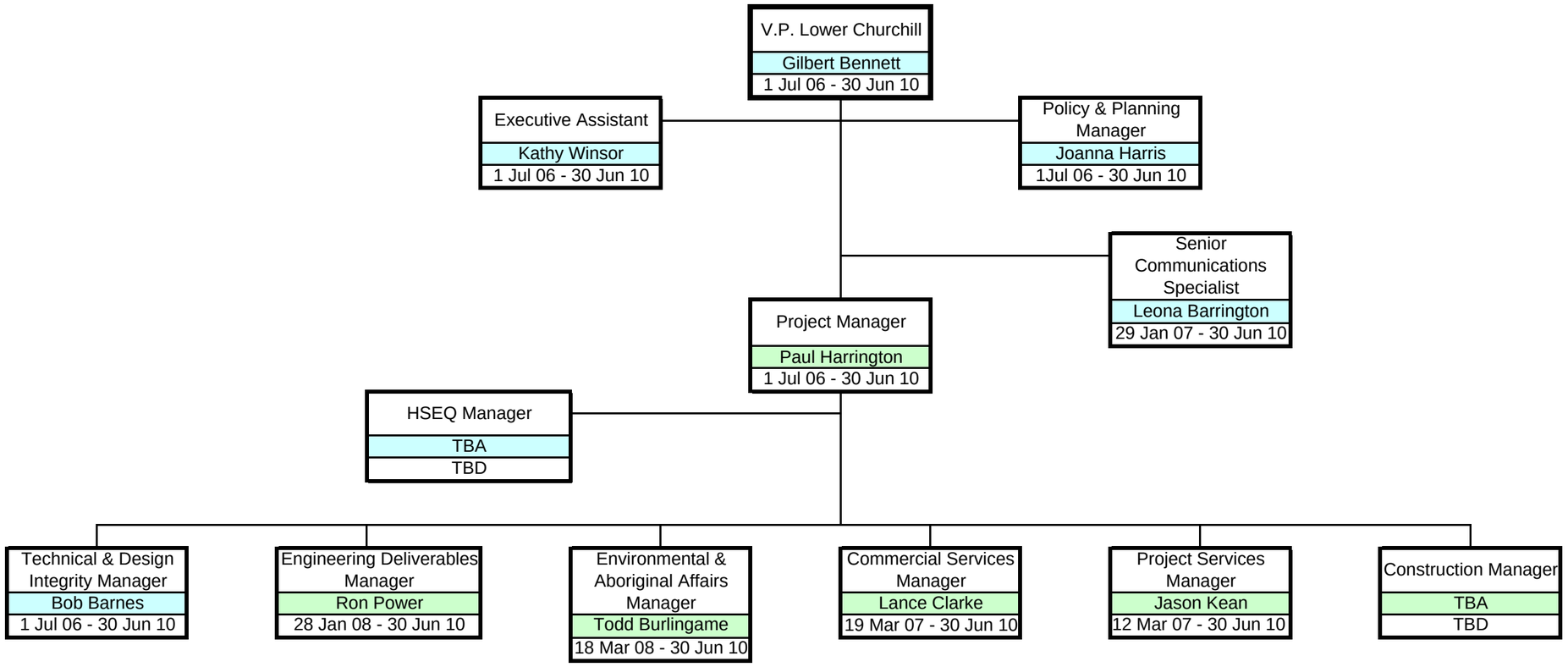
No.	Description	Contract Strategy	Commence Procurement Activities	Award Date	Mobilization / Delivery	Required On Site	Comments
C-008	Dam Works including survey work, clearing & grubbing, coffer dam(s), concrete cut-off wall, bulk excavation, dam construction, foundation preparation, switchyard civil works. Including the Site Clearing of any Borrow Pits and Disposal Areas.	Contractor with unit rate contract	1-Jul-09	1-Apr-10	3 months	1-Jul-10	BB had concerns with the award of C-007 and C-008 being awarded to separate contractors relating to the quality of materials the latter would receive and the added cost of double handling material if the Phase I contractor stockpiled away from the dam location.
C-009	Phase II Structure excavation and Concrete including intake, embedded parts and grounding, penstocks, spillway, powerhouse crane, powerhouse foundation and powerhouse building including Structural Steel, Cladding, HVAC and electromechanical equipment associated with building. Add gates and hoists, trash racks and stop logs from Balance of Plant due to the need of the civil contractor to place guides and concrete embeddments. Including the Site Clearing of any Borrow Pits and Disposal Areas.	Contractor with unit rate contract	1-Oct-09	1-Jul-10	3 months	1-Aug-11	Note: Expect successful contractor to subcontract building work above foundations. BB believes there are logical breaks in this package if we want to break this package down further.
C-010	Site Remedial Work	Contractor with unit rate contract				TBD	Need to understand scope of work for this package. Could be a part of each individual Construction Contract Package or an overall package to avoid claims.
E-001	Construction Power Line, substation 138KV down to 25 KV, one line to Camp and one line to North side Construction Distribution Panel. Potential for line across Construction Bridge to South Side of River.	Lump Sum Contract	1-Jun-09	1-Nov-09	2 months	1-Jan-10	Need Scope of Work to determine award date. Does Hydro have transformers spare in system if not delivery could be long for Transformer? To ensure timely completion this should be awarded to a contractor not NLH.
E-002	Converter stations @ Gull Island and Soldiers Pond & building including electromechanical equipment, civil works, synchronous condensers,	EPC lump sum	1-Oct-09	1-Jul-10	36-39 Months	25-Aug-11	ABB and Siemens indicated in their presentations to us in February that they could handle the entire scope as a black box technology and all we nee provide them is a level site. Verify delivery - 24 month delivery
E-003	Taylor's Brook Switchyard, consisting junction Bipolar lines between Gull Island, Soldiers Pond and Maritimes to support a multi-terminal scheme.	EPC lump sum	1-Oct-09	1-Jul-10	36-39 Months	25-Aug-11	Verify delivery - 24 month delivery
E-004	735 /235 KV Switchyard at Gull Island	EPC lump sum	1-Oct-09	1-Jul-10	36-39 Months	25-Aug-11	
E-005	Sychronous Condensers	Lump Sum PO	1-Oct-09	1-Jul-10		25-Aug-11	
E-006	Electrode Sites Preparation	Lump Sum PO	1-Oct-09	1-Jul-10		25-Aug-11	Locations yet to be determined.
E-007	Submarine Cable and Installation including landing sites, termination buildings @ Strait of Belle Isle and Cabot Strait, cable storage building, testing and mechanical completion	EPC lump sum	1-Oct-09	1-Jul-10			Market Intelligence required

No.	Description	Contract Strategy	Commence Procurement Activities	Award Date	Mobilization / Delivery	Required On Site	Comments
E-008	Remote Control system (communications)	EPC lump sum	15-Jan-10	1-Jul-10			Contracting Strategy under review.
E-009	Line construction and installation Contract, including surveying, line clearing, access roads, foundations, anchors, tower erection, string transmission and electrode lines, terminations, installation of electrical equipment, line camps, testing..	Contractor with unit rate contract, potentially 6 Contracts.	1-Oct-09	1-Jul-10	3 months	1-Feb-11	Final Package Strategy inclusions need to be reviewed, however if there are 6 potential line contractors involved it may be appropriate to leave this in the scope.
E-010	Conductor AC / DC / Electrode Purchase	Lump Sum PO	15-Jan-10	1-Jul-10		1-Feb-11	Verify delivery information
E-011	AC and HVdc Insulator Purchase	Lump Sum PO	15-Jan-10	1-Jul-10		1-Feb-11	Verify delivery information
E-012	Tower Steel Purchase	Lump Sum PO	15-Jan-10	1-Jul-10		1-Feb-11	Verify delivery information
E-013	Tower Hardware and Anchors Supply only.	Lump Sum PO	15-Jan-10	1-Jul-10		1-Feb-11	Eng'g believe this should be supplied by Installation Contractor. (if required)
E-014	OPGW Conductors Purchase	Lump Sum PO	15-Jan-10	1-Jul-10		25-Aug-11	Verify delivery information
E-015	OHGW Conductor Purchase	Lump Sum PO	15-Jan-10	1-Jul-10		25-Aug-11	Verify delivery information
E-016	Modifications to existing bldg at Churchill Falls	Contractor with unit rate contract	15-Jan-10	1-Jul-10		1-Feb-11	Verify delivery information
G-001	Project Office	Unit Rates and Lump Sum	30-Apr-08	30-May-08	3 months	1-Sep-08	Late
G-002	Project Support Contract (Engineering & Proj. Mgmt Support)	Reimburseable	30-Apr-08	30-Jul-08	2 months	1-Jul-08	Late
G-003	Catering	Contractor with unit rate contract	1-Mar-09	1-Dec-09	3 months	1-Mar-10	Confirm mobilization time
G-004	Janitorial	Contractor with unit rate contract	1-May-09	1-Oct-09	3 months	1-Jan-10	Confirm mobilization time
G-005	Security	Contractor Lump Sum	1-May-09	1-Oct-09	3 months	1-Jan-10	Confirm mobilization time
G-005	Medical Services	Contractor Lump Sum	1-May-09	1-Oct-09	3 months	1-Jan-10	Confirm mobilization time
G-006	Transportation	Contractor with unit rate contract	1-May-09	1-Oct-09	3 months	1-Jan-10	Confirm mobilization time
G-007	Camp maintenance	Contractor with unit rate contract	1-May-09	1-Dec-09	3 months	1-Mar-10	Plumber, Electrician, Carpenter, Communications etc.
G-008	Snow Removal and Road Maintenance	Contractor with unit rate contract	1-May-09	1-Oct-09	3 months	1-Jan-10	
G-009	Fuel supply and dispensing	Contractor with unit rate contract	1-May-09	1-Oct-09	3 months	1-Jan-10	Central Supply all Contractors
G-010	Sewage Disposal	Contractor with unit rate contract	1-May-09	1-Oct-09	3 months	1-Jan-10	
G-011	Potable Water Delivery	Contractor with unit rate contract	1-May-09	1-Oct-09	3 months	1-Jan-10	
G-012	Electrical Distribution Contractor Multiple (Call-Off's)	Contractor with unit rate contract	1-May-09	1-Oct-09	3 months	1-Jan-10	Electrical Hook-Up Construction Power and Trailers.
G-013	Explosives Supply and Warehouse includes security, issuance and permitting.	Contractor with unit rate contract	1-Oct-09	1-Mar-10	3 months	1-Jun-10	Direct Supply or Subcontract Project decision required.
G-014	Reservoir Clearing including surveying & clearing, harvesting, collection of materials and disposal of waste	Contractor with unit rate contract or lump sum per acre	1-Oct-08	1-Jul-09	1 year	1-Jul-10	1 year leadtime for equipment, camps and training (reference Enfor report) Review required with NL Forestry Department to ensure alignment for harvest activity in the area.

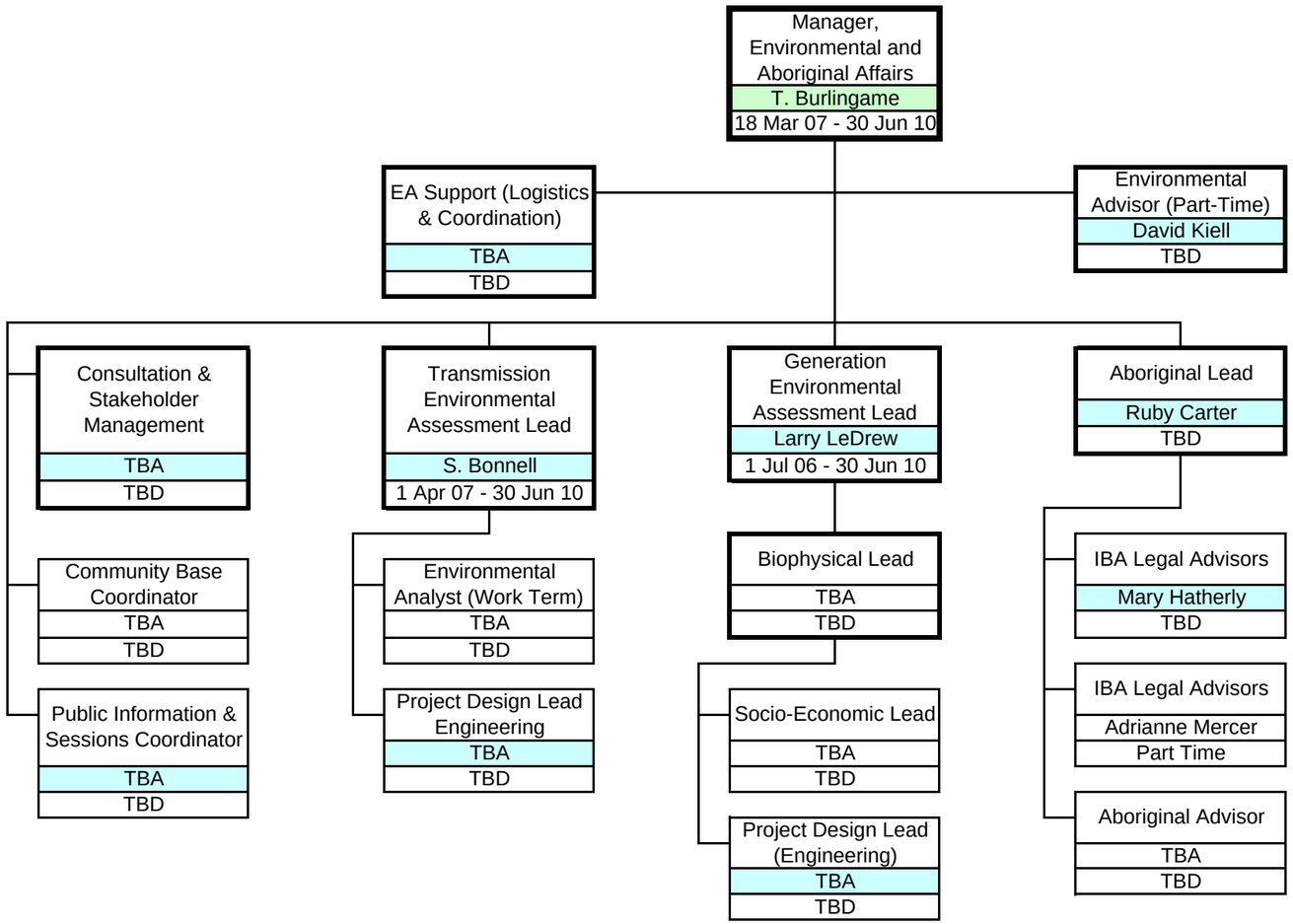
No.	Description	Contract Strategy	Commence Procurement Activities	Award Date	Mobilization / Delivery	Required On Site	Comments
G-015	Marketing of harvest trees	LCP responsibility not tied to financing				TBD	Inter-related activities between G-014 and G-015. Need to determine strategy.
G-016	Debris / Slash Management	LCP responsibility not tied to financing				TBD	Inter-related activities between G-014 and G-015. Need to determine strategy.
G-017	Barge Contract to move Equipment to South Side to Commence Diversion Tunnel and Phase I excavation work.	Contractor Lump Sum or day rate with mob / demob	1-Jul-09	1-Apr-10	3 months	1-Jul-10	Eng'g suggest we move to Diversion Tunnel Contract Package, however the barge is not soley to be used by Diversion Contractor, until bridge in place?
G-018	Cell Towers (2)	Contractor Lump Sum	1-May-09	1-Oct-09	3 months	1-Jan-10	Contracting Strategy under review.
G-019	Satellite Phone	Contractor Lump Sum	1-May-09	1-Oct-09	3 months	1-Jan-10	Confirm delivery time
G-020	Telephone for Camp	Contractor Lump Sum	1-May-09	1-Oct-09	3 months	1-Jan-10	Confirm delivery time
G-021	Cable or Satellitte TV for Camp	Contractor Lump Sum	1-May-09	1-Oct-09	3 months	1-Jan-10	Confirm delivery time
G-022	Data Lines	Contractor Lump Sum	1-May-09	1-Oct-09	3 months	1-Jan-10	Confirm delivery time
G-023	Happy Valley / Goose Bay Office Space Project Office	Contractor with unit rate contract	1-Jul-09	1-Dec-09	2 months	1-Jan-10	Project office set-up, we need to define the scope and duration and purpose.
G-024	Happy Valley Goose Bay Hotels (Mob / Demob) or Peak periods.	Nightly rate	1-Jul-09	1-Dec-09	2 months	1-Jan-10	Hotels may be required when senior management visit site and or we have logistics problems during inclement weather where a plane arrives but cannot take off and the roads to camp are impassable.
G-025	Happy Valley / Goose Bay Catering and box lunches	Unit rates	1-Jul-09	1-Dec-09	2 months	1-Jan-10	
M-001	Turbine & Generators, including exciters, control systems and govenors. (TBD)	EPC lump sum	1-Mar-09	1-Dec-10	53 Months	1-Feb-14	1st unit on site 1 Feb 2014. 12 month installation, 5 mo. Commissioning. 1st power 15 July 15
M-002	Balance of Plant (TBD) including powerhouse E&M services, transformers(15/230kv), switchyard structure, electro mechanical equipment, including diesel generator back-up unit.	EPC lump sum	1-Jul-09	1-Mar-10		1-Feb-14	Market Intelligence required and a project decision whether this package is component purchased.

No.	Description	Contract Strategy	Commence Procurement Activities	Award Date	Mobilization / Delivery	Required On Site	Comments
M-003	Spillway Gates and Guides and Concrete embeddments.	Lump Sum PO	15-Dec-09	1-Jun-10	1 month	1-Jul-11	Assume 1 year delivery. Could be part of Gates Pkg or Diversion Tunnel. Delivery to be confirmed through Market Intelligence. Could all be lumped together or separate supply only contracts individual contractors responsible for installation.
M-004	Diversion Tunnel Gates and Guides and Concrete embeddments and Stop Logs	Lump Sum PO	15-Dec-09	1-Jun-10	1 month	1-Jul-11	Market Intelligence required.
M-005	Intake Gates and Guides and Concrete embeddments	Lump Sum PO	15-Dec-09	1-Jun-10	1 month	1-Jul-11	Market Intelligence required.
M-006	Draft Tube Gates and Guides and Concrete embeddments	Lump Sum PO	15-Dec-09	1-Jun-10	1 month	1-Jul-11	Market Intelligence required.

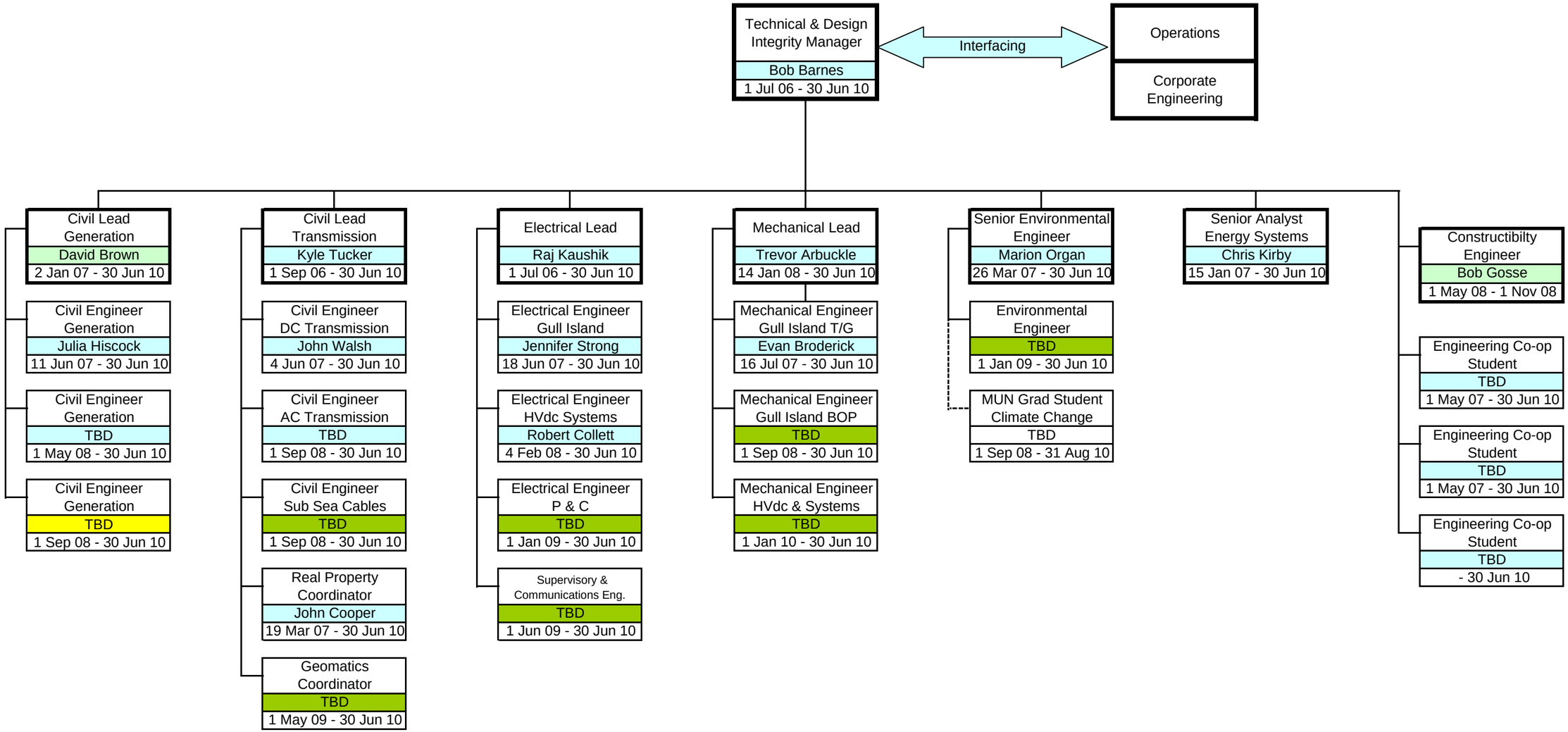
Leadership Organization - Phase 3



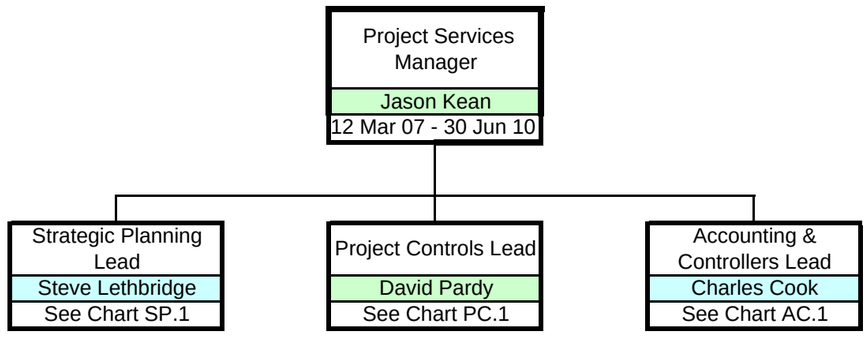
Environmental and Aboriginal - Phase 3



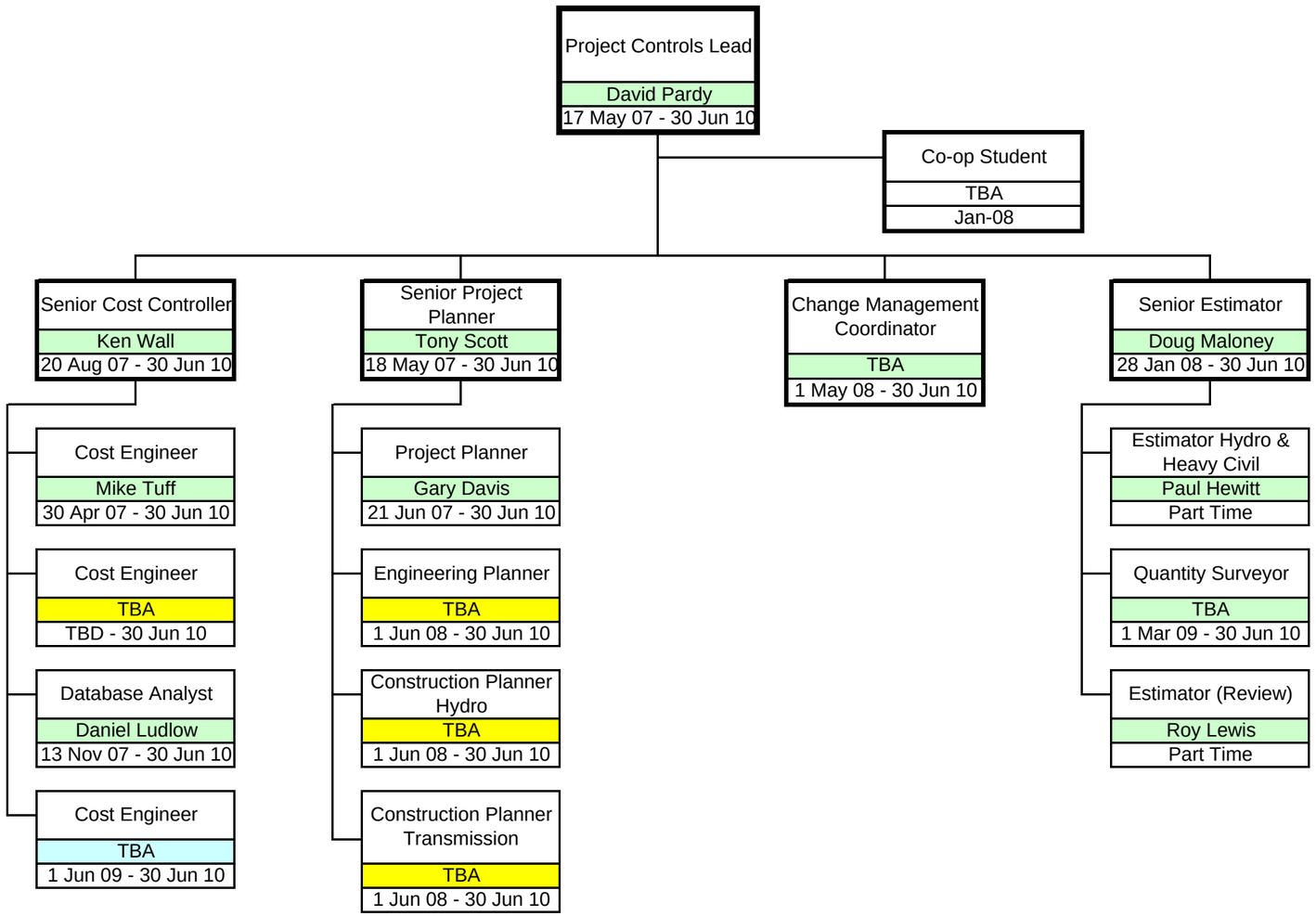
Technical & Design Integrity Team - Phase 3



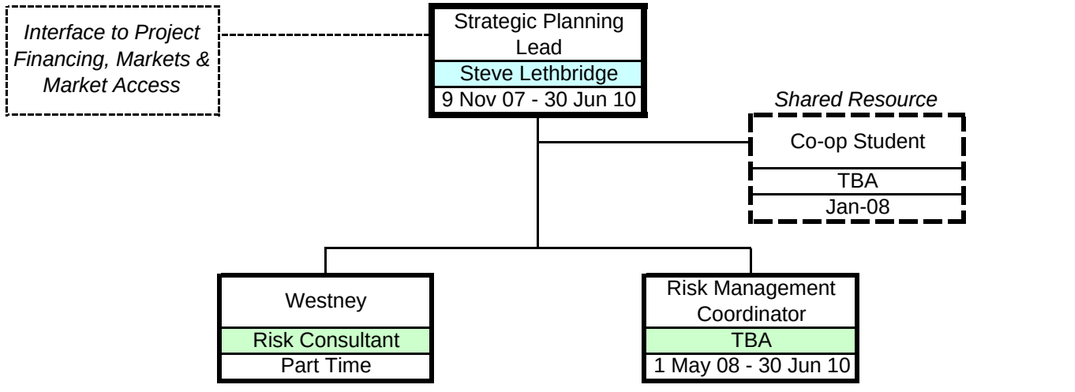
Project Services Organization - Phase 3



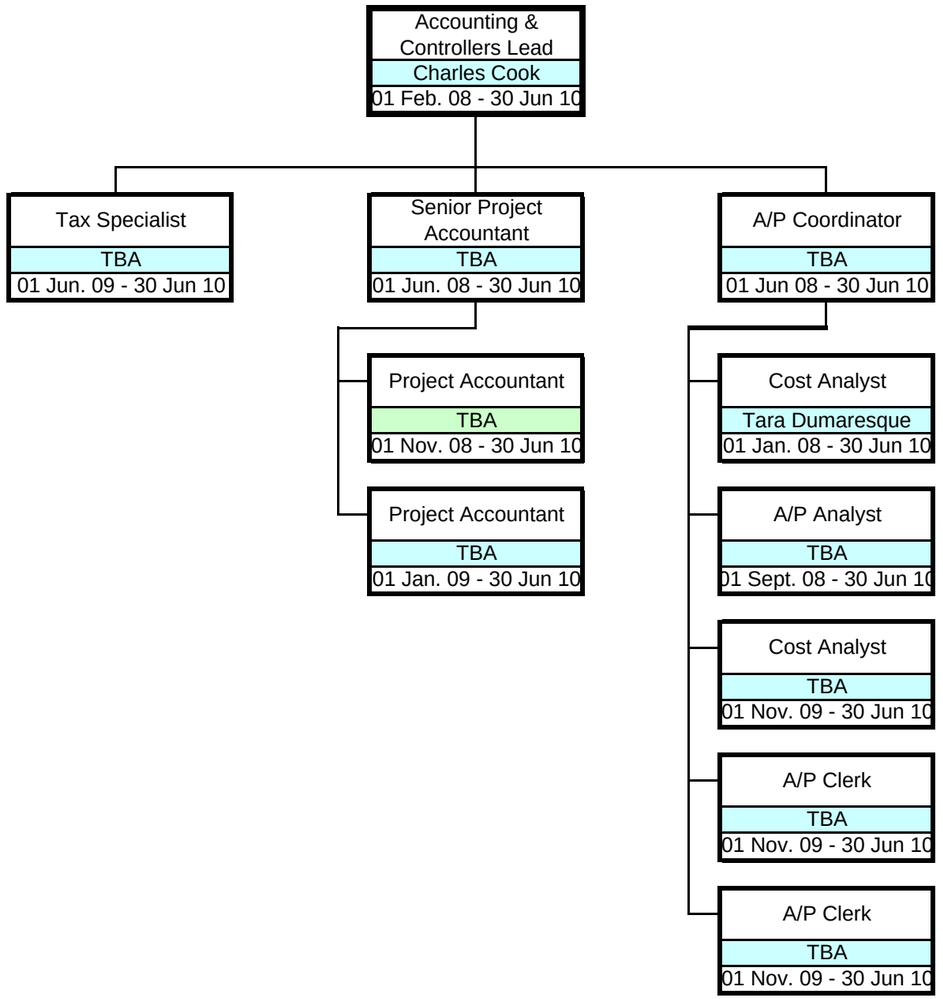
Project Controls - Chart PC.1 Phase 3



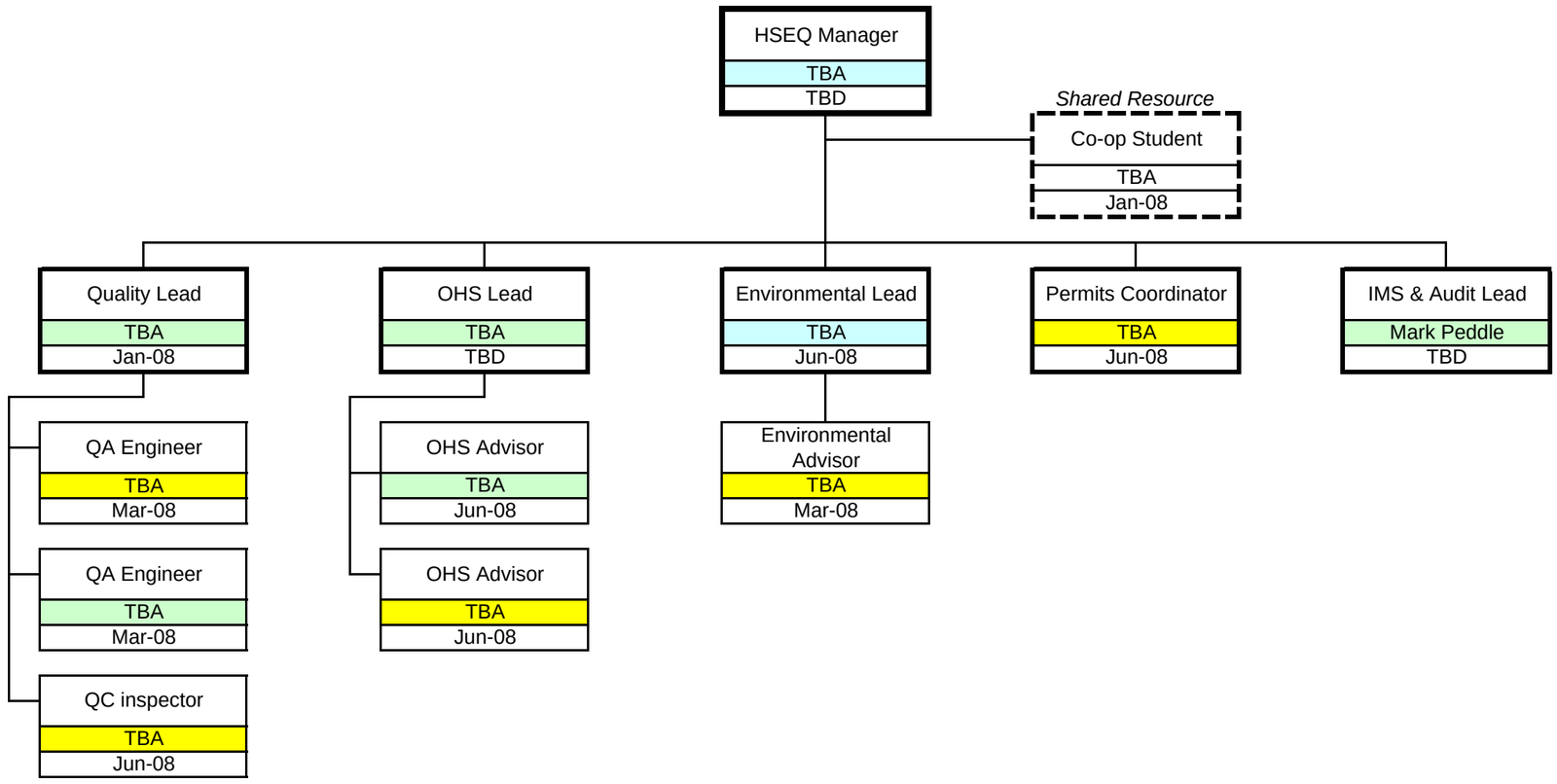
Strategic Planning - Chart SP.1 - Phase 3



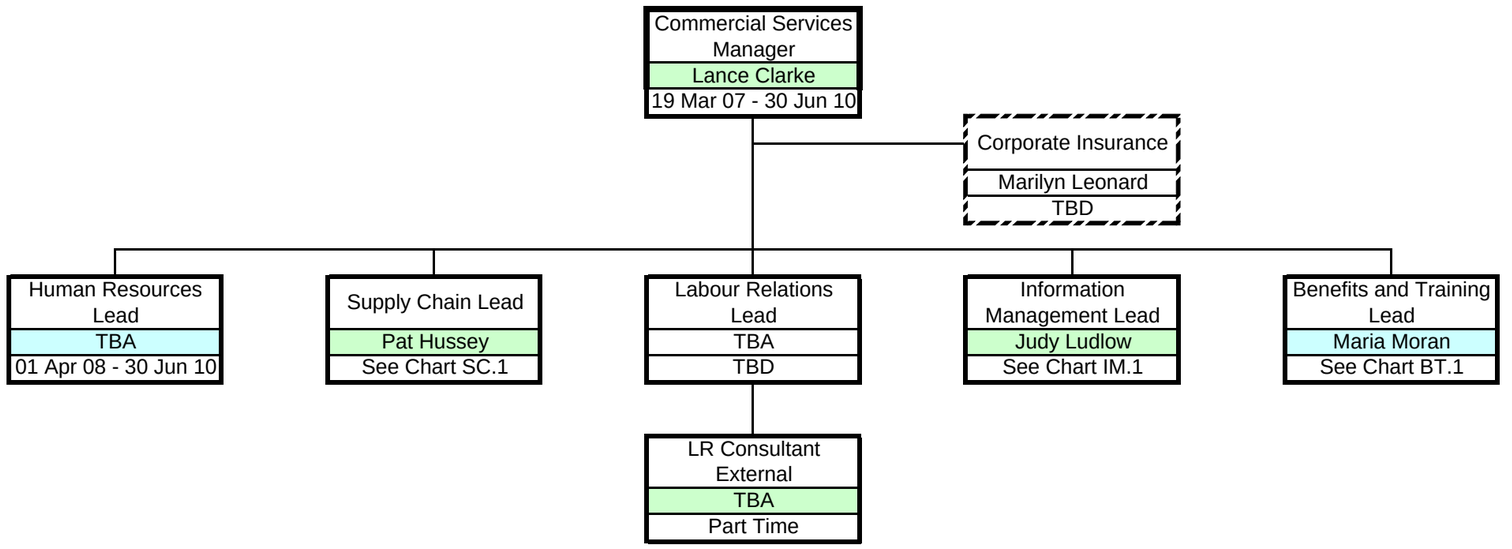
Accounting and Controllers - Chart AC.1 - Phase 3



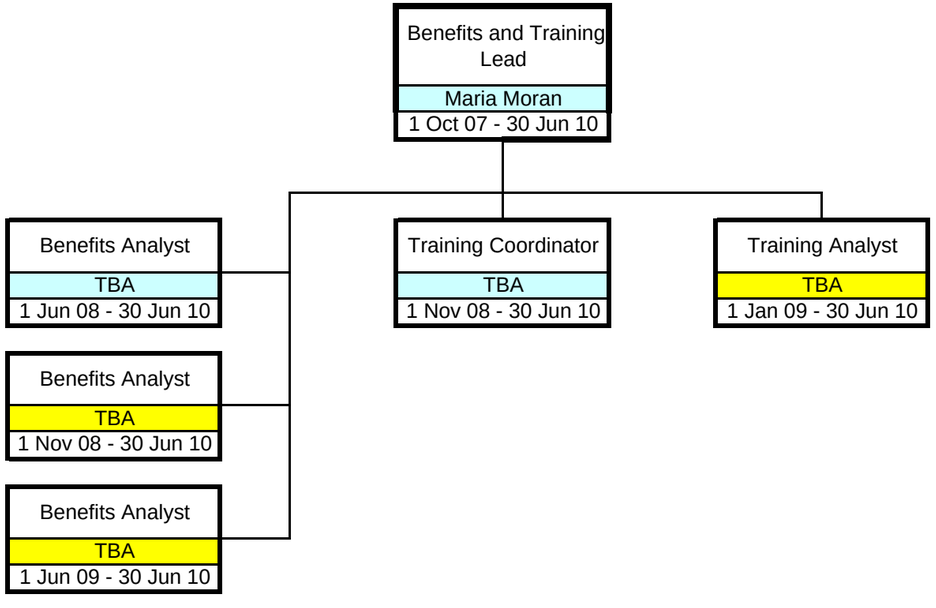
Health, Safety, Environment & Quality - Phase 3



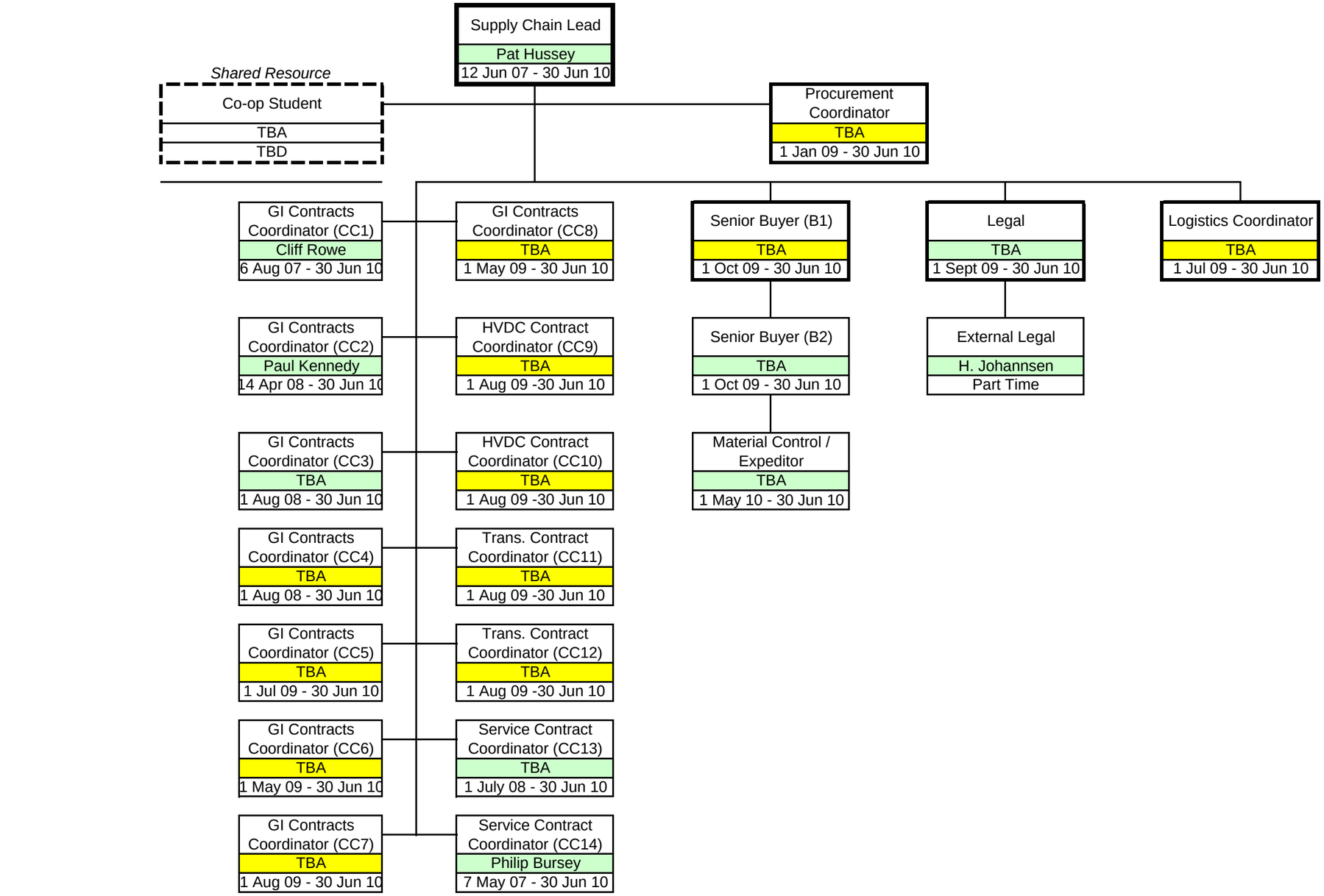
Commercial Organization - Phase 3



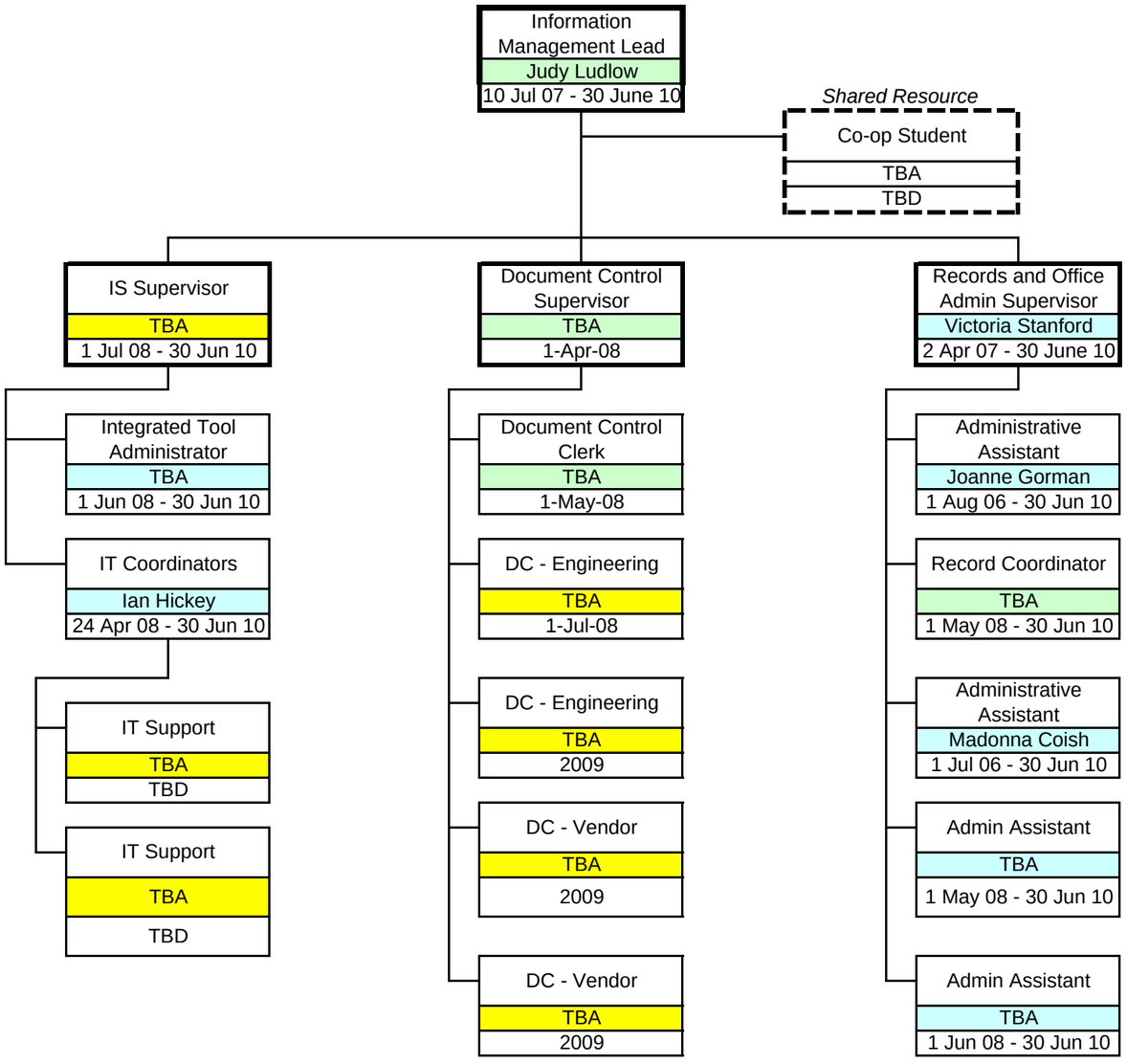
Benefits and Training Chart BT.1- Phase 3



Supply Chain - Chart SC.1 - Phase 3

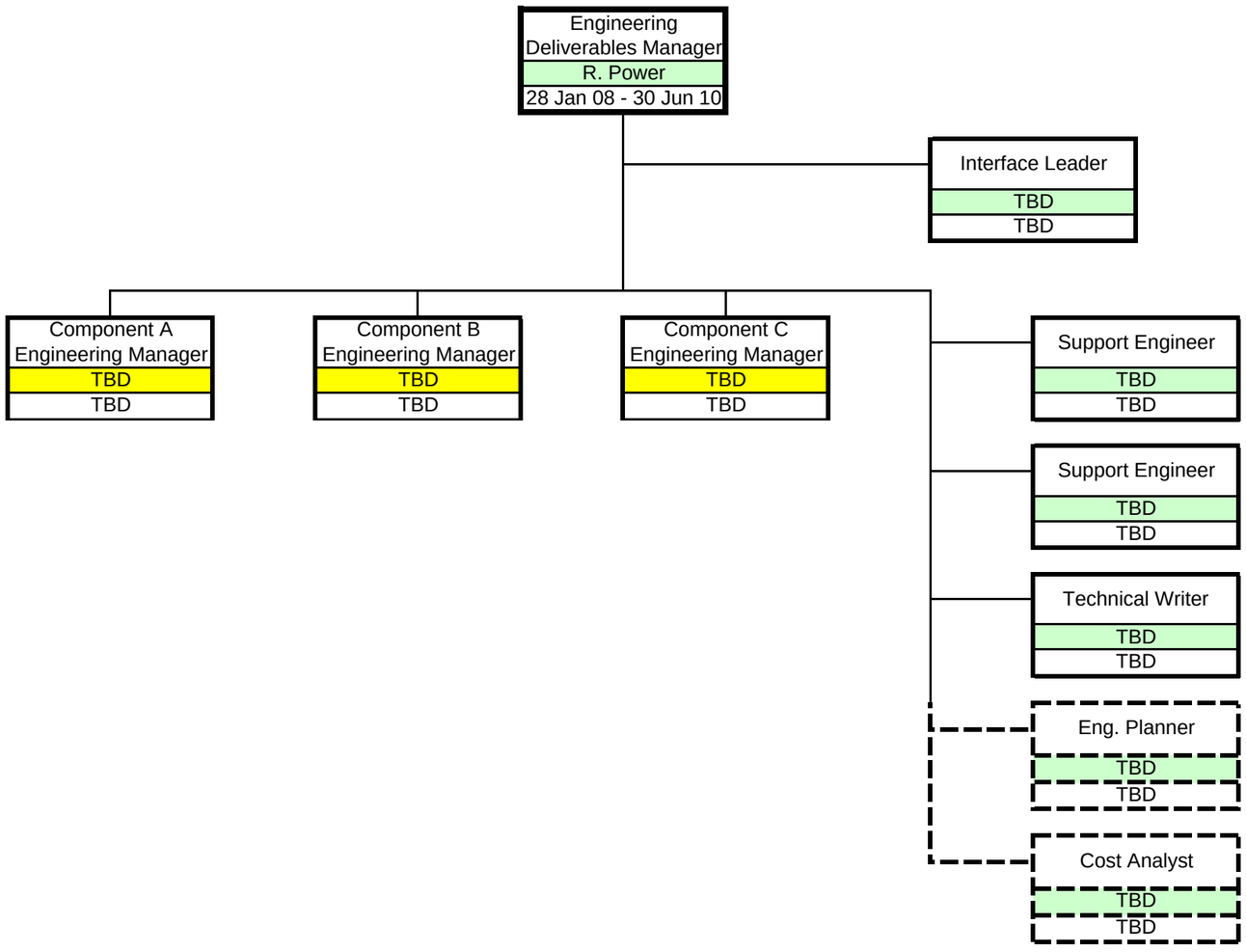


Information Management Chart Chart IM.1- Phase 3



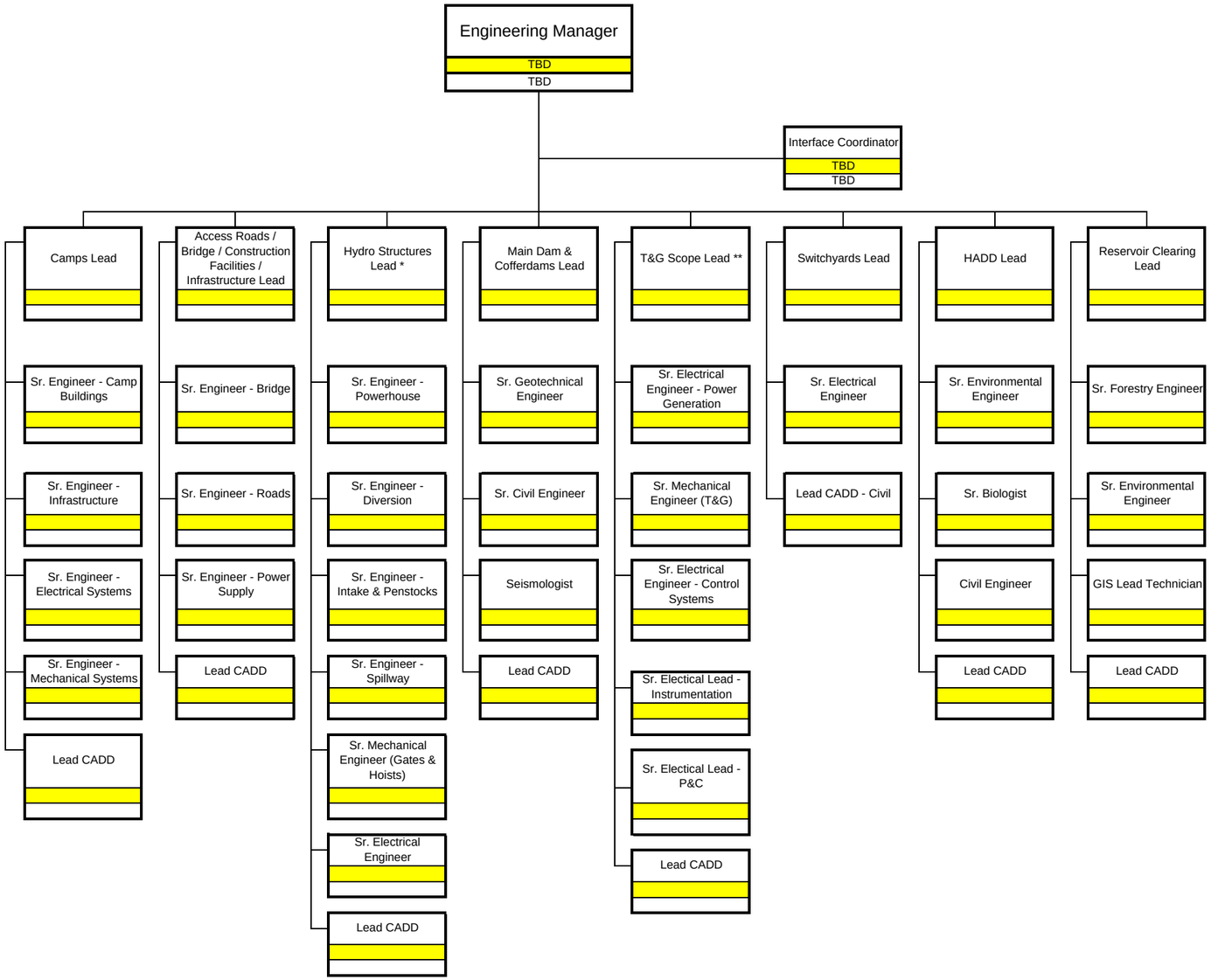
Phase 3

Engineering Deliverables Organization



Engineering - Phase 3

Component A - Gull Island Hydroelectric Development



Discipline Support
(Note: Two NLH Engineers will be included in this team)

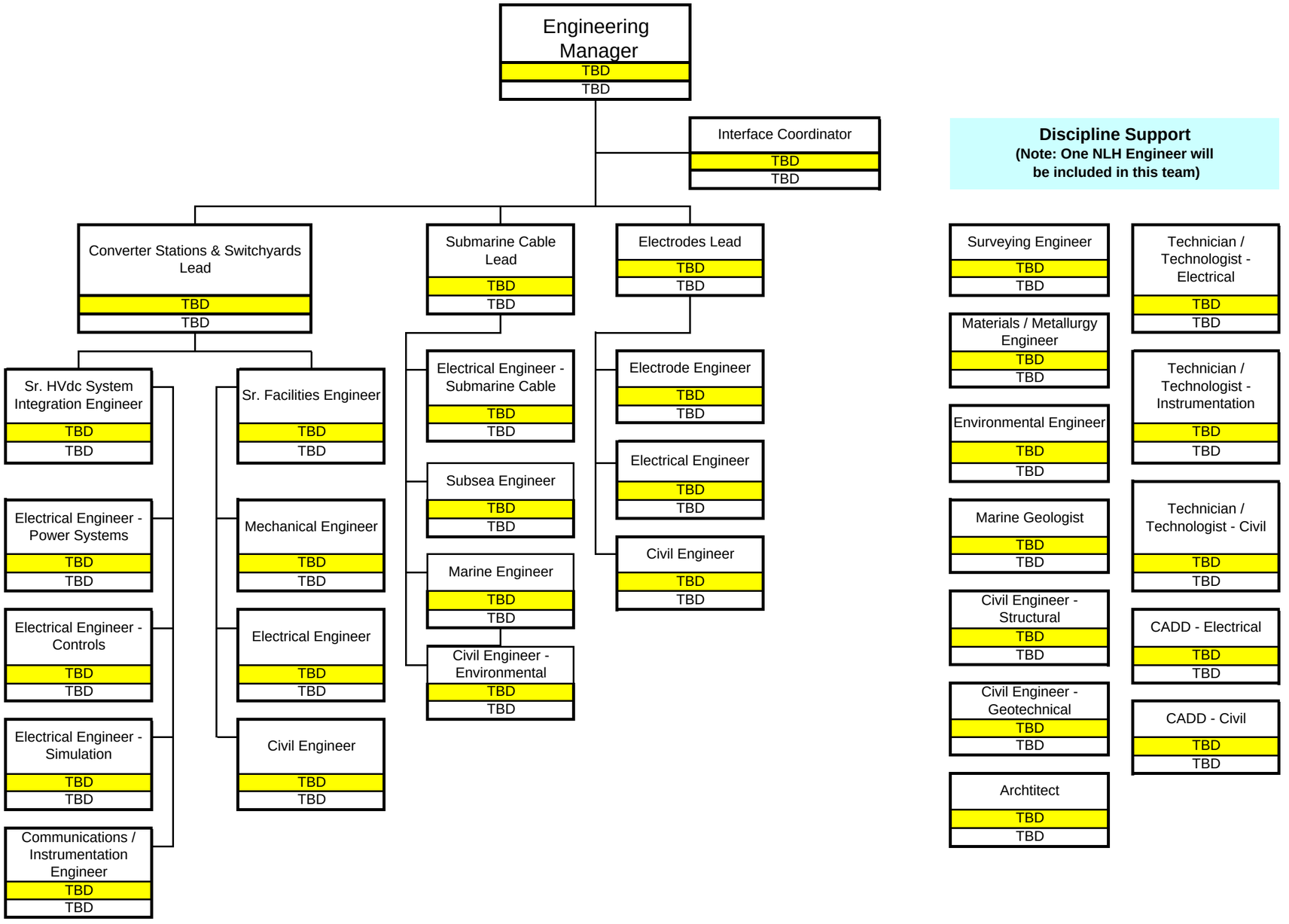
- Geological Engineers / Geologists — TBD / TBD
- Civil Engineers - Hydrotechnical / Hydraulics — TBD / TBD
- Civil Engineers - General — TBD / TBD
- Materials / Metallurgy Engineer — TBD / TBD
- Civil Engineers - Geotechnical — TBD / TBD
- Environmental Engineer — TBD / TBD
- Civil Engineers - Structural — TBD / TBD
- Electrical Engineers — TBD / TBD
- Communications Engineer — TBD / TBD
- Forestry Engineers — TBD / TBD
- Mechanical Engineers — TBD / TBD
- Technician / Technologist - Civil / Electrical / Mechanical — TBD / TBD
- Hydrologist — TBD / TBD
- Technician / Technologist - Instrumentation — TBD / TBD
- Archtitect — TBD / TBD
- GIS Technicians — TBD / TBD
- CADD - Civil / Mechanical / — TBD / TBD

* Hydro Structures include Diversion Tunnel, Powerhouse, Intake / Penstocks, Spillway, Auxiliary Dams

** T&G Scope to produce functional Specification for "Design, Fabrication, Supply, Installation and Commissioning" contract.

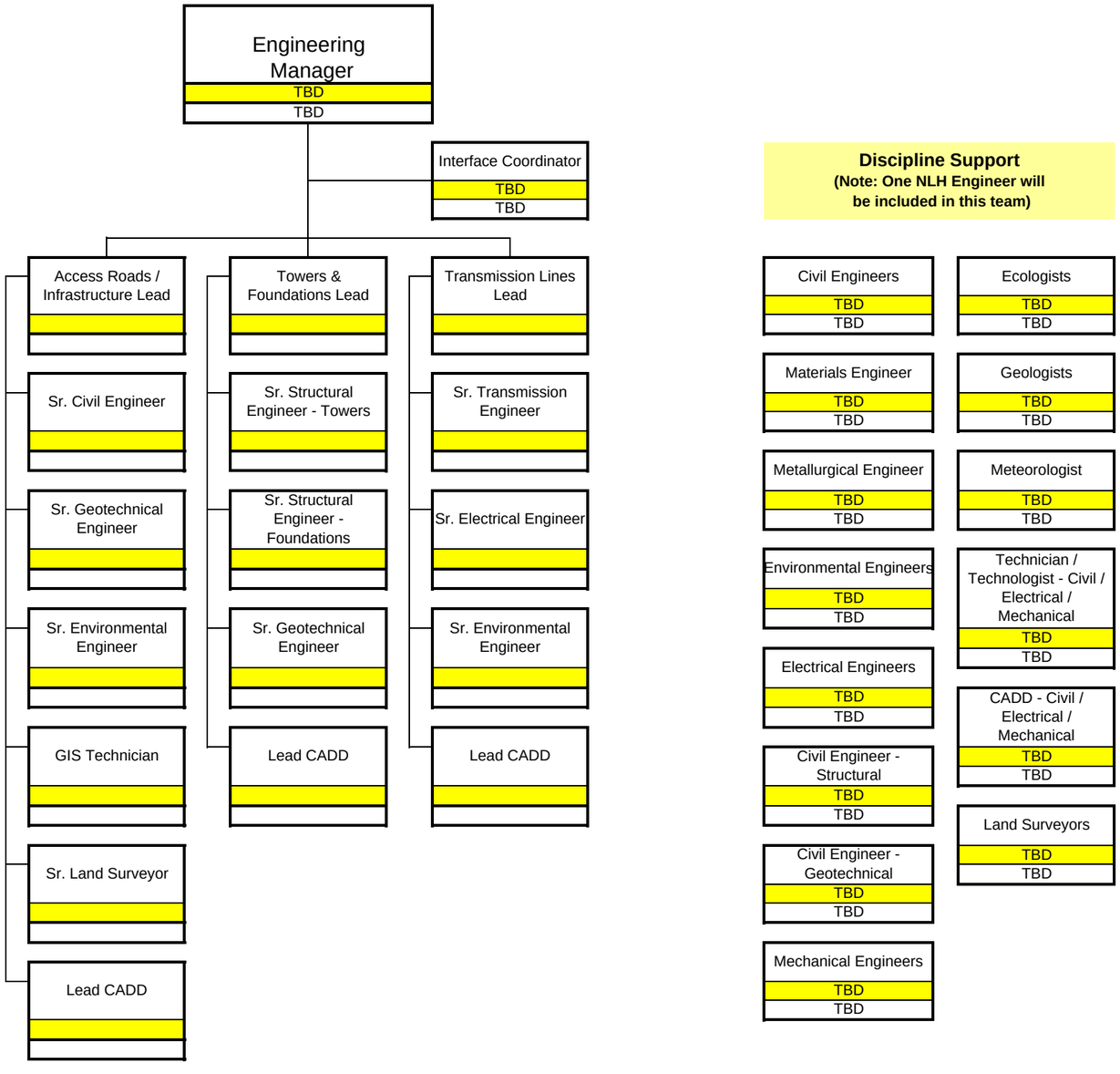
Engineering - Phase 3

Component B - HVdc Specialty Installations

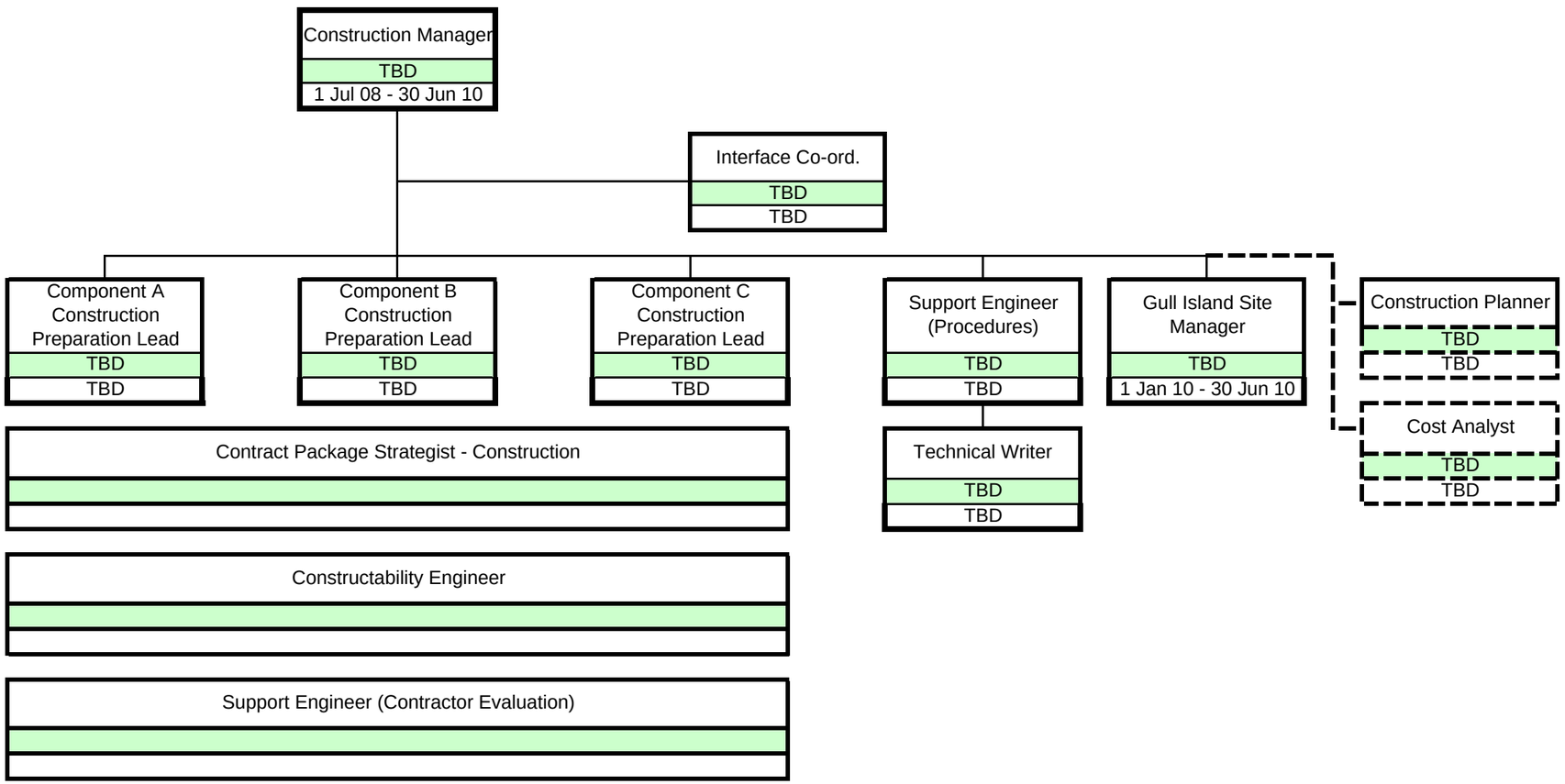


Engineering - Phase 3

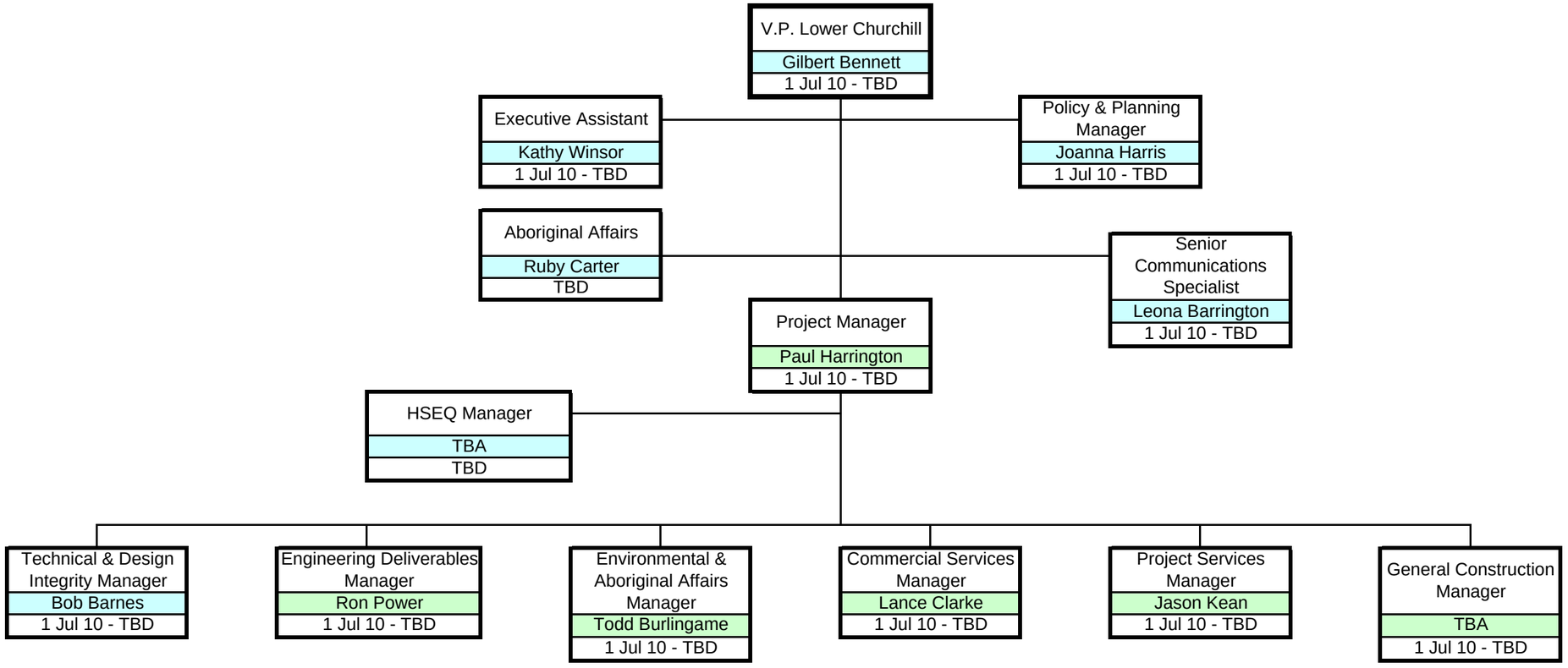
Component C - Overland Transmission



Construction Management Organization - Phase 3



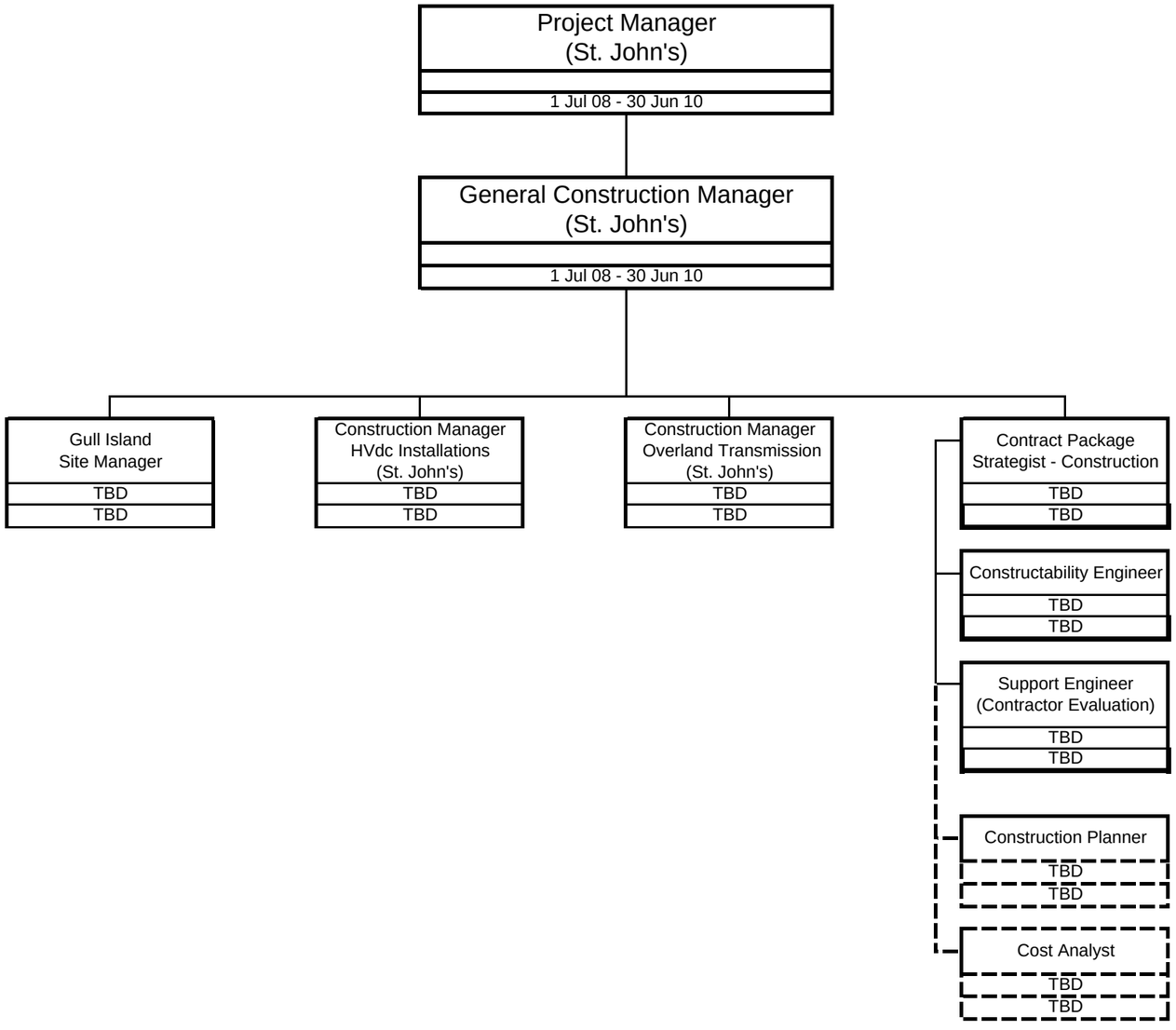
Leadership Organization - Phase 4 - Home Office



Phase 4

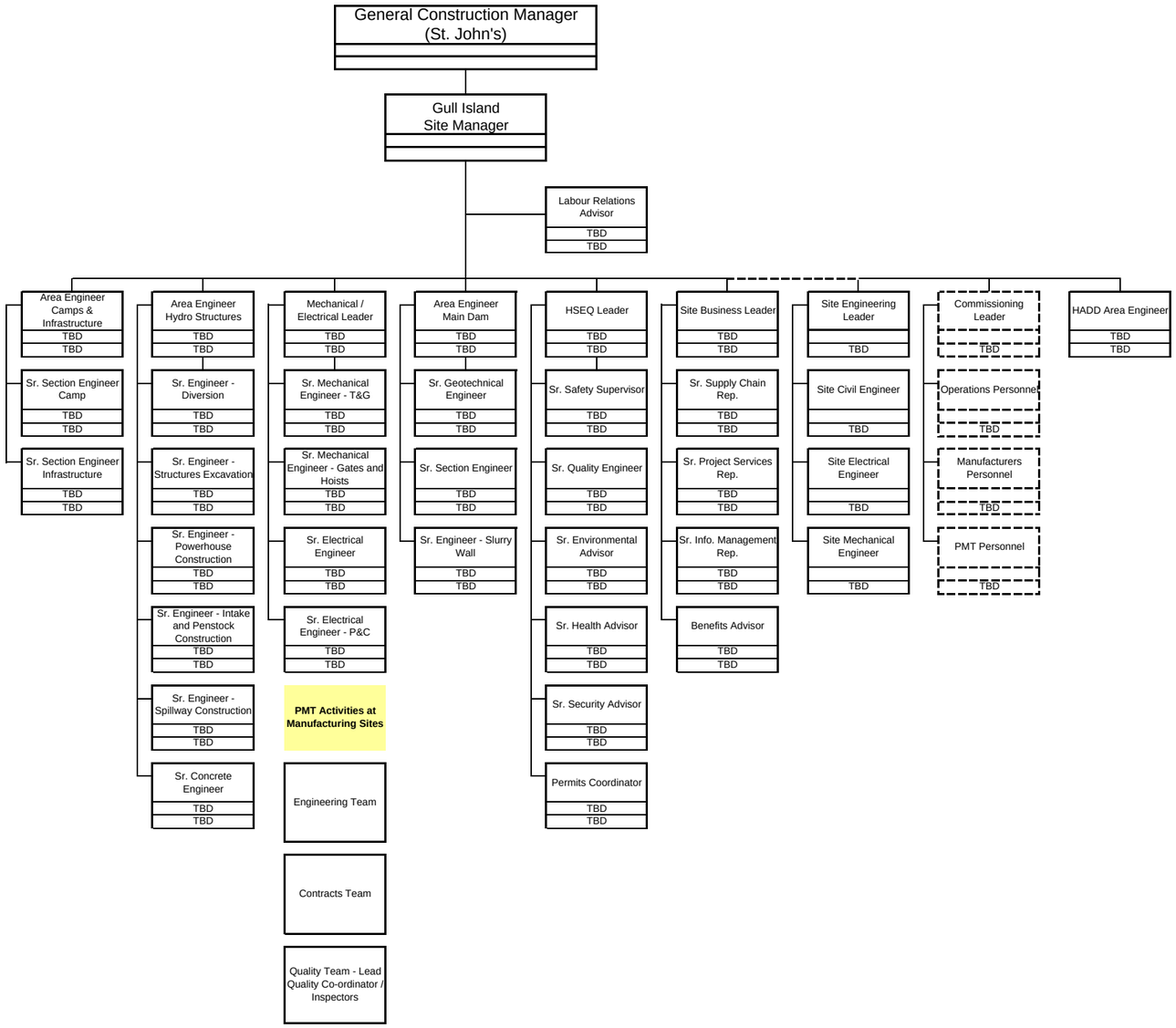
Construction Management Organization

NOTE: **THE CONSTRUCTION MANAGEMENT TEAM WILL BE COMPRISED OF PERSONNEL FROM VARIOUS ORGANIZATIONS. ACCORDINGLY, THE POSITIONS ARE NOT COLOR-CODED AT THIS POINT IN TIME.**

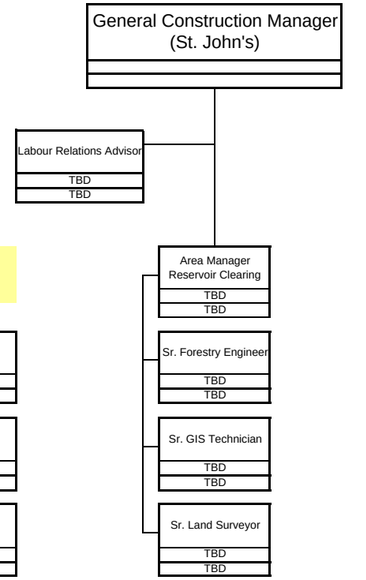


Construction Management - Phase 4

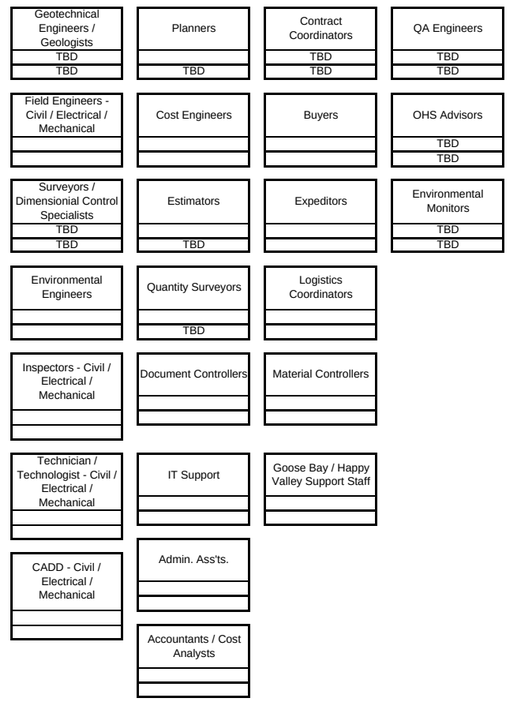
Component A - Gull Island Hydroelectric Development



Reservoir Clearing & HADD

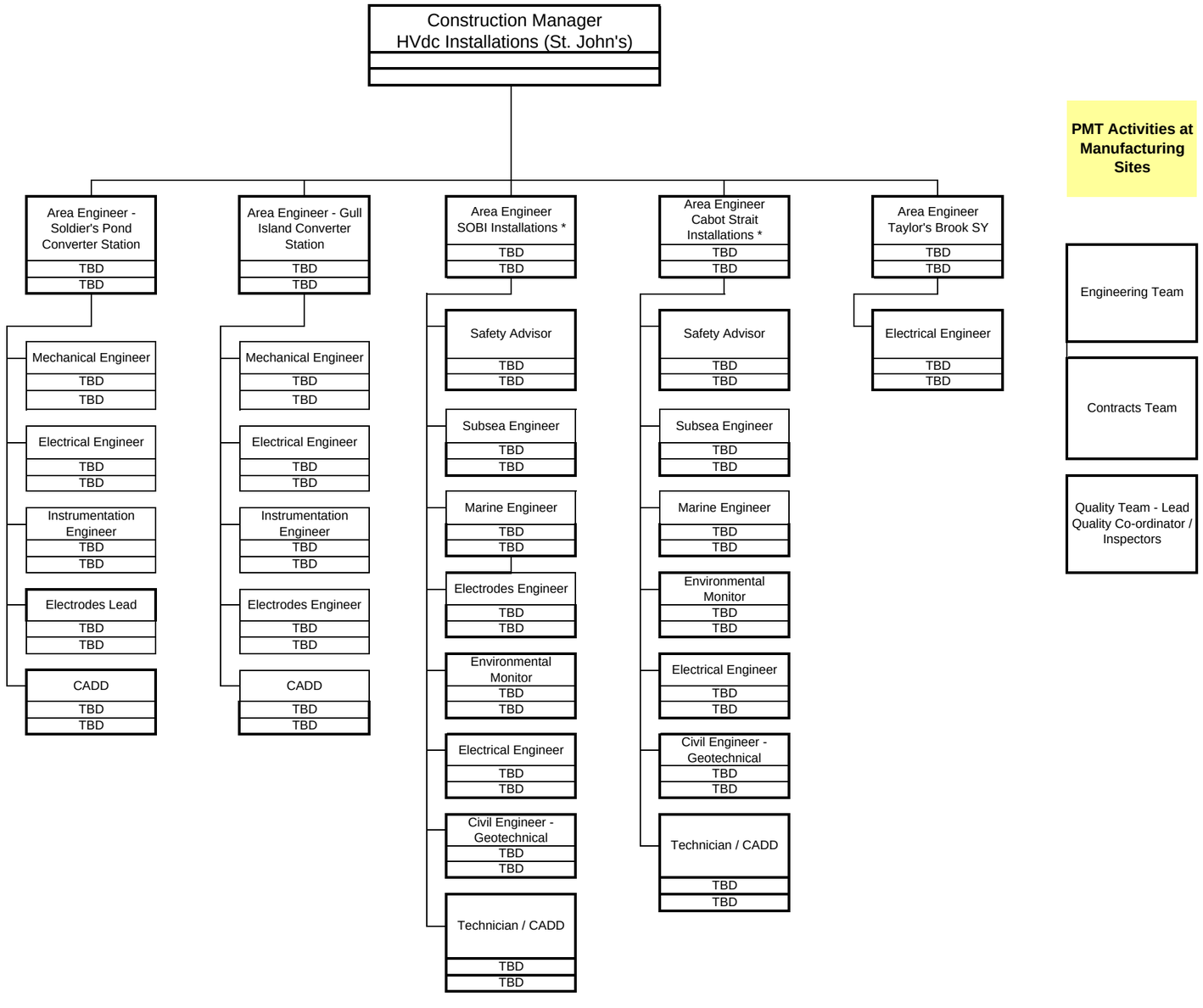


Site Support Pool



Construction Management - Phase 4

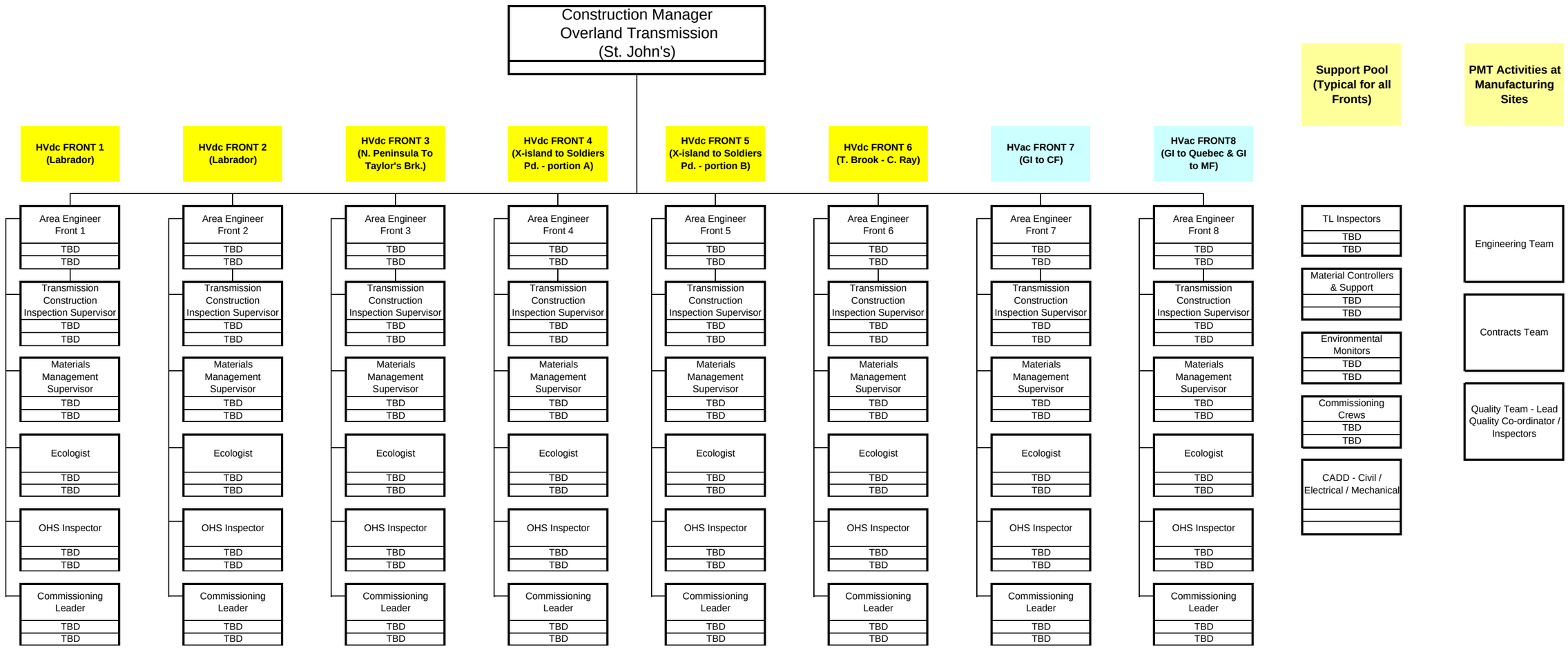
Component B - HVdc Specialty Installations



* Installations include switchyards, marine cable installations, tunnelling & other protection works

Construction Management - Phase 4

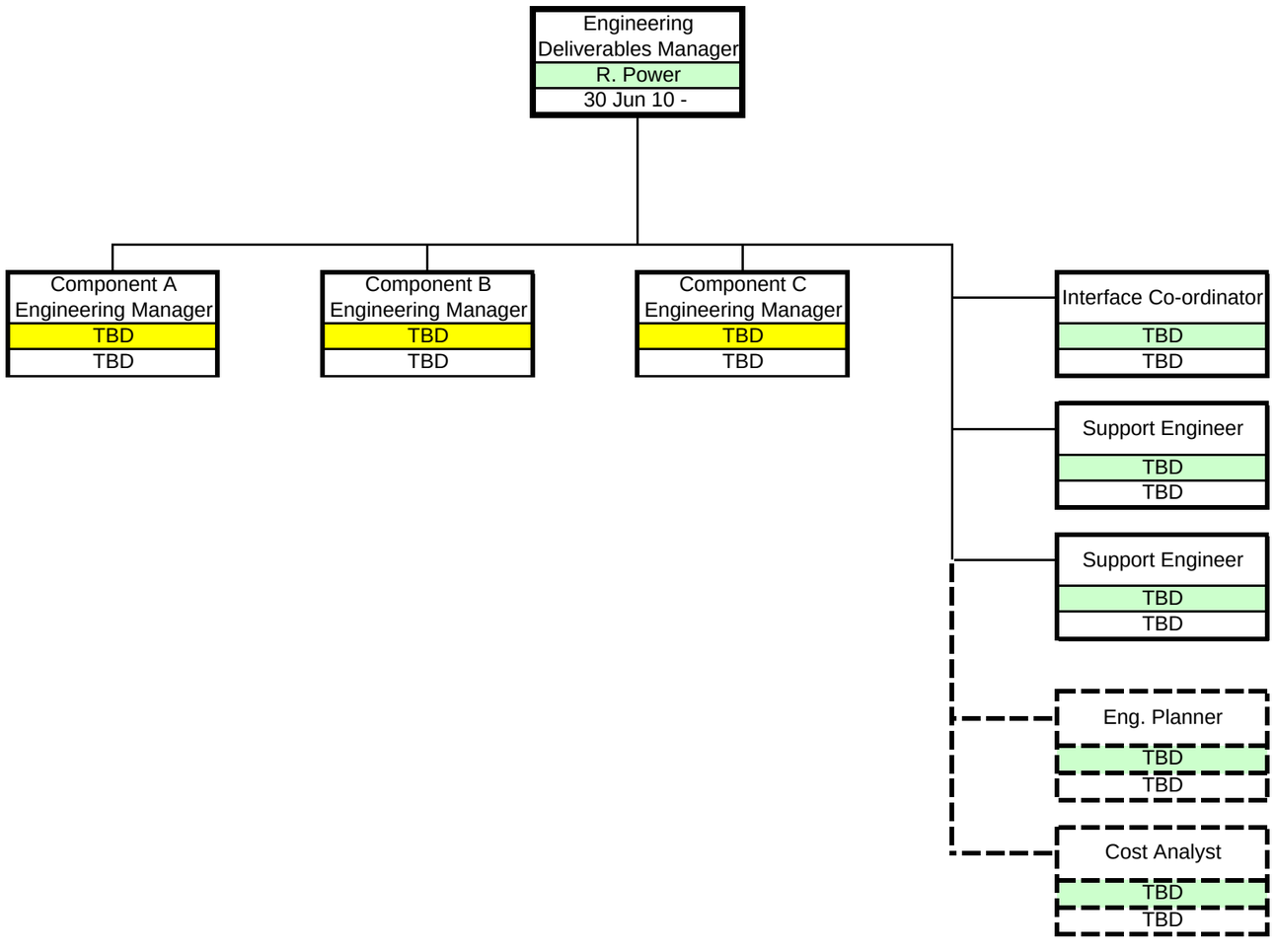
Component C - Overland Transmission



Phase 4

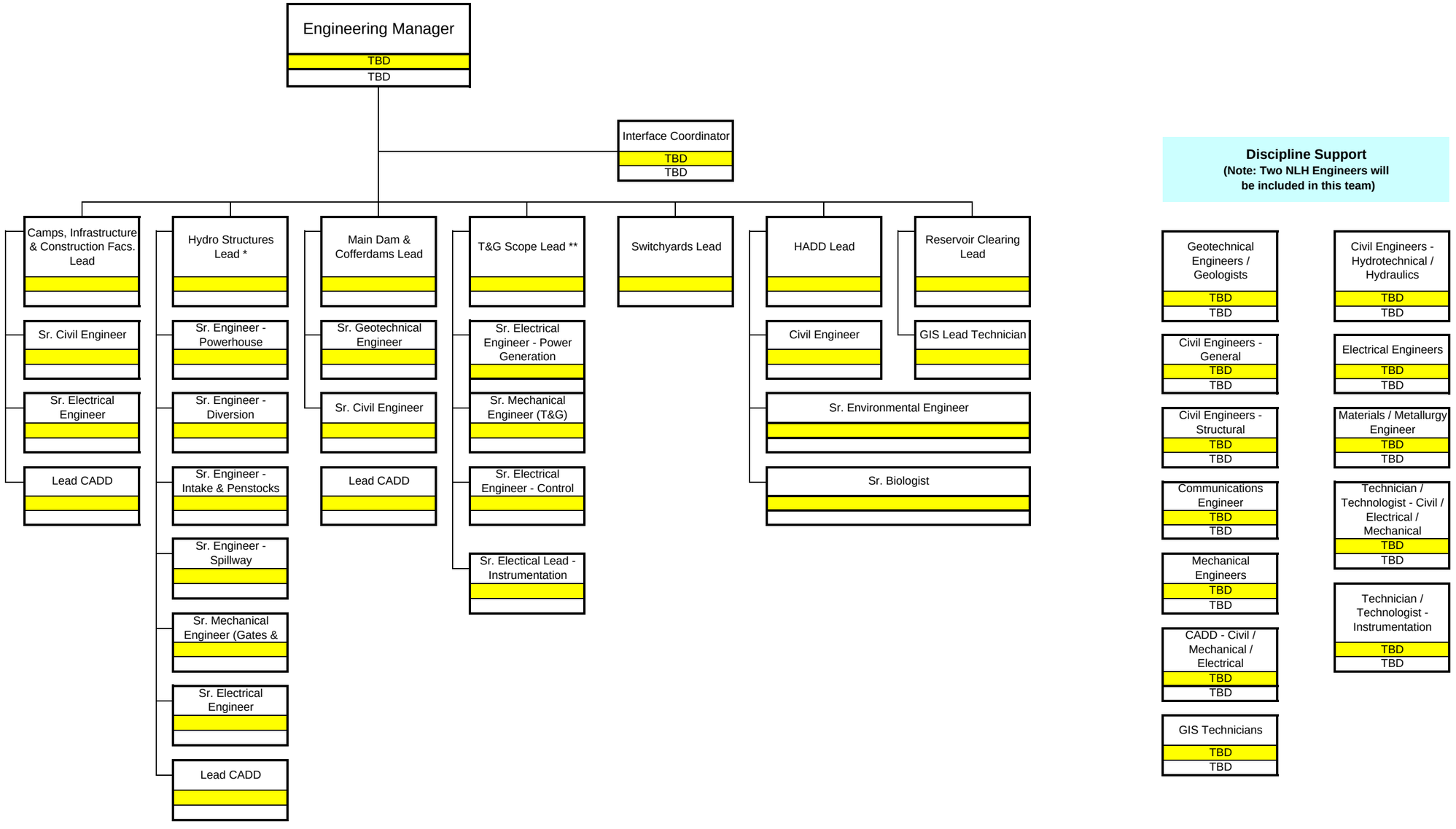
Engineering Deliverables Organization

NOTE: **THE ENGINEERING ORGANIZATIONS FOR EACH COMPONENT ARE REPRESENTATIVE OF EARLY PHASE 4 TIMELINES. A NUMBER OF THE POSITIONS WILL TRANSFER TO VARIOUS SITES AS THE PROJECT PROGRESSES.**



Engineering - Phase 4

Component A - Gull Island Hydroelectric Development

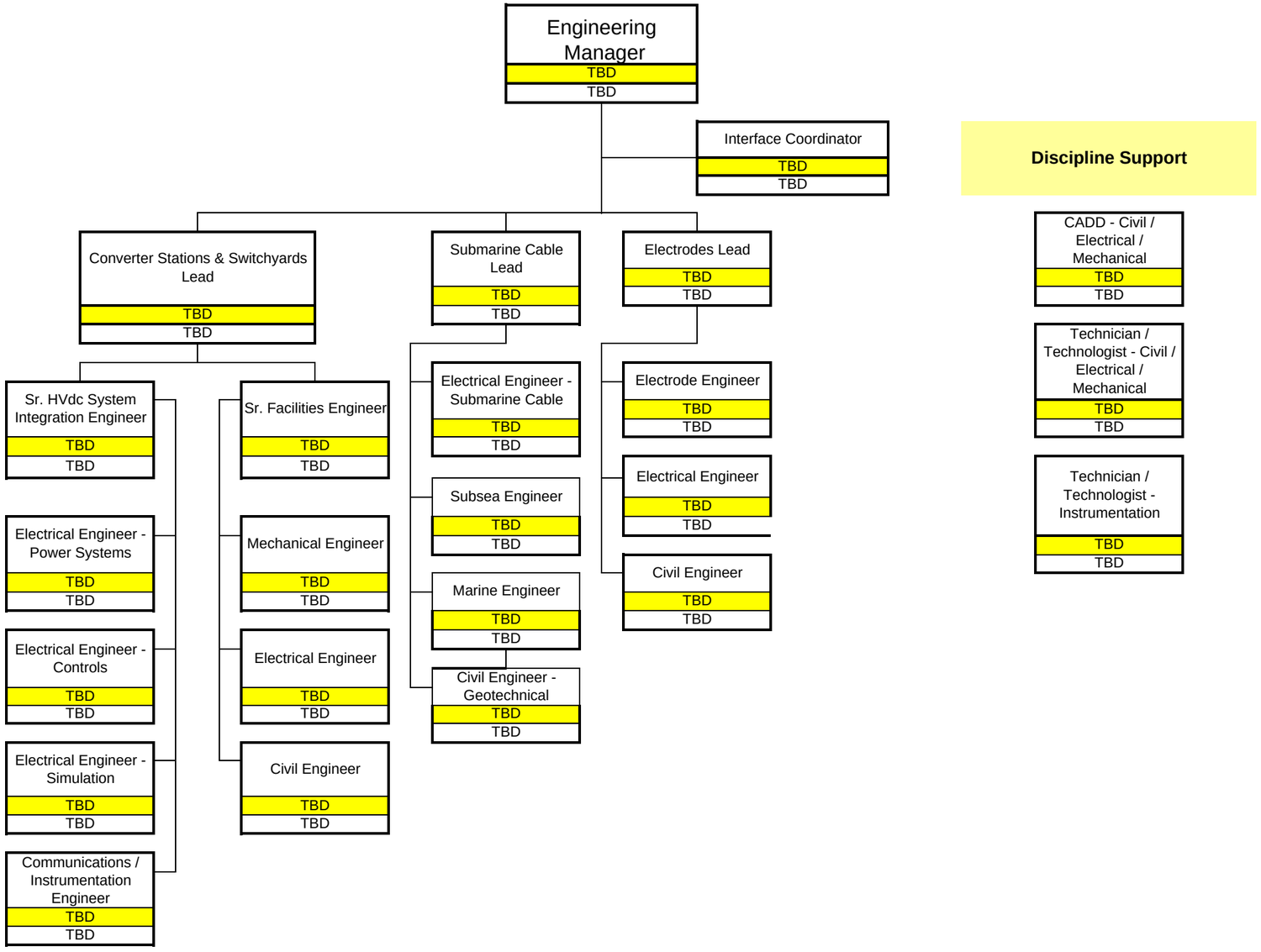


* Hydro Structures include Diversion Tunnel, Powerhouse, Intake / Penstocks, Spillway, Auxiliary Dams

** T&G Scope to produce functional Specification for "Design, Fabrication, Supply, Installation and Commissioning" contract.

Engineering - Phase 4

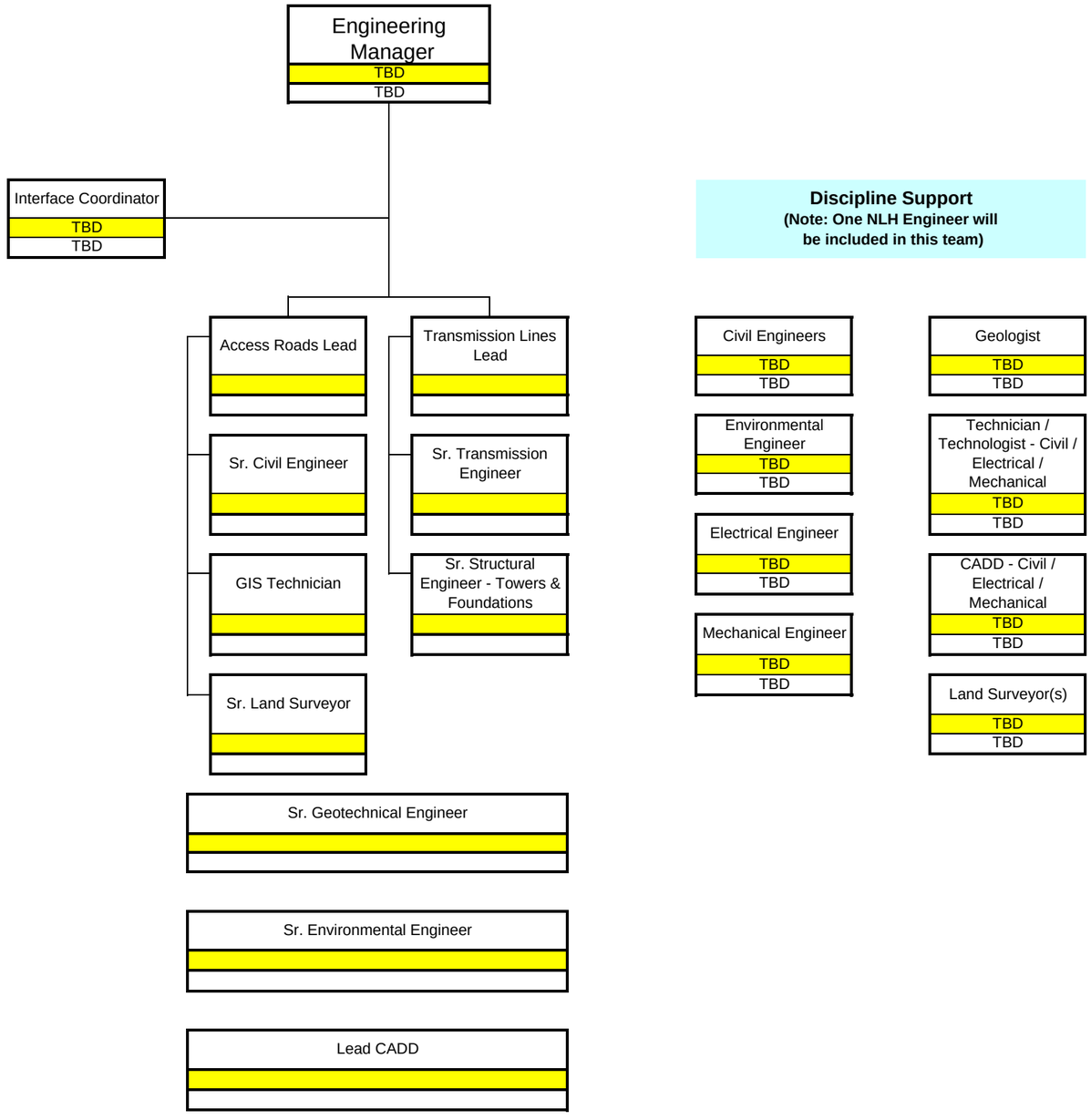
Component B - HVdc Specialty Installations



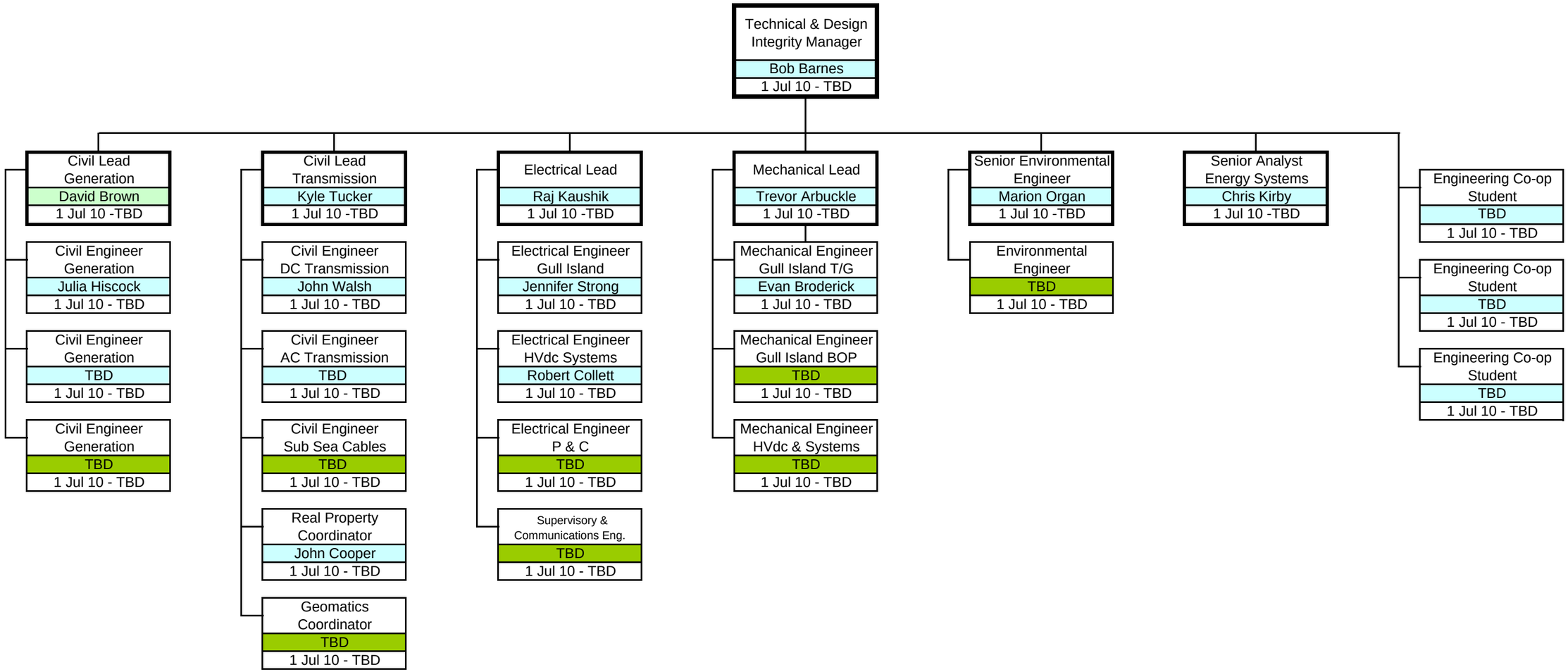
Note: One NLH Engineer will be included in this team.

Engineering - Phase 4

Component C - Overland Transmission



Technical & Design Integrity Team - Phase 4 - Home Office



Operations Organization - Phase 4

GULL ISLAND

- Plant Manager
  - TBD
  - TBD
  - Plant Engineer
  - Asset Specialist
  - Planner
  - Civil Technologist
  - Storekeeper / Tool Crib
  - Technical Supervisors (2)
  - Technical Operators (8)
  - Utility Personnel (4)
  - HSE /Admin.
  - Clerical Staff (2)

TRANSMISSION

LABRADOR

- Manager Production - CF (existing)
  - Asset Specialist
  - Line Maintence Personnel (electricians / lineworkers) (4)
  - P&C / Communication Technologists (2)

ISLAND

- TRO* Manager(s) (existing)
  - Asset Specialist
  - Line Maintence Personnel (electricians / lineworkers) (8)
  - P&C / Communication Technologists (3)

TRO: Transmission & Rural Operations

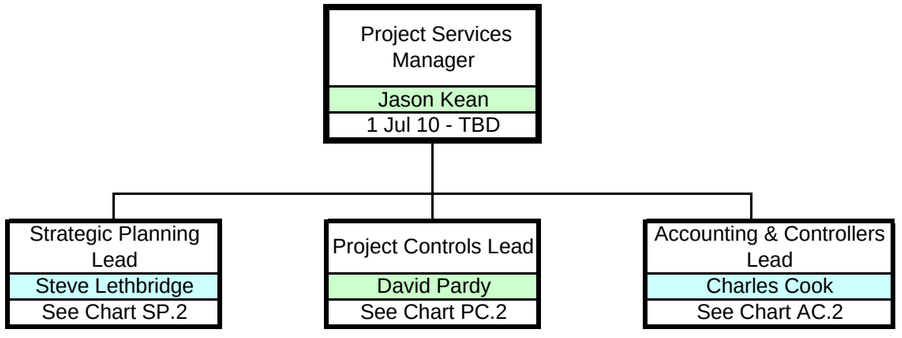
ECC

- Manager Systems Operations & Customer Services (existing)
  - Systems Engineer
  - Operators (5)

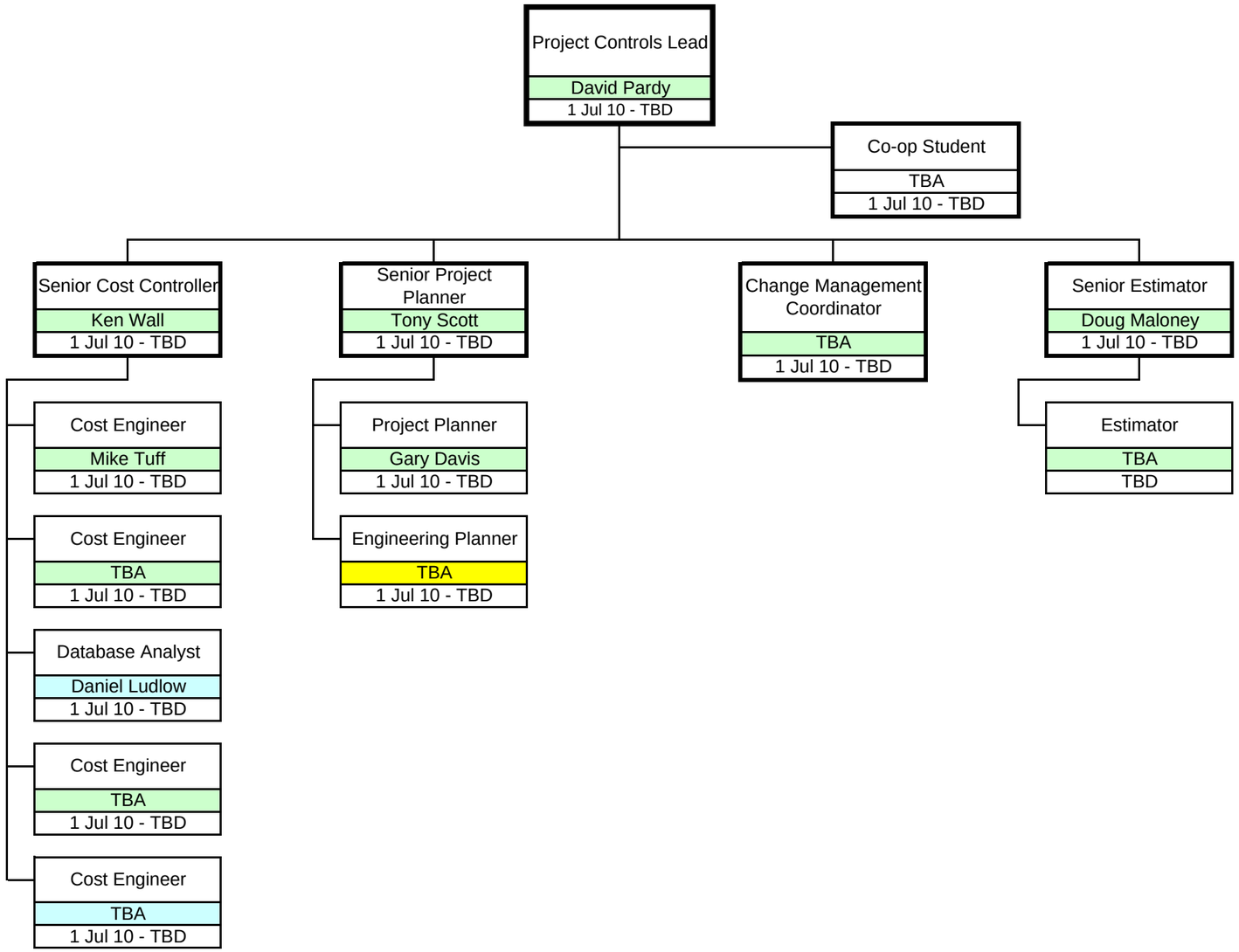
ENGINEERING

Operations Engineering Staff to be developed during project execution. Some resources will likely be recruited from the NLH Technical & Design Integrity team as well as from the project engineering teams.

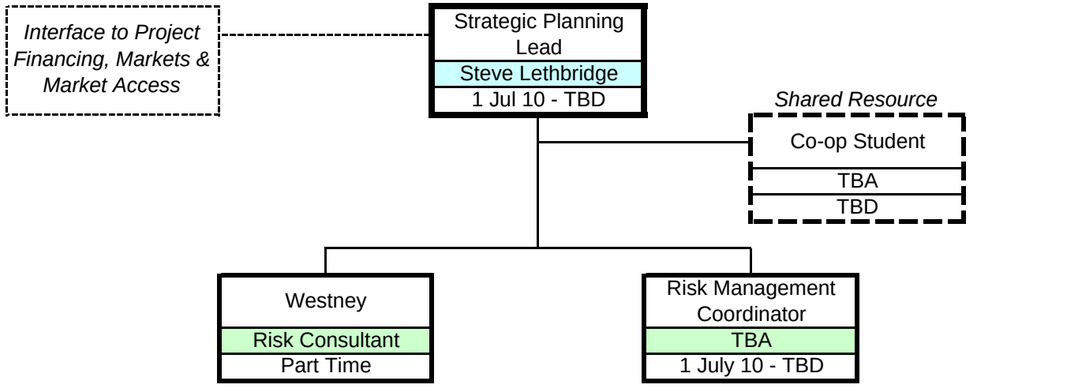
Project Services Organization - Phase 4 - Home Office



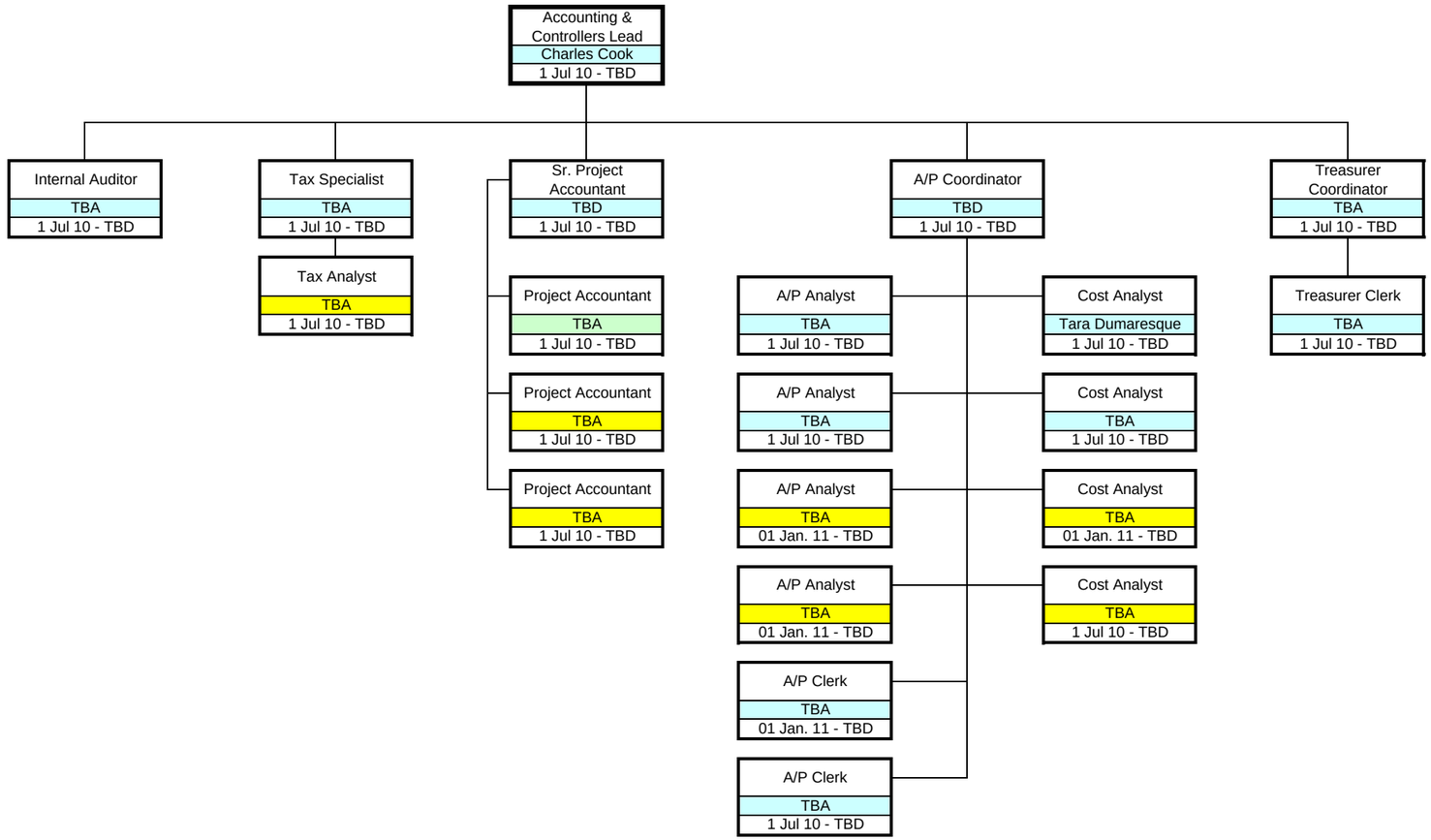
Project Controls - Chart PC.2 Phase 4 - Home Office



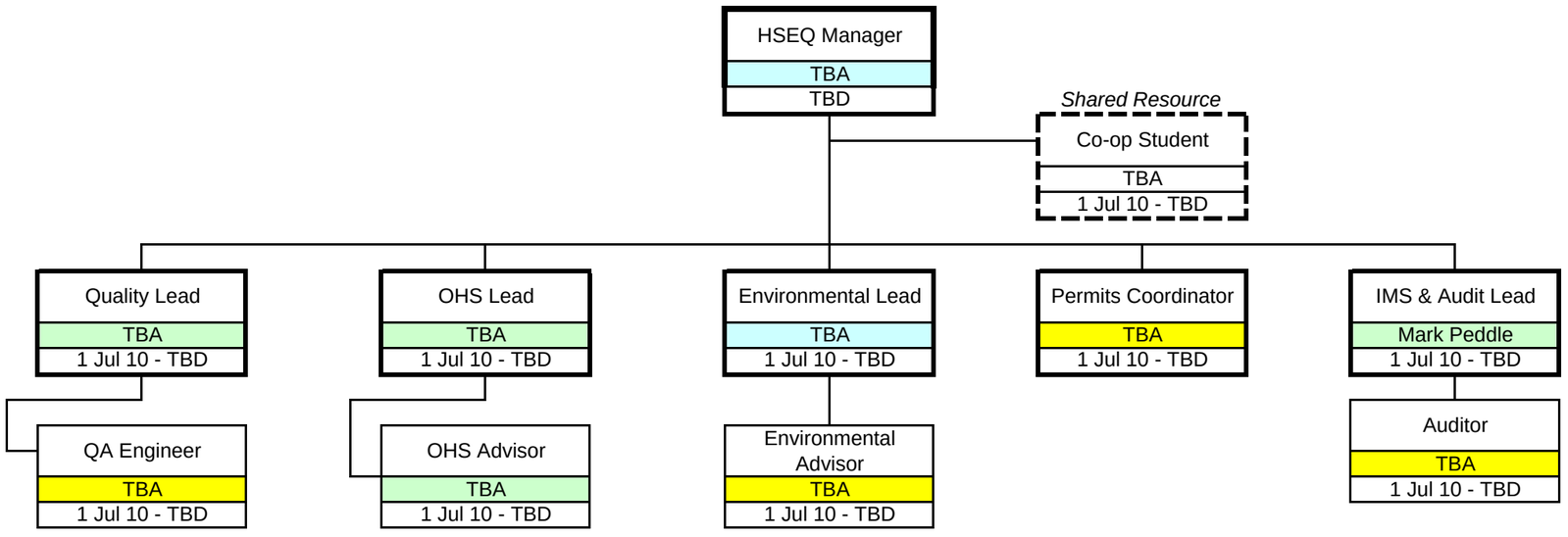
Strategic Planning - Chart SP.2 - Phase 4 - Home Office



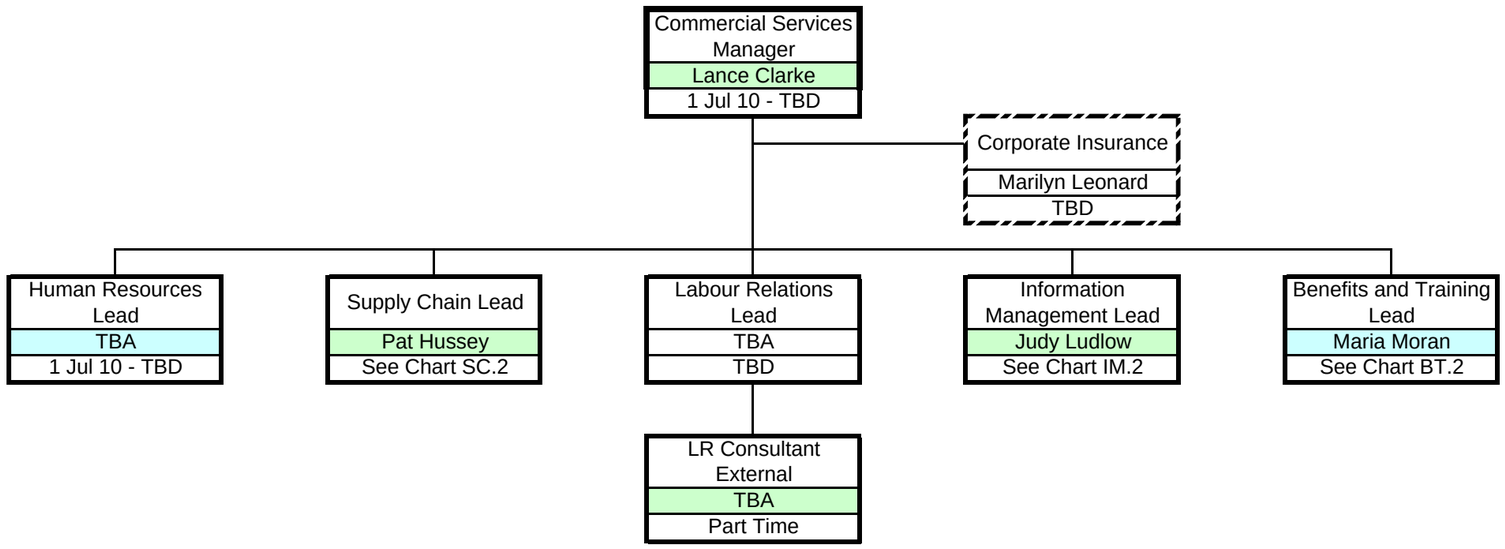
Accounting and Controllers - Chart AC.2 - Phase 4 - Home Office



Health, Safety, Environment & Quality - Phase 4 - Home Office

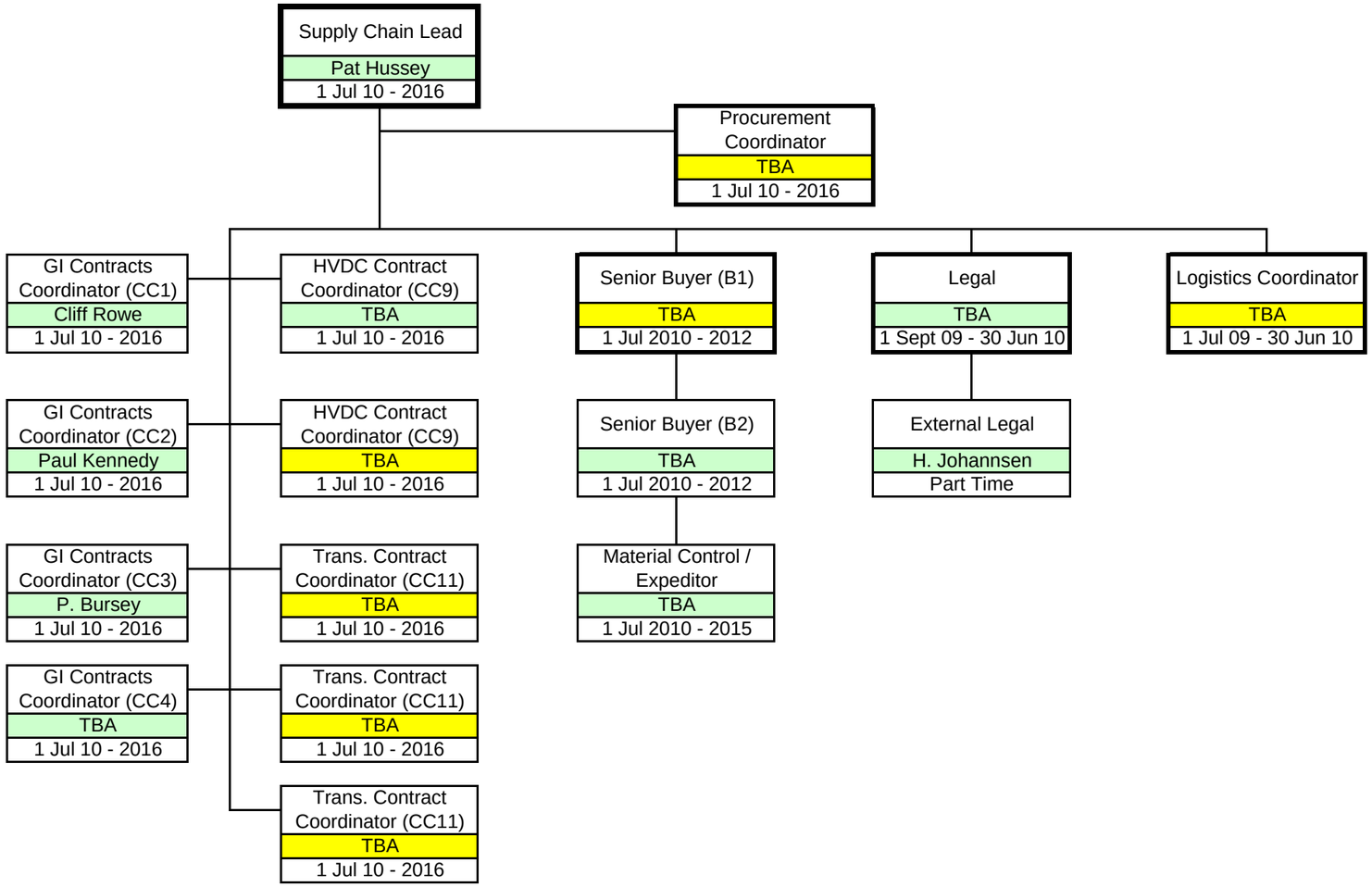


Commercial Organization - Phase 4 - Home Office

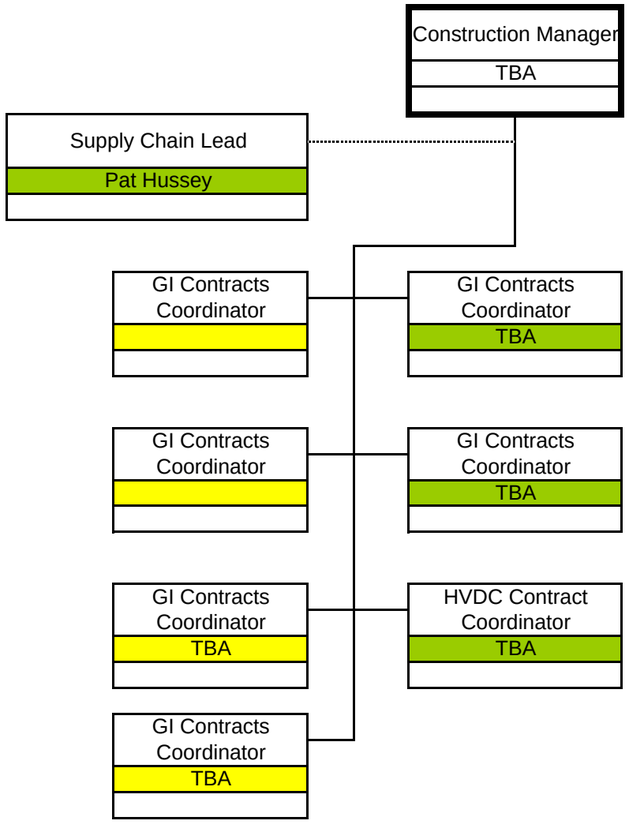


Benefits and Training Chart BT.2 - Phase 4 - Home Office

Supply Chain - Chart SC.2 - Phase 4 - Home Office



Supply Chain - Chart SC.3 Phase 4 Field Office



Information Management Chart Chart IM.2 - Phase 4 - Home Office