2.4.1 Transmission Lines

The width of the right-of-way for the Construction Power line will be 60 m. A 265-m width will be required for the four Unit Transmission Lines between the Keeyask Generating Station and the Keeyask Switching Station. A 200-m width will be required for the three Generation Outlet Transmission lines proposed between the Keeyask Switching Station and Radisson Converter Station. The estimated total cleared area required for all Project transmission lines rights-of-way is approximately 744 ha.

2.4.2 Stations

The proposed Keeyask Switching Station will require 13 ha of land for Project development and an adjacent 22 ha of land will be acquired for possible future expansion, for a total site area of 35 ha. The Construction Power Station will require 2.25 ha of land. No additional land is required for the Radisson Station upgrade.

2.5 CONSTRUCTION ACTIVITIES

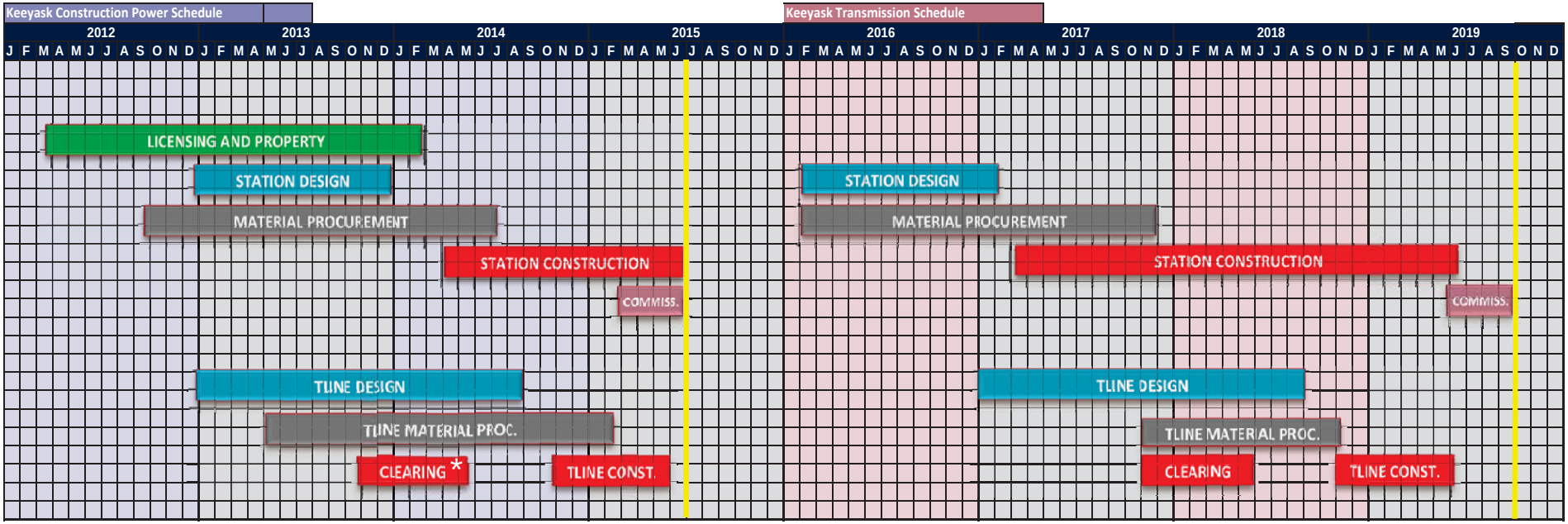
2.5.1 Overall Schedule

The overall construction schedule is shown on Figure 2-15.

2.5.1.1 Construction Power

The Construction Power Transmission Line and Construction Power Station are proposed to be in service by May 2015. The property acquisition is scheduled to be completed by February 2014, with construction of the Construction Power Station beginning in April 2014, and the Construction Transmission Line beginning October 2014. No construction will begin until all regulatory approvals and property reservations are completed. The earliest clearing and construction would start is November 2013; the exact start date is subject to regulatory approval of the Keeyask Generation Project. The Keeyask Construction Power 138 kV Transmission Line and Station is proposed to be in service by July 2015.

The initial 138 kV Generation Outlet Transmission line (KR1), designed for backup construction power supply from Radisson to the Construction Power Station, is scheduled to be completed by May 2015. It is expected due to time and weather constraints that only the right-of-way for KR1 will be cleared at this time and KR2 and KR3 will be cleared prior to 2017 when construction is expected to begin.



* This is the earliest that clearing could commense. However, exact start date is subject to regulatory approval of the Keeyask Generation Project

Figure 2-15: Construction Schedule

2.5.1.2 Switching Station

The Keeyask Switching Station construction will begin in early 2017 and the planned in-service date is October 2019.

2.5.1.3 Unit and Generation Outlet Transmission Lines

The construction of four 138 kv ac Unit Transmission lines between the Keeyask Switching Station and the Keeyask Generating Station and two 138 kV Generation Outlet Transmission Lines KR2 and KR3 between the Keeyask Switching Station and Radisson Converter Station is scheduled to begin in 2017, and completed by October 2019. This timing corresponds with the in-service date for the proposed Keeyask Generating Station.

2.5.2 Workforce Requirements

Table 2-2 summarizes the preliminary average workforce estimates by quarter for the Construction Power, Unit and Generation Outlet Transmission Lines. These estimates are based on a number of assumptions related to Project schedule and conceptual design and are therefore subject to change.

The major transmission activities involving potential local workforce opportunities relate to non-designated trades such as labourers and equipment operators required for rights-of-way clearing. There may be some local workforce employment opportunities associated with the site preparation of the Construction Power Station and Keeyask Switching Station, though much of this work will involve specialized skilled workforce requirements.

Table 2-2: Preliminary Estimated Peak Workforce Estimates by Quarter

Calendar Year	Q1	Q2	Q3	Q4
2014	0	0	100	200
2015	200	100	0	0
2016	0	0	0	200
2017	200	25	25	200
2018	200	25	25	200
2019	200	0	0	0

*Estimated average workforce by quarter. These estimates could change when the Project is implemented depending on how the contractors choose to perform the work.

The preliminary estimates indicate the cyclical and seasonal nature of workforce requirements. In the case of the proposed transmission lines, work is primarily expected to occur during the winter months; consequently, job and business opportunities are short term in duration (three-month winter season). The preliminary workforce estimates are based on a number of assumptions, including Project schedule and design concept, which are subject to change.

The major transmission activities involving potential local workforce opportunities relate to rights-of-way clearing from the Keeyask Switching Station to Radisson Converter Station and for the Construction Power Transmission Line from KN36 to the Construction Power Station. The Joint Keeyask Development Agreement (JKDA) designates the Construction Power Station Clearing and the Construction Power Transmission Line right-of-way clearing as direct-negotiated contracts for the Cree Nation Partners (CNP). Other components of the Project such as Generation Outlet Transmission Lines may be direct-negotiated contracts or public tender opportunities.

There will likely be modest local job opportunities associated with construction of the Construction Power Station, the Keeyask Switching Station and salvage of the temporary construction power facilities after use. Much of this work will involve specialized skilled labour requirements; local opportunities will relate primarily to site preparation and salvage. Although the number of positions will fluctuate, the total employment is expected to be in the range of 15 to 30 jobs per transmission line for the Project.

Transmission line and station construction will be carried out either by Manitoba Hydro employees or contractors.

2.5.3 Access Roads and Construction Camps

2.5.3.1 Access Roads

Access to the Construction Power Station site will be provided from Provincial Road 280 via the North Access Road currently being constructed as part of the Keeyask Infrastructure Project (Map 1-1). Later, an access road from the south will be constructed which will allow access from the community of Gillam to the Keeyask Switching Station construction. The two access roads will be treated as private roads with 24-hour security control, until such time as the Manitoba Infrastructure and Transportation assumes ownership of this road after the Keeyask Generation Project is constructed.

Access for construction and subsequent line maintenance activities will generally occur along the rights-of-way and any existing public access roads or trails. At waterway crossings, structures will be located as far back from the water's edge as possible for maximum stability and prevention of bank damage.

2.5.3.2 Camps

Clearing and construction workers on the transmission lines are expected to be housed in mobile construction camps These mobile camps would contain sleeper units, a wash car, cooking and eating trailers, offices and a machine/parts shop. Camp size would vary according to the activity, contract size and labour force. Clearing camps are generally smaller and may be moved more frequently than construction camps.

Camps will be located in well-drained areas within the right-of-way. Additional areas may be cleared to facilitate vehicular traffic, transportation and distribution of construction materials, installation of temporary maintenance shops, kitchens, sleeping quarters, offices, etc. Decisions on worker housing and specific field camp locations will be determined after final Project planning and design is completed.

Potable water will be transported by truck to the mobile camps. Subject to suitable soil conditions, drainage will be established with the approval of the Natural Resources Officer. Wastewater will typically use disposal pits constructed for the purpose and restored upon camp relocation.

Construction workers for the Keeyask Switching Station and Radisson Converter Station Upgrades will make use of other Manitoba Hydro camps and infrastructure in the vicinity of the project.

2.5.4 Transmission Line Right-of-Way Clearing and Transmission Line Construction

2.5.4.1 Right-of-Way Clearing

Prior to construction, the right-of-way and required easements will first be surveyed and flagged to establish the line alignment. Clearing and disposal of trees on the proposed right-of-way will be undertaken in advance to facilitate construction activities. Right-of way clearing will be subject to mitigation measures outlined in the Construction Environmental Protection Plan.

Clearing activities will be modified in environmentally sensitive areas (e.g., river and stream crossings) and will be subject to a variety of pre-determined but adaptable environmental protection measures.

The Construction Power Transmission Line requires a width of approximately 58 m of clearing within the 60-m-wide right-of way. For the shared right-of-way corridors to be occupied by the Generation Outlet and Unit Transmission Lines, the entire right-of-way minus 1 m on either side will be cleared. These 2 m of buffer allowance for potential errors in surveying and flagging.

Clearing requirements for the new transmission line rights-of-way will also require selective clearing of potential dangerous trees beyond the right-of-way. Such trees could potentially affect the function of the transmission line or result in safety concerns, and are normally identified during initial right-of-way clearing activities and removed.

A variety of methods are available for right-of-way clearing. Typically, these include conventional clearing done by “V” and "KG” blades on tracked bulldozers, mulching by rotary drums, selective tree removal by feller bunchers (e.g., for removal of danger trees with minimal adverse effect to adjacent vegetation and trees) and hand clearing with chain saws in environmentally sensitive sites. Final clearing methods will be determined on the basis of detailed survey of the transmission line routes, and site-specific identification of environmentally sensitive features.

Trees within the right-of-way will be cleared to a maximum height of approximately 10 cm (4 in.) above the ground. Ground vegetation will not be “grubbed” except at tower sites, where the foundation area will typically be scraped to allow unencumbered access for equipment and safe walking areas for workers. Disposal of cleared vegetation typically involves a variety of options including piling and burning, mulching, collection and secondary use by local communities (e.g. firewood), or salvage and marketing of merchantable timber resources if feasible. The final decision for disposal of vegetation will be determined by the method of clearing used and the environmental license conditions applied to the Project.

Apart from removal of danger trees beyond the right-of-way edges, clearing activities are normally confined to the right-of-way. Where access outside the right-of-way is necessary (e.g., bypass trails) and has not been identified in advance, supplementary approvals will be obtained from Manitoba Conversation and Water Stewardship (e.g., work permits and timber permits relating to activity on provincial Crown lands) or from individual land owners.

2.5.4.2 Transmission Line Construction

The basic transmission line construction steps involve installing tower foundations and guy anchors, assembling and erecting towers, installing insulators and stringing of the phase conductors and overhead ground wires. Line construction will involve the use of heavy machinery.

The structure foundations and anchors proposed to be used for this Project will be similar to those used for comparable terrain and soil conditions elsewhere in northern Manitoba (the dimensions noted below may be modified during the design stage).

The anchors will be installed to a minimum of 1.5 m into sound bedrock and, up to 26 m in overburden.

In the case of exposed bedrock, guyed lattice structures will be founded on a grout pad secured directly to the rock by anchor bolts grouted into a drilled hole, involving a typical total footing depth (from the surface of the pad to the bottom of the anchor) of approximately 1.2 m.

In the case of deeper bedrock (up to about 2.5 m) guyed lattice structures will be similarly founded by use of a tubular steel section extending from the grout pad on bedrock to the surface grade, involving a total footing depth in the order of approximately 1.2 to 1.6 m.

In the case of guyed lattice structures founded on soil, the tubular steel section below grade will be secured by steel fittings to a pre-cast concrete mat of approximately 1.8 to 2.5 m in dimension, constructed with the long dimension perpendicular to the transmission line, and installed approximately 1.8 to 3.0 m below existing surface grade.

Guy anchors will be drilled and grouted into rock or suitable mineral soil to the length necessary for structural stability.

Self-supporting or free-standing lattice steel angle structures on rock will be founded at all four legs in a manner similar to that for guyed structures; either directly anchored to the rock by grouted bolts, or on concrete pads anchored to the rock. Free-standing structures on soil will have all four legs founded on approximately 3-m x 3-m precast concrete mats constructed about 3 m below existing surface grade.

Foundation excavations, where necessary (e.g., in the case of organic soils), will be backfilled with approved material; excavated organic material will be mounded to provide additional cover around the foundation.

When wet or unstable soil conditions are encountered, raft foundations may be installed inside a large diameter steel culvert section for additional stability. Such requirements will likely be limited to the guyed tangent or suspension structures. Preliminary tower spotting for the freestanding angle structures indicates that all will involve reasonably good quality foundation conditions.

Different contractors may have different preferences as to structure assembly. Some may choose to assemble structures at each tower site and then erect them by crane. Others may choose to assemble the structures at a central marshalling yard and then either truck the structures to the site and erect them by crane, or use a helicopter to fly the towers to the site and erect them.

Insulator strings are attached to the structure cross arms prior to tower erection. The insulators will separate the conductors from the structures. Conductors are transported to the site in reels, then suspended from the insulator strings, and tensioned by machine to provide the ground-to-conductor design clearances specified at the midspan points of maximum sag. Each reel holds

about 3,200 m (10,500 ft.) of conductor. The conductors are spliced together by use of implosive sleeves.

Access for construction (and subsequent line maintenance) activities will generally occur along the right-of-way using existing public access roads or trails wherever possible. This enables maximum use of existing road access and minimizes the requirement for the development of new temporary trail access, and the associated environmental effects.

Minor deviations from the right-of-way may be necessary in severe terrain conditions. Unless required for ongoing maintenance, the right-of-way access trails will not be regularly maintained post construction.

Construction activity and access requirements will be subject to standard environmental protection measures associated with Manitoba Hydro's transmission line construction practices. These will be identified and cross-referenced in site-specific Construction Environmental Protection Plans, and adherence to them will be stipulated in related contract specifications.

At waterway crossings, structures will be located as far back from the water's edge as possible, to maximize stability and prevent bank erosion. Construction procedures used at each required crossing will be based on site-specific considerations, such as existing soil and subsurface conditions, biophysical sensitivities, and operational requirements. Site-specific construction techniques will be developed where necessary for difficult terrain or steep slope conditions. Contractors will be required to develop site-specific sediment and erosion control plans.

Equipment access and construction activities will be carried out in a manner that will minimize disturbance to shorelines. Vegetative buffer zones will be retained along the shorelines wherever possible. The precise character and extent of buffer zones will be determined on a site-specific basis. In general, existing (and potential future) tree heights will govern the amount of clearing that must be done in buffer zones to ensure the safe operation of the line.

Marshalling yards will typically be established near the transmission line route for the storage of construction materials and equipment, and for further deployment to the construction site. The exact number and location of marshalling yards will be determined during the course of developing detailed construction specifications and contract arrangements. Granular materials required for line construction (e.g., concrete and granular fill) will generally be purchased from local suppliers or borrow areas along the right of way.

Borrow pit locations will typically be located along the right-of-way to minimize environmental disruption, haul distances and cost. Where suitable sources are not available along or close to the right-of-way, nearby deposits may have to be identified and the surrounding brush cleared to gain access to the line. Normally, rubber-tired dump trucks are used to transport gravel and fill materials. Selection, development and reclamation of new borrow sites will be undertaken in

accordance with provincial regulations and with the approval of the local Natural Resources Officer and local government authorities. Where borrow pits are required, exposed soils will be reclaimed by promoting re-growth of native vegetation and other mitigation measures in accordance with *The Mines Act*.

Disposal of solid waste materials and refuse will generally be transported off-site and will rely on locally available services and infrastructure. Accordingly, existing and appropriately licensed operations will be utilized. Material supply and waste handling activities will be subject to standard environmental protection measures associated with Manitoba Hydro transmission line construction practices and to the Construction Environmental Protection Plan requirements.

Any use of explosives during transmission line construction (e.g., in borrow pit operations, foundation installation, conductor splicing, etc.) will be made in accordance with all applicable legislation and regulations, including acquisition of permits and compliance with all conditions set by Manitoba Conservation and Water Stewardship. Transmission line construction activity will extend to implementation of site-specific mitigation measures, identified in the course of final survey and design. Such measures can include construction safety measures at infrastructure or waterway crossings, and provision for control of induced voltage and current effects within Canadian Standards Association and industry standards (e.g., in the case of railways, communications facilities, pipelines, metallic fences, etc.). Such measures will be coordinated with the appropriate government and corporate authorities.

2.5.5 Construction Power Station and Keeyask Switching Station

2.5.5.1 Clearing

Initial site preparation will generally consist of clearing, grubbing and disposal of vegetation; stripping and removal of organic soils; and grading and drainage for control of surface or near-surface water.

Clearing procedures will be subject to detailed requirements identified in the Construction Environmental Protection Plan. Suitable buffer zones will be provided and maintained to the satisfaction of Manitoba Conservation and Water Stewardship. Applicable fire, roadway and electrical (hydro pole) clearances will be maintained.

Cleared trees and brush will be stockpiled and burned, or otherwise disposed of in a manner approved by Manitoba Conservation and Water Stewardship.

Organic soils suitable for landscaping and site reclamation will be stockpiled for later use during decommissioning of the various construction support facilities, to be undertaken once construction is complete.

2.5.5.2 Construction

The station sites will require grading and compacted aggregate surfacing over a metallic ground grid followed by installation of perimeter fencing and ditch drainage along with a 9 m (29.5 ft) wide gated access road. Material required for the station construction (e.g., concrete and granular fill) will generally be obtained from local sources (providing specific material specifications can be met).

Once site improvements have been completed, concrete equipment foundations (i.e., transformer bases, etc.) and necessary grounding arrangements, and oil containment systems will be installed. Station apparatus and equipment installations will follow, including filling of equipment with insulating oil, construction cleanup and commissioning.

Although construction cleanup will occur throughout the construction phase, as soon as practicable after completion of construction, the station site will be cleaned up and left in standard operating condition. Non-toxic waste materials will be disposed of using existing, appropriately licensed facilities. As with construction activity, material supply and waste handling will be subject to sound Manitoba Hydro codes of practice and relevant provincial legislation.

2.5.6 Radisson Converter Station Upgrade

The specific sites of the Keeyask Transmission Project at Radisson Converter Station will require preparation and extension of station infrastructure systems to service the related buildings and equipment installations. Site preparation will extend to grading, lining with a geotextile fabric, surfacing with crushed stone, and installation of the subsurface ground grid.

Development of the individual sites will include connection to, and related expansion of, the station infrastructure systems (e.g., drainage and storm water management provisions; installation of point source oil containment and connections to the station fast drain facilities).

Construction activities for the 138 kV switchyard expansion will include: placement of piles and placement of concrete for foundations, pads and structures; trenching for the placement of in-ground piping and cabling; placement of granular materials for surfacing; erection of steel structures for electrical hardware and equipment; delivery, placement and construction of switchyard equipment such as breakers; and the stringing, splicing and termination of overhead conductors for the switchyard.

2.6 OPERATIONS AND MAINTENANCE

2.6.1 Inspections and Maintenance of Facilities

2.6.1.1 Line Maintenance Procedures

Manitoba Hydro conducts inspection of all its transmission lines on an annual basis. The inspection encompasses both facilities (right-of-way, right-of-way access, structures and wires) and vegetation conditions. Following the inspection, all pertinent information and findings are entered into a transmission line management database. From this central database, annual maintenance activities are identified and tracked.

The annual patrol is conducted either by ground or by air, and is completed once per fiscal year on every span in the transmission system. Non-scheduled patrols, by ground or air, may be conducted should unexpected information requirements be identified. Patrols are normally undertaken by snow machine, all-terrain vehicles, light trucks or helicopter, depending on the geographical location and ease of access. In winter, equipment operations may include a flex track groomer to facilitate access where snow conditions otherwise restrict travel on the right-of-way.

Where maintenance tasks involve heavy equipment (such as brushing), winter trails/roads must be built for access in remote areas. Where mobile work camps are required for line maintenance activities, these typically include a collection of trailers on tank-like tracks consisting of a few bunk trailers (each sleeping three or four people), a shower trailer, a kitchen trailer and a generator trailer. Mobile work camps generally consist of approximately 12 workers and must be set up in a location where there is a water source for the shower and kitchen. The camp is moved about every two weeks when enough progress is made in each direction along the transmission line.

Maintenance procedures are well established and are the subject of continuously updated corporate guidelines for maintenance and construction activities. Maintenance activities include instances where crews are required to obtain access to specific areas to repair deficiencies on the transmission system. In northern regions, maintenance repairs are typically done in the winter months, after frost has entered the ground, using heavier soft track equipment to gain access.

In circumstances where maintenance activity requires the use of access trails off the right-of-way (e.g., difficult terrain), approval is first obtained from Manitoba Conservation and Water Stewardship, when on provincial Crown land, and through formal easement or Crown land reservations where necessary.

2.6.1.2 Operations Workforce Requirements

Workforce requirements associated with the operations and maintenance of a particular transmission line generally involve deployment of established regional operations and maintenance personnel, and contractor staff as required. Line inspections could involve concurrent inspections of various lines in the region. Maintenance would include repairs as required.

For the operations and maintenance activity associated with the transmission lines, the average annual workforce requirement (average over the life expectancy of the project) is estimated to be 11.5 persons. It is anticipated that initial workforce requirements up to the first major maintenance event (i.e., between the in-service date and year eight of operations) will increase gradually to this level.

Of the total average of 11.5 persons, two to three would be internal Manitoba Hydro staff and the remainder would be contractor staff. The breakdown of the total average would be roughly two patrollers, two linemen, 0.5 helicopter pilots, and seven heavy equipment operators (e.g., caterpillar, backhoe, crane, etc.).

2.6.1.3 Vegetation Management

Vegetation management is required on an ongoing basis to ensure that re-growth in the cleared rights-of-way does not interfere with transmission line operations. Related management procedures include periodic review and removal of danger trees in the immediate vicinity of the right-of-way. Manitoba Hydro is also subject to North American Electric Reliability Corporation requirements that stipulate vegetation control be conducted along its rights-of-way to prevent situations from arising where trees can cause an outage on transmission lines 230 kV or higher.

Vegetation management involves a variety of methods, including hand cutting (e.g., utilizing chainsaws, brush saws, axes, or brush hooks), mechanical shear blading (using "V" or "KG" blades), brush mowing with rotary and drum cutters (typically rubber-tired equipment), and herbicide treatment. Herbicide applications are typically conducted on foot, or by all terrain or flex-tracked vehicles. Due to access constraints, the typical program in northern areas is normally done during the winter months using mechanical shear blading methods.

The vegetation maintenance brushing cycle for transmission line rights-of-way typically ranges between eight and ten years. An integrated vegetation management approach is used within the right-of-way to control and reduce potential tree problems.

Herbicide treatments are formulated to target only broad-leafed plants leaving grasses unaffected. Foliar applications of herbicides are made in the summer months only; dormant stem applications are done when the plants are dormant, usually in the fall and winter.

Permits for pesticide use are obtained on an annual basis. The process involves public notification as part of the formal permit application to Manitoba Conservation and Water Stewardship Pesticide Approvals Branch. All herbicide applications are completed and supervised by licensed applicators in accordance with conditions specified in the Pesticide Use Permit and on product label.

Herbicide application rates are established by Manitoba Hydro's Chief Forester in accordance with product label instructions. Only herbicides which have been approved in the Pesticide Use Permit can be used. Manitoba Hydro maintains a typical list of herbicide foliage treatments and has developed application guidelines that it adheres to for its activities. Manitoba Hydro's vegetation management procedures are well established with respect to herbicide application requirements and obtaining Pesticide Use Permits.

Several methods of herbicide application are available. High volume broadcast stem/foliar application equipment, used for tree heights of 2.5 m (8 ft) or less, includes droplet applicators (such as Radiarc and Vecta-Spray sprayers), boom busters, and hose and handgun sprayers. Aerial foliar spraying has also been used as an application technique and could be used in the future. Selective stem/foliar applications (both high and low volume) are the preferred method for tree heights of 2.5 m (8 ft) of less, and are made with hose and handgun sprayers, or backpack sprayers. Individual stem treatment includes thin line or similar basal treatment applications made with hand-held equipment to direct a low pressure stream to the lower tree stem, or tree injection techniques. These can be done at any time of year and on trees over 2.5 m (8 ft) in height, and are mainly used in circumstances where selective treatment is necessary for environmental or aesthetic reasons. Wherever practical, stump treatment is used following hand-cutting to provide selective control of suckering for deciduous species and to minimize effects on desirable vegetation.

Weed control on the rights-of-way is required for regulatory (i.e., *The Noxious Weed Act*), operational and safety reasons. On provincial Crown lands, a work permit issued under *The Forest Act* (Manitoba) is required and owners adjacent to the right-of-way are typically notified in advance. Manitoba Hydro's Chief Forester coordinates the necessary approvals and is responsible for obtaining the necessary Pesticide Use Permits and submitting Post Seasonal Control Reports in accordance with Manitoba Regulation 94-88R under *The Environment Act*.

2.7 ELECTRICAL EFFECTS

2.7.1 Electric and Magnetic Fields

Electric and magnetic fields (EMF) are invisible lines of force surrounding any wire carrying electricity, and are produced by all electric tools and appliances, household wiring and power lines. A transmission line produces an electric field, a magnetic field and corona. Corona and an

electric field can cause electrical effects, the most common of which are radio interference, audible noise and induction effects of nearby metallic objects.

The strength of electric and magnetic fields depends on the voltage level and the amount of current flow, respectively. The fields around a transmission line fall off sharply with increasing distance from the line. Electric fields are easily blocked by vegetation, buildings and obstacles, while magnetic fields are unaffected by such objects.

Many studies on electric and magnetic fields have been completed worldwide. Some studies have shown certain biological responses. Some have indicated a possible association between electric and magnetic fields and human health effects, while others have not. A recent health and EMF expert's consensus statement on human health effects of EMFs suggests that "the weight of scientific evidence does not support the conclusion that extremely low frequency EMFs, such as those produced by power lines, are a cause of adverse effects on human health" (Manitoba Clean Environment Commission March 2001). The consensus statement also states that "research to date has not confirmed any biophysical mechanisms that would link properties of power and frequency fields to the initiation or promotion of cancer or any other adverse effect on human health."

While Manitoba Hydro is sensitive to public concerns regarding possible health effects from electric and magnetic fields, there is at present no scientific evidence to justify modification of existing practices or facilities for the generation, transmission and distribution of electricity. Manitoba Hydro continues to develop and maintain a reliable technical database and undertakes the following actions to ensure the safety of the public and its employees:

- Respond to enquiries and concerns from the public and employees.
- Monitor worldwide research programs on electric and magnetic fields.
- Maintain active communications and make technical information available to interested parties, including the public and agencies responsible for public health and the environment.

2.7.2 Noise and Interference

Except for Radio Frequency Interference, there are no statutory design limits imposed on the various electrical effects associated with Manitoba Hydro transmission lines. The federal Radio Frequency Interference limit, as established under Industry Canada, is 53 dB over 1μV/m (decibel microvolts per metre) for 230 kV transmission lines, measured at 15 m (49 ft) distant from the outermost conductor. Estimated television interference (levels range from 11.3 to 11.8 dBμV/m at the edge of right-of-way.

Manitoba Hydro applies a design guideline maximum for audible noise of 50 dBA (decibels, A-weighted sound level) at the edge of the right-of-way. This level is consistent with that sometimes specified by Manitoba Conservation and Water Stewardship as a license condition. Estimated audible noise levels range from 39.2 to 41.00 dBA at the edge of the right-of-way.

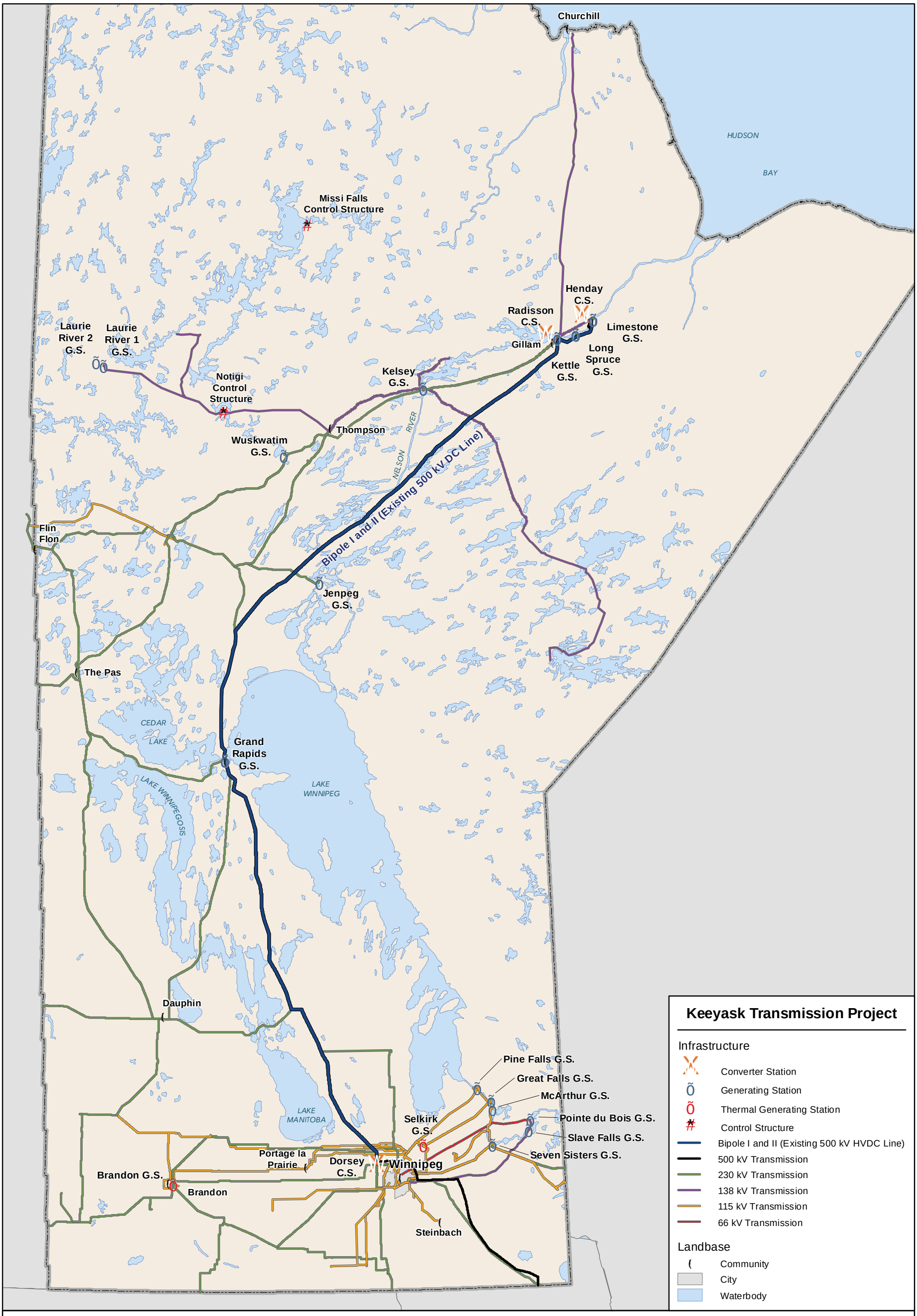
2.8 DECOMMISSIONING

Some portions of the transmission lines and station facilities will be decommissioned and salvaged, as discussed earlier. A Decommissioning Environmental Protection Plan will be developed prior to decommissioning and salvage of these temporary facilities. Provisions also exist for the decommissioning and rehabilitation of any temporary infrastructure or facilities (e.g., borrow pits, access trails, marshalling areas, mobile construction camps, etc.).

Decommissioning of towers involves dismantling of the structures and salvage or disposal of all steel and wood pole tower components. Tower decommissioning also involves the collection and salvage of conductor and ground wire.

Decommissioning of marshalling yards involves the removal of all new and used equipment and materials, dismantling of any ancillary equipment or structures, and the remediation of the yard property.

Trails no longer required after construction will be left to return to natural condition. Any drainage structures and road material will be removed. With the exception of the backup construction power transmission line Manitoba Hydro has no plans to decommission the Keeyask Transmission Project itself. If decommissioning is required at some future date, it will be undertaken according to the legislative requirements, existing agreements and industry standards prevalent at that time.



Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, Stantec, ProvMB, NRCAN
Date Created: September 19, 2012

0 25 50 Kilometres

0 25 50 Miles

1:3,000,000

Manitoba Hydro
Existing Generation and Transmission System

Map 2-1

Keeyask Transmission Project

Manitoba Hydro

Project Infrastructure

- Generation Outlet Lines (200m ROW)
- Construction Power Line (KN36) (60m ROW)
- Construction Power Line (Temporary) (60m ROW)
- Unit Lines (265m ROW)
- Construction Power Station
- Keeyask Switching Station
- Project Study Area

Infrastructure

- Converter Station
- Generating Station (Proposed)
- Generating Station
- Bipole I and II (Existing 500 kV DC Line)
- Transmission Line
- South Access Road (Proposed)
- North Access Road
- Keeyask Principal Infrastructure Axis
- Initial Flooded Area (159m Elevation)
- Dewatered Area

Landbase

- Community
- Provincial Road
- Municipal Road
- Active Railway
- Abandoned Railway
- Watercourse
- Waterbody

Coordinate System: UTM Zone 15N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: October 03, 2012

0 2 4 Kilometres
0 2 4 Miles

1:150,000

Preferred Routes and Station Sites

Map 2-2

Callan Island
Stephens Lake
Kettle G.S.
North Access Road
Mary Miller Island
John Taylor Island
Stratford Island
Fox Lake Cree Nation
A Kwis Ki Mahka Reserve
Gillam
Radisson C.S.
South Access Road (Proposed)
Gull Rapids
Keeyask G.S.
Howe Island
Nelson River
Gillrat Lake
Cache Lake
Generation Outlet Transmission Lines Preferred Route
Construction Power Line (KN36) Preferred Route
Kettle River
Joslin Lake
Ethel lake
Butnau
Willbeach
KN36
R26K
Bipole I and II (Existing 500 kV DC Line)

Construction Phase

Construction Power Station
Construction Power Line (Temporary)
Keeyask G.S.
Dewatered Area
Proposed Switching Station
Generation Outlet Transmission Lines Preferred Route
Construction Power Line (KN36) Preferred Route
South Access Road (Proposed)
Kettle Lake

Operation Phase

Construction Power Station
Keeyask G.S.
Construction Power Line (KN36) Preferred Route
Dewatered Area
Unit Lines
Generation Outlet Transmission Lines Preferred Route
Switching Station
South Access Road (Proposed)

Keeyask Transmission Project

Manitoba Hydro

Project Infrastructure

- Generation Outlet Lines (200m ROW)
- Construction Power Line (KN36) (60m ROW)
- Construction Power Line (Temporary) (60m ROW)
- Unit Lines (265m ROW)
- Right-Of-Way Cross Section
- Construction Power Station
- Keeyask Switching Station
- Project Study Area

Infrastructure

- Converter Station
- Generating Station (Proposed)
- Generating Station
- Bipole I and II (Existing 500 kV DC Line)
- Transmission Line
- South Access Road (Proposed)
- North Access Road
- Keeyask Principal Infrastructure Axis
- Initial Flooded Area (159m Elevation)
- Dewatered Area

Landbase

- Community
- Provincial Road
- Municipal Road
- Active Railway
- Abandoned Railway
- Watercourse
- Waterbody

Coordinate System: UTM Zone 15N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: October 03, 2012

0 2 4 Kilometres
0 2 4 Miles

1:150,000

Preferred Routes and Rights-of-Way

Map 2-3