

Coordinate System: UTM NAD 1983 Z15  
 Data Source: Manitoba Hydro, Government of Canada  
 Date Created: 03 August 2011  
 Created By: Manitoba Hydro: HPP - GIS & Special Studies

- Legend**
- Proposed Keyask GS
  - Existing G.S.
  - FN Communities
  - Keyask Principal Infrastructure Axis
  - Highways
  - Rail
  - Transmission Line (TL)
  - Resource Management Areas
  - Aboriginal Lands

# Keyask Generating Station Project Location Plan





Artist's Rendering - September 2011 - Concept Only

Note: Estimated extent of dewatered area.  
The exact extents of this area are uncertain  
due to the limited bathymetric data in the area.

# Keeyask Generating Station General Arrangement North View

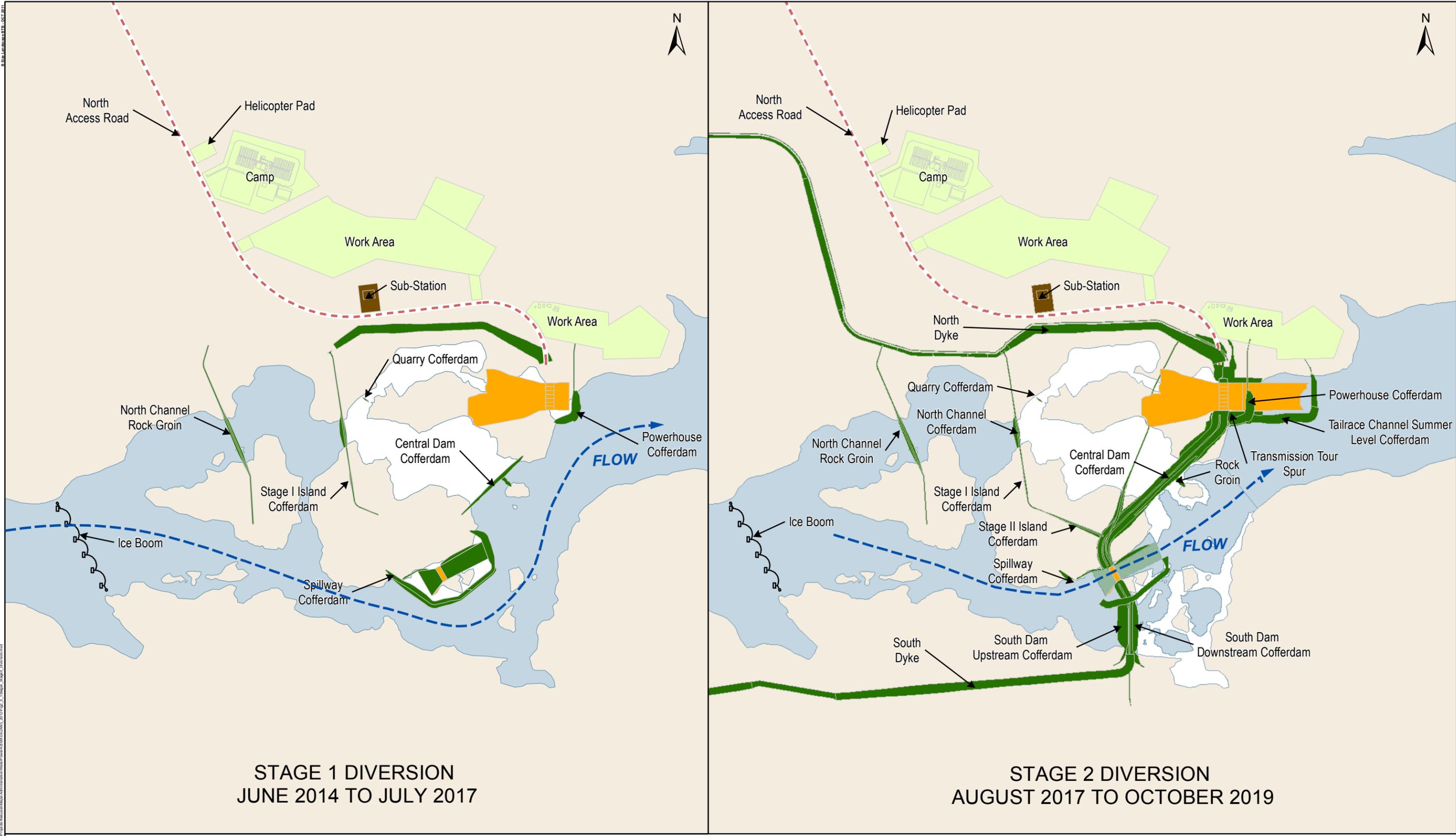


Coordinate System: UTM NAD 1983 Z15  
 Data Source: Manitoba Hydro, Government of Canada  
 Date Created: 03 August 2011  
 Created By: Manitoba Hydro: HPP - GIS & Special Studies

Note: Estimated extent of dewatered area.  
 The exact extents of this area are uncertain  
 due to the limited bathymetric data in the area.

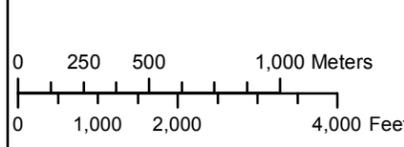
# Keeyask Generating Station Principal Structures





**STAGE 1 DIVERSION**  
**JUNE 2014 TO JULY 2017**

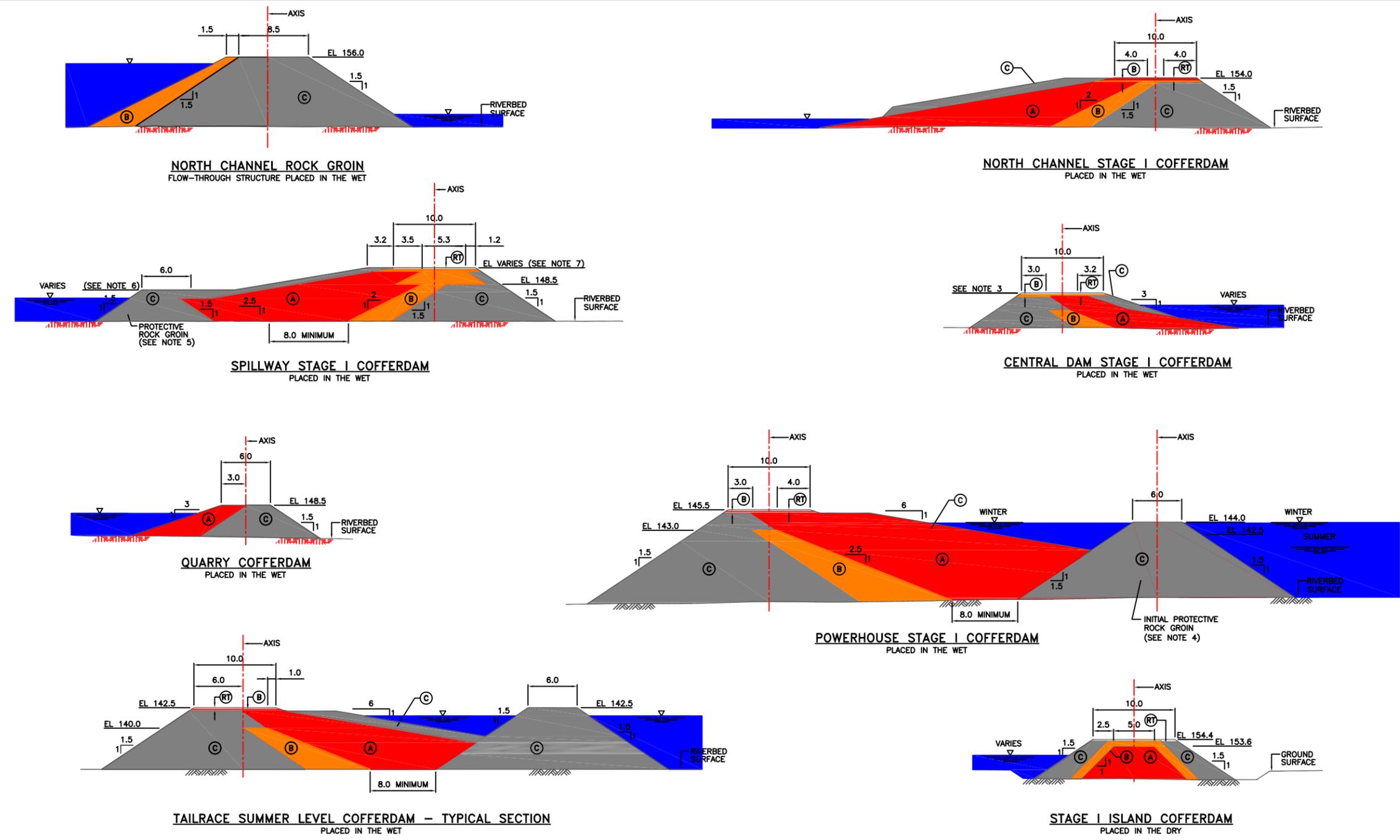
**STAGE 2 DIVERSION**  
**AUGUST 2017 TO OCTOBER 2019**



Coordinate System: UTM NAD 1983 Z15  
 Data Source: Manitoba Hydro, Government of Canada  
 Date Created: 04 January 2012  
 Created By: Manitoba Hydro: HPP - GIS & Special Studies

- Legend**
- Dewatered Area
  - Water Surface Area

# Keyask Generating Station Stage I and II Diversions



- LEGEND:**
- A IMPERVIOUS FILL
  - B GRANULAR TRANSITION FILL
  - C ROCKFILL (SEE NOTE 8)
  - RT ROAD TOPPING
  - WATER LEVEL
  - OVERBURDEN
  - BEDROCK

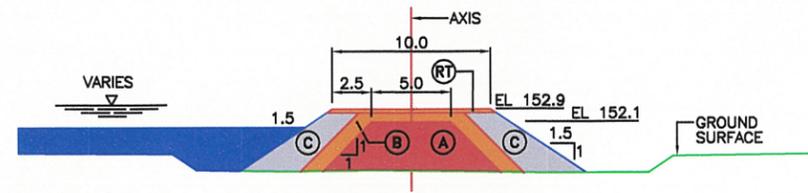
- NOTES:**
1. DIMENSIONS AND ELEVATIONS ARE IN METRES.
  2. ELEVATIONS ARE BASED ON CGVD 1928.
  3. CREST ELEVATION VARIES FROM EL 146.5 AT ITS LEFT ABUTMENT TO EL 147.5 AT ITS RIGHT ABUTMENT.
  4. INITIAL PROTECTIVE ROCK GROIN NOT REQUIRED FOR POWERHOUSE COFFERDAM DOWNSTREAM OF TAILRACE CHANNEL.
  5. PROTECTIVE ROCK GROIN NOT REQUIRED FOR SPILLWAY STAGE I COFFERDAM SECTION DOWNSTREAM OF DISCHARGE CHANNEL.
  6. CREST ELEVATION SET AT 1.0 METRE ABOVE THE PREVAILING WATER LEVEL AT TIME OF CONSTRUCTION.
  7. THE CRESTS SHALL BE EL 151.0 AT THE LEFT ABUTMENT OF THE UPSTREAM LEG SLOPING TO EL 150.5 AT THE RIGHT CORNER OF THIS LEG, THEN SLOPING ALONG THE RIVER LEG TO EL 148.0 AT THE RIGHT CORNER OF THE DOWNSTREAM LEG, THE DOWNSTREAM LEG SHALL HAVE A CREST AT EL 148.0 FOR ITS ENTIRE LENGTH.
  8. VARIOUS SIZES AND GRADATIONS OF ROCKFILL (CLASSES C1, C2, C3 AND C4) WILL BE UTILIZED. PRECISE LOCATIONS OF UTILIZATION WILL BE BASED ON FLOW CONDITIONS.

Note: Design dimensions are preliminary and may change during the final design stage.



Data Source: KGSA  
 Date Created: 12 May 2011  
 Created By: Manitoba Hydro: HPP - GIS & Special Studies

# Keyask Generating Station Stage I Cofferdam & Groin Cross Sections



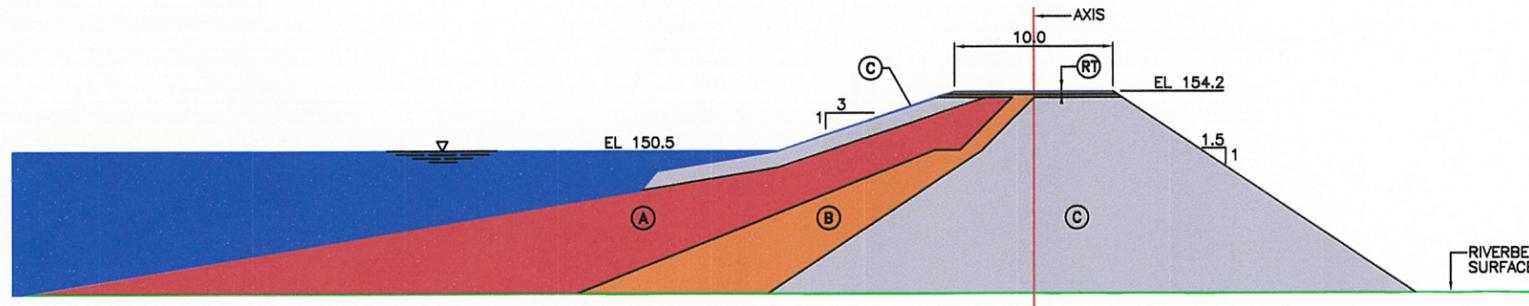
**STAGE II ISLAND COFFERDAM**  
PLACED IN THE DRY

**LEGEND:**

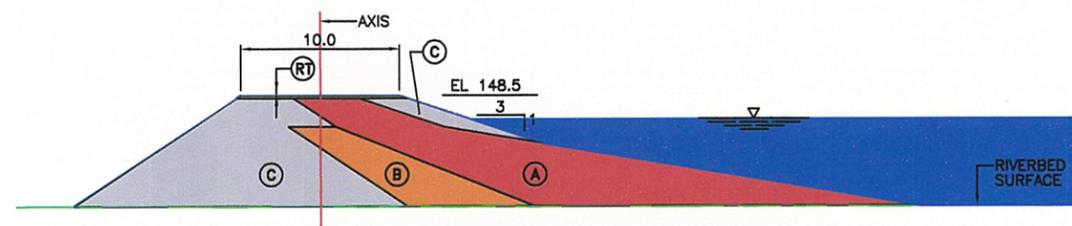
- IMPERVIOUS FILL
- GRANULAR TRANSITION FILL
- ROCKFILL (SEE NOTE 3)
- RT ROAD TOPPING
- ▬ WATER LEVEL

**NOTES:**

1. DIMENSIONS AND ELEVATIONS ARE IN METRES.
2. ELEVATIONS ARE BASED ON CANADIAN GEODETIC VERTICAL DATUM 1928.
3. VARIOUS SIZES AND GRADATIONS OF ROCKFILL (CLASSES C1, C2 AND C3) WILL BE UTILIZED. PRECISE LOCATIONS OF UTILIZATION WILL BE BASED ON FLOW CONDITIONS.



**SOUTH DAM UPSTREAM STAGE II COFFERDAM**



**SOUTH DAM DOWNSTREAM STAGE II COFFERDAM**

Note: Design dimensions are preliminary and may change during the final design stage.

File Location: \\psccdata\warehouse\Warehouse\_Groups\Power\_Supply\Projects\Keyask\Maps\Administrative\WaterPowerAct\AK03\AK03\_2012\Fig3\_0\_StageII\_CofferdamCrossSections.dwg



Data Source: KGSA  
Date Created: 12 May 2011  
Created By: Manitoba Hydro: HPP - GIS & Special Studies

**Keyask Generating Station  
Stage II Cofferdam Cross  
Sections**

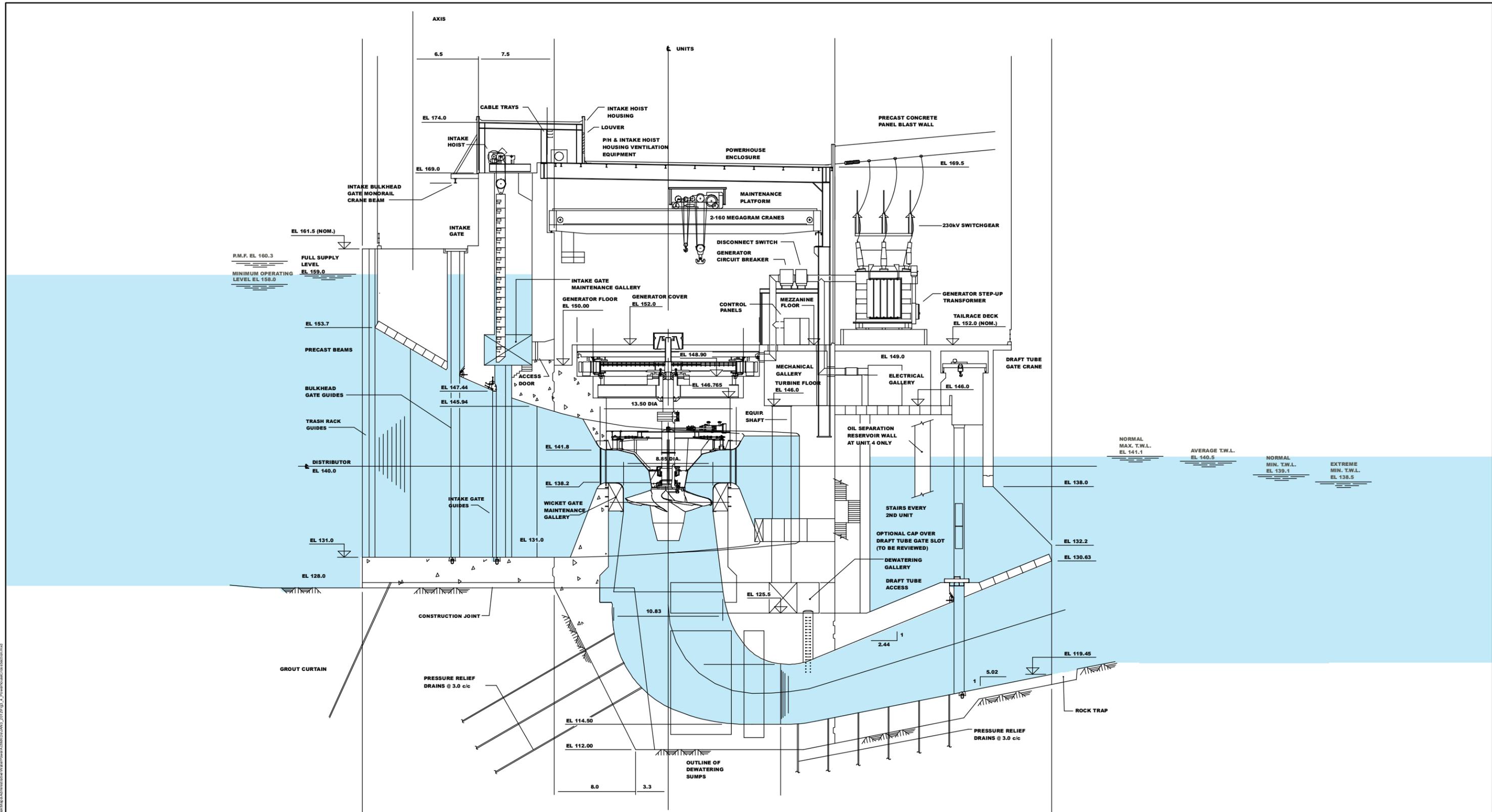


File Location: \\Warehouses - Onsite\Power\_2\300\Projects\Keeyask\Map\Admin\SitePlan\PowerAct\MOA\MOA\_2011\2011\_PowerHouseComplexRendering.mxd



Artist's Rendering - September 2011 - Concept Only

# Keeyask Generating Station Powerhouse Complex



Note: Design dimensions are preliminary and may change during the final design stage.



Data Source: KGSA  
 Date Created: 04 May 2009  
 Created By: Manitoba Hydro: HPP - GIS & Special Studies

# Keyask Generating Station Powerhouse Cross Section



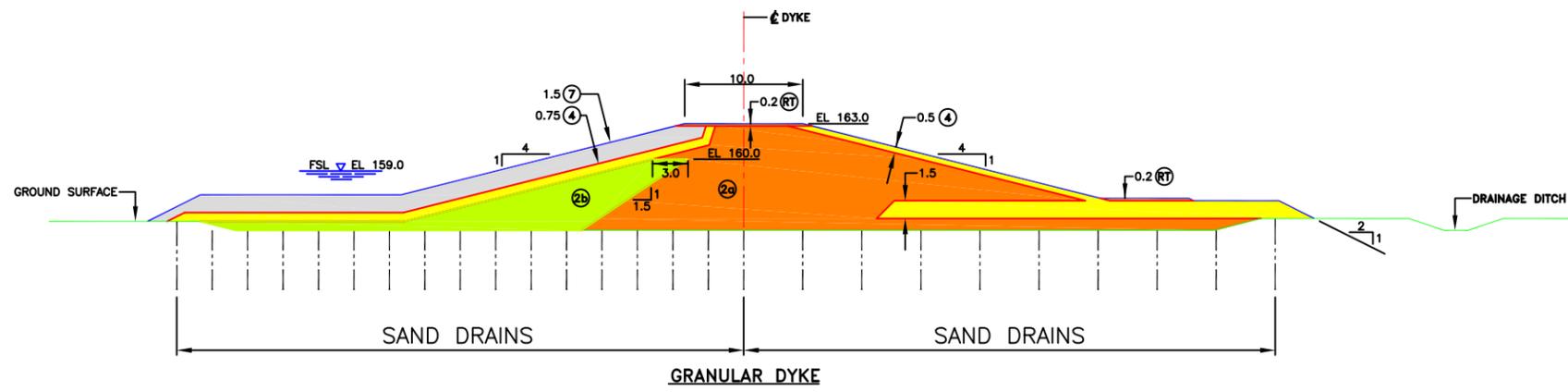
File Location: W:\Workbooks - Cheryl Powers - 01007\Projects\Keyask\Map\Administrative\WaterPower\act\KWD\KWL\K201102\Fig11\_SpillwayRenderings\_CrossSection\_v2.mxd



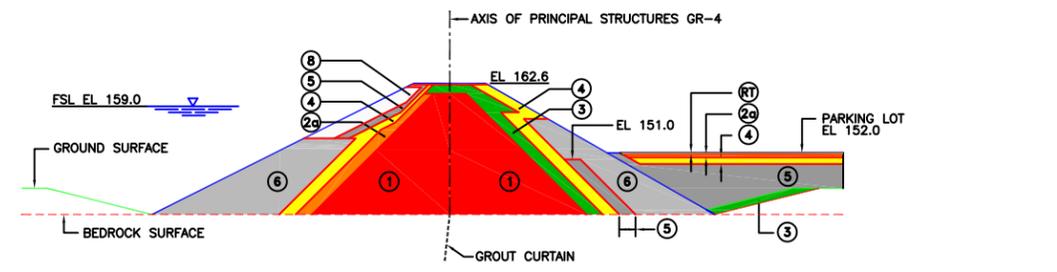
Artist's Rendering - September 2011 - Concept Only

# Keeyask Generating Station Spillway

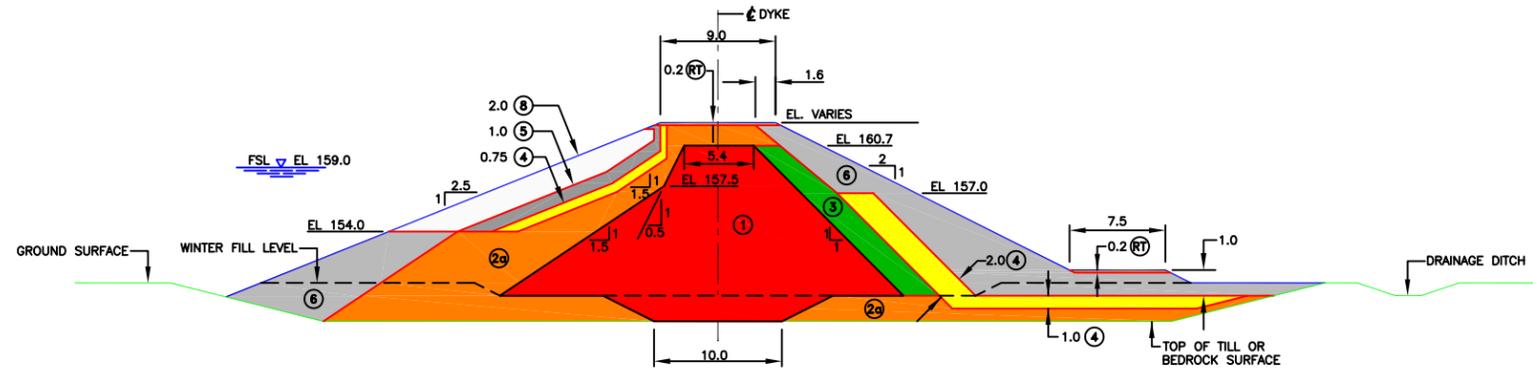




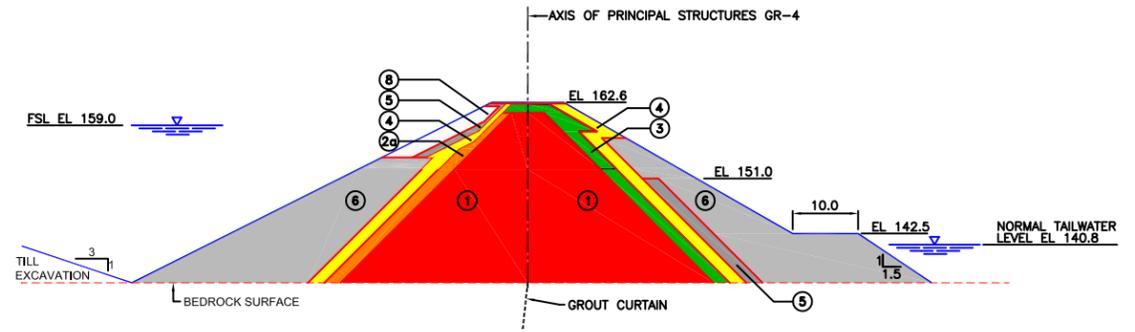
GRANULAR DYKE



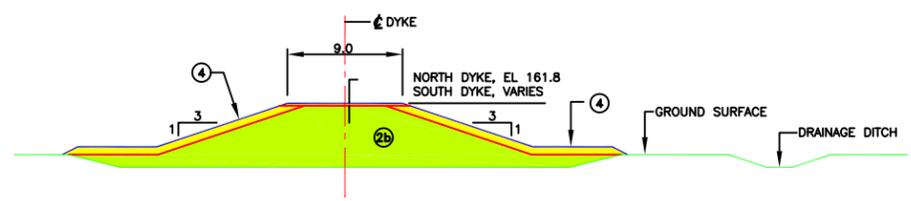
NORTH DAM  
MAIN SECTION



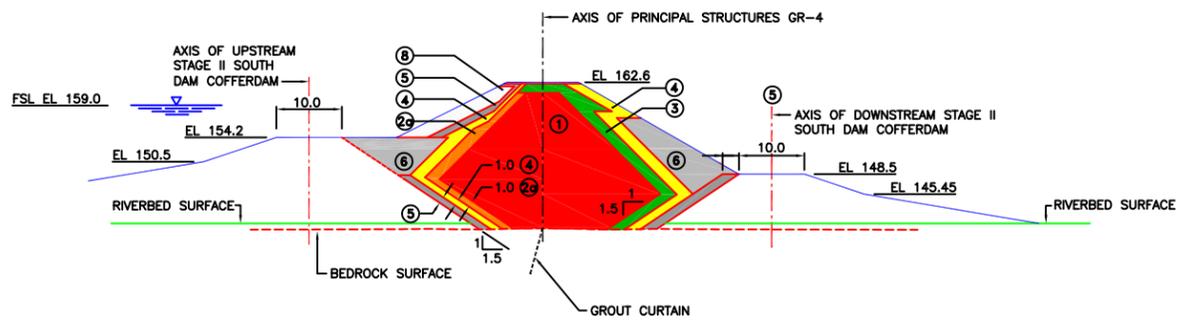
ZONED IMPERVIOUS CORE DYKE



CENTRAL DAM NEAR POWERHOUSE



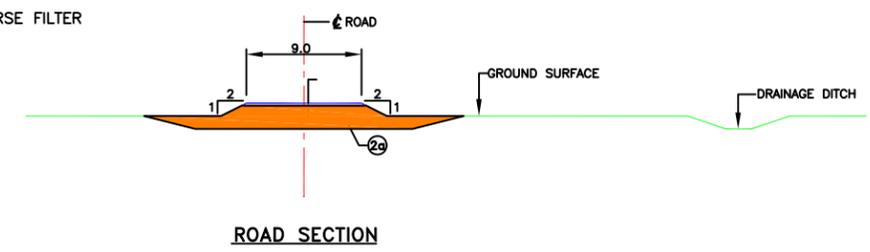
FREEBOARD DYKE



SOUTH DAM RIVER SECTION

Note: Design dimensions are preliminary and may change during the final design stage.

- ① IMPERVIOUS FILL
- ②a PERVIOUS GRANULAR FILL
- ②b SEMI-PERVIOUS GRANULAR FILL
- ③ FINE FILTER
- ④ TRANSITION - CRUSHED ROCK/COARSE FILTER
- ⑤ RIPRAP BEDDING/FINE ROCKFILL
- ⑥ ROCKFILL
- ⑦ RIPRAP
- RT ROAD TOPPING
- ▽ WATER LEVEL
- FSL NORMAL FULL SUPPLY LEVEL

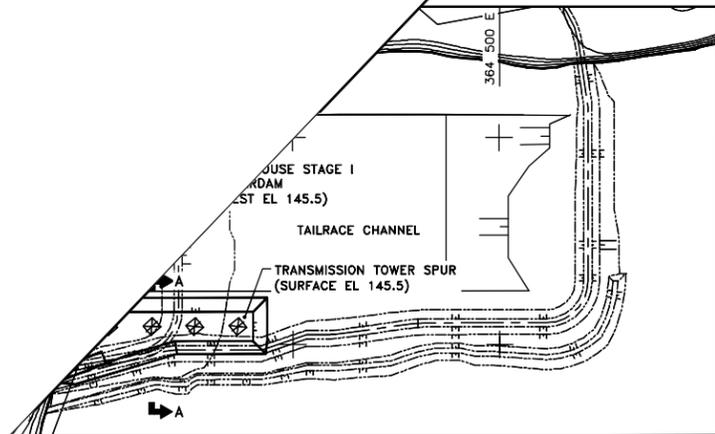


ROAD SECTION



Data Source: KGSA  
Date Created: 06 February 2009  
Created By: Manitoba Hydro: HPP - GIS & Special Studies

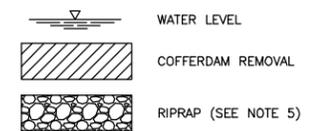
# Keyask Generating Station Dykes & Dams Typical Cross Sections



PLAN  
N.T.S.

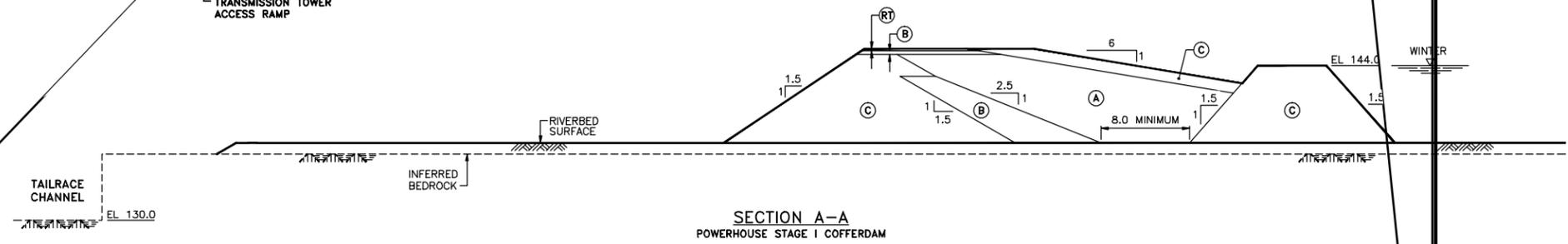
LEGEND:

- IMPERVIOUS FILL
- GRANULAR (TRANSITION) FILL
- ROCKFILL
- ROAD TOPPING

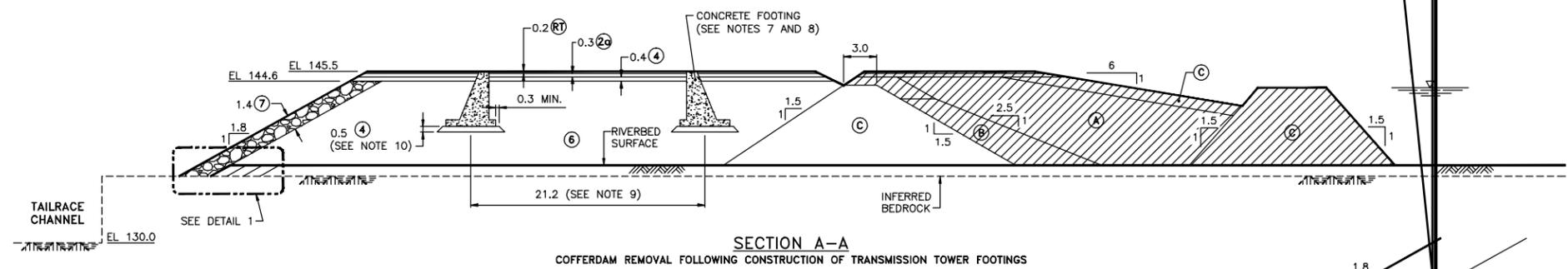


NOTES:

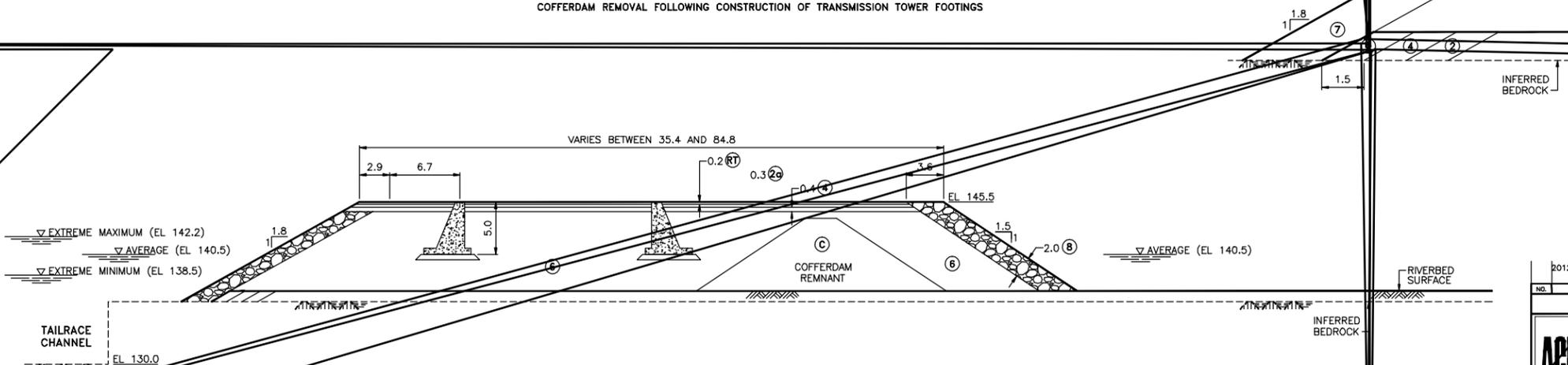
1. ELEVATIONS AND DIMENSIONS ARE IN METRES.
2. ELEVATIONS ARE BASED ON CGVD 1928.
3. FREEBOARD ALLOWANCE APPROXIMATELY 3.3 METRES ABOVE MAXIMUM TAILWATER ELEVATION.
4. ADDITIONAL ROCK ARMOUR SHALL BE PLACED AS REQUIRED, WHERE HIGHER VELOCITIES ARE ANTICIPATED.
5. CLASS 7 OR 8 (2 x D<sub>50</sub>) ROCKFILL ARMOUR PROTECTION.
6. PRIOR TO THE REMOVAL OF THE POWERHOUSE COFFERDAM, ALL EXPOSED RIVERBED SLOPES WITHIN THE TAILRACE CHANNEL SHALL HAVE FILTERS AND RIPRAP INSTALLED TO MINIMIZE THE HYDRAULIC FORCES ACTING ON THE ALLUVIUM. THIS IS TO PREVENT THE POWERHOUSE DISCHARGE FLOWS FROM UNDERMINING THE TRANSMISSION TOWER SPUR.
7. FOOTINGS ARE SHOWN FOR ILLUSTRATION PURPOSES ONLY. FOOTINGS WILL BE REVIEWED DURING THE FINAL DESIGN.
8. CONCRETE FOOTINGS WILL EXTEND INTO THE TRANSMISSION TOWER SPUR.
9. THE CENTER-TO-CENTER SPACING OF THE TOWER FOOTINGS WILL BE 15.0 m, HOWEVER THE ORIENTATION OF THE TOWERS RELATIVE TO THE LOCATION AT WHICH THE CROSS-SECTION IS VIEWED RESULTS IN THE INCREASED DISTANCE INDICATED.
10. CLASS 4 TO BE WRAPPED WITH NON-WOVEN GEOTEXTILE FILTER FABRIC.
11. FIGURE SOURCE GN-4.2.2.6.



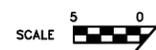
SECTION A-A  
POWERHOUSE STAGE I COFFERDAM



SECTION A-A  
COFFERDAM REMOVAL FOLLOWING CONSTRUCTION OF TRANSMISSION TOWER FOOTINGS



SECTION A-A  
FINAL TRANSMISSION TOWER SPUR



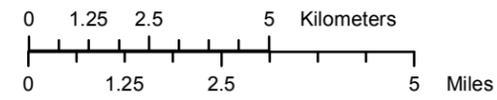
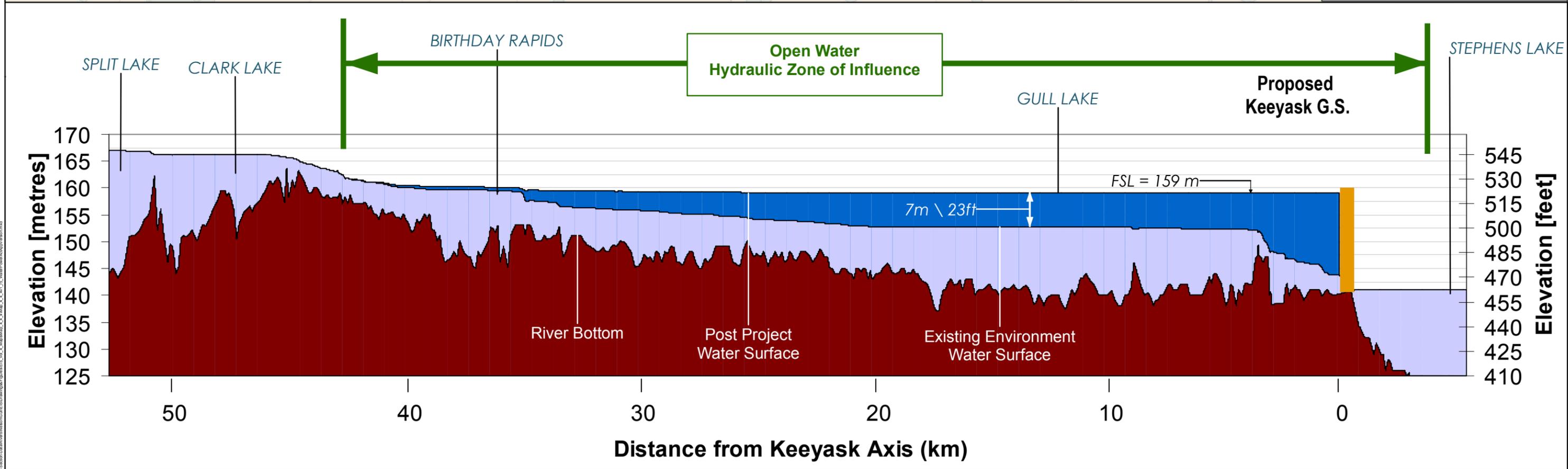
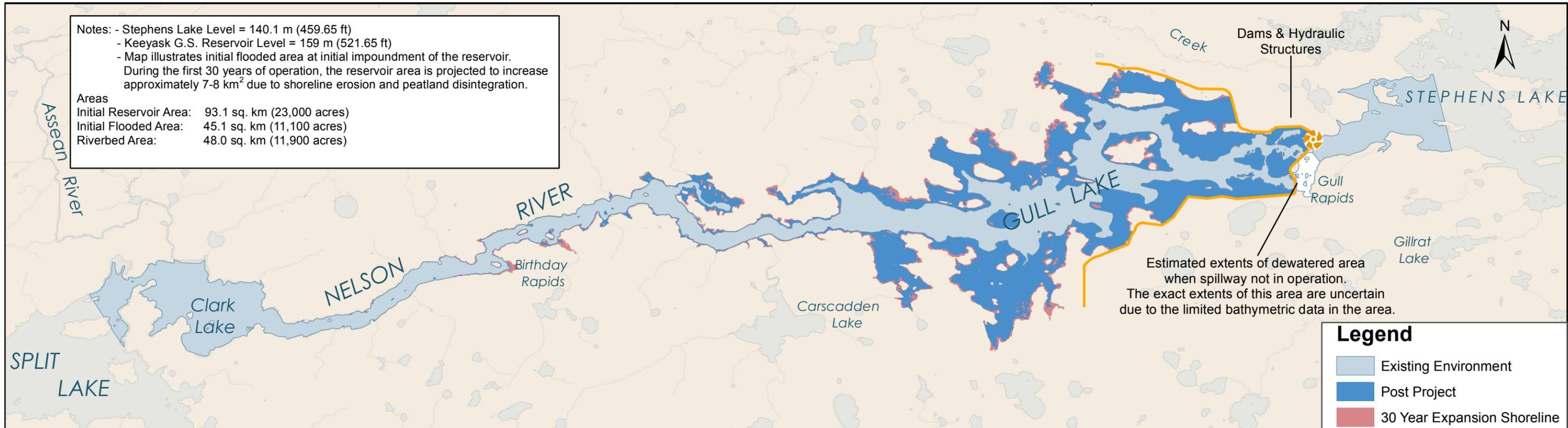
NO.	DATE	ISSUED FOR

ACRES MANITOBA LIMITED



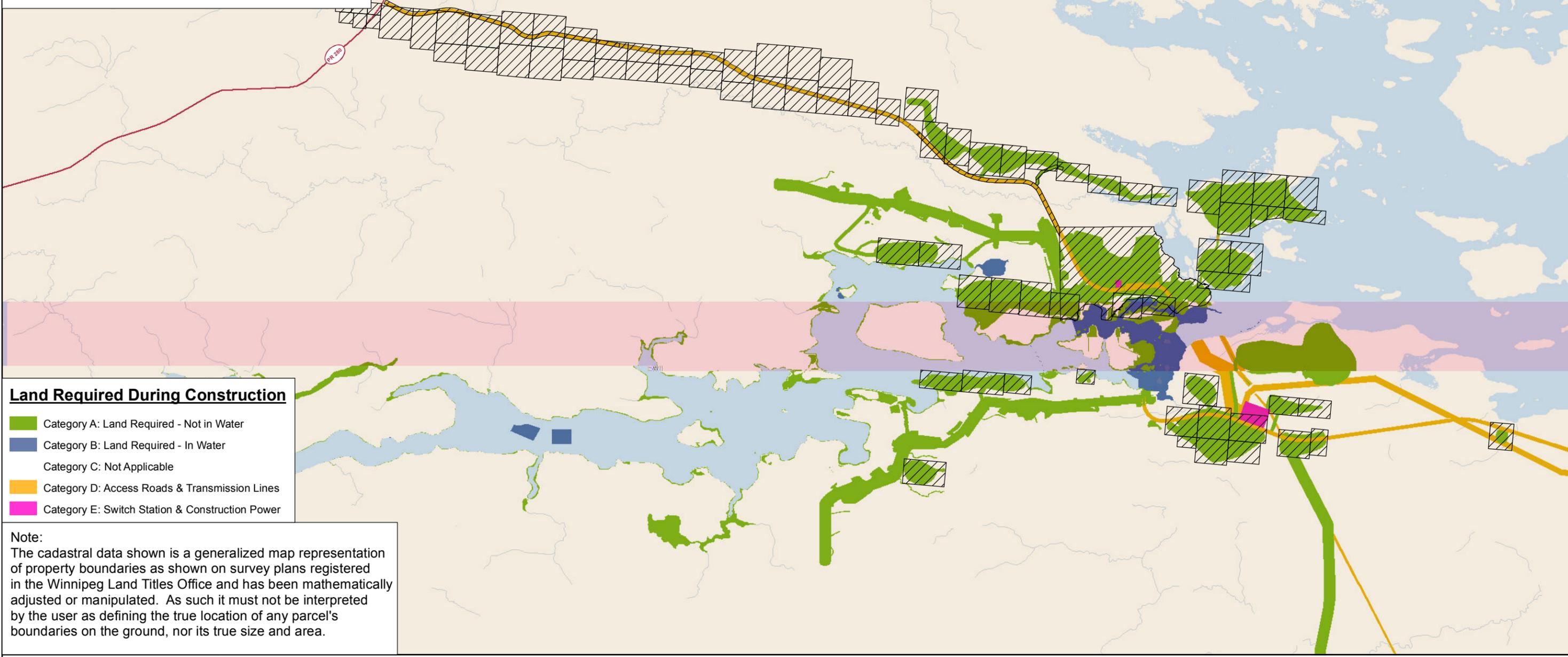
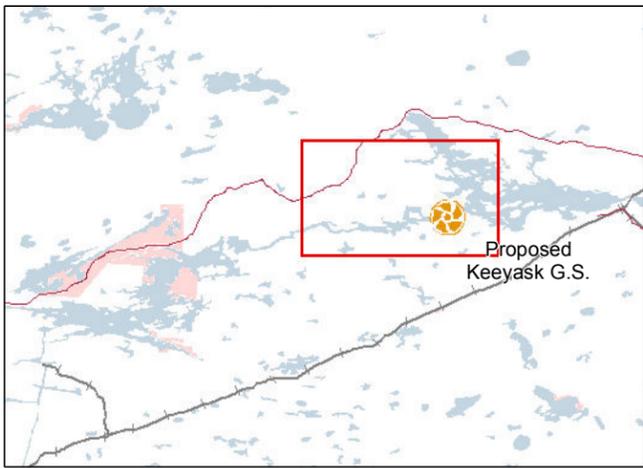
NOTE: Design and dimensions are preliminary and may change during final design stage.

Keeyask Water Power Act Application



Coordinate System: UTM NAD 1983 Z15  
 Data Source: Manitoba Hydro, NTDB  
 Date Created: 08 December 2010  
 Created By: Manitoba Hydro:  
 Water Resource Engineering

**Project Flooded Area and Water Surface Profiles  
 50<sup>th</sup> Percentile, Open Water Flow  
 Existing Environment and Post-Project Environment**

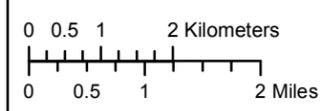


- Land Required During Construction**
- Category A: Land Required - Not in Water
  - Category B: Land Required - In Water
  - Category C: Not Applicable
  - Category D: Access Roads & Transmission Lines
  - Category E: Switch Station & Construction Power

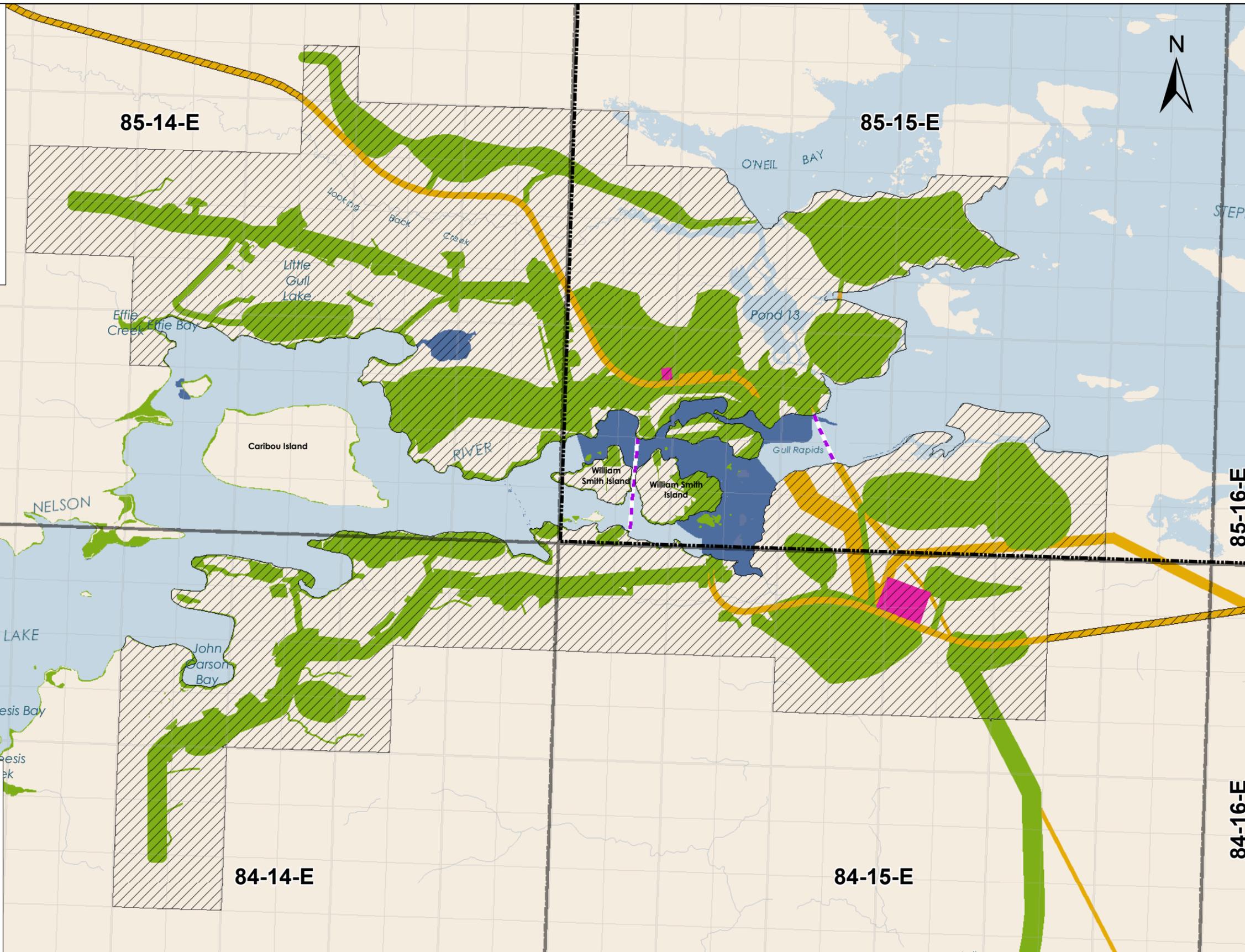
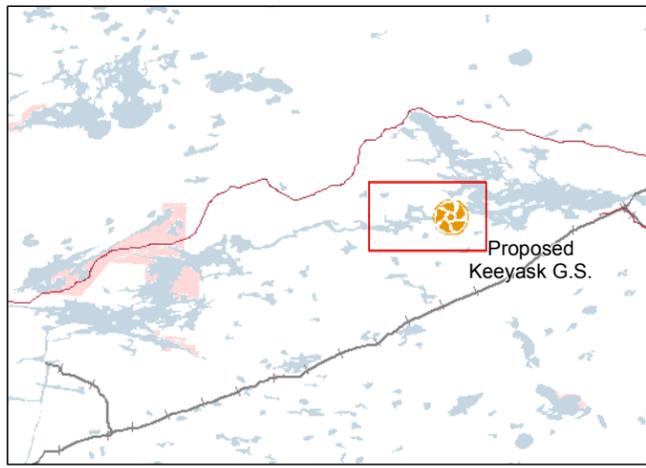
**Note:**  
 The cadastral data shown is a generalized map representation of property boundaries as shown on survey plans registered in the Winnipeg Land Titles Office and has been mathematically adjusted or manipulated. As such it must not be interpreted by the user as defining the true location of any parcel's boundaries on the ground, nor its true size and area.

- Legend**
- Lands Currently Leased
  - Highways

Coordinate System: UTM NAD 1983 Z15  
 Data Source: Manitoba Hydro, Government of Canada  
 Date Created: 13 January 2012  
 Created By: Manitoba Hydro: HPP - GIS & Special Studies



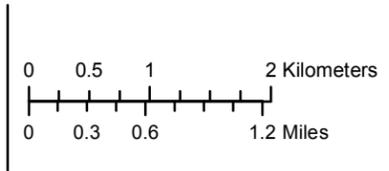
# Keeyask Generating Station Leased Lands



- Land Required During Construction**
- Category A: Land Required - Not in Water
  - Category B: Land Required - In Water
  - Category C: Not Applicable
  - Category D: Access Roads & Transmission Lines
  - Category E: Switch Station & Construction Power

**Notes:**

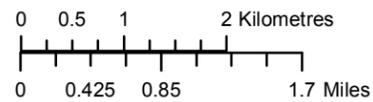
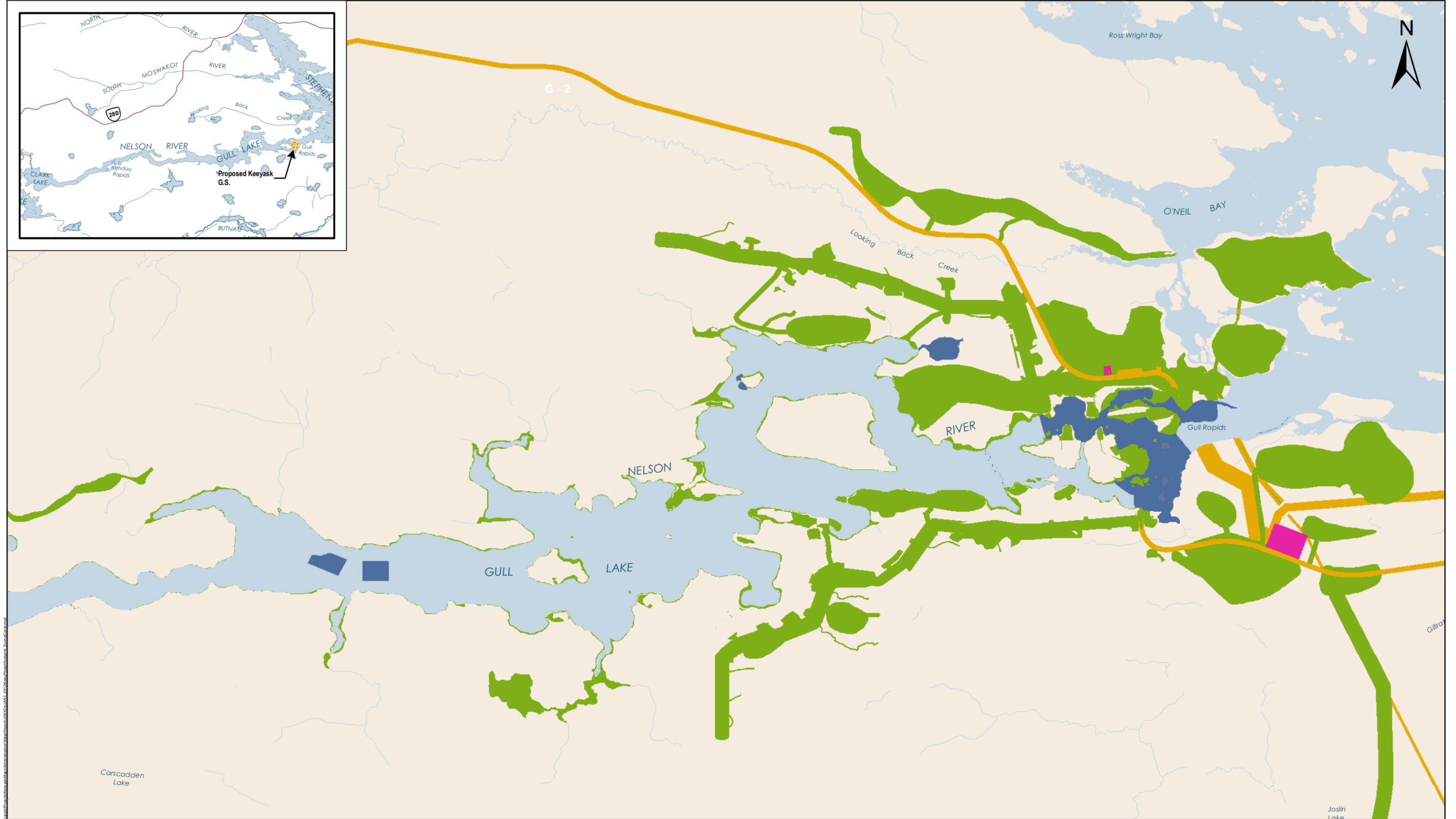
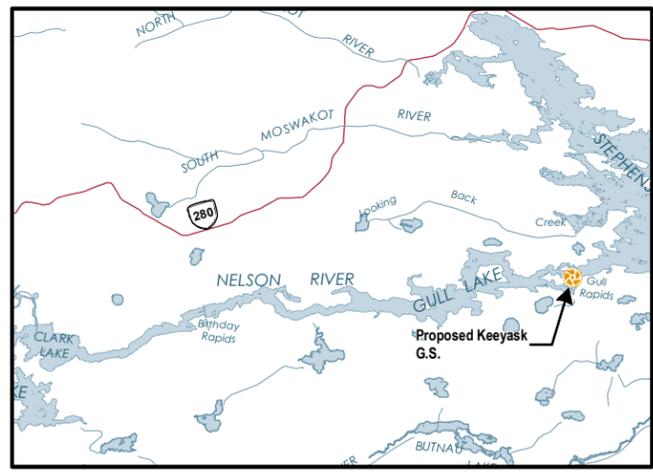
- The projected land acquisition for the north access road is a 100m right-of-way extending from the Keeyask Generating Station site to PR280. The exact route will be determined during final design.
- The projected land acquisition for the south access road is a 100m right-of-way extending from the Keeyask Generating Station site to the vicinity of the Butnau Dam weir crossing. The exact route will be determined during final design.



Coordinate System: UTM NAD 1983 Z15  
 Data Source: Manitoba Hydro, Government of Canada  
 Date Created: 13 January 2012  
 Created By: Manitoba Hydro: HPP - GIS & Special Studies

- Legend**
- Projected Land Acquisition
  - Township Range Grid
  - Section Grid
  - Water Lot Boundary
  - Kettle Severance Line

# Keeyask Generating Station Projected Land Acquisition

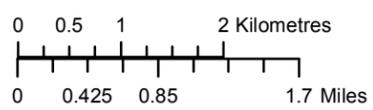
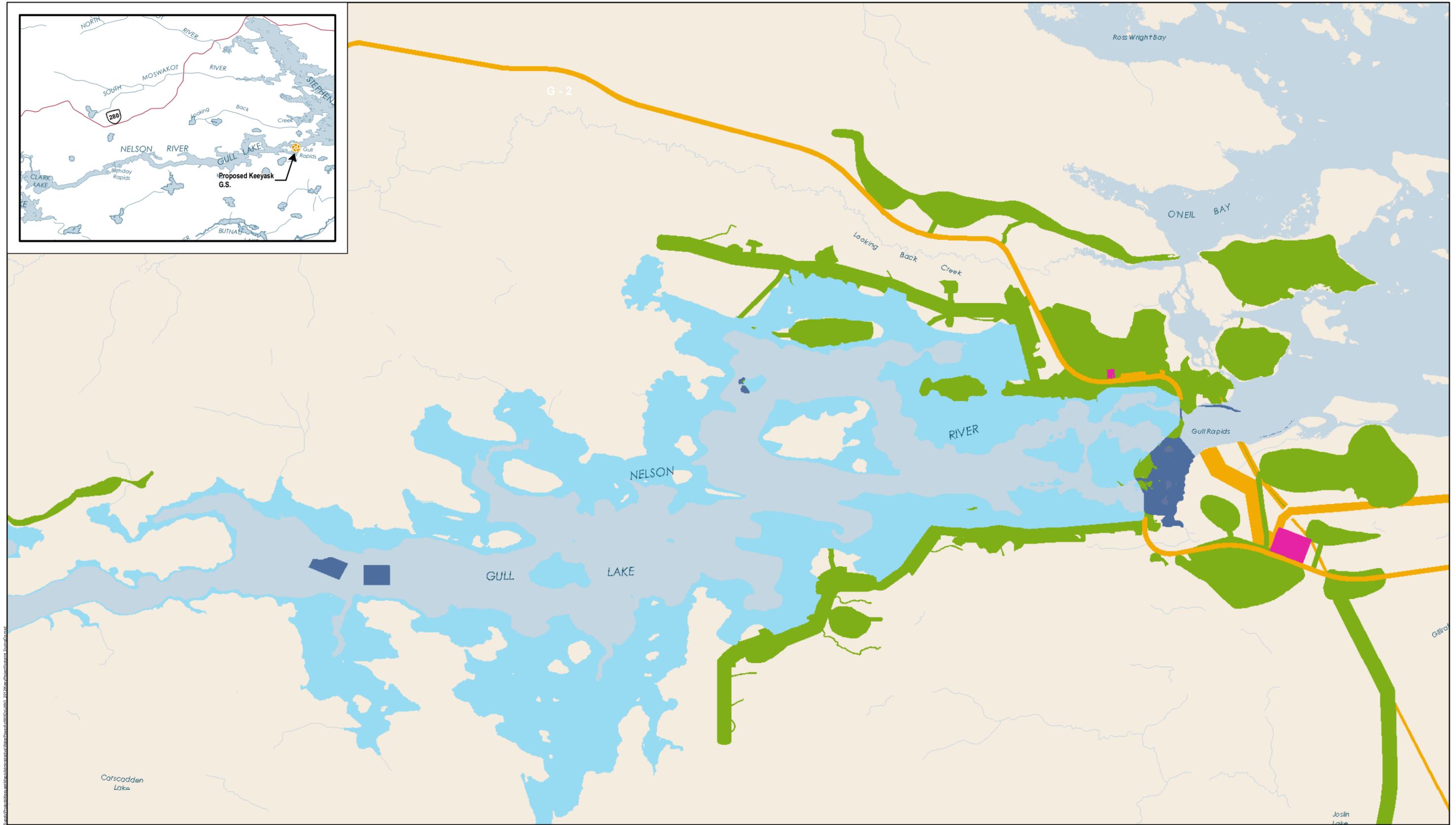
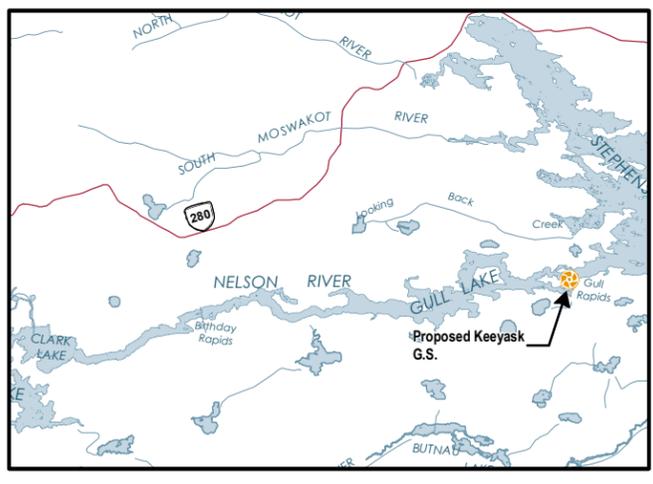


Coordinate System: UTM NAD 1983 Z15  
 Data Source: Manitoba Hydro  
 Date Created: January 11, 2012  
 Created By: Manitoba Hydro: HPP - GIS & Special Studies

**Legend**

- Category A: Land Required - Not in Water
- Category B: Land Required - In Water
- Category C: Not Applicable
- Category D: Access Roads & Transmission Lines
- Category E: Switch Station & Construction Power

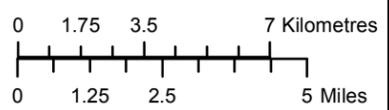
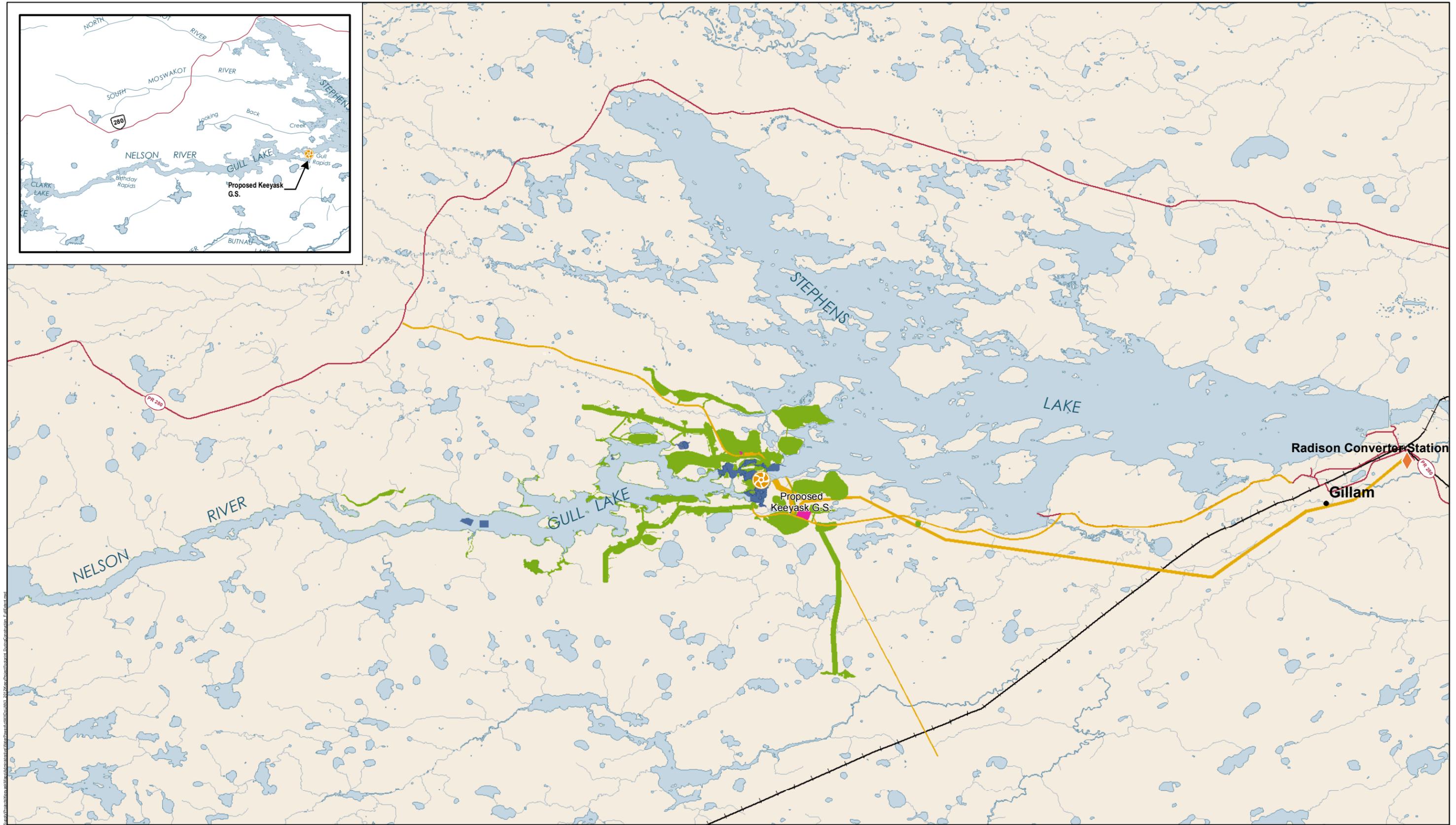
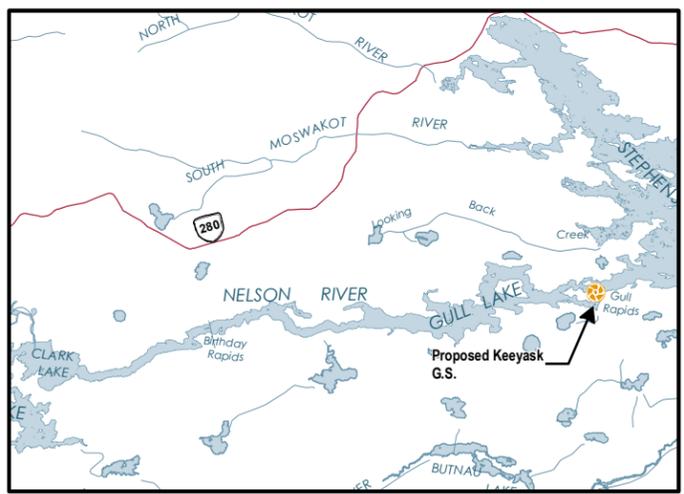
**Keeyask Generating Station  
 Project Lands Required  
 During Construction**



Coordinate System: UTM NAD 1983 Zone 15  
 Data Source: Manitoba Hydro, KGS Acres  
 Date Created: January 12, 2012  
 Created By: Manitoba Hydro: HPP - GIS & Special Studies

- Legend**
- Category A: Land Required - Not in Water
  - Category B: Land Required - In Water
  - Category C: Initial Flooding & 30 Year Reservoir Expansion
  - Category D: Access Roads & Transmission Lines
  - Category E: Switch Station & Construction Power

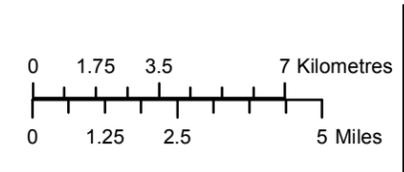
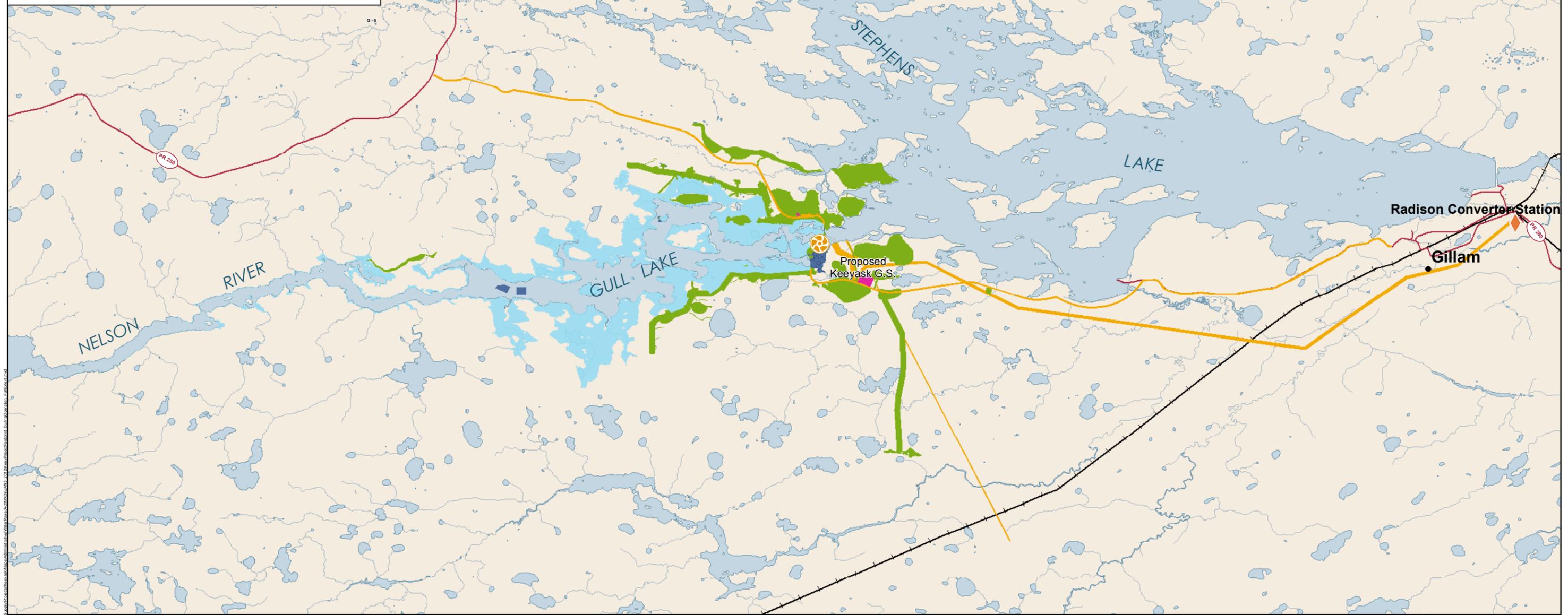
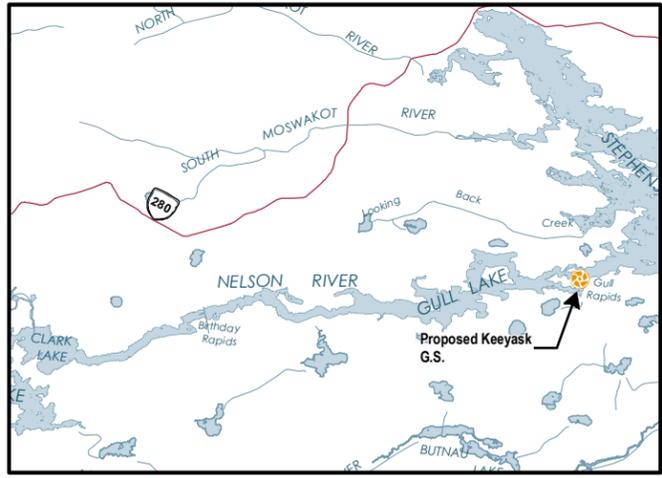
## Keeyask Generating Station Project Lands Required During Operation



Coordinate System: UTM NAD 1983 Z15  
 Data Source: Manitoba Hydro, KGS Acres  
 Date Created: January 17, 2012  
 Created By: Manitoba Hydro: HPP - GIS & Special Studies

- Legend**
- Category A: Land Required - Not in Water
  - Category B: Land Required - In Water
  - Category C: Not Applicable
  - Category D: Access Roads & Transmission Lines
  - Category E: Switch Station & Construction Power

**Keeyask Generating Station  
 Project Lands Required  
 During Construction - Full Extent**

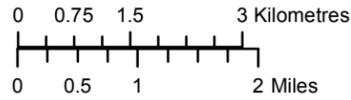
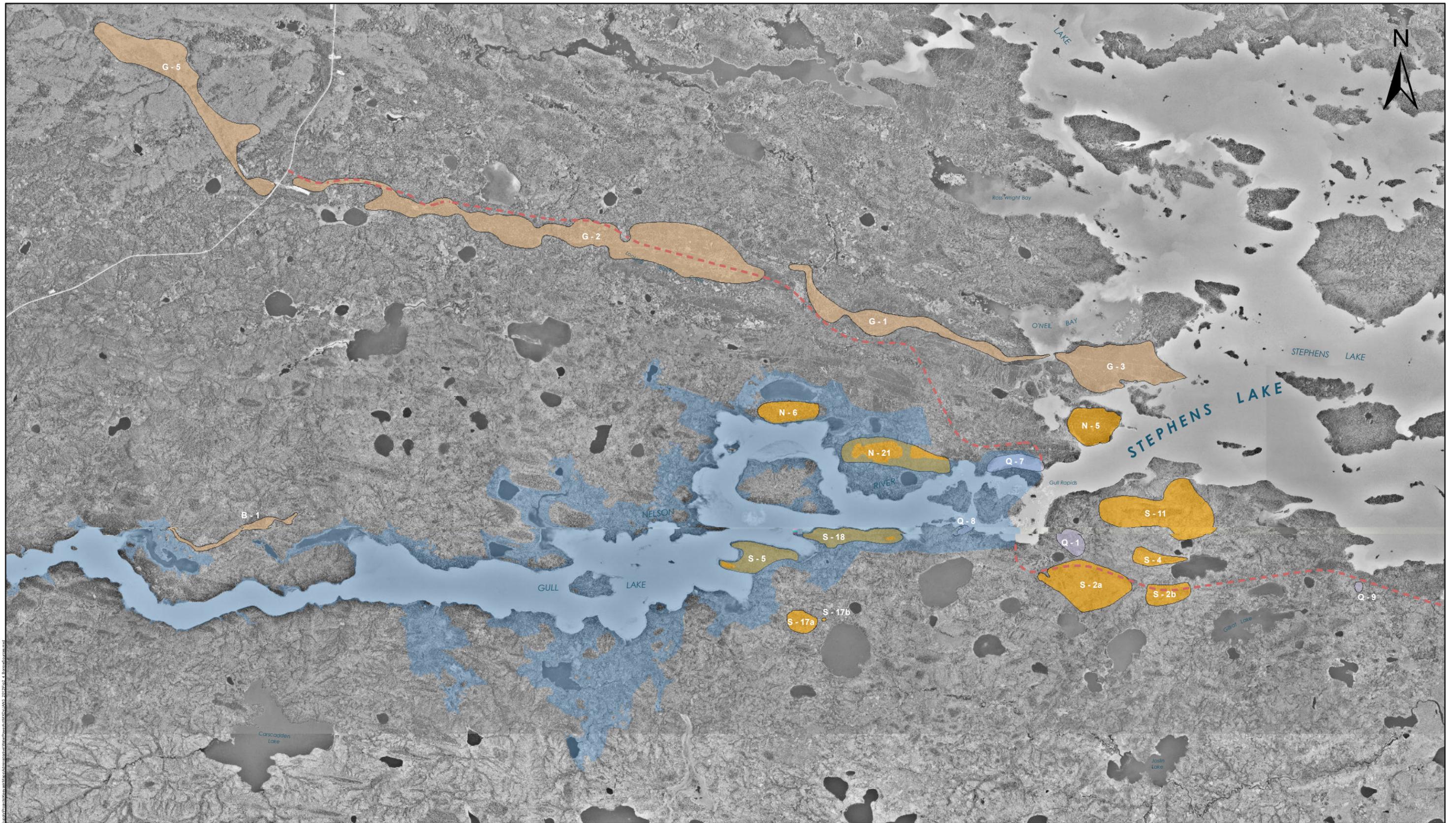


Coordinate System: UTM NAD 1983 Z15  
 Data Source: Manitoba Hydro, KGS Acres  
 Date Created: January 12, 2012  
 Created By: Manitoba Hydro: HPP - GIS & Special Studies

**Legend**

- Category A: Land Required - Not in Water
- Category B: Land Required - In Water
- Category C: Initial Flooding & 30 Year Reservoir Expansion
- Category D: Access Roads & Transmission Lines
- Category E: Switch Station & Construction Power

## Keeyask Generating Station Project Lands Required During Operation - Full Extent

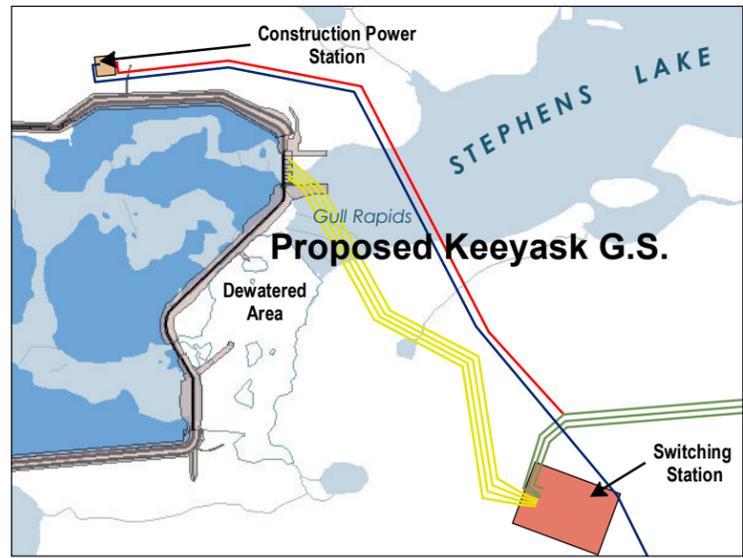
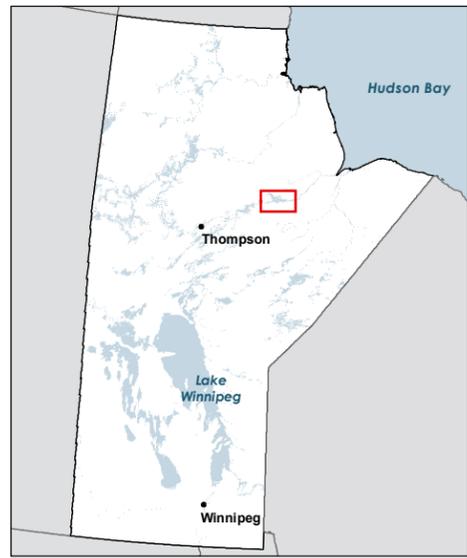


Coordinate System: UTM NAD 1983 Z15  
 Data Source: Manitoba Hydro, KGS Acres  
 Date Created: October 24, 2011  
 Created By: Manitoba Hydro: HPP - GIS & Special Studies

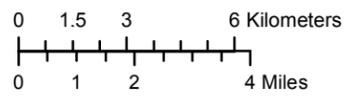
Legend	
<b>Material Sources</b>	
<span style="display:inline-block; width:15px; height:10px; background-color: #D2691E; border: 1px solid black;"></span> Granular Borrow	<span style="display:inline-block; width:15px; border-bottom: 2px dashed red;"></span> Access Roads
<span style="display:inline-block; width:15px; height:10px; background-color: #FFA500; border: 1px solid black;"></span> Impervious Borrow	<span style="display:inline-block; width:15px; height:10px; background-color: #ADD8E6; border: 1px solid black;"></span> Flooded Area Reservoir
<span style="display:inline-block; width:15px; height:10px; background-color: #9370DB; border: 1px solid black;"></span> Rock Quarry	

## Keeyask Generating Station Potential Borrow Sources and Quarries





**Notes:**  
 - Alignment and other design parameters are preliminary and subject to change  
 - Estimated extent of dewatered area. The exact extents of this area are uncertain due to the limited bathymetric data in this area



Coordinate System: UTM NAD 1983 Z15  
 Data Source: Manitoba Hydro  
 Date Created: 16 August 2011  
 Created By: Manitoba Hydro: HPP - GIS & Special Studies

**Legend**

- Generating Station to Switching Station
- 138kV Construction Power Route
- Keyask Generation Outlet Lines
- Construction Power 2nd Supply
- Existing Transmission Lines
- Dewatered Area
- Flooded Area - 159m
- Keyask Infrastructure

# Keyask Generating Station Preliminary Transmission Corridors