GIS NEEDS ASSESSMENT

QUESTIONAIRE TEMPLATE

GIS Specialist

April 2020

FIRST NATIONS LAND MANAGEMENT RESOURCE CENTRE

Disclaimer: This document is designed to assist you in gathering information from your organization's departments, pertinent to making an informed decision on how GIS can assist you in Governance and Lands management. Please contact the GIS Specialist at the Lands Advisory Board Resource Centre, if you need assistance in using this GIS Needs Assessment.

GIS can be an effective planning tool only if it is the appropriate tool for the appropriate task. Preliminarily, you should have a clear understanding of the concepts of geographic information systems and recognize the spatial components of your community's land management applications.

A GIS Needs Assessment identifies the desire and potential for GIS use within your band office/organization, which leads to recommendations concerning data, equipment, software and training needs.

By performing a GIS needs assessment of your community's Lands Governance needs in its current state and discussing where you hope GIS will take it, is the beginning of your GIS Implementation Plan. By conducting this assessment, you will also be determining your GIS Goals and Objectives.

This template is a general outline of some items to consider before taking on a large task of setting up a GIS office with staff, hardware, software and the applications of GIS.

The steps include building capacity, where/who will govern the GIS, who will operate the System, what other resources are needed? This will include computer and software research, database/data model development, computer/ server implementation, or the development of a customized open-source application, to present information in a clear and concise manner.

The questions included within each of the following sections are the key ingredients to a GIS Needs Assessment. How your organization answers the questions will help in developing the GIS implementation plan. Within each coinciding section we have provided some suggestions to assist in answering the consequentially numbered questions.

Once completed, a GIS needs assessment will present to you a clear plan for how to achieve your mapping goals; be fully customizable and designed around what is important to your organization.

Only after accomplishing this GIS Needs assessment, should you seek out information about GIS software/hardware systems from prospective vendors. Make sure that the capabilities of a GIS software will address the tasks identified in this assessment, and not redefine your decision to accommodate the capabilities of a Vendor's GIS product!

The Resource Centre will not make equipment or software recommendations, but instead, will assist you in using this questionnaire template to determine if GIS is the right choice for your Land's Governance needs.

Building Capacity

In most organizations among the First Nations across Canada there is always the question of where the money is coming from. At this time, the Resource Centre cannot assist in funding your GIS endeavors, but rather assist in determining what components should be considered if you choose to budget for GIS.

Questions to assess Resources

1. How much is needed?

_____

_____

2. Which department will be handling the annual budget for the human resources needed to run the GIS?

_____

_____

3. Will a GIS office be needed and if so, where?

_____

_____

Suggestions to assist in Building Capacity

1. This assessment will assist in determining the types of hardware, software and knowledgeable user needed to perform the GIS applications identified. Base minimum could be in range of $20,000.00 and up.
2. Maintaining GIS production and budget depends on the Location and Governance portion of this template.
3. A GIS Technician, office space and equipment depend on your responses to this template's Location/Governance to GIS Applications sections.

Location/Governance

Consider where the system will be the most useful, which department would get the most benefit. Knowing who will manage your GIS plan, will depend on discussions with Leadership, department heads and or land committee on how the GIS will be governed.

Questions to consider to who will

1. How would your organization use a GIS?

_____

manage the GIS	2. Who will be maintaining the budget for the GIS? 3. Will Chief and Council be the lead on decision making of how/what the GIS will be used for? 4. Will it be housed in the Lands department, led by the Lands Director? 5. Will Lands & Resources, LUP and Environment Protection require GIS? 6. Do we need it for defining our Treaty Lands or for Cultural Heritage Management?
Suggestions to assist in the location and Governance of a GIS Office.	1. GIS has countless uses, such as building capacity, creating directional maps, assist in historic imaging to relaying Land uses and emergency routes. 2. The budget should be maintained by the department that will be managing and needing the GIS products.

	3. The community governance could delegate how the GIS will be used and by which department. 4. GIS could be used for creating maps and other data visualizations relevant to Lands Governance decision-making and can assist in conducting Lands-related planning and community engagement. 5. GIS allows you the ability overlay information from your Land Use Plan, including how a parcel or area of a reserve is designated or Zoned, or where infrastructure and services are located. 6. If you're embarking on or having completed a Traditional Use and Occupancy Study or similar project, that information can be spatially represented in your GIS.
Personnel	
Another key component to the implementation of the GIS Plan would be the identification of who will use the GIS and in what capacity in the organization. The importance of having a knowledgeable GIS User is determined by the Lands Governance need for GIS as a tool for assistance in decision making.	
Questions to consider when hiring GIS Technician	1. How many GIS Technicians should we hire? _____ _____ _____ 2. How many years' experience do they need? _____ _____ _____ 3. Will they need to have the ability to create georeferenced digital files from hard copy maps? _____ _____ _____ 4. Do they need to know this community, the language and the culture?

	_____ _____ _____ 5. What software do they need to know? _____ _____ _____ 6. What is the Salary? _____ _____ _____
Suggestions for hiring a GIS Technician	1. Having only one technician leaves the First Nation Community at a disadvantage if their GIS Tech must leave suddenly. One suggestion is having a mentor program built into the GIS plan, this is key to the continuation of the ongoing GIS projects. 2. The applicant should have a Mapping Diploma, 2 years GIS education or 2 years GIS work related experience. 3. Creating and maintaining digital data is an asset. 4. Traditional Uses and Place names in your language requires some community knowledge. 5. Most applicants will name the software they have knowledge of, in their resumes. A knowledgeable GIS user will understand the basics of any software, and won't take long to learn, if one already exists at your band. 6. The salary of the GIS technician depends on their experience and your budget.

DATA Library

Before any GIS applications can be implemented the data must be present. Consider spending some time doing an inventory of existing land and environmental spreadsheets, record names of hardcopy maps that exist with the community's Value-added information. Start listing the types of digital information

you will need and from where. The creation of a digital Data Library must consist of comprehensive, current, and accurate data which are fundamental to the successful implementation of your GIS plan.	
Questions to define types of Data needed to run a GIS	1. What are the different types of Hardcopy Data do we have, in house? 2. Will this data need to be captured by a GIS? 3. What types of Digital Data (mapping layers) do we have access to? 4. What types of mapping layers will we be using? 5. What format of data will we need? 6. At what scale and accuracy will we be we be receiving our data in? 7. When and by whom was the data created?

	_____ 8. How old is the data we are receiving? _____ _____ _____ 9. How often is this data being revised? _____ _____ _____
Suggestions for gathering data.	1. Check previous projects' inventory or archives for existing information such as maps and spreadsheets. E.g. TUS, EK, Animal Habitat, Heritage sites etc. 2. Digitally recording this information will be determined by its importance to the community. Identify the spatial components of this data. Determine if the spatial character of this data is significant in data analysis for your community's Lands Management. 3. Most topographic, cadastral or infrastructural data is made available per Province. Best to establish a digital data group or network system to acquire a list of contacts who may have suggestions to access existing digital data. 4. Depending on the location and governance of the GIS Office, there are numerous layers that can assist in Lands Governance. 5. The format of your data will depend mainly on the software chosen to display your information. E.G. If Google Earth is chosen, then the common format is KML (keyhole markup language) Some spreadsheets hold x and y coordinate information in an excel document. Most open source software companies develop their own format that works within that product.

	6. The accuracy of digitized information relies mainly on how that information was captured. Most GPS units capture information within 1-meter accuracy. Digitizing information at a large scale increases the accuracy of the linework. The projection and scale the layer was captured in, also plays a factor on the preciseness of the points, linear and/or polygonal features. 7. The type of information needed usually sets the source on where you would obtain it. If you need forest cover you may want to contact the local Forestry Government, or species at risk you would contact the Department of Environment. Cadastral information may come from the municipality within the area of interest you are displaying. 8. Most data suppliers pride themselves on updating and maintaining their information as it changes, Hydro, Phone/Cable, Forestry Companies, Municipalities and Regional Districts have GIS departments to perform updates on a regular basis. 9. Asking your data provider these questions is necessary, you do not want 20-year-old information.
Hardware	
The Resource Centre will not make equipment recommendations, but instead will assist you in determining what hardware will work best for you. The data layers, the scanned maps, the software application and the digital map projects need to be on a very capable computer system. Acquiring a comparable computer will require extensive research, an annual maintenance plan and good backup system or network.	
Questions before purchasing GIS Hardware	1. What type of CPU or processor is needed? _____ _____ _____ 2. What graphics card is needed? _____

3. What type of Monitor or should there be 2?

4. How much hard drive space is required?

5. Is Wi-Fi or an internet connection advisable?

6. Will we need large printouts of our maps?

7. Will there be ground truthing or capturing nonexistent information required?

8. What other office equipment will be required?

9. Will we be doing aerial capture of our lands for forestry/agriculture?

Suggestions for types of Hardware	1. Most GIS software lists the computer requirements needed. 2. Most 2D mapping software does not require high-end graphic ability. 3D imaging will require a graphics card with a quick refresh rate. 3. Monitors come in various sizes, different refresh rates and resolutions, extensive research for one that suits the end user. 4. SSD or Hard drive space will need to be large enough to hold large amounts of data, images and the mapping software. 1 terabyte is suggested for a startup GIS office. 5. An internet connection is strongly recommended for downloading data and software upgrades that are mostly available online. 6. If yes, you will need a plotter or have your final product plotted elsewhere. 7. If yes, you will need a Global Positioning System (GPS) 8. You may need a large map file holder, a filing cabinet, a desk, office chair, printer, and other office paraphernalia. 9. If yes, you may want to purchase a Camera/Video Drone with GPS capabilities.
GIS Software	
The Resource Centre will not make software recommendations, but instead will assist you in choosing the right system for your community's needs. Depending on your GIS needs assessment, if you've identified that mapping software would assist with Lands and Heritage management, you have your software search criteria.	
Questions to consider for GIS Software	1. Will we need georeferencing capabilities? _____ _____ _____ 2. Will we be editing and updating our information often? _____

	_____ _____ 3. Will we need access to external databases and have the capability to convert to mapping layers? _____ _____ _____ 4. Will we need to show slope, elevations and aspect of our region? _____ _____ _____ 5. Will we be designing our own routes or terrain modelling? E.g. river/terrain erosion. _____ _____ _____ 6. Will we be analyzing the layers for Fish and Wildlife studies for example? _____ _____ _____
Suggestions for selecting appropriate software.	1. Hard copy inventory will assist in answering this. 2. For editing graphics and table information, Google Earth will NOT suffice. Any open source mapping software has editing capabilities. 3. This action is called DB connection or Table Join, this should be part of your criteria search. 4. Then your software will need to have some 3D capabilities to show heights of land. 5. Spatial Data requires a specific software for analysis.

	6. Spatial Data requires a specific software for analysis.

Applications of GIS

Once you've Identified the data to be mapped, the decision on how to apply your GIS will be determined by the community's responses to the following questions. The link below covers many applications many GIS software can perform.
https://gisgeography.com/gis-applications-uses/

From Agricultural mapping, mapping disasters, planning transportation routes, to cultural heritage protection, these types of applications depends on the results of your GIS Needs assessment. The following questions are only a start to determining how your GIS will be applied.

How will we be using our GIS?

1. Have we adopted a Land Use Plan?

_____

_____

_____

2. Do we have an Environmental Management Plan?

_____

_____

_____

3. Are there agricultural activities on our reserve?

_____

_____

_____

4. Do we have an Archaeological Department or Archaeologist?

_____

_____

_____

5. Do we need maps to show Evidence of Title? Licenses? Or Leased Land?

_____

_____

_____

6. Do we need an emergency plan for our community?

_____

	_____ _____ 7. Do we have lands that are in the flood zone?
Suggestions for the Application of your GIS	1. Use and occupancy information can be used as overlays in Land Use Plan development. 2. Mapped Layers such as agricultural use, gravel sites, back yard mechanics and dumping sites are key initial components of an EMP. 3. Any farming or cattle grazing areas captured with GIS can be another component in the LUP and EMP. 4. This professional could use maps to help assist in the protection of sacred sites, cultural and heritage areas 5. Lands Managers can use GIS to show all search results from the First Nations Lands Registry System. 6. Community safety is a priority, informative maps showing muster locations and emergency routes, could be usefully displayed at public locations. 7. Elevations along with seasonal high-water marks for lakes and rivers, could be used to determine the probable flood zones of your community.

Leeanna Rhodes
GIS Specialist
Cell: (778) 687-1533
Email: leeanna.rhodes@labrc.com