Town of Lakeshore
GIS Implementation Plan

November 17, 2006

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1. GIS IMPLEMENTATION PLAN OVERVIEW

The following GIS Implementation Plan is based on the approved recommendations of the GIS Strategic Plan. This Implementation Plan organizes and prioritizes the recommendations of the Strategic plan based on logical relationships between technology, resources, information and documentation, considering the Town's needs and budget over a period of five years.

This Plan consists of:

- This Microsoft Word document describes the recommended scope and tasks related to implementing each deliverable, which forms the basis of the estimated effort and costs; and,
- A Microsoft Project Gantt chart identifying the timelines, estimated days of effort, costs, and recommended resources.

The costs identified in this Plan are broken into the following four categories:

- Software Costs - The estimated "off-the-shelf" cost to purchase a software solution. This estimate does not include customizing, maintenance, installation or training
- Consulting Costs – The estimated cost for consulting services related to those services not typically performed by internal staff due to the unique skills required to complete the deliverable or task.
- Data Creation Costs – Data creation, enhancement and integration effort can be performed by internal resources or contracted out. The effort to complete data creation has been included in the "Days Effort" should the Town choose to create any given dataset internally. Outsourcing data creation enables the Town to draw on the skills, best practices and technology to complete the deliverable. Outsourcing enables staff to focus on working with business units to implement business data maintenance and quality assurance procedures.
- Other Costs – Other costs include the cost for additional internal resources.

The total estimated costs to implement the recommendations of the GIS Strategic Plan over a period of five years are as follows:

Software	Consulting	Data Creation	Other	Total
$40,000	$450,000	$380,000	$50,000	$920,000

The costs and days effort identified in this Plan are high end estimates for budgeting purposes. It is anticipated that a competitive bidding process will result in lower costs. Based on a five year implementation schedule, the estimated yearly budget would be $184,000.

It is recommended that a committee be struck to determine the budget responsibilities related to each deliverable. For example, the cost to acquire a Digital Elevation Model should be funded at a corporate level as opposed to being paid for by an individual department, such as Planning. Other costs, such as Software and Consulting related to implementing a development tracking solution would be drawn from the Planning budget.

The estimated days of effort to implement the deliverables of the project, totalling 1640 days, includes all effort with the exception of Consulting services. The figure is a high end estimate and does not include efforts the Town may have already completed. The estimates are based on i*PLAN*corp's past experience, methodologies and standards.

The Duration associated with each deliverable is based on i*PLAN*corp's experience implementing projects of similar size and complexity and considers the anticipated timelines required to secure approvals, change business processes and implement new technology in a municipal environment.

2. BUDGET AND RESOURCE SUMMARY

The cost to implement the recommendations of this Plan as well as the long-term cost of maintaining a GIS environment will require the coordination of departmental budgets based on the beneficiary of the deliverables. To this end, this section provides a summary of the costs and effort associated to each recommendation as well as a recommended cost breakdown between Corporate Services, Engineering and Infrastructure Services and Finance and Performance Services.

The Project Summary Table on the following page identifies the Software, Consulting, Data Creation and other Costs, as well as Days Effort associated to implementing each recommendation.

Project Summary Table

Section	Recommendation Description	Software Cost	Consulting Cost	Data Creation Cost	Other Costs	Total Costs	Days Effort
	Town of Lakeshore Enterprise GIS Implementation	**$80,000**	**$450,000**	**$380,000**	**$50,000**	**$920,000**	**1640**
3.1	**County of Essex**	**$0**	**$0**	**$0**	**$0**	**$0**	**40**
3.2	**Senior GIS Analyst**	**$0**	**$0**	**$0**	**$50,000**	**$50,000**	**10**
3.3	**Training**	**$0**	**$18,000**	**$0**	**$0**	**$18,000**	**110**
3.3.a	Senior GIS Analyst	$0	$6,000	$0	$0	$6,000	30
3.3.b	GIS Technologist	$0	$12,000	$0	$0	$12,000	30
3.3.c	Staff	$0	$0	$0	$0	$0	50
3.4.	**GIS Data Warehouse**	**$0**	**$0**	**$0**	**$0**	**$0**	**20**
3.5.	**Network Communications**	**$0**	**$0**	**$0**	**$0**	**$0**	**15**
3.13.	**GIS Operations Manual**	**$0**	**$0**	**$0**	**$0**	**$0**	**75**
3.12.	Job Descriptions	$0	$0	$0	$0	$0	15
3.14.	Standards, Maintenance Procedures and Metadata	$0	$0	$0	$0	$0	40
3.15.	Disclaimer	$0	$0	$0	$0	$0	10
3.16.	GIS Documentation Library	$0	$0	$0	$0	$0	10
3.17.	**Strategic Partnerships**	**$0**	**$0**	**$0**	**$0**	**$0**	**30**
3.18.	**Computers**	**$0**	**$0**	**$0**	**$0**	**$0**	**10**
3.10.	**Addressing**	**$0**	**$10,000**	**$20,000**	**$0**	**$30,000**	**50**
	Develop Policies and Implementation Strategy	$0	$10,000	$0	$0	$10,000	10
	Capture Address Datasets	$0	$0	$0	$0	$0	40
	Address Points	$0	$0	$10,000	$0	$10,000	20
	Road Centreline	$0	$0	$10,000	$0	$10,000	20
3.8.	**Web-Based Address Point Management Tool**	**$0**	**$6,000**	**$0**	**$0**	**$6,000**	**30**
3.6.	**Asset Management System**	**$0**	**$160,000**	**$220,000**	**$0**	**$380,000**	**560**
	Determine business needs and workflow, customize application	$0	$80,000	$0	$0	$80,000	40
	Capture Asset Datasets	$0	$0	$220,000	$0	$220,000	400
	Storm Sewers	$0	$0	$0	$0	$0	40
	Storm Water Ponds	$0	$0	$0	$0	$0	20
	Storm Water Pumps	$0	$0	$0	$0	$0	20
	Watermains *	$0	$0	$0	$0	$0	40
	Catch Basins	$0	$0	$0	$0	$0	20
	Curb Stop Valves	$0	$0	$0	$0	$0	20
	Consultant	$0	$0	$0	$0	$0	0
	Manholes	$0	$0	$0	$0	$0	20
	Sanitary Pumps	$0	$0	$0	$0	$0	20
	Sanitary Sewers	$0	$0	$0	$0	$0	40
	Water Towers	$0	$0	$0	$0	$0	20
	Water Metre Routes	$0	$0	$0	$0	$0	10
	Drainage Areas	$0	$0	$0	$0	$0	10
	Sidewalks	$0	$0	$0	$0	$0	20
	Roadside Drainage	$0	$0	$0	$0	$0	10
	Road Patrol Routes	$0	$0	$0	$0	$0	10
	Roads Maintenance Activities	$0	$0	$0	$0	$0	20
	Municipal Facilities	$0	$0	$0	$0	$0	40
	Park Assets	$0	$0	$0	$0	$0	10
	Private Drain Connections	$0	$0	$0	$0	$0	10
	Implement business processes	$0	$80,000	$0	$0	$80,000	120
3.21.	**Land Development Tracking System**	**$40,000**	**$160,000**	**$80,000**	**$0**	**$280,000**	**400**
	Define business needs and secure application	$40,000	$80,000	$0	$0	$120,000	40
	Capture Development Activity Datasets	$0	$0	$80,000	$0	$80,000	240
	Survey Documents (scanned T-Plans, M-Plans, and R-Plans)	$0	$0	$0	$0	$0	20
	Plans of Subdivision	$0	$0	$0	$0	$0	30
	Development Activity	$0	$0	$0	$0	$0	40
	Development Agreements	$0	$0	$0	$0	$0	10
	Site Plan Agreements	$0	$0	$0	$0	$0	10
	Minor Variances	$0	$0	$0	$0	$0	20
	Land Use Regulations	$0	$0	$0	$0	$0	20
	Zoning	$0	$0	$0	$0	$0	20
	Easements	$0	$0	$0	$0	$0	20
	Building Permits	$0	$0	$0	$0	$0	20
	By-Law Amendments	$0	$0	$0	$0	$0	20
	Census Data	$0	$0	$0	$0	$0	5
	Demographic Data	$0	$0	$0	$0	$0	5
	Implement application and business processes	$0	$80,000	$0	$0	$80,000	120
3.7.	**Web-Mapping Solution**	**$0**	**$6,000**	**$0**	**$0**	**$6,000**	**20**
3.9.	**Web-Based Public Access Solution**	**$0**	**$0**	**$0**	**$0**	**$0**	**20**
3.11.	**Create/Enhance GIS Datasets**	**$0**	**$70,000**	**$60,000**	**$0**	**$130,000**	**190**
	Foundation Dataset - Orthographic Photography	$0	$0	$0	$0	$0	10
	Foundation Dataset - Digital Elevation Model	$0	$0	$0	$0	$0	10
	High Priority Dataset - Fire Incident Reports	$0	$0	$0	$0	$0	10
	High Priority Dataset - Points of Interest	$0	$0	$0	$0	$0	10
	High Priority Dataset - Police Incident Reports	$0	$0	$0	$0	$0	10
	Long Term Dataset - Utilities (Hydro, Gas)	$0	$0	$0	$0	$0	0
	Long Term Dataset - Aquifers	$0	$0	$0	$0	$0	20
	Long Term Dataset - Building Floor Plans / Footprints	$0	$0	$0	$0	$0	40
	Long Term Dataset - Bus Routes	$0	$0	$0	$0	$0	5
	Long Term Dataset - Business Improvement Area Boundary	$0	$0	$0	$0	$0	5
	Long Term Dataset - Conservation Authority Boundaries	$0	$0	$0	$0	$0	5
	Long Term Dataset - Environmental Assessment Processes	$0	$0	$0	$0	$0	5
	Long Term Dataset - Parking Lots	$0	$0	$0	$0	$0	5
	Long Term Dataset - Recreation	$0	$0	$0	$0	$0	5
	Long Term Dataset - Railways	$0	$0	$0	$0	$0	5
	Long Term Dataset - Schools	$0	$0	$0	$0	$0	5
	Long Term Dataset - Soils	$0	$0	$0	$0	$0	10
	Long Term Dataset - Trails	$0	$0	$0	$0	$0	10
	Long Term Dataset - Voters List	$0	$0	$0	$0	$0	0
	Long Term Dataset - Waterways	$0	$0	$0	$0	$0	20
3.20.	**AVL**	**$0**	**$10,000**	**$0**	**$0**	**$10,000**	**20**
3.19.	**Document Management Solution**	**$0**	**$10,000**	**$0**	**$0**	**$10,000**	**40**

The Five Year Budget Forecast Table below breaks down the budget needs and days of effort to implement each of the recommendations of this plan over a period of five years.

Five Year Budget Forecast Table

Sec.	Recommendation	2007		2008		2009		2010		2011		Costs	Effort
3.1.	County of Essex		20		5		5		5		5		40
3.2.	Senior GIS Analyst	$50,000	10								10	$50,000	20
3.3.	Training	$3,600	30	$3,600	20	$3,600	20	$3,600	20	$3,600	20	$18,000	110
3.4.	GIS Data Warehouse		20										20
3.5.	Network Communications		15										15
3.13.	GIS Operations Manual		25		20		10		10		10		75
3.17.	Strategic Partnerships		10		5		5		5		5		30
3.18.	Computers		10										10
3.10.	Addressing	$30,000	50									$30,000	50
3.8.	Address Point Management Tool			$6,000	30							$6,000	30
3.6.	Asset Management System	$140,000	140	$160,000	300	$80,000	120					$380,000	560
3.21.	Land Development Tracking System					$120,000	40	$160,000	360			$280,000	400
3.7.	Web-Mapping Solution	$6,000	20									$6,000	20
3.9.	Web-Based Public Access Solution		20										20
3.11.	Create/Enhance GIS Datasets							$30,000	30	$100,000	150	$130,000	180
3.20.	AVL									$10,000	20	$10,000	20
3.19.	Document Management Solution									$10,000	40	$10,000	40
		$229,600	**370**	**$169,600**	**380**	**$203,600**	**200**	**$193,600**	**430**	**$123,600**	**260**	**$920,000**	**1,640**

It is recommended that the costs related to implementing Asset Management System (3.6.) and Land Development Tracking System (3.21.) should be paid by the respective departments responsible for the business activities associated to the deliverable.

The Information Technology (IT) department within Corporate Services should be responsible for providing the technical support and resources related to implementing the deliverables of this Plan. In the case of implementing the Asset Management System, Engineering and Infrastructure Services as well as Finance and Performance Services should be responsible for the estimated cost of $380,000. In the case of implementing the Land Development Tracking System, Community and Development Services should be responsible for the estimated cost of $280,000. In both cases the cost to implement each recommendation can be reduced based on the number of days of effort (resources) IT can provide to the project. Based on this budget breakdown, Corporate Service will be responsible for $260,000 out of the $920,000 for five year project.

3. SUMMARY OF DELIVERABLES

The following is a summary of the considerations the Town should take into account when implementing each deliverable, such as scope, terms of reference, methodology and standards.

3.1.1. County of Essex

Recommendation	Cost	Days Effort	Start	Finish
3.1		40	Q2-2007	Q2-2007

The working relationship between the Town and the County of Essex should be communicated to and receive the support of Council to ensure the success and longevity of the relationship.

Establishing the relationship with the County should begin with an agreement by both parties to a vision and engagement procedures, which would include identifying the terms of reference for those responsible for establishing and maintaining the relationship.

Agreements with the County should be in place prior to implementing the Asset Management System.

3.1.2. Senior GIS Analyst

Recommendation	Cost	Days Effort	Start	Finish
3.2	$50,000	10	Q2-2007	Q2-2007

The estimated cost associated with filling the Senior GIS Analyst position is based on an anticipated salary for the first year in which the position is filled. The estimated Days Effort represents the effort to advertise and interview candidates.

3.1.3. Training

Senior GIS Analyst

Recommendation	Cost	Days Effort	Start	Finish
3.3	$6,000	30	Q2-2007	Q2-2011

Senior GIS Analyst training is scheduled at the beginning of each year prior to GIS Technologist training. Senior GIS Analyst training should focus on the business use and management of GIS technology as opposed to the use of applications.

GIS Technologist

Recommendation	Cost	Days Effort	Start	Finish
3.3	$12,000	30	Q2-2007	Q2-2011

GIS Technologist training is scheduled at the beginning of each year after the Senior GIS Analyst training and before delivering staff training. The estimated

cost and effort represents that total cost and effort over the five years of the project implementation.

Staff

Recommendation	Cost	Days Effort	Start	Finish
3.3		50	Q2-2007	Q2-2011

Staff training is not only essential to the implementation of the recommended deliverables, but more importantly to the long-term integration of GIS technology in department business activities.

The estimated effort for Staff training includes yearly preparation and delivery of workshops and/or training sessions by GIS staff as well as department staff time.

3.1.4. GIS Data Warehouse

Recommendation	Cost	Days Effort	Start	Finish
3.4		20	Q3-2007	Q3-2007

Days Effort associated with implementing the GIS Data Warehouse is technical in nature and does not include the effort of establishing a relationship with the County or implementing the Asset Management System.

3.1.5. Network Communications

Recommendation	Cost	Days Effort	Start	Finish
3.5		15	Q2-2007	Q2-2007

The estimated Days Effort to implement Network Communications is dependant on the complexity of technical and relationship issues and could be greater than the estimated amount.

3.1.6. GIS Operations Manual

Recommendation	Cost	Days Effort	Start	Finish
3.13		75	Q3-2007	Q2-2009

Implementing the GIS Operations Manual includes completing the following deliverables:

- Job Descriptions – Recommendation 3.12
- Standards, Maintenance Procedures and Metadata – Recommendation 3.14
- Disclaimer – Recommendation 3.15
- GIS Documentation Library – Recommendation 3.16

The effort associated with developing the GIS Operations Manual consists of establishing the structure, policies and procedures for maintaining the Manual. The Manual must be developed and maintained in coordination with business units and as an integral part of the implementation of each deliverable. The Operations manual must be updated as datasets are created, enhanced or acquired from other sources

3.1.7. Strategic Partnerships

Recommendation	Cost	Days Effort	Start	Finish
3.17		30	Q2-2007	Q3-2011

Forming Strategic Partnerships requires the creation of a vision based on a thorough understanding of the Town's policies. Resources responsible for forming strategic partnerships must have the authority to bring agreements with external agencies to Council.

While forming and maintaining Strategic Partnerships is an ongoing effort; the Days Effort identified in this Plan represents the initial effort to create the policies and form relationships as recommended in the Strategic Plan.

3.1.8. Computers

Recommendation	Cost	Days Effort	Start	Finish
3.18		10	Q4-2007	Q2-2007

Installation of the recommended Computers should coincide with the implementation of the Asset Management System. The Days Effort represents the effort to secure quotes and install each Computer.

3.1.9. Addressing

Recommendation	Cost	Days Effort	Start	Finish
3.10	$30,000	50	Q2-2007	Q4-2007

Town addressing policies should be created and passed by Council prior to implementing the Addressing recommendation. Consulting costs associated with Addressing includes $10,000 for developing and implementing address point policies and $20,000 for Address Point data creation, enhancement and integration cost.

Enhancement of the Road Centreline dataset, identified as a deliverable of the Asset Management System, as well as the implementation of the Web Based Address Point Management Tool should be considered when implementing the Address Point Dataset deliverables.

3.1.10. Web-Based Address Point Management Tool

Recommendation	Cost	Days Effort	Start	Finish
3.8	$6,000	30	Q1-2008	Q1-2008

The estimated Consulting costs to implement Web Based Address Point Management Tool is based on GeoCortex Per-Diem rates determine through past proposals provided to the Town factored by the estimated effort to develop the tool.

The Days Effort represents the estimated effort to determine workflow and implement the tool, which includes training.

3.1.11. Asset Management System

Recommendation	Cost	Days Effort	Start	Finish
3.6	$380,000	560	Q2-2007	Q1-2009

The costs associated with implementing the Asset Management System consists of three components. Each component will proceed concurrently as the project is implemented.

1. The first component consists of securing a consultant to assist in identifying specific asset management business needs and workflows, and developing a detailed implementation plan. The Consultant will also assist with data model design, considering operational and financial accounting business needs meeting PSAB financial accounting requirements, standards, quality assurance procedures and performance measures. The estimated Consulting cost to implement the first component is $80,000.

2. The second component of the project consists of data capture, enhancement and integration. Asset related datasets have been grouped in the Implementation Plan based on the similarity between data standards and the methodology in which the data would be contracted out and captured.

   For example, information captured from as-built plan and profile engineering drawings would be completed as a group, such as storm sewers, storm water pumps, watermains, curb stop values, private drain connections, catch basins, manholes, sanitary pumps, sanitary pumps and sewers.

   The suggested methodology for capturing this data would include, positioning scanned as-built engineering drawings relative to parcel fabric and orthographic imagery, creating a world file, capturing spatial features and related attribute information. Data capture effort would include capturing financial information.

   Administrative datasets, which includes Water Meter Routes, Drainage Areas, Road Maintenance Activities and Road Patrol Routes would be created based on administrative policies. Water Meter and Road Patrol Routes can be created by feature coding the Road Centre Line dataset.

   Other datasets related to Asset Management includes Water Towers, Sidewalks, Roadside Drainage and Municipal Facilities.

   Municipal Facilities and Park Asset information includes scanning architectural, engineering, survey drawings and site plans, and linking that information to building footprints. This effort would also include capturing information related to buildings, such as area, floor space use, leases, year built, as well as details related to past and future construction.

   The estimated $220,000 cost to capture asset information is dependant on the amount of information the City determines would be Contracted out as apposed to completed internally.

3. The third component consists of a cost of $80,000 to cover project management, application customization, maintenance procedures and training.

3.1.12. Land Development Tracking System

Recommendation	Cost	Days Effort	Start	Finish
3.21	$280,000	560	Q4-2008	Q4-2010

The implementation of the Land Development Tracking System consists of three components.

1. The first component consists of securing a consultant to assist in identifying specific development tracking business needs and workflows, and develop a detailed implementation plan. The Consultant will also assist in securing the desired software solution, data model design, standards, quality assurance procedures and performance measures. The estimated Consulting cost to implement the first component is $80,000 plus the cost of licensing "off-the-shelf" software, $40,000.

2. The second component of the project consists of data capture, enhancement and integration. Planning and development related datasets have been grouped in the Implementation Plan based on the similarity between data standards and the methodology in which the data would be contracted out and captured.

   Datasets includes:
   - Survey Documents (scanned T-Plans, M-Plans, and R-Plans)
   - Plans of Subdivision
   - Development Activity
   - Development Agreements
   - Site Plan Agreements
   - Minor Variances
   - Land Use Regulations
   - Zoning
   - Easements
   - Building Permits
   - By-Law Amendments
   - Census Data
   - Demographic Data

   Official Plan and Zoning data require the creation of a point in time dataset, which will represent the by-law passed by Council, as well as a maintained dataset which will depict amendments as applied for and approved. Detailed cartographic standards must consider hard copy colour and black and white printing, as well as on screen viewing.

   The estimated $80,000 cost to create these datasets is dependant on the amount of information the City determines would be Contracted out as apposed to completed internally.

3. The third component consists of $80,000 Contracting costs related to project management, application customization, maintenance procedures and training.

3.1.13. Web-Mapping Solution

Recommendation	Cost	Days Effort	Start	Finish
3.7	$6,000	20	Q2-2007	Q2-2007

The Days Effort associated with implementing the Web-Mapping Solution consists of working with the County to resolve configuration issues and enhance the GeoCortex web-mapping solution, as well as working with other stakeholder, such as the Ontario Provincial Police.

The Cost represents an estimated amount to GeoCortex for further application enhancement. This cost is dependant on the needs of other stakeholders and would logically be paid for by the stakeholder.

3.1.14. Web-Based Public Access Solution

Recommendation	Cost	Days Effort	Start	Finish
3.9		20	Q2-2007	Q2-2007

While the public has been given access to a web-based GIS solution, the associated effort related to this deliverable consists of enhancing the data content and functionality of the existing solution.

3.1.15. Create/Enhance GIS Datasets

Recommendation	Cost	Days Effort	Start	Finish
3.10	$130,000	190	Q2-2007	Q3-2011

Data creation and enhancement effort includes:
Foundation Datasets

- Orthographic Photography
- Digital Elevation Model (DEM) Q2-2007

Working with the County, the Town can obtain the DEM for an estimated cost of $70,000. This estimate was calculated based on proportional Cost of acquiring DEM for the entire County $225,000 divided by the area of the Town.

High Priority Datasets

- Fire Incident Reports
- Points of Interest
- Police Incident Reports

Long Term Datasets

- Utilities (Hydro, Gas)
- Aquifers
- Building Floor Plans / Footprints
- Bus Routes
- Business Improvement Area Boundary
- Conservation Authority Boundaries

- Environmental Assessment Processes
- Parking Lots
- Recreation
- Railways
- Schools
- Soils
- Trails
- Waterways

Datasets such as Bus Routes, Recreation and Schools can be created by feature coding individual parcels or road line segments. Datasets such as Waterways, Utilities and Aquifers can be obtained from or created in partnership with other agencies.

Opportunities should be considered to create and enhance the datasets identified above while completing the other deliverables identified in this Plan, such as capturing Utility and Building Floor Plans / Footprints information as part of the Asset Management System.

3.1.16. AVL

Recommendation	Cost	Days Effort	Start	Finish
3.20	$10,000	20	Q2-2010	Q3-2010

Integrating the Town's datasets into the existing AVL solution may result in Costs incurred to have Grey Island integrate the Town's data.

3.1.17. Document Management Solution

Recommendation	Cost	Days Effort	Start	Finish
3.19	$10,000	40	Q2-2008	Q3-2008

The estimated Cost and Days Effort is subject to the capabilities of Laserfiche and effort to develop storage and query structure to manage image files, such as scanned survey documents.