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Portfolio

t o t t e n s i m s h u b i c k i a s s o c i a t e s

Our clients operate in an ever-changing world, and for over 40 years, TSH has been assisting clients to proactively meet these challenges. As Public Sector Accounting Board (PSAB) Regulation 3150 comes into effect, TSH has been working to help many clients prepare for this significant change to municipal accounting.

PSAB has been the authoritative accounting body for municipalities since 2000. Until Regulation 3150 was introduced, only minor changes had been made to the accounting standards. Regulation 3150 requires municipalities change from a modified accrual approach to a full accrual accounting approach. Previously, transactions that were not accrued in municipal accounting ledgers were the costs associated with purchasing, constructing, or improving tangible capital assets. Tangible capital assets include any asset a municipality owns that has an expected life greater than one accounting period such as roadways, water systems, wastewater systems, facilities, land, and equipment.

Municipalities continue to face the challenge of how to effectively manage a growing portfolio of aging assets with limited budgets

Under Regulation 3150, municipalities are required to capitalize tangible capital assets so an inventory of owned assets is required. Municipal financial statements will reflect how much capital spending has been put into tangible assets in the past, and how much of that asset base has been amortized. Municipalities will be able to use this inventory data to project capital asset conditions, improvements, and replacements.

Compliance with PSAB requires the early identification of information required and a plan to acquire and maintain it. Quality data that is universally accessible is a critical component of asset management, however, simply collecting and managing data is not enough. Data must be systematically analyzed to produce information that can support a broad range of management decisions as well as meeting the reporting requirements of PSAB.

Municipalities continue to face the challenge of how to effectively manage a growing portfolio of aging assets with limited budgets. TSH has a wide range of asset management services available to assist municipalities with the inventory, assessment, and valuation of their assets for PSAB 3150.

CITY OF KAWARTHA LAKES –
LIFECYCLE AND CAPITAL BUDGET PLAN FOR ROADS AND RELATED SERVICES

Together with Watson and Associates Ltd., TSH provided the City of Kawartha Lakes with a capital budget and life cycle plan to assist them in developing a funding program to sustain their road network of approximately 2,800 km.

The municipality had used its "roads specific" funding from the Province for downloaded highways as well as the funds provided for the creation of the City in 2001. The Engineering and Public Works staff recognized the current funding level was insufficient and foresaw that additional spending would be required in order to maintain the municipal roads and bridges at acceptable levels.

Kawartha Lakes looked to TSH and Watson to develop system condition scenarios based on different funding levels for various activities and to develop short, medium and long-term plans for the life cycle replacement of components of their road infrastructure. This was an exciting opportunity for TSH.

Kawartha Lakes is an important client, so working with them on this project was welcomed. TSH had performed regular updates to Kawartha's road and bridge condition data. This project was also the ideal opportunity for TSH to use Deighton Associates Ltd's asset management software, dTIMS CT, as a licensed provider. Deighton's software uses information for cost, maintenance, current condition, construction history, deterioration and depreciation information to model and optimize the maintenance and rehabilitation priorities for municipal assets. There were a number of scenarios generated to assess the impacts of status quo funding as well as maintaining or improving the overall adequacy of the road network.

From the scenarios generated, a preferred solution was identified by Kawartha Lakes staff and Watson and Associates were able to advise Kawartha Lakes on funding sources and financing options, taxation impacts of plans, and the possible need for lifecycle reserves.

CITY OF KAWARTHA LAKES
PSAB INVENTORY AND DATABASE OF WATER AND WASTEWATER INFRASTRUCTURE

In order to effectively manage infrastructure assets, each asset's life must be accurately predicted. TSH worked with the City of Kawartha Lakes to accurately evaluate and predict the depreciation of their water and wastewater assets, develop an inventory of these assets and calculate lifecycle costing.

Over 55 water treatment plants, wastewater treatment plants, water pumping stations, and sewage lagoons throughout the area were analyzed. An equipment inventory was developed through a review of historical data sources and some site visits to confirm equipment. Replacement costs of the major process equipment, each of the facilities, yard piping, architectural features, concrete, and the electrical and mechanical HVAC systems were established through a variety of methods.

The expected life value was determined through a review of installation dates, typical life expectancies and industry standards. Depreciation rates were then established for the assets' remaining life.

Based upon a review of the water and wastewater systems within the City of Kawartha Lakes, an inventory database was developed that complied with PSAB requirements. The asset database includes a listing of assets, date of installation, expected life and current replacement cost.

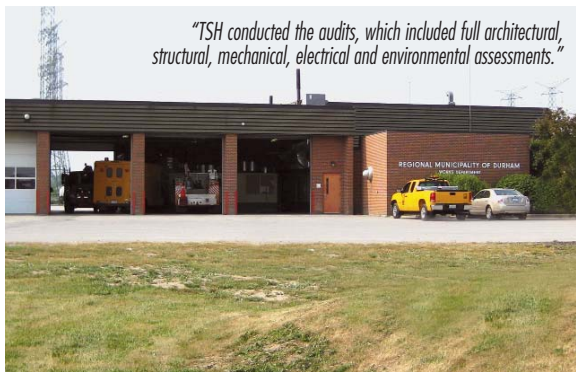
This inventory will allow the City to satisfy their requirements under PSAB, and to efficiently manage their water and wastewater infrastructure.

DURHAM REGION FACILITIES AUDIT

To address current needs and prepare for the future of their communities, the Regional Municipality of Durham retained TSH to undertake detailed facilities audits of public works depots in Scugog, Ajax, and Whitby/Oshawa. When combined with audits previously completed for Sunderland and Orono, Durham would have valuable information to help them plan for their immediate needs as well as developing a strategic plan for the longer term.

TSH conducted the audits, which included full architectural, structural, mechanical, electrical and environmental assessments. Assistance was enlisted from specialist sub-consultants who have expertise in specific areas of facility auditing.

In addition to the facility condition audits, a key objective of this project was to use this information to help optimize activities and operations. Establishing the current capacity and future requirements were necessary to gain a true picture of the adequacy of the existing depots. Benchmarking using other similar-sized comparators is being undertaken to assist in the development of policies addressing service standards at depots.



"TSH conducted the audits, which included full architectural, structural, mechanical, electrical and environmental assessments."

A life cycle investment analysis for each facility is being developed for major repairs. From this analysis and the forecasted needs, Durham can make an informed decision whether a facility should be renovated, expanded, or replaced in its entirety. The project is expected to be completed in early 2008.

COBOURG – WASTEWATER RATE ASSESSMENT

In 2003, the Town of Cobourg completed a Full Cost Recovery analysis for their water and wastewater systems. This analysis formed part of an update to water and wastewater rates and billing. TSH completed the original analysis and recently completed an update to the water and wastewater infrastructure condition, expected life and future replacement costs.

As part of these studies, background information including existing and future population figures, water consumption rates, wastewater generation, land use, billing information and operating budgets, future capital needs/plans, and long term liabilities, was collected.

An assessment of the water and wastewater systems was prepared so that life expectancy for each infrastructure component could be developed. Life expectancy is based on several factors including existing condition, CCTV work, installation dates, industry standards, review of watermain break frequency and potential future upgrade requirements. Replacement costs were also determined.

Based upon this assessment of the water and wastewater systems, a capital replacement /expansion schedule was developed. This schedule was prepared for a 20 year time frame in a format that could be easily updated every five years. This Asset Management System will allow Cobourg to comply with full cost accounting principles and ensures that their rate of wastewater billing reflects the true cost of providing these services.

CLARINGTON INFRASTRUCTURE INVENTORY

Like many municipalities, the Municipality of Clarington faces the challenge of allocating a limited budget to effectively manage a growing portfolio of aging assets. Clarington recognized that universal access to accurate information is a critical component in the infrastructure management process, and that this process incorporates a wide variety of individuals, business processes and software tools.

In response, Clarington retained TSH to assist in implementing a system that would allow all infrastructure inventory and condition data to be stored in a single standardized location. TSH consolidated all infrastructure data using an SQL Server-based "data warehouse," which was designed using the Municipal Infrastructure Data Standard (MIDS) and adapted to meet the Municipality's specific needs. A data management interface and Clarington's ESRI-based enterprise GIS were both closely integrated with the data warehouse to provide Clarington staff with the ability to quickly access, update and visualize infrastructure data.

With the data management system in place TSH worked in partnership with Deighton Associates to undertake a refinement of the Municipality's Pavement Management System (PMS). Built using Deighton's dTIMS CT software, the PMS integrates with the data warehouse to analyze multiple maintenance, rehabilitation and replacement scenarios for each asset. Through a life-cycle cost/benefit evaluation, alternative projects are then selected resulting in an objectively prioritized list of projects that optimizes the overall investment in the pavement network. Reflecting Clarington's current data collection practices and asset management policies, the refined PMS is used extensively by Clarington staff to assist in the development of short and long-term pavement management plans.

The new system integrates a variety of software packages around a central data warehouse so that Clarington staff have a variety of dependable tools to address all stages of the asset management cycle, from data collection through analysis and the development of prioritized management plans. Through an annual inspection program, TSH continues to provide Clarington with current condition data. TSH also contributes to the ongoing refinement of the PMS model.

CITY OF VAUGHAN MUNICIPAL STRUCTURES INVENTORY AND ASSESSMENT

The City of Vaughan has a pro-active infrastructure management group. One of its goals in 2006 was to create an analysis model using their asset management software, dTIMS CT, and their biennial bridge and culvert inspection data. To achieve this, Vaughan retained the services of a joint venture of TSH, Engineered Management Systems Inc. (EMS), and Deighton Associates Limited. TSH was Vaughan's prime contact for overall administration and management of the project.

The main goal of this project was to develop a Municipal Structure Management System (MSMS) for Vaughan's bridges and culverts. The objective of the MSMS is to lead the implementation of proactive and effective management practices for the bridges and culverts. The analysis model using dTIMS CT allows the creation of scenarios that may be used to optimize both the value of the assets and the overall infrastructure management and repairs. This ultimately will result in improved services provided to residents.

The key components of the project included:

- All structures with a span greater than 1.2 metres were inspected in accordance with the Ontario Structure Inspection Manual (OSIM);
- Vaughan's own dTIMS CT software was used to create the MSMS;
- All of the data was organized in accordance with Vaughan's specifications for it to reside in their MIDS compliant database;
- The MSMS was developed to operate in Vaughan's own dTIMS CT software;
- A metadata document was created to provide the technical background for the operation of the MSMS;
- A report was prepared that explains the structures inventory, analysis, findings, and the rationale and principles for this project; and
- The training of Vaughan staff on how to operate the MSMS.


City of Vaughan

In addition to the scope of work, this project was unique because TSH, EMS and Deighton worked as a team to deliver the results. Also, this was the first time a municipal bridge analysis was created for dTIMS CT based on the OSIM methodology.

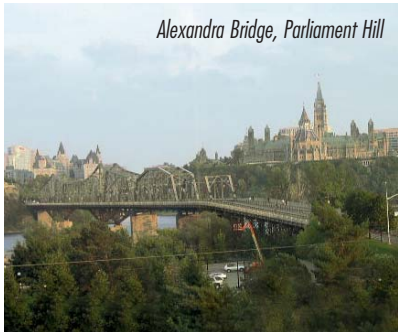
ALEXANDRA BRIDGE, PARLIAMENT HILL

Alexandra Bridge is one of Ottawa's key landmark features, and is one of the Province's most historically significant structures. Built between 1898 and 1901, the bridge spans the Ottawa River from Ottawa to Gatineau. Originally designed to carry trains and trolley cars, the bridge is now an important commuter link, with approximately 15,000 vehicles a day crossing it. The bridge also accommodates pedestrians and cyclists, and forms part of the Trans Canada Trail.

Alexandra Bridge is maintained by the Public Works and Government Services Canada (PWGSC), and they selected TSH to provide professional engineering services for its comprehensive detailed inspection in 2007.

TSH performed the inspection of the structure and approaches in accordance with the PWGSC Bridge Inspection Manual (BIM). The inspection involved the use of a variety of devices, including boats, boom trucks and a below deck inspection vehicle. Following the inspection, TSH made several recommendations to PWGSC. TSH recommended that, in conjunction with the proposed rehabilitation, an annual program to remove delaminated concrete from the underside of the north trestle spans and the exterior curb fascias over the watercourse be initiated, so that potential hazards to the public are minimized.

To extend the life of the bridge, TSH developed a ten-year management plan. The plan recommended that a coating maintenance program be initiated to prolong the service life of the bridge and to minimize steel repairs, and an annual program of pressure washing all below-deck components be implemented. Further recommendations included design improvements that would enhance safety and make future maintenance and inspection easier.



Alexandra Bridge, Parliament Hill

BUILDING CANADA

The complete framework for "Building Canada", specific to Ontario and Alberta, is not yet confirmed, but TSH is eagerly awaiting the details and how this new program will affect our clients. TSH assisted many clients in benefiting from the earlier COMRIF program, and as more details of Building Canada become available, we will actively look for ways to assist clients in making the most of this opportunity.

"BUILDING CANADA: Modern Infrastructure for a Strong Canada"
Source: www.buildingcanada-chantierscanada.gc.ca

BRIDGE INSPECTIONS

Recently, bridge safety has received a lot of attention from the media and has been at the forefront of many municipalities' and governments' agendas. To safeguard the public, infrastructure must be maintained through evaluations and rehabilitations. Bridge inspections are a significant portion of TSH project work, and the company has accumulated a great deal of experience in this important field. Clients have come to rely on our bridge inspection expertise, and TSH has been commissioned for many noteworthy inspections.

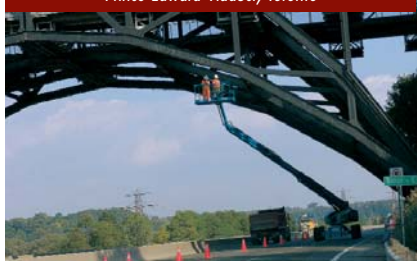
This year, the City of Toronto retained TSH for the inspection and rehabilitation of the Prince Edward Viaduct. This involved a detailed visual inspection, delamination survey and rehabilitation pre-design of the historic viaduct which spans the Don River, Don Valley Parkway and Bayview Avenue.

Following the collapse of a deck truss bridge in Minneapolis, USA, the Ministry of Transportation in Northeastern Ontario retained TSH to perform structural inspections of several bridges in Northeastern Ontario. These inspections were completed within 48 hours, so the Transportation Minister could communicate the results with the public in a timely manner.

"Clients have come to rely on our bridge inspection expertise, and TSH has been commissioned for many noteworthy inspections."

TSH's ability to perform these inspections draws on experience acquired from the completion of over 5,000 inspections for municipalities and the MTO, and involvement in the design and /or rehabilitation of over 1000 structures. Project success depends on TSH's ability to put together a team of individuals who have the experience, breadth of knowledge, and the capability to work well together to deliver results.

Prince Edward Viaduct, Toronto



GO TRANSIT HAGERMAN DIAMOND

RAIL TO RAIL GRADE SEPARATION WILL EASE CONGESTION

The GO Transit Stouffville line is part of a busy commuter network, and carries almost 13,000 passengers each weekday to and from Stouffville and Toronto Union Stations. To improve service, GO Transit wanted to resolve the bottleneck at Hagerman Diamond in Markham. This is where the Stouffville rail line intersects with the busy Canadian National freight corridor, resulting in heavy congestion and delays.

In May 2006, GO Transit awarded the team of Aecon and TSH the $45 Million Design-Build Contract to relieve the congestion. New grade separations will take the GO Transit under the CN rail line and 14th Avenue in Markham. This will eliminate conflict between GO commuter services and CN freight service and 14th Avenue traffic, improve safety and traffic flow, and allow for the future expansion of transit services.

This project includes the design and construction of:

- Two grade separations, one under the CN rail line and one under 14th Avenue to eliminate the current level crossings;

Construction of rail to rail grade separation

Aerial view of work progression

- Construction of over 1 km of complex retaining walls;
- Construction of 2 km of new railway track;
- Design of a railway diversion and 14th Avenue detour;
- Storm sewer pumping station (capacity of 2,500 l/sec);
- Sanitary sewer pumping station;
- Relocation of numerous storm sewers and watermains (typical example: a 1950 mm storm sewer), 250 mm dia sanitary sewer, Bell cables encased in concrete as well as Telus, Rogers and CN fiber optic cables, and relocation of gas lines; and
- Complex shoring (14 m deep) and tunneling (3 m dia).

Building the GO Transit grade separation is complicated as the project involves many aspects of engineering expertise including; Design Management, Subsurface Utility Engineering, Structure Design, Rail Design, Tunneling, Process Engineering, Architectural Design, Highway / Detour Design, Electrical / Mechanical Design, Storm Sewer Management, Utilities, Landscaping, and Quality Assurance. TSH has the expertise that is needed to deal with such a complex project, and was able to successfully complete the detailed design and secure all approvals within an extremely compressed schedule.

YONGE STREET SUE INVESTIGATION

TSH has a long history of working with the City of Toronto, and this relationship has developed into the establishment of a standing offer for TSH/TBE to provide the City with Subsurface Utility Engineering (SUE) services. SUE investigations reliably determine the existence and location of underground utilities.

Recently the City commissioned TSH/TBE to perform a SUE investigation of Yonge Street, from Eglinton Avenue to Lawrence Avenue. The City is installing two new watermains which will run along Yonge Street. To lower construction costs and reduce the risk of potential delays, this investigation was undertaken to identify the location of existing utilities in the area.

Yonge Street, Toronto

One aspect of the investigation was a detailed inventory of the existing storm and sanitary manholes. The City was looking to determine invert elevations, collar height, manhole construction types, and general overall condition. To deliver results efficiently, a specially designed zoom camera was used. Complete details of manhole conditions were captured, and the City was provided with both digital video and still image documentation of the manhole assessment. The information obtained from an investigation like this can be used to assess the current network, and plan for future investments. Using the camera also eliminated the need for TSH/TBE staff to enter a confined space, thereby reducing the potential safety risk.

Yonge Street is a major artery for autos and transit vehicles, and this presented an obvious challenge to the project. Safety is a key concern in all project work, and therefore field personnel receive special training on management of traffic issues.

GREENSMART

DELIVERING THE TRIPLE BOTTOM LINE

TSH has always operated with an acute awareness of the social and physical aspects of our environment. When the company launched Greensmart on Earth Day 2007, it was a natural progression in our efforts to integrate more sustainable approaches into our project work and business practices.

TSH Greensmart is a company-wide initiative to reduce our environmental footprint, and is a forum for sharing ideas among staff at all 11 TSH locations. In the past year, TSH worked on approximately 2,800 projects for 1,650 clients – the scope of our work is impressive, and fostering knowledge through Greensmart will encourage the increased application of sustainable practices.

As part of the Greensmart initiative, Green Captains now represent each branch and major department. These leaders are introducing changes and circulating information among all staff. Highlights of their year's work includes local area clean ups, commuter challenges, organizing recycling and composting facilities, and seasonal tips.

Northumberland County Headquarters

Northumberland County Headquarters Cobourg, Ontario

Cobourg, Ontario

Northumberland County wanted to increase their Headquarters, and they retained TSH to analyze their expansion options. It was decided that a new 40,000 sq ft building be designed and constructed.

Through this project, the County wanted to demonstrate the leadership role that public buildings can play in sustainable design. The Headquarters utilized an integrated design approach that emphasized sustainability.

The development of the geo-thermal system was the primary goal. Heat exchangers transfer the geo-thermal sourced energy to a high volume, low velocity air system featuring heat recovery technology. Heat recovery wheels recycle heat prior to air being exhausted. The lower velocity of air movement reduces drafts, noise and wear on mechanical system components, which in turn reduces operating and maintenance costs. This is combined with a highly efficient resource-conserving envelope. The moderating effect of the surrounding earth also assists in reducing energy demand. Since opening in November 2007, the facility has been heated primarily by recycled energy from occupants, lighting and equipment.

Today, when Clients are choosing which projects to pursue, they are faced with increasing constraints. Budgets are limited, but expectations are not. More often, end-users are insisting that municipal projects be undertaken in a manner that aligns with the triple bottom line, balancing economics with social and environmental goals. TSH Greensmart is ensuring that TSH practitioners remain at the forefront of the development and implementation of sustainable practices.

AWARDS — TSH is proud to share news of these achievements

ASSOCIATION OF CONSULTING ENGINEERS OF CANADA

AWARD: Award of Excellence
PROJECT: Conger Marsh Wastewater Treatment Plant
ROLE: TSH was the Consulting Engineer for the forcemain, wastewater treatment plant and outfall sewer.

TORONTO URBAN DESIGN AWARDS 2007

AWARD: Visions and Master Plans Award of Excellence
PROJECT: Port Lands Estuary
ROLE: TSH is providing the civil, transportation, marine recreation, structural and utility engineering services for the Michael Van Valkenburgh Associates, Inc. team.

Conger Marsh WTP: Endangered species (including the Eastern Hognose Rattler, pictured above) were considered in this winning design.

HIGHWAY 17 –

NEW FOUR LANE HIGHWAY THROUGH GARDEN RIVER FIRST NATIONS' LAND COMPLETE

TSH has completed work on a new four lane highway, Kings Highway 17, which travels through Garden River First Nation, from Sault Ste. Marie to Lower Echo River. This expansion to Ontario's northern highway network is a significant development.

Highway 17

This large-scale project included the construction of 16 km of new mainline highway, 5 side roads, 11 new bridge structures including 8 waterway crossings, 2 overpasses, an underpass, and partial illumination at intersections. The construction was procured in a design/build format and completed by Garden River Constructors, a joint venture between Peter Kewitt and Sons and Garden River Development Corporation. A large proportion of the work force were members of the local First Nation community, and all aggregates for this and the adjacent contracts were supplied from First Nation lands.

This unique project also bought together 4 distinct parties who successfully accommodated political and cultural sensitivities – the Garden River First Nations people, the Ministry of Transportation, Garden River Constructors, and TSH.

Acting as the agent for the Ministry, TSH played a key role in the success of this project. TSH supplied all professional and technical services during the construction phase, including project management, bridge design change reviews, contract administration, construction inspection, environmental and traffic management monitoring, public information, and on-site quality assurance testing. The contract administration and construction inspection functions were completed with staffing from TSH's Sault Ste. Marie office comprising 5 full time site staff together with part time support and management staff. Quality assurance and structural design change review functions were provided by staffing from Whitby.

This project was completed ahead of schedule, and the facility was opened to traffic on October 31, 2007.

Project Start – Fall 2000
Project Completion – October 2007
Construction Value – $72 million

TSH engineers architects planners

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