

Municipal Governments and Sustainable Communities:
A BEST PRACTICES GUIDE

2002

FCM-CH2M HILL
Sustainable Community Awards

CH2MHILL



Canada



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FCM-CH2M HILL Sustainable Community Awards: Best Practices Guide 2002

Each year, case studies of all submissions to the FCM-CH2M HILL Sustainable Community Awards that win or receive honourable mention are published in this Best Practices Guide for distribution to municipal governments across Canada. The Guide also includes summaries of all other submissions received.

The Best Practices Guide 2002 is available electronically through FCM's Web site at www.fcm.ca/scep/awards/index.htm

For printed copies of the Best Practices Guide 2002, please contact Sylvie Delaquis at 613-241-5221, ext. 245 or sdelaquis@fcm.ca

Cette publication est disponible en français sous le titre *Prix des collectivités viables FCM-CH2M HILL : Guide des pratiques exemplaires 2002*

Honouring excellence and innovation in municipal service delivery that contributes to a sustainable future

Across Canada, municipal governments of all sizes are demonstrating leadership and environmental responsibility through sustainable community development.

Sustainable development improves the quality of life in communities by investing in social and economic development that delivers environmental benefits, such as clean air, water and soil. The FCM-CH2M HILL Sustainable Community Awards recognize and celebrate this leadership.

The Federation of Canadian Municipalities (FCM) supports sustainable community development through its Centre for Sustainable Community Development that offers programs on climate protection, community energy planning, regulatory reform in the housing sector, active transportation, and the Green Municipal Funds. The Centre's vision is a future where Canadian communities provide a high quality of life while minimizing their ecological footprint.

CH2M HILL Canada Limited is a full-service infrastructure and environmental firm, providing services in water, transportation, energy and industrial systems, environmental management, and telecommunications. CH2M HILL works with clients to develop and implement innovative, practical and sustainable solutions.

Sponsorship

The Awards in 2002 were sponsored by the Government of Canada through the Climate Change Action Fund and the Office of Energy Efficiency, FCM's Green Municipal Funds, and CH2M HILL Canada Limited.

For more information on participating as a sponsor, contact the FCM Awards Office at:

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INTRODUCTION



WHO CAN APPLY

- FCM municipal members
- Participants in Partners for Climate Protection

Municipalities of all population sizes are encouraged to apply.

Each municipal government may submit a maximum of two projects. Please submit separate applications for each project.

AWARDS ELIGIBILITY CRITERIA

To be accepted by the Awards office, submissions must meet the following criteria:

- Projects must demonstrate innovation and excellence in one of the Awards categories: buildings, renewable energy, solid waste, sustainable community planning, sustainable transportation, wastewater, and water.
- Applicants must follow the submission guidelines on the application form to ensure that judges have all the information necessary to evaluate submissions.
- Projects must have been completed within two years of the date of application or be in the final stages of implementation.

HOW SUBMISSIONS ARE JUDGED

Awards submissions will be reviewed and judged by a panel selected by FCM. In addition to meeting the Awards eligibility criteria, each submission will be judged with special attention to the following elements:

- Innovation and excellence (e.g., how, and to what extent, the project improves on previous approaches);
- Demonstration of environmental and social benefits, and their impact on the community;
- Demonstration of economic benefits and cost effectiveness;
- Partnerships created or supported by the project;
- Sustainability of the project (e.g., relationship to the municipality's sustainability goals, land-use plans, etc.); and
- Promotional activities (internal and external).

AWARDS RECOGNITION

Winners are recognized in the annual Best Practices Guide as well as during an Awards recognition ceremony at FCM's Annual Conference and Municipal Expo™.

NOMINATIONS/DEADLINES

Consult FCM's Web site (www.fcm.ca/scep/awards/index.htm) for the latest information on Awards deadlines.

FOR MORE INFORMATION

For more information on how to apply or to obtain an application form, visit our Web site or contact:

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Best Practices Guide 2002**

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Municipal governments are embarking on new paths to improve services in ways that simultaneously address environmental, economic and social goals. This third edition of the Best Practices Guide features case studies of 14 projects honoured with FCM-CH2M-HILL Sustainable Community Awards. It also offers profiles of several dozen other submissions to the Awards. All of these community-based initiatives serve to demonstrate municipal government commitment to improving quality of life while reducing negative environmental impacts.



The case studies reflect the persistence of municipal leaders to find innovative ways of improving service delivery. This is true whether we speak of energy management programs in Mississauga, Ontario, restored wildlife habitat in Saanich, British Columbia or the remarkable rates of recycling achieved by a small community like Shoal Lake, Manitoba.

The challenge of building sustainable communities is daunting. However, these case studies demonstrate the multiple benefits of investing in sustainable communities. Our hope is that this guide will encourage those already engaged in sustainable undertakings to stay on this path, and inspire other municipal governments to pursue similar visions.



Alderman John Schmal
President
Federation of Canadian Municipalities



Sustainable development is a journey requiring flexible, creative solutions, as well as new methods of thinking and planning. CH2M HILL Canada is proud to partner with the Federation of Canadian Municipalities (FCM) to encourage and recognize forward-thinking municipalities for their initiative and commitment to improving Canada's quality of life.

Through strong leadership, citizen involvement and innovative programs and ideas, municipal governments across Canada are improving the environment in significant ways and obtaining tangible results.

In May 2002, FCM and CH2M HILL Canada honoured 13 municipal governments in eight categories for excellence in sustainable community development. Winners were fêted at FCM's 65th Annual Conference and Municipal Expo™ in Hamilton, Ontario.

This Best Practices Guide highlights the remarkable work carried out by the award winners and inspires other communities to plan and initiate their own projects. Hamlets, towns and cities are making impressive strides in diverse ways: reducing fuel demands and greenhouse gases, creating educational programs using "real life" lessons, diverting waste to landfills through effective recycling programs and composting, increasing transit ridership, community parklands and forestry, and wildlife wetlands.

Whether you are a civic worker, community leader, city planner or an interested citizen seeking the benefits of sustainability in your community, we hope that the FCM-CH2M HILL Sustainable Community Awards help to encourage, inform and inspire you to continue this important work.

John Murray
President
CH2M HILL Canada Limited

2002 Winners

BUILDINGS

Energy Management Program

Population: 612,925

SUMMARY

Increasing utility costs and a pending deregulation of the electricity market spurred the City of Mississauga to implement its Energy Management Program (EMP). Previously, the city had retrofitted several of its facilities with energy-efficient technologies. Using improved energy monitoring software, the EMP extends those efforts with ongoing energy evaluations of existing facilities and reviews of new building construction proposals. Comprehensive energy audits were conducted on eight facilities in 2001, with another eight scheduled in 2002. The EMP is well ahead of schedule and is estimated to save \$600,000 per year in utility costs from new and existing buildings, with corresponding annual savings of 4,000 tonnes of greenhouse gas emissions.

BACKGROUND

In 1998, the city established the Mississauga Air Quality Advisory (MAQA) Committee to recommend to council short- and long-term strategies to improve air quality by reducing greenhouse gas emissions. The energy management program is one of 36 air quality action plans identified by the MAQA committee, and is also part of the city's larger corporate smog response plan that was introduced in 1999.

"We have all aspects of what an energy program should be," said Rajan Balchandani, the EMP's administrator. "Staff awareness programs are not always well structured in other municipalities, but they can bring tremendous savings if people are careful about energy use. They could easily save five per cent in utilities. That's a lot of money compared to the cost of doing an energy awareness program."

The city prepares its utility budgets centrally, a practice that initially acted as a hindrance to educating facility managers about energy use. The EMP introduced a system of quarterly consumption reports so that facility managers know exactly how much energy is used in a given building and can take steps to conserve energy.



CITY OF MISSISSAUGA, ONTARIO

The city actively promotes the benefits of energy efficiency to the private sector. It hosted an energy efficiency workshop for the local building community in November 2000 to develop partnerships with the private sector to build new energy-efficient buildings and retrofit existing ones.



Since 1990, the city has been recording its contribution towards greenhouse gas reductions in anticipation of future funding or incentives from new federal government legislation. The city has been a participant in FCM's Partners for Climate Protection since 1998. It also has partnered with the City of Toronto in the 20/20 The Way to Clean Air pilot program launched in January 2002, which encourages residents to reduce home energy use and the amount of driving done alone by 20 per cent.

PROJECT DEVELOPMENT

Before the energy management program was introduced, the city had retrofitted several of its buildings with energy-efficient technologies, mainly through incentives offered by utility companies. Rising energy costs (since 2000 the cost of natural gas doubled and that of electricity increased 33 per cent) prompted the city to expand its efforts and create a more comprehensive program. The Ontario electricity market was deregulated in May 2002, causing additional concern that operational costs could rise further.

Mr. Balchandani stressed, however, that the EMP must make both financial and environmental sense. "The city is run like a corporation," he said, "but the mayor and council are also very particular about air quality issues."

Before joining the city, Mr. Balchandani had 10 years of experience with an energy services company (ESCO). "When I was working with the ESCO, we had four or five municipalities as our clients and I was responsible for doing their programs, so I knew how municipalities worked. I put that experience into this program," he said.

The goal of the EMP is to reduce utility bills by an average of five per cent based on 2002 prices, which would represent savings of \$600,000 a year in operating costs and greenhouse gas emission reductions of 4,000 metric tonnes. The city has installed—and will continue to install—improved energy monitoring systems in many of its buildings.

PROJECT IMPLEMENTATION

The city first established an energy management team, made up of Mr. Balchandani, Garrick Bradshaw, the manager for facility maintenance and energy management, and Daryl Martin, an energy management coordinator working on contract.

To establish a baseline of energy information, the city upgraded its energy monitoring software and, in addition to data that was available from past years, entered another two years' worth of utility bills. The city purchased the software from TEAM Energy Auditing Agency in England. According to Mr. Balchandani, entering the data into the database "was a big project where manpower wasn't available." He applied to ON-SITE, a program that matches organizations with post-secondary graduates in various disciplines. Daryl Martin was hired to enter the data and has since been retained on contract as an energy consultant.

"The software is very helpful," Mr. Balchandani reported. "People need to be aware of the energy they are using, plus it helps us compare the energy performance in similar buildings. We can look at one that is more efficient and see what's different." The software also produces reports that are sent to each facility manager. "Before we started, people were less worried about energy because it wasn't part of their budget. They never saw the energy bills," said Mr. Balchandani. Facility managers now receive quarterly utility consumption reports and a performance index report that compares the utility costs of buildings with similar operations.

A big component of the EMP is Energenius, a staff education program. In addition to the regular reports, each facility manager receives an easy-to-use information package, and staff is rewarded for suggesting ways to save energy. The first award went to a staff member who proposed that putting computers into "sleep" mode when not being used would save the city \$7,000 a year. Competition between facilities to become more energy efficient is also encouraged. The Energenius program is available to staff through the city's Intranet Web site.

"I've made presentations to supervisors and have gotten very good responses. People are even coming back with questions on buying energy [in a deregulated market] and how they can save energy at home," said Mr. Balchandani. That prompted the energy management team to organize in-house seminars by Green\$aver, a local non-profit organization that conducts

home energy audits. "Many staff members have opted to do the program, so we're not just promoting energy conservation at work, but at their homes as well."

By the end of 2001, the team had conducted energy audits of eight facilities and made recommendations to council on conservation techniques, automating energy controls and, in some cases, the need for major renovations. A business case analysis was done for each facility to assess the return on investment. Improvements that yielded a three-year payback or better were done first. "If we have enough quick payback projects—for example, lighting upgrades—those are the first ones to attack with the available funds," said Mr. Balchandani.

Retrofits were completed at the Tomken Arena, Lakeview and Port Credit libraries, Mavis Works, and the Mississauga Transit garage. The retrofits included computerized building automation systems, energy-efficient lighting and controls, infrared heaters, and ventilation controls.

Part of the EMP's longer-term strategy is to learn as much as possible about electricity deregulation. The energy team stays informed by regularly attending seminars on the subject and has prepared load profiles and consumption patterns of all the city's facilities. Interval meters have been installed in the city's largest buildings to record electricity loads, and this information is used to create software models and develop a purchasing strategy.

RESULTS

- Between 2000 and 2002, energy efficiency improvements to existing facilities and the construction of new energy-efficient facilities have saved \$220,000 in utility costs with less than a three-year payback for each project.
- As a result of Energenius, an additional \$380,000 in savings is expected through the efficient use of energy by staff.
- Energy-efficient technologies were installed at two new facilities constructed in 2001—the Erin Meadows and Cawthra Community Centres. At Erin Meadows, for example, waste heat from the pool's dehumidifier is used to heat pool water. New heat pipe technology (allowing operators to obtain maximum heat recovery on peak demand days) used in the Cawthra Community Centre ventilation unit recovers 60 per cent of waste heat, which is then used to heat incoming fresh air.



LESSONS LEARNED

All aspects of the EMP worked well, except for the procurement of natural gas, which was affected by the high volatility of market prices. On the advice of an agent, the city had purchased 90 per cent of its natural gas from the AECO natural gas exchange in Alberta, where gas is traded as a commodity and can be purchased for a future period at a price quoted in advance. Prices fell, however, due to an economic downturn and mild weather. The city is now investigating various options for better methods of procuring natural gas.

RELATED AND FUTURE INITIATIVES

Senior management is committed to looking at innovative ideas, not just those that have been tried and tested. “If we want to be at the leading edge, we can’t ignore new developments,” said Mr. Balchandani. “For example, there are magnets available that, when put on the gas lines of heating equipment, change the molecular structure and are said to improve the combustion efficiency of gas.”

The energy management team plans to review all existing computerized building automation systems so they can make recommendations for automating other buildings. It will also conduct more energy audits, continue to make energy efficiency improvements, and promote energy awareness among staff members.

The city is looking for new sources of green electricity and for deregulated markets to stabilize before deciding on the purchase of green electricity. “Our policy is to wait and see when real green electricity is produced—such as biomass or wind power—then look at buying,” said Mr. Balchandani.

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Fuel Sense Program

Population: 937,845

SUMMARY

The Fuel Sense Program targeted 1,000 municipal employees who had logged the highest fuel

consumption in the City of Edmonton's vehicles. In the 10 months of the program, employees were trained to drive for better fuel efficiency. Drivers first took voluntary training that included handbooks and on-road instruction, and were then re-tested to see if these techniques were improving fuel efficiency. The Fuel Sense Program was also incorporated into Edmonton Transit's operator training program. The city's original goal of reducing overall corporate fuel usage by five to 10 per cent was met and exceeded. By the end of 2001, fuel consumption was down 10 to 20 per cent for the 10-month period, translating into savings of \$175,000.

BACKGROUND

As part of its commitment to FCM's Partners for Climate Protection, Edmonton city council approved a greenhouse gas emissions reduction plan that aimed to reduce emissions from municipal operations by 20 per cent by 2008. Municipal operations account for three per cent of the total emissions within city boundaries.

In December 1999, the city's office of the environment helped create CO₂RE, a group comprised of industrial firms, other businesses, institutions and environmental organizations, to develop an emissions reduction plan for the community sector. In January 2002, with input from over 50 local groups, CO₂RE completed a community-wide strategy to combat climate change and improve energy efficiency. One of its key recommendations was to improve the efficiency of the city's municipal fleet vehicles by modifying driving practices and implementing training programs.

PROJECT DEVELOPMENT

In March 2001, shortly before CO₂RE released its recommendations, the city implemented Fuel Sense, a program that educates its fleet drivers on energy-efficient driving techniques. "Council encourages anything that is seen as doing the environment a favour," said Bryan Payne,

supervisor of fleet safety. "We made a strategic decision to involve council and senior management in the program from the beginning so that word came down from the top. This was a big catalyst to get the drivers on side."

Fuel Sense differed from the city's previous driver education program in one important way. Rather than being solely a classroom program, employees practice the new driving techniques on a closed course. According to Mr. Payne, the practical aspect gives the program greater value and longer-term savings.

In 2000, fuel prices increased by 40 per cent. Since that trend was expected to continue, the city predicted a major budget deficit for its vehicle operations. "The old program wasn't as successful as it could have been, largely because we didn't get enough return on our investment," said Mr. Payne. "Fuel prices were quite low at that time so the financial incentive was lower."

The program's budget and plan were approved in October 2000. An instructor was hired and trained in the new approaches to driving, and on-board computers were installed in the training vehicles to monitor performance.

PROJECT IMPLEMENTATION

In the Fuel Sense Program, drivers attend a four-hour training session—two hours in the classroom and two hours of on-road instruction. The program's objectives include:

- reducing overall fuel use by five to 10 per cent in the first year;
- fuel cost reductions through reduced consumption;
- reducing community-wide greenhouse gas emissions as drivers apply the techniques to both work and personal driving;
- encouraging wider use of the Fuel Sense techniques and an improved defensive driver training program; and
- increasing awareness of the environmental impact of greenhouse gases.



In the classroom session, employees learn that as vehicle speed and revolutions per minute (RPM) of the engine rise, fuel efficiency falls. They also learn about the impact of greenhouse gas emissions on the environment, and the potential dollar savings to be realized through efficient driving techniques.

During the on-road instruction, employees test their knowledge and practices on a 10-kilometre closed course. A pre-test establishes a benchmark of performance for each driver. Then individualized coaching and a follow-up driving test are conducted with the trainer. “We teach proactive driving rather than reactive,” said Mr. Payne. “City drivers have a number of routes they routinely drive, so our message is to get their vehicle up to the speed limit and drive with a knowledge of what’s happening around them. For example, we teach them that traffic lights are timed and if they drive outside of that window they’ll miss the timing.”

All of the drivers are re-tested to determine what skills they have retained. Drivers were initially re-tested 90 days after they had completed the training, but the city has decided to extend that period. The second test is now done a year after a driver completes the program, which provides more longevity to the campaign and keeps awareness alive.

Feedback has been positive—95 per cent of drivers rate the training as excellent. For many drivers, using efficient driving techniques is a much more relaxed way to cover their routes. “It proves that there’s always something new to learn. The best drivers always realize the impact they potentially have behind the wheel and never fail for a second to remember that safe driving is important,” said Mr. Payne.

Two test vehicles are equipped with on-board computers, one of which captures RPM and speed information. “There is a direct correlation between that and fuel efficiency,” said Mr. Payne. “Drivers who maintain a consistent RPM tend to be more productive than those that are on and off the throttle constantly.” The other computer is connected to a fuel flow gauge, and the trainer compares fuel consumption for each driver before and after the training.

Fuel consumption is measured in three ways, the main one being a comparison of monthly and yearly historical fuel consumption data. This type of data provides better information than a time-based formula because some vehicles (snow plows, for example) sit idle for several months. The forecast of fuel costs based on current fuel prices is also measured against actual costs. Finally, the re-test of drivers allows for a comparison of litres of fuel used per 100 kilometres driven.

Weather conditions are also factored in. The Fuel Sense trainer drives the course regularly and re-drives it when the weather changes, then factors in any changed conditions when a fleet driver’s re-test results are examined.

On-board computers have been installed in a number of municipal trucks. “Part of our commitment is to reinvest in on-board technology,” said Mr. Payne. “We’re working toward a one-system communication tool and a standards committee is examining potential opportunities for global positioning systems and black boxes and how to ‘marry up’ all that equipment.” The city’s snow removal vehicles, for example, use automated vehicle locators and global positioning systems. The trucks are dispatched and tracked, and if one stops for an unusual length of time it sends up a red flag. This system also helps to investigate any complaints the city receives from residents.

Fuel savings pay for the Fuel Sense Program. “The city is always looking for ways to save money,” said Mr. Payne. “There was another fuel increase last year and we were able to deflect a large percentage of the increase through the savings of the drivers.”

Mr. Payne says the success of Fuel Sense rests on its practical component. “Maximum efficiency occurs when you capitalize on the vehicle’s momentum. The program is based on simple techniques, but it was bringing it together the way we have that makes the program successful. The bottom line is achievable by anyone.”



RESULTS

- 700 drivers have been trained as of March 2002, with savings estimated at \$175,000. As more drivers are trained, a simple extrapolation of the numbers indicates that annual fleet cost savings could be well over half a million dollars.
- Fuel consumption savings have consistently remained between 10 and 20 per cent, regardless of the type of vehicle, and despite the fact that the total number of kilometres driven had increased due to greater service demands.
- Fuel volumes consumed per kilometre dropped by approximately 5.5 per cent, a gain in fuel efficiency of 1.8 litres per 100 kilometres.
- An estimated 310 tonnes of greenhouse gas emissions were avoided in the program's first year of operation.

LESSONS LEARNED

- Communicating results regularly to drivers and council is critical. The need to provide follow-up information and keep communication lines open is recognized.
- The program is relatively easy to transfer to other types of vehicle operations, such as those of Edmonton Transit or private industry.
- There were some initial problems with the on-board computers. Greater effort should have been made to ensure that computers were working properly since they are essential to measure results.

RELATED AND FUTURE INITIATIVES

The city has arranged with Natural Resources Canada to help develop an urban transit fuel-efficient training program based on the Fuel Sense experience.

Fuel Sense may be used as a model for a "train the trainer" program in private corporations that already have driver training programs in place.

The fleet safety unit and Edmonton Transit have prepared a manual and training regime for Edmonton Transit operators. Transit buses are already hooked up to maintenance computers, allowing all the required data to be captured from existing on-board equipment. Fuel consumption, speed, time spent in top gear and other parameters can be accessed via a laptop computer, and the driver can be informed immediately.

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Sylvan Lake Aquatic Facility

Population: 7,008

SUMMARY

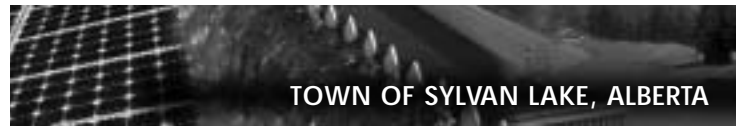
The Town of Sylvan Lake—one of the fastest growing communities in Canada—built a swimming pool facility that uses geothermal heat rather than conventional fuel sources for heating. Underground piping collects and stores heat from the earth that is then used to heat the entire facility, eliminating the need to use natural gas. The town has estimated that as much as \$60,000 to \$70,000 per year will be saved in operating costs, with additional benefits for the environment. To meet future needs, the facility was also designed to expand as the community grows.

BACKGROUND

One of the main reasons for which the Town of Sylvan Lake, Alberta, decided it needed to build an aquatic facility was its growing population. Sean Barnes, director of recreation and parks, believes that the town's thriving economy, pristine lake and proximity to large urban centres, such as Calgary and Red Deer, are the reasons why more people are moving to Sylvan Lake. With 5,000 residents in 1996, the town's population had grown to almost 7,500 by 2001, making it the second-fastest growing community in Canada.

Although the town does not have a specific sustainable development policy, council encourages projects that reduce greenhouse gas emissions. "If it wasn't for our recreation board and council, we couldn't have done it," said Mr. Barnes. He recognized Council Member Janet Wilson Down as an especially energetic project champion.

The town's primary objective was to build the facility at minimal cost to taxpayers. "You want to cut costs in an aquatic centre because the biggest expense is the gas bill to heat all the water," he explained. The hunt began for an efficient, cost-effective solution.



TOWN OF SYLVAN LAKE, ALBERTA

PROJECT DEVELOPMENT

Residents were involved right from the start. "We held an open house in 2000 to decide whether the town wanted an arena or an aquatic centre. The majority wanted the aquatic facility," said Mr. Barnes.



To explore its options, the town sent staff members to a conference on recreation facilities in Jasper, Alberta. Staff members who attended the conference were interested in a company's display on geothermal heating. The town asked Histech Energy Solutions of Calgary to provide more information on how geothermal systems work. Concurrently, recreation staff was conducting Internet research on the subject. "You don't get many negative stories about geothermal, only successful ones," said Mr. Barnes. "It's such a simple system, and the earth is always going to be there. It's mind-boggling really."

At the town's open house in 2000, an exhibit on geothermal systems attracted people's attention. Sylvan Lake's local newspaper was also curious about the concept and published several articles about the plans before and during construction, stimulating further community interest.

To cut costs for the project, the Sylvan Lake Futures Foundation, in partnership with the Sylvan Lake minor hockey league, raffled off a cabin, raising \$200,000. Most of the \$3.1 million needed to finance the facility came from municipal reserves and debentures. Additional funds came from the county and a provincial lottery.

PROJECT IMPLEMENTATION

Construction of the facility began in July 2001 and is scheduled for completion in late 2002. It was designed to allow for expansion, should the town's population continue to grow at its current rapid pace. Chandos Construction, the general contractor hired to build the facility, was initially skeptical about the geothermal concept, but became an enthusiastic partner after learning more about the system.

Simply put, a geothermal system uses the heat of the earth to supply heating for a building. The first two to 300 metres of the earth's surface stays at a relatively constant temperature of about 7°C. Loops of pipe are laid in the ground surrounding a building and a solution of 20 per cent



TOWN OF SYLVAN LAKE, ALBERTA

methanol and 80 per cent water is pumped through them, warming the earth as well as absorbing the ground heat during the winter. The methanol-water solution keeps the liquid from freezing in cold weather. The heat is then forced into ground-source heat pumps located inside the building. To cool the facility during the summer, the process is reversed; heat is extracted from the building and injected back into the earth.

The system uses up to 60 per cent less energy than traditional heating and cooling systems. “There’s no gas line into the facility at all,” said Mr. Barnes, “the geothermal system is used to heat the floors and all the water in the pool.”

Histech Energy Solutions was hired as the mechanical consultant and contractor for the geothermal system. Three engineering firms also approved the drawings for the aquatic facility, and the Royal Lifesaving Society and Canadian Paraplegic Association approved the final plans. “It made us feel better that we had that expertise behind us,” said Mr. Barnes.

Instead of a chlorine system to kill bacteria in the pool water, Sylvan Lake opted for an ozone filtration system. This system uses more water for backwashing (the process of cleaning a pool filter by reversing the flow of water through it), but since dissolved ozone decomposes more rapidly, it leaves no residual disinfectant in the water. “It oxidizes the water and destroys 100 per cent of bacteria and doesn’t leave the chemical smell or taste that chlorine does. It smells fresh, like after a thunderstorm,” Mr. Barnes explained. “It is expensive, but it’s a front-loaded expense because, in the long run, there’s less maintenance.”

Communities in Alberta are watching the operation of this “facility of the future” closely. Other municipalities and individuals have already contacted the town, asking how geothermal energy might be used in homes and in subdivisions. “We’re hoping that other municipalities can learn from our experience and improve upon their facilities,” said Mr. Barnes. He admits that people were nervous about the expense since this was the first multi-million dollar facility the small town had built. “But, we’ve had so much fun with this project, and if it’s 100 per cent successful, you’re going to see more of this type of system,” Mr. Barnes predicted.

RESULTS

- The geothermal heating system has eliminated the need for a natural gas line. The town estimates this will save as much as \$70,000 per year in operating costs, with a three-year payback on investment.
- The money raised by the cabin lottery was enough to cover the costs of the ozone filtration system as well as pool toys. It also covered the cost of constructing an entrance in the shape of a lighthouse.
- Some people have adverse reactions to the smell and taste of chlorine when it is used for filtration, therefore the ozone filtration system is a better alternative.
- The facility may require 12 new employees, positions that, ideally, will be filled locally. Recreation staff members are also encouraged to use the facility because the town council firmly believes that a healthy employee is a happy employee.

LESSONS LEARNED

- Open communication with the construction committee and council was important to ensure that everyone was informed at each stage of the design and construction. “It’s hard working on such a big facility,” said Mr. Barnes, “and sometimes you leave people out, so communication is a big necessity.”
- There is always a learning curve with new technology, so staff members took time to review all the options and learn as much as possible about the geothermal and ozone filtration systems before approving them.

RELATED AND FUTURE INITIATIVES

A second arena in Sylvan Lake is slated for 2004-2005. The new building will be twinned with Sylvan Lake’s existing arena, located across the street from the aquatic facility. The geothermal system can be adapted to work with both the aquatic facility and the twinned arenas.



PARTNERS

External

Royal Lifesaving Society

Canadian Paraplegic Association

Sylvan Lake Minor Hockey

Sylvan Lake Futures Foundation

Chandos Construction

Histech Energy Solutions

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SOLID WASTE



Not In My Backyard! The City of Red Deer's New Waste Management Facility

Population: 68,000

SUMMARY

A 10-year process came to fruition in September 2001, with the opening of the City of Red Deer's new waste management facility and landfill. Designed well above the minimum standards set by the provincial department of health, the facility incorporates 160 acres of landfill and preserves an existing wetland. The site also houses recycling and composting areas, and an interpretive centre where 1,000 schoolchildren have learned about recycling and reducing waste. Among other features of the facility, some of the landfill's leachate is recirculated, which speeds up decomposition and increases the rate of landfill gas production, thereby making the site more viable for methane gas recovery.

BACKGROUND

The City of Red Deer's strategic plan sets out its long-term vision for the community. A guiding principle is that the conservation and protection of the natural environment must be considered in all city operations. Quality of life goals are also a high priority and include many sustainability elements, such as maintaining effective public transportation and working with other orders of government, business and the community to conserve the natural environment.

As part of the strategic plan, each municipal department must develop a detailed three-year business plan that advances the city's principles and goals. The waste management department set a much longer planning horizon when it developed a solid waste master plan that looks ahead 25 to 30 years. The plan's goals are to:

- develop an affordable and sustainable waste management system;
- recognize that the "4Rs" of waste management (reduction, reuse, recycling and recovery) will reduce dependence on landfill;
- give the public an opportunity to voice its concerns and ideas; and
- stagger the implementation of programs and facilities so they are in place at the right time.

PROJECT DEVELOPMENT

In the early 1990s, staff realized that the city's landfill would reach capacity by 2000. At the same time, residents were becoming increasingly concerned about environmental issues, and particularly waste reduction and recycling.

"The process of siting a landfill needed to be started well in advance of when we would need it," explained Paul Goranson, the city's public works manager. "If there's not enough time, often you're too far down the road and it becomes more difficult to deal with." Once the solid waste master plan was in place, the department took a systematic approach to public consultation, and established guidelines on where and how a new landfill site would be constructed.

Constructing the landfill required a diverse set of professional skills—project management, construction and design, and hydrogeology—and timing was a critical factor. The old landfill was nearing capacity and it would be necessary to get a layer of waste over the liner of the new site before winter 2001.

PROJECT IMPLEMENTATION

Waste management staff applied a set of best practices for siting a new landfill, which included finding a location close to the city. This practice would minimize the environmental impacts of transporting waste over long distances and give staff more control over the landfill's operations.

A consultant was hired to locate a new site that not only met the department's best practices, but also provided enough room to develop additional recycling and composting activities.

Once a potential location was identified, preliminary testing was conducted, including a health risk assessment. In parallel with this process, the city created an advisory committee to obtain input from landowners and other stakeholders in the immediate area of the proposed landfill. "If you allow yourself the time to find out what the true interests of the parties are, you can modify your plans," said Mr. Goranson. "We didn't try and deny those concerns as they came up, we tried to determine what could be done."

One concern raised by stakeholders was that the landfill would be too close to neighbouring developments. To address this concern, the city bought 256 hectares of land, but used



only the middle 160 acres as active landfill. “Instead of filling the landfill right to the boundaries, we bought enough land around it so that the buffer is significant,” said Mr. Goranson.

Between May and December 2000, all roads, fences and buildings were constructed, and a vehicle weighing system was set up. The first landfill cell and temporary roads were completed in spring and summer 2001.

The landfill opened in September 2001. It has two main liners: a composite liner made of compacted clay, and a high-density polyethylene liner. The landfill was designed so that leachate (liquid that percolates through waste) is first collected in a granular layer, then removed through a manhole on the edge of the cell. The leachate is either sent for disposal at the wastewater treatment plant, or recirculated through the landfill, which speeds up decomposition. This latter procedure turns the landfill into a bioreactor, increasing the rate of landfill gas production and creating a potential source of energy in the form of captured methane.

Groundwater protection was an underlying principle from day one. Baseline conditions were established and groundwater samples are tested twice each year. “We had to do that before the landfill was commissioned because you don’t know what’s naturally occurring in the groundwater without any industrial impacts,” explained Mr. Goranson. The city continues to monitor groundwater quality and has had no concerns to date.

An existing wetland at the landfill site was identified as a sensitive area. All native plants and animal species were inventoried, allowing the city to make informed decisions on how to protect the wetland. “The wetland is mainly symbolic because it’s not something that’s normally compatible with a landfill,” said Mr. Goranson. The landfill was planned to minimize disruption to existing surface drainage of the wetland and is regularly monitored using a standardized set of biological and physical indicators.

The landfill site houses the city’s recycling and compost facilities. In addition, a farmhouse on the site was renovated to serve as an interpretive centre with exhibits and displays geared to the grade four science curriculum.

Mr. Goranson believes that the project’s greatest strength is the process that was developed through the solid waste master plan. “In comparison to what you hear about landfills in other parts of the country, ours went smoothly because of it,” he said.

RESULTS

- Without a new landfill site, Red Deer would have faced the expense of transporting waste 100 kilometres.
- Commercial waste loads are monitored and businesses are contacted to provide information about waste reduction, and the city’s reuse and recycling activities.
- Materials were reused at the site. For example, topsoil from residential subdivisions was used to create berms (raised banks of grass that surround the site’s borders). Paving stones made of recycled tires and decking material fabricated from recycled plastic were used at the interpretive centre.
- In response to citizens’ concerns, landfill users can drive on a paved surface and drop waste into bins, instead of having to drive up to the tipping face.

LESSONS LEARNED

- Meaningful public input needs to be sought early. The city’s proactive approach helped it identify public concerns and fully address them before the landfill opened.
- The creation of a buffer zone—seldom done in landfill siting projects—allows the city to control the area by providing a reasonable setback from neighbouring developments.
- Hiring an independent technical consultant gave added weight to staff recommendations on site planning.
- Staff communicated with other area municipalities to establish best practices and learn from others’ experiences.

RELATED AND FUTURE INITIATIVES

The landfill site allows both the space and the flexibility to salvage additional materials as new markets are identified. For example, pilot programs to divert construction and demolition waste, as well as computers and fluorescent light bulbs, are being considered. The city is working with a major hospital that is being upgraded to find ways to reuse and recycle certain materials.

The city is also interested in setting up a “take it or leave it” program—a community exchange in which a resident can drop off items at the landfill, such as couches or books, that may be useful for another resident.



PARTNERS

External

Red Deer River Naturalists

Citizens Action Group on the Environment

Internal

Public Works, Planning, Parks departments

Environmental Advisory Board

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SOLID WASTE

Shoal Lake Recycling Program

Population: 801

SUMMARY

The Town and Rural Municipality of Shoal Lake provide an excellent example of how a community-based program can significantly reduce waste by recycling. In 2001, Shoal Lake recycled 126.1 kilograms of material per person, far beyond the 72.5 kilograms per person that represents the average for large urban centres. Another 20 per cent of Shoal Lake's waste is organic material that is composted. The existing recycling centre, built at the municipal landfill in 1995, has now tripled in size. Selling recycled materials for re-use brings in more than \$40,000, which represents almost 75 per cent of the annual cost of the program. Shoal Lake now has plans to expand its program throughout the rest of the region where recycling rates are much lower—only about 23 kilograms per resident per year.

BACKGROUND

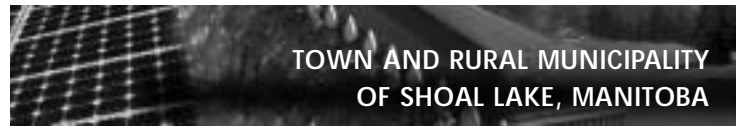
The Shoal Lake recycling program was a joint effort between the Town of Shoal Lake and the Rural Municipality of Shoal Lake. This award-winning recycling program began not from an official plan or political pressure, but from a community initiative that initially involved only a handful of people. Recycling plays a key role in minimizing the town's waste management and landfill costs. By reducing and diverting waste, the program has extended the lifespan of the town's landfill site.

Other sustainability initiatives in the town and rural municipality include working in partnership with the Province of Manitoba on a watershed management plan to protect water quality in Shoal Lake.

PROJECT DEVELOPMENT

Since 1991, four volunteers had been operating a drop-off program for recyclable materials in an abandoned community building. The town willingly permitted this initiative, because it wanted the building to be used and was interested in diverting waste from the landfill where space was getting low. In 1995, the town moved the recycling centre to the municipal landfill, and bought equipment for crushing and bailing paper and cans.

Mayor Johnny W. A. Michasiw has been in charge of the recycling centre since 1997. "The first building at the landfill site was only 14 feet by 28 feet and was built from recycled



TOWN AND RURAL MUNICIPALITY
OF SHOAL LAKE, MANITOBA

and donated materials," Mayor Michasiw recalled. Over the next several years, the drop-off centre tripled in size. By 1999, the town had made five additions to the recycling centre. In parallel, the town implemented a residential pick-up program and adapted the town's sanitation truck to collect refuse and recyclables at the same time. The materials collected include most types of paper and plastics, cans, glass bottles, heavy aluminum, and copper wiring. Organic material is also collected and composted at the landfill.



PROJECT IMPLEMENTATION

Once the sanitation truck had been adapted, the Shoal Lake Credit Union donated blue boxes to make it easier to pick up recyclable materials from people's homes. With the residential pick-up program in place, recycling immediately began to increase. Then the town began selling the recyclable material to end users, and used the earnings to build additional storage spaces for the recycling centre as well as three extra buildings.

Tin cans are shipped to Brandon, Manitoba, and glass is crushed and sent to a local construction company. "We're also finding different uses for crushed glass," said Mayor Michasiw. "For example, it can be used when building a septic system or as a road base." Other materials are sold to a variety of companies that use them to manufacture new products. Each company provides the town with a certificate confirming the amount of recyclable material it purchased.

The town receives additional revenue for its recycling efforts—a premium of \$150 to \$200 per tonne of materials it collects and sells to end users—by filing the certificates with the Manitoba Product Stewardship Corporation (MPSC). MPSC is a statutory corporation that operates at arm's length from the Province of Manitoba and is funded solely by the two-cent levy on most beverage containers sold in Manitoba. This additional revenue not only helps pay for most of the recycling program's operating costs, but stimulates the market for recycled goods.

The Shoal Lake School is also registered with MPSC's Student Action for Recycling program that helps schools set up recycling programs. MPSC provides an annual \$500 honorarium to Manitoba schools to offset the costs of recycling and environmental activities, and of various support materials.

All of these benefits emerged from a tiny, volunteer effort. “When the community saw the original drop-off program, they didn’t think too much about it,” said Mayor Michasiw. “But as the program developed, it proved that recycling really does work and has reduced the amount of waste going to our landfill.” In fact, the life span of the landfill has tripled because of the town’s waste diversion program.

The recycling centre also operates a program called “take some, bring some.” Residents bring unwanted items to the landfill to donate or exchange for desired items, thereby encouraging people to reuse as well as recycle. The program has been so successful that it has been dubbed the “east-end mall.”

The landfill is staffed at all times to prevent the disposal of hazardous waste or unwanted dumping. “There’s always an attendant to put things in the right place. That’s the reason it works so well,” said Mayor Michasiw. Waste streams are divided at the landfill into household waste, as well as stone, cement, tire, compost, metal, wood and appliance piles.

The recycling centre serves about 1,600 people. The town’s budget for the recycling program is \$41,000 per year, three-quarters of which is recouped from the sale of recyclable material. The recycling centre also employs three staff members for three days each week, plus a summer student every year. Community volunteers also continue to help out.

“The main thrust of the whole program was that we realized that recycling is big business,” said Mayor Michasiw. “There are so many things that will go away in the world, but this won’t be one of them.”

RESULTS

- The Town and Rural Municipality of Shoal Lake reduced their municipal waste by a total of 60 per cent—40 per cent of municipal waste is recycled, and 20 per cent is organic material used for composting.
- Shoal Lake has the highest rate of recycling per person in Canada at 126 kilograms per year, compared to an average of 72.5 kilograms per person in large urban centres.
- Following the construction of the recycling centre, the total annual kilograms of materials recycled increased from 37,000 in 1996 to 170,353 in 2000-2001.
- The town and rural municipality regularly receive an A+ rating on the Manitoba Product Stewardship Council’s community recycling report card. To attain that standing, a community must recycle about 75 kilograms per person.

LESSONS LEARNED

- The town may have been able to avoid making five additions to the recycling centre had a larger facility been built at the start.
- The town has seen how profitable recycling can be and knows that it is the way of the future.

RELATED AND FUTURE INITIATIVES

In its 2002 budget, the town considered building a new recycling and composting centre that would serve a greater number of people in the region. “It would include a 40-kilometre radius,” said Mayor Michasiw, “so we’d be encouraging other communities to recycle.”

The success of the recycling program has encouraged other sectors in Shoal Lake to look at sustainable development initiatives. Shoal Lake’s agricultural industry hopes to attract Pure Lean Hogs Inc. of Medicine Hat, Alberta, to the community. The company composts all its manure and deadstock (thereby avoiding the use of controversial manure storage lagoons). Its future plans include constructing a plant to package this compost as pellets for farmers to use as fertilizer.

PARTNERS

External

Rural Municipality of Shoal Lake

Manitoba Product Stewardship Corporation

Shoal Lake School

Shoal Lake Credit Union

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SUSTAINABLE TRANSPORTATION

Improving Transit Ridership and Transit Means to Accommodate Growth

Population: 351,646

SUMMARY

Large cities typically experience the challenge the City of Brampton faced in the mid-1990s. As subdivisions grow, transit services are not implemented fast enough to give new residents the choice of using transit. As a result, many people decide to purchase a second car. Brampton's proactive approach introduced transit routes to new subdivisions as early as possible. Brampton Transit staff participated in the road network development of all new subdivisions, and had input into subdivision plans on features, such as the location of bus stops and pedestrian walkways. Subdivision agreements include a requirement to phase in development so that transit servicing can be provided in an affordable manner, and roads are wide enough and have appropriate turnaround areas for buses. The result has been a 40 per cent increase in ridership between 1996 and 2000, double the percentage of population growth for the same period.

BACKGROUND

In 1998, the City of Brampton adopted "The Four Cornerstones of Brampton," a strategic plan for the community that includes a commitment to an efficient transportation network. The city's specific goals for public transit are to:

- increase ridership on the Brampton Transit system;
- ensure a funding stream for the capital and operating requirements of Brampton Transit sufficient to maintain its position as the most efficient transit system in the Greater Toronto Area; and
- integrate Brampton Transit with GO Transit and other municipal transit systems.

Before adopting the strategic plan, however, several other factors helped the city develop a new focus on public transit. In 1995, the transit department was moved from the community services department to public works. Before the move, the transit department, parks and recreation, and the fire department had all competed for budget revenues. Moving transit to public works meant that all transportation matters were now planned within one department. "All of a



sudden, competition became a non-issue. The roads budget is huge and transit became a component of that," said Director of Transit Glen Marshall.

Another factor favouring public transit was a transportation study performed in 1995-1996 showing that, even if all roads planned for Brampton were built to capacity, the modal share (share of riders carried by different transport modes) for transit would need to be 25 per cent to avoid significant congestion.



PROJECT DEVELOPMENT

Between 1989 and 1996, transit ridership had declined by 12 per cent in Brampton. "The significant decline started in 1992. By 1996, there were about 4.9 million riders, down from about 5.5 million in 1992," said Mr. Marshall. "I would attribute that decline to the recession, which caused higher unemployment, fewer recreational trips and discretionary shopping trips." During this time, the Province of Ontario had also removed public transit subsidies. Mr. Marshall applauds council's stance to push for improved public transit in the face of these challenges. "It would have been understood if less emphasis or a status quo approach had been applied," he said. "Council, however, recognized transit's importance in a growing city and saw that expansion was the only alternative."

Brampton's older neighbourhoods were already well served by public transit, so council and transit staff decided that the emphasis should be placed on capturing new riders in new subdivisions. Many residents who move into the Brampton area come from densely populated areas with a good level of public transit. "As a result their expectations are pretty high, so we want to be in new subdivisions early so that residents don't have to find alternative transportation," said Mr. Marshall.

Beginning in 1996, therefore, transit staff began to participate fully in road network development for subdivisions.

PROJECT IMPLEMENTATION

In many municipalities, transit routes are planned and implemented well after a new subdivision is built. This practice leaves many residents with little choice but the private car as their primary means of travel, exacerbating



CITY OF BRAMPTON, ONTARIO

traffic congestion and gridlock, and deteriorating air quality. Even after transit service is introduced, the car habit may be so ingrained that residents will often not switch to transit. Brampton has avoided this scenario in many of its new subdivisions by implementing a proactive approach.

Brampton requires that transit be phased in and roads appropriately constructed for bus routes in all new subdivisions. “Sometimes we’re in there early and we’ll get held up by construction vehicles,” said Mr. Marshall. “But it’s better to be early and suffer the inconvenience, knowing that it’s an evolving process.”

Before any new development is approved, transit staff reviews the plans, makes recommendations on transit routes, bus stop pads and pedestrian walkways, and is actively involved in the overall transportation planning process. This participation involves driving through subdivisions as they are being built to determine the most appropriate routes. “We want to avoid surprising new residents when a bus route appears on their street, or a bus stop pad is on their boulevard,” said Mr. Marshall.

Transit routes are usually operating in Brampton’s new subdivisions within one year of development or within two to four months of residents moving in. Usually, new residents are without service or the service is some distance away for only a short period of time.

“Providing service to a new subdivision early is mostly based on common sense,” said Mr. Marshall. “Our goal is to have transit thoroughly planned in advance so that new home purchasers, when viewing plans of the subdivision in the sales office, can view where transit will be supplied and then purchase their homes accordingly.”

The community of Springdale is a case in point. This large development northeast of Brampton will eventually house 70,000 residents. With only one developer and the early intervention of transit staff, “it was phased perfectly from a transit perspective as there were no competing interests,” said Mr. Marshall. Staff pushed for the construction of mid-collector streets, rather than the looped streets the developer preferred, to lessen congestion on arterial roads and allow the appropriate space for transit routes. In this way, Brampton is actually creating the demand for transit because it provides an immediate and attractive transportation alternative.

The new transit planning procedure also allows Brampton to monitor and manage land use designations and zoning so that transit use is supported and traffic congestion is reduced, making more efficient use of its staff and operating costs. “Transit has proven to be a viable option when the appropriate emphasis is placed on it,” said Mr. Marshall.

Adding new routes into the subdivisions has, of course, resulted in the need for more buses. Twenty-one new buses are scheduled to arrive in September 2002, part of a procurement plan that calls for buying 195 more buses over the next 10 years—105 for growth and 90 for replacement. The bigger bus fleet will improve the current bus-to-population ratio from one bus per 2,950 residents to one bus per 1,979 residents by 2011.

“I’ve been here for 17 years and never used to get calls for transit service,” Mr. Marshall explained. With so much development in this growing municipality, Brampton Transit is now receiving calls from residents in other communities asking for more or new transit service. “It’s a sign that transit is desired and needed,” he added.

RESULTS

- Brampton’s original target was a 65 per cent return on investment. By carefully planning transit infrastructure as subdivisions are built, the city’s cost recovery has increased from 62 per cent in 1996 to 74 per cent in 2000.
- Ridership grew by over 40 per cent between 1996 and 2000, double the increase in Brampton’s population and double the national transit ridership increases for the same period.
- Net operating costs decreased from 98¢ per passenger in 1996 to 62¢ per passenger by 2000.

LESSONS LEARNED

- The project was well timed to coincide with a growing economy and significant development growth in Brampton. Had the city not been proactive in bringing public transit to the new subdivisions, it would have been left in a “catch up” position.
- New subdivisions must be planned from the beginning to be transit friendly, and operating standards, clear objectives and good planning are the keys to operating an efficient public transit service.



RELATED AND FUTURE INITIATIVES

Brampton is now developing a transportation and transit master plan. “Senior staff and council need, at this stage of our development, a larger picture of the ultimate relationship between roads and transit,” said Mr. Marshall. The master plan will bring in a modelling system that will require ongoing measurement of traffic volumes and the modal share.

Transit staff continues to work with adjacent municipalities, the City of Toronto in particular, to supply cross-boundary service. Brampton is also moving toward a seamless service between municipalities using smart card technology.

PARTNERS

Internal

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Planning department

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Mississauga Transit—GO Shuttle Service—Cooksville Station

Population: 612,925

SUMMARY

A deceptively simple approach to transit service brought big results to the City of Mississauga. Using a 21-seat shuttle bus, passengers are driven from Cooksville to the GO Rail station so that parking requirements, traffic congestion and air pollution are reduced. Although there is a transit service to the GO Rail station, it was not convenient enough to attract many riders. What began as a six-month pilot program is now a permanent travel option, with about 900 residents using the service every week. Seventy-seven per cent of the new riders used to drive to the station or were dropped off by another driver. Based on these initial ridership reports, the city has estimated that 67 tonnes of CO₂ emissions per year have been avoided.

BACKGROUND

In November 1999, Mississauga Transit presented a report to the general committee of the city, outlining the shuttle service concept. As part of the city's strategic plan to be an environmentally responsible community and to set the direction for long-term growth and development, Mississauga Transit wanted to introduce a customized door-to-door shuttle service to its clients in the Cooksville community. The existing transit service used arterial roads only and was not as convenient for residents who lived some distance away. Introducing smaller, air-conditioned buses onto local streets was not only a more attractive option for residents, it was more cost-effective than adding another large transit route. The city accepted Mississauga Transit's report and the shuttle service concept.

The shuttle service complements the city's smog response plan, introduced in 1999, which includes 36 air quality action plans. The city has also been recording its contribution toward greenhouse gas reduction since 1990, and has partnered with the City of Toronto in the 20/20 The Way to Clean Air pilot program launched in January 2002. The program encourages residents to reduce home energy use and the amount of

driving done alone by 20 per cent. Mississauga has also been a participant in FCM's Partners for Climate Protection since 1998.

Owing to the city's strong commitment to reducing greenhouse gas emissions, the program encountered no policy or procedural barriers. In fact, "all city councillors supported the community busing concept," said Bill Cunningham, director of Mississauga Transit. "Each station we looked at (before one was chosen) was in a different ward and each councillor hoped that their ward would get the service."

PROJECT DEVELOPMENT

Transit staff distributed 5,100 surveys to customers at three stations, and achieved a 50 per cent return rate. The Cooksville GO Rail station was identified as having the highest potential for a successful launch of the service, and was chosen for the pilot based on the existing level of transit service, the number of potential users, and how well the route design could maximize area coverage.

Once the initial survey was complete, transit staff contacted the Cooksville respondents by telephone. The addresses of those who responded positively to this type of service were plotted on a map. The goal for the trip time from the rider's door to the GO Rail station was between 15 and 20 minutes. This time constraint, together with the catchment area based on the plotted addresses, helped determine the preferred route.

PROJECT IMPLEMENTATION

The Cooksville GO shuttle service began in late March 2001 as a six-month trial, with the buses running during peak morning and afternoon periods. The mini-buses, each seating 21 people, are much better accepted for use on local streets than regular-sized buses. Since only two mini-buses were made available for the pilot, it was impossible to meet every train at the Cooksville GO Rail station. Based on the survey responses, the most popular train times were chosen so that the bus could meet three trains in the morning and four in the afternoon.

Monday to Friday, passengers are picked up at or near their front door in the morning and guaranteed a maximum 20-minute travel time to the GO Rail station. In the afternoon, the process is reversed, with passengers dropped



near their home. Passengers show their GO Rail ticket to the driver and add 50 cents to the fare box. Since the service started in late March, ridership numbers for April 2001 were the first indication of how the service was doing. In its first month, 1,715 passengers had used the service.

Mississauga Transit's direct contact with potential riders meant that Cooksville residents were fully aware of the shuttle service and began to use it immediately.

Bus drivers have been helpful in delivering the service. "They ensured that they met the schedule and gave people information during the initial few weeks," said Mr. Cunningham. He said that the service works well because it is highly customized to people's needs. "It proves that people will use transit if good service is offered."

The service generates 60 per cent of revenue from the fare box, compared to the average of 65 per cent for the entire transit system. "We are losing money, but one of the points that councillors have made is that it's an investment in the community," said Mr. Cunningham. "We're providing good transit and there are social and environmental spin-off benefits that aren't as easily quantifiable."

As of May 2002, the service was running at 60 per cent capacity, so there is room for improvement. Terry Dubois, Mississauga Transit's marketing manager, explained that the service was not advertised during the six-month trial period. "We were concerned that advertising might attract an increased ridership that we could not accommodate with only two buses." But once full capacity is reached, Mississauga Transit plans to add more mini-buses, pending budget approval.

Mississauga Transit presented the results of the pilot program to the Ontario Community Transportation Association in April 2002 to encourage transit managers in other communities to introduce similar services. "Traditional transit planning, where you assign buses to an arterial road and you hope that people will take the bus, just doesn't work anymore," said Mr. Cunningham. "We have to do a better job."

RESULTS

- As of May 2002 about 3,200 people in the Cooksville area were using the GO shuttle service.
- Customer surveys found that 100 per cent are satisfied with the service, and that about three-quarters of them used to drive or were dropped off at the Cooksville GO Rail station. The shuttle service has effectively eliminated approximately 600 car trips.
- Based on the survey responses of September 2001, Mississauga Transit has estimated that the use of the GO shuttle service instead of cars has reduced carbon dioxide emissions by about 67 tonnes per year.
- The customer base grew quickly by word-of-mouth and direct contact with community residents. No advertising or marketing campaigns were undertaken.
- City council has approved the permanent continuation of the service.
- GO Transit and Mississauga Transit are now partners in joint advertising to promote local transit to and from GO Rail stations. "It benefits them as well if we can reduce the demand for parking at the stations and get more people using transit," said Mr. Cunningham.

LESSONS LEARNED

- Contacting potential customers directly through surveys and by telephone was essential in designing the service to meet their needs.
- This project demonstrates that there is a market for high-quality transit services and that the success of the GO Shuttle service can be duplicated elsewhere.
- Since ridership increased by word-of-mouth from satisfied customers, marketing needs to be stronger and ongoing. "Ridership has levelled off and we need to keep the momentum," said Mr. Cunningham.

RELATED AND FUTURE INITIATIVES

Mr. Cunningham expects that the GO Shuttle service will soon be introduced to the other two stations, Meadowvale and Clarkson, identified in Mississauga Transit's initial survey. Meadowvale will begin receiving a shuttle service in fall 2002. Service to Clarkson will be recommended in the 2003 budget.



Based on future budget dollars and appropriate vehicles, the service may expand to other areas as well. Mississauga Transit plans to recommend that council introduce this type of service in other communities.

Ridership had levelled off by May 2002. Marketing and surveys of both customers and the shuttle bus drivers will occur in fall 2002 to see how the service can be improved. “Now that we know we can carry additional capacity and now that the pilot is part of our regular service, an advertising program can be developed to encourage increased ridership,” said Mr. Dubois.

PARTNERS

GO Transit

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WASTEWATER

Computerized Data Acquisition and Control System

Population: 2,000,000

SUMMARY

Although many municipal governments use computerized data acquisition and control (CDAC) systems in wastewater collection and treatment systems, the Greater Vancouver Regional District (GVRD) has adopted the technology for a new use. Utilizing the programmable features of the CDAC systems that were installed at two of its wastewater treatment plants, the GVRD has achieved impressive energy and chemical cost savings estimated at \$550,000 annually. For example, at both facilities, lighting systems were programmed using the CDAC system to operate according to occupancy and light level requirements, saving \$50,000 in energy costs per year.

BACKGROUND

The Greater Vancouver Regional District (GVRD) is made up of 21 member municipalities and provides air, water, wastewater and solid waste services, in addition to other regional services, such as air quality monitoring, parks, housing and regional planning. The GVRD provides regional wastewater collection and treatment service to 17 municipalities and one electoral area for a total service population of two million people.

In 1996, GVRD member municipalities endorsed the “livable region strategic plan,” a regional growth strategy that formed part of its sustainable region initiative. The CDAC system supports the vision of the GVRD’s wastewater treatment plant division to be “the safest, best run, most efficient, and innovative wastewater treatment utility in Canada.” The CDAC system also brings the division into line with the directions set out in the GVRD’s liquid waste management plan and the current sustainable region initiative.

PROJECT DEVELOPMENT

A CDAC system was installed at two of the GVRD’s five wastewater treatment plants. The computer system is connected to virtually all points and devices, and monitors all functions. The system not only allows staff to control operations and troubleshoot potential problems, but it also enables the GVRD to save thousands of dollars in operational costs.



CDAC systems were installed at the Annacis and Lulu Island wastewater treatment plants as part of their upgrades from primary to secondary treatment in 1997 and 1999, respectively. Primary treatment uses physical processes to remove solids from wastewater,



while secondary treatment uses biological processes to further remove dissolved organic matter. The secondary treatment process at Annacis and Lulu consists of trickling filters and solids contact tanks. A trickling filter is used inside a tank and is filled with a solid media, such as rocks or plastic packing material. As wastewater is “trickled” over the surface at the top of the tank, the bacteria that grows on the surface eventually dies and falls off the surface. The effluent then flows to the solids contact tanks.

The two plants provide secondary treatment services to about half of the two million people served in the GVRD. The Wastewater Treatment Plant (WWTP) division recognized that a higher level of automation, using a computerized system, would facilitate operations analysis and could increase plant efficiency. “Virtually every part of the treatment and support systems are fully automated,” said Rudy Palsenbarg, the WWTP division’s administrator. “Before that the process was essentially manually operated.”

A central control room in each plant provides information to the operators from all areas of the plant. Remote control centres are also located throughout the plants in strategic areas so that all plant equipment and processes can be monitored and controlled from any local area console.

PROJECT IMPLEMENTATION

Installation of the CDAC system, which began in 1995, was a complex undertaking that involved 44 process control view computer nodes and 45 distribution control systems. No local manual controllers were installed. Instead, 100 per cent reliance was placed on the CDAC system’s hardware and software. The CDAC system monitors and controls every piece of equipment, from boilers and generators to lighting and heating and ventilation systems. Many third-party devices were linked to CDAC, including programmable logic controllers and power measurement devices from the 600-volt motor control level up to the 69,000-volt plant feeds.

The data collected is continuously stored by the computers and can be easily retrieved for analysis. New computer logic and reporting tools are routinely being developed to link equipment operating conditions to process performance, operating costs and equipment availability.

A seven-person team runs the system. The team includes a supervisor, four logic and graphics personnel, and two system administrators. “With the expansion and upgrade of the two facilities, the way we operate wastewater treatment plants required significant change,” Mr. Palsenbarg explained. “Data and the accurate analysis of the data became king rather than ‘operational intuition.’ Operations staff members embraced the changes that came with the CDAC system because they saw immediate benefit to the ease of executing their duties.” In other words, the data and analysis enhanced human insight, knowledge and experience.

CDAC is also linked to the GVRD’s corporate information systems, providing full information on all operations and supplying additional services, such as:

- system training;
- electronic document management system implementation and support;
- process report creation;
- network design and maintenance;
- information technology support;
- process optimization; and
- test procedure creation and data gathering.

“Great emphasis was placed on providing system information to anyone in the organization,” said Mr. Palsenbarg. “The control systems group took a leadership role in ensuring that non-control system information, such as databases, operations manuals, drawings and safety procedures, were readily available in the field in electronic format to operations and maintenance staff to assist in decision-making.”

Six CDAC system applications to conserve energy and materials were part of this overall initiative, which began in 1995. The greatest economic and environmental benefits have come from the way the CDAC system was used to control the use of digester gas. “GVRD uses mostly anaerobic digestion in its biological process,” Mr. Palsenbarg explained.

“This results in the generation of digester gas that is used to produce heat and electricity for the plant.” At Annacis, there are two types of users for digester gas: boilers that produce hot water for space heating and treatment processes, and cogeneration units that produce both electricity and hot water.

Digester gas is produced continuously, but there are “swings” in heat demand, particularly in colder weather. Before the installation of the CDAC system, manual systems at the Lulu and Annacis plants were unable to respond to these demand swings. The boilers that supplement the required heat load would go to high fire, demanding more digester gas than was being produced. When demand exceeded the supply of digester gas, natural gas was burned. Because the manual system responded slowly and was unable to match the digester gas supply with demand, unnecessary flaring of digester gas would occur. Flaring gas contributed to the emission of pollutants and wasted available energy. A generator trim control strategy was implemented at Annacis to correct this problem.

Mike Kennett, supervisor of WWTP division control systems, explained how the generator trim control system works. “As temperatures drop at night, we get a high demand for digester gas from the boilers. The boilers have a firing range—low to high and modulating—and the higher the fire, the more the digester gas is used. When the boiler goes to high fire it consumes more digester gas than is available.” The trim control system recognizes that the boiler is demanding more digester gas than is available, and slows generators down to decrease the amount of overall gas required, allowing the boilers to maintain a high fire range. Or, if the boiler goes to a lower fire range and uses less gas, the system recognizes this change and increases the generator speed. Since the implementation of the CDAC system for generator trim control, the amount of digester gas wasted during cold weather has dropped by 9,000 cubic metres per heating day. On average, this means that 5,300 cubic metres per heating day of purchased natural gas can be saved.

Another benefit of using the CDAC system was the achievement of mechanical and chemical optimization in the “dissolved air flotation thickeners” (DAFTs). This optimization allowed for substantial reductions in the amounts of polymer (a chemical compound) used for thickening at the Annacis plant. On average, the polymer feed was reduced from 2.1 kg per tonne of solids to 1.6 kg per tonne of solids being processed in the DAFTs. Improved thickening performance was also noted.

The heating, ventilation and air conditioning system at the Lulu plant was centrally programmed using the CDAC system to operate according to occupancy schedules and zone-specific requirements. Variable settings were also made possible. More than \$72,000 in annual operating savings has been realized.

At the Annacis plant, the CDAC system was used to optimize the solids contact tank blower operation. All three 800 horsepower blowers were normally operated at full output, which resulted in an unnecessary waste of energy. Interfacing the blowers' programmable logic controllers with the CDAC system optimized the system. The software solution that was designed considered variables, such as air flows, valve positions, blower output, dissolved oxygen levels, air demand, and air supply. A drop of 220 kW in monthly demand and about two million kWh in annual electricity consumption has been attributed to the CDAC-based solution.

Owing to these efficiencies, the plant was able to take redundant equipment out of service. A total of 264 kW of fans, blowers and pumps were turned off, reducing equipment run-time hours that has extended equipment life cycles and decreased maintenance costs.

Mr. Kennett believes that, beyond automation, the CDAC system has effected a cultural change at the two plants. "Before CDAC, no one made changes to the processes except the full-time operations supervisor. Now, every day including weekends, the supervisor, lab technician and foreman review a series of spreadsheets produced by CDAC that report on process control data." In half an hour, staff can evaluate literally thousands of pieces of discrete information. "The continuous generation of information and real-time access allow staff to make instant decisions and prevent things from going wrong," adds Mr. Palsenbarg.

RESULTS

- Reduction in electricity demand has led to annual savings of \$50,000.
- Annual electricity energy savings of over 10 million kWh have led to annual savings of over \$300,000.
- 9,000 kilograms of polymer are saved per year, which amounts to \$46,000 in chemical savings.
- \$2,000 is saved in natural gas per heating day.
- There has been a daily reduction of over 10 tonnes of carbon dioxide emitted.

LESSONS LEARNED

- Educating and informing people about the system takes time and patience, but it was well worth it. "The only thing more important than the tools used is the quality of people using them," said Mr. Palsenbarg. "The accomplishments so far demonstrate that staff will strive for and succeed if fully supported and encouraged by all levels in the organization."
- The system's standards and integrity must be protected, particularly when bringing in new equipment or when changes to the existing controls are necessary.
- Better documentation early on would have helped in the initial stages of installing the system and would also have helped the operators better understand the changes involved.

RELATED AND FUTURE INITIATIVES

Using the experiences learned from the Lulu and Annacis plants, the GVRD is expanding the CDAC system to three other water treatment plants.

PARTNERS

External

Local gas and utility companies

Internal

Information Technology department

Operations and Maintenance department

Engineering department

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TOWN OF ROBLIN, MANITOBA

WASTEWATER



Tertiary Wastewater Demonstration Project

Population: 1,885

SUMMARY

As early as 1996, the Town of Roblin identified a need to manage excess effluent flow in its wastewater to alleviate overloading of irrigated lands with water and chemicals. The town constructed an engineered wetland to do the job, but went further than simple water treatment. Nutrients from the effluent are used for crop production, local waterfowl habitat has been developed, and a potential revenue source has been created from the sale of timber that is grown using treated effluent. The relatively low-cost, 40-acre wastewater treatment system has not only stopped the degradation of nearby irrigated land, but has created a new provincial standard with its zero-discharge capability.

BACKGROUND

At meetings held in 1997, residents and elected officials of the Town of Roblin began discussing the need to develop guiding principles and goals for the community. Owing to agricultural and environmental pressures on the town's existing wastewater treatment system, one of those goals was to find a solution for treating municipal and residential sewage.

The town uses a lagoon as its primary wastewater treatment system. Towns that use such systems often discharge the effluent into local streams or rivers during times of high water flow. This option was not available to Roblin. "We had been told that we couldn't discharge into the nearby Shell River because there was strong pressure put on the provincial ministry of the environment from a local lobby group," said Mayor Lorne Boguski.

In 1981, therefore, a 10-year agreement was reached with a local landowner who agreed to take all the lagoon's excess effluent to irrigate his hay crop. But when the agreement expired in 1991, the landowner would accept only some of the effluent at certain times of year. Under that scenario, the town would still have been faced with disposing of excess effluent during times of high rain and heavy snowfall.

Instead, the town purchased a section of land next to the landowner's. Then, with the assistance of the Prairie Farm

Rehabilitation Administration (PFRA) of the Government of Canada and the Province of Manitoba's Water Services Board, the town installed an irrigation system to carry the excess effluent to an alfalfa crop planted on the new land. The alfalfa crop now absorbed all the excess effluent.

The problem appeared to be solved, but around 1996, after several years of record rainfall in Manitoba, the amount of effluent doubled. For example, in the summer of 1993, rainfall for the province was double the annual average of 231 mm. The irrigation system was unequipped to deal with such an excess of effluent, and the land soon became overloaded with water and salt nutrients. "We drowned out the crop," said Mayor Boguski. "It had come to the point where we either had to buy more land and set up another irrigation system, or find an alternate method." The Province of Manitoba objected to Roblin's initial plan to buy more land for irrigation, and instead suggested that a wetland might be the solution.

PROJECT DEVELOPMENT

TetrES Consultants Inc., an environmental services company in Winnipeg, was hired to analyze the town's options. Two of the eight possibilities developed by the company were chosen based on cost and environmental issues:

- an engineered wetland, and
- a hybrid poplar plantation.

The wetland would provide comprehensive treatment of the town's municipal and residential sewage in an environmentally sustainable manner. It would also act as a secondary system, complementing the existing lagoon and irrigation systems, and providing thorough treatment of wastewater while maximizing the recovery of dissolved nutrients to fuel the growth of wetland vegetation.

The hybrid poplar plantation would provide seepage control and, because the trees require a great deal of moisture for growth, excess effluent could be used to irrigate the plantation.

PROJECT IMPLEMENTATION

In January 1996, the town purchased 80 acres of land next to its lagoon system, of which 40 acres is used for the wetland and 20 acres for the poplar plantation. Volunteer teachers and students from Roblin Goose Lake High School (under the supervision of PFRA, which also oversaw the wetland



construction project) seeded the wetland in spring 1999 and harvested seeds in fall 1999, in time for the 2000 planting season. The wetland was fully operational by summer 2001.

The lagoon and the wetland each have four cells. Liquid from the fourth lagoon cell is pumped into the wetland. As the liquid flows through each of the wetland's cells, floating and rooted plants (cattails, bull rushes, reeds, sedge, and other marsh grass plants) improve water quality by removing nutrients, such as phosphorous and nitrogen that are necessary for plant growth. "The cattails and bull rushes, in particular, experienced very good growth in 2001," said Mayor Boguski. "As they become more and more mature, they'll be able to use most of the phosphates and nitrates."

A total of 12,500 hybrid poplar trees have been planted around the wetland. New trees will be planted as older trees mature and are harvested. "Poplars have a high affinity for water," Mayor Boguski explained, "so any seepage or leakage is used up by the root systems. The whole idea is that, as the trees grow taller, new ones will be planted in between for a continuous rotation. If we ever need to discharge from the wetland, they will take up the extra [water]." It is anticipated, however, that no discharge from the wetland will be required except in abnormally wet years. The plantation, known as the Aspen Parkland, also provides additional wildlife habitat and local schools use the area for educational tours.

The town set aside a budget of \$350,000 to construct the wetland, but actual costs were approximately \$285,000. "It's a much lower cost to pay than if we were to purchase additional land," said Mayor Boguski.

The wetland complements the irrigation system that was already in place. "When the land we were irrigating became saturated with salt, we recultivated it, sowing a combination of salt-tolerant and water-tolerant grasses," Mayor Boguski explained. "We also pump excess water into the wetland so that irrigation doesn't drown out that land. It's a safety valve for the irrigation system."

These innovations have improved the town's ability to properly dispose of its effluent and have eliminated the need to discharge into the Shell River. "While we were constructing the wetland, we had a licence from the province

to discharge into the Shell River, but from this point on, with proper monitoring, we shouldn't have to do that," said Mayor Boguski. In fact, high levels of phosphates had been found in the town's lagoon in the past. The wetland has reduced phosphate levels to the point that any water discharged from the wetland into the Shell River would be cleaner than the water already flowing in it.



Mayor Boguski believes that patience and sheer determination were the deciding factors in completing this project. "I give the community a lot of credit because they've lived through this since 1981," he said. "Today we have a greater commitment from our public works department, the community and town council, because we proved that there was a bright light at the end of the tunnel."

RESULTS

- The wetland has created and restored habitat conservation in the area, particularly for local water bird species.
- Opportunities have opened up to enrich the high school science curriculum.
- The irrigated land has been protected from water and chemical overloading.

LESSONS LEARNED

- The decision-making process needs to be open and transparent to enhance the co-operation and understanding of all the stakeholders. During the entire process, the town consulted citizens, gained an understanding of their views and involved them in ongoing evaluations.
- Technical support from TetrES was key, since expertise was not available in-house. The project also highlighted the need for a stronger relationship between the town's public works department, council, the Manitoba Water Services Board and PFRA. As an example, the town is a participant in the Partnership Agreement for Municipal Water Infrastructure (PAMWI) that provides cost-sharing of capital works to improve municipal water supplies. PAMWI covered a portion of the costs of the town's wetland construction project.



TOWN OF ROBLIN, MANITOBA

RELATED AND FUTURE INITIATIVES

Louisiana Pacific, one of North America's largest suppliers of building products, operates in the Roblin area. The Aspen Parkland poplar plantation may be a potential revenue source for the town if the company opts to harvest the trees.

PARTNERS

External

TetrES Consultants

Ducks Unlimited

Prairie Farm Rehabilitation Administration
(Government of Canada)

Province of Manitoba Water Services Board

Save the Shell River Group

Roblin Goose Lake High School

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WATER

Relocation and Restoration of Upper Blenkinsop Creek

Population: 107,574

SUMMARY

A tributary of the Colquitz River, the Upper Blenkinsop Creek had been severely degraded by agriculture and urban development over the last century. Working closely with the farmer whose land included part of the upper creek, the Corporation of the District of Saanich relocated and restored the creek to its original stream channel. Native plants were also restored, increasing plant cover and bird habitat. In fact, there was an almost immediate increase in the number of bird species inhabiting the area—a boon for farmers, as the birds feed on insects that farmers would have otherwise controlled with chemical pesticides. The number of service roads was reduced from two to one, and viewing platforms and interpretive signs are to be installed at various locations along the creek for educational purposes.

BACKGROUND

The diverse natural environment of the Saanich region coexists with a growing metropolitan area of residential development and intensive agriculture. In its official community plan, the District of Saanich recognizes this “uncommon pattern” as a feature greatly valued by residents, but one that needs to be protected for future generations. Therefore, the official plan emphasizes projects that meet the district’s goals of sustainable development, community involvement and environmental protection. Saanich has also been a participant in FCM’s Partners for Climate Protection since 1996 and has committed itself to reducing greenhouse gas emissions.

The area’s shorelines and waters are of special value to the community. In particular, municipal watersheds, such as the Upper Blenkinsop Creek, are to be maintained and enhanced as a central element of community planning.

The district’s past approach to solving municipal agricultural issues tended to be short-term and reactive. Stakeholder concerns and environmental management practices were often not fully addressed. In contrast, the relocation and restoration of the Upper Blenkinsop Creek is an example of



a long-term approach to problem solving that has required the district to reserve more time for environmental permitting and public consultation.



PROJECT DEVELOPMENT

The Upper Blenkinsop Creek is a tributary of the Colquitz River. A portion of the creek runs through private farmland. Over a century ago, forest covered much of the area. With an increase in agricultural activities in the early 1900s, the creek had been converted into a drainage channel, primarily for irrigation purposes and flood control. Over time, this activity affected water quality downstream. More recently, urban storm water from a development north of the creek had also degraded downstream water quality. What was once a thriving natural habitat had become nothing more than a drainage ditch that crossed a farmer’s field.

Starting in late 2000, concerned local groups began meeting with district staff and councillors, and federal and provincial regulators. They developed a comprehensive watershed management plan that included the relocation and restoration of the Upper Blenkinsop Creek.

Aqua-Tex Scientific Consulting Ltd., the environmental consultant hired to oversee the project, used a technique known as “proper functioning condition assessment” to make recommendations on how best to proceed with the relocation and restoration of the creek. “That assessment technique involved looking at before and after conditions to determine the best strategy to address the concerns of the creek,” explained Peter Sparanese, manager of capital works for Saanich.

The relocation and restoration of the creek was the result of a collaborative effort, involving many of the district’s municipal departments, non-profit organizations, provincial and federal departments, the University of Victoria, and public and private schools. Mr. Ray Galey, the farmer whose land the creek crossed, was a major partner and instrumental in moving the project forward.

“Mr. Galey has been a farmer in the area for 20 to 30 years,” said Mr. Sparanese. Over the years, Mr. Galey had noticed a decline in bird species, and a corresponding increase in insects, causing him to use more pesticides to protect his crops.

PROJECT IMPLEMENTATION

A team of experts was first created to design and implement the project. The team consisted of hydrologists, botanists, fisheries biologists, aquatic ecologists, educators, engineers, scientists and heavy equipment operators. Before any work began, senior restoration specialists, district staff, and provincial and federal regulators conducted an external peer review of the design.

Six hundred metres of the creek were realigned to the edge of Mr. Galey's field and adjacent to the vegetation growing along a segment of the district's 'Lochside' regional trail. The flood plain and channel circuit were restored and volunteers planted vegetation along the new channel. Many of the groups involved belong to Conservation Connection, a network of local conservation and stewardship organizations.

The creek originally separated Mr. Galey's farmland into two parcels. The relocation merged the two parcels, eliminating a now redundant second irrigation system and increasing the amount of productive farmland by two acres—a five per cent increase on this 40-acre farm. "It has improved the overall operation of how Mr. Galey irrigates his land, and the cost of watering and equipment maintenance in the long term," Mr. Sparanese said. Merging the land also reduced the number of roads Mr. Galey needed to service his fields.

The restored creek soon attracted new life to the area. "Before we did this, the creek was essentially devoid of any vegetation or habitat," said Mr. Sparanese. "Now there are trees that canopy the creek and that has brought back bird species that feed on the insects." After only one year, Mr. Galey has reported a 10 per cent decrease in the amount of pesticide used. "He has become a big promoter of the project and he's telling other farmers about the benefits he's experienced."

The creek also had a positive effect on the way the district handles watershed management. Because of the successful outcome of the creek restoration project, according to Mr. Sparanese, the district implemented a bylaw that improves its storm water management.

The project's success can be attributed to the combined efforts of all the partners. "Patrick Lucey (an aquatic ecologist with Aqua-Tex Consulting) brought all the key players on board at an early stage and that removed any potential barriers," said Mr. Sparanese. "[The federal department

of] Fisheries and Oceans was impressed with the proactive approach—that a municipality was looking at ways to improve its water quality before it went downstream and affected fish stocks."

Mr. Sparanese also reserves praise for the Swan Lake Christmas Hill Nature Sanctuary, and its executive director, Mr. Terry Morrison. "The sanctuary played a critical role and agreed to work with us by managing the financial aspects of the project. They've been building on the project as well by using the area as an interpretive centre to educate the community and school groups."

RESULTS

- The stream channel and vegetation have been restored to their approximate historical conditions.
- Interpretive signs, describing the types of vegetation planted, and viewing platforms will be added to regional trails, giving the community an opportunity to learn more about the creek and its restoration.
- Once the vegetation matures, it will reduce sediment erosion that has historically caused significant downstream habitat degradation and enhanced eutrophication of Swan Lake. Eutrophication can be hastened by human activities when runoff from sources, such as lawns, golf courses, and farmers' fields, bring excessive levels of plant nutrients (primarily phosphorus, nitrogen and carbon) to bodies of water. The nutrients promote the growth of algae or other plants that can affect water quality and disturb the ecological balance.
- The farmer has gained more arable land and a sustainable way to control pests.

LESSONS LEARNED

- Involving many partners was critical to achieving successful results. "It's amazing how much we accomplished together instead of individually," said Mr. Sparanese. "Two heads are better than one!"
- A significant amount of marine clay was discovered mid-way through the excavation of the realigned stream channel. Digging it out required four times more handling than had been budgeted and the clay could not be mixed with other soils on-site. Additional costs were incurred to remove the clay by truck and to rebuild the farmer's road,

which had suffered from the truck traffic and other work by heavy machinery. The final project evaluation included a recommendation to require a soil profile in future projects.

- A geotechnical profile should have been used to integrate more fully the design and reduce the costs associated with materials handling, transportation and construction.

RELATED AND FUTURE INITIATIVES

This project will serve as a benchmark for the future restorations of the Cumberland and Big Barn Creeks. “It’s a working example of how a stream restoration in an agricultural community can be done without negatively affecting the farm,” said Mr. Sparanese.

The project has also been highlighted at a storm water management workshop held in the Capital Regional District.

PARTNERS

External

Aqua-Tex Scientific Consulting Ltd.

Conservation Connection

Fisheries Renewal BC’s Salmonid Renewal Program

Swan Lake Christmas Hill Nature Sanctuary

B.C. departments of the Environment and Municipal Affairs

Galey Bros. Farms

Environment Canada

Fisheries and Oceans Canada

Natural Sciences and Engineering Research Council
of Canada

University of Victoria

Pacific Christian Academy

Glen Lyon Private School

District of Saanich School Board

Internal

Engineering, Planning and Environment, Parks, and Public
Works departments

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WATER



Protecting Water Supplies at the Source

Population: 458,000

SUMMARY

Unlike other large urban centres, the Regional Municipality of

Waterloo depends on local water resources for its municipal water supply. The region's challenge was to create a proactive program that preserved and improved water quality, and reduced the risk of contamination from future land uses. The water resources protection strategy includes planning policies to limit high-risk business development near municipal water supplies, and financial incentive programs for existing businesses and farmers to carry out appropriate actions. Farmers have implemented new measures, such as installing manure storage facilities, fencing around creeks, and tree planting, that improve and protect water quality. The farming community has responded so well to the programs that there has been a 360 per cent increase in the number of environmental farm plans completed since 1998. The success of the incentive programs rests on the excellent relationship the region has forged with the farming and business communities.

BACKGROUND

In 1994, the Regional Municipality of Waterloo adopted a water resources protection strategy (WRPS) that included a 10-year program to preserve and improve the quality of water resources. The region initiated the strategy in response to concerns over degrading water quality, and in recognition of its responsibility to provide a clean and safe public water supply. "The region had a couple of incidents in the late 1980s and early 1990s," said Eric Hodgins, manager, water resources protection. "One was industrial contamination in Elmira that contaminated the town's entire water supply."

Unlike other large urban centres in Ontario, 126 groundwater wells supply 75 per cent of the region's water, with 25 per cent coming from the Grand River. "Municipalities like Ottawa or Toronto are on a big river or near the Great Lakes, but we're land-locked and are totally reliant on local water resources," said Mr. Hodgins. Ensuring a safe and viable municipal water supply is important to the future sustainability of the region. In April 2001, the region endorsed a recommendation to develop a 30- to 40-year smart growth plan entitled "Waterloo

Region in the 21st Century... Planning our Future." The plan includes eight goals, including protecting the region's water resources.

PROJECT DEVELOPMENT

The region's water quality and quantity are affected by industrial and agricultural land uses. Its prosperous agricultural lands are under ever-increasing pressure from economic growth. Its industrial community encompasses a wide variety of small to medium-sized businesses, including chemical and auto parts manufacturers and pharmaceutical companies. The WRPS aims to minimize impacts on water resources from these types of land uses and reduce the risk of impacts from future land uses.

To establish baseline information, the region compiled extensive technical material. This included a 1995 inventory of potential contaminant sources that was used to assess risks to the water supply and to develop a discussion paper identifying options for dealing with each type of potential problem. Wells were mapped and other water management programs were also researched. "It was a considerable amount of work to map and understand the groundwater resources, wellhead protection areas and groundwater flow system," said Mr. Hodgins. "We also had a lot of discussion with other municipalities across North America. We canvassed many agencies in the United States where source water management programs are further along."

The region implemented incentive programs for farmers and businesses, and developed planning policies to limit new high-risk businesses from establishing themselves near water supply wells. "First came education and awareness. The regulatory parts came later. That's important because it gave people the opportunity to understand and change on their own before being required to do so," said Mike Murray, commissioner of transportation and environmental services. "The incentive programs are unique in Ontario in terms of a municipality providing significant funding to farmers to protect water quality."

The region lobbied the Province of Ontario to create a development permit act that would provide municipalities with a way to require best practices from businesses as they expand their operations. "The region is the only community of the five included in the act to use it for groundwater protection," said Mr. Hodgins.



The WRPS is financed through municipal water rates. “Regional council is very supportive of source water protection and the need to allocate money to it,” Mr. Murray said. “In particular, Regional Chair Ken Seiling, who lived in Elmira during the groundwater contamination in the late 1980s, has been one of the program’s most significant supporters.”

PROJECT IMPLEMENTATION

While the WRPS was initiated in 1994, program and policy development began in late 1998, and focused on three elements:

- planning policies for new business development near municipal water supply wells;
- a Rural Water Quality Program (RWQP); and
- a Business Water Quality Program (BWQP).

The RWQP and BWQP are financial incentive programs that assist farmers and businesses to implement measures to protect water quality.

A good example of an RWQP project is building fences that keep cattle out of creeks. “We provide 75 per cent of the cost of the farmer installing a fence over a given length of creek,” Mr. Hodgins explained. The region also funds 50 per cent of the cost to construct new manure storage facilities. “From a water protection perspective, manure storage can affect both surface water and groundwater quality. We fund different practices in different locations, depending on what might be affected,” said Mr. Hodgins.

An example of an activity supported by the BWQP is the construction of secondary containment units around chemical storage tanks. The region provides 50 per cent of funding (up to a maximum amount) per facility for the business to conduct an environmental assessment and then implement specific water quality improvement projects, such as a containment structure, or to deliver employee training. The BWQP is also linked to other local pollution prevention programs for energy efficiency and reduction of toxic substances, which allows the region to present a “one-window” service to businesses.

“We partnered with the Grand River Conservation Authority to deliver the rural program,” said Mr. Hodgins. “They had credibility with the farmers and the staff. On the business

side, we partnered with a not-for-profit organization [Ontario Centre for Environmental Technology Assessment] that delivers the program on our behalf. Companies are more comfortable when the approach is at arm’s length from regional government.”

The region worked with representatives in both the farming and business communities to develop the incentive programs, to take advantage of their expertise, and to address any concerns. “We asked them how to implement the programs in a way that worked for them and met our goals,” said Mr. Hodgins.

Working with the Mennonite farming community involved a different strategy. Conservation Authority staff used word of mouth in the Mennonite community and churches to publicize the program, explained Mr. Hodgins. “Essentially, we were able to get one or two farmers involved and it just took off. For example, if one farmer did a fencing project, neighbours would come to a community meeting to learn more because they liked what they saw. They also know that additional regulations are coming, so they’ve become very proactive,” he added.

The most challenging initiative the region undertook was to amend its official plan to implement its groundwater protection planning policies. The region first designated the areas to be protected in order to make decisions about what kind of industrial development could be sited near the wells. Second, the region had to determine how certain areas should be managed when existing businesses want to expand.

The region informed the business community by sending information to thousands of area firms and holding meetings with local economic development offices. Although the business community is supportive of implementing best management practices, it does not want a “heavy-handed” approach, according to Mr. Hodgins. “Many firms said that the risks were not as great as we thought they were, and were more comfortable with implementing engineering solutions and best practices than regulations,” he said.

For Mr. Murray, the experience highlights the balance that needs to be struck between environmental protection and economic development. “We’re trying to promote the idea that the two are inextricably linked. It’s a challenge to develop and communicate that message, but environmental protection and a safe, secure water supply are critical for economic development.”



REGIONAL MUNICIPALITY OF WATERLOO, ONTARIO

RESULTS

- It has cost roughly \$6.8 million to implement the WRPS between 1998 and 2002. By contrast, it costs \$7.8 million to \$10 million to replace one medium-size well field. Protecting groundwater sources reduces the need to build new wells if a well becomes contaminated. “It’s always difficult to measure [the financial value of] prevention,” said Mr. Murray. “You can’t quantify the social cost of a significant groundwater contamination incident.”
- The region is the first municipality in Ontario (and perhaps in Canada) to finance a source water quality incentive program specifically for the agricultural sector.
- An estimated 6,500 kilograms of phosphorous per year has been prevented from reaching local rivers and creeks.
- The WRPS has generated a 360 per cent increase in the number of environmental farm plans completed since 1998, and protects public health by identifying contaminated sites and addressing problems before they affect the water supply.

LESSONS LEARNED

- The region was optimistic that the strategy would be implemented quickly and easily. As it progressed, however, staff realized that the region was embarking on a larger process to change the attitudes that people hold towards water conservation and protection. “We’ll never be able to say ‘we’re done’,” said Mr. Murray.
- The success of the RWQP and BWQP rests on the excellent relationships the region forged with the farming and business communities.

RELATED AND FUTURE INITIATIVES

A further \$1.5 million has been approved in principle by regional council to implement a second, five-year rural quality water program. Staff is developing an implementation program to guide the WRPS through its second decade.

PARTNERS

External

- Grand River Conservation Authority
- Ontario Centre for Environmental Technology Advancement

Economic development staff from the municipalities of Cambridge, Kitchener, and Waterloo

Representatives from over 20 local and provincial farm associations, and from over 30 local businesses and business associations

Four local environmental consultants

Internal

Planning, Housing and Community Services department

Community Health department

Legal Services division

Water Services division

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INTEGRATED

City Hall School

Population: 876,519

SUMMARY

The City of Calgary is putting the familiar phrase “children are our future” into action. A collaboration between the city and other partners, “City Hall School” promotes better understanding among students of the role of municipal government. Classrooms are moved into city hall for a week. Using real-life examples, students examine social and environmental issues in greater depth than occurs in regular class or at home. Parents learn alongside the students and teachers, and city staff is able to share its expertise with new audiences. Calgary is going beyond the “bricks and mortar” of community development by investing in its social infrastructure to create a sustainable, vibrant community for the future.

BACKGROUND

The city’s strong commitments to youth and to the health, safety and well-being of the entire community provided the necessary backdrop to implementing the City Hall School. In the spring of 2001, the city set forth its policy and direction in “One Future, the City of Calgary’s Commitment to Youth,” which recognizes that decisions at all levels, and in all areas, can affect the lives of young people. Consequently, policies and decisions are continually evaluated to determine if they affect the lives of youth, and to ensure that any effect is positive.

Also that spring, the city completed its report based on the Calgary data drawn from FCM’s Quality of Life Reporting System. The system monitors the social, economic and environmental health of communities, and employs eight sets of indicators: population resources, community affordability, quality of employment, quality of housing, community stress, health of the community, community safety, and community participation.

PROJECT DEVELOPMENT

City Hall School is an extension of the Campus Calgary/ Chevron Open Minds Program. In 1993, Gillian Kydd, who works with the Calgary Board of Education, developed the model with students who spent a week at the Calgary Zoo. She understood that students on field trips were so overwhelmed with the novelty of the visit they often forgot



the information imparted during the day. Therefore, she designed a week-long experience for children to learn theory and practice on location over a longer period. This approach also gives students the luxury of slowing down and reflecting on the issues they study, two factors that are critical to learning. The program was so successful it soon expanded to many other sites. A Calgary alderman heard of the program’s success and became so enthused with the idea that he got the ball rolling for the City Hall School.



In the past, municipal staff visited classrooms to make presentations to students, but these were not part of a coordinated or integrated program. As part of its commitment to youth, the city wanted to engage young minds in the business of municipal government as part of a larger strategy on sustainability. “We’ve seen declining numbers coming out to municipal elections, particularly in young voters, which is a troubling trend,” said Lesley Taylor, manager of the city’s community priorities division. “As our economy stays strong, there will be pressures from more people coming to town, pressure on infrastructure, and a more diverse community. Those challenges won’t go away. We need our citizens, including young people, to work with us and help shape that future.”

Ms. Taylor believes that educating young people is the “ultimate in sustainability. If youth, our future leaders and citizens, value the environment and a vital community, our efforts today will have succeeded,” she said. “It’s part of our agenda to make Calgary a better community.”

Before classes could be held at city hall, the city’s corporate properties business unit transformed a street-level committee room into a bright and inviting child-friendly space. City Hall School organizers wanted a storefront operation where passersby could see the children at work and observe their excitement and energy.

PROJECT IMPLEMENTATION

City Hall School opened its doors in March 2000 to six pilot classes. The city and the Max Bell Foundation (which supports innovative endeavours to encourage the development of human potential in the pursuit of social, academic and economic goals) provide joint funding.



CITY OF CALGARY, ALBERTA

Interested teachers must design and implement a long-term, interdisciplinary program of study that uses the week at city hall as a catalyst for learning. “We meet with the teachers and talk with them about their focus,” said Ms. Murray. “They have to say how it fits into their year.” Once a class has been accepted, Ms. Murray arranges for the appropriate municipal staff to make presentations on-site.

Students go to their regular school each morning, but then they board a Calgary Transit bus that brings them to city hall. Calgary Transit has supported the program. “It’s also a way to increase their ridership and get the message out about environmentally friendly ways of getting around,” said Ms. Taylor. “It is a highlight of the day for some students because we have kids who’ve never ridden on a city bus before.”

Classes are accepted from every school board—public, private, Catholic or charter—and the program tries to balance participation by higher-needs schools versus those in wealthier socio-economic locations. Between 2000 and 2002, roughly 2,000 students from grades two to eight have attended City Hall School.

Virtually every city business unit has been involved in the program over the past two years, and there is no limit to what students may study:

- environmental issues, which have included waste and recycling, landfill issues, and water treatment;
- the city’s art collection and heritage buildings;
- animals that work for the city—the police canine unit, for example;
- forensics and emergency medical services;
- media;
- geographic information systems and how the city uses technology;
- careers with the city; and
- social issues, such as population diversity, youth, poverty, homelessness, and affordable housing.

Since the interests of teachers and students drive the program, every week’s activities are custom-made. Ms. Murray offered a timely example. “After September 11, 2001, we had a lot of kids asking about security,” she explained. “One class staged a mock disaster. Some of the children had come from a part of

town with a high immigrant population, including Bosnia and Afghanistan, and those children found it very reassuring that someone would be there to help them if there was an emergency.”

Aldermen visit the classes, giving them the chance to meet with their young constituents, and students also meet with the mayor during the week. The program has also captured the interest and commitment of municipal employees, and has tapped into the passion they bring to their work. “When I talk with staff about their jobs, they begin to see how interesting it can be to a young person,” said Ms. Murray. “They start looking at their jobs differently.”

Parents are also encouraged to volunteer in order to learn alongside students and to assist the coordinator and staff with projects and field trips. Many parents are unaware of the range of city services, so their involvement fits well with the city’s aim of providing more information about the role of municipal government in the community.

One of the major tenets of City Hall School is to slow things down, to look deeply at issues. Children and parents are encouraged to record their thoughts and feelings in journals while at city hall or any other municipal site they may visit. “There’s a lot of emphasis on sketching and writing in every class because it’s part of the philosophy,” said Ms. Murray. “It gives students and parents time to reflect and that’s crucial to learning.”

RESULTS

- Staff has embraced the program. More staff members are volunteering than can be accommodated, and the program is considered a great way to increase morale among employees.
- The students know they have made a difference. For example, Calgary’s Parks department sought the input of one class for its five-year program plan. Another class provided urban planners with suggestions on what factors make up a youth-friendly neighbourhood.
- More than 60 teachers, 700 parent volunteers, 40 student teachers, and about 200 city staff members have been directly involved in the program.
- Demand is high, with more requests by teachers than the program can deliver over the school year.



LESSONS LEARNED

- The Calgary Board of Education supports the program. Diane Murray was seconded to the City Hall School from the Calgary Board of Education. Her presence was a critical success factor. With 25 years of teaching experience, Ms. Murray has an excellent understanding of the curriculum and the challenges that teachers face.
- Good communication with teachers and students, both before and during the on-site classes, alleviated the concerns of municipal staff members. “If the students are respectful of the need for people to do their jobs, it opens doors for them,” said Ms. Murray. “When staff realize how cooperative the kids can be, we can get a lot further in [to the topic at issue] because staff know that the kids know the rules.”

RELATED AND FUTURE INITIATIVES

During the 2002-2003 school year, City Hall School hopes to encourage participation from more high school classes, and is looking at ways to use city data in math projects. Another area that Ms. Murray believes will be of particular interest to teenage students is the city’s human resources business unit and opportunities for career planning.

Campus Calgary and City Hall School organizers have been assisting the City of Moncton, New Brunswick, in developing a similar program.

PARTNERS

External

- Max Bell Foundation
- Campus Calgary Open Minds
- Calgary Catholic Board of Education
- Calgary Board of Education
- Calgary Foundation

Internal

- All city business units

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Whistler. It's Our Nature

Population: 10,000

SUMMARY

Whistler. It's Our Nature will inspire any municipal government that wishes to encourage sustainable

practices throughout the community. Stemming from a community visioning exercise that began in 1997, and building on an international framework called The Natural Step, the Resort Municipality of Whistler (RMOW) has begun to engage its entire community—from residents and schools to businesses and municipal government—in working toward environmentally sustainable practices. This rapidly growing community has already created an award-winning pedestrian-oriented village, completed a bicycle master plan that focuses on commuter transportation, and established the Environmental Legacy Fund, which is financed through excess landfill tipping fees.

BACKGROUND

During the late 1980s and early 1990s, Whistler grew so rapidly that many residents questioned whether such growth was in the best interests of the community and the local environment. The Association of Whistler Area Residents for the Environment (AWARE) was particularly vocal in its concerns to council.

A new council and mayor were elected in 1996. Early in 1997, they began to flesh out a vision for the community into the 21st century. This effort brought renewed focus to the interrelated social, economic and environmental issues in the community. Council sought feedback through public consultation, informal workshops, interviews among its own members, municipal staff and community partners, and a re-examination of community surveys carried out in the past. The result was Whistler 2002—Charting a Course for the Future, a plan that articulates the resort municipality's vision, values and priorities. Five priorities, each given equal importance, were identified:

1. Building a stronger resort community;
2. Enhancing the Whistler experience;
3. Moving toward environmental sustainability;
4. Achieving financial sustainability; and
5. Contributing to the success of the region.

PROJECT DEVELOPMENT

In response to strong community support, the RMOW developed the Whistler Environmental Strategy (WES) in late 1999. Given that the WES was a complex document, the RMOW realized that, in order to ensure collaboration from major community stakeholders, it would need a way to communicate the plan.

A few months later, in March 2000, Dr. Karl-Henrik Robèrt, a Swedish oncologist and sustainability expert, happened to be in Whistler on vacation. Dr. Robèrt is the founder of The Natural Step, a framework for sustainability based on natural cycles and scientific principles. In Sweden, more than 70 municipalities and 60 corporations—Ikea and Electrolux among them—have adopted the framework.

Dr. Robèrt made three presentations about The Natural Step to interested members of the Whistler community. Following these presentations, an “early adopters” group was formed to create and communicate a common understanding of sustainability to the community. The early adopters group included the RMOW, Whistler and Blackcomb Mountain Resorts Ltd., the Fairmont Chateau Whistler, Whistler's Fotosource, The Natural Step (Canada), Tourism Whistler and AWARE. Their partnership led directly to the development of *Whistler. It's Our Nature*, a community-wide program that promotes and supports a more sustainable Whistler.

At its root, The Natural Step framework relies on a shared understanding of why sustainability is important, and encourages communities and organizations to picture how they would operate in a sustainable society. An organization's practices are compared with its long-term sustainability objectives to determine current unsustainable practices and opportunities for action.

PROJECT IMPLEMENTATION

The Whistler Centre for Sustainability, a non-profit organization, has been created to administer the *Whistler. It's Our Nature* program. Initially, the centre will be directed by a cross-section of senior members of the community, including representatives from the RMOW, Tourism Whistler, Fairmont Chateau Whistler, Whistler and Blackcomb Mountain Resorts Ltd., AWARE, and the Whistler Chamber of Commerce.

In November 2000, the Canadian branch of The Natural Step (TNS Canada) delivered a “train the trainer” program for each of the early adopter organizations. TNS Canada then delivered a more extensive level-two training program in summer 2001. Dave Waldron, the RMOW’s environmental services manager and coordinator of *Whistler. It’s Our Nature*, reported that this peer-to-peer model has been generally well received because the message is spread out among many different sources. He also cited the value of having the group of facilitators who represent all the early adopters function as a “learning community” in which solutions to common challenges can be explored through brainstorming exercises.

The first event directed toward the community was a sustainability symposium in December 2000 to learn more about The Natural Step framework and what the RMOW had already accomplished. This symposium was followed by the “Leadership through Sustainable Innovation” speakers’ series held between October 2001 and March 2002. The series included a short multimedia show used to launch the initiative to the community, and presentations by sustainability advocate Ray Anderson of Interface Inc. and Dr. Karl-Henrik Robèrt.

Sustainability tool kits were produced and distributed in February 2002 to over 3,000 households. The tool kits were meant to provide a simple explanation of sustainability, and offer some simple tips for more sustainable practices in the home.

School and small business tool kits have also been produced but not yet distributed as of summer 2002. There were concerns that, without a dedicated school coordinator to run a sustainability program, the tool kit alone would not lead to successful outcomes. The business community expressed similar reservations, so the centre is designing a more comprehensive program. “It could include the tool kit, a recognition program, a sustainable suppliers registry, time with trained facilitators, and perhaps a business licence rebate program,” said Mr. Waldron.

RESULTS

The results of the *Whistler. It’s Our Nature* program come in two main forms—widespread awareness of sustainability and tangible examples of more sustainable practices.

Awareness:

- The RMOW made sustainability concepts easy to understand by starting with a common framework and tailoring its message to specific sectors.
- The speakers’ series has helped to create widespread awareness of the advantages of more sustainable business practices.
- Forty people from the early adopters group were trained in the November 2000 training session. Twenty people were trained in the level-two session. These facilitators are now able to act as a network to help other early adopter staff become engaged.
- The most important result of the RMOW’s willingness to embrace sustainability concepts may be that these ideas have become commonplace at virtually all levels of municipal government and the community.

Sustainable practices:

- Completed comprehensive community energy and transportation strategies, leading to an increase in public transit ridership from 325,000 riders in 1991 to over two million in 2000. A community and regional ridesharing program was also launched, and bicycle and ski racks have been installed on all transit buses.
- Installed geothermal heat exchange systems for heating and cooling at the Spruce Grove Community Building and the Beaver Flats housing project.
- Negotiated the implementation of green building concepts in several new buildings that were subject to rezoning applications.
- Adopted two new watershed management plans.
- Protected the 56-hectare Emerald Forest Lands within a larger protected areas network.
- Implemented a chemical-free weed and pest control program in all municipal parks.

- Community partners have also achieved significant energy and waste reduction. For example, Whistler and Blackcomb Mountain Resorts Ltd. reduced waste by 19 per cent, and Tourism Whistler reduced energy use by 19 per cent over one year. Slopeside Supplies, a major local supplier to area restaurants and lodges, started its own program of “greening” its supply chain to purchase more environment-friendly products.

LESSONS LEARNED

- The key lesson is that a business, a municipality, or an individual can act to make a community more sustainable, but it cannot be done overnight, and a strategic plan and shared framework are vital.
- The real strength of *Whistler. It's Our Nature* is that it has grown out of a community partnership of early adopters, in which all partners help guide the program's development.
- Working from both the top down and the bottom up is critical. Senior management must foster an environment that allows for grassroots initiatives from employees, and must provide staff time and funding for initiatives that follow The Natural Step framework.

RELATED AND FUTURE INITIATIVES

The Whistler Centre for Sustainability will continue to promote and support sustainability concepts. The centre has plans to expand programs for youth, businesses, residents and visitors, becoming a strong advocate for more sustainable practices within all sectors of Whistler and beyond.

The RMOW has also embarked on a new initiative called *Whistler. It's Our Future*, a process for developing a comprehensive sustainability plan. This process will engage the community to determine its collective vision for a sustainable Whistler, likely leading to transformation of the official community plan and other strategic policies.

PARTNERS

External

The Natural Step (Canada)

Fairmont Chateau Whistler

Whistler and Blackcomb Mountain Resorts Ltd.

Whistler Fotosource

Association of Whistler Area Residents for the Environment

Tourism Whistler

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<http://www.naturalstep.org/>

2002 Honourable Mention

WATER

Water for Tomorrow Student Education Program

Population: 792,150

SUMMARY

Water conservation devices and technology will take a community only so far in protecting its water resources. It is vital that consumers also be educated, and what better way to start than with youth? The Water for Tomorrow program was developed for the grade 7 and 8 science curriculum and, as of 2002, has been delivered to 30,000 students. Resources, such as a teacher's manual and student handbook, are easy to use. Although long-term benefits are often difficult to quantify, the Regional Municipality of York estimates that the program will save several hundred thousand cubic metres of water each year, which has a financial value of over \$150,000. These savings mean that the \$450,000 it has cost to deliver the program since its inception in 1998 will have been recovered in less than three years.

BACKGROUND

The Regional Municipality of York adopted an official plan, Vision 2021, in 1994. It described the shape and direction for growth of the region and emphasized the protection of its natural resources.

In July 1997, as part of its commitment to a healthy environment, the region asked United Utilities Canada Limited to complete a long-term water project master plan to identify strategies to meet anticipated water demand to 2036. The plan identified four primary activities:

- a residential/commercial retrofit program;
- an industrial/institutional audit program;
- a leakage reduction program; and
- a public education program (which became the Water for Tomorrow program).

In 1998, several more action areas were identified in the official plan that addressed other sustainability initiatives. These included a thorough analysis of the public transit system, options to increase the region's forest cover and acquire more green land, and a "corporate model for clean air" initiative. All of these activities support the region's commitment to reduce greenhouse gas emissions as



participants in FCM's Partners for Climate Protection. In June 2002, the region began a process to amend its official plan to the year 2026.



PROJECT DEVELOPMENT

Developed in fall 1998, the Water for Tomorrow program is a set of resources designed to teach grade 7 and 8 students the importance of water conservation. "Initially we considered an 'off-the-shelf' product," said Michael Brooks, the program's project manager. "But we thought we could do something just as good or better using local resources more cost-effectively and tailor the resources to the region."

The region approached the two local school boards to join as project partners. The initial response was that the boards were too busy and too tight for money, recalled Mr. Brooks. "But we convinced them that we wanted to provide these resources and needed their input to make the program more useful. Once we got their support, they were excited about it." A committee, comprised of a facilitator, ten teachers from the region, and a curriculum advisor from each school board, was formed to prepare the resources. The committee took five months to assemble the first draft of the education package.

Development charges provide 80 per cent of the program's financing, and the remaining 20 per cent comes from water service charges. The pilot program was launched in 10 schools in spring 1999.

PROJECT IMPLEMENTATION

The program was developed in part to support the new Ontario provincial curriculum for grades 7 and 8, specifically targeting geography and science. The program covers a wide range of topics, including issues that are specific to the York region. Materials include a teacher's resource manual, a student activity handbook, a locally produced video that takes students on a "virtual tour" of York's water systems, and a Web site.



REGIONAL MUNICIPALITY OF YORK, ONTARIO

Teachers can use these materials either as part of a major theme on water conservation or as independent lessons. Taken as a whole, the program teaches students about:

- the water cycle and the origins of water;
- where the Regional Municipality of York's water comes from, including local watersheds and how the Oak Ridges Moraine acts as a collecting area for the water;
- how groundwater and surface water is extracted, transported, distributed and treated;
- water conservation techniques; and
- the global importance of water conservation.

"Globally, the example I like to use is how some people in the world have only two litres of water per day and contrast that with how much we use in Canada. Simply brushing your teeth can waste two litres of water," said Mr. Brooks. Field trips to water treatment plants or watershed areas are at the discretion of the teacher. "That's why the video is important. If the students can't go to those areas, they can still take a virtual tour of our water systems and all aspects of reducing water [use]."

After the initial pilot in spring 1999, the teacher's manual and student activity books were delivered to every elementary school board that fall. Based on teacher and student feedback the resources were updated in 2002 and redistributed to approximately 11,000 grade 7 students.

Council also became involved with the Water for Tomorrow program. "Once it was off the ground, we felt that the senior staff at the school boards weren't aware of the program as much as they should be," Mr. Brooks explained, "so our regional chair made presentations to the trustees."

The program incorporates other curriculum components, such as language and arts activities. "We're introducing water-related vocabulary to the students and all the materials have been translated for the French immersion schools," said Mr. Brooks. "In the area of art, each year we have a poster-drawing contest and the top 13 posters are chosen for a calendar that goes to the grade 8 students the following year."

Students give the program a thumbs up. "In the last classroom I visited, it was overwhelming," Mr. Brooks said. "The kids had decorated the entire room with posters and flyers all about Water for Tomorrow. It was obvious they'd spent weeks on this curriculum. It's our jewel in the overall water program."

Water for Tomorrow is a six-year program and Mr. Brooks believes the biggest challenge will be sustaining the savings over the long term. "Public education has to be ongoing," he said. "A perfect example is the littering campaigns of the 1960s and 70s. That had a big influence on my generation and for a long time there was no littering. Now the younger generation is starting to litter because there has been no education on it. Although parents may set a good example, education has to be ongoing to sustain the goal."

The short-term results of educational programs are often difficult to measure, so the region considers Water for Tomorrow a crucial part of its long-term investment in water conservation and protection. "Water-saving technology can only go so far," said Mr. Brooks. "You also have to change attitudes and habits."

RESULTS

- The Water for Tomorrow program was delivered to over 30,000 students between 1999 and 2002. By the end of the program in 2005 it is anticipated that 60,000 students will have benefited from the program at a cost to the region of \$6.80 per student.
- Teacher feedback indicates that they appreciate the comprehensive package of information, which does not require them to do any photocopying or producing of overheads.
- The region used the American Water Works Association's estimates that a utility can expect savings of four to five per cent from ongoing education, on top of a water efficiency program. That translates into savings of about \$150,000 per year. The cost to develop and deliver the program is \$450,000, which means the payback period is less than three years.

LESSONS LEARNED

- Getting the early support of the school boards was critical. Teachers and curriculum advisors provided input into the resource materials as well as important feedback that was used in the updated package.
- "Off-the-shelf" products were available, but by preparing its own materials, York tailored the program to local issues and challenges.

PARTNERS

External

York District School Board

York District Catholic School Board

CONTACT INFORMATION

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<http://www.water4tomorrow.com>

Award Submissions

In 2002, more than 50 municipal governments applied to the FCM-CH2M HILL Sustainable Community Awards, reflecting substantial achievements in sustainable community development in communities of all sizes. The accomplishments of these municipal governments demonstrate the wide range of strategies and projects, through which they take responsibility for community quality of life and contribute to a sustainable future.

BUILDINGS

CITY OF AIRDRIE, ALBERTA (pop. 15,946)

Environmental Education Centre

The City of Airdrie wanted to build an educational facility for school and community groups. It, therefore, established an environmental education centre, housed at its recycling depot. The centre combines environmental stewardship with maximum energy efficiency and occupant comfort. It boasts straw bale walls, passive solar heating, environmentally safe paints and finishes, a waterless toilet, and non-toxic strawboard kitchen cabinets. The radiant floor heating uses solar collectors to heat the building. The straw bale walls provide R50 insulation, preventing heat loss in winter and heat gain in summer. Twenty photovoltaic cells generate the electricity needed to run the centre and the city hopes to eventually supply solar energy back to the electrical grid.

Contact: Mary G. Curtis, Project Coordinator for Environmental Education Centre, (403) 948-0246

CITY OF FREDERICTON, NEW BRUNSWICK

(pop. 48,000)

Municipal Building Initiative

Between 1999 and 2001, the City of Fredericton retrofitted 18 buildings that had the highest energy consumption among its municipal buildings. The buildings ranged from arenas and a library to the city hall, fire and police stations, and public works depots. The city hall retrofit included upgraded lighting, a new heating, ventilation and cooling system, and an energy management control system. In this building alone, savings are expected to be approximately \$30,000 per year. The payback period for the entire project is four to seven years. The retrofits have had no adverse impact on the city's budget since the energy performance contractor that did the retrofits has guaranteed annual



savings of \$180,000. If the savings are not realized, the contractor will not be paid.

Contact: Brian Phillips, Manager, Property Services, (506) 460-2218



CITY OF RICHMOND, BRITISH COLUMBIA

(pop. 160,000)

Energy Management Program


One of the City of Richmond's energy management program initiatives involved a lighting upgrade at the Thompson Community Centre. The centre was a relatively new facility, but had an inefficient lighting system. High-efficiency, compact fluorescent high bay fixtures were installed along with new lighting controls. Occupancy sensors are connected to the building's automation system and switch the system off when the centre is not in use. Energy consumption was reduced by 82 per cent in the first year. As a result of its experience with the community centre, the city now reviews lighting and energy design for all new facilities. In another project, automatic door lock systems were installed in seven park washroom facilities. The system has virtually eliminated the travel time of staff members who used to manually lock and unlock the facilities, resulting in savings of \$82,000 compared to the \$14,000 cost of the micro-switches.

Contact: Phil Hogg, Manager, Facilities Operations and Maintenance, (604) 244-1243

CITY OF SPRUCE GROVE, ALBERTA (pop. 51,343)

Tri-municipal Family Leisure Centre

The opening of the Tri-municipal Family Leisure Centre is the result of a partnership among the City of Spruce Grove, the Town of Stony Plain and Parkland County. Rather than incurring the expense of building separate recreation centres, this co-operative partnership enabled the three communities to build one large facility to meet the needs of a growing region. The facility includes heat exchangers on the ice plants that cycle heat into the hot water tank to heat other parts of the building, such as the hot tub in the aquatic centre. An ozone slipstream system was installed for the swimming pool, reducing the need for large amounts of chlorine. This cost-sharing approach not only allowed the three communities to do more than any single municipality could



CATEGORY SUMMARIES



have done, but it has provided a model that can be used in future community projects.

Contact: Diane Hamel, Director of Economic Development and Corporate Communications, (780) 962-7612

DISTRICT OF NORTH VANCOUVER, BRITISH COLUMBIA (pop. 87,000)

Fire Station Energy Upgrade

The District of North Vancouver's fire stations were losing heat through open bay doors, a waste of energy and money. Each station has at least two or more truck bays with high ceilings that are heated by gas-fired overhead furnaces. Although staff had been asked repeatedly to switch off the furnaces while the bay doors were open, the furnaces were often found running for long periods of time. The district installed micro-switches in each station that disable the overhead gas furnaces when the doors are open. When the doors are closed, the gas furnaces are turned back on. The fire stations' annual gas consumption has been reduced by 13 per cent, giving this \$8,000 capital investment a payback period of two years.

Contact: G.D. Calder, Fire Chief, (604) 990-3653

FLEET

CITY OF REGINA, SASKATCHEWAN (pop. 190,400)

Natural Gas Vehicle Program

Beginning in 1994, the City of Regina began converting many of its fleet vehicles to burn a mixture of natural gas and gasoline. The city had already purchased a natural gas fueling station in 1993. When SaskEnergy (Saskatchewan's natural gas distribution utility) built a fueling station in 2001, thereby providing an additional fueling station for the city's fleet, the city's resolve to buy dedicated compressed natural gas (CNG) vehicles grew stronger. At first, the use of CNG had been optional, leaving drivers to choose which fuel to use. But this voluntary system did not bring the desired results. Now, each vehicle is monitored to ensure that the required percentage of CNG is used. In addition, since January 2002, each municipal division that uses fleet vehicles is charged directly for fuel costs, giving it the opportunity to save budget dollars if it uses CNG instead

of gasoline. The city's "dual fuel" fleet consumes 89 per cent natural gas, an increase of nine per cent over its initial target, and has saved annual fuel costs of approximately \$62,000.

Contact: Les Malawski, Manager, Energy and Materials Management, (306) 777-7154

RENEWABLE ENERGY

CITY OF PRINCE GEORGE, BRITISH COLUMBIA (pop. 80,000)

Fuel Cell Project

The City of Prince George collaborated with Environment Canada and a private consultant to study how fuel cell technology can be used at its wastewater treatment plant. The plant produces surplus anaerobic digester gas that is flared during periods of low heat demand. Fuel cell technology could be used to harness this free energy source to generate electricity, produce heat and reduce greenhouse gas emissions. Fuel cell technology is still evolving, so the city's research has included compiling a history of existing fuel cell power plants, determining the capital and operating costs and the market potential. Using the research findings, the city developed a concept for a pilot fuel cell plant to test the potential of the technology in Prince George and other municipalities.

Contact: Christine Russell, Customer Service and Communications, (250) 561-7732

SOLID WASTE

CARIBOO REGIONAL DISTRICT, BRITISH COLUMBIA (pop. 73,024)

Rock'n Refuse Revival—Redeveloping an Industrial Site into a Sustainable 3P Landfill

Since 1991, the Cariboo Regional District had been searching for a municipal landfill site to serve 25,000 of its residents. When a local mining company was forced to close, the company suggested to the region that the landfill be situated on the former mine site. Since the mine was already an industrial site, using it for the landfill eliminated the potential problem of siting a new landfill close to residential areas, which could lower property values. Existing equipment owned by the mining company, such as earth-moving machinery and a groundwater monitoring system, was used to develop and maintain the landfill. Use of this equipment has increased operational efficiencies. Leachate generated

from the landfill and containing nutrients can be sprayed onto reclaimed mine areas, fostering new plant growth.

Contact: Mitch J. Minchau, Supervisor of Environmental Services, (250) 392-3351

CITY OF HAMILTON, ONTARIO (pop. 498,065)
Solid Waste Management Master Plan

The City of Hamilton has set an ambitious target of 65 per cent waste diversion by 2008 with its 25-year solid waste management master plan. Without a new waste management system, the city's landfill would need to close in approximately 15 years. A 32-member public advisory committee was formed to learn about current waste management services. Among the committee's 19 recommendations was the suggestion that the city construct facilities for organics processing and material recovery as well as a community recycling and reuse centre. The city's current waste diversion rate is one of the lowest in Canada, so the committee has also recommended a public education program that will include a citizens' task force.

Contact: Scott Stewart, Director, Waste Management, (905) 546-4409

CITY OF KAMLOOPS, BRITISH COLUMBIA
(pop. 82,000)

Transforming Green Waste into Value-added Compost

Until 1994, all organic waste in the City of Kamloops was disposed of at the landfill and made up roughly one quarter of the waste stream. After studying the viability of a centralized compost operation, the city opened the Cinnamon Ridge compost facility in 1994. Since then, more than 7,000 tonnes of organic material have been diverted from the landfill every year, decreasing the production of methane in the landfill and increasing its life span by about eight years. The public can buy the compost and the city also uses it in its own operations, saving about \$60,000 each year in topsoil purchases. Diversion rates of organic matter increased by eight per cent in the first year, and the city is now considering banning all yard waste from its landfill.

Contact: Marni Gillis, Environmental Coordinator, (250) 828-3348



CITY OF NANAIMO, BRITISH COLUMBIA
(pop. 77,583)
Guarding Against Waste

The City of Nanaimo wanted to prepare its residents for service changes, which included the removal of six recycling drop-off depots and the expansion of its curbside recycling service to include household plastics. These changes had been requested by residents. During the re-tendering process for the six recycling depots, the city had discovered that the cost to run them would increase by 50 per cent. All the city's solid waste programs are funded through garbage and recycling fees, so closing the depots allowed it to keep user fees stable and provide the additional plastics recycling. A public education campaign was implemented to inform residents of the service changes and to encourage them to recycle plastics.

Contact: Gary Franssen, Manager, Sanitation and Recycling, (250) 758-5222



CITY OF QUEBEC, QUEBEC (pop. 504,235)
Residual Concrete Recycling

In tough economic times, the City of Quebec needed to find ways to do more with less. It saw an opportunity in the residual cement and asphalt concrete waste generated by its public works projects. The residual concrete is crushed then treated to improve its mechanical properties and to make the new product resistant to cracking. Over a five-year period, the city has recovered and recycled an annual average of 30,000 tonnes of residual concrete, which is then used in the construction and repair of the city's roadways, sidewalks, parking lots, and bicycle and pedestrian paths. Transportation and landfill costs have been reduced and new construction materials do not need to be purchased, saving the city an estimated \$1 million since 1995.

Contact: Daniel Audet, Director, Network Division, (418) 691-7175



MUNICIPALITY OF CHELSEA, QUEBEC (pop. 6,500)

Integrated Waste Management Program

The Municipality of Chelsea's integrated waste management strategy delivers recycling services to every resident. Before

implementation, residents had to bring their recyclable material to a collection depot. Curbside service began in 1998 and the amount of materials recycled has since jumped from eight to 20 per cent of the waste stream with almost 100 per cent of residents participating in the program. A permanent composting site was built outside city hall where residents can also purchase low-cost composters and participate in composting workshops. In addition, the company that screens the recycled materials created new jobs in the community by hiring youth with school adjustment problems.

Contact: Sharron Cosgrove, Director, Technical Services, (819) 827-1124

SUSTAINABLE TRANSPORTATION

CITY OF NEW WESTMINSTER, BRITISH COLUMBIA (pop. 55,000)

Green Linkages in New Westminster: Cross-town Greenway and Sapperton Landing Park

Because of its proximity to the Greater Vancouver Regional District (GVRD), the City of New Westminster's roads carry a high proportion of the GVRD's traffic. To reduce automobile trips, the city wanted to encourage more bicycle use. In partnership with the GVRD, the city improved the links along its greenway and Sapperton Landing Park. Sidewalks were widened, and curb extensions, traffic circles and multi-use trails were constructed. A tidal channel in the centre of the park was designed to accommodate young salmon, and native plant species were introduced to stabilize the soil and provide wildlife habitat. As funds become available, the city plans to build an integrated network of greenways that will connect all residents to businesses, schools, and places of work and recreation.

Contacts: Pat Connolly, Director of Engineering, and Mary Pynenburg, Director of Planning, (604) 527-4532

REGIONAL MUNICIPALITY OF YORK, ONTARIO (pop. 792,150)

On the Move Toward Sustainable Transportation (York Region Transportation Master Plan)

The Regional Municipality of York is making the shift toward sustainable urban transportation standards with the release of its 30-year transportation master plan. In January 2001, all five regional transit authorities were amalgamated into York Region Transit. Within a year of amalgamation, the transit fleet had expanded by 20 per cent and ridership had increased 7.3 per cent. The region has set a target of having one-third of rush hour commuters using transit in major travel corridors of the region. By subsidizing 50 per cent of transit fares for all regional employees to travel to work, the region has shown its own commitment to this goal. It will soon choose a private company as a partner in providing a rapid transit service.

Contact: Tom Apparao, Manager, Transportation Planning, (877) 464-9675

RESORT MUNICIPALITY OF WHISTLER, BRITISH COLUMBIA (pop. 10,000)

The Whistler Way! Rideshare Program

Although many commuters between Squamish and Whistler have created informal carpools, there was a need for efficient commuter transportation for employees within the Resort Municipality of Whistler (RMOW). The RMOW partnered with BC Transit and the Jack Bell Foundation to develop The Whistler Way! rideshare program. The program was modified to operate seven days a week to address the needs of service industry employees who do not work traditional nine-to-five schedules. In the first three months, 27 passengers used vanpools and carpools, avoiding trips by 23 private vehicles, each of which had been travelling over 100 kilometres per workday. The program is just one component of the RMOW's transportation demand management program, and fills a niche that provides Whistler residents and employees with an affordable transportation option.

Contact: Emma Dal Santo, Transportation Demand Management Coordinator, (604) 935-8197

TOWN OF MARKHAM, ONTARIO (pop. 217,000)
The Great Transportation Debate

The Town of Markham tested public support for light rail technology versus bus rapid transit in an imaginative new way. The Great Transportation Debate, held October 15, 2002, was a lively forum with a celebrity moderator and a theatrical twist. Professional actors performed the opening sketch and the entire operation was overseen by professional stage and lighting managers. Of the 230 people who attended, 100 used wireless remotes to record their opinions and answers, which were then immediately displayed on computers during the debate. Half the group supported funding a rapid transit system, be it bus or light rail, and two-thirds supported the idea of a public-private partnership to finance the system. Marketing tactics before the debate included targeted direct mail and e-mail invitations, radio and television interviews, and an on-line chat with the mayor.

Contact: Mary-Frances Turner, Commissioner,
 (905) 477-7000

WASTEWATER

CITY OF CHILLIWACK, BRITISH COLUMBIA
 (pop. 68,000)

Wastewater Treatment Plant—Biofilter Odour Control System

A biofilter installed at the wastewater treatment plant was the answer to the City of Chilliwack's odour problems. Emissions from untreated ammonia and hydrogen sulfide would waft into the downtown area and were most noticeable during the summer. The emissions were not harmful to human health or the environment, but complaints from residents were common. The biofilter uses material that can be composted, and was installed in such a way that it is not affected when equipment is taken out of service for maintenance or replacement. There is also capacity within the system to allow for any future plant expansion. With the odours eliminated, complaints have disappeared, and residents and visitors can thoroughly enjoy the area.

Contact: Rob Carnegie, Director of Corporate Services,
 (604) 793-2910

CITY OF GRANDE PRAIRIE, ALBERTA (pop. 35,962)
Modernization, Upgrading and Expansion of the City's Wastewater Treatment System

The City of Grande Prairie's wastewater treatment plant was being overloaded with biological nutrients, resulting in poor performance and odours. A biofilter and biological nutrient removal system were installed to control odours from aerobic digesters and improve effluent quality. The new equipment and system not only solved performance and odour problems, but also produced "class A" sludge that the city uses as an intermediate cover at its adjacent landfill. The city modified and reused two of its aerobic digester tanks, dividing them into six bioreactor cells to create an activated sludge hybrid system. The biological nutrient removal system decreased ammonia, nitrogen and phosphorous effluent concentrations. Effluent quality has consistently met all the provincial treatment requirements. The new system has improved operational performance, eliminated odours and extended the life of the wastewater treatment plant.

Contact: Bernd Manz, Utilities Director, (780) 538-0423

CITY OF KITCHENER, ONTARIO (pop. 186,400)
Storm Water Management Policy Development

The City of Kitchener has streamlined its development approval process with the policies created under its master storm water management plan. In the past, the city reviewed each development application case-by-case. The new policies indicate how storm water management is to be provided for a particular development area before an application is made. Measures include the retrofit of existing facilities, building new storm water facilities, pollution prevention and stream rehabilitation. The costs associated with these measures will be recovered through a redevelopment/infill charge that will be collected before a building permit is issued. These charges will supplement the capital funds provided by the city to implement the storm water management measures.

Contact: Dave Mansell, Acting Director of Engineering,
 (519) 741-2419





CITY OF NEW WESTMINSTER, BRITISH COLUMBIA (pop. 55,000)
Sewer Rehabilitation by Trenchless Methods

Mending sewer pipes is often disruptive for both the sewer system and the public. The City of

New Westminister's sewer system had several defects, ranging from leaky joints or cracked pipes to pipes in danger of imminent collapse. The defects were causing infiltration into the system and, during times of heavy rainfall, were producing sewer overflows that discharged into the Fraser River. To solve these problems, the city rehabilitated 3,000 metres of sewer mains using "trenchless" methods. These included using polyvinyl chloride pipes that were heated until flexible, pulled off the spool into the old pipe, then rounded using low-pressure steam. Joints were sealed using a chemical grouting process that was installed by a remote-controlled, inflated packer system monitored by closed-circuit television.

Contact: Robert Vosilla, Utilities and Special Projects Engineer, (604) 527-4617

CITY OF VANCOUVER, BRITISH COLUMBIA (pop. 550,000)

Stanley Park Storm Water Treatment Wetland

The City of Vancouver built a wetland within an existing water body to solve the storm water contamination problem caused by the 60,000 cars per day that travel along the causeway through Stanley Park. As cars drove along the route, oil and grit would be deposited onto the road surface, then flow uncontrolled into the adjacent forests and watercourses. Runoff is now collected and diverted to the bottom end of the causeway adjacent to Lost Lagoon and then treated by an engineered wetland. Grit and oil are divided in large capacity separators that were installed at a midway point on the causeway. The separators will also provide containment in the event of a toxic spill. Discharge from the lower separator empties into an inlet pool where larger particles settle. Water then flows from the inlet pool into a series of shallow marsh areas and deeper pools where native wetland plants further break down contaminants. The treated outflow then discharges into the lagoon.

Contact: Stephen Wong, Park Development Coordinator, (604) 257-8402

GREATER VANCOUVER REGIONAL DISTRICT, BRITISH COLUMBIA (pop. 2,000,000)

Liquid Waste Management Plan

A Liquid Waste Management Plan (LWMP) has given the Greater Vancouver Regional District (GVRD) the opportunity to implement "made-in-the-region" long-term sustainable plans, rather than relying strictly on regulations that often made evolving issues more difficult to address. Each aspect of the LWMP is addressed through a series of policies and commitments. For example, source control and demand management policies target the control of toxic substances, and promote pollution prevention and water conservation. Storm water management planning integrates watershed plans with official community plans, recreation and parks plans, and strategic transportation plans. With annual and biennial reporting, and a mandatory review every five years, the plan also allows the GVRD the flexibility to address new issues as they arise.

Contact: Ken Cameron, Manager, Policy and Planning, (604) 432-6379

MUNICIPALITY OF SOUTHWEST MIDDLESEX, ONTARIO (formerly known as Wardsville) (pop. 400)

Small Bore Sewer™ System Project

The Village of Wardsville in Southwest Middlesex had experienced widespread failure of its sewage system, posing a clear threat to public health. Runoff from raw sewage in surface and sub-surface water throughout the community was also polluting the Lower Thames River. A new communal sewage system was implemented and included the installation of clarifier tanks in each of the village's homes. The tanks remove solids and store them in a sludge compartment that must be pumped out every seven to 10 years. Since only liquid travels through the system, the Small Bore Sewer™ system uses smaller pipes to convey the sewage to a treatment plant. Pipes and fittings are heat fused, creating a seamless system with no leaks. Outflow from the treatment plant is now safely released into the Lower Thames River, and the project met or exceeded all environmental and social objectives.

Contact: Rosario (Rozy) Lindia, Business Development Manager, Innovative Water and Sewer Systems Inc., (613) 831-9906

WATER

CITY OF COQUITLAM, BRITISH COLUMBIA

(pop. 113,000)

Remote Video Surveillance System

A security breach at a water reservoir in early 2001 that resulted in a water alert for thousands of consumers led the City of Coquitlam to install a video surveillance system to protect public health and safety from sabotage. Remote wireless video surveillance equipment was installed at eight remote water reservoirs and two recycling centres, and is connected to a central monitoring station. The city's operating costs are kept low because the equipment is hardwired to the city's existing network and because the system requires fewer on-site patrols. The city plans to extend video surveillance to other critical facilities, such as sanitary lift stations and water pump stations.

Contact: Henry Wong, Manager, Geomatics, (604) 927-3503

CITY OF RICHMOND, BRITISH COLUMBIA

(pop. 160,000)

SCADA System

A wireless network has literally saved the City of Richmond from sinking into the Fraser River. Radio transmitters attached to drainage pumps send status reports to a receiver every 20 seconds, which are then transmitted via the wireless network known as the Supervisory Control and Data Acquisition (SCADA) system. The reports provide staff members with instant readings, enabling them to respond quickly to alerts of changing water and temperature levels as well as potential problems. The city has an average elevation of just one metre above sea level. Without the drainage pumps, entire areas would be flooded if drainage systems were unable to meet the demands of new development or a heavy downpour. The SCADA system allows city staff to guide emergency response from virtually anywhere using a palm pilot or mobile computer, and has significantly reduced the number of trips made by staff members as well as maintenance and repair costs. The SCADA system is also useful for designing strategies in areas such as infrastructure planning, and commercial and residential development. As well, the system can monitor road temperatures in winter for better application of salt and sand.

Contact: Edward Hung, Manager, Advanced Research and Technology, (604) 276-4232



CITY OF YELLOWKNIFE, NORTHWEST TERRITORIES

(pop. 18,337)

Water and Energy Conservation at Pumphouse No. 1 and Piped Water and Sewer Networks

Deep ground frost caused by extreme temperatures and water mains that were not looped for continuous circulation meant that the City of Yellowknife used to bleed water into the sewer to keep the water main from freezing. When water services did freeze, excavation was difficult and expensive. The city's water and energy conservation program has improved the efficiency of its system. Piped water and sewer mains that require upgrading are replaced with insulated pipe, reducing pipe failure and lowering water consumption by 30 per cent. The water main is looped for continuous flow at all times. The city also identified critical areas for potential freeze up and monitors the water main temperature at those points, enabling the city to heat the water only every second or third day and cutting energy consumption by 64 per cent.

Contact: Julian Huang, Municipal Works Engineer, (867) 920-5097



DISTRICT OF SAANICH, BRITISH COLUMBIA

(pop. 107,574)

Durrell Creek Integrated Watershed Management Plan

The Durrell Creek watershed is one of the largest fish production streams in Greater Victoria, supporting endangered coho salmon and resident cutthroat trout. The District of Saanich's integrated watershed management plan has stabilized flooding and bank erosion, and created a vegetation buffer between the fields and the stream. Willow cuttings, transplanted in dredge soil along the bank of the creek, helped slow erosion and have prevented soil migration from farmers' fields. In fall and winter, the stream often flooded nearby agricultural fields, saturating the soil, and farmers were frequently unable to plant crops until stream levels dropped in summer. With flooding stabilized, higher agricultural production will be realized. An auxiliary pumping facility installed parallel to the new culvert has also ensured that additional water flow capacity is available if required in the future.

Contact: Peter Sparanese, Manager, Capital Works, (250) 475-1775



MUNICIPAL DISTRICT OF EAST PEACE NO. 131, ALBERTA (pop. 2,552)
Regional Water Supply System and Co-op Water Distribution Lines

Residents of the Municipal District of East Peace No. 131 once relied on trucked water or, in some cases, on

surface runoff as potable water sources. The water received little or no treatment. Since 1994, a regional water supply system, co-op water distribution line extensions, and a treated water storage facility have been constructed. The district partnered with the regional system to form the East Peace Water Co-op. The co-operative charges a connection fee for service, and its members maintain the supply lines and storage facilities. Installation of water lines reduced the need to truck potable water to residents, decreasing vehicle emissions, road maintenance and operational costs. The Village of Nampa, which runs the treatment plant, upgraded the facility and constructed a larger raw water storage reservoir to serve the needs of the districts for the next 20 years.

Contact: Jason Schuler, Project Coordinator, (780) 624-5631

REGIONAL MUNICIPALITY OF HALTON, ONTARIO (pop. 346,000)

Regional Aquifer Management Plan

The Regional Municipality of Halton's aquifer management plan has provided a solid technical foundation for protecting groundwater resources and for making well-informed decisions on residential and commercial growth. Halton supplies water services to approximately 60,000 residents through a network of 21 wells. Using a database of well water information, staff members have been able to pinpoint the most sensitive areas for protection. Policies and techniques were developed, such as the creation of a regional groundwater model and a preliminary list of land use restrictions. The health department also conducts public workshops that promote many of the plan's recommendations. The region is now working to incorporate these policies into its official plan.

Contact: Heather Malcolmson, Senior Hydrogeologist, (905) 825-6000, ext. 7134

REGION OF PEEL, ONTARIO (pop. 950,000)

York-Peel Water Agreement

The Region of Peel signed an inter-regional agreement to supply the Region of York with enough water to meet York's growth requirements until 2031. Since York has no direct access to Lake Ontario, it relies on water supplied through the City of Toronto and several municipal groundwater systems. Peel operates and maintains two water treatment facilities, and viewed this partnership as an opportunity to sell water, maximize its existing infrastructure, and save on the construction of new facilities by sharing the costs with York. A feasibility study and economic analysis were conducted before the agreement was drafted. This safe, cost-effective and reliable source of water will begin meeting York's growth requirements once the agreement is implemented in 2004.

Contact: Troy Mander, Supervisor, Capital Programming and Infrastructure Management, (905) 791-7800

REGION OF PEEL, ONTARIO (pop. 950,000)

Wellhead Protection Area Program

The Region of Peel's Wellhead Protection Area (WHPA) program helps prevent well field contamination. The region compiled a source inventory of all contaminants and developed a management plan and policy framework. The WHPA policies outline land use restrictions and prohibitions depending upon the proximity of a given activity to a municipal well. The WHPA has been used for 12 municipal well fields, incorporating 38 supply wells. Long-term water quality rests on the WHPA's monitoring program, which is designed to ensure there is sufficient time to undertake corrective measures should contamination issues arise. The region also plans to introduce a series of best management practices to protect groundwater quality within the wellhead protection areas.

Contact: Alina Korniluk, Hydrogeologist, (905) 791-7800

TOWNSHIP OF ESQUIMALT, BRITISH COLUMBIA (pop. 18,000)

Sport Centre Compressor Glycol Cooling Loop

The Township of Esquimalt installed a recirculating glycol cooling loop at the Archie Browning Sports Centre. With the old system, fresh water circulated through compressors and was then discharged into the sewer system. The new

system uses a pump to circulate glycol through refrigeration compressors and then into a heat exchanger where the glycol loses the heat picked up from the compressors. A one-time cost of \$10,000 to install the system has reduced future operating costs since the glycol medium does not need regular replacement and the system requires little routine maintenance. From 2000 to 2001, water consumption was reduced by 24 million litres.

Contact: Michael Reed, Building Maintenance Supervisor, (250) 361-9933

**TOWNSHIP OF LANGLEY,
BRITISH COLUMBIA (pop. 88,000)**
Water Resources Management Strategy

The Township of Langley has laid out a 20-year timeline of activities and costs in its water resources management strategy. By protecting its local groundwater sources, the township will be able to use its own municipal water supply rather than buying water from the nearby Greater Vancouver Regional District (GVRD). GVRD water rates are expected to double in the near future. Projects slated to begin in 2002 include a public outreach campaign, groundwater protection measures, floodplain management, and the development of a water resources master plan. Already, 10 signs have been posted in high-visibility areas over vulnerable aquifers within the township to increase public awareness.

Contact: Marina Stjepovic, Project Coordinator, (604) 533-6082

**INTEGRATED:
Recognizing projects that encompass more
than one category**

CITY OF BRAMPTON, ONTARIO (pop. 351,646)
Responsible Use of Salt in Snow and Ice Control

The escalating use of salt on the City of Brampton's roads was increasing costs and environmental degradation. The city purchased new spreaders that pre-wet the salt before it is applied to roads, reducing salt usage by 30 per cent. When snowfall or icy conditions are expected, primary roadways are pre-salted to prevent snow and ice from sticking to the road surface. Salt is placed along the centre of the roadway and allowed to spread to the curb by means of normal traffic flow, forming a brine that melts the ice. New salt storage shelters were also built to prevent runoff from improper storage, and the city plans to phase out conventional snow removal

equipment and replace it with leading-edge salt spreaders.

Contact: Deborah Tracogna, Senior Manager, Corporate Communications, (905) 874-2143

**CITY OF BRANTFORD,
ONTARIO (pop. 85,000)**
*Protecting Natural Habitats by Development of
an "Environmental Master Plan"*

The City of Brantford faced the common problem of balancing the necessity of economic growth with environmental preservation. The Northwest Gateway Park Committee, made up of municipal staff, and community, conservation and industry representatives, was formed to recommend ways to protect the city's natural resources, including improving the quality of the Grand River. On the committee's recommendation, the city implemented a system that returns precipitation to the ground instead of diverting it as surface runoff to a storm water retention pond. The system eliminated the need to build a retention pond, saving the city \$200,000, and has protected rare vegetation of the Carolinian forest region.

Contact: Joe Amodeo, Director of Design, Construction & Operations, (519) 759-1350

CITY OF CALGARY, ALBERTA (pop. 876,519)
ISO 14001—Registered Environmental Management System

Three of the City of Calgary's business units (fleet, fire and golf course) have achieved certification in the International Organization for Standardization's (ISO) 14001 program. Each unit is the first of its kind to be certified in the ISO 14001 program in North America. Each business unit scrutinized and documented every aspect of its operations, developing new policies and programs, setting objectives, and establishing a management audit system to monitor performance. The overall goal is to move the environmental performance of each unit to a higher level than regulations require. Corporate-wide registration for all the city's business units is scheduled to be completed by August 2003.

Contact: Alex Eddington, Coordinator, Environmental Management System, (403) 268-2385





CITY OF GRANDE PRAIRIE, ALBERTA (pop. 35,962)
Integrated Approach to a Sustainable Community

The City of Grande Prairie adopted an integrated planning approach that examined transportation, waste, wastewater and energy. In

the transportation sector, the city constructed 11 kilometres of bicycle and pedestrian trails between 1996 and 2002, and expanded transit service and service hours to several growing residential and commercial neighbourhoods. In its focus on solid waste, the city doubled tipping fees on commercial loads that contained cardboard, and piloted a recycling program for construction and demolition waste. A bioreactor was installed at the landfill that could provide an alternative energy source as well as maximize landfill life by speeding up decomposition. The methane captured from the bioreactor over five years is predicted to generate enough energy to heat 380 homes per year.

Contact: Bernd Manz, Utilities Director, (780) 538-0423

CITY OF HAMILTON, ONTARIO (pop. 470,000)
Infrastructure Asset Management Strategy

The City of Hamilton's infrastructure asset management strategy (IAMS) involves ongoing data collection and analysis and a complete overview of the city's total investment needs over the lifetime of its water and wastewater infrastructure. The city recognized that deferring maintenance or replacement of infrastructure would ultimately jeopardize the long-term sustainability of water and wastewater services. As part of the IAMS, all costs were reviewed, including operating and maintenance costs and the cost to rehabilitate and ultimately replace any infrastructure component. Following this review, the capital and operating budgets for 100 years were developed in 10-year envelopes. The IAMS allows city council to make well-informed decisions on investments and utility rate increases, and to accurately predict the cost of providing water and wastewater services in perpetuity.

Contact: Betty Matthews-Malone, Director of Infrastructure and Environmental Planning, (905) 546-4621

REGIONAL MUNICIPALITY OF WATERLOO, ONTARIO (pop. 458,000)

Region of Waterloo Smart Growth Strategy—Phase One

The Regional Municipality of Waterloo expects that its smart growth strategy will decrease auto dependence and expenditures on the maintenance of new roads, preserve agricultural and rural communities, and protect the Waterloo Moraine. During phase one, staff conducted a literature review that included an examination of planning reports and public consultation studies dating back to 1973 when the region's original official plan was being drafted. Presentations were then made to council, the public and the business community. Input from residents, the business community, and from municipal visioning exercises enabled staff to quickly prepare a list of options and terms of reference that will make up the second phase of the strategy. Future emphasis will be placed on directing greenfield development to locations that minimize environmental impacts while maximizing the use of existing infrastructure.

Contact: Kevin Curtis, Administrator, Policy Planning, (519) 575-4794

TOWN OF COCHRANE, ALBERTA (pop. 12,429)
Brownfield Development Committee

The Town of Cochrane's Brownfield Development Committee (BDC) was created to deal with the cleanup and development of the 80-acre site of a former wood preservative manufacturer that had been vacant for 12 years. After extensive public consultation and meetings with stakeholders, the BDC was formed to help develop an action plan and inform the public about the project. Some of the land has now been leased for redevelopment by retail businesses, which will increase the town's tax base. Among other risk management strategies, separate truck fleets are used on- and off-site to minimize the chances of potential contaminants travelling off-site. The BDC has also become the "watchdog" on other brownfield properties. Using a public consultation approach instead of taking direction from regulatory agencies has helped all the stakeholders take ownership of the process.

Contact: T. Ian Smith, Director, Communications and Protective Services, (403) 932-7981