



When Efficiency Becomes a Liability

Capital Funding Priorities in the Ontario College System

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Educational Consulting Services Corp.

Executive Summary

When Efficiency Becomes a Liability - Capital Funding Priorities in the Ontario College System

Executive
Summary

A Third Party Perspective

Educational Consulting Services (ECS) has supported every college in Ontario in the planning of their campuses and buildings. The focus of this work has been the reconciliation of the colleges' education and training missions with their infrastructure. As campus and space planners, ECS has assisted in enhanced space management, transformation of facilities, and improved utilization.

This report is a compendium of observations and a high level commentary on the question of capital funding. It was prepared at the request of ACAATO and draws on ECS's experience in Ontario and other jurisdictions. The report also draws on information provided by college administrators for this study.

Today, the colleges' sustainability is compromised. Reliance on efficiency as a means of overcoming budget shortfalls is an exhausted strategy. The *expectation* that colleges can still be more efficient has, in fact, become a liability.

Helping the Colleges Help Ontario

A number of priorities set by the Government of Ontario are directly related to the raison d'être and the strengths of the colleges. To assist Ontario in pursuing provincial priorities, the colleges need support to adapt, renew, and maintain their facilities.

A Relevance and Quality of Learning Environments

Colleges must deliver relevant programs that fit within an evolving, global context. They must create and maintain quality learning environments that reflect current academic delivery practices and the standards of industry, particularly for equipment and technology. This is best accomplished in facilities built or renovated to suit, not in facilities designed for the education and training practices of the previous three, four, or even five decades. Furthermore, colleges must to adapt campus footprints to reflect changing enrolments through growth or consolidation. For example, in large, urban colleges, the addition of floor space is a more likely reaction to market and program demands and enrolment growth. In some colleges, where enrolment is stable or declining, the decommissioning, consolidation, and adaptation of space may be necessary.

B Safe, Reliable, Cost-Efficient Facilities

Colleges require the use of reliable, safe, and code-compliant facilities. Some institutions face a real risk that older buildings in their inventory might become unavailable due to the failure of a key system (such as a boiler or an electrical transformer). And, how much longer can certain buildings remain inaccessible to individuals with disabilities?

What Is Needed

Increased and Stable Capital Funding to allow colleges to adapt campuses to sustain the relevance and quality of college programs and meet infrastructure renewal needs.

A Relevance and Quality of Learning Environments

- **Academic Adaptation**

Sustaining the relevance and quality of college programs will be most readily achieved through the adaptation and renewal of *existing* buildings. The Government of Ontario is encouraged to **support capital funding requests** that combine investment in quality and relevance with the imperative of safe, reliable, and cost-efficient facilities (as per item B below).

- **Academic Equipment**

The Government should reconsider an **annual instructional equipment fund** to ensure that education and training programs have access to state-of-the-art equipment and technology and the ability for renewal to industry standards. Ever-greening of IT hardware and software should occur every three years, while other instructional equipment should be replaced as needed to keep pace with industry standards.

B Safe, Reliable, Cost-Efficient Facilities

- **Facility Renewal: To Bring Colleges up to Standards**

A **\$700 million** capital infusion is needed for facility renewal to correct serious infrastructure deterioration and safety issues. Funding could be distributed over a number of years based on the merit of individual projects and a demonstration of good stewardship of existing assets. This \$700 million figure represents the renewal projects backlog estimated by the colleges at this time. The life-cycles of furniture (about 20 years) and of buildings and building equipment (25-40 years) should be taken into account.

- **Facility Renewal: To Keep Colleges in Optimum Condition**

The Rae Report called for stable facility renewal funding delivered over 10 years. To achieve this, approximately **\$80.8 million** is required annually for 10 years, based on the replacement value of the entire system's building inventory and the industry standard of 1.5% of that value. In contrast, the current annual allocation is \$13.3 million. Colleges also require **targeted funding** to implement the physical changes necessary to meet new accessibility, building, and health and safety codes and regulations.

- **Cost Savings Measures: Reduction in Energy Consumption**

Colleges are poised to implement energy retrofit measures to reduce energy consumption by 10% and meet government targets. The *State of Readiness Report* prepared by Power Application Group Inc. in 2005 suggests an infusion of **\$60 million** for retrofit projects which will reduce demand by 26.7 MW and 92,950 MWH, and return savings of \$11 to \$15 million annually.

Performance benchmarks *set by Government upon which funding and planning decisions will be made. Colleges should be responsible for systematic measurement of the progress made towards achieving these benchmarks.*

The setting of performance benchmarks by Government will establish targets for Ontario that the colleges can work toward. Measurement and analysis of performance indicators will provide a basis for planning and funding decisions by Government and internally within each college. The following are examples of measurable performance indicators.

A Relevance and Quality of Learning Environments

- Utilization ECS recommends a maximum space utilization target of 80% of available hours per week for general purpose academic space such as classrooms, general computer laboratories, and auditoria. A number of colleges are operating at utilization rates in excess of 90% and are compromising the quality of their academic delivery in doing so.

- Area per Student The Ontario college median is 120 square feet per student compared to the American college median of 197 square feet per student. Ontario universities provide about 180 square feet per student.

B Safe, Reliable, Cost-Efficient Facilities

- Facilities Condition Index (FCI) The Facility Condition Index (FCI) is a ratio which allows a comparison of the relative condition of buildings.

FCI =
$$\frac{\text{cost to correct deficiencies and liabilities}}{\text{current replacement value of facility}}$$

General industry guidelines suggest the following Facility Condition Index levels, which are usually expressed as percentages: Good – 0 to 5%; Fair – 5.01 to 10%; and Poor – over 10%. The average FCI for Ontario colleges in 2002-2003 was 9% with ranges of 1% to 35%. It is projected to climb to 13% by 2006-2007. American universities have an average FCI of 7% and APPA records indicate a slight improvement from 2004 to 2005. The average FCI of Ontario universities is 10%.

- Facilities Maintenance Expenditure The median facilities maintenance expenditure per student in Ontario colleges is \$589.77 compared to \$1,220.23 per student in the U.S. The Ontario figure represents the college system’s capacity to spend, which does not represent actual need.

Table of Contents

Executive Summary	i
Section 1: Introduction	1-1
A Third Party Perspective	1-1
Approach	1-1
Relevance to Government Objectives	1-2
Organization of the Paper	1-3
Section 2: Transforming College Infrastructure to Support a Transforming Economy	2-1
Effective Learning Environments	2-1
Meeting Employer Requirements	2-4
Implementing Public Priorities	2-7
Section 3: The Legacy of Fiscal Restraint	3-1
Impact of Inadequate Budgets	3-1
When Efficiency Becomes a Liability	3-2
Challenge: Relevance & Quality of Learning Environments	3-3
Challenge: Safe, Reliable, Cost-efficient Facilities	3-4
Section 4: Investment in College Infrastructure	4-1
Capital Funding Components	4-1
Capital Funding Priorities	4-2
Summary of the Vision for Stable Capital Funding Mechanisms	4-5
List of Abbreviations	
Selected Bibliography	
Appendix A: ECS Qualifications	
Appendix B: New Economic Development in Ontario Regions	
Appendix C: Compromised Programs at Ontario Colleges	
Appendix D: Summary of Capital Improvements at Ontario Colleges, 1995-2005	

Section 1 – Introduction

In July 2006, the Association of Colleges of Applied Arts and Technology of Ontario (ACAATO) commissioned Educational Consulting Services Corp. (ECS) to develop a background paper on capital funding priorities in the Ontario college system. The purpose of the paper was to provide ACAATO with a commentary on college infrastructure in terms of planning issues and funding requirements.

Section 1:
Introduction

**Ontario Colleges of
Applied Arts and Technology (CAATs)**

24 colleges and 100 campuses in 19 communities
21.5 million square feet / 2 million square meters
150,000 full time and 350,000 part time students
33,800 staff including 17,000 academic, 15,000 support, and 1,800 administrative staff
2,400 program choices in 600 subject areas
Preparatory, certificate, diploma, post-diploma, skills training, and baccalaureate programs
Business in 80 countries and territories

A Third Party Perspective

ECS has assisted every college in Ontario since 1973 in the planning of their campuses and buildings. The focus of this work has been the reconciliation of the colleges' education and training missions with their infrastructure. As campus and space planners, ECS has witnessed college achievements such as enhanced space management, transformation of facilities, and improved utilization. ECS is also familiar with the compromises, choices, and difficulties colleges continue to face in dealing with shrinking funding envelopes and unpredictable capital allocation mechanisms. A partial listing of relevant ECS project experience is provided in Appendix A.

This report draws on ECS's experience in Ontario and other jurisdictions. The report also draws on the input provided by college administrators for this study.

Approach

Preliminary interviews were held with representatives of ACAATO, the Ontario Ministry of Training, Colleges and Universities (MTCU) and the Ontario College Facilities Management Association (OCFMA) to discuss capital funding issues in the college system and to launch the research process. A Project Steering Committee composed of the following members guided the development of the paper to ensure its relevance and impact.

Bill Summers, Acting President and CEO, ACAATO
John Hoicka, Senior Research and Policy Advisor, ACAATO
Carol Anderson, Chair, OCFMA and Director, Facilities Management,
Humber Institute of Technology and Advanced Learning
Harry Bakker, Vice Chair, OCFMA and Director, Facilities Management,
Fanshawe College
Barbara Cameron, Vice President, Finance and Facilities, Fleming College
Dale Schenk, Vice President, Finance & Administration, Mohawk College
Roy Langille, Director, Facilities Management, Seneca College

A letter was sent July 19 inviting each college to participate in the development of the position paper by providing input to the following questions:

Section 1:
Introduction

1. What, in your opinion, are the most pressing capital funding priorities in the CAATs system, overall?
2. What has been the impact of the level of capital funding your institution has received over the past 10 years on fixed assets (buildings and equipment)?
3. From an academic perspective, what are the top three capital funding priorities at your institution?
4. From a facilities perspective, what are the top three capital funding priorities at your institution?
5. Are you aware of best practices in other Canadian and international jurisdictions in the area of investment in college infrastructure?

Following a Steering Committee meeting on September 15, a second letter was sent to the colleges requesting digital images of infrastructure problems and the names of programs for which demand exists but that cannot be offered because of space or equipment limitations.

OCFMA and all 24 colleges responded to the requests for information.

In this paper, college infrastructure refers to:

Buildings	Libraries and learning resource centres
Campus grounds	Electronic networks
Utilities	Computer equipment and technical/scientific apparatus
Instructional spaces	Faculty and staff offices
Student study and project spaces	Ancillary space - residences, daycares, food service areas, etc.

Additional Research

The context and rationale for capital funding was explored through research into facilities management issues, trends in post-secondary education and their implications for space and equipment, facilities performance and cost indicators, and best practices in other jurisdictions.

Relevance to Government Objectives

This paper will demonstrate that the Ontario college system shares the priorities of government and that the colleges are committed to working collaboratively with government to address the key objectives, in particular the province's third objective, Strong People, Strong Economy (Government of Ontario Progress Report, 2006).

1. Success for Students
2. Better Health
3. Strong People, Strong Economy (Increase Education and Skills; Capitalizing on Diversity; A Competitive Business Environment; Modern, Efficient Public Services; and Reliable, Affordable Energy).

The vision for Ontario colleges expressed through ACAATO complements the priorities identified by government:

Section 1 :
Introduction

Ontario Colleges

- Design effective learning environments to equip a broader range of learners with the skills for good jobs and successful careers,
- Deliver responsive high quality programs required by employers to sustain investment, innovation, and economic growth, and
- Partner with government to implement emerging public priorities, such as health care reform, infrastructure renewal, a shift to alternative energy, community economic development, and greater commercialization of research.

On September 25, 2006, the Honourable Jim Flaherty, the federal Minister of Finance announced that the provinces and territories will receive additional one-time funding of \$3.3 billion to invest in post-secondary education, public transit and affordable housing. Funding for post-secondary education will amount to \$1 billion and will be paid through the Post-Secondary Education Infrastructure Trust over the next two years on an equal per capita basis. Ontario will receive \$390 million, about half of which will be allocated in 2006-2007 and the remainder in 2007-2008.

The federal government is encouraging the jurisdictions to invest in:

- Modernizing classrooms, laboratories, and research facilities
- Updating training equipment
- Developing interactive library technologies and facilities
- Enhancing distance-learning technologies.

With **adequate financial support** the colleges will assist the provincial government achieve its goals and improve education and training facilities as suggested by the federal government.

Organization of the Paper

This paper describes the rationale for increased capital funding in the Ontario college system and synthesizes priority needs. Section 2 describes the central role of college education and training in Ontario and the physical requirements for academic excellence, relevance, and responsiveness. Sections 3 and 4 focus on the status of college infrastructure and outline capital funding priorities for the system.

The appendices to the report contain information on ECS qualifications and experience, new economic development in Ontario; capital improvements in the college system over the last 10 years; and program limitations at the colleges.

Another series of appendices are provided under separate cover including a copy of the letters sent to the colleges by ECS on behalf of ACAATO; the individual college responses; the OCFMA response; and representative images of infrastructure renewal issues in the college system.

Section 2 – Transforming College Infrastructure to Support a Transforming Economy

One of the defining characteristics of Ontario colleges is their capacity, or their potential capacity to adapt to changing labour market needs. The colleges are striving to deliver relevant education and training to produce skilled administrators, technicians and practitioners in response to these changing needs which are occurring not only within the province but also within the global economy.

Effective Learning Environments

Innovations in post-secondary education and training and the central role of information technologies have had a significant impact on the context within which learning takes place.

The College as a Learning Institution

Post-secondary institutions have been referred to as *teaching* institutions but a shift in emphasis is causing colleges to be increasingly referred to as *learning* institutions. Faculty members are encouraged to refine their roles to facilitate the transfer of knowledge within a learning community.

Some colleges have created centres for teaching excellence, such as Georgian's Centre for Teaching and Learning, which provides support for teaching staff in instructional design, use of electronic teaching tools, and production of teaching and learning materials.



LRC at Seneca@York

Capital projects or plans are in place for new or expanded Learning Resource Centres (LRCs) at Durham, Fanshawe, George Brown, Georgian, Humber, Loyalist, Mohawk, and Seneca colleges. LRCs provide resources and services that support both faculty teaching and student learning.

Integrated Learning and Simulation of the Industry Environment

Integrated learning environments combine the virtual and the physical. Learning can take place anywhere, everywhere, and anytime within IT rich settings, that provide flexible and blended learning opportunities combining online and campus-based activities.

Integrated learning more closely resembles the working environments students will enter and also responds to the changing profile of adult learners, which includes a natural comfort level with information technologies. Collaborative learning is emphasized through close peer to peer and student-teacher interaction. Project-based learning crosses formal discipline boundaries.

To support integrated learning, planned (and existing) educational buildings must be viewed as a (potential) series of learning hubs, precincts, and communities housing multi-purpose spaces rather than single use facilities for specific disciplines.

Humber Institute of Technology and Advanced Learning (ITAL) has recently completed an open manufacturing centre where products are designed, developed, and produced using a variety of industrial machinery in space similar to the production floor in any modern industrial centre. The centre serves students in the Industrial Design, Plastics, Industrial Mechanical Maintenance, and Computer Numerical Control (CNC) programs which are increasingly delivered in one setting. A benefit from creating the manufacturing centre was a reduced foot print which enabled Humber to create 11 new classrooms.

Section 2:
Transforming
College
Infrastructure to
Support a
Transforming
Economy

Another Humber example is the college's new Digital News Room where Journalism, Radio Broadcast and Web-based News are taught in a single facility. Students experience cross-training and are exposed to various aspects of digital news production. This facility emulates any current commercial studio.

The Ford Centre for Excellence in Manufacturing at St. Clair College delivers high quality, hands-on training using sophisticated technology including CNC, plastic injection molding and rapid prototyping machines. Students experience authentic learning experiences that combine theory and practice. They are exposed to current business and industry environments including centralized, just-in-time processes, safe operating practices, work deadlines, precise work skills and habits and develop the ability to follow directions and work in large multi-disciplinary groups.



Ford Centre, St. Clair College

Space and Equipment Requirements

How do innovations in college education impact on existing or planned physical resources? What are the infrastructure requirements for learning in the 21st century?

Dr. Kenn Fisher's (2005) old and new assumptions on instructional space summarize the shift in planning of physical resources:

OLD ASSUMPTIONS

Learning only happens in classrooms

Learning happens at fixed times

Learning is an individual activity

What happens in classrooms is pretty much the same from class to class and day to day

A classroom always has a front

Learning demands privacy and removal of distractions (windows, e.g.)

Flexibility can be enhanced by filling rooms with as many chairs as will fit

Rooms crowded with furniture may ease the job of those who schedule them but not those who learn in them

NEW ASSUMPTIONS

Learning happens everywhere

Learning happens anytime

Learning is very much influenced by the social environment

Differences in course goals and teaching methods from day to day and course to course require different spaces

Classroom configuration depends on the activity

Learning is aided by openness and stimuli (windows provide much needed light and sense of openness)

Section 2:

Transforming
College
Infrastructure to
Support a
Transforming
Economy

A college that is equipped to train individuals for future employment in the competitive labour market of the global economy should have the following new or adapted facilities and equipment including:

- Learning clusters that incorporate spaces for formal and informal peer and teacher/student interaction. These clusters should be flexible and be located next to e-spaces or retail space. They should contain:
 - Smart classrooms with flexible seating configurations
 - Labs with individual workspace and team environments within one room and informal seating
 - Project/break out rooms
 - Open access computer rooms with team and individual areas, co-located with project/breakout rooms
 - Peer assisted study spaces
 - Quiet, confidential spaces
 - Group study spaces
 - Current software, assistive technologies and internet connections (wired or wireless), adjacent to or within informal student leisure space
- Learning resource centres for both students and teachers; or separate teacher training facilities
- E-learning capabilities supporting virtual teamwork and interactive lectures, video conferencing, video streaming, asynchronous collaboration, etc.
- Integrated learning facilities such as
 - Studio environments
 - Computer studios
 - Flexible/collaborative learning centres co-located with support services, food outlets, cafes, retail outlets, soft seating, tables in bays, foyers, arcades
- Night hubs or spaces that accommodate commuters, students juggling work, school, and families, learners preferring after hours study sessions
- Specialized equipment to support applied research and commercialization
- Space and processes that simulate business and industry environments

Meeting Employer Requirements

Relevance to Global and Canadian Realities

Industry worldwide is relying increasingly on the availability of highly skilled personnel.

- In the past 2 years *The Economist* has dedicated five covers to the emerging power of Asia and Pacific Rim countries that now compete effectively with established western economies. Three other issues focus on the impact of globalization. A recurring theme in these analyses is the need for nations to prepare for knowledge-based economies. *Business Week* states in its August 22, 2005 online edition that:

“... technical and managerial skills in both China and India are becoming more important than cheap assembly labor. China will stay dominant in mass manufacturing, and is one of the few nations building multibillion-dollar electronics and heavy industrial plants. India is a rising power in software, design, services, and precision industry...”

... the balance of power in many technologies will likely move from West to East. An obvious reason is that China and India graduate a combined half a million engineers and scientists a year, vs. 60,000 in the U.S. In life sciences, projects the McKinsey Global Institute, the total number of young researchers in both nations will rise by 35%, to 1.6 million by 2008.”

- In the past decade, the low Canadian dollar has given the Canadian manufacturing and resource sectors an edge. A stronger Canadian dollar creates a new set of challenges for Ontario exporters. Reliance on other competitive factors, such as the quality of a skilled workforce has become increasingly critical.
- The shortage of qualified labour will affect the operations of Canadian industry since 78% of companies depend on the availability of qualified personnel for their innovation activities; and 38% evaluate access to skilled labour to make decisions on business location (Canadian Manufacturers and Exporters in *Pathway to Prosperity*, 2006).

Relevance to Ontario Employer Needs

The province has made recent strides in securing new business that will depend on the college system to produce the necessary skilled workers.

Section 2:

Transforming
College
Infrastructure to
Support a
Transforming
Economy



June 3, 2006



July 30, 2005



November 5, 2005

- Ontario has successfully attracted \$7 billion in auto industry investment which will support auto industry research, education and training (www.2ontario.com). According to the *Globe and Mail* (September 19, 2006, p. B5), “Ontario replaced Michigan as the largest auto-producing political jurisdiction in North America in 2004 and retained the title in 2005”. New developments include:
 - General Motors’ Beacon project creating 400 new jobs in Oshawa, Ingersoll and St. Catharines as well as supporting auto industry research, education and training in Ontario
 - Toyota’s new Woodstock facility
 - Ford’s investment in its Oakville Assembly Complex
 - DaimlerChrysler’s investment in Windsor and Brampton
 - Navistar’s investment in heavy truck manufacturing in Windsor and Chatham
 - Nemak’s Windsor investment to launch a new innovative engine block process
 - Linamar’s investment in automotive powertrains and related research, development and plant improvements



Ford Plant, St. Thomas
(Photo Credit - CBC)

- The province has recently provided a grant to GE Canada to build a facility in Cobourg that will turn advanced plastics research into marketable technology.

- An Ontario trade delegation to the Farnborough International Air Show in England has secured contracts for Ontario aerospace companies (Atlantis Systems International, Brampton; EMS SATCOM, Ottawa; CableTest, Markham and Northstar Aerospace, Milton). The province’s aerospace industry consists of over 350 companies and 23,000 skilled jobs.



*Photo Credit -
Diamond Aircraft*

- The province’s Advanced Manufacturing Investment Strategy (AMIS) program is a \$500 million repayable loan program to encourage companies to invest in leading edge technologies and processes that will increase productivity and competitiveness. The first projects to be funded by the program are:
 - Diamond Aircraft Industries in London for the development of a single-engine, five-seat jet aircraft
 - Messier-Dowty Inc. in Ajax to help create a Landing Gear Systems Centre of Excellence
 - Procter & Gamble Inc. in Brockville to develop a new generation of quick-cleaning homecare products.

As of August 2006, a number of economic development initiatives were underway or planned for regions in Ontario other than the Golden Horseshoe. Appendix A provides a list of new construction, modernization or expansions in major centres in Northern, Eastern, and Western Ontario that will create employment for skilled workers.

Increasing Links between Educational Institutions and Industry

Not only are there integrated learning environments within colleges, wider integrated environments are growing within regions, nations, and internationally. Links between colleges, universities, government, communities, business and industry are creating valuable exchange mechanisms allowing for a deeper understanding of needs, the transfer of best practices, heightened responsiveness, and complementary collaborations.

The World Wind Energy Institute at St. Lawrence College, for example has collaborated with Ontario Power Generation to install a 44 kW turbine at on its Cornwall Campus. This unit has worked without interruption since 2001 and the College plans to install a 3MW unit in the same location and a similar one on Brockville campus. The College is also working with private developers to produce a 2 MW unit.

Work in Niagara (WIN) is a regional workforce development initiative launched by Niagara College in 2001. It has provided information to career information seekers, employers, associations, and employment service providers. WIN has worked to increase awareness and the status of skilled trades and apprenticeships and has assisted employers in defining their training needs.

Another way colleges partner with their communities is through program advisory boards such as the Law & Security Administration Advisory Committee at Confederation College.

The Challenge of State-of-the-Art IT and Equipment

The academic equipment inventory in a single college can range from \$1,500 to \$60,000 oscilloscopes to \$100,000 simulation mannequins to \$250,000 sound boards and digital radiography equipment (OCFMA, 2006). State-of-the-art IT and equipment, however costly to buy, install, and maintain is necessary to maintain the currency and relevance of technical programs.

... students were appalled to learn that the College's machine shop equipment was even older than the "old" equipment they used in high school and local hospitals expected the College's nursing labs be equipped with the hospital's latest electronic charting systems so that student nurses could be properly trained in advance of clinical placement (Fanshawe College).

Our biggest challenge is the lack of funds to provide and maintain equipment in our labs, shops, and studios. Today we have 77 post-secondary programs and no specific provincial allotment for new capital equipment and the ever greening of equipment. It will be impossible to train our students for the current marketplace using old and outdated equipment. In certain areas we have had to make the choice between taking on long term debt for the purchase of new equipment or eliminating a program because of the lack of proper equipment (Durham College).

Section 2:

Transforming
College
Infrastructure to
Support a
Transforming
Economy

Implementing Public Priorities

Increasing College Enrolment

The demand for college education and training in Ontario has been well documented in government publications, the media, and scholarly reports. Highlights are summarized below.

- College enrolment rose by 66% between 1989 and 2005 (ACAATO, 2006).
- Colleges are proposing an increase in full-time college enrolment of 30,000 by 2011 to address the shortage of skilled workers for the knowledge economy (Miner, 2006).
- The government of Ontario is aiming to increase the number of new entrants into apprenticeship programs by 7,000 to reach a total of 26,000 by 2007-2008 (Reaching Higher: The McGuinty Government Plan for Postsecondary Education, 2005)
- Ontario will face an estimated shortage of 100,000 skilled trade workers in the manufacturing sector over the next 15 years due to retirements (Ontario Chamber of Commerce, 2006).

Developing Public and Private Sector Partnerships

Some colleges have been successful in leveraging the value of MTCU funding to attract investment from other ministries and industry. For example, the Ford Centre of Excellence at St. Clair College mentioned previously was funded mainly by SuperBuild, the Ford Motor Company of Canada Ltd., Daimler Chrysler Canada Inc. and Essex County.

Fleming College was able to develop additional new facilities in 2005 by partnering with the City of Peterborough in the creation of a Sport and Wellness Centre to accommodate curriculum needs in the area of fitness. The \$14 million facility was financed through the municipal SuperBuild process, along with the College's student government and general College funds.

It is important to acknowledge that partnerships can be an effective way of raising capital for the development of new facilities or to acquire major academic equipment. They are much less effective to secure funds for operations or for capital improvements and should not be considered an appropriate way to fund infrastructure renewal.

Section 2:

Transforming
College
Infrastructure to
Support a
Transforming
Economy



Improving Energy Conservation

Energy conservation and retrofit projects with short payback periods have been completed at the colleges, including re-insulation, energy saving lighting, reduction in water consumption, and regulated or timed thermostats. An estimated \$30.5 million was saved in energy consumption between 1974-1975 and 1999-2000 (Association of CAATs Facilities Administrators, 2000).

Additional projects with longer payback periods aimed at meeting the government's goal of a further 10% reduction in energy consumption are planned *pending new capital funding*. OCFMA estimates that with an investment of \$60 million, Ontario colleges could implement major energy conservation and retrofit projects that will save between \$11 and \$15 million annually in operating costs and lower electrical and energy consumption by 26.7 MW and 92,950 MWH (OCFMA, 2006 and Power Application Group, 2005).

As an example of the innovation that is possible in the Ontario college system, Fleming College has received a Leadership Award from the Ministry of Energy for its Environmental Technology Wing which was designed to showcase green technology. The facility, opened in 2004, acts as a living, working classroom featuring an interconnected living laboratory, a green roof, a constructed wetland, and a wind turbine for alternative energy. According to Natural Resources Canada, the Environmental



*Environmental Technology Wing,
Fleming College*

Technology Wing is one of Canada's most energy efficient buildings. It is designed to operate at 66% above the requirements of the Model National Energy Code for Buildings and produce energy savings of \$36,000 annually (Ontario Ministry of Energy, 2006).

Advancing Applied Research and Professionalization of Programming

Colleges are developing capacity for applied research and in some cases are moving beyond commercialization activities to the development of an applied research ethic with problem-based projects and interdisciplinary solutions. According to Bernard Shapiro (2006), "*the most interesting research results are increasingly situated at the interface between the traditional academic disciplines rather than within them*". He further suggests that development of applied research activities can provide an opportunity to redesign or adapt physical structures. Integrated learning spaces where research questions are explored, with their opportunities for formal and informal exchanges, create "permeable interfaces" between the disciplines, learners and faculty.

Section 2:

Transforming
College
Infrastructure to
Support a
Transforming
Economy

Demonstration centres provide opportunities to leverage state-of-the-art equipment and showcase advances in applied research. The Centre for Alternative Wastewater Treatment (CAWT) at Fleming College, for example, promotes constructed wetlands and other innovative forms of wastewater treatment through applied research, education, and demonstration projects.



CAWT, Fleming College

The Glenn Crombie Centre for disability services at Cambrian College is an example of an education, research, and demonstration centre. The Centre provides the community and business in Northern Ontario with access to resources and consultations on needs and accommodations for people with disabilities. The building is fully accessible with adaptations both inside and outside, and is equipped with state-of-the-art assistive learning technologies. Cambrian students with disabilities use the resources of the centre to achieve their educational goals.



Glenn Crombie Centre, Cambrian College

Linked to the development of applied research is a desire for colleges to have their programs recognized through formal accreditation, to offer baccalaureate degrees and provide university graduates with post-diplomas programs. For example,

- The Primary Care Paramedic program at Durham College is accredited by the Canadian Medical Association.
- Seneca College has added three more Bachelor's programs to its roster: Applied Business in International Accounting and Finance, in Human Resources Strategy and Technology, and Applied Technology in Informatics and Security.
- Confederation College offers an intensive one-year post-diploma course in Human Resource Management, after which candidates can take National Exams leading to the CHRP (Certified Human Resources Professional).

In this section of the report, a case was made to develop and sustain the relevance of college education and training and to provide students with quality learning environments in order to support the transforming economy of Ontario. The next section, The Legacy of Fiscal Restraint focuses on the reality of the Ontario college system in terms of the impact of funding levels on infrastructure over the past 10 years.

Section 3 – The Legacy of Fiscal Restraint

Impact of Inadequate Budgets

Section 3:

Ontario is 10th out of the 10 provinces in per-capita college revenues. In Canada, average spending on college education is over \$9,000 per student. In Ontario, it is about \$7,500 per student (ACAATO, 2006).

The Legacy of
Fiscal Restraint

Ontario colleges have a diminished capacity to establish reserves and/or fund capital expenditures which will allow them to respond to priorities or crises without having to incur additional debt.

Funding over the past 10 years through the Facilities Renewal Program (FRP), the Apprenticeship Enhancement Fund (AEF), and the Capital Equipment Renewal Fund (CERF) has been critically important though inadequate to cover all costs – and AEF and CERF have now been cancelled. Appendix C contains a summary of the capital improvements achieved by the colleges.

The industry standard for infrastructure renewal is 1.5% to 2.5% of replacement value annually. Current FRP funding, at \$13.3 million, represents only 0.27% of the total replacement value for Ontario college facilities. OCFMA reports that as a result, there is a \$700 million backlog of renewal projects across the college system involving structural elements as well as building equipment, systems, and finishes. A conservative estimate of an appropriate level of infrastructure renewal funding based on \$250 per square foot (SF) for the college system's 21.5 million SF yields a requirement for an annual investment of \$80.8 million per year – which does not address the backlog (OCFMA, 2006).

To illustrate the severity of the problem, Northern College receives an annual FRP grant of about \$250,000 but any single major renewal project could easily devour the funds. Two 30 year-old boilers used to heat one of the Timmins campuses in winter months are at the end of their life cycle. A June 2006 tender quoted \$226,000 to replace them. Two 30 year-old multizone rooftop HVAC units need to be replaced at a cost of \$300,000. Annual replacement of 12,000 SF sections of the aging roof would cost in the area of \$240,000 each.

Rising Costs and Short Life Cycles

Over the period 1995-1996 to 2001-2002, the consumer price index has risen 12% while facilities operating budgets only increased 3%. Construction costs in some cases have doubled in the past 10 years.

Escalating energy costs are making it increasingly difficult to supplement capital needs from operating budgets. Humber College states: "The College is not in a position to fund energy retrofit projects as the savings which could pay down any loan that might be taken are eaten up by increased costs."

To remain competitive as a source of effective education and training for the labour market, colleges must keep equipment current with industry standards. Computer equipment in particular has a short life cycle and needs to be upgraded or replaced about every three years. To ensure the quality of their programs, colleges must invest millions or risk becoming irrelevant.

When Efficiency Becomes a Liability

Since their inception in the 1960's the colleges of Ontario have contributed significantly to the socio-economic development and prosperity of the province. Today their capacity to sustain this contribution is compromised. Fiscal restraint over the past 15 years has compelled the colleges to be ever more resourceful and efficient in dealing with the growth, adaptation, and maintenance of their campus infrastructure. Reliance on efficiency as a means of overcoming further budget shortfalls is an exhausted strategy. The *expectation* that colleges can still be more efficient has, in fact, become a liability.

Style over Substance?

Current facilities are aging and deteriorating, yet colleges are expected to grow their populations and compete for the student market. In creating attractive 'front doors' and appealing facilities to attract prospective students and their parents, colleges are obliged to divert funds that would otherwise be applied to less visible, yet critical infrastructure renewal projects.

Dipping Into Scarce Operating Funds

FRP grants have been supplemented with operating funds when critical facilities issues have required attention or for adaptation projects, which are not covered by FRP funds. Likewise, CERF grants have been supplemented with operating funds to expand IT infrastructure and to replace furniture.

Inability to Respond Effectively to Government's 'Strong People, Strong Economy' Objective

The provincial government's *Strong People, Strong Economy* objective focuses on the need to

- Increase education and skills by increasing participation in postsecondary education and skills training
- Capitalize on diversity by increasing the percentage of internationally trained people becoming qualified to work in Ontario
- Develop and maintain a competitive business environment that will attract jobs and investment
- Offer modern, efficient public services in a timely, cost-effective, and accountable manner
- Ensure a supply of reliable and affordable energy.

Without adequate financial support, the colleges will find it difficult to maintain the status quo let alone accommodate growth in enrolments, provide state-of-the-art learning environments to prepare students to 'hit the ground running', and undertake additional retrofit and energy conservation projects.

Challenge: Relevance and Quality of Learning Environments

Section 3:

Turning Away Students and Postponing Programs

The Legacy of
Fiscal Restraint

Capacity for growth of programs is often limited because of lack of space and the high utilization of existing facilities affecting even strategic areas such as trades and health. There are many instances where new or expanded programs for which demand exists both from students and the labour market have had to be shelved until adequate funding is made available.

Appendix D provides a lengthy list of academic programs at Ontario colleges that are not going ahead or are not expanding because of insufficient capital development funds. New or additional space, retrofits/refurbishments of space, and state-of-the-art or specialized equipment are required.

Adaptation Costs

FRP funds do not cover adaptation projects to support academic relevance and meet health and safety codes.

Adaptation is defined by industry as:

- **Related to Safety**
Code compliance including alterations to meet new legislative codes covering fire, health and safety, environmental, building, and accessibility
- **Related to Academic Relevance**
Changing a facility's original use to a new one and/or updating a space to meet requirements of curriculum and program delivery, or upgrading technology and space to better replicate current industry practices.



Not ODA Compliant

Industry standards indicate a required annual investment of 1.0% to 1.5% of replacement value to meet adaptation issues. Projects of this nature are numerous and significant in the Ontario college system. Examples at any single college indicate a backlog and pent up need significant enough to warrant a 1.5% investment in the system overall. This translates into an additional annual requirement of \$80.8 million per year (OCFMA, 2006).

Over-utilization of Space

Colleges have examined how their instructional spaces are organized and scheduled in order to develop strategies to increase efficiency. As a result, colleges have consolidated spaces, clustered similar or complementary facilities and services, and made changes to scheduling practices to achieve better utilization.

The space utilization ratio is the number of scheduled hours of activity divided by the number of total hours that can be scheduled. For example, if a college scheduled 38

hours of activity out of 50 available hours (based on the number of classrooms and the number of operating hours), the ratio would be 38/50, or 76%. According to Council of Ontario Universities Space Standards, this is an optimum utilization rate. For the college system, ECS recommends a target of 80% utilization. With improvements in space management since the late 1980's, Ontario colleges have achieved excellent utilization rates.

Unfortunately, a number of colleges are now over-utilizing their instructional spaces with utilization rates exceeding 90% resulting in significant difficulties for institutions to create reasonable timetables for student and faculty in terms of learning pace, stability, cohesiveness and independent access to labs and workshops to complete assignments and project work. In addition, constant high utilization taxes facilities with accelerated wear and tear and reduced access for maintenance and set up.

Challenge: Safe, Reliable, Cost-efficient Facilities

Unfunded Code and Regulatory Compliance

The colleges are required by law to comply with recent building code amendments, including ODA and health and safety regulations.

Worsening Facilities Condition Indices

The Facility Condition Index (FCI) is a ratio which allows a comparison of the relative condition of buildings.

$$\text{FCI} = \frac{\text{cost to correct deficiencies and liabilities}}{\text{current replacement value of facility}}$$

General industry guidelines suggest the following Facility Condition Index levels, which are usually expressed as percentages:

Good	0 to 5%
Fair	5.01 to 10%
Poor	Over 10%

The average FCI for Ontario colleges in 2002/03 was 9% and is projected to be 13% by 2006/07, which places the colleges increasingly into the 'unacceptable' category. Some colleges provided their average FCI in their responses for this project.

Algonquin	A range of 1% to 35% with an average of 20%
Centennial	25% and over
Fanshawe	11%
Lambton	18%
Seneca	11%
Sheridan	17%

In comparison, the Association of Higher Education Facilities Officers (APPA) reports that American universities have an average FCI of 7% (CSAO/OAPPA, 2004). Furthermore, APPA states that overall statistics for all institutions surveyed have decreased by .5% from 9.5% in 2004 to 9% in 2005 (APPA, 2006).

Section 3:

The Legacy of
Fiscal Restraint



A large water-proofing and foundations under-pinning project is underway at a 130 year-old George Brown College building.

Due to the costs involved, (close to \$2 million), the project will be completed in phases spread over a number of years.

The poor state of the foundations that carry this 9-storey building of about 450,000 SF makes this George Brown's top priority project.



Inadequate Infrastructure Renewal Practices

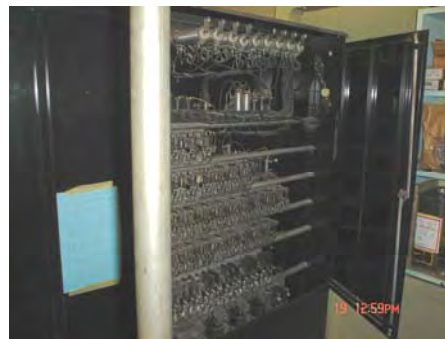
Section 3:

The timing of infrastructure renewal is critical since deterioration is exponential over the years. Many facilities administrators believe the college system is at a crossroads. College revenues once were able to accommodate facilities management costs, but the gap has closed and currently costs are exceeding revenues. Planning is now reactive by necessity.

The Legacy of
Fiscal Restraint

Some of the practices reported by the colleges include:

- **Band-aids**
Temporary solutions are implemented with no real opportunity for improvement or replacement. For example, old equipment is ‘cannibalized’ to stretch the life of existing equipment. One college reports hunting for parts on eBay.
- **Half the job**
At one Southern Ontario college, roofing replacement or repairs are falling behind and currently only half of what consultants have recommended can get done.
- **Imminent problems**
Underground water and sewer services or boilers, if not attended to in a timely manner, require that sections of campus be closed down or inconvenienced for repairs. Replacement costs under these circumstances can be prohibitive. Some lighting panels are 40 years old with no replacement parts available; main switch gear equipment is 30 or more years old.
- **Plans on hold**
Some mechanical/electrical systems are as old as the buildings they are in and monies cannot be released to get them replaced or upgraded. Flat PVC roofs are aging with inadequate insulation levels. It is difficult to implement effective energy conservation strategies.
- **Potential safety hazards**
Issues considered to be routine are often not completed which can lead to health and safety problems, for example, delaying the removal of mould. At one college, snow clearing equipment was in for repair so many times last year that facilities administrators were concerned for the safety of staff, students, and visitors. Their sand truck is 24 years old.



39 Year-Old Elevator Relay Controls

Crisis Mode

Unless capital funding is increased, Ontario colleges will continue to operate in an ad hoc, if not crisis mode. According to OCFMA, if no new operating and capital funding is made available colleges will be forced to reduce their renewal and operation activities to ensure basic necessities such as heat and lighting. Facility cleanliness, the general state of repairs, health and safety, and academic adaptation will continue to decline at an accelerated rate.

Section 4 – Investment in Infrastructure

Colleges in Ontario are operating in an exciting, albeit challenging fiscal environment:

Section 4:

- Innovative educational approaches are placing new demands on the inventory and on configuring and equipping instructional spaces
- Learners are provided with more tools and support to ensure their retention and success
- Information technologies are constantly evolving
- Expectations from employers and partners are becoming more sophisticated
- Colleges compete with one another and with universities to attract students, and rely on the appearance of their campuses to project a positive image.

Investment in
Infrastructure

Colleges have responded to these challenges well. They remain among the most innovative and efficiently run post-secondary systems of education in North America. However, the pressure to continue to offer effective education and training with fewer dollars has resulted in deteriorating physical assets and equipment obsolescence.

Colleges are losing the ability to do what is expected of them.

The challenge for college administrators and government officials is to examine capital funding needs within the larger framework of infrastructure renewal which includes academic relevance and quality, not simply a list of facilities maintenance projects, however critical.

Capital Funding Components

Capital Funding for Relevant and Quality Learning Environments

Colleges must deliver relevant programs that fit within an evolving, global context. They must create and maintain quality learning environments that reflect current academic delivery practices and the standards of industry, particularly for equipment and technology. This is best accomplished in facilities built or renovated to suit, not in facilities designed for the education and training practices of the previous three, four, or even five decades. Furthermore, colleges require funds to adapt campus footprints to reflect changing enrolments through growth or consolidation. For example, in large, urban colleges, the addition of floor space is a more likely reaction to market and program demands and enrolment growth. In some colleges, where enrolment is stable or declining, the decommissioning, consolidation, and adaptation of space may be necessary.

Capital Funding for Safe, Reliable, and Cost-Efficient Facilities

Colleges must enjoy the use of reliable, safe, and code-compliant facilities. Some institutions face a real risk that older buildings in their inventory might become unavailable due to the failure of a key system (such as a boiler or an electrical transformer). And, how much longer can certain buildings remain inaccessible to individuals with disabilities? Furthermore, colleges deserve fiscal support, as the stewards of public assets, when seeking to implement cost saving measures such as energy retrofits.

Capital Funding Priorities

Section 4:

Ontario College Facilities Management Association (OCFMA)

Investment in
Infrastructure

The Executive of OCFMA was unable to reach consensus on a rank ordering of priorities for this paper for a number of reasons including:

- An overwhelming concern that a prioritized list may indicate that certain needs are of lesser importance and may give the false impression that certain items could be expendable
- Difficulty in arriving at priorities for the system as a whole because individual colleges may have different emphases depending on local circumstances.

Rather, OCFMA identified areas that are under-funded and provided background information. The most recent benchmarking information for the college system was also provided.

Infrastructure Renewal

The infrastructure renewal backlog for the system is valued at about \$700 million. Ideally, the system would benefit from a one-time infusion to eliminate the backlog. About \$80.8 million annually would then be required to ensure the system remains current. This figure is based on the industry standard of 1.5% of building replacement value, which is about \$250 per square foot @ 21.5 million square feet. Current funding is \$13.3 million annually.

Adaptation

Adaptation of facilities is not formally covered under the existing FRF fund. As defined by industry, adaptation includes code compliance, health and safety, and changing or updating the use of facilities to meet requirements of academic curriculum and delivery as well as preparing spaces for technology and to replicate industry settings. Industry standards of 1% to 1.5% of current replacement value are indicated to address adaptation issues annually – an additional \$80.8 million annually.

Energy may soon be considered an adaptation project in order to meet government legislation to reduce consumption or demand by 10%. With an investment of \$60 million for retrofit projects, OCFMA expects to reduce overall energy demand and return savings of \$11 to \$15 annually into infrastructure renewal. Energy demand would be lowered by 26.7 MW and 92,950 MWH.

Equipment and Apprenticeship Funds

OCFMA recommends that both CERF and AEF programs be reinstated with increased budgets

Investment in Infrastructure

2005/06	FTE	Maint & Op Cost – M&OC (1)	% Salaries (2)/ M&OC	M&OC/ FTE	M&OC/ GSF	% M&OC/ GIE	Total GSF/ FTE
Algonquin	16 705	\$8 638 799	32.4%	\$517.14	\$6.92	5.01%	74.72
Boreal	2 166	\$1 324 550	14.6%	\$611.52	\$4.64	2.42%	131.87
Cambrian	5 578	\$4 980 304	31.0%	\$892.85	\$5.69	8.23%	156.96
Canadore	3 669	\$2 356 336	53.9%	\$642.23	\$4.63	6.82%	138.82
Centennial	12 478	\$5 610 264	11.8%	\$449.61	\$5.19	3.81%	86.69
Conestoga	7 801	\$4 446 039	29.7%	\$569.93	\$4.29	4.98%	132.74
Confederation	4 685	\$2 353 510	48.0%	\$502.35	\$4.43	3.99%	142.10
Durham	7 952	\$4 660 534	23.5%	\$586.08	\$5.39	5.21%	120.51
Fanshawe	14 623	\$8 458 709	27.5%	\$578.45	\$7.04	6.22%	83.75
Fleming	7 500	\$4 661 714	21.8%	\$621.56	\$5.10	6.34%	121.87
George Brown	16 980	\$7 663 880	24.6%	\$451.35	\$6.09	4.51%	74.10
Georgian	7 803	\$4 630 754	24.2%	\$593.46	\$5.24	4.07%	113.16
Humber	18 699	\$7 994 897	19.8%	\$427.56	\$5.45	4.39%	69.74
La Cite	4 056	\$2 699 760	12.8%	\$665.62	\$5.44	5.11%	122.29
Lambton	3 002	\$2 186 568	17.2%	\$728.37	\$6.09	6.66%	119.59
Loyalist	3 552	\$1 795 951	29.5%	\$505.62	\$4.17	4.25%	121.24
Mohawk	12 377	\$6 090 249	22.0%	\$492.06	\$5.18	4.99%	95.01
Niagara	7 890	\$5 287 354	24.0%	\$670.13	\$5.85	7.07%	115.82
Northern	1 797	\$2 012 215	38.3%	\$1 119.76	\$3.41	6.78%	328.25
Sault	3 750	\$2 165 394	49.8%	\$577.44	\$5.06	5.84%	123.96
Seneca	21 926	\$14 301 771	34.7%	\$652.27	\$7.10	6.40%	91.84
Sheridan	15 687	\$6 851 515	20.8%	\$436.76	\$6.11	5.35%	86.58
St. Clair	8 175	\$6 419 349	30.9%	\$785.24	\$7.15	8.60%	109.82
St. Lawrence	6 326	\$5 247 521	16.9%	\$829.52	\$6.39	7.88%	129.90
Ontario System Median			24.4%	\$589.77	\$5.42	5.28%	120.05
US College Median			46.0%	\$1 220.23	\$6.16	11.00%	197.00
12th Annual College M&O Cost Study				\$1 022.40	\$5.16	< in US\$	
http://asumag.com/2006MOcollege.pdf				US\$1=	\$1.1935	< in Cdn\$	
www.asumag.com/					www.bankofcanada.ca/en/rates/exchform.html		

(1) Maintenance & Operations Costs include: Administration, Building Maintenance, Electrical/ Mechanical Maintenance, Utilities, Cleaning & Grounds Maintenance Costs

(2) Salaries includes Administration, Building Maintenance, Electrical/ Mechanical Maintenance, Utilities, Cleaning & Grounds Maintenance Costs salaries and fringe benefits.

Response from the Colleges

Section 4:

As with OCFMA, analysis of the responses from the colleges did not produce a graduated list of priorities. Concerns are clustered around capital funding of learning environments and capital funding of fixed assets.

Investment in
Infrastructure

Renewal of Science Labs

Humber College is renewing its 40 year old science labs and support spaces. The 6 labs and two support spaces which were designed to serve as dedicated labs for set disciplines are being converted into a suite of open, bookable labs. These labs will not be organized according to the former discipline 'silos'; they will be built according to type, i.e. organic, inorganic, anatomy, prosection¹, and instrumentation labs. Support space will include prep, balance, and storage rooms. New furnishings and equipment will be supplied.

Conversion of Building Trade Workshops

Traditional building trade workshops consisted of a series of shops enclosed by walls. At the Southern Alberta Institute of Technology, these spaces are now beginning to be converted into large, and flexible multipurpose training areas that can be used simultaneously by various trade groups, for regularly scheduled term courses or for shorter sessions, and for larger or smaller numbers of students. All services such as power and computer hook ups, ventilation, etc., are provided in modules within the space allowing students to be exposed to a number of trades, not just the one they registered for. For example, a plumbing group may apply their skills in a house framing area of the workshop.

Updating IT

Ever-greening of IT equipment and infrastructure, ideally every three years, and development of e-learning capacity, audio/video conferencing capability, and accessible/assistive technologies.

Renewal of Furniture

Classroom/lab and office furniture is at the end of its life cycle in many institutions.

Infrastructure Renewal

New construction such as LRCs, and trades, health studies, distance education facilities

Renewal of existing assets such as:

- Fabrics: roofing, windows, frost damage
- Systems: Structural, water, sewer, mechanical, electrical, HVAC, lighting, elevators

¹ Prosection is the dissection of human cadavers prior to their instructional use by undergraduate anatomy and physiology classes.

- Finishes: flooring, ceilings
- Site work: frost damage, paving, walkways

Energy Management and Conservation

Retrofit projects include window replacement, upgraded chillers, and water conservation measures

Health and Safety

Projects including code compliance including:

- Chiller replacement (refrigerant legislation)
- HVAC
- Emergency Lighting
- Accessibility (ODA Code: e.g. ramps, doors, openers, railings, alarms)
- Electrical systems
- Building code (e.g. roof anchors)
- Fire (e.g. sprinkler system)
- Indoor air quality
- Removal of hazardous material such as asbestos and PCBs

Summary of the Vision for Stable Capital Funding Mechanisms

The following suggestions for capital funding in the Ontario college system are based on the opinions articulated by the individual colleges, OCFMA, the Project Steering Committee, and ECS's experience in the college sector in Ontario, the rest of Canada and a number of American jurisdictions.

1. Increased and Stable Capital Funding

Increased and stable capital funding will allow colleges to adapt campuses to sustain the relevance and quality of college programs and meet infrastructure renewal needs.

Capital Funding for Learning Environments

- ***Academic Adaptation***
Sustaining the relevance and quality of college programs will be most readily achieved through the adaptation and renewal of *existing* buildings. The Government of Ontario is encouraged to **support capital funding requests** that combine investment in quality and relevance with the imperative of safe, reliable, and cost-efficient facilities (as per item B below).
- ***Academic Equipment***
The Government should reconsider an **annual instructional equipment fund** to ensure that education and training programs have access to state-of-the-art equipment and technology and the ability for renewal to industry standards. Ever-greening of IT hardware and software should occur every three years, while other instructional equipment should be replaced as needed to keep pace with industry standards.

- **Facility Renewal: To Bring Colleges up to Standards**
A **\$700 million** fund is urgently needed for facility renewal to correct serious infrastructure deterioration and safety issues. Funding could be distributed over a number of years based on the merit of individual projects and a demonstration of good stewardship of existing assets. This \$700 million figure represents the renewal projects backlog estimated by the colleges at this time. The life-cycles of furniture (about 20 years) and of buildings and building equipment (25-40 years) should be taken into account.
- **Facility Renewal: To Keep Colleges in Optimum Condition**
ECS supports the Bob Rae recommendation calling for stable facility renewal funding delivered over 10 years. Approximately **\$80.8 million** is required annually for 10 years, based on the replacement value of the entire system's building inventory and the industry standard of 1.5% of that value. In contrast, the current annual allocation is \$13.3 million. Colleges also require **targeted funding** to implement the physical changes necessary to meet new accessibility, building, and health and safety codes and regulations.
- **Cost Savings Measures: Reduction in Energy Consumption**
Colleges are poised to implement energy retrofit measures to reduce energy consumption by 10% and meet government targets. The *State of Readiness Report* prepared by Power Application Group Inc. in 2005 suggests an infusion of **\$60 million** for retrofit projects which will reduce demand by 26.7 MW and 92,950 MWH, and return savings of \$11 to \$15 million annually.

2. Performance Benchmarks

The setting of performance benchmarks by government will establish targets for Ontario that the colleges will work toward. Measurement and analysis of performance indicators will provide a basis for planning and funding decisions by government and internally within each college. The following are examples of measurable performance indicators.

Learning Environments

Utilization	ECS recommends a space utilization target of 80% of available hours per week for general purpose academic space such as classrooms, general computer laboratories, and auditoria. A number of colleges are operating at utilization rates in excess of 90% and are compromising the quality of their academic delivery in doing so.
Area per Student	The Ontario median is 120 square feet per student compared to the American College median of 197 square feet per student. Ontario universities provide about 180 square feet per student.

Safe, Reliable, Cost-Efficient Facilities

<p>Facilities Condition Index (FCI)</p>	<p>A good FCI is between 0% and 5%. The average FCI for Ontario colleges in 2002-2003 was 9% with ranges of 1% to 35%. It is projected to climb to 13% by 2006-2007. American universities have an average FCI of 7% and APPA records indicate a slight improvement from 2004 to 2005. The average FCI of Ontario universities is 10%.</p>
<p>Facilities Maintenance Expenditure</p>	<p>The median facilities maintenance expenditure per student in Ontario colleges is \$589.77 compared to \$1,220.23 per student in the U.S. The Ontario figure represents the college system's capacity to spend, which does not represent actual need.</p>

In conclusion, ECS supports the efforts made by the Ontario college system to secure additional capital funding as well as stable funding mechanisms to bring the colleges up to standards, to maintain them to industry standards, and to provide excellent learning environments for the education and training of Ontario's future highly skilled work force.

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List of Abbreviations

ACAATO	Association of Colleges of Applied Arts and Technology of Ontario
APPA	Association of Higher Education Facilities Officers, formerly the Association of Physical Plant Administrators
AEF	Apprenticeship Enhancement Fund
AMIS	Advanced Manufacturing Investment Strategy
CAATS	Colleges of Applied Arts and Technology
CERF	Capital Equipment Renewal Fund
CNC	Computer Numerical Control
ECS	Educational Consulting Services Corp.
FCI	Facility Condition Index
FOC	Facilities Operating Cost
FRP	Facilities Renewal Program
FTE	Full Time Equivalent
GIE	Gross Institutional Expenditure
GSF	Gross Square Feet
HVAC	Heating Ventilation Air Conditioning
IT	Information Technology
ITAL	Institute of Technology and Advanced Learning
LRC	Learning Resource Centre
MTCU	Ontario Ministry of Training, Colleges and Universities
OCFMA	Ontario College Facilities Management Association
MW	Megawatt
MWH	Megawatt Hours
ODA	Ontarians with Disabilities Act
OECD	Organization for Economic Co-operation
SF	Square Feet

List of
Abbreviations

Appendix A – ECS Experience

Partial Listing of ECS Project Experience at Ontario CAATs

Appendix A:

Algonquin	Centre for Trades & Technology Position Paper, 2006 Timetabling, Scheduling Efficiency Studies, 2004 - 2005 Master Plan, 1998 – 1999, 1989 Design Brief, Woodroffe Campus, 1991	ECS Experience
Boréal	Space Program, Design Brief for New Campus Facility, Timmons, 2005 , 2004 Trades Building Shop Options, Sudbury, 2005 Space Program for Proposed New Toronto Campus Facility, 2005 Master Plan, 1994 Site Selection, 1994	
Cambrian	Master Plan, 1993 Barrydowne Campus Student Residence Study, 1989 Space Utilization Study, 1988 Capital Requirements, 1987	
Canadore	Canadore – Nipissing, Master Plan with Stantec Inc., 2006 Canadore – Nipissing, Master Land Use Plan Update, 2001 Canadore – Nipissing, Master Land Use Plan, 1995 Relocation of School of Aviation Planning Study, 1995 Development of a Centre of Excellence in Aviation Training, 1994 Canadore – Nipissing, Development of a Wellness-Recreation Facility, 1993 Canadore – Nipissing, Master Land Use, A 20-Year Plan, 1992 Master Plan for 1983 to 1987, 1983 Canadore – Nipissing, Space Utilization and Space Needs, 1977	
Centennial	Strategic Space Plan, 2006 Master Plan and related studies, 1993 - 1995	
Conestoga	Doon Campus Long Range Development Plan, 1988	
Confederation	Utilization Study of Academic Space, 2004 Student Services Consolidation Study, 2003 Learning Resource Consolidation, 1996 Space Study, 1981	
Durham/UOIT	School of Applied Sciences and School of Technology Space Plan, 2005 UOIT/Durham/Trent Analysis of Long-Term Space Requirements, 2002 Funding Proposal, 1999	
Fanshawe	Study of Health Sciences Facilities, 1978	
Fleming	Facilities Audit, 1995 Monaghan Road Relocation Plan, 1995 Master Plan Implementation, Frost Campus, 1995 Student Centre Study, 1994 Development of Master Plan, Sutherland Campus, 1994 Master Plan, 1989 School of Natural Resources Space Study, Lindsay Campus, 1986	
George Brown	Master Plan, 2006 Teaching Space Audits, 2003, 2004, 2005, 2006 Space Program, Concept Plans for Consolidation of Student Services, 2002 Centre for Studies in Community Health with Ryerson University, 2001 Functional Space Program, School of Graphic Communications, 2001 Multi-Campus Master Plan and Campus Consolidation Studies, 1991 – 1993 Scheduling Study, 1989	

Georgian	<p>Site Update, 2004 Long Range Campus Development Plan, 2004 Enrolment and Utilization Report, 1999 Machine Shop Study, 1999 Reorganization of the Owen Sound Campus, 1999, 1995 Kempfenfelt Conference Centre Options Study, 1996 Student Centre Feasibility Study, 1994 Master Plan Update, 1992 Space Study – Owen Sound Campus, 1992 Space Study – Barrie Campus, 1989</p>
Humber	<p>Science Laboratory Space Study, 2006 Library Study, 2006 Creative Arts and Performing Arts Instructional Space Utilization Study, 2002 Library Space Requirement Assessment, Lakeshore Campus, 2002 Space Audit, 2002 Space Plans, Schools of Applied Technology, Media Studies, 2002 Office Requirements Study, North Campus, 2001 Space Needs Evaluation, School of Applied and Creative Arts, 1989 Space Needs Evaluation, School of Technology, 1987 Engineering Technology Facilities Study to Replace Leased Premises, 1982</p>
La Cité collégiale	<p>Médi@Cité Space Program, 2002 School Board Partnership Long Term Evaluation, 2002 Learning Resource Centre Study, 2000 Stratégie Jeunesse, 2000 Master Plan, 2000 Office Study, 1998 Carson Road Site/Suitability of Existing Building, 1993 Site Master Plan Development, Cornwall, 1992</p>
Lambton	<p>Sarnia Multiple Use Centre, 1995 Master Space Plan, 1987 College Space Study, 1981</p>
Loyalist	<p>Zone A Design Scheme – New Student Service Centre, 2006 Master Plan, 2006 Computerized Facility Management, 1991</p>
Mohawk	<p>Brantford Campus Space Plan, 2006 Master Plan, 2006 Instructional Space Needs Analysis, 2005 Campus Space Study, Brantford, 1996 Various Utilization Studies, 1979</p>
Niagara	<p>Master Plan, 1993 Master Plan, 1992</p>
Northern	<p>Master Plan, South Porcupine Campus, 1990 - 1992 Space Study, Porcupine Campus, 1987 Master Plan, Porcupine and Kirkland Lake Campuses, 1978</p>
St. Clair	<p>Campus Master Plan, 2000 Design Brief for Student Centre, 1994 Priorities, Options and Space Requirements, 1985</p>

Appendix A:
ECS Experience

St. Lawrence	Food Preparation Area Layouts, 2005 Trade Shop Layouts, 2003 Applied Skills Training Facilities Master Plan, Kingston Campus, 2002 Brockville Campus Relocation Feasibility Study, 2000 Program Relocation Analysis, 1998 Extension of Advanced Technology Institute Revised Layout, 1996 Brockville Campus Library Study, 1996 Health Sciences and Science Labs Studies, 1995 Various Space Planning Studies, 1980 - 1991	Appendix A: ECS Experience
Sault	Master Plan Update, 2006 Site Planning for Algoma Health Unit, 2006 Campus Master Plan, 2001 Classroom Analysis Study, 1990 Master Plan Study, 1986	
Seneca	Space Program, Business/Mgmt, Marketing/e-Business, Markham, 2006 Design Brief for Technology Enhanced Learning Centre, 2001 Library Study, 2000 Newnham Campus Master Plan Functional Program, 2000 Master Plan, 1996 Planning for 'Seneca at York University', 1995 Master Plan, 1994	
Sheridan	Utilization Study, 2006 Skills Training Centre Trades Relocation, Space Requirements, 2005 C-Wing Expansion Design Brief, Davis Campus, 2004, 2003 Allocation Study of Academic Space, Trafalgar Campus, 2004 C-Wing Building Expansion Study, Davis Campus, 2003 Office Development Studies, 1997 Scheduling Study, 1997 Teaching Space Needs Analysis, 1997 CSP for Purchase of Skills Training Centre, 1996 Facilities Master Plan, Various Studies, 1994	
System-wide Studies	Analysis of College Facilities in Ontario, 1987 Metropolitan Toronto Area Colleges Facilities Analysis, 1986	

Ontario University Experience

Brock University	Queen's University
Carleton University	Ryerson University
Lakehead University	Trent University
Laurentian University	University of Ontario Institute of Technology
McMaster University	University of Ottawa
Nipissing University	University of Windsor
Ontario College of Art and Design	York University

Appendix A:
ECS Experience

Other Canadian Experience

Alberta	Mount Royal College SAIT, Southern Alberta Institute of Technology University of Calgary
BC	BCIT, British Columbia Institute of Technology Capilano College ECIAD, Emily Carr Institute of Art + Design Kwantlen University College
New Brunswick	NBCCD, New Brunswick College of Craft and Design University of New Brunswick
Newfoundland & Labrador	All Colleges Memorial University
Nova Scotia	NSCC, Nova Scotia Community College NSCAD, Nova Scotia College of Art & Design University Dalhousie University
Quebec	Collège Édouard-Montpetit Concordia University École nationale d'aérotechnique

**Appendix B – New Economic Development
in Ontario Regions**

New economic developments are planned in Northern, Eastern, and South Western Ontario. The following is a listing of those developments as of August 2006.

Appendix B:

New Economic
Development
in Ontario
Regions

- New construction, modernization, or expansions in Northern Ontario include:

In the Sudbury area:

- Mining/metal and mineral processing (an estimated \$645 million investment at Inco, Falconbridge, and URSA Major Minerals with over 150 new jobs created)
- Call centres (estimated 250 jobs)
- IT and telecommunications (estimated 200 jobs).

In the Thunder Bay area:

- Mining/metal and mineral processing (\$245 million investment at Placer Dome and North American Palladium with 145 new jobs)
- Forestry products (\$132 million investment at Bowater, Sterling Pulp Chemicals, and Buchanan Lumber and about 35 jobs)
- Call centres (an estimated 450 jobs will be created).

In the Timmins area:

- Mining/metal and mineral processing (\$900 million at Falconbridge, Globex, Liberty Mines and 130 jobs)
- Energy sector (Canadian Hydro Developers investing \$64 million)
- Forestry products (Grant Forest Products investing \$31 million and creating 130 jobs)
- An estimated 725 jobs will be created from investment in Call Centres.

- New construction, modernization, or expansions in Eastern Ontario:

In the Ottawa area:

- The IT and telecommunications sector is continuing to grow and has recently created 4,000 jobs (Dell, Cisco, Bell, Group Telecom and Metera Networks).
- Other new investments have been made in Agri-Food, Forest Products, Energy, Retail, and Biopharmaceutical sectors.

In the Kingston area:

- The energy sector has contributed to new development (Vector Wind Energy, Guelph Hydro Generation, and Canadian Hydro Developers)
- The automotive and retail industries have contributed to new developments leading to an estimated 275 jobs
- 1,400 jobs have been created by new Call Centres.

- New construction, modernization, or expansions in South Western Ontario:

In the Windsor area:

- The automotive sector is growing in the Windsor area with recent investments totaling about \$1.5 billion. DaimlerChrysler, Nemak, Klinec, Innovative Seating Systems, Ford, and Canadian Electrocoating have created an estimated 1,200 new jobs.

- Other growing sectors include energy, entertainment, and manufacturing and production.

Appendix B:

In the London area:

New Economic
Development
in Ontario
Regions

- The automotive sector is growing in London as well with Accuride, Brose, Copperweld, Intier Automotive, Magee Reiter Automotive Systems, Starlim-Sterner, Thyssen Krupp Budd Systems, and TransForm Automotive investing over \$140 million and creating about 1,000 new jobs.
- About 1,000 new call centre jobs were also created in London.
- Other active sectors are agri-food, biopharmaceuticals, and retail.

Not included in the above is the constant need for skilled workers in social and financial services, environmental planning and sciences, education, health sciences, correctional services, and government.

**Appendix C – Summary of Capital Improvements
at Ontario Colleges 1995-2005**

Ontario colleges, in ECS' experience, leverage their facilities to achieve the highest utilization factors and efficiencies among North American tertiary education institutions. In the face of retracting budgets, the colleges have responded to fiscal challenges creatively and effectively.

Capital funding by government has been allocated through discrete college specific grants, broad provincial programs such as Access and SuperBuild and directed funding programs such as the Facilities Renewal Program (FRP), the Capital Equipment Renewal Fund (CERF), and the Apprenticeship Enhancement Fund (AEF).

This support has allowed the colleges collectively to have:

- Increased enrolments
- Focused capital investment on new buildings and equipment to recruit and retain students. Fanshawe College, for example has nearly doubled the size of its campuses since 1998 to accommodate student growth. Key Performance Indicators (KPI) show that student satisfaction with the quality of facilities has increased 14% in 6 years from 65% in 1999-2000 to 79% in 2005-2006. Student satisfaction with labs and shops increased 14% to 72% and for computer labs, satisfaction increased 12% to 81%.



M Building, Fanshawe College

- Cambrian College built and equipped 118,000 GSF of new shops, classrooms and labs, and Georgian College grew 25% from 705,000 GSF to 880,000 GSF including the acquisition of another campus in Midland.
- Completed capital projects to replace decommissioned facilities or add gross square footage (GSF) to campus portfolios. Algonquin College replaced 275,000 GSF of obsolete facilities with new construction.
- Invested annually in refurbishing interior space, replacing furniture, addressing program requirements, and upgrading or acquiring academic equipment including new technologies
- Invested in building systems equipment such as fire detection systems, boilers, and electrical switchgear
- Completed health and safety projects, for example Sheridan College has used FRP funds to remove moulds, PCB waste, and asbestos
- Completed some critical building systems projects.

However, these improvements were achieved with limited funding which did not meet all needs. Colleges were and are pushed into finding new efficiencies, delaying renewal projects, and shuffling and reshuffling long lists of priorities. This is why efficiency has become a liability. An indicator of the impact of this reality is the amount of gross square footage available per full-time equivalent student (FTE): the GSF/FTE at George Brown, for example decreased from 80 in 2002 to 74 in 2006. Humber ITAL's GSF/FTE is currently 70. The median in the Ontario college system is 120 GSF/FTE compared to the median in American Colleges of 197 GSF/FTE (OCFMA, 2006).

**Appendix D – Compromised Programs
at Ontario Colleges**

While impressive in the short term, ‘making do with less’ for over 15 years has taken its toll on the condition of college infrastructure. While colleges have, so far, been able to respond to critical facilities issues they have not been able to implement long term life cycle plans and they have seen a steady decline in their ability to renew and adapt physical resources to respond to the needs of students, the community, and industry.

The following are examples of academic programs that are not going ahead or are not expanding because of insufficient capital development funds.

New and Existing Programs Requiring Investment in Space and Equipment

College	Compromised Programs	Details
Algonquin	Trades	Need new trades facilities
	Health Studies	Need refurbishing of Health facilities
	Student Services	Need consolidated and refurbished facilities
Boréal	Trades: hauling, parts person, carpenter, woodworking, plumbing, masonry, electrician, machinist, millwright, cooling and ventilation, hairdressing, food preparation, construction worker, trades helper	Need new facility
Cambrian	Broadcast New Media Animation Energy Systems Management	Need new lab to start program
	Powerline Engineering Technician	Need equipment to expand enrolment and meet industry demand
	Trades programs	Need more lab space and equipment to increase enrolment and decrease wait lists
	All programs	Need to renew/evergreen computer equipment for student use
Conestoga	Apprenticeship Training Any new program	Need new facilities and equipment
Confederation	Health Studies: Lab Technician, Diagnostic Imaging, Respiratory Technician, Dental, Nursing Emergency and Protective Services programs: Pre-Fire Education, Pre-Protective Services, Paramedic, and Dispatcher	Need a Health Science Centre and an emergency & protective services facility Need equipment
La Cité collégiale	Pre-Service Firefighter Education and Training Emergency Measures and Preparedness	Need additional space and equipment
Durham	Rapid Manufacturing Landscape and Turf Management Interior Decorating Community Integration through Cooperative Education	n/a

	HVAC and Plumbing Emergency Services and Firefighting	Need additional space to accommodate demand
	Trades	Need expansion of Whitby Skilled Trades Centre and new equipment
Fanshawe	Automation Technician Composite Manufacturing Technician CNC Operator CNC Programmer	Need Automation/Manufacturing Centre space expansion and adaptation Need new equipment
	Medical Laboratory Technician Anesthesia Assistant Medical Imaging Radiology Assistant	Need Health Sciences Centre space expansion Need medical equipment
	Technical Production for Live Performance and Presentation: Sets, Properties and Lighting; and Sound Design Acting for Contemporary Media –radio, TV, film and live venues Voice Over and Narrative Performance and Production Hosting and Production Specializations Dance Performance and Production Live Recording Post-Diploma Costume Post-Diploma	Need new Arts Centre with performance and studio spaces, a black box theatre, a live recording facility, and a full media broadcast facility
	Three-Dimensional Animation Gaming	Need high-end computer equipment
	Apprenticeship Training Aircraft mechanic	Need new Aircraft Maintenance Centre and equipment
	Horticulture Technician	Need greenhouse expansion
	Public Safety, including Police Foundations, Paramedic, Firefighting, Emergency Telecommunications	Need new Public Safety Centre, including academic fitness centre and gymnasium
Fleming	Apprenticeship Training	Need additional space
Georgian	Diploma, Apprenticeship Training	Need additional facilities
	Law and Security Administration and Police Foundations	Need new gymnasium
	Potential new programs	New equipment with adequate funding for start-up, ongoing maintenance and renewal
Humber	Applied Technology/ Health Sciences	Need retrofit of existing 5 lab science suites to meet code (chemistry, bio-science, anatomy)
	Hospitality, Recreation & Tourism	Need to relocate and retrofit existing labs (cooking/baking) to meet code
	Music Degree Programming Performing Arts	Need new music production facility
	All Degree Programming - Lakeshore Campus	Need 8 additional large group classrooms & faculty space to accommodate 3rd & 4th years
	All Programming - North Campus	Need additional space for library collections, independent learning seats, open access computer labs

Appendix D:
Compromised
Programs at
Ontario
Colleges

	Any New Program - University of Guelph-Humber	Need additional multi-purpose instructional space	
Lambton	Physical Education Courses, Varsity, and Intramural Activities	Need new gymnasium facilities	
	Cluster of Emergency Response Programs	Need new gymnasium facilities to keep pace with expanding enrolment	
	Paramedic, Fire Science Technology, Law and Security, Police Foundations, Nursing, and Hazardous Materials Response Training	Need new Centre for Public Safety	
	Pharmacy Technician Nursing Alternative Energy Apprenticeship Training	Need new/upgraded equipment Need support for apprenticeship programs	
Loyalist	Entertainment Management Chef Apprenticeship – Level 3 Baker Pastry Chef Pharmacy Technician	n/a	
	Niagara	Expanded/Specialty Welding	Need new specialized facility and equipment
		Viticulture and hospitality	Need new Wine Discovery Centre facility at Niagara-on-the-Lake
		Fitness/Health Promotion and Policy Foundations	Need additional space to accommodate demand Need new gymnasium facilities
High Definition TV (HDTV) training in new standard		Need new equipment and studio floor space to accommodate old and new standards	
Broadcasting – Radio, TV, and Film (BRTF)		Need additional TV studio, control room, edit suites, and support space 700 applications annually for 90 openings	
Advanced Television Production Graduate Studies Certificate		n/a	
Acting for TV and Film		Need expansion of the BRTF area	
Journalism Print – Advanced Diploma Graphic Designer – Advanced Diploma		Need expansion of existing space and technology investment Need additional space to accommodate demand Need expansion of existing space and technology investment	
Northern	Heavy Duty Equipment and Motor Vehicle	Need new shop area	
	Millwright	Need renovation and expansion of shop area	
	Veterinary Technician	This program at risk of losing accreditation Need to consolidate courses at one location in a new veterinary sciences building	
	Construction Craftsperson and Plumbing Apprenticeships	Need space for these new apprenticeships	

Appendix D:
Compromised
Programs at
Ontario
Colleges

	Building Inspection Technician and Geographic Information System Technician	Need additional classroom and lab space
	Bachelor of Science-Nursing, Practical Nursing, and Personal Support Worker	Need additional classroom space
	Medical Lab Assistant (1-year), Medical Lab Technologies (3-year), Occupational Health and Safety Nursing (Specialty)	Need new chemistry lab (students currently taking lab at a high school)
Sault	Paramedic, Dental Hygiene, Diagnostic Imaging, and Robotics	Need new space and equipment
Seneca	Computer Studies including Networking and Informatics and Security	Need new classroom and space, and current computer equipment with adequate storage and servers
	Broadcasting	Need new equipment to move to HDTV
	Applied Science and Engineering Technology	Need funding to keep up with industry standards for equipment Need additional lab space with more equipment per class Need to replace old equipment
	Aviation, Environmental Site Remediation, Environmental Technology, and Control Systems Technology	Need additional lab space including an environmental analysis lab (students travel to York for chemistry courses)
	Biological Sciences and Applied Chemistry	Need additional classroom and lab space at Jane Campus
	Pharmaceutical Industry and Advanced Techniques	Need separate pharmaceutical production/manufacturing facility Need new state-of-the-art equipment

Appendix D:
Compromised
Programs at
Ontario
Colleges

