SELF-STUDY REPORT

For

Environmental Technician

&

Environmental Technology

at

Sir Sandford Fleming College of Applied Arts and Technology

Lindsay, ON

April 2017

Fleming College

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SELF-STUDY REPORT

Environmental Technician & Environmental Technology

Sir Sandford Fleming College of Applied Arts and Technology

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Self-Study Report
Fleming College - Environmental Technician & Environmental Technology

GENERAL INFORMATION

1. Program Name: Environmental Technician & Environmental Technology

2. Graduation Credential (check 1):
   D degree x diploma D certificate
   D other (specify) _____

3. Name of credential on student transcript: Environmental Technician diploma & Environmental Technology advanced diploma

4. Structure of Program:
   i. Length of school year: 8 months (September – April)
   ii. Number of semesters: Environmental Technician has 4 semesters & Environmental Technology has 2 semesters
   iii. Weeks per semester: 15

5. Department/section/faculty within which the program resides: School of Environmental and Natural Resource Sciences

6. Date Program first offered: (month/year) September 1986 for both programs

7. Date of first graduating class: (month/year) June 1988 for Environmental Technician and June 1989 for Environmental Technology

8. Maximum # of students who can be enrolled in the Program each year: 120 for the Environmental Technician and 28 for the Environmental Technology program.

9. If integral portions of the program are offered at locations other than the main campus, please indicate the course(s)/lab or field work and location(s) below:
   Similar to many programs in the School of Environmental and Natural Resource Sciences, the Environmental Technician program emphasizes the value of applied learning in the field context, and incorporates an intensive field camp opportunity for each student. Fall Field School occurs at an off-campus location and is designed to reinforce key environmental skills in the application of practical field techniques. Also offered off-campus are some lab and field components in the following courses: Environmental Measurement, Aquatic Biology and Watershed Management.

10. Contacts:
    i. Dean/Director/Program Coordinator/Chair or equivalent:
       Ron Macdonald, Academic Chair, School of Environmental and Natural Resource Sciences, Frost Campus
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iii. Designated Liaison for CEAC:
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11. Year the program was first implemented: September 1986

12.

Major Change in Environmental Technician Program	Year of Change
Field School moved to Spring (APST27)	2011
Co-op Implemented	2014
One hour reduction to Environmental Techniques course	2015
Aboriginal Content (ENVR10)	2016
Environmental Principles (Competency-based training)	2016
OIT (Operator-in-Training) and ELC (Entry-Level for Drinking Water Operator Certifications embedded in course (ENVR18)	2012

Major Change in Environmental Technology Program	Year of Change
Instituted Business Acumen (ENVR5)	2012
OBBN Certification (ECOS1)	2013
Field Placement (FLPL71) modified to include International Option	2011
Environmental Site Assessment (name change and move to Semester 6)	2015
Environmental Hydrogeology moved to Semester 5	2015

13. Program is currently accredited, please provide year of first graduates: June 1988

14. If the request is for re-accreditation, include a summary of deficiencies or concerns identified in the previous accreditation review. Describe what actions have been taken to remedy these and include the dates on which these actions were taken.

Recommendation 2.1.1:
10-02-01 In the Environmental Technician program there is a concern there will be insufficiencies in future staffing that may result in issues of insufficient instructor capacity. Due to funding pressures, there may also be a shift to fewer core faculty members (as currently defined), but more cross-program staffing. While this format has its merits, there were concerns of less cohesiveness within the core faculty and the effect that could have on the students' education.

It is recommended that the Dean assess the need for additional full-time and part-time faculty and environmental technologists.

Action: *The program had three full time faculty retirements and two full time hires since 2010: Melanie Logan was hired in 2011 and Robert Bialkowski was hired in 2014. A new full time faculty will be hired in 2017 (and will be shared with the Environmental Health and Safety Program graduate certificate). Staffing has remained the same.*

Recommendation 2.1.4.:
10-02-02 The current Program coordinator for the Environmental Technician Program has occupied this position for several years but will reach the nominal retirement age in May 2010. There is no designated person or person-in-training to take on this potential vacancy. In addition, potential future changes to the current core faculty dynamic suggest the need to have a program coordinator with strong management skills and knowledge of the job position.

It is recommended that the Environmental Technician Program implement a succession strategy for identifying and/or mentoring replacement program coordinators within the Collective agreement.

Action: *After the retirement of Steve Thompson, Mark Williamson assumed the program coordinator role.*

Recommendation 2.2.1.:
10-02-03 There are currently adequate faculty to student ratios with good coverage of the technical requirements of the program. However, there is a concern that increased student numbers projected for the coming years will strain existing faculty and a higher demand on laboratory and field class capacities.

It is recommended that a detailed review be conducted of the adequacy of program staffing to meet current and changing needs as influenced by enrolment and other factors.

Action: *In 2010, the Fall enrolment on day 10 was 250 students for both the Technician and Technology programs. In 2016, the Fall enrolment on day 10 was 231 students in comparison (see chart below). Enrolment has fluctuated in the past six years but faculty to student ratios continue to provide good coverage of the technical requirements of the program.*

Fall 2010 Enrolment	Fall 2016 Enrolment
Environmental Technician – 138 students	Environmental Technician – 180 students
Environmental Technology – 112 students	Environmental Technology – 51 students

Recommendation 4.1.1. General Facilities:
10-04-01 Current laboratory facilities are barely adequate for the number of students. Projected increases in student numbers in the near future will result in insufficient laboratory and field capacity. Proposed improvements to the physical facilities are expected to meet the projected student numbers.

It is recommended that the Dean/Program Coordinator evaluate the impact of increased student numbers on laboratory facilities and field programs, particularly the off-campus Fall and Winter Field Programs.

Action: *New ET Classrooms and Preparation room (rooms 191, 193 and 194) built in September 2010.*

Recommendation 4.1.4.:
10-04-02 Current facilities were constructed to meet earlier student load and are now near to over-loaded. Student increases, projected for September 2010, will further tax the current facilities. Re-developed facilities should meet these challenges, but there will be additional need for associated laboratory and field equipment. The $1000 limitation on expenses/capital allocation for equipment and laboratory purchases is inadequate for a program of this size, with the needs of the field/lab experiences.

It is recommended that the Dean investigate alternatives to the process of equipment renewal and to increasing the budget for small capital laboratory and field equipment purchasing.

Action: *The capital request process occurs annually whereby all SENRS programs submit their desired capital needs to the academic leaders for ranking. Capital requests are defined as those greater than $5000 or a multiple purchase of items that total $500 or greater. Based on the ranking, capital submission templates are completed and forwarded to the Vice President Academic for further ranking within the academic division. In the past two years, $1 million has been allotted for the entire academic division for capital expenditures. The capital committee determines which capital submissions are awarded from all the submissions within Fleming College. Alternatively, advancement reviews program wish lists and determines which items they may be opportunity to seek donations externally.*

Recommendation 5.1.1.:
10-05-01 The curriculum, with minor deficiencies (discussed in the next point), does adequately meet the requirements for a Type 1 program, but is not sufficient in content for key categories if assessed as a Type 2 program.

It is recommended that the Environmental Technician program revise their application for accreditation as a Type 1 program.

Action: *This was completed in 2011.*

Recommendation 5.3.1.:
10-05-02 In a number of instances, learning outcomes presented in courses were not reflected in the subcategories of the NOS Transferable Competencies and, conversely, in some instances courses were identified as contributing to NOS subcategories that did not appear to be accurate. 29

It is recommended that the Fleming Environmental Technician NOS tables be revisited and refined if the Commission decides to keep them within the Curriculum Requirement after its assessment of the pilot project.

Action: *These have been reviewed and updated as per the recommendation above (see Appendix 5.3.1A for the Environmental Technician Program and Appendix 5.3.1B for the Environmental Technology Program).*

INTRODUCTION TO FLEMING COLLEGE

The Environmental Technology program is offered at Fleming College's Frost Campus in Lindsay, Ontario, home to the School of Environmental and Natural Resource Sciences. The Frost Campus serves approximately 1,600 full-time students and has prepared graduates for entry into careers in the environment and natural resources sector of Canada's economy for 50 years. The campus offers 31 programs in Environment, Natural Resource Sciences, and the success and reputation of Frost graduates in their careers is nationally recognized and respected. The high regard in which our graduates are held by employers constitutes our most significant success. The reputational value of our "product" is acknowledged as being second to none.

In 2003, Fleming College added a 42,000 square foot Environmental Technology Wing to the Frost Campus. The wing demonstrates various "green" technologies encompassing renewable energy sources, environmentally sensitive building design and materials, and several specialized features including a Green Roof and Living Wall.

In 2016, Fleming College received approximately $5 Million dollars in infrastructure funding to enhance the geology/soils labs at the Frost Campus. These enhancements will benefit the students in the Environmental Technician program.

The Centre for Alternative Wastewater Treatment (CAWT) is also at the heart of the school's Environmental Technology Wing. The CAWT is focused on achieving a scope of constructed wetland research that does not presently exist in Canada. It is a hub for constructed wetland and alternative wastewater treatment expertise, applied research, education, resources and demonstration projects. The CAWT fosters collaborative research partnerships with universities, government agencies, non-governmental organizations, and the private sector. In addition, it fosters and engages in opportunities to enhance student learning through the integration of applied research activities in student curricula.

REQUIREMENT 1: Mission and Objectives

Mission Statement and/or Program Goals/Program Plan

1.1.1 An environmental program must have a current mission statement and/or a formal statement of overall program goals/program plan which is in alignment with the Institution's current mission statement and strategic plan.

The Mission of the Environmental Technician (ET) Program is to provide students with exceptional training, knowledge and skills in the sciences comprising the environmental discipline. Students will be provided with sound education and core competencies in current theories, principles and practices unique to the environmental discipline with a strong emphasis on practical, hands-on training. The aim is to position our students at an advanced level in order to set them apart from other institutions. Competent instructors will ensure that students possess confidence, capability and will be prepared and employable as environmental practitioners upon graduation.

The mission statement for the ET program aligns very well with the mission statement for Fleming College, which is "Fleming Champions personal and career success through applied learning. We contribute to community success and environmental sustainability through programs, services and applied research."

Fleming College's strategic priorities include, but are not limited to; deliver outstanding student learning and experiences; collaborate and prosper with our communities; excel as an organization and enhance financial health and sustainability. The ET program supports these strategic priorities through the delivery of quality learning experiences, the provision of industry-recognized hands-on training to students, and the opportunities to partner with the local community and outside agencies through applied research projects and student placement opportunities.

Appendix 1.1.1 outlines Fleming's current strategic plan 2015 – 2018. In the fall of 2009, the college launched its 'core promise', "Learn, Belong, Become", which places continued emphasis on the provision of high quality learning opportunities for students in a supportive community that enables students to develop to their full potential. This core promise will serve as a key directional statement for the college's strategic plan in 2015 and beyond.

1.1.2 The current mission statement and/or formal statement of overall program goals/program plan must demonstrate that the program's purposes are appropriate as an environmentally focused academic program or one focusing on the preparation and training of environmental practitioners/professionals.

Please refer to Section 1.1.1 above.

1.2 Development, Re-evaluation and Revision of the Mission Statement and Program Goals/Plan

1.2.1 The current mission statement and/or formal statement of overall program goals/program plan are the starting point or foundation for all of the program's activities, services and policies. They give direction for strategic planning, curriculum and allocation of resources.

The above mission statement serves as the starting point for all of the program's activities, services and policies. This statement has served as a guide in all aspects of the ET Program direction from guiding the recruitment of full-time faculty as well as part-time faculty from semester to semester, to adoption of procedures and protocols, to the acquisition and implementation of instrumentation and techniques in the field. In addition, the mission statement has set the bar to ensure that the Program remains competitive and current through ensuring currency and competence in faculty, acquisition of capital equipment and supplies, and maintaining/upgrading of infrastructure (teaching resources, classrooms, laboratories, field camps and equipment).

1.2.2 The current mission statement and/or formal statement of overall program goals/program plan are developed -and when necessary, revised- in a collaborative process with representatives from the program's administration, faculty, students and/or industry. They are adopted or accepted by the institution's governing board and/or approved by an external credential validation service or government agency.

The Environmental Technician and Technology program curriculum aligns with and adheres to provincial program standards, which were updated in 2012 and validated by the Ontario Colleges Credential Validation Service and approved for publication by the Ministry of Advanced Education and Skills Development. This process includes collaboration with all Colleges delivering the program as well as employers and industry leaders. For further details on the updated standards, access these links:

http://www.tcu.gov.on.ca/pepg/audiences/colleges/progstan/enviro/entech.html

http://www.tcu.gov.on.ca/pepg/audiences/colleges/progstan/enviro/techno.html

The program standards include all vocationally specific learning outcomes that graduates are expected to demonstrate, as well as essential employability skills and meeting a general education requirement.

Program faculty and staff are involved in the review and renewal of program curriculum on a regular basis. The Program and Curriculum Review process at Fleming College is designed to foster continuous improvement and involves two integrated and complementary stages: An annual curriculum review, and a comprehensive program at five year intervals. The process includes both quantitative and qualitative analysis such as student and graduate satisfaction, graduate employment, enrolment trends, retention and graduation rates, faculty and staff input, Program Advisory Committees input on external trends, employer satisfaction as well as financial analysis of a program's performance.

This review process carefully examines emerging trends in related industries and solicits input from the Program Advisory Committee (comprised of outside agencies, private

consultants, municipal, provincial and federal governments, and industry related to the environmental field). They meet on an annual basis and provide essential feedback from the perspective of employers and players in the discipline.

Program Improvement Plans are developed as a result and once approved, the recommendations become the program action items with resources allocated to implement the plan. Any major modifications that are recommended must be approved by both the School Administration and the Vice-President, Academic.

The ET Program faculty and staff also meet on a regular basis (often weekly) and are continually adapting and adjusting curriculum within the program to meet the changing needs of both the workplace and students. There are also very active alumni who are now employers of our current graduates and/or are working in the discipline and provide faculty with current information about industry trends. Employment opportunities and trends inform future direction for the ET program.

REQUIREMENT 2: Faculty Complement and Leadership

2.1.1 The development and recruitment of the environmental program's faculty should take into account its mission/program objectives, the communities it serves and the need to support and ensure the continuing relevance and viability of the program and its curriculum.

Core full-time program faculty members include the following individuals:

- Mark Williamson (FT and Program Coordinator with leadership responsibilities)
- Anne van Warmerdam (FT)
- Melanie Logan (FT)
- Bob Bialkowski (FT)

Core Part-Time faculty members include the following individuals:

- Gord Balch
- Steve Thompson (retired ET faculty and coordinator)
- Ken MacDonnell
- Mark Dzurko
- Lawrie Keillor-Faulkner
- Joyce Sedore
- Cyndy Broughton

Table 1 below summarizes the full-time fall 2016 teaching commitments in core program courses.

Table 1 - Fall Semester 2016 Summary of Teaching Commitments for ET Program Faculty

Faculty Name	Full-time	Part-time	Courses Delivered	Teaching Load (TCH) per Week	Other Duties
Mark Williamson	YES		SCIE6 Aquatic Biology ECOS1 Applied Ecology APST28 Fall Field School	9 3 1	Program Coordinator
Melanie Logan	YES		ENVR8 Environmental Measurement ENVR5 Environmental Applications ENVR17 Waste Management Approaches	9 2 4 1	

Faculty Name	Full-time	Part-time	Courses Delivered	Teaching Load (TCH) per Week	Other Duties
			APST28 Fall Field School		
Robert Bialkowski	YES		ENVR 15 Land Reclamation Principles ENVR11 Environmental Techniques ENVR12 Environmental Technology APST28 Fall Field School	9 5 2 1	
Gord Balch	YES		ECOS4 Constructed Wetlands	3	
Anne VanWarmerdam	YES		ENVR19 Watershed Management GEOL63 Environmental Hydrogeology	9 4	

2.1.2 Faculty members must have appropriate education, professional credentials, work, field and/or research experience, skills in teaching and learning methodologies including assessment methodologies, communication skills and technologically current knowledge for their teaching positions in the environmental program.

Please refer to Appendix 2.1.2 for a detailed summary of the credentials of program faculty and all corresponding Curricula Vitae.

2.1.3 The overall composition and the combined experience of faculty members must adequately reflect the environmental orientation of the academic program and field experiences. This should contribute to the program's ability to produce graduates capable of integrating environmental principles, philosophy and theory into environmental practice.

The ET Program evolved in the early 1980's from a need to fill a sector within the community college system that was void of environmental training. From the outset, Program developers set the bar by recruiting only faculty and staff who were previously employed outside the college from either the private or public sectors and

coming from an environmental discipline. The intention was to ensure that these individuals could provide relevant and practical training in all aspects of core materials being delivered to students; specifically within an environmental context. This same strategy continues to be used for all full-time, part-time, partial load or sessional faculty to ensure definitive curriculum delivery. As a result of this strategy, faculty and staff are well-equipped to meet the primary objectives of the program; specifically in the areas of environmental theory and practical hands-on application.

2.1.4 The program must have effective leadership and a full-time faculty member with defined leadership responsibilities must be in charge. Reasonable efforts should also be made to develop leadership skills in others to ensure that the program's survival does not become critically dependent on one individual.

Fleming College operates all programs on the basis of a Program Coordinator model, whereby (most often) a full-time faculty member with expertise in the program discipline is provided time release to perform these leadership duties. Please refer to Appendix 2.1.4 for a job description of the duties of a Program Coordinator. The term of appointment for a coordinator is three years in duration. The current Program Coordinator, Dr. Mark Williamson, is a full- time faculty member with 23 years of teaching experience at the College, and over 15 years (collectively) of experience in the role of Program Coordinator for the ET program. Other individuals are given the opportunity to assume this leadership role in the program during the summer term, when the incumbent is off on official vacation time.

2.1.5 Faculty performance evaluation procedures must be in place. When deficiencies are identified during the review process, professional development opportunities are available to address them.

There are 3 processes in place at Fleming College to review and measure the quality and performance of faculty members.

Bi-annually, a Faculty & Course Evaluation survey is administered by Fleming College to all full time students (Appendix 2.1.5A). This survey is administered in the fall and winter semesters. These results are reviewed by the academic Dean, Chair and the Vice-President Academic and contribute to the college's performance management process.

In addition to this internal survey, a provincial student satisfaction survey is administered to all students in all colleges, and satisfies accountability requirements established by the Ministry of Advanced Education and Skills Development (MAESD) in Ontario. The MAESD survey (Appendix 2.1.5B) is administered during the winter semester and the college results of this survey inform the Key Performance Indicators (KPI). These KPIs are published annually and available on college websites and at the MAESD. In addition to the student satisfaction survey, graduate and employer satisfaction surveys are also administered. Please see http://www.tcu.gov.on.ca/pepg/audiences/colleges/colindicator.html#gsr for a copy of these surveys.

The collective agreement (article 27.02) states the expectation agreed to by the faculty union and college management, for the evaluation of probationary faculty members. Faculty members are on probation for 1 year. This evaluation occurs each semester and includes, but is not limited to, classroom visits and the solicitation of student feedback.

2.1.6 Opportunities for professional development and faculty renewal must be provided to enhance faculty members' skills and leadership abilities and their

effectiveness in meeting the mission and/or program goals/program plan. There must be evidence of reasonable support for such efforts such as funding of some professional development activities, study leave, facilitation of secondments, sabbaticals etc.

Please refer to Appendix 2.1.6A for a copy of the College's official Professional Development Policy, as well as information related to faculty sabbaticals (Appendix 2.1.6B). At the academic school/department level, the annual PD budget allocation is equal to 0.6% of the full-time salaries. In the academic year 2016/2017, the PD budget for the School of Environmental and Natural Resource Science is $25,000. In addition to the PD allocation at the School level, there are funds available for corporate initiatives.

ET program faculty members have participated in the following professional development and/or sabbatical opportunities over the past three years:

Mark Williamson
- Completed PhD (Professional Development funded)….2010
- CABIN course….Summer 2012
- Professional Development International Trip - Costa Rica - 2011
- Professional Development International Trip - Iceland – 2014

Anne Vanwarmerdam
- Webinar – Flash Flooding – U.S. – 2014
- Webinar --Mars – Water on Mars—U.S. 2016
- Webinar -- Environmental Bill of Rights (EBR) Dianne Saxxe – Toronto – 2017
- National Groundwater Association Membership (personally paid)
- Canadian Geographical Association Membership (personally paid)

Melanie Logan
- Professional Development International Trip - Costa Rica - 2012
- Professional Development International Trip- Iceland – 2017
- CUESN/CCEN Conference – Trent University Peterborough -- 2013
- OACETT Membership (personally paid)

Robert Bialkowski
- Partial teaching load in CAWT – 2015
- Eastern Region Teacher Training – Kingston (ongoing)

*Part-time instructors not eligible for Professional Development Funds

The Environmental Technology Program initiated an International Placement as an alternative to the credit acquired in the "Industrial Placement" course (FLPL71). The intent of the international placement was, initially, to provide students with a range of experiences tied to the course load and curriculum mix within the ET Program. This included a combination of experiencing the following in other cultural settings:
- local environmental issues
- water treatment
- wastewater treatment
- waste management
- energy
- local flora and fauna

- local geology
- ecosystem management techniques
- environmental legislation and policies

Subsequently, the College was hoping to initiate more sustainable international trips by pursuing more long-lasting relationships with other education institutions, government institutions, associations or NGO's. To that end, the focus of the international trips has been expanded to, not only provide students with the experiences listed above, but to also establishing relationships that may carry forward from year-to-year. This may involve student/faculty exchanges, coops/work placements, work terms, and others.

The college supports faculty in the maintenance of professional memberships in industry organizations, including the CCEP certification, as well as membership in OACETT and other industry organizations. All faculty have maintained professional associations relative to their specific environmental disciplines including Water Environment Association of Ontario, Ontario Land Reclamation Association and National Groundwater Association.

Faculty members are also eligible to receive 50% tuition rebates for courses they take that lead to a credential. For example, Mark Williamson received support toward the acquisition of his PhD. Fleming College staff can take any post-secondary credit course offered by the college for a nominal fee.

2.2 Faculty Sufficiency

2.2.1 There must be a sufficient number and appropriate balance of faculty members (full- time and non-full-time) and technical support to meet the needs of the academic program. The faculty members must cover by experience and interest all areas of the institution's environmental curriculum. There must be enough faculty members to provide program and course continuity, appropriate lab/field experiences and appropriate levels of student-faculty interactions. Measures should be in place to determine the impact of non-full-time faculty on the program and the students.

The College recently updated *The Guidelines for Professional Practice* for faculty and students. These guidelines recognize the importance of positive student-faculty interaction (please see Appendix 2.2.1). The full-time workload includes a minimum of 6 hours per week for out of class assistance time for faculty to meet with students. The ET program is delivered by a complement of full and part-time faculty and a full-time program technologist.

Every program in the School experiences the challenges of delivering an integrated curriculum with a mix of both full- and part-time faculty. The program relies on individuals with expertise in specific areas of hydrogeology, environmental assessment, land reclamation, environmental analysis and others. This expertise is sometimes met by contract faculty who may change from one semester to the next, making the process of continuous curriculum development more of a challenge. An additional challenge that the School of Environmental and Natural Resource Sciences (SENRS) faces is the fact that a portion of the curriculum is managed and staffed by another School within the college, the School of General Arts and Sciences (GAS). These challenges may be met in part through the hiring of additional full-time faculty for core program courses, and revising the current model by which GAS courses are delivered within the School (these include General Education courses, mathematics and communications courses).

2.2.2 A reasonably stable core group of full-time or near full-time faculty with a primary commitment to the program and/or institution is required to provide for coherent academic planning, coordination of instruction and curriculum development.

The ET Program is very committed to the maintenance of program integrity and also assisting in the planning and development of Program direction. Faculty members are hired on the basis of their relevant experience and teaching capabilities and are expected to participate in curriculum maintenance and development by providing input via a number of venues. This process (see Section 2.3.1 below) serves the student well because assessment of student reaction and success is immediate and required changes can be identified and dealt with expeditiously. The College also supports this function in the provision of regular release periods for curriculum renewal where faculty are provided with release time to focus on curriculum and resource updates.

2.3 Faculty Participation in Professional Development and Academic Administration

2.3.1 The faculty, within the administrative and financial limits of the institution, must have an appropriate role in the development of the program's curriculum and academic policies including the opportunity to define, implement, revise and achieve program and/or course educational objectives and outcomes.

Program faculty and staff are involved in the review and renewal of program curriculum on a regular basis. All programs at the College undertake an annual curriculum renewal process that examines the current performance of the program with respect to a series of indicators, including student and graduate satisfaction with the program. This renewal process also examines emerging trends in related industries and solicits input from the program advisory committee. Program faculty and staff collectively identify projects related to curriculum renewal that are undertaken during the spring-summer semester. Each program also undertakes a much more in-depth program review process every five years. This process examines trends in the program over the previous five years with respect to student enrolment, student and graduate satisfaction, human and financial support resources, competitor programs, and industry trends. Program faculty, staff and advisory committee members are key players in this process.

The college provides many opportunities for faculty to be involved in committees and groups responsible for continuous improvement of college policies and procedures related to curriculum development, academic progression and probation, strategic plan development for the college, and others. Faculty can seek membership on the following committees:

- *Academic Council (AC)*
  - Academic Council is a forum for raising and addressing college-wide academic issues. The Council provides recommendations and advice to the Vice-President Academic on issues affecting teaching and learning at Fleming. Appendix 2.3.1A provides Terms of Reference for AC. The work of the Council is to review college-wide academic policy, procedures and directions. Issues for discussion and recommendation may include:
    - ✓ Admissions criteria
    - ✓ Academic plans and priorities

- ✓ Grading, evaluation and transcript practices and policies
- ✓ Academic integrity and academic appeals
- ✓ Student preparedness, remediation and retention
- ✓ New program development
- ✓ Program standards
- ✓ Performance indicators
- ✓ Program quality processes (renewal, review, suspension)
- ✓ College accreditation
- ✓ ELearning and educational technologies
- ✓ Modes of teaching and learning

- *College Board of Governors (BOG)*
  - Fleming College is governed by a formal, Board of Governors, comprised of twelve external governors (appointed), four internal governors (elected by constituent group), the College President, and one (non-voting) student observer (elected). The Board responsibilities include evaluating and monitoring Fleming College's quality and integrity; review and approval of strategic financial plans, and the annual budget plans and fiscal audits. For details of the authority and responsibilities of the governing board please see Appendix 2.3.1B.

- *General Education Committee*
  - This committee is responsible for the review of general education courses across the college to ensure adherence to and consistency with respect to the general education policies set by the Ministry of Advanced Education and Skills Development and the College.

- *President's Advisory Council*
  - As stated in the Minister's Binding Policy Directive, the purpose of an advisory college council is to provide a means for students and staff of the college to provide advice to the President on matters of importance to students and staff. It is a corporate body in the sense that it will deal with issues that affect the entire college. It is a future oriented body involved with Strategic Planning. An underlying premise is that the Council will be a forum for communication between the President and College faculty, staff, and students regarding issues which are focused on, or affect, the academic activities of the College (see Appendix 3.1.2A).

In addition, there are ad hoc college-wide steering committees and teams formed to address current projects and tasks.

Developmental positions are also available to faculty including temporary assignments in other academic schools.

Consistent with College policy and practices, the ET Program faculty team has a commitment to sound academic planning, coordination and instruction and curriculum development. The ET Program developed a Skills Matrix (Appendix 5.2.1C) which documents program principles and practices as well as key legislative content. In addition, related certifications and competencies are documented. All of these categories are further ranked as to the level of competency achieved at the completion of the Program (Basic, Intermediate or Advanced). This Matrix serves as a guide to provide consistency in curriculum content. It is assessed annually to permit identification of gaps, changes in the market/discipline as well as recent additions/advancements to Program curriculum. All faculty members (either full-time or part-time), use the matrix as a guide to curriculum content which ensures consistency and

achievement of both course and Program outcomes as well as a guide for curriculum development.

As a result of the compact size of the ET Team, there is the advantage of being able to discuss and react more quickly to identify needs for Program integrity, planning and development. Faculty members are intimately familiar with the course content and also test this content on a regular basis by being the conduit for delivery and immediate feedback from the student body. In addition, curriculum is formally reviewed and discussed on an on-going basis through focus meetings (i.e., weekly meetings) by the faculty in the Program and when modifications to curriculum are deemed necessary. The Advisory Committee is apprised of these candidate modifications and they are discussed at the annual meeting within the context of the expertise of the committee and relevant job skills required by students. Once a decision is made for modification, the Advisory Committee passes a resolution to support implementation of the modifications and this is presented to Administration for implementation. Proposed program modifications are considered with the larger context of budget (available resources) and the academic planning cycle.

2.3.2 Faculty meetings must be scheduled on a regular basis and include opportunitiesto discuss program, curriculum and current environmental issues. Structures and mechanisms must be in place to facilitate communication among the faculty and between the faculty and administration.

The Program Coordinator attends bi-weekly SENRS Coordinator's meetings and also attends weekly program team meetings. Regular communication between the College and School administration is provided through electronic mail.

At the Program level, regular team meetings are held on a weekly basis, or as needed. These meetings deal primarily with the day-to-day issues involving daily issues, student needs, but also serve as a platform for short-term planning for each week ahead. Typical topics would include logistical planning of bus bookings for field trips, planning of structure and details for Field Schools, equipment purchases, part-time faculty hires, representation at Open Houses and others. Significant issues identified here are also brought forward to the higher level Coordinator meetings for discussion and resolution.

REQUIREMENT 3: Students

3.1 General Provisions

3.1.1 The institution/administration delivering the program shall provide student services and support activities that promote student success, engagement and retention as well as professional growth and the transition to the workplace or further education. All student services must promote equitable treatment of individuals, regardless of race, gender, age, ethnicity, sexual orientation, socio-economic status or physical challenges.

Appendix 3.1.1A provides an organizational outline of the Student Services department. Fleming College prides itself in the extensive supports that are offered to students to support their learning. Fleming provides free tutoring for students who require it. There is a very active Tutoring and Academic Skills Centre (TASC) department that provides support to students on different levels, depending on individual student needs. At the beginning of each semester, drop-in group tutorials are automatically set up for courses where there is known demand for tutoring support. Depending on the semester, students studying in the Environmental Technician or Technology Program will find tutoring immediately available in *Applied Math*, *Geospatial Techniques*, *Introductory Chemistry*, *Introductory Computing*, *Geomatics in Surveying, Natural Resources and the Law* and *Statistics*. As the semester progresses, tutorials are set up for additional courses at the request of students who require them. Students who require further support can sign-up to meet with a peer tutor from within the Environmental Technician program. TASC also offers regular workshops which provide tips and strategies to help students develop better time management skills, note-taking techniques, study skills and test preparation techniques.

Accommodations for students with disabilities are available for students who self-identify and may include: weekly appointments with a Learning Support Strategist, one-on-one tutoring, note taking services, and testing accommodations such as alternative testing areas and additional time on tests. The college employs full-time Learning Support Strategists as well as a full-time Assistive Technologist, both of whom are on campus at Frost one day a week to support students with disabilities.

Other Student Services on campus include access to a registered nurse on a daily basis, and access to a doctor one day per week. There are two full-time counselors on campus who maintain full schedules of appointments throughout the academic year to provide personal, academic and disability counseling to students in need. The counseling department often partners with community agencies to organize on-campus workshops in areas such as stress management, healthy relationship or other topics that promote individual well-being. An Aboriginal Counselor and an Aboriginal Student Success Facilitator are available to support aboriginal students attending the college. The Career Services department offers personal resume, cover letter and interviewing services and maintains a very active job board. Career Services also organizes an on-campus job fair in February of each year that is attended by numerous agencies across Ontario and Canada. Student Services runs an Emerging Student Leaders Series to help students develop their leadership skills and prepares them to take on leadership roles such as peer tutoring, student government positions and volunteer opportunities. Mature Student Meet and Greet sessions offered early in the semester help to ease some of the challenges that may be associated with returning to school as an adult.

The Environmental Technician program now offers an optional co-op program. Students

entering the program in September may apply to participate in an optional paid co-op. As space is limited, selection of applicants is competitive and based on the following criteria: grades factor as 80% and the other 20% is a personal statement explaining why you are a good candidate and will be successful in a co-op position. Students must have achieved a 70% (2.5 GPA) average, maintain a 70% average, and pass all classes in order to apply and enroll in the co-op option. Students must also submit their resume and copies of certificates, if applicable. Students who are accepted will participate in a Co-op Preparation course, and will do their co-op between semesters 2 and 3. Fleming College has hired a full-time Co-op Officer to assist students in the co-op process and liaise with industry employers.

The College Policy No. 3-311 - Harassment/Discrimination Prevention ensures that all students are treated equitably regardless of race, gender, age, ethnicity, sexual orientation, socio-economic status or physical challenges (see Appendix 3.1.1B).

3.1.2 The institution/administration delivering the program shall provide a means for systematically obtaining student views and input into institutional and programmatic planning, which shall include but not be limited to provision for student evaluations of courses and faculty and for representation on student councils and advisory committees.

Students are asked to complete a Faculty & Course Evaluation twice annually as previously discussed in section 2.1.5 (Appendix 2.1.5A). The instructions indicate that students provide their evaluation and their perception of the faculty members and the courses.

Students are represented on the College's President's Advisory Council (PAC) (see Appendix 3.1.2A for Terms of Reference), the College's Board of Governors, and the Student Association. In addition students participate on all Program Advisory Committees (Appendix 3.1.2B). Students also are members of the Program Advisory Committee (PAC) and provide a report to the industry PAC members on areas of program strength and areas for improvement.

In addition, the Academic Chair of the School conducts focus group sessions with students on an annual basis and on other occasions as warranted. These focus group meetings take place near the completion of the semester and provide students with an opportunity to give candid feedback about their experiences at Fleming. Students in semester one also complete a comprehensive student survey in the Fall semester. Students frequently attend consultations when the college has plans to make major changes that will affect the student body, i.e., the recent consultations that sought feedback on possible new models for the design of the academic year at the college.

3.2 Admissions

3.2.1 Admissions must be based on specific approved selection criteria, which shall be published prior to consideration of applicants. The criteria must reflect the program's mission/goals and clearly specify the educational pre-requisites, and minimum qualifications of applicants that the program considers necessary for academic and professional success.

The College Admissions Policy (Appendix 3.2.1) outlines Fleming College's overall admissions policy. The following is the admission policy specific to the Environmental

Technician and Technology program:

Students may apply for entry to semester one of Environmental Technology program and/or semester one of the Environmental Technician program. The curriculum is the same for the first two years of these programs. Regular stream students must possess an OSSD with the majority of credits at the College (C) and Open (O) level, including 2 College (C) English courses (Grade 11 or Grade 12) and 2 College (C) Math courses (Grade 11 or Grade 12). These students apply to programs via the Ontario Central Application Service (OCAS) and applications are channeled to the appropriate School Registrar and loaded into the relevant programs. Timetables and schedules are presented to students at that time. Typically, these students would progress through consecutive semesters 1 through 4 and be eligible for graduation with the Environmental Technician Diploma at the end of the second year (4th semester). To progress to semester 5 of the Environmental Technology program, students must have successfully completed (and passed) all courses in semesters 1, 2, 3 and 4.

3.2.2 The admissions policies and procedures must involve planning and periodic review to determine whether the policy is adequately serving the needs and interests of the students, faculty, program and the environmental sector.

The admissions policies and procedures for college programs are reviewed on a regular basis as part of the Program Review process. In addition, Policy No. 5-505 (Appendix 3.2.2) provides a vehicle for students to appeal an admissions decision made by the college.

3.2.3 The number of students accepted in the program must be consistent with the resources available (i.e. physical facilities, laboratories, opportunities for co-op and field placement, faculty members and technical support staff).

Table 2 summarizes the number of students, faculty and technical support staff in the ET program from the 2013/14, 2014/15 and 2015/16 academic years.

Table 2 - Number of Students, Faculty and Support Staff in the ETN Program

Academic year	# students (FTE)	# faculty (FT/PT)	# support staff
2013/14	151		1 FTE
2014/15	147		1 FTE
2015/16	147		1 FTE

Number of Students, Faculty and Support Staff in the ETY Program

Academic year	# students (FTE)	# faculty (FT/PT)	# support staff
2013/14	42		1 FTE
2014/15	32		1 FTE
2015/16	28		1 FTE

Tables 3A and B summarize the number of graduates – both female and male – who have graduated from the ET Technician and Technology Programs for the 2013/14, 2014/15 and 2015/16 academic years.

Table 3A - Number of Graduates Successfully Completing the Environmental Technician Program

Academic Year	Female	Male	Unknown	Total
2013 - 2014	33	55	0	88

2014- 2015	35	43	0	78
2015 - 2016	38	34	0	72

Table 3B - Number of Graduates Successfully Completing the Environmental Technology Program

Academic Year	Female	Male	Unknown	Total
2013 - 2014	19	23	0	42
2014- 2015	12	18	0	30
2015 - 2016	9	10	0	19

3.2.4 The program must adhere to its published admissions policies. The content of marketing and of any representations made to prospective students must be clear and accurate.

Please refer to the current ET program page here. This is one of the documents used to market the program. These documents outline the admission requirements for the program.

The program adheres to its published admission policies, which are consistent for all diploma programs within the School. Admissions policies are also reviewed as part of the program review process.

3.2.5 Specific admissions policies (e.g. policies pertaining to Prior Learning Assessment recognition, transfer credit, advanced standing, re-admittance into the program) shall be clearly stated in institutional publications.

Please refer to Appendix 3.2.5A for the published college policies related to Prior Learning Assessment and transfer credits.

The college follows standard policies to address issues related to academic performance. Students who complete a semester with a GPA lower than 1.0 or who fail greater than 2/3 of their course load are required to meet with a panel of faculty and staff to determine the appropriate course of action. This action may require that students step out of the college for a minimum of one academic semester, or that they return to classes on either a full- or part-time basis under an Academic Probation Contract. Please refer to Appendix 3.2.5B for policies related to Academic Progression and Probation.

Currently, Fleming College has a process where students may be considered for acceptance to upper semesters of the ET Program via articulation agreements with select universities or via assessment for Advanced Standing if from other Institutions. Students are evaluated on an individual basis on the merits of program taken, course mix and academic standing. The outcome normally involves a student entering directly to Semester 3 of the ET Program in the Fall Semester and subsequently continuing to a combination of courses from Semesters 2 and 4. Both are offered in the Winter Semester. This normally allows graduation with a two-year Environmental Technician Diploma in a minimum of 1 full year.

In the fall of 2010, modifications were proposed in order to streamline the application process for students with Environmental Studies or Science Degrees from accredited Canadian universities. Students from these institutions can now apply directly to a unique Program of Study (Environmental Technician – Advanced Standing) and will eliminate the

inherent time delays associated with exemptions. It must be noted, however, that the process of accepting and registering students from Institutions outside of this agreement for Advanced Standing or Direct Entry will continue to follow the standard process for exemption evaluation.

3.3 Student Services

3.3.1 Students must have timely access to personal, academic and career counseling which should include services to assist students finding work experiences and employment upon graduation. Provision for academic counseling must be tied in with and reinforce the efforts of faculty members, program administration and student affairs officers.

Fleming offers a multitude of services to support student success including Aboriginal Student Services, Accessible Education Services, Counseling Services, Health Services and many more as listed in the Fleming website here. Students beyond their first semester of studies are assigned their Program Coordinator as their advisor. The School has a team of very dedicated counselors who work with faculty and other support staff to ensure that all applicable supports and provisions are made available to students. Alternate testing, note-takers, tutors, educational assistants and other supports are available. The counselors at the campus have expressed concern that – due to student volume – they are often unable to attend to students in a timely manner. This is particularly challenging at the start and end of each academic semester. In response to this challenge, a part time counseling position was converted to a full time position for the 2009/10 academic year. Currently, there are two full-time counselors on campus.

The ET Program also incorporates its own specific strategies for assisting students in finding work experiences and employment upon graduation. One primary method is for all faculty members to maintain ongoing contact with existing employers, past graduates, agencies, and institutions. This results in advanced and direct notice of job postings to program students. All students are directly informed of each of these postings by the Program Coordinator via email as well as having these posted on the Campus job site maintained by a full-time support person. In addition, the ET Program holds sessions on proper preparation of resumes and cover letters as well as running mock interviews and interview preparation guidance sessions. Consultant lists are maintained, updated and supplied to the students annually to ensure a current list of contacts for resume deployment. Finally, the Frost Campus holds a Job Fair whereby employers from a multitude of sectors and environmental disciplines are invited to the college to interact directly with students and to accept resumes on the spot.

In the winter of 2017, a new Career Preparation course was added to the curriculum to further aid students in finding and securing employment. Co-op streamed students also have the support of a full-time Co-op and Placement Officer on campus.

3.3.2 Prospective and current students should receive information on the expected costs of the program including field experiences, text books, living expenses, lab fees and educational fees and opportunities and requirements for financial aid prior to admission.

Details outlining the expected tuition fees and additional costs for books, supplies and field camps are published on the official College web-site, as well as the ET program page here.

The Registrar's Office provides full details of fees on the College website. In addition, students receive a package of information upon admission which includes details about financial aid.

Information about opportunities and requirements for financial aid are available on the College website. Guidelines on how to apply for OSAP, bank loans, jobs on campus and more are also available on the College website. The College's Admissions and Financial Aid staff are also available to provide guidance and assistance to the students in completing the necessary documentation to apply for financial assistance. In addition, the Registrar's Office produces an annual "Welcome Package" which outlines these opportunities, together with the many services available for students.

Fleming College and the Fleming College Foundation, along with our generous donors and sponsors, have provided more than $6 million to students in financial need. Details of all available bursaries and information on how students can apply are provided on the College website, together with information on how students can be selected to receive awards.

Additionally, entrance bursaries are available for new, full-time students and returning full-time students, provided from a percentage of tuitions fees collected by Fleming College. To be considered for this bursary program, students are mailed a copy of the Financial Aid Profile with their program offer and asked to complete it for consideration. In recent years, 80% of students who applied were eligible and received this bursary.

3.3.3 The institution or department delivering the program shall make available to students and to the general public a catalogue, calendar and/or student handbook or comparable official publication(s) that accurately sets forth information on its current mission and educational objectives, admissions requirements and procedures, and opportunities for financial or other student services, as well as policies and procedures applicable to, or of special interest to students.

The College provides a variety of options by which students are able to acquire information about the College, programs, admission requirements, financial assistance and student services. The College strives to continue to provide the most up to date program information through a variety of mediums including the website; open houses, trade shows, and liaison information sessions, as well as personal contact with program staff.

Fleming's Liaison Office is often the first point of contact for visitors. This office provides information for potential students about their post-secondary options and students are also welcome to visit the campus. The Liaison staff will answer questions about the College, the programs and services, provide a tour of the campus, and arrange for visitors to meet student tour leaders, and talk to the faculty.

REQUIREMENT 4: Physical and Learning Resources

4.1 General Facilities

4.1.1 The physical facilities and equipment must be appropriate for the delivery of the program, realization of program outcomes and to support student achievement of the program goals.

The Environmental Technician (ET) program is one of the largest programs at the campus with approximately 190 students. Since the campus facility's ET program footprint was originally designed to accommodate approximately 100 students, many classrooms and classroom resources were inadequate to accommodate larger sections of students. In recognition of this growth in program needs, the College modified the existing lab space for the ET program and new ET Classrooms and a Preparation room (rooms 191, 193 and 194) were remodeled in September 2010 in addition to dedicated classrooms 132 and prep room 133. Classroom 132 consists of 12 workstations where a typical class size can range from 24 to 35 students.

The School also contains a large learning space called the 'Biodiversity Lab', which enables students to study a wide range of organisms outside of regular scheduled class time. This lab is supported by knowledgeable staff and, similar to a library loan system, operates a circulation desk where additional equipment and specimens are available for students to sign out and use to complete projects or to practice skills.

4.1.2 Access to the facilities and availability of equipment by faculty and students must be sufficient in relation to student enrolment and not adversely affected by the demands of other programs using the same facilities or equipment.

Access to facilities and equipment presents an on-going challenge to the ET Program at Fleming College.

Facilities:
The existing facilities for the ET Program, consisting of three dedicated classroom (room 132, 191 and 193) and two dedicated Prep Rooms (room 133 and 194), are sufficient for the current size of the ET student body and activities. The remodeled space (rooms 191, 193 and 194) will serve as an interim measure until such time as sufficient funding can be identified to bring the original ET Wing to standard.

Equipment:
The Program is provided with an annual operating budget to cover instructional supplies, daily program activities as well as consumable items. This funding meets the basic needs of daily operations and is currently adequate for most activities. However, as a result of a growing student body, aging equipment and limited annual capital funding, equipment renewal and replacement is an ongoing challenge.

Equipment is purchased through School budgets and special purpose funding from the Ministry of Advanced Education and Skills Development (MAED). Budget allocation for publicly-funded post- secondary education has been an ongoing issue in Ontario. As a result some academic programs struggle due to underfunding, resulting in instructors and students having to use aging and outdated equipment. The ultimate concern is the impact on the students. If they do not have access to use and learn with the most up-to-date equipment, this could potentially place them at a disadvantage in the workplace. Hence, the School has

sought to mitigate this by sharing equipment across programs through innovative solutions such as the Biodiversity Commons, and seeking partnerships that provide alternative sources of revenue. As well, Fleming College has an applied research program that is eligible for federal research grants such as NSERC. This provides sources of additional funds as well as applied learning opportunities for students.

Awarded capital purchases dating back to 2010 include:
- Spectrophotometers (2010) $9,840
- 2014 Savana Cargo Van (2014) $29,920.
- Stream Velocity Meters 3 units (2016) $42,453.

4.1.3 Institutional administration must ensure that facilities providing major components of the program are securely committed to the program. External facilities must have affiliation agreements that provide for sufficient notice of termination to allow reasonable time for the program to make alternative arrangements.

N/A

4.1.4 The institution must have policies/provision for the maintenance or replacement of laboratory and field equipment, software/hardware, supplies, teaching aids and reference materials.

The College has practices in place for the update and replacement of information technology (IT) in order to remain current. General practices include an IT roadmap that details upgrades that need to occur every three, five or seven years across the infrastructure including, networking, server, desktop, operating system, software applications, telephone, administrative systems, emergency notification systems, instructional classroom technology, and learning management systems. Upgrading, replacement and repairs are prioritized based on safety requirements, academic delivery plans and normal IT lifecycle planning. They are contingent on the overall level of resources in any given year. Replacement and repairs relating to safety are a priority and a certain portion of the facilities budget is allocated for this each year and in response to needs as they arise.

4.2 Library Services and Information Resources

4.2.1 A professionally administered /resource center must be available and accessible to students and faculty during and after scheduled hours of instruction.

The Frost Campus houses a comprehensive library facility which contains a large collection of environmental books, publications and maps. This is augmented by an extensive collection of online resource databases including current, full-text availability of leading peer-reviewed journals in the environmental field.

Library hours: Monday – Thursday: 7:30 am – 8:00 pm
Friday: 7:30 am – 4:30 pm
Saturday – Sunday: 12:00 pm – 4:00 pm

- Remote Access to Online Databases and Library Catalogue: 24/7

- All databases by all vendors, including the library catalogue, e-books and Google Scholar, can be searched individually or simultaneously by using our Integrated Search service
- Books can be renewed, or put on hold electronically (remotely)
- Support is provided by email, by phone and in person.
- In first semester communications, students are provided with library orientation classes where they are introduced to the physical and online library with a tour of our online resources and our physical space and a library assignment.
- In other semesters and programs, classes on research are provided as requested by Faculty

Resources:

Total Print Sources:
Books: 35,256 (3 campuses)
Visual Media: 1115 (3 campuses)
Periodicals:
63 (Frost) (170 – 3 campuses)

Environmental technician/technologist Print Collection:
Book titles: 641
Periodical Titles: 5

- College participates in borrowing agreements with all 23 community colleges, Trent University and Kawartha Lakes Public Library. There is also an interlibrary loan service extending across the country with libraries across Canada.

Electronic Resources:
Total # Databases: approximately 32
Subject Specific databases: 4
Ebooks in this subject area 14,053

Visual Media Collection:
Total # of titles: 1115
Environmental Program Titles: 44

Streaming video collections:
Various video streaming services that allows students/staff to view educational media on laptops/computers with internet access anywhere, anytime.
Approximate # of Environmental Titles: 1,000

Map Collection:
1,600 Ontario base maps and national topographic maps
Collection of Geological Survey Reports

4.2.2 Available learning resources must include electronic equipment, networked computers, software and supporting subscriptions adequate to support faculty scholarly activity and essential student research and learning. Quiet individual work areas should be available in convenient proximity to these resources.

The Frost Campus library provides the following resources:

- Wireless network available
- 13 networked computer workstations in the library
- 5 group work rooms with 8-10 seats per room, 3 are equipped with computers, data projectors, and white boards for team projects and discussion groups
- Absolute quiet study space with 7 seats
- Quiet study space for students with laptops with ability to seat 8 people. This space also has 4 computers
- Various types of seating and study space for approximately 193 students
- Networked printing, both colour and black and white
- 1 black & white photocopier and 1 colour photocopier

4.2.3 The adequacy and use of the library and learning resources should be regularly evaluated.

An evaluation of the library and related learning resources is conducted each year and summarized in an Annual Report (Appendix 4.2.3A). This includes collection analysis by program, activity reports for electronic databases and circulation statistics by call number area. Surveys of students and staff are conducted periodically, and KPI data is collected annually and summarized in a Service Review Report (Appendix 4.2.3B).

4.2.4 There are sufficient staff members available with appropriate training, experience, and qualifications to carry out professional and technical operations to manage resources and services of the library that are assigned/available to students/faculty in the environmental program(s).

The staffing complement for library resources includes a Manager of Career & Academic Success Services at the Sutherland Campus, two full-time library technicians and one full-time library technologist at the Frost Campus. Two part time Library Technicians provide service on evenings and weekends.

4.2.5 The library and its staff must be supportive of, and responsive to, the research and teaching activities of the program (e.g. acquisition process for books, journals; available secure and reliable remote access) and the changing roles and services in an evolving technological environment.

The library staff works in partnership with the academic program faculty and co-ordinators to build a robust, relevant and up-to-date collection of physical and electronic resources. Staff attend school meetings, review curriculum and course outlines, liaise with faculty and use collection development tools available from jobbers. Staff also participate in program reviews and curriculum renewal processes.

As well, professional library staff is actively involved in developing information literacy in students through library orientation, information sessions and research assignments.

REQUIREMENT 5: Preliminary Curriculum Standard

5.1 Program Type

5.1.1 A program must apply for accreditation as a public program that falls within one of the following categories:

The ET Program falls within a Type 1 Category.

5.2 Generic Curricular Criteria

5.2.1 The program curriculum reflects and implements an overall program of study with explicitly defined and measurable goals and objectives. These goals and objectives provide a basis for curriculum development and for evaluating the performance/effectiveness of the program.

Please refer to Appendices 5.2.1A and 5.2.1B for the most recent program curriculum maps that are directly linked to the MAESD (formerly MTCU) approved Vocational Outcomes for the programs. The Environmental Technician (ETN) program has also published a skills matrix that clearly identifies specific skills that are developed as the students' progress through the program (see Appendix 5.2.1C).

5.2.2 A curriculum review committee or equivalent regularly reviews, evaluates and revises, as needed, the content and instructional methodology of the program including required competencies, expected outcomes and the supporting academic and lab/field experiences – taking into account findings identified by the program's or institution's outcomes assessment processes. There is a process in place at the institution that will facilitate the professional review and see that the recommendations are received and implemented.

Fleming College has developed a policy and process for curriculum renewal and program review that has been approved by the Ministry of Advanced Education and Skills Development, formerly the Ministry of Colleges, Training and Universities (Appendix 5.2.2A). Every program at the College undertakes a comprehensive program review every 5 years that examines both the vitality and viability of the program with respect to a series of criteria. Programs that are not in program review follow the guidelines for curriculum renewal, which explores industry trends, student and graduate satisfaction, and minor curriculum changes on an annual basis.

Programs are also required to maintain an active Advisory Committee that meets at least once per year and includes approximately 10 to 12 individuals from key industry sectors related to the program of study. Please refer to Appendix 3.1.2B for the Program Advisory Committee Terms of Reference. The recommendations of Advisory Committees, curriculum renewal and Program review panels are reviewed and approved for implementation through a series of academic committees within the College's organizational structures. All areas of content and instructional methodology are reviewed on a continual basis by the program team. In 2009, an analysis of the types of written assignments completed within core courses in the program curriculum was completed by the program team. The team used the results to assess the variety of written work completed by students, as well as the progression of writing skills from semesters one to four of the program. This enabled the

team to be more deliberate about the placement and sequencing of written assignments for students as they progress through the program. Appendix 5.2.2B also contains the ET program Advisory Committee minutes from the past 3 years.

5.2.3 The program is clearly and accurately described in published materials. A syllabus must be prepared for each course or major unit of instruction, distributed to each student in the course, and maintained in the program's curriculum files. The syllabus should contain the following information, or the equivalent as defined by institutional policy:

- **the purpose of the course;**
- **the learning objectives of the course in outcome-based terms, and the educational competencies/learning outcomes to be attained;**
- **an outline of the content of the course and laboratory instruction in enough detail to permit the student to see its full scope;**
- **the method(s) of instruction and assessment;**
- **the requirements of the course with important dates (e.g., papers, projects, examinations);**
- **the type of grading system used; and**
- **the required and recommended reading.**

Please refer to Appendix 5.2.3 for a compendium of all course outlines for all courses in the ET program from Semesters 1 to 6 inclusive. Course outlines and course policies are made available to students in hard copy and/or on individual course pages (in the Learning Management System: Desire2Learn). Specific course assignments related to core program courses will be made available for viewing at the site visit. The College Website will be made available at the site visit. Published information about the College and specific program information is included on the website.

5.2.4 The program ensures that each student has access to adequate learning opportunities for each component of the program. Where applicable, academic and lab/field/work experiences are carefully coordinated, interwoven and integrated, and are mutually reinforcing.

The students in the ET program participate in both regularly scheduled field days and a Fall Camp activity during the fall semester of their second year of studies. These activities provide the opportunity for program faculty and staff to deliver integrated, mutually reinforcing learning experiences for students.

The ET Program has carefully considered the curriculum delivery and has designed this to be sequential and cumulative over the six-semester program. Foundation skills are delivered in the early semesters (semesters 1 and 2) in order to develop basic knowledge, skills and abilities specific to the environmental discipline. Subsequent semesters build on this knowledge culminating in more advanced concepts and procedures in later semesters.

To facilitate this process, a significant amount of coordination and integration of academic/lab and field work experiences is implemented for several courses. Most often, theories/concepts/principles are offered and discussed in a lecture setting to instill general and broad knowledge in these areas. These topics are further enhanced in more focused laboratory settings allowing more elaboration in concert with the use of equipment and

application of principles and concepts. Consequently, students are led to further develop interpretation and analytical skills by challenging the data and comparing to legislative standards and protocols.

Field trips present additional opportunities to enhance the integration of these skills from a multitude of disciplines. By combining various courses into single field trips, Professors from each course attend the field trip and cause students to cycle through activities pertinent and applicable to each Professor's area of expertise. As a result, students are exposed to a plethora of experiences that tie together the concepts and principles delivered in a classroom setting to a practical field setting.

In 2014, the ET program added a paid co-op work option. The co-op option provides students who choose this option with the opportunity to integrate classroom learning with work-based learning; to explore the variety of careers available in the field of environmental technology; to network for future job opportunities; and, to earn while the student learns.

5.2.5 The program ensures that each student possesses or develops the *National Occupational Standards for Environmental Employment (NOS) Transferable Competencies* necessary to support targeted learning.

Appendix 5.2.5 identifies the program courses that develop a knowledge base in the NOS transferable competencies. Many of these competencies are developed in the context of team-based projects that require students to demonstrate these skills in order for the activity to be successfully completed. Peer evaluation occurs in some instances, such that the mark a student receives is directly related to their performance as a member of a team.

In the previous documentation, there was a statement that read "The school recognizes that, up to this point, there has not been as much emphasis at the program level to formally assess these transferable competencies in students beyond the generic skills and general education courses; however, the assessment of transferable competencies will be a focus for curriculum renewal activities in all program areas at the School in the coming academic year".

As an update, using the NOS Transferable Competency Categories/Clusters as a guide (see table below), the ET Program has made a conscious effort in the period of 2010 to current, to incorporate and embed many of the transferable competencies into curriculum across the various course and various semesters where possible and applicable.

Name of College/University: Fleming College		
Name of Program: Environmental Technician & Environmental Technology programs **(courses with an * are only offered in Environmental Technology program)**		
NOS Transferable Competencies Sub-Categories	**Course which offers <u>primary</u> opportunity to develop this Knowledge Base**	**<u>Any other course</u> which offers an opportunity to develop this Knowledge Base**
	Name of Course	**Name of Course**
Sub-Category 1: Professional Ethics and Work Style	SURV18 Geomatics in Surveying ENVR11 Environmental Techniques ENVR8 Environmental Measurement SCIE6 Aquatic Biology ENVR19 Watershed Management ENVR15 Land Rec Principles	NATR8 Skills for Stewardship & Sustainability ECOS13 Ecosystem Skills

	ENVR21 Environmental Legislation ENVR1 Air Pollution and Abatement ENVR18 Water Treatment and Pollution Control ENVR5 Environmental Applications* ENVR6 Environmental Site Assessment*	
Sub-Category 2: Learning and Creativity	ENVR8 Environmental Measurement ECOS4 Constructed Wetlands*	ENVR10 Environmental Principles ENVR19 Watershed Management ENVR15 Land Reclamation Principles SURV18 Geomatics in Surveying ECOS13 Ecosystem Skills ENVR20 Ecology and Environment
Sub-Category 3: Communicating Effectively	ENVR10 Environmental Principles ENVR19 Watershed Management ENVR15 Land Reclamation Principles SURV18 Geomatics in Surveying ENVR8 Environmental Measurement COMM201 Communications I ENVR20 Ecology and Environment ENVR1 Air Pollution and Abatement ECOS 1 Applied Ecology* ECOS 4 Constructed Wetlands* ENVR17 Waste Management Approaches* ENVR3 Behaviour of Contaminants* FLPL71 Field Placement* ENVR16 Spill Response and Case Studies* APST 88 Winter Field School*	ENVR20 Ecology and Environment
Sub-Category 4: Collaboration	ENVR10 Environmental Principles ENVR19 Watershed Management ENVR15 Land Reclamation Principles SURV18 Geomatics in Surveying ENVR8 Environmental Measurement COMM201 Communications I ENVR20 Ecology and Environment ENVR1 Air Pollution and Abatement ECOS 1 Applied Ecology* ECOS 4 Constructed Wetlands* ENVR 17 Waste Management Approaches* ENVR 3 Behaviour of Contaminants* FLPL 71 Field Placement* ENVR 16 Spill Response and Case Studies* APST 88 Winter Field School*	ENVR20 Ecology and Environment COMM201 Communications I
Sub-Category 5: Critical Thinking/Judgement	ENVR8 Environmental Measurement ENVR19 Watershed Management ENVR1 Air Pollution and Abatement ENVR21 Environmental Legislation ECOS1 Applied Ecology* ECOS4 Constructed Wetlands*	ENVR10 Environmental Principles ENVR20 Ecology and Environment COMM201 Communications I

	ENVR17 Waste Management Approaches* ENVR3 Behaviour of Contaminants* FLPL71 Field Placement* ENVR16 Spill Response and Case Studies* APST88 Winter Field School*	
Sub-Category 6: Planning and Organizing Work and Projects	ENVR10 Environmental Principles ENVR19 Watershed Management ENVR15 Land Reclamation Principles SURV18 Geomatics in Surveying ENVR8 Environmental Measurement COMM201 Communications I ENVR20 Ecology and Environment ENVR1 Air Pollution and Abatement ENVR5 Environmental Applications* ENVR6 Environmental Site Assessment*	
Sub-Category 7: Leading/Influencing Others	ENVR10 Environmental Principles ENVR19 Watershed Management ENVR15 Land Reclamation Principles SURV18 Geomatics in Surveying ENVR8 Environmental Measurement COMM201 Communications I ENVR20 Ecology and Environment ENVR1 Air Pollution and Abatement ECOS1 Applied Ecology* ECOS4 Constructed Wetlands* ENVR17 Waste Management Approaches* ENVR3 Behaviour of Contaminants* FLPL71 Field Placement* ENVR16 Spill Response and Case Studies* APST88 Winter Field School*	
Sub-Category 8: Business Acumen	ENVR17 Waste Management* ENVR5 Environmental Applications* ENVR6 Environmental Site Assessment*	

Categories of Transferable Competencies:

Professional Ethics & Work Style
Learning & Creativity
Communication Effectively
Collaboration
Critical Thinking and Judgment
Planning and Organizing Work and Projects
Leading and Influencing Others
Business Acumen

Professional Ethics & Work Style

All courses from Semester 2 to 6 have embedded many of the key "dictionary" items from this Category. Instilling professional ethics, professional conduct, integrity, remaining current in practices, demonstration of self-reliance, motivation, cooperating willingly with others, attention to detail, application of principles of accuracy and scientific rigor and others. are common themes throughout lecture, laboratories, field activities, tests and assignments.

Communicating Effectively

Students are required to carry out a full range of communication strategies in various courses and activities. This includes preparation of well-formatted reports and other written communications, oral communication in class presentations, convey technical information accurately (i.e., collection and sharing of data collected in the field) and others.

Collaboration

Many projects, due to equipment, time and space limitations, require that students work in groups. In order to be successful in evaluations, students must build constructive networks to facilitate the accomplishments of the tasks presented. Often, students are assessed on their ability to build strong relationships and trust with group members ensuring input and ideas from all group members. As expected due to varying work styles, students often must deal with confrontational situations and resolve these in order to meet project and course objectives.

Critical Thinking and Judgment

With the ET Program having a very strong data collection and compliance ("regulatory") focus, students are often required to carry out independent research to collect sufficient and accurate data. Subsequently, data must be objectively and thoroughly analyzed to determine compliance with relevant legislation. As a result, the student must employ professional scrutiny to assess reliability of data collected.

Planning and Organizing Work and Projects

Higher level courses (i.e., Environmental Applications) have utilized class/student projects to instill planning/organization of work and projects. By use of specific case studies simulating real-life examples, students learn to use information communication technologies (i.e., Gant Charts) to manage work effectively and increase efficiency. These projects also help students in learning to develop work/project plans to identify work to be accomplished.

Leading and Influencing Others

As mentioned previously, many projects require the students to work in groups or in project teams in order to carry out assigned tasks. This often means peers taking turns managing and coordinating the efforts of the team. This helps students learn the benefits of building consensus, assigning responsibilities and effecting processes.

Business Acumen

The ET Program has the strength of faculty from a wide variety of backgrounds that they bring to the team and consequently students in the classroom. In particular, faculty have been able to bring private consulting case studies and practices to the course curriculum. For example, students in the Waste Management course learn to analyze business trends, economic factors, new regulations and others in carrying out regulatory functions (i.e., waste audits). This results in students being able to translate vision and goals into relevant plans and actions in order to meet regulatory requirements.

5.2.6 For all three program types, Instructional Methodology (the approaches taken to the presentation of didactic/theoretical and experiential course components) must be congruent with, or supportive of, the targeted learning objectives or competencies.

The ET program provides vocationally unified didactic/theoretical instruction and related experience in the application of skills that are practiced and developed with guidance and feedback.

Instructional methodology includes a variety of teaching and learning strategies. Using terminology from Bloom's Taxonomy, semester one through semester four courses feature a mix of didactic/theoretical and experiential course components. In semester one, the instructional methodologies focus more on knowledge and comprehension whereas by semester four the instructional methodologies have transitioned to focus more on application and synthesis. Table 4 summarizes the relative percentage of time spent in each of the four semesters on these instructional methodologies.

Table 4 - Breakdown of instructional Methodologies by semester (percent)

	Knowledge	Comprehension	Application	Synthesis
Semester One	40%	40%	15%	5%
Semester Two	30%	30%	25%	15%
Semester Three	20%	30%	30%	20%
Semester Four	10%	20%	40%	30%

5.2.7 The program utilizes formative (informally graded, not-for-credit/contributing to the student's knowledge of results of learning) and summative (formally graded, for- credit/determination of success in learning) evaluation processes for evaluating student learning. Some evaluation should take place early enough in the program to allow time for students to access remedial options open to them.

Formative evaluation is a process of ongoing feedback on performance. The purposes are to identify aspects of performance that need to improve and to offer corrective suggestions. To this end, the ET Program has embedded a number of formative evaluation techniques. Since one of the key program objectives is to deliver measurable competency-based training, formative evaluation is critical to students' success. The following is a list of sample methods used in this type of evaluation:

- practice in use of equipment, monitoring and measurements in the Biocommons
- practice in specimen identification using a variety of sample sets in both classroom and Biocommons including invertebrates, aquatic plants, terrestrial plants, trees and shrubs, fish and minnows, vertebrates (skulls, study-skins, specimens, bird calls, etc.)
- video for practice and self-evaluation of competencies
- several field trips to locations allowing repetition of the use of equipment to build competence and confidence in use (i.e. calibrations and measurements)
- night laboratories where course resources and personnel are available for non-graded guidance and practice
- use of student mentors
- use of tutors

- extra assistance outside of class by Professors/Technologists
- target and sample performance standards as a guide to expectations

Summative evaluation is a process of identifying larger patterns and trends in performance and judging these summary statements against criteria to obtain performance ratings.

The Environmental Technology Program uses a multitude of methods for summative evaluation. Various courses lend themselves to various summative techniques and each Professor has integrated the technique that best suits the course and topics being considered. The following is a list of typical summative evaluations employed within the Program:

- quizzes
- tests
- assignments
- examinations
- demonstration of competency
- accreditation
- project evaluation and grading
- accuracy and precision testing against known standards
- peer evaluations

5.3 Environmental Relevance

5.3.1 Program goals/objectives must include a primary objective to prepare a graduate who can function effectively as a practitioner within the environmental field and the program curriculum must illustrate adequate provision to achieve this objective.

Appendix 5.2.3 contains course outlines for all courses in the ET program. Each outline clearly articulates both the essential employability skills and vocational outcomes that students should expect to achieve at the completion of the course. Appendix 5.3.1A maps all core courses in the Environmental Technician program to the specific NOS subcategories that would be considered vocational in nature. Appendix 5.3.1B maps all core courses in the Environmental Technology program to the specific NOS subcategories that would be considered vocational in nature

ET faculty members who have been hired in the program have demonstrated knowledge, skills and abilities in the environmental discipline and also have worked with the private and/or public sectors in the capacities of environmental practitioners. With this foundation, the faculty have developed, designed and delivered courses that are reflective of the key elements that have been deemed essential to the success of practitioners in the field. As previously outlined, there is a detailed process in place that ensures that all curricula are current and consistent with the practitioner standards in place in Ontario and Canada. Program courses continue to be carefully audited and modified to reflect these current priorities and activities within the environmental sector (refer to the Skills Matrix in Appendix 5.2.1C).

Every year the College receives data from a provincially administered survey of both program graduates and students currently enrolled in the program. Appendices 5.3.1C and 5.3.1D contain the most recent Key Performance Indicator data for the Environmental Technician

and Technology programs in terms of student and graduate satisfaction with their learning experiences in the program, graduate employment data, and graduate satisfaction with the ability of the program to prepare them for employment in the field.

As part of the program review process a KPI trend analysis will be included and areas for improvement identified along with strategies for improvement. These program KPI data are bench marked against the college and competitor programs in the province. Program strengths that have been identified by analyzing the data include graduation rate, student satisfaction with the learning experience and student satisfaction with teachers. Areas for improvement include graduate overall and related employment rates.

The success of the graduates of the Environmental Technician and Technology Programs is of paramount importance as a measure of success of the program. To that end, the ET Program has consistently achieved a high placement rate in the job market averaging approximately 77% for the Technician program and 81% for the Technology program in the past 5 years.

This success rate is directly attributable to the relevance and effectiveness of curriculum content, knowledge, skills and abilities that the ET students are acquiring as a direct result of curriculum content and design. As previously documented, this success is mainly attributed to active and knowledgeable Advisory Committee members who help to focus and direct key curriculum; as well as progressive and knowledgeable faculty that are able to share knowledge and skills and deliver that curriculum in a very effective manner.

Also, as a result of continuous networking, professional development, and activity in outside projects and interests, faculty are able to stay current and enrich the classroom setting by bringing fresh and innovative ideas, activities and technologies to the students.

5.3.2 When a program targets higher level skills, it must identify the higher level skills the curriculum is intended to help develop, such as:

- **recognizing and using subject-specific theories, paradigms, concepts and principles;**
- **analyzing, synthesizing and summarizing information critically, including research;**
- **collecting and integrating lines of evidence to formulate and test hypotheses;**
- **applying knowledge and understanding to complex and multidimensional problems in familiar and unfamiliar contexts; and**
- **the moral and ethical issues of investigations and appreciating the need for professional codes of conduct.**

Appendices 5.3.2A and 5.3.2B summarize the ET Program Standards as sanctioned by the Ontario Ministry of Advanced Education and Skills Development (MAESD), formerly the Ontario Ministry of Training, Colleges and Universities. The ET Program at Fleming College was developed under the auspices of this Program Standard and, as a result, is accredited to use this official designation of an ET Program in the Province of Ontario.

5.3.3 Programs that deal with higher level knowledge and skills must map their program's treatment of any of themes and sub-themes to their own program curriculum as applicable. In addition, for those themes /sub-themes identified as covered within the program, the program must identify any performance

indicators employed.

The core courses in the ET program link to a series of sub-themes as indicated in Appendix 5.3.3. Many of the course themes within the Environmental Technician Program are dictated by the MAESD Environmental Program Standard (see Appendices 5.3.2A and 5.3.2B).

In addition to this, the Program Advisory Committee meets annually (at a minimum) to discuss curriculum relevance as well as suggested changes and modifications. The Advisory Committee mix represents a broad spectrum of the environmental industry, and this ensures the appropriate mix of courses, curriculum and resources to enable student success and Program viability.

As discussed previously in this document, there are three systems/processes in place to ensure mapping of themes and sub-themes against program curriculum.

a) Annual Advisory Committee Meetings
b) Annual Curriculum Renewal Strategy
c) 5 year Program Review Strategy

As referenced in 5.3.1, MAESD (formerly MTCU) mandates that colleges participate in the Key Performance Indicator (KPI) process.

REQUIREMENT 6: Financial Resources

6.1 Sufficiency of Resources

6.1.1 The institution in which the program is located must have adequate financial resources to support the program. Actions in response to financial pressures must not compromise the quality of the program or result in having more students enrolled than the program's total resources can reasonably accommodate.

The college is a public-sector organization, and as such, its primary funding sources are transfers from the Ministry of Advanced Education and Skills Development (the "Ministry") and student tuition. Additional, one-time allocations of funds for capital, infrastructure and instructional equipment are also provided by the Ministry to all colleges. However, this funding is not guaranteed and is provided on an ad hoc basis. During the annual budgeting process, resources are allocated based on a costing model that takes into account the unique costing pressures of individual programs. At the school level, these cost pressures for individual programs are rationalized against an overall revenue and costing allocation through budget review meetings with representation from each program coordinator (see response under 6.2.3).

Funding pressures are an ongoing challenge for Community Colleges in Ontario and a concern for Ontario's Council of Presidents ("COP"), as well as Colleges and Institutes Canada (CICan) which is the national organization that advocates for colleges. All have been strongly advocating for additional funding for community colleges. The current funding model provides additional funding only if specific growth targets are met and for targeted funding envelopes (e.g., aboriginal funding, first generation funding, etc.). Given the current demographics in most areas of the province, Ministry growth targets can be a particular challenge for small to medium sized colleges outside of the Greater Toronto Area.

6.2 Financial Management

6.2.1 The program must have sufficient input into financial and strategic planning to ensure that its current and developing needs will be met and sustained over time. The program team does provide input into the development of the preliminary budget (operational) and capital requests on an annual basis. There are provisions to request additional funds related to unanticipated expenses that arise during the budget year.

Please see Appendix 6.2.1 for Fleming College's Financial Plan and explanation of process provided under 6.2.3.

6.2.2 The program's annual budget process (including how resources are allocated) must be clearly defined and consistently implemented. The annual budget must be reviewed and ultimately approved by the institution's governing board.

The approval of program budgets is part of a larger annual budget approval process for the College that aggregates each school budget into an overall academic division budget. Each division of the college completes a budget that is rolled into a college budget which is submitted for approval to the Board of Governors.

6.2.3 The program must have a mechanism to review its current operating budget.

See attached Appendix 6.2.3 for the corporate budget development process. As a public sector institution, the college undergoes an external audit each year in accordance with appropriate public sector accounting procedures. Revenue is received through tuition and Ministry of Advanced Education and Skills Development funding. Resources are allocated based on a costing model that takes into account the unique costing pressures of individual programs. At the school level, these cost pressures for individual programs are rationalized against an overall revenue and costing allocation through budget review meetings with representation from each program coordinator. The Coordinator of the Environmental Technician program participates in these meetings.

REQUIREMENT 7: Research/Scholarly/Liaison Activity

7.1 Research and Scholarly Activity Policies and Practices

7.1.1 The program/ faculty must demonstrate an appropriate commitment to academic or applied research and/or scholarly activity including external liaison that is consistent with the mission, goals and educational objectives of the program.

Faculty members in the ET Program have a history of commitment to advanced academic endeavours as evidenced by engaging in a multitude of projects and activities. Initially, the Program Faculty took part in an international project involving the assistance of the Environment Ministry in Belize, Central America. This involved a number of visits to that country as well as an exchange among students. The primary focus was the review and revision of environmental legislation, policy and strategies for pollution abatement in that country. Also, the process of Environmental Assessment was reviewed and assistance provided in the re-writing of environmental legislation and implementation of an environmental assessment strategy.

A second initiative of the ET Faculty was in the discipline of wastewater treatment. Part of this strategy was to develop domestic expertise in alternative wastewater treatment for domestic application and, subsequently, take this knowledge and technology to international locations.

The initial project that launched these endeavours was the securing of a footprint within the Greenhouse at the Frost Campus at Fleming College and the subsequent construction of an innovative and research-based Solar Ecology Wastewater Treatment system (SES). This facility was unique in its design and provided the students with the opportunity to enhance their academic experience by being provided with a facility to further develop knowledge in areas including advanced wastewater treatment, aquatic biology, hydraulics, environmental chemistry, sampling/monitoring and interpretation of water quality results.

The SES was so well received that it was recognized by Trent University and its international partners from Ecuador and Mexico within an existing federally funded Canadian International Development Agency (CIDA) project. This led to an invitation to the faculty and students for participation and installation of a similar facility at a selected location for an impoverished community in Mexico. This project resulted in an exchange of faculty and students between learning institutions both in Mexico and Canada as well as several visits, construction of a wastewater treatment system, the basis of a number of student Masters Theses, student internships in Mexico as well as a sabbatical for an ET faculty member. In addition, faculty and students were also involved in a number of domestic and international conferences and site tours (Stratford - England, Wales – England, Kentucky - U.S.A, Orlando – Florida, U.S.A, and Mexico City, Mexico) which enriched the learning environment and opportunities.

Faculty and staff of the ET Program built further on this initiative by modifying course curriculum to include a stronger focus on alternative wastewater treatment (i.e., creation of the Constructed Wetland course in Semester 5 of the Program); construction of or assistance with the design and construction of a number of constructed wetland systems in Ontario (Haliburton Hatchery, Dartford Straw-bale home, Community Centre - Minden, Kinark Outdoor Educational Centre – Minden, Straw-bale home – Peterborough and others). Concurrently, the faculty of the ET Program initiated the securing of $2 million in funding as well as concept, design and construction of the Centre for Alternative Wastewater Treatment (CAWT) at the Frost Campus.

This facility has since been split from the ET Program to operate as an autonomous research facility and has grown as a leader in research and development of alternative wastewater treatment systems, among other new initiatives and growth areas which are described below.

In summary, faculty, staff and students have benefited greatly from the groundwork and innovations in the discipline of wastewater treatment and particularly alternative technologies. This information, knowledge and skills have been embedded into curriculum and have greatly enriched the learning experience for students in both the ET Program and also for the college community in general.

Centre for Alternative Wastewater Treatment (CAWT) Today:

The Frost campus is the site of the Centre for Alternative Wastewater Treatment (CAWT). In 2002, The Canada Foundation for Innovation (CFI) awarded Fleming College a $670,754 Innovation Fund to build the Centre for Alternative Wastewater Treatment. The Ontario Innovation Trust matched the CFI funding, and Fleming's contributions brought total funding to $1.6 million. Built as part of the new $17 million Environmental Technology wing at the Frost campus, CAWT construction began in 2003 and was fully operational for the 2004- 2005 academic year.

A Director of Applied Research was appointed and an Applied Research Strategic Plan was created that identified CAWT as Fleming's primary focus of applied research activities. The CAWT serves as a model for expansion of college applied research activities into other core areas.

Since 2003, the College has increased its core funding for the CAWT and Office of Applied Research from a base of $25,000 a year to its current level of $325,000 a year. Since 2005, the CAWT has received $13M in research funding to support research projects.

The School is hoping to develop opportunities for applied research for both faculty and students at the CAWT. Faculty members in the ET program primarily use the expertise of CAWT staff for guest lectures and tours.

7.2 Support for Research/Scholarly Activity

7.2.1. The institution should provide, secure or arrange adequate funding, facilities, information technology, equipment, staff, library and other resources to accommodate the research /scholarly/liaison activity of the program.

The School and the College have recently demonstrated a stronger commitment towards the development of applied research projects that serve to enhance student learning. International activities which had been limited for a number of years are now also being encouraged, and several faculty members have been approved to conduct applied research as part of their sabbatical activities. The CAWT has numerous resources that could be shared with the ET program that would serve to enhance applied research activities for both faculty and students. These resources include, but are not limited to:

- Six outdoor sub-surface flow constructed wetland cells
- Greenhouse facility for bench scale and mesocosm research
- Environmental Chamber
- 2000 sq. foot plant propagation facilities
- Fully-equipped accredited analytical laboratory
- 20 outdoor experimental ponds.

Plans are underway to expand the physical space of CAWT and efforts are being made to find dedicated student space where students can work on their own projects over long periods of time.

7.2.2 Where an institution or program/faculty has a commitment to research/scholarly/liaison activity, this is reflected in such areas as the teaching load and assignment of full-time faculty responsibilities, the provision of stipends and other remuneration for research/scholarly/liaison activity, support for seeking external funding, opportunities for faculty leave to conduct and participate in appropriate research/scholarly/liaison activity programs, and professional development opportunities to increase research/scholarly/liaison activity capabilities.

There is currently 1 full time faculty member who has been released for approximately 30% of his workload to focus on applied research activities within the CAWT. Over the past 5 years, there have been a total of 4 faculty released for a few hours to participate in research at the CAWT.

7.2.3 The institute/program with active research programs should facilitate mentored opportunities for interested faculty and students to participate in research/scholarly/liaison activity.

The college does not yet have a mentoring program in place, but it is anticipated that this or a similar process may be initiated as the School's level of involvement in applied research continues to expand.

7.2.4 Research/scholarly activity/liaison resulting from active program/faculty initiatives should be used to enhance the quality of the program and student learning experiences.

As mentioned above, the quality of the program and student learning experiences have and are enhanced by:

a) international internship opportunities
b) student placement/exchanges
c) instructional materials (experiences, video, photographs, case studies, etc.) now incorporated into curriculum in a number of courses including Aquatic Biology, Environmental Measurement, Water Treatment and Pollution Control as well as upper level courses in the Environmental Technology Program
d) field trip locations

Operation Wallacea

In the previous documentation, it was stated that faculty from the ET Program were to receive release time in the summer of 2010 semester to investigate international opportunities with an organization called Operation Wallacea (OPWall). OPWall is an organization that encourages and supports the involvement of students in research projects at locations around the globe. This provides students with opportunities to assist in on-going research projects focuses in the disciplines of biodiversity, biological and conservation management that operate in remote locations across the world. Survey teams, comprised of academics and student volunteers, are involved in practical assistance with the projects.

Although the ET Program was not able to secure release time nor funding to participate

specifically in OPWall in the summer of 2010, the ET Program did initiate an alternative international initiative by implementing the “International Option” within the existing Industrial Placement course. This resulted in the first international trip to Costa Rica involving 14 students and 2 faculty.

It is important to note that it is still the intention of the ET Program to establish an on-going relationship with OPWall to engage students and provide a pathway for other international opportunities.