



## **Report:**

# **Canadian National Accreditation Program for Technology Education Programs**

## **Submitted to:**

**Technology Professionals Canada**



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## 1 PROJECT SCOPE

The Provincial Professional Associations (PPA) developed and rely upon the accreditation of technology education programs as a pivotal element of professional certification of technologists and technicians. Accreditation of a technology program signals to the PPAs that an applicant has met the educational requirements for certification. Over the years, the ten PPAs have each entered into agreements with the Canadian Technology Accreditation Board (CTAB) to deliver accreditation in each of the provinces (“the Canadian System”).

The current technology accreditation program was launched over 3 decades ago and, while there have been adjustments to the program throughout this timeframe, there has never been a comprehensive third party review of the program.

CSA was approached by Technology Professionals Canada to review the existing technology accreditation program and compare the Canadian model to similar internationally recognized programs and best practices, specifically how it compared with internationally recognized accreditation and quality management criteria. The project included a gap analysis and a series of stakeholder engagement workshops, designed to gain an understanding of the issues and opportunities related to the current accreditation process.

In addition, CSA was to issue a report of recommendations and a path forward for the establishment of a national accreditation program based on the outcomes of the gap analysis and feedback derived from the stakeholder engagement activities.

As the service provider for this project, CSA agreed to:

- Create the project schedule and detailed work plan;
- Conduct a gap analysis between existing program criteria and protocols and internationally recognized program criteria, including internationally recognized auditing criteria as outlined in ISO 19011 “Guidelines for quality and/or environmental management systems auditing”, the Registrars Accreditation Board (RABQSA) requirements and other identified organizations;
- Work to define the appropriate stakeholders for consultation;
- Design and conduct stakeholder consultation sessions to obtain desired results;
- Develop and present a final report and recommendations including gaps in skills, knowledge and education.

CSA's recommendations are focused on the following guiding principles:

- The system must be 'lean' and the design must be mindful around not creating duplicative or non value-added processes
- Bureaucratic processes must be kept to a minimum given the funded business model supporting the accreditation system
- Stakeholder needs and expectations, including Provincial Professional Associations, accreditation clients (educational institutions) and the accreditation system itself must be met through the demonstration of due diligence in the delivery of functional accountabilities
- Transparency and a shared purpose are key attributes and an inherent outcome of the system

## 2 PROJECT METHODOLOGY

### 2.1 Gap Analysis, Accreditation and Quality Management Principles

CSA reviewed governance and procedural documentation related to accreditation activities for the following organizations:

- Accreditation Board for Engineering and Technology (ABET)
- Engineers Canada – Canadian Engineering Accreditation Board
- Engineers Ireland
- Engineers Australia
- Engineers South Africa

Subsequent to reviewing the similar accreditation systems outlined above, CSA conducted a review of the governance and structure of the Canadian System from the perspective of internationally recognized Accreditation practices in the areas of standards development, quality management and certification activities.

Preliminary recommendations were based on Quality Management Principles, Qualified Auditor Criteria, Requirements for the Certification of Personnel and identified best practices related to governance and operational models of other accreditation organizations – specifically ABET and Engineers Canada. In addition, governance and procedural recommendations were derived from best practices and accreditation criteria in the area of Standardization – specifically Standards Development and Quality Management System Registrars.

## 2.2 Stakeholder Engagement Activities

A series of stakeholder engagement sessions were conducted across Canada to encourage honest and open feedback regarding CSA's preliminary findings and to determine the extent to which the existing system met the needs of the primary stakeholders (PPAs represented by their Registrars and College Programs). Face to face meetings were held in:

- Vancouver, British Columbia – June 15, 2011
- Calgary, Alberta – June 17, 2011
- Mississauga, Ontario – June 23, 2011
- Halifax, Nova Scotia – June 27, 2011

To allow for greater feedback, CSA also conducted two webinars designed to achieve the same outcomes as the face to face sessions. These webinars were held on:

- August 16, 2011
- August 30, 2011

Participant lists and feedback results for these events are attached as Appendix A.

The key and consistent messages that came through in the stakeholder feedback sessions were:

- One Accreditation system for Canada is critically important;
- The use of the National Technology Benchmarks as standards is acceptable to most stakeholders;
- There is a great deal of inconsistency in the audit process and in demonstrated auditor competency in the existing system; Truly competent auditors were seen as a strong benefit to the process.
- Cost is an issue. Although the system should have more stringent operating requirements, it should not place the burden of cost on the Educational Institutions.

## 2.3 Interviews

To supplement research and comparative activities, CSA approached staff members from the Canadian Technology Accreditation Board, Accreditation Board for Engineering and Technology and Canadian Engineering Accreditation Board requesting interviews to discuss their accreditation models from the operational perspective. We discussed engagement of volunteer stakeholders, value propositions in relation to recruitment of auditors and specific issues related to the operation of their accreditation activities.

Canadian Technology Accreditation Board:  
*Mr. Isidore LeBlond*

Accreditation Board for Engineering and Technology  
*Ms. Mary Ann Weiss*  
*Mr. Joe Sussman*

Engineering Accreditation Board  
*Mr. Gordon Griffith*  
*Ms. Lynn Villeneuve*

Discussions were informative albeit, informal. All parties were open and welcomed discussion and freely provided information. Findings are referenced within the recommendations contained in this report.

### 3 EXECUTIVE SUMMARY

#### 3.1 Key Findings

CSA's review of other National Systems, related standardized practices, accreditation programs in other contexts and discussions with similar organizations have resulted in the recommendations contained within this document. It became apparent as we delved deeper into the project that one set of best practices would not be applicable to all aspects of the Canadian System. We have developed this recommendation based upon a number of identified areas for improvement, and the recommendations will cite each best practice or related standardized activity as it applies.

During the review of the Canadian System and stakeholder consultation sessions, a number of items became evident:

- Stakeholders in the system clearly wish to have one National Accreditation Body;
- There is an issue with the separation of the different Provincial Professional Associations into two different National groups. There is confusion regarding how they will align within the Accreditation system.
- There is a requirement for the role of the PPAs to be articulated and for more clearly defined roles and responsibilities (Terms of Reference) for all standing committees and functional groups of the Canadian System.
- Although accountability for the certification of technologists and technicians resides with the Provincial Professional Associations, the formal approval of the National

Technology Benchmarks (NTBs) lies with a third party, the National Technology Benchmarks Committee, which is comprised of members from the National Council of Deans of Technology (NCDOT), Canadian Council of Technicians and Technologists, Canadian Technology Accreditation Board and Council of Registrars.

- The published procedures for the accreditation of educational programs at the post-secondary level are sufficiently stringent when compared to other programs and to recognized quality management principles. However, the system requires a significant amount of enhancement primarily related to documentation, competency definition/measurement and quality review.
- Orientation, training and competency measurement of auditors is a key shortcoming in the current system. Stakeholder feedback indicated both a lack of consistency in the audit process and a significant gap in auditor competencies when comparing different audit experiences.

### **3.2 Embedding Accountability in the System**

Established, verified procedures for auditor training, accreditation activities and standards development activities enables the system to maintain its quality control through verification that all procedures and processes have been followed.

Rather than re-establishing a system where there is dependence upon a Board to “approve” all accreditation decisions, this report recommends that the Board approve the processes by which accreditation is granted, including the establishment of the standards, the determination of auditor competency, the appropriate composition of the audit team and the documentation supporting the audit process. A Governance/Audit Council will then validate that the processes were followed through a second level review and an annual review and appeals forum.

## **4 QUALITY CONTROL, RESOURCING AND OPERATIONS**

The confidence in an audit and the audited system relies on the competence of those individuals conducting the audit. Auditor competence is based upon the demonstration of attributes, skills and knowledge.

Stakeholder feedback indicated a lack of consistency in audit methodologies and auditor competencies. Comments indicated a disparity in the audit experience from one event to the next. In addition, it was mentioned that auditor experience and expertise appears to vary significantly. Clearly, consistent training delivery and measurement of learning is required to address these issues.

CSA recommends the following processes be implemented:

1. Clear documented auditor competencies (attributes, knowledge and skills)
2. Second level review of auditor training delivery and results
3. Central database of qualified auditors
4. Second level review of audit results and process
5. The establishment of an annual meeting to review documentation
6. Development and measurement of Key Performance Indicators for the Accreditation process, including the establishment of Educational Institution satisfaction surveys.

#### **4.1 Documented auditor competencies**

ISO 19011 Guidelines for Quality and/or Environmental Systems Auditing has clear requirements for auditor attributes, including requirements for ethical, open-minded, diplomatic behaviours. Also included are requirements for auditors to be observant, perceptive, versatile, tenacious, decisive and self-reliant. Within the program delivered by CTAB, these auditor attributes are defined and in line with the expectations within ISO 19011.

In addition to attributes, effective auditors must have strong knowledge and skills, particularly related to an understanding of audit principles, procedures and techniques. These skills enable an auditor to ensure that audits are conducted consistently and systematically.

In addition to applying these skills, an effective auditor should also have the ability to stay within established timelines, prioritize and focus on significant issues, identify relevant issues, use effective interviewing techniques and understand and apply these skills within the context of different institutions and program areas. These skills are referenced within the informational documents supplied to auditors, but a measurement mechanism must be implemented to ensure that competency is established.

Leading an audit team adds additional knowledge and skills to the mix. In addition to facilitating the effectiveness of the audit, the Lead must be able to plan, allocate resources, guide the team to reach the audit results, resolve conflicts, represent the team in communications with the institution and finally, prepare and deliver the final report. It is strongly recommended that the Accreditation Group recruit and/or train a team of qualified Lead Auditors to provide this level of service.

It is recommended that a test be developed to measure the ability of a potential auditor to demonstrate knowledge of the National Accreditation process as well as an understanding of the attributes and skills identified within ISO 19011. This test may be delivered online, or in a classroom environment. Subsequent to the successful completion of this test the status “provisional” or “interim” auditor will be granted.

Subsequent to the successful completion of the test, an evaluation should be conducted by a Lead Auditor, during an audit, to measure the extent to which the provisional auditor displays the required attributes and demonstrates the required knowledge. The successful completion of this two tiered evaluation process will result in the provisional auditor transitioning to competent auditor status.

Complete and signed documentation must be retained in the auditors files to validate that each step has been completed.

An example of identified learning outcomes and relevant test questions/answer key associated with the competencies of Internal Auditors has been included as Appendix D. These questions are drawn from CSA's RABQSA accredited training program in the area of ISO 9001.

## **4.2 Second Level Review**

A second level review is an independent review of a process to verify compliance with procedures. The review also serves to identify actual and potential problem areas to assist with the mitigation of risk and liability, and to help ensure that audits are conducted in a consistent manner. The Canadian system currently does not have a second level review process in place

Second level review is a key element in ensuring that continual improvement is embedded in the system. CSA strongly recommends that a systematic second level review be initiated and regularly conducted on:

- Standards development activities
- Accreditation activities
- Auditor training activities

With established, verified procedures for auditor training, accreditation activities and standards development activities, the system maintains its quality control through verification that all procedures and processes have been followed. As opposed to dependence upon a Board to "approve" all accreditation decisions, the Board approves the processes by which the accreditation is granted, including the establishment of the standards, the determination of auditor competency, the appropriate composition of the audit team and the documentation supporting the audit process. The Governance/Audit Council then validates that the processes were followed through a second level review and an annual review and appeals forum.

### 4.3 Auditor Qualifications Records

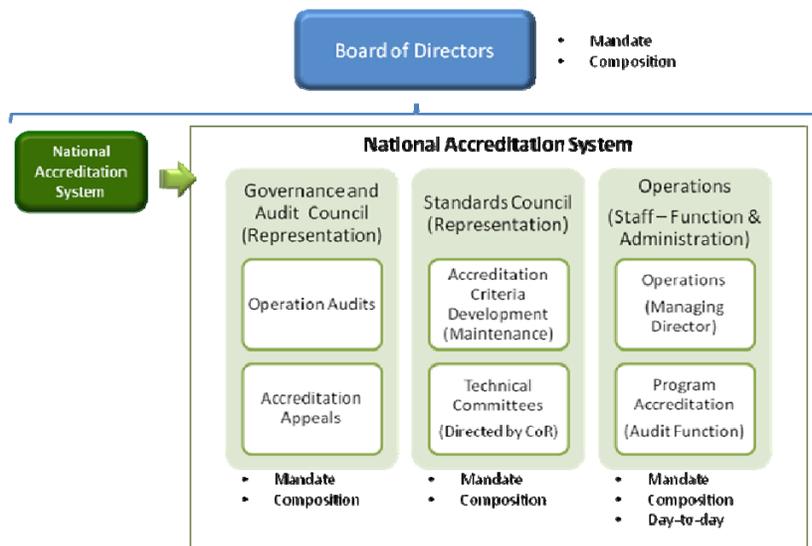
It is recommended that a national database of “qualified” auditors be established that contains contact information, technical background and level of auditing skill achieved (ie. Auditor or Lead). Although this project will be time consuming initially, centralizing the contact database will reduce the time spent by individual Registrars in populating audit teams for Accreditation activities on an ongoing basis.

This centralized repository of information needs to be consistently monitored and updated to ensure that all auditors are competent in their areas as defined within the Accreditation procedures. An example of CSA’s qualified instructor tracking file is included as Appendix C for reference. This tracking file is part of the RABQSA audited process that measures CSA’s compliance with the requirements for Accreditation as a Training Provider of ISO 9001 and ISO 14001 Auditor training programs.

## 5 STRUCTURE AND GOVERNANCE

Clear, concise governance definition lays the foundation for the successful operation of any Association.

The following recommended governance model provides a structure that addresses specific issues such as the separation of Accreditation and Standards Development activities; representation of Provincial Stakeholders in standards operations (development of audit criteria); ongoing Audit and Governance review; the definition of accreditation activities as a business operation with clear accountability to the Board of Directors; and a clear, auditable trail confirming the fiduciary duty of the Accreditation Program to the stakeholders (Provincial Associations).



## 5.1 Board of Directors:

### Mandate:

- National Oversight of a world-class model for accreditation of technology programs.

### Defined membership composition:

- Representation of Provincial Professional Associations (Senior Staff Association participation)
- Industry / Technical Association
- Academia
- Auditing Professional / General Interest

### Suggested Composition:

Provincial Members	Regional* (7)
Audit Professional / General Interest	1
Academia	2
Industry / Technical Association	2

\*Regional Representation allows for rotation of Board Members from smaller constituent groups, and further balance can be achieved through recruitment of regional Board members in the alternate categories.

The Canadian Engineering Accreditation Board noted that the model allowing for regional representation worked very well in their organization. It was felt that given the varying size of Provincial Associations, reflected as well in the Canadian Engineering Accreditation Board, this practice would be applicable in this case.

## 5.2 Governance and Audit Council:

### Mandate:

- Evaluation and monitoring of governance structures and processes, including policy development and processes for Board monitoring/oversight of operations
  - identification and development of recommendations on Board conflict of interest and discipline, bylaws, policies and processes

- Recruitment and orientation of new and existing Board members (education related to governance roles and responsibilities)
- Definition of skills and attributes required in Board members
- Assessment/evaluation of Board performance
- Ensuring transparency and accountability within the Board and Operating systems
- Financial and procedural audits and review for organization and operating councils
- appeals
- Appeals process for Accreditation activities
- Annual process review for Accreditation and Standards development activities

***Recommended Composition:***

Managing Director (Staff)

Four Board Members (different categories recommended)

One member Council of Registrars

One Audit Professional

***Rationale:***

The model defined above allows for representation at all levels within the governance of the Canadian System. It provides the mechanism for continual review and measurement of Board, subcommittee and operational effectiveness through the activities of the Governance / Audit Council. In addition to its primary role in the review and appeals process for Accreditation activities, this Council has accountability for recruitment and continued competency of the Board.

### **5.3 Standards Council:**

**Mandate:**

The Standards Council's mandate is to ensure that the integrity of the professional certification process is maintained for each of the PPAs. The Council of Registrars (CoR) is a National body that is comprised of the Registrars in the PPAs and as such, CoR would be the most appropriate body to provide oversight and leadership related to the development of NTBs in collaboration with Industry, Academia and other technical experts.

As a formal council reporting to the Board, CoR will be the conduit for information and issues related to the updating and development of new NTBs, ensuring the PPAs and other stakeholders are informed on issues related to the professional certification of their members, including any enhancements to the Accreditation process as they become necessary.

***Composition:***

All PPA registrars

Chair approved by Board of Directors for two year term

**Rationale:**

It is recommended that the PPAs assume a greater involvement in the development of the NTBs through the representation of their Registrars in CoR. There is a need to ensure consistency of process in the development of the NTBs and subsequently ensure a more effective, consistent mechanism for the ongoing maintenance of the NTBs. The establishment of clear development processes, modeled after those used by nationally recognized Standards Development Organizations, must be implemented and monitored. The system for the effective management of the NTBs must be properly resourced and the CoR should play a pivotal role in the management of the process by which the NTBs are developed..

**5.4 Standards Development Committee(s)**

**(currently NTBC)**

**Mandate:**

- Activities related to the development and maintenance of Standards (National Technology Benchmarks) in compliance with a developed set of procedures in line with generally accepted standards development principles will be handled through individual committees. A recommended process is attached in Appendix C.

**Committee Composition:**

Cycling membership based on technology

Composition – balanced matrix with a recommended balance in composition where 50% of the membership is represented between the CoR member and Technology Accreditation Operations categories and 50% between the Academia and Industry categories.

CoR member	3-4
Technology Accreditation Operations	1
Academia	2-3
Industry	2-3

## Standards Development Process



### ***Rationale:***

In discussions with stakeholders, and CoR members, it was noted that the development process for the National Technology Benchmarks, although working for the system, had areas for improvement related to communication and a defined process for feedback and the approval of the content of the NTBs. With clear development processes based on the Canadian National Standards system requirements, these issues will be addressed in the process for each NTB both in the development and review stages.

Since the accreditation process, based on the NTBs, is the foundation on which the Provincial Professional Associations grant the certification of technologists and technicians, it is critical that each PPA be confident in the level of technical requirements contained within each NTB. This model provides for the feedback and inclusion of Provincial representation through the Council of Registrars to the development process.

## **5.5 Operations - Accreditation Agency**

Each Accreditation organization we examined operated separately and specifically under the mandate for Accreditation activities. Both ABET and CEAB are governed by an Accreditation Board that approves all accreditation decisions made by the Accreditation Body.

Given the size of the market in Canada, relative to the United States, it is recommended that the Accreditation program operate as a separate business unit, responsible for Accreditation activities. On an annual basis, the development and execution of an operational plan including budgets and deliverables will be approved by the Board. Operations will be supported by an Accreditation or Managing Director accountable to the Governance / Audit Council for compliance with procedures, and receiving business approval and policy direction from the Board. Appeals will be handled through the Governance / Audit Council.

Operating procedures will be developed and it is recommended that they align with the procedures currently used by CTAB so as to provide a seamless transition for Educational Institutions to the new Accreditation model. Quality review of the published procedures for the

National Accreditation activities indicated that they were in line with accepted quality management principles. What is required is documented validation that all processes are followed in a consistently applied fashion.

The differentiating factor for the new Accreditation model will be clear requirements for documentation, maintenance, financial accountability, second level review and transparency guiding the internal operation of the group. None of these activities will impact the Educational Institutions in their preparation for audit activities, but will improve the audit experience and subsequent follow up activities.

## 6 FIDUCIARY AND REPORTING ACCOUNTABILITIES

In discussions with stakeholders across the country, it became apparent that the organizational structure and reporting requirements utilized by CCTT and CTAB did not provide sufficient transparency and confidence to some members of Provincial Professional Associations.

This recommendation for a new Accreditation model to deliver accreditation on behalf of the Provincial Professional Associations provides for clear, measureable performance indicators, and maintains financial and strategic control of the system within the governing Board.

Although we did not conduct a formal financial analysis, we have been advised that both the ABET model of charging audit fees to educational institutions while realizing additional funding through the member bodies; and the CEAB model, which covers costs of accreditation for Educational Institutions are viable models to consider in terms of funding.

A pricing model that is fully funded by the Provincial Professional Associations provides clearly defined accountability of the Accreditation program to the PPAs and reduces financial barriers for smaller educational institutions to participate. The risk of this model is a dramatic expansion of participating educational institutions will increase costs and resourcing requirements for continuing operations.

Continuing with the model employed by CTAB, which is primarily funded through a combination of a moderate accreditation fee for Educational Institutions plus the financial support of PPAs to ensure a sustainable program, appears to be the most logical approach given that it represents the least amount of change to the existing system from the perspective of the Educational Institutions and allows for the development of an operating plan and budget that is scalable if interest in accreditation expands over the upcoming years.

## 7 SUMMARY AND RECOMMENDATIONS

CSA has completed the review, stakeholder engagement activities and interviews, and findings indicate that the primary opportunity area for enhancement to the National

Accreditation system is the development of clear, auditable processes and documented conformity. This requirement should be applied to the standards development process, Accreditation operations and the management and training of auditing volunteers and personnel.

It is recommended that clear, concise, auditable procedures be developed for the following:

### **Development and Approval Process for Standards (National Technology Benchmarks)**

These procedures should include requirements for acknowledgement of requests and recommendations, timelines, stakeholder involvement and a measureable method by which standards are approved.

### **Accreditation Process**

These procedures should include requirements for recruitment, training and competency measurement of auditors, procedures for the complete Audit schedules and outcomes, including submission of preliminary documents and requests, the consultative process (continual improvement) during the auditing activities, quantifiable requirements for measurement and reporting of outcomes, and an Appeals procedure.

### **Training and Measurement of Auditors**

As indicated above, these procedures should include a definition of auditor competency, procedures for the training or informative program by which new auditors are familiarized with the process, and documented procedures on measurement of competency through testing and observation. Subject area expertise should be validated and documented.

All procedural and competency records must be maintained for audit and appeal purposes.

### **Accountability and Reporting**

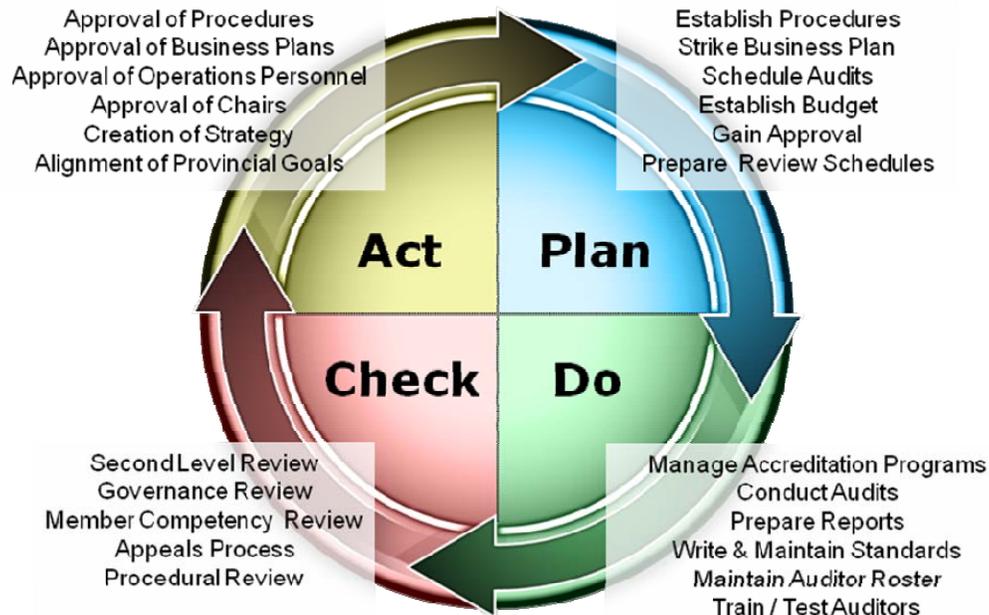
Schedules should be established for a regular review of By-Laws, Governance documents and membership matrix to ensure continued viable operation and effective recruitment.

In terms of operating procedures, a clear process for operational business planning related to Accreditation activities must be established that includes accountability for deliverables and management of costs, reporting structure and timelines. Also to be established and measured are customer value and satisfaction measurements (lines of accountability to the National Body, Provincial Professional Associations and Educational Institutions) to ensure ongoing relevance of the Accreditation program to the needs of all stakeholders.

It is also strongly recommended that immediate next steps include the following :

- Define the Accreditation process and mandatory activities for second level review.
- Define the process by which CTAB audit results will be accepted within the new Accreditation model and the Provincial Professional Associations, for example:
  - Accreditation manager reviews results
  - Submits recommendation to Governance/Audit Committee
  - Results accepted, or non-conformities cited and resolved prior to recognition of CTAB audit results

In closing, the recommended model provides for the continual improvement of the Accreditation System based upon the “Plan Do Check Act” model outlined below.



## 8 APPENDICES

Attached to this report are appendices that provide a series of examples and frameworks that are intended to support the implementation of the recommendations as efforts proceed to develop the National program.

- Appendix A - Stakeholder Engagement Attendees and Comments**
- Appendix B - Outline Standards Development Process**
- Appendix C - Sample Auditor Competency Grid**
- Appendix D - Sample Auditor Quiz**
- Appendix E - Sample Second Level Review Checklists**
- Appendix F - CAN-P-1517D – Management Systems Accreditation Program (MSAP) Handbook (*Copyright Standard Council of Canada*)**