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Report of the Auditor General to the Nova Scotia House of Assembly

Bluenose II Restoration Project
January 2015

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January 15, 2015

Honourable Kevin Murphy
Speaker
House of Assembly
Province of Nova Scotia

Dear Sir:

I have the honour to submit herewith my Report to the House of Assembly under Section 18(2) of the Auditor General Act, to be laid before the House in accordance with Section 18(4) of the Auditor General Act.

Respectfully submitted

MICHAEL A. PICKUP, CA

Auditor General of Nova Scotia

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Office of the Auditor General

Our Vision

A relevant, valued and independent audit office serving the public interest as the House of Assembly's primary source of assurance on government performance.

Our Mission

To make a significant contribution to enhanced accountability and performance in the provincial public sector.

Our Priorities

Conduct and report audits that provide information to the House of Assembly to assist it in holding government accountable.

Focus our audit efforts on areas of higher risk that impact on the lives of Nova Scotians.

Contribute to a better performing public service with practical recommendations for significant improvements.

Encourage continual improvement in financial reporting by government.

Promote excellence and a professional and supportive workplace at the Office of the Auditor General.

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Who We Are and What We Do

The Auditor General is an independent nonpartisan officer of the Legislature, appointed by the House of Assembly for a ten-year term. He or she is responsible to the House for providing independent and objective assessments of the operations of government, the use of public funds, and the integrity of financial reports. The Auditor General helps the House to hold the government to account for its use and stewardship of public funds.

The Auditor General Act establishes the Auditor General's mandate, responsibilities and powers. The Act provides his or her Office with a modern performance audit mandate to examine entities, processes and programs for economy, efficiency and effectiveness and for appropriate use of public funds. It also clarifies which entities are subject to audit by the Office.

The Act stipulates that the Auditor General shall provide an opinion on government's annual consolidated financial statements; provide an opinion on the revenue estimates in the government's annual budget address; and report to the House at least annually on the results of the Office's work under the Act.

The Act provides the Office a mandate to audit all parts of the provincial public sector, including government departments and all agencies, boards, commissions or other bodies responsible to the crown, such as regional school boards and district health authorities, as well as funding recipients external to the provincial public sector. It provides the Auditor General with the authority to require the provision of any documents needed in the performance of his or her duties.

In its work, the Office of the Auditor General is guided by, and complies with, the professional standards of the Chartered Professional Accountants of Canada, otherwise known as generally accepted auditing standards. We also seek guidance from other professional bodies and audit-related best practices in other jurisdictions.

Message from the Auditor General

I would like to thank my staff who worked on this audit for their hard work and professionalism. I would also like to thank the management and staff of the numerous departments and other entities involved in the audit for their cooperation.

The work on this audit was led by the following:

- Terry Spicer, CMA – Assistant Auditor General
- Andrew Atherton, CA – Audit Principal

Our work forward

Our planned audit reports are now outlined on our website up until June 2015 and include the following.

February 2015

- Information on Unfunded Employee Retirement Benefits and Compensated Absences
- Results of Audit and Reviews
- Accountability Audit
- Indicators of Financial Condition
- Review of Audit Opinions and Management Letters
- Finance Follow-up

April 2015

- Report on Review of Government Financial Statement Revenue Estimates for the Fiscal Year Ended March 31, 2016

June 2015

- Forest Management and Protection
- Aquaculture Monitoring
- Follow-up of 2011 and 2012 Performance Audit Recommendations
- Responsible Gambling and the Prevention and Treatment of Problem Gambling
- Procurement and Management of Professional Services

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At a Glance

Bluenose II Restoration Project

Summary

Project Initiation and Planning

The government as a whole, and the Department of Communities, Culture and Heritage specifically, did not adequately plan the Bluenose II restoration project. This started with leaving responsibility for the project with a Department having little experience managing construction projects. Construction projects like the Bluenose II restoration require a lead department with staff who are familiar with project management and construction projects in general.

The Department did not appropriately define the roles and responsibilities for contractors or government participants in the project. While there were numerous committees involved in the project, none had terms of reference defining their roles. The impacts of not defining roles were made worse by the large number of Departments and private companies involved in the project.

The Department's initial project schedule was based on meeting a deadline to comply with the Federal Infrastructure Stimulus Program. While obtaining this funding would have obvious benefits to the Province, it led to the Department setting overly optimistic end dates to comply with the requirements of the Federal program.

The Department did not prepare clearly-defined goals or requirements for the project. We also noted only one half-day risk management meeting was held. A comprehensive list of risks was not completed and little was done to prepare mitigation plans or assess the potential impact of identified risks. The meeting was held after the project manager and designer had been selected and therefore did not address risks associated with hiring for either of those key roles. Also, the Department did not ensure identified risks were adequately monitored during the project and an assessment to identify new risks was not completed.

The Department did not ensure a realistic and complete project budget was prepared, instead the preliminary cost estimate was used as a final budget. This estimate was prepared without using a robust process and as such was not an adequate first estimate, or a final project budget.

The Department did not ensure the decision to work with an international classification society was adequately addressed in the construction contract and it did not ensure the increased costs or time delays related to this decision were included in updated project plans. We also noted the method used to acquire the

services of a classification society did not comply with the province's procurement rules. These rules place more emphasis on the quality of the proponents bid, but this selection was based largely on price with insufficient consideration given to the experience of the two companies asked to bid.

When the main project contractors, project manager, designer, and builder were selected, the Department did not have sufficient details to know what would be required. This information is critical to ensure the proponents with the right skill set are selected. The lack of details was particularly evident in the construction contract, and contributed to the delays and extra costs experienced throughout the project. The Department and builder signed a fixed price construction contract before the designer prepared a detailed project specification. At that point in time, it was unclear what was to be built, resulting in weak contract terms.

The Department did not include key details concerning project expectations in the contracts signed with the project manager and the designer. The contracts did not include penalty clauses and were routinely extended throughout the life of the project. There was no monetary incentive in the contracts to complete the project in a timely manner.

Inadequate project planning resulted in a lack of clarity between the builder and the designer as to the timing and nature of drawings to be prepared. The builder indicated that they did not receive drawings sufficient to meet their needs, while the designer indicated the drawings met the requirements of the design contract.

Project Execution and Oversight

While planning for the project was deficient, the Department's failure to adequately address obvious issues during the project and its failure to provide sufficient oversight, caused further problems.

There were a number of stakeholders involved in the project, including the Department, builder, designer, project manager, regulatory bodies and various project committees. Ensuring these parties worked together in a professional and effective manner was critical to the success of the project. The Department had the overall responsibility to ensure these relationships were properly managed and was not able to do so.

We also noted the project manager did not attend all required meetings and the Department did not always obtain required monthly status reports. Further, no comprehensive project schedule was prepared. This is a basic component of successful project management. The Department's failure to ensure this was completed did not meet our expectation of due diligence over contract management.

Project Results

As a result of the lack of planning and overall weak management by the Department, a number of issues arose during construction. The rudder and steering gear took far longer than expected and continue to cost more money as the province seeks a solution to allow the vessel to pass sea trials. We also noted the change order process was poorly defined and has contributed to the pending dispute resolution to address disputed builder costs.

Our audit was focused only on the Department's management of the Bluenose II restoration project and did not look at the quality of the design or construction. We found poor planning and project management by the Department contributed to the project being over budget and delivered years late. While it may have been highly unlikely that the Bluenose II could have been restored based on the initial budget and schedule, the poor planning and project management combined to add further costs and delays to the project. A comprehensive initial planning process is critical to the success of any large construction project like the Bluenose II, and when a government department hires external contractors to fulfill a role, it is still the responsibility of that department to provide thorough oversight of those contractors.

Government needs to exercise leadership and take away some important lessons from this project to ensure mistakes are not repeated on significant construction projects in the future. If the government fails to act upon these lessons learned, it may be doomed to repeat the same poor performance in the future.

Bluenose II Restoration Project

Background

Project History

1. The Bluenose II and its predecessor, the original Bluenose, have been considered Nova Scotia's sailing ambassadors for over 90 years. The Bluenose was launched in Lunenburg in 1921, and soon became an undefeated racing champion, and a Canadian icon. She sailed for 25 years before sinking in the Caribbean in 1946.

2. In 1963, the Bluenose II was launched in Lunenburg. The Bluenose II was originally built by the Oland family, but was gifted to the province in 1971, and continues to serve as Nova Scotia's sailing ambassador.

3. In 2009, the province decided to restore the Bluenose II with the help of the Infrastructure Stimulus Fund. This would allow Nova Scotia to access matching funding from the federal government to help cover the costs of the project. The high annual maintenance costs associated with keeping a nearly 50-year-old vessel seaworthy led to the decision to restore the Bluenose II.

4. The project was announced in May 2009 with an approved initial cost estimate of $14.4 million. The Department of Tourism Culture and Heritage was the Department responsible at the time, although we will use its current name of Communities, Culture and Heritage throughout this report. The timeline below includes key dates during the project.

Project Timeline

5. Beyond the Department of Communities, Culture and Heritage as project owners, there were a number of other parties directly involved with the Bluenose II restoration project.

Project Participants	
Entity	**Role**
Lunenburg Marine Museum Society	Responsible for operating the Bluenose II on contract from the Department of Communities, Culture and Heritage
Transport Canada	Regulatory body
American Bureau of Shipping	Classification society, also handled delegated responsibility from Transport Canada
Transportation and Infrastructure Renewal	Steering Committee member Prepared tender documents for project manager and designer
Department of Finance	Steering Committee member
Department of Justice	Steering Committee member Legal advisor
Procurement Services	Steering Committee member
MHPM Project Managers	Project managers
Lengkeek Vessel Engineering	Designers and naval architects Also helped administer the builder's contract and provided ongoing inspection and review of the construction process
Lunenburg Shipyard Alliance consisting of Snyder's Shipyard, Lunenburg Industrial Foundry and Engineering, and Covey Island Boatworks	Builders
Deputy to the Premier	Eventually placed in charge of the rework required for the rudder and steering gear
Costello Fitt	Construction manager for the builders Project manager for the rework on the rudder and steering gear

6. On December 17, 2009, the Province announced the federal funding of $7.2 million and indicated the project had to be completed by March 31, 2011. It is important to note that this announcement preceded the hiring of a design firm or even the beginning of the process to hire a builder. Ultimately, the project received $4.9 million in federal funding as work was not completed until after the funding deadline.

7. The original contract with the builder included a contract delivery date of May 29, 2012, and a fixed price of $12.5 million. The vessel was turned over to the Province in July 2014; although work continues to correct problems with the rudder and steering design. Total costs to date are summarized in the following table. There is approximately another $4 to $5 million still uncertain pending dispute resolution between the builder and the province.

Project Costs	
Contractor	**Total Paid to January 12, 2015**
Builder (labour and materials)	$15,771,643
Project Manager	$1,375,457
Designer	$1,321,856
Other	$280,873
Classification Society	$69,434
Subtotal – paid to date	$18,819,263
Total approved – not paid	$753,726
Grand total to date	$19,572,989
Federal contribution	$(4,937,500)
Net provincial portion	$14,635,489

Audit Objectives and Scope

8. In January of 2014, the Minister of Communities, Culture and Heritage wrote to our office requesting that we include the Bluenose II restoration project in our audit plans for the 2014-15 year. We started working on the audit in spring 2014 and completed our fieldwork late that fall. Our overall goal was to assess whether the project was adequately managed by the Department of Communities, Culture and Heritage and whether provincial resources were used appropriately.

9. The audit was conducted in accordance with sections 18 and 21 of the Auditor General Act and with auditing standards of CPA Canada. Our work considered all aspects of the project from planning in 2009 and up until the writing of this report.

10. Our audit objectives were to assess:

- whether the Department complied with the requirements of the Province of Nova Scotia Procurement Policy and went through adequate due diligence throughout the procurement process;
- the adequacy of contract terms, including due regard for value-for-money and protection of public interest;
- the adequacy of the Department's overall management of the Bluenose II restoration project;
- the adequacy of the Department's processes to ensure compliance with key contract terms, and ensure action is taken in the event of noncompliance; and
- the adequacy of the Department's processes to monitor and manage project costs.

11. Our audit criteria were developed specifically for this audit, but were based on various other project management audits we have completed, including the Colchester Regional Hospital replacement audit from May 2011. The audit objectives and criteria were discussed with, and accepted as appropriate by, management at the Department of Communities, Culture and Heritage.

12. Our work consisted of reviewing documents related to the project, and multiple interviews with government staff involved in the project. We also met with the various companies who were engaged to provide services, along with management at Transport Canada.

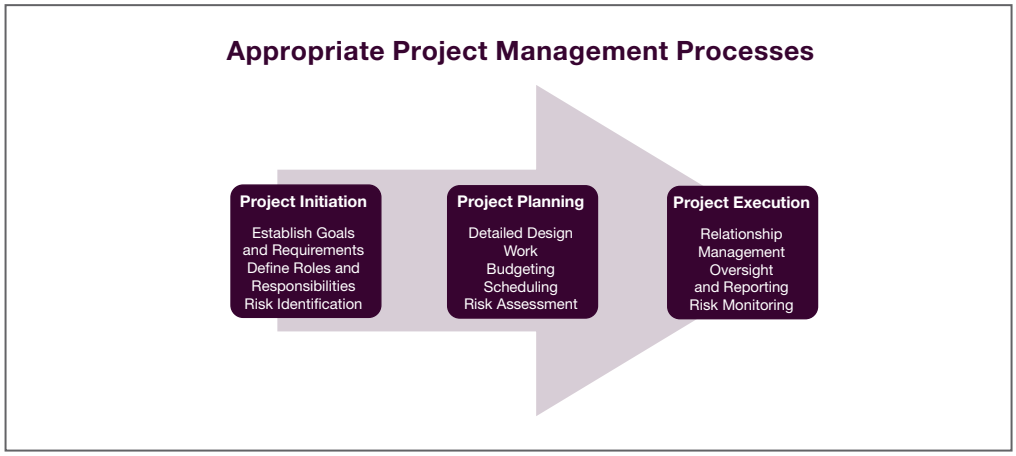
13. It is important to note the focus of our work was on the Department's management of the project to restore the Bluenose II, not the design or construction of the Bluenose II itself. We did not look at the quality of the construction or the design of the vessel. These assessments were the responsibility of Transport Canada and the Classification Society; we did not attempt to do our own evaluation of them.

14. The conclusions and findings in this report address the objectives of our audit and are not intended for any other purpose. We also provide recommendations to improve how the province manages significant construction projects in the future.

Significant Audit Observations

Realistic Project Expectations

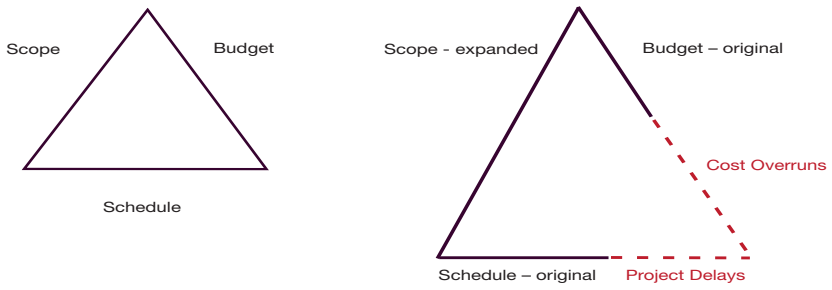
15. Throughout this report we will introduce each section with comments about what we expected to find. Our office identified a number of steps or processes which are critical to the success of any significant project. Some of the basic project management processes we expect to see are summarized in the chart below.



16. The basic concepts of good project management are applicable whether a project is a new hospital, school, courthouse, implementation of a major IT system or the restoration of a world famous Grand Banks schooner. Unfortunately, we found that few principles of good project management were followed in the Bluenose II restoration, leading to many of the issues noted in this report.

17. There are three key concepts that factor into any major project: scope, budget and schedule. A change in any one of these will impact on the other two, and on the final results of the project. This is best demonstrated with a project management triangle, as illustrated below. Scope, budget and schedule each represent one side of the triangle. If one side changes the other sides need to change as well, or a gap is created.

Project Management Triangle



18. Our audit found that this basic principle of project management was not followed. The budget and schedule were fixed early in the project, but the scope was not adequately defined, and continued to grow through much of the early stages of the project. This is illustrated above with the second diagram. We will discuss these results in detail throughout the rest of the report. The final result was that while there was little desire to change the budget and schedule for the project, the actual costs and delivery dates were changing as a result of the increases to the project scope.

Project Initiation and Planning

Conclusions and summary of observations

Responsibility for the Bluenose II restoration project resided with the Department of Communities, Culture and Heritage, despite the Department's lack of experience

managing large construction projects. It was highly unlikely that the Bluenose II project would meet the initial completion schedule or budget, due to the lack of project planning. The initial budget of $14.4 million was not based on detailed cost estimates, and did not include significant cost drivers, but was used as the project budget. The initial schedule was driven by access to federal infrastructure stimulus funding, instead of being guided by the work required. The project goals were not clearly defined and no analysis of their impact was completed. There was a single risk analysis meeting but no risk management process existed.

19. *Appropriate planning process* – Key stakeholders should be included throughout the project, especially at the initial stages to identify the right project lead, to ensure goals are defined and to assess risks. Consulting the right stakeholders will help to ensure that everyone who will be impacted is heard and their concerns and desires identified. It is also important to ensure the right level of expertise is involved in managing the project, so that decisions are made by people who understand the subject matter. While each construction project is unique, the basic concepts of project management do not change and proper expertise with a project management background is very important to ensuring government successfully runs large projects.

Responsibility for the project left with Communities, Culture and Heritage, despite little experience managing large projects

20. *Responsible department* – The Department of Communities, Culture and Heritage is responsible for overseeing all aspects of culture and heritage in Nova Scotia. The Bluenose II is part of this heritage and the schooner is ultimately the Department's responsibility. The day-to-day operations of the vessel are contracted by the Department to the Lunenburg Marine Museum Society, the same group that operates the Fisheries Museum in Lunenburg.

21. During the early discussions around the possibility of restoring the Bluenose II, there do not appear to have been any discussions of whether Communities, Culture and Heritage was the best choice to act as the project owner. Department management and staff collaborated with staff from the Departments of Transportation and Infrastructure Renewal, Finance, and Justice along with Procurement Services during planning and procurement stages. Each department or group was represented on the project steering committee. However, it appears the default position was that the department responsible for the vessel would be responsible for the project, which meant Communities, Culture and Heritage.

22. The Department of Communities, Culture and Heritage is not typically involved in large construction projects. Its role involves promotion and development of our culture and heritage. Its responsibilities include operating museums across the province; maintaining the provincial archives; and promoting cultural festivals and events. While we acknowledge that

some staff had past experience with construction projects, the Department of Transportation and Infrastructure Renewal have far more project management experience. The primary consideration should be whether staff at the selected department have the skills necessary to run the project. Project management expertise should be considered a basic requirement when government decides which department should run significant construction projects.

23. In previous reports, we have addressed the issue of which departments should take responsibility for large construction projects. In our 2011 report on the Colchester Regional Hospital replacement project, recommendation 4.12 addressed the need for an appropriate level of expertise to represent the province in projects such as these. Our follow-up of that audit in May 2014 found the Treasury Board Office had yet to implement any changes. Colchester Hospital and the Bluenose II are examples of what can happen when government does not ensure the group leading the project has the right expertise. With potential large construction projects, such as the Centennial Building replacement, happening in the future, this issue is only becoming more important and must be addressed.

Recommendation 1
Finance and Treasury Board should assign responsibility for all significant construction projects to a government department with the necessary expertise to oversee them.

Finance and Treasury Board Response: Finance and Treasury Board accept this recommendation. As noted in the report, this decision has already been made as part of the shared services initiative and implementation is already in process.

24. We understand major construction projects are being centralized under the new Shared Services Act recently passed by the government. At the time of this report, the legislation had not come into force.

The Department did not clearly define roles and responsibilities

25. *Project structure* – In addition to not assigning the project to the most suitable department, the structure of the project was not conducive to a successful project. The Department created a structure with a number of committees, including a project steering committee with representation from various external advisors; members from the Departments of Transportation and Infrastructure Renewal, Justice, and Finance; as well as Procurement Services. There were no terms of reference for any of the project committees, including the steering committee, making the committees' roles unclear. We noted specific concerns, including that the procurement committee only met twice. Both meetings were after the RFPs for project manager and

designer were issued. We also found the steering committee tended to review information and decisions already made, rather than providing direction in making those decisions.

26. The Department never defined the overall approach to this project. A successful project requires a clear plan that defines who is responsible for each task, who has the authority for decision-making, and who is responsible for oversight. The plan should also define who is accountable for quality and ensuring the project is completed on time and on budget. A good plan or project charter identifies the best choice for project lead and the ideal structure for the implementation of the project.

27. The number of people involved, combined with the lack of adequate planning, made it unclear who was ultimately in charge of making decisions, who was responsible to implement decisions and who would be held accountable. The government stakeholders included four departments or branches involved with the steering committee, the Deputy to the Premier, and Transport Canada. Externally, there were three primary contractors – the project manager, designer and builder and within those entities there were multiple other groups brought on to bring more expertise. In addition at least 4 external companies were used as consultants by the project manager and there were various suppliers and contractors for the builder and designer. This project had multiple layers of input with no defined roles or responsibilities for the various parties, which contributed to the problems that eventually plagued the project.

28. *Role of captains* – Another complicating factor in the project structure related to the role of the current captain and former captain on the Bluenose II. While the captains played a key role in the initial stages of the project by providing a document outlining the options for restoring the vessel, as the project moved forward, it was not clear what authority the captains had. They were part of the steering committee and the builders indicated they would typically expect the captain of a vessel to speak for the owners, but that was not the case on this project. This illustrates the lack of clarity around decision-making and the uncertainty it created.

29. *Infrastructure funding* – The federal infrastructure stimulus program provided matching funds for provincial projects. The province and the Government of Canada reached an agreement to include the Bluenose II project in the program, with a maximum federal contribution of $7.2 million. The program required the project to be substantially completed by March 31, 2011 and required the province to have spent the money in order to get the matching federal contribution. This deadline was eventually extended to October 31, 2011. Ultimately, the province obtained $4.9 million in federal infrastructure funding.

30. While the infrastructure funding helped alleviate the overall financial burden on the province, the wider impact of this decision was significant. The desire to obtain federal money for the project contributed to a rushed and incomplete project budget, along with an overly optimistic project schedule.

31. The need to complete the project by March 31, 2011 appears to have led the Department to either rush or not make important decisions during the planning stage. Numerous decisions link back to the need to obtain federal funding, from the lack of clearly defined goals and poor risk analysis to the timing of hiring all three main contractors. Many of the issues we noted in our work were ultimately rushed or avoided in an effort to meet the federal funding deadlines.

32. *Importance of initial approval* – In government projects, the decision to provide initial approval is often the most significant step in the process. That decision should be based on the need for the project and reasonability of the project budget and schedule. In this situation, the initial decision appears to have been heavily influenced by the availability of federal funding. Department management told us that the need to replace or restore the Bluenose II predates the project, but was not approved until the federal funding was attached to the project.

33. The factors on which an initial decision are based, in this case the availability of federal funding made the project appealing financially, must be carefully considered. For this project, that should have meant a detailed review of the feasibility of achieving the schedule necessary to obtain the federal funding. As discussed below, and throughout this report, there was insufficient analysis to determine when the project could realistically be completed.

34. Although not an excuse for poor decision-making, we were told by many of those involved that the desire to participate in this project and be part of the group that built a new Bluenose II was a strong influence and may have caused some to overlook concerns or issues with the project planning and structure.

35. *Initial schedule* – An appropriate project schedule should follow a similar path to a robust cost estimate. Initial schedules or due dates, which are developed early in the process in order to receive approval to proceed, should be realistic and include contingencies.

36. A final project schedule should be developed when detailed specifications exist and all parties know what is expected of them. The final schedule should incorporate all aspects of the project and identify all the relationships between tasks to ensure the work is scheduled in the most efficient and

effective manner. The final project schedule should also provide dates which would then be used to monitor project progress and to measure project performance.

37. The initial schedule for this project was the first instance when the tight time frame needed to acquire federal funding had a negative impact. The builder's contract included a delivery date of May 29, 2012, which was overly optimistic. We could not find any specific analysis supporting or assessing the reasonableness of this end date and, as noted later in this report, there was no comprehensive final project schedule. The initial deadline appears to have been based on getting the majority of the work done in order to qualify for federal funding. Appropriate project management requires the project schedule be based on how long a project will take, not how long the department wants it to take.

Project goals or requirements were not defined

38. *Project goals* – An important step in good project management is a clear description of what the project is intended to accomplish. Clearly defined project goals or desired outcomes should be documented and shared with key stakeholders so everyone understands what they are trying to accomplish. At this stage, it is also important that stakeholders understand that the more they ask for, the more it will cost and the longer it will take. All goals or project expectations need to be analyzed to gain a reasonable assessment of the impact, on both project costs and schedules, prior to acceptance as part of the project.

39. The Department did not prepare a defined project scope or charter document for the Bluenose II restoration. Additionally, project goals were not clearly defined or documented. Our conversations with management led us to conclude that there were no specific discussions or other work to identify the overall project goals, but rather certain concepts came to become accepted as the goals by default. Two of the more impactful goals we identified were to build the Bluenose II in Lunenburg and to work towards building a vessel that would last 50 years.

40. None of the goals we identified were analyzed to determine their potential impact on the project or on each other. Regardless, some had a big impact on the budget, schedule and scope. For instance, there was no analysis to assess the additional costs associated with building a wooden vessel to last 50 years. Similarly, the Department did not assess the impact of requiring the ship to be restored in Lunenburg. While the historical importance of this decision is clear, the practical issue of then seeking private companies to build a project in Lunenburg was not considered. We also noted some of the concepts might have been incompatible with each other, such as building a 1920s Grand Banks schooner that meets current safety rules and regulations.

Project risks were not adequately addressed

41. *Risk management* – Risks associated with meeting project goals should be assessed and ranked from highest to lowest risk early in the project. A plan to address risks should be established. Some risks can be simply avoided through careful planning while others will need to have mitigation strategies to reduce either the likelihood of them happening or to lessen the impact if they do occur. The risk management approach should be an ongoing effort, with regular meetings to monitor the risks identified in planning and consider if any new areas of concern have arisen.

42. For this project, the Department did not carry out a risk assessment before the project manager was hired. We noted that while a contract had not yet been signed, the successful bidder for the design was represented at the only risk management meeting. This timing concerns us as the Department did not evaluate the potential risks of hiring external experts like the project manager or designer.

43. The half-day risk management meeting that was held in November 2009 was not sufficient to adequately identify project risks. While the designer's team and a consultant from the project manager's team were familiar with boat building, neither had much experience in wooden boats. The wooden boat experts the project manager was supposed to rely on did not attend the risk meeting. In simple terms, this meant a group of people unfamiliar with building wooden boats were trying to assess the risks associated with building a wooden boat.

44. The result of the risk meeting was a list of 43 concerns, many of which were not significant to the success of the project. For instance, communicating with the public and Freedom of Information and Protection of Privacy requests were identified. While these are certainly issues that everyone involved needs to understand and for which plans should exist, we expected that more significant risks such as inadequate time allocated for design, the possibility of hiring external experts without enough expertise, or relationship breakdowns between the parties would have been assessed.

45. We found responsibility for 40 of the 43 concerns was assigned to project partners but only 22 included information on possible consequences of the risks. More concerning, only four of the identified risks had a due date by which actions were to be taken to address the risk and only four others included indicators of how the risk would be successfully avoided or mitigated. For instance, the risks of not meeting scheduled milestones and of not knowing approval times for regulatory bodies were both assigned to a project partner, but there was nothing documented indicating the date by which action should be taken or how to mitigate or avoid the risk.

46. *Monitoring* – Project goals and identified risks should be tracked throughout the project. This would allow project leadership to ensure plans to achieve goals are followed and to ensure risk mitigation or avoidance strategies are in place, while monitoring to see which risks have become reality and which may no longer be a concern.

47. We found that the Department did not monitor either the goals of, or risks to, the project. The goals were not clearly documented and as such were very difficult to follow up. No monitoring or follow-up sessions were held to address what was happening on the project. Once the builders were hired, there was no session to get their input into the risks to the project. In addition, the Department did not reassess risks and goals when the project started to fall behind. By the time the Bluenose II was handed over to the province, it had been over four and a half years since the risk meeting.

48. Failure to identify all risks to a project early and to actively monitor and update that list throughout the project is not appropriate project management. As a result, Communities, Culture and Heritage did not have sufficient information to know what events might cause the project to fail and whether effective mitigation strategies were in place. Managing risks is a basic requirement for any project. We find it unusual that the Department did not identify this and ensure the information was obtained.

Detailed project budgets were not prepared

49. *Project cost estimates and budgets* – An important step in good project management is preparing a robust initial cost estimate. The initial estimate should be prepared very early in the project, and is usually prepared without much detail supporting the project. Without detailed drawings a degree of uncertainty about the budget may still exist. It is important for all parties to keep in mind this initial estimate is not a project budget, but simply a starting point. A project budget cannot be prepared until more details are available.

50. In government, the initial cost estimate is usually required to get approval to proceed with a project. The challenge is the funding for projects is often dependent on there being sufficient budget allocation available, meaning the project needs to fit into the available funding. This potentially creates a bias to present an unrealistic initial estimate. This issue is compounded if the government considers the preliminary estimate as the project budget and attempts to carry it through the entire project.

51. A proper costing approach starts with a realistic estimate, one which should include a significant level of contingencies to cover unexpected cost increases. The initial estimate is completed early in the process, and as actual costs are difficult to determine, contingencies should be included to allow for unknown costs.

52. The estimate should be updated routinely by management until a final project budget can be prepared. A final budget cannot be determined until detailed specifications are available to accurately predict the materials and time required for completion. This information should form the basis of the project budget for which the project can be monitored and performance assessed.

53. For the Bluenose II restoration project, the Department did not have a detailed project budget, and the preliminary cost estimate was carried forward as the project budget. The estimate was based on the 2009 proposal the Lunenburg Marine Museum Society prepared for the refurbishment of the Bluenose II. The proposal was prepared by society staff, and had a total project estimate for construction of $15 million.

54. In March 2009, Communities, Culture and Heritage used the project proposal to request capital asset funding, using a cost estimate of $14.4 million. At that time the project was identified as being eligible for federal stimulus funding, thereby reducing the provincial responsibility to $7.2 million provided the project could be completed within the federal timelines.

55. The preliminary cost estimate was used as a final project budget and the builders were expected to construct the vessel within that figure, not knowing whether that budget could actually be achieved or whether it was sufficient to meet the objective of a safe vessel that would last for 50 years.

56. In May 2010, the builder was informed that the available construction budget for the project was around $12.2 million. As final drawings had not been completed at the time, the builder agreed to prepare a specification of what they could deliver within the budget. The builder indicated they created the benchmark scope of work (this defined the restoration work required), which became part of the builder's contract. Our concerns with the benchmark scope are discussed in greater detail later in this report, but the primary issue was the benchmark explicitly excluded additional costs associated with making the vessel compliant with an international classification society's rules. So, while the builder's contract was for a figure that was within the acceptable project budget, it clearly excluded costs that were known to be coming, although those could not be defined until more detailed design information was available.

57. Without considering the costs of classification, the project cost estimates at the time the builder's contract was signed in July 2010 already showed an overage of $600,000. It is clear the builder's contract, and the budget associated with it, were created based on available funding not the actual cost to build the vessel. For the Bluenose II, this created a situation in which it was highly unlikely the project could be completed within the project funding

available. This issue is very similar to the findings in our 2012 audit of the Colchester Regional Hospital replacement.

58. *Reusable equipment* – In trying to keep the restoration as true to the original as possible, items from the original Bluenose II were identified in the builder's contract to be reused on the restored Bluenose II. The project manager stated approximately $1 million of this equipment ultimately could not be reused as it did not meet classification society requirements. Due to the lack of analysis of the impact of classification, these costs were not identified or incorporated into the project budgets.

59. *Additional project funding* – Additional project funding was approved by Executive Council on multiple occasions as noted in the chart below. Cost increases related to approved change orders, many due to either gaps between final drawings and the benchmark plan, or related to meeting classification society rules, along with fees to pay for continued project management and designer involvement.

Approved Funding		
Date	**Amount**	**Description**
May 4, 2009	$14,400,000	Overall approved budget.
June 2, 2010	$400,000	Changed original scheduled completion from March 31, 2011 to June 2012. Budget increased from $14.4 million to $14.8 million.
June 2, 2011	$1,200,000	$800,000 for safety-related work and $400,000 for future contingencies.
February 20, 2013	$2,385,000	$985,000 for change orders for work done and increases for the project manager and designers. $1.4 million approved related to delay claims.
June 18, 2014	$1,187,900	Work to be completed for sea trials anticipated in the spring of 2014.
Total	**$19,572,900**	

60. Project budgets need to be evaluated by the project lead to determine if they are realistic, and to ensure there is sufficient allowance for risks. The failure to create a realistic budget for the Bluenose II project resulted in the project starting with an unachievable cost estimate. A subsequent project budget should have been prepared using goals and final design drawings to determine if the project was achievable within approved funding. This would have allowed project leadership to reconsider the project scope if the approved funding was inadequate.

61. *Reactive approach* – Ultimately the lack of planning for this project resulted in decisions being made in a reactive rather than proactive manner. Instead of defining the goals for a successful project, identifying the risks to achieving those goals and then creating a plan to get there, the project leaders worked from day-to-day, dealing with issues as they came up.

Recommendation 2
Finance and Treasury Board should put in place a mandatory approach to managing significant projects in government. This should include strong project management practices with essentials such as: outlining goals and risks, timelines for project budgets and schedules, assigning responsibility for key decisions, and project oversight.

Finance and Treasury Board Response: Finance and Treasury Board accept this recommendation. Changes have been made to the Tangible Capital Asset process over the last few years and processes continue to be refined. Appropriate and experienced project management will be provided through the shared services initiative being implemented. We believe that these changes address the concerns raised in the report.

Lack of Defined Scope

Conclusions and summary of observations

The Department decided to have the Bluenose II comply with classification society construction requirements but failed to adequately reflect this requirement in the construction contract. The Department conducted inadequate analysis of the impact of requiring the vessel to be constructed to class requirements, and never updated cost estimates to reflect this change. It is unclear why concerns identified by various project technical advisors were not addressed.

62. *Canadian requirements* – All ships built in Canada and under Canadian jurisdiction must comply with the Canada Shipping Act, administered by Transport Canada. Transport Canada is responsible for design inspection and approval; enforcement and inspections related to areas such as life-saving; environmental and fire protection equipment; as well as crew requirements and related approvals. Transport Canada does not maintain comprehensive rules addressing all aspects of ship construction, instead relying on international classification societies for detailed rules.

63. Classification societies are international organizations which maintain their own rules for ship design and construction. Classification society rules generally address areas such as electrical systems, and vessel propulsion and steering systems; and relate to the quality and strength of components, providing assurance components were made from approved materials and that the vessel is built following approved construction methodology. Taking a vessel into class with a society provides independent assurance the vessel design and construction complies with the classification society rules and processes.

64. Transport Canada representatives told us that designers and builders are required to select a set of classification society rules against which the vessel will be designed and constructed, regardless of whether the vessel will be formally classed with that society. If the vessel is not being classified by a society, Transport Canada inspectors would then verify that construction complies with the selected rules, in addition to verifying the statutory inspection requirements enforced by Transport Canada.

65. Transport Canada noted that because the planned changes to the Bluenose II were more than just routine maintenance or repairs, the project was required to comply with modern Transport Canada requirements. Situations in which the original Bluenose II was allowed to be noncompliant would no longer apply. Transport Canada management also noted they told Communities, Culture and Heritage that noncompliance with Transport Canada requirements was not an option for this project.

Known project requirements were not included in the construction contract

66. *Disregard for the impact of class on the project* – Working with a classification society for the restoration of the Bluenose II was first identified during the risk assessment meeting in November 2009. The Department subsequently accepted that recommendation and the process began to identify the appropriate society. Department management indicated there was a discussion with the project managers and its consultants who suggested the decision to build to class requirements would increase the construction cost by up to 6%, while also adding five to six months to the project. The Department did not reflect these changes in project budgets and they were explicitly excluded from the builder's contract.

67. In recommending the project be built to class requirements, the impact on the costs and schedule for the project were not adequately considered. Discussions noted the decision would increase both the builder and designer workloads, but concluded that these costs could be absorbed within the existing project budget, and that the impact on the schedule would be negligible. These statements are not consistent with other evidence or the final results of the project, and indicate a failure to fully consider the impact of taking the vessel to class.

68. In September 2010, two months after the builder's contract had been signed, a project technical advisor expressed concerns to the steering committee that the classification inspections can be a very lengthy process, and could result in schedule delays. The concerns were dismissed during the meeting with little further analysis.

69. The fact that project technical advisors were suggesting concerns about the potential impact of going to class should have been a warning signal for the project. The Department should have obtained additional information to assess the potential impact on project schedules and budgets, and determined whether contracts required amendments. An independent report prepared for the Department in early 2014 indicated the project likely underestimated the impact of the requirement to class the Bluenose II.

70. *Selection of a classification society* – The Department delegated the selection of a classification society to the designer without requiring them to follow provincial procurement rules.

71. The designer contacted the American Bureau of Shipping (ABS) and Lloyd's Register, only two of the five potential societies, to obtain initial quotes. From those initial estimates the designer made a recommendation to the project manager to go with Lloyd's Register. At that time, Lloyd's had the higher bid by approximately $14,000, but the designer felt they were superior in terms of experience with wooden boats and a more applicable set of rules. Subsequent to that recommendation, ABS lowered their quote by $16,000 and Lloyd's increased their bid by around $6,000, leaving a difference in price of approximately $35,000. The designer changed its recommendation to the Department, indicating the difference in price was such that the ABS bid should be accepted based on price. The Department accepted this choice.

72. On a $14 million project budget, a difference of $35,000 represents less than 0.25% of the total project cost. While we realize every dollar counts, the first recommendation from the designer clearly identified Lloyd's proposal as the *"best technical proposal."* We also note the provincial procurement policy puts more emphasis on proponent capabilities and experience than it does on the cost of the contract, the opposite of the approach used in selecting a class society for the project. While we cannot know what impact changing the classification society would have had on the project, the fact that provincial procurement rules were not followed leaves uncertainty regarding the final decision.

73. *Class and the builder's contract* – The Department did not ensure compliance with classification society standards was included in the builder's contract; it was explicitly excluded from the specifications used to determine the contract price. This was a serious omission which could have been avoided as the decision for the project to be built to American Bureau of Shipping standards was made in May 2010, two months before the build contract was signed in July 2010. Department management indicated class was not included specifically in the contract because a formal agreement with the classification society had yet to be signed.

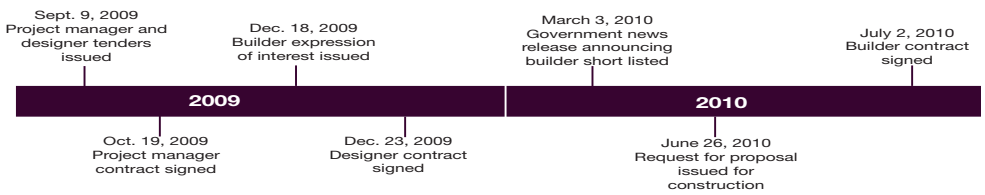
74. The builder's contract did include a clause with an option for the Minister to require the project to comply with the classification society requirements. However the benchmark scope of work, included as a schedule to the contract, specifically excluded all costs of bringing the Bluenose II into class, even though the decision to go to class had already been made. We are not clear why this was excluded. It appears to have been related to the rush to get the project started but has proven to be a key point of contention throughout the project.

Procurement Approach

Conclusions and summary of observations

While we found that the Department of Communities, Culture and Heritage followed the provincial procurement policy by conducting tender evaluations against the defined criteria, we also noted the tender documents were unclear and did not adequately define the project. Those responsible for evaluating the tenders had limited experience with shipbuilding. Further, the project manager and the designer had limited or no experience with wooden shipbuilding and the builder did not have experience with shipbuilding projects the size or complexity of the Bluenose II.

Procurement Timeline



75. The Government often hires external partners when completing large projects, particularly construction projects. A key step in procuring a private partner is a clear and complete understanding of what is to be delivered and when. Immature or incomplete project plans often have not sufficiently defined the project scope which makes it hard to select the optimum private partner or to hold them accountable for achieving deliverables. A detailed project plan completed prior to hiring contractors should help avoid confusion over

deliverable dates later in the project. Waiting until everyone understands what is required before signing contracts will reduce the level of change during the project; a lot of changes can significantly increase the cost.

76. *Type of procurement* – Communities, Culture and Heritage indicated they relied on the Department of Transportation and Infrastructure Renewal during the procurement process for the project manager and designer. The project manager and designer were selected using a traditional request for proposal approach, while the builder was selected using a request for expression of interest, which involves prequalifying bidders based solely on experience before costs are considered.

77. The Department of Transportation and Infrastructure Renewal told us three options could be considered for a project such as this.

- Hire the designer and complete contract documents (drawings and specifications) before seeking a builder.
- Complete the designs to a certain point and issue a tender or request for proposals for the builder.
- Use a design/build contract in which the owner provides detailed requirements and the designer and builder are hired under the same contract.

78. At a meeting in August 2009, the Department of Transportation and Infrastructure Renewal representative told the steering committee that separate procurement processes for each of the project manager, designer and builder would be used to *"control costs and the project quality."* The design was only partially complete when the builder was engaged and while the builder's contract required the drawings to be complete shortly after the contract was signed, this did not happen. Drawings were not completed to the builder's satisfaction on the dates in the contract, contributing to project delays later on.

79. Management at procurement services told us they would consider the design/build approach more appropriate for this kind of project, and that the project management role would typically be filled by the responsible department. We could find no support showing this advice was provided to the Department at the time of the procurement, but that approach likely should have been followed.

Necessary project details were not included in the procurement documents

80. *Project manager and designer tender documents* – We reviewed tender documents for the project manager and designer and found the project

requirements were not adequately defined. There was overlap between roles and responsibilities. For instance, both requests for proposals included reference to cost and schedule management. Project goals were not defined in either request for proposal. The Department did not take the necessary steps to ensure the project was ready to proceed to the procurement phase; this would have helped to avoid overlap and ensure the requirements were clear.

81. There were three responses for the project management role and two for the designer. The proposals were assessed in accordance with the provincial procurement policy and were evaluated based on the defined criteria included in the request for proposal. The evaluation teams included representatives from Communities, Culture and Heritage, and Transportation and Infrastructure Renewal, with the project managers also participating in the evaluation of the designer bids. Both evaluation teams had experience in evaluating proposals for large construction projects; however neither had experience with shipbuilding.

82. The selected project manager had experience in large construction projects. However, the project manager relied on consultants it contracted to provide experience in the boat building industry. The successful designer was an experienced naval architecture firm, although they had little experience with wooden boats.

83. *Builder procurement* – For the builder procurement process, the Department chose to use a request for expression of interest process to prequalify bidders. In this process, interested proponents submit proposals outlining their experience and qualifications for the project, but no pricing information is submitted. The submissions are evaluated and only qualified proponents are invited to bid on the subsequent request for proposal.

84. Similar to the first two procurements, the request for proposal supporting documents did not include adequate project details. For example, the scope of work was not accurately defined and the project goals were not adequately communicated to the proponents.

85. The information contained in the tender documents for the builder was quite different from the work that was actually completed. The scope was not adequately defined prior to the tender and the project that the builders bid on was different from the project that was completed.

86. We noted the expression of interest documents had reasonable criteria to assess the builder's qualifications to the extent the project scope was defined at the time, but a number of requirements were not included when scoring the proposals. For instance, the requirement to have experience completing large value, complex, wooden ship construction projects was not included in the formal evaluations and therefore had no bearing on the decision. Failure to

include such key criteria in the scoring process increases the risk of selecting an unqualified bidder.

87. Only one proponent, an alliance of three Lunenburg area companies, responded to the initial request for expression of interest. The proposal was assessed in accordance with the provincial procurement policy and was evaluated appropriately based on the defined criteria. The proponent was found to be qualified. The Department's project manager then began negotiations for a final contract including construction costs. The successful proponent did not have experience with shipbuilding projects the size or complexity of the Bluenose II, but had extensive experience in the shipbuilding and wooden ship industry.

88. The fact the project as tendered was not the project built is a significant concern; it means the builder bid on a project which was different than what they were then required to build. It is impossible to know whether the builder would have been interested, or considered qualified, to build the project as it was eventually defined. In addition, we have identified other concerns with results of the contract price negotiations earlier in this report; the budget was predetermined by the Department and the negotiations were really just finding a way for the builder to accept the maximum amount the Department was willing to commit to the project.

89. Tender documents provide the foundation on which the procurement process is built and therefore must be complete and robust in defining and describing the project. The Bluenose II tender documents for all three consultants were insufficient to allow potential proponents to fully assess whether their skills would be appropriate for the project. So although technically compliant with the provincial procurement policy, the process selected and documentation provided contributed to the problems on the project.

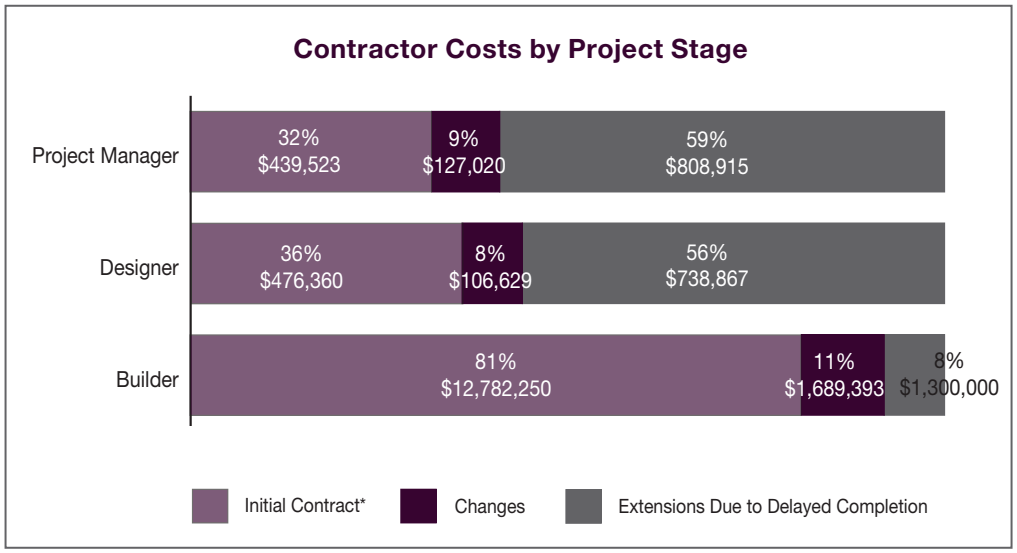
90. *Contract terms* – Each contract was essentially the same as the draft contract included in the respective procurement documentation. Much like the procurement documents, there was little in the contracts that linked back to project goals or risks, as these were not adequately defined during project planning. There were two key areas of deficiency in the contracts: a lack of clarity in some of the terms; and specific terms or requirements were missing that we expected to find. Without adequate terms in the contracts, the Department cannot ensure it is obtaining sufficient value-for-the money.

91. *Project managers* – The project manager's contract makes reference to schedules and budgets, but the Department did not ensure it clearly stated what was required and by when. The project managers told us they prepared a draft schedule but did not do anything further with the schedule due to lack of planning on the project. We will address the details around the schedule later in this report, but we noted the schedule was very preliminary and

lacking a lot of necessary information. We are concerned with the lack of clear definition in the contract around what was required and when it was to be completed. Without that clarity, it is very difficult for the Department to monitor contractor performance and to assess value-for-money of the contract.

92. The Department did not ensure that the project manager's contract was clear regarding the level of oversight required at the building site. The project manager's staff indicated they did not feel their presence was of significant help due to their lack of shipbuilding knowledge, but they acknowledged they probably should have arranged for the designer, who was also responsible for inspection, to be available more frequently to the builder.

93. The Department did not ensure there were schedules included in the project manager's contract. As such, there were no penalties for delivering the project late. The initial contract provided for monthly payments based on milestones which were each assigned a percentage of the overall contract price. As the project continued, the contract was amended to provide the project manager with a flat monthly payment for project management services. This was eventually changed to hourly billing near the beginning of 2014. The lack of a scheduled end date or penalties in the contract did not provide sufficient incentive to the project managers to complete the project in a timely manner. The chart below shows the total payments to the project manager, a significant portion of which – $808,915, or 59% – was related to the delays in completing the project.



** includes reimbursable expenses and initial contract*

94. *Designer* – The primary focus of the contract with the designer was on its role as inspector once the vessel construction began. There was limited information on which drawings were required or the level of detail required. This issue will be examined in more detail later in this report.

95. The design contract was structured similar to the project manager's. It had little schedule information and no penalties for being late. Once the original agreed fees had been paid, subsequent amendments provided monthly fees for construction administration and additional inspection services. This provided little incentive to conclude the project in a timely manner. The chart above shows total payments to the designer, a significant portion of which – $738,867 or 56% – was related to the delays in completing the project.

96. *Builder* – The Department signed the builder's contract too early in the overall planning and design process when sufficient information was not available to accurately determine costs. Gaps in supporting information have resulted in significant problems with the detailed expectations.

97. The contract states a fixed price to build the Bluenose II, and was based on the benchmark scope of work, which is included as a schedule to the contract. The builder prepared this document and it was written with a clear explanation that it did not include taking the vessel into class. We discussed class and regulatory approval earlier in this report, but the main issue is that all parties should have known the boat would eventually need to be built to meet a classification society's rules. It was not appropriate for the Department to sign a contract for a fixed price without sufficient specifications on what was to be built.

98. The fact that the builder had to create its own benchmark scope of work on which to base the contract price is indicative of the premature timing of the construction contract. The designer of the vessel would typically be the one to provide a detailed specification on which a builder could then determine the costs to build. In this case, the designer was not finished with their drawings, but the Department required that the build contract be signed. The reason the Department wanted a signed contract appears to be based on the need to meet deadlines to obtain federal infrastructure money.

99. The build contract did not include penalties for failing to meet the construction deadlines. The Department attempted to include a clause in the contract to address penalties and late fees, but the builder was unwilling to sign the contract so the clause was removed.

100. The build contract did not clearly define the change order process. Both the builder and the project manager acknowledge that this should have been clearer. This issue has resulted in a large number of rejected change orders that will need to be addressed through the pending dispute resolution process. We discuss change orders in more detail later in this report.

Design Expectations

Conclusions and summary of observations

There was a significant expectation gap with respect to design drawings between the designer and the builder. The designer tender documents lacked basic details such as the construction budget to which they were to design the vessel. The builder and the designer still do not agree on the quality and volume of drawings that should have been prepared, indicating an ongoing failure by the Department to manage the situation. We also noted the province paid for a shadow bid to compare against the builder's proposal. The shadow bid was not adequately evaluated; it should have raised concerns about the builder's submission but instead was portrayed as confirming the accuracy of the bid.

101. *Design expectations* – Poor planning and the lack of clear project goals caused problems throughout the project. There were no clear design expectations for the project prior to tendering and signing the design contract.

102. The designer indicated their primary requirement was to achieve a 50-year life for the new vessel. They indicated they were not provided a clear budget for the vessel, so they worked with a focus on extending the life of the vessel without a good sense of cost parameters. This resulted in the extensive use of brass fittings and strapping throughout the vessel as brass was known to last longer and be stronger than alternatives; it is also more expensive.

103. The builder expressed concern that they could not build the boat within the construction budget given the amount of brass required by the design. The designer changed the plans to use galvanized steel, which was less expensive and more readily available to the builder. The designer noted it was less certain regarding long-term strength.

104. Taking the time to better plan this project before tendering would have helped to ensure the design team had the necessary information to create a design that met the goals and requirements of the project. Planning the project to meet federal funding deadlines resulted in key parties not knowing what they were expected to do, contributing to the current situation of the Bluenose II being delivered late and over budget.

Design drawing requirements were not adequately defined

105. *Drawing expectation gap* – There was a fundamental gap in expectations between the designer and builder regarding the number and detail of drawings required. The designer's contract did not define the drawings required in sufficient detail; they told us they were required to provide drawings as

outlined in their technical scope of requirement (the technical requirement) whereas the builder told us they expected more detailed drawings.

106. The designer created the technical requirement to describe the work they would complete for the contract price. This included a list of drawings to be provided by the beginning of March 2010. The builder indicated the designer's drawings did not meet their needs at that date. The Department asked the builder to create their own specification with which they could determine a fixed price required to sign a contract.

107. The builder created the benchmark scope of work which outlined the work they intended to do to restore the vessel. The construction contract included due dates by which the builder was to receive design drawings. The builder noted its construction price and acceptance of the overall end date for the project were based on receiving complete drawings on those dates. As discussed, the benchmark did not include taking the vessel to class.

108. The builder told us the drawings they initially received were not detailed enough. The designer felt the drawings were adequate. We are unable to comment on the level of detail in design drawings, but it is apparent from the volume and timing of revisions to the drawings that what was required was not understood by both parties.

109. The builder and designer still disagree on whether the information provided was adequate, suggesting these issues were not addressed when they arose. The Department should have ensured both parties worked together to determine the best outcome and found common ground going forward. While Department management indicated they attempted to address these issues, this was not successful as both parties still disagree on what was required. As we will discuss later in the project execution section of this report, the builder and designer rarely talked with each other until late in the project.

110. *Shadow bid* – The original project estimate included $100,000 for construction cost estimating, but this was never awarded. In March 2010, the builder was informed that an independent cost consultant would be engaged to complete a shadow bid to compare against the builder's bid. As only one proponent was eligible to bid on the request for proposals, a shadow bid could help ensure the builder's price was reasonable.

111. When the decision to pursue a shadow bid was approved, only the designs for the hull had progressed sufficiently to allow accurate costing. The project manager noted the interiors and system design work would not be sufficiently advanced to allow valuations at that time. The cost of the shadow bid quoted to the province was $43,620, and the project manager agreed to negotiate costs with the builder on behalf of the province.

112. *Shadow bid results* – The contract to complete the shadow bid included the following components.

1. Review and comment on the facility infrastructure estimates
2. Detail shadow estimate of deconstruction costs
3. Phase 1 – Hull and deck cost estimate
4. Phase 2 – Interior cost estimate as design information was available
5. Phase 3 – Systems cost estimate as design information was available

113. We compared Phase 1 of the shadow bid to the builder's proposal and noted some significant differences in assumptions and plans which were not communicated to the steering committee.

- The shadow bid included 20,000 more labour hours than the builder's estimate.
- The shadow bid included higher staffing numbers, in one case 40 staff were estimated to be needed while the builder only had 13.
- The shadow bid excluded profit and markup on materials.
- The shadow bid showed a 30/70 split between material cost and labour, while the builder's estimate showed a 50/50 split.
- The shadow bid noted project construction costs could change significantly depending on the regulatory requirements or whether classification was included.

114. The overall cost estimated by the shadow bid was within an acceptable variance from the builder's estimate, however the significant differences we noted in the assumptions raise questions about the conclusions reached. It appears from the shadow bid that the builder may have underestimated the amount of time and cost associated with project labour. This should have been brought to the steering committee for consideration, allowing the steering committee to better assess the value-for-money and overall reasonability of the builder's proposal.

115. As noted, only phase one of the shadow bid was completed initially, with phase two not completed until October 29, 2010, and phase three completed on January 29, 2011. For phases two and three, this was months after the build contract was signed and a firm price agreed to. In effect, a complete evaluation of the builder's budget was not performed. These estimates were not reviewed when received and were of little usefulness to the project.

116. The fact that the external consultant indicated it could not prepare accurate estimates for the interior and systems of the project due to insufficient design work should have raised a concern to the Department whether they were ready

to sign a build contract. It is puzzling why they believed it was reasonable to sign a lump sum price contract for a project that did not include sufficient drawings to know what was to be built.

117. In June 2010, the project manager reported to the project steering committee that builder costs had been verified *"as accurate."* However, the steering committee was not made aware of differences in assumptions used or the consultant's comments that the costs could significantly change if classification was included; the decision to seek classification had already been made.

118. The shadow bid results were poorly analyzed. Phase one showed that the builder may not have understood the labour hours that would be required and neither phase two or three had been completed. We see very little value to the project for the $43,000 paid for the shadow bid.

Project Execution and Oversight

Conclusions and summary of observations

The Bluenose II restoration project required strong project leadership in order to manage schedules and costs, maintain relationships among participants, and anticipate and resolve issues. Communities, Culture and Heritage was responsible to provide this overall leadership. Communication between the parties was limited and contentious, and while management indicated they attempted to address this, very little improvement was noted over the course of the project. There was no comprehensive project schedule created, eliminating the ability to monitor overall progress. Instead, assessing project progress relied on cash flow projections, even though the project scope had expanded far beyond what was considered in the original budget, making such comparisons ineffective.

119. *Departmental oversight* – Within any project, a key role is to manage relationships to ensure all parties are working well together and getting the information and support they require. The Bluenose II project included a number of stakeholders, increasing the importance of relationship building. In a project such as the Bluenose II where the Department and most of the contractors involved were not experienced with large wooden vessels, there is heightened importance in having thorough and ongoing oversight focused on results. We found the Department did not adequately oversee the project to ensure relationships were maintained and functioning.

The Department's failure to provide adequate project oversight meant relationships were not maintained between project participants

120. *Relationship management* – The Department did not take appropriate action when relationships between the project manager and builder deteriorated. While management indicated they attempted to address this, it is clear from results of the project that they were not successful. The project manager, designer, builder and regulatory bodies did not communicate effectively, hindering their ability to work together. These roles and communications channels were never clearly defined, leaving project participants with no clear approach to address issues as they arose.

121. *Lines of communication* – We were told the builder was not to speak directly with the current and former captains or with the wooden boat experts hired by the project manager. The designer and builder indicated they were not to speak directly to each other until later in the project. All communications were to go through the project manager. Restricting the ability of the builder to talk with the various experts involved in the project limited their ability to get direction and seek solutions to problems. Fast, effective resolution of issues is difficult when communication is restricted.

122. The addition of the classification society further complicated the flow of information. Communication concerns were raised by the builder very early in the project with regards to communicating with the classification society, but no solution appears to have been provided by the Department.

123. The minutes for a meeting dated August 26, 2010 note the builder requested clarification about communication processes with the designer and regulatory authorities and that the project manager agreed to provide a matrix defining these processes. We found no evidence that this request was addressed. The project manager's wooden boat expert identified the issue of communication between the builder, designer and class society in many of its reports, with questions about the roles of the parties involved arising regularly. The consultant could not always offer a recommendation or diagnose a problem because the roles and lines of communications were unclear.

124. Communication problems resulted in unnecessary work completed and extra costs incurred. For example, the builder told us about an issue they identified with the design; the designer created a solution which used steel for the floors. After the steel was ordered and cut by the builder, the project manager notified the builder that the steel was not from a class approved facility and therefore could not be used. The requirement for the materials to be certified by the class society had not been identified by the designer. The society was not included in the discussions around the issue, or in the decision on what

material to use. Failure to communicate can add both time and costs to a project but these kinds of issues can be avoided with open and clear lines of communication.

125. The Department should have ensured the lines of communication between all parties were defined very early in the project to mitigate these types of issues. Failure to do so caused frustration to project participants and contributed to delays associated with the project.

126. *Meetings* – The contracts with the project manager, designer and builder did not include specific requirements for the frequency of meetings. Requirements were limited to the designer attending all project meetings and the project manager attending all design and project meetings.

127. Through our discussion with project stakeholders we noted the project manager often missed production meetings. The project manager told us they stopped attending the meetings as they felt the meetings were not helpful due to conflict among the attendees. They told us they felt things would work better without them. Department management indicated they required the project manager to attend meetings once they were aware of the issue.

128. *On-site presence* – During our discussions with the builder, they noted there was limited on-site supervision by the Department through its project manager. Without regular site visits and regular discussions with individuals working on the project, it would be difficult for the Department to assess the project's progress towards planned results.

129. The design contract required monthly reports to the Department regarding on-site activities during the build; the project manager was responsible for administering this contract. The Department did not receive inspection reports at the required frequency over the duration of the contract. The designer issued 28 inspection reports for the 55 months between December 2009 and June 2014. These reports did not include information about the builder's construction schedule and very few included progress photos, as required by the contract. None of this was identified as a concern by the Department which should be a basic contract oversight expectation.

130. The builder indicated they would typically have direct access to the designer to address design questions. This was not the case for this project. Starting in early 2013, the designer started to visit the site regularly, but prior to that time they were on site once every month or two. The builder told us that, up to 2013, the designer provided them with reports listing deficiencies which the builder was expected to figure out and resolve without further input.

131. We expected the Department to provide more rigorous oversight of the project to ensure all participants were getting the level of input they required to ensure timely completion of the project.

Accurate and complete project information was not provided

132. *Reporting* – The project manager was required to provide monthly progress reports to the Department on the status of changes to design, construction, schedule, budget, and scope, as well as quality issues. We noted the Department did not receive the status reports monthly as per contract requirements and the reports received rarely discussed design issues in any detail. The duration of the contract was approximately 56 months (October 19, 2009 and extended to June 30, 2014) and we found 41 reports were issued. Some reports covered two months which is not timely and is inconsistent with the terms of the contract.

133. The project manager's status reports received by the Department did not include complete information about the issues facing the project. We found that there was a tendency toward blaming the builder for issues identified. While in most cases it is difficult to determine one specific cause, it was clear that many issues related to multiple parties, including but not limited to the builder.

A complete project schedule was not prepared

134. *Lack of scheduling* – There was no overall project schedule created to manage project progression. We expected a full project schedule, in which all resource requirements required to complete the project would be included. While both the designer and builder had created detailed schedules for their own work, a full project schedule was not prepared. As a result, it was very difficult to assess the progress of the project.

135. The builder created detailed construction schedules and adjusted these as the project progressed, but they were unclear when final, class approved drawings would be received. This made scheduling difficult. While the builders schedule was discussed at construction meetings, it appears changes were not tracked and the impact of changes on the schedule were not monitored.

136. The designer prepared its own detailed schedules that were based on getting final approved drawings to the class society, not on when those drawings would be available to the builder. We saw no evidence that the Department monitored the designer's compliance with its schedule or that any actions were taken if issues or delays occurred.

137. Throughout the project, the builder and designer had fundamental differences and disagreements around project deliverables. The Department failed to ensure these differences were addressed, or to clarify the different expectations to help ensure that the project would progress adequately. For example, there was a significant difference in expectations around the level of detail in design drawings which lead to an ongoing issue throughout the

project. The Department should have worked with all parties to develop an agreed-upon project schedule with consistent deliverables.

138. Preparing and monitoring an overall project schedule is a basic component of successful project management. This was not done on the Bluenose II restoration project. As the project lead, the Department did not do its due diligence.

139. *Reliance on cash flow* – Progress was monitored by tracking cash flow against the initial project budget. While this is an accepted approach, it is only one component of complete project management. The scope, schedule and costs should have all been considered.

140. Considering only the amount invoiced by the builder was not an effective approach for the Bluenose II project because progress was influenced by other factors, such as delays related to regulatory approvals. Further, the addition of regulatory requirements caused the original scope to change, yet this was not considered. This is further impacted by change orders that were pending review and subsequently approved. This work would not have been invoiced or paid, but in many cases the work was already completed.

Specific Project Issues

Conclusions and summary of observations

There were a number of issues that arose during the project which added to the delays, overruns and general confusion and disagreement amongst project participants. For example, the rudder and steering gear required 11 drawings, changing from an all wooden approach to all steel. Problems with the electrical system also caused delays. The overall change order process was poorly defined and has been a source of ongoing conflict. Changes requested by the builder are hard to evaluate due to the unclear starting point of the project. The result of these issues, and those discussed earlier in this report, was long delays in the completion of the project and the current requirement for a dispute resolution process to address delay claims and disputed change orders.

141. *Rudder and steering gear* – There have been ongoing issues with the rudder and steering gear for the new Bluenose II. The original design, consistent with the original Bluenose and Bluenose II, included a wooden rudder attached to a wooden stock. The stock, a shaft that attaches the rudder to the steering gear, was traditionally around 11 inches in diameter. In order to use a wooden stock on the new vessel, the classification society required the shaft to be 21 inches in diameter. This is a significant increase and was deemed not feasible given the significant changes which would be required to the overall

design of the vessel. Once the decision to use a steel stock was made, it was determined that attaching the wooden rudder to a steel stock would be too complicated and a steel rudder was chosen instead.

142. The second version of the rudder design was for an all steel rudder and stock; no alternatives appear to have been considered since that time. The designers completed 11 versions of the rudder design to get to the one currently attached to the vessel. Serious questions and concerns were raised early in the project by various parties. However, there does not appear to have been any consideration of alternatives to the steel rudder. Ultimately, the design of the rudder and steering gear posed an issue during sea trials in 2014, when it failed to perform to Transport Canada requirements.

143. Early concerns were noted as Transport Canada rules require a power-operated system, such as hydraulics, be included to assist in operating the rudder, but the project leadership felt this was not appropriate for the Bluenose II. Transport Canada approved construction without the hydraulics. As noted, the design eventually failed to meet sea trial requirements and the province is now working on installing hydraulics to allow the vessel to meet requirements.

144. The designer and project manager told us that the classification society required a steel rudder. However, both the wooden shipbuilding expert hired by the project manager and an independent consultant hired by the province, have suggested an appeal to the class society may have resulted in permission for a more functional, simpler design. The project manager's expert provided this suggestion in a report dated July 19, 2012, but we can find no evidence that the Department ensured action was taken to pursue this option with the classification society. We expected the Department to have followed up on this suggestion to ensure further discussion at the steering committee, and to have discussed the possibility with the builder and designer. We found no evidence that this occurred.

145. The project manager told us that, throughout the design and building phase, despite numerous issues and delays, the designer was confident the rudder would meet the necessary class and Transport Canada requirements. However, both the builder and the shipbuilding expert hired by the project manager continued to express their concerns. Ultimately, the rudder did not pass sea trials. At the conclusion of our fieldwork, the province was continuing to work with a new group of project managers and designers to develop a hydraulics system to allow the rudder to function to classification society and Transport Canada requirements.

146. There were a number of red flags that the design of the rudder was not appropriate. Department management should have been aware of these concerns through status reports and from their role on the steering committee.

Management indicated they were told by the designer that the rudder would work so they took no further actions. It appears that the Department should have pursued alternatives far earlier in the process, and should have considered presenting a different option to the class society. Ultimately, the province has incurred additional costs to design and install a hydraulic steering system on the Bluenose II to meet classification society and Transport Canada requirements. The current estimate for that work is $350,000.

147. *Electrical issues* – The electrical systems were identified as an area of concern during the project. The designer hired an external company to prepare electrical systems design drawings, and the builder retained the same company to purchase the electrical equipment. Electrical delays were first noted in January 2011 and continued through 2014. Changes to specifications resulting from the implementation of the class requirements resulted in design approval delays. Changes made to required equipment also delayed the start of construction.

148. Electrical system requirements were further delayed waiting for the steering gear selection, as a powered-operated system would have to be incorporated into the electrical designs. Installation delays were noted early in 2012, as a project inspection report indicated no wire had yet been installed on the vessel in April 2012. It remains unclear why the builders had not started installation at that point.

149. In October 2012, the selected electrical contractor went into receivership, further delaying the design completion and procurement of electrical components. Installation deficiencies were noted in early January 2014, when the project manager's consultant noted there were noncompliant electrical installations. Additional materials procurement and further installation work were required to ensure compliance with requirements.

150. There are a number of problems that contributed to the electrical delays. The original drawings and class society approvals were slow coming; the company hired to build the systems went bankrupt, and it appears the builder struggled with installation. All of these factors led to the overall delays however we could not quantify the impact each of the problems had on the project.

151. *Change orders – Project manager and designer contracts* – Both contracts contain sections addressing contract changes, but do not address change orders. Either the contract signatory or the owner may request changes to the contract, but both parties must agree to the change. The contract change process does not include a conflict resolution process in the event agreement cannot be reached, and it does not include any details on what supporting documentation is required. Department management told us that they did not use change orders for these two contracts, but rather made amendments to the contracts as necessary. We did note one change order early in the

project manager's contract that was subsequently turned into a contract amendment.

152. The change order approved for the project manager's contract totalled $76,800. The change order related to various tasks completed by the project manager including, negotiating the builder's contract and meetings with the Deputy Minister and the Premier to brief them on progress. Department management acknowledged negotiation with the builder was part of the project manager's contract, but since the length of time required was not specified, the Department decided that additional funding was appropriate.

153. This approach contrasts with the strict contract-based interpretation used by the Department's project manager when assessing builder-requested change orders. The project manager generally rejected changes if it was not absolutely clear the request represented a change from the original contract. The Department told us they felt this was appropriate.

154. *Builder change orders* – The change order process in the builder contract is not adequate as it does not require builder changes to be reviewed or approved before work is started. This meant that completed work could be rejected if it was assessed as not being a change to the contract or if the costs were deemed too high. This created an adversarial process in which the builder may have already completed work, incurring labour and material costs in the process, only to see the change order rejected.

155. *Change order review* – Change orders were received by the project manager for review. The change order requests were reviewed to determine whether the change was a valid change from the original contract, and whether the valuation of the cost of the change was reasonable. The project manager could forward change orders to the designer to verify whether it is a change, or forward cost concerns to any of the consultants they retained in addition to the designer if required.

156. The Department's project manager told us that the change order process on the Bluenose II project was not a normal change order process. Normal practice would involve changes being approved along with a quote for the cost before work was started. Completion of the work then would be verified as part of regular processing of payments to the builder. Despite the change order process defined in the contract not following conventional practice, the project manager indicated they relied on the contract requirements when assessing change orders from the builder. Further, partway through the project, the project manager informed the builder that change orders would only be considered once the work was completed. We have discussed this approach with the Department and they indicated they were comfortable with it.

157. *Inability to determine whether a change occurred* – To determine whether a change was acceptable, the project manager assessed changes against the initial plans in the construction contract – the benchmark scope of work on which the builder based their price. The benchmark was created assuming noncompliance with any class society requirements and does not indicate what, if any, rules or requirements the vessel will comply with.

158. This created a number of challenges throughout the project as the builder believed that any change to the benchmark would result in a change order and they would be compensated. However, these were not readily accepted as changes because the classification society was listed as a possibility in a clause separate from the benchmark within the contract. As indicated earlier, the project as defined in the benchmark was not the same as the final project that was built. The inclusion of the class society represents a change in scope of work from the time the build contract was signed and presumably contributed to some of the change orders submitted.

159. Our examination confirmed that the lack of clear project specifications made it very difficult to determine when a change from the benchmark scope had occurred. We reviewed a total of 40 change orders (20 approved, 20 rejected), and found that for 50% of cases (20) it was unclear whether a change from the benchmark had occurred. For each change order tested, we reviewed the change and compared the information provided against the benchmark, but were unable to tell whether the work was new.

160. As an example, one rejected change order related to a reduction in the number of watertight doors in the vessel. Based on the documentation available, it is not possible to clearly conclude how many of these doors were included in the benchmark, and accordingly, the Department cannot say how many fewer are now required. A key aspect of a vessel such as the number of watertight doors should be clearly defined in the specifications used to determine the contract price. This is a clear example of the nature of disputes that arise when project specifications are not clear.

161. We also noted a problem related to communication between the project manager and the builder for change orders. The contract required responses to change orders within seven days, but did not define what constitutes a response, and there are no penalties or consequences for failing to respond.

162. *Delays* – While the project has clearly gone much longer than anyone anticipated, the lack of a clear schedule makes it difficult to determine what a reasonable estimate would have been. The construction contract included a delivery date, but the premature nature of that contract – signed before drawings were complete, and excluding the impact of using a classification society – means that date was likely unattainable.

163. As we identified in this report, a number of different departments had involvement in certain aspects of this project. Although we cannot quantify the impact the issues we identified had on the cost and delivery date, it is our belief that poor project planning and management by government have caused the project to take longer and cost more than expected.

164. One result of these delays has been significant increases in the fees paid to both the designer and project manager. The project manager has received $808,915 in additional approved funding related to the project delay, while the designer has received an additional $738,867. There is also a large outstanding delay claim from the builders. That claim, along with the outstanding change orders, is supposed to go to dispute resolution for a final decision per the terms of the builder's contract. When this report was written, the builder had yet to submit its formal report supporting these claims, but as part of the Bluenose II handover in July 2014, the total amount in dispute was agreed to be $4.3 million. Upon receipt of the builder's claim, the province will work with another external consultant to prepare a response for dispute resolution. We have not done an assessment of the validity of the builder's claims and we are not part of the dispute resolution process that will review these claims.

165. *Payments* – Payments to the builder were based on contracted milestones as outlined in the construction contract, such as completion of work or the arrival of materials on site. There is a defined payment process for invoice processing, which includes reviews prior to payment. Payments for the designer and project manager were made on a monthly basis as invoiced. Designer and project manager invoices were forwarded to the Department for review and approval prior to payment.

166. Builder invoices require that the designer verify the milestone has been completed and the work meets appropriate standards before payment is recommended to the project manager. The project manager reviews the invoices, and when they are satisfied, forwards the invoice to the Department for additional review prior to payment approval.

167. *Lack of detailed review of invoices* – Starting in early 2014, payments to the project manager and designer were based on hourly rates up to a maximum monthly total. This change was made as the designer and project manager involvement in the project was being reduced. Communities, Culture and Heritage does not require details about the work completed by the individuals working on the project; it simply requires a listing showing the hours per day that each individual is billing. More detail is not requested unless there are specific questions identified. Without details of the work completed on the project, it is not possible for the Department to know whether the work invoiced was reasonable and consistent with the ongoing project requirements.

NOVA SCOTIA

Communities, Culture and Heritage Additional Comments

The department would like to thank the Auditor General and his staff for following through with government's request for this audit, and the respectful manner with which they engaged staff and project partners.

The construction of a vessel that would be representative of a 1920's fishing schooner while meeting the highest 21st century shipbuilding standards, and at the same time preserving the essence of Bluenose ll, was difficult, and a first for government.

The department consistently met with partners, sought external advice, and encouraged collaboration to resolve issues. However, combining tradition with modern standards meant the assembly of key components of the vessel became more complex than originally envisioned. There were often divergent views on the best way to proceed, which strained relationships between the department and its contractors. And the decision to pursue a higher classification standard further complicated matters.

All of this added cost and time to the project schedule.

Government accepts the Auditor General's recommendations, will learn from these observations, and has taken steps to ensure the project's completion. It remains government's collective goal to have the Bluenose II return as Nova Scotia's sailing ambassador.