Australian Capital Territory

Auditor-General's Office

THE NORTH WESTON POND PROJECT

REPORT NO. 3 / 2011

ACT AUDITOR-GENERAL'S OFFICE

PA 10/14

The Speaker
ACT Legislative Assembly
Civic Square, London Circuit
CANBERRA ACT 2601

Dear Mr Speaker

I am pleased to forward to you a Performance Audit Report titled '**The North Weston Pond Project'**, for tabling in the Legislative Assembly, pursuant to Section 17(5) of the *Auditor-General Act 1996*.

Yours sincerely

Bernie Sheville
Acting Auditor-General
26 May 2011

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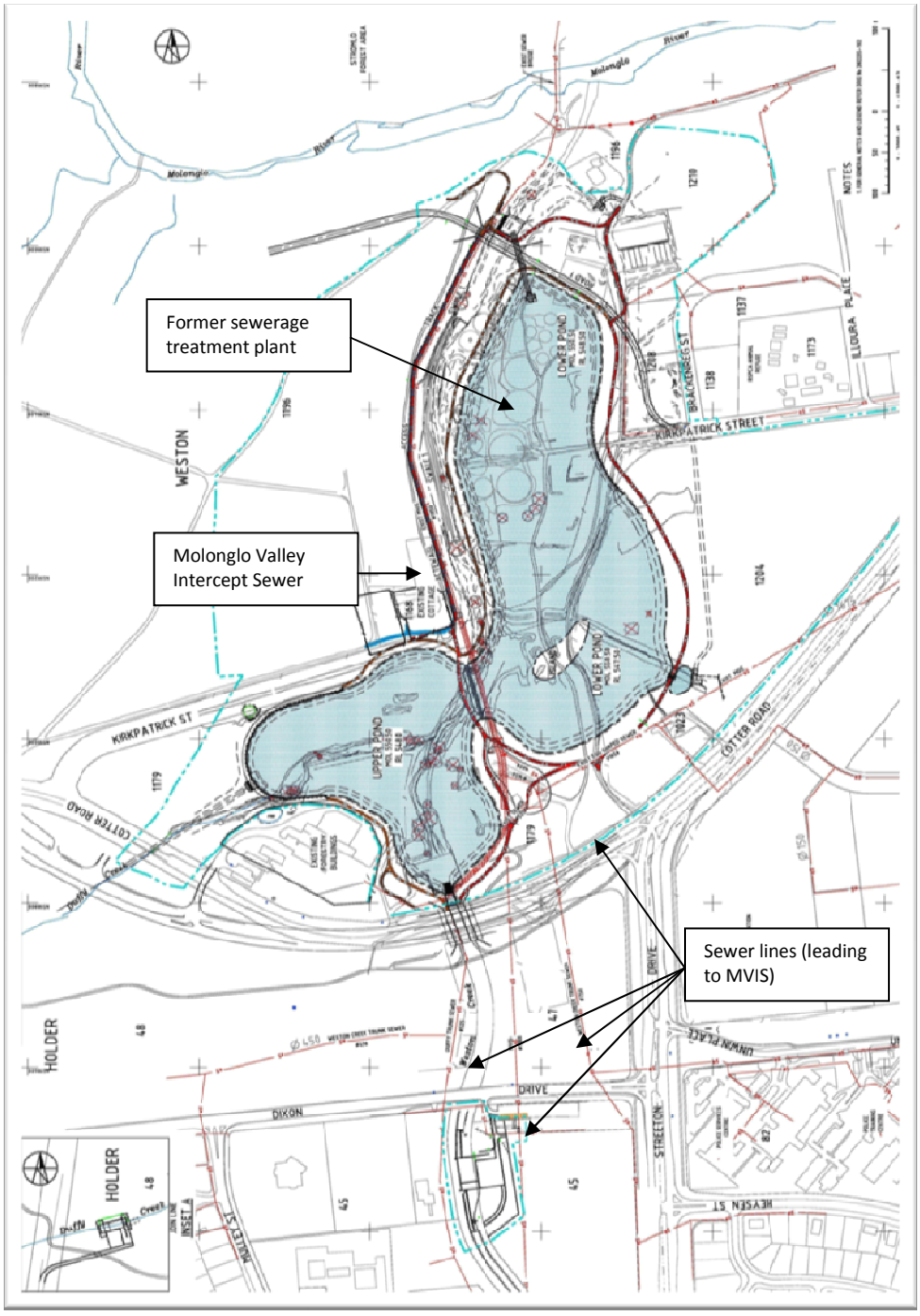
GLOSSARY

ACTPLA	ACT Planning and Land Authority
Bill Guy and Partners	Bill Guy and Partners Pty Ltd
Cardno Young	Cardno Young Pty Ltd
DECCEW	Department of the Environment, Climate Change, Energy and Water
Douglas Partners	Douglas Partners Pty Ltd
GL	Gigalitre, 1GL = one thousand Megalitres (ML)
Hewatt Earthworks	Hewatt Earthworks Pty Ltd
Interceptor Sewer	Molonglo Valley Interceptor Sewer
ML	Megalitre, 1 ML = one million litres
Procurement Solutions	ACT Procurement Solutions
Roads ACT	A business unit in the Department of Territory and Municipal Services
Sampling Plan	Sampling and Analysis Quality Plan
Site Auditor	Contaminated Site Auditor
SMEC	SMEC Australia Pty Ltd
TAMS	Department of Territory and Municipal Services

LOCATION MAPS

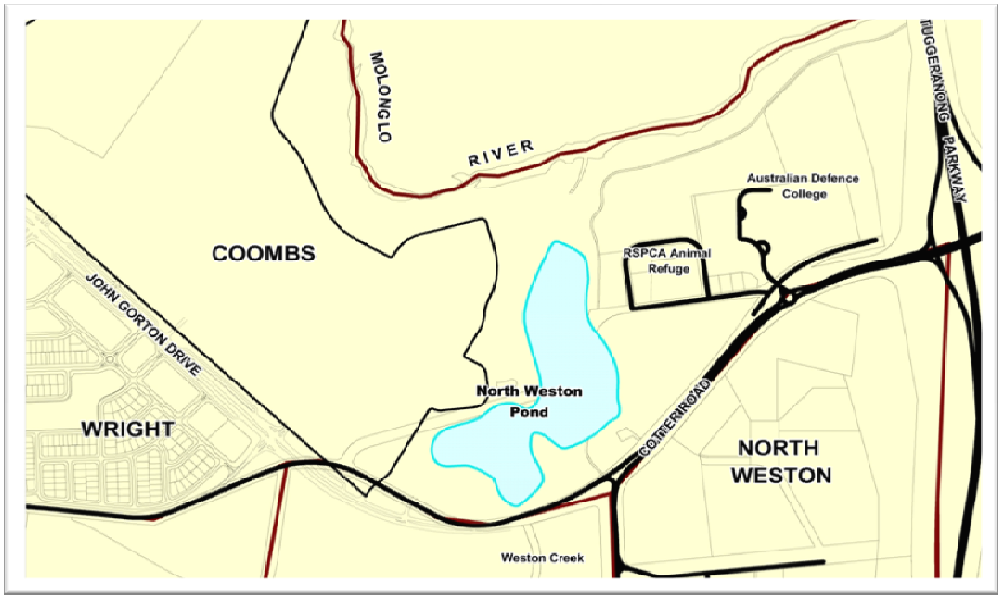
Site Map



Source: Cardno Young, September 2009

This diagram shows the North Weston Pond as planned in September 2009. The location of the Molonglo Valley Interceptor Sewer, connecting sewerage lines and site of the former Weston Creek Sewerage Treatment Plant are marked.

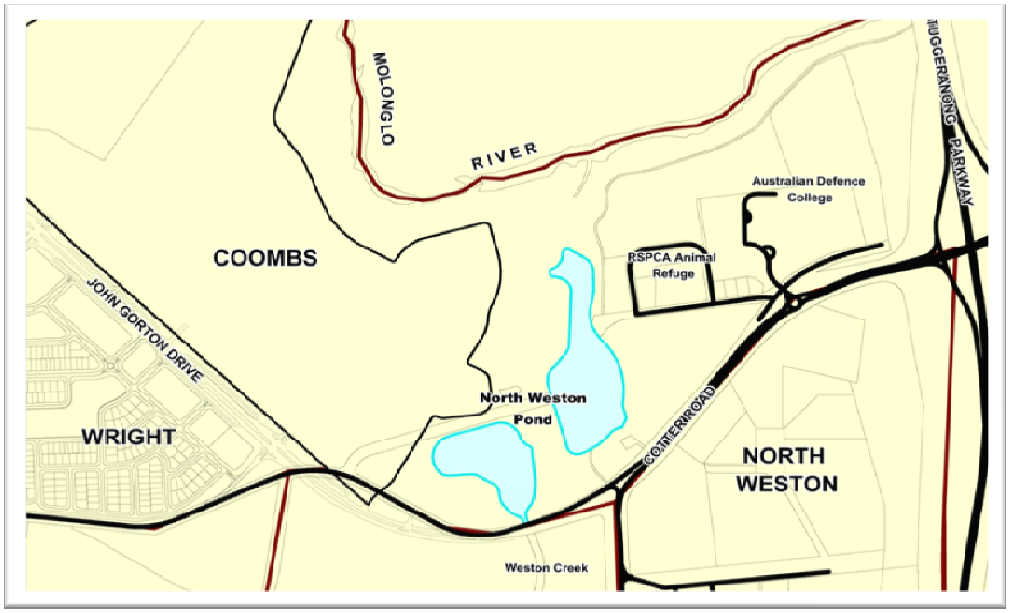
North Weston Pond – September 2009 design



Source: Land Development Agency

This diagram provides a basic outline of the North Weston Pond and its placement within the area as initially designed in September 2009.

North Weston Pond – revised January 2011 design



Source: Land Development Agency

This diagram provides a basic outline of the revised North Weston Pond design and its placement within the area. The actual shape of the pond is yet to be finalised, and will be finalised as part of the design acceptance process, which is to be completed in May 2011.

1. REPORT SUMMARY AND CONCLUSIONS

INTRODUCTION

1.1 This report presents the results of a performance audit that reviewed the effectiveness of processes used by ACT Government agencies in planning, designing and constructing the North Weston Pond (the pond) in the Molonglo Valley.

1.2 The pond was planned as a component of the new Molonglo Valley residential development, situated to the north of the Weston Creek area. Construction was originally planned for completion in May 2011. Planning for the pond commenced in 2004 with a series of environmental site assessments and feasibility and design studies. Construction commenced in April 2010, but was halted in November 2010, when the discovery of much more contaminated and geotechnically unsuitable material than was originally expected led to substantial increases to project costs. The project recommenced in March 2011 following further assessment.

1.3 In January 2011, the Minister for Transport agreed to a revised design for the pond. The final details of the revised design is yet to be approved by the ACT Government, but is not expected to change significantly from that agreed to by the Minister. The revised pond is:

- estimated to cost $43.4 million ($22.6 million or 109 percent more than originally budgeted cost of $20.8 million); and
- expected to be much smaller than the originally designed pond (approximately 180 ML compared to the original pond design of 280 ML).

1.4 Completing the pond according to the original design specifications was estimated to cost at least $46.8 million.

1.5 The Auditor-General decided to undertake a performance audit to examine planning, design and construction of the North Weston Pond in response to a request from the Chief Minister and concerns raised in the ACT Legislative Assembly and community.

1.6 ACT Government agencies involved in the planning, design and construction of the pond include the ACT Planning and Land Authority (ACTPLA), the Department of Territory and Municipal Services (ACT Procurement Solutions and Roads ACT) and the Department of the Environment, Climate Change, Energy and Water (Environment Protection Authority). Their roles and responsibilities are described in Table 2.1 in Chapter 2 of this report.

1.7 Audit appreciated the cooperation and assistance of all ACT Government agency staff, and that of the contractors and consultants who were also consulted during the audit.

BACKGROUND

1.8 The Molonglo Valley represents the next major area for residential land release in the ACT. It is an area of some 25 km^2, located in the west of Canberra, between Belconnen and Weston. Current and former uses of the land include rural leasehold areas and pine plantations that were destroyed in the 2003 bushfires. The Molonglo Valley is about ten kilometres from Civic, five kilometres from Woden and 12 kilometres from Belconnen. When fully developed, the Molonglo Valley will support an estimated 55 000 people.

North Weston Pond

1.9 The pond is an important component in the development of the Molonglo Valley precinct. It is intended to serve a variety of purposes, including:

- providing water quality protection to the Lower Molonglo River;
- providing a source of non-potable water for use on playing fields and other uses in the Weston Creek/Molonglo Valley area;
- improving stormwater quality management for Weston Creek, which currently does not have regional stormwater quality improvement measures; and
- providing benefits to the amenities in the area of North Weston, creating both a visual feature and a recreational area for the residents.

1.10 Public parkland, waterside promenades, picnic areas, playgrounds and cycle paths are also planned as part of the pond development. The pond was originally intended to cover an area of 15 hectares and have a stored volume of 280 ML.

Site features and former uses

1.11 The pond is to be located on or around several blocks which, at the time of planning for the pond, were unused and unleased Territory land. However, the site was problematic given its former uses, which were known to include:

- the Weston Creek Sewerage Treatment Plant (sewerage treatment plant), which was built in 1925 and operated until 1978;
- a quarry;
- a pine plantation, which was destroyed in the 2003 bushfires;
- an uncontrolled builders' landfill, on which builders were dumping waste and other materials from building sites without oversight or regulation by the Commonwealth or Territory government; and
- a nightspoil and waste oil deposit site. This site was located off the Cotter Road and provided public access to the sewerage system for the purpose of disposing of waste.

1.12 Informal notes from the Environmental Protection Authority dated 1999 indicate that the site may have been used as a training ground for drivers of earthmoving equipment during the 1990s. However, stakeholders, including industry representatives, provided conflicting accounts about this possible use of the site.

If the site was used for this purpose, then any contamination in the builders' landfills would have been spread over a larger area of the site.

1.13 Given the proximity of the site to the new Molonglo Valley residential development, any contamination risks deriving from the former uses of the site would have to be recognised and managed. This was required, irrespective of the proposed land use and was the reason for much of the environmental and contamination assessment work undertaken during planning for the pond.

1.14 The site is located at the intersection of large sewer mains connecting to the Molonglo Valley Interceptor Sewer (Interceptor Sewer), which is a key sewerage connection to the Lower Molonglo Water Quality Control Centre. The Interceptor Sewer handles approximately 70 percent of the region's sewerage.

Pond construction

1.15 Around $20 million was initially allocated in the ACT Capital Works Program for construction of the pond, to be spent in the 2009-10 and 2010-11 financial years. The estimate was updated to $20.8 million in August 2009, at the time of the development application. These estimates related to the construction of the pond only and did not take into account costs associated with planning and design consultancies, or nearby road works.

1.16 Construction of the pond commenced in April 2010. Within days of commencing the pond's construction, consultants and contractors involved in the project (including SMEC and Hewatt Earthworks) reported greater than expected contamination (asbestos containing material). Much of this material found on site during construction was removed, under the supervision of an environmental superintendent (SMEC) and transported to the Belconnen landfill site. Other contaminated material was removed to the Mugga landfill site.

1.17 Geotechnical issues associated with the site also became apparent as earthworks continued. The principle concern was the presence of the largely intact, but buried, sewerage treatment plant and the unsuitable nature of some of the underground material. This meant further excavation than expected was required to reach a suitable foundation for the pond's embankment wall and floor. Much of this geotechnically unsuitable material was removed off site.

1.18 About 100 metres of the Molonglo Valley Interceptor Sewer was to be under the pond and a further 600 metres close to the pond's embankment wall. There was some concern that the close proximity of the embankment wall to the Interceptor Sewer represented a significant risk to the integrity of the sewer, due mainly to the size of the embankment wall and weight of water over the sewer. ACTPLA's design for the pond took into account the risks associated with the location of the Interceptor Sewer. However, during construction, ACT Government agencies and contractors continued to discuss options for additional measures to protect the Interceptor Sewer during and following construction work for the pond.

Revised pond design

1.19 Construction was halted in November 2010 to provide ACT Government agencies an opportunity to identify alternative pond designs to manage the higher costs that were estimated to be incurred in the project.

1.20 On 17 January 2011, the Minister for Transport agreed to a revised pond design. The Minister was advised that although the revised design for the pond provided a 'high level of water quality improvement' and met 'most of the non-potable water supply for playing field irrigation', there was a 'reduction in water quality and stormwater harvesting capacity' compared to the original design.

1.21 The revised design involves two separate ponds, which are smaller and shallower than the original design. Storage capacity has been reduced from approximately 280 ML to 180 ML (a 36 percent reduction). The redesigned ponds are no longer over the Interceptor Sewer and do not require extensive works close to the Interceptor Sewer. The redesign reduces the previously mentioned risks to the integrity of the Interceptor Sewer. The revised design also minimises the amount of excavation required around the former sewerage treatment plant and provides a location for the reuse of geotechnically unsuitable material.

Timeline of key processes and events

1.22 An overview of key processes and events associated with the planning, design and construction of the North Weston Pond is included at Appendix B.

AUDIT OBJECTIVES

1.23 The objective of this audit was to provide an independent opinion to the ACT Legislative Assembly on whether the processes used by ACT Government agencies in planning, designing and constructing the North Weston Pond in the Molonglo Valley were effective.

1.24 The audit focused on the effectiveness of ACT Government agencies in managing contamination and geotechnical risks associated with the pond project.

AUDIT CONCLUSION

ACT Government agencies did not effectively manage the North Weston Pond project to ensure the project was completed for the budgeted cost within the planned timeframe. The project has required significant redesign to address escalating costs due to risks that were known at the earliest stages of the project. The smaller capacity ponds approved by the Minister for Transport in January 2011 are estimated to cost $43.4 million. This is $22.6 million (or 109 percent) more than the originally budgeted amount of $20.8 million. The original planned completion date of May 2011 has not been met.

The location of the North Weston Pond presented significant risks to the project. These risks stemmed from the former uses of the site and existence of the critical Molonglo Valley Interceptor Sewer at the site. ACT Government agencies were aware of these risks from the beginning of the project. However, the growing knowledge and understanding of these risks, including their impact on the project, was not adequately recognised by ACT Government agencies and reflected in project design and cost estimates.

Individual processes associated with the planning, design and construction of the pond were generally appropriate and in accordance with industry practice. However, ACT Government agencies did not effectively combine the information and knowledge generated from each process, to ensure the project was completed for the budgeted cost within the planned timeframe.

Specific shortcomings in the management of the project included a failure by ACT Government agencies to:

- apply a robust risk management framework;
- implement appropriate project governance or oversight arrangements to benefit from the combined knowledge and expertise of the different agencies and consultants involved in the project;
- critically assess the feasibility or otherwise of the pond at key points throughout the project, including cost implications of information that was available; and
- critically review the work and advice provided by consultants engaged in the project.

KEY FINDINGS

Chapter 2 - Governance and project management

- There was no single project owner with responsibility for the project from its inception through to its construction. Project ownership changed between the ACT Planning and Land Authority (ACTPLA) and Roads ACT, leading to decisions by new project participants (mainly representatives from Roads ACT and Procurement Solutions) who did not have a detailed history or understanding of the site. When contamination and geotechnical problems began emerging in the early stages of construction, no ACTPLA representatives with a detailed understanding of the environmental and contamination assessments were involved in the project.

- ACTPLA was the project owner for most of the planning and design phase of the project. ACTPLA did not establish effective project management or governance arrangements for the pond project, including:
  - an appropriate project governance or oversight committee, involving input and expertise from other ACT Government agencies and consultants involved in the project;
  - an overall strategic operational plan for the project;
  - an appropriate risk management framework for the project; and
  - regular and ongoing feasibility assessments for the pond throughout the project, which evaluated the project risks and cost implications of the pond, based on new and emerging knowledge and information.
- ACT Procurement Solutions was responsible for managing consultant and contractor performance on behalf of its client agencies (ACTPLA and Roads ACT). This included reviewing technical, environmental and geotechnical reports produced by consultants during preliminary investigation and assessment stages. There was little documentation to support the rigorous examination of consultants' advice, including the nature and extent of work performed and any limitations or caveats placed on the information and advice.
- There was, and remains, some confusion as to the role and responsibility of the Environment Protection Authority and Contaminated Site Auditor during the pond project and the level of assurance that can be obtained from their participation. Discussions with representatives from Roads ACT, Procurement Solutions and some project consultants indicated that involvement by the Environment Protection Authority and Site Auditor led them to assume a greater level of assurance that environmental and contamination issues were being addressed during planning, than was actually warranted. The Environment Protection Authority's *Contaminated Sites Environment Protection Policy* does not clearly state the role of the Authority or the Contaminated Site Auditor in the management of contaminated sites.
- There is an opportunity for the Environment Protection Authority to take a more proactive role in providing advice and guidance to ACT Government agencies managing future high-risk projects involving contaminated sites.

Chapter 3 - Environmental assessments

- At the earliest stages of the project, the Environment Protection Authority communicated the general environmental and contamination risks associated with the site to consultants engaged for the pond project.
- An important output from the environmental and contamination assessments was the Sampling and Analysis Quality Plan (Sampling Plan), which was developed over time by consultants involved in the project. The Sampling Plan determined the methodology and approach for testing for contamination on the site, the results of which were reported in the Phase 2 Environmental Site Assessment report. This plan has subsequently been assessed in a review commissioned by ACT Procurement Solutions, on behalf of Roads ACT, as inappropriate for testing for asbestos at a high risk site.

- The Remedial Action Plan, which was informed by the results of the testing undertaken as part of the Phase 2 Environmental Site Assessment, was a key document for the construction phase, as it articulated the processes for managing contaminated material encountered during construction. The Remedial Action Plan under-estimated the quantity of contaminated material and processes required to manage the asbestos containing material.

Chapter 4 - Feasibility and design of the pond

- ACTPLA undertook key stages of the planning and design process, including the finalisation of a feasibility study for the pond (incorporating design options) as well as the acceptance of the pond design, before completion of the Phase 2 Environmental Site Assessment, which provided more information about the ground conditions at the site.
- ACTPLA did not adequately recognise and cost issues identified during the environmental and geotechnical assessments during the planning process. These include risks associated with the integrity of the Molonglo Valley Interceptor Sewer (an ageing structure) and the existence of former Weston Creek Sewerage Treatment Plant structures at the location of the pond.
- ACTPLA did not adequately document acceptance of the pond design or the risks associated with the selected design option and measures to address these risks.

Chapter 5 - Construction of the pond

- Under the contractual arrangements agreed with the construction contractor (Hewatt Earthworks), Roads ACT paid for the removal of contaminated material on a volume basis. The tender brief for the construction phase included estimates of the likely quantities of asbestos containing material to be removed from the site, based on the quantities identified in the Remedial Action Plan. The estimated quantities proved to be substantially less than the quantities disposed of as 'asbestos containing material,' and recorded as such, during construction. The project budget was exceeded largely due to the need to pay higher than expected removal costs.
- Early in the construction phase, the initial Remedial Action Plan informed ACT Government agencies' (including Procurement Solutions and Roads ACT) activities for the management of asbestos containing material on the site. In the absence of any ACT, national or New South Wales guidelines, a 'zero tolerance' approach was adopted, whereby 'no known asbestos was to remain on site' nor were any asbestos fibres to remain in the soil. This established a conservative approach for the treatment of asbestos containing material at the site.
- During the construction phase, ACT Government agencies (Procurement Solutions and Roads ACT) treated fill containing builders' rubble as asbestos containing material, which required it to be removed from the site. This reflected the likelihood that builders' rubble included asbestos containing material, as well as the perceived impracticality of adopting on-site treatment options, such as sieving, to separate asbestos containing material from the fill. Decision-making processes at this time were not well documented, including assessing the impracticality of adopting on-site treatment options or their cost implications. In addition, there was a requirement in the revised Remedial Action Plan that

identified the site's topsoil as both geotechnically unsuitable material and asbestos containing material.

- The records maintained do not distinguish between the type of material (asbestos containing material or geotechnically unsuitable material) removed from the site.
- In May 2010, the higher than expected volumes of material treated as 'asbestos containing material' and resulting costs led to the adoption by ACT Government agencies (ACT Procurement Solutions and Roads ACT) of an alternative, more flexible and risk-based approach, which allowed low-risk asbestos containing material to remain on-site. This was facilitated by the Environment Protection Authority's adoption of revised guidelines for managing contaminated material. A revised Remedial Action Plan was developed and implemented in June 2010 to facilitate this. Although the new Environment Protection Authority guidelines and the revised Remedial Action Plan provided ACT Government agencies with more flexibility for managing asbestos at the site, large amounts of asbestos containing material continued to be removed off the site, because the concentration of asbestos exceeded the acceptable threshold.
- Work at the site recommenced on 8 March 2011. The completion of a revised, smaller capacity pond, as approved by the Minister for Transport in January 2011, is estimated to cost $43.4 million, $22.6 million (or 109 percent) more than the originally budgeted amount of $20.8 million.

RECOMMENDATIONS AND RESPONSE TO THE REPORT

1.25 This audit report has eight recommendations to address the audit findings. These recommendations apply to high risk or complex infrastructure projects, particularly those involving contaminated sites.

1.26 In accordance with Section 18 of the *Auditor-General Act 1996*, the proposed report was provided to the Chief Executives of the Department of Territory and Municipal Services and Department of the Environment, Climate Change, Energy and Water and the Chief Planning Executive of ACTPLA for consideration and comments. Their overall responses are shown below:

Response from the Chief Planning Executive of ACTPLA

As a general comment I don't believe the conclusions and key findings in the proposed report have been clarified sufficiently to lead the reader to the recommendations contained in the report.

I support the recommendations contained within the report and believe that implementing these will strengthen the process in relation to managing high-risk infrastructure projects that involve multiple agencies. I continue, however, to have a serious concern about commentary on the governance and project management processes that I believe were in place and which were followed for this project. I will reiterate that ACTPLA followed good practice and that the circumstances that have given rise to the current situation are not as a result of poor management or the other conclusions that could be reached from reading the report in its current form.

In relation to one of the other key aspects of the proposed report – that of the placement of ACTPLA's reliance on expert consultants reports – it is particularly frustrating to see the lack of audit commentary on what are obvious deficiencies in the reports and advice that ACTPLA, on behalf of the Government, 'purchased' for significant sums. It would appear from the commentary in the proposed report that consultants can simply adopt an 'all care and no responsibility' approach, and that the audit does not assess the 'performance' of these service providers in terms of value for money for government in its purchasing. This, in my view, should be a key aspect of any 'performance audit' undertaken by your Office.

Response from the Chief Executive of TAMS

Thank you for the opportunity to provide formal comments on the proposed report on the 'North Weston Pond Project.' My Department agrees with the general thrust of the report and supports the recommendations.

Response from the Chief Executive of DECCEW

The Department of the Environment, Climate Change, Energy and Water supports the Audit recommendations. The Department believes that there is always potential to improve governance and management of multi agency projects.

The Department remains cognisant of the need to continually review policy to ensure robustness and efficiency in procedures and decision making. It should be noted by the Audit that the Department is currently reviewing the Environment Protection Act 1997 (the Act) *and will ensure that issues raised are considered in the broader review.*

There still appears to be a misunderstanding as to the role of contaminated land auditors. As previously advised, the nationally accepted practice of assessment and remediation of contaminated sites is no different in the ACT to other jurisdictions. Accredited Contaminated Sites Auditors oversee the processes used by specialist environmental consultants to assess and remediate contaminated land to ensure it meets the standards for the intended land use.

1.27 In addition, the Chief Executives provided responses to each recommendation, as shown below.

Recommendation 1 (Chapter 2)

For future high-risk infrastructure projects, relevant ACT Government agencies should identify a single project owner agency early in the project with a clearly defined responsibility for planning, designing and constructing the asset. The nominated project owner agency should be involved throughout the project.

ACTPLA and DECCEW response:

Agreed.

TAMS response:

Agreed. The directorate with funding authorisation should be identified as the project owner. Further definition around 'high risk infrastructure' will be necessary to avoid confusion and delay, and assist in business case development.

Recommendation 2 (Chapter 2)

For projects involving multiple ACT Government agencies, the project owner should convene an inter-agency governance committee or similar arrangement to review project risks, progress and costs on a regular basis.

ACTPLA, TAMS and DECCEW response:

Agreed.

Recommendation 3 (Chapter 2)

For future high-risk infrastructure projects, the project owner should ensure that:

(a) a strategic operational plan for the entire project is prepared, as a key project governance document and ongoing reference source for the project oversight or governance committee; and

(b) a series of gateway reviews are incorporated within the plan. This should involve a series of critical reviews of the ongoing feasibility and appropriateness of the project at appropriate stages, which seek to test the project's underlying assumptions and cost considerations, based on new and accumulated information and knowledge.

ACTPLA and DECCEW response:

Agreed.

TAMS response:

a) Agreed. This is consistent with best practice project management in other jurisdictions.

b) Agreed. The gateway review process will deliver better project management outcomes, however, this approach will also have resource implications which will need to be identified in the initial business case.

Recommendation 4 (Chapter 2)

For future high-risk infrastructure projects, the project owner should seek to reduce risks through a formal project-wide risk assessment process that provides for input by all parties (ACT Government agencies, consultants and contractors) with relevant knowledge of risks.

ACTPLA, TAMS and DECCEW response:

Agreed.

Recommendation 5 (Chapter 2)

For future high-risk infrastructure projects, the project owner should ensure that the roles of key stakeholders are identified and documented, particularly regarding which agency will be responsible for critically reviewing technical advice provided by a third party before accepting and incorporating it into the project.

ACTPLA response:

Agreed in part. The critical review of technical advice provided by a third party may require an agency acquiring additional expertise in-house and should not obviate the professional competency and responsibility of the third party's expert advice to government.

TAMS response:

Agreed. Project governance will need to establish the reviewer and acceptor of technical advice early in the project planning phase. However, this approach will have time and cost implications in terms of program, skill level and staff resources to undertake technical reviews.

DECCEW response:

Agreed.

Recommendation 6 (Chapter 2)

The Environment Protection Authority should review the Contaminated Sites Environment Protection Policy and consider amendments to the Policy that:

(a) clarify roles and responsibilities for the management of contaminated sites, including its role, the role of the Contaminated Site Auditor and other stakeholders, including the project owner; and

(b) allow for greater and more sustained involvement from the Environment Protection Authority for future high-risk infrastructure projects involving contaminated sites.

TAMS and DECCEW response:

Agreed.

Recommendation 7 (Chapter 4)

For future high-risk infrastructure projects, the project owner should ensure that the decision-making process for acceptance of infrastructure design is properly documented, including documentation demonstrating that all known risks were recognised and either accepted or mitigated.

ACTPLA, TAMS and DECCEW response:

Agreed.

Recommendation 8 (Chapter 5)

For projects on contaminated sites, ACT Procurement Solutions should consider using alternative pricing methodologies that can provide better value for money for the excavation and removal of contaminants during the construction stage.

TAMS response:

Agreed. Project governance should identify preferred procurement options for the specifics of a major project. This advice should direct Procurement Solutions in identifying alternative contract pricing methodologies.

DECCEW response:

Agreed.

2. GOVERNANCE AND PROJECT MANAGEMENT

INTRODUCTION

2.1 This chapter discusses the roles and responsibilities of key ACT Government agencies involved in the project, including the ACT Planning and Land Authority (ACTPLA), ACT Procurement Solutions (Procurement Solutions) and the Environment Protection Authority.

KEY FINDINGS

- There was no single project owner with responsibility for the project from its inception through to its construction. Project ownership changed between the ACT Planning and Land Authority (ACTPLA) and Roads ACT, leading to decisions by new project participants (mainly representatives from Roads ACT and Procurement Solutions) who did not have a detailed history or understanding of the site. When contamination and geotechnical problems began emerging in the early stages of construction, no ACTPLA representatives with a detailed understanding of the environmental and contamination assessments were involved in the project.
- ACTPLA was the project owner for most of the planning and design phase of the project. ACTPLA did not establish effective project management or governance arrangements for the pond project, including:
  - an appropriate project governance or oversight committee, involving input and expertise from other ACT Government agencies and consultants involved in the project;
  - an overall strategic operational plan for the project;
  - an appropriate risk management framework for the project; and
  - regular and ongoing feasibility assessments for the pond throughout the project, which evaluated the project risks and cost implications of the pond, based on new and emerging knowledge and information.
- ACT Procurement Solutions was responsible for managing consultant and contractor performance on behalf of its client agencies (ACTPLA and Roads ACT). This included reviewing technical, environmental and geotechnical reports produced by consultants during preliminary investigation and assessment stages. There was little documentation to support the rigorous examination of consultants' advice, including the nature and extent of work performed and any limitations or caveats placed on the information and advice.
- There was, and remains, some confusion as to the role and responsibility of the Environment Protection Authority and Contaminated Site Auditor during the pond project and the level of assurance that can be obtained from their participation. Discussions with representatives from Roads ACT, Procurement Solutions and some project consultants indicated that involvement by the Environment Protection Authority and Site Auditor led them to assume a greater level of

assurance that environmental and contamination issues were being addressed during planning, than was actually warranted. The Environment Protection Authority's *Contaminated Sites Environment Protection Policy* does not clearly state the role of the Authority or the Contaminated Site Auditor in the management of contaminated sites.

- There is an opportunity for the Environment Protection Authority to take a more proactive role in providing advice and guidance to ACT Government agencies managing future high-risk projects involving contaminated sites.

BACKGROUND

2.2 The pond project was a high risk project. There were significant inherent risks associated with the pond site arising from the well-known former uses of the site and its resulting contamination and geotechnical risks.

2.3 The project was also administratively complex due to the involvement of several ACT Government agencies and consultants and the various administrative steps and processes undertaken, including different investigations, assessments and studies. In such circumstances, it is imperative that ACT Government agencies have clearly understood roles and responsibilities and implement effective governance arrangements.

2.4 Table 2.1 outlines the role of the various ACT Government agencies involved in the project.

Table 2.1: ACT Government agencies involved in the North Weston Pond project

Agency	Roles and responsibilities
ACTPLA	Responsible for planning and designing the pond, including undertaking environmental and geotechnical assessments. ACTPLA (Planning Services Branch) was the ACT Government project owner from project inception (before 2005) until approximately September 2009 when project ownership transferred to Roads ACT. ACTPLA (Development Services Branch) also reviewed and approved the Development Application.
Roads ACT (TAMS)	Responsible for managing the construction of the pond, including the procurement of the construction contractor. Roads ACT was the ACT Government project owner from the time of procurement of the construction contractor.
ACT Procurement Solutions (TAMS)	Responsible for administering procurement and contract management processes on behalf of project owners (ACTPLA and Roads ACT).
Environment Protection Authority	Provided advice and guidance throughout the project on ACT Government policy for the management of contaminated land. The Authority would also endorse / approve some project reports, when completed.

NOTE: ActewAGL was consulted by ACTPLA and TAMS during the project and provided advice and guidance on aspects of the design and construction of the pond, particularly with respect to the Molonglo Valley Interceptor Sewer.

Source: ACT Audit Office

2.5 Table 2.2 identifies the main consultants and contractors involved in the project, grouped under key areas and responsibilities:

Table 2.2: Consultants and contractors involved in the project

Consultants and contractors	Roles and responsibilities
Environmental/contamination assessments	
Coffey Geosciences	Responsible for the Preliminary Geotechnical and Contamination Constraints Study in 2005 and Phase 1 Environmental Site Assessment in 2005-06.
SMEC	Responsible for Phase 2 Environmental Site Assessment, Phase 3 Remedial Action Plan (2008-09).
CM Jewell and Associates	As Contaminated Site Auditor, responsible for overseeing aspects of the environmental and contamination assessments and endorsing key reports and deliverables, 2007 to the present.
Geotechnical assessments	
Coffey Geosciences	Responsible for Preliminary Geotechnical and Contamination Constraints Study in 2005.
Coffey Geotechnics	Undertook a Preliminary Geotechnical Investigation as part of the Pond Feasibility Study. Prepared a report for Bill Guy and Partners (see below).
Douglas Partners	Responsible for detailed Geotechnical Assessments, as part of Phase 2 Environmental Site Assessment (under sub-contract to SMEC).
Pond design	
Bill Guy and Partners	Responsible for Pond Feasibility Study, 2007-08.
Cardno Young	Responsible for Pond Design and Superintendence, 2008 to the present.
Pond construction	
Hewatt Earthworks	Responsible for the construction of the pond (and adjacent road).
Cardno Young	As project superintendent, responsible for overseeing the construction of the pond according to pond design specifications.
SMEC	As environmental consultant, responsible for overseeing the management of contamination risks during the construction of the pond.
CM Jewell and Associates	As Contaminated Site Auditor, responsible for overseeing aspects of the environmental and contamination assessments and endorsing key reports and deliverables, 2007 to the present.
Robson Environmental Pty Ltd	As the Occupational Hygienist, oversaw the removal of asbestos from the site.

Source: ACT Audit Office

2.6 Key issues to note from these tables are the:

- change in project ownership from ACTPLA to Roads ACT, which occurred between the planning and construction phases;
- significant number of consultants involved during the project; and

- involvement of multiple consultants for key processes. For example, at least two consultants were involved (at separate times) for each of the environmental/contamination assessment, geotechnical assessment and pond design processes.

2.7 The use of multiple consultants may be both a means to manage project risk and a source of project risk. One risk from having multiple service providers is the possibility of limited transfer of accumulated knowledge about the site. An additional project risk resulted from consultants' reference to, and use of, advice contained in reports from earlier consultants. Any shortcomings in the work of the earlier consultants could be incorporated into advice provided by subsequent consultants, resulting in an adverse cumulative effect on the project.

2.8 One means by which the risks associated with using multiple consultants can be mitigated is through implementation of strong, ongoing project management and governance arrangements.

Ongoing project ownership/responsibility

2.9 There was a lack of an ongoing project owner during the project.

2.10 Although Procurement Solutions was involved throughout the project, it did not have a project ownership role. Its governance documents identified that it was acting on behalf of client agencies (ACTPLA and Roads ACT). These client agencies remained responsible for the overall management of the project, its strategic direction, and implementation.

2.11 The change in project ownership between ACTPLA and Roads ACT led to decisions being made by new project participants who did not have a detailed history or understanding of the project. This occurred when issues and problems in the project began to emerge in the earliest stages of construction, (when Roads ACT was project owner). There is also a risk that the focus of the project and relative importance of particular priorities or issues changed with the project owner.

Recommendation 1

For future high-risk infrastructure projects, relevant ACT Government agencies should identify a single project owner agency early in the project with a clearly defined responsibility for planning, designing and constructing the asset. The nominated project owner agency should be involved throughout the project.

ACT PLANNING AND LAND AUTHORITY

2.12 ACTPLA was the project owner from the project's inception until approximately September 2009 when project ownership transferred to Roads ACT.

Project governance committee arrangements

2.13 The North Weston Pond project was a large and complex project involving multiple ACT Government agencies and consultants.

2.14 Specific components of the project were characterised by frequent communication and interaction between ACT Government agencies and consultants involved in that component. However, there was no regular inter-agency committee or working group tasked with the responsibility for centrally overseeing the project and facilitating effective participation from all ACT Government agencies (and key consultants).

2.15 An inter-agency management or governance committee, appropriately constituted with clearly defined roles and responsibilities, would have facilitated a more encompassing approach to the management of the project. Such a committee could have provided a mechanism by which the different components and interdependencies of the project could be recognised and discussed regularly. This may not be necessary for all ACT Government construction projects, but the high inherent risks and complexities of the pond project, as well as the involvement of multiple ACT Government agencies and consultants, indicates that the need for such a committee was reasonably foreseeable and warranted at the time.

Recommendation 2

For projects involving multiple ACT Government agencies, the project owner should convene an inter-agency governance committee or similar arrangement to review project risks, progress and costs on a regular basis.

Project planning

2.16 During the pond project, a range of different operational planning documents were produced. These included:

- procurement plans;
- remedial action plans;
- environmental management plans; and
- various plans prepared specifically by consultants for individual project components.

2.17 Specific *design* plans were also produced for the project, including Preliminary and Final Sketch Plans, and other detailed schematics identifying the geographic location of different features of the pond and its surrounding area.

2.18 Each of these documents fulfilled a defined and specific need in the project. However, there was no overall strategic operational plan (or similar document), that considered the project in its totality or, more specifically, the key interdependencies of the different project components and processes.

2.19 A strategic operational plan would clearly identify:

- project outcomes and objectives;
- project components, phases and interdependencies;
- project risks and risk treatments;
- key roles and responsibilities (including agency and consultant roles and responsibilities); and
- budgets and timeframes.

2.20 Developing an overall strategic operational plan would provide a key project governance document and an ongoing reference source for the project oversight or governance committee. Such a plan could be improved and modified throughout the project, and could reflect updated knowledge and information of the project as advice is provided by various expert consultants and studies.

Project feasibility assessments

2.21 Audit was advised that the pond, as originally designed, was capable of being constructed on the site. That is, there were no fundamental site issues that could not be overcome during the construction of the pond.

2.22 The location of the pond presented significant risks to the project. These risks stemmed from the former uses of the site and existence of the critical Interceptor Sewer at the site. ACT Government agencies were aware of these risks at the earliest stages of the project. However, the knowledge and understanding of these risks, including their impact on the project was not recognised by ACT Government agencies and reflected in the original project design and cost estimates. Agencies did not implement appropriate decision-making processes that recognised and more effectively accounted for the:

- significant and well-known inherent risks associated with the site;
- growing knowledge and understanding of the site (as well the limitations in this knowledge and understanding);
- limitations of the technical advice and expertise that was received, including many caveats and limitations placed on this advice; and
- interdependencies of the different components of the project.

2.23 Furthermore, there was no evidence of the project having been critically assessed, at key stages in its implementation, to determine the feasibility or appropriateness of proceeding in the originally designed form, recognising the accumulating body of knowledge associated with the project. Such assessments should have occurred and should have considered the design, construction and budget feasibility of continuing the project. Industry representatives consistently indicated that this is a useful practice for complex projects where knowledge and understanding of the site is improving as site assessments and studies are progressively undertaken. Such a process is sometimes referred to as a ‘go/no go’ or ‘gateway’ approach and the decision points referred to as ‘hold points’.

2.24 Key considerations in adopting such an approach are:

- establishing a series of review points, sometimes known as 'gateways';
- conducting independent reviews of project status and risks at each gateway;
- ensuring all key stakeholders are involved, and can provide relevant expertise and input (similar to the governance or oversight committee identified earlier);
- understanding and assessing the adequacy of information that is known, including acknowledging its limitations;
- deciding when or if the ACT Government should be advised about cost implications;
- understanding the potential cost implications for the project from the information that is known and any potential limitations; and
- determining how to address identified risk, cost, and performance issues.

2.25 Such an approach should be documented and incorporated into the strategic operational plan prepared by the project owner.

Recommendation 3

For future high-risk infrastructure projects, agencies should:

(a) prepare a strategic operational plan for the entire project, as a key project governance document and ongoing reference source for the project management or governance committee; and

(b) incorporate a series of gateway reviews within the plan, involving critical reviews of the ongoing feasibility and appropriateness of the project at appropriate stages, and which seek to test the project's underlying assumptions and cost considerations, based on new and accumulated information and knowledge.

Project risk management

2.26 Different risk assessments were conducted for different components of the pond project. These included:

- a design consultancy risk assessment undertaken by ACTPLA. ACTPLA has a standard risk template (with seven generic risks) that is completed as part of all design consultancy projects;
- various procurement risk assessments undertaken by Procurement Solutions for major project contracts;
- a risk assessment undertaken by Cardno Young, incorporated into the Project Quality Plan, for the design and superintendency component of the project. The risk assessment identified risks to the achievement of project objectives, which could arise during the construction of the pond; and
- a risk assessment produced by Hewatt Earthworks for the construction phase of the project.

2.27 These risk assessments were:

- undertaken at different times of the project for specific purposes and components associated with the project; and
- conducted by the different project participants, with little or no input from other project participants.

2.28 However, ACT Government agencies did not combine the information in the risk assessments to facilitate an overall understanding and consideration of the project and its risks.

2.29 An overall project risk management approach, with regular review and input from knowledgeable ACT Government representatives (and consultants if appropriate), would be a means by which overall project risks could have been more effectively recognised, assessed and managed throughout the project.

Recommendation 4

For future high-risk infrastructure projects, agencies should seek to reduce risks through a formal project-wide risk assessment process that provides for input by all parties (ACT Government agencies, consultants and contractors) with relevant knowledge of risks.

ACT PROCUREMENT SOLUTIONS

2.30 ACT Procurement Solutions is the ACT Government's centre of expertise for procurement matters, providing procurement and contract management-related services to ACT Government agencies. Procurement Solutions was involved throughout the pond project, providing services to, and on behalf of, ACTPLA and Roads ACT as the project owners.

2.31 Procurement Solutions issued a project responsibilities document to advise its client agencies of its roles and responsibilities. This document outlines the allocation of responsibilities between itself and the client agency and addresses different stages of the project, from its initiation to completion.

2.32 Key points from this document are:

- the client agency (project owner) is responsible for early parts of the procurement, including the description of functional requirements;
- the procurement process is managed by Procurement Solutions, although the client agency (project owner) approves key documents including the Procurement Plan and Tender Evaluation Report;
- Procurement Solutions manages consultant performance on behalf of the project owner, including monitoring and reviewing performance, providing feedback and actioning performance issues;
- any variations are evaluated and prepared by Procurement Solutions, but approved by the client agency (project owner);

- any defects in project deliverables are identified and managed by Procurement Solutions, but final acceptance is the responsibility of the relevant agency (as advised by Procurement Solutions); and
- responsibility for dispute management is with Procurement Solutions but final dispute resolution and associated funding decisions are with the client agency (project owner) (as advised by Procurement Solutions).

2.33 This document is useful in identifying respective roles and responsibilities for the main design and construction aspects of a project. The roles and responsibilities were generally well understood and adhered to.

Managing technical and expert advice

2.34 As noted in the project responsibilities document, Procurement Solutions was responsible for managing consultants' performance, including monitoring and reviewing performance, and while any defects in project deliverables are identified and managed by Procurement Solutions, final acceptance is the responsibility of the relevant agency. A key issue that emerged during the audit related to the appropriateness of the review and acceptance of the environmental and geotechnical reports produced during initial investigation and assessment phases. The review was not performed or documented effectively.

2.35 A review of file documentation and discussions with staff from Procurement Solutions indicated that advice was sought from other stakeholders, including ACTPLA, the Environment Protection Authority and Site Auditor, to consider the technical appropriateness and acceptability of the advice contained in consultant reports. There was also evidence that technical advice and information produced by consultants was considered and questioned by ACTPLA during feasibility and design processes. However, there was little documentation to support the rigorous examination and acceptance of consultants' advice, including the nature and extent of work performed and any limitations or caveats placed on the information and advice.

2.36 ACTPLA has advised that it:

> should reasonably be expected to rely on expert consultants for highly specialised advice on projects such as this. It would not be feasible for ACTPLA or any other agency to have the specialist skills required for detailed review of such advice.

2.37 ACT Government agencies have a right to expect a high quality of services from consultants. Standard contractual terms require consultants to perform services 'to the standard of care and skill expected of a person who regularly acts in the capacity in which the consultant is engaged and who possesses the knowledge, skill and experience of a person qualified to act in that capacity.' However, this does not mean that ACT Government agencies can abrogate their ultimate responsibility for the government activity by transferring this responsibility to another party, such as an expert. Agencies should therefore take steps to reasonably satisfy themselves that the other party has properly applied its expertise. The Australian National Audit Office's Better Practice Guide on Developing and Managing Contracts notes:

> ... final accountability for accepting contract deliverables remains with the acquiring entity. Information provided by a third party or the contractor for monitoring purposes should be reviewed and audited, as necessary, to ensure its accuracy and reliability.

2.38 Accordingly, it remains necessary for ACT Government agencies to assess the quality and appropriateness of any external technical advice received, including any limitations placed on the advice, and document the assessment. In assessing the quality and appropriateness of the advice, agencies should consider the reasonableness of the assumptions, methods and source data used by the expert, and the reasonableness of the expert's findings in relation to other information known and available to the agency.

2.39 Where, as in the case of this project, the advice is specialised or complex and has potentially significant consequences for the project, agencies should implement effective processes for reviewing the advice regardless of whether the agency has the in-house specialist skills to review the advice.

2.40 Where there is a highly technical component to a project and external advice is received there should be explicit decisions as to who will be the ACT Government's 'technical expert'. The 'technical expert' would be the party responsible for critically reviewing expert advice provided by a third party before accepting it.

Recommendation 5

For future high-risk infrastructure projects, agencies should have processes for recognising and documenting the roles of key stakeholders, particularly regarding which agency will be the responsible for critically reviewing technical advice provided by a third party before deciding whether to accept it.

ENVIRONMENT PROTECTION AUTHORITY

2.41 The Environment Protection Authority is a statutory position established by the *Environment Protection Act 1997*, with responsibility for regulating the assessment and remediation of contaminated sites. In practice, this work is undertaken by the Environment Protection Unit (a part of the Environment Protection Authority, within DECCEW).

2.42 The Environment Protection Authority, through the Environment Protection Unit, has been involved in planning for the pond from early 2005. The Authority's involvement included:

- providing advice and input to other ACT Government agencies, from initial planning through to activities to manage contaminated material during construction;
- providing responses to contaminated land search requests of the Authority's records from various consultants during the process; and

- endorsing reports produced by consultants during the pond project (including the Phase 1 Environmental Site Assessment reports and final Site Audit Statement produced by the Site Auditor).

2.43 The Environment Protection Authority did not have a role or responsibility regarding geotechnical risks associated with the site of the pond project, or for developing cost-effective remediation strategies for the site.

Contaminated Sites Environment Protection Policy

2.44 Part 4 of the *Environment Protection Act 1997* allows the Environment Protection Authority to develop environment protection policies.

2.45 The Contaminated Sites Environment Protection Policy (the policy) was developed in 2000 and subsequently updated in November 2009. The substance of the policy did not change significantly in the 2009 revision. The policy provided the primary framework and context for the management of contamination risks associated with the site. The policy:

> ... is designed to help people understand the [Environment Protection Act and Regulation] as they apply to contaminated land.
>
> … contains information and policies relating to the assessment and remediation (including management) of contaminated land and aims to minimise the risk of adverse impacts of contaminated land on the environment and human health. This [policy] explains the procedures used by the Environment Protection Authority to manage contaminated land within the [the ACT] and provides guidance for owners and occupiers of contaminated land to meet their legislative obligations ...

2.46 Various participants may be involved in managing a contaminated site. These include the:

- project's proponent;
- environmental consultant undertaking the site assessment;
- Contaminated Site Auditor (Site Auditor); and
- Environment Protection Authority.

2.47 These participants, particularly the environmental consultant and Site Auditor, produce a series of reports, some of which are subject to endorsement by the Environment Protection Authority.

2.48 The Environment Protection Policy does not adequately specify these participants' roles and responsibilities or the purpose and outcomes sought from the different processes. The shortcomings in the policy particularly related to the role and purpose of the Site Auditor and Environment Protection Authority and the nature and types of audits to be conducted.

Role of the Contaminated Site Auditor

2.49 The Environment Protection Policy stated that 'a site audit of contaminated land is an independent review of an assessment or remediation by an accredited contaminated land auditor'. Under the policy:

> An audit can be conducted for the purpose of determining any one or more of the following matters:
>
> - the nature and extent of any contamination of the land;
> - the nature and extent of the assessment or remediation;
> - what assessment or remediation remains necessary before the land is suitable for any specific use or range of uses; and
> - the comprehensiveness of a remedial action plan for contaminated land.

2.50 The policy states that 'on completion of an audit, the auditor is required to issue a site audit statement (or certificate of environment audit)' and 'the main purpose of an audit is to determine whether a site is suitable for a particular use or range of uses'.

2.51 Under the policy a 'Section A' audit statement may be completed 'where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land use(s)'. Alternatively, a 'Section B' audit statement may be completed as an interim statement:

> 'to determine the nature and extent of contamination and/or the appropriateness of an investigation or remedial action or management plan and/or whether the site can be made suitable for a specific land use or uses subject to the successful implementation of a remedial action or management plan'.

2.52 The policy was not clear about who was responsible for setting the scope of the audit (i.e. choosing from among the matters listed in paragraph 2.49, or determining whether an interim 'Section B' audit statement was warranted). The policy implied a discretionary role for the Site Auditor and did not provide sufficient guidance on the nature and extent of the Site Auditor's role.

2.53 No interim 'Section B' audit statements were issued for this project certifying that the nature or extent of the contamination had been appropriately determined or that environmental investigations or the Remedial Action Plan were appropriate. However, representatives from ACT Government agencies (ACTPLA, Procurement Solutions and Roads ACT) continued to expect that, because of the Site Auditor's involvement during the project, ongoing assurance was obtained about the management of the contamination risks for the site.

2.54 While some comfort could be gained from the Site Auditor's involvement in the project, the Site Auditor's deliverables for the North Weston Pond Project were the provision of a 'Section A' Site Audit Report and Site Audit Statement at the conclusion of the remediation process.

2.55 The project brief for the Site Auditor did not specify whether a 'Section A' or 'Section B' report was required, or differentiate between the two types of report. The assurance that can be obtained from each type of audit, was not well understood by agency representatives, suggesting it should be explained more clearly in the policy.

Role of the Environment Protection Authority

2.56 The role of the Environment Protection Authority was not adequately described in the Environment Protection Policy. In the case of the pond project, the Authority was involved throughout the process and provided advice and input to other agencies and other parties on particular issues and matters. The Authority had endorsed some (but not all) of the reports produced during the contaminated site management process. Reports formally endorsed by the Authority (in relation to the North Weston Pond site) included:

- the Phase 1 Environmental Site Assessment by Coffey in March 2006 (although this endorsement was subject to a review of the assessment by the Site Auditor and a review of the proposed methodology for sampling and analysis); and
- a Site Audit Report and Site Audit Statement for the adjacent former pine plantation block (Block 1204).

2.57 The Environment Protection Authority was expecting to endorse Site Audit Reports produced by the Site Auditor for other blocks, when they were finalised, including a report for Block 1196 (on which the former Weston Creek Sewerage Treatment Plant and parts of the builders' landfill was located).

2.58 The Environment Protection Authority did not have a role in endorsing other reports, including preliminary investigation reports, Phase 2 site assessment reports, environmental management plans or remedial action plans.

2.59 Similar to earlier comments on the role of the Site Auditor, there was some confusion among other ACT Government agencies (ACTPLA and Procurement Solutions) about the role of the Environment Protection Authority and its role in the project. In some instances, these agencies sought endorsement or approval from the Authority on a particular process, which was not forthcoming. In other instances, agencies incorrectly assumed that the Authority had 'approved' or 'signed-off' on various aspects of the process, or would do so.

Application of the Contaminated Sites Environment Protection Policy to the North Weston Pond

2.60 The Contaminated Sites Environment Protection Policy identified processes for the management of contaminated sites that generally focused on:

- assessment of the contamination risks;
- remediation of the contamination risks; and
- site audit (including the Site Audit Report, which is subsequently endorsed by the Environment Protection Authority).

2.61 Although the Environment Protection Authority prefers these activities to occur prior to development and/or construction activities on the site, the Environment Protection Policy does not specifically require this.

2.62 Remediation for the North Weston Pond was to occur at the same time as construction. This is logical for the construction of a pond, as remediation of

contaminated material occurs as the potentially contaminated material is dug from the ground to construct the pond void.

2.63 In practice, however, this meant that a 'Section A' Site Audit Report and Site Audit Statement (to be endorsed by the Environment Protection Authority) could not be produced until the pond was largely completed. At the time of audit fieldwork in February 2011, there had not been a Site Audit Report and Site Audit Statement for the key North Weston Pond site (Block 1196), despite the extensive and expensive work undertaken on the pond project by various agencies, consultants and contractors.

2.64 A 'Section A' Site Audit Report and Site Audit Statement produced at this stage (that is, when the pond was largely completed) is not timely assurance 'to the actual or prospective lessees/occupiers of the site, including the ACT Government and community that the site is suitable for a particular land use or range of uses'. This is an expected outcome of a site audit, as described in the Contaminated Sites Environment Protection Policy.

2.65 The processes outlined in the Environment Protection Policy, which were generally completed sequentially, may be suitable for a 'simple' contaminated site. However, the pond was on a complex site, which involved significantly higher risks such as the:

- contamination risks identified for the site; and
- simultaneous completion of remediation and construction processes.

2.66 Consequently, amendments to the policy should be considered that address these risks and provide for a greater and more sustained involvement of the Environment Protection Authority as well as clearer guidance on the nature and types of audits to be conducted (i.e. Section A or Section B audits) and when they are warranted.

Recommendation 6

The Environment Protection Authority should review the Contaminated Sites Environment Protection Policy and consider amendments to the Policy that:

(a) clarify roles and responsibilities for the management of contaminated sites, including its role, the role of the Contaminated Site Auditor and other stakeholders, including the project owner; and

(b) allow for greater and more sustained involvement from the Environment Protection Authority for future high-risk infrastructure projects involving contaminated sites.

CONCLUSION

2.67 The pond project has not met its original objectives. It is late, well over budget and has required significant redesign.

2.68 The main geotechnical and environmental constraints and risks of the pond were known, at least in outline, from the start. Although various processes were undertaken by ACT Government agencies to understand and manage these constraints and risks, these agencies did not combine the knowledge and information into a coherent whole to effectively address these constraints and risks.

2.69 Major causes of this project's problems are the shortcomings in the project's governance and management arrangements. There was inadequate coordination between the various ACT Government agencies and consultants and agencies did not implement effective overall strategic planning and project risk management arrangements.

3. ENVIRONMENTAL ASSESSMENTS

INTRODUCTION

3.1 This chapter describes the environmental assessment processes conducted during planning for the pond. Key outcomes sought from these assessments were the identification of contamination and geotechnical constraints for consideration during the pond's construction phase.

3.2 ACTPLA was the ACT Government agency with primary responsibility at this stage of the project. Procurement Solutions acted on behalf of ACTPLA in the procurement and contract management of several contractors engaged to carry out the assessments.

KEY FINDINGS

- At the earliest stages of the project, the Environment Protection Authority communicated the general environmental and contamination risks associated with the site to consultants engaged for the pond project.
- An important output from the environmental and contamination assessments was the Sampling and Analysis Quality Plan (Sampling Plan), which was developed over time by consultants involved in the project. The Sampling Plan determined the methodology and approach for testing for contamination on the site, the results of which were reported in the Phase 2 Environmental Site Assessment report. This plan has subsequently been assessed in a review commissioned by ACT Procurement Solutions, on behalf of Roads ACT, as inappropriate for testing for asbestos at a high risk site.
- The Remedial Action Plan, which was informed by the results of the testing undertaken as part of the Phase 2 Environmental Site Assessment, was a key document for the construction phase, as it articulated the processes for managing contaminated material encountered during construction. The Remedial Action Plan under-estimated the quantity of contaminated material and processes required to manage the asbestos containing material.

BACKGROUND

3.3 In 2004, the Molonglo Valley was identified in the Canberra Spatial Plan as the next area for major residential development within the ACT. The Plan stated that 'due to its proximity to existing services and employment centres, the Molonglo Valley is considered highly suitable for urban development.'

3.4 Following the identification of the Molonglo Valley as an area for residential development, a series of environmental and geotechnical assessments were undertaken. These included a:

- Preliminary Geotechnical and Environmental Constraints Study;
- Phase 1 Environmental Site Assessment; and
- Phase 2 and 3 Environmental Site Assessment.

3.5 As part of usual environmental site assessment practice, a Contaminated Site Auditor (Site Auditor) was engaged by Procurement Solutions on behalf of ACTPLA to review the outcomes of the environmental site assessments. The Site Auditor would issue Site Audit Statements to certify the land as suitable for its intended use.

3.6 Each of these components of the environmental and geotechnical site assessments is considered in further detail in this chapter, as well as Environment Protection Authority records associated with the site.

ENVIRONMENT PROTECTION AUTHORITY RECORDS

3.7 The Environment Protection Authority maintains information on contaminated sites and potentially contaminated sites through its Contaminated Site Management Database.

3.8 The Environment Protection Authority also maintains the Register of Contaminated Sites, required by Section 21A of the *Environment Protection Act 1997*. The Register contains particulars of land for which:

- an order has been made to assess whether the land is contaminated,
- an order has been made to remediate contaminated land; or
- an environment protection order has been made to manage the contaminated land.

3.9 No such orders have ever been made for the North Weston Pond site, nor were they made during this process. Consequently, the North Weston Pond site has never been placed on the Register.

3.10 The Environment Protection Authority provided the results of contaminated land searches from its Contaminated Site Management Database to the consultants undertaking the Preliminary Geotechnical and Environmental Constraints Study and the Phase 2 Environmental Site Assessment (Coffey and SMEC respectively).

Results of contaminated land searches

3.11 The Environment Protection Authority advised the consultants (Coffey and SMEC) of the following risks associated with the site of the pond.

- Sewerage treatment works – 'part of the site was formerly the old Weston Creek Sewerage Treatment Works which was demolished on site and covered with soil. There are no records of an assessment being undertaken for the decommissioning of the former sewerage works';
- Forestry plantation – 'the other major use of the block was for Forestry Plantation (Radiata Pine) which was destroyed in the January 2003 bushfires. Records held by Environment ACT indicate that the application of chemicals may have been undertaken in the area for the purpose of pest control'; and
- Landfill – 'there is also an historic quarry located on the site which was subsequently used as an uncontrolled landfill'.

3.12 Anecdotal evidence that the site may have been used as a training ground for drivers of earthmoving equipment was not communicated to consultants engaged in the project.

3.13 The Environment Protection Authority's advice to the consultants noted that 'the information … only relates to records held by the Environment Protection Unit and may not represent the actual condition of the site' and the information provided by the Authority 'does not absolutely rule out the possibility of contamination and should not be interpreted as a warranty that there is no contamination'. The Authority consistently stated 'due to the lack of specific plans recorded for the activities on the site, you or your client should also investigate the historic aerial photographs for the block'.

3.14 The records maintained by the Environment Protection Authority recognised key sources of risk for the site, including the Weston Creek Sewerage Treatment Plant, uncontrolled builders' landfill and forestry plantation. These risks were communicated to the consultants (identified above) undertaking the environmental site assessments.

3.15 The Environment Protection Authority's records also indicated that the structures relating to the former sewerage treatment plant could still be located on the site.

3.16 The Environment Protection Authority's records were not sufficient to provide precise information about the nature and location of the builders' material on the site. The Authority's advice to consultants recognised that the builders' landfill was uncontrolled and that it was close to the disused quarry at the southern end of the site. It was subsequently discovered during site investigations that the builders' material was located more extensively throughout the site.

PRELIMINARY GEOTECHNICAL AND CONTAMINATION CONSTRAINTS STUDY

3.17 The purpose of the Preliminary Geotechnical and Contamination Constraints Study was 'to assess broad geotechnical and environmental constraints to urban development within the Molonglo area.' The study addressed the area of the proposed new residential development.

3.18 The project brief required consideration of available reports, a desktop study of information and inspection of any constraints visible from the surface. The focus was on geotechnical issues, but the consultant was also required to identify areas of environmental concern, such as sites used for filling, spoil dumping, sheep dips or waste disposal. According to the brief:

> The study will be used to determine if there are any areas that should be excluded from urban development or where special engineering works may be required to address geotechnical constraints.

3.19 Procurement Solutions engaged Coffey to undertake the Constraints Study in July 2004, through a selective tender process (with three firms invited to tender). The report was completed in May 2005.

Findings of the Preliminary Geotechnical and Contamination Constraints Study

3.20 The preliminary study identified geotechnical constraints and noted that:

- excavation of a pond would be required due to the existing narrow creek channel;
- existing drainage and sewerage infrastructure constrained where the pond could be created; and
- excavation of hard, slightly weathered to fresh bedrock, if required, would be difficult and slow.

3.21 The report also noted that remnant structures of the Weston Creek Sewerage Treatment Plant and uncontrolled fill in the former quarry may create problems.

3.22 The study found 'at least thirteen potential areas of environmental concern within the Molonglo Valley urban development area, comprising eight sheep dips, various landfill areas, Weston Creek Sewerage Treatment Works, Coppins Crossing sludge ponds, forestry plantation areas and a waste oil disposal point.' All of these areas were assessed as 'able to be remediated if required … although there may be moderate costs incurred for the remediation.' The term 'moderate costs' was not clarified further.

3.23 The report also stated that further investigation of the areas of environmental concern should be carried out (a Phase 1 Environmental Site Assessment) to assess the nature and extent of potential contaminants.

3.24 The Coffey report on geotechnical and environmental constraints met its objectives and provided appropriate advice on areas of environmental concern and the contaminants that may be found.

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT

3.25 A Phase 1 Environmental Site Assessment was conducted on the recommendation in the Coffey Preliminary Study to investigate areas of environmental concern.

3.26 The objectives of this study were to:

- identify areas of environmental concern, possible constraints on the use of the land (including its use as an urban pond); and
- scope the requirements for a more detailed Phase 2 investigation.

3.27 The study was also expected to assess and report on the type and extent of any contamination on the site.

3.28 Coffey was engaged to undertake the Phase 1 Environmental Site Assessment. This work was awarded on 25 May 2005 and the report was completed on 7 February 2006.

3.29 The initial project brief was limited to the former Weston Creek Sewerage Treatment Plant. However, this was recognised and the contract was varied in

June 2005 to include the builders' landfill (part of Blocks 1196 and 1179) and Block 1203 (labelled as the Night Spoil Depot).

Findings from the Phase 1 Environmental Site Assessment

3.30 The report, completed by Coffey in February 2006, noted the potential for hotspots of contamination within each of the areas of environmental concern. The report noted the presence of asbestos and other contaminants through observation and limited sampling and confirmed that the site assessment should proceed to Phases 2 and 3.

3.31 The report included a draft Sampling Analysis and Quality Plan (Sampling Plan) and provided an estimate of the cost of the Phase 2 site assessment. The report did not include an estimate for the cost of Phase 3, as this would primarily depend on the results of the Phase 2 environmental site assessment. The draft Sampling Plan developed at this stage formed the basis for the testing methodology subsequently adopted in the Phase 2 environmental site assessment.

Subsequent criticism of the Phase 1 Environmental Site Assessment

3.32 In August 2010, following concerns about the removal of large amounts of contaminated material at the construction stage, Roads ACT commissioned a review of the environmental and geotechnical site assessments. This review identified deficiencies in the Phase 1 Environmental Site Assessment. These included:

- borehole test results (which represented approximately one-third of the testing conducted at the location of the former Weston Creek Sewerage Treatment Plant) that inadequately described the nature of the building debris revealed by the tests; and
- some borehole tests that did not penetrate deep enough to obtain useful results (for example, drill 'refusal' was encountered as shallow as 0.3 metres below ground level).

3.33 The review concluded that the proposed Sampling Plan was underscoped and inappropriate given the known history of the site. This is discussed further at paragraphs 3.44 to 3.49.

3.34 In response to this criticism, Coffey has advised that the Sampling Plan was in draft form and would have been the starting point for subsequent investigations. Should any of the test pits identify potential contaminants it was expected that the environmental site assessor [SMEC] would expand the scope of the investigation. (SMEC subsequently expanded the scope of testing as part of the Phase 2 Environmental Site Assessment).

Tender process for the Phase 2 and 3 Environmental Site Assessment

3.35 Coffey's preliminary assessment of the cost for the Phase 2 study was $75 000 to $82 500 (GST exclusive) and that the cost of engaging the Site Auditor would range between $10 000 and $20 000 (GST exclusive). Coffey said 'the potential extent of remedial works will not be known until the completion of the Phase 2

[Environmental Site Assessment] and therefore it has not been possible to prepare budget estimates for Phase 3.'

3.36 A tender for the Phase 2 and 3 assessments was commenced, based on these estimates. The tender process was abandoned when insufficient tenders were received.

3.37 The work was subsequently re-tendered with a Procurement Solutions budget of up to $550 000. The final cost of the consultancy, which was awarded to SMEC, was $569 395. Douglas Partners was subcontracted by SMEC to undertake the detailed geotechnical testing. The Site Auditor's contract was initially identified as $22 500, although the final cost of the contract was estimated to be $50 000.

3.38 The initial cost estimates provided by Coffey for Phase 2 of the project have subsequently proven to be significantly less than the actual costs for these components of the project. This indicates that, at the conclusion of Phase 1, the expectations for the nature and extent of the work to be performed as part of Phase 2 were significantly underscoped.

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT

3.39 SMEC completed the Phase 2 Environmental Site Assessment (for the part of the site containing the former sewerage treatment plant, builders' landfill and nightspoil depot) on 9 May 2009, over a year after the pond design option had been selected. The Phase 2 Environmental Site Assessment scope of works also included a geotechnical assessment. This was conducted by Douglas Partners (under subcontract to SMEC), but this was reported separately to Procurement Solutions. The results of the geotechnical assessment are discussed in Chapter 4.

3.40 The project brief identified that the purpose of the study was to 'define the comprehensive ground conditions in the locations proposed for the infrastructure works' and that the study 'required extensive geotechnical, environmental investigation and reporting for detailed design of the North Weston Pond'.

3.41 A detailed scope of works was identified, although the key requirements for the environmental and contamination component of the project were that SMEC was to develop a Sampling Plan and execute testing in accordance with the Sampling Plan 'to provide detailed analysis on extent and degree of contamination and migration sufficient to develop a Phase 3 Environmental Site Assessment Remedial Action Plan (RAP) if required'.

Findings of the Phase 2 Environmental Site Assessment

3.42 SMEC reported that 'in general, contaminant concentrations in soil, groundwater, surface water and sediments were less than the adopted assessment criteria' although several exceptions were identified. SMEC identified various locations where there was excess lead, heavy metals, petroleum hydrocarbons, phosphorus and asbestos. Fill material was also identified on the site comprising 'a range of wastes including domestic, building, operational and maintenance waste'.

3.43 SMEC identified hotspots (where there were excessive amounts of contaminants) and identified that these would need to be remediated, together with removal of surface fill material.

Sampling Analysis and Quality Plan

3.44 The Sampling Plan developed as part of the Phase 2 Environmental Site Assessment was an overarching sampling methodology for the project. Several different consultants were involved in producing the Sampling Plan.

Development of the Sampling Plan

3.45 The Sampling Plan was developed in the following stages.

- A draft was prepared by Coffey as part of the Phase 1 Environmental Site Assessment.
- The draft was reviewed and commented on by the Site Auditor and Environment Protection Authority. The Authority was 'in general agreement' with the draft and provided brief comments. The Site Auditor provided comments and a detailed amended draft plan.
- The draft Sampling Plan was used in the project brief as part of the tender process for the Phase 2 and 3 Environmental Site Assessment.
- SMEC was required, as part of the brief for Phase 2 and 3 Environmental Site Assessment, to prepare its own 'preliminary Sampling Analysis and Quality Plan [to be] finalised in conjunction with the Site Auditor, based on the review of associated Phase 1 Environmental Site Assessment report and before the commencement of Phase 2 works'.
- SMEC prepared a revised Sampling Plan in May 2008.
- SMEC's plan was reviewed and commented on by the Site Auditor who considered that it was 'acceptable for the purpose of [the] audit' subject to 'a few minor issues that should be addressed in the final [Sampling Plan]'.

3.46 SMEC prepared a final version of the Sampling Plan, which was then used to guide testing on the site. The results of this testing were a major influence on the estimated quantities of contaminants and processes identified in the Phase 3 Remedial Action Plan.

Reported deficiencies in the Sampling Plan

3.47 As previously noted, in August 2010, Procurement Solutions commissioned a peer review of the environmental and geotechnical site assessments. The peer reviewer noted that 'the absence of ACT guidelines on assessing [asbestos containing material] or asbestos impacted sites/soils at the time of investigation provided little direction on the preferred investigation for potentially asbestos impacted soil.' However, the peer reviewer also concluded that the Sampling Plan (and its subsequent execution) was inappropriate for the site, as there was insufficient focus on testing for asbestos, which should have been considered as one of the most commonly occurring contaminants on a site that had previously been used as an uncontrolled builders' landfill.

3.48 Specifically, the testing was assessed as deficient because:

- many borehole sampling locations did not extend deep enough to provide a reliable indication of the nature and extent of the fill material;
- some testpits (excavated with a backhoe) did not meet the objective of this aspect of the investigation, which was to extend into natural ground; and
- less than 15 percent of all samples collected were analysed for asbestos, and these were mostly from or near surface locations.

3.49 In its response to this report, SMEC has advised that the Sampling Plan met the minimum requirements of the NSW guidelines for sampling (as adopted by the ACT) and that the testing was reasonable in the circumstances.

PHASE 3 ENVIRONMENTAL SITE ASSESSMENT - REMEDIAL ACTION PLAN

3.50 There was one contract for the conduct of Phases 2 and 3 of the Environmental Site Assessment. The project brief for this work stated that, among other things, a Phase 3 Remedial Action Plan was to be produced to assess remedial options for all areas of environmental concern. The Remedial Action Plan was an outcome of the testing conducted under the Sampling Plan.

3.51 At a minimum, the Remedial Action Plan was expected to:

- identify areas within the study area that require remediation or have particular management requirements;
- select the remediation goals;
- specify site cleanup criteria;
- outline remediation, validation, site control and health and safety procedures; and
- provide a basis for which the construction specifications for site remediation activities can be established.

Amount of contaminants estimated in the Phase 3 Remedial Action Plan

3.52 The Phase 3 Remedial Action Plan was completed by SMEC on 10 September 2009. The Remedial Action Plan was subsequently relied upon by ACT Government agencies for identifying the remediation work (and associated costs) to be performed during the construction phase of the project.

3.53 The Remedial Action Plan identified the need to remediate soil at various specific points, but provided little guidance as to the practicalities of undertaking the remediation or how the remediation would be managed. The Remedial Action Plan identified Total Petroleum Hydrocarbons contamination at 15 locations, asbestos at seven locations and heavy metal contamination at one location.

3.54 Based on these locations, the Remedial Action Plan provided estimates of volumes of material that would have to be remediated: up to approximately 6 400 m^3 (about 9 600 tonnes) of Total Petroleum Hydrocarbons and / or asbestos

containing material. SMEC based its calculation of this quantum on remediating the specific locations across the site and detailed and precise depths of soil.

3.55 The Remedial Action Plan underestimated the amount of material that was subsequently treated and disposed of as 'asbestos containing material', primarily because of the shortcomings identified in the Sampling Plan. The consultant who undertook the review for Procurement Solutions (on behalf of Roads ACT) has criticised the Remedial Action Plan on the basis that there is no clear rationale for how these volumes were estimated. In particular:

- volume estimates appeared to be calculated on the area immediately surrounding asbestos finds. An accepted practice for volume estimation is to take the mid-point between a clean and dirty sample and assume that all soil requires excavation up to the midpoint (although even more conservative approaches to estimating volumes may be adopted); and
- fill containing scattered presence of asbestos containing material or fibres should be deemed entirely as impacted with asbestos unless appropriate management conditions existed at the site.

Remediation criteria

3.56 The Remedial Action Plan confirmed the remediation criteria for asbestos was to be 'no free fibres in soils' and 'no known asbestos containing materials are to remain on site'. This is, in effect, a zero tolerance policy for asbestos on site, which accorded with Environmental Protection Authority guidance at the time.

3.57 Having such a high criteria for asbestos remediation, however, requires:

- highly accurate estimates of the amount of asbestos to be remediated; or
- large contingencies in the project budget, to allow for greater-than-expected amounts.

3.58 The under-estimated volumes of material treated as 'asbestos containing material' in the Remedial Action Plan, combined with Procurement Solutions' reliance on these estimated volumes to inform purchasing decisions for the construction contractor has contributed to much of the higher than expected costs associated with the project.

CONTAMINATED SITE AUDITOR

3.59 Procurement Solutions also engaged a Contaminated Site Auditor (CM Jewell and Associates), to review the work of SMEC and to subsequently issue Site Assessment Statements to certify the land as suitable for its intended use.

3.60 The project brief required the Site Auditor to:

- review the Phase 1 Environmental Site Assessment report;
- review the Sampling and Analysis Sampling Plan prepared in Phase 2;
- endorse the Phase 2 report and Phase 3 Remedial Action Plan; and
- conduct extensive consultations with the consultant (SMEC).

Demands and expectations of the Site Auditor

3.61 ACT Government agencies (Procurement Solutions, ACTPLA and Roads ACT) placed a high degree of reliance on the Site Auditor. The Site Auditor reviewed the Sampling Plan, provided ongoing advice and feedback to environmental assessors and reviewed and commented on Remedial Action Plans and Environment Management Plans. Although the Site Auditor provided ongoing advice throughout the project, the Site Auditor had only issued a formal Site Assessment Statement for Block 1204 (the former pine plantation block) and no other statements have been issued for the site.

3.62 A 'Section A' Site Assessment Statement (certifying that the land is suitable for its proposed land use(s)) cannot be issued by a contaminated site auditor until final remedial action is complete. At the time of this report, remedial action had not been completed for affected blocks other than Block 1204. Therefore, the Site Auditor has not yet issued an audit statement for Block 1196 (the former sewerage treatment plant, builders' landfill and nightspoil depot site) or other blocks that were also included within the scope of the investigations.

3.63 This is a key point that has not been well understood by some parties (ACT Procurement Solutions and Roads ACT) during the pond project. In the absence of a 'Section B' Site Audit Statement the role of the Site Auditor was to certify the appropriateness of the land for its intended use following remediation. In the case of the pond project, remediation was to occur simultaneously with construction, and in the case of the main Block 1196, is yet to be completed. However, as noted in Chapter 2, it was not clear why 'Section B' statements were not sought from the Site Auditor.

3.64 The Site Auditor drew attention to the high level of expectations being placed on their role. In commenting on the project brief for Phases 2 and 3, the auditor noted that 'the scope of work for the audit appears to be moving beyond the original tender brief.' As early as 4 December 2008, Procurement Solutions also noted that 'large amounts of contaminated sites auditor assessment time were allowed for but now this time has been exhausted'.

CONCLUSION

3.65 The environmental site assessments did not provide a reasonable estimate of the amount of contaminated material. The reasons for this included:

- an insufficient consideration of the risks associated with the source and dispersion of the asbestos containing material based on the history of the site, even though most of this history was generally known and documented;
- a Sampling Plan and testing that did not fully reflect the likely dispersion of asbestos on the site; and
- a Remedial Action Plan that significantly underestimated quantities of material subsequently treated as asbestos contaminated material, based on a misunderstanding of the asbestos dispersion throughout uncontrolled landfill and within the old sewerage treatment plant structures.

Figure 3.1 – North Weston Pond site, showing rubble excavated from the site

Source: ACT Audit Office – photograph taken 27 January 2011

Figure 3.2 – North Weston Pond site, showing partially excavated sewerage tanks from the former sewerage treatment plant

Source: ACT Audit Office – photograph taken 27 January 2011

4. FEASIBILITY AND DESIGN OF THE POND

INTRODUCTION

4.1 This chapter assesses the management of the design phase of the pond project by ACT Government agencies. This involved designing the pond to meet ACT Government objectives, while recognising the limitations and constraints of the site.

KEY FINDINGS

- ACTPLA undertook key stages of the planning and design process, including the finalisation of a feasibility study for the pond (incorporating design options) as well as the acceptance of the pond design, before completion of the Phase 2 Environmental Site Assessment, which provided more information about the ground conditions at the site.
- ACTPLA did not adequately recognise and cost issues identified during the environmental and geotechnical assessments during the planning process. These include risks associated with the integrity of the Molonglo Valley Interceptor Sewer (an ageing structure) and the existence of former Weston Creek Sewerage Treatment Plant structures at the location of the pond.
- ACTPLA did not adequately document acceptance of the pond design or the risks associated with the selected design option and measures to address these risks.

BACKGROUND

4.2 In 2006, Cardno Young reviewed stormwater needs in the Molonglo Valley on behalf of ACTPLA, to 'inform Government on a preferred strategy for ponds and lakes as one component of an integrated stormwater management plan.' The resulting Molonglo Valley Ponds and Lakes Options Study identified three prospective options for the area:

- a 16 GL lake on Molonglo River and a 280 ML pond on Weston Creek;
- a short 6.3 GL lake at Coppins Crossing, a 150 ML pond on Yarralumla Creek and a 280 ML Weston Creek pond; or
- consolidated regional ponds throughout the Molonglo Valley with a 480 ML pond on Yarralumla Creek in combination with upstream ponds/wetlands as well as a 280 ML Weston Creek pond.

4.3 A key outcome of the study was that all three options supported the placement of a 280 ML pond at the Weston Creek site.

POND FEASIBILITY STUDY

4.4 In 2007, following the completion of the Cardno Young Options Study, ACTPLA engaged Bill Guy and Partners to:

> [Undertake] the feasibility study for a major pond on Weston Creek for water quality control purposes, non-potable water supply and to form a major landscape

feature for the proposed North Weston (formerly Western Broadacre) urban development and to create an interface and gateway to the proposed Molonglo Valley development.

4.5 The primary objectives for the study were to:

- identify pond layout options;
- provide plans and details for the pond including embankment and spillway options; and
- provide a detailed assessment of related major sewer protection and/or relocation options.

Feasibility study findings

4.6 Bill Guy and Partners provided the feasibility study report on 26 February 2008. The report noted:

> Major constraints for the implementation of a large pond at this location are the trunk sewer system running along Weston Creek, the available site area for the pond and the contamination at the site of the former Weston Creek Sewerage Treatment Works near the confluence of Weston Creek and Molonglo River.

4.7 The report concluded that two options should be considered:

> Option 1: Utilises a long embankment, which is lengthened to contain the pond, specifically to minimise the extent of protection or relocation required for the Molonglo Valley Interceptor Sewer.
>
> Main components of Option 1 are a northern embankment of about 100 metres to impound the water, a western embankment of about 600 metres in length along the west side of the pond to contain the pond, protect the Molonglo Valley Interceptor Sewer and to act as a secondary spillway.
>
> The former Weston Creek Sewerage Treatment Plant would be largely inundated by the pond development, requiring minimum excavation and remediation over this area.
>
> Option 2: Created by a short embankment across Weston Creek, it requires the relocation of a 910 metre section of the Molonglo Valley Inceptor Sewer on the eastern side of the pond.
>
> Similar to Option 1, the former Weston Creek Sewerage Treatment Plant would be largely unaffected.

4.8 The report identified Option 1 as the preferred option, noting that 'the key advantage of this option is the minimal impact on the Molonglo Valley Interceptor Sewer, which crosses the site.' Additional benefits identified from Option 1 included:

- a significantly lower initial capital cost;
- a cost effective spillway arrangement, using the long embankment spillway to minimise pond runoff during storms; and
- more effective land use and planning outcomes, providing more available land for the proposed residential development west of the pond.

4.9 Table 4.1 summarises the estimated costs for these two options.

Table 4.1: 2008 Estimated costs for pond options

Option	Construction cost ($ million)		Life cycle cost ($ million)
	Pond	Other Works	
Option 1	8.4	5.6	11.1
Option 2	6.5	12.5	8.3

Source: Bill Guy and Partners' feasibility report dated 26 February 2008

Choice of pond design

4.10 At the time of the feasibility study, detailed geotechnical or environmental assessments had not been completed. Although findings from the Preliminary Investigation and Phase 1 Environmental Site Assessment were made available to Bill Guy and Partners, this assessment only provided the preliminary information needed for subsequent, more detailed environmental site assessments.

4.11 ACTPLA has advised that the results of the Preliminary Investigation and Phase 1 Environmental Site Assessment were 'considered appropriate for a feasibility design. Detailed investigations are usually conducted to inform the final design'.

4.12 ACTPLA accepted Option 1 and it became the basis for all subsequent planning and design activities. There is little documentation within ACTPLA to support this decision, including evidence of rigorous analysis of the costs, benefits and risks associated with selecting Option 1 over Option 2. ACTPLA subsequently advised that 'the feasibility study concept design did not require an official design sign-off but it was presented, reviewed and commented by a number relevant ACT Government agencies and ActewAGL.'

4.13 Such a significant decision should have been properly documented. Documentation of the decision-making process should include recognition and analysis of the risks associated with the different options, and consideration of their potential implications for design and cost objectives of the project.

Recommendation 7

For future high-risk infrastructure projects, the project owner should ensure that the decision-making process for acceptance of infrastructure design is properly documented, including documentation demonstrating that all known risks were recognised and either accepted or mitigated.

GEOTECHNICAL CONSIDERATIONS

4.14 Douglas Partners, under subcontract to SMEC, completed a detailed geotechnical site study in December 2008 as part of the Phase 2 Environmental Site Assessment.

4.15 Douglas Partners conducted geotechnical testing based on Option 1. In its report, Douglas Partners said the purpose of its testing was 'to provide information on the subsurface conditions to assess excavation conditions and reuse of borrow material and to provide comments on pond/embankment design and construction and protection measures for the Molonglo Valley Interceptor Sewer.'

4.16 The report noted that:

> the existing uncontrolled filling within the site is considered suitable for re-use following screening of unsuitable factors such as building rubble, vegetation, cobbles and boulders greater than a maximum particle size of 150 millimetre. The screened material could then be used as general filling or incorporated into the downstream zone of the embankment.

4.17 Douglas Partners did not specifically test for the existence of structures from the former sewerage treatment plant, but reported that:

> It is understood that there are concerns regarding the possible existence of existing structures buried in the old sewerage treatment plant site and their possible collapse during bulk earthworks. Should such structures exist or be located, the sites should be over-excavated to the full depth of the structure and subsequently backfilled under controlled conditions ... The depth of over-excavation can only be determined onsite following determination of the extent of such structures.

4.18 Regarding the Molonglo Valley Interceptor Sewer, the report noted:

> The condition of the existing Molonglo Valley Interceptor Sewer appears to be a major concern with a significant likelihood that following construction of the proposed pond, even with protection measures in place, replacement of pipeline will be required in the future.
>
> Hence it is strongly recommended that consideration should be given to installing a redundancy line either adjacent to the alignment of the existing pipeline (prior to commencement of pond construction) or outside the pond perimeter. Construction of a new pipeline following completion of the pond would most likely prove to be significantly more expensive particularly if failures in the existing Molonglo Valley Interceptor Sewer pipeline occur. The cost of protection measures for the existing pipeline could offset the cost of the new pipeline which will be required in the future regardless.

4.19 The report highlighted the risks associated with the location of the Molonglo Valley Interceptor Sewer and the possible existence of the sewage treatment plant structures. These risks were realised during the construction phase and have subsequently lead to higher than expected costs for the project for:

- the removal of the sewerage treatment plant structures; and
- additional protection measures for the Molonglo Valley Interceptor Sewer.

4.20 These risks also led to a revised pond design (agreed in January 2011), which involves two smaller ponds that avoid the Molonglo Valley Interceptor Sewer.

FINAL POND DESIGN

4.21 In April 2008, Cardno Young was appointed to administer the preparation of the final design of the pond. ACTPLA directed Cardno Young to finalise the design

of the pond based on Option 1 identified in the feasibility study and to prepare tender documents for its construction.

4.22 Throughout the latter half of 2008 and early 2009, Cardno Young worked on the design, in conjunction with the Planning Services Branch of ACTPLA. The Planning Services Branch was involved in the major activities, including finalising the preliminary and final sketch plans, preparing the Development Application and construction tender documents.

4.23 ACTPLA's Planning Services Branch agreed to the final design in August 2009 as part of preparing the final sketch plans and development application. The design closely resembled Option 1 from the feasibility study. However, the design agreed to by ACTPLA and ActewAGL did not incorporate the redundancy protection for the Interceptor Sewer that had been 'strongly recommended' by Douglas Partners because ACTPLA considered it too expensive.

Exemption from an Environmental Impact Statement

4.24 ACTPLA sought and received an Environmental Impact Statement exemption from the Minister for Planning in July 2009 for Molonglo Stage 1 (Coombs, Wright and North Weston), in accordance with Section 211 of the *Planning and Development Act 2007*. The exemption was granted on the basis that 'the expected environmental impact of the proposal has already been sufficiently addressed by another study or studies.'

Development application

4.25 The development application was submitted in August 2009, with endorsements by executives of the various TAMS branches (Environment and Recreation, Parks Conservation and Lands, and Roads ACT) that were the owners of the leases. The development application was assessed and approved by ACTPLA's Development Services Branch, in a process similar to any other development.

CONCLUSION

4.26 The basic pond design and location was largely decided by ACTPLA before receiving results of the detailed geotechnical testing. The detailed geotechnical testing identified significant risks associated with the proposed design in relation to the site and recommended a series of measures be implemented for managing these risks (primarily associated with protecting the Interceptor Sewer and the former sewerage treatment plant).

4.27 The geotechnical testing noted the serious risks associated with constructing the pond adjacent to the Interceptor Sewer and recommended the construction of an additional redundancy line. This was not adopted. The revised pond design, decided in January 2011, avoids the Interceptor Sewer.

4.28 ACTPLA's acceptance process for the design of the pond was not adequate, and there was a lack of an overall, rigorous analysis of the feasibility of the pond, as designed, including an analysis of the risks associated with the design of the pond and the potential impact on the project's design and cost objectives.

5. CONSTRUCTION OF THE POND

INTRODUCTION

5.1 This chapter assesses ACT Government agencies' activities during the construction phase of the pond project, including remediation activities.

KEY FINDINGS

- Under the contractual arrangements agreed with the construction contractor (Hewatt Earthworks), Roads ACT paid for the removal of contaminated material on a volume basis. The tender brief for the construction phase included estimates of the likely quantities of asbestos containing material to be removed from the site, based on the quantities identified in the Remedial Action Plan. The estimated quantities proved to be substantially less than the quantities disposed of as 'asbestos containing material,' and recorded as such, during construction. The project budget was exceeded largely due to the need to pay higher than expected removal costs.
- Early in the construction phase, the initial Remedial Action Plan informed ACT Government agencies' (including Procurement Solutions and Roads ACT) activities for the management of asbestos containing material on the site. In the absence of any ACT, national or New South Wales guidelines, a 'zero tolerance' approach was adopted, whereby 'no known asbestos was to remain on site' nor were any asbestos fibres to remain in the soil. This established a conservative approach for the treatment of asbestos containing material at the site.
- During the construction phase, ACT Government agencies (Procurement Solutions and Roads ACT) treated fill containing builders' rubble as asbestos containing material, which required it to be removed from the site. This reflected the likelihood that builders' rubble included asbestos containing material, as well as the perceived impracticality of adopting on-site treatment options, such as sieving, to separate asbestos containing material from the fill. Decision-making processes at this time were not well documented, including assessing the impracticality of adopting on-site treatment options or their cost implications. In addition, there was a requirement in the revised Remedial Action Plan that identified the site's topsoil as both geotechnically unsuitable material and asbestos containing material.
- The records maintained do not distinguish between the type of material (asbestos containing material or geotechnically unsuitable material) removed from the site.
- In May 2010, the higher than expected volumes of material treated as 'asbestos containing material' and resulting costs led to the adoption by ACT Government agencies (ACT Procurement Solutions and Roads ACT) of an alternative, more flexible and risk-based approach, which allowed low-risk asbestos containing material to remain on-site. This was facilitated by the Environment Protection Authority's adoption of revised guidelines for managing contaminated material. A revised Remedial Action Plan was developed and implemented in June 2010 to facilitate this. Although the new Environment Protection Authority guidelines and the revised Remedial Action Plan provided ACT Government agencies with

more flexibility for managing asbestos at the site, large amounts of asbestos containing material continued to be removed off the site, because the concentration of asbestos exceeded the acceptable threshold.

- Work at the site recommenced on 8 March 2011. The completion of a revised, smaller capacity pond, as approved by the Minister for Transport in January 2011, is estimated to cost $43.4 million, $22.6 million (or 109 percent) more than the originally budgeted amount of $20.8 million.

BACKGROUND

5.2 Contracts for the construction of the pond and adjacent road works were combined as the two projects were considered to complement each other, particularly given the opportunity to use cut and fill material.

5.3 Hewatt Earthworks Pty Ltd (Hewatt Earthworks) was engaged through a tender process for the construction of the pond and road. Hewatt Earthworks was managed by Procurement Solutions on behalf of Roads ACT. Following on from its role in the final design of the pond, Cardno Young was appointed as superintendent and was assigned to monitor and sign-off stages of the project.

5.4 The intention was to remediate the site simultaneously with construction work. As both pond construction and remediation work involved significant earthworks it was cost effective to do them at the same time.

TENDER BRIEF REQUIREMENTS

5.5 In September 2009, Procurement Solutions advertised the tender for the construction phase of the project, from which three tenders were received and reviewed by Procurement Solutions and Cardno Young. Hewatt Earthworks was selected as the preferred tenderer and the contract for the construction of North Weston Pond and Molonglo Infrastructure Stage 1A was executed on 21 January 2010. Construction commenced on 6 April 2010. The contract was valued at $38.25 million and represented more than 70 percent of the total approved budget of the whole North Weston Pond and Molonglo Infrastructure projects ($54.5 million).

5.6 Audit reviewed the tender process and identified that:

- the final design of the pond had not been settled when the tender was released (it was finalised in January 2010);
- the development application had not been approved when the tender was released (it was approved and finalised in early December 2009); and
- key tender documents were finalised by Cardno Young only days before the tender was released.

5.7 Furthermore, TAMS' Certificate of Design Acceptance for the pond (which signifies that the design of the works is acceptable, to the extent that it complies with the plans, specifications and requirements) was not issued until 15 March 2010. This indicates that the tender was released before key aspects of the project had been settled.

5.8 Representatives from Hewatt Earthworks and Cardno Young advised that the tender process was compressed, for a project of this size and magnitude. The tender was advertised on 16 September 2009 with responses due on 29 October 2009. The due date was extended twice, however, with final tenders due on 19 November 2009.

5.9 The tender documents advised prospective tenderers of the potential for contaminated material to be present on site:

> Environmental investigations undertaken at the site have identified several areas where contamination poses a potential risk to human health and the environment, including a landfill, uncontrolled fill, grease trenches and underground tanks impacted with total petroleum hydrocarbon and demolition waste which contains asbestos containing material.

5.10 Under the heading 'Asbestos occurrences – soil' the tender brief advised:

> The potential exists for additional buried asbestos containing material to be present ... Such materials may not be encountered until earthworks commence. Therefore remediation efforts may not be solely limited to the areas in this report. All additional occurrences of asbestos containing material, if any, will require remediation.

5.11 The tender brief identified that remediation works were to:

> reduce the ... contamination at the site to a level that does not pose an unacceptable risk to human health and the environment under a sensitive land use setting, in order to provide for appropriate future land use.

Estimation of quantities

5.12 The tender brief identified approximate amounts of waste material (including contaminated material) that would need to be disposed of off-site. Prospective tenderers were expected to use this information to offer a schedule of rates for the disposal of spoil material.

5.13 Cardno Young was responsible for preparing the tender documents. As noted previously, estimated quantities for contaminated material were derived from the Remedial Action Plan.

5.14 Table 5.1 shows the predicted quantity of waste material to be removed off-site and the actual waste material recorded as removed off-site (as of November 2010).

5.15 As discussed at paragraph 5.49, during construction fill containing significant amounts of builders' rubble was removed off-site and recorded as asbestos containing material. Records of materials removed from the site do not distinguish between the type of material removed (that is, whether it was asbestos containing material or geotechnically unsuitable material).

Table 5.1: Predicted quantities and recorded quantities of waste material as at November 2010

Description	Predicted quantity (tonnes)	Recorded quantity removed (tonnes)
Inert waste	1 425	13 200
Solid waste	7 800	
Industrial waste	30	
Hazardous waste	30	
Asbestos waste	405	90 500
Other unsuitable material	30 000	(a further 25 000 tonnes remain stockpiled on site for assessment and potential removal)

Note: The predicted quantity of spoil material in the tender brief was expressed in cubic metres, while the actual quantity of material removed was expressed in tonnage. Audit has converted the predicted quantities into tonnage at a conversion rate of 1 m^3 = 1.5 tonnes

Source: North Weston Pond Tender Brief and Hewatt Earthworks Contaminated Material Record

5.16 The per unit cost for the removal of asbestos containing material was approximately 20 times the per unit cost for the removal of unsuitable material.

5.17 Fill containing builders' rubble was treated as asbestos containing material. In addition, there was a requirement in the revised Remedial Action Plan that identified the site's topsoil as both geotechnically unsuitable material and asbestos containing material. The above table shows that 90 500 tonnes of material was treated as contaminated and removed off-site.

5.18 Handling a substantially higher volume of material as 'asbestos containing material' was a key factor in the significant increase in project costs. In October 2010, it was estimated that the cost of transporting contaminated material off-site would be $9.5 million. The originally budgeted cost was $1.8 million.

Pricing methodologies

5.19 The tender brief and associated construction contract were conventional in practice. The contract included a pricing schedule of rates against the identified provisional quantities of material to be removed. This practice is common for excavation work and is appropriate where there is a reasonable degree of certainty about the quantities. In this situation, it is appropriate to identify a per unit price for removal of materials to appropriately evaluate tenders and lock in expected costs for the project.

5.20 There are risks with such an approach, however, where there is a possibility that the predicted quantities will vary considerably from initial estimates. In these circumstances, alternative pricing methodologies may be more appropriate, such as the provision of renegotiation points for schedules of rates if higher volumes are reached. A variety of such approaches are currently in use within the construction industry, particularly for dealing with the uncertainty of contaminated land.

5.21 At the time of the tender process, Procurement Solutions' staff believed the quantities of asbestos containing material estimated by Cardno Young (on the basis of information in the Remedial Action Plan) to be sufficiently accurate to use a conventional pricing methodology. A better understanding of the risks of the site, the appropriateness of the testing and its inherent limitations, could have identified that such an approach had higher-than-anticipated risks.

5.22 Accordingly, there may be an opportunity for Procurement Solutions to recognise these alternative approaches in pricing methodologies for future projects.

Recommendation 8

For projects on contaminated sites, ACT Procurement Solutions should consider using alternative pricing methodologies that can provide better value for money for the excavation and removal of contaminants during the construction stage.

MANAGING THE REMOVAL OF CONTAMINATED MATERIAL

5.23 Initial key documents that provided the framework for the management of contamination on the site during construction were:

- the Remedial Action Plan, produced by SMEC in September 2009 (the Plan was revised in June 2010); and
- the Remedial Works Plan, produced by Hewatt Earthworks in March 2010.

Remedial Action Plan

5.24 The purpose of the Remedial Action Plan was to articulate a strategy to 'reduce residual contaminant concentrations within the site to acceptable levels, in accordance with environmental protection policies.' Following the remediation strategies identified in the Remedial Action Plan, it was intended that the site would be suitable for its intended use.

5.25 With respect to asbestos, the original Remedial Action Plan states:

> To date, there are no national, NSW DECC or ACT EPA endorsed guidelines relating to human health or the environmental investigation of material containing asbestos on sites. Hence the EPA provisional criteria of no free fibres in soils has been adopted. In addition, no known [asbestos containing materials] are to remain on site. Further information regarding Asbestos Criteria and Remediation will be provided by the engaged occupational hygienist.

5.26 This is essentially a 'zero tolerance' approach for managing asbestos found during construction; that is, no asbestos or asbestos containing material was to remain on site.

5.27 In June 2010 the Remedial Action Plan was revised to recognise the Environmental Protection Authority's adoption in May 2010 of the Western Australian guidelines for the assessment, remediation and management of contaminated sites. The revised Remedial Action Plan allowed for soil considered

to be 'low-risk' (generally where asbestos content is below 0.02 percent) to be reused on-site, below one metre of fill.

Remedial Works Plan

5.28 The purpose of the Remedial Works Plan was to outline Hewatt Earthworks' approach to managing the classification and removal of contaminated material found during construction.

5.29 When developing the Remedial Works Plan in March 2010, Hewatt Earthworks questioned the accuracy of the September 2009 Remedial Action Plan and communicated its concerns to Cardno Young and Procurement Solutions.

Confirmation of expected quantities of asbestos containing material

5.30 Partially in response to Hewatt Earthworks' concerns, a meeting was held on 6 April 2010 between Cardno Young, SMEC, ACTPLA and Procurement Solutions to discuss the accuracy of the testing and the expected quantities of asbestos containing material. There was no representative present from the project owner, Roads ACT.

5.31 At the meeting, Procurement Solutions sought confirmation from SMEC on whether the amount of asbestos containing material identified (270 m^3, or 405 tonnes) was correct. According to Procurement Solutions notes of the meeting, SMEC 'expressed a good level of certainty of the quantity of various types of contaminated material and asbestos containing material'. However, some variation could be expected at the northern site (close to the former sewerage treatment plant) of between five percent to seven percent and that:

> 'this means that some additional asbestos containing material can be reasonably expected ... [this] can present an additional 2 450m^3 of asbestos containing material'.

5.32 This revised estimate (approximately a ten-fold increase) had an implication for the project and project budget, particularly as contractual arrangements, including the agreed schedule of rates, had already been agreed with Hewatt Earthworks.

5.33 There is no evidence that Procurement Solutions recognised the implications of the revised estimate on the project budget. This information should have prompted a concerted inter-agency effort to manage the potential additional costs. This may have involved temporarily halting the project to obtain a better understanding of the likely quantity of contaminated material on the site.

5.34 However, any delays to the project caused by Procurement Solutions or other ACT Government agencies could result in significant prolongation costs that could be claimed by the contractor.

REMOVAL OF CONTAMINATED MATERIAL

5.35 Construction of the pond commenced on 6 April 2010. Asbestos containing material was first recorded as removed from the site on 14 April 2010.

5.36 On the first day of remediation, 1 500 tonnes of the waste material was recorded as removed from the site.[1] By 21 April 2010, ACT Procurement Solutions reported that 9 000 tonnes had been recorded as removed from the site[2] and by 2 July 2010 Hewatt Earthworks reported that 27 694 tonnes had been recorded as removed. By November 2010, Hewatt Earthworks reported that 90 500 tonnes had been recorded as removed from the site, with a further 25 000 tonnes stockpiled for further testing. As noted previously, these figures do not necessarily represent the amount of asbestos containing material removed from the site.

Consideration of alternative approaches to managing contaminated material

5.37 On 13 April 2010 (the day before the removal off-site of excavated waste material commenced), a regular on-site meeting was held at which Hewatt Earthworks, Procurement Solutions, SMEC and Cardno Young were present. During this meeting alternative approaches to managing the risks of asbestos contamination were discussed. Two options were discussed:

- no asbestos containing material was to remain on-site [as per the Remedial Action Plan] and any builders' rubble that was found would be assumed to contain contaminated material and subject to a visual inspection by SMEC and the environmental consultant. If any asbestos was observed or detected during this process, it was to be removed off-site; or
- low-risk asbestos containing material could remain on-site, being buried and capped, thereby avoiding the need for removal, provided the eventual land owner was willing to implement a long-term Asbestos Management Plan. Any builders' rubble would be assumed to contain asbestos, unless proven otherwise through a visual inspection process.

5.38 No resolution was reached at the meeting, other than to refer a decision on the preferred option to Procurement Solutions in consultation with the Environment Protection Authority. Nevertheless, both options provided that builders' rubble be assumed to contain asbestos contaminated material (and disposed of as such).

5.39 Subsequent activities and records indicate that Procurement Solutions and Roads ACT continued with the first option (in accordance with the Remedial Action Plan) and continued to remove all such material off-site (records show that any asbestos containing material identified in excavated material was removed off-site). This decision was not documented. Consequently, there was no evidence to indicate that Procurement Solutions recognised the implications of the decision, or its potential impact on project costs. Nor is there evidence that Roads ACT (the project owner) was involved or informed of this development.

5.40 Further discussion about alternative approaches to the management of asbestos contamination risks represented an opportunity for ACT Government agencies to

[1] In a letter to ACT Procurement Solutions on 30 April 2010, Cardno Young reported that 1 000 cubic metres was removed off site on the first day of construction. Audit has equated this amount to 1 500 tonnes (1 cubic metre = 1.5 tonnes).

[2] In an e-mail to Cardno Young on 21 April 2010, ACT Procurement Solutions identified that more than 6 000 cubic metres had been removed off site by 21 April 2010. Audit has equated this amount to 9 000 tonnes (1 cubic metre = 1.5 tonnes).

manage the potential cost increases for the project. However, financial penalties may have been incurred by the ACT Government, in accordance with the contract, if decisions were made that delayed construction activities on the site.

Treatment of builders' rubble as contaminated material

5.41 On the first day of removal of the asbestos containing material (14 April 2010), Hewatt Earthworks was prepared to remove asbestos containing material from the site. SMEC, which was responsible for assessing each load excavated to identify whether it was contaminated, had a representative on site for this purpose. The SMEC representative communicated their concerns that material that may not have contained asbestos was being moved off-site.

5.42 SMEC's representative was concerned that:

- the level of contamination varied but was generally low;
- the contaminants were widespread across the site; and
- insufficient time was being allowed by the contractor to adequately assess each load of excavated material.

5.43 A report from Cardno Young to Procurement Solutions confirmed SMEC's concerns and advised:

> there was some concern also with the approach taken that defines all material containing building rubble as [asbestos containing material] and the reluctance from Hewatt Earthworks to comply [with] the instruction [from SMEC] to stockpile building material not containing visible asbestos because of previous discussions deeming all building rubble to be contaminated'.

5.44 These concerns were discussed on 15 April 2010 in a meeting between Hewatt Earthworks, SMEC and Cardno Young. In response, a Hewatt Earthworks' foreman was assigned to assist the SMEC representative in communicating whether to stockpile material or whether to take it off-site.

Figure 5.1 – North Weston Pond site, showing builders' rubble in excavated trench

Source: SMEC – photograph taken April 2010

Reports on fill containing asbestos containing material

5.45 On 19 April 2010, in response to the large amounts of material treated as asbestos containing material being removed off-site, SMEC sent a letter to Procurement Solutions advising:

> The initial gross excavation works on the site ... indicated that asbestos containing material is contained within significant areas of the fill. To date asbestos containing material, contaminated rubble and soil has been identified at 1-2 metres depth within the builders' landfill (area of environmental concern 2) section of the site … The concentration of bonded asbestos containing material fill is very low.
>
> However, these concentrations of asbestos containing material appear to be present in much of the fill associated with building rubble. Consequently, high volumes of fill contain low level asbestos waste, as the fill contains significant levels of rubble.
>
> Given the volume of fill material being excavated, and the physical nature of the material, it is considered impractical to provide onsite treatment such as sieving. It is also difficult to segregate fill containing rubble and asbestos containing material from fill containing rubble with no asbestos containing material. In the original Remedial Action Plan, all the asbestos containing material is to be directly disposed offsite. Given the volume of fill that contains rubble across the site, and which may contain asbestos containing material, a different approach is required to reduce the volumes being disposed of as asbestos waste.

5.46 On 22 April 2010, Hewatt Earthworks was instructed to stop removing excavated material off-site while alternative solutions were considered to manage the risks associated with this material. Hewatt Earthworks was redirected to excavate other non-contaminated parts of the site during this period. This action was taken to mitigate project delay costs until alternative solutions were found.

5.47 A series of inter-agency and consultant and contractor meetings occurred around this time. One outcome of these meetings was that, in May 2010, the Environment Protection Authority adopted technical aspects of the Western Australia Department of Health *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in WA*. The WA Guidelines provided more flexibility for managing risks associated with asbestos containing material on contaminated sites, including recognising tolerance levels at which it was deemed safe for asbestos containing material to be present.

5.48 In June 2010 a revised Remedial Action Plan was implemented. This plan allowed for stockpiling of material into categories for assessment and treatment depending on the on-site assessment by SMEC and the environmental consultant. The revised Remedial Action Plan:

- required that 100 millimetres of topsoil at the site should be treated as 'industrial waste containing asbestos.' The material was identified as 'geotechnically unsuitable material and not considered suitable for any reuse options'; and
- allowed for the assessment of other site material, and where considered to be 'low-risk' (generally where asbestos content is below 0.02 percent), this could be re-used on-site, below one metre of fill. Material was stockpiled on site while samples were being assessed.

5.49 In practice, any fill that contained more than 20 to 30 percent of builders' rubble was treated as high-risk material, recorded as 'asbestos containing material' and removed off-site.

5.50 In June 2010, Hewatt Earthworks recommenced the removal of asbestos containing material off-site. Considerable amounts of material continued to be removed off-site, reflecting a combination of factors, including the:

- greater than expected amount of asbestos containing material on site;
- assumption that builders' rubble contained asbestos containing material;
- impracticality of adopting on-site treatment services such as sieving; and
- difficulty in segregating fill containing rubble and asbestos containing material from fill containing rubble that had no asbestos containing material; and
- inability to reuse geotechnically unsuitable material.

5.51 Procurement Solutions advised that adopting on-site treatment services was considered expensive and time-consuming, for the original estimated quantities, and would have involved variations to the construction contract to allow for alternative approaches to be adopted.

5.52 The continuing removal of waste material off-site was to have a significant impact on the project costs. ACT Government agencies, including Procurement Solutions and Roads ACT, recognised the cost implications and sought to address these through a number of initiatives, including:

- receiving a waiver of tip fees from the landfill sites; and
- seeking to renegotiate contractual rates with Hewatt Earthworks.

5.53 During this period, estimates of the material to be treated as asbestos containing material on site varied considerably. For example:

- on 22 June 2010, it was estimated by Hewatt Earthworks that 18 000 tonnes remained to be removed off-site (in addition to 16 000 tonnes already removed); and
- on 24 August 2010, it was estimated by Hewatt Earthworks that a total of 63 000 tonnes was to be removed off-site.

5.54 These estimates have since proved to be too low (with up to 90 500 tonnes having been recorded as removed off-site as at November 2010). These estimates are included in the report to demonstrate the imperfect information that was available to ACT Government agencies, consultants and contractors during this period.

CONCLUSION

5.55 The discovery of more asbestos containing material than expected, followed by undocumented decision-making to treat all builders' rubble as if it were asbestos containing material, led to large amounts of material being removed over a short period at the start of the contract. Although communication of these issues was reasonably quick (a small number of weeks), a large and costly volume was moved before the project was suspended. Key operational decisions, which had a significant impact on project costs, were being made prior to and during this period, but were not well documented.

APPENDIX A: AUDIT OBJECTIVE, APPROACH AND METHODOLOGY

AUDIT OBJECTIVE

The audit objective was to provide an independent opinion to the Legislative Assembly on whether the processes adopted by ACT Government agencies in planning and delivering the North Weston Pond in the Molonglo Valley were effective. In particular, the audit focuses on the effectiveness of ACT Government agencies in managing contamination and geotechnical risks associated with the pond project.

SCOPE AND FOCUS

The audit examined the management of risks associated with the site of the North Weston Pond.

The audit focused on three key processes or activities:

Process/Activity	Key agency
Environmental assessments and surveys to detect contaminated material and design of the ponds to account for geotechnical issues, including the Molonglo Valley Interceptor Sewer.	ACTPLA/Procurement Solutions
Approval and sign-off of environmental assessments and surveys and identification of remediation and mitigation strategies.	ACTPLA/ Environment Protection Authority /Procurement Solutions
Recognition of contaminated material risks in pond construction and management of the design and construction phases.	TAMS/Procurement Solutions

Audit considered the following issues:

- the adequacy of Territory records and information to identify the existence and extent of contaminated material on the site;
- the adequacy of environmental surveys and assessments undertaken during the planning process to identify the existence and extent of contaminated and geotechnical material;
- the adequacy of the environmental approval and sign-off process for the construction of the North Weston Pond, including identification and consideration of any remediation and mitigation strategies that are to be implemented;
- the adequacy of any activities or strategies to recognise and incorporate remediation and mitigation requirements in the pond construction process; and
- how geotechnical issues were investigated and volumes of contaminated materials were estimated.

AUDIT METHODOLOGY

The performance audit was conducted under the authority of the *Auditor-General Act 1996*, and in accordance with the principles, procedures, and guidance contained in Australian Auditing Standards relevant to performance auditing. These standards prescribe the minimum standards of professional audit work expected of performance auditors. Of particular relevance is the professional standard on assurance engagements - *ASAE 3500 Performance Engagements*.

The audit approach and methodology consisted of:

- compiling a timeline of relevant information relating to the history of the site;
- reviewing ACT Government records and information to identify the information recorded for the site;
- discussing administrative processes with relevant ACT Government agency representatives;
- reviewing the completeness and reliability of environmental assessments and surveys undertaken for the project; and
- reviewing procurement processes and contracts relating to environmental assessments and surveys conducted for the project as well as the construction of North Weston Pond.

The above activities involved a review of files and other documentation maintained by ACT Government agencies, including ACTPLA, DECCEW and TAMS (including Roads ACT and Procurement Solutions), and discussions with management and staff of relevant agencies.

Audit also met with representatives of most of the consultants and contractors involved in the planning for the pond, including representatives from:

- Coffey Geosciences;
- SMEC;
- Douglas Partners;
- Cardno Young;
- CM Jewell and Associates; and
- Hewatt Earthworks.

Audit also engaged Sinclair Knight Merz (SKM) to provide additional environmental and geotechnical advice.

APPENDIX B: KEY PROCESSES AND EVENTS

Timeframes	Key processes and events	Description
2004	Canberra Spatial Plan	In 2004, the Canberra Spatial Plan identified the Molonglo Valley as the next major area for residential development within the ACT.
July 2004 to May 2005	Preliminary Geotechnical and Contamination Constraints Study	The purpose of the Preliminary Study was to assess broad geotechnical and environmental constraints to urban development within the Molonglo Valley area. Coffey was engaged in July 2004 and the report was delivered in May 2005.
May 2005 to February 2006	Environmental Site Assessment Phase 1	The purpose of the Phase 1 Assessment was to: • identify potential areas of environmental concern and potential contaminants of concern; • assess potential planning constraints to development; conduct preliminary soil and groundwater sampling to assess the sites contamination status; and • assess the scope of work and budget estimates required for further Phase 2 investigations and a Phase 3 Remedial Action Plan. Coffey was engaged in May 2005 and the report was completed in February 2006.
February 2007 to February 2008	Review of North Weston Pond design options.	The purpose of the review was to undertake pond layout options, provide plans and details for the pond and provide a detailed assessment of related major sewer protection and/or relocation options. This was completed by Bill Guy and Partners in February 2008.
November 2007 - ongoing	Engagement of the Contaminated Site Auditor	The role of the Contaminated Site Auditor was to: • review the work of the Environmental Site Assessor (SMEC) and • issue Site Audit Statements to certify that the land is suitable for its intended use. The auditor also reviewed the draft Sampling Analysis and Sampling Plan (Sampling Plan) prepared in Phase 1. CM Jewell and Associates was engaged in November 2007.

Timeframes	Key processes and events	Description
November 2007 to December 2007	Project brief prepared for Phases 2 and 3	ACTPLA, with Procurement Solutions, prepared the project brief for Detailed Geotechnical Investigation and Environmental Site Assessment Phases 2 and 3. This used input from the Environmental Site Assessment Phase 1 report and advice from the Contaminated Site Auditor and Environment Protection Authority.
November 2007 to March 2008	Tender process for Phases 2 and 3	Initial tender process, which was conducted from November 2007 to January 2008, did not have an outcome. A revised tender process was conducted from January to March 2008. SMEC was selected as the preferred tenderer, with Douglas Partners as a subcontractor for geotechnical investigations.
April 2008 to September 2009	Detailed Geotechnical Investigation and Environmental Site Assessment Phases 2 and 3 North Weston and Molonglo Valley Suburbs 1 and 2	The purposes of Phase 2 and 3 assessments included developing an Sampling Plan and excavation and analysis according to the Sampling Plan. The Phase 3 Remedial Action Plan was to assess remedial options for all areas of environmental concern. The consultant was also required to provide a short-term Environmental Management Plan for the management of the site during construction of the pond. SMEC was prime contractor for environmental assessment, with Douglas Partners responsible for geotechnical assessment. SMEC and Douglas Partners were engaged in April 2008, with work ongoing to September 2009.
July 2009	EIS exemption granted	ACTPLA sought and received an Environmental Impact Statement exemption from the Minister for Planning.
August 2009 to November 2009	Development Application	Development application lodged for the construction of the pond on 31 August 2009. ACTPLA approved the development application on 26 November 2009, with amendment on 7 December 2009.
September 2009 to November 2009	Tender process for Pond construction	Tender advertisements on 16 September and 26 September 2009. Hewatt Earthworks was identified as the preferred tenderer.
April 2010	Construction work commenced	Construction work commenced 6 April 2010.
April 2010	Construction work temporarily stopped	Construction work temporarily stopped on 22 April 2010 to identify alternative solutions to the greater than expected amounts of asbestos containing material.

Timeframes	Key processes and events	Description
May 2010	EPA adopts technical aspects of WA Dept of Health 'Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in WA'	Adoption of the WA Guidelines allows more flexibility for managing asbestos containing material that is found on site. In response, a revised Remedial Action Plan was prepared and endorsed by the Contaminated Site Auditor.
November 2010	Construction work stopped	Construction work stopped while alternative design options were considered
March 2011	Construction work re-commenced	Construction work re-commenced on revised design option on 8 March 2011.

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