

FEASIBILITY STUDY YARRAMUNDI REACH ROWING COURSE



Client: The National Capital Authority

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Date: June 2007

FEASIBILITY STUDY

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1. EXECUTIVE SUMMARY



In 2006, the National Capital Authority completed the Central National Area - Western Foreshores and Environs Planning Framework. The Framework considered, among other things; land and water use in the western reaches of Lake Burley Griffin. The Framework identified that upgrading the existing rowing course in Yarramundi Reach to an international standard course would have a significant influence over other water and land based activities. The Framework recommended that the proposal be investigated to determine if an upgrade is in fact possible, so that future planning and development can properly account for it.

In 2006, the NCA engaged Tecknos to undertake investigations into the potential of Yarramundi reach to accommodate a rowing course suitable for staging national and international events. This study included surveying, heritage and cost planning sub-consultants sufficient to explore the physical, constructional, heritage and cost implications of upgrading the existing course in Yarramundi Reach to an international standard. It also included an exploration of issues emerging from the study itself, the Planning Framework and other related matters to assess the potential opportunities and constraints of the study area. The study concludes that a master plan and ongoing management decisions within the study area should take into consideration the potential future opportunities for an international rowing facility in Yarramundi Reach.

The study investigated two options for accommodating an international standard course. It concludes that from a physical planning and design perspective there would appear to be no insurmountable technical or course layout obstacles to upgrading the existing 1800m course to a 2000 metre world championship standard. The study notes the potential for impacts on the natural and cultural heritage values of the area and recommends detailed investigation to identify and protect these.

The study also concludes that any upgrade should consider its suitability for use by other aquatic sports such as sprint canoeing and triathlons and take account of water based craft operating on the lake. Further, the study established that the lake edge reshaping and the provision of facilities for a course upgrade would cost in the order of \$37 to \$47 million subject to the preferred alignment. The study notes that a detailed siting and design exercise could reduce this cost.

The study concludes that rowing events of a national and international standard would attract large visitor and media participation, particularly in the instance of major events being staged. It would enhance rowing opportunities in the region and positively influence the perceptions of Canberra in its role as the National Capital both nationally and internationally.

2. INTRODUCTION

Rowing became a popular recreational activity in Canberra not long after Lake Burley Griffin was filled. It attracts participants ranging from school age (the largest single group) to seniors and elite AIS athletes all using the existing permanently buoyed course in Yarramundi Reach (refer Study Area). Lake Burley Griffin is currently home to eleven rowing clubs – their number only limited by existing facilities. Canoeists and distance swimmers also make use of the existing course although there are limitations in relation to the length and width of the current course.

The history of proposals to extend the Yarramundi Reach rowing course is approximately two decades long. Whilst past proposals have suggested extending the existing 1800m buoyed course to a proposed 2150 m length and providing width, subsurface conditions and associated infrastructure to meet all the criteria for an international standard course, past investigations and analysis has been limited.

Given the significance of such a proposal and the influence it would have on other activities within the Yarramundi Reach area, the NCA resolved to revisit the proposal to ascertain not only the likely feasibility but what this would mean for other land and water based uses/activities within the area.

The aim of this feasibility study is to investigate the proposal - including inputs derived from consultation, planning issues, course layout, construction, environmental and heritage impacts, and cost.

3. THE STUDY

3.1 Project Brief

The primary objective of this study has been to determine the design parameters and likely cost of developing an international championship rowing course in Yarramundi Reach but not to prepare actual design proposals. The study also provides an understanding of the key issues of planning and design influencing the existing and potential expansion of the rowing facilities in the Reach.

This study is intended to determine the suitability of the Reach to accommodate an upgrading of the existing rowing facility and sets the stage for decisions to be made in regard to the future use of the Reach for this purpose. In addition, the study identifies a range of activities (both existing and future) that are compatible for collocation with the rowing use. The resulting “Opportunities” plan (refer Section 9 below) proposes a number of propositions for consideration under a future detailed master planning exercise; specifically to identify the most appropriate land uses and ongoing management arrangements for the Yarramundi site.

The study provides sufficient information to enable decisions to be made in regard to the need for continued detailed investigations of an upgraded course in Yarramundi Reach.

The study aims to provide an accurate determination of the FISA course layout rules for a world championship course, the plotting of options overlaid on aerial photographs and then an examination of the impacts such a course might have with regard to several specific criteria: the lake itself, surrounding foreshore areas, construction cost as well as heritage and environmental constraints. In addition an initial stakeholder consultation process was undertaken to understand possible responses that might be associated with a proposed course upgrade. Given the heritage significance of the area this was supplemented with input from a specialist heritage consultant.

3.2 Project Team

Andrew Smith	NCA (Director of Projects)
Bruce Chalmers	NCA (Project Manager)
Sri Tharan	NCA (Contracts Manager - Lake Burley Griffin and Scrivener Dam)
Ros Ransome	NCA (Heritage Officer)
Andrew Metcalf	Tecknos Architecture (Principal Consultant)
Ken Taylor	Heritage (Heritage Sub-Consultant)
Alex Feng	Donald Cant Watts Cork (Cost Sub-Consultant)
David Sloan	LandData (Surveyor)

3.3 Sources

A range of documents exist that are relevant to the study, including:

- National Capital Plan
- Australian Capital territory (Planning and Land Management) Act
- CNA West Planning Framework and Consultation Report
- Lake Burley Griffin Management Plan, 1995
- NCA Environment Policy
- NCA Lake Policy
- NCA 2007 (Draft) Heritage Assessment for Lake Burley Griffin
- Memorandum of Understanding between the NCA, Environment ACT and the Department of Environment and Heritage in relation Threatened Species and Endangered Ecological Communities
- Action Plans for threatened species or ecological communities within the Study Area (Environment ACT)
- Yarramundi Reach Water Supply Master plan - Draft (DUS/Bill Guy and Partners)
- National Museum of Australia - Site Investigation - Infrastructure
- National Museum of Australia - Site Investigation - Geotechnical Investigation
- FISA Rules of Racing – Appendix 1 (Courses)

4. STUDY CONTEXT

4.01 Study Area

The study area encompasses the entire western end of Lake Burley Griffin extending up to Parkes Way to the north and west. It includes a range of lake edge land, which for the most part is non-urban open space. This land adjoining Yarramundi Reach comprises:



Southern edge: National Zoo and Aquarium
Government House (“Yarralumla”)
Westbourne Woods
Royal Canberra Golf Course

Eastern Edge: Yarralumla Nursery
Weston Park
Black Mountain Peninsula

Northern Edge: Road Corridor (Lady Denman Drive and Parkes Way)
Black Mountain

Western Edge: Yarramundi [including Burringiri Cultural Centre and Lindsay Pryor National Arboretum), protected natural temperate grasslands

The existing 1800 metre rowing course runs through the long axis of Yarramundi Reach and is not suitable for staging international or World Championship events in its present configuration.

Existing land uses within the study area include Lindsay Pryor National Arboretum, Weston Park, Royal Canberra Golf Course, Government House, Scrivener Dam and associated maintenance facilities and site offices, and the Aboriginal and Torres Strait Islander Cultural Centre - Burringiri.

The predominant land use activities include cycling, lake based recreational and sporting activities, such as rowing, sailing, canoeing, fishing and swimming. The foreshore areas are very popular for informal recreation although vehicular access is restricted to weekends in the case of the western edge of the Reach.

Yarramundi was once earmarked for the National Museum of Australia and a visitor centre remains on site, including an administration building and a theatre/exhibition building. These buildings are now leased and occupied by the ACT Aboriginal and Torres Strait Islander Cultural Centre: Burringiri.

4.02 Planning Context

4.02.1 National Significance

In its overall prescription for national significance, the *National Capital Plan* (p.5) lists the following requirements and objectives in the planning and development of Canberra:

- The pre-eminence of the role of Canberra and the Territory as the National Capital.
- The reservation and enhancement of the landscape features, which give the National Capital its character and setting.
- Respect for the key elements of Walter Burley Griffin's formally adopted plan for Canberra.
- Creation, preservation and enhancement of fitting sites, approaches and backdrops for national institutions and ceremonies as well as National Capital Uses.
- The development of a city, which both respects the environmental values and reflects national concerns with the sustainability of Australia's urban areas.

The Yarramundi Reach study area falls within the scope of these requirements and objectives.

4.02.2 Statutory Planning Framework

The planning, development and management of Canberra and the Territory is undertaken within the framework of the:

- legislative requirements of the *Australian Capital Territory (Planning and Land Management) Act 1988*;
- objectives of the *National Capital Plan*;
- matters of national significance; and
- matters required to be included in the *National Capital Plan* to enhance and protect the special character of the National Capital.

The broad Land Use Policies set out in the *National Capital Plan* for the study area relate to policies on non-urban land use. The non-urban land uses contribute to the scenic backdrop and natural setting for the Central National Area and urban areas of the National Capital.

The land uses identified in the study area under the *National Capital Plan* are:

- National Capital Use (Government House), Yarramundi Reach Open Space (Park).
- Restricted Access Open Space (Royal Canberra Golf Course).
- Administrative and Utility Service (Yarralumla Nursery).

Lying within the National Capital Open Space System (NCOSS), the Lake is part of the nationally significant open space framework, visual backdrop and landscape setting for the National Capital, and contributes to the system that protects the environmental quality of the city. The Lake's overall management is guided by the principles and policies of the National Capital Plan and the Lake Burley Griffin Management Plan 1995. This plan acknowledges a range of uses for the Lake, consistent with the policies of the National Capital Plan.

The above policies direct that the water quality and hydraulic operation of the Lake be maintained in a manner that protects the Lake and its foreshores, as well as their visual and symbolic roles. Should the water quality of the Lake not be managed effectively, these functions and values could be compromised, leading to stakeholder and community dissatisfaction.

4.02.3 CNA Western Foreshores and Environs (Draft) Planning Framework

On 24-25 December 2001 bush fires destroyed a significant area of pine forest and native landscape in the area of Yarramundi Reach near Scrivener Dam including a small triangular plantation on national land off Lady Denman Drive. There has been considerable debate since then concerning the options for replanting vegetation lost on both National and Territory Land and the future land use of these areas.

The fires in January 2003 extended the debate and led to the initiation of a review the current land use provisions for both the National Land areas damaged by the 2001 fires and of adjacent Territory Land (in Designated Areas). A comprehensive study by the National Capital Authority of the western reaches of Lake Burley Griffin and environs commenced in January 2004 to review existing planning policies and prepare a Planning Framework to set the strategic planning direction for the development and management of the Designated Areas at the western end of the lake including Yarramundi Reach.

The *Planning Framework* concluded that the area:

"... should continue to contribute to the "green heart" of the city (with an emphasis on public access). The land (and water) should be developed as a metropolitan-scale recreation or urban edge park, integrating new and existing land uses and facilities to encourage active and passive recreation and tourist uses in a manner that optimises opportunities offered by the areas central location, unique heritage and waterway frontages."

The *Planning Framework* also noted:

- The important visual role of the site due to its visibility across the lake from the Central National Area, Yarralumla and Government House.
- The inlets of the Yarramundi shoreline (Acacia to the north, and Yarramundi to the south) provide important habitats for waterbird species, both common and rare including the Latham's Snipe *Gallinago hardwickii* (in Acacia Inlet).
- A general lack of services, vehicular access and parking at Yarramundi Reach.

4.04 Site Characteristics

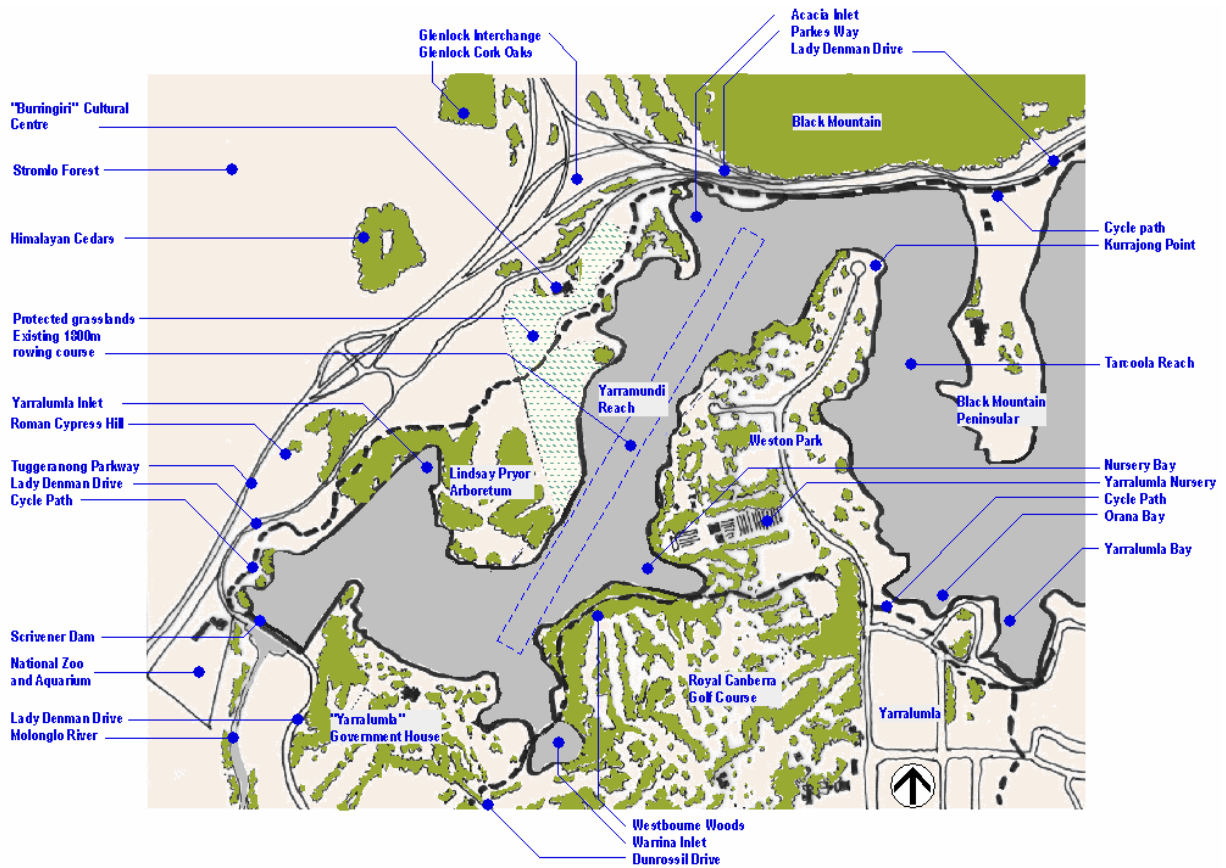
Prior to the 2001 fires a large section of the western edge of the study area had been planted for the production of commercial softwood. These areas were located between Lady Denman Drive and the Tuggeranong Parkway, encompassing Roman Cypress Hill, and extending south to Barrenjoey Drive.

The area previously planted with pines by ACT Forests was left bare following the fires and was subsequently overtaken by weeds and uncontrolled pine regrowth. The NCA has removed woody weeds and pine wildings to address fire hazard issues and regraded the previously deep ripped forested areas.



Vehicular access to Lindsay Pryor National Arboretum and the Acacia Inlet headland is only available on weekends. The toilet block at Acacia Inlet has only recently been reopened with the reinstatement of a temporary water supply from Black Mountain Peninsula. This same supply has recently been extended to serve Burringiri although it is not considered to be a long term solution as it is connected to a major reservoir bulk supply main at Black Mountain Peninsula.

Importantly, Yarramundi is the last major National Land site reserved for National Capital Use in the Central National Area.



5 COURSE LAYOUT

The current buoyed rowing course is 1800 metres long with 6 lanes (each 13.5m wide). Whilst the course is relatively sheltered and has good bank characteristics, it is 200m too short. It is also , too narrow and too shallow to satisfy the pre-requisite design criteria for the staging of international events such as a World Championships or a World Master’s championships. Liaison with senior officials and coaches within the Canberra rowing community led to the FISA Rules as the paramount benchmark specification for course layout and design.

5.01 FISA Rules

FISA or “*Fédération Internationale des Sociétés d’Aviron*” (English equivalent is the International Federation of Rowing Associations) is the governing body of the sport of rowing. It is empowered by its 126 member National Rowing Federations, the National Olympic Committees and the International Olympic Committee to govern the sport of rowing. FISA sets the rules and regulations for the practice of the sport, in all its forms and organises sanctioned World Rowing events.

The following is an extract from the FISA “Rules of Racing” – Appendix 1 (Courses) dated 2/2005:

2.1 General

A standard international course shall be straight and shall not have less than 6 racing lanes. It shall provide fair and equal racing conditions for six crews. For a course constructed after February 2001, there must be a minimum of eight racing lanes. In addition to the 6 racing lanes there must be sufficient water width available to allow crews to get to the start, to warm up and to cool down safely.

For a World Championships or a Rowing World Cup regatta it is recommended to have a minimum of 8 racing lanes available, plus sufficient water width on both sides of the course to allow for both safe traffic patterns and for moving lanes in case of unequal conditions.

2.2 Length of Water

The minimum length of water necessary to contain the standard course is 2,150 m. For a course for Masters the minimum length is 1,150 m.

2.3 Width of Water

The standard international course shall be at least 108m wide i.e. $13.5 + (6 \times 13.5) + 13.5 = 108m$.

The minimum recommended width of the course for FISA Championships and Rowing World Cup regattas shall be at least 135m i.e. $13.5 + (8 \times 13.5) + 13.5 = 135m$. This width is a minimum and is only acceptable if a low level TV road is provided alongside the full length of the course.

The ideal recommended width of the course for FISA Championships and Rowing World Cup regattas shall be at least 162 m i.e. $27 + 8 \times 13.5 + 27 = 162m$. This width allows for traffic movements beside the course and for TV coverage from the water

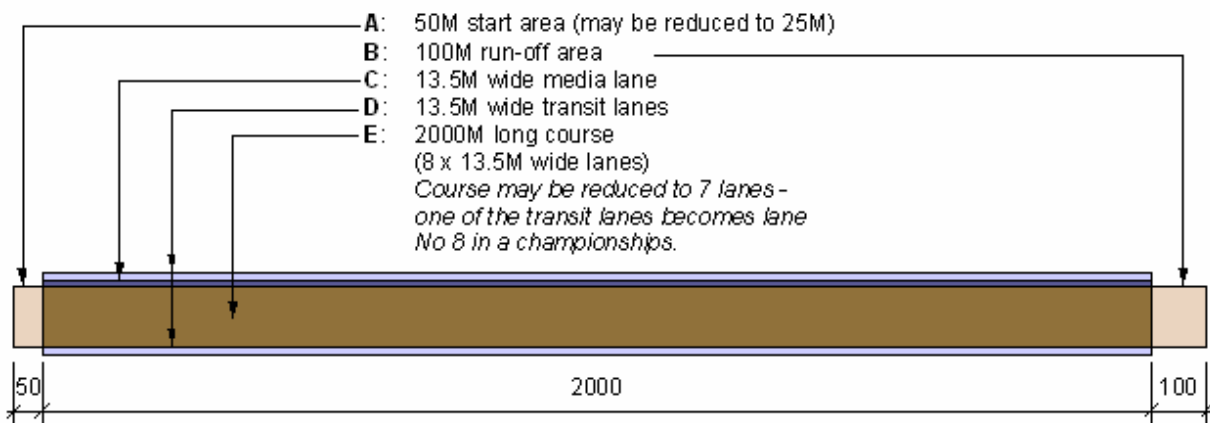
2.4 Depth of Water

For a standard international course the depth of water must be at least 3 metres throughout all racing lanes at the shallowest point if the depth over the course is unequal. However, it is recommended that a course should have a minimum depth of 3.5 metres.

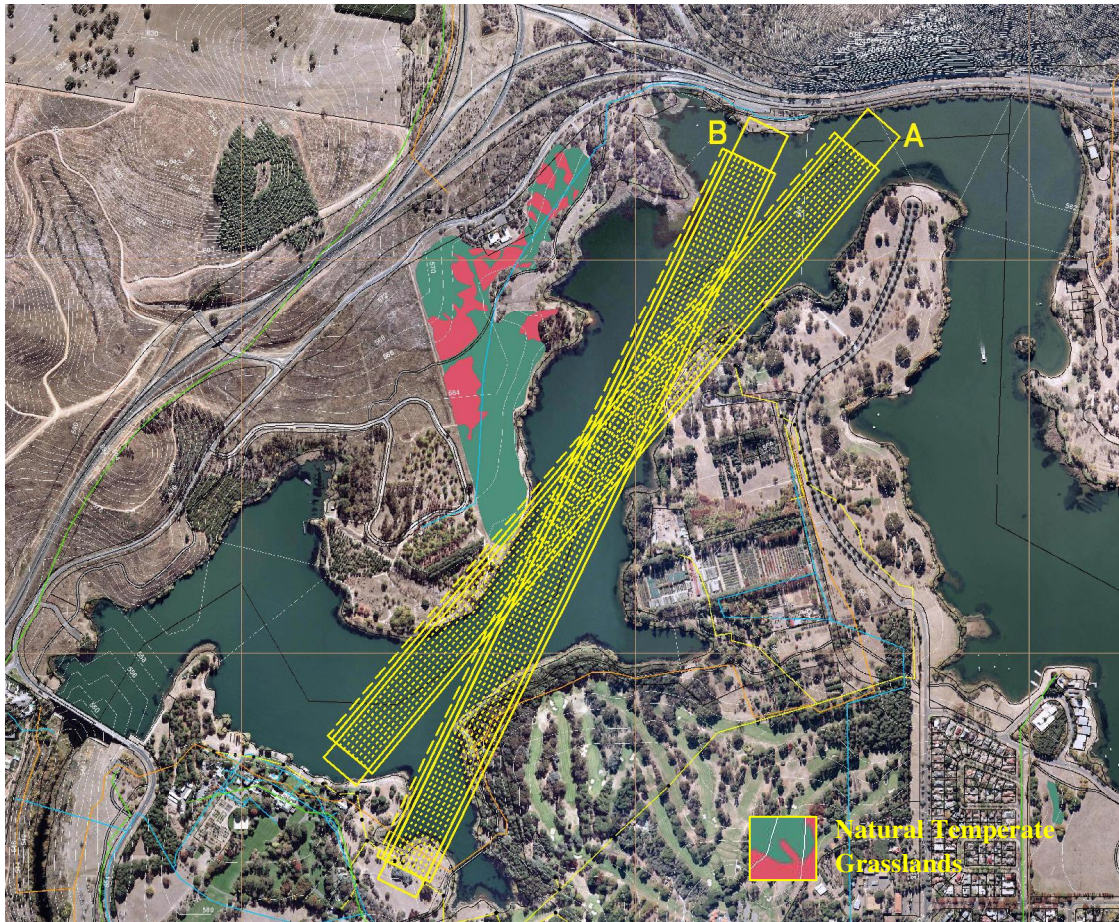
A number of old, artificial courses were constructed with an even depth of 2 metres. As long as they remain with an equal depth at all points on the course then they can still be accepted as a standard course.

5.02 Course Template

This template is derived from the FISA Rules – suggested modifications to it have come from detailed discussions with the various rowing coaches and administrators and had been applied to the study area in the development of the two course alignment options.



6. COURSE OPTIONS



Natural temperate grassland is listed as ‘an endangered ecological community’ under the EPBC and the Nature Conservation Act 1980 (ACT) and are considered to be a ‘matter of national environmental significance’ under the EPBC.

Overlaying an accurate, to scale course template over an aerial photograph of the study area at the same scale indicates there are two potential alignments for setting out an upgraded rowing course in Yarramundi Reach. These are shown here as Options A and B – both of them impact physically (but in different ways) on adjoining foreshore land.

The alignments indicated are not designs but overlays based on the specifications from FISA to ascertain the physical relation between the FISA requirements and the site at Yarramundi Reach to identify issues and to gain an appreciation of the order of costs associated with upgrading the existing course to an international standard.

Detailed designs would be undertaken should the project proceed to address specific issues including cost management and protection of identified heritage values.

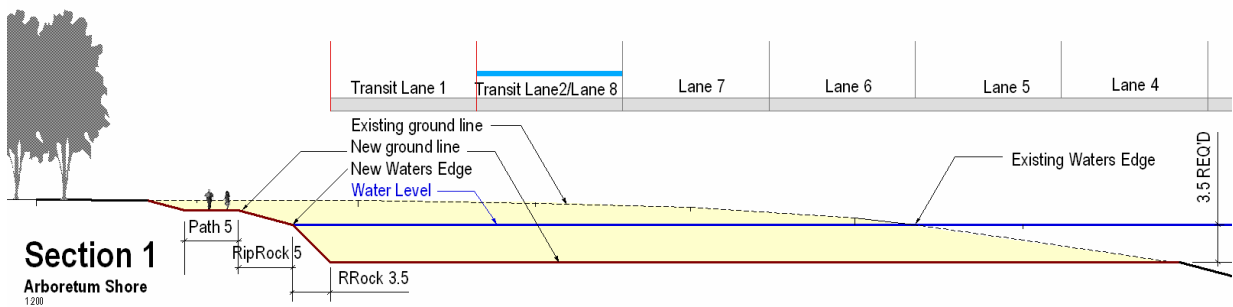
6.01 Option A



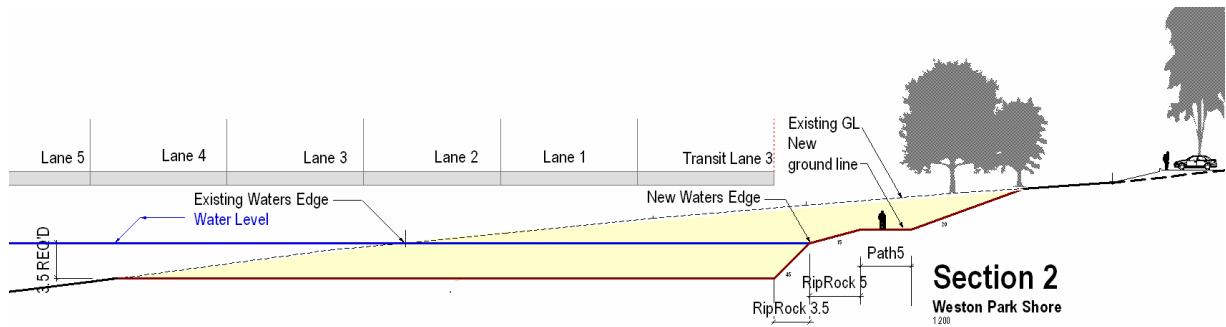
Option A shown with 7 lanes for everyday use plus three extra lanes. In a championship event these three additional lanes would be assigned as follows: one to become lane No 8, the second to be the media lane and the third to remain a transit lane. The figures “1” and “2” on the illustration locate the cross sections below.

Option A aligns as closely as possible with the existing water area of Yarramundi Reach to minimise the overall extent of edge reshaping. The course widening intersects the east and west shorelines at Weston Park and the Lindsay Pryor National Arboretum respectively, involving the re-alignment of both. However, Option A has no physical impact on either Government House or Westbourne Woods (Royal Canberra Golf Course).

Of the two options, Option A involves the least amount of civil engineering works to be constructed and is considered the least cost option to build. On the other hand it is the least ideal in consideration of the wind affectation on the rowing course itself. Specifically, with the prevailing westerly wind on the lake, rowers in the left hand lanes will be sheltered for a longer length of the course than their competitors by the adjacent land area. The impact of wind is to a degree mitigated by the general practice of holding regattas in the morning.



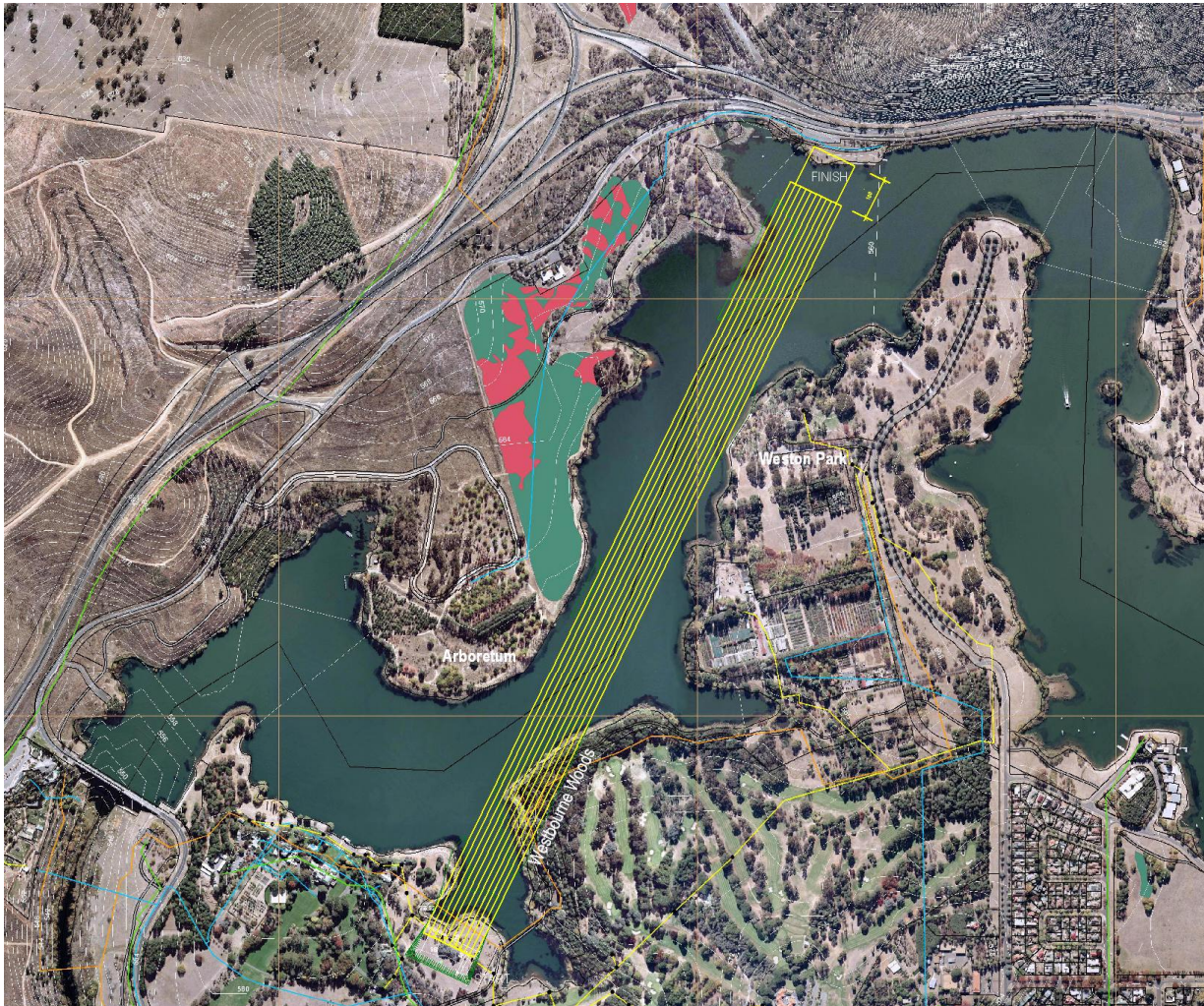
Extent of excavation required to Arboretum shoreline (Option A)



Extent of excavation required to Weston Park shoreline (Option A)

Based on the template Option A will also require disturbance to the western shore of Weston Park including truncating of an existing beach together with the loss of a number of mature pine trees planted by Charles Weston who was Officer-in-Charge, Afforestation 1913-1926.

6.02 Option B



Option B shown with 7 lanes for everyday use plus three extra lanes. In a championship event these three additional lanes would be assigned as follows: one to become lane No 8, the second to be the media lane and the third to remain a transit lane.

Option B involves major civil engineering works in the eastern corner of the Government House site and in the nearby Westbourne Woods in the vicinity of the Royal Canberra Golf Course. Option B would also involve edge shaping works at the tip of the Acacia Inlet Peninsula and adjustment to the foreshore at the car park off Lady Denman Drive below Black Mountain. This option has the benefit though of skirting the shoreline at both Weston Park and at the Arboretum although would still require sub-water level surface excavation to achieve the design depth for the course at both of these locations. This option also comes closer to Acacia Inlet, although at what is possibly a manageable offset from the critical bird habitat.

In all, Option B involves around 20-25% more civil engineering works than Option A and is the more expensive option on this basis.

7. KEY ISSUES

7.01 Usage and Visitation

Apart from the existing 1800 metre rowing course, that part of the lake covered by the study area attracts recreational vessels including sailing, canoeing, charter (and other water based sight seeing craft), and fishing craft. Shoreline uses include running, strolling, cycling, picnicking, triathlons, swimming and fishing.

An upgraded course would enable the staging of a range of events which are not possible at present. With appropriate marketing up to two National Rowing championships and four FISA world championship events may be attracted to the new course environment. These events would attract a combined total of 32,000 competitors and spectators and result in an additional 106,050 visitor nights over a nominal 12 month period. The upgraded course would create additional opportunities to stage both national and international canoeing events and triathlons. Distance swimmers and Dragon Boat racing would also be attracted to the area with the introduction of improved facilities and access.

It is quite likely that an upgrading of the rowing course in Yarramundi Reach would be supported by a majority of those belonging to the regional rowing community which includes not only the rowing clubs, schools and recreational rowers but also the elite level AIS Canberra based rowing and canoeing programs (the latter being Queensland based but have indicated they would use such a facility). From the possible additional visitor numbers that an upgraded facility would bring, it is also clear that the Canberra tourism industry would support an upgrade

The lakes location within the Central National Area of Canberra is a key feature of the environment of the city in its role as the National Capital of Australia. The perception of this role is significantly influenced by the character of the lake and its surrounds and by the types of activities associated with the lake. The ability to hold national and international rowing events on the lake would be an appropriate way to showcase the national capital.

7.02 Heritage and Environment

The NCA's 2007(draft) Heritage Assessment for Lake Burley Griffin and associated areas of National Land provides an assessment of the heritage values of Lake Burley Griffin and adjacent lands, addressing both the Commonwealth and National Heritage criteria established in the Environment Protection and Biodiversity Conservation Amendment Regulations 2003. The subsequent Heritage Management Plan currently being completed will guide the future development of an upgraded rowing course and associated facilities. Heritage values that are likely to be impacted by foreshore reshaping should the project proceed include:

1. Lake Burley Griffin Conservation Area
2. Bird habitats including a protected migratory species
3. Protected Natural Temperate Grasslands
4. Lindsay Pryor National Arboretum
5. Weston Park
6. Westbourne Woods
7. Government House (Yarralumla and Surrounds)

To date the work done on alternative course templates and subsequent discussions with stakeholders indicates that both course templates (Option A and B) will impact in different ways on items 1, 2, 3 and 4 (above) but these could be mitigated through design and management strategies. Consultative discussions to determine the potential for negative impacts have included representatives of the local rowing community, Environment ACT, the Department of Environment and Water Resources, Friends of ACT Arboreta, and Government House.

Using the FISA standards the civil works associated both options will have an impact on items 4, 5 and 6. Westbourne Woods and Government House are impacted by foreshore reshaping associated with Option B. Similarly, Option A will impact Weston Park and Lindsay Pryor National Arboretum foreshores.

A preliminary Heritage Impact Assessment by Professor Ken Taylor has identified that the overlay of the FISA course template on the existing landform of the lake will present two key cultural heritage issues:

- The introduction of a straight edge profile resulting from lake edge modifications will result in the loss of a significant component of Canberra's heritage setting which reflects formative planning of the city. Professor Taylor notes that this includes heritage trees and the sinuous lake edge detail with its natural looking outline that complements the overall aesthetic setting of the western edge of Weston Park.
- The loss of heritage trees planted by Charles Weston who was Officer-in-Charge, Afforestation 1913-1926 and simultaneously Director of City Planting 1921-1926.

Should the project proceed, detailed siting and design exercises would consider ways to ensure that lake access and existing lake design features can be accommodated. Consideration would also be given to matters of detail such as the angle of the banking and aesthetic locations for reed growth in a cultural landscape setting that acknowledges the engineering intervention in the lake shore while not causing wave reflection that would interfere with rowing activities.

Regardless of which option is adopted it is clear that it is not possible to construct a championship course in Yarramundi Reach without re-shaping the lake foreshores to some degree. It is recommended that should the project proceed a review be undertaken with FISA to determine site specific rather than generic requirements to determine the extent to which foreshore changes can be reduced to mitigate the potential for impacting on the heritage values of the lake. Once a firm set of requirements have been established for the rowing course and support infrastructure the impacts of these would be assessed as required by the EPBC and National Capital Plan.

Consideration should also be given to ongoing land and water management activities within the study area that would allow for the potential for an upgrade to the rowing course including the development of tree replacement strategies for heritage trees in locations that would not preclude the future consideration of an upgraded course. A number of the trees that could be impacted in Weston Park are in decline and consideration could be given to replacing these trees in locations that would allow for the potential future upgrade of the rowing course.

7.03 Water

In addition to the FISA rowing course requirements a suitable volume and quality of water is also a fundamental issue for rowing and other water based activities.

Lake Burley Griffin is an integral part of Walter Burley Griffin's design for Canberra and is a vital and key element in the plan for the National Capital. The Lake is not only one of the centrepieces of Canberra's plan in its own right but also forms the immediate foreground of the Parliamentary Zone. Additionally, the Lake is part of the nationally significant open space framework, visual backdrop and landscape setting for the National Capital, and contributes to the system that protects the

environmental quality of the city. Management of the lake acknowledges a broad range of uses including the role the lake plays in the perception of Canberra as the National of Australia and the potential influence that the state of the lake and activities on the lake have on this perception. Management policies direct that the water quality and hydraulic operation of the Lake be maintained in a manner that protects the Lake and its foreshores, as well as their visual and symbolic roles.

Lake Burley Griffin and its foreshores are the focus for a diverse range of water and land-based recreational activities that rely on the maintenance of an acceptable water level and quality including rowing, triathlons and sailing events.

7.03.1 Water Quality

The ANZECC/ARMCANZ¹ *Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)* stipulates which recreational activities are safe for users depending on the physical, chemical and biological quality of the water. The Guidelines recognise two broad categories of water use:

1. Primary Contact relates to activities which involve direct contact with the water where prolonged immersion is possible such as swimming and wading.
2. Secondary Contact relates to activities which generally don't require direct contact with the water such as canoeing, boating and rowing.

Rowing at all levels including training in Lake Burley Griffin is classified as a secondary contact activity. Monitoring of water quality in Lake Burley for both primary & secondary contact recreational activities is based on the Guidelines. The ability to hold events at a national and international level for rowing and other water based activities requires a high degree of certainty in terms of water quality. The programs for these events are set well in advance and the effective management of water quality is essential to avoid compromising them. Ongoing monitoring and management of water quality provides the basis for assessing the risks posed by water quality to organisations seeking to hold events on the lake.

Experience with data collected over the past 23 years indicates that the study area offers the highest water quality of all lake areas and therefore the least risk in terms of the potential to disrupt events on the lake. As a mature urban lake system Lake Burley Griffin offers a relatively stable water quality regime managed in part by the natural processes that have developed within the lake.

Additionally, the nationally significant profile of the lake ensures that it is protected through legislation from upstream works that may negatively impact on its water quality and other values. Depending on their source of water, other urban rowing courses rely on stormwater runoff from adjacent areas and require purpose built pond systems upstream to treat water before it enters the rowing course.

¹ ANZECC – Australian and New Zealand Environment and Conservation Council

ARMCANZ – Agriculture and Resource Management Council of Australia and New Zealand

7.03.2 Water Level

One of the key challenges to maintaining the operating water level of Lake Burley Griffin is evaporation. Experience to date indicates an average evaporation rate of 0 to 3 mm per day in winter and up to 7 to 8mm per day in the summer months resulting in an annual loss of approximately 0.9m to 1.2m. Compounding this, the highest evaporation occurs in the summer months when inflows are likely to be the lowest.

As a component of integrated urban water system the lake is able to maintain a relatively constant water level. This is a critical factor in the lakes ability to perform in its various roles including the ongoing operation of the rowing facility at Yarramundi Reach.

Access to adequate inflows to offset evaporation losses is critical if water levels are to be maintained on a rowing course. Evaporative losses for the area of a rowing course could equate to 340ML per annum (based on the Lake Burley Griffin experience), a significant volume given the ever increasing uncertainty over rainfall in the region. Other urban courses rely on natural flows or stormwater runoff. In times of drought, water is pumped from neighbouring areas which in Canberra’s case would involve significant energy input, cost and impacts on adjacent catchments.

7.04 Adjacent Land Uses

7.04.1 Government House

Once a pastoral property known as “Yarralumla”, Government House has been the official residence of the Governor-General since 1927. Government House is the site of a government administrative agency and of various head-of-state activities and functions. Its numerous buildings are well supported by a range of mature landscapes. Government House is listed on the Commonwealth Heritage List.



The preservation of a high level of security and privacy for this official residence is an important requirement for the development of any proposed upgrading of the rowing course in the adjacent lake. It is unlikely that access to the grounds of Government House would be agreed for rowing activities

although it is understood that as the starting point for races, water based access to this area is likely to be sufficient for rowing events. Should the project proceed, full negotiations with Government House would be essential to develop a preferred course alignment option and address specific land use, security and privacy issues.

7.04.2 Royal Canberra Golf Course

The Royal Canberra Golf Course has held a lease over a large section of Westbourne Woods since 1962. The golf course proper is separated from the lake edge by a lake-front strip of Westbourne Woods which accommodates popular walking and cycling facilities. It is this area which would be mostly affected by Option B.



7.04.3 Weston Park

Weston Park forms a large portion of the eastern flank of Yarramundi Reach. It is a well known district park covering approximately 60 hectares. The park is the most intensively used area of the lake foreshore within the Central National Area with an estimated number of multiple visits in 2002 of 778,800. The Yarralumla Nursery lies at one end of the park and there are various lake beaches, swimming access and established picnic areas through out. Weston Park is Registered on the Register of National Estate and is Provisionally Registered on the ACT Heritage Register.

Like Yarramundi, Weston Park is significant in the context of this study because it sits opposite virtually one whole side of the course and it is possible that an upgraded rowing course would impact on the western side of Weston Park, particularly in the case of Option A, template.

7.04.4 Black Mountain Peninsula and Road Corridor

The Peninsula, well known and used as a mostly passive recreation area, is just east of one end of the rowing course. It offers a continuous beach almost for its full length on that side which can be used for marshalling and launching of boats. The Peninsula also accommodates a few of the rowing clubs that use the course and may have the capacity to include more at some future point.

The Parkes Way road corridor occupies the only level land between the foot of Black Mountain and the lake and as such forms a solid “constructed” boundary to the northern edge of the lake and hence, the rowing course. Part way along there is one small parking area off Lady Denman Drive which looks directly onto the present rowing course finish area and is frequently used by spectators and competitors during rowing events.

Lying just to the west of this car park Acacia Inlet is the seasonal habitat of the Latham Snipe, recognized as an endangered bird species. Consequently this small area should be quarantined from any future rowing course development.

7.04.5 Burringiri Cultural Centre

The Burringiri Cultural Centre is the home for the Burringiri Association whose members are drawn from all indigenous groups in Canberra including members of the Ngunnawal clan as well as other clan groups from around Australia, and Torres Strait Islander groups all representing a diverse range of interests. An important aspect of the Centre’s program is to become a keeping place for artefacts and a focus of education and reconciliation with the local indigenous people.

The Centre occupies the former Visitor Centre of the National Museum of Australia (NMA) which was once slated to occupy the Yarramundi Peninsula. The buildings constructed for the NMA and now used by the Centre include an administration building and a theatre/exhibition building.

An upgrade of the existing rowing course could present the opportunity of providing access by ferry from Lake Burley Griffin to Burringiri at some future date. This has been accounted for in the developments of possible rowing course templates by including transit lanes.

7.04.6 Yarramundi Peninsula

Yarramundi Peninsula is the last major National Land site reserved for National Capital Use. As such it was once intended for the National Museum of Australia. The NMA’s visitor centre buildings remain and are now leased and occupied by the ACT Aboriginal and Torres Strait Islander Cultural Centre: Burringiri.

The eastern portion of Yarramundi also supports a large area of endangered natural temperate grassland, close to Burringiri, extending east towards the lake and south to the Lindsay Pryor National Arboretum. This area has in the past supported a threatened species of Striped Legless Lizard (*Delmar impar*). It has been part of the consultation undertaken for this study to liaise with Environment ACT and confirm this ecological status.

As a consequence of this status future development of this part of the site will have to be carefully considered in order to minimize penetrations by built infrastructure such as pathways, service trenches and drainage.

Similarly, twelve aboriginal sites have previously been identified at Yarramundi and entered onto the ACT Heritage Register and whilst they are not considered to be in locations likely to be impacted by foreshore reshaping they should be considered in the overall context of any development at Yarramundi including the provision of supporting infrastructure and facilities.

7.04.7 Lindsay Pryor National Arboretum

Initially established to trial a range of possible street trees for Canberra the Lindsay Pryor National Arboretum occupies most of Yarramundi’s peninsula area directly opposite Government House. Many

of these trees are now mature and situated in a park-like setting. There are basic picnic facilities and a toilet block in the arboretum, however the toilet block is permanently closed due to the lack of a water supply. Since its closure, the toilet block has been the subject of vandalism and is in poor condition. Barrenjoey Drive is a gravel loop road within the arboretum area, accessible from Lady Denman Drive. A locked gate at the entrance to Barrenjoey Drive prevents vehicular access during week days. Notwithstanding the reduction in land area that could result from a widened rowing course in Yarramundi Reach, the arboretum would offer opportunities for spectator viewing, shared parking and toilet facilities and if managed appropriately; benefit from an increase in exposure to the Canberra community and visitors using the rowing course.

7.04.8 National Zoo and Aquarium

The National Zoo and Aquarium is a privately run tourist facility in the south western corner of the site adjacent to the Scrivener Dam and the Molonglo River. The zoo and aquarium exhibits a range of native Australian and exotic animals together with aquatic and marine species.

The key issue concerning the National Zoo and Aquarium in this study has been the possibility of providing access by ferry from Lake Burley Griffin at some future date. This has been accounted for in the developments of possible rowing course templates by including transit lanes.

7.04.9 Lake Burley Griffin

The lake and foreshores are an integral part of the design of the National Capital. They are vital elements in Griffin's plan for the National Capital and have influenced this project accordingly. In addition to being one of the centrepieces of Canberra's plan the lake and foreshores also form part of the National Capital Open Space System.

The *National Capital Plan* specifies the following principle for Lake Burley Griffin and its foreshores:

"To conserve and develop the lake and foreshores as the major landscape feature, which unifies the National Capital's central precincts and the surrounding inner hills; and to provide for National Capital uses and a diversity of recreational opportunities."

Lake Burley Griffin is an Indicative Heritage Place on the Commonwealth Heritage List and the Register of National Estate. The NCA is currently undertaking a Conservation Management Plan for the Lake and a (2007 Draft) **Heritage Assessment** component has informed the work on this feasibility study.

The western end of Lake Burley Griffin leading up to Scrivener Dam is that part where the outline of the inundated Molonglo River is most obvious – the construction of a dam here is an indicator of a deep river base profile with reasonably steep banks. As a result some of the deepest and cleanest water in the lake is to be found here. The existing rowing course fits within the constraints imposed by this topography; however it is not deep enough at its foreshores, long enough or wide enough to allow the staging of international standard events.

Nearby, land adjacent to Yarramundi Inlet contains the works depot and wharf associated with the floating gate used for the maintenance of Scrivener Dam. When not in use, the floating gate is moored in the inlet. This area is also being used temporarily for the maintenance of the commercial boats which cruise on lake while the Kingston Boat Harbour is being redeveloped.

The lake is a major recreational resource and provides the setting for numerous recreational activities in addition to rowing including sailing, ferry cruises, informal boating, fishing and swimming. It is important to maintain access to Yarramundi Reach for existing water based activities. In future ferry wharves may be provided in various places within the study area, and fishing and viewing platforms may also be provided in selected locations connecting ferry-based tourist activity and existing and new cultural/education destinations.

Responses to the CNA West Planning Framework indicated that ferries using western end of the Lake generally try to avoid any potential conflict with the rowers and that there is generally a very good relationship between ferry operators and the rowing clubs.

Consideration of the continued access requirements for ferries and other water craft and activities on the lake would be an important element in the siting and design of an upgraded rowing course should the project progress.

8. FEASIBILITY (STAGE) COST ESTIMATE

Quantity Surveyors Donald Cant Watts Corke (ACT) Pty Ltd were engaged as study sub-consultants to prepare a Feasibility Cost Estimate to establish the order of cost likely to be associated with a rowing course upgrade in Yarramundi Reach. Option A was selected for the costing exercise because it was found to involve less civil works than Option B and hence was the less costly of the two options on that basis. Option B involves approximately 20-25% more civil engineering works than Option A and is regarded as being more expensive on this basis.

8.01 Summary

In summary the major items of work to provide the minimum requirements to establish the Championship course in the Reach with some limited associated infrastructure is as follows:

ITEM	% of total	COST \$
Works to Arboretum shoreline (Piling/excavation to 3.5m depth)	34.43	11,645,000
Works to Weston Park shoreline (Piling/excavation to 3.5m depth)	33.47	11,323,000
New car park in Yarramundi Reach area	1.17	397,000
Toilet and change room facilities	0.60	202,000
Water supply to Yarramundi Reach	0.96	325,000
Rowing course infrastructure for start and finishing areas	4.38	1,480,000
TOTAL -cost of all the above items		<u>\$ 25,372,000</u>
Construction Preliminaries	7.77	2,628,000
Management fees	5.65	1,912,000
Consultant's fees	2.48	840,000
Contingency	9.09	3,075,000
SUB-TOTAL		<u>\$ 33,827,000</u>
GST		3,382,700
TOTAL COST		<u>\$ 37,209,700</u>

8.02 Inclusions

Broadly, the scope of work included in this estimate includes the following:

- Installation of sheet piles for excavation below water level.
- Pumping out of water.
- Site clearance including allowance to relocate significant trees.
- Bulk excavation to create additional volume.
- Construction of new bank consisting of boulders and walkway.
- Provision of a new car park for 200 cars, constructed of stabilised gravel on the Arboretum side (Bitumen car park would cost additional \$150,000).
- New toilet and change room facility on the Arboretum side.
- Start and finish facilities consisting of pontoons.
- Minor making good and planting to area surrounding new works.

8.03 Clarifications and Exclusions

The estimate is based on the following clarifications:

- Estimate does not include credit for purchase of excavated materials.
- Building works such as public pavilion, seating, etc. excluded (except toilet facilities).
- It is assumed there won't be lighting to car park.
- It is assumed that the car park will not be drained.
- It is assumed that 25% of excavation will be carried out in rock requiring hammering.
- It is assumed the project is delivered through a lump sum delivery method.
- It is assumed that excavated material can be disposed of on site adjacent to the arboretum side.
- Costs associated with environmental protection such as relocation of local wild life species including aquatic life are excluded from this budget estimate.

The cost plan excludes the following:

- Escalation costs.
- Latent Conditions.
- Staging costs.
- Removal of hazardous material.

Analysis of the cost estimates illustrates that the major cost component (68%) is attributable to the civil engineering works associated with the foreshore reshaping and excavation of the lake bed to achieve the required 3.5m depth. It is expected that a detailed siting and design exercises and site specific review of FISA course requirements could contribute to reducing the extent of these works to some degree. Additionally, should the course upgrade proceed; detailed survey of geotechnical conditions would allow confirmation/or otherwise of the allowances made in the feasibility stage cost estimate for excavation in rock.

9. INITIAL STAKEHOLDER CONSULTATION

As the project is preliminary in nature and will serve to inform decision making at a broader strategic and master planning level, consultation has been limited to those stakeholders who would be most impacted by an upgrade of the existing course or have specific knowledge in relation to the Reach and rowing requirements.

There have been two groups consulted in this process: those who occupy adjoining areas and those who would represent a wide range of varying interests in the site and adjoining areas. Groups consulted during the feasibility study included:

- Government House
- Department of Environment & Water Resources
- National Museum of Australia
- Friends of ACT Arboreta
- Environment ACT
- Rowing ACT
- AIS Rowing
- AIS Sprint Canoeing
- Triathlons ACT/Sri Chimnoy

This process has highlighted issues that would undoubtedly come out in an extensive consultation that would accompany a later stage of this project if it were to proceed. The following issues have been identified at this stage:

- Modifying the lake shoreline – seen positively by rowers and by those associated with the Lindsay Pryor National Arboretum vis a vis the potential for upgraded infrastructure to the arboretum. Consultation with the Friends of the ACT Arboreta indicates that foreshore reshaping would “*have little direct impact on the arboretum: this would appear to be not much more than the loss of a few sweet chestnuts (Castanea sativa) - a tree which seldom thrives in ACT conditions, some white poplars (Populus alba) which are widely planted in Canberra and trees planted to protect the lake shores.*”² The Friends of ACT Arboreta considered that the potential impact of spectators, media representatives, etc could be much more detrimental to the Lindsay Pryor National Arboretum and recommended the preparation of a management plan for the arboretum to guide future development. Edge shaping viewed pessimistically by specialist heritage consultant because of potential loss of heritage values although this pessimism was not shared by heritage officers from DEWR.
- Provision of lake infrastructure – most of those that were approached to discuss the proposal saw Yarramundi as an under utilised resource and that this was related to an under provision of basic infrastructure and that future development including an upgraded rowing course could be a way to address this.
- Increased public visitation – acknowledgement of the potential for vastly increased usage associated with a course upgrade and therefore increased public interest and visitation at Yarramundi.
- Parking – consensus amongst those approached was that parking needs to be provided in the form of formalised car parks suitable for general public usage as well as for rowing with additional parking specific for major rowing events be provided as required.

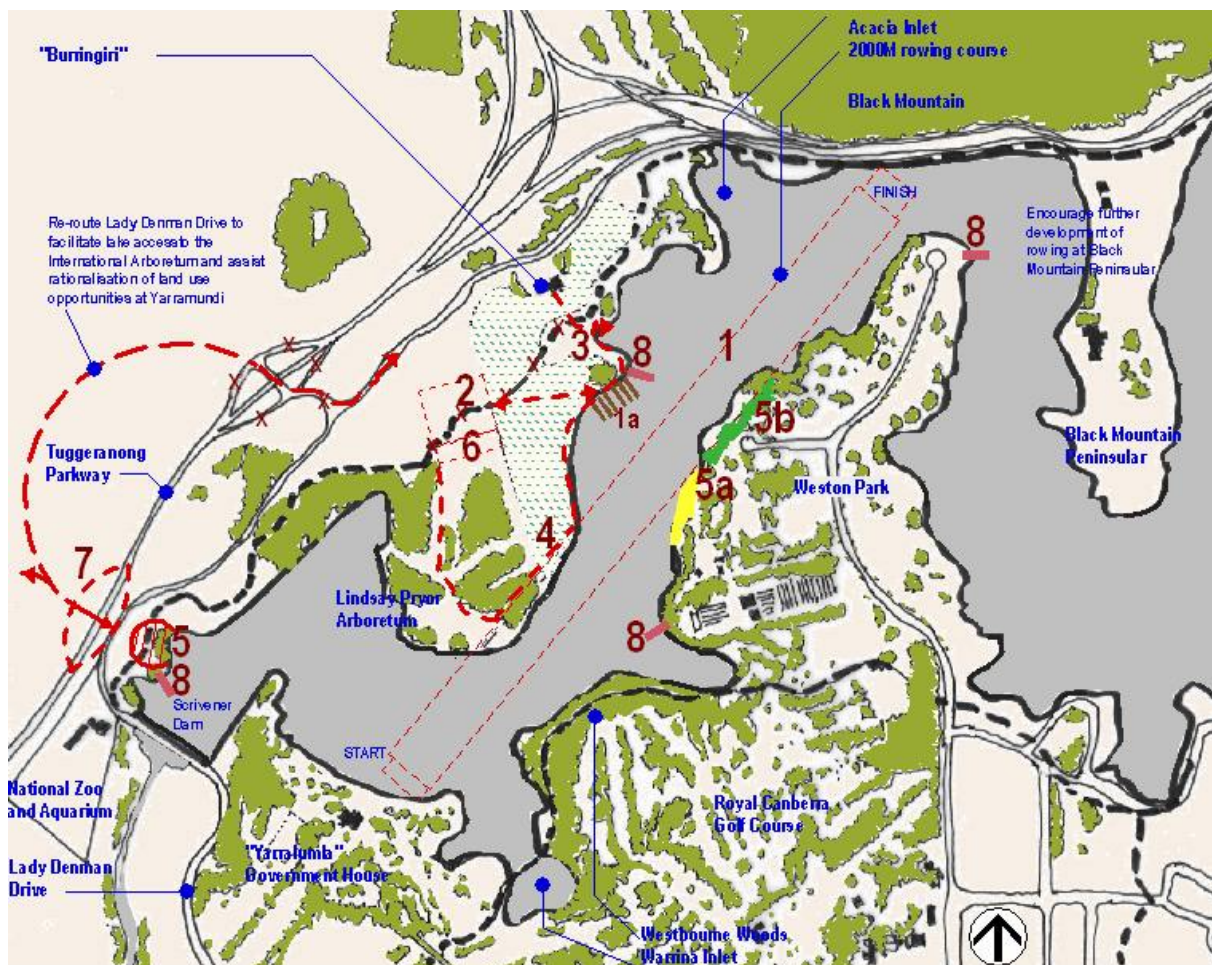
² Friends of ACT Arboreta Letter dated 9 March 2007

- Protected Grasslands Community – the grasslands need to be carefully considered, however their presence does not rule out an upgraded rowing course. Need for dedicated crossing points and means of restricting access whilst at the same time creating opportunities for increased interpretation and education of the grasslands to the community.
- Protected species – Latham Snipe and other habitat related to grasslands needs to be preserved. Additional information on the species use of the area is required to determine the most appropriate response, although a precautionary approach of adopting an exclusion zone would be appropriate in the first instance.
- Government House – security and privacy are the two keys issues with this interface for any future development at Yarramundi including a rowing course upgrade. Noise and surveillance risks likely to require an active management response.

10. STUDY AREA OPPORTUNITIES AND CONSTRAINTS

It is important at this stage to identify salient master planning opportunities and constraints for the study area as whole rather than simply regarding the rowing course as an isolated activity. The following diagrams and notes attempt to illustrate this by commencing this process. A strategic master plan for the entire study area will be a vital element of any further consideration of the rowing course upgrade project. Such a plan would account for all the strategic planning needs of adjacent land uses and water based recreation for the future of Yarramundi Reach including identification of complimentary uses and activities and opportunities for the provision of public infrastructure to support future development.

10.01 Opportunities



1 2000 Metre Rowing Course

Upgrade rowing course to FISA “World Championship” specification to maximise use of water quality of the study area for primary and secondary contact activities.

1a Indicates possible launch and return pontoons for rowing events.

2 Parking

200 space car park with amenities to suit a range of users within the study area including the Lindsay Pryor National Arboretum, Government House, International Arboretum etc.

3 Burringiri Water Access

New jetty to provide structural support to temporary launching pontoons subject to detailed siting and design exercise and including access path to Burringiri and lakeside path system.

4 Cycle path

Re-route existing pathway to skirt the grasslands providing improved access to lakeside picnic areas and approach to the Lindsay Pryor National Arboretum incorporating interpretative opportunities for grasslands and connection to the new arboretum car park.

5 Restoration in Weston Park

5a Extend swimming beach and accessible edge to the south and identify other new opportunities for primary contact to capitalise on water quality within the Reach.

5b Replacement (*Pinus radiata*) pine planting to lake edge as part of an overall tree management plan for Weston Park to replace senescing trees – to consider future upgrade of the rowing course. A similar approach would be taken to the future planning for Lindsay Pryor National Arboretum.

6 Public Car Park

Provide for overflow car parking (suitable for trailers) that would suit major events and Lindsay Pryor National Arboretum.

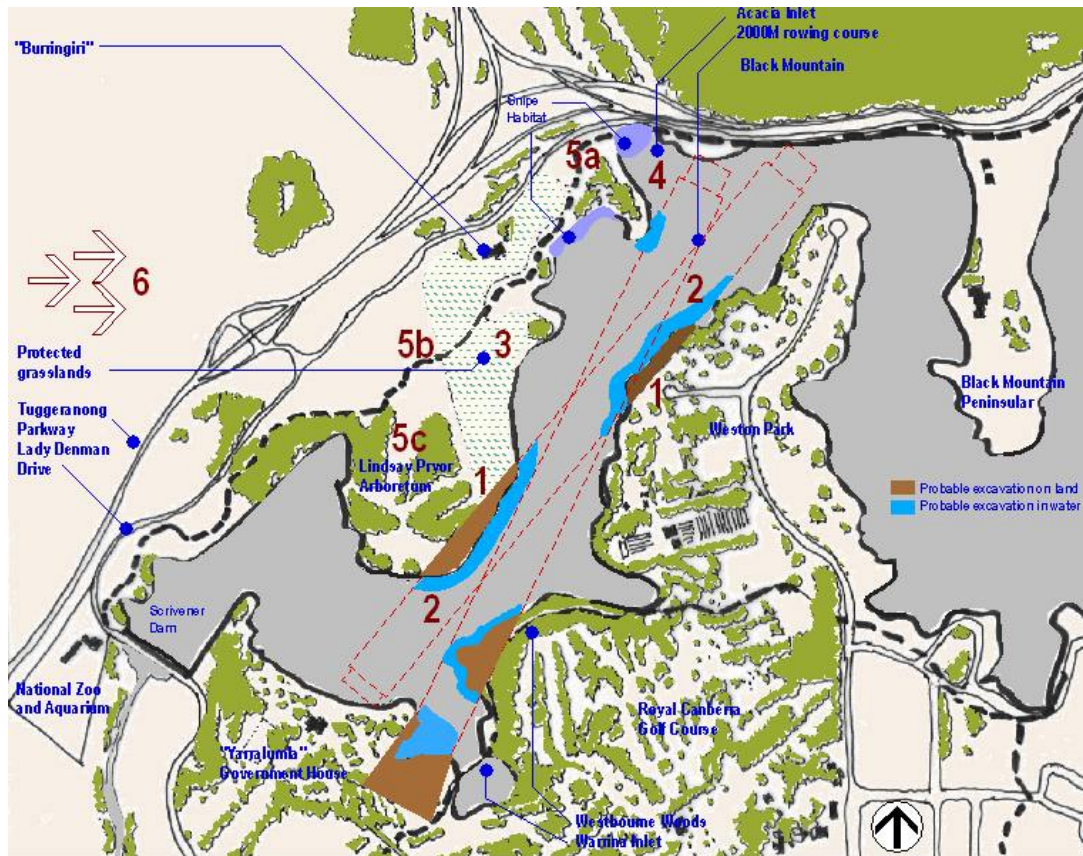
7 New Interchange

New interchange and relocation of Lady Denman Drive to facilitate lake access to the International Arboretum and maximize the potential for future National Capital Uses at Yarramundi that would compliment an international standard rowing course and facilitate cost sharing associated with the provision of infrastructure within the study area.

8 New Ferry Jetties

Increased jetty facilities within the study area would provide an ideal access point to the rest of the Lake Burley Griffin foreshores via lake based transport. Ferry access to existing land uses within the study area such as the Zoo, Lindsay Pryor and International Arboreta, Burringiri and Weston Park would facilitate access between these sites and compliment the lakeside pedestrian path system. Ferries with the capacity to accommodate bicycles would facilitate smaller lake circuits for younger families and open up opportunities for links to cycle hire facilities at West Basin.

10.02 Constraints



- 1 **Realignment of the existing shoreline required to accommodate a larger rowing course**
Issues: Potential impact on natural and cultural heritage values of the lake, capital cost, truncation of accessible edges/beaches where reshaping occurs.
- 2 **Dredging/excavating of lake to gain required 3.5 metre depth for rowing course**
Issues: capital cost, disturbance of sub-surface plants, control of silt pollution during construction.
- 3 **Large area of natural temperate grasslands**
Issues: Management and interpretation driven. Access to and traversing over this area needs to be actively monitored and managed.
- 4 **Acacia Inlet: seasonal home to Latham Snipe (endangered species)**
Issue: Consideration of the level of access to shoreline areas know to be visited by the Latham’s Snipe until a detailed investigation of the habitat value has been undertaken.
- 5 **Lack of reticulated services**
Issues: In addition to upgrading the existing capacity serving the Burringiri centre there is a requirement for potable water, electricity and sewer infrastructure to the following locations:
 - 5a Acacia Inlet
 - 5b Parking facilities at Lindsay Pryor National Arboretum
 - 5c Floating Gate workshop at Yarramundi Inlet

6 Prevailing winds

Issue: The NNE orientation of a 2000 metre course (Option A) is not as wind protected as the existing course or the Option B upgrade proposal.

7 Ferries and other water craft

Issue: allowance to be made in course design and infrastructure for vessel access during non-event times and management arrangements during events.

8 Other water based activities

Issues: consider facility design and management to accommodate as many compatible activities as possible to maximize water quality within the Reach and assist with zoning across the lake generally.

11 CONCLUSION AND RECOMMENDATIONS

This study has examined the physical requirements of an International Standard or “Championship” rowing course in the context of Yarramundi Reach. Following the analysis of the site characteristics and adjacent land uses within the study area it is concluded that:

- An upgraded rowing course is physically and technically feasible within Yarramundi Reach;
- There are two possible alternative alignments for an upgraded course both of which result in significant foreshore reshaping costing in the order of \$ 37M (Option A) to \$ 47M (Option B);
- Both course options result in potentially significant heritage impacts that could in part be addressed through a detailed siting and design exercises and site specific review of FISA course requirements. Further consideration of an upgrade to the existing buoyed course will require the identification and protection of significant natural and cultural places as required by the provisions of the National Capital Plan and the *Environment Protection and Biodiversity Conservation Act, 1999*;
- Lake Burley Griffin offers the potential to zone recreational uses that rely on a consistent water level and quality in the context of contemporary water sensitive urban design principles and the ever increasing uncertainty related to rainfall within the region;
- An international standard course is likely to deliver significant benefits to the local and national rowing communities and would enhance rowing opportunities in the region at all levels including schools through to the elite AIS training programs;
- An international standard course could potentially offer significant benefits to other water based sports that could use the same infrastructure such as sprint canoeing, distance swimming, and triathlons;
- There are a range of potential synergies between an upgraded course and land based activities and land uses within the study area that should be fully explored in future planning and strategic thinking for the study area ;
- There is a degree of support amongst the majority of key stakeholders approached through the course of the project subject to the outcome of detailed design and siting exercises;
- An international standard course would attract large visitor and media participation, particularly in the instance of major events being staged offering flow on benefits to the local tourism industry;
- The holding of national and international regattas in Lake Burley Griffin National Capital is an appropriate activity in Lake Burley Griffin to showcase the national capital; and
- The national capital setting of Lake Burley Griffin and Yarramundi Reach offers the potential to enhance rowing events of national and international significance.

The study also concludes that in the context of increasingly uncertain rainfall as climate change impacts on the region, Yarramundi Reach, as an element of a mature urban lake system; offers water level and water quality control benefits necessary to support rowing in the ACT.

It is recommended that the National Capital Authority consult with the Australian Sports Commission, Australian Institute of Sport, Australian Olympic Committee, the ACT Government and other interested parties to determine their interest in undertaking further investigation. In particular it will be important to consult with FISA so as to determine which, if any; of their requirements can be adapted to suit the specific site characteristics of Yarramundi Reach to mitigate potential heritage impacts.

It is also recommended that, where possible; ongoing land and water management and works within the study area should consider the potential for an upgrade to the rowing course and where possible contribute towards the achievement of this goal. This could include:

- the provision of necessary infrastructure as new land based developments are undertaken;

F E A S I B I L I T Y S T U D Y

- development of water based activities that are complimentary to the rowing activities and maximize the high water quality in the western end of the lake;
- the development of a tree replacement strategies that include the collection of seed, “growing on” and replanting of heritage trees in locations that would not preclude the future consideration of an upgraded course; and
- the consideration of the potential upgrade of the existing rowing course in the development of master plans and management plans for adjacent land areas and water based access so that these do not preclude the future expansion of rowing in Yarramundi Reach.