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THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

## REPORT

relating to the proposed construction of the

# POINT PERON— GARDEN ISLAND CAUSEWAY

(Naval Support Facility, Cockburn Sound)

## Western Australia

(TWENTY-SECOND REPORT OF 1970)

## C O N T E N T S

	<u>Paragraph</u>
The Reference	1
The Committee's Investigation	6
Cockburn Sound	11
Garden Island	14
Naval Support Facility, Western Australia	15
The Site	17
Access to Garden Island from Mainland	23
Construction of the Proposed Works	
Design	27
Southern and Northern Moles	29
Low Level Trestle Bridge	30
Central Mole	31
High Level Bridge	32
Small Ships Channel	35
Committee's Recommendation	37
Estimate of Cost	39
Programme	40
Recommendations and Conclusions	41

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

POINT PERON - GARDEN ISLAND CAUSEWAY  
(NAVAL SUPPORT FACILITY, COCKBURN SOUND)

R E P O R T

By resolution on 4 September 1970, the House of Representatives referred to the Parliamentary Standing Committee on Public Works for investigation and report to the Parliament, the proposal to construct a causeway between Point Peron and Garden Island, Western Australia to enable a naval support facility to be established in Cockburn Sound.

The Committee have the honour to report as follows:

THE REFERENCE

1. The proposal referred to the Committee is for the construction in the southern part of Cockburn Sound of a causeway, some 13,500 ft long, linking Garden Island to the mainland at Point Peron. The causeway is a preliminary to the establishment of shore based facilities on Garden Island.

2. The present work involves

- a 2,100 ft southern approach rockfill mole;
- a 1,000 ft low-level trestle bridge;
- a 6,200 ft central section of armoured rockfill mole;
- a boat channel 100 ft wide dredged to 12 ft below low water ordinary spring tide;

2.

- a 2,020 ft high-level bridge with a 40 ft clearance over the boat channel; and
- a 2,400 ft northern approach rockfill mole.

3. A 24 ft roadway, a 5 ft footway, water, power and communication services and road lighting are to be provided on the causeway.

4. The work is estimated to cost \$9 million. However, as site investigations and hydraulic model testing are as yet incomplete and services requirements have not been defined, this estimate was not as firm as usually submitted to the Committee.

5. Plans for the naval support facility to follow the construction of the causeway envisage berthing and logistic support for ships and submarines. These facilities are to include wharves, workshops and engineering services, offices, ammunition storage, barracks and possibly later, oil fuel tanks. Major refitting and docking facilities are not planned initially. The Committee noted that subject to finalisation and approval of the Navy's plans, the facility could be in operation by the end of 1975.

#### THE COMMITTEE'S INVESTIGATION

6. The Committee received written submissions and drawings from the Departments of the Navy and Works and took evidence from their representatives at public hearings in Canberra and Perth. We also heard evidence from witnesses representing State and local government authorities and other interested organizations and from a number of individuals. The Committee inspected the Cockburn Sound area including the proposed causeway alignment and Garden Island.

7. At the public hearings we took a considerable amount of sometimes conflicting evidence from witnesses expressing reservations about the proposed development from a number of viewpoints. Some of the evidence suggested that insufficient investigations had been made for an unequivocal assurance to be given that the proposed work would not have harmful long term effects on the natural environment of Cockburn Sound and Garden Island. More positive assertions on these lines were made by some witnesses.

8. Contrary evidence on these aspects was given by departmental and supporting witnesses and we were told of the various investigations which had been taken into account when the project was being developed.

9. It was also submitted that Garden Island should continue to be available for recreational use and that the survival of the Island's flora and fauna would be prejudiced by the proposed development.

10. During our final consideration of the proposal, we closely studied the evidence given by all witnesses and the result of our study is reflected in the extract from the minutes of the meeting held on 21 October which is quoted in paragraph 37 below. Clearly we could not reach a decision acceptable to all witnesses or other people interested in the Cockburn Sound area but it was the view of the majority of the Committee that the proposed development on Garden Island is essential and that the construction of a causeway for access purposes is appropriate having regard to all the circumstances.

#### COCKBURN SOUND

11. Cockburn Sound is the largest of a series of basins immediately south of Fremantle, bounded in the south by Point Peron. The western boundary consists of an off-shore bank characterised by chains of shoaling reefs and islands, of which Garden Island shelters Cockburn Sound itself, with

Rottneest Island at the north-west extremity. The main embayment is intersected by two sand barriers, Success and Parmelia Banks through which access is provided for large ships by the Success and Parmelia channels which are dredged to 45 ft. The southern entrance to the Sound between Garden Island and Point Peron, is obstructed by a broad shallow sandy sill, the Southern Flats, at a depth of one to two fathoms.

12. Within Cockburn Sound there is a large central basin having a comparatively level muddy floor at 60 ft to 70 ft. Along the eastern side of the Sound there is a shelf at 30 ft, which rises in places on its outer edge to 12 ft.

13. The largest industrial complex in Western Australia is centred in two areas, Owen Anchorage and Kwinana on the mainland shores of the Sound. Owen Anchorage is south of the Port of Fremantle Inner Harbour whilst Kwinana extends along the eastern and south-eastern reaches of the Sound towards Rockingham.

14. Garden Island Garden Island is some six miles long and a maximum of a mile wide. It is Commonwealth-owned and has an area of 2,928 acres. Its western side has scrub-covered irregular sand dunes up to a height of 150 ft, whilst the eastern side is relatively flat up to a group of hills around Mt. Moke, about two miles from the northern end. On the south-eastern side of the island is Careening Bay, a sheltered semi-circular bay open to the east and some 4,000 ft across with depths of 40 ft to 50 ft close in-shore.

#### NAVAL SUPPORT FACILITY, WESTERN AUSTRALIA

15. The Australian Fleet is concentrated at Sydney and has, since World War II, been backed up by naval shipbuilding and limited support facilities in Melbourne. Outside Sydney and Melbourne, there are few facilities for naval support but improved communications and transport have permitted specialised skills and equipment to be moved rapidly to points where they were required.

16. The Committee were informed of the strategic and logistic considerations which gave rise to the decision to establish a significant naval support facility in Western Australia. In particular, we noted the considerable savings in time and money and the increased operational efficiency and flexibility that are likely to result from being able to keep naval forces on task in the Indian Ocean based on such a facility, rather than on Melbourne or Sydney.

#### THE SITE

17. A naval support facility requires a sheltered anchorage with a deep water berth and easy access to the open sea. The berth must be secure and have the facilities needed for ships to maintain their equipment and machinery alongside. Such facilities include fuel, water, power, air, steam and communications. Stores and workshops and accommodation and recreation facilities are also required. A good service for supplies by sea, road, rail and air is essential and the locality should be reasonably close to suitable industrial resources including heavy engineering and electrical industry. It should, of course, be as near as possible to the likely operational area.

18. We noted that before deciding to establish this facility in Cockburn Sound, several other ports in Western Australia were considered, namely Albany, Geraldton and ports north of Geraldton including those used for the export of bulk ores. Albany was discarded as it is too far to the south and east of the possible operational area and because it does not have the desirable industrial resources and support. Geraldton lacks space for harbour expansion and is limited in water depth in the approaches and likewise is not suitably equipped industrially. The other ports were considered unsuitable due to their specific wharf use, lack of engineering support and problems caused by the high tidal range.

19. Within Cockburn Sound, Mangles Bay, Woodman Point and Garden Island were considered. Mangles Bay was rejected as the land backing is zoned and developed for urban use necessitating large scale reclamation from the sea for the establishment of the facility. In addition, the area is exposed to northerly gales and seas entering the southern channel.

20. A comparison between Garden Island and Woodman Point showed the former to be superior regarding wind and swell shelter, natural water depth, lack of siltation and weed growth, adjacent buoy mooring sites, security and space for expansion.

21. It is also relevant that Garden Island is Commonwealth property and is immediately available. Also most significant is the fact that even allowing for the cost of providing a causeway, it would be less costly to develop Garden Island than Woodman Point.

22. We concluded therefore that Garden Island is a suitable location for the establishment of a naval support facility in Western Australia.

23. Access to Garden Island from Mainland It is obvious that apart from the proposed causeway, access to Garden Island for the construction and subsequent operation of the facility could be provided by water transport or by a bridge. The Committee were told construction costs of the ultimate facility would rise by as much as 12% to 15% if the first alternative was adopted, in addition to the extra operational cost and inherent inefficiency involved in providing and operating ferries to service the daily needs of the base.

24. The bridge, whilst probably comparable to the causeway on a cost basis, would not protect the proposed berthing areas from seas entering the Sound through the Southern channel and would also be incompatible with the Fremantle Port Authority's port development plans.



25. From the functional and economic viewpoints, the proposed causeway linking Garden Island to the mainland is considered to be the most suitable solution for the construction and subsequent efficient operation of the facility. Apart from providing easy access, it will limit the ingress of swell waves, thus protecting berthing areas at Careening Bay and the land-backed wharves and docking facilities planned by the Fremantle Port Authority in the Rockingham area.

26. In these circumstances, the Committee consider that a causeway is the most appropriate means of obtaining access to Garden Island from the mainland.

#### CONSTRUCTION OF THE PROPOSED WORKS

27. Design The Committee were told that the causeway has been designed to meet the requirements of the Department of the Navy at the same time having regard to economy in both construction and subsequent maintenance, the development plans of the State Government for port facilities in the area and for minimal effects on the local natural environment.

28. Three rockfill mole sections, armoured where exposed to significant wave action, will connect a 1,000 ft low level trestle bridge towards the south with a 2,000 ft high-level northern bridge spanning a dredged small ships channel. We were informed that the bridged openings will permit water to be exchanged between the Sound and the ocean at a rate adequate to maintain the present hydrological and ecological balance in the Sound.

29. Southern and Northern Moles These moles, approximately 2,100 ft and 2,400 ft long respectively will be constructed of limestone rock and will be similar to other groynes constructed on the Western Australian coast. Large limestone rock armouring will be provided as necessary.

30. Low Level Trestle Bridge This structure, 1,000 ft in length will be of concrete decking on steel piles and will provide a 24 ft wide road, a pedestrian walkway and provision for services.

31. Central Mole The central 6,200 ft mole will be constructed to cope with the varying wave conditions to which it will be exposed. It will generally consist of a limestone core paved with a filter rock layer of up to two to three feet. Each face will then be armoured by a two-stone layer of either limestone or granite rock of differing weights depending on maximum wave heights.

32. High Level Bridge This structure, 2,020 ft long, will have 12 spans of 120 ft, three central spans of 125 ft, 130 ft and 125 ft and two end spans of 100 ft. The 130 ft span will have a 40 ft clearance above mean high water springs over the small ships channel.

33. The superstructure will comprise four pre-cast post-tensioned rectangular concrete beams in each span. The deck will be in situ reinforced concrete on tapered reinforced concrete piers which will be supported on partially submerged concrete pile caps on piles founded in the sand. Pile types and foundation details will not be determined until current site investigations are completed.

34. The 32 ft wide deck will incorporate a 24 ft roadway and a 5 ft footpath, and provision will be made for services underneath.

35. Small Ships Channel The channel, to provide access to the Sound at its southern end under the proposed high level bridge, will have a 100 ft navigable width, a clearance of 40 ft above mean high water springs and a navigable depth of 12 ft below low water ordinary spring tide.

36. The location of the channel on the seaward side of the bridge has not been determined although three possible routes have been selected. Final selection will be made after further investigation of dredging conditions, wave patterns and ship handling. Whichever route is chosen, dredging of some 50,000 cubic yards of sand over 6,000 ft will be required.

37. Committee's Recommendation The result of the Committee's consideration of the evidence about the construction of the work as proposed is reflected in the following extract from the minutes of the meeting held in Canberra on 21 October.

" It was moved Senator Branson, seconded Mr. Corbett.

That the Committee recommend the construction of the proposed causeway.

An amendment was then moved by Mr. Fulton, seconded Mr. Johnson.

That unless the Government is able to convince the Parliament that the work is urgent, further investigation should be carried out to ensure that impairment of the Cockburn Sound environment will not occur.

Debate ensued.

The Committee divided on the amendment.

<u>Ayes</u>	<u>Noes</u>
Mr. Fulton	Mr. Kelly
Mr. Johnson	Mr. Corbett
	Mr. Whittorn
	Mr. James
	Senator Branson

and so it was negatived.

The Committee then divided on the motion.

<u>Ayes</u>	<u>Noes</u>
Mr. Kelly	Mr. Fulton
Mr. Corbett	Mr. Johnson
Mr. Whittorn	
Mr. James	
Senator Branson	

And so it was resolved in the affirmative. "

38. The Committee therefore recommend the construction of the work in this reference.

ESTIMATE OF COST

39. The estimated cost of the work when referred to the Committee was \$9 million, made up as follows:

	\$
Southern approach rockfill mole and low level trestle bridge	1,050,000
Central rockfill mole	3,750,000
High level bridge	2,500,000
Northern approach rockfill mole	800,000
Small ships channel	100,000
Services	800,000
	<u>9,000,000</u>

PROGRAMME


40. The Committee were told that after an approval to proceed is given, a contract is to be let for construction of the southern approach rockfill mole and the low level trestle bridge and work is expected to commence in January 1971.

Tenders for the remaining sections of the project will be progressively invited with the aim of completing the causeway by June 1973.

RECOMMENDATIONS AND CONCLUSIONS

41. The summary of recommendations and conclusions of the Committee is set out below. Alongside each is shown the paragraph in the report to which it refers.

		<u>Paragraph</u>
1.	GARDEN ISLAND IS A SUITABLE LOCATION FOR THE ESTABLISHMENT OF A NAVAL SUPPORT FACILITY IN WESTERN AUSTRALIA.	22
2.	A CAUSEWAY IS THE MOST APPROPRIATE MEANS OF OBTAINING ACCESS TO GARDEN ISLAND FROM THE MAINLAND.	26
3.	THE COMMITTEE RECOMMEND THE CONSTRUCTION OF THE WORK IN THIS REFERENCE.	38
4.	THE ESTIMATED COST OF THE WORK WHEN REFERRED TO THE COMMITTEE WAS \$9 MILLION.	39

  
 (C.R. KELLY)  
Chairman

Parliamentary Standing Committee on Public Works,  
 Parliament House,  
CANBERRA, A.C.T.

27 October 1970.