

Parliamentary Standing Committee on Public Works

REPORT

relating to the

RESTORATION OF FACADE, GENERAL POST OFFICE, MARTIN PLACE, SYDNEY

(Eleventh Report of 1985)

THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

1985



Parliamentary Standing Committee on Public Works

REPORT

relating to the

RESTORATION OF FACADE, GENERAL POST OFFICE, MARTIN PLACE, SYDNEY

(Eleventh Report of 1985)

THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA
1985

1 9 8 5

THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA
PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

R E P O R T

relating to the

RESTORATION OF FACADE, GENERAL POST OFFICE,
MARTIN PLACE, SYDNEY

(Eleventh Report of 1985)

Canberra 1985

MEMBERS OF THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS
(Twenty-Eighth Committee)

Senator Dominic John Foreman (Chairman)
Percival Clarence Millar, Esq., M.P. (Vice-Chairman)

Senate

House of Representatives

Senator Gerry Norman Jones	John Neil Andrew, Esq., M.P.
Senator Dr Glenister Sheil	Robert George Halverson, Esq., O.B.E., M.P.
	Colin Hollis, Esq., M.P.
	Léonard Joseph Keogh, Esq., M.P.
	Keith Webb Wright, Esq., M.P.

EXTRACT FROM THE
VOTES AND PROCEEDINGS OF THE HOUSE OF REPRESENTATIVES
NO. 36 DATED 22 AUGUST 1985

- 31 PUBLIC WORKS COMMITTEE - REFERENCE OF WORK -
RESTORATION OF FACADE, GPO, SYDNEY: Mr West (Minister
for Housing and Construction), pursuant to notice, moved
- That, in accordance with the provisions of the Public
Works Committee Act 1969, the following proposed work be
referred to the Parliamentary Standing Committee on
Public Works for consideration and report: Restoration
of facade, General Post Office, Martin Place, Sydney.

Mr West presented plans in connection with the proposed
work.

Debate ensued.

Question - put and passed.

C O N T E N T S

	<u>Paragraph</u>
THE REFERENCE	1
THE COMMITTEE'S INVESTIGATION	3
BACKGROUND	4
Early History	9
Construction Material	13
Extensions 1892-1942	14
Previous Committee Inquiries	19
Current Role of GPO	20
THE NEED	22
Investigations	23
Results of Investigations	27
Options Considered	30
Option 1	31
Option 2	33
Option 3	34
Option 4	36
Committee's Conclusion	37
THE PROPOSAL	38
Painting	41
Colonnade	42
METHOD OF RESTORATION	
Cleaning	43
Stonework	44
Artificial Stone	45
Flashings	46
Pointing	47
Joinery	48
Glazing	49
Cast Iron	50
Committee's Conclusion	51

	<u>Paragraph</u>
ENVIRONMENTAL CONSIDERATIONS	
Heritage	52
Environment Protection	56
Safety Aspects	57
CONSULTATIONS	
Technical	59
General	62
OTHER OBSERVATIONS	64
Supply of Sandstone	65
Skilled Stonemasons	66
Feral Birds	69
LIMIT OF COST	71
RESTORATION TIMETABLE	75
Committee's Recommendation	78
RECOMMENDATIONS AND CONCLUSIONS	79

<u>APPENDICES</u>	<u>Page</u>
APPENDIX A - List of Witnesses	A-1
APPENDIX B - Illustrations	
Locality Plan	B-1
Site Plan	B-2
Martin Place Elevation	B-3
Pitt and George Streets Elevation	B-4
Option 2	B-5
Option 3	B-6

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

RESTORATION OF FACADE, GENERAL POST OFFICE,
MARTIN PLACE, SYDNEY

R E P O R T

By resolution on 22 August 1985 the House of Representatives referred to the Parliamentary Standing Committee on Public Works for consideration and report the proposal for the restoration of facade, General Post Office, Martin Place, Sydney.

The Committee has the honour to report as follows:

THE REFERENCE

1. The work proposed under this reference comprises the following work to the facade of the General Post Office, Martin Place, Pitt Street and George Street, Sydney, including the clock tower:

- replacement of deteriorated stonework;
- repair or replacement of windows;
- restoration of exposed cast iron work;
- replacement of overflashings;
- cleaning of the stonework and other surfaces.

Also included is the restoration of the colonnade and the paving steps.

2. The estimated cost of the proposed work is \$17 million at April 1985 prices.

THE COMMITTEE'S INVESTIGATION

3. The Committee received written submissions from Australia Post and the Department of Housing and Construction (DHC) and took evidence from their representatives at a public hearing held in Sydney on 1 October 1985.
4. The Committee also received a submission and took evidence from Mr Kenneth Lown, Bird Removalist.
5. Submissions and letters were received from the Masons' Consortium, the Public Works Department, NSW, the Australian Heritage Commission (AHC), and the Department of Arts, Heritage and Environment (DAHE).
6. The Committee inspected the facade of the GPO on 1 October 1985 prior to the public hearing.
7. A list of witnesses who appeared at the public hearing and the organisations which they represented is at Appendix A.
8. The Committee's proceedings will be printed as Minutes of Evidence.

BACKGROUND

9. Early History In 1809, the first post office in New South Wales, which was then a colony, was established in Sydney and located in Lower George Street.
10. In 1829, an old Police Station, which was located in George Street, on part of the present GPO site, was opened for business and remained in operation until temporarily relocated when Stage I of the construction of the present GPO, i.e., the George Street section, began in 1863.

11. The new GPO was officially open for business in 1874 and the building finally completed in 1887.

12. Since the first stage was completed the GPO has become the symbolic centre of the NSW postal systems. The Sydney GPO was designed by the colonial architect, James Barnet, in the style of the Italian Renaissance, of Venetian and Florentine character, and the facade possesses some of the finest and most intricate stone carving in Australia. The building features a colonnade at ground level and a 70-metre high centrally located clock tower on the Martin Place facade. The clock, which was installed in 1891, is the major time piece in Sydney. The bells, believed to have been the largest ever to leave England, were exceeded in size only by those at Westminster.

13. Construction Material The building was constructed of Sydney sandstone known as 'yellow block', a common term used to describe a stone which oxidises to a yellow colour and which was extracted from the Sydney basin.

14. Extensions 1892-1942 In 1892 the widened Martin Place was opened for vehicular and pedestrian traffic. With the rapid expansion of postal business, and particularly the telephone service towards the turn of the century, further expansion became necessary.

15. Barnet's successor, Walter Vernon, widened the George Street facade and an additional floor was added in 1898.

16. Further heavy expansion of business necessitated major additions to the building in 1923-27. This entailed demolition of much of the original interior and the construction of 7 new floors in the rear courtyard, known as the 1927 building. An adjacent building in George Street, known as the John Sands Building, was purchased in 1923.

17. In the mid-1930s Hoffnungs Buildings, 159-161 Pitt Street, were purchased. A 9-storey building was constructed between 1939 and 1942 (known as the 1942 building) to provide further accommodation for the rapidly expanding business.

18. In 1942, as a wartime precautionary measure, the clock tower was dismantled and heavy shuttering was erected along the length of the colonnade. The stone was stored in the open at Maroubra. In 1964, after public demand, the tower was re-erected, steam cleaned and coated with silicone water repellent.

19. Previous Committee Inquiries Reports on earlier inquiries by the Committee into the General Post Office, Sydney, are set out below:

- Remodelling and Additions to the General Post Office, Sydney (9 November 1921)
- Installation of Mail-Handling Appliances, General Post Office, Sydney (25 October 1926)
- Extension of Installation of Mail-Handling Appliances, General Post Office, Sydney (30 November 1927)
- Extension of Installation of Mail-Handling Appliances, General Post Office, Sydney (27 April 1929)
- Rehabilitation of 1942 Building, GPO, Sydney (Seventeenth Report of 1969)

20. Current Role of GPO The Sydney GPO has the largest patronage and revenue generation of any post office in Australia. It provides postal services, electronic mail services, Intelpost and Imagegram. Agency services include facilities for the payment of telephone accounts, Metropolitan Water Sewerage and Drainage Board accounts, Defence Forces Homes repayments, Sydney City Council rates and AMP Society premiums. Also handled are passport applications and interviews, sale of Australian Savings Bonds and Maritime Services Board licence renewals.

21. Annual revenue for business transacted at the GPO exceeds \$30 million per annum.

THE NEED

22. In 1981, following the unexpected dislodgement of a 10 kg piece of sandstone forming a rosette on the underside of the main cornice, a series of inspections were carried out. It was discovered that some elements of the facade had deteriorated badly. For safety reasons scaffolding was erected in George Street in that year. Catch scaffolding was subsequently erected around the remaining perimeter of the building in case further stones should become dislodged. Although this scaffolding is sufficient as an interim safety measure it is necessary to proceed with restoration work to the facade in order to prevent further deterioration and to render the facade safe.

23. Investigations Subsequent investigations revealed that many joints and cracks admitted water and confirmed that some elements of the facade had deteriorated to a potentially dangerous state. Rain, combined with airborne pollutants has resulted in decay and, in some cases, the splitting of the stonework into separate layers.

24. The facade was recorded by photogrammetry drawings. This technique produces 3-dimensional images from stereo photographs. These drawings were supplemented in detail by hand measurement and then coded to identify each individual stone and joint. The building was also recorded on a computer aided drafting system, which enabled reproduction of drawings at any required scale.

25. Materials scientists from the National Building Technology Centre and the NSW Institute of Technology carried out tests to quantify the condition of the stone. Drillings were made to various depths in both sound and decayed stone from which the concentration of deleterious salts was determined.

26. Many cleaning tests have been carried out over the years, but areas cleaned and methods employed have not been adequately recorded. Subsequent damage cannot therefore be directly related to a particular substance or technique.

27. Results of Investigations Due to exposure to the elements the masonry of the upper levels of the facade is more damaged than the lower levels. The wide main cornice shelters the facade below by diverting rain water. Damage is associated with the presence of salts formed by reaction between acid rain and the sandstone. As water migrates through the stone and evaporates, salt crystals are formed just below the surface, ultimately causing a layer of stone to fall away. Deterioration is accelerated by the failure of joints which allow water to penetrate deep into the stonework.

28. The work performed in 1958 concentrated on replacing the top front edges of cornices. The indented replacement stones were very small and jointing techniques were not sufficient even though the work was carried out according to the common practice of the time.

29. The soffit (i.e., the underside plane of a building component such as that of a cornice, eaves, etc.) and rosettes of the entire cornices have deteriorated to different levels. The inadequacy of 1958 repair work has resulted in the failure of many joints which has led to damage of the stone soffit. On the main cornice the small amount of stone left to support the edge has now deteriorated and itself consists mainly of replacement parts. Due to the shelter of the wide cornice most of the carving and moulded work below is in excellent condition.

30. Options Considered Various options to restore the facade were considered. These related to different philosophical and procedural approaches. The main emphasis was placed on ensuring the adequate repair of the main cornice, an ornamental projecting stone which protects the facade. This cornice protects the most valuable parts of the building from attack by rain.

31. Option 1 The Vernon additions would be removed and the original Barnet building facade restored. This would enable easier access to the heavy stones comprising the main cornice. Although the Vernon additions are the most damaged sections they are acknowledged as having heritage significance by the Heritage Commission and the National Trust.

32. The Committee agrees that this option should be rejected not only on heritage grounds, but also because it is the most expensive option.

33. Option 2 (See Illustration B-5). The upper portion of the Vernon additions would be dismantled as well as the supports for the cantilever clock which overhangs George Street. The surrounds of the clock are of massive stone which has suffered fairly serious deterioration. Defective stone would be replaced with new, re-used and indented stone as appropriate. The Committee questioned the viability of this option and was told that this option would prove disruptive in staff having to vacate

the building and there would be the problem of waterproofing the building below, while the work was being carried out. Also, this option would cost approximately \$5 million more than Option 3. Whilst acceptable on heritage grounds it was rejected in favour of Option 3.

34. Option 3 (See Illustration B-6) This would entail minimal dismantling of the facade and current techniques of indenting stonework would be employed. All horizontal areas would have metal overflashings which would prevent water from settling. An underfelt would separate the underside of the lead from the stone.

35. There would be no need to vacate the building. This option would leave open options for the redevelopment of the site. The facade work could proceed independently of any redevelopment work undertaken. This option would cost \$17 million at April 1985 prices.

36. Option 4 Fibreglass or artificial stone would be used to simulate the appearance of stone. The expected life of fibreglass is considerably less than maintained new stonework. Although it lessens the problem of stone procurement it reduces the cultural significance by introducing historically inaccurate material and craft. This option would not be acceptable to heritage bodies.

37. Committee's Conclusion The Committee accepts the need to restore the GPO facade and agrees that Option 3 would be the most acceptable option based on technical, heritage and cost considerations.

THE PROPOSAL

38. The proposed work broadly comprises:

- the replacement of deteriorated stonework;
- repair or replacement of windows;
- the restoration of exposed cast iron work;
- the cleaning of the stonework and other surfaces.

39. The work will involve some replacement of whole block stone, but the majority of stone repair will be carried out by indenting. Indenting is the practice of replacing the outer layer of an eroded or damaged stone by forming a pocket approximately 100mm deep and infilling with a similar material.

40. Particular emphasis will be placed on the cleaning of the facade to remove damaging salts, effective painting of all joints between the stones and on the overflashing of horizontal surfaces. The Committee was told that the most important task was to ensure a watertight facade.

41. Painting Internal painting will only be carried out where defective timber is replaced. Externally, window joinery will be repaired and restored.

42. Colonnade Repairs will be made to the joinery and lighting. The paving and steps will be repaired or replaced as necessary.

METHOD OF RESTORATION

43. Cleaning The building will be sprayed with water over a 12 to 24 hour period. The facade will then be cleaned using scrubbing brushes. This method is now recognised as the least aggressive and will not damage the facade. Bronze wire brushing will be used to remove stubborn grime. No chemicals, high water temperature or steam cleaning will be used.

44. Stonework Use of whole stone will be restricted to the pediments (i.e., the triangular adornments of the building). Indenting will be carried out in other areas.

45. Artificial Stone Artificial stone will be used only where it will be covered by lead flashing which is proposed for each cornice.

46. Flashings The tops of the dormer windows (i.e., windows in a sloping roof with vertical glazing), the coping (the uppermost stones on a wall which are sloped to shed rain and hence protect walls from weathering) and each of the four cornices will be overflashed with lead on a perforated felt underlay. Flashings embedded in the stone around dormer windows will be repaired or replaced as necessary - also the existing overflashing on to the box gutters.

47. Pointing The joints to all replacement work and elsewhere, as necessary, will be pointed in mason's putty. Areas of sound jointing will be left undisturbed.

48. Joinery Existing windows will be replaced or repaired as required. The repair or replacement of defective timber work, sash cords and hardware will be included.

49. Glazing Glass penetrated to support the scaffolding will be replaced by similar glass.

50. Cast Iron The patterned cast iron grilles will be cleaned and painted.

51. Committee's Conclusion The restoration work proposed in this reference appears to be a satisfactory solution to arrest the deterioration and ensure the GPO building is preserved in good condition.

ENVIRONMENTAL CONSIDERATIONS

52. Heritage The GPO building is entered on the Register of the National Estate and is classified by the National Trust of Australia (NSW).

53. The obligations imposed on Australia Post by this heritage status are specified in section 30 of the Australian Heritage Commission Act 1975.

54. Australia Post assesses all of their old buildings for heritage value and for their suitability for continued use for postal operations. They aim to restore historic buildings to their original state whenever significant work on these buildings becomes necessary, normally in conjunction with major alterations to or maintenance of such buildings.

55. The Australian Heritage Commission and the National Trust of Australia (NSW) have signified their agreement with the manner and extent of the proposed restoration of the facade.

56. Environment Protection The Department of Arts, Heritage and Environment, has confirmed that no action or assessment was required under the Environment Protection (Impact of Proposals) Act 1974 in respect of this proposal.

57. Safety Aspects The Committee was informed by the Department of Housing and Construction that the proposed construction method recognises the paramount safety to the public and the building occupants. The Department will also take provision to minimise adverse effects of noise and dust.

58. The construction method will continue to be reviewed and refined during the development of the project.

CONSULTATIONS

59. Technical Following the initial inspections in 1981, extensive historical, technical and field work investigations were carried out by the Department of Housing and Construction to establish the heritage significance of the GPO, the condition of the facade and the reasons for decay.

60. The New South Wales Works Department Stone Buildings Group provided valuable assistance on stone restoration and stone supply. The Committee commends the NSW Works Department for its generous support.

61. Other bodies consulted by DHC were the National Building Technology Centre, the Department of Applied Geology, NSW Institute of Technology, Unisearch Ltd and professional consultants, etc.

62. General In addition to the statutory bodies mentioned elsewhere in this report consultations were also held with the Council of the City of Sydney regarding working hours, access to the site, public safety and public convenience, etc. Also consulted were the Royal Australian Institute of Architects (NSW), the NSW Department of Environment and Planning, the Royal Australian Historical Society, the Returned Services League and other various bodies.

63. Consultations will continue throughout the proposed restoration work.

OTHER OBSERVATIONS

64. Problems associated with the restoration work include the supply of suitable stone and the shortage of skilled stonemasons.

65. Supply of Sandstone. Approximately 750 cubic metres of sandstone will be required to restore the facade. The 250 cubic metres of sandstone needed to complete Stage 1 is available in an existing quarry in NSW. Further supplies of 'yellow block' (a generic term, not a geological term) are being investigated. Supply of stone that has the right physical properties and is of the right colour, from interstate sources, is being investigated. The Committee was advised that the cost of obtaining stone from outside the Sydney area is provided for in the Limit of Cost Estimate.

66. Skilled Stonemasons. The number of skilled stonemasons in Sydney is divided between private companies and the NSW Department of Public Works.

67. The two years leading up to the bicentenary will involve a significant program of stonework in New South Wales. The Committee was advised by the Department of Housing and Construction that if there was a shortage of masons in Australia, particularly during the first stage, i.e., to 1987, then stonemasons would be sought from other States as well as from overseas. These stonemasons have indicated a willingness to become involved in the project.

68. The Masons' Consortium in their submission pointed out that by recruiting local tradesmen first, some of the problems of assimilation of overseas masons would be avoided.

69. Feral Birds. Mr K. Lown, Bird Removalist, in evidence to the Committee, stated that his invention prevents feral birds from fouling public buildings and roof drainage systems. He showed the Committee his invention and expressed his desire to place his expertise of 20 years at Australia Post's disposal.

70. The Committee has arranged for Mr Lown to be contacted by the Department of Housing and Construction, in the course of the development of the project, who will then assess his product.

LIMIT OF COST

71. The limit of cost estimate for the proposal when referred to the Committee was \$17 million at April 1985 prices.

72. The estimate of \$17 million is based on a detailed study of the George Street facade from construction scaffolding and on visual inspections of the other facades from a mobile crane. Reasonable allowance has been made for the expected deterioration of stonework during the predicted construction period.

73. The construction period of approximately 7 years is dependent upon the availability of suitable sandstone and skilled stonemasons.

74. While Australia Post is to fund this project the Committee was given to understand that the Department of Arts, Heritage and Environment, is currently reviewing the issue of how elements of building work of a heritage nature will be funded in the future. The Committee supports Australia Post's view that expenditure of this magnitude should not be borne wholly by users of the postal service.

RESTORATION TIMETABLE

75. The continued operation of the General Post Office and the need to minimise disruption to the public and building occupants, as previously mentioned, necessitates that the work be undertaken in stages. Staging is also required because of the limited supply of materials and labour and by the desire to economise the amount of scaffolding required at any one time. The present staging plan envisages that the main Martin Place facade will be left free of construction work during the bicentennial year.

76. The proposed sequence for the restoration work is set out below:

Stages

Stage 1 - George Street

Stage 2 - Pitt Street

Stage 3 - Martin Place - in two phases

Stage 4 - Clock Tower and work to Colonnade

Sufficient sandstone for each stage will be secured before work commences on any stage.

77. It is expected that repairs to the entire facade could take up to 7 years to complete.

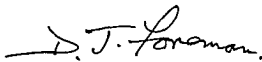
78. Committee's Recommendation The Committee recommends the restoration work in this reference and requests that every reasonable means of accelerating the program be pursued.

RECOMMENDATIONS AND CONCLUSIONS

79. The recommendations and conclusions of the Committee and the paragraph in the report to which each refers are set out below:

Paragraph

1. THE COMMITTEE ACCEPTS THE NEED TO RESTORE THE GPO FACADE AND AGREES THAT OPTION 3 WOULD BE THE MOST ACCEPTABLE OPTION BASED ON TECHNICAL, HERITAGE AND COST CONSIDERATIONS. 37
2. THE RESTORATION WORK PROPOSED IN THIS REFERENCE APPEARS TO BE A SATISFACTORY SOLUTION TO ARREST THE DETERIORATION AND ENSURE THE GPO BUILDING IS PRESERVED IN GOOD CONDITION. 51
3. THE LIMIT OF COST ESTIMATE FOR THE PROPOSAL WHEN REFERRED TO THE COMMITTEE WAS \$17 MILLION AT APRIL 1985 PRICES. 71
4. THE COMMITTEE RECOMMENDS THE RESTORATION WORK IN THIS REFERENCE AND REQUESTS THAT EVERY REASONABLE MEANS OF ACCELERATING THE PROGRAM BE PURSUED. 78



(D.J. FOREMAN)

Chairman

Parliamentary Standing Committee
on Public Works
Parliament House
CANBERRA

14 November 1985

LIST OF WITNESSES

Colombo, D.W., Esq., Project Manager, Department of Housing and Construction, Sydney, New South Wales

Cox, N.C., Esq., Manager, GPO Redevelopment, Australia Post, Sydney, New South Wales

Fennell, K.J., Esq., General Manager, Estates Management, Australia Post Headquarters, Carlton South, Victoria

Hayes, B.J., Esq., Principal Quantity Surveyor, Department of Housing and Construction, New South Wales Region, Sydney, New South Wales

Lown, K.M., Esq., Proprietor, Bird Removalist, 3 Close Street, Coogee, New South Wales

Saunderson, D.F., Esq., Manager, Special Projects, Australia Post Headquarters, Carlton South, Victoria

Setchell, G.H., Esq., Chief Architect, Heritage and Planning, Department of Housing and Construction, Canberra, Australian Capital Territory

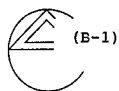
APPENDIX B

ILLUSTRATIONS

Locality Plan	B-1
Site Plan	B-2
Martin Place Elevation	B-3
Pitt and George Streets Elevation	B-4
Option 2	B-5
Option 3	B-6



- 1 SITE
- 2 HARBOUR BRIDGE
- 3 CIRCULAR QUAY
- 4 HYDE PARK
- 5 DARLING HARBOUR
- 6 OPERA HOUSE



Location Plan 1

GEORGE STREET

PITT STREET

MARTIN PLACE

extent of facade restoration
work is shown hatched

Historic Stone
Building

Clock Tower

1927 Building

John Sands Building

1942
Building

American Express
Tower.

Hooker House

KING STREET



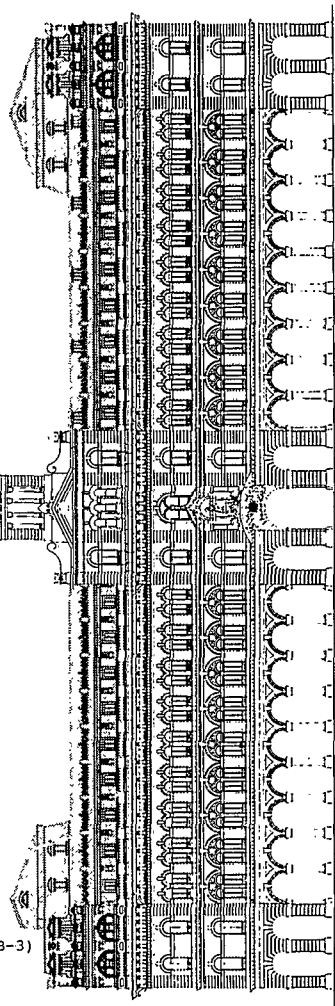
(B-2)

0 5 10 25 m

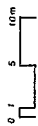
Site Plan 2

11
 12
 13
 14
 15
 16
 17
 18
 19
 20
 21
 22
 23
 24
 25
 26
 27
 28
 29
 30
 31
 32
 33
 34
 35
 36
 37
 38
 39
 40
 41
 42
 43
 44
 45
 46
 47
 48
 49
 50
 51
 52
 53
 54
 55
 56
 57
 58
 59
 60
 61
 62
 63
 64
 65
 66
 67
 68
 69
 70
 71
 72
 73
 74
 75
 76
 77
 78
 79
 80
 81
 82
 83
 84
 85
 86
 87
 88
 89
 90
 91
 92
 93
 94
 95
 96
 97
 98
 99
 100

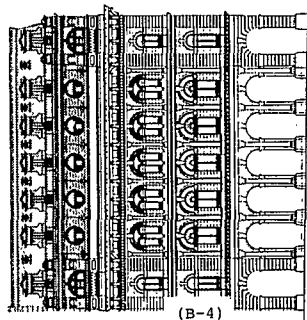
(B-3)



Vernon addition
 is shown shaded

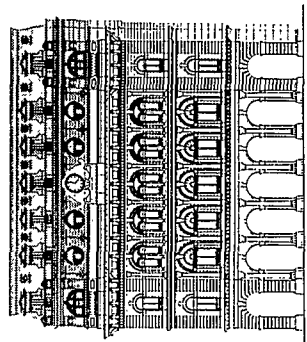


GPO Martin Place Elevation



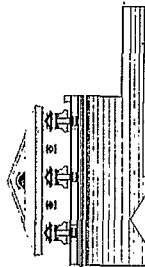
Pitt Street

GPO Elevations



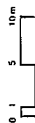
George Street

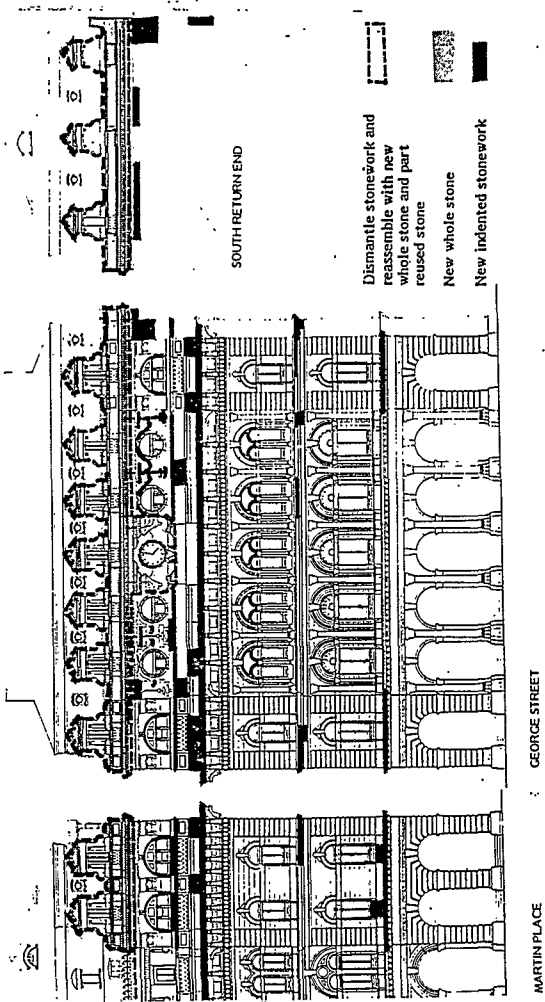
Vernon addition
is shown shaded



detail

Elevation of high level return
over John Sands Building



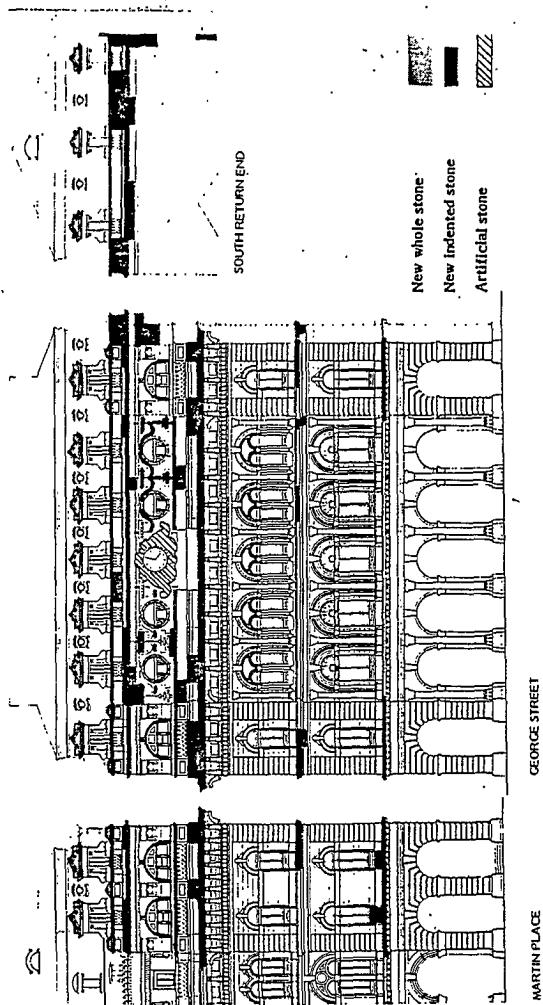


OPTION 2

PART DISMANTLING AND REPAIR USING A
COMBINATION OF WHOLE AND INDENTED STONEMWORK

(B-5)

FIG. 10.2



OPTION 3

REPAIR OF FACADE USING INDENTED STONEWORK
AND ARTIFICIAL STONE CLOCK SWAG

(B-6)

FIG. 10.3