

## PORT AUTHORITY OF NSW HERITAGE INVENTORY

### State Heritage Inventory

SHI Number: 4560010		Study Number: N/A	
Item Name: Automatic Tide Gauge			
Location: Brotherson House, Port Botany			
Address: Gate B103 Penrhyn Rd, Port Botany		DUAP Region: Sydney South	
Suburb / Nearest Town: Port Botany 2036		Historic Region: Sydney	
Local Govt Area: Randwick		Parish: Botany	
State: NSW		County: Cumberland	
Other/Former Names:			
Area/Group/Complex:			Group ID:
Aboriginal Area:			
Curtilage/Boundary:			
Item Type: Movable / Collection	Group: Government and Administration	Category: Meteorological Station	
Owner: Port Authority of New South Wales			
Current Use:			
Former Uses:			
Assessed Significance: State		Endorsed Significance:	
Statement of Significance: <p>The tide gauge is significant as the first of several gauges which have collected critically important data for over 150 years for use in navigation, engineering, surveying and oceanography. The original gauge was used for 44 years. Unique as the first automatic tide gauge established in Sydney and from which an important body of data was recorded which has shaped the development of Sydney and the operation of the Harbour. Mean sea level on the gauge was adopted in 1897 as the standard datum for levels in NSW. This datum is still used for levelling purposes via the datum (brass plug) embedded in 1897 in the wall of the Lands Department Building (Bridge Street) based on a fixed height above the Fort Denison level calculated through the measurements collected by this original tide gauge.</p>			
Historical Notes or Provenance: <p>An accurate knowledge of the movement of the tide is necessary for the calculation of certain surveying and engineering problems (e.g. shoreline boundaries) as well as for safe navigation and oceanography; therefore tide gauge records have been kept over long periods.</p> <p>Mean Sea Level on the gauge was adopted at a Conference of Representatives of Government Departments in 1897 as standard datum for levels in NSW. The level of this datum adopted was 2.525 feet above gauge zero. This value having been computed by Mr H.C. Russell, the Government Astronomer, from the Gauge for the 13 years prior to 1897 (Ward 1949:199). While this standard datum is still in use for levelling purposes the term 'mean sea level' has been discarded in reference to this datum as it was later discovered that there was a gradient between the Heads and Fort Denison.</p>			

For the standard to be permanently accessible to surveyors, the height of a brass plug set in the wall of the Lands Department building in Bridge Street was carefully determined by the 1897 Conference by precise levelling from Fort Denison as 28 feet 11 and 1/4 inches above standard datum (Ward 1949:200).

The first tide gauge at Fort Denison was established in 1866 by the then Government Astronomer G R Smalley on the southwest corner of the island (Ward 1949:198). Tide gauge operations were moved to a small room close to the Martello Tower on the north end of the island in 1923.

Management of the gauge was taken over by the Sydney Harbour Trust in 1901, then by the Maritime Services Board in 1936. The tide measurement at Fort Denison is used to define the Australian Height Datum for survey purposes and its constant location has enabled shifts in sea level over time to be monitored. The first gauge was replaced in 1910 and is now housed in a glass case at Port Authority of New South Wales office space at Brotherson House in Port Botany.

Themes:	National Theme:	State Theme:	Local Theme:
	3. Economy	Transport	(none)
	3. Economy	Technology	(none)
	4. Settlement	Towns, suburbs and village	(none)

Designer:

Maker / Builder:

Year Started: 1866

Year Completed: 1866

Circa: No

Physical Description:

The original gauge.

The gauge consists of a revolving drum carrying a graph, upon which every movement of the tide is recorded by a pen. The pen is actuated by a system of wires connected to a float in a well in the floor of the gauge house at Fort Denison. The well is open to the rise and fall of the Harbour's water and surface changes that could distort the measurement of the basic rise and fall of the tides. As the float rises and falls with the tide its motion is transmitted to the gauge (Ward: 1949).

The vertical movements of the float are recorded by the pen of the gauge moving horizontally across the tide graph at a ratio of 1 inch to 1 foot of tide variation. The graph known as the tide sheet is 24 inches long, each inch representing an hour, and 9 inches wide, each inch representing a foot of tide height. The tide sheet is fitted around a brass cylinder exactly 24 inches in circumference, which is made to revolve once every 24 hours by means of a clock attached to the gauge (Ward 1949:199).

The gauge was sensitive and despite the damping down of surface waves it would register disturbances such as the displacement waves of ships passing close to Fort Denison, waves caused by local gales and seismic ocean waves caused by earthquakes in distant parts of the Pacific Ocean.

Physical Condition: The original tide gauge is in good condition and housed in a glass case at Port Authority of New South Wales marine operations facility at Brotherson House, Port Botany.

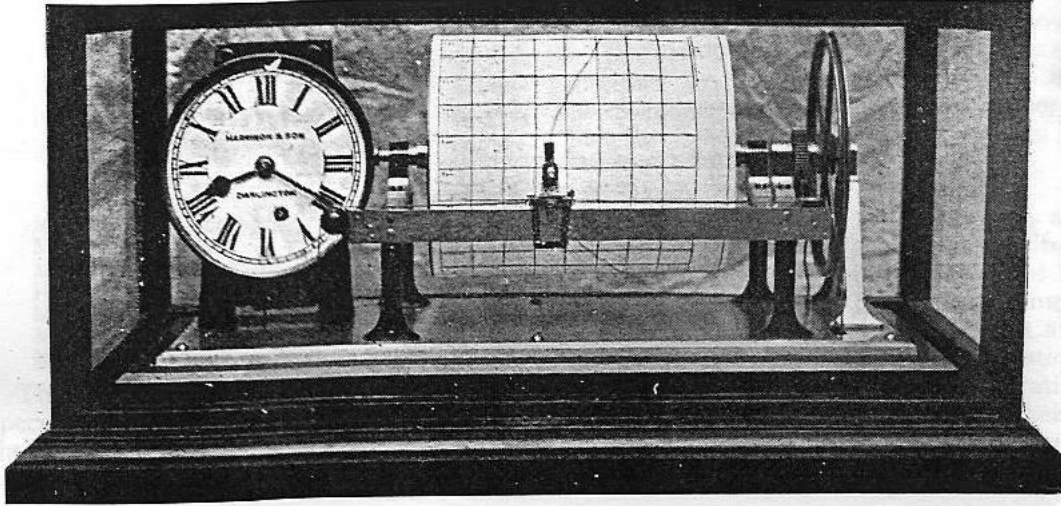
Modification Dates:

This is the original gauge and was replaced in 1910. This original gauge is now housed in a glass case at Port Authority of New South Wales marine operations facility at Brotherson House, Port Botany (refer to Images 2-5). The second gauge has since been replaced, but it remains in situ at Fort Denison and is owned by Port Authority of New South Wales.

<p>Recommended Management: Preparation of a Heritage Assessment to provide a comprehensive understanding of the significance of the item and assist with its long-term conservation.</p> <p>Preparation of a Moveable Heritage Management Plan for Port Authority of NSW moveable heritage assets including the Automatic Tide Gauge to provide a comprehensive guide to the future conservation and management of the items.</p>				
Management: Statutory Instrument				
Further Comments:				
Criteria a) This tide gauge (now in Port Authority of New South Wales office Brotherson House, Port Botany) was the first tide gauge installed at Fort Denison in 1866. It was replaced in 1910.				
Criteria b) Established by the Government Astronomer Mr G. R Smalley.				
Criteria c)				
Criteria d) The importance of the tide gauge is recognised by a limited group of people such as the caretakers who supervised operations, sailors, architects and builders who rely on the information from the gauge. However the social significance of the gauge extends beyond this small group, having played an integral part in the very design and appearance of the City of Sydney through its role as the key surveyors standard datum for levels.				
Criteria e) The tide gauge is significant as the first of several gauges which have collected critically important data for over 150 years for use in navigation, engineering, surveying and oceanography. The original gauge was used for 40 years.				
Criteria f) Unique as the first automatic tide gauge established in Sydney and from which an important body of data was recorded which has shaped the development of Sydney and the operation of the Harbour. Mean sea level on the gauge was adopted in 1897 as the standard datum for levels in NSW. This datum is still used for levelling purposes.				
Criteria g)				
Integrity / Intactness:				
References:	Author:	Title:	Year:	
	Sydney Harbour Trust	Sydney Harbour Trust Commissioners Tenth Report	1910	
	K W Sweetman	Centenary of Fort Denison Port of Sydney Journal 5 No 7	1957	
A M Ward	Automatic Tide Gauge, Port of Sydney Journal	1949		
Studies:	Author:	Title:	Number:	Year:
	A Tsaccounis	Fort Denison Tide Gauge History Port Jackson, Port Authority of New South Wales		2019
	Susan McIntyre-Tamwoy Heritage Consultants	Sydney Ports Corporation Heritage and Conservation Register	4560010	2004
	NSW National Parks & Wildlife Service	Fort Denison Conservation Plan		1997

	James Semple Kerr - Sydney National Trust	Fort Denison - An Investigation for the Maritime Services Board of NSW			1986
	Trueman Ludlow Pty Ltd: Howard Tanner and Assoc Prof Ian Jack; W Ashton	Woollahra Heritage Study			1984
Parcels:	Parcel Code:	Lot Number:	Section:	Plan Code:	Plan Number:
Latitude: -33.96750040321129			Longitude: 151.22042479872226		
Listings:	Name: Heritage Act – S.170 NSW State agency heritage register	Title: Automatic Tide Gauge	Number: 4560010	Date: 1/07/2004	
Data Entry:	Date First Entered: 24/06/2004	Date Updated: 25/01/2023	Status: Basic		

Image: 1



Caption: Automatic Tide Gauge

Copyright: Port Authority of New South Wales

Image By: Maritime Services Board in Port of Sydney Journal, Vol 2, No 6, October 1949, page 198

Image Date: undated

Image File: 4560010b1.jpg

Image: 2



Caption: Automatic Tide Gauge

Copyright: Port Authority of New South Wales

Image By: Ben McGuinness, Port Authority of New South Wales

Image Date: 13 March 2023

Image File: IMG\_1147.jpg



Image: 3



Caption: Automatic Tide Gauge

Copyright: Port Authority of New South Wales

Image By: Ben McGuinness, Port Authority of New South Wales

Image Date: 13 March 2023

Image File: IMG\_1148.jpg

Image: 4



Caption: Automatic Tide Gauge

Copyright: Port Authority of New South Wales

Image By: Ben McGuinness, Port Authority of New South Wales

Image Date: 13 March 2023

Image File: IMG\_1149.jpg



Image: 5



Caption: Automatic Tide Gauge

Copyright: Port Authority of New South Wales

Image By: Ben McGuinness, Port Authority of New South Wales

Image Date: 13 March 2023

Image File: IMG\_1150.jpg