Ngā Pūtahitanga / Crossings

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Jet Crossings:
Flying Hybrid Machines Over Rose Bay Seaplane Airport (1938)

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Abstract

The invention of flying boats in the early twentieth century prompted architects and urbanists to adapt to a new hybrid transport technology. Flying boats' ability to take off and land on the water made the water an endless runway with airport terminals positioned on coastlines. The miracle of flying boats and, more broadly, aeroplanes in the air struck a chord in the popular imagination of ordinary tourists, avant-garde architects and urban designers. The Art Deco style expressed their excitement for the new modern transport technology, with smooth, streamlined aesthetics based on the curved, aerodynamic surface of aeroplane bodies. Design professionals internalised aerial themes when shaping places where the sea meets the sky.

Taking full advantage of aircraft technology with the ability to take off from the water, Qantas built Australia's first international airport and maintenance facilities at Rose Bay in 1938 for easy access to the waters of Sydney Harbour. To serve further increases in the popularity of international air travel, a second international airport was proposed for the waters at Newport in Sydney's Pittwater. The airport buildings at Rose Bay and Newport are examples of airport architecture at a local level, their stories providing tangible and material insights into the broader history of Australian aviation heritage. This paper's archaeology of Rose Bay's and Newport's terminal buildings as obsolescent objects will uncover glimpses into how architects networked innovative transport technologies into the modern cities of the past.

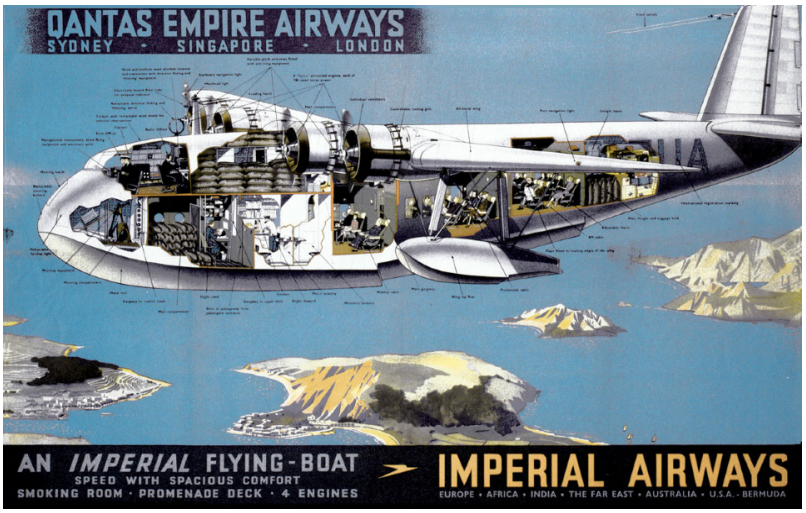

Figure 1. Flying boat cutaway brochure from the late 1930s (Qantas Heritage Collection).

Introduction

A Qantas Empire Airways brochure from the late 1930s advertises an Imperial Airways flying boat gliding above blue waters. The flying boat, drawn as a cross-sectional view, reveals a collection of neatly assembled cabins expanding out to the hull's exterior.[1] Flying boat cabins recreated the comfortable experience of travelling inside an ocean liner, where the compartments were designed as adaptations of sailing boat chambers. Passengers were expected to get to know one another well while on board, spending at least nine days together inside the compartments. The 'C Class' planes provided passengers with ample amounts of space, the interior being large enough for people to move around and play a round of quoits to pass the time.[2] Flying boats attempted to recreate the luxurious experience of sailing in the skies by fusing the comfort of cruising in an ocean liner with the speed and convenience of flying in an aeroplane. Qantas Empire Airways flew fifteen passengers and five crew to international destinations in serious style inside their fleet of six flying boats. The company's investment to fly passengers in an aquatic fleet of aircraft expanded the Empire Air Mail scheme and added Qantas to the list of international aircraft operators, beginning a new era in Australia's aviation history.[3]

Flying Boats existing as a cross between a plane and a boat, with machinery capable of flying in the sky and landing on the water, required a unique set of equipment to guide them for take-off from the water. In a video by *Film Australia* released in the 1970s entitled *The Ships that Flew,* a pilot describes the take-off process.[4] First, aviators sought a clearing of water free from ferries, vessels and other boats with the potential of

intercepting the runway. With the propellers whizzing and the plane lurching forward, the pilot used the floats on the underside of either wing to stabilise the nose and prevent drag. The pilot pulled back on the controls, and the air moving around the curved metal aerodynamic wings gradually lifted the plane upwards from the water. The waters of Rose Bay in Sydney were sufficiently flat and calm for the length of the runway, warranting a safe take-off and landing.[5] The introduction of flying boats in the early twentieth century prompted architects to design places where a new hybrid transport technology could take off and land.

Figure 2. Image of the entrance into the Rose Bay Flying Boat Base. The sign to the right of the photograph reads, "Commonwealth of Australia Department of Civil Aviation, Rose Bay Flying Boat Base, No Admittance…" ("Rose Bay 1940s," Qantas Heritage Collection).

For many Australians in the 1930s, international air travel was becoming a viable option, increasing the need for aircraft companies to build tarmac capable of landing large, long-range aircraft. Flying boats did not need to land on tarmac runways, taking off from calm stretches of water.[6] Taking full advantage of aircraft technology with the ability to take off from the water, Qantas built Australia's first international airport and maintenance facilities at Rose Bay for easy access to the waters of Sydney Harbour.[7] To serve further increases in the popularity of international air travel, a second international airport was proposed for the waters at Newport in Sydney's Pittwater. The *Airport of Tomorrow* scheme was drawn at a monumental scale and was envisioned to house the largest flying boats in the world.[8] The project sought to dramatically reshape the existing landscape of Newport, uprooting the small instances of utilitarian architecture serving the local surf lifesaving community and Royal Motor Yacht Club. The airport at Newport

project would have transformed the local Australian community of Pittwater by overlaying an entirely new aviation suburb.[9] The airport buildings at Rose Bay and Newport are examples of airport architecture at a local level, their stories providing tangible and material insights into the broader history of Australian aviation heritage.[10]

Designing for Hybrid Typologies

Rose Bay Flying Boat Base was designed by the Government Architect and opened to a crowd of 2000 people with an existing fleet of flying boats on 4 August 1938.[11] The base on the edge of Lyne Park faced the water, prompting a design that merged a bayside pavilion with an airport. Images collected from the Qantas Heritage Archives reveal the front of the airport building in elevation and the unique treatment for the façade. The design mimics a European standard for airports that fused a control tower and passenger terminal into the same location.[12] Tying both typologies together and tailoring the airport to its setting were the architectural tectonics of a beachfront colonnade and recreational amenities building. Inside the airport facilities were the passenger terminal, waiting area, cargo storage and refuelling tanks. On the top deck overlooking the water was a curved control tower with glass windows and a curved balcony. The balcony and colonnade levels of the airport connected passengers to the water through glass windows, framing the view to the outside.[13] The viewing areas brought the animated activities of boats floating on the water to the interior, entertaining the flow of people that sat and waited for their flights.

The first airports constructed in Australia were basic, utilitarian buildings consisting of industrial hangars and small administration pavilions. Their appearance reassured passengers with a familiar aesthetic until the early 1930s when architects realised the potential for aviation architecture.[14] In 1938, the Government Architect designed Rose Bay's airport in an avant-garde Art Deco style, expressing the excitement surrounding the new modern transport technology.[15] The curved aerodynamic surface of aeroplanes' bodies inspired a smooth, streamlined aesthetic on the façade. Art Deco themes were slowly overlayed onto the red brick administration building, reflecting the lines and forms within aircraft.[16] The beautiful long lines of ships and the convex, graceful lines of wings were taken from the designs of transport vehicles and tied into the aesthetics of Rose Bay. The first floor was lined with long horizontal strips along the top and outlined with thin round balustrades above and below. The control tower and viewing deck are curved, mimicking the front of an aeroplane or the front of a ship on the bay's waters. The Base's curved corners and long lines are visibly an interpretation of an Art Deco style. Rose

Bay conformed to modernist ideas of purity and vitality of form,[17] turning aeroplane technology into the airport's aesthetic.[18]

Figure 3. Image of the airport's front façade facing the water ("Rose Bay 1930s," Qantas Heritage Collection).

The jetty in front of the Rose Bay airport bridged sailors with their craft docked on the water besides. The boardwalk was continuously upgraded and extended to accommodate new mobile aircraft technologies and immobile technologies like control towers and airports, permitting an approach from floating vessels of all types. In addition to anchoring an assortment of ships, it functioned as a jet bridge connecting passengers to the flying boats that docked beside it. The jetty's design was carefully crafted to protect passengers from unpredictable wind and wave conditions.[19] After checking in, passengers walked along the deck, past the ships anchored along the edge, and through the flying boat's cabin doors. On the airport's opening day, the popularity of the jet bridge showed the jetty was more significant to the people of Rose Bay than simply mooring boats and docking flying boats. People were gripped by the enthusiasm for aviation that swept the world. Many design professionals had become air-minded and strove to take advantage of the opportunities the new technologies offered, upgrading existing infrastructure for landing flying boats on the shoreline.

Figure 4. Image of the enormous industrial hangars that took over a large portion of Lyne Park. The hangars were large enough to house flying boats while they were under repair ("Rose Bay 1940s," Qantas Heritage Collection).

The establishment of the maintenance facilities to support the airport at Rose Bay was slow, forcing flying boats to be repaired on their moorings until a purpose-built hangar was constructed.[20] Work on the main hangar began in 1938 and was completed in 1939, a considerable time after the airport terminal building had been opened.[21] Once the hangar was opened, the airport was considered a base, with a cluster of buildings, including a hangar, large enough to cover flying boats, workshops, fabrication facilities and staff amenities.[22] Employees at the base were swamped with work as the daily pressures and requirements for maintaining their new fleet of flying boats increased.[23] Under cover of immense warehouses, a flow of maintenance equipment and mechanics moved around the machines under repair on the inside.[24] Employees were tasked with maintaining the six Empire Class flying boats given to Rose Bay by the Short Brothers in the United Kingdom.[25] Flying boats would be launched into the hangars on a slipway that led from the shoreline to the water. The ramp was made from iron frames and wooden slats that formed an inclined ramp. A second hangar was planned to help with the increased workload but was never completed due to the end of the war and decreased demand for new flying boats.[26] The steelwork meant for building the hangar was sold and reassembled at Mascot airfields, where it later housed Qantas' land planes. The remains of the main hangar were eventually disassembled in the 1970s when the land was returned to civilian hands and turned into a sporting field once again.[27]

Designing for Hybrid Urban Activities

An aerial image of Rose Bay shows the bay's waters heaving with civilian activity. Combining swimming, cricket and other sporting activities at the park meant the public grew accustomed to having seaplane activity at the bay. Sailors could easily hire a boat from the sheds at Lyne Park and spend the day floating around the bay, and swimmers participated in water activities at the baths. Following increased activity on the water, sporting events emerged on the grass, drawing crowds of young people to the park. Ocean baths, boating activities and sporting games were jammed within a small section of the bay, making it difficult for flying boat pilots to find a clear stretch of water for take-off.[28] Fuel from flying boats and sailing boats poured into the water, polluting the bay's ecosystem and causing the fresh water to fill with seaweed. With seaweed littering the surface, swimming activity soon decreased, causing seaplanes and boats to take over the remainder of the bay.

Figure 5. Aerial image of the first international airport in Australia on opening day. A crowd of people line the shoreline, and two flying boats float along the water ("Rose Bay 1938," Qantas Heritage Collection).

Locating airports on the periphery of cities and parklands had the detrimental effect of introducing potentially hazardous and unwanted pollution. Rose Bay had become known as a dirty and smelly place with copious amounts of seaweed littering the shoreline.[29] Meeting minutes from gatherings of Woollahra City councillors detail the task of removing pollution from the water.[30] They proposed to reclaim part of the water and construct a seawall, the wall doubling as a buffer from seaweed plaguing the beach and a retaining wall for the newly infilled parkland. The councillors resolved the urban

threshold between the water and Lyne Park through a delicate combination of ecosystem management and precise incision of infrastructure.

The provision of large open spaces located inside the city was hard to find. Existing parks, parade grounds and military training spaces were turned into airports and became settings for the first aviators. Double Bay, an inlet just above Rose Bay, became the runway for Lebbeus Hordern's famous flight. An image taken at the event shows crowds of people standing on the sand at Double Bay to watch Hordern's seaplane take off in 1914, indicating just how important the water events were to the people of Woollahra.[31] Next to sailing and swimming, seaplanes were a preferred source of entertainment, and residents didn't miss the chance to catch the spectacle of new technology with their own eyes. The promise of innovation captured the imagination of residents, pilots and designers, who imagined where this new technology could take them.

Figure 6. Crowds lined the shoreline to catch a glimpse of this famous flight. The crowds' attendance highlighted the popularity of aviators' first flights ("Maurice Farman Hydro-Aeroplane (Hydroplane) imported by Lebbeus Hordern, flown by Guillaux, 1914," State Library of New South Wales, reproduced from the State Archives & Records Authority of NSW, 9 May 1914).

Scheme for a Hybrid Airport

Operating from Rose Bay to Palm Beach, Aquatic Airways flew seaplanes along the NSW coastline, continuing the legacy of flying boats through the 1970s. Tourists wishing to view Sydney from the air and businesspeople travelling to Gosford preferred flying the seaplane route from Rose Bay to Palm Beach and their destination in Gosford.[32] Aquatic Airways leased Barrenjoey Boathouse to land seaplanes along the coast and connect Palm Beach to the route of seaplane destinations. Constructed in 1947, the

boatshed was typical of small utilitarian marine buildings and wasn't large enough to cover seaplanes from the weather on the inside. Damaged seaplanes were dragged onto the sand beside the boatshed for repairs, including the Cessna 185 floatplane and De Havilland Beaver. Cessnas could carry three or five passengers, depending on the model, while the Beavers were larger, more reliable and could carry eight passengers. Beavers, the preferred seaplanes, were installed with windows designed to provide better aerial views. These seaplanes were a familiar sight at Rose Bay and Palm Beach, ferrying groups of tourists regularly. Seeing the harbour from the air made these tourist flights popular experiences and allowed passengers to soak in the full beauty of the coastline.[33]

Figure 7. Seaplane docked beside the boatshed at Palm Beach
(Photograph by Russell Walton, "Barrenjoey Boat House,"
Pittwater Online News,
www.pittwateronlinenews.com/barrenjoey-boat-house.php,
accessed 6 January 2023).

The marine port of Newport is located to the south of Palm Beach and bound by the waters of Pittwater to the west and the Tasman Sea to the east.[34] Identified by a unique deep-water channel that passes alongside the shoreline, Newport is accessed by large steamers and vessels that travel close to the bay.[35] Surrounded by water, residents considered the bay their favourite fishing destination and a treasured place for yachting and sailing. The Pittwater Regatta held at Newport Beach attracted thousands of spectators making Newport the central location for marine activities. Competitors raced between the Royal Motor Yacht Club and the finishing line near the Newport Hotel.[36] Rowboats, sailing yachts of various sizes and motorboats covered the water, the event continuing to be the largest of the sailing calendar for many years. Spectators would

travel down from Mossman, and ferries would transport revellers from other northern destinations. Busses would pull up near the Newport Hotel, and ferries would wait to taxi passengers who had just arrived.[37] Ferries were the usual form of transport to Newport until the introduction of public transportation.

Newport's Surf Life Saving Club, built in 1933, and the Royal Motor Yacht Club, first opened in 1928, are two examples of structures present at Newport Beach.[38] The RMYC was an imposing building by the water that included a club room, dressing rooms, showers, a reading room, a veranda, a basement boat shed, a swimming pool and a marina.[39] A photo from the State Library shows its appearance on the water. The sailing community hosted ocean races from the yacht club, including the Pittwater Regatta, speed boat championships and carnivals.[40] The neighbouring Surf Lifesaving Club served to protect swimmers at the beach and rockpools. The surf club's hall, which seated just under 300 guests, was the most important social venue for the Newport Community.[41] The remainder of the beach was dotted with small dressing sheds and rock pools made of concrete and smaller rocks.[42] Newport's popularity as a social destination, and beach for swimming and motor boating, made the area the terminal point for an extensive line of river traffic and people movement. Growing into an established marine location, Newport became the perfect fit for developing a new vision for a seaplane airport.

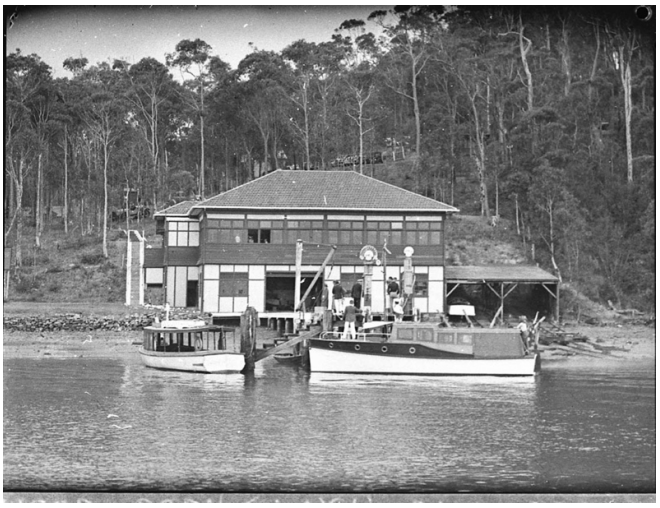

Figure 8. Image of Newport's Royal Motor Yacht club with two boats docked on the jetty (Photograph by Sam Hood, "Pittwater Regatta," 26 November 1936, Home and Away Collection, Mitchell Library, State Library of New South Wales [13593]).

Early airport landscapes were chosen for being naturally suited for landing aircraft and their location close to urban areas. Airport engineers sought large open terrain with level ground and an environment free from foggy and gusty winds.[43] With the gradual urbanisation of cities, competition quickly arose between the space needed for stable tarmac runways and suitable landscape conditions. Land runways needed to stretch long distances, wide enough to enable aeroplanes to take off. They were reliable and predictable, yet the cost of laying pavement capable of carrying enormous loads was expensive.[44] Water runways offered an alternative. However, long stretches of calm and sheltered water were rare and dependent upon the existing natural landscape. The orientation, length and width of runways were determined by the direction of prevailing winds.[45]

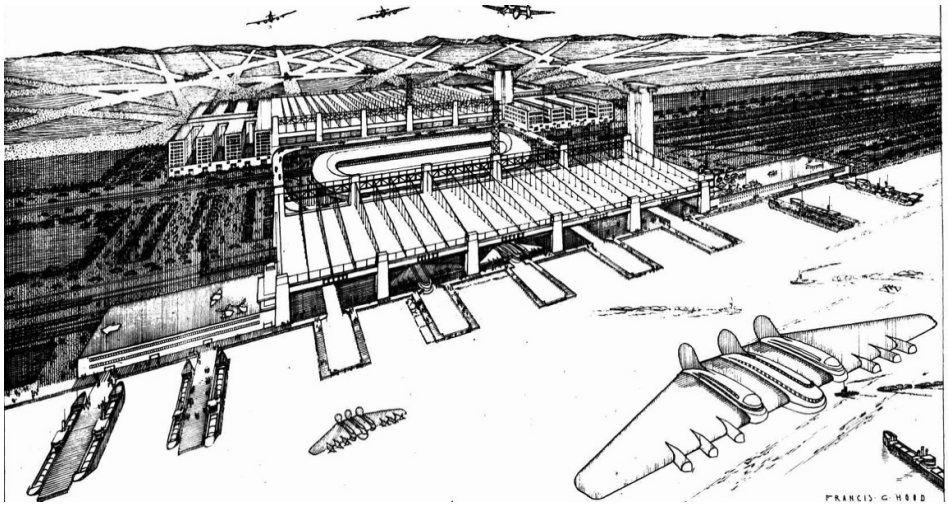

Figure 9. Aerial view of the scheme for Newport's new seaplane airport (Drawn by Francis Hood, "The Airport of Tomorrow, Aerial View," *Construction*, 7 February 1945. Mitchell Library, State Library of New South Wales).

The *Airport of Tomorrow* proposal of 1944 by Francis Hood, Charles Harrison and Florence Taylor sought to take advantage of Newport's existing landscape, dramatically reshaping the beach into a new airport. Initially published in *Construction* magazine, the scheme conformed to twentieth-century modernist idealism with a monumental project of gigantic proportions.[46] The proposal was multi-purpose, with an airport, seaplane base, railway terminal and dock for small vessels. Two parallel airport buildings rose high in elevation, with the seaplane airport located along the edge of Pittwater Bay and the land plane airport, drawn in elevation as a mirrored duplicate of the seaplane terminal and separated by a land traffic zone in between.[47] The seaplane airport was proposed as five consecutive hangars lined up along the water's edge and large enough to contain

the largest flying boats of the future. The land plane airport included turntables that rotated aircraft to face onto land runways and directed aeroplanes out from the terminal on a trajectory that suggested all flights would rise over the Pacific Ocean.[48] Above each hanger spanned large steel skillion roofs, capable of reaching long distances with the support of colossal steel trusses underneath.[49] The architects of the scheme considered the *Airport of Tomorrow* Australia's second international airport, after the first and significantly smaller international airport at Rose Bay.

Integrating Hybrid Urbanism

Hood, Harrison and Taylor's drawings were an overly optimistic view for Newport, yet the scheme was based on the sound purpose of reducing travel time for residents.[50] The airport's positioning promised shorter transit routes, being located close to Sydney's central business district and the opportunity to connect to existing transportation networks.[51] The land traffic zone between the two airport buildings delivered passengers to and from the terminal. The railway platforms were arrayed one after the other, with tracks directed towards the city and roadways stacked underneath them. However, the cost of the tunnel wide enough to cover the four railway lines from Newport to the city would have been enormous and have claimed a vast portion of Pittwater's land.[52] A similar plan for a railway to Pittwater, originally put forward with the Tramway and Railway Act of 1888, followed along the same lines, yet that scheme also ceased operations in 1939. A large portion of land required for transport avenues along the North Shore was in private hands, requiring an unobtainable expense to buy land that would eventually be turned into a road.[53] The provision of aviation infrastructure often demanded extensive urban redevelopment, frequently causing conflict with residents. Newport's scheme was no exception. The advantages to the economy the airport proposed were far outweighed by mismatched urban planning and a misaligned vision for the future of aviation.[54]

Newport airport would have required a complex administration system that evolved to accommodate new technologies, urban situations and the flow of people around the airport.[55] Concrete structures designed in a Soviet Era style rose ten storeys in the air, containing an international hotel, mail, customs and transport administration responsible for controlling the flow of movement on the ground.[56] On the tarmac below, subways moved people and cargo along fast conveyor belts from building to building. Passengers were led across the tarmac upon a labyrinth of roads, pathways, pedestrian crossings and markings for the seaplanes and the land planes. Planes would weave in and out of

the dotted lines and road indicators along the tarmac, their wheels rolling along the tangle of routes and avenues. Maintenance workers would rush between workshops and maintenance buildings with helipad markings painted on their roofs. In the airport, travellers would walk by lobby areas, reception and through gates at customs to the arrival and departure areas. Combined, the proposed airport experience was a controlled dance of people, planes, water and jet crossings, their movement requiring the processing of vast amounts of knowledge and state-of-the-art administration technologies. [57]

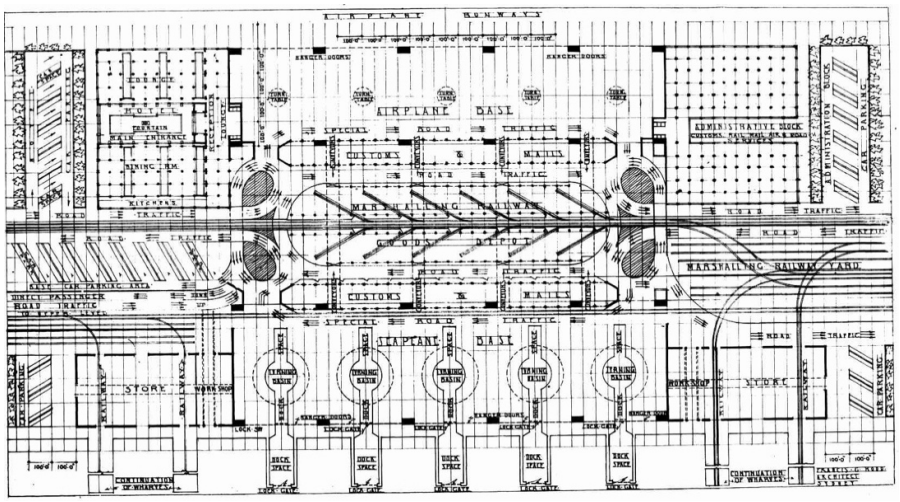

Figure 10. Detailed plan view showing seaplane turntables, roads, hangars and airport buildings (Drawn by Francis Hood, "The Airport of Tomorrow, Plan View," *Construction*, 7 February 1945. Mitchell Library, State Library of New South Wales).

The authors proposed tidal lock technology to overcome changes in sea level and warp flying boats inside the aircraft hangars.[58] The rotating locks would turn the aeroplanes around within each hangar to facilitate loading and unloading. The giant aircraft would be loaded onto turntables and slowly raised from level to level while passengers, mail and cargo embarked and disembarked. The performance of a mechanism twirling a seaplane while a flow of people and objects moved to and from would have been a spectacular event. The seaplanes warped through a tidal lock to sit on top of the turning deck, and as the planes were hoisted upwards, circular basins underneath the hangars adjusted the water level. The lock technology doubled as a dry dock, and dry turntables were used to turn planes inside the airport opposite.[59] Hood, Harrison and Taylor envisioned seaplanes having a permanent presence on the water, taking the opportunity to invent unique marine solutions. However, the majestic seaplane of the future never eventuated, and seaplanes were eventually subsumed by jet planes. In the end, the

Airport of Tomorrow was never realised, and the pristine beaches, bay and humble buildings at Newport were protected.

Landing Gear

Pioneering journeys in flying boats were fraught with frequent crashes and dangerous accidents, earning them a treacherous reputation, made infamous by newspapers.[60] Stable land airfields were established during the war, removing the need for unpredictable water landings.[61] Water-based flying boats were no longer trusted with ferrying mail, finding a new purpose thrilling tourists on joy fights above the coastline. Upon the same location as the first airport at Rose Bay, Sydney Seaplanes are flying passengers around the Sydney Harbour, the current terminal building still functioning as a seaplane airport.[62] Seaplane rides provide intimate joy flights for small groups of people, continuing the legacy pioneered by Qantas, Imperial Airways, Ansett and Aquatic Airways before them. The introduction of the 747-jet airliner inspired the majority of Australians to take to the air for their holidays overseas. With many Australians flying in 747s, the government returned the south portion of the park to the public, and the local Sailing Club re-occupied part of the Flying-Boat Base in 1959, returning Lyne Park to civilian hands.[63]

Figure 11. Aerial view of the current seaplane airport building, ferry terminal and Lyne Park (Nearmap Images).

Currently gracing the skies of Rose Bay are the Cessna Caravan Amphibian and the Classic Beaver seaplane models. Caravan seaplanes are reliable and safe to fly, with their amphibious floats able to land on almost any runway or suitable body of water within flying distance of Sydney Harbour. The Beaver, first built in 1947, is a reliable

single-engine monoplane whose floats can be replaced by wheels or skis depending on the terrain and runway. These historical aircraft have been refurbished and fitted with the latest technology making them sky worthy by modern standards.[64] The use of historical flying boats lasted a little over a decade. Yet, they represent the romance and wonder of the machine age, a legacy that continues with the Cessna and Beaver seaplanes currently in the air. To see a flying boat float amongst the clouds today is a rare and beautiful sight.

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[17] Ashton, *Connecting the Nation*.
[18] Curated as a series of images of airplane parts with dramatic captions, Le Corbusier imagined a new modern aesthetic based on the forms and curves flying machines. Le Corbusier, *Aircraft* (London: Trefoil Publications Ltd, 1935).
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[58] Morcombe, "Secret Plan for Airport at Newport," 14.
[59] Hood, "The Airport of To-Morrow," 10.
[60] Ashton, *Connecting the Nation*, 83.
[61] Smith, "'I Can Still Remember the Roar of the Engines'," 68.
[62] Lawrence, *Pittwater Paradise,* 23.
[63] Smith, "'I Can Still Remember the Roar of the Engines'," 68.
[64] Sydney Seaplanes, "Our Aircraft," Sydney Seaplanes, www.seaplanes.com.au/aircraft. (accessed 6 January 2022).