= Admiral Clarey Bridge =

Admiral Clarey Bridge , also known as the Ford Island Bridge , is a pontoon bridge , commonly called a floating concrete drawbridge , providing access to Ford Island , a United States Navy installation situated in the middle of Pearl Harbor . The bridge provides access to Ford Island 's historic sites to the public via tour bus and provides access to O 'ahu for US military families housed on the island . Before the completion of the bridge , the island 's residents were required to use ferry boats operated by Naval personnel that operated on an hourly basis . The bridge is one of only a few floating bridges and its floating moveable span is the largest worldwide . Its namesake , Admiral Bernard A. Clarey , was one of the Navy 's most decorated officers .

= = History = =

Prior to the bridge being built , access to Ford Island was provided via ferryboats . Two diesel @-@ powered ferries served the island , Waa Hele Honoa (YFB @-@ 83) and Moko Holo Hele (YFB @-@ 87) . The Waa Hele Honoa , translated to " Canoe go to land " , was purchased in 1959 for $ 274 @,@ 000 . Later , the ferry was pressed into service by the Navy on 3 March 1961 . It is the older and larger of the two ferries at 181 feet long . It could carry 750 people and 33 vehicles . The other , Moko Holo Hele , translated to " boat go back and forth " , was purchased for $ 1 @.@ 1 million on 25 May 1970 . It is 162 feet long , but can hold 750 people and 42 vehicles . Both ferries were operated by U.S. Navy personnel . Access to the island was restricted to U.S. military personnel , their dependents , and invited guests . In addition to the two car ferries there were several smaller " foot ferries " that allowed pedestrians to transit between Ford Island and several alternate landings around Pearl Harbor .

= = = Funding = = =

Proposals to connect the island had been around since 1967 . A 1967 study suggested that there were only three ways to connect the island : a bridge , a tunnel , or a rubble @-@ filled causeway . The 1976 military construction budget included a proposal for a $ 25 million causeway but it was removed from the budget for being too expensive . Other proposals such as a steel bridge were considered but were never constructed because of the cost . Not until Sen. Inouye 's special legislation , 10 U.S.C. § 2814 , to authorize the Navy to sell land to fund the bridge did a real proposal come to fruition . The bridge was primarily funded through the " Manana deal " with Pearl City where the Navy sold 109 acres (44 ha) , called the Manana storage site , to Pearl City for development for $ 94 @,@ 000 @,@ 000 . The Navy was also able to lease and sell 34 acres (14 ha) of Ford Island as part of Sen. Inouye 's renovation project to use private funds to redevelop the island .

= = = Rebirth of Ford Island = = =

Initially termed " the bridge to nowhere " , the Admiral Clarey bridge was instrumental in Senator Daniel Inouye 's " rebirth " of Ford Island and enabled over $ 500 @,@ 000 @,@ 000 in development on the island . It connected 45 families and 3 @,@ 000 civilian workers to Kamehameha Highway . The completion of the bridge also enabled the Navy to further develop the island to include the $ 331 @,@ 000 @,@ 000 NOAA 's Senator Daniel Inouye Pacific Tsunami warning center . In addition , visitor access to the island with the bridge enabled the construction of the $ 50 @,@ 000 @,@ 000 16 @-@ acre (6 @.@ 5 ha) Pacific Aviation Museum .

It was designed by Parsons Brinckerhoff Quade & Douglas , Inc and constructed by the joint venture of Dillingham @-@ Manson . Ground was broken on the causeway bridge on 10 January 1996 and was completed in 1998 and dedicated on 15 April of that year . The entire project cost $ 78 @,@ 000 @,@ 000 to complete . The design of the bridge earned the 1999 American Society of Civil Engineers Outstanding Projects and leaders award of merit and the United States Department

of Transportation 2000 Honor Award for design excellence . The project was completed ahead of time and under budget .

Future plans for the bridge include a plan by the city of Honolulu to build a second bridge from Ford Island to ' Ewa Beach to reduce the stress on existing highways caused by high traffic and congestion . Currently , Interstate H @-@ 1 provides the only access from the west side of the island to Honolulu . The plan would include a public use or toll roadway that would come near the Navy 's West Loch Naval Magazine , which stores ammunition for the military ; a concern for the Navy . The Navy also expressed concerns about the infrastructure of Pearl Harbor and Ford Island 's historical significance being affected by the project .

= = Design = =

The bridge has a total length of 4 @,@ 672 ft (1 @,@ 424 m) , including a 930 ft (280 m) pontoon section that can be retracted under the fixed bridge to allow the largest battleships and aircraft carriers to pass . The bridge consists of a 650 @-@ foot (200 m) wide channel as well as a 100 @-@ foot (30 m) wide 30 @-@ foot (9 @.@ 1 m) high opening for smaller craft under an elevated span . The entry control point at the east end of the bridge provides room for two traffic lanes of entry , a single exit lane , and a guard tower with a turnaround .

= = = Design ? build = = =

The project was developed using a design ? build , operate and maintain (DBOM) approach . The Navy did pre @-@ planning and conducted an environmental impact statement and studied various bridge alternatives and had already settled on a combination fixed and floating bridge . The Navy then awarded contracts of $ 350 @,@ 000 to three major contractors to solicit designs for the bridge . On 19 August 1994 the Navy awarded a design @-@ build contract to Dillingham @-@ Manson , JV .

= = = Construction = = =

350 to 400 24 @-@ inch prestressed concrete piles were used to support the bridge and constructed on site . The piles were driven at angles 137 feet (42 m) into the seabed . In 2001 , three years after construction had completed , cracks were discovered in four pillars . Under a maintenance contract , the cracks were repaired with concrete sleeves at no cost to the Navy .

The majority of the pre @-@ cast girders and deck panels were constructed in Tacoma , Washington and shipped by 300 @-@ foot (91 m) barge . The three concrete pontoons for the floating moveable span were also constructed in Tacoma by Concrete Technology Corporation in a graving dock and floated to Ford Island by barge in three shipments . They are 310 feet (94 m) long , 50 feet (15 m) wide , and 17 feet (5 @.@ 2 m) tall , and contain 21 water @-@ tight air @-@ filled cells with leak detectors to provide buoyancy . The three sections were assembled at the site using large steel bolts .

Because of the vulnerability of pontoon bridges , as they rest on water , they have to be designed to withstand not only stresses from traffic but from nature as well . A similar bridge in Washington , the Hood Canal bridge , sank in 1979 after flooding of the pontoons due to 80 @-@ mile @-@ per @-@ hour (130 km / h) winds . Experience from the replacement for that bridge helped engineers better design the pontoons for wave load resistance for the Admiral Clarey bridge . The Admiral Clarey bridge was designed to withstand winds as high as 100 miles per hour (160 km / h) and waves as high as 5 feet (1 @.@ 5 m) .

= = = Moveable span = = =

The bridge was designed with a movable floating pontoon . Steel transition spans connect the two ends of the fixed bridge to the pontoon . Two hydraulic rams , located on either side of the transition

spans , lift the transition spans off the pontoon allowing the pontoon to retract under the fixed bridge . The transition spans accommodate 1 foot (0 @.@ 30 m) of tide movement and 4 @.@ 6 feet (1 @.@ 4 m) of pontoon movement . In addition , the spans sit on a central pivot that assists with the movement caused by waves . In the event that the transition spans are unable to bear the stress of movement of the pontoon , specifically in the case of seismic activity , the bridge has a breakaway feature that can be easily repaired .

The floating portion is then retracted under the O 'ahu side of the fixed bridge at a rate of 14 inches per second to create a 650 ft navigation channel . The entire process takes 25 minutes to complete . Retraction of the movable span is accomplished by two hydraulic winches located on the control pier on the southeast side of the bridge . Two @-@ inch steel cables are used to connect each winch to the pontoon : one is connected to the far and the other to the near end of the pontoon . The opening sequence consists of activating the warning lights and bells , lowering the warning gates and barriers , lifting the transition spans on both sides , and operating the winches . During the opening , winch connected to the west end pulls while the winch on the east end pays out . As the span nears fully open , the winch speeds are slowed to allow the pontoon to stop without snapping a cable . This entire operation is operated from a control room on the east section of the bridge at the highest point and monitored from wireless cameras . 36 post @-@ tensioned straddle bents span 60 @-@ ft under the elevated span to form a pocket for the movable span to rest while the bridge is open .

= = Public reception = =

Although access to the bridge is limited to those who hold a US military ID card , several events are hosted annually that are open to the public . The bridge is the location of the annual Ford Island 10K Bridge run which has been one of the largest runs in O 'ahu . Starting in 2012 , the Tripler Fisher House started its " Boots on the Bridge " event which honors fallen military members by placing boots with photos across Ford Island and the Admiral Clarey Bridge . More than 6 @,@ 000 boots line the route to remember each fallen soldier since the September 11 terrorist attacks in New York City . In 2009 , the American Cancer Society raised over $ 150 @,@ 000 from 3 @,@ 000 participating for breast cancer research through the Making Strides Against Breast Cancer walk over the bridge and in 2011 had over 8 @,@ 000 participants and raised over $ 200 @,@ 000 .

National Park Service officials criticized the construction of the Admiral Clarey bridge fearing that by connecting road traffic to the mainland , the increased flow of island visitors would raise the level of theft of historical artifacts from the USS Arizona and other memorials on or around Ford Island .

The National Oceanic and Atmospheric Administration , which has a facility on Ford Island , criticized the US Navy 's hurricane and tsunami disaster plans which calls for closing the bridge to traffic and opening the channel to allow all ships to vacate the harbor . The NOAA 's concerns were that with the bridge outage , the tsunami warning center would not be able to operate effectively at a time when its need was greatest . The Navy 's plan calls for the use of the tour boats to act as ferries whenever the bridge would be unavailable for long periods of time and offered them as a solution to the NOAA 's concerns . However , an organization called Public Employees for Environmental Responsibility (PEER) believed that the boats would be unable to provide for a speedy evacuation in a Tsunami . In the event of a storm , PEER also noted that if the Navy was so concerned that they would evacuate their largest ships , that the small ferries would be unable to operate in those storm conditions . If the ferries were unable to operate , NOAA employees could not rotate shifts with fresh staff to relieve stranded employees sheltering in place . The NOAA assured its employees that a Tsunami affecting Ford Island was unlikely despite that O 'ahu is an area of high tsunami danger .

= = Namesake = =

The Admiral Clarey bridge was named after United States Navy Admiral Bernard A. Clarey . Admiral Clarey served as Commander U.S. Second Fleet (COMSECONDFLT) and later was Commander U.S. Pacific Fleet . He was awarded three Navy Crosses for valor . Admiral Clarey is a

survivor of the attack on Pearl Harbor while he was the executive officer of the submarine Dolphin (SS @-@ 169) . After his service in the Navy , Clarey served as vice president for the Bank of Hawaii . He died at Tripler Army Medical Center in Hawaii on 15 June 1996 .

= = Memorials = =

The submarine Bowfin lies just south of the sentry tower . Visible from the Admiral Clarey bridge , also to the south but on the Ford Island side , are the USS Arizona Memorial and USS Missouri . While ferry boats still provide access to the USS Arizona memorial , the bridge is the only access to the Missouri tour , the USS Oklahoma memorial , the Pacific Aviation Museum Pearl Harbor , and USS Utah for the public via Roberts Hawaii tour bus .

The Navy Facilities Engineering Command required that the bridge be low @-@ profile to prevent any visual degradation to the USS Arizona memorial and to maintain Ford Island 's historical and cultural value .