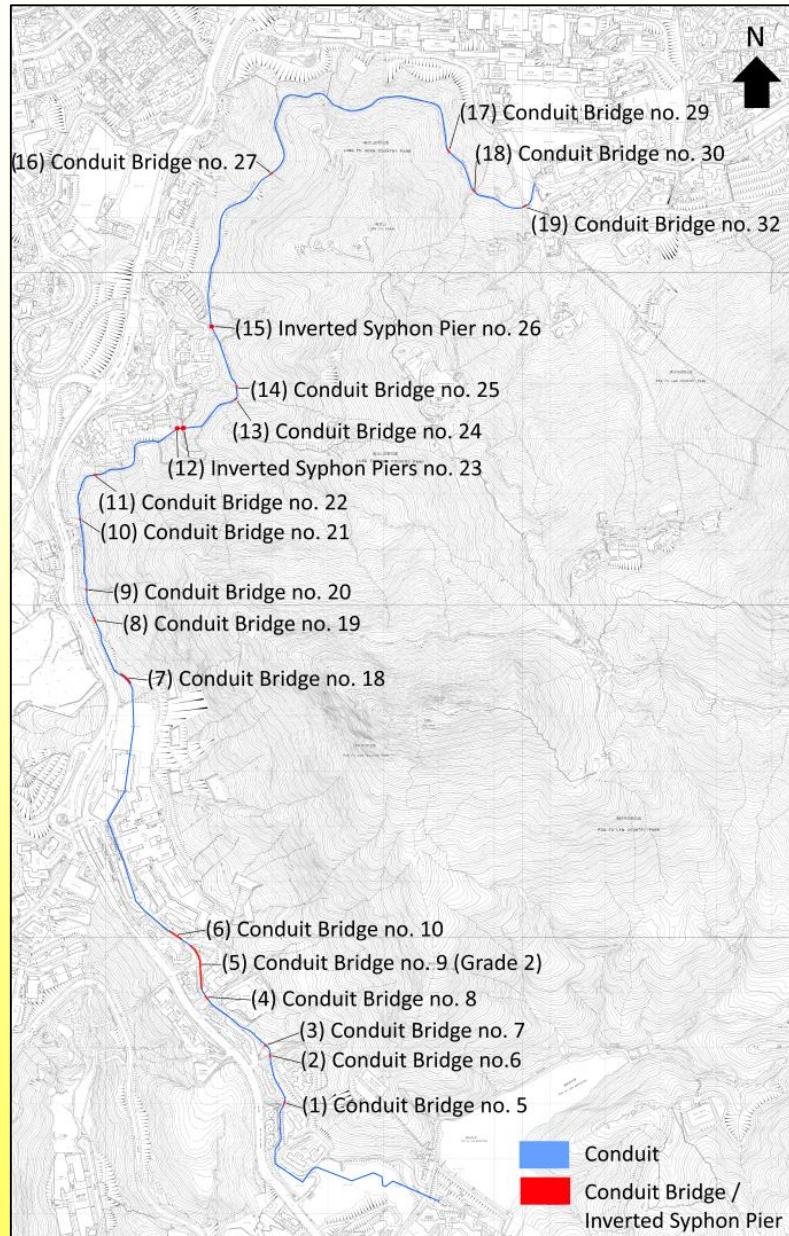


N372

香港薄扶林輸水道
(輸水道橋樑及倒虹吸管橋墩)
Pok Fu Lam Conduit
(Conduit Bridges and Inverted Syphon Piers), H.K.

擬議二級歷史建築
Proposed Grade 2

建於1877年
Built in 1877



擬議評級範圍
Proposed grading boundary

只用於識別位置，並非確實範圍 For identification of location only, not exact boundary



(1) Conduit Bridge no.5



(2) Conduit Bridge no.6



(3) Conduit Bridge no.7



(4) Conduit Bridge no.8



(5) Conduit Bridge no.9 (Grade 2)



(6) Conduit Bridge no.10



(7) Conduit Bridge no.18



(8) Conduit Bridge no.19

香港薄扶林輸水道(輸水道橋樑及倒虹吸管橋墩)
Pok Fu Lam Conduit (Conduit Bridges and Inverted Syphon Piers), H.K.



(9) Conduit Bridge no.20



(10) Conduit Bridge no.21



(11) Conduit Bridge no.22



(13) Conduit Bridge no.24



(14) Conduit Bridge no.25



(16) Conduit Bridge no.27



(17) Conduit Bridge no.29



(18) Conduit Bridge no.30



(19) Conduit Bridge no.32



(12) Inverted Syphon Piers no. 23



(15) Inverted Syphon Pier no. 26

倒虹吸管橋墩 Inverted Syphon Piers

Historic Building Appraisal
Pok Fu Lam Conduit
(Conduit Bridges and Inverted Syphon Piers), H.K.

The Pok Fu Lam Conduit (“the Conduit”), constructed by the **Historical Interest** Government in 1877, is the earliest masonry and brickwork conduit in Hong Kong. It was originally built to deliver water from the Pok Fu Lam Reservoir to the growing population of Victoria City and, later, to the Peak District.

Built in 1863 and expanded in 1871, Pok Fu Lam Reservoir was the first reservoir built by the Government to address water scarcity arising from geographical constraints on water retention and a growing population.¹ With a capacity of 68 million gallons (around 310,000 m³), the reservoir was originally connected to a 10-inch cast iron main that extended 17,400 feet (around 5.3 km) along Pok Fu Lam, ending at Robinson Road to deliver raw water to the areas below.² However, this main soon proved insufficient to accommodate the needs of urban development as it reached higher elevations above Robinson Road, requiring modifications to the water distribution system.³

To address this issue, John MacNeile Price,⁴ the Surveyor General at the time, recommended in a report on Hong Kong’s water supply dated 1875 that a new conduit be constructed with appropriate dimensions at a higher elevation.⁵

¹ Hong Kong’s mountainous terrain and uneven rainfall posed challenges for water retention, leading residents to rely on wells or streams in the early days. From 1841 to 1861, the population in Hong Kong surged from 7,450 to 119,321, creating a pressing need for water and prompting the Government to develop additional water resources. In 1859, they offered a \$1,000 prize for proposals to enhance the water supply. The winning proposal, submitted by S.B. Rawling, a Clerk of Works in the British Royal Engineering Department, advocated for a reservoir in the Pok Fu Lam valley. The construction of Pok Fu Lam Reservoir began in 1860 and completed in 1863. Initially capable of holding 2 million gallons (around 9,100 m³), its capacity was expanded to 68 million gallons (around 310,000 m³) by 1871 through an extension. The Pok Fu Lam Reservoir was the only reservoir in Hong Kong before the completion of the “Taitam Water Works Project” in 1889. See “Report on the Water Supply of the City of Victoria and Hill District Hong Kong” *Sessional Paper for the Year 1896*, 9 May 1896, pp.5-6.

² The endpoint of the cast iron main at Robinson Road led to Tank No. 1, holding 200,000 gallons (around 910 m³). Tank No. 1 is linked to Tank No. 2, located on Bonham Road above the Taipingshan district, with a capacity of 850,000 gallons (around 3,900 m³). *Ibid.*

³ *Ibid.*

⁴ John MacNeile Price served as Surveyor General from 1873 to 1889. During his tenure, in addition to spearheading the Conduit, his projects included the “Taitam Water Works Project”, the Hong Kong Observatory (香港天文台) (Declared Monument) and more. Price Road (裴樂士道) in Jardine’s Lookout is named after him. See 馬冠堯：《香港工程考 II 三十一條以工程師命名的街道 · 第 2 卷》，香港：三聯書店（香港）有限公司，2014 年，頁 121-151.

⁵ “Notification No. 127.” *The Hong Kong Government Gazette*, 10 July 1875.

Consequently, construction of this conduit, known as the “Pokfoolum Conduit”,⁶ began in 1876.⁷ Spanning a total length of 17,840 feet (around 5.4 km) from the Gauge Basin just below the Pok Fu Lam Reservoir Embankment to the Albany Tanks on the eastern side of the Glenealy Ravine, the Conduit was completed the following year at an elevation of about 500 feet above sea level at a cost of \$62,090.76. The old 10-inch cast iron main was removed, allowing the new system to deliver raw water to areas above Robinson Road while continuing to supply those below.⁸

Nonetheless, in 1889, the Sanitary Board criticised that the raw water delivered by the Conduit was “highly unsatisfactory”⁹ due to the muddy conditions during rainy seasons, and urged the Government to improve the water quality.¹⁰ In response, the Government constructed the “Pokfoolum Filter Beds” (later known as West Point Filters (西環濾水廠); the site now stands the Kotewall Road Fresh Water Service Reservoir (旭龢道食水配水庫))¹¹ on the hillside at the west end of the city, directly beneath the Conduit, in 1890 to filter the raw water before distribution.¹² Subsequently, the section of the Conduit

⁶ The Conduit was referred to as the “Pokfoolum Conduit” or “Pokfulam Conduit” in the early government reports and historical maps. The variations in spelling arose from different transliterations of the place name “Pok Fu Lam”. See “Report on the Water Supply of the City of Victoria and Hill District Hong Kong” *Sessional Paper for the Year 1896*, 9 May 1896, pp.6-7 and HKRS207-12-73. “Map Of Hong Kong - With British Kowloon (C.A. 1888) (Map No. 73)”, 1888.

⁷ Ibid.

⁸ The construction of the Conduit was completed under the supervision of William Danby, a civil engineer who partnered with Granville Sharp to establish the company Sharp & Danby. After Sharp left the partnership in 1880, and Robert K. Leigh joined in 1882 and James Orange in 1890, the firm eventually became known as Leigh & Orange Ltd. Ibid and See Milestone, Hong Kong: Leigh & Orange, 2025. <https://www.leighorange.com/about/history/>. Accessed on 9 November 2025.

⁹ “Notification No. 267.” *The Hong Kong Government Gazette*, 8 June 1889.

¹⁰ Ibid.

¹¹ The filter beds, initially referred to as the “Pokfoolum Filter Beds” or “Pokfulam Filter Beds” in historical documents from the 19th century, were renamed to “West Point” around the early 20th century. See “Report on the Water Supply of the City of Victoria and Hill District Hong Kong” *Sessional Paper for the Year 1896*, 9 May 1896, p. 8 and National Archives, “Plan of the City of Victoria, Hong Kong, 1901 160 feet to 1 inch. Author, Publisher,...”, CO700/HongKongandChina21, <https://www.hkmaps.hk/map.html?1901.3>, accessed on 20 August 2024.

¹² Constructed at a cost of \$37,431, the site included four filter beds and a covered service reservoir for storing and distributing filtered water upon completion. The idea of water filtration originated from a report prepared by Osbert Chadwick, a special commissioner investigating sanitation and public health in Hong Kong, in 1882, in which he recommended implementing a filtering system due to the turbid water quality during rainy seasons. This concept was first applied in the “Taitam Water Works Project”, which featured six filter beds before raw water was discharged into the Albany Fresh Water Service Reservoir (Grade 1). Ibid and See Chadwick,

between the filter beds and Albany Tanks was converted into a road and named “Conduit Road” (干德道), to reflect its historical connection.¹³

As the population in the Peak District (also known as the Hill District),¹⁴ which depended entirely on well water, continued to grow,¹⁵ and with the completion of the “Taitam Water Works Project” in 1889 providing additional water sources for the city,¹⁶ the Government decided to reorganise the water distribution system in the early 1890s,¹⁷ dedicating the water delivered by the Conduit specifically for the Peak District by constructing the Bonham Pumping Station (般咸道抽水站)¹⁸ below the filter beds for pumping filtered water to the Peak.¹⁹

Osbert, *Report on the Sanitary Condition of Hong Kong* (London: Colonial Office), 1882, p. 37.

¹³ Following the establishment of the filtering system, the Government announced in 1891 that “water will not be regularly allowed to flow through that portion of the Pokfoolum Conduit situated between the Pokfoolum Filter Beds to the west and the Glenealy Ravine to the east”. In 1899, the Government agreed to convert this section into “Pokfulam Conduit Road”. See “Notification No. 490.” *The Hong Kong Government Gazette*, 28 November 1891 and “Notification No. 50. Legislative Council No. 12” *The Hong Kong Government Gazette*, 7 October 1899.

¹⁴ The Peak District was once known as the Hill District. According to *The Peak District Reservation Ordinance, 1904*, “Peak District” means “all that area in the Island of Hongkong situated above the 788 feet contour and to the west of a line drawn in a north and south direction through Middle or Cemetery Gap, including the hills known as Mount Cameron, Mount Gough, Mount Kellett and Victoria Peak”. See “PEAK DISTRICT RESERVATION ORDINANCE, 1904”, Historical Laws of Hong Kong Online, accessed 13 November 2025, <https://oelawhk.lib.hku.hk/items/show/1219>.

¹⁵ The population of the Peak District experienced an increase following the opening of the Peak Tram in 1888. See “Report on the Water Supply of the City of Victoria and Hill District Hong Kong” *Sessional Paper for the Year 1896*, 9 May 1896, p.10.

¹⁶ Overseen by James Orange, the “Taitam Water Works Project” was implemented from 1883 to 1889 at a cost of \$1,257,474. The project involved building an impounding reservoir capable of storing 312 million gallons of raw water (around 1.4 million m³), a tunnel for transporting the raw water through the hills, a covered masonry and brickwork conduit linking the tunnel outlet to the Albany, and the construction of filter beds and a service reservoir at the Albany. *Ibid*, p.8.

¹⁷ With the water source from Tai Tam becoming available in 1889, the Government sought to optimise the water distribution network by channeling the water from Tai Tam to Victoria City, while the supply from Pok Fu Lam was allocated to the Peak District. *Ibid*, pp.9-11.

¹⁸ The Bonham Pumping Station, built in 1891, operated until the site was transferred to The University of Hong Kong in 1914. At the same year, the Pok Fu Lam Road Pumping Station was built to replace it and began supplying water to the Peak on 28 July 1914. See “Notification No. 21.” *The Hong Kong Government Gazette*, 16 January 1891 and “Report of the Director of Public Works for the Year 1914”, *The Hong Kong Government Administrative Reports*, 1914.

¹⁹ The filtered water pumped to the Peak District was initially stored in six cast-iron tanks relocated from Glenealy. It was not until 1897 that the Peak Fresh Water Service Reservoir (Grade 1) was constructed, with a capacity of 409,000 gallons (around 1,900 m³), storing roughly ten days’ supply for the population at that time. See “Notification No. 241.” *The Hong Kong Government Gazette*, 28 May 1898.

Today, the raw water flowing through the Conduit has been directed to the Western Salt Water Service Reservoir (西區海水配水庫), commissioned in 2009 at the Centennial Campus of The University of Hong Kong (HKU) (香港大學百周年校園), and the last section of the Conduit has been disused.²⁰ The Conduit, despite no longer being a major water distribution channel in the modern age, stands as a testament to the development of water distribution network in the 19th century, shaped by demographic changes and urban development at that time.

The cross-section of the Conduit is rectangular in shape, with internal dimensions of 1 foot 6 inches by 1 foot 6 inches.²¹ The base was constructed with granite, the two side walls were constructed of red bricks laid in English Bond, and covered with lap-jointed granite slabs. Most of the Conduit is buried underground, and when crossing streams or valleys, conduit bridges and inverted siphons are used to deliver the raw water.

Architectural Merit

The keystones or granite slab bases of the conduit bridges and the inverted siphon piers are engraved with sequential numbers, marking their order from the Pok Fu Lam Reservoir to the Kotewall Road Fresh Water Service Reservoir. The final conduit bridge is numbered 32, indicating that there were originally 32 structures in total, including two inverted siphons.²² However, due to subsequent developments and landslides along the Conduit, only 17 conduit bridges (i.e. Nos. 5–10,²³ 18–22, 24–25, 27, 29–30 and 32) and two sets of inverted siphon piers (i.e. Nos. 23 and 26) survive today to reflect the hydraulic engineering techniques of the time.

Except for conduit bridges Nos. 8 to 10, which are further supported

²⁰ 陳子浩、黃曦諾、蔡元貴、Ling HO：《唯水是問：隱藏於香港水務歷史的人和事》，香港：三聯書店（香港）有限公司，2025年，頁233。

²¹ “Report on the Water Supply of the City of Victoria and Hill District Hong Kong” *Sessional Paper for the Year 1896*, 9 May 1896, p.6.

²² Before the section between the filter beds and Albany Tanks was converted into “Conduit Road,” three additional inverted siphons were constructed to cross the ravines. See National Archives, “Plan of the City of Victoria, Hong Kong, 1889 160 feet to 1 inch. Author, Publisher, &c.: Official, London”, CO700/HongKongandChina7, <https://www.hkmaps.hk/map.html?1889>, accessed on 20 August 2024.

²³ Despite the backfilling of its base, conduit bridge No. 10 is identified by the presence of the remaining wing wall and the faintly discernible numeral ‘10’ inscribed on the granite slab base. See 〈點滴 第一百二十二期〉，水務署網頁，https://www.wsd.gov.hk/filemanager/common/droplet/Droplet_122.pdf，accessed on 15 July 2025.

on granite slabs and with conduit bridge No. 9 (Grade 2) further distinguished by rectangular granite piers with cut-water leading edges facing upstream, the remaining conduit bridges, although differing in height and length, are characterised by arches. These arches, composed of voussoirs and a keystone, rest on granite abutments and wing walls, with fill-back walls of irregular rubble masonry providing additional support. Notably, conduit bridges Nos. 6, 27, and 29 incorporate overflow outlets within their red brick walls, demonstrating the engineers' efforts to optimise the performance of the Conduit.²⁴

The two inverted syphons were adopted as an alternative to conduit bridges, which were susceptible to flood damage due to the large and steep catchment slopes. They were therefore constructed several tens of feet below the conduit alignment.²⁵ Each inverted siphon originally comprised siphon wells on either side of the slope, connected by two cast-iron pipes, each 10 inches in diameter, laid side by side²⁶ and supported by rectangular granite piers with cut-water leading edges facing upstream. This design enabled raw water to flow downward and rise again under pressure to maintain continuous flow. However, due to silting problems, the two inverted syphons were eventually abandoned and replaced by concrete conduit bridges,²⁷ leaving two granite piers of No. 23 and one granite pier of No. 26 intact.

Over the years, developments and landslides have compromised the integrity of the Conduit, including the construction of Queen Mary Hospital and High West of HKU, resulting in some sections being lost or replaced with modern materials. Today, only 17 conduit bridges and two sets of inverted siphon piers remain as representatives of its historical significance. In addition, some modern railings and piping were fixed on the historic granite paving and on the walls of the conduit bridges, diminishing its authenticity. Nonetheless, this masonry and brickwork conduit, which has served the city

Authenticity & Rarity

²⁴ 〈點滴 第一百二十三期〉, 水務署網頁,
https://www.wsd.gov.hk/filemanager/common/droplet/Droplet_123.pdf , accessed on 15 July 2025.

²⁵ 〈點滴 第一百一十八期〉, 水務署網頁,
https://www.wsd.gov.hk/filemanager/common/droplet/Droplet_118.pdf , accessed on 15 July 2025.

²⁶ “Report on the Water Supply of the City of Victoria and Hill District Hong Kong” *Sessional Paper for the Year 1896*, 9 May 1896, p.7.

²⁷ The concrete conduit bridges were constructed at approximately 500 feet above sea level to link with the existing Conduit. See 〈點滴 第一百一十八期〉, 水務署網頁,
https://www.wsd.gov.hk/filemanager/common/droplet/Droplet_118.pdf , accessed on 15 July 2025.

since the 19th century, remains a distinctive civil engineering asset, reflecting the construction practices of that period.

After its completion in 1877, the Conduit expanded the city's water distribution network, providing water access to a larger population and significantly improving public health. Even today, parts of the Conduit continue to deliver water and serve the community. Notably, the section from Clinical Building 1 of Queen Mary Hospital to the Kotewall Road Fresh Water Service Reservoir, has also become a popular hiking trail known as Pik Shan Path (碧珊徑). However, past developments along the Conduit and landslides have altered its historic fabric, limiting public recognition of its historical and architectural value.

Social Value & Local Interest

As a subsidiary facility of the Pok Fu Lam Reservoir, the Conduit is closely linked to the reservoir's infrastructures, which include the Embankment (土堤), the Old Masonry Dam (舊石壩) (both Grade 2) and others. The Conduit also shares group value with the Gauge Basin (量水站) (Declared Monument) of the Pok Fu Lam Reservoir, the Bungalow (平房) (Grade 1) and the two Workmen's Quarters of West Point Filters (西環濾水廠工人宿舍及職員宿舍) (both Grade 2), as well as the Peak Fresh Water Service Reservoir (山頂食水配水庫) (Grade 1) as they collectively form parts of the historical water distribution system that served the Peak District.

Group Value

Furthermore, the Conduit shares group value with the 21-Arch Section of the Bowen Aqueduct (寶雲輸水道的 21 孔拱券段) (Declared Monument), a larger²⁸ and more imposing masonry and brickwork channel constructed in 1887 to transport raw water from Tai Tam, demonstrating the early water distribution network in the city.

²⁸ This aqueduct, spanning 5,163 lineal yards (around 4.7 km) from Wong Nai Chung Gap to the filter beds at Albany, is also designed in a rectangular form, “being 3’ 0” wide and 2’ 6” deep” and “carried over the deeper ravines by masonry and brickwork arches”. See “Report on the Water Supply of the City of Victoria and Hill District Hong Kong” *Sessional Paper for the Year 1896*, 9 May 1896, p.8.

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