討論文件　　中西區區議會文件 2/2006 號

合約編號 CE 3/2005(WS)
水管更換及修復工程第 2 階段
香港島及離島水管工程
勘查、設計及施工

1. 目的

1.1 水務署曾在 2005 年 11 月，就本題工程中西區部份諮詢中西區區議會，尋求議員對其發展和設計的意見。現我們根據當時議會提出的意見，提供進一步的資料供議會參考，及再次諮詢議會的意見，並請議員支持是項工程。

2. 背景

2.1 近數十年來，水務署的供水網絡發展迅速，而部份建於三十多年前的水管不但呈現嚴重老化跡象，而且部份水管更已臨近使用年限。老化的水管在維修上困難重重，維修費用亦與日俱增。水管爆裂及漏水的情況在近年越見嚴重，爲公眾帶來不便，影響交通和浪費食水。有見及此，水務署計劃在 15 年內有系統地分階段全面更換及修復全港長約 3000 公里的老化水管以改善供水網絡的狀況，由於工程龐大，故有需要分段執行，其次序是考慮水管老化程度、失修後果相對嚴重性、位置分佈及對區內的影響等因素而定。

2.2 爲應中西區內市民訴求，早日改善在區內現有水管狀況，區內第 1 階段第 1 期工程已於 2003 年 10 月開始施工，並預計於 2007 年 12 月完成。工程包括在中西區區內更換及修復長約 16 公里水管。

2.3 第 1 階段第 2 期工程中西區部分包括更換及修復長約 48 公里水管，而有關的勘察研究已在 2003 年 6 月完成，過程中曾於 2002 年 5 月諮詢中西區區議會，並得到議會支持。現初步設計亦已完成，而詳細設計現正進行中，有關詳細資料載於會議文件第 1/2006 號。

2.4 第 2 階段工程（本題工程）中西區部份包括更換及修復長約 30 公里

水管，水務署於 2005 年 7 月委任博威工程顧問有限公司進行本題工程的勘查，研究及詳細設計，而其勘查研究現正進行中。

3 中西區的工程簡介

3.1 本題工程項目包括更換及修復港島區內大約 100 公里直徑由 25 毫米至 1200 毫米的食水及海水管道。其中的 30 公里直徑由 25 毫米至 375 毫米的水管位於中西區，水管直徑小於 150 毫米佔大約 22 公里。這些水管大多為鍍鋅鐵管，石棉水泥管和鑄鐵管。有關水管的位置及圖則現詳列於附件甲。

3.2 本題工程初期包括修復或更新卑路乍街位於士美菲路以西的現有水管。在本年十一月諮詢議會時，得知議員意見，認爲此街道近年有大型渠務工程，對居民及商戶已經帶來長期嚴重不便，實不適宜短時間內再進行開路工程。本署就此已再評檢有關水管的狀況，並結論若把此段水管的復修/更換工程延遲數年，雖然期間水管爆破的風險會因此增加，但其程度仍可接受，故本署現已將此段工程從本題工程抽起，並計劃在 2010 年方才施行，以避免區內居民和商戶在數年內再受影響。與此同時，在 2010 年前若情況有變而有實際需要，本署亦可安排把有關部份水管提前修復/更換，屆時有關安排亦會先諮詢議會同意方才進行。

4 水管更換及修復方法

4.1 我們爲每條水管選擇適合的更換及修復技術時，會優先考慮各種無坑更換及修復技術，以減少對公眾、交通及環境的影響。當無開坑更換及修復水管技術實際上不適用時，我們才會採用傳統的開掘更換方法。

4.2 傳統的開掘方法是在原有的舊水管旁，敷設另一新的水管取代原有舊水管。雖然傳統的開掘方法造成的滋擾較大，但其可行性較高，並尤其適用於更換直徑小的水管。無開坑修復方法是透過開掘進管井(約 3 米長 2 米闊)將原來的舊水管加入新的搪層，這技術不需要開掘整條喉坑，對交通和環境的影響都小很多。無開坑修復技術包括有套喉滑進法、內喉緊貼法、原位內搪喉管法。而無坑開掘更換方法是利用無坑開掘技術安裝新水管，例如喉管爆破法、定向鑽挖法、微型隧道開掘法等。

4.3 當選擇無坑開掘修復或更換技術時有多個考慮。除非另有水源供應或可安裝臨時供水裝置，否則會需要暫停供水。由於需要開井以接駁支管，閥門及彎管，這技術不適用於有多支管及閥門的水管。附件甲的

水管位置圖顯示了中西區初步擬議採用無坑開掘技術修復的水管。然而最終施工方法的選擇，將取決於各種因素，包括地理環境、施工限制、物料選擇、交通及環境影響等。

4.4 在施工期間，我們將實施以下措施，使工程順利展開：

- 在施工前進行一個詳細的地質勘察，避免在施工期間損害水管及其他公共設施；
- 安裝臨時供水裝置以盡量減少停水時間；
- 配合用戶用水模式安排停水，每次停水不超過 8 小時；
- 在施工期間設立諮詢小組，爲停水安排進行協調工作；
- 開發不同的合約管理控制形式，有效地控制施工進度及時間；及
- 汲取早期更換及修復水管工程的經驗，改善合約形式和施工方法。（詳情見 5.1.1 段）

5 工程管理

5.1 總括過往的經驗，新工程合約將會採取一些新的工程管理措施及加強現有措施，以盡量減少工程延誤的風險。例如：

5.1.1 採用合約訂單形式，使工程更具彈性，其好處包括：

a. 配合其他相關工程制定合約訂單及工期，減少延誤。
b. 配合路面實際情況，分小段進行復修，減少風險。
c. 工程費用劃分成小份，減少延誤而造成之損失。
d. 這合約訂單模式已在更換及修復水管第一期工程使用，成效顯著，公眾投訴及承建商的索償亦較少。

5.1.2 加強對承建商的監控，使工程能依期完成；

5.1.3 加強嚴格評審承建商的表現，並在其表現報告中反映，從而影響其將來投標其他工程的機會，以收阻嚇作用。

5.2 正如第 2.1 段所述原因，此項全面更換及修復水管計劃有需要分階段執行。同時，基於財務撥款上的安排及公平和開放競爭的原則，故此水務署安排了公開招標，並且根據招標評審結果分別聘用了不同的顧問公司來執行第 1 階段第 2 期和第 2 階段的設計和監工。這兩次評審都是經過同一套嚴謹的程序，故此所選用的顧問公司皆符合水務署的嚴格要求標準。同時，兩間顧問公司亦需要按照相同標準去

設計工程、選用承建商和監察施工。而水務署亦會嚴緊監管及統籌不同顧問公司的工作及安排顧問公司之間的溝通，以確保所有工程皆符合水務署的要求標準。

6 協調其他相關工程

6.1 施工時間的制定最主要的是與其他有關部門協調以防止重複開掘道路。工程將會經協調後分階段進行，以應付交通情況和實際需要。

我們正與其他政府部門及公共設施機構對區內的相關工程進行詳盡而全面的溝通和複查。根據已搜集的資料顯示，相關工程大部份與渠務及道路工程有關。爲減少相關工程的影響，我們會考慮分階段進行工程，委託其他政府部門代爲施工或在同一時間內用水務署承建商和其他地下公用設施一並進行水管鋪設或復修。我們會就所有方案繼續與各有關部門進行協調工作，以尋求最有效的施工安排。

6.2 我們亦正籌劃前期勘測工程，目的是更詳細地搜集有關地質及現有地下設施的資料。這些資料有助選擇最合適的水管更換及修復技術和確定水管定線以免與有關地下設施互相衝突。

6.3 如第 5.1.1 段所述，爲了增加施工時間的控制和彈性，本工程將採用按量數付款的訂單合約形式，這合約形式比較適用於需要很多協調工作的工程，亦方便在有需要時因工地實際情況更改設計。在工地確定設計後才發出訂單，可減低工程的風險，施工的進度及時間便可更有效率地控制，從而盡量減小工程對公眾和交通的影響。

7 環境檢討

7.1 我們已完成了符合環境保護條例要求的環境檢討評估報告，主要評估範圍包括噪音、塵埃、廢料、污水、環境生態及文化古蹟。報告辨認出噪音敏感地點，包括醫院、學校、教會、廟宇及安老院等。該環境評估報告已呈交環境保護署及有關政府部門批核。

7.2 在施工期間，我們會採取以下措施以盡量減少工程對環境的影響：

(a) 定期於地盤灑水控制塵埃飛揚；

(b) 在噪音敏感受體附近如住宅，醫院，學校，教堂，廟宇或安老院附近使用隔音屏障和裝有滅音器的設備。當工程於學校附近進行須調節施工時段以免影響學校的教學和考試；

(c) 避免同時使用多項高噪音設備及儘量將該設備遠離最近的敏感受體；

(d) 使用無坑開掘更換及修復水管方法；

(e) 工程項目會產生各種建築廢料包括因挖掘路面而廢棄的泥土，一般工地廢物及設備保養維修所產生的化學廢料等。此等廢物會根據環保署的要求程序作現場分類再用、儲存、運送及棄置；

(f) 工地產生的廢水必須經嚴格處理以達致水質污染管制的要求；

(g) 設定水管定線時盡量遠離現有的樹木和具文化古蹟價值的建築物。

7.3 我們現正準備一份全面的樹木勘察報告。該報告完成後會呈交漁農自然護理署和康樂及文化事務署批核。

7.4 我們在設定水管定線時會盡量遠離現有的樹木和具文化古蹟價值的建築物。若部分工程必需於具文化古蹟價值的建築物附近施工，我們會諮詢康樂及文化事務署古物古蹟辦事處的意見，並實施適當的措施來保護有關的建築物。

8 交通影響評估

8.1 施工期間工程將會影響一些道路網絡。我們現正進行有關的交通影響評估，該評估報告於完成後會呈交運輸署、警務處及路政署批核。根據評估，部分工程乃位於交通敏感的道路，其中包括薄扶林道、加多近街、科士街、士美非路、德輔道西、皇后大道西、皇后大道中、堅道、德己立街、花園道、紅棉路、金鐘道和正義道等。爲了減低工程帶來的交通影響，我們在這些地點將會在情況許可下採用無開坑技術。有些地點因地理和交通等不同因素的限制，不能使用無開坑技術，而需採用傳統的開掘更換方法。在這些地點，承建商在施工期間將實施臨時交通管制措施，令工程對交通的影響維持在可接受水平以下。

8.2 爲減少對公眾引致的不便，工程將會分段進行。而在每一段施工之前，承建商將會就施工細節及臨時交通措施安排，提交建議予包括各有關政府部門及有關公共設施機構代表的交通管理聯絡小組（其中包括運輸署、警察交通部、路政署及民政事務署等）進行討論，在議定同意後方會進行。而當時區內若有其他掘路工程，其對整區交通的合併影響亦會作爲考慮的因素。

9　公眾聯絡

9.1　爲加強與公眾的溝通和確保工程順利進行，我們將會推行公眾聯絡活動。這些活動將提供是項工程及其影響地區的詳細資料，了解及回應公眾關注的事項，駐地盤工程師辦事處亦會設有專職人員負責聆聽公眾的意見和處理有關投訴，以確保有需要時能夠盡快作出改善。

10.　土地事宜

10.1　建議之工程將不需要徵收私人土地，水管的更換工程將會在私人土地範圍外停止。然而有小部分政府水管會經過私人土地範圍，在一般情況下，我們會根據有關土地契約的條款或在取得土地業主的同意後，進行更換及修復該段水管工程。

11.　施工時間表

11.1　此工程項目將於 2006 年中呈交立法會財務委員會批核，若獲得財務委員會撥款，我們便會展開招標程序，預計由 2007 年初至 2010 年期間施工。在工程開展後，水務署將與承建商共同制訂詳細施工時間表，並提交中西區區議會參考。在施工期間，水務署將會向中西區區議會定期滙報工程進度和最新的施工時間表。

附件

水務署

2006 年 1 月

工程覆蓋範圍

街道名稱	擬更換及修復水管直徑(毫米)	擬更換及修復水管長度(米)
薄扶林		
薄扶林道	150 - 300	2000
摩星嶺道	100 - 200	4800
堅尼地城		
加多近街	150 - 200	500
科士街	150 - 200	200
吉席街	50 - 150	400
上環		
皇后大道西	75	900
文咸東街	75 - 375	600
文咸西街	75 - 150	1100
皇后大道中	75 - 150	200
中環		
皇后大道中	50 - 375	2900
士丹利街	50 - 150	900
威靈頓街	50 - 250	1000
和安里	50 - 100	500
德己立街	75 - 150	600
雲咸街	75 - 150	500
下亞厘畢道	75	600
上亞厘畢道	75 - 150	600
中半山		
羅便臣道	25 - 200	1800
摩羅廟街	150	300
堅尼地道	75 - 200	1200
麥當奴道	150	1200
寶雲道	200	500
馬己仙峽道	150	200
花園道	50 - 250	1400
金鐘		

街道名稱	擬更換及修復水管直徑(毫米)	擬更換及修復水管長度(米)
金鐘道	300 - 375	2000
正義道	80 - 300	300
法院道	100 - 250	300

圖列

圖紙編號	名稱
圖一	擬更換及修復水管索引圖 - 中西區
圖二	擬更換及修復水管位置圖 - 堅尼地城區
圖三	擬更換及修復水管位置圖 - 摩星嶺區
圖四	擬更換及修復水管位置圖 - 摩星嶺區
圖五	擬更換及修復水管位置圖 - 上環區
圖六	擬更換及修復水管位置圖 - 半山區
圖七	擬更換及修復水管位置圖 - 半山區
圖八	擬更換及修復水管位置圖 - 中環及金鐘區
圖九	擬更換及修復水管位置圖 - 中環區
圖十	擬更換及修復水管位置圖 - 金鐘區

完

Central & Western District Council

Agreement No. CE3/2005(WS)
Replacement and Rehabilitation of Water Mains Stage 2
Mains on Hong Kong and Islands – Investigation, Design and Construction

1 PURPOSE

1.1 Water Supplies Department consulted Central and Western District Council in November 2005 to seek the Council Members' views on the development and design for the captioned project (the Central and Western District part). Based on the views raised by the Council Members in the meeting, we have supplemented further information in this paper for the Council's reference and to seek Council Members' further views and support for the proposed works.

2 BACKGROUND

2.1 In recent decades, WSD's water supplies network develops rapidly. Many water mains were laid some 30 years ago. They are approaching the end of the service life and have become increasingly difficult and costly to maintain. Frequency of water mains bursts and leaks have been increasing, resulting in inconvenience to public, disruption to traffic and wastage of water. To resolve this problem, WSD has planned a 15-year comprehensive programme to systemically replace and rehabilitate about 3,000 km of aged water mains to prevent their further deterioration, to improve the condition of the water supply network, and to maintain quality of services to consumers. Due to the large size of the programme, it was necessary to implement it in stages. The watermains to be included in each stage was determined taking into consideration the age of the pipes, the relative level of seriousness of consequence in case of failure of the pipes, the locations of the pipes and how the areas concerned would be affected by the works.

2.2 In order to address the local residents' requests for early improvement of the conditions of the water mains in the area, the first stage of the programme - the Stage 1 Phase 1 project, commenced construction in October 2003 and will be completed in December 2008. The project covers approximate 16km of water mains in Central and Western District.

2.3 Stage 1 Phase 2 project includes the replacement and rehabilitation of about 48km of water mains in Central and Western District. The related investigation study was completed in June 2003. In the course of the study, we consulted Central & Western District Council in May 2002 and received the Council's support. The preliminary design has been completed and the detailed design is currently in progress. Detailed information for this Stage 1 Phase 2 works is contained in the Central & Western District Council Paper No. 1/2006.

2.4 The Stage 2 project (the subject project) includes the replacement and rehabilitation of

about 30km of water mains in Central and Western District. In July 2005, WSD commissioned Black and Veatch to undertake the investigation study and detailed design of Stage 2 works. The investigation study is currently in progress.

3 SCOPE OF WORKS IN CENTRAL & WESTERN DISTRICT

3.1 The scope of works under the subject project is to replace or rehabilitate about 100 km of fresh and saltwater water mains ranging from 25 mm to 1200 mm in diameter. Of these water mains, approximately 30 km are in Central & Western District. Approximately 22km of these water mains diameter are less than 150mm in diameter. These water mains are mainly made of galvanized iron, asbestos cement, or cast iron. Location summary and location plans of the water mains are given in **Appendix A**.

3.2 The subject project initially included the replacement and rehabilitation of existing water mains along Belcher's Street west of Smithfield. In the November 2005 Central and Western District Council Meeting , the District Council Members raised the view that, as there had been large scale drainage works in this street in the recent years which had caused serious inconvenience to the local residents and shops, it was not suitable to open up the street again so soon. We have reviewed the conditions of the water mains concerned and conclude that, while the risk of the water mains bursting would increase if we defer the replacement/rehabilitation works for a few years, the risk level is still acceptable. We have therefore now decided to exclude this works from the subject project and reschedule it to start in 2010 in order not to cause inconvenience to the local residents and shops in the coming few years. At the same time, should there be a need due to change in the situation before 2010, we can implement the works earlier with the consent of the District Council.

4 METHODOLOGY OF REPLACEMENT AND REHABILITATION

4.1 In the selection of replacement or rehabilitation methods for each pipe, we would first explore the suitability of various trenchless techniques to minimize disruption to public, traffic and environment. Open cut method will be adopted only when trenchless techniques are shown to be impracticable.

4.2 The traditional open cut replacement method is to replace an existing water main by open trench excavation and laying a new water main alongside the existing mains. Although it will cause more disturbance, the open cut method is more practicable particularly for small diameter water mains. Trenchless rehabilitation method is to insert a new liner into an existing water main via a launching pit and a receiving pit (pit size being about 3m long by 2m wide). As it involves limited excavation, there is less impact to traffic and environment. The typical trenchless techniques are slip-lining, close fit lining, and cured-in-place pipe. Trenchless replacement technique is to install a new pipe without open trench excavation. Some examples are pipe bursting, horizontal directional drilling or micro-tunneling.

4.3 There are, however, some considerations before choosing trenchless rehabilitation or replacement methods. Suspension of water supply is required unless there is an alternative

supply source or when supply can be maintained by a temporary by-pass main. Trenchless technique is not suitable for water mains with many tee branches, valves and bends. The location plan in Appendix A shows the locations of the water mains preliminarily proposed to adopt the trenchless rehabilitation/ replacement method. However, the eventual determination of the method of construction depends on many factors such as site condition, construction constraints, choice of material, traffic and environmental impact, etc.

4.4 We will adopt the following measures to ensure smooth implementation of the works:

- conduct a detailed pre-construction survey to investigate underground conditions to avoid damaging water mains and other utilities during construction;
- provide temporary by-pass main to minimize the time of water suspension;
- arrange water supply suspensions by matching with the user consumption patterns and limiting the supply suspensions to 8 hours;
- set up a liaison team during construction to liaise with the public to coordinate supply suspension activities;
- evaluate different forms of contract management to control the programme and duration of works effectively; and
- improve construction method and contract management based on the experiences gained in previous similar projects. (as detailed on section 5.1.1)

5 PROJECT MANAGEMENT

5.1 Having reviewed experiences gained in previous similar projects, we will adopt some new project management measures and strengthen the existing measures, so as to minimize the risk of project delay. For example:

5.1.1 Adopt term contract works order arrangement to allow more flexibility in the project. The advantage includes:

a. Delay can be minimized by issuing works orders. Construction periods can be revised to suit other interfacing projects.
b. Risk can be reduced by issuing works order to cover short sections of replacement works to suit the actual site condition.
c. Construction costs can be split into small sections so as to reduce loss caused by work delays.
d. The term contract arrangements have been applied in the current Stage 1 Phase 1 project with success. There have been fewer public complaints and contractor claims.

5.1.2 Strengthen project supervision to ensure timely project completion;

5.1.3 Strengthen the review of the contractor's performance and to reflect it in the contractor's performance report. This will have an effect on the contractor's future tendering of works contracts and serve as a deterring effect.

5.2 It was necessary to implement the water mains replacement and rehabilitation programme

in stages for the reasons given in section 2.1. Due to funding arrangement and need for fair and open competition, WSD awarded the design and construction supervision consultancy of the Stage 1 Phase 2 project and the Stage 2 project to two different consultants through open tendering. The selection processes in both cases were in strict accordance with the same stringent procedures and both consultants meet with WSD's stringent required standards. At the same time, these two consultants are required to carry out the design, selection of contractors and site work supervision according to the same standards. WSD will also closely supervise and monitor the work of the different consultants and will coordinate the liaison and communication among the consultants to ensure that all the projects meet with the required standards of WSD.

6 PROGRAMME AND PROJECT INTERFACE

6.1 The major consideration in programming the works is the coordination with various parties to avoid repetitive road openings. Road opening will be carried out section by section in a coordinated manner to suit the traffic conditions and actual needs.

We are conducting detailed and comprehensive reviews on project interface with other government departments and utilities undertakers. From the information gathered, the majority of the interfacing projects are related to drainage, sewerage and highways works. To avoid impacts arising from these projects, we will consider carrying out the works in sections, entrusting part of the works to other departments or carrying out the works concurrently in common trench with other underground utilities. We will continue to further discuss these options with the relevant parties with a view to arriving at the most effective construction arrangement.

6.2 To resolve the conflicts due to project interfaces and to avoid repeated road opening, the options of entrusting the concerned water mains to DSD's contractor, or carrying out the works in phases to avoid crashing of programmes have been considered. Detailed project programmes will be submitted to the Council Members before the commencement of the project works.

6.3 As mentioned in section 5.1.1, to allow flexibility for programming of works, term contract type re-measurement contracts will be adopted in this project. This form of contract is particularly suitable for works which require considerable coordination with others. It can facilitate necessary amendment to suit actual site conditions. By issuing Works Orders after confirming the design on site, risks can be minimized. The programme and duration of the works can also be controlled effectively and disruption to the public and traffic can be minimized.

7 ENVIRONMENTAL REVIEW

7.1 We have conducted an environmental review in compliance with the relevant environmental regulations/ requirements. The major aspects of review include the effect on noise, air, waste, water, ecology and cultural heritage. The review has identified the noise sensitive receivers (NSRs) which include hospitals, schools, churches, temples and homes for the elderly...etc in the proximity of the proposed construction activities. We

have submitted the Environmental Review Report to Environmental Protection Department (EPD) and the relevant departments for endorsement.

7.2 We would apply the following mitigation measures to minimize the impact to the environment during construction:

(a) Dust generated from excavation could be controlled by water spraying or enclosure.
(b) Use of noise barrier and silencer near the NSRs such as residential blocks, hospitals, schools, church, temple and home for the elderly. Restriction of working hours in the vicinity of school during examination periods.
(c) Avoidance of using several noisy plants simultaneously; locate the noisy plants as far from the NSRs as possible.
(d) Use of trenchless replacement or rehabilitation method whenever possible.
(e) All construction waste generated from the site including excavated materials, other wastes and chemical waste generated from facilitates maintenance works etc. should be sorted, stored, transported and disposed in accordance with EPD's requirement.
(f) All wastewater generated from the site must be treated in accordance with the Water Pollution Control Ordinance prior to discharge.
(g) Align water mains away from the existing trees and buildings of cultural heritage interest.

7.3 We are preparing a comprehensive tree survey report. Upon completion of the report, we will submit it to Agriculture, Fisheries and Conservation Department and Leisure and Cultural Services Department for their endorsement.

7.4 The water mains will be aligned away from the existing trees and buildings of cultural heritage interests, If part of the works must be carried out near buildings of cultural heritage interest, we will consult the Antiquities and Monuments Office (AMO) of Leisure and Cultural Services Department and will implement appropriate measures to protect these historical buildings.

8 TRAFFIC IMPACT ASSESSMENT

8.1 The construction works will inevitably affect the traffic. We are conducting a Traffic Impact Assessment for this project. A Traffic Impact Assessment report will be prepared and submitted to Transport Department, Hong Kong Police Force and Highways Department for endorsement. The findings indicate that some of the works are located in the traffic sensitive routes, such as Pok Fu Lam Road, Cadogan Street, Forbes Street, Smithfield, Des Voeux Road West, Queen's Road West, Queen's Road Central, Caine Road, D'Aguilar Street, Garden Road, Cotton Tree Drive, Queensway and Justice Drive etc. To minimize traffic disruption during construction, trenchless techniques will be adopted in these locations as far as practicable. If this is not practicable due to site and traffic constraints, the contractor will adopt open trench method and implement temporary traffic management measures to keep the disruption to traffic to acceptable levels.

8.2 The works will be carried out in sections to reduce disruption to the public. Before the commencement of each section of works, our contractor will submit the construction details and the temporary traffic management measures to the Traffic Management Liaison

Group which consist of representatives from relevant government departments and utilities undertakers (including Transport Department, Road Management Office of Hong Kong Police Force, Highways Department, District Offices... etc.) for assessment and agreement. If there are other road opening works in the same area, the combined effect to the traffic in the area would also be taken into consideration in the assessment.

9 PUBLIC CONSULTATION

9.1 We will launch various public liaison activities to ensure smooth implementation of the construction works and to enhance communication with the public. These activities include providing details of our works and the areas affected, the appreciation and responding to public concerns. The Resident Site Office will also have dedicated staff to receive and follow up on public suggestions and complaints to ensure prompt rectification measures are taken when necessary.

10 LAND MATTER

10.1 The extent of the proposed works will not require private land acquisition. The replacement of water mains will be terminated outside private lot boundary. However, some small number of Government mains might be located within private land. Under normal situation, we will carry out the works on these mains in accordance with the relevant land lease conditions or after we have obtained the consent of the land owners.

11 CONSTRUCTION PROGRAMME

11.1 This project will be submitted to the Finance Committee of Legislative Council in mid 2006 for approval. Subject to the funding being made available, we will start the tender invitation process. Construction works are anticipated to commence in early 2007 for completion in 2010. During the construction stage of the project, WSD will report the progress and the latest programme of the works regularly to the Central & Western District Council.

Water Supplies Department
January 2006

Appendix A

A Summary of Proposed Works

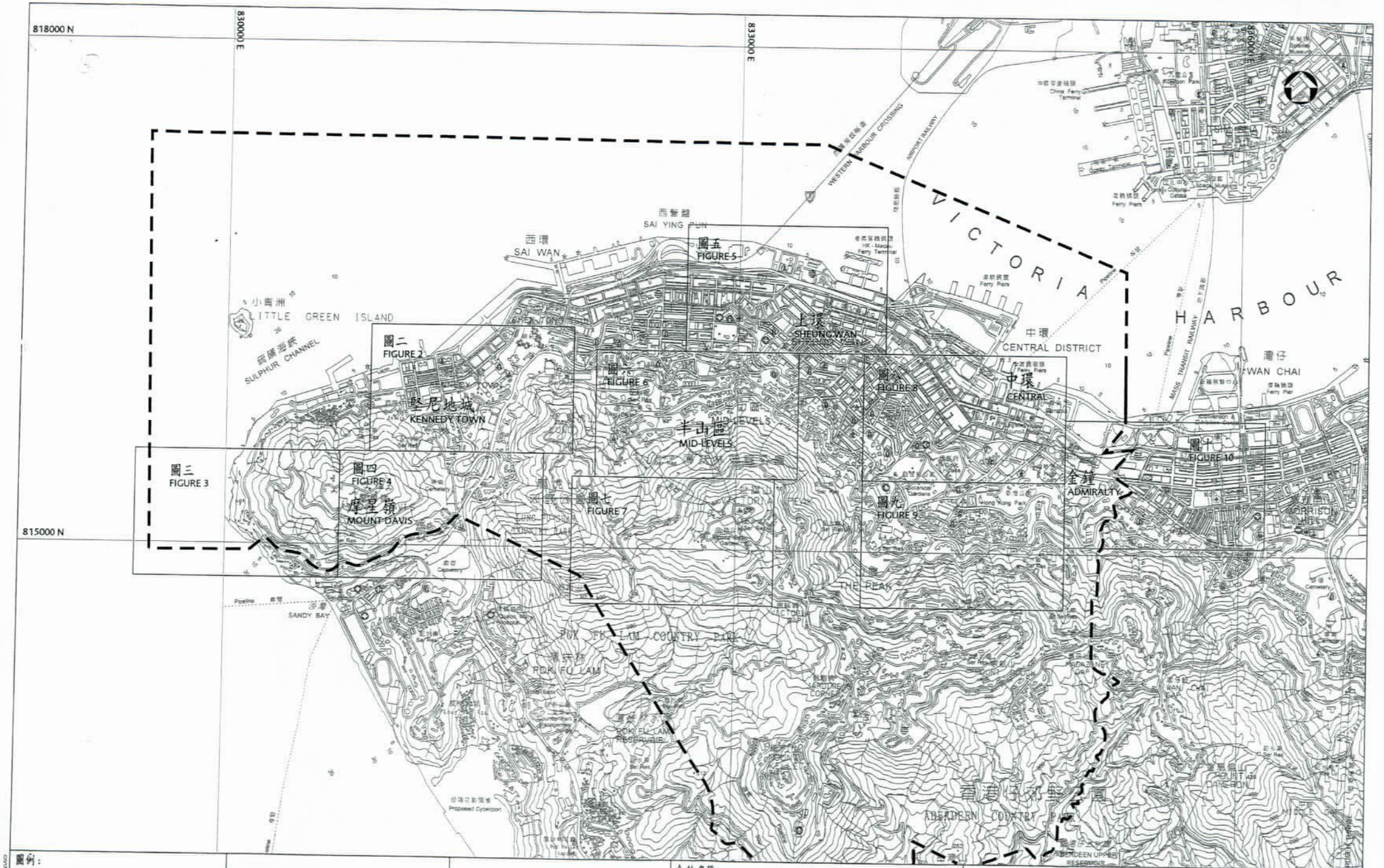
Name of Road	Diameter of the Proposed Water Mains to be Replaced and Rehabilitated (mm)	Length of the Proposed Water Mains to be Replaced and Rehabilitated (m)
Pok Fu Lam		
Pok Fu Lam Road	150 – 300	2000
Mt Davis Road	100 – 200	4800
Kennedy Town		
Cadogan Street	150 – 200	500
Forbes Street	150 – 200	200
Catchick Street	50 – 150	400
Sheung Wan		
Des Voeux Road West	75	900
Bohnam Strand	75 – 375	600
Bohnam Strand West	75 – 150	1100
Queen's Road Central	75 – 150	200
Central		
Queen's Road Central	50 – 375	2900
Stanley Street	50 – 150	900
Wellington Street	50 – 250	1000
Wo On Lane	50 – 100	500
D'Aguilar Street	75 – 150	600
Wyndham Street	75 – 150	500
Lower Albert Road	75	600
Upper Albert Road	75 – 150	600
Mid-Level		
Robinson Road	25 – 200	1800
Mosque Street	150	300
Kennedy Road	75 – 200	1200
Macdonnell Road	150	1200

Name of Road	Diameter of the Proposed Water Mains to be Replaced and Rehabilitated (mm)	Length of the Proposed Water Mains to be Replaced and Rehabilitated (m)
Bowen Road	200	500
Magazine Gap Road	150	200
Garden Road	50 – 250	1400
Admiralty		
Queensway	300 – 375	2000
Justice Drive	80 – 300	300
Supreme Court Road	100 – 250	300

Figure List

Figure No.	Description
Figure 1	Proposed Replacement and Rehabilitation of Water Mains Key Plan – Central and Western District
Figure 2	Proposed Replacement and Rehabilitation of Water Mains Layout Plan – Kennedy Town District
Figure 3	Proposed Replacement and Rehabilitation of Water Mains Layout Plan – Mount Davis District
Figure 4	Proposed Replacement and Rehabilitation of Water Mains Layout Plan – Mount Davis District
Figure 5	Proposed Replacement and Rehabilitation of Water Mains Layout Plan – Sheung Wan District
Figure 6	Proposed Replacement and Rehabilitation of Water Mains Layout Plan – Mid-levels District
Figure 7	Proposed Replacement and Rehabilitation of Water Mains Layout Plan – Mid-levels District
Figure 8	Proposed Replacement and Rehabilitation of Water Mains Layout Plan – Central and Admiralty Districts
Figure 9	Proposed Replacement and Rehabilitation of Water Mains Layout Plan – Central District
Figure 10	Proposed Replacement and Rehabilitation of Water Mains Layout Plan – Admiralty District

END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圖例：
中西區分界線
CENTRAL AND WESTERN DISTRICT BOUNDARY LINE
圖則編號
FIGURE NO.
水務署
Water Supplies Department
BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司
合約名稱：
水管更換及修復工程第二階段
香港島及離島水管勘查設計及施工
REPLACEMENT AND REHABILITATION OF WATER MAINS STAGE 2 MAINS ON HONG KONG AND ISLANDS INVESTIGATION DESIGN AND CONSTRUCTION
圖則名稱：
擬更換及修復水管索引圖 - 中西區
PROPOSED REPLACEMENT AND REHABILITATION OF WATER MAINS KEY PLAN - CENTRAL AND WESTERN DISTRICT
圖則編號：
圖一 / FIGURE 1
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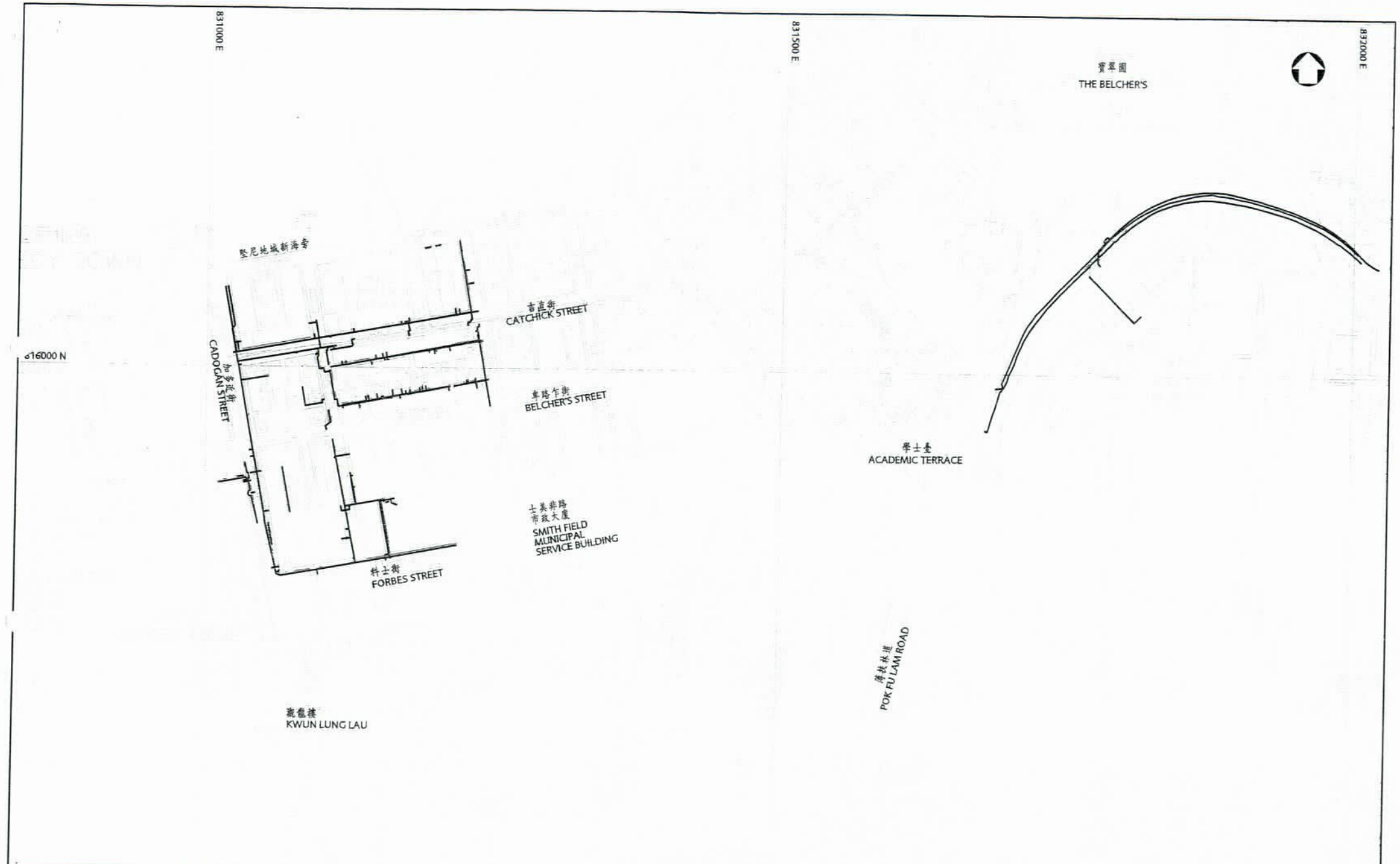
圖二 FIGURE 2
圖三 FIGURE 3
圖四 FIGURE 4
圖五 FIGURE 5
圖六 FIGURE 6
圖七 FIGURE 7
圖八 FIGURE 8
圖九 FIGURE 9
圖十 FIGURE 10
西環 SAI WAN
西營盤 SAI YING PUN
小青洲 LITTLE GREEN ISLAND
硫磺海峽 SULPHUR CHANNEL
堅尼地城 KENNEDY TOWN
摩星嶺 MOUNT DAVIS
半山區 MID-LEVELS
上環 SHEUNG WAN
中環 CENTRAL DISTRICT
中環 CENTRAL
灣仔 WAN CHAI
金鐘 ADMIRALTY
維多利亞港 VICTORIA HARBOUR
西區海底隧道 WESTERN HARBOUR CROSSING
機場鐵路 AIRPORT RAILWAY
港鐵東涌線 MASS TRANSIT RAILWAY
THE PEAK
SANDY BAY
POK FU LAM COUNTRY PARK
薄扶林 POK FU LAM
薄扶林水塘 POK FU LAM RESERVOIR
ABERDEEN COUNTRY PARK
香港仔郊野公園
Proposed Cyberport
Pipeline 海管



圖例：
- 區界線 BOUNDARY LINE
- 擬使用開挖法更換水管 PROPOSED WATER MAIN REPLACEMENT BY OPEN TRENCH METHOD
- 擬使用無開挖法更換及修復水管 PROPOSED WATER MAIN REPLACEMENT/ REHABILITATION BY TRENCHLESS METHOD
- 歷史文物古蹟 CULTURAL HERITAGE

水務署 Water Supplies Department

BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司

合約名稱：水管更換及修復工程第二階段 香港島及離島水管勘查設計及施工
REPLACEMENT AND REHABILITATION OF WATER MAINS STAGE 2 MAINS ON HONG KONG AND ISLANDS INVESTIGATION DESIGN AND CONSTRUCTION

圖則名稱：擬更換及修復水管分佈圖 - (堅尼地城區)
PROPOSED REPLACEMENT AND REHABILITATION OF WATER MAINS LAYOUT PLAN - KENNEDY TOWN DISTRICT

圖則編號：圖二 / FIGURE 2

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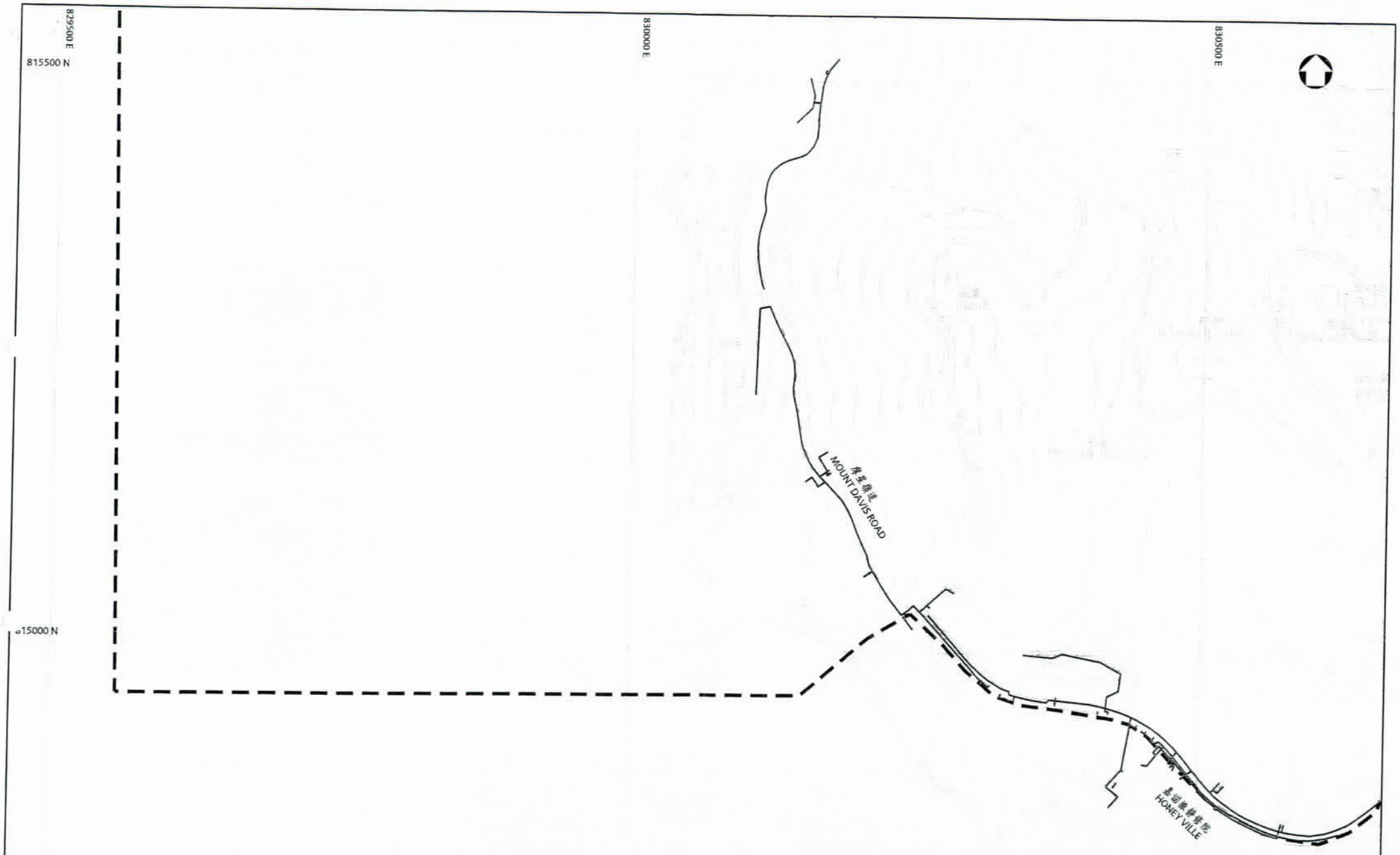

圖例：
- 區界線 BOUNDARY LINE
- 擬使用開挖法更換水管 PROPOSED WATER MAIN REPLACEMENT BY OPEN TRENCH METHOD
- 擬使用無開挖法更換及修復水管 PROPOSED WATER MAIN REPLACEMENT/ REHABILITATION BY TRENCHLESS METHOD
- 歷史文物古蹟 CULTURAL HERITAGE

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香港島及離島水管勘查設計及施工
REPLACEMENT AND REHABILITATION OF WATER MAINS STAGE 2 MAINS ON HONG KONG AND ISLANDS INVESTIGATION DESIGN AND CONSTRUCTION

圖則名稱：
擬更換及修復水管分佈圖 - (摩星嶺區)
PROPOSED REPLACEMENT AND REHABILITATION OF WATER MAINS LAYOUT PLAN - MOUNT DAVIS DISTRICT

圖則編號：圖三 / FIGURE 3

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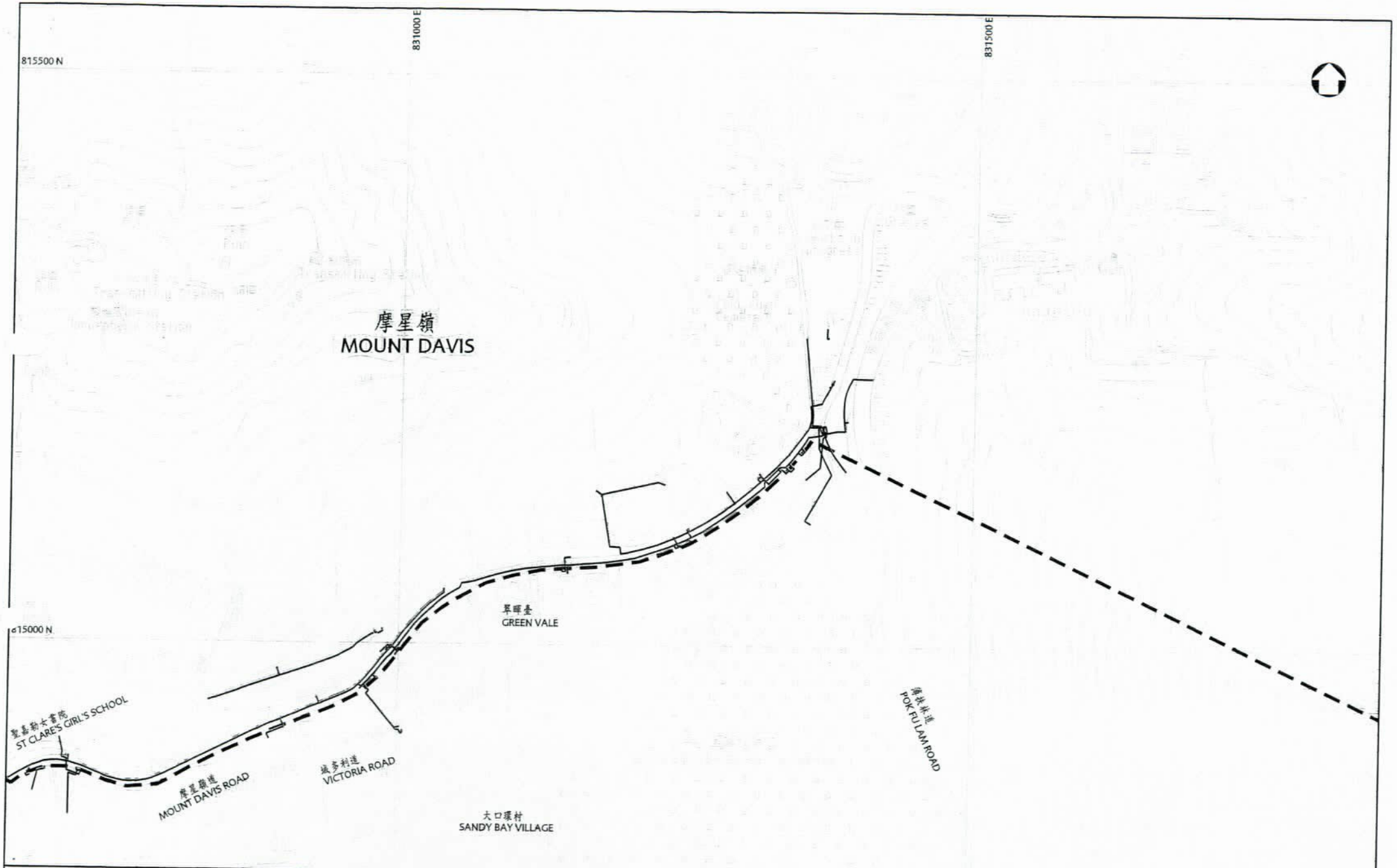

圖例：
- 區界線 BOUNDARY LINE
- 歷史文物古蹟 CULTURAL HERITAGE
- 截使用開鑿法更換水管 PROPOSED WATER MAIN REPLACEMENT BY OPEN TRENCH METHOD
- 截使用無鑿法更換及修復水管 PROPOSED WATER MAIN REPLACEMENT/ REHABILITATION BY TRENCHLESS METHOD

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香港島及離島水管勘查設計及施工
REPLACEMENT AND REHABILITATION OF WATER MAINS STAGE 2 MAINS ON HONG KONG AND ISLANDS INVESTIGATION DESIGN AND CONSTRUCTION

圖則名稱：
擬更換及修復水管分佈圖 -
(摩星嶺區)
PROPOSED REPLACEMENT AND REHABILITATION OF WATER MAINS LAYOUT PLAN - MOUNT DAVIS DISTRICT

圖則編號：
圖四 / FIGURE 4

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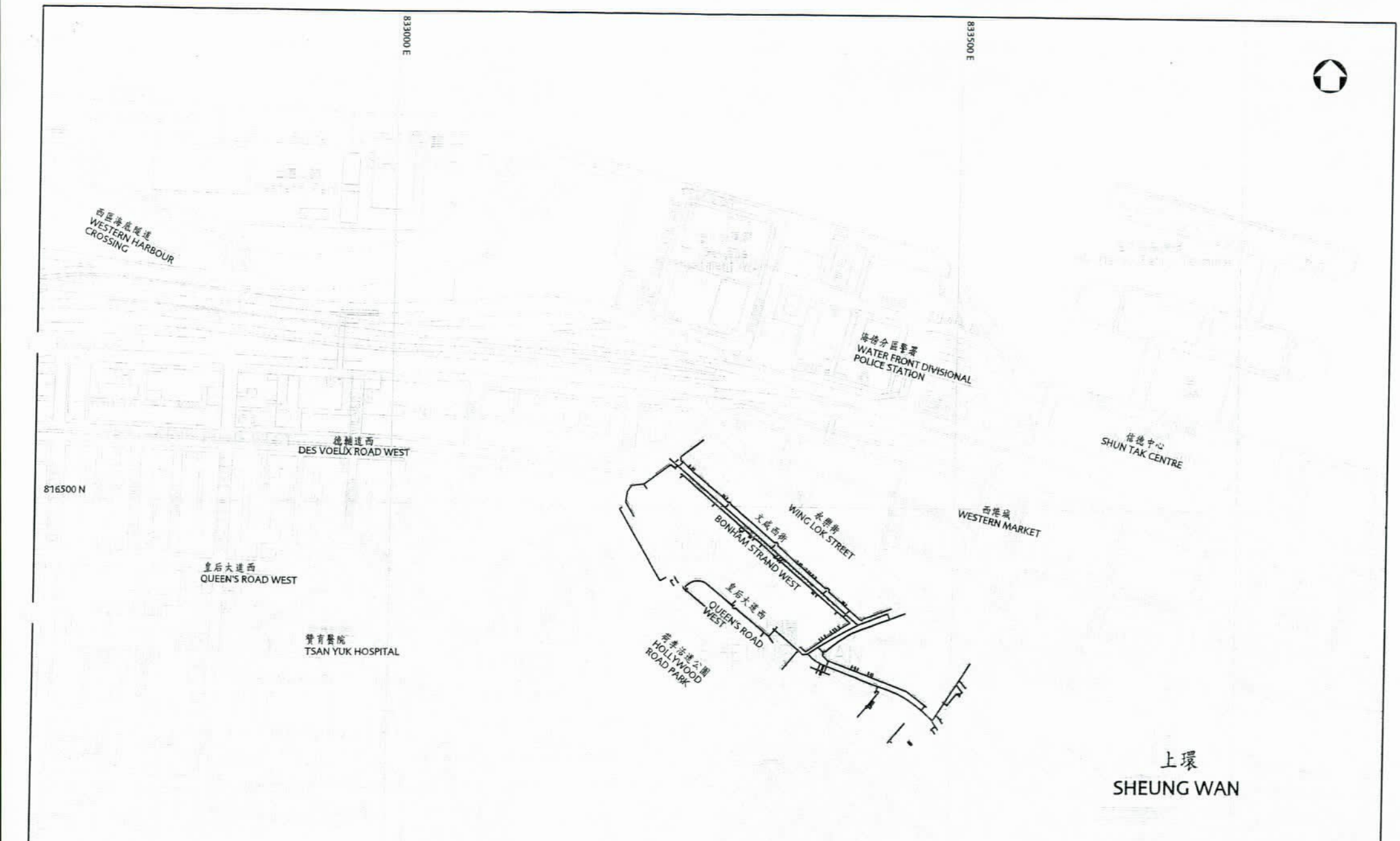

圖例：
- 區界線 BOUNDARY LINE
- 歷史文物古蹟 CULTURAL HERITAGE
- 新使用開挖法更換水管 PROPOSED WATER MAIN REPLACEMENT BY OPEN TRENCH METHOD
- 新使用無開挖法更換及修復水管 PROPOSED WATER MAIN REPLACEMENT/ REHABILITATION BY TRENCHLESS METHOD

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圖則名稱：
擬更換及修復水管分佈圖 -
(上環區)
PROPOSED REPLACEMENT AND REHABILITATION OF WATER MAINS LAYOUT PLAN - SHEUNG WAN DISTRICT

圖則編號：
圖五 / FIGURE 5

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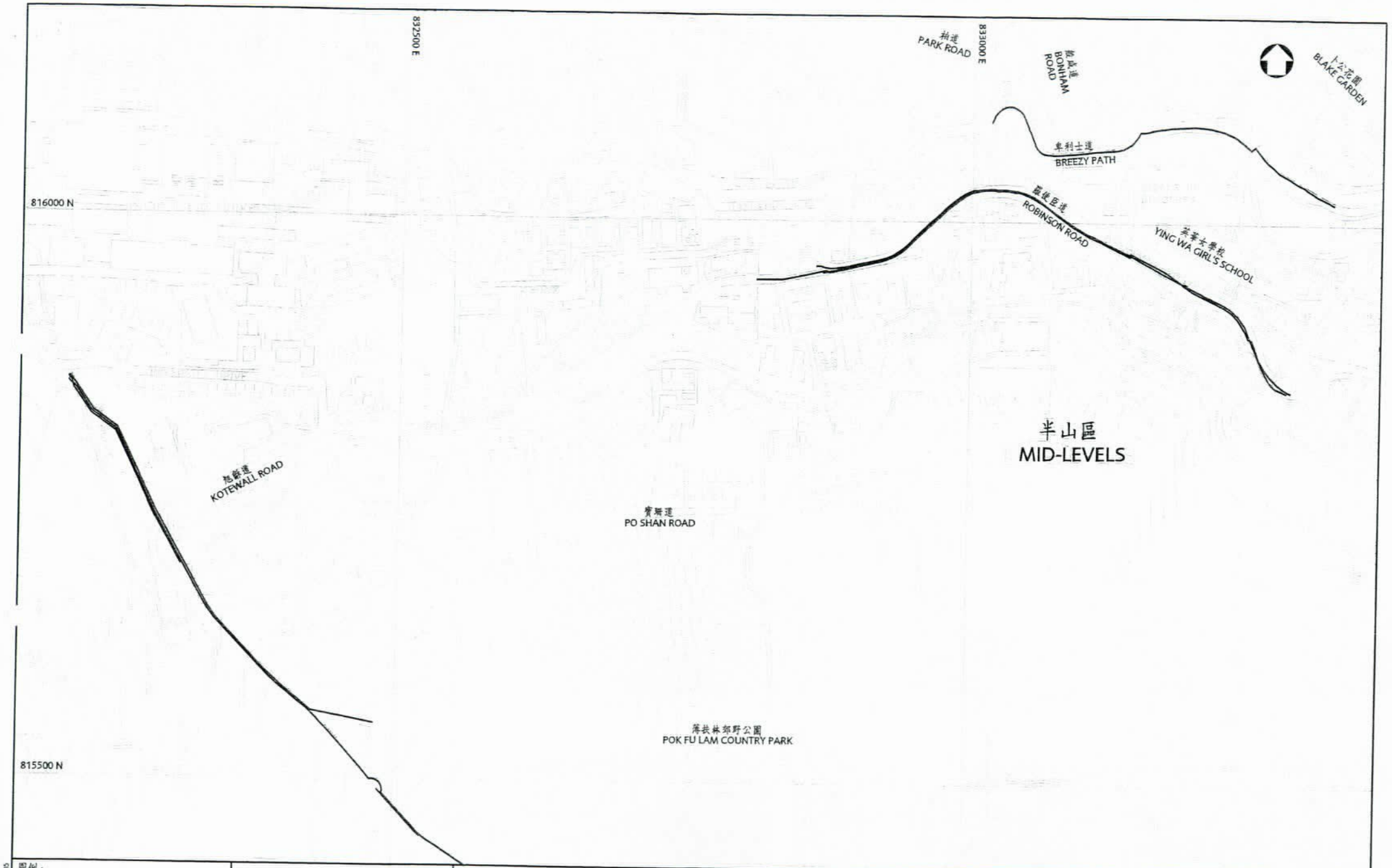

圖例：
- 區界線 BOUNDARY LINE
- 歷史文物古蹟 CULTURAL HERITAGE
- 擬使用開鑿法更換水管 PROPOSED WATER MAIN REPLACEMENT BY OPEN TRENCH METHOD
- 擬使用無開鑿法更換及修復水管 PROPOSED WATER MAIN REPLACEMENT/ REHABILITATION BY TRENCHLESS METHOD

水務署 Water Supplies Department

BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司

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水管更換及修復工程第二階段
香港島及離島水管勘查設計及施工
REPLACEMENT AND REHABILITATION OF WATER MAINS STAGE 2 MAINS ON HONG KONG AND ISLANDS INVESTIGATION DESIGN AND CONSTRUCTION

圖則名稱：
擬更換及修復水管分佈圖 - (半山區)
PROPOSED REPLACEMENT AND REHABILITATION OF WATER MAINS LAYOUT PLAN - MID-LEVELS DISTRICT

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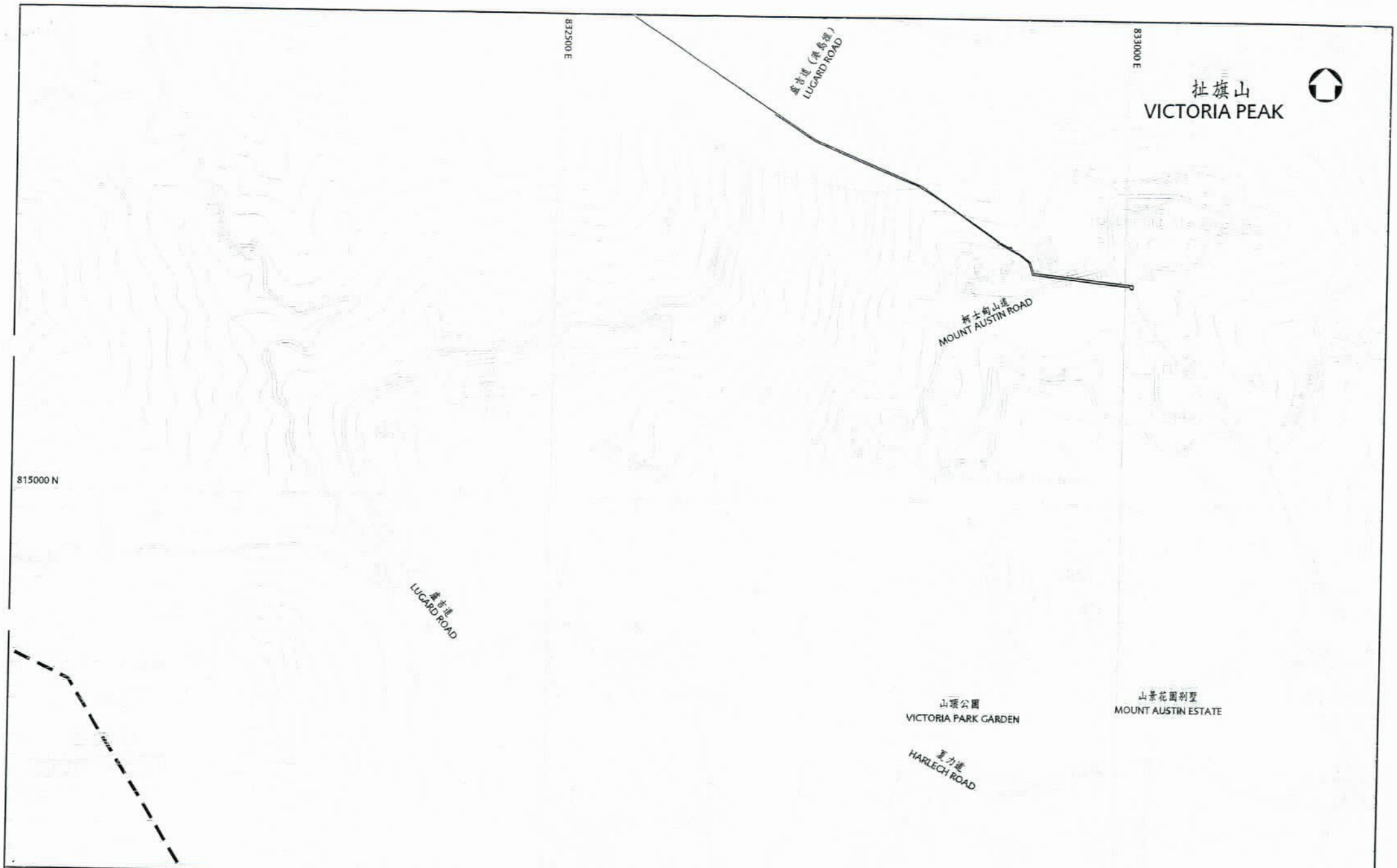

圖例：
- 區界線 BOUNDARY LINE
- 歷史文物古蹟 CULTURAL HERITAGE
- 擬使用開挖法更換水管 PROPOSED WATER MAIN REPLACEMENT BY OPEN TRENCH METHOD
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REPLACEMENT AND REHABILITATION OF WATER MAINS STAGE 2 MAINS ON HONG KONG AND ISLANDS INVESTIGATION DESIGN AND CONSTRUCTION

圖則名稱：
擬更換及修復水管分佈圖 -
（半山區）
PROPOSED REPLACEMENT AND REHABILITATION OF WATER MAINS LAYOUT PLAN - MID-LEVELS DISTRICT

圖則編號：圖七 / FIGURE 7

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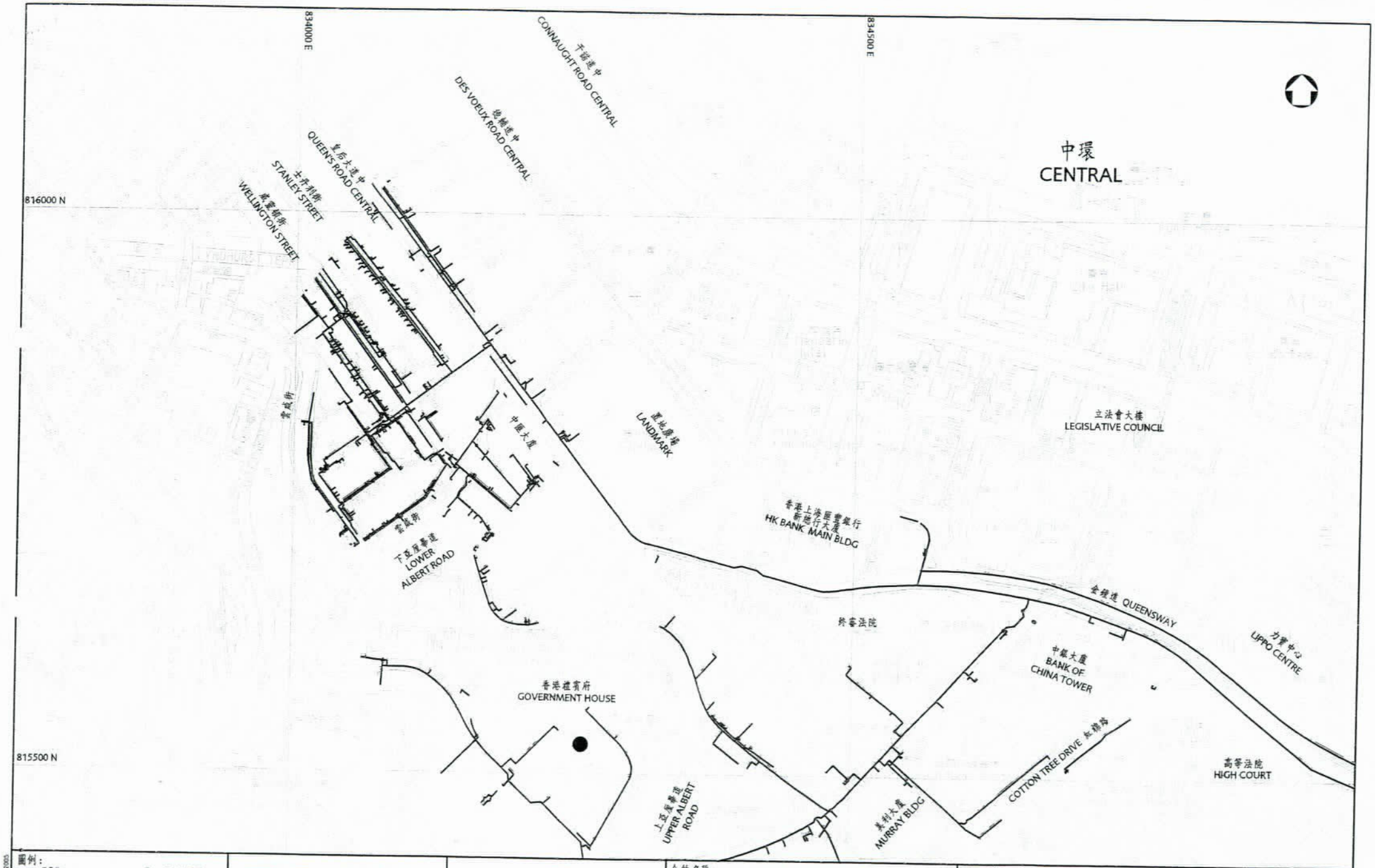

圖例：
- 區界線 BOUNDARY LINE
- 歷史文物古蹟 CULTURAL HERITAGE
- 新使用開挖法更換水管 PROPOSED WATER MAIN REPLACEMENT BY OPEN TRENCH METHOD
- 新使用免開挖法修復水管 PROPOSED WATER MAIN REPLACEMENT/ REHABILITATION BY TRENCHLESS METHOD

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Water Supplies Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

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水管更換及修復工程第二階段
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REPLACEMENT AND REHABILITATION OF WATER MAINS
STAGE 2 MAINS ON HONG KONG AND ISLANDS INVESTIGATION
DESIGN AND CONSTRUCTION

圖則名稱：
擬更換及修復水管分佈圖 -
（中環及金鐘區）
PROPOSED REPLACEMENT AND REHABILITATION
OF WATER MAINS LAYOUT PLAN
- CENTRAL AND ADMIRALTY DISTRICTS

圖則編號：
圖八 / FIGURE 8

比例：
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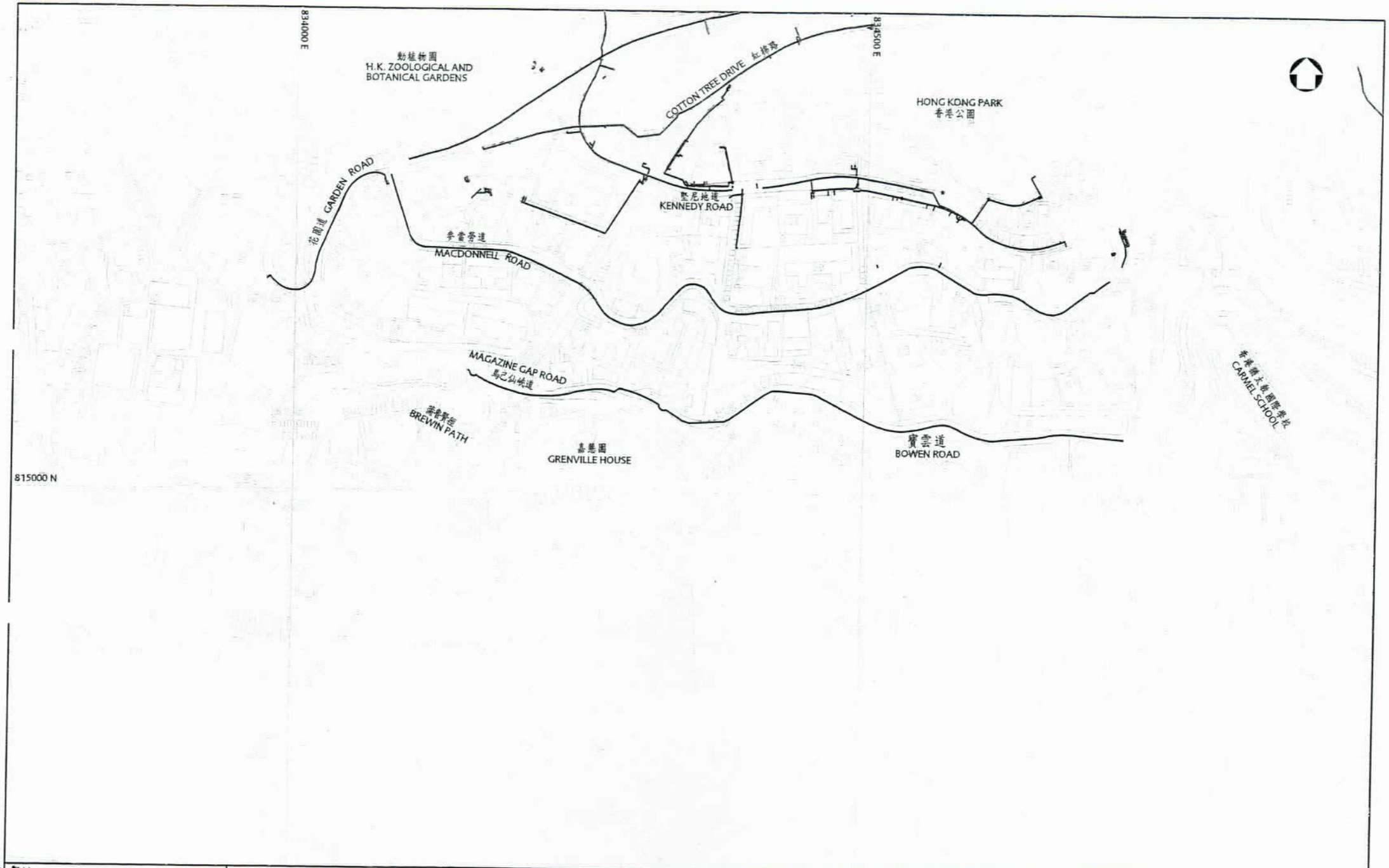


圖例：

- 區界線 BOUNDARY LINE
- 擬使用開挖法更換水管 PROPOSED WATER MAIN REPLACEMENT BY OPEN TRENCH METHOD
- 擬使用無開挖法更換及修復水管 PROPOSED WATER MAIN REPLACEMENT/ REHABILITATION BY TRENCHLESS METHOD
- 歷史文物古蹟 CULTURAL HERITAGE

水務署 Water Supplies Department

BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司

合約名稱：
水管更換及修復工程第二階段
香港島及離島水管勘查設計及施工
REPLACEMENT AND REHABILITATION OF WATER MAINS STAGE 2 MAINS ON HONG KONG AND ISLANDS INVESTIGATION DESIGN AND CONSTRUCTION

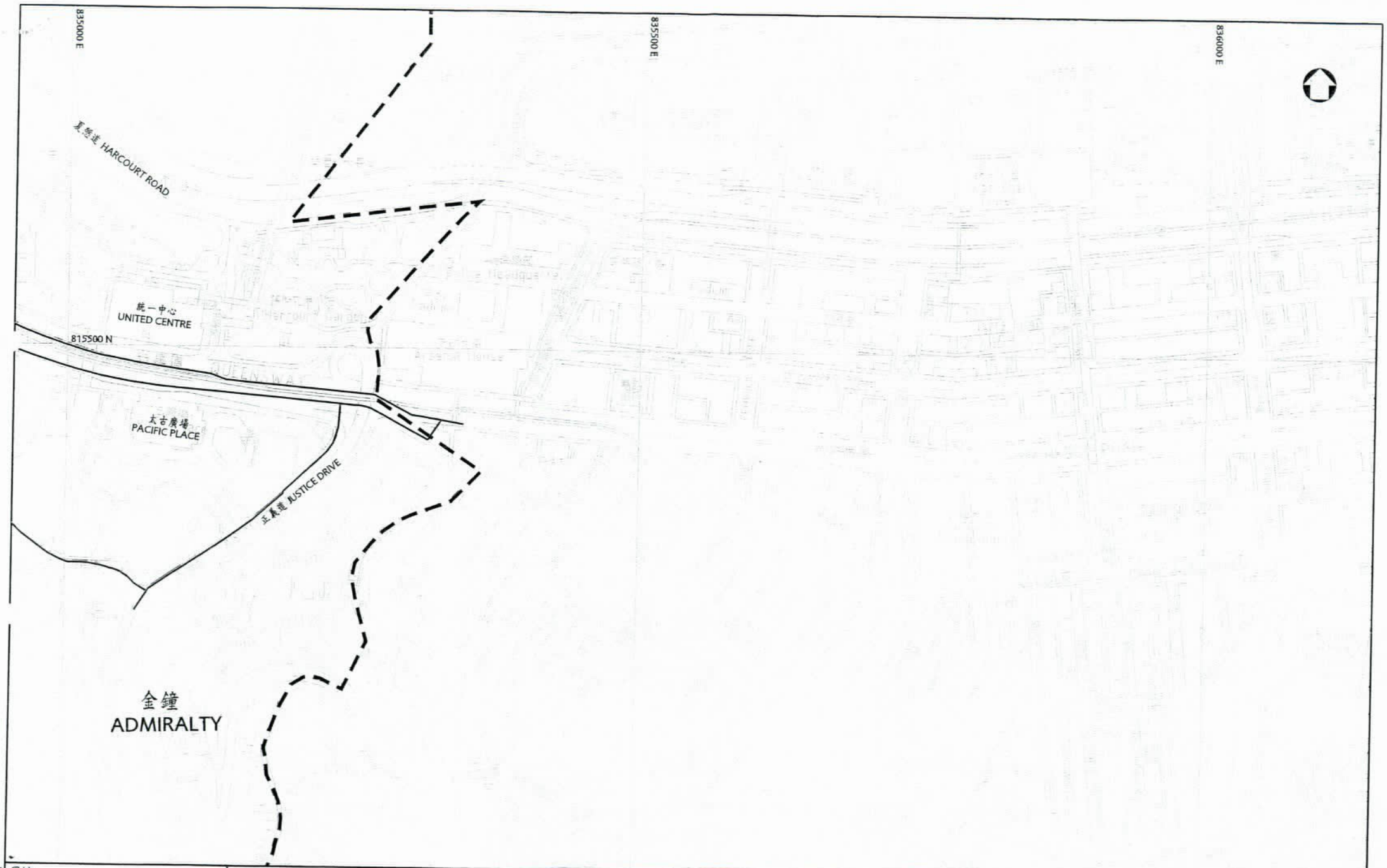
圖則名稱：
擬更換及修復水管分佈圖 -
（中環區）
PROPOSED REPLACEMENT AND REHABILITATION OF WATER MAINS LAYOUT PLAN - CENTRAL DISTRICT

圖則編號：
圖九 / FIGURE 9

比例：
A3 1:3000

Plot Date - 21 DEC 2005

CAD Filename - p:\drain-water\cw\382638-0201\sketch\central& western district\cw-042.dgn



圖例：
- 區界線 BOUNDARY LINE
- 歷史文物古蹟 CULTURAL HERITAGE
- 擬使用開挖法更換水管 PROPOSED WATER MAIN REPLACEMENT BY OPEN TRENCH METHOD
- 擬使用無開挖法更換及修復水管 PROPOSED WATER MAIN REPLACEMENT/ REHABILITATION BY TRENCHLESS METHOD

水務署 Water Supplies Department

BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司

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REPLACEMENT AND REHABILITATION OF WATER MAINS STAGE 2 MAINS ON HONG KONG AND ISLANDS INVESTIGATION DESIGN AND CONSTRUCTION

圖則名稱：
擬更換及修復水管分佈圖 -
（金鐘區）
PROPOSED REPLACEMENT AND REHABILITATION OF WATER MAINS LAYOUT PLAN - ADMIRALTY DISTRICT

圖則編號：
圖十 / FIGURE 10

比例：
A3 1:3000

Plot Date - 21DEC 2005

CAD Filename - p:\drain-water\cw\382638-0201\sketch\central& western district\cw-043.dgn