



The background of the page features a blue-tinted photograph of several large, parallel pipes running through a grassy area. In the foreground, there is a stylized graphic of blue and white wavy lines representing water. The text is overlaid on this background.

有效供水
Delivering
Water Efficiently

有效供水

Delivering Water Efficiently



水務署持續不斷地改善水塘、食水和海水處理設施，以及全港供水和配水網絡內各項的基礎建設。

改善供水網絡

於二零零零年開展為期15年的水管更換及修復計劃，範圍包括3 000公里的水管（其中許多已使用超過30年），現已進入最後施工階段。截至二零一二年八月三十一日，已完成更換及修復的水管長度為1 894公里，切實提升了供水的可靠性。水管爆裂、水壓驟降及其他事故，不單會令供水中斷，在很多情況下，更會導致交通和運輸受阻。水管更換及修復計劃預期於二零一五年底前完成，屆時供水系統的可靠性將會大大提高，對公眾日常生活造成的不便亦將會大減。

在更換及修復水管的工程方面，我們採用了最先進的方法和技術。在有需要時，我們會使用各種「非開挖」的施工方法，包括內喉緊貼法、原位內搪喉管法、水管推頂法及定向鑽挖法，以減少在路面上施工所引起對公眾的滋擾。

除目前在市區進行的工程外，我們亦計劃更換連接大嶼山與長洲之間的海底水管。我們會採用水平定向鑽挖技術鋪設新海底水管，以減少工程對環境、鄰近海陸古蹟和海上交通的影響。

The Water Supplies Department is constantly working to improve impounding reservoirs, fresh and sea water treatment facilities and the infrastructure that forms Hong Kong's extensive supply and distribution network.

IMPROVING THE SUPPLY NETWORK

Our 15-year phased programme of replacing and rehabilitating 3 000 km of water mains, many more than 30 years old, began in 2000 and is now in its final stages. As at 31 August 2012, we had completed work on 1 894 km of water mains, ensuring greater supply reliability. Water mains bursts, sudden drops in pressure and other incidents can disrupt water supplies and, in many cases, cause traffic and transport disruptions. The replacement and rehabilitation programme, expected to be completed by 2015, will go a long way to enhance system reliability and minimise disruption to daily life.

The programme involves advanced construction methods and technologies. Where necessary, we use trenchless construction methods including close fit lining of existing mains, cure in-place pipes, pipe jacking and horizontal directional drilling to reduce on the ground construction and lessen inconvenience caused to the public.

In addition to the urban work currently being undertaken, we are planning to replace a submarine pipeline from Lantau Island to Cheung Chau. A horizontal directional drilling method will be used to lay the new submarine pipeline to minimise the impact of the work on the environment, nearby marine and terrestrial archaeological sites and marine traffic.



測漏統計數字 (二零一一至一二年度) Statistics of Leak Detection (2011/12)

食水 Fresh Water

各財政年度所進行的測漏工作

Tests Conducted Per Financial Year

	2007/08	2008/09	2009/10	2010/11	2011/12
最低晚間流量測試次數 No. of Minimum Night Flow Tests	291	278	276	241	174
分段流量測漏次數 (或滲漏測試) No. of Step Tests (or Leakage Tests)	57	65	30	27	25
音聽視察次數 No. of Sounding & Visual Inspections	4 220	4 438	4 914	3 177	3 221
經發現的滲漏個案數目 No. of Leaks Detected	2 998	2 598	2 563	1 846	2 006
估計每日可節省的水量 (立方米/日) Estimated Quantity of Fresh Water Saved (cubic metres/day)	126 019	127 244	93 731	75 299	79 531

海水 Sea Water

各財政年度所進行的測漏工作

Tests Conducted Per Financial Year

	2007/08	2008/09	2009/10	2010/11	2011/12
最低晚間流量測試次數 No. of Minimum Night Flow Tests	0	0	0	0	0
分段流量測漏次數 (或滲漏測試) No. of Step Tests (or Leakage Tests)	3	2	2	0	0
音聽視察次數 No. of Sounding & Visual Inspections	222	207	155	304	532
經發現的滲漏個案數目 No. of Leaks Detected	161	153	154	124	154
估計每日可節省的海水量 (立方米/日) Estimated Quantity of Sea Water Saved (cubic metres/day)	45 592	113 201	18 204	29 918	21 719

減少水管滲漏

我們定期進行最低晚間流量測試、分段流量測漏和音聽視察，以檢測水管滲漏情況。而廣泛地應用區域監控和水壓管理技術，亦大大加強了我們對用水流失的控制。一向以來，我們致力把管網內的漏點滲漏初期找出，以便迅速修補。我們正於各供水網絡安裝減壓閥以降低水壓，藉此更有效地減少水管故障及控制用水流失，目前的工作集中在供水網絡能夠接受水壓下調的地區。我們亦在整個供水網絡安裝電磁流量計和噪音數據記錄儀，以監測管網狀況、偵測漏點和系統的其他異常情況。此外，我們不斷探討在供水網絡的不同水管配置相應的技術，以找出滲漏點並進行維修。我們更與專門承造商訂立以成效為本的合約，鼓勵他們準確檢測漏水情況。

延伸供水網絡

我們於維多利亞港西面施工鋪設一條直徑1 200毫米、全長2.1公里的跨海港食水海底水管，連接西九龍和西營盤。工程現已竣工，只待相連的陸上水管和海底輸水系統完成，即可於二零一二年十二月啟用。

REDUCING LOSS THROUGH LEAKAGE

We conduct routine minimum night flow tests, step tests, sounding and visual inspections for leak detection. The control of water loss has also been strengthened through the wide application of district monitoring and pressure management technologies. We endeavor to identify suspected leaks early so remedial action can be taken quickly. Pressure reducing valves are being installed to lower the pressure in the distribution network and more effectively reduce pipe failures and control water losses. We are concentrating on areas where the distribution network can absorb a reduction in pressure. Electromagnetic flow meters and noise loggers are being installed along the water supply network to monitor performance and identify leakage and other irregularities in the system. We are exploring a suite of technologies to apply to different mains across the supply network. These technologies will identify leaks and enable us to implement repairs. We have also adopted performance-based contracts with specialist contractors, to encourage the detection of leaks with accuracy.

EXTENDING THE NETWORK

The installation of a cross-harbour fresh water submarine pipeline, 1 200 mm in diameter and 2.1 kilometres in length, under the western part of Victoria Harbour between West Kowloon and Sai Ying Pun, has been completed. It will be commissioned in December 2012 once the associated land mains and the submarine water transfer system are completed.



正進行滲漏檢測。
Conducting leak detection tests.



位於九龍灣的更換水管工程。
Water mains replacement works in Kowloon Bay.



我們不斷尋求方法，在現有的資源和集水區收集更多原水。結合渠務署所制訂的西九龍防洪策略，我們計劃利用排洪隧道把九龍水塘群與下城門水塘連接起來，並把九龍水塘群一貫以來直接排放到維多利亞港的溢流，經下城門水塘和現有輸送系統輸往沙田濾水廠處理。工程計劃完成後，本港每年平均會增加收集約250萬立方米的原水。

為進一步確保安全和有效地收集地表水，我們將實施改善引水道的工程。首個項目涉及城門、筆架山、金山和大欖涌現有共長約26公里的引水道系統。

We are constantly looking at ways to generate more water from our existing resources and catchments. In conjunction with Drainage Services Department's flood control strategy for West Kowloon, we plan to implement a proposal for an Inter-reservoirs Transfer Scheme which will connect the Kowloon Group of reservoirs with Lower Shing Mun Reservoir using a raw water transfer tunnel. Flood water, instead of being discharged into Victoria Harbour, will be carried through a tunnel and along an existing transfer system to the Sha Tin Water Treatment Works where it will be treated for supply. The project is expected to generate an additional 2.5 million cubic metres to the local yield annually.

Improvements will be made to catchwaters to further ensure the safe and efficient collection of surface water. The first of these projects will involve improvements to 26 kilometres of catchwaters in the Shing Mun, Beacon Hill, Golden Hill and Tai Lam Chung catchwater systems.

擴建供水系統

節約用水的其中一個重要策略，是擴建或提升作為沖廁用的海水供應設施。為此，一個全新的海水供應系統，現正在薄扶林區興建中。該系統包括於鋼線灣設置海傍海水抽水站，及相連的海水進水涵洞；兩個分別位於華富和薄扶林的海水配水庫；位於華富的海水抽水站，及相連的鹹水水管。工程現時進展理想，所有設施預期將於二零一三年完成，應付整個薄扶林區85 000人口平均每日15 100立方米的海水需求。為了提高中區半山及山頂一帶食水和海水供應系統的可靠性，我們亦正於克頓道和山頂興建三個新的配水庫，並於旭龔道興建一個新的食水抽水站。位於山頂的現有食水抽水站將會遷移，而西區食水及海水抽水站的水泵將優化。我們亦正在區內鋪設相連水管，整個項目將於二零一三年初竣工。

為應對沙田區新樓盤發展項目的用水需求，本署正在提升該區的海水供應系統，工程包括建造一個新的海傍抽水站、兩個分別位於馬鞍山及多石的新配水庫，以及相連的水管系統。此外，在一直以淡水作沖廁用途的新界西北區，本署亦正在建設一個海水供應系統，工程包括在樂安排與元朗及天水圍之間鋪設67公里的海水水管、在樂安排建造一個海水抽水站以及在丹桂村興建一個海水配水庫，以滿足該區的需求。

EXPANDING THE SUPPLY SYSTEM

As part of our initiative to conserve fresh water, we are extending or upgrading facilities to supply sea water for flushing. A new system is being built for the Pok Fu Lam area involving a seafront salt water pumping station at Telegraph Bay and an associated sea water intake culvert, two sea water service reservoirs at Wah Fu and Pok Fu Lam and a pumping station at Wah Fu with associated water mains. Construction is in good progress and all facilities will be commissioned in 2013 to meet the area's daily demand for sea water of 15 100 cubic metres a day, for a population of 85 000 people. To enhance the reliability of both fresh and sea water supply systems to Central mid-level and high-level areas, three new fresh water reservoirs at Hatton Road and the Peak, and a new fresh water pumping station Kotewall Road are being built. An existing fresh water pumping station at the peak will be relocated while pumps at the existing Western Fresh and Salt Water Pumping Station will be upgraded. Associated water mains are also being laid in the area. The overall project will be completed in early 2013.

Sha Tin's sea water supply system is being upgraded to meet an increase in demand from new housing developments in the area. The upgrade includes a new sea front pumping station and two service reservoirs at Ma On Shan and To Shek as well as an associated mains system. A sea water supply system is being built to serve the North West New Territories which has been relying on fresh water for flushing. The work includes 67 kilometres of salt water mains from Lok On Pai to Yuen Long and Tin Shui Wai, a sea water pumping station at Lok On Pai and a service reservoir at Tan Kwai Tsuen.



山頂二號食水配水庫於2011年底啟用。
Peak No.2 Fresh Water Service Reservoir
commissioned in late 2011.

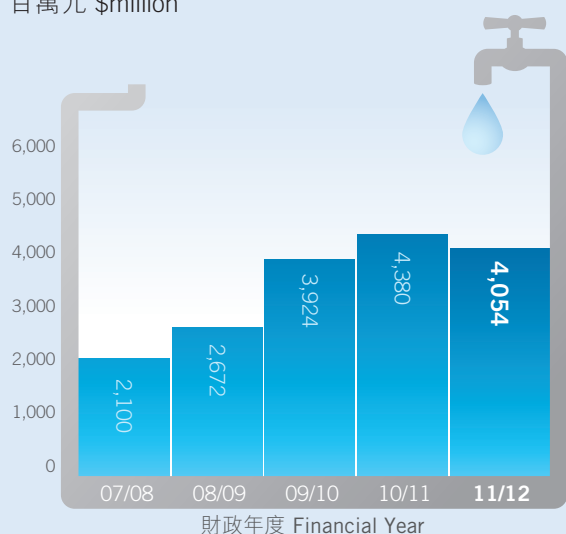


試驗研究廠用作測試擬用於沙田濾水廠南廠的處理工藝流程。
Pilot plant for testing the proposed treatment process
for Sha Tin Water Treatment Works – South Works.

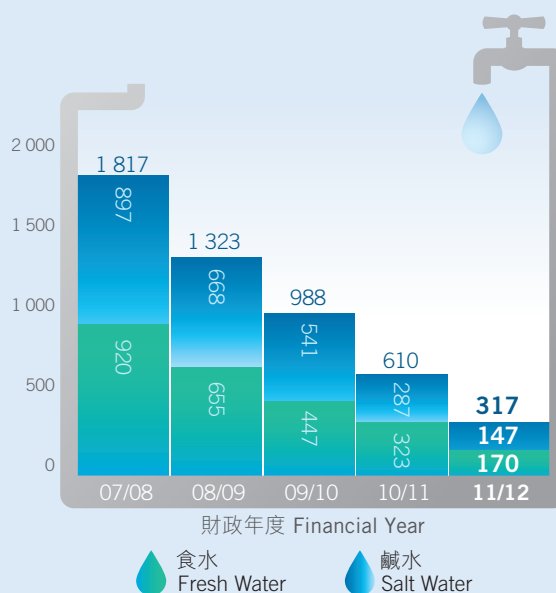
為了應付灣仔、中環和半山地區不斷增加的沖廁用水需求，本署將會重置海水抽水站，在馬己仙峽道新置配水庫、在寶雲徑附加抽水站並鋪設7公里長的新鹹水水管，以提升海水供水系統。

To meet the increased demand for flushing water in Wan Chai, Central and Mid-level areas, the sea water supply system is being upgraded with a reprovisioned sea water pumping station, a new service reservoir at Magazine Gap Road, an additional pumping station on Bowen Drive and 7 kilometres of new salt water mains.

資本投資
Capital Investment
百萬元 \$million



水管爆裂修理個案統計數字
Statistics on Mains Bursts Repaired



確保食水處理能力

沙田濾水廠和大埔濾水廠是本署兩個主要處理原水的設施。沙田濾水廠已進入原地重置的主要階段，而大埔濾水廠的擴建工程亦正在進行中，兩個項目將確保我們可以維持把原水處理達至符合目前水質標準的能力，並能應付將來需要提高水質標準的情況。兩個工程的進展經過妥善規劃，確保了在任何工程進行階段，兩間廠的處理能力皆能互為補足，相輔相成，應付本港整體用水需求。

大埔濾水廠的擴建工程分兩期進行，日產量將由現時的25萬立方米增至80萬立方米，估計總成本為56億元。第一期工程已於二零一一年竣工，把該廠房的日產量提升至40萬立方米。有賴此額外產量，沙田濾水廠（南廠）可暫時停產進行原地重置，沙田濾水廠（北廠）則會繼續

SECURING TREATMENT CAPACITIES

The Sha Tin Water Treatment Works and the Tai Po Water Treatment Works are two major facilities used to treat raw water. The Sha Tin plant is entering a major reprovisioning phase while the Tai Po plant is being expanded. Both projects will ensure that we continue to have adequate capacity to treat raw water to current drinking water standards, with a provision to meet higher standards in the future. The phasing of works is carefully planned so that at all stages of construction, the treatment capacities of the two facilities will complement each other to produce an overall output that meets the required aggregate demand.

The capacity of the Tai Po Water Treatment Works will be increased from 250 000 cubic metres per day to 800 000 cubic metres per day in two parts at a cost of \$5.6 billion. Part 1, taking the treatment capacity up to 400 000 cubic metres per day, was completed in 2011. With this additional capacity, the south works of the Sha Tin Water Treatment Works can be shut down for in-situ reprovisioning while the north works will remain in operation. The reprovisioned



運作。重置的沙田濾水廠（南廠）預計於二零一九年落成。大埔濾水廠第二期擴建計劃將提升日產量至80萬立方米，工程將於二零一三年動工，並於二零一七年落成。

提高運作效率

我們一直不斷改善用於監察抽水站和配水庫等設施的監控及資料收集系統。經強化的系統將由四個中央控制中心管理，以提高全港供水網絡的運作效率。此外，為確保系統可靠及有效運作，我們已提升馬鞍山、北港、上水及荃灣濾水廠的監控系統，並正提升油柑頭和屯門濾水廠的監控系統。我們根據以可靠性為中心的維修方式和狀況監察研究，持續提高濾水廠設備的效能。網上抽水效率監管系統已經成功測試，預計將在10個抽水站啟用。

現時部分的海水配水庫僅有單一間隔，我們正為這些配水庫加建分隔牆，使維修這些配水庫時不需中斷供水。

一旦發生緊急情況，例如食水管爆裂，我們將首先盡可能「轉移食水供應區」¹，使供水不受影響。如果無法轉移供應區，而預計客戶會因緊急情況斷水三小時以上，我們將為客戶提供臨時食水，滿足基本需要。臨時食水供應將在適當情況下，透過街喉、水車或水缸提供。為了加強服務，我們正增加水車數量，預期在二零一三年底前，我們將新增五輛水車，規模是目前的一倍。

資產管理

原水收集、食水處理和供水服務均有賴有形基建。我們管理這些資產的使用周期的目標，是在可接受的風險框架內，令運作效能達至期望的水平及具成本效益。

¹ 「轉移食水供應區」意指把相鄰的食水供應區的區界予以更改，使供水受事故影響的地區得以獲鄰區的水源供應。

south works at the Sha Tin Water Treatment Works is scheduled for commissioning in 2019. Part 2 of the Tai Po Water Treatment Works expansion will increase the capacity of the works to 800 000 cubic metres per day and construction is scheduled to begin in 2013 for commissioning in 2017.

IMPROVING OPERATIONAL EFFICIENCY

We have been upgrading our regional SCADA system which is used to oversee facilities such as pumping stations and service reservoirs. The enhanced system will operate from four centralised control centres to improve the operational efficiency of territory-wide water supply networks. Control systems at water treatment works at Ma On Shan, Pak Kong, Sheung Shui and Tsuen Wan have also been upgraded and similar upgrade programmes are underway at Yau Kom Tau and Tuen Mun Water Treatment Works to ensure reliable and effective operations. In line with Reliability-centered Maintenance (RCM) and on-condition monitoring studies, we are continuing to improve the performance of plant equipment. A web-based management system to monitor pumping efficiency has been successfully tested and will be rolled out at 10 pumping stations.

To facilitate maintenance without causing supply interruption, we are adding compartment walls to sea water service reservoirs which currently operate with just single compartments.

When there is an emergency situation such as a main burst, we will first maintain an uninterrupted supply by “shifting the water supply zone”¹ wherever possible. If shifting of the supply zone is not possible, we will provide a temporary fresh water supply to customers to meet their basic need should they face a temporary suspension of supplies due to an emergency which is expected to last for more than three hours. Emergency temporary fresh water supplies will be provided through standpipes, water wagons or water tanks as appropriate. To enhance the service, we are increasing our fleet of water wagons and, by 2013, we will have five additional wagons, doubling our fleet size.

MANAGING ASSETS

We rely on our physical infrastructure to collect, treat and deliver water to the community. Our goal is to manage the life cycle of these assets to achieve a desired level of service cost-effectively and within an acceptable risk framework.

¹ “Shifting the water supply zone” refers to the changes of the zonal boundaries of adjoining supply zones so that the affected area can be supplied by an adjoining source of supply.

我們正研究將地理資訊系統和統計模型 (statistical model) 技術，應用於地下資產的風險管理。我們已評估全港900處水務設施的具體狀況，並會就需要的改善工程排序分階段進行。在機電資產方面，我們就一間濾水廠及兩個抽水站已完成研究，進行以可靠性為中心的維修方式，研究結果將會成為制定完善維修機電資產策略的基礎。

二零一二年年初，我們推出經加強的斜坡管理系統。該系統與土木工程拓展署所採用的斜坡資料和格式一致。提升項目包括引入「新優先次序編排系統」，以便我們更有效安排斜坡鞏固工程的先後次序。

We are exploring the use of GIS technology and statistical models in risk-based management of our underground assets. The condition of 900 waterworks installations have been assessed and the required improvement works will be prioritized for phased implementation. RCM studies have been completed at one water treatment works and two key pumping stations. They will form the basis of a comprehensive model of maintenance strategies for mechanical and electrical assets.

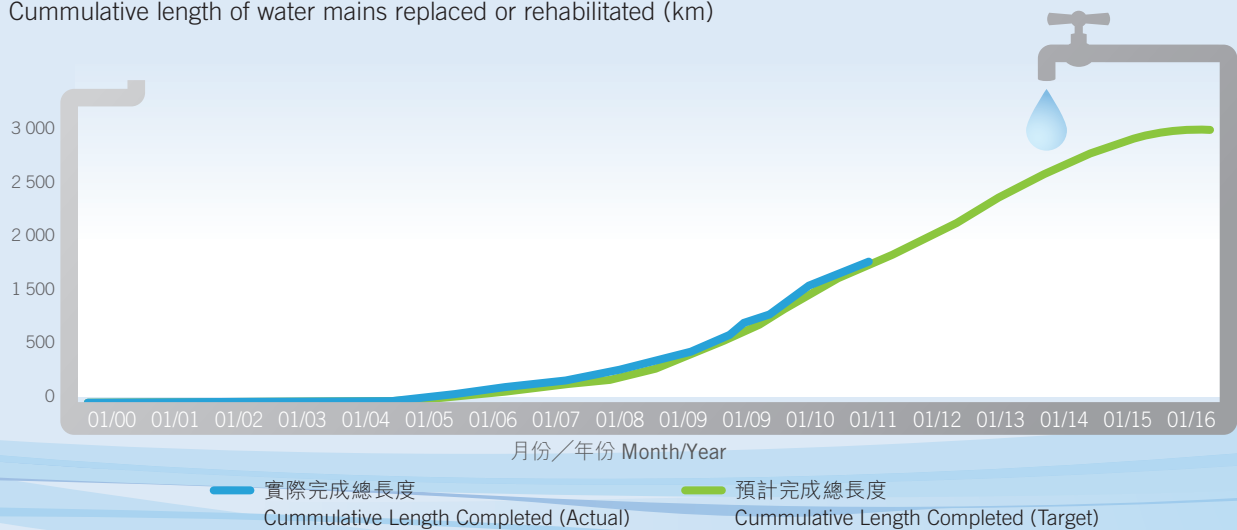
In early 2012, we rolled out an enhanced Slope Management System which aligns with the slope data and format adopted by the Civil Engineering and Development Department. The enhancement included the introduction of the “new Priority Ranking System”. This helps us to prioritise slope upgrading works more efficiently.

更換及修復水管計劃下的施工計劃及工程進度

Construction Programmes and Progress of Works under Replacement and Rehabilitation Project

已更換及修復的水管總長度 (公里)

Cummulative length of water mains replaced or rehabilitated (km)



借助資訊科技提升效率

資訊科技是有效運作、監管及決策的基石。我們將繼續維持及提升資訊科技基礎設施和軟件系統，同時研究新的資訊科技應用軟件及方案，以提高效率和服務水平。舉例而言，操作人員在處理緊急事故時，可使用便攜式流動通訊器材獲取水閥和水管資料，從而在現場迅速評估事態。

EFFICIENCY IMPROVEMENT THROUGH IT

Information technology is the corner stone in enabling efficient and effective operations, management controls and decision makings. We will continue to maintain and upgrade our IT infrastructure and application systems and explore new IT solutions to improve efficiency and services to the public. For example, operational staff can access information on water valves and water mains using hand held mobile devices, enabling rapid on-the-spot emergency assessments.



為優化供水網絡的抽水運作效能，並減少能源和電力成本，我們委聘英國艾克斯特大學的專家，與本署人員協作發展先進的「遺傳基因演算法」科技，供本署運作使用。我們又繼續研究以先進技術檢測運作中帶壓水管滲漏的情況，包括試用智能球在壓力管道中隨著流體自由滾動時進行測漏的技術。

危機管理

本署恆常地辨識和管理整個供水系統的潛在風險。處理危機及在不尋常事故出現時，維持無間斷供水的能力，乃本署持續的挑戰。我們擬備了危機管理方案和多個應變計劃，盡可能使我們在危機發生時，能夠快速調配資源和協調相應緊急行動。

二零一二年三月，為籌備政府的跨部門大亞灣應變計劃演習，我們進行模擬廣東核電站事故場外應急的內部演習。這演習在理論和實地層面上均取得理想成果，確定我們的危機管理方案能有效處理此類緊急事故。

水錶更換計劃

截至二零一二年七月，我們更換了約160萬個使用超過12年的直徑15毫米的水錶。是項加強工作始於二零零六年，旨在提升水錶的整體準確度。根據水務設施規例的規定，水錶的不準確度須在正負百分之三以內方可視作記錄準確。

To optimise the pumping of water within the water supply network and reduce energy and electricity cost, we have engaged specialists from the University of Exeter in the UK who with the participation of our staff, are working to develop an advanced genetic algorithm based technology for operational use by the Department. We have also continued our research into technology that can detect leakage in in-service pressurized water mains. This includes the trial use of free-swimming in-line leak detection technology.

CRISIS MANAGEMENT

The Department constantly identifies and manages risks across the entire supply system. Crisis management and the ability to maintain an uninterrupted water supply should any extraordinary event occur are ongoing challenges. A crisis management plan and various contingency plans are in place to maintain a state of preparedness for the rapid mobilisation of resources and the co-ordination of emergency actions.

In March 2012, in preparation for an inter-departmental exercise involving the Government's Daya Bay Contingency Plan, we carried out an internal drill which dealt with a hypothetical off-site incident at the Guangdong Nuclear Power Station. Both desktop and field exercises were successfully conducted to test the effectiveness of our crisis management plan in handling an emergency of this nature.

WATER METER REPLACEMENT PROGRAMME

Up to July 2012, some 1.6 million 15-mm water meters older than 12 years have been replaced. This work is part of a catch-up programme launched in 2006 to enhance the overall accuracy of water meters. Under the Waterworks regulations, a meter shall be deemed to register correctly if its inaccuracy does not exceed +/- 3%.