

LCQ14: Impact of damage to sewage treatment facilities and the resilience of the facilities against typhoons

Following is a question by the Hon Kenneth Leung and a written reply by the Secretary for the Environment, Mr Wong Kam-sing, in the Legislative Council today (November 7):

Question:

It has been reported that as some of its pipes and secondary treatment facilities were damaged during the time when super typhoon Mangkhut hit Hong Kong in September this year, the Sai Kung Sewage Treatment Works has since then been discharging into the sea effluent which was primary treated only. In this connection, will the Government inform this Council:

- (1) of the details (including timetable, progress and expenditure incurred) of the inspections and repair works carried out by the authorities in respect of the damaged facilities of the aforesaid plant;
- (2) whether it has assessed the impact on the quality of the water bodies in the areas in Sai Kung brought about by the plant's discharge of effluent which has not been fully treated; if so, of the outcome; given that the effluent treated by the plant will be discharged into the Port Shelter via a submarine outfall, of the current compliance rates of the water bodies there on the key marine Water Quality Objectives parameters (total inorganic nitrogen, unionized ammonia and E. coli, etc.);
- (3) whether it has assessed if the interim measures taken by the authorities during the period when the facilities concerned remained damaged can effectively alleviate the impact on the water quality brought about by the plant's discharge of effluent which has not been fully treated; and
- (4) whether it will comprehensively review the resilience of various sewage treatment facilities against strong wind and storm surges, and implement the necessary strengthening measures; if so, of the details; if not, the reasons for that?

Reply:

President,

Our reply to the question raised by the Hon Kenneth Leung is as follows:

- (1) After super typhoon Mangkhut hit Hong Kong in September this year, under

safe conditions, staff of the Drainage Services Department (DSD) immediately inspected the damage caused to various sewage treatment facilities on September 17 and found that over 50 metres of seawall and many treatment units of the Sai Kung Sewage Treatment Works (SKSTW) were severely damaged. These included the ultraviolet (UV) disinfection system, equipment for secondary sewage treatment such as air blowers, electrical installations and sludge pumps and some pipework. As a result, only primary treatment could be maintained at that time, with partially treated effluent discharged nearshore. The DSD immediately activated a contingency plan to remove some of the boulders and debris and pump out the seawater in order to assess the damage of the mechanical facilities and arrange emergency repair. To reduce the impact to the environment, the DSD has immediately implemented an additional procedure to disinfect the effluent that was treated to primary level. On September 24, the DSD completed the restoration of some major pipework and diverted the partially treated effluent back to the original submarine outfall for dispersed discharge at a location some 400 meters from SKSTW in Port Shelter. On October 12, the DSD installed some temporary facilities to further upgrade the treatment capability to chemically enhanced primary treatment (CEPT) (Note). Initial restoration works for the damaged seawall was completed on October 3 with the assistance of the Civil Engineering and Development Department (CEDD). At present, the DSD is expediting the installation temporary facilities such as power distribution units, blowers, auxiliary pipes, sludge pumps and UV disinfection systems, with a view to resuming secondary level sewage treatment by December. However, the full repair of all treatment facilities may take some more months.

The DSD's preliminary cost estimate of the above emergency repair and temporary facilities is about \$25 million. However, the full cost of all the repair and modification works is yet to be evaluated.

(2) and (3) In respect of the incident, the DSD and the Environmental Protection Department (EPD) commenced seawater sampling and testing near SKSTW and at three nearby beaches (i.e. Kiu Tsui Beach, Trio Beach, and Hap Mun Bay Beach) on September 21 for close monitoring of the water quality and started to release the results on the DSD's website on September 24. The monitoring results showed that there has been no obvious sign of deterioration of water quality near SKSTW, and the effect of the incident on the three beaches has also been minimal, with the E.coli level of water samples largely remained within the normal ranges of fluctuation. As regards the water quality of the Port Shelter Water Control Zone, the monitoring data up to October 2018 (including those obtained after the incident at SKSTW) shows that the levels of E. coli, dissolved oxygen, total inorganic nitrogen and non-ionised ammonia nitrogen have fully (100 per cent) met the Water Quality Objectives. Therefore, the EPD considers that the emergency measures adopted by the DSD have been effective in mitigating the potential impact to water quality due to the typhoon damage of SKSTW.

(4) In order to strengthen the resilience of the seawall against extreme waves, the CEDD has taken into account the impact of climate change in the design of seawall strengthening works in accordance with the latest

requirements of the Port Works Design Manual – Corrigendum No.1/2018 and adopted the most critical loading condition (i.e. 100 years extreme wave plus 10 years extreme water level). In addition, in order to counteract the long-term effect of climate change, the DSD commenced the "Climate Change Impact Study on Sewerage Facilities in Hong Kong" in 2015. The study will assess the impact of climate change on sewerage facilities in Hong Kong; and develop corresponding mitigation and adaptation measures for the planning, design, construction and maintenance of sewerage facilities and a framework plan for the continual monitoring and mitigation of climate change impact to Hong Kong's sewerage facilities. The study is expected to complete in 2019.

Note: About 75 per cent of the sewage in Hong Kong is currently treated by CEPT process.