Executive Summary
Direct Investigation Operation Report

Government's Work on Landslide Prevention and Mitigation and Management of Government Slopes

Introduction

The Hong Kong Special Administrative Region is characterised by its hilly terrain and scarcity of land, where over 60% of land area is covered by natural hillsides. Coupled with the high population density, buildings and public transport facilities are often constructed along hillsides, resulting in a vast number of man-made slopes in various sizes. Upon continuous heavy rain or extreme rainstorms, there may be landslide risks in both natural hillsides and man-made slopes, posing potential threats to people's daily activities, lives and property.

2. In 1977, the Government launched the Landslip Preventive Measures Programme, primarily targeting man-made slopes, to address landslide risks in Hong Kong. In 2010, the Landslip Prevention and Mitigation Programme ("the Programme") was launched under the lead of the Civil Engineering and Development Department ("CEDD") to dovetail with the Landslip Preventive Measures Programme upon its completion.

3. Under the Programme, CEDD, as the Government's technical adviser for regulation of slope safety, adopts a risk-based approach to identify suitable government and private man-made slopes for upgrading works and safety screening studies respectively. Should safety screening studies reveal significant distress or potential hazards on the private man-made slopes, CEDD will refer such cases to the Buildings Department for further action under the Buildings Ordinance. CEDD has also extended the scope of the Programme from man-made slopes to include natural hillside catchments.

4. Over the decades since the launch of these two programmes, CEDD has carried out various types of landslide prevention and mitigation works as well as safety screening studies on thousands of slopes. Currently, the overall landslide risk in Hong Kong is substantially lower than that prior to the launch of the Landslip Preventive Measures Programme in 1977. Although landslides still occur every year in Hong Kong, the annual average of around 214 incidents recorded over the past decade (2015 to 2024) is nearly one-third below the annual average of around 300 incidents recorded in the past. The continuous effort and achievement of CEDD in monitoring and regulating slope safety over the years is commendable.

5. In addition to the hard work of CEDD, the effective maintenance of slope safety and stability also relies on slope owners or responsible parties properly undertaking maintenance and repairs for man-made slopes under their management. In this direct

investigation operation, the Office not only examined CEDD's overall prevention and mitigation work, but also scrutinised the routine maintenance of government man-made slopes. For such purpose, four departments with maintenance responsibility for a large majority of government man-made slopes and the highest number of slopes involved in landslides are included in our investigation, namely the Lands Department ("LandsD"), the Highways Department ("HyD"), the Water Supplies Department ("WSD") and the Architectural Services Department ("ArchSD").

6. Overall, the Office considers that with CEDD's continuous efforts in implementing the Programme and regulating slope safety over the past few decades, the landslide risks of Hong Kong's slopes at present are substantially lower than in over ten years ago. In this regard, the Office highly commends CEDD's work. The Office is also pleased to note that during this investigation, CEDD has formulated a number of forward-looking measures to address extreme weather events and proactively support the current-term Government's ongoing efforts to strengthen the overall capacity in coping with extreme weather in four key areas, namely preparedness, early warning, emergency response and recovery. Nevertheless, as global climate change intensifies, slope safety in Hong Kong still faces new challenges and risks. CEDD should continually keep up with an innovative spirit and strive for excellence to safeguard the monitoring and regulation of slope safety in Hong Kong. As regards the various departments with maintenance responsibility for government man-made slopes, the Office considers them to have carried out slope maintenance and repairs in accordance with their respective purview and the technical guide issued by CEDD. Following landslide incidents, these departments have also closely followed up (including seeking advice from CEDD), and arranged emergency inspections and necessary repairs. Our comments regarding the work of the five departments under investigation are elaborated in several areas, including the Programme, safety management of natural hillside catchments and government man-made slopes, application of technologies and inter-departmental collaboration.

Our Findings and Comments

The Landslip Prevention and Mitigation Programme

7. In 2010, CEDD launched the Programme with the annual targets to identify 150 government man-made slopes for upgrading works and 100 private man-made slopes for safety screening studies according to a risk-based approach. It also identifies 30 natural hillside catchments annually for risk mitigation works based on the "react to known hazard" principle. As of December 2024, CEDD was able to meet the pre-set annual targets of completed works and safety screening studies.

8. CEDD explained that the above annual targets were set for the purpose of controlling landslide risks, while giving due consideration to multiple factors including the inconvenience to the public caused by the works, as well as the situation and manpower within the geotechnical engineering sector.

9. CEDD added that it would periodically review its risk-based criteria for identification and inclusion of slopes in the Programme. After completing a systematic investigation and study of a series of landslides triggered by extreme rainstorms in September 2023, it has proposed several adjustments to the Programme: (1) selecting three sites under similar geological conditions to Yiu Hing Road, Shau Kei Wan, where a landslide occurred in September 2023, for inclusion in the Programme; (2) prioritising the man-made slopes adjacent to the sole vehicular access with greater impact on people's livelihood under the risk-based approach; and (3) progressively increasing the annual targets for upgrading and risk mitigation works and safety screening studies.

10. The Office notes that the Programme has been operating effectively as the Government's integral and long-term measure in response to landslide risks arising from climate change, particularly extreme weather events. It is positive and commendable for CEDD to conduct timely review and adjust the Programme's operational directions to ensure its validity and keep pace with changing circumstances. Given that the Programme has been launched for quite a long time and extreme weather events have become increasingly frequent and unpredictable in recent years, we recommend that CEDD, while reviewing and adjusting the Programme's directions in response to individual major incidents, also conduct periodic comprehensive reviews of the Programme (Note: CEDD had reported the results of periodic reviews of the Programme to the Legislative Council in 2015 and 2021). We believe that a comprehensive review can facilitate the formulation of forward-looking operational directions, which will not only greatly benefit CEDD's landslide prevention and mitigation work but also further enhance the entire Programme's sustainability. We recommend that CEDD continue to conduct periodic comprehensive reviews of the Programme depending on actual circumstances, such as the latest climate conditions and the trend of landslides in Hong Kong.

11. We understand that it takes time for CEDD to implement the proposed adjustments to the Programme in **paragraph 9** due to the significant extent of alteration and involvement of long-term planning including resource allocation and risk assessment of slopes. Consequently, CEDD should consider mapping out a schedule for phased implementation of all the adjustments according to priority and feasibility, and closely monitor whether the adjustments are implemented as scheduled. Meanwhile, we also recommend that CEDD review from time to time whether the adjustments can achieve the intended objectives and outcomes in line with the changing environment.

12. One of the adjustments proposed by CEDD to the Programme is the inclusion of three sites under similar geological conditions to Yiu Hing Road, Shau Kei Wan, where a landslide occurred in September 2023. While acknowledging this adjustment proposed by CEDD, we note that the Yiu Hing Road incident was the largest rockfall on record in Hong Kong. Moreover, the natural hillside concerned was situated along a major traffic corridor used by residents, and thus had a relatively severe impact on the community and livelihood. Considering the severity of possible incidents and the potential impact on the community and livelihood, we recommend that CEDD actively

explore the feasibility of expediting risk mitigation works for the three sites already included in the Programme with similar geological conditions to Yiu Hing Road.

13. Secondly, we are pleased to note that CEDD will also progressively increase the annual target of upgrading works from 150 to 200 government man-made slopes. Currently, upgrading works under the Programme are led by CEDD, with works design undertaken by consultants and construction carried out by contractors. Prior to the commencement of works, CEDD will apply to LandsD for temporary land allocation to take over the relevant slopes. Upon review of a landslide occurred in September 2023 on a government man-made slope in Sha Tin, we note that CEDD had already included the slope in the Programme for study and design of upgrading works prior to the incident. However, CEDD expected to commence works only in the first quarter of 2026. In other words, there was a gap of at least two years between the inclusion of the slope in the Programme and the commencement of upgrading works. The Office is not inclined to comment on the study and works design after the inclusion of slopes in the Programme which involves professional judgement in the geotechnical field.

14. However, our review of landslides revealed that repeated incidents took place in some government man-made slopes within three years. Hence, even if the government department with maintenance responsibility has carried out emergency works after the first incident, this does not necessarily entail full mitigation of the potential landslide risks. In this light, we recommend that CEDD examine the feasibility of further streamlining or even reducing the administrative procedures after the inclusion of government man-made slopes in the Programme, thereby further expediting its implementation.

15. Taking a step further, to align with its gradual increase of the annual target of upgrading works for government man-made slopes, we recommend that CEDD explore any room for collaboration with maintenance departments to carry out upgrading works under the Programme. For example, CEDD can undertake the works design, while the relevant maintenance department can carry out the works. This is because each government man-made slope has a designated department responsible for its routine maintenance, and all such departments should be familiar with the structure and condition of the slopes under their purview. This arrangement should help streamline procedures by, for example, obviating the need for CEDD to apply for temporary land allocation and enhance the cost-effectiveness of resource utilisation.

16. In addition to the proposed adjustments to the Programme, we note that CEDD is also actively developing the Smart Slope Catalogue[1] to enhance the effectiveness of slope safety management. We understand that it may be difficult to pursue the Smart Slope Catalogue in one go as its development and rollout involve substantial research, data collation and administrative work. As such, we recommend that CEDD consider a phased rollout, followed by examinations and necessary revisions based on experience

[1] Actively developed by CEDD and targeted for rollout within 2026, the Smart Slope Catalogue will expand the existing slope database to include records of landslide prevention and mitigation works, historical rainfall data, landslide records and relevant complaint records.

obtained from each phase. CEDD may also systematically sum up and consolidate experience in each phase to ensure complete rollout of the Catalogue within 2026. In the long run, CEDD should enhance the management of landslide prevention and mitigation works and slope maintenance audits as well as the planning of post-landslide responses through the gradual increase of slope monitoring and management data (such as the maintenance records from the Centralised Slope Maintenance Database[2] to be launched later), coupled with artificial intelligence and big data analytics. Meanwhile, CEDD should continue to apply new technologies with the data applications of the Smart Slope Catalogue to optimise slope maintenance and the landslip warning system.

17. The Programme was launched to reduce the overall landslide risk in Hong Kong. However, as and when there is continuous heavy rain or extreme rainstorms, the threat of landslides to the local community inevitably increases. Therefore, while implementing the Programme, CEDD should enhance public awareness of slope safety and understanding of Hong Kong's landslide risks through publicity and education to maximise the effectiveness of its work. In this regard, we note that CEDD has disseminated information on slope safety and maintenance through television, radio, social media and seminars. It has also established the Community Advisory Unit to assist private owners in fulfilling their slope maintenance responsibility. Given the inconvenience inevitably brought by landslide prevention and mitigation works, CEDD should enlist the understanding and support of affected residents by highlighting the importance of such works for public safety through publicity and education.

Safety Management of Government Man-made Slopes

18. Based on ownership and maintenance responsibility, man-made slopes can be categorised into government or private slopes. Regardless of ownership, the departments with maintenance responsibility for government slopes and owners of private slopes are obliged to carry out regular inspection and maintenance in accordance with CEDD's Guide to Slope Maintenance. Data from CEDD shows that between 2015 and 2024, there were 882 landslides involving government slopes and 117 involving private slopes in Hong Kong, which represents a noticeable difference.

19. Undeniably, there are far more government man-made slopes than private slopes[3], so the higher number of incidents involving government man-made slopes is understandable. However, discounting the actual difference in the number of incidents involving the two kinds of slopes, we notice that the failure rate of government man-

[2] The Centralised Slope Maintenance Database to be launched by CEDD soon is an electronic platform enabling maintenance departments to upload slope maintenance records for centralised storage. Database analytics will be performed to select government man-made slopes for site inspections.

[3] As at December 2024, there were 38,656 government man-made slopes across the territory, more than double the number (15,878) of private man-made slopes.

made slopes[4] was still higher than that of private man-made slopes[5] by one to three times between 2020 and 2024. We also note that the consequence-to-life category[6] of most government man-made slopes with landslides over the past five years was the lower category 2 or 3. Furthermore, the failure rates of both government and private man-made slopes remained at a very low level of less than 1% each year. Nevertheless, we consider that the relatively higher failure rate of government man-made slopes still warrants the Government's continuous attention.

20. Admittedly, our review of landslide cases involving government man-made slopes did not reveal any inadequacies on the part of the departments in slope maintenance and repairs. During site inspections, we also found no irregularities in the inspections carried out by the departments' consultants and contractors. However, in response to our request for information, LandsD was unable to locate the routine maintenance inspection records from the two years preceding the landslide occurred in 2016 on Wing Lung Road, Hang Hau, Sai Kung. To ensure proper retention of information, LandsD started planning in 2014 to fully digitise the slope maintenance records of the department for centralised storage in an online register. In September 2016, it launched the Slope Maintenance Information System, which has been in use since then. Separately, LandsD indicated that it will align with and use the Centralised Slope Maintenance Database to be launched by CEDD later, such as regularly uploading slope maintenance records or interfacing with its existing information systems to share maintenance records. We consider that proper compilation and retention of slope maintenance records are essential for departments to monitor slope safety and carry out landslide prevention and mitigation work. Therefore, we recommend that all maintenance departments (including LandsD, HyD, WSD and ArchSD) make effective use of CEDD's Centralised Slope Maintenance Database to be launched later by regularly uploading slope maintenance records for CEDD's data analytics and ensuring the proper retention of information. The departments concerned should also regularly remind consultants, contractors and departmental staff of the importance of recording and maintaining slope maintenance data in accordance with established guidelines.

21. On another front, we recommend that CEDD continue to take note of the difference in the failure rates between government and private man-made slopes, examine the underlying cause and formulate proper counter-measures where necessary. If any areas for improvement are revealed in slope maintenance undertaken by maintenance departments, CEDD should continue to issue technical guidelines for their compliance. Taking a step further, CEDD should continue to monitor the number of landslides involving government man-made slopes and conduct timely reviews when any unusual upward trend is detected to ensure the precision and effectiveness of the Government's landslide prevention and mitigation work.

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[4] (Number of government man-made slopes with landslides / Total number of government man-made slopes) × 100%

[5] (Number of private man-made slopes with landslides / Total number of private man-made slopes) × 100%

[6] The consequence-to-life category reflects the potential severity of casualties in the event of slope failure. It is classified into three levels from highest to lowest: category 1, category 2 and category 3.

22. In addition, we have the following two key observations upon review of a number of landslides involving government man-made slopes.

23. Firstly, we note that among the government man-made slopes with repeated landslides of a more serious nature since 2014, a vast majority of them had not been included in the Programme. Some of them recorded repeated landslides within three years since the first incident, and one of them even recorded four landslides at different parts of the slope within five years since 2016. Although the consequence-to-life category of all these slopes was not the highest category 1, and some of the incidents were not large-scale, the recurrence of incidents inevitably raises concerns about the potential risks and structural safety of these slopes.

24. We recommend that CEDD review any room to optimise the current selection criteria for inclusion of government man-made slopes in the Programme to undertake upgrading works, such as according more flexibility in prioritising slopes with repeated landslides under the Programme based on actual circumstances. If CEDD concludes after review that no changes or additions to the selection criteria are necessary, it may continue to assess whether the emergency maintenance works on these government slopes with repeated landslides should be further enhanced to prevent recurrence more effectively.

25. Secondly, we have selected several serious landslides that occurred on government slopes in consequence-to-life category 1 or 2 for scrutiny. We note that CEDD included many of these slopes in the Programme immediately after the incidents. We reckon that it is justifiable to prioritise these slopes for landslide prevention and mitigation work as they have higher consequence-to-life categories, representing greater risks to lives and property when landslides occur.

26. However, to strengthen the effectiveness of landslide prevention and mitigation work, we recommend that CEDD continue with its systematic review on the key factors for including these government slopes in the Programme. It should draw on these factors as a reference to promptly identify other government man-made slopes with similar characteristics for inclusion in the Programme before incidents occur, thereby further enhancing the Programme's prevention and mitigation capacity.

Safety Management of Natural Hillside Catchments

27. Over 60% of Hong Kong's land area is covered by natural hillside catchments. Natural hillside catchments refer to slopes without artificial alteration in structure. These hillsides in general do not require regular inspection or maintenance, and hence the Government has not assigned any maintenance departments for them. Prevention and mitigation work for natural hillside catchments relies primarily on CEDD's "react to known hazard" principle, whereby those with higher potential risks are identified for inclusion in the Programme to carry out risk mitigation works (mainly flexible barriers and rigid barriers).

28. Between 2015 and 2024, there were 507 landslide incidents involving natural hillside catchments, accounting for 23.7% of all incidents during the same period, at a rate just lower than that involving government man-made slopes. These figures reflect the potential risks posed by natural hillsides and should not be taken lightly. Therefore, we recommend that CEDD continue to closely monitor the number of landslides involving natural hillside catchments and examine the reasons promptly should there be any unusual rising trend observed, thereby addressing the problem early.

29. After reviewing nine serious landslides that occurred since 2008 (including the incident on Yiu Hing Road, Shau Kei Wan in September 2023), we found that most of them involved natural hillside catchments. A majority of them had not been included in the Programme before the incidents, or even if they had been so included in the Programme, they were accorded a relatively low priority such that the actual study and design of works had yet to commence by a consultancy contract before the incidents. Given that the Government mainly relies on the Programme to control landslide risks associated with natural hillside catchments, we recommend that CEDD continue to regularly review any room to optimise the criteria for identifying natural hillside catchments for inclusion in the Programme, so that those with potential risks can be identified by it earlier. In conducting this review, CEDD should continue to consult the Slope Safety Technical Review Board and explore collaboration with academic institutions to conduct relevant researches.

30. Additionally, we note that in response to findings from a recently completed systematic landslide investigation and study, CEDD has identified territory-wide three sites under similar geological conditions and hydrological environment to Yiu Hing Road, Shau Kei Wan. Natural hillside catchments at these sites, which pose potential risks to existing buildings and traffic corridors, are included in the Programme. In this regard, we recommend that if specific geological conditions and hydrological environment contribute to occurrence of landslides on natural hillsides again, CEDD should likewise seriously review whether there are other similar natural hillside catchments that require prioritisation, and promptly identify and include them in the Programme for detailed assessment and design of appropriate risk mitigation works.

Application of Technologies

31. Given the vast number of slopes, CEDD should, in addition to long-term planning and a sustainable programme to address the increasing landslide risks brought about by climate change, adopt innovative technologies proactively and extensively to strengthen slope risk control and enhance the effectiveness of its landslide prevention and mitigation work.

32. We are pleased to note that over the years, CEDD has applied innovative technologies for monitoring and regulating slope safety in various aspects, and has collaborated with several tertiary institutions to initiate related research projects. CEDD is also actively developing the Smart Slope Catalogue, and plans to expand the existing Catalogue of Slopes to include natural hillside catchments. In addition, CEDD

is exploring the use of automated drones for works management, slope monitoring and contingency response through the two pilot projects on Low-altitude Economy Regulatory Sandbox under the Transport and Logistics Bureau.

33. We consider that CEDD deserves recognition in keeping abreast of the times in the application of innovative technologies, thereby achieving continuous progress in the territory's landslide prevention and mitigation work. We recommend that CEDD continue to closely monitor technological developments related to slope safety, and explore the feasibility of collaborating with local universities and relevant academic or research institutions to initiate research projects concerning the monitoring of slope safety, thereby further integrating technologies into slope safety work. Regarding its plan to expand the coverage of the Catalogue of Slopes to include natural hillside catchments, we recommend that CEDD study how the expanded catalogue can support the further development of the Programme and slope safety monitoring.

Inter-departmental Collaboration

34. Our review of the four selected maintenance departments revealed that they have complied with the Guide to Slope Maintenance to schedule inspections based on the consequence-to-life category of each slope; they have also consulted CEDD on post-landslide response actions. In addition to the routine management of government slopes, CEDD has set up an inter-departmental platform and organises meetings regularly to facilitate collaboration in monitoring and ensuring slope safety.

35. Since the inspection and maintenance of government man-made slopes and post-landslide response actions involve geotechnical expertise, CEDD has seconded professional staff to each of the four maintenance departments to provide technical support. CEDD also deploys staff to conduct site inspections and provide suggestions for contingency response after landslides. The four departments themselves have assigned professional staff to oversee maintenance of their slopes. We note that the ratio of professional staff (i.e., the average number of slopes managed per professional officer) varies considerably from department to department. We recommend that each maintenance department review its current professional staff complement and determine whether there is any need for adjustment or redeployment. Where necessary, the departments may seek professional advice from CEDD to ensure adequate staffing for operational needs.

36. CEDD also conducts slope maintenance audits to assess whether departments have properly maintained and repaired their slopes. We are pleased to note that in the audit cycle ended in late 2023, CEDD did not discover any non-conforming practices among the maintenance departments. Nonetheless, we note that the existing audits mainly focus on slope maintenance and inspection. Given that a significant number of landslides involving government man-made slopes still occur each year, we recommend that CEDD explore expanding the scope of audit to include post-incident investigation and response, in order to review the performance of departments from multiple perspectives and identify possible areas for improvement. This would help the

authorities to learn from experience and nip the landslide risks in the bud as far as possible. At the same time, CEDD can refine its audit work through the insights gained from examining the follow-up actions taken by different departments after landslide incidents.

37. We consider that the existing collaboration mechanism among relevant departments is effective for properly discharging their maintenance responsibility for government man-made slopes. However, given the ever-changing climate conditions, all departments should continue deepening their collaboration to create synergy in enhancing slope safety and reducing landslide risks. On this basis, all relevant departments may make use of the Centralised Slope Maintenance Database being developed by CEDD and the Smart Slope Catalogue for data analytics, in order to monitor the latest situations of slope maintenance, share common maintenance issues, and assess the impact of heavy rainfall on slopes. This should facilitate their planning of routine maintenance inspections and special inspections after adverse weather events, leading to higher efficiency.

38. Furthermore, CEDD should continue to encourage its professional staff seconded to various departments to maintain close communication and exchange insights gained from managing government man-made slopes. Their observations and experiences can help review whether slope management practices and procedures are consistent across departments. These officers can also serve as a bridge between CEDD and the frontline staff responsible for slope management within their seconded departments to foster the exchange of views and sharing of experience.

Recommendations

39. In the light of the above, the Ombudsman makes recommendations in five key areas: the Programme, safety management of government man-made slopes, safety management of natural hillside catchments, application of technologies and inter-departmental collaboration. Details are as follows:

Regarding the Landslip Prevention and Mitigation Programme

(1) While the Programme has been operating effectively, given the increasing occurrence of extreme weather events in Hong Kong, CEDD, while reviewing and adjusting the Programme's directions in response to individual major landslides, should continue to conduct periodic comprehensive reviews of the Programme to further enhance its overall sustainability;

(2) CEDD should map out a schedule for phased implementation of the proposed adjustments to the Programme based on the outcomes of its systematic landslide investigation and study;

(3) Following recommendation (2), CEDD should implement the adjustments by phases according to priority and feasibility, and closely monitor whether all the adjustments are implemented as scheduled;

(4) Following recommendation (2), CEDD should review from time to time whether the adjustments proposed for the Programme can achieve the intended objectives and outcomes in line with the changing environment;

(5) CEDD should actively explore the feasibility of expediting risk mitigation works for the three sites already included in the Programme with similar geological conditions as Yiu Hing Road, Shau Kei Wan;

(6) CEDD may examine the feasibility of further streamlining or even reducing the administrative procedures after the inclusion of government man-made slopes in the Programme, thereby further expediting its implementation;

(7) CEDD may explore any room for collaboration with maintenance departments to carry out upgrading works under the Programme, thereby enhancing the cost-effectiveness of resource utilisation;

(8) CEDD may consider a phased rollout of the Smart Slope Catalogue, followed by examinations and necessary revisions based on experience obtained from each phase for complete rollout;

(9) Following recommendation (8), CEDD may systematically sum up and consolidate experience in each phase to ensure complete rollout of the Smart Slope Catalogue within 2026;

(10) In the long run, CEDD should continue to enhance the management of landslide prevention and mitigation works and slope maintenance audits as well as the planning of post-landslide responses through the gradual increase of slope monitoring and management data, coupled with artificial intelligence and big data analytics;

(11) Following recommendation (10), CEDD should continue to apply new technologies with the data applications of the Smart Slope Catalogue to optimise slope maintenance and the landslip warning system;

(12) CEDD should continue to strengthen publicity and education to enhance public awareness of slope safety and understanding of Hong Kong's landslide risks, and to enlist the understanding and support of affected residents by highlighting the importance of landslide prevention and mitigation works for public safety, thereby maximising its effectiveness;

Safety Management of Government Man-made Slopes

(13) Relevant maintenance departments (including LandsD, HyD, WSD and ArchSD) should regularly upload slope maintenance records to the Centralised Slope Maintenance Database to be launched by CEDD later for CEDD's data analytics and ensuring the proper retention of information;

(14) Relevant maintenance departments (including LandsD, HyD, WSD and ArchSD) should regularly remind consultants, contractors and departmental staff of the importance of recording and maintaining slope maintenance data in accordance with established guidelines;

(15) CEDD should continue to take note of any considerable difference in the failure rates between government and private man-made slopes, examine the underlying cause and formulate proper counter-measures where necessary;

(16) Following recommendation (15), if its examination reveals any areas for improvement in the maintenance of government man-made slopes on the part of the maintenance departments, CEDD should continue to issue technical guidelines for their compliance;

(17) CEDD should continue to monitor the number of landslides involving government man-made slopes, conduct timely reviews when any unusual upward trend is detected to ensure the precision and effectiveness of the Government's landslide prevention and mitigation work;

(18) CEDD should continue with its regular review for any room to optimise the current selection criteria for inclusion of government man-made slopes in the Programme for upgrading works (for example, according more flexibility in prioritising slopes with repeated landslides under the Programme based on actual circumstances);

(19) Following recommendation (18), if CEDD concludes after review that no changes or additions to the selection criteria are necessary, it may continue to assess whether the emergency maintenance works on these government slopes with repeated landslides should be further enhanced to prevent recurrence more effectively;

(20) In respect of the several cases examined by the Office of government man-made slopes in consequence-to-life category 1 or 2 which were included in the Programme after serious landslides, CEDD should continue with its systematic review on the key factors for their inclusion in the Programme, and draw on these factors as a reference to promptly identify other government slopes with similar characteristics for inclusion in the

Programme, thereby further enhancing the Programme's prevention and mitigation capacity;

Safety Management of Natural Hillside Catchments

(21) CEDD should continue to closely monitor the number of landslides involving natural hillsides catchments and examine the reasons promptly should there be any unusual rising trend observed;

(22) CEDD should continue to review regularly any room to optimise the criteria for identifying natural hillside catchments for inclusion in the Programme, so that those with potential risks can be identified earlier;

(23) Following recommendation (22), in conducting reviews, CEDD should continue to consult the Slope Safety Technical Review Board and explore collaboration with academic institutions for research;

(24) If specific geological conditions and hydrological environment contribute to occurrence of landslides on natural hillsides again, CEDD should likewise seriously review whether there are other similar natural hillside catchments that require prioritisation;

(25) Following recommendation (24), if natural hillside catchments requiring prioritisation are revealed, CEDD should promptly identify and include them in the Programme for detailed assessment and design of appropriate risk mitigation works;

Application of Technologies

(26) CEDD should continue to closely monitor technological developments related to slope safety, and explore the feasibility of collaborating with local universities and relevant academic or research institutions to initiate research projects concerning the monitoring of slope safety, thereby further integrating technologies into slope safety;

(27) Regarding its plan to expand the coverage of the Catalogue of Slopes to include natural hillside catchments, CEDD should study how the expanded catalogue can support the further development of the Programme and slope safety monitoring;

Inter-departmental Collaboration

(28) Each maintenance department (including LandsD, HyD, WSD and ArchSD) should review its current professional staff complement and determine whether there is any need for adjustment or redeployment. Where necessary, the departments may seek professional advice from

CEDD to ensure adequate staffing for operational needs;

(29) CEDD should explore expanding the scope of slope maintenance audits to include post-incident investigation and response actions involving government man-made slopes, with a view to reviewing the performance of maintenance departments from multiple perspectives and identifying possible areas for improvement, thereby learning from experience and nipping the landslide risks in the bud;

(30) Given the ever-changing climate conditions, all relevant departments (including CEDD, LandsD, HyD, WSD and ArchSD) should continue to deepen their collaboration to create synergy in enhancing slope safety and reducing landslide risks;

(31) All relevant departments (including LandsD, HyD, WSD and ArchSD) may make use of the Centralised Slope Maintenance Database being developed by CEDD and the Smart Slope Catalogue for data analytics, so as to monitor the latest situations of slope maintenance, share common maintenance issues, and assess the impact of heavy rainfall on slopes. This should facilitate their planning of routine maintenance inspections and special inspections after adverse weather events, leading to higher efficiency; and

(32) CEDD should continue to encourage its professional staff seconded to various departments to maintain close communication and exchange insights gained from managing government man-made slopes. Their observations and experiences can help review whether slope management practices and procedures are consistent across departments. These officers can also serve as a bridge between CEDD and the frontline staff responsible for slope management within their seconded departments to foster the exchange of views and sharing of experience.

Office of The Ombudsman
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