



Water Supplies Department

The Government of the Hong Kong Special Administrative Region

Agreement No. CE 37/2010 (WS)
Development of Catchwater System Management Plan
- Prioritisation of Catchwater Systems
- Feasibility Study

Draft BRIEF
(7 April 2011)

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DRAFT BRIEF

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1. Introduction

This Brief is to be read in conjunction with the Memorandum of Agreement, the General Conditions of Employment of Engineering and Associated Consultants for a Feasibility Assignment (1997 Edition) [hereinafter referred to as the General Conditions of Employment], the Special Conditions of Employment and the Schedule of Fees.

2. Description of the Project

- 2.1 There are 45 catchwater systems with a total length of about 120 km maintained by the Water Supplies Department (WSD). About 57 km of these catchwaters were constructed pre-war. They are usually situated on steep natural terrain with numerous cuttings up-slope together with embankments of fill down-slope. There are about 2,200 registered man-made slopes adjoining the catchwaters.
- 2.2 A catchwater is usually designed for a rainfall intensity of 20 to 25 mm/hr. Overflows, mostly in the form of weirs are provided along catchwaters to discharge the water collected in the local catchment which is in excess of the carrying capacities of the catchwaters. The excess water is normally discharged to the natural stream course downhill of the weir and then eventually to the sea via, in many cases, engineered stormwater drains.
- 2.3 In the past, catchwater-related incidents were largely caused by failures of the slopes (both natural and man-made) uphill of the catchwaters causing blockage to the catchwater flows. They were also caused by breach of catchwater, overbank flow and erosion of the natural stream courses conveying the overflow water. Catchwater-related hazards include flooding of the downstream area, triggering channelised debris flows or debris flood along stream courses and slope failures on natural terrain and man-made slopes.

- 2.4 Recognising the increasing significance of the hazards related to catchwaters due to progressive developments in the vicinity of catchwaters, a number of studies and improvement works had been carried out by various Government departments in as early as 1980 to address the potential hazards of catchwaters and related issues. They include :
- (a) Flood studies for Tai Lam Chung Catchwaters, Tai Tam group of catchwaters, Beacon Hill Catchwater, Aberdeen group of catchwaters and Shek Pik Catchwaters by WSD;
 - (b) Reconstruction of catchwater channels in Tai Lam Chung, Hong Kong Island and Lantau Island by WSD;
 - (c) Modelling the Tai Lam Chung Catchwaters for three target weirs by WSD;
 - (d) Condition survey on Shing Mun Catchwaters and associated slopes by WSD;
 - (e) The following stormwater drainage master plan studies by the Drainage Services Department (DSD) :-
 - (i) Stormwater drainage master plan study in Tsuen Wan, Kwai Chung and Tsing Yi;
 - (ii) Stormwater drainage master plan study in Tuen Mun and Sham Tseng;
 - (iii) Stormwater drainage master plan study in Sha Tin and Tai Po;
 - (iv) Stormwater drainage master plan study in Sai Kung, East Kowloon and Southern Lantau; and
 - (v) Stormwater drainage master plan study in Southern HK Island;
 - (f) Study on surface water overflow hazards including catchwaters by the Civil Engineering and Development Department (CEDD) in 2005;
 - (g) Natural terrain landslide risk studies by CEDD;
 - (h) Review report on catchwater by CEDD/DSD/WSD in 2006 (the Review Report);

- (i) Feasibility study on improvement of Shing Mun, Beacon Hill, Golden Hill and Tai Lam Chung Catchwater Systems (Sections L, M, N and O) by WSD in 2007 (the Feasibility Study) (The relevant documents prepared under the Feasibility Study are listed in Clause 14.1 of this Brief);
- (j) Upgrading works of about 110 catchwater-related slopes under CEDD's Landslip Preventive Measures Programme and WSD's Enhanced Maintenance Programme; and
- (k) Engineers Inspection for Maintenance for WSD's Slopes carried out by WSD.

2.5 Despite the considerable efforts put in to mitigate the catchwater-related hazards in the past, incidents still occurred from time to time causing damage and inconvenience to the public. The Review Report mentioned in Clause 2.4(h) of this Brief therefore recommended WSD to adopt a more effective and holistic approach, the "system approach", to treat the catchwater channel and the associated operation facilities of a catchwater, the adjoining natural and man-made slopes, the overflow stream courses and where applicable, the engineered stormwater drains below the catchwater as a system (catchwater system) in defining the problem and tackling the catchwater-related hazards.

2.6 Adopting the system approach, the consultants of the Feasibility Study (the FS Consultants) mentioned in Clause 2.4(i) of this Brief :

- (a) developed a Catchwater System Management Strategy and a methodology for preparation of a Catchwater System Management Plan for the management, operation and maintenance of all the catchwater systems in Hong Kong; and
- (b) conducted a pilot study to identify the improvement works and mitigation measures for alleviating the hazards arising from the operation of 4 selected catchwater systems, namely Shing Mun, Beacon Hill, Golden Hill and Tai Lam Chung (Sections L, M, N and O) Catchwater Systems.

- 2.7 The overall methodology for the preparation of the Catchwater System Management Plan recommended by the FS Consultants consists of (i) the prioritisation of the catchwater systems in order of urgency and need for improvements, and (ii) the investigation and design of the most favourable or the optimum combination of intervention measures to mitigate the risks related to catchwater systems or sub-systems to a level that is as low as practically achievable.
- 2.8 The methodology recommended by the FS Consultants for prioritising the catchwater systems comprises 2 stages, viz. Stage I and Stage II. Stage I is the initial screening of the catchwater systems, in which WSD catchwater systems would be classified into 2 groups, namely Group A and Group B according to the consequence of failure of the catchwater systems to the facilities located immediate downhill of the catchwater channel. Group A represents high priority and Group B represents low priority. The FS Consultants had completed this stage for all the 45 catchwater systems. Stage II is to determine the priority ranking of Group A catchwater systems using a Numerical Rating System. The Numerical Rating System is a direct and simplified method developed by the FS Consultants to compute the ranking scores of the catchwater systems basing on the readily available and selective data of the catchwater systems, including past landslide/failure incident records, existing conditions of the catchwater systems and various facilities likely to be affected. The FS Consultants had calculated the ranking scores for the 4 selected Group A catchwater systems mentioned in Clause 2.6(b) of this Brief. Details of the Numerical Rating System are given in the Final Report for Development of a Catchwater System Management Plan (DCSMP) prepared under the Feasibility Study mentioned in Clause 2.4(i) of this Brief. As WSD is desirous to look into the risks associated with the Group B catchwater systems, this Assignment therefore includes the prioritisation of the remaining Group A catchwater systems and Group B catchwater systems using the Numerical Rating System (See **Appendix 2**).
- 2.9 WSD had established the WSD Digital Mapping System (DMS) in 1998 using Geographic Information System (GIS) platform to store the asset information of the underground assets and some of the surface assets including water treatment works, impounding reservoirs, service reservoirs and pumping stations but excluding the catchwater systems. To support the preparation of a Catchwater System Management Plan, WSD considers it imperative to establish the catchwater register/databases and store the corresponding asset information in geographical format in the DMS.

- 2.10 The locations and detailed list of all catchwaters are shown in **Appendices 1 and 2** respectively.

3. Objectives of the Assignment

The objectives of this Assignment are as follows :

- (a) Prioritisation of the remaining 41 out of the 45 catchwater systems in accordance with the methodology recommended in the Feasibility Study;
- (b) Establishment of the asset register/databases for the 45 catchwater systems; and
- (c) Post implementation review of the methodology for prioritisation of the catchwater systems recommended in the Feasibility Study and overall scale of the catchwater-related problems of the remaining 41 catchwater systems based on the findings of this Assignment.

4. Description of the Assignment

4.1 This Assignment shall comprise the following tasks :-

- (a) Study the findings, conclusions and recommendations of the previous studies related to catchwater systems mentioned in Clause 2.4 of this Brief;
- (b) Assess the general constraints, limitations, performance and inadequacies of the remaining 41 out of the 45 catchwater systems;
- (c) Study the methodology for prioritisation of catchwater systems developed by the FS Consultants for the production of the Catchwater System Management Plan;
- (d) Collect information available for and/or related to the remaining 41 catchwaters systems including the Non-Development Clearance (NDC) squatters / structures and input relevant information into the asset register/databases for the catchwater systems mentioned in Clause 6.3 of this Brief;

- (e) Carry out desk studies, site inspections, investigations, etc., to assess the detailed condition, performance and both direct and indirect failure consequences of the elements of the remaining 41 catchwater systems;
- (f) Study the existing records, information and historical failure records of the elements of the remaining 41 catchwater systems, analyse the scale of the problems, frequency of occurrence and consequence of the failures;
- (g) Prioritise the remaining 41 catchwater systems according to the methodology developed by the FS Consultants and identify vulnerable areas of the catchwater systems including associated registered man-made slopes, natural terrain and stream courses;
- (h) Review and improve/enhance the framework and information system requirements recommended by the FS Consultants in DCSMP and establish an asset register/databases for the 45 catchwater systems;
- (i) Conduct the post implementation review and recommend improvement to the methodology for prioritisation of catchwater systems developed by the FS Consultants based on the findings of this Assignment; and
- (j) Review the overall scale of catchwater-related problems of the remaining 41 catchwater systems based on the results of the “Report on Improvement Strategy of the Pilot and Feasibility Study” prepared under the Feasibility Study mentioned in Clause 2.4(i) of this Brief, any available existing data and the findings of this Assignment.

5. Deliverables

- 5.1 The Consultants shall produce and submit deliverables as specified in this Clause. All delivered reports shall first be submitted to the WSD in a draft form for comment and shall then be amended to incorporate comments to produce the final reports. The deliverables shall be adequately supported with working papers and shall clearly set out any assumptions used. Unless otherwise stated in this Clause, the Consultants shall produce all the submissions in English, together with 8 hard copies on A4 size paper and one soft copy in Microsoft Word 2000 format or any other format as approved by the Director’s Representative, with colour illustrations and insets where appropriate, as follows :-

- (a) Programme of Implementation of the Assignment (8 copies) in accordance with Clause 8 of this Brief. (To be submitted within 2 weeks from the commencement of the Agreement.)
- (b) Progress Reports (8 copies) in accordance with Clause 9 of this Brief. (To be submitted within 3 working days before progress meeting or within the first 5 working days of the month for which no progress meeting will be held.)
- (c) Financial Reports (8 copies) in accordance with Clause 10 of this Brief. (To be submitted together with the Progress Reports.)
- (d) Records of meetings (4 copies) and correspondence with others (1 copy). (To be submitted within 5 working days from the date of meeting/ correspondence.)
- (e) Insurance policy (1 copy) in accordance with Clause S5 of the Special Conditions of Employment. (To be submitted prior to the commencement of the Agreement.)
- (f) Inception Report (8 copies and 1 soft copy) (To be submitted within 2 weeks from the commencement of the Agreement.) which should include, but not limited to, the following details :-
 - (i) the understanding and appreciation of the objectives and constraints of the Assignment;
 - (ii) the framework for all aspects required for the efficient planning, management, administration, programming, financial control and monitoring of all the processes and procedures required for implementing the Project throughout the course of the Assignment;
 - (iii) details of the Consultants' organisation and staffing to carry out the Assignment including the staff curriculum vitae and their responsibilities;
 - (iv) the approach, methodology and the quality control procedures for undertaking the key elements of the Assignment; and

- (v) a comprehensive Programme of Implementation for the Assignment containing all activities, their timing, consultation, key dates for receipt of approvals, reporting and meetings; a schedule detailing the submission of reports, working papers, technical notes and executive summary shall also be included.
- (g) Desk Study Report (10 copies) in accordance with Clause 6.2.2 of this Brief. (To be submitted by the key date specified in Clause 8.4 of this Brief.)
- (h) Working Paper (10 copies) on the establishment of asset register/databases for the catchwater systems in accordance with Clause 6.3 of this Brief, including, but not limited to, the data specifications.
- (i) Working Papers (10 copies) on the preliminary and final prioritisation of the remaining 41 catchwater systems (Group A and Group B) summarising the categorisation, detailed calculations of the rating scores and prioritisation of the remaining 41 catchwater systems with drawings showing the catchwater systems including, but not limited to, the catchment areas, the overflow weirs, the overflow stream courses and NDC squatters / structures. (To be submitted by the key dates specified in Clause 8.4 of this Brief.)
- (j) Information papers, in English and Chinese (up to 100 copies for each consultation) as requested by the Director's Representative for consultations with District Councils, rural committees or other public bodies and community groups. (To be submitted 4 weeks prior to the consultation.)
- (k) Presentation materials (2 hard copies and 1 digital copy) including colour drawings mounted on boards, photographs and slides in connection with the Assignment, programme and progress for consultation with District Councils, rural committees or other public bodies and community groups. (To be submitted 2 weeks prior to the presentation.)
- (l) User Manual of the asset register/databases for the catchwater systems (10 sets in hard copies and 1 set in electronic files copy stored in CD-ROMs).

- (m) Administration Manual of the asset register/databases for the catchwater systems (10 sets in hard copies and 1 set in electronic files copy stored in CD-ROMs).
- (n) Training sessions (2 sessions) for WSD's staff (a maximum number of 30 staff members for each session) and training materials (up to 60 sets in hard copies and 1 set in electronic files copy stored in CD-ROMs) on the application of the asset register/databases for the catchwater systems as specified in Clause 6.3 of this Brief.
- (o) Draft Report (20 copies) including drawings for circulation to Government departments and others involved in or affected by the proposed works for comments. (To be submitted by the key date specified in Clause 8.4 of this Brief.) The Draft Report shall be fully comprehensive and detailed enough to show the Consultants' findings and recommendations including, a description of the objectives and requirements of the Project, the assumptions and input data, the alternatives considered, the recommended options, the methodology used in arriving at the results and the factors considered in developing the recommendations. The Draft Report shall also include a schedule showing how and where in the Report the items of Services mentioned in Clause 6 of this Brief have been addressed. All the review, studies and investigations carried out under the Assignment shall also form part of the Draft Report. The Consultants shall submit responses to comments received prior to finalisation of the Draft Report.
- (p) Drawings shall be prepared by Computer-Aided-Drafting (CAD) in AutoCAD DXF or DWG format conforming to the CAD Standard for Works Projects version 1.03.00 (or later versions as agreed between the Employer and the Consultants from time to time) as posted on the Development Bureau's web site http://www.devb-wb.gov.hk/electronic_services/comp_aid_draft_standard/cad_standard/index.aspx?langno=1&nodeid=634. The Consultants shall also submit one soft copy of drawings in AutoCAD format. One additional soft copy of drawings in Arcview format (version as agreed with the Employer) shall also be prepared and submitted.
- (q) Draft Final Report (20 copies). (To be submitted by the key date specified in Clause 8.4 of this Brief.)

- (r) Final Report (20 copies). (To be submitted by the key date specified in Clause 8.4 of this Brief.)
 - (s) Executive Summary (20 copies). The Executive Summary shall outline the major issues considered and the findings of the Project. The Executive Summary of the Final Report is to be submitted with a Chinese translation. (To be submitted in conjunction with the Draft Final Report and the Final Report.)
- 5.2 The Deliverables required under Clause 5 of this Brief shall be prepared and submitted in draft form to the Director's Representative for comments before issue. The finalised Deliverables shall contain a summary of the comments received from concerned parties following circulation of the draft versions, and responses and actions taken by the Consultants.
- 5.3 When revised draft or updated version of any papers, reports or documents of any kind are submitted by the Consultants, the Consultants shall, when so requested by the Director's Representative, provide red-lined versions highlighting all changes from the previous draft/version for easy reference by the readers.
- 5.4 The Deliverables shall generally be in A4 size and accompanying drawings should be of convenient sizes but not exceeding A3 size unless otherwise specified or approved by the Director's Representative. All drawings produced for circulation other than those incorporated in the reports and working papers shall be in A1 size unless otherwise specified or approved by the Director's Representative.
- 5.5 The Employer shall become the exclusive owner of all intellectual property rights of all Deliverables and shall be free to use, reproduce, copy, promulgate or distribute the Deliverable in any form. The Consultants shall draw the Employer's attention to any Deliverables that are under licence, have any pre-existing copyright or patent or have any other restrictions whatsoever affecting the Employer's use of the same and, if required by the Director's Representative, to establish the existence of any licence copyright, patent or restriction.

- 5.6 When requested by the Director's Representative, the Consultants shall seek the agreement of the owners of the intellectual property rights to allow the Government to copy, distribute or amend those Deliverables in respect of which there is a pre-existing intellectual property right.
- 5.7 The Consultants shall adopt the following green measures in preparing the Deliverables required above:
- (a) all reports, technical notes, working papers, and other relevant documents including their draft forms should be of single line spacing and should be printed on both sides of recycled paper using environmentally friendly ink. Recycled paper with not less than 50% recycled materials and not exceeding 80 gsm shall be used as a general rule. Bleached paper should not be used if possible. The logo of recycled paper should preferably be printed in prominent area of the reports;
 - (b) unnecessary and excessive use of plastic laminates, glossy covers or double covers shall be avoided as far as possible. Use of recyclable non-glossy art board paper as document covers shall be encouraged;
 - (c) excessive white space around the borders and in-between the paragraphs of all documents prepared by the Consultants should be avoided. A margin of 2 cm should be sufficient. Excessive use of blank papers should also be avoided; and
 - (d) number of pages can be reduced by reducing the size of typeface (font). For example "Times New Roman" or "C.G. Times" of font size not exceeding 10 characters per inch (cpi) or equivalent to point 12 can be used in balancing legibility and clarity against the waste reduction objective. The appearance and readability of the document can be improved by using two columns where the font size used is less than 12 points.
- 5.8 Deliverables shall also include all documents including technical papers, reports and any supporting notes, sketches, plans, drawings, photographs, charts, software programmes and all digital storage media which are prepared or produced by the Consultants or its sub-consultants for the purpose of or in connection with this Assignment. Such documents and information shall be

submitted to Director's Representative when so requested by him or within 4 weeks of the approval of the last deliverable.

- 5.9 The Consultants shall submit to the Director's Representative a set of DVD-ROM's in duplicate containing the digital copies of all Deliverables upon the completion of this Assignment.

In addition, the DVD-ROM's shall include a digital copy of this Brief to be provided by the Director's Representative and an index file in HyperText Markup Language (HTML) (version 4.0 or later) or equivalent format containing the salient points of the Assignment and the following information about each of the digital copies provided:

- (a) Title of the Deliverable;
 - (b) Version number and date of issue of the Deliverable;
 - (c) File name of the Deliverable;
 - (d) Software used to create the Deliverable;
 - (e) Version of the software; and
 - (f) Highlights of any intellectual property rights belonging to a third party.
- 5.10 All reports, technical notes, working papers, manuals, memoranda, written submissions and documents shall be prepared in a reader-friendly manner to enable readers to easily understand the contents of documents. The Consultants shall be aware that readers may not necessarily have knowledge about the detailed background of the subject matter especially where document is to be circulated to different parties. Arguments, discussions, recommendations and/or conclusions on key issues shall be presented in a concise, logical and easily understandable manner in the main text of the documents without distracting readers' attention to supplementary details. Where appropriate, appendices shall be used to explain the background and/or present supporting information on the subject issues. Executive summary shall be used, where appropriate, to highlight the main contents of the documents. Key recommendations, conclusions and/or matters requiring decision, agreement, approval, follow-up action and/or special attention shall be clearly highlighted in the documents.

- 5.11 The Consultants shall ensure that all key technical reports, working papers and design submissions are properly checked and reviewed by a technical review panel formed by senior members and relevant specialists of the project team prior to submission. In this connection, the Consultants shall submit for consideration by the Director's Representative their quality assurance and control measures that shall be put in place to ensure high quality of the deliverables.

6. Services to be provided by the Consultants

6.1 General Requirements

- 6.1.1 The services to be provided by the Consultants shall be as defined in the General Conditions and Special Conditions of the Employment and as amplified, extended and set out in the Brief.
- 6.1.2 In order to address the objectives in Clause 3 of this Brief and in compliance with the requirements as stated in this Brief, the Consultants shall provide personnel with appropriate qualifications and relevant experience to manage all tasks and shall direct, control and undertake, where appropriate, the services detailed in the following sections.
- 6.1.3 The Consultants shall comply with all instructions of the Director's Representative and with all Government Handbooks, Manuals, Circulars, Instructions, Code of Practice, Technical Memoranda, GEO Guidance Documents, Government Regulations and WSD Instructions and Guidelines that are in force at the relevant time and that may be relevant to the Project.
- 6.1.4 The Consultants shall consult and liaise with other Government departments/bureaux, relevant Regions/Divisions of WSD, public utility companies and other authorities, bodies, consultants, contractors or persons on matters related to the Assignment and developments likely to be affected by the Project, and will be expected to communicate and correspond directly with them. The Consultants shall obtain their approval, where necessary, to the proposed works, the working methods and the programme for the works. Any correspondence, notes or minutes arising from the liaison shall be copied to the Director's Representative. The co-ordination works in respect of utilities and other services in connection with the Assignment shall also be the responsibility

of the Consultants. Any difficulty encountered in communication, liaison and co-ordination shall be referred to the Director's Representative for assistance.

- 6.1.5 The Consultants shall comply with and observe all ordinances, by-laws, regulations and rules for the time being in force in Hong Kong. The Consultants shall provide all necessary assistance and input to obtain necessary licence and permits for the implementation of the Project.
- 6.1.6 The Consultants shall draw to the attention of the Director's Representative the need to consider any legal implications and consequences arising out of or in relation to the Assignment and any other alternative proposals.
- 6.1.7 The Consultants shall consider in detail the economic, financial, technical, environmental, legal and social implications of the Assignment and recommend to the Director's Representative an order of preference for the alternative proposals.
- 6.1.8 In particular, the Consultants shall:
- (a) liaise closely with the Hong Kong and Islands (HK&I) Region, New Territories East (NTE) Region, New Territories West (NTW) Region, Development (1) Division, Resources Planning Section, and Slope Safety Section and Drawing Office of WSD, WSD's DMS Maintenance Contractor or other parties as may be authorised by the Director's Representative in writing and notified to the Consultants from time to time on matters relating to the Project;
 - (b) liaise with other organisations or bodies as may be required from time to time during the course of the Assignment or as required by the Director's Representative;
 - (c) submit updated cost estimates and forecast of expenditures;
 - (d) prepare and submit a programme covering the work of the Assignment and such revised programmes as may be necessary in accordance with Clause 8 of this Brief. The Consultants shall review the programme from time to time and explore means to fast-track the Project with a view to completing the proposed works as early as practicable, and in any case not later than the key dates specified in Clause 8.4 of this Brief;
 - (e) prepare the various reports and other documents as stated in Clause 5 of this Brief. The Consultants shall provide Chinese translation of the

Information Papers and Executive Summary referred to in Clause 5 of this Brief respectively. This translation shall be carried out by competent translators or translation firms. The translation should be of reasonable quality in rhetoric and phraseology to convey precisely the original meaning of the English version;

- (f) attend progress meetings at monthly intervals or at such other intervals as required by the Director's Representative;
- (g) identify all facilities, installations and existing rights that may be affected by the Assignment. The Consultants shall liaise with all relevant parties who have an interest in or affected by the Project, in carrying out this Assignment; and
- (h) carry out all necessary surveys, levels and soundings and make such investigations and inquiries and search site records as are necessary for the satisfactory completion of the Assignment.

6.1.9 The Consultants shall provide all relevant information, plans, drawings, documents, etc., relating to the Project as may from time to time be required by the Director's Representative.

6.1.10 The Consultants shall provide technical support for the Director's Representative to attend meetings in connection with the implementation of the Project. This assistance is to include the preparation of briefing notes and information papers (including the required information on greening works in accordance with ETWB Technical Circular (Works) No. 34/2003) and presentation materials such as coloured drawings, photographs, transparencies and slides (in both English and Chinese) in both hard copies and computerised format, and to attend the meetings.

6.1.11 The Consultants shall respond to queries, findings and recommendations arising out of various kinds of audit carried out by the WSD and other Government departments (including, but not limited to, technical audit, quality audit and other audit made by Director of Audit).

6.1.12 The Consultants shall take cognizance of and comply with relevant provisions, where applicable, all relevant Ordinances, regulations, procedures, standards, guidelines, manuals, circulars, handbooks in use by the Employer including the following during the course of the Assignment: -

Title	<u>Issuing Authority</u>
(a) Updated Surface Asset Management Manual	WSD
(b) General Specification for Electrical Installation in Government Buildings of the Hong Kong Special Administrative Region	ArchSD
(c) General Specification for Fire Service Installations in Government Buildings of the Hong Kong Special Administrative Region	ArchSD
(d) General Specification for Air Conditioning, Refrigeration, Ventilation and Central Monitoring & Control System Installation in Government Buildings of the Hong Kong Special Administrative Region	ArchSD
(e) Project Administration Handbook for Civil Engineering Works	CEDD
(f) Standard Drawings	CEDD
(g) Technical Circulars/Memoranda	CEDD
(h) Geotechnical Manual for Slopes	GEO of CEDD
(i) Geoguide 1 – Guide to Retaining Wall Design	GEO of CEDD
(j) Geoguide 2 – Guide to Site Investigation	GEO of CEDD
(k) Geoguide 3 – Guide to Rock and Soil Descriptions	GEO of CEDD
(l) Geoguide 4 – Guide to Cavern Engineering	GEO of CEDD
(m) Geoguide 5 – Guide to Slope Maintenance	GEO of CEDD
(n) Stormwater Drainage Manual	DSD
(o) Technical Circulars/Memoranda	DSD
(p) Code of Practice for the Energy Efficiency of Electrical Installations	EMSD
(q) Code of Practice for the Electricity (Wiring) Regulations	EMSD
(r) Technical Memoranda on the Environmental Impact Assessment Process of the Environmental Impact Assessment Ordinance	EPD
(s) Circular Letters and Codes of Practice for Minimum Fire Service Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment	FSD

Title	<u>Issuing Authority</u>
(t) Technical Circulars/Memoranda	HyD
(u) Guidelines on Traffic Impact Assessment and Day-Time Ban Requirements for Road Works on Traffic Sensitive Routes	HyD
(v) Highways Department's Guidance Notes on Pavement Design	HyD
(w) Code of Practice for the Lighting, Signing and Guarding of Road Works	HyD
(x) Hong Kong Planning Standards and Guidelines	PlanD
(y) Professional Persons Environmental Consultative Committee (Pro PECC) Practice Notes	PlanD
(z) Civil Engineering Design Manual	WSD
(aa) Manual of Mainlaying Practice	WSD
(bb) Project Administration Manual for Engineering Works	WSD
(cc) Standard Drawings	WSD
(dd) Departmental Instructions	WSD
(ee) Standard Specifications for Mechanical and Electrical Works	WSD
(ff) Electrical Project Design Manual	WSD
(gg) Mechanical Project Design Manual	WSD
(hh) Feasibility Study on Cleaning and Disinfection of Service Reservoirs and Disposal of the Effluent (Agreement No. CE 19/94)	WSD
(ii) Design Guide for Polyethylene (PE) Pipelines for Water Supply Purpose	WSD
(jj) General Specification for Civil Engineering Works	Government of HKSAR
(kk) Standard Method of Measurement for Civil Engineering Works	Government of HKSAR
(ll) General Conditions of Contract for Civil Engineering Works	Government of HKSAR
(mm) General Conditions of Contract for Term Contracts for Civil Engineering Works	Government of HKSAR

Title	<u>Issuing Authority</u>
(nn) General Conditions of Contract for Electrical and Mechanical Engineering Works	Government of HKSAR
(oo) General Conditions of Contract for Design and Build Contracts	Government of HKSAR
(pp) The Administrative Procedures for Use with the Government of the Hong Kong Special Administrative Region General Conditions of Contract for Design and Build Contracts	Government of HKSAR
(qq) Public Works Departmental, Lands and Works Branch, Works Branch, Works Bureau, Environment, Transport and Works Bureau and Development Bureau Technical Circulars	DEVB
(rr) Code of Practice on Monitoring and Maintenance of Water-carrying Services Affecting Slopes	ETWB
(ss) Stores and Procurement Regulations	FSTB
(tt) Planning, Environment and Lands Bureau (Branch), Planning and Lands Bureau and Housing, Planning and Lands Bureau Technical Circulars	HPLB
(uu) Regulations for Electrical Installations	IET
(vv) IEE Wiring Regulations	IET

Should any documents referred to in this Brief, e.g. Development Bureau Technical Circulars (Works), be updated in the course of this Agreement, the Consultants shall make use of the updated versions for performing the Services unless directed otherwise by the Director's Representative.

6.2 Prioritisation of the Remaining 41 out of the 45 Catchwater Systems

6.2.1 Data Collection

(a) The Consultants shall identify all elements of a catchwater system and the Government departments and parties responsible for the administration, operation and maintenance of the elements. The elements of a catchwater system can include, but not limited to, the following :

- The natural terrain and registered man-made slopes adjoining the catchwater channel;

- The catchwater channel and associated operation facilities including overflow weirs and intakes and associated structures including deckings and bridges;
 - The natural stream courses receiving water from the overflows of the catchwater channel, and the associated natural terrain and man-made slopes; and
 - The engineered stormwater drains.
- (b) The Consultants shall liaise with CEDD, DSD, WSD (including but not limited to HK&I Region, NTE Region, NTW Region, Resources Planning Section and Slope Safety Section), other Government departments and their Consultants to collect, review and analyse data, records and other relevant information available for and/or related to the catchwaters systems and their associated slopes, including the Natural Terrain Landslide Inventory (NTLI), the Enhanced Natural Terrain Landslide Inventory (ENTLI), inspection records, Engineer Inspections reports, Maintenance Manuals, study reports, design calculations and records of previous condition surveys, hydrological and hydraulic models, etc.
- (c) The Consultants shall obtain and make use of the aerial photographs, land status plans, digital topographical maps and other map products available from the Lands Department for the study and bear all the expenses involved in its collection.

6.2.2 Desk Study

- (a) The Consultants shall carry out a desk study to assess the detailed condition, performance and both direct and indirect failure consequences of the elements of the remaining 41 catchwater systems.
- (b) The Consultants shall prepare a Desk Study Report for the remaining 41 catchwater systems. The report shall document the information examined (including available reference documents, aerial photographs where appropriate), describe the geological setting of each catchwater system and its associated catchment areas, and indicate the location of facilities and land use characteristics within and surrounding the catchwater system and summarise all observations and findings of the data collection and desk study.

6.2.3 Prioritisation

The Consultants shall apply the methodology developed by the FS Consultants in the Feasibility Study and described in the DCSMP to compute the risk scores of the remaining 41 catchwater systems. The Consultants shall carry out the key tasks shown below.

- (a) For each catchwater system :
 - (i) Develop, within the catchwater system, a list of sub-systems based on their catchment area.
 - (ii) Apply the Numerical Rating System detailed in the DCSMP to assess the individual sub-systems under the following 11 rating criteria and to evaluate the potential hazard of the existing catchwater sub-systems. The 11 criteria are :

Instability and Hydraulic Factors

- Percentage area covered by boulders immediately upslope of the catchwater;
- Type of recent landslides identified from ENTLI affecting the catchwater;
- Reported landslide incidents of natural terrain, uphill and downslope man-made slopes affecting the catchwater;
- Potential of uphill sub-standard slope(s) affecting the catchwater;
- Potential of downhill sub-standard slope(s) affecting the catchwater;
- Average cross-sectional area of the catchwater;
- Presence of flood wall / decking along the length of the catchwater channels;

- Reported catchwater-related failure(s) affecting facility groups downslope of the catchwater; and
- Reported catchwater-related failure(s) affecting facility groups in proximity of existing engineered stormwater drainage system.

Consequence Factors

- Consequence of failure affecting facility groups downslope of the catchwater; and
- Consequence of failure affecting facility groups located in proximity of existing engineered stormwater drainage systems.

A preliminary list of adjoining WSD's registered man-made slopes of the 45 catchwater systems is included in **Appendix 3** for reference. The Consultants shall identify all the man-made slopes adjoining the catchwater systems.

(iii) Calculate the total risk scores and average scores per sub-system.

(b) For the remaining 41 catchwater systems :

Prioritise the remaining 41 catchwater systems in accordance with the calculated average score per sub-system of each catchwater system.

6.3 Establishment of the Asset Register/Databases for the 45 Catchwater Systems

6.3.1 To support development of the Catchwater System Management Plan, the FS Consultants in DCSMP recommended the framework and information system required for building a comprehensive asset register/databases for the catchwater systems so that Government can populate the data and incorporate the existing records and asset database using common data standard. The asset register/databases are to support management and maintenance of the existing maintenance histories of the systems and the data collected during the development of the Catchwater System Management Plan for future decision making and report production.

6.3.2 The Consultants shall review and improve/enhance the aforesaid recommended framework and information system requirements and establish the asset register/databases for the catchwater systems (with appropriate hierarchy/structures) containing all essential attributes (to support amongst others hydraulic analysis). The Consultants shall formulate the most appropriate approach to transform the asset register/databases for the catchwater systems from textual format to geographical format in WSD's Geographic Information System (GIS)-based Digital Mapping System (DMS) in consultation with Development (1) Division, Drawing Office of WSD and WSD's DMS Maintenance Contractor. The recommended approach shall be able to allow readily linkages of a catchwater section to its relevant documents (e.g. condition monitoring, maintenance histories, risk assessment results etc) and features (e.g. natural stream courses, man-made slopes, engineered drainage systems etc). In order to uphold data quality in the DMS, the duty of data owner(s) and the frequency of data updating shall be considered and recommended. Consideration must be given to the fact that different departments are responsible for different elements of the catchwater systems.

6.3.3 The data and GIS requirements for the catchwater systems shall be as follows :

- (a) Shapefiles and other data files shall be compatible with ArcGIS 9.2 and above;
- (b) Database management tools shall be provided to maintain a continuous and seamless spatial data set;
- (c) With the shapefiles prepared under this Assignment, users shall be able to add them onto WSD's DMS and to quickly retrieve data and perform spatial and geometric analysis with topographical searches, buffering, overlays and intersections, dissolve and clip, and topographical data cleaning;
- (d) The Consultants shall define the data requirements and data structure for, but not limited to, the following items :
 - (i) features with textual attributes for the catchwater systems including catchwater lining, water channels, watercourse inlets, overflow weirs,

flow control devices, catchwater tunnels, man-made slope features, boulder fields, roads, building outlines including squatter structures, railways, tunnels, rivers, stream courses, details of downstream drainage inlet receiving catchwater overflow, catchwater catchments, contours, country park boundaries, Sites of Special Scientific Interest (SSSI), water gathering grounds and reservoirs;

- (ii) associated existing, planned and proposed features of catchwater systems to be shown with different legends as agreed by the Director's Representative;
 - (iii) reference information to fully calibrated/verified hydraulic models for the catchwater systems and for intersecting stream courses for which such hydraulic models have been developed. Direct interfacing with the hydraulic models is not required;
 - (iv) squatter structures located upslope or downslope of the catchwaters; and
 - (v) reference to planned and proposed improvement works including details of capital and recurrent cost estimates and implementation programme of each works package.
- (e) Tools shall be developed to facilitate capturing and updating of information/data required to maintain the catchwater system database.

6.3.4 The Consultants shall compile all necessary documents supporting the establishment and future maintenance and management of asset register/databases including but not limited to asset hierarchy, user manual, administration manual and data model/structures/specifications. The user manual shall detail guidelines/methods for users to perform some common operations, such as query and analysis. The administration manual shall detail procedures, responsibility and frequency to update information/data of the catchwater systems. The data model/structures/specifications shall detail the data structures of the asset register/databases for the catchwater systems.

6.3.5 The Consultants shall input all relevant information collected for the 4 selected catchwaters in the Feasibility Study as well as those collected for the remaining

41 catchwater systems under this Assignment into the aforesaid asset register/databases. All relevant documents/information shall be attached systematically to the register/databases as external files. Such external files shall be in the format as listed below :

File Format	Text	Table	Database	Drawing	Photo	Video
MS Word 2000	✓					
MS Excel 2000		✓				
MS Access 2000		✓	✓			
Adobe Acrobat	✓	✓		✓	✓	
ArcGIS		✓	✓	✓		
AutoCAD Ver. 2000				✓		
JPEG					✓	
MPEG						✓

- 6.3.6 The Consultants shall recommend a data collection plan to populate fully the asset register/databases together with the associated costs/resources required and priority.
- 6.3.7 The Consultants shall conduct 2 training sessions on the application of the asset register/databases for the catchwater systems. Each training session will be attended by a maximum number of 30 WSD's staff. The Consultants shall submit details of the training sessions to the Director's Representative for agreement.
- 6.4 Post Implementation Review of the Methodology for Prioritisation of the Catchwater Systems and Overall Scale of the Catchwater-related Problems
- 6.4.1 The Consultants shall conduct the post implementation review to take stock of the implementation experience of prioritisation and to recommend improvement to the methodology for prioritisation of the catchwater systems.
- 6.4.2 The FS Consultants had prepared the cost estimate and the programme for carrying out the improvement works to mitigate the catchwater-related hazards for the 4 selected catchwater systems, which is shown in the Report on Improvement Strategy of the Pilot and Feasibility Study. Based on the results of the Feasibility Study, supplemented by the existing data and information on past failure histories collected in and findings of this Assignment, the Consultants shall provide an estimation of the scope and the order of the total

cost of the measures to mitigate the risks of the remaining 41 catchwater systems and the corresponding phasing of expenditure and programme for implementing the measures. The assumptions and approach used shall be clearly presented. As the aim is to provide an indication of the order of the long-term investment cost and a tentative programme for implementation of the necessary improvement works, detailed design of each improvement scheme are not required.

7. Response to Queries

The Consultants shall respond to queries under Clause 20 of the General Conditions of Employment raised prior to a date 3 months after the final submission of the Deliverables required under the Agreement. Such date shall be confirmed in writing to the Consultants by the Director's Representative.

8. Programme of Implementation

8.1 The due date for commencement of the Agreement shall be September 2011.

8.2 Pursuant to Clause 26(B) of the General Conditions of Employment, the Consultants shall submit the draft programme and revised draft programmes and the Director's Representative shall agree, or instruct, within the following periods :-

- | | |
|---|---|
| (a) Submission of the draft programme | : Within 2 weeks of the due date for commencement of the Agreement. |
| (b) Agreement of the draft programme or instruction for submission of the revised draft programme | : Within 2 weeks from receipt of the draft programme. |
| (c) Submission of the revised draft programme | : Within 2 weeks from the instruction of the Director's Representative. |

- 8.3 The draft programme and revised draft programmes shall detail the activities to be carried out, key dates for key activities, target dates for particular tasks and any decision dates that may be required for the uninterrupted progress of the Assignment. The Consultants shall discuss with the Director's Representative during the above periods to agree the timing of submission of reports, other documents and plans for each of the main elements of the Assignment, for inclusion in the draft programme and revised draft programmes.
- 8.4 The following key activities of this Assignment are to be completed within the key dates specified below :-

Key Activity	Key Date (from commencement of the Agreement)
(a) Submission of Inception Report	2 weeks
(b) Submission of Desk Study Report	4 months
(c) Submission of Working Paper on the establishment of the Asset Register/Databases for the catchwater systems	6 months
(d) Submission of Working Paper on Preliminary Prioritisation of the remaining Group A catchwater systems	8 months
(e) Submission of Working Paper on Final Prioritisation of the remaining Group A catchwater systems	9 months
(f) Submission of Working Paper on Preliminary Prioritisation of Group B catchwater systems	11 months
(g) Submission of Working Paper on Final Prioritisation of Group B catchwater systems	12 months
(h) Submission of Draft Report	12 months

Key Activity	Key Date (from commencement of the Agreement)
(i) Submission of Draft Final Report	13 months
(j) Submission of Final Report	14 months
<p>8.5 The Consultants shall endeavour to ensure that the Assignment are carried out in accordance with the Programmes and shall submit regular reviews as part of the progress reports referred to in Clause 9 of this Brief.</p>	
<p>9. Progress Reports</p>	
<p>The Consultants shall submit to the Director's Representative progress reports at monthly intervals on all aspects of the Services required under Clause 6 of this Brief relating progress to the programme referred to in Clause 8 of this Brief. The reports shall include a list of those parts of the Services the execution of which are behind the programme together with proposals to expedite progress, so as to complete the work on time. The reports shall also include updated expenditure forecasts in accordance with Clause 10 of this Brief.</p>	
<p>10. Financial Management</p>	
<p>At monthly intervals or at such other intervals as the Director's Representative may require, the Consultants shall submit a report on the current and forecast expenditure on the Assignment and the fees due to the Consultants, in a form to be agreed by the Director's Representative.</p>	
<p>11. Standards and Specifications</p>	
<p>The Consultants shall adopt such technical and design standards and specifications as are in current use by the Works Group of departments and Transport Department or, if non-existent, British Standards, Codes of Practice</p>	

and Specifications. Should instances arise for which suitable standards or specifications do not exist or for which the current standards or specifications appear to require modifications or if by the adoption of current standards the Consultants would incur additional expenses not within reasonable contemplation, the Consultants shall submit recommendations on appropriate alternatives to the Director's Representative for agreement.

12. Director's Representative

- 12.1 The Director's Representative as defined in the General Conditions of Employment shall be the Assistant Director/Operations of WSD or such other person as may be authorised by the Director of Water Supplies in writing and notified to the Consultants. The Director's Representative may delegate any of the powers and functions vested in him to other officers. If the Consultants are dissatisfied with a decision or instruction of any such officer the matter shall be referred to the Director's Representative for a ruling.
- 12.2 During the course of the Agreement, the Consultants shall report direct to the Director's Representative.

13. Control of the Project and Assignment

- 13.1 Pursuant to Clause 13 of the General Conditions of Employment, the Consultants shall attend meetings of relevant committees, rural committees, public consultation bodies and District Councils as necessary. The total amount of this kind of meeting time is estimated to be not more than 160 hours, beyond which the extra cost shall be reimbursed by the Employer on a time charge basis.
- 13.2 The Consultants when necessary, shall communicate and correspond directly with other Government departments/parties, utility undertakers and various Regions/Divisions of WSD to obtain information in connection with the Project, copying such correspondence to the Director's Representative.

14. Information and Facilities Provided by the Employer

- 14.1 All available information relevant to the Assignment will be provided to the Consultants. The relevant documents prepared under Agreement No. CE 44/2006 (WS), Improvement of Shing Mun, Beacon Hill, Golden Hill and Tai Lam Chung Catchwater Systems – Feasibility Study are as follows: -
- (a) “Final Report for Development of a Catchwater System Management Plan”;
 - (b) “Report on Improvement Strategy of the Pilot and Feasibility Study”; and
 - (c) “Final Report for the Pilot and Feasibility Study”.
- 14.2 The Consultants shall indicate for guidance those documents which they currently hold and those of which a copy may be needed, should the Assignment be awarded to them. A copy of each of the documents indicated as needed will be supplied free of charge by the Director's Representative on request from the Consultants, except those currently available from the Publications Sales Unit of the Information Services Department. In the case of plans and drawings, two prints of each plan or drawing shall be provided free of charge if requested by the Consultants.

15. Consultants' Office and Staffing

- 15.1 The Consultants shall maintain for the duration of this Agreement an office in Hong Kong under the control of the Project Director of the Consultants who shall be responsible for the Assignment. He shall have adequate authority and sufficient professional, technical and administrative support staff in all relevant disciplines to ensure progress to the satisfaction of the Director's Representative.
- 15.2 The Consultants shall provide the staff and manpower input in accordance with the Technical Proposal which was submitted with the Consultants' tender for this Assignment. The Director's Representative shall have the right to check the time-log record of the Consultants' staff deployed for the Assignment.
- 15.3 If the Director's Representative considers that the performance of the Consultants is not satisfactory due to inadequate staffing and manpower input allocated to the Assignment, the Consultants shall, upon the request of the Director's

Representative, forthwith submit to the Director's Representative the time-log record of the staff deployed for the Assignment for the Director's Representative to check against the Technical Proposal.

- 15.4 The Consultants' failure to adhere to their staffing proposal, in particular the employment of core personnel of the Consultants and their sub-consultants, thus causing an adverse impact on the performance of the Services, shall be duly reflected in the Employer's performance report on the Consultants.
- 15.5 If the Consultants are unable to maintain any of the core personnel specified in the Technical Proposal, the Consultants shall as soon as possible report this to the Director's Representative and propose, for the Director's Representative's approval, a revised personnel arrangement which is equivalent to or better than the existing personnel arrangement, in terms of qualifications, experience and competence.

16. Specialist and Sub-consultant Services

- 16.1 The Consultants shall provide all specialist and sub-consultant services required for the satisfactory completion of the Assignment. No additional fees or expenses for the provision of such services rendered locally or overseas shall be payable by the Employer except as otherwise provided for in the Schedule of Fees.
- 16.2 Without derogating from the generality of Clause 38(i) of the General Conditions of Employment, the Consultants shall, upon the award of this Agreement and save as otherwise agreed by the Director's Representative, appoint the sub-consultants as proposed in their Technical Proposal for the Assignment. The Director's Representative shall have the right to check the sub-consultancy agreements. If the Director's Representative considers that the performance of the Consultants is not satisfactory due to inadequate staffing and manpower input allocated to the Assignment, the Consultants shall, upon the request of the Director's Representative, forthwith submit to the Director's Representative a certified copy of any or all of the sub-consultancy agreements.

17. Surveys

- 17.1 One velograph and two prints of topographical mapping at 1:20,000, 1:5,000 and 1:1,000 scales prepared by the Survey and Mapping Office of the Lands Department (LandsD), where available for the area covered by the Project for which the Assignment forms a part, can be obtained free of charge on application to the Director's Representative. For the supply of Government digital map data, the Consultants will be charged a fee for handling. This fee shall be included in the Lump Sum.
- 17.2 All field survey work required for the proper execution of the Assignment shall unless otherwise provided for in the Agreement, be the duty of the Consultants. A copy of field notes, field data and resultant plans arising from these surveys shall be handed over to the Director's Representative upon completion of the Assignment. The accuracy as well as presentation of these surveys should be of a standard agreed by the Director's Representative.
- 17.3 The Consultants shall be responsible for all engineering surveys required in connection with the Assignment. The division of responsibility among the Consultants, the Lands Administration Office, and Survey and Mapping Office of the LandsD for other surveying required in connection with the Assignment shall be as follows :-

Task		Responsibility of
(a)	(i) Provision of basic horizontal and vertical survey control	Survey and Mapping Office
	(ii) Checking of given control point values and establishment of survey control network(s) based on survey control given vide (i)	Consultants
(b)	(i) Provision of basic mapping (at 1:1000 scale or other standard mapping relevant to the Assignment)	Survey and Mapping Office (excluding those specified as to be provided by the Consultants in the Agreement)

	Task	Responsibility of
	(ii) Updating and verification of accuracy of information shown on plans supplied vide (i) as necessary in relation to the Assignment.	Consultants
(c)	(i) Supply of digital data	Land Information Centre, LandsD
	(ii) Provision of a plan of the study area to the Land Information Centre for data preparation.	Director's Representative
	(iii) Completion of "Undertakings by Government Department for provision of Digital Data from Land Information Centre, Lands Department to Consultants" Form.	Director's Representative
	(iv) Completion of Digital Data Order Form	Consultants
	(v) Completion of "Undertaking by Consultants on the use of Government Digital Data from the Land Information Centre, Lands Department" Form.	Consultants
	(vi) Before data collection, payment of the charges for the storage media and labour to prepare the data when informed by the Land Information Centre prior to data collection and collection of the Demand Note.	Consultants

Task	Responsibility of
(d) Supply of existing cadastral plans and records and co-ordinate data.	District Survey Office
(e) Computation of detailed dimensioned layouts of roads, drainage and WSD reserves, platforms, etc.	Consultants (checked and accepted by District Survey Office)
(f) Determination of site/lot boundaries, calculation of areas, etc. in connection with the agreed dimensioned layouts.	District Survey Office (in liaison with District Lands Office)
(g) (i) Processing of resumption and surrender for privately owned land in Development Area.	District Lands Office (in liaison with District Survey Office and Consultants)
(ii) Resumption and surrender plans and demarcation of lands to be resumed.	District Survey Office (in liaison with District Lands Office and Consultants)
(h) Preparation of proposal plans for Government land allocations and grants.	District Survey Office (in liaison with District Lands Office)
(i) Preparation of dimensioned plans and setting out of boundaries of sites and lots for Government land allocation and for grants to architects (Government and Housing Authority).	District Survey Office

18. Insurance

The amount of insurance cover to be maintained in accordance with Sub-Clause (A) of Clause 47 of the General Conditions of Employment shall be the lump sum value of the fee, subject to a maximum of HK \$25 million and a minimum of HK\$1 million.

