

CHAPTER 2

Civil Engineering and Development Department

**Engineering consultancies for
new town and urban area development**

**Audit Commission
Hong Kong
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This audit review was carried out under a set of guidelines tabled in the Provisional Legislative Council by the Chairman of the Public Accounts Committee on 11 February 1998. The guidelines were agreed between the Public Accounts Committee and the Director of Audit and accepted by the Government of the Hong Kong Special Administrative Region.

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Audit Commission
26th floor, Immigration Tower
7 Gloucester Road
Wan Chai
Hong Kong

Tel : (852) 2829 4210
Fax : (852) 2824 2087
E-mail : enquiry@aud.gov.hk

ENGINEERING CONSULTANCIES FOR NEW TOWN AND URBAN AREA DEVELOPMENT

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PART 1: INTRODUCTION

1.1 This PART describes the background to the audit and outlines the audit objectives and scope.

Background

1.2 In 1973, the Government initiated a programme to develop new towns in the New Territories to meet the housing needs of the growing population. To date, nine new towns have been developed (Note 1). About 3.2 million people, representing some 47% of the Hong Kong population, live in the new towns. Based on the experience gained from the new town development, the Government also undertook development in major urban areas to meet housing, commercial and transport needs. The timely provision of essential infrastructure and facilities to match population intake, and the success in achieving a balanced development of the new towns/major urban areas were the concerted efforts of many professionals, including engineers, town planners and architects.

1.3 The Government acquired professional services to assist it in the development of new towns/major urban areas through a number of consultancy agreements. Many of these consultancy agreements were executed before 1991, with some dating back to the 1970s (hereinafter referred to as the old consultancy agreements). Under these old consultancy agreements, for development within the new towns/major urban areas, the consultants were required to provide investigation, design, and supervision services for construction works.

1.4 The development of new towns/major urban areas was usually large in scale and implemented by stages over many years. As the development progressed from one stage to another, the consultants were awarded further work generally in accordance with the scope of the old consultancy agreements. A situation has arisen whereby these old consultancy agreements have been in use for such a long time (ranging from 14 to 30 years) that their terms are no longer compatible with the current government policy on the selection and remuneration of consultants. Firstly, the scope of the old consultancy agreements is based on development areas without any specified completion date. The consultants have been assigned successive packages of work within the development areas generally in accordance with the scope of the old consultancy agreements without going through the normal competitive tendering procedures. Secondly, under the terms of the old consultancy

Note 1: *Sha Tin, Tsuen Wan, Tuen Mun, Tai Po, Fanling/Sheung Shui and Yuen Long are the first six new towns to start their development in the 1970s. Their development works are now near completion or have progressed to an advanced stage. As for the other three new towns (i.e. Tseung Kwan O, Tin Shui Wai and Tung Chung/Tai Ho) which started their development after the 1970s, their development works are still ongoing.*

agreements, the consultants are primarily paid basic scale fees which are tied to the cost of the construction works. The current government policy is as follows:

- (a) since May 1991, the Government has adopted a new system of selecting engineering and associated consultants based on both technical merit and fee competition (Note 2). The scope of consultancy agreements awarded under the new system is based on projects with defined commencement and completion dates; and
- (b) for consultancy agreements awarded under the new system, consultants are paid fixed lump sum fees independent of the cost of the works.

1.5 The then Territory Development Department (TDD) was responsible for managing the old consultancy agreements through its five regional development offices (Note 3). In performing its management duties, the TDD was guided by instructions issued by the Environment, Transport and Works Bureau (ETWB) and the Engineering and Associated Consultants Selection Board (EACSB — Note 4). In July 2004, the TDD merged with the Civil Engineering Department to form a new Civil Engineering and Development Department (CEDD). After merging, the development offices continue with their role in managing the old consultancy agreements.

1.6 In 1996, the TDD reviewed the position of the old consultancy agreements and initiated an exercise to wind up some of them. Up to May 2004, 22 old consultancy agreements had been completed. There are 12 ongoing old consultancy agreements. The total expenditure for the old consultancy agreements amounted to \$206 million in 2003-04.

Note 2: *Before May 1991, engineering consultants were selected on the basis of technical merit, and consultancy fees were negotiated after the consultants had been selected.*

Note 3: *The five regional development offices were the Hong Kong Island and Islands Development Office (HKI&I DevO), Kowloon Development Office (K DevO), New Territories East Development Office (NTE DevO), New Territories North Development Office (NTN DevO) and New Territories West Development Office (NTW DevO). With effect from July 2004, the NTN DevO and the NTW DevO have been merged to form the New Territories North and West Development Office.*

Note 4: *With the delegated authority of the Secretary for Financial Services and the Treasury, the EACSB approves the selection, appointment and remuneration of consultants for engineering and related projects. The Board is chaired by the Director of Civil Engineering and Development (formerly the Director of Civil Engineering) and its members include representatives of the Financial Services and the Treasury Bureau and the ETWB.*

Audit review

1.7 The Audit Commission (Audit) has recently conducted a review on the management of the old consultancy agreements for the development of new towns/major urban areas to see if there is any room for improvement. The audit focused on the following issues:

- (a) the payment terms of the old consultancy agreements (PART 2);
- (b) the 1996 initiative to wind up the old consultancy agreements (PART 3);
- (c) phasing of works instructed under the old consultancy agreements for fee calculation (PART 4); and
- (d) design and contract stage fee (PART 5).

Acknowledgement

1.8 Audit would like to acknowledge with gratitude the full cooperation of the staff of the CEDD during the course of the audit review.

PART 2: PAYMENT TERMS OF OLD CONSULTANCY AGREEMENTS

2.1 This PART examines the payment terms of the old consultancy agreements.

Types of fee payment to consultants

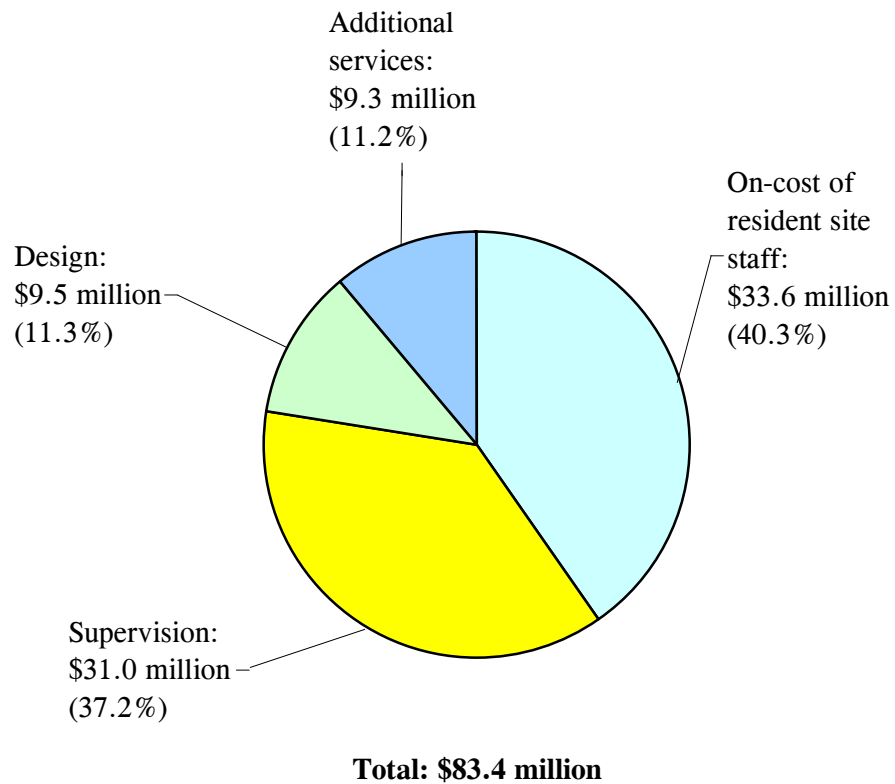
2.2 There are four types of fee payment to consultants under the old consultancy agreements:

- (a) ***Basic scale fee.*** This is the primary method of fee remuneration in respect of design and construction works supervision services. The basic fee structure is a tapering scale of percentage charges on the cost of works, i.e. the percentage charges decrease with the increase in the cost of works up to a certain threshold. For cost of works above the threshold, the lowest percentage charge applies;
- (b) ***Cost of resident site staff.*** As part of their services, consultants are required to employ resident site staff for supervising the works. Resident site staff include different grades of staff (i.e. professional grade, technical grade and general grade). The Government reimburses consultants the personal emoluments of resident site staff. The Government also pays an on-cost to consultants to cover their cost in managing the resident site staff. The personal emoluments of the resident site staff are set with reference to the current civil service employment terms, i.e. the same arrangements as those of the new consultancy agreements awarded by competitive bidding. However, the on-cost payments are different because the on-cost rates for the new consultancy agreements form part of the competitive fees, whereas those for the old ones are fixed;
- (c) ***Lump sum fee.*** The lump sum fee is used primarily for investigation work and additional services. The lump sum fee may be computed either from an estimated time charge input or from the basic scale fee on a theoretical or estimated cost of works; and
- (d) ***Time charge fee.*** This is usually used to cover additional/unexpected items of work, or when the exact extent of the work involved cannot be defined in advance.

2.3 In 2003-04, the expenditure for the old consultancy agreements was \$83.4 million (excluding personal emoluments of resident site staff of \$122.6 million but including on-cost payments to the consultant). Analyses of the expenditure by nature of services, and by type of fee payment are shown in Figures 1 and 2, respectively.

Figure 1

**2003-04 expenditure on old consultancy agreements
by nature of services**

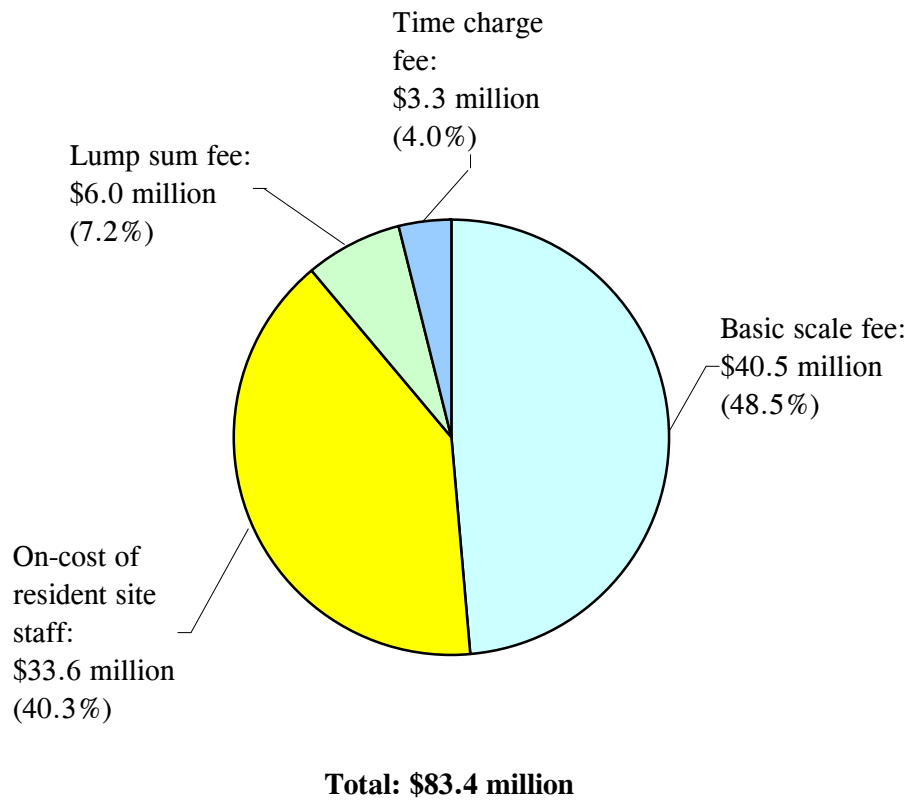


Source: Audit analysis of CEDD records

Note: The "Design" expenditure includes payments of the basic scale fee for the design and contract stage of the consultants' work. The "Supervision" expenditure includes payments of the basic scale fee for the construction stage of the consultants' work.

Figure 2

**2003-04 expenditure on old consultancy agreements
by type of fee**



Source: Audit analysis of CEDD records

Shortcomings of the basic scale fee

2.4 The basic scale fee was the Government's normal method of remunerating consultants for the provision of design and construction works supervision services before 1991. In 1989, the then Chief Secretary expressed concern at the way a consultant's professional fees were increased automatically with the cost of works. He questioned whether this was justified and whether there was incentive for a consultant to economise on his design.

2.5 In 1989, the then Lands and Works Branch Directors Meeting tasked a Working Party on Engineering Consultancy Agreement (hereinafter referred to as the Working Party) to review the selection of consultants and the fee remuneration method. The Working Party identified the following shortcomings in linking consultancy fee to the cost of works:

- (a) **there was disincentive for a consultant to produce an economical design. This was because the more time a consultant spent on pursuing an economical design, the less would be the cost of the works constructed and hence his fee.** Although the removal of such disincentive would not guarantee an economical design, it was considered that the removal would increase the likelihood of an economical design solution;
- (b) similarly, there was disincentive for a consultant, in his role as Engineer of the works contract, to critically assess contractual claims to safeguard government interest. This was because the award of such claims would be included in the final cost of works for calculating the consultancy fee;
- (c) the amount of consultancy fee was not known at the start of the consultancy agreement. It was difficult to prepare financial budget for cost control purpose;
- (d) a consultant would receive windfall payments for the completed stages of work if, in a subsequent stage of work, there was an increase in the cost of works. For instance, if the cost of works during the construction stage was increased, the consultant would receive increased fees for the investigation and design and contract stages as well; and
- (e) the fee band for cost of works over \$100 million (this was used for capping the lowest percentage charge of the basic scale fee) did not appear to be appropriate for mega projects. Additional fee bands should be introduced.

2.6 The Working Party also obtained information from 12 overseas organisations on how they selected and remunerated consultants. The Working Party found that the majority of the overseas organisations did not relate consultants' fees to the cost of works. The commonly used remuneration methods were lump sum fee and time charge fee. They selected their consultants based on qualitative considerations and also took fee into account in the selection process.

Risk of uneconomical design

2.7 In 1989, in their deliberation of the shortcomings of the basic scale fee, the Working Party considered a report prepared by a senior officer of the TDD. The following observations were made in the report:

- (a) ***Uneconomical design.*** The professional ethics of consultants would not allow them to deliberately produce an uneconomical design, or perform their duties as Engineer of the contract in an unfair manner. However, like other businessmen, consultants were at times under pressure to maintain profit margin and reduce their operating cost. If the effect of this was to reduce their service to the Government, it would be a cause for concern;
- (b) ***Contractor's alternative design.*** One of the means of determining the prevalence of uneconomical design was to consider the extent of alternative design subsequently prepared by contractors (Note 5). A contractor would offer an alternative design for his contract works if he considered that he could provide the Government with a cheaper alternative to the consultant's design. The contractor's motive might be to increase his profit margin, to facilitate construction, or to save time. At the same time, he had to offer the Government sufficient savings to induce the Government to accept his offer. The contractor might make the offer either as an alternative tender, or as an alternative design during construction;
- (c) ***Effect of adopting contractor's alternative design.*** The adoption of an alternative design meant that the original consultant's design was aborted. The cost of the contractor's alternative design would have been allowed for in his offer. Accordingly, the Government ended up effectively paying for both designs of the consultant and the contractor. This was an unnecessary expense although some savings could be achieved in adopting the cheaper alternative design;

Note 5: *A contractor is employed to execute the works designed by a consultant. If during the course of works, the contractor proposes an alternative design, such alternative design has to be approved by a directorate officer of D2 rank or above.*

- (d) ***Frequency of occurrence of alternative design.*** With reference to the works projects of the then Tsuen Wan Development Office, there were alternative tenders submitted for two contracts. There were also alternative designs submitted during the construction stage of three contracts. It was considered that there was no evidence to show that alternative designs were proposed on a large scale. However, there was indication that savings could be achieved on individual projects in adopting the alternative design; and

- (e) ***Remedies.*** One possible solution to tackle the issue of uneconomical design was to adopt new fee structures, such as lump sum fee, for the design and supervision services (such that the consultant would not receive more payment for an uneconomical design). Another possible solution was to carry out a design check to ensure that the economical design objective was met. The additional cost of checking could be recovered through the resultant savings in construction.

2.8 In May 1991, having regard to the findings of the Working Party, the then Works Branch adopted a new system of selection and remuneration of consultants. Since May 1991, consultants have been selected on the basis of both technical and fee competition. Selected consultants are paid fixed lump sum fees independent of the cost of the construction works.

Contractor's alternative designs

2.9 As mentioned in paragraph 2.7(b), one of the means of determining whether uneconomical designs were prevalent was to consider the extent of alternative designs prepared by contractors. Audit has selected three old consultancy agreements for checking the occurrence of contractor's alternative designs for the period 1990 to 2004. The results are summarised in Table 1.

Table 1

Contractor's alternative designs

Consultancy agreement	Contract	Contractor's alternative design accepted	Savings to the Government	Consultancy fee paid on the original design
		(No.)	(\$ million)	(\$ million)
CE/WK — West Kowloon Development	WK1	1	7.5	1.0
	WK2 (Note)	1	1.2	1.0
CE/NL — North Lantau Development	NL1	1	2.4	1.0
	NL2 (Note)	1	0.7	0.3
CE/ST — Sha Tin Development	ST1	3	25.8	20.1
	ST2	1	18.8	13.1
	ST3	2	1.2	1.6
	ST4	2	3.0	1.0
	ST5	3	14.7	8.0
	Total	15	75.3	47.1

Source: CEDD records

Note: For details, see Appendix A.

2.10 For illustration purpose, more information on the four contracts with contractor's alternative designs as highlighted in Table 1 is given in paragraphs 2.11 to 2.14. Information on the remaining five contracts with contractor's alternative designs is given in Appendix A.

Consultancy agreement CE/WK

2.11 *Alternative design for Contract WK1.* In 1990, the TDD executed consultancy agreement CE/WK for the West Kowloon Development. Contract WK1 for constructing works for the West Kowloon Development Northern Area was designed and supervised by the Consultant (the WK Consultant). In February 1993, the TDD awarded Contract WK1 to a contractor. In December 1994, the contractor proposed an alternative design for the

piled section of the box culverts under Contract WK1. The WK Consultant was satisfied that the alternative design was comparable with the original design and would not give rise to additional maintenance cost. The cost of piling under the Consultant's design was about \$63 million. The contractor's offer for the alternative piling works was about \$55.5 million. In view of the savings of \$7.5 million and benefit in programming, the TDD accepted the contractor's alternative design in September 1995. The TDD paid the Consultant about \$1 million for the original design.

Consultancy agreement CE/NL

2.12 ***Alternative design for Contract NL1.*** In 1990, the TDD executed consultancy agreement CE/NL for the North Lantau Development. Contract NL1 for the Tung Chung Development Phase 3A — Reclamation was designed and supervised by the Consultant (the NL Consultant). In March 1999, the TDD awarded Contract NL1 to a contractor. In January 2001, the contractor proposed an alternative design using large diameter pre-cast concrete pipes in place of the in-situ concrete box culvert in the original design. The NL Consultant considered the alternative design technically feasible. The cost of works under the original design was \$76.4 million. The cost of works under the alternative design was \$74 million. In view of the savings of \$2.4 million and benefit in programming, the TDD accepted the contractor's alternative design in August 2001. The TDD paid the Consultant about \$1 million for the original design.

Consultancy agreement CE/ST

2.13 ***Alternative designs for Contract ST1.*** In 1977, the TDD executed consultancy agreement CE/ST for the Sha Tin Development. Contract ST1 for constructing Trunk Road T7 in Ma On Shan was designed and supervised by the Consultant (the ST Consultant). In February 2001, the TDD awarded Contract ST1 to a contractor. During the works, three alternative designs were accepted, as follows:

- (a) in February 2001, the contractor proposed an alternative piling and superstructure design for four road bridges. The alternative design could substantially reduce the number of piles, from 338 in the original design to 192. The cost of works under the original design was \$304.2 million. The cost of works under the alternative design was \$288.4 million. The contractor was also able to shorten the contract period by eight weeks. After negotiations, the TDD and the contractor agreed to share the net savings of \$15.8 million (\$9.5 million for the Government and \$6.3 million for the contractor) to be derived from adopting the alternative design. In September 2001, the TDD agreed with the contractor to implement the cheaper alternative design. The TDD paid the ST Consultant about \$9.5 million for the original design;
- (b) in September 2001, the contractor proposed alternative slope works and architectural finishing for the retaining walls. The cost of works under the

original design was \$44 million. The cost of works under the alternative design was \$29.4 million. After negotiations, the TDD and the contractor agreed to equally split the net savings of \$14.6 million from adopting the alternative design (i.e. \$7.3 million each). In May 2002, the TDD agreed with the contractor to implement the cheaper alternative design. The TDD paid the ST Consultant about \$1.4 million for the original design; and

- (c) in February 2002, the contractor proposed an alternative design for the noise barriers and their foundation. The alternative design included increasing the column spacing and reducing the thickness of the structural steel. The cost of works under the original design was \$295.8 million. The cost of works under the alternative design was \$280.2 million. After negotiations, the TDD and the contractor agreed to share the net savings of \$15.6 million to be derived from adopting the alternative design (\$9 million for the Government and \$6.6 million for the contractor). In September 2002, the TDD agreed with the contractor to implement the cheaper alternative design. The TDD paid the ST Consultant about \$9.2 million for the original design.

2.14 *Alternative design for Contract ST2.* Contract ST2 for constructing Trunk Road T3 and associated roadworks was designed and supervised by the ST Consultant. In March 2003, the TDD awarded Contract ST2 to a contractor. In March 2003, the contractor proposed an alternative design for the bridge viaducts and noise barrier supporting frameworks. The contractor also proposed the use of fewer but larger diameter piles. The cost of works under the original design was \$498.2 million. The cost of works under the alternative design was \$479.4 million. In view of the savings of \$18.8 million, the TDD accepted the contractor's alternative design in March 2004. The TDD paid the Consultant about \$13.1 million for the original design.

Audit observations

2.15 **Under the payment terms of the old consultancy agreements, there is financial disincentive for the consultants to pursue an economical design because they would receive less consultancy fees if their design results in lower costs of works.** The risk of uneconomical design warrants the management's close monitoring. Based on Audit's sample checking of three consultancy agreements (see paras. 2.9 to 2.14), there were instances of alternative designs proposed by the contractors. Significant savings of \$75.3 million were derived from adopting the contractors' alternative designs, indicating that there were cheaper alternatives to the consultants' original designs. Audit considers that there is a need to tighten the control over the checking of consultant's designs to ensure that the economical design objectives are fully met from the outset. In this connection, Audit noted that in August 2004, the ETWB issued new guidelines on contractors' alternative designs under ETWB Technical Circular (Works) No. 25/2004. Among other things, the new guidelines reminded departments that the Government would only get a share of the cost saving arising from contractors' alternative designs after contract award.

To achieve best value for money, alternative designs should, as far as possible, be considered during the design and the tendering stages.

Audit recommendations

2.16 **Audit has recommended that the Director of Civil Engineering and Development should:**

- (a) **step up the checking of the consultants' designs to ensure that the objective of economical design is met; and**
- (b) **ensure that the guidelines on contractors' alternative designs under ETWB Technical Circular (Works) No. 25/2004 are complied with.**

Response from the Administration

2.17 The **Director of Civil Engineering and Development** agrees with the audit recommendations mentioned in paragraph 2.16. He has said that:

- (a) the CEDD has been complying with the ETWB guidelines in that each project office is required to set up a committee to review the preliminary design of a project to achieve cost-effectiveness and to avoid subsequent problems. The review results are reported to him or his delegate before proceeding with the detailed design. Value management studies are considered for every major project to achieve value for money by developing a cost-effective design at the early stage. Where there is potential for better value for money, the project office may invite tenderers to submit alternative designs in their tenders notwithstanding that a design has been provided by the consultant. The CEDD will consider strengthening the departmental procedure for further enhancement; and
- (b) in order to ensure competitive tendering, consultants have to prepare designs which can be built by more than one contractor. Such designs are usually based on commonly available plant and equipment. The designs are usually economical. It cannot be concluded that the scale fee method adopted in the old consultancies has resulted in more uneconomical designs which have in turn generated more contractor's alternative designs. Furthermore, cheaper alternative designs from contractors do not necessarily mean that the consultant's designs are uneconomical.

2.18 The **Secretary for the Environment, Transport and Works** has said that:

- (a) to ensure the quality of a consultant's work, relying only on the method of payment does not provide a complete solution. The consultant's technical proposal submitted in the selection stage and his past performance need to be properly evaluated in selecting the consultant for an assignment. In January 2002, the ETWB introduced past performance as a quality criterion in the final stage of selection of consultants. Consultants with good track records will have a higher chance of winning consultancies. The consultants' performance under the old consultancies is also taken into account in assessing their past performance;
- (b) it is true that, on the face of it, the adoption of an alternative design means that the Government is effectively paying for both the designs of the consultant and the contractor. However, there will usually be overall cost savings for the employer (i.e. the Government) where the benefit of adopting an alternative design will outweigh the additional design cost incurred. The fact that a contractor has submitted an alternative design does not necessarily mean that the original design was not the "best choice" based on the information available at the design stage when the expertise available from the prospective tenderers is not known; and
- (c) construction technology develops with time. A wide variety of enhanced construction techniques, which will have a bearing on the choice of design, are in possession by individual contractors. Permitting the contractors to submit alternative designs is an effective means of tapping these resources in the construction industry and encouraging cost-effective innovation. The ETWB has promulgated ETWB Technical Circular (Works) No. 25/2004 to facilitate the adoption of contractor's alternative design and to promote the concept of value engineering.

Resident site staff on-cost

2.19 Before 1995, it was the practice for consultants, acting as the Government's agents, to employ resident site staff for construction works supervision. The Government had to pay the consultants on-costs for the consultants' administration of the resident site staff. The on-cost was set at the rate of 10% of the staff salaries and gratuities. The Works Branch found in a review in 1991 that the arrangements had the following disadvantages:

- (a) *Unclear liability arising from action of resident site staff.* While technically the resident site staff were government employees, they were under the direct control of the consultant. In the event of a third party claim arising from the action of the resident site staff, it was unclear as to whether the Government or the consultant would be liable;

- (b) ***Slow recruitment/replacement procedures.*** The consultant was bound by the more rigid government procedures for the recruitment and replacement of resident site staff which took a long time to complete; and
- (c) ***Duplication of administrative efforts.*** The works department concerned had to spend considerable time in checking the consultant's work on recruitment and personnel management of the resident site staff.

2.20 Since 1995, the Government has adopted a new system by which consultants are required to employ directly resident site staff on projects for which they are responsible for construction supervision. To take account of the new administrative arrangements and other changed circumstances, the on-cost rate for the consultant's administration of the resident site staff has changed over the years:

- (a) ***Changes in 1995.*** With the implementation of direct employment of resident site staff by consultants in 1995, consultants were required to bid for the on-cost rates of the six categories of resident site staff in their tenders. For the ongoing old consultancy agreements, the TDD had to negotiate with the consultants concerned with a view to agreeing on a new on-cost rate. All the consultants then quoted a uniform on-cost rate of 25% on staff salaries and gratuities. In April 1996, the EACSB considered that, as the on-cost rate of 25% was widely used in the competitive bids received at that time, it was reasonable to accept 25% as the maximum on-cost rate for the ongoing consultancy agreements. In 1996, with the EACSB's approval, the TDD executed supplemental agreements for the direct employment of resident site staff and the adoption of the 25% on-cost rate under the old consultancy agreements; and
- (b) ***Changes in 1999.*** Under the system of direct employment of resident site staff by consultants, the Government reimburses consultants the cost of resident site staff by reference to the civil service employment terms. In view of the various civil service reviews since 1999, the employment terms and condition of resident site staff were also reviewed. In 1999, an interim measure was introduced requiring consultants to bid for the on-cost rates of the six categories of resident site staff on the basis of a fixed rate per man-month, instead of as a percentage payment on staff salaries and gratuities. In March 2002, the then Works Bureau promulgated a technical circular (Note 6) to formally adopt the fixed rate on-cost payment method as a standing arrangement.

Note 6: *This was Works Bureau Technical Circular No. 23/95A of March 2002. This circular has now been replaced by ETWB Technical Circular (Works) No. 31/2003 of November 2003. The contents of these two circulars concerning the fixed rate on-cost payment method are the same.*

Survey on resident site staff on-cost

2.21 In May 2001, the EACSB compiled a summary of the resident site staff on-cost under the new fixed rate payment method. The summary covered 21 consultancy agreements approved by the EACSB from May 2000 to April 2001. Based on the summary, Audit calculated the equivalent on-cost rates, expressed as a percentage of staff salaries and gratuities (details are shown in Appendix B). The maximum on-cost rates for the six categories of resident site staff ranged from 5.1% to 14.9%, which were lower than the 25% on-cost rate used under the old consultancy agreements since 1996 (see para. 2.20(a)). In 2004, Audit further sample checked the on-cost rates of ten consultancy agreements awarded since 2003 (details are shown in Appendix C). The maximum on-cost rates ranged from 3.2% to 8%. This showed that there had been further decrease in the on-cost rates as a result of competitive bidding.

Audit observations

2.22 **Market forces have lowered the on-cost rates of resident site staff for consultancy agreements awarded on competitive bidding. Based on the EACSB's information of 2001, the on-cost rates of resident site staff ranged from 5.1% to 14.9%. These rates were substantially lower than the 25% on-cost rate used under the old consultancy agreements since 1996.** Audit's recent survey showed that the market on-cost rates had further decreased to between 3.2% and 8%. For the year 2003-04, the resident site staff on-cost payment was \$33.6 million. The on-cost payment would be reduced to \$20 million if the highest bid rate of 14.9% is used, instead of the 25% under the old consultancy agreements. In other words, the on-cost payment under the old consultancy agreements was \$13.6 million more expensive. As such, there is a need to speed up the completion of the old consultancy agreements.

Audit recommendation

2.23 **Audit has recommended that the Director of Civil Engineering and Development should explore ways to speed up the completion of the old consultancy agreements.**

Response from the Administration

2.24 The **Director of Civil Engineering and Development** agrees with the audit recommendation mentioned in paragraph 2.23.

PART 3: WINDING UP OF OLD CONSULTANCY AGREEMENTS

3.1 This PART examines the TDD's efforts in winding up the old consultancy agreements.

1996 initiative

3.2 In January 1995, the then Secretary for the Treasury requested the TDD to look into the possibility of winding up some of the old consultancy agreements. In May 1995, the TDD sought legal advice with reference to the consultancy agreement CE/TM for the Tuen Mun Development, which was typical of these old consultancy agreements. Clause 25 of the General Conditions of Employment of Consulting Engineers (GCE — Note 7) stated that:

“The Director reserves the right at his discretion to suspend or terminate this Agreement by giving to the Consulting Engineers three months’ notice in writing. Upon any such suspension or termination, the Consulting Engineers shall be entitled to such fee proportionate to the fee referred to in the Schedule of Fees.....”

Based on the legal advice obtained, GCE Clause 25 could be used in appropriate circumstances to terminate the agreement on three months’ notice and upon the terms set out in that clause.

The TDD's exercise to wind up the old consultancy agreements

3.3 In May 1996, after consulting the development offices, the TDD Headquarters issued a paper setting out the position and the way forward on the winding up of the old consultancy agreements. The main points of the paper are summarised below:

- (a) **Background.** The scope of the old consultancy agreements was by no means certain. References were usually made to a number of vaguely defined public works programme items and plans roughly indicating a new town boundary. Under these agreements, project work was divided into phases and each phase was further divided into stages. The consultants could not start work on any phase or stage without the TDD's specific instruction. There was a common

Note 7: *The GCE set out the consultants' duties and responsibilities, define the various stages of the assignment and contain general provisions regarding the conduct of the agreement and the rights and obligations of both parties.*

provision in these agreements whereby the Government might terminate them after giving the consultants advance notice and paying the outstanding fees;

- (b) **Problems.** While the majority of the basic infrastructure of some of the new towns had been completed, the consultants were still asked to carry out work for the remaining development and newly identified projects within the new town boundary. The current government policy was that consultants were required to compete both in technical aspect and in fee. However, the consultants of these old consultancy agreements were enjoying the more favourable scale fee without competition. Moreover, the administration of these old consultancy agreements had become a burden because of staff changes;
- (c) **Status.** Based on information provided by the development offices, 18 consultancy agreements were targeted for winding up. These 18 consultancy agreements were classified into the following two categories:
 - (i) **“No immediate action required”.** There were 11 agreements in this category. The agreements were expected to be wound up when the current or committed work was completed; and
 - (ii) **“Adjustment to the scope required”.** There were 7 agreements in this category. The relevant consultants were to be approached with a view to omitting the uncommitted work from the agreements;
- (d) **Immediate action to be taken.** The development offices should review the old consultancy agreements under their control and consider ways to wind them up as soon as practicable, having regard to the circumstances of the individual case. To ensure a uniform approach, the development offices should seek approval from the TDD Headquarters before giving any new instruction to proceed to a new stage or phase of work in respect of the 18 consultancy agreements. The development offices should prepare final accounts for completed phases and stages of the agreements; and
- (e) **Projects not within scope.** Projects not within the scope of the consultancy agreements should go for tendering based on technical merit and fee competition.

3.4 Since 1996, the TDD Headquarters had carried out half-yearly reviews of the winding up of the 18 old consultancy agreements mentioned in paragraph 3.3(c). In October 2001, the TDD Headquarters reminded the development offices to also provide information on other old consultancy agreements (other than the 18 cases) in the half-yearly review to track progress on their completion.

Risk of claim for compensation in deleting outstanding work

3.5 In pursuance of the TDD Headquarters' instruction of 1996, the development offices had to discuss with the consultants the omission of uncommitted work from the old consultancy agreements (see para. 3.3(c)). In this connection, the development offices had to assess the risk of claims for compensation by the consultants. The first assessment related to consultancy agreement CE/ST (see paras. 3.6 to 3.8 for details). The second assessment related to consultancy agreement CE/IS (see paras. 3.9 to 3.11 for details).

Consultancy agreement CE/ST

3.6 The NTE DevO was responsible for managing consultancy agreement CE/ST. According to the scope of CE/ST, the design and supervision of the Trunk Road T3 project formed part of the ST Consultant's work. There was an overlap between the Trunk Road T3 project and the highways Route 16 project (renamed as Route 8 in August 2003). The Highways Department planned Route 8 to link Lai Chi Kok to Sha Tin. A section of approach roads of Route 8 inside the Sha Tin New Town boundary was included as part of the Trunk Road T3 project under CE/ST. In 1996, the Highways Department suggested to employ another consultant to carry out the design and works supervision of Route 8 and part of Trunk Road T3 to maintain integrity of design, minimise co-ordination work and interface problems during construction. It was expected that the consultancy fee obtained by open bidding would be cheaper than that charged under CE/ST.

3.7 In August 1996, the NTE DevO assessed the risks of claims by the ST Consultant if the Government was to enter into a new consultancy agreement for the design and supervision of the Trunk Road T3 project. The relevant terms of the consultancy agreement CE/ST were as follows:

- (a) ***Provisions under the GCE.*** GCE Clause 14(1) set out the duties to be performed by the Consulting Engineers. The consultancy work included the preliminary report stage, the design stage, the contract stage and the construction stage. GCE Clause 14(3) stated that "no guarantee is given or implied that the Consulting Engineers will be instructed to proceed from one stage to the next";
- (b) ***Provisions under CE/ST consultancy brief.*** Paragraph 1.3 of the CE/ST consultancy brief (Note 8) stated that Stage II engineering works had been divided into a number of discrete packages. Package No. 19 specifically referred to the construction of Trunk Road T3. Paragraph 2.4 of the brief stated

Note 8: *The consultancy brief describes the project and the assignment which the consultant is to undertake. It also sets down the scope and stages of the assignment and all general and specific requirements and/or constraints.*

that no guarantee could be given that all engineering works would be proceeded. However, it further stated that **“it is also anticipated that the Consulting Engineers will be instructed to proceed on each component of work as it is authorised by the Government but, again, no guarantee can be given that instructions to proceed will be issued for all or any work authorised”**; and

- (c) ***Overall position.*** Although there was no guarantee that the Government would give instructions to proceed with all or any work, paragraph 2.4 of the brief also provided that if the Government was to proceed with any work, it would be anticipated that the Consulting Engineers would be instructed to do so.

3.8 After seeking legal advice, the NTE DevO and the Highways Department decided that the whole Trunk Road T3 project should be assigned to the ST Consultant for design and supervision.

Consultancy agreement CE/IS

3.9 Consultancy agreement CE/IS for the development in Islands/Sai Kung districts was executed in 1975 and managed by the HKI&I DevO. In 1996, there were six work items to be carried out by the Consultant (the IS Consultant). With a view to winding up the consultancy agreement, the HKI&I DevO intended to delete the six outstanding work items from the agreement. The IS Consultant replied that he would claim for compensation.

3.10 In September 1996, the HKI&I DevO assessed the risk of claim for compensation by the IS Consultant if the Government wound up CE/IS by deleting the six outstanding work items. The relevant terms of the consultancy agreement CE/IS were as follows:

- (a) ***Provisions under the GCE.*** GCE Clause 25 provided that “The Director reserves the right at his discretion to suspend or terminate this Agreement by giving to the Consulting Engineers three months’ notice in writing. Upon any such suspension or termination, the Consulting Engineers shall be entitled to such fee proportionate to the fee referred to in the Schedule of Fees..... In addition, the Consulting Engineers shall be entitled to reimbursement of the actual cost of or an allowance in respect of any financial commitment or obligation such as the payment of overseas passages which they may have properly incurred for the purposes of the Project prior to the giving of the notice of suspension or termination.....”. Clause 1 of the Schedule of Fees stated that “the remuneration of the Consulting Engineers for the performance of the necessary services under the Agreement shall be calculated on the cost of the

works as defined in Clause 4, subject to the reservations and limitations in Clauses 5 and 6”. Clause 4 set out what constituted the cost of works whilst Clauses 5 and 6 were provisions about additional payment and expenses; and

- (b) ***Overall position.*** Based on the legal advice obtained, the Government might delete the outstanding work items by invoking GCE Clause 25.

3.11 In November 1996, the IS Consultant accepted the TDD’s decision that the claim for compensation of loss in respect of the deletion of the six outstanding work items was invalid.

Provisions of other ongoing old consultancy agreements

3.12 GCE Clause 25 is a common provision of all the old consultancy agreements. According to the legal advice of 1996, GCE Clause 25 might be invoked in appropriate circumstances and subject to the terms and provisions of the agreements to delete outstanding work items (see para. 3.10(b)).

Flexible provisions in consultancy agreement CE/NL

3.13 The HKI&I DevO was responsible for managing consultancy agreement CE/NL. The terms of CE/NL about the Government’s power to terminate the agreement were similar to those of CE/IS. In addition, paragraph 1.2.3 of CE/NL consultancy brief further stated that:

“During the term of the Study or at some later time, the Consultants may be required to proceed to the Design Stage (and possibly subsequent Stages) for all or part of the Works necessary to implement the Project. The Consultants should note that no representation or warranty of whatsoever nature is given that this work will be given to them. The Employer expressly reserves the right to carry out any subsequent work contemplated in this Agreement by its own forces or third parties. The Consultants shall not be entitled to compensation or payment should this occur.”

3.14 Consultancy agreement CE/NL was included in the TDD’s half-yearly review of the winding up of old consultancy agreements in November 2003. The following items relating to CE/NL were reported as work in progress and could not be deleted:

- (a) Contract NL3 — Tung Chung Development Phase 2B — Main Works;
- (b) Contract NL1 — Tung Chung Development Phase 3A — Reclamation;
- (c) Contract NL4 — Tung Chung Development Phase 2B — Access Road; and
- (d) Contract NL5 — Widening of Tung Chung Road between Pa Mei and Lung Tseng Tau.

3.15 The dates of the HKI&I DevO's instructions to the NL Consultant to carry out work relating to the four contracts are provided in Table 2:

Table 2

Date of instruction to start work

Contract	Date
A. <i>Instruction given before 1996</i>	
NL3	December 1993
B. <i>Instructions given after 1996</i>	
NL1	February 1998 for the investigation work and July 1998 for the design and supervision work
NL4	July 1998
NL5	May 2001

Source: CEDD records

The instructions to start work on Contracts NL1, NL4 and NL5 were given after commencement of the TDD's exercise in 1996 to wind up the old consultancy agreements. If action had been taken to delete these works from CE/NL by invoking the provision in paragraph 1.2.3 of the consultancy brief (see para. 3.13), it would have been possible to acquire the professional service by open tendering. The total consultancy fee (excluding the cost of resident site staff) for these three contracts was about \$10 million.

Current position

3.16 Up to May 2004, the TDD had wound up 22 old consultancy agreements (including 11 agreements targeted for winding up action in 1996 — see para. 3.3(c)). There are 12 ongoing old consultancy agreements. Five of the twelve agreements are expected to be completed within the next two years, but the completion dates of the remaining seven agreements are uncertain. Details of these twelve agreements are shown in Appendix D.

Audit observations

3.17 Of the 12 ongoing old consultancy agreements, 5 are expected to be completed within two years. **For the remaining 7 agreements without specific completion dates, there is a need to explore ways of early completion.**

3.18 Audit noted that before merging with the TDD in July 2004, the Civil Engineering Department had about 30% by value of its works projects managed by in-house staff. The remaining 70% of the works projects were managed by consultants. With the pooled resources, the CEDD may consider re-deploying the in-house staff to undertake some of the outstanding development work of new towns and major urban areas. If, as a result of this re-deployment, there is a need to acquire professional services for some other work of the CEDD, the professional services should be obtained by open tendering.

Audit recommendations

3.19 **Audit has recommended that the Director of Civil Engineering and Development should require the development offices to:**

- (a) **closely monitor the five consultancy agreements targeted for completion within the next two years to ensure that there is no slippage in their completion;**
- (b) **explore ways to facilitate the early completion of the seven old consultancy agreements without specific completion dates, such as taking over some of the outstanding development work of new towns and major urban areas by in-house staff, if this is feasible having regard to the provisions of the agreements; and**
- (c) **seek legal advice where there are doubts about the rights and obligations of the Government under the provisions of the old consultancy agreements.**

Response from the Administration

3.20 The **Director of Civil Engineering and Development** agrees with the audit recommendations mentioned in paragraph 3.19. He has said that:

- (a) the Public Works Programme Management Committee chaired by him and the Public Works Programme Review Committee chaired by the Deputy Director of Civil Engineering and Development are closely monitoring the five ongoing old consultancy agreements which are targeted for completion within two years to ensure that there is no slippage in their completion; and
- (b) as regards the seven ongoing old consultancy agreements without specific completion dates, the CEDD is exploring all possible means, including commercial settlement, with the concerned consultants to expedite their completion. Legal advice will be sought where necessary as recommended in paragraph 3.19(c).

Scope of work of consultancy agreements

3.21 *EACSB's requirements.* Since 1991, it has been the procedure that new consultancy agreements should be awarded on the basis of both technical merit and fee competition. The use of an existing consultant to undertake work not within the original scope of a consultancy agreement is at variance with the procedure. The EACSB Handbook stipulates that if, during a consultancy study, it is considered appropriate to extend the scope of the consultancy agreement, a submission should be made to the EACSB for approval. Where additional fees are involved, approval from the EACSB in principle to the extension should be sought prior to conducting negotiations with the consultant.

3.22 *TDD Headquarters' instruction of 1996.* In May 1996, the TDD Headquarters instructed all development offices that immediate action should be taken to facilitate the winding up of the relevant agreements as soon as possible. Projects not within the scope of the consultancy agreements should go for competitive tendering (see para. 3.3(e)). Audit selected two consultancy agreements, CE/ST and CE/YL for the Yuen Long Development, for checking whether they complied with the promulgated requirements. The results are summarised in paragraphs 3.23 to 3.28 for CE/ST, and paragraphs 3.29 to 3.30 for CE/YL.

Investigation work outside the scope of CE/ST

3.23 The work of the consultants under the old consultancy agreements is typically divided into clearly defined stages:

- **Investigation.** The investigation stage is primarily concerned with the technical and practical aspects of a project;
- **Design and contract.** The design and contract stage, which follows the investigation stage, is concerned with the preparation of detailed design, drawings, specifications and tender documents; and
- **Construction.** The construction stage is concerned with the administration and technical control of the works contracts.

3.24 For CE/ST, in July 1977, the EACSB (then known as the Consultant Selection Board) gave approval for the NTE DevO (then known as the Sha Tin New Town Development Office) to negotiate fees with the selected consultant only for the design and supervision of the construction works for Sha Tin Development. The investigation stage of work was not within the approved scope of CE/ST. This was provided for in Clause 3.2 of the consultancy brief of CE/ST, which stated that “for the purposes of the Project, the preliminary report stage is deemed to have been completed and no action is required on the part of the Consulting Engineers”. The preliminary report stage was defined in GCE Clauses 14 and 15 as “comprising an investigation into the whole Project and the preparation of such reports, drawings, estimates and other documents as are necessary to determine the practicability of the Project and the method or methods in respect of location, design (preliminary) and specification to be employed for the purposes of the Project.....”.

3.25 Audit selected three roadworks contracts (i.e. Trunk Roads T3, T4 and T7) under CE/ST for checking. In all three cases, there was investigation work conducted before the design and contract stage of the roadworks. For Trunk Road T4, the NTE DevO duly followed the EACSB’s requirement of obtaining the professional service for the investigation work by open tendering. However, for Trunk Roads T3 and T7, the NTE DevO instructed the ST Consultant to carry out investigation work. This was at variance with the EACSB’s requirements. Details are summarised in paragraphs 3.26 to 3.28.

3.26 **Trunk Road T3.** In April 1993, the NTE DevO instructed the ST Consultant to carry out a traffic and transport review for Trunk Road T3. The cost of \$2.9 million for the review was charged to Subhead “Consultants’ fees and charges and major in-house investigations for urban areas, new towns and public housing” in Category D of the Public Works Programme. However, the NTE DevO had not sought the approval of the EACSB to extend the scope of CE/ST before engaging the Consultant to carry out the review. The review was completed in 1994, i.e. before the NTE DevO instructed the Consultant to proceed with the design and contract stage of Trunk Road T3 (the approved scope of CE/ST) in August 1996.

3.27 **Trunk Road T7.** In November 1998, the NTE DevO instructed the ST Consultant to proceed with the design and contract stage of Trunk Road T7 (the approved scope of CE/ST). However, in 1997, the NTE DevO had instructed the Consultant to provide investigation services on the following occasions:

- (a) in March and June 1997, the Consultant was engaged to undertake environmental impact assessment and drainage impact assessment studies for Trunk Road T7. The cost of the studies of \$2.4 million was charged to Subhead “Minor housing development related works, studies and investigations” for items in Category D of the Public Works Programme; and
- (b) in October 1997, the Consultant was engaged to undertake the preliminary design for Trunk Road T7. The cost of the preliminary design work of \$2.6 million was charged to Subhead “Minor housing development related works, studies and investigations” for items in Category D of the Public Works Programme.

The NTE DevO had not sought the prior approval of the EACSB before engaging the Consultant to carry out the investigation work.

3.28 **Trunk Road T4.** In May 2002, the Director of Territory Development, under delegated authority, approved the funding of \$10 million under Subhead “New towns and urban areas works, studies and investigations” for items in Category D of the Public Works Programme for carrying out an investigation study for Trunk Road T4. The scope of the study included environmental, traffic and drainage impact assessments and preliminary design (similar to those carried out for Trunk Roads T3 and T7). In accordance with the EACSB’s established procedures, the NTE DevO obtained the professional service for the investigation work by open tendering.

No express provision for environmental impact assessment in CE/YL

3.29 Carrying out of environmental impact assessment was not a common practice before the Government introduced such a requirement in major public works projects in 1986. Consultancy agreement CE/YL for the Yuen Long Development was executed in 1975. The scope of CE/YL did not expressly cover the consultant’s duties associated with environmental impact assessment.

3.30 In September 1997, the TDD obtained approval from the Secretary for the Treasury to include the detailed design and an environmental impact assessment study for the Lau Fau Shan Development as a Category D item of the Public Works Programme. The Category D item for the Lau Fau Shan Development was estimated to cost

\$14.7 million, of which \$5.6 million was earmarked for the environmental impact assessment study. In October 1997, the NTN DevO instructed the YL Consultant to carry out the environmental impact assessment study for the Lau Fau Shan Development at a lump sum fee of \$1.8 million.

Audit observations

3.31 **The direct use of the ST Consultant to undertake work outside the original scope of CE/ST (see paras. 3.24 to 3.27) without seeking competitive tendering was at variance with the EACSB's laid down procedures.** Such an arrangement for the Trunk Road T7 project in 1997 was also not consistent with the intention of the TDD's 1996 exercise to wind up the old consultancy agreements. If there were special circumstances necessitating the use of the existing Consultant to carry out additional services outside the scope of the agreement, the development office concerned should have sought the prior approval of the EACSB to extend the scope of agreement.

3.32 As for consultancy agreement CE/YL (see paras. 3.29 to 3.30), in August 2004, Audit asked the CEDD why, in the absence of any express provision for environmental impact assessment study, the EACSB's prior approval to extend the scope of the agreement was not sought before instructing the YL Consultant to carry out the study. The CEDD replied that under the GCE of CE/YL, the duties of the Consultant included an investigation to determine the practicability of the project. The environmental impact assessment study was an indispensable task to determine the practicability of the Lau Fau Shan Development and hence was interpreted as within the scope of CE/YL. **However, in Audit's view, it is prudent to clarify with the EACSB whenever an interpretation of the scope of a consultancy agreement, beyond its express terms, is in doubt.**

Audit recommendations

3.33 **Audit has recommended that the Director of Civil Engineering and Development should ensure that the development offices:**

- (a) **award consultancy assignments, which are outside the scope of an existing consultancy agreement, only on the basis of technical merit and fee competition;**
- (b) **seek the prior approval of the EACSB to extend the scope of an existing consultancy agreement if there are special circumstances necessitating the use of an existing consultant to provide services which are outside the scope of the agreement; and**

- (c) seek clarification with the EACSB whenever the scope of a consultancy agreement is in doubt.

Response from the Administration

3.34 The **Director of Civil Engineering and Development** agrees with the audit recommendations mentioned in paragraph 3.33. He has said that:

- (a) the three items of work outside the scope of CE/ST (see paras. 3.26 and 3.27) were instructed between April 1993 and October 1997. Procedures and controls were tightened in late 1997 and again in 1998. The letting of a separate investigation consultancy for Trunk Road T4 (highlighted in para. 3.28) is a result of the tighter control; and
- (b) in addition to following the laid down procedures, since 1998, the CEDD has implemented the Quality Management System covering project management services for the planning, design and implementation of civil engineering works. The procedures for selecting and employing consultants and ordering additional services are included in the Quality Management System documentation.

PART 4: PHASING OF WORKS FOR FEE CALCULATION

4.1 This PART examines the phasing of works instructed under the old consultancy agreements for fee calculation.

Application of the basic scale fee

4.2 The basic fee structure of the old consultancy agreements is a tapering scale of percentage charges on the cost of works, i.e. the percentage charges decrease with the increase in the cost of works up to a certain threshold. For the cost of works above the threshold, the lowest percentage charge applies. According to the EACSB Handbook, for the development of a new town which usually spans over a number of years, there may be justification for separating the works into phases and calculating the consultancy fee separately for each phase.

4.3 The implication of the phasing of works for fee calculation is that the total fee would be higher than that if the cost of works of all phases is aggregated for fee calculation. This is because if the cost of works is aggregated for fee calculation, the higher percentage charges are applied only **once** up to the threshold, and thereafter the lowest percentage charge is applied for any value over the threshold. If the works are divided into separate phases for fee calculation, the cost of works for each phase would be subject to the tapering scale of percentage charges separately.

4.4 The Schedule of Fees (Note 9) for the consultancy agreements usually sets out the number of phases a project shall be divided into for the purpose of fee calculation. In some consultancy agreements, the phases may be further divided into sub-phases for fee calculation, as follows:

“Should the Director’s Representative (Note 10) require that each phase be further divided into sub-phases, each sub-phase shall be defined as comprising all works for which instructions are given to proceed to the Design Stage at any one time. The fees shall be calculated separately for each phase or sub-phase, so that the Cost of

Note 9: *The Schedule of Fees sets out the fees and expenses to be paid to a consultant for carrying out the assignment and also the method of payment.*

Note 10: *The Director’s Representative is the person appointed by the Director to give instructions and convey the Government’s decisions and views to the consultant. He is usually the Project Manager of the development office responsible for the consultancy agreement.*

Civil Engineering Works or Cost of Structural Works used in applying the Scale of Percentage Charges shall be the part of such cost applicable to the separate phase or sub-phase.”

EACSB’s guidelines on phasing of works for fee calculation

4.5 Originally, there was no provision in the consultancy agreements CE/TP and CE/IS for further division of the works into phases/sub-phases for fee calculation. In approving amendments to these consultancy agreements to allow for the division of the work into phases/sub-phases for fee calculation, the EACSB laid down guidelines in their application. The details are summarised in paragraphs 4.6 to 4.8.

4.6 ***Consultancy agreement CE/TP.*** Consultancy agreement CE/TP for the Tai Po Development was executed in 1975. In the Schedule of Fees of CE/TP, it was stated that “the Project shall be designed and planned for construction in three phases, each phase being defined as comprising all works in each of the three separate development areas (i.e. Tai Po, Fanling and Shek Wu Hui)”. In 1984, the TP Consultant informed the TDD of the financial difficulties in operating under CE/TP. The Consultant said that the scope of works had increased beyond what could have been foreseen on signing the agreement. The fact that each new project was aggregated for fee purpose had contributed to the financial difficulties. In May 1984, the EACSB approved the inclusion in CE/TP a clause (which existed in other consultancy agreements) for the discretionary division of works into further phases for fee calculation (see para. 4.4). **The EACSB said that the approval was given on the assumption that each phase would comprise as large a package of works as possible.**

4.7 ***Consultancy agreement CE/IS.*** The terms of CE/IS did not specify if the cost of works in the various townships of the outlying islands, or works in the various packages of a town, was to be aggregated for fee calculations. In 1980, due to the widely separated locations of the townships and the piecemeal fashion in which development was implemented, the IS Consultant requested renegotiation of the payment terms. In September 1980, the EACSB approved the inclusion of the following new clause about fee calculation:

“Subject to the approval of the Director’s Representative, fees will be calculated individually for each part of the project for which the Government instructs the Consulting Engineers to proceed to the Design and Contract Stages. The separate parts of the project for which fees may be calculated individually will generally comprise those for which instructions have been given at any one time to proceed to the Design and Contract Stages.”

In September 1980, the EACSB agreed that the new clause should take retrospective effect from April 1980. In April 1992, the EACSB further agreed that the new clause should be applied to all works instructed under CE/IS. **However, the EACSB also recommended that, where the Director's Representative considered that it was reasonable to do so, instructions to proceed to the design and contract stage issued over a relatively short time span should be deemed to constitute one instruction only.**

4.8 In accordance with the EACSB's recommendation, in May 1992, the HKI&I DevO agreed with the IS Consultant that instructions issued within one year of each other for the same township were to be treated as a single instruction for calculating the basic scale fee. As a result, the cost of two packages of works in Mui Wo under two separate instructions issued in July and November 1976 was aggregated for fee calculation. Similarly, the cost of two packages of works in Cheung Chau under two separate instructions in October 1983 and May 1984 was aggregated for fee calculation.

Audit check on phasing of works for fee calculation

4.9 Audit selected five old consultancy agreements (Note 11) for checking on the phasing of works for fee calculation to see if the phasing applied was consistent with the agreement terms and the EACSB's guidelines. The sample check covered works carried out under the five consultancy agreements since 1990. In four of the five consultancy agreements checked, there were fee payments made for works which should have been aggregated for fee calculation. The details are summarised in paragraphs 4.10 to 4.17.

Consultancy agreement CE/TM

4.10 The Schedule of Fees of CE/TM provided that the new town development in Tuen Mun "shall be designed and planned for construction in two phases subject to division into contracts of suitable sizes as provided for in the Brief. Should the Director's Representative require that the Project be divided into further phases, **each phase shall be defined as comprising all works for which instructions are given to proceed to the Design Stage at any one time.** The fees shall be calculated separately for each phase so that the cost of works used in applying the Scale of Percentage Charges shall be the part of such cost applicable to the separate phase."

Note 11: *The five consultancy agreements selected for checking were CE/TM, CE/TP, CE/YL, CE/IS and CE/CC for the Cheung Chau Development.*

4.11 In June 1993, the NTW DevO instructed the TM Consultant to proceed with the detailed design for the following two contracts:

- (a) Contract TM1 for constructing outstanding roadworks in Tuen Mun and a footbridge over Road D9; and
- (b) Contract TM2 for constructing a cycle bridge across road D1 and a cycle track in Tuen Mun.

According to the Schedule of Fees, the cost of works of these two contracts, which were instructed at the same time, should be aggregated for consultancy fee calculation. However, Audit's inspection of the related payment records revealed that the cost of works of these two contracts was not aggregated for fee calculation. As a result, there was an overpayment of about \$288,000 to the Consultant.

4.12 In April 1994, the NTW DevO instructed the TM Consultant to proceed with the detailed design for the following two contracts:

- (a) Contract TM3 for constructing footbridges, roads and drains in Tuen Mun; and
- (b) Contract TM4 for the site formation and construction of an access road in Tuen Mun.

According to the Schedule of Fees, the cost of works of these two contracts (the works were instructed at the same time) should be aggregated for consultancy fee calculation. However, Audit's inspection of the payment records revealed that the cost of works of these two contracts was not aggregated for fee calculation. As a result, there was an overpayment of about \$440,000 to the Consultant.

Consultancy agreement CE/YL

4.13 The Schedule of Fees of CE/YL provided that the new town development in Yuen Long district "shall be designed and planned for construction in three phases, each phase being defined as comprising all works in each of the three separate development areas. **Should the Director's Representative require that each phase be further divided into sub-phases, each sub-phase shall be defined as comprising all works for which instructions are given to proceed to the Design Stage at any one time.**"

4.14 In November 1991, the NTN DevO instructed the YL Consultant to proceed with the design and construction of Kau Hui Development. The development was subsequently implemented by stages, as follows:

- (a) the Kau Hui Development phase 1 engineering works were carried out under Contract YL1;
- (b) the Kau Hui school site was carried out under Contract YL2; and
- (c) the Kau Hui Development phase 2 engineering works had been suspended at the design stage since 1999.

According to the Schedule of Fees, the cost of the above works (which were instructed at the same time) should be aggregated for consultancy fee calculation. However, Audit found that the cost of these works was not aggregated for fee calculation. The NTN DevO agreed with Audit's observation that, if adjustments were not made to the fee calculation basis, there would be an overpayment of \$171,000. The NTN DevO undertook to make necessary adjustment in the future payment due to the Consultant.

Consultancy agreement CE/IS

4.15 As mentioned in paragraph 4.7, in April 1992, the EACSB approved the retrospective application of the provision for the phasing of works to all works instructed under CE/IS. In December 1987, the HKI&I DevO instructed the IS Consultant to proceed with the design, contract and construction stages for the following two contracts of the Cheung Chau Development:

- (a) Contract IS1 for Cheung Chau Development Package 4, Stages I and II (part); and
- (b) Contract IS2 for Cheung Chau Development Package 4, Stage II.

According to the Schedule of Fees, the cost of the above works (the works were instructed at the same time) should be aggregated for consultancy fee calculation. However, Audit found that the cost of these works was not aggregated for fee calculation. As a result, there was an overpayment of about \$514,000 to the Consultant.

4.16 In August and September 1993, the HKI&I DevO issued two instructions to the IS Consultant to proceed with the design, contract and construction of Tai O Development, as follows:

- (a) instruction for Tai O Development, Package 3 and Package 4 Stage I works was issued on 4 August 1993; and
- (b) instruction for Tai O Development, Package 4 Stage II works was issued on 23 September 1993.

According to the EACSB's recommendations of April 1992, instructions to proceed to the design and contract stage issued over a relatively short time span should be deemed to constitute one instruction only (see para. 4.7). In fact, in May 1992, the HKI&I DevO agreed with the Consultant that instructions issued within one year of each other for the same township were to be treated as a single instruction for calculating the basic scale fee (see para. 4.8). However, Audit found that the cost of the Tai O Development works completed so far was not aggregated for fee calculation. It is estimated that there would be an overpayment of about \$442,000 in the consultancy fee if the cost of works is not aggregated in preparing the final account for CE/IS.

Consultancy agreement CE/CC

4.17 Consultancy agreement CE/CC for the Cheung Chau Development was executed in 1989. The Schedule of Fees of CE/CC provided that "for the purpose of calculating the Consultant's remunerations on a percentage basis, the cost of works refers to the total cost of works covered by this Agreement notwithstanding the works having to be executed under more than one contract if necessary." The works for improving existing roads and drains in Cheung Chau old town under CE/CC were carried out in two stages. The Stage I works were completed at a cost of \$61.2 million. The Stage II works, estimated to cost \$115 million, are currently in progress. Audit found that the cost of the Stage II works was not aggregated with that of the Stage I works for fee calculation, as required by the Schedule of Fees. There was an overpayment of about \$248,000 for the design and contract stage.

Audit observations

4.18 Under the basic scale fee structure of the old consultancy agreements, the phasing of works for fee calculation would result in a higher total consultancy fee than if the works are not divided into phases. The phasing of works should therefore be applied with due care in accordance with the agreement terms and the EACSB's guidelines. **Based on the results of the sample checks mentioned in paragraphs 4.10 to 4.17, there were instances of improper phasing of works for fee calculation, resulting in the overpayment of fees of about \$2.1 million (see paras. 4.11, 4.12, 4.14 to 4.17).** There is a need to tighten the control over the phasing of works for fee calculation.

Audit recommendations

4.19 **Audit has recommended that the Director of Civil Engineering and Development should:**

- (a) **carry out detailed checks of the fee calculation of the old consultancy agreements to ensure that phasing of works is consistent with the agreement terms and the EACSB's guidelines; and**
- (b) **take prompt action to recover any overpayment of consultancy fee due to improper phasing of works for fee calculation.**

Response from the Administration

4.20 The **Director of Civil Engineering and Development** agrees with the audit recommendations mentioned in paragraph 4.19. He has said that the CEDD has initiated action to carry out detailed checks of the fee calculation of the old consultancy agreements and will take prompt recovery action where there is an overpayment of fee.

PART 5: DESIGN AND CONTRACT STAGE FEE

5.1 This PART examines the cost of works used for calculating the consultancy fee of the design and contract stage.

Works designed by others

5.2 According to the Schedule of Fees of the old consultancy agreements, a consultant is required to perform all the duties of a specified stage of work before he is entitled to full payment of consultancy fee for that stage of work. A consultant is therefore not entitled to the design portion of the design and contract stage fee for works which he has no design input, such as entrusted works designed by other departments.

CE/WK — overpayment of design fee for a culvert

5.3 In 1990, the K DevO engaged the WK Consultant to carry out the investigation, design and construction supervision of the West Kowloon Development. There was a need to extend the Gascoigne Road culvert to reach the new waterfront formed by the West Kowloon Development. After the Drainage Services Department had completed the detailed design of the Gascoigne Road culvert extension works, it entrusted the works to the TDD. The TDD included the works as part of the West Kowloon Development Southern Area roadworks Contract WK3 supervised by the Consultant.

5.4 According to the final account of Contract WK3 of 2002, the cost of the Gascoigne Road culvert extension works was \$9 million. While the WK Consultant had no design input in the culvert extension works, the cost of \$9 million was included in calculating the design and contract stage fee paid to the Consultant, resulting in an overpayment of some \$100,000 in design fee (Note 12). In response to Audit's enquiry, in July 2004, the K DevO said that the design fee was paid on an on-account basis at this stage and adjustment would be made in future payment to the Consultant.

Note 12: *The total design and contract stage fee paid was about \$140,000. As the WK Consultant had been involved in the contract preparation of the Gascoigne Road culvert extension works, the K DevO agreed that the Consultant was entitled to 30% of the total design and contract stage fee. Therefore, the overpayment of design fee was about \$100,000 (i.e. \$140,000 times 70%).*

Audit observations

5.5 Audit noted that in 1995, the TDD's engineer responsible for Contract WK3 had reminded the team responsible for processing the consultancy fee payment to exclude the cost of the Gascoigne Road culvert extension works in calculating the design fee. However, the reminder was not brought up for action. Hence the overpayment had gone unnoticed. Audit noted that in July 2004, the K DevO issued an office instruction to its project and accounts staff to improve the office procedures.

Audit recommendations

5.6 Audit has *recommended* that the Director of Civil Engineering and Development should require the development offices to:

- (a) check whether there is any overpayment of design fee to which a consultant is not entitled and take recovery action as appropriate; and
- (b) put in place a proper filing system to bring up information essential for checking fee payment.

Response from the Administration

5.7 The Director of Civil Engineering and Development agrees with the audit recommendations mentioned in paragraph 5.6.

Information on contractor's alternative designs

Consultancy agreement CE/WK

1. *Alternative design for Contract WK2.* In December 1998, the TDD awarded Contract WK2 for constructing West Kowloon Development roadworks. In January 1999, the contractor proposed an alternative piling design for a road and two footbridges. The contractor proposed using fewer but larger diameter piles. The WK Consultant considered the alternative piling works acceptable. The cost of piling under the original design was about \$63.6 million. The contractor offered to carry out the alternative piling works for about \$62.4 million. In view of the savings of \$1.2 million and benefits in programming, the TDD accepted the contractor's alternative design in October 2000. The TDD paid the Consultant about \$1 million for the original design.

Consultancy agreement CE/NL

2. *Alternative design for Contract NL2.* In May 1997, the TDD awarded Contract NL2 for constructing Tung Chung Development Phase 2A infrastructure. In August 1997, the contractor proposed an alternative design using larger diameter bored piles for a road bridge. The NL Consultant considered the alternative piling works technically feasible. The cost of piling works under the original design was about \$19.2 million. The contractor's offer for the alternative piling works was about \$18.5 million. In view of the savings of \$0.7 million and benefit in programming, the TDD accepted the contractor's alternative design in April 1999. The TDD paid the Consultant about \$0.3 million for the original design.

Consultancy agreement CE/ST

3. *Alternative designs for Contract ST3.* In July 2000, the TDD awarded Contract ST3 for constructing local roads and drainage works at Shek Mun. During the works, two alternative designs were accepted, as follows:
 - (a) in December 2000, the contractor proposed alternative piling works for the foundation of a noise barrier. The cost of works under the original design was \$41.3 million. The cost of works under the alternative design was \$40.6 million. The ST Consultant considered the contractor's offer fair, reasonable and beneficial to the Government. In view of the savings of \$0.7 million, the TDD accepted the contractor's alternative design in September 2001. The TDD paid the Consultant about \$1.2 million for the original design; and

- (b) in February 2002, the contractor proposed an alternative design for a transparent noise barrier system. The cost of works under the original design was \$13 million. The cost of works under the alternative design was \$12.5 million. In view of the savings of \$0.5 million, the TDD accepted the contractor's alternative design in May 2002. The TDD paid the ST Consultant about \$0.4 million for the original design.

- 4. ***Alternative designs for Contract ST4.*** In December 2001, the TDD awarded Contract ST4 for constructing a road. During the works, two alternative designs were accepted, as follows:
 - (a) in July 2002, the contractor proposed an alternative design for the foundations and deck of three bridges. The alternative design included replacing the cast-in-situ bored piles with smaller diameter pre-bored piles, and replacing the beams for the bridge deck to reduce its weight. It was checked that the alternative design would provide the same function as the original design. The cost of works under the original design was \$23.8 million. The cost of works under the alternative design was \$21.7 million. In view of the savings of \$2.1 million and less environmental nuisance due to using smaller machines, the TDD accepted the contractor's alternative design in September 2002. The TDD paid the ST Consultant about \$0.8 million for the original design; and
 - (b) in July 2002, the contractor proposed an alternative design for two retaining walls. The cost of works under the original design was \$5.8 million. The cost of works under the alternative design was \$4.9 million. In view of the savings of \$0.9 million and less environmental nuisance due to using smaller machines, the TDD accepted the contractor's alternative design in September 2002. The TDD paid the ST Consultant about \$0.2 million for the original design.

- 5. ***Alternative designs for Contract ST5.*** In November 2002, the TDD awarded Contract ST5 for constructing Route 8. In May 2003, the contractor proposed three alternative designs which were accepted by the TDD, as follows:
 - (a) the contractor's first proposal involved an alternative temporary access road (Note 1) to minimise the risk in using the originally designed temporary access road which would span over the live East Rail tracks. The alternative design would provide the same function as the original design. The cost of works under the original design was \$7.2 million. The cost of works under the alternative design was \$5.6 million. In view of the savings of \$1.6 million and the reduced construction risk, the TDD accepted the contractor's alternative design in

September 2003. The TDD paid the ST Consultant about \$0.3 million for the original design;

- (b) the contractor's second proposal involved an alternative design for slip roads and associated works. The original design required a permanent diversion of a section of a culvert, and involved large-scale excavation, utilities diversion and temporary traffic arrangements. The alternative design allowed for constructing the slip roads without culvert and utilities diversion. The cost of works under the original design was \$147.9 million. The cost of works under the alternative design was \$144.5 million. In view of the savings of \$3.4 million and less nuisance to the public, the TDD accepted the contractor's alternative design in December 2003. The TDD paid the ST Consultant about \$5.2 million for the original design; and
- (c) the contractor's third proposal involved an alternative design to the site formation and associated works of a tunnel. The main features for the alternative design included replacing the bored pile walls and L-shaped retaining walls by reinforced earth walls and associated works (Note 2). The cost of works under the original design was \$72.5 million. The cost of works under the alternative design was \$62.8 million. In view of the savings of \$9.7 million and less environmental nuisance (due to reduced use of heavy construction machinery), the TDD accepted the contractor's alternative design in January 2004. The TDD paid the ST Consultant about \$2.5 million for the original design.

Source: CEDD records

Note 1: The alternative temporary access road had been considered at the design and contract stage but was not recommended by the ST Consultant because the construction traffic generated by the works, if not planned carefully, might be affected by the busy Tai Po Road. However, the contractor later suggested a scheme that would substantially reduce the off-site traffic volume for delivering excavated materials. The scheme was thus considered viable.

Note 2: The use of reinforced earth walls had been considered at the design and contract stage but was not recommended by the ST Consultant because the walls were more susceptible to excessive deformation due to vibration from blasting operation. The number of specialist contractor capable of building such walls was rather limited. The use of bored pile walls would attract more competitive bidding. After the award of the contract, the contractor analysed the blasting operation and identified a working method that could limit the vibration impact on the reinforced earth wall.

Survey of on-cost rates in 2001

(A) On-cost rate per man-month:

Agreement No.	Resident site staff on-cost rate (\$ per man-month) (Note 1)					
	R1	R2	R3	R4	R5	R6
CE/X1	—	—	3,000	850	600	—
CE/X2	—	—	3,800	1,800	1,200	—
CE/X3	—	—	5,000	2,500	2,000	—
CE/X4	—	—	2,500	1,150	720	100
CE/X5	—	—	4,400	2,200	1,400	—
CE/X6	—	—	2,000	2,000	2,000	—
CE/X7	5,700	4,620	3,250	1,560	860	560
CE/X8	—	—	5,000	2,000	1,800	—
CE/X9	—	—	5,000	3,000	2,000	—
CE/X10	—	—	2,500	2,500	2,500	—
CE/X11	—	—	1,200	650	400	—
CE/X12	—	—	2,600	1,500	1,500	—
CE/X13	—	—	6,400	2,350	1,500	—
CE/X14	—	6,560	3,945	3,078	1,640	—
CE/X15	6,300	5,000	3,000	1,700	900	600
CE/X16	—	4,900	3,000	1,500	600	—
CE/X17	12,640	10,260	6,390	3,340	1,960	—
CE/X18	6,900	5,000	3,300	1,600	900	500
CE/X19	—	5,500	3,500	1,600	1,200	—
CE/X20	—	4,320	1,400	800	—	—
CE/X21	—	5,100	3,470	1,720	950	—

Appendix B
(Cont'd)
(para. 2.21 refers)

(B) The maximum on-cost as a percentage of monthly salaries and gratuities:

	R1	R2	R3	R4	R5	R6
(a) Maximum on-cost (\$ per man-month — Note 2)	12,640	10,260	6,400	3,340	2,500	600
(b) Monthly salaries & gratuities (\$)	126,375	102,631	75,238	48,369	16,781	11,851
(c) Maximum on-cost rate (c)=(a)÷(b)×100%	10.0%	10.0%	8.5%	6.9%	14.9%	5.1%

Source: *Audit analysis of EACSB records*

Note 1: *The consultant's fee proposals included six resident site staff on-cost rates (R1 to R6):*

R1 is for staff on Directorate Pay Scale D1 or above;

R2 is for staff on Master Pay Scale 45-49;

R3 is for staff on Master Pay Scale 34-44;

R4 is for staff on Master Pay Scale 15-33;

R5 is for staff on Master Pay Scale 1-14; and

R6 is for staff on Model Scale I.

Note 2: *This is the highest rate for the respective category in item (A).*

Survey of on-cost rates in 2004

(A) On-cost rate per man-month:

Agreement No.	Resident site staff on-cost rate (\$ per man-month) (Note 1)					
	R1	R2	R3	R4	R5	R6
CE/Y1	—	—	1,750	1,150	1,000	—
CE/Y2	—	—	4,000	1,500	1,200	—
CE/Y3	—	—	4,000	1,500	1,200	—
CE/Y4	—	—	6,000	1,500	1,200	—
CE/Y5	4,000	3,800	3,300	1,500	800	—
CE/Y6	—	—	3,100	1,600	1,100	—
CE/Y7	—	—	4,000	2,000	1,000	—
CE/Y8	—	5,000	3,500	1,600	900	—
CE/Y9	—	—	3,500	1,500	800	—
CE/Y10	—	—	4,000	2,000	1,200	—

(B) The maximum on-cost as a percentage of monthly salaries and gratuities:

	R1	R2	R3	R4	R5	R6
(a) Maximum on-cost (\$ per man-month — Note 2)	4,000	5,000	6,000	2,000	1,200	—
(b) Monthly salaries & gratuities (\$)	126,825	102,988	75,506	48,713	19,088	—
(c) Maximum on-cost rate (c)=(a)÷(b)×100%	3.2%	4.9%	8.0%	4.1%	6.3%	—

Source: Audit analysis of works departments records

Note 1: The consultant's fee proposals included six resident site staff on-cost rates (R1 to R6):

R1 is for staff on Directorate Pay Scale D1 or above;

R2 is for staff on Master Pay Scale 45-49;

R3 is for staff on Master Pay Scale 34-44;

R4 is for staff on Master Pay Scale 15-33;

R5 is for staff on Master Pay Scale 1-14; and

R6 is for staff on Model Scale I.

Note 2: This is the highest rate for the respective category in item (A).

Ongoing old consultancy agreements as at May 2004

(A) Five ongoing consultancy agreements expected to be completed within two years:

Consultancy Agreement	DevO	Status		Expected completion date
		Number of work items agreed with consultants to be deleted	Number of work items in progress/ not yet started	
CE/TW* (Note 1)	NTW	Nil	1	2004
CE/TWR	NTW	Nil	1	2005
CE/TPS*	NTN	Nil	1	2005
CE/IS*	HKI&I	9	4	2005
CE/NL	HKI&I	Nil	4	2006

(B) Seven ongoing consultancy agreements for which the completion dates are uncertain:

Consultancy Agreement	DevO	Status		Expected completion date
		Number of work items agreed with consultants to be deleted	Number of work items in progress/ not yet started	
CE/ST*	NTE	Nil	11	Uncertain
CE/TKO	NTE	Nil	7	Uncertain
CE/TP*	NTN	3	3	Uncertain
CE/YL*	NTN	2	3	Uncertain
CE/TSW*	NTN	1	2	Uncertain
CE/WK	K	Not Applicable	Not Applicable	(Note 2)
CE/CC	HKI&I	Not Applicable	Not Applicable	(Note 2)

Source: CEDD records

Note 1: Agreements marked with * were targeted for winding up action in 1996.

Note 2: Up to May 2004, CE/WK and CE/CC were not included in the half-yearly monitoring reports of TDD's old consultancy agreements.

Chronology of key events

July 1977	The EACSB approved the negotiation with the ST Consultant only for the design and supervision work of Sha Tin Development.
May 1984	The EACSB approved the inclusion in CE/TP a clause for the division of works into phases for fee calculation on the assumption that each phase would comprise as large a package of works as possible.
1989	The Lands and Works Branch tasked a Working Party to review the selection of consultants and the fee remuneration method.
May 1991	The Government adopted a new system of selecting engineering consultants based on both technical merit and fee competition and using fixed lump sum fee.
April 1992	The EACSB recommended that for CE/IS, instructions to proceed to the design and contract stage issued over a short time span should be deemed as one instruction.
1995	The Government adopted a new system of direct employment of resident site staff by consultants.
May 1996	The TDD initiated an exercise to wind up some of the old consultancy agreements.
1996	The EACSB approved the use of 25% as the maximum on-cost rate for the old consultancy agreements.
July 2004	The TDD merged with the Civil Engineering Department to form a new CEDD.
August 2004	The ETWB issued new guidelines on contractors' alternative design.

Acronyms and abbreviations

Audit	Audit Commission
CEDD	Civil Engineering and Development Department
CE/CC	Consultancy agreement for the Cheung Chau Development
CE/IS	Consultancy agreement for the development in Islands/ Sai Kung districts
CE/NL	Consultancy agreement for the North Lantau Development
CE/ST	Consultancy agreement for the Sha Tin Development
CE/TM	Consultancy agreement for the Tuen Mun Development
CE/TP	Consultancy agreement for the Tai Po Development
CE/WK	Consultancy agreement for the West Kowloon Development
CE/YL	Consultancy agreement for the Yuen Long Development
EACSB	Engineering and Associated Consultants Selection Board
ETWB	Environment, Transport and Works Bureau
GCE	General Conditions of Employment of Consulting Engineers
HKI&I DevO	Hong Kong Island and Islands Development Office
K DevO	Kowloon Development Office
NTE DevO	New Territories East Development Office
NTN DevO	New Territories North Development Office
NTW DevO	New Territories West Development Office
TDD	Territory Development Department