(Translation)

香港特別行政區政府
The Government of the Hong Kong Special Administrative Region

運輸及房屋局
香港九龍何文田佛光街 33 號

Transport and Housing Bureau
33 Fat Kwong Street, Ho Man Tin,
Kowloon, Hong Kong

本局檔號 Our Ref. HD 4-2/PS1/1-55/1/4 (2017/18) III
來函檔號 Your Ref.

電話 Tel No. 2761 5049
圖文傳真 Fax No. 2761 7445

5 January 2018

Mr Derek Lo
Clerk to Legislative Council Panel on Housing
Legislative Council Secretariat
Legislative Council Complex
1 Legislative Council Road, Central
Hong Kong

Dear Mr Lo,

Legislative Council Panel on Housing
Letter on 1 December 2017

Thank you for your email dated 1 December 2017, attaching a letter dated 30 November 2017 from Hon CHU Hoi-dick, which requested the Government to provide supplementary information on the issues mentioned below.

2. After consolidating information gathered from relevant bureaux/departments, our reply regarding the relevant issues is as follows -

Planning and Cost of Infrastructure Projects for Supporting Public Housing Developments

3. Land is crucial for sustaining Hong Kong's housing development. The Government attaches great importance to the supply of adequate land to house our growing population, and to provide the necessary infrastructures to support the population in Hong Kong. Given the unique and mountainous topography of Hong Kong and the major shift in demographic and economic structures over the past-decades, planning and land development have been challenging, not only in ensuring adequate and timely supply of land in tandem

with population and economic growth, but also in providing land for the mix of different uses.

4. In planning land for development, the Government has been adopting a multi-pronged approach to identify suitable areas and sites for development, conduct appropriate planning and engineering studies or land use reviews, and undertake necessary improvement and mitigation measures, thereby providing land for development in a technically and environmentally acceptable, efficient and cost-effective manner.

5. To support public housing developments, the Government needs to carry out site formation and infrastructure works. Since 1997, the Government has implemented various such projects. The site formation and infrastructure works under Capital Works Reserve Fund (CWRF) Head 711 and proposed by the Civil Engineering and Development Department (formerly known as Territory Development Department) are set out in **Annex 1**.

6. The capital cost of a project depends on the scope of works; while the scope of works depends on the limitations and technical difficulties specific to individual projects.

7. In site formation and infrastructure works projects for public housing developments of the Hong Kong Housing Authority (HA), the design and the scope of the site formation part vary with a host of factors, including site location, topography, geology, and the proposed site formation levels, etc.; whereas those of the infrastructure works part differ depending on a number of factors including the existing infrastructure provisions, the development parameters of the project, the estimated traffic growth and the future planning of the area. Such infrastructure works are not only for supporting public housing developments, but also improving the environment and community facilities in the vicinity, which provide intangible benefits to the community as a whole.

8. The physical environment in the vicinity of the proposed project also affects the construction methodology and programme. These two factors are also directly related to the capital cost.

9. Besides, the number of units produced under a public housing development depends on the planning brief and the permitted plot ratio. The planning brief of a public housing development is based on the planning intention, the development restrictions on the Outline Zoning Plan, topography, surrounding land uses and considerations over public comments received. A number of urban design considerations including wind corridors, visual

permeability, the size and height of building blocks and their connectivity and integration, open space and pedestrian linkage systems, etc., also have to be taken into account in the development projects.

10. Based on the above considerations, it is not appropriate to assess the cost-effectiveness of a project merely by comparing the capital cost of the project and the number of public housing units to be produced. In response to the community's keen demand for public housing, we have been adopting the principle of optimising land use as long as planning, infrastructure and environmental factors permit, so as to fully optimise the development potential of lands to maximise public housing production, and satisfy the needs of both existing and future residents.

11. The Government has been striving to secure sites for public housing development, and HA has been working hard to speed up the development process where possible. HA has been successful in pushing forward "spade-ready"[1] sites, including completing the first six newly-built Home Ownership Scheme projects and the Eastern Harbour Crossing Site Phase 7 in around five years. However, such "spade-ready" sites are rare under the current circumstances of tight land supply and HA has virtually used up all spade-ready sites at hand. About 80% of the projects for which we have consulted District Councils in the past seven years (from 2010-11 to 2016-17) are located on sites that are not "spade ready".

12. To implement housing development on sites which are not "spade ready", depending on the actual circumstances, various works need to be carried out to support the development, such as site formation and infrastructure works.

13. We will examine carefully the feasibility of each proposed public housing site and continue to adopt measures to overcome the challenges and difficulties of developing public housing development projects.

Redacted Parts in the Report of the "Planning and Engineering Study for the Public Housing Development and Yuen Long Industrial Estate Extension at Wang Chau"

14. Regarding the request for disclosing the redacted parts of the report of the "Planning and Engineering Study for the Public Housing Development and Yuen Long Industrial Estate Extension at Wang Chau", as the Government

[1] Sites that have been properly zoned, and do not require resumption, clearance, reprovisioning of existing facilities, site formation or provision of additional infrastructure.

advised the public in October 2016 when disclosing the report, it was not appropriate to disclose some parts of the report. The Government has redacted a few parts based on the following principles:

(a) Third party information;
(b) Financial/cost information;
(c) Privacy of the individual;
(d) Land sensitive information; and
(e) Grave details.

Further Information of Public Works Programme Item B780CL

15. The basic information of public works programme item (PWP) B780CL has been provided via LC Paper No. CB(1)155/17-18(04). The locations of the drainage, sewerage, waterworks and landscaping works under PWP item no. B780CL are shown in **Annex 2**.

16. The proposed scope and the breakdown of the estimated capital cost have also been provided via LC Paper No. CB(1)308/17-18(01) (please refer to paragraphs 8 and 9 of the paper for details).

17. In PWP item no. B780CL, the engineering design drawings and sections of the proposed underpass and the proposed pick-up / drop off areas at the area of Wing Ning Tsuen are shown in **Annex 3**. The design of the proposed infrastructure works does not take into account the private development projects in the nearby Wing Ning Tsuen. Therefore, there are no relevant connection points.

"Site Formation and Infrastructural Works for Remaining Phases of Public Housing Developments at Wang Chau, Yuen Long - Feasibility Study" Reports

18. "Site Formation and Infrastructural Works for Remaining Phases of Public Housing Developments at Wang Chau, Yuen Long - Feasibility Study" is in progress. Upon completion of the feasibility study, the Government will consult the public on the project at a suitable juncture.

Land Transaction Records near Wang Chau Phase 1 in This Year

19. In general, land records are kept by the Land Registry and available

for public access. The modes, charges and other information regarding land searches are shown in the website below.

http://www.landreg.gov.hk/en/services/services_b.htm

Consultancy Report for Ha Mei San Tsuen Village Expansion Area Project

20. The consultants employed by Civil Engineering and Development Department completed the "Design Review Report for Ha Mei San Tsuen Village Expansion Area" project in 2013. The softcopy of the report (English version only) is enclosed in the CD as **Annex 4** for members' reference. Some parts in the Review Report are not appropriate for disclosure. Government departments have redacted a few parts based on the following principles:

(a) Third party information; and
(b) Internal discussion and advice.

Reasons for the Increase in Cost Estimate for Two Items under CWRF Head 701 Subhead 1100CA Relating to Wang Chau Development Project

21. In preparing the estimates for the ex-gratia compensation and allowances for the projects under Head 701 Subhead 1100CA, the Government would assess the amount according to the rates of ex-gratia compensation and allowances at the time of assessment. If the private land for the projects was already reverted to the Government, the estimates would be based on the rates of the ex-gratia compensation and allowances at the date of reversion. The Government will review the rates of the ex-gratia compensation and allowances periodically.

22. In the two projects, "Resumption of land for development at Wang Chau, Yuen Long" and "Road Works – Site Formation and Infrastructure Works for Development at Wang Chau, Yuen Long", their estimates for the ex-gratia compensation and allowances for the year of 2017/18 were all assessed in 2016. Therefore, the estimates in that financial year were based on the rates of the ex-gratia compensation and allowances at that time (i.e. 2016). As the private land for the two projects has already been reverted to the Government on 3 August 2017, the cost estimates in 2018/19 have to be updated based on the rates of the ex-gratia compensation and allowances at the date of reversion. As the rates of ex-gratia compensation and allowances effective in 2017 have been raised from those in 2016, the total amount of the

cost estimates for the two projects in 2018/19 has increased as compared with 2017/18.

Compensation Amount Relating to Affected Graves and Fung-shui

23. A total of three graves and 16 urns have to be relocated due to the two above-mentioned projects. The Government has so far received claims for ex-gratia allowances for three graves and 10 urns amounting to about $1.3 million. In addition, the Government has received five alleged "Fung Shui" related claims for Tun Fu ceremonial fee and among which, four cases are still under processing whilst one case has been rejected.

Yours sincerely,

(Original Signed)

(Jerry Cheung)
for Secretary for Transport and Housing

c.c.

Hon Alice MAK Mei-kuen, BBS, JP, Chairman of the Legislative Council Panel on Housing	
Secretary for Financial Services and the Treasury	(Attn: Ms HO Hoi Kwan, June)
Secretary for Development	(Attn: Mr TANG Chun Yin, Joey) Mr WONG Lap Ki)
Director of Civil Engineering and Development	(Attn: Mr CHAN Cheuk Wing, Edward Mr LAU Wing Kam)
Director of Lands	(Attn: Ms CHIU Lee Lee, Lily Mr TSUI Kwan Yu, James)
Director of Housing	(Attn: Ms TAM Kwai Yee, Ann Mary Mr IP Shing Tim Mr LEUNG Tak Yan, Kenneth)

由 1997 年至今在基本工程儲備基金總目 711 項下
由土木工程拓展署(前稱拓展署)建議的
工地平整工程和基礎設施工程撥款建議

Funding proposal of site formation and infrastructure works
proposed by the Civil Engineering and Development Department (formerly known as Territory Department)
under Capital Works Reserve Fund Head 711 since 1997

I. 繼續進行的項目 Ongoing Projects

工程計劃編號 Project code	工程計劃名稱 Project title	工務小組委員會討論文件 Item for Public Works Subcommittee
B563CL	天水圍的進一步發展計劃 – 道路交界處改善工程、地盤平整及主要基礎設施工程 Tin Shui Wai further development – road junction improvement, site formation and main engineering infrastructure	PWSC(97-98)109 中文 https://www.legco.gov.hk/yr97-98/chinese/fc/pwsc/papers/p1102109.htm English https://www.legco.gov.hk/yr97-98/english/fc/pwsc/papers/p1102109.htm

工程計劃編號 **Project code**	工程計劃名稱 **Project title**	工務小組委員會討論文件 **Item for Public Works Subcommittee**
B564CL	彩雲道及佐敦谷毗鄰的發展計劃 Development near Choi Wan Road and Jordan Valley	PWSC(2000-01)99 中文 http://www.legco.gov.hk/yr00-01/chinese/fc/pwsc/papers/pw00-99c.pdf English http://www.legco.gov.hk/yr00-01/english/fc/pwsc/papers/pw00-99e.pdf PWSC(2005-06)9 中文 http://www.legco.gov.hk/yr04-05/chinese/fc/pwsc/papers/p05-09c.pdf English http://www.legco.gov.hk/yr04-05/english/fc/pwsc/papers/p05-09e.pdf
B566CL	安達臣道的發展計劃 Development at Anderson Road	PWSC(2007-08)57 中文 http://www.legco.gov.hk/yr07-08/chinese/fc/pwsc/papers/p07-57c.pdf English http://www.legco.gov.hk/yr07-08/english/fc/pwsc/papers/p07-57e.pdf

工程計劃編號 **Project code**	工程計劃名稱 **Project title**	工務小組委員會討論文件 **Item for Public Works Subcommittee**
B742CL	與東涌第 56 區的建議發展項目有關的主要基礎建設工程 Main engineering infrastructure in association with the proposed developments at Area 56 in Tung Chung	PWSC(2013-14)31 中文 http://www.legco.gov.hk/yr13-14/chinese/fc/pwsc/papers/p13-31c.pdf English http://www.legco.gov.hk/yr13-14/english/fc/pwsc/papers/p13-31e.pdf
B757CL	沙田第 16 區及第 58D 區的道路及渠務工程 Roads and drains in Area 16 and Area 58D, Sha Tin	PWSC(2015-16)16 中文 http://www.legco.gov.hk/yr14-15/chinese/fc/pwsc/papers/p15-16c.pdf English http://www.legco.gov.hk/yr14-15/english/fc/pwsc/papers/p15-16e.pdf
B777CL	深水埗連翔道用地發展之道路及基礎設施工程 Road and infrastructure works for development at Lin Cheung Road, Sham Shui Po	PWSC(2016-17)15 中文 http://www.legco.gov.hk/yr15-16/chinese/fc/pwsc/papers/p16-15c.pdf English http://www.legco.gov.hk/yr15-16/english/fc/pwsc/papers/p16-15e.pdf
B783CL	粉嶺皇后山發展之基礎設施工程 Infrastructure works for development at Queen's Hill, Fanling	

工程計劃編號 **Project code**	工程計劃名稱 **Project title**	工務小組委員會討論文件 **Item for Public Works Subcommittee**
B800CL	深水埗西北九龍填海區 1 號用地發展的拆卸及土地淨化工程 — 第一期 Demolition and ground decontamination works for development at North West Kowloon Reclamation Site 1, Sham Shui Po – Phase 1	PWSC(2016-17)20 中文 http://www.legco.gov.hk/yr15-16/chinese/fc/pwsc/papers/p16-20c.pdf English http://www.legco.gov.hk/yr15-16/english/fc/pwsc/papers/p16-20e.pdf
B781CL	東涌第 54 區公營房屋發展之基礎設施工程 Infrastructure works for public housing development at Area 54, Tung Chung	PWSC(2016-17)39 中文 https://www.legco.gov.hk/yr16-17/chinese/fc/pwsc/papers/p16-39c.pdf English https://www.legco.gov.hk/yr16-17/english/fc/pwsc/papers/p16-39e.pdf
B813CL	大埔第 9 區和頌雅路公營房屋發展之工地平整及基礎設施工程－第一期 Site formation and infrastructure works for public housing developments at Chung Nga Road and Area 9, Tai Po – Phase 1	PWSC(2016-17)38 中文 https://www.legco.gov.hk/yr16-17/chinese/fc/pwsc/papers/p16-38c.pdf English https://www.legco.gov.hk/yr16-17/english/fc/pwsc/papers/p16-38e.pdf

II. 已完成的項目 Completed Projects

工程計劃編號 Project code	工程計劃名稱 Project title	工務小組委員會討論文件 Item for Public Works Subcommittee
B550CL	天水圍的進一步發展計劃－第 101 至 108 區、109 區(部分)、110 區及 111 區的地盤平整工程 Tin Shui Wai further development – site formation in areas 101 to 108, 109 (part), 110 and 111	PWSC(97-98)24 中文 https://www.legco.gov.hk/yr96-97/chinese/fc/pwsc/papers/pw210524.htm English https://www.legco.gov.hk/yr96-97/english/fc/pwsc/papers/pw210524.htm
B567CL	重建紅磡邨第 2 期地盤平整工程 Site formation for redevelopment of Hung Hom Estate phase 2	PWSC(98-99)60 中文 https://www.legco.gov.hk/yr98-99/chinese/fc/pwsc/papers/pw200160.htm English https://www.legco.gov.hk/yr98-99/english/fc/pwsc/papers/pw200160.htm
B561CL	天水圍的進一步發展計劃 － 餘下基礎設施及地盤平整工程 Tin Shui Wai further development – remaining engineering infrastructure and site formation works	PWSC(1999-2000)35 中文 http://www.legco.gov.hk/yr98-99/chinese/fc/pwsc/papers/pw020635.pdf English http://www.legco.gov.hk/yr98-99/english/fc/pwsc/papers/pw020635.pdf

工程計劃編號 **Project code**	工程計劃名稱 **Project title**	工務小組委員會討論文件 **Item for Public Works Subcommittee**
B572CL	東頭平房區公營房屋發展計劃的地盤平整工程 Site formation for public housing development at Tung Tau Cottage Area	PWSC(2000-01)101 中文 http://www.legco.gov.hk/yr00-01/chinese/fc/pwsc/papers/p00-101c.pdf English http://www.legco.gov.hk/yr00-01/english/fc/pwsc/papers/p00-101e.pdf
B571CL	龍華街地盤平整工程 Site formation at Lung Wah Street	PWSC(2001-02)15 中文 http://www.legco.gov.hk/yr00-01/chinese/fc/pwsc/papers/p01-15c.pdf English http://www.legco.gov.hk/yr00-01/english/fc/pwsc/papers/p01-15e.pdf PWSC(2003-04)36 中文 http://www.legco.gov.hk/yr02-03/chinese/fc/pwsc/papers/p03-36c.pdf English: http://www.legco.gov.hk/yr02-03/english/fc/pwsc/papers/p03-36e.pdf

工程計劃編號 **Project code**	工程計劃名稱 **Project title**	工務小組委員會討論文件 **Item for Public Works Subcommittee**
B575CL	鯉魚門第 2 期房屋用地地盤平整工程 Site formation works for Lei Yue Mun phase 2 housing site	PWSC(2001-02)56 中文 http://www.legco.gov.hk/yr01-02/chinese/fc/pwsc/papers/p01-56c.pdf English http://www.legco.gov.hk/yr01-02/english/fc/pwsc/papers/p01-56e.pdf
B732CL	堅尼地城焚化爐及屠房地面上建築物、構築物和煙囪拆卸工程 Demolition of buildings, structures and chimneys above ground at Kennedy Town incineration plant and abattoir	PWSC(2007-08)30 中文 http://www.legco.gov.hk/yr06-07/chinese/fc/pwsc/papers/p07-30c.pdf English http://www.legco.gov.hk/yr06-07/english/fc/pwsc/papers/p07-30e.pdf

註：

就其他工務計劃，可參閱政府在每一立法會會期提交予立法會工務小組委員會的《提請工務小組委員會審議的項目年終報告》

Note:

Regarding other works projects, please refer to the "Year-end Report on Submissions to Public Works Subcommittee" submitted by the Government to the Public Works Subcommittee of the Legislative Council at each legislative session.

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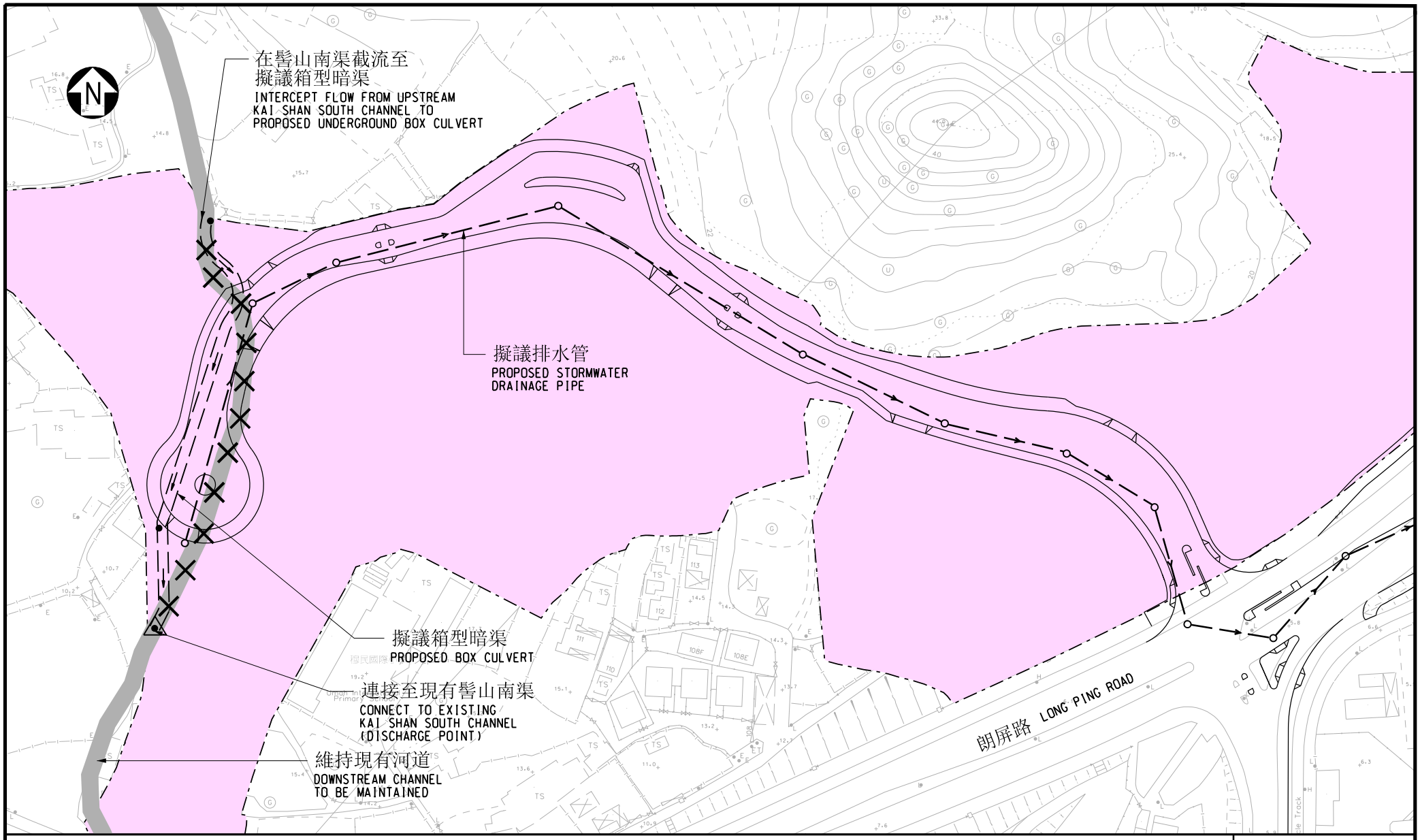
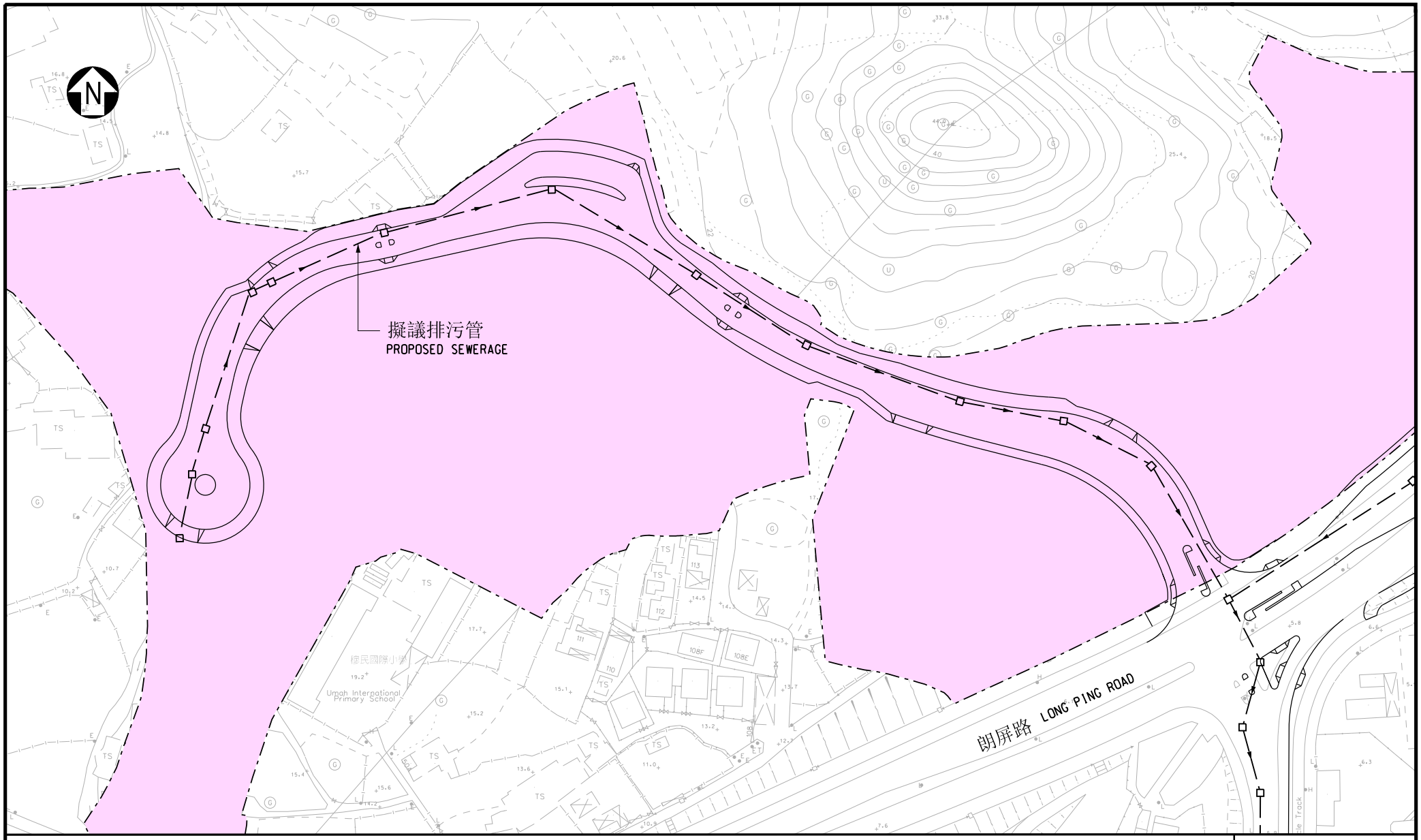
- ENDS -



工務計劃項目編號 B780CL
元朗橫洲公營房屋發展之工地平整及基礎設施工程

PWP ITEM NO. B780CL
SITE FORMATION AND INFRASTRUCTURE WORKS FOR
PUBLIC HOUSING DEVELOPMENT AT WANG CHAU, YUEN LONG

擬議排水管
PROPOSED
DRAINAGE



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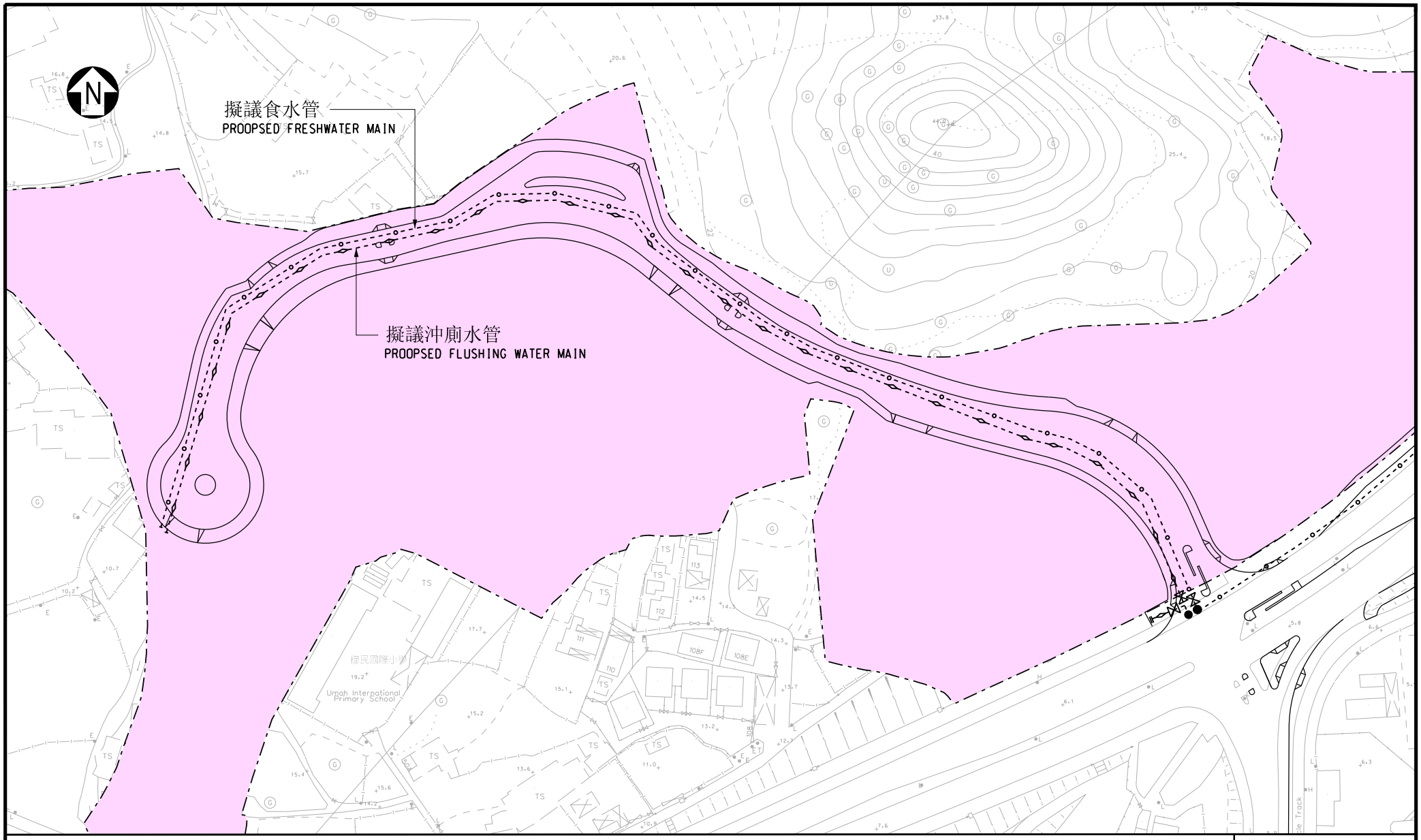
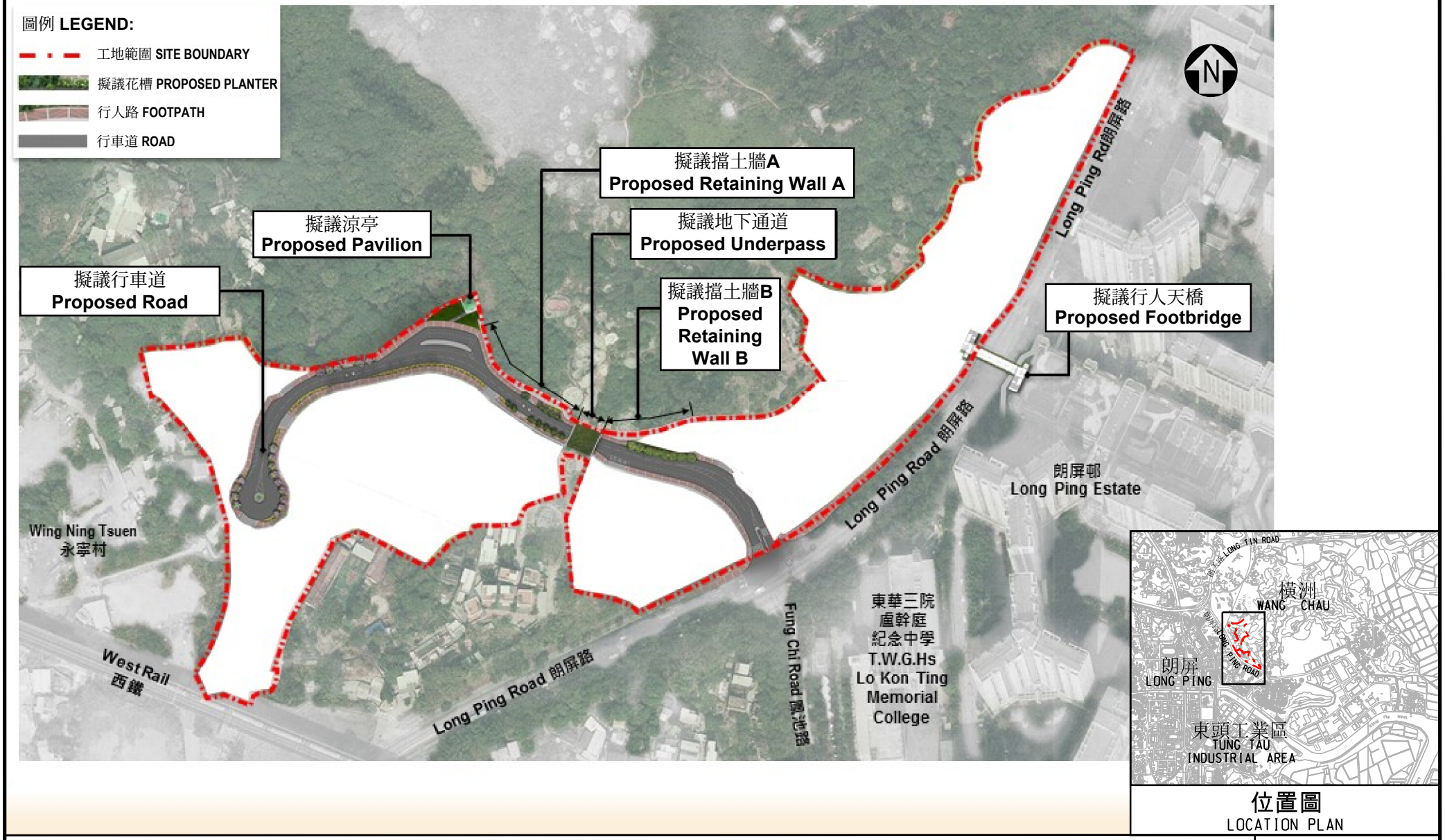
元朗橫洲公營房屋發展之工地平整及基礎設施工程
PWP ITEM NO. B780CL
SITE FORMATION AND INFRASTRUCTURE WORKS FOR
PUBLIC HOUSING DEVELOPMENT AT WANG CHAU, YUEN LONG

擬議排污管
PROPOSED
SEWERAGE



工務計劃項目編號 B780CL
元朗橫洲公營房屋發展之工地平整及基礎設施工程
PWP ITEM NO. B780CL
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT AT WANG CHAU, YUEN LONG

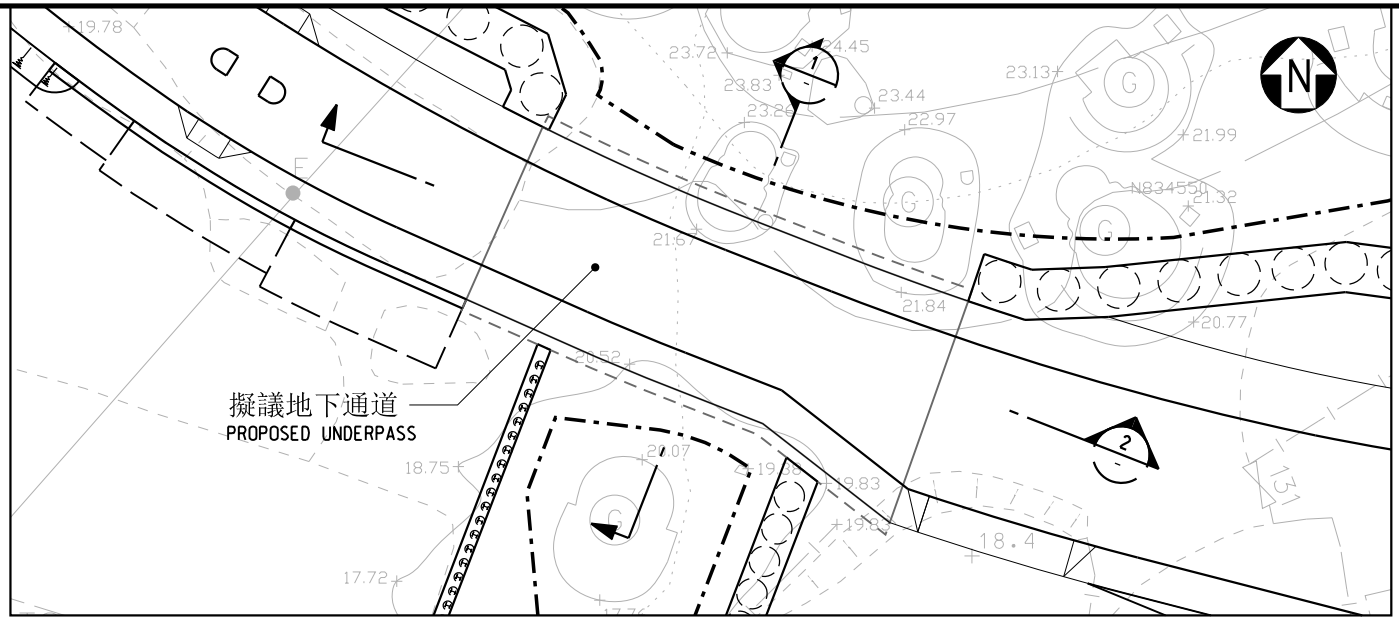
擬議水管
PROPOSED WATERWORKS



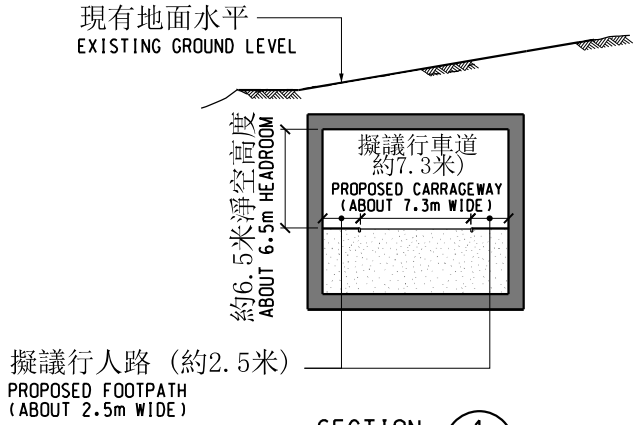
位置圖
LOCATION PLAN

工務計劃項目編號 B780CL
元朗橫洲公營房屋發展之工地平整及基礎設施工程
PWP ITEM NO. B780CL
SITE FORMATION AND INFRASTRUCTURE WORKS FOR
PUBLIC HOUSING DEVELOPMENT AT WANG CHAU, YUEN LONG

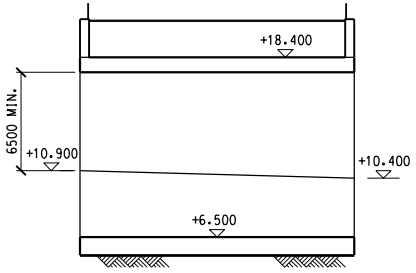
園景設計總圖
MASTER LANDSCAPE PLAN



地下通道平面圖
PLAN VIEW OF UNDERPASS



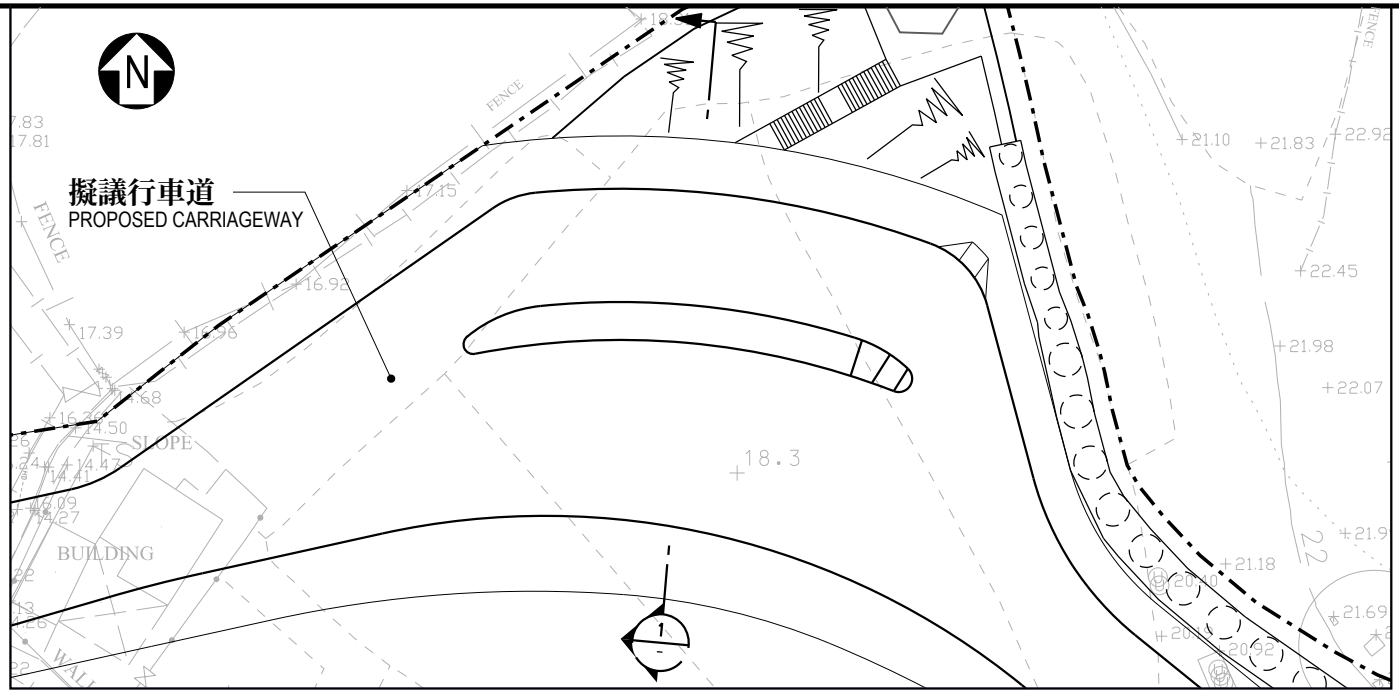
SECTION 1 - 橫截面一
SCALE N.T.S.

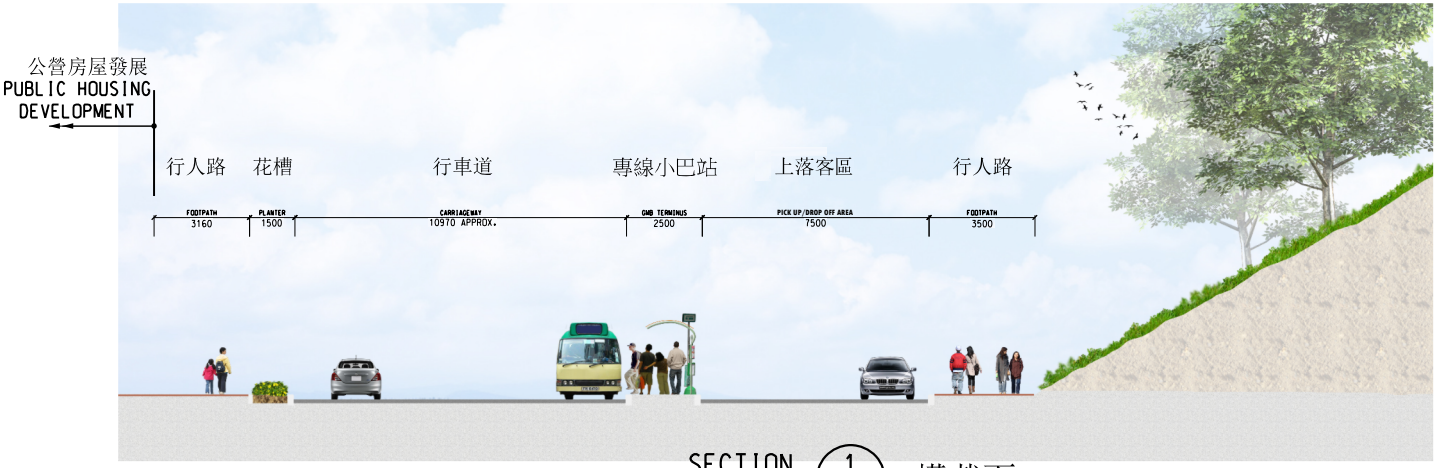


SECTION 2 - 橫截面二
SCALE N.T.S.

工務計劃項目編號 B780CL
元朗橫洲公營房屋發展之工地平整及基礎設施工程
PWP ITEM NO. B780CL
SITE FORMATION AND INFRASTRUCTURE WORKS FOR
PUBLIC HOUSING DEVELOPMENT AT WANG CHAU, YUEN LONG

地下通道詳圖
DETAILS OF UNDERPASS





SECTION 1 SCALE N.T.S. 圖一 橫截面一

工務計劃項目編號 B780CL
元朗橫洲公營房屋發展之工地平整及基礎設施工程
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上落客區詳圖
DETAILS OF PICK UP/ DROP OFF AREA

Agreement No. CE 5/86
Tin Shiu Wai Development – Engineering Infrastructure

Engineering Works for Ha Mei San Tsuen Village Expansion Area

Design Review Report

380390/B&V/005/Issue 3

Report Authorized For Issue By:	[redacted]
	For and on Behalf of Black & Veatch Hong Kong Limited

Black & Veatch Hong Kong Limited
25/F, Millennium City 6
392 Kwun Tong Road
Kowloon
Hong Kong

Civil Engineering and Development Department
NTN&W Development Office
9/F, Sha Tin Government Offices
1 Sheung Wo Che Road
Sha Tin, N.T., Hong Kong

August 2013

DOCUMENT CONTROL	Agreement No. CE 5/86 Tin Shiu Wai Development – Engineering Infrastructure Ha Mei San Tsuen Village Expansion Area	**No:** 380390/B&V/005/Issue 3	
AMENDMENT RECORD		**Prepared by:**	B&V
Design Review Report	Client: Civil Engineering and Development Department	**Initials:**	VW
		Date:	August 2013

Pages	**Date:**	**Issue No.**	**Description**	**Initials**
All	August 2012	1	Circulation for comments	JOEL
All	April 2013	2	Circulation for vetting	JOEL
All	August 2013	3	Circulation for record and retention	VW

CONTENTS

FIGURES

APPENDICES

Appendix E DSD's Drainage Records

Appendix F As-built Drawings of Village Flood Protection Works for Ha Mei San Tsuen

Appendix G Construction Drawings of Sitting-out Area at Ha Mei San Tsuen

Appendix H Assessment and Design of Man-made Slopes or Retaining Walls

Appendix I Design Calculation of Revised Drainage Works

Appendix J Design Calculation of Revised Sewerage Works

Appendix K Construction & Demolition Material Management Plan

DRAWINGS

Drawing 380930/B/KP001 Key Location Plan

Drawing 380930/B/GA001 General Layout

Drawing 380930/B/GA002 Site Formation Plan

Drawing 380930/B/GA003 Cross Sections

Drawing 380930/B/LC001 Landscape Works

Drawing 380930/B/M001 Road Works Miscellaneous Details

Drawing 380930/B/M002 Miscellaneous Drainage Details (Sheet 1 of 2)

Drawing 380930/B/M003 Miscellaneous Drainage Details (Sheet 2 of 2)

Drawing 380930/B/SD001 Stormwater Drainage Layout

Drawing 380930/B/SD002 Sewerage Layout

RESPONSE TO COMMENTS

	Name	Signature	Date
Prepared by	[redacted]		August 2013
Checked by			August 2013
Reviewed by			August 2013

1 BACKGROUND

1.1.1 Black & Veatch Hong Kong Limited (formerly Binnie Consultants Limited) were commissioned by the Hong Kong Government under Agreement No. CE 5/86 in May 1987 to provide professional services in respect of the development of Tin Shui Wai and any necessary village flood protection and drainage works in the peripheral areas (including Ha Mei San Tsuen).

1.1.2 The first Supplementary Agreement (SA) to Agreement No. CE 5/86 was made on 23 May 1995 and Black & Veatch Hong Kong Limited (B&V) were further commissioned to undertake the investigation, design and supervision of the construction of engineering works for Ha Mei San Tsuen at the eastern periphery of Tin Shui Wai New Town. The second SA to Agreement No. CE 5/86 was made on 28 November 1996 for the direct employment of Resident Site Staff.

1.1.3 The Investigation Phase, Design Phase and Tender Phase for Ha Mei San Tsuen under the first SA have been completed in 1996. However, construction works has not commenced after completion of the detailed design and tender preparation of the engineering works.

1.1.4 From 1996 to present, there have been a number of changes in terms of conditions of the project site and adjacent environment, as well as a number of updates on standards and requirements in terms of environmental, design and tendering aspects. As such, it is necessary to carry out reviews and updates, if necessary, on the proposed engineering works completed in 1996 before the construction works commence.

1.1.5 Being very familiar with the history and previously proposed engineering works, B&V were instructed under the SA (Instruction No. CE5/86/SA/001 dated 8 February 2012) to provide additional services on Environmental Review, Design Review and Tender Review of the proposed engineering works for Ha Mei San Tsuen previously completed in 1996.

2 OBJECTIVES OF THIS REPORT

2.1 The objectives of this report are to review the engineering design works previously completed in 1996 based on the existing and latest available information and current design standards and statutory requirements. The engineering design works previously completed in 1996 include the following:

a) Site formation works;

b) Road works and miscellaneous details;

c) Drainage works;

d) Sewerage works; and

e) Landscaping works.

2.2 In addition, the need of noise barriers, subject to results of environmental review, will be briefly discussed in this report.

3 EXISTING AND LATEST AVAILABLE INFORMATION

3.1 PREVIOUS DESIGN DRAWINGS UNDER THIS AGREEMENT

3.1.1 A set of previous design drawings completed under this Agreement in 1996 is enclosed in ***Appendix A***.

3.2 EXISTING GROUND INVESTIGATION RECORDS

3.2.1 An information search in the Geotechnical Information Unit (GIU) of Geotechnical Engineering Office (GEO) of Civil Engineering and Development Department was conducted in May 2012. The available ground investigation (GI) records in the GIU are listed as follows:

(i) Contract No. NTDB19/85/06b, Tin Shui Wai Development prepared by Lam Geotechnics Limited, January 1986 (GIU Report No. 07131).

(ii) Contract No. GE/93/08, Ground Investigation – New Territories West term Contract, Tin Shui Wai Development Village Flood Protection Phase IV Ground Investigation at Ha Mei San Tsuen prepared by Lam Geotechnics Limited, June 1994 (GIU Report No. 18794).

(iii) Contract No. GE/97/15, Supplementary Agreement to Agreement No. CE 5/86, Yuen Long – Tuen Mun Corridor / Rural Hinderland, Engineering Works for Village Priority Areas (1-13) Ha Mei San Tsuen prepared by Enpack (Hong Kong) Limited, May 1998 (GIU Report No. 28428).

3.2.2 The locations of drillholes in the above GI records are shown in ***Figure 1***. A summary and copies of the drillhole records are re-produced in ***Appendix B***.

3.2.3 From the above GI records, the site of Ha Mei San Tsuen generally comprise a layer of fill (0 to 6m thick) overlying pond deposit (0 to 4.6m thick), then alluvium (0.5m to 6m thick) and completely to slightly decomposed meta-siltstone (8m to 51m thick).

3.3 REVIEW OF HISTORICAL INFORMATION

3.3.1 A number of aerial photos taken in the past 14 years were obtained from the Lands Department and reproduced in ***Appendix C*** with Project boundary superimposed to aid the review. Observations from these aerial photos are summarised below.

Table 1 Observations of Development History from Aerial Photos of the Past

Aerial Photos	Observations
19 Jan 2011 (a year ago)	No change to the Ha Mei San Tsuen Road and the number of existing village houses. The site was vacant and largely covered by vegetation. There were no signs of encroachment by open storages in the north and south.
5 Mar 2004 (8 year ago)	No change to the Ha Mei San Tsuen Road and the number of existing village houses. The site was vacant and covered by vegetation, and with a small part in the south probably occupied by containers of the open storage in the south.
8 Nov 1998 (14 years ago)	The existing houses present nowadays were already built within the site. The village flood protection works and associated Ha Mei San Tsuen Road were completed. The site was vacant with some obvious excavation close to the Ha Mei San Tsuen.

3.4 LAND REQUIREMENTS

3.4.1 The entire site falls within the "V" zone according to the Outline Zoning Plan (OZP), PlanD, which is the same as the previous design. The relevant OZP is included in ***Appendix D***.

3.5 LATEST UTILITY RECORDS

3.5.1 Requests for information on existing and planning utilities at or in the vicinity of the Site were made in February 2012. ***Table 1*** summarises the Government departments and utility undertakers to which request is made and the utility records received before the preparation of this report. The drainage records provided by DSD are included in ***Appendix E***, and the approximate locations and alignments of the utility records are shown in ***Figure 2***.

Table 2 – Summary of Existing Utility Records Received

Government Department / Utility Undertaker	Reply?	Utility in/near the Site?
Drainage Services Department	Yes	Drainage records
Water Supplies Department	Yes	Water mains
Transport Department	No	-
Highways Department/Lighting Division	Yes	Highways lighting
Electrical and Mechanical Services Department	Yes	Apparatus and cables
CLP Power Hong Kong Ltd.	Yes	Underground cable
Wharf T&T Ltd.	No	-
New World Telephone Company Ltd.	No	-
Hong Kong & China Gas Co. Ltd.	No	-
PCCW – HKT Telephone Ltd.	Yes	Ducts and cables
Hong Kong Broadband Network Ltd.	No	-
Hutchison Global Communication Ltd.	Yes	Ducts and joint box
Rediffusion (Hong Kong) Ltd.	No	-
Hong Kong Cable Television Ltd.	No	-
Trax Comm Ltd.	No	-

3.5.2 After reviewing the existing utility records, it is found that there is no conflict between the existing ultities and our design.

3.6 AS-BUILT DRAWINGS OF VILLAGE FLOOD PROTECTION WORKS

3.6.1 A request for as-built drawings of the village flood protection works at or in the vicinity of the Site was made to Drainage Services Department (DSD) in May 2012.

3.6.2 A copy of the as-built drawings of the village flood protection works was provided by DSD and is re-produced in ***Appendix F.***

3.7 SITTING-OUT AREA AT HA MEI SAN TSUEN

3.7.1 From our recent site inspections, a sitting-out area at Ha Mei San Tsuen was being constructed. Upon request for information, a set of construction drawings for the sitting-out area was provided by the architect of Leisure and Cultural Services Department in June 2012. A copy of the construction drawings is re-produced in ***Appendix G.*** This Ha Mei San Tsuen Sitting-out Area shall be excluded from the site boundary of this project.

3.8 EXISTING REGISTERED MAN-MADE SLOPES AND RETAINING WALLS

3.8.1 According to GEO's latest slope safety records, there are a total of 3 existing registered man-made slopes and retaining walls ***(Figure 3)*** located within the Site, which are numbered 6NW-B/FR213, 6NW-B/F144 and 6NW-B/F199. 6NW-B/FR213 and 6NW-B/F144 are located along the west boundary of the Site and abutting Tin Tsz Road, while 6NW-B/F199 is located at the northeast boundary of the Site and abutting Ha Mei San Tsuen Road.

3.9 EXISTING HERITAGE CONSIDERATION

3.9.1 House nos. 13-19, Ha Mei San Tsuen, Grade 3 historic buildings are located near the project boundary. Since there will be no works to these existing buildings and the immediate environ, Antiquities and Monuments Office (AMO) of Leisure and Cultural Services Department replied in their memo dated 13 December 2010 that heritage impact assessment (HIA) was not required. It is confirmed under this Review that there are no works to these existing buildings and the immediate environ. These historic buildings are about 6m from the site boundary. Hence, HIA is not required. It was also confirmed by AMO via their e-mails dated 23 August 2012. Since the project boundary is in close vicinity of the historic buildings, due care will be exercised during the course of the works to ensure no disturbance and physical damage to the above items.

4 DESIGN REVIEW

4.1 REVIEW OF SITE FORMATION WORKS

4.1.1 Ha Mei San Tsuen is a low-lying village which lies to the east of Tin Shui Wai New Town and is bounded by Tin Tsz Road and Tin Tsz Estate at the east, Fung Ka Wai to the northeast and Wing Ning Tsuen to the southeast (***Drawing 380390/B/KP001***). The previous site formation works design completed in 1996 is reviewed based on the existing and latest available information mentioned in Section 3 and current geotechnical design standards published by GEO. The results of the review show that design parameters (density, shear strength and permeability) and the range of soil and rock types likely to be encountered remain unchanged. There is no change to the design standards for site formation works since 1996. The relevant design parameters adopted in 1996 are re-produced below:

Meta-siltstone			**Rock Weathering Grade**	
			XW	**X/DW**
Effective cohesion	(c')	kPa	0	Not known
Effective friction angle	Φ'		30	Not known
Deformation modulus	(E_0)	MPa	110	700
Shear modulus	(G)	MPa	40	260
Undrained shear strength	C_U	kPa	350	600
Bulk density	(γ)	Mg/m^3	1.97	1.97

Fill Material	**Shear Strength**		**Density**	**Field Permeability**
	c' (kPa)	**Φ' (°)**	**(Mg/m^3)**	**k (m/s)**
Alluvial Sand	Above water table		2.10	1×10^{-5}
	0	30		
	Below water table			
	0	35		
Decomposed Granite	0	39	2.05	-

REVIEW EXISTING REGISTERED FEATURES

4.1.2 As discussed in Section 3.8.1, there are four registered man-made slopes and retaining walls, namely Feature Nos. 6NW-B/C86, FR213, F144 and F199 located within or in the vicinity of the boundary of the project. As shown in ***Drawing 380390/B/GA001***, Feature Nos. 6NW-B/C86, FR213, F144 and F199 could not affect or be affected by the proposed site formation works under this project.

4.1.3 Feature Nos. 6NW-B/C86, FR213 and F144 have been checked if their failure could affect lives and property within the boundary of the project based on the possible extreme travel distance of landslide debris as recommended in GEO Technical Guidance Note No. 15 (TGN 15). The results of the checking (Sections A-A, B-B, C-C and D-D in ***Appendix H1***) indicate that the site formation extent is far away from the reaching distance of the landslide debris should the features fail. Hence, detailed investigations and studies for these 3 features are not

required under this project.

4.1.4 Feature No. 6NW-B/F199 is one of the slope faces of a 3.2 m high trapezoidal earth fill bund along the northern boundary of the project. According to the as-built records of the Village Flood Protection Works for Ha Mei San Tsuen, this trapezoidal earth fill bund and Feature No. 6NW-B/F199 were constructed and formed by compacted granular fill in August 1998. The basic data of this feature is shown below:

Feature No.	Height (m)	Slope Angle (°)	Surface Cover	Crest Facility	Toe Facility
6NW-B/F199	3.2	30	100% Vegetation	Minor Access Road (bitumen paving)	Village House

4.1.5 In order to assess if the failure of Feature No. 6NW-B/F199 could affect lives and property within the boundary of the project, the stability analysis has been carried out based on the following considerations:

(1) Design parameters of Feature No. 6NW-B/F199:

Material	Slope Height (m)	Slope Angle (°)	γ (kN/m³)	c' (kPa)	ϕ' (°)
Existing compacted fill	3.2	30	19	0	35

Note: For conservative assessment purpose, *generalized strength parameters are adopted for the existing compacted fill (lower bounds) as recommended in Table 8 of Geoguide 1.*

(2) Due to the trapezoidal geometry of the earth bund and the hard paving of the road at the slope crest, groundwater level is assumed at or below the toe of the feature.

(3) Due to the trapezoidal geometry of the earth bund, the hard paving of the road at the slope crest and the 100% vegetation of the slope surface, there should be little run-off over and infiltration into the fill body. Furthermore, laboratory tests for determination of relative compaction of the soil at the area of this feature show that the relative compaction of the slope is over 95%. Hence, the potential of a liquefaction failure of the fill is considered to be low.

(4) Due to the trapezoidal geometry of the earth bund, there are no effects of the upslope topography on the stability of the feature.

(5) Surcharges of 5 kPa and 10 kPa on the slope crest are assumed for footpath and minor road respectively.

(6) No signs of distress nor signs of seepage were observed at the feature during the inspections in May 2012.

(7) In accordance with Works Bureau Technical Circular (WBTC) No. 13/99, the consequence category in case of failure is considered to be 1. Hence, the required minimum factor of safety (FoS) for the Feature in the existing state is 1.4.

(8) The stability analysis was carried out using the BD approved computer software package *SLOPE/W* adopting the Morgenstern & Price's method of

analysis.

The result of stability analysis indicates that the minimum calculated FoS of the Feature is above the recommended minimum of 1.4 (see ***Appendix H2*** and table below). Hence, upgrading works are not required for Feature No. 6NW-B/F199.

Feature	Slope Height (m)	Slope Angle (°)	Required FoS	Calculated Min. FoS
6NW-B/F199	3.2	30	1.4	1.42

DESIGN OF SITE FORMATION SLOPE

4.1.6 The reviewed and revised general layout and cross sections are shown in ***Drawings 380390/B/GA001*** to ***GA003***. The northern two-third portion of the Site will be slightly reformed to formation levels between +3.3 mPD and +4.7mPD, while the southern one-third portion will be filled up to form a formation level of around +6.0 mPD. The soil in the site will be compacted to achieve the standard of site formation, i.e. 95% of soil compaction. To facilitate accessibility, an access ramp is added between these two formation levels. The existing trees will be retained as far as possible.

4.1.7 The adopted design parameters for stability analysis of the platform on the southern side are shown in the following table.

Origin	Soil Materials	γ (kN/m^3)	c' (kPa)	ϕ' (°)
Imported Material	Compacted Granular Fill	19	0	39

Note: For design purpose, *generalized strength parameters are adopted for compacted fill (lower bounds) as recommended in Table 8 of Geoguide 1. These parameters will be verified by triaxial test during construction.*

4.1.8 To account for loading due to pedestrian on footpath and small houses to be constructed in future, surcharges of 5 kPa and 60 kPa on the slope crest are assumed in the stability analysis respectively.

4.1.9 Since the toe facility of the new fill slope (2.4 m high) are future residential house, the consequence category in case of failure is considered to be 1 in accordance with WBTC No. 13/99. Hence, the required minimum FoS for the slope in the existing state is 1.4. The slope should be registered according to WBTC No. 9/2000 upon completion.

4.1.10 The stability analysis was carried out using the BD approved computer software package *SLOPE/W* adopting the Morgenstern & Price's method of analysis.

4.1.11 The result of stability analysis indicates that the minimum calculated FoS of the newly formed slope is above the recommended minimum of 1.4 (see ***Appendix H3*** and table below).

Slope	Slope Height (m)	Slope Angle (°)	Required FoS	Calculated Min. FoS
New Slope	2.4	16	1.4	2.657

4.1.12 Furthermore, there is no natural terrain within and close to the Site. As such, no natural terrain will be affected by this Project, and hence natural terrain hazard assessment is not required under this Project.

4.1.13 With reference to Practice Note for Authorized Persons 161 (PNAP-161), marbles cavities may be a matter of concern since the site falls within the Scheduled Areas No. 2 (North-western New Territories) in the Buildings Ordinance. However, the available GI records do not indicate any existence of marble cavities within the site. Furthermore, based on the latest design review, there is no piling works to be carried out and only shallow excavations will be involved for laying of storm drains and sewers, and associated manholes. Hence, it is considered that the marble cavities in this area will not be a matter of concern for the proposed works.

4.2 Review of Road Works and Miscellaneous Details

4.2.1 The previous road works design completed in 1996 is reviewed based on the existing and latest available information mentioned in Section 3 and current traffic engineering design standards, e.g. Transport Planning and Design Manual (TPDM) Volume 2 and the relevant Traffic Engineering Practice Notes and Road Notes. The results of the review show that the previously proposed emergency vehicle run-in, and associated crash gate and road paving near the southern end of the Site remain unchanged. The proposed road works meet the current design standards.

4.2.2 However, our recent site inspections indicate that surface cracks have been observed on Ha Mei San Tsuen Road at the north of the Site. As such, a short section of the road will be repaved. The details of the design road works are shown in ***Drawings 380390/B/GA001*** and ***M001***.

4.3 Review of Drainage Works

The previous drainage works design is reviewed and revised to suit the latest general layout and based on the existing and latest available information mentioned in Section 3 and current design standards, e.g. DSD's latest requirements, e.g. the latest edition of Stormwater Drainage Manual (3rd Edition published in December 2000) and its Corrigenda 1 & 2 in March 2005 & August 2005 respectively. The results of the review show that the previously adopted design parameters for the drainage works design remain unchanged and are re-produced below:

Drainage Works	Return Period
Flood protection embankments	>200 years
Road drainage	50 years
Village drainage	10 years

Return Period	Flood Level (mPD)
1 in 200 year	+4.80
1 in 50 year	+4.30
1 in 10 year	+3.80

4.3.1 Due to the slightly revised site formation works discussed in Section 4.1, the previously drainage works design is revised and some of the existing surface channels are required to be upgraded. However, under the revised design, modification of the inlets of the existing box culverts connected to the flood pond at the north of the Site is not required.

4.3.2 The revised drainage works will collect surface runoff confined in Ha Mei San Tsuen, which will then be conveyed to the existing flood pond and pumped via the existing Ha Mei San Tsuen Stormwater Pumping Station at about 140 m to the north of the Site to the existing stormwater system beneath Tin Tsz Road. As the existing flood pond and Ha Mei San Tsuen Stormwater Pumping Station have been designed to collect the surface runoff from Ha Mei San Tsuen, it is considered that the downstream drainage system including the existing flood pond, the Ha Mei San Tsuen Stormwater Pumping Station and the further downstream network has sufficient capacity to deal with the surface runoff from Ha Mei San Tsuen.

4.3.3 The revised drainage works are shown in ***Drawings 380390/B/SD001, M002*** and ***M003***. The design calculation of the revised drainage works is enclosed in ***Appendix I***.

4.4 REVIEW OF SEWERAGE WORKS

4.4.1 The previous sewerage works design is reviewed and revised to suit the latest layout and based on the existing and latest available information mentioned in Section 3 and current design standards, e.g. DSD's Sewerage Manual and its Corrigendum 1 in December 2004. The results of the review show that the previously adopted design parameters for the sewerage works design remain unchanged and are re-produced below:

Village Development	Population	Global unit flow factor (m^3/d/person)	ADWF (L/s)	Peak = 8 x ADWF
Existing –traditional village	280	0.15	0.486	3.888
Ultimate – modern village	949	0.240	2.636	21.088

4.4.2 Gravity sewers are proposed for the Ha Mei San Tsuen VEA to serve the existing and future village houses. Due to the slightly revised site formation works discussed in Section 4.1, the previously sewerage works design is revised. Nonetheless, the alignment of the proposed sewer keeps the same as the previous design while the invert level of the sewer has been adjusted to fit in the revised site formation levels.

4.4.3 The revised sewerage works will convey the sewage flow generated from the existing and future village houses to the existing Ha Mei San Tsuen Sewage Pumping Station at about 20 m to the north of the Site and then pumped to the existing sewerage system beneath Tin Tsz Road. As the Ha Mei San Tsuen Sewage Pumping Station have been designed to collect the sewage flow from Ha Mei San Tsuen including all existing and future village houses, it is considered that the downstream sewerage system including the existing Ha Mei San Tsuen Sewage Pumping Station and the further downstream network has sufficient capacity to deal with the sewage flow from Ha Mei San Tsuen.

4.4.4 As regards to the Road (Works, Use and Compensation) Ordinance (Chapter 370) as applied by Section 26 of the Water Pollution Control (Sewerage) Regulation (Chapter 358, subsidiary Legislation), it is expected that no resumption of land is involved while the works would be unlikely to attract any objection if gazetted under Section 8 of the Ordinance. It is therefore recommended that the works be authorized as minor works under the Ordinance.

4.4.5 The revised sewerage works are shown in ***Drawings 380390/B/SD002, M002*** and ***M003***. The design calculation of the revised sewerage works is enclosed in ***Appendix J***.

4.5 REVIEW OF LANDSCAPING WORKS

4.5.1 Although the site formation works are designed to retaining the existing trees as far as possible, there are still some existing trees over the Ha Mei San Tsuen VEA, which will be required to be felled or transplanted to facilitate the development. Topographical survey and tree survey will be carried out to identify the trees to be felled. Tree felling application according to the latest requirements will be submitted to relevant authorities, e.g. DLO, LCSD and AFCD for approval.

4.5.2 Based on the revised site formation works design, the existing trees along Tin Tsz Road on the west and northeast of Ha Mei San Tsuen VEA will be retained. The revised landscape works are shown in ***Drawing 380390/B/LC001***.

4.6 CONSTRUCTION AND DEMOLITION MATERIAL MANAGEMENT PLAN (C&DMMP)

4.6.1 The scope of works of this project includes site formation, drainage and sewerage works, road works and landscaping works.

4.6.2 After the revision of the works, it is anticipated that the total volume of inert C&D Materials (soft public fill) to be reused in the project will be 9,400 m^3, while the volume of inert C&D Materials to be disposed as public fill (or C&D waste) will be 2,000 m^3. Total volume of soft public fill to be generated will be 11,400 m^3. It is also anticipated that the volume of inert C&D Materials (soft public fill) to be imported as fill material will be 28,800 m^3. The C&DMMP is enclosed in ***Appendix K.***

4.7 MAINTENANCE RESPONSIBILITY

4.7.1 The scope of works of this project includes site formation, drainage and sewerage works, road works and landscaping works. The maintenance responsibility of VEA is recommended below.

4.7.2 Architectural Services Department (ArchSD) shall be responsible for maintenance of the common area within the VEA, such as platform areas and emergency vehicular access including railings, crash gates, footpaths and passageways.

4.7.3 Leisure and Cultural Services Department (LCSD) shall be responsible for the and maintenance of trees and vegetation on the unallocated Government lands as well as on the new amenity areas.

4.7.4 Drainage Services Department (DSD) shall be responsible for management and maintenance of stormwater drainage and sewerage system within the VEA.

4.7.5 The recommended maintenance schedules of completed works are summerised in the following table. Coloured drawing for the demarcation of maintenance responsibility is enclosed in ***Figure 4***.

Items of works	Maintenance
1. Areas within Village including small house area, platform areas and emergency vehicular access including railings, crash gates, footpaths, passageways, surface channels, catchpits, sloping ground and retaining structures that registration is not required, common pedestrian areas, pedestrian ramp and stairways.	Land D responsible for coordination
2. Trees and Vegetation within Village (a) On unallocated Government Land (b) On new amenity areas	 LCSD LCSD
3. Proposed Stormwater Drainage and Sewerage Systems (a) Proposed stormwater drainage pipes and manholes within vehicular access roads and car parking areas (b) Proposed sewers and manholes within vehicular access roads and car parking areas (c) Proposed stormwater drainage pipes and manholes on platform areas, EVAs and other common areas but not including individual village house drainage systems up to terminal manholes (d) Proposed sewers and manholes on platform areas, EVAs and other common areas but not including individual village house drainage systems up to terminal manholes	 DSD DSD ArchSD ArchSD

4.8 NEED OF NOISE BARRIERS

4.8.1 A draft Environmental Review Report (***Report ref. 380390/B&V/002***) has been submitted to Environmental Protection Department (EPD) for comments in May and June 2012. The results of the traffic and industrial noise assessments presented in the Environmental Review Report conclude that no noise mitigation measures, i.e. noise barriers, for the proposed development are necessary. EPD has showed no comment on this conclusion of noise impact assessments. As such, there is no need to provide noise barriers under this Project.

END OF TEXT

FIGURES

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Revision	Date	Description			Initial
		Designed	Checked	Drawn	Checked
Initial		JOEL	GC	SZ	GC
Date		JUN2012	JUN2012	JUN2012	JUN2012

Approved

Agreement No.
CE 5/86

Agreement Title
TIN SHUI WAI DEVELOPMENT – ENGINEERING INFRASTRUCTURE FOR HA MEI SAN TSUEN VILLAGE EXPANSION AREA

Drawing Title
LOCATION OF EXISTING DRILLHOLES

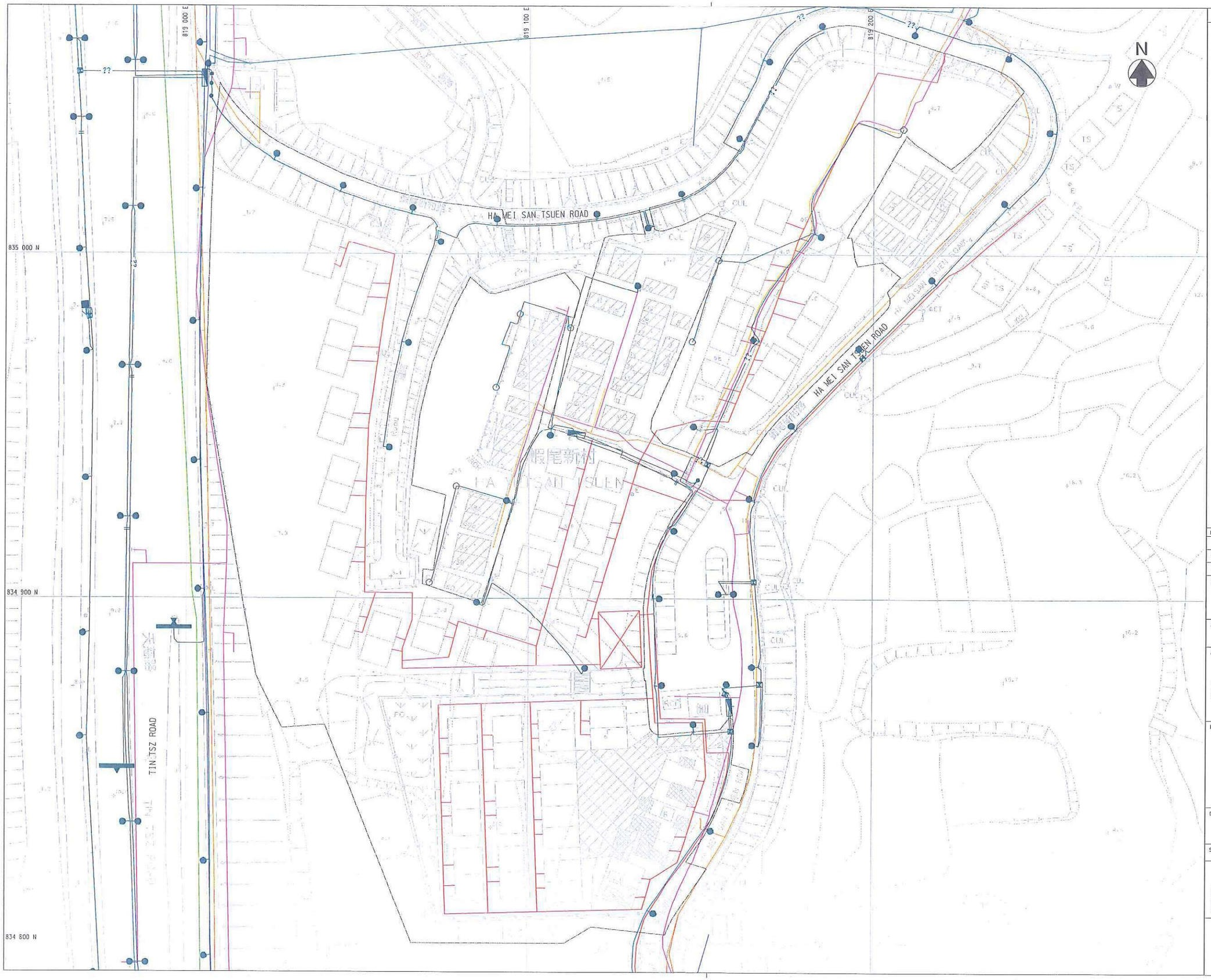
Figure No.
FIGURE 1

Revision
–

Scale
A1 1:1000
A3 1:2000

CEDD 土木工程拓展署 Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司



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NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (mPD).
3. GRID LINES ARE HONG KONG METRIC GRID 1980.

LEGEND:

- SITE BOUNDARY
- EXISTING HGC CABLE
- PROPOSED CLP DUCT ROUTE
- EXISTING CLP DUCT ROUTE
- EXISTING FRESH WATER MAIN
- EXISTING PCCW CABLE DUCT ROUTE
- EXISTING LIGHTING

Revision	Date	Description			Initial
	Designed	Checked	Drawn		Checked
Initial					
Date	MAY2012	MAY2012	MAY2012		MAY2012

Approved

Agreement No.
CE 5/86

Agreement Title
TIN SHUI WAI DEVELOPMENT – ENGINEERING INFRASTRUCTURE FOR HA MEI SAN TSUEN VILLAGE EXPANSION AREA

Figure Title
UTILITIES LAYOUT PLAN

Drawing No.
FIGURE 2

Revision
–

Scale
A1 1:500
A3 1:1000

CEDD 土木工程拓展署 Civil Engineering and Development Department

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博威工程顧問有限公司

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LEGEND:

- SITE BOUNDARY
- REGISTERED SLOPE / RETAINING WALL

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	JOEL	GC	SZ	GC	
Date	AUG2012	AUG2012	AUG2012	AUG2012	

Approved

Agreement No.
CE 5/86

Agreement Title
TIN SHUI WAI DEVELOPMENT – ENGINEERING INFRASTRUCTURE FOR HA MEI SAN TSUEN VILLAGE EXPANSION AREA

Drawing Title
EXISTING REGISTERED MAN-MADE SLOPES AND RETAINING WALLS WITHIN SITE BOUNDARY

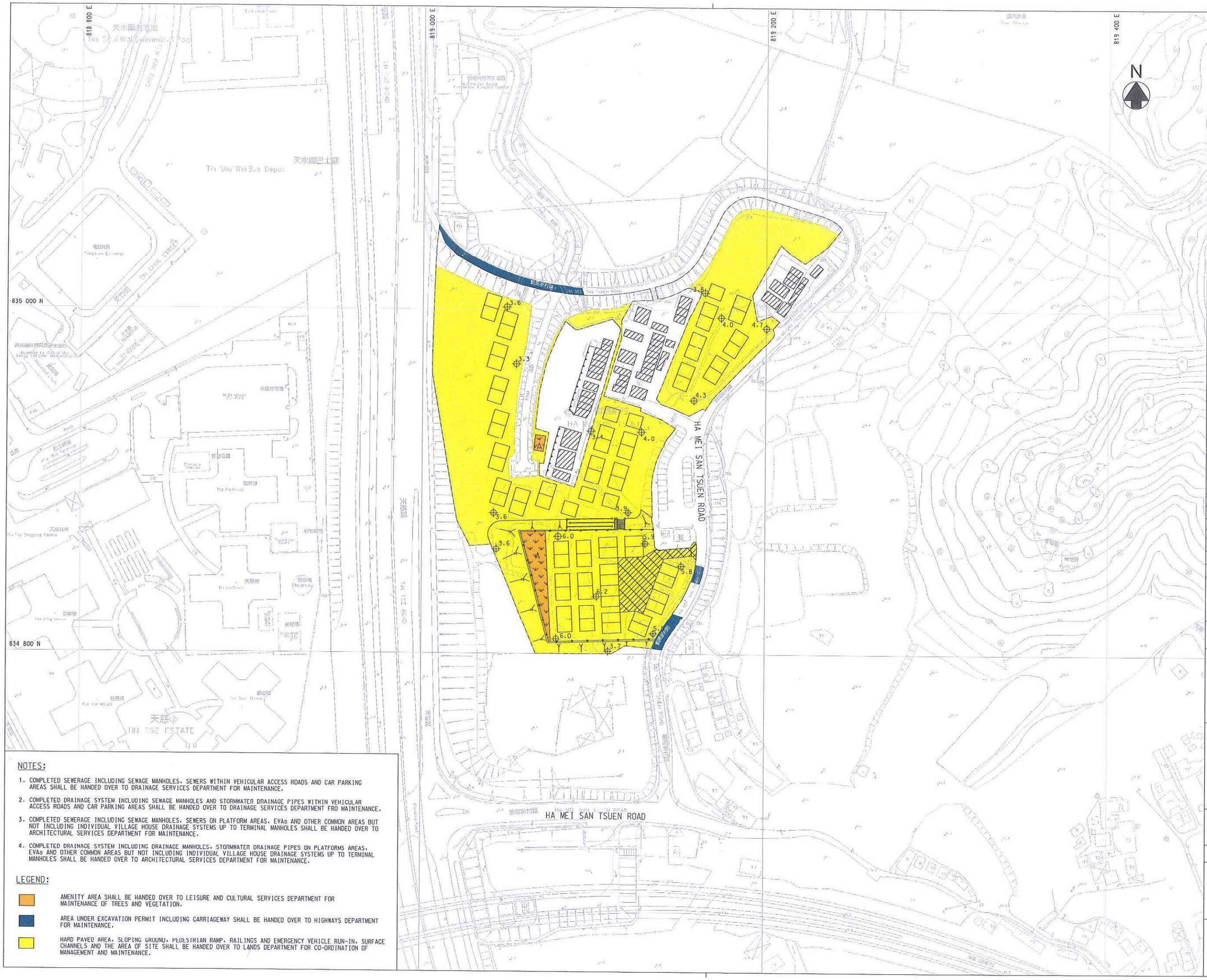
Drawing No.
FIGURE 3

Revision
–

Scale
A1 1:1000
A3 1:2000

CEDD 土木工程拓展署 Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司



NOTES:

1. COMPLETED SEWERAGE INCLUDING SEWAGE MANHOLES, SEWERS WITHIN VEHICULAR ACCESS ROADS AND CAR PARKING AREAS SHALL BE HANDED OVER TO DRAINAGE SERVICES DEPARTMENT FOR MAINTENANCE.
2. COMPLETED DRAINAGE SYSTEM INCLUDING SEWAGE MANHOLES AND STORMWATER DRAINAGE PIPES WITHIN VEHICULAR ACCESS ROADS AND CAR PARKING AREAS SHALL BE HANDED OVER TO DRAINAGE SERVICES DEPARTMENT FRO MAINTENANCE.
3. COMPLETED SEWERAGE INCLUDING SEWAGE MANHOLES, SEWERS ON PLATFORM AREAS, EVAs AND OTHER COMMON AREAS BUT NOT INCLUDING INDIVIDUAL VILLAGE HOUSE DRAINAGE SYSTEMS UP TO TERMINAL MANHOLES SHALL BE HANDED OVER TO ARCHITECTURAL SERVICES DEPARTMENT FOR MAINTENANCE.
4. COMPLETED DRAINAGE SYSTEM INCLUDING DRAINAGE MANHOLES, STORMWATER DRAINAGE PIPES ON PLATFORMS AREAS, EVAs AND OTHER COMMON AREAS BUT NOT INCLUDING INDIVIDUAL VILLAGE HOUSE DRAINAGE SYSTEMS UP TO TERMINAL MANHOLES SHALL BE HANDED OVER TO ARCHITECTURAL SERVICES DEPARTMENT FOR MAINTENANCE.

LEGEND:

- AMENITY AREA SHALL BE HANDED OVER TO LEISURE AND CULTURAL SERVICES DEPARTMENT FOR MAINTENANCE OF TREES AND VEGETATION.
- AREA UNDER EXCAVATION PERMIT INCLUDING CARRIAGEWAY SHALL BE HANDED OVER TO HIGHWAYS DEPARTMENT FOR MAINTENANCE.
- HARD PAVED AREA, SLOPING GROUND, PEDESTRIAN RAMP, RAILINGS AND EMERGENCY VEHICLE RUN-IN, SURFACE CHANNELS AND THE AREA OF SITE SHALL BE HANDED OVER TO LANDS DEPARTMENT FOR CO-ORDINATION OF MANAGEMENT AND MAINTENANCE.

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NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (mPD).
3. GRID LINES ARE HONG KONG METRIC GRID 1980.

LEGEND:

- SITE BOUNDARY
- EXISTING VILLAGE HOUSE
- PROPOSED VILLAGE HOUSE
- 6.2 PROPOSED FINISH LEVEL IN mPD
- AMENITY AREA
- PROPOSED SLOPE
- TYPE 2 RAILING
- TUBULAR RAILING
- PROPOSED EMERGENCY VEHICLE RUN-IN WITH STRENGTHENED PAVING
- EXISTING ROAD SURFACE TO BE REPAVED WITH BITUMEN SURFACE

Revision	Date	Description			Initial
		Designed	Checked	Drawn	Checked
C	AUG2013	MINOR REVISION			JK
B	JUL2013	MINOR REVISION			JK
A	OCT2012	MINOR REVISION			JOEL
Initial		JOEL	GC	SZ	GC
Date		FEB2012	FEB2012	FEB2012	FEB2012

Approved

Agreement No.
CE 5/86

Agreement Title
TIN SHUI WAI DEVELOPMENT
- ENGINEERING INFRASTRUCTURE FOR HA MEI SAN TSUEN VILLAGE EXPANSION AREA

Drawing Title
MAINTENANCE MATRIX FOR COMPLETED WORKS

Drawing No. FIGURE 4

Revision C

Scale A1 1:1000
A3 1:2000

CEDD 土木工程拓展署 Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

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Note :

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METRE ABOVE PRINCIPAL DATUM (mPD).
3. GRID LINES ARE HONG KONG METRIC GRID 1980.

LEGEND :

- SITE BOUNDARY
- EXISTING VILLAGE HOUSE
- EXISTING VILLAGE HOUSE TO BE DEMOLISHED
- PROPOSED VILLAGE HOUSE
- 4.6 PROPOSED FINISH LEVEL IN mPD
- A AMENITY AREA
- PROPOSED SLOPE
- TYPE 2 RAILING
- TUBULAR RAILING

No.	Date	Description	Checked
REVISION			

Drawn JAMES TAM	Date 11/98	Designed MK	Date 11/98
Checked DW	Date 11/98	Authorised for Issued	Date
Approved			

Contract no.	YL 45/99
FSP no.	213 CL
Agreement no.	CE 5/86

Project
YUEN LONG / TUEN MUN CORRIDOR / RURAL HINTERLAND ENGINEERING WORKS FOR VILLAGE PRIORITY AREAS (HA MEI SAN TSUEN)

Contract title
ENGINEERING WORKS FOR HA MEI SAN TSUEN VILLAGE EXPANSION

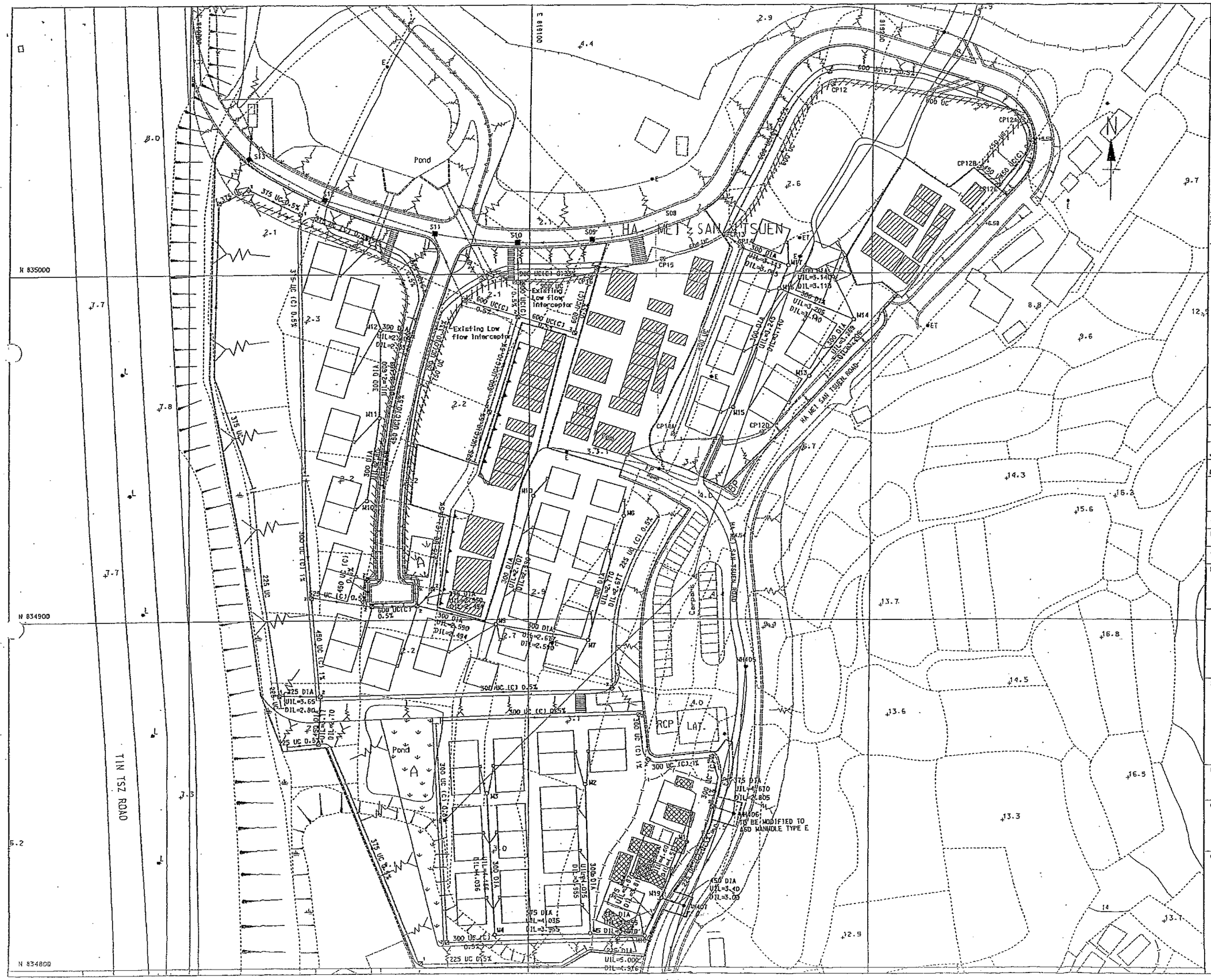
Drawing title
GENERAL LAYOUT

Drawing no.	File register no.	Scale
GA 1	0188/C45/001 A	1 : 1000

Contractor
Binnie Black & Veatch Hong Kong Limited
博威工程顧問有限公司

Office
新界北拓展處
NEW TERRITORIES NORTH DEVELOPMENT OFFICE
拓展署
Territory Development Department, Hong Kong

C/D file :



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Notes:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METRE ABOVE PRINCIPAL DATUM (mPD).
3. GRID LINES ARE HONG KONG METRIC GRID 1980.

LEGEND :

- Existing 300 U-channel
- Existing precast concrete pipe
- CP12D Existing catchpit
- Existing stormwater manhole
- U-channel to be demolished
- 225 UC — Proposed 225 U-channel
- 300 UC (C) — Proposed 300 U-channel with precast concrete cover
- 375 DIA — Proposed 375mm dia precast concrete pipe
- Existing sewer manhole
- Proposed stormwater manhole
- Proposed catchpit Type 1
- Proposed manhole Type F refer to ASD Standard Drawing no. S513-09 with 150 diameter UPVC pipe
- Existing intake structure to be demolished

No.	Date	Description	Checked
REVISION			

Drawn JAMES TAM	Date 11/98	Designed MK	Date 11/98
Checked DW	Date 11/98	Authorized for Issue	Date
Approved			

10D Contract no.	YL 45/99
PWP no.	213 CL
Agreement no.	CE 5/86

Project
YUEN LONG / TUEN MUN CORRIDOR / RURAL HINTERLAND ENGINEERING WORKS FOR VILLAGE PRIORITY AREAS (HA MEI SAN TSUEN)

Contract title
ENGINEERING WORKS FOR HA MEI SAN TSUEN VILLAGE EXPANSION

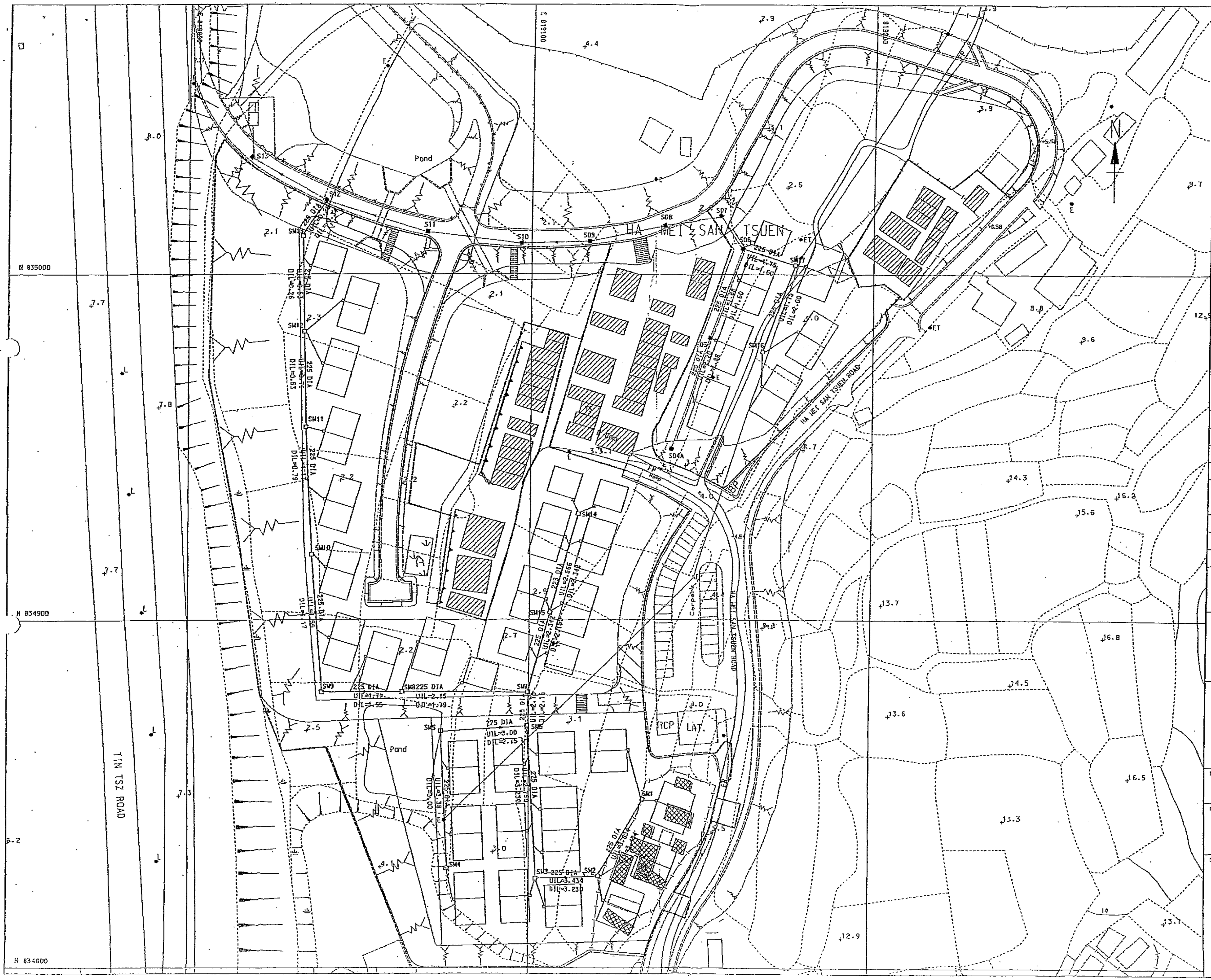
Drawing title
STORMWATER DRAIN LAYOUT

Drawing no.	Plan register no.	Scale
SD 1	D188/C45/002 A	1 : 500

Consultant
Binnie Black & Veatch Hong Kong Limited
博威工程顧問有限公司

Office
新界北拓展處
NEW TERRITORIES NORTH DEVELOPMENT OFFICE
拓展署
Territory Development Department, Hong Kong

CAD file:



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Notes:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METRE ABOVE PRINCIPAL DATUM (mPD).
3. GRID LINES ARE HONG KONG METRIC GRID 1980.

LEGEND :

- SITE BOUNDARY
- EXISTING SEWAGE MANHOLE AND PIPE
- PROPOSED SEWAGE MANHOLE AND PRECAST CONCRETE PIPE
- TERMINAL MANHOLE TYPE T10 REFER TO DSD STANDARD DRAWING NO. DS1058A WITH 150mm DIA UPVC PIPE

No.	Date	Description	Checked

REVISION

Drawn	Date	Designed	Date
JAMES TAM	11/98	MK	11/98
Checked	Date	Authorized for issued	Date
DW	11/98		

Approved

TDD Contract no. YL 45/99

PWP no. 213 CL

Agreement no. CE 5/86

Project
YUEN LONG / TUEN MUN CORRIDOR / RURAL HINTERLAND ENGINEERING WORKS FOR VILLAGE PRIORITY AREAS (HA MEI SAN TSUEN)

Contract title
ENGINEERING WORKS FOR HA MEI SAN TSUEN VILLAGE EXPANSION

Drawing title
SEWER LAYOUT

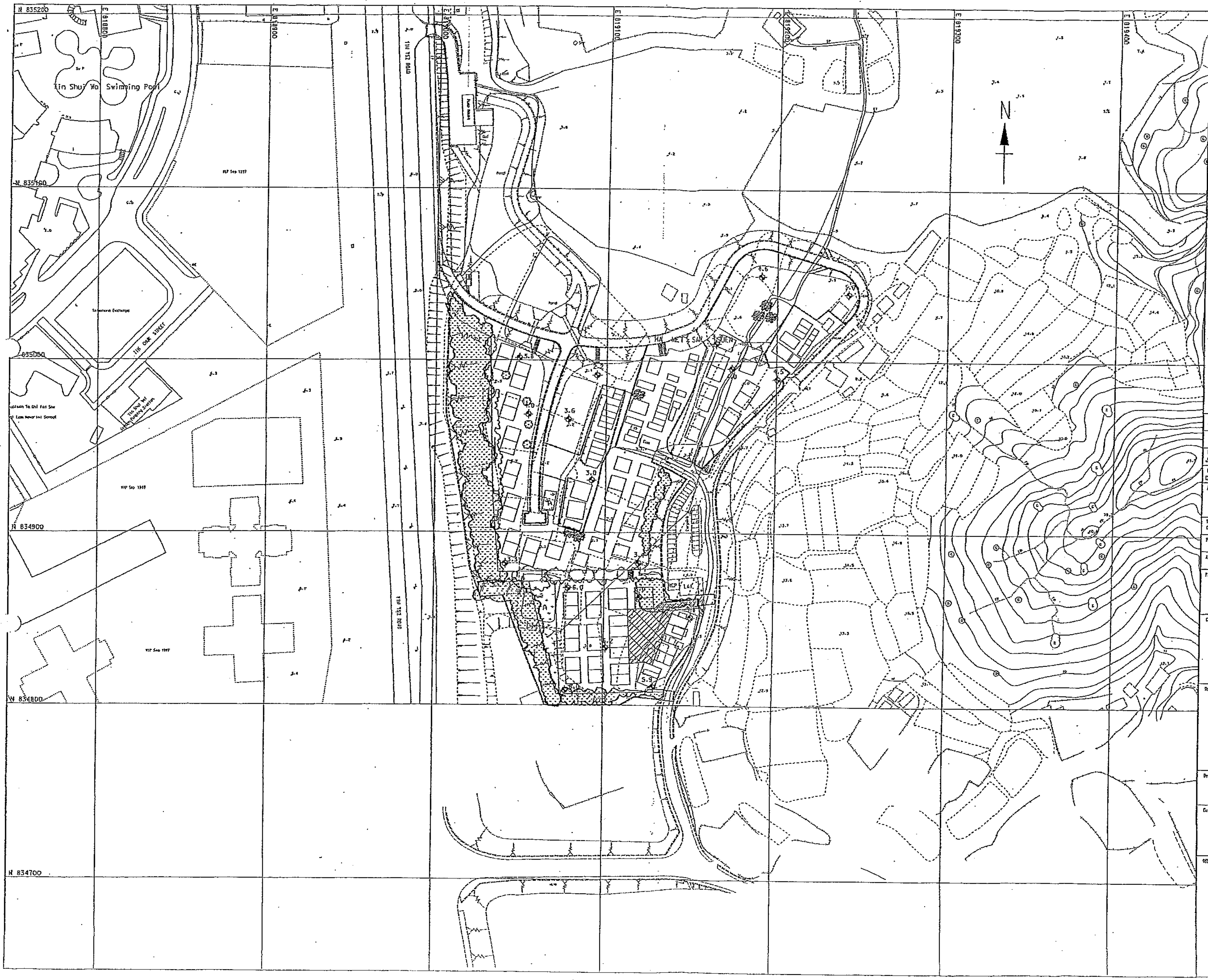
Drawing no.	Plan register no.	Scale
SD 2	0188/C45/003 A	1:500

Consultant
Binnie
Binnie Black & Veatch Hong Kong Limited
博威工程顧問有限公司

Office
新界北拓展處
NEW TERRITORIES NORTH DEVELOPMENT OFFICE

拓展署
Territory Development Department, Hong Kong

CAD file :



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Notes :

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METRE ABOVE PRINCIPAL DATUM (mPD).
3. THE VILLAGE DEVELOPMENT AREAS AND THE INTERNALE ALLEYS BETWEEN THE EXISTING VILLAGE HOUSES SHALL BE PAVED WITH INTERLOCKING PRECAST CONCRETE PAVING BLOCKS.

LEGEND :

- SITE BOUNDARY
- EXISTING TREES TO BE RETAINED
- SMALL TREES & SHRUBS
- MIXED WOODLAND BUFFER PLANTING
- ORNAMENTAL TREES & SHRUB PLANTING
- GRASS AREAS

No.	Date	Description	Checked

REVISION

Drawn	Date	Designed	Date
JAMES TAM	11/98	WK	11/98
Checked	Date	Authorized for issued	Date
DW	11/98		

Approved

TDD Contract no. YL 45 / 99

PWP no. 213 CL

Agreement no. CE 5 / 86

Project
YUEN LONG / TUEN MUN
CORRIDOR / RURAL HINTERLAND
ENGINEERING WORKS FOR VILLAGE PRIORITY AREAS
(HA MEI SAN TSUEN)

Contract title

ENGINEERING WORKS FOR
HA MEI SAN TSUEN
VILLAGE EXPANSION

Drawing title

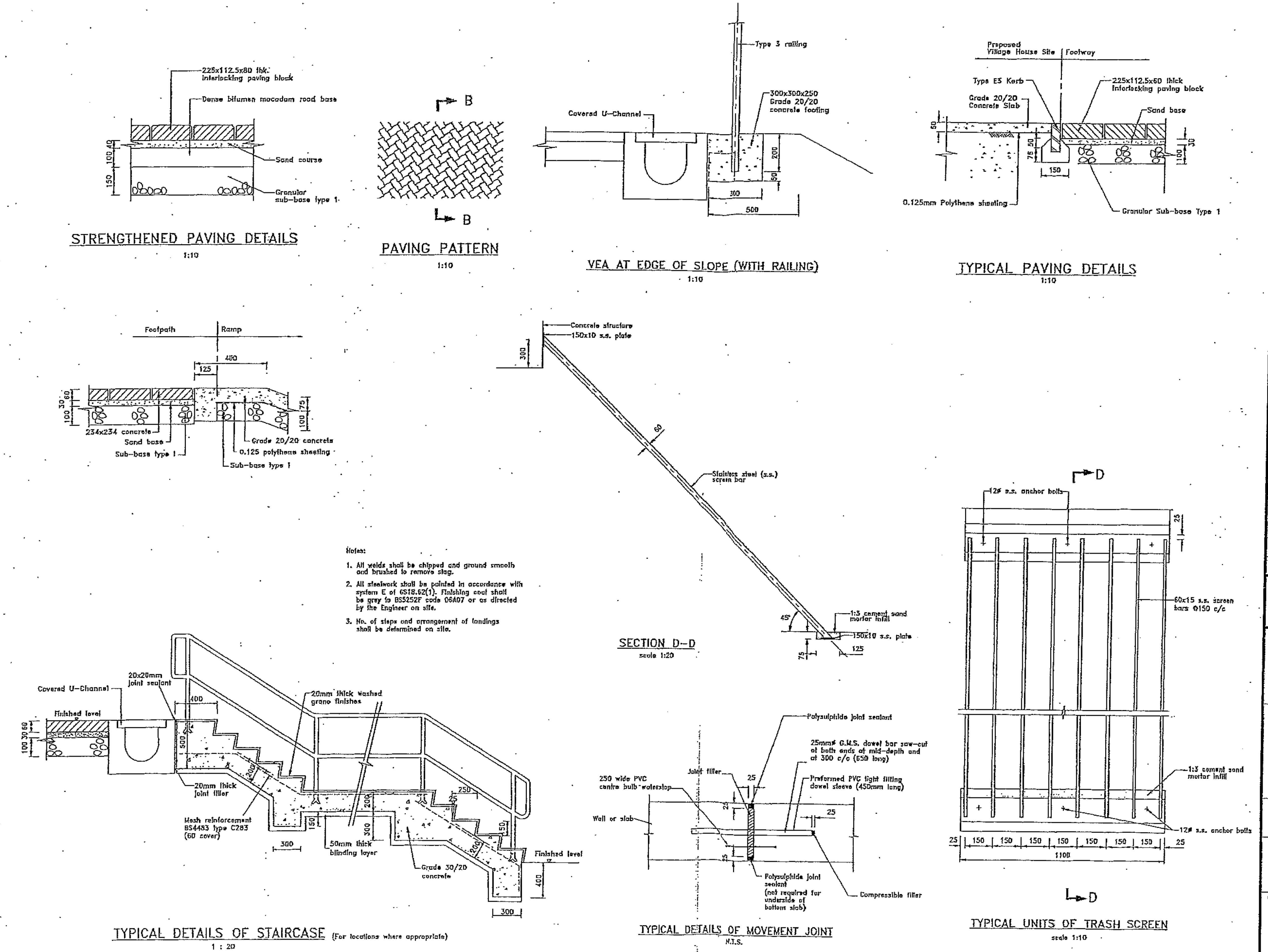
LANDSCAPE WORKS

Drawing no.	Plan register no.	Scale
LC 1	0188/C45/006 A	1 : 1000

Consultant
& Binnie
Binnie Black & Veatch Hong Kong Limited
博威工程顧問有限公司
Engineers and Scientists

Office
新界北拓展處
NEW TERRITORIES NORTH
DEVELOPMENT OFFICE
拓展署
Territory Development
Department, Hong Kong

CAD file :



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Notes:

1. All dimensions are in millimetres unless otherwise stated.
2. All covers to reinforcement to be 30mm.
3. Details of type 3 railing refer to HyD Standard Drawing nos. H2133 & H2134.
4. Details of tubular railing refer to HyD Standard Drawing no. H2135.
5. Details of type E5 precast concrete kerb refer to HyD Standard Drawing no. H1118.

No.	Date	Description	Checked

REVISION

Drawn JAMES TAM	Date 12/98	Designed MK	Date 12/98
Checked D. WONG	Date 12/98	Authorized for issued	Date
Approved			

TDD Contract no.	YL 45/99
PWP no.	213 CL
Agreement no.	CE 5/86

Project: YUEN LONG / TUEN MUN CORRIDOR / RURAL HINTERLAND ENGINEERING WORKS FOR VILLAGE PRIORITY AREAS (HA MEI SAN TSUEN)

Contract title: ENGINEERING WORKS FOR HA MEI SAN TSUEN VILLAGE EXPANSION

Drawing title: ROAD WORKS MISCELLANEOUS DETAILS

Drawing no.	Plan register no.	Scale
M1	0188/C45/007A	AS SHOWN

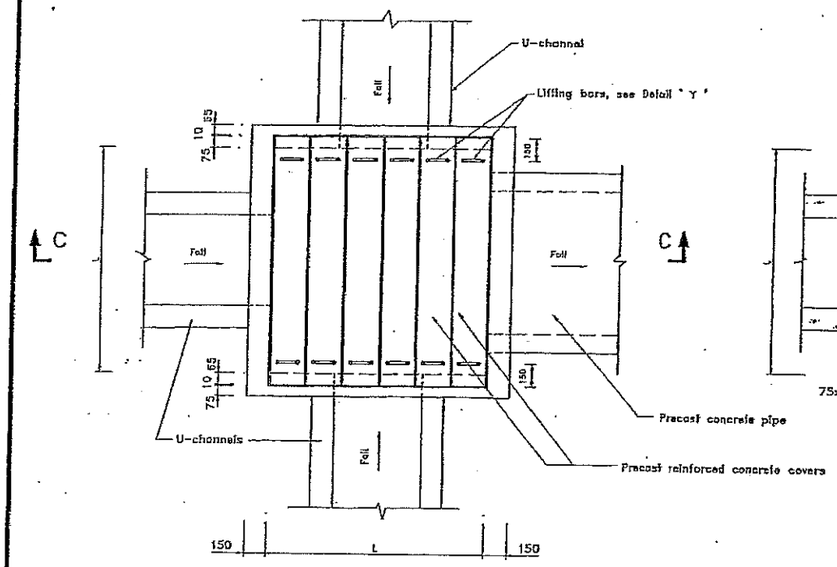
Consultant: Binnie Black & Veatch Hong Kong Limited 博威工程顧問有限公司

Office: 新界北拓展處 NEW TERRITORIES NORTH DEVELOPMENT OFFICE

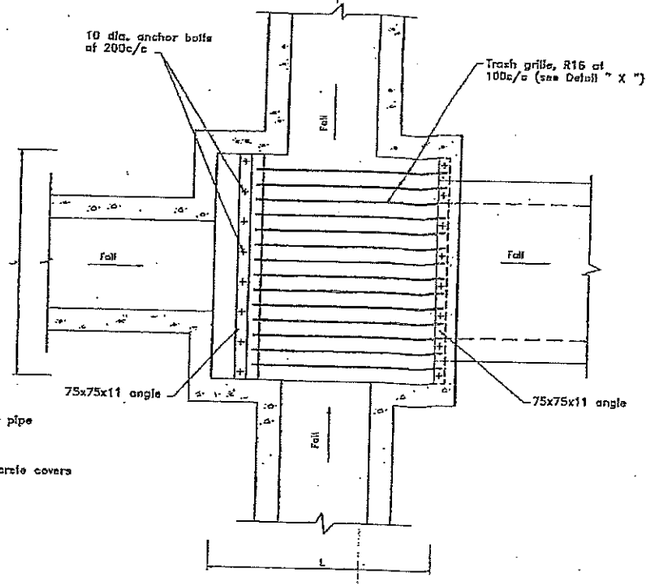
拓展署 Territory Development Department, Hong Kong

APPENDIX A

Previous Design Drawings Completed in 1996



PLAN
1 : 20



SECTION D — D
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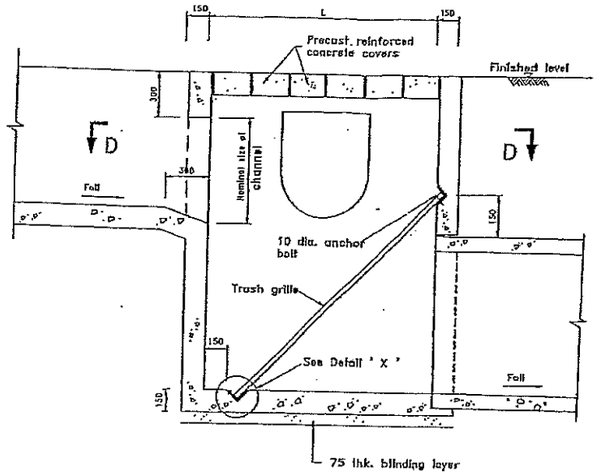

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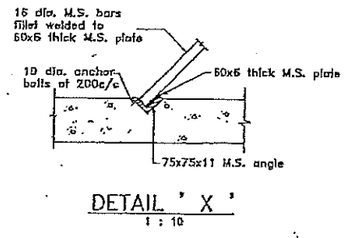

DETAIL ' X '
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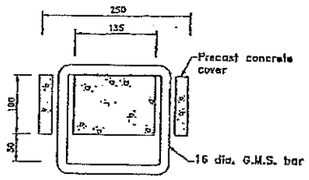

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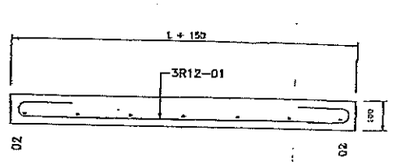
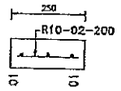
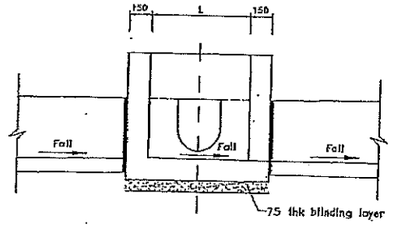
1 : 5



ELEVATION
1 : 10



SECTION F — F
1 : 10



SECTION B — B

CATCHPIT TYPE 2

TYPICAL R.C. DETAILS OF PRECAST CONCRETE COVER

Stormwater Manhole Schedule

Stormwater Manhole no.	ASD * Concrete Manhole Type	Pipe Diameter (m)	Finished Ground level (mPD)	Lowest Invert level (mPD)	Depth From GL to pipe (mPD)
M1	B	0.3	5.90	4.600	1.300
M2	C	0.3	6.10	4.075	2.025
M3	C	0.3	6.00	4.156	1.844
M4	C	0.375	6.00	4.036	1.964
M5	C	0.375	6.00	3.955	2.045
M6	A	0.375	3.40	2.770	0.630
M7	A	0.3	3.40	2.677	0.723
M8	A	0.3	3.40	2.707	0.693
M9	A	0.3	3.30	2.590	0.710
M10	B	0.3	3.80	2.800	1.000
M11	B	0.3	4.00	2.600	1.400
M12	B	0.3	3.90	2.408	1.492
M13	B	0.3	4.50	3.269	1.231
M14	B	0.3	4.50	3.206	1.294
M15	A	0.3	4.00	3.245	0.755
M16	A	0.3	4.00	3.140	0.860
M17	A	0.3	4.00	3.113	0.887
M18	G	0.3	5.90	3.400	2.500

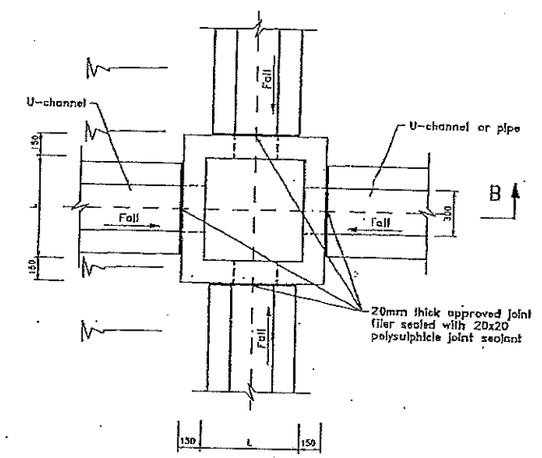
* ASD — Architectural Services Department Standard Drawings

Sewerage Manhole Schedule

Sewerage Manhole no.	ASD * Concrete Manhole Type	Pipe Diameter (m)	Finished Ground level (mPD)	Lowest Invert level (mPD)	Depth From GL to IL (m)
SM1	C	0.225	6.00	3.634	2.366
SM2	C	0.225	6.00	3.434	2.566
SM3	C	0.225	6.00	3.230	2.770
SM4	C	0.225	6.00	3.380	2.620
SM5	D	0.225	6.00	3.000	3.000
SM6	D	0.225	6.00	2.750	3.250
SM7	B	0.225	3.40	2.150	1.250
SM8	C	0.225	3.40	1.790	1.610
SM9	C	0.225	3.40	1.550	1.850
SM10	C	0.225	3.70	1.170	2.530
SM11	D	0.225	3.90	0.790	3.110
SM12	D	0.225	4.00	0.530	3.470
SM13	D	0.225	3.80	0.260	3.540
SM14	A	0.225	3.40	2.566	0.834
SM15	A	0.225	3.30	2.342	0.958
SM16	C	0.225	4.00	2.000	2.000
SM17	C	0.225	4.00	1.750	2.250

DIMENSION OF CATCHPIT

Size of largest pipe or U-channel (mm)	L (mm)
225 ~ 300	550
375 ~ 450	800
525 ~ 675	1050
750 ~ 900	1300



PLAN

CATCHPIT TYPE 1
1 : 20

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Notes:

1. This drawing is to be read in conjunction with Drawing nos. M3 and M6.
2. All dimensions are in millimetres unless otherwise stated.
3. All concrete shall be Grade 20/20 unless otherwise stated.
4. All exposed formed surface shall be F2 finish. All buried formed surface shall be F1 finish. All unformed finished shall be U2 finish unless otherwise stated.
5. Trash grille, angle and plate shall be galvanised mild steel.
6. Minimum 30mm cover shall be provided for the precast reinforced concrete cover.
7. All reinforcement shall comply with BS4449.
8. Catchpit shall have walls and slab centrally reinforced with one layer of square mesh fabric no. A252 to BS4483.
9. Movement joint for channels shall be formed at 30m interval and when joining catchpits.
10. All blinding concrete shall be Grade 10/20.
11. All pipes with cover below finish ground level less than 1m shall be provided with concrete surround as shown in HyD Standard Drawing no. H3130.
12. All bolts, nuts and washers shall be Grade A4 stainless steel.

No.	Date	Description	Checked

REVISION

Drawn JAMES TAM	Date 12/98	Designed MK	Date 12/98
Checked D. WONG	Date 12/98	Authorised for Issued	Date
Approved			

TDD Contract no.	YL 45/99
PNP no.	213 CL
Agreement no.	CE 5/86

Project

YUEN LONG / TUEN MUN CORRIDOR / RURAL HINTERLAND ENGINEERING WORKS FOR VILLAGE PRIORITY AREAS (HA MEI SAN TSUEN)

Contract title

ENGINEERING WORKS FOR HA MEI SAN TSUEN VILLAGE EXPANSION

Drawing title

MISCELLANEOUS DRAINAGE DETAILS SHEET 1 OF 2

Drawing no.	Plan register no.	Scale
M2	0188/C45/008A	AS SHOWN

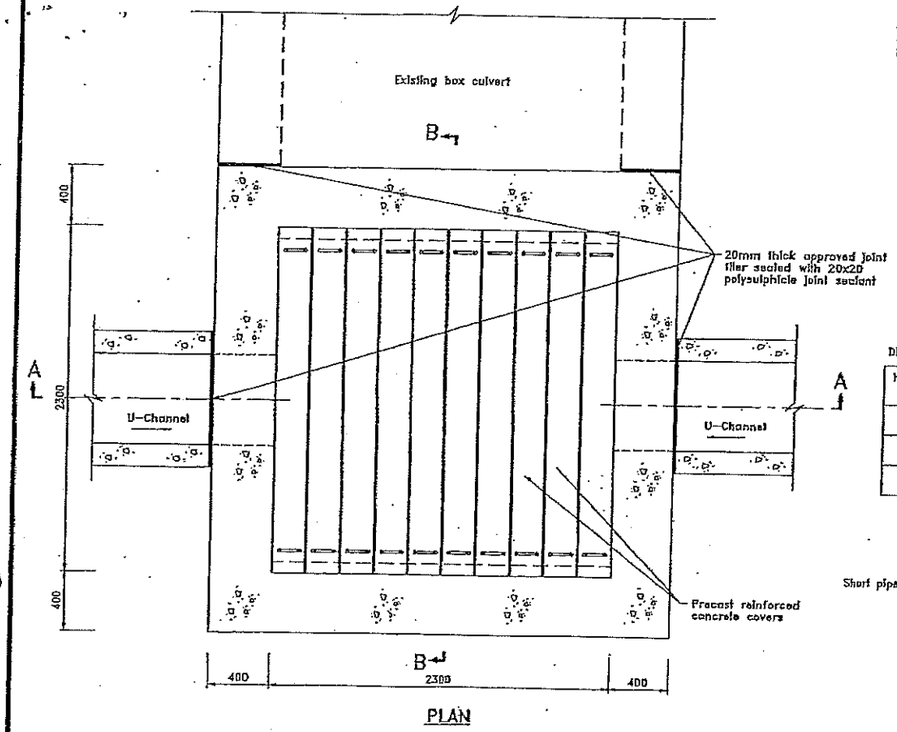
Consultant

Binnie
Binnie Black & Veatch Hong Kong Limited
柏威工程顧問有限公司
Engineers and Advisers

Office

新界北拓展處
NEW TERRITORIES NORTH DEVELOPMENT OFFICE
拓展署
Territory Development Department, Hong Kong

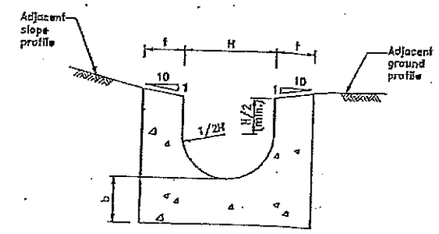
H:\TSW\HWST\EVA\M2.DGN



PLAN

CATCHPIT TYPE 3

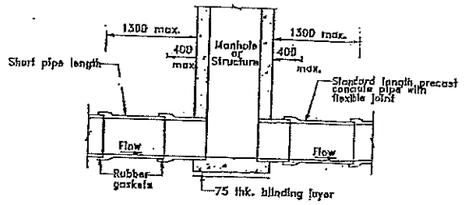
1 : 20



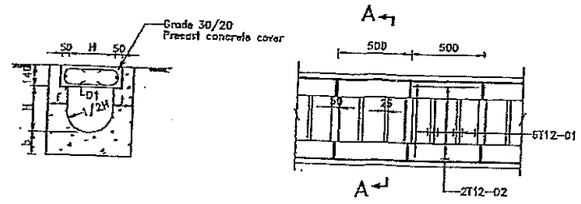
TYPICAL DETAIL OF U-CHANNEL

DIMENSION OF U-CHANNEL

Nominal size of channel H (mm)	Thickness t (mm)	Thickness b (mm)	Reinforcement
225 to 300	100	100	Not required
375 to 575	150	150	Not required
750 to 900	175	175	A252 mesh placed centrally



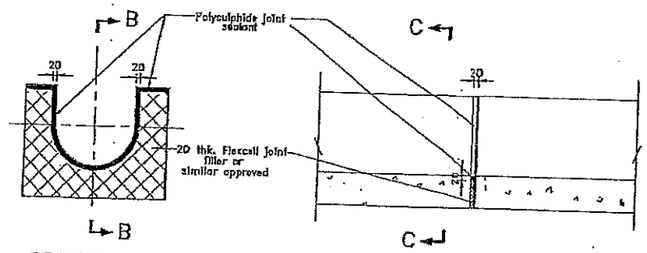
TYPICAL DETAILS OF DOUBLE FLEXIBLE JOINT AT MANHOLE OR STRUCTURE



SECTION A-A

PLAN

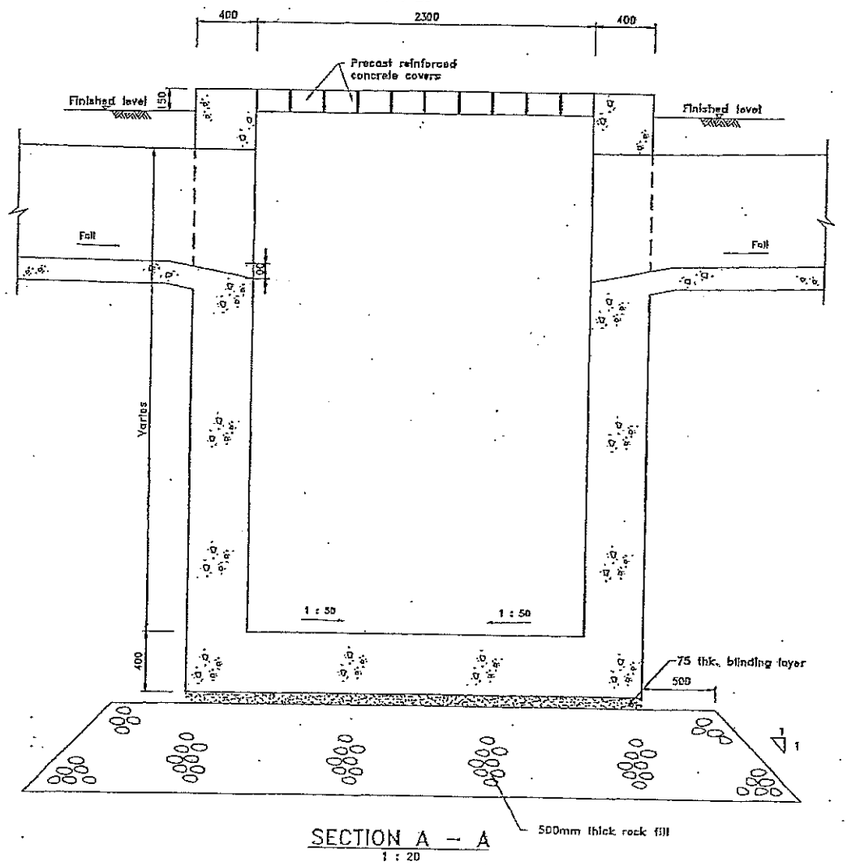
TYPICAL DETAIL OF COVERED U-CHANNEL



SECTION C-C

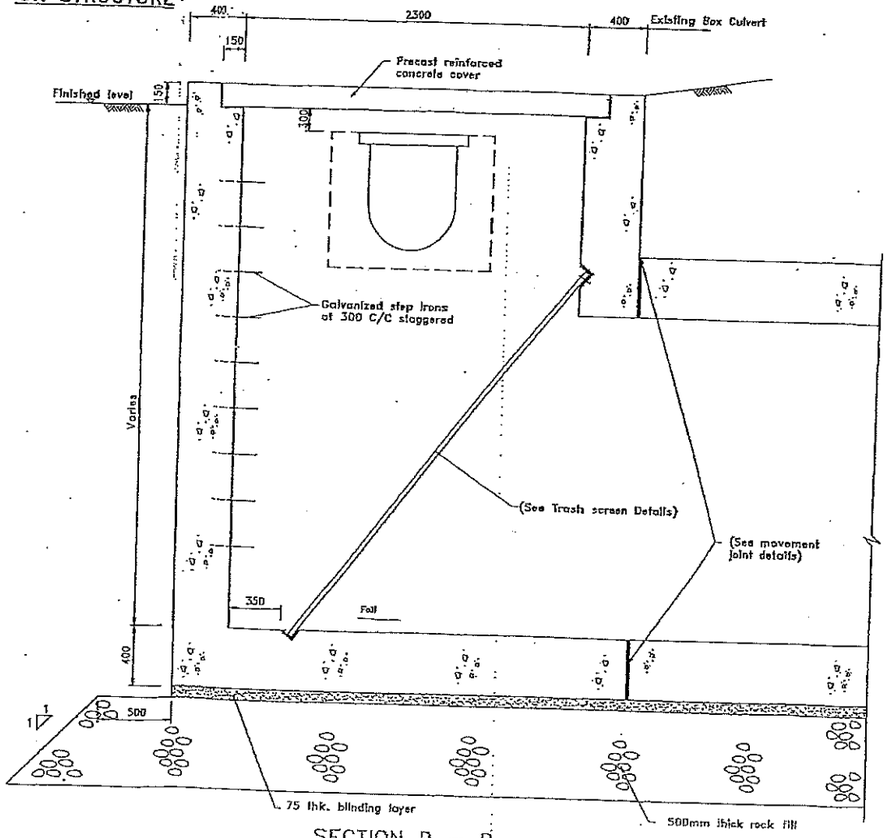
SECTION B-B

TYPICAL MOVEMENT JOINT FOR U-CHANNEL



SECTION A - A

1 : 20



SECTION B - B

1 : 20

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Notes:

1. This drawing is to be read in conjunction with Drawing nos. M4.
2. For general notes, refer to Drawing no. M4.
3. For details of flexible joints for pipes, refer to HyD Standard Drawing no. H1132.

No.	Date	Description	Checked
		REVISION	

Drawn JAMES YAM	Date 12/98	Designed MK	Date 12/98
Checked DW	Date 12/98	Authorised for issued	Date
Approved			
TDD Contract no.	YL 45/99		
FRP no.	213 CL		
Agreement no.	CE 5/86		

Project

YUEN LONG / TUEN MUN CORRIDOR / RURAL HINTERLAND ENGINEERING WORKS FOR VILLAGE PRIORITY AREAS (HA MEI SAN TSUEN)

Contract title

ENGINEERING WORKS FOR HA MEI SAN TSUEN VILLAGE EXPANSION

Drawing title

MISCELLANEOUS DRAINAGE DETAILS SHEET 2 OF 2

Drawing no.	Plan register no.	Scale
M3	01BB/C45/009A	N.T.S.

Consultant

Binnie Black & Veatch Hong Kong Limited 博威工程顧問有限公司 Engineers and Scientists

Office

新界北拓展處 NEW TERRITORIES NORTH DEVELOPMENT OFFICE

拓展署 Territory Development Department, Hong Kong

H:\TDM\HMST\EVA\M3.DWG

Tin Shui Wai Development - Engineering Infrastructure for Ha Mei San Tsuen Village Expansion Area

Job No.	Drillhole no.	Termination Depth	Ground Level	Strata Description					
				Fill	Pond Deposit	alluvium	Completely Decomposed Meta-siltstone Grade V	Completely Decomposed Meta-siltstone Grade V-IV	Completely Decomposed Meta-siltstone Grade IV-II
28428	D1	35.23	2.87	2.87 | 0.27	0.27 | 0.27	0.27 | -3.73	-3.73 | -32.36	-32.36 | -32.36	-32.36 | -32.36
				2.60	0.00	4.00	28.63	0.00	0.00
	D2	35.15	2.60	2.60 | 1.10	1.10 | 1.10	1.10 | -4.00	-4.00 | -26.70	-26.70 | -29.70	-29.70 | -32.55
				1.50	0.00	5.10	22.70	3.00	2.85
	D3	35.00	3.59	3.59 | 3.59	3.59 | 2.09	2.09 | -1.92	-1.92 | -31.42	-31.42 | -31.42	-31.42 | -31.42
				0.00	1.50	4.01	29.50	0.00	0.00
	D4	35.00	4.41	4.41 | 1.41	1.41 | -3.19	-3.19 | -7.39	-7.39 | -16.49	-16.49 | -25.19	-25.19 | -30.59
				3.00	4.60	4.20	9.10	8.70	5.40
	D5	59.51	5.16	5.16 | 2.56	2.56 | 1.56	1.56 | -2.85	-2.85 | -22.20	-22.20 | -39.30	-39.30 | -54.36
				2.60	1.00	4.41	19.35	17.10	15.06
18794	V/B1	20.50	2.90	2.90 | 0.90	0.90 | -1.60	-1.60 | -9.10	-9.10 | -17.60		
				2.00	2.50	7.50	8.50		
	V/B2	20.50	2.83	2.83 | 1.33	1.33 | -1.67	-1.67 | -7.67	-7.67 | -17.67		
				1.50	3.00	6.00	10.00		
	V/B3	20.00	2.56	2.56 | 0.06	0.06 | 0.06	0.06 | -5.94	-5.94 | -17.44		
				2.50	0.00	6.00	11.50		
	V/B5	20.00	6.65	6.65 | 5.65	5.65 | 5.65	5.65 | 1.65	1.65 | -13.35		
				1.00	0.00	4.00	15.00		
	V/B6	20.00	7.02	7.02 | 1.02	1.02 | -0.48	-0.48 | -4.98	-4.98 | -12.98		
				6.00	1.50	4.50	8.00		
7131	A187	4.00	2.45	2.45 | 0.95	0.95 | -0.05	-0.05 | -1.55			
				1.50	1.00	1.50			
	A189	3.00	2.37	2.37 | 0.87	0.87 | -0.13	-0.13 | -0.63			
				1.50	1.00	0.50			

PPENDIX B

Existing Drillhole Records in Ha Mei San Tsuen

18794

18794

Lam Geotechnics Limited

GEOTECHNICAL INFORMATION UNIT
27 JUN 1994
RECEIVED

CED Contract No. GE/93/08
Ground Investigation – New Territories West
Term Contract

Works Order No. GE/93/08.6
Tin Shui Wai Development
Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

FIELDWORK REPORT

See also 20190

CIVIL ENGINEERING DEPARTMENT
GEOTECHNICAL INFORMATION UNIT
Report No. 18794
AREA Ref. 6NW-3D5.8
8B2

CONTRACTOR

LAM GEOTECHNICS LIMITED
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Wanchai
Hong Kong

CLIENT

GOVERNMENT OF HONG KONG
Civil Engineering Department
Geotechnical Engineering Office
Civil Engineering Building
101 Princess Margaret Road
Homantin
Kowloon

Date : 22 June 1994

CED Contract No. GE/93/08
Ground Investigation – New Territories West
Term Contract

Works Order No. GE/93/08.6
Tin Shui Wai Development
Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

CONTENTS

Contract Data Summary

Project Name: New Territories West Term Contract	Site Name: Tin Shui Wai Development Ground Investigation at Ha Mei San Tsuen	Date: to Official only
G.I. Contractor: Lam Geotechnics Ltd	Client: G. E. O.	G.E.O. Data Bank No.
Contract No.: GE/93/08	W.O. No.: GE/93/08.6	File Ref.

Field Work Summary

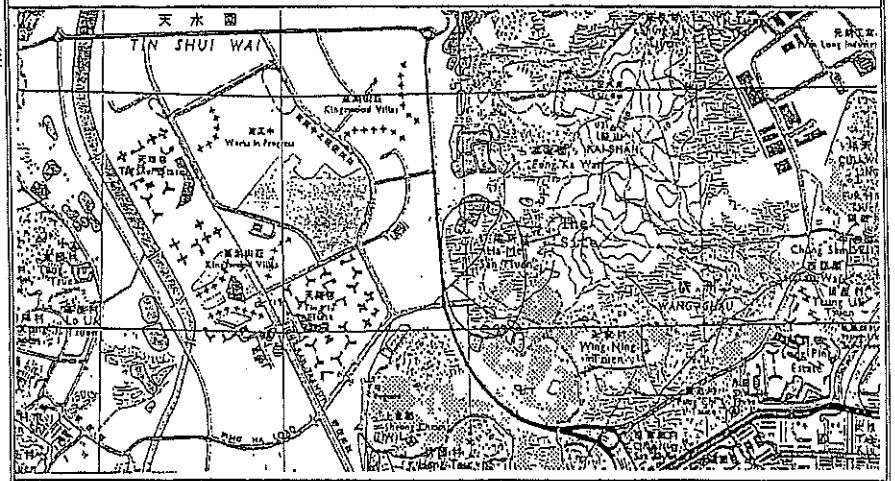
Drillholes Total No.: 5	Method:	Date: 21/3/94 to 25/4/94
Pits / Trenches / Caissons: No.: 1 Trial Pit		
Probes : No.: 3		
Piezometers : No.		
Insitu Tests : No.: 53	Types: Standard Penetration Tests	
Geophysics : Traverses	Type	

Laboratory Testing Summary

Total No. of Tests : Date to

Soil	Physical Properties	LL	PL	Grading	M/C
		SG	Tm/Td		
	Strength Tests	CU	CD	UU	Shear CD Box
	Compaction & CBR Tests	Standard	Modified		CBR
	Oedometer & Perm. Tests	Cv	k		
	Others				
Rock	T	Pt load	UC	Shear Box	US Vel.

Location Plan SCALE : 1 : 20 000 / 5 000 Derived from : 20 000 Sheet _____ / 5 000 Sheet _____



	G. I.	Laboratory	GEOTECHNICAL ENGINEERING OFFICE
Contractor	Lam Geotechnics Ltd		CIVIL ENGINEERING DEPARTMENT HONG KONG
Works Order No.	GE/93/08.6		

CED Contract No. GE/93/08
Ground Investigation – New Territories West
Term Contract

Works Order No. GE/93/08.6
Tin Shui Wai Development
Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

1. Introduction

In November 1993, Lam Geotechnics Limited was awarded a two year term contract by the Geotechnical Engineering Office to carry out land ground investigations in the western New Territories of Hong Kong.

This particular report presents the results of a ground investigation for the Tin Shui Wai Development village flood protection, Phase IV, at Ha Mei San Tsuen. The fieldwork consisted of five drillholes (Nos. V/B1 to V/B3, V/B5 and V/B6), three GCO probes (Nos. V/S1, V/S2 and V/S5), one trial pit (No. TP1) and one slope stripping (No. CS1), and was carried out during the period from the 21st of March to the 25th of April, 1994 under the supervision of the consultant, Binnie, and the Materials Division of the Geotechnical Engineering Office.

2. THE SITE

The site is located east of Tin Tsz and Long Tin Roads where they meet Tin Fuk Road. The area is occupied by the Ha Mei San Tsuen village and several reclaimed and existing fish ponds. The fieldwork was carried out between Hong Kong grid coordinates 819000E, 819200E and 834700N, 835130N (see Location Plan).

3. GEOLOGY

According to the 1:20000 scale geological map published by the Geotechnical Control Office, entitled Hong Kong Geological Survey, Sheet 6, Series HGM–20, Edition 1–1988, the drillhole locations are underlain by superficial deposits of terraced alluvium and debris flow deposits. The geological map also indicates that the bedrock in the area typically consists of Metasiltstone and Phyllite, with Metasandstone.

The material encountered in the drillholes consisted of a superficial fill layer overlying alluvium. The alluvium was underlain by completely decomposed rock at all drillhole locations. The completely decomposed rock encountered was identified as Metasiltstone in drillhole Nos. V/B1, V/B2 and V/B5 and as sandstone in drillhole Nos. V/B2 and V/B6. The rock encountered in the trial pit (No. TP1) was identified as Phyllite.

A summary of the strata encountered at each drillhole location is given in Table 2.

The rock decomposition terms and grades used in this report are described in Appendix A.

4. FIELDWORK

4.1 Drillholes

Five drillholes (Nos. V/B1 to V/B3, V/B5 and V/B6) were put down at locations set out in accordance with the coordinates given on Drawing No. V/92/H8B or as agreed on site. The as–drilled locations were surveyed and the coordinates are presented in Table 1. The drillholes were extended to the termination requirements specified in the Works Order.

The drillholes were advanced through Common Ground by rotating Sx (168mm diameter) then Px (140mm diameter) drill casing with water as the flushing medium.

Undisturbed Mazier samples were taken as instructed in the Works Order using a triple tube retractor core barrel fitted with a one metre long rigid PVC tube to retain the sample. U100 samples were recovered by attaching the 450mm sample barrel to the drive head and drill rods and driving it into the ground using a sliding hammer.

The material from the cutting shoe of each attempted Mazier and U100 was recovered as a small disturbed sample. Small disturbed samples were also recovered from the driving shoe of the split barrel sampler for the Standard Penetration Test.

These small disturbed samples were placed in plastic containers, labelled and stored in the appropriate order in the core boxes. All sampling is reported at the relevant depth on the drillhole records (refer to Appendix B).

4.2 Field Tests

Standard Penetration Tests (SPT) were carried out as instructed in the Works Order with the equipment and as specified in BS1377:1975 (Test 19), modified by Geoguide 2 as required. The test results are reported at the relevant depths on the drillhole records.

4.3 GCO Probes

Three GCO Probes (Nos. V/S1, V/S2 and V/S5) were carried out at locations agreed on site. The exact probe locations were surveyed upon completion and the coordinates are presented in Table 1.

The GCO Probe tests were carried out using the equipment shown in Geoguide 2, Figure 36. A 10kg hammer was allowed to fall 300mm onto the lower anvil, driving in the rods, at a rate of about 30 blows per minute. The three tests were terminated on refusal when the probe could not be penetrated 100mm by 100 blows of the driving hammer.

The GCO Probe record sheets are presented in Appendix C.

4.4 Trial Pits

One trial pit (TP1) was excavated by hand at the location set out in accordance with coordinates on Drawing No. V/92/H8B. A driven U100 sample was taken at 1.0m below existing ground. The trial pit was terminated at a depth of 2.3m on encountering highly to moderately decomposed Phyllite. Disturbed samples were taken at 0.5m intervals in the trial pit.

4.5 Slope Stripping

Slope surface protection was stripped at a location agreed on site and disposed of to expose the underlying strata. The slope stripping record, which includes descriptions of the strata encountered, surveyed levels, coordinates and a dimensioned sketch of the stripped section, is presented in Appendix E.

4.6 Photographs

As there were no rotary cored material obtained from the drillholes no photographs were taken of the drillhole samples. Each face and the bottom of the trial pit was photographed, however and the photos are presented with the trial pit record in Appendix D.

4.7 Sample Description

The soil encountered in the drillholes, trial pit and slope stripping have generally been described in accordance with Geoguide 3 – Guide to Rock and Soil Description (GCO , 1988). A summary of the description system recommended in the Geoguide is presented in Appendix A. The drillhole records are included as Appendix B. The trial pit records and photographs are presented in Appendix D. The chunham strip record is presented in Appendix E.

The soil descriptions and delineation of various strata were based primarily on examination of samples obtained during excavation and from the cutting shoe of the SPT split barrel, Mazier and U100 samples and, to some extent, on the driller's report. Strata boundaries on drillhole records are placed at the tops of undisturbed samples or standard penetration tests associated with the small disturbed samples where a material change has been noted. The records were finalised by adopting relevant comments provided by the consultant and the Geotechnical Engineering Office.

Teresa Farrell

TERESA A. FARRELL
Geotechnical Engineer

22 June 1994

18794

Table 1 – Survey Records

Works Order NO. : GE/93/08.6

Location : Tin Shui Wai Development Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

HOLE NO.	CO-ORDINATES		GROUND LEVEL
	EASTING	NORTHING	(m.P.D.)
V/B1	819005.70	6NW 305 835034.79	2.90
V/B2	819067.40	835084.14	2.83
V/B3	819115.10	835028.02	2.56
V/B5	819191.26	6NW 308 834966.93	6.65
V/B6	819051.22	6NW 882 834703.14	7.02
V/S1	819056.54	6NW 305 835125.68	3.64
V/S2	819087.59	835055.97	3.10
V/S5	819156.07	6NW 308 834815.74	7.12
TP1	819180.03	834866.90	11.65
CS1 (Bottom)	819164.14	834870.93	5.53
CS1 (Top)	819165.31	834870.87	7.22

Table 2 – Summary of Drillhole Results

Drillhole No.	Ground Level	Bottom of Fill	Bottom of Alluvium	Top of CD Rock	End Level
V/B1	2.90	−1.60	−9.10	−9.10	−17.60
V/B2	2.83	−1.67	−7.67	−7.67	−17.67
V/B3	2.56	0.06	−5.94	−5.94	−17.44
V/B5	6.65	5.65	1.65	1.65	−13.35
V/B6	7.02	−0.48	−4.98	−4.98	−12.98

Note : All levels are given in mPD.

APPENDIX A – SOIL AND ROCK DESCRIPTIONS AND MATERIAL SYMBOLS

SOIL DESCRIPTION

For the preparation of drillhole logs the soil description may report the following information as appropriate in the order indicated:

Soil Strength (compactness & consistency)
Colour
Weathering
Soil Name
Additional Geological Information
Other qualifying remarks

1. SOIL STRENGTH (COMPACTNESS & CONSISTENCY)

Soil Type	Term	Identification
Very Coarse (COBBLES & BOULDERS)	Loose	By inspection of voids and particle packing in the field (from trial pits only).
	Dense	
Coarse (SANDS & GRAVELS)	Very loose	SPT 'N' value 0–4,
	Loose	SPT 4–10; can be excavated with spade; 50mm 'peg' easily driven.
	Medium dense	SPT 10–30.
	Dense	SPT 30–50; requires pick for excavation; 50 mm peg hard to drive.
	Very dense	SPT > 50.
Fine (CLAYS & SILTS)	Very soft	Undrained shear strength (USS) < 20 kPa; exudes between fingers when squeezed in hand.
	Soft	USS 20–40 kPa; moulded by light finger pressure.
	Firm	USS 40–75 kPa; can be moulded by strong finger pressure.
	Stiff	USS 75–150 kPa; cannot be moulded by fingers; can be indented by thumb.
	Very stiff or hard	USS > 150 kPa; can be indented by thumbnail.
Organic (ORGANIC CLAYS, SILTS SANDS & PEATS)	Compact	Fibres already compressed together.
	Spongy	Very compressible and open structure.
	Plastic	Can be moulded in hand and smears fingers.

Terms applicable only to TRANSPORTED SOILS. For soils derived from insitu rock weathering, record actual values of quantitative tests as part of the description, where appropriate.

2. COLOUR

Parameter	Terms
Value	Light, Dark
Chroma	Pinkish, Reddish, Yellowish, Orangish, Brownish, Greenish, Bluish, Purplish Greyish
Hue	Pink, Red, Yellow, Orange, Brown, Green, Blue, Purple, White, Grey, Black

For uniform colour distribution, choose a hue, supplemented by a value and/or chroma if necessary.

For non-uniform distribution, repeat this procedure, using one of the following descriptors : spotted, mottled, dappled, streaked, striped (e.g. light yellowish brown mottled with red).

State whether sample was wet or dry when described (if appropriate).

3. WEATHERING

Soils Derived from Insitu Weathering of Rocks
There are two main types: saprolites (rock texture/structure retained) and residual soils (rock texture / structure completely destroyed). Describe state of weathering in accordance with item 4 for rock description (see Rock Description).

Sedimentary (Transported) Soils
Coarse soils : Describe overall discolouration of soil and degree of decomposition of gravel and larger particles (see item 4, Rock Description). Also note any signs of disintegration of large particles where apparent.

Fine Soils : Describe overall discolouration of soil where apparent.

4. SOIL NAME

A. Basic Soil Types

Soil Type	Particle Sizes (mm)			Identification
BOULDERS	--		> 200	Only seen complete in pits or exposures. Often difficult to recover from boreholes.
COBBLES	--	60	– 200	
GRAVELS	Coarse	20	– 60	Easily visible to naked eye; particle shape and grading can be described. Well-graded : wide range of grain sizes. Poorly-graded : not well-graded (split further into uniform or gap-graded).
	Medium	6	– 20	
	Fine	2	– 6	
SANDS	Coarse	0.6	– 2	Visible to naked eye; very little or no cohesion; grading can be described. May be well-graded or poorly-graded (uniform or gap-graded) as for gravel.
	Medium	0.2	– 0.6	
	Fine	0.06	– 0.2	
SILTS	Coarse	0.02	– 0.06	Only coarse silt barely visible to naked eye; exhibits little plasticity and marked dilatancy; slightly granular or silky to the touch. Disintegrates in water, lumps dry quickly; possesses cohesion but can be powdered easily between fingers.
	Medium	0.006	– 0.02	
	Fine	0.002	– 0.006	
CLAYS	--		< 0.002	Dry lumps can be broken by hand but not powdered between the fingers. Disintegrates in water more slowly than silt; smooth to the touch; exhibits plasticity but no dilatancy; sticks to the fingers and dries slowly; shrinks appreciably on drying, usually showing cracks. These properties more noticeable with increasing plasticity.
ORGANIC CLAYS, SILTS OR SANDS	--		varies	Contains much organic vegetable matter; often has a noticeable smell and changes colour on oxidation.
PEATS	--		varies	Predominantly plant remains; usually dark brown or black in colour, often with distinctive smell; low bulk density.

B. Composite Soil Types (Mixtures of Basic Types)

Principal Soil Type	Terminology Sequence	Term for Secondary Constituent	% of Secondary Constituent
Very coarse (BOULDERS & COBBLES) (> 50% of soil > 60mm)	Secondary constituents (finer material) † after principal	with occasional	< 5
		with some	5 – 20
		with much	20 – 50
Coarse (GRAVELS & SANDS) (> 65% gravel & sand sizes)	Secondary constituents before principal (excluding gravel, cobbles & boulders) *	Slightly (silty, clayey or silty/clayey) □	< 5
		— (silty, clayey or silty/clayey) □	5 – 15
		Very (silty, clayey or silty / clayey) □ AND / OR	15 – 35
		Slightly (sandy) □	< 5
		— (Sandy) □	5 – 20
		Very (sandy) □	20 – 50
Fine (SILTS & CLAYS) (> 35% silt & clay sizes)	Secondary constituents before principal (excluding gravel, cobbles & boulders) *	Slightly (sandy) □	< 35
		— (Sandy) □	35 – 65

\+ GRAVEL term will be placed at end of description.

† Full name of finer material should be given.

□ Secondary soil type as appropriate; use 'silty / clayey' when a distinction cannot be made between the two.

* If gravel, cobbles or boulders are also present in a coarse or fine soil, this can be indicated by using one of the following terms relating to the very coarse fraction after the principal : 'with occasional' (<5), 'with some' (5–20), 'with many' (20–50), where figures in brackets are % very coarse material expressed as a fraction of the whole soil.

For fine soils, plasticity terms should also be described where possible, viz : 'non-plastic' (generally silts), 'intermediate plasticity' (lean clays), 'high plasticity' (fat clays).

5. ADDITIONAL GEOLOGICAL INFORMATION

Record geological name which indicates geological origin of soil type (e.g. Alluvium, Colluvium, Marine Deposit etc). Refer to HKGS maps & memoirs for further information.

6. OTHER QUALIFYING REMARKS (if required)

Here any additional relevant information may be added
e.g. (a) Particle shape & Composition
(b) Structure
(c) Discontinuities

Notes :
For full description of soils derived from insitu rock weathering :
(a) Saprolites (rock texture / structure retained) – describe as rocks, supplemented by soil strength (but not relative density) and soil name terms in brackets.
(b) Residual Soils (rock texture / structure completely destroyed) – describe as soils, supplemented by name of parent rock where apparent from field evidence.

ROCK DESCRIPTION

For the preparation of drillhole logs the rock description may report the following information as appropriate in the order indicated :

Strength
Colour
Material Weathering/Alteration
Grain Size
Rock Name
Discontinuities
Additional Geological Information
Other qualifying remarks

1. STRENGTH :

Term	Identification
Extremely weak	Easily crumbled by hand; indented deeply by thumbnail.
Very weak	Crumbled with difficulty; scratched easily by thumbnail; peeled easily by pocket knife.
Weak	Broken into pieces by hand; scratched by thumbnail; peeled by pocket knife; deep indentations (to 5 mm) by point of geological pick; hand-held specimen easily broken by single light hammer blow.
Moderately weak	Broken with difficulty in two hands; scratched with difficulty by thumbnail; difficult to peel but easily scratched by pocket knife; shallow indentations easily made by point of pick; hand-held specimen usually broken by single light hammer blow.
Moderately strong	Scratched by pocket knife; shallow indentations made by firm blow with point of pick; hand-held specimen usually broken by single firm hammer blow.
Strong	Firm blows with point of pick cause only superficial surface damage; hand-held specimen requires more than one firm hammer blow to break.
Very strong	Many hammer blows required to break specimen.
Extremely strong	Specimen only chipped by hammer blows.

2. COLOUR

Parameter	Terms
Value	Light, Dark
Chroma	Pinkish, Reddish, Yellowish, Orangish, Brownish, Greenish, Bluish, Purplish, Greyish
Hue	Pink, Red, Yellow, Orange, Brown, Green, Blue, Purple, White, Grey, Black

For uniform colour distribution, choose a hue, supplemented by a value and / or chroma if necessary.

For non-uniform distribution, repeat this procedure using one of the following descriptors: spotted, mottled, dappled, streaked, striped (e.g. light pinkish grey spotted with black).

3. GRAIN SIZE

Term	Size of Component Particles	Equivalent Soil Grade
Fine grained	2 – 60 microns (grains larger than 10 microns visible using X10 hand lens)	Silt
Medium grained	60 microns – 2 mm (just visible to naked eye)	Sand size
coarse grained	2 – 60 mm	Gravel size

MATERIAL WEATHERING / ALTERATION

Decomposition Term	Grade Symbol	Typical Characteristics
Residual Soil	VI	Original rock texture completely destroyed; can be crumbled by hand and finger pressure into constituent grains.
Completely Decomposed	V	Original rock texture preserved; can be crumbled by hand and finger pressure into constituent grains; easily indented by point of geological pick; slakes in water; completely discoloured compared with fresh rock.
Highly Decomposed	IV	Can be broken by hand into smaller pieces; makes a dull sound when struck by hammer; not easily indented by point of pick; does not slake in water; completely discoloured compared with fresh rock.
Moderately Decomposed	III	Cannot usually be broken by hand; easily broken by hammer; makes a dull or slight ringing sound when struck by hammer; completely stained throughout.
Slightly Decomposed	II	Not broken easily by hammer; makes a ringing sound when struck by hammer; fresh rock colours generally retained but stained near joint surfaces.
Fresh Rock	I	Not broken easily by hammer; makes a ringing sound when struck by hammer; no visible signs of decomposition (i.e. no discolouration).

This classification is applicable to igneous and volcanic rocks and other rocks of equivalent strength in fresh state.

Disintegration
Describe small-scale cracking and fracturing caused by mechanical weathering, where apparent.

Alteration
Describe state of alteration (e.g. mineralised, kaolinised) where apparent.

5. ROCK NAME (Including Grain Size)

Igneous : Coarse- (6-20 mm), Medium- (2-6 mm) & Fine- (0.06-2 mm) grained GRANITE; GRANODIORITE. Very Fine-grained (<0.06 mm) RHYOLITE; BASALT. (Common types only, see Geoguide 3 for others).

Pyroclastic : PYROCLASTIC BRECCIA (>60 mm), Lapilli TUFF (2-60 mm). Coarse ash TUFF (0.06-2 mm), Fine ash TUFF (<0.06 mm).

Metamorphic : Foliated - SCHIST (>0.06 mm), PHYLLITE (<0.06 mm). Non-foliated - MARBLE, QUARTZITE, FAULT BRECCIA.

Sedimentary : CONGLOMERATE, BRECCIA (>2 mm), SANDSTONE (0.06-2 mm), MUDSTONE (<0.06 mm) = SILTSTONE (0.002-0.06 mm) + CLAYSTONE (<0.002 mm). (Common types only).

If rock name cannot be identified, describe grain size quantitatively, including textural term where appropriate.

6. DISCONTINUITIES
SPACING

Term	Spacing
Extremely widely spaced	> 6 m
Very widely spaced	2 - 6 m
Widely spaced	0.6 - 2 m
Medium spaced	200 - 600 mm
Closely spaced	60 - 200 mm
Very closely spaced	20 - 60 mm
Extremely closely spaced	< 20 mm

Aperture Size

Wide (> 200 mm), Moderately wide (60-200 mm), Moderately narrow (20-60 mm), Narrow (6-20 mm), Very narrow (2-6 mm), Extremely narrow (>0-2 mm), Tight (zero).
This is not normally described for rock core from drillholes.

Infilling (Nature) of Joints

Clean	Surface staining	Decomposed / Disintegrated rock
Non-cohesive soil	Cohesive soil	Quartz
Calcite	Manganese	Kaolin
Other (Specify)		

Give full description of infill materials / minerals where appropriate.

Fracture State

In drillhole cores, measure the following:

a) TOTAL CORE RECOVERY (T.C.R.) - Defined as summed length of all pieces of recovered core expressed as a percentage of length drilled. When the core is highly fragmented the length of such core is estimated by assembling the fragments and estimating the length of core that the fragments appear to represent.

b) SOLID CORE RECOVERY (S.C.R.) - Defined as the length of material which is recovered as solid core pieces at full diameter expressed as a percentage of the length of core (drill) run.

c) ROCK QUALITY DESIGNATION (R.Q.D.) - Defined as the length of solid core recovered in lengths greater than 100 mm expressed as a percentage of the length of core (drill) run. Measurements are made along the core axis and core pieces must possess a full diameter to be included in the R.Q.D. value.

d) FRACTURE INDEX (F.I.) - Defined as the number of fractures per metre run, measured over any length of reasonably uniform character, which is not necessarily the core run length. If there is a marked change in fracture frequency during a run the fracture index should be calculated for each part of the run separately.

Where core is too highly fractured for fracture index to be measured the term N.I. meaning NOT INTACT is inserted.

NOTE : Artificial fractures caused by core handling or by the drilling process are ignored when measuring the above values.

7. ADDITIONAL GEOLOGICAL INFORMATION

Record geological formation name if known. Avoid conjecture. Refer to HKGS maps & memoirs for further information.

8. OTHER QUALIFYING REMARKS

At the end of the description comments can be made on the nature of joints and discontinuities, mineralisation and other factors that may be of engineering or descriptive importance.

Examples :
Very strong, light greyish pink, slightly decomposed, fine grained GRANITE, with closely to medium spaced, iron stained joints dipping at subhorizontal to 10°, 40° and 85°. (one subvertical joint)

Extremely weak, light yellowish brown speckled with grey, dark brown and white, completely decomposed, medium-grained GRANITE, with occasional relict joints. (Slightly silty/clayey, fine SAND with some subangular fine to coarse gravel).

MATERIAL SYMBOLS

KEY TO MATERIAL SYMBOLS

MAT CODE	F	DESCRIPTION
AGGLOM	1	Pyroclastic Breccia (volcanic ash, agglomerate)
ASPHALT	1	Asphalt
BASALT	1	Basalt
BIOCLAST	1	Shells, Bioclastic Remains
BLANK	0	
BLDRCBBL	1	Boulders and Cobbles
BOULDERS	1	Boulders
BRECCIA	1	Sedimentary Breccia
CLAY	1	Clay
CLAYGR	1	Gravelly Clay
CLAYGSL	1	Silty Clay with gravel
CLAYGSS	1	Sandy silty Clay with gravel
CLAYPT	1	Organic Clay
CLAYSD	1	Sandy Clay
CLAYSH	1	Shelly Clay
CLAYSL	1	Silty Clay
CLAYSLPT	1	Silty Clay with organics
CLAYSLSH	1	Silty Clay with shells
CLAYSS	1	Sandy silty Clay
CLAYSSPT	1	Sandy silty Clay with organics
CLAYSSSH	1	Sandy silty Clay with shells
CLAYSTON	1	Claystone
COBBLES	1	Cobbles
CONCRETE	1	Concrete
CONGLOM	1	Conglomerate
CORAL	1	Coral
DACITE	1	Dacite, Latite, Andesite, Trachyte, Trachyandesite
DOLOMITE	1	Dolomitic Limestone
EVAPORIT	1	Gypsum, Rocksalt, etc.
FAULT	1	Fault Breccia
FILL	1	Artificial Fill; includes landfill, rock fill, mas
FISSIN	1	Fissure Infill
GABBRO	1	Gabbro, Lamprophyre
GNEISS	1	Gneiss, Coarse-grained metamorphic rock
GRANITE	1	Granite, Coarse-grained Acid Igneous Rock
GRAVEL	1	Gravel
GRAVELCL	1	Clayey Gravel
GRAVELSD	1	Sandy Gravel
GRAVELSL	1	Silty Gravel
GRAVELSS	1	Silty Sandy Gravel
GRAVSSC	1	Clayey Silty Sandy Gravel
LIMESTON	1	Limestone
LSTSLT	1	Interbedded Limestone and Siltstone
MARBLE	1	Yuen Long Marble
METACON	1	Contact Metamorphic Rock
METAREG	1	Regional Metamorphic Rock
MUDSTONE	1	Mudstone
PEAT	1	Peat
PEATCL	1	BSI Clayey Peat
PEATSL	1	Silty Peat
PEGMTITE	1	Very Coarse-grained Igneous Rock
PHYLLITE	1	Phyllite, Mylonite (fine grained metamorphic rock)
QUARTZIT	1	Quartzite, Coarse-grained Metamorphic Rock
RHYOLITE	1	Rhyolite, fine grained acid igneous rock
SAND	1	Sand
SANDCL	1	Clayey Sand
SANDGR	1	Gravelly Sand

SANDGSC	1	Silty clayey Sand with gravel
SANDSCPT	1	Silty clayey Sand with organics
SANDSCSH	1	Silty clayey Sand with shells
SANDSH	1	Shelly Sand
SANDSL	1	Silty Sand
SANDSLCL	1	Silty clayey Sand
SANDSLGR	1	Silty Sand with gravel
SANDSLPT	1	Silty Sand with organics
SANDSLSH	1	Silty Sand with shells
SANDSTON	1	Sandstone
SCHIST	1	Schist (Medium grained Metamorphic Rock)
SHALE	1	Shale, Fissile Mudstone
SILT	1	Silt (Hong Kong)
SILTCL	1	Clayey Silt
SILTCLPT	1	Clayey Silt with organics
SILTCLSD	1	Sandy clayey Silt
SILTCLSH	1	Clayey Silt with shells
SILTGR	1	Gravelly Silt
SILTGSC	1	Sandy clayey Silt with gravel
SILTPT	1	Organic Silt
SILTSCPT	1	Sandy clayey Silt with organics
SILTSCSH	1	Sandy clayey Silt with shells
SILTSD	1	Sandy Silt
SILTSH	1	Shelly Silt
SILTSTON	1	Siltstone (Hong Kong)
SYENITE	1	Granodiorite, Syenite, Monzonite
TUFF	1	Coarse Ash Tuff, Lapilli Tuff (Fine-grained Igneou
TUFFFINE	1	Fine Ash Tuff

APPENDIX B – DRILLHOLE RECORDS

DRILLHOLE RECORD

HOLE NO. V/B1

SHEET 1 of 3

CONTRACT NO. GE/93/08 LG21518/09

PROJECT Tin Shui Wai Development, Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

METHOD Rotary

CO-ORDINATES
E 819006.70
N 836034.78

WORKS ORDER No. GE/93/08.6

MACHINE & No. Diamant Boart D6

DATE from 8/4/94 to 11/4/94

FLUSHING MEDIUM Water

ORIENTATION Vertical

GROUND-LEVEL 2.80 mPD

Drilling Progress	Casing depth/size	Water level/ time/ date	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
8/4/94	5x		0				25blo	1		1.00			Soft to firm, light brown, mottled grey, sandy clayey SILT with occasional subangular fine gravel and some thin roots (FILL)
			100				21blo	2		1.45			
								3	0.00	2.00			
							(1,1, 1,2,3,3) N=8	4		2.45			Firm to stiff, dark grey, mottled brownish yellow, sandy clayey SILT with some thin roots (FILL)
			100				25 blo	5		3.00			
							(1,1, 2,3,3,5) N=13	6		3.45			
								7		3.95			
									-1.80	4.60			
			100				68blo	8					Stiff to very stiff, whitish grey, spotted and mottled red, silty sandy CLAY with some fine to medium gravel sized ferruginous nodules (ALLUVIUM)
							(1,2, 2,3,5,7) N=17	9		4.95			
								10		5.45			
		0.04m								6.00			
9/4/94	Px	0.65m	100				54blo	11		6.45			
							(2,2, 3,4,6,8) N=19	12		6.95			
								13	-4.60	7.50			
			100				90blo	14		7.95			Very stiff, light grey, silty sandy CLAY with some thin laminations (1-2mm) of fine sand and some decayed plant debris below 9.00m (ALLUVIUM)
							(2,3, 3,5,6,8) N=22	15		8.45			
									-8.10	9.00			
			100				51blo	16		9.45			
							(3,3, 4,5,7,7)	17					
								18					

REMARKS

LOGGED S.P.Su
DATE 26/4/94
CHECKED T.F.
DATE 3/5/94

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DRILLHOLE RECORD

HOLE NO. V/B1

SHEET 2 of 3

CONTRACT NO. GE/93/08 LG21518/09

PROJECT Tin Shui Wai Development, Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

METHOD Rotary

CO-ORDINATES
E 819005.70
N 836034.78

WORKS ORDER No. GE/93/08.6

MACHINE & No. Diamant Boart D6

DATE from 8/4/94 to 11/4/94

FLUSHING MEDIUM Water

ORIENTATION Vertical

GROUND-LEVEL 2.80 mPD

Drilling Progress	Casing depth/size	Water level/ time/ date	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
							N=23		-7.60	10.60			
			100				53blo	20					Very stiff, light yellowish-grey, sandy clayey SILT, with occasional thin bands (5-8mm) of light brownish yellow fine to medium sand (ALLUVIUM)
							(2,4, 4,6,7,9) N=26	21		10.96			
								22		11.45			
								23	-9.10	12.00			
			100				48blo	24		12.45		V	Extremely weak, light brownish grey becoming light greenish grey, completely decomposed fine grained METASILTSTONE (Stiff to very stiff, sandy clayey SILT, with iron and manganese oxide stained relict joints. From 18.50m to 18.95m band of light yellowish grey, silty fine sand)
							(1,1, 2,2,2,4) N=10	25		12.95			
								26		13.50			
								27		14.50			
		0.80m						28		14.95			
11/4/94		0.06m					(1,2, 2,3,4,6) N=16			15.50			
			90					29		16.50			
								30		16.95			
							(2,3, 3,5,5,7) N=20	31		17.50			
			100					32		18.50			
								33		18.95			
							(3,5, 7,7, 11,11) N=36	34		19.50			
			100					35					

REMARKS

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DATE 3/5/94

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DRILLHOLE RECORD

CONTRACT NO. GE/93/08 LG21518/09

HOLE NO. V/B1

SHEET 3 of 3

PROJECT Tin Shui Wai Development, Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

METHOD Rotary

CO-ORDINATES
E 819005.70
N 836034.79

WORKS ORDER No. GE/93/08.6

DATE from 5/4/94 to 11/4/94

MACHINE & No. Diamant Boart D6

ORIENTATION Vertical

GROUND-LEVEL 2.90 mPD

FLUSHING MEDIUM Water

Drilling Progress	Casing depth/size	Water level/ time/ date	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
			100					36	-17.60	20.50			End of investigation hole at 20.50m

REMARKS

LOGGED S.P.Su
DATE 26/4/94
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DATE 3/5/94

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DRILLHOLE RECORD

CONTRACT NO. GE/93/08 LG21518/09

HOLE NO. V/B2

SHEET 1 of 3

PROJECT Tin Shui Wai Development, Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

METHOD Rotary

CO-ORDINATES
E 819067.40
N 836084.14

WORKS ORDER No. GE/93/08.6

DATE from 15/4/94 to 16/4/94

MACHINE & No. Diamant Boart D6

ORIENTATION Vertical

GROUND-LEVEL 2.83 mPD

FLUSHING MEDIUM Water

Drilling Progress	Casing depth/size	Water level/ time/ date	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
15/4/94	5x	1.20m	0				18blo	1	1.33	1.00			Soft, light yellowish brown, mottled light grey, sandy clayey SILT with some thin roots and occasional fragments of china (FILL)
	Px		100				30blo (0,0, 1,1,1,2) N=6	2 3 4		1.50			Soft to firm, yellowish brown, mottled dark grey, sandy clayey SILT with occasional thin roots (FILL) From 2.40m to 2.45m band of fine to coarse sand
			100				22blo (1,1, 2,2,2,3) N=9	5 6 7		1.95 2.45 3.00 3.45 3.95			
			100				57blo (2,3, 5,6,7,9) N=28	8 9 10	-1.67	4.50 4.95 5.45			Very stiff, whitish grey, spotted and mottled red, slightly silty sandy CLAY with some fine to medium gravel sized ferruginous nodules (ALLUVIUM)
			100				53blo (2,2, 4,5,5,7) N=21	11 12 13		5.00 6.45 6.95			
			100				63blo (3,3, 5,7,7,9) N=28	14 15 16	-4.67	7.50 7.95 8.45			Medium dense to dense, whitish grey, silty very clayey fine SAND. Striped light pink from 8.00m and also striped light yellow below 9.00m (ALLUVIUM)
			100				62blo (2,3, 5,6, 8,14) N=32	17 18 19		9.00 9.45			

REMARKS

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DATE 4/5/94

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DRILLHOLE RECORD

HOLE NO. V/B2

CONTRACT NO. GE/93/08 LG21518/09

SHEET 2 of 3

PROJECT Tin Shui Wai Development, Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

METHOD Rotary	CO-ORDINATES E 819067.40 N 836084.14	WORKS ORDER No. GE/93/08.6
MACHINE & No. Diamant Boart D5		DATE from 15/4/94 to 16/4/94
FLUSHING MEDIUM Water	ORIENTATION Vertical	GROUND-LEVEL 2.83 mPD

Drilling Progress	Casing depth/size	Water level/ time/ date	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
16/4/94		1.30m							-7.67	10.50		V	Extremely weak, orangish brown becoming greenish brown, completely decomposed fine grained METASILTSTONE (Stiff to very stiff, slightly sandy clayey SILT, with occasional cobble sized weak rock fragments below 20.00m and with relict joints)
			100				57blo	20					
11							(2,2, 4,5,7,7) N=23	21		10.95			
								22		11.45			
12			100					23		12.00			
								24					
13							(2,3, 3,5,6,9) N=20	26		13.00			
										13.45			
14			100							14.00			
								25					
15							(2,3, 5,5,6,9) N=28	27		15.00			
								28		15.45			
16			80							16.00			
								29					
17							(2,4, 6,7, 7,10) N=30	30		17.00			
								31		17.45			
18			100					32		18.00			
								33		18.45			
19							(1,2, 4,4,6,9) N=23	34		19.00			
			100					35		19.45			
20													

REMARKS

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MARKER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED S.P.Su
DATE 2/6/94
CHECKED T.F.
DATE 4/6/94

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DRILLHOLE RECORD

HOLE NO. V/B2

CONTRACT NO. GE/93/08 LG21518/09

SHEET 3 of 3

PROJECT Tin Shui Wai Development, Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

METHOD Rotary	CO-ORDINATES E 819067.40 N 836084.14	WORKS ORDER No. GE/93/08.6
MACHINE & No. Diamant Boart D5		DATE from 15/4/94 to 16/4/94
FLUSHING MEDIUM Water	ORIENTATION Vertical	GROUND-LEVEL 2.83 mPD

Drilling Progress	Casing depth/size	Water level/ time/ date	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
			100					36	-17.67	20.50			End of investigation hole at 20.50m
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

REMARKS

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MARKER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

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CHECKED T.F.
DATE 4/6/94

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DRILLHOLE RECORD

HOLE NO. V/B3

CONTRACT NO. GE/93/08 LG21518/09

SHEET 1 of 2

PROJECT Tin Shui Wai Development, Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

METHOD Rotary

CO-ORDINATES
E 819115.10
N 835028.02

WORKS ORDER No. GE/93/08.6

MACHINE & No. Diamant Boart D5

DATE from 20/4/94 to 20/4/94

FLUSHING MEDIUM Water

ORIENTATION 90.0

GROUND-LEVEL 2.56 mPD

Drilling Progress	Casing depth/size	Water level/ time/ date	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
20/4/94	SX									1.00			Firm, dark grey mottled brownish yellow, sandy clayey SILT with some thin roots (FILL)
			100				22blo	1		1.45			
							(1,1, 1,2,1,2) N=6	2 3		1.95			
			100				24blo	4	0.06	2.50			Medium dense, light grey and brownish yellow, clayey very silty fine SAND (ALLUVIUM)
							(2,2, 2,3,3,4) N=12	5 6		2.95			
										3.45			
			100				55blo	7	-1.44	4.00			Medium dense, light grey spotted light brown, silty very clayey fine SAND (ALLUVIUM)
							(2,3, 5,5, 6,11) N=29	8 9		4.45			
										4.95			
			100				45blo	10		5.50			
							(2,3, 4,5,7,7) N=23	11 12		5.95			
										6.45			
			100				64blo	13		7.00			
							(3,3, 4,6, 7,10) N=27	14 15		7.50			
										7.95			
			100				57blo	16	-5.94	8.50		V	Extremely weak, light grey becoming light yellowish brown, completely decomposed fine grained SANDSTONE (Very silty fine SAND)
							(4,5, 7,7, 10,13) N=37	17 18		8.95			
										9.45			

REMARKS

SMALL DISTURBED SAMPLE
LARGE DISTURBED SAMPLE
SPT LINER SAMPLE
U76 UNDISTURBED SAMPLE
U100 UNDISTURBED SAMPLE
MAZIER SAMPLE
PISTON SAMPLE
WATER SAMPLE
PIEZOMETER TIP
STANDPIPE
STANDARD PENETRATION TEST
PERMEABILITY TEST
IN-SITU VANE SHEAR TEST

LOGGED S.P.Su
DATE 3/6/94
CHECKED T.F.
DATE 4/6/94

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DRILLHOLE RECORD

HOLE NO. V/B3

CONTRACT NO. GE/93/08 LG21518/09

SHEET 2 of 2

PROJECT Tin Shui Wai Development, Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

METHOD Rotary

CO-ORDINATES
E 819115.10
N 835028.02

WORKS ORDER No. GE/93/08.6

MACHINE & No. Diamant Boart D5

DATE from 20/4/94 to 20/4/94

FLUSHING MEDIUM Water

ORIENTATION 90.0

GROUND-LEVEL 2.56 mPD

Drilling Progress	Casing depth/size	Water level/ time/ date	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
11			80				(3,4, 7,8, 11,11) N=38	18 20		11.00			
12			90					21		11.45			
								22		12.00			
13							(3,5, 7,8, 12,14) N=41	23 24		13.00			
										13.45			
14			80					25		14.00			
15							(2,4, 7,8, 9,13) N=38	26 27		15.00			
			60							15.45			
16								28 29		16.00			
17			80					30 31		17.00			
18							(4,4, 7,8, 11,14) N=40	32		18.00			
										18.45			
19			80					33		19.00			
20								34	-17.44	20.00			End of investigation hole at 20.00m

REMARKS

SMALL DISTURBED SAMPLE
LARGE DISTURBED SAMPLE
SPT LINER SAMPLE
U76 UNDISTURBED SAMPLE
U100 UNDISTURBED SAMPLE
MAZIER SAMPLE
PISTON SAMPLE
WATER SAMPLE
PIEZOMETER TIP
STANDPIPE
STANDARD PENETRATION TEST
PERMEABILITY TEST
IN-SITU VANE SHEAR TEST

LOGGED S.P.Su
DATE 3/6/94
CHECKED T.F.
DATE 4/6/94

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DRILLHOLE RECORD

HOLE NO. V/B5

CONTRACT NO. GE/93/08 LG21518/09

SHEET 1 of 2

PROJECT Tin Shui Wai Development, Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

METHOD Rotary	CO-ORDINATES E 819191.26	WORKS ORDER No. GE/93/08.6
MACHINE & No. Diamant Boart D5	N 834966.93	DATE from 22/4/94 to 23/4/94
FLUSHING MEDIUM Water	ORIENTATION Vertical	GROUND-LEVEL 6.65 mPD

Drilling Progress	Casing depth/size	Water level/ time/ date	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
22/4/94	5x								6.65	1.00			Firm, dark grey mottled brownish yellow, sandy clayey SILT with occasional thin roots (FILL)
			100				(1,1, 2,2,3,4) N=11	1 2 3		2.00 2.45 3.00			Yellowish grey, mottled red, silty sandy CLAY with some fine to medium gravel sized ferruginous nodules (ALLUVIUM)
	Px		90				(2,3, 5,6,7,7) N=25	4 5 6	1.65	4.00 4.45 5.00		V	Extremely weak, orangish brown becoming greenish brown, completely decomposed fine grained METASILTSTONE (Stiff to very stiff, sandy clayey SILT, with iron and manganese oxide stained relict joints)
			80				(2,2, 4,6,6,8) N=24	7 8 9		5.00 5.45 6.00			
			80				(10,11, 10,20, 22,42) N=102	10 11 12		7.00 7.45 8.00			
			85					13 14		8.45 9.00			

REMARKS

LOGGED S.P.Su
DATE 3/6/94
CHECKED T.F.
DATE 4/6/94

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DRILLHOLE RECORD

HOLE NO. V/B5

CONTRACT NO. GE/93/08 LG21518/09

SHEET 2 of 2

PROJECT Tin Shui Wai Development, Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

METHOD Rotary	CO-ORDINATES E 819191.26	WORKS ORDER No. GE/93/08.6
MACHINE & No. Diamant Boart D5	N 834966.93	DATE from 22/4/94 to 23/4/94
FLUSHING MEDIUM Water	ORIENTATION Vertical	GROUND-LEVEL 6.65 mPD

Drilling Progress	Casing depth/size	Water level/ time/ date	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
23/4/94		1.10m 1.30m	100				(2,2, 3,5, 7,11) N=28	15 16 17		10.45 11.00 12.00			
							(2,4, 5,8, 8,13) N=34	18 19 20		12.45 13.00 14.00			
			100				(3,5, 6,7,9,9) N=30	21 22 23		14.45 15.00 16.00			
			90				(3,5, 7,8, 11,13) N=39	24 25 26		16.45 17.00 18.00			
			90				(3,6, 9,9, 11,14) N=43	27 28		18.45 19.00			
		1.20m	100						13.35	20.00			End of investigation hole at 20.00m

REMARKS

LOGGED S.P.Su
DATE 3/6/94
CHECKED T.F.
DATE 4/6/94

Lam Geotechnics Limited
-Offices: 2/F., 332 Lockhart Rd., Kai Kwong Comm. Bldg., Hong Kong.
-Laboratory: 26/F., Unit 3, Honour Ind. Centre, No. 6, Sun Yip St., Chaiwan, Hong Kong.
-Tel: 891 - 0663 -Fax: 834 - 0657

DRILLHOLE RECORD

CONTRACT NO. GE/93/08 LG21518/09

HOLE NO. V/B6

SHEET 1 of 2

PROJECT Tin Shui Wai Development, Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

METHOD Rotary	CO-ORDINATES E 819051.22 N 834703.14	WORKS ORDER No. GE/93/08.6
MACHINE & No. Diamant Boart D6		DATE from 12/4/94 to 14/4/94
FLUSHING MEDIUM Water	ORIENTATION 90.0	GROUND-LEVEL 7.02 mPD

Drilling Progress	Casing depth/size	Water level/ time/ date	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
12/4/94	Sx		100				35blo	1		1.00			Medium dense to dense, light brownish grey, silty fine to coarse SAND with some subangular fine to medium gravel and occasional wood fragments above 1.50m (FILL)
							(3,5, 5,7, 8,10) N=30	2		1.45			
								3		1.95			
			89				55blo	4		2.50			
		1.20m					(4,4, 6,7,8,8) N=23	5		2.95			
								6		3.46			
			100				58blo	7		4.00			
13/4/94							(4,5, 6,8, 10,13) N=37	8		4.46			
								9		4.95			
	Px		0				69blo	10	1.02	5.50			
			0				55blo	11		6.00			Firm, light brown, silty sandy CLAY (FILL)
							(1,2, 2,3,4,4) N=13	12		6.45			
			100							6.95			
							34blo	13	-0.48	7.50			Very stiff, light grey silty sandy CLAY with occasional fine to medium gravel sized red ferruginous nodules (ALLUVIUM)
							(2,2, 3,5,6,8) N=19	14		7.95			
								15		8.45			
			100				69blo	16		9.00			
								17		9.45			
			89										

REMARKS

LOGGED S.P.Su
DATE 3/5/94
CHECKED T.F.
DATE 4/5/94

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MARKER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

Lam Geotechnics Limited
Office: 2/F., 332 Lockhart Rd., Kai Kwong Comm. Bldg., Hong Kong.
Laboratory: 26/F., Unit 3, Honour Ind. Centre, No. 6, Sun Yip St., Chaiwan, Hong Kong.
Tel: 881 - 0563 Fax: 834 - 0657

DRILLHOLE RECORD

CONTRACT NO. GE/93/08 LG21518/09

HOLE NO. V/B6

SHEET 2 of 2

PROJECT Tin Shui Wai Development, Village Flood Protection Phase IV
Ground Investigation at Ha Mei San Tsuen

METHOD Rotary | CO-ORDINATES E 819051.22 N 834703.14 | WORKS ORDER No. GE/93/08.6

MACHINE & No. Diamant Boart D6 | DATE from 12/4/94 to 14/4/94

FLUSHING MEDIUM Water | ORIENTATION 90.0 | GROUND-LEVEL 7.02 mPD

Drilling Progress	Casing depth/size	Water level/ time/ date	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
							(3,3, 4,6,9,9) N=28	18	-3.48	10.50			
			89				72blo	19		10.95			Dense, light grey, very clayey/silty fine SAND (ALLUVIUM)
								20		11.45			
							(2,3, 5,6, 10,12) N=32	21	-4.98	12.00		V	
			89				91blo	22		12.45			Extremely weak, grey becoming light yellowish brown, completely decomposed fine grained SANDSTONE (Very silty fine SAND)
								23		12.95			
							(3,4, 6,6, 10,12) N=34	24		13.50			
			89				137blo	25		13.95			
								26		14.45			
							(3,5, 6,8, 13,16) N=44	27		15.00			
			100				55blo	28		16.45			
14/4/94							(2,3, 3,5,7,8) N=23	29		15.95			
								30		16.50			
			100					31		17.50			
							(2,4, 6,6, 8,10) N=30	32		17.95			
								33		18.50			
			100					34		19.50			
							(3,5, 5,7, 9,14) N=35	35	-12.98	20.00			
								36					

REMARKS

End of investigation hole at 20.00m

LOGGED S.P.Su
DATE 3/5/94
CHECKED T.F.
DATE 4/5/94

Lam Geotechnics Limited
Office: 2/F., 332 Lockhart Rd., Kai Kwong Comm. Bldg., Hong Kong.
Laboratory: 26/F., Unit 3, Honour Ind. Centre, No. 6, Sun Yip St., Chaiwan, Hong Kong.
Tel: 881 - 0563 Fax: 834 - 0657

APPENDIX C – GCO PROBE RECORDS

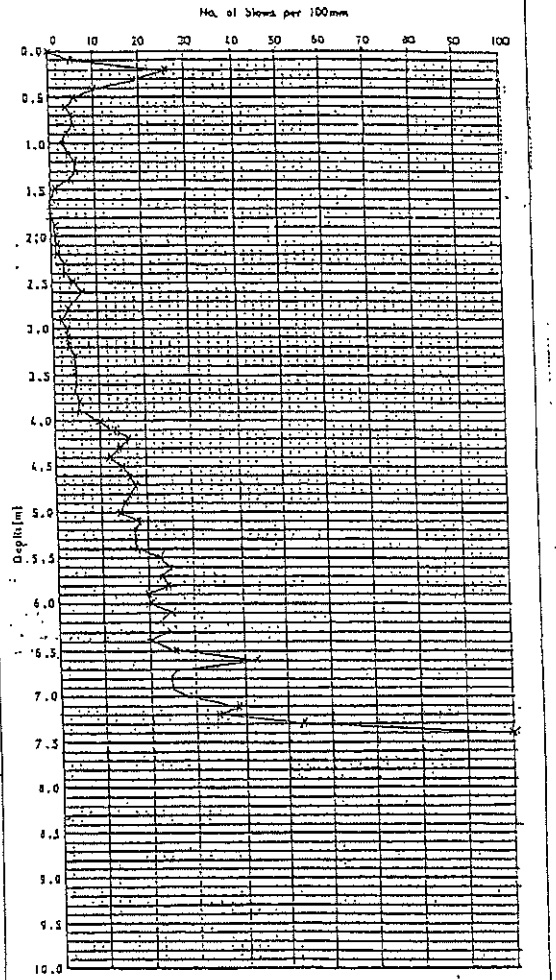
G C O PROBE RECORD SHEET

Contractor : Lam Geotechnics Ltd	Contract No. : GE/93/08 Probe No. : V/S1	
Works Order No. : GE/93/08.76	Date 28/3/94	Level 3.64 mPD
Project : Tin Shui Wai Development Village Flood Protection Phase IV	Co-ordinates	
Operator :	E 819056.54	N 835125.68

Results

Depth (m)	Blows/100mm	Depth (m)	Blows/100mm	Depth (m)	Blows/100mm
0	5	3.5	4	7.0	38
	26		4		35
	9		5		59
	10		5		100
0.5	5	4.0	10	7.5	
	7		13		
	4		15		
	6		14		
	3		12		
1.0	2	4.5	14	8.0	
	3		16		
	4		17		
	4		16		
1.5	3	5.0	15	8.5	
	0		16		
	0		18		
	0		17		
	1		17		
2.0	1	5.5	17	9.0	
	1		22		
	2		24		
	2		22		
	3		23		
2.5	6	6.0	20	9.5	
	6		20		
	3		25		
	2		22		
	3		23		
3.0	3	6.5	20	10.0	
	3		27		
	4		42		
	4		26		
	4		25		
3.5	4	7.0	25		
			28		

Remarks :



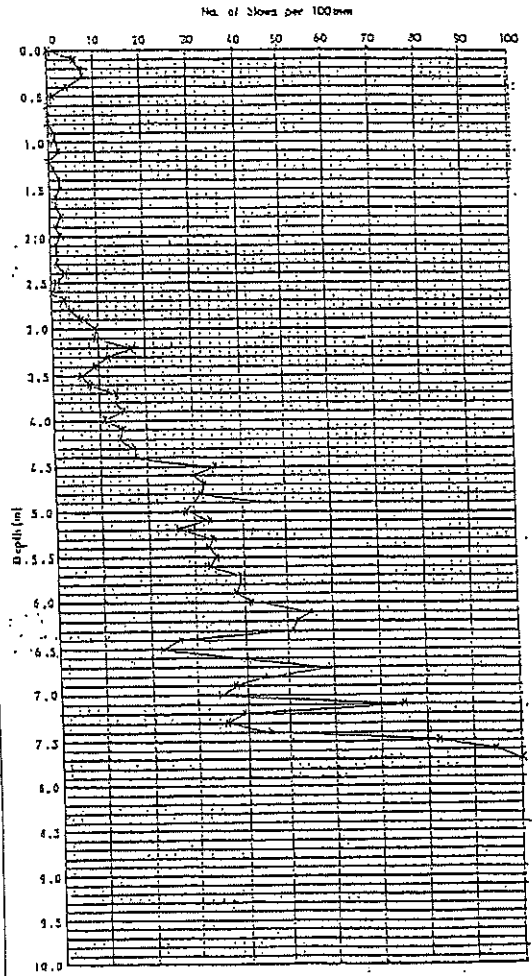
G C O PROBE RECORD SHEET

Contractor : Lam Geotechnics Ltd	Contract No. : GE/93/08 Probe No. : V/S2	
Works Order No. : GE/93708.6	Date 26/3/94	Level 3.10 mPD
Project : Tin Shui Wai Development Village Flood Protection Phase IV	Co-ordinates	
Operator :	E 819087.59	N 835055.97

Results

Depth (m)	Blows/100mm	Depth (m)	Blows/100mm	Depth (m)	Blows/100mm
0	6	3.5	8	7.0	75
	7		13		39
	7		13		36
	3		14		45
0.5	1	4.0	11	7.5	72
	0		15		94
	0		14		100
	0		17		
	1		17		
1.0	2	4.5	34	8.0	
	0		30		
	2		32		
	1		37		
1.5	2	5.0	46	8.5	
	1		28		
	2		33		
	1		26		
2.0	2	5.5	33	9.0	
	1		32		
	1		33		
	2		32		
2.5	1	6.0	39	9.5	
	0		39		
	2		38		
	3		41		
	6		55		
3.0	9	6.5	52	10.0	
	9		51		
	17		36		
	12		32		
	9		40		
	7		59		
3.5	4	7.0	45		
			38		
			35		

Remarks:



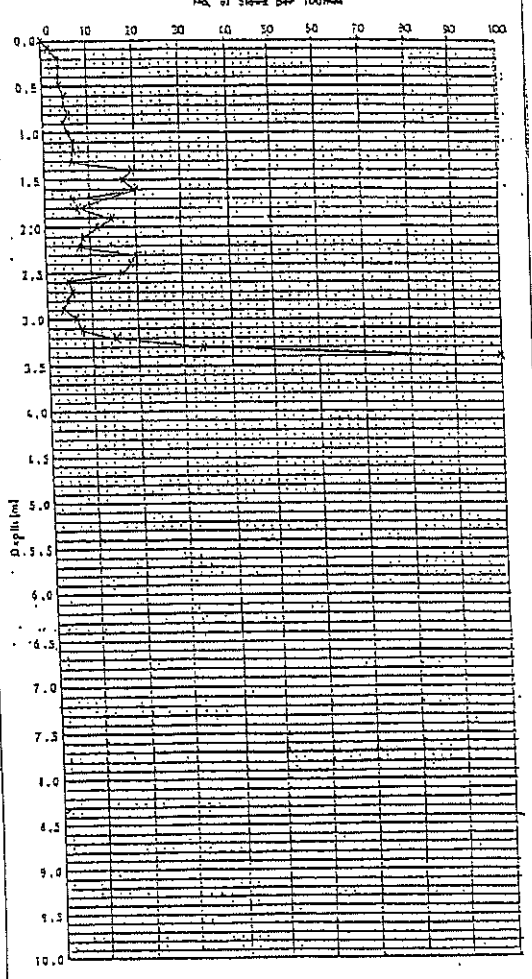
G C O PROBE RECORD SHEET

Contractor : Lam Geotechnics Ltd	Contract No. : GE/93/08 Probe No. : V/S5	
Works Order No. : GE/93/08.6	Date 28/3/94	Level 7.12 mPD
Project : Tin Shui Wai Development Village Flood Protection Phase IV	Co-ordinates	
Operator :	E 819156.07	N 834815.74

Results

Depth (m)	Blows/100mm	Depth (m)	Blows/100mm	Depth (m)	Blows/100mm
0	1	3.5	3	7.0	
	3		7		
	3		3		
	3		3		
0.5	4	4.0	4	7.5	
	4		5		
	4		4		
	5		5		
1.0	5	4.5	6	8.0	
	6		6		
	6		6		
	19		19		
1.5	17	5.0	20	8.5	
	20		6		
	6		7		
	7		14		
2.0	14	5.5	11	9.0	
	9		9		
	8		8		
	20		20		
2.5	19	6.0	19	9.5	
	17		17		
	4		4		
	5		5		
	4		4		
	3		3		
3.0	6	6.5	6	10.0	
	7		7		
	14		14		
	33		33		
	100		100		
3.5		7.0			

Remarks:



APPENDIX D – TRIAL PIT RECORD AND PHOTOGRAPHS

CONTRACTOR: Lam Geotechnics Ltd
WORKS ORDER NO.: GE/93/08.6
LOGGED BY Kwok DATE: 22/3
CHECKED BY: TF DATE: 23/3
CO-ORDINATES: E 819180.03
N 834866.90
GROUND LEVEL: 11.65 mPD
PROJECT: Tin Shui Wai Development Village Flood Protection Phase IV Ground Investigation at Ha Mei San Tsuen
EXCAVATION DATES: 22/3/94

SAMPLES & TESTS | DEPTH (m) | LEGEND (FACE A) | GRADE | DESCRIPTION

DATUM 11.65 P.D.

0 – 0.5 – 1.0 – 1.5 – 2.0 – 2.5

1 Soft greyish brown slighlty sandy clayey SILT with some subangular fine gravel and some roots (TOP SOIL)

2 Soft to firm, light brown sandy clayey SILT with occasional subangular to subrounded fine to medium gravel and cobble sized weak rock fragments, and occasional roots (COLLUVIUM)

3 Extremely weak light yellowish brown mottled light purple completely decomposed fine grained PHYLLITE (Firm clayey SILT with relict joints)

4 Weak-to moderately weak light yellowish brown mottled light purple highly to moderately decomposed fine grained PHYLLITE with very closely to closely spaced rough planar undulating tight and clean, locally clay infilled joints, dipping at subhorizontal, 60 – 80 dip directions 050 – 070 , 220 – 240 and 310 – 330 , very narrow subhorizontal cleavages developed

Average depth : 2.30m
Remarks : No seepage observed

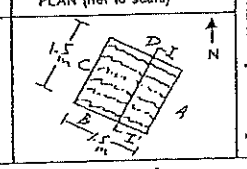
1-1' Section
25°
2.2m
2.4m

GRADE: V; IV/III

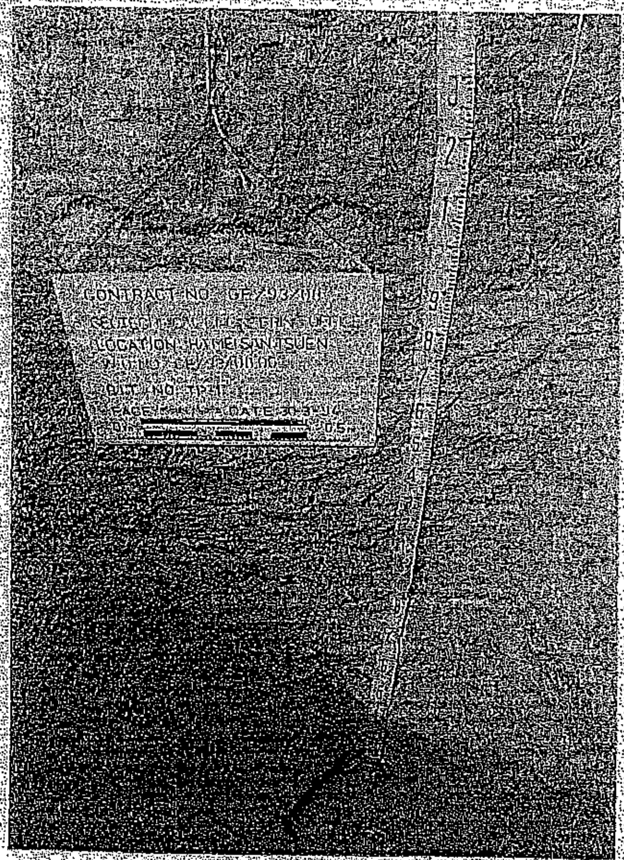
FACE A: SE | FACE B: SW | FACE C: NW | FACE D: NE

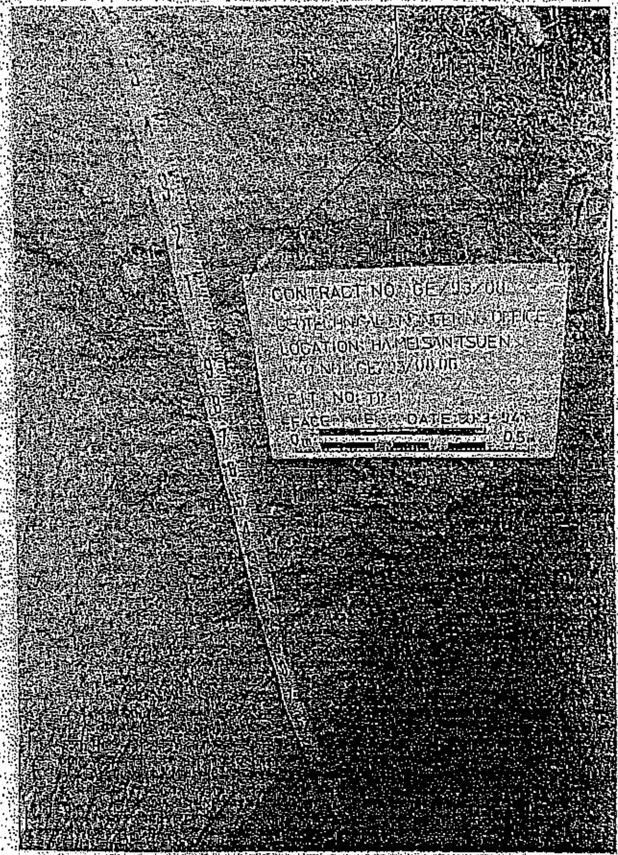
SYMBOL | SAMPLES/TESTS/WATER
Small dist. sample
Large dist. sample
Undist. sample hori. ( )
Undist. sample vert. (U)
Block sample
Insitu density test
Water sample
Seepage

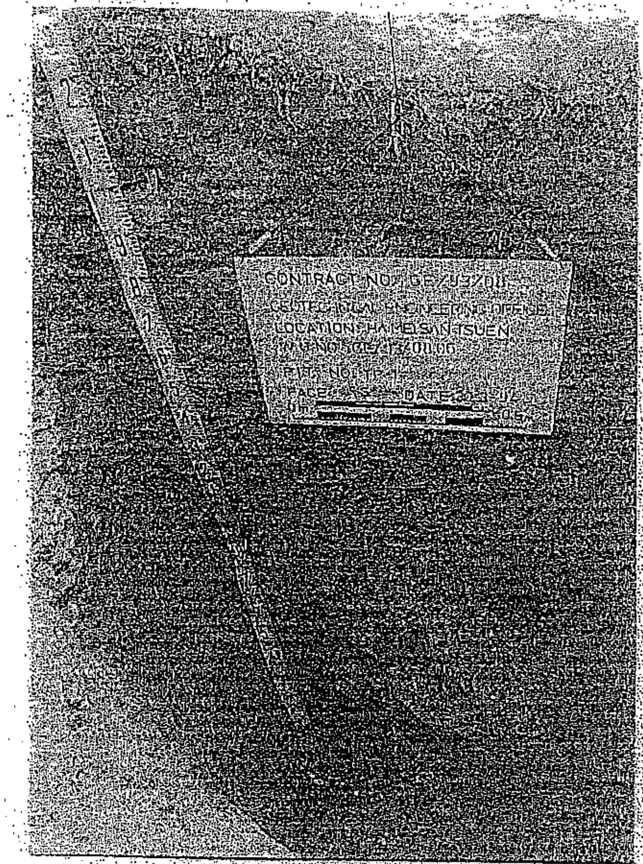
PLAN (not to scale)

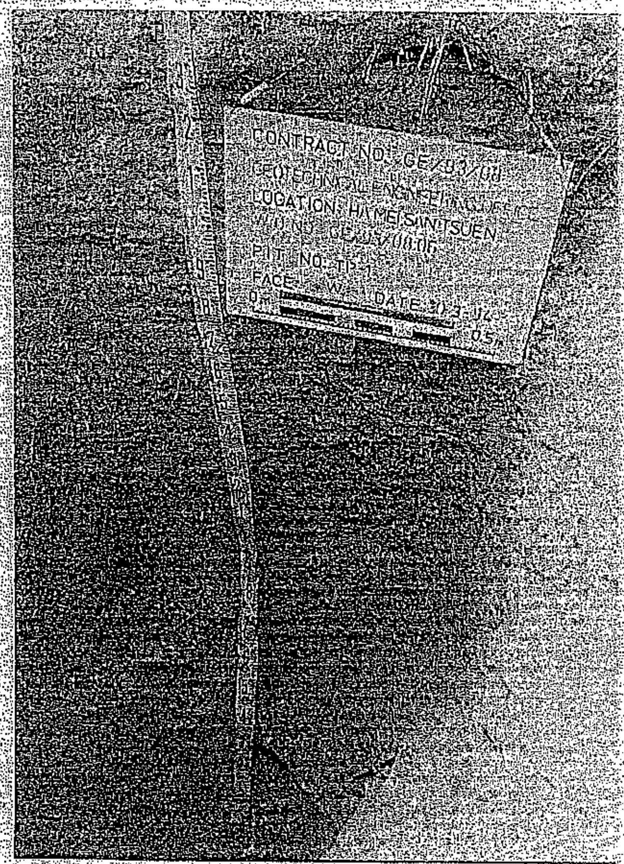


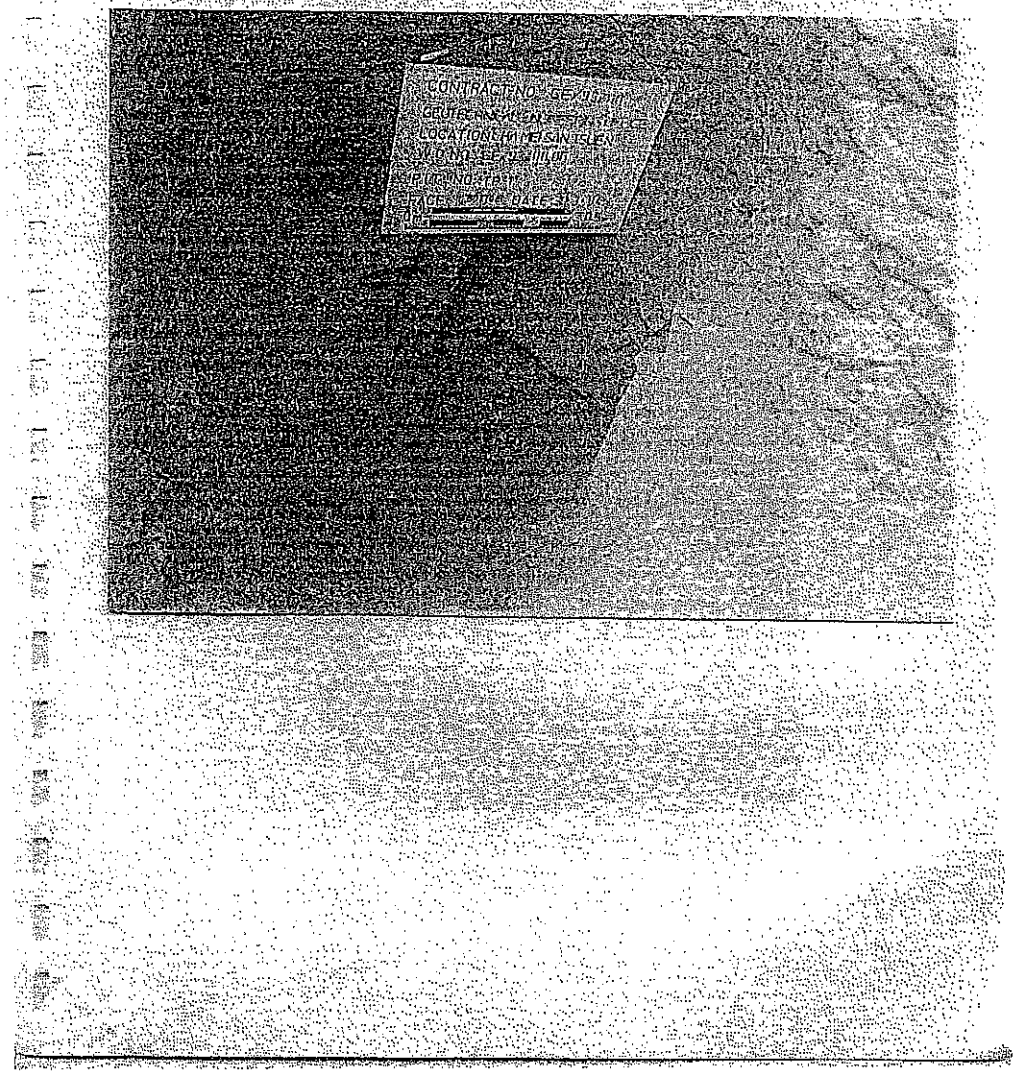
SHEET 1 OF 1
T.P. 1


CONTRACT NO
LOCATION
PIT NO
DATE
0.5m


CONTRACT NO
LOCATION: HA MEI SAN TSUEN
PIT NO
DATE
0.5m


LOCATION: HA MEI SAN TSUEN


LOCATION: HA MEI SAN TSUEN
PIT NO. TP-1



APPENDIX E – SLOPE STRIPPING RECORD

SLOPE STRIPPING RECORD

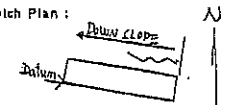
CONTRACTOR: Lam Geotechnics Ltd		CONTRACT NO.: GE/93/08	
Works Order No.: GE/93/08.6	Datum (Toe) Co-ordinates: E 819164.14, N 834870.93, Level 5.53	Datum (Top) Co-ordinates: E 819165.31, N 834870.87, Level 7.22	Strip No.: CS1
Project: Tin Shui Wai Development			Slope No.: —
			Sheet 1 of 1
Date Stared:	Date Completed:	Date Reinstated: / Logged by:	Checked by: T.F.

Distance from Datum (m)	Slope Angle	Reduced Level (mPD)	Description and Sample Data	Legend	Discontinuities: Dip	Discontinuities: Nature & Infilling
14						
13						
12						
11						
10						
9						
8						
7						
6						
4.8		9.23	Light brown, slightly sandy clayey SILT with some thin roots, some angular fine to coarse gravel and cobble sized fragments and occasional concrete and glass fragments (FILL)			
4	15°					
3			Extremely weak, light brown and reddish grey, completely decomposed fine grained METASANDSTONE (Very silty fine SAND with relict joints)			
2	42°					
1	55°					
0.35	65°	5.79				
0		5.53				

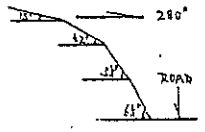
Remarks:

Legend:
- Small disturbed sample
- Large disturbed sample
- Block sample
- Insitu - density test
- Water sample
- Seepage
- N - Schmidt hammer test

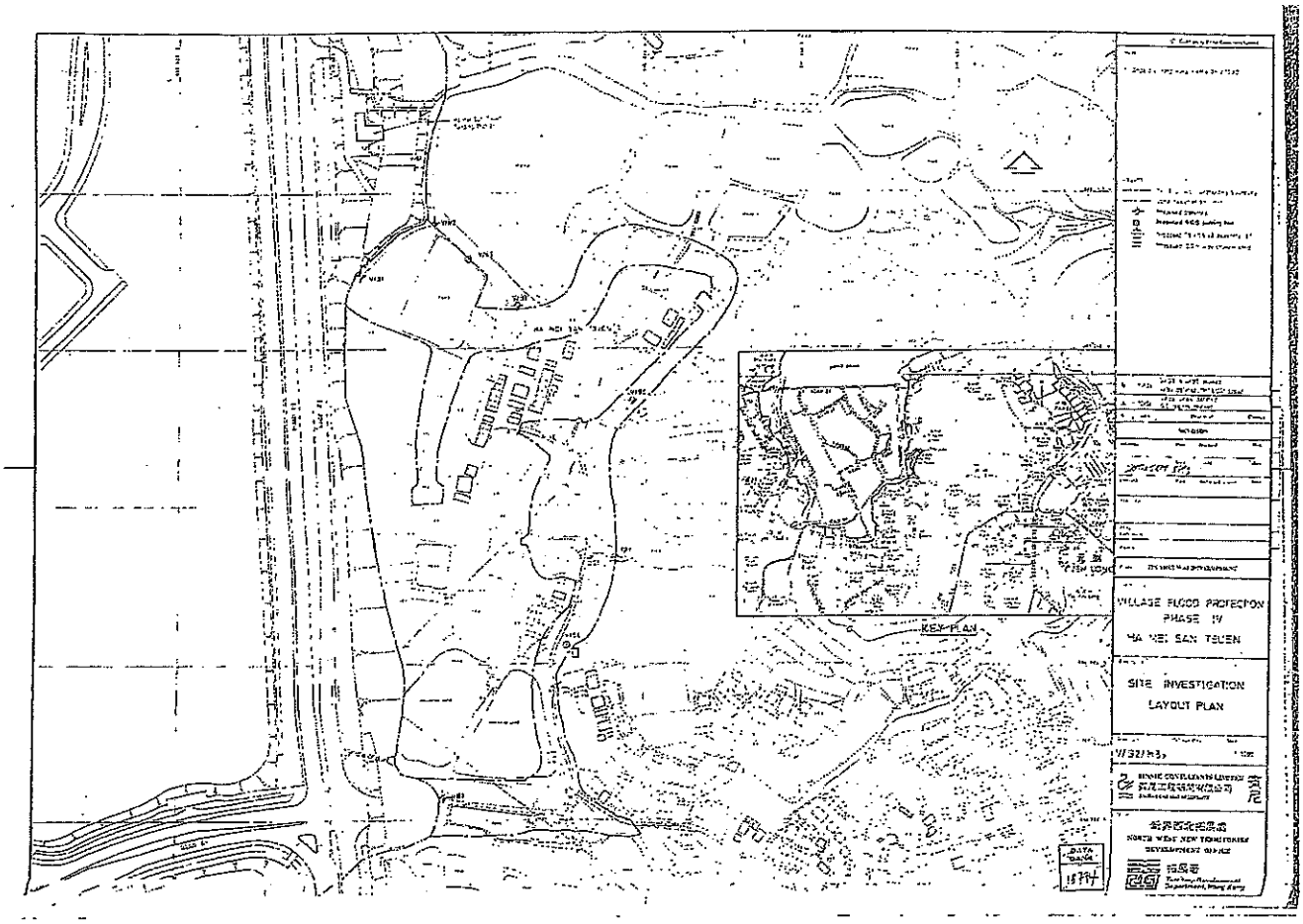
Sketch Plan:



Sketch Section:



APPENDIX F – LOCATION PLAN


KEY PLAN
VILLAGE FLOOD PROTECTION
PHASE IV
HA WEI SAN TSUEN
SITE INVESTIGATION
LAYOUT PLAN
NORTH WEST NEW TERRITORIES
DEVELOPMENT OFFICE

JCRIC

Tables

JCRIC

JCRIC

JCRIC

LIST OF TABLES

28428

JCRIC

JCRIC

JCRIC

Table 1 - Summary of Strata Depth Intervals and Thicknesses

CONTRACT NO: GE/97/15
WORKS ORDER NO: GE/97/15.22
SITE LOCATION: Supplementary Agreement to Agreement No. CE 5/86, Yuen Long - Tuen Mun Corridor / Rural Hinterland, Engineering Works for Village Priority Areas (1-13) Ha Mei San Tsuen, Ground Investigation.

DRILLHOLE NO.	TERMINATION DEPTH (m)	STRATA DESCRIPTION								
		FILL	POND DEPOSIT	ALLUVIUM	Completely Decomposed Meta-SILTSTONE Grade V	Completely to Highly Decomposed Meta-SILTSTONE Grade V-IV	Highly to Slightly Decomposed Meta-SILTSTONE Grade IV-II			
		Depth Intervals (m) / Thickness(m)	Depth Intervals (m) / Thickness(m)	Depth Intervals (m) / Thickness(m)	Depth Intervals (m) / Thickness(m)	Depth Intervals (m) / Thickness(m)	Depth Intervals (m) / Thickness(m)	Depth Intervals (m) / Thickness(m)	Depth Intervals (m) / Thickness(m)	Depth Intervals (m) / Thickness(m)
D 1	35.23	0.00-2.60	—	2.60-6.60	6.60-35.23	—	—			
		2.60		4.00	28.63					
D 2	35.15	0.00-1.50	—	1.50-6.60	6.60-29.30	29.30-32.30	32.30-35.15			
		1.50		5.10	22.70	3.00	2.85			
D 3	35.00	—	0.00-1.50	1.50-5.50	5.50-35.00	—	—			
			1.50	4.00	29.50					
D 4	35.00	0.00-3.00	3.00-7.60	7.60-11.80	11.80-20.90	20.90-29.60 *	29.60-35.00			
		3.00	4.60	4.20	9.10	8.70	5.40			
D 5	59.51	0.00-2.60	2.60-3.60	3.60-8.00	8.00-27.35	27.35-44.45 *	44.45-59.51			
		2.60	1.00	4.40	19.35	17.10	15.06			

* Grade V/IV with grade IV/III CORESTONE (S).

Prepared By: K. C. Wu Checked By: P. Barr

Date of Issue: 21st May, 1998

Table 2 - Investigation Station Co-ordinates and Ground Levels

Job No.: GE/97/15.22
Project: Supplementary Agreement to Agreement No. CE 5/86, Yuen Long - Tuen Mun Corridor / Rural Hinterland, Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen, Ground Investigation.

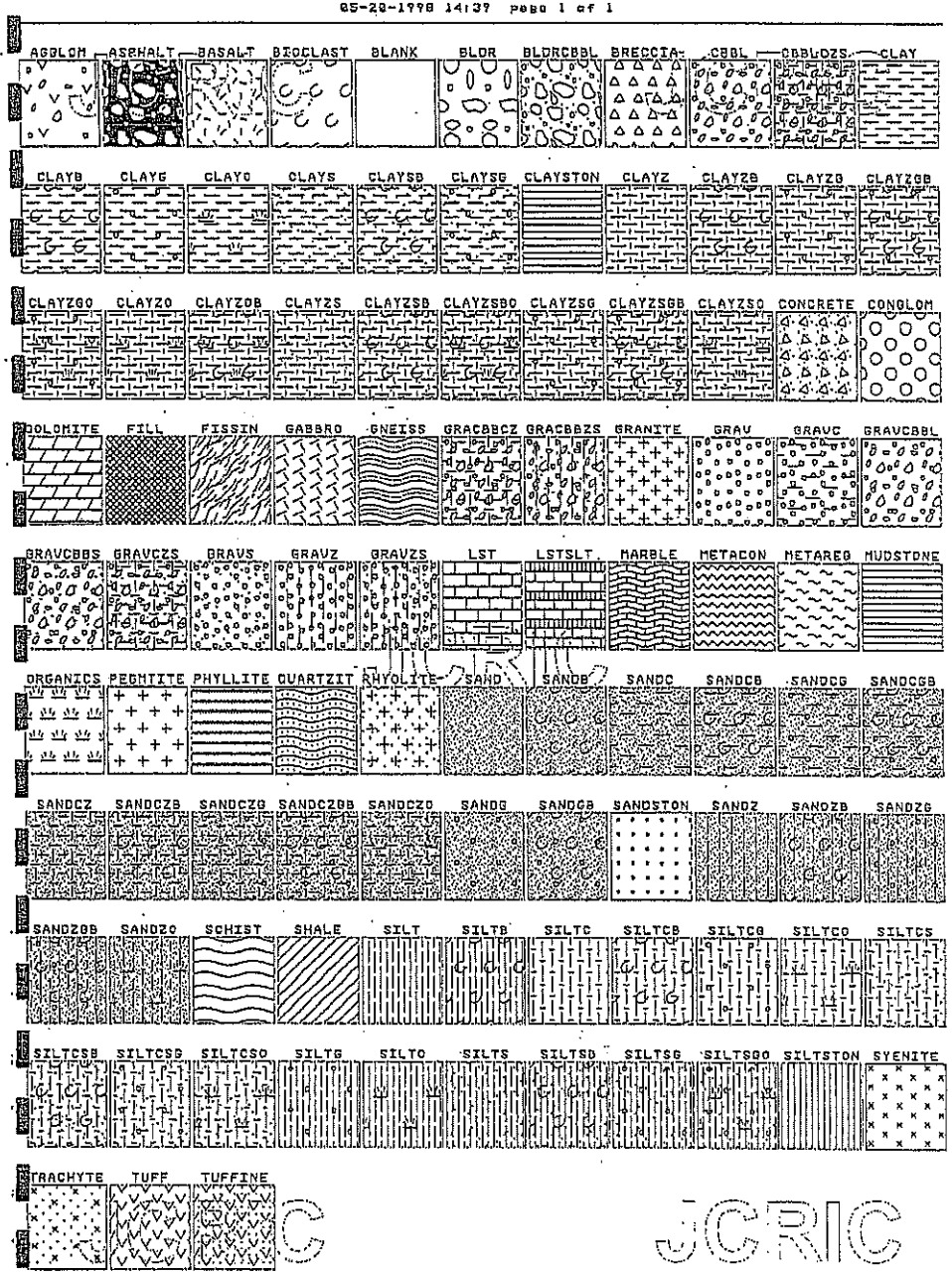
DATE : 21/05/1998
SHEET 1 OF 1

INVESTIGATION STATION No.	CO-ORDINATES E	CO-ORDINATES N	GROUND LEVEL mPD	Remarks
D 1	819054.81	834976.73	2.87	Vertical
D 2	819052.26	834899.05	2.60	Vertical
D 3	819119.71	834882.73	3.59	Vertical
D 4	819042.76	834820.04	4.41	Vertical
D 5	819243.94	835057.74	5.16	Vertical

JCRIC

Appendix A - Legend Patterns

JCRIC JCRIC JCRIC JCRIC



JCRIC

Material Code	Description
[A]	
AGGLOM	Agglomerate
ASPHALT	Asphalt
[B]	
BASALT	Basalt
BIOCLAST	Shells
BLANK	Materials not recovered
BLDR	BOULDERS
BLDRCBBL	BOULDERS and COBBLES
BRECCIA	Sedimentary Breccia
[C]	
CBBL	COBBLES
CLAY	CLAY
CLAYB	CLAY with occasional / some / many shells
CLAYG	CLAY with occasional / some / much gravel
CLAYO	CLAY with occasional / some / much organics
CLAYS	Sandy CLAY
CLAYSB	Sandy CLAY with occasional/some/many shells
CLAYSG	Sandy CLAY with occasional / some / much gravel
CLAYSTON	CLAYSTONE
CLAYZ	Silty CLAY
CLAYZB	Silty CLAY with occasional / some / many shells
CLAYZG	Silty CLAY with occasional / some / much gravel
CLAYZO	Silty CLAY with occasional / some / much organics
CLAYZS	Silty Sandy CLAY
CLAYZSB	Silty Sandy CLAY with occasional / some / many shells
CLAYZSG	Silty Sandy CLAY with occasional / some / much gravel
CLAYZSO	Silty Sandy CLAY with occasional / some / much organics
CONCRETE	CONCRETE
CONGLOM	Conglomerate
[D]	
DOLOMITE	Dolomitic Limestone
[F]	
FILL	Artificial Fill
FISSIN	Fissure Infill
[G]	
GABBRO	Gabbro, Lamprophyre
GNEISS	Gneiss
GRACBBZS	Silty Sandy GRAVEL and COBBLES
GRANITE	Granite
GRAV	GRAVEL
GRAVC	Clayey GRAVEL
GRAVCBBL	GRAVEL and COBBLES
GRAVCZS	Silty Sandy Clayey GRAVEL
GRAVS	Sandy GRAVEL
GRAVZ	Silty GRAVEL
GRAVZS	Silty Sandy GRAVEL
[L]	
LST	Limestone
LSTLT	Interbedded Limestone and Siltstone
[M]	
MARBLE	Marble
MATACON	Metamorphic Rock - Contact
METAREG	Metamorphic Rock - Regional
MUDSTONE	Mudstone
[O]	
ORGANICS	Organics, Peat

Material Code	Description
[P]	
PEGMTITE	Pegmatite
PHYLLITE	Phyllite, Mylonite
[Q]	
QUARTZIT	Quartzite
[R]	
RHYOLITE	Rhyolites
[S]	
SAND	SAND
SANDB	SAND with occasional / some / many shells
SANDC	Clayey SAND
SANDCB	Clayey SAND with occasional /some/ many shells
SANDCG	Clayey SAND with occasional /some/ much gravel
SANDCOC	Clayey SAND with occasional /some/ much gravel and cobble
SANDCZ	Silty clayey SAND
SANDCZB	Silty Clayey SAND with occasional / some / many shells
SANDCZG	Silty Clayey SAND with occasional / some / much gravel
SANDCZOC	Silty Clayey SAND with occasional / some / much gravel and cobble
SANDCZO	Silty Clayey SAND with occasional / some / much organics
SANDG	SAND with occasional / some / much gravel
SANDSTON	Sandstone
SANDZ	Silty SAND
SANDZB	Silty SAND with occasional / some / many shells
SANDZG	Silty SAND with occasional / some / much gravel
SANDZGB	Silty SAND with occasional / some / much gravel and shells
SANDZO	Silty SAND with occasional / some / much organics
SCHIST	Schist
SHALE	Shale
SILT	SILT
SILTB	SILT with occasional / some / many shells
SILTC	Clayey SILT
SILTCB	Clayey SILT with occasional / some / many shells
SILTCO	Clayey SILT with occasional / some / much organics
SILTCS	Clayey Sandy SILT
SILTCSB	Clayey SILT with occasional / some / much gravel
SILTCSG	Clayey Sandy SILT with occasional / some / much gravel
SILTCSO	Clayey Sandy SILT with occasional / some / much organics
SILTG	SILT with occasional / some / much gravel
SILTO	SILT with occasional / some / much organics
SILTS	Sandy SILT
SILTSO	Sandy SILT with occasional / some / much gravel
SILTSTON	Siltstone
SYENITE	Granodiorite, Syenite, Monzonite
[T]	
TRACHYTE	Trachyte, Dacite, Latite, Andesite
TUFF	Coarse Ash Tuff, Lapilli Tuff
TUFFINE	Fine Ash Tuff

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Appendix B - Drillhole Records

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ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. D1
CONTRACT NO. GE/97/15
SHEET 1 of 4

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.		
METHOD W	CO-ORDINATES E 818064.81 N 834976.73	W.O. No GE/97/15.22
MACHINE & No. DR 12		DATE: 03/04/1998 to 07/04/1998
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 2.87 mPD

Drilling Progress	Casing size	T.C.R.(%)	Samples	Reduced Level	Depth (m)	Grade	Description
03/04	PX		1 1.00, 2 1.50, 3 2.50	0.27	2.60		Soft, reddish brown (5YR 5/3), sandy CLAY. (FILL)
		100	4 2.70, 5 3.00, 3.50, 6 4.30	-1.73	4.60		Loose, light grey (N7) mottled brown, clayey fine SAND with some angular fine quartz gravel. (ALLUVIUM)
		0	7 4.50, 8 5.50, 9 5.60, 10 6.10, 11 6.50	-3.73	6.60		Medium dense, light grey (N7), fine SAND. (ALLUVIUM)
		100	12 7.60	-4.83	7.70	V	Extremely weak, yellowish brown streaked black, completely decomposed, meta-SILTSTONE. (Silty CLAY)
		95	13 7.90, 14 8.10, 15 8.60, 16 9.30, 17 9.50			V	Extremely weak, reddish brown streaked black, completely decomposed, meta-SILTSTONE. (Clayey SILT)
		80					

Small Disturbed Sample; Piston Sample; U76 Undisturbed Sample; U100 Undisturbed Sample; Mazier Sample; SPT Liner Sample; Water Sample; Standard Penetration Test; In-situ Vane Shear Test; Permeability Test; Impression Packer Test; Packer Test; Piezometer Tip; Standpipe Tip

LOGGED C.P.Hamilton
DATE 08/04/1998
CHECKED P. Barry
DATE 19/06/1998

REMARKS
+. Piezometer tip installed at 6.50m depth.

JCRIC

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO.	D1
CONTRACT NO.	GE/97/15
SHEET	2 of 4

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W	CO-ORDINATES E 819054.81 N 834978.73	W.O. No GE/97/15.22
MACHINE & No. DR 12		DATE: 03/04/1998 to 07/04/1998
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 2.87 mPD

Drilling Progress	Casing size	Water level (m) Shift start/end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
							N=17	18 10.10					As sheet 1 of 4.
			96					19 10.60	-7.73	10.60		V	Extremely weak, pinkish brown streaked black, completely decomposed, meta-SILTSTONE. (SILT)
							[illegible] N=48	20 11.60, 21 11.80, 22 12.10, 23 12.60					
04/04		0.31m at 18:00 / [illegible] at 08:00	100										
							[illegible] N=30	24 13.60, 25 13.80, 26 14.10, 27 14.60					
			100										
							[illegible] N=37	28 15.60, 29 15.80, 30 16.10, 31 16.60					
			100										
							[illegible] N=31	32 17.60, 33 17.80, 34 18.10, 35 18.60					
			100				[illegible]	36 19.60, 37 19.80					

Key: Small Disturbed Sample; Piston Sample; U76 Undisturbed Sample; U100 Undisturbed Sample; Mazier Sample; SPT Liner Sample; Water Sample; Standard Penetration Test; In-situ Vane Shear Test; Permeability Test; Impression Packer Test; Packer Test; Piezometer Tip; Standpipe Tip

LOGGED C.P.Hamilton
DATE 08/04/1998
CHECKED P. Barry
DATE 19/05/1998

REMARKS

JCRIC

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO.	D1
CONTRACT NO.	GE/97/15
SHEET	3 of 4

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W	CO-ORDINATES E 819054.81 N 834978.73	W.O. No GE/97/15.22
MACHINE & No. DR 12		DATE: 03/04/1998 to 07/04/1998
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 2.87 mPD

Drilling Progress	Casing size	Water level (m) Shift start/end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
							N=[illegible]	38 20.10					As sheet 2 of 4.
			73					39 20.60	-17.73	20.60		V	Extremely weak, pinkish brown mottled and streaked black, completely decomposed, meta-SILTSTONE. (Sandy SILT with some fine quartz gravel)
			100					40 21.60, 41 21.70					
							[illegible] N=28	42 22.70, 43 22.90, 44 23.30					
			100					45 23.70					
07/04		0.32m at 18:00 / 0.43m at 08:00					[illegible] N=34	46 24.70, 47 24.90, 48 25.30, 49 25.70					
			40					50 26.70					
	HX		100					51 26.80	-23.93	26.80		V	Extremely weak, yellowish brown streaked black, completely decomposed, meta-SILTSTONE. (Sandy SILT)
							[illegible] N=[illegible]	52 27.80, 53 28.00, 54 28.30, 55 28.80					
			100					56 29.80, 57 30.00					

Key: Small Disturbed Sample; Piston Sample; U76 Undisturbed Sample; U100 Undisturbed Sample; Mazier Sample; SPT Liner Sample; Water Sample; Standard Penetration Test; In-situ Vane Shear Test; Permeability Test; Impression Packer Test; Packer Test; Piezometer Tip; Standpipe Tip

LOGGED C.P.Hamilton
DATE 08/04/1998
CHECKED P. Barry
DATE 19/05/1998

REMARKS

JCRIC

DRILLHOLE RECORD

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

HOLE NO.	D 1
CONTRACT NO.	GE/97/15
SHEET	4 of 4

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W	CO-ORDINATES E 819054.81 N 834976.73	W.O. No	GE/97/15.22
MACHINE & No. DR 12		DATE:	03/04/1998 to 07/04/1998
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL	2.87 mPD

Drilling Progress	Casing size	Water level (m) Shift start/end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
			100				12,6,7, 7,10,10 N=31	54 30.50, 55 30.80					As sheet 3 of 4.
			100				15,5,5, 5,6,8 N=21	60 31.80, 61 32.00, 62 32.30, 63 32.80					
		0.30m at 17:00					11,11,15, 15,30,10 N=110	64 33.80, 65 34.00, 66 34.30					
							15,11, 22,15,15, 200/130mm	67 34.80, 68 35.15	-32.36	35.23			
													End of investigation hole at 35.23m.

LOGGED	C.P.Hamilton
DATE	08/04/1998
CHECKED	P. Barry
DATE	19/05/1998

REMARKS

DRILLHOLE RECORD

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

HOLE NO.	D 2
CONTRACT NO.	GE/97/15
SHEET	1 of 4

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W+RC	CO-ORDINATES E 819052.26 N 834899.05	W.O. No	GE/97/15.22
MACHINE & No. DR 78		DATE:	31/03/1998 to 03/04/1998
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL	2.60 mPD

Drilling Progress	Casing size	Water level (m) Shift start/end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
31/03	PX							1 0.50, 2 1.00, 3 1.40, 4 1.50	1.10	1.50			Brown (7.5YR 5/2) and grey (N6), sandy SILT with some angular fine gravel sized rock fragments. (FILL)
		1.70m at 11:00	100, 90				15,4,4, 4,4,5 N=17; 12,1,2, 2,3,5 N=10	5 2.50, 6 2.70, 7 3.00, 8 3.50, 9 4.50, 10 4.70, 11 5.00, 12 5.50	-2.90	5.50			Medium dense, light grey (N7) mottled yellow, very silty fine SAND. (ALLUVIUM)
01/04		1.00m at 08:00	100					13 6.50	-4.00	6.60			Yellowish brown (10YR 5/4), fine to coarse SAND with some angular fine quartz gravel. (ALLUVIUM)
			35, 35, 0				12,3,5, 5,7,10 N=30	14 6.70, 15 7.00, 16 7.50, 17 8.50, 18 8.60, 19 9.50, 9.70				V	Extremely weak, dark yellowish brown streaked black, completely decomposed, meta-SILTSTONE. (Very sandy SILT)

LOGGED	C.P.Hamilton
DATE	04/04/1998
CHECKED	P. Barry
DATE	19/05/1998

REMARKS
1. Piezometer tip installed at 6.50m depth.

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ENPACK (HONG KONG) LIMITED — Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. D2 — SHEET 2 of 4

CONTRACT NO. GE/97/15

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W+RC	CO-ORDINATES E 819052.26 N 834899.05	W.O. No GE/97/15.22	
MACHINE & No. DR 78		DATE: 31/03/1998 to 03/04/1998	
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 2.60 mPD	

Drilling Progress	Casing size	Water level (m) Shift start/end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
			80				[illegible]	20 10.10, 21 10.30					As sheet 1 of 4.
11							SPT [illegible]	22 10.65, 23 10.80, 24 11.10					
12			88					25 12.30					
13			86					26 13.10, 27 13.30					
14							SPT [illegible]	28 14.30, 29 14.50, 30 14.60					
15		2.70m at 18:00						31 15.30					
02/04		0.10m at 08:00	86										
16							SPT [illegible]	32 16.30, 33 16.50, 34 16.60					
17			90					35 17.30					
18							SPT [illegible]	36 18.20, 37 18.50, 38 18.60					
19			100					39 19.30					
20													

Key: Small Disturbed Sample; Piston Sample; U76 Undisturbed Sample; U100 Undisturbed Sample; Mazier Sample; SPT Liner Sample; Water Sample; Standard Penetration Test; Insitu Vane Shear Test; Permeability Test; Impression Packer Test; Packer Test; Piezometer Tip; Standpipe Tip

LOGGED C.P.Hamilton — DATE 04/04/1998

CHECKED P. Berry — DATE 19/05/1998

REMARKS

ENPACK (HONG KONG) LIMITED — Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. D2 — SHEET 3 of 4

CONTRACT NO. GE/97/15

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W+RC	CO-ORDINATES E 819052.26 N 834899.05	W.O. No GE/97/15.22	
MACHINE & No. DR 78		DATE: 31/03/1998 to 03/04/1998	
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 2.60 mPD	

Drilling Progress	Casing size	Water level (m) Shift start/end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
							SPT [illegible]	40 20.30, 41 20.50, 42 20.60					As sheet 1 of 4.
21			86					43 21.30					
22							SPT [illegible]	44 22.30, 45 22.50, 46 22.60					
23			100					47 23.30					
24							SPT N=75	48 24.30, 49 24.50, 50 24.60					
25		0.10m at 18:00						51 25.30					
03/04		0.10m at 08:00	100										
26							SPT [illegible]	52 26.30, 53 26.50, 54 26.60					
27			100					55 27.30					
28							SPT [illegible]	56 28.30, 57 28.50, 58 28.60					
29								59 29.30	-26.70	29.30			
			100									V/IV	Extremely weak to very weak, yellowish grey, completely to highly decomposed, meta-SILTSTONE. (Sandy SILT with some cobble sized weak rock fragments)
30													

Key: Small Disturbed Sample; Piston Sample; U76 Undisturbed Sample; U100 Undisturbed Sample; Mazier Sample; SPT Liner Sample; Water Sample; Standard Penetration Test; Insitu Vane Shear Test; Permeability Test; Impression Packer Test; Packer Test; Piezometer Tip; Standpipe Tip

LOGGED C.P.Hamilton — DATE 04/04/1998

CHECKED P. Berry — DATE 19/05/1998

REMARKS

JCRIC

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. BD 2

CONTRACT NO. GE/97/15

SHEET 4 of 4

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W+RC	CO-ORDINATES E 819052.26 N 834699.05	W.O. No GE/97/15.22
MACHINE & No. DR 78		DATE: 31/03/1998 to 03/04/1998
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 2.60 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
													As sheet 3 of 4.
			66						-29.70	32.30		III	Moderately strong, light yellowish grey, moderately decomposed, fine grained mete-SILTSTONE, highly fractured. Where intact, joints are closely to very closely spaced, rough, planar, very narrow, iron stained, dipping at 20°-30°, 40°-50° and 60°-65°.
		4.33m at 11.00	100	85	66	15.0							
			30	50	20	>20							
			100	15	0								
			100	30	0				-32.66	35.15			End of investigation hole at 35.15m.

Small Disturbed Sample; Piston Sample; U76 Undisturbed Sample; U100 Undisturbed Sample; Water Sample; SPT Split Sample; Standard Penetration Test; Insitu Vane Shear Test; Permeability Test; Impression Packer Test; Packer Test; Piezometer Tip; Standpipe Tip

LOGGED C.P.Hamilton
DATE 04/04/1998
CHECKED P. Barry
DATE 19/05/1998

REMARKS

JCRIC

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. BD 3

CONTRACT NO. GE/97/15

SHEET 1 of 4

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W	CO-ORDINATES E 819119.71 N 834882.73	W.O. No GE/97/15.22
MACHINE & No. DR 76		DATE: 07/04/1998 to 14/04/1998
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 3.59 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
07/04	PX												Soft, grey (N6), sandy CLAY. (POND DEPOSIT)
			80						2.09	1.50			Medium dense, yellowish brown (10YR 5/4), sandy SILT. (ALLUVIUM)
			80										
			81						-1.02	5.50		V	Extremely weak, dark yellowish brown streaked black, completely decomposed, mete-SILTSTONE. (Sandy SILT)
		5.57m at 13.00											
08/04		1.81m at 22.00	57										
			03										

Small Disturbed Sample; Piston Sample; U76 Undisturbed Sample; U100 Undisturbed Sample; Water Sample; SPT Split Sample; Standard Penetration Test; Insitu Vane Shear Test; Permeability Test; Impression Packer Test; Packer Test; Piezometer Tip; Standpipe Tip

LOGGED P.S.Woo
DATE 15/04/1998
CHECKED P. Barry
DATE 19/05/1998

REMARKS
1. Piezometer tip installed at 6.50m depth.

JCRIC

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. D3

CONTRACT NO. GE/97/15 — SHEET 2 of 4

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W	CO-ORDINATES E 819119.71 N 834882.73	W.O. No GE/97/15.22	
MACHINE & No. DR 75		DATE: 07/04/1998 to 14/04/1998	
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 3.59 mPD	

Drilling Progress	Casing size	Water level (m) Shift start/end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
							N=38	19 10.10					As sheet 1 of 4.
			90					20 10.60		11			
							N=31	21 11.60, 22 11.80, 23 12.10		12			
			32					24 12.60		13			
			45					25 13.50, 26 13.70		14			
							N=18	27 14.70, 28 14.90, 29 15.20		15			
			80					30 15.70	-12.12	15.70		V	Extremely weak, light yellowish brown, completely decomposed, meta-SILTSTONE. (Slightly clayey SILT)
							N=33	31 16.70, 32 16.90, 33 17.20		16, 17			
			70					34 17.70		18			
08/04		0.63m at 18:00; 0.30m at 08:00	80					35 18.70, 36 18.90		19			
								37 19.90, 38 20.00		20			

Key: Small Disturbed Sample; Piston Sample; U76 Undisturbed Sample; U100 Undisturbed Sample; Mazier Sample; SPT Liner Sample; Water Sample; Standard Penetration Test; In-situ Vane Shear Test; Permeability Test; Impression Packer Test; Packer Test; Piezometer Tip; Standpipe Tip

LOGGED F.S.Woo
DATE 15/04/1998
CHECKED P. Barry
DATE 19/05/1998

REMARKS

JCRIC

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. D3

CONTRACT NO. GE/97/15 — SHEET 3 of 4

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W	CO-ORDINATES E 819119.71 N 834882.73	W.O. No GE/97/15.22	
MACHINE & No. DR 75		DATE: 07/04/1998 to 14/04/1998	
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 3.59 mPD	

Drilling Progress	Casing size	Water level (m) Shift start/end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
							N=31	39 20.30, 40 20.60					As sheet 2 of 4.
			48					41 21.60, 42 21.90		21, 22			
			68					43 22.90, 44 23.00		23			
	HX		100				[illegible]	45 23.15					
							N=[illegible]	46 24.10, 47 24.40		24			
			53					48 25.00		25			
			100					49 26.00, 50 26.10		26			
14/04		1.11m at 18:00; 0.81m at 08:00					N=36	51 27.10, 52 27.30, 53 27.60		27			
			100					54 28.10		28			
							N=33	55 29.10, 56 29.30, 57 29.60		29			

Key: Small Disturbed Sample; Piston Sample; U76 Undisturbed Sample; U100 Undisturbed Sample; Mazier Sample; SPT Liner Sample; Water Sample; Standard Penetration Test; In-situ Vane Shear Test; Permeability Test; Impression Packer Test; Packer Test; Piezometer Tip; Standpipe Tip

LOGGED F.S.Woo
DATE 15/04/1998
CHECKED P. Barry
DATE 19/05/1998

REMARKS

JCRIC

DRILLHOLE RECORD

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

HOLE No. DP3 — SHEET 4 of 4

CONTRACT NO. GE/97/15

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W	CO-ORDINATES E 819119.71 N 834882.73	W.O. No GE/97/15.22	
MACHINE & No. DR 76		DATE: 07/04/1998 to 14/04/1998	
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 3.59 mPD	

Depth scale	Water level (m) Shift start/end	T.C.R.(%)	Reduced Level	Depth (m)	Description
30–31		100			As sheet 2 of 4.
32–33		67			
33–34		100			
35	0.83m at 18:00		-31.42	35.00	End of investigation hole at 35.00m.

LOGGED F.S.Woo DATE 15/04/1998
CHECKED P. Berry DATE 19/05/1998

REMARKS

Legend: Small Disturbed Sample; Piston Sample; U76 Undisturbed Sample; U100 Undisturbed Sample; Mazier Sample; SPT Liner Sample; Water Sample; Standard Penetration Test; In-situ Vane Shear Test; Permeability Test; Impression Packer Test; Packer Test; Piezometer Tip; Standpipe Tip

DRILLHOLE RECORD

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

HOLE No. DP4 — SHEET 1 of 4

CONTRACT NO. GE/97/15

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W+RC	CO-ORDINATES E 819042.76 N 834620.04	W.O. No GE/97/15.22	
MACHINE & No. DR 76		DATE: 07/04/1998 to 09/04/1998	
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 4.41 mPD	

Drilling Progress	Casing size	T.C.R.(%)	Reduced Level	Depth (m)	Description
07/04	PX	0	2.41	2.00	Yellowish grey, fine to coarse SAND with some angular to subangular fine to coarse gravel sized weak to moderately weak rock fragments. (FILL)
		0, 0	1.41	3.00	Yellowish brown, angular coarse GRAVEL and COBBLE sized strong granite fragments. (FILL)
		55, 100	-3.19	7.60	Soft to firm, light grey (N7), clayey SILT. (POND DEPOSIT)
		85	-4.29	8.70	Very stiff, yellowish brown (10YR 5/4), sandy CLAY. (ALLUVIUM)
		0	-5.19	9.60	Very dense, dark yellowish brown (10YR 4/4), fine to medium SAND with some angular fine to medium gravel sized rock fragments. (ALLUVIUM)
					Yellowish brown (10YR 5/4), fine to medium SAND with some angular quartz cobbles.

LOGGED C.P.Hamilton DATE 14/04/1998
CHECKED P. Berry DATE 19/05/1998

REMARKS
Piezometer tip installed at 11.60m depth.

Legend: Small Disturbed Sample; Piston Sample; U76 Undisturbed Sample; U100 Undisturbed Sample; Mazier Sample; SPT Liner Sample; Water Sample; Standard Penetration Test; In-situ Vane Shear Test; Permeability Test; Impression Packer Test; Packer Test; Piezometer Tip; Standpipe Tip

JCRIC

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. DR 4

CONTRACT NO. GE/97/15

SHEET 2 of 4

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W+RC	CO-ORDINATES E 819042.76 N 834820.04	W.O. No GE/97/15.22
MACHINE & No. DR 76		DATE: 07/04/1998 to 09/04/1998
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 4.41 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
													(ALLUVIUM)
	HX		0						-7.09	11.80		V	Extremely weak, orangish brown streaked black, completely decomposed, mafa-SILTSTONE. (Silty fine SAND)
98/04		0.10m at 19:00 98/04	100						-9.09	13.80		V	Extremely weak, yellowish brown streaked black, completely decomposed, mafa-SILTSTONE. (Clayey SILT)
			98										
			80										
			90										
			50										

Small Disturbed Sample
Piston Sample
U76 Undisturbed Sample
U100 Undisturbed Sample
Water Sample
Standard Penetration Test
In-situ Vane Shear Test
Permeability Test
Packer Test
Piezometer Tip
Standpipe Tip

LOGGED C.P.Hamilton
DATE 14/04/1998
CHECKED P. Berry
DATE 19/05/1998

REMARKS

JCRIC

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. DR 4

CONTRACT NO. GE/97/15

SHEET 3 of 4

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W+RC	CO-ORDINATES E 819042.76 N 834820.04	W.O. No GE/97/15.22
MACHINE & No. DR 76		DATE: 07/04/1998 to 09/04/1998
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 4.41 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
													As sheet 2 of 4.
			90	0	0	NI			-16.49	20.90		IV/III	Moderately strong to weak, brown, highly to moderately decomposed, mafa-SILTSTONE, highly fractured. (CORESTONE)
			93						-17.49	21.90		V/IV	Extremely weak to very weak, brown, completely to highly decomposed, mafa-SILTSTONE. (Sandy SILT with many fine to coarse gravel sized rock fragments)
99/04		0.10m at 19:00 98/04	95										
			75										
			88	0	0	NI			-25.19	29.60		IV/III	Weak to moderately strong, brown, highly to moderately decomposed, mafa-SILTSTONE.

Small Disturbed Sample
Piston Sample
U76 Undisturbed Sample
U100 Undisturbed Sample
Water Sample
Standard Penetration Test
In-situ Vane Shear Test
Permeability Test
Packer Test
Piezometer Tip
Standpipe Tip

LOGGED C.P.Hamilton
DATE 14/04/1998
CHECKED P. Berry
DATE 19/05/1998

REMARKS

JCRIC

ENPACK (HONG KONG) LIMITED — Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. D4 — SHEET 4 of 4

CONTRACT NO. GE/97/15

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W+RC	CO-ORDINATES E 819042.76 N 834820.04	W.O. No GE/97/15.22
MACHINE & No. DR 76		DATE: 07/04/1998 to 09/04/1998
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 4.41 mPD

Drilling Progress	Casing size	Water level (m) Shift start/end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
			92 / 0 / 0 / 87 / 88	0 / 0 / 0	0 / 0 / 0	NI / NR		TZ-101 30.40–31.40; 30 31.40, 31.60, 31 31.70, 31.80; 33.15					highly fractured. Where intact, joints are very closely spaced, rough, planar, very narrow, iron stained, dipping at 30°-40°, 60°-80° and 70°-80°.
		1.6?m at 17:00							-30.59	35.00			From 34.54-35.00m : No recovery inferred as completely decomposed meta-SILTSTONE.
													End of investigation hole at 35.00m.

LOGGED C.P.Hamilton DATE 14/04/1998
CHECKED P. Barry DATE 19/05/1998

REMARKS

ENPACK (HONG KONG) LIMITED — Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. D5 — SHEET 1 of 5

CONTRACT NO. GE/97/15

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W+RC	CO-ORDINATES E 819243.94 N 835057.74	W.O. No GE/97/15.22
MACHINE & No. DR 72		DATE: 24/03/1998 to 01/04/1998
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 5.18 mPD

Drilling Progress	Casing size	Water level (m) Shift start/end	T.C.R.(%)	Reduced Level	Depth (m)	Grade	Description
24/03	PX		0	2.58	2.60		Brown (10YR 5/3) and grey (N5), sandy SILT with occasional subangular cobble sized moderately strong granite fragments. (FILL)
			0 / 95	1.66	3.50		Soft, grey (N5), silty CLAY. (POND DEPOSIT)
			100	0.01	5.15		Firm, yellowish brown (10YR 5/4) mottled red, SILT. (ALLUVIUM)
26/03		0.83m at 18:00 / 0.83m at 08:00	97	-2.00	7.18		Medium dense, light yellowish grey, silty fine SAND. (ALLUVIUM)
			100	-2.86	8.00		Loose, yellowish brown (10YR 5/4), silty fine SAND with some angular cobble sized quartz fragments. (ALLUVIUM)
			88			V	Extremely weak, yellowish brown mottled white streaked black, completely decomposed, meta-SILTSTONE. (Clayey SILT)

LOGGED C.P.Hamilton DATE 02/04/1998
CHECKED P. Barry DATE 19/05/1998

REMARKS

Key: Small Disturbed Sample; Piston Sample; U76 Undisturbed Sample; U100 Undisturbed Sample; Mazier Sample; SPT Liner Sample; Water Sample; Standard Penetration Test; In-situ Vane Shear Test; Permeability Test; Impression Packer Test; Packer Test; Piezometer Tip; Standpipe Tip

JCRIC

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. DD 5
CONTRACT NO. GE/97/15
SHEET 2 of 6

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD	W+RC
MACHINE & No.	DR 72
FLUSHING MEDIUM	WATER
CO-ORDINATES	E 819243.94 N 835057.74
ORIENTATION	VERTICAL
W.O. No	GE/97/15.22
DATE:	24/03/1998 to 01/04/1998
GROUND LEVEL	5.16 mPD

Drilling Progress	Casing size	Water level (m) Shift start/end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
			95					19 10.05					As sheet 1 of 6.
								20 11.05		11			
							SPT N=31	21 11.25					
								22 11.65					
			85					23 12.05		12			
								24 13.05		13			
							SPT N=18	25 13.25					
								26 13.65					
			87					27 14.05		14			
								28 15.05		15			
							SPT N=46	29 15.25					
								30 15.65					
			91					31 16.05		16			
		0.83m 18:00						32 17.05		17			
28/03		1.38m 08:00	86					33 17.15					
								34 18.15		18			
							SPT N=23	35 18.35					
								36 18.65					
			80					37 19.15		19			
										20			

Small Disturbed Sample; Piston Sample; U76 Undisturbed Sample; U100 Undisturbed Sample; Mazier Sample; SPT Liner Sample; Water Sample; Standard Penetration Test; In-situ Vane Shear Test; Permeability Test; Impression Packer Test; Packer Test; Piezometer Tip; Standpipe Tip

LOGGED C.P.Hamilton
DATE 02/04/1998
CHECKED P. Barry
DATE 19/05/1998

REMARKS

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. DD 5
CONTRACT NO. GE/97/15
SHEET 3 of 6

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD	W+RC
MACHINE & No.	DR 72
FLUSHING MEDIUM	WATER
CO-ORDINATES	E 819243.94 N 835057.74
ORIENTATION	VERTICAL
W.O. No	GE/97/15.22
DATE:	24/03/1998 to 01/04/1998
GROUND LEVEL	5.16 mPD

Drilling Progress	Casing size	Water level (m) Shift start/end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
			92					38 20.15					As sheet 1 of 6.
								39 20.25					
								40 21.25		21			
	HX						SPT N=48	41 21.45					
								42 21.75					
			100					43 22.25		22			
								44 23.25		23			
							SPT N=44	45 23.45					
								46 23.75					
			60					47 24.25		24			
			91					48 25.25		25			
								49 25.35					
								50 26.25		26			
							SPT N=90	51 26.35					
								52 26.65					
		1.01m 18:00						53 27.25	-22.20	27.35			
27/03		1.24m 08:00	97									V/IV	Extremely weak to very weak, greyish brown mottled black, completely to highly decomposed, meta-SILTSTONE. (Sandy SILT with some cobble sized moderately weak rock fragments)
								54 28.25		28			
							SPT N=200	55 28.45					
								56 28.65					
			20					57 29.25		29			
										30			

Small Disturbed Sample; Piston Sample; U76 Undisturbed Sample; U100 Undisturbed Sample; Mazier Sample; SPT Liner Sample; Water Sample; Standard Penetration Test; In-situ Vane Shear Test; Permeability Test; Impression Packer Test; Packer Test; Piezometer Tip; Standpipe Tip

LOGGED C.P.Hamilton
DATE 02/04/1998
CHECKED P. Barry
DATE 19/05/1998

REMARKS

JCRIC

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. DR 5

CONTRACT NO. GE/97/15 — SHEET 4 of 6

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W+RC	CO-ORDINATES E 819243.94 N 835057.74	W.O. No GE/97/15.22
MACHINE & No. DR 72		DATE: 24/03/1998 to 01/04/1998
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 5.16 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
													As sheet 3 of 6.
			100	0	0	NI			-26.11	31.26		III	Moderately strong, yellowish brown, moderately decomposed, fine grained mete-SILTSTONE, highly fractured. (CORESTONE)
			0	0	0	NR			-27.11	32.26		V	Extremely weak to very weak, dark brown, completely to highly decomposed, mete-SILTSTONE. (Sandy SILT with some fine to coarse gravel sized weak rock fragments) From 32.26-32.45m and 34.46-34.60m : No recovery inferred as completely decomposed mete-siltstone.
			0									V/IV	
		3.91m at 18:00	0	0	0	NR			-28.45	34.60		V	
20/03		5.30m at 08:00	88	20	0	> 20						III	Moderately strong, dark brown, moderately decomposed, fine grained mete-SILTSTONE, highly fractured. (CORESTONE)
			100	56	20	10.0							
			67	0	0	NI							
						NR						V	From 38.36-38.80m : No recovery inferred as completely decomposed mete-siltstone.
			0	0	0				-33.65	38.80			
			0									V/IV	Extremely weak to very weak, greyish brown, completely to highly decomposed, mete-SILTSTONE. (Sandy SILT with some fine to coarse gravel sized weak rock fragments)

Small Disturbed Sample
Piston Sample
U76 Undisturbed Sample
U100 Undisturbed Sample
Mazier Sample
SPT Liner Sample
Water Sample

Standard Penetration Test
Insitu Vane Shear Test
Permeability Test
Imbrication Packer Test
Packer Test
Piezometer Tip
Standpipe Tip

LOGGED C.P.Hamilton
DATE 02/04/1998
CHECKED P. Barry
DATE 19/06/1998

REMARKS

JCRIC

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. DR 5

CONTRACT NO. GE/97/15 — SHEET 5 of 6

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.

METHOD W+RC	CO-ORDINATES E 819243.94 N 835057.74	W.O. No GE/97/15.22
MACHINE & No. DR 72		DATE: 24/03/1998 to 01/04/1998
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 5.16 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
													As sheet 4 of 6.
			100										
			64										
		5.84m at 18:00											
28/03		1.67m at 03:00	90										
			100	90	16	20.0			-39.30	44.45		II	Strong, grey mottled brown streaked green, slightly decomposed, fine grained mete-SILTSTONE, Joints are closely to medium occasionally very closely spaced, rough and smooth, planar, extremely narrow, iron stained and clean, dipping at 30°-40° and 70°-75°.
			100	100	69	6.0							
			100	100	100								
			100	100	93								
						9.2							
			100	100	71								
						2.0							
		9.91m at 18:00											
31/03		Loam at 06:00	100	100	90								

Small Disturbed Sample
Piston Sample
U76 Undisturbed Sample
U100 Undisturbed Sample
Mazier Sample
SPT Liner Sample
Water Sample

Standard Penetration Test
Insitu Vane Shear Test
Permeability Test
Imbrication Packer Test
Packer Test
Piezometer Tip
Standpipe Tip

LOGGED C.P.Hamilton
DATE 02/04/1998
CHECKED P. Barry
DATE 19/06/1998

REMARKS

JCRIC

ENPACK (HONG KONG) LIMITED
Civil Engineers & Contractors

DRILLHOLE RECORD

HOLE NO. D5

CONTRACT NO. GE/97/15

SHEET 6 of 6

PROJECT Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ho Mei San Tsuen.

METHOD W+RC	CO-ORDINATES E 819243.94 N 835057.74	W.O. No GE/97/15.22
MACHINE & No. DR 72		DATE: 24/03/1998 to 01/04/1998
FLUSHING MEDIUM WATER	ORIENTATION VERTICAL	GROUND LEVEL 5.16 mPD

Drilling Progress	Casing size	Water level (m) Shift start/end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
			100	100	70	5.5		T2-101 50.07					As sheet 5 of 6.
			100	100	82			51.67					
			100	100	100			52.40					
			100	75	75	NI		53.00	-40.70	53.05		IV/III	Weak to moderately strong, greyish brown, highly to moderately decomposed, fine grained meta-SILTSTONE, highly fractured.
			100	100	93	2.5		54.33	-40.18	54.33		II	Strong, grey, slightly decomposed, fine grained meta-SILTSTONE. Joints are medium to widely spaced, rough and smooth, planar, extremely narrow, calcite coated and clean, dipping at 20°-30° and 70°-75°.
			100	100	100			55.70					
		0.10m at 18:00	100	100	100			56.10					
01/04		1.82m at 08:00	100	100	100			57.42					
		2.32m at 13:00	100	100	100			58.81 T2-102	-54.36	59.51			End of investigation hole at 59.51m.

Depth scale: 51, 52, 53, 54, 55, 56, 57, 58, 59, 60

Key: Small Disturbed Sample; Piston Sample; U76 Undisturbed Sample; U100 Undisturbed Sample; Mazier Sample; SPT Liner Sample; Water Sample; Standard Penetration Test; In-situ Vane Shear Test; Permeability Test; Impression Packer Test; Packer Test; Piezometer Tip; Standpipe Tip

LOGGED C.P.Hamilton
DATE 02/04/1998
CHECKED P. Barry
DATE 19/05/1998

REMARKS

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Appendix D - Piezometer Detail and Response Test Record Sheets

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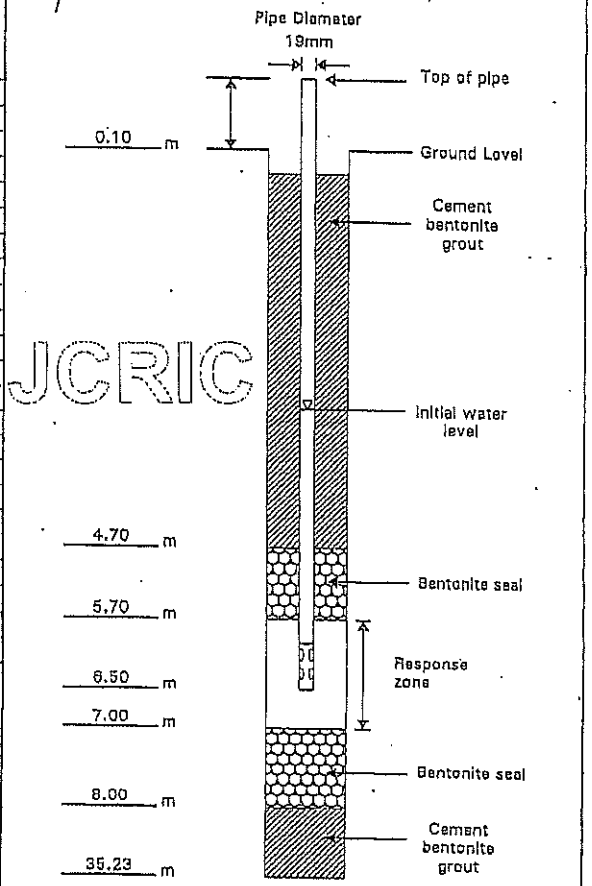
PIEZOMETER DETAIL AND RESPONSE TEST RECORD SHEET

Contractor :	Enpasit (H.K.) Ltd.	Drillhole No. :	D 1
Contract No. :	GE/97/15	Date of Test :	09/04/1998
Works Order No. :	GE/97/15.22	Ground Level :	2.87 mPD
Project :	Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.	Co-ordinates :	N 834976.73 E 819064.81
Initial Water Level	4.26 m below G.L.	Piezometer tip level :	-9.63 mPD
Tested/Supervised by :	K. C. Wu	Checked by :	P. Barry

Time Elapsed (minutes)	Depth of water from top of pipe (m)
0.00	0.00
0.25	0.17
0.50	0.19
0.75	0.22
1.00	0.28
1.50	0.34
2.00	0.41
3.00	0.48
4.00	0.53
5.00	0.62
6.00	0.66
7.00	0.68
8.00	0.74
9.00	0.79
10.00	0.83
15.00	0.99
25.00	1.07
30.00	1.14
45.00	1.32
60.00	1.48

Remarks :



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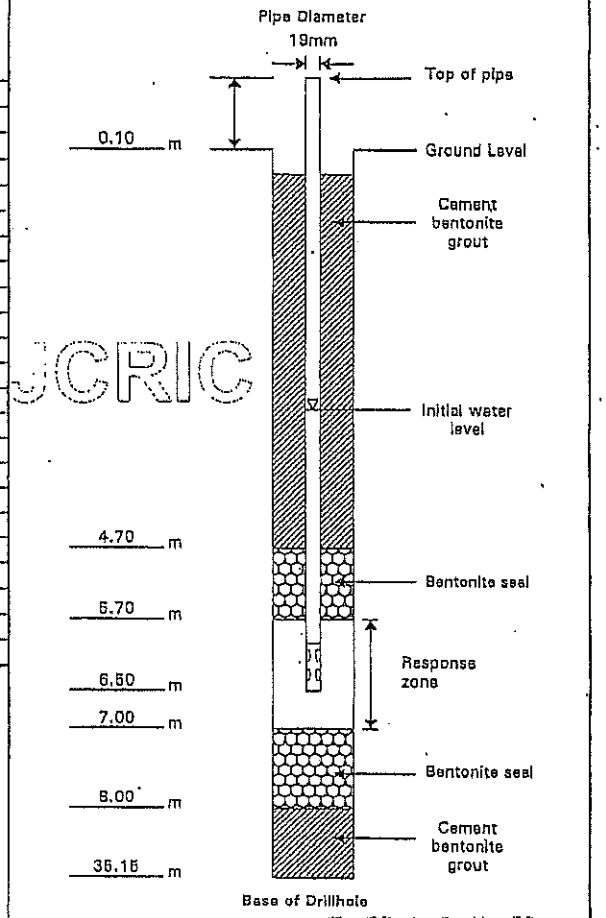
PIEZOMETER DETAIL AND RESPONSE TEST RECORD SHEET

Contractor :	Enpack (H.K.) Ltd.	Drillhole No. :	D 2
Contract No. :	GE/97/15	Date of Test :	03/04/1998
Works Order No. :	GE/97/15.22	Ground Level :	2.60 mPD
Project :	Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.	Co-ordinates :	N 834899.05 E 819052.26
Initial Water Level	0.10 m below G.L.	Piezometer tip level :	-8.90 mPD
Tested/Supervised by :	K. C. Wu	Checked by :	P. Barry

Time Elapsed (minutes)	Depth of water from top of pipe (m)
0.00	
0.25	
0.50	
0.75	
1.00	
1.50	
2.00	
3.00	
4.00	
5.00	
6.00	
7.00	
8.00	
9.00	
10.00	
15.00	
25.00	
30.00	
45.00	
60.00	

Remarks :

No response test carried out due to high water level (as instructed by Consultant Engineer).

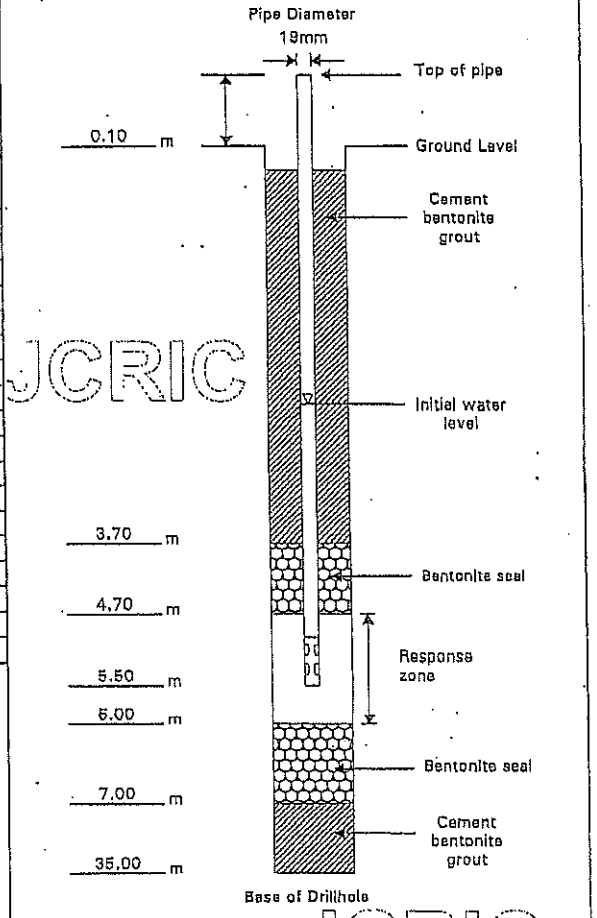


PIEZOMETER DETAIL AND RESPONSE TEST RECORD SHEET

Contractor :	Enpack (H.K.) Ltd.	Drillhole No. :	D 3
Contract No. :	GE/97/15	Date of Test :	16/04/1998
Works Order No. :	GE/97/15.22	Ground Level :	3.59 mPD
Project :	Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.	Co-ordinates :	N 834882.73 E 819119.71
Initial Water Level	0.89 m below G.L.	Piezometer tip level :	-1.91 mPD
Tested/Supervised by :	K. C. Wu	Checked by :	P. Barry

Time Elapsed (minutes)	Depth of water from top of pipe (m)
0.00	0.00
0.25	0.52
0.50	0.60
0.75	0.65
1.00	0.71
1.50	0.74
2.00	0.77
3.00	0.82
4.00	0.85
5.00	0.87
6.00	0.90
7.00	0.94
8.00	0.96
9.00	0.98
10.00	
15.00	
25.00	
30.00	
45.00	
60.00	

Remarks :

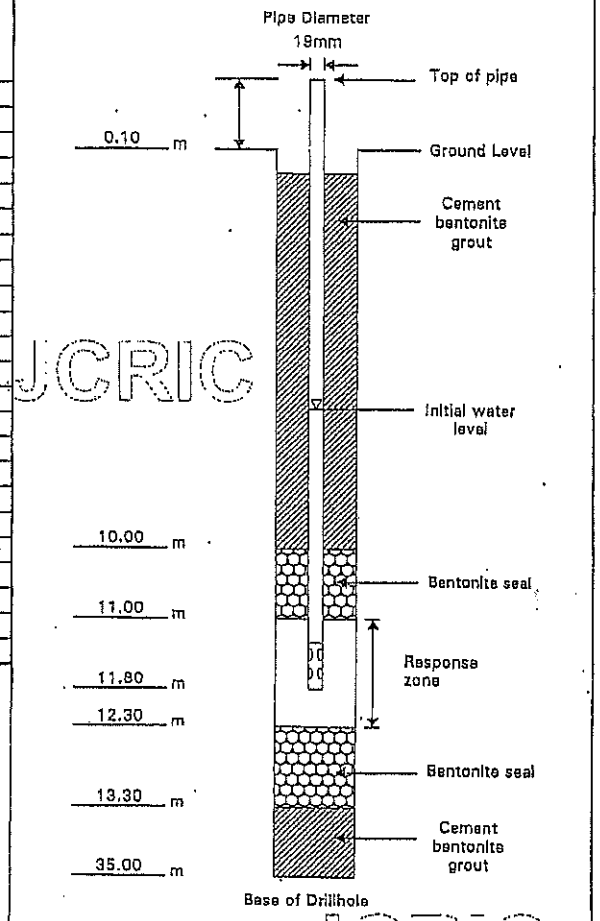


PIEZOMETER DETAIL AND RESPONSE TEST RECORD SHEET

Contractor :	Enpack (H.K.) Ltd.	Drillhole No. :	D 4
Contract No. :	GE/97/15	Date of Test :	15/04/1998
Works Order No. :	GE/97/15.22	Ground Level :	4.41 mPD
Project :	Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen.	Co-ordinates :	N 834820.04 E 819042.76
Initial Water Level	1.16 m below G.L.	Piezometer tip level :	-7.39 mPD
Tested/Supervised by :	K. C. Wu	Checked by :	P. Barry

Time Elapsed (minutes)	Depth of water from top of pipe (m)
0.00	0.00
0.25	0.08
0.50	0.12
0.75	0.20
1.00	0.23
1.50	0.25
2.00	0.31
3.00	0.41
4.00	0.51
5.00	0.60
6.00	0.66
7.00	0.73
8.00	0.78
9.00	0.84
10.00	0.87
15.00	1.01
25.00	1.12
30.00	1.13
45.00	1.16
60.00	1.20

Remarks :



Appendix E - Groundwater Records

GROUNDWATER RECORDS

W.O.No.: GE/97/15/22

Project: Supplementary Agreement to Agreement No. CE5/86, Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13), Ha Mei San Tsuen, Ground Investigation.

(P) : Piezometer (S) : Standpipe

Drillhole No.	Date Installed	Installed Depth (m)	Ground Level (mPD)	Date & Water Level (m) (depth measured below ground level)						
				10/4/98	11/4/98	13/4/98	14/4/98	15/4/98	16/4/98	17/4/98
D1 (P)	9/4/98	6.50	+2.87	4.20	4.18	4.16	4.16	4.13	4.13	4.13
				4/4/98	7/4/98	8/4/98	9/4/98	10/4/98	11/4/98	12/4/98
D2 (P)	3/4/98	6.50	+2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				17/4/98	18/4/98	20/4/98	21/4/98	22/4/98	23/4/98	24/4/98
D3 (P)	16/4/98	5.50	+3.59	0.87	0.86	0.86	0.85	0.85	0.85	0.86
				16/4/98	17/4/98	18/4/98	20/4/98	21/4/98	22/4/98	23/4/98
D4 (P)	15/4/98	11.80	+4.41	1.16	1.16	1.17	1.16	1.15	1.15	1.15

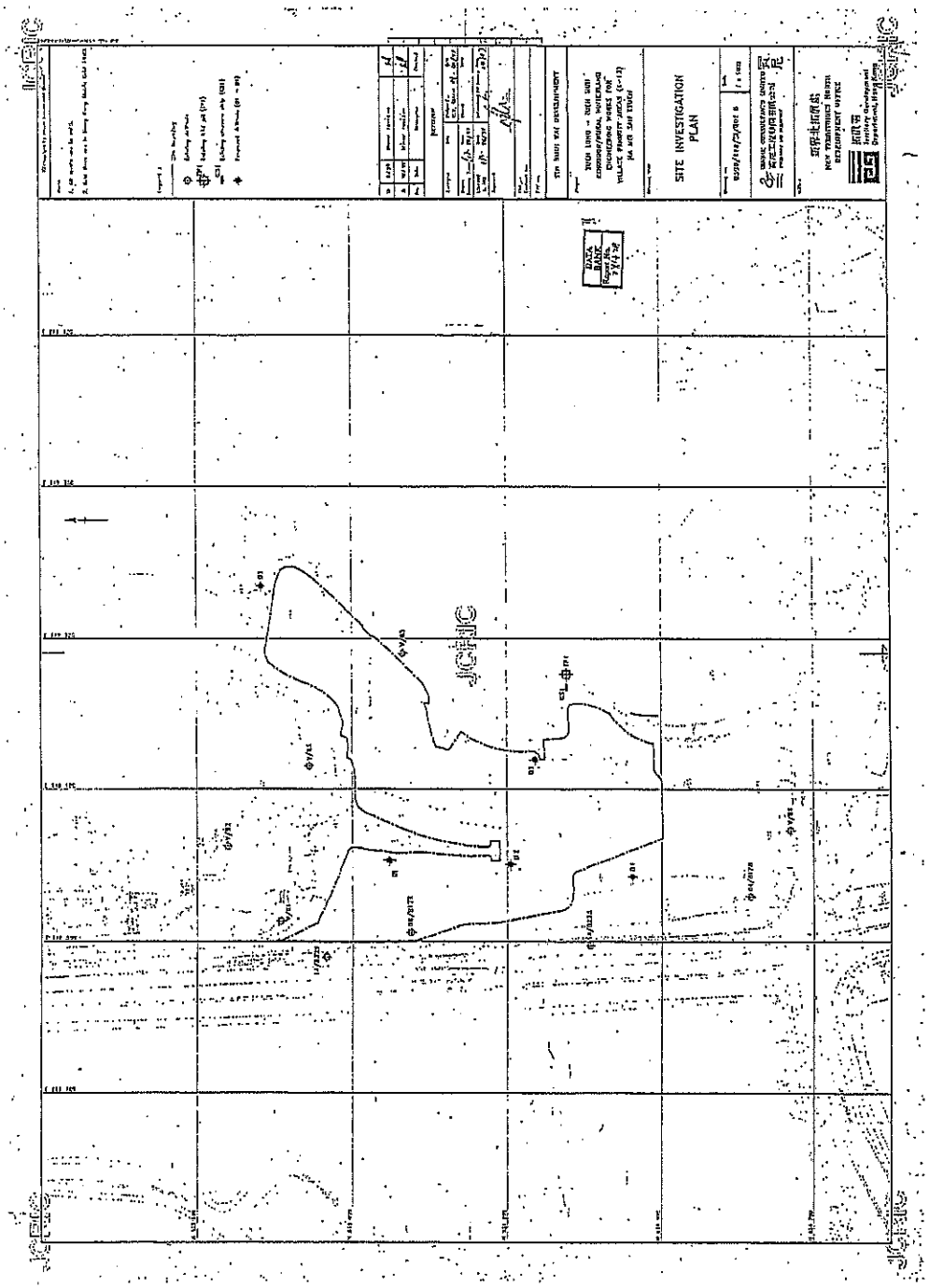
Recorded By: K.C. Wu

Checked By: P. Barry

Revision No. 0

Date of Issue : 21st May, 1998

Appendix F - Drawing (No. 0390/11/SI/001B)



Media Index Record

Contract No.: GE/97/15

Works Order No.: GE/97/15.22

Date of issue to the Engineer : 21/05/1998

Description : *Supplementary Agreement to Agreement No. CE5/86 Yuen Long - Tuen Mun Corridor / Rural Hinterland Engineering Works for Village Priority Areas (1-13) Ha Mei San Tsuen, Ground Investigation.*

File Name	Creation Date	Creation Time	Size (Bytes)	General Information
1522.ags	21/05/1998	11:04am	44300 (1 of 1)	Project Information (Drillhole)

JCRIC

07131

Location: Eastern culvert and eastern edge areas (NTDB19/85/06b)
Equipment & Methods: 100mm Hand Auger (Post-hole type)

HAND AUGER RECORD

Hole No.: 06/A179

Hong Kong Metric Grid Reference: E818691.40 N834490.42 Ground level: 2.70 mPD.
Diameters are in millimetres. Lengths, levels and thicknesses are in metres.

Sheet 1 of 1

PROGRESS				SAMPLE/TEST/INSTRUMENT		STRATA			
(time) date	(dia) & depth hole	casing	depth to water	type and number	test result	depth	symbol	level mPD (thickness)	description
13/1						0.00			Loose, yellowish brown, silty SAND with rootlets & gravel
				• 1					
13/1						0.70		2.00	(Fill)
									Unable to advance further due to gravel obstructions

LEGEND (lengths and positions of symbols are to scale)

Samples
- • Small disturbed
- Large disturbed
- U76 Undisturbed
- 14 Type, dia & details; d = part of double length sample; f = finger catcher; U = tube
- ▲ Water sample

Tests & instruments
- Standard Penetration Test
- X Vane
- Piezometer filter
- Permeability in hole
- Permeability in piezometer

Results & observations
- N Standard Penetration Test (SPT)
- V Vane peak & remoulded
- m Moisture content
- k Permeability

REMARKS

1. Carried out G.C.O. Probing to 5.70m

Scale 1:50
Logged by SP Su
Date 13.1.86

Auger arrive 13.1.86 — Auger depart 13.1.86

TIN SHUI WAI DEVELOPMENT

CONTRACTOR: Lam Geotechnics Limited

HONG KONG GOVERNMENT & MIGHTYCITY COMPANY LIMITED
BINNIE & PARTNERS (HONG KONG)

Report auger and percussion borehole log — Form no. 3101

07131

Location: Eastern culvert and eastern edge areas (NTDB19/85/06b)
Equipment & Methods: 100mm Hand Auger (Post-hole type)

HAND AUGER RECORD

Hole No.: 06/A187

Hong Kong Metric Grid Reference: E819025.45 N834873.94 Ground level: 2.45 mPD.
Diameters are in millimetres. Lengths, levels and thicknesses are in metres.

Sheet 1 of 1

PROGRESS				SAMPLE/TEST/INSTRUMENT		STRATA			
(time) date	(dia) & depth hole	(dia) & depth casing	depth to water	type and number	test result	depth	symbol	level mPD (thickness)	description
8/1						0.00			Soft, greyish brown, silty CLAY with rootlet
				• 1		1.00			(Fill / Pond Mud)
						1.50		0.95	
				• 2		2.00			Soft, dark grey, silty CLAY with decayed wooden fragments
						2.50		-0.05	(Marine Clay b_2)
8/1				• 3		3.00			Soft, reddish brown & grey, silty CLAY with gravel
9/1									(Alluvial Clay C_1)
9/1				• 4		4.00		-1.55	
									Unable to advance further due to gravel obstructions

LEGEND (lengths and positions of symbols are to scale)

Samples
- Small disturbed
- Large disturbed
- U76 Undisturbed
- Id Type, dia & details; d = part of double length sample; f = finger catcher; U = tube
- Water sample

Tests & instruments
- Standard Penetration Test
- Vane
- Piezometer filter
- Permeability in hole
- Permeability in piezometer

Results & observations
- N Standard Penetration Test (SPT)
- V Vane: peak & remoulded
- m Moisture content
- k Permeability

REMARKS

1. Carried out G.C.O. Probing to 4.30m

Scale 1:50
Logged by SP Su
Date 8.1.86

Auger arrive 8.1.86
Auger depart 9.1.86

TIN SHUI WAI DEVELOPMENT

HONG KONG GOVERNMENT & MIGHTYCITY COMPANY LIMITED

CONTRACTOR: Lam Geotechnics Limited

BINNIE & PARTNERS (HONG KONG)

Report auger and percussion borehole log
Form no. 3101

Location: Eastern Culvert
Equipment & Methods: G.C.O. Probe and hammer

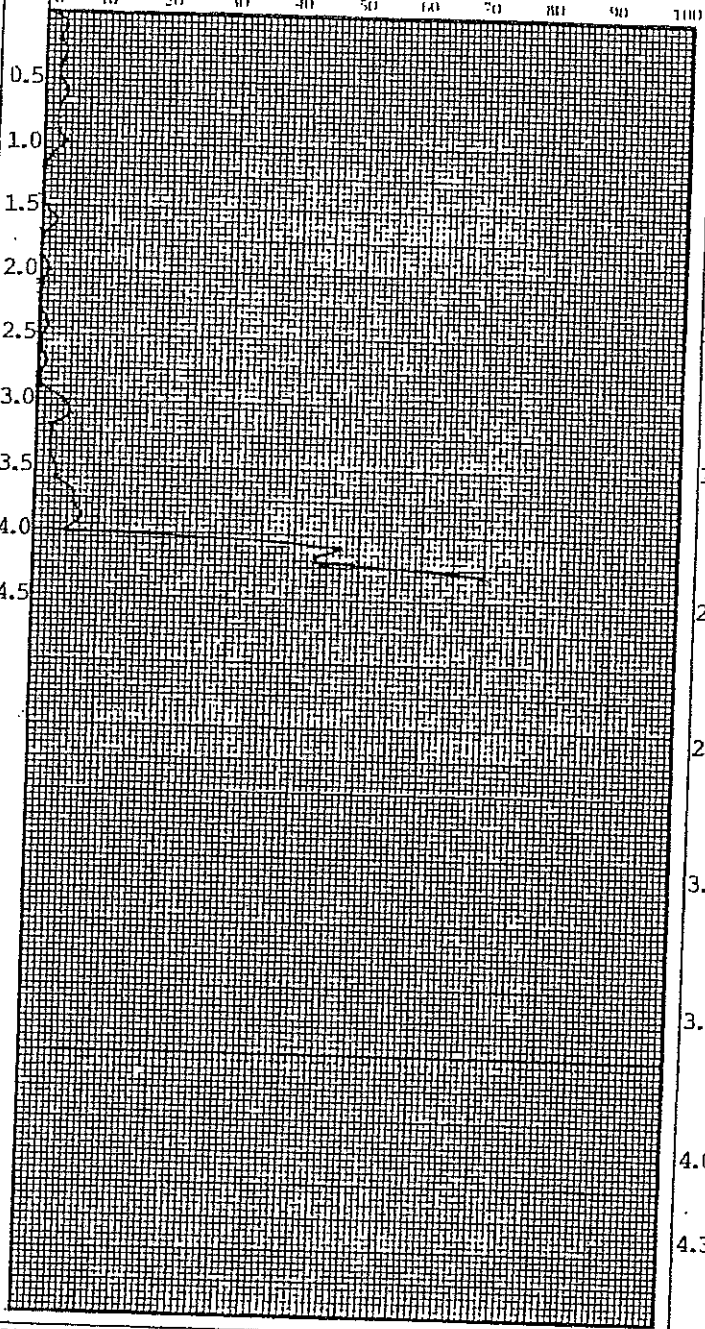
G.C.O. Probe
06/A187

Hong Kong Metric Grid Reference: E819025.45 N834873.94 Ground level: 2.45 mPD.
Date of test: 9/1/86 All depths are in metres below ground level.

Sheet of

Interpretation	Level mPD	Depth m
Probably Fill	1.45	0.5
Probably Marine Deposit	0.45	1.0 / 1.5 / 2.0 / 2.5
Probably Alluvium		3.0 / 3.5 / 4.0 / 4.5

Number of blows per 300mm
[result plotted at based of interval]
0 10 20 30 40 50 60 70 80 90 100



READINGS			
Depth to base of interval m	Blows per 300 mm	Depth to base of interval m	Blows per 300 mm
	3		
	2		
	3		
	2		
0.5	2		
	3		
	2		
	2		
	2		
1.0	3		
	1		
	0		
	0		
	0		
1.5	0		
	2		
	0		
	0		
	0		
2.0	1		
	0		
	0		
	0		
	0		
2.5	1		
	0		
	0		
	1		
	0		
	0		
3.0	4		
	5		
	2		
	2		
	2		
3.5	3		
	3		
	6		
	6		
	7		
4.0	5		
	47		
	43		
4.3	70		
	rebounded		

LEGEND

R Rod added
P Pause greater than 5 minutes; duration recorded in minutes after "P" (e.g. P15 for 15 minutes)

NOTES ON EQUIPMENT

WEIGHTS in kg
Cone. 0.13
One rod: 0.985
Coupler: 0.102
Hammer. 10
Hammer slide and anvils: 3.582

OTHER DETAILS
Rod length 1 m
Rod diameter 12 mm
Cone diameter. 25 mm
Hammer fall 350 mm
Blow rate 20 min

REMARKS

TIN SHUI WAI DEVELOPMENT

CONTRACTOR: Lam Geotechnics Limited

HONG KONG GOVERNMENT & MIGHTYCITY COMPANY LIMITED
BINNIE & PARTNERS (HONG KONG)

Mackintosh Probe
Checked

Location: Eastern culvert and eastern edge areas (NTDB19/85/06b)
Equipment & Methods: 100mm Hand Auger (Post-hole type)

HAND AUGER RECORD
Hole No.: 06/A189

Hong Kong Metric Grid Reference: E819005.09 N834997.84 Ground level: 2.37 mPD.
Diameters are in millimetres. Lengths, levels and thicknesses are in metres.

Sheet 1 of 1

PROGRESS (time) date	PROGRESS (dia) & depth hole	PROGRESS (dia) & depth casing	PROGRESS depth to water	SAMPLE/TEST/INSTRUMENT type and number	SAMPLE/TEST/INSTRUMENT test result	STRATA depth	STRATA symbol	STRATA level mPD (thickness)	STRATA description
9/1				• 1		0.00			Soft, greyish brown, silty CLAY with rootlet (Fill / Pond Mud)
						1.00			
						1.50		0.87	
				• 2		2.00			Soft, dark grey, sandy CLAY with decayed wooden fragments (Marine Clay b_2)
						2.50		-0.13	
9/1				• 3		3.00		-0.63	Soft, yellowish brown, sandy CLAY with gravel (Alluvial Clay C_1)
									Unable to advance further due to gravel obstructions

LEGEND (lengths and positions of symbols are to scale)

Samples
- Small disturbed
- Large disturbed
- UTG Undisturbed
- Id Type, dia & details; d = part of double length sample; f = finger catcher; U = tube
- Water sample

Tests & instruments
- Standard Penetration Test
- Vane
- Piezometer filter
- Permeability in hole
- Permeability in piezometer

Results & observations
- N Standard Penetration Test (SPT)
- V Vane: peak & remoulded
- m Moisture content
- k Permeability

REMARKS

1. Carried out G.C.O. Probing to 5.20m

Scale 1:50
Logged by SP Su
Date 9.1.86

Auger arrive	Auger depart
9.1.86	9.1.86

TIN SHUI WAI DEVELOPMENT

HONG KONG GOVERNMENT & MIGHTYCITY COMPANY LIMITED
BINNIE & PARTNERS (HONG KONG)

CONTRACTOR: Lam Geotechnics Limited

Report auger and percussion borehole log
Form no. STD1
Approved:
Traced:
Checked:

APPENDIX C

Aerial Photos of Years 1998, 2004 and 2011

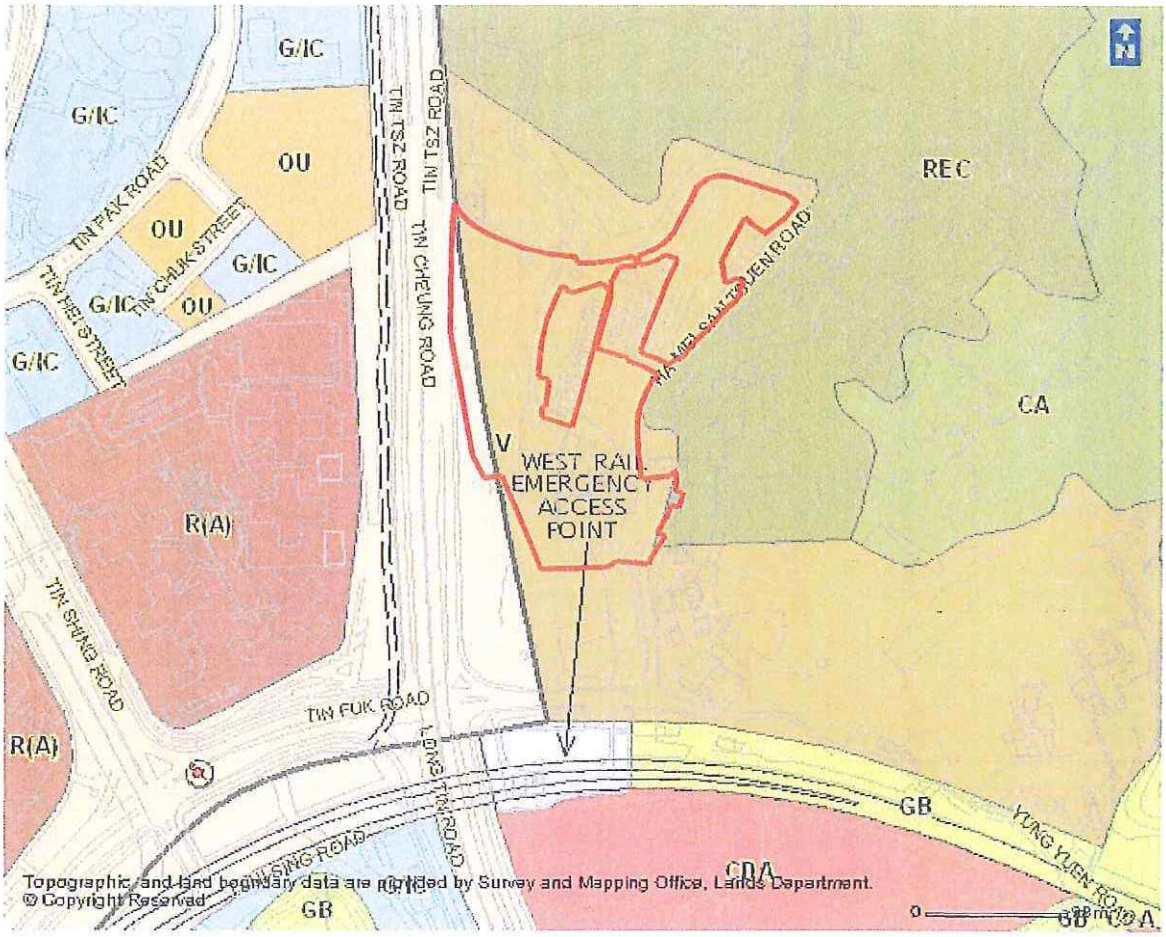

Subject Site
Ref.: 19 Jan 2011 (CS32485)


Subject Site
Ref.: 5 Mar 2004 (CW56222)


Subject Site
Ref.: 7 Nov 1998 (CN21413)

APPENDIX D

Part-print of OZP S/YL-PS/14



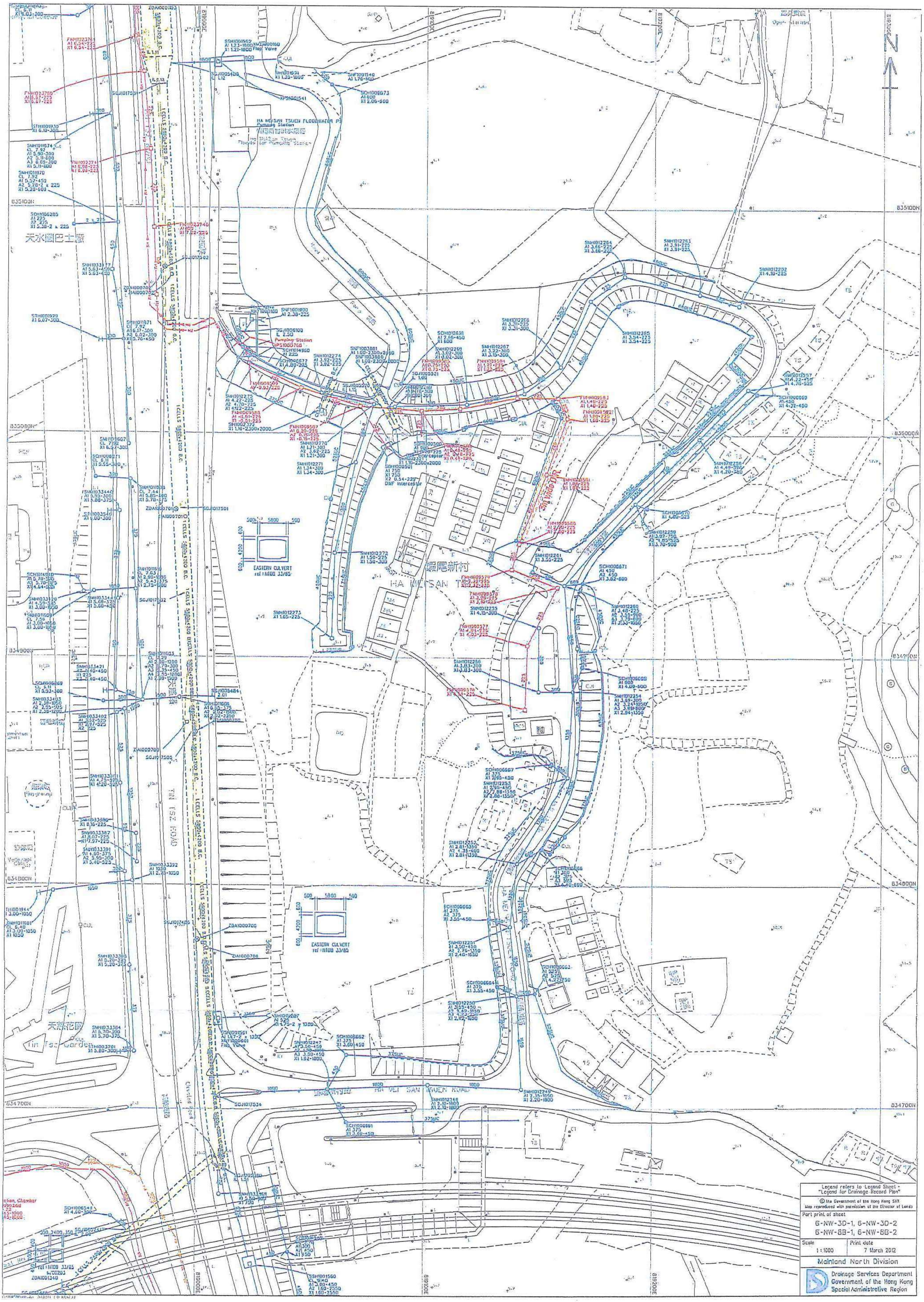
Part-print of Outline Zoning Plan S/YL-PS/14

Legend:

CA: Conservative Area
CDA: Comprehensive Development Area
GB: Green Belt
G/IC: Government, Institution or Community
REC: Recreation
R(A): Residential (Group A)
OU: Other Specified Uses
V: Village Type Development

APPENDIX E

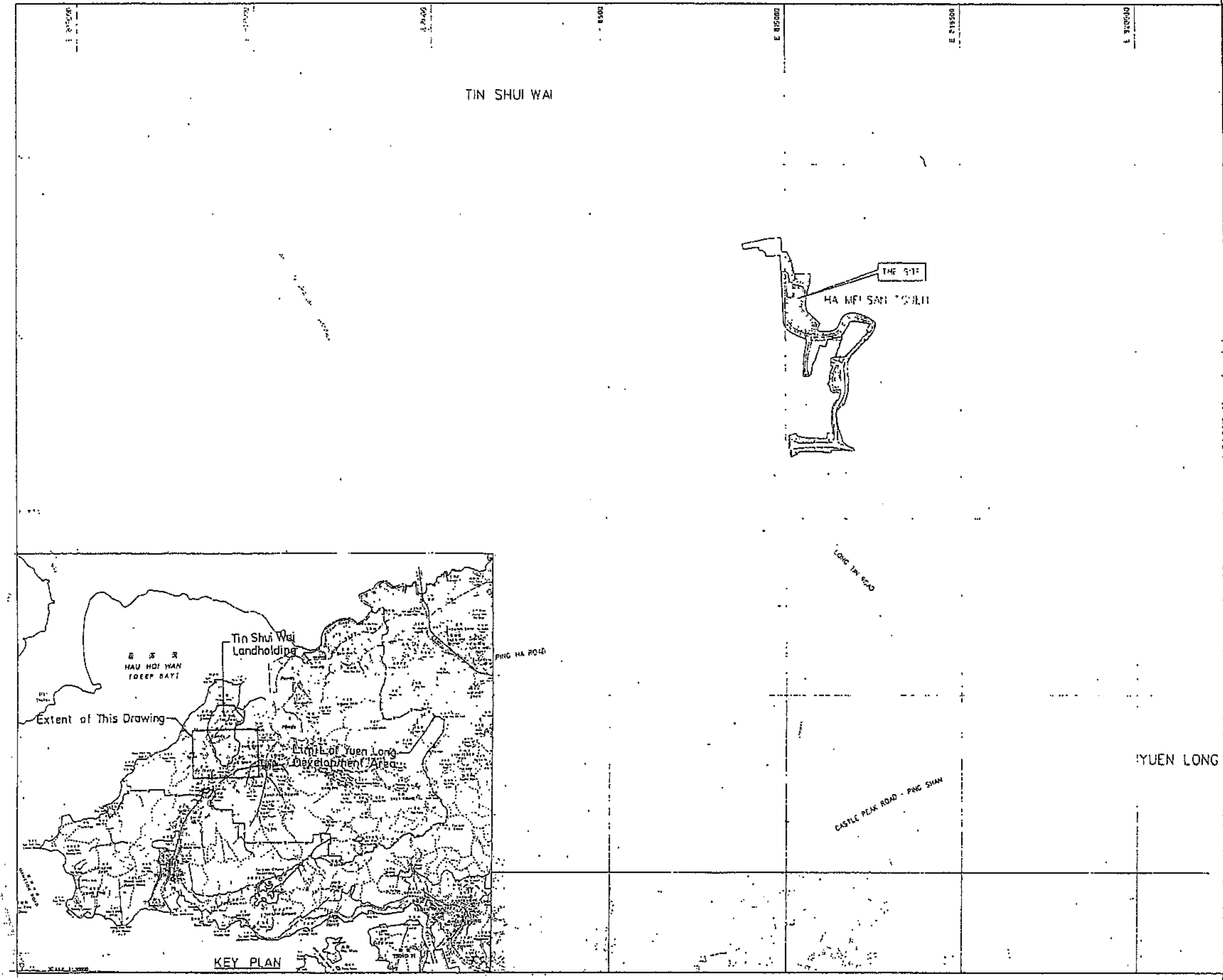
DSD's Drainage Records



N
HA MEI SAN TSUEN FLOODWATER PS
Pumping Station
HA MEI SAN TSUEN
蝦尾新村
HA MEI SAN TSUEN ROAD
TIN TSZ ROAD
天水圍巴士廠
Tin Tsz Garden
EASTERN CULVERT
1 CELLS 5800x4200 B.C.
835100N
835000N
834900N
834800N
834700N
819000E
819100E
819200E
Legend refers to Legend Sheet - "Legend for Drainage Record Plan"
© the Government of the Hong Kong SAR
Map reproduced with permission of the Director of Lands
Part print of sheet
6-NW-3D-1, 6-NW-3D-2
6-NW-8B-1, 6-NW-8B-2
Scale
1:1000
Print date
7 March 2012
Mainland North Division
Drainage Services Department
Government of the Hong Kong Special Administrative Region

APPENDIX F

As-built Drawings of Village Flood Protection Works for Ha Mei San Tsuen



WORK COMMENCED: 15th APR 1997
DATE OF COMPLETION: 31 st AUG 1998

WORK AS EXECUTED

Notes

1. Grid lines are Hong Kong Metric Grid 1980.

Approved

YL 1/96

747JCL

Project: TIN SHUI WAI DEVELOPMENT

Contract title:

VILLAGE FLOOD PROTECTION
WORKS FOR
HA MEI SAN TSUEN

Drawing title:

LOCATION PLAN

Drawing no.	Plan register no.	Scale
1R	0350/HMST/001	1 : 5000

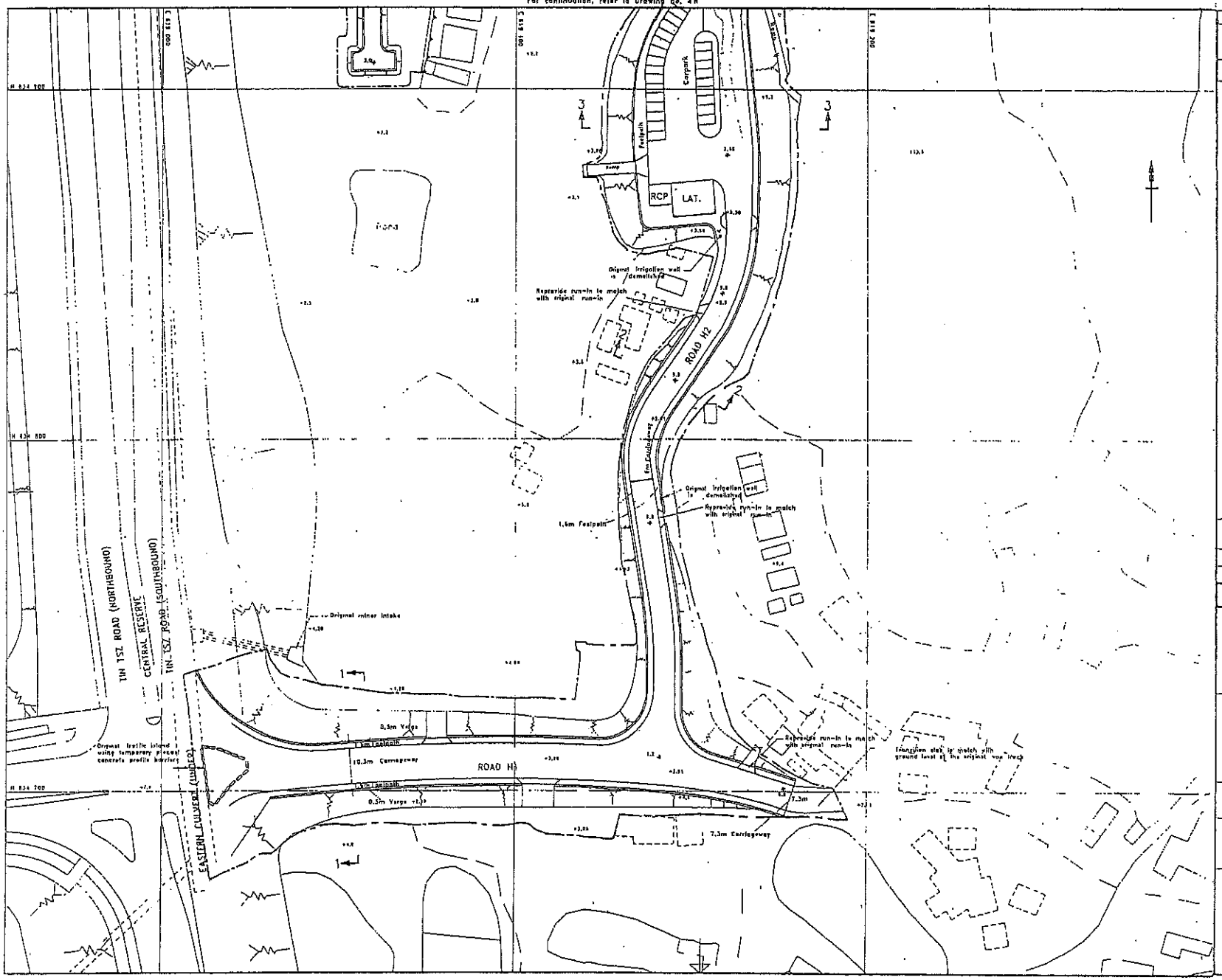
Binnie

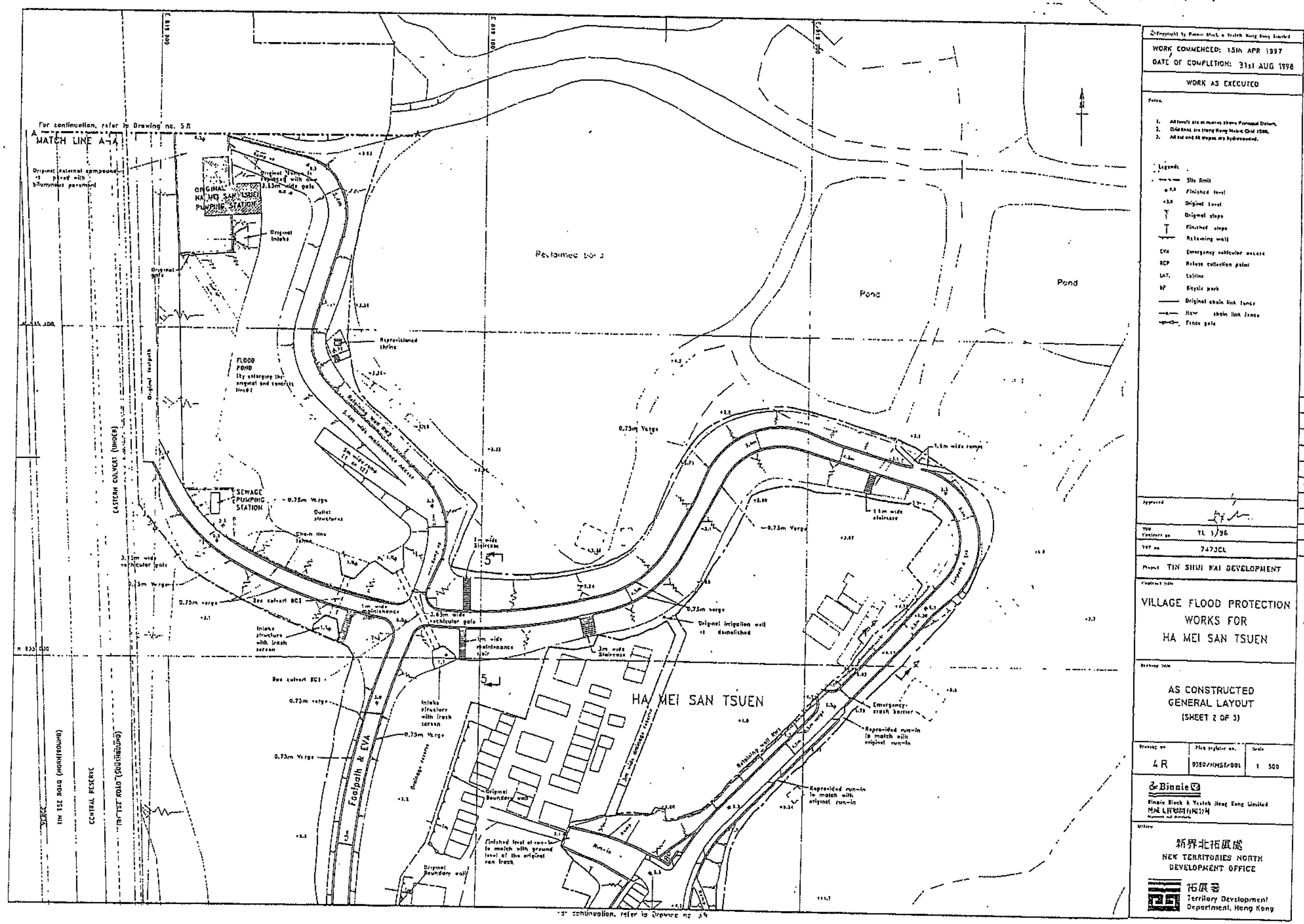
Binnie Black & Veatch Hong Kong Limited

Office:

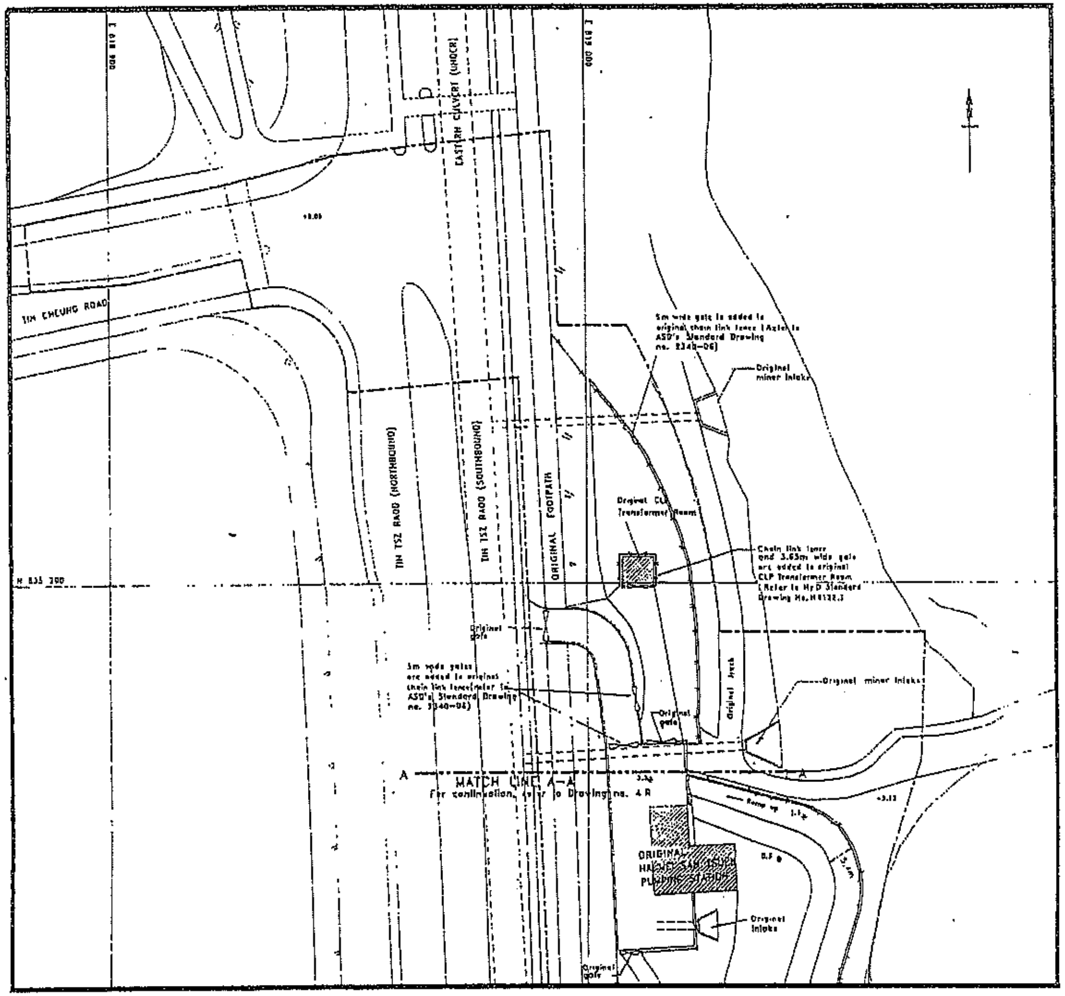
新界北拓展處
NEW TERRITORIES NORTH
DEVELOPMENT OFFICE

拓展署
Territory Development
Department, Hong Kong


For continuation, refer to Drawing no. 4R
TIN TSZ ROAD (NORTHBOUND)
CENTRAL RESERVE
TIN TSZ ROAD (SOUTHBOUND)
EASTERN CULVERT (LUPEL)
ROAD H1
ROAD H2
RCP
LAT.
Pond
Carpark
Footpath
Ramp
Original irrigation wall to be demolished
Reprovide run-in to match with original run-in
Original irrigation wall to be demolished
Reprovide run-in to match with original run-in
1.5m Footpath
Original water intake
0.5m Verge
3m Footpath
10.3m Carriageway
0.5m Verge
3m Footpath
7.3m Carriageway
Reprovide run-in to match with original run-in
Formation slab to match with ground level of the original box track
Original traffic island using temporary precast concrete profile barriers
WORK COMMENCED: 15th APR 1997
DATE OF COMPLETION: 31st AUG 1998
WORK AS EXECUTED
Notes:
1. All levels are in metres above Principal Datum.
2. Grid lines are Hong Kong Grids Grid 1980.
3. All cut and fill slopes are hydroseeded.
Legends
Site Boundary
Finished level
Original level
Original slope
Finished slope
Retaining wall
EVA Emergency vehicular access
RCP Refuse collection point
LAT. Latrine
BP Bicycle park
Original irrigation wall
Original kerb
Approved
Job Contract no. YL 11/96
Drg no. 7473CL
Project TIN SHUI WAI DEVELOPMENT
Contract title
VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN
Drawing title
AS CONSTRUCTED GENERAL LAYOUT (SHEET 1 OF 3)
Drawing no. 3R
Plan register no. 0390/HM5T/003
Scale 1 : 500
Binnie Black & Veatch Hong Kong Limited
Officer
新界北拓展處
NEW TERRITORIES NORTH DEVELOPMENT OFFICE
拓展署
Territory Development Department, Hong Kong



WORK COMMENCED: 15th APR 1997
DATE OF COMPLETION: 31st AUG 1998
WORK AS EXECUTED
Legend
Site limit
Finished level
Original level
Original steps
Finished steps
Retaining wall
EVA Emergency vehicular access
RCP Refuse collection point
Original chain link fence
New chain link fence
Fence gate
Project TIN SHUI WAI DEVELOPMENT
VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN
AS CONSTRUCTED GENERAL LAYOUT (SHEET 2 OF 3)
4R
1 500
Binnie
新界北拓展處
NEW TERRITORIES NORTH DEVELOPMENT OFFICE
拓展署
Territory Development Department, Hong Kong
For continuation, refer to Drawing no. 5R
MATCH LINE A-A
ORIGINAL HA MEI SAN TSUEN PUMPING STATION
Reclaimed land
Pond
Pond
FLOOD POND
SEWAGE PUMPING STATION
EASTERN CULVERT (UNDER)
CENTRAL RESERVE
HA MEI SAN TSUEN
Footpath & EVA
0.75m Verge
Box culvert BC1
1.5m wide ramp
Emergency crash barrier
for continuation, refer to Drawing no. 3R



WORK COMMENCED: 15th APR 1997
DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes.

1. [illegible]
2. [illegible]

Legend:

Site limit
Original level
Original steps
Finished steps
Contractor's works area specified in Particular Specification Clause 1.53
Hatched area (minimum 3.5m wide) is maintained clear of obstruction at all times by the Contractor

Approved

Contract no. YL 1/96

7473CL

Project TIN SHUI WAI DEVELOPMENT

Contract title

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title

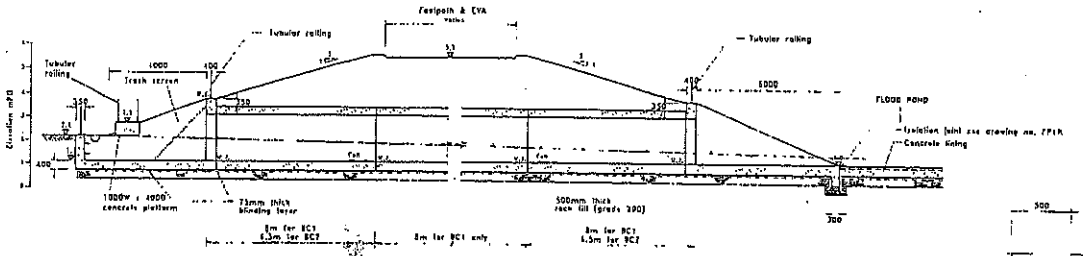
AS CONSTRUCTED GENERAL LAYOUT
(SHEET 3 OF 3)

Drawing no.		Scale
5R	0310/HMST/005	1 : 500

Binnie Black & Veatch Hong Kong Limited

新界北拓展處
NEW TERRITORIES NORTH DEVELOPMENT OFFICE

拓展署
Territory Development Department, Hong Kong

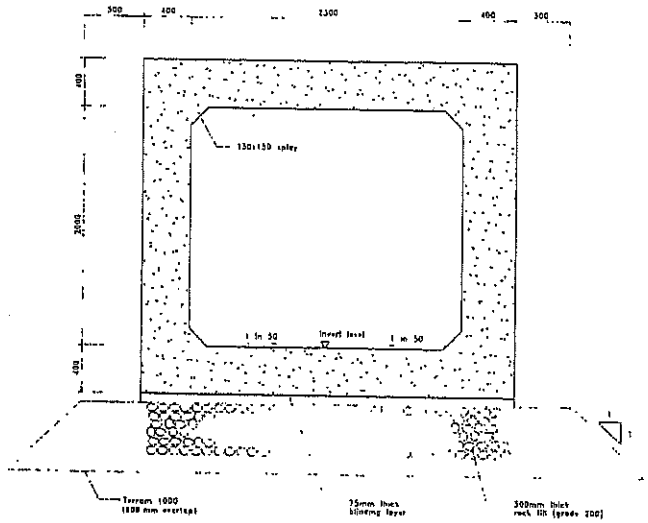


LONGITUDINAL PROFILE

1 : 100

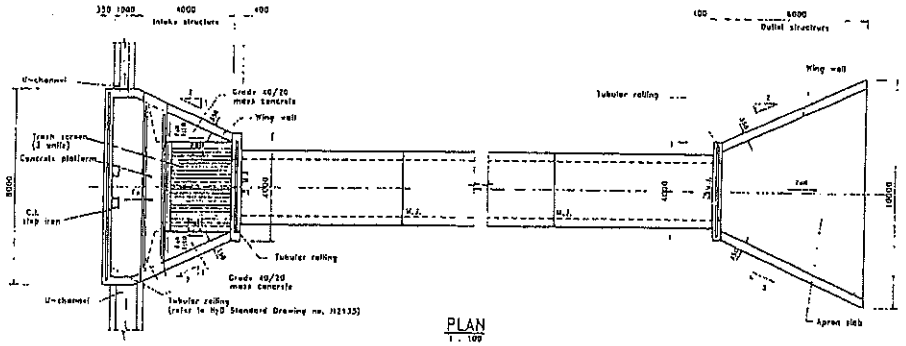
SETTING OUT TABLE OF THE CULVERTS

Point no.	Box Culvert BC1 (3 bays) Box Culvert BC1		Box Culvert BC2 (2 bays) Box Culvert BC2	
	Easting	Northing	Easting	Northing
P1	819086.888	835002.425	819054.330	835010.961
P2	819074.580	835025.512	819058.161	835023.481



TYPICAL SECTION OF BOX CULVERT

1 : 20



PLAN

1 : 100

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WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG. 1998

WORK AS EXECUTED

Notes:

1. All dimensions are in millimetres unless otherwise stated.
2. All levels are in metres above Principal Datum.
3. For general layout of the box culverts, refer to Drawing no. 4R.
4. Structural concrete is grade 40/20 unless otherwise specified.
5. For reinforcement details, refer to Drawing no. C2R and C3R.
6. Bending materials is Grade HY30.
7. Surface finishes are F3 or U3 for external faces and F4 or U3 for interior faces of box culvert and wingwall structures.
8. For movement joint and trash screen details refer to Drawing no. C2R.
9. Isolation joints are provided at the interface of the culvert structure with the concrete body of flood pond.

Legend:

M.J. Movement joint

Original ground profile

Approved

Job Contract no. YL 1/96

TYP no. 7473CL

Project TIN SHUI WAI DEVELOPMENT

Contract title

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title

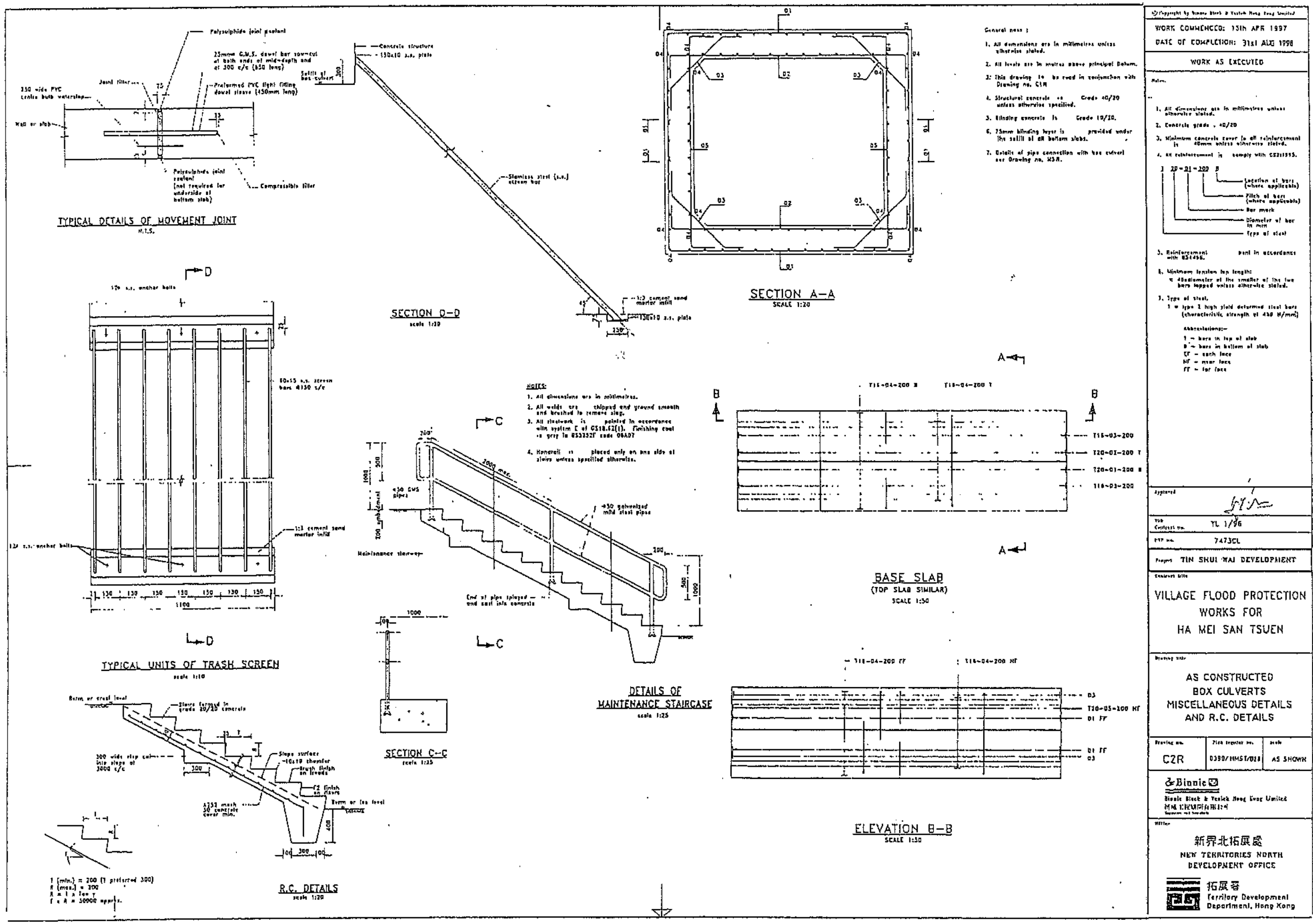
AS CONSTRUCTED BOX CULVERTS BCI & BC2 GENERAL ARRANGEMENT

Drawing no.	Plan register no.	Scale
C1R	0330/HM51/023	AS SHOWN

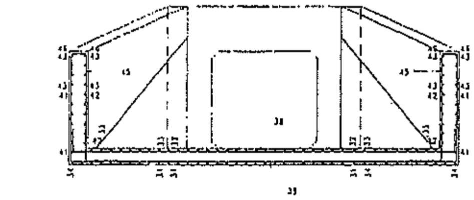
Binnie Black & Veatch Hong Kong Limited

新界北拓展處
NEW TERRITORIES NORTH DEVELOPMENT OFFICE

拓展署
Territory Development Department, Hong Kong

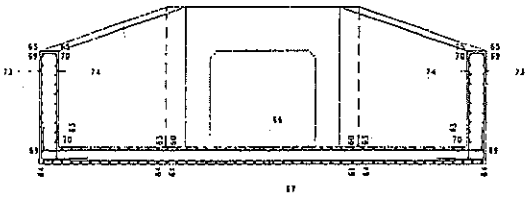


TYPICAL DETAILS OF MOVEMENT JOINT
N.T.S.
SECTION D–D
SECTION A–A
SCALE 1:20
TYPICAL UNITS OF TRASH SCREEN
SECTION C–C
DETAILS OF MAINTENANCE STAIRCASE
BASE SLAB
(TOP SLAB SIMILAR)
SCALE 1:50
ELEVATION B–B
SCALE 1:50
R.C. DETAILS
General notes :
1. All dimensions are in millimetres unless otherwise stated.
2. All levels are in metres above principal Datum.
3. This drawing is to be read in conjunction with Drawing no. C1R
4. Structural concrete is Grade 40/20 unless otherwise specified.
5. Blinding concrete is Grade 10/20.
6. 75mm blinding layer is provided under the soffit of all bottom slabs.
7. Details of pipe connection with box culvert see Drawing no. W3R.
WORK COMMENCED: 15th APR 1997
DATE OF COMPLETION: 31st AUG 1998
WORK AS EXECUTED
Location of bars (where applicable)
Pitch of bars (where applicable)
Bar mark
Diameter of bar in mm
Type of steel
Abbreviations:–
T – bars in top of slab
B – bars in bottom of slab
EF – each face
NF – near face
FF – far face
TL 1/96
7473CL
TIN SHUI WAI DEVELOPMENT
VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN
AS CONSTRUCTED BOX CULVERTS MISCELLANEOUS DETAILS AND R.C. DETAILS
C2R
AS SHOWN
Binnie
新界北拓展處
NEW TERRITORIES NORTH DEVELOPMENT OFFICE
拓展署
Territory Development Department, Hong Kong



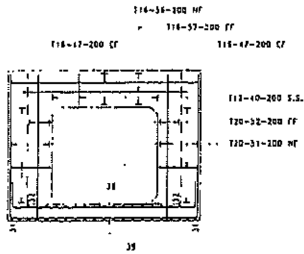
SECTION B–B

SCALE 1 : 50



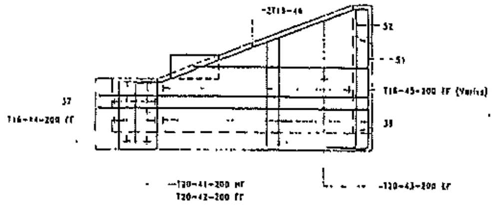
SECTION D–D

SCALE 1 : 50



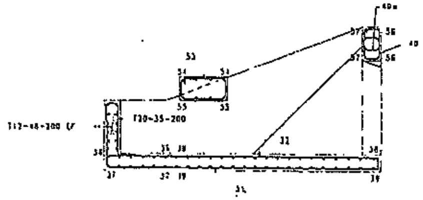
WALL 3 ELEVATION (WALL 4 SIMILAR)

SCALE 1 : 50



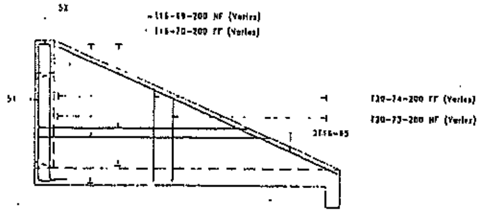
WING WALL 1 ELEVATION (THUS TWO NO.)

SCALE 1 : 50



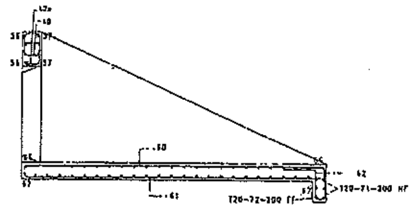
SECTION A–A

SCALE 1 : 50



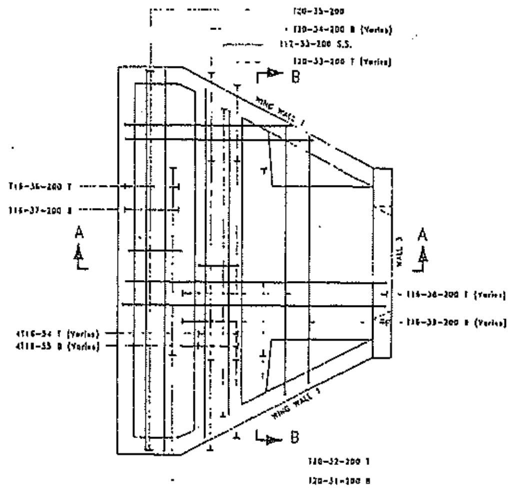
WING WALL 2 ELEVATION (THUS TWO NO.)

SCALE 1 : 50



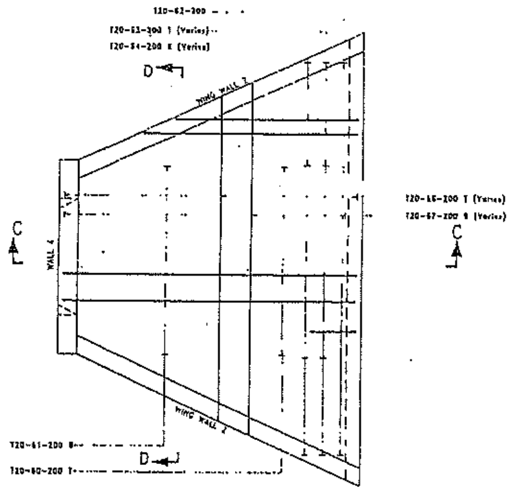
SECTION C–C

SCALE 1 : 50



PLAN OF INTAKE STRUCTURE

SCALE 1 : 50



PLAN OF OUTLET STRUCTURE

SCALE 1 : 50

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WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes

1. All dimensions are in millimetres unless otherwise stated.
2. Concrete grade 40/20
3. Minimum concrete cover to all reinforcement is 40mm unless otherwise stated.
4. All reinforcement complies with CS2:1995.

2 – T – 20 – 01 – 150 – B

- Location of bars (where applicable)
- Pitch of bars (where applicable)
- Bar mark
- Diameter of bar in mm
- Type of steel
- Number of bars

5. Reinforcement to be bent in accordance with BS4466.
6. Minimum tension lap length = 37 x diameter of the smaller of the two bars lapped unless otherwise stated.
7. Type of steel.
   T = type 2 high yield deformed steel bars (characteristic strength of 425 N/mm²)

Abbreviations:–

T – bars in top of slab
B – bars in bottom of slab
EF – each face
NF – near face
FF – far face

Approved

TDD Contract no. YL 1/96

PWP no. 7473CL

Project TIN SHUI WAI DEVELOPMENT

Contract title

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title

AS CONSTRUCTED INTAKE/OUTLET STRUCTURE R.C. DETAILS

Drawing No.	Plan register no.	Scale
C3R	0350/HMST/023	AS SHOWN

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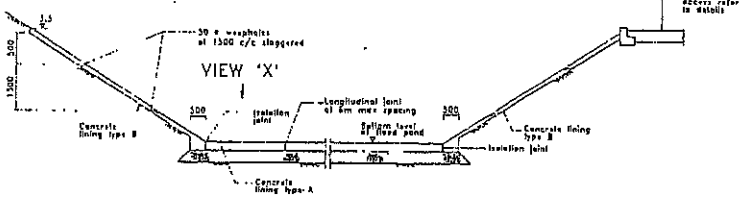
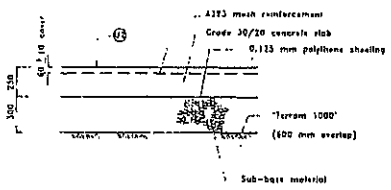
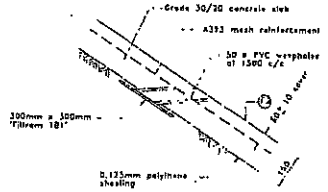


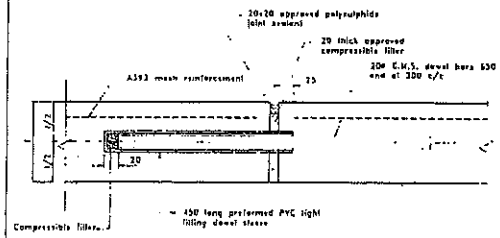
SECTION A–A (TYPICAL SECTION)
N.T.S.



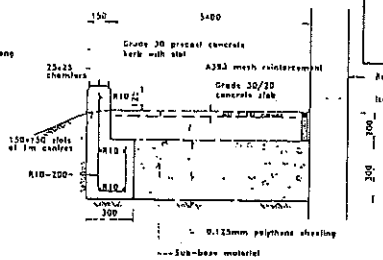
CONCRETE LINING TYPE A
scale 1:20



CONCRETE LINING TYPE B
scale 1:10

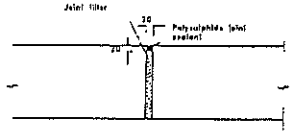


TYPICAL DETAILS OF LONGITUDINAL JOINT
(TRANSVERSE JOINT SIMILAR)
N.T.S.

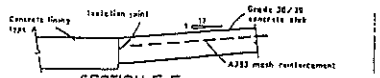


PAVEMENT DETAILS OF
MAINTENANCE ACCESS
N.T.S.

Note: Transverse joints across the concrete slab and concrete kerb at 6m max spacing.

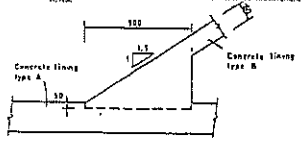


TYPICAL DETAILS OF ISOLATION JOINT
N.T.S.

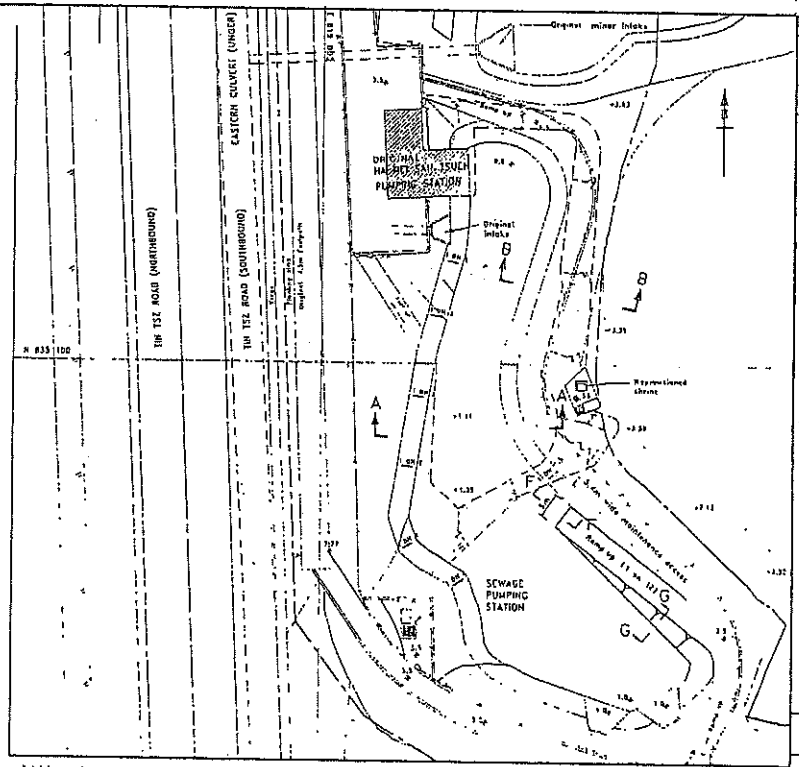


SECTION F-F NOTE
N.T.S.

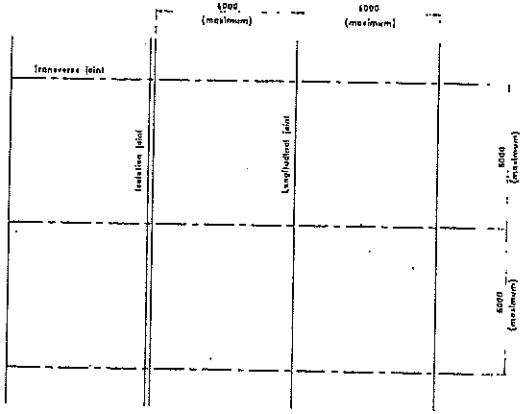
Pavement details of the access ramp is similar to maintenance access.



SECTION G-G
N.T.S.



FLOOD POND LAYOUT PLAN
1 : 500



VIEW 'X'
not to scale

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WORK COMMENCED: 15th APR 1997
DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes:
1. All levels are in metres above Principal Datum.
2. All dimensions are in millimetres unless otherwise noted.
3. Setting out details of the maintenance access refer to Drawing no. 32R.

Legend :
- Type A concrete lining
- Type B concrete lining
- Approximate extent of original flood pond
- Finished ground level
- Original ground level
- Retaining wall RW2

Approved

Contract no.	YL 1/96
FSP no.	7473CL

Project: TIN SHUI WAI DEVELOPMENT

Contract title:
VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title:
AS CONSTRUCTED IMPROVEMENT WORKS TO ORIGINAL FLOOD POND LAYOUT AND DETAILS
(SHEET 1 OF 2)

Drawing no.	Site registry no.	Scale
FP1R	0350/HMST/029	AS SHOWN

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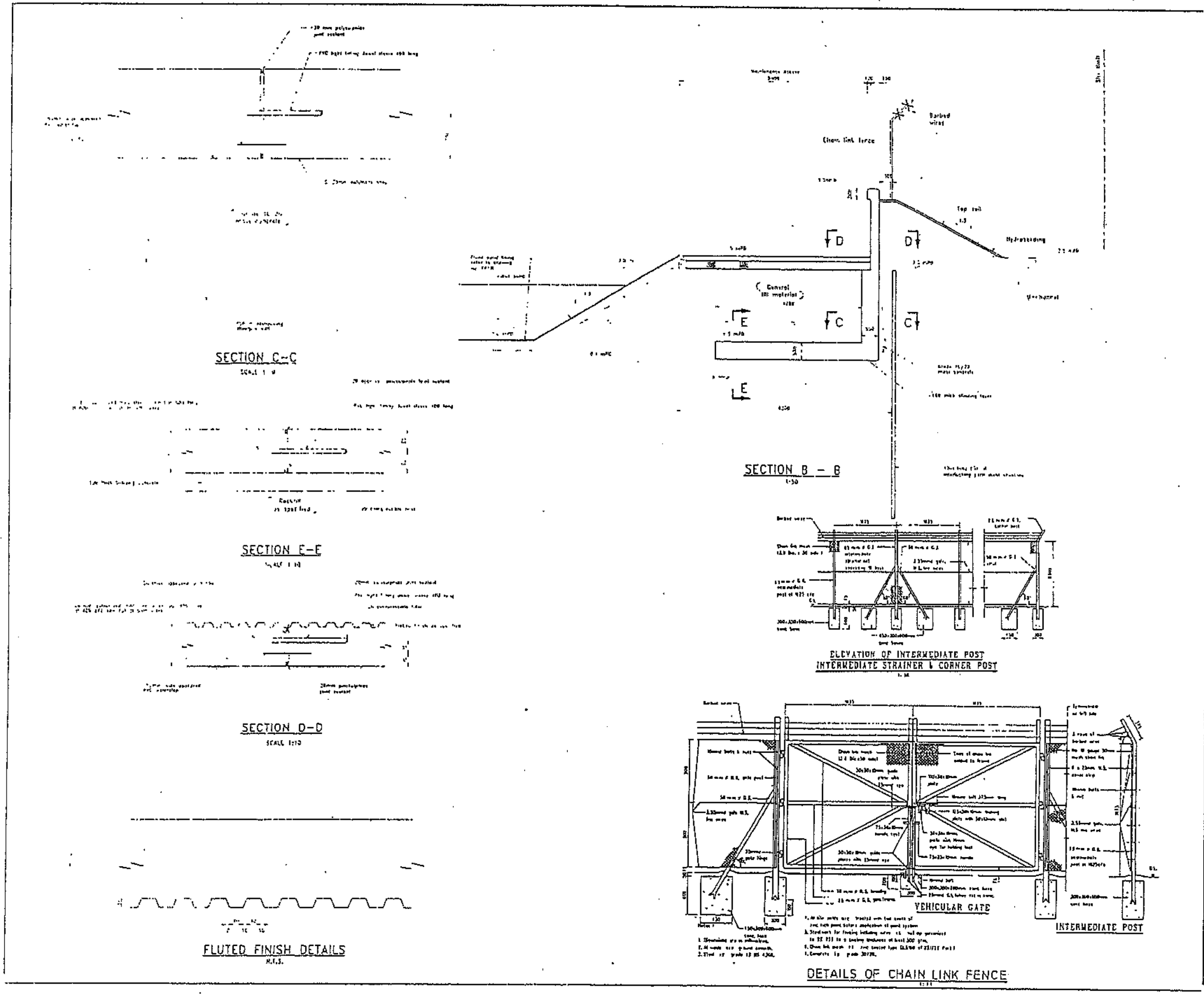
Territory Development Department, Hong Kong



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WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes:

1. All levels are in metres above Principal Datum.
2. All dimensions are in millimetres unless otherwise stated.
3. For location of Retaining Wall RW2, refer to General Layout Drawing no. 4R.
4. All structural concrete is grade 30/20.
5. All blinding concrete is Grade 10/20.
6. Movement joint is provided at a spacing not more than 12 metres.
7. Finish a F3 or U3 for external surface and F2 or U2 for buried surface.
8. The alignment of the retaining wall and permanent sheet pile follow the setting out details of the maintenance access.

Legend:

Original ground profile
Original ground level
Finished ground level

Approved

TDD Contract no.: TL 1/96

PWP no.: 7473CL

Project: TIN SHUI WAI DEVELOPMENT

Contract title: VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title: AS CONSTRUCTED IMPROVEMENT WORKS TO ORIGINAL FLOOD POND LAYOUT AND DETAILS (SHEET 2 OF 2)

Drawing no.	File register no.	Scale
FP2R	0390/HMST/030	AS SHOWN

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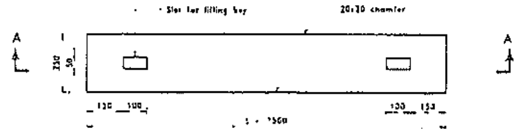
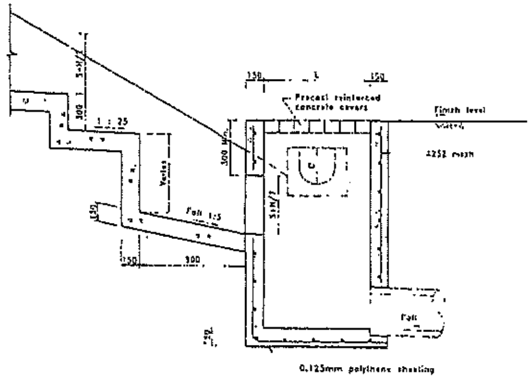
SECTION A–A
1 : 10

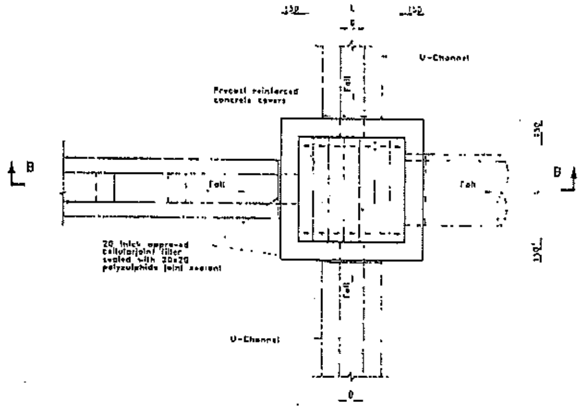


PLAN

PRECAST CONCRETE COVER FOR CATCHPIT AND SAND TRAP
1 : 10

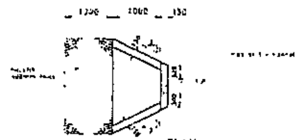


SECTION B – B
1 : 20



PLAN

DETAILS OF CATCHPIT
1 : 20



PLAN

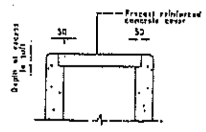
SECTIONAL ELEVATION

FRONT ELEVATION

INTAKE/OUTFALL DETAILS
SCALE 1:50

DIMENSION OF CATCHPIT

Catchpit Type	Size of largest pipe or U-channel (mm)	L (mm)
1	225 ~ 300	550
2	375 ~ 450	800
3	525 ~ 675	1050
4	750 ~ 900	1300



TOP SECTION FOR PRECAST CONCRETE COVER
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WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes

1. All dimensions are in millimetres unless otherwise stated.
2. All concrete is Grade 20/20 unless otherwise stated.
3. Concrete surface finish is Class U2 or F2 as appropriate.
4. Catchpit has walls and slab centrally reinforced with one layer of square mesh fabric no. A252 to BS 4483.
5. Movement joint for channels is formed at 10m intervals and when joining catchpits.
6. All pipes with cover below finish ground level less than 1m are provided with concrete surround as shown in HyD Standard Drawing No. H3130.
7. All bolts, nuts and washers are Grade A4 stainless steel.

Contract no. TL 1/96

747301

Project: TIN SHUI WAI DEVELOPMENT

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

AS CONSTRUCTED MISCELLANEOUS DRAINAGE DETAILS (SHEET 1 OF 2)

M4R | D390/HMST/071 | AS SHOWN

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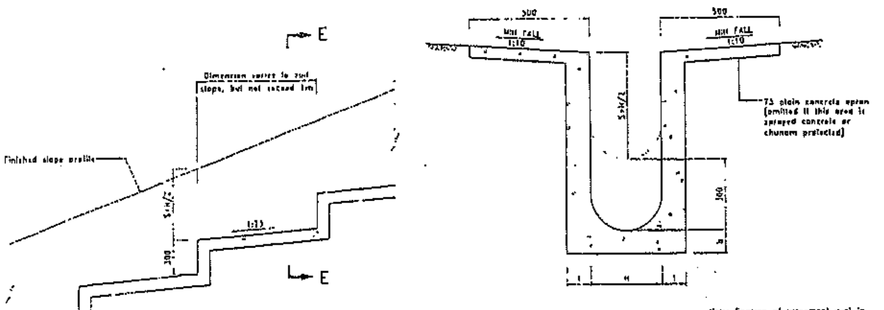


LONGITUDINAL SECTION

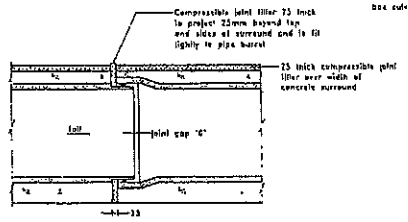
SECTION D-D

Note: Spacing of movement joint in channels, berm slab, aprons is 10m maximum, (see sections B-B and C-C for details)

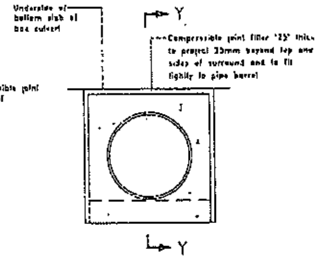
TYPICAL DETAIL OF STEPPED CHANNEL

DIMENSION OF STEPPED CHANNEL

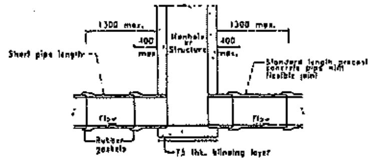
Nominal size of channel H (mm)	Thickness t (mm)	Thickness b (mm)	Thickness S (mm)	Reinforcement
225 to 300	100	100	300	Not required
375 to 675	150	150	350	Not required
750 to 900	175	175	400	A252 mesh placed centrally



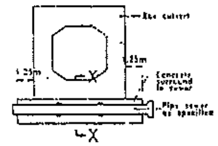
SECTION Y-Y



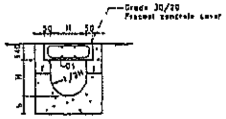
SECTION X-X



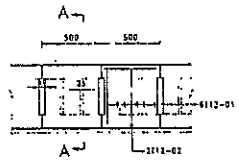
TYPICAL DETAILS OF DOUBLE FLEXIBLE JOINT AT MANHOLE OR STRUCTURE



DETAILS OF PIPE SEWER UNDER BOX CULVERT

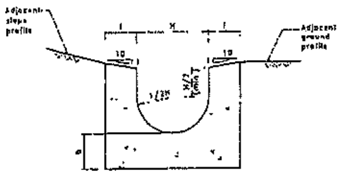


SECTION A-A



PLAN

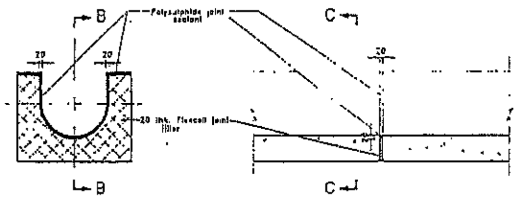
TYPICAL DETAIL OF COVERED U-CHANNEL



TYPICAL DETAIL OF U-CHANNEL

DIMENSION OF U-CHANNEL

Nominal size of channel H (mm)	Thickness t (mm)	Thickness b (mm)	Reinforcement
225 to 300	100	100	Not required
375 to 675	150	150	Not required
750 to 900	175	175	A252 mesh placed centrally



SECTION C-C

SECTION B-B

TYPICAL MOVEMENT JOINT FOR U-CHANNEL

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WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes

1. This drawing to be read in conjunction with Drawing no. M4R.
2. For general notes, refer to Drawing no. M4R.
3. For single untrapped gully (with gully farmer) installation details, refer to H_yD Standard Drawing no. H3108.
4. For details of flexible joints for pipes, refer to HyD Standard Drawing no. H3132.

Approved

TDD Contract no. YL 1/96

PWP no. 743CL

Project TIN SHUI WAI DEVELOPMENT

Contract title

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title

AS CONSTRUCTED MISCELLANEOUS DRAINAGE DETAILS (SHEET 2 OF 2)

Drawing no.	Filing number no.	Scale
M5R	D350/HMST/072	N T S

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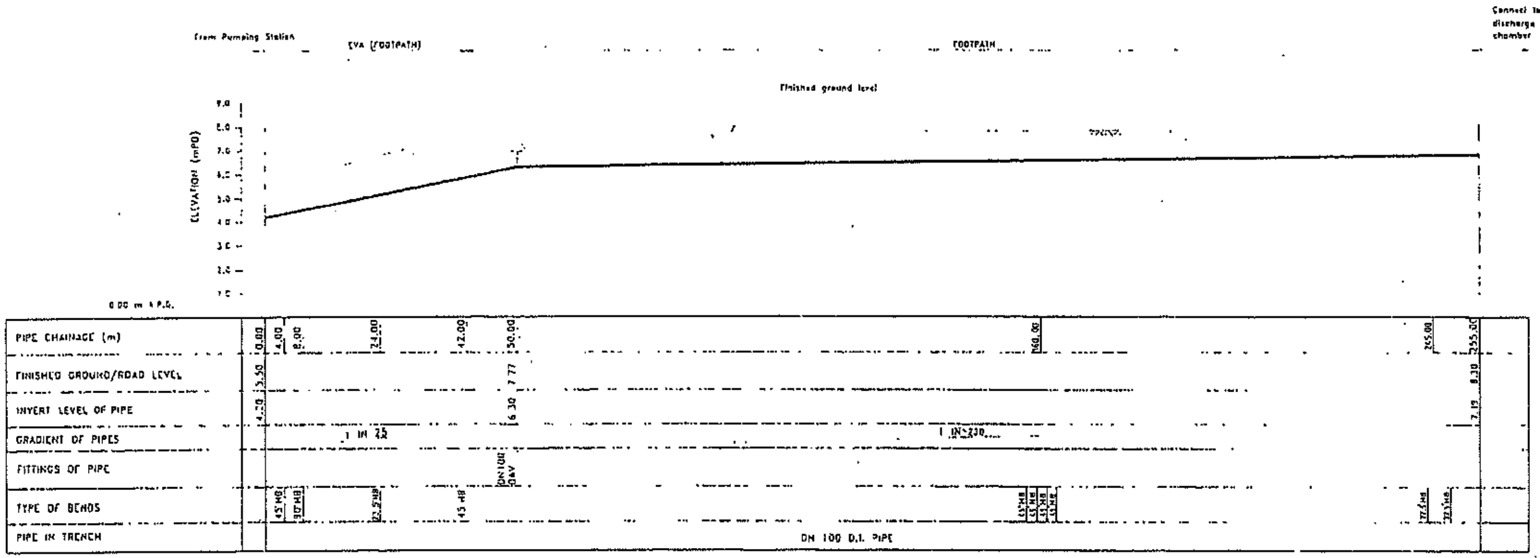

LONGITUDINAL PROFILE

HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

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WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes

1. All levels are in metres above Principal Datum.
2. For horizontal alignment, refer to Drawing nos. SD2R and SD3R.

Abbreviations:

DN Nominal diameter

DI Ductile iron

DAV Double air valve

HB Horizontal bend

Approved

Contract no. YL 1/96

Project TIN SHUI WAI DEVELOPMENT

Contract title

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title

AS CONSTRUCTED SEWAGE RISING MAIN LONGITUDINAL PROFILE

Drawing no.		Scale
RM1R	0390/HMST/036	AS SHOWN

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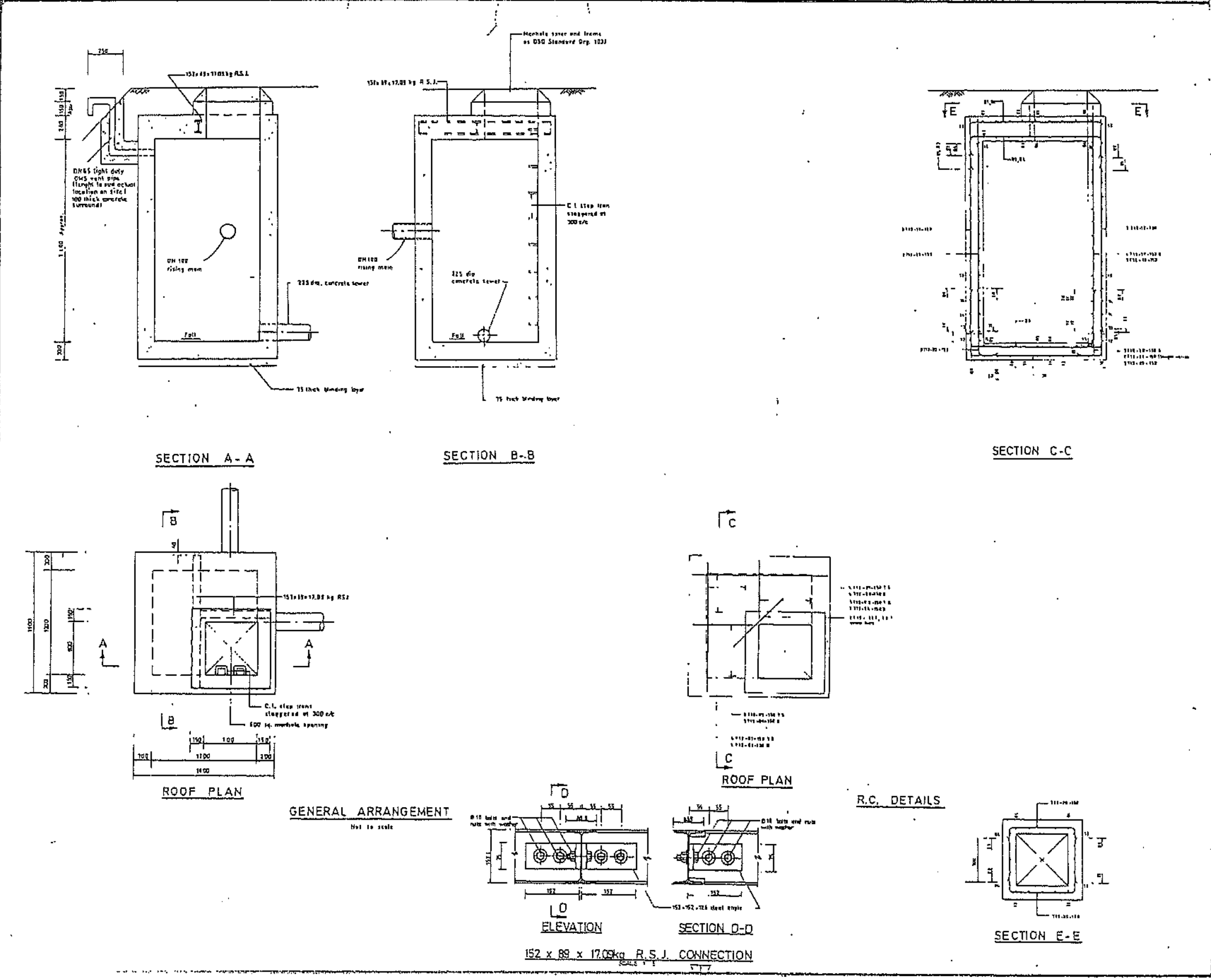

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WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes.

1. All dimensions are in millimetres unless otherwise stated.
2. Reinforcement complies with BS4449. The bending and scheduling of all bars comply with BS4466.
3. Minimum lap length for reinforcement for high yield type 2 deformed bars is 45 times the diameter of the smaller lapped bar unless otherwise specified.
4. Concrete to structures and blinding layer are of grades 30/20D and 10/20D respectively unless otherwise stated.
5. Concrete cover to steel reinforcement is 40mm unless otherwise stated.
6. For C.I. Manhole cover, refer to DSD's Standard Drawing no. DS1033.
7. Finishes are of Class U3 or F3 for exposed and internal surfaces, U2 or F2 for buried surfaces and U1 for blinding layer.
8. All exposed steel has to receive two coats of black bituminous paint.

Approved

TDD Contract no. YL 1/96

PWP no. 7473CL

Project: TIN SHUI WAI DEVELOPMENT

Contract title

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title

AS CONSTRUCTED SEWAGE RISING MAIN DETAILS OF DISCHARGE CHAMBER

Drawing no.	File reference no.	Scale
RM2R	0390/HMST/025	AS SHOWN

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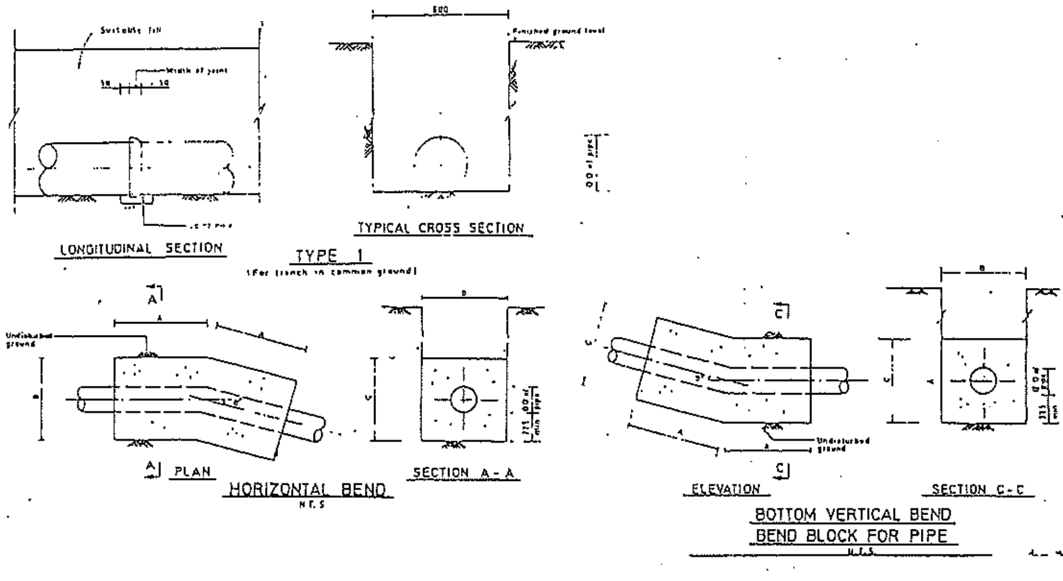
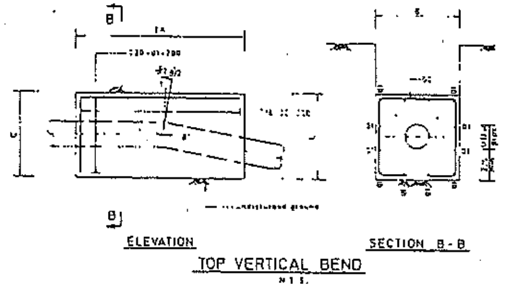
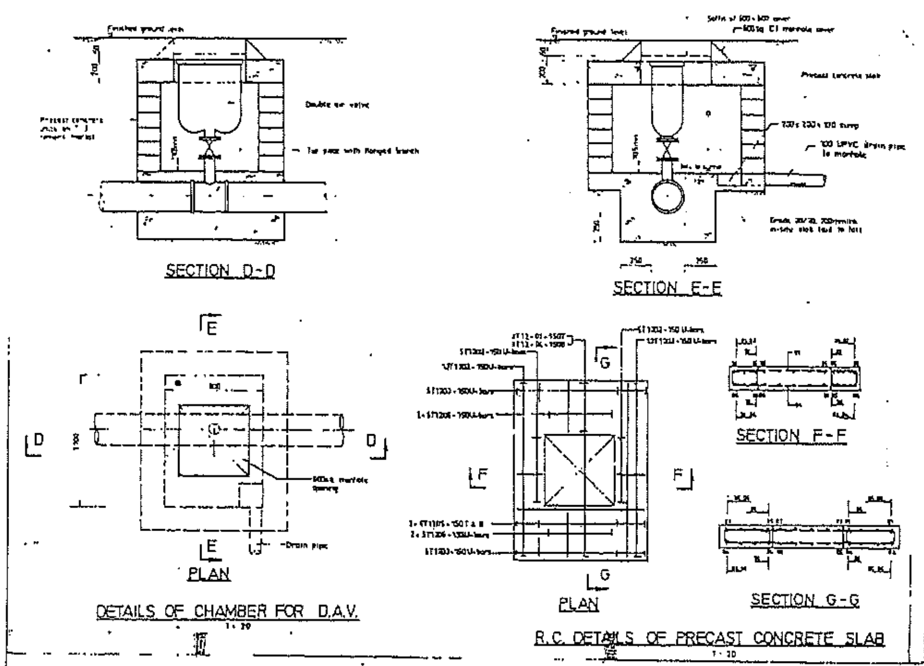


NOMINAL DIAMETER (mm), & MATERIAL OF PIPE	TYPE OF BEND / ANGLE OF BEND (θ) / DIMENSION (mm)	HORIZONTAL			TOP VERTICAL			BOTTOM VERTICAL		
		A	B	C	A	B	C	A	B	C
DN 100 DI										
	22.5°	700	600	700	600	700	550	700	600	600
	45°	1000	850	800	900	500	900	300	600	800
	90°	1500	1100	1000	—	—	—	—	—	—





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WORK COMMENCED: 15th APR 1997
DATE OF COMPLETION: 31st AUG 1990

WORK AS EXECUTED

Notes

1. All dimensions are in millimetres unless otherwise stated.

Approved

TDD Contract no. YL 1/98

PTP no. 7473CL

Project TIN SHUI WAI DEVELOPMENT

Contract title

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title

AS CONSTRUCTED SEWAGE RISING MAIN MISCELLANEOUS DETAILS

Drawing no.	File register no.	Scale
RM3R	0390/HMST/026	AS SHOWN

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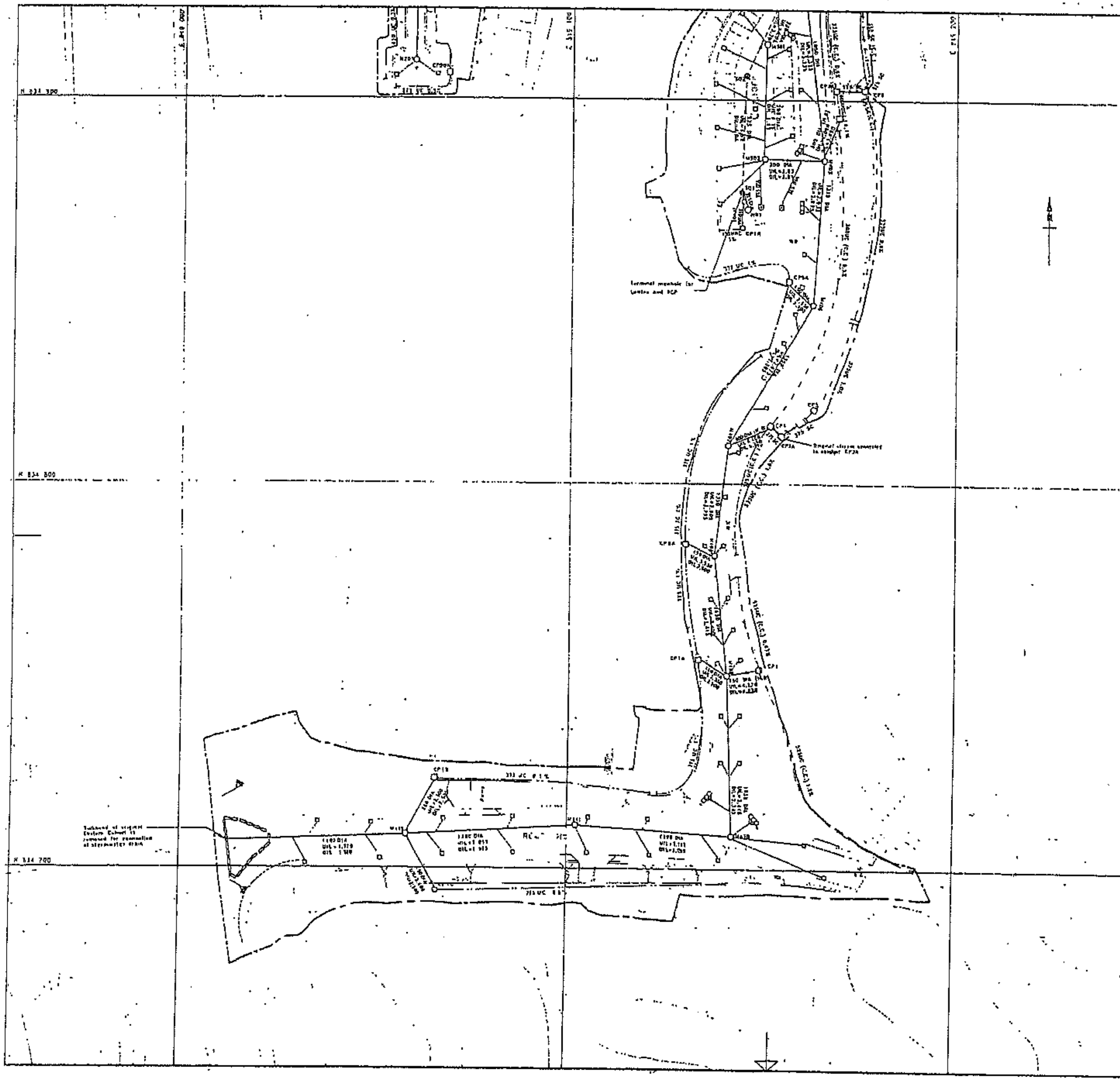

Abbreviations :

UIL Upstream invert level

DIL Downstream invert level

Legend:

Sewage drain

Stormwater drain 375mm nominal diameter precast concrete pipe

Stormwater manhole no. W101

Sewage manhole no. S01

Catchpit no. CP4, 300mm nominal diameter, Class U precast concrete pipe with Class B bed

Gully with 225mm gully pipe (without kerb overflow weir)

Gully with 225mm gully pipe (with kerb overflow weir)

Triple gully with 225mm gully pipe (with kerb overflow weir)

300mm U-channel (0.5% longitudinal gradient)

300mm , U-channel with concrete cover at 0.5% longitudinal gradient

300mm stepped channel

Original double gully

Original well

C.I. gully trap

WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes.

1. All levels are in metres above Principal Datum.
2. Grid lines are Hong Kong Metric Grid 1980.
3. This drawing to be read in conjunction with Drawing no. SD2R and SD3R.
4. All pipes are precast concrete pipes.
5. For drainage and miscellaneous details, see Drawing nos. M4R and M5R.
6. All pipes with cover less than 1m below finished ground level are provided with concrete surround as shown on DSD Standard Drawing no. DS1048.
7. [illegible]
8. [illegible]
9. [illegible]
10. For details of flexible joints for pipes, see HyD Standard Drawing no. H3122.
11. [illegible]
12. [illegible]
13. [illegible]
14. For pipe bedding details refer to DSD Standard Drawing no. DS1048.

Approved

TDD Contract no. YL 1/96

7473CI

Project TIN SHUI WAI DEVELOPMENT

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

AS CONSTRUCTED STORMWATER DRAINS AND SEWERS LAYOUT (SHEET 1 OF 3)

Drawing no. SD1R

0390/NM51/015

Scale 1 : 500

Binnie

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NEW TERRITORIES NORTH DEVELOPMENT OFFICE

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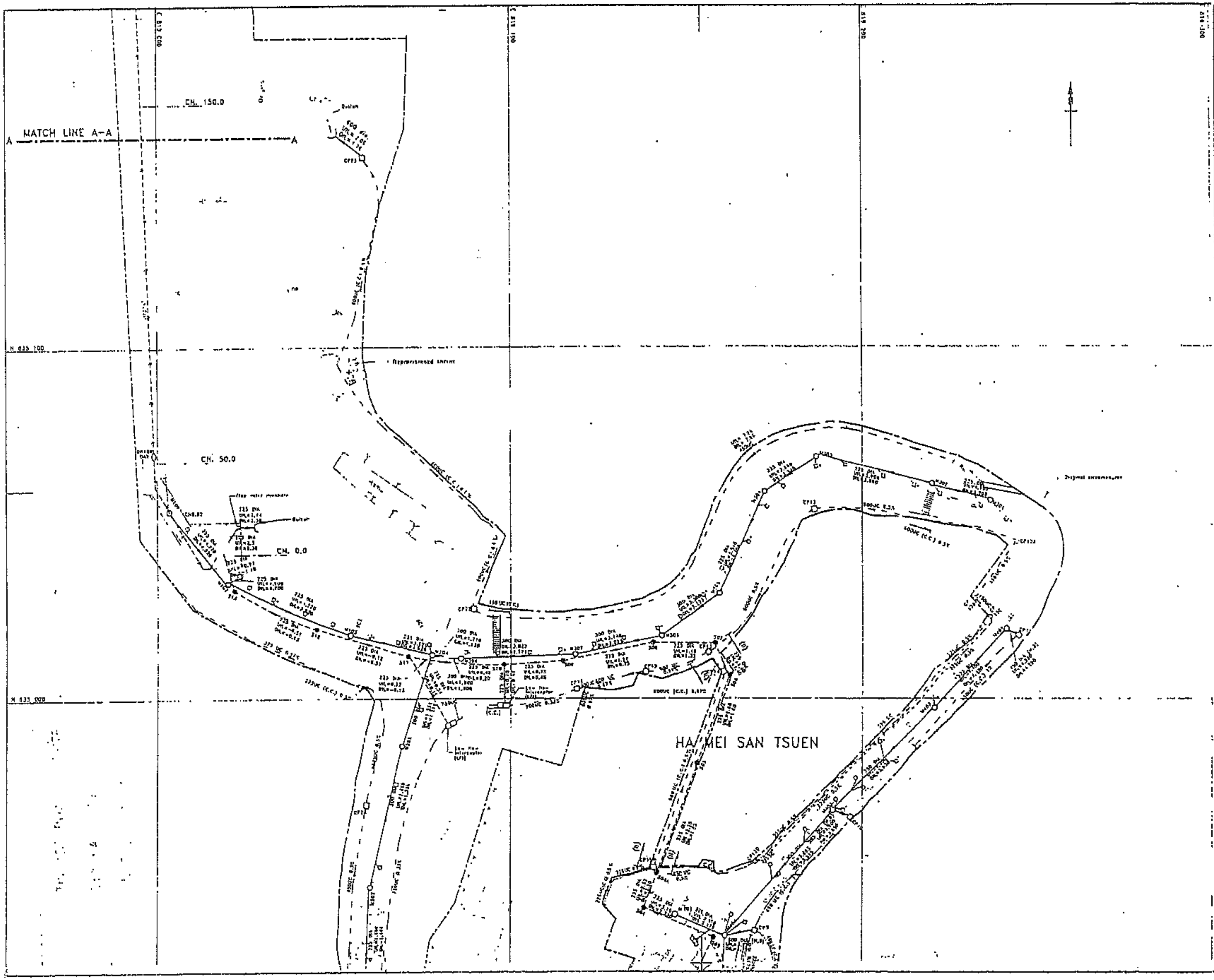

WORK COMMENCED: 15th APR 1997
DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes

1. All levels are in metres above Principal Datum.
2. Grid lines are Hong Kong Metric Grid 1980.
3. This drawing to be read in conjunction with Drawing nos. SD1R and SD3R.
4. For general notes, refer to Drawing no. SD1R.

Legend :

Sewage rising main
Low flow interceptor
Flap valve manhole
Limit of Section of Works

TDD Contract no. TL 1/96

PWP no. 7473CL

Project TIN SHUI WAI DEVELOPMENT

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

AS CONSTRUCTED STORMWATER DRAINS AND SEWERS LAYOUT (SHEET 2 OF 3)

Drawing no.	Plan register no.	Scale
SD2R	0390/HMST/020	1 : 500

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Territory Development Department, Hong Kong

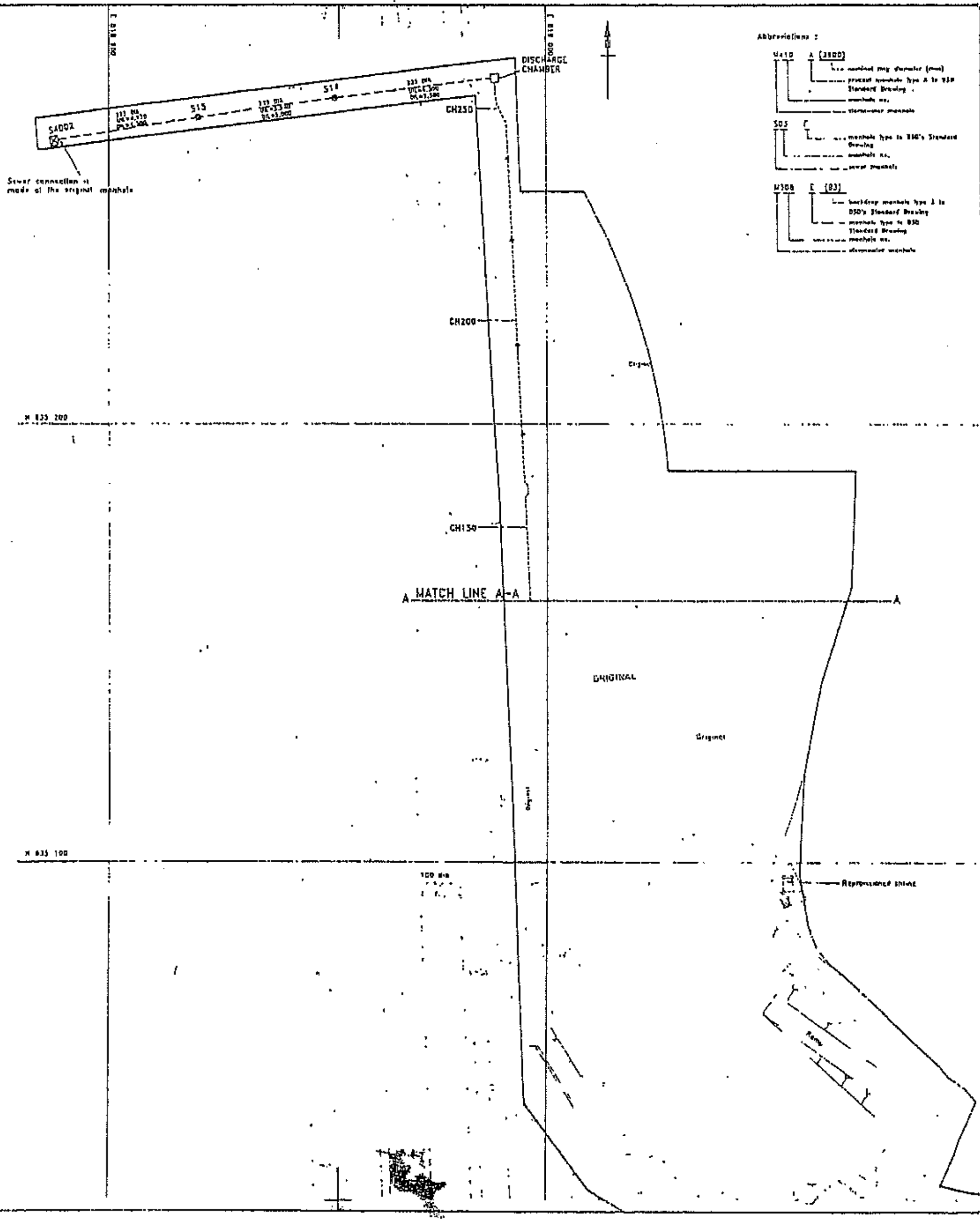
Stormwater Manhole Schedule

From	Manhole type	Pipe size	Pipe class	bedding	To
M101	C	225	M	B	M102
M102	D	225	M	B	M103
M103	C	225	M	B	M104
M201	D	225	M	B	M202
M202	C	300	M	B	M203
M203	F	300	M	B	M104
M104	L(B3)	300	M	B	BC1
M301	D	225	M	B	M302
M302	C	225	M	B	M303
M303	C	225	M	B	M304
M304	C	225	M	B	M305
M305	C	300	M	B	M306
M306	E	300	M	B	M307
M307	C	300	M	B	M308
M308	F(B3)	300	M	B	BC1
M401	C	525	H	B	M402
M402	H/D	750	H	B	M403
M403	H/D	900	H	B	M404
M404	H/D	1050	H	B	M405
M405	J/D	1350	H	B	M406
M406	J/D	1350	H	B	M407
M407	J/D	1350	H	B	M408
M408	J/D	1650	H	B	M409
M409	J/D	1650	H	B	M410
M410	K/D(3900)	1800	H	B	M411
M411	A (2700)	1800	H	B	M412
M412	B (2700)	1800	H	B	Section tested
M501	D	300	M	B	M502
M502	C	300	M	B	M403
M601	D	225	M	B	M404

Sewer Manhole Schedule

From	Manhole type	Pipe size	Pipe class	bedding	To
M01	C	225	M	B	S01
S01	TI	225	M	B	S02
S02	C	225	M	B	S03
S03	C	225	M	B	S04
S04	D	225	M	B	S04A
S04A	C	225	M	B	S05
S05	E	225	M	B	S06
S06	C	225	M	B	S07
S07	C	225	M	B	S08
S08	L	225	M	B	S09
LFI	–	225	M	B	S10
LFI	–	225	M	B	S11
S09	L	225	M	B	S10
S10	L	225	M	B	S11
S11	L	225	M	B	S12
S12	L	225	M	B	S13
S13	J (1)	225	M	B	SPS
Discharge chamber		225	M	B	S14
S14	C	225	M	B	S15
S15	C	225	M	B	S4002 (original)

† Deep sewage manhole refer to Drawing no. SD5R



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WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes

1. This drawing to be read in conjunction with Drawing nos. SD1R and SD2R.
2. Refer to DSD's Standard Drawing for manhole details.
3. Refer to Drawing no. M4R for catchpit details.
4. Refer to Drawing no. SD4R for details of low flow interceptor.
5. For general notes, refer to Drawing no. SD1R.
6. For details of manhole type J, refer to Drawing no. SD5R.
7. The rising main is ductile iron pipes with push-in joints to BSEN545 (Class K9 cement mortar lined internally).
8. For longitudinal profile of rising main, refer to Drawing no. RM1R.
9. For details of discharge chamber, thrust blocks and valve pit chamber, refer to Drawing nos. RM2R and RM3R respectively.

Key

UC	U-channel
BC	Box culvert
CP	Catchpit
LFI	Low flow interceptor
—R—R—	Sewage rising main
DAV	Double air valve for sewage

Approved

TDD Contract no. YL 1/96

PWP no. 7473CL

Project TIN SHUI WAI DEVELOPMENT

Contract title

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title

AS CONSTRUCTED STORMWATER DRAINS AND SEWERS LAYOUT (SHEET 3 OF 3)

Drawing no.	File register no.	Scale
SD3R	0390/HMST/021	1 : 500

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賓尼工程顧問有限公司

Office

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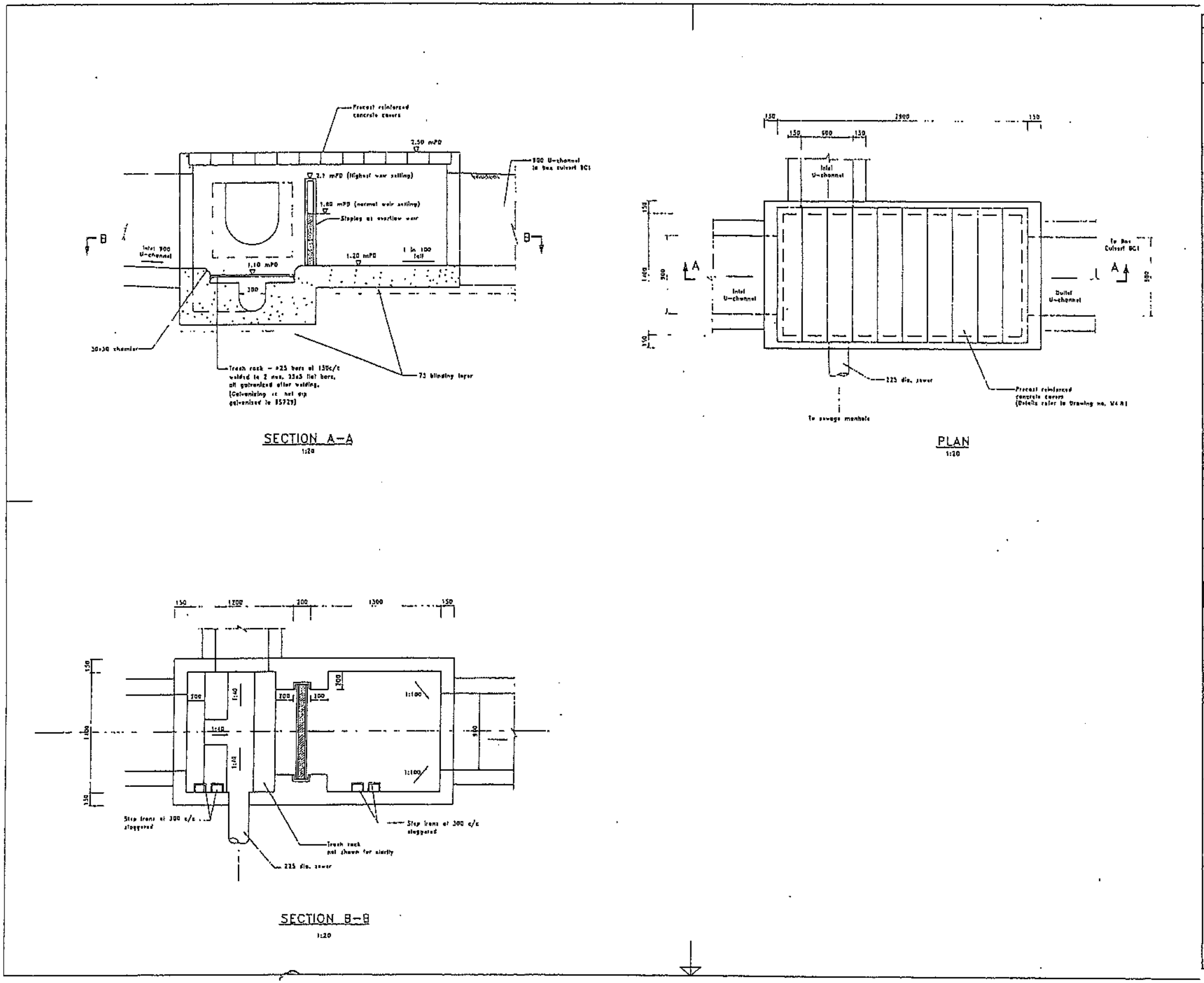
Territory Development Department, Hong Kong



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WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes.

1. All dimensions are in millimetres unless otherwise stated.
2. Concrete grade is 20/20 unless otherwise stated.
3. All exposed formed surfaces in F3 finish. All buried formed surfaces in F1 finish. All unformed surfaces in U3 finish unless otherwise stated.
4. Walls and slab are centrally reinforced with one layer of square mesh fabric ref. A393 to BS4483.
5. All blinding concrete is Grade 10/20.
6. Stoplog is of 'Caplastic' material. Frame and fastening elements are stainless steel of grade 316. Sizes of stoplog panels to suit the specified weir setting levels.

Approved

Contract no. TL 1/96

PWP no. 7473CL

Project TIN SHUI WAI DEVELOPMENT

Contract title

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title

AS CONSTRUCTED LOW FLOW INTERCEPTOR

Drawing no.	Plan register no.	Scale
SD4R		1 : 20

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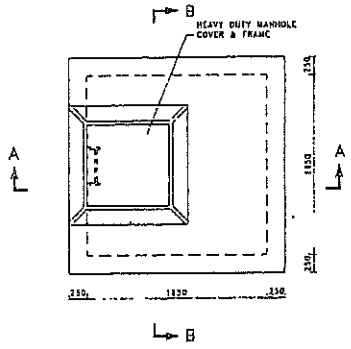
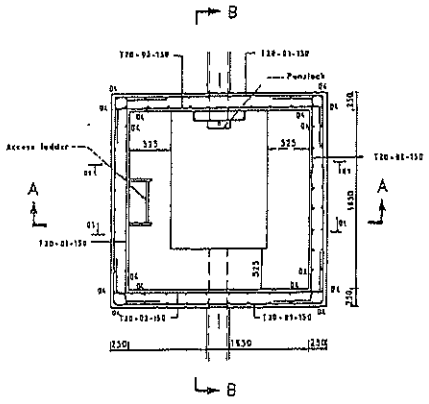
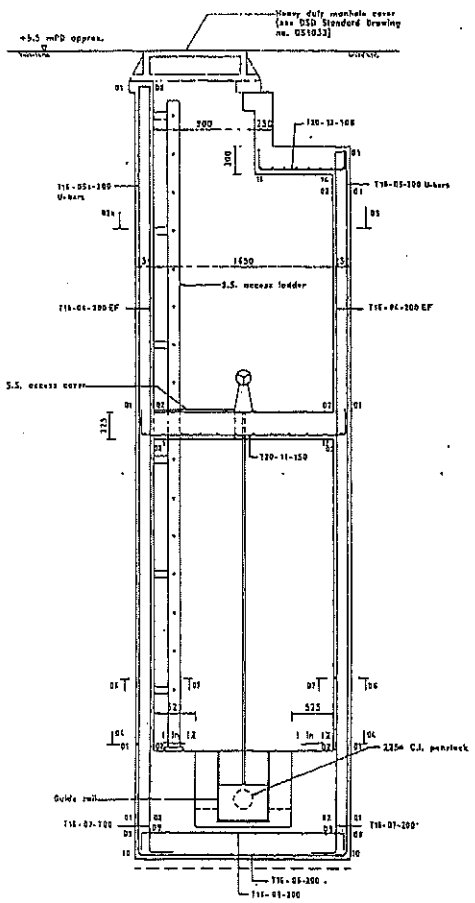
Territory Development Department, Hong Kong



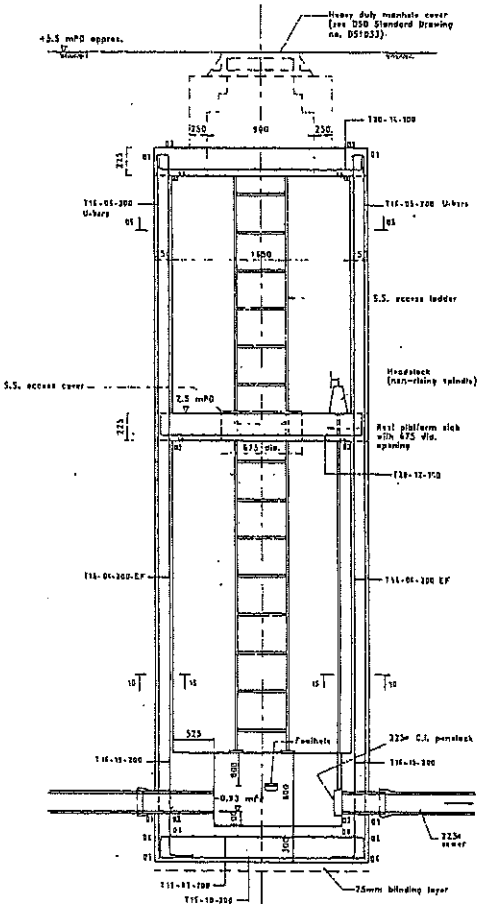
TOP PLAN



BOTTOM PLAN



SECTION A-A



SECTION B-B

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WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes:

1. All dimensions are in millimetres unless otherwise stated.
2. All levels are in metres above Principal Datum.
3. Structural concrete is grade 30/20. Blinding concrete is grade 10/20.
4. Design surcharge and allowable pressure for pavement is 4kPa.
5. For notes regarding steel bar reinforcement refer to Dwg. No. C3A.

Approved

Yau Contract no.	YL 1/95
PSP no.	7473CL

Project: TIN SHUI WAI DEVELOPMENT

Contract title:

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title:

AS CONSTRUCTED DEEP SEWAGE MANHOLE

Drawing no.	Plan register no.	Scale
SD5R	0390/TMWSP/023	N.T.S.

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Client:

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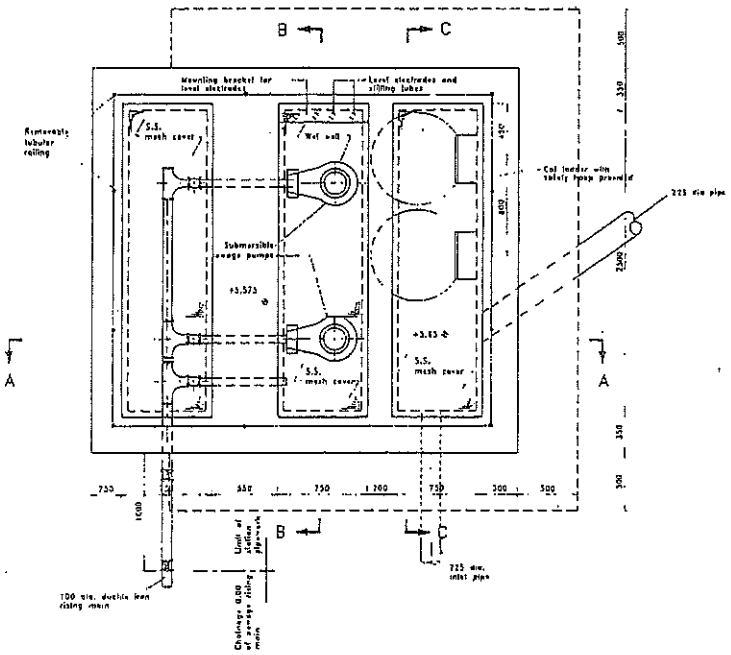
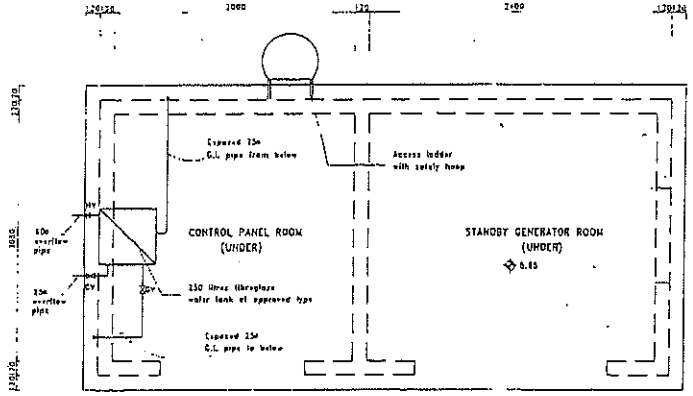


PLAN OF PUMP CHAMBER

1 : 50

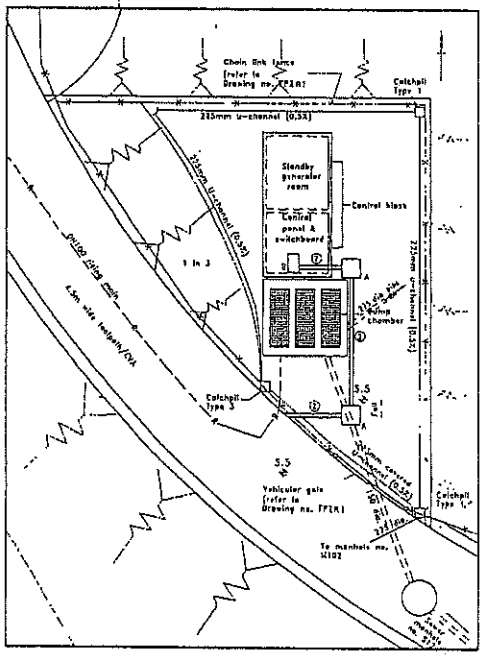


PLUMBING PLAN AT ROOF LEVEL

1 : 25

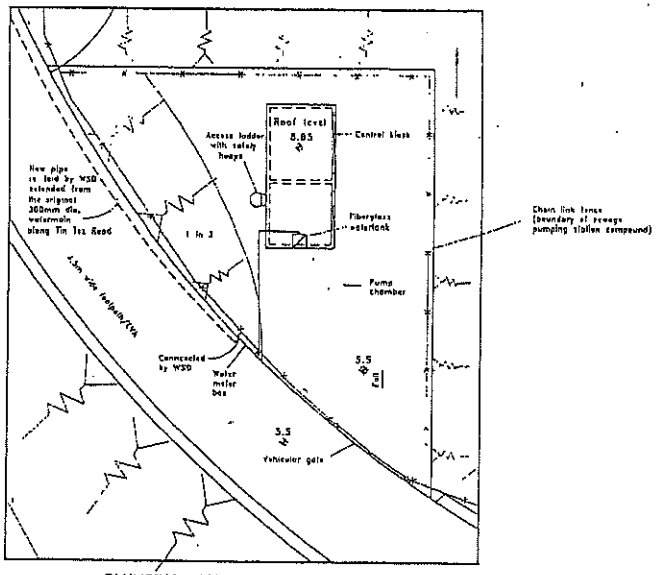
Legend:

G.I. pipe	Galvanized steelpipe with uPVC internal lining
GV	Gate valve
HV	Self-closing non-return flap with grating



LAYOUT PLAN

1 : 100



PLUMBING ALIGNMENT PLAN

1 : 100

Note: Water pipes --- 25ø G.I. pipe with uPVC internal lining

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WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes:

1. All dimensions are in millimetres unless otherwise stated.
2. All levels are in metres above Principal Datum.
3. Structural concrete is grade 40/20 unless otherwise specified.
4. Surface finishes are as follows:
   - external below FGL P2, U3
   - external above FGL P4, U5
   - internal P4, U5

Approved

YLR Contract no. YL 1/96

DSD no. 7473CL

Project TIN SHUI WAI DEVELOPMENT

Contract title

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title

AS CONSTRUCTED SEWAGE PUMPING STATION GENERAL ARRANGEMENT

Drawing no.	Plan register no.	Scale
SP1R	9350/HM57/013	AS SHOWN

Binnie Black & Veatch Hong Kong Limited 柏寧工程顧問有限公司

Office

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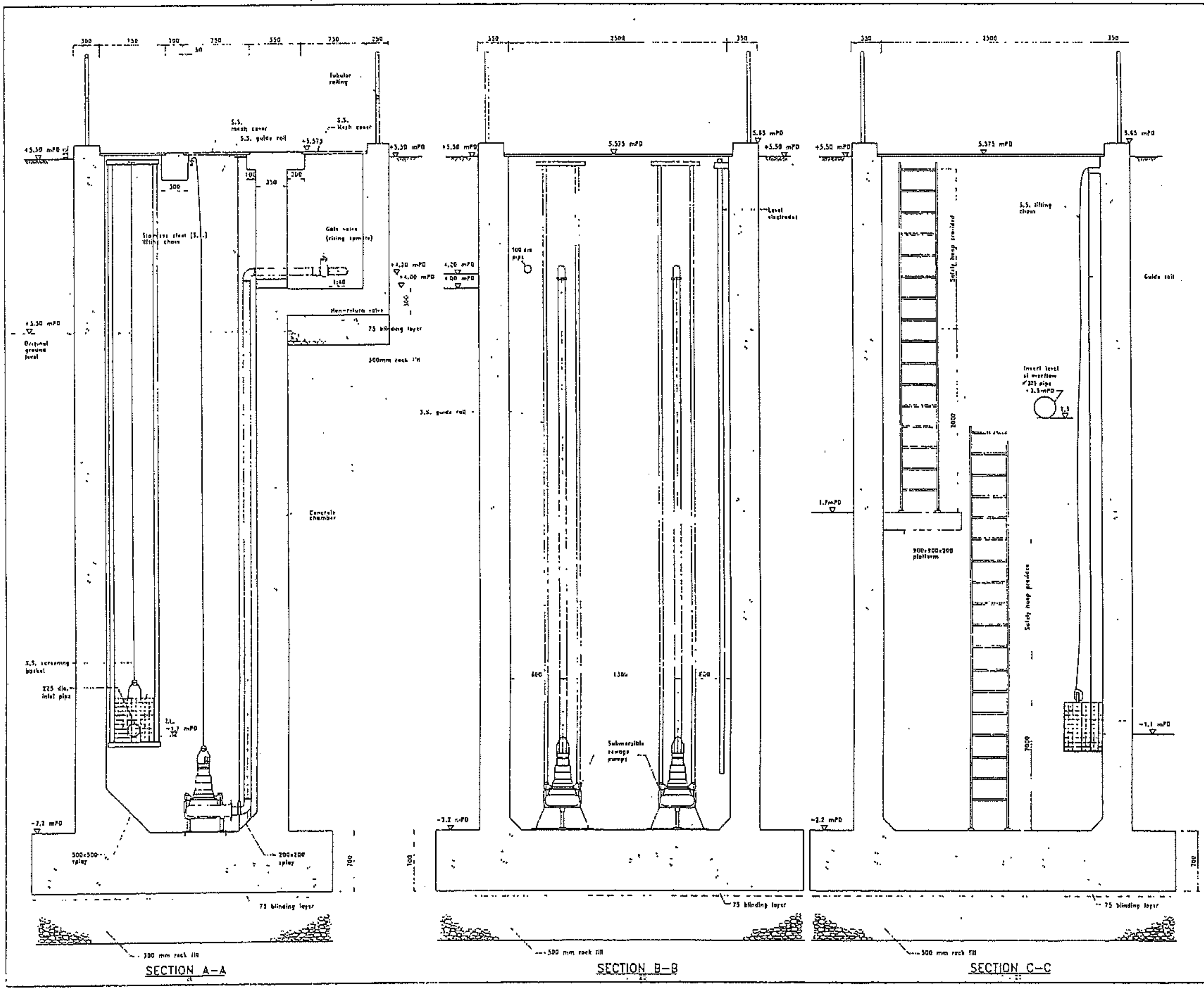

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WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes

Approved

TDD Contract no.	YL 1/96
PWP no.	7473CL

Project TIN SHUI WAI DEVELOPMENT

Contract title

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title

AS CONSTRUCTED SEWAGE PUMPING STATION PUMP CHAMBER

Drawing no.	Plan register no.	Scale
SP2R	D390/HHST/050	AS SHOWN

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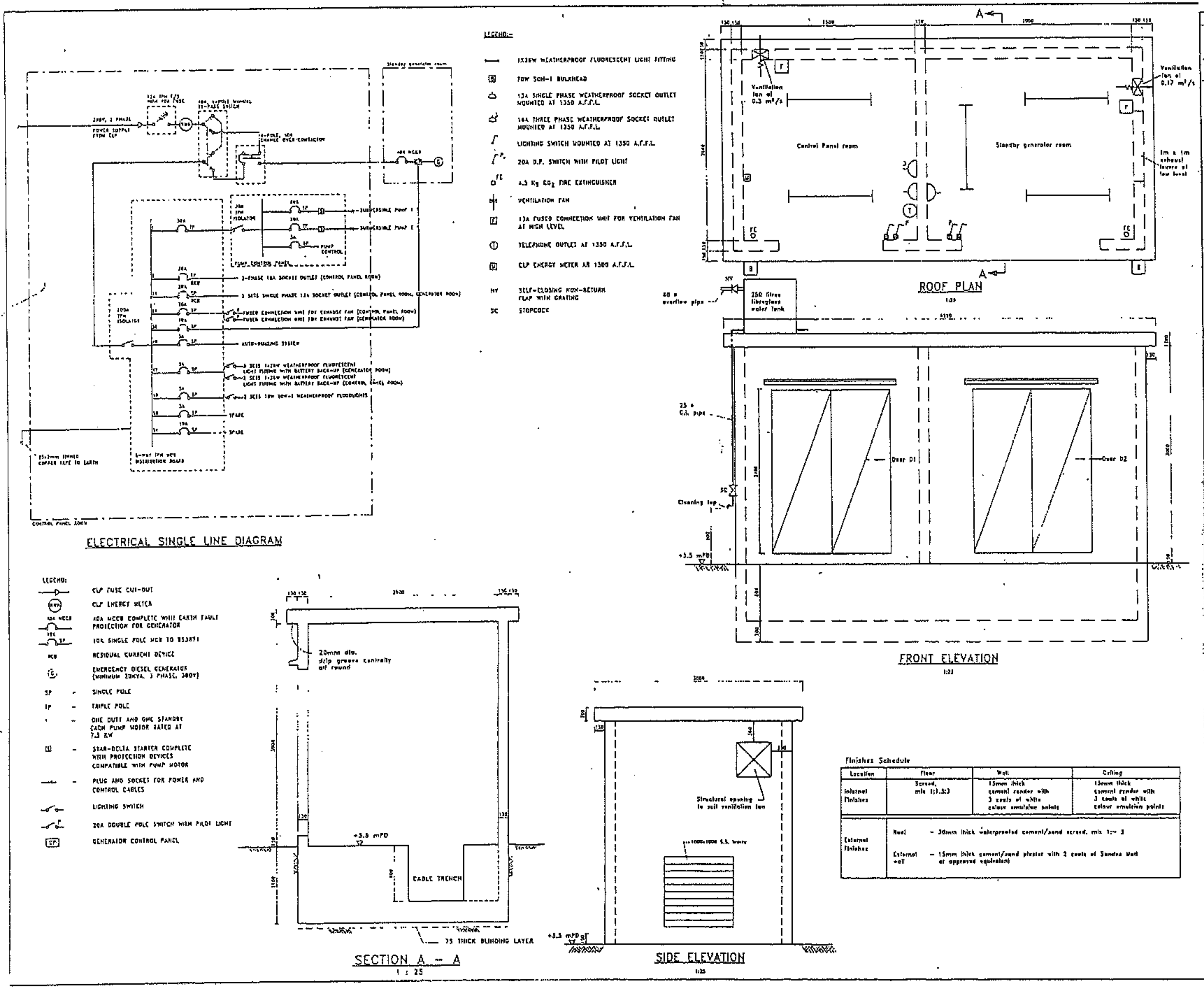

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WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes:

1. All dimensions are in millimetres unless otherwise stated.
2. All levels are in metres above Principal Datum.
3. Structural concrete of Control Kiosk is grade 30/20.
4. Concrete surfaces of the Control Kiosk are U3 and F3 as appropriate. Finishes are in accordance with the Finishes Schedule.

Approved

TDD Contract no. YL 1/96

PWP no. 7473CL

Project TIN SHUI WAI DEVELOPMENT

Contract title

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title

AS CONSTRUCTED SEWAGE PUMPING STATION CONTROL KISOK AND ELECTRICAL SINGLE LINE DIAGRAM

Drawing no.	File number	Scale
SP3R	0380/HMST/051	AS SHOWN

Binnie

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NEW TERRITORIES NORTH DEVELOPMENT OFFICE

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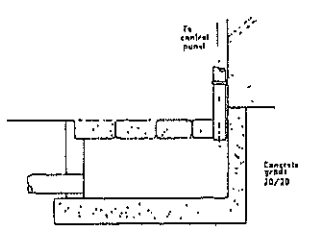

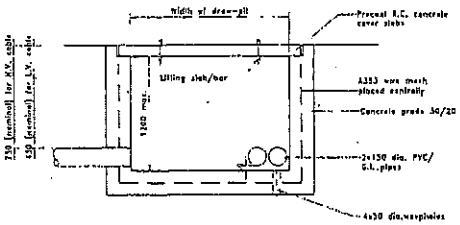

SECTION B – B
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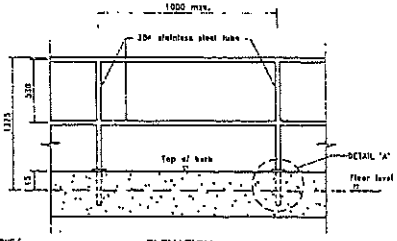
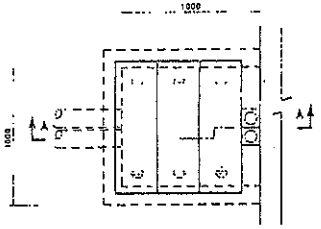


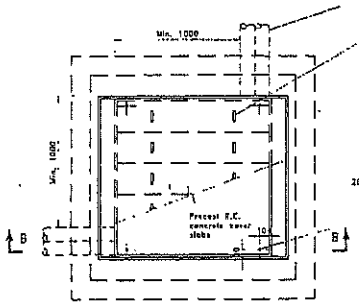
ELEVATION
N.T.S.

SECTION A – A
scale 1:20



PLAN
scale 1:20

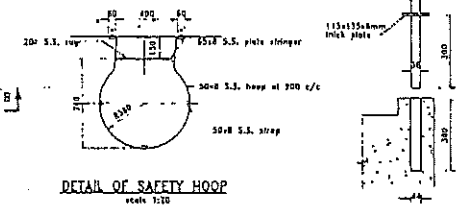
DRAWPIT TYPE B



PLAN
scale 1:25

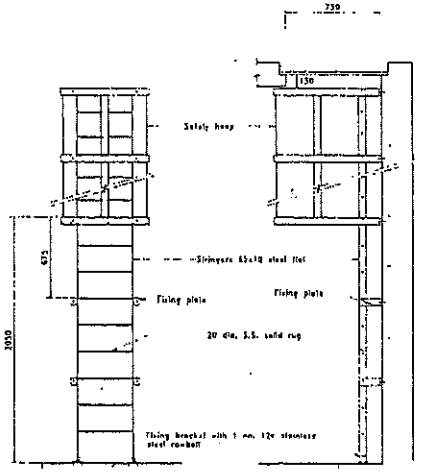
DRAWPIT TYPE A

REMOVABLE STAINLESS STEEL HANDRAILING



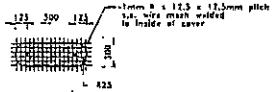
DETAIL OF SAFETY HOOP
scale 1:10

DETAIL 'A'
N.T.S.

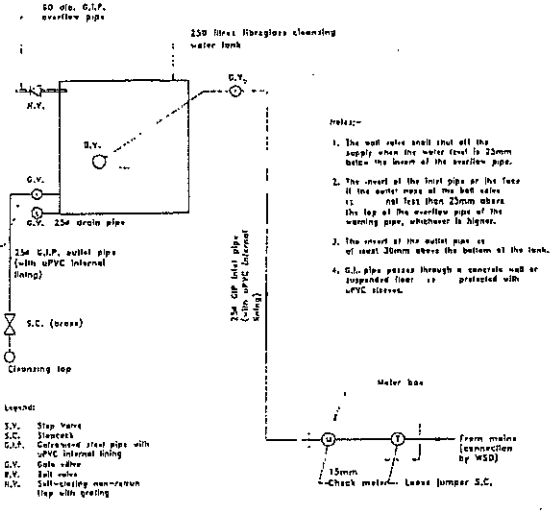


FRONT ELEVATION SIDE ELEVATION

DETAILS OF STAINLESS STEEL CAT LADDER
scale 1:20



VIEWING WINDOWS DETAILS
1:5



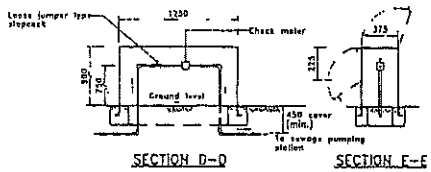
Notes:-

1. The wall valve shall shut off the supply when the water level is 25mm below the invert of the overflow pipe.
2. The invert of the inlet pipe or the face of the outlet pipe of the ball valve is not less than 25mm above the top of the overflow pipe of the warning pipe, whichever is higher.
3. The invert of the outlet pipe is at least 30mm above the bottom of the tank.
4. G.I. pipes passes through a concrete wall or suspended floor is protected with uPVC sleeves.

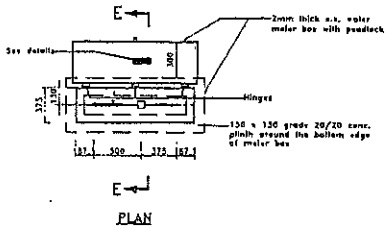
Legend:

S.V.	Stop Valve
S.C.	Stopcock
G.I.P.	Galvanized steel pipe with uPVC internal lining
G.V.	Gate valve
B.V.	Ball valve
N.V.	Self-closing non-return flap with grating

PLUMBING VERTICAL LINE DIAGRAM

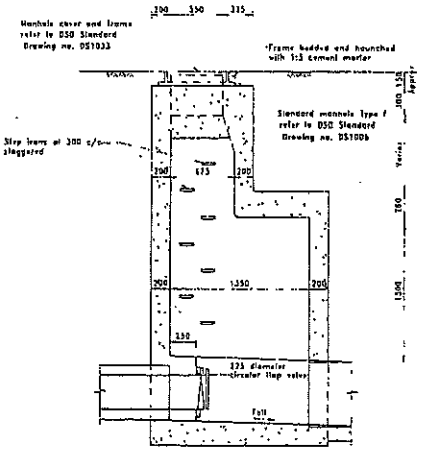


SECTION D–D SECTION E–E



PLAN

WATER METER BOX DETAILS
1:20



FLAP VALVE MANHOLE DETAILS
scale 1:25

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WORK COMMENCED: 15th APR 1997
DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes

1. All dimensions are in millimetres unless otherwise stated.
2. All levels are in metres above Principal Datum
3. Gate/sluice valves comply with General Specification Clause 5.36
4. All uPVC comply with BS 3505 Class D

Approved

Scale VL 1/25

Drawing No. 7473CL

Project TIN SHUI WAI DEVELOPMENT

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title

AS CONSTRUCTED SEWAGE PUMPING STATION MISCELLANEOUS DETAILS (SHEET 1 OF 2)

Drawing no.	Item register no.	Issue
SP4R	3390/HMST/052	AS SHOWN

Binnie Black & Veatch Hong Kong Limited
HSK I.P.V.95571/052-4

Engineer

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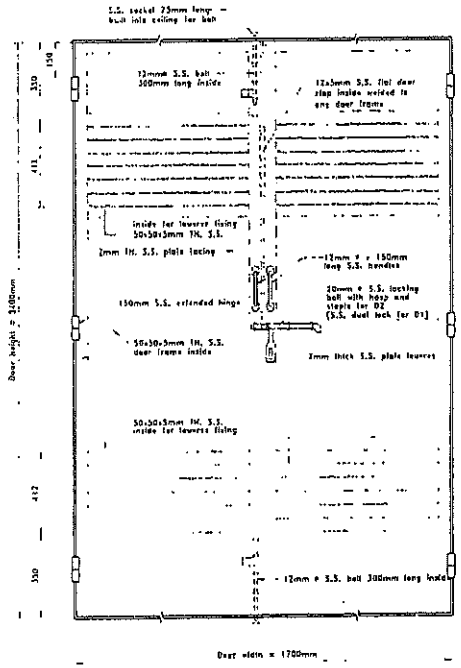
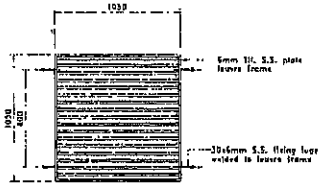
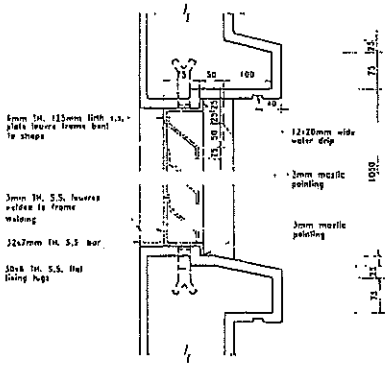
Territory Development Department, Hong Kong



FRONT ELEVATION
1:10

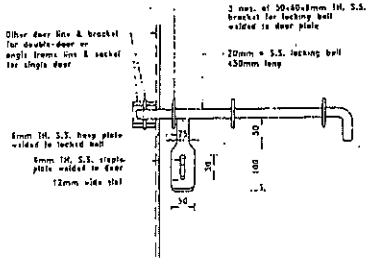


FRONT VIEW
1:20

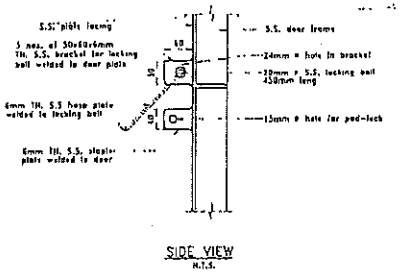


SECTION
1:5

DOOR 1 DETAILS (DOOR 2 SIMILAR)

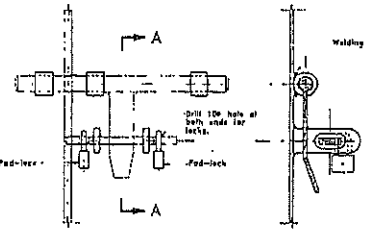


FRONT ELEVATION
N.T.S.



SIDE VIEW
N.T.S.

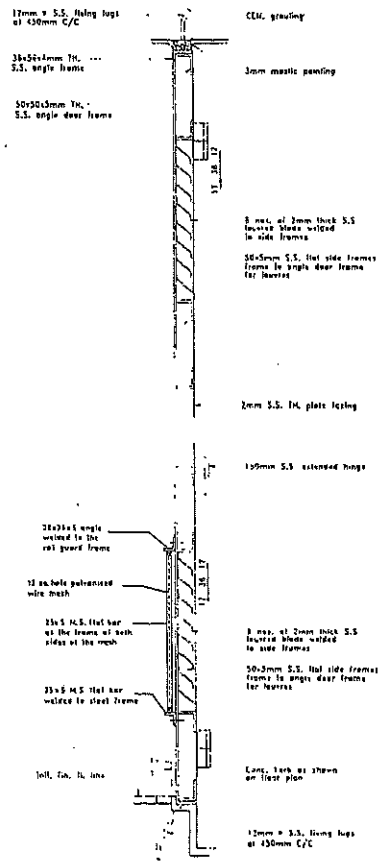
STAINLESS STEEL LOCK FOR STANDBY GENERATOR ROOM



FRONT ELEVATION
N.T.S.

SECTION A-A
N.T.S.

DUAL LOCKS (STAINLESS STEEL) FOR CONTROL PANEL ROOM



METAL DOOR DETAILS
N.T.S.

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WORK COMMENCED: 15th APR 1997
DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes:
1. All dimensions are in millimetres unless otherwise stated.
2. All levels are in metres above Principal Datum.

Approved

Agreement No. YL 1/95

Drawing No. 7473CL

Project TIN SHUI WAI DEVELOPMENT

Contract Title
VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing Title
AS CONSTRUCTED SEWAGE PUMPING STATION MISCELLANEOUS DETAILS (SHEET 2 OF 2)

Drawing No.	Plan Register No.	Scale
SP5R	0380/HMST/053	AS SHOWN

Binnie Black & Veatch (Hong Kong) Limited

Drawn

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NEW TERRITORIES NORTH DEVELOPMENT OFFICE

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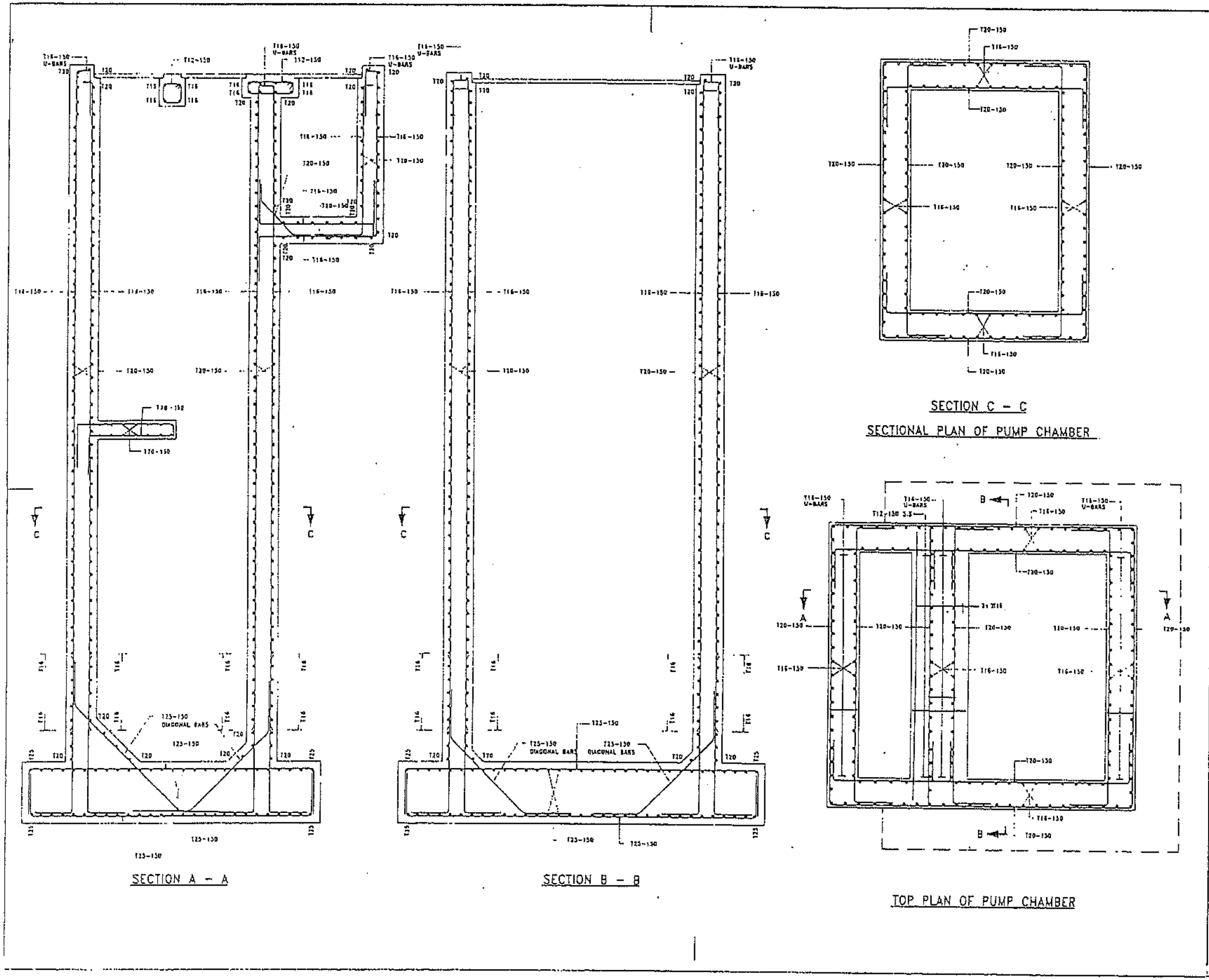
Territory Development Department, Hong Kong



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WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes

1. All dimensions are in millimetres unless otherwise stated.
2. Concrete grade 40/20
3. Minimum concrete cover to all reinforcement is 40mm unless otherwise stated.
4. All reinforcement complies with BS2:1225.

   - Location of bars (where applicable)
   - Pitch of bars (where applicable)
   - Bar mark
   - Diameter of bar in mm
   - Type of steel
   - Number of bars

5. Reinforcement are bent in accordance with BS4466.
6. Minimum tension lap length = 37x diameter of the smaller of the two bars lapped unless otherwise stated.
7. Type of steel.
   T = type 2 high yield deformed steel bars (characteristic strength of 460 N/mm²)

Abbreviations:-

T – bars top of slab
B – bars in bottom of slab
EF – each face
NF – near face
FF – far face

Approved

7473CL

Project: TIN SHUI WAI DEVELOPMENT

Contract title:

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title:

AS CONSTRUCTED SEWAGE PUMPING STATION R.C. DETAILS (SHEET 1 OF 3)

Drawing no.		Scale
SP6R	0390/NMST/05A	1 : 20

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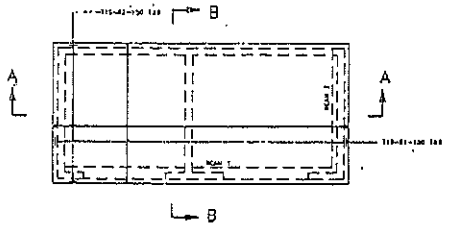
新界北拓展處

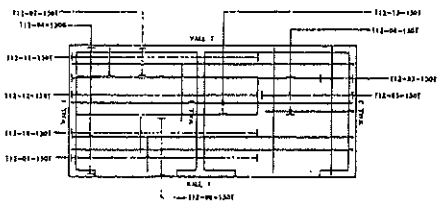
NEW TERRITORIES NORTH DEVELOPMENT OFFICE

拓展署

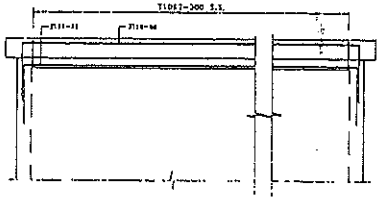
Territory Development Department, Hong Kong



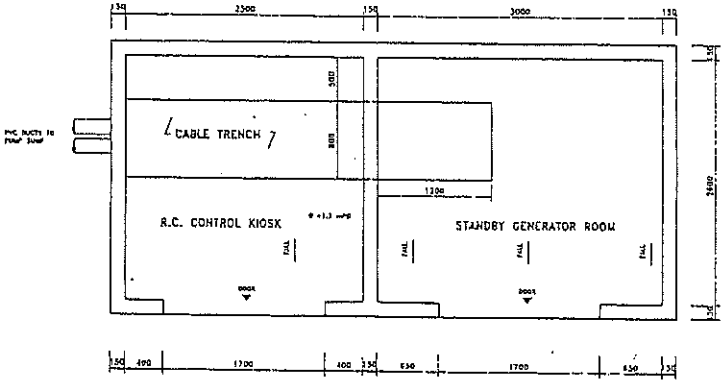
ROOF SLAB



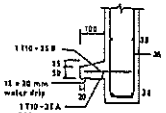
BASE SLAB



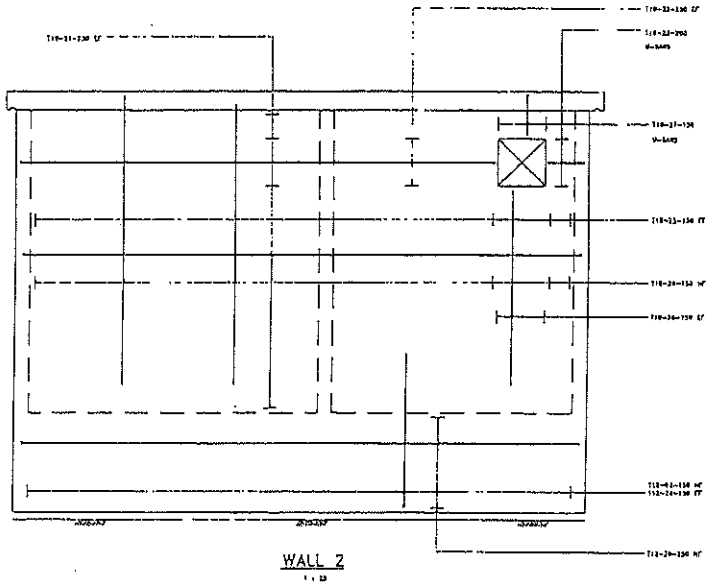
R.C. DETAILS OF ROOF BEAM 1 & 2



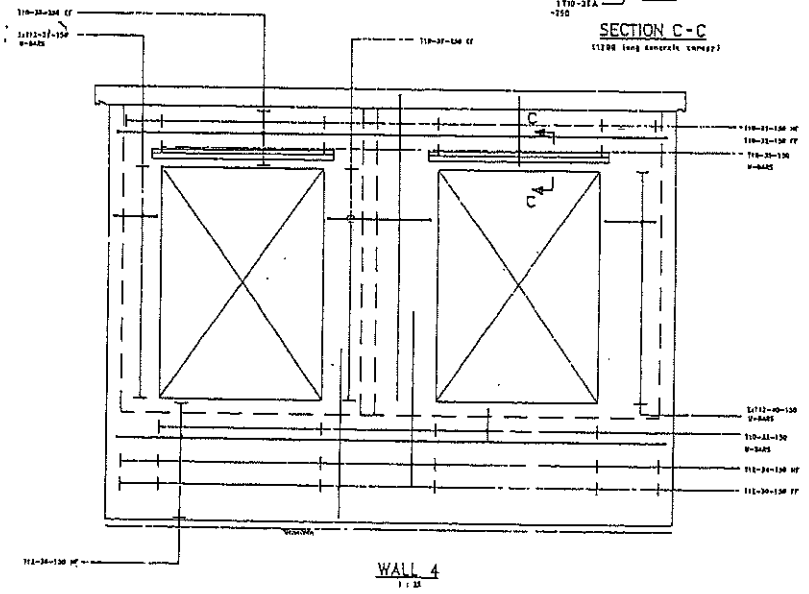
SECTIONAL PLAN OF THE CONTROL KIOSK



SECTION C-C



WALL 2



WALL 4

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WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes:

1. For general notes refer to Drawing no. SP1R
2. Control Panels:
   concrete cover = 25mm
   concrete grade = 30/20

Approved

YL 1/96

PWP no. 7473CL

Project: TIN SHUI WAI DEVELOPMENT

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

AS CONSTRUCTED SEWAGE PUMPING STATION R.C. DETAILS (SHEET 2 OF 3)

Drawing no.	Plan register no.	Scale
SP7R	0290/HMST/055	AS SHOWN

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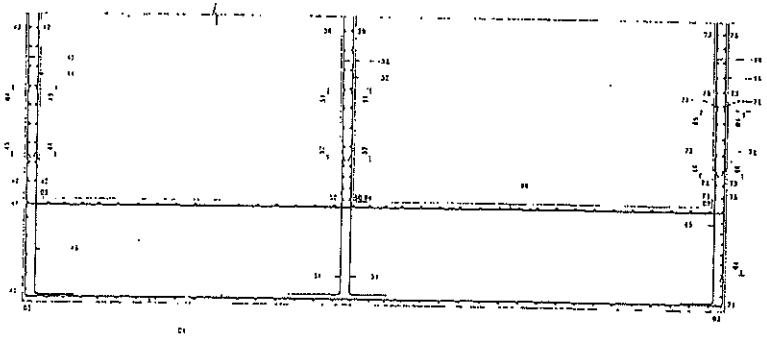
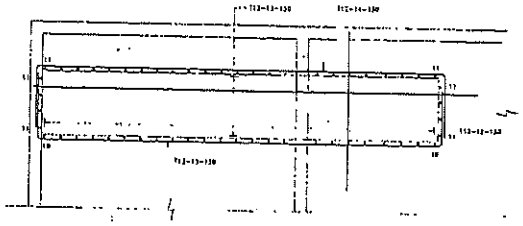
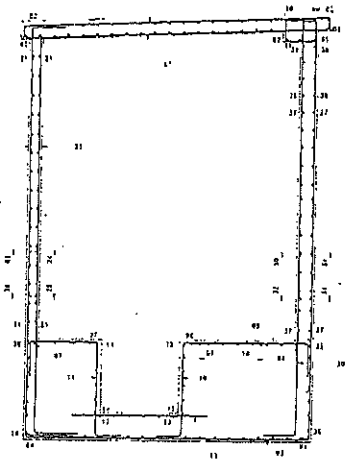
Territory Development Department, Hong Kong



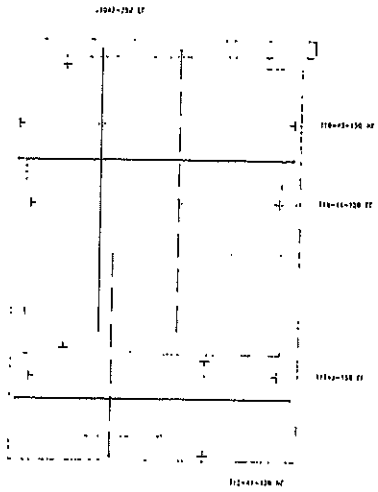
SECTION A–A



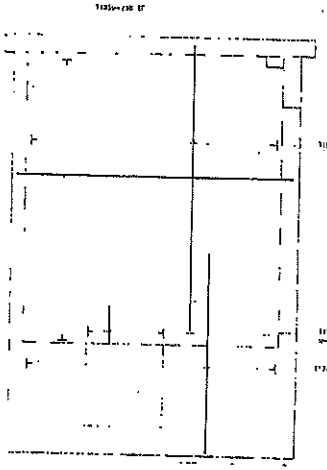
PLAN FOR CABLE TRENCH



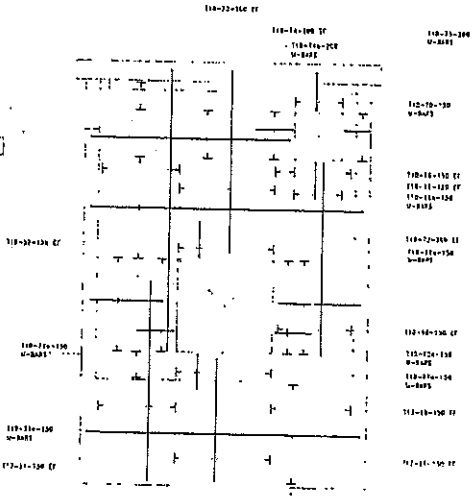
SECTION B–B



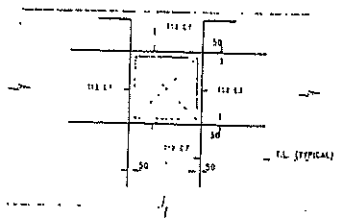
WALL 1



WALL 5



WALL 3



DETAILS FOR OPENING

WORK COMMENCED: 15th APR 1997
DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes

1. For general notes refer to Drawing no. SP8R

Approved

YL 1/98

DFP no. 7473CL

Project: TIN SHUI WAI DEVELOPMENT

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

AS CONSTRUCTED SEWAGE PUMPING STATION R.C. DETAILS (SHEET 3 OF 3)

Drawing no.	Item register no.	Scale
SP8R	0330/HMST/058	AS SHOWN

Binnie

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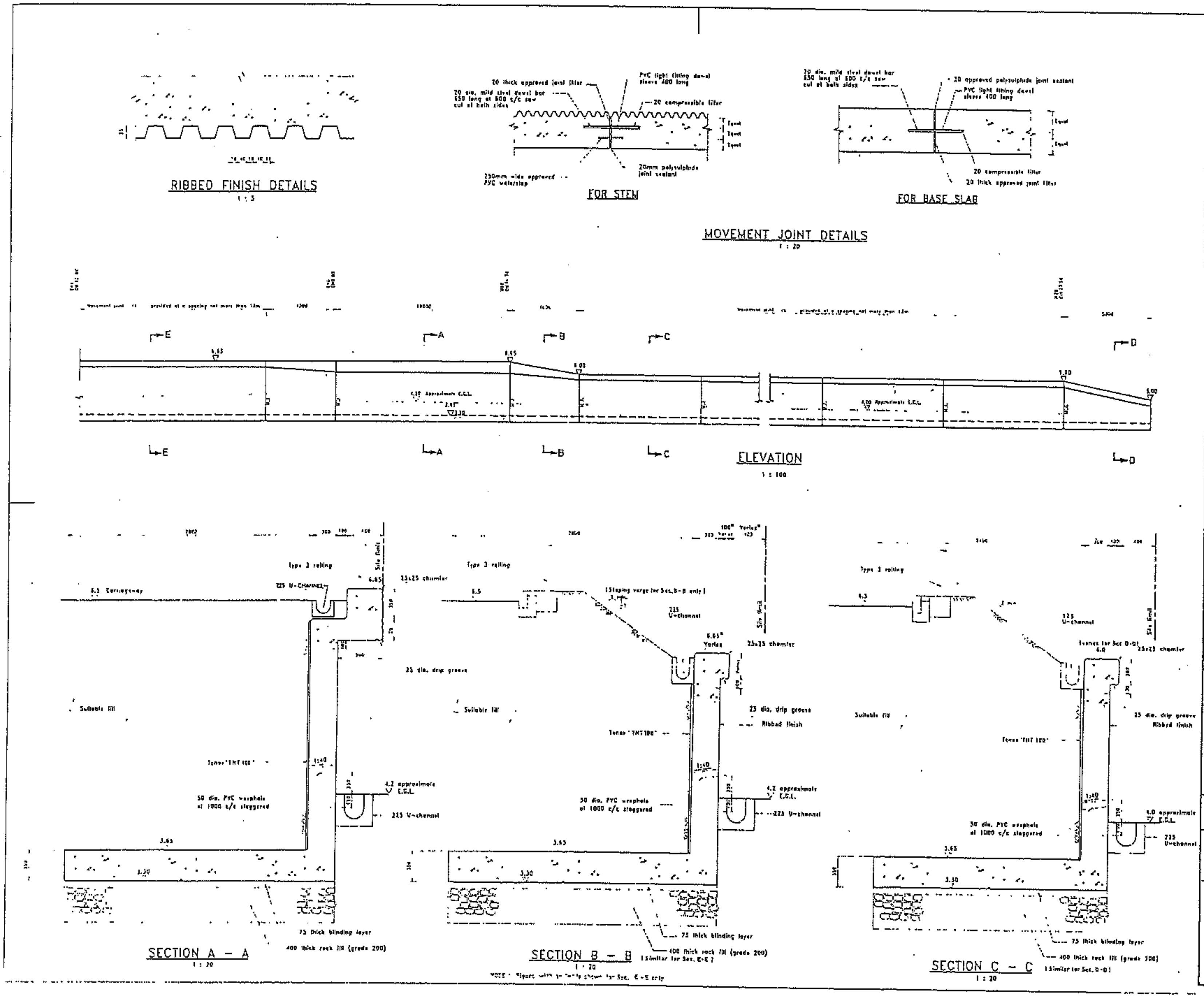
Territory Development Department, Hong Kong



WORK COMMENCED: 15th APR 1997

DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Legend :

Original ground level

Contract no. YL 1/96

7473CL

Project: TIN SHUI WAI DEVELOPMENT

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

AS CONSTRUCTED RETAINING WALL RWI GENERAL ARRANGEMENT

Drawing no. W1R

Scale: AS SHOWN

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NEW TERRITORIES NORTH DEVELOPMENT OFFICE

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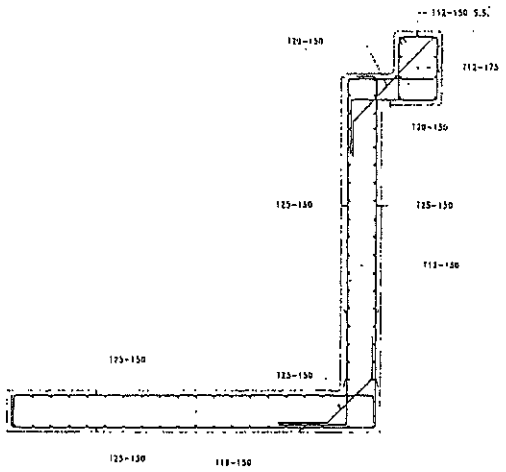
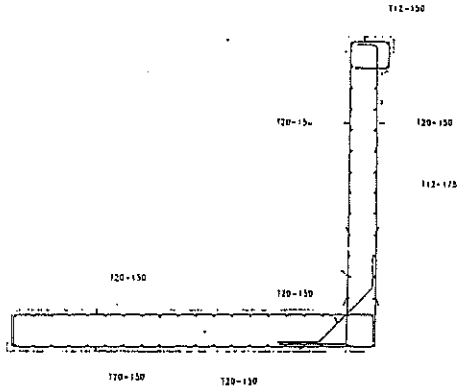
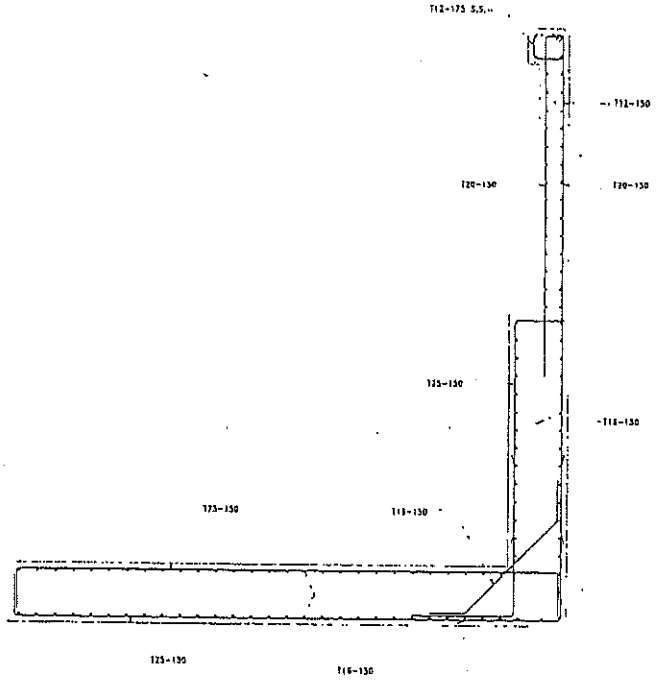
Territory Development Department, Hong Kong



SECTION A – A
RETAINING WALL RW1
1 : 20



SECTION B – B
RETAINING WALL RW1
1 : 20



RETAINING WALL RW2
1 : 50

WORK COMMENCED: 15th APR 1997
DATE OF COMPLETION: 31st AUG 1998

WORK AS EXECUTED

Notes:

1. All dimensions are in millimetres unless otherwise stated.
2. Concrete grade 40/20
3. Minimum concrete cover to all reinforcement is 40mm unless otherwise stated.
4. All reinforcement complies with CS2:1995.

B – 3 – 27 – R1 – 150 – B
- Location of bars (where applicable)
- Pitch of bars (where applicable)
- Bar mark
- Diameter of bar in mm
- Type of steel
- Number of bars

5. Reinforcement are bent in accordance with BS4466.
6. Minimum tension lap length = 37x diameter of the smaller of the two bars lapped unless otherwise stated.
7. Type of steel
   T = Type 2 high yield deformed steel bars (characteristic strength of 460 N/mm²)

Abbreviations:–
T = bars top of slab
B = bars in bottom of slab
CF = each face
NF = near face
FF = far face

Approved

Contract no. YL 1/99

Job no. 7473CL

Project TIN SHUI WAI DEVELOPMENT

VILLAGE FLOOD PROTECTION WORKS FOR HA MEI SAN TSUEN

Drawing title:

AS CONSTRUCTED RETAINING WALLS R.C. DETAILS

Drawing no.	Plan register no.	Scale
W2R	0350/HM57/033	AS SHOWN

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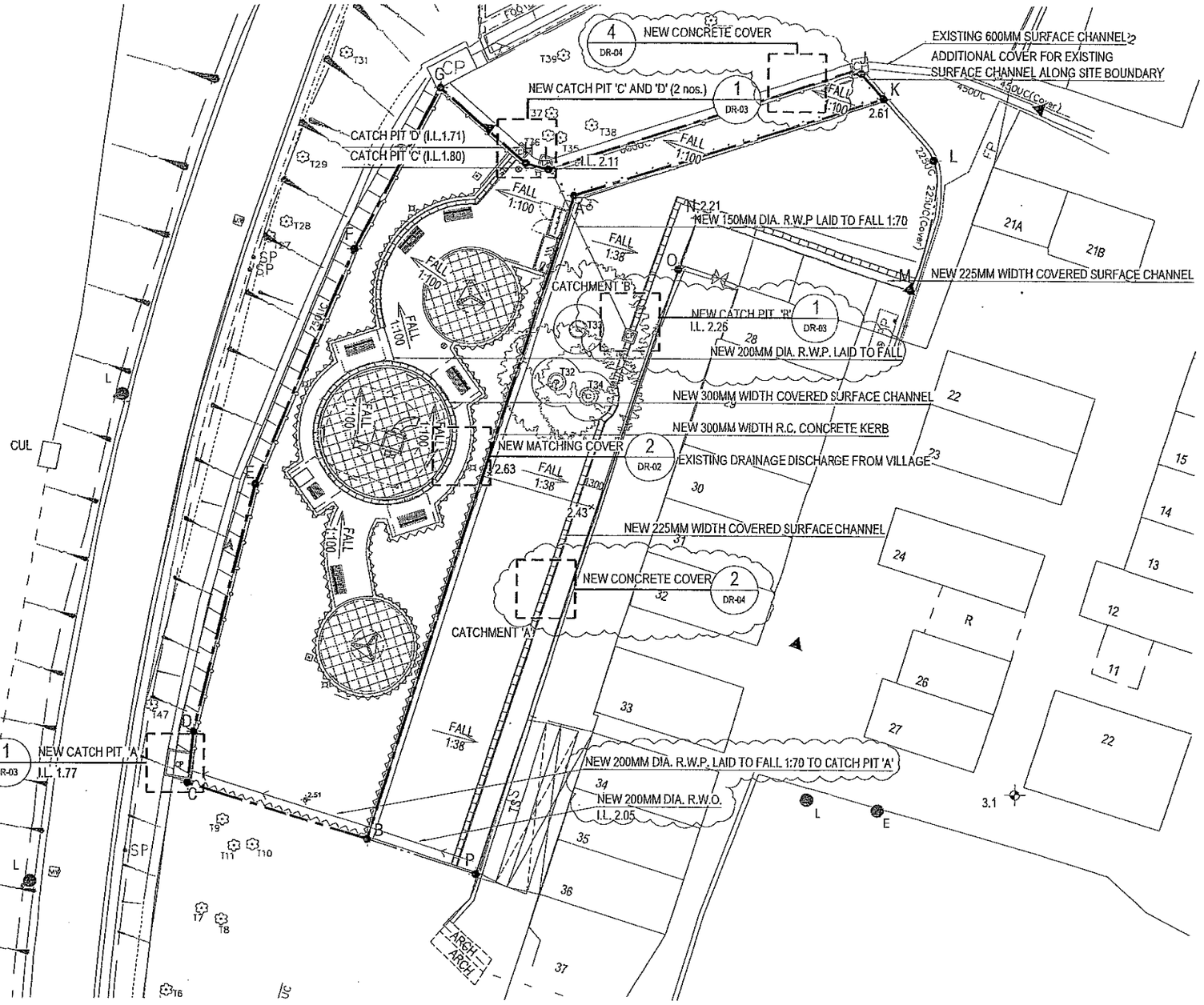
APPENDIX G

Construction Drawings of Sitting-out Area at Ha Mei San Tsuen



N

LEGEND:

- SITE
- A — SETTING OUT POINT (FOR REFERENCE ONLY)
- 250mm WIDTH U-CHANNEL WITH PAINTED CAST IRON HINGED GRATING
- 250mm WIDTH CONCRETE COVER U-CHANNEL WITH TILE FINISH
- B.L. — BOUNDARY LINE
- PROPOSED U-CHANNEL

NOTE:

1. THE CONTRACTOR SHALL CARRY OUT DRAIN TEST AND SUBMIT DRAIN TEST REPORT AFTERWARDS.
2. THE CONTRACTOR SHALL VERIFY ON SITE THE ACTUAL INVERTED LEVEL OF THE EXISTING 750 DIA. UNDERGROUND DRAINAGE PIPE. THE ACTUAL DEPTH OF THE TERMINAL MAN-HOLE SHALL BE SUBJECT TO THE ACTUAL INVERTED LEVEL OF THE EX. 750 DIA. UNDERGROUND DRAINAGE PIPE BEFORE CONSTRUCTION OF THE MAN-HOLE.
3. ALL WORKMANSHIPS FOR DRAINAGE WORKS TO COMPLY WITH HAD'S SPECIFICATION FOR CONSTRUCTION OF WORKS AND DSD'S CURRENT REQUIREMENTS.

NOTES

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4. Prints not showing the last revision are to be cancelled, approved spaces below and after the last revision above are
5. Prints without an authorized signature in the checked and NOT valid for use outside SRL.

REV.	DATE	DESCRIPTION	INITIAL
E	03/01/12	GENERAL REVISION	KYC
D	16/12/11	GENERAL REVISION	KYC
C	09/12/11	GENERAL REVISION	KYC
B	05/12/11	GENERAL REVISION	KYC
A	15/6/11	GENERAL REVISION	RT

EMPLOYER
LEISURE AND CULTURAL SERVICES DEPARTMENT

ARCHITECT
Spence Robinson Ltd
Architects · Project Managers · Interior Designers
馬海(建築顧問)有限公司

QUANTITY SURVEYOR:
C. S. Toh & Sons & Associates Ltd
Quantity Surveyors & Contract Management Consultants
杜志成父子有限公司

STRUCTURAL ENGINEER
WONG & CHENG
Consulting Engineers Limited
黃鄭顧問工程師有限公司

	NAME	SIGNED	DATE
DESIGNED	HP		20-07 2010
DRAWN	ZH		20-07-2010
CHECKED	EL		20-07-2010
APPROVED	KCY		20-07-2010

CONTRACT NO.
DMW/YL/08/2008

FILE NO.

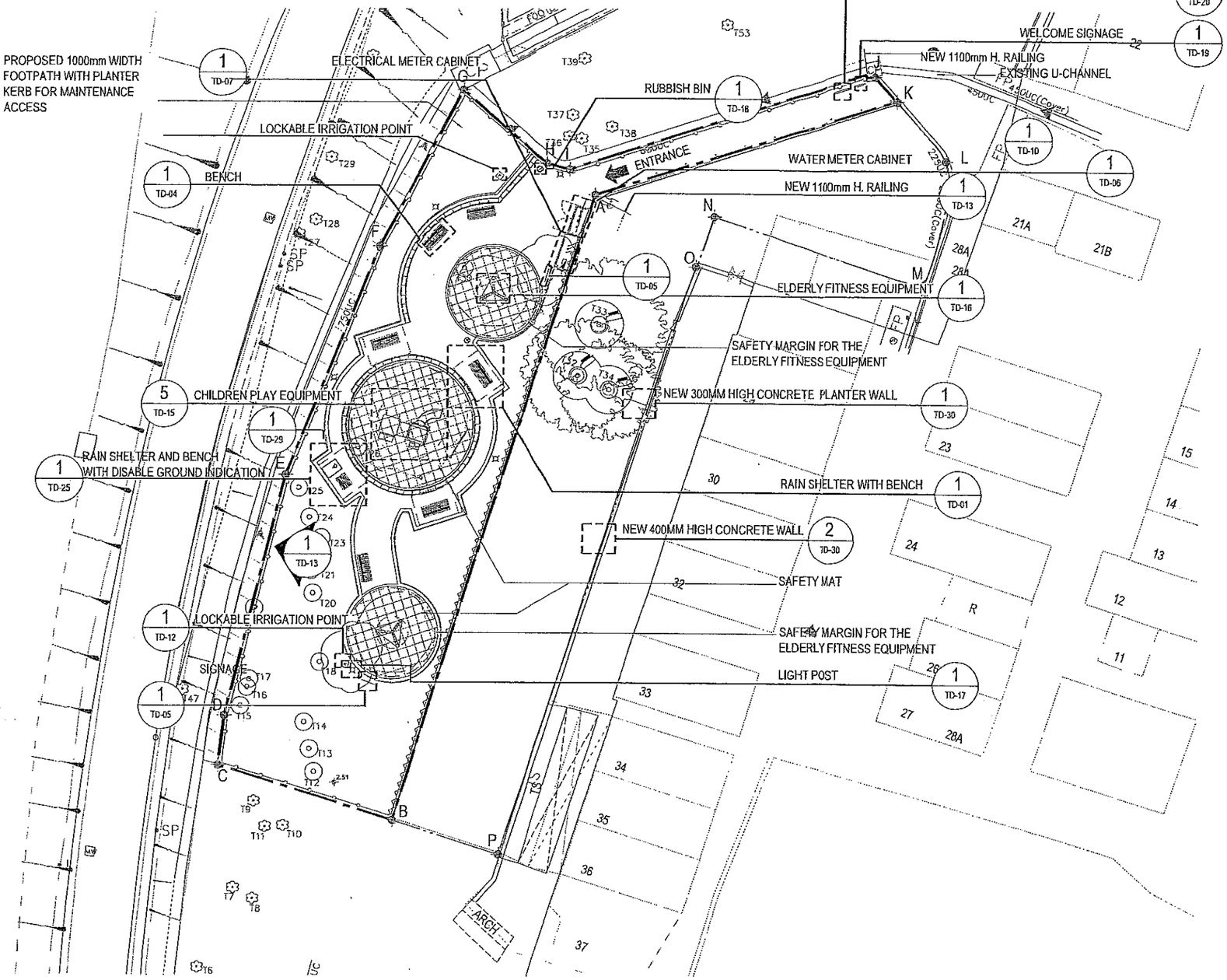
PROJECT NO.
YL - DMW014

PROJECT:
CONSTRUCTION OF SITTING OUT AREA AT HA MEI TSUEN, YUEN LONG

DRAWING TITLE :
DRAINAGE LAYOUT PLAN

DRAWING NO.	SCALE
DR-01(E)	AS SHOWN (A3)
SIGNED	DATE 20-07-2010

YUEN LONG DISTRICT COUNCIL | LEISURE AND CULTURAL SERVICES DEPARTMENT | H.A.D. WORKS



1 / GP-02 LAYOUT PLAN
SCALE 1:300

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REV.	DATE	DESCRIPTION	INITIAL
G	19/6/12	GENERAL REVISION	KYC

EMPLOYER
LEISURE AND CULTURAL SERVICES DEPARTMENT

ARCHITECT
Spence Robinson Ltd
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QUANTITY SURVEYOR:
C. S. Toh & Sons & Associates Ltd
Quantity Surveyors & Contract Management Consultants
杜志成父子有限公司

STRUCTURAL ENGINEER
WONG & CHENG
Consulting Engineers Limited
黃鄭顧問工程師有限公司

	NAME	SIGNED	DATE
DESIGNED	HP		20-07 2010
DRAWN	ZH		20-07-2010
CHECKED	EL		20-07-2010
APPROVED	KCY		20-07-2010

CONTRACT NO.
DMW/YL/08/2008

FILE NO.

PROJECT NO.
YL - DMW014

PROJECT:
CONSTRUCTION OF SITTING OUT AREA AT HA MEI TSUEN, YUEN LONG

DRAWING TITLE:
LAYOUT PLAN

DRAWING NO.	SCALE
GP-02(G)	AS SHOWN (A3)
SIGNED	DATE 20-07-2010

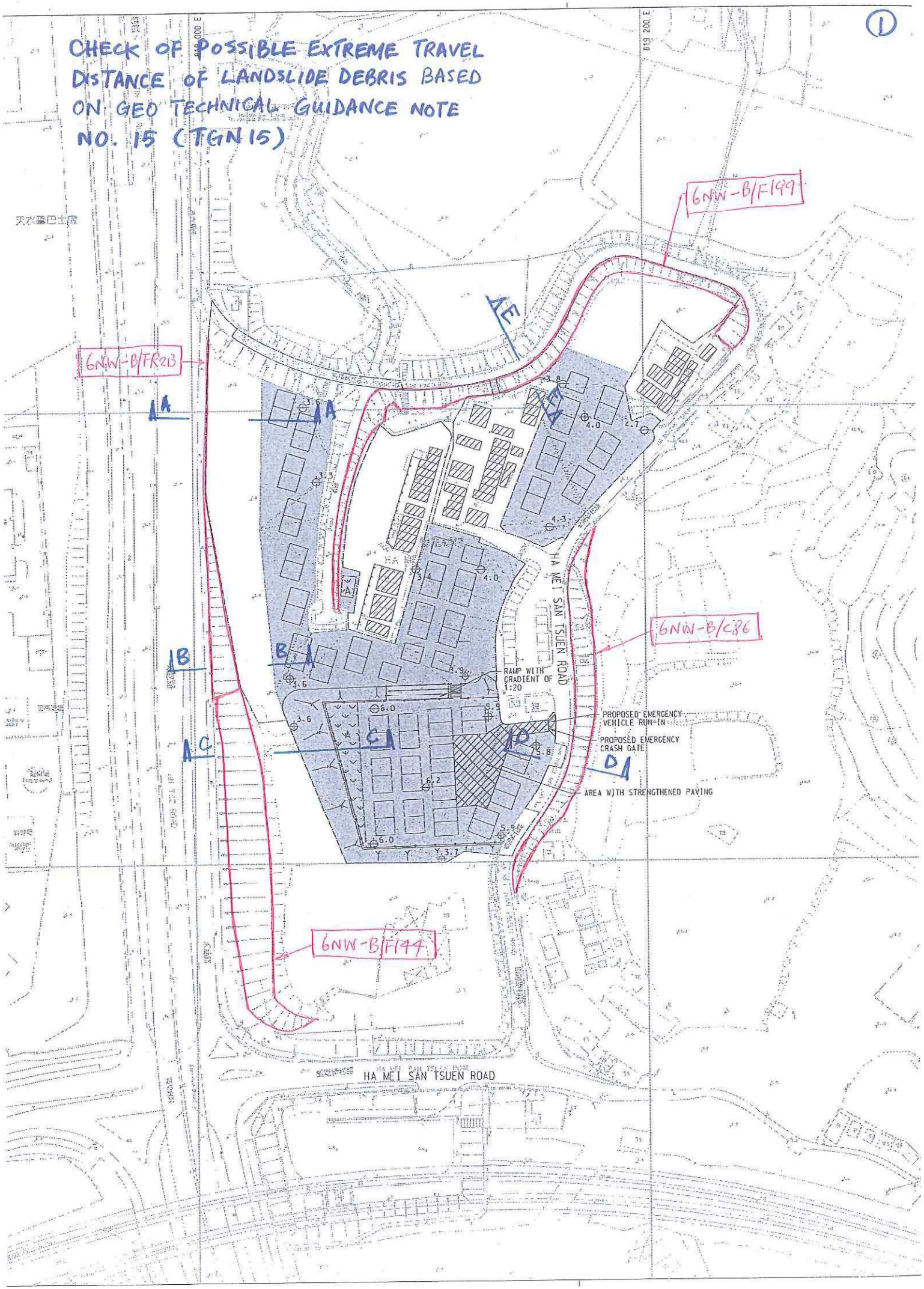
YUEN LONG DISTRICT COUNCIL | LEISURE AND CULTURAL SERVICES DEPARTMENT | H.A.D. WORKS

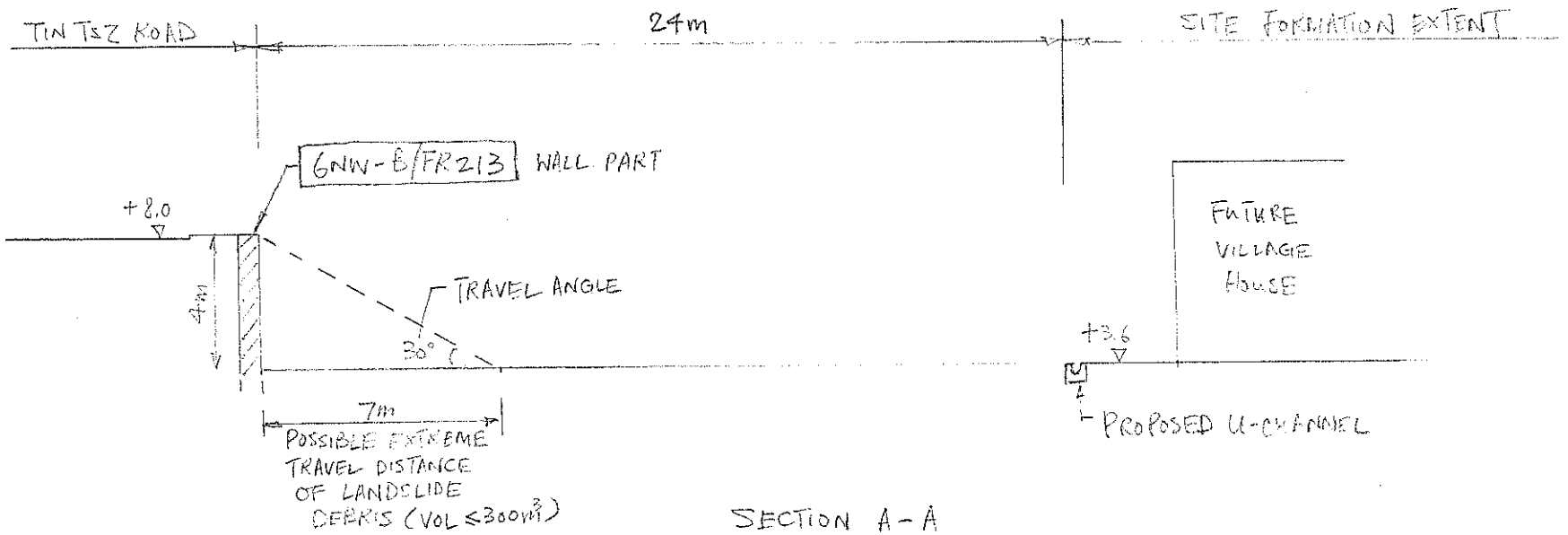
APPENDIX H

Assessment and Design of Man-made Slopes or Retaining Walls

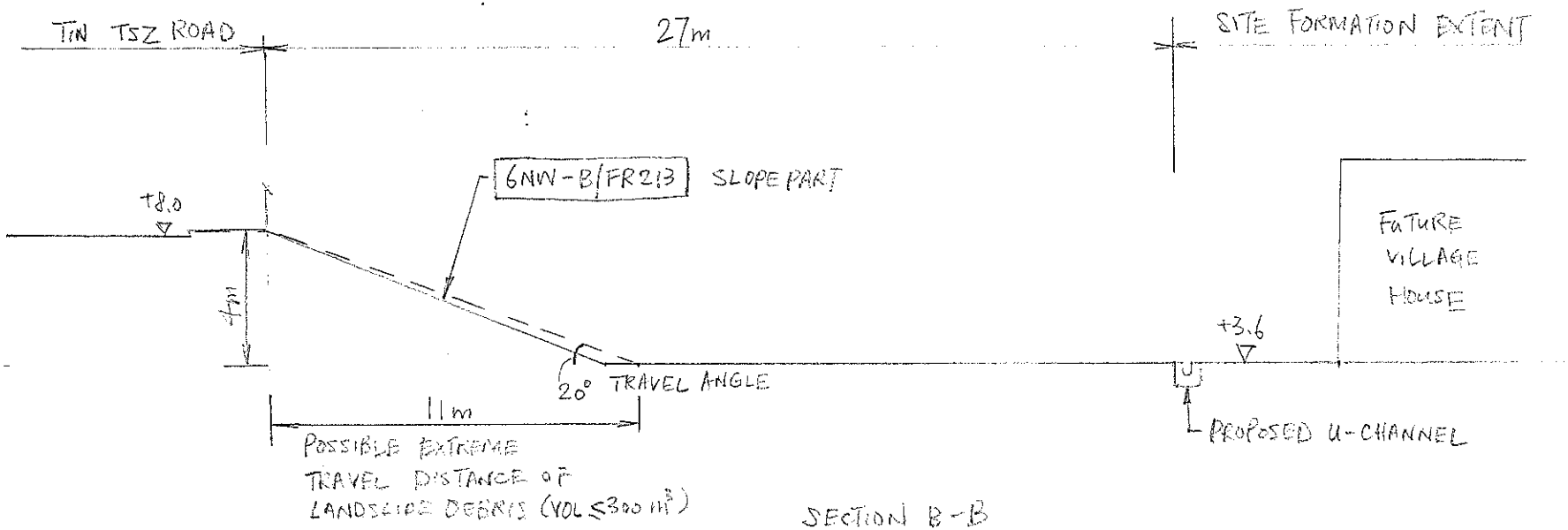
APPENDIX H1

Assessment of Feature Nos. 6NW-B/C86, FR213 and F144 based on GEO Technical Guidance Note No. 15

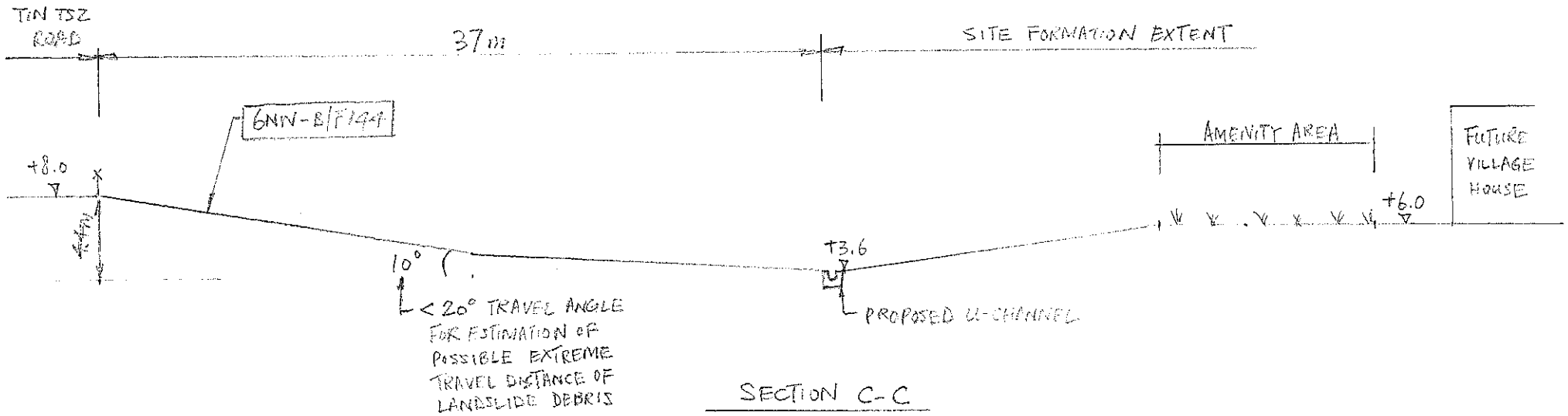

CHECK OF POSSIBLE EXTREME TRAVEL DISTANCE OF LANDSLIDE DEBRIS BASED ON GEO TECHNICAL GUIDANCE NOTE NO. 15 (TGN15)
①
818000 E
819200 E
6NW-B/F199
6NW-B/FR213
6NW-B/C86
6NW-B/F144
A
A
B
B
C
C
D
D
E
E
RAMP WITH GRADIENT OF 1:20
PROPOSED EMERGENCY VEHICLE RUN-IN
PROPOSED EMERGENCY CRASH GATE
AREA WITH STRENGTHENED PAVING
HA MEI SAN TSUEN ROAD
HA MEI SAN TSUEN ROAD



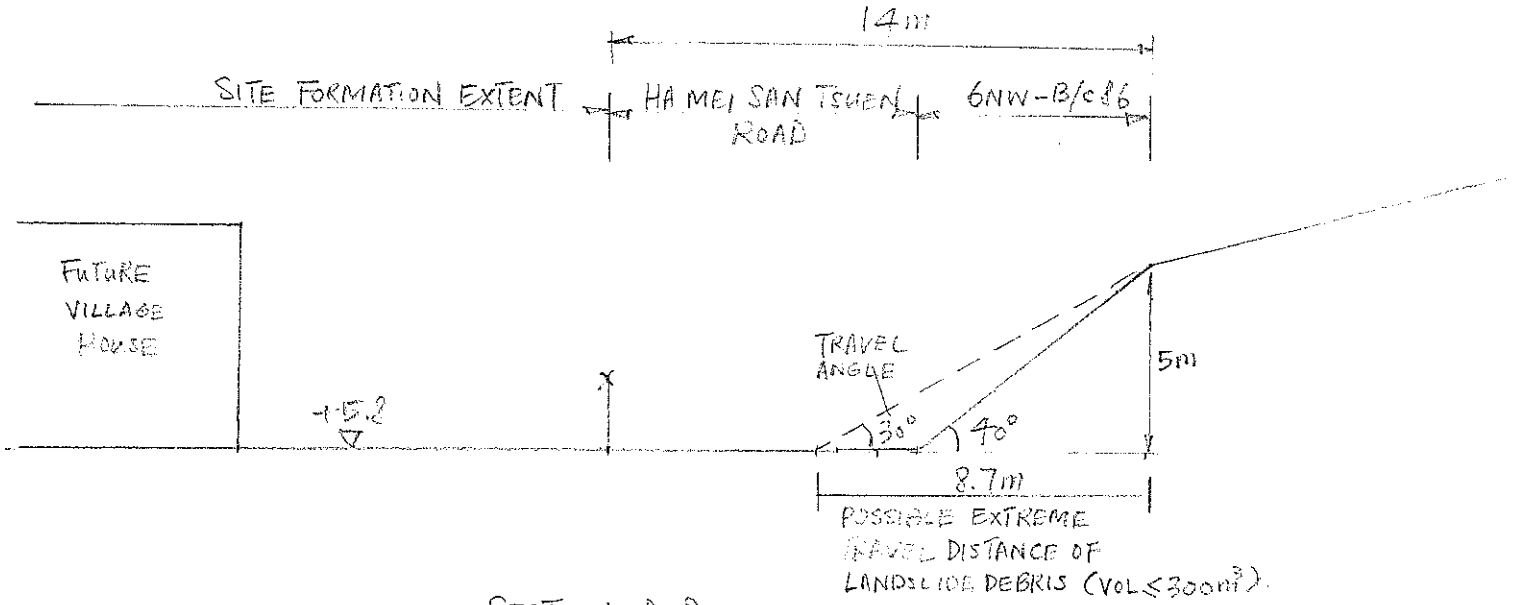
SECTION A-A
(1:200)



SECTION B-B
(1:200)



SECTION C-C
(1:300)



SECTION D-D
(1:200)

APPENDIX H2

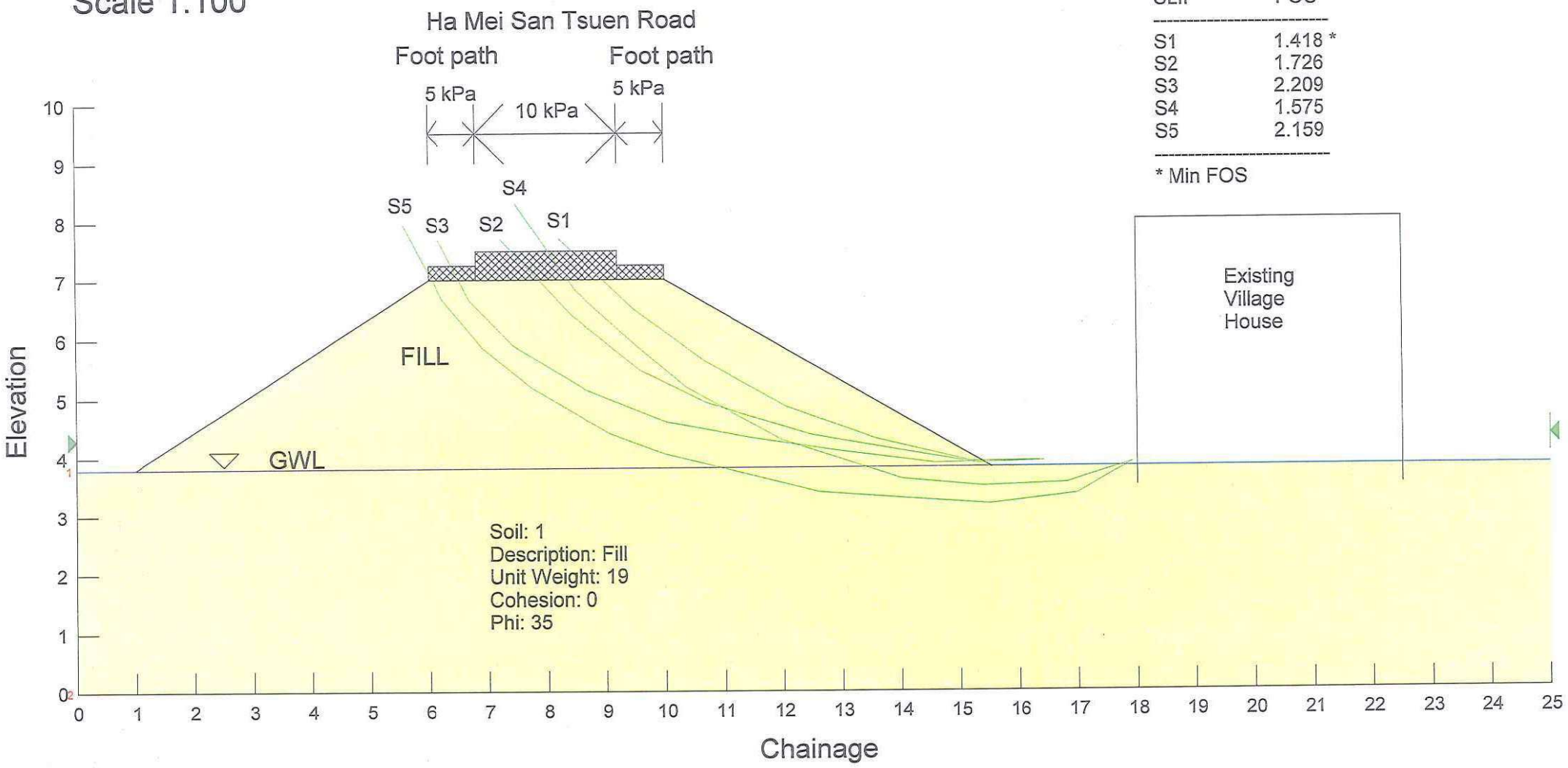
Stability Analysis Results of Feature No. 6NW-B/F199


6NW-B/F199
6NW-B/FR213
6NW-B/C86
6NW-B/F194
HA MEI SAN TSUEN ROAD
RAMP WITH GRADIENT OF 1:20
PROPOSED EMERGENCY VEHICLE RUN-IN
PROPOSED EMERGENCY CRASH GATE
AREA WITH STRENGTHENED PAVING
HA MEI SAN TSUEN ROAD

Tin Shui Wai Deelopment Engineering Infrastructure
For Ha Mei San Tsuen Village Expansion Area

Typical Section of Feature 6NW-B/F199 (SECTION E-E)

Scale 1:100



SLIP	FOS
S1	1.418 *
S2	1.726
S3	2.209
S4	1.575
S5	2.159

* Min FOS

FEATURE No. 6NW-B/F199

APPENDIX H3

Stability Analysis of Newly Formed Small Slope

Tin Shui Wai Development Engineering Infrastructure
For Ha Mei San Tsuen Village Expansion Area

Typical Section of Slope of the Platform

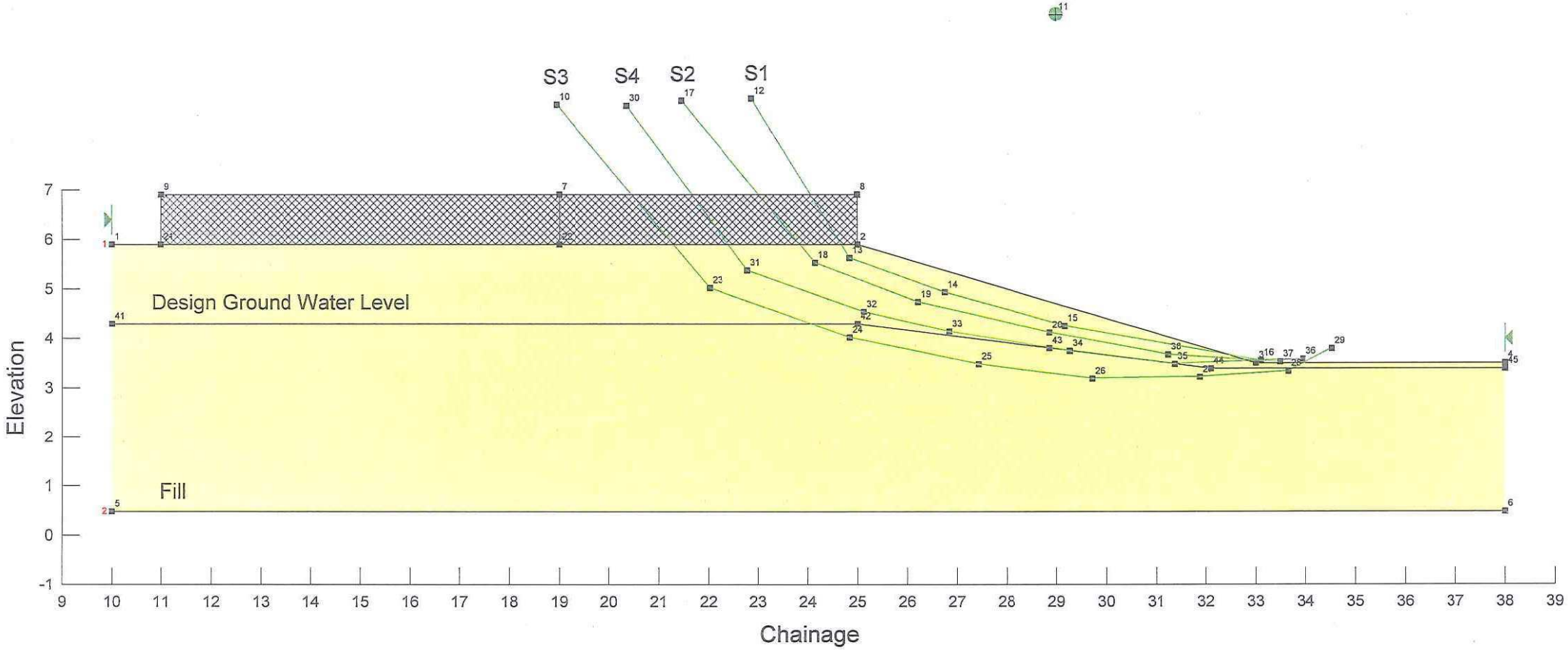
Scale 1:100

SLIP	FOS
S1	2.683*
S2	2.922
S3	3.411
S4	3.424

*MIN FOS > 1.4
O.K.

SOIL PARAMETER:

Fill
Unit Weight 19
Cohesion 0
Phi 39



Tin Shui Wai Development Engineering Infrastructure
For Ha Mei San Tsuen Village Expansion Area

Typical Section of Slope of the Platform

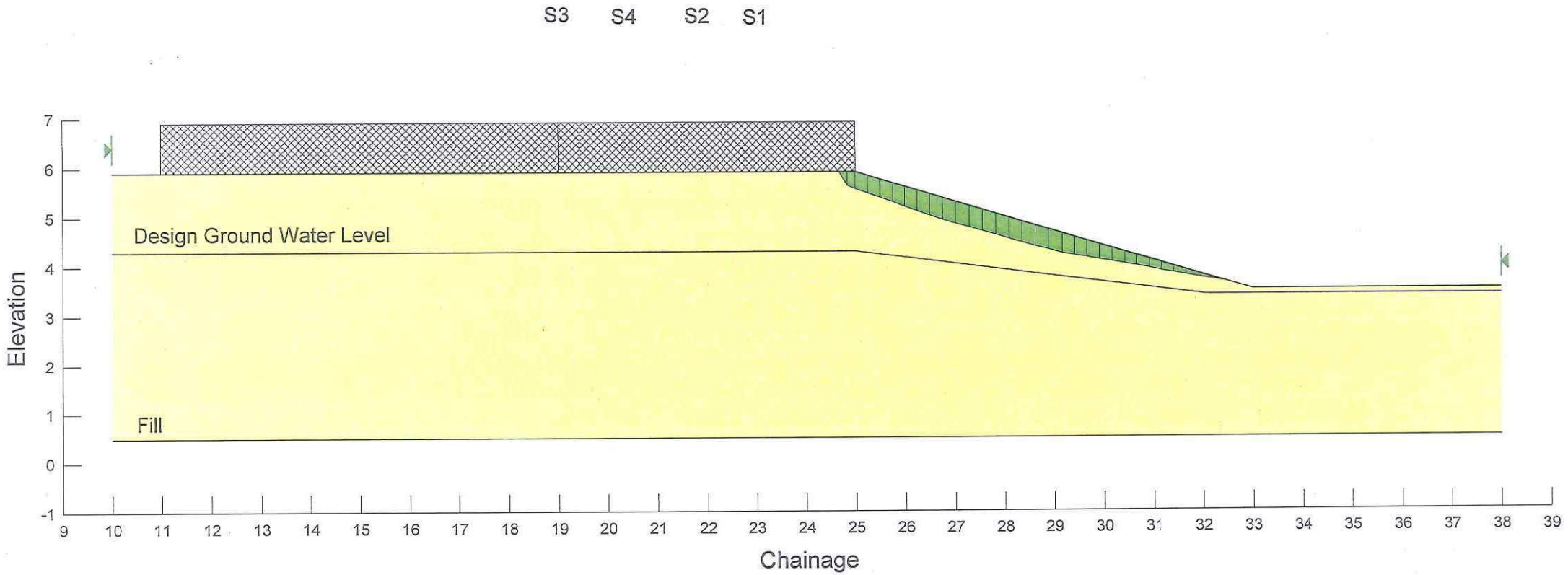
Scale 1:100

SLIP	FOS
S1	2.683*
S2	2.922
S3	3.411
S4	3.424

*MIN FOS > 1.4
O.K.

SOIL PARAMETER:

Fill
Unit Weight 19
Cohesion 0
Phi 39



Tin Shui Wai Development Engineering Infrastructure
For Ha Mei San Tsuen Village Expansion Area

Typical Section of Slope of the Platform

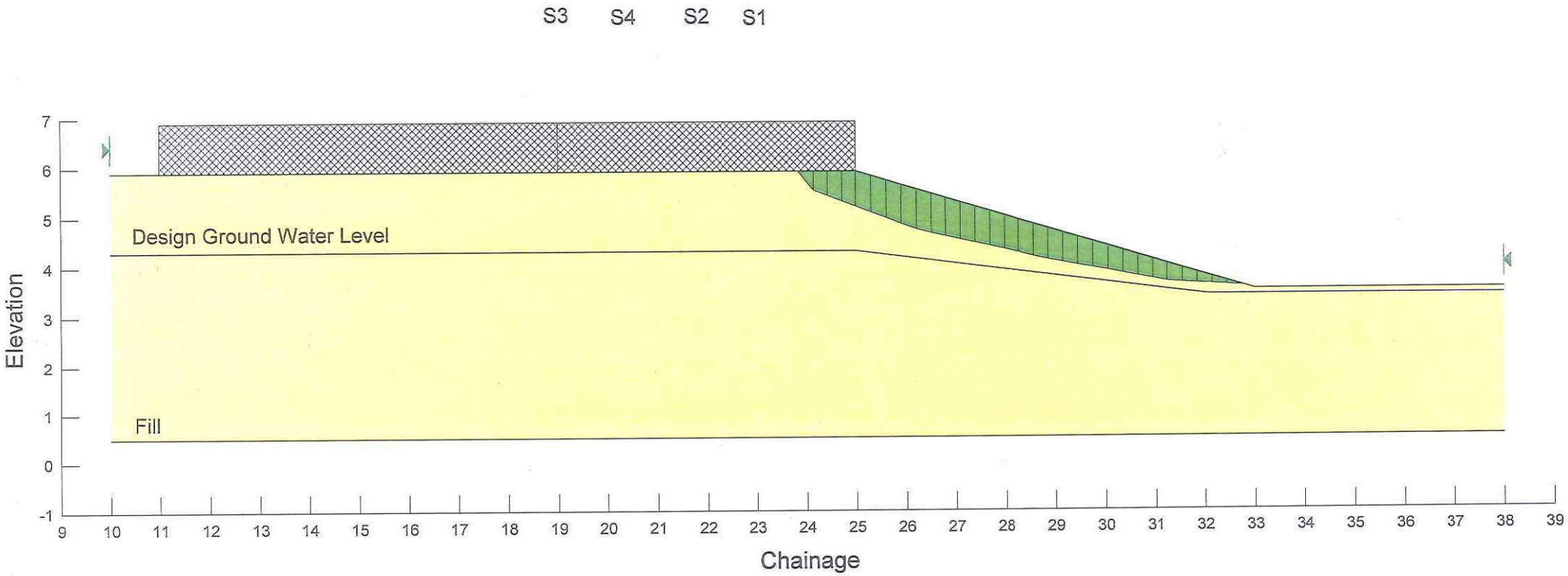
Scale 1:100

SLIP	FOS
S1	2.683*
S2	2.922
S3	3.411
S4	3.424

*MIN FOS > 1.4
O.K.

SOIL PARAMETER:

Fill
Unit Weight 19
Cohesion 0
Phi 39



Tin Shui Wai Development Engineering Infrastructure
For Ha Mei San Tsuen Village Expansion Area

Typical Section of Slope of the Platform

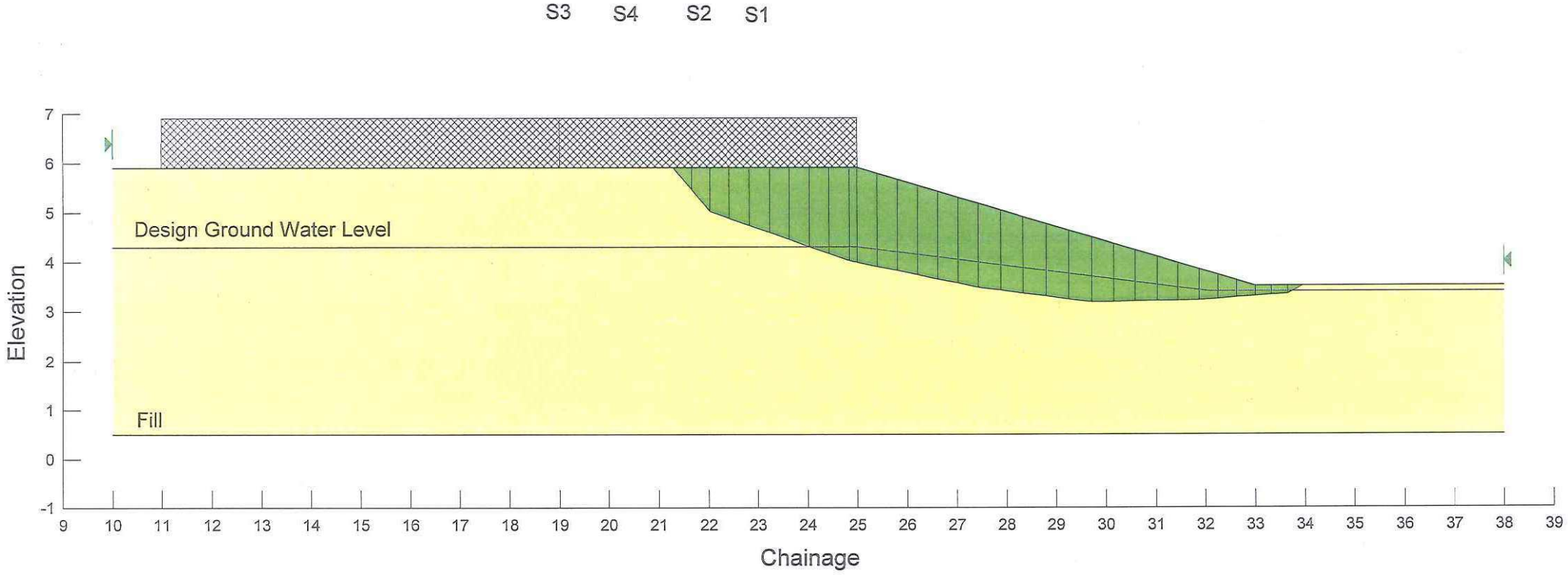
Scale 1:100

SLIP	FOS
S1	2.683*
S2	2.922
S3	3.411
S4	3.424

*MIN FOS > 1.4
O.K.

SOIL PARAMETER:

Fill
Unit Weight 19
Cohesion 0
Phi 39



Tin Shui Wai Development Engineering Infrastructure
For Ha Mei San Tsuen Village Expansion Area

Typical Section of Slope of the Platform

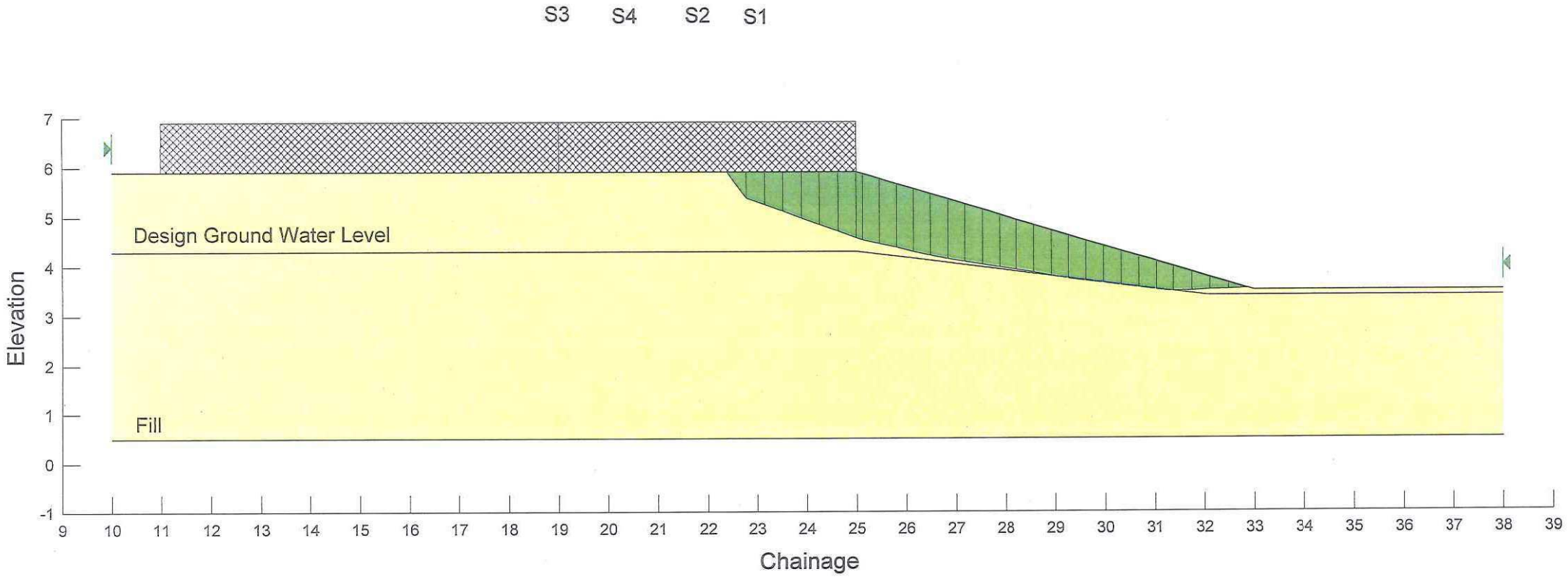
Scale 1:100

SLIP	FOS
S1	2.683*
S2	2.922
S3	3.411
S4	3.424

*MIN FOS > 1.4
O.K.

SOIL PARAMETER:
Fill
Unit Weight 19
Cohesion 0
Phi 39

3.424



```
FILEINFO
SLOPEW 4.20
TITLE


19/10/2012

10:55:29

ANALYSIS
    3     2     2 +9.8070e+000     0     0
CONVERGE
   30 +1.0000e-002  1000
SIDE
    2
LAMBDA
+0.0000e+000 +9.9900e+002 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
SOIL            2
    1 +1.9000e+001 +0.0000e+000 +3.9000e+001 +0.0000e+000 +0.0000e+000 +0.0000e+000   1  0
      +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000   0   0
      +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
      +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
Fill
    2 +1.9000e+001 +0.0000e+000 +3.5000e+001 +0.0000e+000 +0.0000e+000 +0.0000e+000   1  0
      +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000   0   0
      +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
      +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
Alluvium
SFUNCTION       0
AFUNCTION       0
POINT          45
    1 +1.0000e+001 +5.9000e+000
    2 +2.5000e+001 +5.9000e+000
    3 +3.3000e+001 +3.5000e+000
    4 +3.8000e+001 +3.5000e+000
    5 +1.0000e+001 +5.0000e-001
    6 +3.8000e+001 +5.0000e-001
    7 +1.9000e+001 +6.9000e+000
    8 +2.4999e+001 +6.9000e+000
    9 +1.1000e+001 +6.9000e+000
   10 +1.8960e+001 +8.6890e+000
   11 +2.9000e+001 +1.0500e+001
   12 +2.2878e+001 +8.8131e+000
   13 +2.4841e+001 +5.6210e+000
   14 +2.6749e+001 +4.9300e+000
   15 +2.9169e+001 +4.2490e+000
   16 +3.3106e+001 +3.5530e+000
   17 +2.1471e+001 +8.7650e+000
   18 +2.4149e+001 +5.5250e+000
   19 +2.6213e+001 +4.7320e+000
   20 +2.8860e+001 +4.1230e+000
   21 +1.0999e+001 +5.9000e+000
   22 +1.9000e+001 +5.9000e+000
   23 +2.2024e+001 +5.0270e+000
   24 +2.4841e+001 +4.0220e+000
   25 +2.7430e+001 +3.4860e+000
   26 +2.9720e+001 +3.1860e+000
   27 +3.1889e+001 +3.2150e+000
   28 +3.3657e+001 +3.3450e+000
   29 +3.4536e+001 +3.7950e+000
   30 +2.0371e+001 +8.6650e+000
   31 +2.2787e+001 +5.3740e+000
   32 +2.5121e+001 +4.5380e+000
   33 +2.6836e+001 +4.1420e+000
   34 +2.9271e+001 +3.7510e+000
   35 +3.1377e+001 +3.4860e+000
   36 +3.3952e+001 +3.5820e+000
   37 +3.3488e+001 +3.5290e+000
   38 +3.1251e+001 +3.6690e+000
   41 +1.0000e+001 +4.3000e+000
   42 +2.5000e+001 +4.3000e+000
   43 +2.8860e+001 +3.8000e+000
   44 +3.2101e+001 +3.4000e+000
   45 +3.8000e+001 +3.4000e+000
LINE            2
    1     4
```

```
    1
    2
    3
    4
    2     2
    5
    6
TENSION
    0 +9.8070e+000 +0.0000e+000 +0.0000e+000      0
GRID
    0     0     0     0     0 0 +0.0000e+000 0 +0.0000e+000
RADIUS
    0     0     0     0     0     0     0
AXIS
   11
LIMIT
0 +1.0000e+001 +3.8000e+001
SLIP            4
    1     5
   12
   13
   14
   15
   16
    2     6
   17
   18
   19
   20
   38
   37
    3     8
   10
   23
   24
   25
   26
   27
   28
   29
    4     7
   30
   31
   32
   33
   34
   35
   36
BLOCK
    0     0     0     0     0 +1.3500e+002 +1.3500e+002 0 0
    0     0     0     0     0 +4.5000e+001 +4.5000e+001 0 0
PORU            2 +0.0000e+000
    1 +0.0000e+000     0
    2 +0.0000e+000     0
PIEZ            2 +0.0000e+000
    1     5     1
   41
   42
   43
   44
   45
    2     5     1
   41
   42
   43
   44
   45
PCON            0 +0.0000e+000
POGH            0 +0.0000e+000
POGP            0 +0.0000e+000
POGR            0 +0.0000e+000
PORA            2
    1 +0.0000e+000
    2 +0.0000e+000
LOAD            0
ANCHOR          0
```

```
PBOUNDARY          2
     1       4 +5.0000e+000       1
    22
     7
     8
     2
     2       4 +6.0000e+001       1
    21
     9
     7
    22
SEISMIC
+0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
NODE               0
ELEMENT            0
MATLCOLOR          2
     1   255   255   128
     2   191   255   128
```

```
For Ha Mei San Tsuen Village Expansion Area
   10 +1.0233e+001 +1.2972e+001 -1.2000e+001     0   400      1      0
Arial
  0   0  34
Scale 1:100
   11 +1.0233e+001 +1.3720e+001 -1.2000e+001     0   400      1      0
Arial
  0   0  34
Typical Section of Slope of the Platform
LINE           0
CIRCLE         0
ARC            0
CUSTSTRINGS      0

IMAGE          1
OBJECT
CUSTCOLORS
    63     63     63
    63     63     63
    63     63     63
    63     63     63
    63     63     63
    63     63     63
    63     63     63
    63     63     63
    63     63     63
    63     63     63
    63     63     63
    63     63     63
    63     63     63
    63     63     63
    63     63     63
    63     63     63
```

19/10/2012
10:32:53

Center_X	Center_Y	Radius	Slip_Surface	Method
2.900000e+001	1.050000e+001	6.317743e+000	1	3

SL#	X_Left	Y_L_Top	Y_L_Bottom	X_Right	Y_R_Top	Y_R_Bottom	Mid_Height
1	2.466943e+001	5.900000e+000	5.899990e+000	2.484100e+001	5.900000e+000	5.621000e+000	1.394992e-001
2	2.484100e+001	5.900000e+000	5.621000e+000	2.499900e+001	5.900000e+000	5.563778e+000	3.076110e-001
3	2.499900e+001	5.900000e+000	5.563778e+000	2.524900e+001	5.825300e+000	5.473238e+000	3.442917e-001
4	2.524900e+001	5.825300e+000	5.473238e+000	2.549900e+001	5.750300e+000	5.382699e+000	3.598313e-001
5	2.549900e+001	5.750300e+000	5.382699e+000	2.574900e+001	5.675300e+000	5.292159e+000	3.753710e-001
6	2.574900e+001	5.675300e+000	5.292159e+000	2.599900e+001	5.600300e+000	5.201619e+000	3.909106e-001
7	2.599900e+001	5.600300e+000	5.201619e+000	2.624900e+001	5.525300e+000	5.111079e+000	4.064507e-001
8	2.624900e+001	5.525300e+000	5.111079e+000	2.649900e+001	5.450300e+000	5.020540e+000	4.219904e-001
9	2.649900e+001	5.450300e+000	5.020540e+000	2.674900e+001	5.375300e+000	4.930000e+000	4.375300e-001
10	2.674900e+001	5.375300e+000	4.930000e+000	2.701789e+001	5.294633e+000	4.854333e+000	4.428000e-001
11	2.701789e+001	5.294633e+000	4.854333e+000	2.728678e+001	5.213967e+000	4.778667e+000	4.378004e-001
12	2.728678e+001	5.213967e+000	4.778667e+000	2.755567e+001	5.133300e+000	4.703000e+000	4.327998e-001
13	2.755567e+001	5.133300e+000	4.703000e+000	2.782455e+001	5.052634e+000	4.627334e+000	4.278002e-001
14	2.782455e+001	5.052634e+000	4.627334e+000	2.809344e+001	4.971967e+000	4.551667e+000	4.227996e-001
15	2.809344e+001	4.971967e+000	4.551667e+000	2.836233e+001	4.891301e+000	4.476001e+000	4.178004e-001
16	2.836233e+001	4.891301e+000	4.476001e+000	2.863122e+001	4.810634e+000	4.400334e+000	4.127998e-001
17	2.863122e+001	4.810634e+000	4.400334e+000	2.890011e+001	4.729968e+000	4.324667e+000	4.078002e-001
18	2.890011e+001	4.729968e+000	4.324667e+000	2.916900e+001	4.649300e+000	4.249000e+000	4.027996e-001
19	2.916900e+001	4.649300e+000	4.249000e+000	2.941891e+001	4.574328e+000	4.204821e+000	3.849034e-001
20	2.941891e+001	4.574328e+000	4.204821e+000	2.966881e+001	4.499356e+000	4.160641e+000	3.541107e-001
21	2.966881e+001	4.499356e+000	4.160641e+000	2.991872e+001	4.424384e+000	4.116461e+000	3.233190e-001
22	2.991872e+001	4.424384e+000	4.116461e+000	3.016863e+001	4.349412e+000	4.072282e+000	2.925262e-001
23	3.016863e+001	4.349412e+000	4.072282e+000	3.041853e+001	4.274440e+000	4.028102e+000	2.617345e-001
24	3.041853e+001	4.274440e+000	4.028102e+000	3.066844e+001	4.199468e+000	3.983922e+000	2.309418e-001
25	3.066844e+001	4.199468e+000	3.983922e+000	3.091835e+001	4.124496e+000	3.939743e+000	2.001495e-001
26	3.091835e+001	4.124496e+000	3.939743e+000	3.116825e+001	4.049524e+000	3.895563e+000	1.693568e-001
27	3.116825e+001	4.049524e+000	3.895563e+000	3.141816e+001	3.974552e+000	3.851384e+000	1.385646e-001
28	3.141816e+001	3.974552e+000	3.851384e+000	3.166807e+001	3.899580e+000	3.807204e+000	1.077721e-001
29	3.166807e+001	3.899580e+000	3.807204e+000	3.191797e+001	3.824608e+000	3.763025e+000	7.697988e-002
30	3.191797e+001	3.824608e+000	3.763025e+000	3.216788e+001	3.749637e+000	3.718845e+000	4.618788e-002
31	3.216788e+001	3.749637e+000	3.718845e+000	3.241778e+001	3.674667e+000	3.674667e+000	1.539564e-002

SL#	L_Load_X	L_Load_Y	A_Load_X	A_Load_Y	P_Load_X	P_Load_Y	A_Modifier
1	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	-1.1452e-008	-8.5787e-001	1.0000e+000
2	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	-1.0546e-008	-7.9000e-001	1.0000e+000
3	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
4	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
5	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
6	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
7	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
8	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
9	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
10	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
11	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
12	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
13	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
14	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
15	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
16	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
17	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
18	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
19	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
20	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
21	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
22	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
23	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
24	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
25	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
26	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
27	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
28	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
29	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
30	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000
31	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.0000e+000

SL#	Weight	Pore_Water	Alpha	Force Fn.	Seismic_F	Seismic_Y	Pore_Air	Phi_B
1	4.5475e-001	0.0000e+000	5.8409e+001	6.9509e-002	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
2	9.2345e-001	0.0000e+000	1.9908e+001	1.3323e-001	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000

3	1.6354e+000	0.0000e+000	1.9908e+001	2.3283e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
4	1.7092e+000	0.0000e+000	1.9908e+001	3.3005e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
5	1.7830e+000	0.0000e+000	1.9908e+001	4.2387e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
6	1.8568e+000	0.0000e+000	1.9908e+001	5.1335e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
7	1.9306e+000	0.0000e+000	1.9908e+001	5.9755e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
8	2.0045e+000	0.0000e+000	1.9908e+001	6.7562e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
9	2.0783e+000	0.0000e+000	1.9908e+001	7.4676e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
10	2.2622e+000	0.0000e+000	1.5717e+001	8.1469e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
11	2.2367e+000	0.0000e+000	1.5717e+001	8.7295e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
12	2.2111e+000	0.0000e+000	1.5717e+001	9.2084e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
13	2.1856e+000	0.0000e+000	1.5717e+001	9.5780e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
14	2.1600e+000	0.0000e+000	1.5717e+001	9.8339e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
15	2.1345e+000	0.0000e+000	1.5717e+001	9.9730e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
16	2.1089e+000	0.0000e+000	1.5717e+001	9.9937e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
17	2.0834e+000	0.0000e+000	1.5717e+001	9.8957e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
18	2.0579e+000	0.0000e+000	1.5717e+001	9.6802e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
19	1.8276e+000	0.0000e+000	1.0025e+001	9.3768e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
20	1.6814e+000	0.0000e+000	1.0025e+001	8.9772e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
21	1.5352e+000	0.0000e+000	1.0025e+001	8.4856e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
22	1.3890e+000	0.0000e+000	1.0025e+001	7.9068e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
23	1.2428e+000	0.0000e+000	1.0025e+001	7.2470e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
24	1.0966e+000	0.0000e+000	1.0025e+001	6.5128e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
25	9.5035e-001	0.0000e+000	1.0025e+001	5.7119e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
26	8.0414e-001	0.0000e+000	1.0025e+001	4.8523e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
27	6.5793e-001	0.0000e+000	1.0025e+001	3.9429e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
28	5.1172e-001	0.0000e+000	1.0025e+001	2.9931e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
29	3.6552e-001	0.0000e+000	1.0025e+001	2.0126e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
30	2.1931e-001	0.0000e+000	1.0025e+001	1.0115e-001	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					
31	7.3102e-002	0.0000e+000	1.0025e+001	-8.7423e-008	0.0000e+000	0.0000e+000
0.0000e+000	0.0000e+000					

Ordinary_Method_Fm= 2.717 Applied_Lambda= 0.0000

SL#	Normal_M	ShearMob	Phi_Angle	Cohesion
1	6.8761e-001	-2.0493e-001	3.9000e+001	0.0000e+000
2	1.6111e+000	-4.8015e-001	3.9000e+001	0.0000e+000
3	1.5377e+000	-4.5827e-001	3.9000e+001	0.0000e+000
4	1.6071e+000	-4.7895e-001	3.9000e+001	0.0000e+000
5	1.6765e+000	-4.9964e-001	3.9000e+001	0.0000e+000
6	1.7459e+000	-5.2032e-001	3.9000e+001	0.0000e+000
7	1.8153e+000	-5.4100e-001	3.9000e+001	0.0000e+000
8	1.8847e+000	-5.6169e-001	3.9000e+001	0.0000e+000
9	1.9541e+000	-5.8237e-001	3.9000e+001	0.0000e+000
10	2.1776e+000	-6.4900e-001	3.9000e+001	0.0000e+000
11	2.1530e+000	-6.4168e-001	3.9000e+001	0.0000e+000
12	2.1285e+000	-6.3435e-001	3.9000e+001	0.0000e+000
13	2.1039e+000	-6.2702e-001	3.9000e+001	0.0000e+000
14	2.0793e+000	-6.1969e-001	3.9000e+001	0.0000e+000

15	2.0547e+000	-6.1236e-001	3.9000e+001	0.0000e+000
16	2.0301e+000	-6.0503e-001	3.9000e+001	0.0000e+000
17	2.0055e+000	-5.9770e-001	3.9000e+001	0.0000e+000
18	1.9809e+000	-5.9038e-001	3.9000e+001	0.0000e+000
19	1.7997e+000	-5.3637e-001	3.9000e+001	0.0000e+000
20	1.6557e+000	-4.9346e-001	3.9000e+001	0.0000e+000
21	1.5117e+000	-4.5055e-001	3.9000e+001	0.0000e+000
22	1.3678e+000	-4.0764e-001	3.9000e+001	0.0000e+000
23	1.2238e+000	-3.6473e-001	3.9000e+001	0.0000e+000
24	1.0798e+000	-3.2182e-001	3.9000e+001	0.0000e+000
25	9.3584e-001	-2.7891e-001	3.9000e+001	0.0000e+000
26	7.9186e-001	-2.3600e-001	3.9000e+001	0.0000e+000
27	6.4789e-001	-1.9309e-001	3.9000e+001	0.0000e+000
28	5.0391e-001	-1.5018e-001	3.9000e+001	0.0000e+000
29	3.5994e-001	-1.0727e-001	3.9000e+001	0.0000e+000
30	2.1596e-001	-6.4363e-002	3.9000e+001	0.0000e+000
31	7.1986e-002	-2.1454e-002	3.9000e+001	0.0000e+000

Bishop_Method_Fm= 2.750 Applied_Lambda= 0.0000

SL#	Normal_M	ShearMob	Phi_Angle	Cohesion	SideLeft	ShearLeft	SideRight	ShearRight
1	1.6946e+000	-4.9908e-001	3.9000e+001	0.0000e+000	0.0000e+000	0.0000e+000	-1.1577e+000	0.0000e+000
2	1.6468e+000	-4.8501e-001	3.9000e+001	0.0000e+000	1.1577e+000	0.0000e+000	-1.2462e+000	0.0000e+000
3	1.5718e+000	-4.6291e-001	3.9000e+001	0.0000e+000	1.2462e+000	0.0000e+000	-1.3307e+000	0.0000e+000
4	1.6427e+000	-4.8380e-001	3.9000e+001	0.0000e+000	1.3307e+000	0.0000e+000	-1.4190e+000	0.0000e+000
5	1.7136e+000	-5.0470e-001	3.9000e+001	0.0000e+000	1.4190e+000	0.0000e+000	-1.5111e+000	0.0000e+000
6	1.7846e+000	-5.2559e-001	3.9000e+001	0.0000e+000	1.5111e+000	0.0000e+000	-1.6071e+000	0.0000e+000
7	1.8555e+000	-5.4648e-001	3.9000e+001	0.0000e+000	1.6071e+000	0.0000e+000	-1.7068e+000	0.0000e+000
8	1.9265e+000	-5.6738e-001	3.9000e+001	0.0000e+000	1.7068e+000	0.0000e+000	-1.8104e+000	0.0000e+000
9	1.9974e+000	-5.8827e-001	3.9000e+001	0.0000e+000	1.8104e+000	0.0000e+000	-1.9177e+000	0.0000e+000
10	2.1703e+000	-6.3919e-001	3.9000e+001	0.0000e+000	1.9177e+000	0.0000e+000	-1.8691e+000	0.0000e+000
11	2.1458e+000	-6.3197e-001	3.9000e+001	0.0000e+000	1.8691e+000	0.0000e+000	-1.8210e+000	0.0000e+000
12	2.1213e+000	-6.2475e-001	3.9000e+001	0.0000e+000	1.8210e+000	0.0000e+000	-1.7734e+000	0.0000e+000
13	2.0968e+000	-6.1753e-001	3.9000e+001	0.0000e+000	1.7734e+000	0.0000e+000	-1.7264e+000	0.0000e+000
14	2.0723e+000	-6.1032e-001	3.9000e+001	0.0000e+000	1.7264e+000	0.0000e+000	-1.6800e+000	0.0000e+000
15	2.0478e+000	-6.0310e-001	3.9000e+001	0.0000e+000	1.6800e+000	0.0000e+000	-1.6341e+000	0.0000e+000
16	2.0232e+000	-5.9588e-001	3.9000e+001	0.0000e+000	1.6341e+000	0.0000e+000	-1.5887e+000	0.0000e+000
17	1.9987e+000	-5.8866e-001	3.9000e+001	0.0000e+000	1.5887e+000	0.0000e+000	-1.5439e+000	0.0000e+000
18	1.9742e+000	-5.8144e-001	3.9000e+001	0.0000e+000	1.5439e+000	0.0000e+000	-1.4997e+000	0.0000e+000
19	1.7641e+000	-5.1956e-001	3.9000e+001	0.0000e+000	1.4997e+000	0.0000e+000	-1.2778e+000	0.0000e+000
20	1.6230e+000	-4.7800e-001	3.9000e+001	0.0000e+000	1.2778e+000	0.0000e+000	-1.0736e+000	0.0000e+000
21	1.4819e+000	-4.3643e-001	3.9000e+001	0.0000e+000	1.0736e+000	0.0000e+000	-8.8727e-001	0.0000e+000
22	1.3407e+000	-3.9487e-001	3.9000e+001	0.0000e+000	8.8727e-001	0.0000e+000	-7.1863e-001	0.0000e+000
23	1.1996e+000	-3.5330e-001	3.9000e+001	0.0000e+000	7.1863e-001	0.0000e+000	-5.6775e-001	0.0000e+000
24	1.0585e+000	-3.1174e-001	3.9000e+001	0.0000e+000	5.6775e-001	0.0000e+000	-4.3462e-001	0.0000e+000
25	9.1734e-001	-2.7017e-001	3.9000e+001	0.0000e+000	4.3462e-001	0.0000e+000	-3.1924e-001	0.0000e+000
26	7.7621e-001	-2.2861e-001	3.9000e+001	0.0000e+000	3.1924e-001	0.0000e+000	-2.2160e-001	0.0000e+000
27	6.3508e-001	-1.8704e-001	3.9000e+001	0.0000e+000	2.2160e-001	0.0000e+000		

-1.4172e-001 0.0000e+000
 28 4.9394e-001 -1.4547e-001 3.9000e+001 0.0000e+000 1.4172e-001 0.0000e+000
-7.9588e-002 0.0000e+000
 29 3.5281e-001 -1.0391e-001 3.9000e+001 0.0000e+000 7.9588e-002 0.0000e+000
-3.5205e-002 0.0000e+000
 30 2.1168e-001 -6.2345e-002 3.9000e+001 0.0000e+000 3.5205e-002 0.0000e+000
-8.5721e-003 0.0000e+000
 31 7.0554e-002 -2.0779e-002 3.9000e+001 0.0000e+000 8.5721e-003 0.0000e+000
3.1129e-004 0.0000e+000

Janbu_Method_Ff= 2.657   Applied_Lambda= 0.0000
SL# Normal_F   ShearMob   Phi_Angle   Cohesion   SideLeft   ShearLeft   SideRight
   ShearRight
==========
==========
  1 1.6754e+000 -5.1067e-001 3.9000e+001 0.0000e+000 0.0000e+000 0.0000e+000
-1.1577e+000 0.0000e+000
  2 1.6412e+000 -5.0024e-001 3.9000e+001 0.0000e+000 1.1577e+000 0.0000e+000
-1.2462e+000 0.0000e+000
  3 1.5664e+000 -4.7745e-001 3.9000e+001 0.0000e+000 1.2462e+000 0.0000e+000
-1.3307e+000 0.0000e+000
  4 1.6371e+000 -4.9900e-001 3.9000e+001 0.0000e+000 1.3307e+000 0.0000e+000
-1.4190e+000 0.0000e+000
  5 1.7078e+000 -5.2055e-001 3.9000e+001 0.0000e+000 1.4190e+000 0.0000e+000
-1.5111e+000 0.0000e+000
  6 1.7785e+000 -5.4210e-001 3.9000e+001 0.0000e+000 1.5111e+000 0.0000e+000
-1.6071e+000 0.0000e+000
  7 1.8492e+000 -5.6365e-001 3.9000e+001 0.0000e+000 1.6071e+000 0.0000e+000
-1.7068e+000 0.0000e+000
  8 1.9199e+000 -5.8520e-001 3.9000e+001 0.0000e+000 1.7068e+000 0.0000e+000
-1.8104e+000 0.0000e+000
  9 1.9906e+000 -6.0675e-001 3.9000e+001 0.0000e+000 1.8104e+000 0.0000e+000
-1.9177e+000 0.0000e+000
 10 2.1644e+000 -6.5972e-001 3.9000e+001 0.0000e+000 1.9177e+000 0.0000e+000
-1.8691e+000 0.0000e+000
 11 2.1400e+000 -6.5227e-001 3.9000e+001 0.0000e+000 1.8691e+000 0.0000e+000
-1.8210e+000 0.0000e+000
 12 2.1156e+000 -6.4482e-001 3.9000e+001 0.0000e+000 1.8210e+000 0.0000e+000
-1.7734e+000 0.0000e+000
 13 2.0911e+000 -6.3737e-001 3.9000e+001 0.0000e+000 1.7734e+000 0.0000e+000
-1.7264e+000 0.0000e+000
 14 2.0667e+000 -6.2992e-001 3.9000e+001 0.0000e+000 1.7264e+000 0.0000e+000
-1.6800e+000 0.0000e+000
 15 2.0422e+000 -6.2248e-001 3.9000e+001 0.0000e+000 1.6800e+000 0.0000e+000
-1.6341e+000 0.0000e+000
 16 2.0178e+000 -6.1503e-001 3.9000e+001 0.0000e+000 1.6341e+000 0.0000e+000
-1.5887e+000 0.0000e+000
 17 1.9934e+000 -6.0758e-001 3.9000e+001 0.0000e+000 1.5887e+000 0.0000e+000
-1.5439e+000 0.0000e+000
 18 1.9689e+000 -6.0013e-001 3.9000e+001 0.0000e+000 1.5439e+000 0.0000e+000
-1.4997e+000 0.0000e+000
 19 1.7611e+000 -5.3677e-001 3.9000e+001 0.0000e+000 1.4997e+000 0.0000e+000
-1.2778e+000 0.0000e+000
 20 1.6202e+000 -4.9383e-001 3.9000e+001 0.0000e+000 1.2778e+000 0.0000e+000
-1.0736e+000 0.0000e+000
 21 1.4793e+000 -4.5089e-001 3.9000e+001 0.0000e+000 1.0736e+000 0.0000e+000
-8.8727e-001 0.0000e+000
 22 1.3384e+000 -4.0794e-001 3.9000e+001 0.0000e+000 8.8727e-001 0.0000e+000
-7.1863e-001 0.0000e+000
 23 1.1975e+000 -3.6500e-001 3.9000e+001 0.0000e+000 7.1863e-001 0.0000e+000
-5.6775e-001 0.0000e+000
 24 1.0566e+000 -3.2206e-001 3.9000e+001 0.0000e+000 5.6775e-001 0.0000e+000
-4.3462e-001 0.0000e+000
 25 9.1574e-001 -2.7912e-001 3.9000e+001 0.0000e+000 4.3462e-001 0.0000e+000
-3.1924e-001 0.0000e+000
 26 7.7485e-001 -2.3618e-001 3.9000e+001 0.0000e+000 3.1924e-001 0.0000e+000
-2.2160e-001 0.0000e+000
 27 6.3397e-001 -1.9323e-001 3.9000e+001 0.0000e+000 2.2160e-001 0.0000e+000
-1.4172e-001 0.0000e+000
 28 4.9308e-001 -1.5029e-001 3.9000e+001 0.0000e+000 1.4172e-001 0.0000e+000
-7.9588e-002 0.0000e+000
 29 3.5220e-001 -1.0735e-001 3.9000e+001 0.0000e+000 7.9588e-002 0.0000e+000
-3.5205e-002 0.0000e+000
 30 2.1132e-001 -6.4409e-002 3.9000e+001 0.0000e+000 3.5205e-002 0.0000e+000
-8.5721e-003 0.0000e+000
 31 7.0431e-002 -2.1467e-002 3.9000e+001 0.0000e+000 8.5721e-003 0.0000e+000

3.1129e-004 0.0000e+000

M-P_Method_Fm= 2.683 Applied_Lambda= 0.4061

SL#	Normal_M	ShearMob	Phi_Angle	Cohesion	SideLeft	ShearLeft	SideRight	ShearRight
1	1.6397e+000	-4.9494e-001	3.9000e+001	0.0000e+000	0.0000e+000	0.0000e+000	-1.1373e+000	3.2101e-002
2	1.6098e+000	-4.8594e-001	3.9000e+001	0.0000e+000	1.1373e+000	-3.2101e-002	-1.2285e+000	6.6461e-002
3	1.5125e+000	-4.5656e-001	3.9000e+001	0.0000e+000	1.2285e+000	-6.6461e-002	-1.3142e+000	1.2425e-001
4	1.5775e+000	-4.7617e-001	3.9000e+001	0.0000e+000	1.3142e+000	-1.2425e-001	-1.4035e+000	1.8810e-001
5	1.6428e+000	-4.9590e-001	3.9000e+001	0.0000e+000	1.4035e+000	-1.8810e-001	-1.4966e+000	2.5758e-001
6	1.7088e+000	-5.1580e-001	3.9000e+001	0.0000e+000	1.4966e+000	-2.5758e-001	-1.5933e+000	3.3213e-001
7	1.7754e+000	-5.3591e-001	3.9000e+001	0.0000e+000	1.5933e+000	-3.3213e-001	-1.6939e+000	4.1100e-001
8	1.8428e+000	-5.5627e-001	3.9000e+001	0.0000e+000	1.6939e+000	-4.1100e-001	-1.7982e+000	4.9333e-001
9	1.9113e+000	-5.7693e-001	3.9000e+001	0.0000e+000	1.7982e+000	-4.9333e-001	-1.9065e+000	5.7810e-001
10	2.1291e+000	-6.4266e-001	3.9000e+001	0.0000e+000	1.9065e+000	-5.7810e-001	-1.8644e+000	6.1677e-001
11	2.1136e+000	-6.3799e-001	3.9000e+001	0.0000e+000	1.8644e+000	-6.1677e-001	-1.8227e+000	6.4608e-001
12	2.0981e+000	-6.3331e-001	3.9000e+001	0.0000e+000	1.8227e+000	-6.4608e-001	-1.7812e+000	6.6603e-001
13	2.0824e+000	-6.2859e-001	3.9000e+001	0.0000e+000	1.7812e+000	-6.6603e-001	-1.7401e+000	6.7676e-001
14	2.0666e+000	-6.2380e-001	3.9000e+001	0.0000e+000	1.7401e+000	-6.7676e-001	-1.6993e+000	6.7854e-001
15	2.0503e+000	-6.1889e-001	3.9000e+001	0.0000e+000	1.6993e+000	-6.7854e-001	-1.6588e+000	6.7174e-001
16	2.0336e+000	-6.1385e-001	3.9000e+001	0.0000e+000	1.6588e+000	-6.7174e-001	-1.6186e+000	6.5683e-001
17	2.0164e+000	-6.0865e-001	3.9000e+001	0.0000e+000	1.6186e+000	-6.5683e-001	-1.5788e+000	6.3439e-001
18	1.9985e+000	-6.0326e-001	3.9000e+001	0.0000e+000	1.5788e+000	-6.3439e-001	-1.5393e+000	6.0505e-001
19	1.8645e+000	-5.6282e-001	3.9000e+001	0.0000e+000	1.5393e+000	-6.0505e-001	-1.3095e+000	4.9861e-001
20	1.7157e+000	-5.1790e-001	3.9000e+001	0.0000e+000	1.3095e+000	-4.9861e-001	-1.0981e+000	4.0030e-001
21	1.5652e+000	-4.7247e-001	3.9000e+001	0.0000e+000	1.0981e+000	-4.0030e-001	-9.0525e-001	3.1192e-001
22	1.4135e+000	-4.2666e-001	3.9000e+001	0.0000e+000	9.0525e-001	-3.1192e-001	-7.3108e-001	2.3472e-001
23	1.2611e+000	-3.8066e-001	3.9000e+001	0.0000e+000	7.3108e-001	-2.3472e-001	-5.7568e-001	1.6941e-001
24	1.1085e+000	-3.3461e-001	3.9000e+001	0.0000e+000	5.7568e-001	-1.6941e-001	-4.3908e-001	1.1612e-001
25	9.5631e-001	-2.8867e-001	3.9000e+001	0.0000e+000	4.3908e-001	-1.1612e-001	-3.2123e-001	7.4504e-002
26	8.0489e-001	-2.4296e-001	3.9000e+001	0.0000e+000	3.2123e-001	-7.4504e-002	-2.2204e-001	4.3749e-002
27	6.5464e-001	-1.9760e-001	3.9000e+001	0.0000e+000	2.2204e-001	-4.3749e-002	-1.4136e-001	2.2633e-002
28	5.0589e-001	-1.5270e-001	3.9000e+001	0.0000e+000	1.4136e-001	-2.2633e-002	-7.9017e-002	9.6036e-003
29	3.5889e-001	-1.0833e-001	3.9000e+001	0.0000e+000	7.9017e-002	-9.6036e-003	-3.4783e-002	2.8426e-003
30	2.1383e-001	-6.4544e-002	3.9000e+001	0.0000e+000	3.4783e-002	-2.8426e-003	-8.4245e-003	3.4602e-004
31	7.0799e-002	-2.1371e-002	3.9000e+001	0.0000e+000	8.4245e-003	-3.4602e-004	3.0965e-004	-1.2574e-011

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S2             2.922
S3             3.411
S4             3.424
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S1
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S4
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Fill
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Arial
  0   0  34
Tin Shui Wai Development Engineering Infrastructure
```

APPENDIX I

Design Calculation of Revised Drainage Works

Drainage Design Review

Calculation Notes

(A) Reference:

1. Stormwater Drainage Manual, 3rd ed., DSD

2. Geotechnical Manual For Slopes, 2nd Edition, by GCO

(B) Design Notes/Assumptions:

1. The runoff of the catchment is determined by using the "Rational Method".
$Q = i * \Sigma(K * A)/3600$

2. The time of concentration is equal to the maximum time taken by surface water to travel from the catchement boundary to the point in the drainage system under design.

time of concentration $tc = t1+t2$
where
t1 = the time taken of the water from boundary of this catchment to the channel which is determined by Bransby-Williams equartions or the time of concentration of the upstream channel

t2 = the time taken of the water level through the length of the design channel downstream of the flowpath for t1

3. The Design rainfall intensity is assumed to be determined by the equation:
$i = a / (tc + b)^c$

4. The velocity of the flow is the channel is determined by Manning's formula.

(C) Design Parameters:

1. In accordance with Geotechnical Manuak for Slopes cl. 8.2.1, the value of K in determination of runoff by "Rational Method" is assumed to be 1.0 except for natural vegetation covered terrain where a K value of 0.7 is assumed.

2. The value of a, b and C in the determinatiojn of design rainfall intensity are based on the recommendations of the Stormwater Drainage Manual. For a 1 in 10 years return period rainfall event, the values of a, b and c are 603, 4.4 and 0.44.

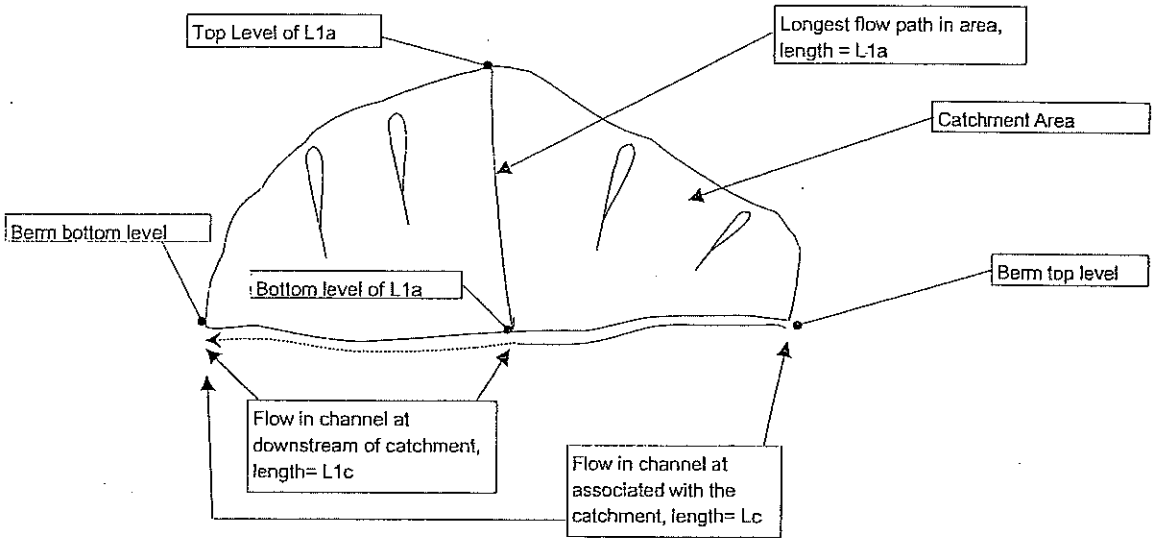
3. The value of roughness factor, n in the Manning's formula is assumed to be 0.013 for concrete U channels.

Drainage System Design

Input catchment area data

Area Name	runoff coeff. K	Ac sq m	Longest flow path in catcment area: Length of flow L1a m	Flow length in channel L1c m	Gradient of flow in area H %	Time of concentration Ta1 for flow in area (min)
C1	1	864	10	45	1	0.74
C2	1	864	10	50	1	0.74
C3	1	768	30	40	1	2.23
C4	1	288	10	5	1	0.82
C5	1	384	30	20	1	2.39
C6	1	762	30	20	1	2.23
C7	1	720	10	50	1	0.75
C8	1	752	20	30	1	1.49
C9	1	144	10	10	1	0.88
C10	1	432	10	50	1	0.79
C11	1	1908	5	50	1	0.34
C12	1	1113	10	60	1	0.72
C13	0.7	2275	30	20	1	2.00
C14	1	2129	15	135	1	1.01
C15	1	450	15	15	1	1.18
C16	1	209	10	10	1	0.85
C17	1	144	10	0	1	0.88
C18	1	1600	15	100	1	1.04
C19	1	905	15	60	1	1.10
C20	1	288	10	40	1	0.82
C21	1	288	10	10	1	0.82
C22	1	734	10	10	1	0.75
C23	1	550	5	100	1	0.38
C24	1	792	10	50	1	0.74
C25	1	452	10	15	1	0.78
C26	1	3753	30	50	1	1.90
C27	1	288	10	10	1	0.82
C28	1	1986	30	95	1	2.03
C29	1	528	15	35	1	1.16
C30	1	550	25	20	1	1.92
C31	1	1668	25	55	1	1.72
C32	1	648	10	60	1	0.76
C33	1	3150	40	50	1	2.58
C34	1	2800	50	20	1	3.27

Schematic:



Summary of Calculation

Design channel under 1 in 10 year return storm

Rainfall intensity i=a/(t+b)^c a= 603 b= 4.4 c= 0.44

Channel No.	Size	Lc Length	Berm Grad	Invert Grad	Associated catchments				Upstream Channels				Velocity of flow	Depth of flow	Quantity of flow
	mm	m	%	%	1	2	3	4	1	2	3	4	m/s	mm	l/s
S1	300	45	1.0	0.5	C1								1.12	230	66.8
U1	300	50	1.0	0.5	C2								1.12	229	66.4
U2	375	50	1.0	1.0	C3				U1	S1			1.86	295	177.7
S2	375	10	1.0	2.0	C4				U3	U2			2.57	273	224.4
U3	225	30	1.0	1.0	C5								1.18	126	27.2
U4	300	65	1.0	0.5	C6								1.08	200	54.4
S3	300	50	1.0	0.5	C7								1.08	202	55.1
U5	375	60	1.0	1.0	C8				U4	S3			1.82	274	159.5
S4	375	10	1.0	2.0	C9				U5				2.45	235	178.9
S5	225	50	1.0	0.5	C10								0.94	179	32.7
U6	375	50	1.0	0.5	C11								1.36	338	152.2
U7	450	85	1.0	0.5	C12				S5	U6			1.55	422	261.5
U8	300	130	1.0	1.0	C13								1.65	266	116.3
U9	600	135	1.0	0.5	C14				U7	U8			1.86	534	523.2
U10	375	25	1.0	1.0	C15								1.24	113	34.8
U11	600	15	1.0	0.5	C16				U9	U10			1.89	569	571.3
U12	600	10	1.0	1.0	C17				U11				2.55	479	636.3
U13	525	155	1.0	1.0	C18								1.70	188	118.3
U14	450	60	1.0	1.0	C19								1.47	150	68.0
S7	225	40	1.0	1.0	C20								1.13	112	22.2
S8	225	20	1.0	1.0	C21								1.14	114	23.0
U15	375	40	1.0	1.0	C22				U14	S7	S8		1.84	282	166.5
S9	300	100	1.0	0.5	C23								1.01	166	40.6
S10	300	70	1.0	0.5	C24								1.10	216	60.8
U16	225	15	1.0	1.0	C25								1.26	151	36.0
U17	750	100	1.0	1.0	C26				S10	U16			2.25	295	363.1
S11	225	10	1.0	1.0	C27								1.14	114	23.0
U18	375	120	1.0	1.0	C28				S11				1.82	273	158.8
U19	450	30	1.0	1.0	C29								1.27	114	40.1
U20	225	20	1.0	1.0	C30								1.29	163	40.2
U21	600	55	1.0	1.0	C31				U19	U20			1.68	179	118.3
S12	225	60	1.0	1.0	C32								1.30	168	42.1
U22	600	135	1.0	1.0	C33								1.20	101	37.6
U23	900	65	1.0	1.0	C34				U21	S12	U22		1.93	213	221.9

UPSTREAM DRAINAGE MANHOLE NO.	DOWNSTREAM DRAINAGE MANHOLE NO.	UPSTREAM GROUND LEVEL (mPD)	DOWNSTREAM GROUND LEVEL (mPD)	UPSTREAM INVERT LEVEL (mPD)	DOWNSTREAM INVERT LEVEL (mPD)	TYPE OF DRAINAGE	SIZE (mm)	LENGTH (m)	GRADIENT (1 in)	GROUND GRADIENT (1 in)	UPSTREAM COVER FROM GROUND LEVEL TO PIPE (m)	DOWN-STREAM DEPTH (m)	DSD UPSTREAM MANHOLE TYPE*	UPSTREAM COVER (m)	DOWN-STREAM COVER (m)	DSD BEDDING TYPE*
DM_1_1	DM_1_2	6.00	6.00	5.60	5.25	UC	300	35.0	100.0	Flat	-	-	-	-	-	B
DM_1_2	DM_1_3	6.00	6.00	5.25	5.12	UC	300	13.0	100.0	Flat	-	-	-	-	-	B
DM_1_3	DM_1_4	6.00	5.90	5.12	4.70	UC (C)	375	42.0	100.0	420.00	-	-	-	-	-	B
DM_1_4	DM_1_5	5.90	5.80	4.70	4.58	UC (C)	375	12.0	100.0	120.00	-	-	-	-	-	B
DM_1_5	DM_1_6	5.80	5.40	4.58	4.40	PIPE	375	9.0	50.0	22.50	1.22	1.00	D1	0.85	0.63	B
DM_2_1	DM_2_2	6.10	6.10	5.43	5.34	PIPE	225	18.0	200.0	Flat	0.68	0.77	C1	0.46	0.54	B
DM_2_2	DM_2_3	6.10	6.10	5.34	5.25	PIPE	225	18.0	200.0	Flat	0.77	0.86	C1	0.55	0.63	B
DM_2_3	DM_1_3	6.10	6.00	5.25	5.20	PIPE	225	10.0	200.0	100.00	0.86	6.00	C1	0.64	5.78	B
DM_3_1	DM_3_2	6.00	6.00	5.60	5.34	UC	300	26.0	100.0	Flat	-	-	-	-	-	B
DM_3_2	DM_3_3	6.00	6.00	5.34	4.92	UC (C)	300	42.0	100.0	Flat	-	-	-	-	-	B
DM_3_3	DM_3_4	6.00	5.90	4.92	4.74	UC (C)	375	18.0	100.0	180.00	-	-	-	-	-	B
DM_3_4	DM_3_5	5.90	5.90	4.74	4.60	UC (C)	375	14.0	100.0	Flat	-	-	-	-	-	B
DM_3_5	DM_3_6	5.90	5.80	4.60	4.40	UC (C)	375	20.0	100.0	200.00	-	-	-	-	-	B
DM_3_6	DM_3_7	5.80	5.80	4.40	4.28	UC (C)	375	12.0	100.0	Flat	-	-	-	-	-	B
DM_3_7	DM_3_8	5.80	5.60	4.28	4.14	PIPE	375	7.0	50.0	35.00	1.52	1.46	E1	1.15	1.09	B
DM_4_1	DM_4_2	6.10	6.10	5.35	5.28	PIPE	300	15.0	200.0	Flat	0.75	0.83	C1	0.45	0.53	B
DM_4_2	DM_4_3	6.10	6.05	5.28	5.22	PIPE	300	12.0	200.0	240.00	0.83	0.84	C1	0.53	0.54	B
DM_4_3	DM_4_4	6.05	6.00	5.22	5.14	PIPE	300	16.0	200.0	320.00	0.84	0.87	C1	0.54	0.57	B
DM_4_4	DM_3_3	6.00	6.00	5.14	5.10	PIPE	300	8.0	200.0	Flat	0.87	0.91	C1	0.57	0.61	B
DM_5_1	DM_1_5	6.00	5.80	5.50	5.15	UC (C)	300	35.0	100.0	175.00	-	-	-	-	-	B
DM_6_1	DM_6_2	4.05	3.90	3.38	3.13	UC (C)	375	50.0	200.0	333.33	-	-	-	-	-	B
DM_6_2	DM_6_3	3.90	3.60	3.13	2.70	UC (C)	450	86.0	200.0	286.67	-	-	-	-	-	B
DM_6_3	DM_6_4	3.60	3.50	2.70	2.01	UC (C)	600	137.0	200.0	1,370.00	-	-	-	-	-	B
DM_6_4	DM_6_5	3.50	2.80	2.01	1.75	UC	600	18.0	200.0	25.71	-	-	-	-	-	
DM_6_5	DM_6_6	2.80	2.70	1.75	1.66	UC	600	2.0	200.0	20.00	-	-	-	-	-	
DM_6_6	DM_6_7	2.70	2.65	1.66	1.65	UC	600	2.0	200.0	40.00	-	-	-	-	-	
DM_7_1	DM_7_2	3.70	3.65	3.36	3.10	UC	300	52.0	200.0	1,040.00	-	-	-	-	-	B
DM_7_2	DM_7_3	3.65	3.60	3.10	2.76	UC	300	68.0	200.0	1,360.00	-	-	-	-	-	B
DM_7_3	DM_6_3	3.60	3.60	2.76	2.70	UC	300	12.0	200.0	Flat	-	-	-	-	-	B
DM_8_1	DM_7_3	3.65	3.60	2.83	2.76	UC	300	14.0	200.0	280.00	-	-	-	-	-	B
DM_9_1	DM_9_2	4.00	3.94	3.33	3.25	PIPE	225	15.0	200.0	250.00	0.68	0.69	C1	0.46	0.47	B
DM_9_2	DM_9_3	3.94	3.86	3.25	3.17	PIPE	225	17.0	200.0	212.50	0.69	0.70	C1	0.47	0.47	B
DM_9_3	DM_9_4	3.86	3.82	3.17	3.10	PIPE	225	13.0	200.0	325.00	0.70	0.72	C1	0.48	0.50	B
DM_9_4	DM_6_2	3.82	3.90	3.10	3.05	PIPE	225	10.0	200.0	-125.00	0.72	0.85	C1	0.50	0.63	B
DM_10_1	DM_10_2	3.55	3.50	2.78	2.70	UC	450	8.0	100.0	160.00	-	-	-	-	-	B
DM_10_2	DM_10_3	3.50	3.20	2.70	2.10	UC (C)	450	60.0	100.0	200.00	-	-	-	-	-	B
DM_10_3	DM_10_4	3.20	3.00	2.43	2.10	UC (C)	525	60.0	100.0	300.00	-	-	-	-	-	
DM_10_4	DM_6_7	3.00	2.70	2.10	1.66	UC (C)	525	40.0	100.0	133.33	-	-	-	-	-	B

UPSTREAM DRAINAGE MANHOLE NO.	DOWNSTREAM DRAINAGE MANHOLE NO.	UPSTREAM GROUND LEVEL (mPD)	DOWNSTREAM GROUND LEVEL (mPD)	UPSTREAM INVERT LEVEL (mPD)	DOWNSTREAM INVERT LEVEL (mPD)	TYPE OF DRAINAGE	SIZE (mm)	LENGTH (m)	GRADIENT (1 in)	GROUND GRADIENT (1 in)	UPSTREAM COVER FROM GROUND LEVEL TO PIPE (m)	DOWN-STREAM DEPTH (m)	DSD UPSTREAM MANHOLE TYPE*	UPSTREAM COVER (m)	DOWN-STREAM COVER (m)	DSD BEDDING TYPE*
DM_11_1	DM_11_2	3.40	3.35	2.73	2.58	PIPE	225	15.0	100.0	300.00	0.68	0.78	C1	0.46	0.55	B
DM_11_2	DM_10_3	3.35	3.30	2.58	2.43	PIPE	225	15.0	100.0	300.00	0.78	0.88	C1	0.56	0.65	B
						PIPE										
DM_12_1	DM_10_3	3.35	3.30	2.53	2.43	PIPE	225	10.0	100.0	200.00	0.83	0.88	C1	0.61	0.65	B
DM_13_1	DM_13_2	3.55	3.10	3.33	2.88	UC (C)	225	15.0	100.0	33.33	-	-	-	-	-	B
DM_14_1	DM_14_2	3.45	3.40	2.70	2.63	PIPE	300	15.0	200.0	300.00	0.75	0.78	C1	0.45	0.48	B
DM_14_2	DM_14_3	3.40	3.35	2.63	2.55	PIPE	300	15.0	200.0	300.00	0.78	0.80	C1	0.48	0.50	B
DM_14_3	DM_14_4	3.35	3.30	2.55	2.49	PIPE	300	12.0	200.0	240.00	0.80	0.81	C1	0.50	0.51	B
DM_14_4	DM_14_5	3.30	3.25	2.49	2.39	PIPE	300	20.0	200.0	400.00	0.81	0.86	C1	0.51	0.56	B
DM_14_5	DM_13_2	3.25	3.10	2.39	2.37	PIPE	300	5.0	200.0	33.33	0.86	0.74	C1	0.56	0.44	B
					2.35											
DM_15_1	DM_15_2	4.70	4.52	3.94	3.67	UC (C)	375	27.0	100.0	150.00	-	-	-	-	-	B
DM_15_2	DM_15_3	4.52	4.39	3.67	3.47	UC (C)	375	20.0	100.0	153.85	-	-	-	-	-	B
DM_17_1	DM_17_2	4.10	4.05	3.43	3.23	PIPE	225	20.0	100.0	400.00	0.68	0.83	C1	0.46	0.60	B
DM_17_2	DM_17_3	4.05	4.00	3.23	3.08	PIPE	225	15.0	100.0	300.00	0.83	0.93	C1	0.61	0.70	B
DM_17_3	DM_17_4	4.00	3.95	3.08	3.00	PIPE	225	8.0	100.0	160.00	0.93	0.96	C1	0.71	0.73	B
DM_17_4	DM_15_5	3.95	3.80	3.00	2.83	PIPE	225	17.0	100.0	113.33	0.96	0.98	C1	0.74	0.75	B

* For the DSD manhole and bedding types, please refer to DSD standard drawings.

APPENDIX J

Design Calculation of Revised Sewerage Works

Sewerage Design Review

Calculation Notes

(A) Reference:

1. Sewerage Manual Part 1 Key Planning Issues and Gravity Collection System, 1st ed. DSD

2. Report No. EPD/TP 1/05 Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning, Version 1.0, EPD

(B) Design Notes/Assumptions:

1. Population estimation is based on 2009-based TPEDM, PlanD.

2. Sewage from household is estimated by report No. EPD/TP 1/05, EPD.

3. Velocity of the sewage flow is calculated by Colebrook-white formula while the roughness coefficient is with reference to Sewerage Manual Part 1, DSD

(C) Design Parameters:

1. In accordance with Report No. EPD/TP 1/05, the peaking factor is assumed to be 8 if the population is less than 1000. The Village Expansion should be classified as Modern village.

2. The roughness coefficient of vitrified clay (VC) pipe is assumed to be 1.5mm.

UPSTREAM SEWER MANHOLE NO.	DOWNSTREAM SEWER MANHOLE NO.	UPSTREAM GROUND LEVEL (mPD)	DOWNSTREAM GROUND LEVEL (mPD)	UPSTREAM INVERT LEVEL (mPD)	DOWNSTREAM INVERT LEVEL (mPD)	PIPE SIZE (mm)	PIPE LENGTH (m)	GRADIENT (1 in)	GROUND GRADIENT (1 in)	UPSTREAM DEPTH	DOWNSTREAM DEPTH	DSD UPSTREAM MANHOLE TYPE*	UPSTREAM COVER	DOWNSTREAM COVER	PIPE MATERIAL	Ks (mm)	BEDDING TYPE*	DESIGN FLOW	FULLBORE V	FULLBORE Q
SM_1_1	SM_1_2	5.90	6.10	5.300	4.780	150	26.0	50	-130.00	0.60	1.32	C1	0.45	1.17	VC	1.5	B	0.012	1.241	0.022
SM_1_2	SM_1_3	6.10	6.00	4.780	4.420	150	18.0	50	180.00	1.32	1.58	D1	1.17	1.43	VC	1.5	B	0.012	1.241	0.022
SM_1_3	SM_1_4	6.00	6.20	4.420	4.060	150	18.0	50	-90.00	1.58	2.14	E1	1.43	1.99	VC	1.5	B	0.012	1.241	0.022
SM_1_4	SM_1_5	6.20	6.00	4.060	3.720	150	17.0	50	85.00	2.14	2.28	E1	1.99	2.13	VC	1.5	B	0.012	1.241	0.022
SM_1_5	SM_1_6	6.00	6.00	3.720	3.540	150	9.0	50	Flat	2.28	2.46	E1	2.13	2.31	VC	1.5	B	0.012	1.241	0.022
SM_1_6	SM_1_7	6.00	3.40	3.540	2.800	150	10.0	14	3.85	2.46	0.60	E1	2.31	0.45	VC	1.5	B	0.012	2.392	0.042
SM_1_7	SM_1_8	3.40	3.40	2.500	2.133	150	22.0	60	Flat	0.90	1.27	C1	0.75	1.12	VC	1.5	B	0.012	1.133	0.020
SM_1_8	SM_1_9	3.40	3.30	2.133	1.904	150	14.0	61	140.00	1.27	1.40	D1	1.12	1.25	VC	1.5	B	0.012	1.122	0.020
SM_1_9	SM_1_10	3.30	3.30	1.904	1.690	150	15.0	70	Flat	1.40	1.61	D1	1.25	1.46	VC	1.5	B	0.012	1.047	0.019
SM_1_10	SM_1_11	3.30	3.30	1.690	1.575	150	8.0	70	Flat	1.61	1.72	E1	1.46	1.57	VC	1.5	B	0.012	1.050	0.019
SM_1_11	SM_1_12	3.30	3.30	1.575	1.318	150	18.0	70	Flat	1.73	1.98	E1	1.58	1.83	VC	1.5	B	0.012	1.048	0.019
SM_1_12	SM_1_13	3.30	3.40	1.318	1.004	150	22.0	70	-220.00	1.98	2.40	E1	1.83	2.25	VC	1.5	B	0.012	1.047	0.019
SM_1_13	SM_1_14	3.40	3.40	1.004	0.733	150	19.0	70	Flat	2.40	2.67	E1	2.25	2.52	VC	1.5	B	0.012	1.047	0.019
SM_1_14	SM_1_15	3.40	3.50	0.733	0.476	150	18.0	70	-180.00	2.67	3.02	E1	2.52	2.87	VC	1.5	B	0.012	1.048	0.019
SM_1_15	SM_1_16	3.50	3.50	0.476	0.076	150	28.0	70	Flat	3.02	3.42	F1	2.87	3.27	VC	1.5	B	0.012	1.048	0.019
SM_1_16	SM_1_17	3.50	3.60	0.076	-0.324	150	28.0	70	-280.00	3.42	3.92	F1	3.27	3.77	VC	1.5	B	0.012	1.048	0.019
SM_1_17	SM_4_10	3.60	5.40	-0.324	-0.510	150	13.0	70	-7.22	3.92	5.91	L	3.77	5.76	VC	1.5	B	0.012	1.049	0.019
SM_2_1	SM_2_2	6.00	6.00	5.000	4.250	150	30.0	40	Flat	1.00	1.75	C1	0.85	1.60	VC	1.5	B	0.012	1.388	0.025
SM_2_2	SM_2_3	6.00	6.00	4.250	4.025	150	9.0	40	Flat	1.75	1.98	E1	1.60	1.83	VC	1.5	B	0.012	1.388	0.025
SM_2_3	SM_1_6	6.00	6.00	4.025	3.540	150	20.0	41	Flat	1.98	2.46	E1	1.83	2.31	VC	1.5	B	0.012	1.367	0.024
												C1								
SM_3_1	SM_3_2	4.00	3.90	3.384	3.234	150	9.0	60	90.00	0.62	0.67	C1	0.47	0.52	VC	1.5	B	0.012	1.132	0.020
SM_3_2	SM_3_3	3.90	3.70	3.234	2.884	150	21.0	60	105.00	0.67	0.82	C1	0.52	0.67	VC	1.5	B	0.012	1.132	0.020
SM_3_3	SM_3_4	3.70	3.50	2.884	2.667	150	13.0	60	65.00	0.82	0.83	C1	0.67	0.68	VC	1.5	B	0.012	1.133	0.020
SM_3_4	SM_1_7	3.50	3.40	2.667	2.500	150	10.0	60	100.00	0.83	0.90	C1	0.68	0.75	VC	1.5	B	0.012	1.133	0.020
SM_4_1	SM_4_2	4.00	4.00	3.175	2.725	225	18.0	40	Flat	0.83	1.28	C1	0.61	1.05	VC	1.5	B	0.012	1.818	0.072
SM_4_2	SM_4_3	4.00	3.90	2.725	2.300	225	17.0	40	170.00	1.28	1.60	D1	1.06	1.38	VC	1.5	B	0.012	1.818	0.072
SM_4_3	SM_4_4	3.90	3.70	2.300	1.600	225	28.0	40	140.00	1.60	2.10	E1	1.38	1.88	VC	1.5	B	0.012	1.818	0.072
SM_4_4	SM_4_5	3.70	3.80	1.600	1.400	225	11.0	55	-110.00	2.10	2.40	E1	1.88	2.18	VC	1.5	B	0.012	1.550	0.062
SM_4_5	SM_4_6	3.80	5.60	1.400	1.220	225	12.0	67	-6.67	2.40	4.38	E1	2.18	4.16	VC	1.5	B	0.012	1.407	0.056
SM_4_6	SM_4_7	5.60	5.40	1.220	0.750	225	22.0	47	110.00	4.38	4.65	L	4.16	4.43	VC	1.5	B	0.012	1.680	0.067
SM_4_7	SM_4_8	5.40	5.30	0.750	0.480	225	20.0	74	200.00	4.65	4.82	L	4.43	4.60	VC	1.5	B	0.012	1.335	0.053
SM_4_8	SM_4_9	5.30	5.20	0.480	0.200	225	24.0	86	240.00	4.82	5.00	L	4.60	4.78	VC	1.5	B	0.012	1.240	0.049
SM_4_9	SM_4_10	5.20	5.50	-0.150	-0.510	225	34.0	94	-113.33	5.35	6.01	L	5.13	5.79	VC	1.5	B	0.012	1.181	0.047
SM_4_10	SM_4_11	5.50	5.70	-0.510	-0.930	225	25.0	60	-125.00	6.01	6.63	L	5.79	6.41	VC	1.5	B	0.012	1.489	0.059
SM_4_11	PH	5.70	5.70	-0.930	-	225	10.0	-	Flat	6.63	-	L	6.41	-	VC	1.5	B	0.012	-	-
SM_5_1	SM_5_2	4.1	4.00	3.000	2.300	150	26.0	37	260.00	1.10	1.70	D1	0.95	1.55	VC	1.5	B	0.012	1.440	0.025
SM_5_2	SM_4_4	4	3.70	2.300	1.600	150	16.0	23	53.33	1.70	2.10	E1	1.55	1.95	VC	1.5	B	0.012	1.838	0.032

* For the DSD manhole and bedding types, please refer to DSD standard drawings.

APPENDIX K

Construction & Demolition Material Management Plan

Submission on C&D Materials Management for Projects
(Generating C&D Materials or Importing Fill Material at or below 50 000 m^3 but more than 5 000 m^3)

Project Division/Branch	:	CEDD/NTN&W Development Office
Responsible Officer & Tel. No.	:	Mr C K Choi (Tel: 2158 5662)
PWP Item No.	:	213CL
Project Title	:	Engineering works for Ha Mei San Tsuen village expansion area
Project Estimate	:	HK$56M in MOD price
Anticipated Commencement Date	:	March 2013
Anticipated Completion Date	:	March 2016
Brief Scope of Works	:	Site formation, drainage and sewerage works, road works and landscaping works

Generation of C&D Materials

	Total quantity (m^3)	Reused in the project (m^3)	Reused in other projects (m^3)	Disposal as public fill (or C&D waste) (m^3)	Suitable for recycled aggregates (m^3)
(i) Inert C&D Materials (soft public fill)	11,400	9,400	0	2,000	NA
(ii) Good Quality Rock					
Grade I	0	0	0	0	0
Grade II	0	0	0	0	0
Subtotal	0	0	0	0	0
(iii) Low Quality Rock	0	0	0	0	NA
(iv) C&D Waste	0	NA	NA	0	NA
(v) Broken Concrete	0	0	0	0	0
Total	11,400	9,400	0	2,000	0

Imported Fill Material:

	Total quantity (m^3)	Source of fill (Contractor's own source and/or others)
(i) Inert C&D Materials (Soft Public Fill)	28,800	Contractor's own source
(ii) Rock	0	-
(iii) Sand Fill	0	-
Total	28,800	-

Proposed measures taken to reduce, reuse and recycle C&D materials (Give brief description)

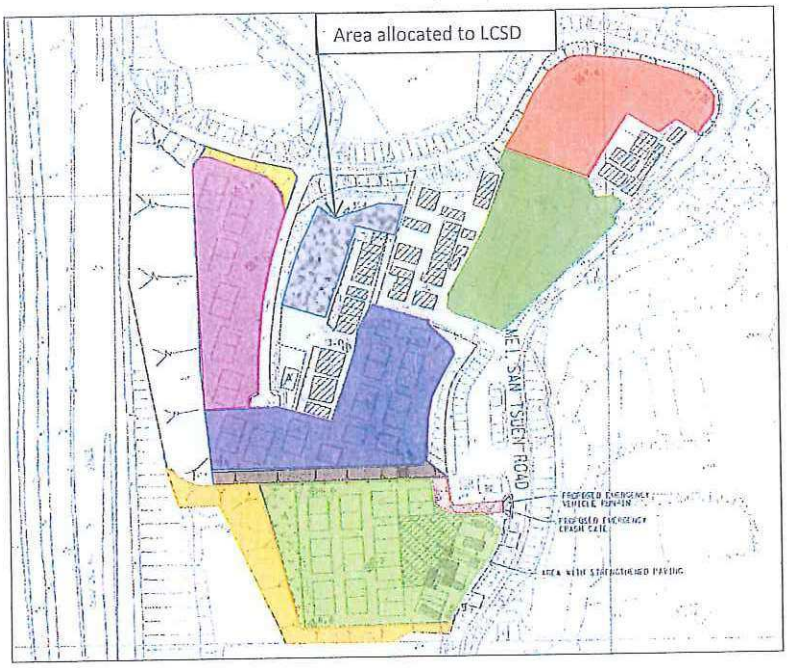
1. Use the excavated materials for the backfilling of site formation.
2. Reuse the fill materials as soil for landscaping works.

Submission Notes :

1. *The quantities of C&D materials indicated should be bulk volume.*
2. *The following conversion factors can be used if no other more accurate data are available:-*
   Bulk density of rock = 2.0 tonnes/m^3; Bulk density of soil = 1.8 tonnes/m^3
   In-situ density of rock = 2.5 tonnes/m^3; In-situ density of soil = 2.0 tonnes/m^3
3. *Only Grade II or better granitic rock is classified as good quality rock. Other types of rock are considered as low quality rock.*
4. *With regard to the source of import fill, if the contractor's own source is proposed, we must make every endeavour to use local sources. To ensure that the source of imported fill is proper, it should be submitted for the Engineer's approval.*
5. *Layout plans of the project in A-3 or A-4 size should be submitted.*

Agreement No. CE 5/86
Engineering Works for Ha Mei San Tsuen Village Expansion Area

Filling Works



	Area (Measured from digital dwg) (m^2)	Average depth (m)	In-situ Volume (m^3)
	2,980.0	1.3	3,874.0
Triangular cross section	250.0	1.7	212.5
	3,800.0	1.0	3,800.0
	4,910.0	3.5	17,185.0
	2,650.0	1.0	2,650.0
Triangular cross section	1,460.0	3.3	2,409.0
	3,000.0	1.0	3,000.0
Triangular cross section	210.0	3.1	325.5
Triangular cross section	540.0	3.3	891.0
Total	19,800.0		34,347.0 m^3

Total Bulk Volume of Fill Required (insitu x 2.0/1.8): 38,163.3 m^3 (Say) **38,200.0**

Total excavation (0.5 m thk) for top soil/unsuitable top layer: 9,900.0 m^3

Volume of storm drain pipe and U-channel (see **Annex B**): 326.4 m^3

Volume of sewer (see **Annex C**): 29.9 m^3

Total Insitu Volume of C&D generated: 10,256.3 m^3

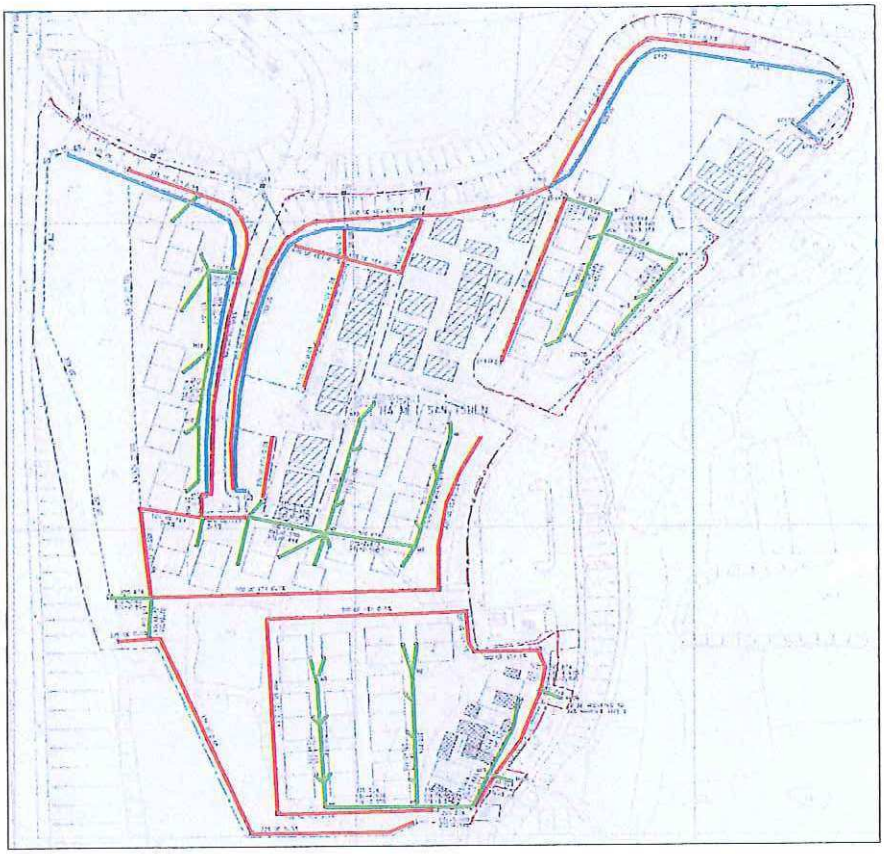
Bulk Volume of C&D Generated (insitu x 2.0/1.8): 11,395.9 m^3 (Say) **11,400.0**

In-situ Volume to be Reused (assumed 85 % of excavated): 8,415.0 m^3

Bulk Volume to be Reused (insitu x 2.0/1.8): 9,350.0 m^3 (Say) **9,400.0**

Agreement No. CE 5/86
Engineering Works for Ha Mei San Tsuen Village Expansion Area

Stormwater Drainage Works



		Length (measured from dgn) (m)	Section area (m^2)	Volume (m^3)
Broken Concrete (Ex. UC)	(average 600 U)	0	0.321	0.0
			Add 10% for modification of intake structures:	0.0
			Total Volume of broken concrete:	0.0
			Say	**0.0**
Proposed U-channel	(average 450 U)	1393	0.181	251.8
Proposed drain pipe	(average 375 dia)	694	0.108	74.6
			Total In-situ Volume of C&D generated by storm drains:	326.4

ANNEX C

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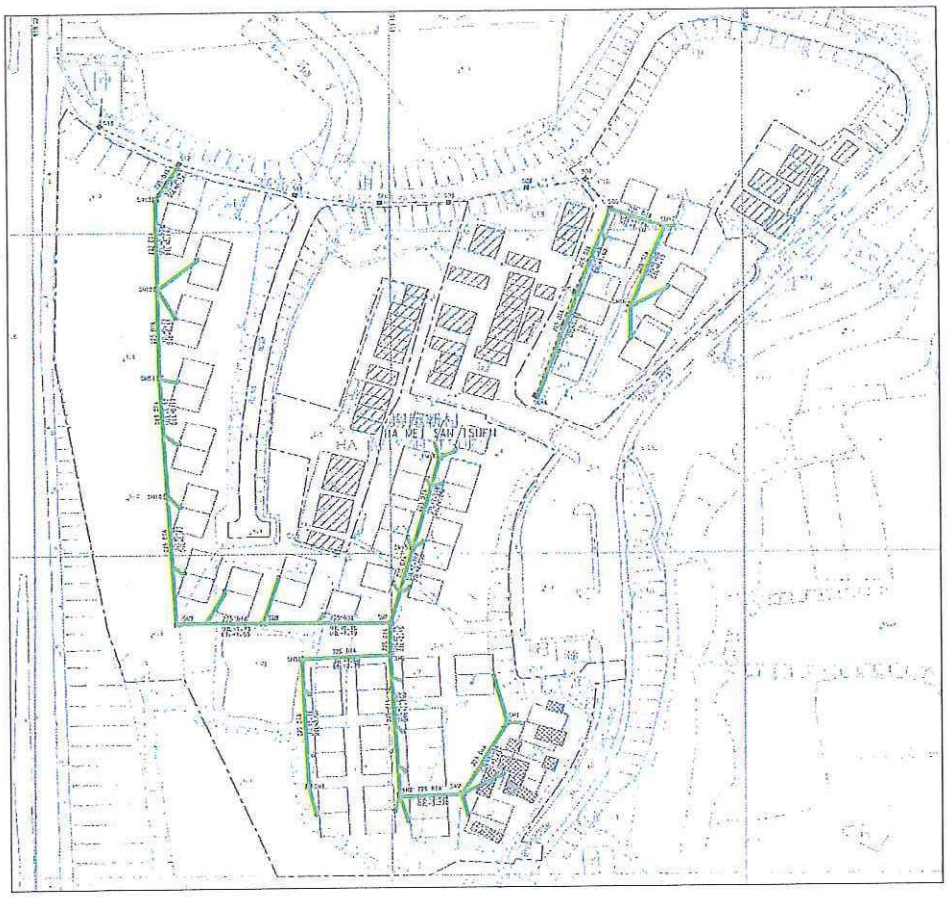
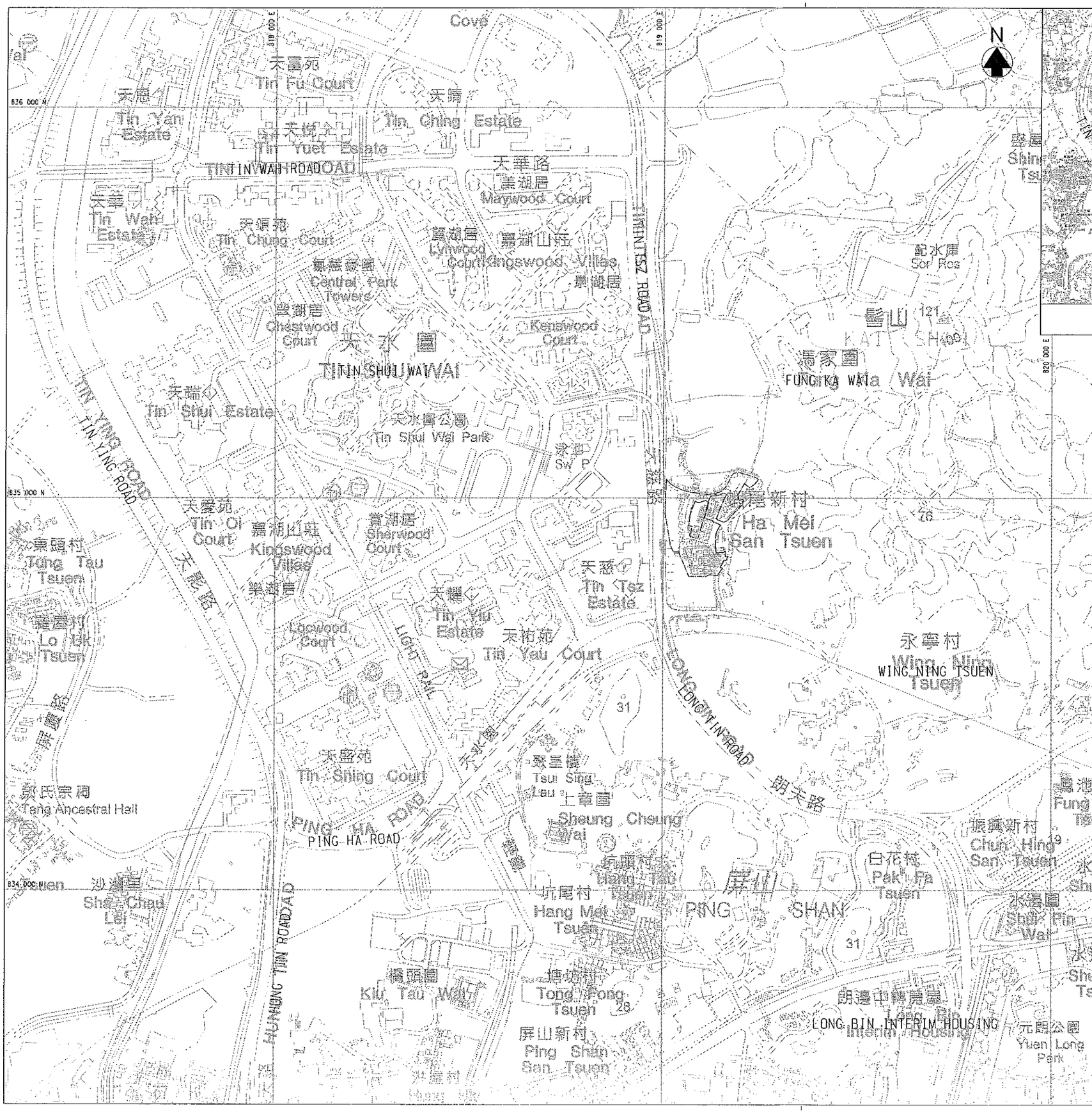
Engineering Works for Ha Mei San Tsuen Village Expansion Area

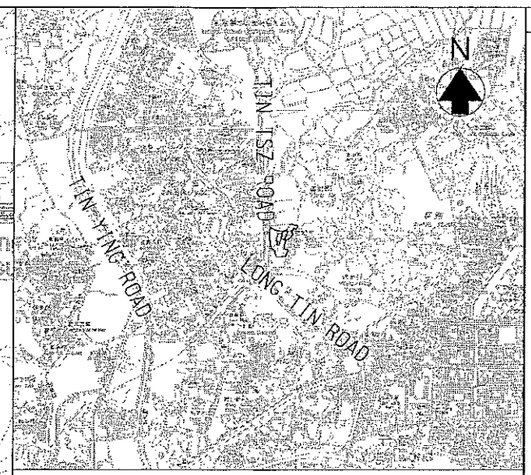
Sewerage Works



		Length (measured from dgn) (m)	Section area (m^2)	Volume (m^3)
Proposed sewer	(average 225 U)	752	0.040	29.9

DRAWINGS





LOCATION PLAN
SCALE 1:25000

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NOTE:
1. GRID LINES ARE HONG KONG METRIC GRID 1980.

LEGEND:

SITE BOUNDARY

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked
Initial	JOEL	GC	SZ	GC
Date	FEB2012	FEB2012	FEB2012	FEB2012

Approved

Agreement No.
CE 5/86

Agreement Title
TIN SHUI WAI DEVELOPMENT – ENGINEERING INFRASTRUCTURE FOR HA MEI SAN TSUEN VILLAGE EXPANSION AREA

Drawing Title
KEY LOCATION PLAN

Drawing No.
380390/B/KP001

Revision
–

Scale
A1 1:5000
A3 1:10000

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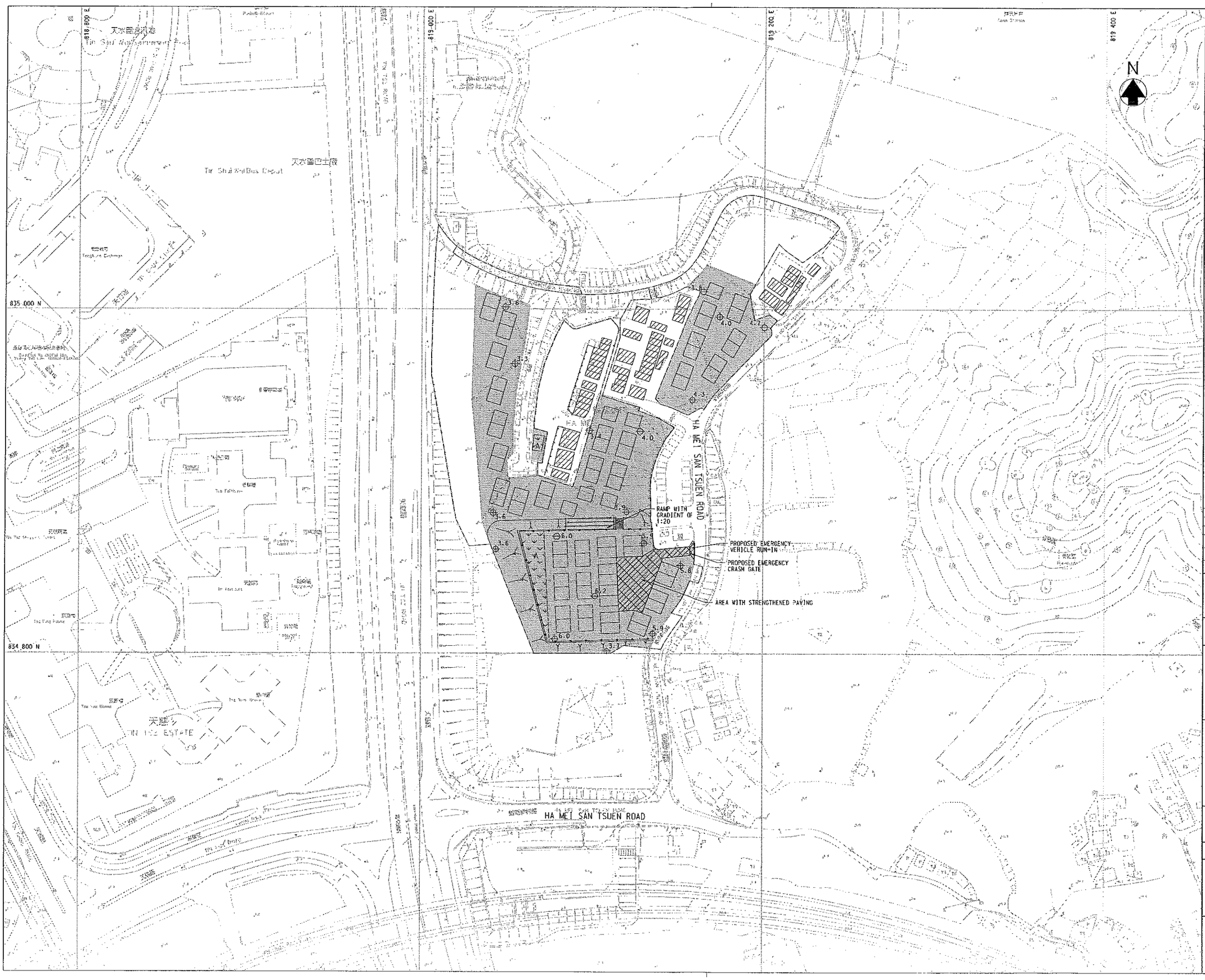
博威工程顧問有限公司



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NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (mPD).
3. GRID LINES ARE HONG KONG METRIC GRID 1980.

LEGEND:

- SITE BOUNDARY
- EXISTING VILLAGE HOUSE
- PROPOSED VILLAGE HOUSE
- 6.2 PROPOSED FINISH LEVEL IN mPD
- AMENITY AREA
- PROPOSED SLOPE
- TYPE 2 RAILING
- TUBULAR RAILING
- PROPOSED EMERGENCY VEHICLE RUN-IN WITH STRENGTHENED PAVING
- EXISTING ROAD SURFACE TO BE REPAVED WITH BITUMEN SURFACE
- PROPOSED AREA FOR SITE FORMATION

Revision	Date	Description			Initial
B	AUG 2012	MINOR REVISION			JOEL
A	JUL 2012	MINOR REVISION			JOEL
	Designed	Checked	Drawn	Checked	
Initial	JOEL	GC	SZ	GC	
Date	FEB2012	FEB2012	FEB2012	FEB2012	

Approved

Agreement No.
CE 5/86

Agreement Title
TIN SHUI WAI DEVELOPMENT – ENGINEERING INFRASTRUCTURE FOR HA MEI SAN TSUEN VILLAGE EXPANSION AREA

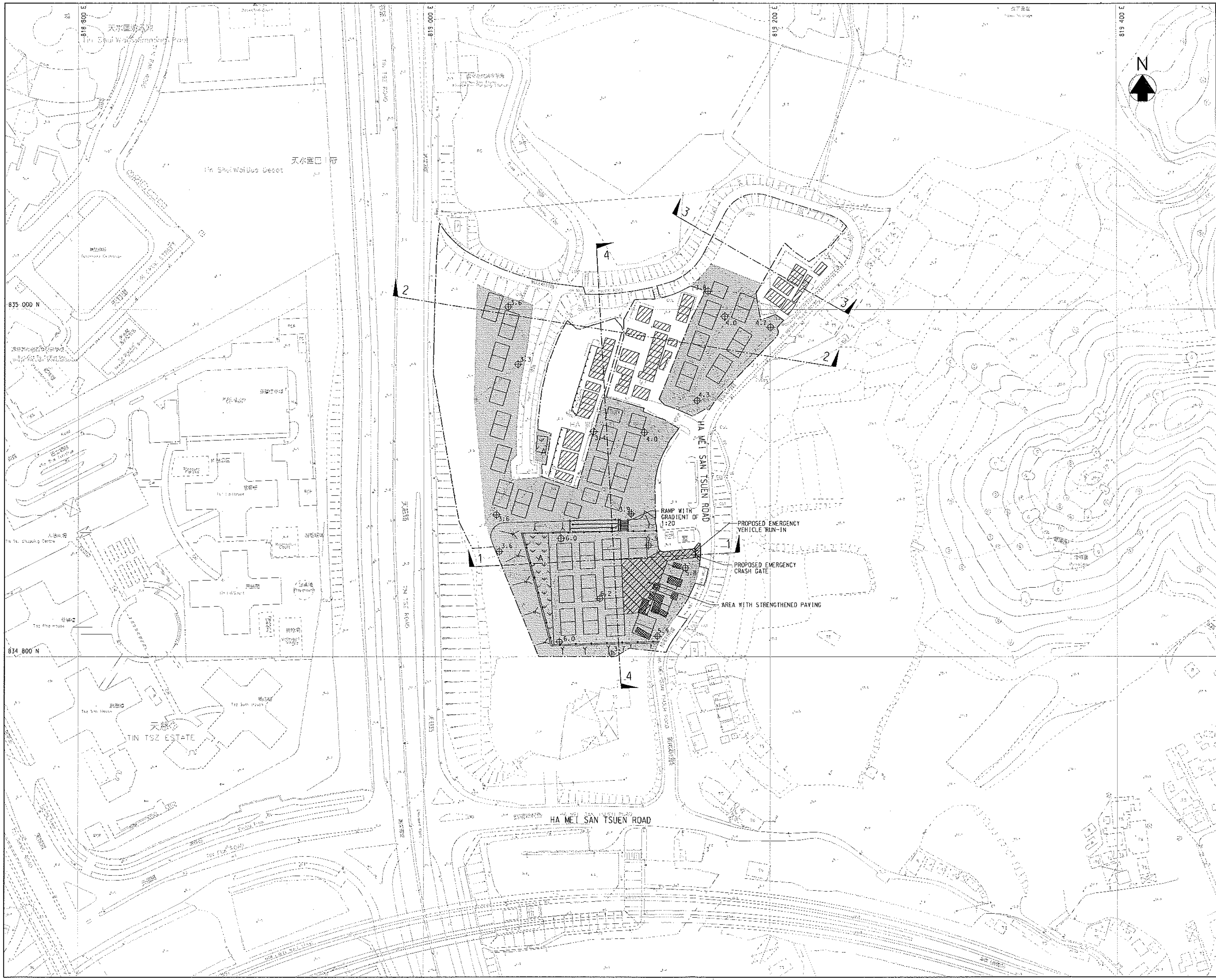
Drawing Title
GENERAL LAYOUT

Drawing No. 380390/B/GA001
Revision B

Scale A1 1:1000
A3 1:2000

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司



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NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (mPD).
3. GRID LINES ARE HONG KONG METRIC GRID 1980.
4. FILL MATERIAL FOR SITE FORMATION SHALL BE COMPLETELY DECOMPOSED GRANITE (CDG).
5. THE DEGREE OF COMPACTION FOR THE SITE FORMATION SHALL BE AT LEAST 95% AND CONSTRUCTION OF THE SITE FORMATION WORKS SHALL BE IN COMPLIANCE WITH THE GENERAL SPECIFICATION FOR CIVIL ENGINEERING WORKS.
6. TRIAXIAL COMPRESSION TESTS SHALL BE CARRIED OUT FOR THE COMPACTED FILL OF SITE FORMATION WORKS IN ACCORDANCE WITH CHAPTER 15 OF GEOSPEC 3 FOR THE ENGINEER'S VERIFICATION OF SOIL STRENGTH PARAMETERS. THE LOCATIONS AND NUMBER OF SOIL SAMPLES FOR THE TRIAXIAL COMPRESSION TESTS SHALL BE DETERMINED BY THE ENGINEER ON SITE.

LEGEND:

- SITE BOUNDARY
- EXISTING VILLAGE HOUSE
- EXISTING VILLAGE HOUSE TO BE DEMOLISHED
- PROPOSED VILLAGE HOUSE
- 6.2 PROPOSED FINISH LEVEL IN mPD
- 3.0 EXISTING LEVEL
- A AMENITY AREA
- PROPOSED SLOPE
- TYPE 2 RAILING
- TUBULAR RAILING
- PROPOSED EMERGENCY VEHICLE RUN-IN WITH STRENGTHENED PAVING
- PROPOSED AREA FOR SITE FORMATION

Revision	Date	Description	Initial
C	AUG 2013	NOTE 6 ADDED	GC
B	JUL 2013	AMENDMENT DUE TO GEO'S COMMENT	JK
A	AUG 2012	MINOR REVISION	JOEL

	Designed	Checked	Drawn	Checked
Initial	JOEL	GC	SZ	GC
Date	MAY2012	MAY2012	MAY2012	MAY2012

Approved

Agreement No.
CE 5/86

Agreement Title
TIN SHUI WAI DEVELOPMENT – ENGINEERING INFRASTRUCTURE FOR HA MEI SAN TSUEN VILLAGE EXPANSION AREA

Drawing Title
SITE FORMATION PLAN

Drawing No. 380390/B/GA002

Revision C

Scale A1 1:1000 A3 1:2000

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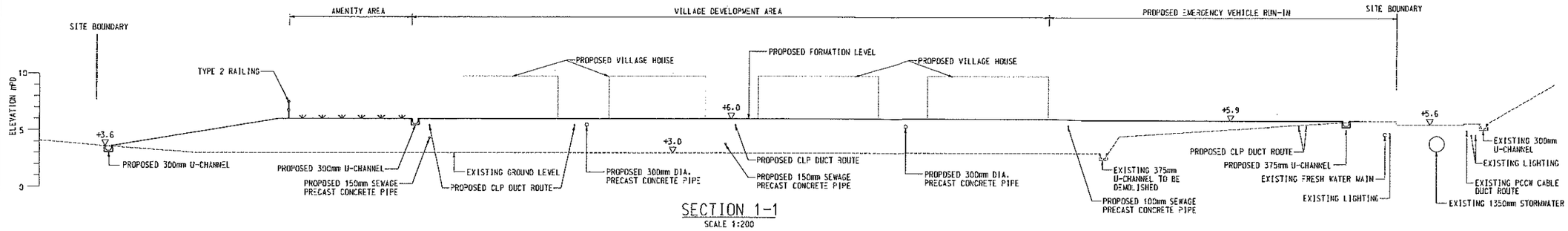

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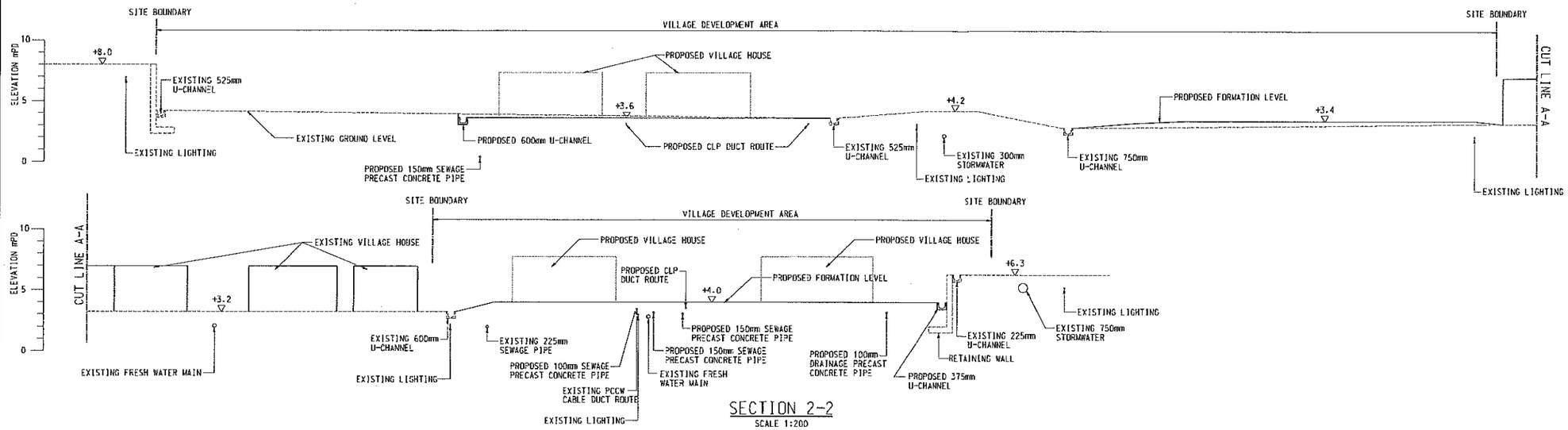
SCALE 1:200



SECTION 2-2
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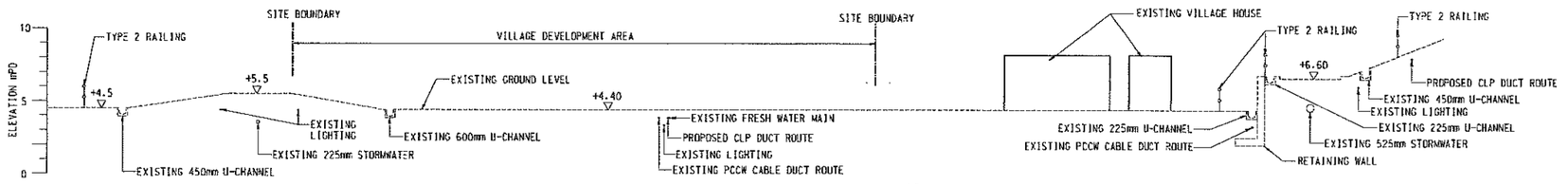

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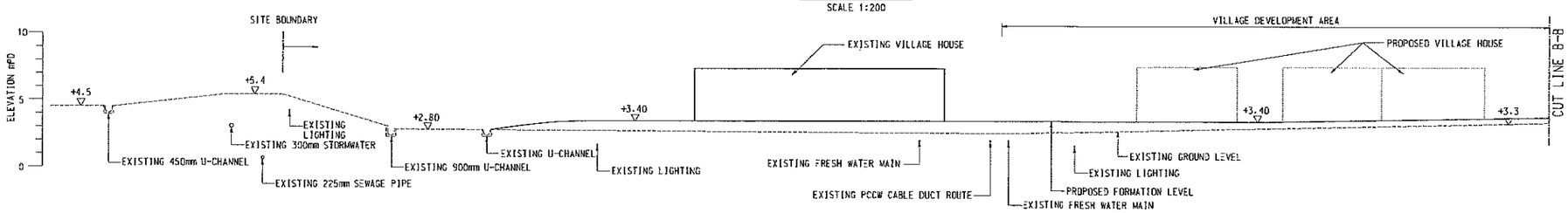

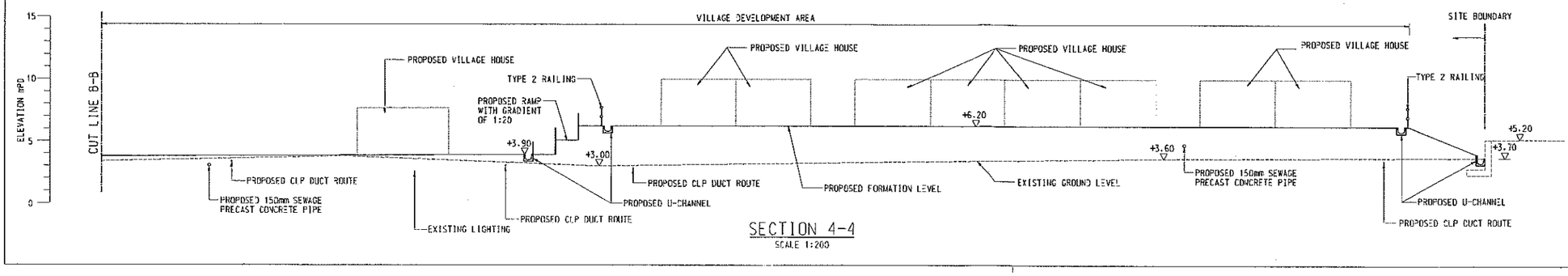

SECTION 4-4
SCALE 1:200

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NOTES:

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2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (mPD).

Revision	Date	Description			Initial
	Designed	Checked	Drawn		Checked
Initial	JOEL	GC	SZ		GC
Date	MAY2012	MAY2012	MAY2012		MAY2012

Approved

Agreement No.
CE 5/86

Agreement Title
TIN SHUI WAI DEVELOPMENT - ENGINEERING INFRASTRUCTURE FOR HA MEI SAN TSUEN VILLAGE EXPANSION AREA

Drawing Title
CROSS SECTIONS

Drawing No.
380390/B/GA003

Revision
-

Scale
A1 1:200
A3 1:400

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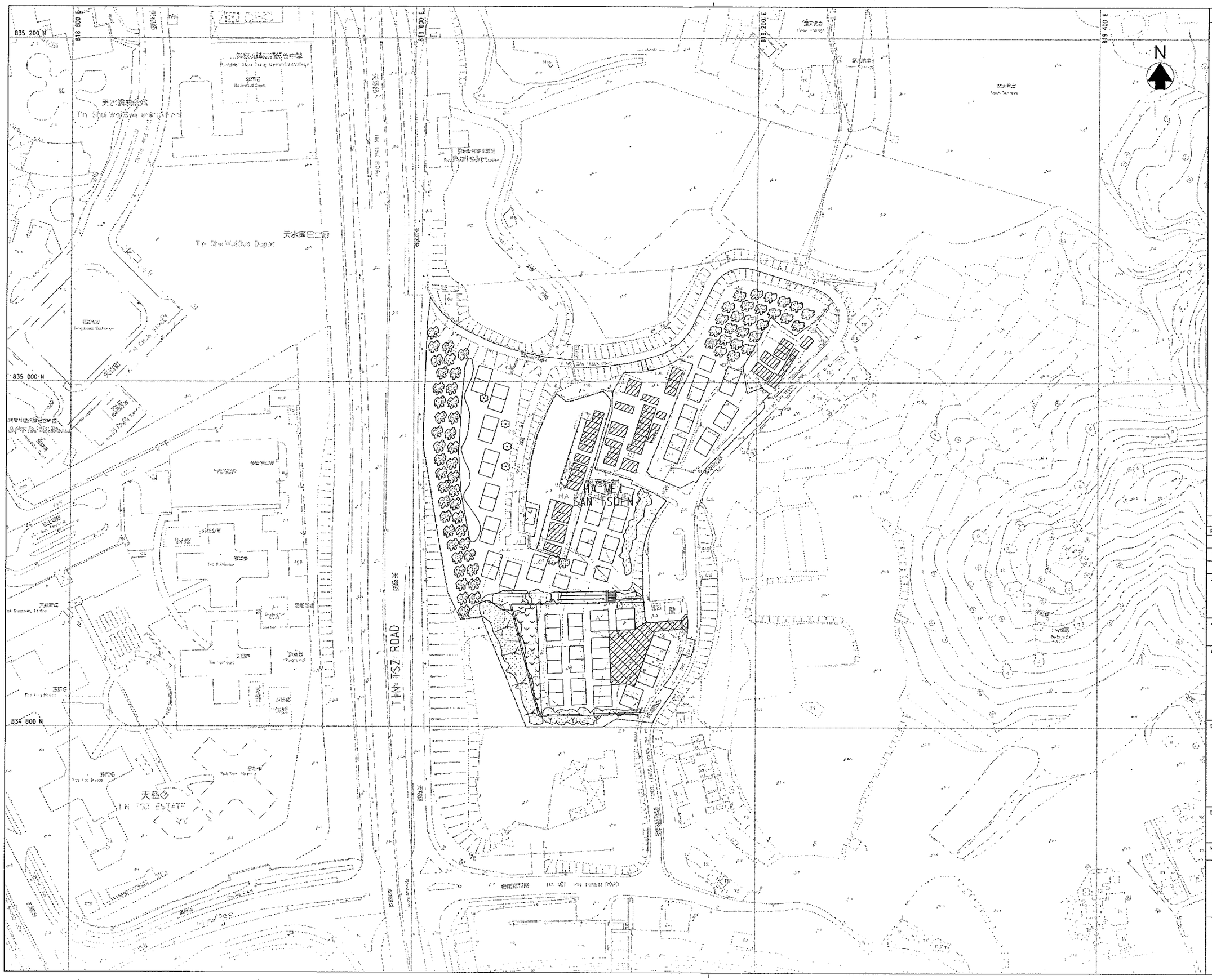

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NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METRE ABOVE PRINCIPAL DATUM (mPD).
3. THE VILLAGE DEVELOPMENT AREAS AND THE INTERNAL ALLEYS BETWEEN THE EXISTING VILLAGE HOUSES SHALL BE PAVED WITH INTERLOCKING PRECAST CONCRETE PAVING BLOCKS.

LEGEND:

- SITE BOUNDARY
- EXISTING TREES TO BE RETAINED
- SMALL TRESS & SHRUBS
- MIXED WOODLAND BUFFER PLANTING
- ORNAMENTAL TREES & SHRUB PLANTING
- PROPOSED EMERGENCY VEHICLE RUN-IN WITH STRENGTHENED PAVING

Revision	Date	Description			Initial
A	8/2012	MINOR REVISION			JOEL
	Designed	Checked	Drawn	Checked	
Initial	JOEL	GC	SZ	GC	
Date	FEB2012	FEB2012	FEB2012	FEB2012	

Approved

Agreement No.
CE 5/86

Agreement Title
TIN SHUI WAI DEVELOPMENT
– ENGINEERING INFRASTRUCTURE FOR HA MEI SAN TSUEN VILLAGE EXPANSION AREA

Drawing Title
LANDSCAPE WORKS

Drawing No.	Revision
380390/B/LC001	A

Scale: A1 1:1000, A3 1:2000

土木工程拓展署
CEDD Civil Engineering and Development Department

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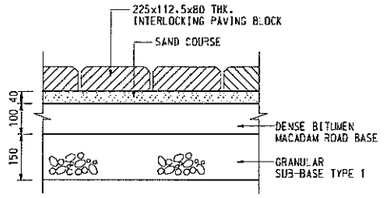
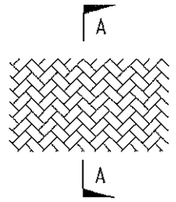
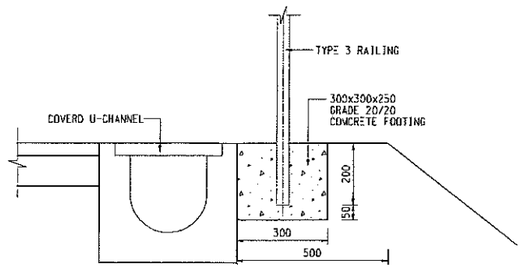


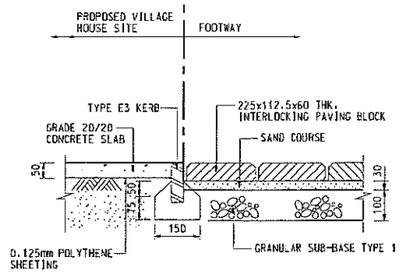
STRENGTHENED PAVING DETAILS
SCALE 1:10



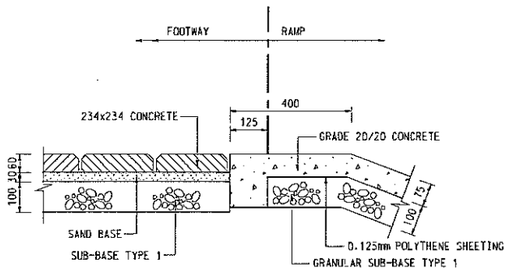
PAVING PATTERN
SCALE 1:10



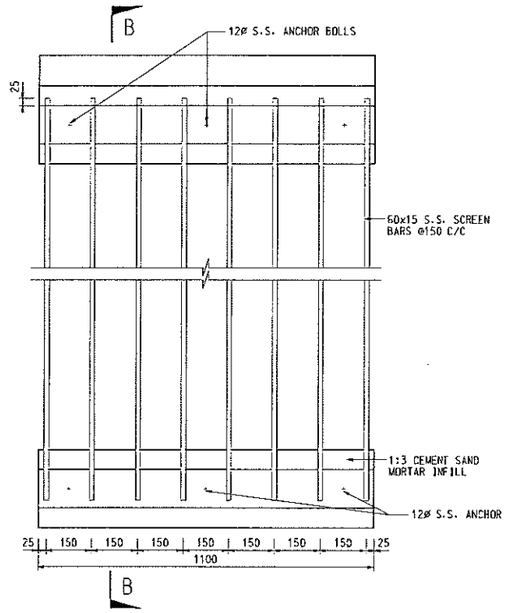
VEA AT EDGE OF SLOPE (WITH RAILING)
SCALE 1:10



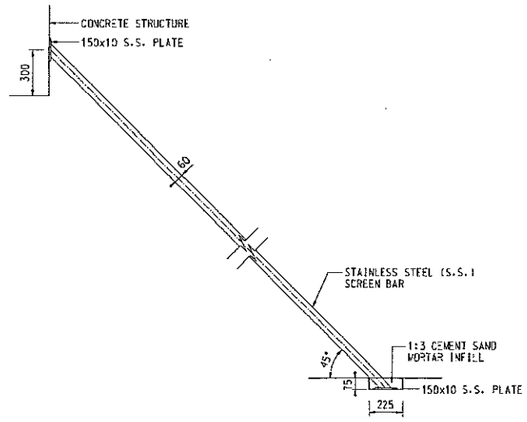
TYPICAL PAVING DETAILS
SCALE 1:10



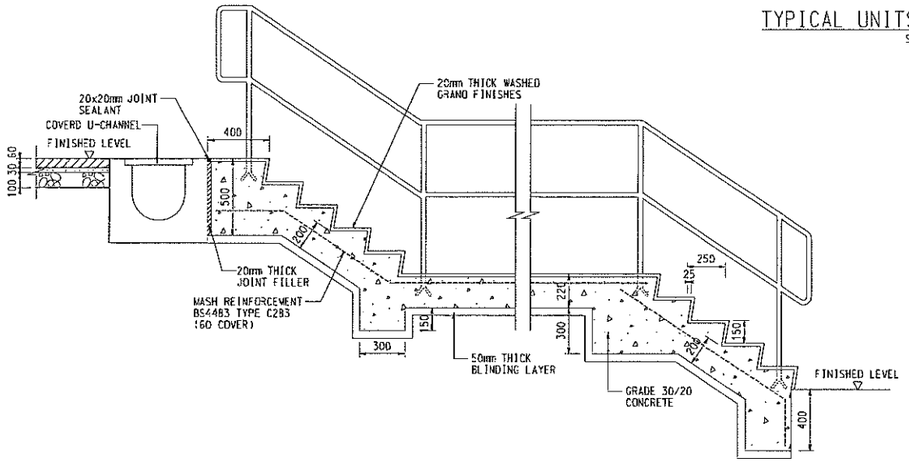
SECTION A - A
SCALE 1:10



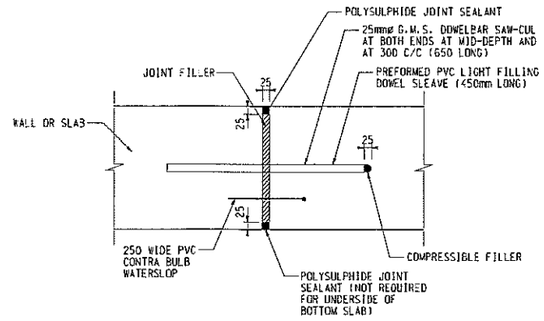
TYPICAL UNITS OF TRASH SCREEN
SCALE 1:10



SECTION B - B
SCALE 1:20



TYPICAL DETAILS OF STAIRCASE (FOR LOCATIONS WHERE APPROPRIATE)
SCALE 1:20



TYPICAL DETAILS OF MOVEMENT JOINT
SCALE 1:10

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
2. ALL COVERS TO REINFORCEMENT TO BE 30mm.
3. DETAILS OF TYPE 3 ROLLING REFER TO HyD STANDARD DRAWING NOS. H2133 & H2134.
4. DETAILS OF TUBULAR ROLLING REFER TO HyD STANDARD DRAWING NO. H2135.
5. DETAILS OF TYPE E3 PRECAST CONCRETE KERB REFER TO HyD STANDARD DRAWING NO. H1118.

NOTES:

1. ALL WELDS SHALL BE CHIPPED AND GROUND SMOOTH AND BRUSHED TO REMOVE SLAG.
2. ALL STEELWORK SHALL BE PAINTED IN ACCORDANCE WITH SYSTEM E OF GS18.62(1). FINISHING COAT SHALL BE GRAY TO BS5252F CODE 06A07 OR AS DIRECTED BY THE ENGINEER ON SITE.
3. NO. OF STEPS AND ARRANGEMENT OF LANDINGS SHALL BE DETERMINED ON SITE.

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial					
Date	FEB2012	FEB2012	FEB2012	FEB2012	

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CE 5/86

Agreement Title
TIN SHUI WAI DEVELOPMENT – ENGINEERING INFRASTRUCTURE FOR HA MEI SAN TSUEN VILLAGE EXPANSION AREA

Drawing Title
ROAD WORKS
MISCELLANEOUS DETAILS

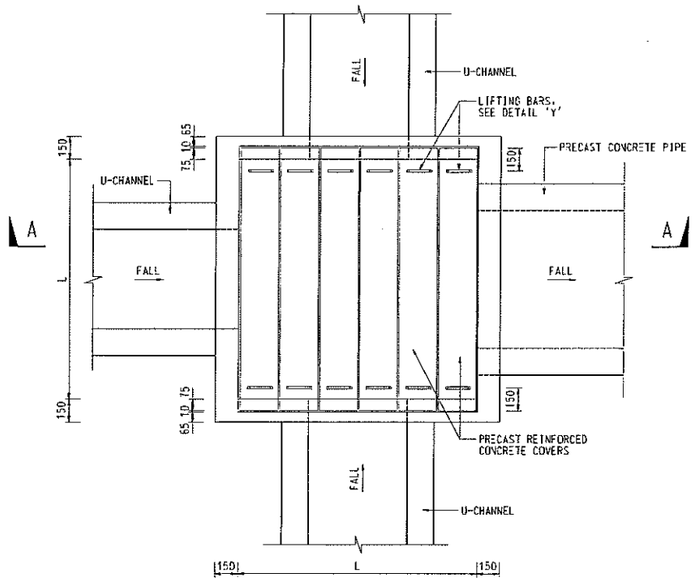
Drawing No.
380390/B/M001

Revision
–

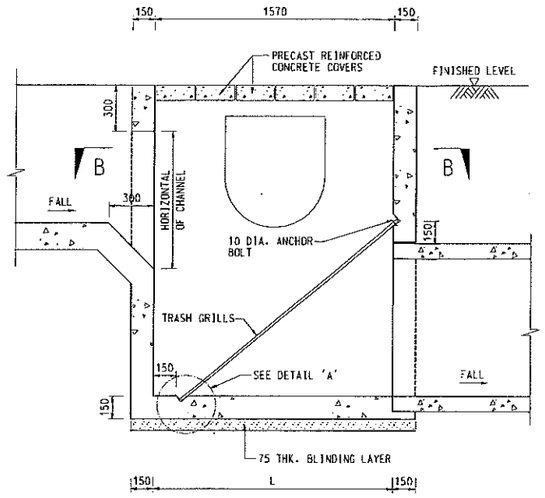
Scale
AS SHOWN

CEDD 土木工程拓展署 Civil Engineering and Development Department

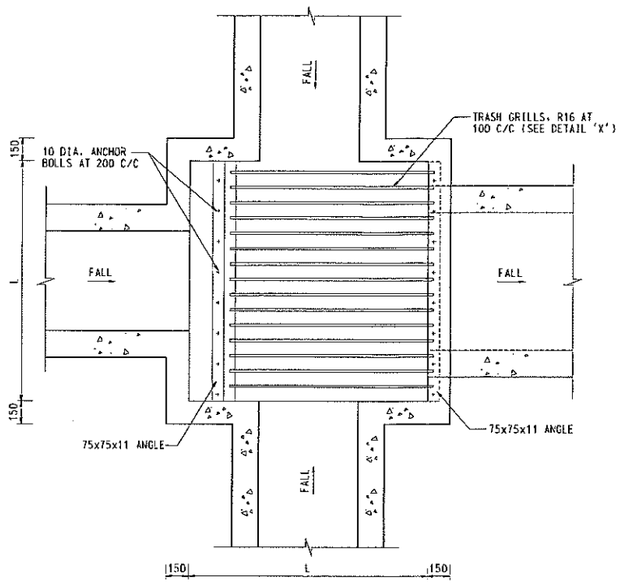
BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司



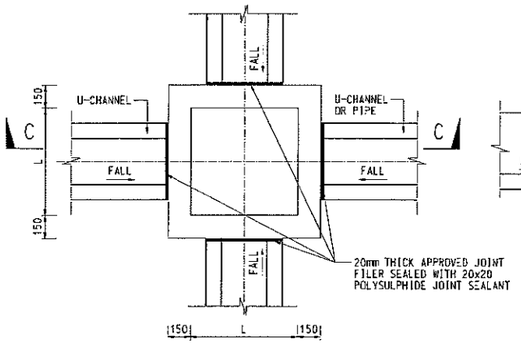
PLAN
SCALE 1:20



SECTION A - A
SCALE 1:20

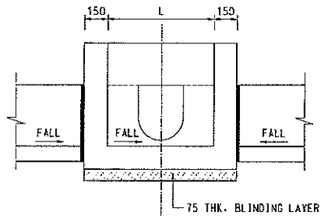


SECTION B - B
SCALE 1:20

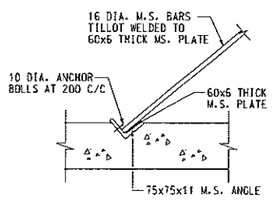


PLAN

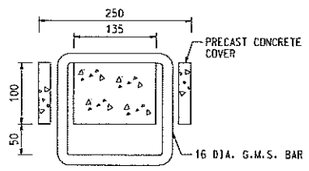
CATCHPIT TYPE 1
SCALE 1:20



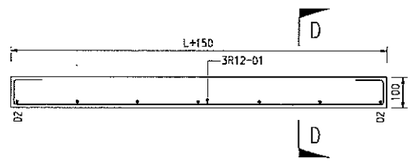
SECTION C - C
SCALE 1:20



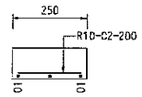
DETAIL 'A'
SCALE 1:10



DETAIL 'Y'
SCALE 1:5



ELEVATION
SCALE 1:10



SEDTION D - D
SCALE 1:10

TYPICAL R.C. DETAILS OF PRECAST CONCRETE COVER

DIMENSION OF CATCHPIT

SIZE OF LARGEST PIPE OR U-CHANNEL (mm)	L (mm)
225 ~ 300	550
375 ~ 450	800
525 ~ 675	1050
750 ~ 900	1300

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NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITHDRAWING NOS. M5 AND M6.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
3. ALL CONCRETE SHALL BE GRADE 20/20 UNLESS OTHERWISE STATED.
4. ALL EXPOSED FORMED SURFACE SHALL BE F2 FINISH. ALL BURIED FORMED SURFACE SHALL BE F1 FINISH. ALL UNFORMED FINISHED SHALL BE U2 FINISH UNLESS OTHERWISE STATED.
5. TRASH GRILLE, ANGLE AND PLATE SHALL BE GALVANISED MILD STEEL.
6. MINIMUM 30mm COVER SHALL BE PROVIDED FOR THE PRECAST REINFORCED CONCRETE COVER.
7. ALL REINFORCEMENT SHALL COMPLY WITH BS4449.
8. CATCHPIT SHALL HAVE WALLS AND SLAB CENTRALLY REINFORCED WITH ONE LAYER OF SQUARE MESH FABRIC NO. A252 TO BS4483.
9. MOVEMENT JOINT FOR CHANNELS SHALL BE FORMED AT 30m INTERVAL AND WHEN JOINING CATCHPITS.
10. ALL BLINDING CONCRETE SHALL BE GRADE 10/20.
11. ALL PIPES WITH COVER BELOW FINISH GROUND LEVEL LESS THAN 1m SHALL BE PROVIDED WITH CONCRETE SURROUND AS SHOWN IN HyD STANDARD DRAWING NO. H3130.
12. ALL BOLLS, BUTS AND WASHERS SHALL BE GRADE A4 STAINLESS STEEL.

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CE 5/86

Agreement Title
TIN SHUI WAI DEVELOPMENT - ENGINEERING INFRASTRUCTURE FOR HA MEI SAN TSUEN VILLAGE EXPANSION AREA

Drawing Title
MISCELLANEOUS DRAINAGE DETAILS

(SHEET 1 OF 21)

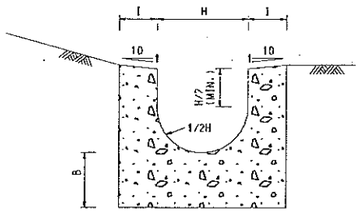
Drawing No.
380390/B/M002

Revision
-

Scale
AS SHOWN

CEDD 土木工程拓展署 Civil Engineering and Development Department

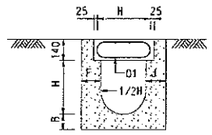
BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司



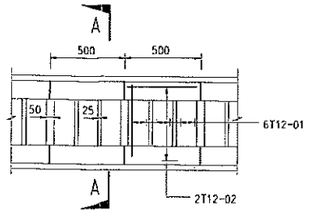
TYPICAL DETAIL OF U-CHANNEL

DIMENSION OF U-CHANNEL

NOMINAL SIZE OF CHANNAL H (mm)	THICKNESS I (mm)	THICKNESS B (mm)	REINFORCEMENT
225 TO 300	100	100	NOT REQUIRED
375 TO 675	150	150	NOT REQUIRED
750 TO 900	175	175	A252 MESH PLACED CENTRALLY

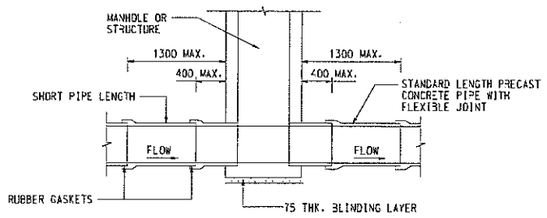


SECTION A-A

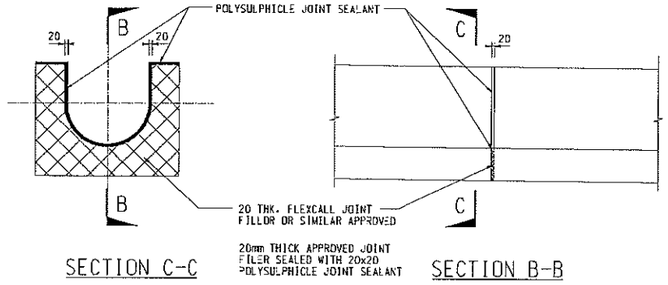


PLAN

TYPICAL DETAIL OF COVERED U-CHANNEL



TYPICAL DETAILS OF DOUBLE FLEXIBLE JOINT AT MANHOLE OR STRUCTURE



SECTION C-C

SECTION B-B

TYPICAL MOVEMENT JOINT FOR U-CHANNEL

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NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRAWING NOS. M4.
2. FOR GENERAL NOTES. REFER TO DRAWING NO. M4.
3. FOR DETAILS OF FLEXIBLE JOINTS FOR PIPES. REFER TO HYD STANDARD DRAWING NO. H3132.

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Initial				
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Agreement Title
TIN SHUI WAI DEVELOPMENT
– ENGINEERING INFRASTRUCTURE FOR HA MEI SAN TSUEN VILLAGE EXPANSION AREA

Drawing Title
MISCELLANEOUS DRAINAGE DETAILS

(SHEET 2 OF 2)

Drawing No.
380390/B/M003

Revision
–

Scale
AS SHOWN

CEDD 土木工程拓展署 Civil Engineering and Development Department

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NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METRE ABOVE PRINCIPAL DATUM (mPD).
3. GRID LINES ARE HONG KONG METRIC GRID 1980.

LEGEND:

- SITE BOUNDARY
- 300UC — EXISTING 300 U-CHANNEL
- 300 — EXISTING 300 PRECAST CONCRETE PIPE
- EXISTING CATCHPIT
- EXISTING STORMWATER MANHOLE
- U-CHANNEL TO BE DEMOLISHED
- PROPOSED U-CHANNEL
- PROPOSED PRECAST CONCRETE PIPE
- PROPOSED CATCHPIT
- PROPOSED STORMWATER MANHOLE
- PIPE — CONCRETE PIPE
- UC — U-CHANNEL
- UC(C) — U-CHANNEL WITH COVER

DRAINAGE MANHOLE SCHEDULE:

UPSTREAM DRAINAGE MANHOLE NO.	DOWNSTREAM DRAINAGE MANHOLE NO.	UPSTREAM GROUND LEVEL (mPD)	DOWNSTREAM GROUND LEVEL (mPD)	UPSTREAM INVERT LEVEL (mPD)	DOWNSTREAM INVERT LEVEL (mPD)	TYPE OF DRAINAGE	SIZE (mm)	UPSTREAM COVER FROM GROUND LEVEL TO PIPE (m)	DSD UPSTREAM MANHOLE TYPE
DM_1_1	DM_1_2	6.00	6.00	5.60	5.25	UC	300	-	-
DM_1_2	DM_1_3	6.00	6.00	5.25	5.12	UC	300	-	-
DM_1_3	DM_1_4	6.00	5.90	5.12	4.70	UC (C)	375	-	-
DM_1_4	DM_1_5	5.90	5.80	4.70	4.58	UC (C)	375	-	-
DM_1_5	DM_1_6	5.80	5.40	4.58	4.40	PIPE	375	1.22	D1
DM_2_1	DM_2_2	6.10	6.10	5.35	5.26	PIPE	225	0.75	C1
DM_2_2	DM_2_3	6.10	6.10	5.26	5.17	PIPE	225	0.84	C1
DM_2_3	DM_1_3	6.10	6.00	5.17	5.12	PIPE	225	0.93	C1
DM_3_1	DM_3_2	6.00	6.00	5.60	5.34	UC	300	-	-
DM_3_2	DM_3_3	6.00	6.00	5.34	4.92	UC (C)	300	-	-
DM_3_3	DM_3_4	6.00	5.90	4.92	4.74	UC (C)	375	-	-
DM_3_4	DM_3_5	5.90	5.90	4.74	4.60	UC (C)	375	-	-
DM_3_5	DM_3_6	5.90	5.80	4.60	4.40	UC (C)	375	-	-
DM_3_6	DM_3_7	5.80	5.80	4.40	4.28	UC (C)	375	-	-
DM_3_7	DM_3_8	5.80	5.60	4.28	4.14	PIPE	375	1.52	E1
DM_4_1	DM_4_2	6.10	6.10	5.35	5.28	PIPE	300	0.75	C1
DM_4_2	DM_4_3	6.10	6.05	5.28	5.22	PIPE	300	0.83	C1
DM_4_3	DM_4_4	6.05	6.00	5.22	5.14	PIPE	300	0.84	C1
DM_4_4	DM_3_3	6.00	6.00	5.14	5.10	PIPE	300	0.87	C1
DM_5_1	DM_1_5	6.00	5.80	5.50	5.15	UC (C)	300	-	-
DM_6_1	DM_6_2	4.05	3.90	3.12	2.87	UC (C)	375	-	-
DM_6_2	DM_6_3	3.90	3.60	2.87	2.44	UC (C)	450	-	-
DM_6_3	DM_6_4	3.60	3.50	2.44	2.01	UC (C)	600	-	-
DM_6_4	DM_6_5	3.50	2.80	2.01	1.75	UC (C)	600	-	-
DM_6_5	DM_6_6	2.80	2.70	1.75	1.66	UC	600	-	-
DM_6_6	DM_6_7	2.70	2.65	1.66	1.65	UC	600	-	-
DM_7_1	DM_7_2	3.70	3.65	3.10	2.84	UC	300	-	-
DM_7_2	DM_7_3	3.65	3.60	2.84	2.50	UC	300	-	-
DM_7_3	DM_6_3	3.60	3.60	2.50	2.44	UC	300	-	-
DM_8_1	DM_7_3	3.65	3.60	2.57	2.50	UC	300	-	-
DM_9_1	DM_9_2	4.00	3.94	3.33	3.25	PIPE	225	0.68	C1
DM_9_2	DM_9_3	3.94	3.86	3.25	3.17	PIPE	225	0.69	C1
DM_9_3	DM_9_4	3.86	3.82	3.17	3.10	PIPE	225	0.70	C1
DM_9_4	DM_6_2	3.82	3.90	3.10	3.05	PIPE	225	0.72	C1
DM_10_1	DM_10_2	3.55	3.50	2.78	2.70	UC	450	-	-
DM_10_2	DM_10_3	3.50	3.20	3.03	2.43	UC (C)	450	-	-
DM_10_3	DM_10_4	3.20	3.00	2.43	2.10	UC (C)	525	-	-
DM_10_4	DM_6_7	3.00	2.65	2.10	1.65	UC (C)	525	-	-
DM_11_1	DM_11_2	3.40	3.35	2.73	2.58	PIPE	225	0.68	C1
DM_11_2	DM_10_3	3.35	3.30	2.58	2.43	PIPE	225	0.78	C1
DM_12_1	DM_10_4	3.35	3.20	2.53	2.31	PIPE	225	0.83	C1
DM_13_1	DM_13_2	3.55	3.10	3.33	2.88	UC (C)	225	-	-
DM_14_1	DM_14_2	3.45	3.40	2.70	2.63	PIPE	300	0.75	C1
DM_14_2	DM_14_3	3.40	3.35	2.63	2.55	PIPE	300	0.78	C1
DM_14_3	DM_14_4	3.35	3.30	2.55	2.49	PIPE	300	0.80	C1
DM_14_4	DM_14_5	3.30	3.25	2.49	2.39	PIPE	300	0.81	C1
DM_14_5	DM_13_2	3.25	3.10	2.39	2.37	PIPE	300	0.86	C1
DM_15_1	DM_15_2	4.70	4.52	3.94	3.67	UC (C)	375	-	-
DM_15_2	DM_15_3	4.52	4.39	3.67	3.47	UC (C)	375	-	-
DM_17_1	DM_17_2	4.10	4.05	3.43	3.23	PIPE	225	0.68	C1
DM_17_2	DM_17_3	4.05	4.00	3.23	3.08	PIPE	225	0.83	C1
DM_17_3	DM_17_4	4.00	3.95	3.08	3.00	PIPE	225	0.93	C1
DM_17_4	DM_15_5	3.95	3.86	3.00	2.83	PIPE	225	0.96	C1

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Agreement Title
TIN SHUI WAI DEVELOPMENT – ENGINEERING INFRASTRUCTURE FOR HA MEI SAN TSUEN VILLAGE EXPANSION AREA

Drawing Title
STORMWATER DRAINAGE LAYOUT

Drawing No.
380390/B/SD001

Revision
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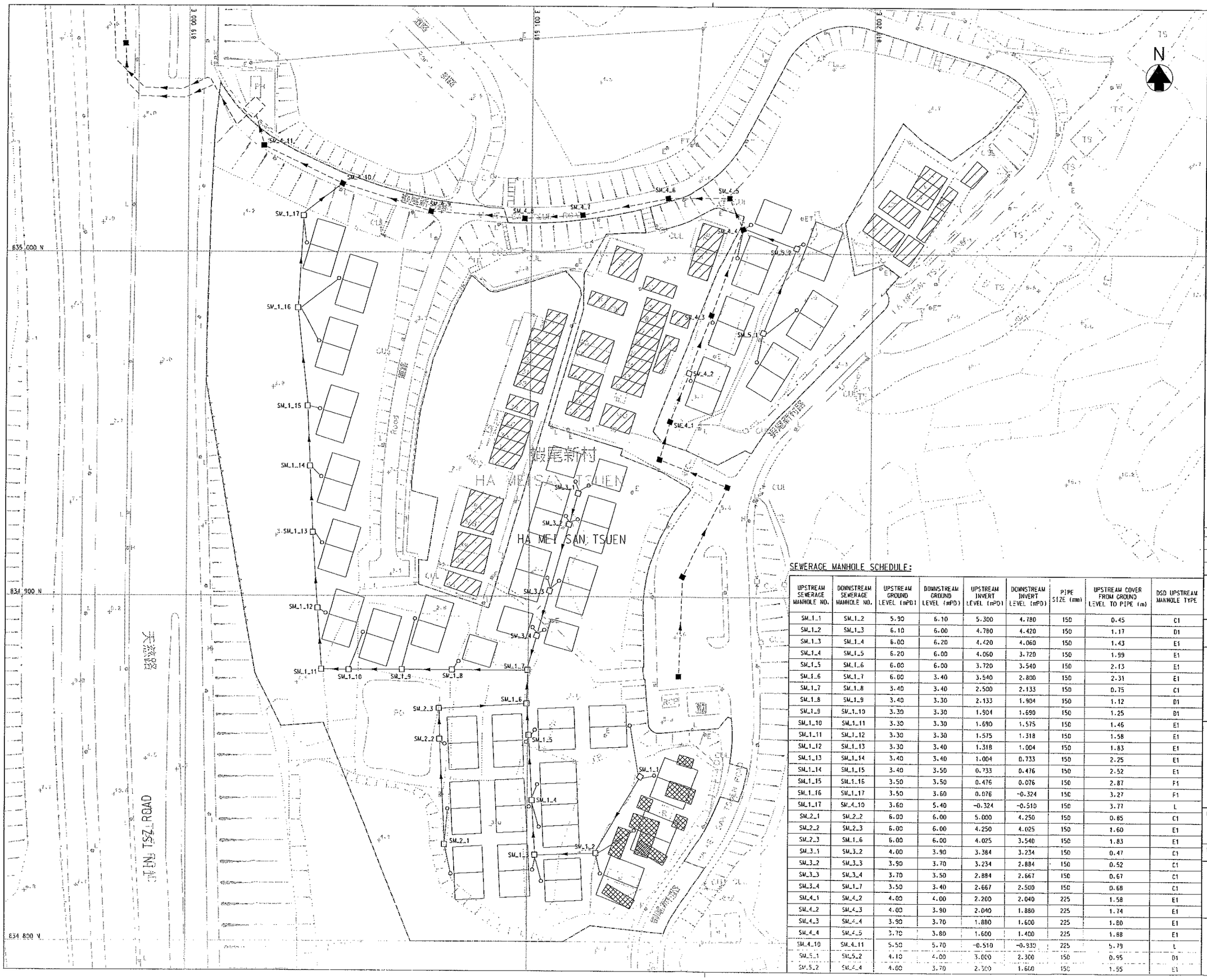
Scale
A1 1:500
A3 1:1000

CEDD 土木工程拓展署 Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司



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NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METRE ABOVE PRINCIPAL DATUM (mPD).
3. GRID LINES ARE HONG KONG METRIC GRID 1980.

LEGEND:

- SITE BOUNDARY
- EXISTING SEWAGE MANHOLE AND PIPE
- PROPOSED SEWAGE MANHOLE AND PRECAST CONCRETE PIPE

SEWERAGE MANHOLE SCHEDULE:

UPSTREAM SEWERAGE MANHOLE NO.	DOWNSTREAM SEWERAGE MANHOLE NO.	UPSTREAM GROUND LEVEL (mPD)	DOWNSTREAM GROUND LEVEL (mPD)	UPSTREAM INVERT LEVEL (mPD)	DOWNSTREAM INVERT LEVEL (mPD)	PIPE SIZE (mm)	UPSTREAM COVER FROM GROUND LEVEL TO PIPE (m)	DSD UPSTREAM MANHOLE TYPE
SM_1_1	SM_1_2	5.90	6.10	5.300	4.780	150	0.45	C1
SM_1_2	SM_1_3	6.10	6.00	4.780	4.420	150	1.17	D1
SM_1_3	SM_1_4	6.00	6.20	4.420	4.060	150	1.43	E1
SM_1_4	SM_1_5	6.20	6.00	4.060	3.720	150	1.99	E1
SM_1_5	SM_1_6	6.00	6.00	3.720	3.540	150	2.13	E1
SM_1_6	SM_1_7	6.00	3.40	3.540	2.800	150	2.31	E1
SM_1_7	SM_1_8	3.40	3.40	2.500	2.133	150	0.75	C1
SM_1_8	SM_1_9	3.40	3.30	2.133	1.904	150	1.12	D1
SM_1_9	SM_1_10	3.30	3.30	1.904	1.690	150	1.25	D1
SM_1_10	SM_1_11	3.30	3.30	1.690	1.575	150	1.46	E1
SM_1_11	SM_1_12	3.30	3.30	1.575	1.318	150	1.58	E1
SM_1_12	SM_1_13	3.30	3.40	1.318	1.004	150	1.83	E1
SM_1_13	SM_1_14	3.40	3.40	1.004	0.733	150	2.25	E1
SM_1_14	SM_1_15	3.40	3.50	0.733	0.476	150	2.52	E1
SM_1_15	SM_1_16	3.50	3.50	0.476	0.076	150	2.87	F1
SM_1_16	SM_1_17	3.50	3.60	0.076	-0.324	150	3.27	F1
SM_1_17	SM_4_10	3.60	5.40	-0.324	-0.510	150	3.77	L
SM_2_1	SM_2_2	6.00	6.00	5.000	4.250	150	0.85	C1
SM_2_2	SM_2_3	6.00	6.00	4.250	4.025	150	1.60	E1
SM_2_3	SM_1_6	6.00	6.00	4.025	3.540	150	1.83	E1
SM_3_1	SM_3_2	4.00	3.90	3.384	3.234	150	0.47	C1
SM_3_2	SM_3_3	3.90	3.70	3.234	2.884	150	0.52	C1
SM_3_3	SM_3_4	3.70	3.50	2.884	2.667	150	0.67	C1
SM_3_4	SM_1_7	3.50	3.40	2.667	2.500	150	0.68	C1
SM_4_1	SM_4_2	4.00	4.00	2.200	2.040	225	1.58	E1
SM_4_2	SM_4_3	4.00	3.90	2.040	1.880	225	1.74	E1
SM_4_3	SM_4_4	3.90	3.70	1.880	1.600	225	1.80	E1
SM_4_4	SM_4_5	3.70	3.80	1.600	1.400	225	1.88	E1
SM_4_10	SM_4_11	5.50	5.70	-0.510	-0.939	225	5.79	L
SM_5_1	SM_5_2	4.10	4.00	3.000	2.300	150	0.95	D1
SM_5_2	SM_4_4	4.00	3.70	2.300	1.600	150	1.55	E1

Revision	Date	Description			Initial
	Designed	Checked	Drawn		Checked
Initial	JOEL	GC	SZ		GC
Date	FEB2012	FEB2012	FEB2012		FEB2012

Approved

Agreement No.
CE 5/86

Agreement Title
TIN SHUI WAI DEVELOPMENT – ENGINEERING INFRASTRUCTURE FOR HA MEI SAN TSUEN VILLAGE EXPANSION AREA

Drawing Title
SEWERAGE LAYOUT

Drawing No.
380390/B/SD002

Revision
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Scale
A1 1:500
A3 1:1000

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BLACK & VEATCH HONG KONG LIMITED 柏克工程顧問有限公司

RESPONSES TO COMMENTS