

Appendix D1

Construction and Demolition Materials Management Plan (C&DMMP)

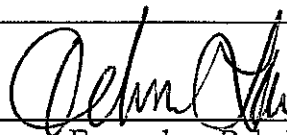
**The Government of the Hong Kong
Special Administrative Region
Drainage Services Department**

Agreement No. CE 6/2002 (DS)
Drainage Improvement in Northern New Territories
Investigation, Design and Construction

Construction and Demolition Material Management Plan (Phase 2)
[382486/74/Issue 2]

March 2007

Report Authorised For
Issue By:



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Appendix
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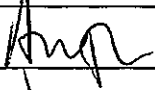
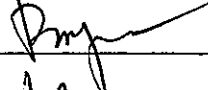

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 Figure No. 382486/REV/029E

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Agreement No. CE6/2002(DS)
Drainage Improvement in Northern New Territories, Package C

Construction and Demolition Material Management Plan

1. PURPOSE

The objective of Construction and Demolition Material Management Plan (C&DMMP) is to enhance the management of C&D material including rock, and to minimize its generation at source. The enhancement measures include:

- (a) Drawing up a management plan at an early design stage to minimize C&D material generation;
- (b) Estimating the quantities of C&D material to be generated; and
- (c) Providing the Contractor with information from the C&DMMP so as to facilitate him in the preparation of the Environmental Management Plan (EMP) and to minimize C&D material generation during construction.

2. BACKGROUND

The Project is entitled "Drainage Improvement in Northern New Territories - Package C" and is hereafter referred to as "the Project". It is one of the three work packages recommended by the Drainage Master Plan in the Northern New Territories (DMP) Study, which has identified the deficiencies in the existing drainage systems. The works of the Project comprise the construction of drainage channels and associated works, which aim to improve the secondary and local stormwater drainage systems located in the upper Indus and Ganges Basins.

The Preliminary Project Feasibility Study (PPFS) concludes that rapid developments in the study areas have resulted in higher runoff and some existing drainage systems are inadequate in respect of flood protection capacities. Consequently, severe flooding occurs in these low-lying areas during heavy rainfall. In accordance with the recommendations of the DMP, the Project implements drainage improvement works in the Lung Yeuk Tau, Man Uk Pin, Ta Kwu Ling, Ping Che, and Lin Ma Hang areas, thereby alleviating flooding problems and facilitating future developments in these areas. Figure 382486/ATS/KP001 shows the locations of all the proposed drainage channels.

The draft C&DMMP for the whole project has been submitted to CEDD for comments on 2 November 2005. Comments from CEDD were received under their letter ref. (3) in FM PF/CDM/00 Pt 10 dated 22 February 2006. A revised C&DMMP incorporating the comments received were issued on 9 May 2006. CEDD indicated no further comment on the revised report in his letter ref. (17) in FM PF/CDM/00 Pt 10 of 30 June 2006.

The project has been grouped into two works packages by the geographical locations with comparable construction cost. Phase 1 includes Channels LYT01, LYT04, LYT09, LYT10 and TKL10 whilst Phase 2 comprises TKL02, TKL07, MUP01, MUP02, MUP03, MUP04, MUP05 and LMH01.

MUP03, 04 & 05, LYT04 and LMH01 are defined in the Project Brief as Designated Projects under the Environmental Impact Assessment Ordinance. However, after discussions and as confirmed in EPD's memo reference EP2//N7/23 Pt.34 dated 6 October 2006, LYT04 is re-defined as a non-Designated Project. As such, all the channels under Phase 1 are non-designated.

According to Clause 11 of ETWB TCW No. 33/2002, for Designated Projects, the C&DMMP should be submitted together with the environmental impact assessment for approval. Since Phase 1 works are all non-designated projects, its C&DMMP can be submitted before the finalization of the EIA report in order to avoid the potential impact on its commencement date.

The Final C&DMMP for Phase 1 has been submitted to DSD on 18 January 2007.

This Plan covers the channels under Phase 2 works. Channels MUP03A, MUP03B, MUP04A, MUP04B, MUP05 and LMH01 are Designated Projects whilst channels TKL02, TKL07. MUP01 and MUP02 are non-Designated Projects.

3. SCOPE OF PROJECT

The scope of the Project comprises the construction of secondary channels with associated maintenance accesses and footpaths and re-provisioning of pedestrian and vehicular bridges. Phase 2 comprises drainage improvement works in the following areas:

Ping Che and Ta Kwu Ling Region

- TKL02 – An approximately 810m long local stream originated in Sheung Shan Kai Wat and tie into the River Ganges Main (Ping Yuen River) at the downstream will be trained as a gabion trapezoidal channel with maximum width of 7.8m.
[Figure Nos. 382486/REV/023F & 024H refer.]
- TKL07 – An approximately 810m section of the River Ganges Main (Ping Yuen River), upstream of the Ping Che Culvert, will be upgraded to a trapezoidal gabions channel of base width between 5 and 8.3m.
[Figure No. 382486/REV/025G refers.]

Man Uk Pin Region

- MUP01 – The bank of a 300m long section at the downstream will be raised to improve the flow conveyance of the watercourse.
[Figure No. 382486/REV/027I refers.]

- MUP02 – The downstream section (about 25m in length) is to be improved to a trapezoidal channel. A by-pass channel is proposed at the meander between chainage 230m to 358m. A 130m long bank raising works and a 110m long bank stabilization works are also proposed.
[Figure No. 382486/REV/027I refers.]
- MUP03A & MUP03B – The existing crossroad pipe and roadside drains on the southern verge of Sha Tau Kok Road (Wo Hang Section) westbound carriageway will be upgraded as trapezoidal channels with base width of 1.2m (MUP03B) and 600 U-channel (MUP03A). These drains will connect to River Indus (Channel MUP05) through the proposed box culvert of internal size of 1m(H) x 3m(W) under the existing Sha Tau Kok Road.
[Figure Nos. 382486/REV/027I & 028H refer.]
- MUP04A - An existing local stream at Loi Tung is to be upgraded to a 4.5m wide, 1.75m deep trapezoidal channel which will tie into the River Indus at downstream via three new crossroad pipes (Ø1950mm) underneath the existing Sha Tau Kok Road.
[Figure No. 382486/REV/028H refers.]
- MUP04B is located to the west of Loi Tung Tsuen along the southern verge of Sha Tau Kok Road (Wo Hang Section). U-channels and carrier pipes are to be constructed alongside the southern verge of the Sha Tau Kok Road westbound carriageway.
[Figure No. 382486/REV/028H refers.]
- MUP05 – A 690m long section of the existing River Indus, from its confluence with MUP02 extending to the existing culvert underneath Wo Keng Shan Road, will be improved to a “Two-Stage Channel” with maximum depth of 2.6m. A further 320m long roadside drain to the north of Sha Tau Kok Road will also be improved to be a 2 to 3m wide, 2 to 2.8m deep trapezoidal gabion channel.
[Figure Nos. 382486/REV/027I & 028H refer.]

Lin Ma Hang Stream

- LMH01 – The proposed drainage improvement works along the existing Lin Ma Hang stream consist of replacing the existing sub-standard screen with an array of new grilles (two-stage) at the confluence with the Shenzhen River, bank improvement for some sections and raising of 3 nos. of bridges. [Figure No. 382486/REV/029E refers.]

4. IMPLEMENTATION PROGRAMME

The construction of the Project will be carried out in two phases. The first and second phases of construction are programmed to commence in June 2007 for completion in May 2010, and December 2007 for completion in December 2010 respectively. Key dates for critical activities of Phase 2 are summarized in Table 4.1.

Table 4.1
Programme of Critical Activities of the Project (Phase 2)

Milestone Activity	Dates
Roads Ordinance (Cap.370)	
- Finalization of Resumption Limits	Jan 06
- Gazettal of Plan & Scheme	Apr 06
- Gazettal of Land Resumption Notice	Apr 06
- Gazettal of Plan & Scheme Amendment	Mar 07
- Gazettal of Land Resumption Amendment Notice	Jun 07
- Site Clearance/ Handover	Dec 07
Land Resumption Ordinance (Cap.124)	
- Finalization of Resumption Limits	Mar 06
- Gazettal of Land Resumption Notice	June 07
- Site Clearance/ Handover	Dec 07
Public Consultations	Jan – May 05
Instruction for Design Phase	Aug 06
Tender invite of Phase 2	Aug 07
Tender closing of Phase 2	Sep 07
Start site work for Phase 2	Dec 07
Substantial completion of Phase 2	Dec 10
Finalization of all accounts	Feb 11
Completion of Assignment	May 11

5. DEVELOPMENT CONSTRAINTS

- 5.1 The main constraint on the channel design was the requirements to follow the recommendations of DSD Practice Notes No. 1/2005 – Guidelines on Environmental Considerations in designing environmental friendly channels. The environmental considerations and other design constraints are discussed below with respect to the minimization of C&D materials:

(a) Environmental Considerations

The existing rivers within Man Uk Ping Channels (MUP01, MUP02 and MUP05), and Lin Ma Hang Channel (LMH01) have high ecological values and required preservation. Environmental friendly design approach for channel such as 2-stage channel or bank raising as recommended in DSD Practice Note No. 1/2005 – Guidelines on Environmental Considerations for River Channel Design – should be adopted. In respect of C&D material minimization, bank raising should be adopted as far as possible because it requires no excavation.

However, at locations where there are adjacent structures and low hydraulic capacity, a 2-stage channel should be adopted. To restore the living environment for natural habitats, gabion linings should be adopted instead of the conventional concrete linings. However, due to the increased roughness of gabion surface, the channel area will inevitably be increased so as to maintain adequate flow capacity.

(b) Land Availability

The objective of minimizing land resumption effects the selection of channel configuration. The proposed channels are designed to locate within government land as far as possible. In cases when land resumption is unavoidable, the extent of resumption shall be kept to the minimum. Since the existing streams are located within government land, it is more preferable to align the proposed channels with the existing streams. This is also in line with the recommendations in channel design according to the recommendations of DSD Practice Note No. 1/2005.

(c) Provision of Maintenance Access Road

Maintenance access road is required for regular inspection and maintenance of the channels. In order to minimize the generation of C&D materials, the maintenance access roads are placed along the channel bed of TKL02 and TKL07. A 1.6m verge is provided along at least one side of the channels as an access for channel inspections. These arrangements for maintenance access will minimize the generation of C&D materials.

(d) Channel Size and Lining

Trapezoidal and rectangular gabion lined channels are considered for the design. A rectangular channel would generate less C&D material than rectangular channel. However, selection of channel shape and size is also subject to hydraulic capacity of the channels.

6. DEVELOPMENT OPTIONS

- 6.1 Reference has been made to DSD Practice Note No. 1/2005 – Guidelines on Environmental Considerations for River Channel Design. This DSD Practice Note presents the essential environmental considerations that should be taken into account and incorporated wherever practicable, in the design of river channels. The Practice Note addresses the need for more environmentally friendly river channel design and be in-line with the new measures being put in place by the Government to strengthen the protection of natural rivers and streams.

- 6.2 Most of the channels under this Project are either designed as two-stage channels or trapezoidal channels with gabion/mattress lining. Both options are considered as ecological friendly designs. The two-stage design has an advantage over trapezoidal design on the protection of ecology as it has no disturbance to river bed. However, since deepening and/or smoothing are not possible for two-stage channels, their hydraulic performances are inevitably less efficient than the gabion trapezoidal channels. Wider channels and more land intake are thus required for the two-stage option.
- 6.3 Although the banks of widened two-stage channels are to be supported by gabion walls, the quantities of such are less than those used for trapezoidal channels lined by gabion and mattress. The gabion channel option therefore has higher cost on lining. The two-stage channels, however, are more costly on excavation and interim flood protection measures (due to the need of retaining the river bed). Considering the above, the construction cost for two-stage channels is in general slightly higher than the gabion trapezoidal channels.
- 6.4 The times required for the construction of channels under the two options are considered approximately the same. The adoption of either method will have no impact to the overall construction programme.
- 6.5 We have assessed the ecological values of the proposed channels and identified that channels MUP05, LMH01, MUP01 and MUP02 are of higher ecological importance. Other channels are considered to have moderate ecological values.
- 6.6 The total quantities of excavation under different design arrangements of channel options are listed as follows for comparison:

Arrangement No. 1

Two-stage channels for TKL02, TKL07, 132,800m³ of excavation material
MUP4B and MUP05 and the downstream of
MUP01 & 02

Arrangement No. 2

Gabion trapezoidal channels for TKL02, 115,300m³ of excavation material
TKL07, MUP4A and MUP05 and the
downstream of MUP01 & 02

Arrangement No. 3

Two-stage channel for MUP05. 123,150m³ of excavation material
Gabion trapezoidal channels for TKL02,
TKL07, MUP04A and the downstream of
MUP01 & MUP02

- 6.7 In order to minimize the generation of C&D materials without compromising too much on the protection of ecology, two-stage channels will be adopted at watercourses with high ecological values at MUP05 whilst gabion trapezoidal channels will be used as much as possible in moderate ecological sensitive areas. As such, Arrangement No. 3 is considered the optimum design and is therefore adopted.
- 6.8 Considerations were given to further raising the embankment behind gabion walls so as to use more C&D material on site and to increase the channel capacity. However, further raising the embankment level behind gabion walls would require more land resumption and induce negative visual impact to the adjacent villages. The embankment levels were designed to adequately meet the flood protection standards stipulated in the Stormwater Design Manual by DSD and not to induce adverse visual impact to the adjacent villages.

7. MANAGEMENT OF C&D MATERIALS

- 7.1 With reference to the C&DMMP [Report No. 382486/48/Issue 2] submitted under our letter ref. 382486-1721 dated 9 May 2006, the estimated volume of C&D material generated from the whole Project is about 283,000 cubic metres (m³).
- 7.2 The estimated volume of C&D material generated from Phase 1 of the Project is about 159,850 cubic metres (m³). The estimated volume of C&D material generated from Phase 2 works is 123,150m³, 43% of the total volume for the whole project. Of these, about 37,970m³ (31%) will be reused on site, 79,980m³ (65%) will be disposed of at public filling areas and 5,200m³ (4%) will be disposed of at landfills. The excavated material will be sorted on site. They will either be reused on site or be disposed off site according to their characteristics. The estimated quantities of these materials are as shown in Table 7.1.

Table 7.1
Quantities of Different C&D Materials for the Proposed Channels

Material	Quantity of C&D Materials (m ³)	Reused on Site (m ³)	Disposed off Site (m ³)	Disposal Site
Inert Soft C&D Material	113,950	34,185	79,765	Public Filling Areas
Rock (Grade III or below)	2,150	1,935	215	Public Filling Areas
C&D Waste	5,200	0	5,200	Landfills
Sediment	1,850	1,850	0	Re-use
Total	123,150	37,970	85,180	N/A

- 7.3 Based on the findings in desk top study and site inspections, it was revealed that the lands are mainly used for storage and vehicles parking. Therefore, high level of contamination of sediments is not expected. Moreover, given the small quantity of sediment (about 1850 m³) likely to be generated, it is proposed that the excavated sediment should be reuse on-site as backfilling material to eliminate the need of off-site disposal. Sampling and testing should be conducted by the contractor prior to excavation of the streambed to ascertain the amount of sediment and degree of contamination if presence. The testing is not conducted at this stage due to accessibility problem as the concerned stream sections are mainly within private lands. If contamination is found, the sediment should be treated on-site to an acceptable level agreed with EPD before reuse on-site as backfilling material. The Environmental Team Leader employed by the contractor should prepare and seek EPD's agreement on the sediment sampling proposal and if necessary the treatment procedures.
- 7.4 Based on G.I. records, the estimated quantity of rock material to be generated is about 2,150 cubic metres, 90% of which is anticipated reusable. Therefore, the anticipated amount of rock to be reused on site is about 1,935 cubic metres.
- 7.5 The programme of the disposal of the C&D material for non-designated channels and designated channels are shown in Tables 7.2 and 7.3 respectively.

Table 7.2
Programme of Disposal of
C&D Materials for Non-Designated Channels
(i.e. TKL02, TKL07, MUP01, MUP02)

	Quantity of C&D materials (m ³)
2008	
Re-used	9,270
Disposal of to public filling areas	19,080
Disposed of to landfill	3,000
2009	
Re-used	5,600
Disposal of to public filling areas	10,800
Disposed of to landfill	100
2010	
Re-used	1,700
Disposal of to public filling areas	3,100
Disposed of to landfill	50
2011	
Re-used	1,100
Disposal of to public filling areas	2,200
Disposed of to landfill	50

Table 7.3
Programme of Disposal of the C&D Materials for
Designated Channels
(i.e. MUP03A, MUP03B, MUP04A, MUP04B and LMH)

	Quantity of C&D materials (m ³)
2008	
Re-used	9,300
Disposal of to public filling areas	20,600
Disposal of to landfill	1,800
2009	
Re-used	7,300
Disposal of to public filling areas	16,100
Disposed of to landfill	100
2010	
Re-used	2,200
Disposal of to public filling areas	4,900
Disposed of to landfill	50
2011	
Re-used	1,500
Disposal of to public filling areas	3,200
Disposed of to landfill	50

Remark: The exact programme and quantities of the disposal works will depend on the contractor's programme after the contracts are awarded.

- 7.6 In order to manage the C&D materials generated from construction, and more importantly to minimize the generation at source, it is recommended that the following measures be implemented throughout the course of the construction contracts. Figure No. 382486/0201/SK140 showing the extent of excavation of typical channel sections and indicating the re-use of the C&D materials is enclosed in this C&DMMP for reference.

Ways to minimize the generation of C&D material

1. Proper design of the level and layout of the proposed works.
2. The proposed channel is designed to locate on the existing stream as far as possible to minimize excavation.
3. Use gabion trapezoidal channel wherever it can suit for the requirement.

4. All site staff and contractors should work together to avoid and minimize the generation of C&D material during construction period.
5. Liaison should be strengthened between the design and the site work to minimize errors in construction to avoid unnecessary excavation.
6. Working method should be reviewed to minimize wastage where possible. Precast units should be used as far as practicable.
7. Steel panels should be used as formwork. As steel formwork can be repeatedly used, the generation of C&D waste will be reduced.

Ways to maximize the use and re-use of inert C&D material

1. Use the excavated materials for backfilling of retaining walls, box culvert and formation of channel embankments.
2. Use the excavated soft materials for landscaping works.
3. Use of excavated rock from existing river for rip-rap lining and gabion lining.
4. Reuse the C&D materials as pipe bedding.
5. Use precast concrete units to encourage the use of non-timber formwork.
6. Use recycle aggregate for sub-base materials, mass concrete, Grade 20 Prescribed concrete, Grade 25-35 design mix and road sub-base.
7. Use lower grade concrete as far as possible such that recycled aggregate can be used.
8. The concrete / brick / aggregates shall be broken up into suitable size for general fill material or reuse the concrete / brick waste for forming the temporary site haul road.
9. Recycled aggregates would be used as the main source for gabion channels before importing from other sources.

Ways to maximize the use of recycled C&D material

1. An area should be assigned for storage of surplus reinforcement bars and all surplus rebars and stockpiles should be collected at the assigned area. Steel reinforcement bars and metal scraps shall then be delivered to scrap steel mills for recycle.

2. All other metal wastes such as steel plates are collected together and delivered to the scrap steel mills.

8. CONCLUSION

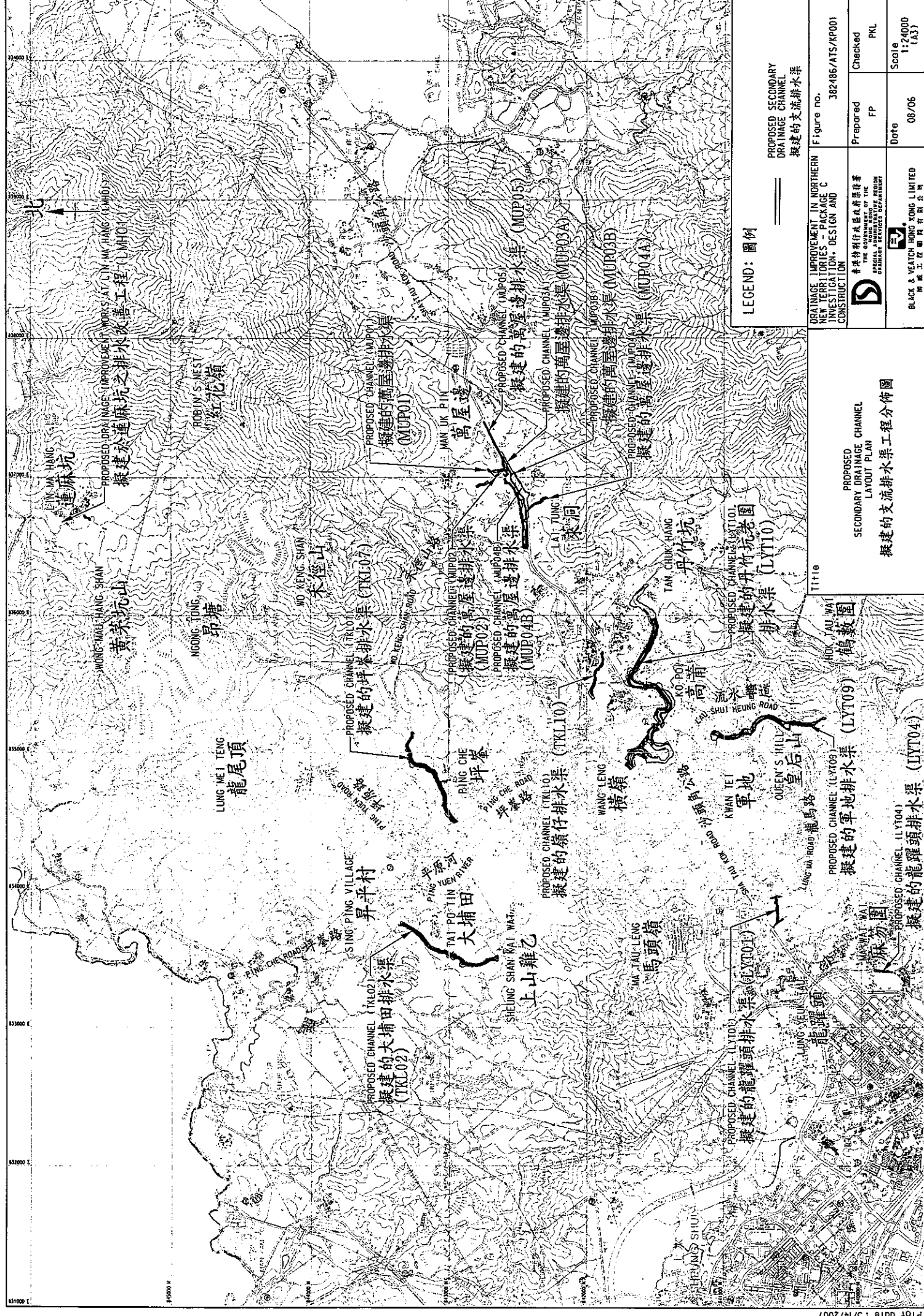
- 8.1 Development options for this drainage project were studied in detail. The selected option is considered optimally maintaining the balance between the minimization of C&D material and other considerations like ecological protection and financial and programming implication.
- 8.2 B&V has been actively sought to minimize C&D material generation and reuse inert material as far as possible. A total of about 123,150m³ C&D materials will be generated from Phase 2. About 31% of the C&D material will be re-used for forming embankment, bedding and channel lining, etc. Continuous efforts will be made to minimize the generation of, and maximize the re-use of, C&D materials in the design and construction stages.
- 8.3 The implementation of the C&DMMP will be closely monitored.

9. RECOMMENDATION

- 9.1 In order to monitor the disposal of C&D material at landfills and public filling areas, as appropriate, a trip-ticket system should be included as one of the contractual requirements to be implemented by the Contractor. One may make reference to ETWB TCW No. 31/2004 for details. The Construction Waste Disposal Charging Scheme implemented in late 2005 shall also be complied with.
- 9.2 This C&DMMP will provide relevant information to the Contractor for his preparation of Environmental Management Plan (EMP) for submission. The EMP shall provide the detailed methodology for the proper management of the C&D waste and C&D material generated from the Project in order to control the potential environmental impacts to the levels in compliance with all relevant legal and contractual requirements.
- 9.3 Environmental monitoring and audit (EM&A) will be necessary to ensure the proper implementation of the measures proposed in EMP during the construction phase.


END OF TEXT

Appendix A – Drawings



LEGEND: 圖例

PROPOSED SECONDARY DRAINAGE CHANNEL
擬建的交流排水渠

DRAINAGE IMPROVEMENT IN NORTHERN NEW TERRITORIES - PACKAGE C INVESTIGATION, DESIGN AND CONSTRUCTION		Figure no.	
		382486/ATS/KP001	
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	PP		
Date	08/06		
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PROPOSED SECONDARY DRAINAGE CHANNEL LAYOUT PLAN
擬建的交流排水渠工程分佈圖

PROPOSED CHANNEL (TKL01)
擬建的大埔田排水渠 (TKL01)

PROPOSED CHANNEL (TKL02)
擬建的大埔田排水渠 (TKL02)

PROPOSED CHANNEL (TKL10)
擬建的嶺仔排水渠 (TKL10)

PROPOSED CHANNEL (MUP01)
擬建的萬屋邊排水渠 (MUP01)

PROPOSED CHANNEL (MUP02)
擬建的萬屋邊排水渠 (MUP02)

PROPOSED CHANNEL (MUP03A)
擬建的萬屋邊排水渠 (MUP03A)

PROPOSED CHANNEL (MUP03B)
擬建的萬屋邊排水渠 (MUP03B)

PROPOSED CHANNEL (MUP04A)
擬建的萬屋邊排水渠 (MUP04A)

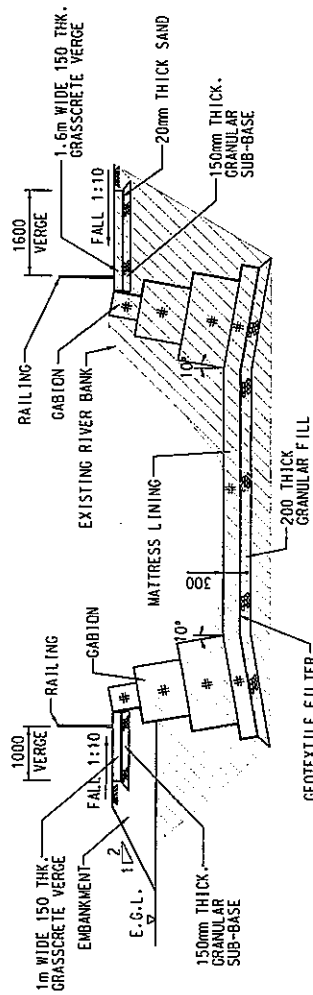
PROPOSED CHANNEL (MUP05)
擬建的萬屋邊排水渠 (MUP05)

PROPOSED CHANNEL (LYT01)
擬建的龍躍頭排水渠 (LYT01)

PROPOSED CHANNEL (LYT04)
擬建的龍躍頭排水渠 (LYT04)

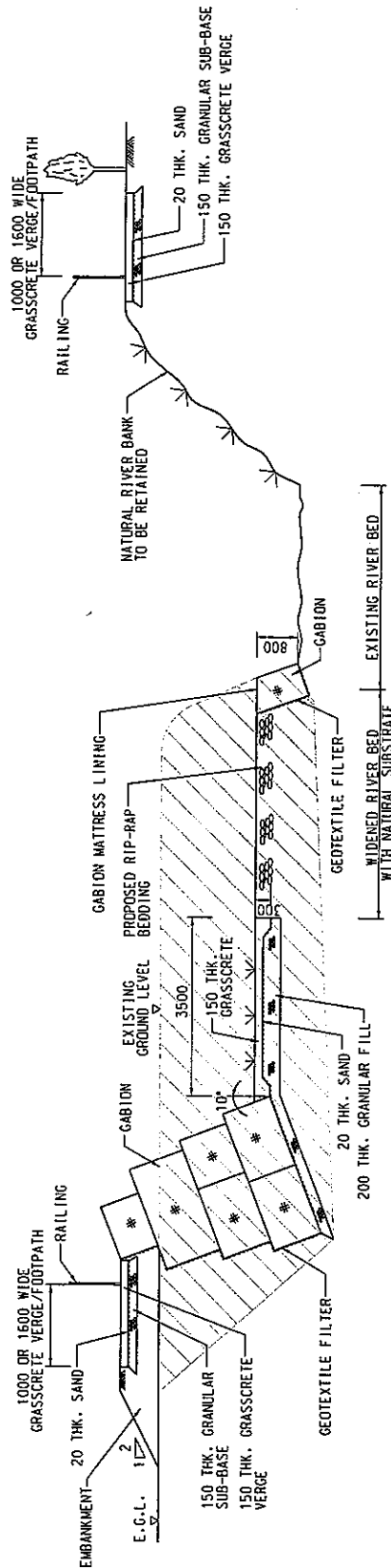
PROPOSED CHANNEL (LYT09)
擬建的草地排水渠 (LYT09)

PROPOSED CHANNEL (LYT10)
擬建的丹竹坑老圍排水渠 (LYT10)



TYPICAL SECTION OF TRAPEZOIDAL GABION CHANNEL

SCALE 1:100



TYPICAL SECTION OF TWO-STAGE CHANNEL

SCALE 1:100

NOTE: 1) SUITABLE C & D MATERIAL SHALL BE SORTED OUT AND RE-USED FOR

- a) EMBANKMENT
- b) LANDSCAPING WORKS
- c) GABION AND MATTRESS LINING
- d) RIP-RAP BEDDING
- e) GRANULAR FILL AND SUB-BASE

2) THE CHANNELS ARE DESIGNED TO FOLLOW THE EXISTING STREAMCOURSE AS MUCH AS POSSIBLE IN ORDER TO MINIMIZE THE GENERATION OF C & D MATERIAL.

LEGEND:

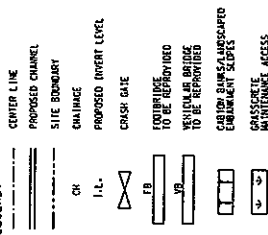


APPROXIMATE EXTENT OF EXCAVATION

MINIMUM EXCAVATION AND RE-USE OF SURPLUS C & D MATERIAL	Title		Figure no.	
	DRAINAGE IMPROVEMENT IN NORTHERN NEW TERRITORIES - PACKAGE C INVESTIGATION, DESIGN AND CONSTRUCTION		302486/0201/SK140	
	香港特別行政區政府路政署 THE HONG KONG SPECIAL ADMINISTRATIVE REGION SPECIAL SERVICES DEPARTMENT		Prepared FP	Checked PKL
BLACK & VEATCH HONG KONG LIMITED 黑域工程顧問有限公司		Date 04/06	Scale 1:100 (A3)	

1. ALL CHASISSES ARE IN METRES UNLESS OTHERWISE INDICATED.
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (A.P.D.).
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
4. THE CHANNEL WIDTH SHOWN IS THE AVERAGE ALONG THE CHANNEL.
5. FIGURED DIMENSIONS IN REFERENCE TO SCALED DIMENSIONS.

LEGEND:



F	P	CH	CHH
E	11/05	CHANNEL AND EMBODY REVISIT	CHANNEL AND EMBODY REVISIT
D	07/05	CHANNEL DESIGN AND EMBODY REVISIT	CHANNEL DESIGN AND EMBODY REVISIT
C	06/05	CHANNEL & EMBODY UPDATED	CHANNEL & EMBODY UPDATED
B	07/04	CHANNEL & EMBODY APPLIED	CHANNEL & EMBODY APPLIED
A	07/04	ISSUE FOR PRELIMINARY REPORT	ISSUE FOR PRELIMINARY REPORT
Initial	Design	Checked	Checked
Initial	QA/QC	CSL	CSL
Base	03/06	03/04	03/04

• On January 1, 2002, the company's net income was \$1.2 million.

Contract title

DRAINAGE IMPROVEMENT IN
NORTHERN NEW TERRITORIES -
PACKAGE C

INVESTIGATION, DESIGN AND CONSTRUCTION

GENERAL ARRANGEMENT FOR
PROPOSED CHANNEL AT
TA KWU LENG (TKL02)
(SHEET 1 OF 2)

TABLE 1

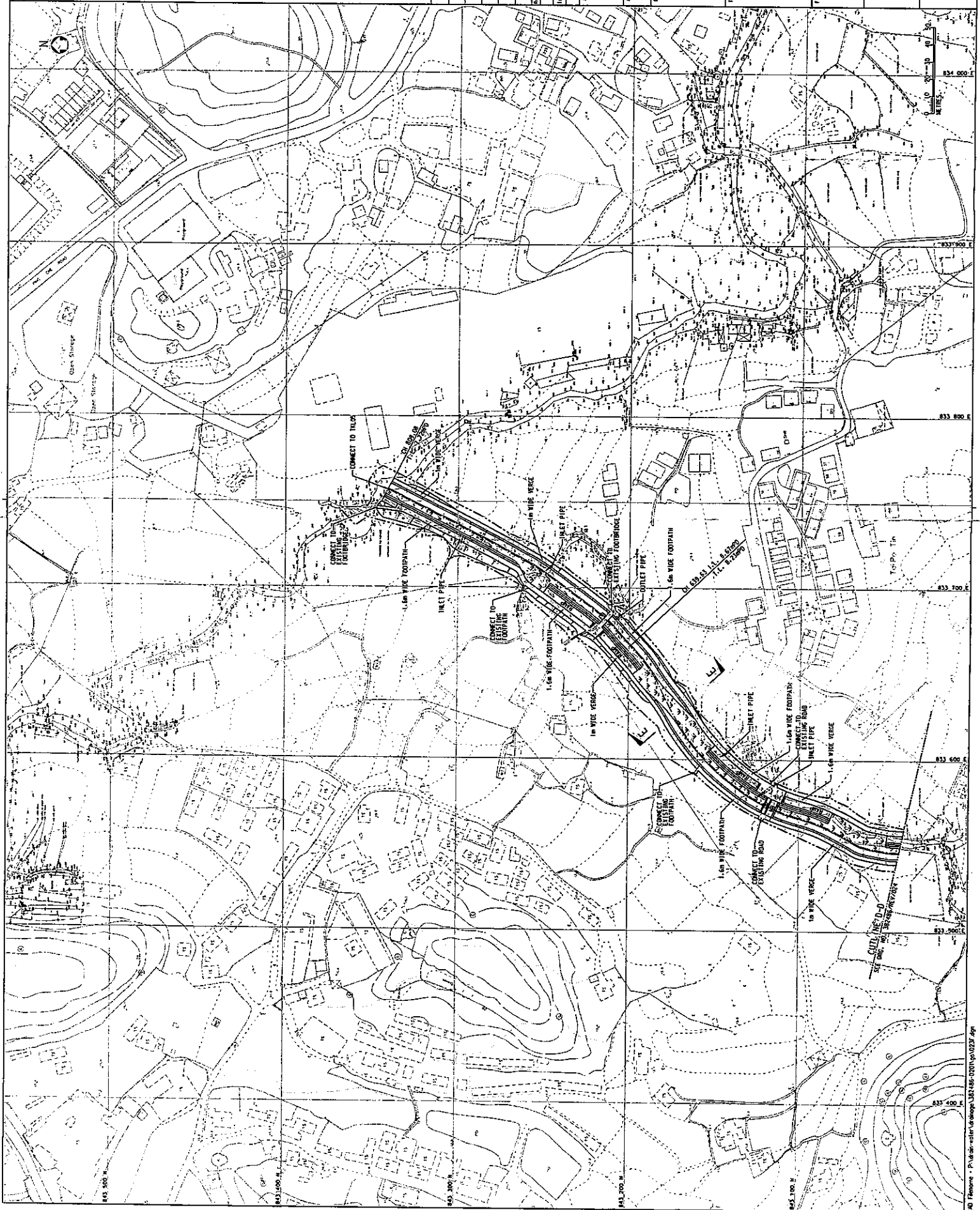
382486/REV/023F 1:1000



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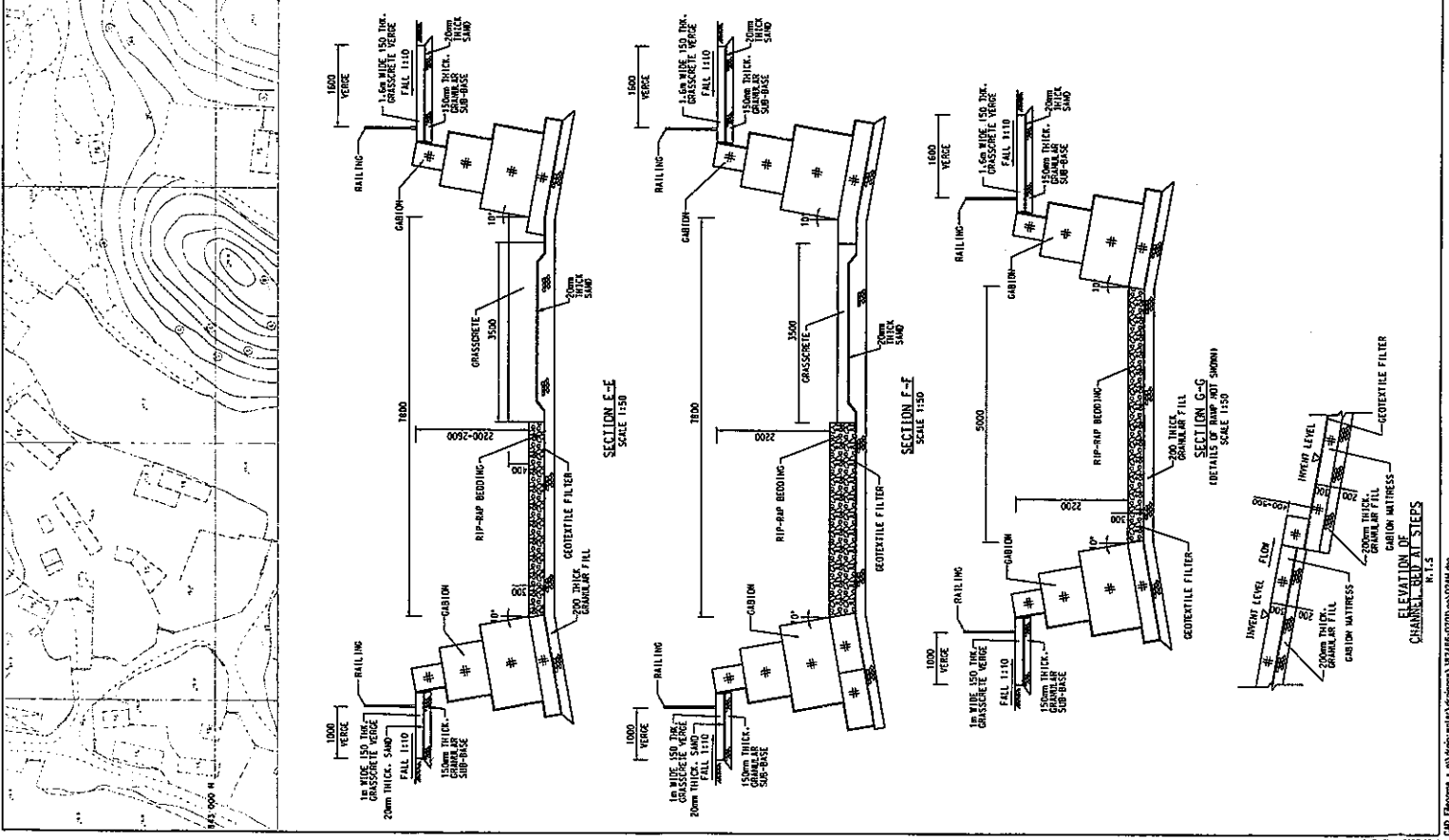


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西昌工程顧問有限公司



NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE INDICATED.
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (MPO).
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
4. THE CHANNEL WIDTH SHOWN IS THE AVERAGE ALONG THE CHANNEL.
5. FIGURED DIMENSIONS IN REFERENCE TO SCALED DIMENSIONS.

LEGEND:	CENTER LINE - - - - -	PROPOSED CHANNEL =====	SITE BOUNDARY =====	CHANGED CN	PROPOSED INVERT LEVEL I-L	CROSS GATE 	FORFORAGE TO BE REMOVED FB	VEHICULAR BRIDGE TO BE REPAIRED VB	GULCH BANKS LANDSCAPED WITH GRASS 	GRASSCUT MAINTENANCE
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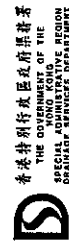
CE 6/2002 (DS)

Contract title
**DRAINAGE IMPROVEMENT IN
NORTHERN NEW TERRITORIES -
PACKAGE C
INVESTIGATION DESIGN AND CONSTRUCTION**

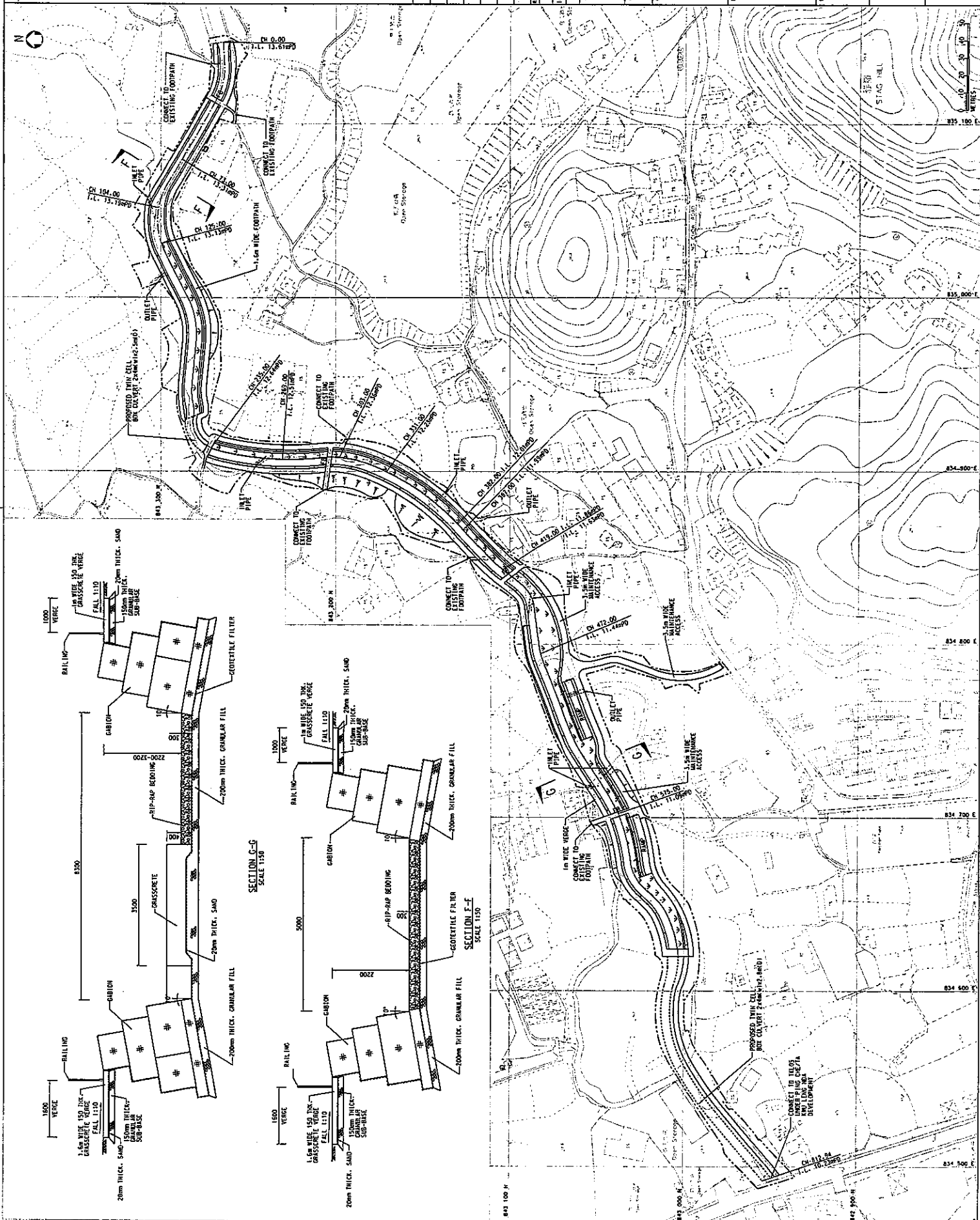
Figure 11110

GENERAL ARRANGEMENT FOR
PROPOSED CHANNEL AT
TA KWU LENG (TKL07)

Figure no.	Scale
382486/REV/025G	1:1000









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NOTES:

1. ALL CHANGES ARE IN METRES UNLESS OTHERWISE INDICATED.
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (APD).
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
4. THE CHANNEL WIDTH SHOWN IS THE AVERAGE ALONG THE CHANNEL.
5. SECTIONS X-X, Y-Y AND Z-Z REFER TO FIGURE NO. 38246/REV/103.

LEGEND:

----	CENTER LINE
=====	PROPOSED CHANNEL
----	SITE BOUNDARY
----	CH
----	I.L.
	PROPOSED INVERT LEVEL
	CRACK GATE
	FOOTBRIDGE TO BE RECONSTRUCTED TO MATCH EXISTING TO BE RECONSTRUCTED
	V-BAR
	CATCHPIT
	CATCHMENT

FF	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
FF	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
FF	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
FF	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
FF	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
FF	1	2	3	4	5	6																																																																																														


Agreement no. CF 62002 (DS)

**DRAINAGE IMPROVEMENT IN
NORTHERN NEW TERRITORIES -
PACKAGE C
INVESTIGATION, DESIGN AND CONSTRUCTION**

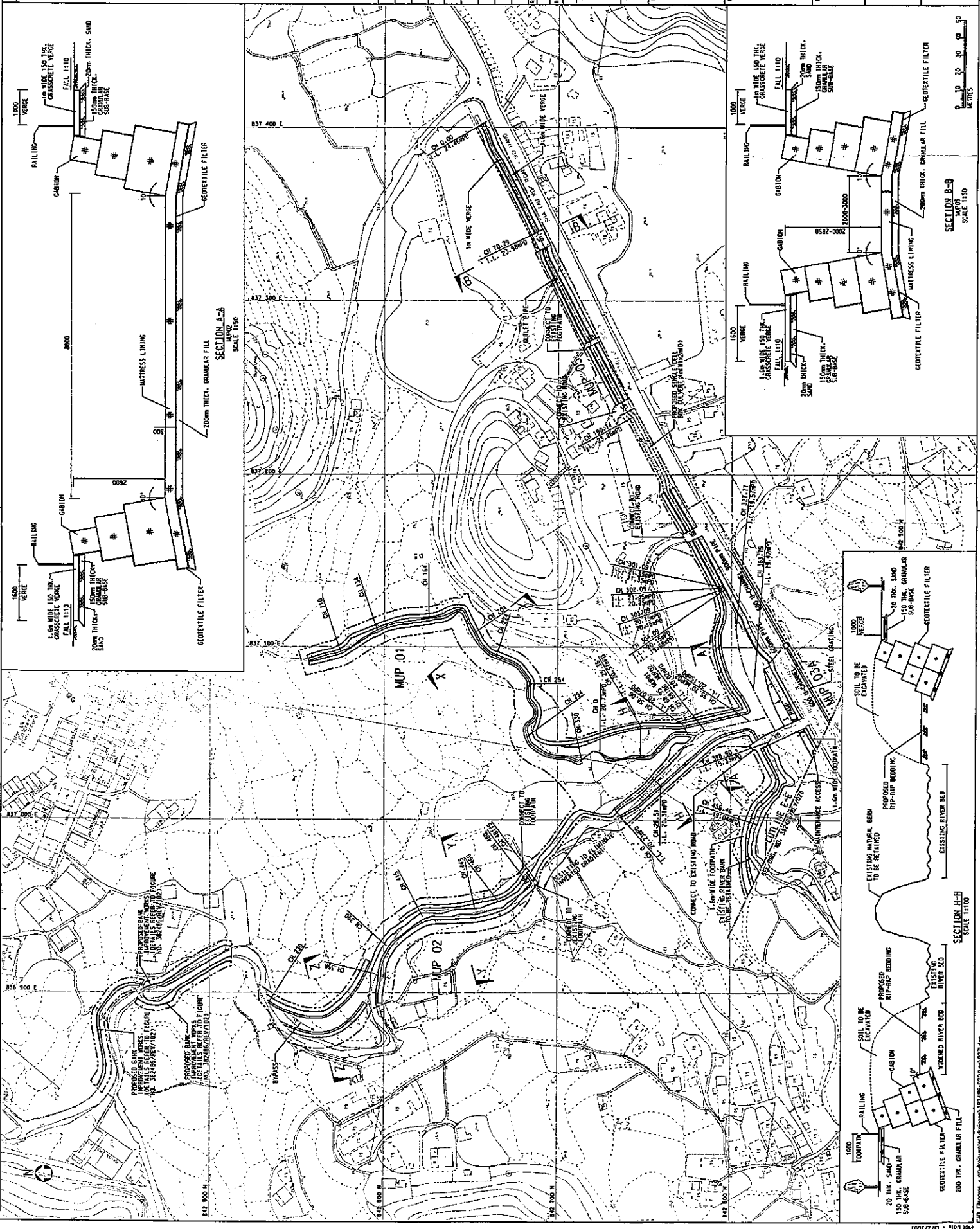
Figure 1188

GENERAL ARRANGEMENT FOR
PROPOSED CHANNEL AT
MAN UK PING REGION
(MUP01,02,03,04&05)
(SHEET 1 OF 2)

Figure no.	382486/REV/0271	Scale	1:1000
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NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE INDICATED.
2. ALL LEVELS ARE IN METRES ABOVE MEAN SEA LEVEL UNLESS OTHERWISE STATED.
3. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
4. THE CHANNEL WIDTH SHOWN IS THE AVERAGE ALONG THE CHANNEL.

LEGEND:

— CENTER LINE
 — PROPOSED CHANNEL
 — SITE BOUNDARY
 — CHAMBER
 — PROPOSED INVERT LEVEL
 — CRASH GATE
 — FOOTING TO BE REPROVIDED
 — VEHICLE BARRIERS TO BE REPROVIDED
 — GROUND BARRIERS/UNDERSLOPED EMBANKMENT SLOPES
 — PROPOSED CHAMBER
 — CATCHMENT
 — MANHOLE

Revision	Date	Description	Checked	Drawn	Initial
1	01/06	CHANNEL DESIGN REVISED	PP		
2	06/06	BOUNDARY AND INVERT LEVELS REVISED	CH		
3	11/05	CHANNEL & BOUNDARY REVISED	CH		
4	09/05	CHANNEL UPDATED	CH		
5	06/05	CHANNEL DESIGN & BOUNDARY REVISED	CH		
6	06/05	CHANNEL & BOUNDARY REVISED	CH		
7	09/04	FOOTING & VERGE UPDATED	HMC		
8	08/04	ISSUE FOR PRELIMINARY REVIEW	HMC		
9	07/04	Channel Design	CH		
10	07/04	Channel Design	CH		
11	07/04	Channel Design	CH		
12	07/04	Channel Design	CH		
13	07/04	Channel Design	CH		
14	07/04	Channel Design	CH		
15	07/04	Channel Design	CH		
16	07/04	Channel Design	CH		
17	07/04	Channel Design	CH		
18	07/04	Channel Design	CH		
19	07/04	Channel Design	CH		
20	07/04	Channel Design	CH		

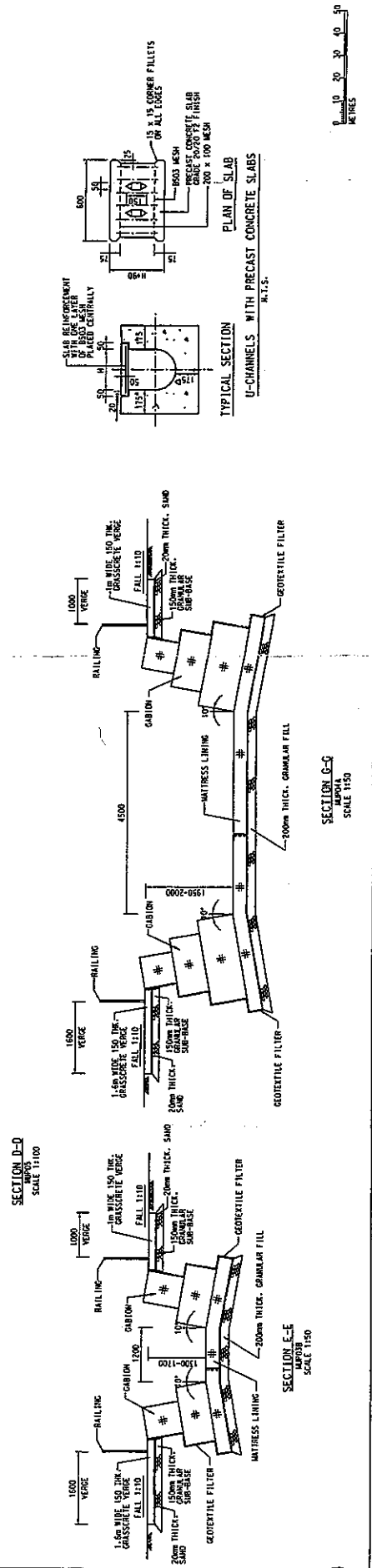
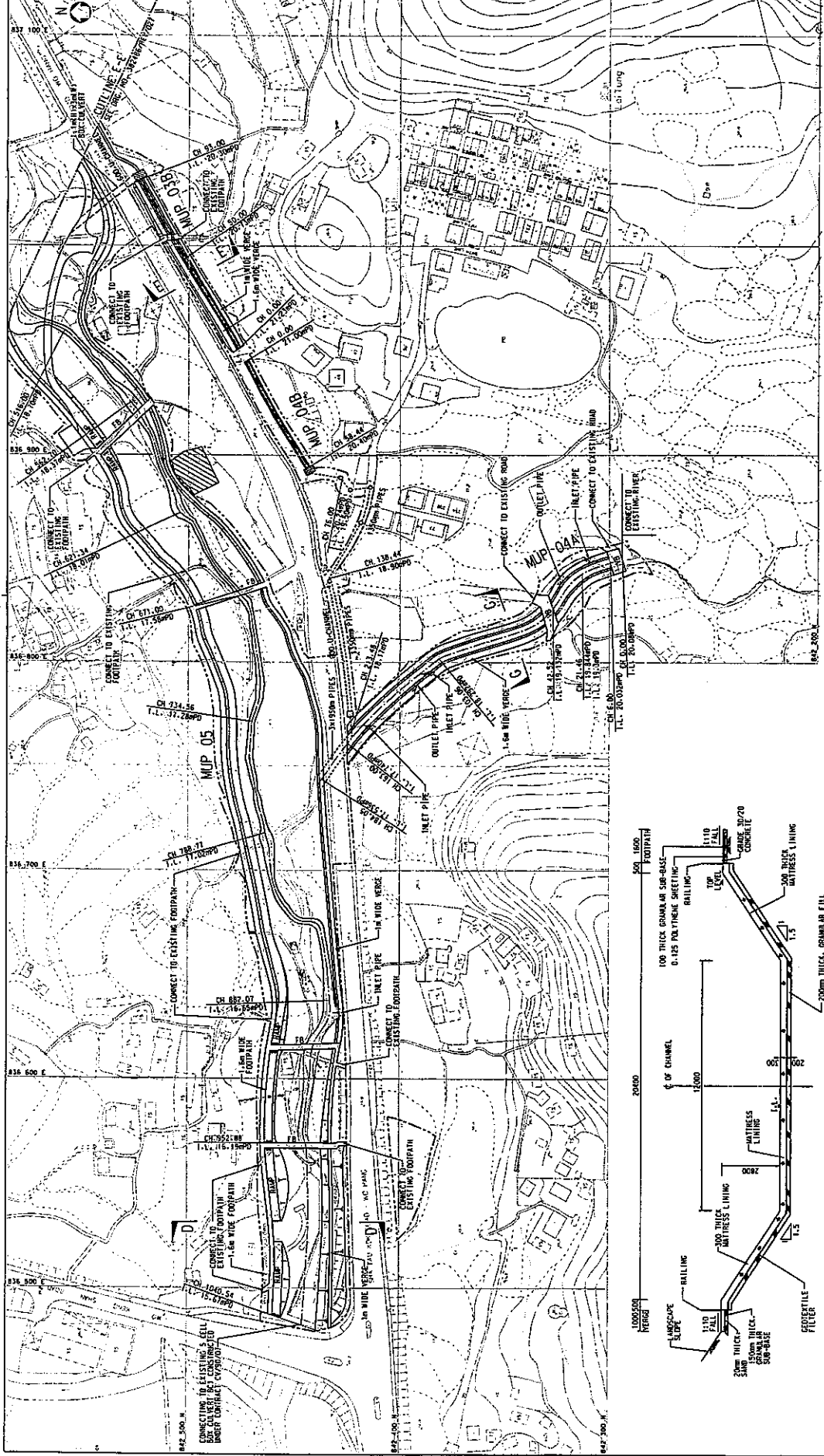
Agreement no. CE 62002 (DS)
 Contract title
 DRAINAGE IMPROVEMENT IN NORTHERN NEW TERRITORIES - PACKAGE C
 INVESTIGATION, DESIGN AND CONSTRUCTION

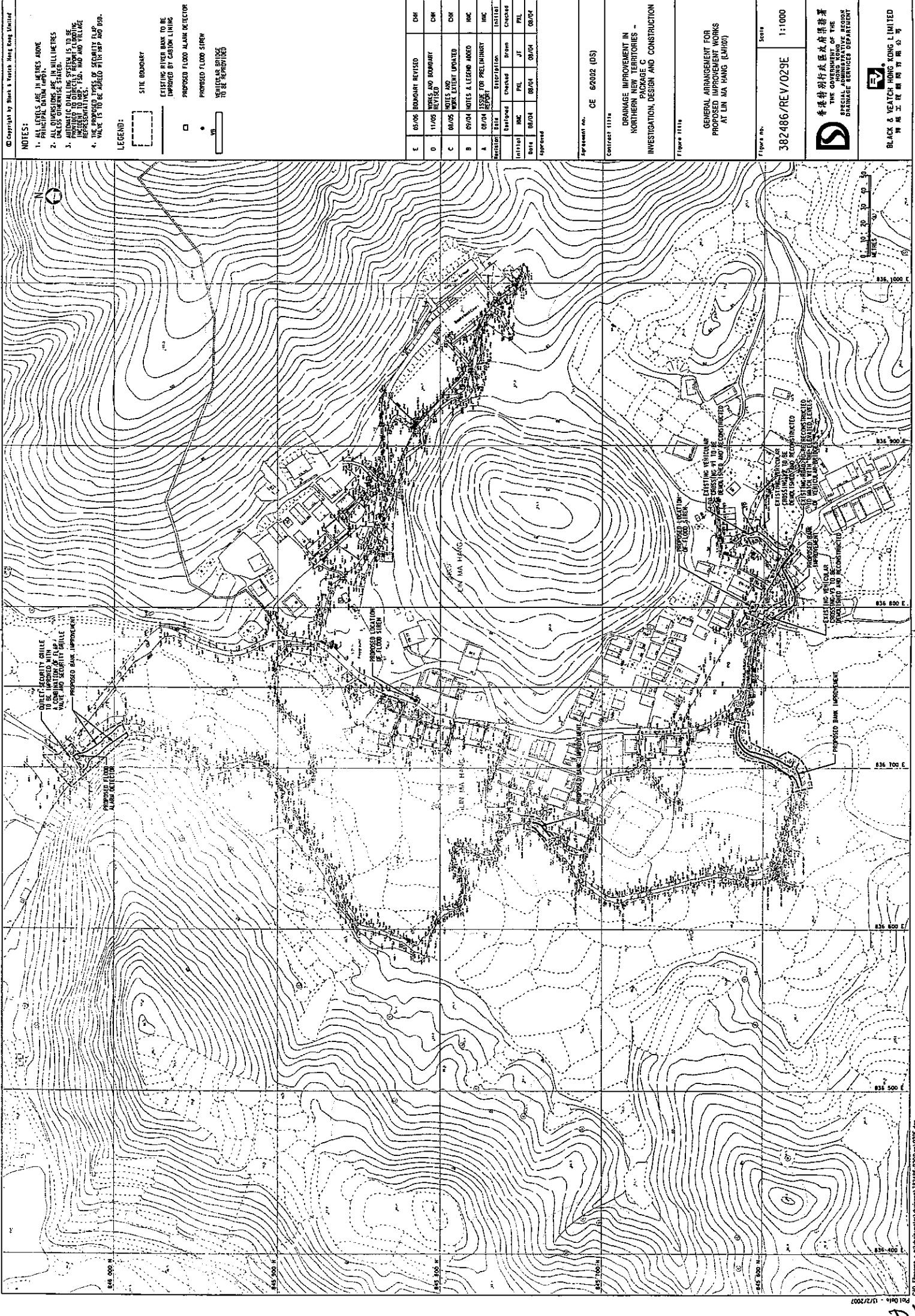
Figure title
 GENERAL ARRANGEMENT FOR PROPOSED CHANNEL AT MAN UK PING REGION (IMP01.02.03.04.05) (SHEET 2 OF 2)

Figure no. 382486/REV/028H
 Scale 1:1000

THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION
 SPECIAL SERVICES DEPARTMENT

BLACK & VEATCH HONG KONG LIMITED
 柏德工程顧問有限公司





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- NOTES:
1. ALL LEVELS ARE IN METRES ABOVE MEAN SEA LEVEL.
 2. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 3. THE PROPOSED FLOOD ALARM DETECTOR IS TO BE PROVIDED TO DIRECTLY ALERT FLOODING OCCURRING TO THE FLOODING AREA.
 4. THE PROPOSED TYPE OF SECURITY FLAP VALVE IS TO BE AGREED WITH HWP AND DSD.

LEGEND:

- SITE BOUNDARY
- EXISTING RIVER BANK TO BE IMPROVED BY GULCH LINING
- PROPOSED FLOOD ALARM DETECTOR
- PROPOSED FLOOD SIREN
- VEHICULAR BRIDGE TO BE REPROPOSED

E	05/06	BOUNDARY REVISED	CHW
D	11/05	WORK AND BOUNDARY REVISED	CHW
C	08/05	NOTES AND WORK EXTENT UPDATED	CHW
B	07/04	NOTES & LEGEND AMENDED	HMC
A	06/04	NOTE FOR PRELIMINARY REPORT	HMC
Revision	Date	Description	Drawn
Initial	HMC	PL	JT
Date	08/04	08/04	08/04

Agreement No. CE 62002 (DS)

Contract 11134
DRAINAGE IMPROVEMENT IN NORTHERN NEW TERRITORIES - PACKAGE C
INVESTIGATION, DESIGN AND CONSTRUCTION

Figure 1111a
GENERAL ARRANGEMENT FOR PROPOSED IMPROVEMENT WORKS AT LIN MA HANG (LH101)

Scale
382486/REV/029E
1:1000

香港特別行政區政府渠務署
THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION
SPECIAL ADMINISTRATIVE REGION
DRAINAGE SERVICES DEPARTMENT

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