Appendix A1

EIA Study Brief

Environmental Impact Assessment Ordinance (Cap. 499)
Section 5(7)

Environmental Impact Assessment Study Brief No. ESB-103/2002

Project Title: Drainage Improvements in Northern New Territories – Package C

Name of Applicant: Drainage Services Department
(hereinafter known as the "Applicant")

1. BACKGROUND

1.1 An application (No. ESB-103/2002) for an Environmental Impact Assessment (EIA) Study Brief (SB) under section 5(1) of the Environmental Impact Assessment Ordinance (EIAO) was submitted by the Applicant on 9 May 2002 with a Project Profile (No. PP-168/2002) for the captioned project.

1.2 The purpose of the Project is to alleviate the flooding problems and to facilitate future development in Lung Yeuk Tau, Man Uk Pin, Loi Tung and Lin Ma Hang areas by improving the secondary and local storm water drainage systems in accordance with the recommendation of the 55CD "Drainage Master Plan Study in the Northern New Territories" (DMP Study).

1.3 The Project comprises the construction of drainage channels and associated works to improve the secondary and local drainage systems in the Lung Yeuk Tau, Man Uk Pin, Loi Tung and Lin Ma Hang areas. The proposed location and scale of the drainage improvement works (the Project), identified to be Designated Project (DP) under the EIAO is shown in attached Figures 1, 2, 3, 4 and Table 1.1 below.

Table 1.1 Scale of Proposed Drainage Works

Proposed Drainage Channel Ref. No.	Location	Detail of Proposed Channel	
		Approx. Length (m)	Average Base Width (m)
MUP03 (Figure 2)	Drainage channel in Man Uk Pin area	120	2
MUP04 A (Figure 2)	Drainage channel in Man Uk Pin area	400	4
MUP04 B (Figure 2)	Drainage channel in Man Uk Pin area	180	1
MUP05 (Figure 2)	Drainage channel in Man Uk Pin area	1000	8
LYT04 (Figure 3)	Drainage channel in Lung Yeuk Tau area	400	3
LMH01 (Figure 4)	Drainage channel at Lin Ma Hang	250	3

1.4 The Project is a Designated Project under the EIAO by virtue of I.1(b) of the

SCHEDULE 2, PART I of the EIAO with specific Designated Project Elements as listed below.

(i) Drainage channels at Man Uk Pin (MUP03, MUP04A, MUP04B, and MUP05) that discharge into an area within 300m from the nearest boundary of an existing "Conservation Area" land use zoning [Item I.1(b)(vii) of Schedule 2 of EIAO].

(ii) Drainage channel at Lung Yeuk Tau (LYT04) that discharges into an area within 300m of an existing site of cultural heritage, the Entrance Tower of Ma Wat Wai, at Ma Wat Wai, Ling Yeuk Tau [Item I.1(b)(ii) of Schedule 2 of EIAO].

(iii) Drainage channel at Lin Ma Hang (LMH01) that discharges into an area within 300m of a planned site of specific scientific interest (SSSI), Lin Ma Hang Stream, at Lin Ma Hang [Item I.1(b)(i) of Schedule 2 of EIAO].

1.5 Pursuant to section 5(7)(a) of the EIAO, the Director of Environmental Protection (the Director) issues this EIA study brief to the Applicant to carry out an EIA study.

1.6 The purpose of this EIA study is to provide information on the nature and extent of environmental impacts arising from the construction and operation of the proposed Project and related activities taking place concurrently. This information will contribute to decisions by the Director on:

(i) The overall acceptability of any adverse environmental consequences those are likely to arise as a result of the proposed Project.

(ii) The conditions and requirements for the detailed design, construction and operation of the proposed Project to mitigate against adverse environmental consequences wherever practicable and reasonable.

(iii) The acceptability of residual impacts, after the proposed mitigation measures are implemented.

2. OBJECTIVES OF THE EIA STUDY

2.1 The objectives of the EIA study are as follows:

(i) To describe the proposed Project and associated works together with the requirements for carrying out the proposed Project.

(ii) To identify and describe the elements of the community and environment likely to be affected by the proposed Project and/or likely to cause adverse impacts to the proposed Project, including both the natural and man-made environment.

(iii) To identify and quantify emission sources and determine the significance of impacts on sensitive receivers and potential affected uses.

(iv) To identify any potential impacts from point and non-point pollution sources on the identified water systems and sensitive receivers during the construction and operation stages.

(v) To identify and quantify any potential losses and damage to flora, fauna and

wildlife habitats.

(vi) To identify and quantify, where applicable, any potential landscape and visual impacts and determine the significance of impacts on sensitive receivers.

(vii) To identify any potential impacts to the historical, archaeological and cultural resources and propose measures to mitigate these impacts.

(viii) To propose the provision of infrastructure or mitigation measures so as to minimize pollution, environmental disturbance and nuisance during construction and operation of the proposed Project.

(ix) To identify, predict and evaluate the residual (i.e. after practicable mitigation) environmental impacts and the cumulative effects expected to arise during the construction and operation phases of the proposed Project in relation to the sensitive receivers and potential affected uses.

(x) To identify, assess and specify methods, measures and standards, to be included in the detailed design, construction and operation of the proposed Project, which are necessary to mitigate these environmental impacts and reducing them to acceptable levels.

(xi) To investigate the extent of secondary environmental impacts that may arise from the proposed mitigation measures and to identify constraints associated with the mitigation measures recommended in the EIA study, as well as the provision of any necessary modification.

(xii) To design and specify the environmental monitoring and audit requirements, if required, to ensure the implementation and the effectiveness of the environmental protection and pollution control measures adopted.

(xiii) To consider alternative flood alleviation options with a view to avoiding or minimizing the potential environmental impacts to the SSSI at Lin Ma Hang, the "Conservation Area" zone in Man Uk Pin, the site(s) of cultural heritage and other sensitive uses, and to compare the environmental benefits and dis-benefits of each of the different option and to provide reasons for selecting the preferred option and to describe the part environmental factors played in the selection.

3. DETAILED REQUIREMENTS OF THE EIA STUDY

3.1 The Purpose

The purpose of this study brief is to scope the key issues of the EIA study. The Applicant has to demonstrate in the EIA report that the criteria in the relevant sections of the Technical Memorandum on the EIA Process of the EIAO (hereinafter referred to as the TM) are fully complied with.

3.2 The Scope

The scope of this EIA study covers the Designated Project (MUP03, MUP04A, MUP04B, MUP05, LYT04 and LMH01) as mentioned in Sections 1.2 and 1.3 above. The EIA study

shall address the likely key issues described below, together with any key issues identified during the course of the EIA study.

(i) Review the merit and effectiveness of the proposed Project as a means to alleviate flooding in the areas, in particular, the proposed drainage channels at Lin Ma Hang (LMH01) and at Loi Tung (MUP04A).

(ii) Exploration of alternatives to include but not limited to different solutions to alleviate the flooding in the areas and to avoid serious environmental and ecological impacts, which could not be satisfactorily mitigated. Examples shall include but not limited to different options of channel design: such as by-pass design, bunds as flood barriers design, flood pond design, and other environmentally friendly design, especially for those parts of the Project likely to result in adverse ecological impacts.

(iii) The potential noise and dust impacts of the proposed Project to sensitive receivers during the construction phase, in particular at the village houses and other residential premises located near the Designated Project Sites.

(iv) The potential impacts to the coastal water quality, marine ecological habitat and ecosystem due to the discharge of stormwater into the coastal waters during the construction and operational phases.

(v) The potential impacts arising from the temporary storage and subsequent disposal of waste generated during the construction and operational phases.

(vi) The potential impacts arising from the soil runoff into the stream courses located in the nearby areas where the dredged/excavated soils are to be stored, leading to fish kill and permanent damage to the aquatic ecosystem.

(vii) The potential impacts on the planned Site of Special Scientific Interest (SSSI), "Lin Ma Hang Stream", at Lin Ma Hang, the Conservation Areas (CA) in Man Uk Pin, and the Site of Cultural Heritage at Ma Wat Wai, Lung Yeuk Tau during the construction and operational phases.

(viii) The potential aquatic and terrestrial ecological impacts arising from the construction and operational phases, including loss of habitats, removal of vegetation, the impact and disturbance to the foraging ground for the bats in the vicinity of Lin Ma Hang stream and the stream at Loi Tung, and disturbance to animals and wild life. The ecological assessment shall demonstrate that the proposed drainage works would not cause any net loss in either wetland area and function, and any residual impacts shall be fully addressed and mitigated. The assessment shall fully address all direct, indirect and cumulative impacts resulting from the proposed Project during the construction and the operational phases, including any subsequent regular maintenance works. The design of the drainage system shall take into account established and new environmentally friendly design concept to mitigate the ecological impacts.

(ix) The potential landscape and visual impacts arising from the removal of vegetation, and construction of the drainage system. The design of the drainage system shall take into account established and new environmentally friendly design concept to mitigate the landscape and visual impacts of the site.

(x) The potential impacts of the proposed Project on the cultural heritage sites, in particular the "Entrance Tower of Ma Wat Wai, Lung Yeuk Tau", that is likely to be affected by

the construction works. The design of the drainage channel shall demonstrate that impact on the cultural heritage site be avoided or minimized.

3.3 Consideration of the Merit of the Proposed Project, Alternative Means, Avoidance of Environmental Impacts and Alternative Drainage Design

3.3.1 Consideration of the Merit of the Proposed Project for Flood Alleviation

The Applicant shall further study and review the merit of the proposed Project as a means to alleviate flooding in the areas. In particular, the drainage channel at Loi Tung within Man Uk Pin (i.e. MUP04A) and the drainage channel at Lin Ma Hang (i.e. LMH01) need detailed research. Information and/or evidence to include data of hydraulic and hydrological predictions of Loi Tung (Man Uk Pin) and Lin Ma Hang areas (with or without the proposed drainage channels in place) are required, in justifying the merit and effectiveness of the proposed Project for flood alleviation against the ecological loss and other environmental impacts.

Consideration of Alternative Means and Avoidance of Environmental Impacts

The Applicant shall critically consider alternative means to achieve flood alleviation instead of through stream training, widening, channelizing at Loi Tung and Lin Ma Hang areas in order to avoid direct ecological impacts on:

- the Lin Ma Hang stream and the stream at Loi Tung;
- the tributaries and wet lands associated with these streams; and
- the aquatic life, wildlife and habitats that depend on these streams and its associated tributaries and wetlands.

Consideration of Alternative Drainage Design

Apart from the alignments, locations, and design of channelization that are proposed in the Project Profile, the Applicant shall also consider different option designs that are practicable and reasonable, to include but not limited to the drainage improvement designs such as: (a) by-pass design, (b) bunds as flood barriers design, (c) flood pond design, (d) other environmentally friendly design; alternative alignment on channel improvements; alternative locations of stormwater drains and their discharge points; and others. An evaluation system that assesses the environmental benefits and dis-benefits of all practicable solutions described above shall be included. The potential ecological impacts on the aquatic life, stream, its surroundings and the wildlife therein shall form one of the key criterion to be included in the evaluation system. The final recommended drainage improvement design options(s), alignment option(s) and locations of the storm water drains and discharge points shall be adequately assessed, evaluated and justified, taking the key criteria included in the evaluation system.

3.3.2 Consideration of Alternative Construction Methods

Having regard to the cumulative effects for the construction of the six different drainage improvement works (MUP3, MUP04A, MUP04B, MUP05, LYT04 and LMH01) and the severity of the construction impacts to the affected sensitive receivers along the drainage channels and the stormwater drains, the EIA study shall also explore alternative construction methods for the Designated Project with a view to avoiding adverse environmental impacts as far as practicable. A comparison of the environmental benefits

and dis-benefits of applying different construction methods shall be made. In comparison, the Applicant shall also take into account the cumulative environmental implications of potential flooding at downstream areas during wet seasons throughout different construction phases.

3.3.3 Based on the comparisons as described in sections 3.3.1 and 3.3.2 above, the Applicant shall recommend and justify the adoption of alignment or location options that will avoid or minimize adverse environmental effects as far as practicable.

3.4 Technical Requirements

The Applicant shall conduct the EIA study to address all environmental aspects of the activities as described in the scope as set out above and subject to the findings under section 3.3. The EIA study shall include the following technical requirements on specific impacts.

3.4.1 Construction Dust Impact

3.4.1.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing air quality impact as stated in section 1 of Annex 4 and Annex 12 of the TM respectively.

3.4.1.2 The assessment area for the construction dust impact assessment shall generally be defined by a distance of 500 m from the boundary of the Project work sites, yet it may be extended depending on the circumstances and the scale of the Designated Project.

3.4.1.4 The construction dust impact assessment shall include the following:

Background and analysis of activities

(i) Provide background information relating to air quality issues relevant to the Project, e.g. description of the types of activities of the Project.

(ii) Give an account, where appropriate, of the consideration/measures that had been taken into consideration in the planning of the Project to abate the air pollution impact. That is, the Applicant shall consider alternative construction methods/phasing programmes to minimize the constructional air quality impact, e.g. use of marine access routes for transportation of construction materials to avoid dust impact on air sensitive receivers due to haul road transport during construction.

(iii) Present the background air quality levels in the assessment area for the purpose of evaluating the cumulative constructional air quality impacts.

Identification of Air Sensitive Receivers (ASRs) and examination of emission/dispersion characteristics

(iv) Identify and describe representative existing and planned/committed ASRs that would likely be affected by the Project, including those earmarked on the relevant Outline Zoning Plans, Development Permission Area Plans, Outline Development Plans and Layout Plans.

The Applicant shall select the assessment points of the identified ASRs such that they represent the worst impact point on these ASRs. A map showing the location and a description including the name of the buildings, their uses and height of the selected assessment points shall be given. The separation distances of these ASRs from the nearest emission sources shall also be given.

(v) Provide an exhaustive list of air pollutant emission sources, including any nearby emission sources, which are likely to have impact on the Project. Examples of construction stage emission sources include stock piling, blasting, concrete batching and vehicular movements on unpaved haul roads on site and so forth. Confirmation of the validity of the assumptions and the magnitude of the activities (e.g. volume of construction materials handled) shall be obtained from the relevant government/authorities and documented.

(vi) The Applicant shall follow the requirements of the Air Pollution Control (Construction Dust) Regulation in dust control to ensure construction dust impacts are controlled to within the relevant standards as stipulated in section 1 of Annex 4 of the TM. A monitoring and audit program during the construction stage shall be implemented to verify the effectiveness of the control measures and to ensure that the construction dust levels are brought under control.

(vii) If the Applicant anticipates a significant construction dust impact that will likely cause exceedance of the recommended limits in the TM at the ASRs despite incorporation of the dust control measures stated in (ii) above, a quantitative assessment shall be carried out to evaluate the construction dust impact at the identified ASRs. The Applicant shall follow the methodology below when carrying out the assessment.

Quantitative Assessment Methodology

(viii) The Applicant shall apply the general principles enunciated in the modelling guidelines "Guidelines for Local-Scale Air Quality Assessment Using Models", issued by EPD in March 2000 (available in EPD's webpage under "Air" Section), while making allowance for the specific characteristic of the Project. This specific methodology must be documented to such level of detail (preferably with tables and diagrams) to allow the readers of the assessment report to grasp how the model is set up to simulate the situation at hand without referring to the model input files. Details of the calculation of the emission rates of air pollutants for input to the modeling shall be presented in the report. The Applicant must ensure consistency between the text description and the model files at every stage of submission. Prior agreement of the general methodology between the Applicant and the Director is required.

(ix) The Applicant shall identify the key/representative air pollutant parameters related to construction activities (types of pollutants and the averaging time concentration) to be evaluated and provide explanation for choosing these parameters for the assessment of the impact of the Project.

(x) The Applicant shall calculate the cumulative air quality impact at the identified ASRs and compare these results against the criteria set out in section 1 of Annex 4 in the TM. The predicted air quality impacts (both unmitigated and mitigated) shall be presented in the form of summary tables and pollution contours, for comparison with relevant air quality standards and for examination of the land use implications of these impacts. Plans of suitable scale shall be used for presentation of pollution contours for determining buffer distances required.

Mitigating Measures for Non-compliance

(xi) The Applicant shall propose remedies and mitigating measures, where the predicted air quality impact exceeds the criteria set in section 1 of Annex 4 in the TM. These measures and any constraints on future land use planning shall be agreed with the relevant government departments/authorities and documented. The Applicant shall demonstrate quantitatively that the resultant impacts after incorporation of proposed mitigating measures will comply with the criteria stipulated in section 1 of Annex 4 in the TM.

Submission of Model Files

(xii) All input and output file(s) of the model run(s) shall be submitted to the Director in electronic format.

3.4.2 **Construction Noise Impact**

3.4.2.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing construction noise impact as stated in Annexes 5 and 13 of the TM, respectively.

3.4.2.2 The construction noise impact assessment shall include the following:

(i) Determination of Assessment Area

The "Assessment Area" for the construction noise impact assessment shall include all areas within 300 m from the Project boundary. Subject to the agreement of the Director, the assessment area could be reduced accordingly if the first layer of noise sensitive receivers, closer than 300 m from the Project boundary, provides acoustic shielding to those receivers further from the site.

(ii) Provision of Background Information and Existing Noise Levels

The Applicant shall provide all background information relevant to the Project, including relevant previous or current studies.

(iii) Identification of Noise Sensitive Receivers

(a) The Applicant shall refer to Annex 13 of the TM when identifying

the noise sensitive receivers (NSRs). The NSRs shall include all existing NSRs and all planned/committed noise sensitive developments and uses earmarked on the relevant Outline Zoning Plans, Outline Development Plans, Layout Plans and other published plans, including any land use and development applications approved by Town Planning Board. For planned noise sensitive land uses without committed layouts, the Applicant shall work out indicative site layouts based on the relevant planning parameters.

(b) The Applicant shall select assessment points to represent all identified NSRs for carrying out quantitative noise assessment described below. The assessment points shall be agreed with the Director prior to the quantitative noise assessment. A map showing the location and description such as name of building, use, and floors of each and every selected assessment point shall be given.

(iv) Provision of an Emission Inventory of the Noise Sources

The Applicant shall provide an inventory of noise sources including construction equipment for construction noise assessment. Confirmation of the validity of the inventory shall be obtained from the relevant government departments/authorities.

(v) Construction Noise Assessment

(a) The Applicant shall carry out assessment of noise impact from construction (excluding percussive piling) of the Designated Project during day time, i.e. 7 a.m. to 7 p.m., on weekdays other than general holidays in accordance with the methodology stipulated in paragraphs 5.3 and 5.4 of Annex 13 of the TM. The criteria in Table 1B of Annex 5 of the TM shall be adopted in the assessment.

(b) To minimize the construction noise impact, alternative construction methods to replace percussive piling shall be explored and recommended as far as practicable.

(c) If the unmitigated construction noise levels are found to exceed the relevant criteria, the Applicant shall propose practicable direct mitigation measures (including movable barriers, enclosures, quieter alternative methods, re-scheduling and restricting hours of operation of noisy task) to minimize the impact. If the mitigated noise levels still exceed the relevant criteria, the duration of the noise exceedance shall be given.

(d) The applicant shall confirm whether construction work during restricted hours is required. If affirmative, the applicant shall evaluate whether construction works in restricted hours as defined under the Noise Control Ordinance (NCO) are feasible or not in the context of programming construction works. Reference shall be made to the relevant technical memoranda issued under the NCO. Regardless of the results of the construction noise impact

assessment for restricted hours, the Noise Control Authority will process the Construction Noise Permit (CNP) application, if necessary, based on the NCO, the relevant technical memoranda issued under the NCO, and the contemporary conditions/situations. This aspect shall be explicitly stated in the noise chapter and the conclusions and recommendations chapter in the EIA report.

3.4.3 Water Quality Impact

3.4.3.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing water pollution as stated in Annexes 6 and 14 of the TM, respectively.

3.4.3.2 The assessment area for the water quality impact assessment shall include all areas within 500m from the Project boundary of the Designated Project Sites. This study area could be extended to include other areas such as stream courses and the associated water system, including the coastal water of Deep Bay, where the water from the Project will eventually discharge into, being impacted during the course of the EIA study if found justifiable.

3.4.3.3 The Applicant shall identify and analyse all physical, chemical and biological disruptions of marine, fresh water or ground water system(s), catchment area(s), stormwater channel and coastal water arising from the construction and operation of the Designated Project.

3.4.3.4 The Applicant shall include (1) the construction phase impacts on water quality at the site; and (2) the operational phase impacts on water quality at downstream of the site due to the natural process of siltation, flows and water velocity, and re-suspensions of sediments. Essentially, the assessment shall address the following:

(i) Collection and review of background information on the existing and planned water systems and their respective catchments and sensitive receivers which might be affected by the Project during construction and operation.

(ii) Characterization of water and sediment quality of the water systems and respective catchments and sensitive receivers which might be affected by the Project during construction and operation based on existing information or appropriate site survey and tests.

(iii) Identification and analysis of all existing and planned future activities and beneficial uses related to the water system(s) and identification of all water sensitive receivers. The Applicant shall refer to, inter alia, those developments and uses earmarked on the relevant Outline Zoning Plans, Outline Development Plans and Layout Plans.

(iv) Identification of pertinent water and sediment quality objectives and establishment of other appropriate water and sediment quality criteria or standards for the water system(s) and all the sensitive receivers, particularly the aquatic biota of conservation

importance, in (i) above.

(v) Review the specific construction methods and configurations, and operation of the Project. Identification of any alteration of existing watercourses, natural streams/ponds, shoreline or bathymetry, flow regimes, ground water levels and catchment types or areas.

(vi) Identification, analysis and quantification of all existing, likely future water and sediment pollution sources, including point discharges and non-point sources to surface water runoff and analyze these in relation to the provision and adequacy of future facilities to reduce such pollution in terms of capacity and levels of treatment; evaluation and quantification through appropriate site investigation and tests to the pollution loading intercepted by the Project and discharged into the Shenzhen River and Inner Deep Bay; evaluation and quantification of the flows and pollution loads collected and discharged into the existing and planned downstream water courses and drainage systems before and after operation of the Project.

(vii) Establishment and provision of a pollution load inventory on the quantities and characteristics of all existing and likely future water pollution sources identified above. Field investigation and laboratory tests shall be conducted as appropriate to fill in any major information gaps.

(viii) Cumulative impacts due to all other committed and planned projects, activities or pollution sources within a boundary of 300m from both sides along the identified water system(s) and sensitive receivers shall be identified and assessed through undertaking a hydraulic modelling.

(ix) Assessment and evaluation of any potential water quality impacts on the identified water system(s), respective catchments and sensitive receivers due to sewage arising from the construction stage. Any effluent generated will require appropriate collection, treatment and disposal to within standards and objectives and criteria established in (iv) above.

(x) Assessment and evaluation of any potential stormwater and construction runoff impacts on the water system(s), respective catchments and sensitive receivers, particularly the aquatic biota of conservation importance, during construction stages and operational phase maintenance works (such as regular desilting and dredging) so as to reduce the water and sediment quality impacts to within standards, objectives and criteria established in (iv) above. Best management practices shall be recommended to reduce any potential impacts arising from site and stormwater runoff during both construction and operation phases.

(xi) Establishment of the erosion control plan during construction as per assessment carried out in point (x) above. This erosion control

plan shall incorporate details such as locations, sizes and types of best management practices, which will be used to reduce stormwater pollution arising from construction works.

(xii) The Applicant shall assess the pattern of the sediment deposition and the potential increase in turbidity and suspended solids levels in the water column due to the disturbance of sediments during dredging. The potential for the release of contaminants during dredging shall also be addressed using the chemical testing results derived from sediment samples collected on site and relevant historic data.

(xiii) The Applicant shall identify whether the discharge of runoff into the Shenzhen River and Inner Deep Bay during the operational phase will give rise to adverse impacts on water quality in accordance with the TM. The Applicant shall evaluate any water quality impacts, including changes in sediment erosion or deposition pattern, downstream salinity profile and effect on aquatic organisms. This assessment shall have regard for the frequency, duration, volume and flow rate of the discharge and its pollutant and sediment load.

(xiv) The Applicant shall assess the effect of the blackish tidal influence from Inner Deep Bay/Shenzhen River, propose mitigation measures such as tidal barriers/flow management devices and evaluate the environmental benefits/dis-benefits of mitigation measures.

Waste Water and Non-point Sources Pollution

(xv) Proposals for effective and practicable infrastructure upgrading or provision, water pollution prevention and mitigation measures to be implemented during the construction and operational stages to reduce the water quality impacts to within acceptable levels of standards. Requirements to be incorporated in the Project contract document shall also be proposed.

(xvi) Evaluation and quantification of residual impacts on the water system(s) and the sensitive receivers with regard to the appropriate water quality criteria, standards or guidelines.

Protection Against Accidental Spillage

(xvii) Specification of an emergency contingency plan for the construction and operation phase of the proposed Project to contain and remove all accidental spillage along the channel maintenance road(s)/haul road(s) at short notice and to prevent or to minimize the quantities of contaminants from the stream water and sensitive habitats.

3.4.4 **Waste Management Implications**

3.4.4.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing waste management implications as stated in Annexes 7 and 15 of the TM, respectively.

3.4.4.2 The assessment of waste management implications shall cover the following:

(i) Analysis of Activities and Waste Generation

Identification of the quantity, quality and timing of the waste arising as a result of the construction and operation activities, based on the sequence and duration of these activities.

(ii) Should dredging be required, the Applicant shall evaluate and quantify the possible impacts arising from the dredging works. The Applicant shall identify clearly the nature, extent and rate of the dredging works, and the volume of sediment disturbed. Appropriate laboratory tests such as elutriate tests (USACE) and sediment pore water (interstitial water) analyses shall be performed on the sediment samples to simulate and quantify the degree of mobilization of various contaminants such as metals, ammonia, trace organic contaminants and chlorinated pesticides into the water column during dredging. Identification and quantification of all dredging, fill extraction, filling, mud/sediment transportation and disposal activities and requirements. Potential fill source and dumping ground to be involved shall also be identified. Field investigation, sampling and chemical and biological laboratory tests to characterize the sediment/mud concerned shall be conducted as appropriate. The ranges of parameters to be analyzed; the number, type and methods of sampling; sample preservation; chemical and biological laboratory test method to be used shall be subject to the approval of the Director.

The categories of sediments which require different types of disposal in accordance with WBTC No.3/2000 shall be identified by both chemical and biological tests, and their quantities estimated. If the presence of any seriously contaminated sediment which requires Type 3 disposal is confirmed, the Applicant shall identify the most appropriate treatment and/or disposal arrangement and demonstrate its feasibility. Identification and evaluation of the best practicable dredging methods to minimize dredging and dumping requirements and demand for fill sources based on the criterion that existing marine mud shall be left in place and not to be disturbed as far as possible.

(ii) Proposal for Waste Management

(a) Prior to considering the disposal options for various types of wastes, opportunities for reducing waste generation and on-site or off-site re-use shall be fully evaluated. Measures, which can be taken in the planning and design stages e.g. by modifying the design approach and in the construction stage for maximizing waste reduction shall be separately considered.

(b) After considering all the opportunities for reducing waste

generation and maximizing re-use, the types and quantities of the wastes, required to be disposed of as a consequence shall be estimated and the disposal options for each type of waste shall be described in detail. Pre-treatment processes for slurry before disposal shall be addressed in details. The disposal method recommended for each type of waste shall take into account the result of the assessment in (c) below.

(c) The impact caused by handling (including labeling, packaging & storage), collection, and disposal of wastes shall be addressed in detail and appropriate mitigation measures proposed. This assessment shall cover the following aspects:

- potential hazard;
- air and odour emissions;
- noise emission;
- wastewater discharge (including but not limited to the run off of pollutant from the storage of extract/fills materials under heavy rain); and
- public transport.

(iii) Land Contamination Assessment:

(a) If land lots/sites within the study area boundary, due to their past or present land uses, are assessed to be potentially contaminated, a detailed account of the present activities and past land history in relation to possible land contamination shall be provided.

(b) The list of potential contaminants which are anticipated to be found in these potential contaminated sites shall be provided and the possible remediation options shall be discussed.

3.4.5. Ecological Impact (Both Terrestrial and Aquatic) Assessment [Except LYT04]

3.4.5.1. The Applicant shall follow the criteria and guidelines for evaluating and assessing ecological impacts as stated in Annexes 8 and 16 of the TM, respectively. The assessment area for the purpose of terrestrial ecological assessment shall include all areas within 500m distance, from the site boundary of the proposed works areas, and the area likely to be impacted by the drainage channels at Lin Ma Hang (LMH01) and Loi Tung, Man Uk Ping (MUP03, MUP04A, MUP04B, MUP05). For aquatic ecology, the assessment area shall be the same as for water quality assessment described in Section 3.4.3.2.

3.4.5.2. In the ecological impact assessment, the Applicant shall examine the flora, fauna and other components of the ecological habitats within the assessment area. The aim shall be to avoid direct and indirect impact, protect, maintain or rehabilitate the natural environment. The assessment shall identify and quantify as far as possible the potential ecological impacts associated with the Project, including the impacts of any haul roads and temporary access. The potential impact on water quality and aquatic ecology from the discharge of stormwater into the Shenzhen River and Inner

Deep Bay waters during the operational phase, shall also be addressed.

3.4.5.3. The assessment shall include the following:

(i) A review of the findings of relevant studies and collating all the available information, including but not limited to the fresh water fish species in Lin Ma Hang stream as listed in **Annex 1**, regarding the ecological characters of the assessment area.

(ii) Evaluation of the information collected and identification of any information gap relating to the assessment of potential ecological impacts to the terrestrial and aquatic environment.

(iii) Carrying out the necessary field surveys [the duration of which shall be at least 12 months (four seasons) and shall cover the wet and dry seasons] and investigations to verify the information collected, fill the information gaps identified and fulfil the objectives of the EIA study.

(iv) Establishing the general ecological profile and describing the characteristics of each habitat found; major information to be provided shall include:

(a) Description of the physical environment.

(b) Preparation of habitat maps of suitable scale (1:1000 to 1:5000) showing the types and locations of habitats in the assessment area.

(c) Definition and characterization of the ecological characteristics of each habitat type including size, vegetation type, species present, dominant species found, species diversity and abundance, community structure, seasonality and inter-dependence of the habitats and species, and presence of any features of ecological importance and species of conservation of important.

(d) Presentation of representative colour photos of each habitat type and of any important ecological features identified.

(e) Listing of species found that are rare, endangered and/or listed under local legislation, international conventions for conservation of wildlife/habitats or red data books.

(v) Investigation and description of the existing wildlife uses of relevant habitats with special attention to those wildlife groups and habitats of conservation interest; including country parks, special areas, sites of special scientific interest, mangrove stands, wetlands, natural stream courses, rivers, woodlands and shrublands; vertebrates, macroinvertebrates, and any other habitats and wildlife groups identified as having special conservation interests by this EIA study.

(vi) Description of all recognized sites of conservation importance in the proposed development site and its vicinity and assessment of whether these sites will be affected by the proposed development or not.

(vii) Using suitable methodology, identification and quantification as far as possible of any direct, indirect, on-site, off-site, primary, secondary and cumulative ecological impacts such as destruction of habitats,

disturbance to wildlife, reduction of species abundance/diversity, loss of feeding grounds, reduction of ecological carrying capacity, habitat fragmentation; and in particular the following:

(a) The habitat loss and disturbance to wildlife and aquatic life during the construction stage, for example the assessment shall assess (i) the construction impacts on the freshwater fish in the stream courses and the associated water systems in the vicinity, (ii) the impacts due to the loss of foraging ground of bats, in particular those inhabit the nearby Lin Ma Hang Lead Mine and iii) the noise impacts of the proposed construction works on waterfowl in the area.

(b) Operational impacts on the stream and their riparian habitats, aquatic life and other wildlife (such as barking deer, fish-eating bat, woodcock and frogs) therein due to any changes in the ecological conditions of the habitats and flow regime.

(c) Impacts due to maintenance works (such as regular desilting and dredging) on stream habitats, aquatic life and flow regime.

(d) Cumulative impacts due to other proposed development projects in the vicinity, for example, the proposed extension of NENT landfill site.

(viii) Evaluation of the significance and acceptability of the ecological impacts identified using well-defined criteria.

(ix) Recommendations for all possible alternatives, such as modifications of route alignment, layout and design and practicable mitigation measures to avoid, minimize and/or compensate for the adverse ecological impacts identified, such as reinstatement of habitats temporarily affected by the proposed development to its original state and if possible with some enhancement features.

(x) Evaluation of the feasibility and effectiveness of the recommended mitigation measures and definition of the scope, type, location, implementation arrangement, resources requirement, subsequent management and maintenance of such measures.

(xi) Determination and quantification as far as possible of the residual ecological impacts after implementation of the proposed mitigation measures;

(xii) Evaluation the severity and acceptability of the residual ecological impacts using well-defined criteria.

(xiii) A review of the need for and recommendation for any ecological monitoring programme required.

3.4.6 Landscape and Visual Impact

3.4.6.1 The Applicant shall follow the criteria and guidelines as stated in Annexes 10, 11, 18, 20 and 21 of the Technical Memorandum and the Guidance Notes EIAO No. 8/2002 on the preparation of Landscape and Visual Impact Assessment under the EIAO. Landscape and visual impacts during both construction and operation phases within the Study Area shall be assessed.

3.4.6.2 The assessment area for landscape impact assessment shall include all areas within a 500m distance from the Project while the assessment area for the visual impact assessment shall be defined by the visual envelope of the Project.

3.4.6.3 The Applicant shall review relevant outline development plan(s), outline zoning plan(s), layout plan(s) or planning briefs and studies which may identify areas of high landscape value and recommend green belt and conservation area designations. The aim is to gain an insight to the future outlook of the area affected so as to assess whether the Project can fit into the surrounding setting. Any conflict with statutory town plan(s) shall be highlighted and appropriate follow-up action shall be recommended.

3.4.6.4 The Applicant shall describe, appraise, analyze and evaluate the existing landscape resources and character of the assessment area. A system shall be derived for judging landscape and visual impact significance as required under the TM. The sensitivity of the landscape framework and its ability to accommodate change shall be particularly focused on. The Applicant shall identify the degree of compatibility of the Project with the existing and planned landscape setting. The landscape impact assessment shall quantify the potential landscape impact as far as possible so as to illustrate the significance of such impacts arising from the proposed development. Clear mapping of the landscape impact is required. A tree survey shall be carried out and the impacts on existing mature trees shall be addressed.

3.4.6.5 The Applicant shall assess the visual impacts of the proposed Project. Clear illustration including mapping of visual impact is required. The assessment shall include the following:

(i) Identification and plotting of visual envelope of the proposed Project within the assessment area.

(ii) Identification of the key groups of sensitive receivers within the visual envelope with regard to views from both ground level and elevated vantage points.

(iii) Description of the visual compatibility of the proposed Project such as channel wall, possible inflatable dam and associated pumping station with the surrounding and the planned setting, and its obstruction arid interference with key views of the adjacent areas.

(iv) The severity of visual impacts in terms of distance, nature and number of sensitive receivers shall be identified. The visual impacts of the proposed Project with and without mitigation measures shall be

included so as to demonstrate the effectiveness of the proposed mitigation measures.

3.4.6.6 The Applicant shall evaluate the merits of preservation in totality, in parts of total destruction of existing landscape. In addition, alternative alignment design and construction method that would avoid or reduce the landscape and visual impact shall be evaluated for comparison before adopting other mitigation or compensatory measures to alleviate the impacts. The mitigation measures proposed shall not only be concerned with damage reduction but shall also include consideration of potential enhancement of existing landscape. The Applicant shall recommend mitigation measures to minimize the adverse effects identified above, including provision of a landscape design.

3.4.6.7 The mitigation measures shall also include the preservation of vegetation, transplanting of mature trees, provision of screen planting, re-vegetation of disturbed lands, compensatory planting, design of structure, provision of finishes to structure, colour scheme and texture of material used and any measures to mitigate the disturbance of the existing land use. Parties shall be identified for the on going management and maintenance of the proposed mitigation works to ensure their effectiveness throughout the operation phase of the Project. A practical programme and funding proposal for the implementation of the recommended measures shall be provided.

3.4.6.8 Colour perspective drawing, plans and section/elevation diagrams, annotated oblique aerial photographs, photographs taken at vantage points, and computer-generated photomontage shall be adopted to illustrate the landscape and visual impacts of the proposed Project to the satisfaction of the Director. The Applicant shall record the technical details in preparing the illustration, which may need to be submitted for verification of the accuracy of the illustration.

3.4.7 Impact on Cultural Heritage

3.4.7.1 The Applicant shall carry out cultural heritage impact assessment of the Project, in particular at the drainage channel (LYT04), in accordance with Annex 10 and Annex 19 of the TM respectively.

3.4.7.2 The heritage impact assessment information shall include the following:

(i) The Applicant shall identify all sites of cultural heritage that might be adversely affected by the impacts due to vibration associated with the construction activities of the designated projects. The EIA study shall establish a comprehensive inventory of archaeological sites, historic buildings and structures located within or in close proximity to the designated project area, that might have the potential to be affected. A plan showing the location of both the proposed works and all sites of cultural heritage identified is required. Besides, a check list including all the affected sites of cultural heritage, impacts identified, recommended mitigation measures as well as the implementation agent and period shall also be included in the EIA report.

(ii) The Applicant shall assess the extent to which those sites of cultural heritage might be directly and indirectly affected and recommend possible alternatives (such as modification of layout and design of the project) and practicable monitoring and mitigation measures to avoid or keep the adverse impacts on the site of cultural heritage to the minimum.

(iii) Special attention shall be paid to the sites of cultural heritage in the vicinity of the Project including the following monument.

- **The Entrance Tower of Ma Wat Wai at Lung Yeuk Tau.**

(iv) A map in 1:1000 scale indicating the boundary of the identified built heritage and declared monuments together with the nearby work areas in proper scale shall be made.

4. ENVIRONMENTAL MONITORING & AUDIT (EM&A) REQUIREMENTS

4.1 The Applicant shall identify in the EIA study whether there is any need for EM&A activities during the construction and operation phases of the Project and, if affirmative, to define the scope of the EM&A requirements for the Project in the EIA study.

4.2 Subject to the confirmation of the EIA study findings, the Applicant shall comply with the requirements as stipulated in Annex 21 of the TM. The Applicant shall also propose real-time reporting of monitoring data for the Project through a dedicated internet website.

4.3 The Applicant shall prepare a project implementation schedule (in the form of a checklist) containing all the EIA study recommendations and mitigation measures with reference to the implementation programme.

5. SUMMARY OF ENVIRONMENTAL OUTCOMES

5.1 The EIA report shall contain a summary of the key environmental outcomes arising from the EIA study, including the population and environmentally sensitive areas protected, environmentally friendly designs recommended, key environmental problems avoided, and environmental benefits of environmental protection measures recommended.

6. DURATION OF VALIDITY

6.1 This EIA study brief is valid for 36 months after the date of issue. If the EIA study does not commence within this period, the Applicant shall apply to the Director for a fresh EIA study brief before commencement of the EIA study.

7. REPORT REQUIREMENTS

7.1 In preparing the EIA report, the Applicant shall refer to Annex 11 of the TM for the

contents of an EIA report. The Applicant shall also refer to Annex 20 of the TM, which stipulates the guidelines for the review of an EIA report.

7.2 The Applicant shall supply the Director with the following number of copies of the EIA report and the executive summary:

(i) 50 sets copy of the EIA report (in English and Chinese) and 80 sets copy of the executive summary (in English and Chinese) as required under section 6(2) of the EIAO to be supplied at the time of application for approval of the EIA report.

(ii) When necessary, any addendum to the EIA report and the executive summary submitted in (i) above as required under section 7(1) of the EIAO, to be supplied upon advice by the Director for public inspection.

(iii) 20 sets copy of the EIA report (in English and Chinese) and 50 copies of the executive summary (in English and Chinese) with or without Addendum as required under section 7(5) of the EIAO, to be supplied upon advice by the Director for consultation with the Advisory Council on the Environment.

7.3 The Applicant shall, upon request, make additional copies of the above documents available to the public, subject to payment by the interested parties of full costs of printing.

7.4 In addition, to facilitate the public inspection of the EIA Report via the EIAO Internet Website, the Applicant shall provide electronic copies of both the EIA Report and the Executive Summary Report prepared in Hyper Text Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF) version 4.0 or later), unless otherwise agreed by the Director. For the HTML version, a content page capable of providing hyperlinks to each section and sub-section of the EIA Report and the Executive Summary Report shall be included in the beginning of the document. Hyperlinks to all figures, drawings and tables in the EIA Report and Executive Summary shall be provided in the main text from where the respective references are made. All graphics in the report shall be in interlaced GIF format unless otherwise agreed by the Director.

7.5 The electronic copies of the EIA report and the Executive Summary shall be submitted to the Director at the time of application for approval of the EIA Report.

7.6 When the EIA Report and the Executive Summary are made available for public inspection under section 7(1) of the EIAO, the content of the electronic copies of the EIA Report and the Executive Summary must be the same as the hard copies and the Director shall be provided with the most up to date electronic copies.

7.7 To promote environmentally friendly and efficient dissemination of information, both hard copies and electronic copies of future EM&A reports recommended by the EIA study shall be required and their format shall be agreed by the Director.

8. OTHER PROCEDURAL REQUIREMENTS

8.1 If there is any change in the name of the Applicant for this EIA study brief, the Applicant mentioned in this study brief must notify the Director immediately.

8.2 If there is any key change in the scope of the project mentioned in section 1.2 and 1.3 of this EIA study brief and in the Project Profile (No. PP-168/2002), the Applicant must seek confirmation from the Director in writing on whether or not the scope of issues covered by this EIA study brief can still cover the key changes, and the additional issues, if any, that the EIA study must also address. If the changes to the project fundamentally alter the key scope of the EIA study brief, the Applicant shall apply to the Director for a fresh EIA study brief.

--- END OF EIA STUDY BRIEF ---

June 2002
Environmental Assessment and Noise Division
Environmental Protection Department

Annex I

List of Fresh Water Fish Species known to be Present in Lin Ma Hang Stream

Annex 1

Freshwater Fish Known to be Present in Lin Ma Hang Stream

No.	Scientific Name	Chinese Name
1	*Carassius auratus*	鯽
2	*Channa asiatica*	月鱧
3	*Macropodus opercularis*	中國鬥魚
4	*Mastacemblus armatus*	大刺鰍
5	*Misgurnus anguillicaudatus*	泥鰍
6	*Monopterus albus*	黃鱔
7	*Nicholsicypris normalis*	擬細鯽
8	*Parazocco spilurus*	異
9	*Puntius semifasciolatus*	五線無鬚鮊
10	*Rasborinus lineatus*	線細鯝
11	*Rhinogobius duospilus*	溪吻　虎魚
12	*Schistura fasciolata*	橫紋南鰍
13	*Silurus cochinchinensis*	越南鯰
14	*Rasbora steineri*	斯氏波魚

Annex II

Figures 1 to 4

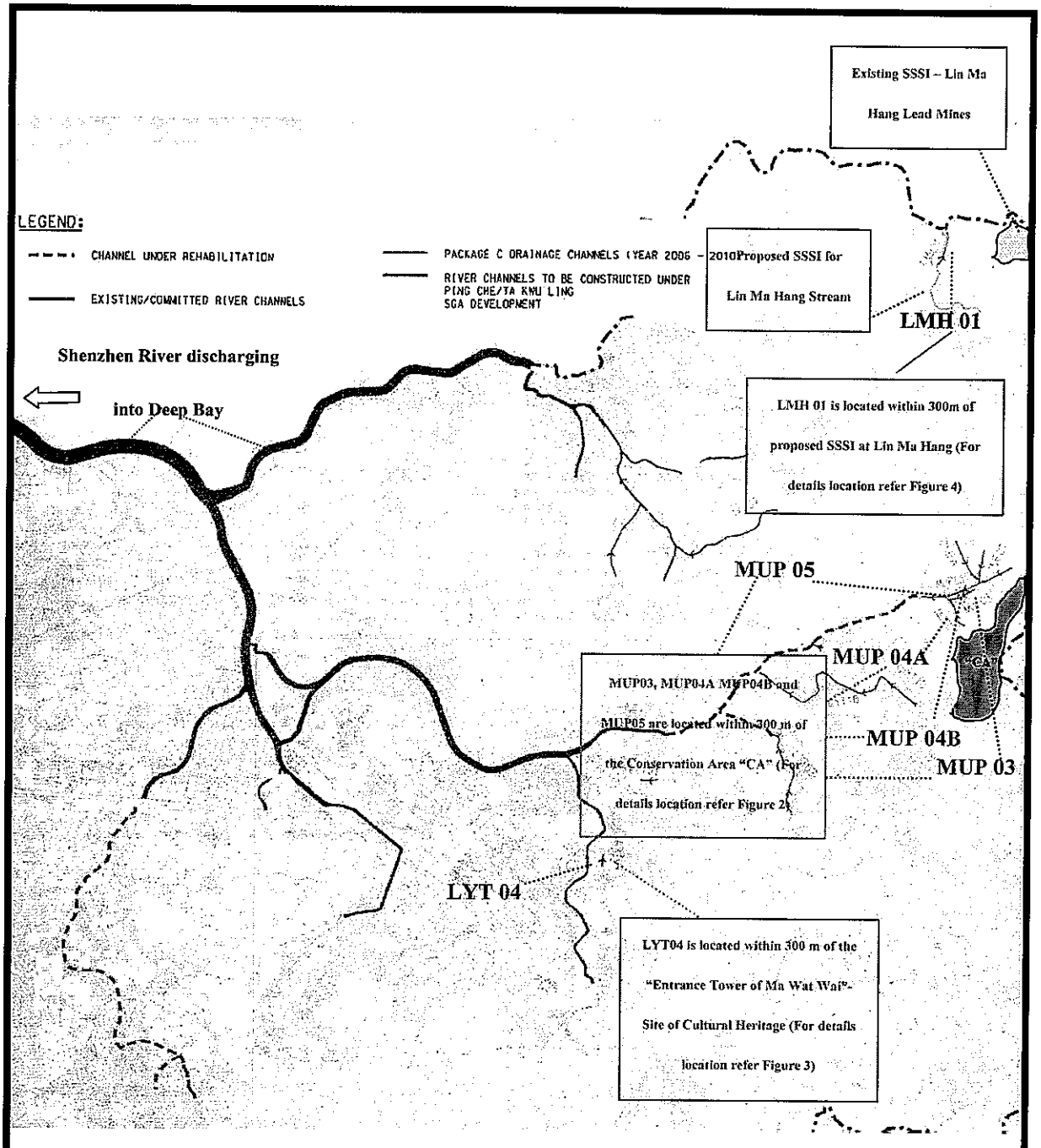

Figure 1 - Drainage Improvements in the Northern NT – Package C
Layout Plan for the Location of Drainage Improvement Works

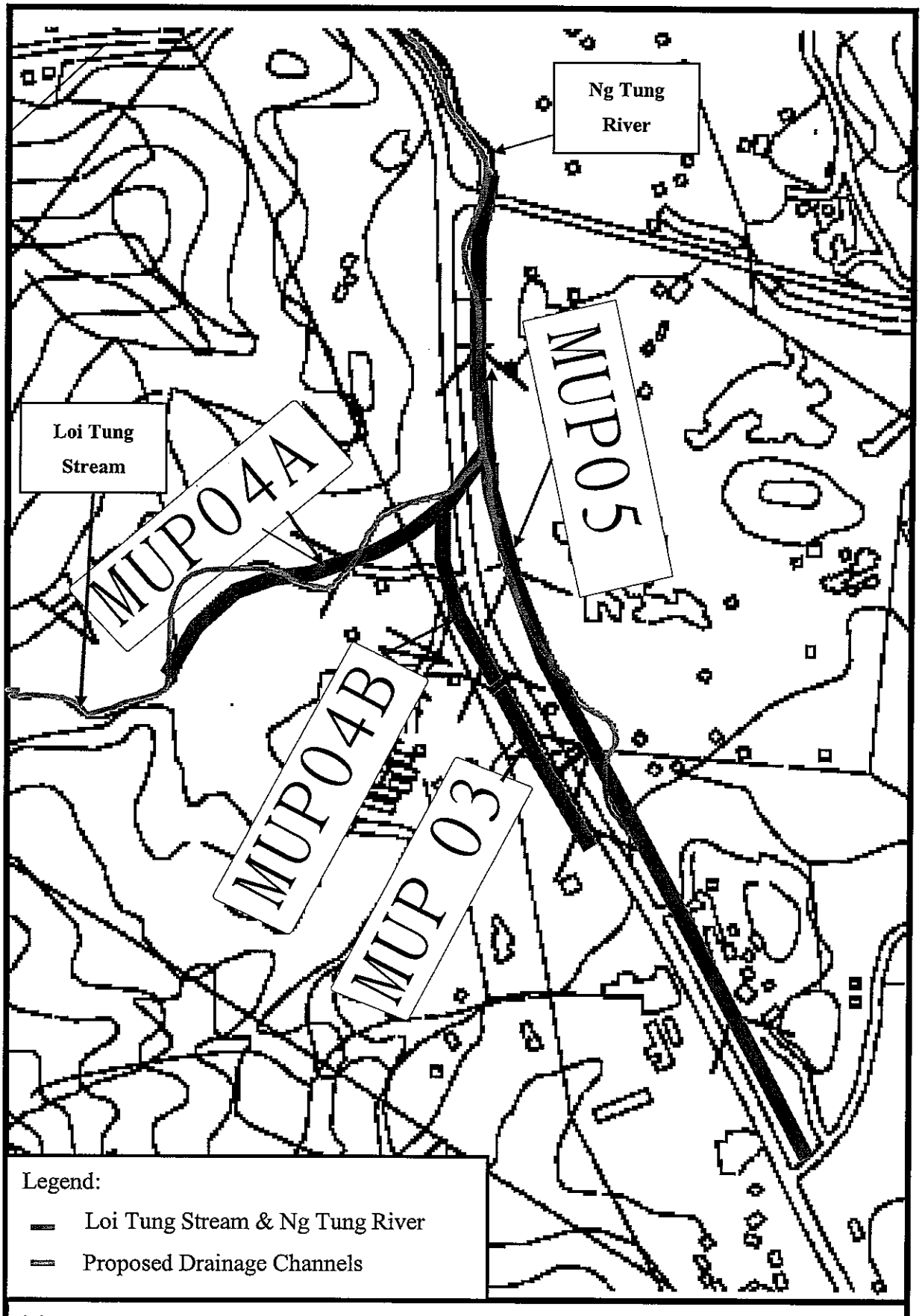

Figure 2 - Drainage Improvement in the Northern NT – Package C
Location of Proposed Drainage Channels at Man Uk Pin (MUP03, MUP04A, MUP04B, MUP05)

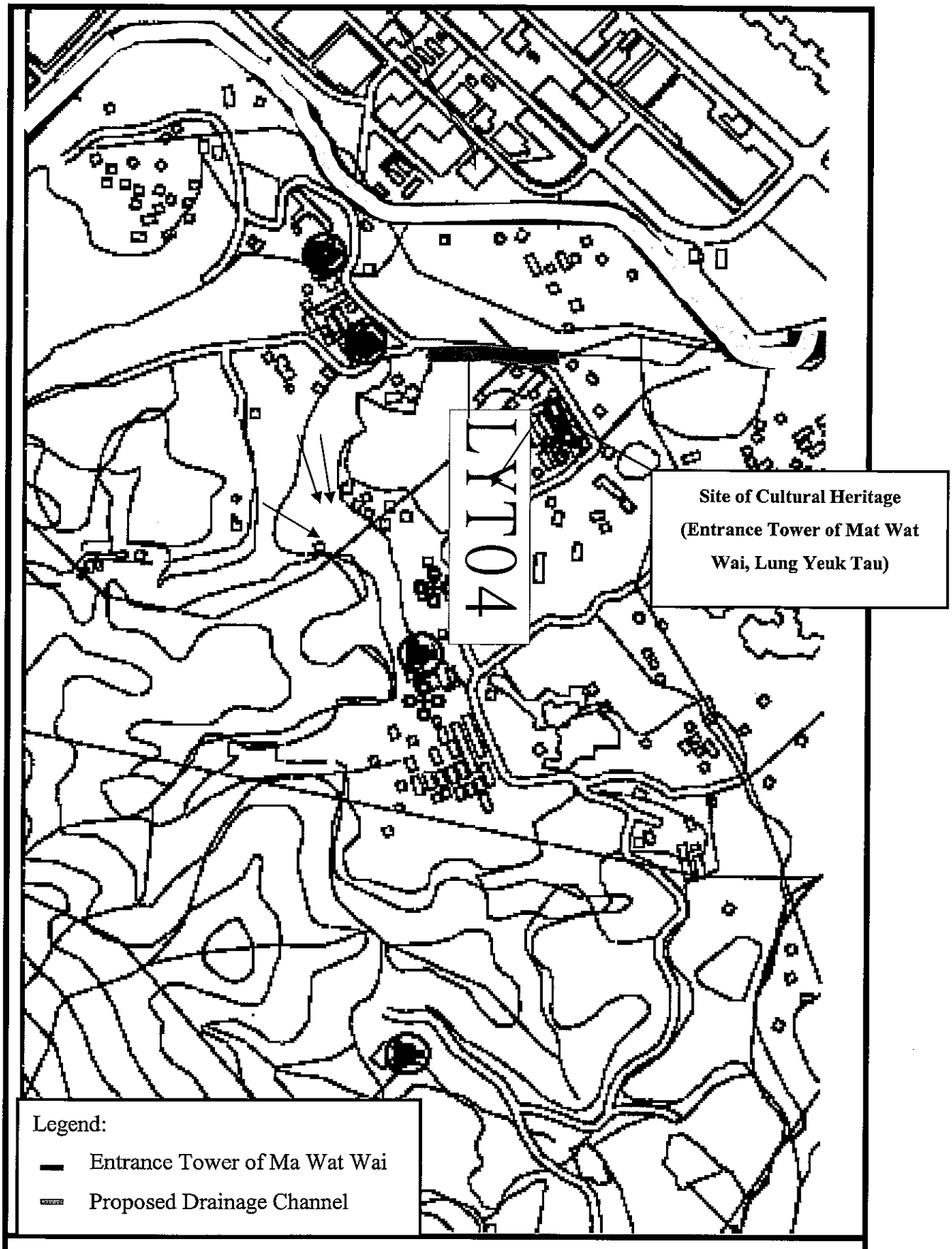

Figure 3 - Drainage Improvement in the Northern NT – Package C
Location of Proposed Drainage Channels at Lung Yeuk Tau (LYT04)

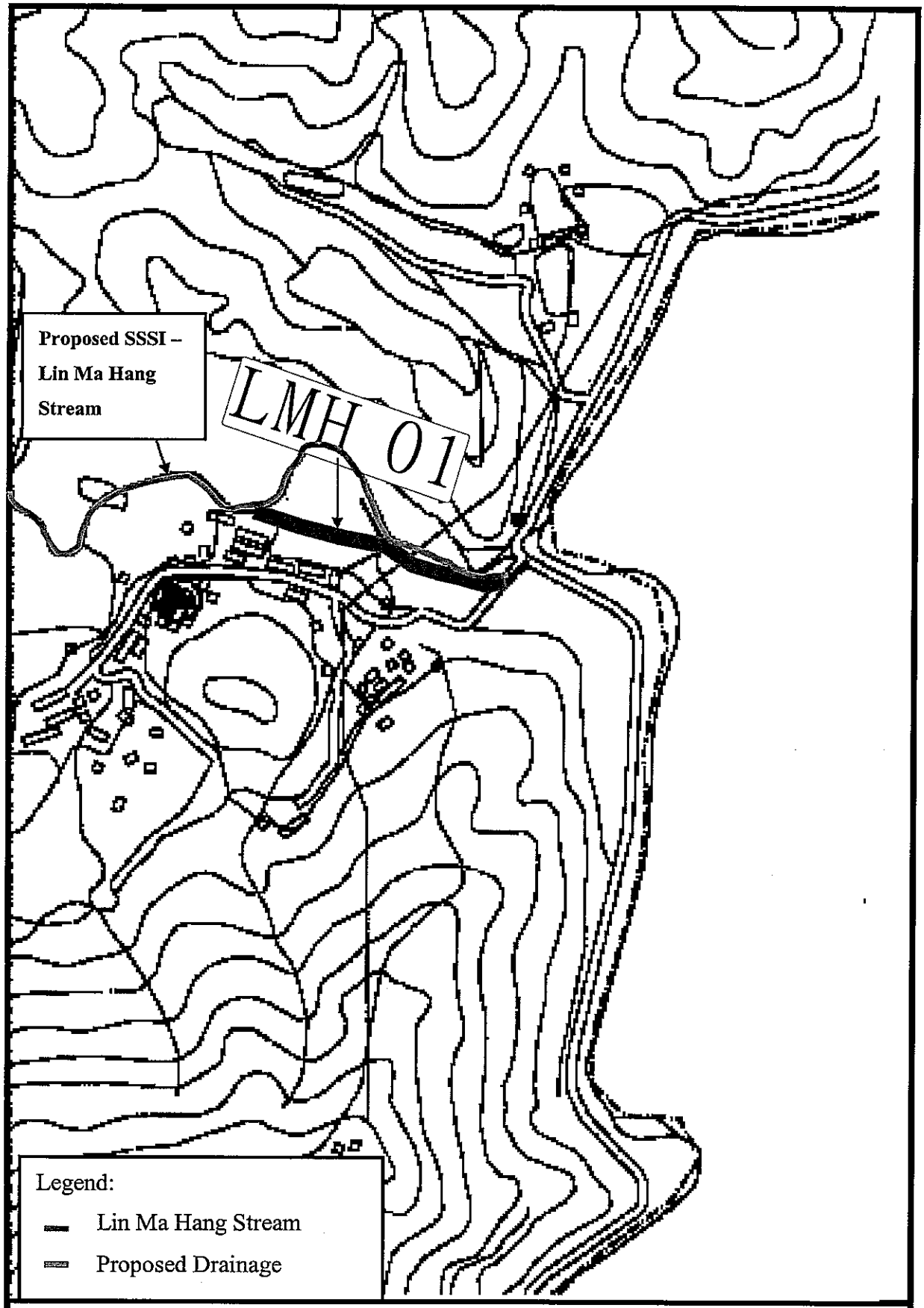

Figure 4 - Drainage Improvement in the Northern NT – Package C
Location of Proposed Drainage Channel at Lin Ma Hang