Section 1

INTRODUCTION

1 INTRODUCTION

1.1 Background

1.1.1 On 16 January 1997, the Territory Development Department of the Hong Kong Government commissioned Maunsell Consultants Asia Ltd. as the lead consultant for the Feasibility Study on the Alternative Alignment for the Western Coast Road, Tseung Kwan O (hereafter known as the Assignment) under Agreement No. CE 46/96. The purpose of the Feasibility Study was to identify alternative alignment options for the Western Coast Road (WCR) and recommend the preferred alignment option for which the Preliminary Design will be developed (hereafter referred to as the Project).

1.1.2 As part of this Assignment, Environmental Resources Management (ERM) Hong Kong, Ltd. were commissioned to undertake the Environmental Impact Assessment (EIA) to provide input during the alignment options selection and to assess the environmental feasibility of the preferred alignment to ensure compliance with Government standards and guidelines. Hassell were commissioned to undertake the Cultural Heritage and Landscape/Visual Impact Studies which were included as part of the EIA.

1.1.3 The boundary of the "Study Area" for the EIA is 300 m either side and along the full length of the proposed alignment, except in the case of landscape impact and air pollution assessment, where the Study Area was defined by a distance of 500 m from the proposed alignment. *Figure 1.1a* depicts the WCR Study Area and preferred alignment.

1.2 Purpose of the Manual

1.2.1 The purpose of this Environmental Monitoring and Audit (EM&A) Manual (hereafter referred to as the Manual) is to guide the setup of an EM&A programme to ensure compliance with the recommendations of the Environmental Impact Assessment (EIA) for the Assignment during construction and operation, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action. This Manual aims to provide systematic procedures for monitoring, auditing and minimising of the environmental impacts associated with the Project.

1.2.2 Hong Kong environmental regulations for air, water quality, noise, ecology, landscape, cultural resources and waste, together with the Hong Kong Planning Standards and Guidelines (HKPSG), the Environmental Impact Assessment Ordinance (EIAO) Technical Memorandum (TM) and the recommendations of the EIA Study Final report have served as environmental standards and guidelines in the preparation of this Manual.

1.2.3 This Manual contains the following:

(a) Responsibilities of the Contractor, the Engineer or Engineer's Representative (ER) and the Environmental Team (ET) Leader with respect to the EM&A requirements during the course of the Project;
(b) Information on Project organisation and programming of construction activities for the Project;
(c) The hypotheses of potential impacts, the basis for and description of the broad approach underlying the EM&A programme;
(d) Requirements with respect to the construction schedule and the necessary EM&A programme to track the varying environmental impacts;
(e) The specific questions and testable hypotheses that the monitoring programme is designed to answer;

(f) Full details of the methodologies to be adopted, including all field, laboratory and analytical procedures, and details on quality assurance and quality control (QA/QC) programme;
(g) The rationale on which the environmental monitoring data will be evaluated and interpreted and the details of the statistical procedures that will be used to interpret the data;
(h) Definition of Action and Limit Levels;
(i) Establishment of Event and Action Plans;
(j) Requirements of reviewing pollution sources and working procedures required in the event of non-compliance of the environmental criteria and complaints;
(k) Requirements for the presentation of EM&A data and appropriate reporting procedures; and
(l) Requirements for review of EIA predictions and effectiveness of the EM&A programme.

1.2.4 For the purpose of this Manual, the "Engineer" shall refer to the Engineer as defined in the Contract and the Engineer's Representative (ER), in cases where the Engineer's powers have been delegated to the ER, in accordance with the Contract. The ET Leader, who shall be responsible for and in charge of the ET, shall refer to the person dedicated to the role of executing the EM&A requirements.

1.3 Project Description

1.3.1 The primary objective of the Assignment is to identify and evaluate the feasibility of four alignment options in providing a new major trunk road connection between Tseung Kwan O (TKO) New Town and South East Kowloon (SEK). The current TKO population of 200,000 is planned to increase to 445,000 with a possible further increase to 520,000. Western Coast Road (WCR) would provide access from East Kowloon for the increased population at TKO and provide a safe route for Dangerous Goods Vehicles (DGV) to and from Area 137, TKO. WCR would also provide access between Eastern Kowloon and other port developments in TKO (such as that in Area 131).

1.3.2 Without the Project, it is expected that road infrastructure would not be able to accommodate future population demand in the area and alternative routing would be required for the transport of DGV. The planning of the Project has been undertaken so as to meet the required traffic carrying capacity and cause the least adverse impact to the local community, environment, road and marine transport activities.

1.3.3 As part of the alignment option assessment, a total of 34 alternative alignment schemes were developed based on four WCR coastal options (Options 1 to 4) and three WCR inland options (Options 5 to 7). These options were initially screened in terms of a combination of factors including environmental, engineering, traffic and cost considerations. Based on these factors, four alignment options (Options 2D2, 2E1, 2E2 and 6) were selected and endorsed at the 3rd Project Steering Group Meeting held on 26 May 1997.

1.3.4 The four options were further assessed based on rating methods accepted at a Project Working Group Meeting held on 3 September 1997 for which the following factors were considered: (i) Traffic (including: *Primary traffic function*, which is the basic requirement to provide a road to link TKO and East Kowloon, with its eastern end connecting to TKO Road P2 and western end connecting to East Kowloon Road T2, and with slip road connections to Yau Tong and TKO Area 131 and *Secondary traffic function*, which includes the effectiveness of the secondary road linkages and the effects on the existing road system); (ii) Environmental considerations (including: *noise, air quality, water quality, waste, ecology and cultural heritage impacts*); (iii) Marine Impacts (including: *impacts to marine facilities and traffic* and *risk of structure against ship collision*); (iv) Land Use and Visual Impacts; (v) Drainage Impacts; (vi) Utilities Impacts;

and (vii) Cost.

1.3.5 During the evaluation of the alignment options, it was found that Option 6 would result in significant environmental impacts to air quality from the enclosures associated with this option and risks could occur with the use of the tunnel for dangerous goods vehicles. Therefore, this option was not included for further consideration as part of the Study.

1.3.6 For Option 2E1, high level bridges would be required over the mouth of Yau Tong Bay and Sam Ka Tsuen Typhoon Shelter and the slip road connection to Cha Kwo Ling Road near Eastern Harbour Crossing would not be provided. This option was found unfavourable based on issues relating to traffic functions, land use impacts, utilities impact, and visual and landscape impacts and had similar effects on noise, air quality, water quality, waste and ecology as with Option 2D2.

1.3.7 The remaining alignment Options, 2D2 and 2E2, were found to be very similar with the exception of their respective slip road connections to Lei Yue Mun Road and Cha Kwo Ling Road:

(a) Option 2D2 would have slip roads running along the hillside of Lei Yue Mun Headland behind Sam Ka Tsuen, with a major portion of the slip roads formed by cut and fill slopes and a minor portion formed by bridges; and
(b) Option 2E2 would have slip roads running along the seawall of Sam Ka Tsuen Typhoon Shelter near Shung Shun Street in the form of high level bridges.

1.3.8 Due to the high level slip road bridges running along the seawall of Sam Ka Tsuen Typhoon Shelter, with some of the bridge columns sitting within the typhoon shelter, Option 2E2 was found to be less favourable than Option 2D2 in terms of marine impact, land use impact, visual and landscape impacts, utilities impact and cost; while other environmental factors including noise impact, air quality impacts, water quality impacts, construction impacts and ecology impact were found to be similar for both Options.

1.3.9 As a result, Option 2D2, which has slip roads running along the hillside of Lei Yue Mun Headland behind Sam Ka Tsuen, was found to be the preferred Option and was therefore recommended as the preferred alignment for WCR. The Option was subsequently endorsed, in principle, at the 4th Project Steering Group Meeting held on 17 November 1997 for further assessment, including the assessment of the option as part of the EIA.

1.3.10 The vertical alignment of WCR along Yau Tong Coastal Section cannot be depressed either in the form of underpass or tunnel due to the following reasons:

- The WCR is required to take DGV and a tunnel alignment is considered not suitable for the DGV.

- The proposed reclamation at Yau Tong waterfront has to be carried out in two phases so that the marine access to the existing waterfront facilities including Sam Ka Tsuen Ferry Pier, WSD Yau Tong Salt Waster Pumping Station and F.M.O. Kwun Tong Wholesale Fish Market can be maintained until the corresponding reprovisioning facilities are completed along the new seawall of the reclamation. If the WCR is the reclamation strip at Yau Tong waterfront, unlike the elevated road option, will have to commence after completion of the reclamation and the reprovisioning facilities since the underpass will block off the marine access to the existing waterfront facilities. As a result o this, the target date of road opening of WCR by year 2006 will be delayed to about year 2009, which is unacceptable from traffic point of view.

- Due to the presence of a 1400mm diameter submarine fresh water pipeline, a twin 600mm diameter submarine gas pipeline and the tunnels of the Eastern Harbour Crossing at the mouth of Yau Tong Bay, the section of WCR need to be elevated to allow marine access below the WCR for the future maintenance of the existing pipelines and tunnels. The alternative option of constructing WCR as a tunnel underneath the pipelines and the Eastern Harbour Crossing tunnels will have a high risk of damage to the pipelines or tunnels and would not be acceptable. The other alternative option of diverting the existing pipelines and the Eastern Harbour Crossing to give way for a depressed alignment of WCR is considered not practical in terms of cost and time.

1.4 Construction Phase

1.4.1 A preliminary Project programme is shown on *Figure 1.4a*. It is understood that this programme may be further refined during the detailed design stage. The construction of the WCR has been divided into four Sections (*Figure 1.4b-1.4f*), namely: TKO Section (*Figure 1.4c*); Lei Yue Mun Headland Section (*Figure 1.4c*); Lei Yue Mun Slip Road Section (*Figure 1.4d*); and Yau Tong Coastal Section (*Figure 1.4d-1.4f*)

1.4.2 The Lei Yue Mun Headland Section will not be open before the opening of Yau Tong Coastal Section. It is expected that all sections of WCR will be open to public traffic at the same time. The work in TKO Section, Lei Yue Mun Slip Road Section and Yau Tong Coastal Section will commence first simultaneously. The work in Lei Yue Mun Headland Section will commence after the reclamation at TKO.

TKO Section

1.4.3 The TKO Section of WCR has been proposed to be built on a narrow strip of reclamation along the TKO coastline towards the Lei Yue Mun Headland. The area of reclamation required for WCR in the TKO Section would be about 75,200 m^2 (7.5 ha), approximately 80 m wide and 940 m in length.

Lei Yue Mun Headland Section

1.4.4 This Section would comprise cut and cover tunnel works for a short tunnel of approximately 175 m involving: site clearance, excavation, tunnel construction, slope works and drainage/utility works.

Lei Yue Mun Slip Roads

1.4.5 Construction for the slip road will involve site clearance, cut and fill works, piling work, roadworks and drainage utility works. It is expected that access to this Section of the alignment will be through the Yau Tong area. However, it is expected that the number of vehicles travelling along haul routes will be minimal, as most of the excavated material will be used on site for the slope works. Any surplus material identified will be used for the small reclamation at Yau Tong coastal area and thus minimise haul traffic requirements.

Yau Tong Coastal Section

1.4.6 This Section will comprise the reclamation works, reprovisioning works and subsequent road infrastructure works.

Stage 1

1.4.7 Stage 1 will involve the initial dredging activities required for the construction of the reclamation seawall and the proposed submerged reef at Yau Tong Bay. Due to the small volumes of material to be dredged, it is expected that the dredging will involve one grab dredger. Stage 1 comprise the following activities:

(a) Dredging for the submerged reef and protective dolphins at Yau Tong Bay; and
(b) Dredging of the seawall for the thin reclamation strip between Yau Tong Bay and Sam Ka Tsuen Typhoon Shelter.

Stage 2

1.4.8 Stage 2 involves the construction of the submerged reef and protective dolphins, the seawall construction and initial filling of the reclamation behind constructed seawalls. This stage will also include the reprovisioning of the new pumping station and ferry pier. Stage 2 comprise the following activities:

(a) Construction of the submerged reef and protective dolphins at Yau Tong Bay;
(b) Construction of the seawall for the thin reclamation strip between Yau Tong Bay and Sam Ka Tsuen Typhoon Shelter;
(c) Phase 1 of the thin reclamation strip between Yau Tong Bay and Sam Ka Tsuen Typhoon Shelter;
(d) Construction for the reprovisioning of the fish market and CEO Maintenance Depot
(e) Construction of the new ferry pier; and
(f) Construction of the pumping station.

Stage 3

1.4.9 Stage 3 will involve the final stage of the reclamation requiring the construction of the remaining seawall, completion of the reclamation and demolition of the old ferry pier and pumping station. Stage 3 comprise the following activities:

(a) Construction of the remaining seawall for the thin reclamation strip between Yau Tong Bay and Sam Ka Tsuen Typhoon Shelter;
(b) Phase 2 of the thin reclamation strip between Yau Tong Bay and Sam Ka Tsuen Typhoon Shelter;
(c) Reprovision of fish market and CEO Maintenance Depot
(d) Demolition of the old ferry pier; and
(e) Demolition of the old pumping station.

1.4.10 The source of fill material would likely be a combination of public fill and contracted fill material. The quantities of which are to be established during the detailed design stage of the Project.

1.4.11 It is expected that the construction programme will be subject to ongoing change and refinement due to design development and Government review, as well as change and refinement as the design progresses. Any subsequent significant changes to the programme will necessitate an environmental review to confirm that impacts, including confirmation that cumulative impacts, are no greater than those predicted in the EIA and this EM&A Manual.

1.5 Operation

1.5.1 WCR is proposed to operate as a dual 4-lane roadway along the TKO Section due to the increased traffic expected from the TKO Cross Bay Bridge. WCR would then be

reduced to a dual 3-lane roadway as it reaches the Lei Yue Mun Headland and traverses into the Yau Tong Area where it connects to the South East Kowloon area. The slip roads in the Yau Tong area will be 1 or 2-lane single carriageways. The expected traffic figures for the year 2021 are shown in *Figure 1.5a*.

1.6 Sensitive Receivers

Noise Sensitive Receivers

1.6.1 The NSRs identified as part of the EIA Study are shown in *Annex B (B-2)* and are listed in *Table 1.6a*.

Table 1.6a Noise Sensitive Receivers

NSR	Description	No. of dwellings represented	Affected Facade	Type
Lei Yue Mun				
N101	Ma San Tsuen Village House	12	N	Low Rise Residential
N102	Ma San Tsuen Village House	20	NE	Low Rise Residential
N103	Ma San Tsuen Village House	4	NE	Low Rise Residential
N104	Ma San Tsuen Village House	7	NE	Low Rise Residential
N105	Ma San Tsuen Village House	5	N	Low Rise Residential
N106	Sam Ka Tsuen Village House	4	NE	Low Rise Residential
N107	Hoi Bun School	1 School	N	Educational Establishment
N108	Sam Ka Tsuen Village House	5	N	Low Rise Residential
N109	Sam Ka Tsuen Village House	7	SW	Low Rise Residential
N110	Sam Ka Tsuen Village House	17	S	Low Rise Residential
N111	Sam Ka Tsuen Village House	21	E	Low Rise Residential
N112	Sam Ka Tsuen Village House	7	SE	Low Rise Residential
N113	Sam Ka Tsuen Village House	4	E	Low Rise Residential
N114	Sam Ka Tsuen Village House	1	E	Low Rise Residential
N115	Sam Ka Tsuen Village House	2	NE	Low Rise Residential
Lei Yue Mun Housing Estate				
N201	Lei Yue Mun Housing Site Block 4	70	SW	High Rise Residential
N202	Lei Yue Mun Housing Site Block 4	70	W	High Rise Residential
N203	Lei Yue Mun Housing Site Block 3	70	W	High Rise Residential
N204	Lei Yue Mun Housing Site Block 3	70	W	High Rise Residential
N205	Lei Yue Mun Housing Site Block 3	70	NW	High Rise Residential
N206	Lei Yue Mun Housing Site Block 2	70	W	High Rise Residential
N207	Lei Yue Mun Housing Site Block 3	Educational	W	Low Rise Kindergarten
N208	Lei Yue Mun Housing Site Block 1	70	W	High Rise Residential
N209	Lei Yue Mun Housing Site Block 1	70	W	High Rise Residential
N210	Lei Yue Mun Housing Site Block 1	70	NW	High Rise Residential
Yau Tong Centre				
N301	Church	1 Church	S	Place of Worship
N302	Yau Tong Centre	120	S	Medium Rise Residential
N303	Yau Tong Centre	80	E	Medium Rise Residential
N304	Yau Tong Centre	140	E	Medium Rise Residential
N305	Yau Tong Centre	40	N	Medium Rise Residential
Yau Tong Estate				
N401	Yau Tong Estate Phase 5 - Block L	35	SW	High Rise Residential

NSR	Description	No. of dwellings represented	Affected Facade	Type
N402	Yau Tong Estate Phase 5 - Block L	70	S	High Rise Residential
N403	Yau Tong Estate Phase 5 - Block L	35	SE	High Rise Residential
N404	Yau Tong Estate Phase 5 - Block L	70	E	High Rise Residential
N405	Yau Tong Estate Phase 5 - Block J	35	SE	High Rise Residential
N406	Yau Tong Estate Phase 5 - Block J	70	E	High Rise Residential
Ko Chiu Road Estate				
N501	Ko Chiu Road Phase 5 - Block H	35	S	High Rise Residential
N502	Ko Chiu Road Phase 5 - Block H	35	SW	High Rise Residential
N503	Ko Chiu Road Phase 5 - Block H	70	W	High Rise Residential
N504	Ko Chiu Road Phase 5 - Block I	70	W	High Rise Residential
N505	Ko Chiu Road Phase 5 - Block K	35	SW	High Rise Residential
N506	Ko Chiu Road Phase 5 - Block K	70	W	High Rise Residential
Yau Tong Bay Development				
N601	Yau Tong Bay	180	W	High Rise Residential
N602	Yau Tong Bay	180	W	High Rise Residential
N603	Yau Tong Bay	180	W	High Rise Residential
N604	Yau Tong Bay	180	S	High Rise Residential
N605	Yau Tong Bay	90	S	High Rise Residential
N606	Yau Tong Bay	90	E	High Rise Residential
N607	School	1 school	E	High Rise Residential
N608	School	1 school	N	High Rise Residential
N609	School	1 school	S	High Rise Residential
N610	School	1 school	S	High Rise Residential
Cha Kwo Ling Site				
N701	Cha Kwo Ling Site	90	SW	High Rise Residential
N702	Cha Kwo Ling Site	90	S	High Rise Residential
N703	Cha Kwo Ling Site	90	SE	High Rise Residential
N704	Cha Kwo Ling Site	90	SE	High Rise Residential
Eastern Harbour Crossing Site				
N801	Site D Secondary School	1	W	School Site
N802	Site D Secondary School	1	S	School Site
N803	Eastern Harbour Crossing Site, Phase 3 , Block T	140	S	High Rise Residential
Tseung Kwan O				
N901	Junk Bay	5	SE	Low Rise Residential
N902	Junk Bay	5	SE	Low Rise Residential
N903	Junk Bay	1	SE	Low Rise Residential
N904	North of Tunnel Section (Construction only)	1	S	Low Rise Residential
Future Development at Yau Tong Industrial Area				
N1001	Future Development at Yau Tong Industrial Estate (20m setback)	180	SW	High Rise Residential
N1002	Future Development at Yau Tong Industrial Estate (30m setback)	180	SW	High Rise Residential
N1003	Future Development at Yau Tong Industrial Estate (50m setback)	180	SW	High Rise Residential
N1004	Future Development at Yau Tong Industrial Estate	180	SE	High Rise Residential

Air Sensitive Receivers

1.6.2 The representative Air Sensitive Receivers (ASRs) that have been identified in the EIA Study are listed in *Table 1.6b* with their locations shown in *Annex B (B-1)*.

Table 1.6b *Air Sensitive Receivers*

ASR	Location	Distance from alignment (m)
A1	Ma Shan Tsuen (West)	30
A2	ma Shan Tsuen (East)	20
A3	Lei Yue Mun Village	30
A4	Sam Ka Tsuen	13
A5	Sam Ka Tsuen Community Centre	15
A6	Yau Tong Centre	30
A7	Proposed Yau Tong Estate Redevelopment (1)	6
A8	Proposed Primary School in Yau Tong CDA Development	115
A9	Proposed Yau Tong CDA Development	195
A10	Sam Ka Tsuen Recreation Ground	20
A11	Proposed Cha Kwo Ling Residential Development	20
A12	Lei Yue Mun Estate Redevelopment	7
A13	Ko Chiu Road Estate Redevelopment	8
A14	Tung Yuen Street Fish Market	40
A15	Yau Tong Industrial Area	120
A16	Bishop of the Roman Catholic Church	60
A17	Eastern Harbour Crossing Housing Site Secondary School	30
A18	Tsuen Kwan O Village Houses	50

Note:
(1) Yau Tong Estate is scheduled to be redeveloped by 2004.

Water Quality

1.6.3 The Water Quality Sensitive Receivers that have been identified in the EIA Study are shown in *Annex B (B-3)* and are listed below in *Table 1.6c*.

Table 1.6c *Water Sensitive Receivers*

WSR	Description
W1	Dairy Farm Factory Seawater Cooling Intake
W2	Cha Kwo Ling WSD Seawater Pumping Station
W3	Yau Tong Bay WSD Seawater Pumping Station
W4	TKO WSD Seawater Pumping Station
W5	Tung Lung Chau Fish Culture Zone (FCZ)

Cultural Heritage

1.6.4 The cultural sensitive receivers that have been identified in the EIA Study include: The Lei Yue Mun and Cha Kwo Ling Tin Hau Temples, Devil's Peak Fort and associated military installations, Ming Chiu Tong, Lei Yue Mun Village Burial Ground and the Historic Quarry Landscape, shown in *Annex B (B-4)*.

1.7 Summary of the EIA Study

1.7.1 A summary of the main findings of the EIA Study is provided in *Section 11, Table 11.1a* of this Manual.

1.8 Environmental Monitoring and Audit Requirements

Noise

1.8.1 EM&A of noise is recommended in the EIA Study during both the construction and operation stage of WCR to ensure compliance with the target limits for noise. Noise mitigation measures have also been recommended to be included in the contract documents for this Project. The Contractor's implementation of these measures is to be audited as part of the site environmental audit activities described in *Section 9* of this Manual.

Air Quality

1.8.2 EM&A of dust has been recommended in the EIA Study during the construction stage of WCR to ensure compliance with the target limits for dust. Dust mitigation measures have also been recommended to be included in the contract documents for this Project. The Contractor's implementation of these measures is to be audited as part of the site environmental audit activities described in *Section 9* of this Manual.

Water Quality

1.8.3 EM&A of water quality is recommended in the EIA Study during construction works and is to be conducted before, during and after dredging and reclamation works (and any other activities likely to impact water quality) to detect any deterioration of water quality. Water quality mitigation measures have also been recommended to be included in the contract documents for this Project. The Contractor's implementation of these measures is to be audited as part of the site environmental audit activities described in *Section 9* of this Manual.

Waste Management

1.8.4 Auditing of each waste stream is recommended as part of the EIA Study to determine if wastes are being managed in accordance with approved procedures and the site waste management plan. The audits shall look at all aspects of waste management including waste generation, storage, recycling, treatment, transport, and disposal. Mitigation measures have also been recommended to be included in the contract documents. The Contractor's implementation of these measures is to be audited as part of the site environmental audit activities described in *Section 9* of this Manual.

Ecology, Landscape and Visual and Cultural Heritage

1.8.5 Mitigation measures have been recommend to be included into contract documents for the Project in terms of ecology, visual and landscape resources and cultural resources. The implementation of the mitigation measures are to be audited as part of the site environmental audit activities during the construction period, as defined in *Section 9* of this EM&A.

1.9 Project Organisation

1.9.1 The Project organisation and lines of communication with respect to the EM&A are shown in *Figure 1.9a*. The ET shall not in any way be an associated body of the

Contractor, ET or ER. The ET Leader shall have relevant professional qualifications, or have sufficient relevant EM&A experience, subject to approval of the ER and the Environmental Protection Department (EPD). The responsibility of respective parties are as follows:

The Project Proponent (Works Agent)

1.9.2 The Project proponent shall ensure the full implementation of environmental mitigation measures to comply with Environmental Permit conditions under the EIAO.

The Contractor

1.9.3 The Contractor shall undertake the following:

(a) Employ an ET to undertake monitoring and audit, laboratory analysis and reporting of environmental monitoring and audit;
(b) Provide assistance to ET in carrying out regular EM&A and ensure environmental mitigation measures recommended in the EIA Study and in the Contract Specifications are enforced;
(c) Submit proposals on mitigation measures in the event of exceedance of Action and Limit Levels in accordance with the Event and Action Plans;
(d) Implement measures to reduce impacts where Action and Limit Levels are exceeded; and
(e) Adhere to the procedures for carrying out complaint investigation in accordance with *Section 9* of this Manual.

The Engineer or Engineer's Representative

1.9.4 The ER shall undertake the following:

(a) Supervise the Contractor's activities and ensure that the requirements in the EM&A Manual and pollution control clauses in the Contract Specification are fully complied with;
(b) Inform the Contractor when action is required to reduce impacts in accordance with the Event and Action Plans;
(c) Employ an Independent Environmental Checker (IC(E)) to audit the results of the EM&A works carried out by the ET; and
(d) Adhere to the procedures for carrying out complaint investigation in accordance with *Section 9* of this Manual.

The Environmental Team Leader

1.9.5 The ET shall undertake the following:

(a) Monitor the various environmental parameters as required in the EM&A Manual;
(b) Analyse the EM&A data and review the success of EM&A programme to confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions and to identify any adverse environmental impacts;
(c) Carry out site inspection to investigate and audit the Contractor's site practices, equipment and work methodologies with respect to pollution control and environmental mitigation, and anticipate environmental issues for proactive action before problems arise;
(d) Audit and prepare audit reports on the environmental monitoring data and the site environmental conditions;
(e) Report the EM&A results to the IC(E), Contractor, ER, EPD and other interested government organisations (such as WSD);
(f) Recommend suitable mitigation measures to the Contractor in the event of

exceedance of Action and Limit Levels in accordance with the Event and Action Plans; and

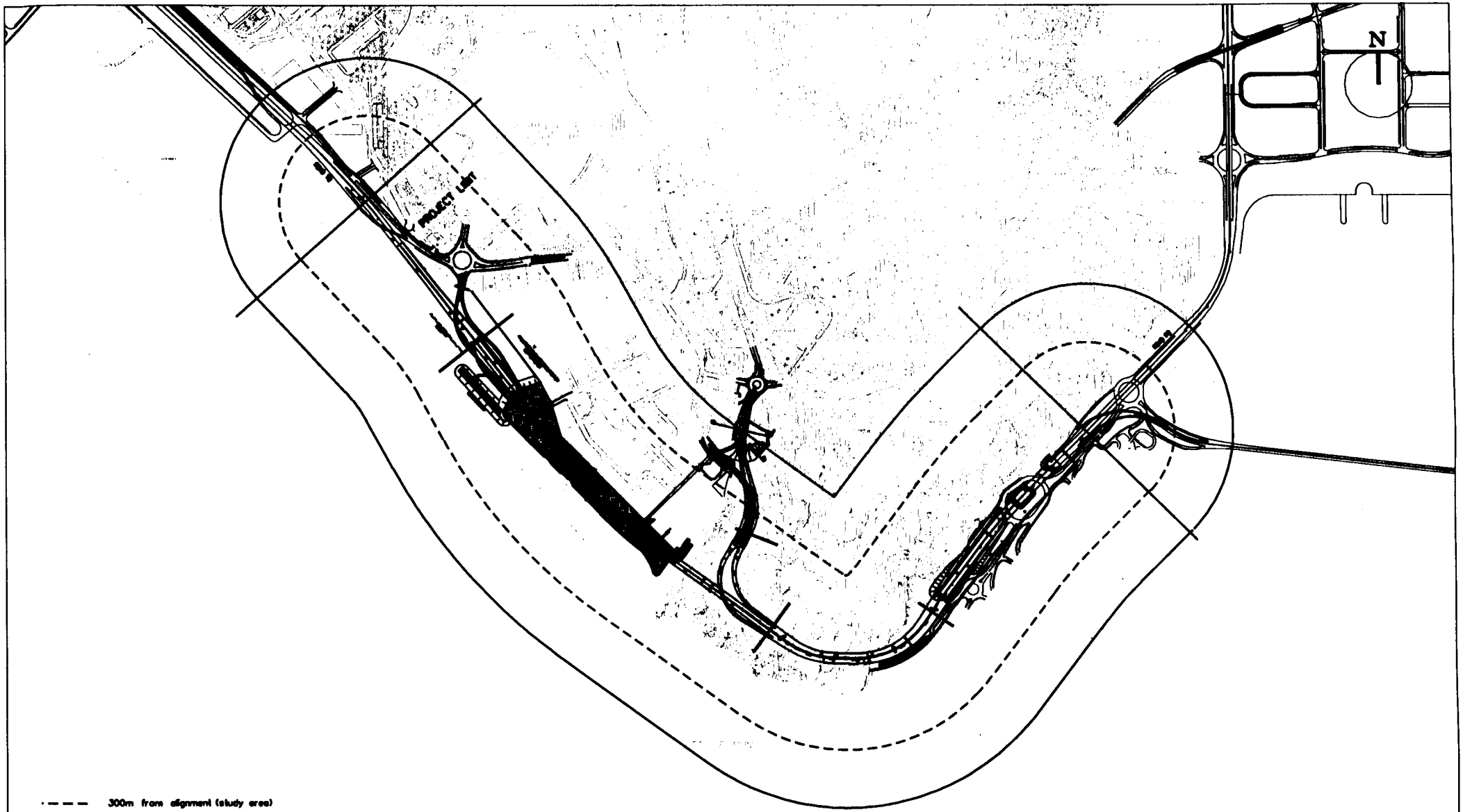
(g) Adhere to the procedures for carrying out complaint investigation in accordance with *Section 9* of this Manual.

Independent Environmental Checker

1.9.6 The IC(E) shall undertake the following:

(a) Review the EM&A works performed by the ET Leader;
(b) Audit the monitoring activities and results;
(c) Report the audit results to the ER and EPD in parallel;
(d) Review the EM&A reports submitted by the ET;
(e) Review the proposal on mitigation measures submitted by the Contractor in accordance with the Event and Action Plans;
(f) Adhere to the procedures for carrying out complaint investigation in accordance with *Section 9* of this Manual.

1.9.7 Sufficient and suitably qualified professional and technical staff shall be employed by the respective parties to ensure full compliance with their duties and responsibility, as required under the EM&A programme for the duration of the Project.



MAUNSELL CONSULTANTS ASIA LTD
茂盛工程顧問有限公司

WCR STUDY AREA

DATE: JUN 98

SCALE: 1 : 18000

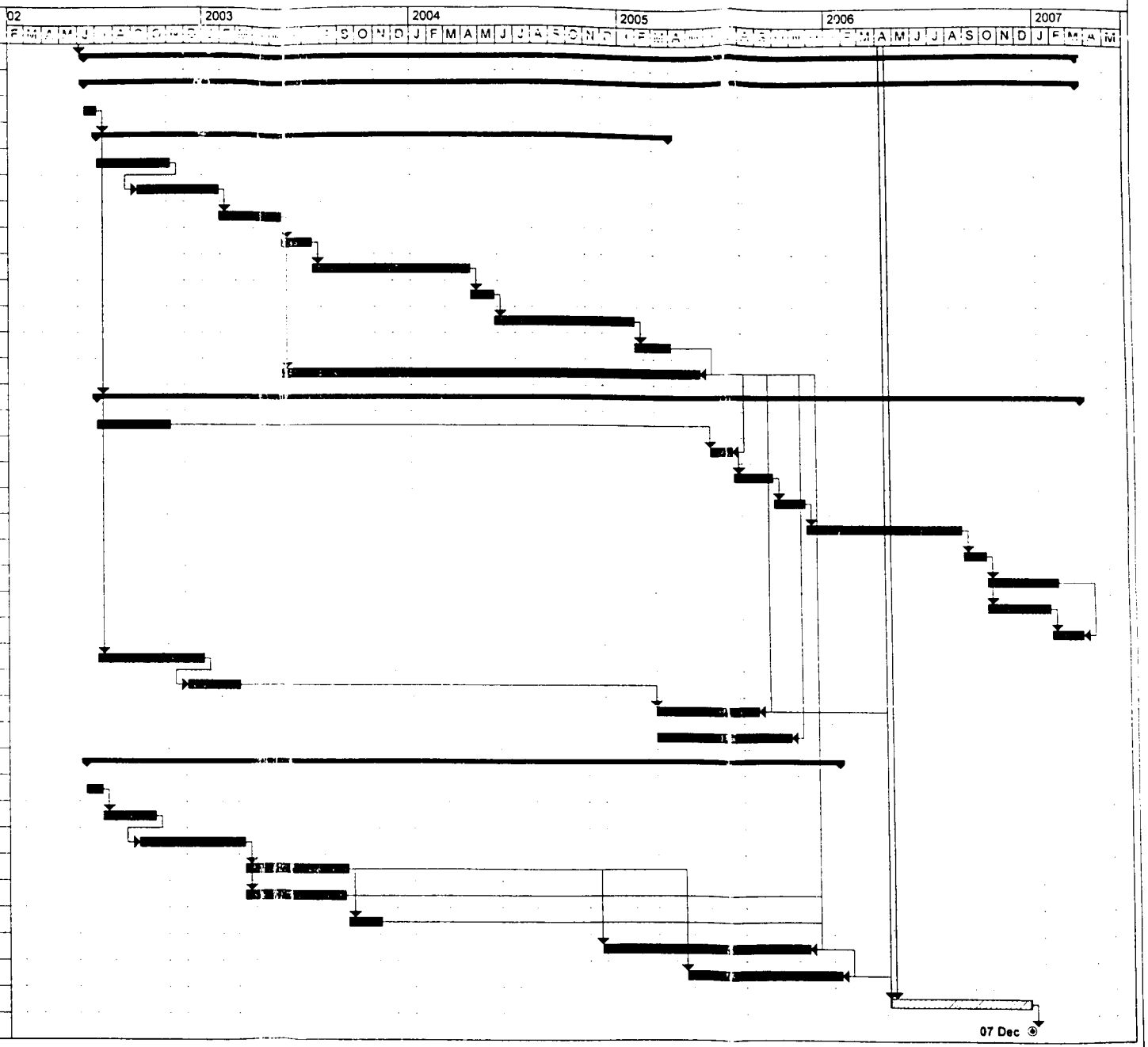
FIGURE No. 1.1a

Maunsell

Agreement No. CE46/96
Feasibility Study on the Alternative Alignment for the Western Coast Road, Tseung Kwan O

IMPLEMENTATION PROGRAMME

ID	Task Name
122	**Yau Tong coastal section**
123	**Reclamation section**
124	Mobilization
125	**Reclamation Phase 1**
126	Dredging for seawall trenches
127	Seawall construction
128	Reclamation
129	Preloading mounds for roads
130	Preloading period (assume 9 months)
131	Removal of preloading mounds
132	Utilities, drainage and sewer works
133	Ground level roadworks
134	Re-provisioning works for waterfront sites (assume 24 months)
135	**Reclamation Phase 2**
136	Dredging for seawall trenches
137	Seawall construction
138	Reclamation
139	Preloading mounds for roads
140	Preloading period (assume 9 months)
141	Removal of preloading mounds
142	Shung Shun Street Box Culvert extension
143	Utilities, drainage and sewer works
144	Ground level roadworks
145	Piling works
146	Pile caps, columns construction
147	Land bridge deck construction
148	Construction of roundabout at Cha Kwo Ling Road near EHC portal
149	**Marine sections**
150	Mobilization
151	Submerged reef construction
152	Marine piling works
153	Pile caps, columns construction
154	Construction of protection dolphins
155	Const'n of ship collision protection fender
156	Marine bridge deck construction
157	Utilities and drainage works
158	Allow 8 months for extension of time due to inclement weather
159	**Opening of Western Coast Road**



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Date: Wed 30-09-98

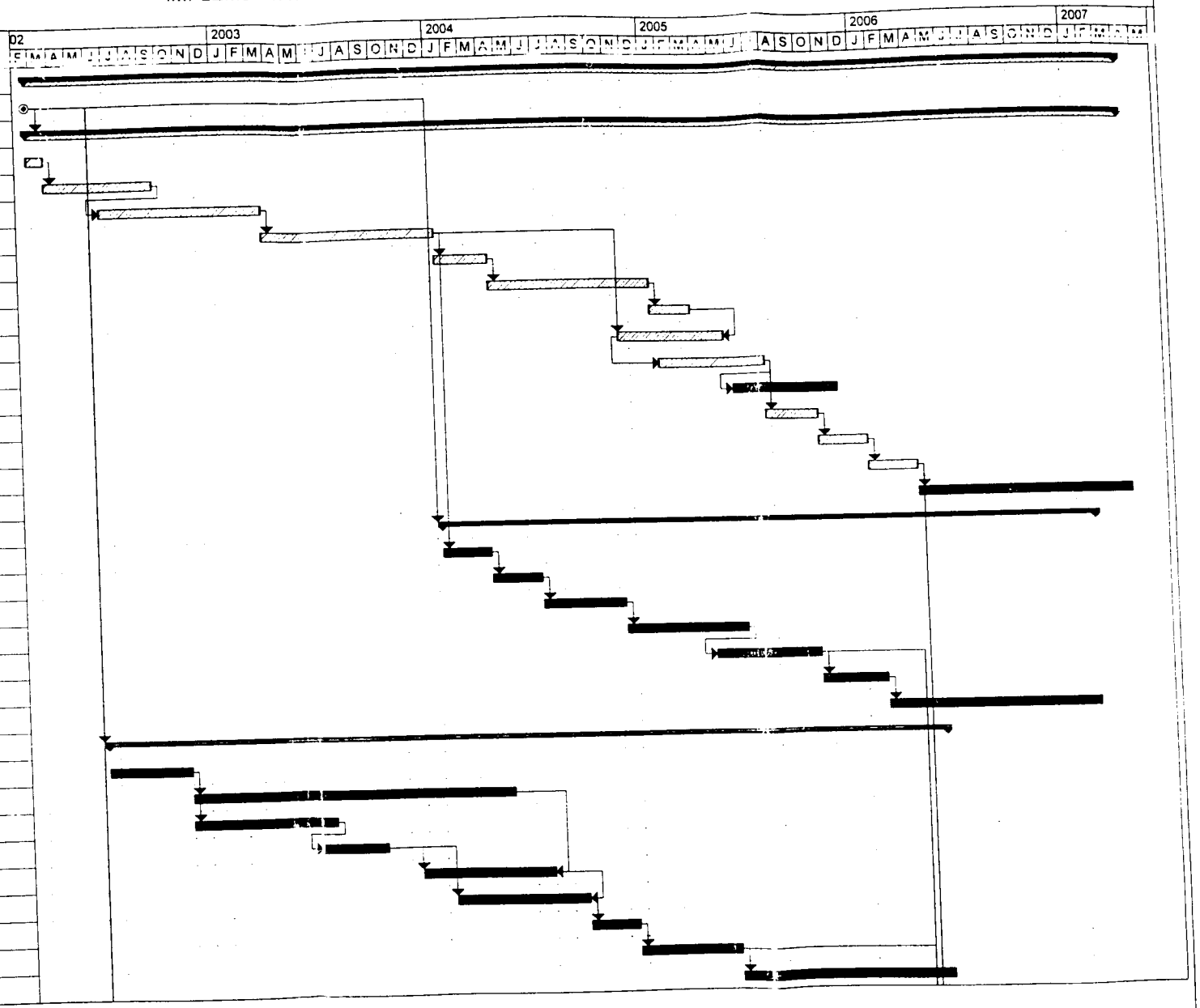
Task | Critical Task | Milestone | Summary

Figure 1.4a-2

Agreement No. CE46/96
Feasibility Study on the Alternative Alignment for the
Western Coast Road, Tseung Kwan O

IMPLEMENTATION PROGRAMME

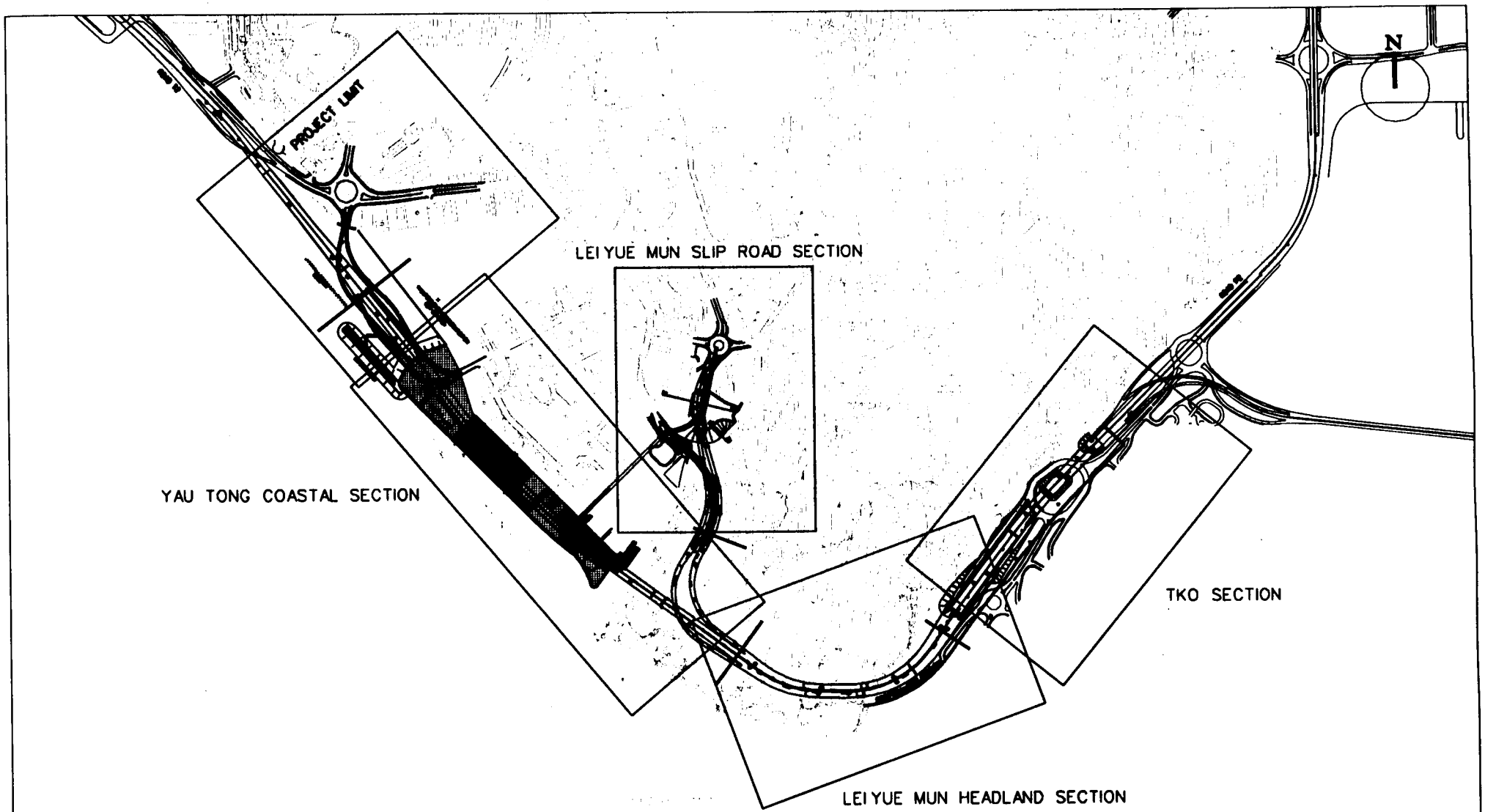
ID	Task Name
87	**Construction period**
88	**Contract commencement**
89	**TKO section**
90	Mobilization
91	Dredging for seawall trenches
92	Seawall construction
93	Reclamation
94	Preloading mounds for roads
95	Preloading period (assume 9 months)
96	Removal of preloading mounds
97	Piling works
98	Pile caps, columns, abutments construction
99	Bridge deck construction
100	Utilities and drainage works
101	Roadworks
102	Landscape softworks
103	Landscape establishment works (12-month)
104	**Cut-and-cover Tunnel Works**
105	Site clearance, tree felling or transplanting
106	Excavation works
107	Tunnel construction (including roadworks)
108	Backfill and slope works
109	Utilities and drainage works
110	Landscape softworks
111	Landscape establishment works (12-month)
112	**Lei Yue Mun slip roads**
113	Site clearance, tree felling or transplanting
114	Cut-and-fill slopeworks, retaining walls
115	Piling works
116	Pile caps, columns, abutments construction
117	Bridge deck construction
118	Utilities, drainage and sewer works
119	Roadworks
120	Landscape softworks
121	Landscape establishment works (12-month)



File: WCRimple-4.mpp
Date: Wed 30-09-98

Task | Critical Task | Milestone | Summary

Figure 1.4a-1



CONSTRUCTION AREAS

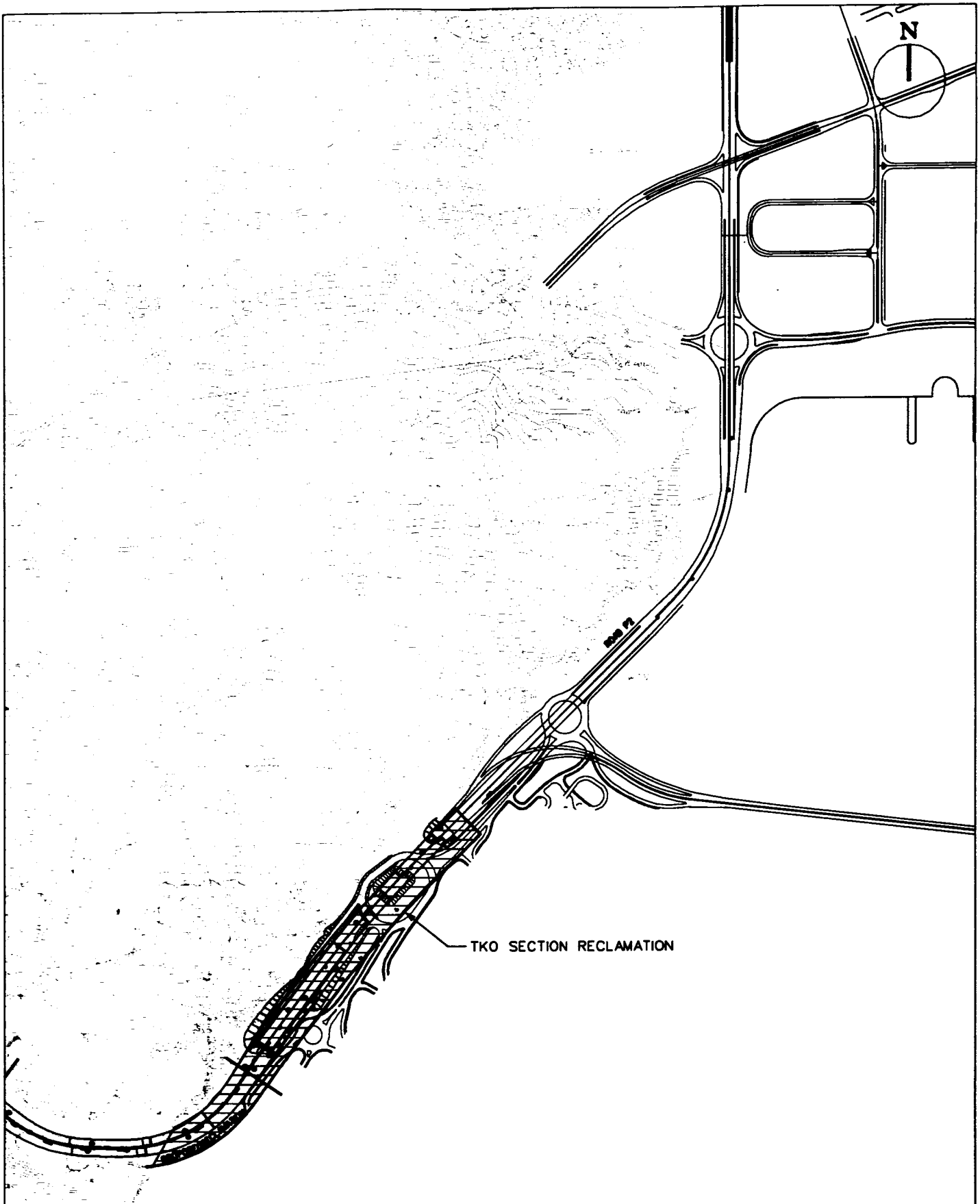
MAUNSELL CONSULTANTS ASIA LTD
茂盛工程顧問有限公司

DATE: JAN 99

SCALE: 1 : 15000

FIGURE No. 1.4b

Maunsell



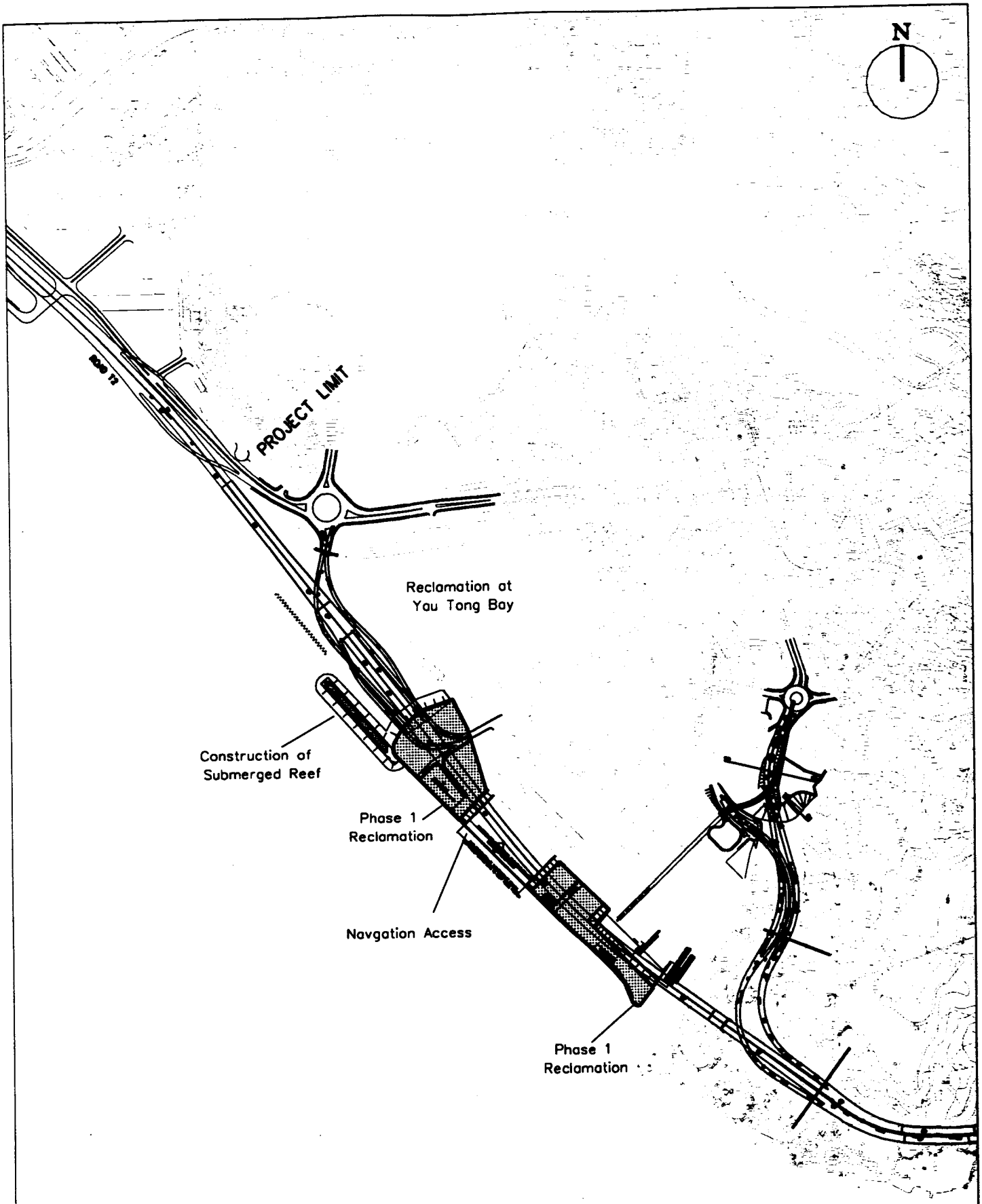
MAUNSELL CONSULTANTS ASIA LTD
茂盛工程顧問有限公司

TKO SECTION RECLAMATION

DATE: JUN 98

SCALE: 1 : 11000

FIGURE No. 1.4c



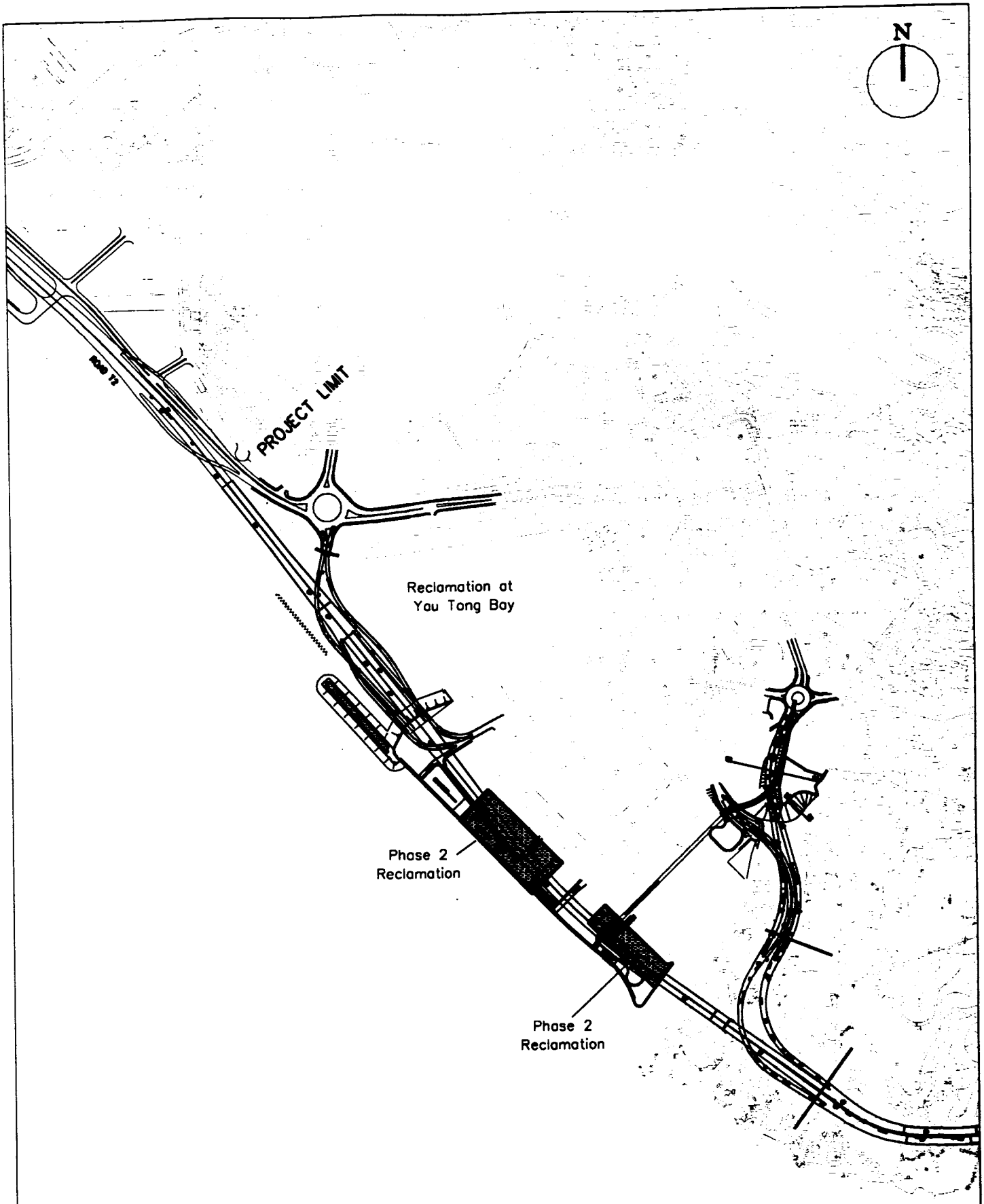
MAUNSELL CONSULTANTS ASIA LTD

YAU TONG COASTAL RECLAMATION - PHASE 1

DATE: JAN 98

SCALE: 1 : 11000

FIGURE No. 1.4d



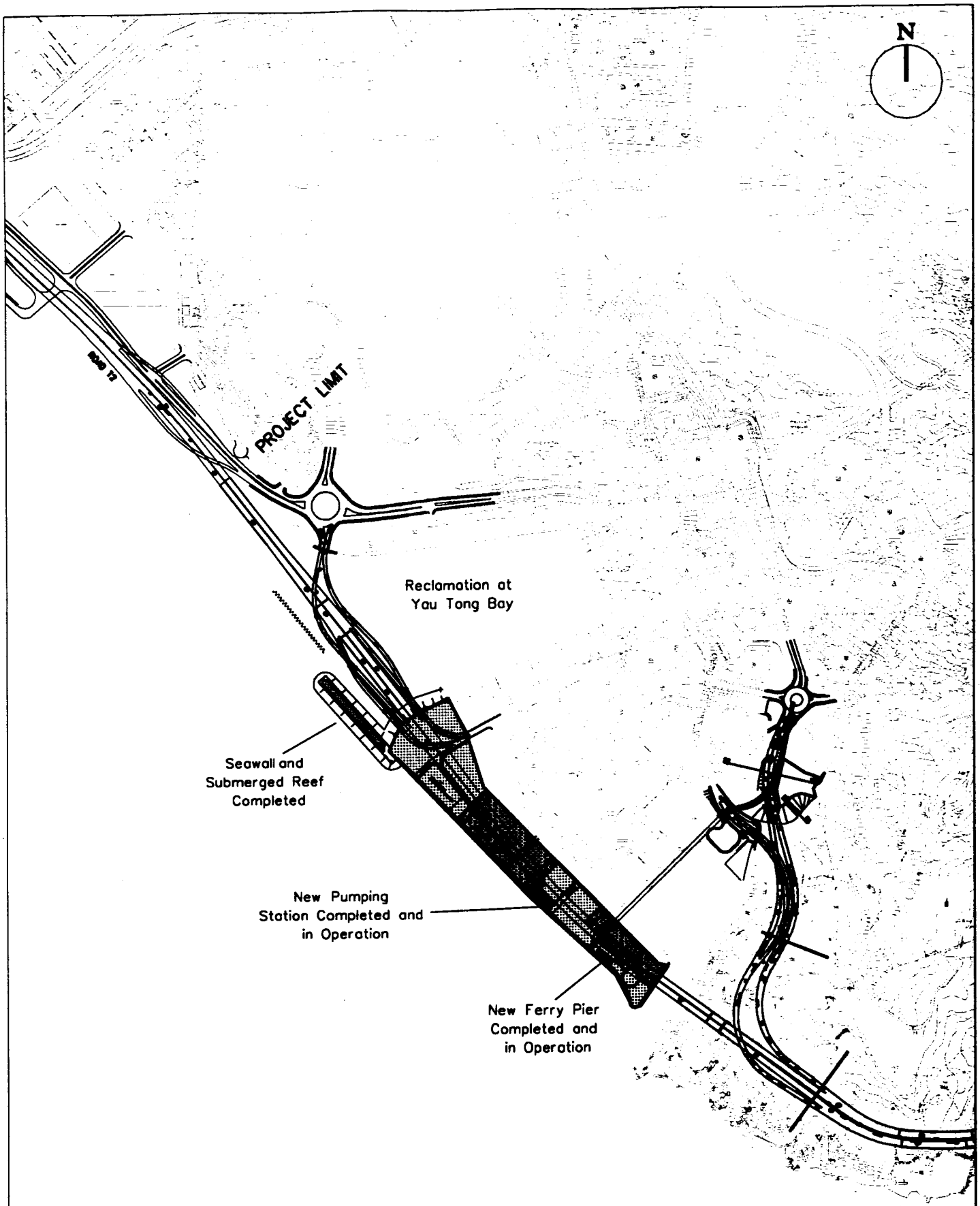
MAUNSELL CONSULTANTS ASIA LTD

YAU TONG COASTAL RECLAMATION – PHASE 2

DATE: JAN 98

SCALE: 1 : 11000

FIGURE No. 1.4e



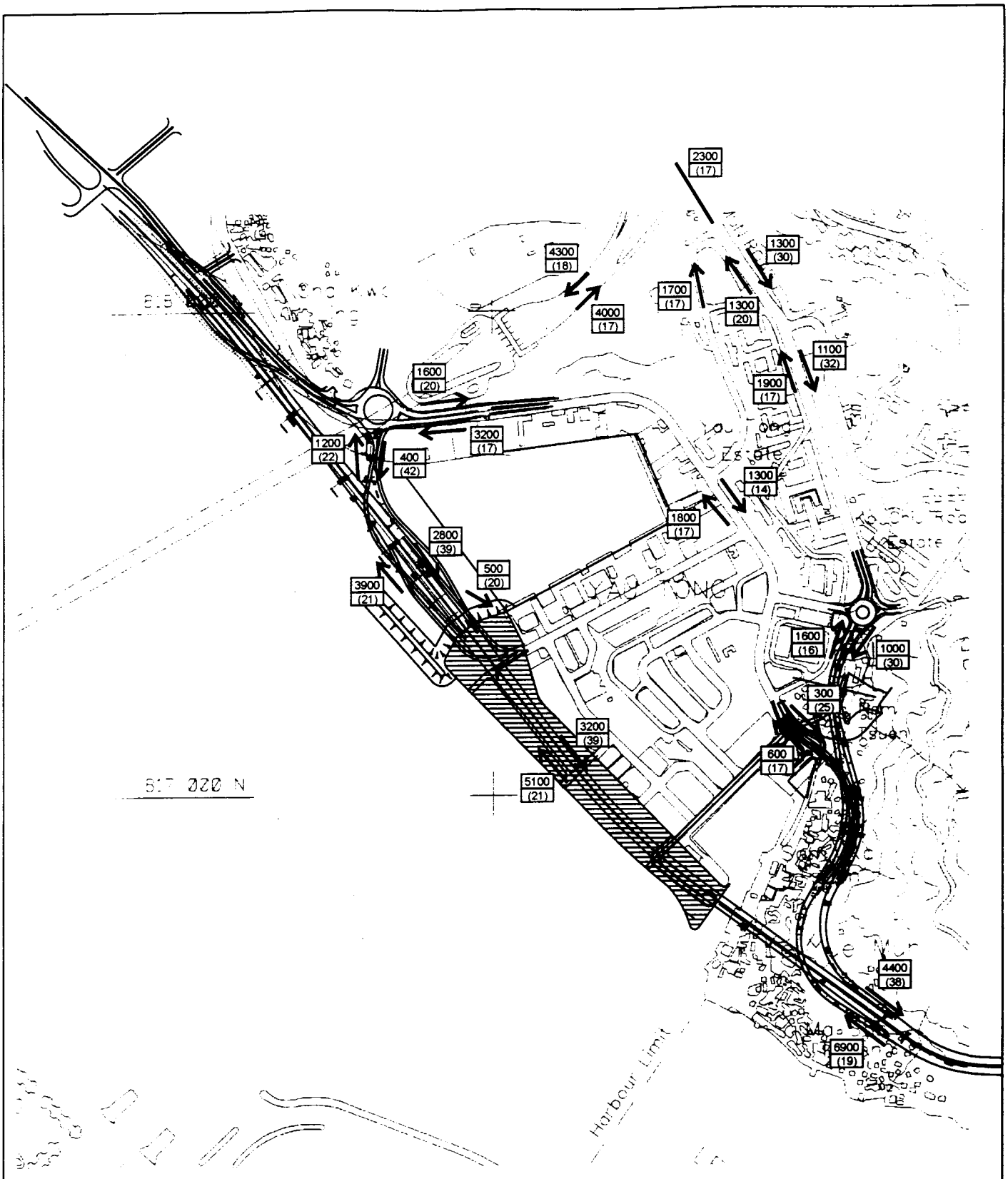
MAUNSELL CONSULTANTS ASIA LTD

YAU TONG COASTAL RECLAMATION – PHASE 3

DATE: JAN 89

SCALE: 1 : 11000

FIGURE No. 1.4f



KEY

6900 - 2021 AM PEAK TRAFFIC FLOWS (IN VEHS)

(19) - % OF HGV

FIGURE 1.5a

TRAFFIC FIGURES FOR THE YEAR 2021

Environmental Resources Management

ERM

FILE: C1609g

DATE: 08/03/99

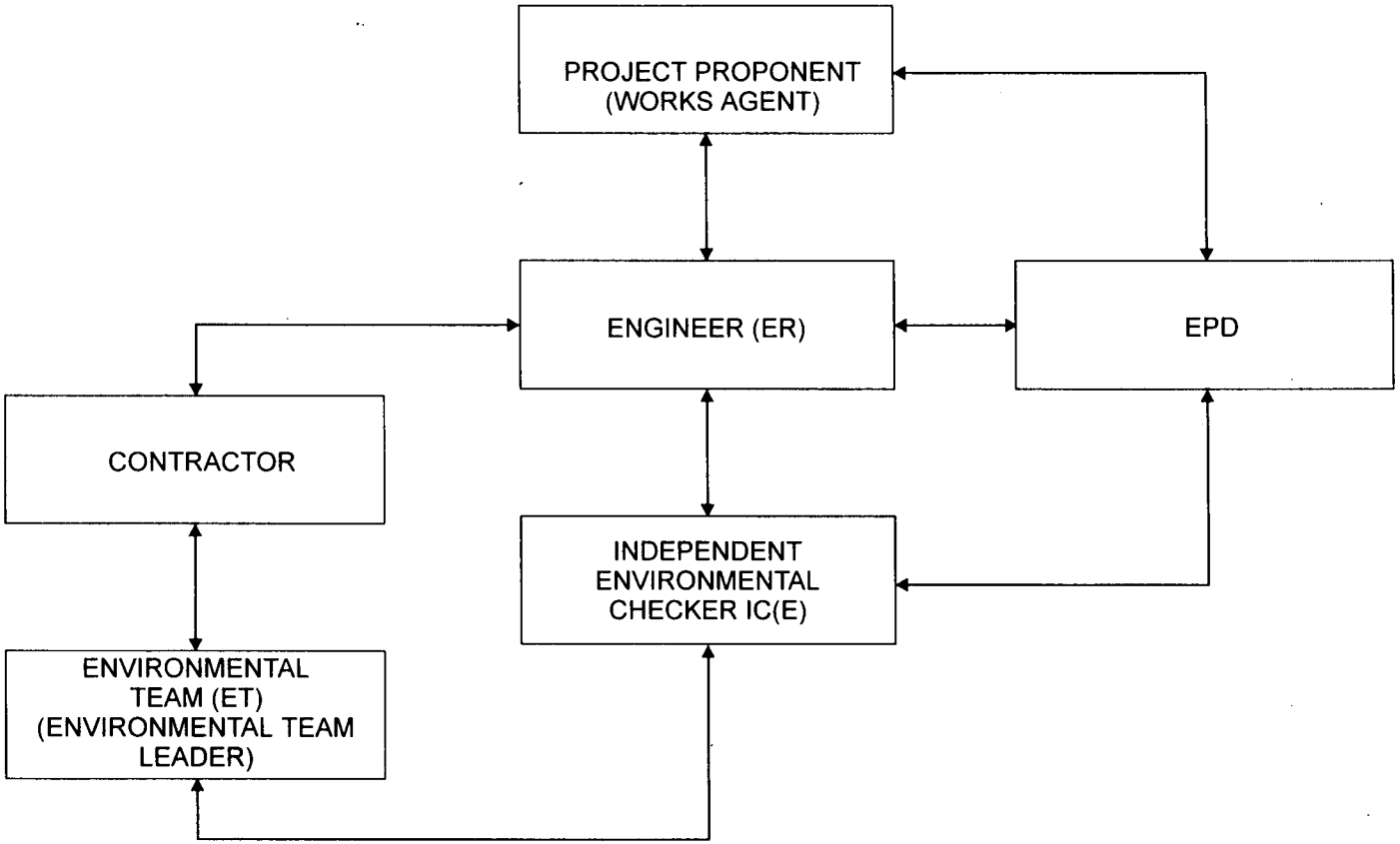


FIGURE 1.9a

PROJECT ORGANISATION AND LINES OF COMMUNICATION WITH RESPECT TO THE EM&A PROGRAMME

FILE: C1618z88
DATE: 19/03/99

Environmental
Resources
Management

ERM