CONTENTS

1 BASIC INFORMATION	1
1.1 Project Title	1
1.2 Purpose and Nature of the Project	1
1.3 NAME OF PROJECT PROPONENT	1
1.4 LOCATION AND SCALE OF PROJECT	1
1.5 DESIGNATED PROJECTS TO BE COVERED BY THE PROJECT PROFILE	2
1.6 Name and Telephone Number of Contact Person	2
2 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME	3
2.1 Project Planning and Implementation	3
2.2 Project Programme	5
3 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT	6
3.1 LAND & SEA ACTIVITIES	6
3.2 SITES OF SPECIAL SCIENTIFIC INTEREST	6
3.3 SITES OF CULTURAL HERITAGE	6
3.4 GAZETTED BATHING BEACHES	6
3.5 MARINE PARK OR MARINE RESERVES	6
3.6 FISH CULTURE ZONE	7
3.7 PROTECTION AND CONSERVATION AREAS	7
3.8 Seawater Intake Points	7
4 POSSIBLE IMPACTS ON THE ENVIRONMENT	8
4.1 SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS	8
4.2 DUST	8
4.3 NOISE	9
4.4 WATER QUALITY	9
4.5 WASTE MANAGEMENT	10
4.6 LANDSCAPE AND VISUAL	11
4.7 CULTURAL AND HERITAGE	11
4.8 TERRESTRIAL ECOLOGY	11
4.9 MARINE ECOLOGY	11
4.10 Fisheries	12
4.11 OTHERS	12
5 PROTECTION MEASURES AND ANY FURTHER IMPLICATIONS	13
5.1 Possible Severity, Distribution and Duration of Environmental Effects	13
5.2 Further Implications	13
5.3 Use of Previously Approved EIA Reports	13
5 A FNIVIDONMENTAL MONITODING & AUDIT	11

1 BASIC INFORMATION

1.1 PROJECT TITLE

East Asian Crossing (EAC) Cable System (TKO).

1.2 PURPOSE AND NATURE OF THE PROJECT

Asia Global Crossing Limited (AGC) propose to install two international submarine fibre-optic telecommunication cables that will enter eastern waters in the Hong Kong Special Administrative Region (HKSAR) and ultimately connect to a Landing Station at the Tseung Kwan O (TKO) Industrial Estate. The proposed fibre-optic cables will allow network connection to Taiwan, Korea, Japan, and ultimately the Mainland of China (see *Figure 1.2a*), and will provide broadband facilities for accessing internet service providers, content providers and e-commerce providers in the HKSAR, ultimately enhancing the HKSAR's capability as a communications and service centre in Asia.

This Project Profile includes an assessment of the potential environmental impacts associated with the installation of the submarine telecommunications cable system. The assessment has been based on information compiled by Global Marine Systems Ltd and EGS (Asia) Ltd on the expected construction activities. Once installed, the cable will not result in any impact to the environment during its operation.

A Letter of Intent ("LOI") has been issued by the Office of the Telecommunications Authority (OFTA) to AGC pursuant to which AGC will be granted an external Fixed Telecommunications Network System licence in due course. The submarine cable system is of great strategic importance to AGC and to the telecommunications network infrastructure of Hong Kong.

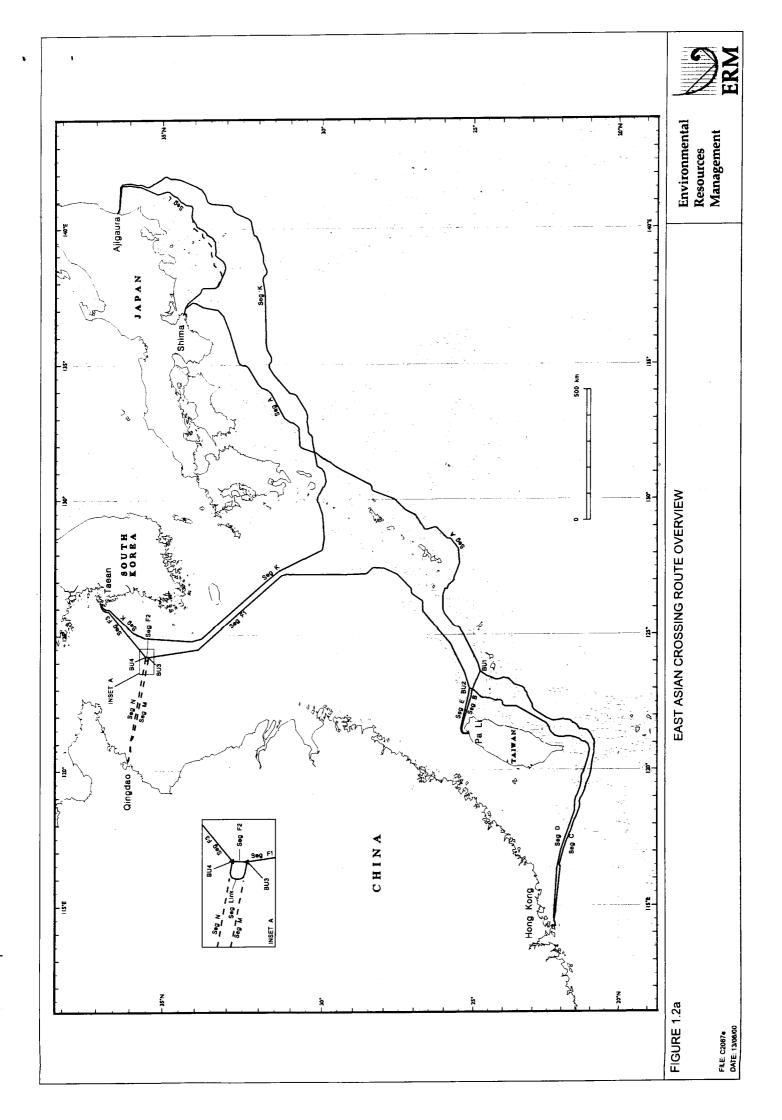
1.3 NAME OF PROJECT PROPONENT

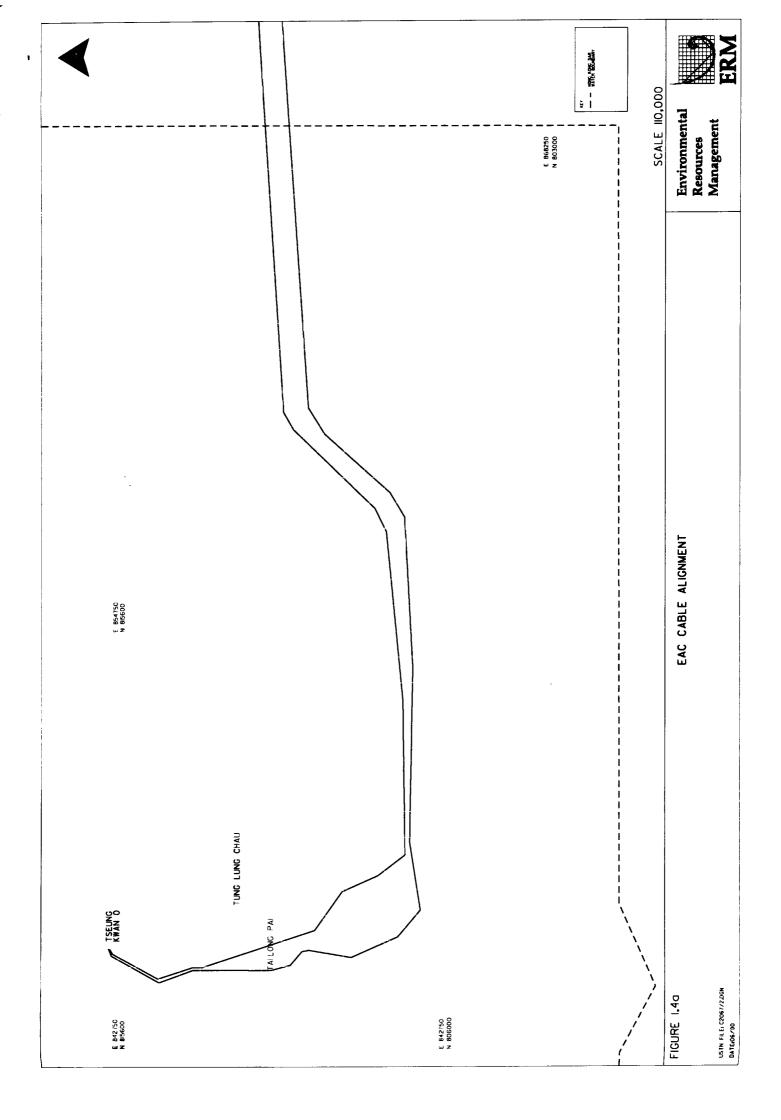
Asia Global Crossing Limited (AGC) Cheung Kong Centre 46/F, 2 Queens Road Central HONG KONG

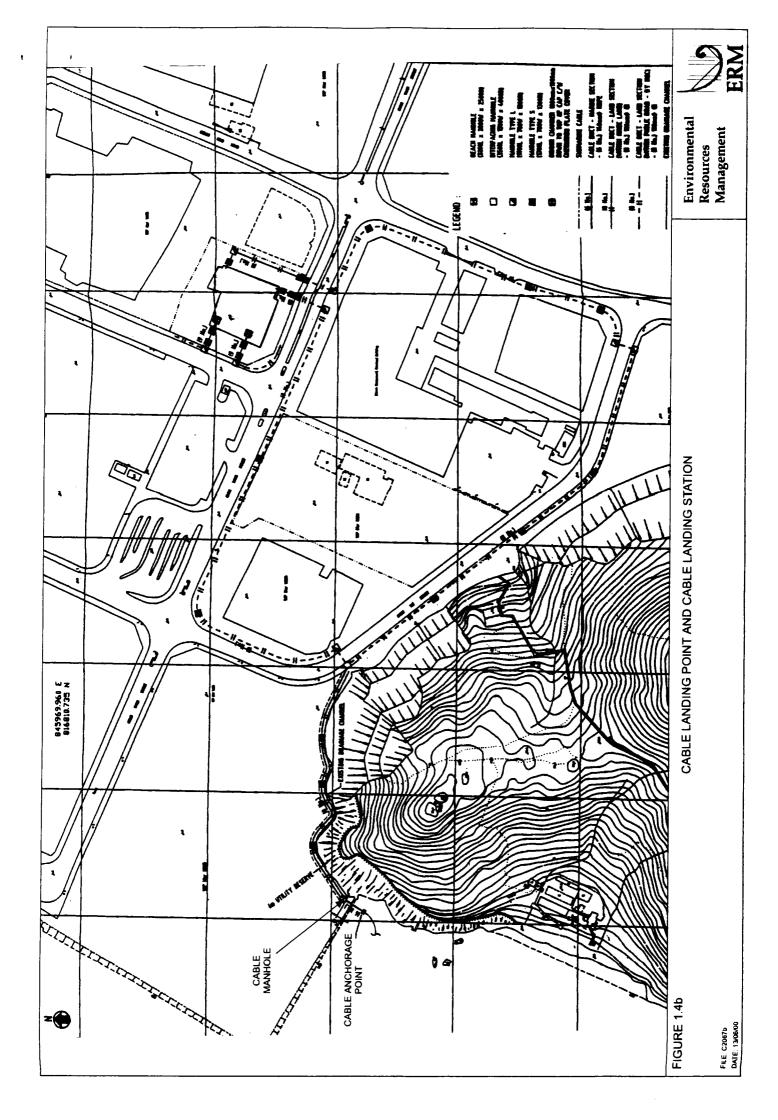
1.4 LOCATION AND SCALE OF PROJECT

1.4.1 Location

The location of the two EAC cable alignments and common landing site are depicted on *Figures 1.4a* and *1.4b*. The proposed cables would enter the







HKSAR via the eastern waters and traverse westward, between the Ninepin Islands Group and Waglan Island, then travel north, through the Tathong Channel to a landing site at the TKO Industrial Estate.

1.4.2 Conditions of the Area

There are several existing submarine cables situated along the proposed EAC cable route, from its entrance into the HKSAR through the eastern and southern waters. The seabed in the general vicinity of the proposed EAC cables within the Tathong Channel up to the landing site has been generally disturbed from previous use as designated Marine Borrow Areas. The EAC landing site is situated within the TKO Industrial Estate, behind a rubble mound sea wall, on reclaimed land.

1.4.3 Scale of Project

The project involves the laying of two international submarine fibre-optic telecommunications cables in HKSAR waters to a single landing site and manhole location in the TKO Industrial Estate. The project will ultimately connect with a Landing Station in the TKO Industrial Estate which is presently under construction and has been approved by the Buildings Department (1 April 2000, BD 2/9016/00(P)). The landing station is scheduled for completion in January 2001.

The cable laying process will only result in minor works within the marine environment which will not affect water quality or the marine ecology of the area. Only small scale construction works are required at the TKO cable landing site to enable the cable to enter the manhole system.

1.5 DESIGNATED PROJECTS TO BE COVERED BY THE PROJECT PROFILE

The project is classified as a Designated Project under the *Technical Memorandum on Environmental Impact Assessment Process (TM EIAO)*:

Schedule 2 (Part I), C.12 - A dredging operation which ---

(a) is less than 500 m from the nearest boundary of an existing or planned---(ii) site of cultural heritage.

1.6 NAME AND TELEPHONE NUMBER OF CONTACT PERSON

All queries regarding the project can be addressed to:

Asia Global Crossing Limited (AGC)

Correspondence should be copied to the following organisations:

Environmental Resources Management (ERM) KDD-SCS

2 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 PROJECT PLANNING AND IMPLEMENTATION

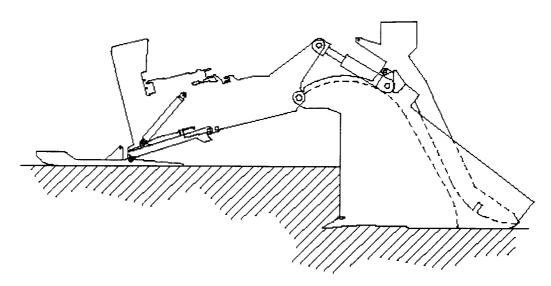
The project will be constructed through the following activities:

- Preparation of TKO Landing Site The seawall at the TKO landing site will be opened to allow installation of a bundled package of conduits (8 in total) between the new manhole (approximately 5 m inland of the seawall) and the seabed at the foot of the seawall. Upon completion of these civil works, the working area will be backfilled and reinstated to its original condition. No materials will be dredged as part of the construction works and all excavated materials will be balanced on site.
- Landing the EAC Cables Each cable segment (cable size of 60 mm in diameter) will be directly laid ashore (via a floated shore-end operation) from the construction barge holding position at a distance of around 100 m (approximately 4 m water depth) from the seawall. The cable's end will be hauled ashore and anchored off, before allowing the construction barge to commence lay operations toward the 20 m contour.
- Cable Laying to HKSAR Boundary After completion of the landing and anchoring off of the cable, the main lay vessel will commence cable laying while simultaneously burying the cable to the reference points (22 dgr 13.727'N & 114 dgr 15.971'E for Segment C; 22 dgr 13.655'N & 114 dgr 16.304'E for Segment D), a distance of approximately 6.5 km, to the -20 m CD sea bed contour. The deep burial operations will be conducted using jetting technology. The "Injector" will bury the cable in a narrow trench (0.25 m width) to the required depth of up to 5 m below the sea bed. The Injection Jetting operations will be conducted to the reference points where the main lay vessel will recover the cable's ends, then proceed with "Plough" operations which will simultaneously lay and bury the cable in a narrow trench (0.3 m width) to a depth of 1.5 m below the sea bed from the -20 m CD sea bed contour to the HKSAR boundary, approximately 20 km. A typical example of the type of jetting and plough equipment that will be used is depicted in Figure 2.1a and a typical example of a cable laying vessel is depicted in *Figure 2.1b*. It should be noted that no materials will be physically dredged as part of the cable installation processes, rather, displaced sediments will backfill naturally in the trench. Further, injection jetting and plough share design are such that they will leave the seabed virtually undisturbed following installation of the cable.
- Post Lay Protection at TKO Landing Site Articulated piping (diameter 100 mm) will be applied over a distance of 50 m from the conduit exit at the base of the seawall offshore. This will ensure that the cable is protected from anticipated debris at the foot of the seawall. The post lay operations

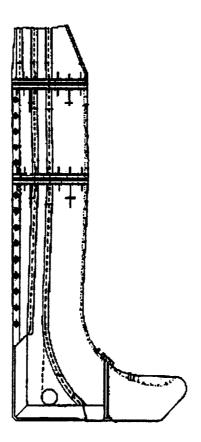
will be guided by divers and will not result in environmental impacts to the marine environment.

• Final Inspection - A final inspection of the cable will be undertaken.

At this stage of the project, all nearshore and onshore construction works are expected to be undertaken during normal working hours.

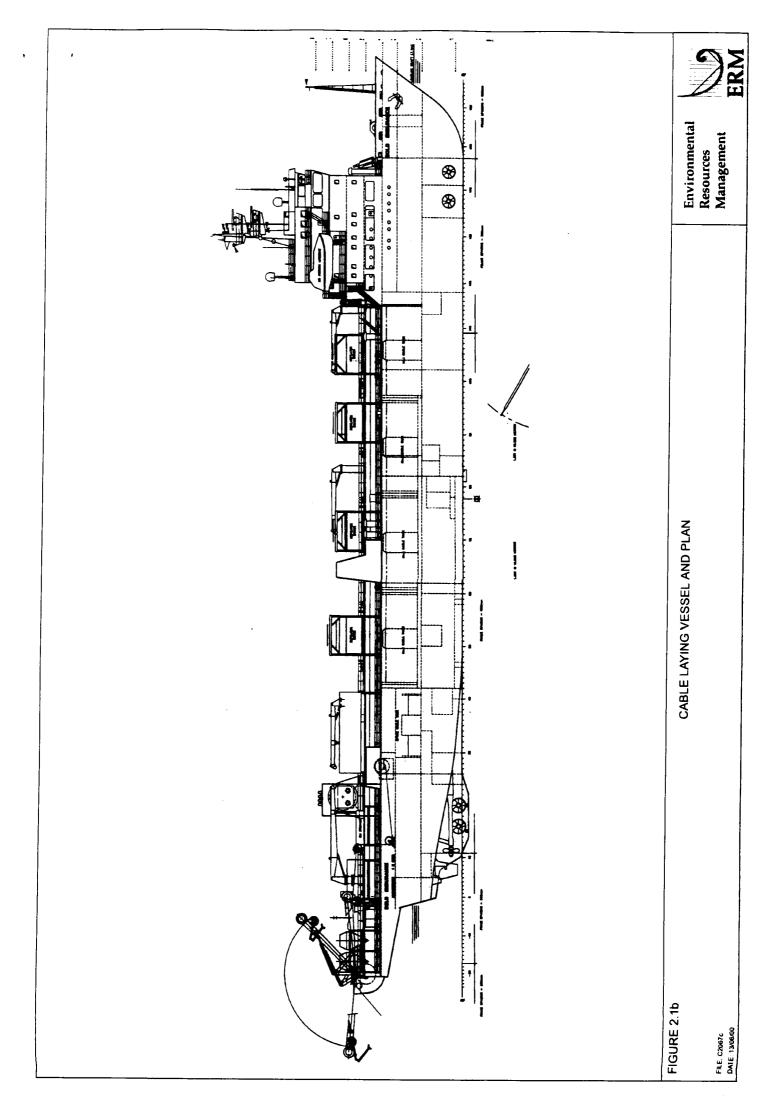


BURIAL USING THE MULTI DEPTH PLOUGH



CONCEPTUAL DIAGRAM OF CABLE DEEP BURIAL INJECTOR





2.2 PROJECT PROGRAMME

The EAC submarine cable system is scheduled to be landed and installed at the TKO landing site commencing in early November 2000 and completed by the end of December 2000. The expected schedule is as follows:

TKO Landing Site	
(including backfill and reinstatement of seawall)	30 days
Cable Landing	2 day
• Cable Installation from TKO to the reference points	5 days
 Post Lay Protection at TKO Landing Site 	10 days
• Shore end recovery by Main Lay Vessel and Burial to SAR	
boundary	2 days
• Final Inspection	1 day

3 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

The locations of the various major elements of the area surrounding the site are shown in *Figure 3.0a*.

3.1 LAND & SEA ACTIVITIES

The seabed within the TKO section of the EAC cable alignment has been disturbed in several areas due to the designation of Marine Borrow Areas and from extensive reclamation works that have been undertaken in TKO.

The Tathong Channel is classified as a principal fairway for marine vessel traffic through Victoria Harbour.

The land uses within and around the TKO Industrial Estate include various industrial premises and the TKO and South East New Territories (SENT) Strategic Landfill. The landing site and manhole for the cable are outside the landfill consultation zone.

3.2 SITES OF SPECIAL SCIENTIFIC INTEREST

The closest Site of Special Scientific Interest (SSSI) is the Shek O Headland SSSI, approximately 1,000 m from the closest cable segment, and the Cape d' Aguilar SSSIs situated 665 m from the closest cable segment.

3.3 SITES OF CULTURAL HERITAGE

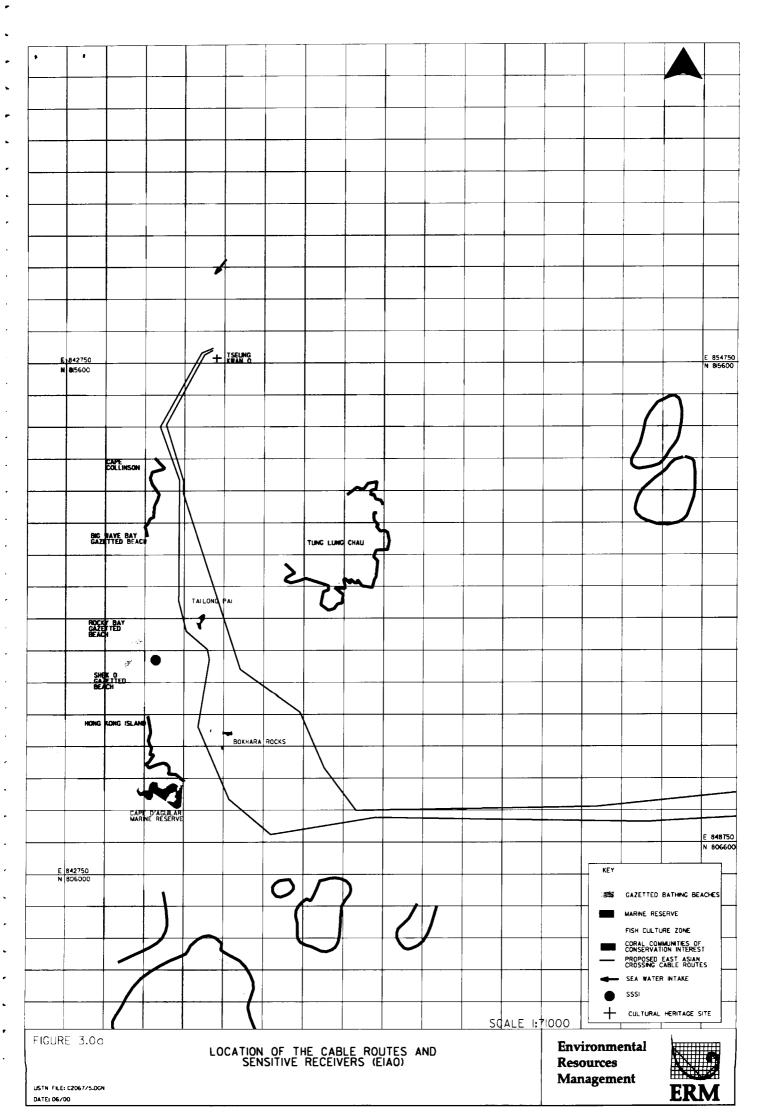
The closest designated site of cultural heritage is the relics of the "Old Chinese Customs Post" on Fat Tong Chau (Junk Island), which is over 200 m from the nearest cable segment.

3.4 GAZETTED BATHING BEACHES

The closest Gazetted Bathing Beaches are Big Wave Bay, Rocky Bay and Shek O, which are 1,390 m, 1,120 m, and 1,460 m, respectively, from the closest segmens of the proposed cable.

3.5 MARINE PARK OR MARINE RESERVES

The Cape d' Aguilar Marine Reserve is 665 m from the closest proposed cable segment.



3.6 FISH CULTURE ZONE

The Tung Lung Chau Fish Culture Zone is situated 2,520 m from the closest cable segment.

3.7 PROTECTION AND CONSERVATION AREAS

There are no designated protection or conservation land uses within 500 m of the project site. A small strip of land along Hong Kong Island and Fat Tong Chau (Junk Island), within 500 m of the cable alignment is designated as "Green Belt". This classification does not represent a conservation designated area.

The EAC cable landing site and manhole location at the TKO Industrial Estate is zoned for "Other Uses" on the TKO Land Use Plan which, according to Column 1 of the Explanatory Statement of Plan No. S/TKO/5, allows for "Radar, Telecommunication Electronic Microwave Repeater, Television and/or Radio Transmitter Installation".

3.8 SEAWATER INTAKE POINTS

There is a Water Services Department (WSD) intake in the inner part of Junk Bay, 1,260 m to the north of the closest segment of the cables.

4 POSSIBLE IMPACTS ON THE ENVIRONMENT

4.1 SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

The following assessment is based on information compiled by Global Marine Systems Ltd and EGS (Asia) Ltd for the conceptual layout plans and the expected construction activities required for installation of the EAC cables.

The construction impacts associated with the submarine cables are summarised in *Table 4.1a* and are described in further detail in the following sections. There are no environmental impacts that are expected to occur during the operation of the submarine cable.

Table 4.1a Potential Sources of Environmental Impacts

Potential Impact	
• Dust	×
• Noise	×
• Liquid Effluents, Discharges, or Contaminated Runoff	✓
Generation of Waste or By-products	×
Disruption of Water Movement or Bottom Sediment	✓
Unsightly Visual Appearance	×
Cultural & Heritage	×
Ecological Impacts:	
- Terrestrial	×
- Marine	✓
- Fisheries	✓
Gaseous Emissions	×
• Odour	×
Night-time Operations	×
Traffic Generation	×
 Manufacturing, Storage, Use, Handling, Transport, or Disposal of Dangerous Goods 	×
Hazardous Materials or Wastes	×
Risk of Accidents Which Result in Pollution or Hazard	×
Disposal of Spoil Material, Including Potentially Contaminated Materials	×
Notes: ✓ = Potential to result in adverse impacts, × = Not expected to result in a	dverse impacts

4.2 DUST

The only dust generating activities that will occur at the project site are construction works at the cable landing site. The construction works will be small in scale and no significant dust impacts will result from these works.

4.3 NOISE

There are no Noise Sensitive Receivers in the TKO Industrial Estate and thus noise generated during construction of the cable landing site and manhole will not result in noise impacts.

During the cable laying process, only minimal noise will be generated from the barge and cable laying equipment which would be similar to that of existing marine traffic in the area and will not impact Noise Sensitive Receivers. Therefore no direct or indirect adverse noise impacts will result from this project.

4.4 WATER QUALITY

The potential for impacts to water quality during the land based activities, involving cable installation and construction of the cable landing site and manhole, primarily relate to surface water run-off and the discharge of pumped water. However the following measures will be incorporated during the land based construction activities to prevent any adverse impacts to water quality.

- Care will be taken during removal of the section of the seawall to avoid spillage of material to the adjacent marine waters;
- Surface run-off from the construction site will be directed into storm drains via adequately designed sand/silt removal facilities;
- Any water pumped from the excavated trenches will pass through silt removal facilities prior to discharge to storm drains;
- Silt removal facilities, channels and manholes will be maintained regularly, at the onset of and after each rainstorm; and
- Stockpiles of materials will be covered with tarpaulin or similar fabric.

The above measures will be sufficient to prevent adverse impacts to water quality during the land based construction activities. Therefore, there are no predicted adverse impacts (either direct or indirect) to water quality from the land based construction activities.

The marine based construction activities relate to burying the cables below the existing sea bed. From the cable landing point to the -20 m CD sea bed contour, which is approximately 6.5 km along the cable route, the cable will be buried up to 5 m below the existing sea bed using a barge mounted injection tool. This burial depth is to be provided for navigational requirements in the Tathong Channel and to provide protection to the cables. The injection jetting tool utilises water injector technology to fluidise the sea bed sediments, which enables the injection tool to penetrate the sea bed to the desired depth and lay the cable. The cable segments will be laid sequentially (ie. one segment will be completed prior to laying the second). The shortest period of time that the cables could be installed in this area would be one working day. The maximum speed of laying of each segment will be

approximately 1.1 km hour^{-1} . The maximum width of disturbance of the sea bed surface will be 0.25 m.

From the -20 m CD sea bed contour to the marine boundary of the HKSAR the cable will be buried to a depth of 1.5 m using the ploughing method, deployed from the main lay vessel. The plough is a simple mechanical device which opens up a v-shaped notch in the sea bed in front of the cable, into which the cable is laid. After placement of the cable the sides of the notch collapse, burying the cable below the sea bed. The speed of the plough vessel is expected to be approximately 2.5 km hour-1. The maximum width of disturbance of the surface of the sea bed will be 0.3 m. The ploughing method of cable laying is considered to be less disruptive to sea bed sediments than the use of an injection tool.

Cable laying will result in the formation of an area of high suspended sediment concentrations around both the injection tool and the plough, which will remain close to the seabed and will settle out quickly. However, as the sediment disturbed during cable laying will remain in suspension for a very short period of time the potential for release of contaminants from seabed sediments and exertion of the oxygen demand on the receiving waters will be limited and is not expected to cause adverse impacts to the water column.

Analysis of the potential transport of fine sediments suspended in the water column for cable laying with the injection tool was undertaken and determined that the sediments would settle onto the sea bed in less than 3 minutes and that the maximum distance of transport for the suspended sediments would be less than 90 m. For cable laying using the ploughing method of construction, the sediments were predicted to remain in suspension for less than 1 minute and would be transported less than 60 m from the cable route. As nearby sensitive receivers (including Gazetted Beaches, SSSI, Marine Reserve, the Fish Culture Zone at Tung Lung Chau, and the WSD seawater intake at Junk Bay) are more than 500 m away from the cable routes, the sites will not be impacted by the cable installation work. No long term disruption of bottom sediment will occur and no disruptions to water movement will result from this project. Therefore, no adverse impacts to water quality will occur during the marine works.

4.5 WASTE MANAGEMENT

During the cable landing work, no waste material will be generated at the site, other than general construction waste materials, which will be handled and disposed of in accordance with the *Waste Disposal Ordinance*. There will be no dredged materials and any excavated material will be balanced on site. Therefore, no adverse waste impacts (either direct or indirect) will be generated from cable installation and construction of the cable landing site or manhole.

4.6 LANDSCAPE AND VISUAL

Since the cable conduit will be underground and the submarine cables are buried in the seabed, no visual obstruction or inconvenience to the public is expected to occur.

4.7 CULTURAL AND HERITAGE

The closest cultural heritage site, the Old Chinese Customs Station, is over 200 m from the cable routes and will not be impacted by the project as it is based on land and cable laying is a marine operation. No impacts to terrestrial archaeological resources will result from this project.

The proposed cable laying method will only have a minimal impact on the seabed sediments with a width of disturbance of 0.3 m. Although the Tathong Channel area is known to be an ancient shipping route, dating back to the Song Dynasty (960 to 1279 AD), there has been a large amount of sand borrowing activity and reclamation work in the area which has altered the nature of the seabed. Hydrodynamic conditions in the Tathong Channel are influenced by both tidal currents and oceanic water movements. Due to the highly disturbed nature of the site, as a result of the prevailing hydrodynamic conditions and the history of dredging and reclamations along the Tathong Channel and Tseung Kwan O coastlines, there is little potential for remaining *in situ* marine archaeological deposits in the immediate vicinity and along the proposed cable routes. A marine archaeological investigation has confirmed that there are no underwater features of potential archaeological significance that would be impacted by the project. As such, no impacts to marine archaeological resources will occur.

4.8 TERRESTRIAL ECOLOGY

The cable landing site is situated on reclamation which holds no important terrestrial ecological resources. No impacts to terrestrial ecology will arise from this project.

4.9 MARINE ECOLOGY

A review of the existing information on the marine ecological resources surrounding the cable routing has identified the area as supporting benthic fauna which are similar in nature to other areas of Hong Kong. The cable laying process will only result in short term direct impacts to the subtidal soft bottom habitats and assemblages present on the artificial seawall at the landing point. However, these assemblages are commonly recorded elsewhere in Hong Kong waters, and no species that are either of ecological importance, or that are considered rare, would be impacted, the short term loss of benthic organisms directly along the cable routes is not considered to represent an unacceptable ecological impact. The rapid natural reinstatement

of the seabed will result in the area being available for prompt recolonisation, and hence, no permanent impacts would occur.

A number of areas in the vicinity of the proposed cables route have been identified as supporting coral assemblages of ecological interest. However, the coral assemblages are located at sufficient distance (at least 190 m) from the alignment of the cables to indicate that impacts will not occur. Similarly, no adverse impacts to the Cape d'Aguilar Marine Reserve are expected to occur as any dispersing plumes of suspended sediments from the proposed injection and plough methods used in the deployment of the cables are predicted to be localised (settling out within 90 m from the cable alignment) and short term in nature (see Section 4.4). As such, no impacts would occur.

4.10 FISHERIES

The majority of the catches reported by fishermen operating in the waters are low value bottom dwelling crustaceans or small fast growing pelagic species of low commercial value. The proposed cable routes pass through seasonal spawning grounds for two commercial species. One Fish Culture Zone (FCZ) lies within close proximity to the proposed cable routes, namely at Tung Lung Chau, which is the 8th largest FCZ in Hong Kong.

Minor interruptions to fishing operations are expected to occur only during the cables deployment phase. However, these disruptions will be minimal as the time required for the cable deployment is predicted to be only a few days. As a result, increases in marine traffic, and hence, disturbance to fishing activities in the area, are small scale, and thus, are not expected to be of concern.

Indirect impacts may occur through elevation in suspended solids resulting from the disturbance of the seabed during deployment. However, as any potential disturbance to the seabed is likely to be minimal, localised and of a short duration, no unacceptable impacts have been predicted to occur to fisheries resources, including spawning grounds, or fishing operations, including aquaculture activity at Tung Lung Chau FCZ, as a result of the proposed cable deployment and installation.

4.11 OTHERS

Gaseous Emissions: Only a small amount of gaseous emissions (SO_2 and NO_x) from diesel-powered equipment would be generated during construction of the cable landing site at the TKO Industrial Estate seawall. These emissions will not impact Air Sensitive Receivers.

Odour: No odour impacts are expected to occur as a result of this project.

Traffic Generation: Only minimal traffic is expected to be generated as a result of the project and this will not generate significant noise or gaseous emissions.

Dangerous Goods: No dangerous goods will be involved in this project.

Night-time Operations: It is expected that all cable laying and burial work will be performed within the inshore area during normal working hours.

Hazardous Materials or Wastes: No hazardous materials or wastes will be generated by this project.

Risk of Accidents Resulting in Pollution or Hazard: No pollution or hazard generating accidents will result from this project.

Disposal of Spoil or Contaminated Material: There will be no disposal of spoil or contaminated materials, hence no impacts are expected to result from this project.

5 PROTECTION MEASURES AND ANY FURTHER IMPLICATIONS

5.1 POSSIBLE SEVERITY, DISTRIBUTION AND DURATION OF ENVIRONMENTAL EFFECTS

The construction of the portion of submarine cable system in Hong Kong waters is expected to take between 35 and 50 days. The residual environmental impacts of the works activities are predicted to be localised to the immediate vicinity of the cable alignment and of low severity and, hence are considered to be acceptable.

No environmental impacts are predicted during the operation of the submarine cable.

5.2 FURTHER IMPLICATIONS

The geotechnical environment of the proposed landing point has been confirmed to be suitable for submarine cable landing by electronic surveys.

The methods used for burying the EAC Submarine Cable System, as described in *Section 2.1*, have been used around the world for more than one century and are widely accepted to have no impact on the surrounding environment. The working period is normally very short and no waste or contaminant disposal issues or excessive noise will be generated by such an operation.

5.3 USE OF PREVIOUSLY APPROVED EIA REPORTS

Similar recent projects that are being/have been conducted in the HKSAR include the following:

- East Asian Crossing (EAC) Cable System, Asia Global Crossing. The Project Profile for this study was submitted to the EPD on 30 June 2000 and is currently being processed.
- Submarine Cable Landing Installation in Tong Fuk Lantau for Asia Pacific Cable Network 2 (APCN 2) Fibre Optic Submarine Cable System, EGS. The Project Profile for this study was submitted to the EPD in May 2000. The study concluded that there would be no adverse long term or cumulative effects/impacts to the environment and the Environmental Permit was issued on 26 July 2000 (EP-069/2000).
- Telecommunication Installation at Lot 591SA in DD 328, Tong Fuk, South Lantau Coast and the Associated Cable Landing Work in Tong Fuk, South Lantau for the north Asia Cable (NAC) Fibre Optic Submarine Cable System. The Project Profile for this study was submitted to the EPD in March 2000 (AEP-064/2000). The study concluded that there would be no adverse long term or cumulative effects/impacts to the environment and the Environmental Permit was granted in June 2000 (EP-064/2000).
- Cable Landing Work in Deep Water Bay for SEA-ME-WE 3 Fibre Optic Submarine Cable System, Hong Kong Telecom. The Project Profile for this study was submitted to the EPD in May 1998 (AEP-001/1998). The study concluded that there would be no adverse long term or cumulative effects/impacts to the environment. The Environmental Permit was granted July 1998 (EP-001/1998).

5.4 ENVIRONMENTAL MONITORING & AUDIT

No environmental monitoring and audit measures have been recommended for this project.