

Shenzhen Western Corridor
Project Profile

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Major Works Project Management Office
Highways Department

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Annex A Drawing No. MWP013TH-SK0006

1. BASIC INFORMATION

1.1 Project Title

Shenzhen Western Corridor

1.2 Purpose and Nature of the Project

- (a) Given the forecast growth in cross boundary traffic, the existing boundary crossings between the Hong Kong Special Administrative Region (HKSAR) and Shenzhen Special Economic Zone will be overloaded. To cope with the expected traffic growth, both the Government of HKSAR (HKSARG) and the Mainland authorities have conducted a number of studies to investigate the feasibility for the provision of additional cross boundary links, involving various alignment options.
- (b) Based on the information provided by the Mainland authorities, the three existing boundary crossings are located within the city centre of Shenzhen due to historical reasons in developing the Shenzhen City. Over 80% of the cross-boundary traffic had to go through the main roads within the city centre and caused serious traffic congestion problem in this area. This not only affected the traffic in the city area as a whole but also resulted in serious environmental problems, particularly, in air quality and noise and hence, they concluded that a new boundary crossing located in the western district of the Shenzhen City in Shekou was urgently required in order to divert some of the cross-boundary traffic away from the city centre area and to meet the predicted growth of traffic.
- (c) After investigation by the Mainland authorities, they had identified a preferred location of the landing point at Dongjiaotou of Shekou with a preferred alignment of Shenzhen Western Corridor (SWC) crossing Deep Bay. The Mainland authorities had investigated various structural forms of the crossing including bridges and tunnels. Their current recommendation was in a bridge form as it was considered that the tunnel option was not desirable due to high cost, need for reclamation to form the approach tunnel at the Hong Kong side and more severe environmental impact than the bridge option in respect of marine water quality and ecological impacts as the disturbance to the seabed would be more severe and lesser control over the mitigation measures could be applied as far as the immersed tube tunnel option was concerned.
- (d) In response, the HKSARG also carried out a Feasibility Study for Additional Cross-border Links Stage 1 to investigate the cross-boundary traffic demand, a Stage 2 Study to assess the environmental and ecological impacts, land use planning and land acquisition issues, financial and economic assessments and preliminary engineering feasibility of the project, and a Stage 3 Study to undertake the engineering feasibility of the connecting road, Deep Bay Link, as well as other detailed impact assessment studies. The Stages 1 and 2 Studies were already completed and the Stage 3 Study is still in progress.

- (e) Based on the conclusions of these studies, the Mainland authorities and the HKSARG agreed to implement the SWC project to connect Shekou and the northwestern part of the New Territories.

1.3 Proponent

Highways Department, Major Works Project Management Office

1.4 Location and Scale of the Project

The locations of the proposed routes are shown in Annex A. The tentative study envelop for the recommended alignment covers a corridor in Deep Bay and a strip of land along northwestern coast of the New Territories of HKSAR.

The scope of the project is to provide the Hong Kong portion of the SWC, a dual-3 lane highway across Deep Bay to link Mainland and HKSAR, as described below:-

- (a) The highway will be constructed tentatively on bridge structures. The section of the highway within the HKSAR waters, about 3 km in length, will be provided under this project. Other structural forms of the crossing will be reviewed and investigated.
- (b) At the northern end, the proposed highway will be connected to the section of the road at the Shenzhen/HKSAR boundary to be provided by the Mainland authorities. The landing location in Shenzhen will be located at Dongjiatou.
- (c) At the southern end, the proposed highway will be connected to Deep Bay Link (DBL).
- (d) Two landing locations, one at Ngau Hom Shek and the other at Ngau Hom Sha, are being investigated under the DBL project for connection by the SWC. Selection of the landing location will be dependent on a variety of factors such as construction programme, environmental impacts, land resumption requirements and interfacing arrangement. These landing locations are shown in Annex A.
- (e) Whereas almost all the permanent works will be located offshore, certain activities will have to be carried out on land in the works areas and along the access roads.

1.5 Number and Types of Designated Projects to be Covered by the Project Profile

SWC- Hong Kong portion is the only project to be covered by this project profile. The project is classified as Categories A.1, A.8, C.12, M.1 and Q.1 under Schedule 2 of the EIA Ordinance.

1.6 Contact Person

2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Planning and Implementation

It is proposed to implement the project by employing consultants to undertake the investigation study, preliminary design, detailed design and supervision of the construction phases of the project.

2.2 Project Timetable

According to current project programme, a consultant will be appointed in late 2001 to undertake the Preliminary Environmental Review and the Environmental Impact Assessment for the project. Construction works are expected to commence as quickly as possible and to complete by around middle of this decade.

2.3 Interfacing with Other Projects

- (a) This project covers only the portion of the SWC within the HKSAR waters which has to tie in with the portion within the Mainland waters.

At the southern end, the SWC will be connected to DBL at the landing location to be provided by the DBL project at the coast of Deep Bay, as described in Section 1.4 above. Design and construction works under the DBL project will be in parallel with the SWC.

- (b) Design and construction for the infrastructures and building developments are expected to be carried out in the New Development Area in Hung Shui Kui, Yuen Long, concurrent with the works for SWC.

3. POSSIBLE IMPACT ON THE ENVIRONMENT

3.1 Project Process

Under the current recommendation of the project, a road bridge will be constructed in Deep Bay. Based on initial assessments, the bridge is likely to be of pre-stressed concrete construction with piled foundations. The spans of the beam segments, the width of the bridge, and the construction methods are subject to investigation under the project.

3.2 Construction and Operational Environmental Impacts

- (a) Four landing locations namely Pak Nai, Sheung Pak Nai, Ngau Hom Sha and Ngau Hom Shek in the northwestern New Territories were studied under the Feasibility Study for Additional Cross-border Links Stage 2 and the preliminary design of the DBL. The landing locations at Pak Nai and Sheung Pak Nai were anticipated to severely fragment the stretch of continuous coastal habitat and have adverse impacts on some key sites of ecological values at Pak

Nai and Pak Nai Sites of Special Scientific Interest. Therefore, Ngau Hom Shek and an additional site at Ngau Hom Sha were selected for further study as they were considered to have less ecological impact.

- (b) It is anticipated that surrounding sensitive receivers could be affected by noise, air quality, ecological, water quality, visual, waste and cultural heritage impacts during the construction and operational stages.

Noise

- (c) Construction noise will be associated with construction activities and equipment, together with construction traffic, both land and marine, to and from the site. The key construction activities which would create noise impacts for the adjacent sensitive receivers will be the piling for foundations and construction of piers and bridge structures. Noise impact may also be caused by dredging works, if such is found to be necessary for the implementation of the project.
- (d) Noise sources in the operational stage will be associated with the traffic using the highway. It is predicted that a large proportion of the traffic will be heavy goods vehicles.

Air Quality

- (e) Air pollution during construction has the potential to occur during construction from dust generated due to exposed site areas, stockpiling of materials, movement of plant and handling of construction materials.
- (f) Air pollution source during the operation stage will be associated with emissions from the traffic using the highway. Its effects will be further investigated by taking account of the cross-boundary aerial pollutants being transported from the Mainland under the project.

Water Quality

- (g) Short term impacts to the water quality of the Deep Bay may occur during construction from the following source:-
- Dredging
 - Marine piling
 - Runoff of soils from exposed surfaces in works areas
 - Runoff of contaminants from equipment
 - wastewater from construction works

- sewage disposal from construction workers' facilities
- (h) Dependent on further investigations, dredging works may have to be carried out to form navigation channels for use by marine plant, or to deepen the seabed to maintain the flow capacity of Deep Bay. During dredging the following impact upon water quality can potentially occur:
- Release of sediment bound pollutants to the receiving water column
 - release of suspended solids into the water column and the formation and off-site migration of sediment plumes
 - potential depletion of dissolved oxygen in the vicinity as a result of the sediment perturbation
- (i) The presence of the piled foundations and piers in Deep Bay will inevitably affect the water flow and circulation pattern. Its effects will be investigated using suitable modelling techniques under the project.
- (j) Detailed investigation will also be carried out to analyze the effects of local erosion and sedimentation pattern in Deep Bay as a result of the project.

Ecology

- (k) Noise and disturbance during construction could affect wildlife distribution and activity near the project but only in the short-term.
- (l) The coastal zones of Deep Bay near the project has a ecologically diverse and complex system that could be directly affected. The coastal zones includes mud flats, sandy shores and mangroves. It supports water birds and valuable species such as horseshoe crabs.
- (m) Chinese White Dolphins have been found in outer Deep Bay. These dolphins are classified as Class I protection species in the Mainland and also protected by law in HKSAR.
- (n) Ecological survey through almost a year was conducted in Deep Bay area in 1998/1999 and some relevant ecological impact assessment for SWC project was made in the 'Feasibility Study for Additional Cross-border Links, Stage 2'. However, in order to collect updated and more specific information for ecological assessment, it is proposed to conduct an ecological survey of not less than six months, covering both wet and dry seasons, to examine how to minimize disturbance on the ecology of Deep Bay. In addition, the information collected from the on-going EIA study for the DBL project will also be made reference in assessing the ecological impacts.

Visual

- (o) During construction phase, there will be a general visual impact from the construction activities, construction traffic and potentially dust emission if not

adequately controlled.

- (p) Operational impact may arise from the visual appearance of the new highway bridge. The night-time visual impact created by street lighting could be significant in the relatively undeveloped region.

Waste

- (q) Activities during the construction phase may result in the generation of a variety of wastes generally comprising excavated materials, construction waste and general refuse.

Cultural Heritage

- (r) There is a planned archeological site at Ngau Hom Shek which may subject to adverse impact caused by the project works. There is no declared monument in the study envelop concerned. However, investigation will be carried out to identify any graded monument.

4. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

4.1 Sensitive Receivers

- (a) Existing noise and air sensitive receivers during both the construction and operational stages include a number of village communities to the south of the study envelop.
- (b) Any planned sensitive receivers identified during the study will be considered.
- (c) In respect of ecological sensitive receivers on land, there are some freshwater agricultural wetlands at Ngau Hom Shek, together with coastal mudflat dominated by mangrove plantation.
- (d) Deep Bay and its coast, are considered as of high ecological value. A number of high value species have been found in the Deep Bay area, such as the Horseshoe Crab and the Chinese White Dolphin. Detailed investigations and surveys will be carried out under the project to assess the impact and work out the appropriate mitigation measures.
- (e) Visual sensitive receivers relating to the project include the residential buildings of the surrounding village areas, non-residential building such as the boundary-crossing facilities, and members of the public using the surrounding roads and footpaths in the area.
- (f) Sensitive receivers of cultural and heritage importance will include the planned archaeological site in Ngau Hom Shek, which is located in the middle of the study envelop on land.

4.2 Existing Environmental Elements

- (a) The area around the landing location is a typical rural area, sparsely populated and consists of cultivated areas, fishponds and shrubland. The coastal area is formed mainly by mudflat.
- (b) The part of the Deep Bay within the study area is shallow. The existing navigation channel within HKSAR waters has a depth of about 7m at the mean high water level. A wide mudflat along the coast can be seen during low tide.
- (c) As Deep Bay is already loaded with domestic, industrial and agricultural waste discharged from both its own catchment and Pearl River, the settled mud layer may be contaminated. Samples will be taken to assess its property for environmental impact assessment.

5. ENVIRONMENTAL MITIGATION MEASURES TO BE INCORPORATED IN THE DESIGN

5.1 Measures to Minimize Environmental Impacts

- (a) Based upon the potential impacts as a result of the construction and operation of the project, it is anticipated that mitigation measures will be required. Measures to minimise environmental effects are detailed below.

Noise

- (b) To mitigate construction noise, temporary noise barriers are likely to be required along the construction site boundary such that construction equipment and noise will be screened. In addition, other measures will include:
 - implementation of the following standard noise pollution control clauses including:
 - ◆ Good site practice to limit noise emission at source
 - ◆ Avoidance of simultaneous noisy activities
 - ◆ selection of quiet plant and working methods
 - ◆ reduction in the number of plant operating in critical areas close to NSRs
 - Carrying out construction activities and limiting construction traffic to and from the site during daytime hours (07:00 - 19:00) where works may affect sensitive receivers
 - Installation of silencers at the exhaust pipes and acoustic enclosures for the engines of the dump trucks and lorries to reduce noise levels
 - installation of mufflers for any concrete pumps and generators to reduce noise levels

- Programming the noisiest or most disruptive works activities outside the winter season to minimize the disturbance to migratory birds
- (c) To mitigate the potential traffic noise impact during operation stage, noise barriers will be considered to mitigate noise disturbance to the sensitive receivers in the vicinity of the bridge landing area if necessary.

Air Quality

- (d) Mitigation measures which may be required to abate construction dust impacts to within the prescribe limits will include the following:
- Establish concrete batching plant(s) in accordance with EPD requirements
 - Watering of unpaved areas
 - Use of water spray during the handling of fill material and the site and at active cuts, excavation and fill sites where dust is likely to be created
 - Ensuring that the level of dropping heights for excavated material is controlled to a minimum height to minimise fugitive dust from unloading
 - inspection of vehicles to ensure that materials are not loaded to a level higher than the side and tail board, and dampering or covering material before transport
 - Covering or watering stockpiled material in dry or windy conditions
 - implementation of wheel washing facilities at access roads to the site
 - controlling speed of on-site vehicles

Water Quality

- (e) Subject to investigation, dredging works may have to be carried out under the project to provide navigation channels or to maintain/improve the water flow in Deep Bay.
- (f) To mitigate the potential water quality impacts during dredging works, appropriate dredging methods must be selected to control the generation of sediment plumes. Methods available to minimise the generation of sediment plumes during dredging are listed below:
- Dredging operation should take account of the tidal conditions
 - Minimization of disturbance to the sediments by exerting care in lowering and lifting the dredge grabs
 - Ensuring that grabs are closed tightly, the hoist speeds are suitably low, and loading onto barges are accurate.
 - Use of water tight barges
 - The use of silt curtains
 - Establish appropriate action plans to control the dredging works, and monitor the water quality closely during dredging.

- (g) The dredged material must be disposed of in an environmentally acceptable manner. Tests should be carried out on samples taken on site and to determine whether the sediments is considered as contaminated for the purposes of backfilling or placement within designated Marine Disposal Areas.
- (h) Suitable sewage/surface run-off collection, treatment and disposal systems will be installed to control water quality impact from the following sources:
- run off of soils from exposed surfaces
 - Run off of contaminants from equipment
 - Waste water from construction works
 - sewage disposal from construction workers' facilities
- (i) There could be spills during operation of the project, potentially containing oil and other contaminants. This could affect water quality in Deep Bay with impacts on the marine fauna. However the operation of the project is not expected to generate significant volumes of discharge except for extreme situations.
- (j) The reduction in tidal discharges across the line of the bridge could be restored by mitigation comprising widening of spaces between bridge piers and appropriately aligning the bridge piers or local dredging following which water quality would also be restored to baseline or pre-development conditions.

Ecology

- (k) It is expected that, with the application of suitable mitigation measures, there should not be significant and irreversible impacts to the ecological conditions in the area during dredging, piling and bridge construction works in Deep Bay. Possible mitigation measures can be considered are:
- Create “artificial reef” habitat at bridge piers
 - Design the bridge to span over intertidal zone without touching down - the practicability and effectiveness of this mitigation measure will be reviewed and investigated
 - Compensatory planting and habitat creation using native species
 - Keep construction activities confined
 - Timing of works in Deep Bay
 - Establishment and enforcement of dolphin exclusion zone
 - Acoustic decoupling
 - Use of bubble curtains during percussive piling
 - Use of silt curtain during dredging activities
- (l) Regarding ecological areas in land, disruption to the sensitive sites identified will be avoided as far as possible through selection of works areas and access roads. In respect of operational impacts, the permanent noise barriers, if required and installed to mitigate the noise impact to acceptable levels, would also mitigate ecological disturbance impacts.

Visual

- (m) Mitigation of construction phase visual impacts should include control and minimisation of the site works area together with abatement of dust generation and good site organization. Visual screening of the works areas from the views of sensitive receivers may also be required.
- (n) Spanning across Deep Bay, the SWC would be a prominent element in the environment. As an operation stage mitigation measure, particular consideration should be given to the design of the bridges to create visual interest.

Waste

- (o) As the SWC is a highway for use by road traffic only. Waste impact during the operational stage is considered as extremely small.
- (p) During the construction stage, adequate management of the storage, handling and disposal of construction waste will be required to prevent adverse impacts and mitigation measures could include:
 - All vehicles entering or leaving the site carrying solid waste should have their loads covered
 - All vehicles travelling to and from the site should be routed, as far as possible, to avoid sensitive receivers in the area
 - All vehicles leaving the site should pass through a wheel wash at the site exit. The wheel wash should be cleaned regularly to remove sediment. Mud or similar material deposited on public roads near the site should be removed immediately
 - Solid materials, litter or wastes should not be disposed of in any surface waters, but should be removed to a designated disposal site
 - All combustibles to go to landfill, and not burned on site
- (q) It is recommended that a material/waste management plan is established prior to commencement of excavation and construction work to outline the methods that can be incorporated into the project for waste minimization, reuse, handling, storage, transport and disposal of expected waste materials.

Cultural Heritage

- (r) SWC would be a highway bridge. The permanent works that would affect the archeological site at Ngau Hom Shek are its piers and foundations. The Project Proponent will endeavor to locate the piers and foundations, outside the essential area of the archeological site. Care will also be taken during the construction to prevent causing adverse effect on the site of archeological interest. Additional appropriate mitigation measures will be provided in due course.

Environmental Monitoring and Audit

- (s) A key component of the mitigation will be the implementation of environmental monitoring and audit during construction of the project. During the operational stage of the SWC, only very minor monitoring and audit work would be necessary and can be included as part of the normal maintenance works for the highway.

5.2 Severity and Duration of Environmental Effects

- (a) Construction impacts will be temporary and the key impacts in terms of potential noise, dust and ecological impacts from dredging, piling and structural works will be confined to the first half of the construction period only and can be minimised by the implementation of suitable mitigation measures.
- (b) Subject to investigation on noise impacts, permanent noise structures may have to be installed to keep the noise impact to acceptable level.
- (c) Placement of bridge piers in the intertidal zone may introduce visual obstacles which could reduce feeding activity of waterbirds in the area as some waterbird species prefer unobstructed views from feeding sites.

5.3 Future Implications

- (a) Public consultation will be arranged once sufficient information is available.
- (b) Close liaison will be maintained between the Mainland authorities and the HKSARG to address interfacing problems and cumulative effect due to the construction and operation stages of the project.

6. USE OF PREVIOUSLY APPROVED EIA REPORTS

No previously approved EIA report is referred to during the preparation of this Project Profile.



蛇口
SHEKOU


口岸過境大樓
BOUNDARY CROSSING
FACILITIES


后海灣
DEEP BAY

香港特別行政區界
BOUNDARY OF HONG KONG SPECIAL
ADMINISTRATIVE REGION

暫定的深港西部通道的推荐
路線方案
TENTATIVE ALIGNMENT OPTIONS
OF SHENZHEN WESTERN CORRIDOR


圖例
LEGEND

 暫定的推荐路線的研究範圍
TENTATIVE STUDY ENVELOPE FOR
RECOMMENDED ALIGNMENTS

 暫定的深港西部通道的推荐路線
方案
TENTATIVE RECOMMENDED ALIGNMENT
OPTIONS OF SHENZHEN WESTERN CORRIDOR

白泥有特別科學價值的地點
PAK NAI SITE OF SPECIAL
SCIENTIFIC INTEREST

正在后海灣幹線工程項目中
作出研究的着陸點方案
POSSIBLE LANDING LOCATIONS
BEING INVESTIGATED UNDER
THE DEEP BAY LINK PROJECT

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