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Environment, Transport and Works Bureau
Technical Circular (Works) No. 5/2005

Protection of natural streams/rivers
from adverse impacts arising from construction works

Scope

This Circular provides an administrative framework to better protect all natural streams/rivers from the impacts of construction works. The procedures promulgated under this Circular aim to clarify and strengthen existing measures for protection of natural streams/rivers from government projects and private developments. The Secretary for Housing, Planning and Lands, Director of Agriculture, Fisheries and Conservation, Director of Buildings, Director of Environmental Protection, Director of Housing, Director of Home Affairs, Director of Lands, and Director of Planning have agreed to the contents of this Circular.

Effective Date

2. This Circular shall take immediate effect and is applicable to all government works contracts for which tenders are invited on or after 1 September 2005.

Effect on Existing Circulars

3. This Circular should be read in conjunction with the following circulars: -

- (a) ETWB TCW No. 13/2003: Guidelines and Procedures for Environmental Impact Assessment of Government Projects and Proposals; and
- (b) ETWB TCW No. 14/2004: Maintenance of Stormwater Drainage Systems and Natural Watercourses.

Background

4. There are over 2 500 km of natural streams and rivers in Hong Kong, mostly located in hillsides remote from developed areas. Many of these natural streams/rivers are good habitats supporting a variety of wildlife and with important ecological functions, and carry high aesthetic and landscape value. Various sectors in the public, including green groups and the Legislative Council, have called for enhanced protection to natural streams/rivers. Construction works should be restrained to minimise possible disturbance to these streams/rivers. In case that construction works (such as flood protection works) in or near natural streams/rivers are unavoidable, they should be carried out in an environmentally responsible manner and with appropriate mitigation measures to minimise any adverse impacts so caused.

Definitions

5. A **natural stream/river** refers to a natural channel with natural water fed from upper terrains, which covers both perennial stream/river with water flowing throughout the year as well as intermittent ones with water-flow only during the wet season. The streambed is natural and not manmade, which could consist of mixtures of bedrocks, boulders, cobbles, gravels, sand, silt or clay. The banks are also largely natural and defined, covered with bank-side and riparian vegetations. **Ecologically Important Streams/Rivers (EIS)** are natural streams/rivers with important ecological functions such as providing habitats for diverse or rare animal or plant communities. The list of EIS is at **Appendix A**. They are identified and updated from time to time by the Agriculture, Fisheries and Conservation Department (AFCD), based on latest available ecological information.

6. For the purpose of this Circular, natural streams/rivers should be differentiated from flood retention ponds, fishponds and engineered stormwater drainage systems which include drainage channels, nullahs, and ditches. Examples of engineered drainage channels are Tin Shui Wai Main Nullah, Yuen Long Nullah, Tuen Mun Nullah, engineered sections of Shing Mun River, or concrete U-channels for collection of surface runoff. These should not be treated as natural streams/rivers.

7. Construction works arising from projects and developments may have direct and/or indirect impacts on natural streams/rivers. **Direct impacts** are those resulted from physical changes directly disturbing the natural habitats of the streams/rivers. Examples of such construction works causing direct impacts are training, filling, culverting, narrowing, widening, damming, realignment and diversion of streams/rivers, as well as bank stabilisation works such as shotcreting on riverbanks. **Indirect impacts** are those resulted from construction works that may cause pollution to or affect waterflow of streams/rivers. Examples of such construction works causing indirect impacts are site formation, landfilling, discharge of silt and polluted water, dumping of debris into an area nearby, or foundation works involving dewatering, geotechnical and demolition works in the proximity of streams/rivers.

Existing Measures to Protect Natural Streams/Rivers

8. Most of the natural streams/rivers in the territory are subject to the control by a number of ordinances¹ to various extents. Application of the ordinances, where applicable, is subject to the advice of the relevant authorities.

9. Designated projects with potential significant impacts on the environment are regulated under the Environmental Impact Assessment Ordinance (EIAO). The proponent of a designated project has to obtain an environmental permit from the Director of Environmental Protection before commencement of the works. In general, the guidelines and procedures of ETWB TCW No. 13/2003 are applicable to the environmental impact assessment of all government projects.

10. In planning public projects and approving/processing private development applications, government departments should give due consideration to environmental issues, and consult the relevant authorities including AFCD (on nature conservation and ecological issues), Buildings Department (on building control), Environmental Protection Department (EPD) (on EIA and pollution control issues), Drainage Services Department (on hydraulics and flooding issues), Planning Department (PlanD) (on land use compatibility issues, etc), Lands Department (LandsD) (on issues related to land allocation, lease modifications and user restrictions under land lease), and Water Supplies Department (on control of leased land in water gathering ground) where appropriate. Geotechnical Engineering Office of the Civil Engineering and Development Department should also be consulted if the effects of works

¹ These may include Land (Miscellaneous Provisions) Ordinance (Cap. 28), Waterworks Ordinance (Cap. 102), Town Planning Ordinance (Cap. 131), Public Cleansing and Prevention of Nuisances Regulation (Cap. 132), Country Parks Ordinance (Cap. 208), Waste Disposal Ordinance (Cap. 354) and Water Pollution Control Ordinance (Cap. 358).

on natural streams/ivers may pose a slope safety hazard. The following paragraphs reinforce the current administrative procedures and promulgate improvement measures to enhance protection of natural streams/ivers from adverse impacts arising from construction works.

Improvement Measures

(A) Government projects

11. Project proponents should assess whether a particular project under planning falls within the ambit of EIAO and consult EPD as necessary. If so, the relevant statutory procedures mentioned in paragraph 9 above should be triggered. For projects that are not covered under EIAO, the following paragraphs will apply as illustrated in the flowchart in **Appendix B**.

12. For projects² with direct impacts on the EIS, project proponents should seek the advice of AFCD in consultation with other relevant authorities listed in paragraph 10 above, on the need and scope of the environmental review/study on a case-by-case basis. It is the project proponents' responsibility to identify the possible impacts on any natural streams/ivers and formulate the necessary mitigation measures before commencement of detailed design. EPD should be consulted on issues related to pollution control.

13. For all projects that may affect natural streams/ivers, except those exempted projects mentioned in paragraph 18 below, the project proponents should ensure that comments/advice received from AFCD and appropriate departments mentioned in paragraph 10 above are incorporated into the planning, design and construction of the projects as far as practicable .

14. During the planning stage, project proponents should avoid any potential impact on natural streams/ivers (particularly EIS). If this is unavoidable, project proponents should adopt appropriate measures to minimise or compensate such impacts, taking into account the advice from all relevant authorities and the recommendations of any environmental review/study that may be required. **Appendix C** contains a set of broad guidelines on planning for construction works in natural stream/ivers and in the EIS.

15. During the detailed design stage, project proponents should adopt environmentally friendly design in order to maintain the naturalness, landscape as well as ecological value of natural streams/ivers. To facilitate smooth implementation during construction, requirements for the proposed mitigation

² For maintenance and desilting works to be carried out in EIS, similar consultation required in paragraph 10 will need to be carried out. However, due to the minor nature of such works, environmental review/study is deemed to be not necessary.

measures covering temporary works and construction activities should be fully incorporated in the contract documents of a project. Guidelines on developing precautionary measures during the construction stage are provided at **Appendix D**.

(B) Private developments and applications

16. The relevant approving/processing authorities (including PlanD, LandsD, BD and EPD) should strengthen internal guidelines and procedures to handle private development applications through the following systems: -

- (a) planning control by PlanD when processing planning applications and rezoning requests;
- (b) land development control by LandsD when processing applications for lease modification, land exchange and New Territories Exempted House;
- (c) building control by BD in operating a centralised approval process for building plans, including drainage or site formation submissions where appropriate; and
- (d) pollution control by EPD as the authority for various environmental legislation including EIAO.

17 For development proposals/submissions that may affect natural streams/rivers, the approving/processing authorities at various stages of the development should consult and collate comments from AFCDD and relevant authorities mentioned in paragraph 10 above and incorporate relevant comments/advice as conditions of approval wherever possible.

Exempted Projects

18. The requirements under this Circular on protection of natural streams/rivers are exempted for the following types of projects:

- (a) public projects or development proposals/submissions with only potential indirect impacts on natural streams/rivers other than the EIS; and
- (b) maintenance and desilting works in natural streams/rivers other than the EIS.

19. For these exempted projects, the project proponents should, similar to all projects not covered by EIAO, carry out good site practice and establish appropriate pollution control measures during construction to minimise impacts in accordance with paragraph 4.2.4 of Appendix A of ETWB TCW No. 13/2003. If in doubt, advice from AFCD and/or EPD should be sought.

Vetting Records

20. To facilitate effective planning and for ease of reference, AFCD will maintain a master list of public projects and private development proposals respectively with impacts on natural streams/rivers for which AFCD has been consulted specifically about such impacts. The list should record the relevant project titles, locations of streams/rivers affected, dates of submission and the project proponent/processing departments. While AFCD will keep the master list, individual departments should oversee the implementation of mitigation measures including compliance with the approval conditions and will, upon request, provide further information on the projects or development proposals such as the dates of approval, commencement and completion.

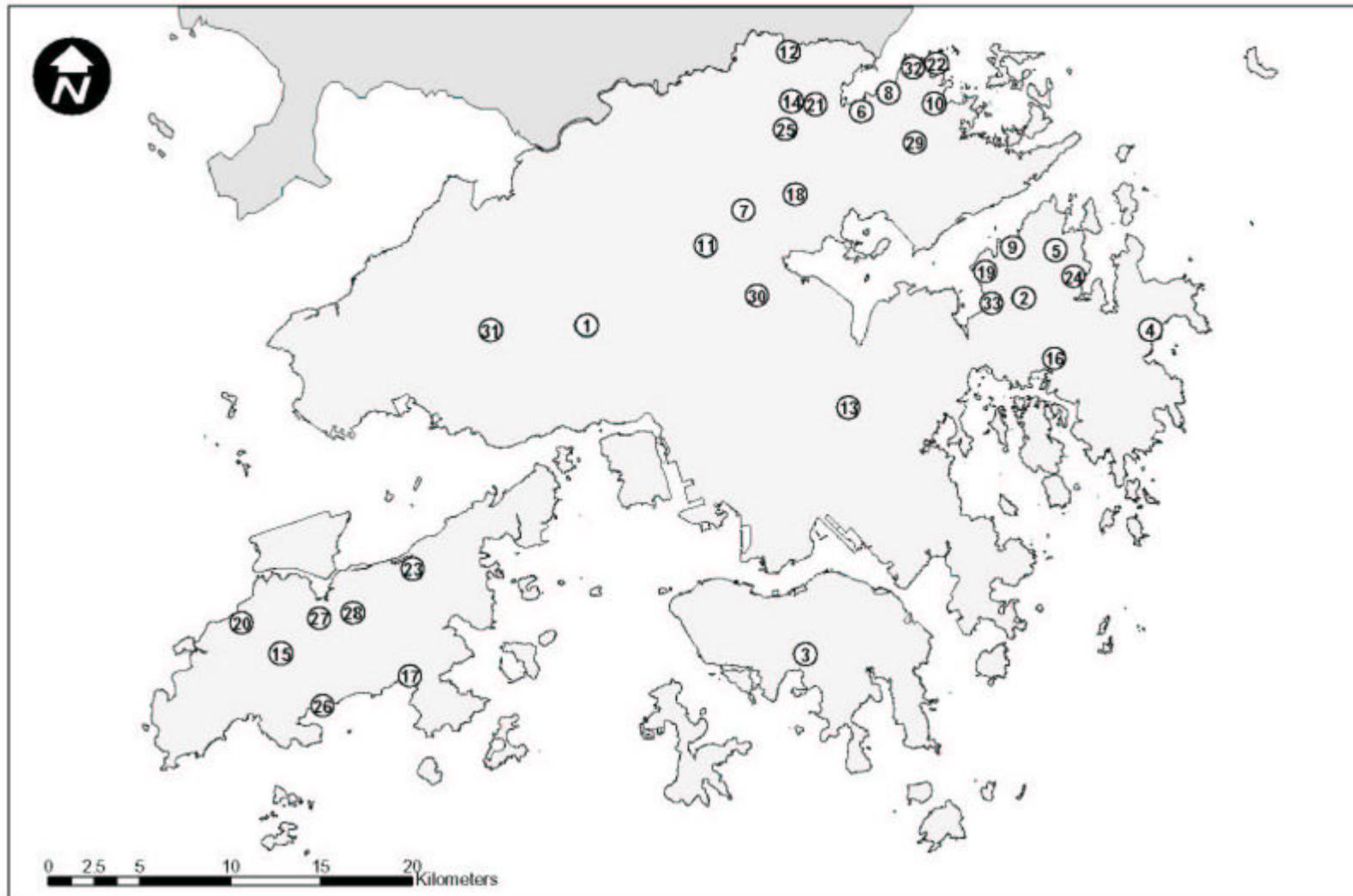
(C S Wai)
Deputy Secretary for the Environment,
Transport and Works (Works) 2

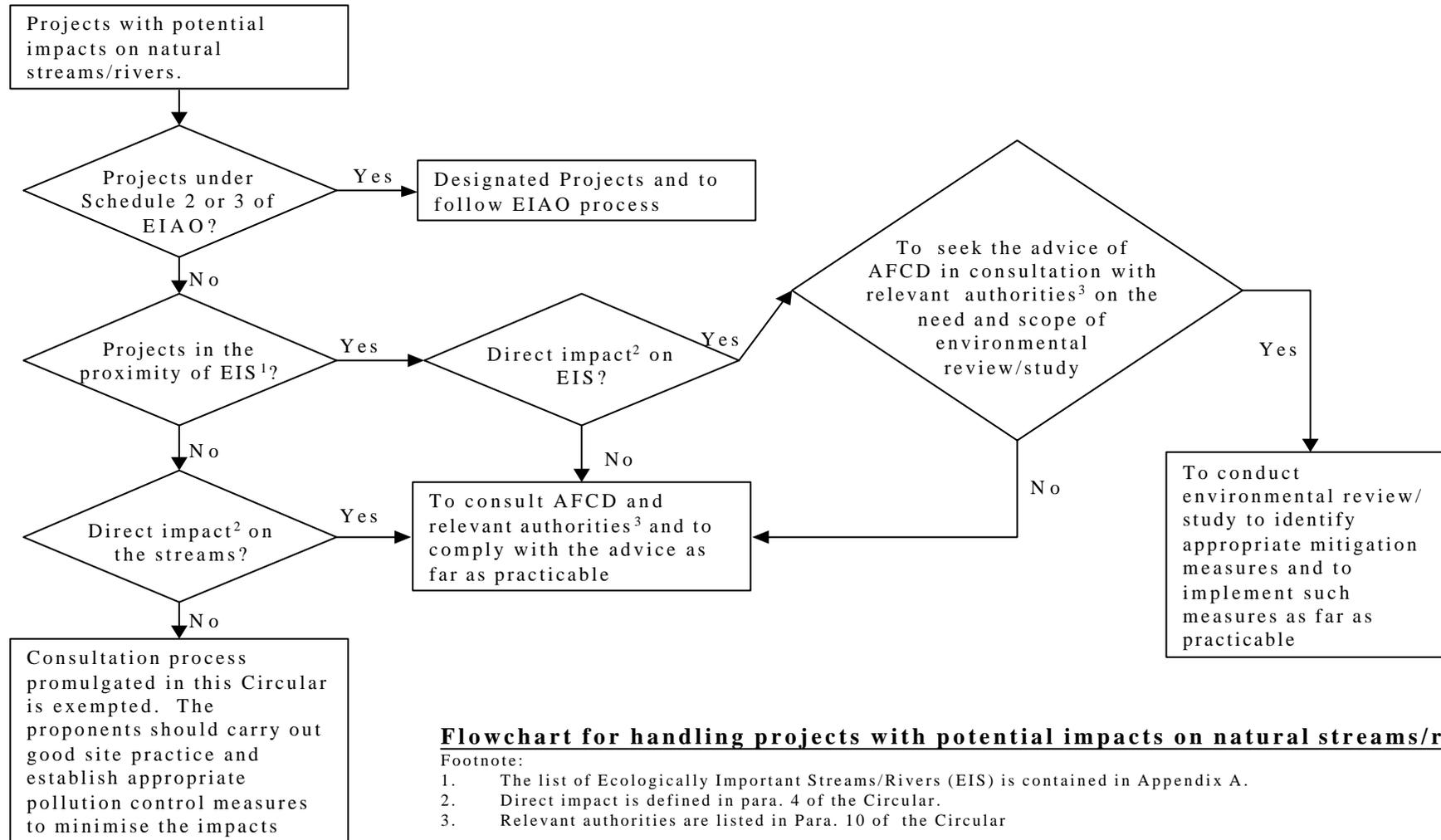
List of Ecologically Important Streams/Rivers (EIS) (as at 31 December 2004)

1. Cheung Po, Kam Tin (錦田 長莆)	18. Sha Lo Tung, Tai Po (大埔 沙羅洞)
2. Cheung Sheung, Sai Kung (西貢 嶂上)	19. Sham Chung, Sai Kung (西貢 深涌)
3. Deep Water Bay valley (深水灣)	20. Sham Wat, Lantau (大嶼山 深屈)
4. Ham Tin, Sai Kung (西貢 鹹田)	21. Sheung Wo Hang, NT North (上禾坑, 新界北)
5. Hoi Ha, Sai Kung (西貢 海下)	22. So Lo Pun, NT Northeast (鎖羅盆, 新界東北)
6. Kai Kuk Shue Ha, NT Northeast (雞谷樹下, 新界東北)	23. Tai Ho, Lantau (大嶼山 大蠔)
7. Kau Lung Hang, Tai Po (大埔 九龍坑)	24. Tai Tan, Sai Kung (西貢 大灘)
8. Kuk Po, NT Northeast (谷埔, 新界東北)	25. Tan Shan River (River Jhelum), NT North (丹山河, 新界北)
9. Lai Chi Chong, Sai Kung (西貢 荔枝莊)	26. Tong Fuk, Lantau (大嶼山 塘福)
10. Lai Chi Wo, NT Northeast (荔枝窩, 新界東北)	27. Tung Chung (Mok Ka and Shek Mun Kap) (東涌(莫家及石門甲))
11. Lam Tsuen River (Upper), Tai Po (大埔 林村河(上游))	28. Wong Lung Hang, Lantau (大嶼山 黃龍坑)
12. Lin Ma Hang, NT North (蓮麻坑, 新界北)	29. Wu Kau Tang (烏蛟騰)
13. Ma Lai Hau Hang, Siu Lek Yuen (小瀝源 馬麗口坑)	30. Wun Yiu, Tai Po (大埔 碗?)
14. Man Uk Pin, NT North (萬屋邊, 新界北)	31. Yeung Ka Tsuen, Shap Pat Heung (十八鄉 楊家村)
15. Ngong Ping, Lantau (大嶼山 昂坪)	32. Yung Shue Au, NT Northeast (榕樹凹, 新界東北)
16. Pak Tam Chung, Sai Kung (西貢 北潭涌)	33. Yung Shue O, Sai Kung (西貢 榕樹澳)
17. Pui O, Lantau (大嶼山 貝澳)	

Note 1: Users are advised to check AFCD's website (http://www.afcd.gov.hk/conservation/eng/eis_1.htm) for the most updated list of EIS, the index map showing all the EIS and the location maps of individual EIS.

Locations of the 33 Ecologically Important Streams





**Guidelines on Planning for Construction Works in Natural Stream/Rivers
and in Ecologically Important Streams/Rivers (EIS)**

(A) Planning for Construction Works in Natural Rivers and Streams

In planning for construction works in natural rivers and streams, the following considerations are relevant: -

- a. When determining the method and type of construction works, the project proponent should ascertain the potential environmental impact associated with such works. The method and type of works should be so chosen to avoid or minimise the possible environmental impact on streams/rivers. Construction of a new channel using artificial non-vegetative smooth lining (e.g. concrete lining) should be avoided as far as possible and should only be applied as the last resort when other more environmentally friendly designs are proved impracticable. In general, the various engineering options that can be adopted for river and stream modification works, in ascending order of impact on the environment and ecology, are as follows: -
 - (i) protection/stabilisation of river bank at locations prone to erosion by use of natural materials such as rock;
 - (ii) removal of fallen objects/obstruction and clearing of vegetation in a selective manner;
 - (iii) enlargement of channel by modifying one bank only;
 - (iv) enlargement of channel by modifying/widening both banks;
 - (v) enlargement of channel by deepening;
 - (vi) realigning by creating a new channel;
 - (vii) construction of a new channel using artificial non-vegetative smooth lining such as concrete.

- b. The proposed works should preferably be carried out during the dry season where flow in the stream/river is low. Rapid flow in a stream/river during the wet season together with the on-going construction works will have a higher potential of inducing collapse of the riverbanks and resulting in highly turbid water.
- c. Temporary access to the works site should be carefully planned and located to minimise disturbance caused to the substrates of streams/ivers and riparian vegetation by construction plant.
- d. The use of less or smaller construction plant may be specified to reduce disturbance to the riverbed where aquatic inhabitants are located.
- e. Temporary sewerage system should be designed and installed to collect wastewater and prevent it from entering rivers and streams.
- f. Proper locations well away from rivers/streams for temporary storage of materials (e.g. equipment, filling materials, chemicals and fuel) and temporary stockpile of construction debris and spoil should be identified before commencement of the works.
- g. Landscape and visual impact assessment should be conducted early to identify, assess and minimise any adverse landscape or visual impact.

(B) Planning for Construction Works in the EIS

In planning for construction works in the EIS, in addition to the considerations mentioned in (A) above, the following considerations are also relevant: -

- a. Environmentally friendly features, such as diversified planting of trees, shrubs, herbaceous and wetland plants and grass on the river embankments to form an ecological riparian zone, should be incorporated into the works. The bottom of a natural stream/river should be left intact where practicable, and only bank stabilisation or bank widening works using soft but adequately robust engineering techniques or bank widening works should be carried out.
- b. The use of concrete or the like should be avoided or minimised. Unless there are severe site constraints, more environmentally friendly alternatives such as geotextile-reinforced grassed lining,

bio-engineering methods, natural stonewall, gabions etc. should be used on the embankment and random rubble or stones on the bottom.

- c. Wherever a natural habitat of special flora and fauna is identified, alternative design and construction methods should be considered to avoid the disturbance. If disturbance is unavoidable, proper mitigation measures such as translocation, temporary migratory pathways, recolonisation or compensation plan should be devised. After construction works, placement of substrates (e.g. gravels, crushed stones or boulders) of similar size and composition to those of the original riverbed should be considered to encourage recolonisation.
- d. Phasing of the works should be considered to better control and minimise any impact caused, and to provide refuge for aquatic animals. Works should not be carried out for the whole width of the stream at the same time, if the stream is wide enough. Adequate width of the stream should be left intact with the flow maintained as far as practicable so that disturbance to the aquatic ecosystem is kept to the minimum. A free passage along the stream is necessary to avoid forming stagnant water in any phase of the works and to maintain the integrity of aquatic communities.
- e. If the upper reaches are breeding grounds for fish and the works would involve construction of dam structures, installation of specially designed fish ladder should be provided for fish migration.
- f. Before commencement of works, AFCD should be consulted for the presence of rare species within the works site. Mitigation measures such as relocation of the rare species outside the site should be discussed with AFCD where necessary.
- g. Before commencement of works, an inspection of stream should be carried out to check the presence of any pools of considerable size. If found, they should be preserved with care as far as possible, as they are usually favourite habitats of aquatic inhabitants and removal of pools can be detrimental to aquatic communities.

**Guidelines on Developing Precautionary Measures
during the Construction Stage**

Depending on the extent of the proposed works and particulars of relevant rivers and streams, different precautionary measures may have to be devised and implemented. Some of the measures generally recommended for adoption to the construction works in the vicinity of natural rivers and streams are listed below:-

- a. The proposed works site inside or in the proximity of natural rivers and streams should be temporarily isolated, such as by placing of sandbags or silt curtains with lead edge at bottom and properly supported props, to prevent adverse impacts on the stream water qualities. Other protective measures should also be taken to ensure that no pollution or siltation occurs to the water gathering grounds of the work site.
- b. The natural bottom and existing flow in the river should be preserved as much as possible to avoid disturbance to the river habitats. If temporary access track on riverbed is unavoidable, this should be kept to the minimum width and length. Temporary river crossings should be supported on stilts above the riverbed.
- c. Stockpiling of construction materials, if necessary, should be properly covered and located away from any natural stream/river.
- d. Construction debris and spoil should be covered up and/or properly disposed of as soon as possible to avoid being washed into nearby rivers/streams by rain.
- e. Construction effluent, site run-off and sewage should be properly collected and/or treated. Wastewater from a construction site should be managed with the following approach in descending order:
 - (i) minimisation of wastewater generation;
 - (ii) reuse and recycle;
 - (iii) treatment.

Proper locations for discharge outlets of wastewater treatment facilities well away from the natural streams/rivers should be identified.

- f. Removal of existing vegetation alongside the riverbanks should be avoided or minimised. When disturbance to vegetation is unavoidable, all disturbed areas should be hydroseeded or planted with suitable vegetation to blend in with the natural environment upon completion of works.
- g. Adequate lateral support may need to be erected in order to prevent soil/mud from slipping into the stream/river, but without unduly impeding the flow during heavy rain
- h. Supervisory staff should be assigned to station on site to closely supervise and monitor the works.