

## **VI-2 Project Programme**



DRAFT

FAO/GOVERNMENT COOPERATIVE PROGRAMME

Project of the Government of Pakistan

Project Title and Symbol : Mithawan Watershed Management

Donor : Japan

Government Implementation Agencies : Irrigation and Power Department  
Forestry Department

Duration : 4.3 years (52 months)

Estimated starting date : September 1994

Brief description: The project is designed to reverse the environmental degradation trend in the Dholi area of the Mithawan Watershed and to improve the living conditions of the people residing in this area by establishing community and on-farm based conservation measures that will improve agriculture production, increase income, conserve soil and water, improve range condition, and improve water supply. Participatory approaches will be used to include organization and training of the local people in planning, implementing and maintaining conservation measures. Project outputs will result in effective and sustainable solutions to the land degradation trend and declining living conditions of the rural people who inhabit the Dera Ghazi Khan hill torrent watersheds. This project is an essential component of the overall development of the hill torrent watersheds in Dera Ghazi Khan.

## ABBREVIATIONS

- APO Associate Professional Officer
- C.O. Community Organization
- CTA Chief Technical Adviser
- DFO Divisional Forest Officer
- D.G. Khan Dera Ghazi Khan
- EXT. Extension
- FD Punjab Forest Department
- GOP Government of Pakistan
- IPD Punjab Irrigation and Power Department
- SDFO Sub-Divisional Forest Officer
- WSM Watershed Management

## PART I: PROJECT AGREEMENT

1. Within the framework of its agreement with the Government of Japan and upon request from the Government of Pakistan, the Food and Agriculture Organization of the United Nations (FAO) will supply assistance for the execution of the following project once it is accepted by the Donor Government.

Project Title: Mithawan Watershed Management

Estimated Costs: (Plan of Expenditure in Part, I.B)

Donor Government Contribution US\$1,349,550

Counterpart Contribution(in kind) Rs 4,052,300

A detailed description of project design, including background, purpose and workplan, is provided in Part II of the present document (attached).

### FAO OBLIGATIONS:

2. FAO shall be responsible for the recruitment, international travel, salaries and emoluments of the international staff (except volunteers) shown in Part II (I.B). Appointments of international staff shall be submitted to the Government for clearance. All staff will work under the direction of the Project manager who, on behalf of FAO, is responsible for the technical execution of the project.

3. FAO will provide the equipment and supplies shown in Part II (I.B). The equipment will remain the property of FAO for the duration of the project. Its ultimate destination shall be decided by FAO in consultation with the Government.

4. FAO will arrange for yearly supervisory travel visit to the project, to be financed from project costs as shown in Part II (I.B).

5. All FAO's obligations arising under this Project Agreement shall be subject to (i) the decisions of its governing bodies and to its constitutional, financial and budgetary provisions, and (ii) the receipt of the necessary contribution from the Donor Government. Any obligations assumed by FAO may, at any time, be taken over by the Donor Government.

6. FAO may, in consultation with the Government, execute part or all of the project by sub-contract. The selection of the sub-contractors shall be made, after consultation with the Government, in accordance with FAO's procedures.

### GOVERNMENT OBLIGATIONS

7. The Government shall take all necessary measures to facilitate the execution of the project and to assist the FAO staff in obtaining such services and facilities as they may require to fulfil their tasks. The Government shall apply to FAO, its property, funds and assets, in connection with the project, the provisions of the Convention of Privileges and Immunities of the Specialized Agencies; the currency exchange rate established with the United Nations.

8. The Government shall deal with any claims brought by third parties against FAO, its personnel or other persons performing services on its behalf in connection with the project, except when it is agreed on by FAO and the Government that such claims arise from gross negligence or wilful misconduct of such persons.

9. The Government shall be responsible for the recruitment, salaries and social security measures of the national staff. The Government shall also provide the facilities and supplies shown in Part II (E), as and when required by the project.

10. The Government shall grant to the staff of FAO and of the Donor Government and to persons acting on their behalf, access to the Project site and to any material or documentation relating to the Project and shall provide any relevant information to such staff or persons.

11. The Government is responsible for the cost of import and customs clearance of project equipment, its transportation, handling storage, and related expenses within the country; its safe custody, maintenance, insurance and replacement, if necessary, after delivery to the project site.

### REPORTING

12. FAO will report on the project to the Donor and recipient Governments as detailed in Part II (H).

13. The Government shall agree to the dissemination of information like descriptions of the project and of its objectives and results, for the purpose of educating public opinion.

### AMENDMENTS AND TERMINATION

14. This Project Agreement may be amended or terminated by mutual consent. Termination shall also take effect sixty days after receipt by either party of written notice of the other party. In the event of termination, the obligations already assumed by the Government shall remain in force to the extent necessary to permit orderly withdrawal of the funds and assets of FAO and of personnel performing the services on its behalf.

15. This Project Agreement shall enter into force upon signature by both parties.

For the Government of Pakistan

For the Food and Agriculture  
Organization of the  
United Nations

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Date:.....

Date:.....

## A. General Background

### 1. Description of sub-sector

The Dera Ghazi Khan District is located west of the Indus River in the Punjab Province. The watersheds of the District exhibit various land features such as hilly regions, piedmont plains, sand dunes, alluvial plains and canal areas. The hilly region consists of major hill torrents that drain into the Indus River. The Mithawan torrent, which is part of this complex, is approximately 973 km<sup>2</sup> in area, of which, 729 km<sup>2</sup> are hilly areas and about 264 km<sup>2</sup> are pachad lands (between the hills and the Indus River). Elevation ranges from 250 meters above sea level to over 2,000 meters. Parent material is of sedimentary origins with geological strata reaching near-vertical in the hilly parts of the drainage.

The climate is semi-arid with average annual precipitation of 300-350 millimeters. Approximately 60 percent of precipitation occurs during the July-September monsoon period. Temperature ranges from 0° C in the winter to 50° C in the summer.

The people of the area reside in small communities or individual households where water is available for human and livestock use. In a few scattered areas perennial water flow exist in sufficient quantities to permit small scale agriculture.

Land ownership in the Mithawan catchment is vested in the leaders of the Leghari Tribe with verbal and traditional rights given to individuals for cultivated land. Village units have rights for grazing in areas adjacent to the villages. Water rights to flood waters and perennial water are clearly defined.

Although management of the area is under the jurisdiction of the Punjab Forest Department. In practice, management is minimal due to past and present disregard by the local people for government intervention on their lands. This fact coupled with the rural people's lack of conservation knowledge and subsequent exploitation of the natural resources of the watershed has created a scenario where the hilly areas are in poor condition. Traditional agriculture and grazing systems plus complete removal of trees and shrubs, and in some areas grasses, for fuelwood has severely depleted the vegetation cover. Migratory grazing by animals of nomadic tribes such as the Powindahs exacerbates the problem. The area has an inherently low biomass production potential due to low annual rainfall. And, a naturally high hydrologic potential for torrent flows due the steep topography and high intensity monsoon rains. Consequently the hydrologic and erosion-sedimentation cycles have changed with increased occurrence of high peak flows in the nallahs and accelerated erosion of the land surface with subsequent increased downstream flooding and siltation and associated damage to structures, property and agriculture lands.

The site proposed for the project interventions is Dholi Village and surrounding subwatersheds located within Mithawan Watershed (Annex VI). The site (approximately 320 ha) is situated approximately eight kilometers northwest of Pakhi Munh which is along the highway from D.G Khan to Balochistan. The area was selected for the initial phase of project operations for the following reasons:



- Central location
- Accessibility
- Concentrated population
- Water available for: (1) Nursery; (2) Site office; and (3) Construction
- Biological and physical characteristics of the area are representative of much of the hilly area of Mithawan and adjacent major watersheds.

The inhabitants of the Dholi area, live in poor conditions.

A majority of their income is generated from the sale of livestock, which appear to be of poor quality. Some additional income is generated by the men who work as labourers in the nearby populations centers such as D.G Khan. According to the local people agriculture production is at the subsistence level. A small irrigation scheme for about 50 ha utilizes flood flows from the nearby Siri Nallah. Millet and sorghum are grown in the summer and wheat is cultivated during the winter months. Fruit and vegetable production are minimal. Access to markets is limited due to poor condition of the road to Pakhi Munh. Water supplies are scarce and a precious commodity in the arid environment of the catchment area. A spring located near Dholi provides perennial water supply for the village.

Although the area has limited potential for resource development due to low rainfall, steep lands and an inherently high-energy hydrologic system, there is scope for preventative and rehabilitative watershed management measures on the sloping lands and the valley bottoms where a majority of the people reside. There is also potential for improvement of the farming and grazing systems through introduction of conservation farming methods and grazing control measures, improvement of water supplies; and for introduction of additional income generating activities.

## 2. Host country strategy

In the 7th Five Year Plan (1988-1993) the Government of Pakistan has provided for the preparation of a Master Plan for Watershed Management (Forestry Sector Master Plan, Pakistan, 1991)

The Government of Pakistan has also recognized the need for further development of the Dera Ghazi Khan hill torrents. In 1984 the Government of Punjab conducted a flood management study which included the D.G. Khan hill torrent areas. In 1991 a PC1 was prepared for the Pilot Project Mithawan Hill Torrent. In 1992, at the request of GOP, the government of Japan conducted a feasibility study on development of irrigation based on flood flows of D.G. Khan hill torrents. The Japan International Cooperation Agency conducted the study and has recently prepared the draft report "Basic Design Study Report on Mithawan Hill Torrent Pilot Project in Punjab" which includes a watershed management component.

## 3. Prior or on-going assistance

At present there are no active watershed management projects in the Punjab Province.

The FAO/UNDP, PAK/88/05 Project, Watershed Planning and Management is in operation in Balochistan Province. Also, the FAO /Italy GCP/INT/542/ITA, Inter-regional Project for Participatory Upland Conservation and Development is underway in this province.

The FAO/UNDP, PAK/87/009 Project, Suketar Watershed Management is in operation in Azad, Jammu and Kashmir.

Two additional projects related to the watershed management sub-sector are in operation in Balochistan.

1. FAO/UNDP, PAK/88/050 Project, Feed Resources Development,
2. FAO/UNDP, PAK/88/071 Project, Integrated Livestock Development.

The Mithawan project is somewhat unique in bio-physical and social characteristics (as described above). However, project management will evaluate the outputs produced, methods used, and lessons learned in the above projects and utilize the techniques, deemed applicable.

#### 4. Institutional framework of subsector

In the D.G Khan District, the Irrigation and Power Department (IPD) is responsible for forestry in the irrigated and canal areas. The Forestry Department (FD) has responsibility for forestry and watershed management in the hilly and non-irrigated pachad areas. Initially the project will operate in the hilly areas of Dholi with some small scale irrigation schemes being included. Eventually it is envisaged that the project will expand operations to other areas in the Mithawan Watershed and other catchments in the D.G. Khan Hill Torrent.

This project will require inputs from the Forest Department; the Irrigation and Power Department; the JICA Grant Aid, Mithawan Hill Torrent Pilot Project; and the FAO/Japan Trust Fund Watershed Management component; plus, assistance from Agriculture, Livestock, Land Reclamation, and other agencies.

In view of the multi-national and -international inputs required, it is proposed that the project counterpart staff be under the direction of a District level Coordination Committee that would consist of five persons: the Conservator of Forests, IPD; the Conservator of Forests, D.G.Khan, FD; the National Project Director; the field supervisor, JICA ; and the CTA,FAO.

#### B. Project Rational/Justification

##### 1. Pre-project situation

The present situation in the proposed project area which includes Dholi village is described below.

As previously stated the local people in the project are not conservation minded nor have they supported past afforestation and range improvement efforts by the Government. However, these rural people are keenly aware of the present condition of the land which continues to deteriorate and they appear to be amenable to participate in upland conservation if the programme will in some way directly benefit them.

The people are poor, living a subsistence lifestyle. The economy of the area is mostly pastoral with small scale subsistence agriculture occurring in the irrigated lands (approximately 50 ha). Agriculture production is limited to wheat in the winter and millet and sorghum in the summer. Water and soil conservation measures are not practiced on the farm lands or in the waterways that have been constructed for distribution of water.

The lands surrounding Dholi village have sparse vegetation cover due to overgrazing and removal of shrubs and trees for fuelwood. The annual regrowth of biomass is mostly removed from these areas due to these constant pressures and inherently slow vegetation growth in this semi-arid area.

The scarcity of water is a limiting factor regarding development in the area.

Poor access to the main highway at Pakhi Munh is a constraint for overall development of Dholi and nearby inhabited areas.

Watershed planning and implementation with direct input from the local people has not been attempted in the D.g. Khan watersheds. Bio-technical (vegetation) erosion control measures need to be developed for this semi-arid region.

## 2. End of project situation

It will take several years for watershed management measures to be effective, for expansion of activities and for changing the attitudes of the local people throughout the D.G. Khan, hill torrent catchments. The long term horizon for watershed management throughout the D.G. Khan hill torrent areas is 10-15 years.

The situation expected in the Dholi area at the completion of the initial implementation phase of the project is as follows.

Participatory methods will be developed for direct involvement of the local people in planning, implementing and maintaining upland conservation measures and for improving their livelihood through income generating activities. These methods will be applicable, to a large degree, in other areas of the Mithawan watershed and other D.G. Khan hill torrent catchments.

The local people (men, women and children) will have increased awareness of the need for conservation of the plant, soil, water and animal resources of their environment.

Development of water resources should provide more reliable water supplies for agriculture, livestock, wildlife and domestic use.

Vegetation cover on the sloping lands will be increased through introduction of grazing systems and micro-niche afforestation methods with the result of increased forage and fuelwood production and more stable watershed condition.

Wildlife will also benefit as increased vegetation cover and water development will improve habitat for game birds, deer and wild boar. There may be scope for wildlife management and controlled hunting when the habitat improves to levels that can sustain adequate populations. Managed hunting could be a source of local derived income. The Community Organization would be the mechanism for implementing such a plan.

To the extent possible, income generating interventions which are suitable and fully supported by the people, will be introduced.

The road from Rakhi Munh to Dholi will be improved with associated improved access for transport of goods and services to and from Dholi.

Bio-technical erosion control measures for this semi-arid region will be developed that will be applicable to other areas in the region.

Government staff will have competence and management capability in participatory watershed management (WSM) planning, implementation and maintenance of preventative and rehabilitative WSM methods.

The above results are expected to produce a higher and more sustainable standard of living for the inhabitants of the Dholi area.

With expanded application of the methods developed in this phase, similar results can be expected in other areas of the Mithawan and adjacent hill torrent watersheds.

### 3. Target beneficiaries

The target beneficiaries are twofold: (1) the inhabitants of the Dholi area who will also receive direct benefits, and (2) the downstream dwellers who will indirectly benefit from the upland conservation measures as the watershed becomes more stable with lower peak flows and lower sedimentation rates.

### 4. Project strategy

A process oriented approach is proposed to facilitate cooperation and participation of the local people in all phases of project operations. Qualified people from Dera Ghazi Khan will be used as group promoters to facilitate communication and active interchange between the project and the people. Community Organization(s) will be the mechanism employed for involvement of the local people in project activities.

This Project will be introducing the concept of integrated watershed management with direct participation of the rural people in the D. G. Khan Hill Torrent watersheds. Therefore, it is proposed that initial project operations be conducted in an area of concentration. This approach will be used to develop new or modify existing technologies for: (1) conservation of soil and water; (2) obtaining rural people's direct involvement in the planning, implementation and maintenance of these technologies; (3) development of the mechanism for conservation education; and (4) to provide costs and economic data for these technologies; plus, (5) these data will provide a base for feasibility and pre-investment surveys; and, (6) this programme will be a forum for development of government competence and capability in participatory approaches to integrated watershed management.

The Dholi area is proposed for initial interventions. However, it is anticipated that project operations will extend beyond this site as the programme progresses and the local people gain confidence in the objectives and activities of the project.

Project operations are envisaged to be conducted in two phases, these being:

Phase 1. Mobilization (six(6) months): The primary objectives of this phase would be: collection and assessment of baseline socio-economic data from the project area; begin initial contacts with the local people in the project area with a start towards establishment of a viable Community Organization; and begin collection of baseline bio-physical data for initial assessment of the potential for interventions in soil and water conservation and range management.

During this phase the JICA Contractor would establish with Japan Grant Aid the facilities and purchase equipment for this Project's operations. These inputs are outlined in the Basic Design Study Report on Mithawan Hill Torrent Pilot Project, November 1993.

Phase 2. Project Implementation (46 months): During this phase a resource development programme will be started, with direct inputs from the local people, with the goal of rehabilitation of the vegetation, soil and water resources of the Mithawan Watershed; and, Community Organization(s) will be established with members that will be trained to maintain systems and structures developed by the project.

A flow chart illustrating project strategy for achieving project objectives is presented in Annex V.

#### 5. Institutional framework and counterpart support capacity

As stated on Section A.4. the Watershed Management project staff will be under the supervision of the District Coordination Committee.

The counterpart staffing proposed for the Project include:

- National Project Director
- Divisional Forest Officer,
- Watershed Management/Extension
- Sub-Divisional Officer, Extension
- (male)
- Sub-Divisional Officer, Extension
- (female)
- Sub-Divisional Officer, Range
- Sub-Divisional Officer, Watershed Management
- Support Staff

The staffing requirements and associated (in kind) expenditures are not expected to over extend the support capacity of the Irrigation and Power Department and the Forest Department.

A organizational diagram of the project is illustrated in Annex IV.

#### 6. Reasons for assistance from FAO/Government Cooperative Programme

The proposed Mithawan Hill Torrent Pilot Project is comprised of flood dispersion facilities and a watershed management component. The Government of Pakistan and the Government of Japan has requested that FAO, with its world-wide experience in watershed management development programmes, provide the technical assistance for the watershed management component of the project.

#### 7. Special considerations

People's participation in upland conservation is essential for sustaining the development process; including continuity of the process after withdrawal of the project. Sustainable management of natural resources implies proper use and the appropriate knowledge, attitudes, and skills of the people who will utilize these resources.

Participatory rural appraisal techniques will be used to achieve active participation of the rural population in the development process. The techniques used in this method include: identification of local community and farm problems; prioritization and selection of appropriate solutions; and planning, implementation, monitoring and evaluation of activities.

Community Organization(s) will be established to facilitate implementation of selected interventions.

All technical packages will be evaluated in terms of their impact on female labour inputs, income generation and overall impact on the household. Female extension officers, consultants and group promoters will be utilized to interact with women in the project area.

At present there are no national or international NGO's operating in the proposed project area. Project management will encourage inclusion of these important entities in overall development of the project area.

There are no known negative impacts that would occur during implementation of the project.

#### 8. Coordination arrangements

Three organizations will be involved in project operations: (1) the Government of Punjab; (2) the Japan International Cooperation Agency (JICA); and (3) the FAO. Therefore field level coordination will be essential for smooth and timely implementation of the project.

Linkages with agriculture (horticulture, agronomy, extension), livestock, land reclamation and other line agencies that may be identified as the programme progresses will also be necessary. These linkages will be facilitated through the Project Coordinating Committee (refer to Section A.4).

A diagram of the proposed coordination arrangement at district level is presented in Annex III.

Timely field cooperation between the JICA contractor and FAO field staff (CTA) is essential regarding the watershed management works to be provided by the Japan Grant Aid Programme. It is important that the Community Organization in Dholi be functional to facilitate input from the community with respect to decisions regarding implementation of any works carried out by FAO and JICA.

C. Development Objective

The development objective is stabilization of the D.G Khan hill torrent watersheds and simultaneous improvement of the livelihood of the upstream inhabitants and downstream dwellers of these catchments. This objective is in line with Government priorities to rectify income disparities and achieve poverty alleviation, and to conserve the natural resources of the country.

D. Immediate Objectives, Outputs and Activities

Immediate Objective 1: Soil and water conservation measures will be tested and implemented in the Dholi area with direct participation of the local people.

The following outputs and activities will be carried out in the Dholi Area unless stated otherwise.

Output 1.1 Participatory rural appraisal conducted in the Dholi area.

(PARTIES RESPONSIBLE)

Activity 1.1.1 Conduct a participatory rural appraisal of the area.  
CONSULTANT, SDFO'S Extension(Ext.)

( C T A ,

Output 1.2 Bio-physical survey conducted in the area.

Activity 1.2.1 Conduct a bio-physical survey of the area.  
(CTA, DFO, SDFO's Range & WSM)

Output 1.3 Community Organization(s) established in the project area to facilitate inputs from the local people in project's decision making process.

Activity 1.3.1 Establish Community Organization(s) consisting of the local people from the project area.

(CONSULTANT, GROUP PROMOTERS, SDFO'S EXT.)

Output 1.4 Community watershed management plan prepared.

Activity 1.4.1 Prepare a Community watershed management plan to include participation of the Community Organization in the planning process.

Output 1.5 Multi-purpose nursery established for propagation of grasses, trees, fruit trees and agriculture plants.

Activity 1.5.1 Establish a multi-purpose nursery in cooperation with JICA. (CTA, JICA, DFO)

The outputs and activities listed below will be produced and carried-out with hands-on assistance from the local people.

Output 1.6 Bio-technical erosion control measures will be tested in the project area using contour strips and drainage planting of *Saccharum munja*, a native grass, and *Vetiver* spp. which are native to Pakistan.

Activity 1.6.1 Establish bio-technical erosion control trials in selected areas with contour and drainage planting of *Saccharum munja* and *Vetiver* spp. (CTA,APO,DFO)

Output 1.7 Grazing Association established in the project area to improve management of grazing areas.

Activity 1.7.1 Through the Community Organization establish a Grazing Association consisting of local herd owners who have grazing rights on the lands adjacent to Dholi village. (CONSULTANT, APO, SDFO Range)

Output 1.8 Simple rotation grazing system will be introduced on selected grazing lands adjacent to Dholi village.

Activity 1.8.1 Implement, to the extent possible, simple rotation grazing system on selected grazing lands.

(CONSULTANT, APO,SDFO Range)

Output 1.9 Afforestation of selected areas with appropriate native tree species using the micro-niche planting method (seedlings are planted only on micro-sites that are suitable for plant growth and that can be protected from grazing animals) with a goal of establishment of a few trees, e.g. 25-50 per hectare, depending on site conditions, in drainages and on sloping land.

Activity 1.9.1 Afforestation of selected areas with native species to be carried out using the micro-niche planting method with the number of trees per hectare and number of hectares to be determined according to local site conditions.

(CTA,APO,DFO)

Output 1.10 Remote monitoring station, for measuring peak flows and suspended sediments during the runoff periods, installed in the subwatershed(Dholi Chur) adjacent to Dholi village where JICA and FAO conservation activities will be conducted.

Activity 1.10.1 Install a remote monitoring station in Dholi Chur for measuring peak flows and suspended sediment transport during runoff periods. (CTA, APO)

Note: JICA will be conducting watershed management works in the Dholi area that are related to achievement of Objective 1. These works are described in Section E.3. Items 2 (Check dams),3 (Contour bunds) and 6 (Nursery establishment).



Immediate Objective 2: Community and on-farm conservation and income generating measures will be established in the Dholi area with direct cooperation of the residents and local farmers.

Output 2.1 On-farm soil and water conservation and production enhancement measures, that are acceptable to the farmers will be carried out, on selected farms.

Activity 2.1.1 Listed below is a "menu" of on-farm measures that will be offered to the farmers to improve production, increase income and conserve soil and water. The interventions that are implemented and the extent of application of these measures will be dependent on the farmers.  
(CONSULTANTS,CTA)

- simple soil and water conservation measures such as, control and disposal of surface water, planting of grass(Vetiver spp.) on terrace risers;
- improvement of agriculture cropping systems;
- improvement of soil fertility;
- introduction of permanent tree cash crops, where applicable;
- introduction of improved varieties of wheat,sorghum,millet;
- improvement of vegetable production;
- improved/more efficient irrigation and drainage systems;
- increased forage/fodder production.

Output 2.2 A survey of livestock numbers and quality will be conducted with livestock improvement strategies being identified and implemented to the extent possible.

Activity 2.2.1 Conduct a survey of livestock numbers and quality and identify strategies for livestock improvement, and initiate improvement programme.

(CONSULTANT, SDFO Range)

Output 2.3 Water supply improvements carried out in the project area.

Activity 2.3.1 Following detailed survey of the project area establish new water supplies for livestock, small scale irrigation and domestic use; either with vertical or horizontal drilling methods and by construction of small ponds. (CTA,JICA)

Note: JICA outputs related to Output 2.3 that will be carried out in the project area are listed in Section E.3. Items 1 (small impounding pond), 4 (well drilling works) and 5 (weir).

Output 2.4 Feasibility study conducted to identify appropriate cottage industries for women with implementation of one or more of appropriate income generating schemes.

Activity 2.4.1 Conduct a feasibility study to identify cottage industries appropriate for the women in the project area.

(CONSULTANT)

Activity 2.4.2 Implement one or more of the industries identified in Activity 2.4.1.  
(SDFO EXT.,GROUP PROMOTERS)

Activity 2.4.3 Conduct marketing study and develop strategies for marketing of agro-based and cottage industry products. (CONSULTANT)

Note: An additional JICA output that is related to Objective 2 is improvement of the road between Rakhi Munh and Dholi (Section E.3, Item 7.

Immediate Objective 3. The local people in the project area will receive training in planning, implementing and maintaining project interventions and in conservation management of the natural resources of their lands.

Output 3.1 Practical training conducted in planning, implementing and maintaining of project interventions.

Activity 3.1.1 Conduct practical field training and demonstration for members of the Community Organization including farmers with respect to the conservation and income generating interventions implemented by the project. (CONSULTANTS,APO,SDFO EXT.)

Activity 3.1.2 Conduct study tours for members of the Community Organization to areas where appropriate conservation and income generating methods are being implemented.  
(APO,SDFO EXT.)

Output 3.2.2 Conservation education programme established in the project area.

Activity 3.2.1 Develop and implement a Conservation Education programme for the men, women and children in the project area to include provision of extension materials such as illustrative posters and flip charts depicting the methods for and benefits of using conservation measures.  
(CONSULTANT,APO,SDFO EXT.)

Activity 3.2 Train the local teachers in conservation principles and provide extension materials for the schools.

(CONSULTANT, APO, SDFO EXT.)

#### E. Inputs

##### 1. Government Inputs

##### 1.1 Personnel:

National Project Director(1)	12 mm
Division Forest Officer(1)	52 mm
Sub-Division Forest Officer Extension (male) (1)	52 mm
Sub-Division Forest Officer Extension (female) (1)	52 mm
Sub-Division Forest Officer Range (1)	52 mm
Sub-Division Forest Officer Watershed Management (1)	52 mm
Support Staff (25)	1300 mm

A provision of Rs 2,143,500 has been allocated for personnel.

1.2 A provision of Rs 424,200 has been allocated for travel expenses of government staff.

1.3 Funds totalling Rs 1,484,600 have been provided for operating expenses and contingencies.

## 2. Japan Trust Fund Inputs

### 2.1 Personnel

#### International

##### Experts:

- Chief Technical Adviser, 40 mm \$488,200

##### Consultants:

- Range Management, 3 mm \$47,200  
 - Conservation Education, 1.5 mm \$23,600  
 - Assoc. Professional Officer  
   Watershed Mgt., 48 mm No cost to project  
 - Assoc. Professional Officer,  
   Extension, 48 mm No cost to project

[The two Associate Professional Officers (APOs) will be requested through FAO Headquarters, however, their actual posting depends upon establishment of APO positions by participating governments.]

#### National

- Community Development Adviser, 51 mm \$76,000  
 - Group Promoters (12), 395 mm \$118,600

##### Consultants:

- Socio-economics, 6 mm \$8,500  
 - Miscellaneous, 25 mm  
   (e.g. horticulture, cottage  
   industries, livestock, Agric.  
   marketing, forage/fodder, etc.) \$33,800

2.1.1 Support Personnel: A provision of \$33,400 is made for FAO administrative support staff.

- Administrative Assistant(1), 52 mm \$36,200  
 - Messenger/Clerk(1), 52 mm \$26,100  
 - Driver(1), 52 mm \$26,100

2.2 Duty Travel: An allocation of \$25,000 is provided for in-country travel of international personnel.

### 2.3 General Operating Expenses:

a)	Operation and Maintenance	\$30,000
b)	Mission Costs	
	- Project Evaluation	\$15,000
	- Technical backstopping	\$10,000
c)	Reporting	\$ 7,000

2.4 Supplies and Materials: An allocation of \$57,800 is provided for office supplies, materials/supplies for nursery operation, hand tools, improved seeds, seedlings, grass slips, production of extension materials and other materials/supplies required for project operations.

### 2.5 Furniture and Equipment:

- Pickup, 4x4, dual cab (1)	\$24,000
- Utility vehicle, 4x4, 10 person(1)	\$28,000
- Field survey/biomass, surface erosion (1 lot)	\$10,000
- Field equipment for training local people (1 lot)	\$ 6,300
- Hydro-sediment monitoring equip. (1 lot)	\$12,000
- Calculators (10)	\$ 700
- Motor cycles (3)	\$ 6,000
- Furnitures (site office, project headquarters) (1 lot)	\$ 3,000
Total	\$90,000

2.6 Training: Funds totalling \$75,000 are provided for conducting in-country study tours, field practicums, and conservation education classes

### 3. Additional Inputs and Arrangements

The following inputs and outputs will be provided by the JICA Grant Aid programme for the Mithawan Hill Torrent Pilot Project (JICA, November 1993).

#### Watershed Management facilities/equipment:

1).	Small impounding pond	:	one(1) site
2).	Check Dams	:	
3).	Contour bunds	:	3,200 m
4).	Well drilling works	:	two(2) sites
5).	Weir	:	one(1) site
6).	Nursery site (50 m x 100 m)	:	0.5 ha
7).	Road improvement(Rakhi Munh to Dholi)	:	eight(8) km
8).	Project main office	:	2,000 m <sup>2</sup>
9).	Site office	:	660 m <sup>2</sup>
10).	Training office	:	190 m <sup>2</sup>

## 11). Procurement of training machinery and equipment:

- Tractor (W/Lorry)	:	two(2) nos
- Horizontal bowling machine	:	one(1) no
- Computer (W/Printer)	:	two(20) nos
- Copy machine	:	one(1) no
- Tele-communication (Facsimile)	:	one(1) L.S.
- Typewriter	:	one(1) no
- Audio visual equipment Video system	:	one(1) L.S.
Slide system	:	one(1) L.S.
O.H.P. system	:	one(1) L.S.
Camera	:	two(2) nos
- Office furniture (desk, chair, cabinet, generator, air conditioners, etc.)	:	one(1) L.S.
- Meteorological equipment	:	one(1) L.S.

F. Risks

1. The production of a majority of project outputs is dependent on the cooperation of the local people. There is a likelihood that this cooperation will not be of sufficient level to achieve the objectives. The likelihood of insufficient participation occurring is considered to be Low.

2. The timely delivery and coordination of JICA and FAO inputs and implementation of watershed management activities is essential for smooth project operations and for production of outputs. The likelihood of problems occurring in delivery and coordination of inputs and outputs between JICA and FAO is considered to be Low.

G. Prior Obligations and Prerequisites

The Government staff required for this project (refer to Section B.5) are expected to be in place prior to the start of project operations.

H. Project Review, Reporting and Evaluation

The project management will prepare every six months a Project Progress report.

Towards the end of the project and not later than six months before the end of project, the project management will prepare and send to FAO Headquarters a draft Terminal Report for technical clearance, finalization and submission to both the recipient and donor Governments/agencies at least 4 months in advance for consideration at the terminal tripartite review meeting.

An evaluation of the project is scheduled during the final year to evaluate project achievements and to make recommendations on a follow-up project.

A Terminal Tripartite Review is scheduled for the last quarter of the project to examine project achievements and to decide on eventual follow-up.

A schedule of project reporting, evaluation and review are presented in Annex II.

#### REFERENCES

FAO. 1993. Revised Mithawan Watershed Management Project Concept Paper. June 1993

GOP. 1991. Forestry Sector Master Plan, Upland Degraded Watersheds. May, 1991.

JICA. 1993. Basic Design Study Report on Mithawan Hill Torrent Pilot Project in Punjab in the Islamic Republic of Pakistan (Draft Report).

## I. BUDGETS

## A. Government Inputs (In Kind):

## 1. Personnel

	Job Title	M/M	Starting Date	Job Description	Total Cost Rs. '000'
	-----	-----	-----	-----	-----
1.	Nat. Project Director (1)	12	9/94	Project Director	
2.	Division Forest Officer (DFO)(1)	52	9/94	Watershed Mgt./ Extension	227.5
3.	Sub-DFO (Male)(1)	52	9/94	Extension	175.0
4.	Sub-DFO (Female)(1)	52	9/94	Extension	175.0
5.	Sub-DFO (1)	52	9/94	Range	175.0
6.	Sub-DFO (1)	52	9/94	Watershed Mgt.	175.0
7.	Block Officers (4)	208	9/94	WSM/Forestry/ Range	282.3
8.	Guards (4)	208	9/94	Protection	238.8
9.	Stenographer	52	9/94	Secretary	81.9
10.	Accountant	52	9/94	Accounts	99.8
11.	Clerk/Typist (7)	312	9/94	Clerical	354.0
12.	Peon (1)	52	9/94		50.9
13.	Driver (1)	52	9/94		57.4
14.	Chowkidar (1)	52	9/94		50.9
		-----			-----
	Total:				2,143.5
					424.2
					1,484.6
					-----
				TOTAL:	4,052.3

B. DONOR CONTRIBUTION (In US\$)  
Country: Pakistan

Project Title and Symbol: Mithawan Watershed Management, GCP/PAK/.../JPN

PROJECT CODES	TOTAL		1994		1995		1996		1997		1998	
	P/m	\$	P/m	\$	P/m	\$	P/m	\$	P/m	\$	P/m	\$
10. PERSONNEL												
CTA	40	488,200	4	45,500	12	141,600	12	147,300	6	76,500	6	77,300
APO Ext.	48	-----		----	12	-----	12	-----	12	-----	12	-----
APO W.S.M.	48	-----		----	12	-----	12	-----	12	-----	12	-----
Range Mgt	3	47,200		----	2	32,300		----	1	14,900		----
Cons.Ed.	1.5	23,600		----		----	1.5	23,600		----		----
Com.D.Adv.	51	76,200	3	4,100	12	18,000	12	18,000	12	18,000	12	18,100
Ntl.Cons.	31	42,300	3	4,100	3	4,100	3	4,100	11	15,000	11	15,000
Griprom.	396	118,600	12	3,600	48	14,400	48	14,400	144	43,200	144	43,000
Adm.Sup.	156	88,400	12	6,800	36	20,400	36	20,400	36	20,400	36	20,400
Comp.Total	774	884,500	34	64,100	137	230,800	136	227,800	234	188,000	233	173,800
20. TRAVEL		25,000		2,000		5,000		6,000		7,000		5,000
40. OFFICE EXPENSES		67,000		3,000		5,000		6,000		18,000		30,000
50. SUPPLIES AND MATERIALS		57,800		3,000		10,000		11,000		17,800		16,000
60. FURNITURE AND EQUIPMENT		90,000		55,600		8,600		8,600		8,600		8,600
80. TRAINING		75,000		5,000		6,000		6,000		26,000		32,000
SUB-TOTAL		1,194,300		132,700		265,400		265,400		265,400		265,400
90. PROJECT SERVICING COST (13%)		155,250		17,250		34,500		34,500		34,500		34,500
GRAND TOTAL		1,349,550		149,950		299,900		299,900		299,900		299,900



ANNEX 1

Mithawan Watershed Management Project

Tentative Work Plan page 1 of 2 pages

ACTIVITY	1994				1995				1996				1997				1998				PARTY RESPONSIBLE
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	

1.1.1 Conduct a participatory rural appraisal	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	Consultant
1.2.1 Conduct a bio-physical survey	**	**	**	**	**	**	**	*	*	*	*	*	*	*	*	*	*	*	*	CTA, DFO
1.3.1 Establish Community Organization	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	Consultant
1.4.1 Establish multi-purpose nursery	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	CTA, JICA
1.5.1 Establish bio-technical erosion control trials	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	DFO
1.6.1 Establish Grazing Association	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	CTA, APO
1.7.1 Implement simple rotation grazing system	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	Consultant
1.8.1 Afforestation with micro-niche planting method	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	CTA
1.9.1 Install hydro-sed monitoring station in Dholi Chur	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	Consultant
2.1.1 Implement on-farm conservation & income generating measures	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	CTA, APO
2.2.1 Conduct livestock survey	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	CTA
	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	Consultants
	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	Consultant

ANNEX 1 (Continued)

Mithawan Watershed Management Project

Tentative Work Plan

page 2 of 2 pages

ACTIVITY	1994				1995				1996				1997				1998				PARTY RESPONSIBLE
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
2.3.1 Establish water supplies																					CTA, JICA
2.4.1 Conduct cottage industry feasibility study																					Consultant, SDFO Ext.
2.4.2 Implement one or more of the industries identified in Activity 2.4.2																					SDFO Ext. Group Prom.
3.1.1 Conduct practical field training of Community Organization members																					CTA, APO, DFO
3.1.2 Conduct study tours																					CTA, DFO
3.2.1 Develop and implement Conservation Education programme																					Consultant APO, SDFO Ext
3.2.2 Train the local teachers in conservation principles																					Consultant, DFO
																					***
																					*****
																					*****
																					*****

ANNEX II

Mithawan Watershed Management Project

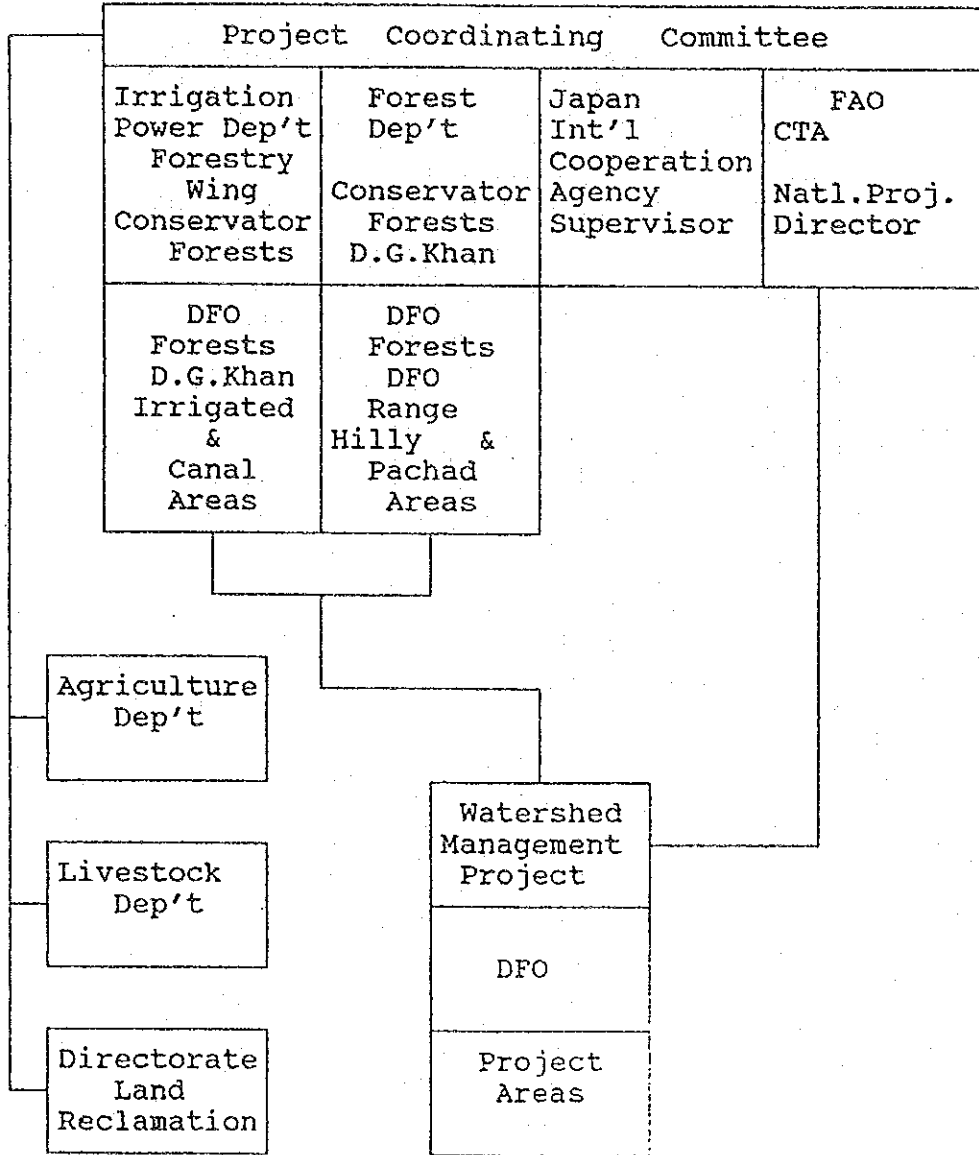
Schedule of project reviews, reporting and evaluation.

	1994				1995				1996				1997				1998			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
PR					*		*		*		*		*		*		*		*	
TE																			*	
TR																			*	
TPR																				*

- PR - Six Month Progress Report
- TE - Terminal Evaluation
- TR - Terminal Report
- TPR - Tripartite Review

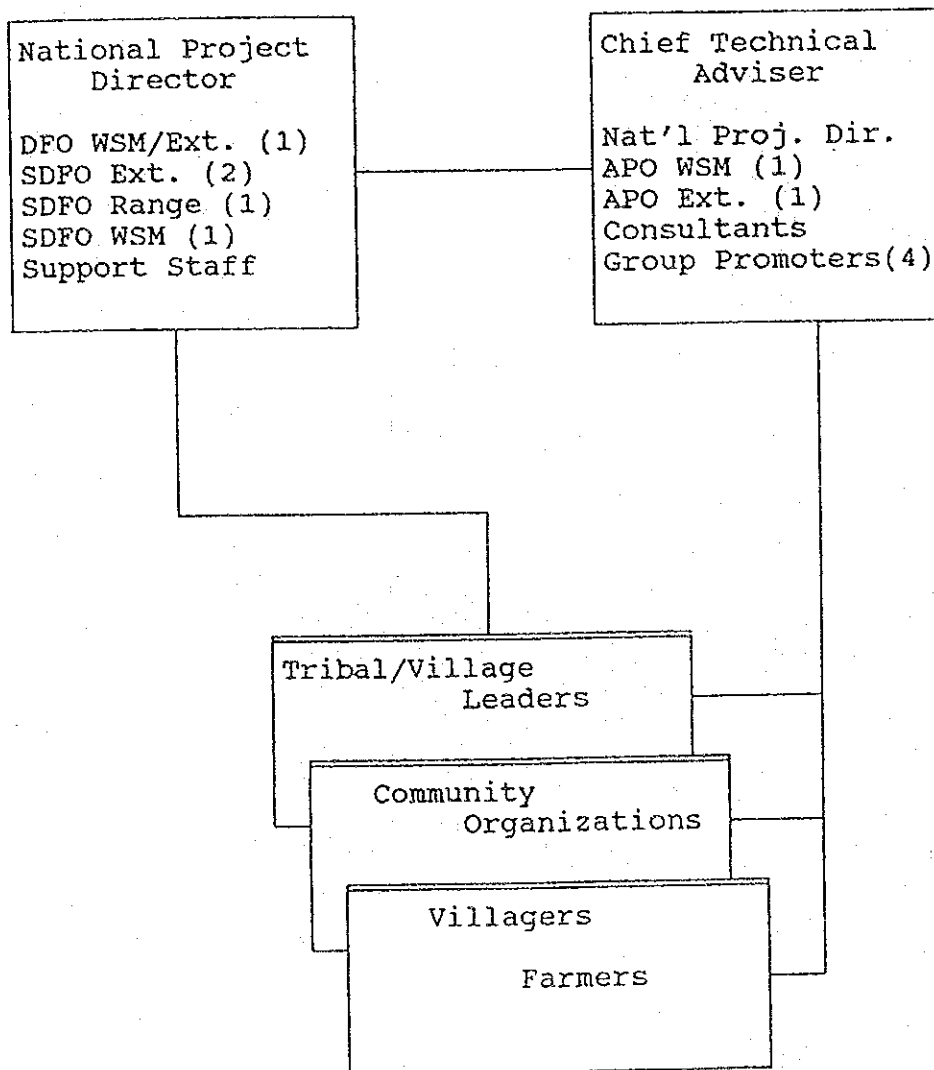
ANNEX III

Mithawan Watershed Management Project  
 District Level Organization/Coordination Chart



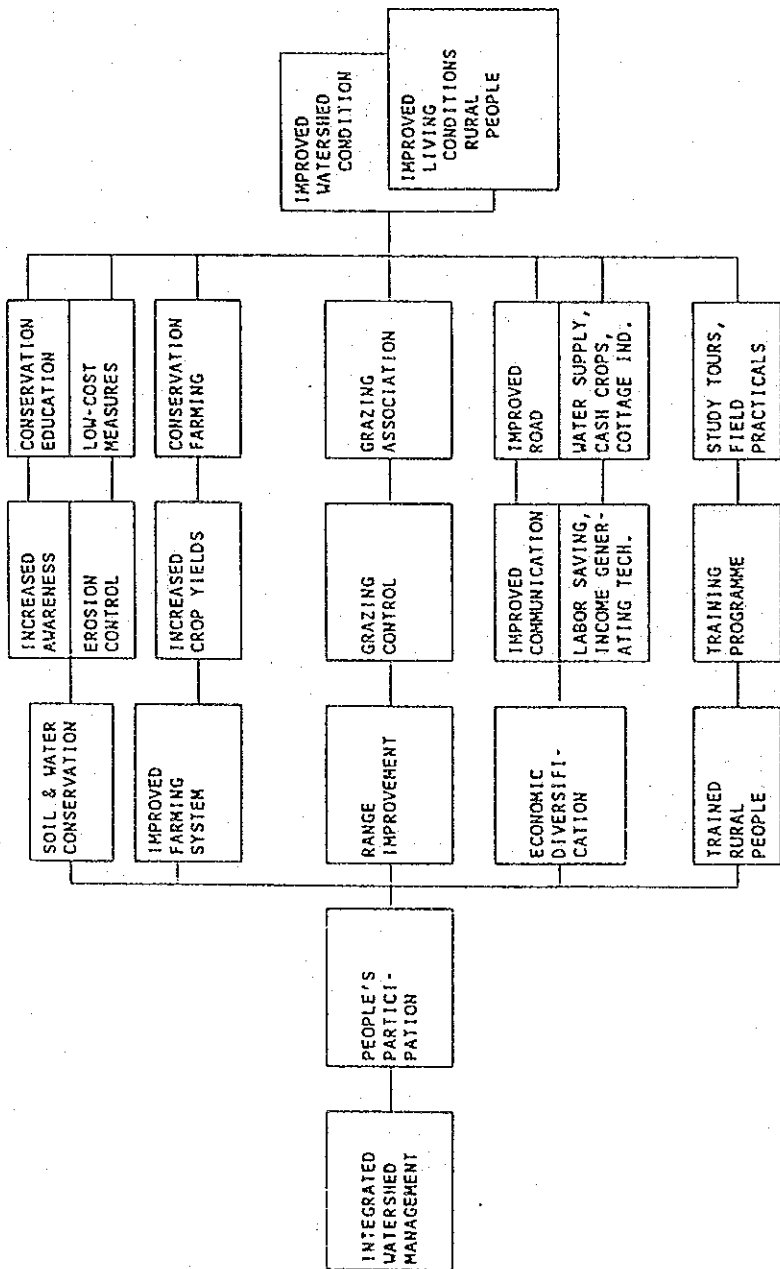
ANNEX IV

Mithawan Watershed Management Project  
Proposed Project Level Organization/Coordination



ANNEX V

Strategy for Achieving Mithauan Watershed Management Project Objectives

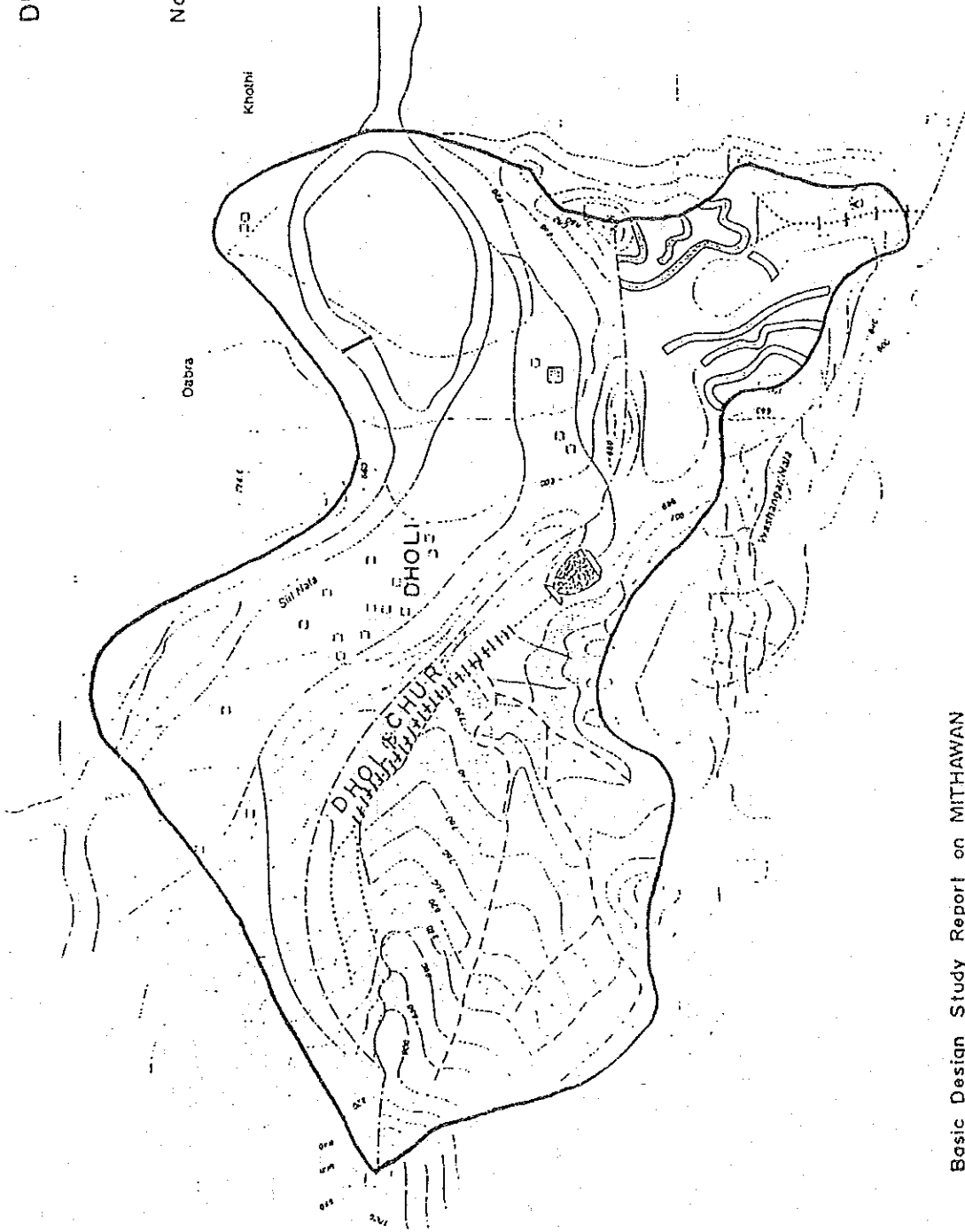


MITHAWAN WATERSHED MANAGEMENT PROJECT

DHOLI : Proposed area of Concentration for Integrated Watershed Management.

Note : Range Management Activities will extend beyond this area; As will other Activities as project Implementation Progresses

WATERSHED MANAGEMENT WORKS PROPOSED BY JICA



Basic Design Study Report on MITHAWAN Hill Terrain Pilot Project in Punjab. (Draft Report) November 93. Nippon GIKENING.

JICA

ANNEX VII

Outputs	Success Criteria	Verifiers	External Factors
<b>Related to Immediate Objective 1</b>			
1.1 Participatory rural appraisal conducted in the Dholi area.	Completion of survey	Survey report	
1.2 Bio-physical survey conducted	Survey completed	Survey report	
1.3 Community Organization(s) established.	Viable C.O.	Active participation of people	Cooperation of villagers
1.4 Multi-purpose nursery established	Nursery operational	Propagation of plants	JICA/FRO coordination
1.5 Bio-technical erosion control measures tested	Planting trials established	Survival, effectiveness of trials	Grazing control
1.6 Grazing Association established	Viable Grazing Assoc.	Control of animals	People's cooperation
1.7 Simple rotation grazing system introduced	Improved range condition	Increased biomass on rangeland	Control of animals
1.8 Afforestation of selected areas using the micro-niche planting method	Survival rate of trees planted	Number of planted trees surviving	Climatic factors Control of animals
1.9 Remote monitoring station, for measuring peak flows and suspended sediments	Gauging station operational	Collection hydro-sed data	
<b>Related to Immediate Objective 2</b>			
2.1 On-farm soil and water conservation and production enhancement measures, acceptable to the farmers carried out	Number farmers participating and types of activities accepted	Changes in farming practices Changes in types of crops raised	Cooperation of farmers



Outputs	Success Criteria	Verifiers	External Factors
2.2 A survey of livestock numbers and quality will be conducted with livestock improvement strategies being identified and implemented to extent possible	Survey completed, Degree of implementation	Survey report, Number of livestock affected by programme	Cooperation of farmers
2.3 Water supply improvements carried out	Number of wells, and ponds constructed	Wells and ponds in place	JICA/FMO cooperation
2.4 Feasibility study conducted to identify appropriate cottage industries for women with implementation of one or more of appropriate income generating schemes	Study completed, no. and type of industries initiated	Study report, industries operational	Cooperation of local women
Related to Immediate Objective 3			
3.1 Practical training conducted in planning, implementing and main-taining of project interventions	Number of persons trained	People active in carrying out interventions	Cooperation of people
3.2 Conservation education programme established	Number of persons attending Types of education materials produced	Conservation awareness of local people	Cooperation of people

VIII  
ANNEX IX

MITHAWAN WATERSHED MANAGEMENT PROJECT

CHIEF TECHNICAL ADVISER

TERMS OF REFERENCE

Under the overall supervision of the Director, Forestry Operations, the guidance of designated technical support and operations officers at FAO Headquarters, and in close collaboration with counterpart staff the Chief Technical Adviser will:

- provide the technical guidance necessary for implementation of the integrated watershed management programme;
- prepare a detailed project work plan to be included in the Inception report to be approved by FAO;
- design and implement the following:
  - methods of participatory planning, implementation, and maintenance of soil conservation measures;
  - bio-technical erosion control methods;
  - hydrology-sediment monitoring station;
- work with and advise the Forestry Department and Irrigation and Power department and other Government agencies on policy and technical issues relating to development of the Punjab watershed management programme;
- be responsible for project monitoring and reporting;
- provide supervision of and technical support to project APO's;
- provide administrative support for and supervision of short-term consultants; and
- conduct other tasks, within his/her sphere of competence, which may be required.

Duty Station: Dera Ghazi Khan

EOD: September 1994

Duration: 40 months

Language: English

## MITHAWAN WATERSHED MANAGEMENT PROJECT

### RANGE MANAGEMENT CONSULTANT

#### TERMS OF REFERENCE

Under the overall supervision of the Director, Forestry Operations, the guidance of designated technical support and operations officers at FAO Headquarters, the Chief Technical Adviser and in close collaboration with counterpart staff the Consultant will:

- assess the condition of range lands in the Dholi area;
- in cooperation with the local Community Organization form a Grazing Association comprised of local livestock herders in the Dholi area;
- design and initiate a pilot rotation grazing system;
- provide guidance to counterpart staff who will carry out the grazing programme;
- prepare detailed, self-explanatory instructions on methods of conducting the range programme;
- prepare end of assignment report with findings and recommendations;
- conduct other tasks as required that are within his/her sphere of competence.

Duty Station:	Dera Ghazi Khan (with frequent travel to Dholi area)
EOD/Duration:	February 1995, two (2) months February 1997, one(1) month
Language:	English

**MITHAWAN WATERSHED MANAGEMENT PROJECT**  
**CONSERVATION EDUCATION CONSULTANT**  
**TERMS OF REFERENCE**

Under the overall supervision of the Director, Forestry Operations, the guidance of designated technical support and operations officers at FAO Headquarters, the Chief Technical Adviser and in close collaboration with counterpart staff the Consultant will:

- design a village level conservation education programme, to include self-explanatory instructions on carrying out the programme;
- identify inputs required for establishing conservation classes in local schools
- include project extension staff in the design phase;
- prepare final report with findings and recommendations.

<b>Duty Station:</b>	Dera Ghazi Khan (with frequent travel to Dholi area)
<b>EOD:</b>	March 1995
<b>Duration:</b>	Six(6) weeks
<b>Language:</b>	English

**MITHAWAN WATERSHED MANAGEMENT PROJECT**  
**ASSOCIATE PROFESSIONAL OFFICER**  
**WATERSHED MANAGEMENT**  
**TERMS OF REFERENCE**

Under the overall supervision of the Director, Forestry Operations, the guidance of designated technical support and operations officers at FAO Headquarters, the Chief Technical Adviser and in close collaboration with counterpart staff the Associate Professional Officer will:

- assist with development of on-farm soil and water conservation measures;
- assist with development and implementation of bio-technical measures for degraded lands;
- assist with development and implementation of conservation training programme for farmers;
- conduct other tasks as required that are within his/her sphere of competence.

Duty Station:	Dera Ghazi Khan
EOD:	January 1995
Duration:	48 months
Language:	English

**MITHAWAN WATERSHED MANAGEMENT PROJECT****ASSOCIATE PROFESSIONAL OFFICER****EXTENSION****TERMS OF REFERENCE**

Under the overall supervision of the Director, Forestry Operations, the guidance of designated technical support and operations officers at FAO Headquarters, the Chief Technical Adviser and in close collaboration with counterpart staff the Associate Professional Officer will:

- assist with development of soil and water conservation extension programme;
- assist with organization and operation of Community Organization;
- assist with development of training programme for villagers;
- assist with development and implementation of conservation education programme;
- conduct other tasks as required that are within his/her sphere of competence.

Duty Station: Dera Ghazi Khan

EOD: January 1995

Duration: 48 months

Language: English

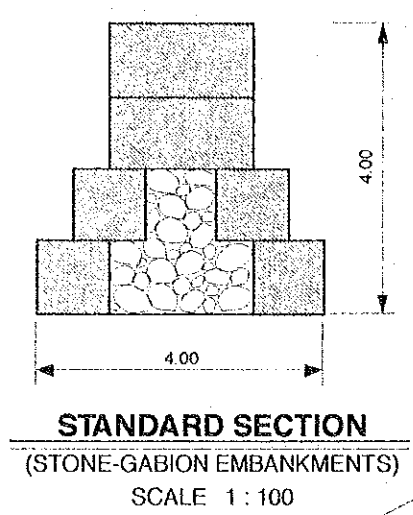
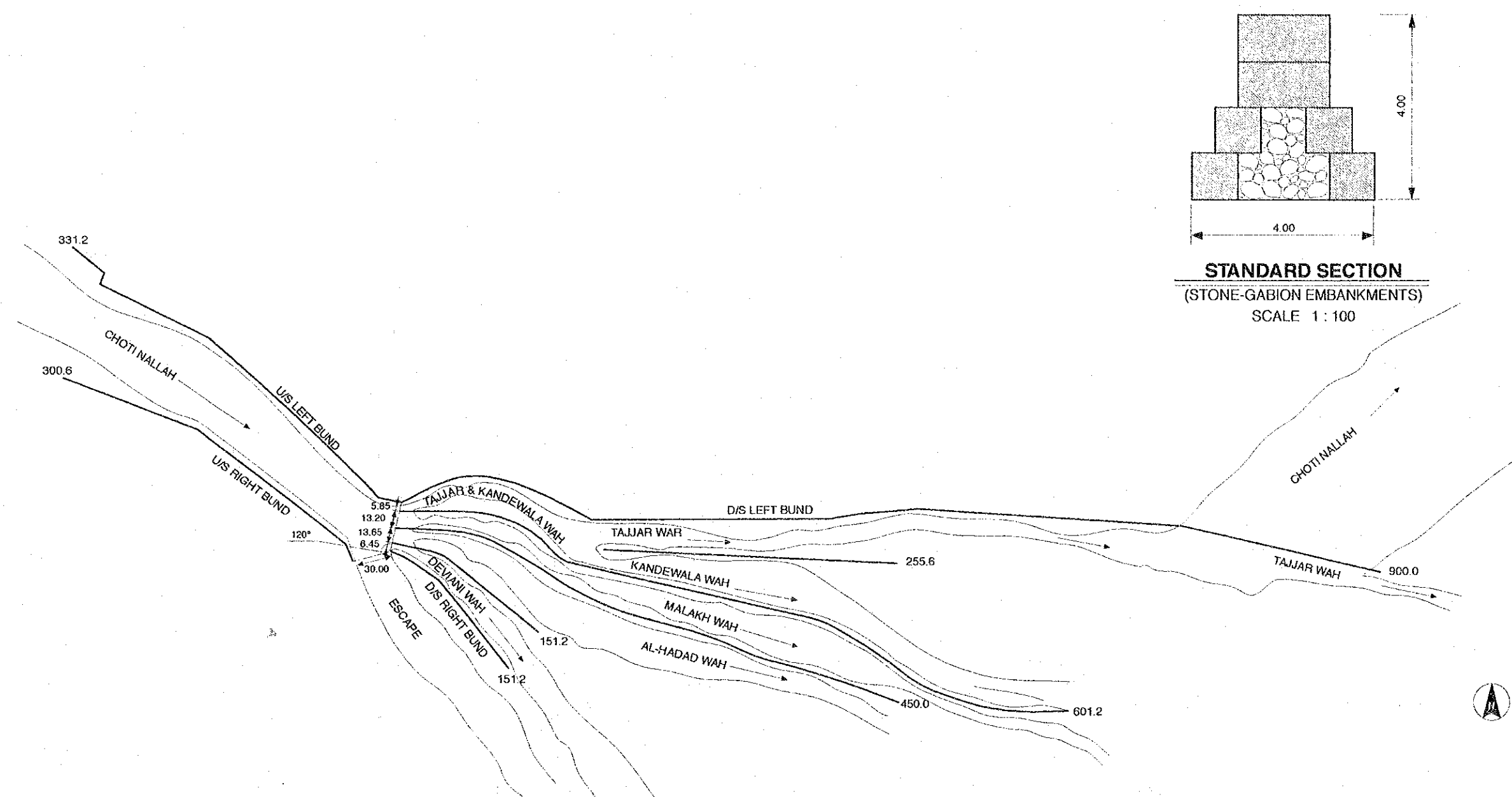
## **DRAWINGS**





## LIST OF DRAWINGS

DWG. No.	TITLE
1.	LAYOUT OF DISPERSION STRUCTURE IN CHOTI NALLAH
2.	DISPERSION STRUTURE IN CHOTI NALLAH
3.	SEDIMENT POCKET IN CHOTI NALLAH
4.	GENERAL PLAN OF WATERSHED MANAGEMENT (Dholi)
5.	SMALL IMPOUNDING POND (Watershed Management)
6.	WEIR / CHECK DAM (Watershed Management)
7.	SECTION OF CHECK DAM & CONTOUR BAND (Watershed Management)
8.	PROPOSED SITE FOR MAIN OFFICE AND TRAINING CENTER
9.	PLAN OF MAIN OFFICE (Watershed Management)
10.	SECTION OF MAIN OFFICE (Watershed Management)
11.	PLAN OF SITE OFFICE (Watershed Management)
12.	SECTION OF SITE OFFICE (Watershed Management)
13.	PLAN OF TRAINING CENTER FOR STAFF (Watershed Management)
14.	PLAN OF ROAD IMPROVEMENT (Choti - Choti Bala (1/2))
15.	PLAN OF ROAD IMPROVEMENT (Choti - Choti Bala (2/2))
16.	PLAN OF ROAD IMPROVEMENT (Sakhi Sarwar - Choti Bala (1/2))
17.	PLAN OF ROAD IMPROVEMENT (Sakhi Sarwar - Choti Bala (2/2))
18.	PLAN OF ROAD IMPROVEMENT (Rakhi Munh - Dholi (1/2))
19.	PLAN OF ROAD IMPROVEMENT (Rakhi Munh - Dholi (2/2))
20.	PLAN OF CAUSE WAY (Choti - Choti Bala)
21.	BOX CULVERT STA. 14+300 (Choti - Choti Bala)
22.	LIPRAP & IMPROVEMENT OF ROAD STA. 14+075, STA. 20+040 (Choti - Choti Bala)

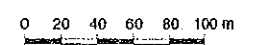


TABLE

	LENGTH (m)
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U/S LEFT BUND	331.2
D/S RIGHT BUND	151.2
D/S LEFT BUND	900.0
BUND BETWEEN DEVIANI & AL-HADAD WAHS	151.2
BUND BETWEEN MALAKH & AL-HADAD WAHS	450.0
BUND BETWEEN MASAKH & KANDEWALA WAHS	601.2
BUND BETWEEN TAJJAL & KANDEWALA WAHS	255.6
TOTAL	3,141.0

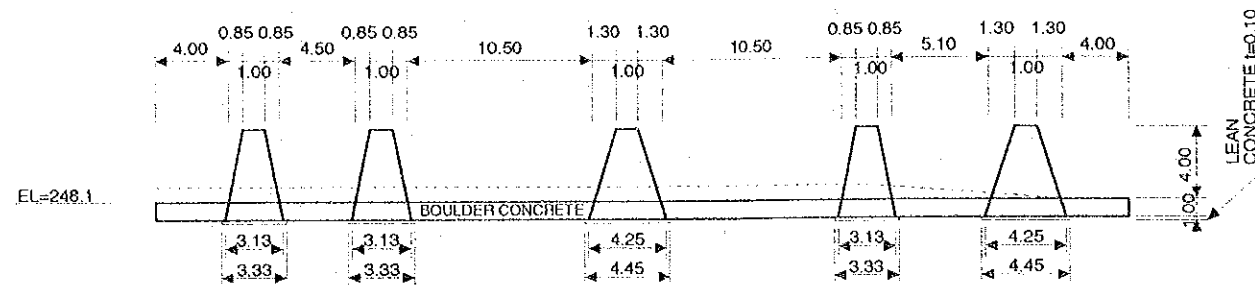
LAYOUT OF DISPERSION STRUCTURE ON CHOTI NALLAH

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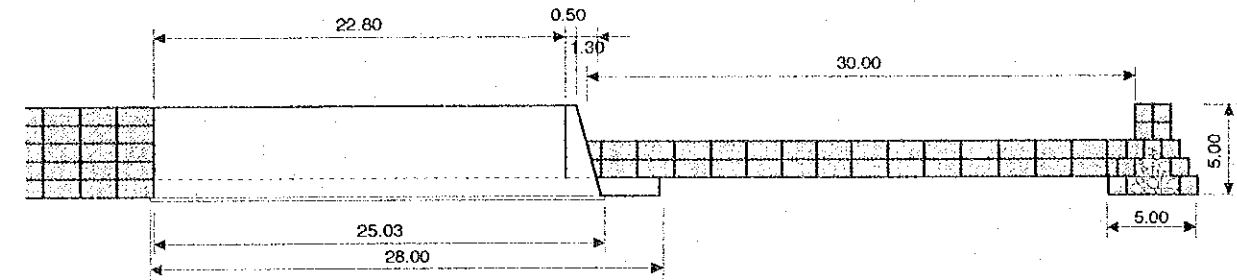


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UNIT IN METER

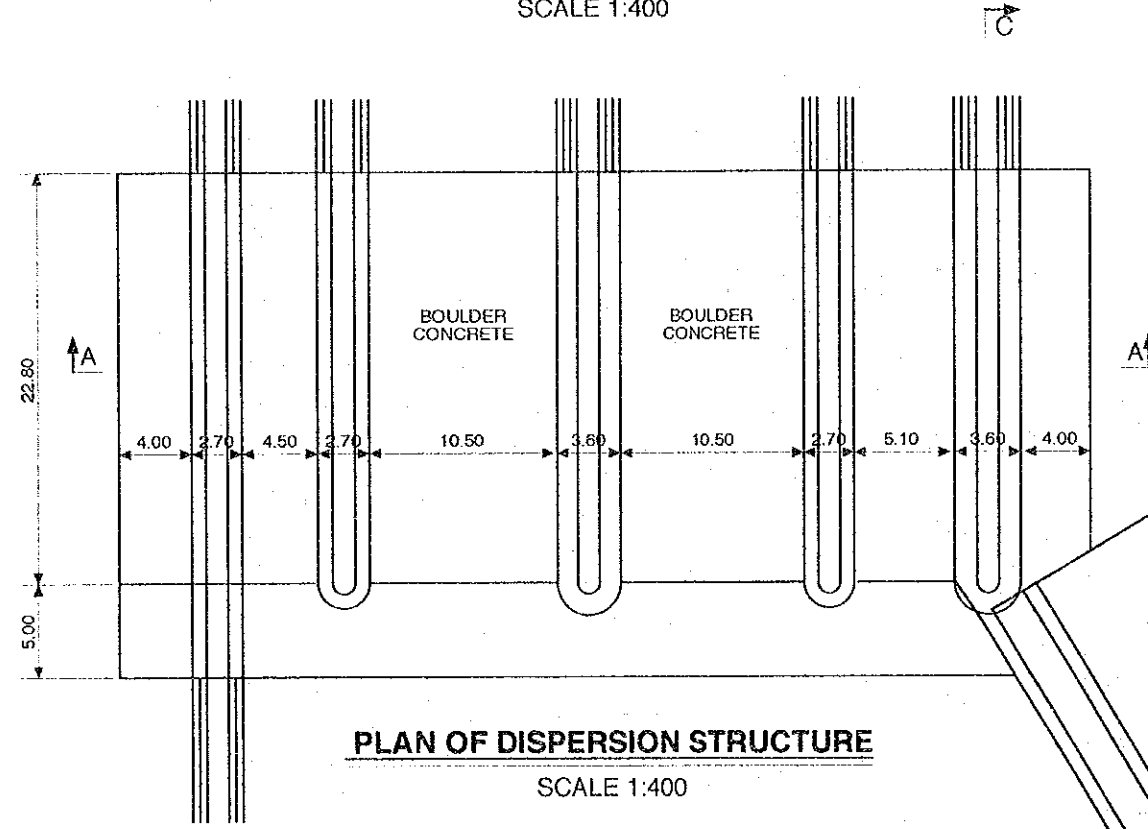
Islamic Republic of Pakistan		
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB		
LAYOUT OF DISPERSION STRUCTURE IN CHOTI NALLAH		
DATE	D.W.G. NO.	1
JAPAN INTERNATIONAL COOPERATION AGENCY		



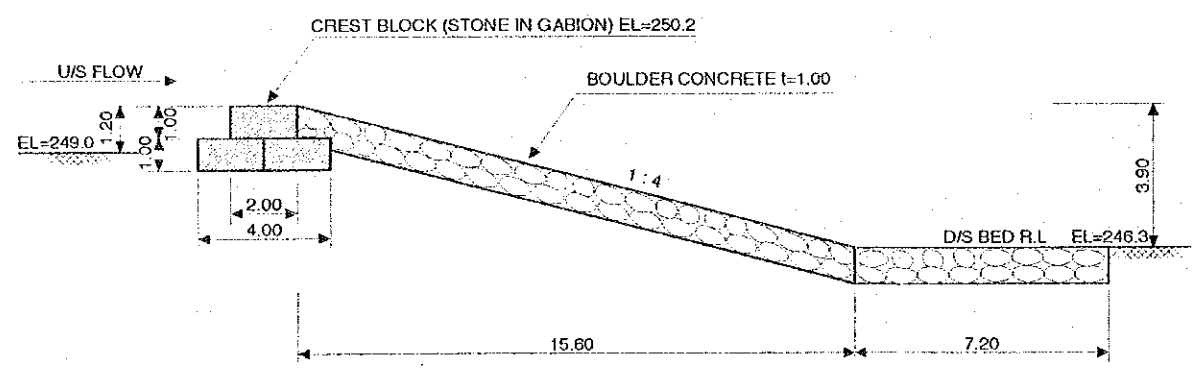
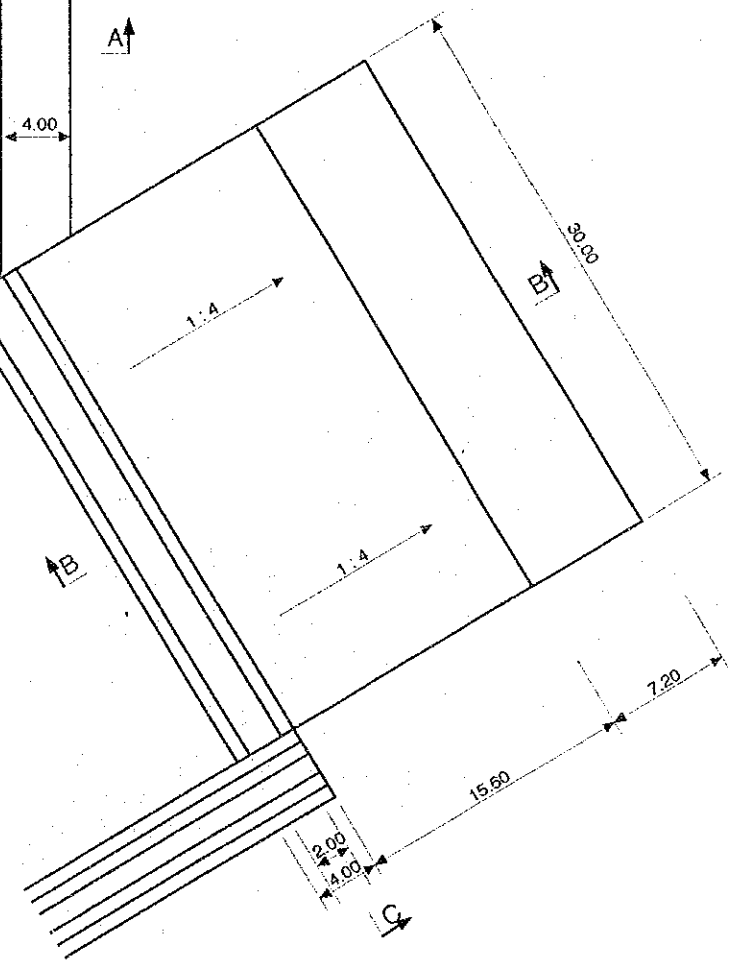
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**SECTION C-C**  
SCALE 1:400



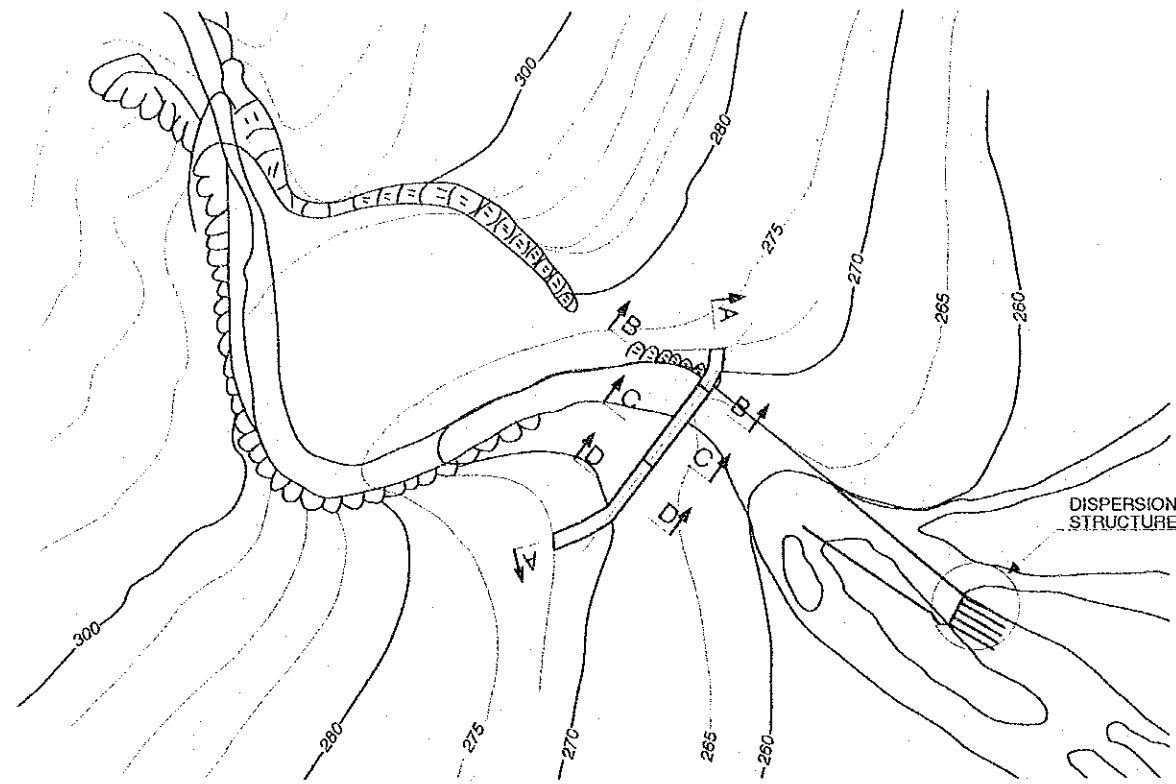
**PLAN OF DISPERSION STRUCTURE**  
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**SECTION B-B**  
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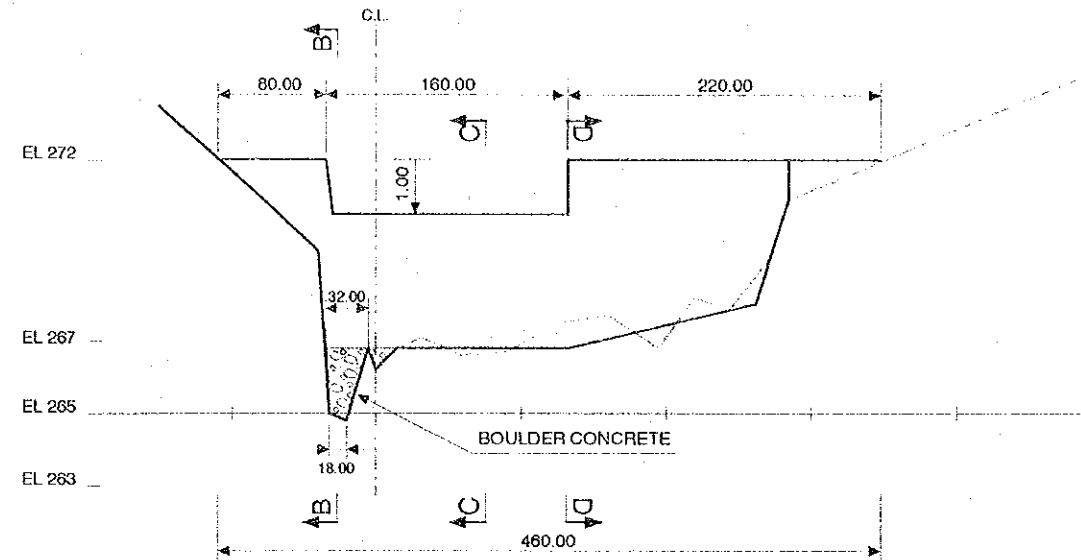
UNIT IN METER

Islamic Republic of Pakistan			
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB			
DISPERSION STRUCTURE IN CHOTI NALLAH			
DATE		D.W.G. NO.	2
JAPAN INTERNATIONAL COOPERATION AGENCY			



**PLAN OF SAND POCKET**

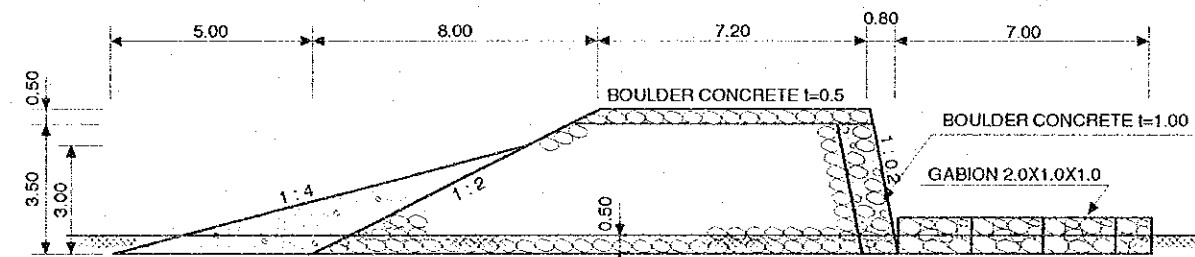
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**SECTION A-A**

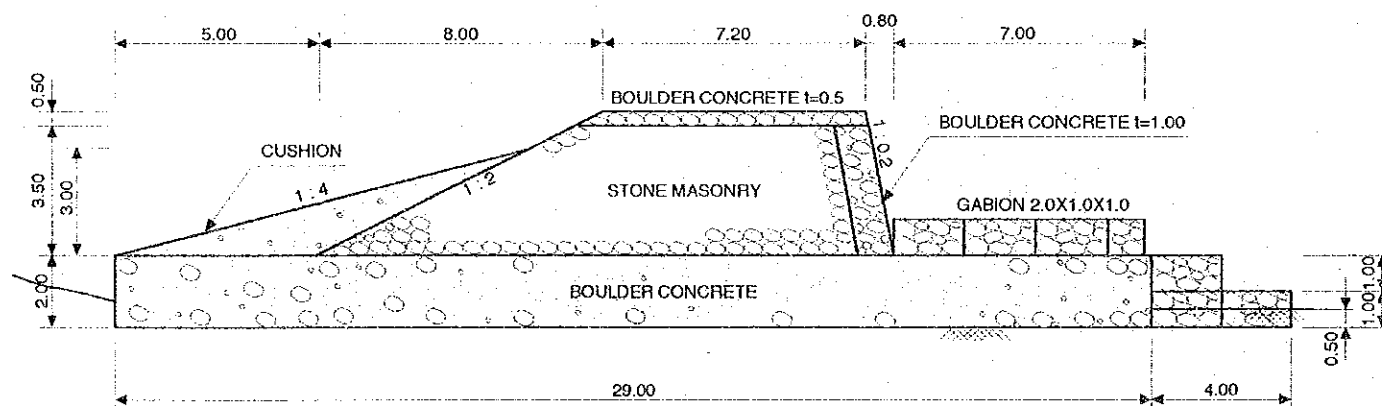
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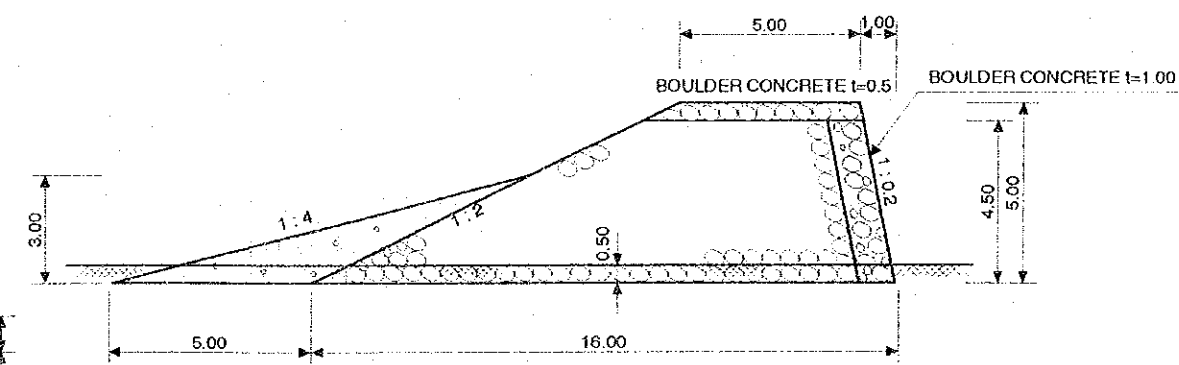
**SECTION C-C**

SCALE 1:200



**SECTION B-B**

SCALE 1:200



**SECTION D-D**

SCALE 1:200

UNIT IN METER

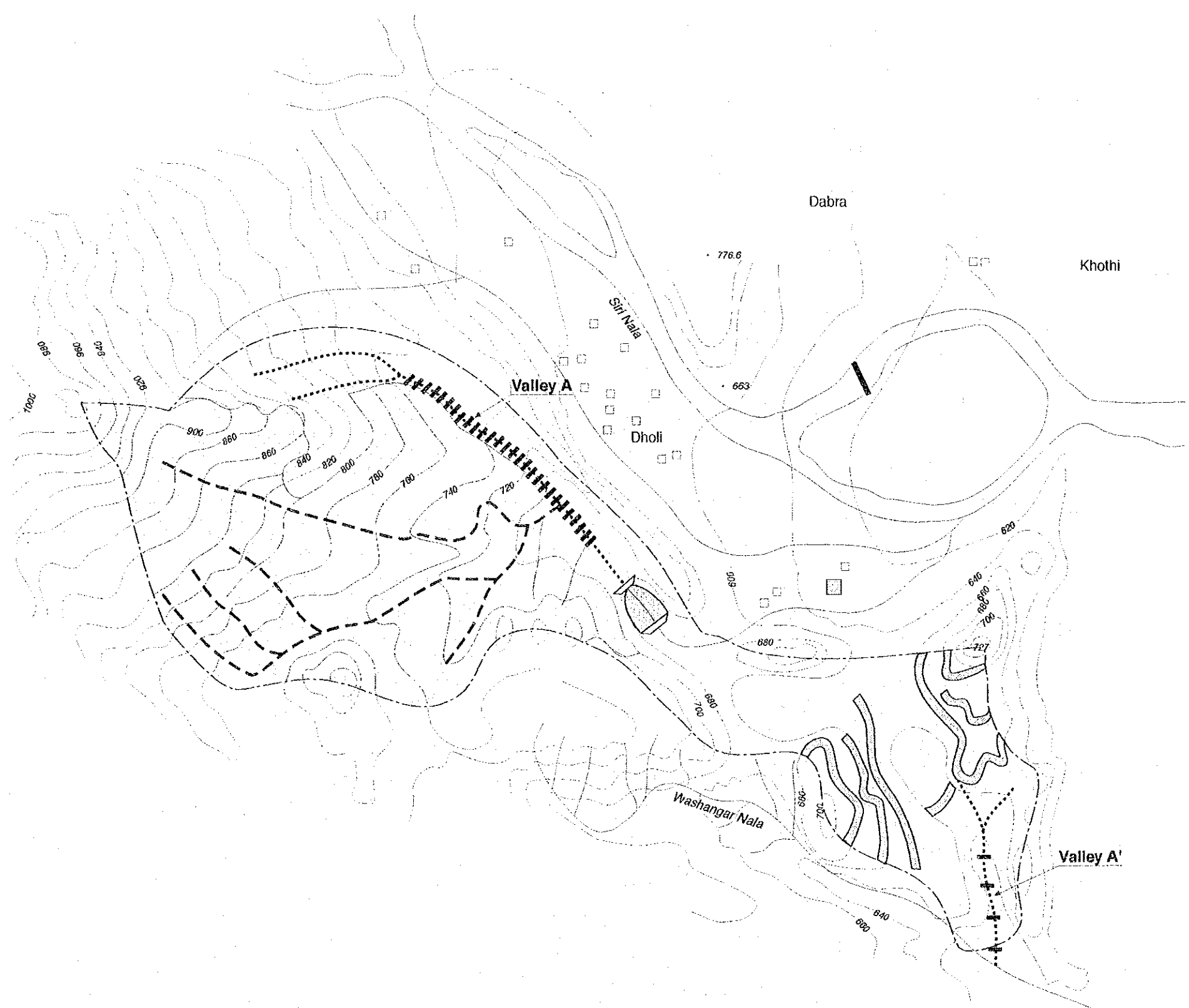
Islamic Republic of Pakistan

THE MITHAWAN HILL TORRENT  
PILOT PROJECT IN PUNJAB









SEDIMENT POCKET IN CHOTI NALLAH

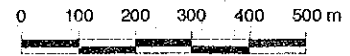
DATE	D.W.G. NO.	3
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JAPAN INTERNATIONAL COOPERATION AGENCY

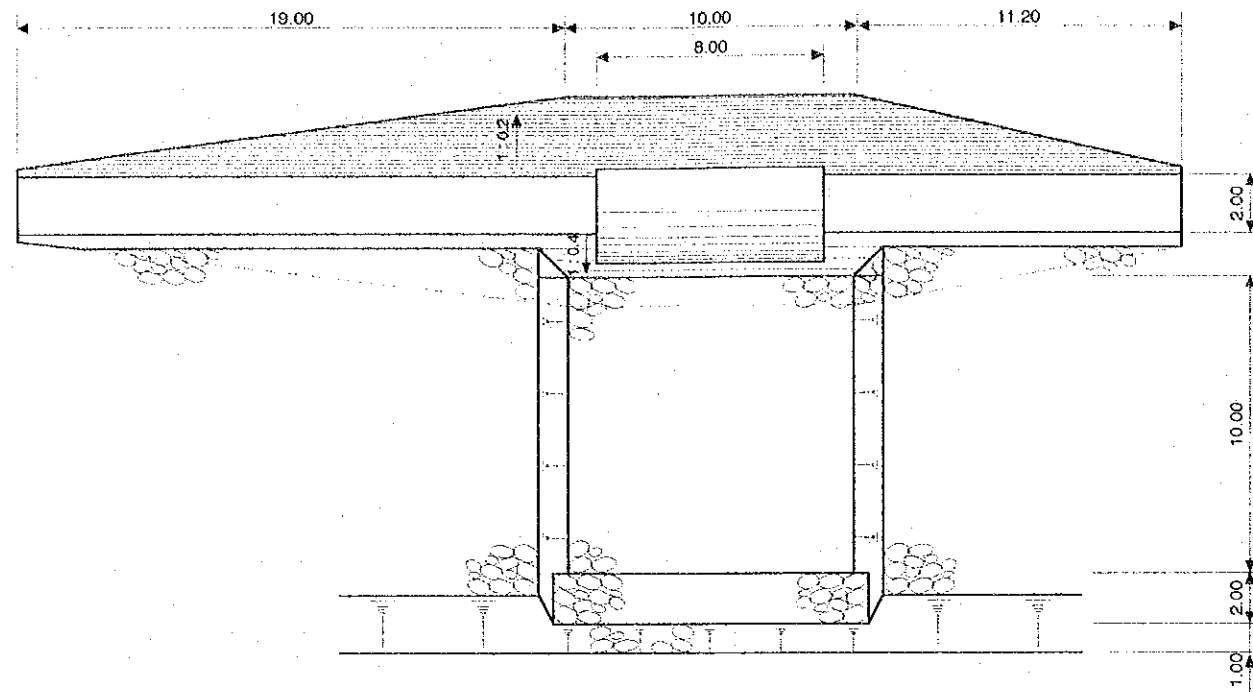


**LEGEND**

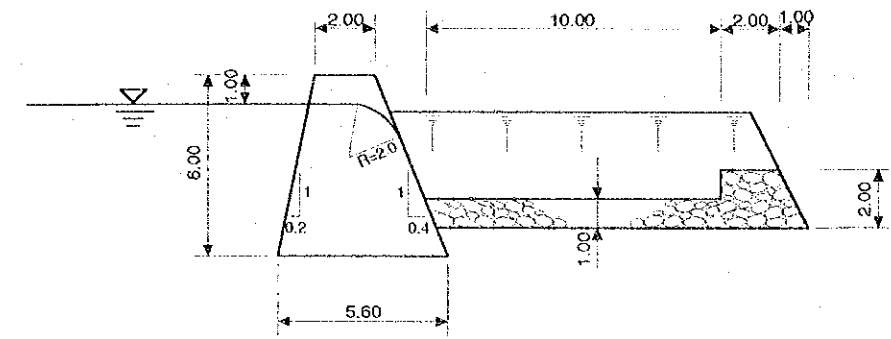
-  Small Impounding Pond
-  Contour Bund Proposed Area
-  Check Dam
-  Water Harvesting Bund
-  Weir
-  Nursery and Site Office
-  Gully Plug
-  Watershed Management Demonstration Area



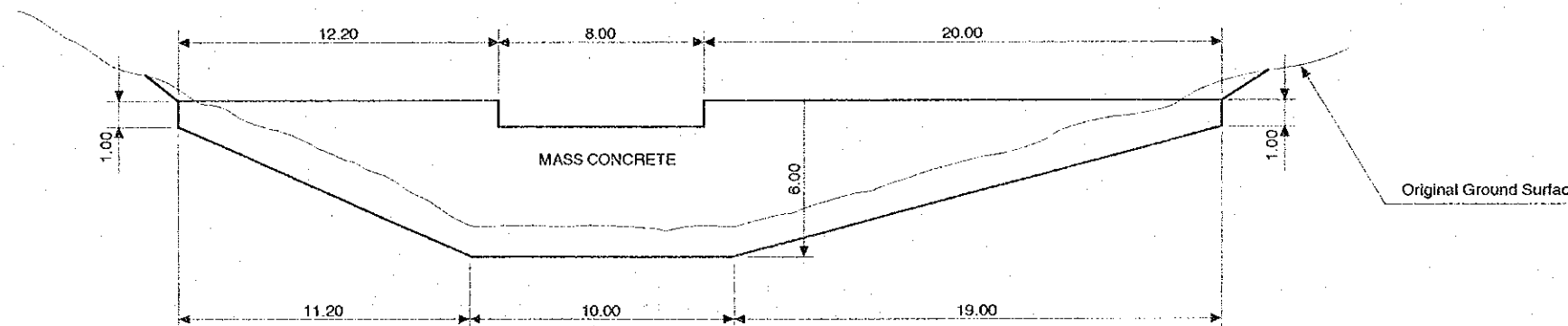
Islamic Republic of Pakistan			
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB			
<b>GENERAL PLAN OF WATERSHED MANAGEMENT (Dholi)</b>			
DATE		D.W.G. NO.	4
JAPAN INTERNATIONAL COOPERATION AGENCY			



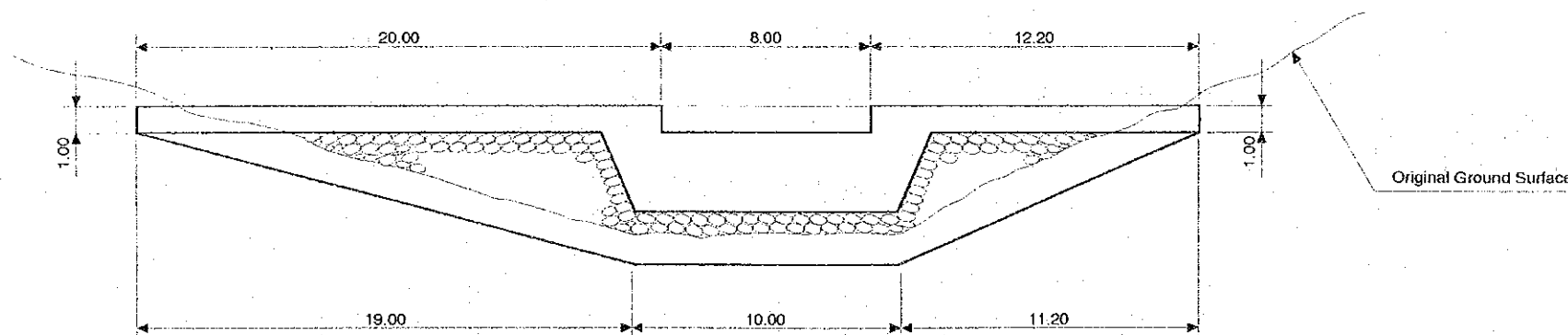
**PLAN OF DAM**  
SCALE 1: 250



**CROSS SECTION OF DAM**  
SCALE 1: 250



**LONGITUDINAL SECTION (seeing from upstream)**  
SCALE 1: 250

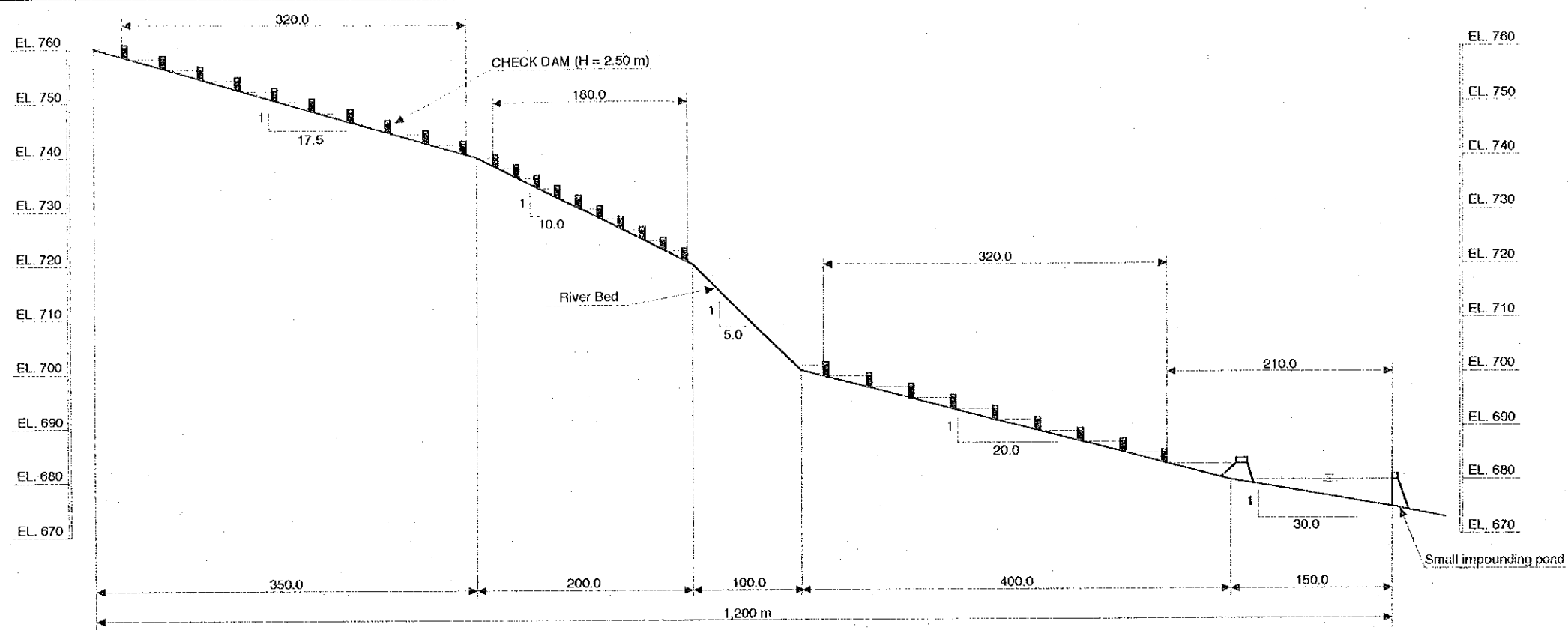


**LONGITUDINAL SECTION (seeing from downstream)**  
SCALE 1: 250

UNIT IN METER

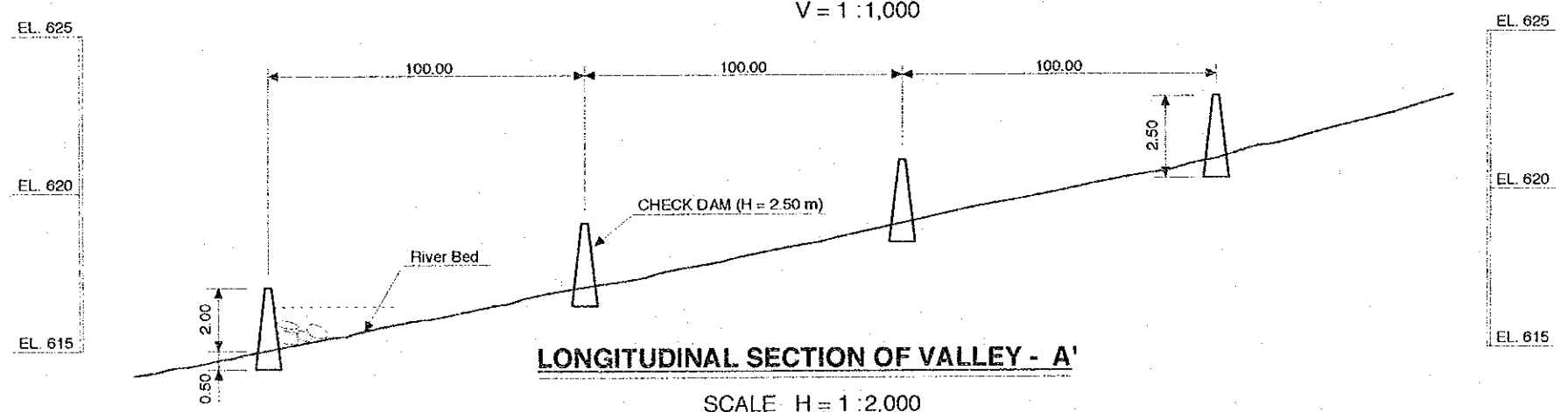
Islamic Republic of Pakistan			
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB			
SMALL IMPANDING POND (Watershed Management)			
DATE		D.W.G. NO.	5
JAPAN INTERNATIONAL COOPERATION AGENCY			





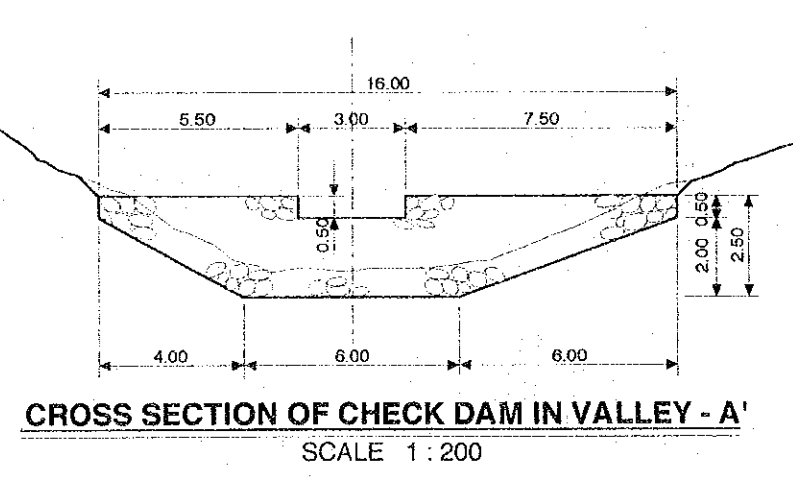
**LONGITUDINAL SECTION OF VALLEY - A**

SCALE H = 1 : 5,000  
V = 1 : 1,000

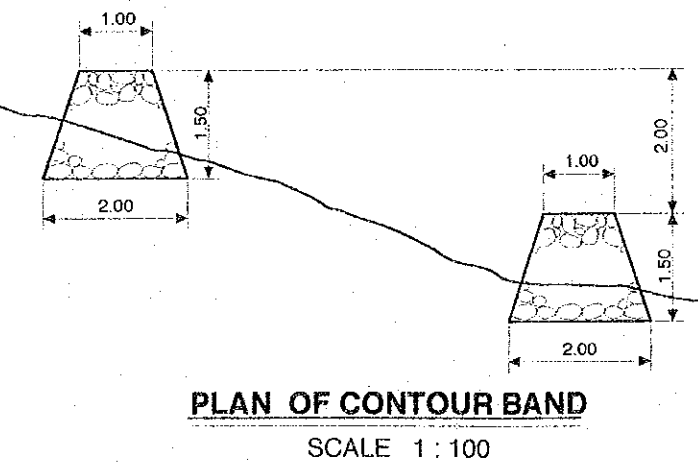


**LONGITUDINAL SECTION OF VALLEY - A'**

SCALE H = 1 : 2,000  
V = 1 : 2,000



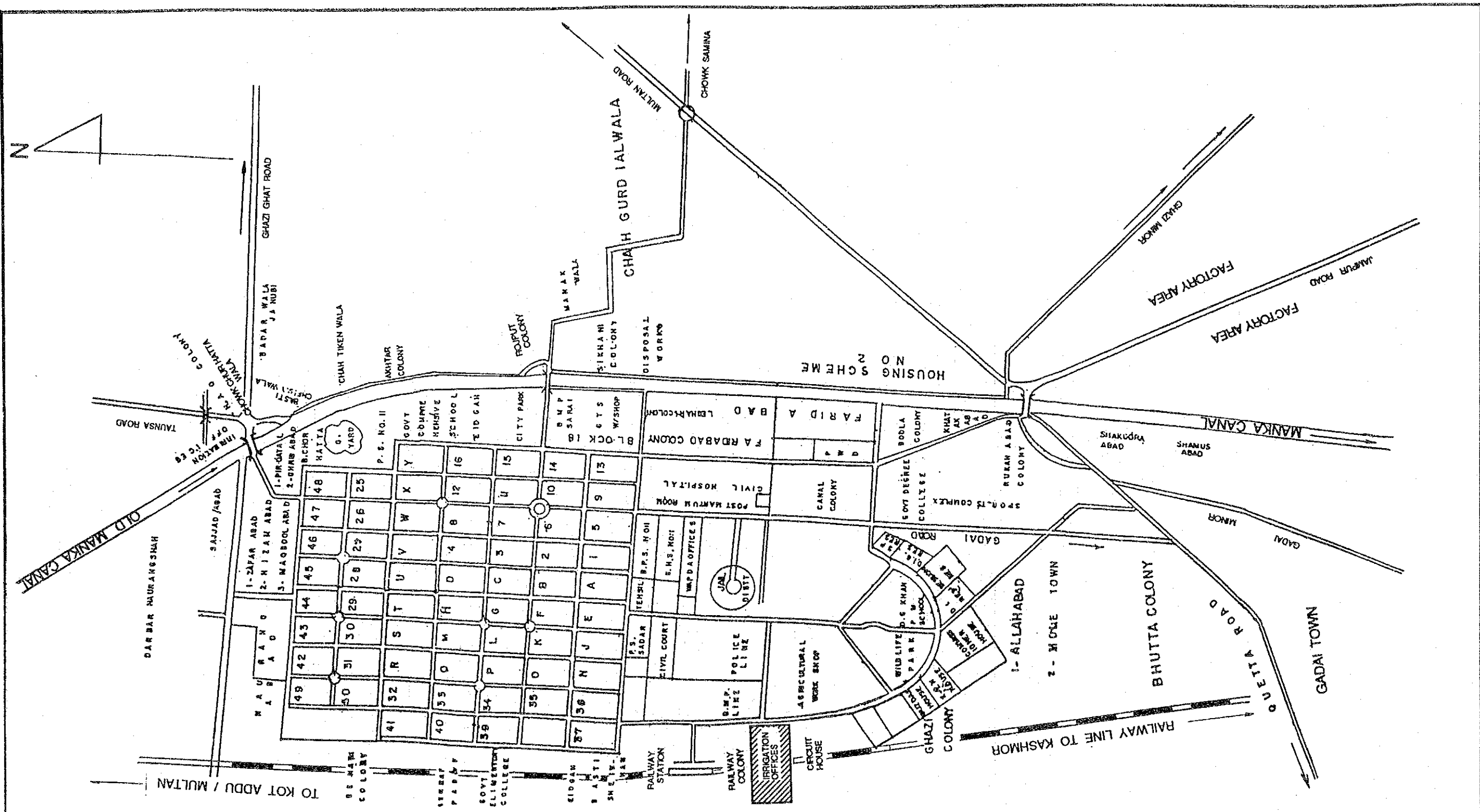
**CROSS SECTION OF CHECK DAM IN VALLEY - A'**  
SCALE 1 : 200




**PLAN OF CONTOUR BAND**  
SCALE 1 : 100

<b>UNIT IN METER</b>			
Islamic Republic of Pakistan			
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB			
SECTION OF CHECK DAM & CONTOUR BAND (Watershed Management)			
DATE		D.W.G. NO.	7
JAPAN INTERNATIONAL COOPERATION AGENCY			



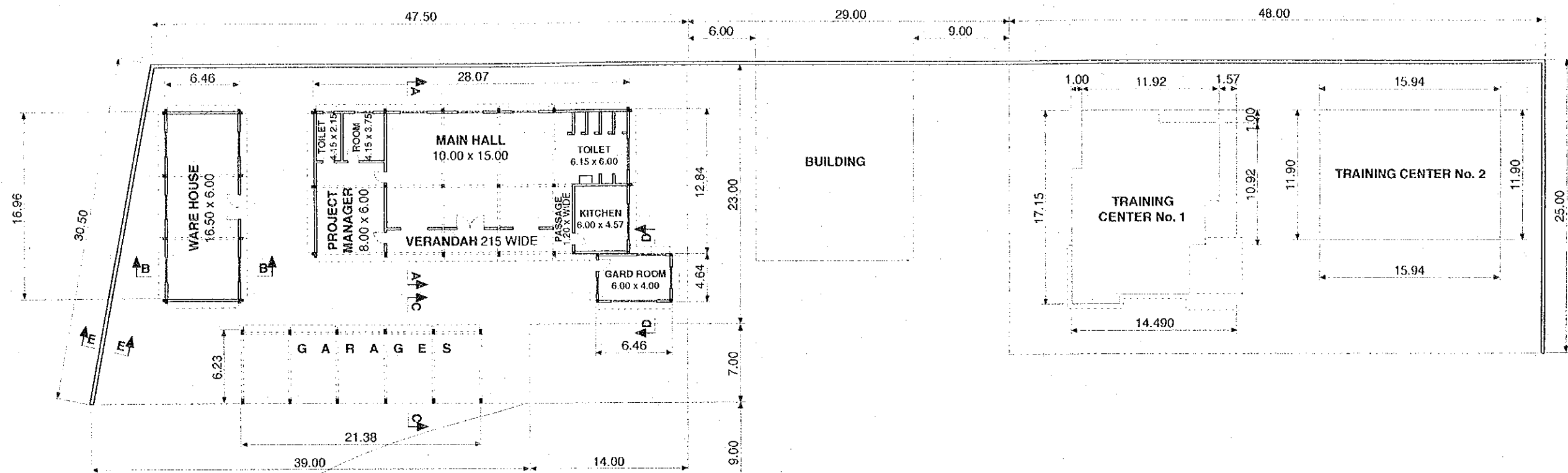


NOTICE

 : PROPOSED AREA FOR MAIN OFFICE AND TRAINING CENTER

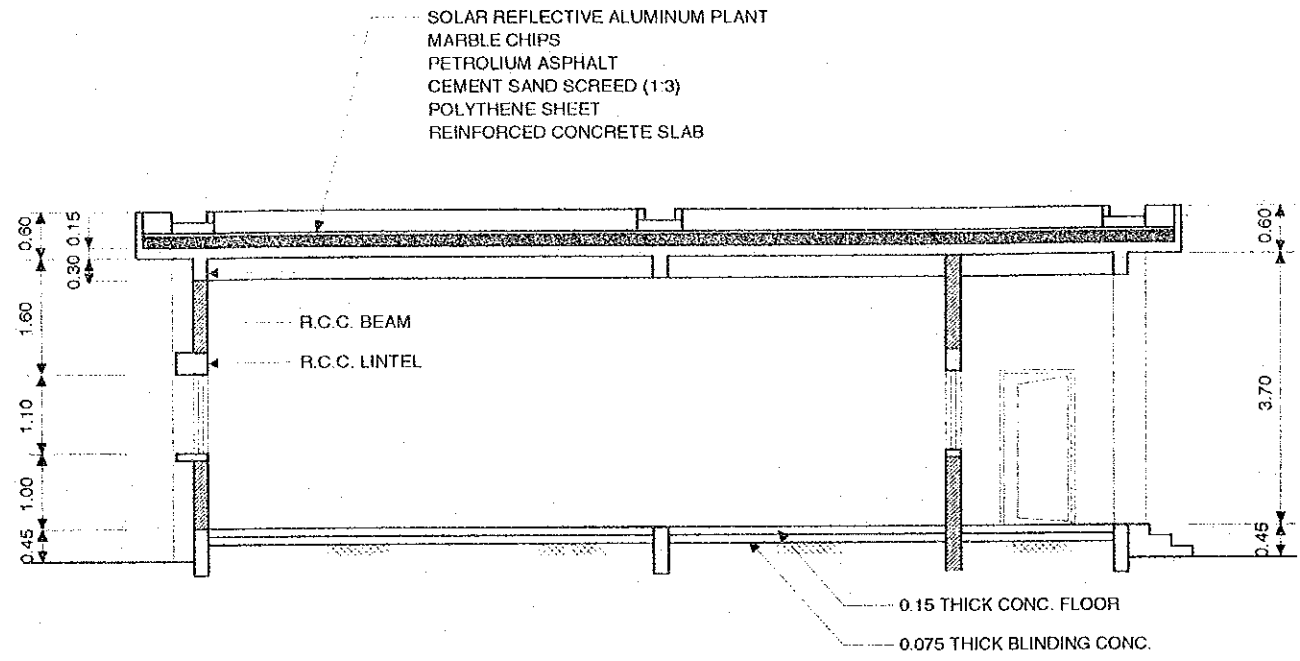
SCALE : 1:13200

Islamic Republic of Pakistan		
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB		
PROPOSED AREA FOR MAIN OFFICE AND TRAINING CENTER IN D.G. KHAN TOWN (Watershed Management)		
DATE	D.W.G.NO.	8
JAPAN INTERNATIONAL COOPERATION AGENCY		

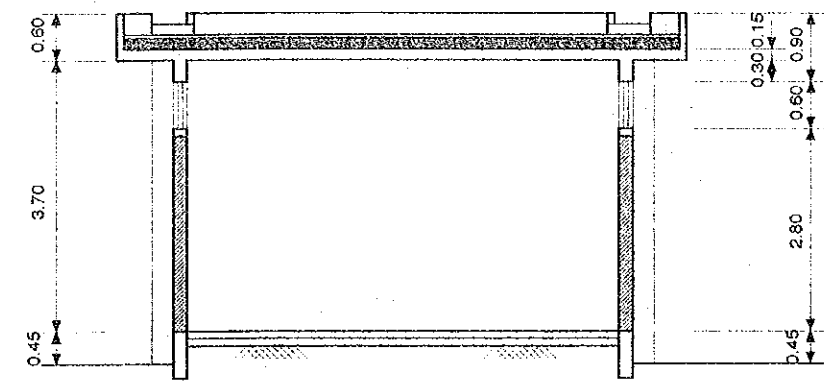


UNIT IN METER  
SCALE 1 : 400

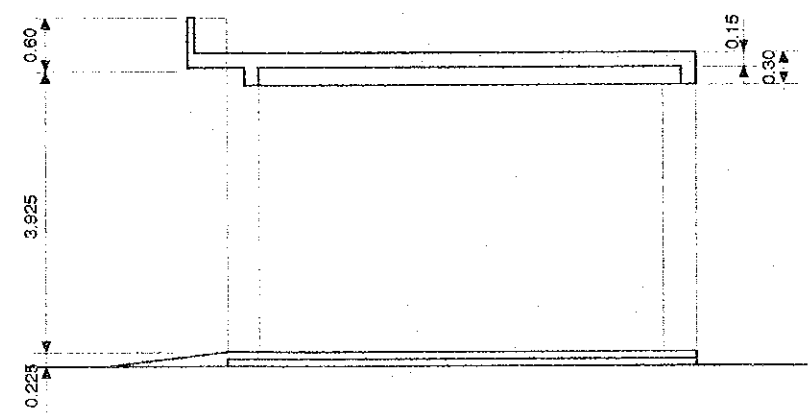
Islamic Republic of Pakistan			
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB			
PLAN OF PROJECT OFFICE AND TRAINING CENTER (Watershed Management)			
DATE		D.W.G. NO.	9
JAPAN INTERNATIONAL COOPERATION AGENCY			



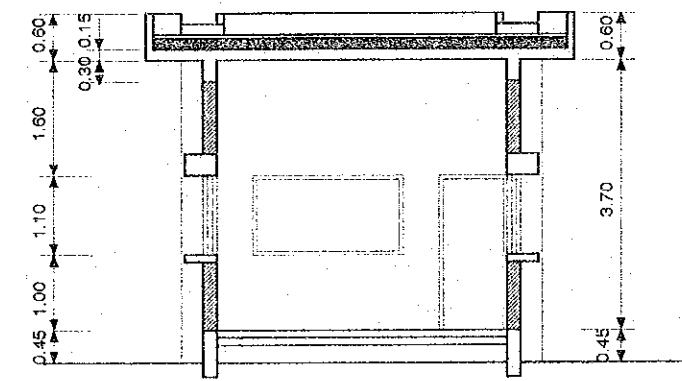
**SECTION A-A**



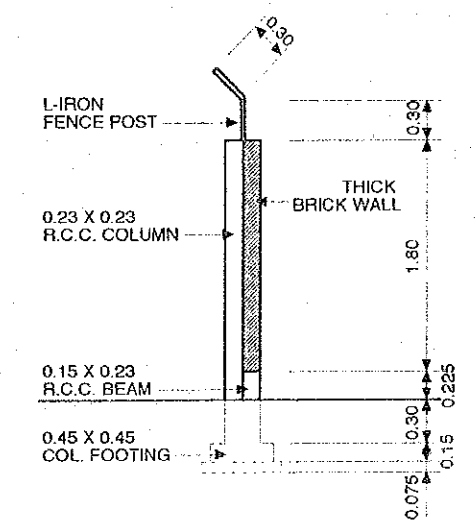
**SECTION B-B**



**SECTION C-C**



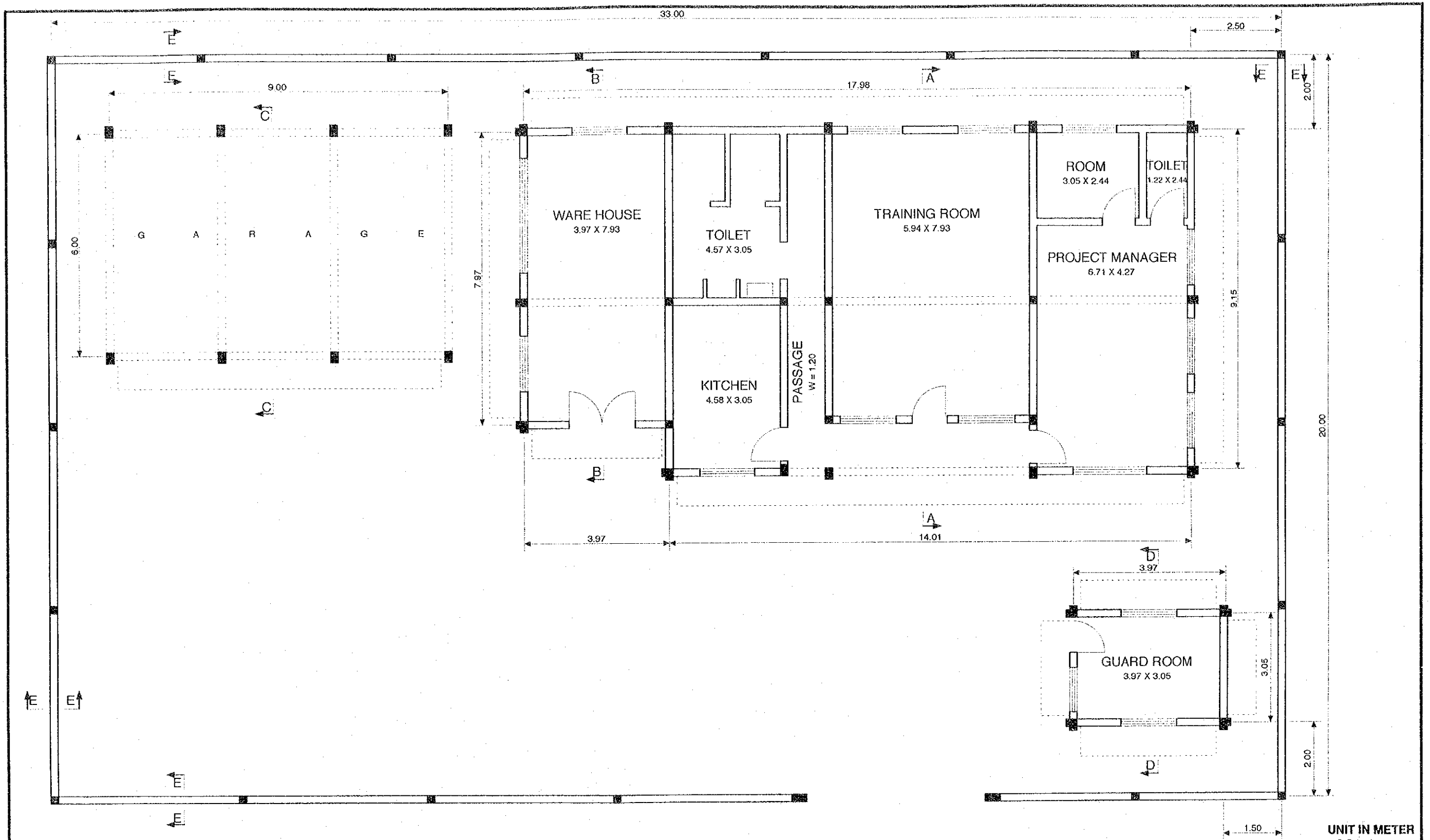
**SECTION D-D**



**SECTION E-E**

UNIT IN METER

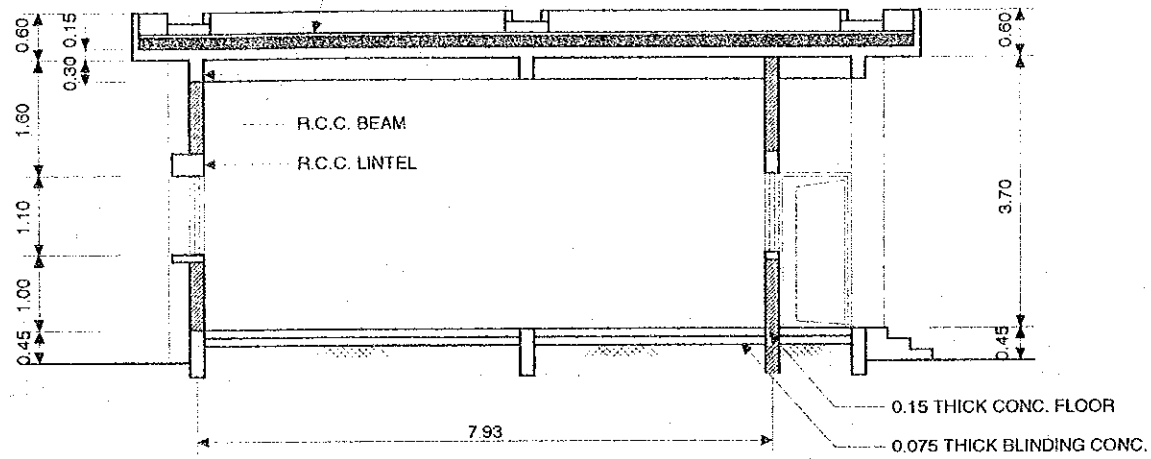
Islamic Republic of Pakistan			
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB			
SECTION OF MAIN OFFICE (Watershed Management)			
DATE		D.W.G. NO.	10
JAPAN INTERNATIONAL COOPERATION AGENCY			



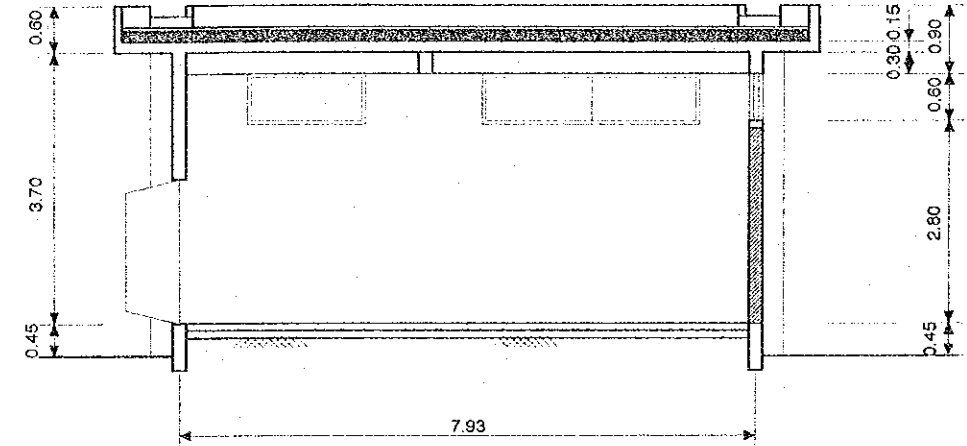
UNIT IN METER  
SCALE 1:200

Islamic Republic of Pakistan			
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB			
PLAN OF SITE OFFICE (Watershed Management)			
DATE		D.W.G. NO.	11
JAPAN INTERNATIONAL COOPERATION AGENCY			

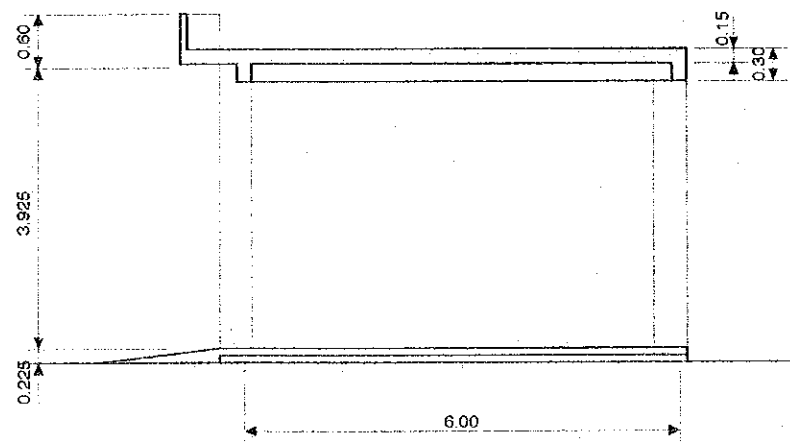
SOLAR REFLECTIVE ALUMINUM PLANT  
 MARBLE CHIPS  
 PETROLIUM ASPHALT  
 CEMENT SAND SCREED (1:3)  
 POLYTHENE SHEET  
 REINFORCED CONCRETE SLAB



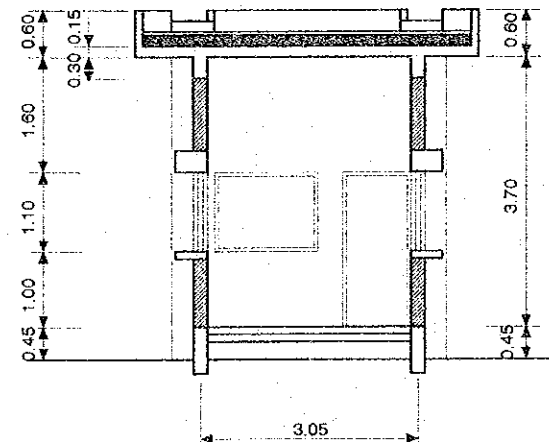
**SECTION A-A**  
 SCALE 1 : 100



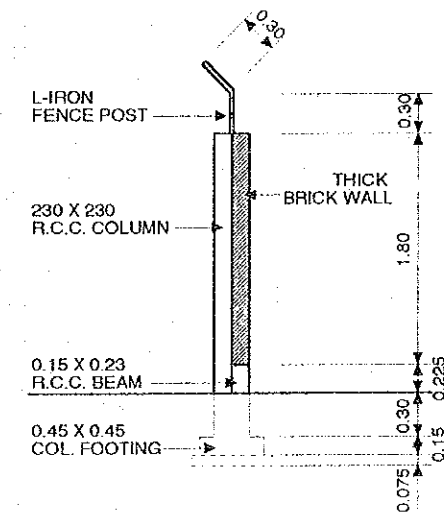
**SECTION B-B**  
 SCALE 1 : 100



**SECTION C-C**  
 SCALE 1 : 100



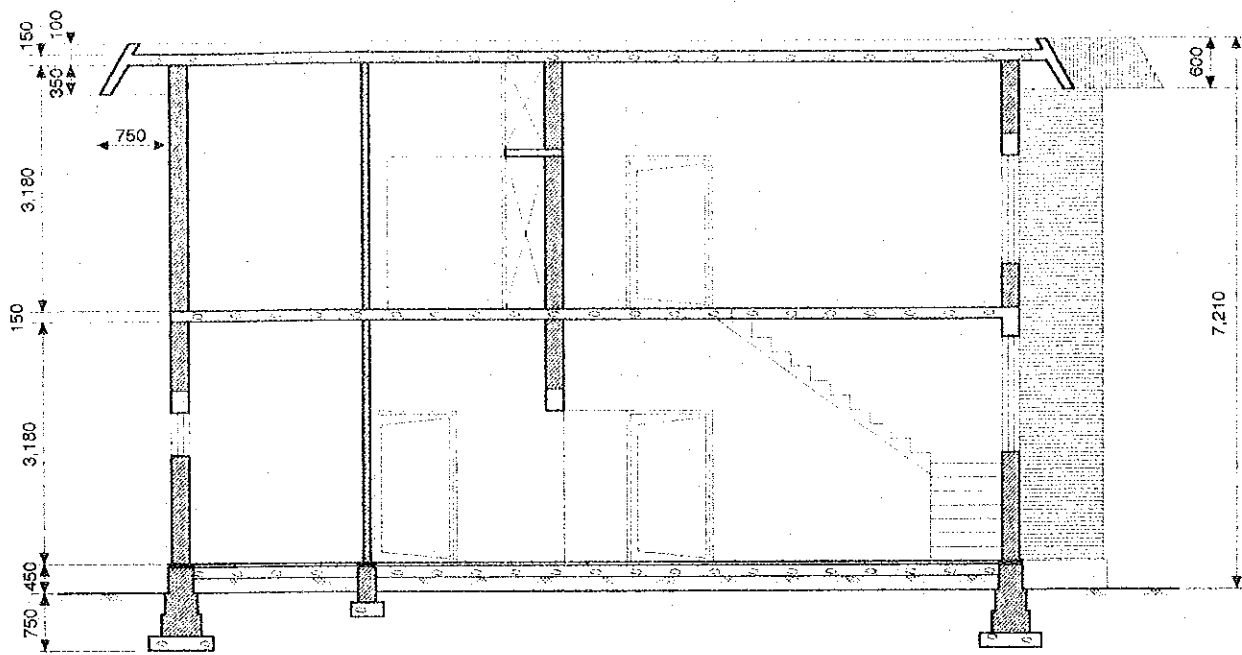
**SECTION D-D**  
 SCALE 1 : 100



**SECTION E-E**  
 SCALE 1 : 50

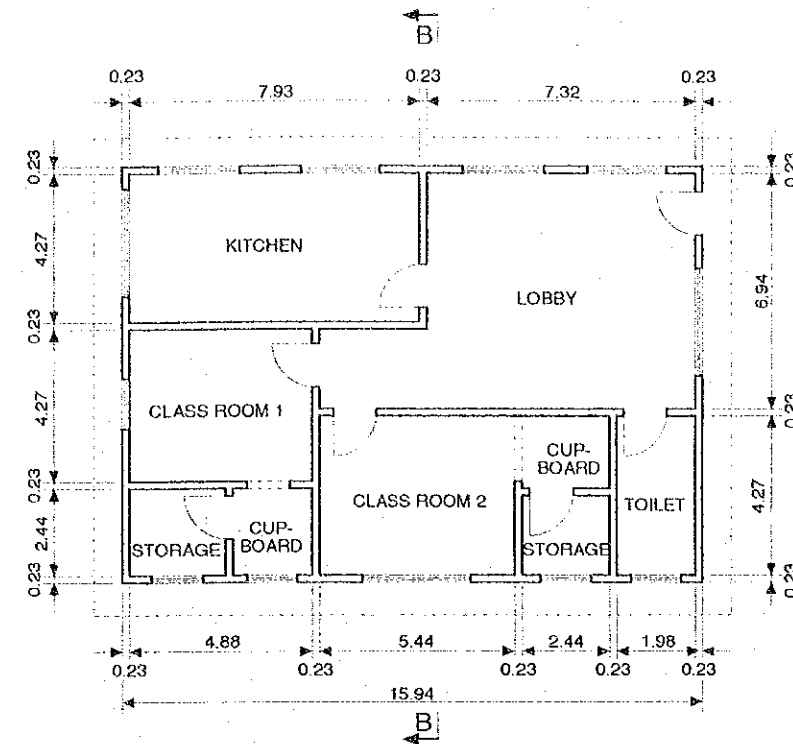
UNIT IN METER

Islamic Republic of Pakistan		
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB		
SECTION OF SITE OFFICE (Watershed Management)		
DATE	D.W.G. NO.	12
JAPAN INTERNATIONAL COOPERATION AGENCY		



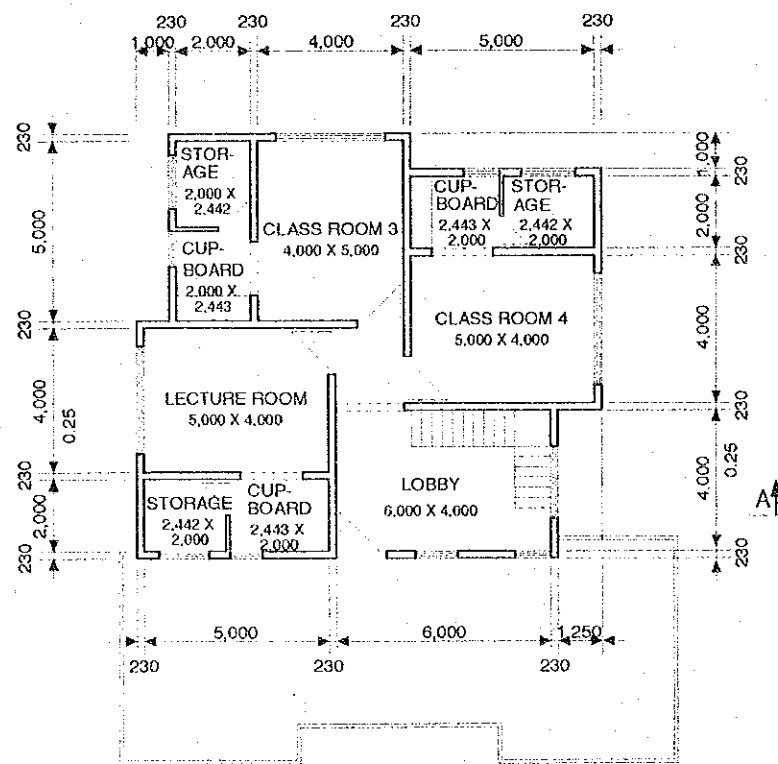
**SECTION A-A (Training Center NO. 1)**

SCALE 1:200



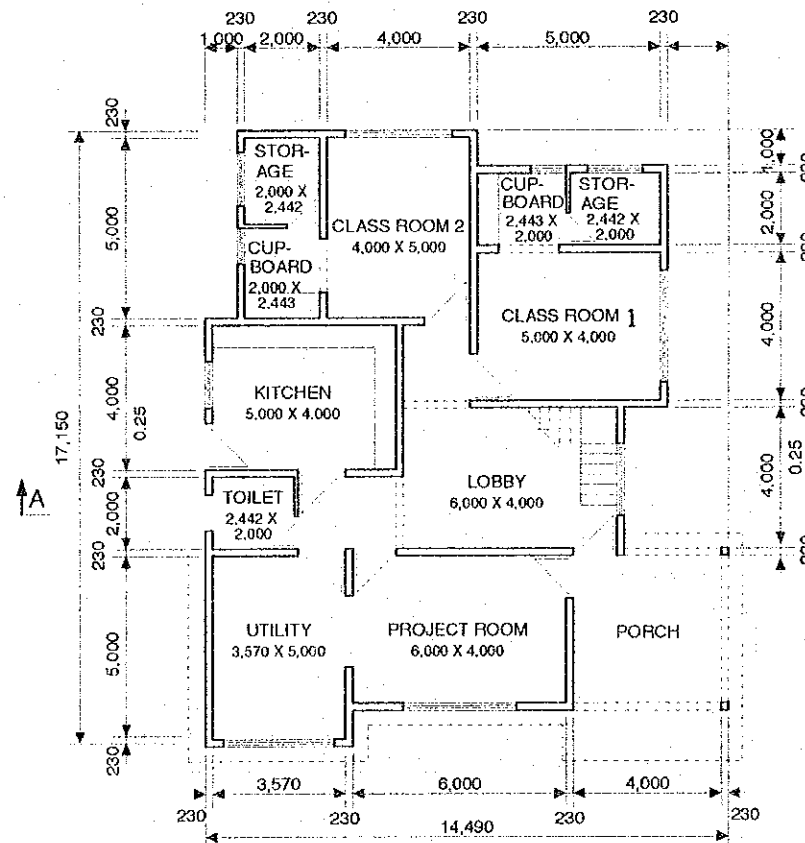
**PLAN (Training Center NO. 2)**

SCALE 1:200



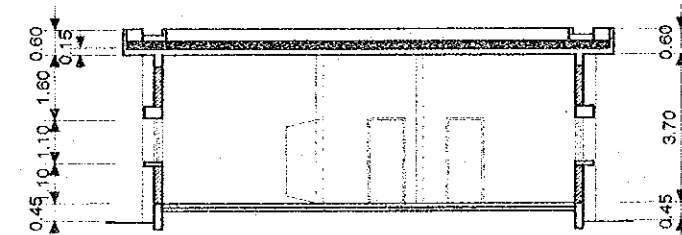
**FIRST FLOOR PLAN (Training Center NO. 1)**

SCALE 1:200



**GROUND FLOOR PLAN (Training Center NO. 1)**

SCALE 1:200

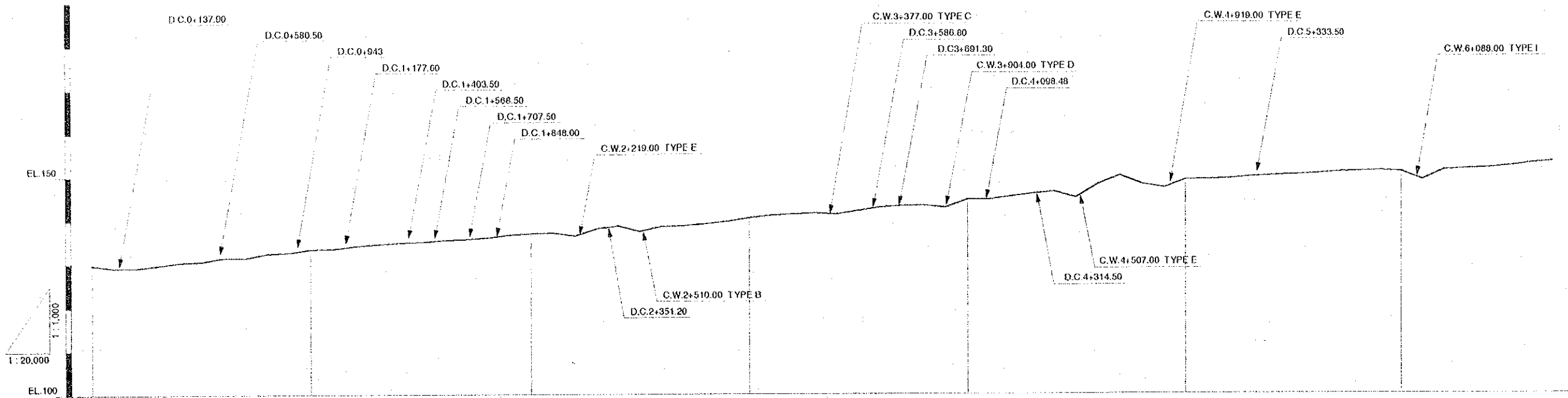


**SECTION B-B (Training Center NO. 2)**

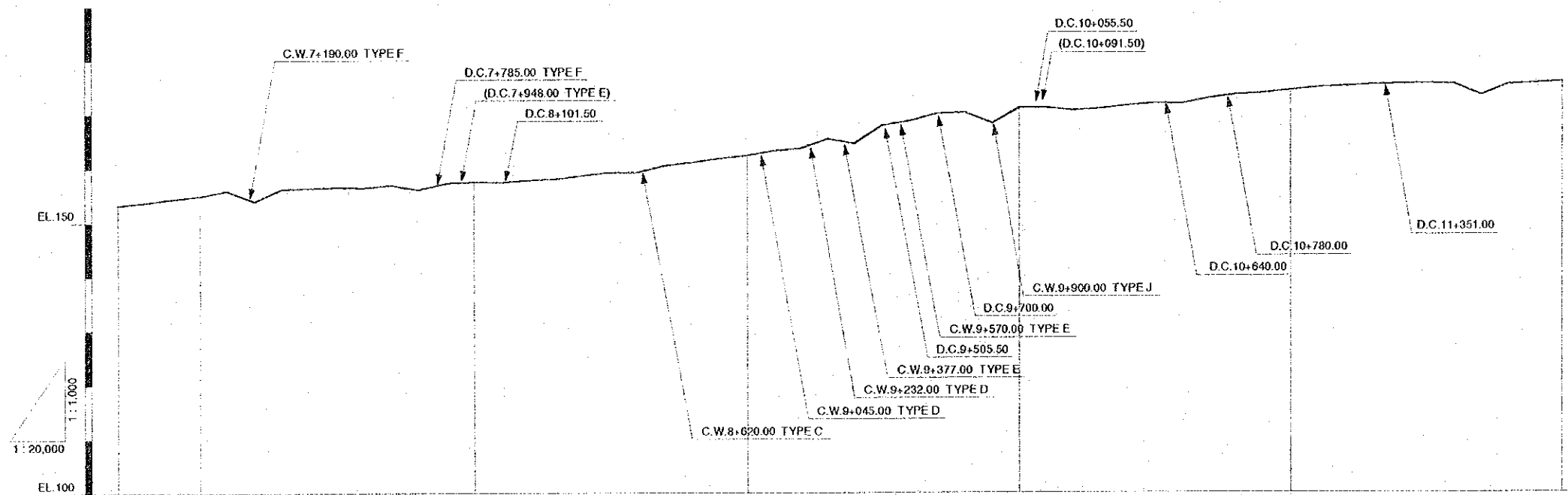
SCALE 1:200

UNIT IN METER

Islamic Republic of Pakistan		
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB		
PLAN OF TRAINING CENTER (Watershed Management)		
DATE	D.W.G. NO.	13
JAPAN INTERNATIONAL COOPERATION AGENCY		



GROUND EL	DISTANCE	STATION
129.85	0	STA. 0
129.21	100	+100
129.19	100	+200
128.79	100	+300
130.35	100	+400
130.55	100	+500
131.37	100	+600
131.91	100	+700
132.40	100	+800
132.60	100	+900
133.28	100	STA. 1
133.41	100	+100
134.10	100	+200
134.49	100	+300
134.88	100	+400
134.97	100	+500
135.44	100	+600
135.63	100	+700
135.95	100	+800
136.58	100	+900
136.95	100	STA. 2
137.14	100	+100
136.42	100	+200
138.12	100	+300
138.66	100	+400
137.36	100	+500
138.48	100	+600
138.82	100	+700
138.98	100	+800
139.55	100	+900
140.41	100	STA. 3
140.98	100	+100
141.29	100	+200
141.57	100	+300
141.26	100	+400
142.07	100	+500
142.85	100	+600
143.17	100	+700
143.28	100	+800
142.78	100	+900
144.57	100	STA. 4
144.80	100	+100
145.31	100	+200
145.65	100	+300
146.43	100	+400
144.99	100	+500
148.01	100	+600
149.87	100	+700
147.86	100	+800
147.16	100	+900
143.98	100	STA. 5
146.01	100	+100
149.25	100	+200
148.65	100	+300
149.87	100	+400
150.18	100	+500
150.44	100	+600
150.80	100	+700
151.03	100	+800
151.18	100	+900
150.90	100	STA. 6
149.04	100	+100
151.32	100	+200
151.57	100	+300
151.79	100	+400
152.22	100	+500
152.85	100	+600
153.21	100	+700



GROUND EL	DISTANCE	STATION
153.21	100	STA. 6
153.71	100	+800
154.33	100	+600
154.91	100	STA. 7
155.91	100	+100
153.99	100	+200
156.25	100	+800
156.40	100	+400
156.63	100	+500
156.49	100	+600
156.88	100	+700
156.12	100	+800
157.30	100	+900
157.49	100	STA. 8
157.44	100	+100
157.83	100	+200
157.99	100	+300
158.84	100	+400
159.20	100	+500
159.24	100	+600
150.47	100	+700
151.07	100	+800
151.78	100	+900
152.35	100	STA. 9
153.15	100	+100
153.59	100	+200
155.35	100	+300
154.54	100	+400
157.82	100	+500
156.64	100	+600
159.98	100	+700
170.21	100	+800
168.27	100	+900
171.07	100	STA. 10
171.08	100	+100
170.56	100	+200
170.85	100	+300
171.40	100	+400
171.89	100	+500
171.76	100	+600
172.79	100	+700
173.37	100	+800
173.65	100	+900
174.18	100	STA. 11
174.68	100	+100
174.90	100	+200
175.15	100	+300
175.33	100	+400
175.37	100	+500
175.25	100	+600
173.19	100	+700
175.15	100	+800
175.38	100	+900
175.62	100	STA. 12

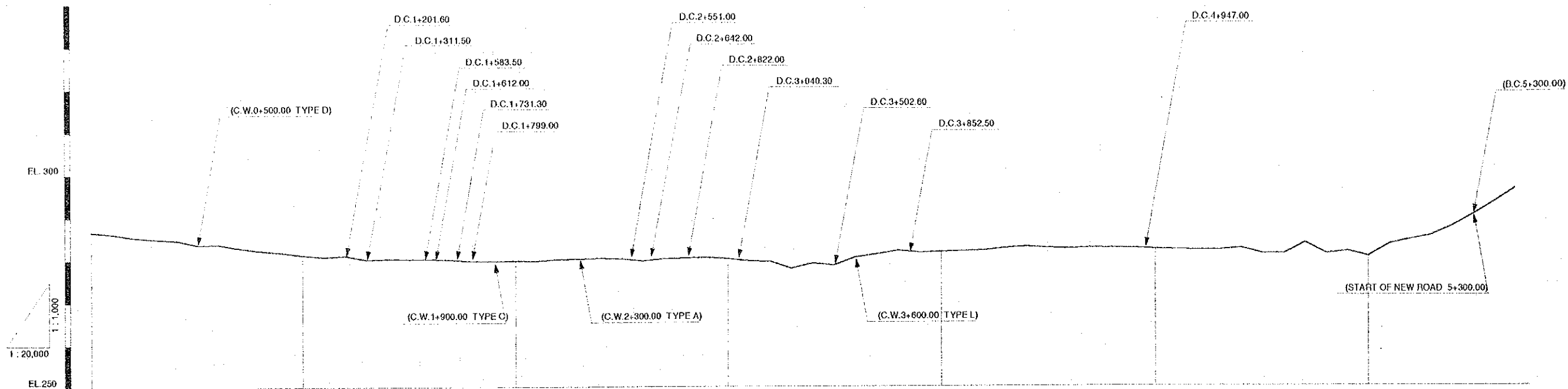
C.W : Causeway  
D.C : Drainage culvert  
( ) : Improvement

SCALE V = 1 : 1,000  
H = 1 : 20,000

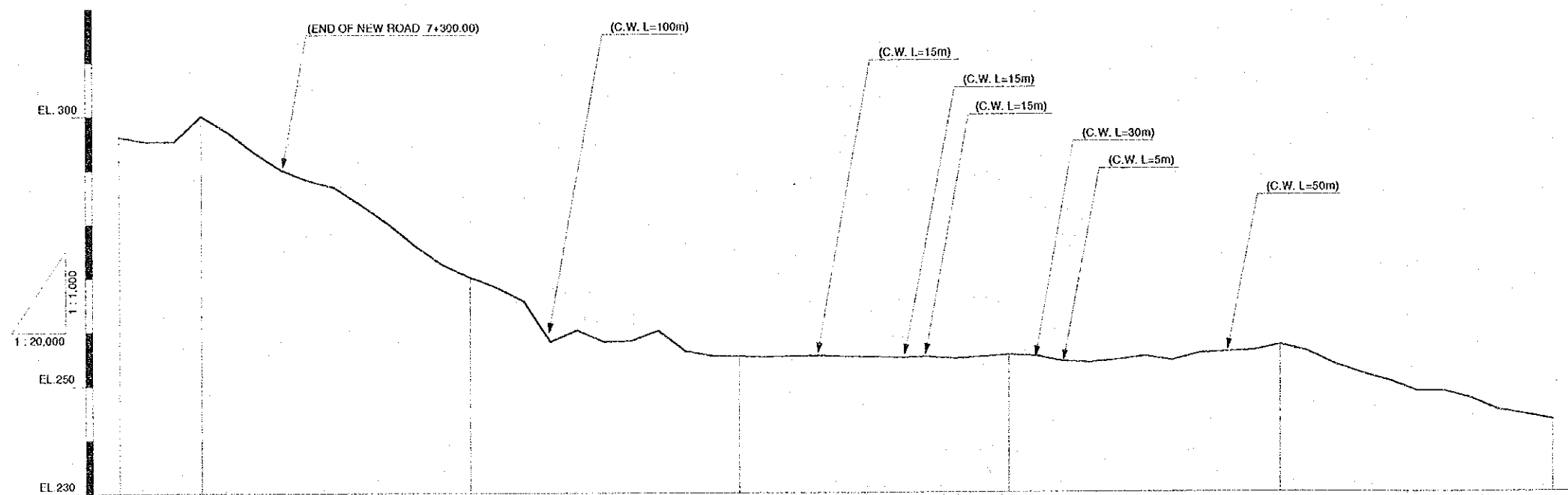
Islamic Republic of Pakistan		
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB		
PLAN OF ROAD IMPROVEMENT ( Choti - Choti Bala (1/2) )		
DATE	D.W.G. NO.	14
JAPAN INTERNATIONAL COOPERATION AGENCY		







GROUND FL.	DISTANCE	STATION
286.58	0	STA. 0
286.11	100	+ 100
285.37	100	+ 200
284.90	100	+ 300
284.55	100	+ 400
283.42	100	+ 500
283.51	100	+ 600
282.66	100	+ 700
282.06	100	+ 800
281.59	100	+ 900
280.95	100	STA. 1
280.55	100	+ 100
280.81	100	+ 200
279.89	100	+ 300
280.04	100	+ 400
280.01	100	+ 500
279.07	100	+ 600
279.83	100	+ 700
279.50	100	+ 800
279.51	100	+ 900
279.58	100	STA. 2
279.50	100	+ 100
279.91	100	+ 200
280.01	100	+ 300
280.14	100	+ 400
279.99	100	+ 500
279.38	100	+ 600
279.86	100	+ 700
278.34	100	+ 800
280.28	100	+ 900
281.00	100	STA. 3
281.81	100	+ 100
281.30	100	+ 200
281.53	100	+ 300
281.70	100	+ 400
281.83	100	+ 500
282.96	100	+ 600
282.64	100	+ 700
282.35	100	+ 800
282.22	100	+ 900
282.35	100	STA. 4
282.32	100	+ 100
282.27	100	+ 200
282.01	100	+ 300
281.89	100	+ 400
281.78	100	+ 500
281.80	100	+ 600
282.25	100	+ 700
281.00	100	+ 800
280.95	100	+ 900
283.50	100	STA. 5
281.00	100	+ 100
281.50	100	+ 200
280.35	100	+ 300
283.15	100	+ 400
284.20	100	+ 500
285.15	100	+ 600
287.30	100	+ 700
290.05	100	+ 800
293.00	100	+ 900
296.15	100	STA. 6
296.15	100	+ 100
294.20	100	+ 200
285.15	100	+ 300
287.30	100	+ 400
290.05	100	+ 500
293.00	100	+ 600
296.15	100	+ 700
299.30	100	+ 800
302.45	100	+ 900
305.60	100	STA. 7
308.75	100	+ 100
311.90	100	+ 200
315.05	100	+ 300
318.20	100	+ 400
321.35	100	+ 500
324.50	100	+ 600
327.65	100	+ 700
330.80	100	+ 800
333.95	100	+ 900
337.10	100	STA. 8
340.25	100	+ 100
343.40	100	+ 200
346.55	100	+ 300
349.70	100	+ 400
352.85	100	+ 500
356.00	100	+ 600
359.15	100	+ 700
362.30	100	+ 800
365.45	100	+ 900
368.60	100	STA. 9
371.75	100	+ 100
374.90	100	+ 200
378.05	100	+ 300
381.20	100	+ 400
384.35	100	+ 500
387.50	100	+ 600
390.65	100	+ 700
393.80	100	+ 800
396.95	100	+ 900
400.10	100	STA. 10
403.25	100	+ 100
406.40	100	+ 200
409.55	100	+ 300
412.70	100	+ 400
415.85	100	+ 500
419.00	100	+ 600
422.15	100	+ 700
425.30	100	+ 800
428.45	100	+ 900
431.60	100	STA. 11
434.75	100	+ 100
437.90	100	+ 200
441.05	100	+ 300
444.20	100	+ 400
447.35	100	+ 500
450.50	100	+ 600
453.65	100	+ 700
456.80	100	+ 800
459.95	100	+ 900
463.10	100	STA. 12
466.25	100	+ 100
469.40	100	+ 200
472.55	100	+ 300
475.70	100	+ 400
478.85	100	+ 500
482.00	100	+ 600
485.15	100	+ 700
488.30	100	+ 800
491.45	100	+ 900
494.60	100	END



GROUND EL.	DISTANCE	STATION
296.15	100	STA. 6
295.27	100	+ 800
295.30	100	+ 900
300.00	100	STA. 7
297.00	100	+ 100
293.15	100	+ 200
290.00	100	+ 300
288.05	100	+ 400
286.75	100	+ 500
283.50	100	+ 600
280.05	100	+ 700
275.85	100	+ 800
272.35	100	+ 900
270.00	100	STA. 8
268.05	100	+ 100
265.55	100	+ 200
258.05	100	+ 300
260.15	100	+ 400
258.05	100	+ 500
258.15	100	+ 600
260.05	100	+ 700
256.28	100	+ 800
255.35	100	+ 900
255.25	100	STA. 9
255.10	100	+ 100
255.25	100	+ 200
255.35	100	+ 300
255.20	100	+ 400
255.15	100	+ 500
255.00	100	+ 600
255.10	100	+ 700
254.80	100	+ 800
255.15	100	+ 900
255.50	100	STA. 10
255.30	100	+ 100
254.21	100	+ 200
258.98	100	+ 300
254.50	100	+ 400
255.10	100	+ 500
254.35	100	+ 600
255.70	100	+ 700
255.95	100	+ 800
256.18	100	+ 900
257.25	100	STA. 11
255.95	100	+ 100
253.55	100	+ 200
251.80	100	+ 300
250.38	100	+ 400
248.55	100	+ 500
248.60	100	+ 600
247.21	100	+ 700
245.15	100	+ 800
244.26	100	+ 900
243.31	100	STA. 12

C.W : Causeway  
D.C : Drainage culvert  
( ) : improvement

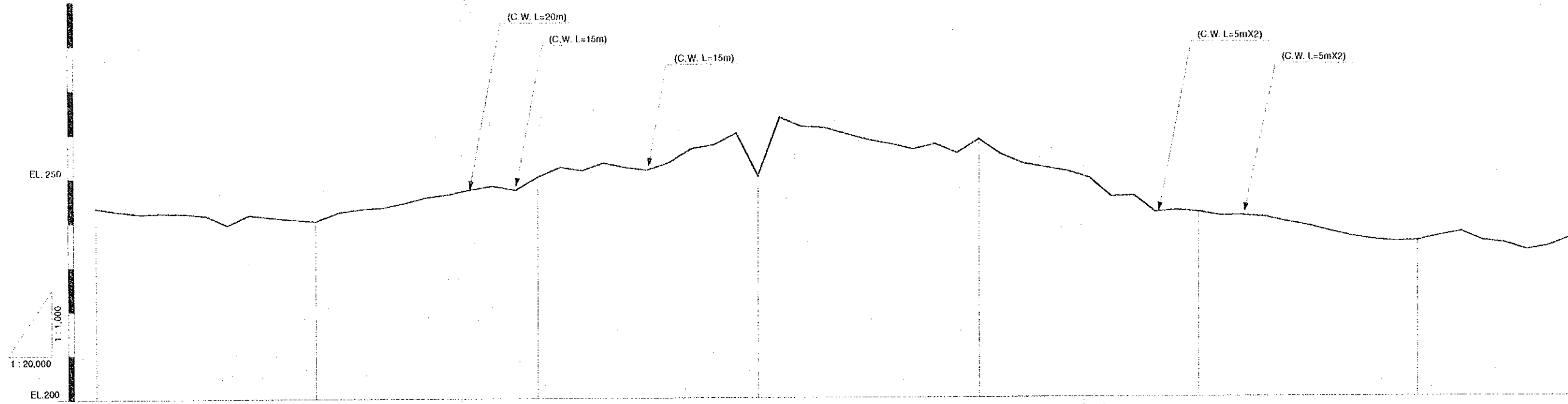
SCALE V=1 : 1,000  
H=1 : 20,000

Islamic Republic of Pakistan  
**THE MITHAWAN HILL TORRENT  
PILOT PROJECT IN PUNJAB**

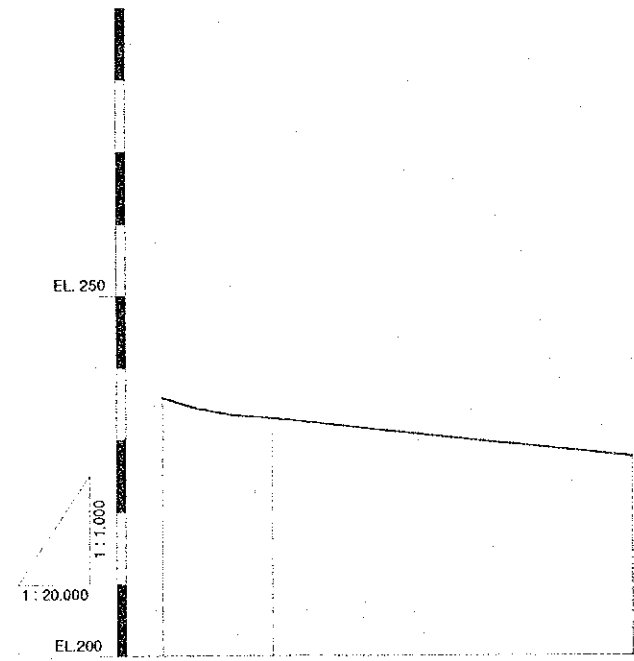
**PLAN OF ROAD IMPROVEMENT  
(Sakhi Sarwar - Choti Bala (1/2))**

DATE	D.W.G. NO.	16
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JAPAN INTERNATIONAL COOPERATION AGENCY



GROUND EL	DISTANCE	STATION
243.31	100	STA. 12
242.53	100	+ 100
241.88	100	+ 200
242.15	100	+ 300
241.88	100	+ 400
241.50	100	+ 500
239.28	100	+ 600
241.33	100	+ 700
240.98	100	+ 800
240.50	100	+ 900
240.15	100	STA. 13
242.10	100	+ 100
242.85	100	+ 200
243.15	100	+ 300
244.20	100	+ 400
245.50	100	+ 500
246.15	100	+ 600
247.28	100	+ 700
248.10	100	+ 800
247.23	100	+ 900
250.15	100	STA. 14
252.38	100	+ 100
251.55	100	+ 200
253.28	100	+ 300
252.21	100	+ 400
251.54	100	+ 500
253.11	100	+ 600
256.25	100	+ 700
257.10	100	+ 800
259.72	100	+ 900
260.05	100	STA. 15
263.21	100	+ 100
261.15	100	+ 200
260.98	100	+ 300
256.50	100	+ 400
258.21	100	+ 500
257.30	100	+ 600
256.10	100	+ 700
257.28	100	+ 800
255.25	100	+ 900
258.35	100	STA. 16
254.93	100	+ 100
252.85	100	+ 200
251.95	100	+ 300
251.10	100	+ 400
249.50	100	+ 500
245.30	100	+ 600
245.50	100	+ 700
241.71	100	+ 800
242.05	100	+ 900
241.59	100	STA. 17
240.75	100	+ 100
240.35	100	+ 200
240.50	100	+ 300
238.35	100	+ 400
238.49	100	+ 500
237.25	100	+ 600
236.15	100	+ 700
235.38	100	+ 800
235.00	100	+ 900
235.21	100	STA. 18
236.31	100	+ 100
237.25	100	+ 200
235.21	100	+ 300
234.63	100	+ 400
233.10	100	+ 500
233.95	100	+ 600
235.31	100	+ 700



GROUND EL	DISTANCE	STATION
245.61	100	STA. 18
234.21	100	+ 800
233.34	100	+ 900
232.68	100	STA. 19
243.31	1,000	STA. 20

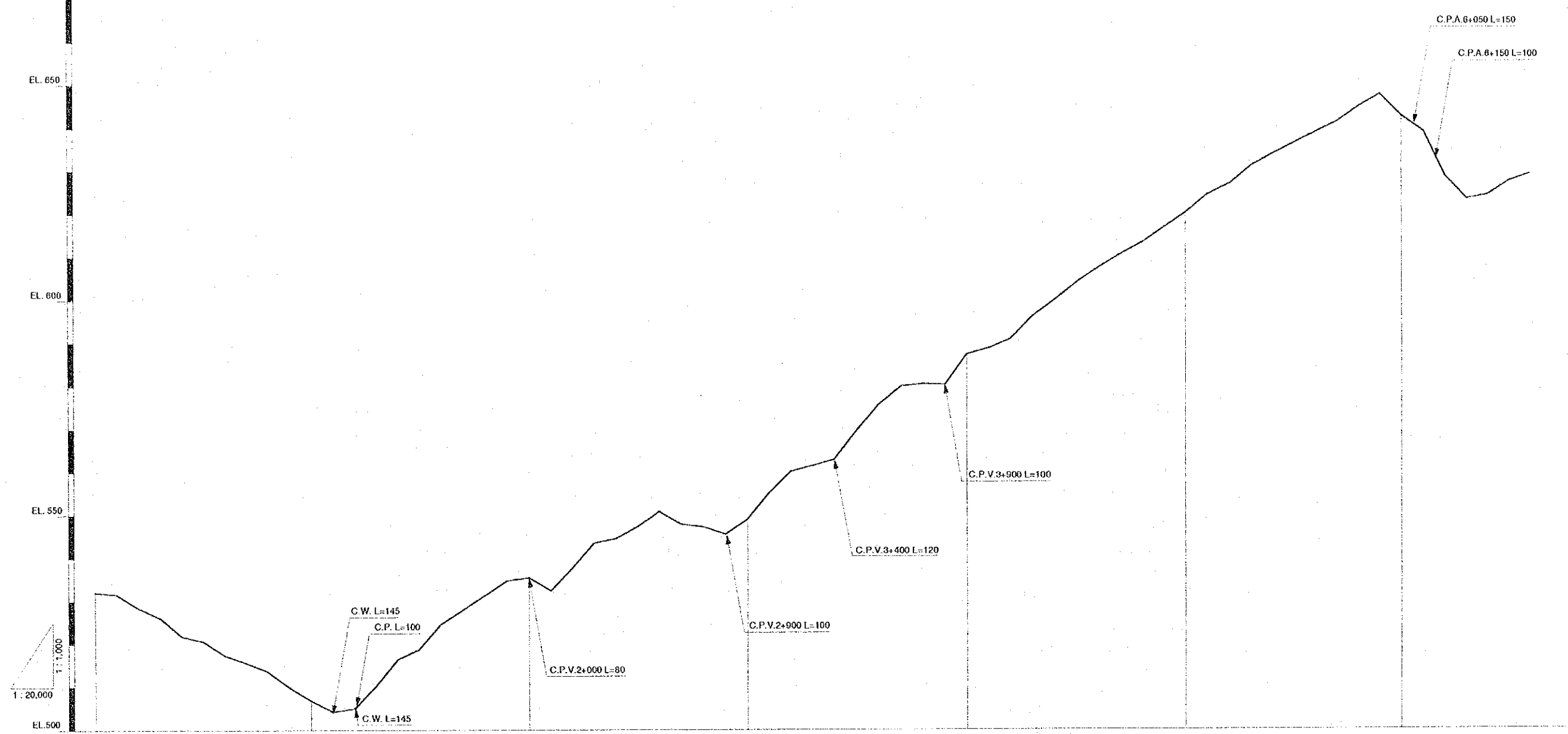
C.W : Causeway  
D.C : Drainage culvert  
( ) : Improvement

SCALE V = 1 : 1,000  
H = 1 : 20,000

Islamic Republic of Pakistan  
THE MITHAWAN HILL TORRENT  
PILOT PROJECT IN PUNJAB  
**PLAN OF ROAD IMPROVEMENT**  
**( Sakhi Sarwar - Choti Bala (2/2) )**

DATE	D.W.G. NO.	17
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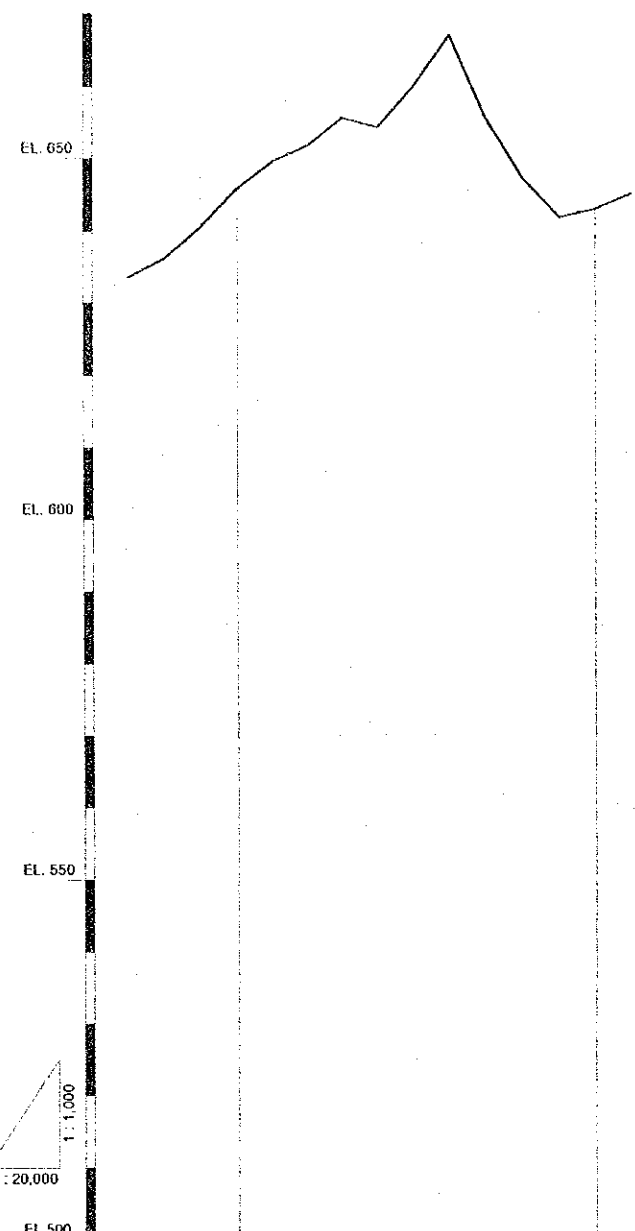
JAPAN INTERNATIONAL COOPERATION AGENCY



GROUND EL	DISTANCE	STATION
532.00	0	STA. 0
531.56	100	+100
528.45	100	+200
526.04	100	+300
521.73	100	+400
520.61	100	+500
517.34	100	+600
515.66	100	+700
513.66	100	+800
508.99	100	+900
506.83	100	STA. 1
504.20	100	+100
505.01	100	+200
510.36	100	+300
516.42	100	+400
518.76	100	+500
524.55	100	+600
527.87	100	+700
531.23	100	+800
534.60	100	+900
535.32	100	STA. 2
532.38	100	+100
537.58	100	+200
543.40	100	+300
544.35	100	+400
547.17	100	+500
550.66	100	+600
547.68	100	+700
547.03	100	+800
545.34	100	+900
546.84	100	STA. 3
554.98	100	+100
559.88	100	+200
561.23	100	+300
562.66	100	+400
568.36	100	+500
573.50	100	+600
579.84	100	+700
580.16	100	+800
580.01	100	+900
587.01	100	STA. 4
588.46	100	+100
590.61	100	+200
595.85	100	+300
599.73	100	+400
603.82	100	+500
607.16	100	+600
610.16	100	+700
612.83	100	+800
616.16	100	+900
619.66	100	STA. 5
623.83	100	+100
626.32	100	+200
630.58	100	+300
633.36	100	+400
635.89	100	+500
638.32	100	+600
640.65	100	+700
644.11	100	+800
647.09	100	+900
642.70	100	STA. 6
638.58	100	+100
628.08	100	+200
622.91	100	+300
623.81	100	+400
626.95	100	+500
628.67	100	+600
633.56	100	+700

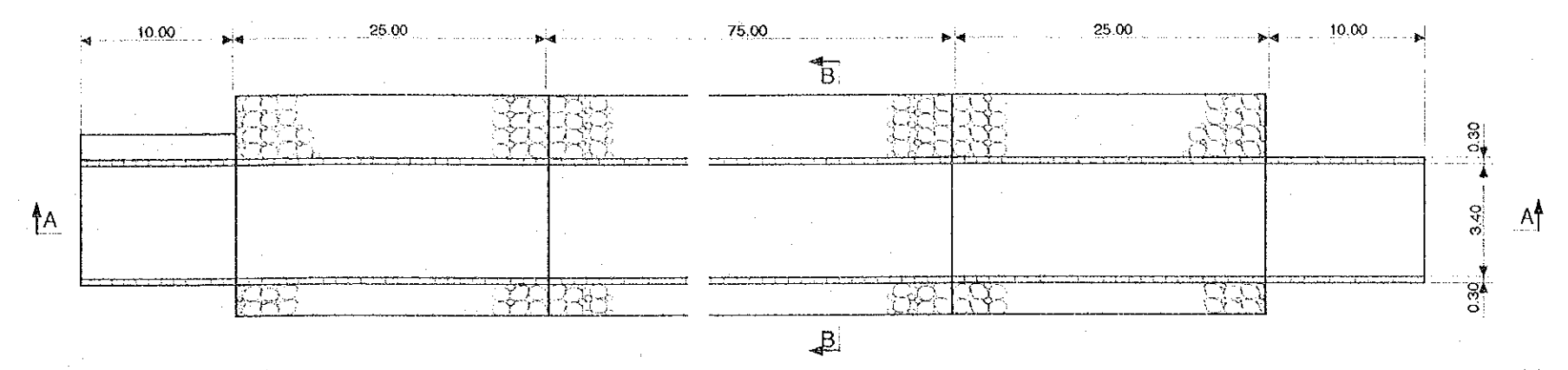
C.W : Causeway  
 C.P.V : Concrete Pavement  
 SCALE V = 1 : 1,000  
 H = 1 : 20,000

Islamic Republic of Pakistan		
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB		
PLAN OF ROAD IMPROVEMENT (Rakhi Munn - Dholi (1/2))		
DATE	D.W.G. NO.	18
JAPAN INTERNATIONAL COOPERATION AGENCY		

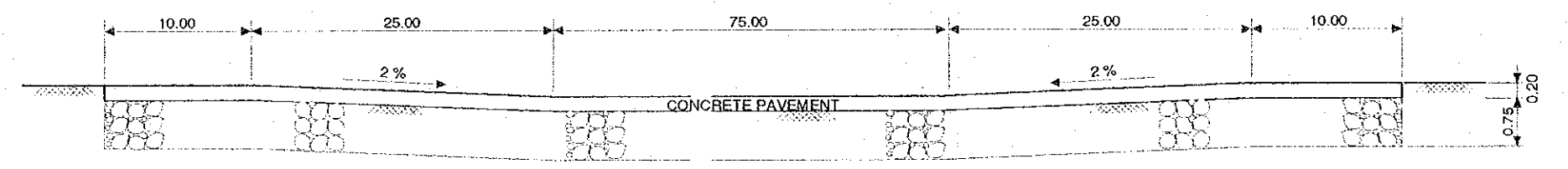


GROUND EL.	633.56	636.18	640.54	675.77	649.54	651.64	655.30	654.04	659.56	682.65	655.10	646.82	641.46	642.69	644.79
DISTANCE	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
STATION	STA. 6+700	+800	+900	STA. 7+000	+100	+200	+300	+400	+500	+600	+700	+800	+900	STA. 8+000	+100

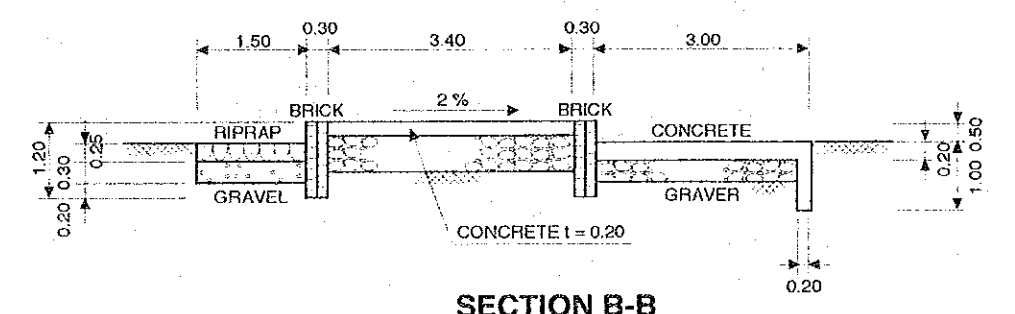
SCALE V = 1 : 1,000  
H = 1 : 20,000



**PLAN OF CAUSE WAY**



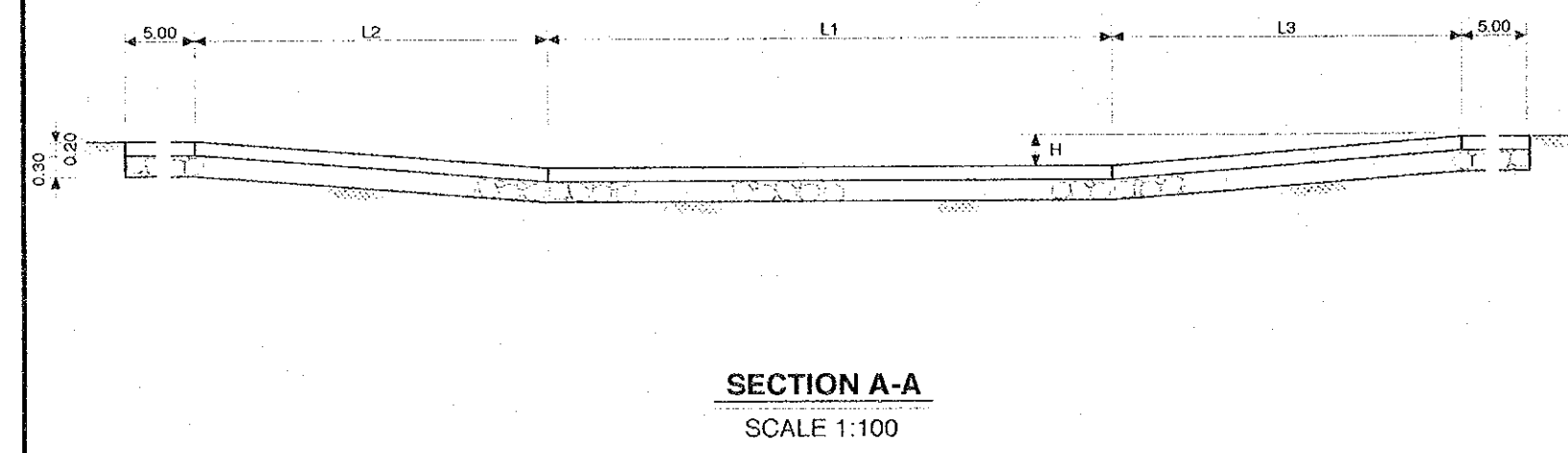
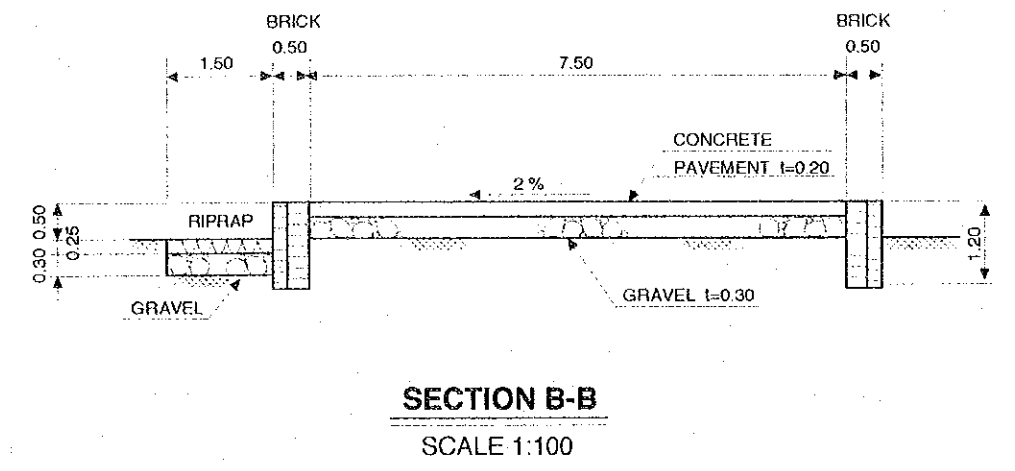
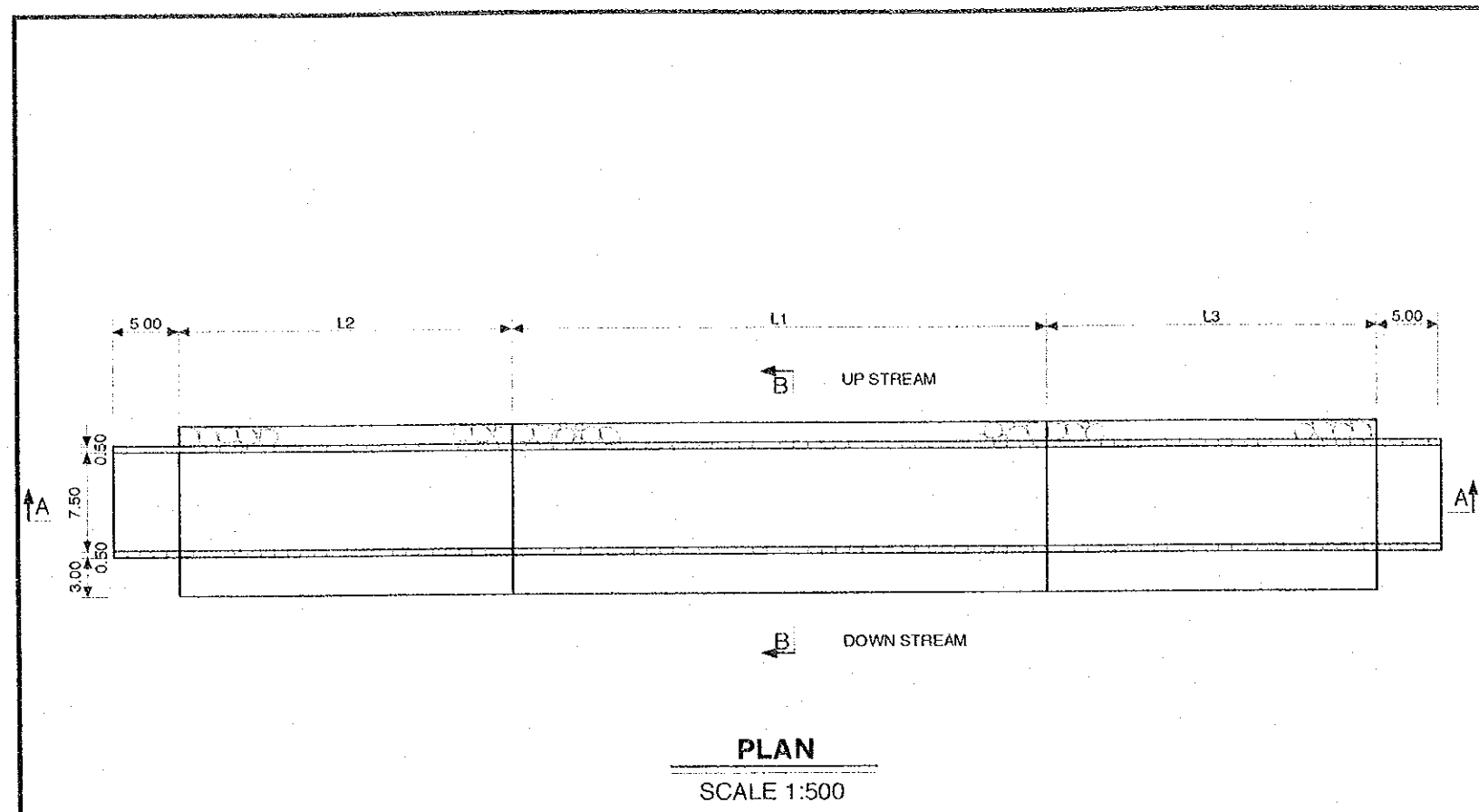
**SECTION A-A**



**SECTION B-B**

UNIT IN METER

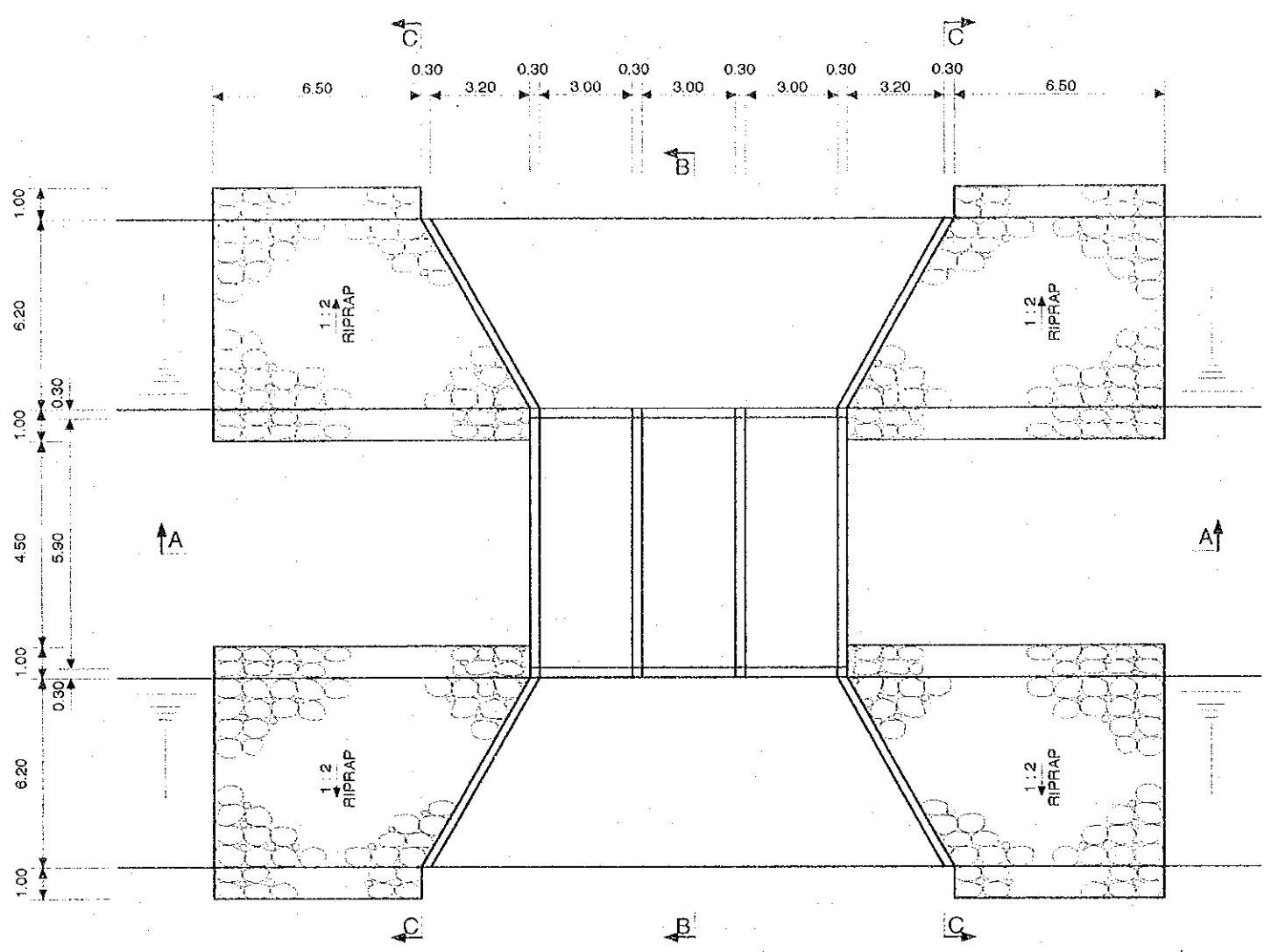
Islamic Republic of Pakistan			
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB			
PLAN OF ROAD IMPROVEMENT (Rakhi Munn - Dholi (2/2))			
DATE		D.W.G. NO.	19
JAPAN INTERNATIONAL COOPERATION AGENCY			



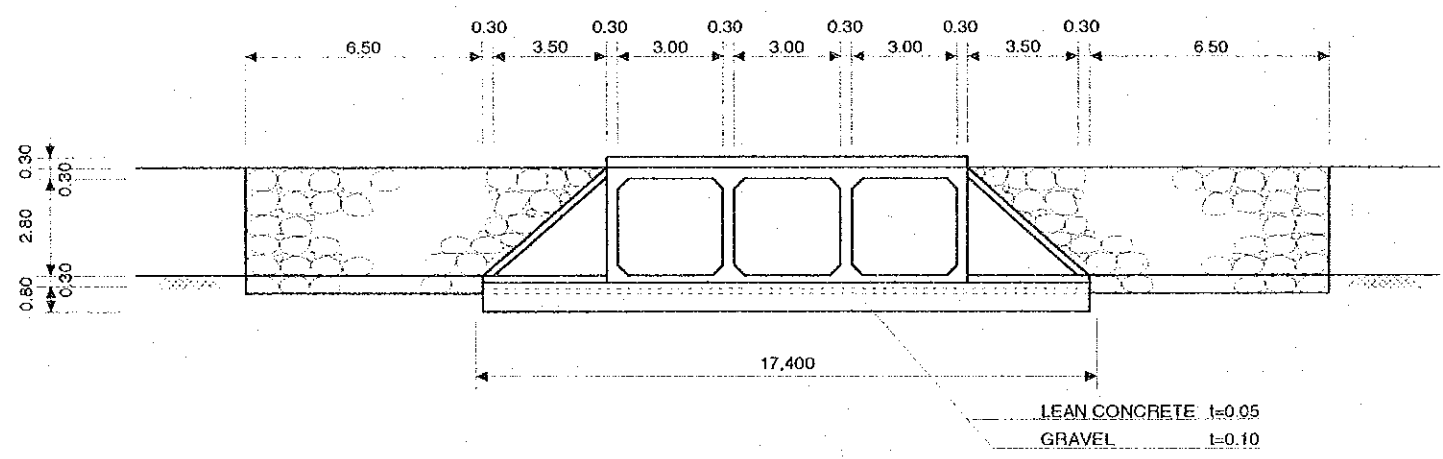
TYPE	L=L1+L2+L3	L1	L2	L3	H
A	50.00	37.00	6.25	6.25	0.50
B	50.00	25.00	12.50	12.50	1.00
C	50.00	12.50	18.75	18.75	1.50
D	75.00	50.00	12.50	12.50	1.00
E	75.00	37.50	18.75	18.75	1.50
F	75.00	25.00	25.00	25.00	2.00
G	100.00	75.00	12.50	12.50	1.00
H	100.00	62.50	18.75	18.75	1.50
I	100.00	50.00	25.00	25.00	2.00
J	100.00	30.00	35.00	35.00	2.50
K	120.00	95.00	12.50	12.50	1.00
L	120.00	70.00	25.00	25.00	2.00

UNIT IN METER

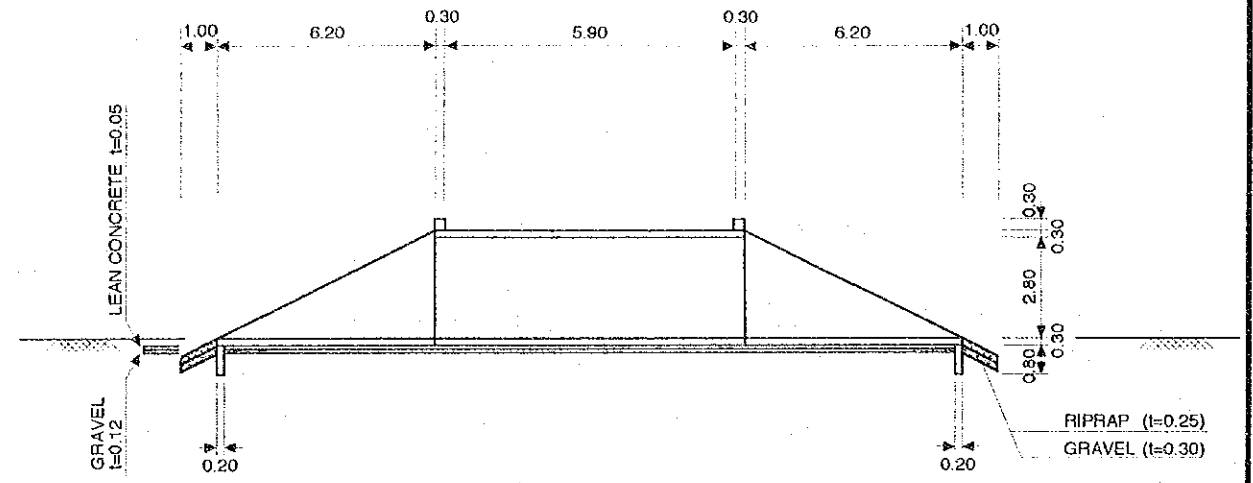
Islamic Republic of Pakistan		
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB		
<b>PLAN OF CAUSE WAY (CHOTI - CHOTI BALA)</b>		
DATE	D.W.G. NO.	20
JAPAN INTERNATIONAL COOPERATION AGENCY		



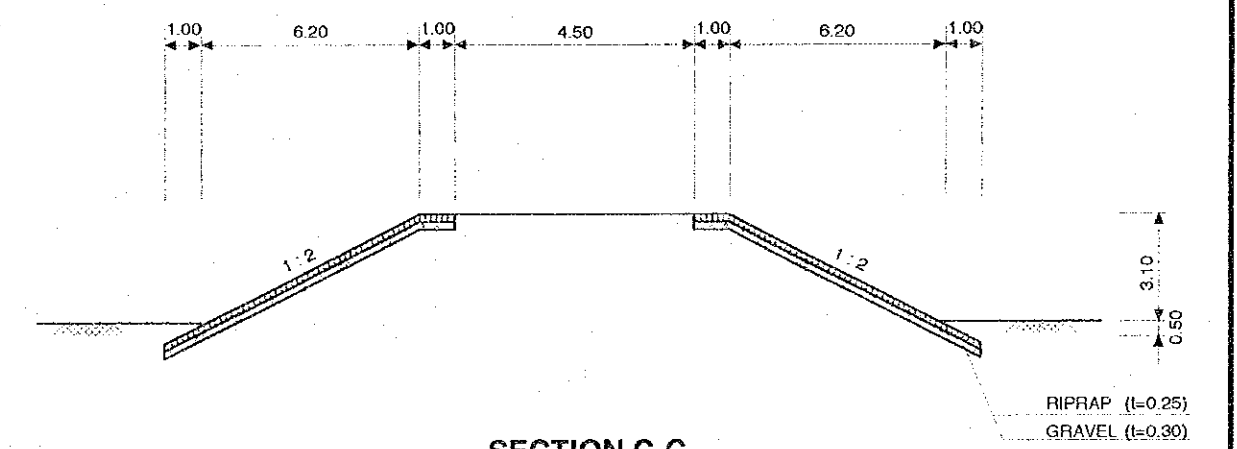
**PLAN**  
SCALE 1:200



**SECTION A-A**  
SCALE 1:200



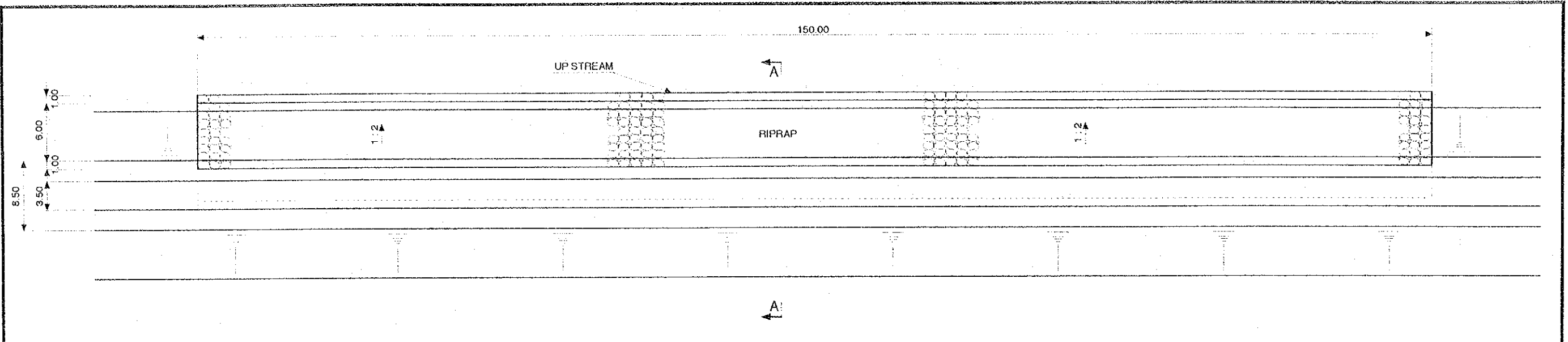
**SECTION B-B**  
SCALE 1:200



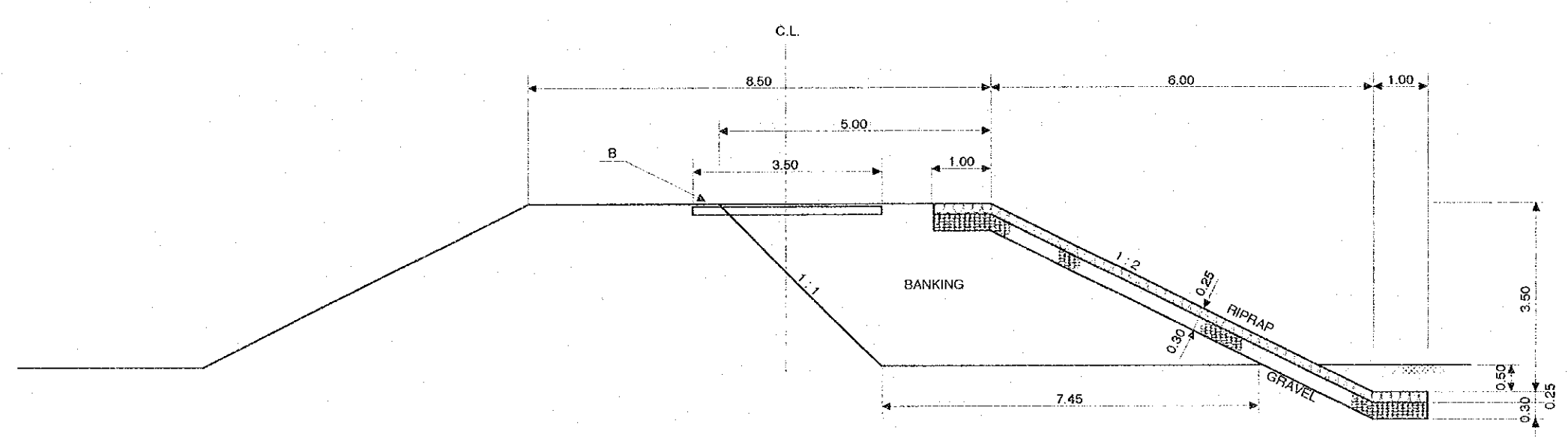
**SECTION C-C**  
SCALE 1:200

UNIT IN METER

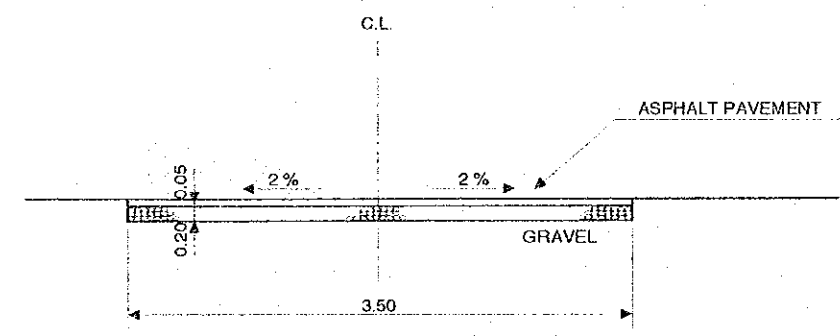
Islamic Republic of Pakistan			
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB			
BOX CULVERT STA. 14+300 (Choti - Choti Bala)			
DATE		D.W.G. NO.	21
JAPAN INTERNATIONAL COOPERATION AGENCY			



**PLAN**  
SCALE 1:500



**SECTION A-A**  
SCALE 1:100



**DETAIL B**  
SCALE 1:50

UNIT IN METER

Islamic Republic of Pakistan		
THE MITHAWAN HILL TORRENT PILOT PROJECT IN PUNJAB		
LIPRAP & IMPROVEMENT OF ROAD STA. 14+750, STA. 20+040 (Choti - Choti Bala)		
DATE	D.W.G. NO.	22
JAPAN INTERNATIONAL COOPERATION AGENCY		











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