Impact of International Finance on Public Policy for Water, Food and Energy Security

Naseer Gillani

Chief National Planning Commission Pakistan
Chair Pakistan Water Partnership

Constitutional Provisions for Public Policy Institutional Framework

156 National Economic Council.–

157(1) The President shall constitute a National Economic Council which shall consist of –

(a) the Prime Minister, who shall be the Chairman of the Council;

(b) the Chief Ministers and one member from each Province to be nominated by the Chief Minister;

Constitutional Provisions for Public Policy Institutional Framework

The National Economic Council shall review the overall economic condition of the country and shall, for advising the Federal Government and the Provincial Governments, formulate plans in respect of financial, commercial, social and economic policies; and in formulating such plans it shall, amongst other factors, ensure balanced development and regional equity and shall also be guided by the Principles of Policy set out in Chapter 2 of Part-II.

Constitutional Provisions for Public Policy Institutional Framework

CHAPTER 3.- SPECIAL PROVISIONS

153. Council of Common Interests.–

(1) There shall be a Council of Common Interests, in this Chapter referred to as the Council, to be appointed by the President.

89[(2) The Council shall consist of –

(a) the Prime Minister who shall be the Chairman of the Council;

(b) the Chief Ministers of the Provinces; and

(c) three members from the Federal Government to be nominated by the Prime Minister

Constitutional Provisions for Public Policy Institutional Framework

(4) The Council shall be responsible to Majlis-e-Shoora (Parliament)

91[and shall submit an Annual Report to both House of Majlis-e-Shoora (Parliament)].

154. Functions and rules of procedure.–

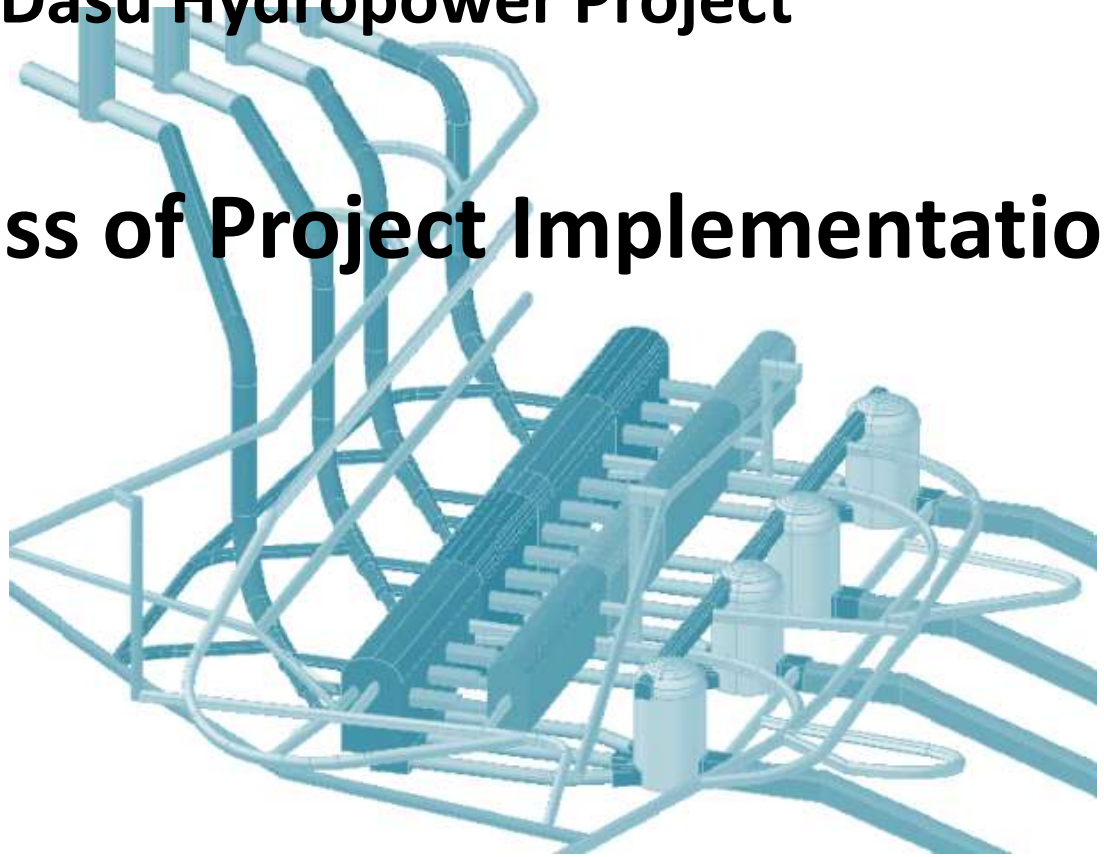
92[(1) The Council shall formulate

and regulate policies in relation to matters in Part II of the Federal Legislative

List and shall exercise supervision and control over related institutions.]

Dasu Hydropower Project

Progress of Project Implementation



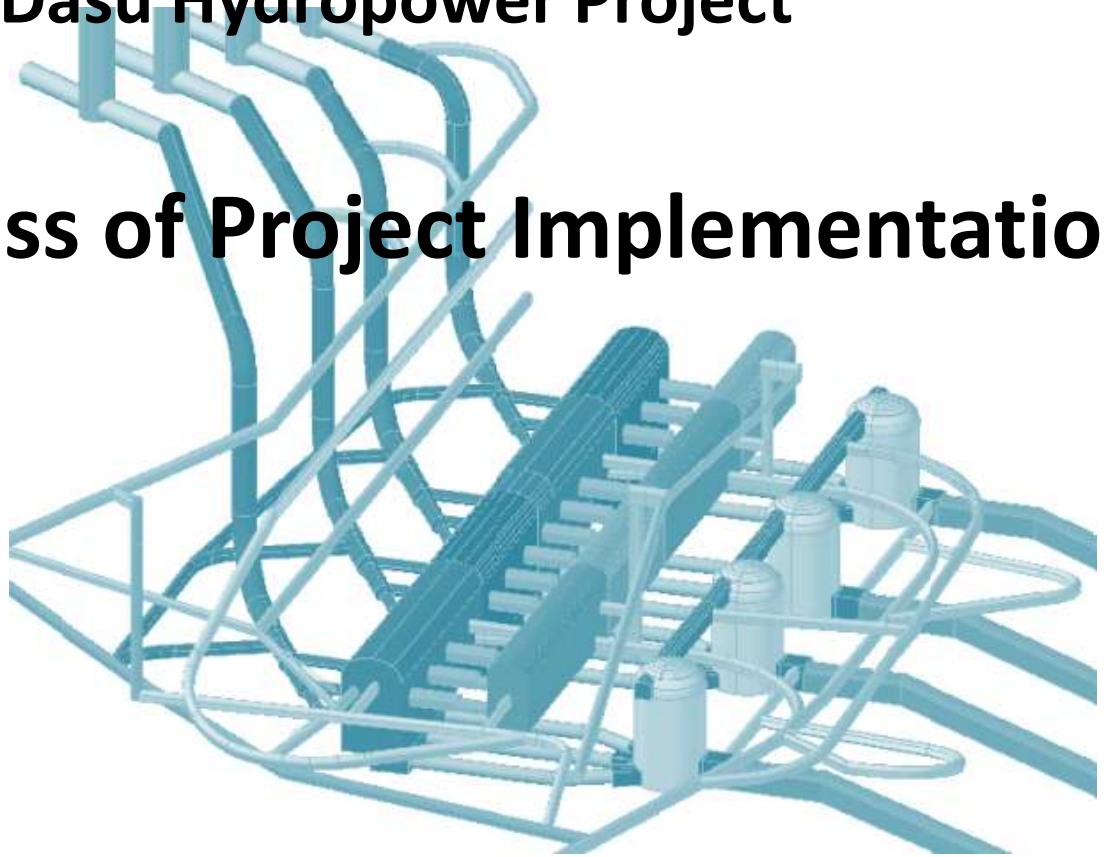
1. Justification of Dasu Project

The necessity of Dasu Hydropower Project is justified as follows:

- Contribution to improve the current power shortage ranging 5,000~ 7,000MW and to meet increasing power demand of 7% per annum
- Improvement of energy mix ratio from thermal to hydro since increasing power tariffs is caused by import of fuel for thermal power plants
- Least cost project comparing to thermal alternatives and in particular among planed hydropower projects
- Less social and environmental impact and high green house gas (GHG) efficiency due to high power density (166 Watt/m^2)

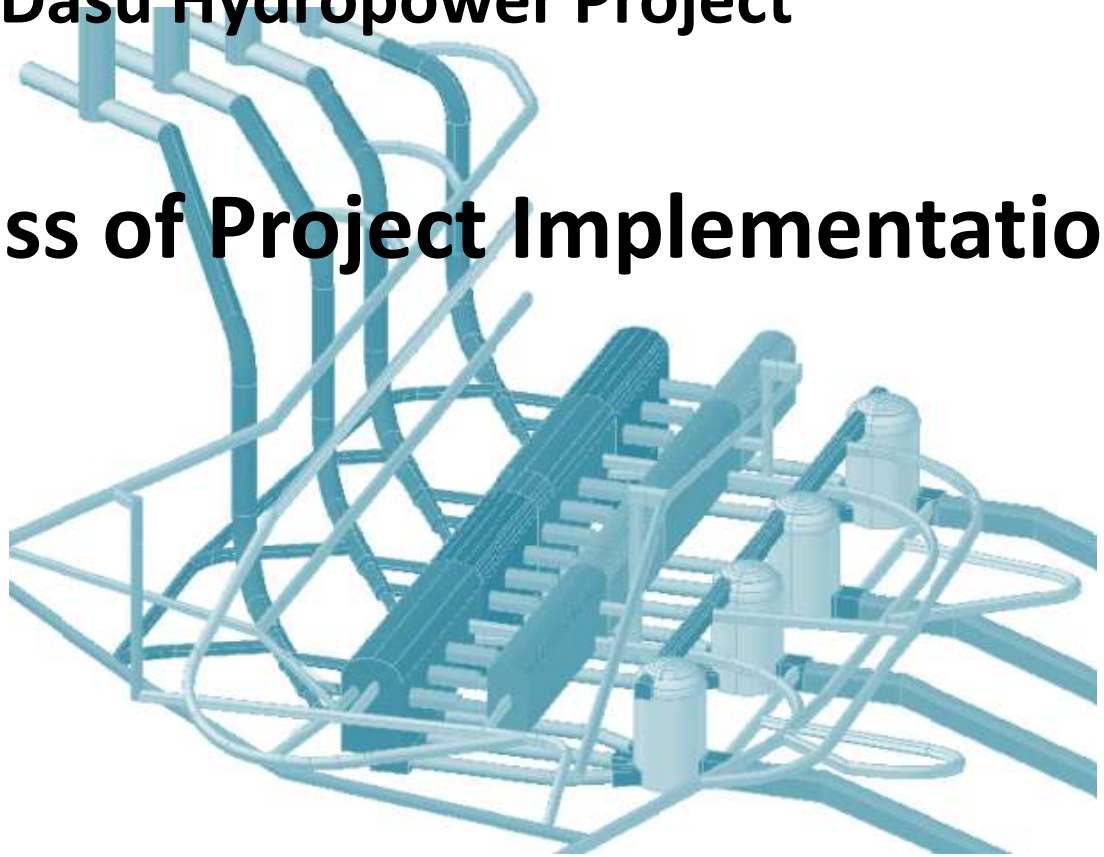
Dasu Hydropower Project

Progress of Project Implementation



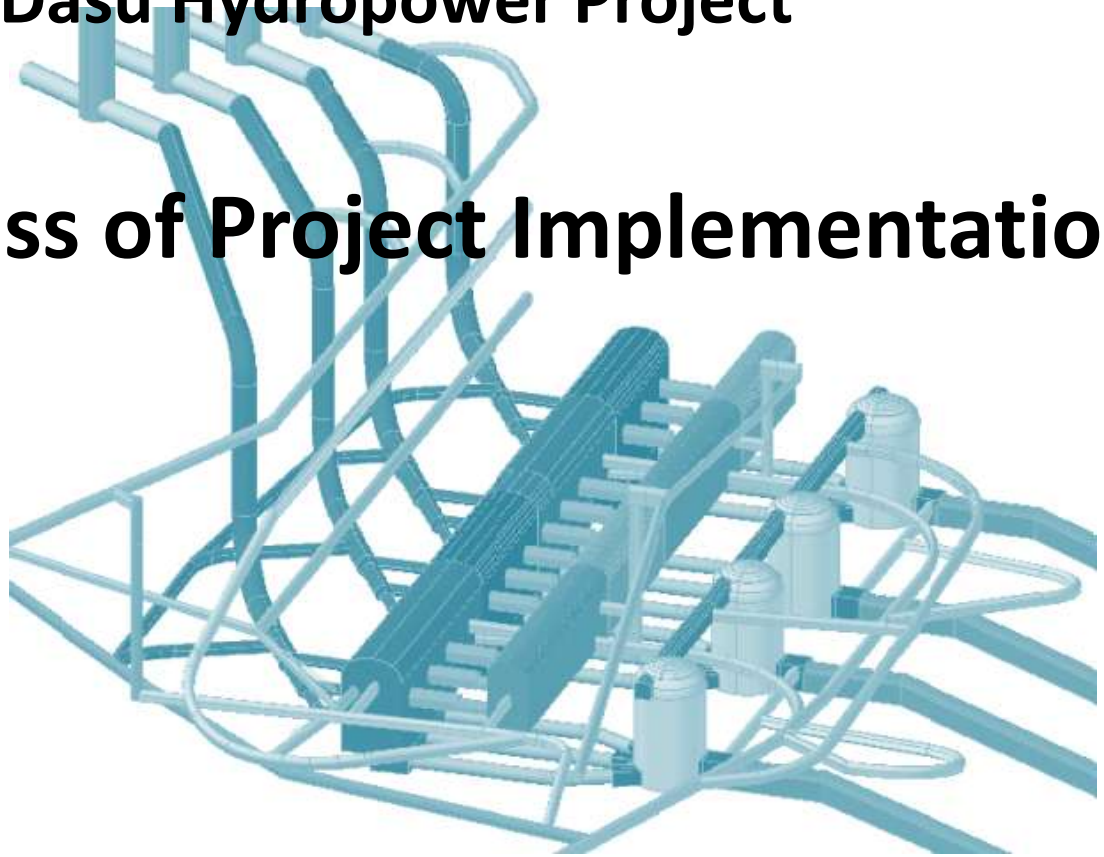
Dasu Hydropower Project

Progress of Project Implementation

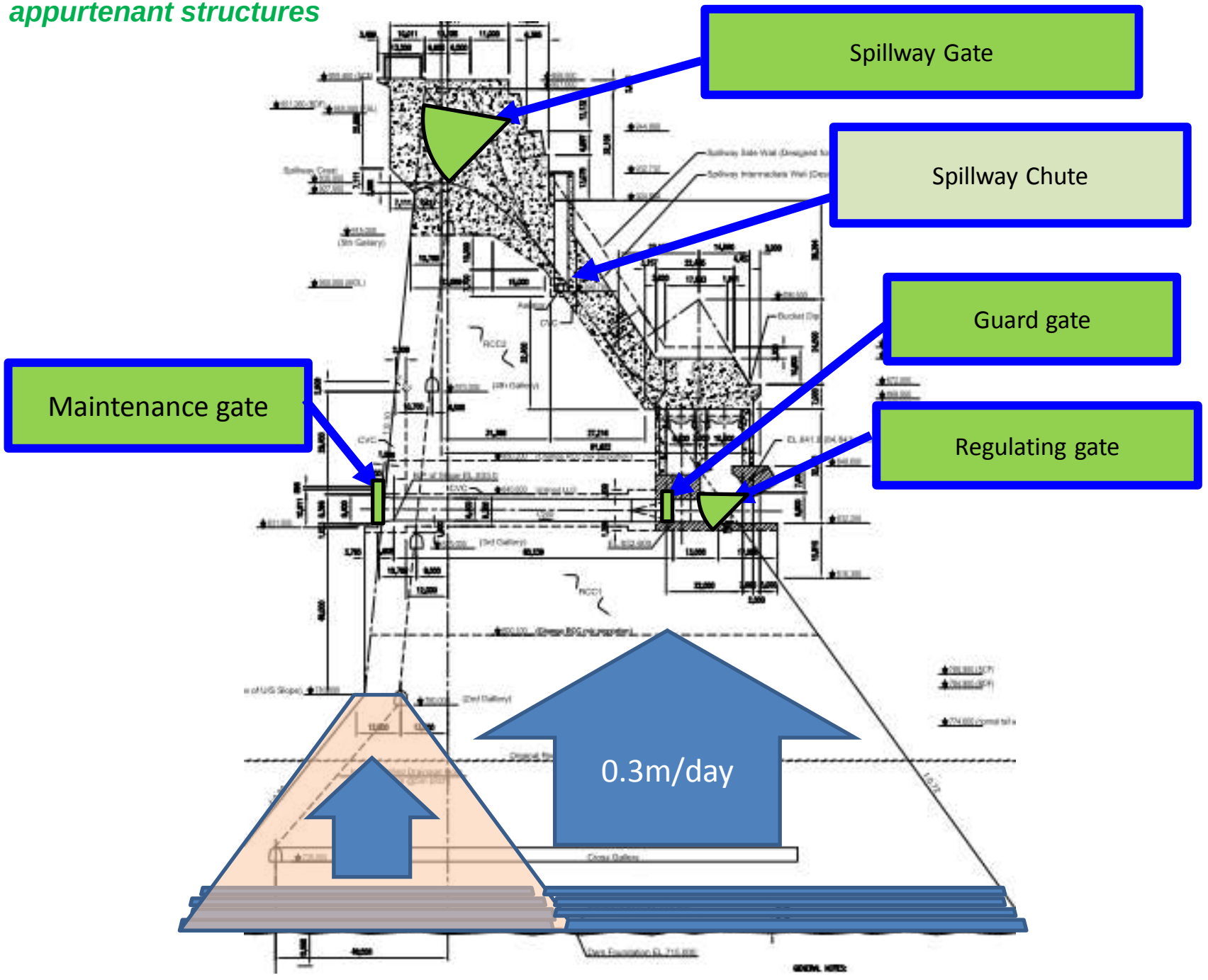


Dasu Hydropower Project

Progress of Project Implementation



Construction of dam and appurtenant structures



1. No. of resettlement sites to be developed **:**

   40 places under 25 villages (R/B=9, L/B=16)

2. Facilities to be provided for each village:

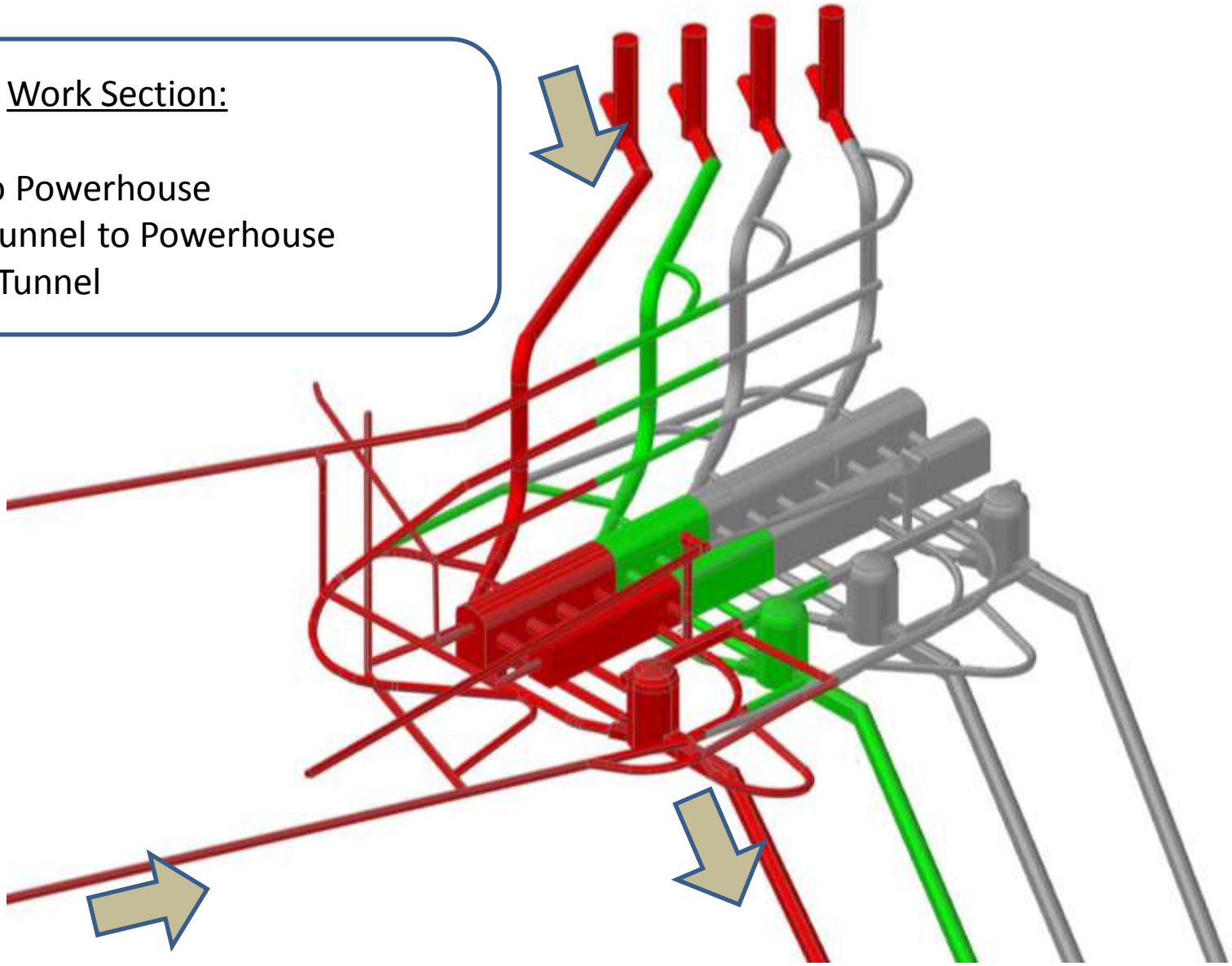
   - Development plan
   - Water supply & sewerage
   - Internal roads
   - Connecting roads from relocated KKH to sites
   - Electricity will be supplied from the Grid Station via 11 kV D/L by a separate contract
   - Communal facilities may or may be provided by Project

3. All resettlement sites are located along the relocated KKH/Right Bank Roads or above relocated KKH/RAR and owned by the villagers who are to be resettled.

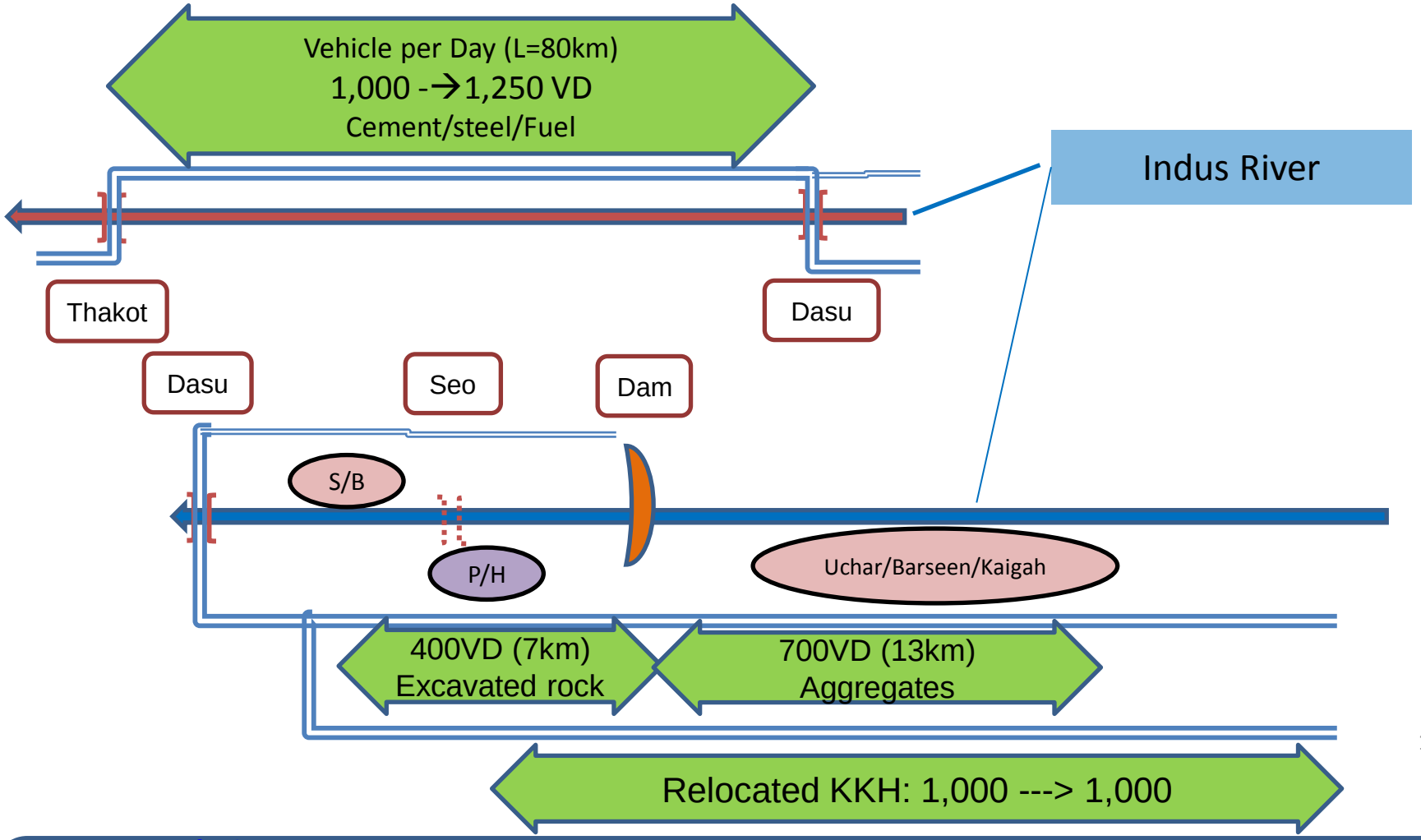
Construction of underground powerhouse and tunnels

Work Section:

WS 1: Intake to Powerhouse
WS 2: Access Tunnel to Powerhouse
WS 3: Tailrace Tunnel



Traffic Conditions at Peak Time



Recommendation:

(1) Establishment of traffic committee,
(2) provision of layby along KKH from Hasanabdal to Dasu
(3) Training and Strengthen of Traffic police
(4) Application of belt-conveyor system

Status of Procurement Documents

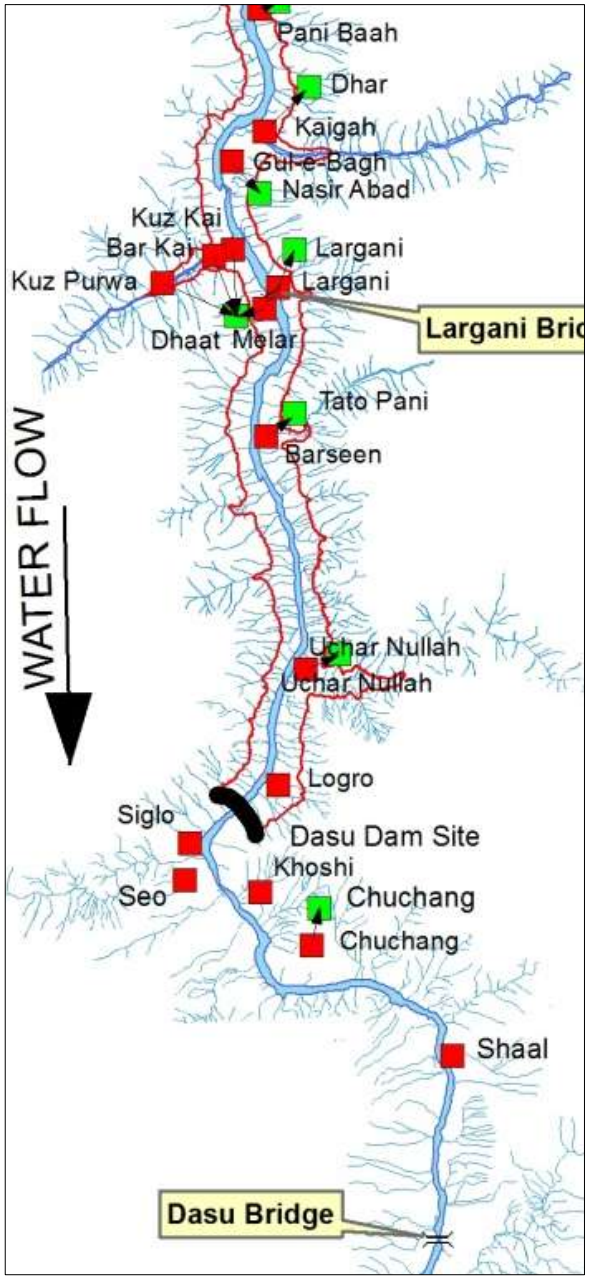
	Documents	PQ	Bidding
PCI-01	Construction of Project Colony Infrastructure including Power Distribution and Telecommunication	PQ evaluation complete and waiting approval by Bank	Waiting approval by Bank
KKH-01	Relocation of KKH - Part 1	PQ evaluation complete and waiting approval by Bank	Waiting approval by Bank
RAR-01	Construction of Komila - Seo Road	PQ evaluation complete and waiting approval by Bank	Waiting approval by Bank
TL-01	Construction of 132 kV transmission line	Post qualification	Waiting approval by Bank
KKH-02	Relocation of KKH - Part 2	Waiting approval by Bank	BD is ready for approval
RAR-02&03	Construction of Dam-Uttar Gah Road via Kandia	(Under survey for design)	-
RAR-04	Construction of Kandia bridge	(Under investigation)	-
MW-01	Main Civil Works: Dam and Hydraulic Steel Structures	Document is ready for approval (*1)	Ready for approval by end of May(*1)
MW-02	Main Civil Works: Underground Complex, Tunnels and Hydraulic Steel Structures	Document is ready for approval (*1)	Ready for approval by end of May(*1)
EM-01	Electro-mechanical Equipment	Document is ready for approval (*1)	Ready for approval by end of May(*1)
RV##	Resettlement area development (6 local contract groups; G1~G6)	--	Ready for approval by the mid of June

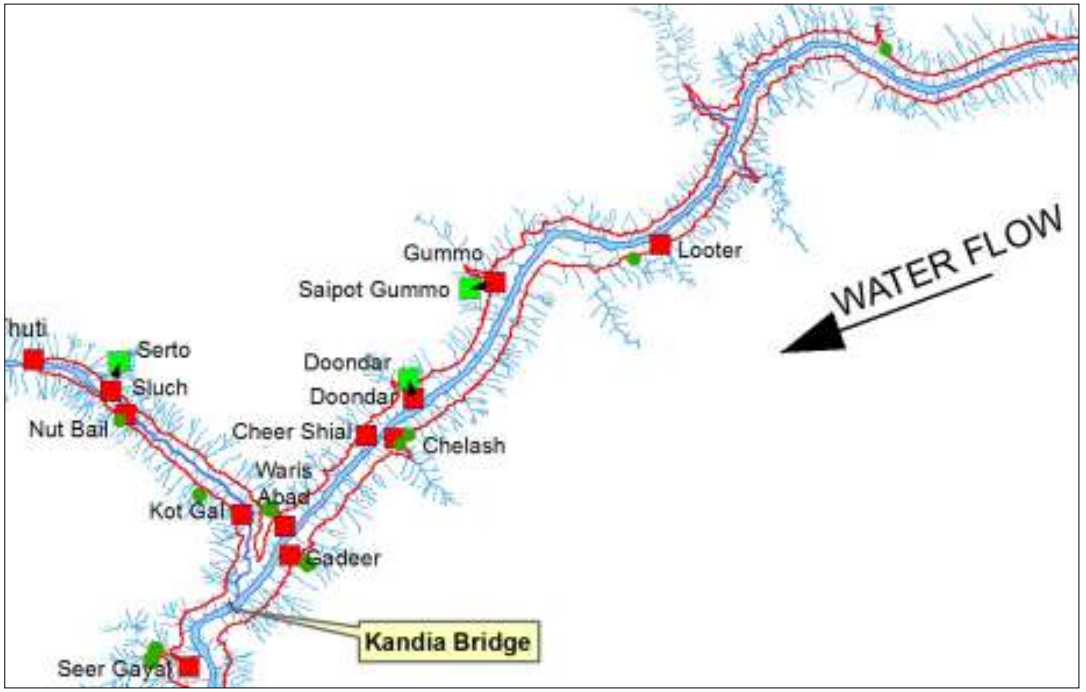
Note *1 : Finalization subject to further discussion on the requirements of Contract Financing with Bank

5. CURRENT ACTIVITIES

Work Items	Target of Completion
(1) Exploratory adit AD-03 incl. over-coring test	Aug/14
(2) Hydraulic model test	Jun/13
(3) Social Preparation Work - Survey and design of resettlement areas - Assistance in cadastral survey by DC - Coordination with DC/communities	Under way
(4) Assistance in loan appraisal	Complete
(5) Preparation of construction drawings (500 sheets)	Jun/14
(6) PQ and Bidding - Assistance in PQ and Bidding - Finalization of PQ documents and bidding documents	Under way

Development of Resettlement Sites

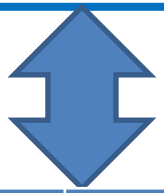




Least Cost Alternative

Unit Cost of Dasu Power Plant (Based on financial cost incl. IDC):

- Capacity cost: Full development=1,850 US$/kW
  Stage -I=2,490 US$/kW
- Energy cost: Full development=2.0~2.4 Usc/kWh
  Stage-I=2.4~3.0 Usc/kWh

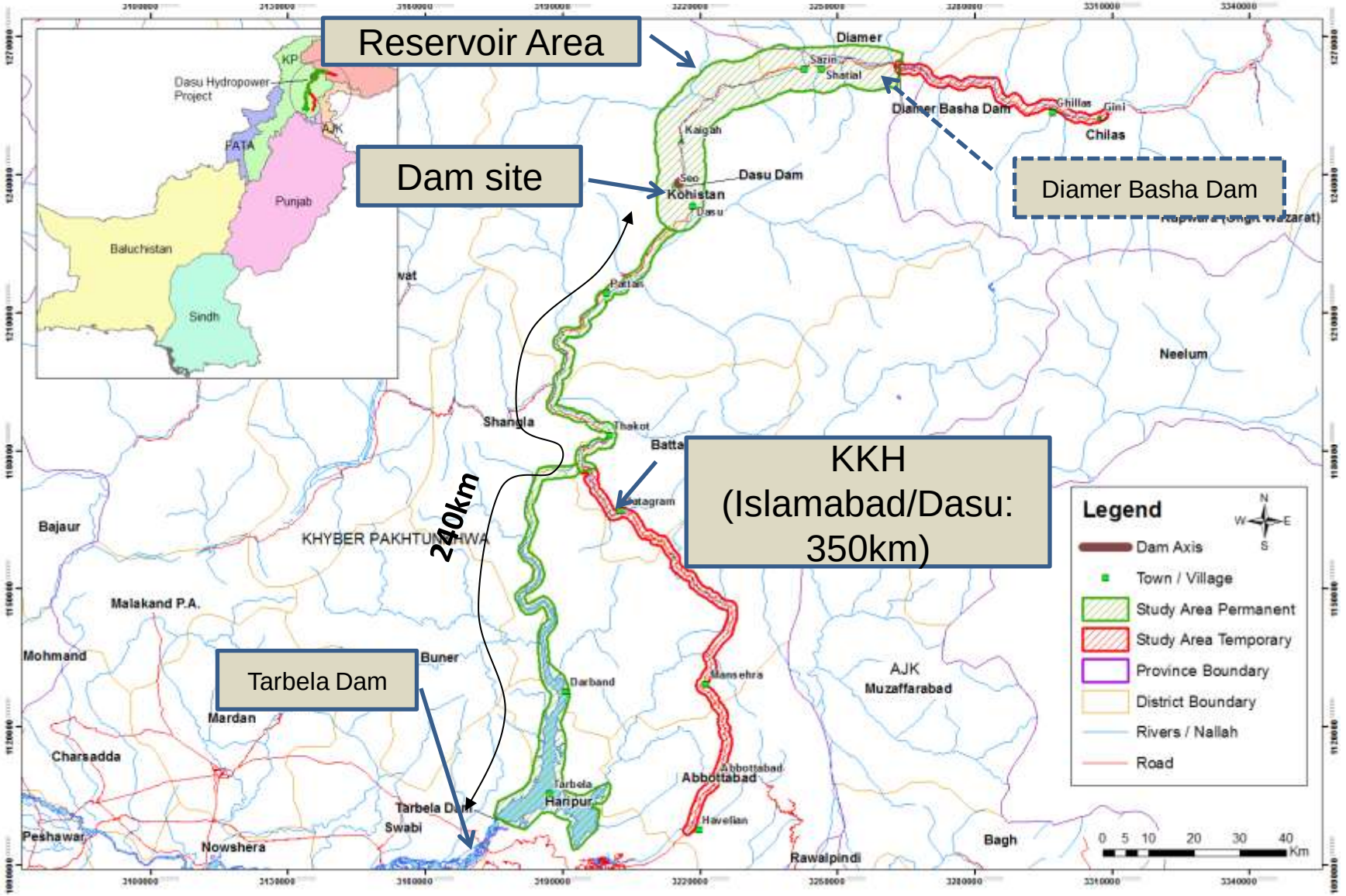


Project	I.C. (MW)	Capacity cost (US$/kW)	Energy cost (Usc/kWh)
Neelam Jhelum	969	2,229	4.5
Bunji	7,100	1,710	5.4
Diamer Basha	4,500	2,510	6.6
CCGT		1,227	14.4
Unit Hydro Cost (2015~2030)			6.5~5.7
Unit cost of thermal (2015~2030)			12.1~14.2

Source: NTDC

2. Project Scope, Facilities and Cost

Location Map and Access to Site



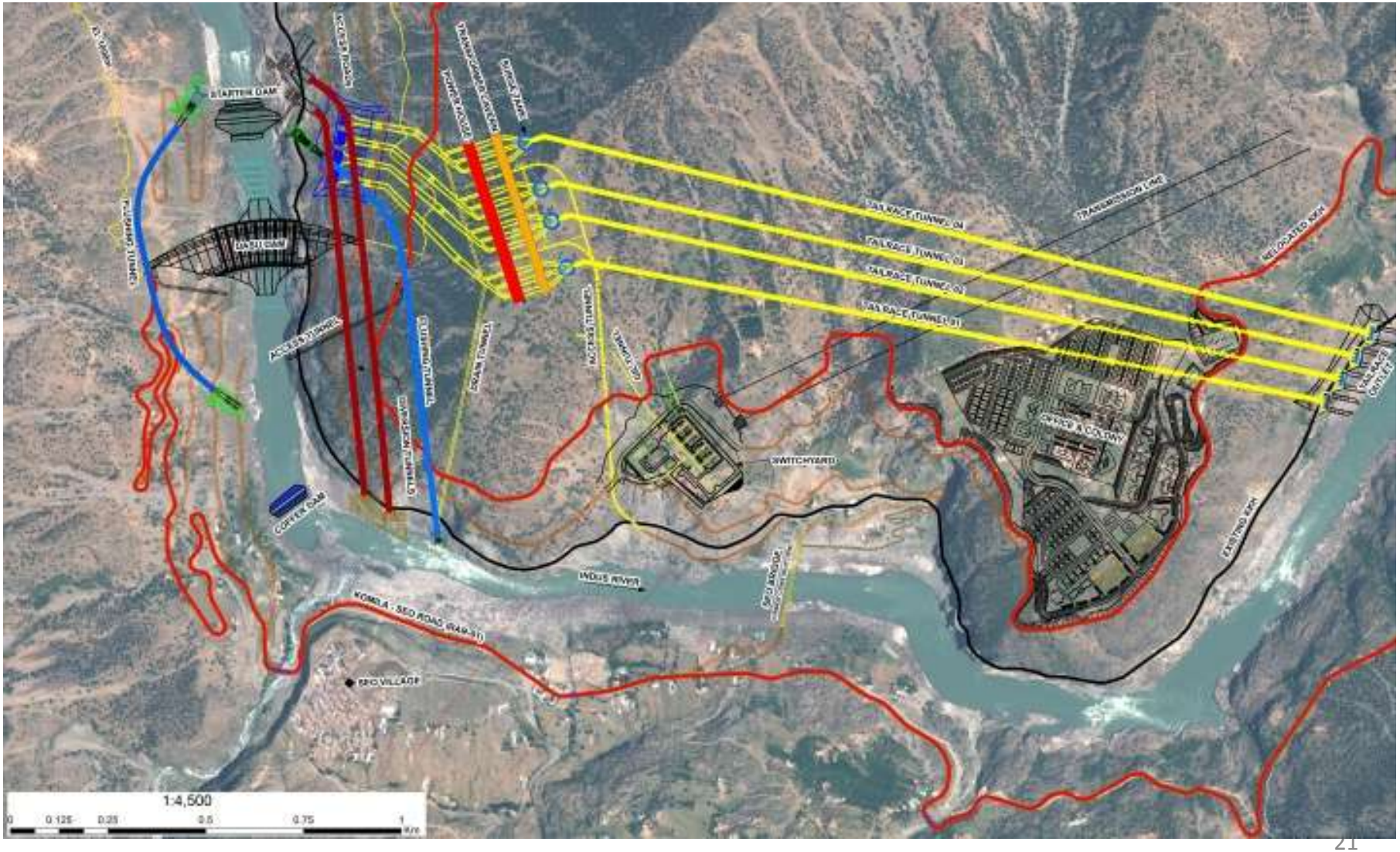
Main Technical Issues

1. High Floods due to GLOFs (Glacier Lake Outburst Floods)
2. High Sediment Yield & Concentration
3. Seismic Danger Zone
4. Limited Accessibility to and within the Site

Solutions:

1. Provision of large spillway gates: 16.5mx22.4mx8nos
2. Provision of low level outlets (LLO) and flushing tunnels (FT):
   - LLO: D=6.4m, 9nos
   - FT: D=9.4m, 2nos
3. Application of 3 D dynamic computer simulation under a peak acceleration of 0.54g
4. Establishment of elaborate traffic management: Provision of laybys along KKH, application of belt conveyor system, etc.

General Layout of Project Facilities



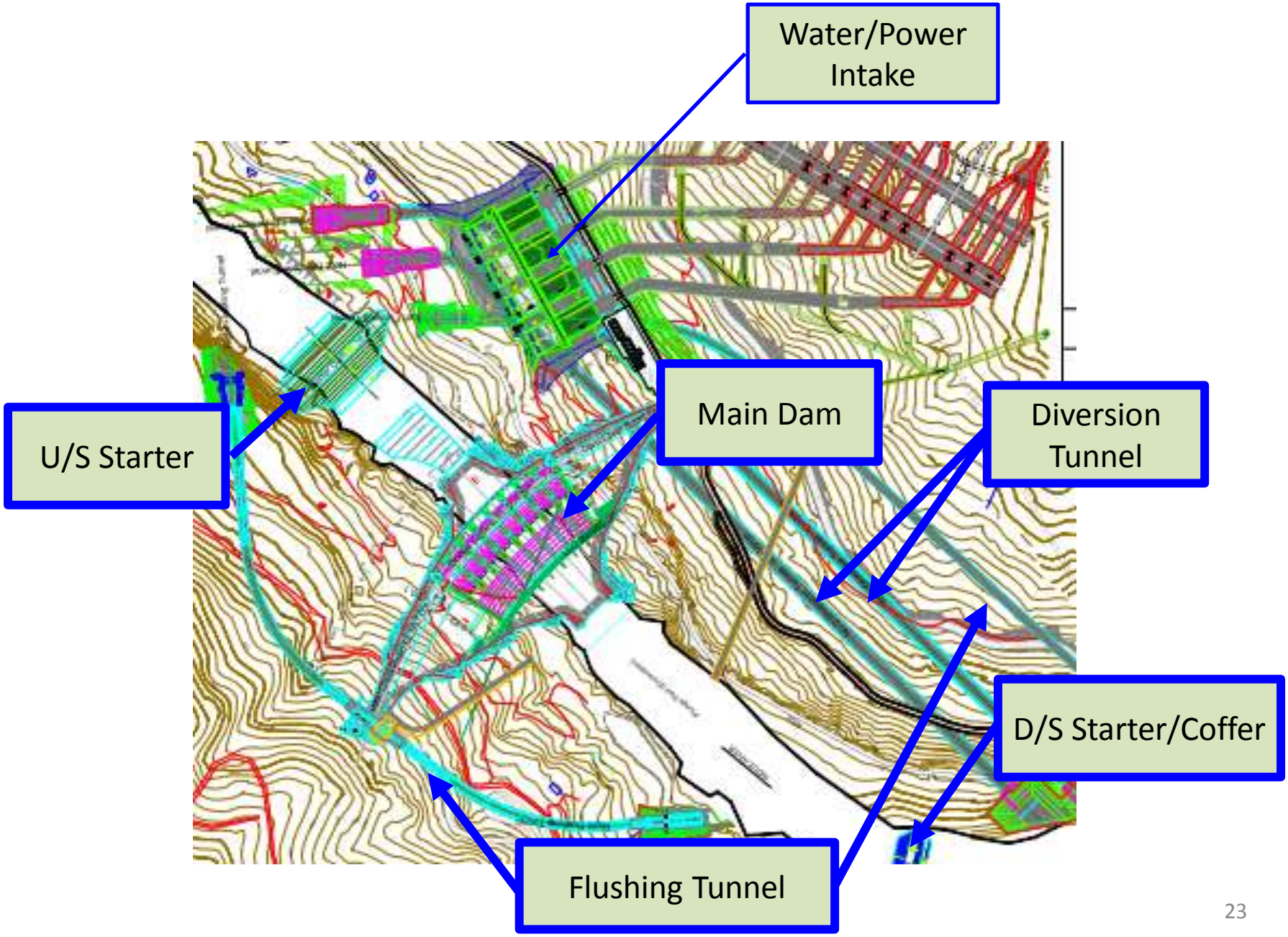
List of Project Facilities

Facilities	Description	Stage I	Stage II
Dam	- 242m high dam - 8 spillway with gates - 9 LLO with gates - 2 flushing tunnels with gates	Completion of all facilities listed in left	
Power Intake & tunnel	- 4 intake and shafts with 4 gates - 4 Power tunnel	- 4 intake and shafts with 2 gate - 2 power tunnels	- Another 2 gates - 2 power tunnels
Underground complex	- Cavern for 12-unit GE space and installation of 12 GE units - Cavern for 12-unit GIS space and installation of 12 GIS units - 4 surge chambers - 4 tailrace tunnels incl. these outlets. - 4 bays with Control Building	- Cavern for 7-unit GE space and installation of 6 GE units - Cavern for 7-unit GIS space and installation of 6 GIS units - 2 surge chambers - 2 tailrace tunnels incl. there outlet. - 2 bay with Control Building	- Cavern for 5-Unit GE space and installation of 6 GE units -Cavern for 5-unit GIS space and installation of 5 GIS units - two surge chambers, - two tailrace tunnels -Two bays
T/L	- 500 kV T/L, 2 lines, double circuit	- 500kV 1 line, double circuit	- second line , double circuit

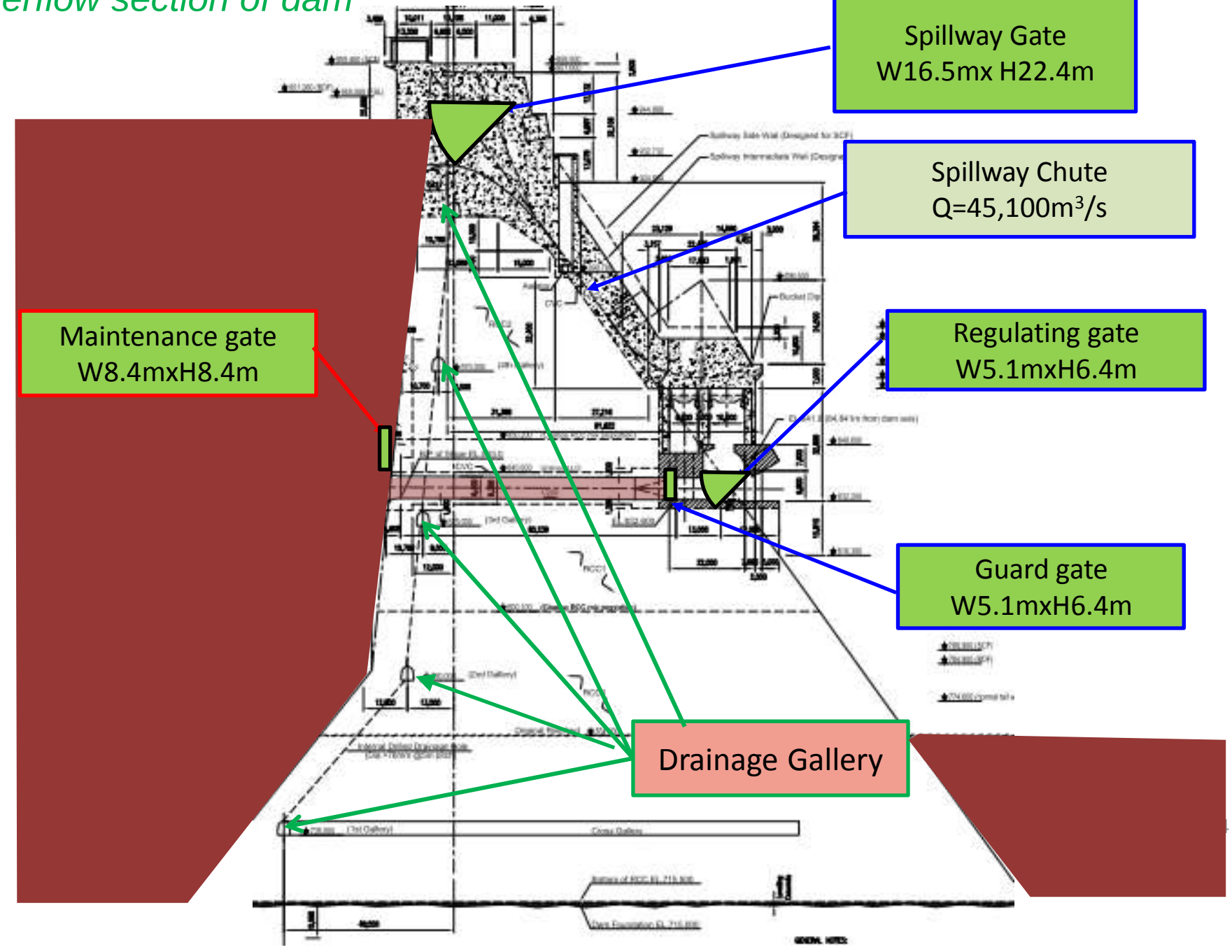
Other than above the following facilities shall be completed before start or during Stage 1:

- Relocation of KKH (64km)
- Construction of right bank roads with bridges over the Indus river
- Construction of WAPDA O& M Staff colony
- Construction of 132 kV transmission line from Dubair to Dasu Town
- Resettlement and environment mitigation measures

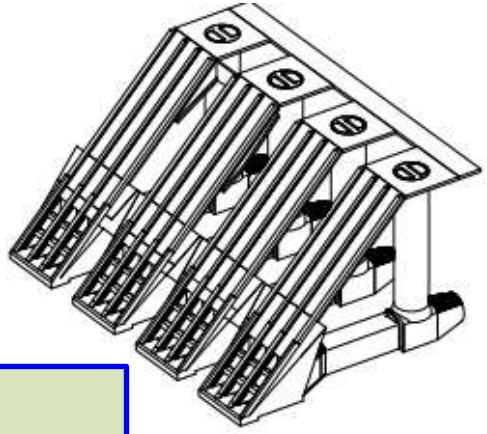
Dam and appurtenant facilities



Overflow section of dam



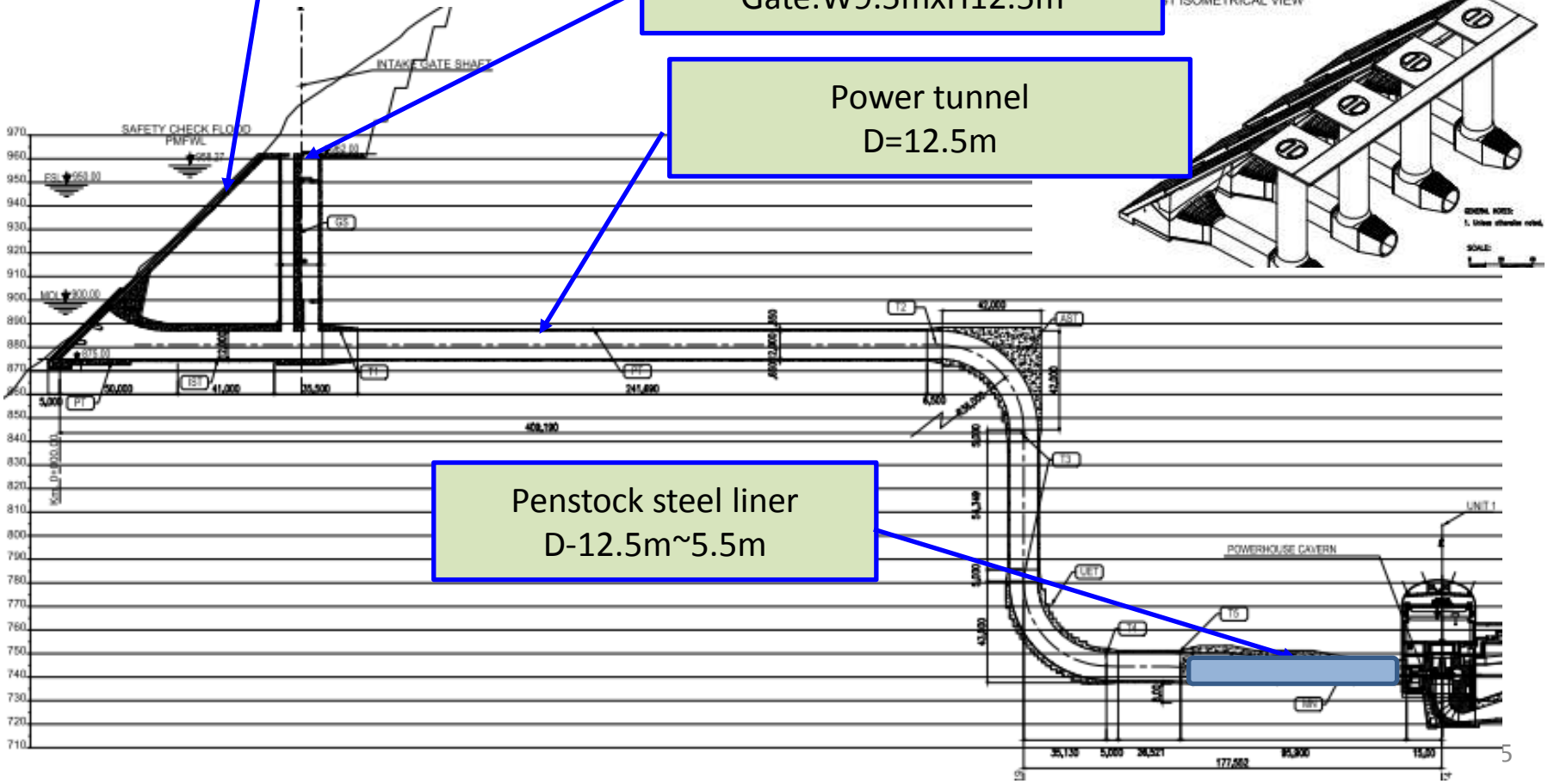
Water intake and power tunnel until powerhouse



Intake trashrack

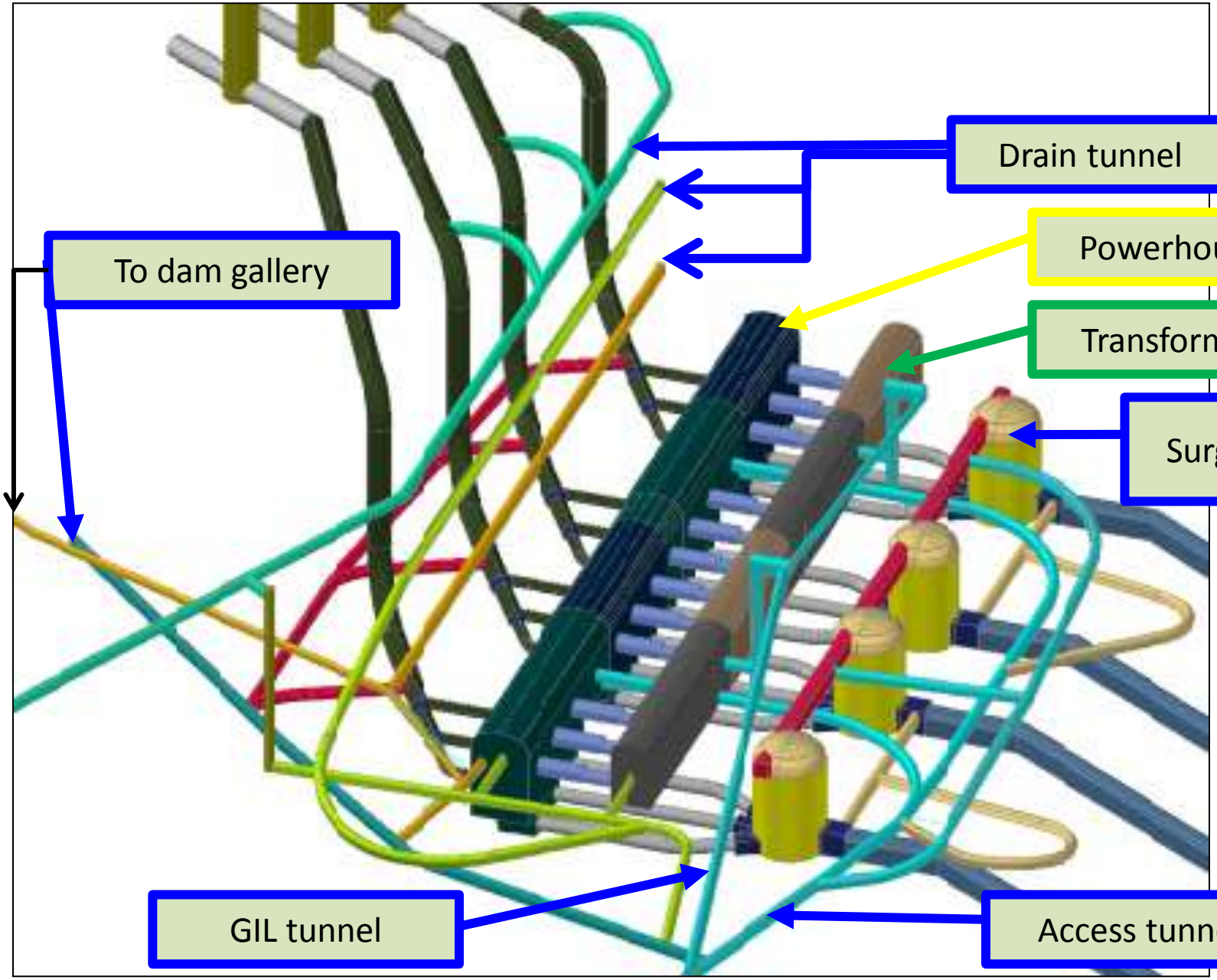
Intake gate shaft
Gate:W9.5mxH12.5m

Power tunnel
D=12.5m

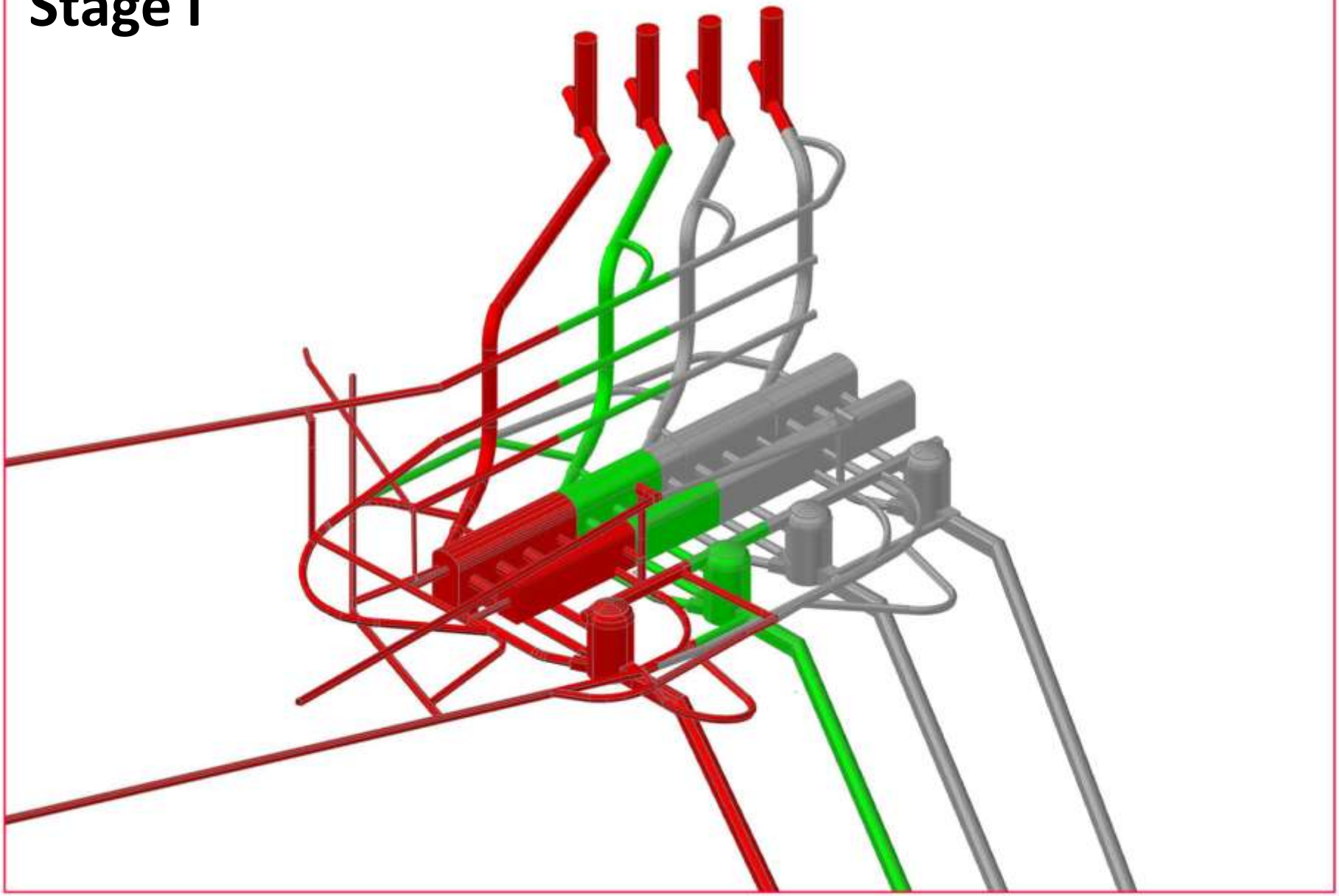


Penstock steel liner
D-12.5m~5.5m

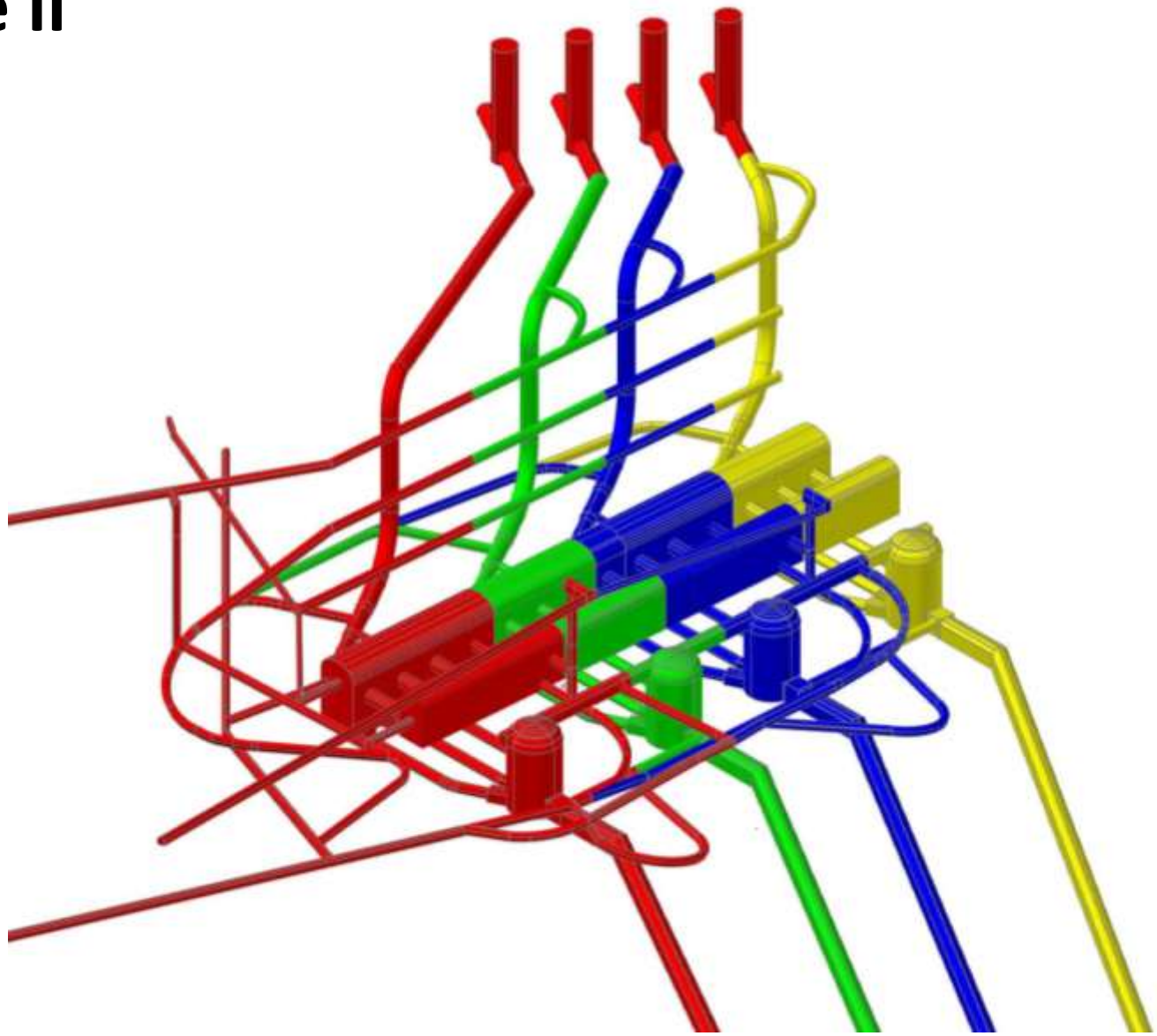
Perspective View of Power Intake and Powerhouse Complex



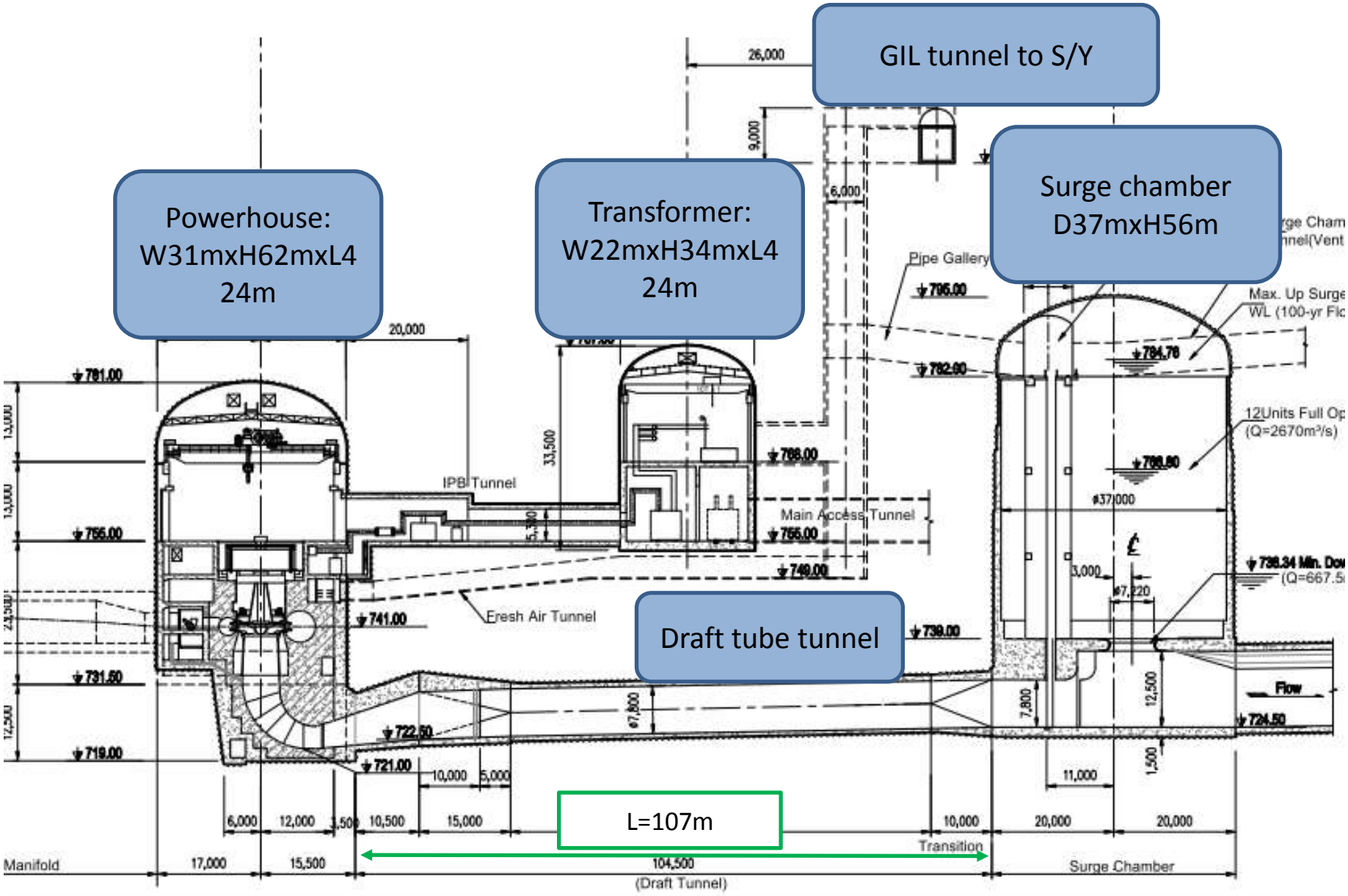
Stage I



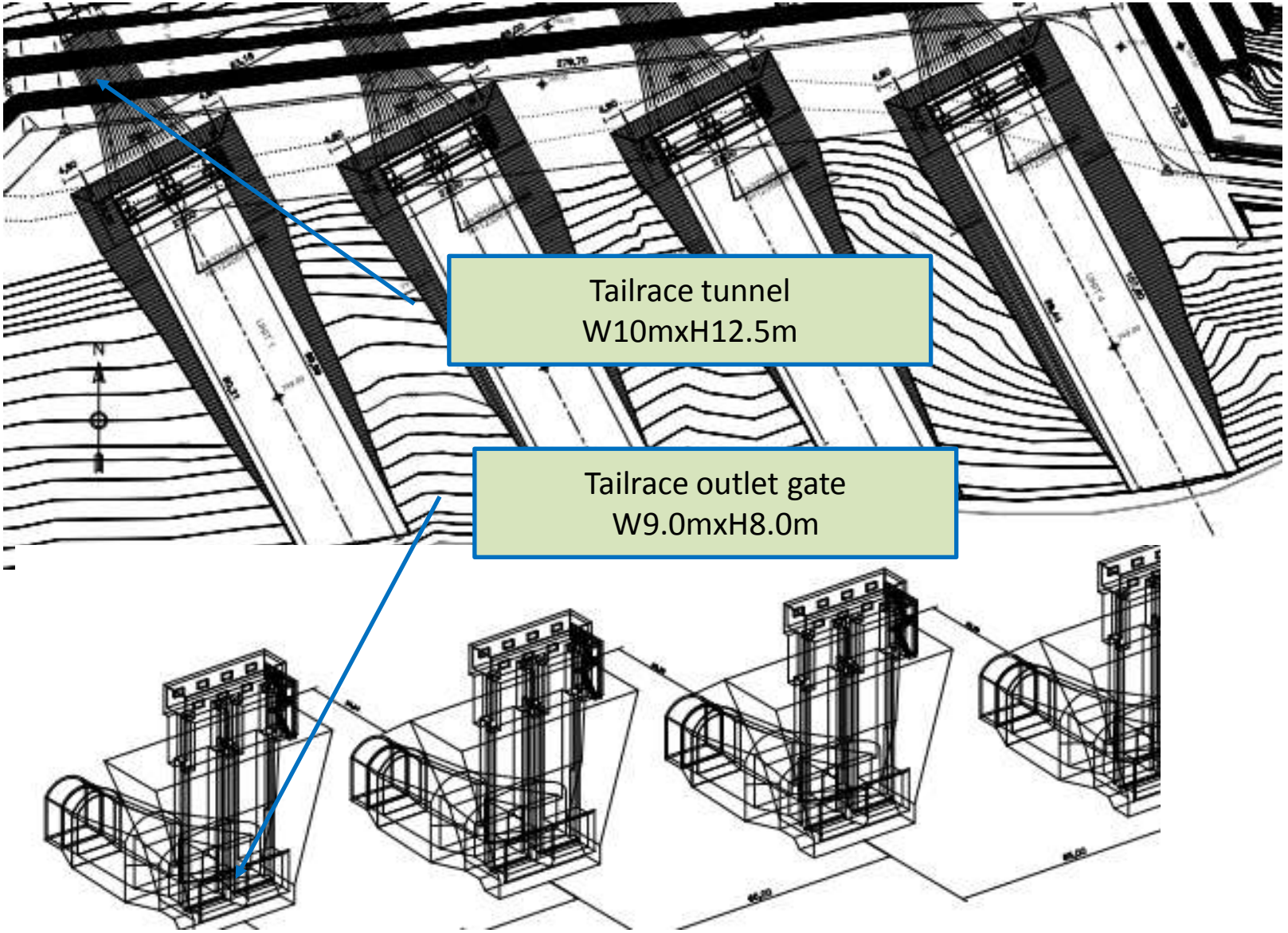
Stage II



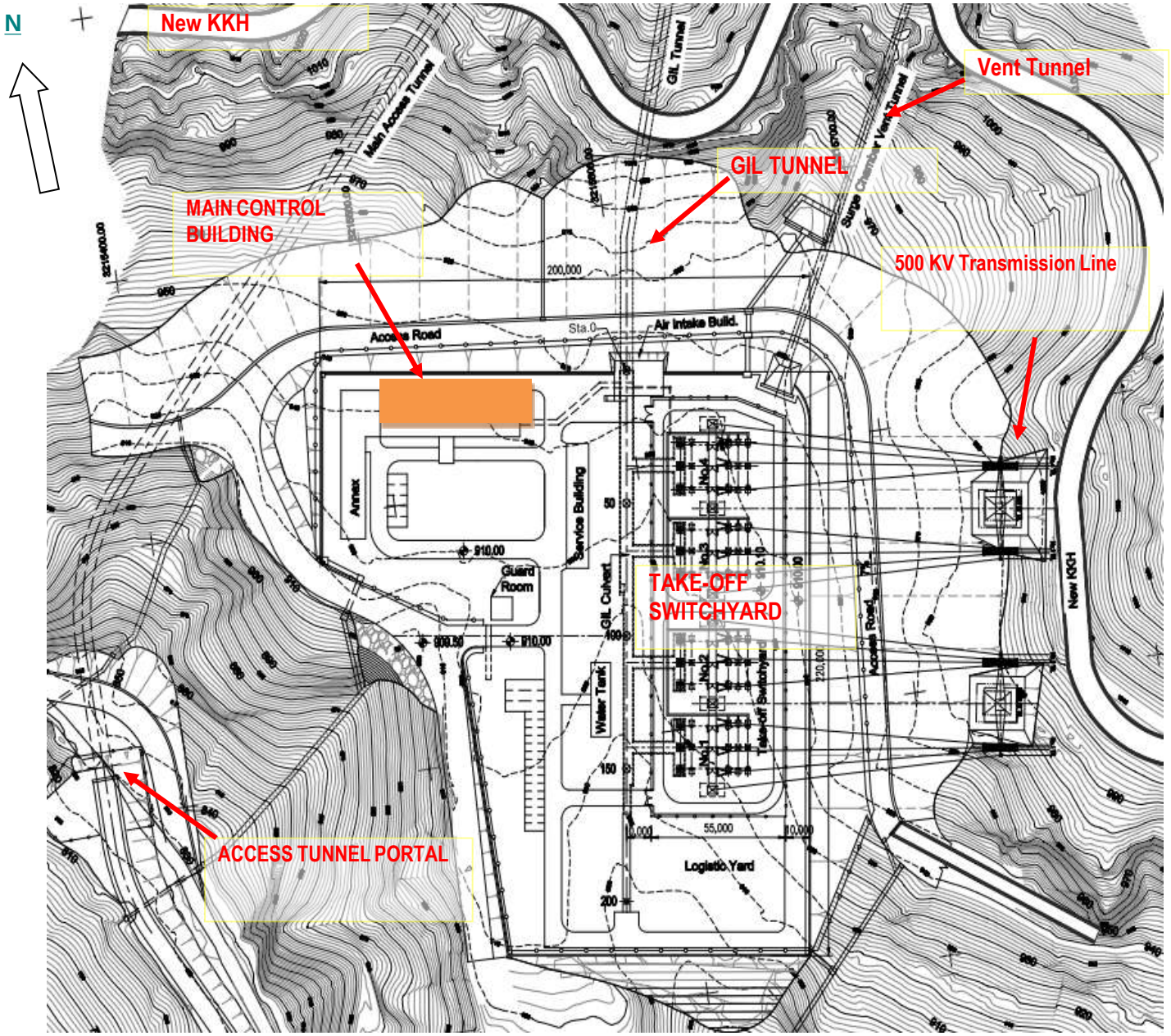
Profile of major underground structures



Plan and 3D model for Tailrace outlet



Plan for Switchyard



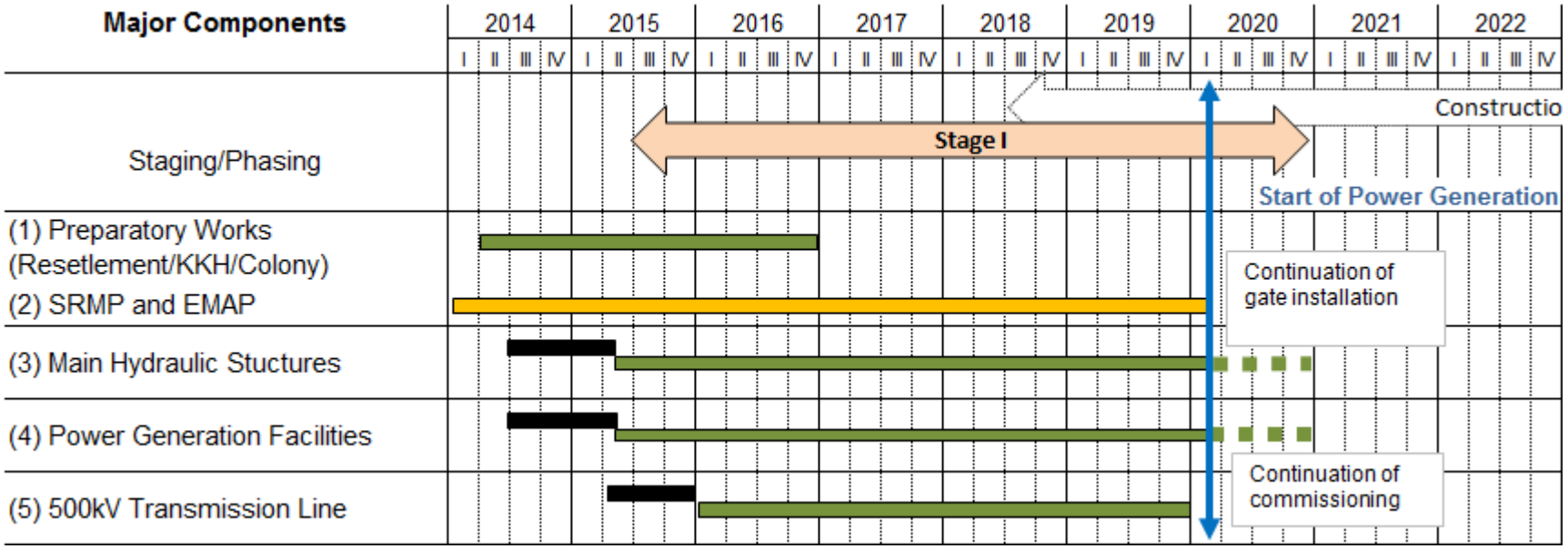
Construction costs for staged development

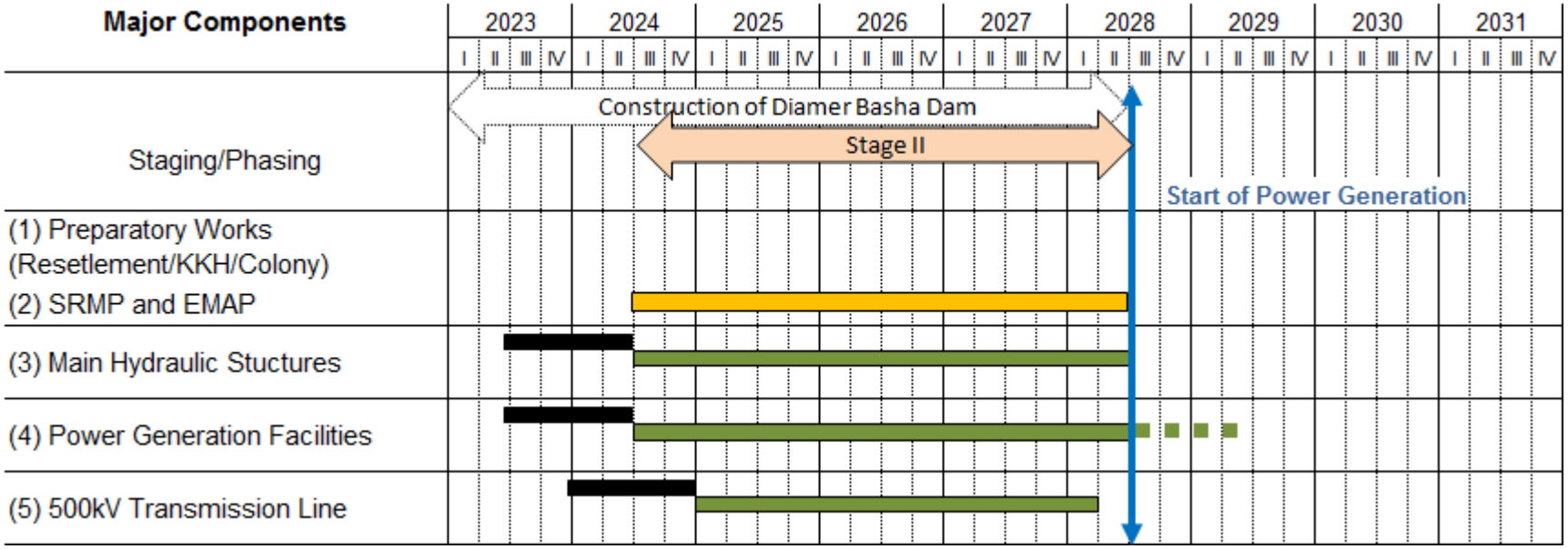
Unit: MUS$

Items	Stage I	Stage II	Total
Power and Energy	2,160MW 12,225GWh	2,160MW 6,207GWh	4,320MW 18,432GWh
I. Direct Cost	**3,006**	**1,200**	**4,206**
1) Hydraulic structures incl. gates	1,246	0	1,246
2) Underground complex incl. gates	626	380	1,006
3) Generating equipment	530	519	1,049
4) 500kV T/L	301	301	602
5) Infrastructures	303	0	303
II. Social and Environ. Management cost	378	0	378
III. Administration and ES cost	254	94	348
IV. Contingencies, tax	640	782	1,422
Financial Cost except IDC*	**4,278**	**2,076**	**6,354**

Note *: Without 500kV T/L, Stage I=3,750MUSD and Stage II=1,540MUSD

Implementation Schedule





Financial Structure

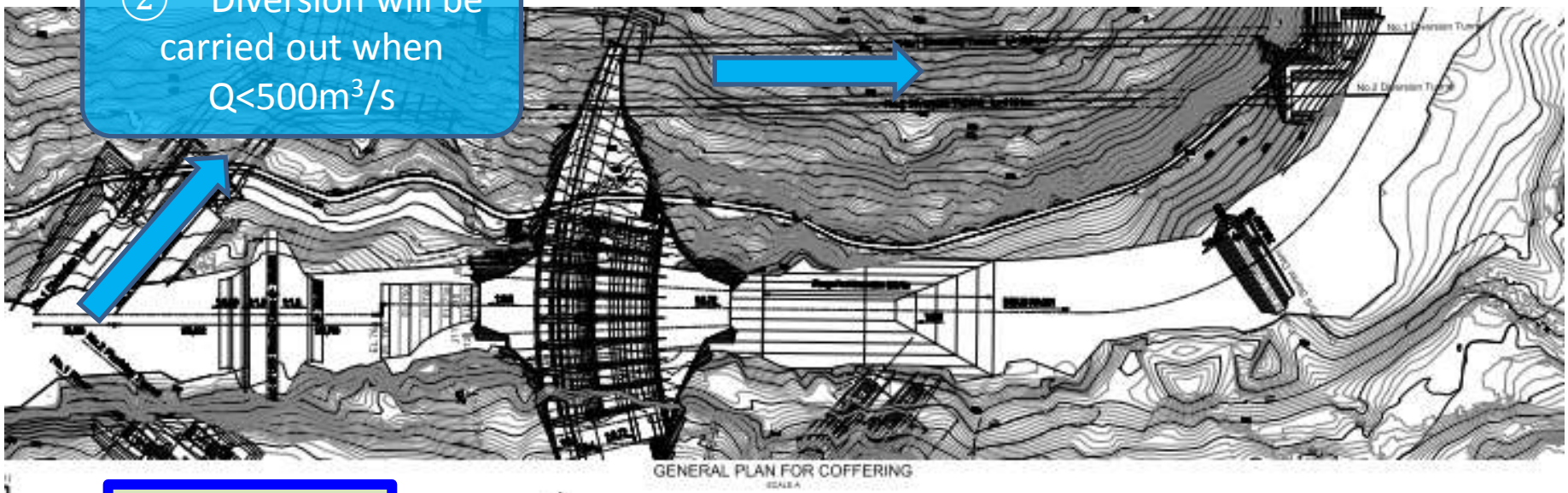
Unit: MUS$

Items	IDA Credit	WAPDA	Commercial Finance/Export Credit	NTDC	Total
I. Construction Cost					
1) Hydraulic structures incl. gates	167	55	1,258		1,480
2) Underground complex incl. gates	61	53	642		756
3) Generating equipment	46	50	546		642
4) 500kV T/L	270			80	350
5) Infrastructures	182	163			345
II. Social and Environ. Management cost	267	237			505
III. Administration and ES cost	129	42			171
	1,122	600	2,446	80	4,248

3. Construction Sequence of Main Works

River diversion system

② Diversion will be carried out when Q<500m^3/s



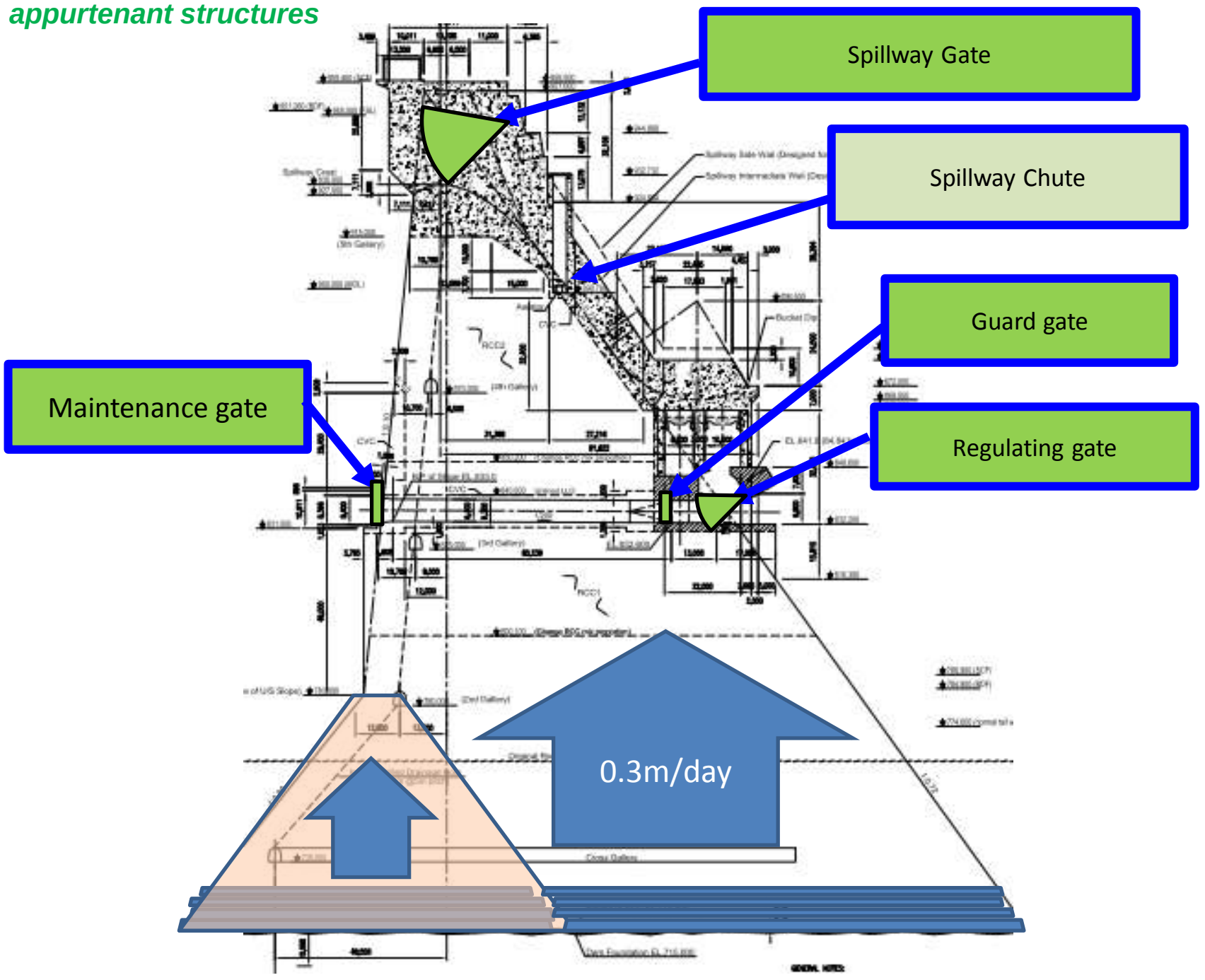
① Diversion Tunnel

③ D/S Coffer

③ Starter Dam

④ Integrated Coffer (H=95m)

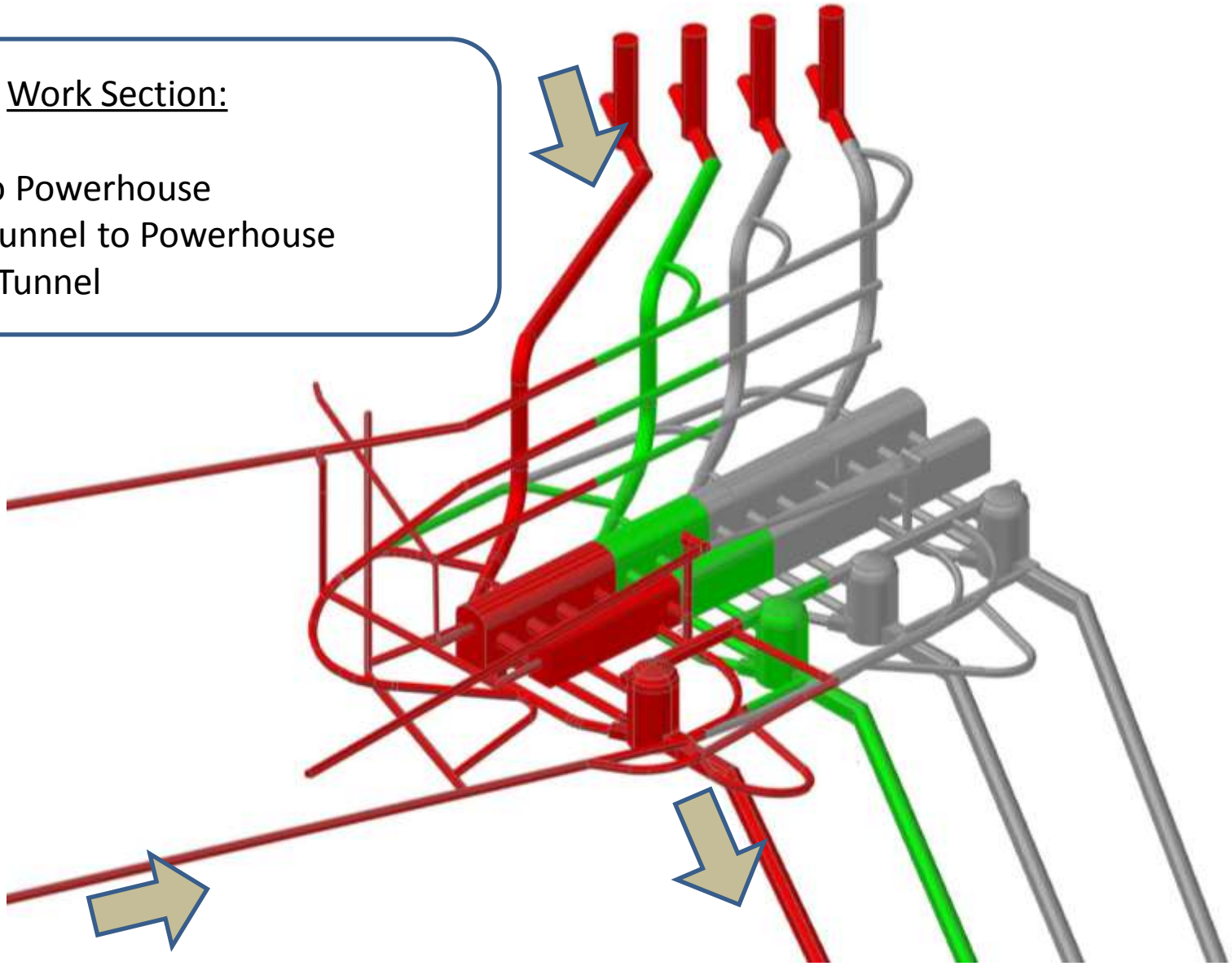
Construction of dam and appurtenant structures



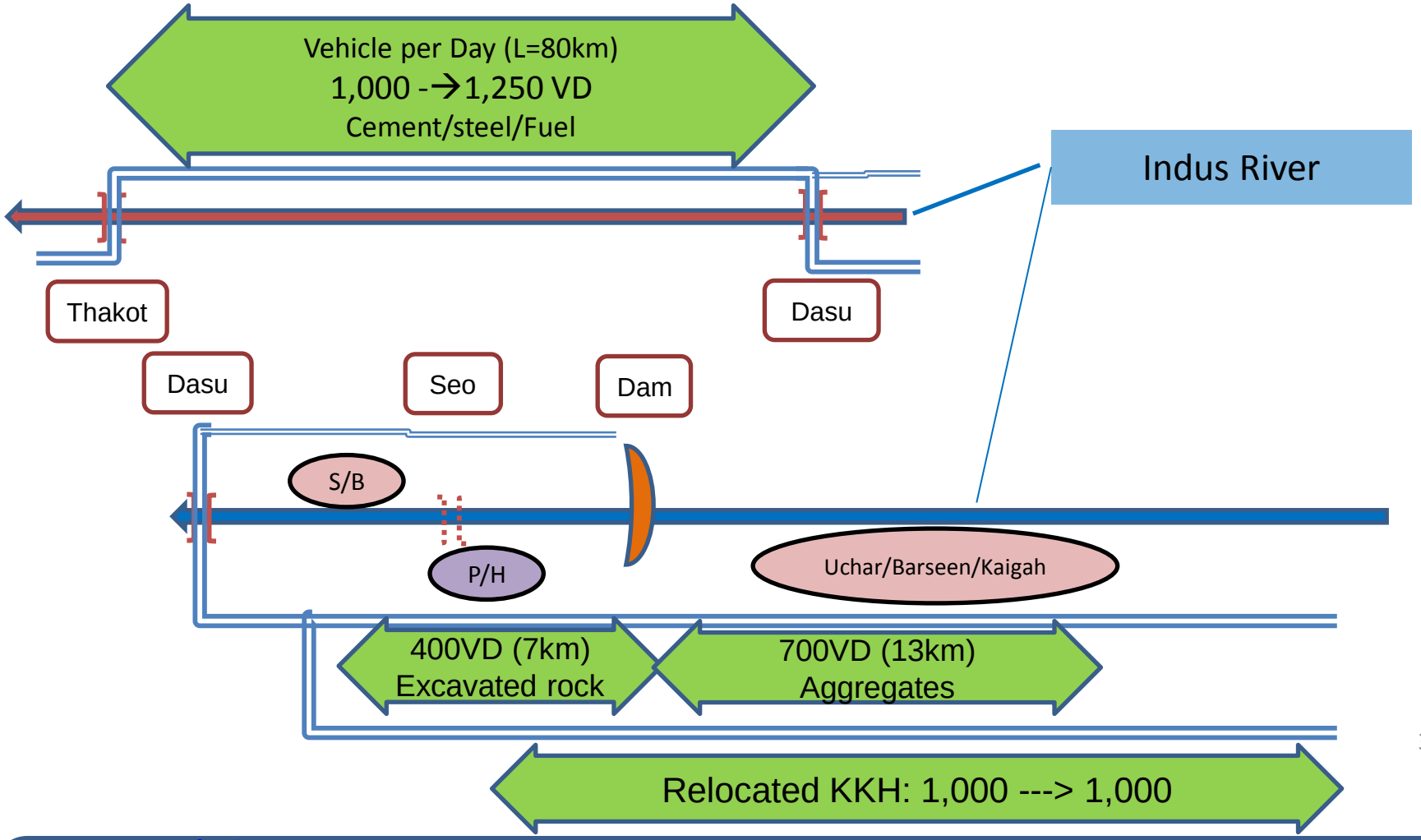
Construction of underground powerhouse and tunnels

Work Section:

WS 1: Intake to Powerhouse
WS 2: Access Tunnel to Powerhouse
WS 3: Tailrace Tunnel



Traffic Conditions at Peak Time



Recommendation:

(1) Establishment of traffic committee,
(2) provision of layby along KKH from Hasanabdal to Dasu
(3) Training and Strengthen of Traffic police
(4) Application of belt-conveyor system

Status of Procurement Documents

	Documents	PQ	Bidding
PCI-01	Construction of Project Colony Infrastructure including Power Distribution and Telecommunication	PQ evaluation complete and waiting approval by Bank	Waiting approval by Bank
KKH-01	Relocation of KKH - Part 1	PQ evaluation complete and waiting approval by Bank	Waiting approval by Bank
RAR-01	Construction of Komila - Seo Road	PQ evaluation complete and waiting approval by Bank	Waiting approval by Bank
TL-01	Construction of 132 kV transmission line	Post qualification	Waiting approval by Bank
KKH-02	Relocation of KKH - Part 2	Waiting approval by Bank	BD is ready for approval
RAR-02&03	Construction of Dam-Uttar Gah Road via Kandia	(Under survey for design)	-
RAR-04	Construction of Kandia bridge	(Under investigation)	-
MW-01	Main Civil Works: Dam and Hydraulic Steel Structures	Document is ready for approval (*1)	Ready for approval by end of May(*1)
MW-02	Main Civil Works: Underground Complex, Tunnels and Hydraulic Steel Structures	Document is ready for approval (*1)	Ready for approval by end of May(*1)
EM-01	Electro-mechanical Equipment	Document is ready for approval (*1)	Ready for approval by end of May(*1)
RV##	Resettlement area development (6 local contract groups; G1~G6)	--	Ready for approval by the mid of June

Note *1 : Finalization subject to further discussion on the requirements of Contract Financing with Bank

5. CURRENT ACTIVITIES

Work Items	Target of Completion
(1) Exploratory adit AD-03 incl. over-coring test	Aug/14
(2) Hydraulic model test	Jun/13
(3) Social Preparation Work - Survey and design of resettlement areas - Assistance in cadastral survey by DC - Coordination with DC/communities	Under way
(4) Assistance in loan appraisal	Complete
(5) Preparation of construction drawings (500 sheets)	Jun/14
(6) PQ and Bidding - Assistance in PQ and Bidding - Finalization of PQ documents and bidding documents	Under way

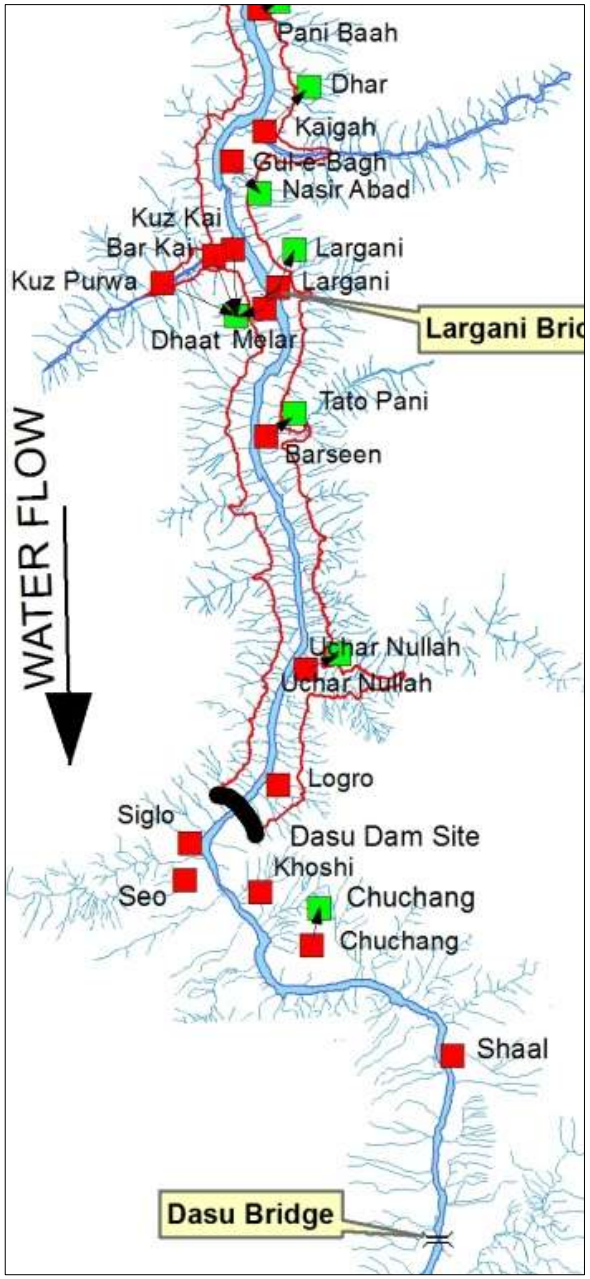
Social Preparatory Works

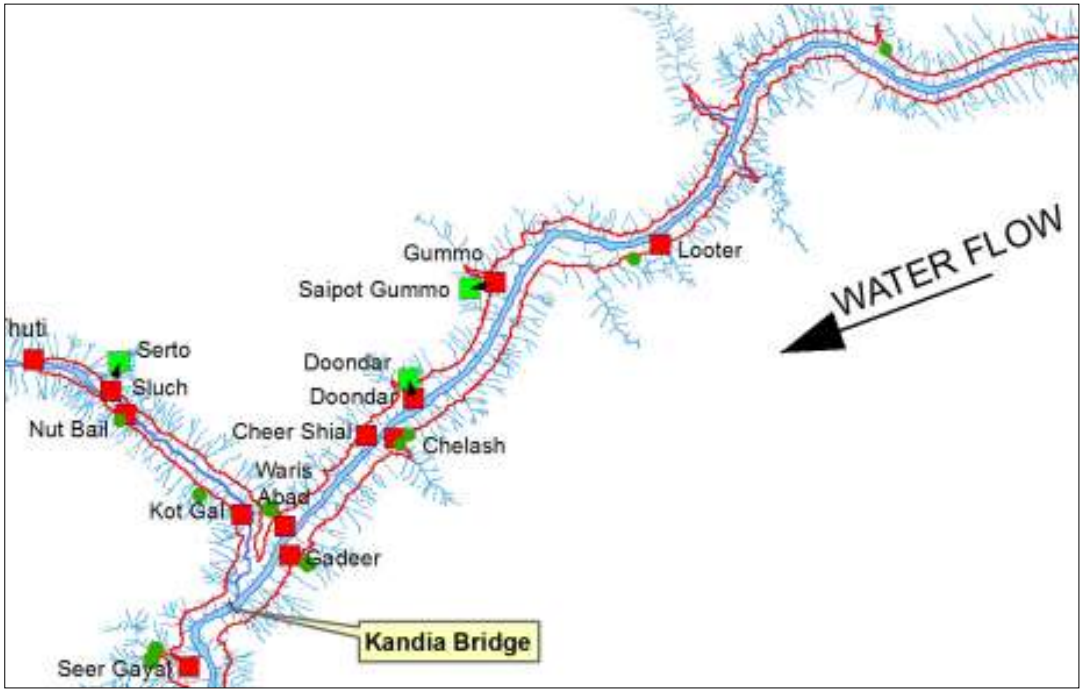
- **Assistance in Boundary Marking of the Reservoir, Colony, Re-aligned KKH and Access Roads**
- **Assistance to Revenue Staff in ownership survey of land and other assests in the affecting villages**
- **Consultation with the affecting community for resettlement options**
- **Coordination with local district administration regarding local issues**
- **Participatory resettlement activities**
- **Survey and identification of resettlement sites in the DHP area and layout planning of the resettlement sites**
- **Drafting of Land, Trees, Built-up properties, etc. rates in coordination with DC**

Note 1. New land rates will be drafted up and submitted to WAPDA/Ministry of Water & Power for approval. Announcement of rates is expected within June.

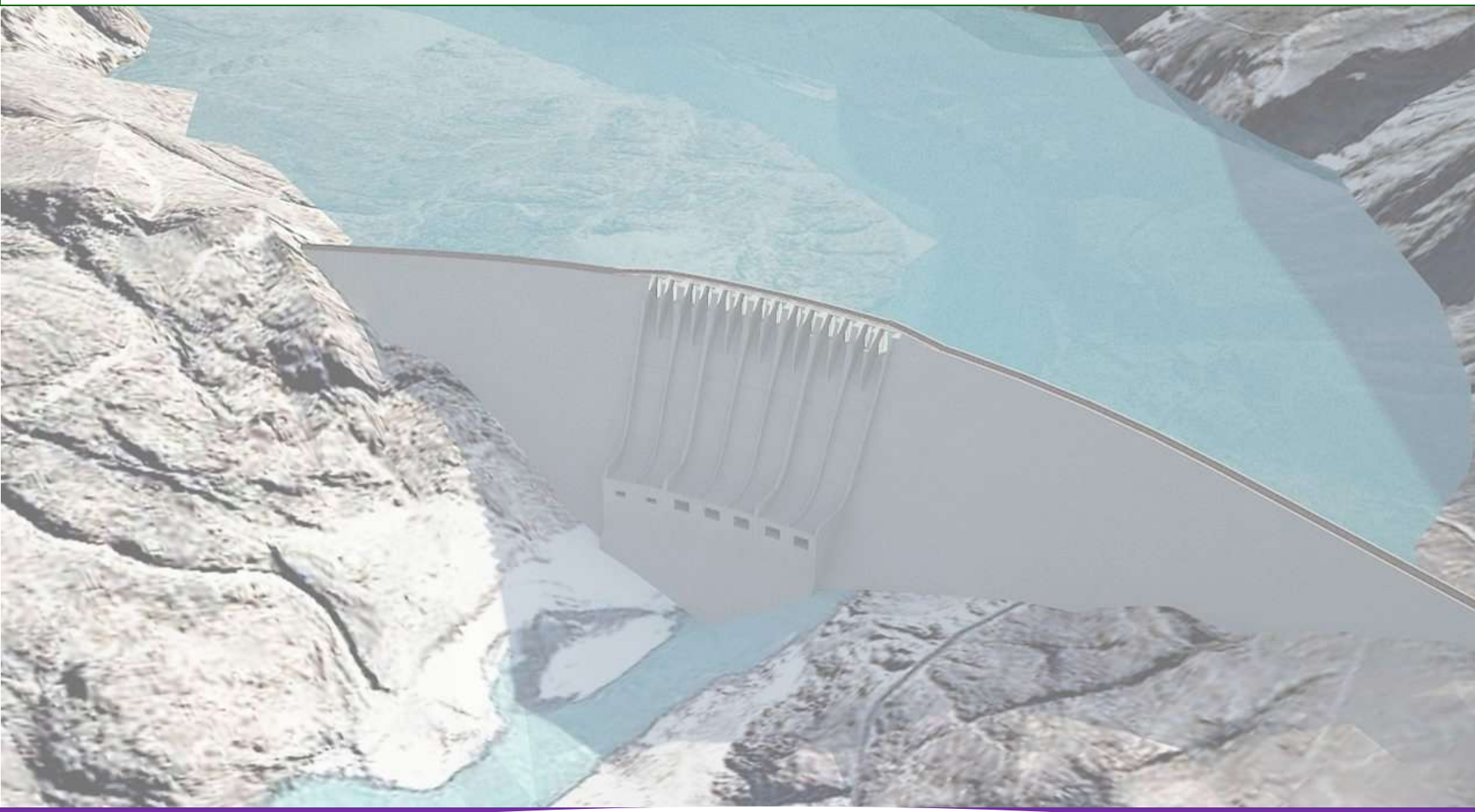
Note 2. In parallel, DC staff are carrying out ownership survey, and the survey for trees and built-up properties are followed.

Development of Resettlement Sites





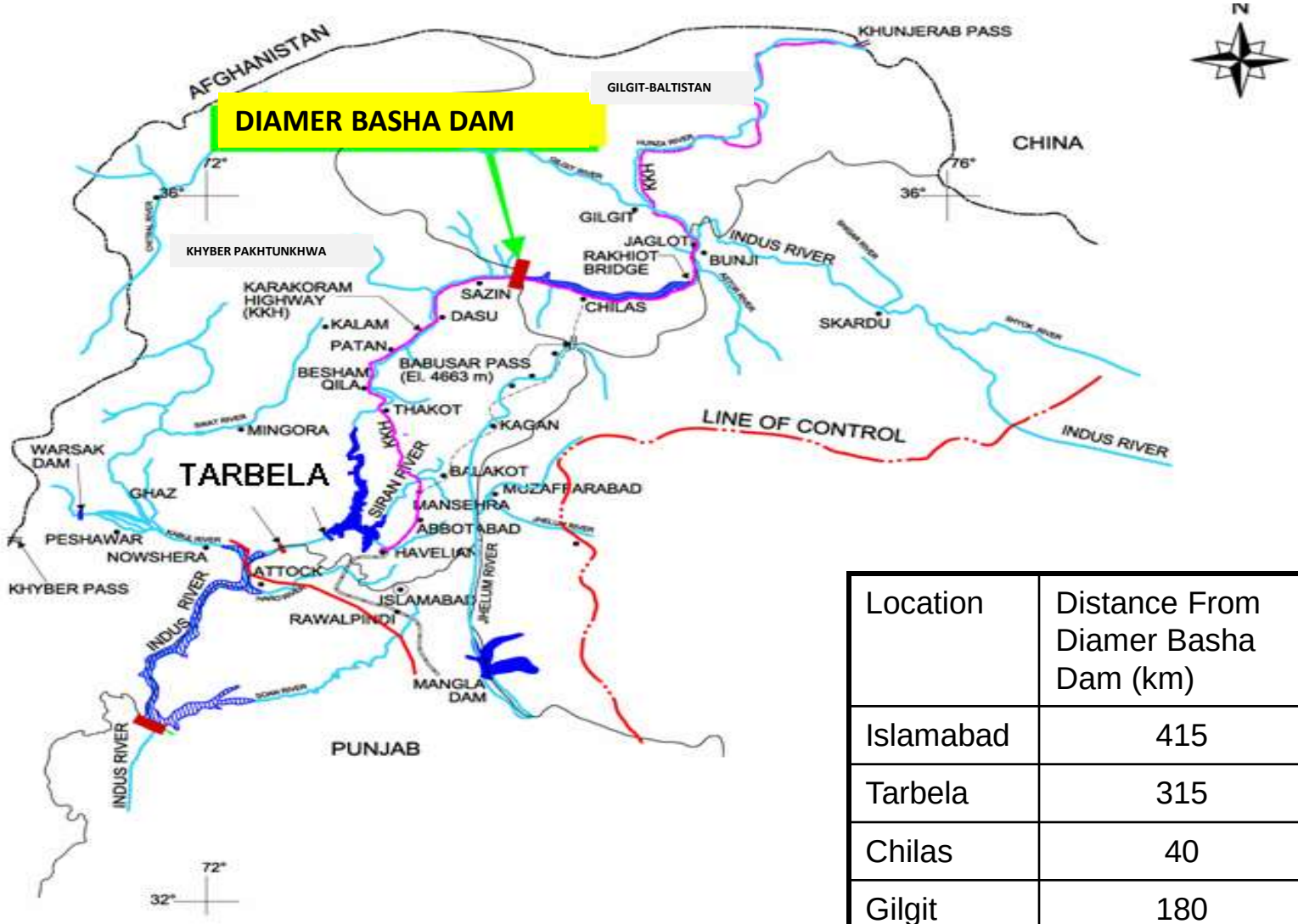
DIAMER BASHA DAM PROJECT



Waiting International Finance support

DIAMER BASHA DAM PROJECT (DBDP)

LOCATION MAP



Location	Distance From Diamer Basha Dam (km)
Islamabad	415
Tarbela	315
Chilas	40
Gilgit	180

DIAMER BASHA DAM
HISTORY OF THE PROJECT

Initial Feasibility study was completed with technical assistance of CIDA by MONENCO in November 1984.

Feasibility Study revised/updated by a consortium of local firms M/s NEAC consultants in 2002-2004.

Detailed Engineering Design alongwith preparation of Tender Documents/PC-I was done by DBC, an international consortium of consultants lead by M/s Lahmeyer International Germany during 2005-2008.

In addition International Panel of Experts reviewed documents during Feasibility and Detailed Engineering Design Studies.

DIAMER BASHA DAM PROJECT

SALIENT FEATURES

Type	**Roller Compacted Concrete (RCC)**
Maximum Height	**272 m**
Gross capacity	**8.1 MAF**
Total installed capacity	**4500 MW**
Units	**12, each of 375 MW**
Average annual generation at site	**18,100 Gwh/year**
PROJECT COST	
PC-I Approved Cost (2009)	**US$ 11.18 Billion**
PC-I Estimated Cost (2014)	**US$ 13.96 Billion**
CONSTRUCTION PERIOD	**9 years with progressive commissioning of power units after 8 years**

DIAMER BASHA DAM PROJECT
MAJOR BENEFITS

- **Annual Energy Generation**
  - **At Site** — **18,100 GWh**
  - **Additional at Tarbela / Ghazi-Barotha / Chashma** — **2,433 GWh**
  - **Total** — **20,500 GWh**
  - **Annual Monitory Benefits** — **Rs 205 Billion (@ Rs 10/-per unit)**
- **Extend useful life of Tarbela reservoir by 35 years**
- **Additional generation of about 5,000 GWh at Dasu attributable to Diamer Basha.**
- **Cascading effect on the future downstream upcoming hydropower projects of Pattan (3,800 GWh) and Thakot (3,500 GWh)**
- **Local poverty alleviation through direct employment opportunities.**

DIAMER BASHA DAM
GoP'S APPROVALS

- PC-I for (AL&R) amounting to US$ 0.75 Billion approved in 2008. This PC-I is a part of Main Project PC-I.
- PC-I of the Project amounting to US$ 11.178 Billion with F.E.C of US$ 3.192 Billion was approved by ECNEC on August 20, 2009.
- Project was approved unanimously by Council of Common Interests (CCI) on 18.07.2010 for National Consensus.

ENVIRONMENT, SOCIAL AND CULTURAL HERITAGE IMPACT ASSESSMENT & MANAGEMENT

• Total villages affected	32
• Total affected households	4228
• Population affected	30,350
• Agricultural land submerged (acres)	2,660
• Total area to be affected (acres)	37,419
• Existing length of KKH submerged	100 km
• Relocated Length of KKH	142 km
• Pre-historic rock carvings inundated	33,000

DIAMER BASHA DAM
PHYSICAL STATUS

LAND ACQUISITION PROCESS

Land Acquisition and Resettlement works started in 2010 and are in process/progress.

- Land to be acquired — 37,419 Acres
- Private Land — 18,357 Acres
- Govt. Land (free of cost) — 19,062 Acres

LAND ACQUIRED

- Government Land (free of cost) — 17,214 Acres (90%)
- Private Land — 3,210 Acres (17%)

DIAMER BASHA DAM

PRELIMINARY WORKS

- **Project Colony at Thor Valley**

- Project Colony for consultants and WAPDA staff (1000 officers/officials) required during construction of Main Dam is under construction through 17 contract packages. 70% work progress achieved.

- **Construction of Bypass from Shatial To Thor Nullah To Existing KKH (35 Km) By NHA As WAPDA'S Deposit Work**

- During Construction of Main Dam the existing KKH is to be used for construction activities while the Bypass on KKH from Shatial to Thor Nullah being constructed by NHA as WAPDA deposit work, will be utilized for uninterrupted traffic flow. Construction Work is in progress at site.

DIAMER BASHA DAM
PRELIMINARY WORKS

- **Resettlement of Affectees in Model Villages**
- Three (3) Composite Model Villages at Thak Das, Harpan Das and Kino Das with all the amenities shall be developed for resettlement of 4228 affected households / families. Each affected households / families shall be given a residential plot of one kanal free of cost. The construction work of Composite Model Village—I I (Harpan Das) is in progress.
- **Environmental, Resettlement Work/Studies**
- Comprehensive Environmental Management Plan (EMP) and Resettlement Action Plan (RAP) were prepared by DBC Consultants which were reviewed and updated in consultation with ADB.
- Two Public hearings on EIAs held, first at Chilas and Gilgit, in GB and second one at Kohistan in KPK.
- GB Government issued NOC further persuasion of the policies/ programme alongwith obtaining NOC from KPK is being pursued.

DIAMER BASHA DAM PROJECT

PROPOSED CONTRACT LOTS FOR IMPLEMENTATION OF CORE PROJECT

Lot No.	Description	Cost (US$ Billion)
LOT 1	Concrete Dam and Related Structures Including Diversion Tunnels and Permanent Access Bridge	2.317
LOT 2	Underground Works and Related Structures (Left and Right Banks)	0.893
LOT 3	Hydro-mechanical Equipment and Hydraulic Steel Structures	0.460
LOT 4	Power Plant Generation Equipment (Left and Right Bank)	1.140
LOT 5	Electrical High Voltage Equipment and Power Plant Electrical Equipment (Left and Right Bank)	1.189

DIAMER BASHA DAM
FINANCIAL STATUS

GoP FUNDING

- Releases (2009- June 2014) US$ 0.488 Billion
- Allocation for 2014-15 US$ 0.154 million

Expenditure

- Land Acquisition & Assets US$ 0.22 Billion

Funds available with WAPDA/Project US$ 0.25 Billion

WAPDA SELF FINANCING

- Preliminary Civil Works/Administrative
  Expenditure through WAPDA Self Financing US$ 0.036 Billion

Total Expenditure **US$ 0.256 Billion**

DIAMER BASHA DAM
FINANCIAL ARRANGEMENT

- Revised PC-I (AL&R) Cost is US$ 1.04 Billion, containing Land Acquisition and Resettlement, social safeguard, Right Bank Periphery Road, RAP, and EMP being funded by GoP.

- Preliminary works project colony at Thor, KKH Bypass Road, Retainer Consultants of Detailed Engineering Design and other Admn. Expenditure are being met through WAPDA self financing.

- For the core project, IFIs, FODP, ADB and USAID are being approached at GOP level.

DIAMER BASHA DAM
CAPITAL REQUIREMENT & FINANCING OUTLINE

Sr. #	Description	Amount (million US$)	Financing Options
1	Land Acquisition/Resettlement	1039	Proposed to be financed by GOP as grant.
2	Project Colony	66	To be financed by GOP as equity.
3	KKH Bypass	411	
4	Lot 1 & 2, Physical Contingency and Escalation during Construction	4163	Through Donors/IFIS
5	Lot 3, 4 & 5, Physical contingency and Escalation during Construction	3741	Through Suppliers Credit
6	Engineering & Project Monitoring	360	To be financed by Government Funding, Commercial Loans, Bonds, Sukuk, TFC, Public Private Partnership etc.
7	Duties and Taxes	109	
8	IDC	4070	It will be capitalized and Project after completion shall pay back.
Total		13959	

1 US$ = Rs 97.67

DIAMER BASHA DAM
IMMEDIATE FINANCIAL REQUIREMENT

Project Financing Requirements

Based on proposed financing outline out of total estimated project cost of US$13.96 Billion, base cost (Lot 1-5) including Physical Contingency + Escalation is US$7.904 Billion.

Total cost of Lot 1 & 2 including Physical Contingency + Escalation is US $ 4.163 Billion; this amount will be utilized during 8 to 9 years construction period (critical path).

Total cost of Lot 3,4 & 5 including Physical Contingency + Escalation US $ 3.741 Billion, this amount will be required after 3 – 4 years from start of main dam construction (Lot 1 & 2). This amount can be arranged through supplier credit from manufacturers of Electrical and Mechanical Equipment.

IMMEDIATE FINANCING REQUIREMENT

To initiate construction of the main project arrangement of US $ 4.163 Billion is required over 8 to 9 years period as per phasing given.