

GOVERNMENT OF BALOCHISTAN

PUBLIC HEALTH ENGINEERING DEPARTMENT



Project Brief For

CONSTRUCTION OF MANGI DAM AND WATER CONVEYANCE SYSTEM

For 8.1 MGD Water Supply To Quetta

5th May 2023

**ASSOCIATED CONSULTING
ENGINEERS-ACE (PVT) LTD**



Joint
Venture

**CAMEOS
CONSULTANTS**



**KASIB
ASSOCIATES**



INTRODUCTION:

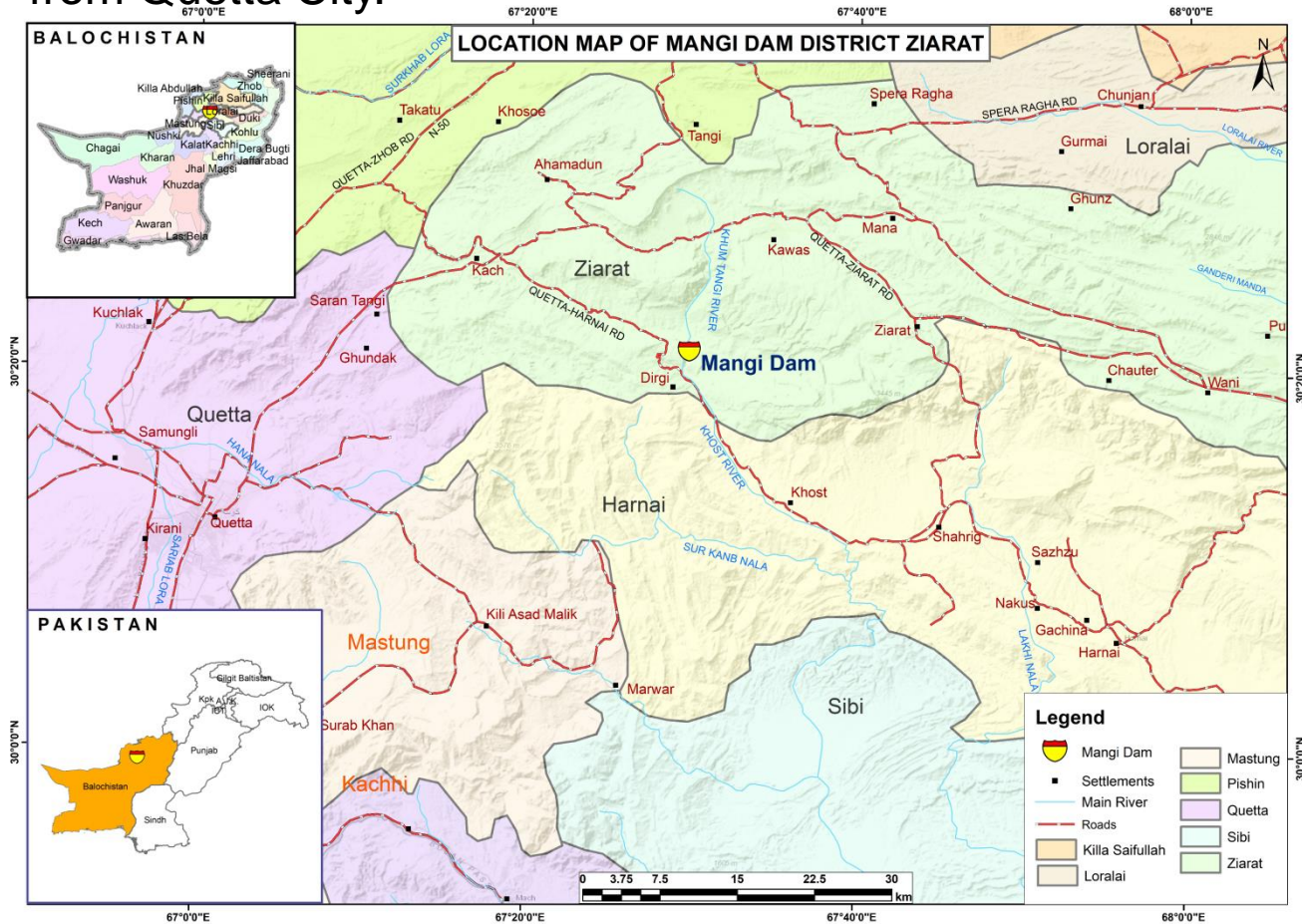
- During the years 2000-2005, Balochistan province faced severe drought which badly effected the water resources in the province. The Federal government lunched a number of projects, with the financial assistance of World Bank and Asian Development Bank, to mitigate the impact of prolonged drought including DERA, DIMRC.
- The Quetta city mainly depends on sub surface water sources and the depleting groundwater made necessary for augmentation of water supplies through surface water sources. The design for Halak and Mangi Dams for water supply to Quetta city was taken up under Quetta water supply & Environmental improvement Project (QWSEIP). The detail design for both Halak Dam and Mangi Dam and the design of Water Conveyance Systems were completed in 2007.
- The Federal Government, keeping in view the scarcity of water in and around Quetta Valley, included the Mangi Dam Project in PSDP (2015-16).

LOCATION MAP:

The Mangi Dam is proposed to be constructed near Mangi village on Khost river about 92 Km (Pipe length 52.70 Km) from Quetta City.

The Dam is located in District Ziarat, Balochistan.

The coordinates of the dam-site are $30^{\circ}21'24.37''\text{N}$, $67^{\circ}29'53.05''\text{E}$.



PROJECT PROFILE:

Approved PC-1 Cost:	Rs. 9.334 Billion.
Date of Approval By ECNEC	08 th March 2016.
Revised PC-1 Cost:	Rs. 13.247 Billion.
Date of Approval By ECNEC	06 th July 2022.
Financed By:	50% Share of Federal Govt: & 50% of Provincial Govt: for Mangi Dam works up to TRT including Power Supply Grid Station and Transmission Line 100% Share of Provincial Govt: for works from TRT to Existing System of WASA
Executing By:	Public Health Engineering Department Govt: of Balochistan.
Designed /Supervision By:	Associated Consulting Engineers-ACE (Pvt) Ltd Joint Venture CAMEOS Consultant & KASIB Associate.
Executing Firms:	M/s Zahir Khan & Brothers (ZKB), M/s National Logistic Cell (NLC) & M/s Noor Ul Haq & Brothers (N&B).
Date of Start:	21st March 2017.
Time of Completion:	36 Months.
Revised time of completion: with additional Work	(Dec-2023)

CONTRACT PACKAGING AND PROCUREMENT

Package	Name	Awarded
Package I	Construction of Main Dam and Allied Structures.	Contract awarded to M/S Zahir Khan & Brothers (ZKB) amounting to Rs. 3141.30 Million
Package II(a)	Providing , Laying & Testing of Pipeline from Mangi Dam to Terminal Point at Quetta.	Contract awarded to M/S NLC amounting to Rs:3433.98 Million.
Package II(b)	Supply & Installation of Pumping Machinery, Treatment Plant and Generators.	Contract awarded to M/S Noor-UI-Haq & Brothers amounting Rs.2167.07 Million.
Package II(c)	Construction of Power System	Estimated Amount is Rs.900.00 Million
Package III	Construction of Main Water Storage Tank and Buildings.	Contract awarded to M/S Zahir Khan & Brothers (ZKB) amounting to Rs.870.78 Million
Package IV(a)	Water Shed Management (Construction of Check Dams)	Work has been awarded to M/S Zahir Khan & Brothers of Amounting Rs.290.805 Million.

MANGI DAM RESERVOIR

Gross Storage	29,515 acre-ft (36.40 MCM) , 8,089 M G
- Live Storage	25,710 acre ft (31.707 MCM), 8127 MG
- Dead Storage	3805 acre ft (4.693 MCM) , 7,046 MG
Annual Releases	10870.00 Acre-ft (8.1 mgd) or (15.00 Cusecs)
Reservoir Operation Period	(for continuous drought -2 years 9 months)
Life of Dam	85 years
Reservoir Area	811 acres at Spillway Crest Level 966 acres at Maximum Reservoir Level (during flood)



DAM BODY

Type:

Concrete Gravity

Height over deepest foundation:

61 M (200.08 ft)

Catchment Area:

1217 Sq Km (470 sq miles)

Crest Length:

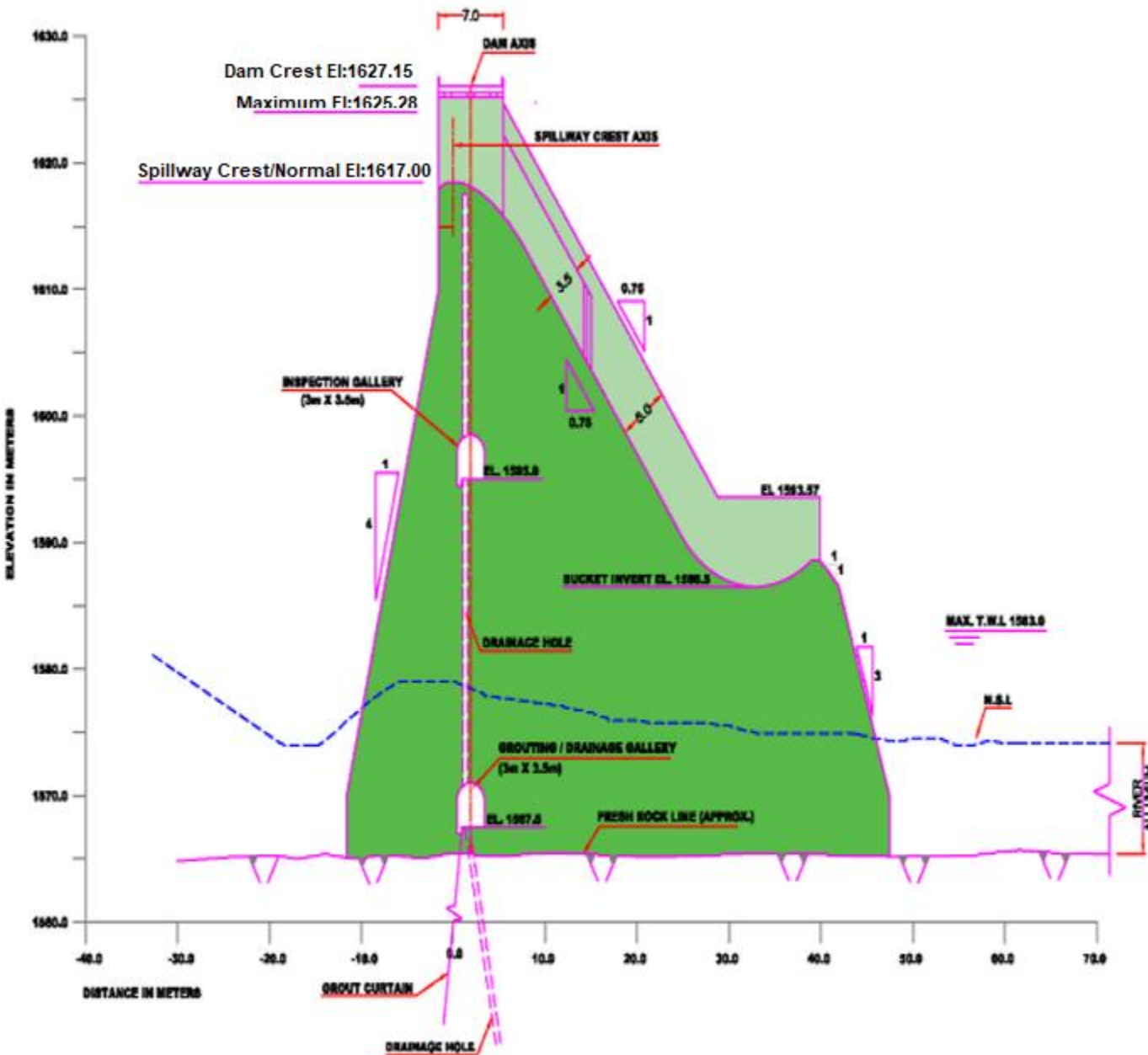
133 M (436.37 ft)

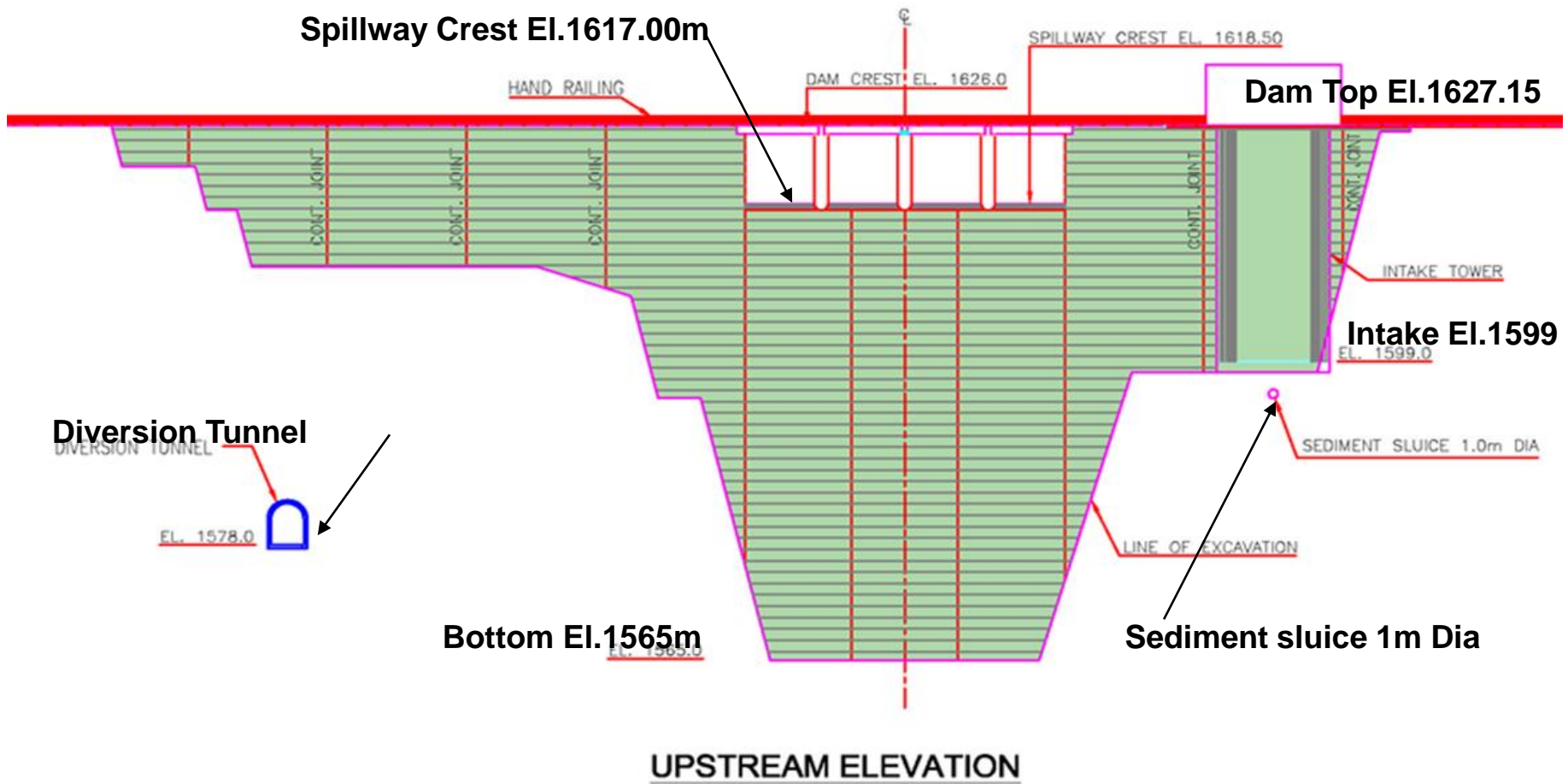
Bottom Width:

59.06 M (193.77 ft)

Top Width:

7.00 M (22.97 ft)





SPILLWAY

Type and Location : Ungated Ogee Overflow Type

Length: 45.59 m

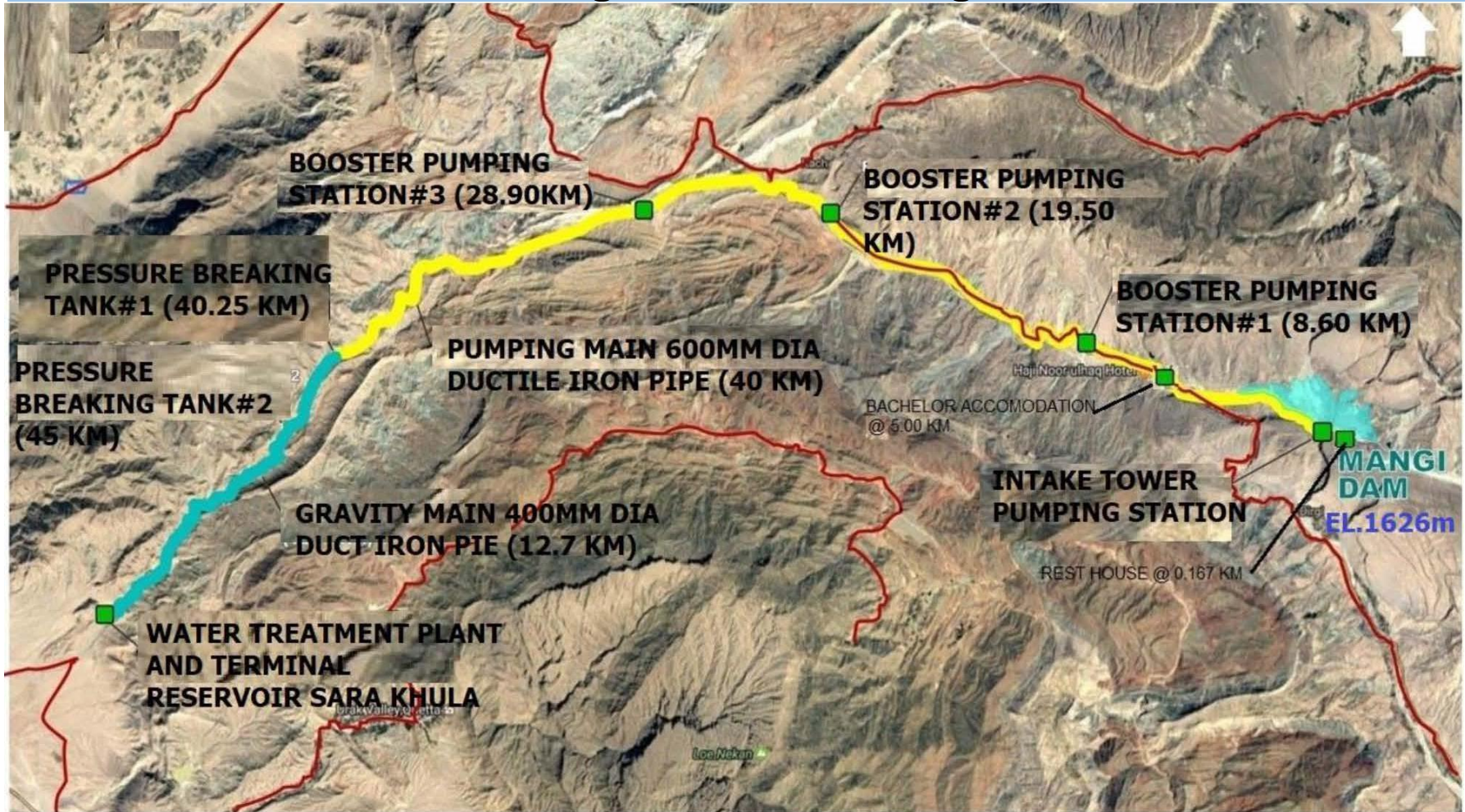
Width: 34.5m

Flood Capacity: 29,751 cusecs

No of Bays: 4.00

Width of Bay: 7.50 m

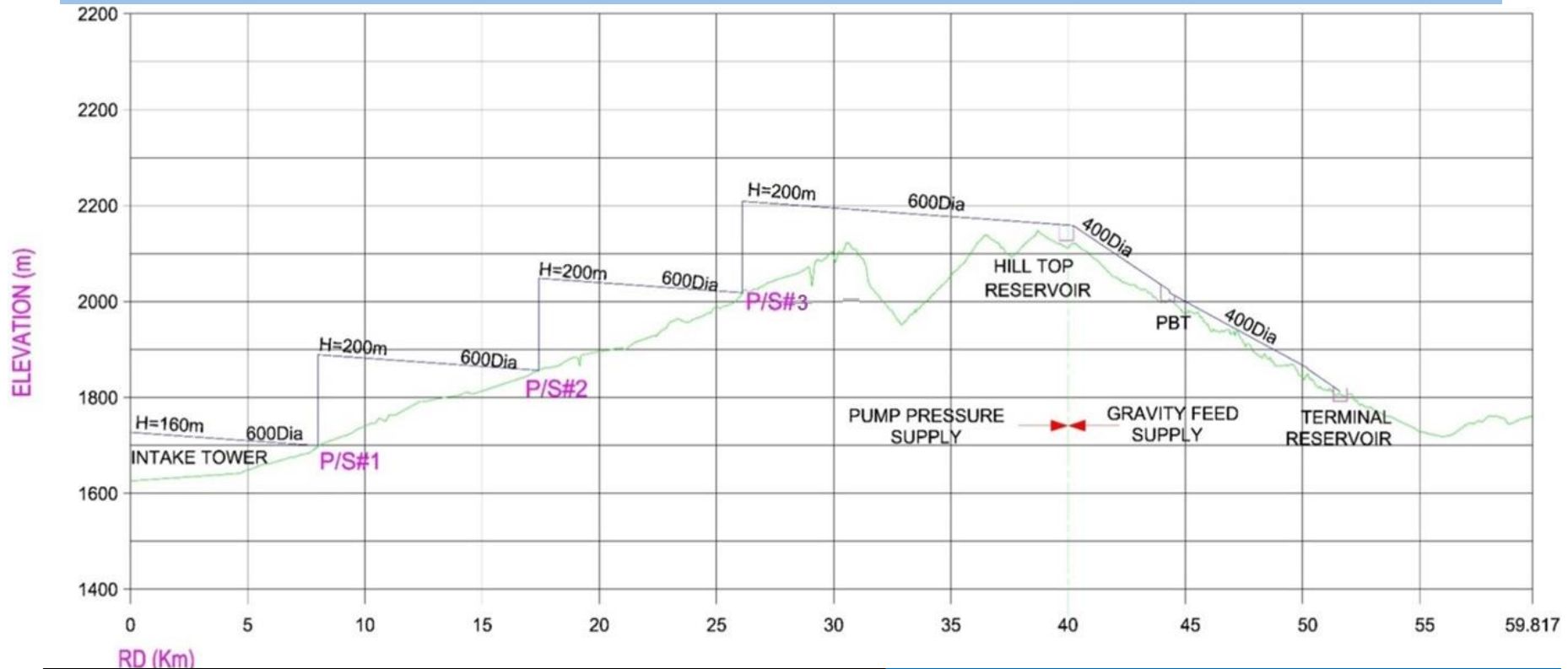
Layout Plan Showing Mangi Dam Water Conveyance Pipeline and Storage Tanks/ Buildings



LEGENDS

- Highways
- Pipe line (600 mm dia)
- Pipeline (400 mm dia)

PIPELINE PROFILE FROM MANGI DAM TO TERMINAL POINT AT QUETTA.



➤ PUMPING MAIN TO HIGH POINT

- Elevation Dam to High Point (1599-2150m)
- From MANGI Dam, with a lift of (760m Dynamic Head and 600m Static Head)
 - DIA 600 mm
 - LENGTH 40 km

➤ GRAVITY MAIN FROM HIGH POINT TO QUETTA

- Elevation from TRT to Quetta City (1835-1785m)
 - 400 mm, 12.7 km, with elevation drop of 320 m

➤ Mangi Pumping Stations

- Power of Pump' motors Intake-335 Hp, Each, PS1 and PS2-425 Hp PS3-335 Hp
- 5 No Operational + 2 No Standby Pumps
- Intake Tower Plus 3 Stage Pumping
- Power Requirements: 8,100 kW

PHYSICAL PROGRESS UPTO 30th APRIL-2023:

1	2	3	4	5	6	7	8	9	10
S.#	Package Name	PKG #	Date of commencement	Date of Completion (Expected)	Package Bid Cost in (Million)	Package Revised Cost in (Million)	Targeted Progress %	Achieved Progress w.r.to revised cost %	Remarks
1	Construction of Main Dam & Allied Structures	P-I	21 st March 2017	Dec 2023	2903.65	3141.30	73.9	55.4	Work in Progress
2	Providing, Laying and Testing of Ductile Iron Pipe	P-IIa	18 th January 2018	August 2023	2576.98	3433.98	87.6	78.7	
	Supply and Installation of Pumping machinery, Treatment Plant and Generators	P-IIb	15 th July 2021	June 2023	2061.46	2167.07	88.5	80.3	
	Construction of Power System	P-II c	6-July 2021	June 2023	160.00	900.00	75.7	58.3	
3.	Construction of Main Water Storage Tanks & Buildings	P-III	23 rd June 2017	June 2023	502.50	870.78	79.3	64.5	
4	Construction of Water Shed Management (Check Dams)	P-IV	27 th May 2019	14 th JULY 2021	249.99	300.804	100.0	86.3	TOC has been issued for 16 Check Dams out of 20 Dams
Over All Progress					8545.579	10813.93	79.8%	69.5%	

FINANCIAL STATUS UPTO 30th APRIL 2023

S.No	Financial Year	Allocation By Federal Govt	Allocation By Provincial Govt	Total Allocation (Rs.in Million)	Released By Federal Govt (Rs.in Million)	Released By Provincial Govt (Rs.in Million)	Total Releases	Protected / Surrender Amount (Rs.in Million)	Expenditure (Rs.in Million)	Over All Financial Project Progress/Remarks
1.	2014-15	1000.0	0.000	1000.0	1000.0	0.00	1000.00	1000.00	0.00	
2.	2015-16	500.00	0.00	500.00	500.00	0.00	500.00	1500.00	0.00	
3.	2016-17	650.00	1500.00	2150.00	0.00	0.00	0.00	0.00	500.00	
4.	2017-18	500.00	315.70	815.70	70.00	315.7	1385.70	1000.00	1292.5	
5.	2018-19	500.00	1200.00	1700.00	500	900	1400.00	93.20	990.014	
6.	2019-20	100.00	1200.00	1300.00	300.00	700.00	1000.00	503.186	1480.23	
7.	2020-21	1389.02	500.00	2629.385	1389.02	500.00	2629.385	0.000	2311.385	
		740.365			740.365					
8.	2021-22	100.00	2000.00	2100.00	167.254	1000.00 3.744	1170.99	318.00	1489.00	
		485.254			0.000					
9.	2022-23	400.00	1101.339	1501.339	130.00	1101.34	1231.34		1231.34	
Total					4796.639	4520.789	9317.42		9317.42	70.34%

- ❖ Federal PSDP No.1112 Year 2022-23
- ❖ Provincial PSDP No.4139 Year 2022-23

PHYSICAL PROGRESS VS FINANCIAL PROGRESS:

1	2	3	4	
S.No	Package Name	Achieved Physical Progress w.r.t Revised Cost %	Financial Progress	
			Financial Progress %	Paid Amount Rs (Million)
1.	Construction of Main Dam & Allied Structures(Package-I)	53.36	51.43	1615.56
2.	Providing, Laying and Testing of Ductile Iron Pipe (Package-Ila)	78.69	73.87	2536.73
	Supply and Installation of Pumping machinery, Treatment Plant and Generators (Package-lib)	80.25	64.15	1390.125
	Construction of Power System. (Package-Ilc)	58.25	94.23	848.10
3.	Construction of Main Water Storage Tanks & Buildings(Package-III)	64.52	60.09	523.265
4.	Construction of Water Shed Management. (Package-IV) Check Dams Lot-I	83.39	83.39	250.832
Overall Progress %		69.51%	66.25%	7164.60

ADDITIONAL WORK :CONNECTION WITH QUETTA WATER SUPPLY SYSTEM PROVIDING , LAYING & TESTING OF PIPELINE FROM TERMINAL POINT TO QUETTA CITY.

A. Pipeline (Terminal Point to Quetta City)

Total Length OF Gravity Main	17.5 Km
Terminal Reservoir Elevation	1,835 m (6,020.6 ft)
Quetta City Elevation	1,785 m (5,856.58 ft)
Pipe Type	MS
Length	Total 17.5 km, 12.5 Km (600mm Dia) and 5 Km (400mm Dia)

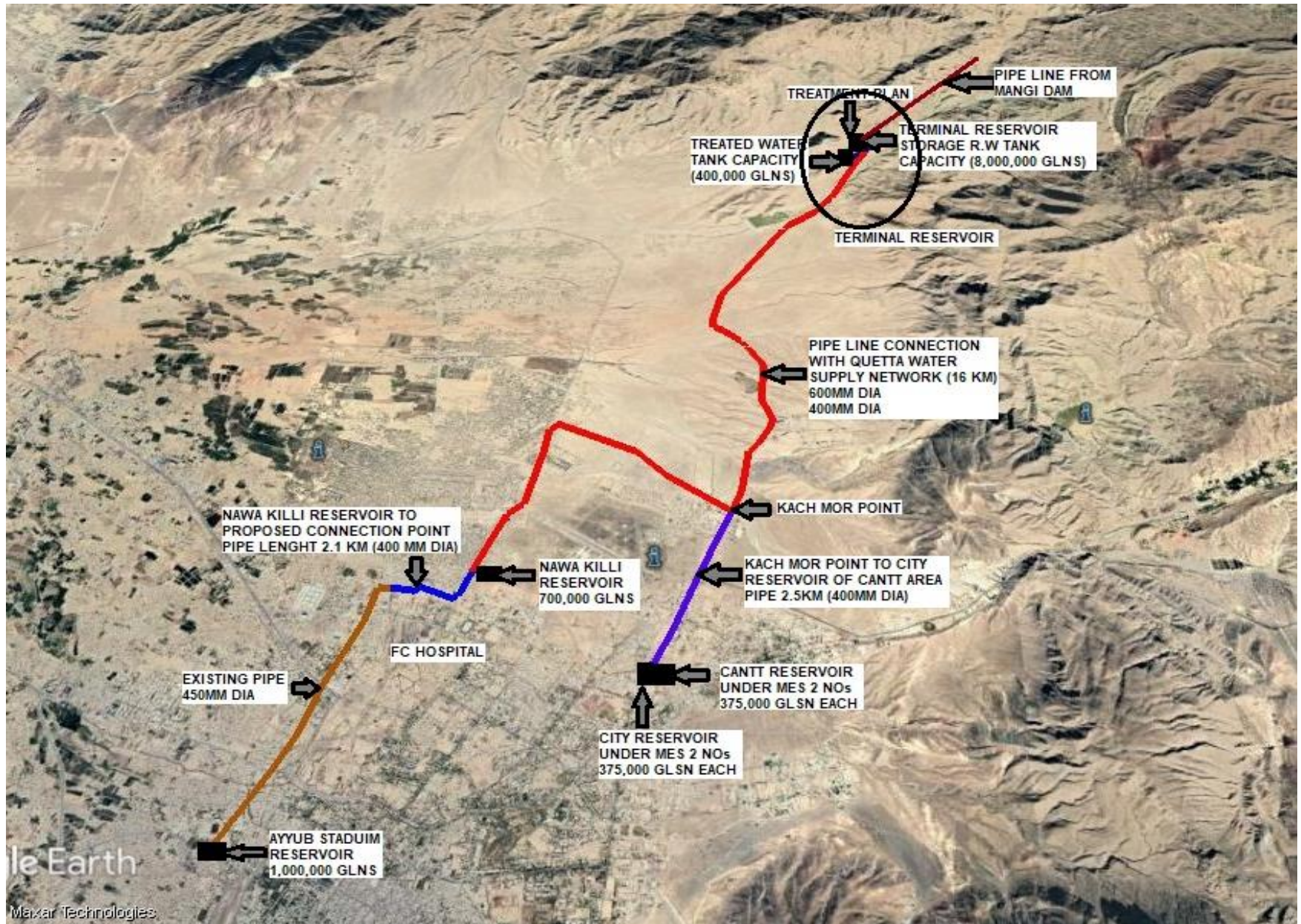
B. Access Road to Terminal Point with Bridge over Kuch Nala

C. Water Supply to Shabak and Sarakhulla Villages near Quetta

D. Water Supply to Mangi Village near Dam

E. Unpaved Road from Mangi Dam to Kili Garhar Track

ADDITIONAL PIPELINE FROM TERMINAL POINT TO QUETTA CITY:

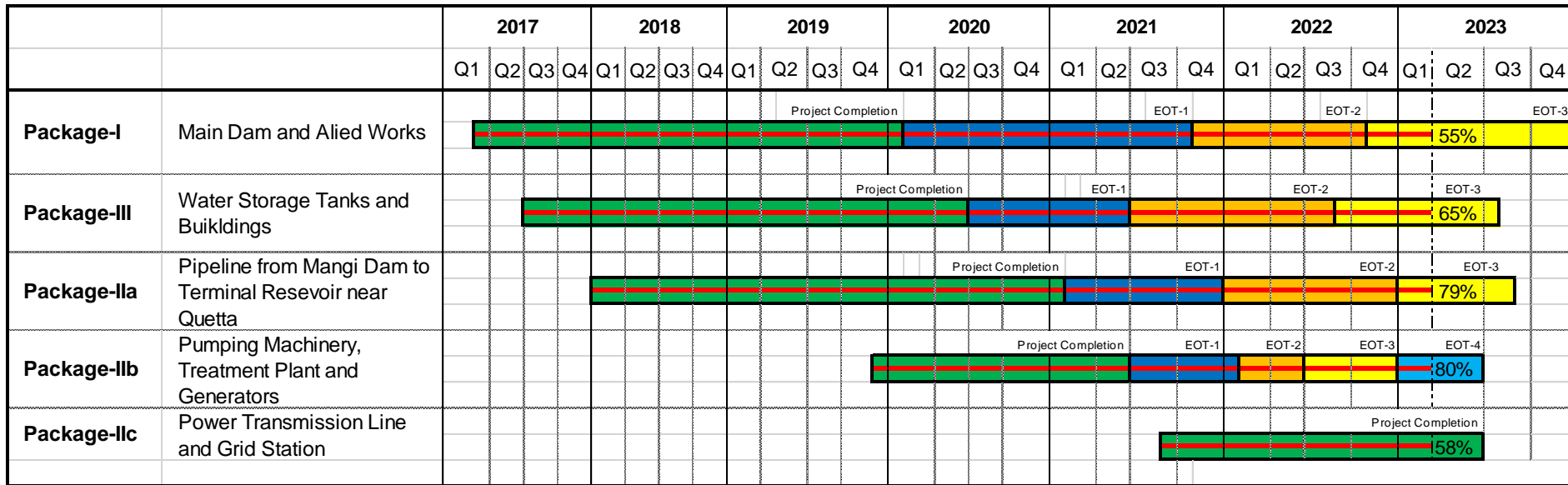


REASONS FOR DELAYS IN THE PROJECT

The PCI of Mangi Dam Project was Approved by ENCEC on 8/3/2016

- Immediately after approval, the process for procurement of Consultant was initiated on 11/4/2016 and procurement process for Contractors on 23/9/2016.
- The Consultancy for Design Review, preparation of Tender Documents and Supervision of Construction Works was awarded to the Joint Venture on 4/12/2016.
- The award for the first Contract Package was made on 29/12/2016, with Signing of the Contract Agreement on 7/3/2017.
- ❑ **The works for Mangi Dam Project started on 21st March 2017, with Package I – Main Dam and Allied Works, duration of 36 months and completion during March 2020.**
- ❑ **The Package I was followed by two contract packages, with a gap in their starting date to minimize delays due to dependency of works of one package to others. :**
 - Package III – Pumping Stations, Water Tanks and other Building Works.
 - Package IIa – Pipeline from Mangi Dam to Terminal Point near Quetta.
- ❑ **Delayed commencement was done for further Contract Packages due to delays in Package I and III:**
 - Package IIb – Pumping Machinery, Treatment Plant and Generators, delayed to enable installation of equipment, after completion of works under other packages.
 - Package IIc – Electrical Power Supply by QUESCO, initiated after sanctioning of required power load from NEPRA.
 - Package IV – Watershed Management, delayed a little to enable completion after a few months of completing the works of Main Dam.

Project Duration and Extension in Time with Achieved Progress



DELAYS IN THE WORKS OF PACKAGE - 1

- **The works of Main Dam got delayed from very start by about 21 months with EOT-1 to December 2021:**
 - Procedural difficulties in procurement of Explosive material for excavation of Dam foundation.
 - Non deployment of Security Forces for security and protection of Explosives.
- **Further delay of 12 months during extended period with EOT-2 to December 2022:**
 - The Covid-19 Pandemic hit the World very badly and activities in Pakistan also became stand still with slow down in construction activities. About 3 months time was lost during the initial complete shutdown followed by progressive but slow starting of construction activities.
 - Adverse Climate conditions and heavy rainfall, also affected the work progress.
 - The security situation in this somewhat peaceful area, also changed on 25th August 2021, after kidnapping of Contractor's personnel working at Check Dam No. 39.
 - The next day, on 26th August 2021, three Levies personnel were martyred and three were injured in a mine blast when they visited the same area for investigation.
 - The workers kidnapped in this incident were released, but operation by the Armed Forces in the area continued and construction activities remained suspended for about a month.
 - Four months additional time was also included in the project, for additional works of Rest House Building at Dam site and RCC Culverts in the Dam Access Road.

DELAYS IN THE WORKS OF PACKAGE – 1 Contd..

Further 8 months with EOT-3 to 10th August 2023

• **The Security Issues resulted in continued delays in the works:**

- Attack in the Base Camp of a Road Works Contractor at Zardalo Chappar Rift near Main Dam and Pumping Station-1, resulted in martyr of one laborer and injuries to others. Four laborers were also kidnapped and construction machinery and equipment at the Contractor's Camp were burned by the miscreants.
 - After this incident, the pumping machinery installed at two pumping stations were removed and the installation work at the third pumping station was stopped.
 - All the equipment was shifted to the location of Terminal Reservoir near Quetta.
 - Re-installation is not considered advisable since then as security is still a main concern.
- On 5th July 2022, a remote controlled bomb blast occurred near the Main Dam Project resulting in the martyr of an Army Personnel.
- On 13th July 2022, during Eid Holidays, an Army Personnel in civilian dress was kidnapped near project area, while travelling to Ziarat and was martyred by the miscreants/ terrorists of BLA.
- From 14th to 23rd July, extensive Army Operation was carried out, killing more than six terrorists and seizing explosive materials and latest arms and ammunition from a nearby area.
- On 11th August 2022, a Check Post of law and enforcement agencies in Khost, downstream of Mangi Dam, was attacked by the terrorists, martyring two soldiers and injuries to one.

• **Monsoon Rains of August 2022**

- During the unprecedented rains in August 2022, the works came to a stand still:
 - Extensive damages in the temporary Access Road and other temporary works and heavy silting in the Access Shaft, Lower Adits and Inspection Galleries with lost of time in re-construction work and required cleaning to continue with the works in Main Dam.

DELAYS IN THE WORKS OF OTHER PACKAGES

- **Similar delays have also affected other Contract Packages, requiring Extension in Times in all the packages.**

MAIN ISSUE ON CONTROLLING FURTHER DELAYS

- **The Security Forces requires more Securing Facilities like:**

- Additional Check Posts at higher locations.
- Lighting Arrangement.
- Fencing around specific Areas.

- **Extra Vigilance by Security Forces, affecting Works Progress:**

- For months since the last incident of mine blast near Main Dam, the Security Forces restricted to start daily construction activities at the usual early morning time and also stopped from working before the usual work time.
- Unexpected stoppage of work on any day, based on intelligence gathering.
- Stoppage of work activities, during movement of higherups of Security Personnel to Dam site or to areas surrounding Mangi Dam; like Harnai.

All the additional requirements of Security Personnel have been met, except for the Fencing in a specific area, for which the work is under progress and will be completed within few weeks.

The Contractors are worried about the loss of time for these reasons and have started to record such time loss for extension in time as well as for its compensation as Claim.

Day and Night works are required to speed up the work, but the Security requirements are preventing this.

PHOTOGRAPHS

INAUGURATION CEREMONY OF MANGI DAM PROJECT BY NAWAB SANAULLAH ZEHRI CHIEF MINISTER BALOCHISTAN ON 11 APRIL 2017.



PUBLIC HEARING OF MANDI DAM PROJECT AT QUETTA ON 3rd APRIL 2018



SITE VISIT OF CHIEF SECRETARY BALOCHSITAN & SECRETARY PHED AT MANGI DAM ON DATED: 8th August, 2018





SITE VISIT OF ZAHIR ALI SHAH (Rt) MAJ-GENERAL AND MEMBER OF PLANNING COMMISSION ALONG WITH HIS DELEGATIONS AT MANGI DAM PROJECT ON DTD 23rd APRIL 2019



VISIT OF MR. M. ASHRAF FEDERAL SECRETARY AND SYED MEHAR ALI SHAH JOINT SECRETARY, MINISTRY OF WATER RESOURCES, ISLAMABAD ON 19TH AUGUST 2019



VISIT OF CAPTAIN FAZEEL ASGHAR (Retd), CHIEF SECRETARY BALOCHISTAN MR FETAH BANGUR SECRETARY PHED & ADDITIONAL CHIEF SECRETARY AT MANGI DAM SITE ON 06TH OCTOBER 2019.



COVID-19 TEST PROFOREMD BY HEALTH DEPARTMENT AT MANGI DAM PROJECT 18, APRIL 2020



PIPELINE DESIGNER & PMU STAFF VISITED TERMINAL RESERVOIR THE MANGI DAM SITE ON DATED 24TH JULY 2020.



HONORABLE CHIEF MINISTER BALOCHISTAN, TAKING BRIEFING ON WATER CRISES IN QUETTA CITY FROM PHED DEPARTMENT 21st SEP,2020



Mr. Saboor Kakar Additional Chief Secretary, Mr Salah Muhammad Nasir Secretary PHED Visit Mangi Dam Project site on Dated 26 December 2020.



CHIEF JUSTICE MR. JAMAL MANDOKHAIL, HONORABLE JUDGES BALOCHISTAN HIGH COURT AND MR.NOOR MUHAMMAD DUMMAR MINISTER PHED VISITED MANGI DAM SITE DATED 10 APRIL.2021



CHIEF JUSTICE MR. JAMAL MANDOKHAIL, HONORABLE JUDGES BALOCHISTAN HIGH COURT AND MR.NOOR MUHAMMAD DUMMAR MINISTER PHED VISITED MANGI DAM SITE DATED 10 APRIL,2021





زیارت: ڈپٹی چیئرمین پلاننگ کمیشن ڈاکٹر جہانزیب علی خان، ایڈیشنل چیف سیکرٹری (ترقیات) حافظ عبدالباسط، سیکرٹری پی ایچ ای صالح محمد ناصر، کمشنر سی ڈویرن بالا ج عزیز مانگی ڈیم کے تعمیراتی کام کا معائنہ کر رہے ہیں

MR. JAHANZAIB ALI KHAN DEPUTY CHAIRMAN PLAINING COMMISSION, MR. ABDUL HAFIZ BASIT (P&D DEV), MR SALAH MUHAMMAD NASAR SECRETARY PHED AND MR. BALACH AZIZ COMMISSIONER SIBI DIVISION VESTED MANGI DAM PROJECT ON DATED 29TH JUNE 2021



TEAM LEADER ENGR M.IBRAHIM SAMOON VISITED SITE 25th - 26th August 2021



Lt. Gen Sarfaraz Ali (Corps Commander) Major-General Yousaf Majoka (Inspector General Balochistan) Mr. Salman Mufti Additional Chief Secretary (Dev). Mr. Salah Baloch Secretary PHED and Mr. Balach Aziz Commissioner Sibi Visited the Mangi Dam Project on 29th March 2022



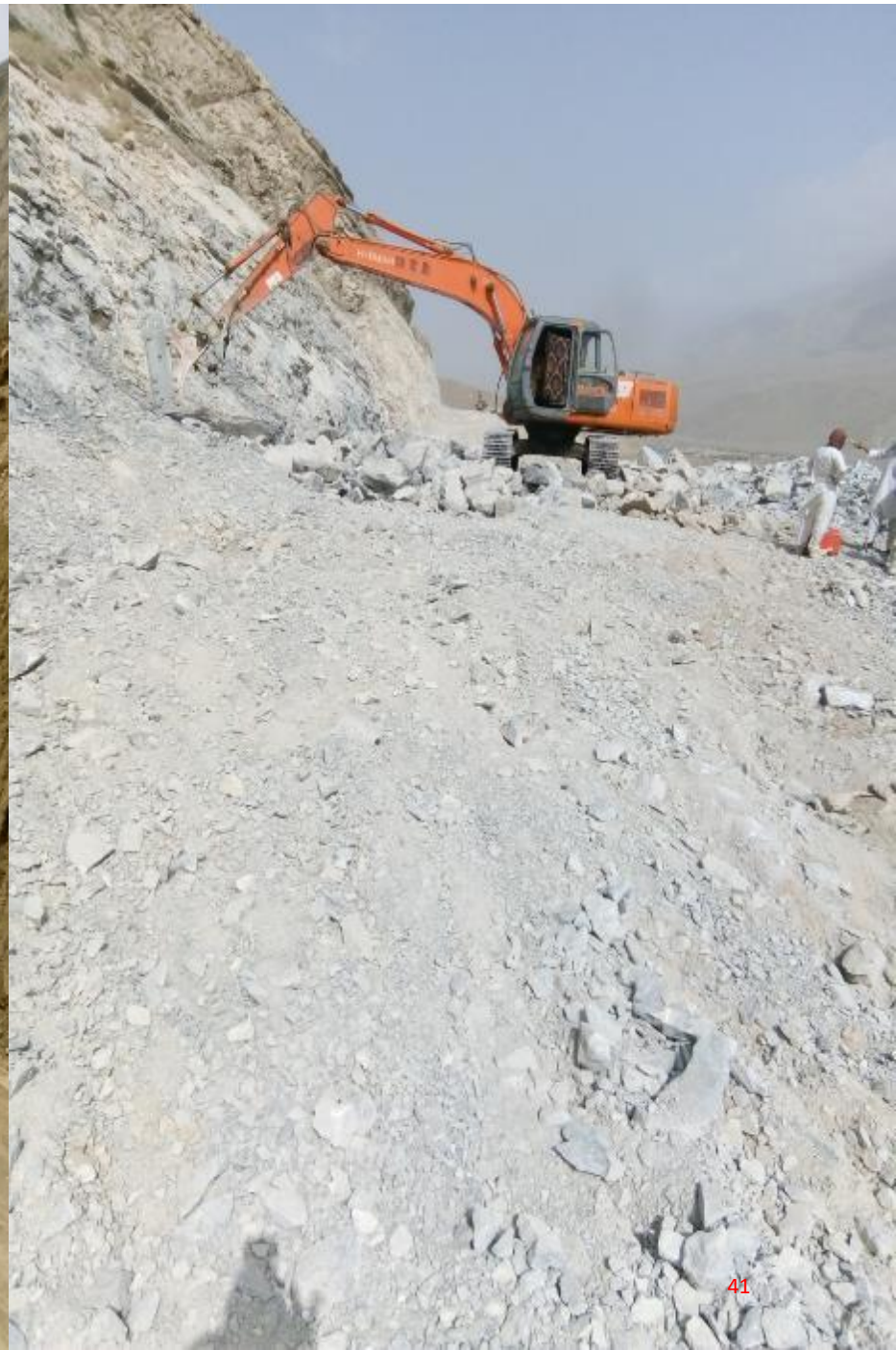
Mr. Salman Mufti Additional Chief Secretary (Dev). Mr. Salah Baloch Secretary PHED and Mr. Balach Aziz Commissioner Sibi Visited the Mangi Dam Project on 29th March 2022



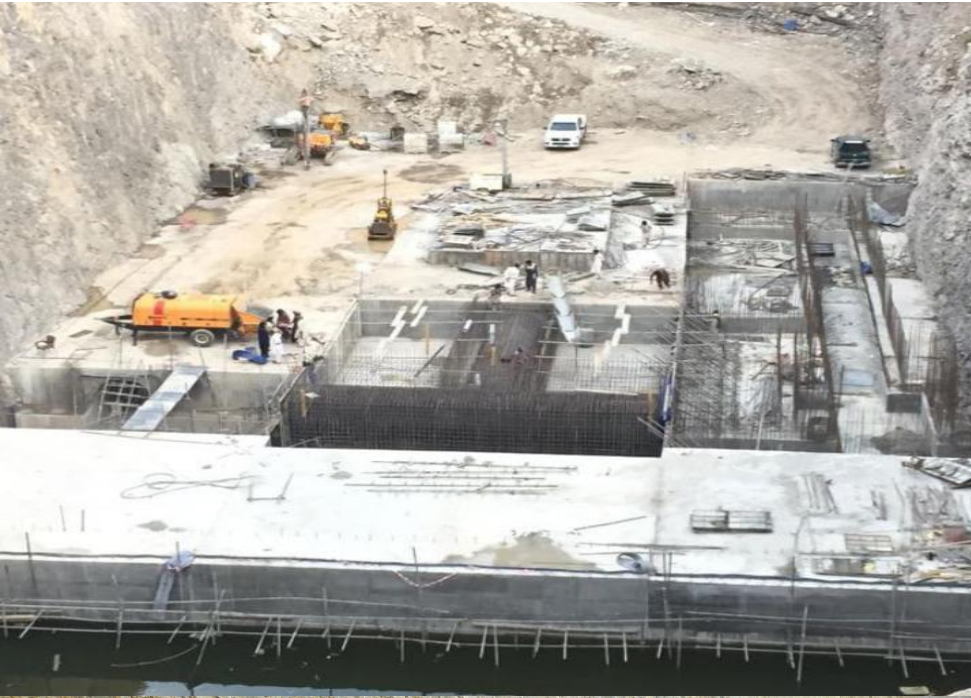
COMMON EXCAVATION OF ACCESS ROAD



ROCK EXCAVATION OF ACCESS ROAD



PACKAGE-I: DAM MASS CONCRETE & ADIT GALLERY STEEL FIXING WORK IS IN PROGRESS



SECURITY FENCING WORK IS IN PROGRESS AT MANGI DAM PROJECT



(PACKAGE-IIA) WORK IS IN PROGRESS



(PACKAGE-IIB) MACHINERY AT SITE



(PACKAGE-III) WORK IS IN PROGRESS



PACKAGE-IV. CHECK DAMS NO.8,10,17,18 WORK IS IN PROGRESS



DIFFERENT TEST OF MATERIAL IS IN PROGRESS



FLOOD 3RD OCTOBER 2019



FLOOD 26 AUGUST 2022



08/26/2022, 10:08 AM

FLOOD 26 AUGUST 2022



08/26/2022, 10:08 AM

FLOOD 26 AUGUST 2022



08/26/2022, 6:29 PM

FLOOD 26 AUGUST 2022



08/26/2022, 6:29 PM

KACH NALLAH FLOOD 15th ARIL 2018



Apowersoft
Video Converter



APRIL 15, 2018

ZIARAT NALLAH FLOOD APRIL 2019



FLOOD 03 OCTOBER 2019



FLOOD August 2020



SNOW FALL MARCH 2019



FLOOD ON 26TH AUGUST 2022



FLOOD ON 26TH AUGUST 2022



FLOOD ON 26TH AUGUST 2022



Thank You