

Initial Environmental Examination

February 2018

PAK: Balochistan Water Resources Development Sector Project

Project No. 48098-002

Part 3 of 4

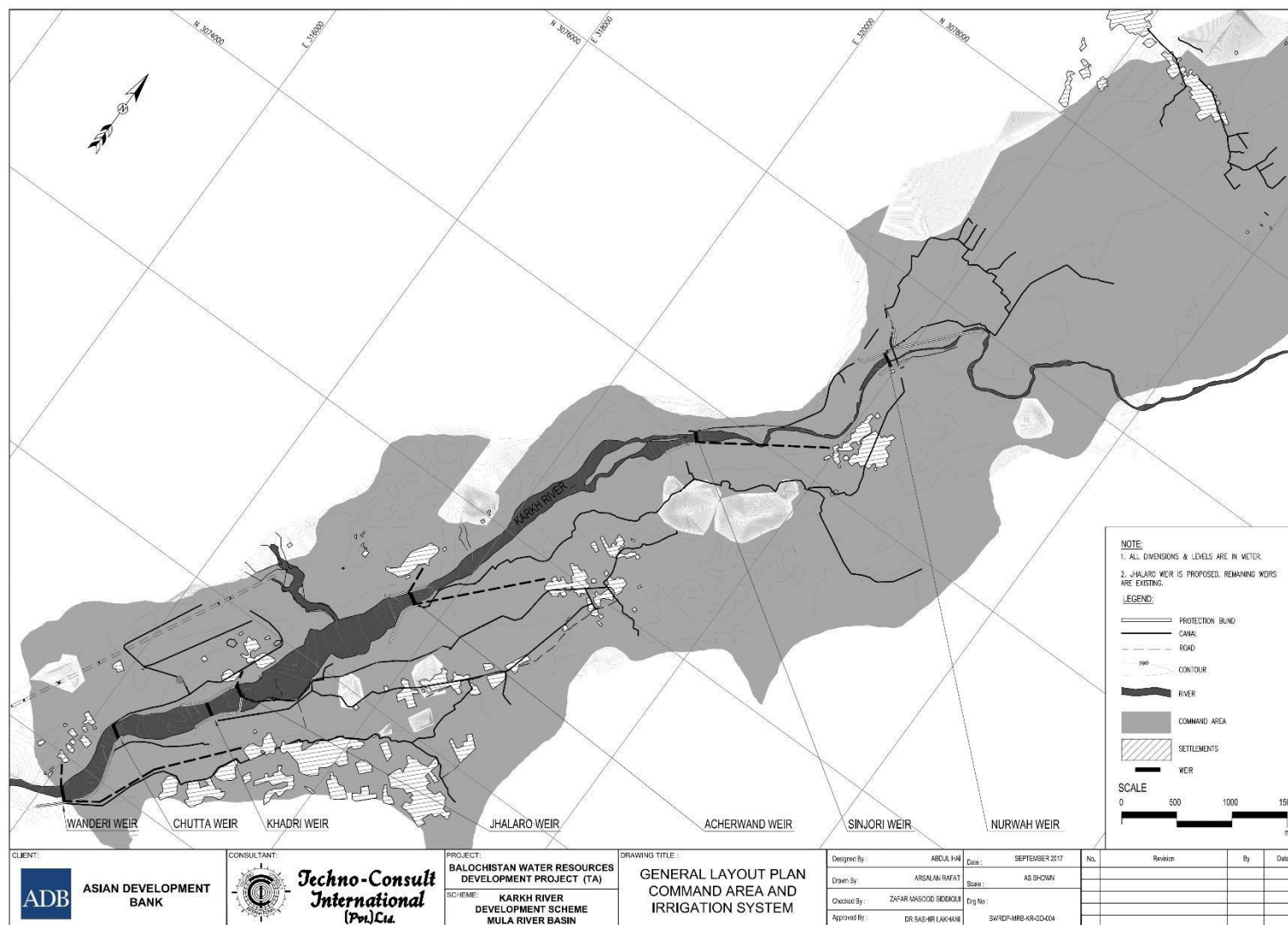
Prepared by Irrigation and Power Department, Government of Balochistan for the Asian Development Bank (ADB).

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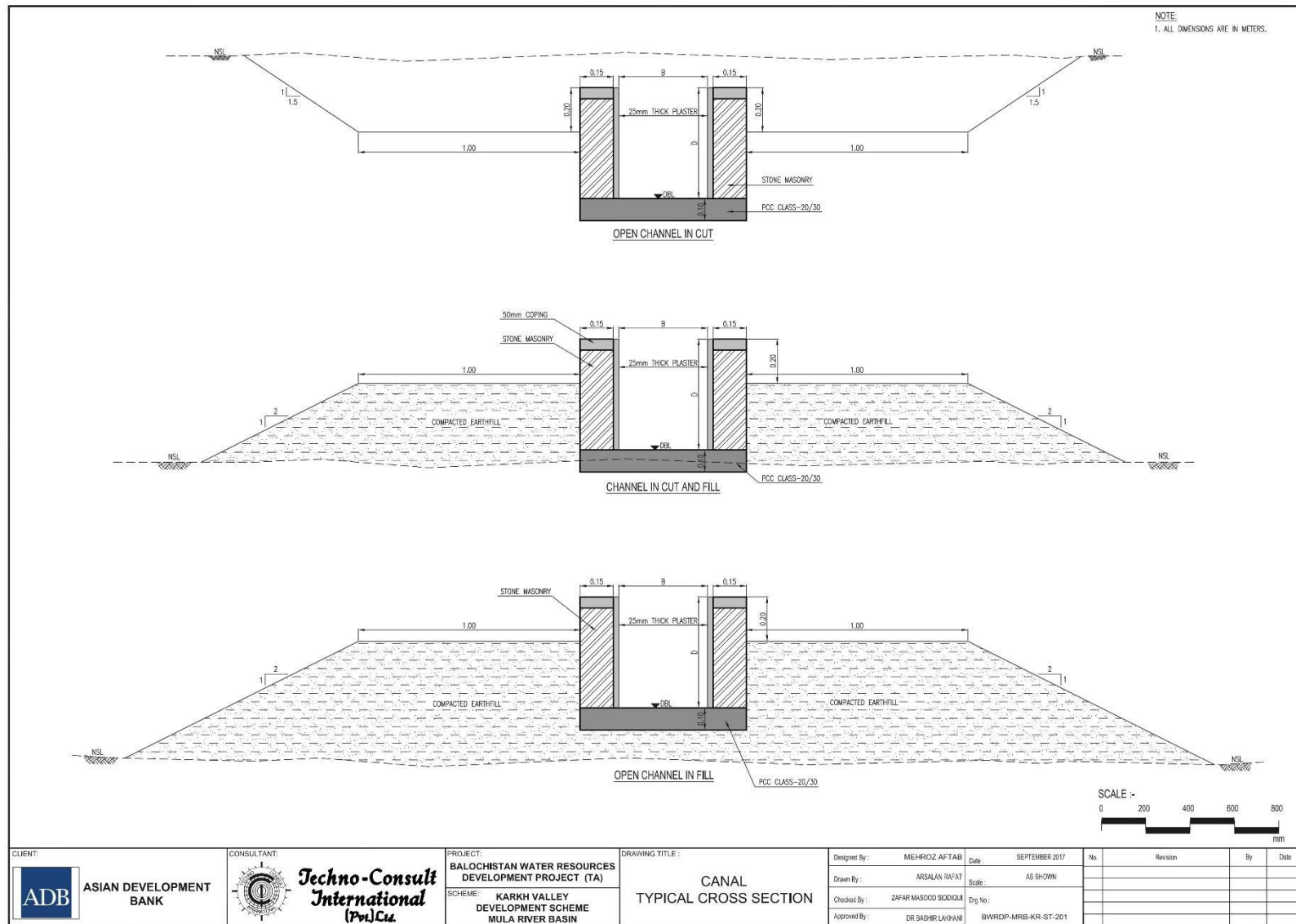
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Annexure 4: A Typical Drawing and Cross-section of the Rehabilitation at Karkh River

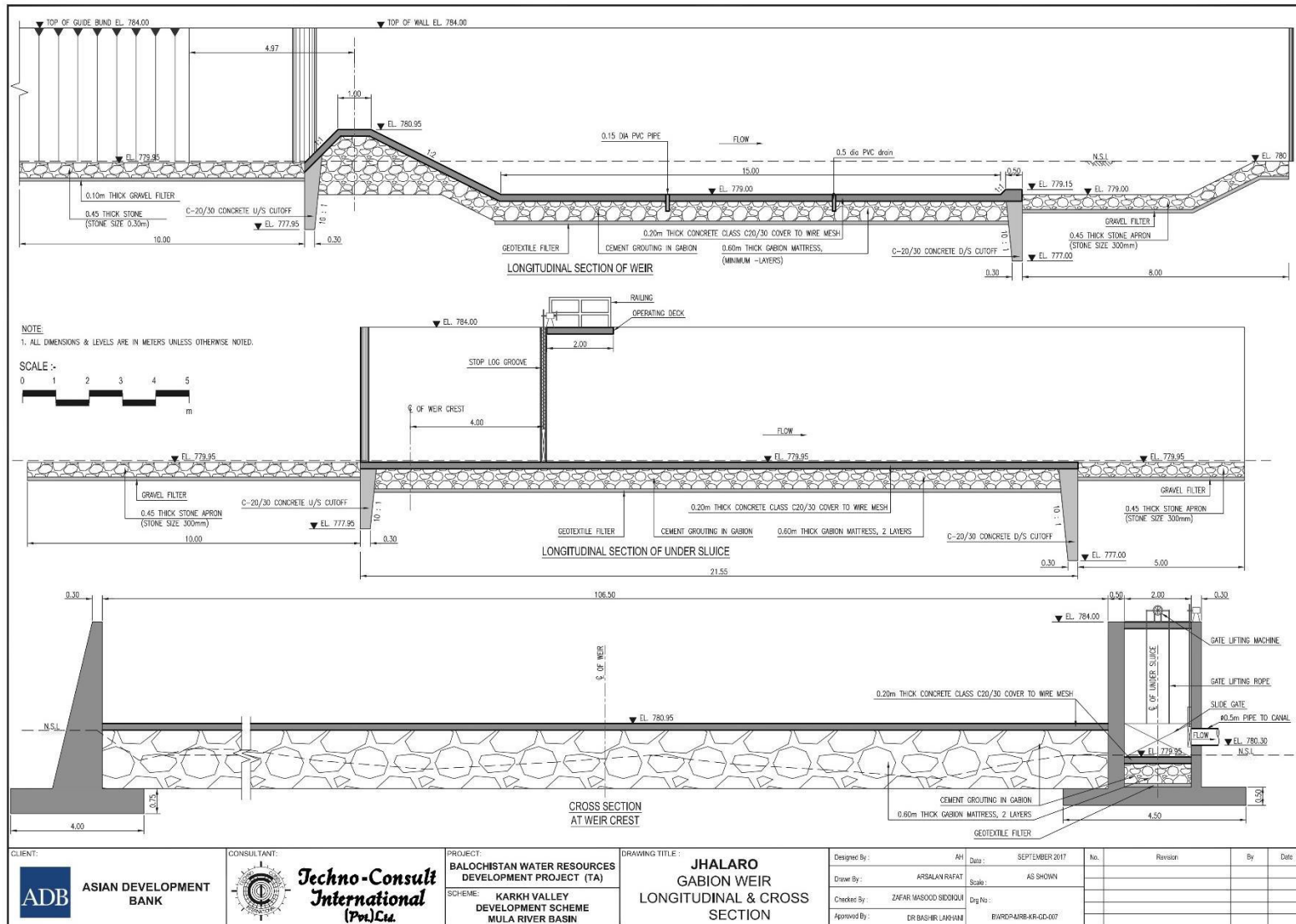
Karkh River Development Subprojects



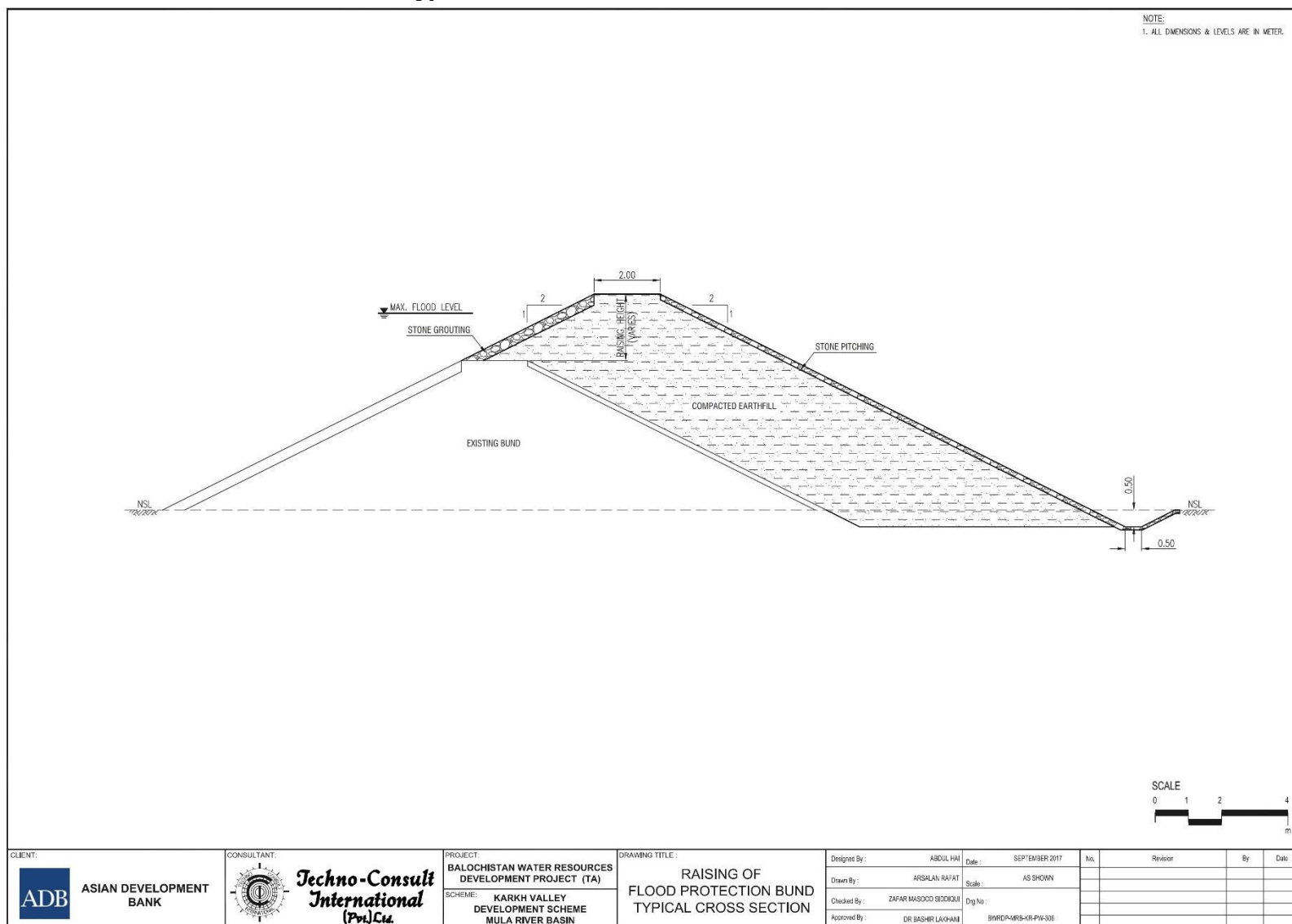
Typical Section of Canal



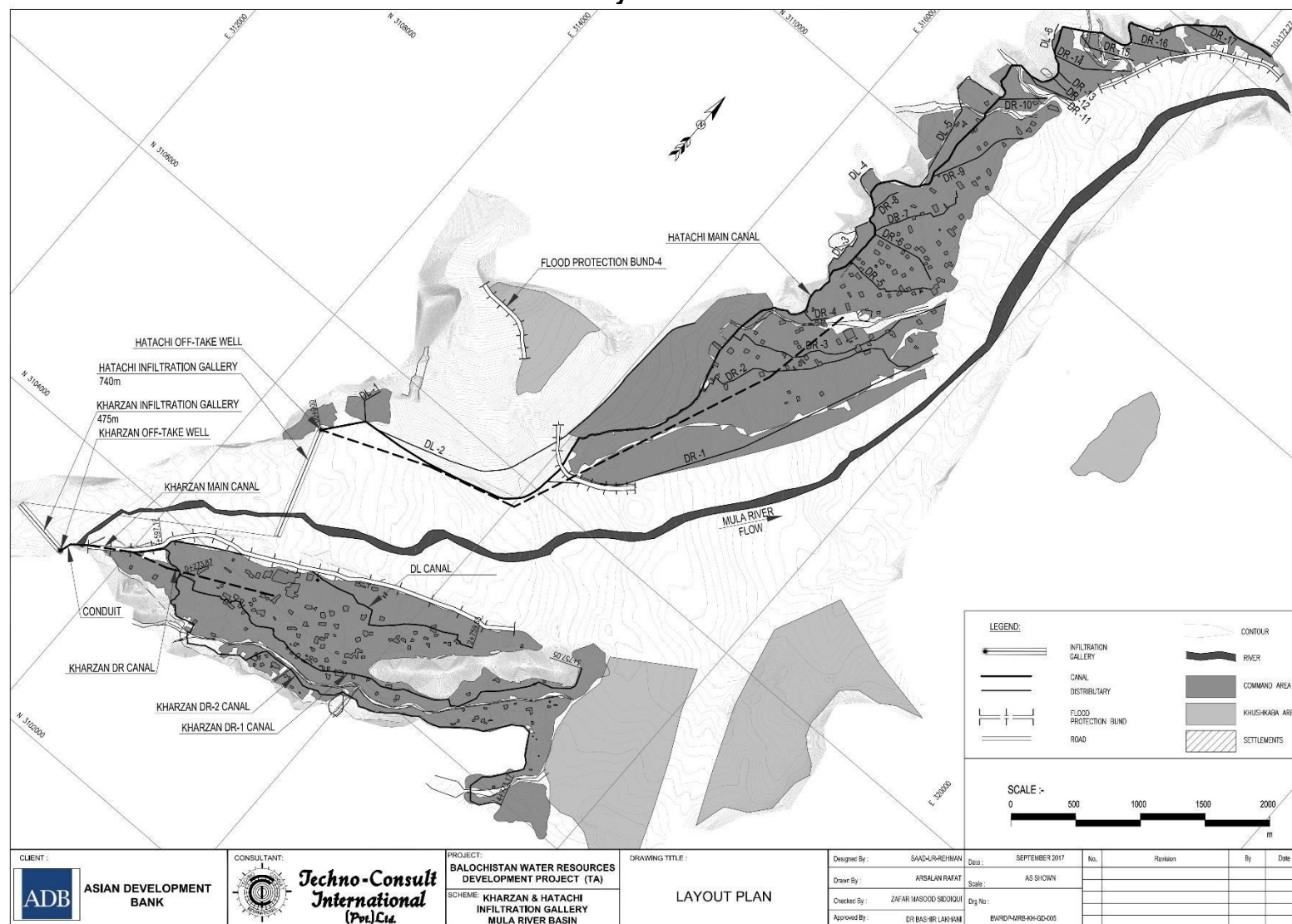
Typical Section of Weir at Jhalaro



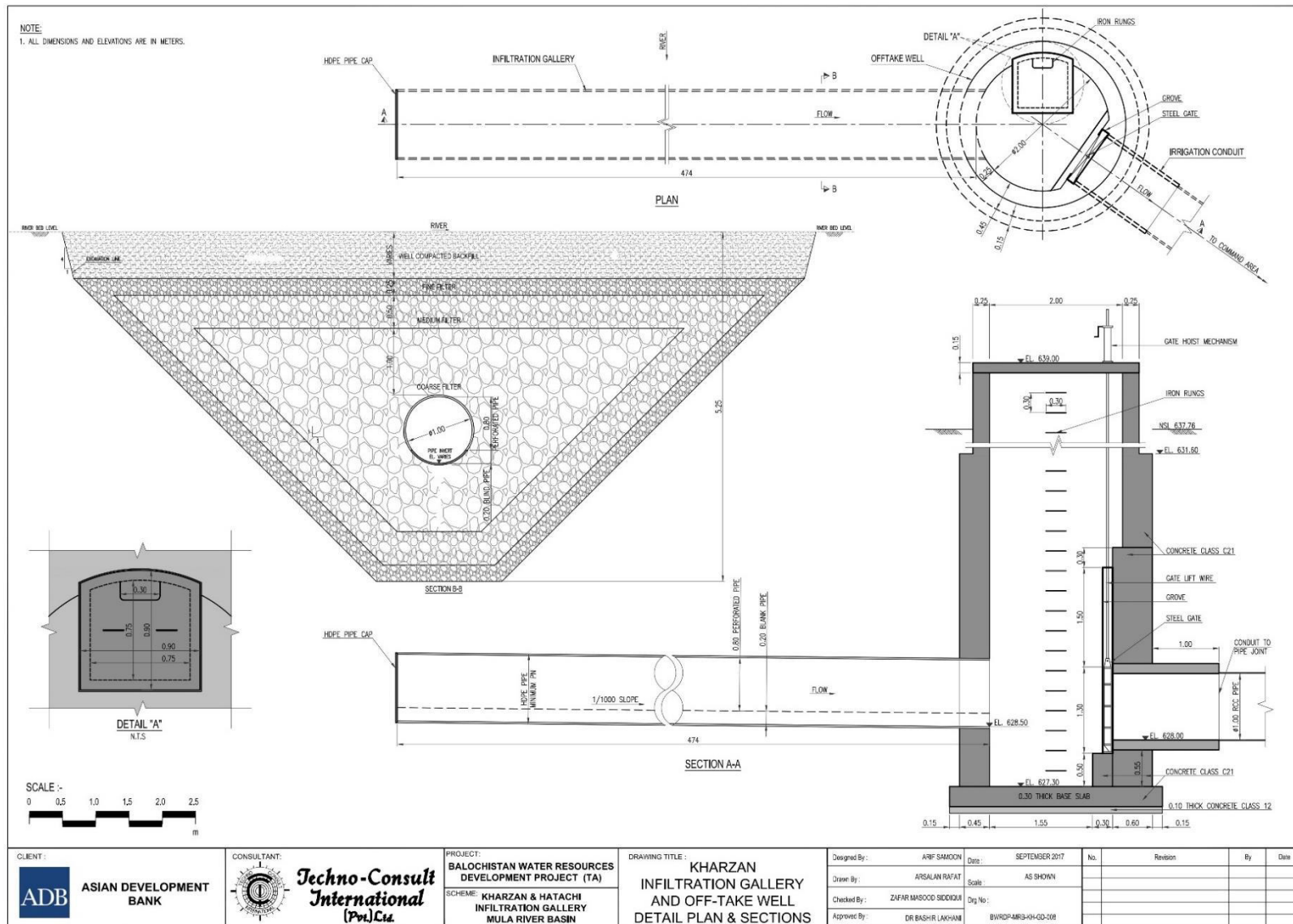
Typical Section of Flood Protection Bund



Annexure 5: A Typical Drawing and Cross-section of Mula River Interventions Layout Plan



Kharzan Infiltration Gallery Details and Cross-Section



NOTE:
1. ALL DIMENSIONS AND ELEVATIONS ARE IN METERS.

PLAN

SECTION B-B

DETAIL "A"
N.T.S.

SECTION A-A

SCALE:-
0 0.5 1.0 1.5 2.0 2.5
m

DRAWING TITLE:
HATACHI
INFILTRATION GALLERY
AND OFF-TAKE WELL
DETAIL PLAN & SECTIONS

CLIENT:
ADB
ASIAN DEVELOPMENT
BANK

CONSULTANT:
Techno-Consult
International
(Pvt) Ltd.

PROJECT:
BALOCHISTAN WATER RESOURCES
DEVELOPMENT PROJECT (TA)

SCHEME:
KHARZAN & HATACHI
INFILTRATION GALLERY
MULA RIVER BASIN

DESIGNED BY:
ARW SAMOON

DRAWN BY:
ARSALAN RAFAT

CHECKED BY:
ZA'AR MASOOD SHODKA

APPROVED BY:
DR BASHIR LAQMANI

DATE:
SEPTEMBER 2017

SCALE:
AS SHOWN

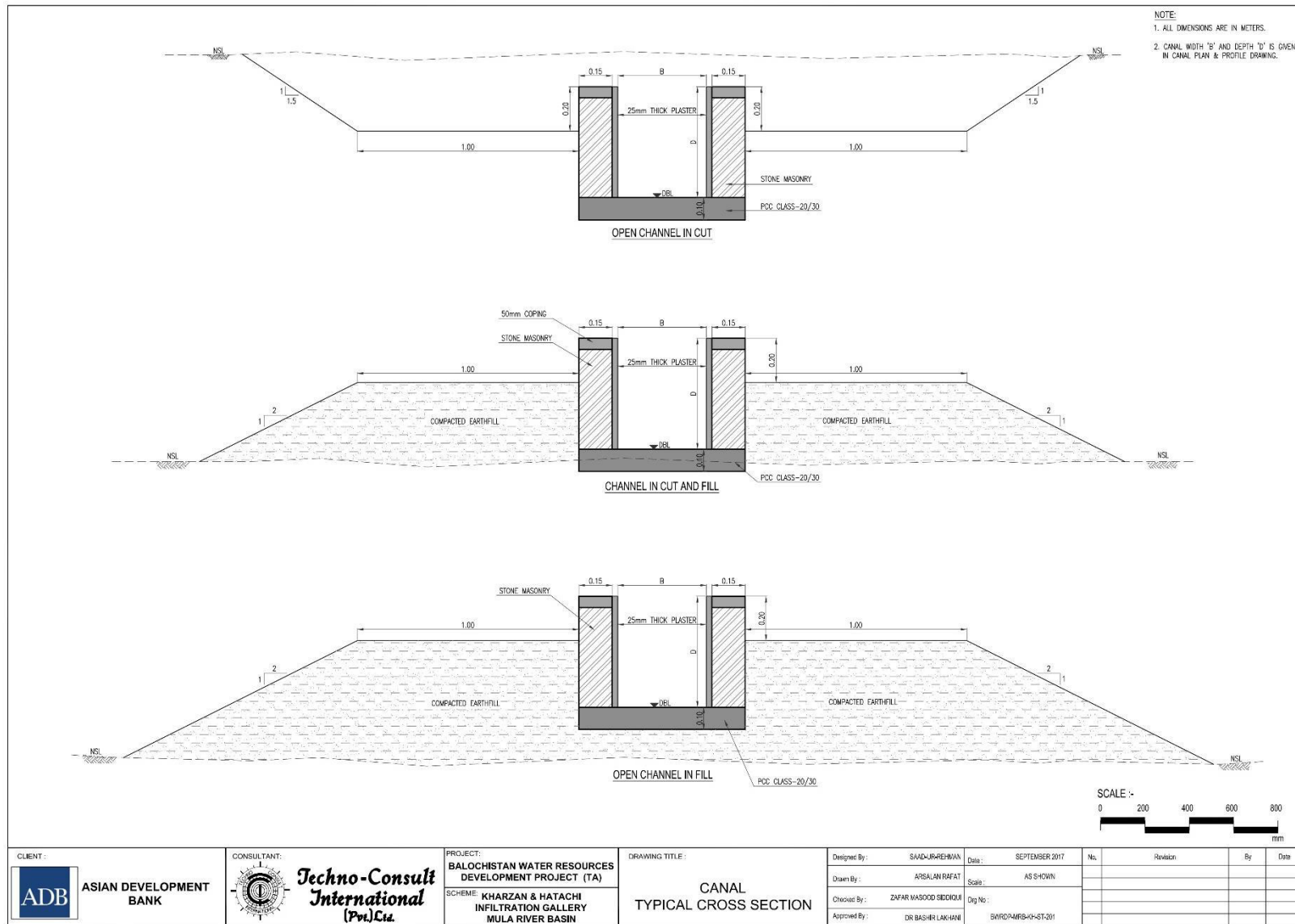
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REVISION:

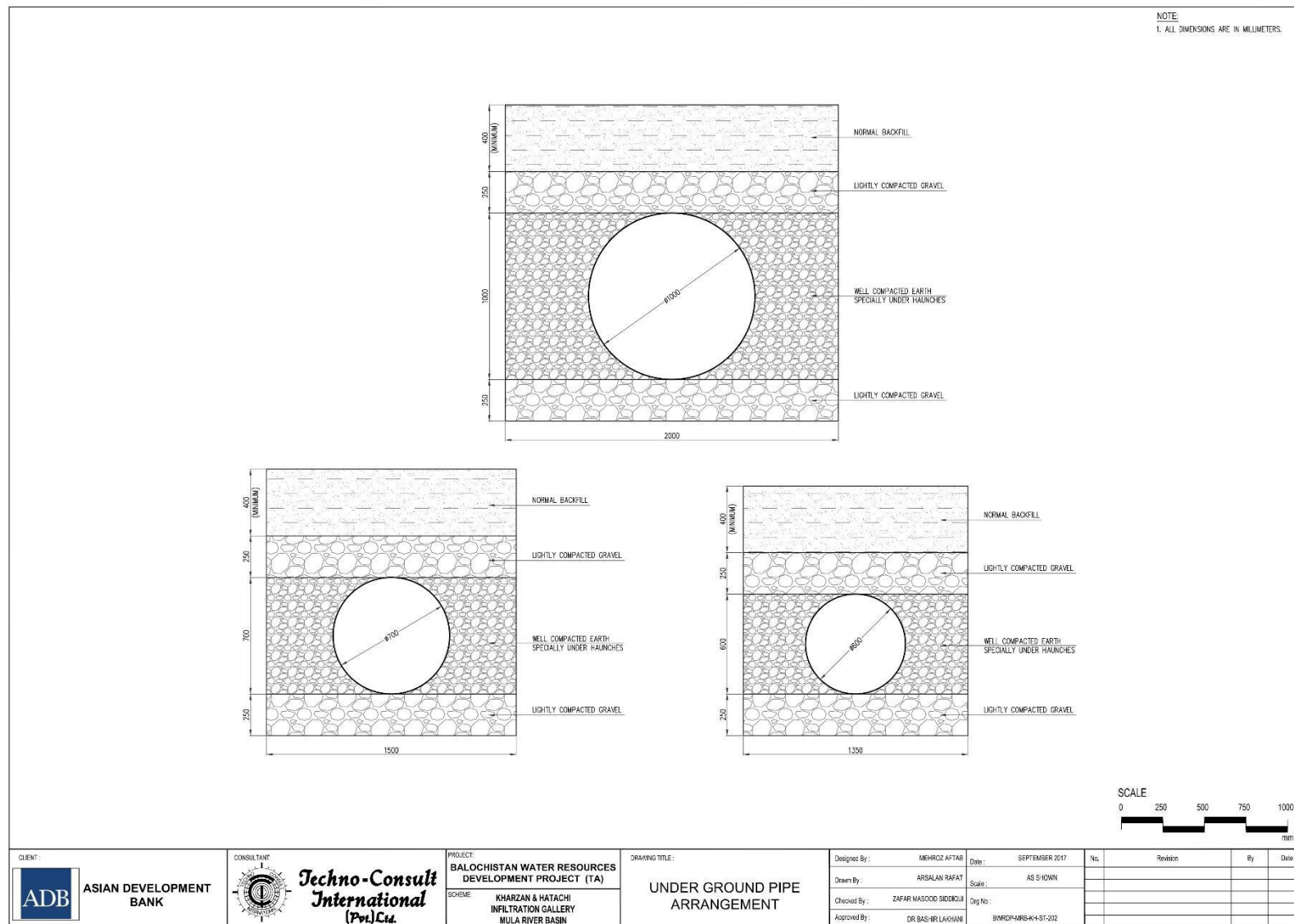
BY:

DATE:

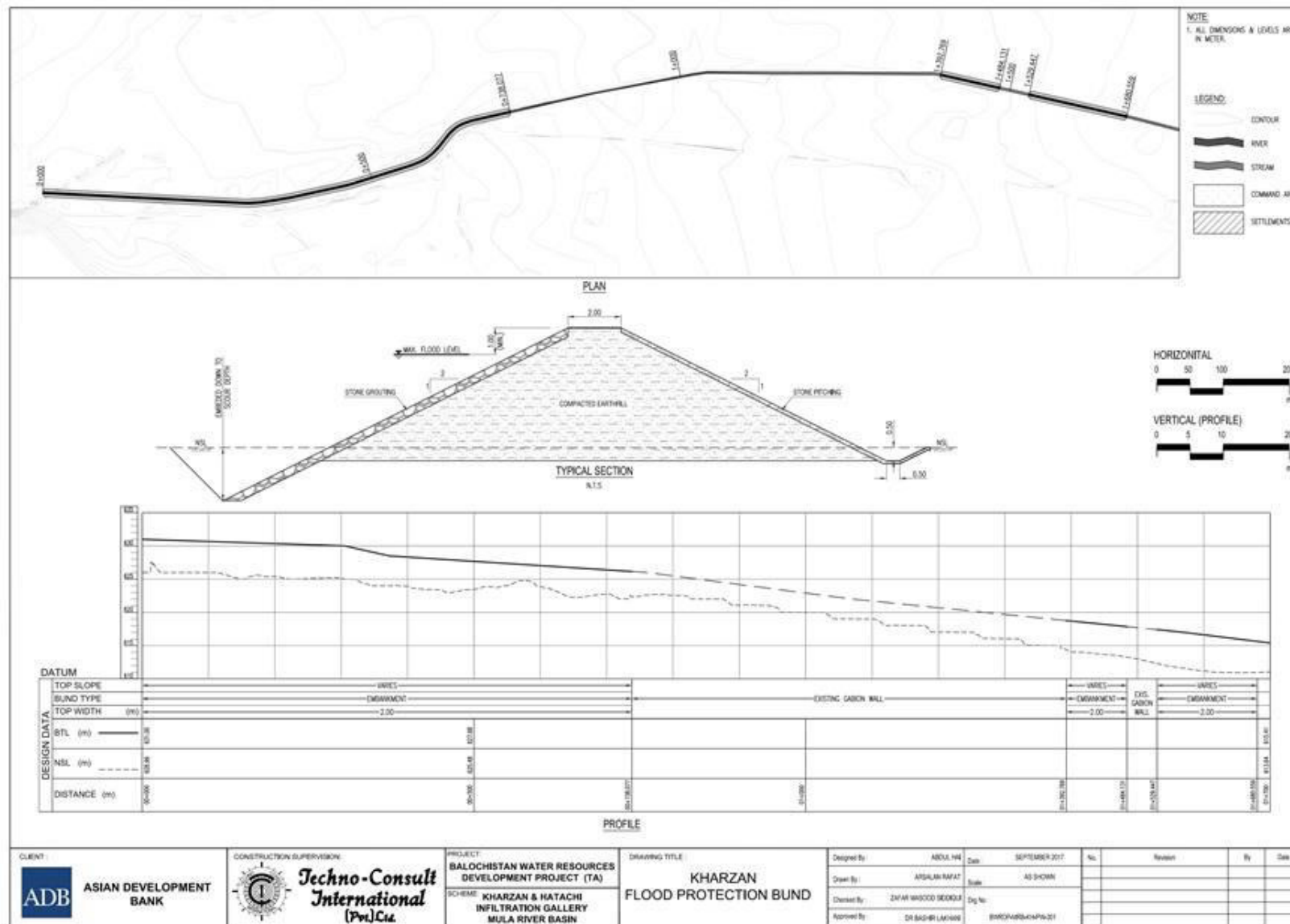
Typical Section of Canal



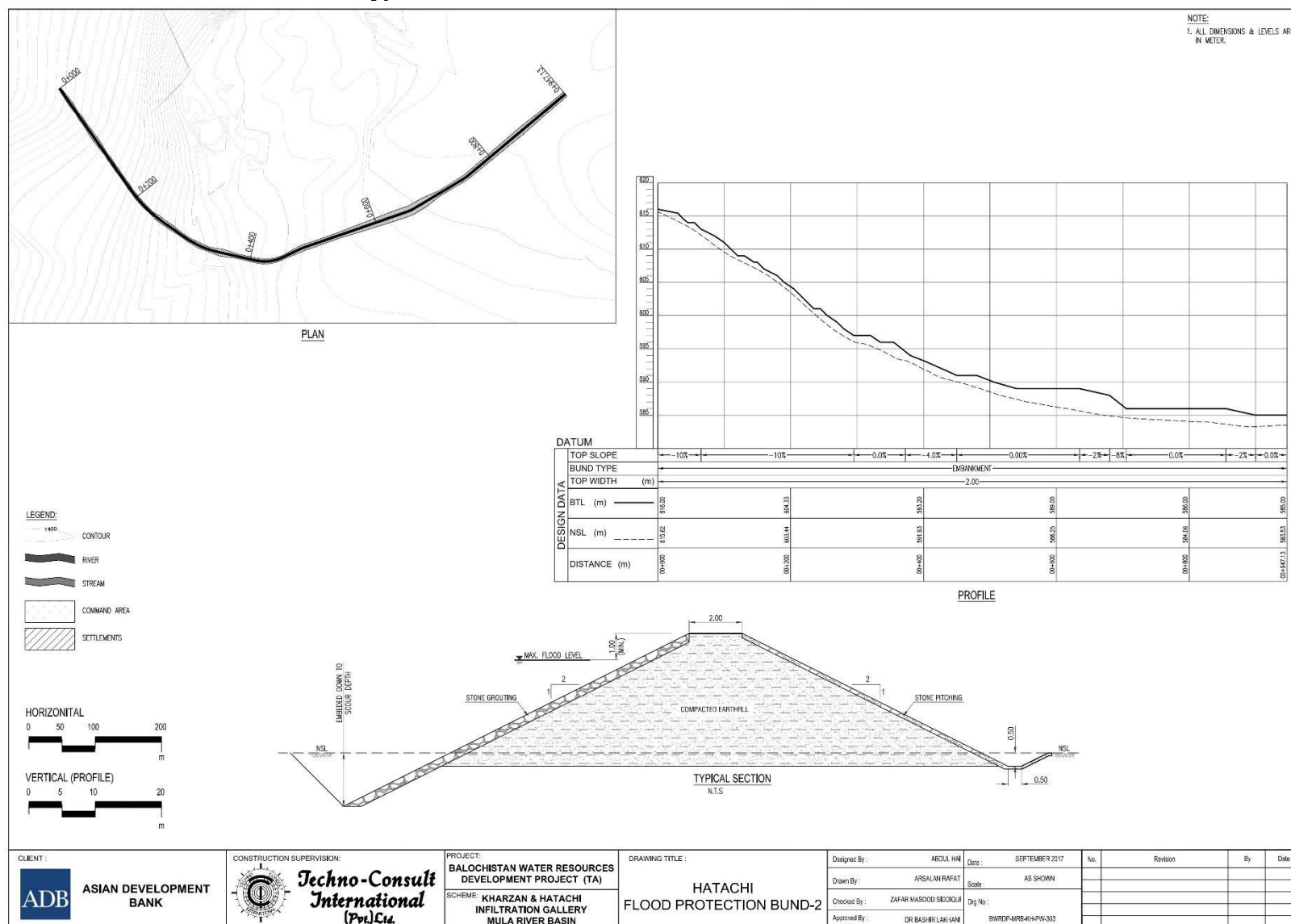
Under Ground Pipe Arrangement



Typical Section of Kharzan Flood Protection Bund

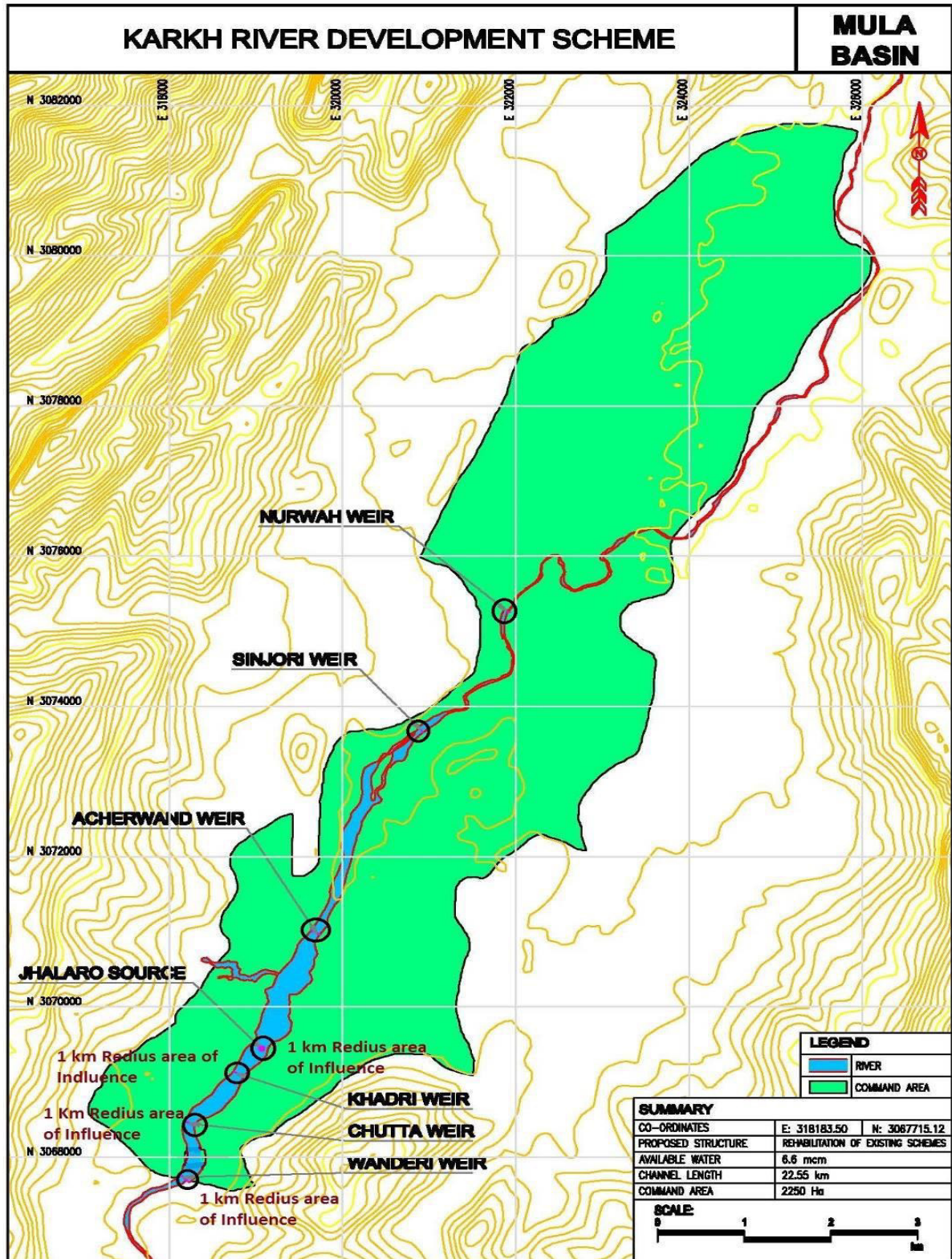


Typical Section of Hatachi Flood Protection Bund

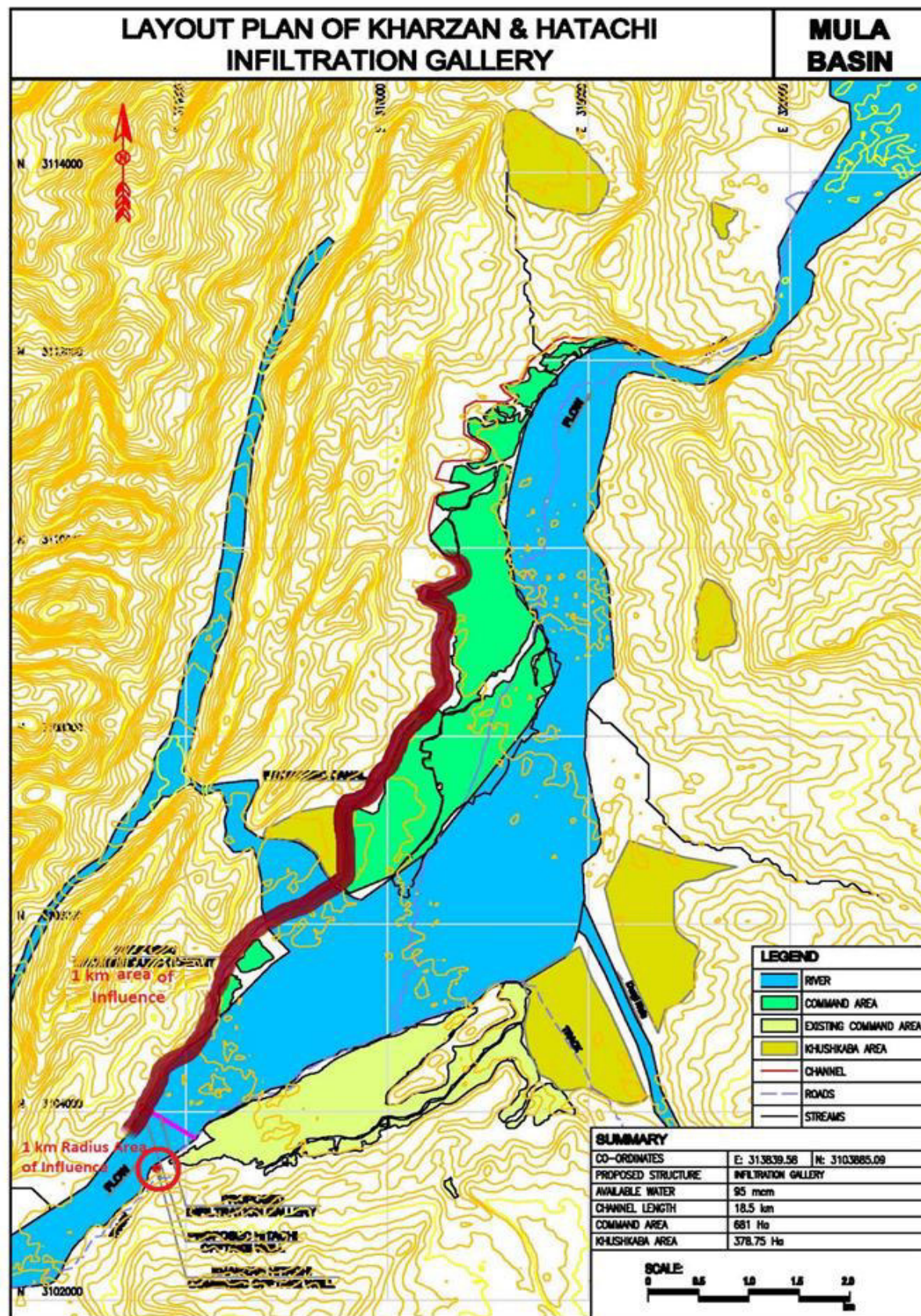


Annexure 6: Area of Influence around the Proposed Subproject Interventions

Karkh River Interventions with Area of Influence



Mula River Interventions at Hatachi-Khazran with Area of Influence





Annexure 7: A history of recorded earthquakes in Balochistan

Year	Place	Intensity at R/Scale
1909	Kech	7.2
1987	Quetta, Chaman	5.6
1935	Quetta, Mach	7.0
1990	Quetta, Kalat, Khuzdar, Mastung, Kalat, Nushki, Surab	5.8-6.1
1935	Quetta, Mastung, Kalat	7.5
1992	Khuzdar, Nal, Quetta	5.7
1941	Quetta	5
1993	Quetta/Pishin, Makran/Gwadar	5.7
1945	Pasni/Makran	8.6
1995	Quetta	5.2
1952	Loralai	5.8
1996	Quetta	5.3
1954	Khuzdar, Nal, Wadh	5.7
1997	Quetta, Mastung, Mach, Sibi, Harnai	5-6.2
1955	Quetta	6
1998	Quetta, Dalbandin	5.3
1956	Kalat, Barkan	6
1999	Barkan	5.2
1957	Khuzdar	5.5
2000	Quetta, Sibi, Ziarat, Harnai and Duki	6
1975	Quetta	5.4
2002	Balochistan Boarder	6
1978	Quetta, Nushki	5.3
2003	Naukundi, Musa Khail	5.3
1983	Khuzdar	6.5
2004	Sibi	5.5
1986	Khuzdar	5.4

Source: Data extracted from Meteorological Department – Quetta Station

Annexure 8: Laboratory Results








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TEST REPORT		Page 02 of 12	
Customer's Name	M/s NEC Consultant (Pvt) Ltd	Test Report No	2421A/2016-2017
Customer's Ref	E-mail	Reporting Date	08-06-2017
Date	05-05-2017	Sample Code	7001
Sample Description	Surface Water (Wandari)	Sampling Date	16-05-2017

TEST METHOD	METHOD TITLE	TEST RESULTS
HACH-8237	Turbidity, NTU	1
APHA-209C	Total Suspended Solids, mg/L	Nil
APHA-209B	Total Dissolved Solids (TDS), mg/L	542
D-1293	pH @ 25 °C	7.89
	Chemical	
By AA	Aluminum (Al), mg/L	Nil
By AA	Antimony (Sb), mg/L	Nil
By AA	Arsenic (As), mg/L	Nil
By AA	Barium (Ba), mg/L	Nil
By AA	Boron (B), mg/L	Nil
By AA	Cadmium (Cd), mg/L	Nil
By AA	Chromium (Cr), mg/L	Nil
By AA	Copper (Cu), mg/L	Nil
By AA	Lead (Pb), mg/L	Nil
By AA	Manganese (Mn), mg/L	Nil
By AA	Nickel (Ni), mg/L	Nil
APHA-320	Mercury (Hg), mg/L	Nil
By AA	Selenium (Se), mg/L	Nil
By AA	Zinc (Zn), mg/L	Nil

 Prepared by	 Section In charge (E)	 Head R&ASD
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The analyses based on Sample (s) provided to us by the Client. The interpretation or opinions expressed represent the best judgment (E.& O.E.). We have no responsibility and warranty or representation in connection with which such report is used.

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TEST REPORT		Page 03 of 12	
Customer's Name	M/s NEC Consultant (Pvt) Ltd	Test Report No	2421B/2016-2017
Customer's Ref	E-mail	Reporting Date	08-06-2017
Date	05-05-2017	Sample Code	7002
Sample Description	Surface Water (Khadri)	Sampling Date	16-05-2017

TEST METHOD	METHOD TITLE	TEST RESULTS
HACH-8237	Turbidity, NTU	1
APHA-209C	Total Suspended Solids, mg/L	Nil
APHA-209B	Total Dissolved Solids (TDS), mg/L	588
D-1293	pH @ 25 °C	7.97
	Chemical	
By AA	Aluminum (Al), mg/L	Nil
By AA	Antimony (Sb), mg/L	Nil
By AA	Arsenic (As), mg/L	Nil
By AA	Barium (Ba), mg/L	Nil
By AA	Boron (B), mg/L	Nil
By AA	Cadmium (Cd), mg/L	Nil
By AA	Chromium (Cr), mg/L	Nil
By AA	Copper (Cu), mg/L	Nil
By AA	Lead (Pb), mg/L	Nil
By AA	Manganese (Mn), mg/L	Nil
By AA	Nickel (Ni), mg/L	Nil
APHA-320	Mercury (Hg), mg/L	Nil
By AA	Selenium (Se), mg/L	Nil
By AA	Zinc (Zn), mg/L	Nil

Prepared by	Section In charge (E)	Head R&ASD

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Customer's Name	M/s NEC Consultant (Pvt) Ltd	Test Report No	2421C/2016-2017
Customer's Ref	E-mail	Reporting Date	08-06-2017
Date	05-05-2017	Sample Code	7003
Sample Description	Surface Water (Jhalaro)	Sampling Date	16-05-2017

TEST METHOD	METHOD TITLE	TEST RESULTS
HACH-8237	Turbidity, NTU	Nil
APHA-209C	Total Suspended Solids, mg/L	Nil
APHA-209B	Total Dissolved Solids (TDS), mg/L	600
D-1293	pH @ 25 °C	7.91
	Chemical	
By AA	Aluminum (Al), mg/L	Nil
By AA	Antimony (Sb), mg/L	Nil
By AA	Arsenic (As), mg/L	Nil
By AA	Barium (Ba), mg/L	Nil
By AA	Boron (B), mg/L	Nil
By AA	Cadmium (Cd), mg/L	Nil
By AA	Chromium (Cr), mg/L	Nil
By AA	Copper (Cu), mg/L	Nil
By AA	Lead (Pb), mg/L	Nil
By AA	Manganese (Mn), mg/L	Nil
By AA	Nickel (Ni), mg/L	Nil
APHA-320	Mercury (Hg), mg/L	Nil
By AA	Selenium (Se), mg/L	Nil
By AA	Zinc (Zn), mg/L	Nil

Prepared by	Section In charge (E)	Head R&ASD

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TEST REPORT		Page 05 of 12	
Customer's Name	M/s NEC Consultant (Pvt) Ltd	Test Report No	2421D/2016-2017
Customer's Ref	E-mail	Reporting Date	08-06-2017
Date	05-05-2017	Sample Code	7004
Sample Description	Surface Water (Acharwand)	Sampling Date	16-05-2017

TEST METHOD	METHOD TITLE	TEST RESULTS
HACH-8237	Turbidity, NTU	1
APHA-209C	Total Suspended Solids, mg/L	Nil
APHA-209B	Total Dissolved Solids (TDS), mg/L	1099
D-1293	pH @ 25 °C	7.87
	Chemical	
By AA	Aluminum (Al), mg/L	Nil
By AA	Antimony (Sb), mg/L	Nil
By AA	Arsenic (As), mg/L	Nil
By AA	Barium (Ba), mg/L	Nil
By AA	Boron (B), mg/L	Nil
By AA	Cadmium (Cd), mg/L	Nil
By AA	Chromium (Cr), mg/L	Nil
By AA	Copper (Cu), mg/L	Nil
By AA	Lead (Pb), mg/L	Nil
By AA	Manganese (Mn), mg/L	Nil
By AA	Nickel (Ni), mg/L	Nil
APHA-320	Mercury (Hg), mg/L	Nil
By AA	Selenium (Se), mg/L	Nil
By AA	Zinc (Zn), mg/L	Nil

Prepared by	Section In charge (E)	Head R&ASD

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TEST REPORT		Page 06 of 12	
Customer's Name	M/s NEC Consultant (Pvt) Ltd	Test Report No	2421E/2016-2017
Customer's Ref	E-mail	Reporting Date	08-06-2017
Date	05-05-2017	Sample Code	7005
Sample Description	Surface Water (Sinjori)	Sampling Date	16-05-2017

TEST METHOD	METHOD TITLE	TEST RESULTS
HACH-8237	Turbidity, NTU	Nil
APHA-209C	Total Suspended Solids, mg/L	Nil
APHA-209B	Total Dissolved Solids (TDS), mg/L	1050
D-1293	pH @ 25 °C	8.30
	Chemical	
By AA	Aluminum (Al), mg/L	Nil
By AA	Antimony (Sb), mg/L	Nil
By AA	Arsenic (As), mg/L	Nil
By AA	Barium (Ba), mg/L	Nil
By AA	Boron (B), mg/L	Nil
By AA	Cadmium (Cd), mg/L	Nil
By AA	Chromium (Cr), mg/L	Nil
By AA	Copper (Cu), mg/L	Nil
By AA	Lead (Pb), mg/L	Nil
By AA	Manganese (Mn), mg/L	Nil
By AA	Nickel (Ni), mg/L	Nil
APHA-320	Mercury (Hg), mg/L	Nil
By AA	Selenium (Se), mg/L	Nil
By AA	Zinc (Zn), mg/L	Nil

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TEST REPORT		Page 01 of 12	
Customer's Name	M/s NEC Consultant (Pvt) Ltd	Test Report No	2421/2016-2017
Customer's Ref	E-mail	Reporting Date	08-06-2017
Date	05-05-2017	Sample Code	7000
Sample Description	Surface Water (ChuttaWeir)	Sampling Date	16-05-2017

TEST METHOD	METHOD TITLE	TEST RESULTS
HACH-8237	Turbidity, NTU	Nil
APHA-209C	Total Suspended Solids, mg/L	Nil
APHA-209B	Total Dissolved Solids (TDS), mg/L	540
D-1293	pH @ 25 °C	7.87
	Chemical	
By AA	Aluminum (Al), mg/L	Nil
By AA	Antimony (Sb), mg/L	Nil
By AA	Arsenic (As), mg/L	Nil
By AA	Barium (Ba), mg/L	Nil
By AA	Boron (B), mg/L	Nil
By AA	Cadmium (Cd), mg/L	Nil
By AA	Chromium (Cr), mg/L	Nil
By AA	Copper (Cu), mg/L	Nil
By AA	Lead (Pb), mg/L	Nil
By AA	Manganese (Mn), mg/L	Nil
By AA	Nickel (Ni), mg/L	Nil
APHA-320	Mercury (Hg), mg/L	Nil
By AA	Selenium (Se), mg/L	Nil
By AA	Zinc (Zn), mg/L	Nil

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TEST REPORT		Page 07 of 12	
Customer's Name	M/s NEC Consultant (Pvt) Ltd	Test Report No	2421F/2016-2017
Customer's Ref	E-mail	Reporting Date	08-06-2017
Date	05-05-2017	Sample Code	7006
Sample Description	Surface Water (Hatachi-Khizran Infiltration gallery)	Sampling Date	16-05-2017

TEST METHOD	METHOD TITLE	TEST RESULTS
HACH-8237	Turbidity, NTU	Nil
APHA-209C	Total Suspended Solids, mg/L	Nil
APHA-209B	Total Dissolved Solids (TDS), mg/L	357
D-1293	pH @ 25 °C	7.99
	Chemical	
By AA	Aluminum (Al), mg/L	Nil
By AA	Antimony (Sb), mg/L	Nil
By AA	Arsenic (As), mg/L	Nil
By AA	Barium (Ba), mg/L	Nil
By AA	Boron (B), mg/L	Nil
By AA	Cadmium (Cd), mg/L	Nil
By AA	Chromium (Cr), mg/L	Nil
By AA	Copper (Cu), mg/L	Nil
By AA	Lead (Pb), mg/L	Nil
By AA	Manganese (Mn), mg/L	Nil
By AA	Nickel (Ni), mg/L	Nil
APHA-320	Mercury (Hg), mg/L	Nil
By AA	Selenium (Se), mg/L	Nil
By AA	Zinc (Zn), mg/L	Nil

Prepared by	Section In charge (E)
	Head R&ASD

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Customer's Name	M/s NEC Consultant (Pvt) Ltd	Test Report No	2421J/2016-2017
Customer's Ref	E-mail	Reporting Date	08-06-2017
Date	05-05-2017	Sample Code	7010-7019
Sample Description	Noise Analysis	Sampling Date	16-05-2017

TEST RESULTS

Code #	LOCATION	Noise dB (A) By Analyzer
7010	Chutta	38
7011	Wandari	41
7012	Khadri	35
7013	Jhalaro	36.2
7014	Acharwand	37
7015	Sinjori	36
7016	Hatachi Khizran Infiltration Gallery	32
NEQS Limits		85

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Customer's Name	M/s NEC Consultant (Pvt) Ltd	Test Report No	2421K/2016-2017
Customer's Ref	E-mail	Reporting Date	08-06-2017
Date	05-05-2017	Sample Code	7020-7029
Sample Description	SPM, $\mu\text{g}/\text{Nm}^3$ Analysis	Sampling Date	16-05-2017

Code #	LOCATION	TEST RESULTS
7020	Chutta	12
7021	Wandari	14
7022	Khadri	15
7023	Jhalaro	11
7024	Acharwand	Nil
7025	Sinjori	4
7026	Hatachi Khizran Infiltration Gallery	Nil

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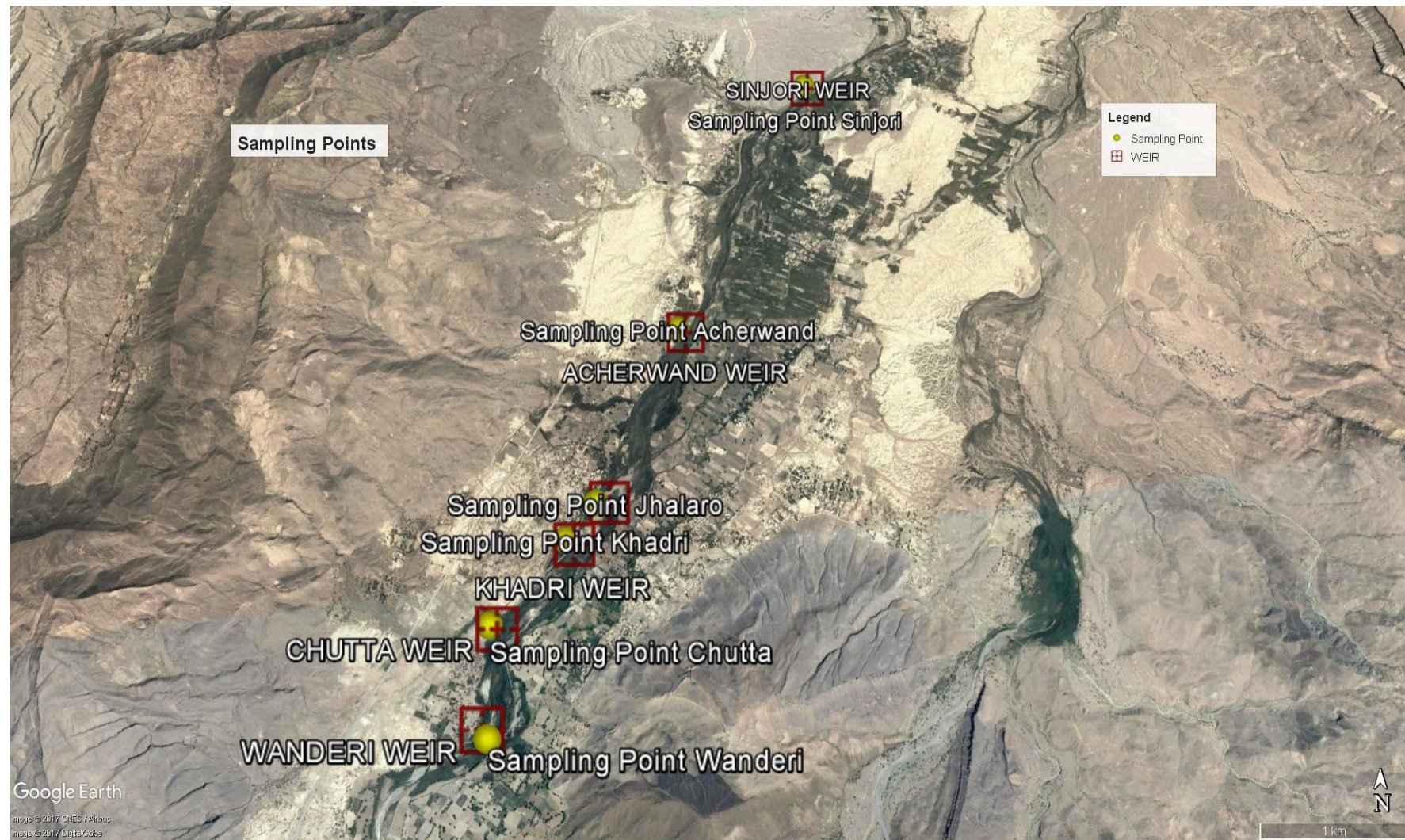
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Annexure 9: Location Map of Sampling Points



Sampling Points of Karak River Interventions



Annexure 10: Combined Location Map of Project Area with Protected Forest

