



**GOVERNMENT OF PAKISTAN**  
**MINISTRY OF WATER AND POWER**  
PROJECT MANAGEMENT & POLICY IMPLEMENTATION UNIT (PMPIU)

Water Sector Capacity Building and Advisory  
Services Project (WCAP)

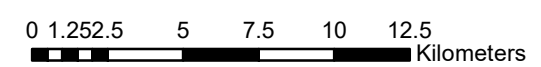
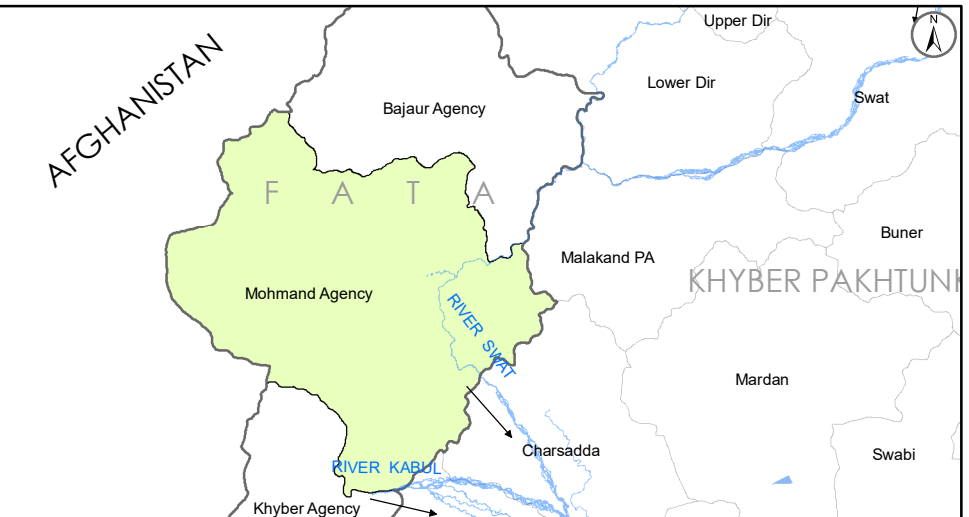
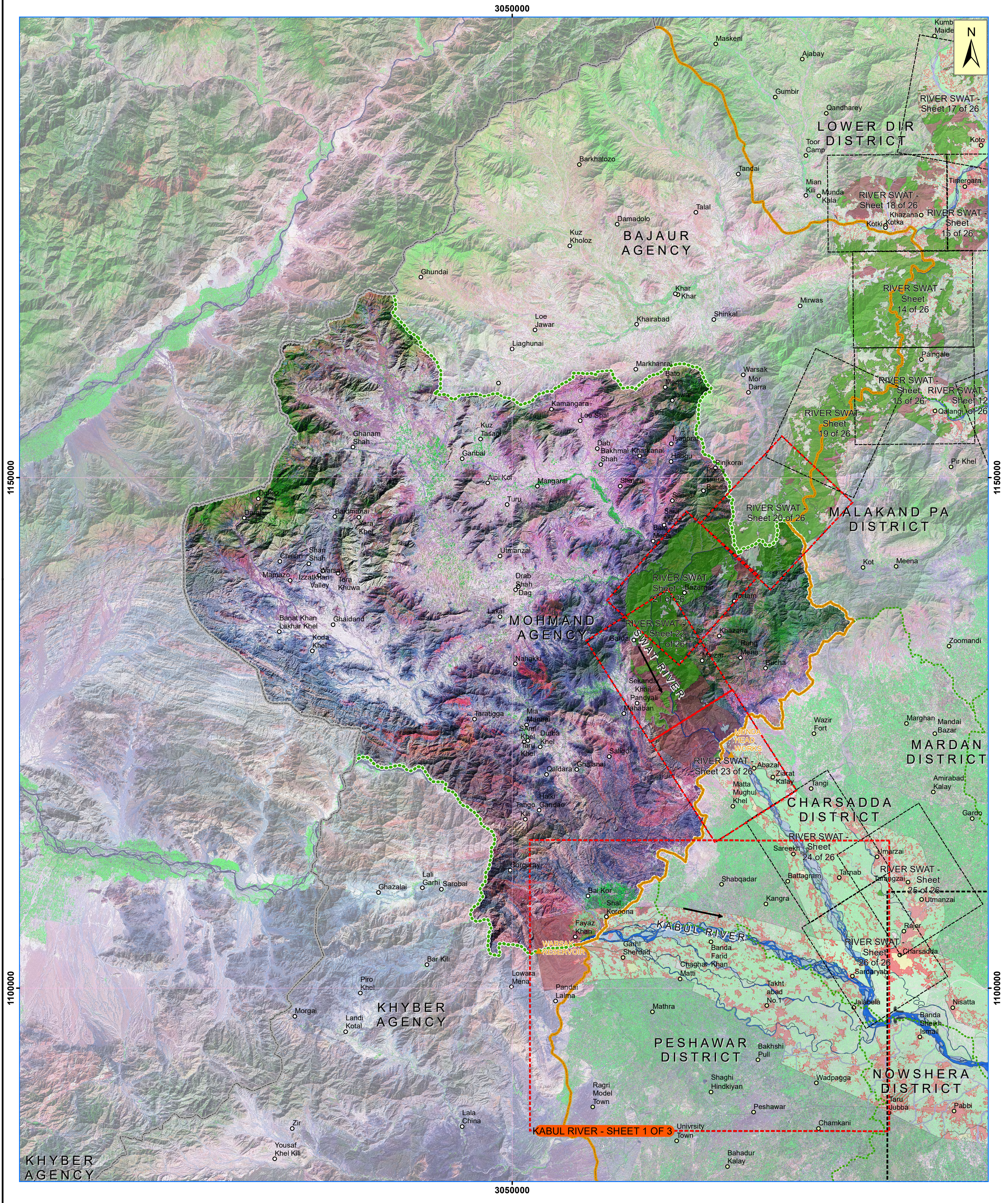
Development of National Flood Protection Plan-IV (NFPP-IV)  
and Related Studies to Enhance the Capacity of  
Federal Flood Commission-FFC

# **LANDUSE AND DISTRICT LEVEL SUBMERGENCE PLANS**

**MOHMAND AGENCY**  
FEDERALLY ADMINISTERED TRIBAL AREAS

**JANUARY 2016**

# MOHMAND AGENCY



DEVELOPMENT OF NATIONAL FLOOD PROTECTION PLAN-IV (NFPP-IV) AND RELATED STUDIES TO ENHANCE THE CAPACITY OF FEDERAL FLOOD COMMISSION-FFC

**MOHMAND AGENCY**

GOVERNMENT OF PAKISTAN  
 MINISTRY OF WATER AND POWER  
 PROJECT MANAGEMENT & POLICY IMPLEMENTATION UNIT (PMPIU)  
 WATER SECTOR CAPACITY BUILDING AND ADVISORY SERVICES PROJECT (WCAP)

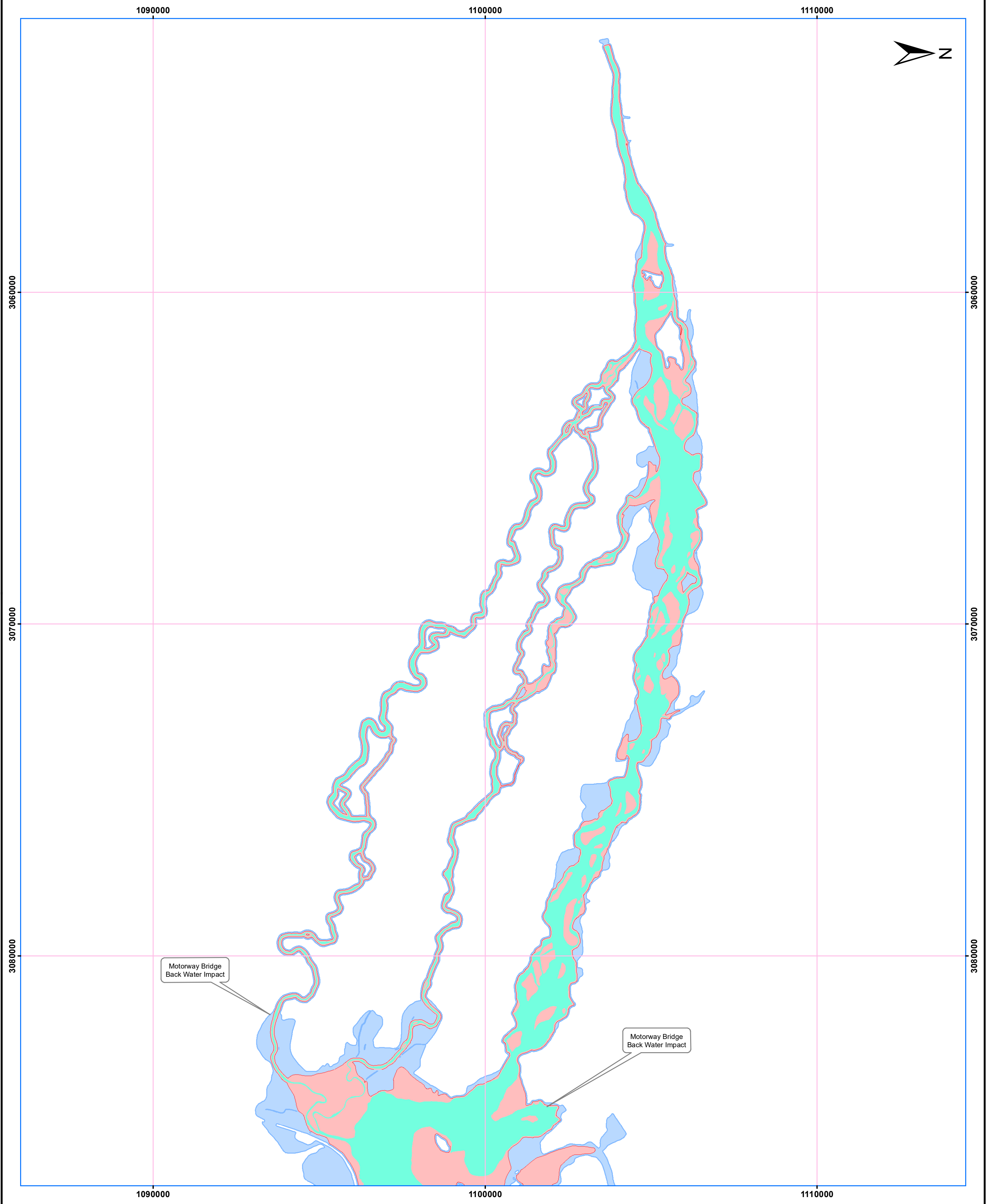
Consultants:  
**NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED**  
 1-C, Block-N, Model Town Extension,  
 Lahore - Pakistan.

in association with  
**Deltares DELTARES, THE NETHERLANDS**  
 Enabling Delta Life

Source of Information:  
 1. Topographic sheets of Survey of Pakistan  
 2. Freely available satellite imagery

Grid Reference is in meters

Date: January 29, 2016



**LEGEND**

**(Flood Risk Zones)**

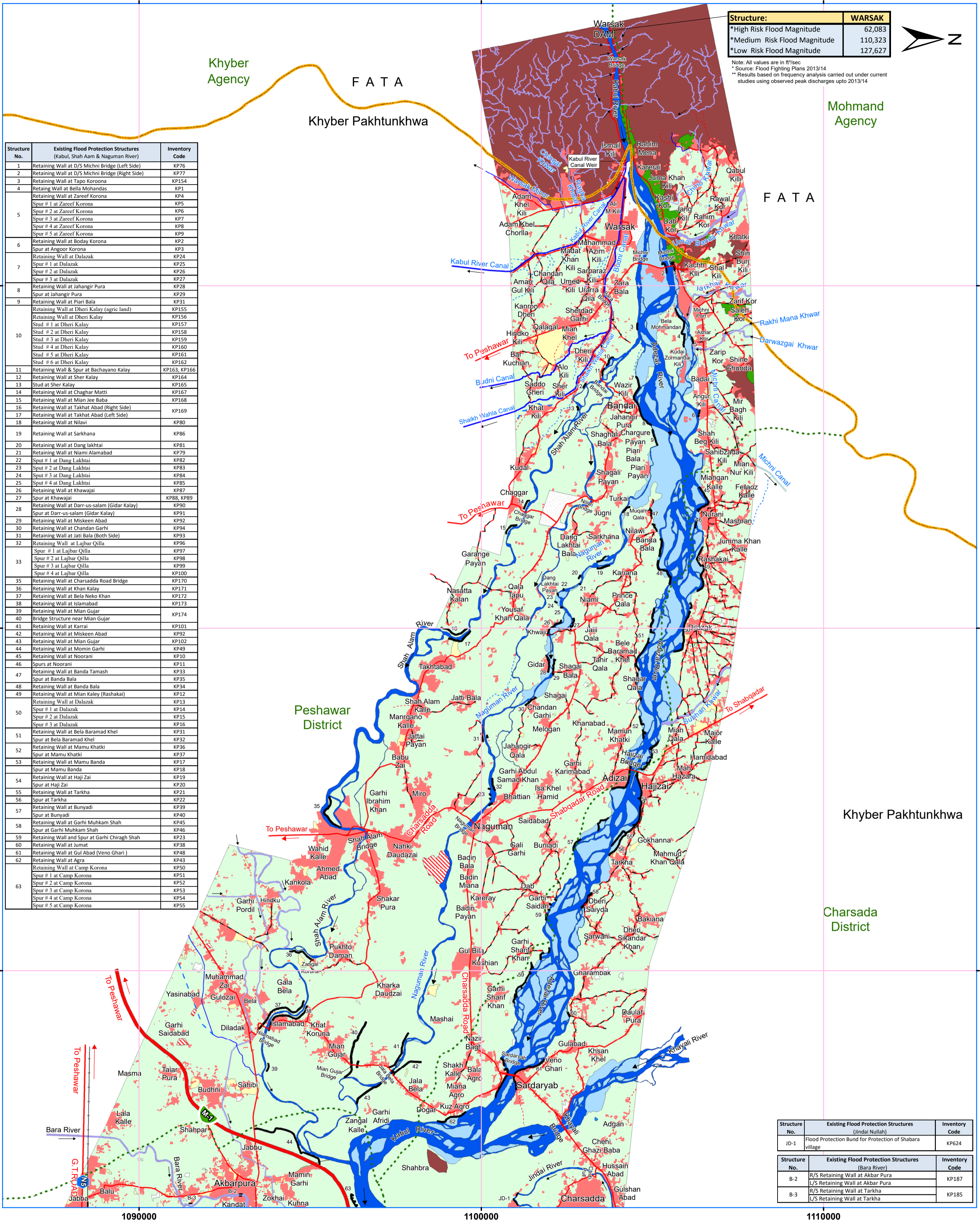
- High Risk Zone (Inundation Extent corresponding to discharge upto 62,000 cusecs in Warsak Dam - Confluence of Swat & Kabul Rivers)
- Medium Risk Zone (Inundation Extent corresponding to discharge from 62,000 to 110,000 cusecs in Warsak Dam - Confluence of Swat & Kabul Rivers)
- Low Risk Zone (Inundation Extent corresponding to discharge from 110,000 to 128,000 cusecs in Warsak Dam - Confluence of Swat & Kabul Rivers)

Note: All flood extents are based on breachless conditions

1090000

1100000

1110000



Structure:	WARSAK
*High Risk Flood Magnitude	62,083
*Medium Risk Flood Magnitude	110,323
*Low Risk Flood Magnitude	127,627

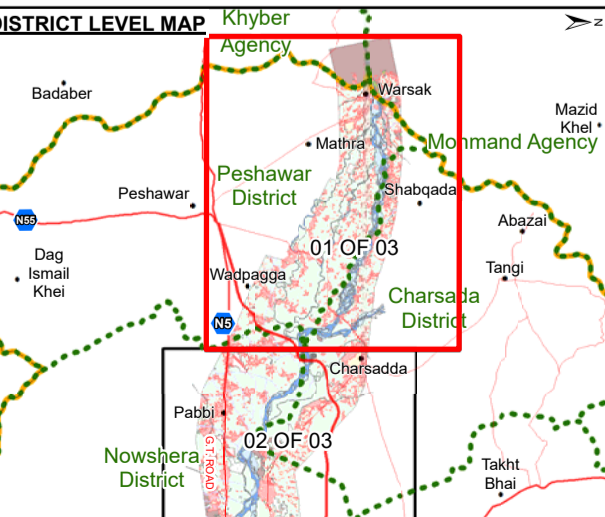
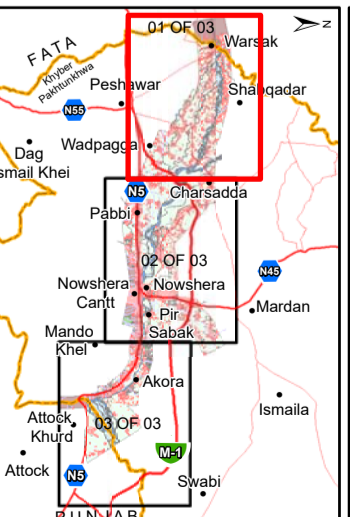
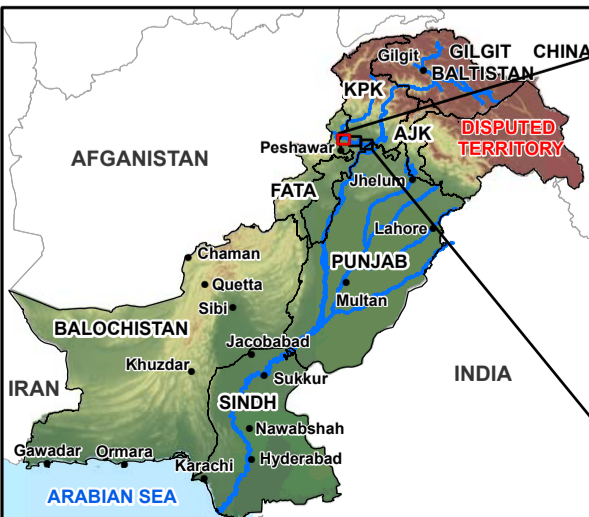
Note: All values are in R<sup>2</sup>/sec  
 \*Source: Flood Fighting Plans 2013/14  
 \*\* Results based on frequency analysis carried out under current studies using observed peak discharges upto 2013/14

Structure No.	Existing Flood Protection Structures (Kabul, Shah Aam & Naguman River)	Inventory Code
1	Retaining Wall at D/S Michni Bridge (Left Side)	KP76
2	Retaining Wall at D/S Michni Bridge (Right Side)	KP77
3	Retaining Wall at Tapo Korona	KP154
4	Retaining Wall at Bella Mohandas	KP1
5	Retaining Wall at Zareef Korona	KP4
5	Spur # 1 at Zareef Korona	KP5
5	Spur # 2 at Zareef Korona	KP6
5	Spur # 3 at Zareef Korona	KP7
5	Spur # 4 at Zareef Korona	KP8
5	Spur # 5 at Zareef Korona	KP9
6	Retaining Wall at Boday Korona	KP2
6	Spur at Angoor Korona	KP3
7	Retaining Wall at Dalazak	KP24
7	Spur # 1 at Dalazak	KP25
7	Spur # 2 at Dalazak	KP26
7	Spur # 3 at Dalazak	KP27
8	Retaining Wall at Jahangir Pura	KP28
8	Spur at Jahangir Pura	KP29
9	Retaining Wall at Pari Bala	KP31
9	Retaining Wall at Dheri Kality (agric land)	KP155
9	Retaining Wall at Dheri Kality	KP156
10	Stud # 1 at Dheri Kality	KP157
10	Stud # 2 at Dheri Kality	KP158
10	Stud # 3 at Dheri Kality	KP159
10	Stud # 4 at Dheri Kality	KP160
10	Stud # 5 at Dheri Kality	KP161
10	Stud # 6 at Dheri Kality	KP162
11	Retaining Wall & Spur at Bachayano Kality	KP163, KP166
12	Retaining Wall at Sher Kality	KP164
13	Stud at Sher Kality	KP165
14	Retaining Wall at Chaghar Matti	KP167
15	Retaining Wall at Mian Jee Baba	KP168
16	Retaining Wall at Takhat Abad (Right Side)	KP169
17	Retaining Wall at Takhat Abad (Left Side)	KP80
18	Retaining Wall at Nilavi	KP80
19	Retaining Wall at Sarkhana	KP86
20	Retaining Wall at Dang Lakhtai	KP81
21	Retaining Wall at Niami Alamabad	KP79
22	Spur # 1 at Dang Lakhtai	KP82
23	Spur # 2 at Dang Lakhtai	KP83
24	Spur # 3 at Dang Lakhtai	KP84
25	Spur # 4 at Dang Lakhtai	KP85
26	Retaining Wall at Khawajai	KP87
27	Spur at Khawajai	KP88, KP89
28	Retaining Wall at Darr-us-salam (Gidar Kality)	KP90
29	Spur at Darr-us-salam (Gidar Kality)	KP91
29	Retaining Wall at Miskeen Abad	KP92
30	Retaining Wall at Chandan Garhi	KP94
31	Retaining Wall at Jati Bala (Both Side)	KP93
32	Retaining Wall at Lajbar Qilla	KP96
33	Spur # 1 at Lajbar Qilla	KP97
33	Spur # 2 at Lajbar Qilla	KP98
33	Spur # 3 at Lajbar Qilla	KP99
33	Spur # 4 at Lajbar Qilla	KP100
35	Retaining Wall at Charsadda Road Bridge	KP170
36	Retaining Wall at Khan Kality	KP171
37	Retaining Wall at Bela Neko Khan	KP172
38	Retaining Wall at Islamabad	KP173
39	Retaining Wall at Mian Gujar	KP174
40	Bridge Structure near Mian Gujar	KP174
41	Retaining Wall at Karral	KP101
42	Retaining Wall at Miskeen Abad	KP92
43	Retaining Wall at Mian Gujar	KP102
44	Retaining Wall at Momin Garhi	KP49
45	Retaining Wall at Noorani	KP10
46	Spurs at Noorani	KP11
47	Retaining Wall at Banda Tamash	KP33
48	Spur at Banda Bala	KP35
48	Retaining Wall at Banda Bala	KP34
49	Retaining Wall at Mian Kality (Rashakai)	KP12
49	Retaining Wall at Dalazak	KP13
50	Spur # 1 at Dalazak	KP14
50	Spur # 2 at Dalazak	KP15
50	Spur # 3 at Dalazak	KP16
51	Retaining Wall at Bela Baramad Khel	KP31
51	Spur at Bela Baramad Khel	KP32
52	Retaining Wall at Mamu Kharki	KP36
52	Spur at Mamu Kharki	KP37
53	Retaining Wall at Mamu Banda	KP17
54	Spur at Mamu Banda	KP18
54	Retaining Wall at Haji Zai	KP19
54	Spur at Haji Zai	KP20
55	Retaining Wall at Tarkha	KP21
56	Spur at Tarkha	KP22
57	Retaining Wall at Bunyadi	KP90
57	Spur at Bunyadi	KP40
58	Retaining Wall at Garhi Muhkam Shah	KP45
58	Spur at Garhi Muhkam Shah	KP46
59	Retaining Wall and Spur at Garhi Chiragh Shah	KP23
60	Retaining Wall at Jumat	KP38
61	Retaining Wall at Gul Abad (Veno Ghari)	KP48
62	Retaining Wall at Agra	KP43
62	Retaining Wall at Camp Korona	KP50
63	Spur # 1 at Camp Korona	KP51
63	Spur # 2 at Camp Korona	KP52
63	Spur # 3 at Camp Korona	KP53
63	Spur # 4 at Camp Korona	KP54
63	Spur # 5 at Camp Korona	KP55

Structure No.	Existing Flood Protection Structures (Jindai Nullah)	Inventory Code
JD-1	Flood Protection Bund for Protection of Shabara village	KP624

Structure No.	Existing Flood Protection Structures (Bara River)	Inventory Code
B-2	R/S Retaining Wall at Akbar Pura	KP187
B-3	R/S Retaining Wall at Tarkha	KP185



Scale 1: 75,000

0 0.5 1 2 3 Kilometers

**LEGEND**

- National Highway
- Metal Road
- Un-metal Road
- Track
- Railway Line
- Canal
- Branch
- Distributary
- Minor
- Nallah
- District Boundary
- Provincial Boundary
- International Boundary
- Barren Area
- Bund / Spur
- Cultivated Area
- Flood Plain
- Grass
- Graveyard
- Hill
- Main/Link Canal, Escape, Spillway
- Motorway
- Mud
- Nallah (Perennial)
- Nallah (Non Perennial)
- Orchard
- Planned Urban Area
- Range Forest
- River
- Sand Dunes
- Town/Village/Settlement
- Water Body

DEVELOPMENT OF NATIONAL FLOOD PROTECTION PLAN-IV (NFPP-IV) AND RELATED STUDIES TO ENHANCE THE CAPACITY OF FEDERAL FLOOD COMMISSION-FFC

**LANDUSE MAP KABLUR RIVER**

GOVERNMENT OF PAKISTAN  
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 PROJECT MANAGEMENT & POLICY IMPLEMENTATION UNIT (PMPIU)  
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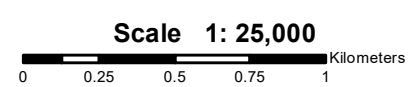
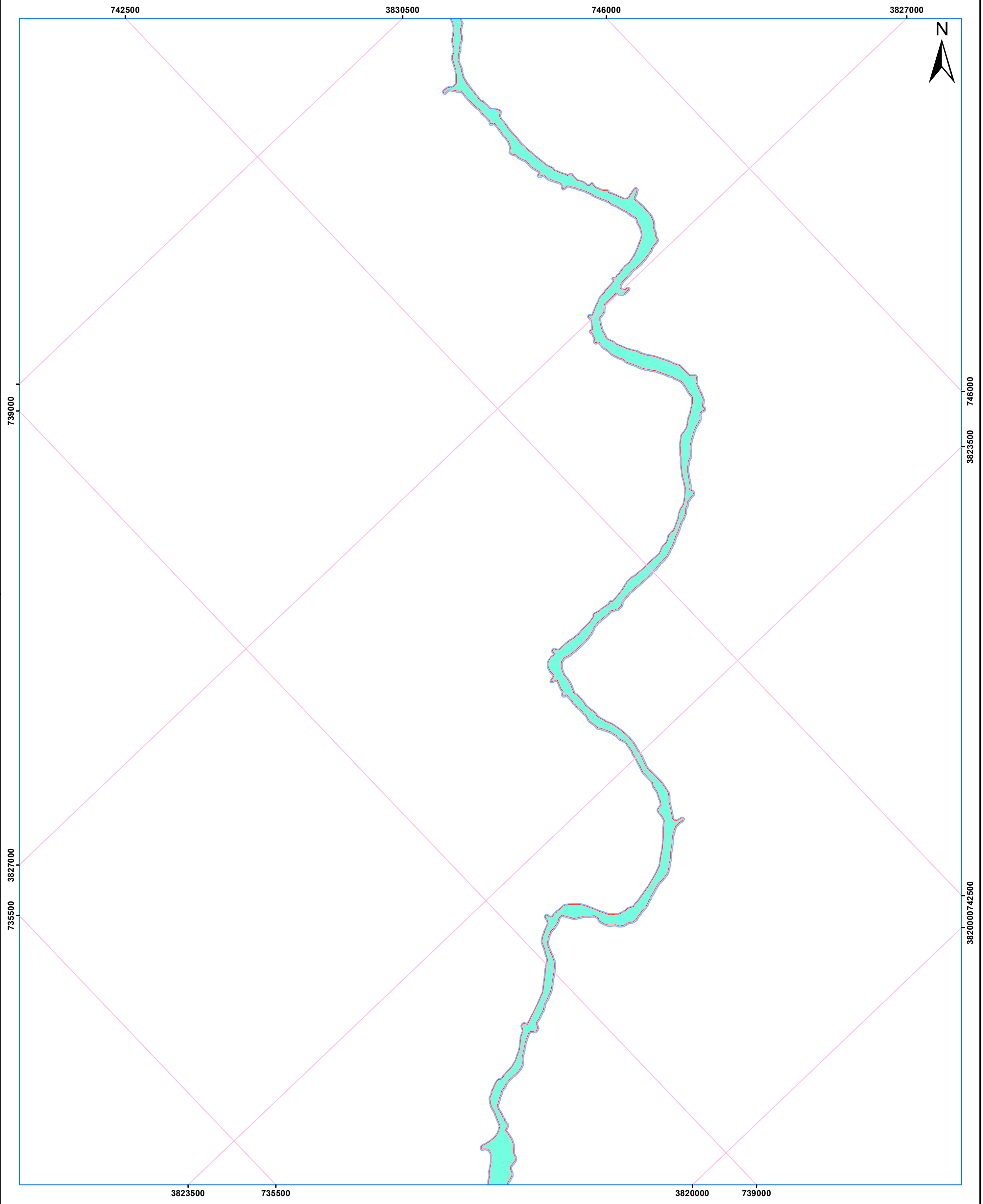
Consultants:  
**NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED**  
 1-C, Block-N, Model Town Extension, Lahore - Pakistan.

in association with  
**Deltares DELTARES, THE NETHERLANDS**

Source of Information:  
 1. Topographic sheets of Survey of Pakistan  
 2. Freely available satellite imagery  
 3. GEEYE Stereo Pair Imagery (0.5 m spatial Resolution)  
 4. Survey data of Flood protection embankments and structures

Coordinate System  
 PROJECTION: Lambert Conformal Conic (LMPAK-I),  
 DATUM: WGS84  
 Grid Reference is in meters

Date: 29 Jan, 2016 By M.Waseem Saeed

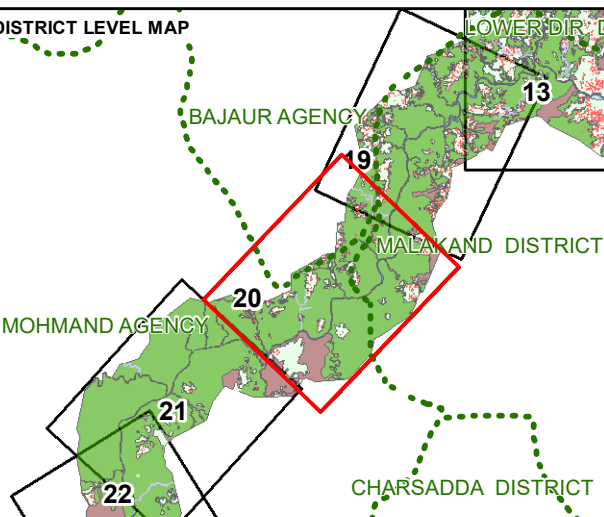
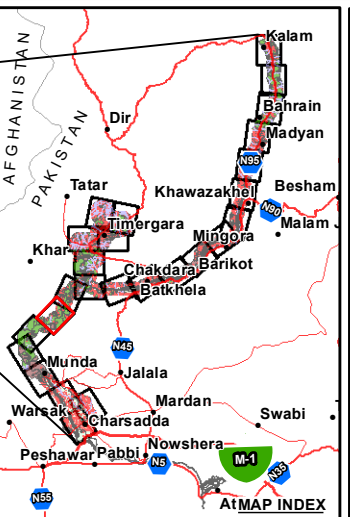
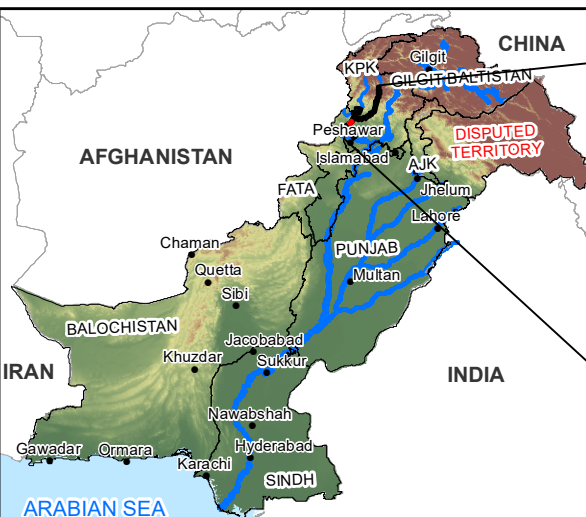
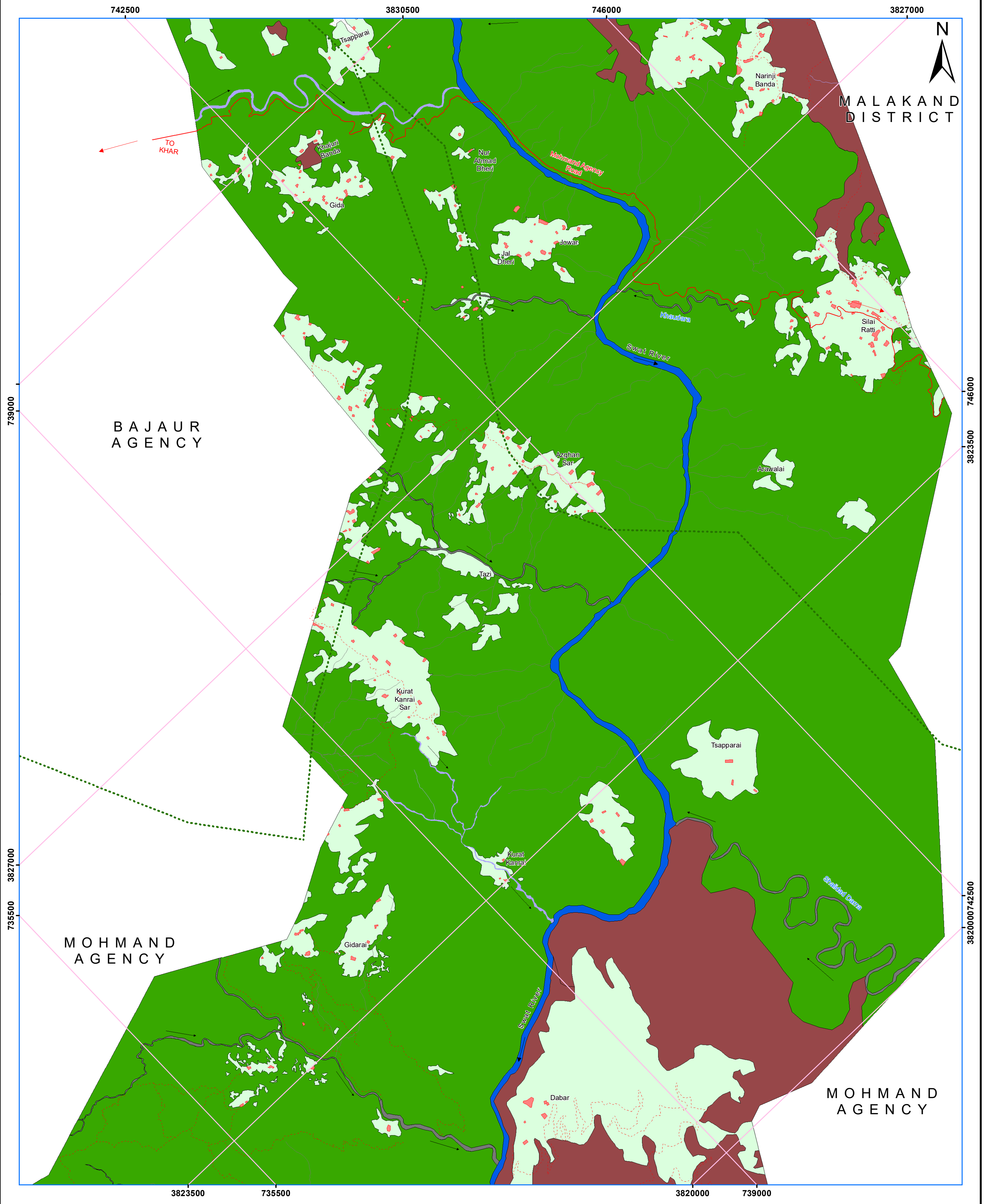


**LEGEND**

**(Flood Risk Zones)**

- High Risk Zone (Inundation Extent corresponding to discharge upto 30,000 cusecs in Chakdara - Confluence of Kabul & Swat Rivers)
- Medium Risk Zone (Inundation Extent corresponding to discharge from 30,000 to 39,000 cusecs in Chakdara - Confluence of Kabul & Swat Rivers)
- Low Risk Zone (Inundation Extent corresponding to discharge from 39,000 to 42,000 cusecs in Chakdara - Confluence of Kabul & Swat Rivers)

Note: All flood extents are based on breachless conditions



**Scale 1: 25,000**

0 0.25 0.5 0.75 1 Kilometers

**LEGEND**

	National Highway		Barren Area
	Metalled Road		Bund / Spur
	Un-metalled Road		Cultivated Area
	Track		Flood Plain
	Railway Line		Grass
	Canal		Gravelyard
	Branch		Hill
	Drain		Main/Link Canal
	Distributary		Escape, Spillway
	Minor		Motorway
	Nallah		Mud
	Wah		Nallah (Perennial)
	District Boundary		Nallah (Non Perennial)
	Provincial Boundary		Orchard
	International Boundary		Planned Urban Area
			Range Forest
			River
			Sand Dunes
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			Water Body

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**LANDUSE MAP SWAT RIVER**

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**MINISTRY OF WATER AND POWER**  
**PROJECT MANAGEMENT & POLICY IMPLEMENTATION UNIT (PMPIU)**  
 WATER SECTOR CAPACITY BUILDING AND ADVISORY SERVICES PROJECT (WCAP)

**Consultants:**  
**NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED**  
 1-C, Block-N, Model Town Extension, Lahore - Pakistan.

*in association with*

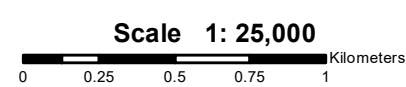
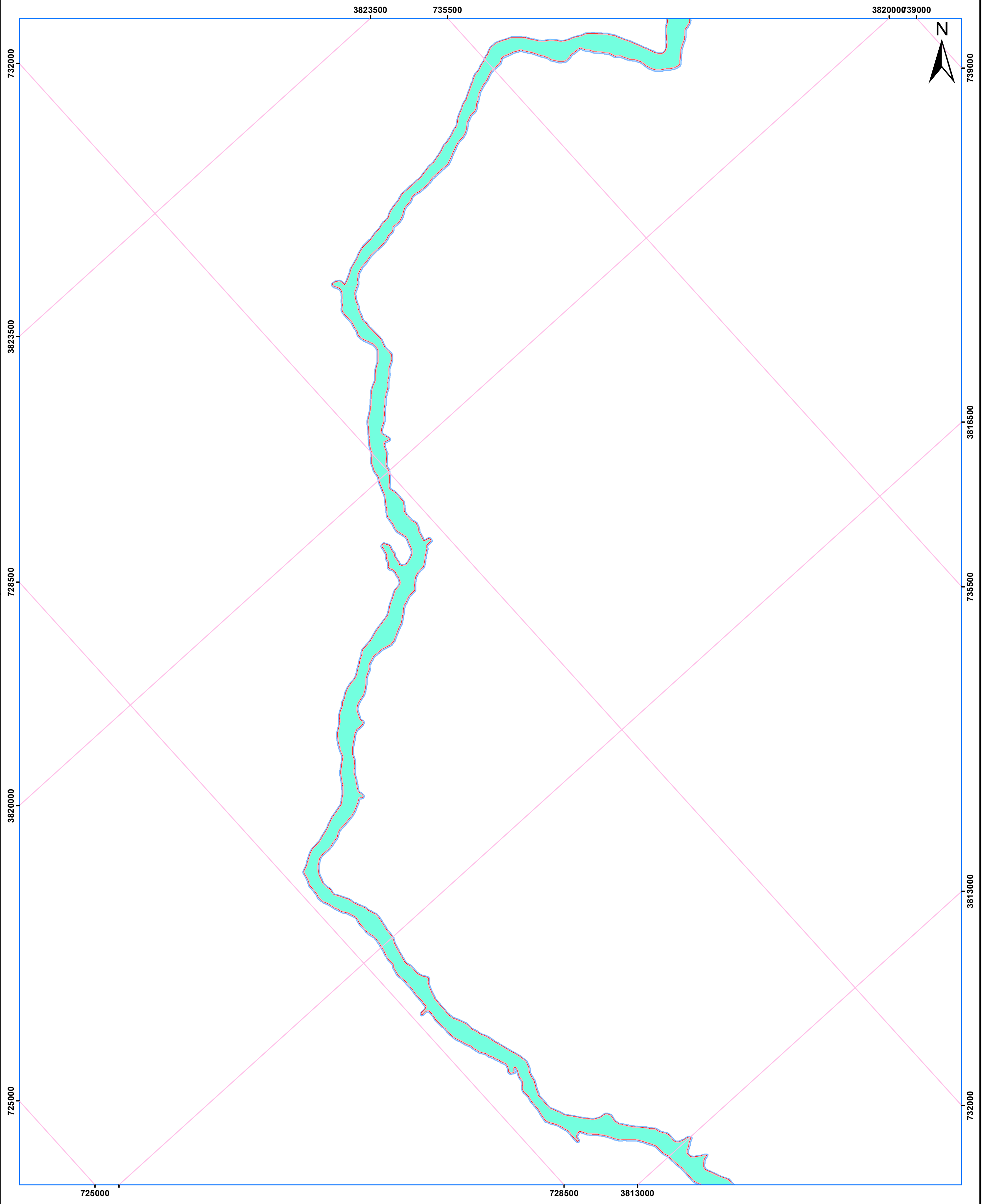
**Deltares DELTARES, THE NETHERLANDS**

*Enabling Delta Life*

**Source of Information:**  
 1. Topographic sheets of Survey of Pakistan  
 2. Freely available satellite imagery  
 3. Shuttle Radar Topographic Mission Data (Resolution:90 m)  
 4. Survey data of Flood protection embankments and structures

**Coordinate System**  
**PROJECTION:** Lambert Conformal Conic (LMPAK-I),  
**DATUM:** WGS84  
 Grid Reference is in meters

**Date:** 29 Jan, 2016 By Asif Ali

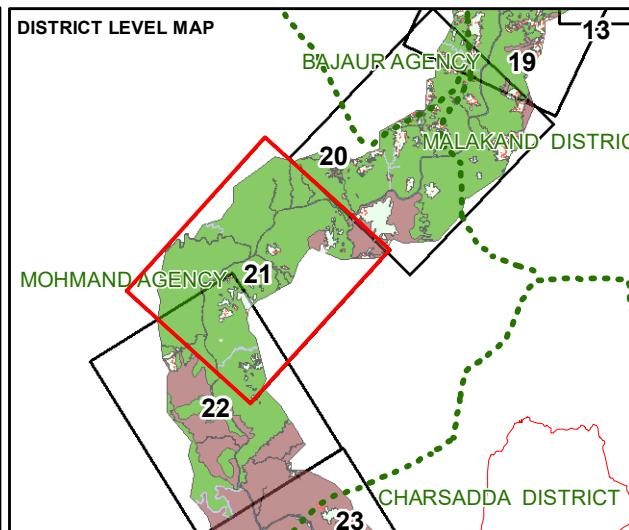
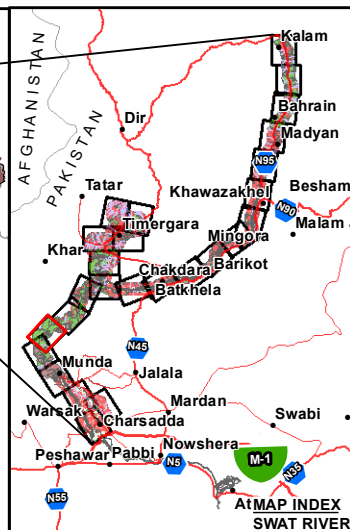
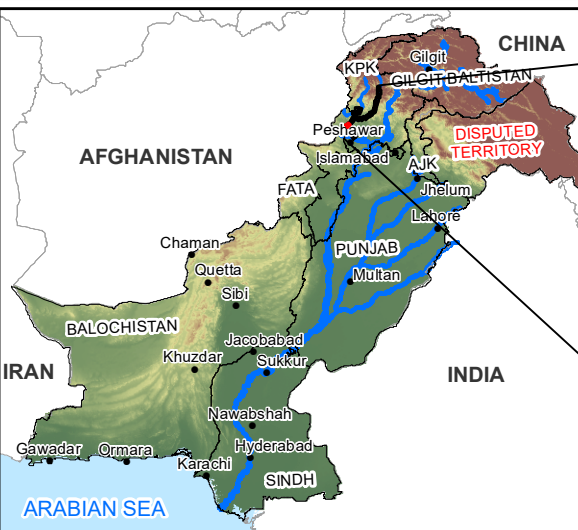
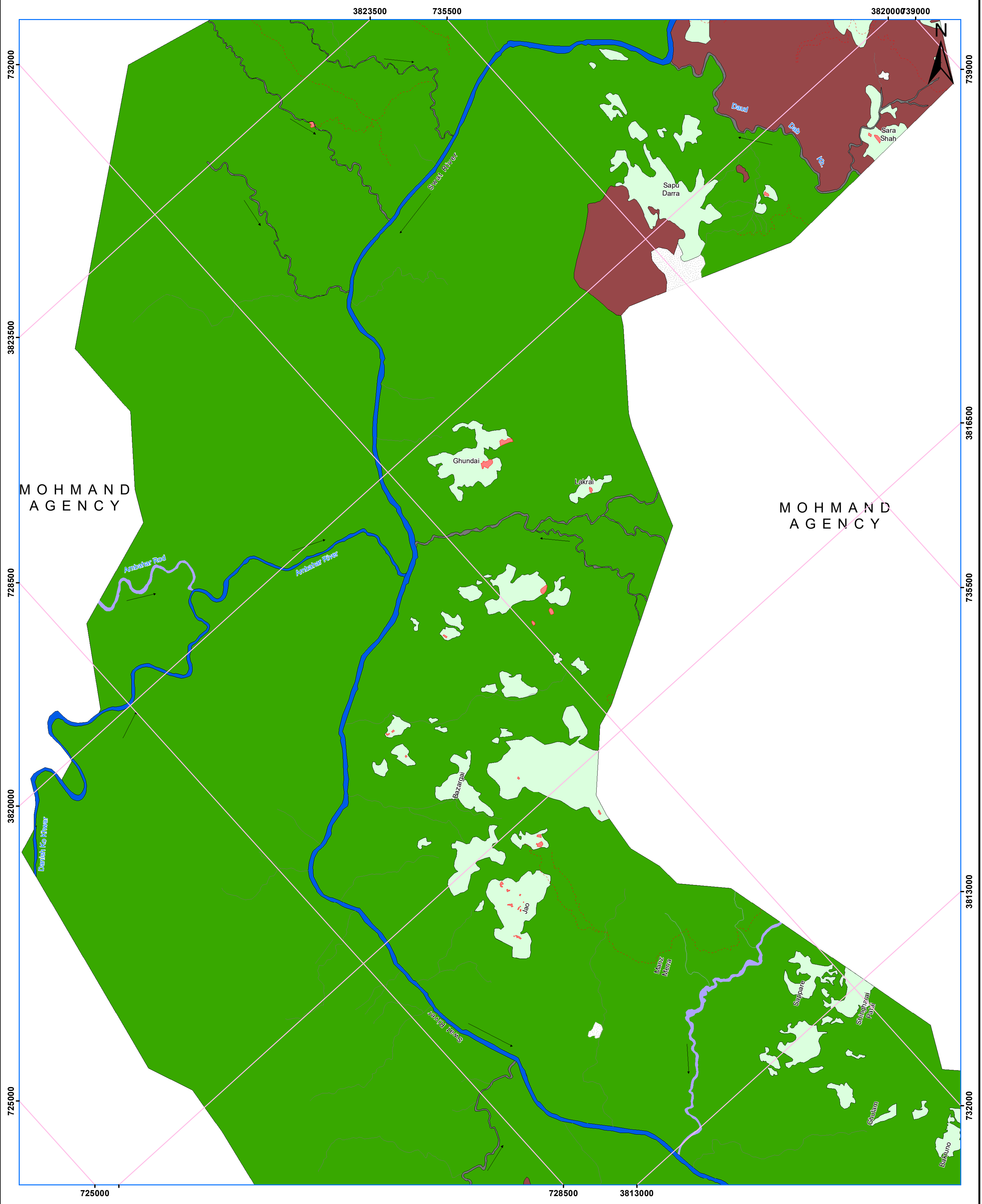


**LEGEND**

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- Medium Risk Zone (Inundation Extent corresponding to discharge from 30,000 to 39,000 cusecs in Chakdara - Confluence of Kabul & Swat Rivers)
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Note: All flood extents are based on breachless conditions



**Scale 1: 25,000**

0 0.25 0.5 0.75 1 Kilometers

**LEGEND**

	National Highway		Barren Area
	Metalled Road		Bund / Spur
	Un-metalled Road		Cultivated Area
	Track		Flood Plain
	Railway Line		Grass
	Canal		Graveyard
	Branch		Hill
	Drain		Main/Link Canal, Escape, Spillway
	Distributary		Motorway
	Minor		Mud
	Nallah		Nallah (Perennial)
	Wah		Nallah (Non Perennial)
	District Boundary		Orchard
	Provincial Boundary		Planned Urban Area
	International Boundary		Range Forest
			River
			Sand Dunes
			Town/Village/Settlement
			Water Body

DEVELOPMENT OF NATIONAL FLOOD PROTECTION PLAN-IV (NFPP-IV) AND RELATED STUDIES TO ENHANCE THE CAPACITY OF FEDERAL FLOOD COMMISSION-FFC

**LANDUSE MAP SWAT RIVER**

GOVERNMENT OF PAKISTAN  
 MINISTRY OF WATER AND POWER  
 PROJECT MANAGEMENT & POLICY IMPLEMENTATION UNIT (PMPIU)  
 WATER SECTOR CAPACITY BUILDING AND ADVISORY SERVICES PROJECT (WCAP)

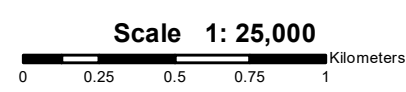
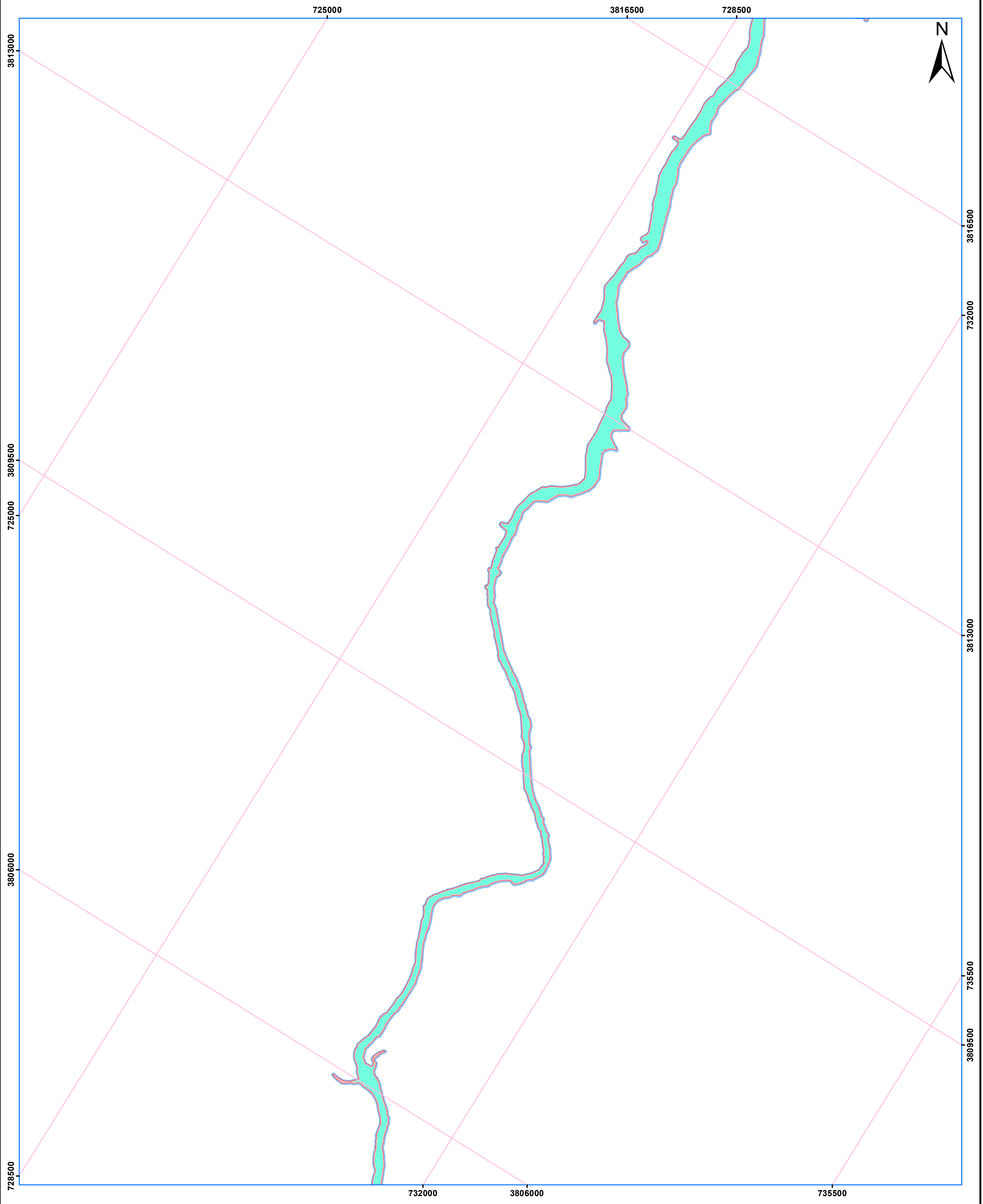
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**Source of Information:**  
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 3. Shuttle Radar Topographic Mission Data (Resolution:90 m)  
 4. Survey data of Flood protection embankments and structures




**Coordinate System**  
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 DATUM: WGS84  
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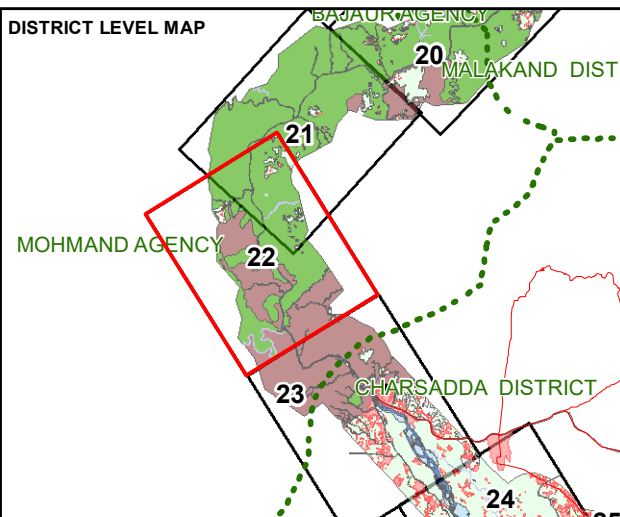
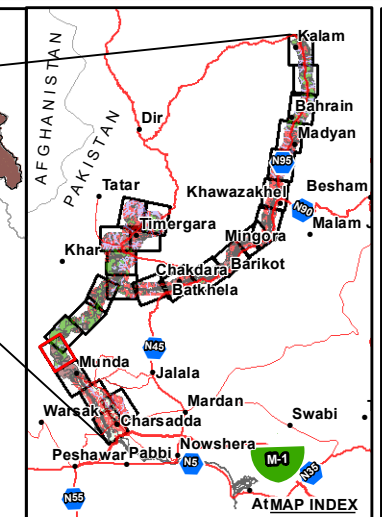
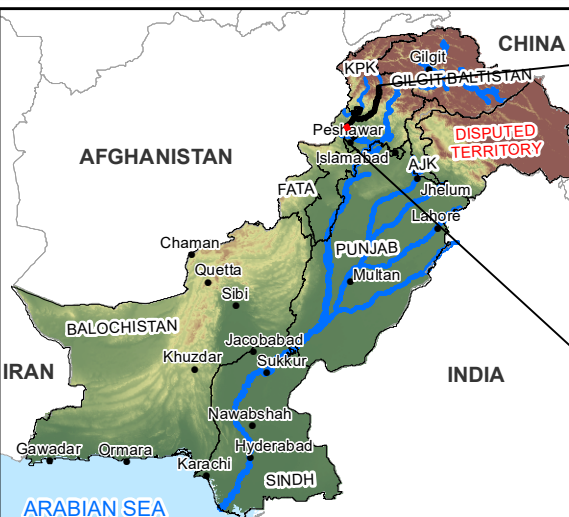
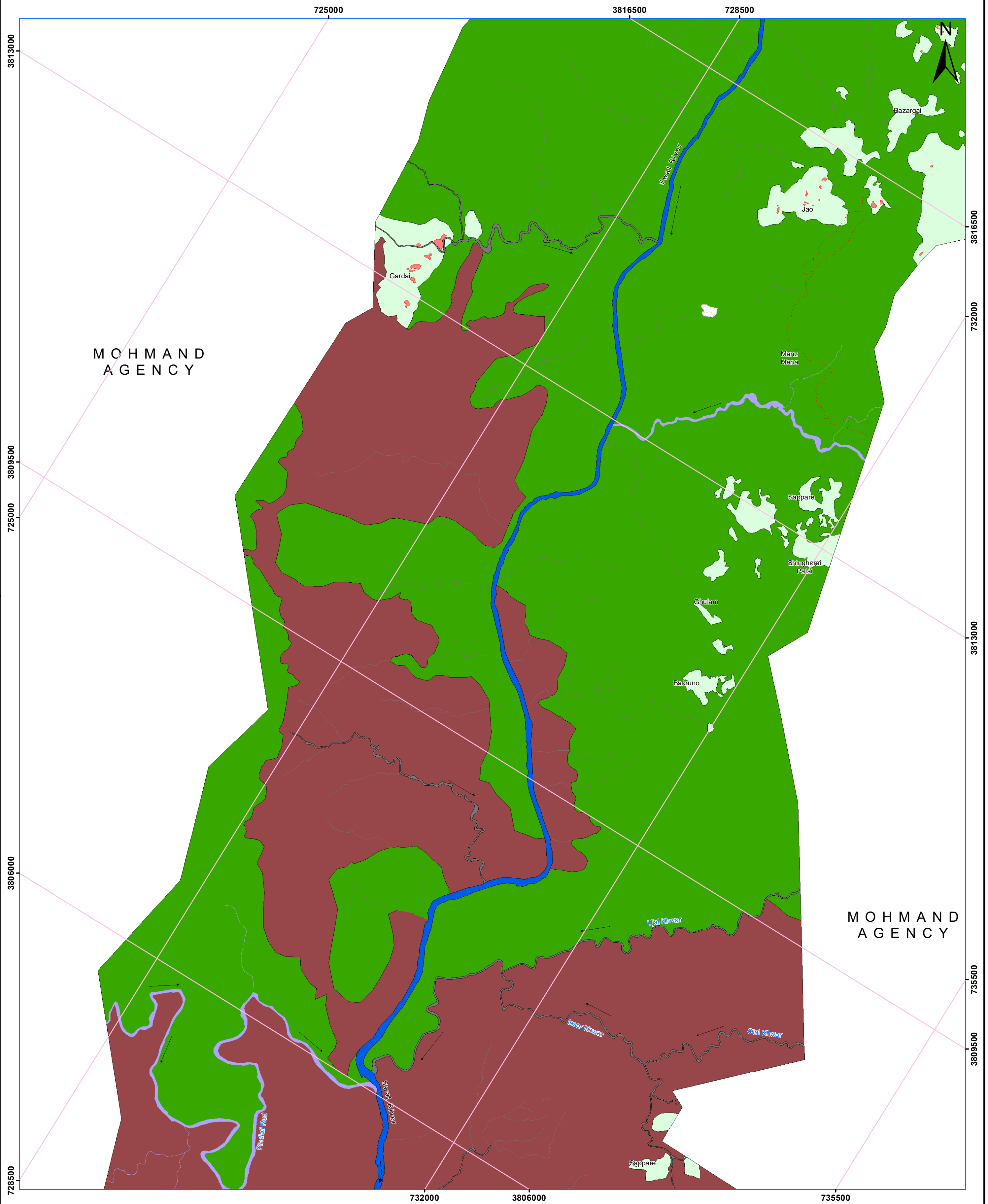


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0 0.25 0.5 0.75 1 Kilometers

**LEGEND**

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**LANDUSE MAP SWAT RIVER**

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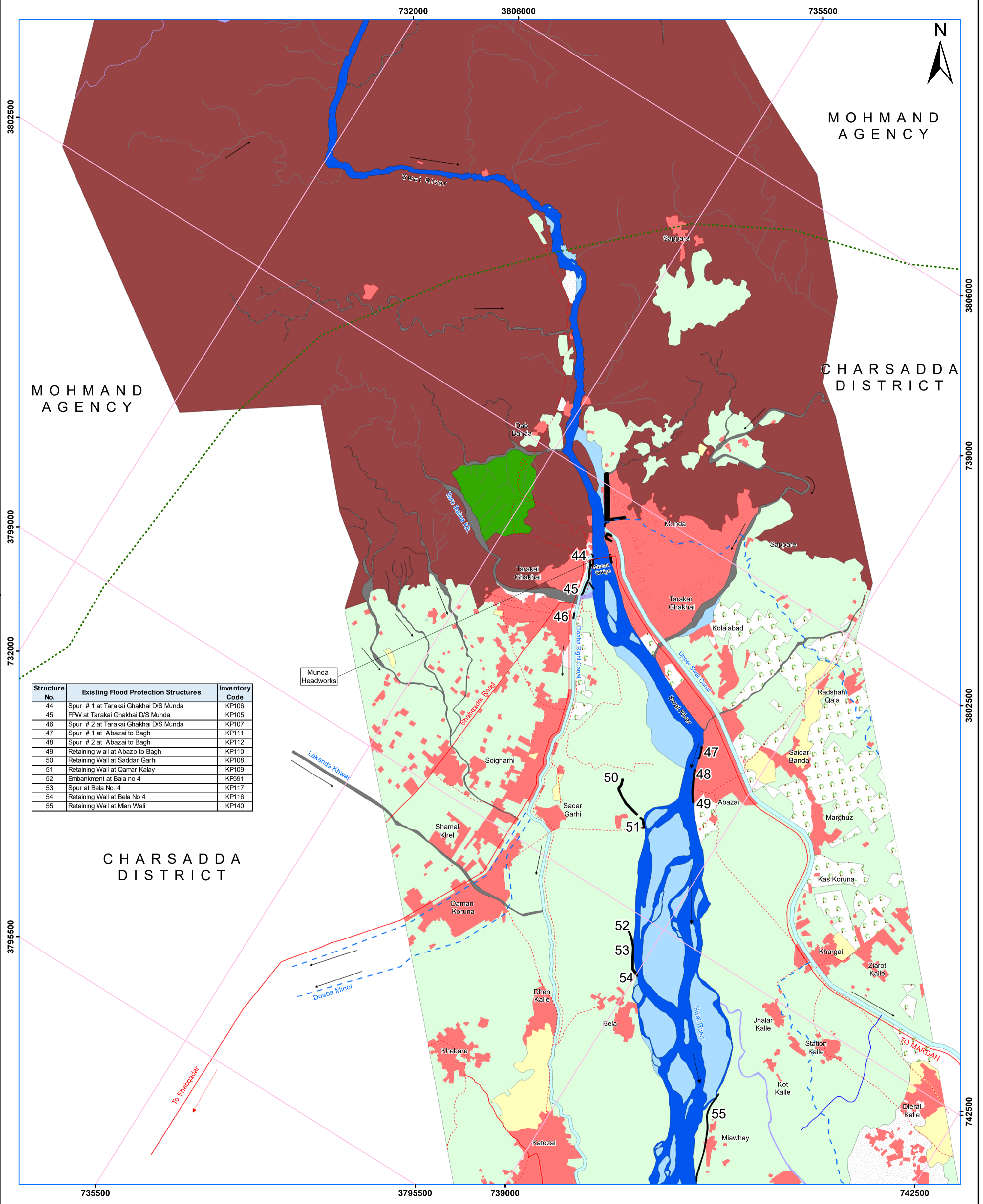
in association with  
**Deltares DELTARES, THE NETHERLANDS**

**Source of Information:**  
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 2. Freely available satellite imagery  
 3. Shuttle Radar Topographic Mission Data (Resolution:90 m)  
 4. Survey data of Flood protection embankments and structures

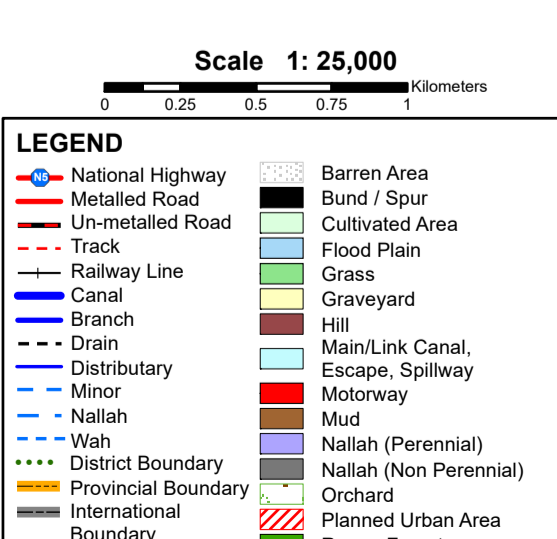
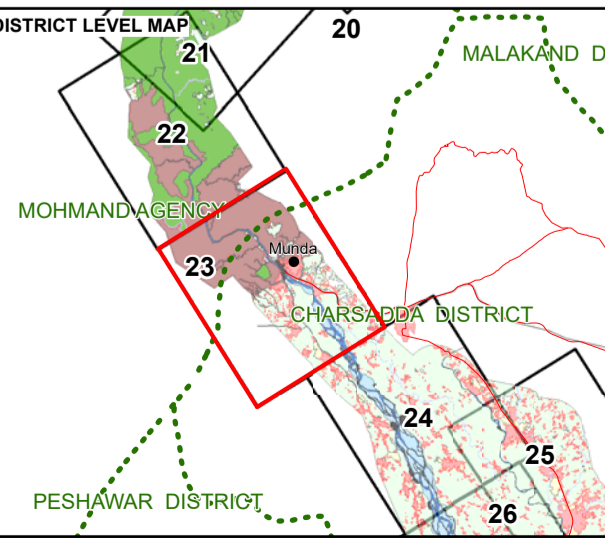
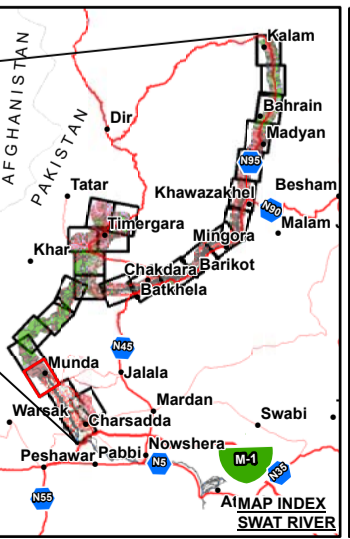
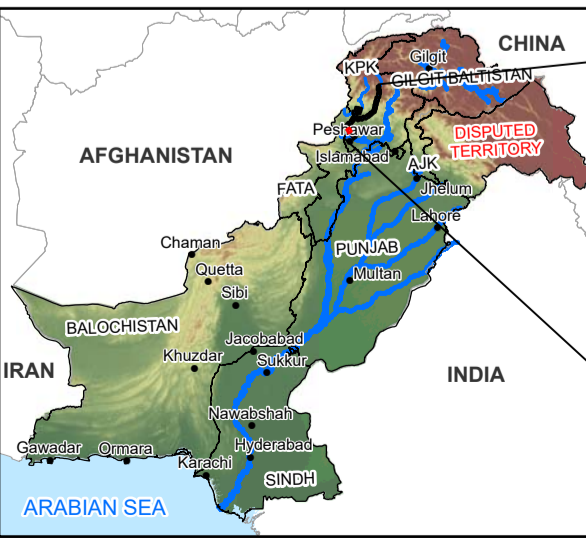
**Coordinate System**  
**PROJECTION:** Lambert Conformal Conic (LMPAK-I),  
**DATUM:** WGS84  
 Grid Reference is in meters

**Date:** 29 Jan, 2016 By Asif Ali





Structure No.	Existing Flood Protection Structures	Inventory Code
44	Spur # 1 at Tarakai Ghakhai D/S Munda	KP106
45	FPW at Tarakai Ghakhai D/S Munda	KP105
46	Spur # 2 at Tarakai Ghakhai D/S Munda	KP107
47	Spur # 1 at Abazai to Bagh	KP111
48	Spur # 2 at Abazai to Bagh	KP112
49	Retaining wall at Abazo to Bagh	KP110
50	Retaining Wall at Saddar Garhi	KP108
51	Retaining Wall at Qamar Kalay	KP109
52	Embankment at Bala no 4	KP591
53	Spur at Bela No. 4	KP117
54	Retaining Wall at Bela No 4	KP116
55	Retaining Wall at Man Wali	KP140



DEVELOPMENT OF NATIONAL FLOOD PROTECTION PLAN-IV (NFPP-IV) AND RELATED STUDIES TO ENHANCE THE CAPACITY OF FEDERAL FLOOD COMMISSION-FFC

**LAND USE MAP SWAT RIVER**

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**NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED**  
 1-C, Block-N, Model Town Extension, Lahore - Pakistan.

in association with  
**Deltares DELTARES, THE NETHERLANDS**

Source of Information:  
 1. Topographic sheets of Survey of Pakistan  
 2. Freely available satellite imagery  
 3. Shuttle Radar Topographic Mission Data (Resolution:90 m)  
 4. Survey data of Flood protection embankments and structures

Coordinate System  
 PROJECTION: Lambert Conformal Conic (LMPAK-I),  
 DATUM: WGS84  
 Grid Reference is in meters

Date: 29 Jan, 2016 By Asif Ali

# Inundation Depth of Settlements in District Mohmand Agency

## Swat River - Sheet No. 23

Sr. No.	Settlement Name	Zone*	District	Inundation Depth at Discharge of 30,194 Cusec below Chakdara		Inundation Depth at Discharge of 38,846 Cusec below Chakdara		Inundation Depth at Discharge of 42,378 Cusec below Chakdara	
				Min (m)	Max (m)	Min (m)	Max (m)	Min (m)	Max (m)
1	2 settlements nearby Dab Banda	H,M,L	Mohmand Agency	0.02	3.08	0.33	3.78	1.37	4.30
2	1 settlement nearby Sappare	H,M,L	Mohmand Agency	0.07	3.34	0.46	4.07	0.69	4.48

## Kabul River - Sheet No. 1

Sr. No.	Settlement Name	Zone*	District	Inundation Depth at Discharge of 62,083 Cusec below Warsak Dam		Inundation Depth at Discharge of 110,323 Cusec below Warsak Dam		Inundation Depth at Discharge of 127,627 Cusec below Warsak Dam	
				Min (m)	Max (m)	Min (m)	Max (m)	Min (m)	Max (m)
1	3 Settlements nesarby Dab Kor	H,M,L	Mohmand Agency	0.22	2.65	0.71	3.26	1.09	3.43

**Zone\***

H= High Risk Inundation Zone corresponds to 5 yr return period flood

M=Medium Risk Inundation Zone corresponds to 15 yr return period flood

L= Low Risk Inundation Zone corresponds to 50 yr return period flood