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

BAJAUR AGENCY

(FEDERALLY ADMINISTERED TRIBAL AREAS)

JUNE 2015

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED
1-C, BLOCK-N, MODEL TOWN EXTENSION,
LAHORE - PAKISTAN

in association with

DELTARES
THE NETHERLANDS
P.O. BOX 177, 2600 MH DELFT, ROTTERDAMSEWEG 185, 2629 HD DELFT, THE NETHERLANDS

BAJAUR AGENCY

3050000 3100000

1200000 1150000

AFGHANISTAN

CHITRAL DISTRICT

UPPER DIR DISTRICT

LOWER DIR DISTRICT

BAJAUR AGENCY

MOHMAND AGENCY

KHYBER AGENCY

MALAKAND PA DISTRICT

CHARSADDA DISTRICT

MARDAN DISTRICT

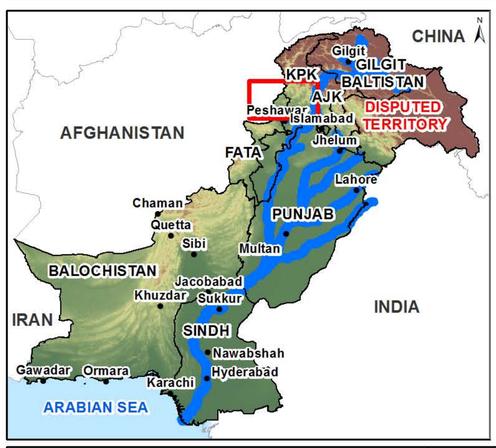
Dir
Bibyawor
Barawal Bandi
Kass Bacha Khail
Wari
Drangal
Kumbar Maiden
Maskeni
Ajabay
Gumbir
Qandharey
Toormang
Khall
Baroon
Rabaat
Koto
Toor Camp
Barkhaibzo
Tandai
Mian Kili
Munda Kala
Timergara
Sya Kalay
Talal
Damadola
Kuz Kholoz
Khazana
Kotki
Kotka
Kodigram
Ghundai
Khar
Mirwas
Ouch
Loe Jawar
Khairabad
Shinkai
Gulabad
Liaghunai
Paingale
Markhanai
Bato Mena
Warsak
Mori Darra
Jawar
Kamangara
Loe Shal
Qalangi
Batkhela
Khanpalaw
Dheri
Kuz Tasagi
Ghanam Shah
Garibal
Dab
Bakhmal Shah
Kharkanai
Tsapprai
Hangu
Pir Khel
Aipi Kor
Mangarai
Shaurai
Ptang Darra
Banda
Oghaz
Turu
Sangar
Darah
Baidmanai
Yara Khel
Sara Mena
Bari Mena
Wartair
Kharkai
Chinari
Shan Shah
Tora Khuwa
Warsak
Mamazo
Izzatkhan Valley
Utmanzai
Kot
Meena
Baizo Kharki
Drab Shah Dag
Bazargar
Tortam
Sakhakot
Banat Khan
Lakhar Khel
Ghaidand
Koda Khel
Lakai
Gardai
Khazana
Rang Mena
Zoomandi
Maizar
Bucha
Lund Khwar
Nahakki
Sekandar Khail, Pandyali
Mahaban
Taratigga
Mia Mandai
Sami Khel
Taru Khel
Durba Khel
Wazir Fort
Marghan
Mandai Bazar
Pir Sado
Saligo
Ghalanai
Qaldara
Abazai
Ziarat Kalay
Tangi
Amirabad Kalay
Takht Bhai
Halki
Tango Klli
Matta Mughul Khel
Gardo
Sareekh
Umarzai
Khanmahi
Gorgoray

Swat River - Sheet 18
Swat River - Sheet 14
Swat River - Sheet 13
Swat River - Sheet 19
Swat River - Sheet 20

PANJKORA RIVER
SWAT RIVER

MUNDA HEAD WORKS
AMANDARA HEADWORK

N



0 1.25 2.5 5 7.5 10 12.5 Kilometers

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

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

Date: June 30, 2015

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

BAJAUR AGENCY

Client :
FEDERAL FLOOD COMMISSION
Ministry of Water & Power

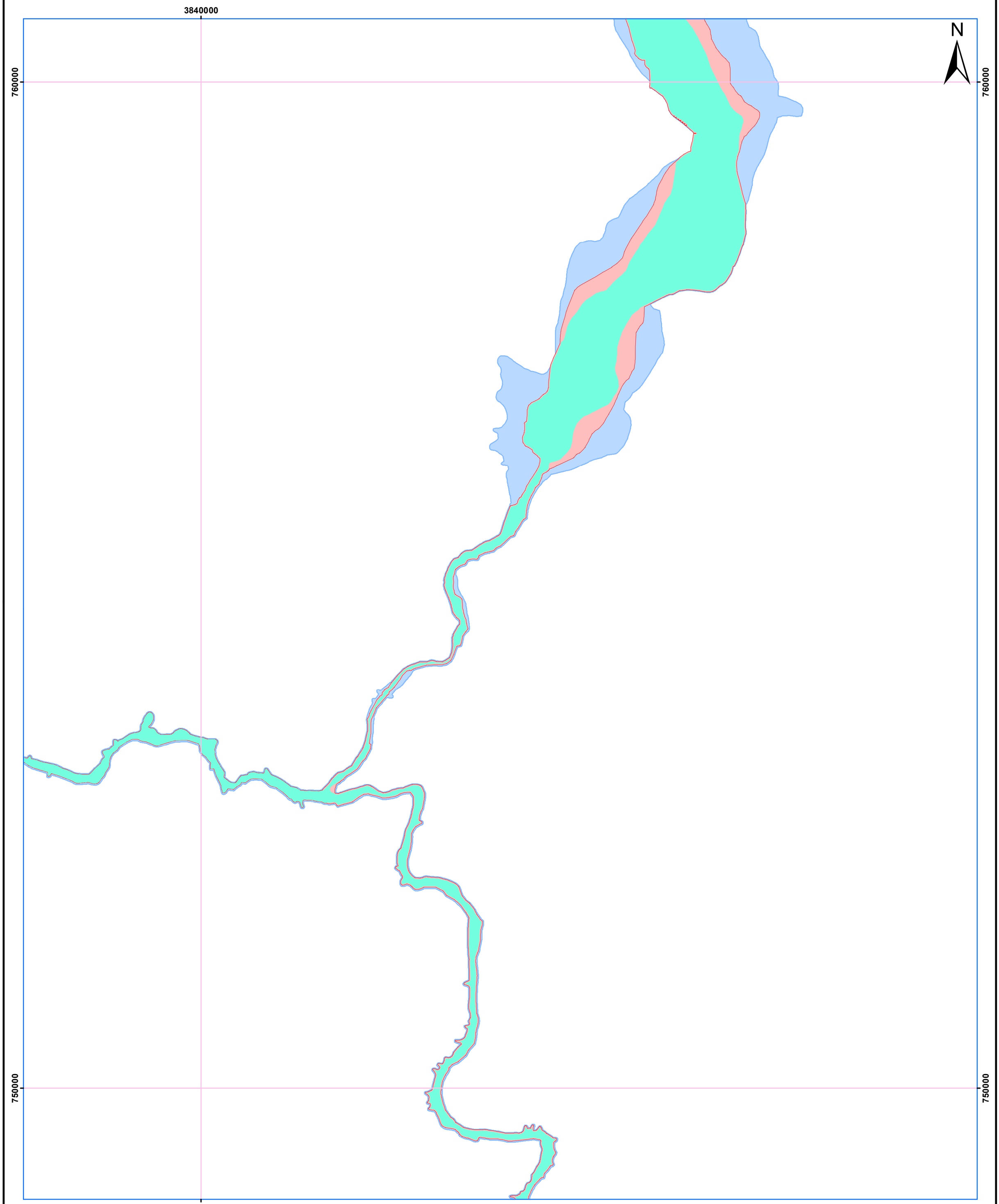
Consultants:
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED
1-C , Block-N, Model Town Extension,
Lahore - Pakistan.

in association with

DELTARES,THE NETHERLANDS

Rev.	Date:	Description	Ckd.	Ver.

BAJAUR AGENCY, MALAKAND AND LOWER DIR DISTRICTS



Scale 1: 25,000

0 0.25 0.5 0.75 1 Kilometers

LEGEND

- High Risk Zone (Inundation Extent Corresponding to discharge of 30,194 cusecs below Chakdara)
- Medium Risk Zone (Inundation Extent Corresponding to discharge of 38,846 cusecs below Chakdara)
- Low Risk Zone (Inundation Extent Corresponding to discharge of 42,378 cusecs below Chakdara)

Note: All flood extents are based on breachless conditions

3840000

760000

750000

N

LOWER DIR DISTRICT

MALAKAND DISTRICT

Sugiar
Kamala
Swat River
Totakan
43
Shanga
Ghundi
Shagai
Chakdara Road
Sar Hasar
Pauda China
Sookani
Kalangai
Kuz Tangi
Shikai kandao
Jalan Put
Bridge
Nigram
Qala
Shamsa Banda
Sor Mor
Inzar
Mabki Kalle
Gidar Kalle
Pingal
Banou Khwar
Mitha
Basak
Panjkora River
Sioh
Sharbatai
Siah
Danaukal
Ziarat
Marchai Kabar
Marchai
Artanawa
Mundai
Barota Sar
Surkawai Banda
Mishta
Banda
Tahu

Structure No.	Existing Flood Protection Structures	Inventory Code
43	Flood Protection w ork from Julagram to Totakan along Sw at River	KP439

Scale 1: 25,000

0 0.25 0.5 0.75 1 Kilometers

LEGEND

- National Highway
- Metalled Road
- Un-metalled Road
- Track
- Railway Line
- Canal
- Branch
- Drain
- Distributary
- Minor
- Nallah
- Wah
- 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

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: May 29, 2015

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

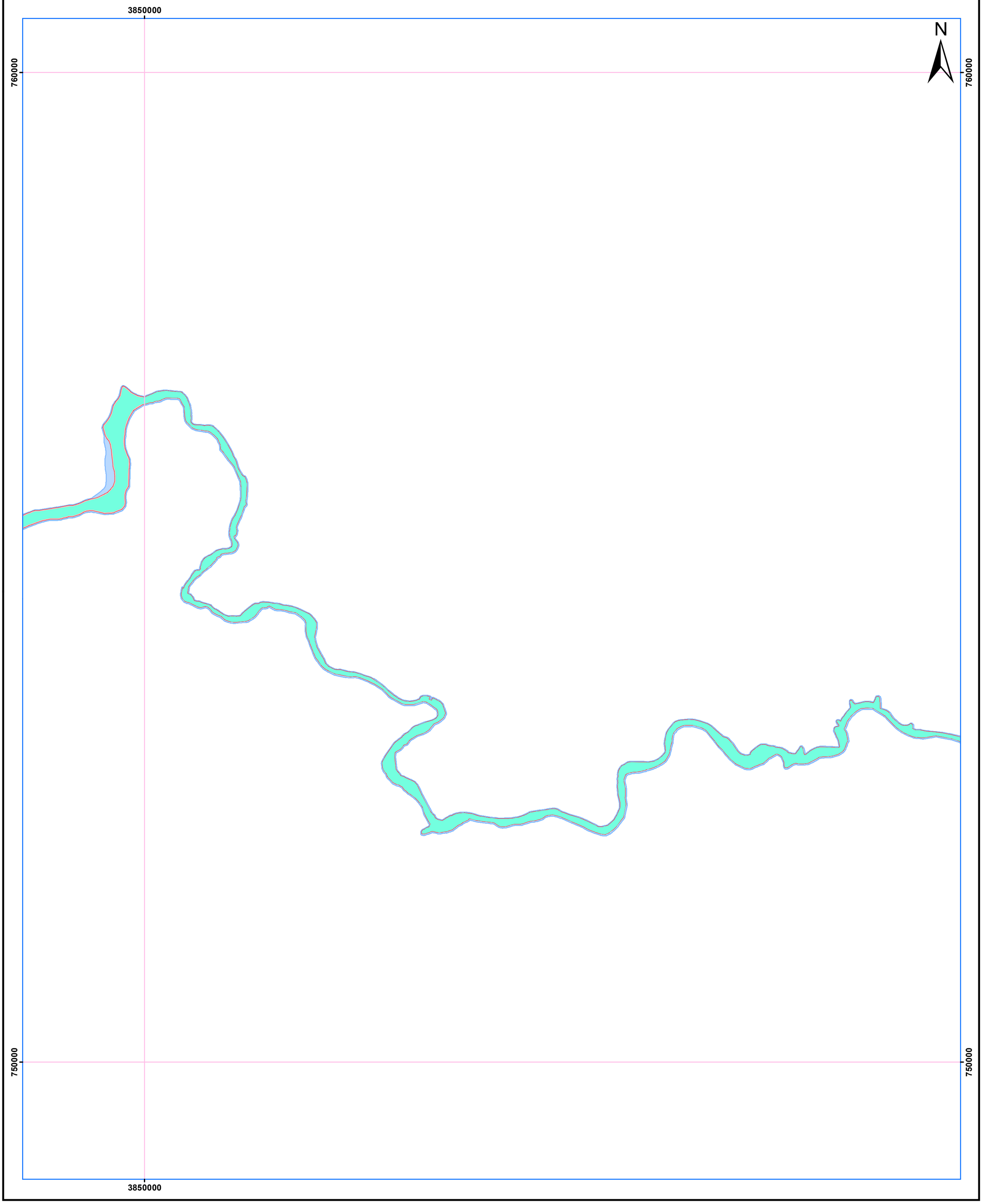
Client :
FEDERAL FLOOD COMMISSION
Ministry of Water & Power

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

in association with

DELTARES,THE NETHERLANDS

Rev.	Date:	Description	Ckd.	Ver.



Scale 1: 25,000

0 0.25 0.5 0.75 1 Kilometers

LEGEND

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- Medium Risk Zone (Inundation Extent Corresponding to discharge of 38,846 cusecs below Chakdara)
- Low Risk Zone (Inundation Extent Corresponding to discharge of 42,378 cusecs below Chakdara)

Note: All flood extents are based on breachless conditions

3850000

760000

N

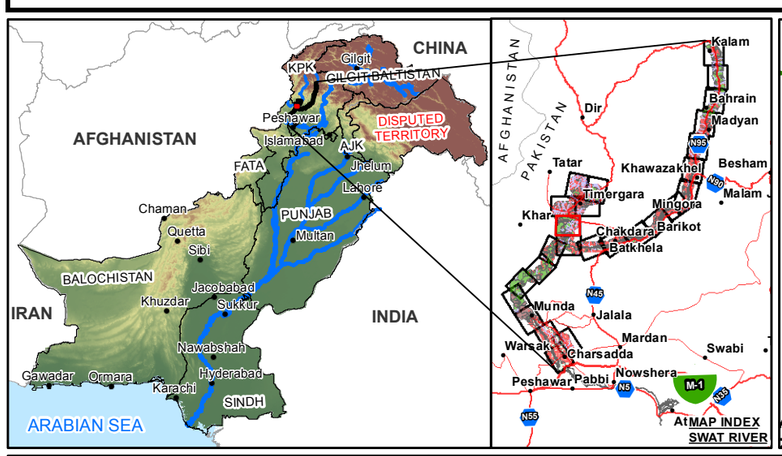
LOWER DIR DISTRICT

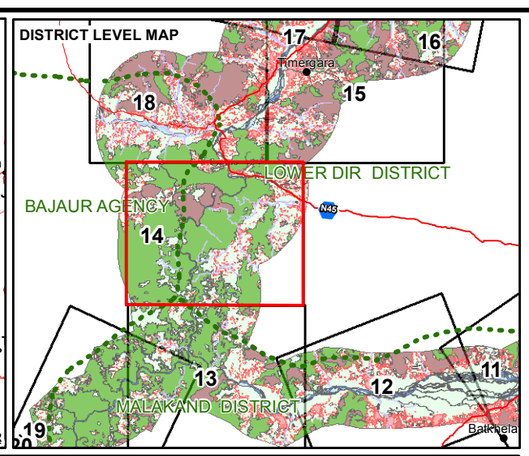
BAJAUR AGENCY

Baridagai
Guroh
Guro
Guro Tangai
Chindrun
Katan
Daman
Bagh
Ghutgai Kandao
Manugai Kalle
Utala
Dugal Banaa
Majal
Khushal Majal Kalle
Sari Begum
Barro Kalle
Panjkora River
Malakand Road
Shigo Kas
Zullam
Arhangai
Dada
Sapparai
Samar Bagh Timergara Road
Kharro Kalle
Apang Nala
Pir Patai
Giga Khe
Gawe
Wuoh Khuzta
Arandusai
Anangurai
Tangai
Mazdai
Jawanai
Katgalai
Munda Jandool
Rag Kili

750000

3850000





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: May 29, 2015

Scale 1: 25,000

0 0.25 0.5 0.75 1 Kilometers

LEGEND

- National Highway
- Metalled Road
- Un-metalled Road
- Track
- Railway Line
- Canal
- Branch
- Drain
- Distributary
- Minor
- Nallah
- Wah
- 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
SWAT RIVER

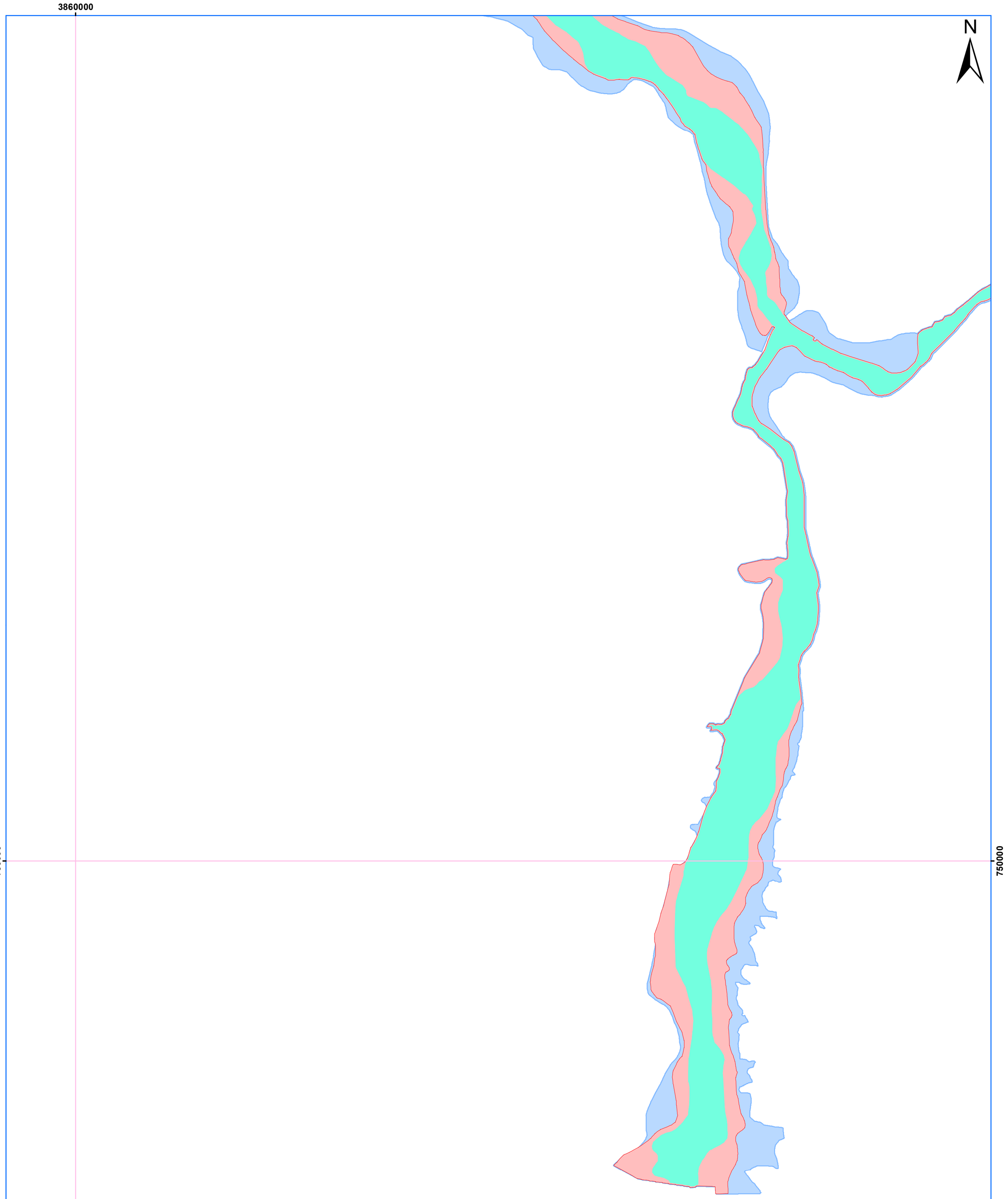
Client :
FEDERAL FLOOD COMMISSION
Ministry of Water & Power

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

in association with

DELTARES,THE NETHERLANDS

Rev.	Date:	Description	Ckd.	Ver.



Scale 1: 25,000

0 0.25 0.5 0.75 1 Kilometers

LEGEND

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- Medium Risk Zone (Inundation Extent Corresponding to discharge of 38,846 cusecs below Chakdara)
- Low Risk Zone (Inundation Extent Corresponding to discharge of 42,378 cusecs below Chakdara)

Note: All flood extents are based on breachless conditions

3860000

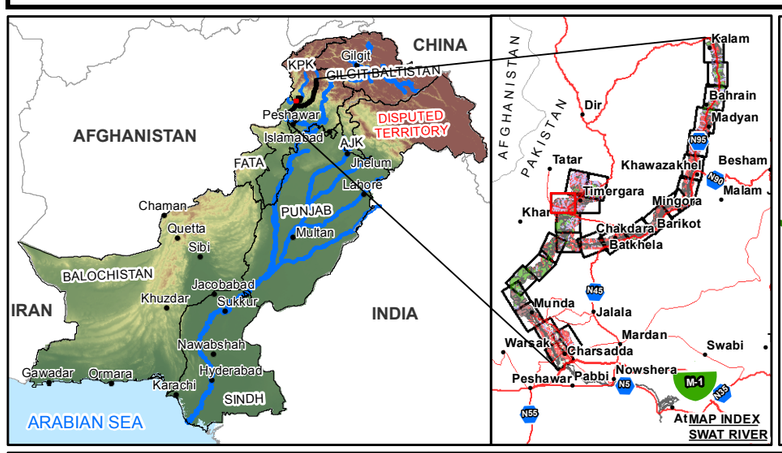
750000

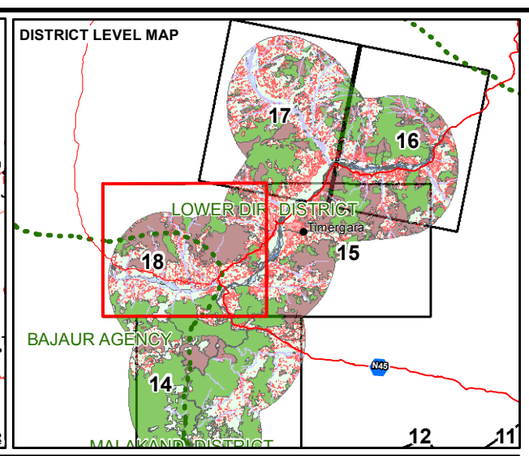
mamregai
Malakand Darra
Chargurai
Khema
Panjkora River
Shikalai
Shaikh Banda
Ghulam Darra
Jahagai
Dherai
Meeghn Road
Rehan Kot
Sado
Shatai
Yusuf Minarai
Gadal
Ford
Malak Aba
Walai
Khazana
Math
Shaikhan
Garai
Pata
Islam Darra
Landakur
Asarak
Malala
Saluban
Kotka
Karimu
Markhani
Pao
Makhai Wuch Khr.
Makhai
Shinoldi
Jughrai
Garra
Bemgrai
Sangar
Jurjurai
Ghobana
Tangai
Khr.
Katasat
Manrogai
Jandool
Ghana
Gosam
Dad
Mayar
Manroga
Dag

LOWER DIR DISTRICT

BAJAUR AGENCY

N





Scale 1: 25,000

0 0.25 0.5 0.75 1 Kilometers

LEGEND

- National Highway
- Metalled Road
- Un-metalled Road
- Track
- Railway Line
- Canal
- Branch
- Drain
- Distributary
- Minor
- Nallah
- Wah
- District Boundary
- Provincial Boundary
- International Boundary
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- Graveyard
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- Nallah (Non Perennial)
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- Planned Urban Area
- Range Forest
- River
- Sand Dunes
- Town/Village/Settlement
- Water Body

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: May 29, 2015

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

Client :
FEDERAL FLOOD COMMISSION
Ministry of Water & Power

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

in association with

DELTARES,THE NETHERLANDS

Rev.	Date:	Description	Ckd.	Ver.

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750000

3830000

Scale 1: 25,000

0 0.25 0.5 0.75 1 Kilometers

LEGEND

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- Low Risk Zone (Inundation Extent Corresponding to discharge of 42,378 cusecs below Chakdara)

Note: All flood extents are based on breachless conditions

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N

Sulai

Marchai Kabar

Ziarat

Marchai

Swat River

Kuz Tsapparai

Mundai

Barota Sar

Mishta

Banda

Surkawai Banda

Tanu

Ghund

Managai

Managai

Andarai

Narinjai

Bagh

Bagh N

Sulai

Tand

Tsapparai

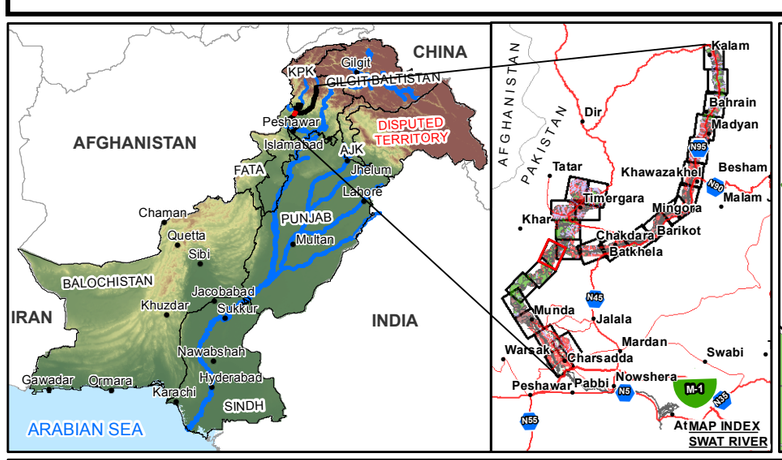
Khajuri Banda

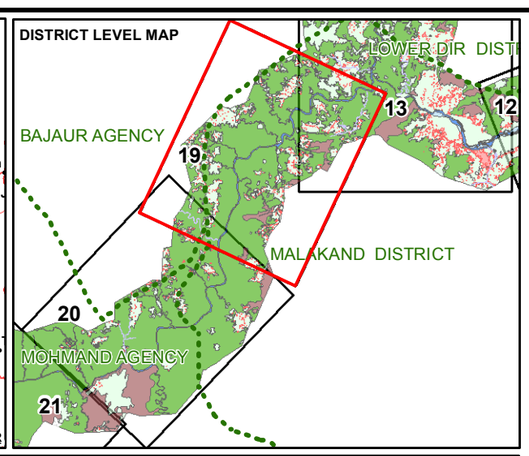
BAJAUR AGENCY

MALAKAND DISTRICT

TO KHAR

3830000





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Coordinate System
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DATUM: WGS84
Grid Reference is in meters

Date: May 29, 2015

Scale 1: 25,000

0 0.25 0.5 0.75 1 Kilometers

LEGEND

- National Highway
- Metalled Road
- Un-metalled Road
- Track
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- Canal
- Branch
- Drain
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- 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

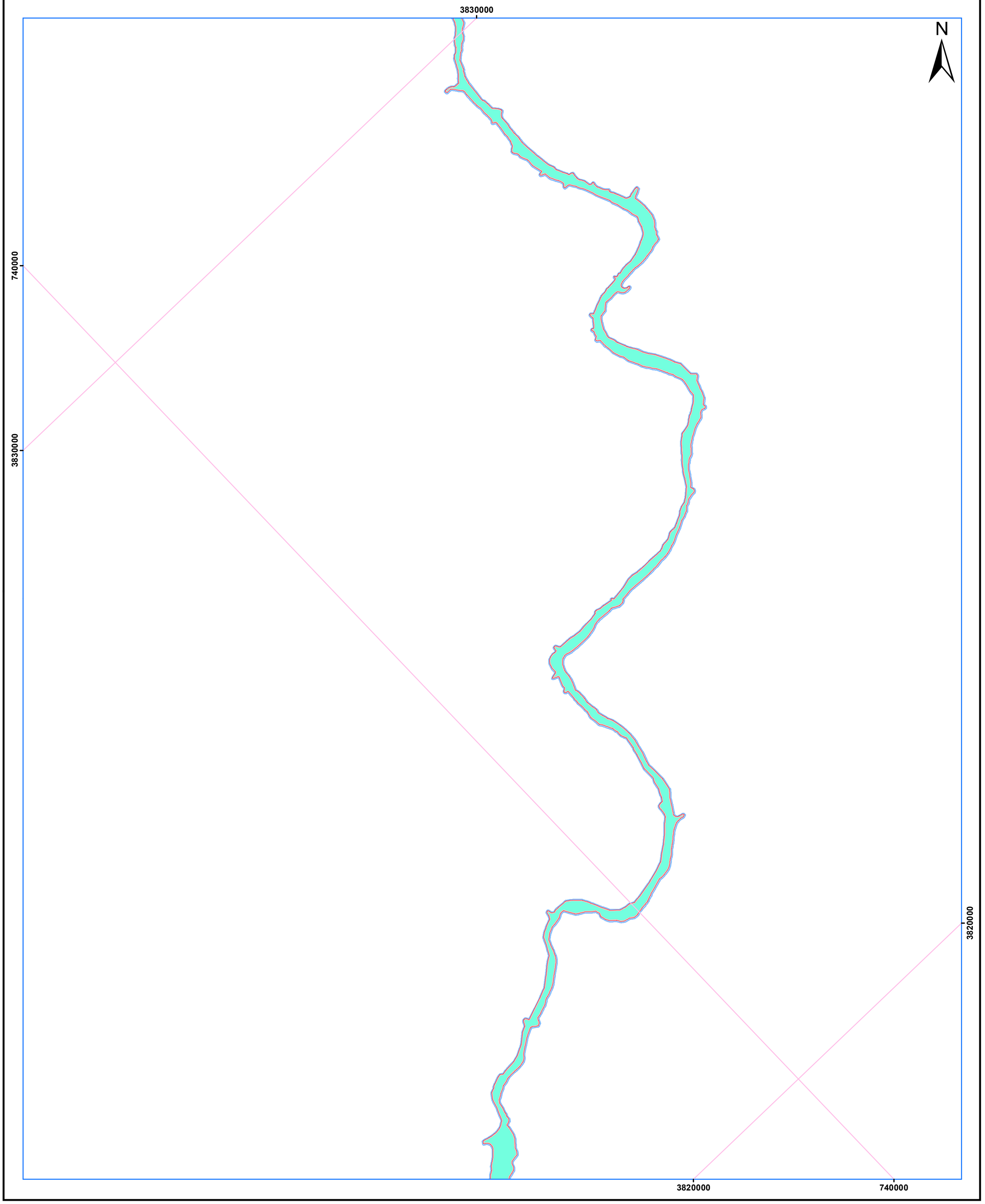
Client :
FEDERAL FLOOD COMMISSION
Ministry of Water & Power

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

in association with

DELTARES,THE NETHERLANDS

Rev.	Date:	Description	Ckd.	Ver.



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0 0.25 0.5 0.75 1 Kilometers

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- Low Risk Zone (Inundation Extent Corresponding to discharge of 42,378 cusecs below Chakdara)

Note: All flood extents are based on breachless conditions

3830000

740000

N

MALAKAND DISTRICT

BAJAUR AGENCY

MOHMAND AGENCY

MOHMAND AGENCY

3820000

740000

TO KHAR

Tsapparai

Khajuri Banda

Gida

Nur Ahmad Dheri

Mohmand Agency Road

Narinji Banda

Jowar

Jal Dheri

Khaudara

Swat River

Silai Ratti

Azghan Sar

Arawalai

Tazi

Kurat Kanrai Sar

Tsapparai

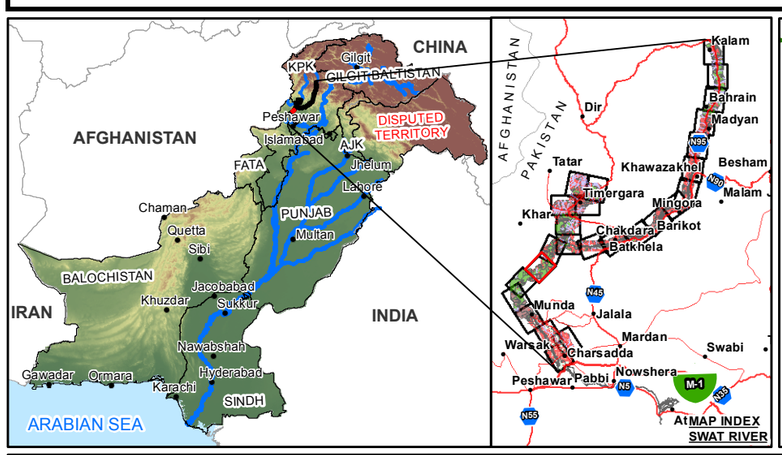
Kurat Kanrai

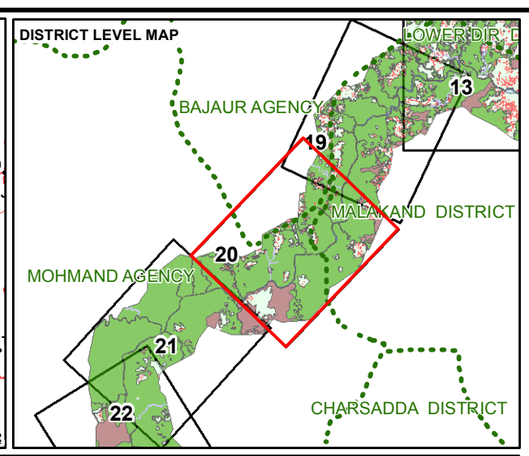
Shaldad Dama

Gidarai

Swat River

Dabar





Scale 1: 25,000

0 0.25 0.5 0.75 1 Kilometers

LEGEND

- National Highway
- Metalled Road
- Un-metalled Road
- Track
- Railway Line
- Canal
- Branch
- Drain
- Distributary
- Minor
- Nallah
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- District Boundary
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- Main/Link Canal, Escape, Spillway
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- Nallah (Perennial)
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- Sand Dunes
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- Water Body

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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: May 29, 2015

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

Client :
FEDERAL FLOOD COMMISSION
Ministry of Water & Power

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

in association with

DELTARES,THE NETHERLANDS

Rev.	Date:	Description	Ckd.	Ver.

Inundation Depth of Settlements in District Bajaur Agency

Swat River - Sheet No. 18

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	Dad and nearby 24 settlements	H,M,L	Bajaur Agency	0.24	3.23	0.77	4.27	1.28	4.43

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