

**FLOOD AND RIVERBANK EROSION
RISK MANAGEMENT INVESTMENT PROGRAM (FRERMIP)
PROJECT-1**

ADB LOAN NO. 3138-BAN (SF) AND GRANT NO. 0396-BAN (EF)

**CHAUHALI, ZAFFARGANJ, HARRIRAMPUR JULY 2016 MONITORING
REPORT - DRAFT**

Prepared for:

Bangladesh Water Development Board (BWDB)
Dhaka, Bangladesh

Prepared by:

Institutional Strengthening and Project Management Consultant (ISPMC)

**Joint Venture
NORTHWEST HYDRAULIC CONSULTANTS LTD/EUROCONSULT MOTT MACDONALD**

July 2016

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ACRONYMS

ADCP	: Acoustic Doppler Current Profiler
BWDB	: Bangladesh Water Development Board
FRERMIP	: Flood and Riverbank Erosion Risk Management Investment Program
JMREMP	: Jamuna Meghna River Erosion Mitigation Project
LWL	: Low Water Level

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1 INTRODUCTION

Under the Flood and Riverbank Erosion Risk Management Investment Program (FRERMIP) managed by the Bangladesh Water Development Board (BWDB) three (3) priority sites along the Jamuna River have been selected to receive comprehensive erosion protection works under Tranche 1 of the project. From upstream to downstream the sites are Chauhali (7 km of bank and scour protection), Zaffarganj (2 km of bank and scour protection), and Harirampur (10 km of bank and scour protection). These bank protection works include a geobag apron to protect the bank from scour, temporary geobag bank protection to mitigate potential erosion caused by the 2016 monsoon, and concrete block bank protection to provide long term erosion protection (construction to begin in 2017). Details of these protective works designs have been provided in previous design memos prepared by Northwest Hydraulic Consultants (NHC) (Harirampur - NHCa, 2016; Zaffarganj - NHCb, 2016; Chauhali – NHCc, 2016).

The joint venture of NHC and Euroconsult Mott MacDonald (EMM) has been tasked with providing advice and support to BWDB in construction supervision and quality control related activities associated with geobag placement along the falling aprons and temporary bank protection.

1.1 Monitoring Survey Components

In order to assess the efficacy of the constructed works over the course of the monsoon Monitoring surveys will be required at the three FRERMIP sites once per month for July, August, September and October with one monitoring survey being conducted at the JMREMP sites in September. The survey work consisted of the following:

1. Bathymetric survey, consisting of 250 m wide cross sections spaced every 200 m along the constructed bank length. If a change in toe elevation of more than 3 m was measured along a section of the apron from the preceding survey, additional sections spaced 50 m apart were measured along the 200 m spaces both upstream and downstream of the lowered cross section.
2. ADCP transects and float tracking were conducted at 5 locations (Figure A.1) in order to determine the discharge and proportion of flow associated with each channel. An additional 3 transects were measure at each site with locations shown in the Interim Construction Completion Drawing Packages for all sites. This data will be critical for further developing the relationship between the designed protection works, measured scour, water velocities located along the geo-bags and the associated flow.

In addition a full river cross section bathymetric survey will be conducted in late August at the key location discussed in Table 1 to provide a clear overview of the current river morphology through this reach and site conditions during the dry season 2016/17. The information will then be used for determining adaptation works not only at the three FRERMIP sites, but also the two JMREMP sites. This data will also provide a clearer picture of future river trends and which bank areas are at highest risk of large scale erosion. A more detailed understanding of the rivers morphology will also assist in providing refined approach to future bank protection works ie. Tranche 2 works.

Table 1. Key locations for full river bathymetric survey.

Location	Rationale
Bifurcation downstream of Jamuna Bridge	Determines magnitude of future erosion due to flow splitting.
River reach along JMREMP sites	Determine upstream erosion potential and working conditions during adaptation works which is required for determining dredging works.
Chauhali reach	Determine site conditions including downstream bifurcation.
Zaffarganj reach	Determine site conditions especially upstream erosion potential.
Harrirampur reach	Required at approach flow and downstream extent to determine whether length of work suitable. Information critical for Tranche 2 and 3 work

2 JULY MONITORING SURVEY WORKS

For the month of July a detailed as-built survey has been conducted. This survey will be used as a benchmark to compare all past and future monitoring surveys to. ADCP flow and velocity measurements have been conducted at all sites along with float tracking measurements for Chauhali and Zaffarganj. These will continue to be conducted twice during the months of August, September and October.

2.1 Surveys Details

2.1.1 Bathymetric Survey Details

Bathymetric surveys were conducted using a single beam echosounder and RTK GPS unit. Several bathymetric surveys have been used to assess and monitor the condition of the dumped and placed geo-textile bags. The following table provides details of the surveys for the FRERMIP work sites.

Table 2. Bathymetric survey details for all FRERMIP sites

Location	Chauhali	Zaffarganj	Harrirampur
Pre-Construction Survey	8 km - Section length 200 m spaced every 100 m	2 km - Section length 200 m spaced every 100 m	10 km - Section length 200 m spaced every 100 m
As-Built Survey May	8 km – Section length 200 m spaced every 100 m	N/A	10 km – Section length 200 m spaced every 100 m
As-Built Survey July	8 km – Section length 500 m spaced every 100 m	2 km – Section length 500 m spaced every 100 m	10 km – Section length 500 m spaced every 100 m

2.1.2 Topographic Survey Details

Topographic surveys were completed using a Total Station and were conducted concurrently with the pre-construction bathymetric surveys at all three sites. The sections extended from the LWL, or as far as the surveyor could wade past the LWL, to the furthest distance the surveyor could walk to while being insight with the Total Station. No topographic data exists for the monitoring surveys and will not be collected as the monitoring assessment only applies to the condition of the bags and the extent of launching of the dumped apron.

2.2 Jamuna and Padma Flows and Float Tracks

A single float track was conducted using 3 floats (additional units will be procured for future float tracks) starting 10 km downstream of the Jamuna Bridge and covering 40 km of river before being extracted 20 km downstream of the Chauhali site office. This was done to determine the attack angle of the flow interacting with the Chauhali bank downstream of the bifurcation. The float tracks are shown in Figure A.2.

2.3 ADCP Measurements

To record discharge, ADCP measurements were conducted in first week of August 2016 when the water level was moving down from the peak. Three ADCP transects positioned at upstream, downstream and middle of bank protection work were taken in each of three project sites as Chauhali, Zaffarganj and Harrirampur. These transects covers bank to bank of front channel of bank protection works. In addition one transect was taken to cover full river in each of the three sites. To record the flow coming from Ganges one addition ADCP measurement were conducted at Rajbari.

3 RESULTS AND CONCLUSIONS

3.1 Water Level

For the month of July water levels recorded at the sites are available for all sites. The water level varied from a low of El. 9.86 m to a high of El. 12.00 m at Chauhali, a low of El. 8.24 m to a high of El. 10.33 m at Zaffarganj, and a high of El. 6.72 m to a high of El. 9.00 m. Figure A.4 present the hydrographs of the three sites.

3.2 ADCP Discharge

In Jamuna River total discharge was recorded around 45,000 m³/s during the survey at both Chauhali and Zaffarganj site. At Padma river total discharge was recorder as 70,600 m³/s in main channel at Harrirampur where in Ganges total observed discharge was about 29,000 m³/s. A detail summary of discharge measurement is provided in Figure A1.

3.3 Near Bank Velocity

During ADCP measurements, velocity transects were also recorded which includes velocity magnitude and direction at every depth for three sites. At Chauhali the near bank velocity recorded up to 3.5 m/s where velocity adjacent to river bed at the underwater slope area varies from 1.5 m/s to 2.4 m/s. At Zaffarganj velocity at river bed is about 1.5 m/s. At Harrirampur site recorded near bank velocity adjacent to river bed varies from 2.5 m/s to 3.0 m/s. Velocity magnitude and profile for three sites is provided in figure A2.

3.4 Launching of Geo-Textile Bag Revetment

3.4.1 Harrirampur

From comparison of the pre-construction, monitoring survey, and as-built survey the average scour occurring along the protected length ranges from 10 to 15 m from Km 5+000 to 7+000 and 1 to 5 m from Km 7+000 to 11+000 (Figure A.5). The bags appear to be launching along the predicted 1V:2H slope however some locations that have had 5 bags dumped along the apron are not launching at the predicted extent (ie. if the scour is 5 m deep then roughly 2 m of protected bed should launch). In some locations the 5 bag thick protection is launching in the same manner a 2 bag thick protective layer would launch (see Section 8+000 of Harrirampur As-Built Survey).

The bed is accreting from 0+000 to 4+600 by upwards of 7 m in isolated regions, on average by 1-2 m.

3.4.2 Zaffarganj

From comparison of the pre-construction and as-built survey no scouring or apron launching was observed along the length of bank with constructed protective works (Figure A.6). No significant scouring was noticed along the bed upstream and downstream of the dumped geo-textile aprons.

3.4.3 Chauhali

From comparison of the pre-construction, June as-built survey and July as-built survey the average scour occurring along the protected length ranges from 8 to 15 m from Km 5+200 to 1+200 with only 1 to 2 m of scouring from Km 1+200 to -0+560 and negligible scour occurring upstream of Km 5+200 (Figure A.7). The bags appearing to be launching along the predicted 1V:2H slope with launching length to protection length ratio following the design ratio (ie. if 2 m of 5 layer geobag apron launches it will protect 10 m of scoured bank – see section 3+400). The section with the most severe scour is located downstream of the vertex of the bank curve where velocities are likely highest and where previous large scale bank failures were observed from June 16 to 21st this area should be closely monitored to ensure bags continue to launch as designed and that mitigative bag dumping post bank failures were adequate.

3.5 Recommendations

3.5.1 Adaptation Works

Based off the extent of the bag launching described in Section 3.4 and the probable continued launching of the bags in August and September it is recommended that additional bags be procured now for adaptive works to be administered immediately following the monsoon. These adaptive works will include increasing the thickness of the launched apron from 1 bag to 3 bags and extending the apron an additional 20 m with a thickness of three bags. Special attention should be applied to the upstream section of Chauhali from km 1+200 to 5+000. The amount of bags that should be procured for each site is detailed in Table 3. The number of CC blocks to be deposited along the toe has been reduced as the previous amount was overly conservative. This reduction will provide sufficient funds to cover this additional amount of geobags.

Table 3. Geo-textile bags required for adaptive works

Location	Additional Bags	Contingency	Total Bags
Chauhali	511,000	51,000	562,000
Zaffarganj	72,000	7,000	79,000
Harrirampur	467,000	117,000	584,000
Total Bags	1,050,000	175,000	1,225,000

3.5.2 Multi-Beam Requirements

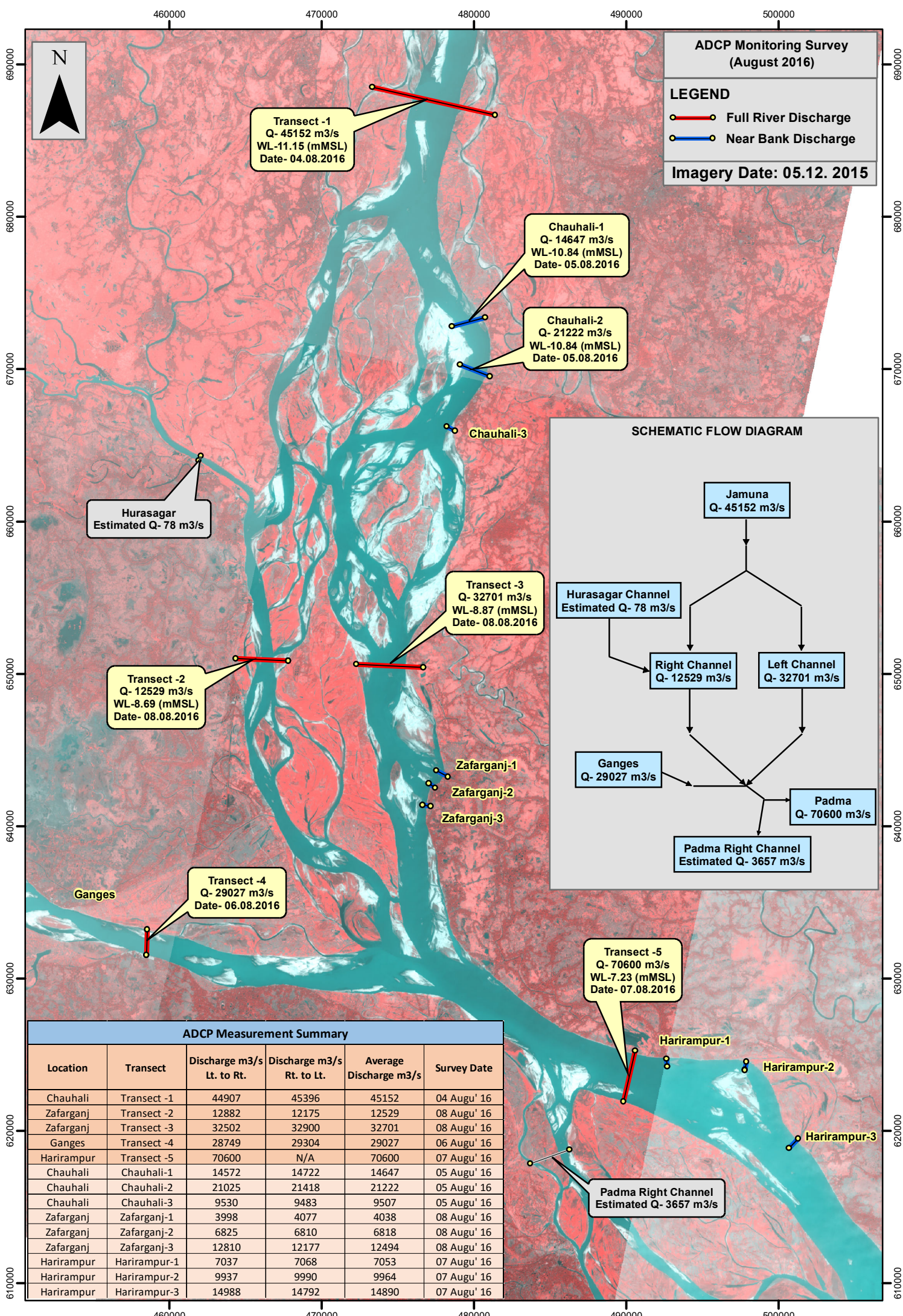
Due to the extreme scouring observed at Chauhali and June bank failures it is recommended that the proposed multi-beam survey be conducted at this site – though a complete multi-beam survey at all sites would be most beneficial to minimizing adaptive work costs and Tranche 2 design work.

Additional floats should be used during flow tracks along the Chauhali protected works over the course of the monsoon to determine the change in attack angle of the river from km 5+000 to km 1+200.

Figures

- A.1 ADCP Transect Locations
- A.2 Chauhali Float Tracks
- A.3 Velocity Magnitude and Profile
- A.4 Jamuna and Padma River Water Level Trends
- A.5 Harrirampur Interim Construction Completion Drawings
- A.6 Zaffarganj Interim Construction Completion Drawings
- A.7 Chauhali Interim Construction Completion Drawings

Figure A.1 ADCP Transect Locations



ADCP Monitoring Survey (August 2016)

LEGEND

- Full River Discharge
- Near Bank Discharge

Imagery Date: 05.12. 2015

Transect -1
 Q- 45152 m3/s
 WL-11.15 (mMSL)
 Date- 04.08.2016

Chauhali-1
 Q- 14647 m3/s
 WL-10.84 (mMSL)
 Date- 05.08.2016

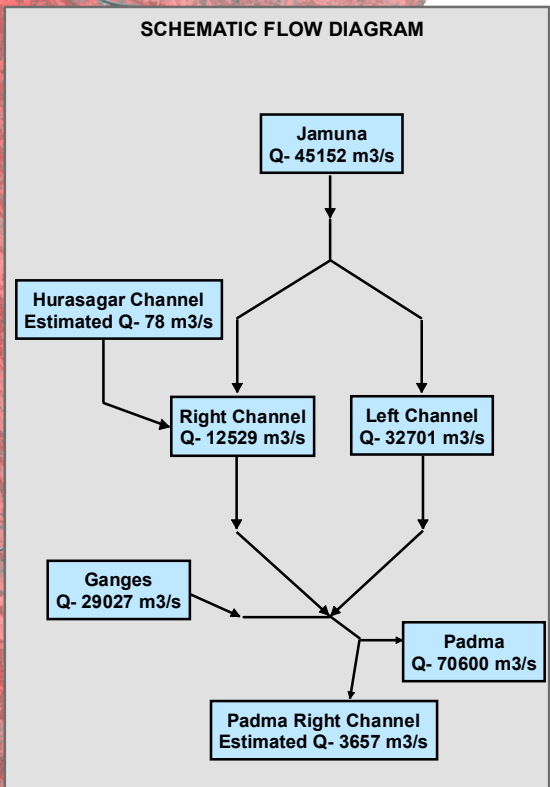
Chauhali-2
 Q- 21222 m3/s
 WL-10.84 (mMSL)
 Date- 05.08.2016

Hurasagar
 Estimated Q- 78 m3/s

Transect -3
 Q- 32701 m3/s
 WL-8.87 (mMSL)
 Date- 08.08.2016

Transect -2
 Q- 12529 m3/s
 WL-8.69 (mMSL)
 Date- 08.08.2016

Transect -4
 Q- 29027 m3/s
 Date- 06.08.2016



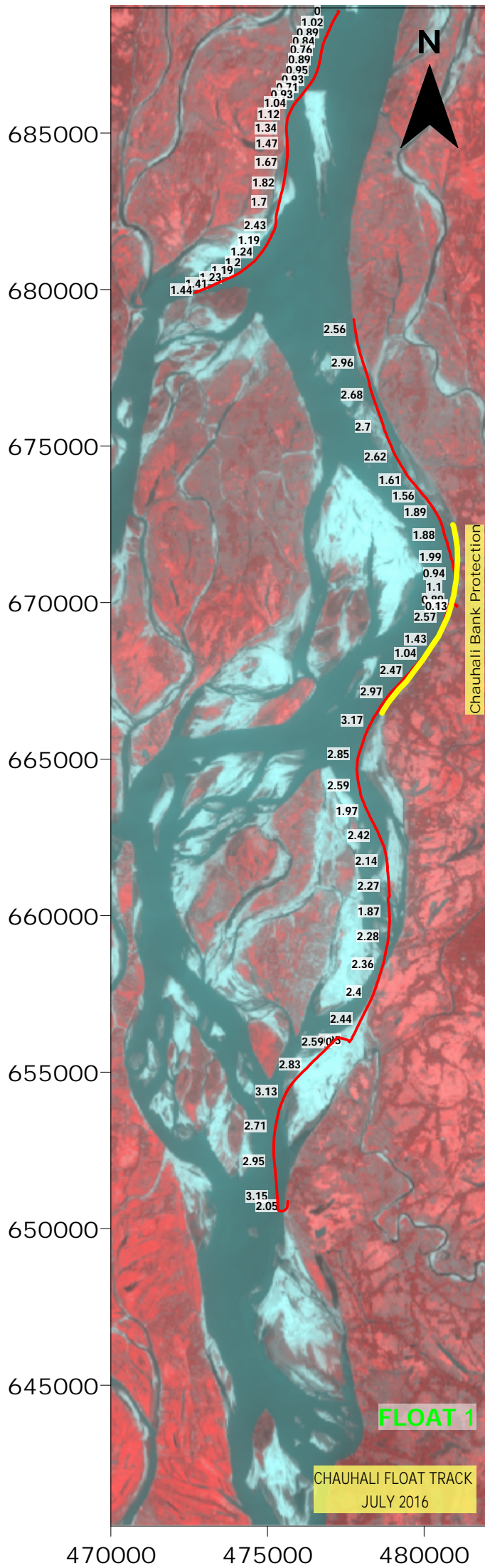
Zafarganj-1
Zafarganj-2
Zafarganj-3

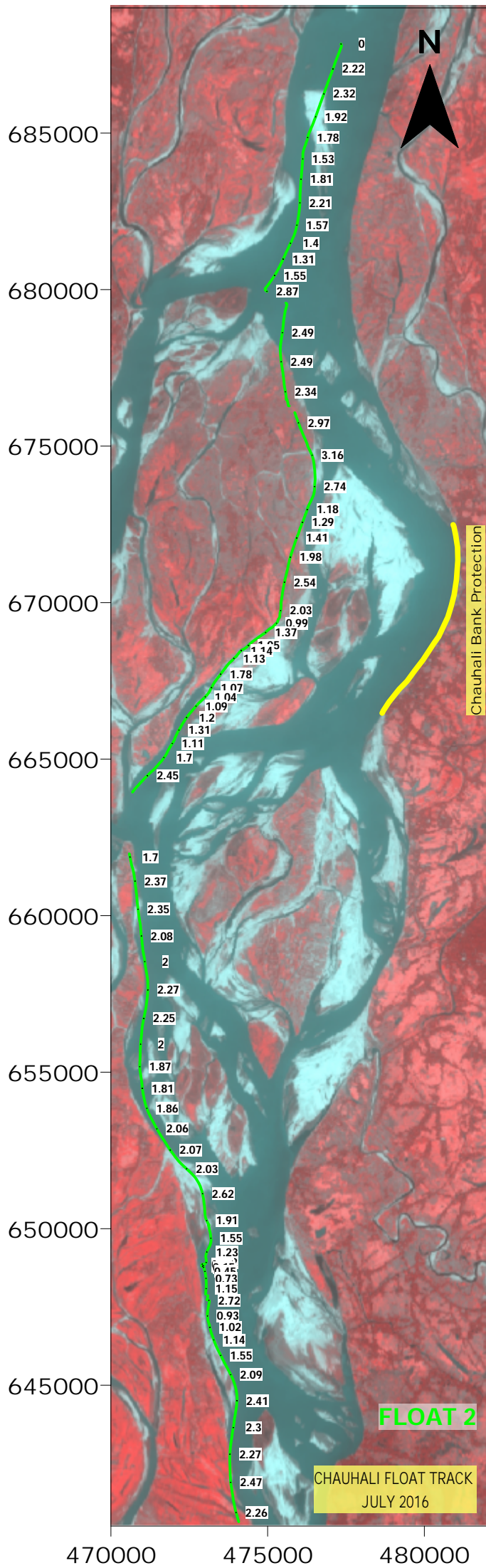
Transect -5
 Q- 70600 m3/s
 WL-7.23 (mMSL)
 Date- 07.08.2016

Padma Right Channel
 Estimated Q- 3657 m3/s

ADCP Measurement Summary					
Location	Transect	Discharge m3/s Lt. to Rt.	Discharge m3/s Rt. to Lt.	Average Discharge m3/s	Survey Date
Chauhali	Transect -1	44907	45396	45152	04 Augu' 16
Zafarganj	Transect -2	12882	12175	12529	08 Augu' 16
Zafarganj	Transect -3	32502	32900	32701	08 Augu' 16
Ganges	Transect -4	28749	29304	29027	06 Augu' 16
Harirampur	Transect -5	70600	N/A	70600	07 Augu' 16
Chauhali	Chauhali-1	14572	14722	14647	05 Augu' 16
Chauhali	Chauhali-2	21025	21418	21222	05 Augu' 16
Chauhali	Chauhali-3	9530	9483	9507	05 Augu' 16
Zafarganj	Zafarganj-1	3998	4077	4038	08 Augu' 16
Zafarganj	Zafarganj-2	6825	6810	6818	08 Augu' 16
Zafarganj	Zafarganj-3	12810	12177	12494	08 Augu' 16
Harirampur	Harirampur-1	7037	7068	7053	07 Augu' 16
Harirampur	Harirampur-2	9937	9990	9964	07 Augu' 16
Harirampur	Harirampur-3	14988	14792	14890	07 Augu' 16

Figure A.2 Chauhali Float Tracks





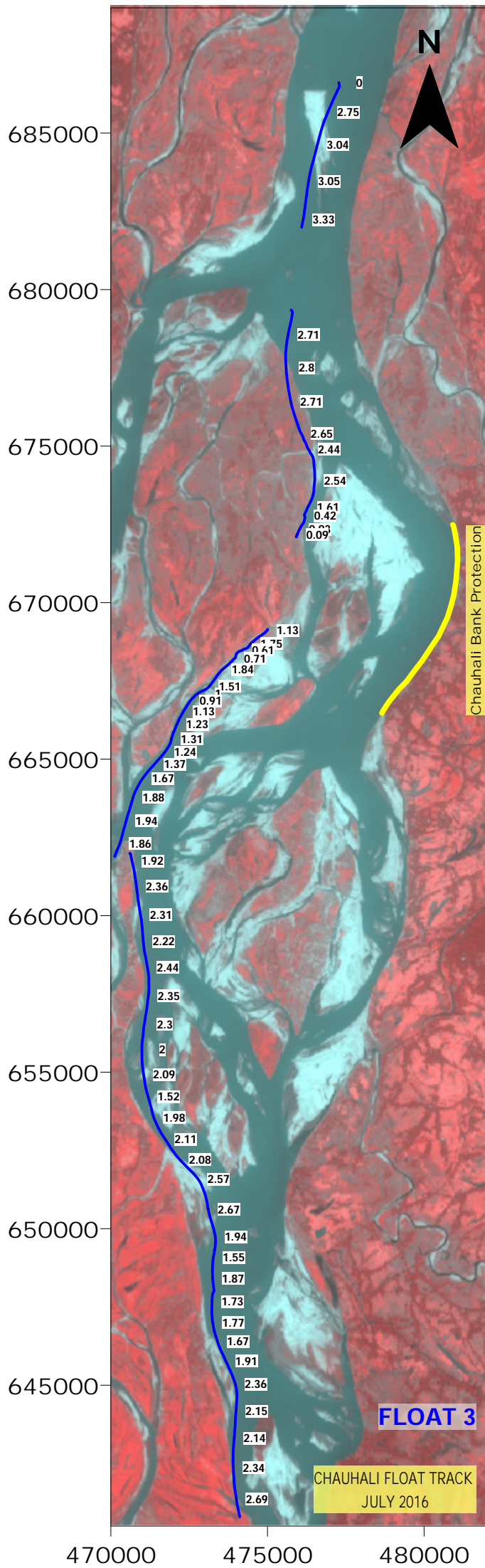


Figure A.3 Velocity Magnitude and Profile

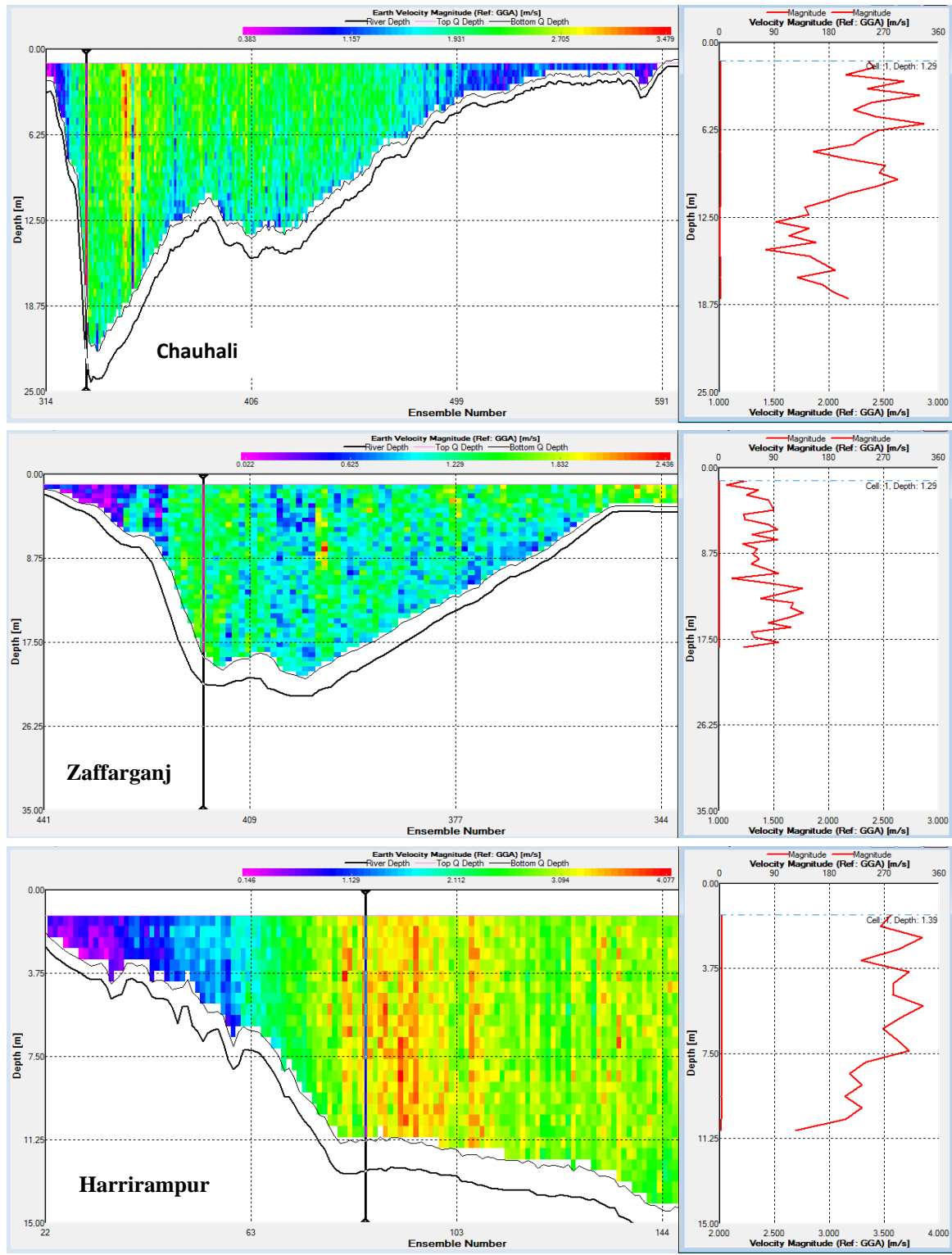


Figure A2

Figure A.4 Jamuna and Padma Water Level Trends

WL HYDROGRAPH

Harrirampur Site Construction WL Harrirampur July AsBuilt Survey Harrirampur ADCP Survey Aricha Gauge 2016 Gaolando Gauge 2016

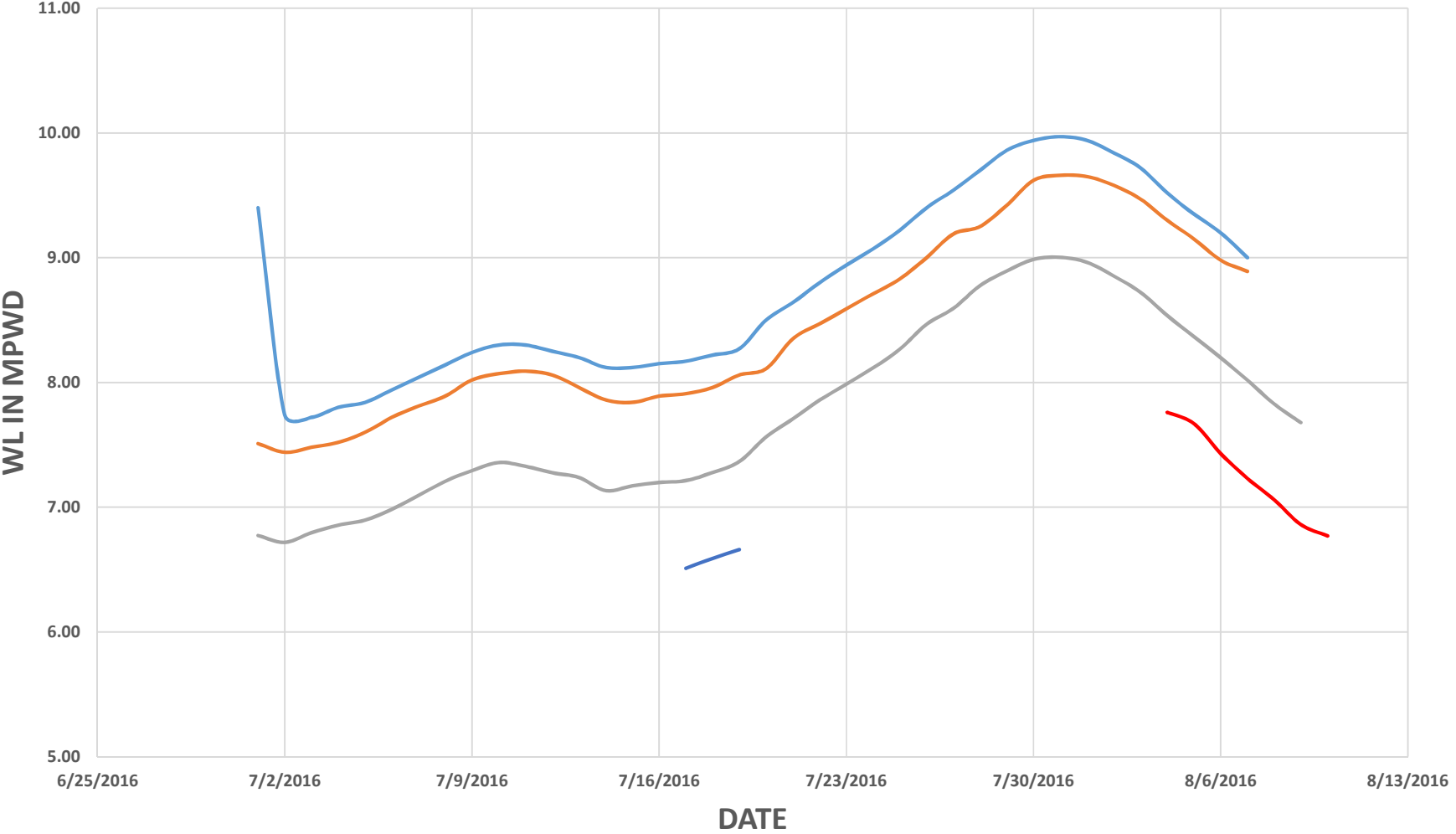
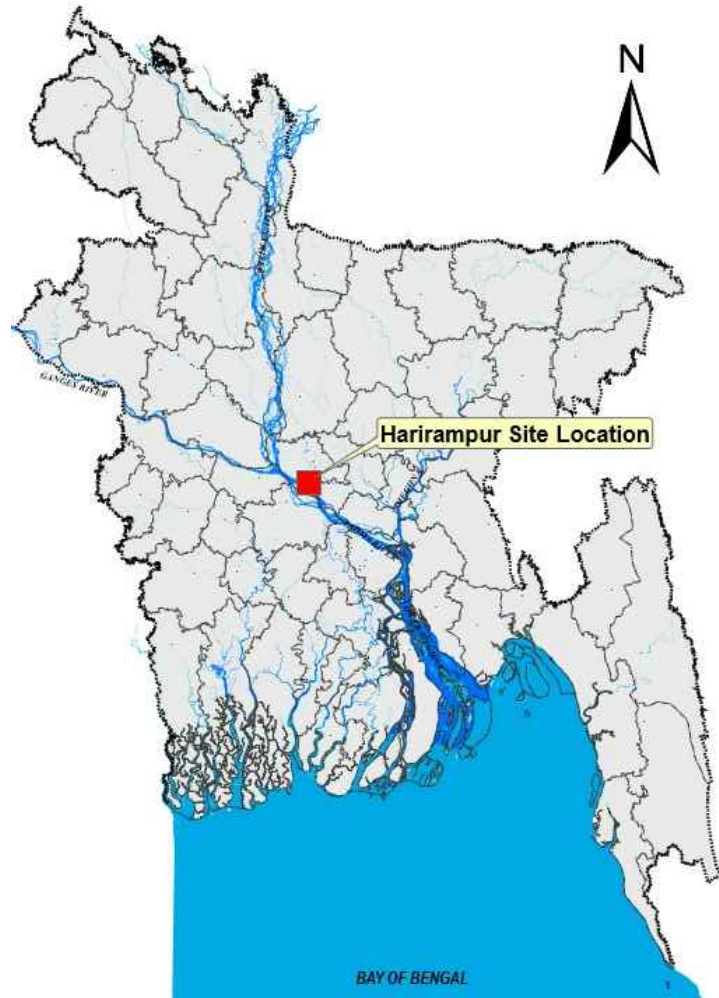
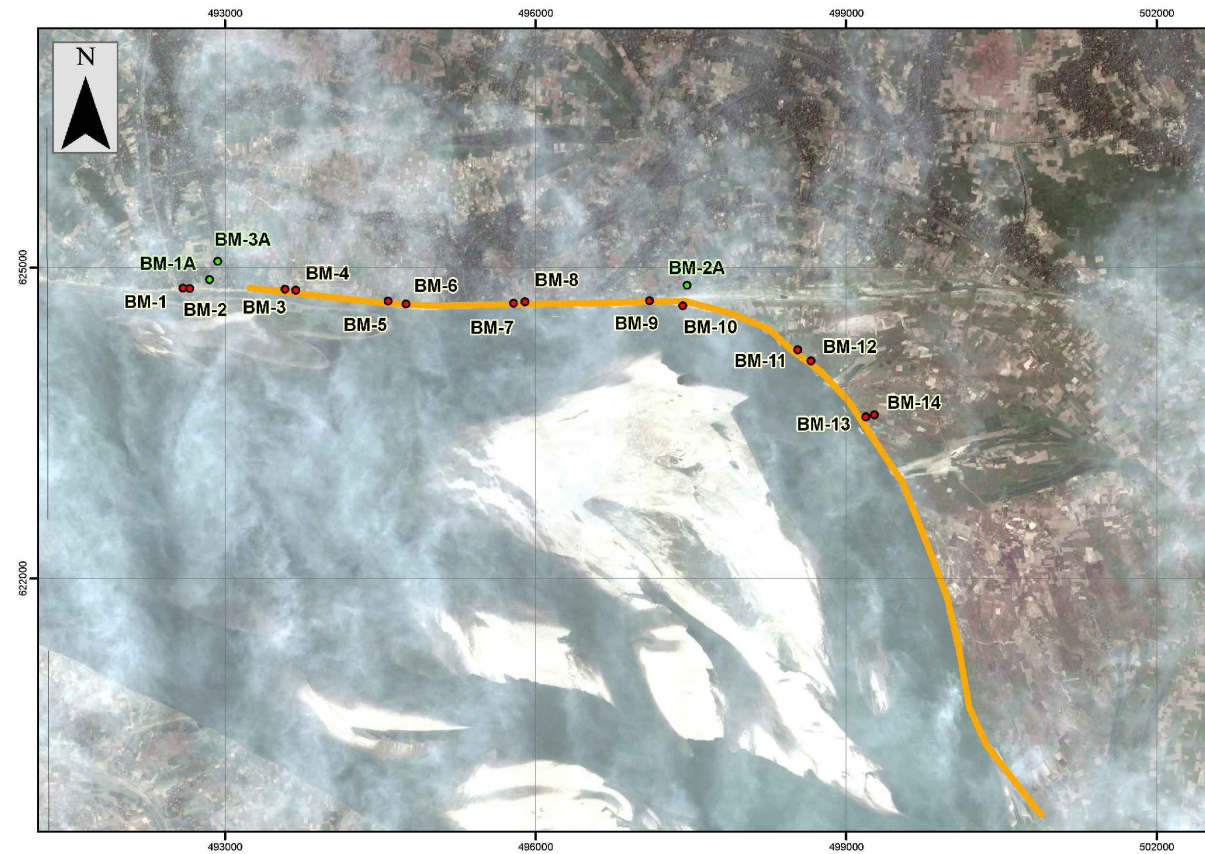


Figure A.5 Harrirampur Interim Construction Completion Drawings

FRERMIP – HARRIRAMPUR SITE INTERIM CONSTRUCTION RECORD DRAWINGS JULY, 2016



PROJECT LOCATION
NTS



SITE PLAN
NTS

BM COORDINATES		
BM NO	EASTING	NORTHING
1	492596	624799
2	492661	624795
3	493583	624786
4	493686	624779
5	494579	624672
6	494754	624644
7	495789	624654
8	495901	624665
9	497104	624676
10	497425	624629
11	498536	624203
12	498665	624094
13	499195	623557
14	499276	623576

DRAWING INDEX		
SHEET NUMBER	DESCRIPTION	REVISION
1	HARIRAMPUR SITE LOCATION AND PLAN AND BM CO ORDINATES	0
2	KEY MAP	0
3	PLAN KM 0+000 – 1+600	0
4	PLAN KM 1+600 – 3+400	0
5	PLAN KM 3+400 – 5+200	0
6	PLAN KM 5+200 – 7+200	0
7	PLAN KM 7+200 – 9+000	0
8	PLAN KM 9+000 – 10+600	0
9	PLAN KM 10+600 – 11+800	0
10	SECTION KM 0+000 – 1+400	0
11	SECTION KM 1+600 – 3+000	0
12	SECTION KM 3+200 – 4+400	0
13	SECTION KM 4+600 – 5+400	0
14	SECTION KM 5+600 – 6+600	0
15	SECTION KM 6+800 – 8+200	0
16	SECTION KM 8+400 – 9+400	0
17	SECTION KM 9+600 – 11+000	0

NOTES:
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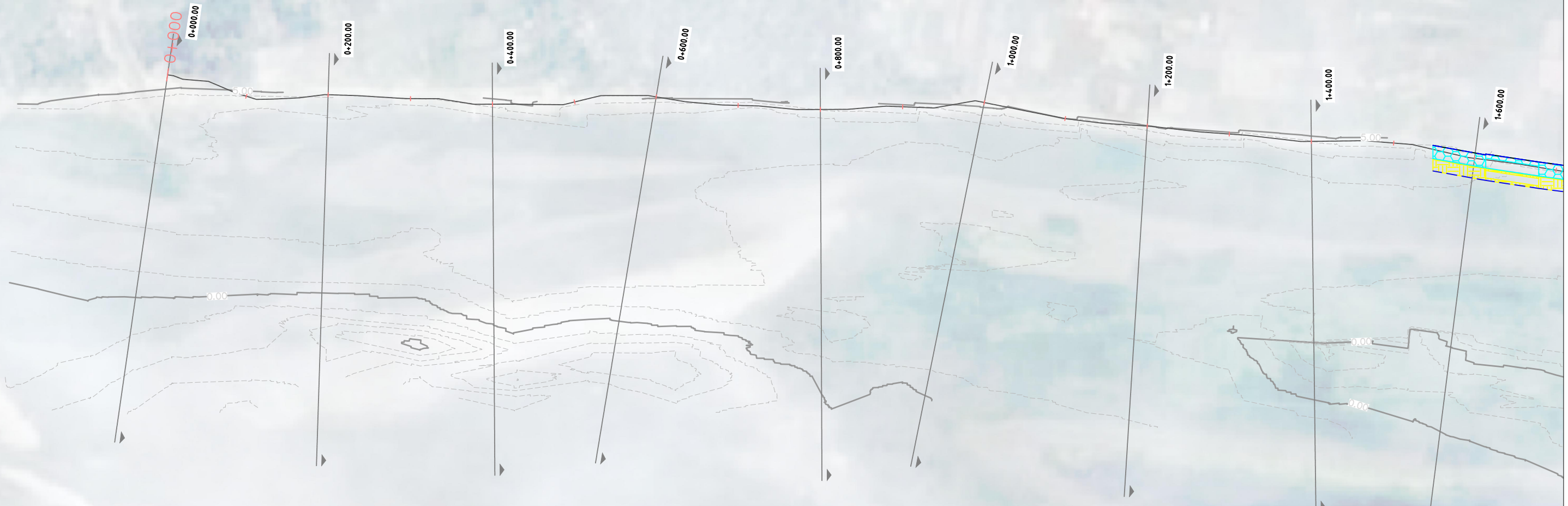


NOTES:
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NOTES:
 1. INTERIM CONSTRUCTION COMPLETION REPORT FOR DIVING CROSS SECTION INFORMATION
 2. TOPOGRAPHIC SURVEY OF UPPER BANK ie HWL TO CREST, NOT INCLUDED IN CONSTRUCTION COMPLETION DRAWINGS.
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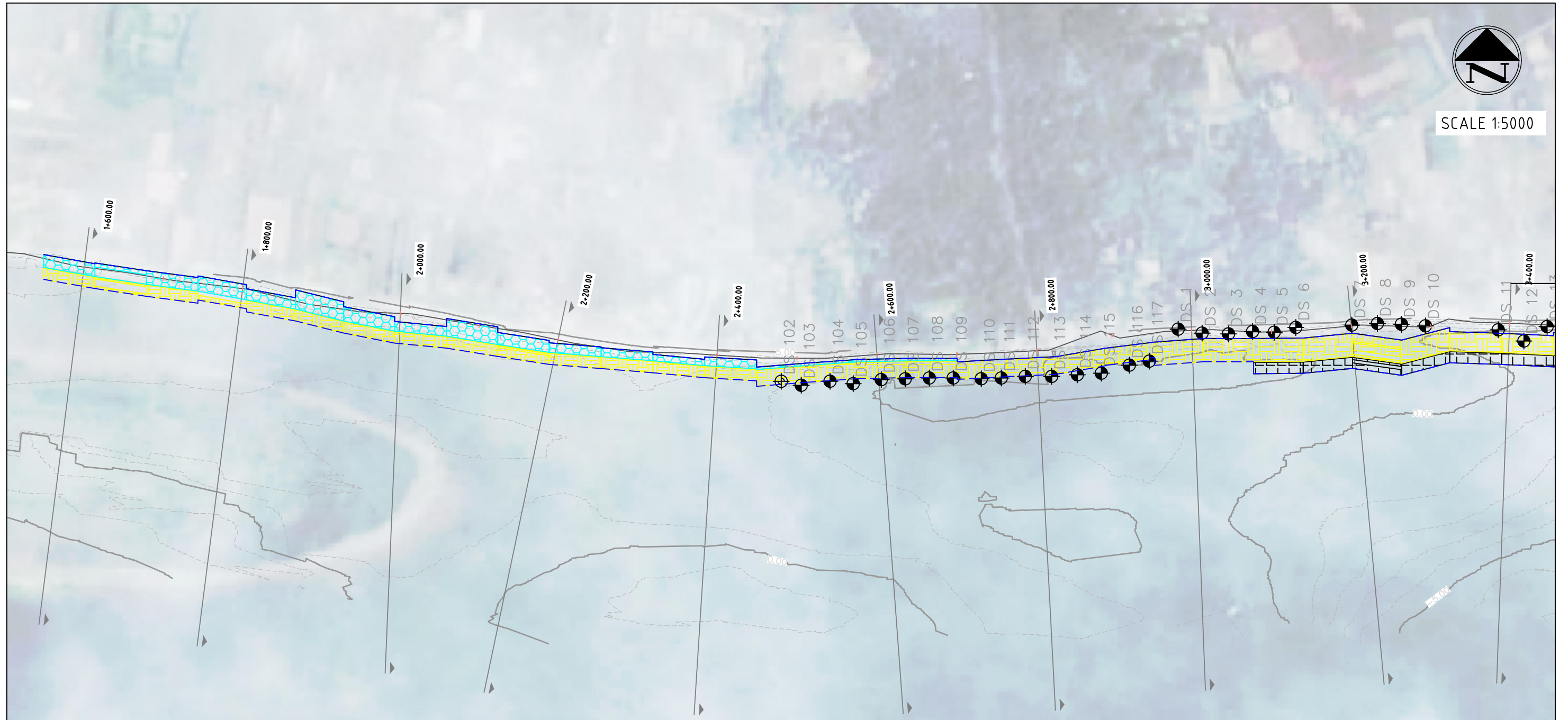
LEGENDS:

- 5 DUMPED BAGS PER ROW
- 4 DUMPED BAGS PER ROW
- 3 DUMPED BAGS PER ROW
- 2 DUMPED BAGS PER ROW
- DIVING CROSS SECTION LOCATION
- EXTENT OF GEOTEXTILE BAG DUMPING

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NOTES:
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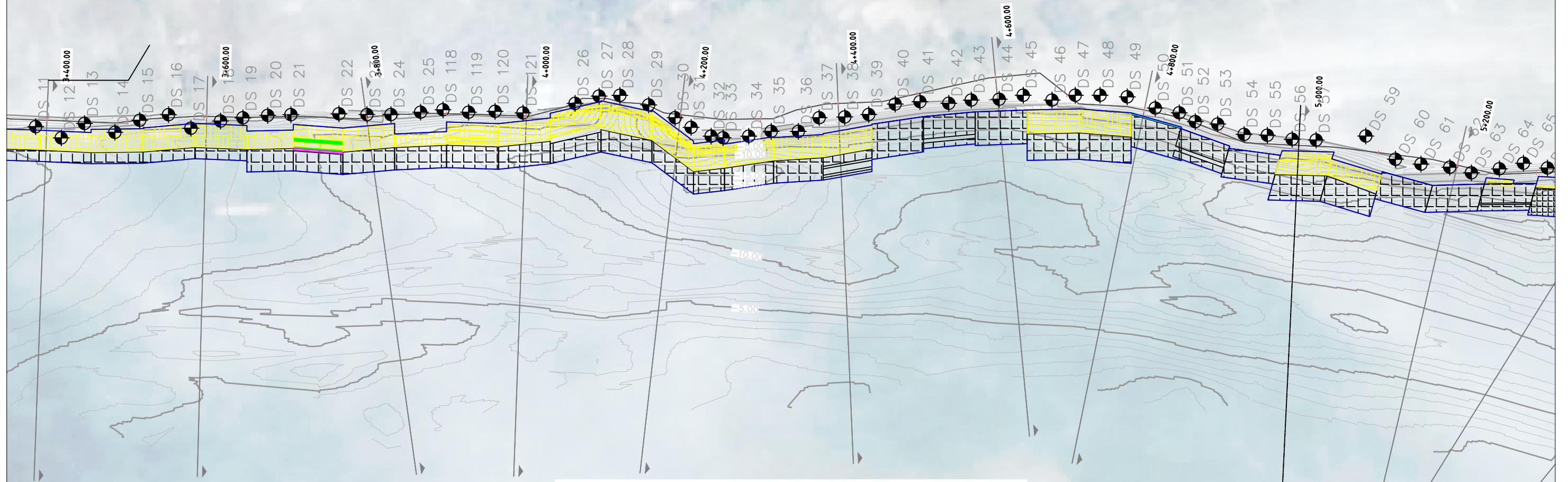
LEGENDS:

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- 4 DUMPED BAGS PER ROW
- 3 DUMPED BAGS PER ROW
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No.	BY	DATE	DESCRIPTION	APPD													



SCALE 1:5000



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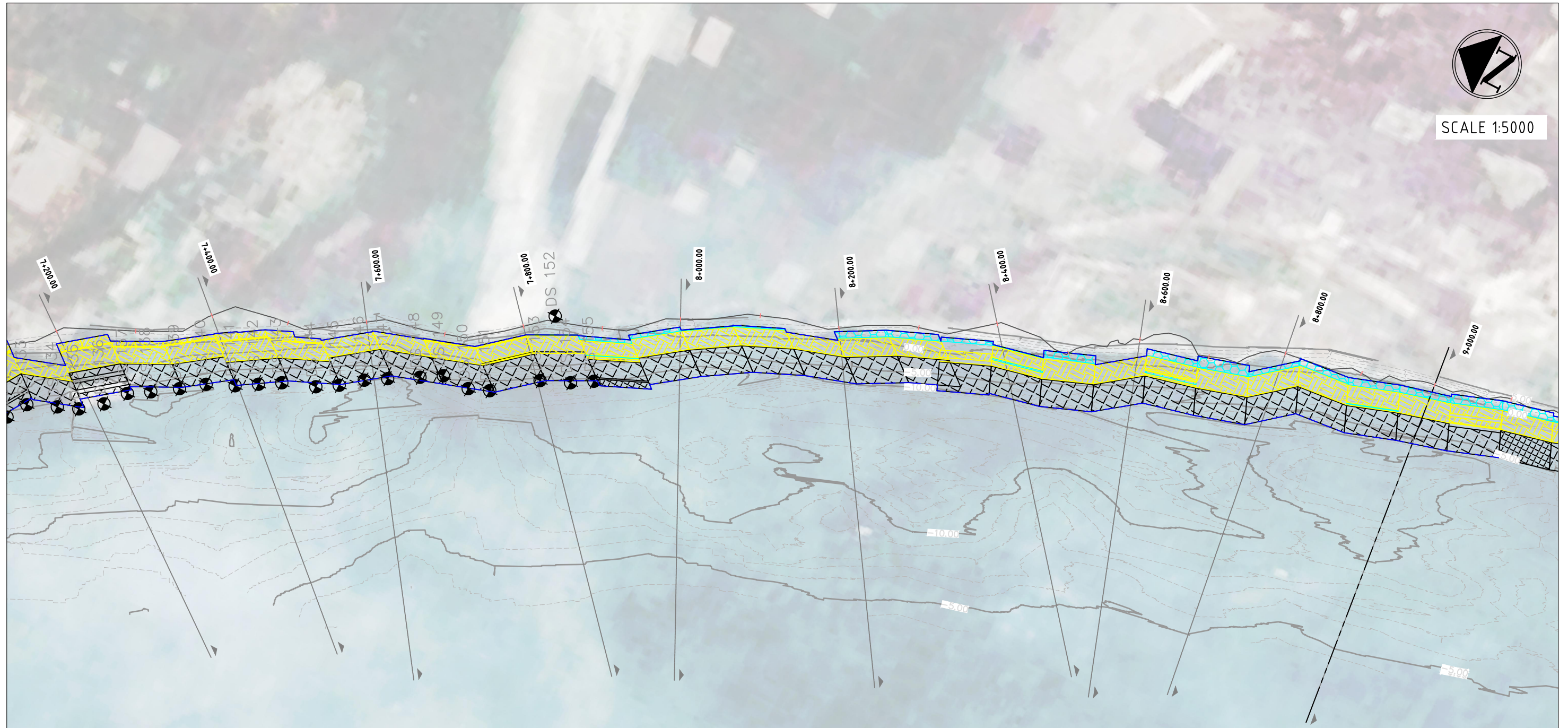
- 5 DUMPED BAGS PER ROW
- 4 DUMPED BAGS PER ROW
- 3 DUMPED BAGS PER ROW
- 2 DUMPED BAGS PER ROW
- DIVING CROSS SECTION LOCATION
- EXTENT OF GEOTEXTILE BAG DUMPING

NOTES:
 1. INTERIM CONSTRUCTION COMPLETION REPORT FOR DIVING CROSS SECTION INFORMATION
 2. TOPOGRAPHIC SURVEY OF UPPER BANK ie HWL TO CREST, NOT INCLUDED IN CONSTRUCTION COMPLETION DRAWINGS. WILL BE SURVEYED FOLLOWING CC BLOCK PLACEMENT

This drawing is confidential and shall only be used for the purposes of this project.				THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED				SCALES: AS SHOWN IN THE DRAWING		CLIENT:  BANGLADESH WATER DEVELOPMENT BOARD		CONSULTANT:  northwest hydraulic consultants  Mott MacDonald		FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM	
DESIGNED	MYA	CHECKED	GV	DESIGNED	MYA	CHECKED	GV	SHEET NO:		STATUS: AS BUILT_JULY 2016		DRAWING NAME: PLAN VIEW FROM CH 3+400 TO CH 5+200			
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0	MYA	26.07.2016	FIRST DRAFT	KO											
No.	BY	DATE	DESCRIPTION	APPD											



SCALE 1:5000



NOTES:
 1. INTERIM CONSTRUCTION COMPLETION REPORT FOR DIVING CROSS SECTION INFORMATION
 2. TOPOGRAPHIC SURVEY OF UPPER BANK ie HWL TO CREST, NOT INCLUDED IN CONSTRUCTION COMPLETION DRAWINGS.
 WILL BE SURVEYED FOLLOWING CC BLOCK PLACEMENT

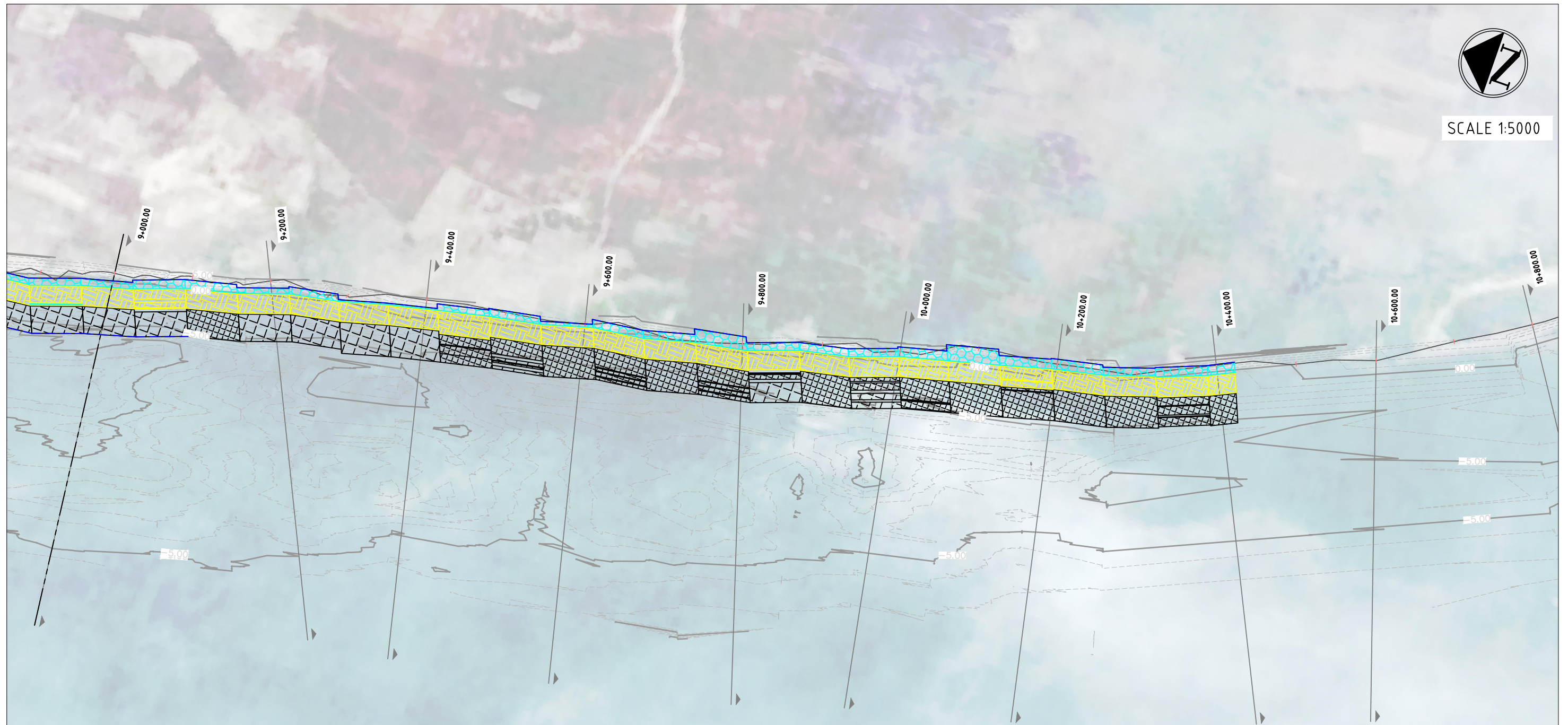
LEGENDS:

- 5 DUMPED BAGS PER ROW
- 4 DUMPED BAGS PER ROW
- 3 DUMPED BAGS PER ROW
- 2 DUMPED BAGS PER ROW
- DIVING CROSS SECTION LOCATION
- EXTENT OF GEOTEXTILE BAG DUMPING

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No.	BY	DATE	DESCRIPTION	APPD													



SCALE 1:5000



NOTES:
 1. INTERIM CONSTRUCTION COMPLETION REPORT FOR DIVING CROSS SECTION INFORMATION
 2. TOPOGRAPHIC SURVEY OF UPPER BANK ie HWL TO CREST, NOT INCLUDED IN CONSTRUCTION COMPLETION DRAWINGS.
 WILL BE SURVEYED FOLLOWING CC BLOCK PLACEMENT

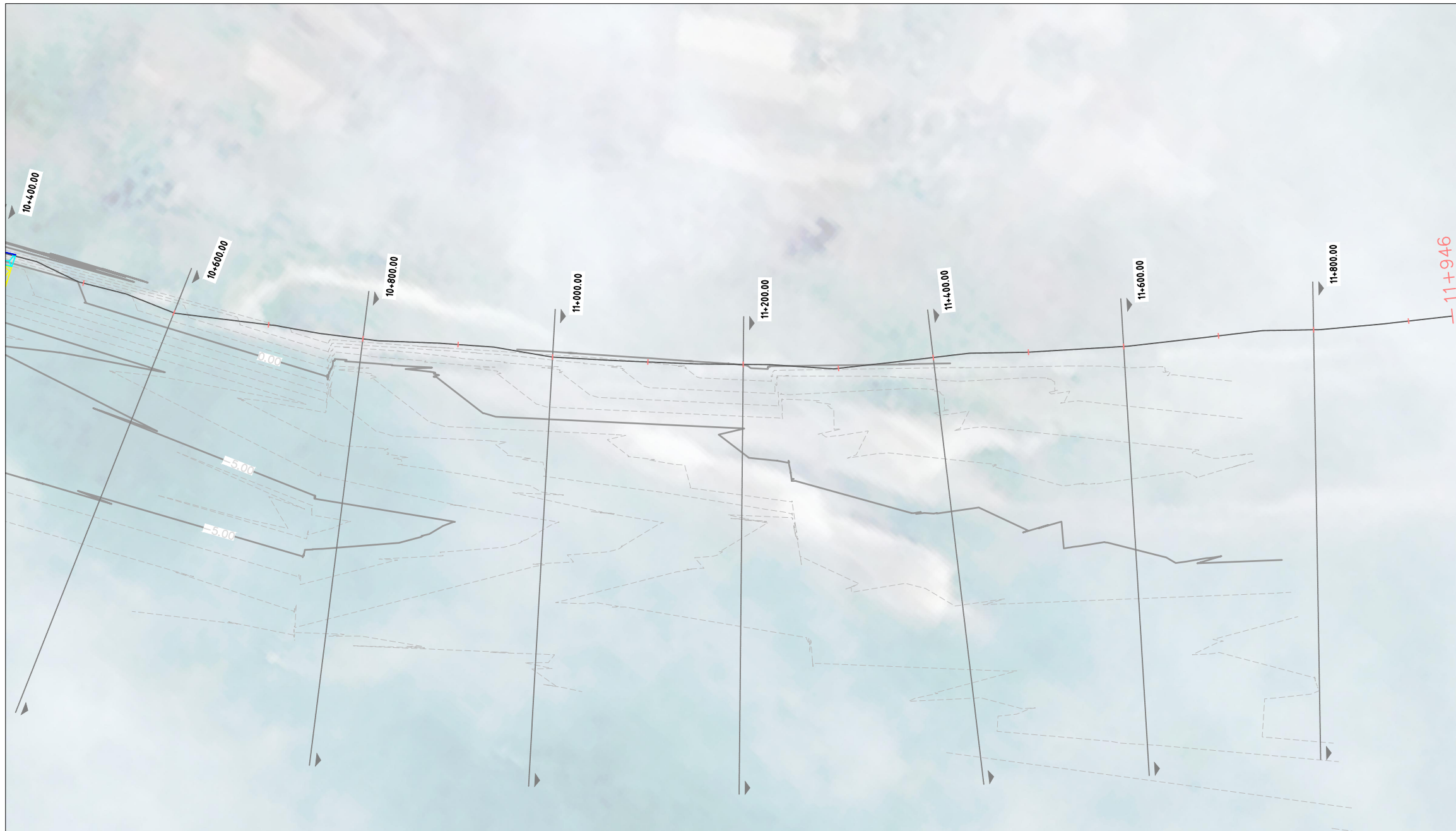
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- 5 DUMPED BAGS PER ROW
- 4 DUMPED BAGS PER ROW
- 3 DUMPED BAGS PER ROW
- 2 DUMPED BAGS PER ROW
- DIVING CROSS SECTION LOCATION
- EXTENT OF GEOTEXTILE BAG DUMPING

This drawing is confidential and shall only be used for the purposes of this project.				THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED				SCALES: AS SHOWN IN THE DRAWING		CLIENT:  BANGLADESH WATER DEVELOPMENT BOARD		CONSULTANT:   northwest hydraulic consultants Mott MacDonald		FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM			
DESIGNED	MYA	CHECKED	GV	SHEET NO:		STATUS: AS BUILT _ JULY 2016		DRAWING NAME: PLAN VIEW FROM CH 9+000 TO CH 10+600		DRAWING NO: FRERMIP-ISPMC-HAR-08		REVISION: 0					
DRAWN	MYA	CHECKED	GV														
APPROVED	KO	DATE															
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No.	BY	DATE	DESCRIPTION	APPD													



SCALE 1:5000

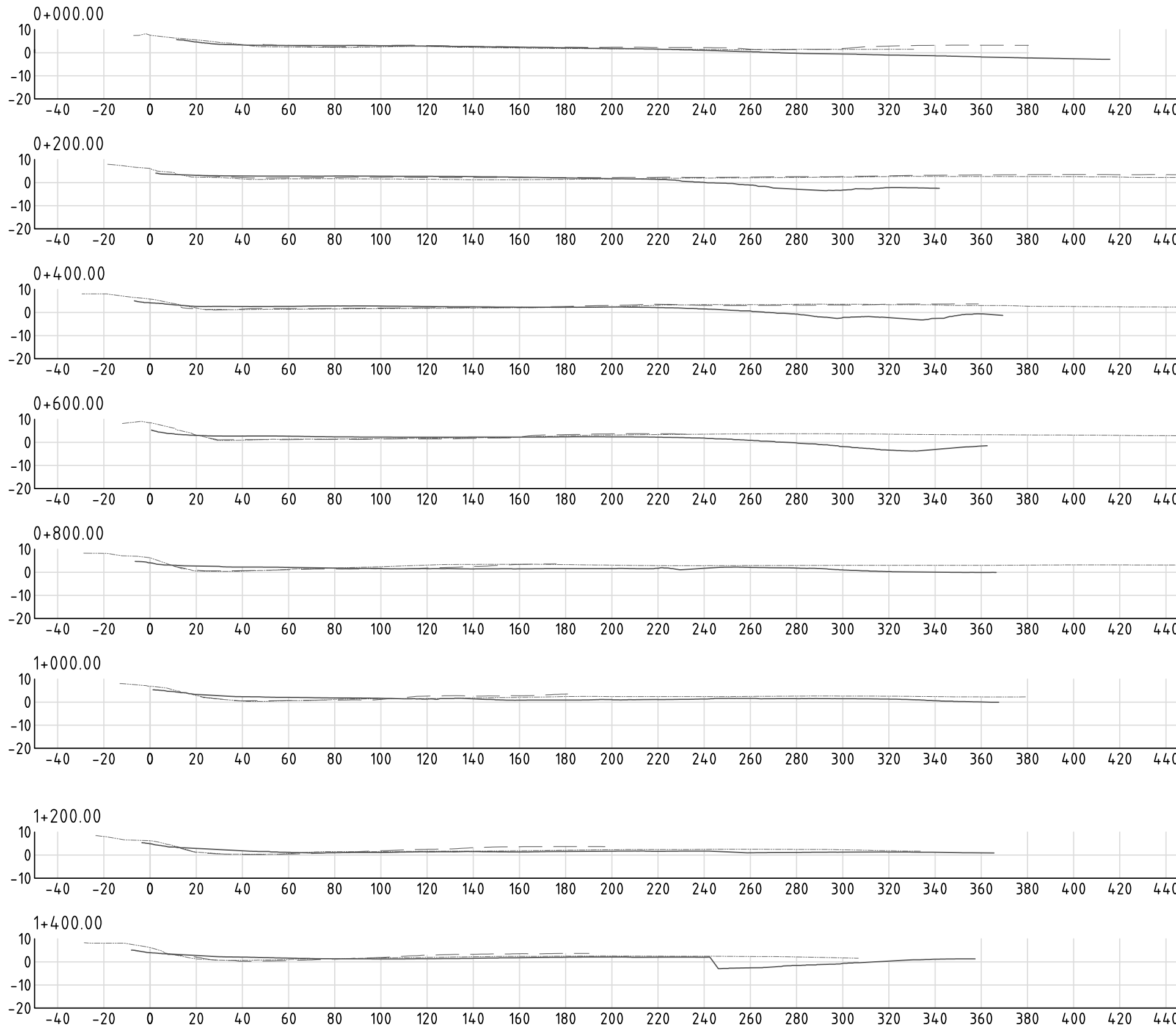


NOTES:
 1. INTERIM CONSTRUCTION COMPLETION REPORT FOR DIVING CROSS SECTION INFORMATION
 2. TOPOGRAPHIC SURVEY OF UPPER BANK ie HWL TO CREST, NOT INCLUDED IN CONSTRUCTION COMPLETION DRAWINGS.
 WILL BE SURVEYED FOLLOWING CC BLOCK PLACEMENT

LEGENDS:

- 5 DUMPED BAGS PER ROW
- 4 DUMPED BAGS PER ROW
- 3 DUMPED BAGS PER ROW
- 2 DUMPED BAGS PER ROW
- DIVING CROSS SECTION LOCATION
- EXTENT OF GEOTEXTILE BAG DUMPING

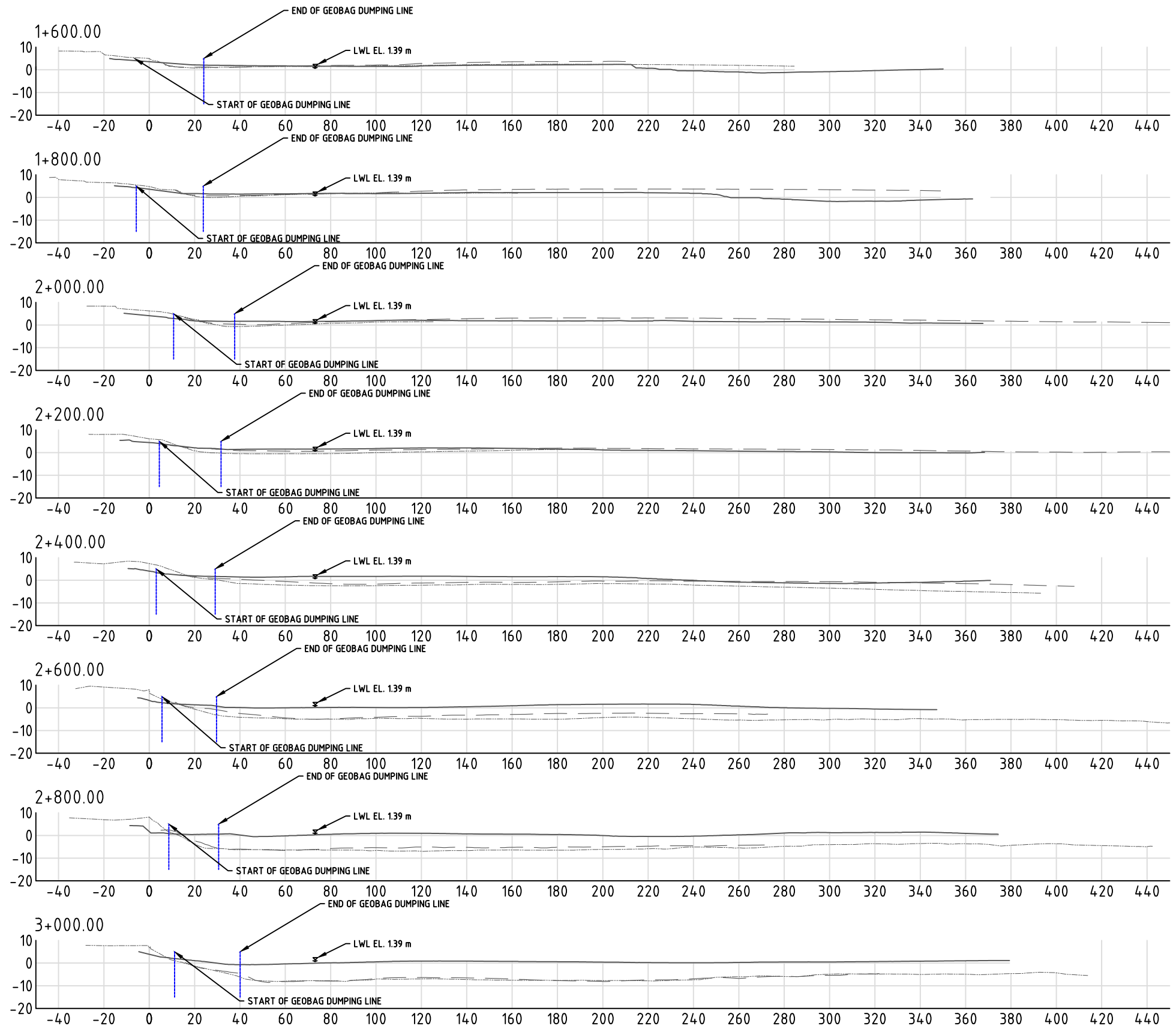
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				DRAWN MYA CHECKED GV				PLAN VIEW FROM CH 10+600 TO CH 11+800						DRAWING NO:	
				APPROVED KO DATE				AS BUILT _ JULY 2016						FRERMIP-ISPMC-HAR-09	
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No.	BY	DATE	DESCRIPTION	APPD							0				



LEGENDS:

PRE-CONSTRUCTION SURVEY	-----
JUNE MONITORING SURVEY	- - - - -
AS-BUILT SURVEY	_____

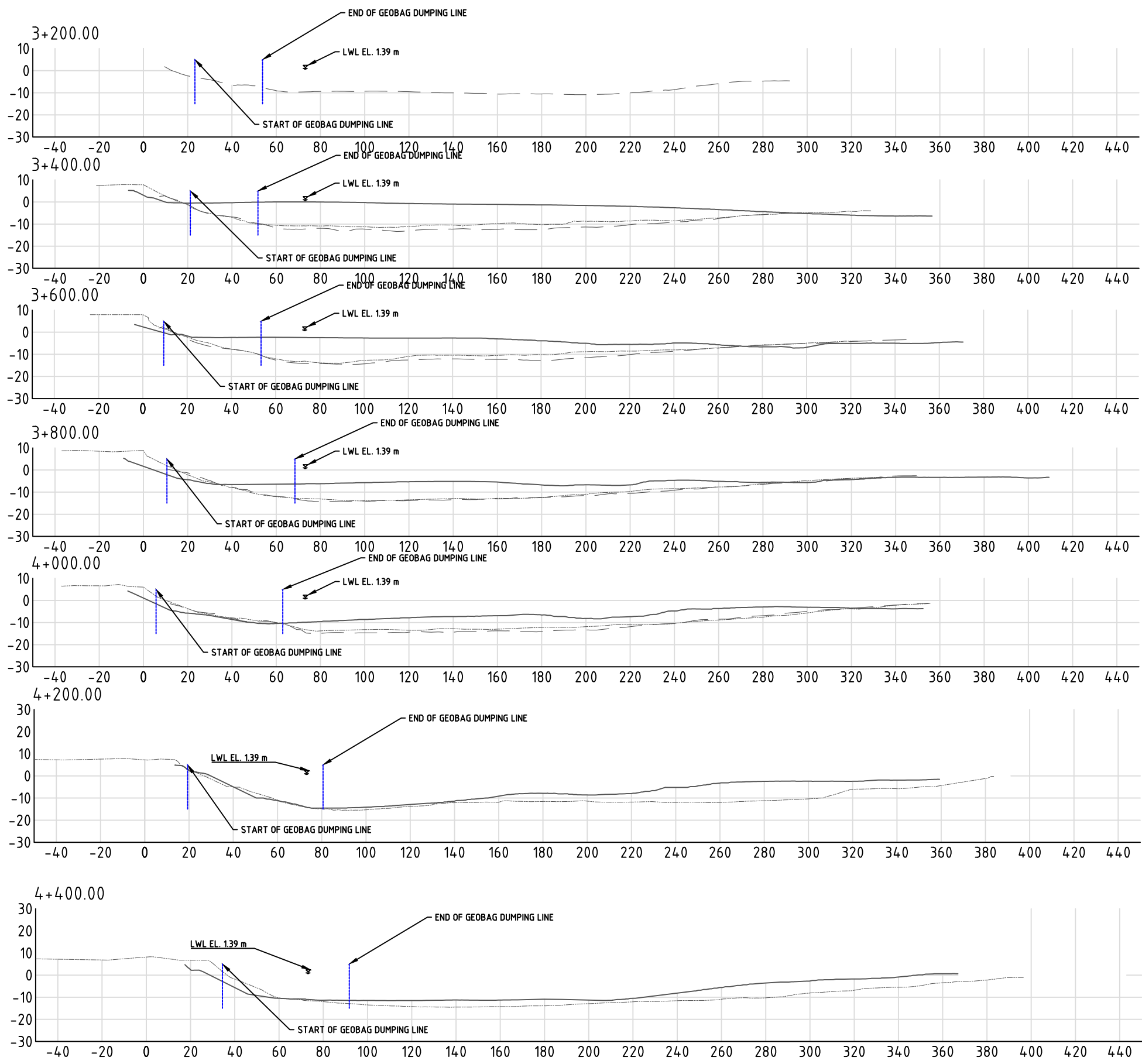
This drawing is confidential and shall only be used for the purposes of this project.				THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED				SCALES:		CLIENT:		CONSULTANT:		FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM			
				DESIGNED	HYA	CHECKED	GV	AS SHOWN IN THE DRAWING		 BANGLADESH WATER DEVELOPMENT BOARD		 northwest hydraulic consultants		 Mott MacDonald		DRAWING NAME:	
				DRAWN	HYA	CHECKED	GV									SECTION VIEW FROM CH 0+000 TO CH 1+400	
				APPROVED	KO	DATE										DRAWING NO:	
0	MYA	26.07.2016	FIRST DRAFT	KO			SHEET NO:		STATUS:		FRERMIP-ISPMC-HAR-10		REVISION:				
No.	BY	DATE	DESCRIPTION	APPD			10		AS BUILT_JULY 2016				0				



LEGENDS:

PRE-CONSTRUCTION SURVEY	-----
JUNE MONITORING SURVEY	- - - - -
AS-BUILT SURVEY	_____

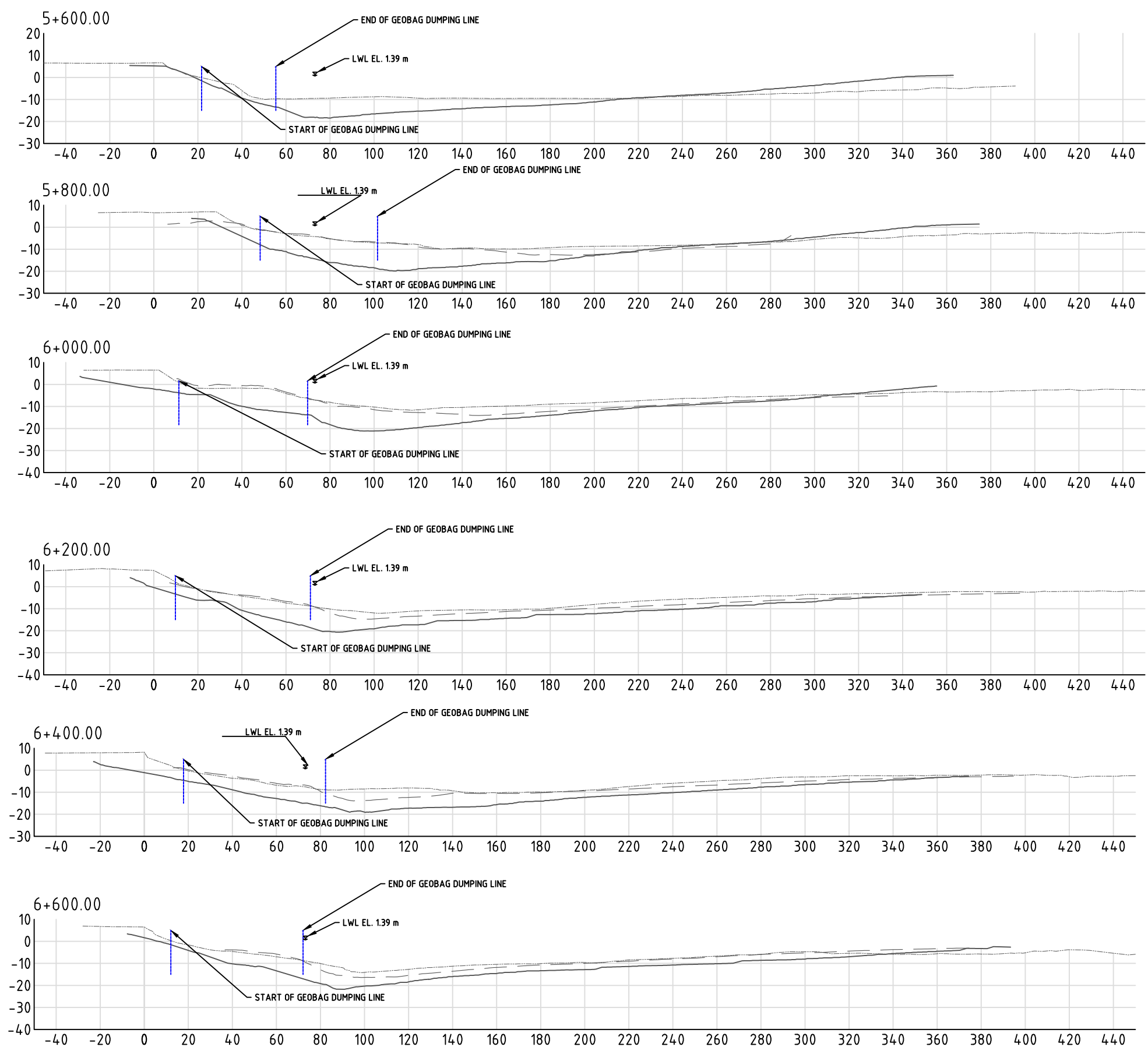
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				DESIGNED MYA CHECKED GV				AS SHOWN IN THE DRAWING		 BANGLADESH WATER DEVELOPMENT BOARD		 northwest hydraulic consultants  Mott MacDonald		DRAWING NAME:	
				DRAWN MYA CHECKED GV										SECTION VIEW FROM CH 1+600 TO CH 3+000	
				APPROVED KO DATE										DRAWING NO:	
0	MYA	26.07.2016	FIRST DRAFT	KD					SHEET NO:		STATUS:		FRERMIP-ISPMC-HAR-11		REVISION:
No.	BY	DATE	DESCRIPTION	APPD					11		AS BUILT_JULY 2016				0



LEGENDS:

PRE-CONSTRUCTION SURVEY	-----
JUNE MONITORING SURVEY
AS-BUILT SURVEY	_____

This drawing is confidential and shall only be used for the purposes of this project.				THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED				SCALES: AS SHOWN IN THE DRAWING		CLIENT:  BANGLADESH WATER DEVELOPMENT BOARD		CONSULTANT:  northwest hydraulic consultants  Mott MacDonald		FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM			
DESIGNED		HYA		CHECKED		GV		SHEET NO: 12				DRAWING NAME: SECTION VIEW FROM CH 3+200 TO CH 4+400					
DRAWN		HYA		CHECKED		GV		DATE				STATUS: AS BUILT_JULY 2016		DRAWING NO: FRERMIP-ISPMC-HAR-12		REVISION: 0	
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No.		BY		DATE		DESCRIPTION		APPD									



LEGENDS:

PRE-CONSTRUCTION SURVEY	-----
JUNE MONITORING SURVEY	- . - . - .
AS-BUILT SURVEY	_____

This drawing is confidential and shall only be used for the purposes of this project.

No.	BY	DATE	DESCRIPTION	APPD
0	MYA	26.07.2016	FIRST DRAFT	KD

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED


DESIGNED	HYA	CHECKED	GV
DRAWN	HYA	CHECKED	GV
APPROVED	KD	DATE	

SCALES:

AS SHOWN IN THE DRAWING

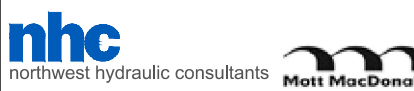
SHEET NO: 14

CLIENT:



BANGLADESH WATER DEVELOPMENT BOARD

CONSULTANT:



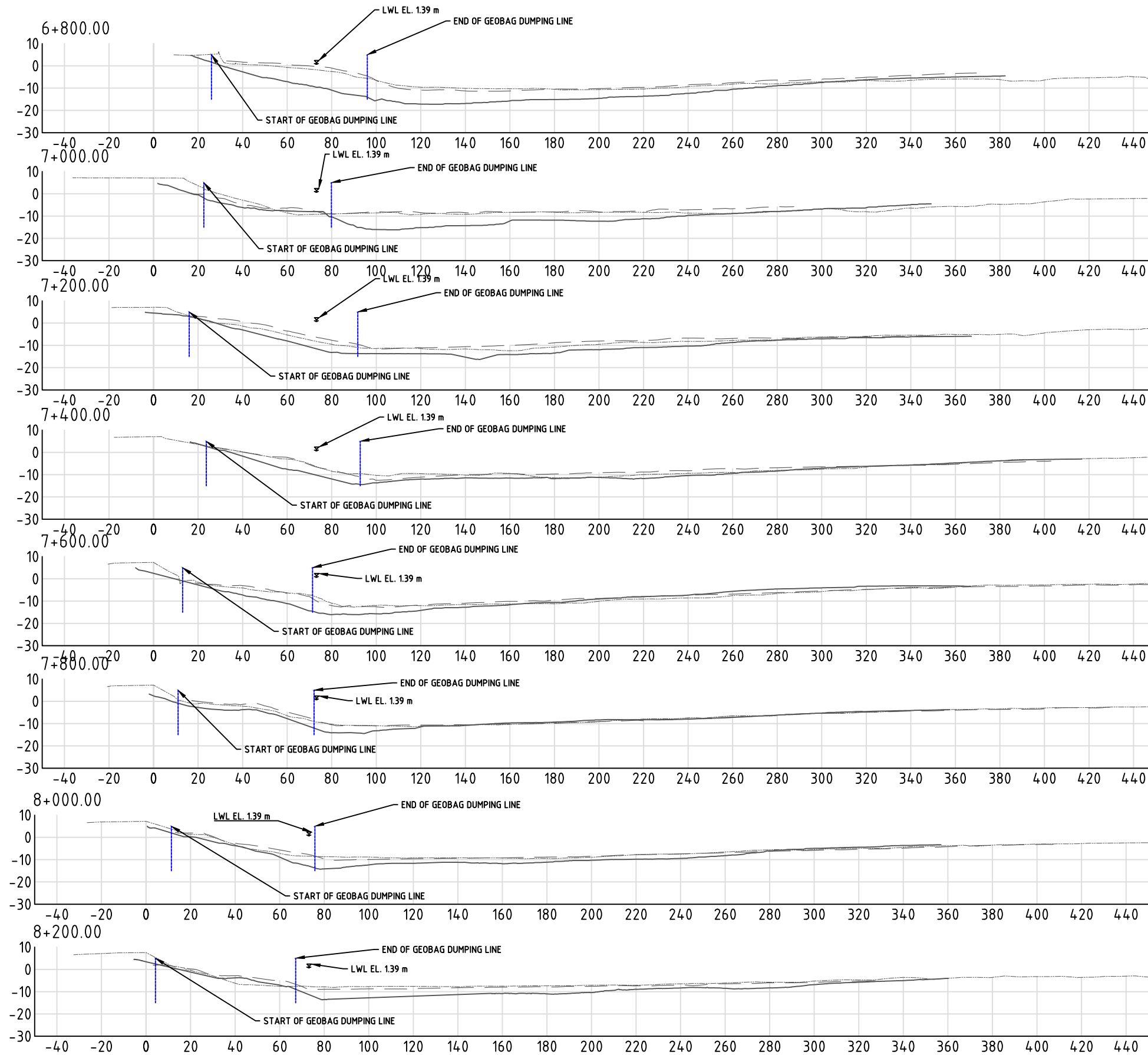
STATUS: AS BUILT_JULY 2016

FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM

DRAWING NAME: SECTION VIEW FROM CH 5+600 TO CH 6+600

DRAWING NO: FRERMIP-IPMC-HAR-14

REVISION: 0



LEGENDS:

PRE-CONSTRUCTION SURVEY	-----
JUNE MONITORING SURVEY	- - - - -
AS-BUILT SURVEY	_____

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DESIGNED		HYA		CHECKED		GV		SHEET NO: 15				DRAWING NAME: SECTION VIEW FROM CH 6+800 TO CH 8+200					
DRAWN		HYA		CHECKED		GV		DATE				STATUS: AS BUILT_JULY 2016		DRAWING NO: FRERMIP-ISPMC-HAR-15		REVISION: 0	
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0		MYA		26.07.2016		FIRST DRAFT		KD									
No.		BY		DATE		DESCRIPTION		APPD									

Figure A.6 Zaffarganj Interim Construction Completion Drawings

FRERMIP – ZAFARGANJ SITE

INTERIM CONSTRUCTION RECORD DRAWINGS

JULY, 2016



PROJECT LOCATION
NTS

NOTES:
PROJECTION SYSTEM USED FOR PRODUCING THESE DRAWINGS IS BANGLADESH TRANSVERSE MERCATOR (BTM)



BAG PLACEMENT RECORDS
AS OF JUNE 30,
2016

SITE PLAN
NTS

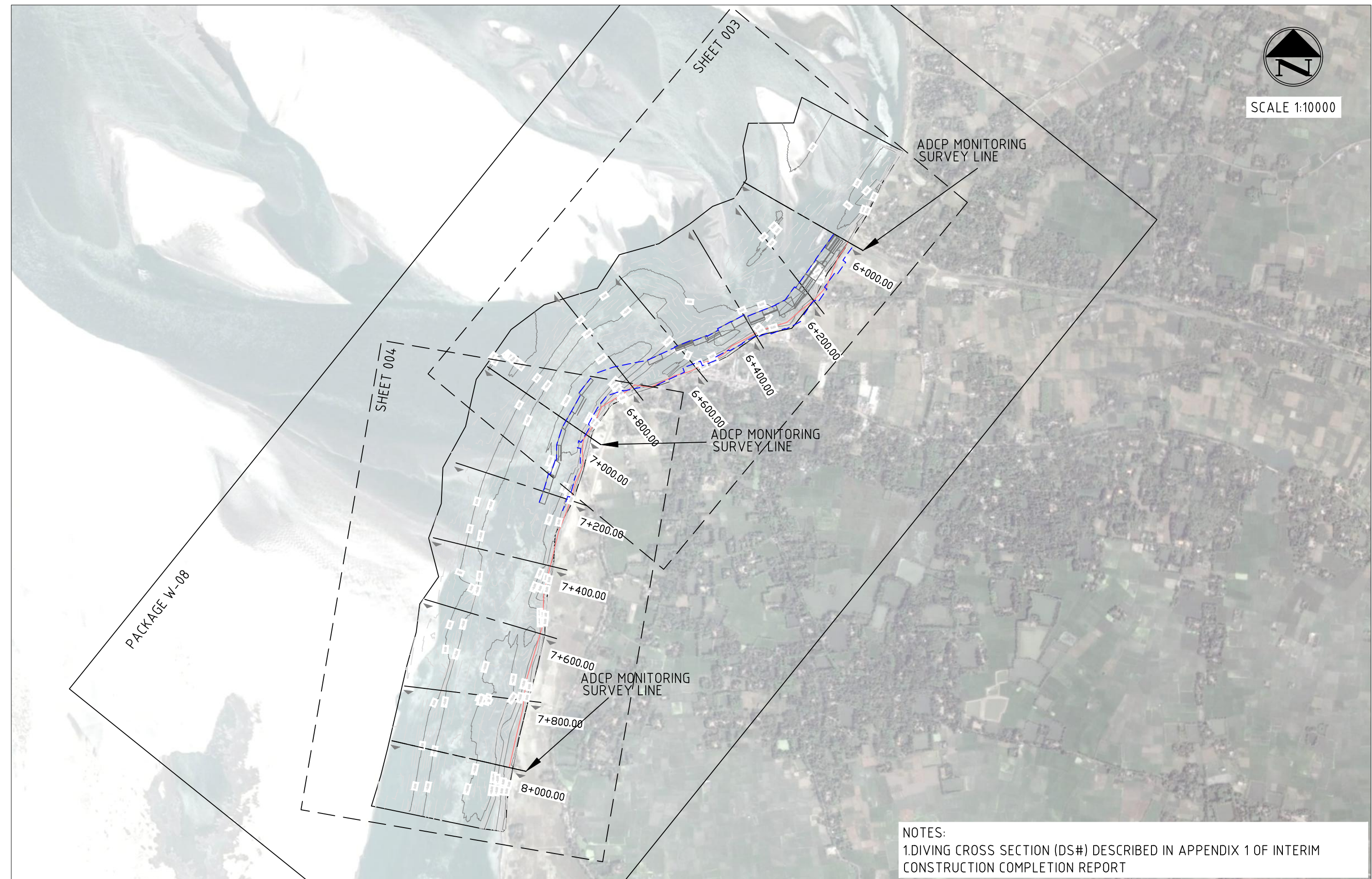
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BM NO	EASTING	NORTHING
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3	477194	642604
4	477105	642470

DRAWING INDEX		
SHEET NUMBER	DESCRIPTION	REVISION
1	SITE & LOCATION MAP, BM POSITIONS	0
2	KEY MAP	0
3	PLAN KM 6+000 – 7+000	0
4	PLAN KM 7+000 – 8+000	0
5	SECTION KM 6+000 – 6+600	0
7	SECTION KM 6+800 – 7+400	0
8	SECTION KM 7+600 – 8+000	0

This drawing is confidential and shall only be used for the purposes of this project.				THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED				SCALES:		CLIENT:		CONSULTANT:		FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM			
				DESIGNED: MYA				AS SHOWN IN THE DRAWING		 BANGLADESH WATER DEVELOPMENT BOARD		 northwest hydraulic consultants		 Mott MacDonald		DRAWING NAME:	
				DRAWN: MYA				SHEET NO: 001								SITE & LOCATION MAP, BM POSITIONS	
				APPROVED: KO						STATUS: AS BUILT_JULY 2016		DRAWING NO: FRERMIP-ISPMC-ZAF-01		REVISION: 0			
0 MYA		28.07.2016		FIRST DRAFT		KO											
No. BY		DATE		DESCRIPTION		APPD											



SCALE 1:10000

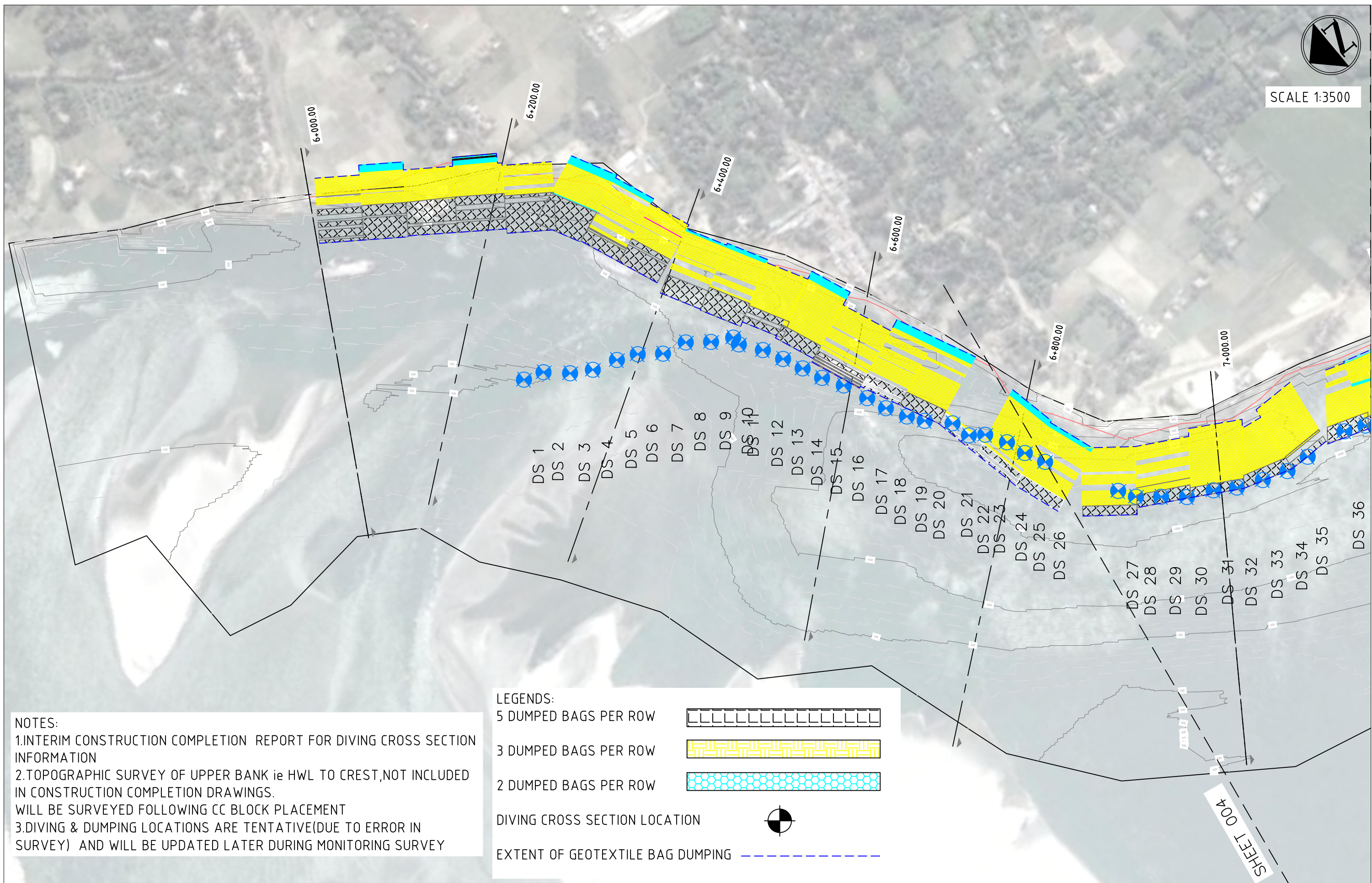


NOTES:
1. DIVING CROSS SECTION (DS#) DESCRIBED IN APPENDIX 1 OF INTERIM CONSTRUCTION COMPLETION REPORT

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DRAWN	MYA	CHECKED	GV	DRAWN	MYA	CHECKED	GV										
APPROVED	KO	DATE		APPROVED	KO	DATE											
0	MYA	28.07.2016	FIRST DRAFT	KO													
No.	BY	DATE	DESCRIPTION	APPD													



SCALE 1:3500



NOTES:
 1. INTERIM CONSTRUCTION COMPLETION REPORT FOR DIVING CROSS SECTION INFORMATION
 2. TOPOGRAPHIC SURVEY OF UPPER BANK ie HWL TO CREST, NOT INCLUDED IN CONSTRUCTION COMPLETION DRAWINGS. WILL BE SURVEYED FOLLOWING CC BLOCK PLACEMENT
 3. DIVING & DUMPING LOCATIONS ARE TENTATIVE (DUE TO ERROR IN SURVEY) AND WILL BE UPDATED LATER DURING MONITORING SURVEY

LEGENDS:

- 5 DUMPED BAGS PER ROW
- 3 DUMPED BAGS PER ROW
- 2 DUMPED BAGS PER ROW
- DIVING CROSS SECTION LOCATION
- EXTENT OF GEOTEXTILE BAG DUMPING

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DESIGNED		MYA		CHECKED		GV		SHEET NO: 003				DRAWING NAME: PLAN KM 6+000 TO KM 7+000					
DRAWN		MYA		CHECKED		GV						DRAWING NO: FRRMIP-ISPMC-ZAF-01					
APPROVED		KO		DATE								STATUS: AS BUILT_JULY 2016				REVISION: 0	
0	MYA	28.07.2016	FIRST DRAFT	KO													
No.	BY	DATE	DESCRIPTION	APPD													

SHEET 004



SCALE 1:3500



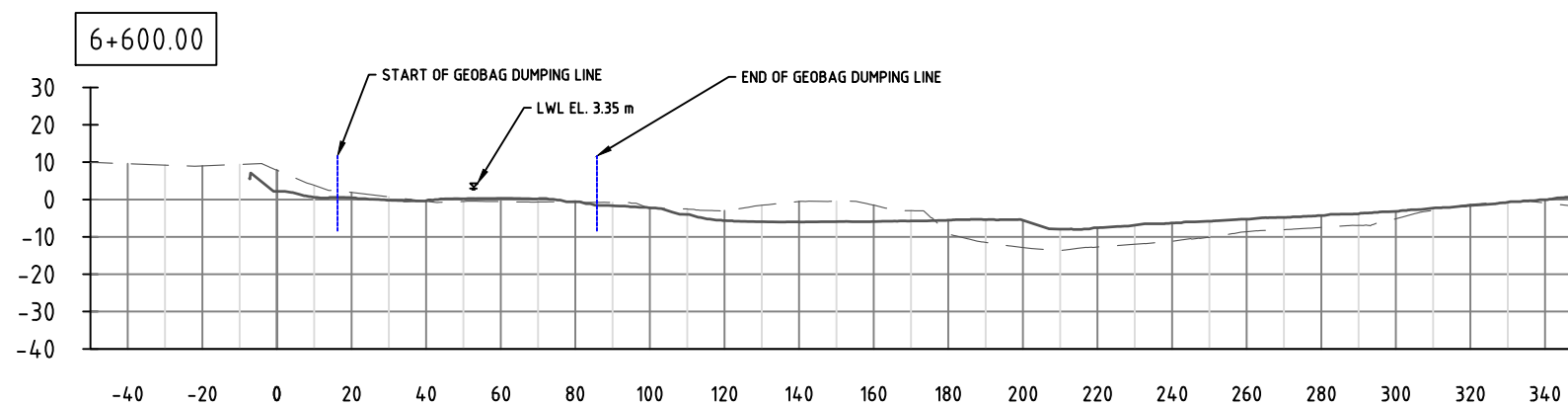
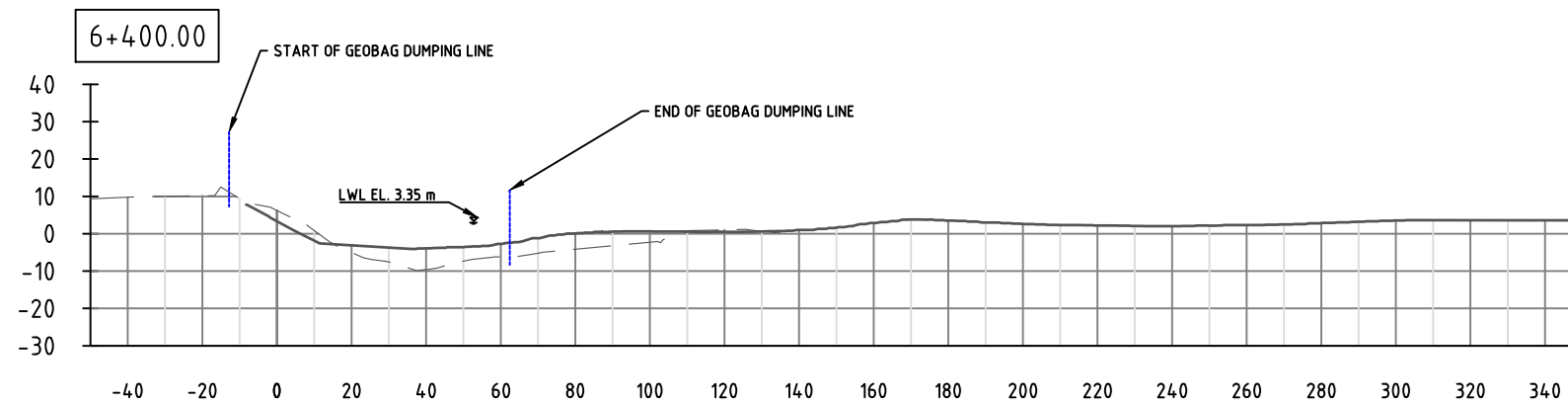
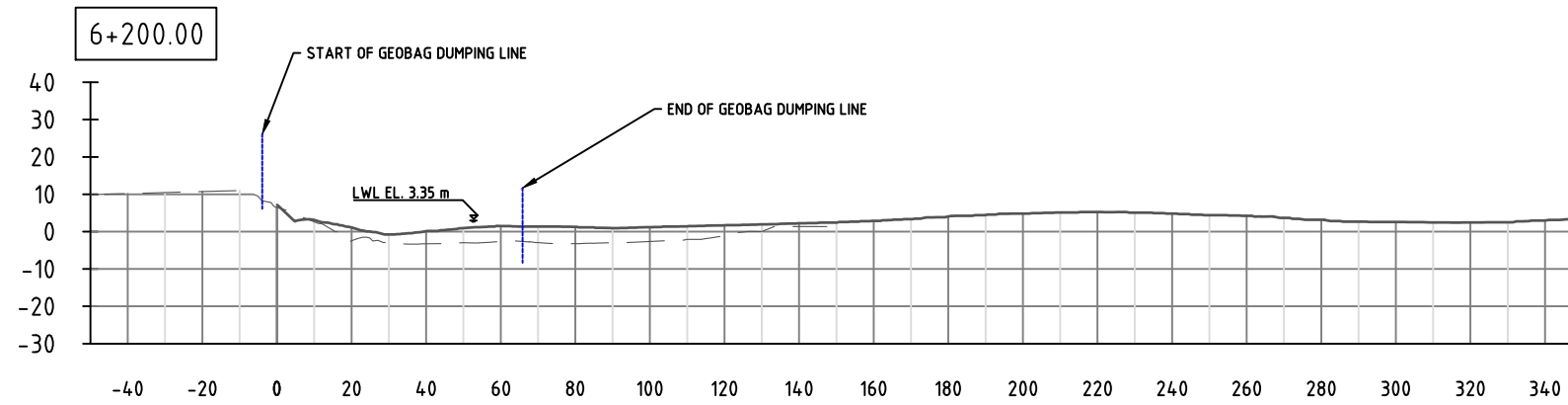
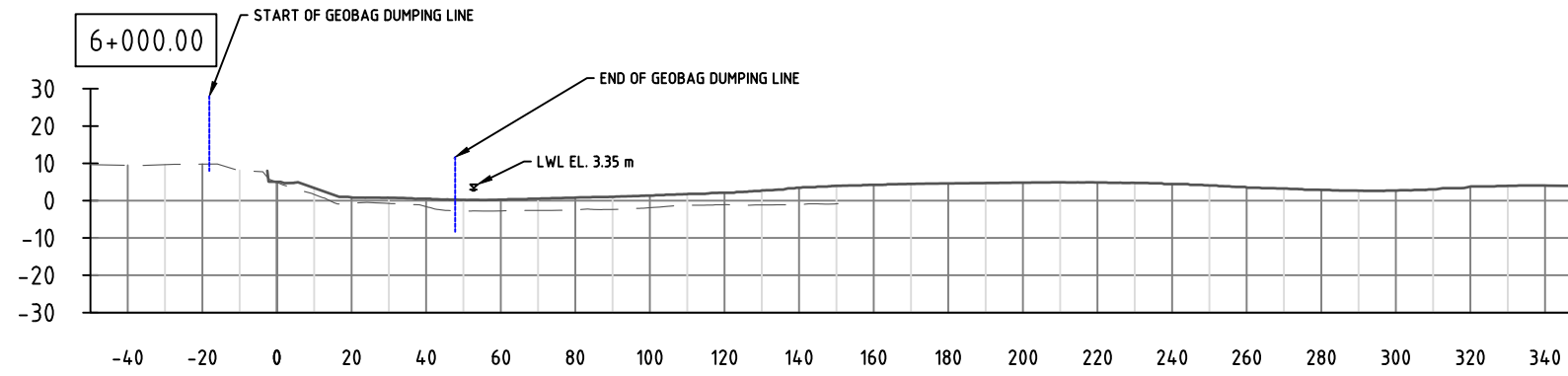
SHEET 003

NOTES:
 1. INTERIM CONSTRUCTION COMPLETION REPORT FOR DIVING CROSS SECTION INFORMATION
 2. TOPOGRAPHIC SURVEY OF UPPER BANK ie HWL TO CREST, NOT INCLUDED IN CONSTRUCTION COMPLETION DRAWINGS. WILL BE SURVEYED FOLLOWING CC BLOCK PLACEMENT
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LEGENDS:

- 5 DUMPED BAGS PER ROW
- 3 DUMPED BAGS PER ROW
- 2 DUMPED BAGS PER ROW
- DIVING CROSS SECTION LOCATION
- EXTENT OF GEOTEXTILE BAG DUMPING

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DESIGNED		HYA		CHECKED		GV		DRAWING NAME: PLAN KM 7+000 TO KM 8+000				DRAWING NO: FRERMIP-ISPMC-ZAF-01		REVISION: 0			
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No. BY		DATE		DESCRIPTION		APPD											

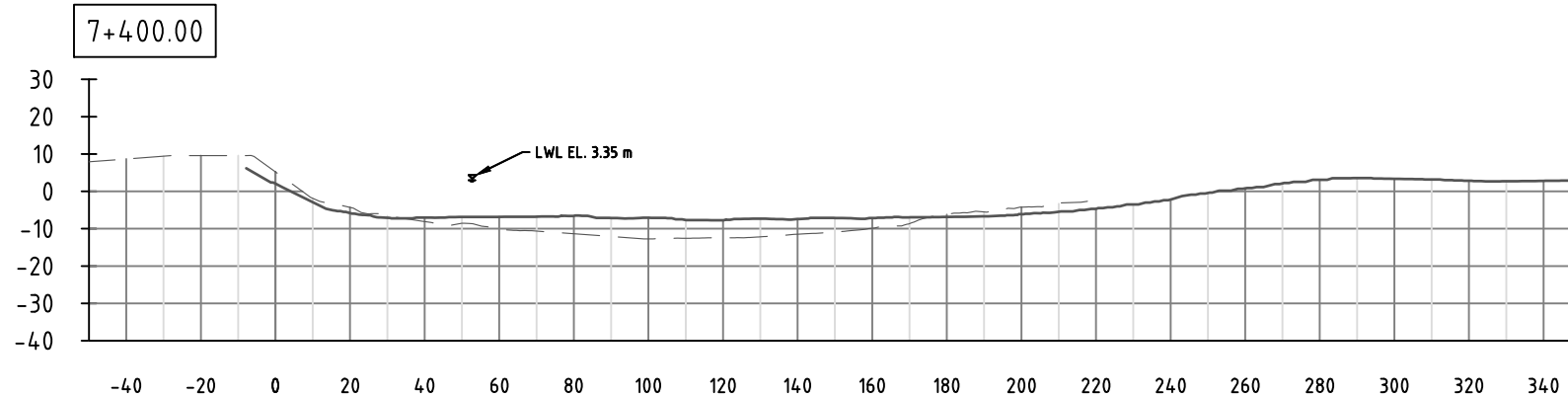
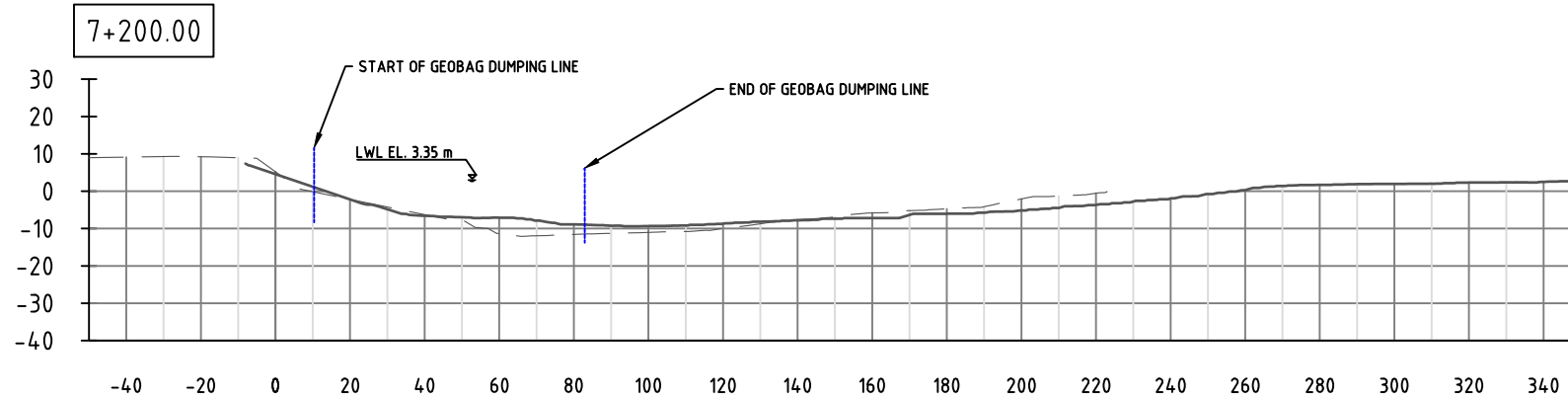
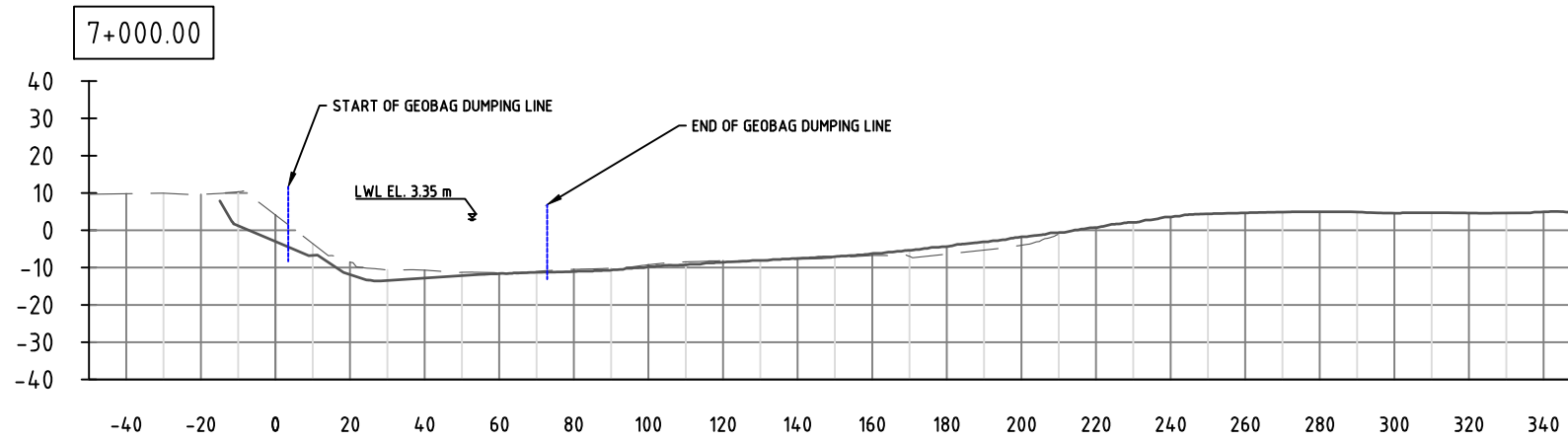
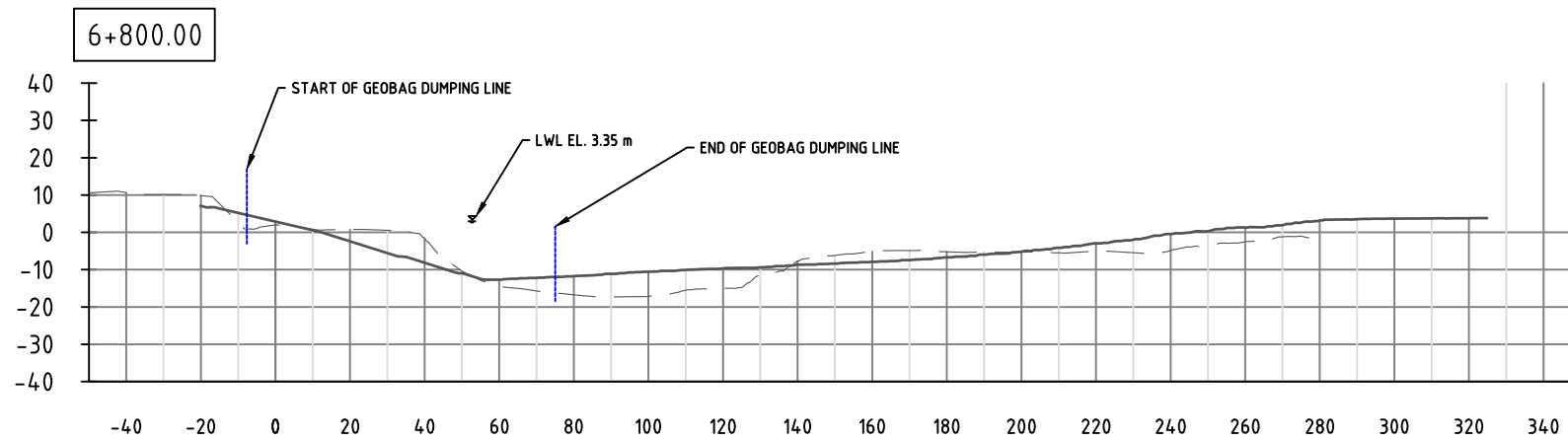


LEGENDS:

PRE-CONSTRUCTION SURVEY

AS-BUILT SURVEY

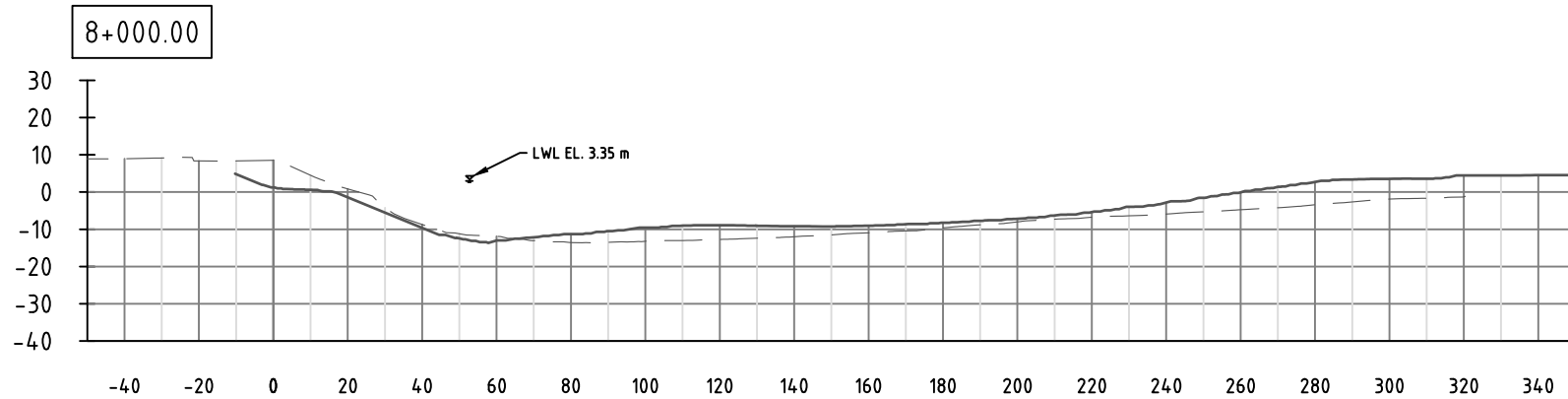
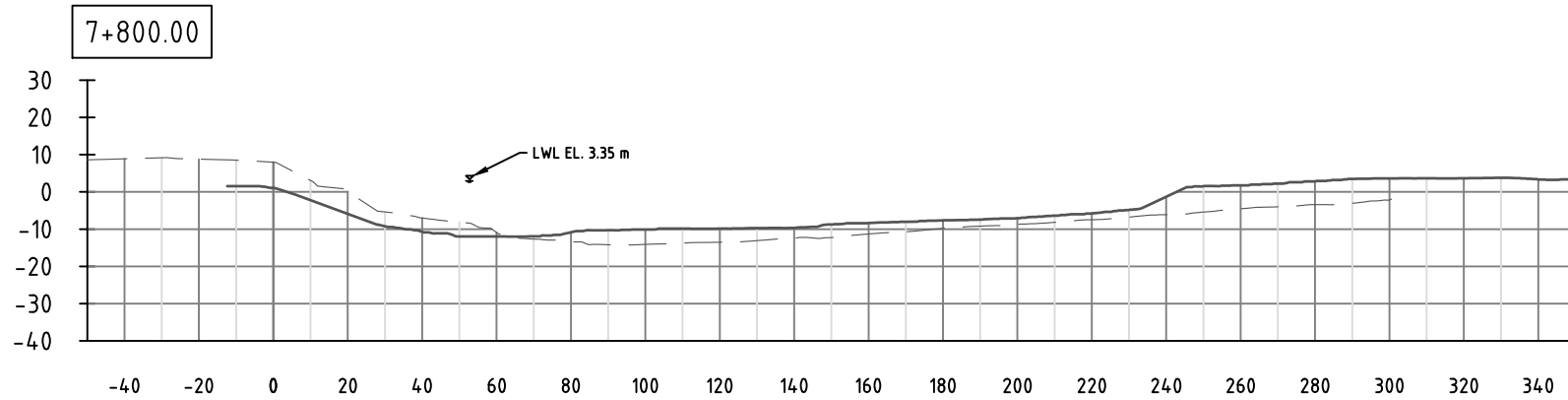
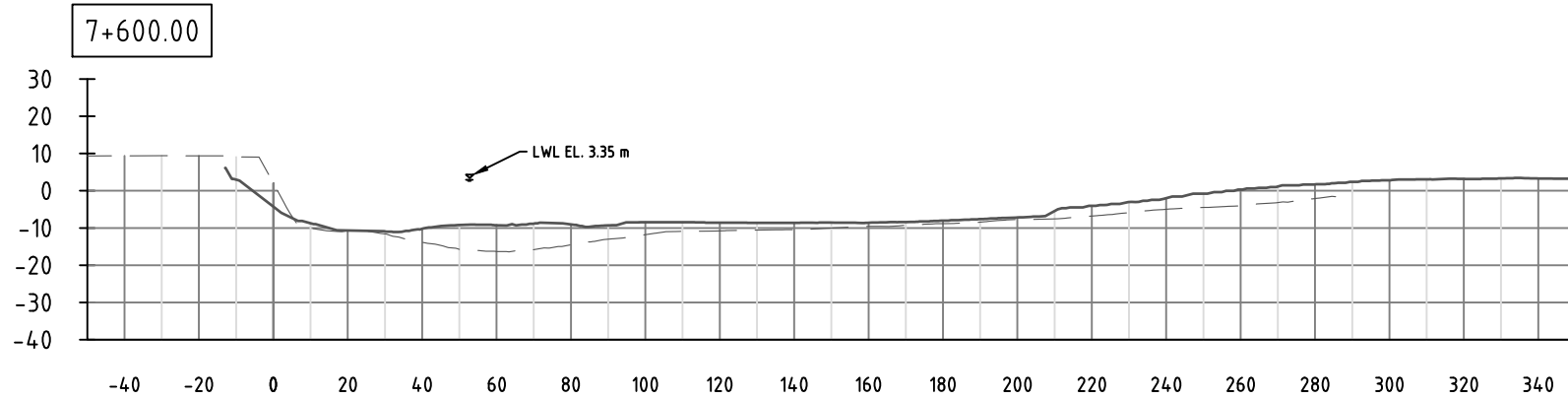
This drawing is confidential and shall only be used for the purposes of this project.				THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED				SCALES:		CLIENT:		CONSULTANT:		FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM																	
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DRAWN	HYA	CHECKED	GV																												
APPROVED	KO	DATE																													
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No.	BY	DATE	DESCRIPTION	APPD																											
												REVISION:		0																	



LEGENDS:

PRE-CONSTRUCTION SURVEY	-----
AS-BUILT SURVEY	_____

This drawing is confidential and shall only be used for the purposes of this project.				THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED				SCALES:		CLIENT:		CONSULTANT:		FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM			
				DESIGNED: MYA				CHECKED: GV		AS SHOWN IN THE DRAWING		 		DRAWING NAME:			
				DRAWN: MYA				CHECKED: GV						SECTION KM 6+800 TO KM 7+400			
				APPROVED: KO				DATE:						DRAWING NO:			
0		MYA		28.07.2016		FIRST DRAFT		KD		SHEET NO: 006		STATUS: AS BUILT_JULY 2016		FRERMIP-ISPMC-ZAF-01		REVISION: 0	
No.		BY		DATE		DESCRIPTION		APPD				BANGLADESH WATER DEVELOPMENT BOARD					



LEGENDS:

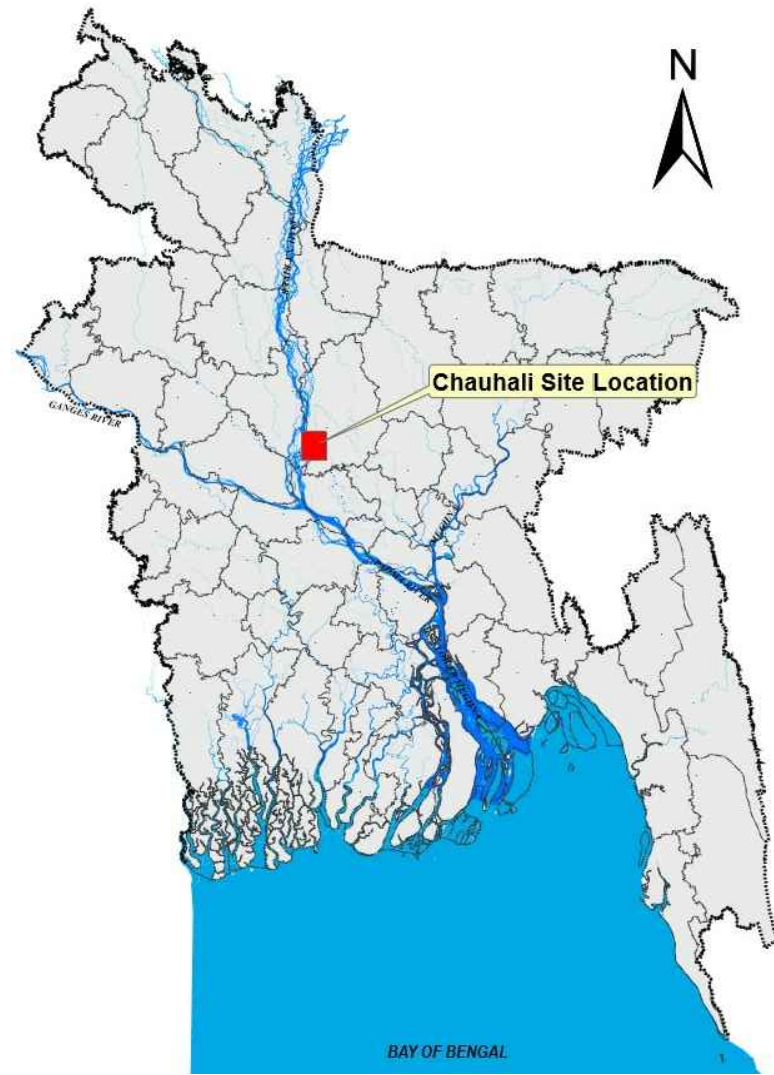
PRE-CONSTRUCTION SURVEY - - - - -

AS-BUILT SURVEY _____

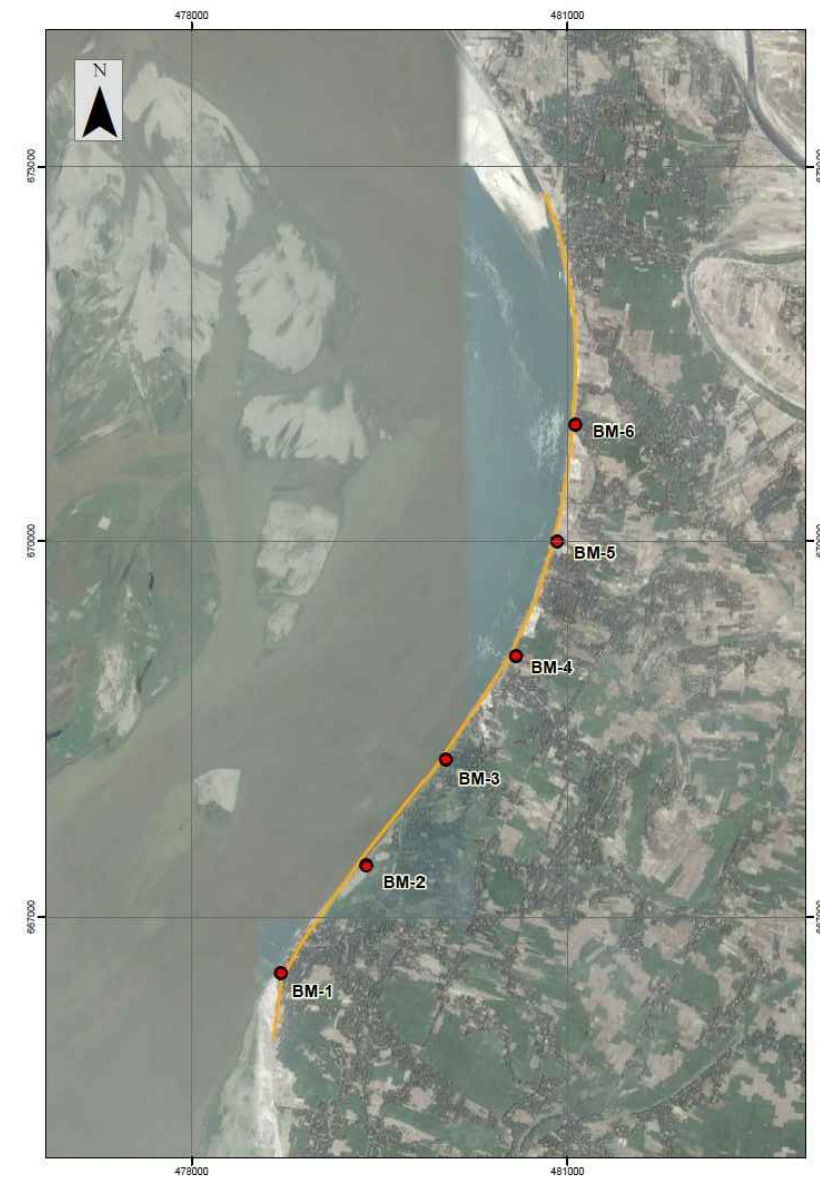
This drawing is confidential and shall only be used for the purposes of this project.				THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED				SCALES:		CLIENT:		CONSULTANT:		FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM	
				DESIGNED MYA CHECKED GV				AS SHOWN IN THE DRAWING		 BANGLADESH WATER DEVELOPMENT BOARD		  northwest hydraulic consultants Mott MacDonald		DRAWING NAME:	
				DRAWN MYA CHECKED GV										SECTION KM 7+600 TO KM 8+000	
				APPROVED KO DATE										DRAWING NO:	
0	MYA	28.07.2016	FIRST DRAFT	KD					SHEET NO:		STATUS:		FRERMIP-ISPMC-ZAF-01		
No.	BY	DATE	DESCRIPTION	APPD					007		AS BUILT_JULY 2016		REVISION: 0		

Figure A.5 Chauhali Interim Construction Completion Drawings

FRERMIP – CHAUHALI SITE INTERIM CONSTRUCTION RECORD DRAWINGS JULY, 2016



PROJECT LOCATION
NTS



SITE PLAN
NTS

BAG PLACEMENT RECORDS
AS OF JUNE 30, 2016

NOTES:
PROJECTION SYSTEM USED FOR PRODUCING THESE DRAWINGS IS BANGLADESH TRANSVERSE MERCATOR (BTM)

BM CO-ORDINATES		
BM NO	EASTING	NORTHING
1	478714	666549
2	479398	667409
3	480027	668264
4	480588	669087
5	480918	669998
6	481064	670930

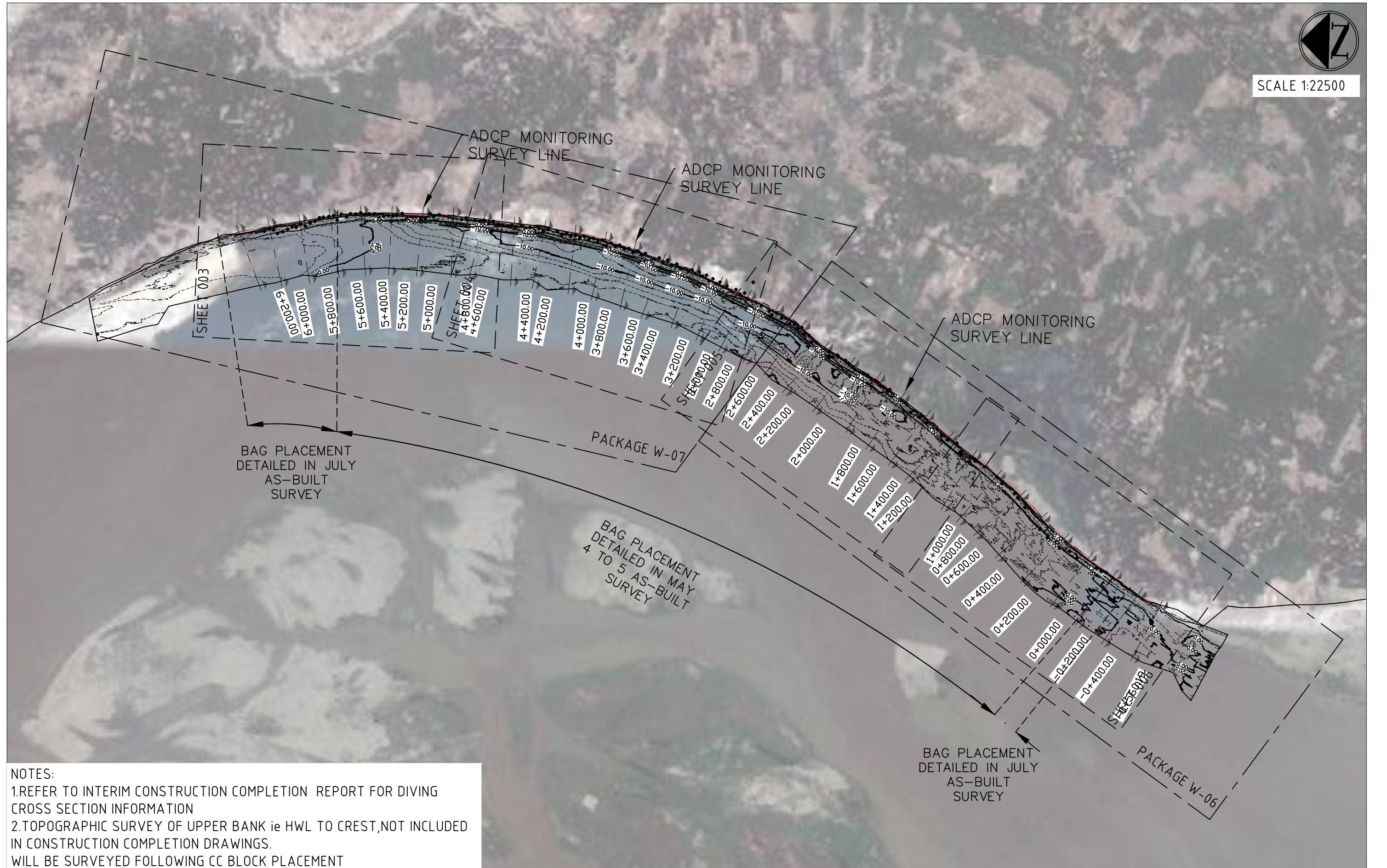
DRAWING INDEX		
SHEET NUMBER	DESCRIPTION	REVISION
1	SITE & LOCATION MAP, BM POSITIONS	0
2	KEY MAP	0
3	PLAN VIEW FROM KM 6+200 TO 4+200	0
4	PLAN VIEW FROM KM 4+600 TO 2+800	0
5	PLAN VIEW FROM KM 2+800 TO 1+000	0
6	PLAN VIEW FROM KM 1+000 TO -0+560.19	0
7	SECTION VIEW FROM KM 6+200 TO KM 5+200	0
8	SECTION VIEW FROM KM 5+000 TO KM 4+000	0
9	SECTION VIEW FROM KM 3+800 TO KM 2+800	0

DRAWING INDEX		
SHEET NUMBER	DESCRIPTION	REVISION
10	SECTION KM 2+600 TO KM 1+600	0
11	SECTION KM 1+400 TO KM 0+400	0
12	SECTION KM 0+200 TO -0+560.19	0

This drawing is confidential and shall only be used for the purposes of this project.		THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED		SCALES:	CLIENT:	CONSULTANT:	FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM			
DESIGNED	HYA	CHECKED	GV	AS SHOWN IN THE DRAWING	 BANGLADESH WATER DEVELOPMENT BOARD	 northwest hydraulic consultants  Mott MacDonald	DRAWING NAME:			
DRAWN	HYA	CHECKED	GV				SITE & LOCATION MAP, BM POSITIONS		DRAWING NO:	
APPROVED	KO	DATE					FRERMIP-ISPMC-CHA-01		REVISION:	
0	MYA	28.07.2016	FIRST DRAFT	SHEET NO:	001	STATUS:	AS BUILT _ JULY 2016			
No.	BY	DATE	DESCRIPTION	APPD			FRERMIP-ISPMC-CHA-01			
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SCALE 1:22500



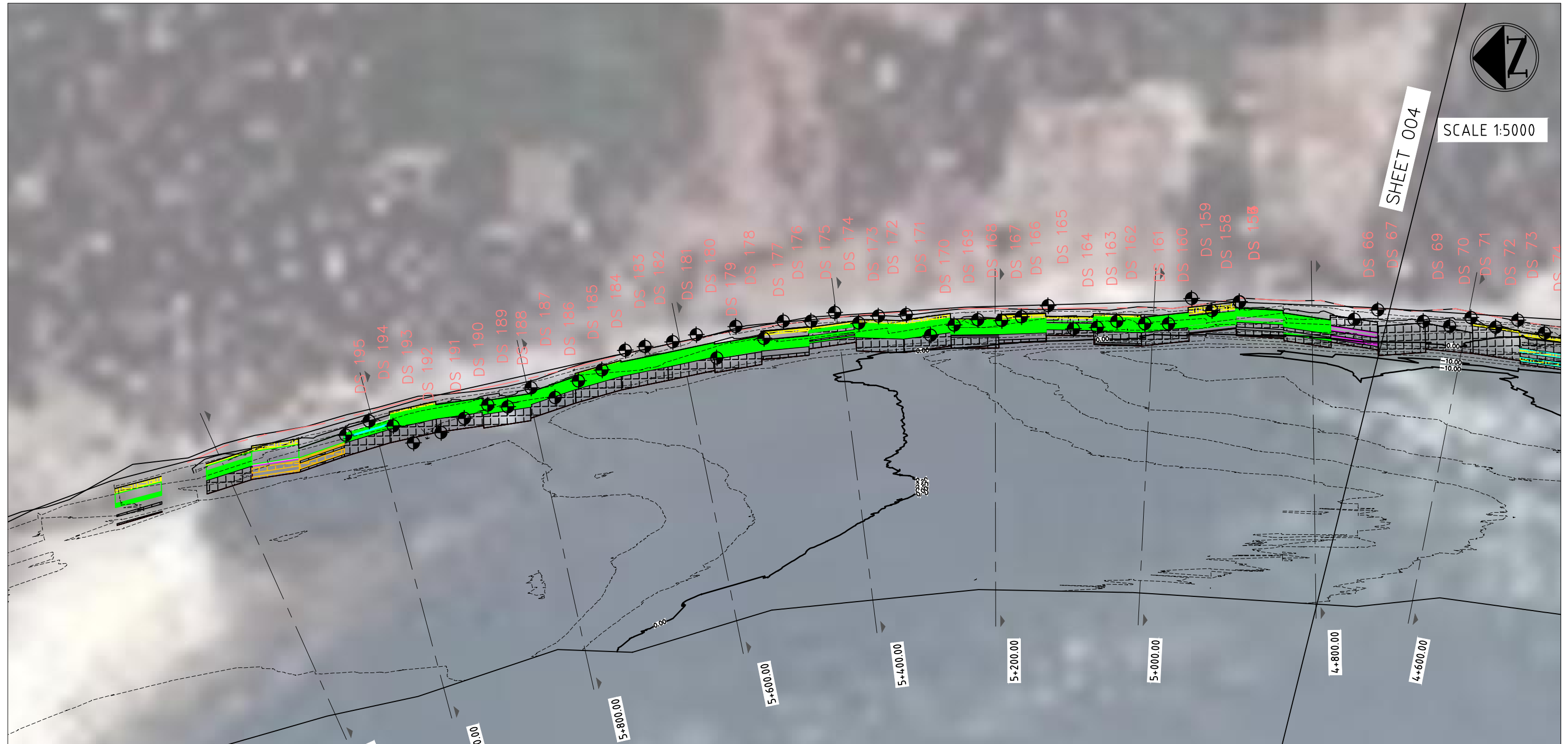
NOTES:
 1.REFER TO INTERIM CONSTRUCTION COMPLETION REPORT FOR DIVING CROSS SECTION INFORMATION
 2.TOPOGRAPHIC SURVEY OF UPPER BANK ie HWL TO CREST,NOT INCLUDED IN CONSTRUCTION COMPLETION DRAWINGS.
 WILL BE SURVEYED FOLLOWING CC BLOCK PLACEMENT

This drawing is confidential and shall only be used for the purposes of this project.				THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED				SCALES: AS SHOWN IN THE DRAWING		CLIENT:  BANGLADESH WATER DEVELOPMENT BOARD		CONSULTANT:   northwest hydraulic consultants Mott MacDonald		FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM			
DESIGNED	MYA	CHECKED	GV	SHEET NO: 002		STATUS: AS BUILT_JULY 2016		DRAWING NAME: KEY MAP		DRAWING NO: FRERMIP-ISPMC-CHA-01		REVISION: 0					
DRAWN	MYA	CHECKED	GV														
APPROVED	KO	DATE															
0	MYA	28.07.2016	FIRST DRAFT	KO													
No.	BY	DATE	DESCRIPTION	APPD													






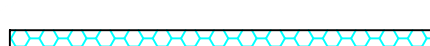

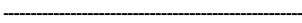
SCALE 1:5000

SHEET 004



NOTES:
 1.REFER TO INTERIM CONSTRUCTION COMPLETION REPORT FOR DIVING CROSS SECTION INFORMATION
 2.TOPOGRAPHIC SURVEY OF UPPER BANK ie HWL TO CREST,NOT INCLUDED IN CONSTRUCTION COMPLETION DRAWINGS.
 WILL BE SURVEYED FOLLOWING CC BLOCK PLACEMENT

LEGENDS:

- 5 DUMPED BAGS PER ROW 
- 4 DUMPED BAGS PER ROW 
- 3 DUMPED BAGS PER ROW 
- 2 DUMPED BAGS PER ROW 
- DIVING CROSS SECTION LOCATION 
- EXTENT OF GEOTEXTILE BAG DUMPING 

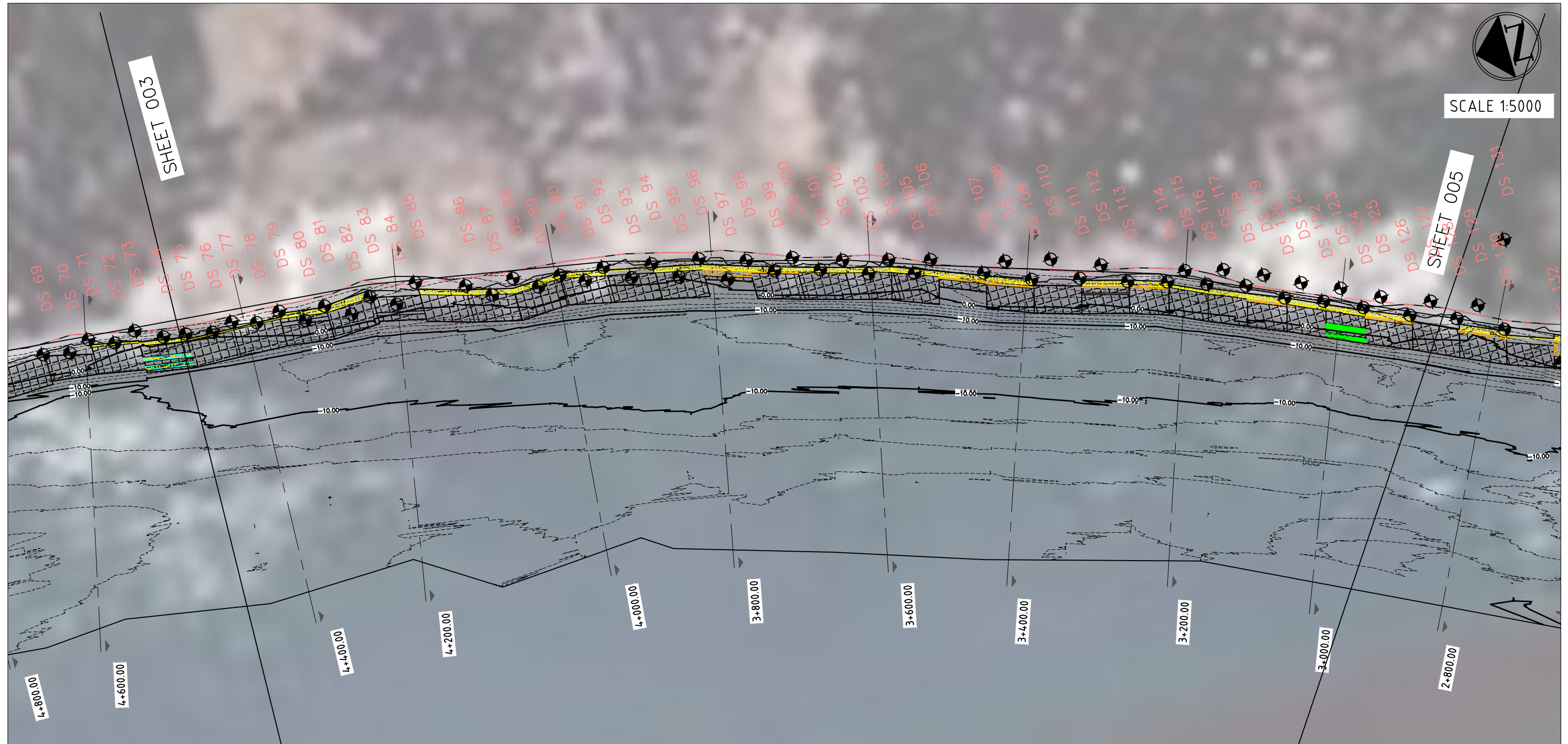
This drawing is confidential and shall only be used for the purposes of this project.				THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED				SCALES: AS SHOWN IN THE DRAWING		CLIENT:  BANGLADESH WATER DEVELOPMENT BOARD		CONSULTANT:  northwest hydraulic consultants  Mott MacDonald		FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM			
DESIGNED	MYA	CHECKED	GV	SHEET NO: 003		STATUS: AS BUILT_JULY 2016		DRAWING NAME: PLAN VIEW FROM KM 6+200 TO 4+600				DRAWING NO: FRERMP-ISPMC-CHA-01		REVISION: 0			
DRAWN	MYA	CHECKED	GV														
APPROVED	KO	DATE															
0	MYA	28.07.2016	FIRST DRAFT														
No.	BY	DATE	DESCRIPTION	APPD													



SCALE 1:5000

SHEET 003

SHEET 005



NOTES:
 1.REFER TO INTERIM CONSTRUCTION COMPLETION REPORT FOR DIVING CROSS SECTION INFORMATION
 2.TOPOGRAPHIC SURVEY OF UPPER BANK ie HWL TO CREST,NOT INCLUDED IN CONSTRUCTION COMPLETION DRAWINGS.
 WILL BE SURVEYED FOLLOWING CC BLOCK PLACEMENT

LEGENDS:

- 5 DUMPED BAGS PER ROW
- 4 DUMPED BAGS PER ROW
- 3 DUMPED BAGS PER ROW
- 2 DUMPED BAGS PER ROW
- DIVING CROSS SECTION LOCATION
- EXTENT OF GEOTEXTILE BAG DUMPING

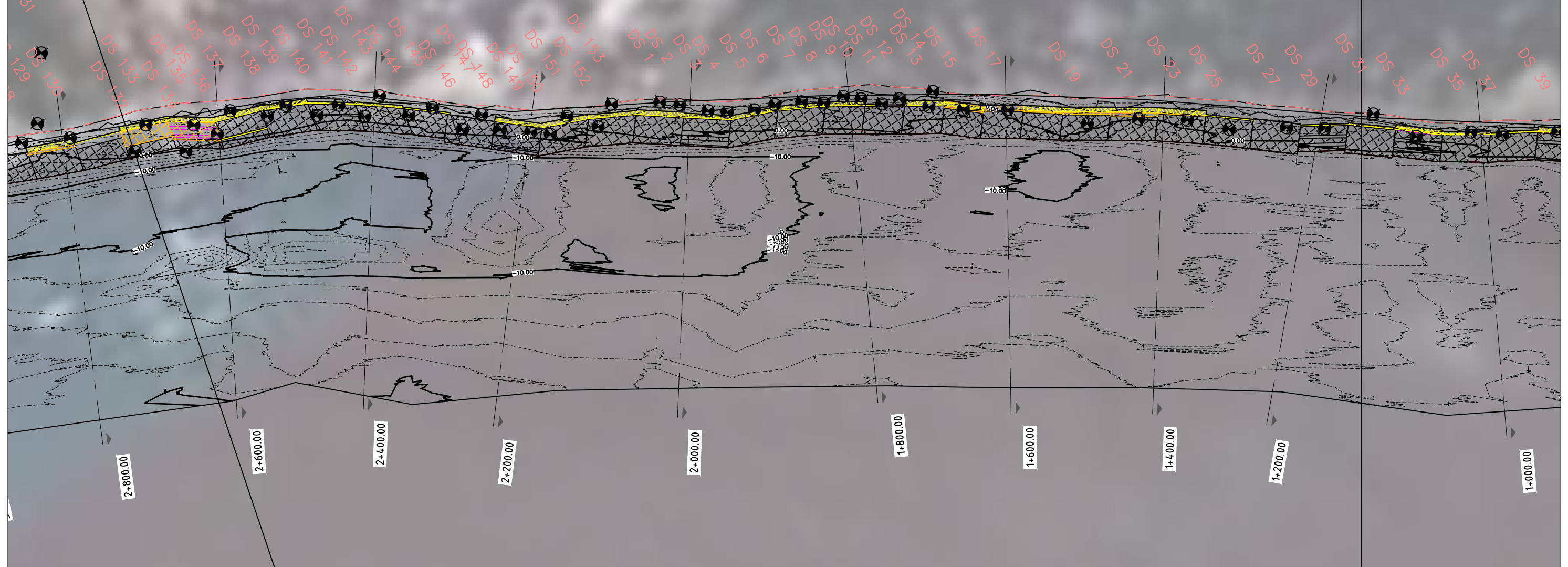
This drawing is confidential and shall only be used for the purposes of this project.				THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED				SCALES: AS SHOWN IN THE DRAWING		CLIENT: 		CONSULTANT: 		FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM			
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DRAWN		MYA		CHECKED		GV											
APPROVED		KO		DATE													
0		MYA		28.07.2016		FIRST DRAFT		KD		STATUS: AS BUILT_JULY 2016		DRAWING NO: FRRMIP-ISPMC-CHA-01		REVISION: 0			
No.		BY		DATE		DESCRIPTION		APPD									



SCALE 1:5000

SHEET 004

SHEET 006



NOTES:
 1.REFER TO INTERIM CONSTRUCTION COMPLETION REPORT FOR DIVING CROSS SECTION INFORMATION
 2.TOPOGRAPHIC SURVEY OF UPPER BANK ie HWL TO CREST,NOT INCLUDED IN CONSTRUCTION COMPLETION DRAWINGS.
 WILL BE SURVEYED FOLLOWING CC BLOCK PLACEMENT

LEGENDS:

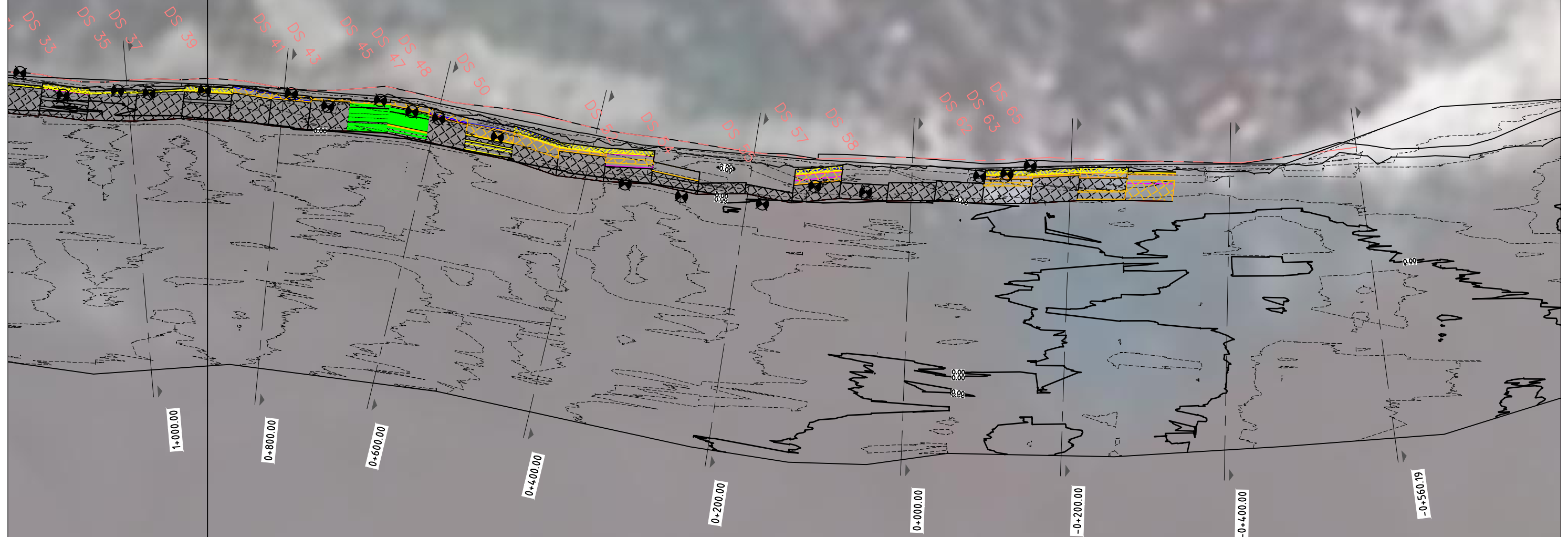
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- 4 DUMPED BAGS PER ROW
- 3 DUMPED BAGS PER ROW
- 2 DUMPED BAGS PER ROW
- DIVING CROSS SECTION LOCATION
- EXTENT OF GEOTEXTILE BAG DUMPING

This drawing is confidential and shall only be used for the purposes of this project.				THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED				SCALES: AS SHOWN IN THE DRAWING		CLIENT: 		CONSULTANT: 		FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM			
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DRAWN		MYA		CHECKED		GV						DRAWING NO: FRRMIP-ISPMC-CHA-01					
APPROVED		KO		DATE								STATUS: AS BUILT_JULY 2016				REVISION: 0	
No.	BY	DATE	DESCRIPTION	APPD													



SCALE 1:5000

SHEET 005



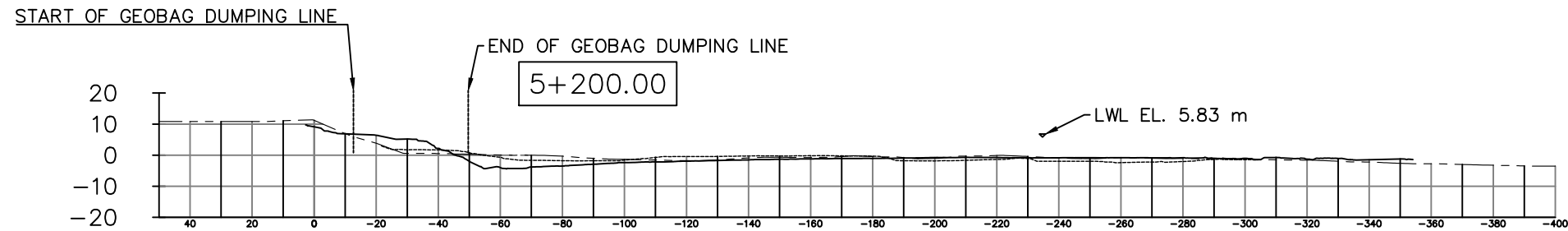
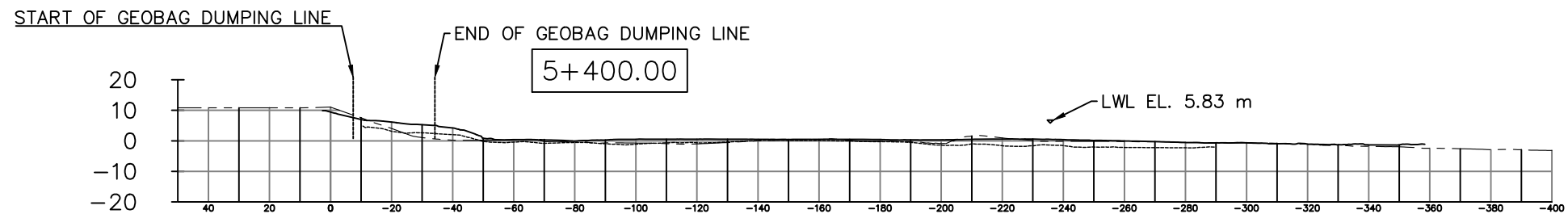
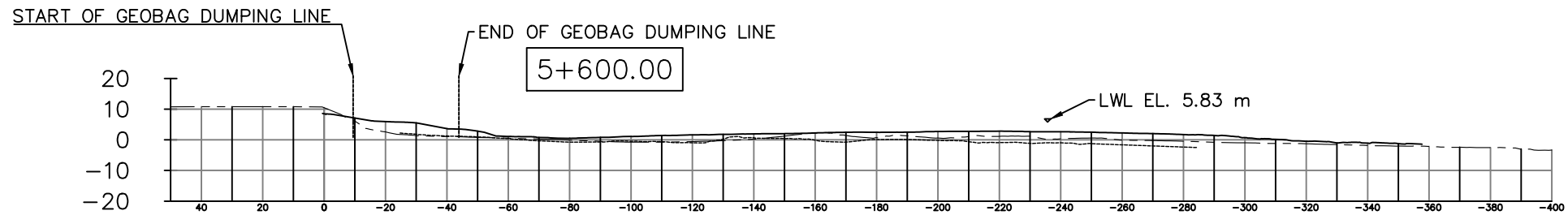
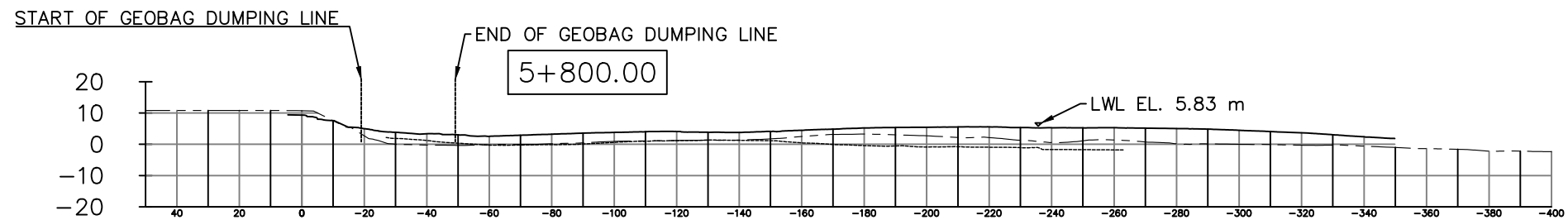
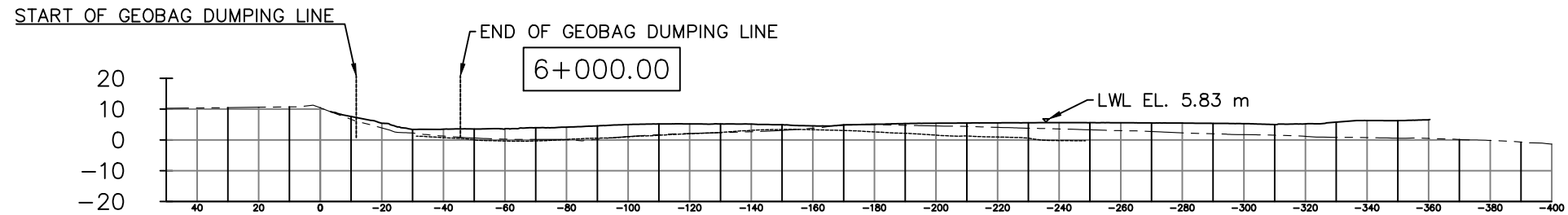
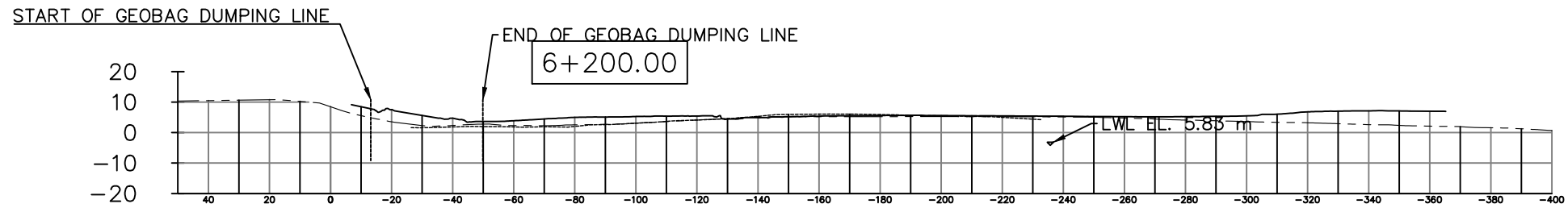
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- 1.REFER TO INTERIM CONSTRUCTION COMPLETION REPORT FOR DIVING CROSS SECTION INFORMATION
- 2.TOPOGRAPHIC SURVEY OF UPPER BANK ie HWL TO CREST,NOT INCLUDED IN CONSTRUCTION COMPLETION DRAWINGS. WILL BE SURVEYED FOLLOWING CC BLOCK PLACEMENT

LEGENDS:

- 5 DUMPED BAGS PER ROW
- 4 DUMPED BAGS PER ROW
- 3 DUMPED BAGS PER ROW
- 2 DUMPED BAGS PER ROW
- DIVING CROSS SECTION LOCATION
- EXTENT OF GEOTEXTILE BAG DUMPING

This drawing is confidential and shall only be used for the purposes of this project.				THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED				SCALES:		CLIENT:		CONSULTANT:		FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM	
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				DRAWN MYA CHECKED GV						BANGLADESH WATER DEVELOPMENT BOARD				PLAN VIEW FROM KM 1+000 TO -0+560.19	
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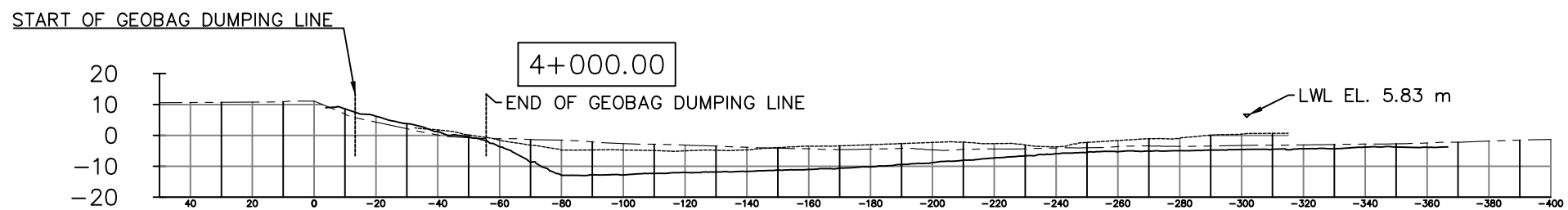
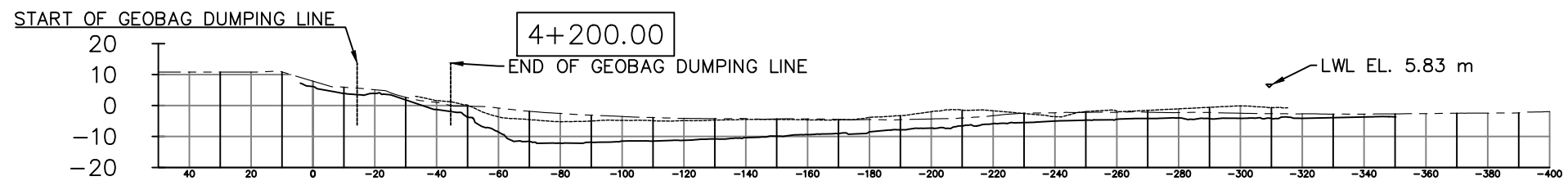
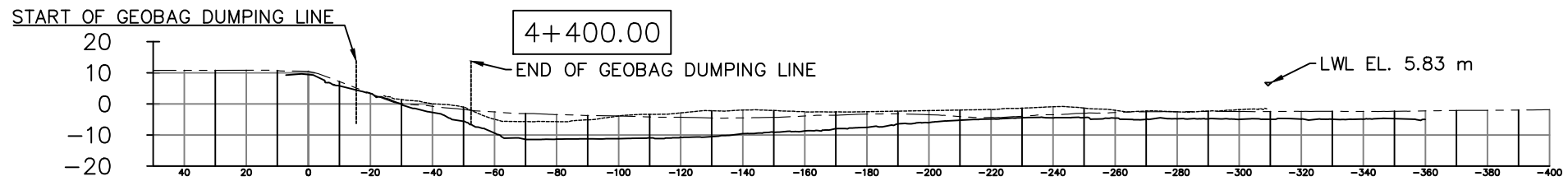
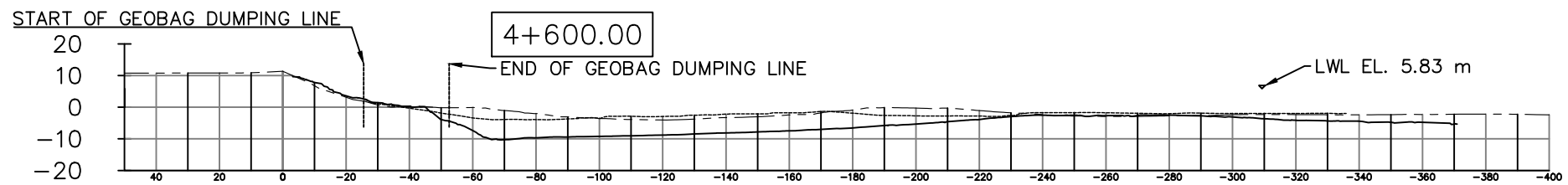
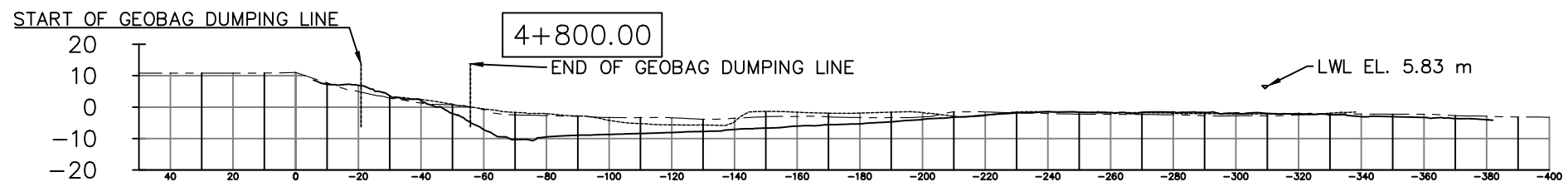
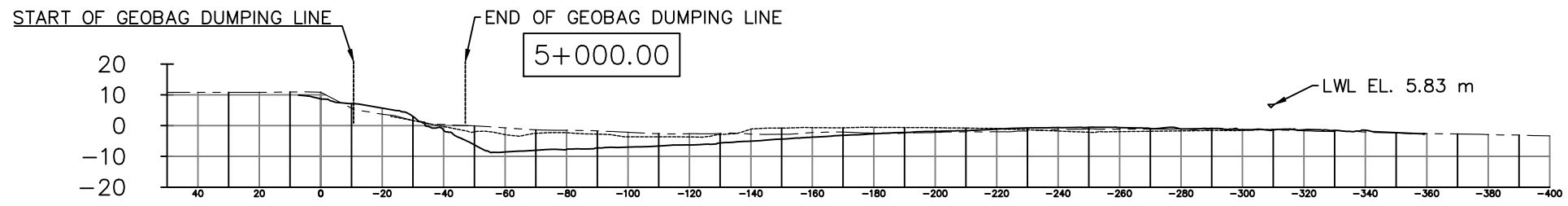
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MAY AS-BUILT SURVEY - - - - -

JULY AS-BUILT SURVEY _____

This drawing is confidential and shall only be used for the purposes of this project.				THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED				SCALES:		CLIENT:		CONSULTANT:		FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM	
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				APPROVED KO DATE				SHEET NO: 007		 Matt MacDonald		DRAWING NO:			
0 MYA 28.07.2016 FIRST DRAFT KD												AS BUILT_JULY 2016		FRERMIP-ISPMC-CHA-01	
No. BY DATE DESCRIPTION APPD												REVISION: 0			



LEGENDS:
 PRE-CONSTRUCTION SURVEY _____
 MAY AS-BUILT SURVEY - - - - -
 JULY AS-BUILT SURVEY _____

This drawing is confidential and shall only be used for the purposes of this project.

No.	BY	DATE	DESCRIPTION	APPD
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THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED

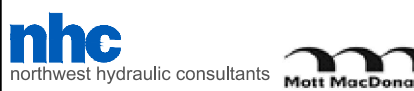
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DRAWN	HYA	CHECKED	GV
APPROVED	KD	DATE	

SCALE: AS SHOWN IN THE DRAWING
 SHEET NO: 008

CLIENT: BANGLADESH WATER DEVELOPMENT BOARD



CONSULTANT: northwest hydraulic consultants



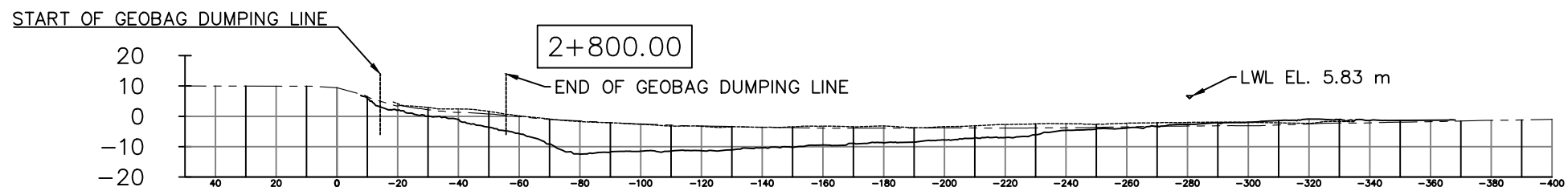
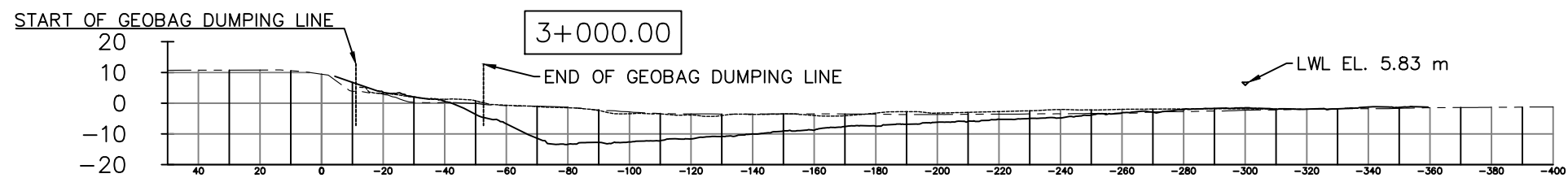
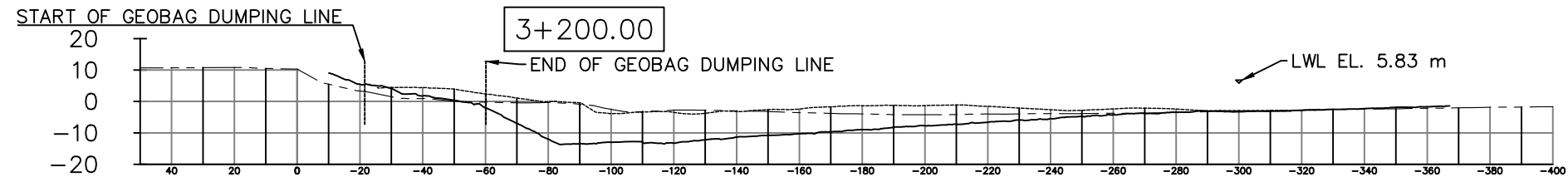
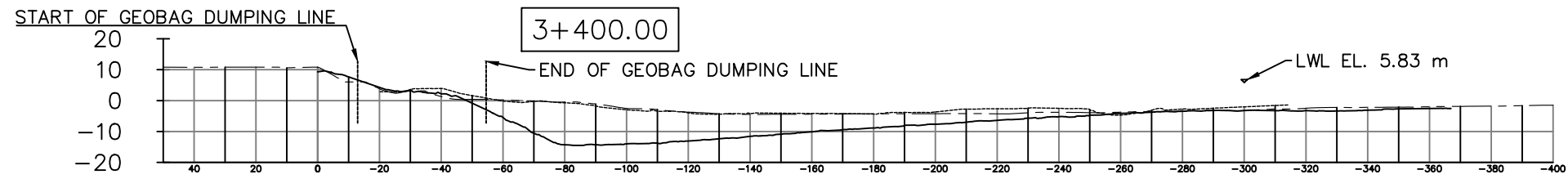
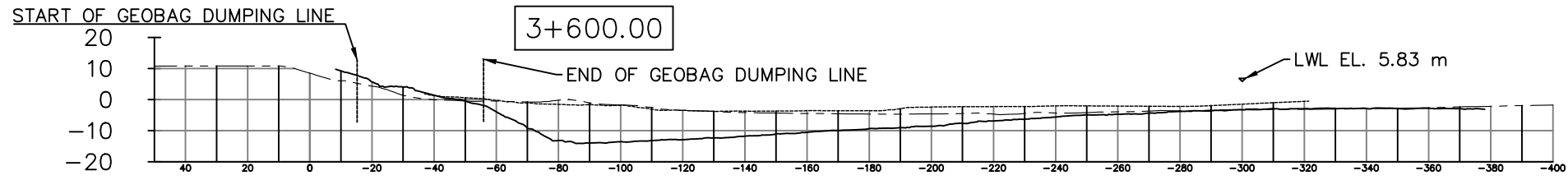
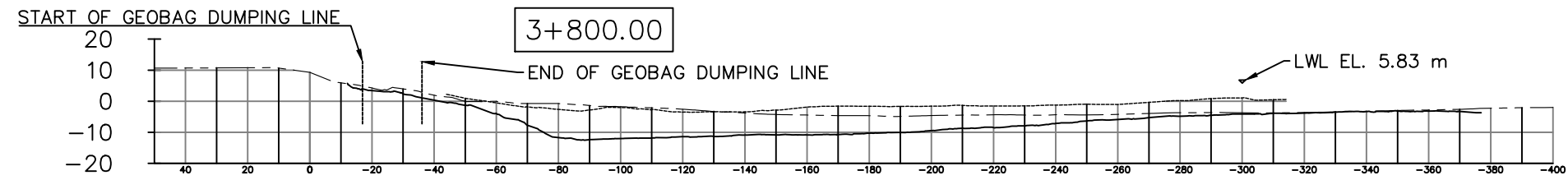
STATUS: AS BUILT_JULY 2016

FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM

DRAWING NAME: SECTION KM 5+000 TO KM 4+000

DRAWING NO: FRERMIP-ISPMC-CHA-01

REVISION: 0



LEGENDS:

PRE-CONSTRUCTION SURVEY _____

MAY AS-BUILT SURVEY - - - - -

JULY AS-BUILT SURVEY _____

This drawing is confidential and shall only be used for the purposes of this project.

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED

DESIGNED	HYA	CHECKED	GV
DRAWN	HYA	CHECKED	GV
APPROVED	KO	DATE	
0	MYA	28.07.2016	FIRST DRAFT
No.	BY	DATE	DESCRIPTION
			APPD

SCALE:	AS SHOWN IN THE DRAWING
SHEET NO:	009

CLIENT:



BANGLADESH WATER DEVELOPMENT BOARD

CONSULTANT



northwest hydraulic consultants



STATUS: AS BUILT_JULY 2016

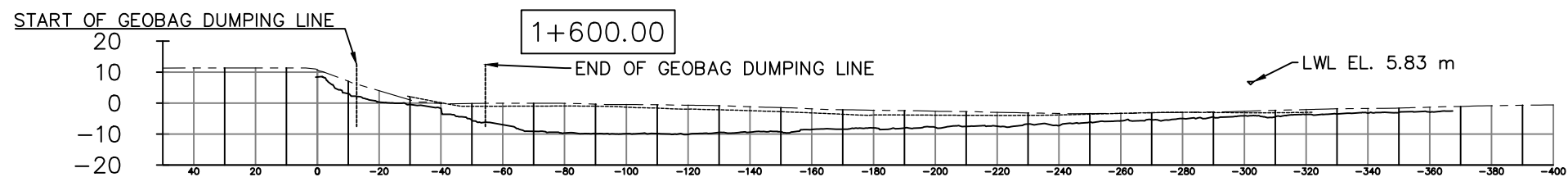
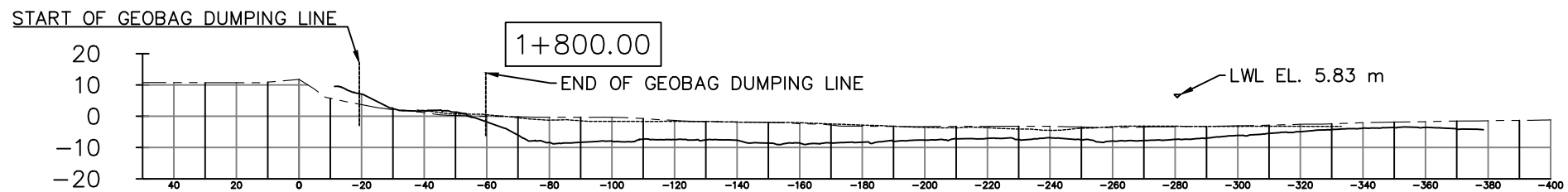
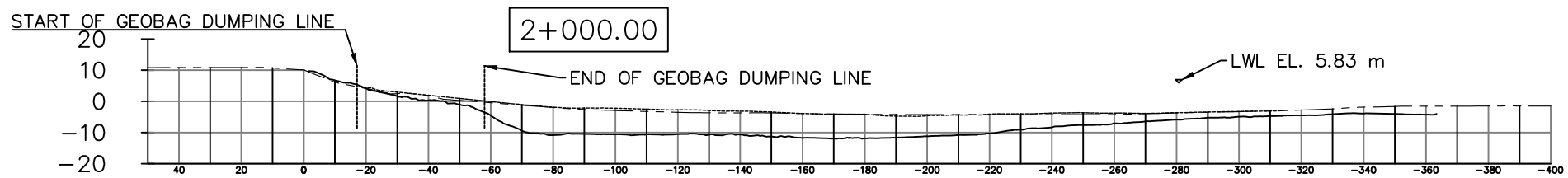
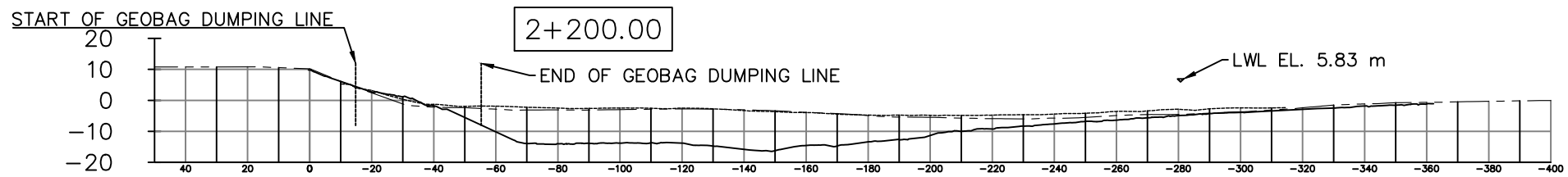
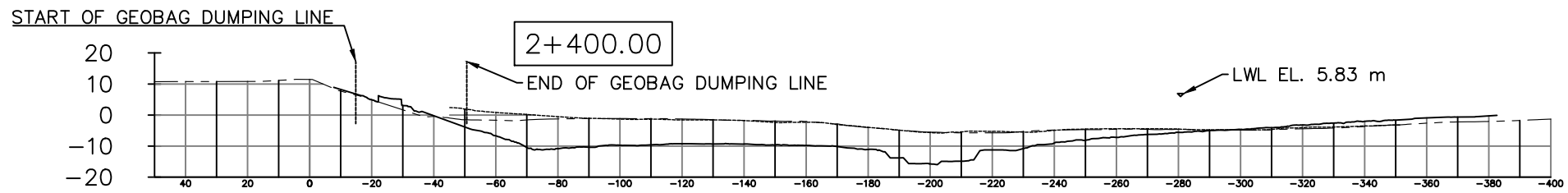
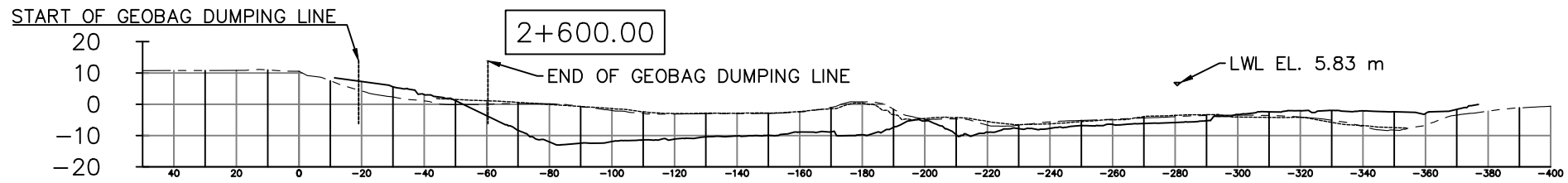
FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM

DRAWING NAME:

SECTION KM 3+800 TO KM 2+800

DRAWING NO: FRERMIP-ISPMC-CHA-01

REVISION: 0



LEGENDS:

PRE-CONSTRUCTION SURVEY _____

MAY AS-BUILT SURVEY - - - - -

JULY AS-BUILT SURVEY _____

This drawing is confidential and shall only be used for the purposes of this project.

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED

SCALE:

CLIENT:

CONSULTANT

FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM

DESIGNED	HYA	CHECKED	GV
DRAWN	HYA	CHECKED	GV
APPROVED	KO	DATE	

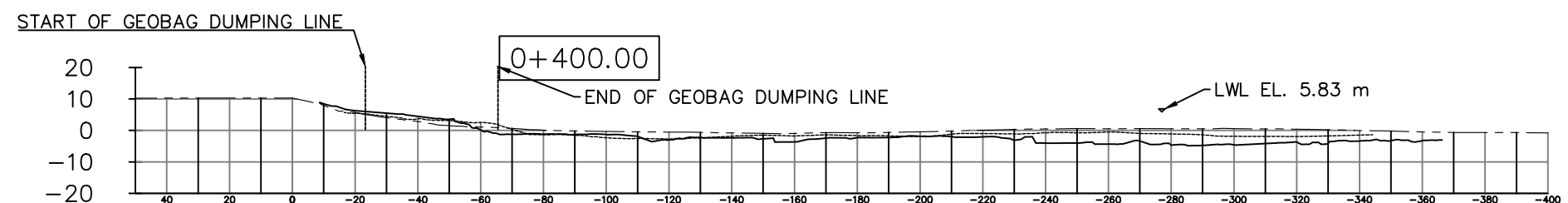
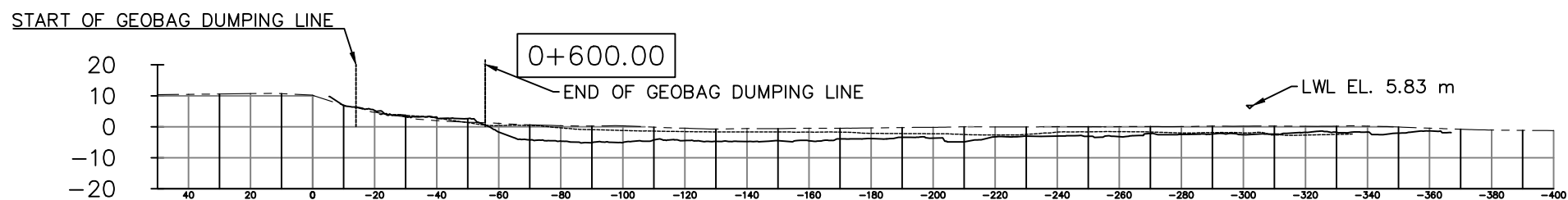
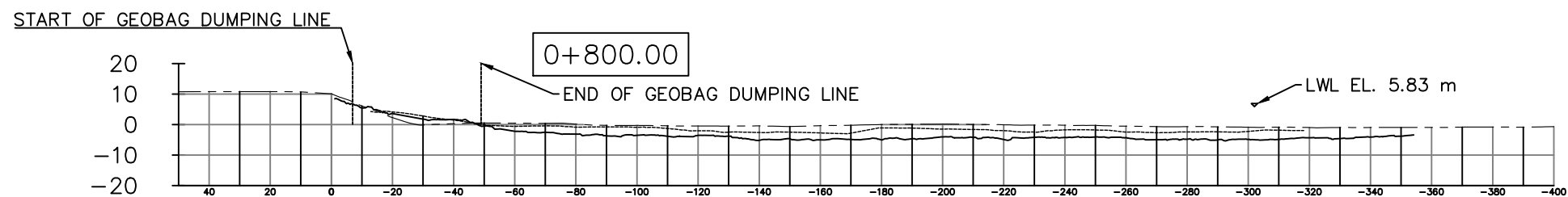
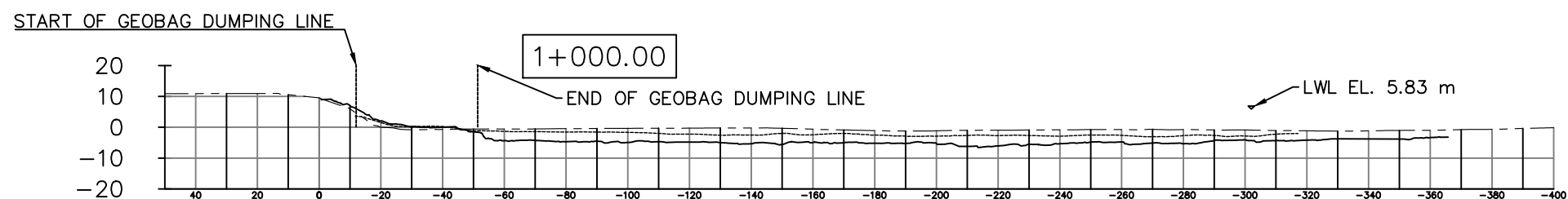
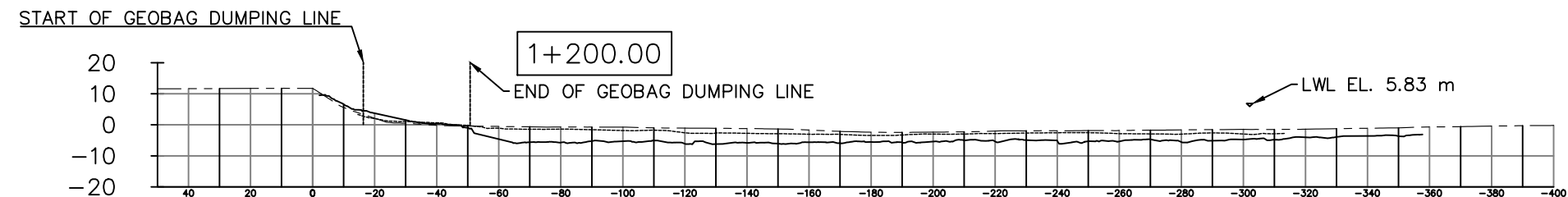
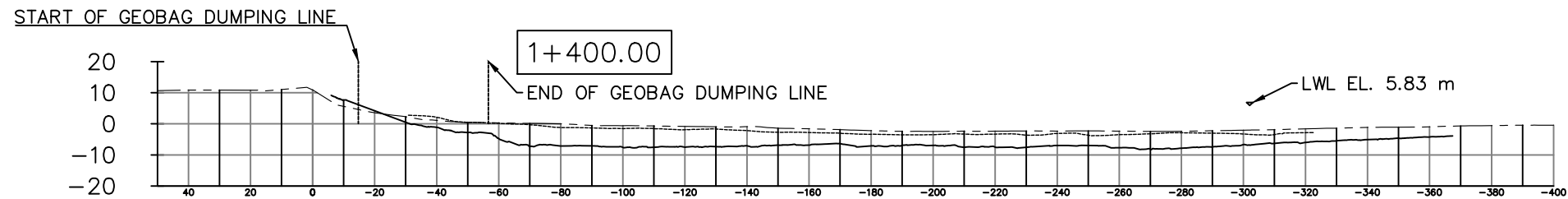
AS SHOWN IN THE DRAWING
SHEET NO: 011

AS SHOWN IN THE DRAWING



DRAWING NAME:	SECTION KM 2+600 TO KM 1+600
DRAWING NO:	FRERMIP-ISPMC-CHA-01
REVISION:	0

STATUS: AS BUILT_JULY 2016






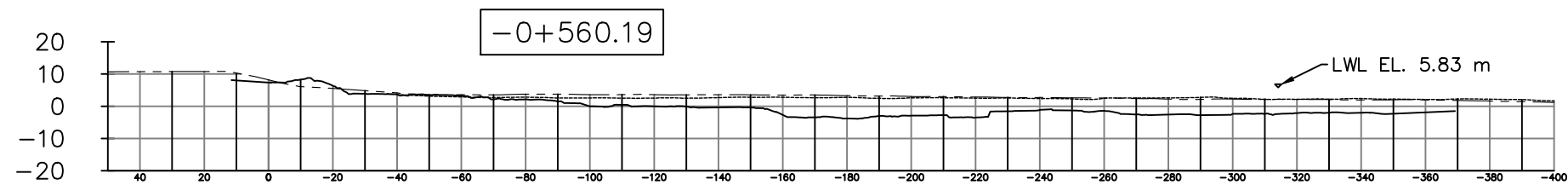
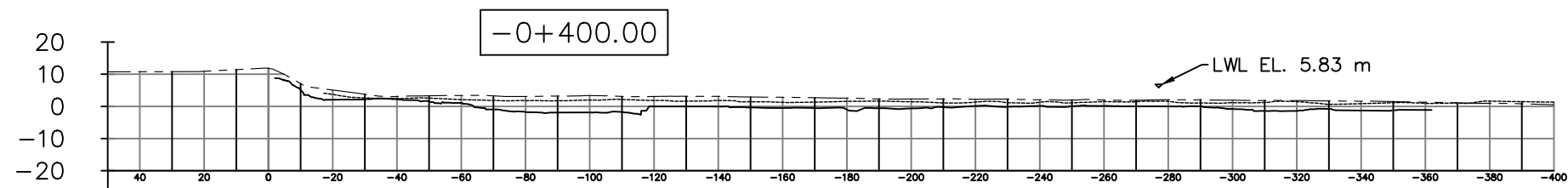
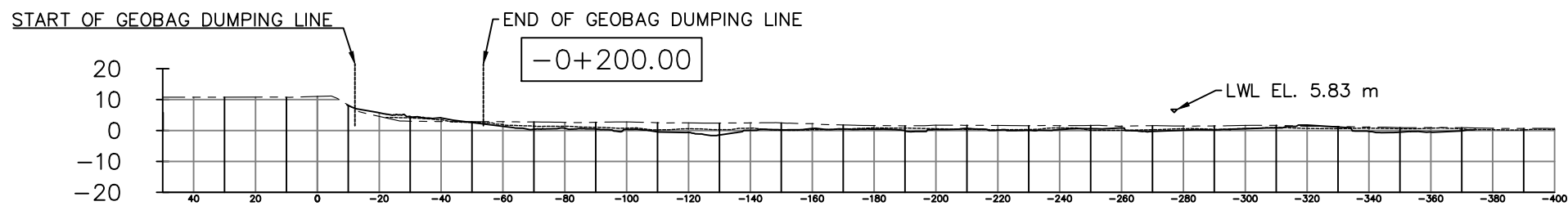
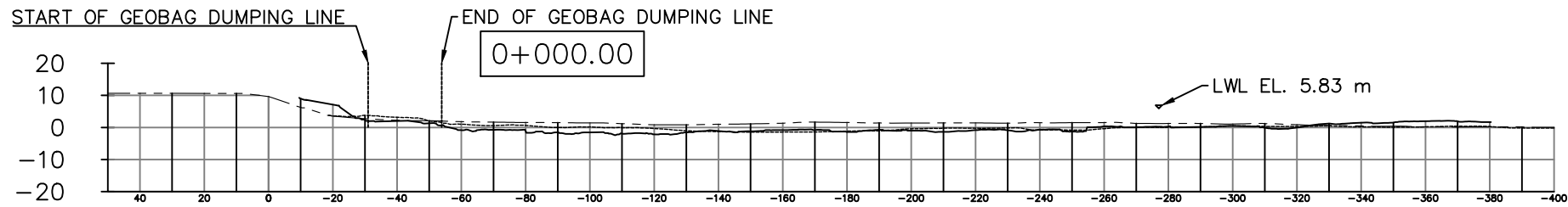
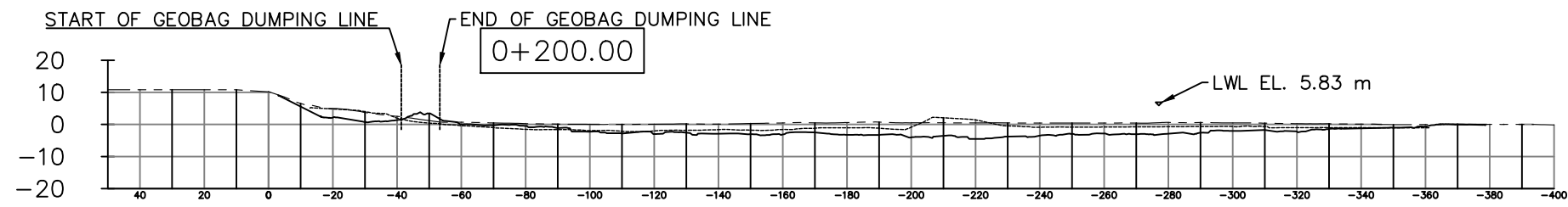
LEGENDS:

PRE-CONSTRUCTION SURVEY _____

MAY AS-BUILT SURVEY - - - - -

JULY AS-BUILT SURVEY _____

This drawing is confidential and shall only be used for the purposes of this project.				THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED				SCALES:		CLIENT:		CONSULTANT:		FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM	
				DESIGNED HYA CHECKED GV				AS SHOWN IN THE DRAWING		 BANGLADESH WATER DEVELOPMENT BOARD		 northwest hydraulic consultants 		DRAWING NAME:	
				DRAWN HYA CHECKED GV				SECTION KM 1+400 TO KM 0+400						DRAWING NO:	
				APPROVED KO DATE				STATUS:						FRERMIP-ISPMC-CHA-01	
0 MYA 28.07.2016 FIRST DRAFT KO				SHEET NO: 011				AS BUILT_JULY 2016		REVISION: 0					
No. BY DATE DESCRIPTION APPD															



LEGENDS:

PRE-CONSTRUCTION SURVEY _____

MAY AS-BUILT SURVEY - - - - -

JULY AS-BUILT SURVEY _____

This drawing is confidential and shall only be used for the purposes of this project.

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED

SCALE:

CLIENT:

CONSULTANT

FLOOD AND RIVERBANK EROSION RISK MANAGEMENT INVESTMENT PROGRAM

DESIGNED	HYA	CHECKED	GV
DRAWN	HYA	CHECKED	GV
APPROVED	KO	DATE	

NO.	BY	DATE	DESCRIPTION	APPD
0	MYA	28.07.2016	FIRST DRAFT	KO

AS SHOWN IN THE DRAWING

SHEET NO: 012



DRAWING NAME:	SECTION KM 0+200 TO KM -0+560.19
DRAWING NO:	FRERMIP-ISPMC-CHA-01
REVISION:	0