

FAP24

Government of
the People's
Republic of
Bangladesh

Water Resources
Planning
Organization

European
Commission

Delft
Hydraulics



Danish
Hydraulic
Institute



Hydroland
Approtech
Osiris

2
Call - 248
BAP-24
(60)
BN-797
A-948

RIVER SURVEY PROJECT

Special
Report
No.23



River Data Book
April 1995 - May 1996

Part B.4: Hardinge Bridge

October 1996

Special Report 23

**River Data Book
April 1995 - March 1996**

Part B.4: Hardinge Bridge

October 1996





Contents of entire Data Book

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Part B:

Routine gauging April 1995 - March 1996

- B.1 Bahadurabad
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- B.4 Hardinge Bridge
- B.5 Baruria
- B.6 Mawa
- B.7 Mymensingh
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- B.9 Gorai
- B.10 Arial Khan
- B.11 Bhairab Bazar

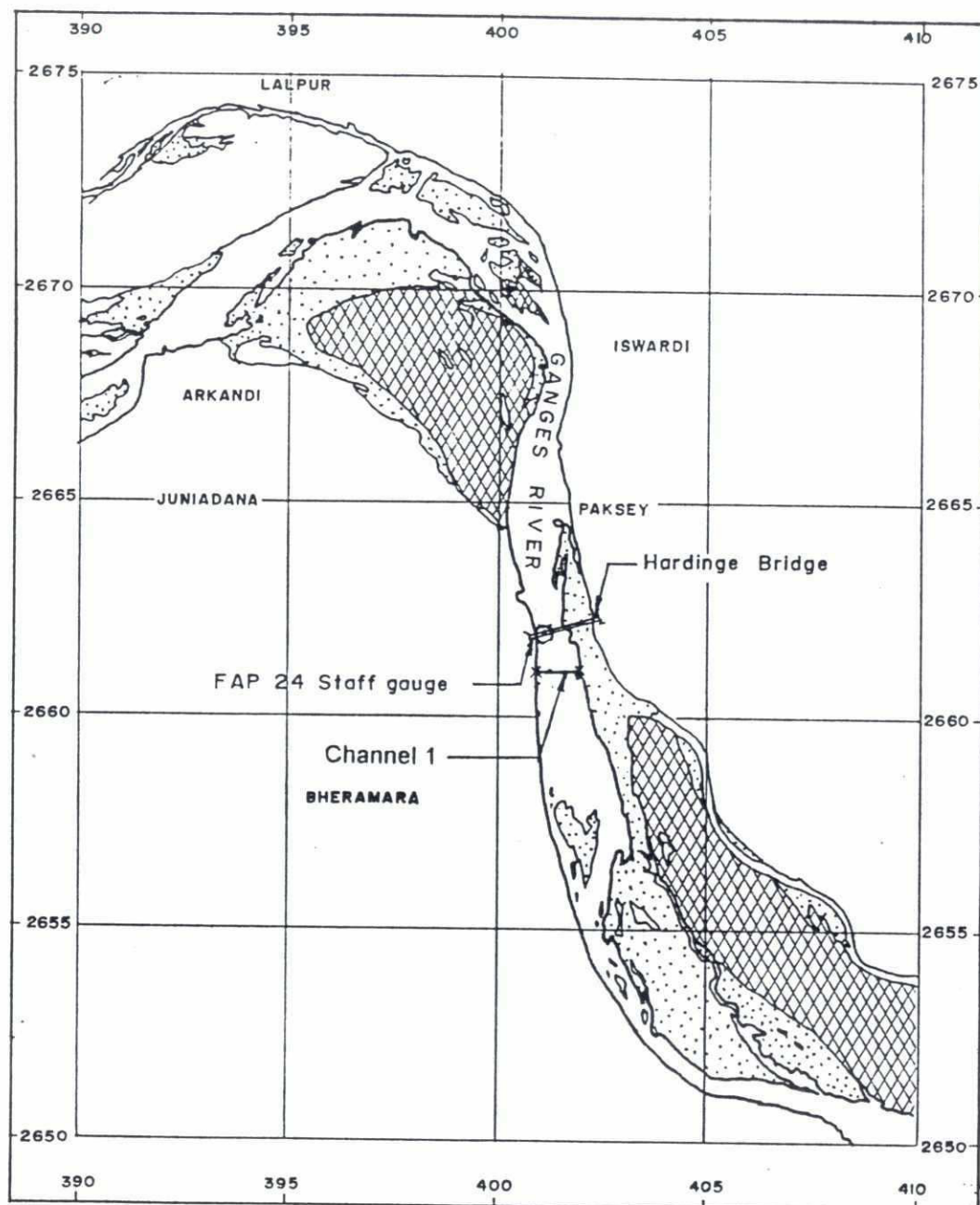
Part C:

Special surveys April 1995 - March 1996





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Contents of Part B.4

Survey No.	Time
150	27-30/4 95
157	25-26/5 95
169	27-29/6 95
180	9-10/8 95
189	5/9 95
197	26-28/9 95
203	2/10 95
209	12-13/10 95
218	29/10 95
227	18-19/11 95
238	13/12 95
243	26/12 95
250	20/1 96
259	1-2/3 96




LEGEND:

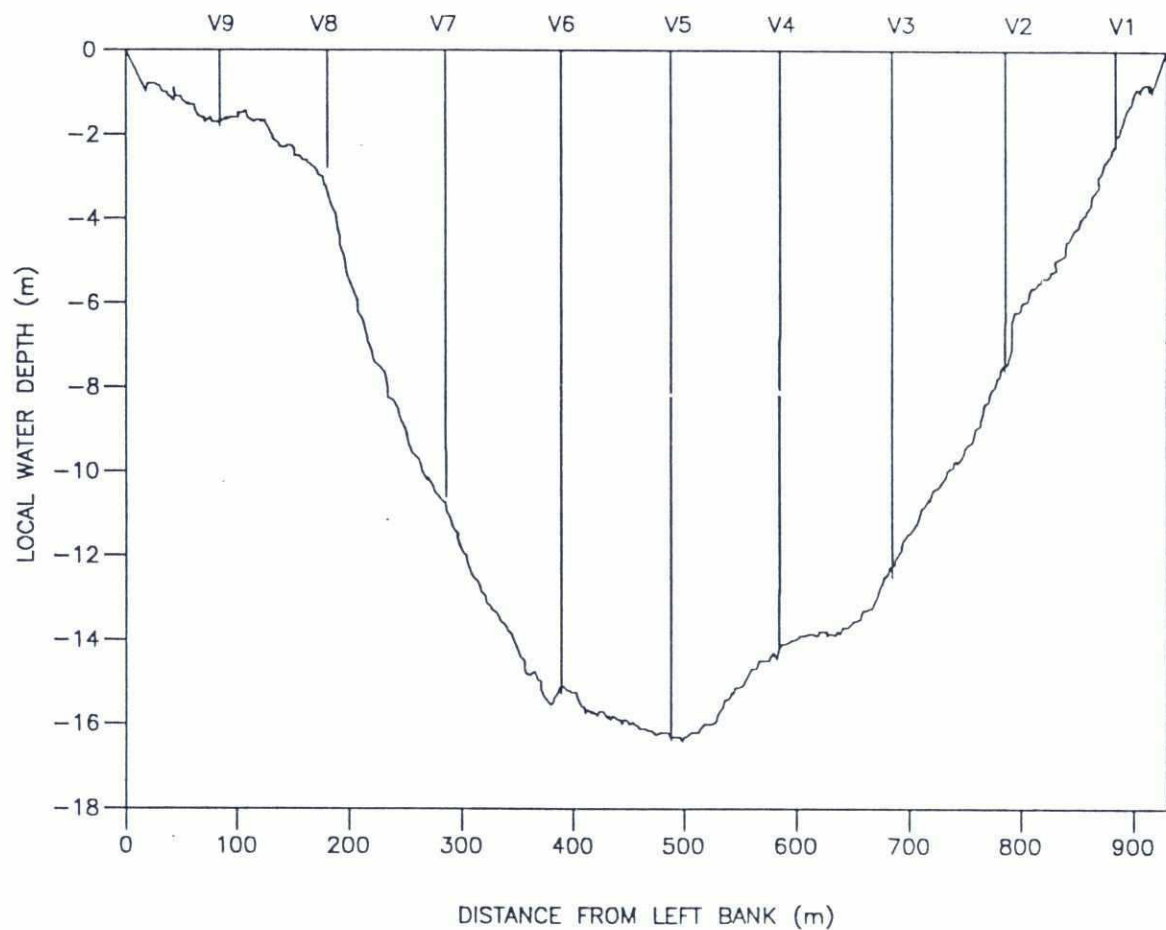
-  High land
-  Unstable/low char
-  Cross section
-  FAP 24 Staff gauge

5000m 2500m 0


Map is based on satellite images of March 1995

FAP 24  DELFT - DHI	WATER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 150 : 28-29 April, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 20 Sep 1995	Location map	page 1.1
	Init : ss		

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Water level : 4.65 m + PWD measured at the station indicated on page 1.1

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 150 : 28-29 April, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H54S0T01	Date : 20 Sep 1995	Cross-sections and measured verticals Channel 1	page 1.2
	Init : ss		

Type of measurement	Method	No. of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	-	-	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	2	-	-	-
Vertical current profile	No. of verticals in channel	9	-	-	-
	ADCP	-	-	-	-
	S4 current meter	9	-	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	45	-	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	-	-	-	-
	Integrated bottle sampling	-	-	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	-	-	-	-
	Delft Bottle	-	-	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-


Table 2.1: Survey programme as made

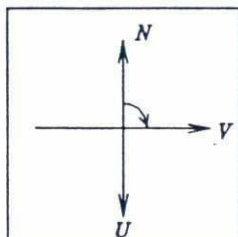
Channel	Width (m)	Area (m ²)	Stage h (m+PWD)	Discharge Q (m ³ /s)	Bed load transport Sb (kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	925	8452	4.65	167	-	1.16

Table 2.2: Key figures

Gauge Location	Channel	Date	Water level (Daily average) (m+PWD)	Gauge
Hardinge Bridge	Channel 1	28 Apr 95	4.65	FAP 24
		29 Apr 95	4.66	FAP 24

Table 2.3: Water-levels

<div><div>FAP 24</div><div></div><div>DELFT & DHI</div></div>		<div>RIVER SURVEY PROJECT</div> <div>Flood Plan Coordination Organization</div> <div>Commission of the European Communities</div>	Survey Bulletin 150 : 28-29 April, 1995	
			Location 4 : Ganges River, Hardinge Bridge	
File : H54S0T01	Date : 20 Sep 1995	Survey programme as made and key figures		page 2.1
	Init : ss			

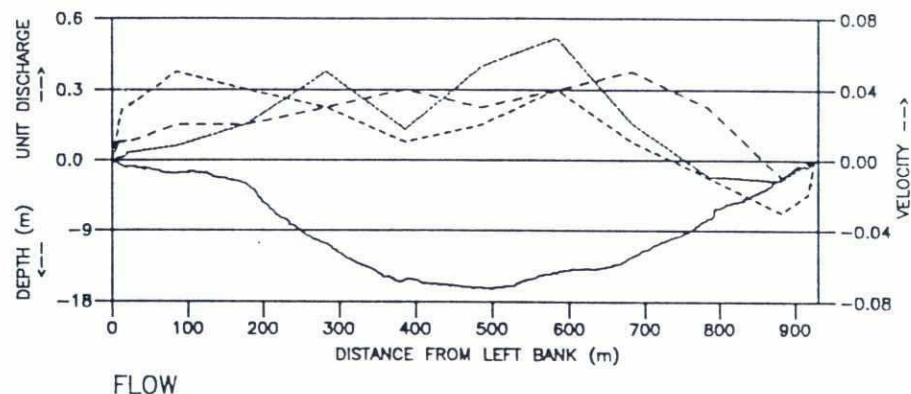


TRANSECT AZIMUTH = 90°

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



LEGEND :

WATER DEPTH (m below STAGE)

..... UNIT DISCHARGE ($m^3/s.m$)

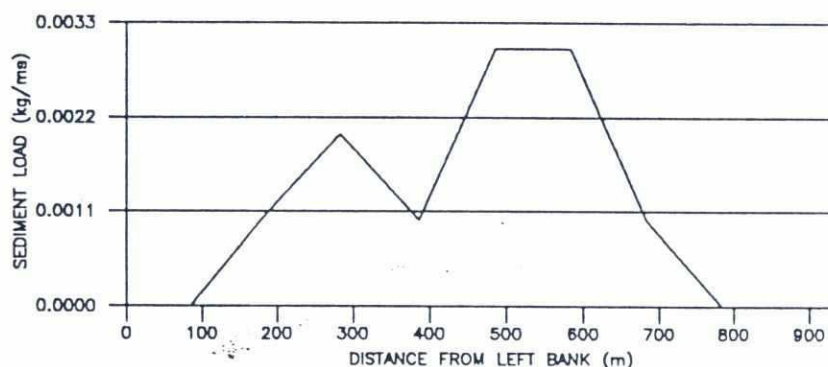
----- U - (m/s)

- . - . - . V - (m/s)

STAGE = 4.65 (m+PWD)

A = 8452 (m^2)

Q = 167 (m^3/s)



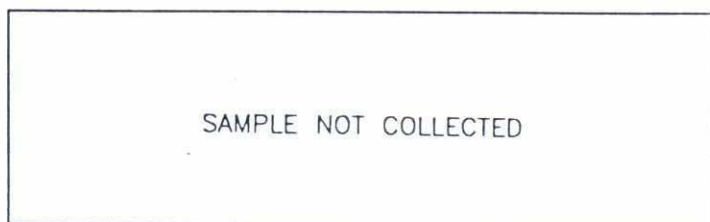
LEGEND :

—— S_{TOTAL} 1.16 (kg/s)

----- $S_{WASH\ LOAD}$ 1.15 (kg/s)

- . - . - . $S_{SUSP.\ RED}$ 0.01 (kg/s)

—— $S_{BED\ LOAD}$ 0.00 (kg/s)



LEGEND :

◆◆◆◆◆ $D_{50\ SUSP.}$ (mm)

▲▲▲▲▲ $D_{50\ BED\ LOAD}$ (mm)

□□□□□ $D_{50\ BED\ MAT.}$ (mm)

GRAIN SIZE

FAP 24



RIVER SURVEY PROJECT

Flood Plan Coordination Organization

Commission of the European Communities

Survey Bulletin 150 : 28-29 April, 1995

Location 4 : Ganges River, Hardinge Bridge

File : H54S0T01

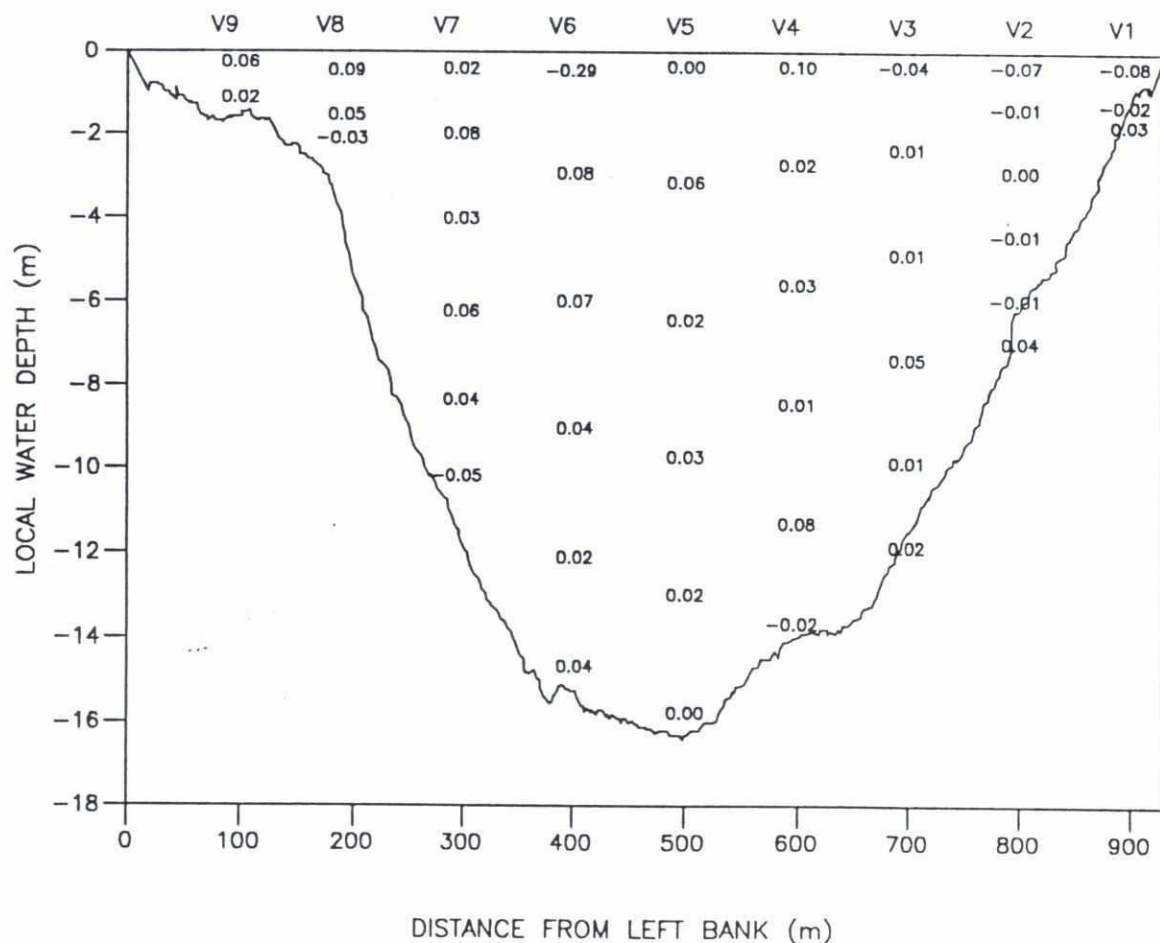
Date : 20 Sep 1995

Init : ss


Horizontal distribution of flow and sediments
Channel 1

page

3.1




Water level : 4.65 m + PWD measured at the station indicated on page 1.1

FAP 24  DELFT - DHI		Survey Bulletin 150 : 28-29 April, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H54S0T01	Date : 20 Sep 1995	Cross-sectional distribution of flow velocity Channel 1	page 4.1
	Init : ss		

Andreasen settling tube							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.1: Grain size of near bed suspended sediment (0.3 m above river bed)							

US BM-54 bed samples							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.2 : Grain size of bed material							

Helley-Smith							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.3 : Grain sizes of bed load							

 <p>FAP 24 DELFT - DHI</p>		RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities		Survey Bulletin 150 : 28-29 April, 1995	
				Location 4 : Ganges River, Hardinge Bridge	
		Date : 20 Sep 1995	Grain size distributions		page
		Init : ss			51

Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
Echo-sounding	1	9504281012-1019 9504281022-1029	H54S0T01 * H54S0T02

Table 6.1: Echo-sounding

* : echo-sounding in PSD 24 data base and presented in Sections 3 and 4

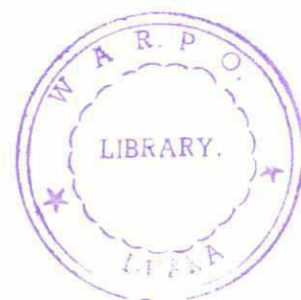
Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1	9504281134-1147	400957	660670	2.30	H54S0P01 *
		2	9504281156-1218	401054	660669	7.60	H54S0P02 *
		3	9504281225-1251	401154	660672	12.50	H54S0P03 *
		4	9504290927-1000	401256	660669	14.30	H54T0P03 *
		5	9504290850-0918	401355	660669	16.40	H54T0P02 *
		6	9504290815-0841	401454	660676	15.30	H54T0P01 *
		7	9504281631-1655	401555	660669	10.60	H54S0P06 *
		8	9504281612-1624	401660	660665	2.80	H54S0P05 *
		9	9504281553-1605	401754	660670	1.80	H54S0P04 *


Table 6.2: Vertical profiles

* ADCP & MEX not available


Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments (pump bottle)	1	1	3	9504281134-1147	400957	660670	2.30
		2	6	9504281156-1218	401054	660669	7.60
		3	6	9504281225-1251	401154	660672	12.50
		4	6	9504290927-1000	401256	660669	14.30
		5	6	9504290850-0918	401355	660669	16.40
		6	6	9504290815-0841	401454	660676	15.30
		7	6	9504281631-1655	401555	660669	10.60
		8	3	9504281612-1624	401660	660665	2.80
		9	3	9504281553-1605	401754	660670	1.80

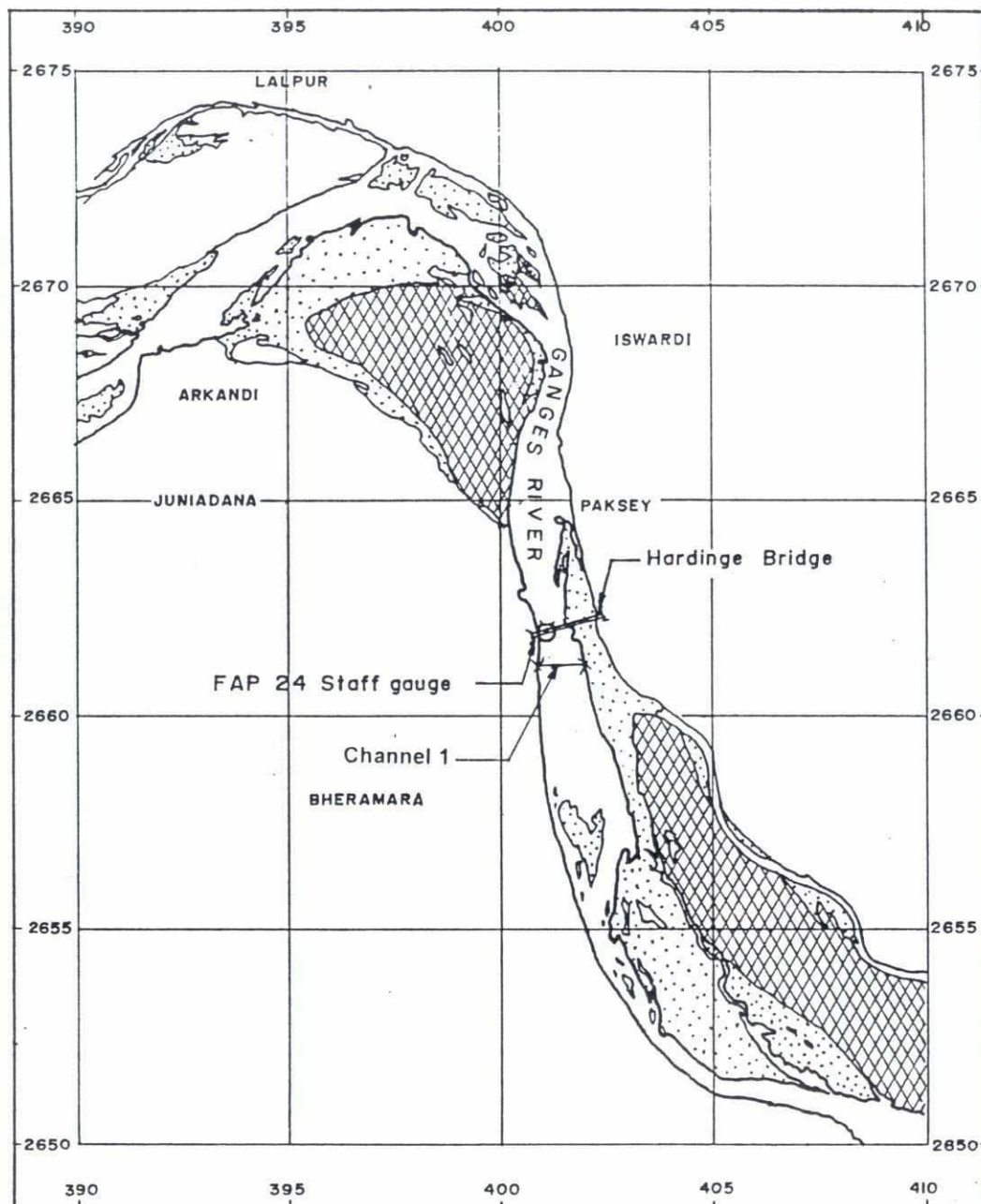
Table 6.3: Suspended sediment - point sampled







 FAP 24 DELFT - DHI	RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 150 : 28-29 April, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 20 Sep 1995	Collected data and their storage (1)	page 6.1
	Init : ss		

Types of Data	Channel	Format	Filename
ADCP/S4/EMF data	1	QUATTRO	H54S0T01 .ase
Echosounder data	1	QUATTRO	H54S0T01 .ech
Sediment transport data	1	QUATTRO	H54S0T01 .sed
Susp.sed.conc. analysis	1	QUATTRO	H54S0T01 .ssc
Transect plot data	1	QUATTRO	H54S0T01 .trs
Table 7.1 PSD 24 Database file description			

 <p>FAP 24 DELFT - DHI</p>	<p>RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities</p>	Survey Bulletin 150 : 28-29 April, 1995	
	Location 4 : Ganges River, Hardinge Bridge		
	Date : 20 Sep 1995	PSD 24 Database file description	page
	Init : ss		7.1



LEGEND:

-  High land
-  Unstable/low char
-  Cross section
-  FAP 24 Staff gauge

5000m 2500m 0

Map is based on satellite images of March 1995

FAP 24

 DELFT - DHI

RIVER SURVEY PROJECT
 Flood Plan Coordination Organization
 Commission of the European Communities

Survey Bulletin 157 : 25 - 26 May, 1995

Location 4 : Ganges River, Hardinge Bridge

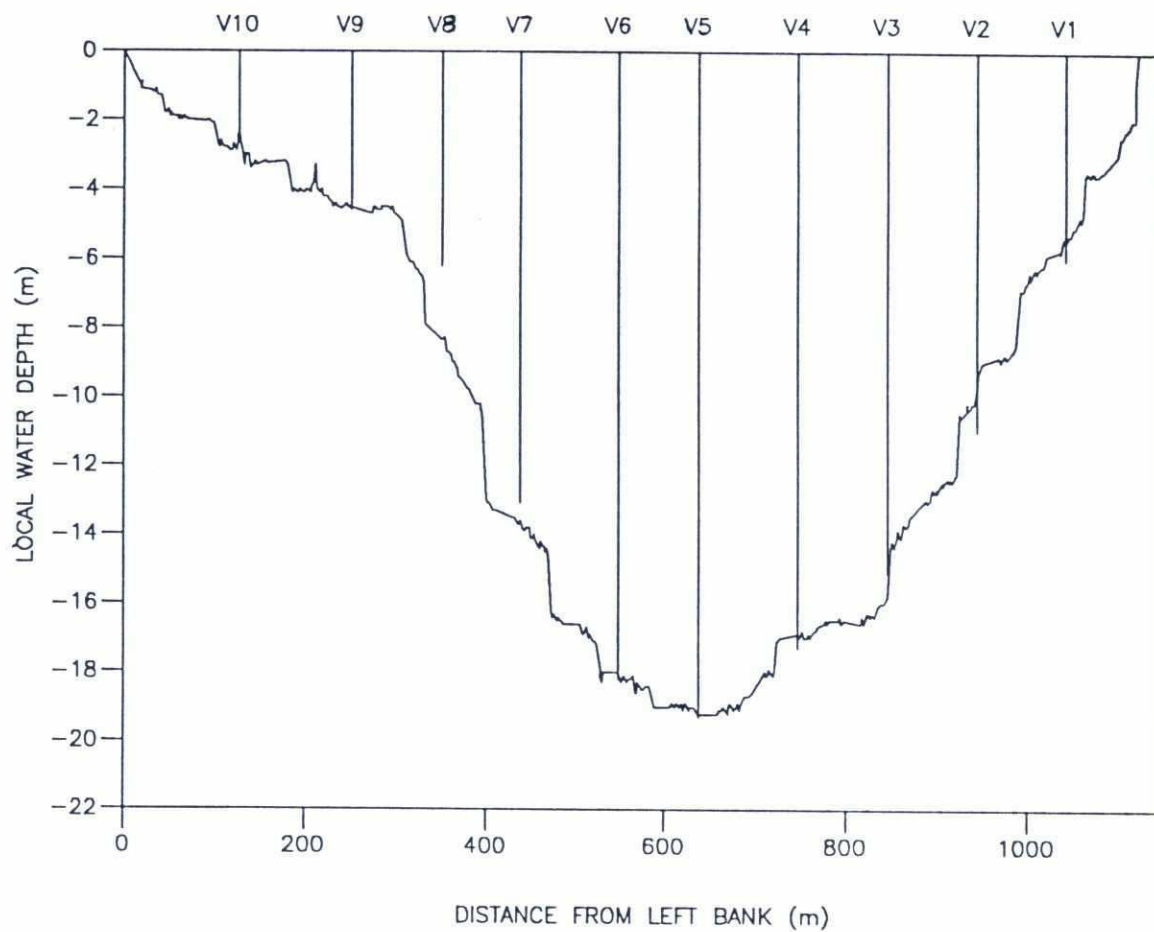
Date : 20 Sep 1995

Init : mk

Location map

page
1.1

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Water-level : 7.61 m + PWD measured at the station indicated on page 1.1

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT
Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 157 : 25- 26 May, 1995

Location 04 : Ganges River, Hardinge Bridge

File : H55POT01

Date : 20 Sep 1995

Init : mk

Cross-sections and measured verticals
Channel 1



page
1.2

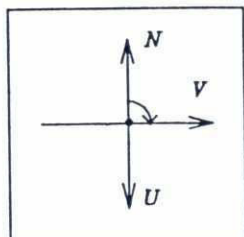
Type of measurement	Method	No. of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	-	-	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	2	-	-	-
Vertical current profile	No. of verticals in channel	10	-	-	-
	ADCP	-	-	-	-
	S4 current meter	10	-	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	57	-	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	-	-	-	-
	Integrated bottle sampling	-	-	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	-	-	-	-
	Delft Bottle	-	-	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-
Table 2.1: Survey programme as made					

Channel	Width (m)	Area (m ²)	Stage h (m+PWD)	Discharge Q (m ³ /s)	Bed load transport Sb (kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	1121	11578	7.61	1259	0	32.3
Table 2.2: Key figures						

Gauge Location	Channel	Date	Water level (Daily average) (m + PWD)	Gauge
Hardinge Bridge	Channel 1	25 May 95 26 May 95	7.61 7.81	FAP 24

Table 2.3: Water-levels

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 157 : 25- 26 May, 1995	
		Location 04 : Ganges River, Hardinge Bridge	
File : H55P0T01	Date : 20 Sep 1995	Survey programme as made and key figures	page
	Init : mk		2.1

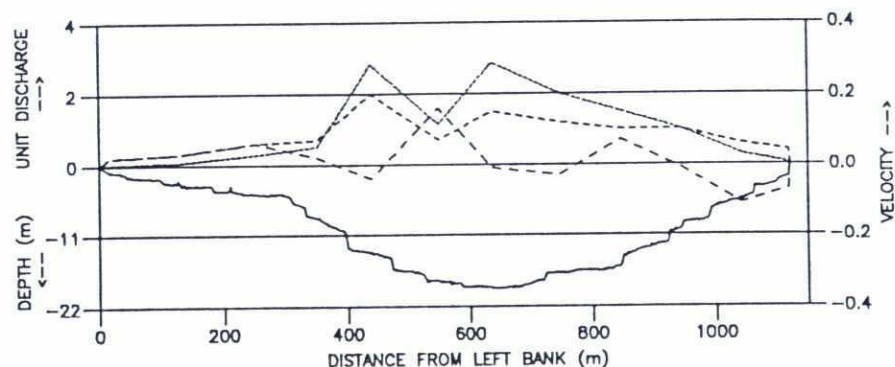


TRANSECT AZIMUTH = 90°

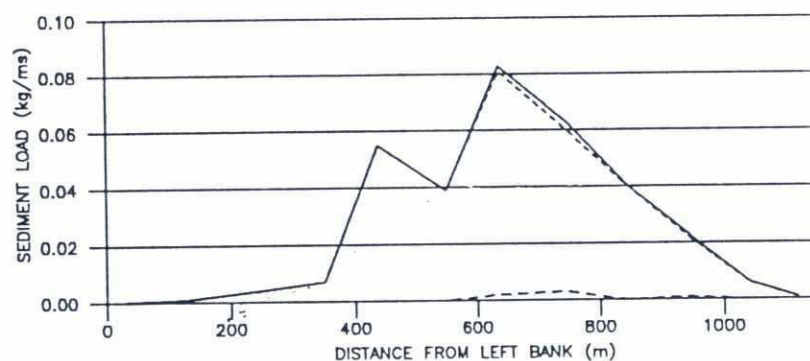
U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

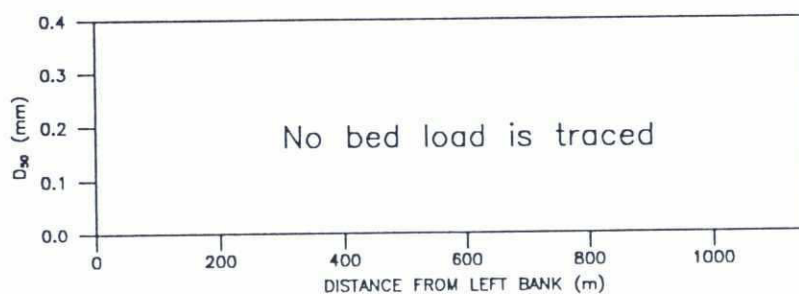
N - MAGNETIC NORTH



FLOW



SEDIMENT TRANSPORT



GRAIN SIZE

LEGEND :

- ◆◆◆◆◆ D₅₀ SUSP. (mm)
- △△△△△ D₅₀ BED LOAD (mm)
- D₅₀ BED MAT. (mm)

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization

Commission of the European Communities

Survey Bulletin 157 : 25- 26 May, 1995

Location 04 : Ganges River, Hardinge Bridge

File : H55P0T01

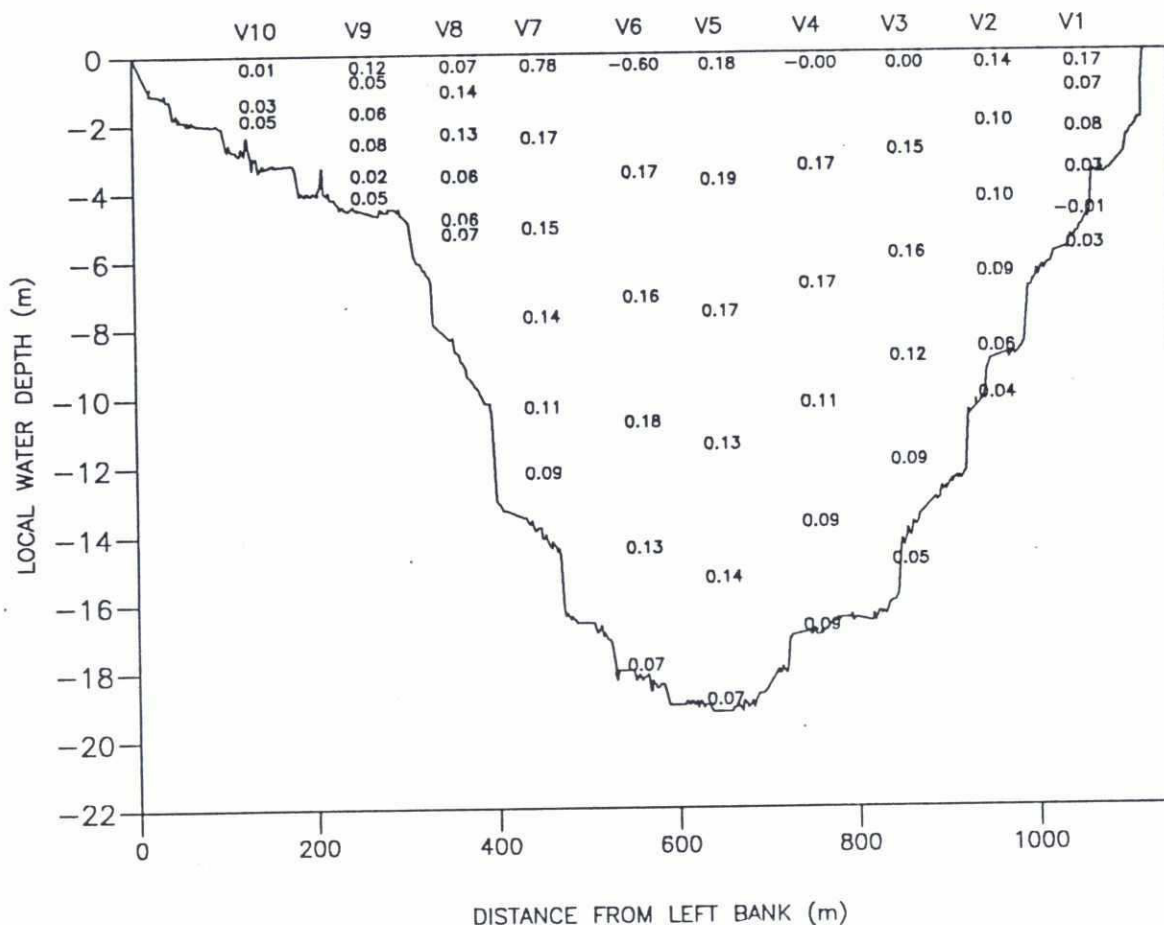
Date : 20 Sep 1995

Init : mk

Horizontal distribution of flow and sediments
Channel 1

page

3.1



Water-level : 7.61 m + PWD measured at the station indicated on page 1.1

FAP 24



RIVER SURVEY PROJECT
Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 157 : 25- 26 May, 1995

Location 04 : Ganges River, Hardinge Bridge

File : H55P0T01

Date : 20 Sep 1995

Init : mk


Cross-sectional distribution of flow velocity
Channel 1

page

4.1

Andreasen settling tube							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth	Weight percent < 0.06 mm > 0.06 mm	D10 (mm)	D50 (mm)	D90 (mm)
Sample not collected							
Table 5.1: Grain size of near bed suspended sediment (0.3 m above river bed)							

US BM-54 bed samples							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth	Weight percent < 0.06 mm > 0.06 mm	D10 (mm)	D50 (mm)	D90 (mm)
Sample not collected							
Table 5.2 : Grain size of bed material							

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJE</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Commu</div></div></div>		Survey Bulletin 157 : 25- 26 May, 1995	
		Location 04 : Ganges River, Hardinge Bridge	
	Date : 20 Sep 1995	Grain size distributions	page 5.1
	Init : mk		

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Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
Echo soundings	1	9505251023-1032 9505251034-1044	H55P0T01 * H55P0T02

Table 6.1: Echo soundings

* : echo sounding in PSD 24 data base and presented in Sections 3 and 4


Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1	9505251200-1225	400963	660679	6.00	H55P0P01 *
		2	9505251235-1304	401061	660672	11.0	H55P0P02 *
		3	9505261219-1243	401160	660666	15.1	H55Q0P07 *
		4	9505261147-1210	401261	660660	17.3	H55Q0P04 *
		5	9505261103-1129	401360	660670	19.3	H55Q0P03 *
		6	9505261028-1052	401460	660663	18.2	H55Q0P02 *
		7	9505260948-1011	401562	660667	13.1	H55Q0P01 *
		8	9505251555-1617	401660	660670	6.20	H55P0P05 *
		9	9505251458-1525	401755	660677	4.60	H55P0P04 *
		10	9505251437-1450	401877	660672	2.60	H55P0P03 *

Table 6.2: Vertical profiles

* ADCP and MEX not available


Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments (pump bottle)	1	1	6	9505251200-1225	400963	660679	6.00
		2	6	9505251235-1304	401061	660672	11.0
		3	6	9505261219-1243	401160	660666	15.1
		4	6	9505261147-1210	401261	660660	17.3
		5	6	9505261103-1129	401360	660670	19.3
		6	6	9505261028-1052	401460	660663	18.2
		7	6	9505260948-1011	401562	660667	13.1
		8	6	9505251555-1617	401660	660670	6.20
		9	6	9505251458-1525	401755	660677	4.60
		10	3	9505251437-1450	401877	660672	2.60

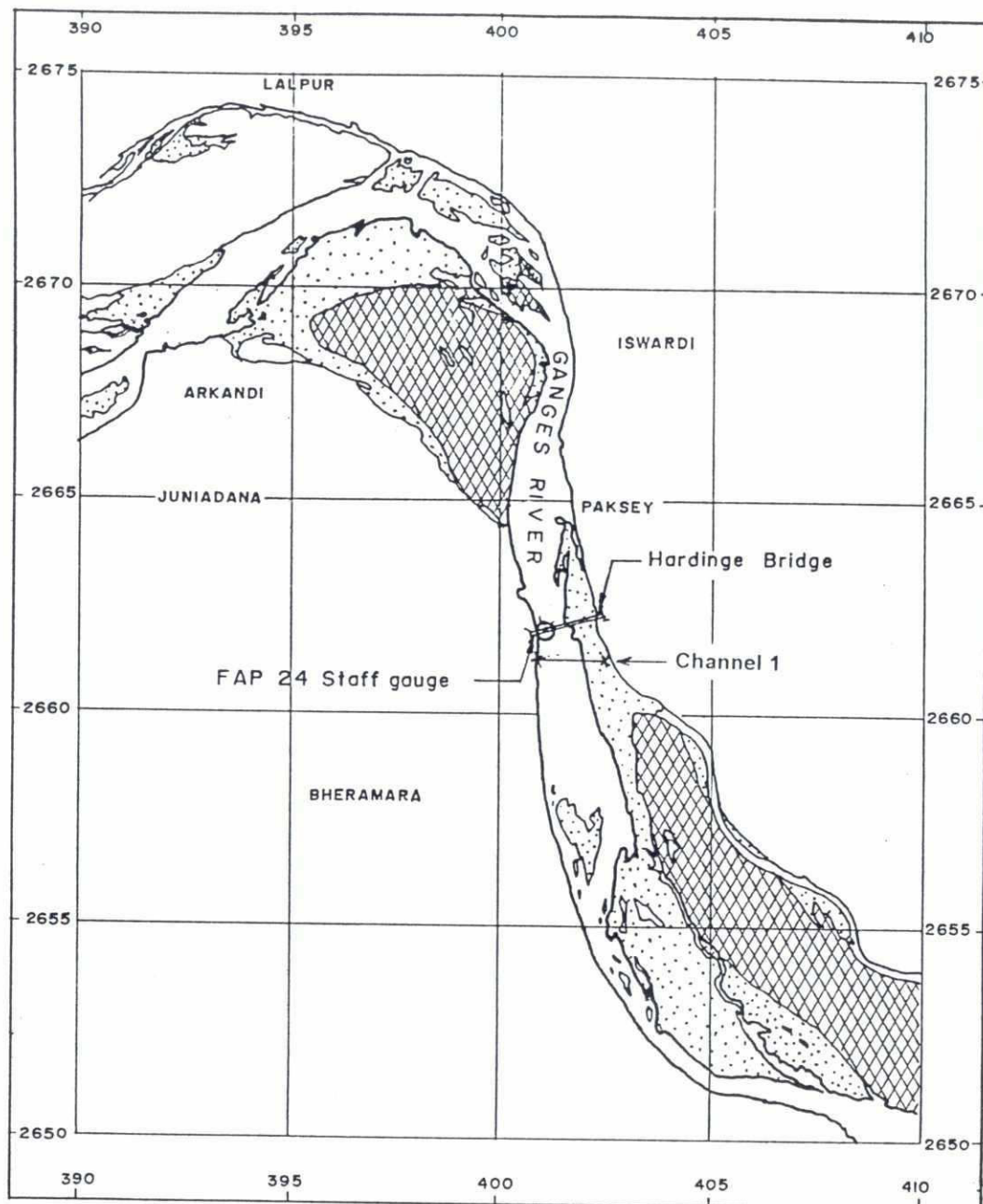
Table 6.3: Suspended sediment - point sampled

FAP 24  DELFT - DHI		RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities		Survey Bulletin 157 : 25- 26 May, 1995	
				Location 04 : Ganges River, Hardinge Bridge	
		Date : 20 Sep 1995		Collected data and their storage (1)	
		Init : mk			
				page 61	

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Types of Data	Channel	Format	Filename
ADCP/S4/EMF data	1	QUATTRO	H55P0T01 .ase
Echosounder data	1	QUATTRO	H55P0T01 .ech
Sediment transport data	1	QUATTRO	H55P0T01 .sed
Transect plot data	1	QUATTRO	H55P0T01 .trs
Table 7.1 PSD 24 Database file description			

FAP 24  DELFT - DHI	RIVER SURVEY PROJECT <small>Flood Plan Coordination Organization</small> <small>Commission of the European Communities</small>	Survey Bulletin 157 : 25- 26 May, 1995	
		Location 04 : Ganges River, Hardinge Bridge	
	Date : 20 Sep 1995	PSD 24 Database file description	page
	Init : mk		7.1



LEGEND:



High land



Unstable/low char

— x — x — Cross section



FAP 24 Staff gauge



5000m 2500m 0

Map is based on satellite
images of March 1995

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 169 : 27 - 28 June, 1995

Location 4 : Ganges River, Hardinge Bridge

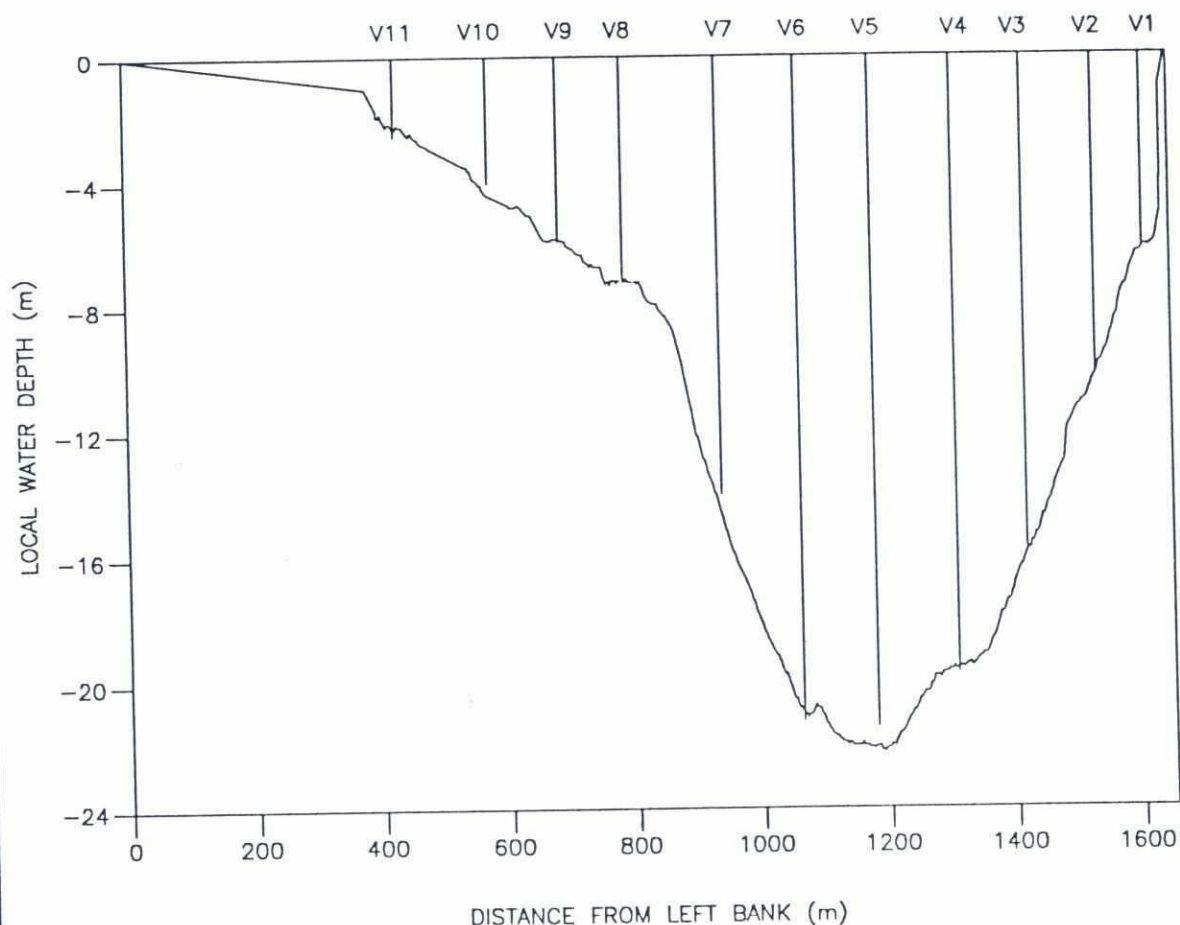
Date : 09 Oct 1995

Init : ss


Location map

page
1.1

22



Water level : 10.47 m + PWD measured at the station indicated on page 1.1

FAP 24  DELFT - DHI		Survey Bulletin 169 : 27 - 28 June, 1995	
RIVER SURVEY PROJECT <small>Flood Plan Coordination Organization</small> <small>Commission of the European Communities</small>		Location 4 : Ganges River, Hardinge Bridge	
File : H56R3T04	Date : 09 Oct 1995	Cross-sections and measured verticals Channel 1	page 1.2
	Init : ss		

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Type of measurement	Method	No. of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	8	-	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	-	-	-	-
Vertical current profile	No. of verticals in channel	11	-	-	-
	ADCP	11	-	-	-
	S4 current meter	-	-	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	60	-	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	-	-	-	-
	Integrated bottle sampling	11	-	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	-	-	-	-
	Delft Bottle	-	-	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-



Table 2.1: Survey programme as made

Channel	Width (m)	Area (m ²)	Stage h (m+PWD)	Discharge Q (m ³ /s)	Bed load transport Sb (kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	1646	15145	10.47	9526	-	5468

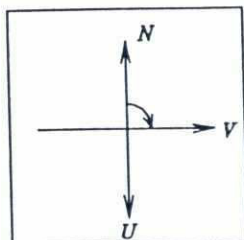
Table 2.2: Key figures

Gauge Location	Channel	Date	Water level (Daily average) (m+PWD)	Gauge
Hardinge Bridge	Channel 1	27 Jun 95	10.47	FAP 24
		28 Jun 95	10.44	

Table 2.3: Water-levels

<div><div><div><div>FAP 24</div><div>DELFT - DHI</div></div></div><div></div></div>		<div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div>	Survey Bulletin 169 : 27 - 28 June, 1995	
		Location 4 : Ganges River, Hardinge Bridge		
File : H56R3T04	Date : 09 Oct 1995	Survey programme as made and key figures	page 2.1	
	Init : ss			

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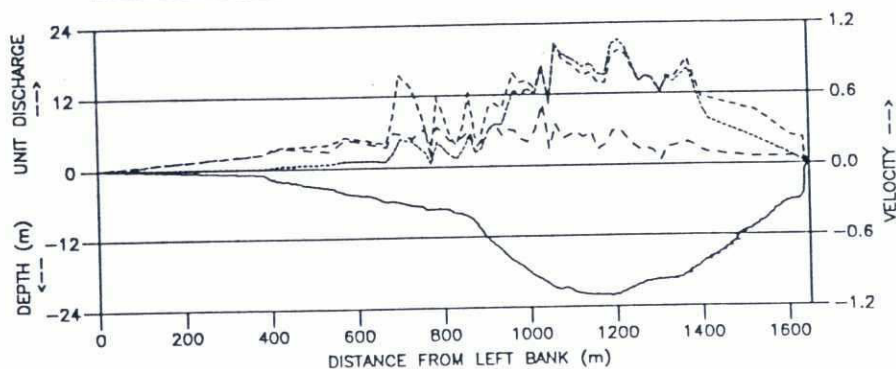


TRANSECT AZIMUTH = 90°

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



FLOW

LEGEND :

— WATER DEPTH (m below STAGE)

..... UNIT DISCHARGE (m³/s.m)

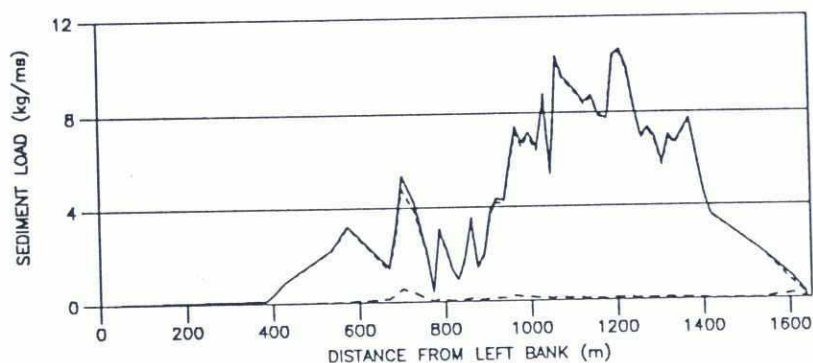
--- U - (m/s)

--- V - (m/s)

STAGE = 10.47 (m+P.W.D)

A = 15145 (m²)

Q = 9526 (m³/s)



SEDIMENT TRANSPORT

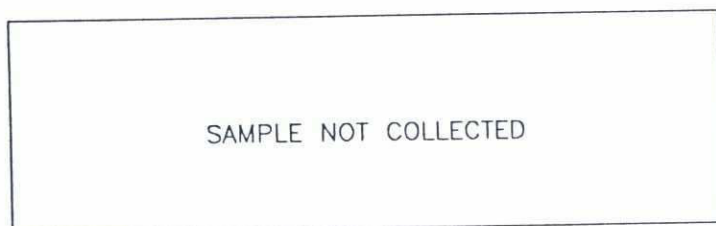
LEGEND :

— S_{TOTAL} 5468 (kg/s)

--- S_{WASH LOAD} 5327 (kg/s)

..... S_{SUSP. BED} 141 (kg/s)

--- S_{BED LOAD} - (kg/s)



GRAIN SIZE

LEGEND :

◇◇◇◇◇ D₅₀ SUSP. (mm)

△△△△△ D₅₀ BED LOAD (mm)

□□□□□ D₅₀ BED MAT. (mm)

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization

Commission of the European Communities

Survey Bulletin 169 : 27 - 28 June, 1995

Location 4 : Ganges River, Hardinge Bridge

File : H56R3T04

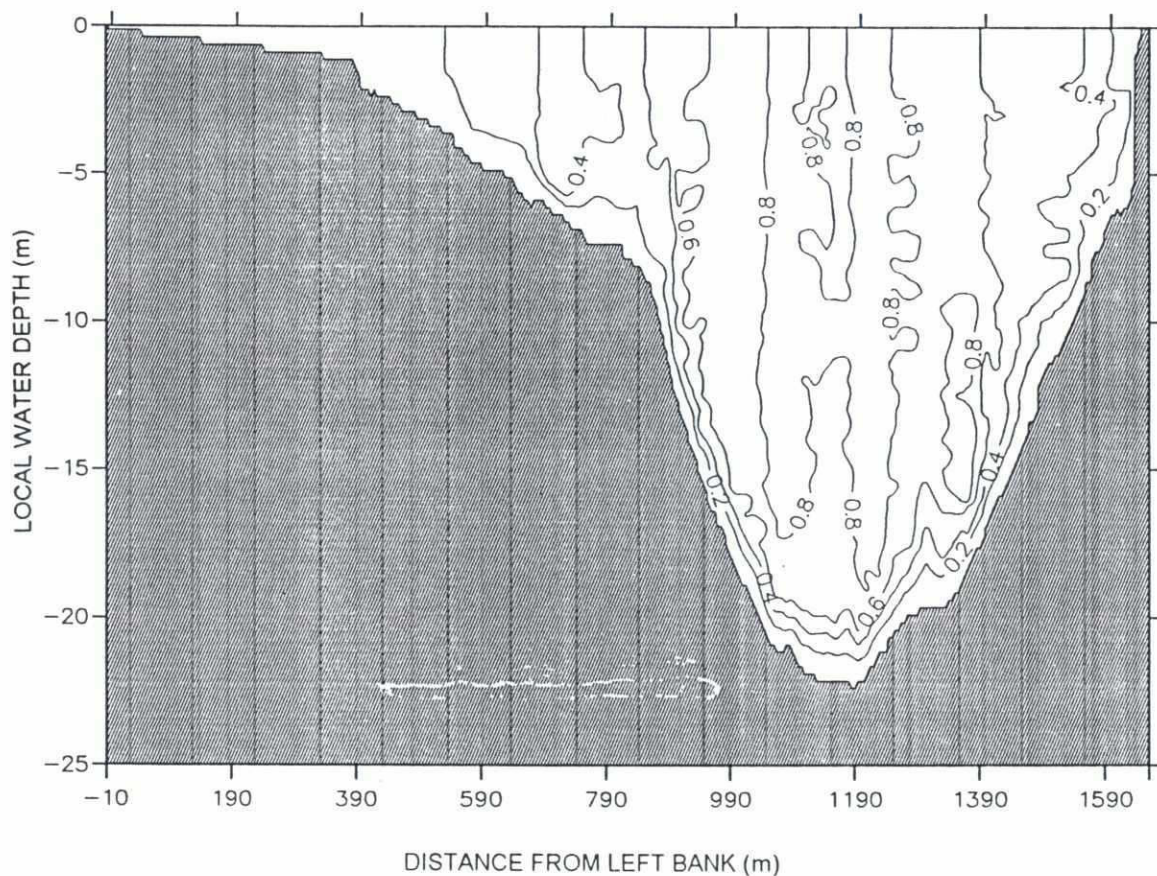
Date : 09 Oct 1995

Init : ss

Horizontal distribution of flow and sediments
Channel 1

page

3.1



Iso-velocity contours (m/s)


Water level : 10.47 m + PWD measured at the station indicated on page 1.1

<div data-bbox="256 1765 392 1888" data-label="Image"> </div> <div data-bbox="450 1807 715 1886" data-label="Text"> <p>RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities</p> </div>		Survey Bulletin 169 : 27 - 28 June, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H56R3T04	Date : 09 Oct 1995	Cross-sectional distribution of flow velocity Channel 1	page 4.1
	Init : ss		

Andreasen settling tube							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.1: Grain size of near bed suspended sediment (0.3 m above river bed)							

US BM-54 bed samples							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.2 : Grain size of bed material							

Helley-Smith							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.3 : Grain sizes of bed load							

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 169 : 27 - 28 June, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 09 Oct 1995	Grain size distributions	page
	Init : ss		5.1

Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
ADCP & EMF transect	1	9506271019-1028 9506271042-1052 9506271745-1754 9506271758-1809 9506280843-0852 9506280855-0904 9506281251-1302 9506281306-1315	H56R3T01 H56R3T02 H56R3T03 H56R3T04 * H56S3T02 H56S3T03 H56S3T04 H56S3T05


Table 6.1: ADCP & EMF transects

* : transect in PSD 24 data base and presented in Sections 3 and 4

Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1 2 3 4 5 6 7 8 9 10 11	9506271233-1241 9506271301-1348 9506271404-1437 9506271447-1520 9506271534-1611 9506271623-1724 9506280915-0947 9506281003-1039 9506281043-1116 9506281125-1155 9506281201-1215	400899 400987 401086 401212 401344 401459 401594 401742 401845 401966 402079	660687 660678 660674 660673 660668 660661 660670 660670 660670 660665 660665	6.10 10.20 15.70 19.70 21.40 21.20 14.00 7.20 5.90 4.00 2.50	H56R3P01 * H56R3P02 * H56R3P03 * H56R3P04 * H56R3P05 * H56R3P06 * H56S3P01 * H56S3P02 * H56S3P03 * H56S3P04 * H56S3P05 *

Table 6.2: Vertical profiles

* S4 & MEX not available


<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 169 : 27 - 28 June, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 09 Oct 1995	Collected data and their storage (1)	page 6.1
	Init : ss		

Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments (pump bottle)	1	1	3	9506271233-1241	400899	660687	6.10
		2	6	9506271301-1348	400987	660678	10.20
		3	6	9506271404-1437	401086	660674	15.70
		4	6	9506271447-1520	401212	660673	19.70
		5	6	9506271534-1611	401344	660668	21.40
		6	6	9506271623-1724	401459	660661	21.20
		7	6	9506280915-0947	401594	660670	14.00
		8	6	9506281003-1039	401742	660670	7.20
		9	6	9506281043-1116	401845	660670	5.90
		10	6	9506281125-1155	401966	660665	4.00
		11	3	9506281201-1215	402079	660665	2.50

Table 6.3: Suspended sediment - point sample

Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments	1	1	1	9506271233-1241	400899	660687	6.10
		2	1	9506271301-1348	400987	660678	10.20
		3	1	9506271404-1437	401086	660674	15.70
		4	1	9506271447-1520	401212	660673	19.70
		5	1	9506271534-1611	401344	660668	21.40
		6	1	9506271623-1724	401459	660661	21.20
		7	1	9506280915-0947	401594	660670	14.00
		8	1	9506281003-1039	401742	660670	7.20
		9	1	9506281043-1116	401845	660670	5.90
		10	1	9506281125-1155	401966	660665	4.00
		11	1	9506281201-1215	402079	660665	2.50

Table 6.4: Suspended sediment - depth integrated


<div><p>FAP 24 DELFT - DHI</p></div> <div><p>RIVER SURVEY PROJECT</p><p>Flood Plan Coordination Organization</p><p>Commission of the European Communities</p></div>		Survey Bulletin 169 : 27 - 28 June, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 09 Oct 1995	Collected data and their storage (2)	page
	Init : ss		6.2

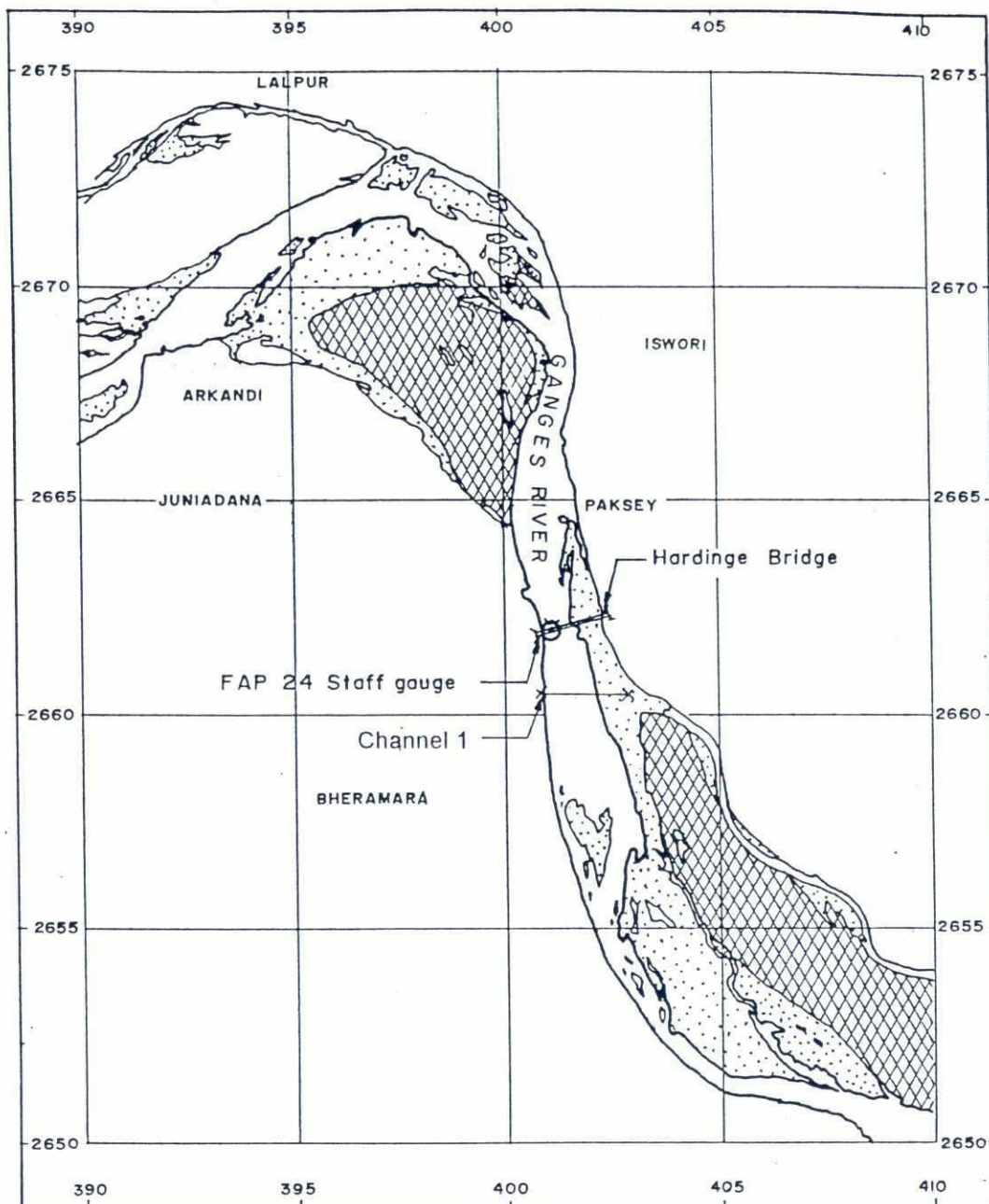
22

Types of Data	Channel	Format	Filename
ADCP/S4/EMF data	1	QUATTRO	H56R3T04 .ase
Echosounder data	1	QUATTRO	H56R3T04 .ech
Sediment transport data	1	QUATTRO	H56R3T04 .sed
Susp. sed. conc. analysis	1	QUATTRO	H56R3T04 .ssc
Transect plot data	1	QUATTRO	H56R3T04 .trs
Iso-velocity plot data	1	MIKE21 MIKE21	H56R3T04 .ct2 H56R3T04 .dt2

Table 7.1 PSD 24 Database file description



FAP 24  DELFT - DHI		Survey Bulletin 169 : 27 - 28 June, 1995	
RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities		Location 4 : Ganges River, Hardinge Bridge	
	Date : 09 Oct 1995	PSD 24 Database file description	page
	Init : ss		7.1



LEGEND:



High land



Unstable/low char

— x — Cross section



FAP 24 Staff gauge

5000m 2500m 0

Map is based on satellite images of March 1995

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization

Commission of the European Communities

Survey Bulletin 180 : 09 - 10 August , 1995

Location 4 : Ganges River, Hardinge Bridge

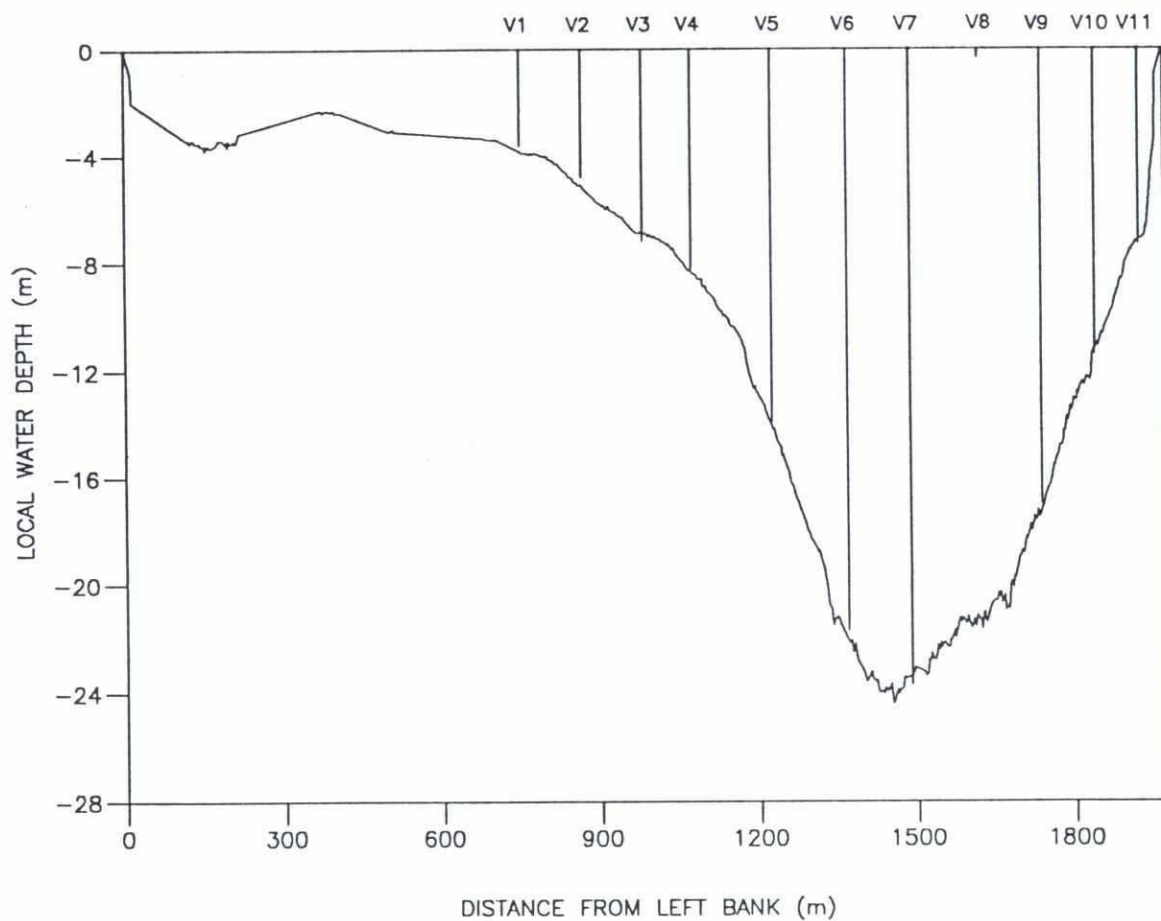
Date : 04 Jan 1995

Init : sjr


Location map

page

1.1



Water level : 12.53 m + PWD measured at the station indicated on page 1.1

FAP 24  DELFT - DHI		Survey Bulletin 180 : 09 - 10 August , 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H5893T03	Date : 04 Jan 1995	Cross-sections and measured verticals Channel 1	page
	Init : sjr		1.2

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Type of measurement	Method	No. of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	8	-	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	-	-	-	-
Vertical current profile	No. of verticals in channel	11	-	-	-
	ADCP	11	-	-	-
	S4 current meter	-	-	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	-	-	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	-	-	-	-
	Integrated bottle sampling	11	-	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	22	-	-	-
	Delft Bottle	-	-	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-


Table 2.1: Survey programme as made

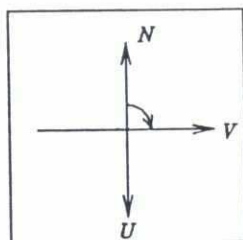
Channel	Width (m)	Area (m ²)	Stage h(m + PWD)	Discharge Q(m ³ /s)	Bed load transport Sb(kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	1968	18725	12.53	19718	65	27528

Table 2.2: Key figures

Gauge Location	Channel	Date	Water level (Daily average) (m + PWD)	Gauge
Hardinge Bridge	Channel 1	09 Aug 95	12.53	FAP24
		10 Aug 95	12.65	

Table 2.3: Water-levels

 FAP 24 RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities		Survey Bulletin 180 : 09 - 10 August, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H5893T03	Date : 04 Jan 1996	Survey programme as made and key figures	page 2.1
	Init : sjr		

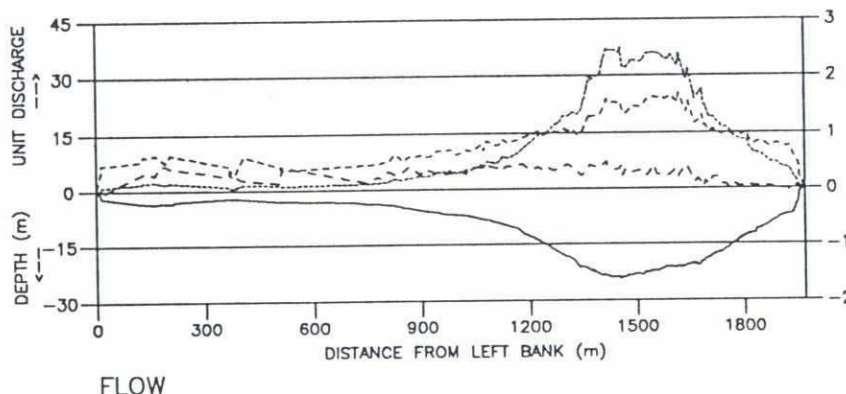


TRANSECT AZIMUTH = 90°

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



FLOW

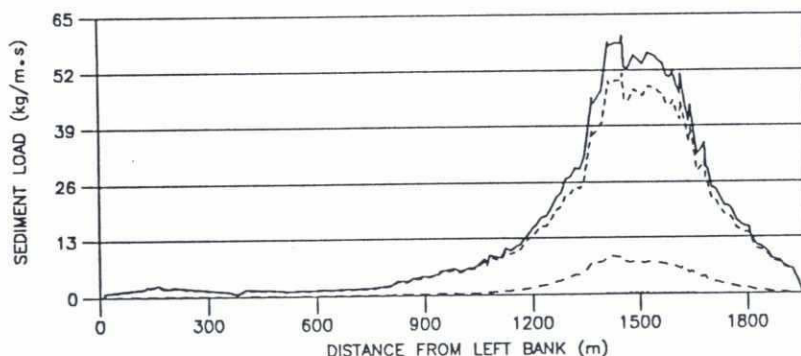
LEGEND :

- WATER DEPTH (m below STAGE)
- - - UNIT DISCHARGE (m³/s.m)
- ... U (m/s)
- . - V (m/s)

STAGE = 12.53 (m+PWD)

A = 18725 (m²)

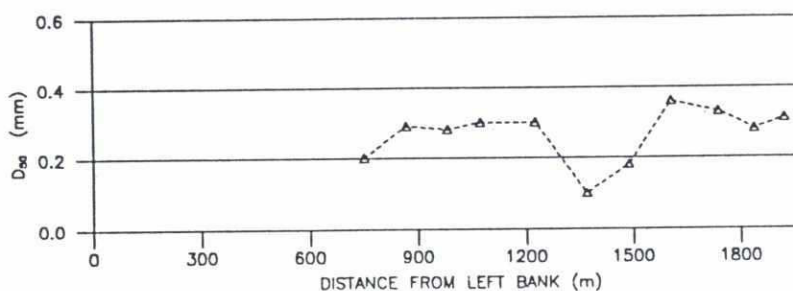
Q = 19718 (m³/s)



SEDIMENT TRANSPORT

LEGEND :

- S_{TOTAL} 27593 (kg/s)
- - - $S_{WASH\ LOAD}$ 24111 (kg/s)
- ... $S_{SUSP.\ BED}$ 3417 (kg/s)
- . - $S_{BED\ LOAD}$ 65 (kg/s)



GRAIN SIZE

LEGEND :

- ◇◇◇◇◇ $D_{50\ SUSP.}$ (mm)
- △△△△△ $D_{50\ BED\ LOAD}$ (mm)
- $D_{50\ BED\ MAT.}$ (mm)

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 180 : 09 - 10 August, 1995

Location 4 : Ganges River, Hardinge Bridge

File : I15893T03

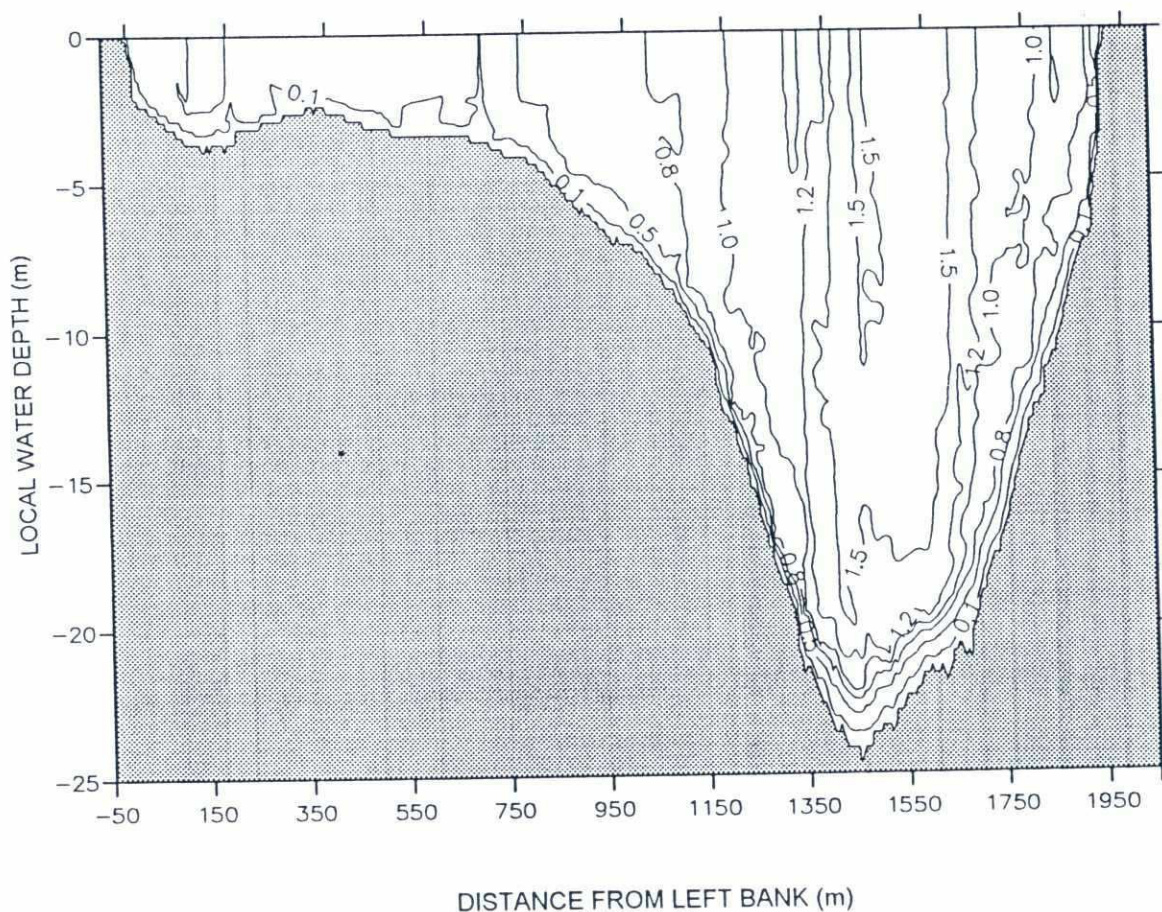
Date : 04 Jan 1996

Init : sjr

Horizontal distribution of flow and sediments
Channel 1

page
3.1

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Iso-velocity contours (m/s)

Water level : 12.53 m + PWD measured at the station indicated on page 1.1



RIVER SURVEY PROJECT
Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 180 : 09 - 10 August , 1995

Location 4 : Ganges River, Hardinge Bridge

File : H5893T03

Date : 04 Jan 1995

Init : sjr


Cross-sectional distribution of flow velocity
Channel 1

page

4.1

02

Helley-Smith								
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent		D35 (mm)	D50 (mm)	D65 (mm)
				< 0.06 mm	> 0.06 mm			
1	1	9508101119-1130	3.60	7.82	92.18	0.212	0.289	0.368
	2	9508101104-1117	4.80	4.39	95.61	0.226	0.291	0.361
	3	9508101050-1100	7.20	10.49	89.51	0.189	0.266	0.328
	4	9508101036-1046	8.20	4.32	95.68	0.246	0.298	0.357
	5	9508101019-1032	13.90	2.99	97.01	0.275	0.318	0.368
	6	9508100957-1001	21.70	13.73	86.27	0.086	0.107	0.142
	7	9508091634-1656	23.70	2.07	97.93	0.143	0.166	0.193
	8	9508091445-1458	-	0.57	99.43	0.310	0.351	0.397
	9	9508091406-1436	17.00	1.03	98.97	0.294	0.334	0.381
	10	9508091350-1358	11.40	7.98	92.02	0.220	0.282	0.339
	11	9508091329-1347	7.30	1.22	98.78	0.276	0.319	0.368
	1	9508101119-1130	3.60	31.35	68.65	0.069	0.103	0.160
	2	9508101104-1117	4.80	2.81	97.19	0.237	0.294	0.355
	3	9508101050-1100	7.20	5.13	94.87	0.244	0.297	0.356
	4	9508101036-1046	8.20	3.95	96.05	0.250	0.296	0.351
	5	9508101019-1032	13.90	3.00	97.00	0.235	0.288	0.343
	6	9508100957-1001	21.70	10.46	89.54	0.085	0.102	0.122
	7	9508091634-1656	23.70	5.95	94.05	0.162	0.201	0.248
	8	9508091445-1458	-	0.31	99.69	0.325	0.371	0.424
	9	9508091406-1436	17.00	0.26	99.74	0.286	0.326	0.372
	10	9508091350-1358	11.40	5.27	94.73	0.213	0.275	0.333
	11	9508091329-1347	7.30	1.66	98.34	0.244	0.292	0.346
Table 5.1 : Grain sizes of bed load								

<div><div><div><div><div></div><div>FAP 24</div></div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div></div>		Survey Bulletin 180 : 09 - 10 August , 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 04 Jan 1995	Grain size distributions	page
	Init : sjr		5.1

Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
ADCP & EMF transect	1	9508091201-1219 9508091225-1246 9508091700-1720 9508091724-1744 9508100905-0921 9508100923-0945 9508101153-1207 9508101209-1230	H5893T03 * H5893T04 H5893T14 H5893T15 H58A3T01 H58A3T02 H58A3T11 H58A3T12

Table 6.1: ADCP & EMF transects

* : transect in PSD 24 data base and presented in Sections 3 and 4


Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1 2 3 4 5 6 7 8 9 10 11	9508101119-1130 9508101104-1117 9508101050-1100 9508101036-1046 9508101019-1032 9508100957-1001 9508091634-1656 9508091445-1458 9508091406-1436 9508091350-1358 9508091329-1347	402075 401967 401841 401751 401601 401459 401344 401218 401092 400991 400909	660673 660676 660676 660674 660670 660669 660666 660664 660672 660666 660671	3.60 4.80 7.20 8.20 13.90 21.70 23.70 - 17.00 11.40 7.30	H58A3P08 * H58A3P07 * H58A3P06 * H58A3P05 * H58A3P04 * H58A3P03 * H5893P12 * H5893P10 * H5893P08 * H5893P07 * H5893P06 *

Table 6.2: Vertical profiles

* S4 & MEX not available

Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments	1	1 2 3 4 5 6 7 8 9 10 11	1 1 1 1 1 1 1 1 1 1 1	9508101119-1130 9508101104-1117 9508101050-1100 9508101036-1046 9508101019-1032 9508100957-1001 9508091634-1656 9508091445-1458 9508091406-1436 9508091350-1358 9508091329-1347	402075 401967 401841 401751 401601 401459 401344 401218 401092 400991 400909	660673 660676 660676 660674 660670 660669 660666 660664 660672 660666 660671	3.60 4.80 7.20 8.20 13.90 21.70 23.70 - 17.00 11.40 7.30


Table 6.3: Suspended sediment - depth integrated

FAP 24  DELFT - DHI		RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities		Survey Bulletin 180 : 09 - 10 August , 1995	
				Location 4 : Ganges River, Hardinge Bridge	
		Date : 04 Jan 1995 Init : sjr		Collected data and their storage (1)	
				page 6.1	


09

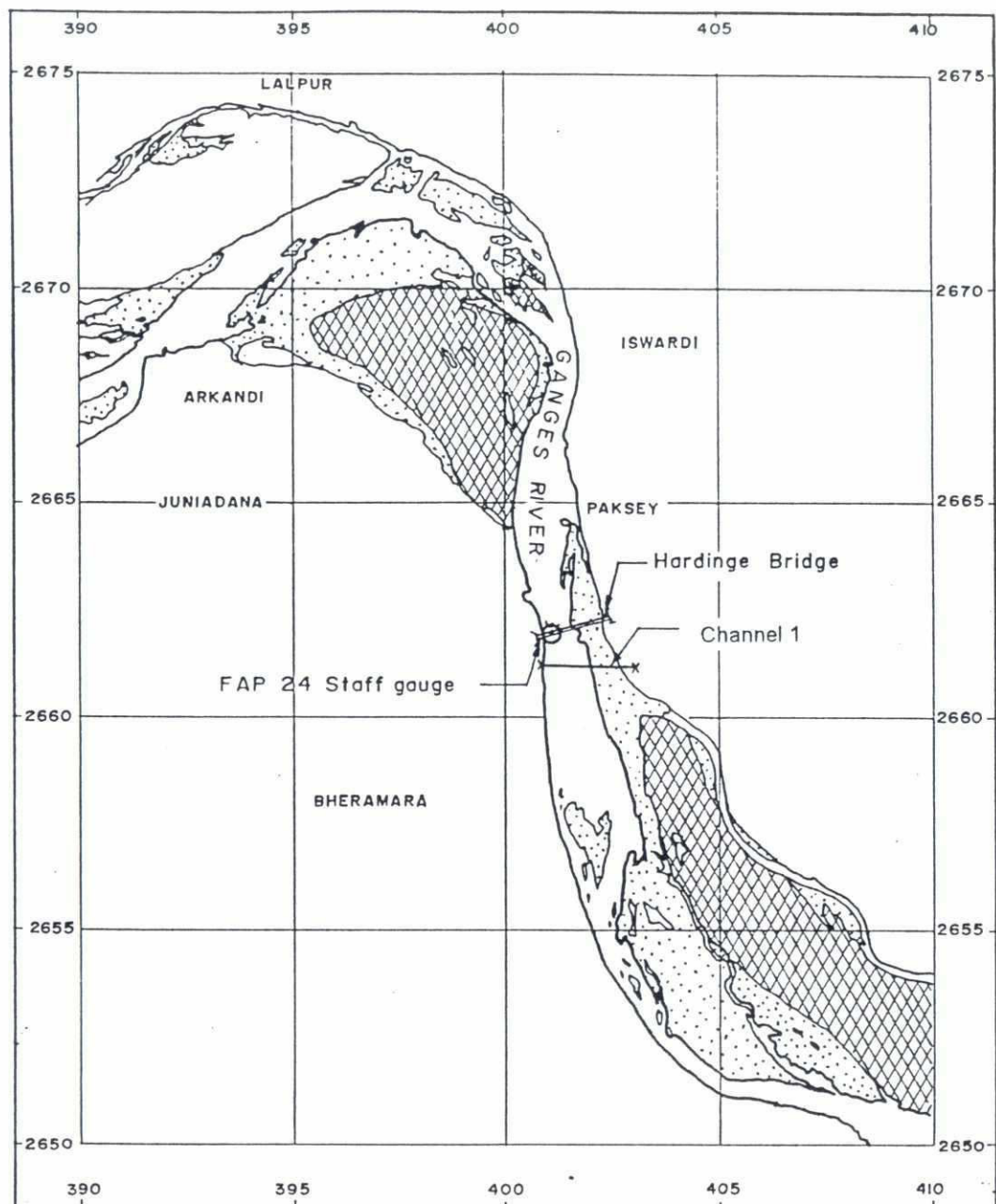
Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	Sample No.
Helley-Smith Sample	1	1	9508101119-1130	402075	660673	3.60	C120
		2	9508101104-1117	401967	660676	4.80	C018
		3	9508101050-1100	401841	660676	7.20	C267
		4	9508101036-1046	401751	660674	8.20	C013
		5	9508101019-1032	401601	660670	13.90	C044
		6	9508100957-1001	401459	660669	21.70	A224
		7	9508091634-1656	401344	660666	23.70	C245
		8	9508091445-1458	401218	660664	-	A2139
		9	9508091406-1436	401092	660672	17.00	A2145
		10	9508091350-1358	400991	660666	11.40	A2219
		11	9508091329-1347	400909	660671	7.30	A351
		1	9508101119-1130	402075	660673	3.60	C650
		2	9508101104-1117	401967	660676	4.80	C077
		3	9508101050-1100	401841	660676	7.20	C061
		4	9508101036-1046	401751	660674	8.20	C242
		5	9508101019-1032	401601	660670	13.90	C252
		6	9508100957-1001	401459	660669	21.70	C082
		7	9508091634-1656	401344	660666	23.70	A1144
		8	9508091445-1458	401218	660664	-	A3044
		9	9508091406-1436	401092	660672	17.00	A2211
		10	9508091350-1358	400991	660666	11.40	A2144
		11	9508091329-1347	400909	660671	7.30	C096

Table 6.4: Bed load

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 180 : 09 - 10 August , 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 04 Jan 1995	Collected data and their storage (2)	page
	Init : sjr		6.2

Types of Data	Channel	Format	Filename
ADCP/S4/EMF data	1	QUATTRO	H5893T03 .ase
Echosounder data	1	QUATTRO	H5893T03 .ech
Sediment transport data	1	QUATTRO	H5893T03 .sed
Bed load sediment analysis	1	QUATTRO	H5893T03 .bdl
Susp. sed. conc. analysis	1	QUATTRO	H5893T03 .ssc
Transect plot data	1	QUATTRO	H5893T03 .trs
Iso-velocity plot data	1	MIKE 21 MIKE 21	H5893T03 .ct2 H5893T03 .dt2
Table 7.1 PSD 24 Database file description			

 <p>FAP 24 DELFT - DHI</p>	<p>RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities</p>	Survey Bulletin 180 : 09 - 10 August , 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 04 Jan 1995	PSD 24 Database file description	page
	Init : sjr		7.1



LEGEND:



High land



Unstable/low char

x—x Cross section



FAP 24 Staff gauge



5000m 2500m 0

Map is based on satellite
images of March 1995

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 189 : 05 September, 1995

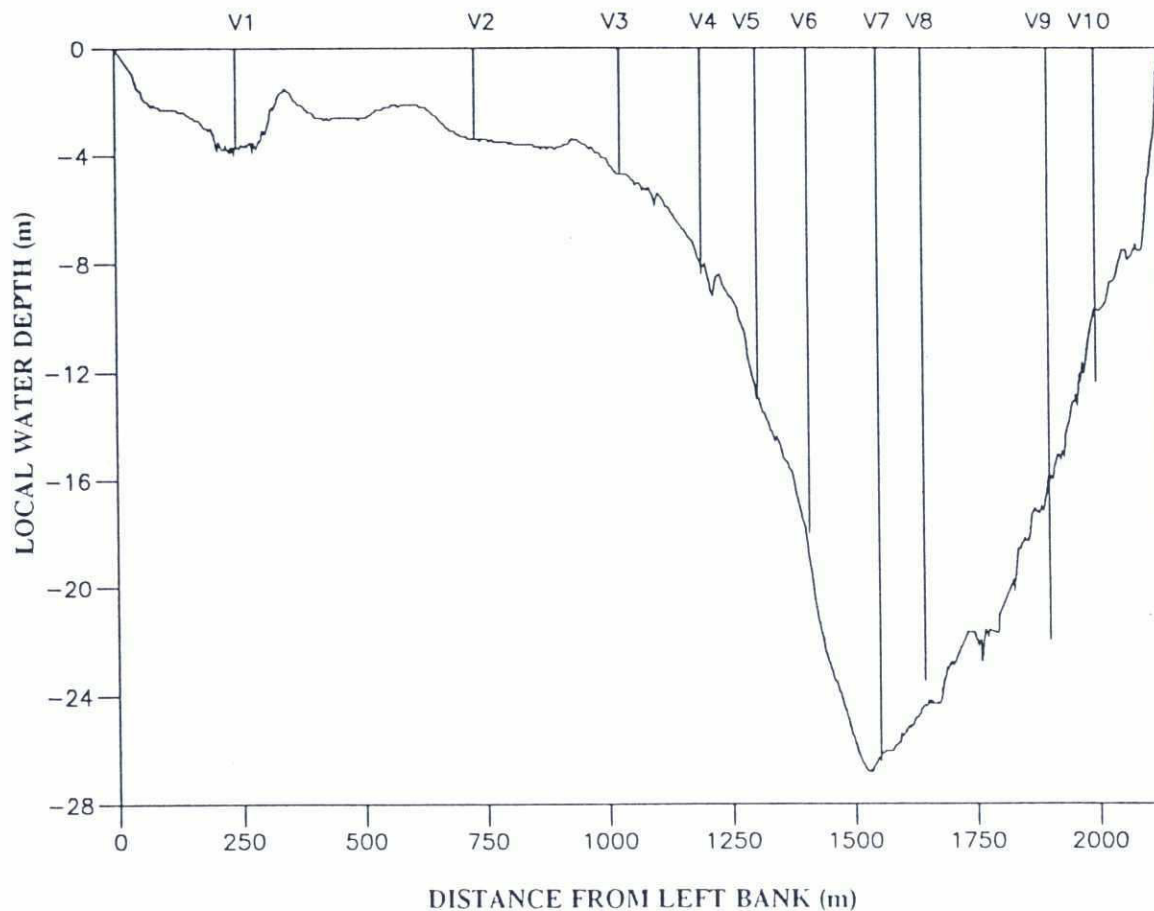
Location 4 : Ganges River, Hardinge Bridge

Date : 12 Feb 1996


Init : ss

Location map

page
1.1



Water level : 13.31 m+PWD measured at the station indicated on page 1.1

 DELFT - DHI		RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 189 : 05 September, 1995
		Location 4 : Ganges River, Hardinge Bridge	
File : H5953T02	Date : 12 Feb 1996	Cross-sections and measured verticals Channel 1	page 1.2
	Init : ss		

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Type of measurement	Method	No. of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	4	-	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	-	-	-	-
Vertical current profile	No. of verticals in channel	10	-	-	-
	ADCP	10	-	-	-
	S4 current meter	-	-	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	-	-	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	-	-	-	-
	Integrated bottle sampling	10	-	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	20	-	-	-
	Delft Bottle	-	-	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-


Table 2.1: Survey programme as made

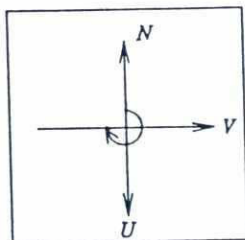
Channel	Width (m)	Area (m ²)	Stage h (m+PWD)	Discharge Q (m ³ /s)	Bed load transport Sb (kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	2130	19938	13.31	33344	67	58409

Table 2.2: Key figures

Gauge Location	Channel	Date	Water level (Daily average) (m+PWD)	Gauge
Hardinge Bridge	Channel 1	05 Sep 95	13.31	FAP 24

Table 2.3: Water-levels

 FAP 24 DELFT - DHI		Survey Bulletin 189 : 05 September, 1995	
		RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	
Location 4 : Ganges River, Hardinge Bridge			
File : H5953T02	Date : 12 Feb 1996	Survey programme as made and key figures	page
	Init : ss		2.1

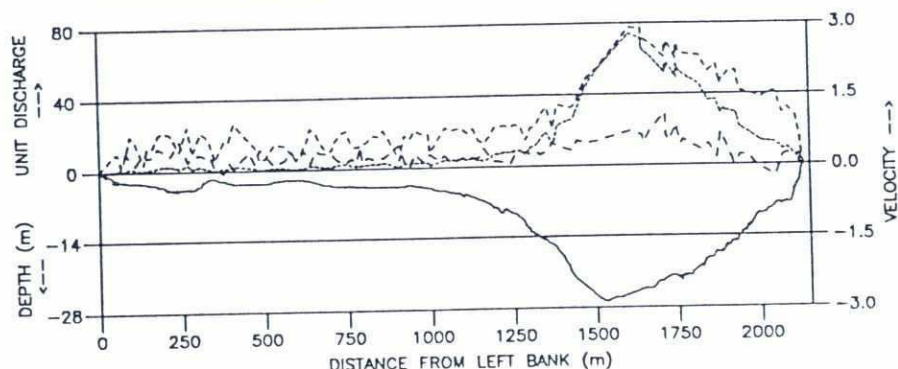


TRANSECT AZIMUTH = 270°

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



FLOW

LEGEND :

— WATER DEPTH (m below STAGE)

..... UNIT DISCHARGE (m³/s.m)

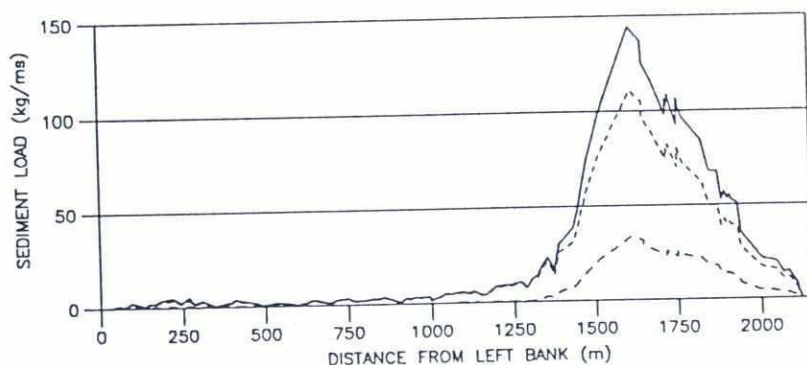
--- U - (m/s)

-.- V - (m/s)

STAGE = 13.31 (m+P.W.D)

A = 19938 (m²)

Q = 33344 (m³/s)



SEDIMENT TRANSPORT

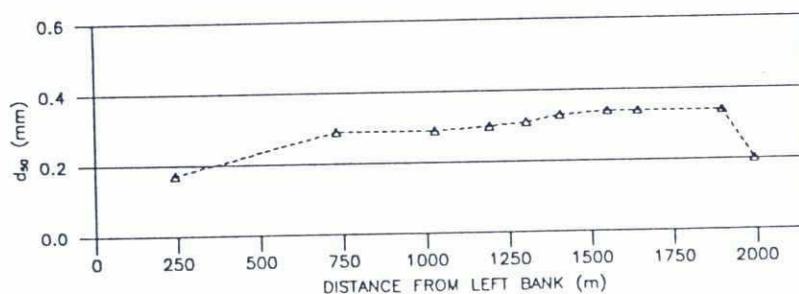
LEGEND :

— S_{TOTAL} 58476 (kg/s)

--- S_{WASH LOAD} 45592 (kg/s)

-.- S_{SUSP. BED} 12817 (kg/s)

..... S_{BED LOAD} 67 (kg/s)



GRAIN SIZE

LEGEND :

◇◇◇◇◇ D₅₀ SUSP. (mm)

△△△△△ D₅₀ BED LOAD (mm)

□□□□□ D₅₀ BED MAT. (mm)

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 189 : 05 September, 1995

Location 4 : Ganges River, Hardinge Bridge

File : II5953T02

Date : 12 Feb 1996

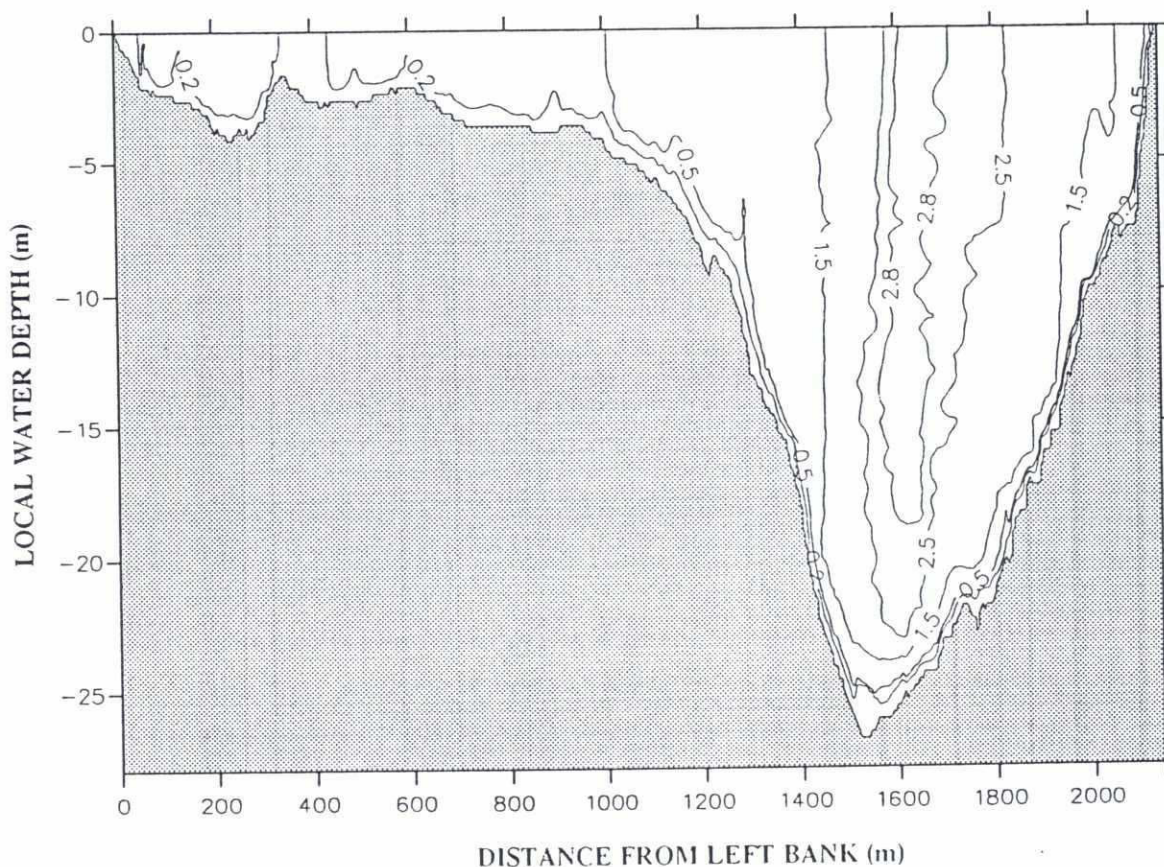
Init : ss

Horizontal distribution of flow and sediments

Channel 1


page

3.1



Iso-velocity contours (m/s)


Water level : 13.31 m+ PWD measured at the station indicated on page 1.1

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 189 : 05 September, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H5953T02	Date : 12 Feb 1996	Cross-sectional distribution of flow velocity Channel 1	page 4.1
	Init : ss		

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Helley-Smith								
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent		D35 (mm)	D50 (mm)	D65 (mm)
				< 0.06 mm	> 0.06 mm			
1	1	9509051614-1617	3.70	1.03	98.97	0.151	0.175	0.203
	2	9509051600-1606	3.40	3.19	96.81	0.224	0.285	0.344
	3	9509051548-1552	4.70	1.08	98.92	0.249	0.296	0.350
	4	9509051533-1538	8.40	3.42	96.58	0.232	0.289	0.347
	5	9509051517-1521	13.00	0.29	99.71	0.279	0.322	0.372
	6	9509051500-1504	18.00	0.43	99.57	0.293	0.335	0.382
	7	9509051433-1437	26.40	1.33	98.67	0.293	0.333	0.380
	8	9509051406-1410	23.50	2.04	97.96	0.295	0.336	0.382
	9	9509051348-1352	22.00	0.52	99.48	0.302	0.344	0.392
	10	9509051334-1338	12.40	1.01	98.99	0.180	0.216	0.264
	1	9509051614-1617	3.70	1.72	98.28	0.138	0.161	0.187
	2	9509051600-1606	3.40	0.59	99.41	0.241	0.292	0.347
	3	9509051548-1552	4.70	3.19	96.81	0.242	0.293	0.350
	4	9509051533-1538	8.40	2.81	97.19	0.267	0.314	0.370
	5	9509051517-1521	13.00	1.54	98.46	0.253	0.300	0.355
	6	9509051500-1504	18.00	2.31	97.69	0.283	0.325	0.374
	7	9509051433-1437	26.40	1.56	98.44	0.301	0.340	0.385
	8	9509051406-1410	23.50	1.05	98.95	0.302	0.343	0.389
	9	9509051348-1352	22.00	0.51	99.49	0.304	0.345	0.390
	10	9509051334-1338	12.40	1.19	98.81	0.163	0.186	0.213

Table 5.1 : Grain sizes of bed load

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>	Survey Bulletin 189 : 05 September, 1995		
	Location 4 : Ganges River, Hardinge Bridge		
	Date : 12 Feb 1996	Grain size distributions	page
	Init : ss		5.1

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Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
ADCP & EMF transect	1	9509051013-1030 9509051037-1058 9509051704-1722 9509051724-1739	H5953T01 H5953T02 * H5953T07 H5953T08


Table 6.1: ADCP & EMF transects *: transect in PSD 24 data base and presented in Sections 3 and 4

Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1	9509051614-1617	402741	660671	3.70	H5953P10 *
		2	9509051600-1606	402242	660674	3.40	H5953P09 *
		3	9509051548-1552	401948	660674	4.70	H5953P08 *
		4	9509051533-1538	401780	660674	8.40	H5953P07 *
		5	9509051517-1521	401670	660673	13.00	H5953P06 *
		6	9509051500-1504	401576	660670	18.00	H5953P05 *
		7	9509051433-1437	401420	660666	26.40	H5953P04 *
		8	9509051406-1410	401306	660662	23.50	H5953P03 *
		9	9509051348-1352	401115	660672	22.00	H5953P02 *
		10	9509051334-1338	400998	660672	12.40	H5953P01 *

Table 6.2: Vertical profiles * S4 & MEX not available


Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments	1	1	1	9509051614-1617	402741	660671	3.70
		2	1	9509051600-1606	402242	660674	3.40
		3	1	9509051548-1552	401948	660674	4.70
		4	1	9509051533-1538	401780	660674	8.40
		5	1	9509051517-1521	401670	660673	13.00
		6	1	9509051500-1504	401576	660670	18.00
		7	1	9509051433-1437	401420	660666	26.40
		8	1	9509051406-1410	401306	660662	23.50
		9	1	9509051348-1352	401115	660672	22.00
		10	1	9509051334-1338	400998	660672	12.40

Table 6.3: Suspended sediment - depth integrated

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 189 : 05 September, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 12 Feb 1996	Collected data and their storage (1)	page 6.1
	Init : ss		

Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	Sample No.
Helley-Smith Sample	1	1	9509051614-1617	402741	660671	3.70	C036
		2	9509051600-1606	402242	660674	3.40	C482
		3	9509051548-1552	401948	660674	4.70	C690
		4	9509051533-1538	401780	660674	8.40	A690
		5	9509051517-1521	401670	660673	13.00	C552
		6	9509051500-1504	401576	660670	18.00	C567
		7	9509051433-1437	401420	660666	26.40	C568
		8	9509051406-1410	401306	660662	23.50	C578
		9	9509051348-1352	401115	660672	22.00	C510
		10	9509051334-1338	400998	660672	12.40	C562
		1	9509051614-1617	402741	660671	3.70	C109
		2	9509051600-1606	402242	660674	3.40	A714
		3	9509051548-1552	401948	660674	4.70	C255
		4	9509051533-1538	401780	660674	8.40	A129
		5	9509051517-1521	401670	660673	13.00	C591
		6	9509051500-1504	401576	660670	18.00	C645
		7	9509051433-1437	401420	660666	26.40	C522
		8	9509051406-1410	401306	660662	23.50	C230
		9	9509051348-1352	401115	660672	22.00	C679
		10	9509051334-1338	400998	660672	12.40	C649


Table 6.4: Bed load

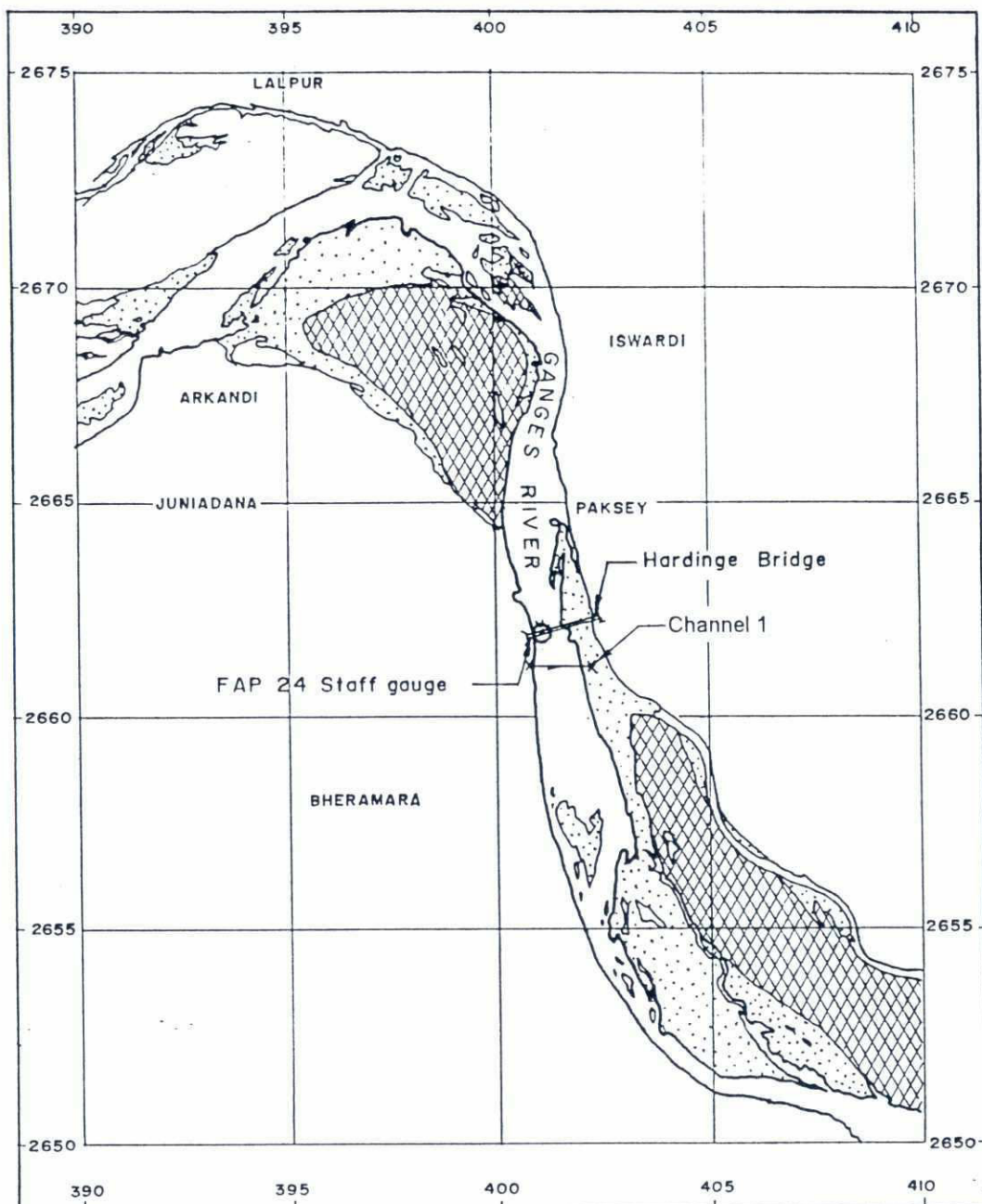
 <p>FAP 24 DELFT - DHI</p>		<p>RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities</p>		Survey Bulletin 189 : 05 September, 1995	
				Location 4 : Ganges River, Hardinge Bridge	
		Date : 12 Feb 1996		Collected data and their storage (2)	page
		Init : ss			6.2

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


Types of Data	Channel	Format	Filename
ADCP/S4/EMF data	1	QUATTRO	H5953T02 .ase
Echosounder data	1	QUATTRO	H5953T02 .ech
Sediment transport data	1	QUATTRO	H5953T02 .sed
Susp. sed. conc. analysis	1	QUATTRO	H5953T02 .ssc
Bedload sediment analysis	1	QUATTRO	H5953T02 .bdl
Transect plot data	1	QUATTRO	H5953T02 .trs
Iso-velocity plot data	1	MIKE21 MIKE21	H5953T02 .ct2 H5953T02 .dt2

Table 7.1 PSD 24 Database file description

 <p>FAP 24 DELFT - DHI</p>	<p>RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities</p>	Survey Bulletin 189 : 05 September, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 12 Feb 1996	PSD 24 Database file description	page
	Init : ss		7.1



LEGEND:

-  High land
-  Unstable/low char
-  Cross section
-  FAP 24 Staff gauge

5000m 2500m 0

Map is based on satellite images of March 1995

FAP 24
DELFT - DHI

RIVER SURVEY PROJECT
Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 197 : 26 September, 1995

Location 4 : Ganges River, Hardinge Bridge

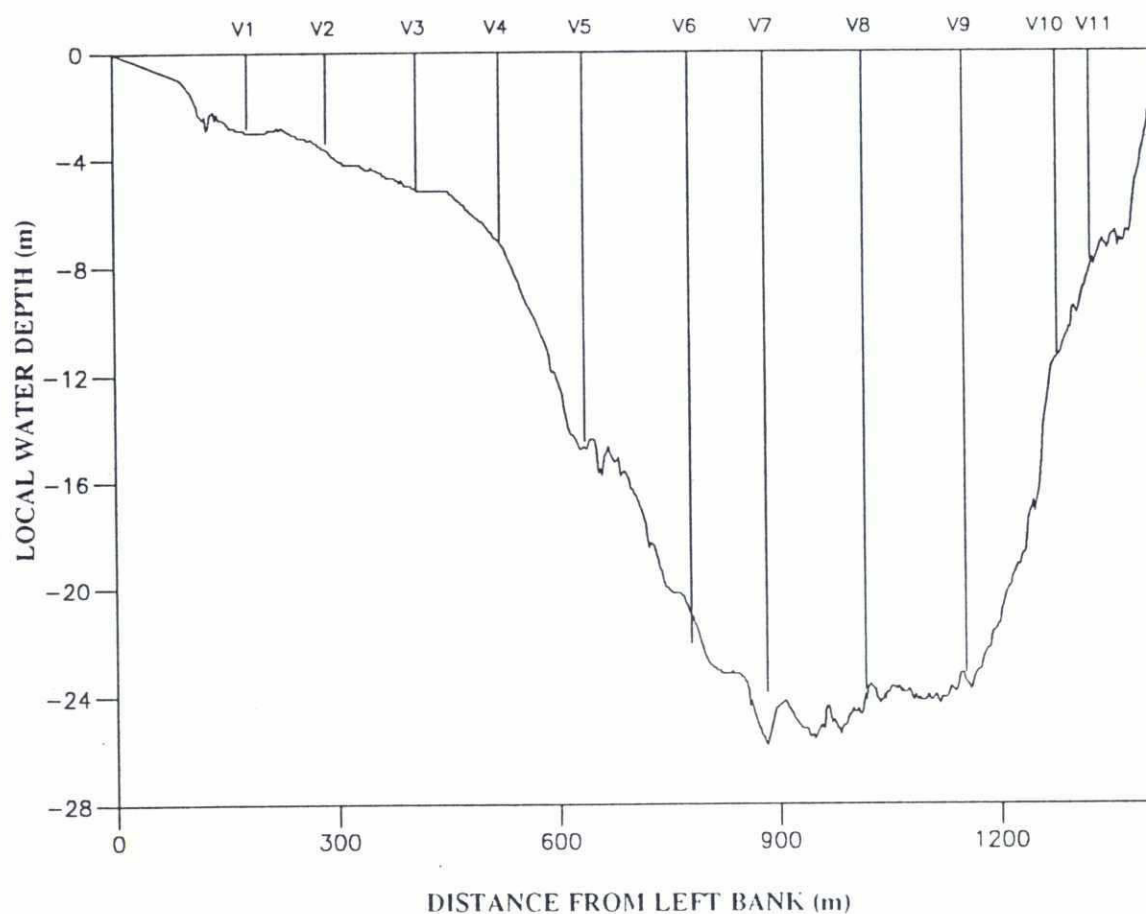
Date : 18 Feb 1996

Init : sjr

Location map

page
1.1

82



Water level : 12.93 m+PWD measured at the station indicated on page 1.1

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 197 : 26 September, 1995

Location 4 : Ganges River, Hardinge Bridge

File : H59Q3T05

Date : 18 Feb 1996

Init : sjr

Cross-sections and measured verticals
Channel 1

page

1.2

00

Type of measurement	Method	No. of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	4	-	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	-	-	-	-
Vertical current profile	No. of verticals in channel	11	-	-	-
	ADCP	11	-	-	-
	S4 current meter	-	-	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	-	-	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	-	-	-	-
	Integrated bottle sampling	11	-	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	21	-	-	-
	Delft Bottle	-	-	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-


Table 2.1: Survey programme as made

Channel	Width (m)	Area (m ²)	Stage h(m + PWD)	Discharge Q(m ³ /s)	Bed load transport Sb(kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	1409	17855	12.93	24353	19	32383

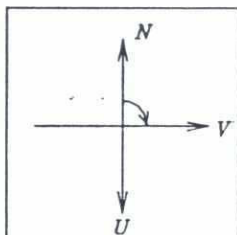
Table 2.2: Key figures

Gauge Location	Channel	Date	Water level (Daily average) (m + PWD)	Gauge
Hardinge Bridge	Channel 1	26 Sep 95	12.93	FAP24

Table 2.3: Water-levels

 FAP 24 RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 197 : 26 September, 1995		
	Location 4 : Ganges River, Hardinge Bridge		
File : II59Q3T05	Date : 18 Feb 1996	Survey programme as made and key figures	page 2.1
	Init : sjr		

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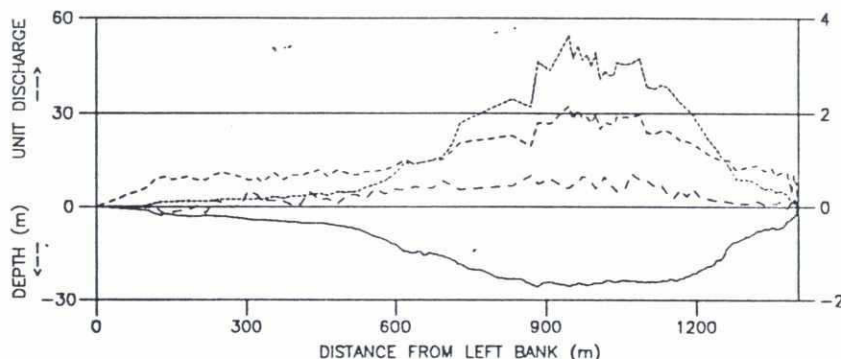


TRANSECT AZIMUTH = 90°

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



FLOW

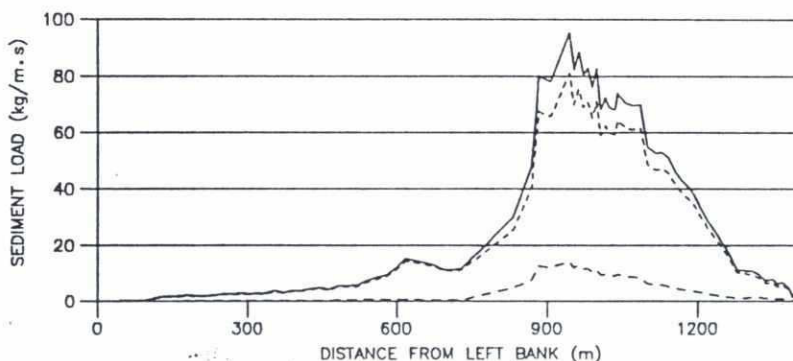
LEGEND :

- WATER DEPTH (m below STAGE)
- UNIT DISCHARGE (m³/s.m)
- U (m/s)
- V (m/s)

STAGE = 12.93 (m+PWD)

A = 17855 (m²)

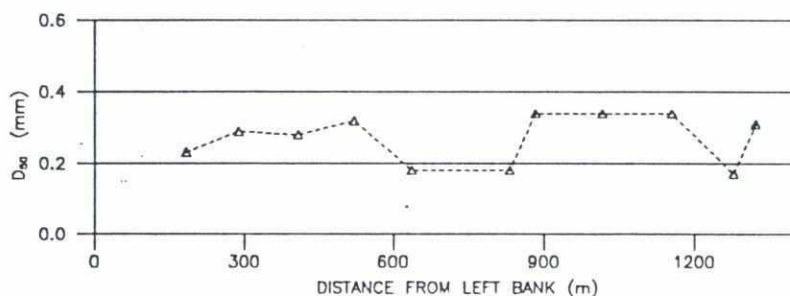
Q = 24353 (m³/s)



SEDIMENT TRANSPORT

LEGEND :

- S_{TOTAL} 32402 (kg/s)
- S_{WASH LOAD} 28367 (kg/s)
- S_{SUSP. BED} 4016 (kg/s)
- S_{BED LOAD} 19 (kg/s)



GRAIN SIZE

LEGEND :

- ◇◇◇◇◇ D₅₀ SUSP. (mm)
- △△△△△ D₅₀ BED LOAD (mm)
- D₅₀ BED MAT. (mm)

FAP 24



RIVER SURVEY PROJECT

Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 197 : 26 September, 1995

Location 4 : Ganges River, Hardinge Bridge

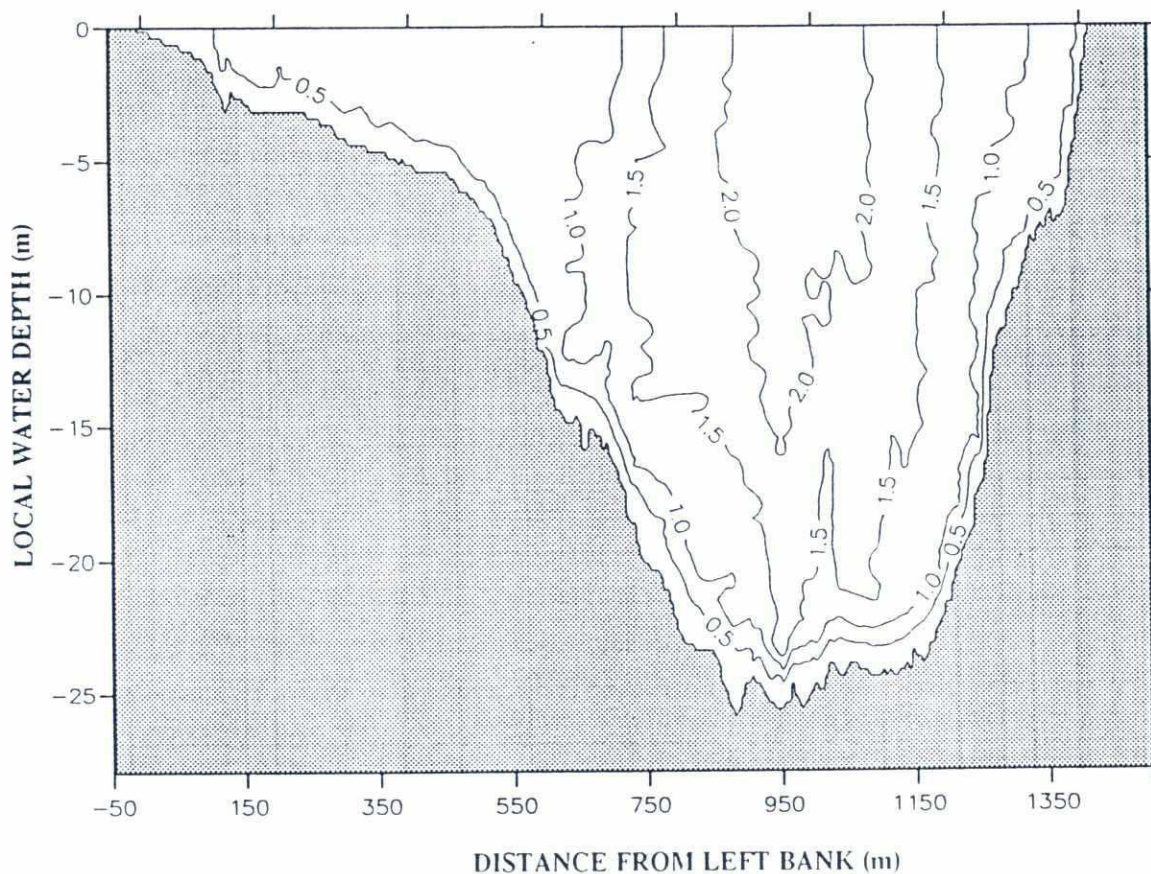
File : H59Q3T05

Date : 18 Feb 1996

Init : sjr


Horizontal distribution of flow and sediments
Channel 1

page
3.1




Iso-velocity contours (m/s)

Water level : 12.93 m+ PWD measured at the station indicated on page 1.1

FAP 24  DELFT - DHI		RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities		Survey Bulletin 197 : 26 September, 1995	
				Location 4 : Ganges River, Hardinge Bridge	
File : H59Q3T05	Date : 18 Feb 1996	Cross-sectional distribution of flow velocity Channel 1			page 4.1
	Init : sjr				

Helley-Smith								
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent		D35 (mm)	D50 (mm)	D65 (mm)
				< 0.06 mm	> 0.06 mm			
1	1	9509261350-1356	2.80	0.79	99.21	0.146	0.178	0.219
	2	9509261406-1412	3.40	0.41	99.59	0.204	0.267	0.328
	3	9509261419-1426	5.20	5.17	94.83	0.213	0.278	0.339
	4	9509261434-1441	7.00	0.96	99.04	0.276	0.325	0.383
	5	9509261449-1456	14.50	0.43	99.57	0.154	0.174	0.197
	6	9509261506-1513	22.10	1.58	98.42	0.151	0.175	0.203
	7	9509261537-1542	23.90	1.17	98.83	0.295	0.335	0.381
	8	9509261548-1554	23.80	0.49	99.51	0.309	0.347	0.390
	9	9509261325-1331	23.20	0.42	99.58	0.298	0.339	0.385
	10	9509261131-1138	11.40	0.19	99.81	0.184	0.220	0.270
	11	9509261116-1123	7.80	0.16	99.84	0.242	0.290	0.343
	1	9509261350-1356	2.80	7.11	92.89	0.212	0.279	0.338
	2	9509261406-1412	3.40	0.34	99.66	0.277	0.322	0.375
	4	9509261434-1441	7.00	5.12	94.88	0.253	0.305	0.367
	5	9509261449-1456	14.50	0.27	99.73	0.164	0.189	0.218
	6	9509261506-1513	22.10	0.77	99.23	0.157	0.182	0.210
	7	9509261537-1542	23.90	0.18	99.82	0.302	0.342	0.387
	8	9509261548-1554	23.80	0.89	99.11	0.304	0.343	0.387
	9	9509261325-1331	23.20	0.66	99.34	0.308	0.347	0.392
	10	9509261131-1138	11.40	43.45	56.55	-	0.127	0.264
	11	9509261116-1123	7.80	0.18	99.82	0.296	0.338	0.386

Table 5.1 : Grain sizes of bed load

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 197 : 26 September, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 18 Feb 1995	Grain size distributions	page 51
	Init. S		

Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
ADCP & EMF transect	1	9509261040-1052 9509261056-1112 9509261559-1603 9509261611-1625	H59Q3T05 * H59Q3T06 H59Q3T07 H59Q3T08


Table 6.1: ADCP & EMF transects * transect in PSD 24 data base and presented in Sections 3 and 4

Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1 2 3 4 5 6 7 8 9 10 11	9509261350-1356 9509261406-1412 9509261419-1426 9509261434-1441 9509261449-1456 9509261506-1513 9509261537-1542 9509261548-1554 9509261325-1331 9509261131-1138 9509261116-1123	402094 401983 401859 401735 401611 401482 401375 401244 401111 400987 400935	660684 660686 660671 660679 660665 660663 660660 660665 660662 660667 660669	2.80 3.40 5.20 7.00 14.50 22.10 23.90 23.80 23.20 11.40 7.80	H59Q3P04 * H59Q3P05 * H59Q3P06 * H59Q3P07 * H59Q3P08 * H59Q3P09 * H59Q3P10 * H59Q3P11 * H59Q3P03 * H59Q3P02 * H59Q3P01 *

Table 6.2: Vertical profiles * S4 & MEX not available


Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments	1	1 2 3 4 5 6 7 8 9 10 11	1 1 1 1 1 1 1 1 1 1 1	9509261350-1356 9509261406-1412 9509261419-1426 9509261434-1441 9509261449-1456 9509261506-1513 9509261537-1542 9509261548-1554 9509261325-1331 9509261131-1138 9509261116-1123	402094 401983 401859 401735 401611 401482 401375 401244 401111 400987 400935	660684 660686 660671 660679 660665 660663 660660 660665 660662 660667 660669	2.80 3.40 5.20 7.00 14.50 22.10 23.90 23.80 23.20 11.40 7.80

Table 6.3: Suspended sediment - depth integrated


FAP 24  DELFT - DHI	RIVER SURVEY PROJECT <small>Flood Plan Coordination Organization</small> <small>Commission of the European Communities</small>		Survey Bulletin 197 : 26 September, 1995	
			Location 4 : Ganges River, Hardinge Bridge	
Date : 18 Feb 1995		Collected data and their storage (1)		page 51
Init. : SP				

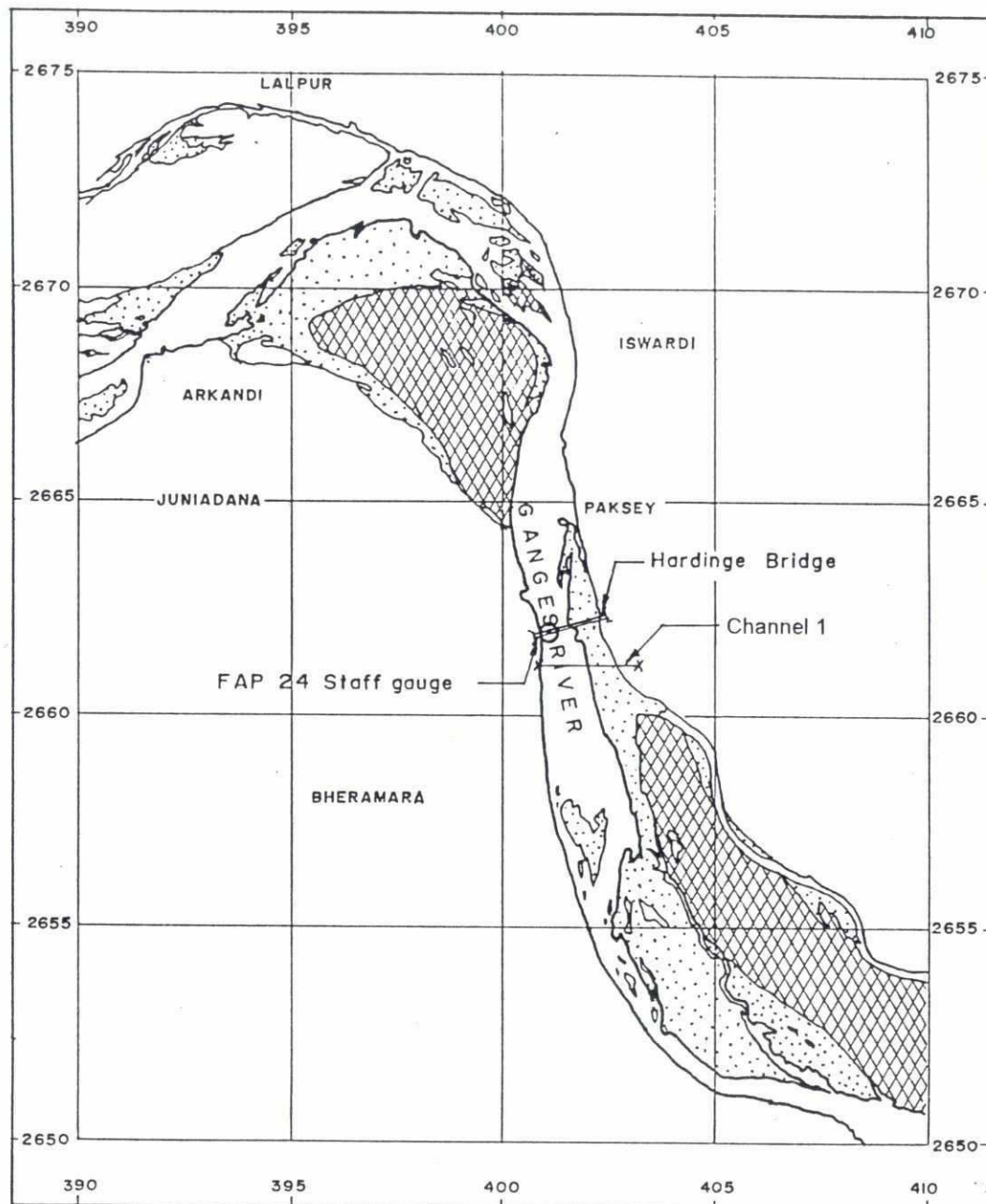
Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	Sample No.
Helley-Smith Sample	1	1	9509261350-1356	402094	660684	2.80	C492
		2	9509261406-1412	401983	660686	3.40	C248
		3	9509261419-1426	401859	660671	5.20	C460
		4	9509261434-1441	401735	660679	7.00	C792
		5	9509261449-1456	401611	660665	14.50	A52
		6	9509261506-1513	401482	660663	22.10	C123
		7	9509261537-1542	401375	660660	23.90	C066
		8	9509261548-1554	401244	660665	23.80	C485
		9	9509261325-1331	401111	660662	23.20	C523
		10	9509261131-1138	400987	660667	11.40	C540
		11	9509261116-1123	400935	660669	7.80	C605
		1	9509261350-1356	402094	660684	2.80	C554
		2	9509261406-1412	401983	660686	3.40	C580
		4	9509261434-1441	401735	660679	7.00	C538
		5	9509261449-1456	401611	660665	14.50	C465
		6	9509261506-1513	401482	660663	22.10	C279
		7	9509261537-1542	401375	660660	23.90	C603
		8	9509261548-1554	401244	660665	23.80	C453
		9	9509261325-1331	401111	660662	23.20	C636
		10	9509261131-1138	400987	660667	11.40	C461
		11	9509261116-1123	400935	660669	7.80	A338

Table 6.4 : Bed load





<div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div>	<div>RIVER SURVEY PROJECT</div> <div>Flood Plan Coordination Organization</div> <div>Commission of the European Communities</div>	Survey Bulletin 197 : 26 September, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 18 Feb 1995	Collected data and their storage (2)	page
	Init. for		62

Types of data	Channel	Format	Filename
ADCP/S4/EMF data	1	QUATTRO	H59Q3T05.ase
Echosounder data	1	QUATTRO	H59Q3T05.ech
Sediment transport data	1	QUATTRO	H59Q3T05.sed
Bed load sediment analysis	1	QUATTRO	H59Q3T05.bdl
Susp. sed. conc. analysis	1	QUATTRO	H59Q3T05.ssc
Transect plot data	1	QUATTRO	H59Q3T05.trs
Iso-velocity plot data	1	MIKE 21 MIKE 21	H59Q3T05.ct2 H59Q3T05.dt2
Table 7.1: PSD 24 Database file description			

 DELFT - DHI	RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities		Survey Bulletin 197 : 26 September, 1995	
			Location 4 : Ganges River, Hardinge Bridge	
	Date : 18 Feb 1996	PSD 24 Database file description		page 7.1
	Init : sjr			



LEGEND:

-  High land
-  Unstable/low char
-  Cross section
-  FAP 24 Staff gauge

5000m 2500m 0

Map is based on satellite images of March 1995

FAP 24

 DELFT - DHI

RIVER SURVEY PROJECT
 Flood Plan Coordination Organization
 Commission of the European Communities

Survey Bulletin 203 : 02 October, 1995

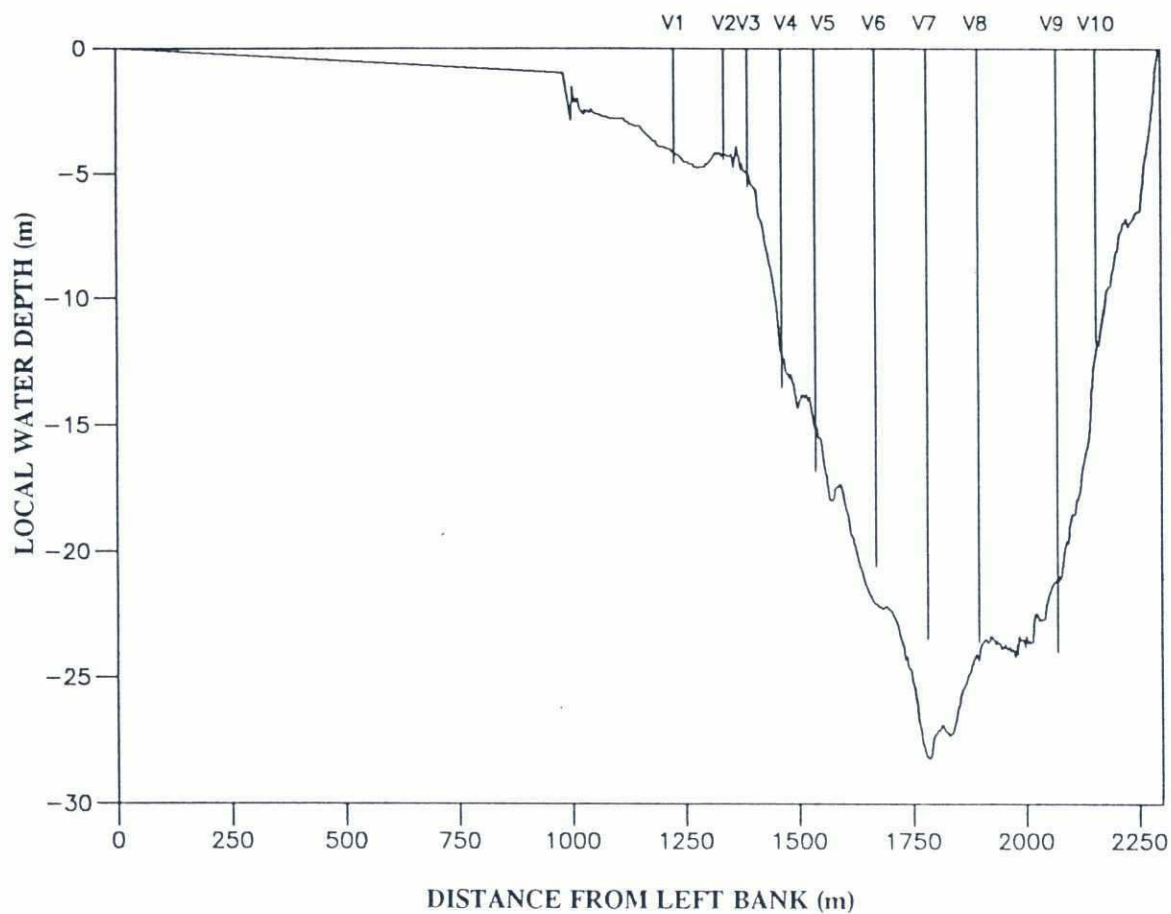
Location 4 : Ganges River, Hardinge Bridge

Date : 02 Mar 1996


Init : mk/ss

Location map

page
1.1



Water level : 12.97 m+ PWD measured at the station indicated on page 1.1

FAP 24  DELFT - DHI	RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 203 : 02 October, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : IISA23T08	Date : 02 Mar 1996	Cross-sections and measured verticals Channel 1	page 1.2
	Init : mk/ss		

(2)

Type of measurement	Method	No of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	4	-	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	-	-	-	-
Vertical current profile	No. of verticals in channel	10	-	-	-
	ADCP	10	-	-	-
	S4 current meter	-	-	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	-	-	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	-	-	-	-
	Integrated bottle sampling	10	-	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	19	-	-	-
	Delft Bottle	-	-	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-


Table 2.1: Survey programme as made

Channel	Width (m)	Area (m ²)	Stage h (m+PWD)	Discharge Q (m ³ /s)	Bed load transport Sb (kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	2295	18236	12.97	29211	44	45859

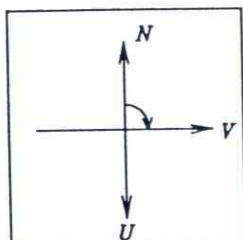
Table 2.2: Key figures

Gauge Location	Channel	Date	Water level (Daily average) (m+PWD)	Gauge
Hardinge Bridge	Channel 1	02 Oct 95	12.97	FAP 24

Table 2.3: Water-levels

 DELFT - DHI	RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 203 : 02 October, 1995	
	Location 4 : Ganges River, Hardinge Bridge		
File : H5A23T08	Date : 02 Mar 1996	Survey programme as made and key figures	page
	Init : ss		2.1

50

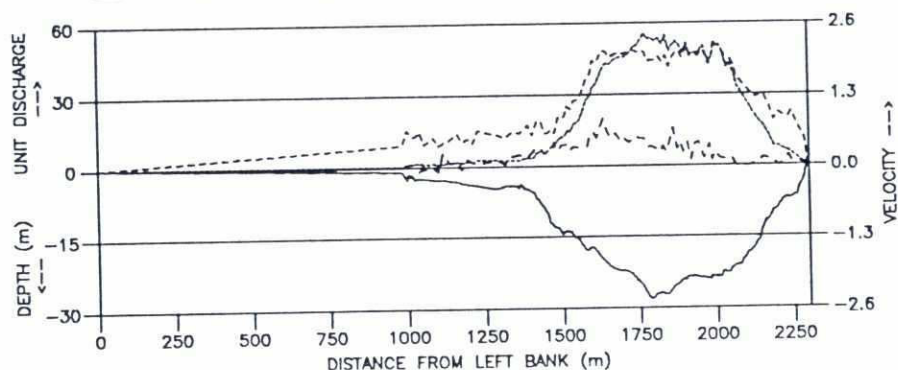


TRANSECT AZIMUTH = 90°

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

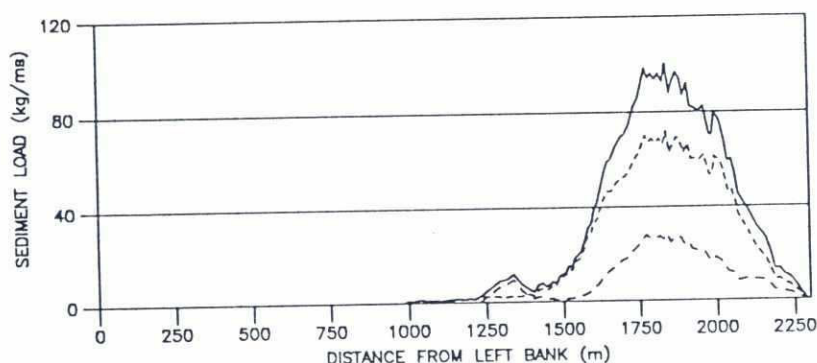
N - MAGNETIC NORTH



FLOW

LEGEND :

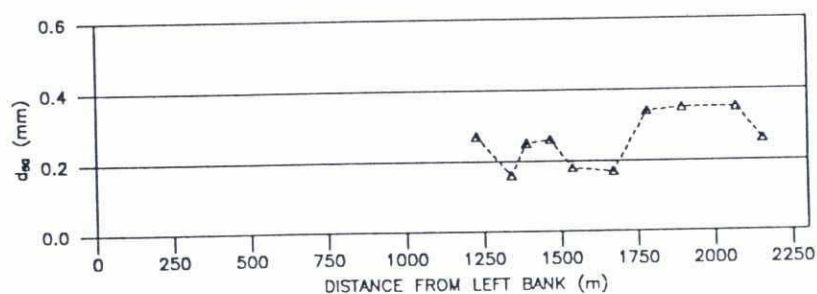
— WATER DEPTH (m below STAGE)
 - - - UNIT DISCHARGE ($m^3/s.m$)
 - - - U - (m/s)
 - - - V - (m/s)
 STAGE = 12.97 (m+PWD)
 A = 18236 (m^2)
 Q = 29211 (m^3/s)



SEDIMENT TRANSPORT

LEGEND :

— S_{TOTAL} 45903 (kg/s)
 - - - $S_{WASH LOAD}$ 34022 (kg/s)
 - - - $S_{SUSP. RED}$ 11837 (kg/s)
 - - - $S_{BED LOAD}$ 44 (kg/s)



GRAIN SIZE

LEGEND :

◇◇◇◇◇ $D_{60 SUSP.}$ (mm)
 △△△△△ $D_{60 RED LOAD}$ (mm)
 □□□□□ $D_{60 RED MAT.}$ (mm)



RIVER SURVEY PROJECT
 Flood Plan Coordination Organization
 Commission of the European Communities

Survey Bulletin 203 : 02 October, 1995

Location 4 : Ganges River, Hardinge Bridge

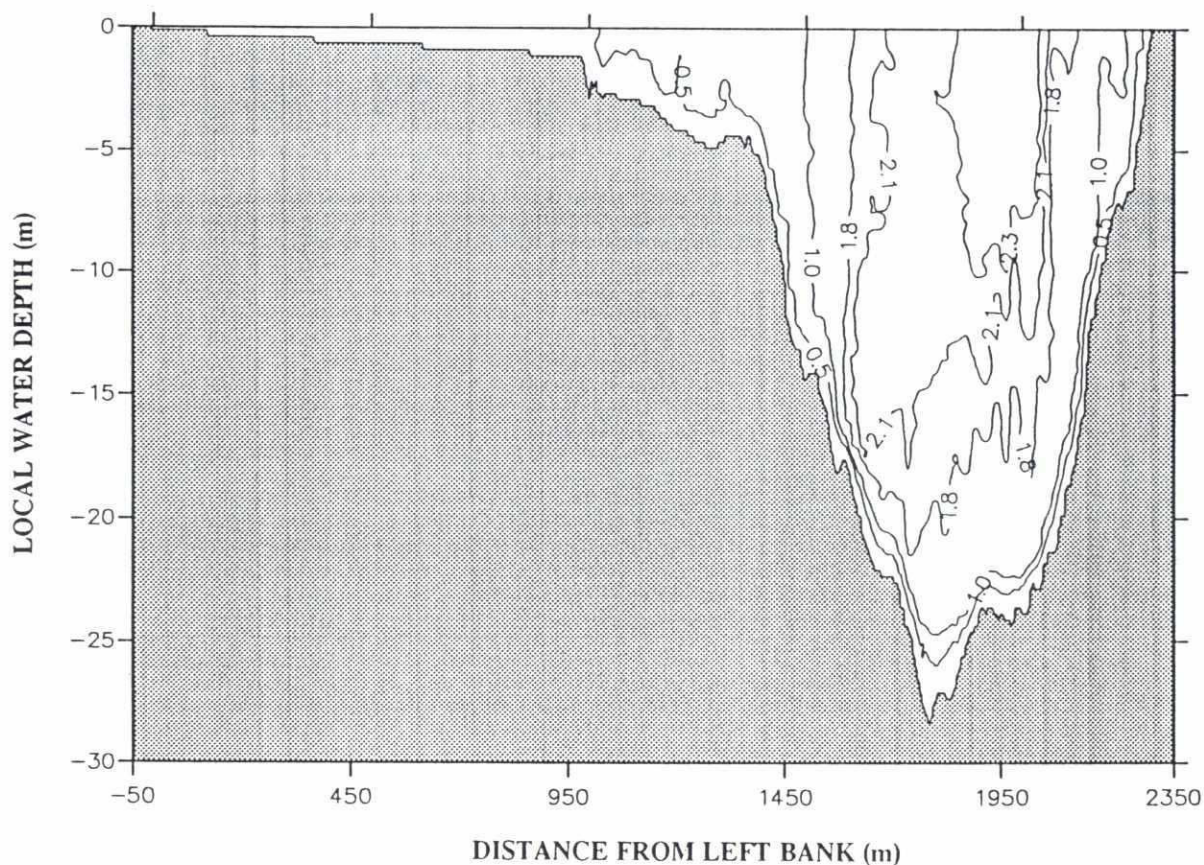
File : H5A23T08

Date : 02 Mar 1996

Init : mk/ss


Horizontal distribution of flow and sediments
 Channel 1

page
 3.1




Iso-velocity contours (m/s)

Water level : 12.97 m+PWD measured at the station indicated on page 1.1

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 203 : 02 October, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H5A23T08	Date : 02 Mar 1996	Cross-sectional distribution of flow velocity Channel 1	page 4.1
	Unit : mk/ss		

Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent		D35 (mm)	D50 (mm)	D65 (mm)
				< 0.06 mm	> 0.06 mm			
1	1	9510021043-1054	4.60	0.47	99.53	0.201	0.253	0.312
	2	9510021058-1110	4.40	0.29	99.71	0.142	0.163	0.188
	3	9510021113-1123	5.50	0.51	99.49	0.187	0.229	0.290
	4	9510021125-1142	13.50	0.71	99.29	0.237	0.292	0.351
	5	9510021143-1153	16.80	1.16	98.84	0.159	0.192	0.231
	6	9510021158-1210	20.60	2.87	97.13	0.139	0.166	0.199
	8	9510021237-1250	23.60	0.19	99.81	0.312	0.352	0.396
	9	9510021254-1305	24.00	0.08	99.92	0.324	0.367	0.414
	10	9510021310-1320	11.70	0.46	99.54	0.163	0.188	0.217
	1	9510021043-1054	4.60	1.03	98.97	0.223	0.283	0.341
	2	9510021058-1110	4.40	0.60	99.40	0.135	0.158	0.184
	3	9510021113-1123	5.50	0.41	99.59	0.217	0.274	0.334
	4	9510021125-1142	13.50	5.61	94.39	0.174	0.217	0.275
	5	9510021143-1153	16.80	0.44	99.56	0.155	0.177	0.203
	6	9510021158-1210	20.60	1.01	98.99	0.155	0.180	0.209
	7	9510021220-1231	23.50	0.17	99.83	0.303	0.343	0.389
	8	9510021237-1250	23.60	0.16	99.84	0.308	0.348	0.392
	9	9510021254-1305	24.00	1.21	98.79	0.296	0.336	0.380
	10	9510021310-1320	11.70	0.11	99.89	0.291	0.332	0.379

Table 5.1 : Grain sizes of bed load

 <p>FAP 24</p> <p>DELFT - DHI</p>	<p>RIVER SURVEY PROJECT</p> <p>Flood Plan Coordination Organization</p> <p>Commission of the European Communities</p>	Survey Bulletin 203 : 02 October, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 02 Mar 1996	Grain size distributions	page
	Init : ss		
			5.1

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Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
ADCP & EMF transect	1	9510020841-0854 9510020901-0916 9510021412-1424 9510021430-1445	H5A23T01 H5A23T02 H5A23T08 * H5A23T09


Table 6.1: ADCP & EMF transects *: transect in PSD 24 data base and presented in Sections 3 and 4

Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1	9510021043-1054	401911	660674	4.60	H5A23P01 *
		2	9510021058-1110	401815	660672	4.40	H5A23P02 *
		3	9510021113-1123	401759	660675	5.50	H5A23P03 *
		4	9510021125-1142	401659	660661	13.50	H5A23P04 *
		5	9510021143-1153	401570	660670	16.80	H5A23P05 *
		6	9510021158-1210	401490	660671	20.60	H5A23P06 *
		7	9510021220-1231	401382	660665	23.50	H5A23P07 *
		8	9510021237-1250	401264	660655	23.60	H5A23P08 *
		9	9510021254-1305	401073	660667	24.00	H5A23P09 *
		10	9510021310-1320	400987	660667	11.70	H5A23P10 *


Table 6.2: Vertical profiles * S4 & MEX not available

Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments	1	1	1	9510021043-1054	401911	660674	4.60
		2	1	9510021058-1110	401815	660672	4.40
		3	1	9510021113-1123	401759	660675	5.50
		4	1	9510021125-1142	401659	660661	13.50
		5	1	9510021143-1153	401570	660670	16.80
		6	1	9510021158-1210	401490	660671	20.60
		7	1	9510021220-1231	401382	660665	23.50
		8	1	9510021237-1250	401264	660655	23.60
		9	1	9510021254-1305	401073	660667	24.00
		10	1	9510021310-1320	400987	660667	11.70

Table 6.3: Suspended sediment - depth integrated

 FAP 24 DELFT - DHI	RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 203 : 02 October, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 02 Mar 1996	Collected data and their storage (1)	page 6.1
	Init : ss		


Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	Sample No.
Helley-Smith Sample	1	1	9510021043-1054	401911	660674	4.60	A55
		2	9510021058-1110	401815	660672	4.40	A901
		3	9510021113-1123	401759	660675	5.50	A922
		4	9510021125-1142	401659	660661	13.50	A692
		5	9510021143-1153	401570	660670	16.80	A1363
		6	9510021158-1210	401490	660671	20.60	C484
		8	9510021237-1250	401264	660655	23.60	C241
		9	9510021254-1305	401073	660667	24.00	C069
		10	9510021310-1320	400987	660667	11.70	C584
		1	9510021043-1054	401911	660674	4.60	C065
		2	9510021058-1110	401815	660672	4.40	A63
		3	9510021113-1123	401759	660675	5.50	A905
		4	9510021125-1142	401659	660661	13.50	A51
		5	9510021143-1153	401570	660670	16.80	A698
		6	9510021158-1210	401490	660671	20.60	C524
		7	9510021220-1231	401382	660665	23.50	C266
		8	9510021237-1250	401264	660655	23.60	C275
		9	9510021254-1305	401073	660667	24.00	C238
		10	9510021310-1320	400987	660667	11.70	C146
		Table 6.4: Bed load					

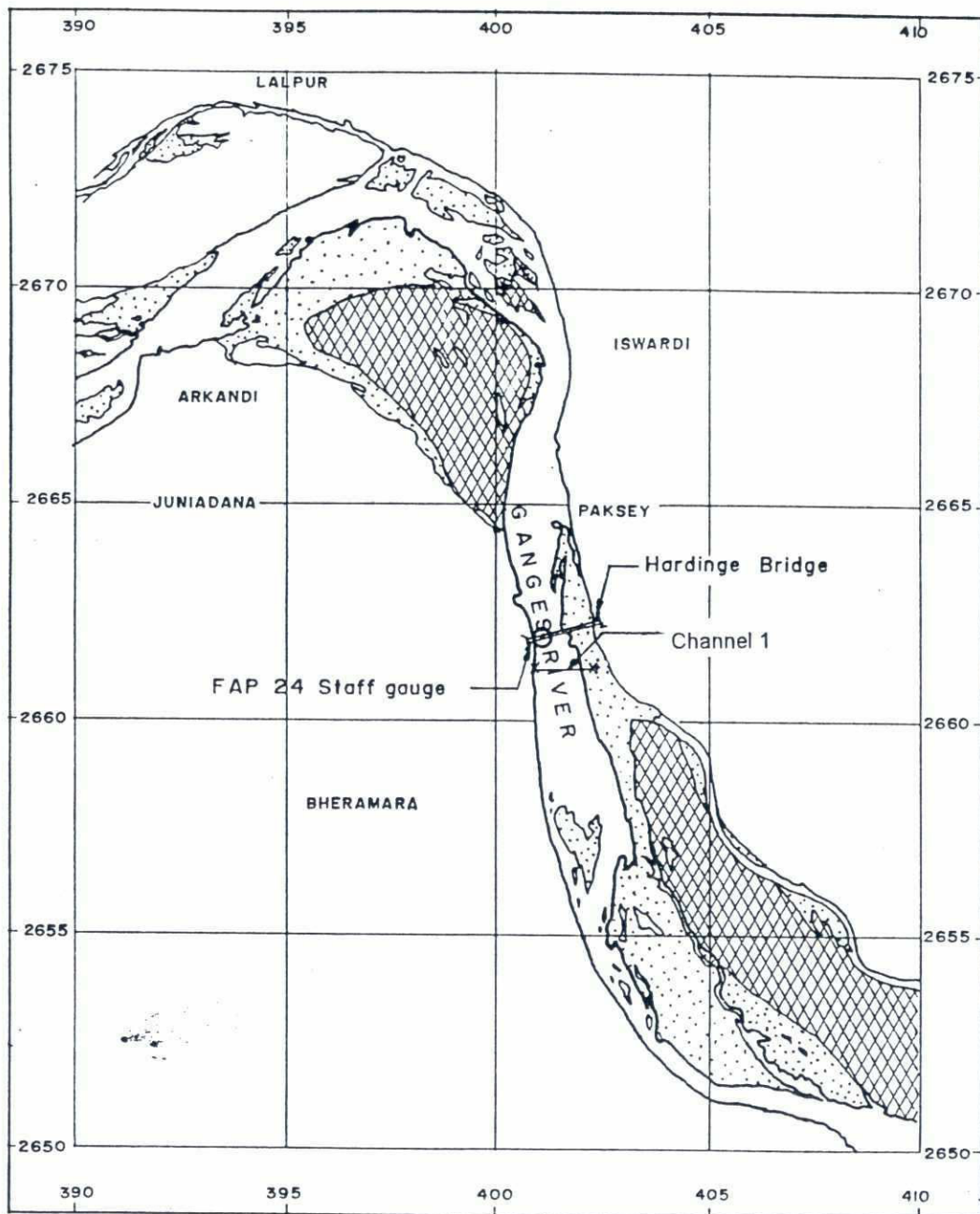
 FAP 24 <small>DELFT - DHI</small>		RIVER SURVEY PROJECT <small>Flood Plan Coordination Organization Commission of the European Communities</small>		Survey Bulletin 203 : 02 October, 1995	
				Location 4 : Ganges River, Hardinge Bridge	
		Date : 02 Mar 1996	Collected data and their storage (2)		page
		Init : ss			6.2

CC





Types of Data	Channel	Format	Filename
ADCP/S4/EMF data	1	QUATTRO	H5A23T08 .ase
Echosounder data	1	QUATTRO	H5A23T08 .ech
Sediment transport data	1	QUATTRO	H5A23T08 .sed
Susp. sed. conc. analysis	1	QUATTRO	H5A23T08 .ssc
Bedload sediment analysis	1	QUATTRO	H5A23T08 .bdl
Transect plot data	1	QUATTRO	H5A23T08 .trs
Iso-velocity plot data	1	MIKE21 MIKE21	H5A23T08 .ct2 H5A23T08 .dt2

Table 7.1 PSD 24 Database file description

 <p>FAP 24 DELFT - DHI</p>	<p>RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities</p>	Survey Bulletin 203 : 02 October, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 02 Mar 1996	PSD 24 Database file description	page
	Init : ss		7.1



LEGEND:

-  High land
-  Unstable/low char
-  Cross section
-  FAP 24 Staff gauge

5000m 2500m 0

Map is based on satellite images of March 1995

FAP 24

 DELFT - DHI

RIVER SURVEY PROJECT
 Flood Plan Coordination Organization
 Commission of the European Communities

Survey Bulletin 209 : 12 -13 October, 1995

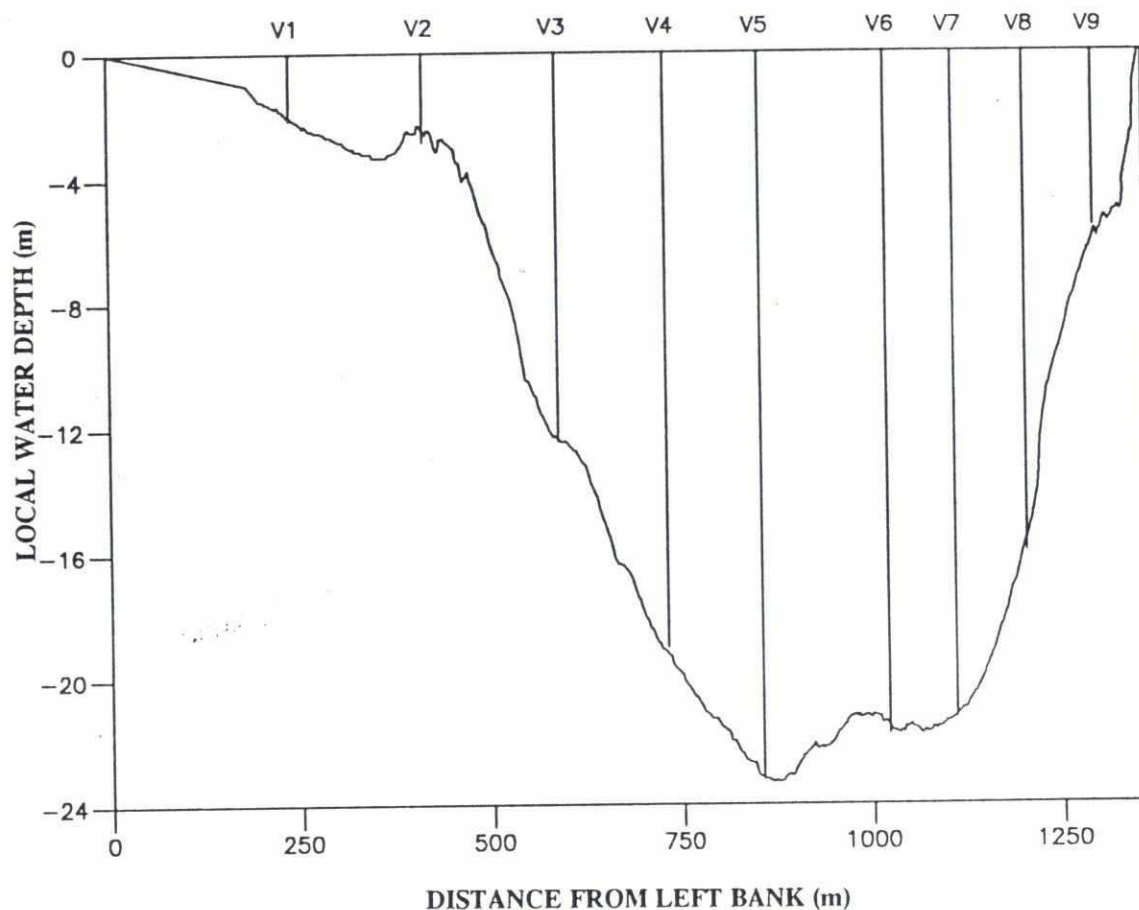
Location 4 : Ganges River, Hardinge Bridge

Date : 03 Mar 1996


Init : mk/ss

Location map

page
1.1



Water level : 11.28 m+PWD measured at the station indicated on page 1.1

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 209 : 12 -13 October, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H5AD3T01	Date : 03 Mar 1996	Cross-sections and measured verticals Channel 1	page 1.2
	Init : mk/ss		

Type of measurement	Method	No. of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	6	-	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	-	-	-	-
Vertical current profile	No. of verticals in channel	9	-	-	-
	ADCP	9	-	-	-
	S4 current meter	1	-	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	6	-	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	-	-	-	-
	Integrated bottle sampling	9	-	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	10	-	-	-
	Delft Bottle	-	-	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-


Table 2.1: Survey programme as made

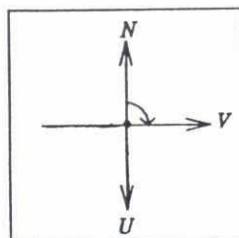
Channel	Width (m)	Area (m ²)	Stage h (m+PWD)	Discharge Q (m ³ /s)	Bed load transport Sb (kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	1356	15262	11.28	14285	15	10189

Table 2.2: Key figures

Gauge Location	Channel	Date	Water level (Daily average) (m+PWD)	Gauge
Hardinge Bridge	Channel 1	12 Oct 95	11.42	FAP 24
		13 Oct 95	11.28	

Table 2.3: Water-levels

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 209 : 12 - 13 October, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H5AD3T01	Date : 03 Mar 1996	Survey programme as made and key figures	page
	Init : mk/ss		21

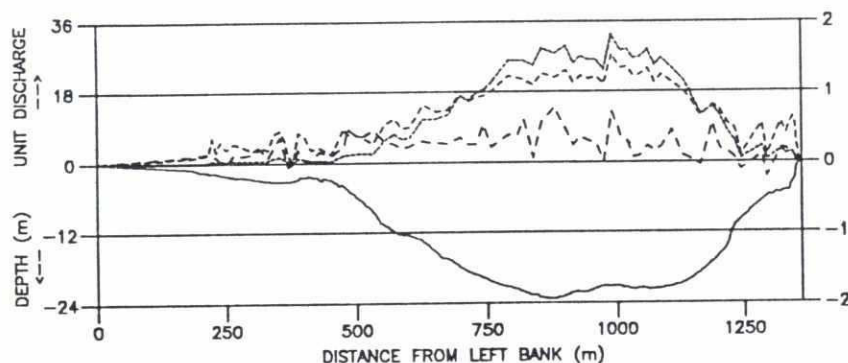


TRANSECT AZIMUTH = 90°

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



FLOW

LEGEND :

— WATER DEPTH (m below STAGE)

--- UNIT DISCHARGE (m³/s.m)

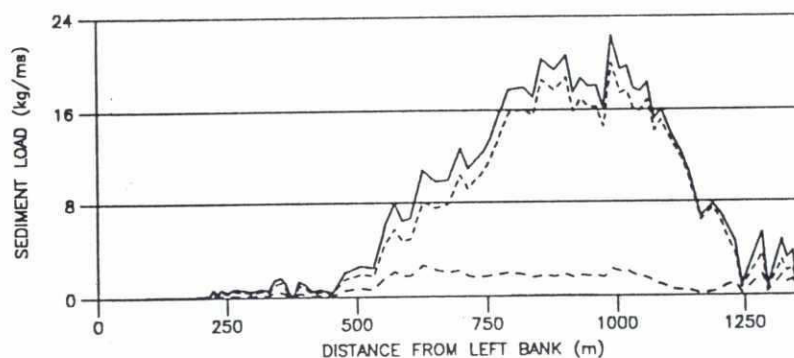
... U - (m/s)

-.- V - (m/s)

STAGE = 11.28 (m+PWD)

A = 15262 (m²)

Q = 14285 (m³/s)



SEDIMENT TRANSPORT

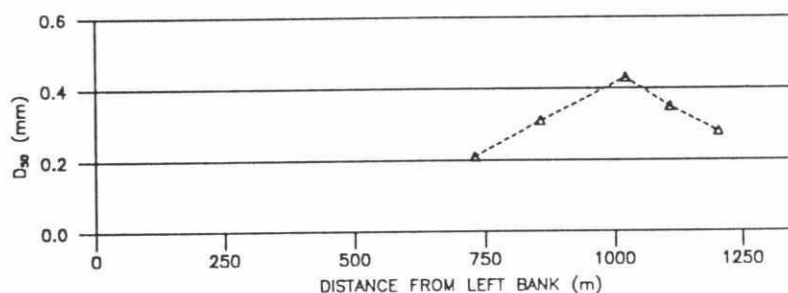
LEGEND :

— S_{TOTAL} 10204 (kg/s)

--- S_{WASH LOAD} 8867 (kg/s)

-.- S_{SUSP. BED} 1322 (kg/s)

... S_{BED LOAD} 15 (kg/s)



GRAIN SIZE

LEGEND :

◇◇◇◇◇ D₅₀ SUSP. (mm)

△△△△△ D₅₀ BED LOAD (mm)

□□□□□ D₅₀ BED MAT. (mm)

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 209 : 12 -13 October, 1995

Location 4 : Ganges River, Hardinge Bridge

File : H5AD3T01

Date : 03 Mar 1996

Init : mk/ss

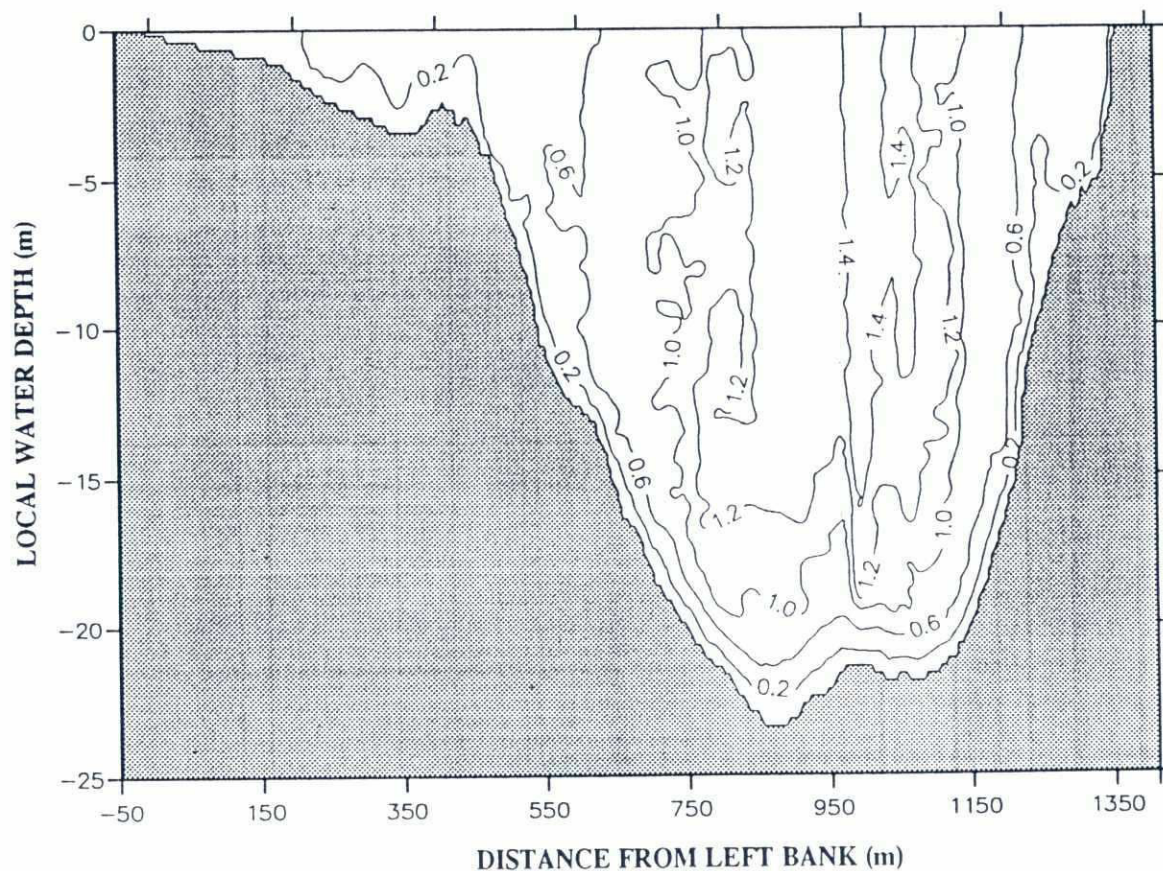
Horizontal distribution of flow and sediments

Channel 1

page


3.1

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Iso-velocity contours (m/s)

Water level : 11.28 m + PWD measured at the station indicated on page 1.1

FAP 24  DELFT - DHI		Survey Bulletin 209 : 12 -13 October, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H5AD3T01	Date : 03 Mar 1996	Cross-sectional distribution of flow velocity Channel 1	page 4.1
	Unit : m/s		

90

Helley-Smith								
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent		D35 (mm)	D50 (mm)	D65 (mm)
				< 0.06 mm	> 0.06 mm			
1	4	9510131123-1133	19.00	2.66	97.34	0.228	0.284	0.339
	5	9510131056-1113	23.20	0.05	99.95	0.301	0.340	0.383
	6	9510131023-1033	21.80	0.08	99.92	0.388	0.476	0.603
	7	9510131001-1011	21.30	0.57	99.43	0.306	0.350	0.400
	8	9510130941-0956	16.00	1.88	98.12	0.225	0.283	0.341
	4	9510131123-1133	19.00	9.13	90.87	0.099	0.130	0.191
	5	9510131056-1113	23.20	0.57	99.43	0.218	0.273	0.328
	6	9510131023-1033	21.80	0.05	99.95	0.331	0.388	0.455
	7	9510131001-1011	21.30	0.48	99.52	0.305	0.350	0.400
	8	9510130941-0956	16.00	1.91	98.09	0.203	0.267	0.328
Table 5.1 : Grain sizes of bed load								

<div><div><div><div><div></div><div>FAP 24</div></div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div></div>		Survey Bulletin 209 : 12 - 13 October, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 03 Mar 1996	Grain size distributions	page
	Init : mk/ss		51

Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
ADCP & EMF transect	1	9510121046-1058 9510121108-1120 9510130850-0900 9510130905-0918 9510131211-1224 9510131231-1240	H5AC3T02 H5AC3T03 H5AD3T01 * H5AD3T02 H5AD3T04 H5AD3T05

Table 6.1: ADCP & EMF transects

* : transect in PSD 24 data base and presented in Sections 3 and 4

Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1	9510131206-1216	401980	660665	2.10	H5AD3P09 *
		2	9510131157-1202	401810	660658	2.80	H5AD3P08 *
		3	9510131145-1155	401626	660671	12.40	H5AD3P07 *
		4	9510131123-1133	401499	660667	19.00	H5AD3P06 *
		5	9510131056-1113	401357	660671	23.20	H5AD3P05 **
		6	9510131023-1033	401193	660685	21.80	H5AD3P04 **
		7	9510131001-1011	401111	660667	21.30	H5AD3P03 *
		8	9510130941-0956	401022	660669	16.00	H5AD3P02 *
		9	9510130923-0936	400916	660668	5.60	H5AD3P01 *

Table 6.2: Vertical profiles

** MEX not available


* S4 & MEX not available

Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments (pump-bottle)	1	6	6	9510131023-1033	401193	660685	21.80


Table 6.3: Suspended sediment - point sample

Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments	1	1	1	9510131206-1216	401980	660665	2.10
		2	1	9510131157-1202	401810	660658	2.80
		3	1	9510131145-1155	401626	660671	12.40
		4	1	9510131123-1133	401499	660667	19.00
		5	1	9510131056-1113	401357	660671	23.20
		6	1	9510131023-1033	401193	660685	21.80
		7	1	9510131001-1011	401111	660667	21.30
		8	1	9510130941-0956	401022	660669	16.00
		9	1	9510130923-0936	400916	660668	5.60

Table 6.4: Suspended sediment - depth integrated


<div>FAP 24</div> <div></div> <div>DELFT - DHI</div>		<div>RIVER SURVEY PROJECT</div> <div>Flood Plan Coordination Organization</div> <div>Commission of the European Communities</div>	<div>Survey Bulletin 209 : 12 - 13 October, 1995</div> <div>Location 4 : Ganges River, Hardinge Bridge</div>	
<div>Date : 03 Mar 1996</div> <div>Init : mkss</div>		<div>Collected data and their storage (1)</div> <div>page</div> <div>61</div>		

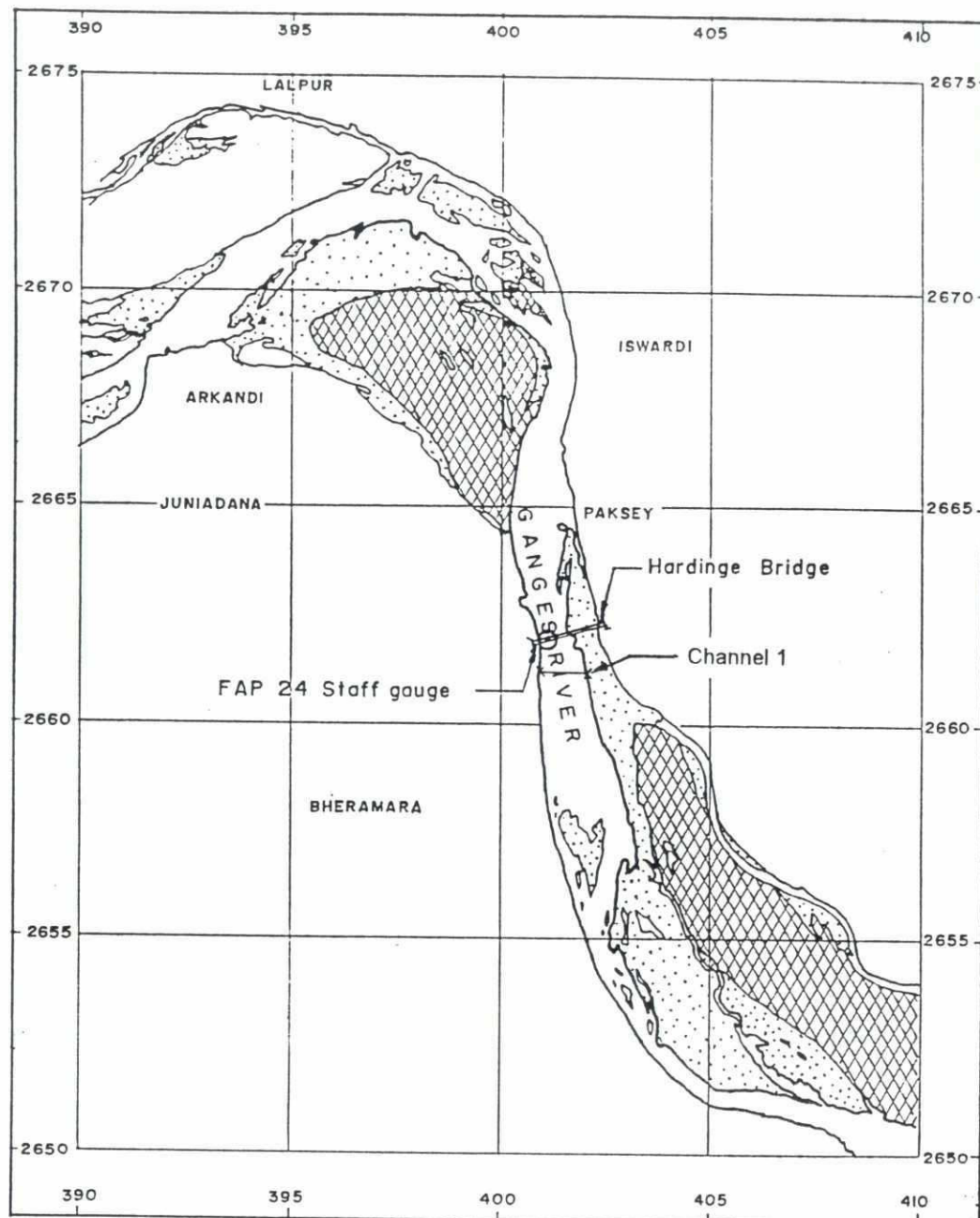
Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	Sample No.	
Helley-Smith Sample	1	4	9510131123-1133	401499	660667	19.00	C154	
		5	9510131056-1113	401357	660671	23.20	C604	
		6	9510131023-1033	401193	660685	21.80	A335	
		7	9510131001-1011	401111	660667	21.30	C199	
		8	9510130941-0956	401022	660669	16.00	C556	
		4	9510131123-1133	401499	660667	19.00	C717	
		5	9510131056-1113	401357	660671	23.20	C430	
		6	9510131023-1033	401193	660685	21.80	A42	
		7	9510131001-1011	401111	660667	21.30	C341	
		8	9510130941-0956	401022	660669	16.00	A345	
		Table 6.5: Bed load						

 <p>FAP 24 DELFT - DHI</p>	<p>RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities</p>	Survey Bulletin 209 : 12 - 13 October, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 03 Mar 1996	Collected data and their storage (2)	page 6.2
	Unit : mk/ss		





Types of Data	Channel	Format	Filename
ADCP/S4/EMF data	1	QUATTRO	H5AD3T01 .ase
Echosounder data	1	QUATTRO	H5AD3T01 .ech
Sediment transport data	1	QUATTRO	H5AD3T01 .sed
Susp. sed. conc. analysis	1	QUATTRO	H5AD3T01 .ssc
Bedload sediment analysis	1	QUATTRO	H5AD3T01 .bdl
Transect plot data	1	QUATTRO	H5AD3T01 .trs
Iso-velocity plot data	1	MIKE21 MIKE21	H5AD3T01 .ct2 H5AD3T01 .dt2

Table 7.1 PSD 24 Database file description

 <p>FAP 24 DELFT - DHI</p>	<p>RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities</p>	Survey Bulletin 209 : 12 - 13 October, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 03 Mar 1996	PSD 24 Database file description	page
	Init : mk/ss		7.1



LEGEND:

-  High land
-  Unstable/low char
-  Cross section
-  FAP 24 Staff gauge



5000m 2500m 0

Map is based on satellite images of March 1995

FAP 24



RIVER SURVEY PROJECT

Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 218 : 29 October, 1995

Location 4 : Ganges River, Hardinge Bridge

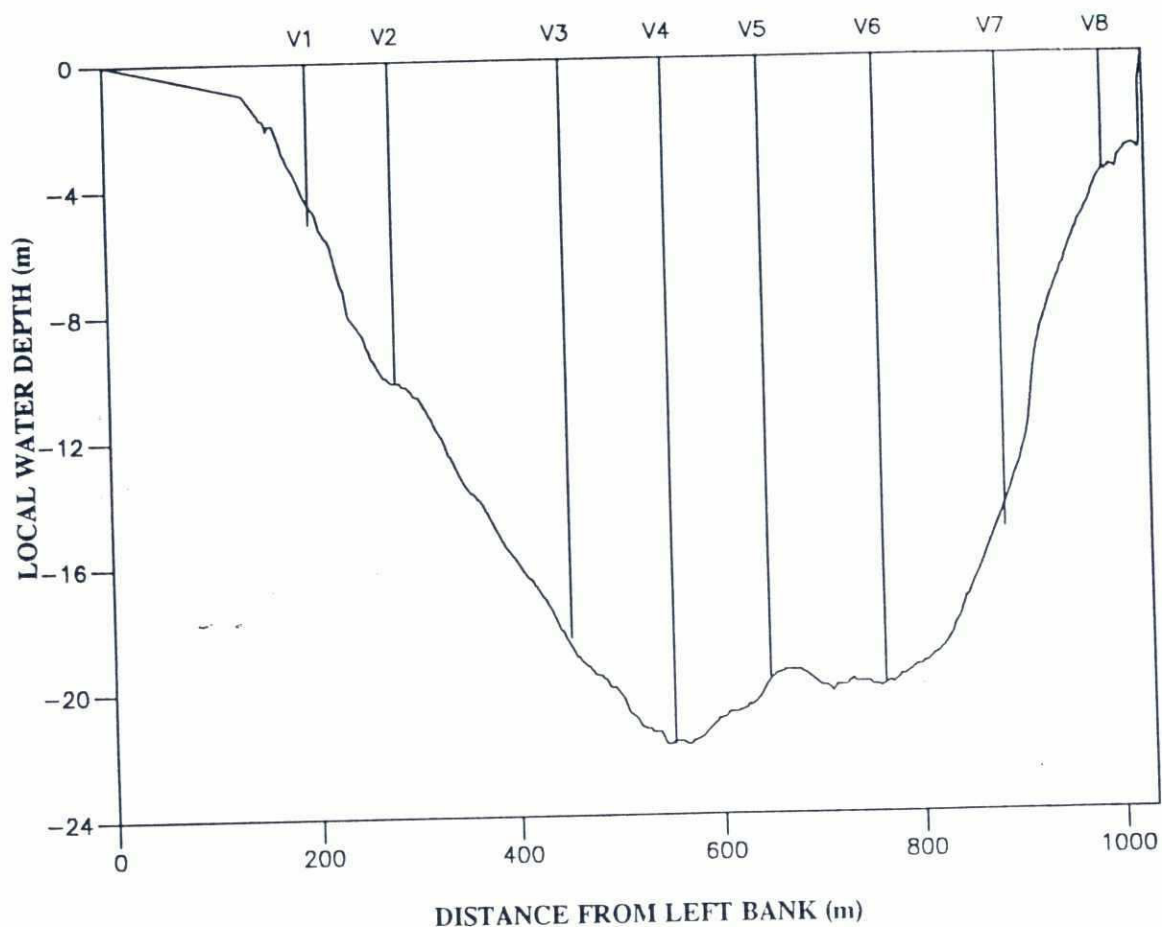
Date : 04 Mar 1996

Init : mk/ss


Location map

page
1.1

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Water level : 9.51 m+PWD measured at the station indicated on page 1.1

FAP 24  DELFT - DHI	RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 218 : 29 October, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H5AT3T01	Date : 04 Mar 1996	Cross-sections and measured verticals Channel 1	page 1.2
	Init : mk/ss		

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Type of measurement	Method	No. of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	4	-	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	-	-	-	-
Vertical current profile	No. of verticals in channel	8	-	-	-
	ADCP	8	-	-	-
	S4 current meter	1	-	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	6	-	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	-	-	-	-
	Integrated bottle sampling	8	-	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	10	-	-	-
	Delft Bottle	-	-	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-


Table 2.1: Survey programme as made

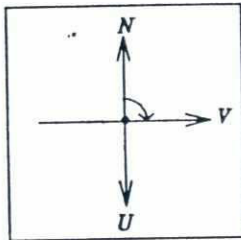
Channel	Width (m)	Area (m ²)	Stage h (m+PWD)	Discharge Q (m ³ /s)	Bed load transport Sb (kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	1030	12812	9.51	6398	2	1863

Table 2.2: Key figures

Gauge Location	Channel	Date	Water level (Daily average) (m+PWD)	Gauge
Hardinge Bridge	Channel 1	29 Oct 95	9.51	FAP 24

Table 2.3: Water-levels

<div><div><div>FAP 24</div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 218 : 29 October, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H5AT3T01	Date : 04 Mar 1996	Survey programme as made and key figures	page
	Int : mk/ss		21

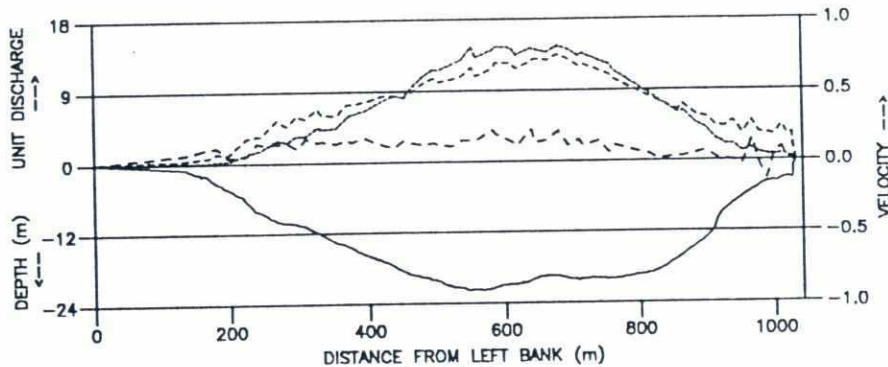


TRANSECT AZIMUTH = 90°

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



FLOW

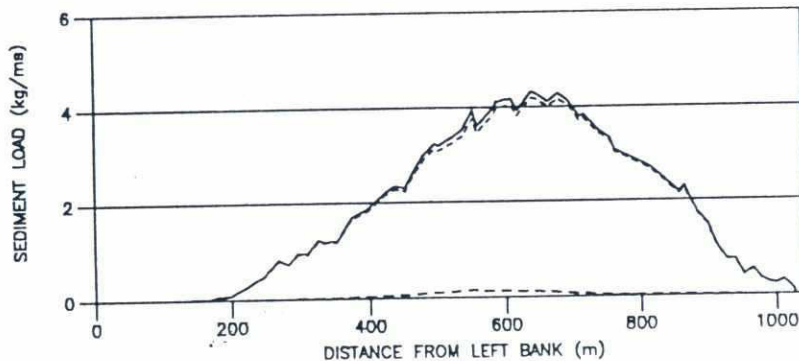
LEGEND :

— WATER DEPTH (m below STAGE)
 UNIT DISCHARGE (m³/s.m)
 - - - U - (m/s)
 - - - V - (m/s)

STAGE = 9.51 (m+PWD)

A = 12812 (m³)

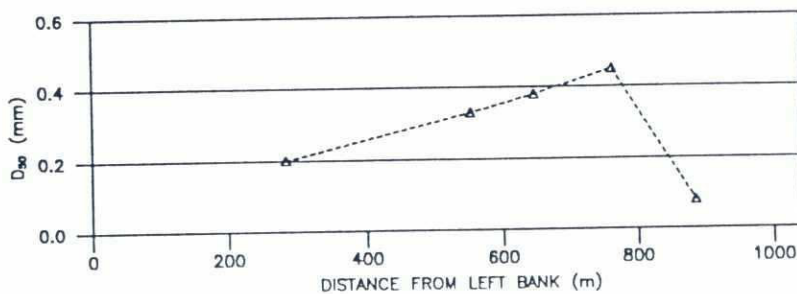
Q = 6398 (m³/s)



SEDIMENT TRANSPORT

LEGEND :

— S_{TOTAL} 1865 (kg/s)
 - - - S_{WASH LOAD} 1817 (kg/s)
 - - - S_{SUSP. BED} 46 (kg/s)
 - - - S_{BED LOAD} 2 (kg/s)



GRAIN SIZE

LEGEND :

◇◇◇◇◇ D₅₀ SUSP. (mm)
 △△△△△ D₅₀ BED LOAD (mm)
 □□□□□ D₅₀ BED MAT. (mm)

FAP 24



RIVER SURVEY PROJECT

Flood Plan Coordination Organization
 Commission of the European Communities

Survey Bulletin 218 : 29 October, 1995

Location 4 : Ganges River, Hardinge Bridge

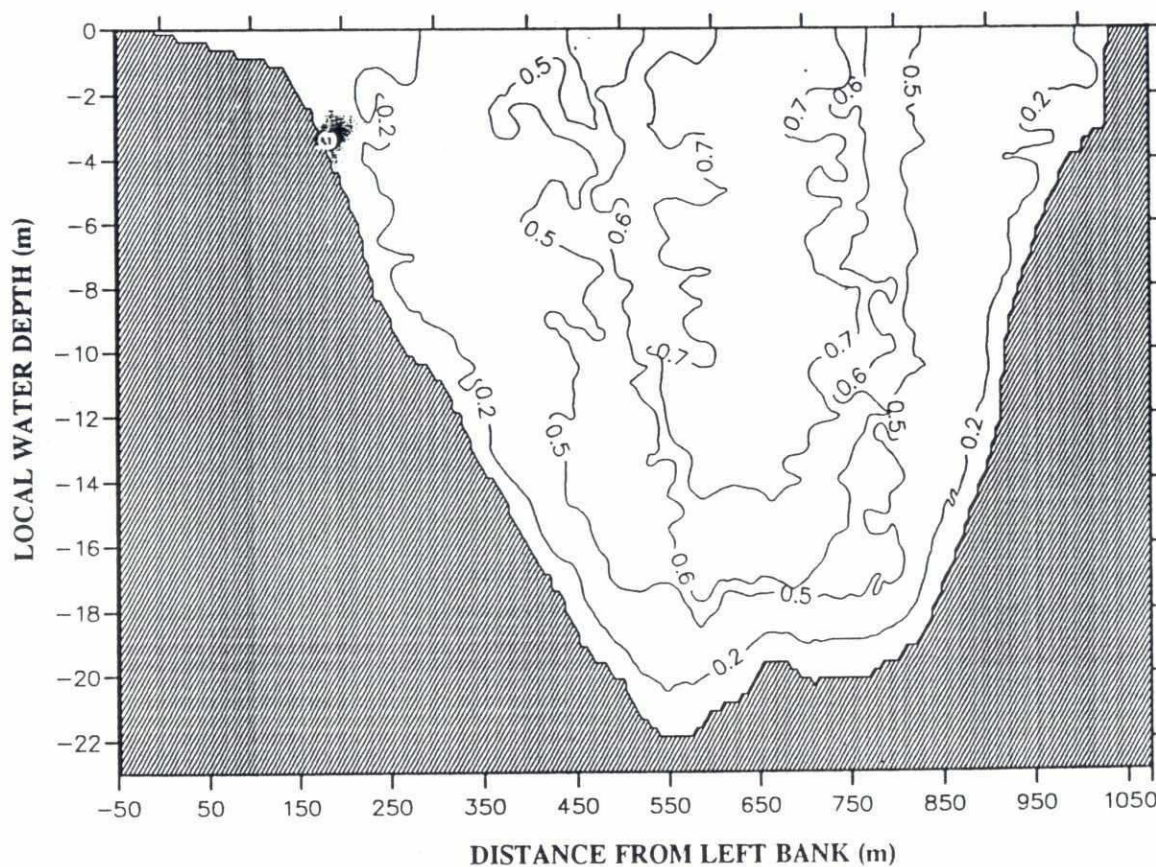
File : H5AT3T01

Date : 04 Mar 1996

Init : mk/ss


Horizontal distribution of flow and sediments
 Channel 1

page
 3,1




Iso-velocity contours (m/s)

Water level : 9.51 m+PWD measured at the station indicated on page 1.1

 DELFT - DHI		RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 218 : 29 October, 1995
		Location 4 : Ganges River, Hardinge Bridge	
File : II5AT3T01	Date : 04 Mar 1996	Cross-sectional distribution of flow velocity Channel 1	page 4.1
	Unit : m/s		

Helley-Smith								
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent		D35 (mm)	D50 (mm)	D65 (mm)
				< 0.06 mm	> 0.06 mm			
1	2	9510290952-1000	10.20	5.62	94.38	0.162	0.199	0.245
	4	9510291014-1025	21.80	0.18	99.82	0.280	0.321	0.367
	5	9510291029-1038	19.70	1.91	98.09	0.308	0.372	0.449
	6	9510291044-1053	20.00	0.02	99.98	0.377	0.460	0.576
	7	9510291058-1106	15.10	28.95	71.05	0.070	0.089	0.114
	2	9510290952-1000	10.20	5.41	94.59	0.163	0.197	0.239
	4	9510291014-1025	21.80	0.12	99.88	0.289	0.328	0.373
	5	9510291029-1038	19.70	0.60	99.40	0.335	0.391	0.457
	6	9510291044-1053	20.00	0.05	99.95	0.363	0.437	0.538
	7	9510291058-1106	15.10	36.23	63.77	-	0.076	0.094
Table 5.1 : Grain sizes of bed load								


 <p>FAP 24 RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities</p>		Survey Bulletin 218 : 29 October, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 04 Mar 1996	Grain size distributions	page 51
	Init. mk/ss		

Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
ADCP & EMF transect	1	9510290839-0847 9510290852-0901 9510291120-1127 9510291128-1143	H5AT3T01 * H5AT3T02 H5AT3T06 H5AT3T08
Table 6.1: ADCP & EMF transects * : transect in PSD 24 data base and presented in Sections 3 and 4			


Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1 2 3 4 5 6 7 8	9510290942-0948 9510290952-1000 9510291006-1012 9510291014-1025 9510291029-1038 9510291044-1053 9510291058-1106 9510291110-1115	401711 401625 401464 401359 401261 401149 401034 400923	660666 660667 660668 660664 660671 660669 660673 660671	5.10 10.20 18.40 21.80 19.70 20.00 15.10 3.70	H5AT3P01 * H5AT3P02 * H5AT3P03 * H5AT3P04 ** H5AT3P05 * H5AT3P06 * H5AT3P07 * H5AT3P08 *
Table 6.2: Vertical profiles ** MEX not available				* S4 & MEX not available			

Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments (pump-bottle)	1	4	6	9510291014-1025	401359	660664	21.80
Table 6.3: Suspended sediment - point sample							

Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments	1	1 2 3 4 5 6 7 8	1 1 1 1 1 1 1 1	9510290942-0948 9510290952-1000 9510291006-1012 9510291014-1025 9510291029-1038 9510291044-1053 9510291058-1106 9510291110-1115	401711 401625 401464 401359 401261 401149 401034 400923	660666 660667 660668 660664 660671 660669 660673 660671	5.10 10.20 18.40 21.80 19.70 20.00 15.10 3.70
Table 6.4: Suspended sediment - depth integrated							

<div>FAP 24</div> <div></div> <div>DELFT - DHI</div>		RIVER SURVEY PROJECT <i>Flood Plan Coordination Organization</i> <i>Commission of the European Communities</i>		Survey Bulletin 218 : 29 October, 1995	
				Location 4 : Ganges River, Hardinge Bridge	
		Date : 04 Mar 1996		Collected data and their storage (1)	
		Init : mk/ss			
				page 6.1	


Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	Sample No.	
Helley-Smith Sample	1	2	9510290952-1000	401625	660667	10.20	C345	
		4	9510291014-1025	401359	660664	21.80	C114	
		5	9510291029-1038	401261	660671	19.70	C202	
		6	9510291044-1053	401149	660669	20.00	C413	
		7	9510291058-1106	401034	660673	15.10	C650	
		2	9510290952-1000	401625	660667	10.20	C459	
		4	9510291014-1025	401359	660664	21.80	C245	
		5	9510291029-1038	401261	660671	19.70	C217	
		6	9510291044-1053	401149	660669	20.00	C760	
		7	9510291058-1106	401034	660673	15.10	C749	
		Table 6.5: Bed load						

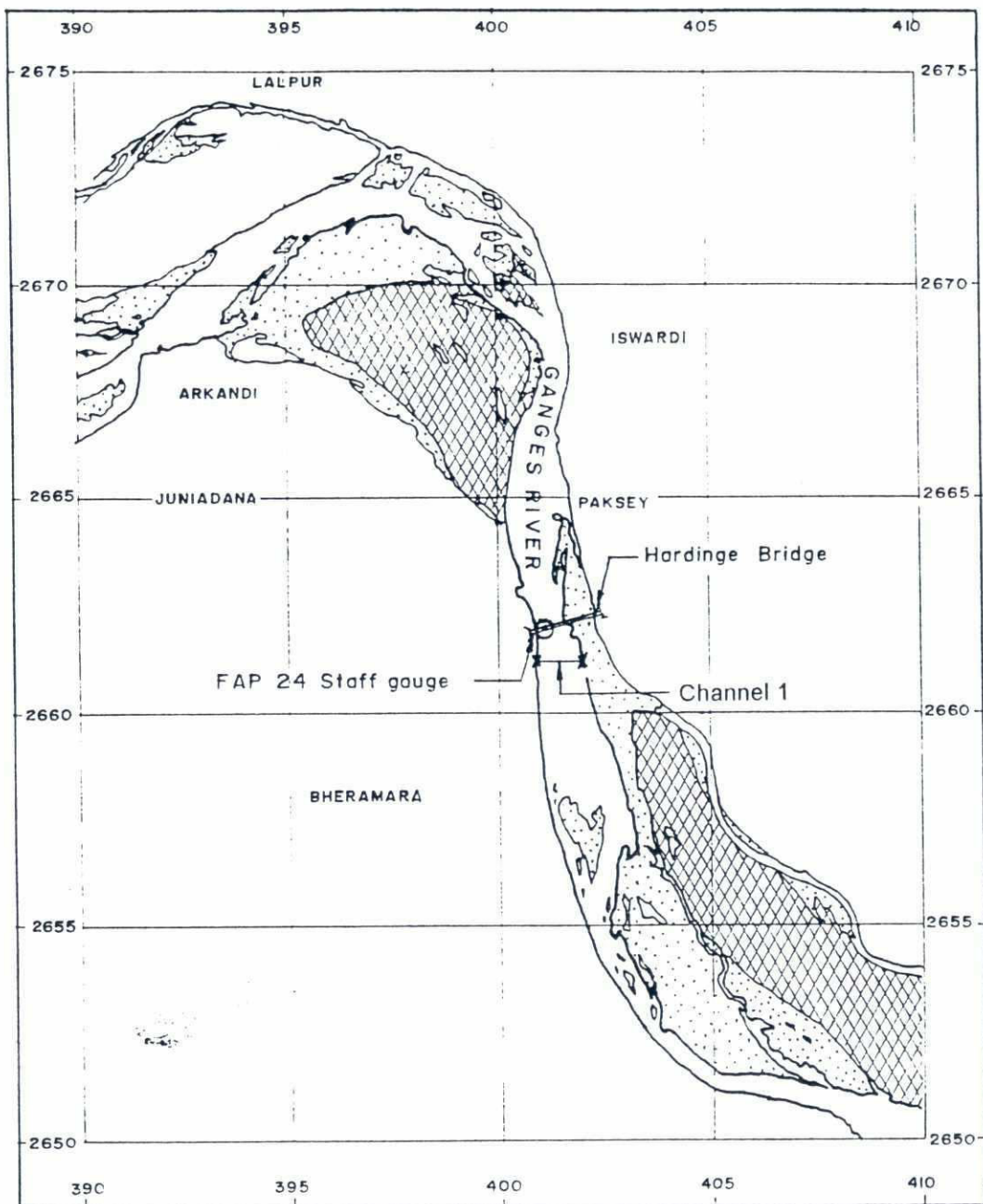
FAP 24  DELFT - DHI		RIVER SURVEY PROJECT <small>Flood Plan Coordination Organization</small> <small>Commission of the European Communities</small>		Survey Bulletin 218 : 29 October, 1995	
				Location 4 : Ganges River, Hardinge Bridge	
		Date : 04 Mar 1996	Collected data and their storage (2)		page
		Init : mk/ss			62

ftv





Types of Data	Channel	Format	Filename
ADCP/S4/EMF data	1	QUATTRO	H5AT3T01 .ase
Echosounder data	1	QUATTRO	H5AT3T01 .ech
Sediment transport data	1	QUATTRO	H5AT3T01 .sed
Susp. sed. conc. analysis	1	QUATTRO	H5AT3T01 .ssc
Bedload sediment analysis	1	QUATTRO	H5AT3T01 .bdl
Transect plot data	1	QUATTRO	H5AT3T01 .trs
Iso-velocity plot data	1	MIKE21 MIKE21	H5AT3T01 .ct2 H5AT3T01 .dt2

Table 7.1 PSD 24 Database file description

 <p>FAP 24 DELFT - DHI</p>		Survey Bulletin 218 : 29 October, 1995	
<p>RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities</p>		Location 4 : Ganges River, Hardinge Bridge	
	Date : 04 Mar 1996	PSD 24 Database file description	page
	Init : mk/ss		7.1



LEGEND:

-  High land
-  Unstable/low char
-  Cross section
-  FAP 24 Staff gauge

5000m 2500m 0

Map is based on satellite images of March 1995

FAP 24

 DELFT - DHI

RIVER SURVEY PROJECT
 Flood Plan Coordination Organization
 Commission of the European Communities

Survey Bulletin 227 : 18 - 19 November, 1995

Location 4 : Ganges River, Hardinge Bridge

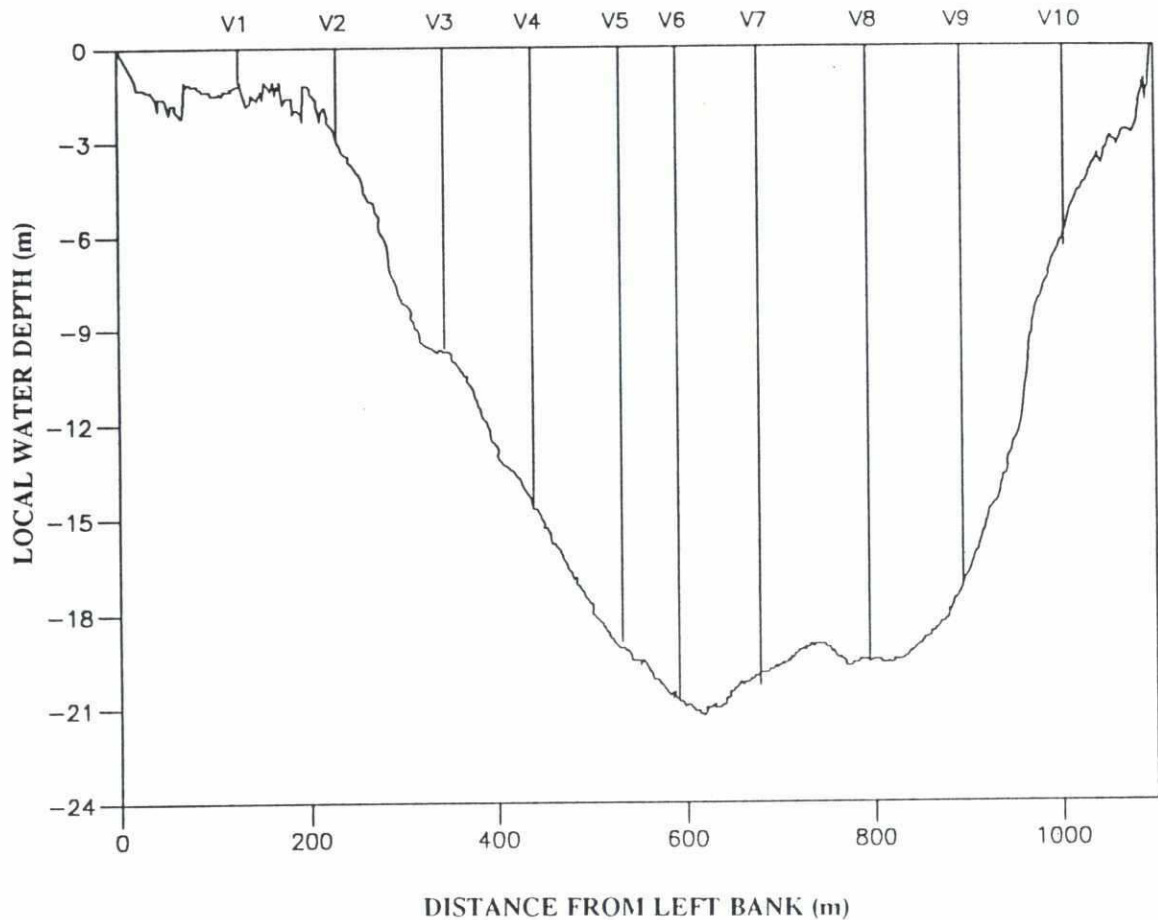
Date : 21 Mar 1996

Init : mk/ss


Location map

page
1.1

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Water level : 9.44 m+PWD measured at the station indicated on page 1.1

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 227 : 18 - 19 November, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H5BI9T03	Date : 21 Mar 1996	Cross-sections and measured verticals Channel 1	page 1.2
	Init : mk/ss		

Type of measurement	Method	No. of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	-	-	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	2	-	-	-
Vertical current profile	No. of verticals in channel	10	-	-	-
	ADCP	-	-	-	-
	S4 current meter	10	-	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	54	-	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	-	-	-	-
	Integrated bottle sampling	-	-	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	-	-	-	-
	Delft Bottle	-	-	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-


Table 2.1: Survey programme as made

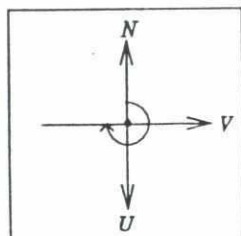
Channel	Width (m)	Area (m ²)	Stage h (m+PWD)	Discharge Q (m ³ /s)	Bed load transport Sb (kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	1097	12566	9.44	4568	-	1508

Table 2.2: Key figures

Gauge Location	Channel	Date	Water level (Daily average) (m+PWD)	Gauge
Hardinge Bridge	Channel 1	18 Nov 95	9.44	FAP 24
		19 Nov 95	9.32	

Table 2.3: Water-levels

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 227 : 18 - 19 November, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H5BI9T03	Date : 21 Mar 1996	Survey programme as made and key figures	page
	Init : mk/ss		21

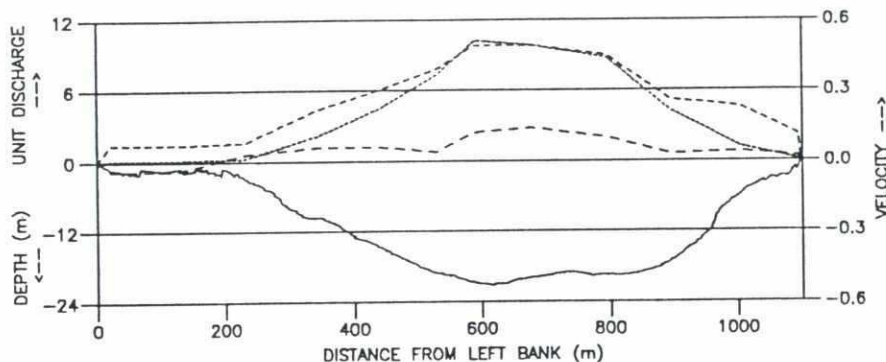


TRANSECT AZIMUTH = 270°

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



FLOW

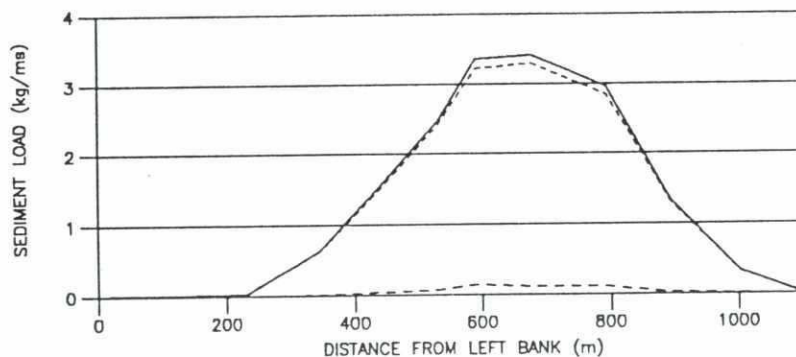
LEGEND :

- WATER DEPTH (m below STAGE)
- UNIT DISCHARGE (m³/s.m)
- ... U - (m/s)
- .- V - (m/s)

STAGE = 9.44 (m+PWD)

A = 12566 (m²)

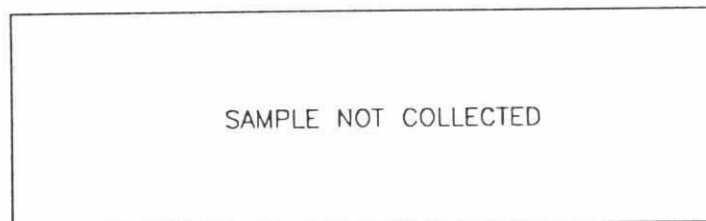
Q = 4568 (m³/s)



SEDIMENT TRANSPORT


LEGEND :

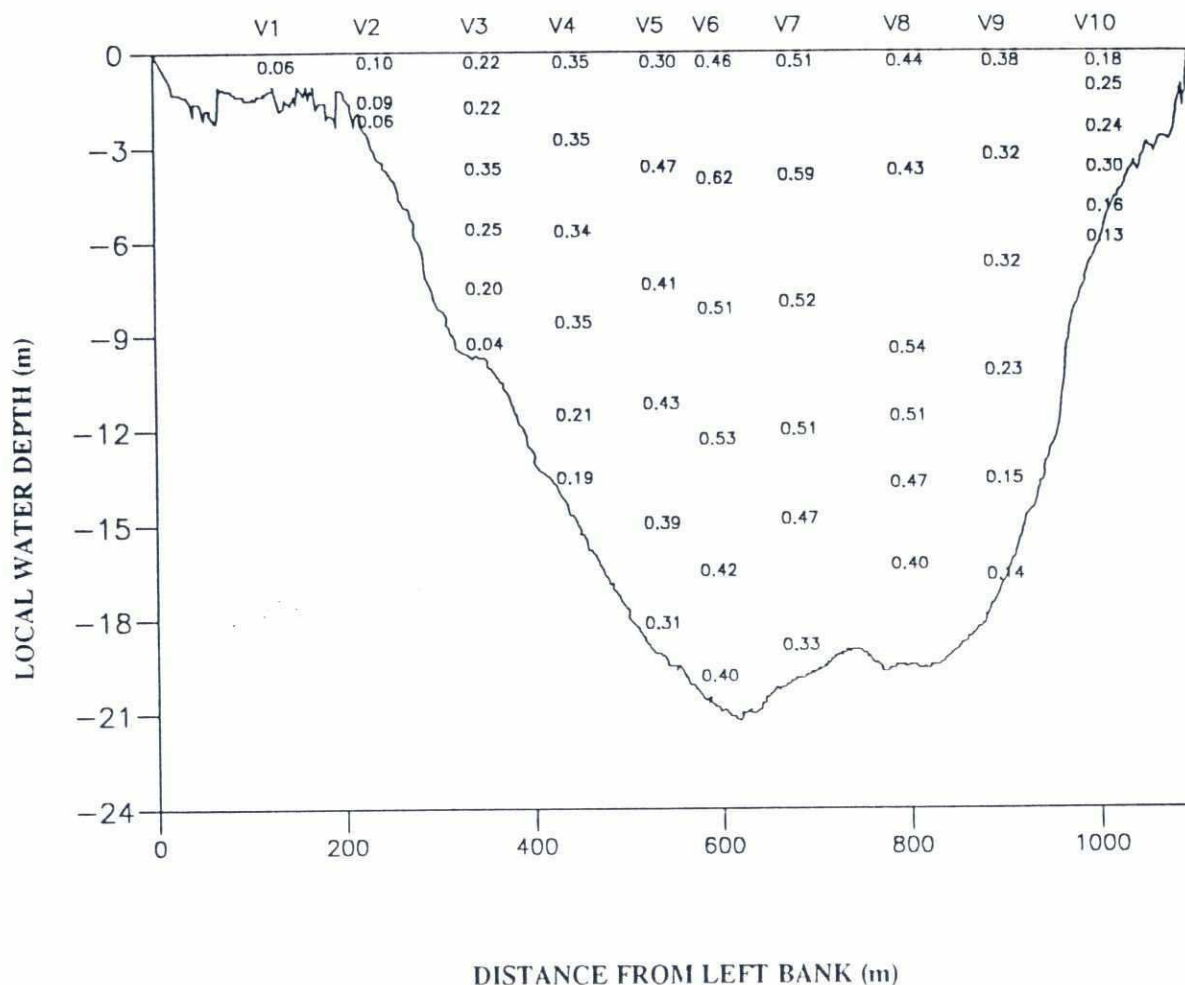
- S_{TOTAL} 1608 (kg/s)
- S_{WASH LOAD} 1457 (kg/s)
- ... S_{SUSP. BED} 51 (kg/s)
- .- S_{BED LOAD} - (kg/s)




GRAIN SIZE



<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 227 : 18 - 19 November, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : I15BI9T03	Date : 21 Mar 1996	Horizontal distribution of flow and sediments Channel 1	page 3.1
	Init : mk/ss		



Water level : 9.44 m+PWD measured at the station indicated on page 1.1



<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 227 : 18 - 19 November, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H5BI9T03	Date : 21 Mar 1996	Cross-sectional distribution of flow velocity Channel 1	page 4.1
	Init : mk/ss		

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Andreasen settling tube							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.1: Grain size of near bed suspended sediment (0.3 m above river bed)							

US BM-54 bed samples							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.2 : Grain size of bed material							

Helley-Smith							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.3 : Grain sizes of bed load							

 DELFT - DHI		 RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 227 : 18 - 19 November, 1995		
			Location 4 : Ganges River, Hardinge Bridge		
		Date : 21 Mar 1996	Grain size distributions		page
		Init : mk/ss			51

Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
Echo-sounding	1	9511181021-1033 9511181036-1048	H5BI9T02 H5BI9T03 *

Table 6.1: Echo-sounding

* : echo-sounding in PSD 24 data base and presented in Sections 3 and 4


Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1	9511190915-0927	401839	660678	1.10	H5BJ9P01 *
		2	9511190935-0947	401733	660675	2.90	H5BJ9P02 *
		3	9511190955-1020	401620	660674	9.60	H5BJ9P03 *
		4	9511191028-1053	401527	660660	14.60	H5BJ9P04 *
		5	9511191105-1125	401432	660664	18.90	H5BJ9P05 *
		6	9511181556-1629	401374	660665	20.80	H5B I9P05 *
		7	9511181507-1542	401284	660675	20.30	H5B I9P04 *
		8	9511181222-1303	401167	660651	19.60	H5B I9P03 *
		9	9511181143-1209	401069	660669	17.20	H5B I9P02 *
		10	9511181111-1134	400962	660669	6.40	H5B I9P01 *

Table 6.2: Vertical profiles

* ADCP & MEX not available

Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments (pump-bottle)	1	1	3	9511190915-0927	401839	660678	1.10
		2	3	9511190935-0947	401733	660675	2.90
		3	6	9511190955-1020	401620	660674	9.60
		4	6	9511191028-1053	401527	660660	14.60
		5	6	9511191105-1125	401432	660664	18.90
		6	6	9511181556-1629	401374	660665	20.80
		7	6	9511181507-1542	401284	660675	20.30
		8	6	9511181222-1303	401167	660651	19.60
		9	6	9511181143-1209	401069	660669	17.20
		10	6	9511181111-1134	400962	660669	6.40


Table 6.3: Suspended sediment - point sample

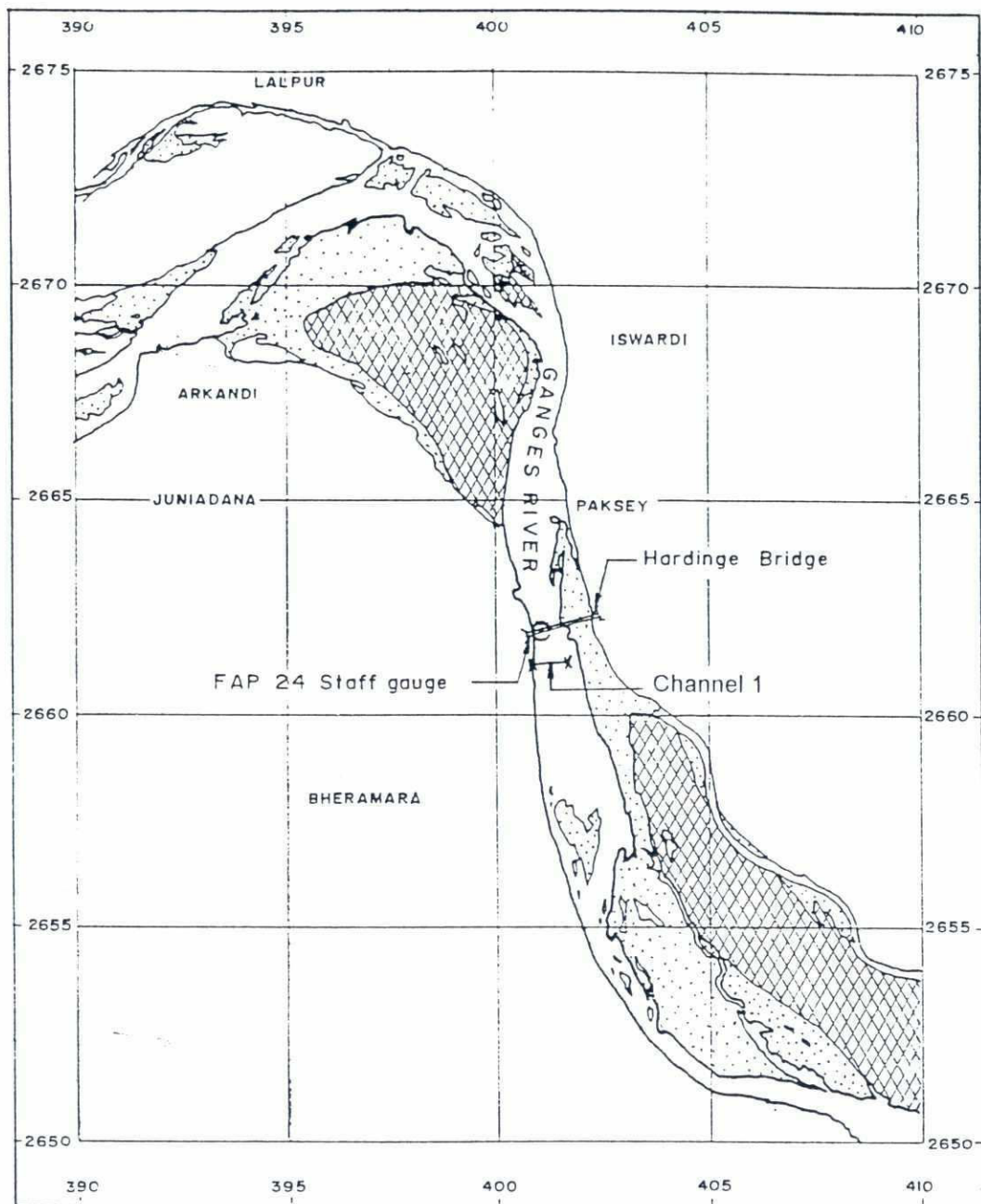
 FAP 24 DELFT - DHI	RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 227 : 18 - 19 November, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 21 Mar 1996	Collected data and their storage (1)	page 61
	Init : mk/ss		

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Types of Data	Channel	Format	Filename
ADCP/S4/EMF data	1	QUATTRO	H5BI9T03 .ase
Echosounder data	1	QUATTRO	H5BI9T03 .ech
Sediment transport data	1	QUATTRO	H5BI9T03 .sed
Susp. sed. conc. analysis	1	QUATTRO	H5BI9T03 .ssc
Transect plot data	1	QUATTRO	H5BI9T03 .trs
Iso-velocity plot data	1	MIKE21 MIKE21	H5BI9T03 .ct2 H5BI9T03 .dt2

Table 7.1 PSD 24 Database file description

 <p>FAP 24 DELFT - DHI</p>	<p>RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities</p>	Survey Bulletin 227 : 18 - 19 November, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 21 Mar 1996	PSD 24 Database file description	page
	Init : mk/ss		7.1



LEGEND:



High land



Unstable/low char



Cross section



FAP 24 Staff gauge



5000m 2500m 0

Map is based on satellite images of March 1995

FAP 24

 DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization
 Commission of the European Communities

Survey Bulletin 238 : 13 December, 1995

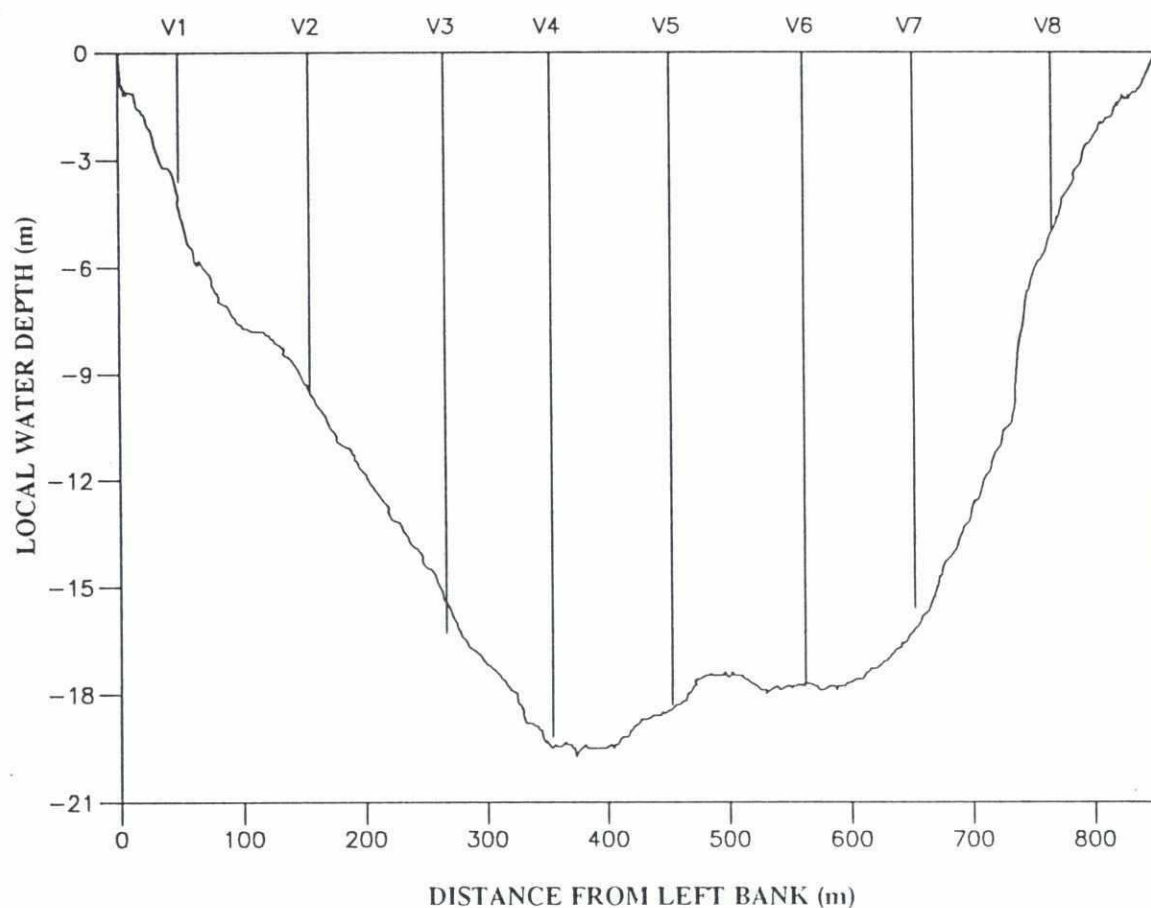
Location 4 : Ganges River, Hardinge Bridge

Date : 28 Mar 1996


Init : mk/ss

Location map

page
1.1



Water level : 7.56 m+PWD measured at the station indicated on page 1.1

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 238 : 13 December, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H5CD9T01	Date : 28 Mar 1996	Cross-sections and measured verticals Channel 1	page 1.2
	Init : mk/ss		

Type of measurement	Method	No. of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	-	-	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	2	-	-	-
Vertical current profile	No. of verticals in channel	8	-	-	-
	ADCP	-	-	-	-
	S4 current meter	8	-	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	48	-	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	-	-	-	-
	Integrated bottle sampling	-	-	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	-	-	-	-
	Delft Bottle	-	-	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-


Table 2.1: Survey programme as made

Channel	Width (m)	Area (m ²)	Stage h (m+PWD)	Discharge Q (m ³ /s)	Bed load transport Sb (kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	853	10703	7.56	2493	-	152

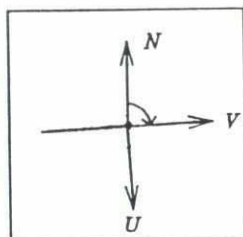
Table 2.2: Key figures

Gauge Location	Channel	Date	Water level (Daily average) (m+PWD)	Gauge
Hardinge Bridge	Channel 1	13 Dec 95	7.56	FAP 24

Table 2.3: Water-levels

<div><div><div><div>FAP 24</div><div>DELFT - DHI</div></div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 238 : 13 December , 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H5CD9T01	Date : 28 Mar 1996	Survey programme as made and key figures	page
	Init : mk/ss		2.1

22

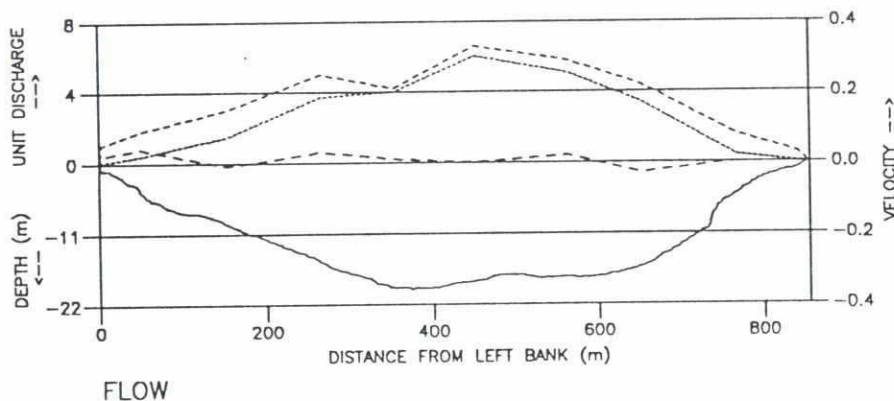


TRANSECT AZIMUTH = 87°

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



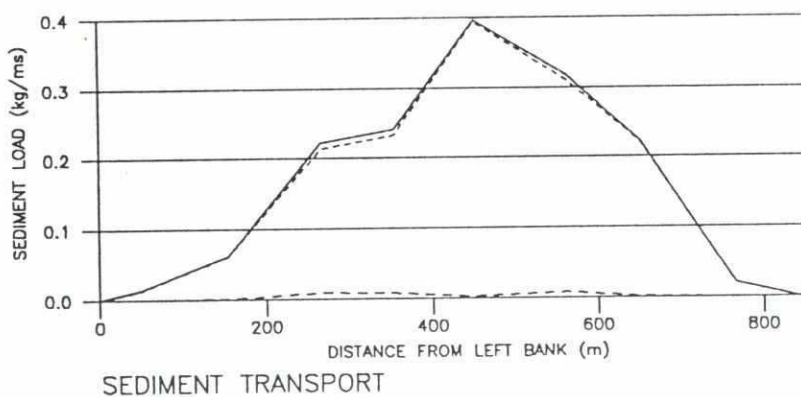
LEGEND :

- WATER DEPTH (m below STAGE)
- UNIT DISCHARGE (m³/s.m)
- U - (m/s)
- .- V - (m/s)

STAGE = 7.56 (m+PWD)

A = 10703 (m²)

Q = 2493 (m³/s)



LEGEND :

- S_{TOTAL} 152 (kg/s)
- S_{WASH LOAD} 149 (kg/s)
- .- S_{SUSP. BED} 3 (kg/s)
- S_{BED LOAD} - (kg/s)

SAMPLE NOT COLLECTED

GRAIN SIZE

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 238 : 13 December, 1995

Location 4 : Ganges River, Hardinge Bridge

File : H5CD9T01

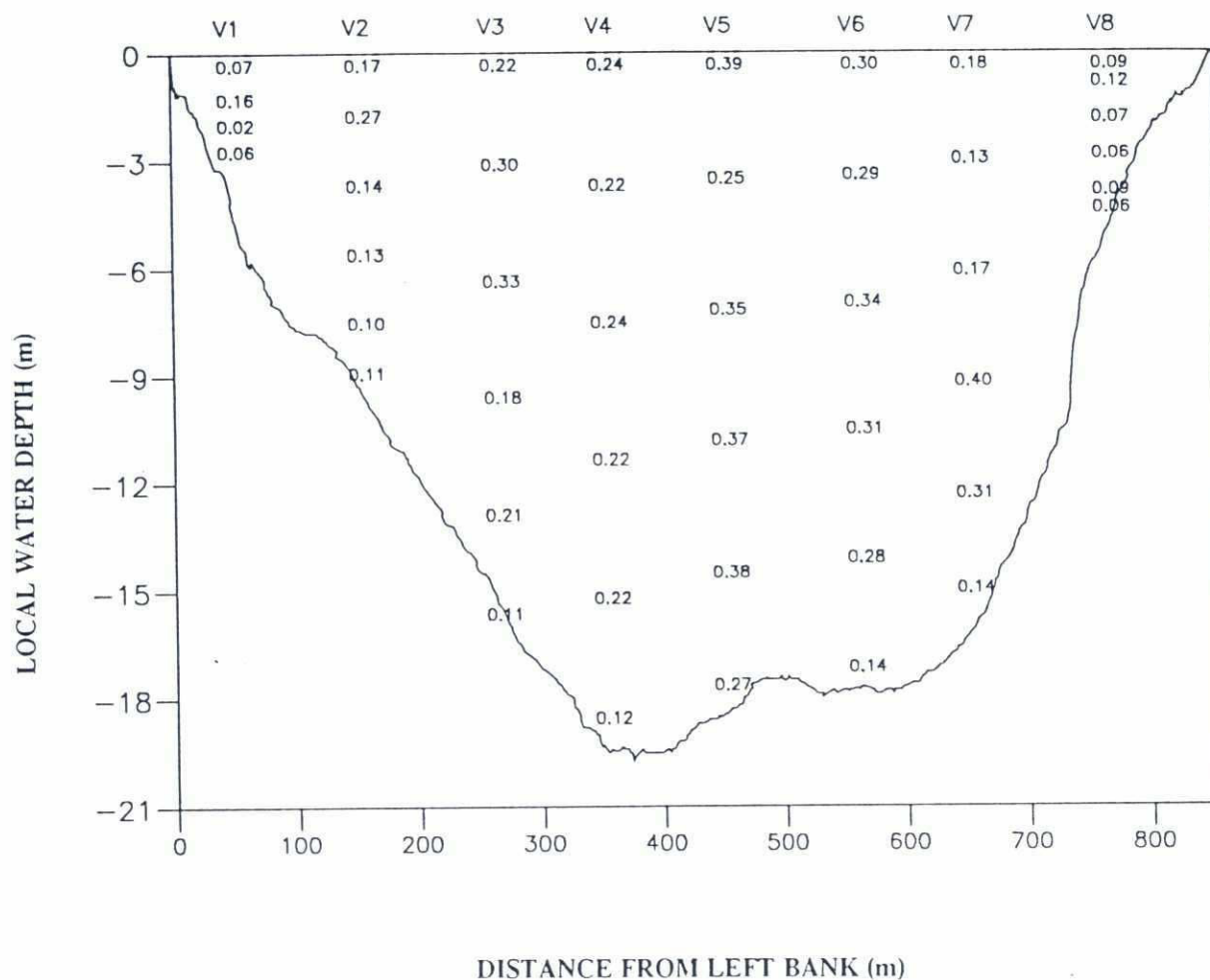
Date : 28 Mar 1996

Unit : mk/ss

Horizontal distribution of flow and sediments
Channel 1

page
3.1

224



Water level : 7.56 m+ PWD measured at the station indicated on page 1.1

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 238 : 13 December, 1995

Location 4 : Ganges River, Hardinge Bridge

File : IISCD9T01

Date : 28 Mar 1996

Unit : m/s

Cross-sectional distribution of flow velocity
Channel 1


page
4.1

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Andreasen settling tube							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.1: Grain size of near bed suspended sediment (0.3 m above river bed)							

US BM-54 bed samples							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.2 : Grain size of bed material							

Helley-Smith							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.3 : Grain sizes of bed load							

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 238 : 13 December , 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 28 Mar 1996	Grain size distributions	page 5.1
	Init : mk/ss		

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Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
Echo-sounding	1	9512130926-0934 9512130937-0943	H5CD9T01 * H5CD9T02

Table 6.1: Echo-sounding

* : echo-sounding in PSD 24 data base and presented in Sections 3 and 4


Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1	9512131527-1550	401694	660664	3.60	H5CD9P08 *
		2	9512131454-1516	401581	660667	9.60	H5CD9P07 *
		3	9512131423-1447	401466	660673	16.30	H5CD9P06 *
		4	9512131240-1305	401379	660670	19.20	H5CD9P05 *
		5	9512131202-1229	401284	660664	18.30	H5CD9P04 *
		6	9512131117-1152	401171	660670	17.80	H5CD9P03 *
		7	9512131046-1114	401081	660669	15.60	H5CD9P02 *
		8	9512131008-1031	400969	660679	5.00	H5CD9P01 *

Table 6.2: Vertical profiles

* ADCP & MEX not available

Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments (pump bottle)	1	1	6	9512131527-1550	401694	660664	3.60
		2	6	9512131454-1516	401581	660667	9.60
		3	6	9512131423-1447	401466	660673	16.30
		4	6	9512131240-1305	401379	660670	19.20
		5	6	9512131202-1229	401284	660664	18.30
		6	6	9512131117-1152	401171	660670	17.80
		7	6	9512131046-1114	401081	660669	15.60
		8	6	9512131008-1031	400969	660679	5.00


Table 6.3: Suspended sediment - point sample

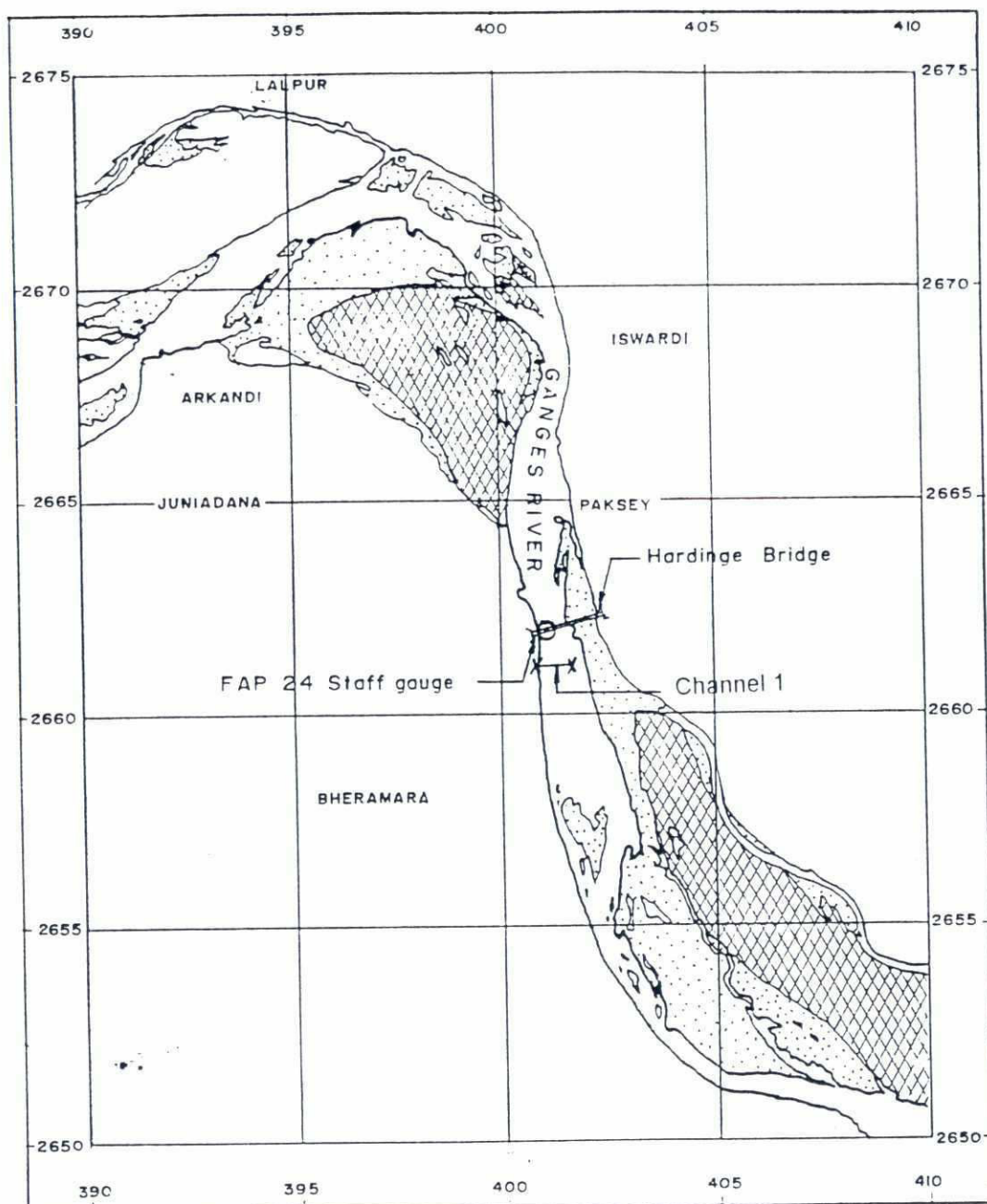
<div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div> <div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div>		Survey Bulletin 238 : 13 December , 1995	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 28 Mar 1996	Collected data and their storage (1)	page 6.1
	Init : mk/ss		

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Types of Data	Channel	Format	Filename
ADCP/S4/EMF data	1	QUATTRO	H5CD9T01 .ase
Echosounder data	1	QUATTRO	H5CD9T01 .ech
Sediment transport data	1	QUATTRO	H5CD9T01 .sed
Susp. sed. conc. analysis	1	QUATTRO	H5CD9T01 .ssc
Transect plot data	1	QUATTRO	H5CD9T01 .trs
Table 7.1 PSD 24 Database file description			



 FAP 24 DELFT - DHI	RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 238 : 13 December , 1995	
	Location 4 : Ganges River, Hardinge Bridge		
	Date : 28 Mar 1996	PSD 24 Database file description	page 7.1
	Init : mk/ss		



LEGEND:



High land



Unstable/low char

x — x Cross section



FAP 24 Staff gauge



5000m 2500m 0

Map is based on satellite images of March 1995

FAP 24
DELFT - DHI

RIVER SURVEY PROJECT
Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 243 : 26 December, 1995

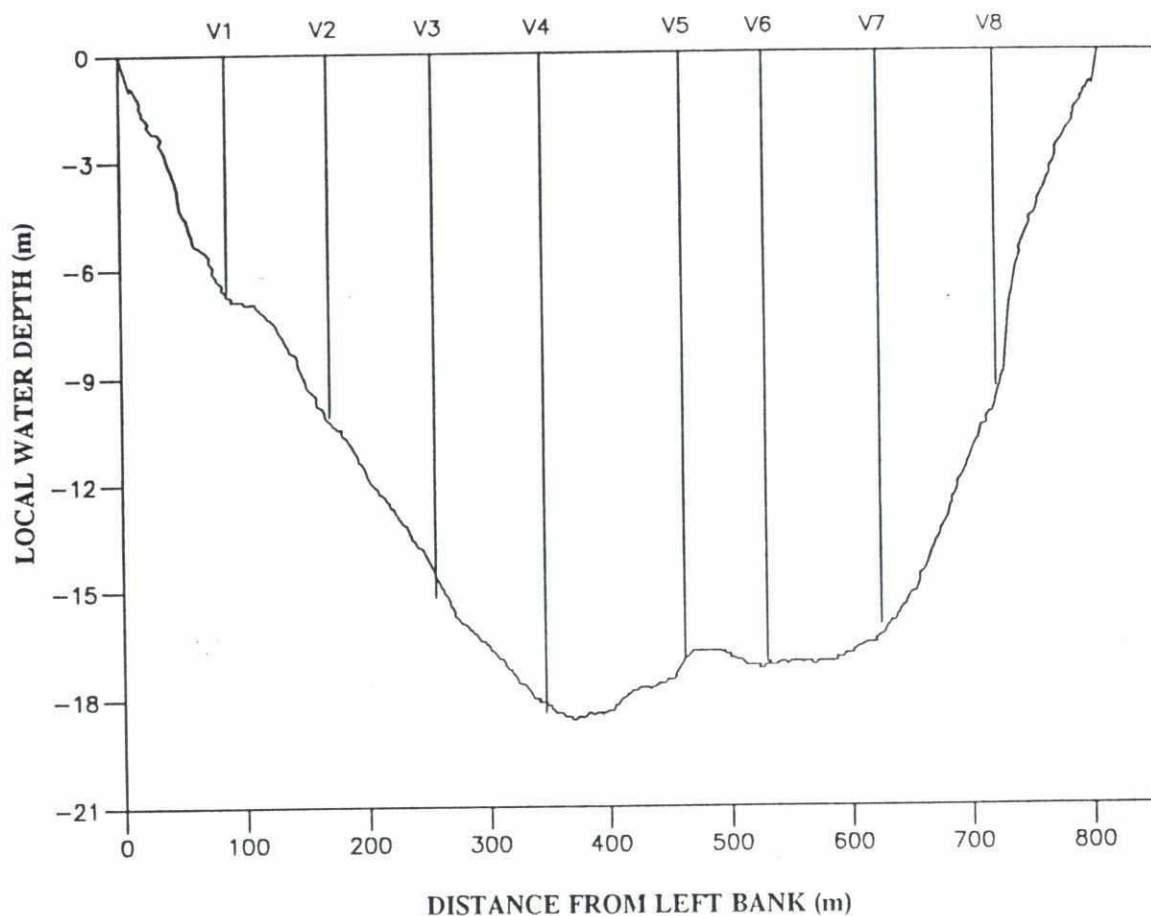
Location 4 : Ganges River, Hardinge Bridge

Date : 30 Mar 1996


Init : mk/ss

Location map

page
1.1



Water level : 6.89 m+PWD measured at the station indicated on page 1.1

FAP 24  DELFT - DHI	RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 243 : 26 December, 1995	
		Location 4 : Ganges River, Hardinge Bridge	
File : H5CQ9T01	Date : 30 Mar 1996	Cross-sections and measured verticals Channel 1	page 1.2
	Init : mk/ss		

Type of measurement	Method	No. of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	-	-	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	2	-	-	-
Vertical current profile	No. of verticals in channel	8	-	-	-
	ADCP	-	-	-	-
	S4 current meter	8	-	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	48	-	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	-	-	-	-
	Integrated bottle sampling	-	-	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	-	-	-	-
	Delft Bottle	-	-	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-


Table 2.1: Survey programme as made

Channel	Width (m)	Area (m ²)	Stage h (m+PWD)	Discharge Q (m ³ /s)	Bed load transport Sb (kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	808	10012	6.89	1830	-	91.8

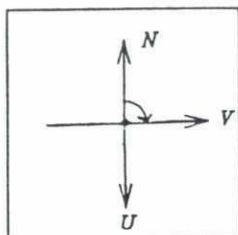
Table 2.2: Key figures

Gauge Location	Channel	Date	Water level (Daily average) (m+PWD)	Gauge
Hardinge Bridge	Channel 1	26 Dec 95	6.89	FAP 24

Table 2.3: Water-levels

 DELFT - DHI		RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 243 : 26 December , 1995	
			Location 4 : Ganges River, Hardinge Bridge	
File : H5CQ9T01	Date : 30 Mar 1996		Survey programme as made and key figures	page
	Init : mk/ss			2.1

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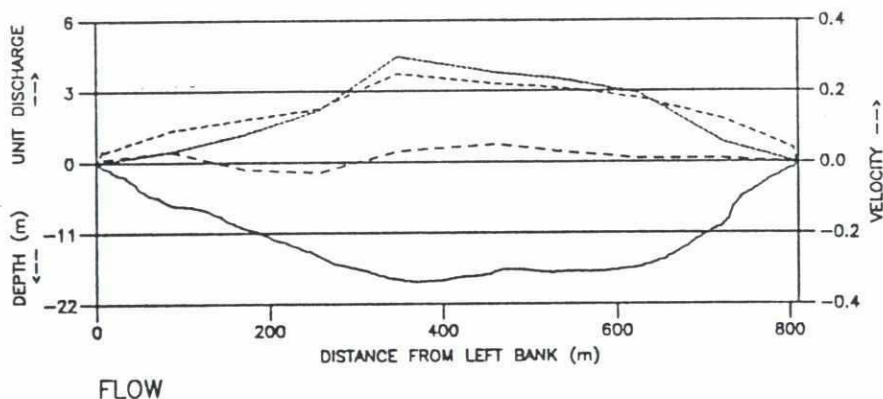


TRANSECT AZIMUTH = 89°

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



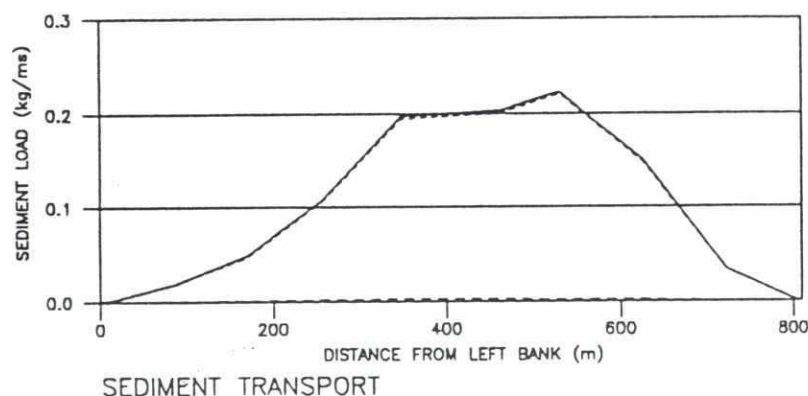
LEGEND :

- WATER DEPTH (m below STAGE)
- UNIT DISCHARGE (m³/s.m)
- U - (m/s)
- .- V - (m/s)

STAGE = 6.89 (m+PWD)

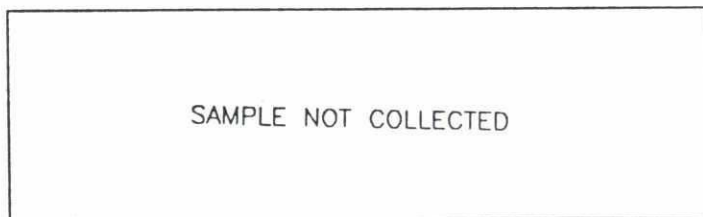
A = 10012 (m²)

Q = 1830 (m³/s)



LEGEND :

- S_{TOTAL} 91.8 (kg/s)
- S_{WASH LOAD} 90.5 (kg/s)
- S_{SUSP. BED} 1.3 (kg/s)
- .- S_{BED LOAD} - (kg/s)



GRAIN SIZE

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 243 : 26 December, 1995

Location 4 : Ganges River, Hardinge Bridge

File : H5CQ9T01

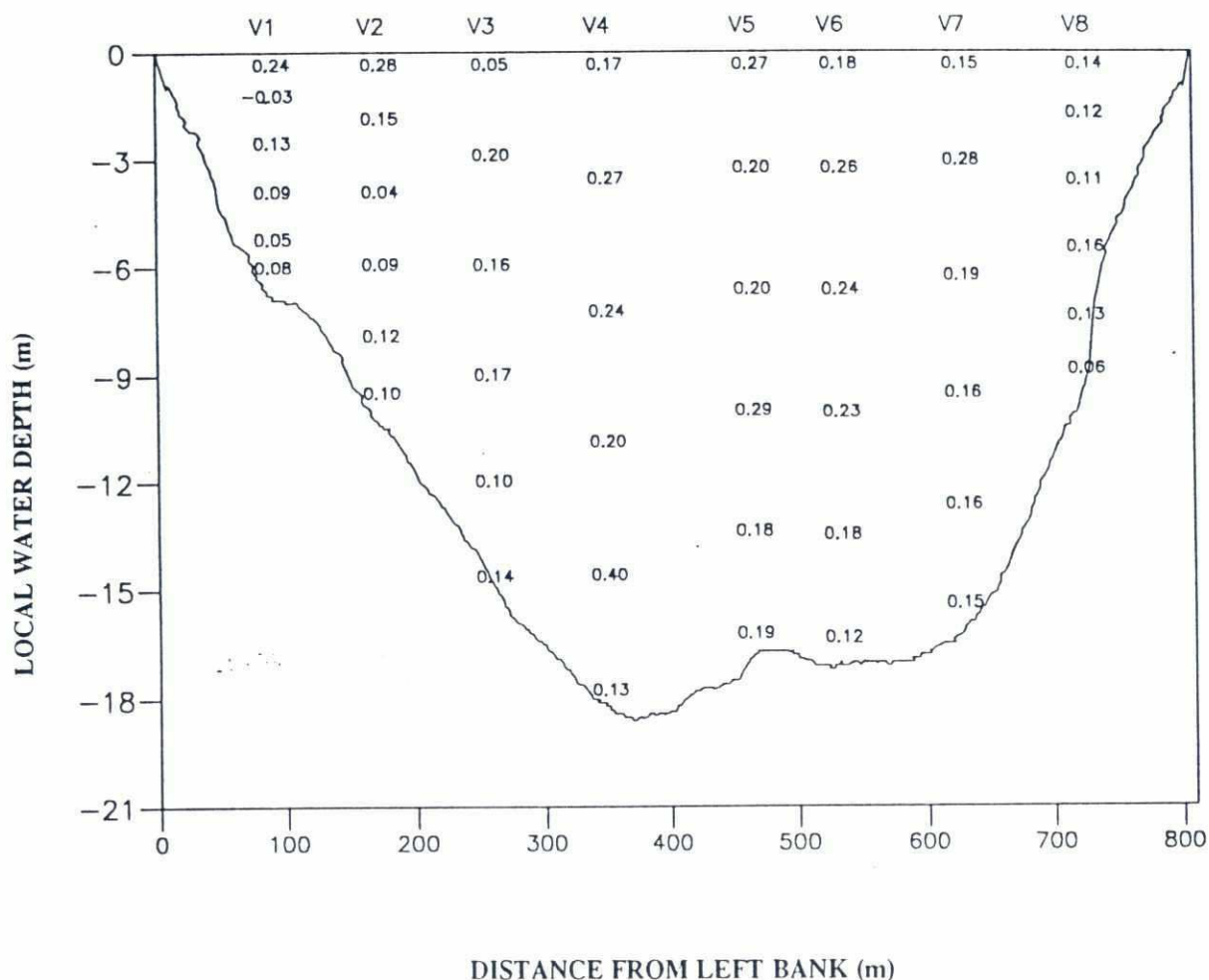
Date : 30 Mar 1996

Init : mk/ss

Horizontal distribution of flow and sediments
Channel 1

page
3.1

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Water level : 6.89 m+PWD measured at the station indicated on page 1.1

FAP 24
DELFT - DHI

RIVER SURVEY PROJECT
Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 243 : 26 December, 1995

Location 4 : Ganges River, Hardinge Bridge

File : IISQC9T01

Date : 30 Mar 1996

Unit : m/s

Cross-sectional distribution of flow velocity
Channel 1


page
4.1

205

Andreasen settling tube							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.1: Grain size of near bed suspended sediment (0.3 m above river bed)							

US BM-54 bed samples							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.2 : Grain size of bed material							

Helley-Smith							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.3 : Grain sizes of bed load							

 FAP 24 DELFT - DHI	RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 243 : 26 December , 1995	
	Location 4 : Ganges River, Hardinge Bridge		
	Date : 30 Mar 1996	Grain size distributions	page 5.1
	Init : mk/ss		

Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
Echo-sounding	1	9512261115-1125 9512261128-1135	H5CQ9T01 * H5CQ9T02


Table 6.1: Echo-sounding * : echo-sounding in PSD 24 data base and presented in Sections 3 and 4

Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1	9512261646-1709	401635	660664	6.70	H5CQ9P08 *
		2	9512261606-1627	401557	660675	10.10	H5CQ9P07 *
		3	9512261527-1554	401468	660671	15.20	H5CQ9P06 *
		4	9512261442-1513	401379	660669	18.40	H5CQ9P05 *
		5	9512261403-1427	401263	660669	16.90	H5CQ9P04 *
		6	9512261326-1349	401196	660670	17.00	H5CQ9P03 *
		7	9512261246-1306	401100	660671	16.00	H5CQ9P02 *
		8	9512261201-1231	401004	660669	9.40	H5CQ9P01 *


Table 6.2: Vertical profiles * ADCP & MEX not available

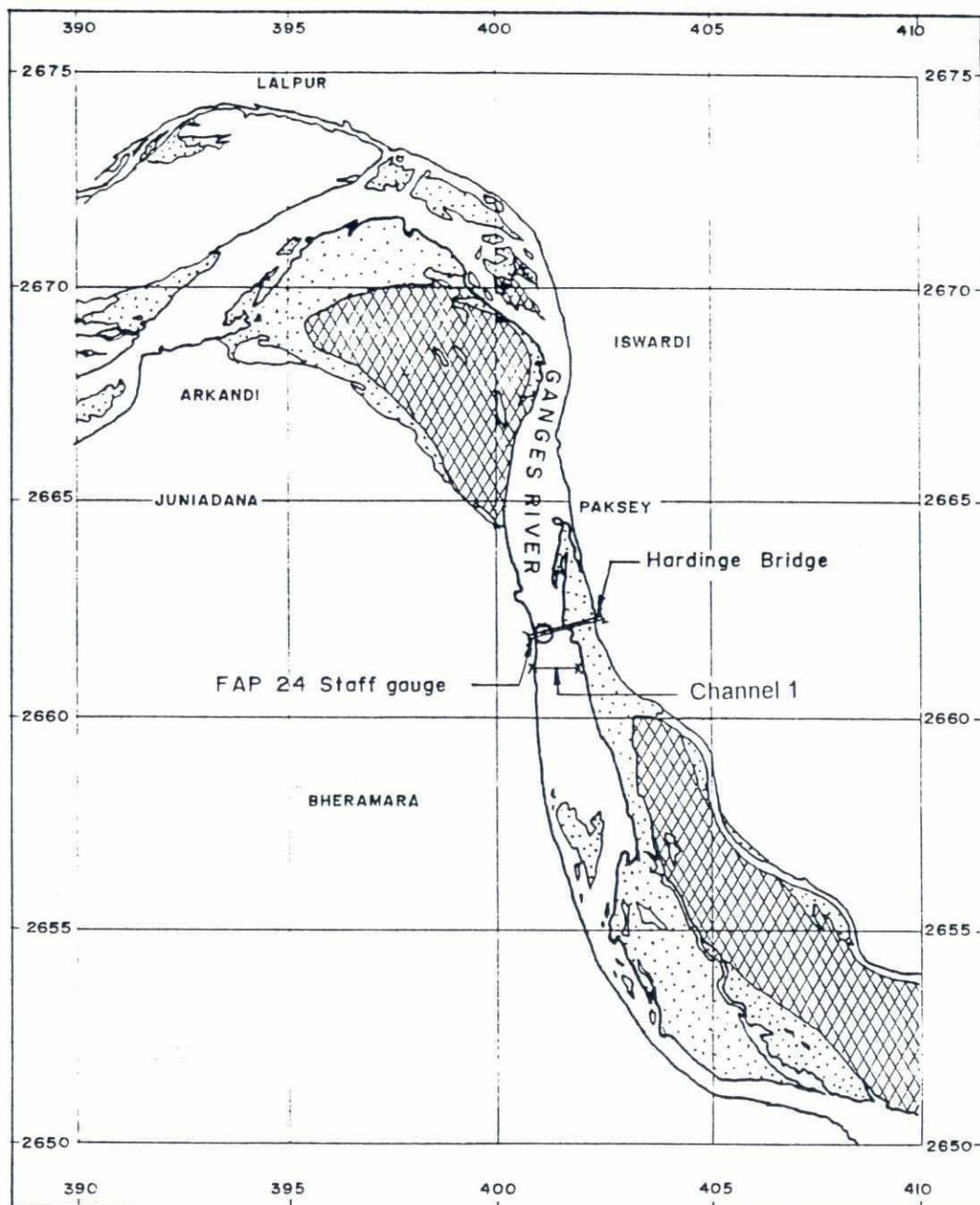
Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments (pump bottle)	1	1	6	9512261646-1709	401635	660664	6.70
		2	6	9512261606-1627	401557	660675	10.10
		3	6	9512261527-1554	401468	660671	15.20
		4	6	9512261442-1513	401379	660669	18.40
		5	6	9512261403-1427	401263	660669	16.90
		6	6	9512261326-1349	401196	660670	17.00
		7	6	9512261246-1306	401100	660671	16.00
		8	6	9512261201-1231	401004	660669	9.40

Table 6.3: Suspended sediment - point sample





<div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div>		<div>RIVER SURVEY PROJECT</div> <div>Flood Plan Coordination Organization</div> <div>Commission of the European Communities</div>	Survey Bulletin 243 : 26 December , 1995	
		Location 4 : Ganges River, Hardinge Bridge		
	Date : 30 Mar 1996	Collected data and their storage (1)		page 6.1
	Init : mk/ss			

Types of Data	Channel	Format	Filename
ADCP/S4/EMF data	1	QUATTRO	H5CQ9T01 .ase
Echosounder data	1	QUATTRO	H5CQ9T01 .ech
Sediment transport data	1	QUATTRO	H5CQ9T01 .sed
Susp. sed. conc. analysis	1	QUATTRO	H5CQ9T01 .ssc
Transect plot data	1	QUATTRO	H5CQ9T01 .trs
Table 7.1 PSD 24 Database file description			

 FAP 24 DELFT - DHI		Survey Bulletin 243 : 26 December , 1995	
RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities		Location 4 : Ganges River, Hardinge Bridge	
	Date: 30 Mar 1996	PSD 24 Database file description	page
	Init: mk/ss		7.1



LEGEND:

-  High land
-  Unstable / low char
-  Cross section
-  FAP 24 Staff gauge

5000m 2500m 0

Map is based on satellite images of March 1995

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 250 : 20 January, 1996

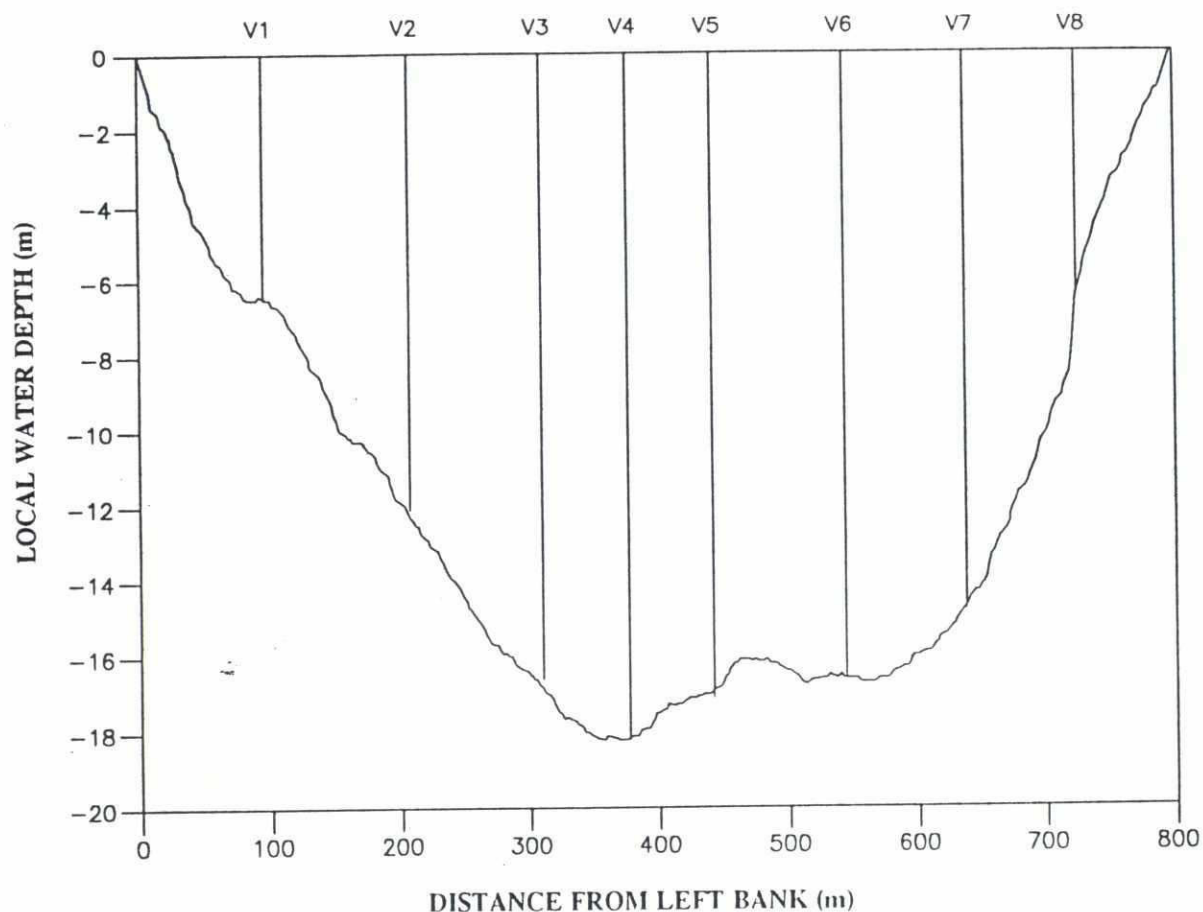
Location 4 : Ganges River, Hardinge Bridge

Date : 16 Apr 1996


Init : mk/ss

Location map

page
1.1



Water level : 6.37 m+PWD measured at the station indicated on page 1.1

FAP 24  DELFT - DHI	RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 250 : 20 January, 1996	
		Location 4 : Ganges River, Hardinge Bridge	
File : H61K9T02	Date : 16 Apr 1996	Cross-sections and measured verticals Channel 1	page 1.2
	Init : mk/ss		

Type of measurement	Method	No. of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	-	-	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	2	-	-	-
Vertical current profile	No. of verticals in channel	8	-	-	-
	ADCP	-	-	-	-
	S4 current meter	8	-	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	48	-	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	-	-	-	-
	Integrated bottle sampling	-	-	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	-	-	-	-
	Delft Bottle	-	-	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-


Table 2.1: Survey programme as made

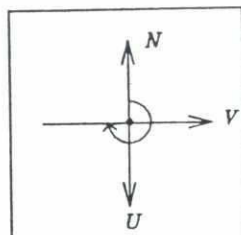
Channel	Width (m)	Area (m ²)	Stage h (m+PWD)	Discharge Q (m ³ /s)	Bed load transport Sb (kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	797	9690	6.37	1374	-	55

Table 2.2: Key figures

Gauge Location	Channel	Date	Water level (Daily average) (m+PWD)	Gauge
Hardinge Bridge	Channel 1	20 Jan 96	6.37	FAP 24

Table 2.3: Water-levels

 FAP 24 RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities		Survey Bulletin 250 : 20 January , 1996	
		Location 4 : Ganges River, Hardinge Bridge	
File : H61K9T02	Date : 16 Apr 1996	Survey programme as made and key figures	page
	Init mk/ss		21

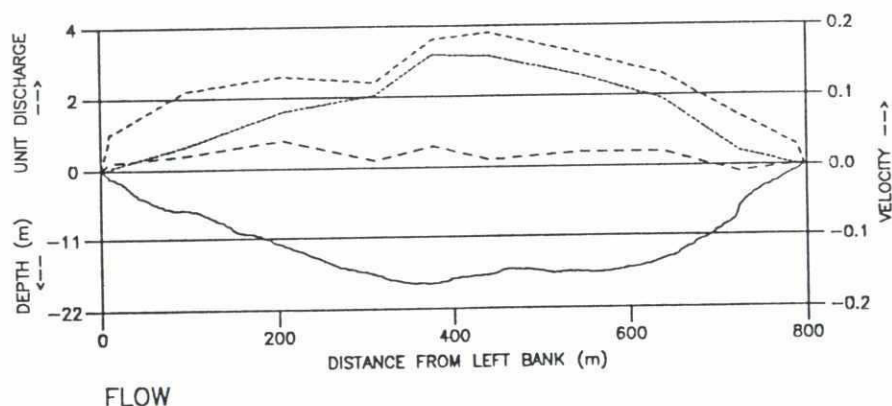


TRANSECT AZIMUTH = 270°

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



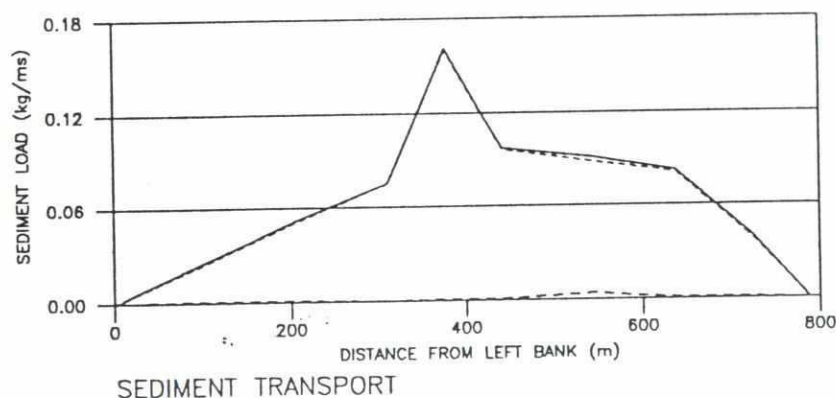
LEGEND :

— WATER DEPTH (m below STAGE)
 UNIT DISCHARGE (m³/s.m)
 --- U - (m/s)
 -.- V - (m/s)

STAGE = 6.37 (m+PWD)

A = 9690 (m²)

Q = 1374 (m³/s)



LEGEND :

— S_{TOTAL} 55 (kg/s)
 --- S_{WASH LOAD} 54 (kg/s)
 -.- S_{SUSP. BED} 1 (kg/s)
 S_{BED LOAD} - (kg/s)

SAMPLE NOT COLLECTED

GRAIN SIZE

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization
 Commission of the European Communities

Survey Bulletin 250 : 20 January, 1996

Location 4 : Ganges River, Hardinge Bridge

File : H61K9T02

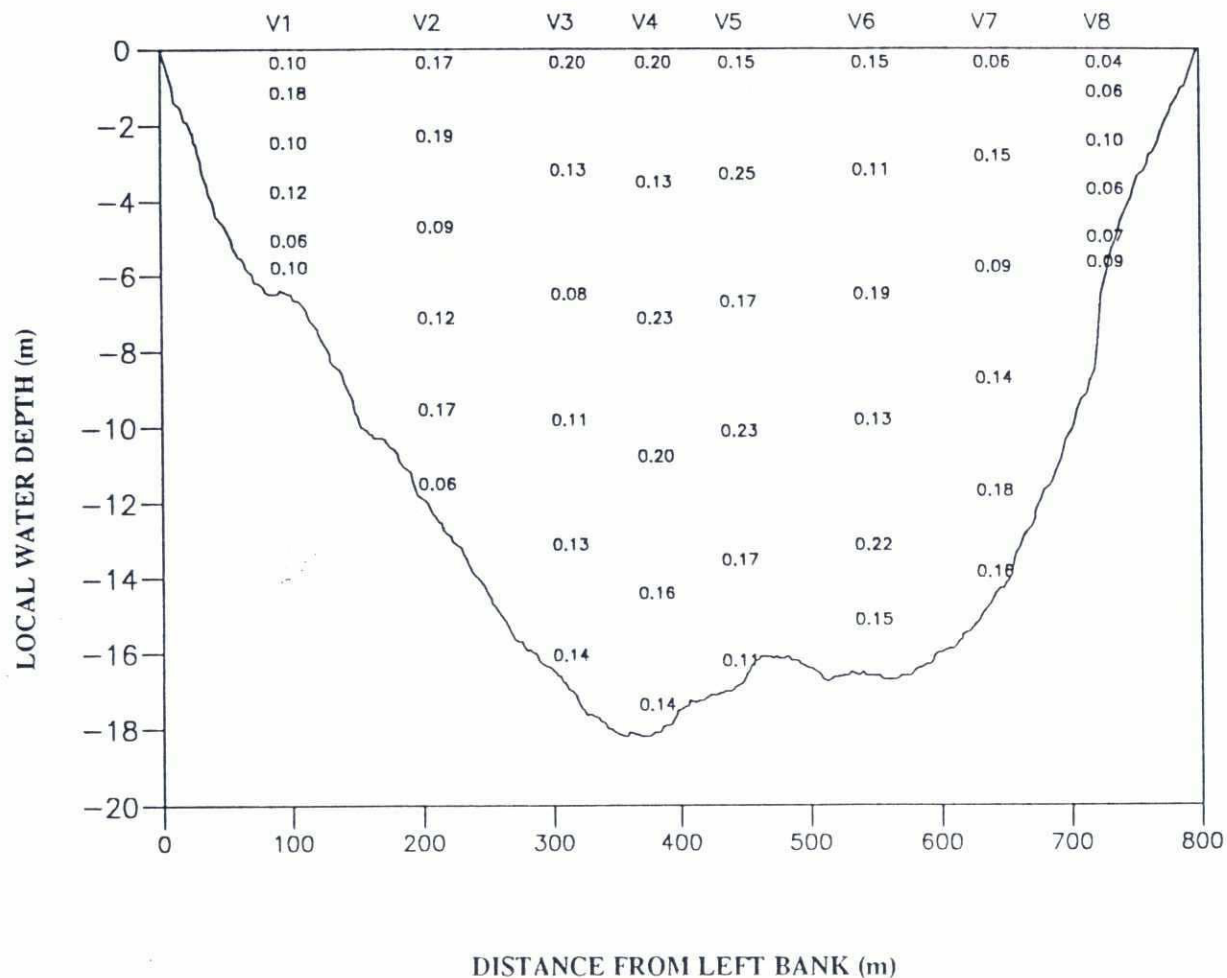
Date : 16 Apr 1996

Init : mk/ss

Horizontal distribution of flow and sediments
 Channel 1

page
 3.1

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Water level : 6.37 m+PWD measured at the station indicated on page 1.1



<div> <div>FAP 24</div> <div> </div> <div>DELFT - DHI</div> </div> <div> <div>RIVER SURVEY PROJECT</div> <div>Flood Plan Coordination Organization</div> <div>Commission of the European Communities</div> </div>		Survey Bulletin 250 : 20 January, 1996	
		Location 4 : Ganges River, Hardinge Bridge	
File : H61K9T02	Date : 16 Apr 1996	Cross-sectional distribution of flow velocity Channel 1	page 4.1
	Unit : m/s		

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Andreasen settling tube							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.1: Grain size of near bed suspended sediment (0.3 m above river bed)							

US BM-54 bed samples							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.2 : Grain size of bed material							

Helley-Smith							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm	D35 (mm)	D50 (mm)	D65 (mm)
Sample not collected							
Table 5.3 : Grain sizes of bed load							

<div><div><div>FAP 24</div><div></div></div><div>DELFT - DHI</div></div> <div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div>		Survey Bulletin 250 : 20 January , 1996	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 16 Apr 1996	Grain size distributions	page
	Init mk/ss		51

Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
Echo-sounding	1	9601200924-0930 9601200932-0938	H61K9T01 H61K9T02 *

Table 6.1: Echo-sounding

* : echo-sounding in PSD 24 data base and presented in Sections 3 and 4


Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1	9601201031-1050	401627	660682	6.50	H61K9P01 *
		2	9601201125-1140	401515	660665	12.10	H61K9P02 *
		3	9601201155-1217	401412	660661	16.60	H61K9P03 *
		4	9601201226-1250	401344	660667	18.20	H61K9P04 *
		5	9601201300-1325	401280	660667	17.10	H61K9P05 *
		6	9601201418-1445	401176	660666	16.60	H61K9P06 *
		7	9601201454-1519	401083	660665	14.80	H61K9P07 *
		8	9601201528-1551	400998	660672	6.40	H61K9P08 *

Table 6.2: Vertical profiles

* ADCP & MEX not available


Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments (pump bottle)	1	1	6	9601201031-1050	401627	660682	6.50
		2	6	9601201125-1140	401515	660665	12.10
		3	6	9601201155-1217	401412	660661	16.60
		4	6	9601201226-1250	401344	660667	18.20
		5	6	9601201300-1325	401280	660667	17.10
		6	6	9601201418-1445	401176	660666	16.60
		7	6	9601201454-1519	401083	660665	14.80
		8	6	9601201528-1551	400998	660672	6.40

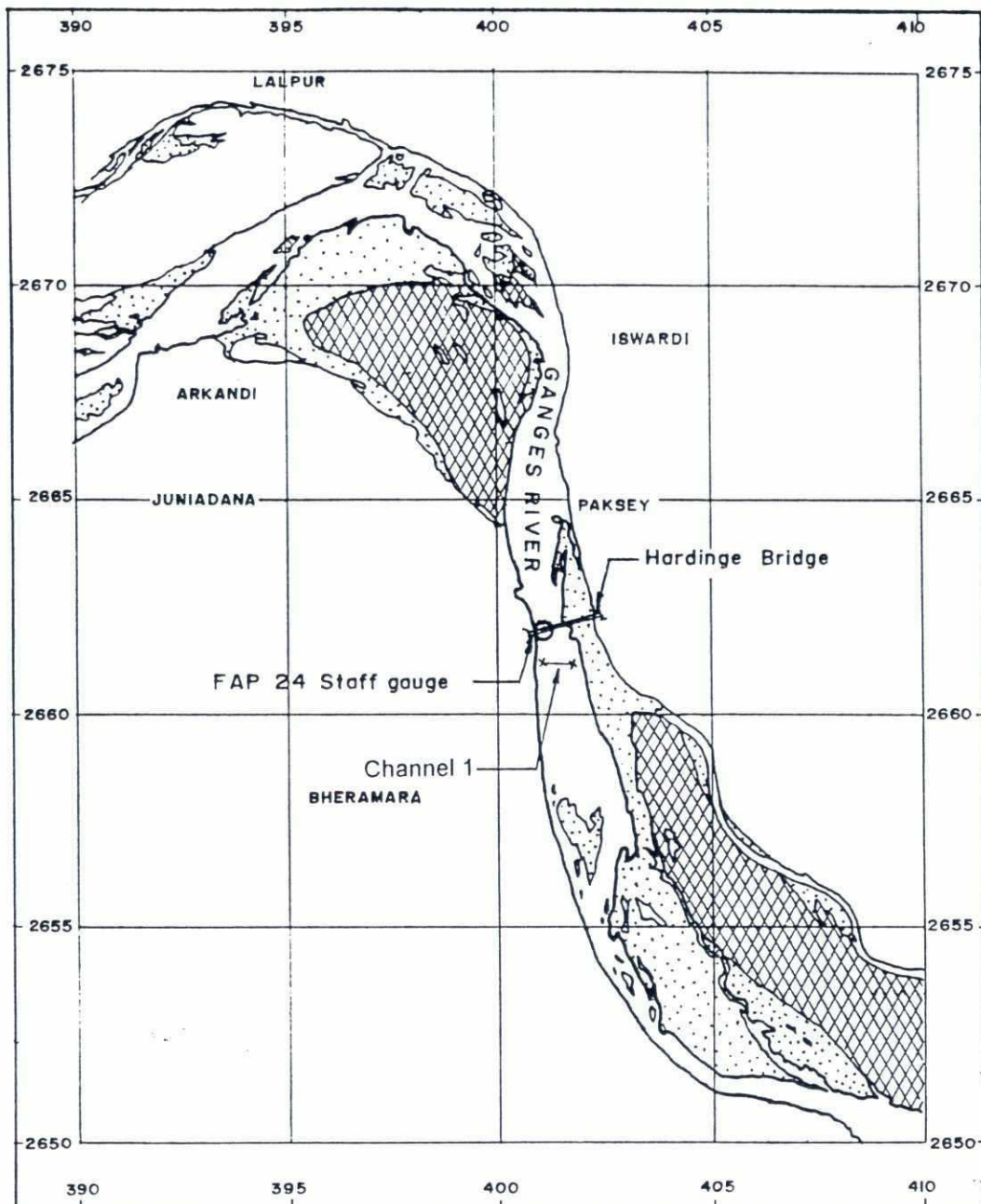
Table 6.3: Suspended sediment - point sample

 FAP 24 RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities DELFT - DHI	Survey Bulletin 250 : 20 January . 1996		
	Location 4 : Ganges River, Hardinge Bridge		
	Date : 16 Apr 1996	Collected data and their storage (1)	page
	Init : mk/ss		6.1

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Types of Data	Channel	Format	Filename
ADCP/S4/EMF data	1	QUATTRO	H61K9T02 .ase
Echosounder data	1	QUATTRO	H61K9T02 .ech
Sediment transport data	1	QUATTRO	H61K9T02 .sed
Susp. sed. conc. analysis	1	QUATTRO	H61K9T02 .ssc
Transect plot data	1	QUATTRO	H61K9T02 .trs
Table 7.1 PSD 24 Database file description			

 <p>FAP 24 DELFT - DHI</p>		Survey Bulletin 250 : 20 January , 1996	
		Location 4 : Ganges River, Hardinge Bridge	
	Date : 16 Apr 1996	PSD 24 Database file description	page
	Init : mk/ss		7.1



LEGEND:



High land



Unstable/low char



Cross section



FAP 24 Staff gauge

5000m 2500m 0

Map is based on satellite images of March 1995

FAP 24
DELT - DHI

RIVER SURVEY PROJECT
Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 259 : 01 - 02 March, 1996

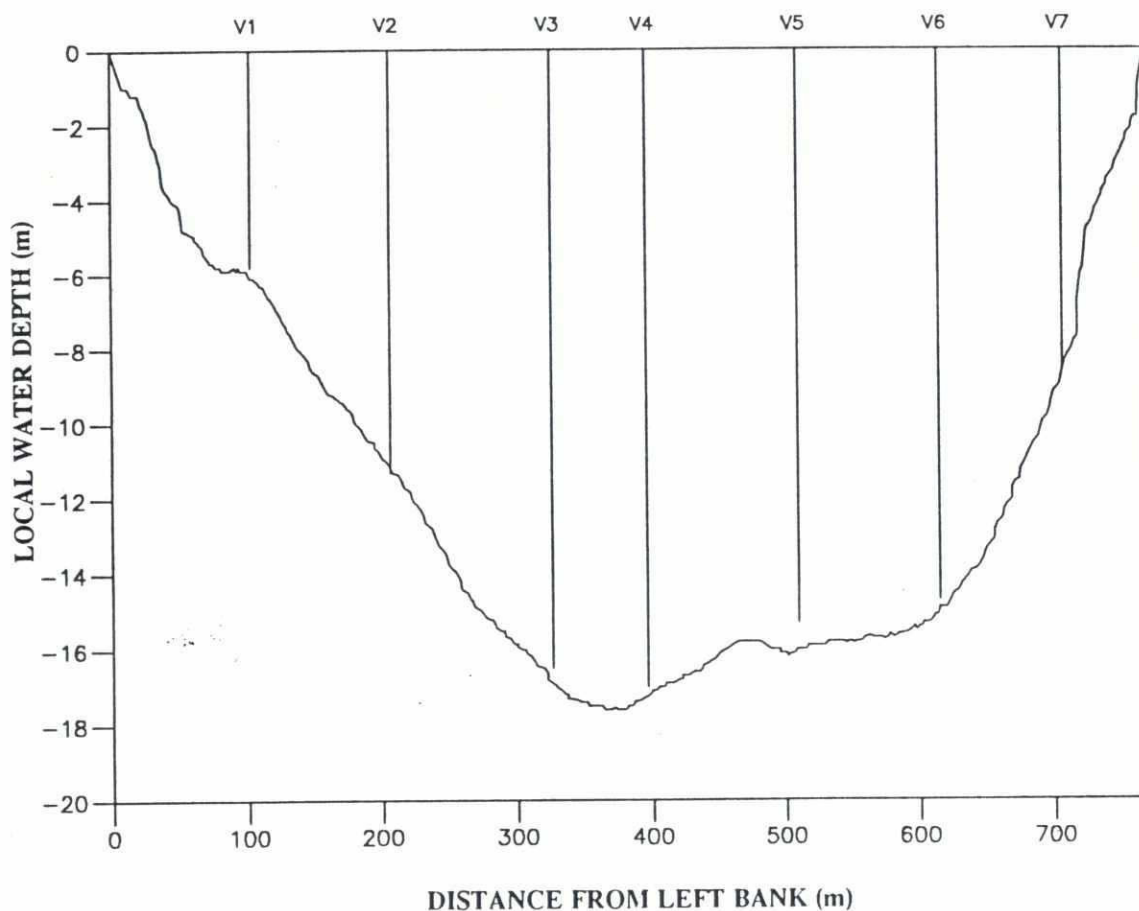
Location 4 : Ganges River, Hardinge Bridge

Date : 06 May 1996


Init : sjr

Location map

page
1.1



Water level : 5.79 m+PWD measured at the station indicated on page 1.1


FAP 24  DELFT - DHI	RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities	Survey Bulletin 259 : 01 - 02 March, 1996	
		Location 4 : Ganges River, Hardinge Bridge	
File : H6319T01	Date : 06 May 1996	Cross-sections and measured verticals Channel 1	page 1.2
	Init : sjr		

Type of measurement	Method	No. of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	-	-	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	2	-	-	-
Vertical current profile	No. of verticals in channel	7	-	-	-
	ADCP	-	-	-	-
	S4 current meter	7	-	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	42	-	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	-	-	-	-
	Integrated bottle sampling	-	-	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	-	-	-	-
	Delft Bottle	-	-	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-
Table 2.1: Survey programme as made					

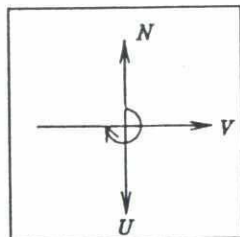
Channel	Width (m)	Area (m ²)	Stage h(m + PWD)	Discharge Q(m ³ /s)	Bed load transport Sb(kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	768	9113	5.79	643	-	22.16
Table 2.2: Key figures						

Gauge Location	Channel	Date	Water level (Daily average) (m + PWD)	Gauge
Hardinge Bridge	Channel 1	01 Mar 96 02 Mar 96	5.79 5.71	FAP24

Table 2.3: Water-levels

 FAP 24 RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities		Survey Bulletin 259 : 01 - 02 March, 1996	
		Location 4 : Ganges River, Hardinge Bridge	
File : H6319T01	Date : 06 May 1996	Survey programme as made and key figures	page 2.1
	Init : sjr		

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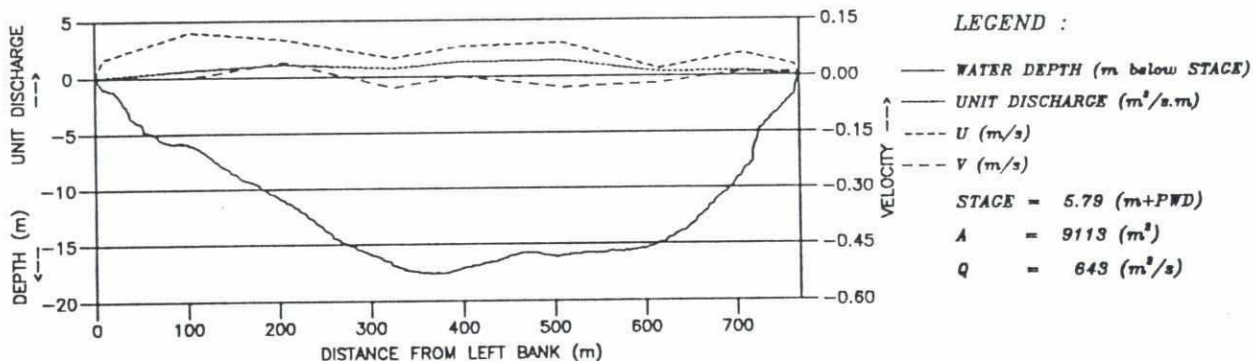


TRANSECT AZIMUTH = 270°

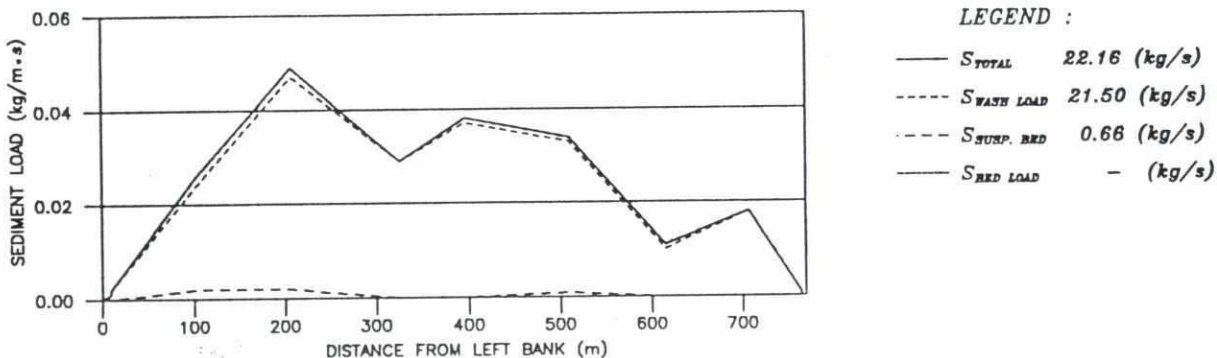
U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



FLOW



SEDIMENT TRANSPORT

SAMPLE NOT COLLECTED

GRAIN SIZE



RIVER SURVEY PROJECT

Flood Plan Coordination Organization
Commission of the European Communities

Survey Bulletin 259 : 01 - 02 March, 1996

Location 4 : Ganges River, Hardinge Bridge

File : I16319T01

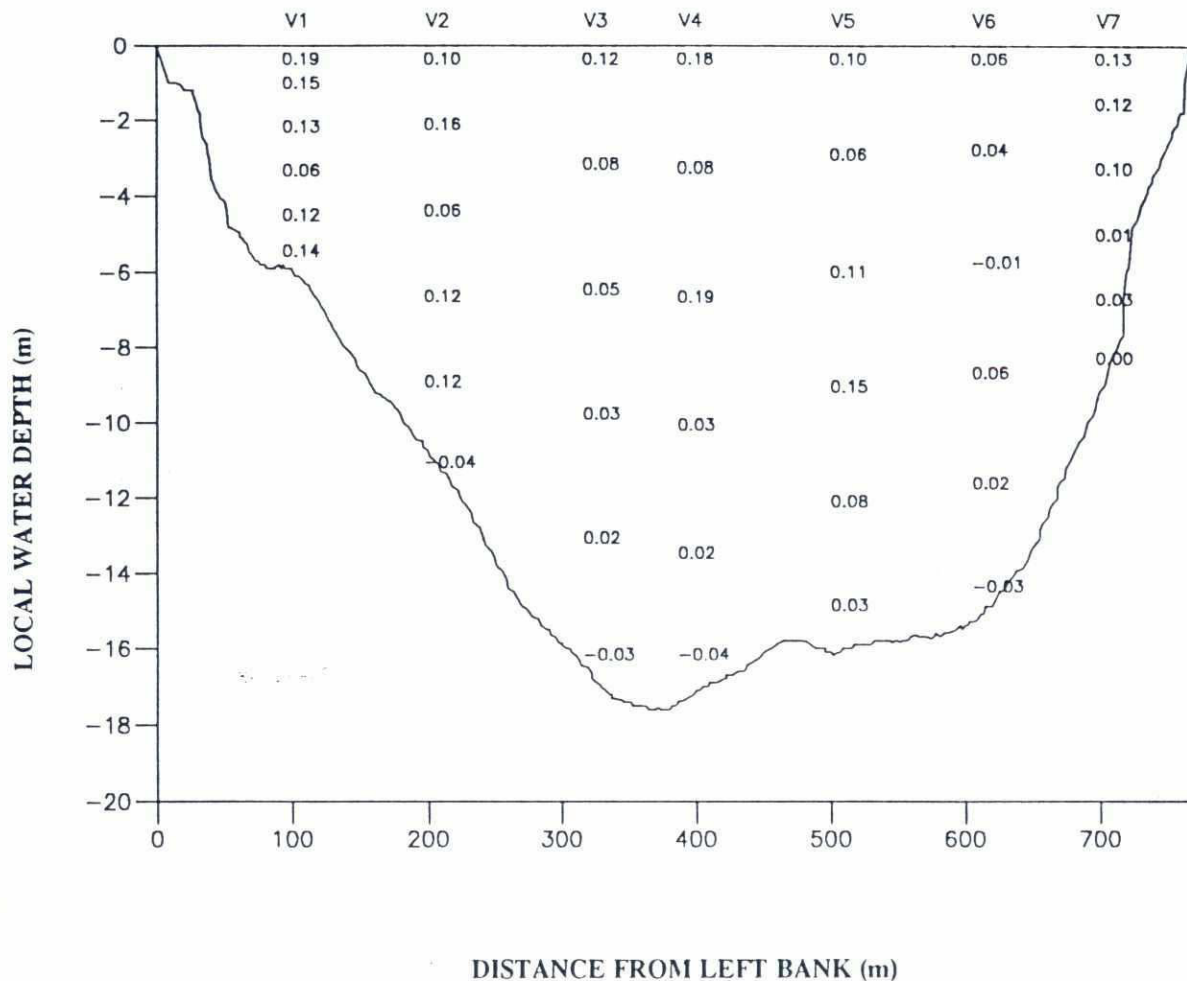
Date : 06 May 1996

Init : sjr

Horizontal distribution of flow and sediments
Channel 1

page
3.1

220




Water level : 5.79 m+PWD measured at the station indicated on page 1.1

Andreasen settling tube								
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent		D10 (mm)	D50 (mm)	D90 (mm)
				< 0.06 mm	> 0.06 mm			
Sample not collected								
Table 5.1: Grain size of near bed suspended sediment (0.3 m above river bed)								

US BM-54 bed samples								
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent		D10 (mm)	D50 (mm)	D90 (mm)
				< 0.06 mm	> 0.06 mm			
Sample not collected								
Table 5.2 : Grain size of bed material								

Helley-Smith								
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent		D35 (mm)	D50 (mm)	D65 (mm)
				< 0.06 mm	> 0.06 mm			
Sample not collected								
Table 5.3 : Grain sizes of bed load								

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>	Survey Bulletin 259 : 01 - 02 March, 1996		
	Location 4 : Ganges River, Hardinge Bridge		
	Date : 06 May 1996	Grain size distributions	page
	Init : sjr		5.1

Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
Echo-sounding	1	9603010831-0838 9603010840-0847	H6319T01 * H6319T02


Table 6.1 : Echo-sounding * : echo sounding in PSD 24 data base and presented in Sections 3 and 4

Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1	9603011004-1039	401616	660666	5.80	H6319P01 *
		2	9603020800-0821	401511	660666	11.30	H6329P01 *
		3	9603020833-0855	401391	660674	16.50	H6329P02 *
		4	9603020908-0933	401320	660665	17.00	H6329P03 *
		5	9603021000-1026	401208	660670	15.30	H6329P04 *
		6	9603021035-1056	401100	660670	14.70	H6329P05 *
		7	9603021105-1130	401010	660668	8.60	H6329P06 *

Table 6.2: Vertical profiles * ADCP & MEX not available

Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments (pump bottle)	1	1	6	9603011004-1039	401616	660666	5.80
		2	6	9603020800-0821	401511	660666	11.30
		3	6	9603020833-0855	401391	660674	16.50
		4	6	9603020908-0933	401320	660665	17.00
		5	6	9603021000-1026	401208	660670	15.30
		6	6	9603021035-1056	401100	660670	14.70
		7	6	9603021105-1130	401010	660668	8.60

Table 6.3: Suspended sediment - point sample

 <p>FAP 24 RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities</p>	Survey Bulletin 259 : 01 - 02 March, 1996		
	Location 4 : Ganges River, Hardinge Bridge		
	Date : 06 May 1996	Collected data and their storage (1)	page 6.1
	Init : sjr		

