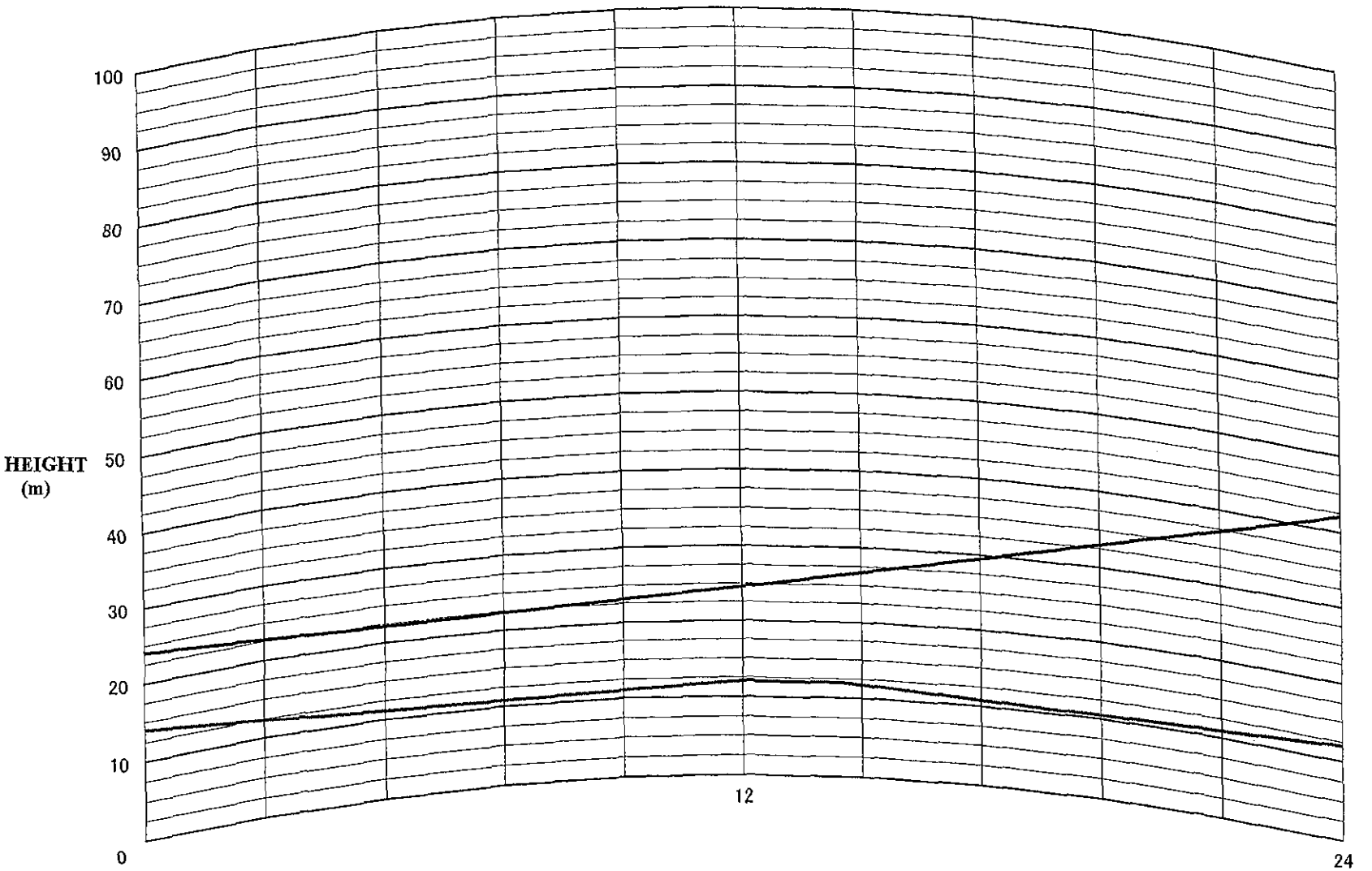
Project Name : FFWS (Figure 1.1)

TERRAIN PROFILE



Station Name : Amalshid
Site Elevation : 14 m
Antenna Height : 10 m

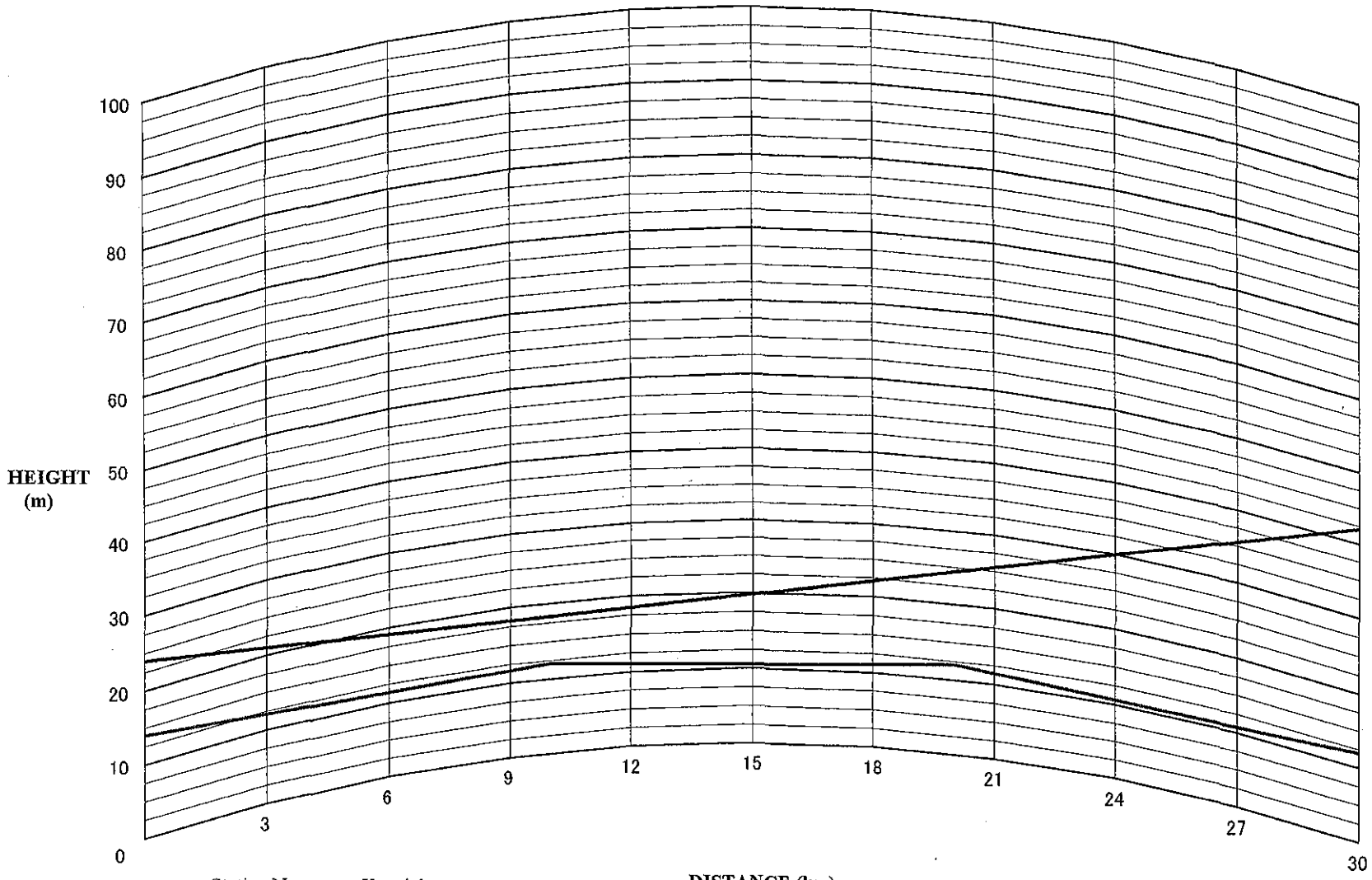
DISTANCE (km)

24 (km)

Station Name : Beani Bazar
Site Elevation : 12 m
Antenna Height : 30 m

Project Name : FFWS (Figure 1.2)

TERRAIN PROFILE

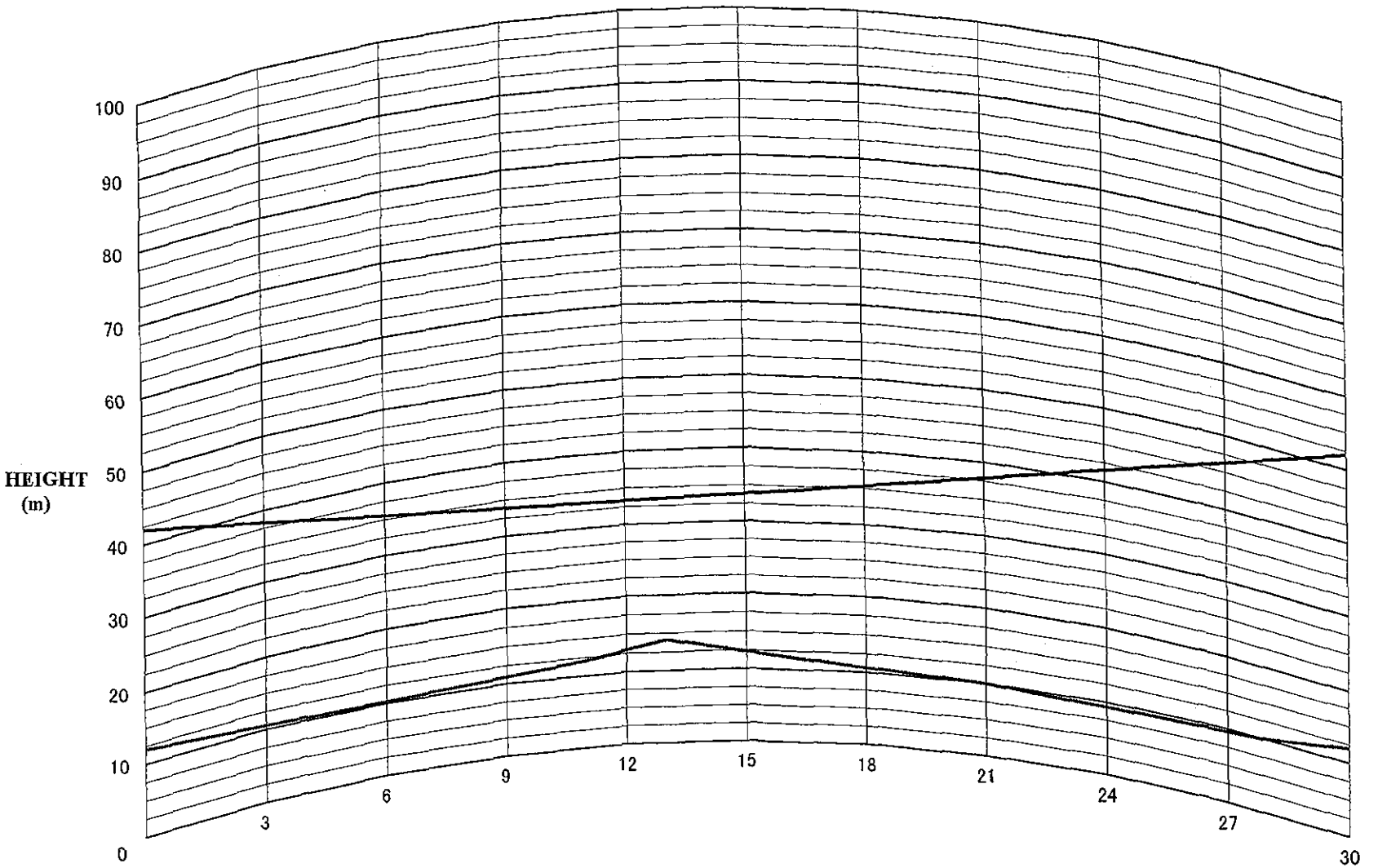


Station Name : Kanaighat
Site Elevation : 14 m
Antenna Height : 10 m

Station Name : Beani Bazar
Site Elevation : 12 m
Antenna Height : 30 m

Project Name : FFWS (Figure 1.3)

TERRAIN PROFILE

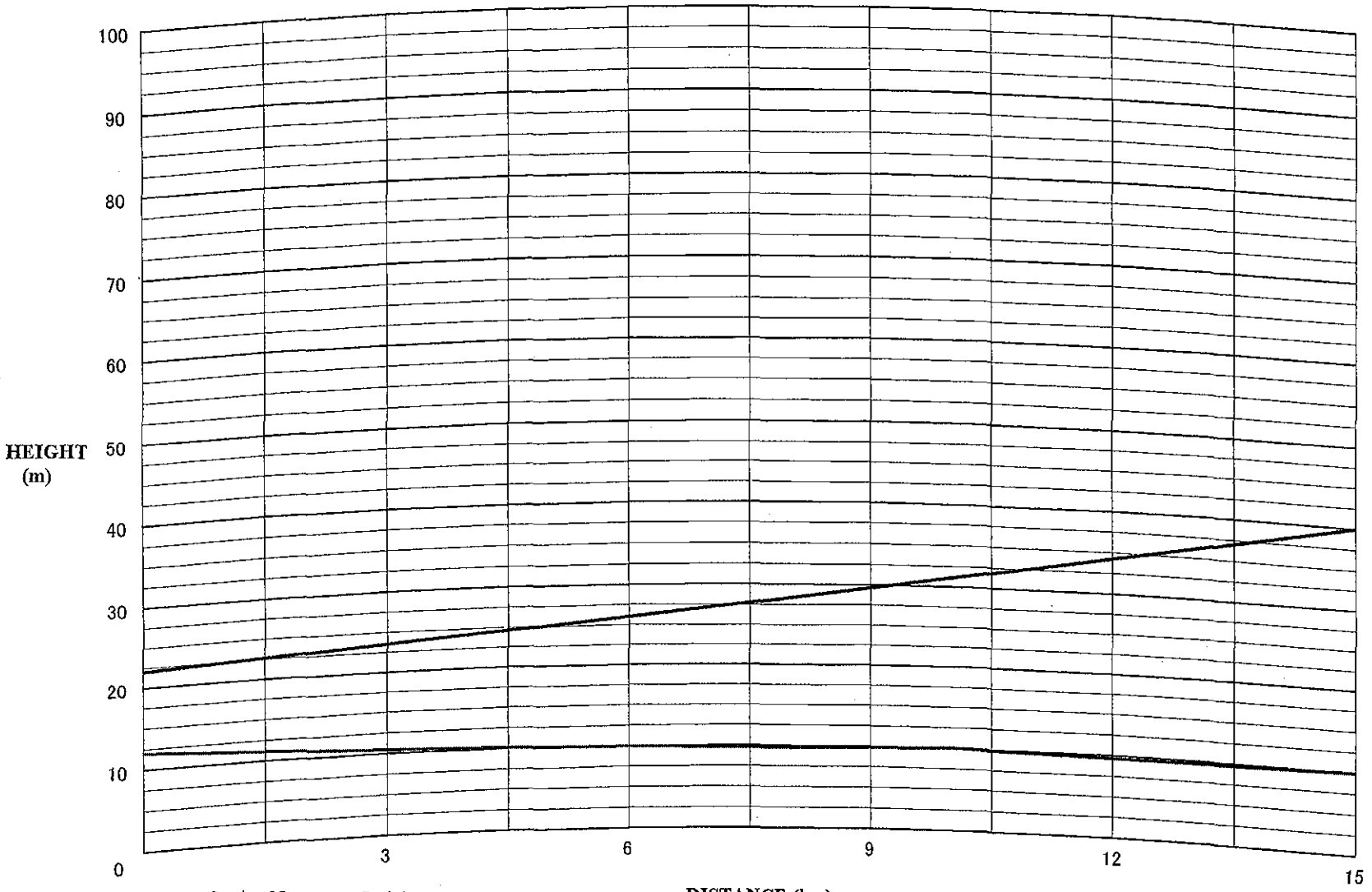


Station Name : Beani Bazar
Site Elevation : 12 m
Antenna Height : 30 m

Station Name : Sylhet
Site Elevation : 12 m
Antenna Height : 40 m

Project Name : FFWS (Figure 1.4)

TERRAIN PROFILE

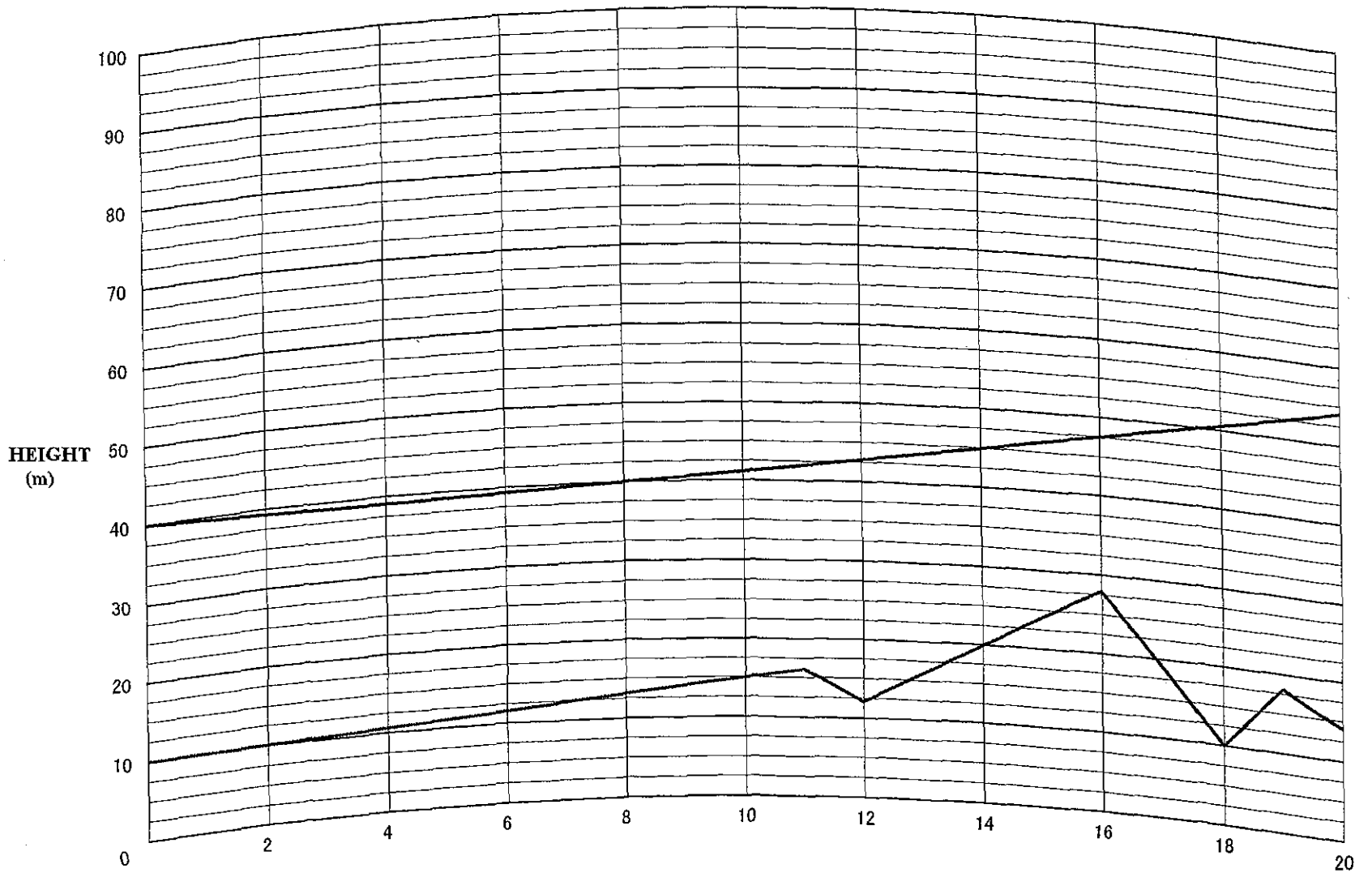


Station Name : Sarighat
Site Elevation : 12 m
Antenna Height : 10 m

Station Name : Goainghat
Site Elevation : 10 m
Antenna Height : 30 m

Project Name : FFWS(Figure 1.5)

TERRAIN PROFILE

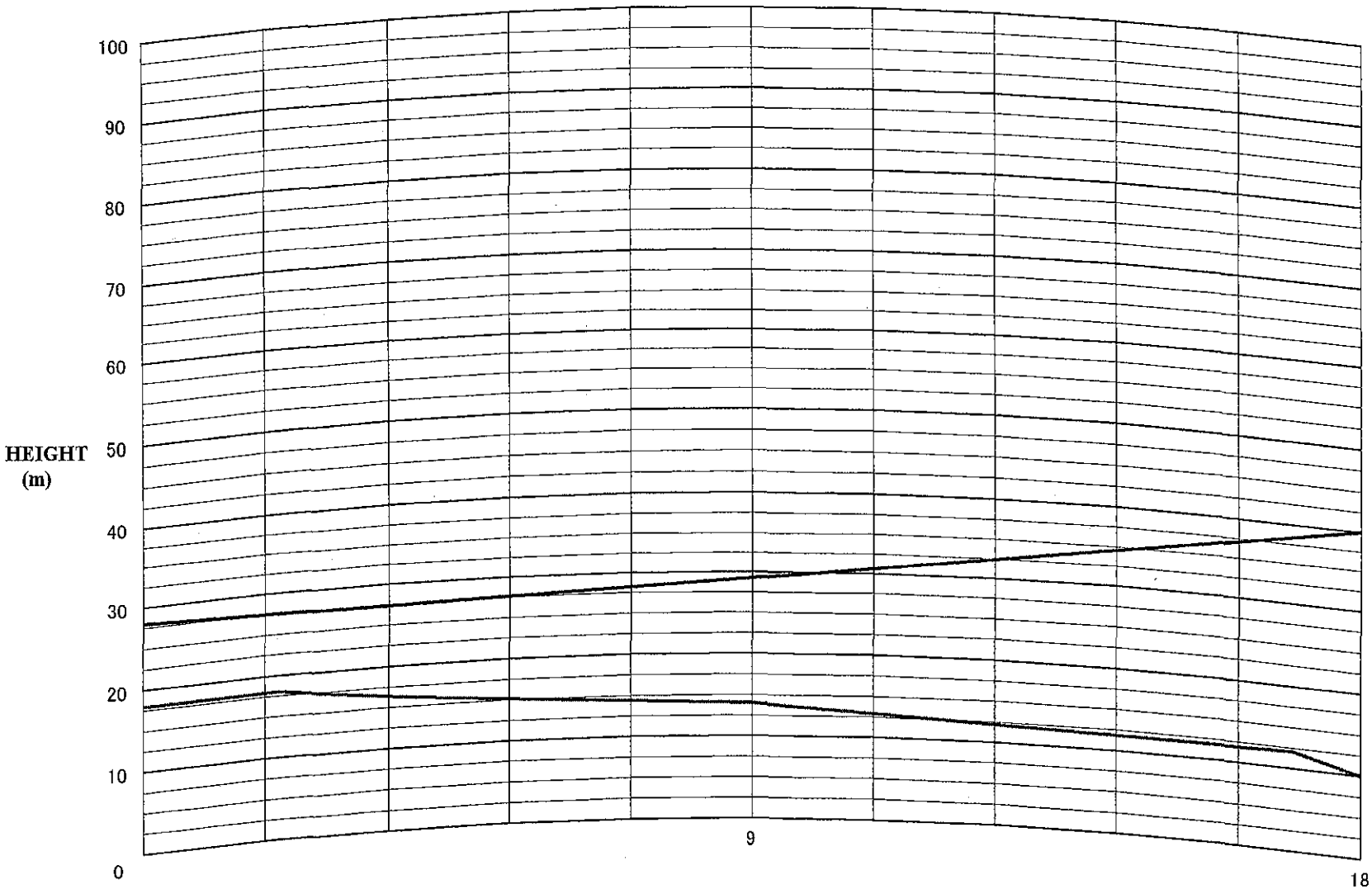


Station Name : Goainghat
Site Elevation : 10 m
Antenna Height : 30 m

Station Name : Sylhet
Site Elevation : 14 m
Antenna Height : 40 m

Project Name : FFWS (Figure 1.6)

TERRAIN PROFILE

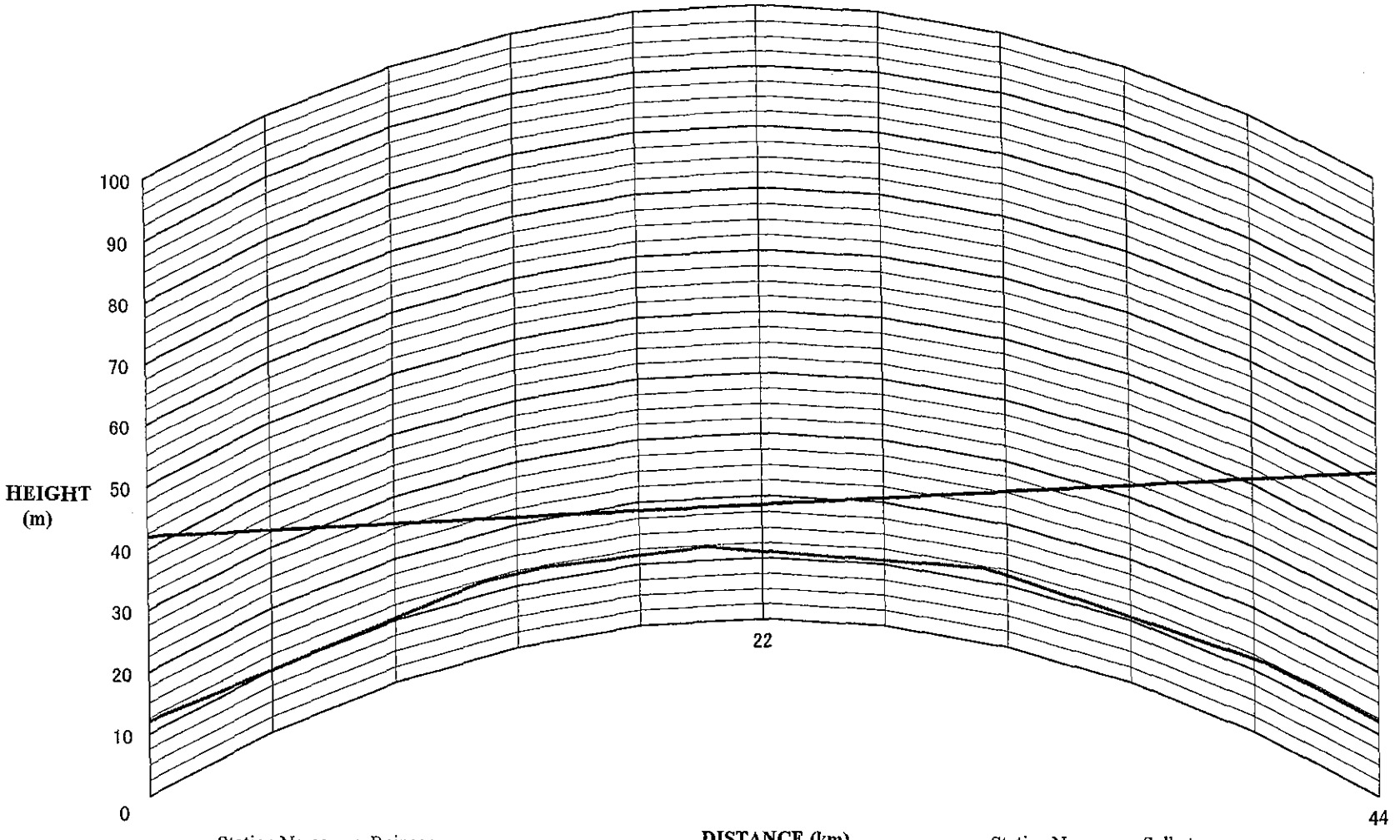


Station Name : Chatlaghat
Site Elevation : 18 m
Antenna Height : 10 m

Station Name : Rajnagar
Site Elevation : 10 m
Antenna Height : 30 m

Project Name : FFWS(Figure1.7)

TERRAIN PROFILE



Station Name : Rajnagar
Site Elevation : 12 m
Antenna Height : 30 m

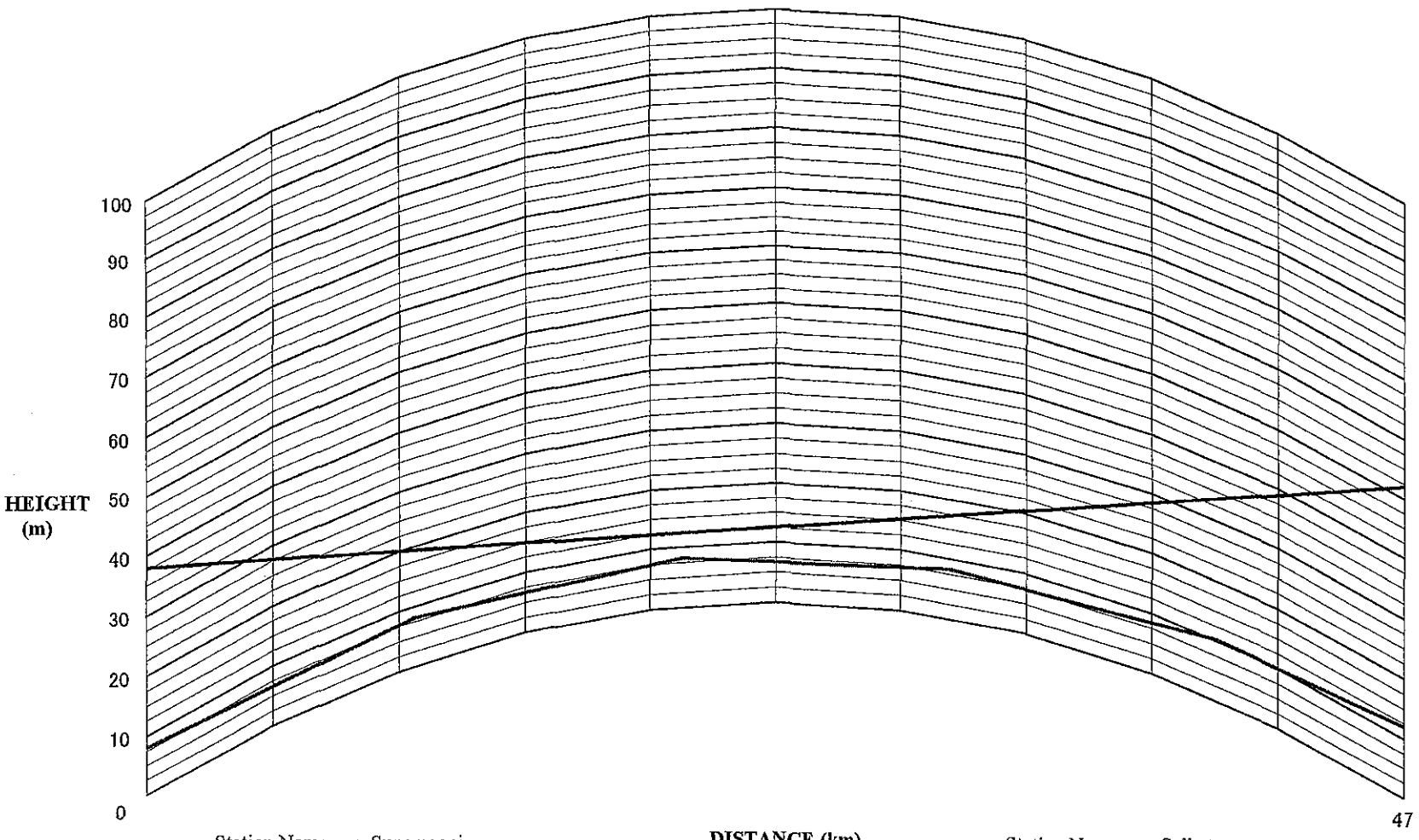
DISTANCE (km)

44 (km)

Station Name : Sylhet
Site Elevation : 12 m
Antenna Height : 40 m

Project Name : FFWS (Figure1.8)

TERRAIN PROFILE



Station Name : Sunamganj
Site Elevation : 8 m
Antenna Height : 30 m

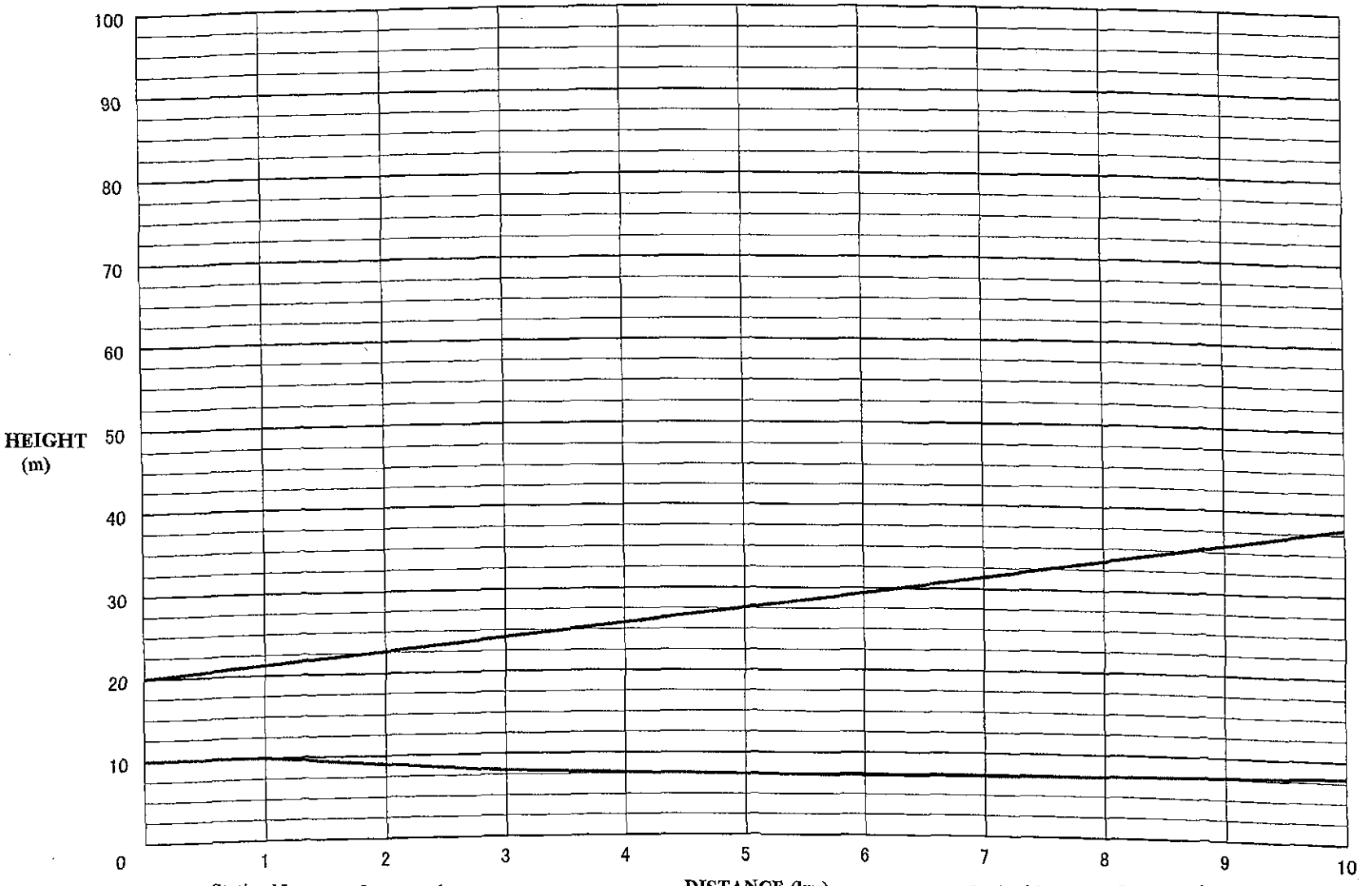
DISTANCE (km)

47 (km)

Station Name : Sylhet
Site Elevation : 12 m
Antenna Height : 40 m

Project Name : FFWS (Figure1.9)

TERRAIN PROFILE



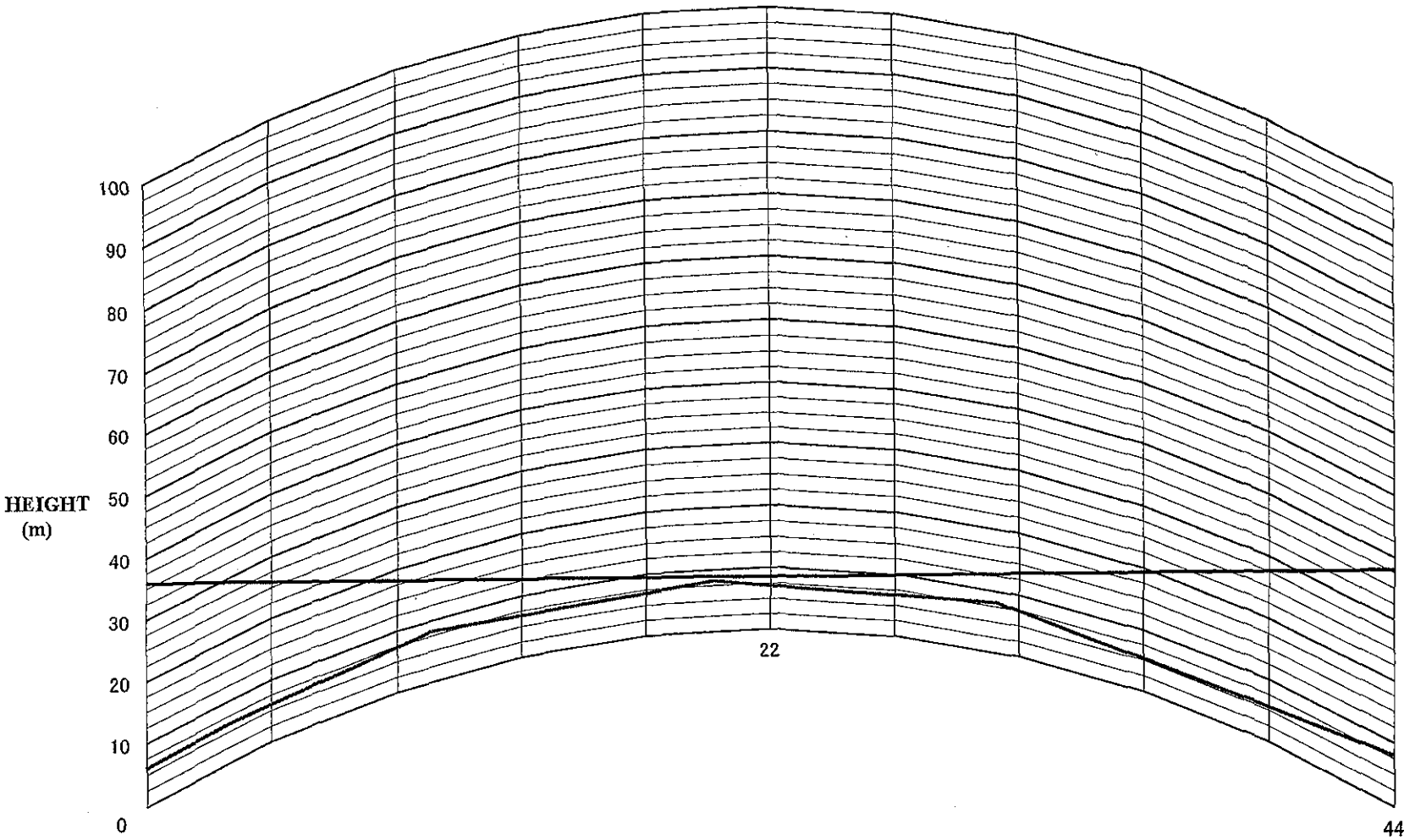
Station Name : Laurergarh
Site Elevation : 10 m
Antenna Height : 10 m

10 (km)

Station Name : Sunamganj
Site Elevation : 8 m
Antenna Height : 30 m

Project Name : FFWS (Figure 1.10)

TERRAIN PROFILE

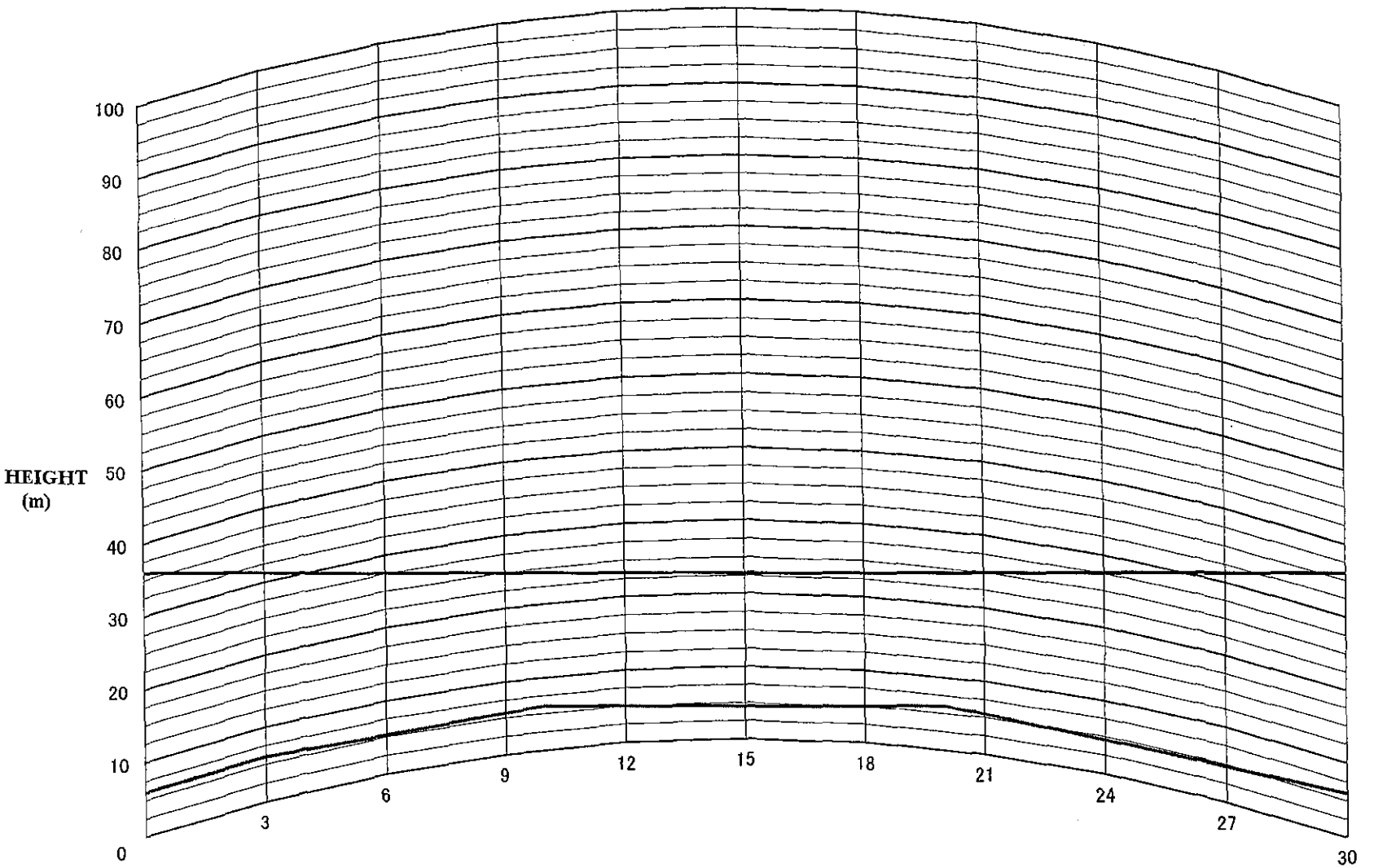


Station Name : Dhamapsha
Site Elevation : 6 m
Antenna Height : 30 m

Station Name : Sunamganj
Site Elevation : 8 m
Antenna Height : 30 m

Project Name : FFWS (Figure 1.11)

TERRAIN PROFILE



Station Name : Netrakona
Site Elevation : 6 m
Antenna Height : 30 m

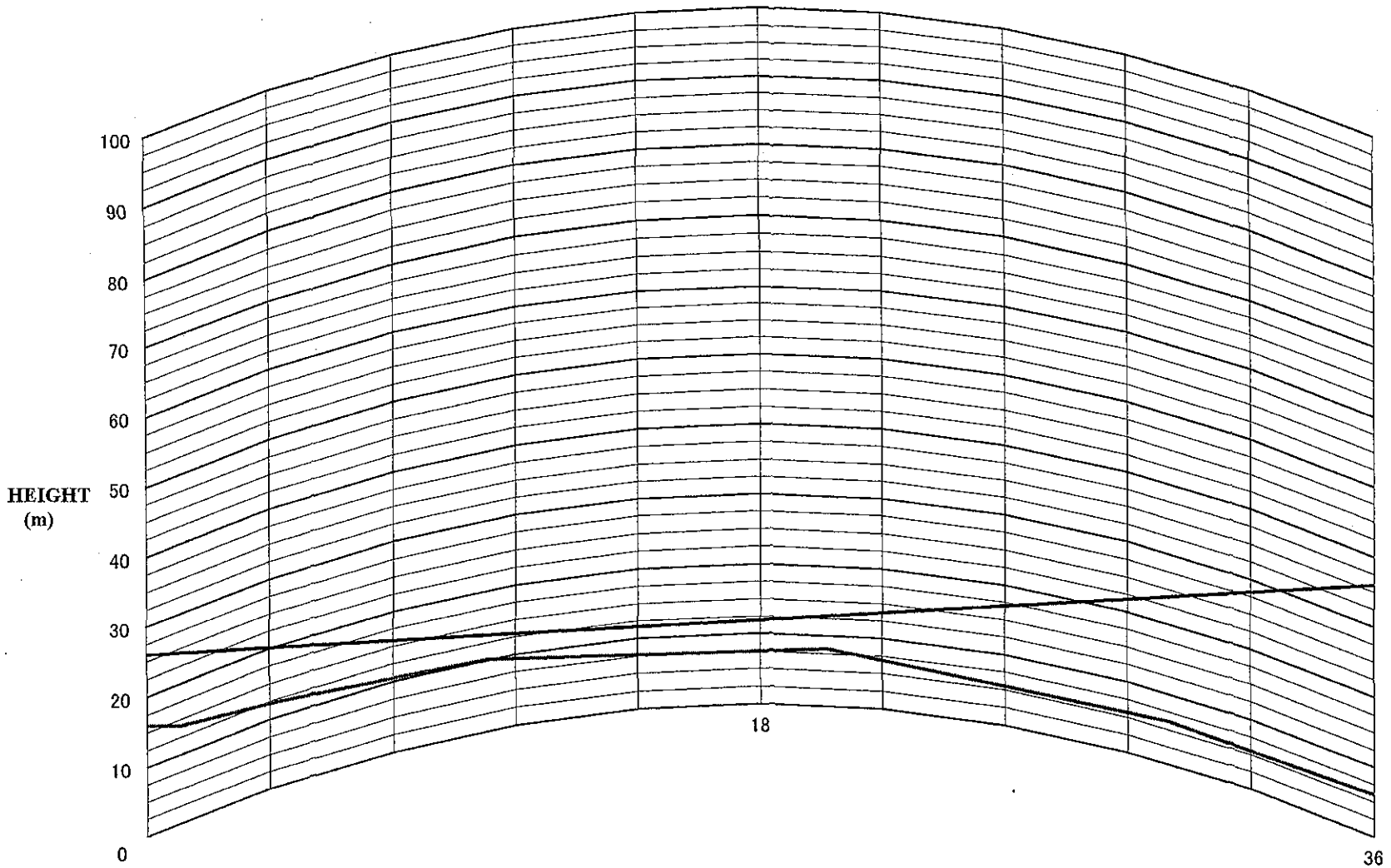
DISTANCE (km)

30 (km)

Station Name : Dhamapsha
Site Elevation : 6 m
Antenna Height : 30 m

Project Name : FFWS (Figure 1.12)

TERRAIN PROFILE

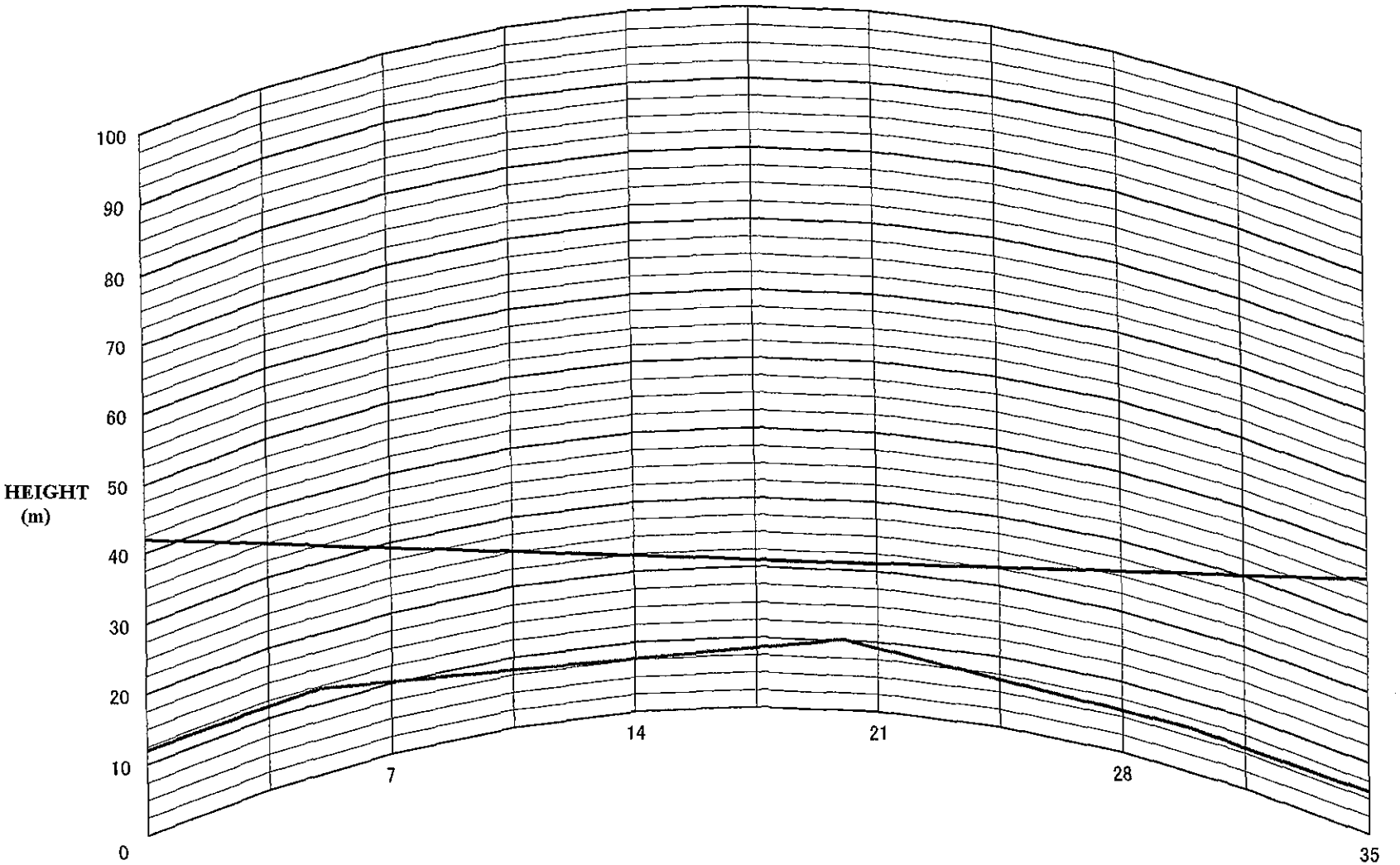


Station Name : Durgapur
Site Elevation : 16 m
Antenna Height : 10 m

Station Name : Netrakona
Site Elevation : 6 m
Antenna Height : 30 m

Project Name : FFWS (Figure 1.13)

TERRAIN PROFILE



Station Name : Phulpur
Site Elevation : 12 m
Antenna Height : 30 m

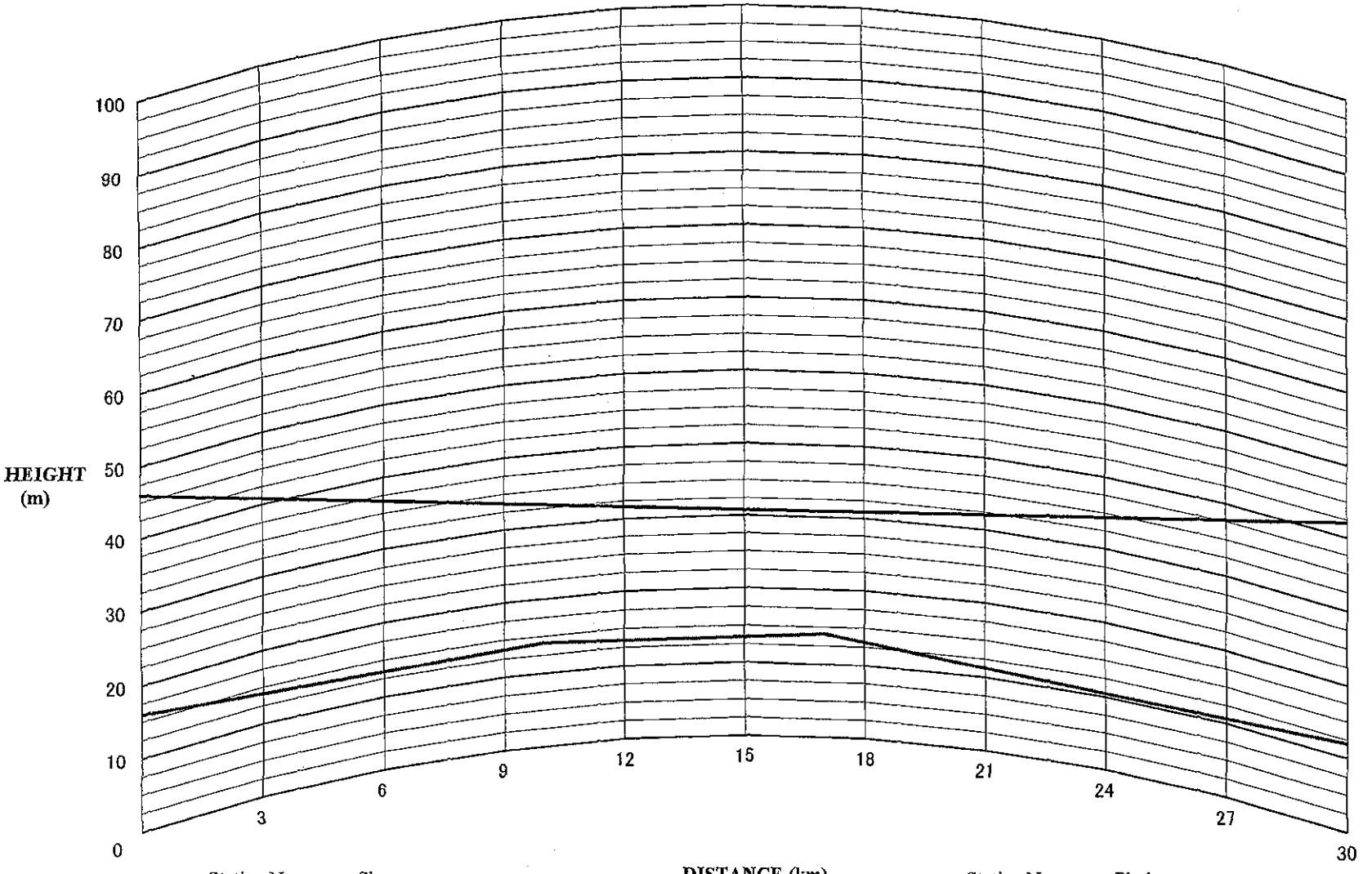
DISTANCE (km)

35 (km)

Station Name : Netrakona
Site Elevation : 6 m
Antenna Height : 30 m

Project Name : FFWS (Figure 1.14)

TERRAIN PROFILE



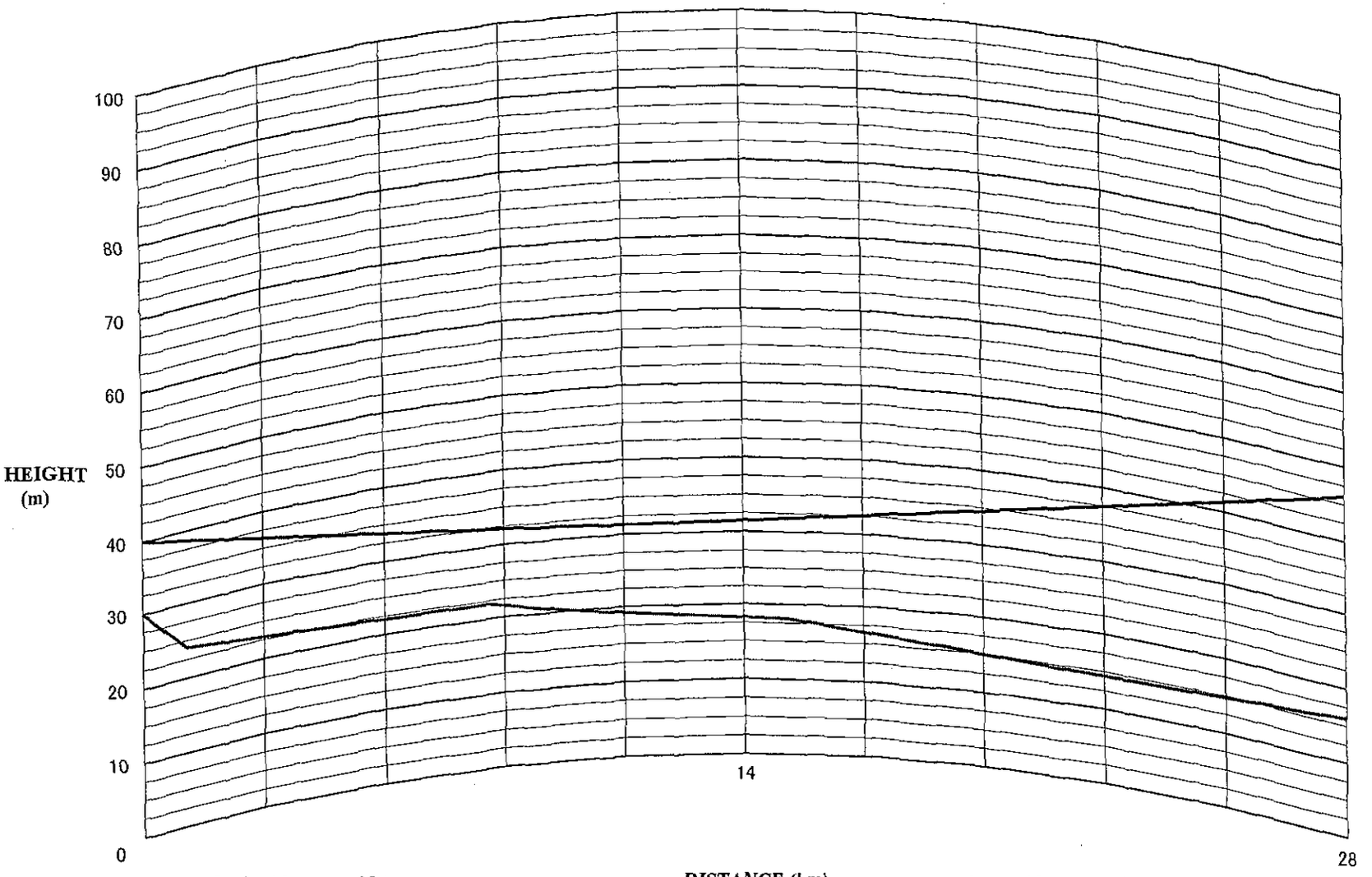
Station Name : Sherpur
Site Elevation : 16 m
Antenna Height : 30 m

30 (km)

Station Name : Phulpur
Site Elevation : 12 m
Antenna Height : 30 m

Project Name : FFWS (Figure1.15)

TERRAIN PROFILE



Station Name : Nakugaon
Site Elevation : 30 m
Antenna Height : 10 m

DISTANCE (km)

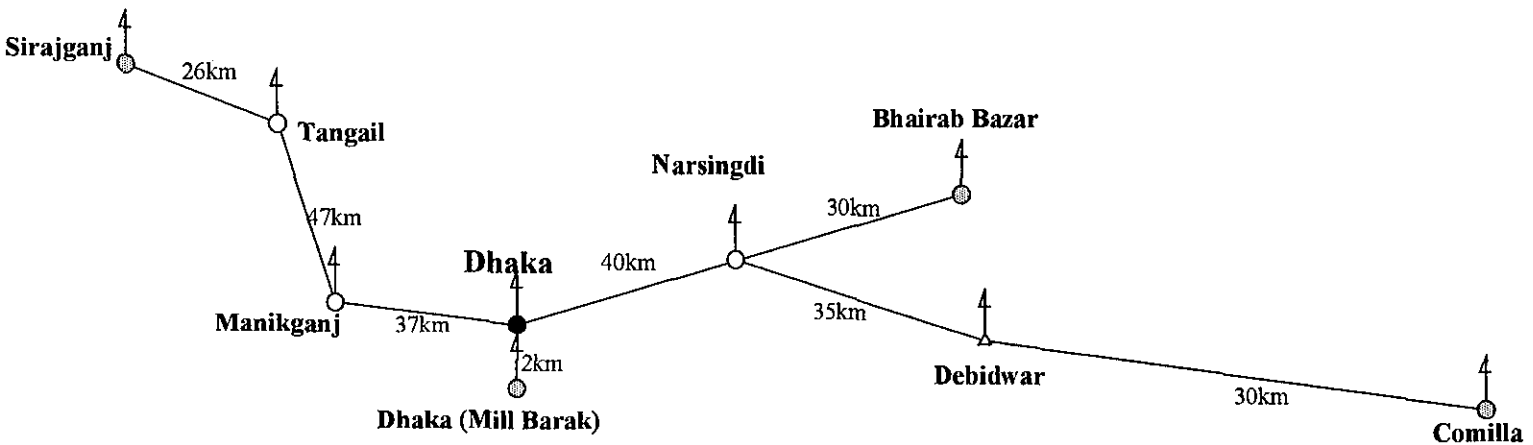
28 (km)

Station Name : Sherpur
Site Elevation : 16 m
Antenna Height : 30 m

2. REGION –NC (DHAKA)

JAPAN INTERNATIONAL COOPERATION AGENCY

Feasibility Study for Improvement of Flood Forecasting and Warning Services in the People's Republic of Bangladesh



Legend

●	Divisional Office
○	*Repeater Station* (O&M Office)
△	Repeater Station (Upazila)
◎	Telemetric Gauging Station
———	BWDB VHF Link

Antenna Type and Height

Station	Antenna Type	Height [m]
Bhairab Bazar	5EL Yagi	10
Comilla	5EL Yagi	10
Debidwar	3EL colinear	20
Dhaka	3EL colinear	45 *
Dhaka (Mill Barak)	5EL Yagi	10
Manikganj	3EL colinear	40
Narsingdi	3EL colinear	20
Sirajganj	5EL Yagi	10
Tangail	3EL colinear	40

Remarks *: 40m (Height of FFWC building) + 5m

Figure 2

Telemeter Network Diagram (Region-NC)

Table 2.1: Radio Design Sheet
Narsingdi to Dhaka

No	Design item		Abb.	Unit	Distance 40.0 km Design value		Value	Unit	Remark
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		10	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-108.8	f	166	MHz	
3	Adds	Diffraction Loss	Lps	dB	0				**From Profile (Figure 2.1)**
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-2.3		55	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-1.3		30	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	5.0				3element colinear
6	Antenna Gain(R)		Gar	dB	5.0				3element colinear
7	Receiving Power		Pr	dBm	-76.9				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	36.1				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Prni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Prne	dBm			10	dB	Noise deterioration
11	Receiver Noise Power: 1/(Prni)+1/(Prne)		Prn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	38.3				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	47.4		39.5		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	7.0				
16	**S/N at Fading**		S/Nfd	dB	**40.4**				No.14-15
17	Threshold Level : Prn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	17.4				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	10.4				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 2.2: Radio Design Sheet
Debidwar to Narsingdi

No	Design item		Abb.	Unit	Distance / Design value		Value	Unit	Remark
					Distance		*35.0*	km	
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		*10*	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-107.7	f	*166*	MHz	
3	Adds	Diffraction Loss	Lps	dB	*0*				**From Profile (Figure 2.2)**
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-1.3		*30*	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-1.3		*30*	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	*5.0*				*3 elements colinear*
6	Antenna Gain(R)		Gar	dB	*5.0*				*3 elements colinear*
7	Receiving Power		Pr	dBm	-74.8				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	38.2				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Prni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Prne	dBm			*10*	dB	Noise deterioration
11	Receiver Noise Power: 1/(Prni)+1/(Prne)		Prn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	40.4				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	49.5		39.0		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	6.5				
16	**S/N at Fading**		S/Nfd	dB	**43.0**				No.14-15
17	Threshold Level : Prn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	19.5				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	13.0				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 2.3: Radio Design Sheet
Comilla To Debidwar

No	Design item		Abb.	Unit	Distance / Design value		Value	Unit	Remark
							30.0	km	
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		*10*	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-106.3	f	166	MHz	
3	Adds	Diffraction Loss	Lps	dB	*0*				**From Profile (Figure 2.3)**
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	*tf*	*dB*	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-0.9		*20*	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-1.3		*30*	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	*9.5*				*5 elements Yagi*
6	Antenna Gain(R)		Gar	dB	*5.0*				*3 elements colinear*
7	Receiving Power		Pr	dBm	-68.5				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	44.5				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Prni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Prne	dBm			*10*	dB	Noise deterioration
11	Receiver Noise Power: 1/(Prni)+1/(Prne)		Prn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	46.7				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	55.8		38.5		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	6.0				
16	**S/N at Fading**		S/Nfd	dB	**49.8**				No.14-15
17	Threshold Level : Prn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	25.8				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	19.8				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 2.4: Radio Design Sheet
Bhairab Bazar To Narsingdi

No	Design item		Abb.	Unit	Distance 30.0 km Design value		Value	Unit	Remark
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		10	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-106.3	f	166	MHz	
3	Adds	Diffraction Loss	Lps	dB	0				From Profile (Figure 2.4)
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-0.9		20	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-1.3		30	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	9.5				5 element yagi
6	Antenna Gain(R)		Gar	dB	5.0				3 element colinear
7	Receiving Power		Pr	dBm	-68.5				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	44.5				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Pmi	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Pne	dBm			10	dB	Noise deterioration
11	Receiver Noise Power: 1/(Pmi)+1/(Pne)		Pn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	46.7				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	55.8		38.5		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	6.0				
16	**S/N at Fading**		S/Nfd	dB	**49.8**				No.14-15
17	Threshold Level : Pn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	25.8				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	19.8				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 2.5: Radio Design Sheet
Dhaka (Mill Barak) To Dhaka

No	Design item		Abb.	Unit	Distance 2.0 km Design value		Value	Unit	Remark
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		10	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-82.8	f	166	MHz	
3	Adds	*Diffraction Loss*	Lps	dB	0				**From Profile (Figure 2.5)**
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-0.9		20	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-2.3		55	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	9.5				*5 elements Yagi*
6	Antenna Gain(R)		Gar	dB	5.0				*3 element colinear*
7	Receiving Power		Pr	dBm	-46.0				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	67.0				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Prni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Prne	dBm			10	dB	Noise deterioration
11	Receiver Noise Power: 1/(Prni)+1/(Prne)		Prn	dBm	-115.2				
12	*S/N at High Frequency*		*C/N*	*dB*	69.2				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	78.3		35.7		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	3.2				
16	**S/N at Fading**		S/Nfd	dB	**75.1**				No.14-15
17	Threshold Level : Prn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	48.3				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	45.1				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 2.6: Radio Design Sheet
Manikganj to Dhaka

No	Design item		Abb.	Unit	Distance / Design value		Value	Unit	Remark
					Distance		37.0	km	
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		10	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-108.2	f	166	MHz	
3	Adds	Diffraction Loss	Lps	dB	0				**From Profile (Figure 2.6)**
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-2.1		50	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-2.3		55	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	5.0				*3 elements colinear*
6	Antenna Gain(R)		Gar	dB	5.0				*3 elements colinear*
7	Receiving Power		Pr	dBm	-77.1				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	35.9				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Prni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Prne	dBm			10	dB	Noise deterioration
11	Receiver Noise Power: 1/(Prni)+1/(Prne)		Prn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	38.1				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	47.3		39.2		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	6.7				
16	**S/N at Fading**		S/Nfd	dB	**40.6**				No.14-15
17	Threshold Level : Prn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	17.3				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	10.6				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 2.7: Radio Design Sheet
Tangail to Manikganj

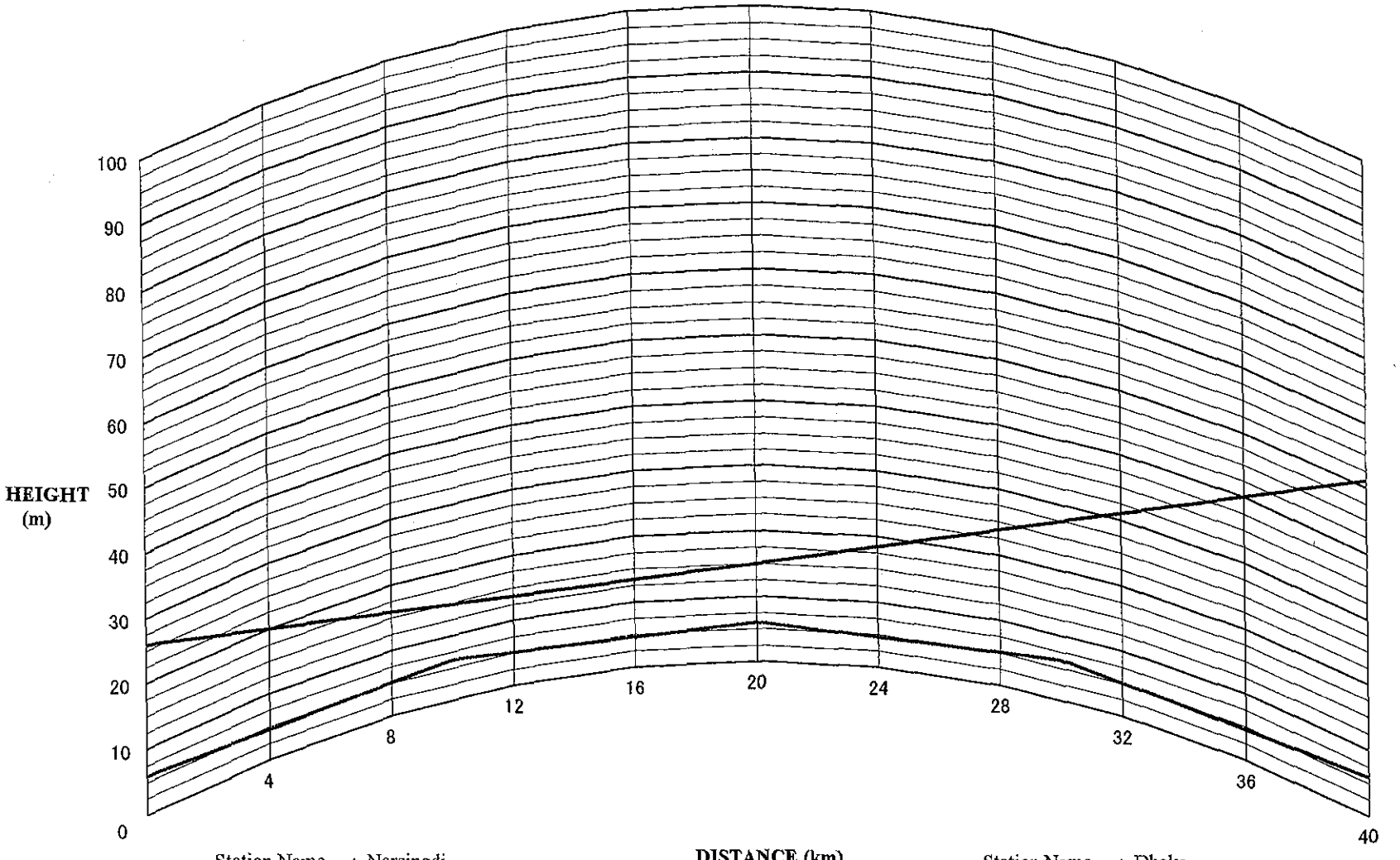
No	Design item		Abb.	Unit	Distance 47.0 km Design value		Value	Unit	Remark
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		10	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-110.2	f	166	MHz	
3	Adds	Diffraction Loss	Lps	dB	0				**From Profile (Figure 2.7)**
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-2.1		50	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-2.1		50	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	5.0				*3 elements colinear*
6	Antenna Gain(R)		Gar	dB	5.0				*3 elements colinear*
7	Receiving Power		Pr	dBm	-78.9				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0db μV=-113dBm			dB μV	34.1				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Prni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Prne	dBm			10	dB	Noise deterioration
11	Receiver Noise Power: 1/(Prni)+1/(Prne)		Prn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	36.3				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	45.4		40.2		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	7.7				
16	**S/N at Fading**		S/Nfd	dB	**37.7**				No.14-15
17	Threshold Level : Prn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	15.4				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	7.7				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 2.8: Radio Design Sheet
Sirajganj to Tangail

No	Design item		Abb.	Unit	Distance / Design value		Value	Unit	Remark
							26.0	km	
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		*10*	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-105.1	f:	166	MHz	
3	Adds Loss	Diffraction Loss	Lps	dB	*0*				**From Profile (Figure 2.8)**
		Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant. sys. Loss	Feeder Loss(T)	Lft	dB	-0.9		*20*	m	10D-2V: 0.041dB
		Feeder Loss(R)	Lfr	dB	-2.1		*50*	m	10D-2V: 0.041dB
		Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	*9.5*				*5 elements colinear*
6	Antenna Gain(R)		Gar	dB	*5.0*				*3 elements yagi*
7	Receiving Power		Pr	dBm	-68.1				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	44.9				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Prni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Prne	dBm			*10*	dB	Noise deterioration
11	Receiver Noise Power: 1/(Prni)+1/(Prne)		Prn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	47.1				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	56.2		38.1		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	5.6				
16	**S/N at Fading**		S/Nfd	dB	**50.6**				No.14-15
17	Threshold Level : Prn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	26.2				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	20.6				No.18-15
20	Result				OK				**No.16>34.5dB**

Project Name : FFWS (Figure 2.1)

TERRAIN PROFILE

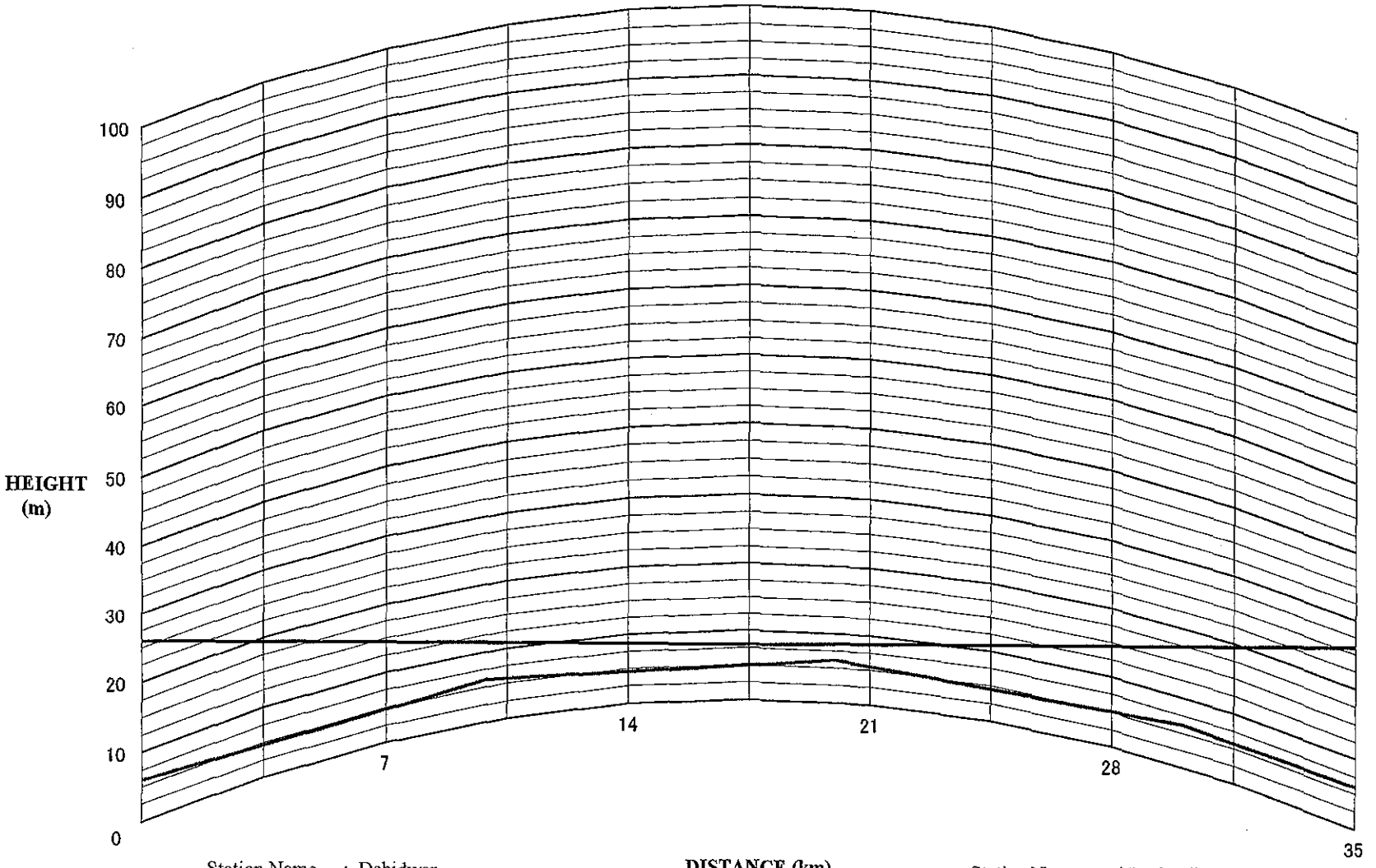


Station Name : Narsingdi
Site Elevation : 6 m
Antenna Height : 20 m

Station Name : Dhaka
Site Elevation : 6 m
Antenna Height : 45 m

Project Name : FFWS (Figure 2.2)

TERRAIN PROFILE

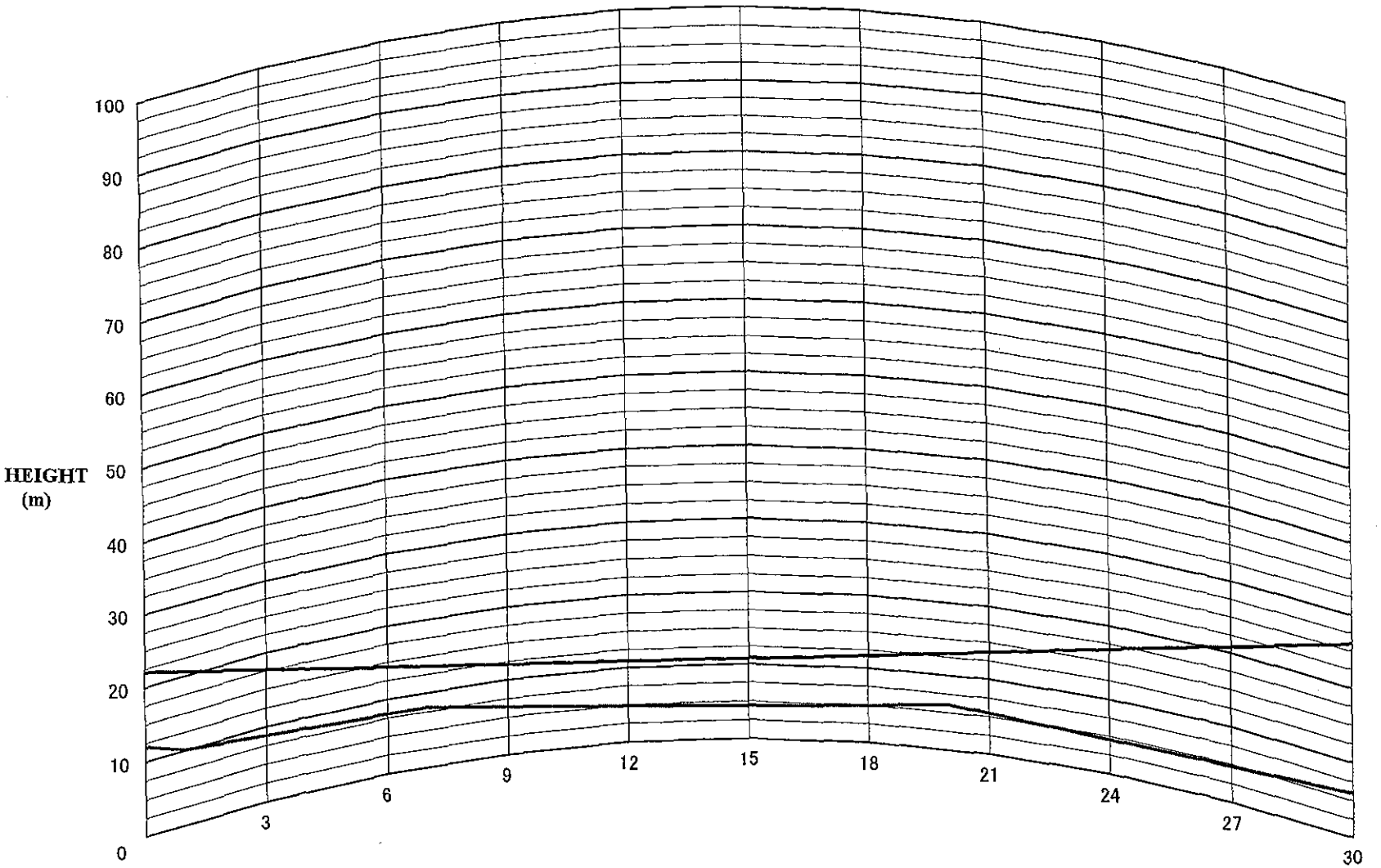


Station Name : Debidwar
Site Elevation : 6 m
Antenna Height : 20 m

Station Name : Narsingdi
Site Elevation : 6 m
Antenna Height : 20 m

Project Name : FFWS (Figure 2.3)

TERRAIN PROFILE

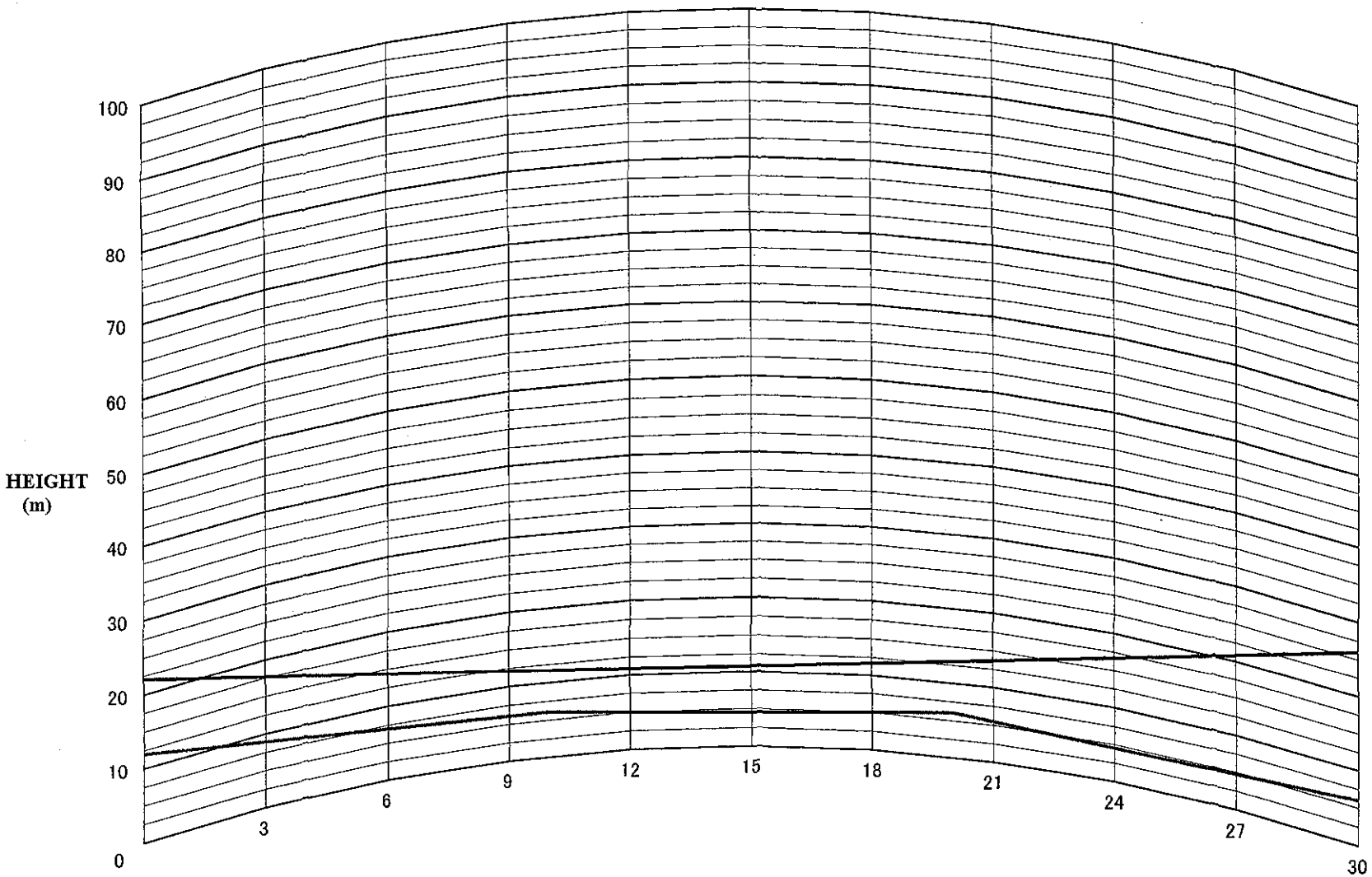


Station Name : Comilla
Site Elevation : 12 m
Antenna Height : 10 m

Station Name : Debidwar
Site Elevation : 6 m
Antenna Height : 20 m

Project Name : FFWS (Figure 2.4)

TERRAIN PROFILE

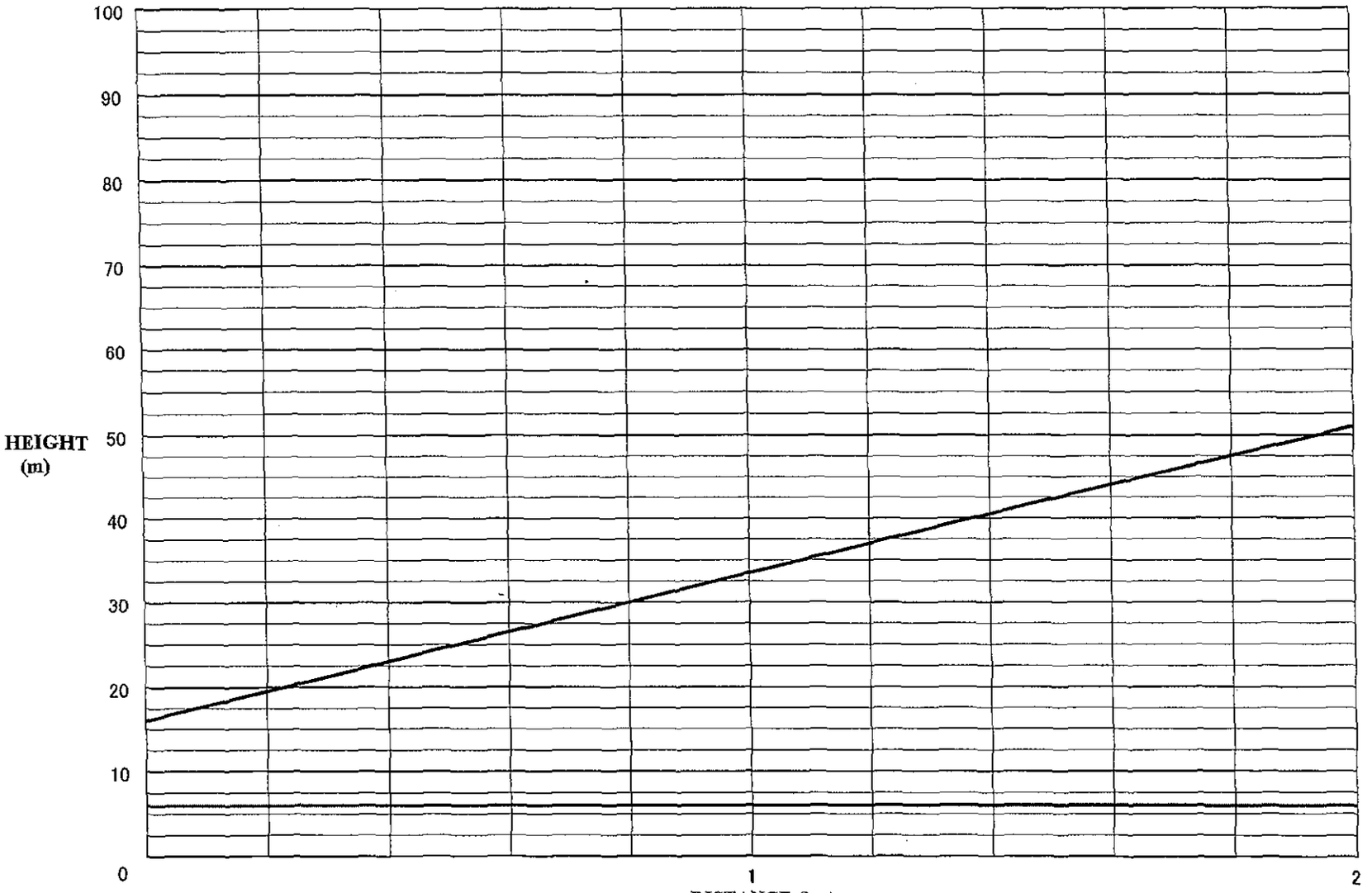


Station Name : Bhairab Bazar
Site Elevation : 12 m
Antenna Height : 10 m

Station Name : Narsingdi
Site Elevation : 6 m
Antenna Height : 20 m

Project Name : FFWS (Figure 2.5)

TERRAIN PROFILE



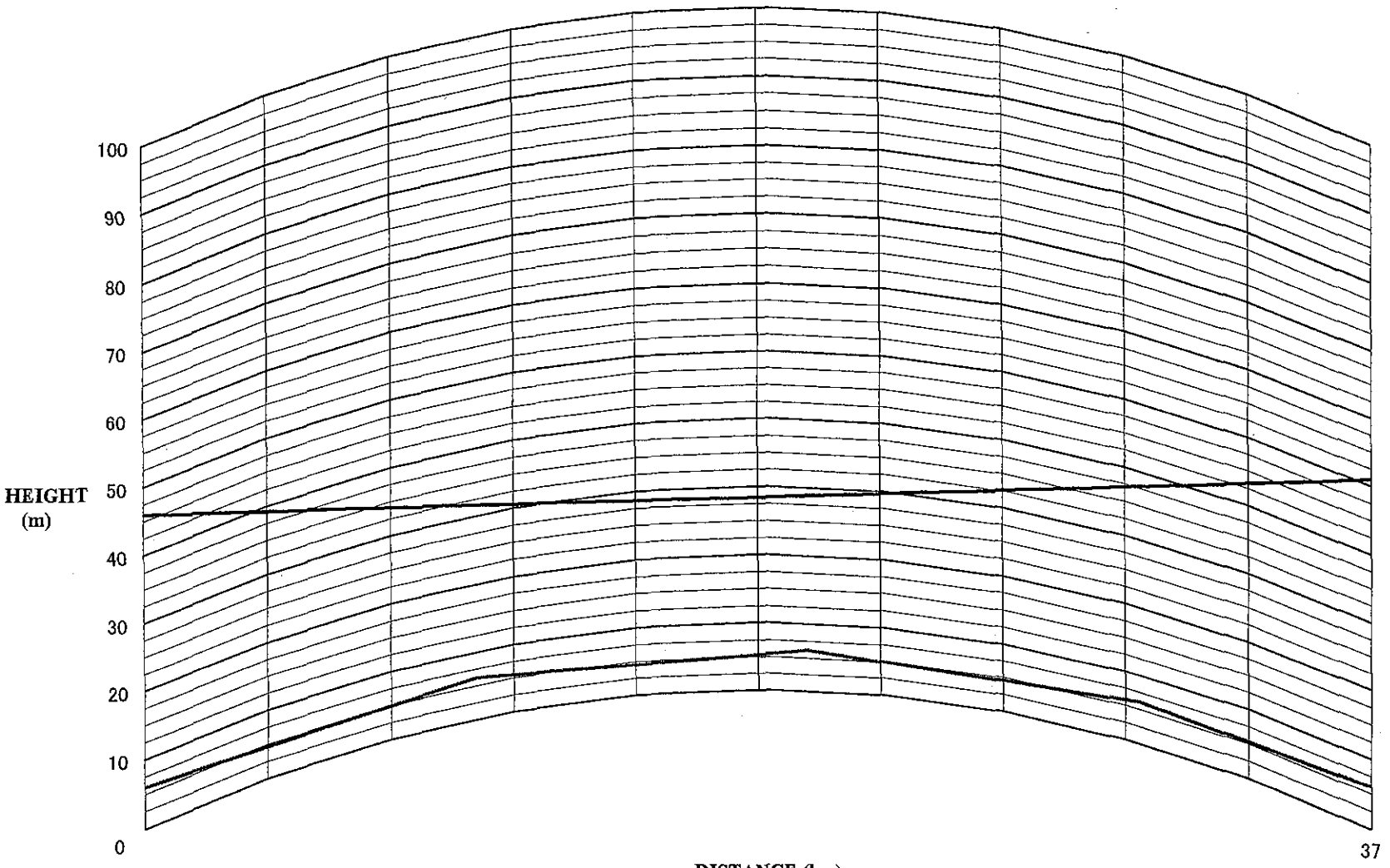
Station Name : Dhaka(Mill Barak)
Site Elevation : 6 m
Antenna Height : 10 m

2 (km)

Station Name : Dhaka
Site Elevation : 6 m
Antenna Height : 45 m

Project Name : FFWS (Figure 2.6)

TERRAIN PROFILE



Station Name : Manikganj
Site Elevation : 6 m
Antenna Height : 40 m

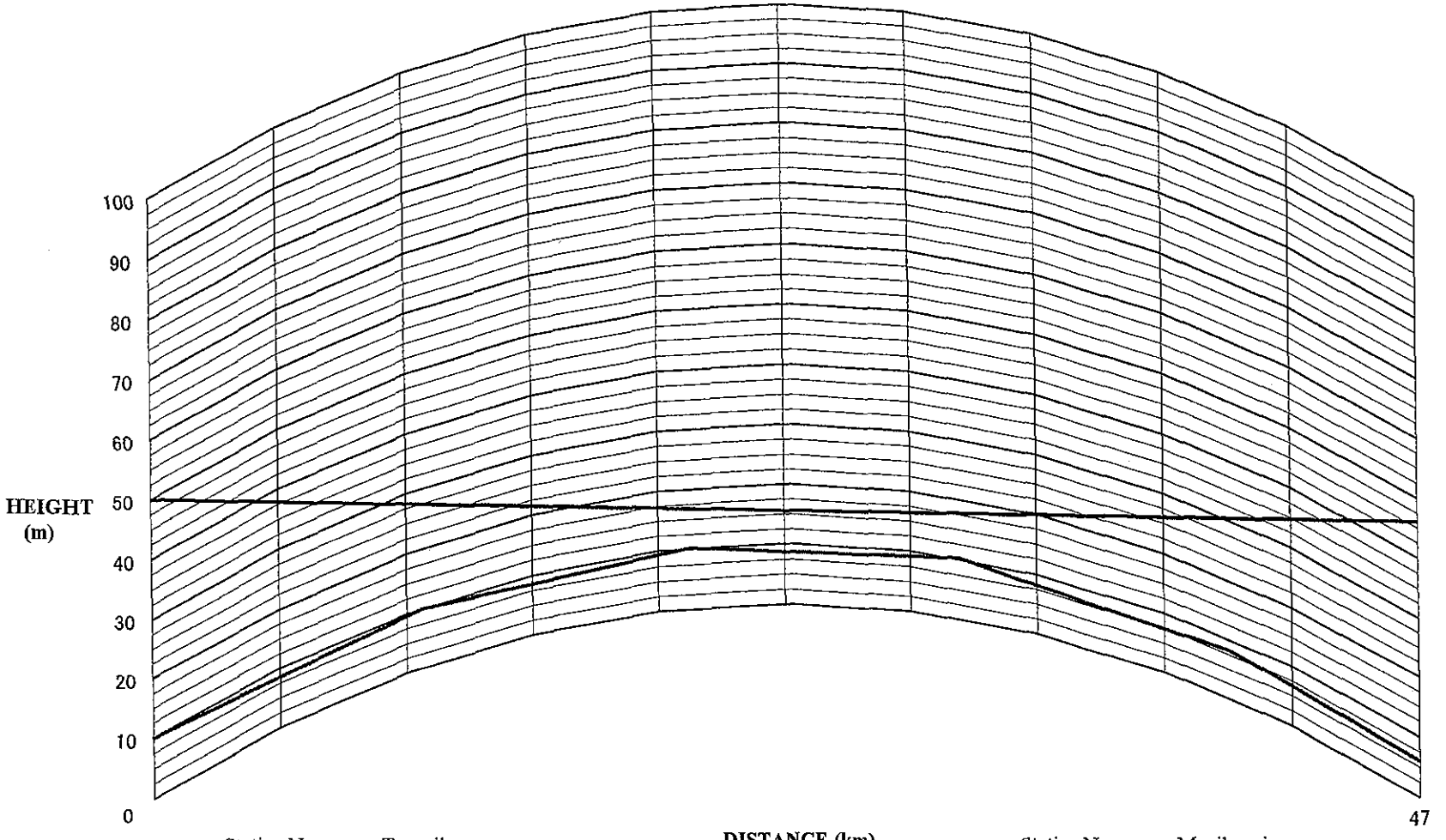
DISTANCE (km)

37 (km)

Station Name : Dhaka
Site Elevation : 6 m
Antenna Height : 45 m

Project Name : FFWS (Figure 2.7)

TERRAIN PROFILE



Station Name : Tangail
Site Elevation : 10 m
Antenna Height : 40 m

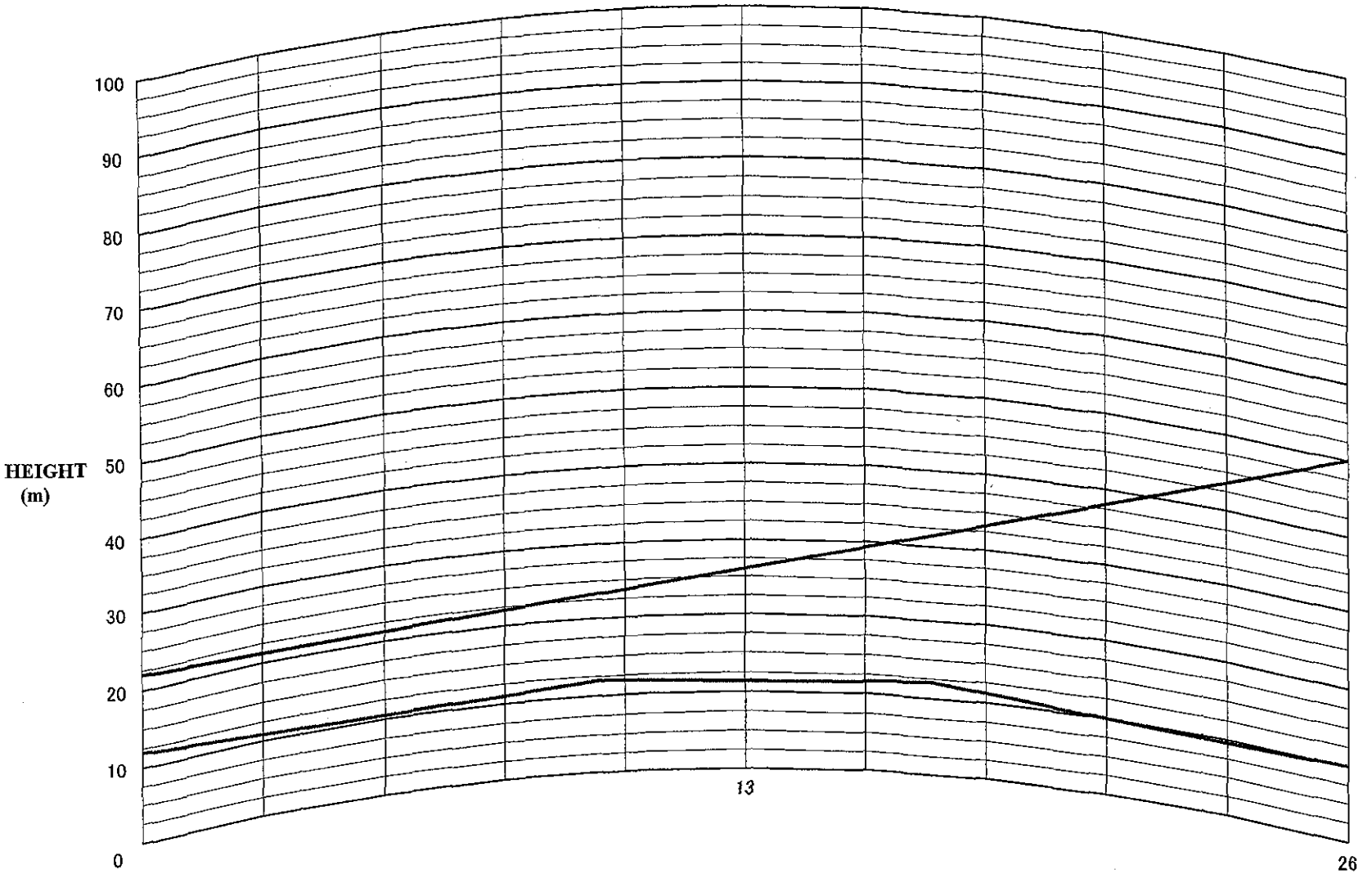
DISTANCE (km)

47 (km)

Station Name : Manikganj
Site Elevation : 6 m
Antenna Height : 40 m

Project Name : FFWS (Figure2.8)

TERRAIN PROFILE

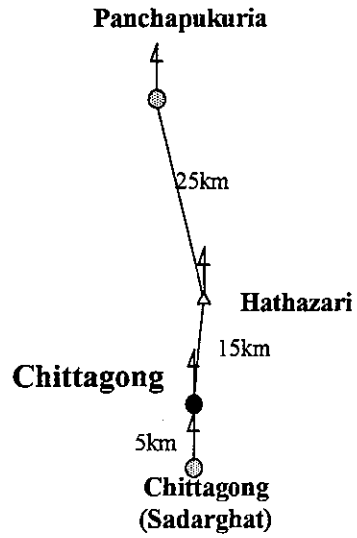


Station Name : Sirajganj
Site Elevation : 12 m
Antenna Height : *10* m

26 (km)

Station Name : Tangail
Site Elevation : 10 m
Antenna Height : 40 m

3. REGION –SE (CHITTAGONG)



Antenna Type and Height

Station	Antenna Type	Height [m]
Chittagong	3EL colinear	30
Hathazari	3EL colinear	20
Panchapukuria	5EL Yagi	10
Chittagong(Sadarghat)	5EL Yagi	10

Legend

●	Divisional Office
○	Repeater Station (O&M Office)
△	Repeater Station (Upazila)
◍	Telemetric Gauging Station
———	BWDB VHF Link

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Figure 3

Telemeter Network Diagram (Region-SE)

Table 3.1: Radio Design Sheet
Panchapukuria To Hathazari

No	Design item		Abb.	Unit	Distance 25.0 km Design value		Value	Unit	Remark
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		10	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-104.8	f	166	MHz	
3	Adds Loss	*Diffraction Loss*	*Lps*	*dB*	0				**From Profile (Figure 3.1)**
		Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant. sys. Loss	Feeder Loss(T)	Lft	dB	-0.9		20	m	10D-2V: 0.041dB
		Feeder Loss(R)	Lfr	dB	-1.3		30	m	10D-2V: 0.041dB
		Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	9.5				*5 element yage*
6	Antenna Gain(R)		Gar	dB	5.0				*3element colinear*
7	Receiving Power		Pr	dBm	-67.0				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	46.0				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Prni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	*External Noise Power: dBμV-113*		Prne	dBm			10	dB	Noise deterioration
11	Receiver Noise Power: 1/(Prni)+1/(Prne)		Prn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	48.2				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	57.4		38.0		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	5.5				
16	**S/N at Fading**		S/Nfd	dB	**51.9**				No.14-15
17	Threshold Level : Prn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	27.4				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	21.9				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 3.2: Radio Design Sheet
Hathazari to Chittagong

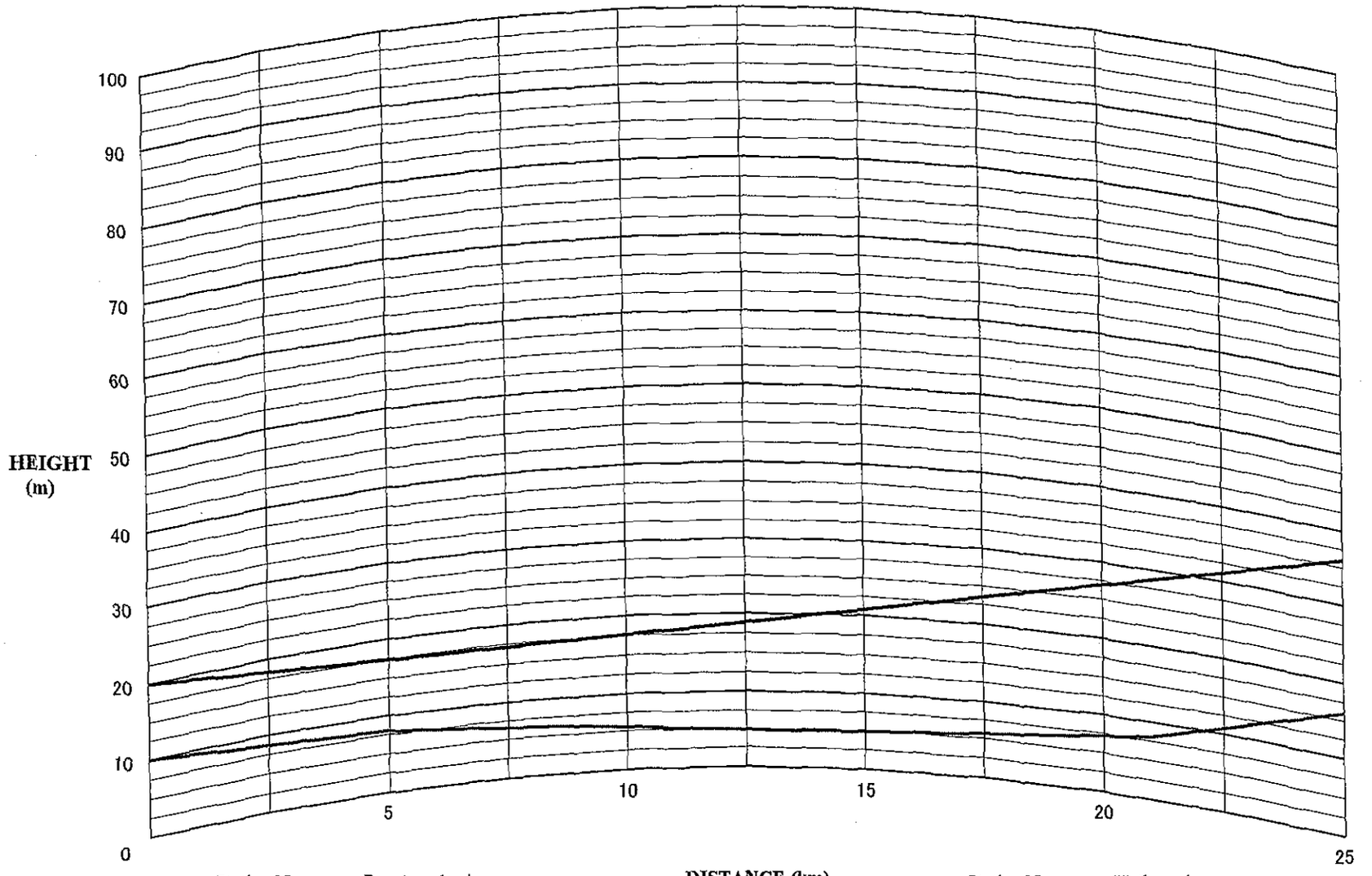
No	Design item		Abb.	Unit	Distance / Design value		Value	Unit	Remark
							15.0	km	
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		*10*	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-100.3	f	166	MHz	
3	Adds	Diffraction Loss	Lps	dB	*0*				**From Profile (Figure 3.2)**
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-1.3		*30*	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-1.7		*40*	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	*5.0*				*3element colinear*
6	Antenna Gain(R)		Gar	dB	*5.0*				*3element colinear*
7	Receiving Power		Pr	dBm	-67.8				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	45.2				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Prni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Prne	dBm			*10*	dB	Noise deterioration
11	Receiver Noise Power: 1/(Prni)+1/(Prne)		Prn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	47.4				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	56.5		37.0		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	4.5				
16	**S/N at Fading**		S/Nfd	dB	**52.0**				No.14-15
17	Threshold Level : Prn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	26.5				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	22.0				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 3.3: Radio Design Sheet
Chittagong (Sadarghat) To Chittagong

No	Design item		Abb.	Unit	Distance / Design value		Value	Unit	Remark
							5.0	km	
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		10	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-90.8	f	166	MHz	
3	Adds Loss	Diffraction Loss	Lps	dB	0				From Profile (Figure 3.3)
		Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant. sys. Loss	Feeder Loss(T)	Lft	dB	-1.7		40	m	10D-2V: 0.041dB
		Feeder Loss(R)	Lfr	dB	-0.9		20	m	10D-2V: 0.041dB
		Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	9.5				5 elements Yagi
6	Antenna Gain(R)		Gar	dB	5.0				3element colinear
7	Receiving Power		Pr	dBm	-53.4				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	59.6				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Prni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Prne	dBm			10	dB	Noise deterioration
11	Receiver Noise Power: 1/(Prni)+1/(Prne)		Prn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	61.8				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	70.9		36.0		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	3.5				
16	**S/N at Fading**		S/Nfd	dB	**67.4**				No.14-15
17	Threshold Level : Prn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	40.9				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	37.4				No.18-15
20	Result				OK				**No.16>34.5dB**

Project Name : FFWS (Figure 3.1)

TERRAIN PROFILE



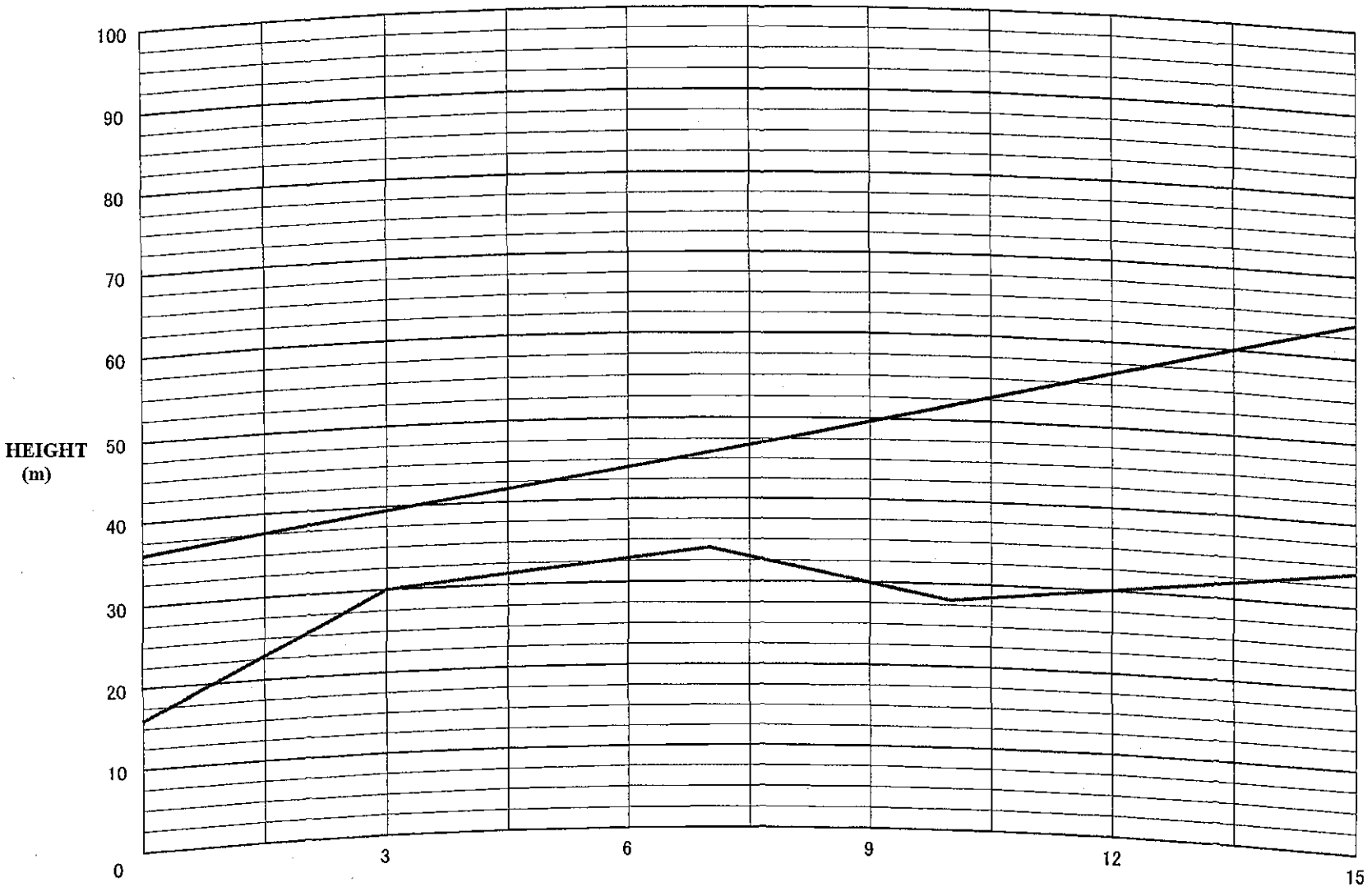
Station Name : Panchapukuria
Site Elevation : 10 m
Antenna Height : 10 m

25 (km)

Station Name : Hathazari
Site Elevation : 16 m
Antenna Height : 20 m

Project Name : FFWS (Figure 3.2)

TERRAIN PROFILE

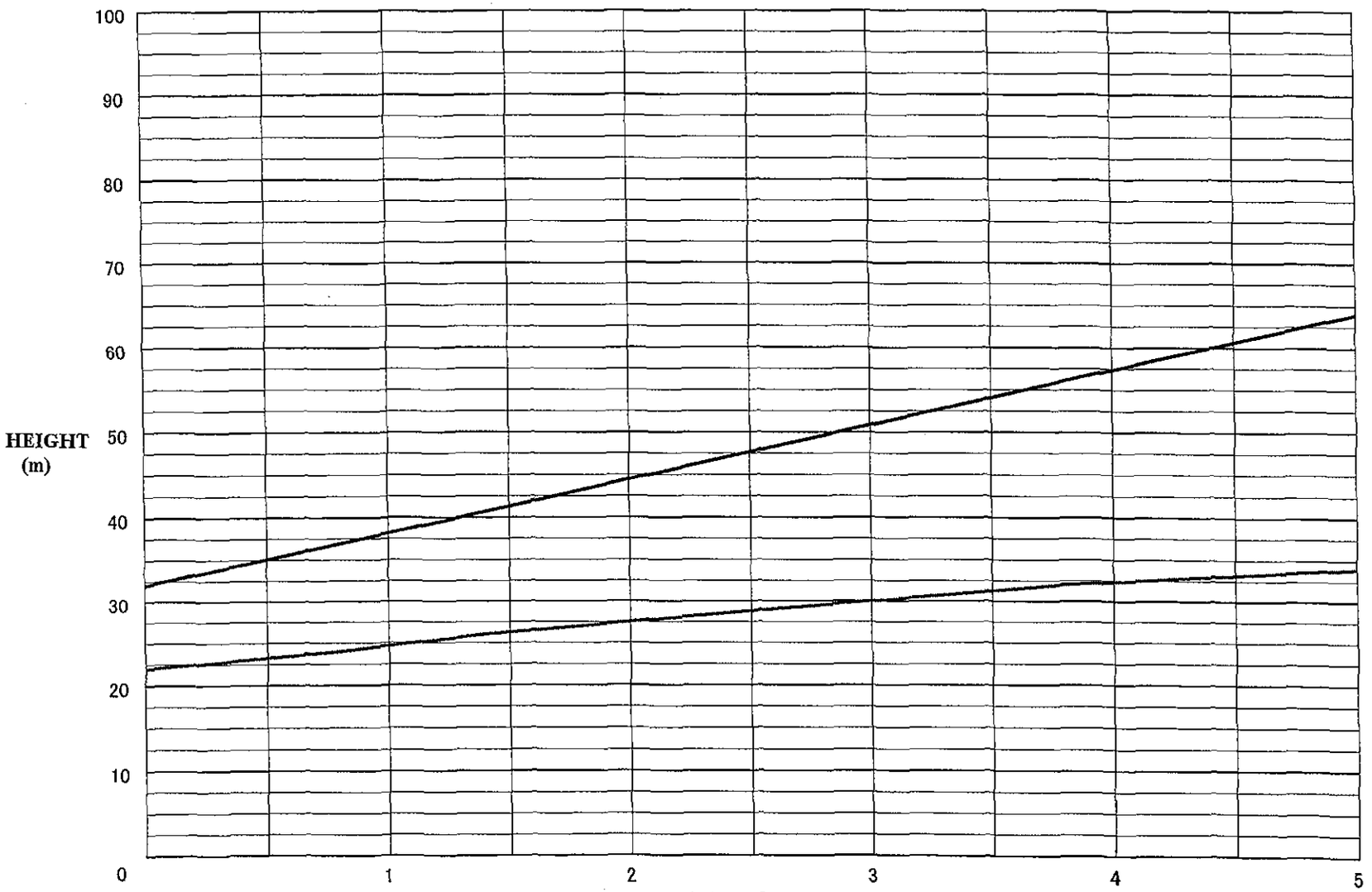


Station Name : Hathazari
Site Elevation : 16 m
Antenna Height : 20 m

Station Name : Chittagong
Site Elevation : 34 m
Antenna Height : 30 m

Project Name : FFWS (Figure 3.3)

TERRAIN PROFILE



Station Name : Chittagong (Sadarghat)
Site Elevation : 22 m
Antenna Height : 10 m

Station Name : Chittagong
Site Elevation : 34 m
Antenna Height : 30 m

4. REGION –SW (BARISAL)

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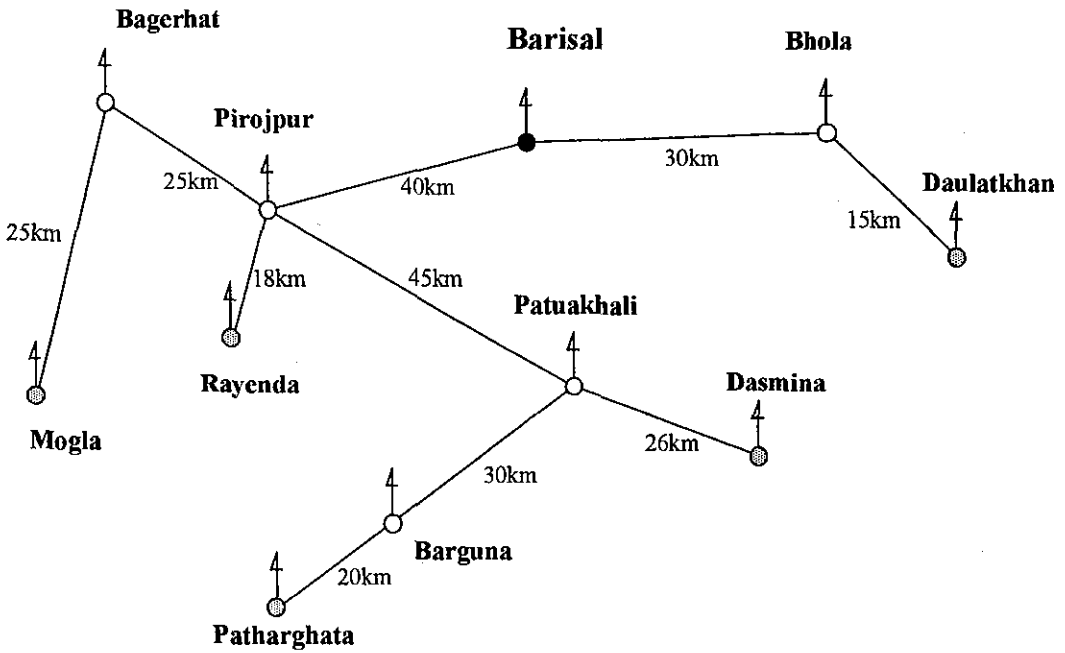
Figure 4

Telemeter Network Diagram (Region-SW)



Legend

●	Divisional Office
○	Repeater Station (O&M Office)
◍	Telemetric Gauging Station
———	BWDB VHF Link

Antenna Type and Height

Station	Antenna Type	Height [m]
Bagerhat	3EL colinear	20
Barguna	3EL colinear	10
Barisal	3EL colinear	30
Bhola	3EL colinear	10
Dasmina	5EL Yagi	10
Daulatkhan	5EL Yagi	10
Mogla	5EL Yagi	10
Patharghata	5EL Yagi	10
Patuakhali	3EL colinear	30
Pirojpur	3EL colinear	30
Rayenda	5EL Yagi	10

Table 4.1: Radio Design Sheet
Mongla To Bagerhat

No	Design item		Abb.	Unit	Distance / Design value		Value	Unit	Remark
					Distance		*25.0*	km	
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		*10*	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-104.8	f	166	MHz	
3	Adds	Diffraction Loss	Lps	dB	*0*				**From Profile (Figure 4.1)**
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-0.9		*20*	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-1.3		*30*	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	*9.5*				*5 elements Yagi*
6	Antenna Gain(R)		Gar	dB	*5.0*				*3 element colinear*
7	Receiving Power		Pr	dBm	-67.0				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	46.0				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Prni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Prne	dBm			*10*	dB	Noise deterioration
11	Receiver Noise Power: 1/(Prni)+1/(Prne)		Prn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	48.2				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	57.4		38.0		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	5.5				
16	**S/N at Fading**		S/Nfd	dB	**51.9**				No.14-15
17	Threshold Level : Prn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	27.4				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	21.9				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 4.2: Radio Design Sheet
Pirojpur to Bagerhat

No	Design item		Abb.	Unit	Distance / Design value		Value	Unit	Remark
					Distance		25.0	km	
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		10	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-104.8	f	166	MHz	
3	Adds	Diffraction Loss	Lps	dB	0				From Profile (Figure 4.2)
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-1.7		40	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-1.3		30	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	5.0				3 elements colinear
6	Antenna Gain(R)		Gar	dB	5.0				3 elements colinear
7	Receiving Power		Pr	dBm	-72.3				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	40.7				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Prni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Prne	dBm			10	dB	Noise deterioration
11	Receiver Noise Power: 1/(Prni)+1/(Prne)		Prn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	42.9				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	52.1		38.0		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	5.5				
16	**S/N at Fading**		S/Nfd	dB	**46.6**				No.14-15
17	Threshold Level : Prn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	22.1				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	16.6				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 4.3: Radio Design Sheet
Rayenda To Piropur

No	Design item		Abb.	Unit	Distance / Design value		Value	Unit	Remark
					Distance		*18.0*	km	
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		*10*	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-101.9	f	166	MHz	
3	Adds	Diffraction Loss	Lps	dB	*0*				From Profile (Figure 4.3)
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-0.9		*20*	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-1.7		*40*	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	*9.5*				*5 elements Yagi*
6	Antenna Gain(R)		Gar	dB	*5.0*				*3 element colinear*
7	Receiving Power		Pr	dBm	-64.5				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	48.5				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Pni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Pne	dBm			*10*	dB	Noise deterioration
11	Receiver Noise Power: 1/(Pni)+1/(Pne)		Pn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	50.7				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	59.8		37.3		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	4.8				
16	**S/N at Fading**		S/Nfd	dB	**55.0**				No.14-15
17	Threshold Level : Pn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	29.8				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	25.0				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 4.4: Radio Design Sheet
Patuakhali to Pirojpur

No	Design item		Abb.	Unit	Distance / Design value		Value	Unit	Remark
					Distance		*45.0*	km	
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		*10*	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-109.9	f	166	MHz	
3	Adds	Diffraction Loss	Lps	dB	*0*				**From Profile (Figure 4.4)**
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-1.7		*40*	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-1.7		*40*	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	*5.0*				*3elements colinear*
6	Antenna Gain(R)		Gar	dB	*5.0*				*3elements colinear*
7	Receiving Power		Pr	dBm	-77.8				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	35.2				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Prni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Prne	dBm			*10*	dB	Noise deterioration
11	Receiver Noise Power: 1/(Prni)+1/(Prne)		Prn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	37.4				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	46.6		40.0		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	7.5				
16	**S/N at Fading**		S/Nfd	dB	**39.1**				No.14-15
17	Threshold Level : Prn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	16.6				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	9.1				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 4.5: Radio Design Sheet
Patharghata to Barguna

No	Design item		Abb.	Unit	Distance / Design value		Value	Unit	Remark
							20.0	km	
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		10	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-102.8	f	166	MHz	
3	Adds Loss	Diffraction Loss	Lps	dB	0				From Profile (Figure 4.5)
		Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant. sys. Loss	Feeder Loss(T)	Lft	dB	-0.9		20	m	10D-2V: 0.041dB
		Feeder Loss(R)	Lfr	dB	-0.9		20	m	10D-2V: 0.041dB
		Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	9.5				5 elements Yagi
6	Antenna Gain(R)		Gar	dB	5.0				3 elements colinear
7	Receiving Power		Pr	dBm	-64.6				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	48.4				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Pni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Pne	dBm			10	dB	Noise deterioration
11	Receiver Noise Power: 1/(Pni)+1/(Pne)		Pn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	50.6				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	59.7		37.5		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	5.0				
16	**S/N at Fading**		S/Nfd	dB	**54.7**				No.14-15
17	Threshold Level : Pn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	29.7				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	24.7				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 4.6: Radio Design Sheet
Barguna to Patuakhali

No	Design item		Abb.	Unit	Distance / Design value		Value	Unit	Remark
					Distance		*30.0*	km	
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		*10*	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-106.3	f:	166	MHz	
3	Adds	Diffraction Loss	Lps	dB	*0*				**From Profile (Figure 4.6)**
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-0.9		*20*	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-1.7		*40*	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	*5.0*				*3 elements colinear*
6	Antenna Gain(R)		Gar	dB	*5.0*				*3 elements colinear*
7	Receiving Power		Pr	dBm	-73.4				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	39.6				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Prni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Prne	dBm			*10*	dB	Noise deterioration
11	Receiver Noise Power: 1/(Prni)+1/(Prne)		Prn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	41.8				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	50.9		38.5		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	6.0				
16	**S/N at Fading**		S/Nfd	dB	**44.9**				No.14-15
17	Threshold Level : Prn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	20.9				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	14.9				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 4.7: Radio Design Sheet
Dasmina to Patuakhali

No	Design item		Abb.	Unit	Distance / Design value		Distance 26.0 km / Value	Unit	Remark
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		*10*	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-105.1	f	166	MHz	
3	Adds	Diffraction Loss	Lps	dB	*0*				**From Profile (Figure 4.7)**
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-0.9		*20*	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-1.7		*40*	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	*9.5*				*5 elements Yagi*
6	Antenna Gain(R)		Gar	dB	*5.0*				*3 elemnets colinear*
7	Receiving Power		Pr	dBm	-67.7				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	45.3				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Prni	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Prne	dBm			*10*	dB	Noise deterioration
11	Receiver Noise Power: 1/(Prni)+1/(Prne)		Prn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	47.5				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	56.6		38.1		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	5.6				
16	**S/N at Fading**		S/Nfd	dB	**51.0**				No.14-15
17	Threshold Level : Prn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	26.6				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	21.0				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 4.8: Radio Design Sheet
Barisal to Pirojpur

No	Design item		Abb.	Unit	Distance / Design value		Value	Unit	Remark
					Distance		*40.0*	km	
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		*10*	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-108.8	f	166	MHz	
3	Adds	Diffraction Loss	Lps	dB	*0*				**From Profile (Figure 4.8)**
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-1.7		*40*	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-1.7		*40*	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	*5.0*				*3element colinear*
6	Antenna Gain(R)		Gar	dB	*5.0*				*3element colinear*
7	Receiving Power		Pr	dBm	-76.7				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	36.3				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Pmi	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Pme	dBm			*10*	dB	Noise deterioration
11	Receiver Noise Power: 1/(Pmi)+1/(Pme)		Pm	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	38.5				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	47.6		39.5		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	7.0				
16	**S/N at Fading**		S/Nfd	dB	**40.6**				No.14-15
17	Threshold Level : Pm+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	17.6				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	10.6				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 4.9: Radio Design Sheet
Bhola To Barisal

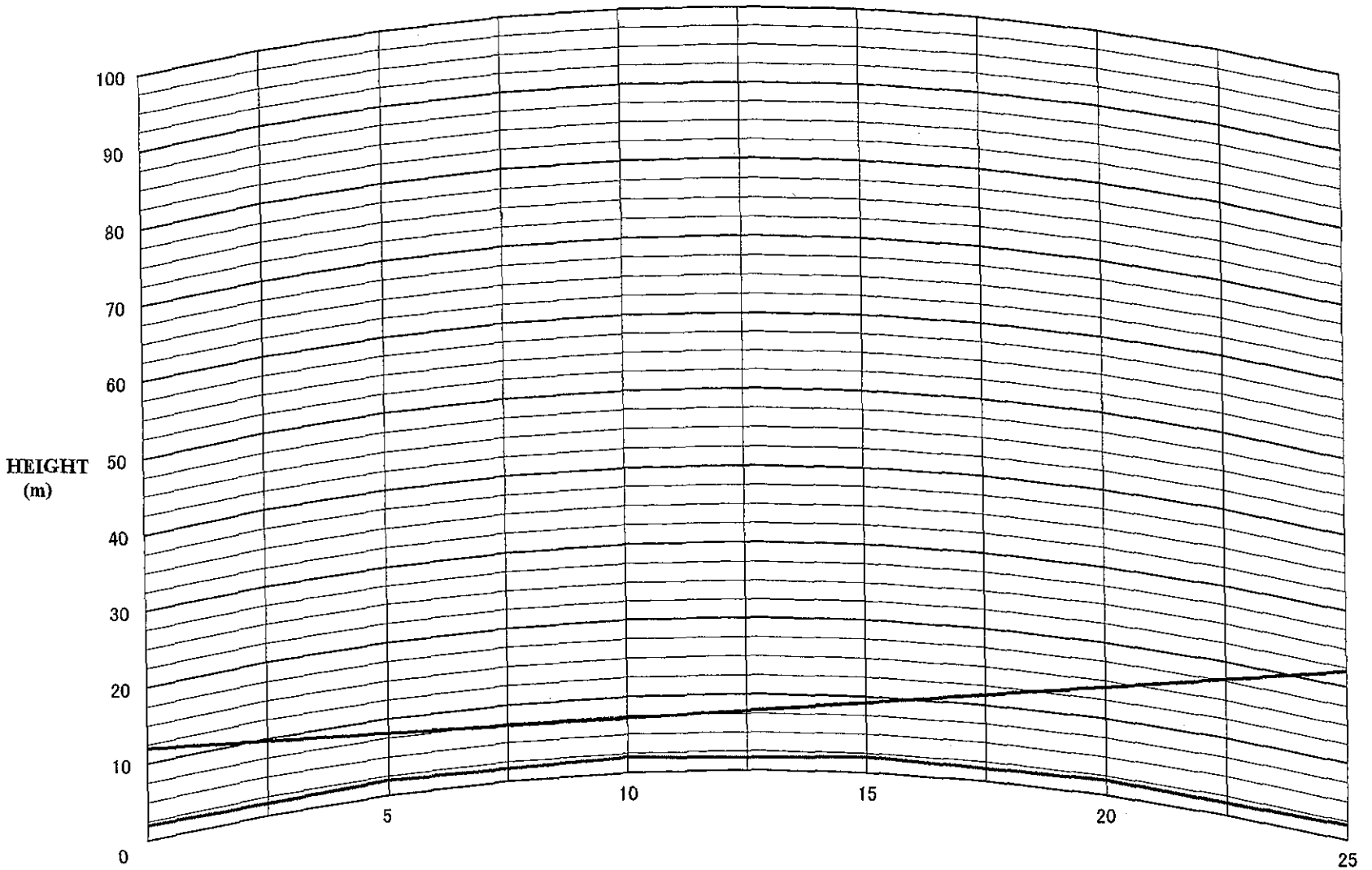
No	Design item		Abb.	Unit	Distance / Design value		Value	Unit	Remark
					Distance		*30.0*	km	
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		*10*	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-106.3	f	166	MHz	
3	Adds	Diffraction Loss	Lps	dB	*0*				**From Profile (Figure 4.9)**
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-0.9		*20*	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-1.7		*40*	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	*5.0*				*3 elements colinear*
6	Antenna Gain(R)		Gar	dB	*5.0*				*3 elements colinear*
7	Receiving Power		Pr	dBm	-73.4				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	39.6				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Pmi	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Pne	dBm			*10*	dB	Noise deterioration
11	Receiver Noise Power: 1/(Pmi)+1/(Pne)		Pn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	41.8				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	50.9		38.5		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	6.0				
16	**S/N at Fading**		S/Nfd	dB	**44.9**				No.14-15
17	Threshold Level : Pn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	20.9				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	14.9				No.18-15
20	Result				OK				**No.16>34.5dB**

Table 4.10: Radio Design Sheet
Daulatkhan to Bhola

No	Design item		Abb.	Unit	Distance / Design value		Value	Unit	Remark
							15.0	km	
1	Power Output: 10log"P"(W)+30		Pt	dBm	40		10	W	
2	Free Space Loss: 20log"f"(MHz)+20log"d"(km)+32.4		Lpf	dB	-100.3	f	166	MHz	
3	Adds	Diffraction Loss	Lps	dB	0				**From Profile (Figure 4.10)**
	Loss	Reflection Loss	LAL	dB					
		Topographic Coefficient	tf	dB	-10.0				Adjusted by the test
		Supplment value by Test	Z	dB					
4	Ant.	Feeder Loss(T)	Lft	dB	-0.9		20	m	10D-2V: 0.041dB
	sys.	Feeder Loss(R)	Lfr	dB	-0.9		20	m	10D-2V: 0.041dB
	Loss	Coaxial Arrester Loss	Lfa	dB	-1.0				0.5 x 2
		Other Loss	Ld	dB	-3.5				Filter, distributor,etc
		Antenna directivity	La	dB					
5	Antenna Gain(T)		Gat	dB	5.0				*3 elements colinear*
6	Antenna Gain(R)		Gar	dB	5.0				*3 elements colinear*
7	Receiving Power		Pr	dBm	-66.6				Sum of No.1 to 6.
8	Receiving Input Voltage (Open end): 0dbμV=-113dBm			dBμV	46.4				No.7+113
9	Internal Noise Power: 10log"B"+NF-144		Pmi	dBm	-125.2	B	12	kHz	
						NF	8	dB	
10	External Noise Power: dBμV-113		Pne	dBm			10	dB	Noise deterioration
11	Receiver Noise Power: 1/(Pmi)+1/(Pne)		Pn	dBm	-115.2				
12	S/N at High Frequency		C/N	dB	48.6				No.7-11
13	S/N Improvement coefficient: 10log3"fd"^2x B/2"fm"^3		I	dB	9.1	fd:	3.5	kHz	Max 70% distortion
						fm:	3	kHz	
14	S/N at Normal Condition		S/N	dB	57.7		37.0		No12+13
15	Fading Value Presumed: 0.1dB/km+3dB		fd	dB	4.5				
16	**S/N at Fading**		S/Nfd	dB	**53.2**				No.14-15
17	Threshold Level : Pn+(S/NL-I)		PL	dBm	-94.3				No.11+30-9.1
18	Fading margin relative to threhold level: Pr-PL		ML	dB	27.7				No.7-17
19	Magin relative to threshold level while a fading: ML-Lfd		Mf	dB	23.2				No.18-15
20	Result				OK				***No.16>34.5dB***

Project Name : FFWS (Figure 4.1)

TERRAIN PROFILE

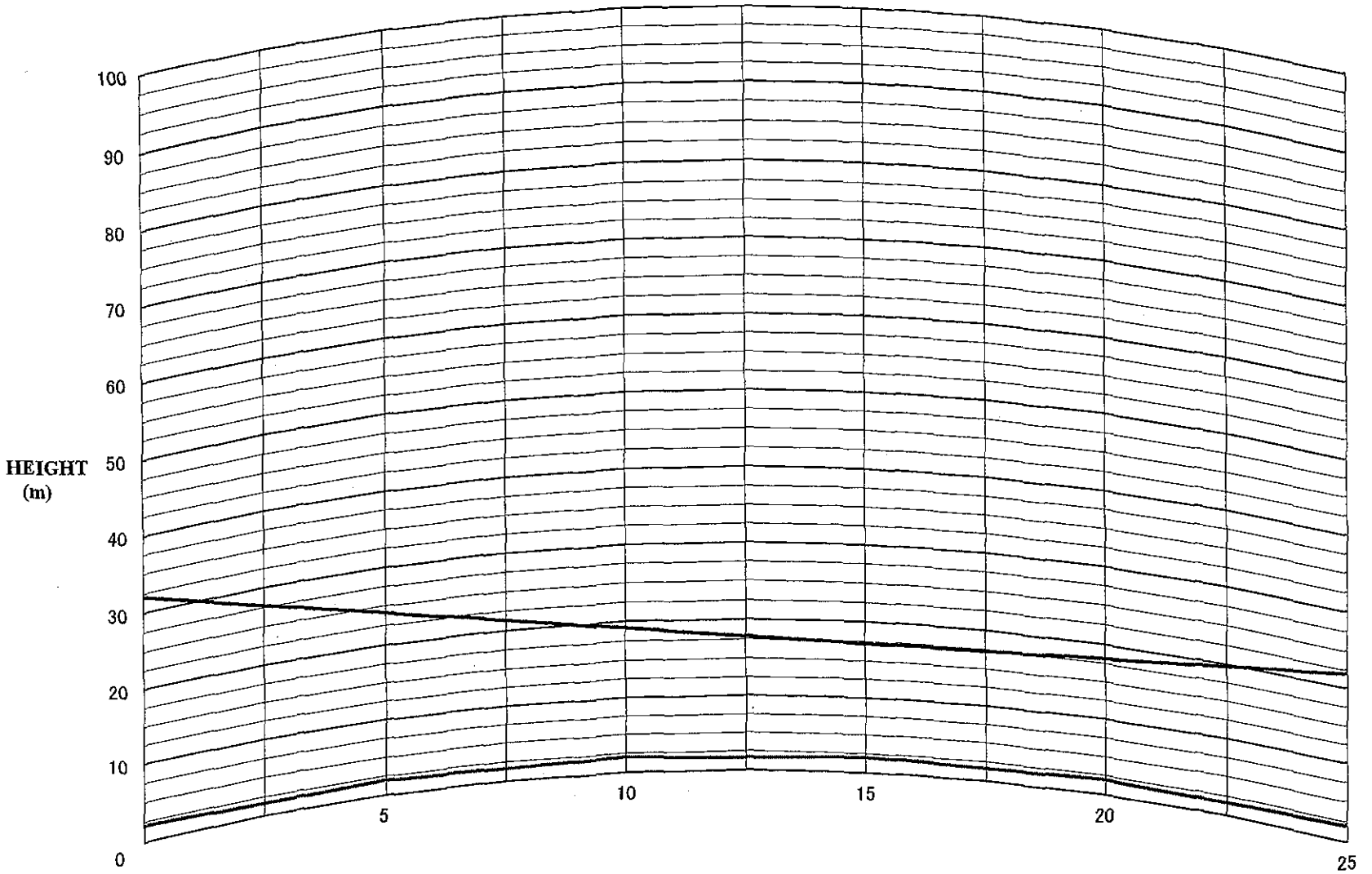


Station Name : Mogla
Site Elevation : 2 m
Antenna Height : 10 m

Station Name : Begerhat
Site Elevation : 2 m
Antenna Height : 20 m

Project Name : FFWS (Figure 4.2)

TERRAIN PROFILE



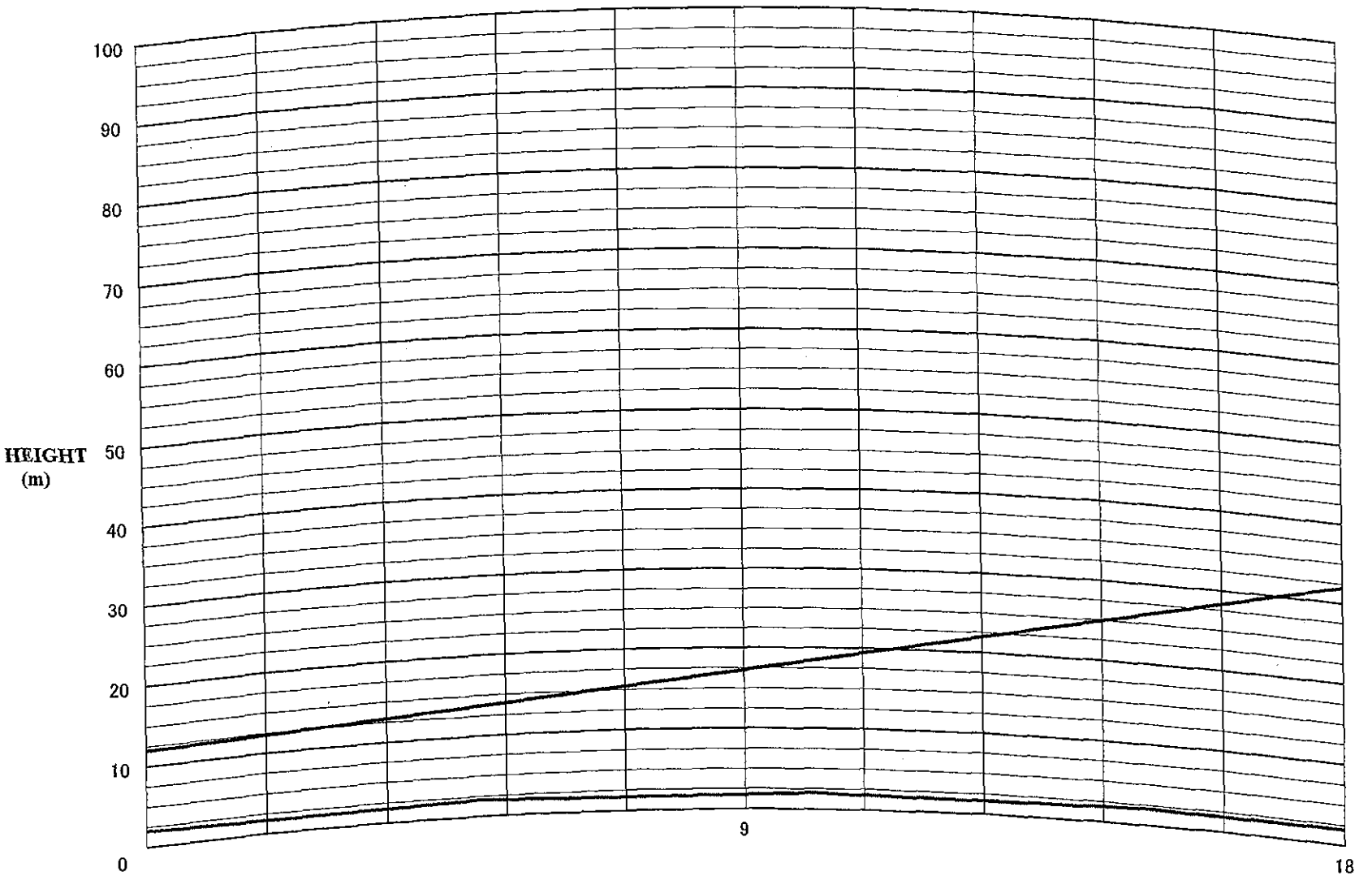
Station Name : Pirojpur
Site Elevation : 2 m
Antenna Height : 30 m

25 (km)

Station Name : Begerhat
Site Elevation : 2 m
Antenna Height : 20 m

Project Name : FFWS (Figure 4.3)

TERRAIN PROFILE



Station Name : Rayenda
Site Elevation : 2 m
Antenna Height : 10 m

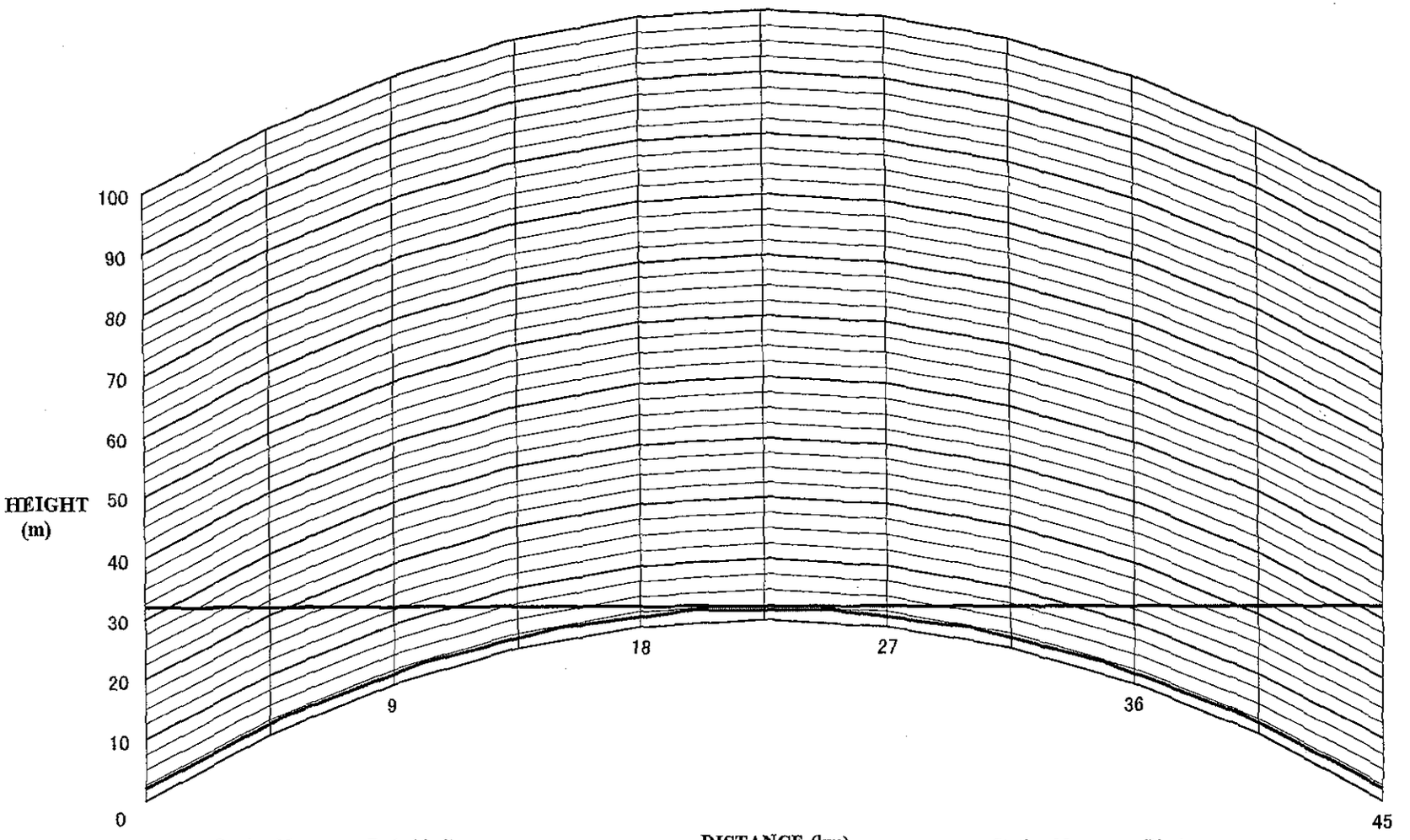
DISTANCE (km)

18 (km)

Station Name : Pirojpur
Site Elevation : 2 m
Antenna Height : 30 m

Project Name : FFWS (Figure 4.4)

TERRAIN PROFILE



Station Name : Pathakhali
Site Elevation : 2 m
Antenna Height : 30 m

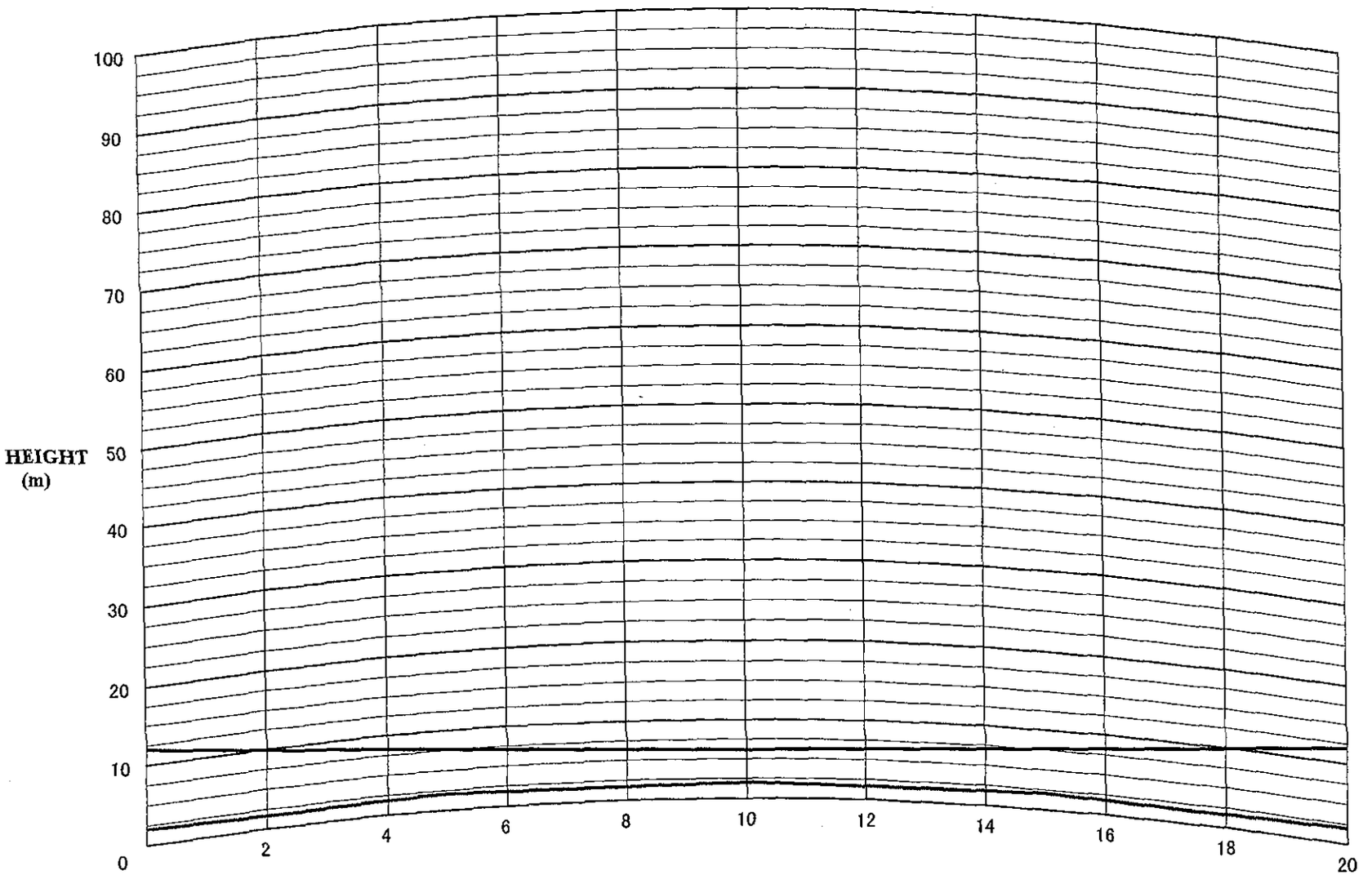
DISTANCE (km)

45 (km)

Station Name : Pirojpur
Site Elevation : 2 m
Antenna Height : 30 m

Project Name : FFWS (Figure 4.5)

TERRAIN PROFILE

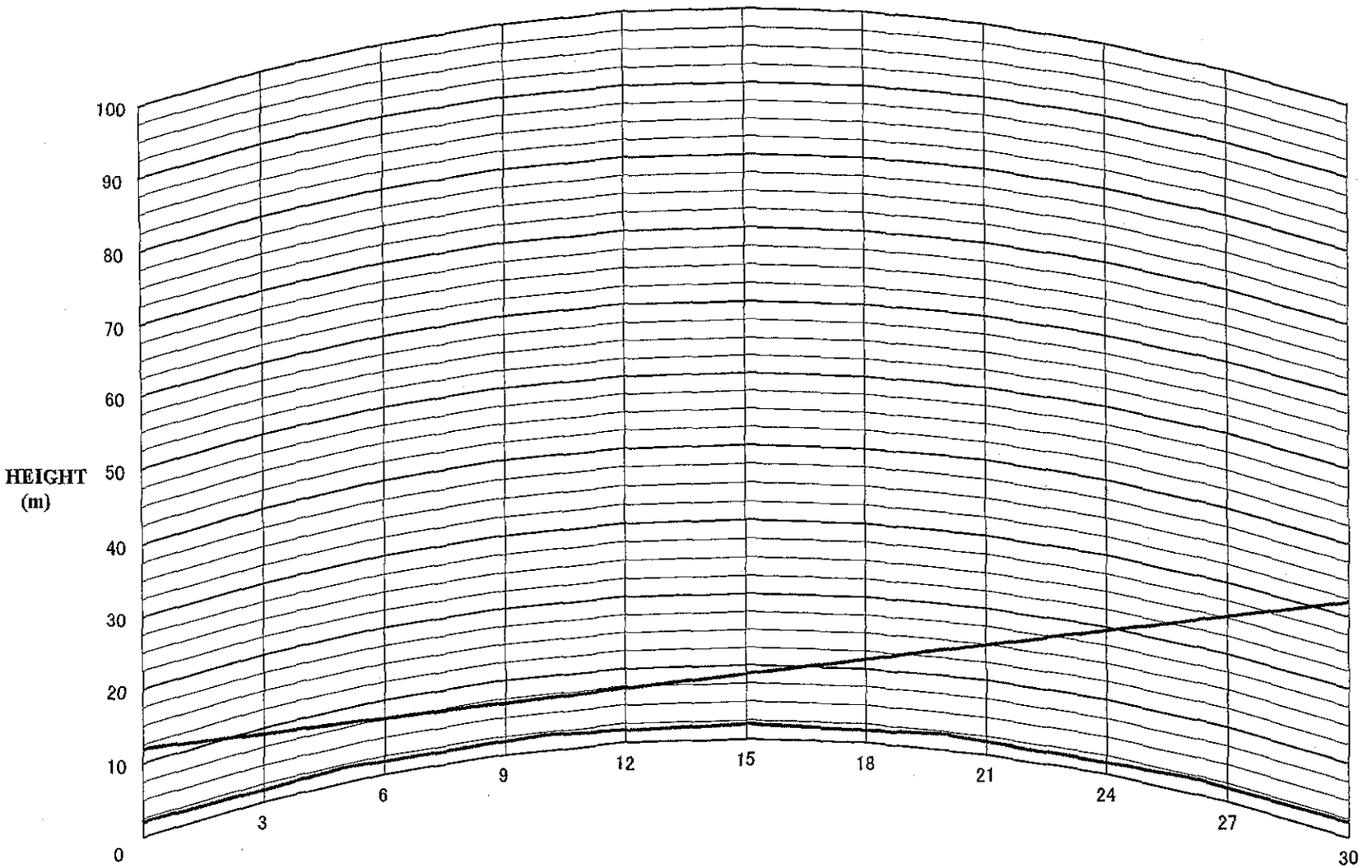


Station Name : Patharghat
Site Elevation : 2 m
Antenna Height : 10 m

Station Name : Barguna
Site Elevation : 2 m
Antenna Height : 10 m

Project Name : FFWS(Figure 4.6)

TERRAIN PROFILE



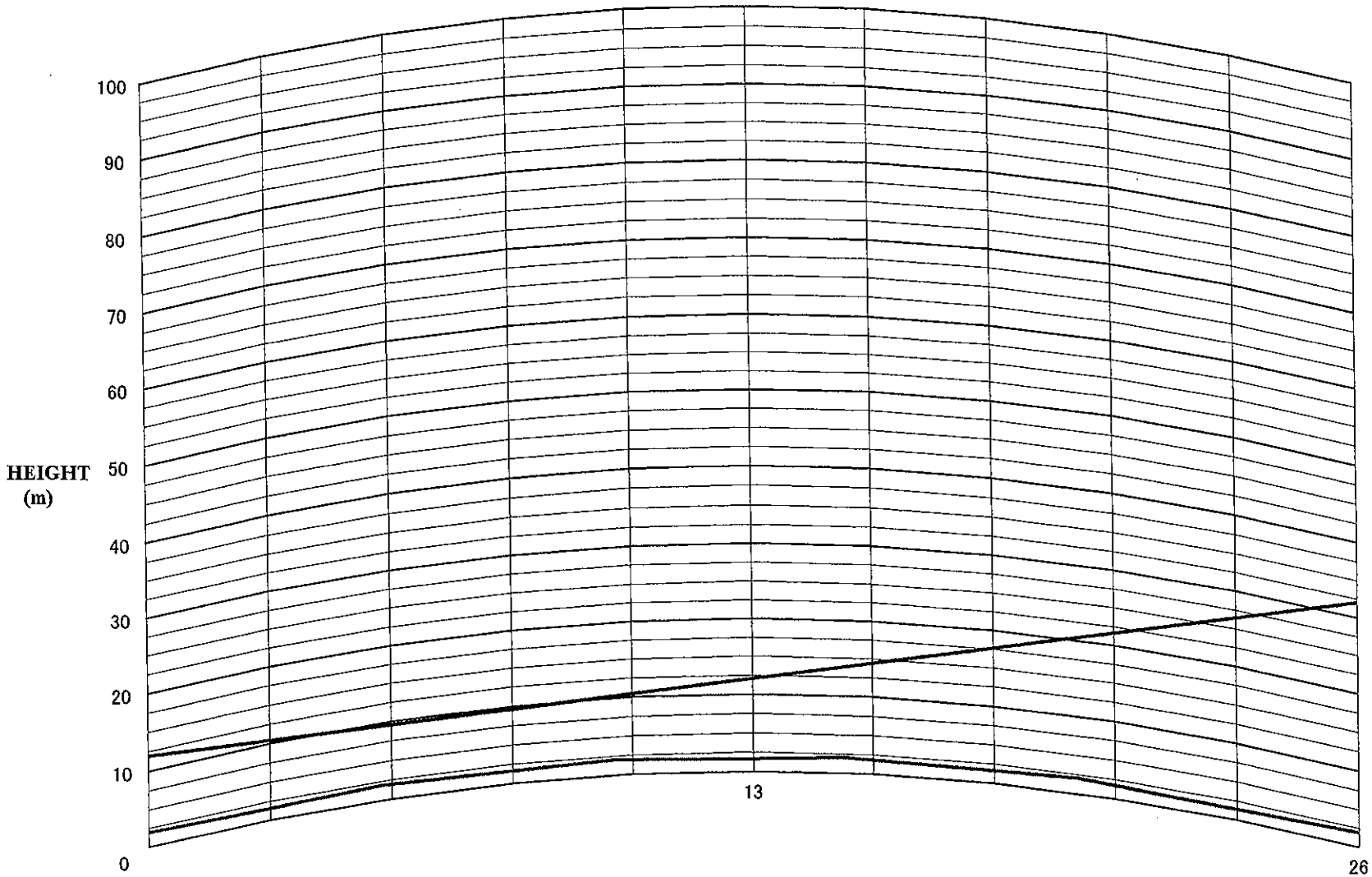
Station Name : Barguna
Site Elevation : 2 m
Antenna Height : 10 m

30 (km)

Station Name : Patuakhali
Site Elevation : 2 m
Antenna Height : 30 m

Project Name : FFWS (Figure 4.7)

TERRAIN PROFILE



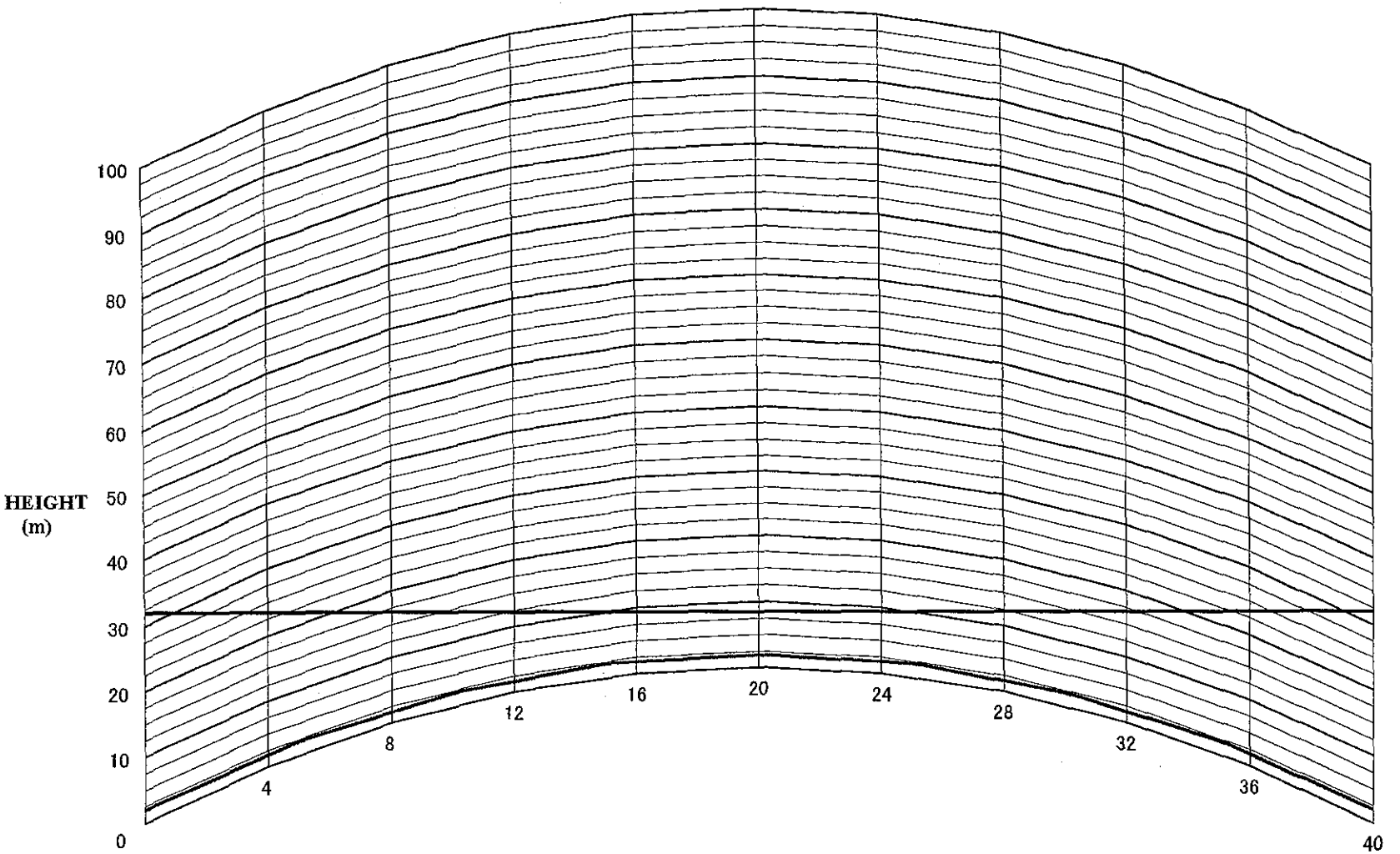
Station Name : Dasmina
Site Elevation : 2 m
Antenna Height : 10 m

26 (km)

Station Name : Patuakhali
Site Elevation : 2 m
Antenna Height : 30 m

Project Name : FFWS (Figure 4.8)

TERRAIN PROFILE

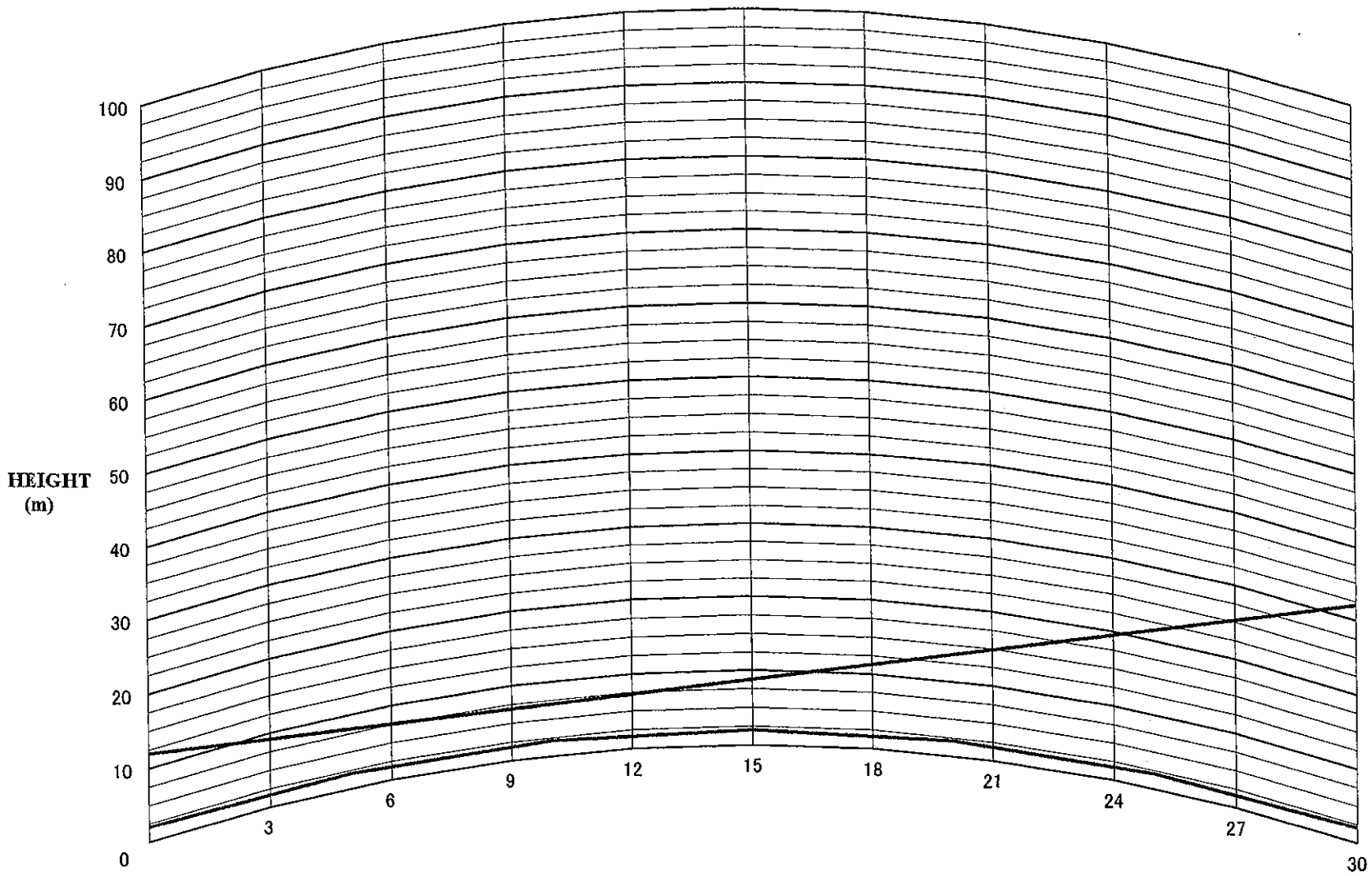


Station Name : Barisal
Site Elevation : 2 m
Antenna Height : 30 m

Station Name : Pirojpur
Site Elevation : 2 m
Antenna Height : 30 m

Project Name : FFWS (Figure 4.9)

TERRAIN PROFILE

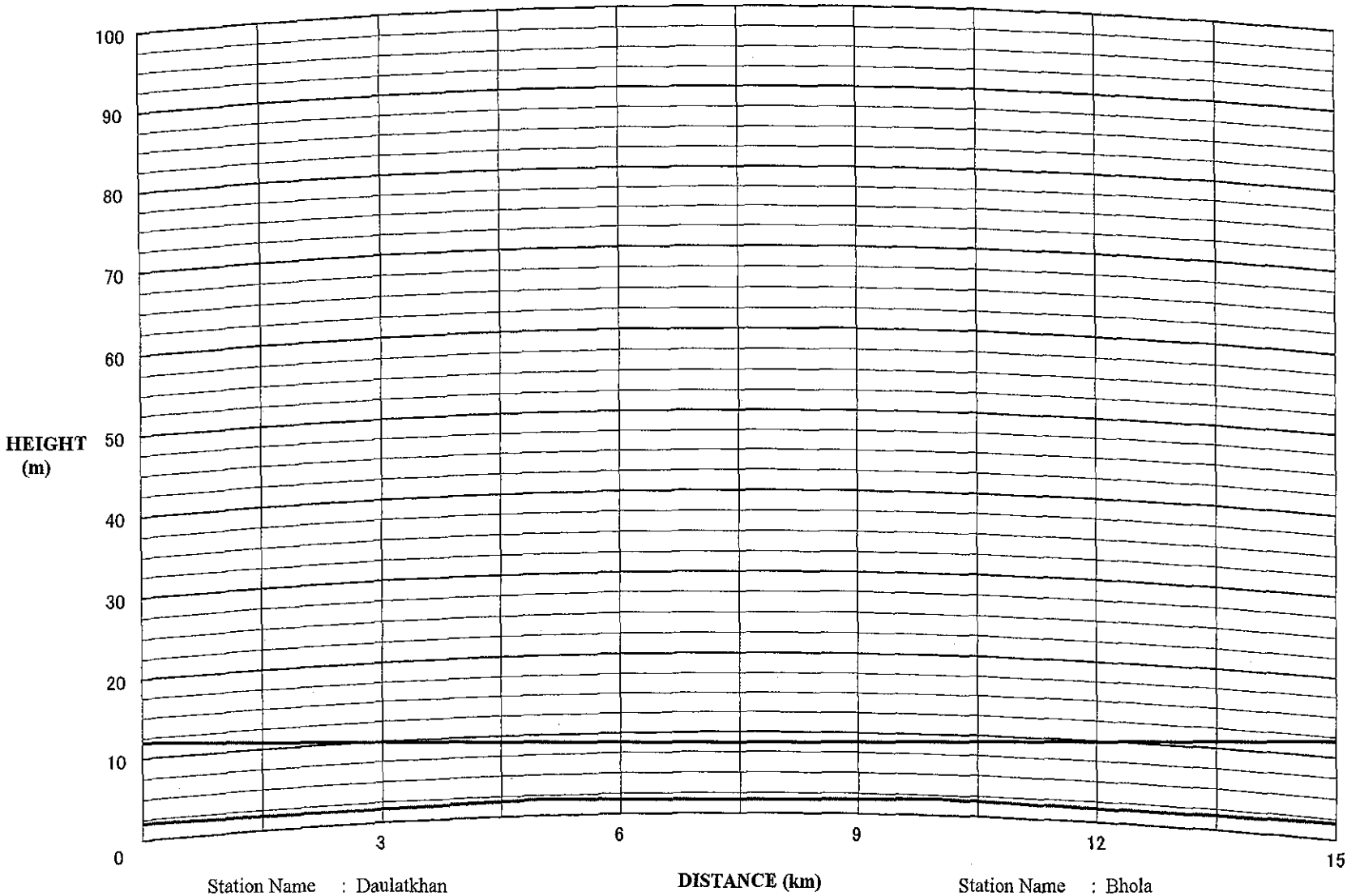


Station Name : Bhola
Site Elevation : 2 m
Antenna Height : 10 m

Station Name : Barisal
Site Elevation : 2 m
Antenna Height : 30 m

Project Name : FFWS (Figure 4.10)

TERRAIN PROFILE



Station Name : Daulatkhan
Site Elevation : 2 m
Antenna Height : 10 m

Station Name : Bhola
Site Elevation : 2 m
Antenna Height : 10 m