



Terminal Development cost:

Finger jetty cost:	Rs. 50.00 crore
Cost of rail connectivity:	Rs. 20.00 crore
Conveyor connectivity (1.4km):	Rs. 21.00 crore
General Cargo handling Equipment:	Rs. 20.00 crore
Logistic support :	Rs. 10.00 crore
Port connectivity (Dredging etc.):	Rs. 15.00 crore
TOTAL:	Rs. 136.00 crore

Chapter-5

Implementation Schedule with Investment Needs

CHAPTER 5

(i) IMPLEMENTATION SCHEDULE WITH INVESTMENT NEEDS

5.0 GENERAL

Keeping in view the limited resources which would not allow all the proposed IWT terminals to be constructed at one go, high demand IWT terminals that can contribute up to 80 per cent of the estimated traffic demand is considered under priority. Based on the traffic estimated under most likely scenario, Base Year, Year of commencement of proposed IWT services (Phase-1 by 2014-17 and Phase-2 by 2017-22) and Terminal Year (2031-32) of the projected traffic, important locations, likely to handle more than 80 per cent of the total divertible cargo have been identified. In view of the fact that only a few identified IWT terminals are designated to handle both incoming and outgoing traffic, whereas in most of the cases one direction of traffic is observed.

To identify potential IWT terminal locations both originating and terminating traffic have been considered. Out of total 31 terminals, 14 IWT Terminals are identified for development under Phase-1 and 17 Terminals are planned to be taken up for development under Phase-2. The list indicating Phase wise and waterway wise terminals identified for development are tabulated below:

PLANNED DEVELOPMENT OF POTENTIAL IWT TERMINALS IN PHASE-1

Sl.No.	National Waterway	Name of IWT Terminal
1	NW1	Haldia
2	NW1	Kolkata
3	NW1	Katwa
4	NW1	Farakka
5	NW1	Sahebganj
6	NW1	Barh
7	NW1	Patna
8	NW 2	Jogighopa
9	NW 2	Pandu
10	NW 3	Kottapuram
11	NW 3	Aluva
12	NW 6	Silchar
13	NW 6	Badarpur
14	NW 6	Karimganj

PLANNED DEVELOPMENT OF POTENTIAL IWT TERMINALS IN PHASE-2

Sl.No.	National Waterway	Name of IWT Terminal
1	NW1	Hazardwari
2	NW1	Behrampur
3	NW1	Bhagalpur
4	NW1	Varanasi
5	NW1	Allahabad
6	NW 2	Tezpur
7	NW 2	Neamati
8	NW 2	Saikhoaghat
9	NW 3	Kollam
10	NW 3	Allappuzha
11	NW 4	Kakinada
12	NW 4	Muktiyala
13	NW 4	Vijayawada
14	NW 5	Talcher
15	NW 5	Paradip
16	NW 5	Kalinganagar
17	NW 5	Dhamra

The cost estimate for each of the 31 IWT terminals and the cost towards port connectivity for 7 identified ports for the study is summarised hereunder. Cost involved for each of the National Waterway is discussed and summarised in subsequent paragraphs. It is to mention that the cost estimates is inclusive of costs towards DPR preparation, detailed engineering and project supervision charges, for which a 10% provision is made.

5.1 SUMMARY COST FOR TERMINALS IN ALL NATIONAL WATERWAYS:

Project Phase	Number of Terminals	Investment Required
Phase-1 (2014-17)	14 (NW 1: 7 NW 2: 2, NW 3: 2, NW 6: 3)	Rs.1,981 Crores
Phase-2 (2017-22)	17 (NW 1: 5, NW 2: 3, NW 3: 2, NW 4: 3, NW 5: 4)	Rs.20,782 Crores
	TOTAL	Rs.22,763 crores

It can be seen from the summary table that an estimated cost of Rs.22,763 crores is required for Integrating National Waterways Transportation Grid. The project estimates are inclusive of fairway development and terminal construction at 31 locations with requisite infrastructure facilities. The above cost includes Rs.1,153 crores towards Port Connectivity works, which is suggested to be taken up by the concerned port authorities with the administrative control of the concerned ports.

The summarized position of Phase-1 and Phase-2 investment indicated above is as follows:

Phase	Investment required (Rs. crore)					Total (Rs Cr)
	Waterway Developmt.	Terminal Developmt.	Port Conn.	Road Conn.	Rail Conn.	
PHASE: 1 2014-17	887	658	344	88	4	1,981
PHASE: 2 2017-22	17965	1389	809	232	387	20,782
TOTAL	18852	2047	1153	320	391	22,763

A further break up of investment proposed in the two phases indicated above is given in the following Tables.

Summary of Phase-1 Investment details (National Waterway wise) for the period: 2014-17

S. N.	National Waterway	INVESTMENT REQUIRED (Rs crore)					TOTAL
		WATERWAY	TERMINAL	PORT CON.	ROAD CON.	RAIL CON.	
1	NW-1	150	446	234	66	2	898
2	NW-2	138	135	-	11	-	284
3	NW-3	110	13	106	7	-	236
4	NW-4	138	4	2	2	2	148
5	NW-5	303	10	2	-	-	315
6	NW-6	48	50	-	2	-	100
TOTAL PHASE-1		887	658	344	88	4	1981

Summary of Phase-2 Investment details (National Waterway wise) for the period: 2017-22

S. N.	National Waterway	INVESTMENT REQUIRED (Rs crore)					TOTAL
		WATERWAY	TERMINAL	PORT CON.	ROAD CON.	RAIL CON.	
1	NW-1	6677	766	-	42	238	7723
2	NW-2	1370	182	-	149	-	1701
3	NW-3	100	33	-	5	35	173
4	NW-4	2640	121	392	11	114	3278
5	NW-5	6400	270	417	19	-	7106
6	NW-6	778	17	-	6	-	801
TOTAL PHASE-2		17965	1389	809	232	387	20782

5.2 PLANNED DEVELOPMENT AND THE INVESTMENT REQUIREMENT YEAR WISE UNDER PHASE-1 IN NATIONAL WATERWAYS

In the following paragraphs, a brief on the development activity planned in each of the National Waterway and the investment requirements year wise is elaborated.

5.2.1 Development activities planned under Phase-1 in National Waterway-1

- **FAIRWAY:** LAD of 3 m in Haldia- Farakka (560 km), 2.5 m in Farakka- Buxar (635 km); Preparation of DPR for Buxar- Varanasi (188 km) & Varanasi- Allahabad (237 km)
- **TERMINALS:** Upgradation of Haldia & Kolkata terminals; new terminals at Katwa, Sahebganj & Patna
- **ROAD CONNECTIVITY:** 2 lane road connectivity to Haldia, Kolkata, Katwa, Sahebganj & Patna(Alt) terminals
- **RAIL CONNECTIVITY:** Preliminary works for Haldia, Katwa & Sahebganj terminals
- **PORT CONNECTIVITY:** Finger jetties with conveyor system at Haldia & Kolkata ports

Planned Activity	Year wise Investment (Rs crore)				Proposed Funding Mechanism
	14-15	15-16	16-17	TOTAL	
Fairway	35	55	60	150	GBS, WB/ ADB
Terminal Development	40	90	316	446	GBS, Beneficiary users, PPP
Port Connectivity	40	60	134	234	KoPT, GBS
Road/ Rail Connectivity	23	23	22	68	State Govt./ NHAI/ GBS/Railways
TOTAL	138	228	532	898	

A further breakup of investment mentioned above with details of activity towards which these investments are planned is provided as under:

Planned Activity	Year wise Investment (Rs. in crores)				Funding Mechanism
	14-15	15-16	16-17	TOTAL	
FAIRWAY DEVELOPMENT/ MAINTENANCE:					
Haldia- Farakka: 3m	10	15	15	40	GBS
Farakka- Buxar: 2.5m	20	35	40	95	GBS
DPRs for Buxar-Varanasi & Varanasi-Allahabad, land acquisition, tie-up source of funding	5	5	5	15	GBS, WB/ ADB
TOTAL	35	55	60	150	
TERMINAL DEVELOPMENT					

Existing terminals at Haldia & Kolkata	20	40	58	118	GBS, PPP
New terminals at Katwa, Sahebganj, Patna (Alt.)	20	50	258	328	GBS, Beneficiary users, PPP
TOTAL	40	90	316	446	
PORT CONNECTIVITY					
Haldia: Finger jetties & connecting conveyor system	20	30	67	117	KoPT, GBS
Kolkata: Finger jetties & connecting conveyor system	20	30	67	117	KoPT, GBS
TOTAL	40	60	134	234	
ROAD/ RAIL CONNECTIVITY					
ROAD: Upgradation to 2 lane and linking to nearest NH/ SH for terminal at Haldia, Kolkata, Katwa, Sahebganj and Patna (alt.)	22	22	22	66	State Govt./ NHAI/ GBS
RAIL: Preliminary works like DPR identification of land etc for Haldia, Katwa, Sahebganj and Patna (alt.)	1	1	-	2	GBS
TOTAL	23	23	22	68	

5.2.2 Development activities planned under Phase-1 in National Waterway-2

- FAIRWAY: LAD of 2.5 m in Dhubri- Neamati (630 km), 2 m in Neamati- Dibrugarh (138 km) and 1.5 m in Dibrugarh- Sadiya (123 km)
- TERMINALS: Completion of Pandu & new terminal at Jogighopa
- ROAD CONNECTIVITY: 2 lane road connectivity to Pandu & Jogighopa terminals

Planned Activity	Year wise Investment (Rs crore)				Funding Mechanism
	14-15	15-16	16-17	TOTAL	
Fairway	30	70	38	138	GBS
Terminal Development	20	60	55	135	GBS, Beneficiary users, PPP
Road/ Rail Connectivity	5	6	0	11	State Govt./ NHAI/ GBS/Railways
TOTAL	55	136	93	284	

A further breakup of investment mentioned above with details of activity towards which these investments are planned is provided as under:

	Planned Activity	Year wise Investment (Rs. in crores)				Funding Mechanism
		14-15	15-16	16-17	TOTAL	
FAIRWAY DEVELOPMENT/ MAINTENANCE:						
1	Dhubri-Neamati: 2.5m (Augmenting Dredging capacity)	10	20	10	40	GBS
2	Neamati-Dibrugarh: 2 m (Augmenting dredging capacity to achieve 2.50m)	10	20	10	40	GBS
3	Dibrugarh-Sadiya: 1.5 m (Augmenting dredging capacity)	10	30	18	58	GBS
	TOTAL	30	70	38	138	
TERMINAL DEVELOPMENT						
1	Completion of Pandu Terminal	10	10	-	20	GBS
2	New Terminal at Jogighopa, along with Multimodal logistic hub of CRWC	10	50	55	115	GBS, CRWC, NTPC, PPP
	TOTAL	20	60	55	135	
ROAD/ RAIL CONNECTIVITY						
1	ROAD: Upgradation of existing road to 2 lane with nearest NH/ SH for terminals at Jogighopa and Pandu	5	6	-	11	State Govt./ NHAI/GBS/ Railways
	TOTAL	5	6	-	11	

5.2.3 Development activities planned under Phase-1 in National Waterway-3

- FAIRWAY: LAD of 2m in the entire waterway (205 km)
- TERMINALS: Upgradation of Aluva & Kottapuram; DPR for upgradation of Kollam & Allapuzha terminals
- ROAD CONNECTIVITY: 2 lane road connectivity to Kottapuram & Aluva terminals
- PORT CONNECTIVITY: Finger jetties with conveyor system at Kochi port

	Planned Activity	Year wise Investment (Rs crore)				Funding Mechanism
		14-15	15-16	16-17	TOTAL	
1	Fairway	20	30	60	110	GBS
2	Terminal Development	3	10	0	13	GBS, Beneficiary users, PPP
3	Port Connectivity	20	30	56	106	CoPT
4	Road Connectivity	2	3	2	7	State Govt./ NHAI/ GBS
	TOTAL	45	73	118	236	

A further breakup of investment mentioned above with details of activity towards which these investments are planned is provided as under:

	Planned Activity	Year wise Investment (Rs. in crores)				Funding Mechanism
		14-15	15-16	16-17	TOTAL	
FAIRWAY DEVELOPMENT/ MAINTENANCE:						
1	2 m in entire NW-3 including modification of locks, bridges etc	20	30	60	110	GBS
	TOTAL	20	30	60	110	
TERMINAL DEVELOPMENT						
1	Terminals at Aluva and Kottapuram	2	8		10	GBS, PPP
2	DPR for above two terminals and Kollam and Allapuzha terminals	1	2		3	GBS, PPP
	TOTAL	3	10		13	
PORT CONNECTIVITY						
1	Kochi: Finger jetties and connecting conveyor system	20	30	56	106	Cochin Port Trust/ GBS
	TOTAL	20	30	56	106	
ROAD/ RAIL CONNECTIVITY						
1	ROAD: Upgradation of existing road to 2 lane with nearest NH or SH for terminals at Kottapuram and Aluva	2	3	2	7	State Govt./ NHAI/GBS
	TOTAL	2	3	2	7	

5.2.4 Development activities planned under Phase-1 in National Waterway-4

- FAIRWAY: LAD of 1.8 m in Sholinganallur- Kalpakkam (37 km) & DPR for Kakinada-Eluru (124 km)
- TERMINALS: New jetties at Kalpakkam & Sholinganallur, DPR for new terminals at Muktiyala, Vijayawada, Kakinada
- ROAD CONNECTIVITY: 2 lane road connectivity to Kakinada terminal
- RAIL CONNECTIVITY: Preliminary works including DPR for Kakinada terminal
- PORT CONNECTIVITY: DPR for Finger jetties with conveyor system at Krishnapatnam and Kakinada with reconstruction of road bridge at Kakinada port

	Planned Activity	Year wise Investment (Rs. in crores)				Funding Mechanism
		14-15	15-16	16-17	TOTAL	
1	Fairway	34	34	70	138	GBS
2	Terminal Development	2	2	0	4	GBS, Beneficiary users, PPP
3	Port Connectivity	2	0	0	2	Kakinada port & Krishnapatnam Port/ GBS
4	Road/ Rail Connectivity	2	2	0	4	State Govt./ NHAI/ GBS
	TOTAL	40	38	70	148	

A further breakup of investment mentioned above with details of activity towards which these investments are planned is provided as under:

	Planned Activity	Year wise Investment (Rs. in crores)				Funding Mechanism
		14-15	15-16	16-17	TOTAL	
FAIRWAY DEVELOPMENT/ MAINTENANCE:						
1	Sholinganallur- Kalpakkam: 1.8m LAD	30	30	70	130	GBS
2	DPR preparation for Kakinada-Eluru stretch.	4	4		8	GBS
	TOTAL	34	34	70	138	
TERMINAL DEVELOPMENT						
1	Development of 2 jetties each at Kalpakkam and Sholinganallur	*	*	*	*	*- GBS. Cost included in fairway
2	DPR for terminals at Muktiyala, Vijayawada & Kakinada	2	2		4	GBS, PPP
	TOTAL	2	2		4	
PORT CONNECTIVITY						
1	DPR for finger jetties and connecting conveyor system (a) at Krishnapatnam & (b) at Kakinada port with reconstruction of road bridge at Kakinada Port	2	-	-	2	Krishnapatnam Port/ Kakinada Port /GBS
	TOTAL	2			2	
ROAD/ RAIL CONNECTIVITY						
1	ROAD: DPR preparation for Improvement/ Upgradation of existing road to 2 lane with nearest NH or SH for terminal at Kakinada	1	1		2	By State Govt./ NHAI/ GBS
2	RAIL: Preliminary works like DPR, identification of land, land acquisition for Kakinada terminal	1	1		2	GBS
	TOTAL	2	2		4	

5.2.5 Development activities planned under Phase-1 in National Waterway-5

- FAIRWAY: LAD of 2 m in Jokadia - Dhamra (201 km), DPR for Talcher- Jokadia
- TERMINALS: DPR for terminals at Kalinganagar, Paradip & Dhamra
- ROAD CONNECTIVITY: DPR for 2 lane road connectivity to Kalinganagar, Paradip & Dhamra terminals
- PORT CONNECTIVITY: DPR for Finger jetties with conveyor system at Paradip & Dhamra ports (By respective ports)

	Planned Activity	Year wise Investment (Rs. in crores)				Funding Mechanism
		14-15	15-16	16-17	TOTAL	
1	Fairway	35	55	213	303	GBS, State Govt, Paradip and Dhamra ports & Beneficiary PSUs + WB/ ADB
2	Terminal Development	3	3	4	10	GBS, Beneficiary users, PPP
3	Port Connectivity	1	1	0	2	Paradip & Dhamra ports
4	Road/ Rail Connectivity	-	-	-	-	State Govt./ NHA/ GBS
	TOTAL	39	59	217	315	

A further breakup of investment mentioned above with details of activity towards which these investments are planned is provided as under:

	Planned Activity	Year wise Investment (Rs. in crores)				Funding Mechanism
		14-15	15-16	16-17	TOTAL	
FAIRWAY DEVELOPMENT/ MAINTENANCE:						
1	Jokadia- Dhamra: Dredging and augmenting to 2 m LAD including DPR preparation	30	50	205	285	GBS, State Govt, Paradip and Dhamra ports & Beneficiary PSUs
2	DPR preparation for Talcher-Jokadia stretch including identifying source of funding	5	5	8	18	GBS/WB/ ADB
	TOTAL	35	55	213	303	
TERMINAL DEVELOPMENT						
1	DPR only for setting up terminals at Kalinganagar, Paradip and Dhamra	3	3	4	10	
	TOTAL	3	3	4	10	
PORT CONNECTIVITY						
1	Dhamra and Paradip Ports : Finger jetties and connecting conveyor system –DPR Studies only	1	1		2	Concerned Ports/ PPP
	TOTAL	1	1		2	
ROAD CONNECTIVITY						
1	ROAD: DPR Studies for Strengthening of existing road to 2 lane with nearest NH or SH for terminals at Kalinganagar, Paradip and Dhamra	*	*	*	*	*- Cost included in DPR for Terminals
	TOTAL	*	*	*	*	

5.2.6 Development activities planned under Phase-1 in National Waterway-6

- FAIRWAY: LAD of 1.6 m in Silchar- Bhanga (70 km)
- TERMINALS: Upgradation of Badarpur & Karimganj terminals; new floating terminal at Silchar
- ROAD CONNECTIVITY: DPR for 2 lane road connectivity to Badarpur & Karimganj terminals

	Planned Activity	Year wise Investment (Rs. in crores)				Funding Mechanism
		14-15	15-16	16-17	TOTAL	
1	Fairway	8	20	20	48	GBS, WB/ ADB
2	Terminal Development	10	10	30	50	GBS, Beneficiary users, PPP
3	Road/ Rail Connectivity	1	1	-	2	State Govt./ NHAI/ GBS
	TOTAL	19	31	50	100	

A further breakup of investment mentioned above with details of activity towards which these investments are planned is provided as under:

	Planned Activity	Year wise Investment (Rs. in crores)				Funding Mechanism
		14-15	15-16	16-17	TOTAL	
	FAIRWAY DEVELOPMENT/ MAINTENANCE:					
1	Silchar-Bhanga: 1.60m LAD (Capital dredging and creating Dredging capacity)	8	20	20	48	
	TOTAL	8	20	20	48	
	TERMINAL DEVELOPMENT					
1	Upgradation of existing terminals at Badarpur and Karimganj & new floating terminal at Silchar	10	10	30	50	
	TOTAL	10	10	30	50	
	ROAD/ RAIL CONNECTIVITY					
1	ROAD: DPR for Strengthening of existing road to 2 lane with nearest NH or SH for terminals at Badarpur, Karimganj & Silchar	1	1		2	State Govt./ NHAI/ GBS
	TOTAL	1	1		2	

5.3 Planned Development and the Investment requirement year wise under Phase-2 in National Waterways

In the following paragraphs, for the Phase-2, a brief on the development activity planned in each of the National Waterway and the investment requirements year wise is elaborated.

5.3.1 Development activities planned under Phase-2 in National Waterway-1

- FAIRWAY: LAD of 3 m in Haldia- Sahebganj (642 km), 2.5 m in Sahebganj- Buxar (553 km); 3m in Buxar- Varanasi-Allahabad (425 km)
- TERMINALS: New terminals at Hazardwari, Behrampur, Bhagalpur, Varanasi & Allahabad
- ROAD CONNECTIVITY: 2 lane road connectivity to Hazardwari, Behrampur, Bhagalpur, Varanasi & Allahabad
- RAIL CONNECTIVITY: For terminals at Haldia, Katwa, Sahebganj, Bhagalpur and Patna (Alt.)

Planned Activity	Year wise Investment (Rs. in crores)						Funding Mechanism
	17-18	18-19	19-20	20-21	21-22	TOTAL	
Fairway	575	1075	1675	1675	1677	6677	GBS, WB/ ADB
Terminal Development	100	100	180	180	206	766	GBS, Beneficiary users, PPP
Road/Rail Connectivity	48	48	48	48	88	280	State Govt./NHAI/ GBS
TOTAL	723	1223	1903	1903	1971	7723	

A further breakup of investment mentioned above with details of activity towards which these investments are planned is provided as under:

	Planned Activity	Year wise Investment (Rs. in crores)						Funding Mechanism
		17-18	18-19	19-20	20-21	21-22	TOTAL	
FAIRWAY DEVELOPMENT/ MAINTENANCE:								
1	Haldia- Sahebganj: 3m LAD	30	30	30	30	30	150	GBS
2	Sahebganj- Buxar: 2.5m LAD	45	45	45	45	47	227	GBS
3	Buxar-Varanasi –Allahabad: 3 m LAD with 4 barrages	500	1000	1600	1600	1600	6300	GBS, WB/ ADB
	TOTAL	575	1075	1675	1675	1677	6677	
TERMINAL DEVELOPMENT								
1	Development of terminals at Hazardwari, Behrampur, Bhagalpur, Varanasi, Allahabad,	100	100	180	180	206	766	GBS, PPP, Private funding, user agencies
	TOTAL	100	100	180	180	206	766	
ROAD/ RAIL CONNECTIVITY								
1	ROAD: Strengthening of existing road to 2 lane with nearest NH or SH for terminals at Hazardwari, Behrampur, Bhagalpur, Varanasi & Allahabad	8	8	8	8	10	42	By State Govt./ NHAI/GBS
2	RAIL: Connectivity to	40	40	40	40	78	238	GBS/

Bhagalpur, Haldia, Sahebganj, Katwa & Patna (alt.)								Railways/ User agencies
TOTAL	48	48	48	48	88	280		

5.3.2 Development activities planned under Phase-2 in National Waterway-2

- FAIRWAY: LAD of 2.5 m in Dhubri- Dibrugarh (768 km), 2 m in Dibrugarh- Sadiya (123 km)
- TERMINALS: New terminals at Tezpur, Neamati & Dibrugarh
- ROAD CONNECTIVITY: 2 lane road connectivity to Tezpur, Neamati & Dibrugarh terminals

	Planned Activity	Year wise Investment (Rs. in crores)						Funding mechanism
		17-18	18-19	19-20	20-21	21-22	TOTAL	
1	Fairway	150	210	280	340	390	1370	GBS, WB/ ADB
2	Terminal Development	18	36	36	46	46	182	GBS, Beneficiary users, PPP
3	Road/ Rail Connectivity	15	30	30	37	37	149	State Govt./ NHAI/ IWAI/ Other Existing schemes
	TOTAL	169	338	338	427	429	1701	

A further breakup of investment mentioned above with details of activity towards which these investments are planned is provided as under:

	Planned Activity	Year wise Investment (Rs. in crores)						Funding Mechanism
		17-18	18-19	19-20	20-21	21-22	TOTAL	
FAIRWAY DEVELOPMENT/ MAINTENANCE:								
1	Dhubri- Dibrugarh: 2.5m *	100	150	200	250	300	1000	GBS/WB/ADB
2	Dibrugarh- Sadiya: 2 m	50	60	80	90	90	370	GBS/ WB/ADB
	TOTAL	150	210	280	340	390	1370	
* Including development of Protocol routes in Bangladesh								
TERMINAL DEVELOPMENT								
1	Development of terminals at Tezpur, Neamati, Dibrugarh	18	36	36	46	46	182	GBS, PPP, Private investment, PSUs
	TOTAL	18	36	36	46	46	182	
ROAD/ RAIL /PORT CONNECTIVITY								
1	ROAD: Strengthening of existing road to 2 lane with nearest NH or SH for terminals at Tezpur, Neamati and Dibrugarh	15	30	30	37	37	149	By State Govt./ NHAI/ GBS
	TOTAL	15	30	30	37	37	149	

5.3.3 Development activities planned under Phase-2 in National Waterway-3

- FAIRWAY: LAD of 2.5 to 3 m in the entire stretch (205 km)
- TERMINALS: Upgradation of Kollam, & Allapuzha terminals
- ROAD CONNECTIVITY: 2 lane road connectivity to Kollam & Allapuzha terminals
- RAIL CONNECTIVITY: For Kollam terminal

	Planned Activity	Year wise Investment (Rs. in crores)						Funding Mechanism
		17-18	18-19	19-20	20-21	21-22	TOTAL	
1	Fairway	20	20	20	20	20	100	GBS, WB/ ADB
2	Terminal Development	5	5	5	9	9	33	GBS, Beneficiary users, PPP
3	Road/ Rail Connectivity	4	8	8	10	10	40	State Govt./ NHA/ GSB
	TOTAL	29	33	33	39	39	173	

A further breakup of investment mentioned above with details of activity towards which these investments are planned is provided as under:

	Planned Activity	Year wise Investment (Rs. in crores)						Funding Mechanism
		17-18	18-19	19-20	20-21	21-22	TOTAL	
	FAIRWAY DEVELOPMENT/ MAINTENANCE:							
1	Entire stretch: maintaining 2.5-3.0m	20	20	20	20	20	100	GBS
	TOTAL	20	20	20	20	20	100	
	TERMINAL DEVELOPMENT							
1	Development of terminals at Kollam and Allapuzha	5	5	5	9	9	33	GBS, Beneficiary users, PPP
	TOTAL	5	5	5	9	9	33	
	ROAD/ RAIL /PORT CONNECTIVITY							
1	ROAD: Strengthening of existing road to 2 lane with nearest NH for terminal at Kollam & Allapuzha	1	1	1	1	1	5	By State Govt./ NHA/ GBS
2	RAIL: Rail connectivity from Kollam Terminal to Kollam Railway Station	3	7	7	9	9	35	
	TOTAL	4	8	8	10	10	40	

5.3.4 Development activities planned under Phase-2 in National Waterway-4

- FAIRWAY: LAD of 2 m in entire stretch (1078 km)
- TERMINALS: New terminals at Kakinada, Muktiyala & Vijayawada
- ROAD CONNECTIVITY: 2 lane road connectivity to Kakinada, Muktiyala & Vijayawada terminals
- RAIL CONNECTIVITY: For Vijayawada & Kakinada terminals
- PORT CONNECTIVITY: Finger jetties with conveyor system at Krishnapatnam and Kakinada port

	Planned Activity	Year wise Investment (Rs. in crores)						Funding Mechanism
		17-18	18-19	19-20	20-21	21-22	TOTAL	
1	FAIRWAY	264	528	528	660	660	2640	GBS, WB/ ADB
2	TERMINAL DEVELOPMENT	13	24	24	30	30	121	GBS, Beneficiary users, PPP
3	PORT CONNECTIVITY	40	79	79	97	97	392	By respective ports/ GBS
4	ROAD/RAIL CONNECTIVITY	13	25	25	31	31	125	State Govt./ NHAI/ GBS
	TOTAL	330	656	656	818	818	3278	

A further breakup of investment mentioned above with details of activity towards which these investments are planned is provided as under:

	Planned Activity	Year wise Investment (Rs. in crores)						Funding Mechanism
		17-18	18-19	19-20	20-21	21-22	TOTAL	
FAIRWAY DEVELOPMENT/ MAINTENANCE:								
1	Entire stretch: Maintaining 2m LAD in NW-4 including DPR	264	528	528	660	660	2640	GBS, WB/ ADB
	TOTAL	264	528	528	660	660	2640	
TERMINAL DEVELOPMENT								
1	Development of terminals at Kakinada, Muktiyala and Vijayawada	13	24	24	30	30	121	GBS, Beneficiary users, PPP
	TOTAL	13	24	24	30	30	121	
ROAD/ RAIL /PORT CONNECTIVITY								
1	ROAD: Improvement/ Upgradation of existing road to 2 lane with nearest NH for terminal at Kakinada, Muktiyala & Vijayawada	3	2	2	2	2	11	By State Govt./ NHAI/ GBS

2	RAIL: Rail connectivity from Vijayawada and Kakinada	10	23	23	29	29	114	GBS
3	PORT: Kakinada & Krishnapatnam Terminal finger jetty and conveyor connectivity	40	79	79	97	97	392	Respective ports
TOTAL		53	104	104	128	128	517	

5.3.5 Development activities planned under Phase-2 in National Waterway-5

- FAIRWAY: LAD of 2.5 m in the river portion (371 km) and 2 m in East Coast Canal
- TERMINALS: New terminals at Talcher, Paradip, Dhamra & Kalinganagar
- ROAD CONNECTIVITY: 2 lane road connectivity to Talcher & Kalinganagar terminals
- PORT CONNECTIVITY: Finger jetties with conveyor system at Paradip & Dhamra ports

	Planned Activity	Year wise Investment (Rs. in crores)						Funding Mechanism
		17-18	18-19	19-20	20-21	21-22	TOTAL	
1	FAIRWAY	640	1180	1280	1600	1700	6400	GBS, WB/ ADB
2	TERMINAL DEVELOPMENT	26	54	54	68	68	270	GBS, Beneficiary users, PPP
3	PORT CONNECTIVITY	41	84	84	104	104	417	Dhamra/ Paradip Port/ GBS
4	ROAD/ RAIL CONNECTIVITY	2	4	4	4	5	19	State Govt./ NHAI/ GBS
TOTAL		709	1322	1422	1776	1877	7106	

A further breakup of investment mentioned above with details of activity towards which these investments are planned is provided as under:

	Planned Activity	Year wise Investment (Rs. in crores)						Funding Mechanism
		17-18	18-19	19-20	20-21	21-22	TOTAL	
FAIRWAY DEVELOPMENT/ MAINTENANCE								
1	Development of Talcher-Jokadia stretch with 2.5 m (5 barrages)	440	880	880	1100	1100	4400	GBS/ WB/ADB
2	Development of East Coast canal with 2 m depth including DPR	200	300	400	500	600	2000	GBS/ WB/ADB
TOTAL		640	1180	1280	1600	1700	6400	

TERMINAL DEVELOPMENT								
1	Development of terminals at Talcher, Paradip, Dhamra and Kalinganagar	26	54	54	68	68	270	GBS, Beneficiary users, PPP
TOTAL		26	54	54	68	68	270	
ROAD/ RAIL /PORT CONNECTIVITY								
1	ROAD: Strengthening of existing road to 2 lane with nearest NH for terminal at Talcher & Kalinganagar	2	4	4	4	5	19	By State Govt./ NHA/ GBS
2	PORT: Port terminals at Paradip and Dhamra with conveyor connectivity	41	84	84	104	104	417	Paradip & Dhamra ports
TOTAL		43	88	88	108	109	436	

5.3.6 Development activities planned under Phase-2 in National Waterway-6

- FAIRWAY: LAD of 2 m for the entire waterway (121 km)
- TERMINALS: Setting up of terminal at Silchar
- ROAD CONNECTIVITY: 2 lane road connectivity to Silchar

	Planned Activity	Year wise Investment (Rs. in crores)						Funding Mechanism
		17-18	18-19	19-20	20-21	21-22	TOTAL	
1	FAIRWAY	78	155	155	195	195	778	GBS, WB/ ADB
2	TERMINAL DEVELOPMENT	3	3	3	4	4	17	GBS, Beneficiary users, PPP
3	ROAD/ RAIL CONNECTIVITY	1	1	1	1	2	6	State Govt./ NHA/ GBS
TOTAL		82	159	159	200	201	801	

A further breakup of investment mentioned above with details of activity towards which these investments are planned is provided as under:

	Planned Activity	Year wise Investment (Rs. in crores)						Funding Mechanism
		17-18	18-19	19-20	20-21	21-22	TOTAL	
FAIRWAY DEVELOPMENT/ MAINTENANCE:								
1	Entire stretch: Development of 2m LAD in Lakhipur- Silchar- Karimganj stretch *	78	155	155	195	195	778	GBS/ WB/ ADB
TOTAL		78	155	155	195	195	778	
* Including development of Protocol routes in Bangladesh								

TERMINAL DEVELOPMENT								
1	Setting up of new terminal at Silchar	3	3	3	4	4	17	GBS, Beneficiary users, PPP
TOTAL		3	3	3	4	4	17	
ROAD/ RAIL /PORT CONNECTIVITY								
1	ROAD: Strengthening of existing road to 2 lane with nearest NH for terminal at Silchar	1	1	1	1	2	6	By State Govt./ NHAI/ GBS
TOTAL		1	1	1	1	2	6	

5.3.7 IMPLEMENTATION SCHEDULE

An implementation schedule planned for both Phase-I and Phase-II is enclosed herewith, indicating the activities like DPR preparation, tendering and other allied activities as well as the execution of works planned under each phase.

Implementation plan for Terminal Development




National Waterway	SI No	Name of IWT Terminal	Year																	
			2014	2015	2016	2017	2018	2019	2020	2021	2022									
NW1	1	Haldia	█	█	█	█	█	█	█	█										
NW1	2	G.R. Jetty-2 (Kolkata)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
NW1	3	Katwa	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
NW1	4	Hazardwari						█	█	█	█	█	█	█	█	█	█	█	█	█
NW1	5	Behrampur						█	█	█	█	█	█	█	█	█	█	█	█	█
NW1	6	Farakka	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
NW1	7	Sahebganj (Samdaghat)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
NW1	8	Bhagalpur						█	█	█	█	█	█	█	█	█	█	█	█	█
NW1	9	Barh	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
NW1	10	Patna (Gaighat)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
NW1	11	Rajghat(Varanasi)						█	█	█	█	█	█	█	█	█	█	█	█	█
NW1	12	Allahabad						█	█	█	█	█	█	█	█	█	█	█	█	█
NW2	13	Jogighopa (Bongaigaon)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
NW2	14	Pandu (Guwahati)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
NW2	15	Tezpur						█	█	█	█	█	█	█	█	█	█	█	█	█
NW2	16	Neamati (Jorhat)						█	█	█	█	█	█	█	█	█	█	█	█	█
NW2	17	SaikhughatGhat/Dibrugarh						█	█	█	█	█	█	█	█	█	█	█	█	█
NW3	18	Kottapuram	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
NW3	19	Aluva	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
NW3	20	Kollam						█	█	█	█	█	█	█	█	█	█	█	█	█
NW3	21	Alappuzha						█	█	█	█	█	█	█	█	█	█	█	█	█
NW4	22	Kakinada/Kakinada Port						█	█	█	█	█	█	█	█	█	█	█	█	█
NW4	23	Muktiyala /Guntur						█	█	█	█	█	█	█	█	█	█	█	█	█
NW4	24	Vijayawada						█	█	█	█	█	█	█	█	█	█	█	█	█
NW5	25	Talcher						█	█	█	█	█	█	█	█	█	█	█	█	█
NW5	26	Paradip						█	█	█	█	█	█	█	█	█	█	█	█	█
NW5	27	Kalingnagar (Jokadia)						█	█	█	█	█	█	█	█	█	█	█	█	█
NW5	28	Dhamra						█	█	█	█	█	█	█	█	█	█	█	█	█
NW6	29	Silchar	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
NW6	30	Badarpur	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
NW6	31	Karimganj	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Legend:			█	DPR Preparation			█	Tendering & other activities			█	Project Implementation								

FAIRWAY AND TERMINAL DEVELOPMENT PLAN UNDER PHASE-I

			2014-15			2015-16			2016-17			
NW-1	i	Haldia- Farakka 560km (3m LAD)										
	ii	Farakka - Buxar 635km (2.5m LAD)										
	iii	DPRs for Buxar- Varanasi (188km) and Varanasi-Allahabad (237km), Land acquisition, tieup for source of funding										
	iv	Upgradation of Kolkata and Haldia Terminals										
	v	New terminlas at Haldia, Katwa, Sahebganj and Patna (Alternate)										
	vi	Finger jetty at Haldia and Kolkata Port										
NW-2	i	LAD of 2.5m in Dhubri-Neamati (630km),										
	ii	LAD of 2m in Neamati-Dibrugarh (138km)										
	iii	LAD of 1.50m in Dibrugarh-Sadiya (123km)										
	iv	Completion of Pandu Terminal and Jogighopa terminal										
NW-3	i	LAD of 2m in entire waterway of 205km including modification of locks and bridges etc.										
	ii	Upgradation of Aluva and Kottapuram										
	iii	DPR for upgradation of Kollam and Allapuzha Terminals										
	iv	Finger jetty at Kochi Port with conveyor connectivity										
NW-4	i	LAD of 1.8m in Sholinghanallur-Kalpakkam (37km)										
	ii	DPR for Kakinada-Eluru canal (124km)										
	iii	New jetties at Kalpakkam and Sholinghanallur										
	iv	DPRs for new terminals at Muktiyala, Vijayawada and Kakinada										
	v	DPR for port conenctivity at Kakinada and Krishnapatnam										
NW-5	i	LAD of 2m in Jokadia-Dhamra (201km)										
	ii	DPR for terminals at Kalinganagar, Paradip and Dhamra										
	iii	DPR for port connectivity at Dhamra and Paradip										
NW-6	i	LAD of 1.6m in Silchar-Bhanga reach of 70km										
	ii	Upgrading Badarpur and Karimkanj terminals										
	iii	New floating terminal at Silchar										

Legend: DPR Preparation Tendering and fixing agency
 Project Execution

FAIRWAY AND TERMINAL DEVELOPMENT PLAN UNDER PHASE-II

			2017-18	2018-19	2019-20	2020-21	2021-22
NW-1	i	Haldia- Sahebganj 642km (3m LAD)					
	ii	Sahebganj - Buxar 553km (2.5m LAD)					
	iii	Buxar-Varanasi-Allahabad 425km (3.0m LAD)					
	iv	New terminlas at Hazardwari, Behrampur, Bhagalpur, Varanasi and Allahabad					
NW-2	i	LAD of 2.5m in Dhubri-Dibrugarh (768km),					
	ii	LAD of 2m in Dibrugarh-Sadiya (123km)					
	iii	New terminlas at Tezpur, Neamati and Dibrugarh					
NW-3	i	LAD of 2.5m to 3.0m in entire waterway of 205km					
	ii	Upgradation of Kollam and Allapuzha terminals					
	iii	Rail connectivity at Kollam Terminal					
NW-4	i	LAD of 2.0m in entire stretch					
	ii	New terminals at Muktiyala, Vijayawada and Kakinada					
	iii	Rail connectivity for Vijayawada and Kakinada Terminals					
	iv	Port connectivity for Krishnapatnam and Kakinada					
NW-5	i	LAD of 2.5m in river portion of 371km (Talcher- Jokadia stretch)					
		LAD of 2 m in East Coast Canal including DPR					
	ii	New terminals at Talcher, Kalinganagar, Paradip and Dhamra					
	iii	Port connectivity at Dhamra and Paradip					
NW-6	i	LAD of 2.0m in entire waterway (121km)					
	ii	New terminal at Silchar					
		Legend:					
		 DPR Preparation	 Tendering and fixing agency	 Project Execution			

Chapter-6

Conclusion and Recommendations

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.0 GENERAL

The National Waterway Grid Connectivity is expected to divert the cargo/ goods movement from the strained road/ rail mode of transport to IWT mode in a phased manner; however, necessary infrastructure has to be created for such modal shift. Further, the waterways need to be developed along with terminal development with necessary infrastructure in place apart from establishing connectivity to the nearest National Highways/ State Highways, rail head wherever feasible apart from possible port connectivity. As part of the grid connectivity study, all the identified terminal locations along with identified ports are studied in terms of their connectivity to the nearest road/ rail and port.

It is estimated that to establish road connectivity to the terminals, the capital cost requirement is Rs.324 crores and for facilitating rail connectivity to 7 terminal locations is costing Rs.352 crores. The terminal wise and phase wise cost for development activities are already discussed in earlier Chapter. The detailed presentation on this study undertaken by RITES was made before senior officials of Ministry of Shipping and IWAI and the same is submitted as a separate volume.

6.1 Private Investments

Based on the detailed study, the private Investments in the following area are anticipated to the tune of Rs.65,599 crores in all the three phases. The private investments are expected mainly on the following activities:

- On Barges
- Creation of storage facilities
- On ship building facilities
- On vessel repair/ bunkering facilities
- On Inland Container Depots/ Domestic Container Terminals
- On industrial units/ areas

Apart from the above area of interest, it is also expected that few terminals are likely to be set up and operated by private parties for their exclusive use.

6.2 Project Phasing and Savings in Transport Cost

As discussed in earlier chapter, the two phases of implementation based on traffic potential covers the period upto year 2022 (i.e., Phase 1: 2014-17 and Phase 2: 2017-22) and the

estimated savings in transport cost is calculated as Rs.2406 crores. The phase wise savings is given in the Table below:

To begin with, the project can be commenced by year 2014 with development of fourteen terminals with an investment of Rs.1981 crore. Simultaneously preparatory waterway developmental works can also be taken up so that the Phase 2 development will also go concurrently. The proposed project phasing, investments required and savings are provided in the following table.

TABLE 6.1 PHASE WISE INVESTMENT REQUIREMENT AND ANTICIPATED SAVINGS

Project Phase	No. of Terminals	Traffic		Investment Required (Rs. Cr)	Private Investment (Rs. Cr)	Savings In Transport Cost (Cr. Rs/Yr)
		MT	BT Km			Annual savings
Phase-I (2014-17)	14	34.56	17.32	1981	10391	341.90
Phase-II (2017-22)	17	159.00*	123.40*	20782	55208	2406.00*
Total upto 2021-22	31	159.00	123.40	22763	65599	2406.00

*: Cumulative of Phase-I & Phase-II

The breakup of investment requirement for various infrastructure creations is provided below:

TABLE 6.2 HEAD OF MAJOR ACTIVITIES FOR WHICH INVESTMENT REQUIRED

Phase	Terminals	Traffic (MnT)	Investment required (Rs crore)					
			WW dev	IWT Terminal	Road	Rail	Port	Total
1	14 (NW 1: 7; NW 2: 2; NW 3: 2; NW 6: 3)	35	887	658	88	4	344 (3)	1981
2	17 (NW 1: 5; NW 2: 3; NW 3: 2; NW 4: 3; NW 5:4)	159	17,965	1389	232	387	809 (4)	20,782
	Total: 31 Terminals		18,852	2047	320	391	1153 (7)	22,763

6.3 STRENGTHENING OF IWAI

For implementation of such a massive grid work, strengthening of IWAI is a pre-requisite. With the existing available human resources/ technical experts, consultants opined that it will be very difficult for IWAI to handle such a large valued infrastructure project, as it requires deployment of technical men-power in large numbers along the stretch of waterways to be connected which is in thousands of kilometers in length. Therefore it is very much essential to strengthen the IWAI organization as a whole, to enable it to handle this project as well as other ongoing projects without any hurdles.

6.4 WAY FORWARD

For effective implementation of the project, preparation of the Detailed Project reports for the 14 terminals identified under Phase-1 should be taken up by IWAI immediately. On getting financial / project sanctions, Consultants can be engaged for detailed engineering and project implementations. Contract documents can also be prepared through identified consulting agencies and implementation of projects can be monitored through project management consultants with overall management and supervision of IWAI authorities. This will also help IWAI to minimise their short term requirement of large manpower resources for implementation of such a mega project in a limited span of time. Strengthening of IWAI by inducting technical manpower can be done simultaneously over a period of time, which will help in maintain the fairway and terminals for the post construction period. While implementing the Phase-I activities, initial studies and other investigations etc., can be carried out for activities/ terminals identified under Phase-II, so that the continuity of implementation and connecting of grid as planned can be established.

6.5 CONCLUSIONS

The National Waterway Grid Connectivity study carried out is expected to divert the cargo/ goods movement from the strained road/ rail mode of transport to IWT mode in a phased manner with an overall investment of Rs 22,763 crore; however infrastructure has to be created for such modal shift. Further, the waterways need to be developed along with terminal development with necessary infrastructure in place apart from establishing connectivity to the nearest National Highways/ State Highways, rail head wherever required apart from possible port connectivity.

For effectively integrating the National Waterways Transportation grid, the following major components of works are to be carried out on priority, which forms part of the total grid system:

1. Buxar- Varanasi & Varanasi- Allahabad stretches of NW-1 with 3.0 m depth by constructing 4 barrages at a cost of Rs. 6,300 crore
2. Talcher- Paradip/ Dhamra stretches of NW-5 with 3.0 m depth by constructing 5 barrages at a cost of Rs. 4,400 crore
3. East Coast Canal of NW-5 with 2.5 m depth with dredging and river training works at a cost of Rs. 2,000 crore
4. Development works in Buckingham canal and other stretches of NW-4 at a cost of Rs. 2,640 crore
5. Dibrugarh- Sadiya stretch of NW-2 and Indo-Bangladesh Protocol route with 2.5 m depth at a cost of Rs.1,200 crore

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6. Port- IWT connectivity proposed by respective ports at Haldia, Kolkata, Kochi, Kakinada, Krishnapatnam, Paradip and Dhamra as part of the port system at Rs.1,153 crore

The private Investments in the following areas are anticipated to the tune of Rs.65, 599 crore in the two phases. The private investments are expected mainly on the following activities:

- On Barges
- Creation of storage facilities
- On ship building facilities
- On vessel repair/ bunkering facilities
- On Inland Container Depots/ Domestic Container Terminals
- On industrial units/ areas

Apart from the above area of interest, it is also expected that few terminals are likely to be set up and operated by private parties for their exclusive use.

However, it is pertinent to mention that, for maintaining fairway with requisite least available depth (LAD) should be the responsibility of the IWAI, as private investments on this area is not anticipated since it is not an attractive proposition for huge investments by Private parties. Globally too, fairway maintenance is in general carried out by the States concerned. Therefore, private investments on fairway development are not expected.

6.6 RECOMMENDATIONS

Based on the detailed study made by the consultants on National Waterway Grid Connectivity, the following points emanate which forms the final outcome/ recommendations by the Consultants:

- IWAI may seek the In-principal approval of scheme for Rs.1,981 crore for Phase-I development and Rs.20,782crore for Phase-II development from the Government of India
- The development and maintenance of fairways may be met mainly through GBS/ public funding. Non fairway development can be taken up by non GBS funding wherever feasible.
- Modification of existing lock gate and construction of additional lock gate at Farakka by MoWR
- Strengthening of IWAI primarily by augmenting technical manpower to take up the massive work indicated in both the phases and maintenance of the same thereafter.
- Port connectivity shall be developed through concerned port authorities or through PPP by concerned port authorities.

-
- IWAI may take up with concerned ministries for enacting Regulations for compulsory movement of hazardous cargo and certain percentage of bulk cargo by IWT mode, wherever feasible, to be in-built in MoEF guidelines.
 - Banks and FIs to support private investments in barges and ship building yards/ facilities.
 - Incentives to barge owners for construction of barges and incentives to cargo owners for modal shift to IWT to be considered.
 - Incentives to State Governments for development activities in waterways sector, apart from encouraging State Governments to incentivize setting up of new industries along NWs/ waterways, wherever feasible.
 - IWT, especially ferry operation within urban area needs to be covered under JNNURM where available.
 - Financial and technical assistance to States for developing and maintaining their waterways and also provide assistance to strengthen their IWT set-ups
 - IWAI/ MoS to collaborate with State Governments for making regulation for construction of new structures (bridges etc) without hampering the future IWT prospects of the State waterways
 - The inland dredging capacity needs to be augmented to cater to the tremendous dredging work anticipated in both the phase of waterway development.