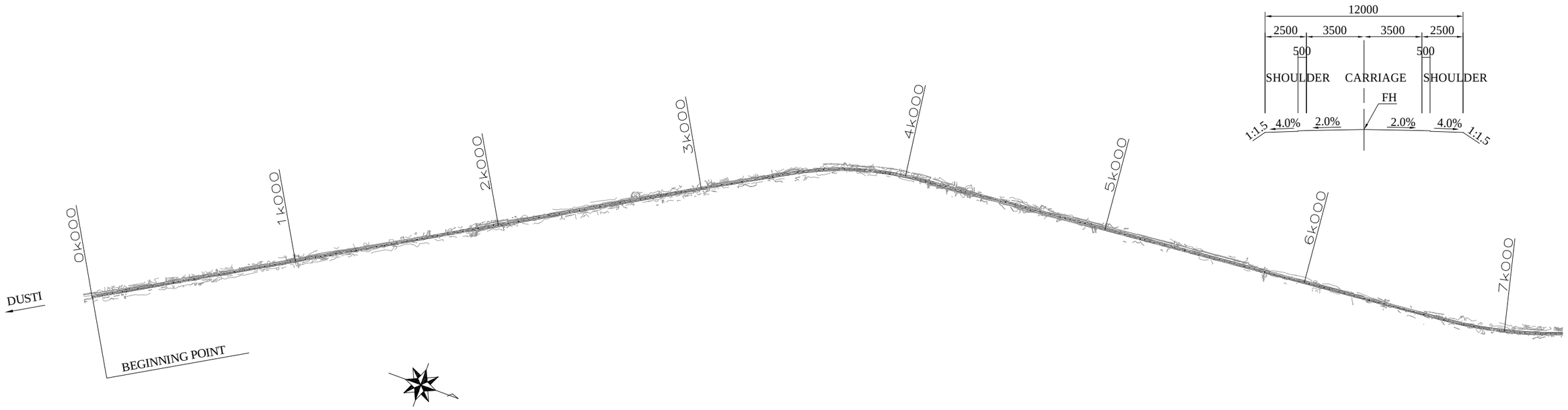
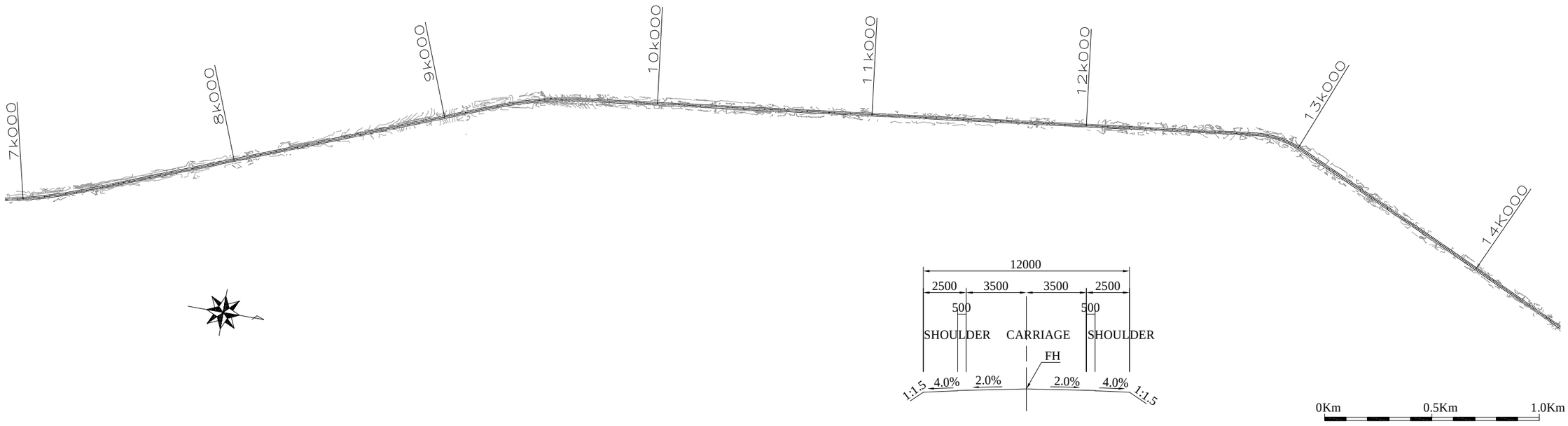
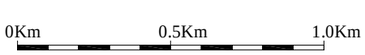
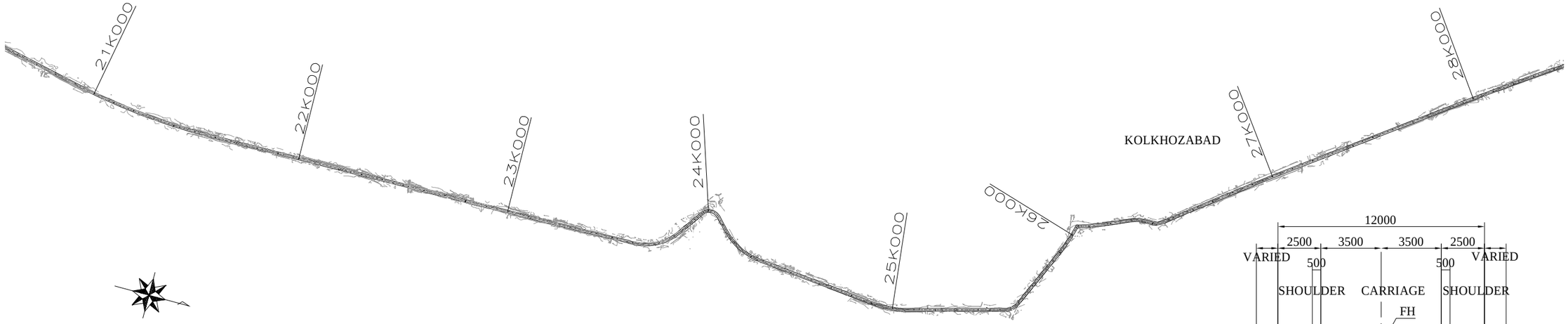
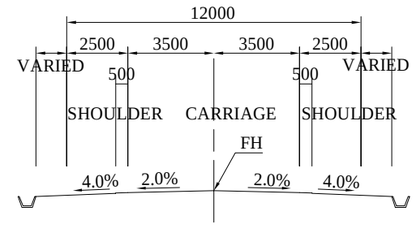


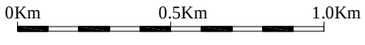


MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: PLAN (1)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－1



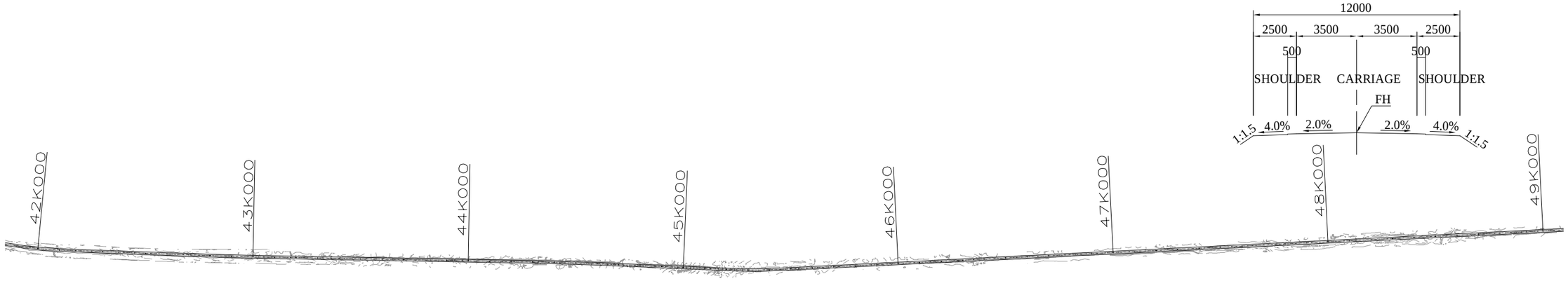


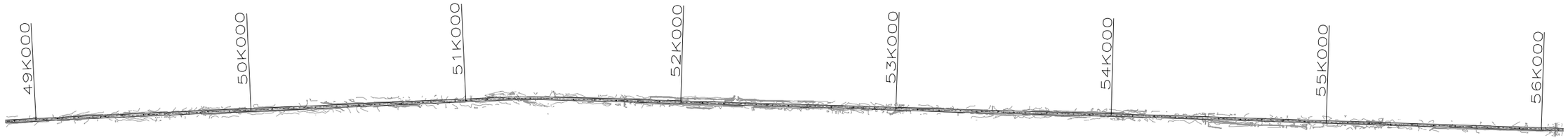


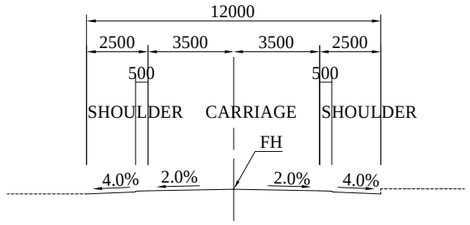


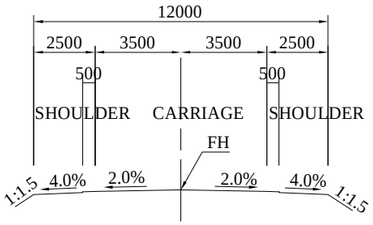
MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: PLAN (2)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－2

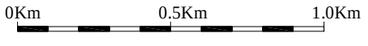
MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: PLAN (3)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－3



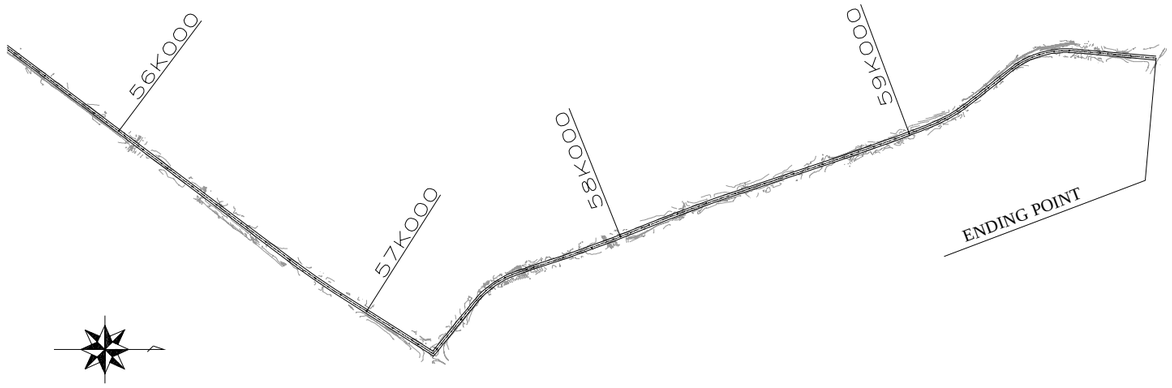




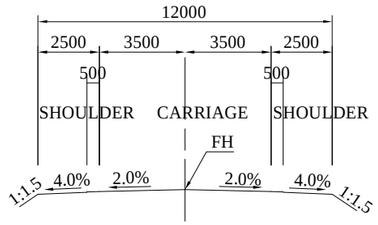




MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: PLAN (4)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－4

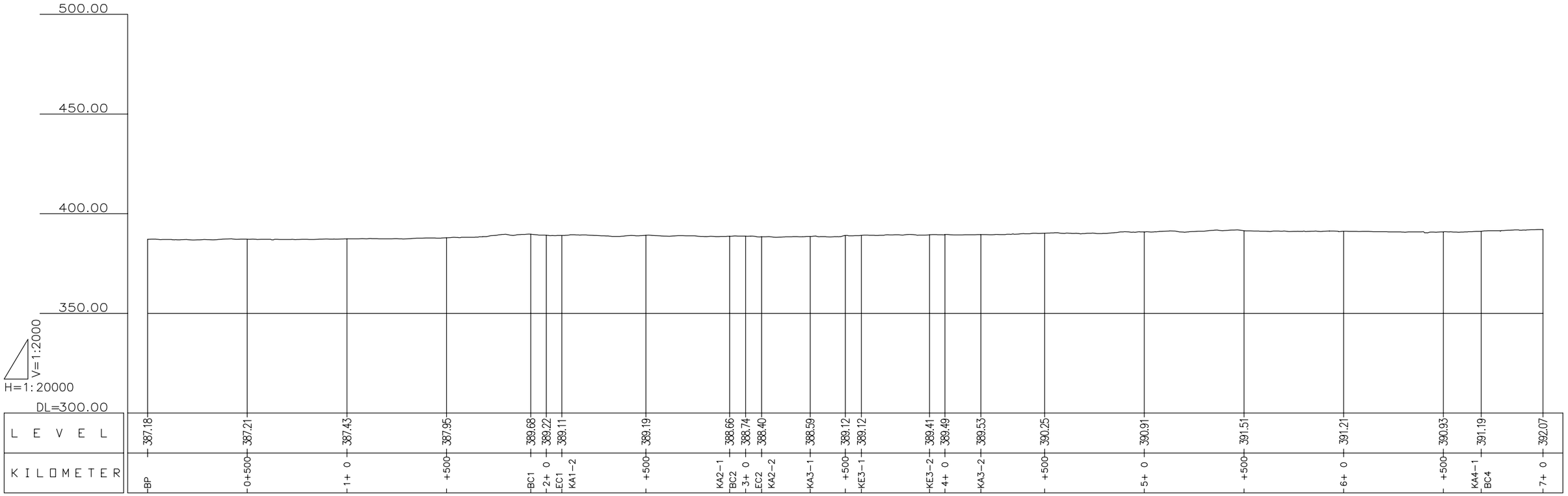


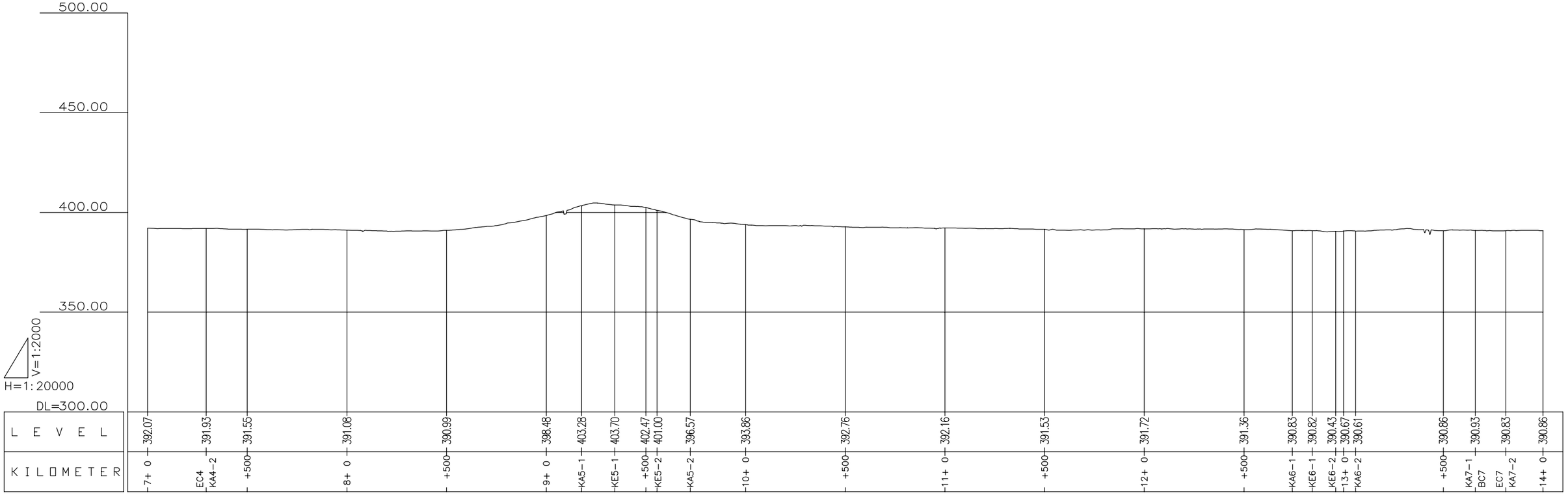
KURUGAN TYUBE



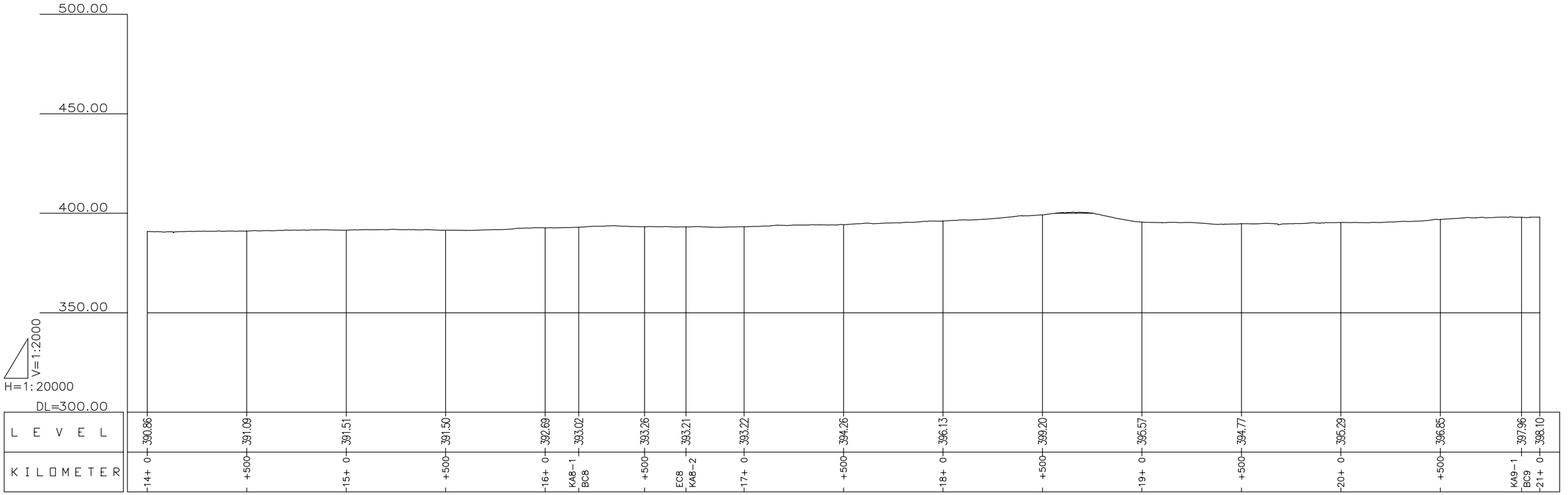
0Km 0.5Km 1.0Km

MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: PLAN (5)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－5

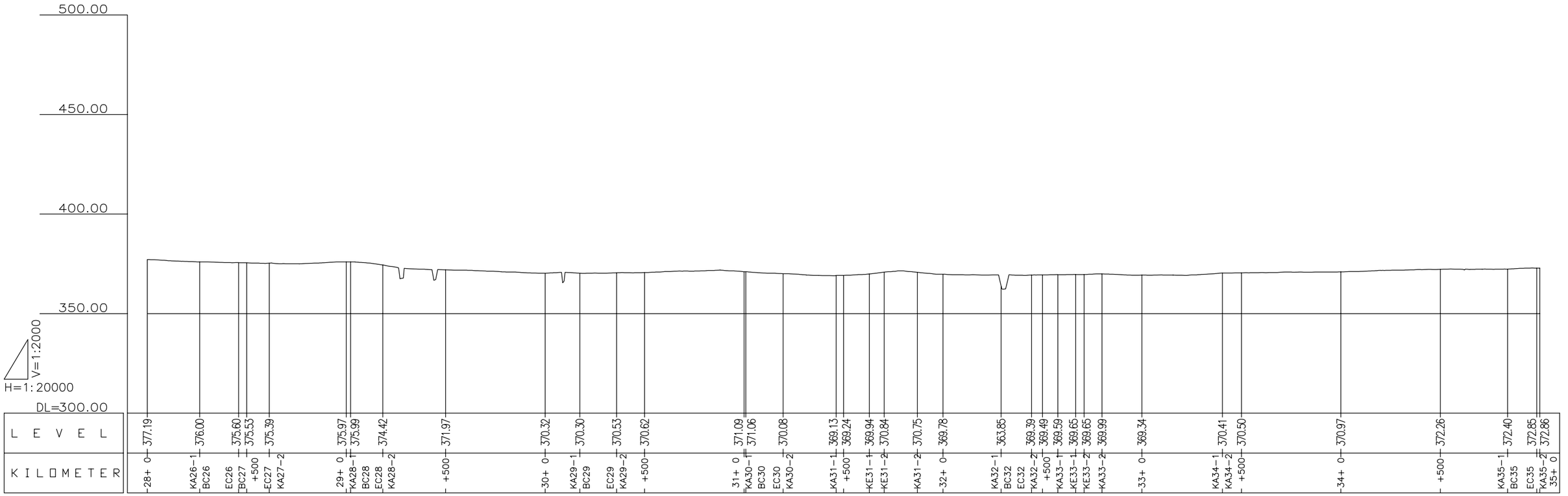




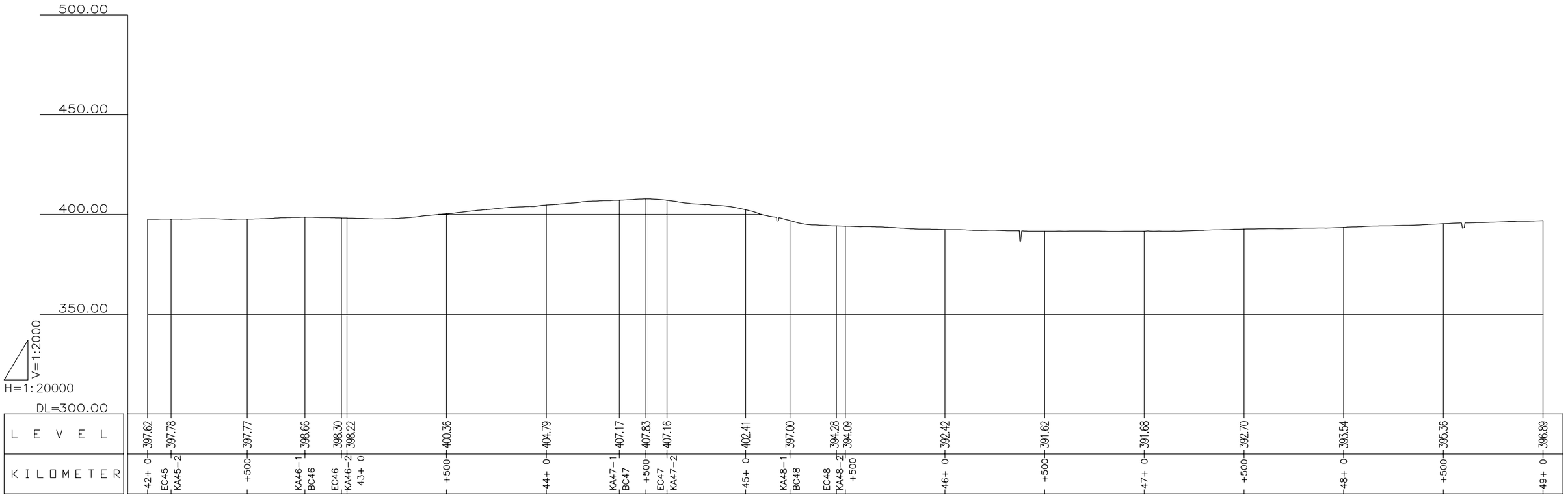
MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE−DUSTI	DRAWING TITLE: PROFILE (1)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD−6

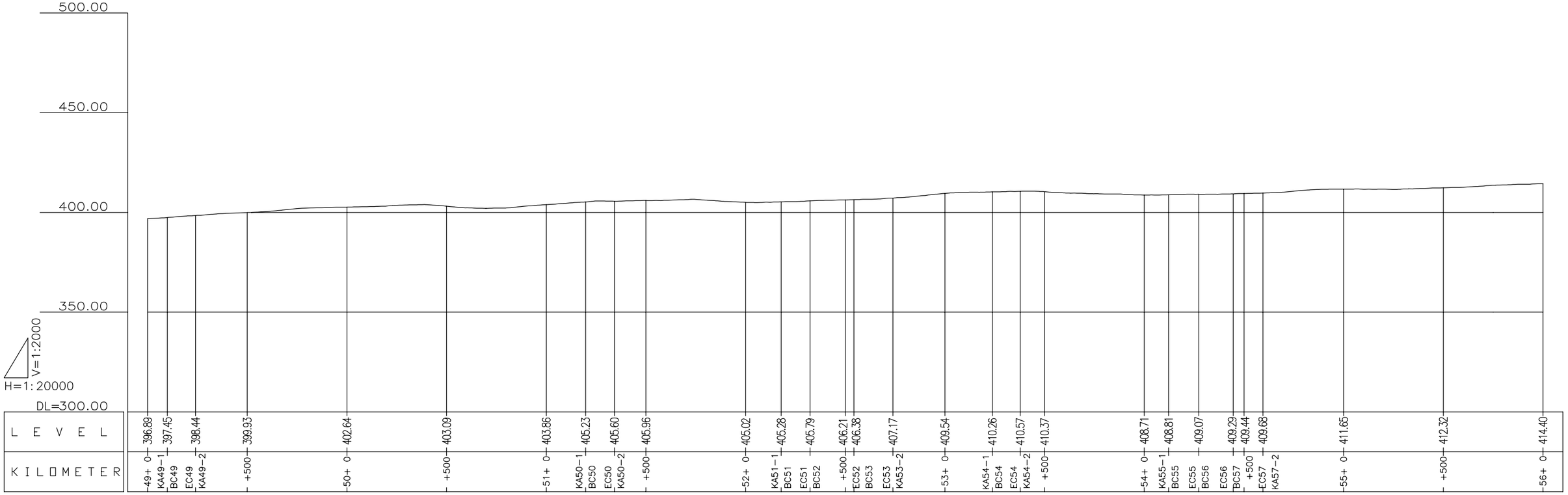


MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: PROFILE (2)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－7

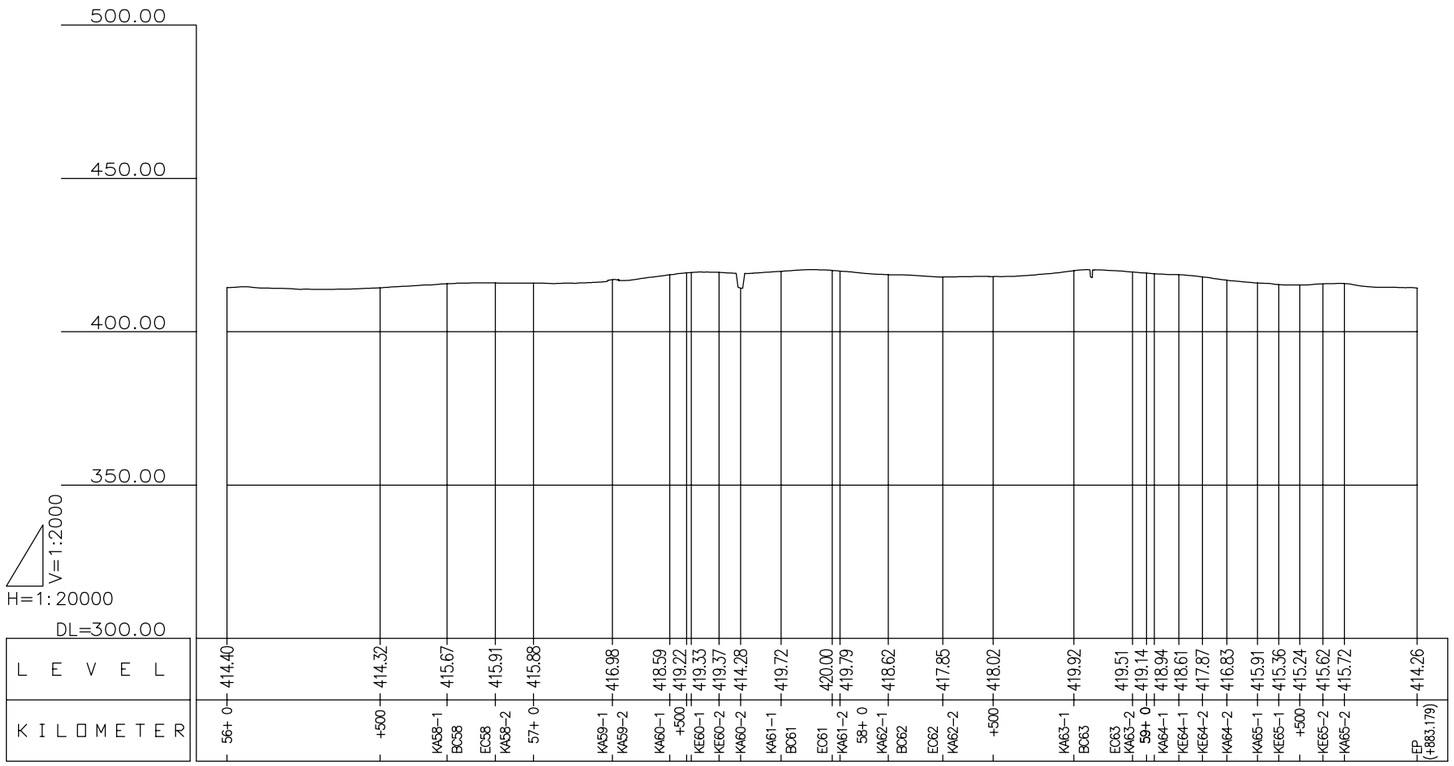


MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: PROFILE (3)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－8





MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: PROFILE (4)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－9

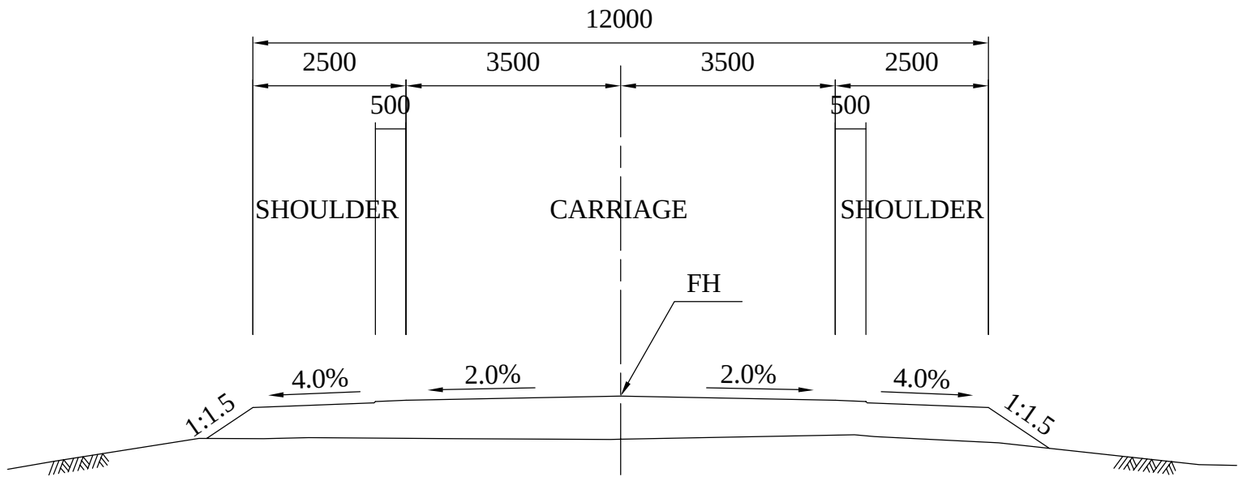


MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: PROFILE (5)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－10

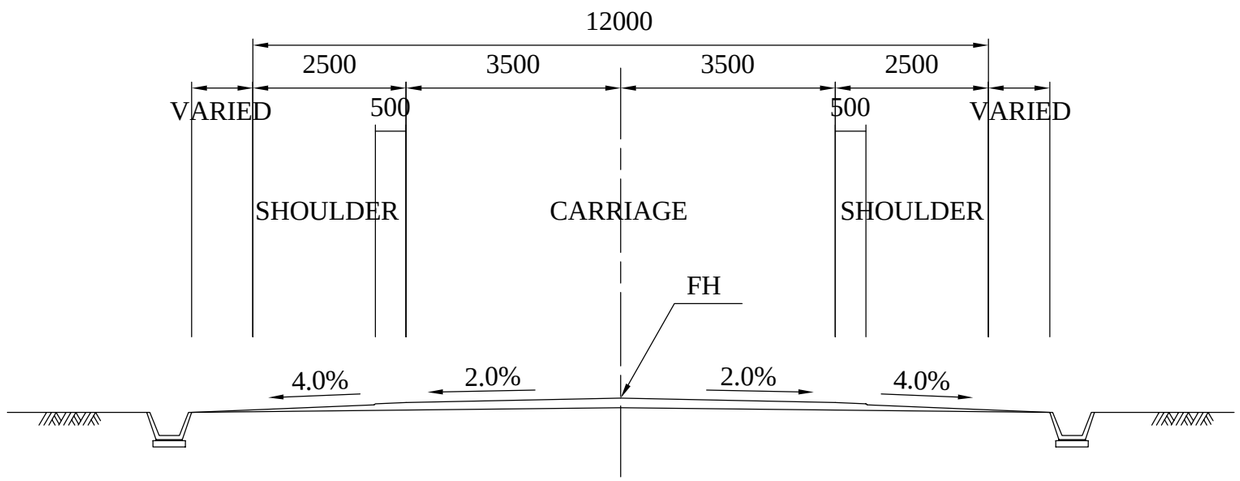
TYPICAL CROSS SECTION

SCALE A3 1:100
A4 70.7%

GENERAL SECTION

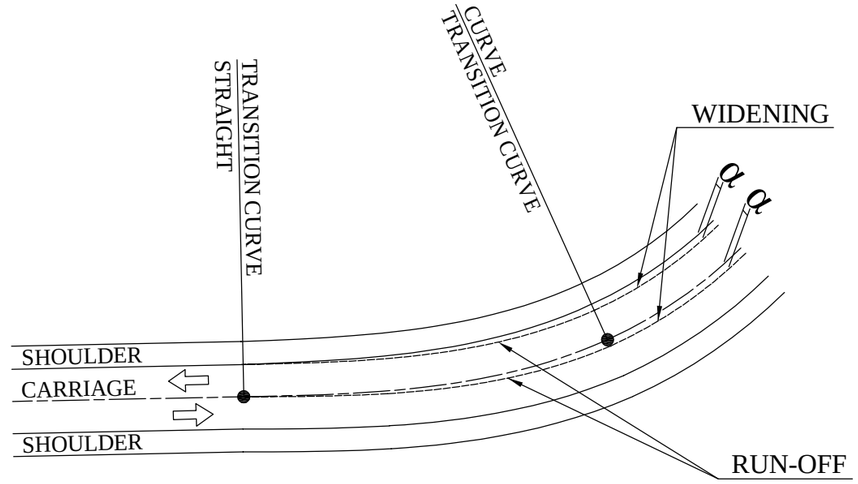


TOWNSHIP SECTION



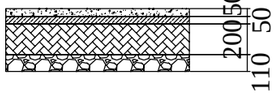
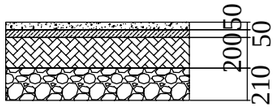
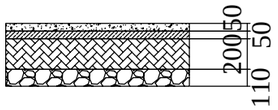
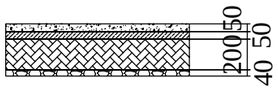
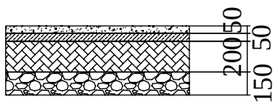
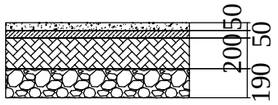
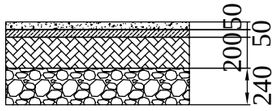
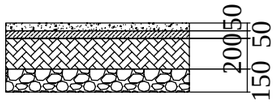
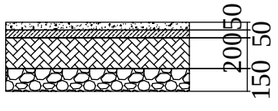
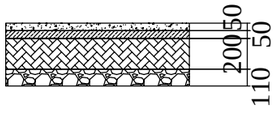
WIDENING OF ROAD LIST

STATION	α (mm)	Remarks
25+516.184 ～ 25+556.684	0～750	
25+556.684 ～ 25+560.223	750	
25+560.223 ～ 25+600.723	750～0	
26+279.752 ～ 26+320.585	0～250	
26+320.585 ～ 26+330.992	250	
26+330.992 ～ 26+371.825	250～0	
26+371.825 ～ 26+416.825	0～500	
26+416.825 ～ 26+426.486	500	
26+426.486 ～ 26+471.486	500～0	



MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: TYPICAL CROSS SECTION	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－11

PAVEMENT STRUCTURE

Section		Type	Total Thickness of Pavement	Pavement Structure		Remarks
Section-1	0+000 ～ 7+000	Type-1	t=410mm		ASPHALT SURFACE COURSE t= 50mm ASPHALT BINDER COURSE t= 50mm BASE COURSE t=200mm SUBBASE COURSE t=110mm	
Section-2	7+000 ～ 16+000	Type-2	t=510mm		ASPHALT SURFACE COURSE t= 50mm ASPHALT BINDER COURSE t= 50mm BASE COURSE t=200mm SUBBASE COURSE t=210mm	
Section-3	16+000 ～ 23+500	Type-1	t=410mm		ASPHALT SURFACE COURSE t= 50mm ASPHALT BINDER COURSE t= 50mm BASE COURSE t=200mm SUBBASE COURSE t=110mm	
Section-4	23+500 ～ 27+000	Type-6	t=340mm		ASPHALT SURFACE COURSE t= 50mm ASPHALT BINDER COURSE t= 50mm BASE COURSE t=200mm SUBBASE COURSE t= 40mm	
Section-5	27+000 ～ 36+500	Type-3	t=450mm		ASPHALT SURFACE COURSE t= 50mm ASPHALT BINDER COURSE t= 50mm BASE COURSE t=200mm SUBBASE COURSE t=150mm	
Section-6	36+500 ～ 43+500	Type-4	t=490mm		ASPHALT SURFACE COURSE t= 50mm ASPHALT BINDER COURSE t= 50mm BASE COURSE t=200mm SUBBASE COURSE t=190mm	
Section-7	43+500 ～ 47+000	Type-5	t=540mm		ASPHALT SURFACE COURSE t= 50mm ASPHALT BINDER COURSE t= 50mm BASE COURSE t=200mm SUBBASE COURSE t=240mm	
Section-8	47+000 ～ 55+000	Type-3	t=450mm		ASPHALT SURFACE COURSE t= 50mm ASPHALT BINDER COURSE t= 50mm BASE COURSE t=200mm SUBBASE COURSE t=150mm	
Section-9	55+000 ～ 57+500	Type-3	t=450mm		ASPHALT SURFACE COURSE t= 50mm ASPHALT BINDER COURSE t= 50mm BASE COURSE t=200mm SUBBASE COURSE t=150mm	
Section-10	57+500 ～ 59+883	Type-1	t=410mm		ASPHALT SURFACE COURSE t= 50mm ASPHALT BINDER COURSE t= 50mm BASE COURSE t=200mm SUBBASE COURSE t=110mm	

MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: PAVEMENT STRUCTURE	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－12

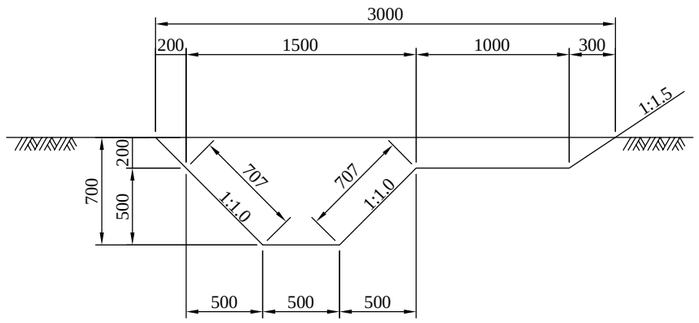
DRAINAGE STRUCTURE (1)

SCALE AS SHOWN

EARTH DITCH

SCALE A3 1:40 A4 70.7%

CUT TYPE

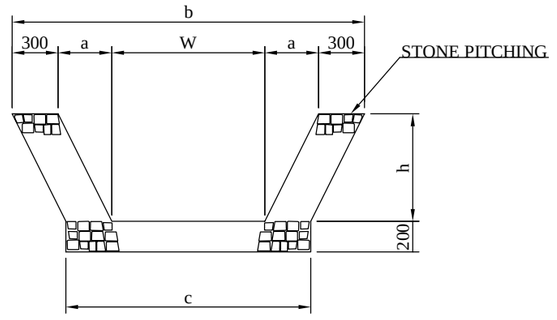


MATERIAL LIST PER m

ITEM	STANDARD	UNIT	QUANTITY	REMARKS
EXCAVATION		cu.m	1.05	

STONE PITCHING DRAINAGE

SCALE A3 1:40 A4 70.7%



MATERIAL LIST PER m

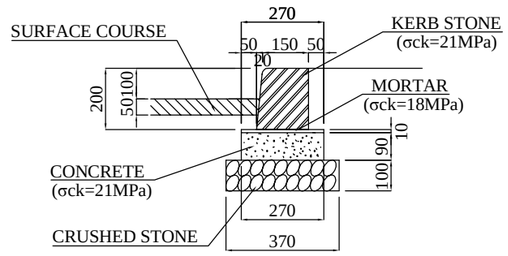
ITEM	STANDARD	UNIT	QUANTITY		REMARKS
			W=0.5m	W=1.0m	
STONE PITCHING		cu.m	0.52	1.01	

DIMENSION LIST

W	a	b	c	h
500	500	2100	1100	500
1000	350	2300	1600	700

KERB

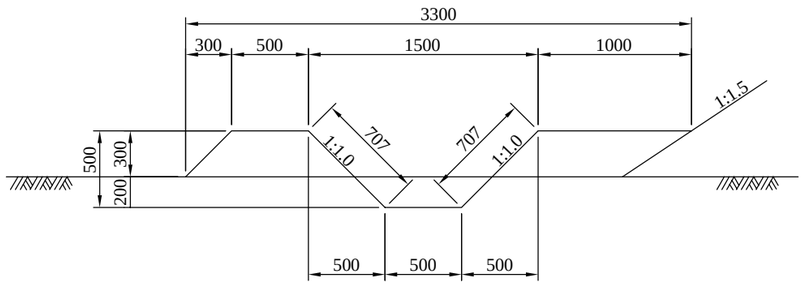
SCALE A3 1:20 A4 70.7%



MATERIAL LIST PER m

ITEM	KERB STONE (σck=21MPa)	FORM (KERB STONE)	MORTAR (σck=18MPa)	CONCRETE (σck=21MPa)	FORM (CONCRETE)	CRUSHED STONE	REMARKS
	cu.m	sq.m	cu.m	cu.m	sq.m	cu.m	
KERB	0.032	0.40	0.003	0.02	0.18	0.37	

EMBANKMENT TYPE

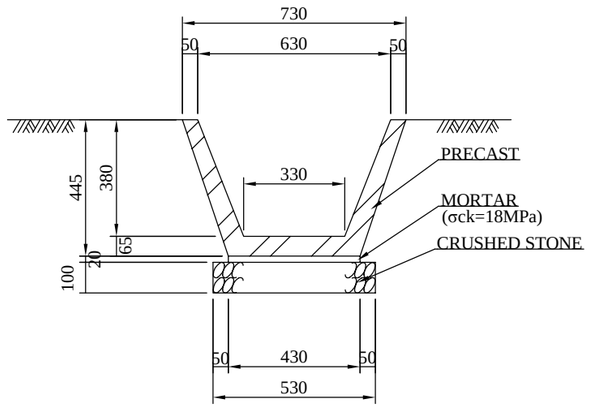


MATERIAL LIST PER m

ITEM	STANDARD	UNIT	QUANTITY	REMARKS
EMBANKMENT		cu.m	0.88	
EXCAVATION		cu.m	0.50	

PRECAST SIDE DITCH

SCALE A3 1:20 A4 70.7%



MATERIAL LIST PER m

ITEM	STANDARD	UNIT	QUANTITY	REMARKS
OPEN DRAINAGE	PRECAST	m	1.00	
MORTAR	σck=18MPa	cu.m	0.009	
CRUSHED STONE		cu.m	0.05	

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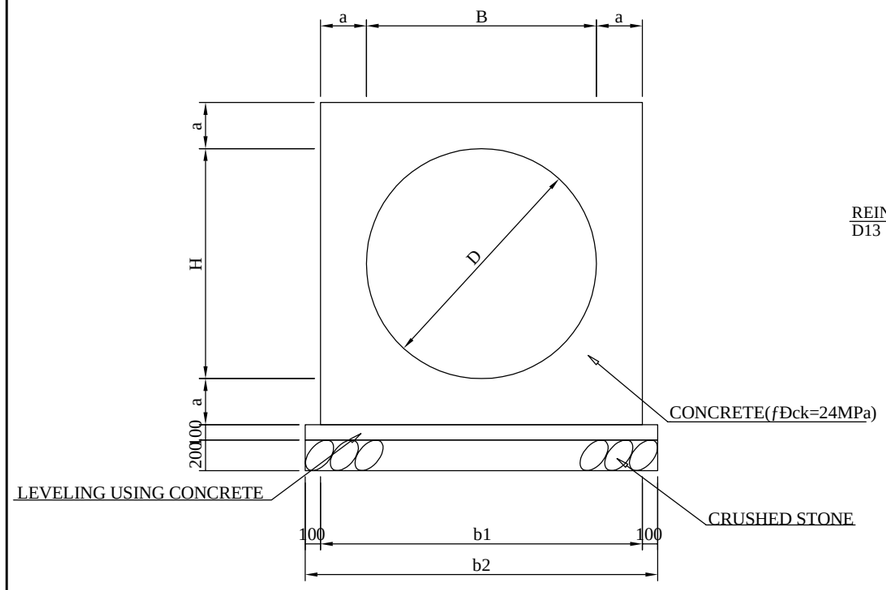
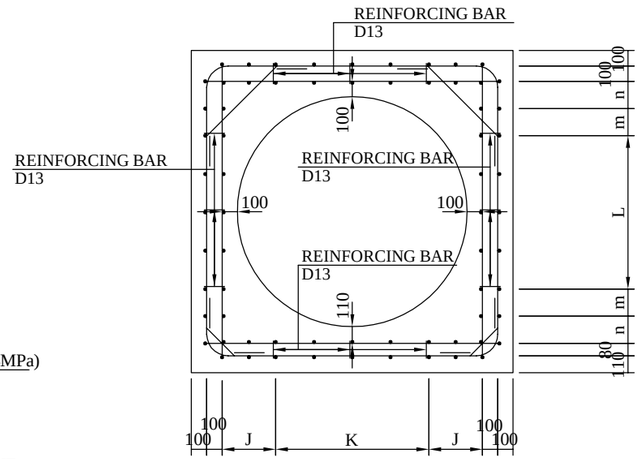
DRAINAGE STRUCTURE (2)

SCALE AS SHOWN

PIPE CULVERT

SCALE A3 1:40
A4 70.7%





MATERIAL LIST PER m

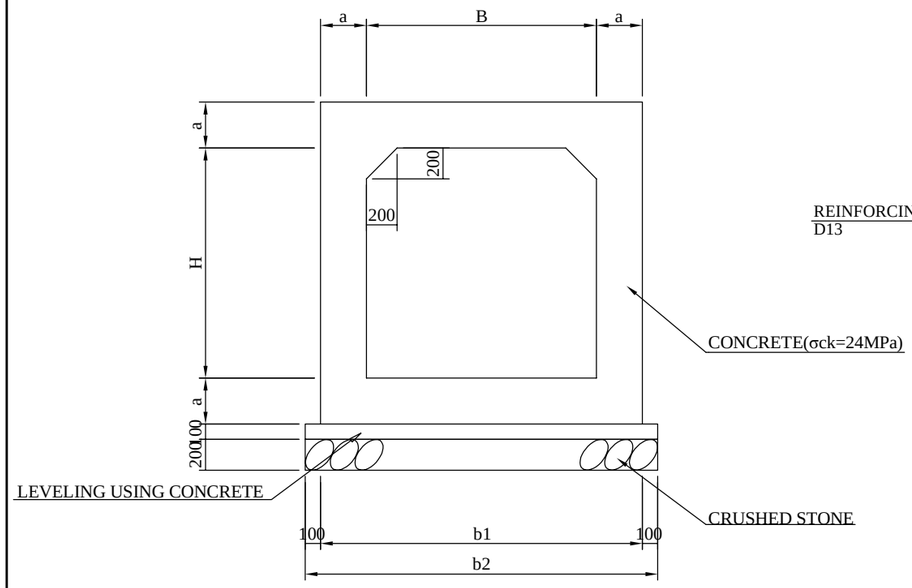
ITEM	REINFORCING BAR	CONCRETE (σck=24MPa)	CRUSHED STONE	FORM	FORM (VOID PIPE)	REMARKS
	kg	cu.m	sq.m	sq.m	sq.m	
D300	66.86	0.74	1.10	1.80	0.94	
D500	81.19	1.01	1.30	2.20	1.57	
D600	84.38	1.16	1.40	2.40	1.89	
D800	103.80	1.46	1.60	2.80	2.51	
D900	118.76	1.61	1.70	3.00	2.83	
D1000	121.95	1.78	1.80	3.20	3.14	
D1500	162.43	2.64	2.30	4.20	4.71	S2,F2 (D16)

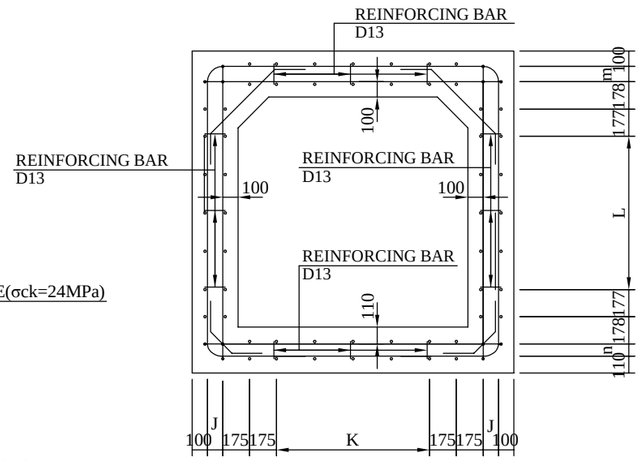
DIMENSION LIST

TYPE	B(=D)	H(=D)	a	b1	b2	J	K	L	m	n
D300	300	300	300	900	1100	0(0@250)	500(2@250)	0(0@250)	127	128
D500	500	500	300	1100	1300	350(2@175)	0(0@250)	0(0@250)	177	178
D600	600	600	300	1200	1400	150(1@150)	500(2@250)	500(2@250)	-	155
D800	800	800	300	1400	1600	0(0@250)	1000(4@250)	500(2@250)	127	128
D900	900	900	300	1500	1700	300(2@150)	500(2@250)	500(2@250)	152	153
D1000	1000	1000	300	1600	1800	350(2@175)	500(2@250)	500(2@250)	177	178
D1500	1500	1500	300	2100	2300	350(2@175)	1000(4@250)	1000(4@250)	177	178

BOX CULVERT

SCALE A3 1:40
A4 70.7%





MATERIAL LIST PER m

ITEM	REINFORCING BAR	CONCRETE (σck=24MPa)	CRUSHED STONE	FORM	REMARKS
	kg	cu.m	sq.m	sq.m	
1000×1500	139.23	1.90	1.80	7.97	
2000×1500	220.65	2.50	2.80	8.97	
2500×2000	315.06	3.10	3.30	11.47	

DIMENSION LIST

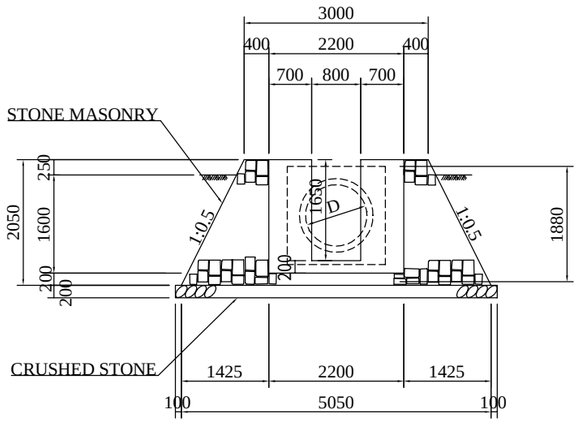
TYPE	B	H	a	b1	b2	J	K	L	m	n
1000×1500	1000	1500	300	1600	1800	100	500(2@250)	1000(4@250)	100	80
2000×1500	2000	1500	300	2600	2800	100	1500(6@250)	1000(4@250)	100	80
2500×2000	2500	2000	300	3100	3300	100	2000(8@250)	1500(6@250)	100	80

MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE−DUSTI	DRAWING TITLE: DRAINAGE STRUCTURE (2)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD−14

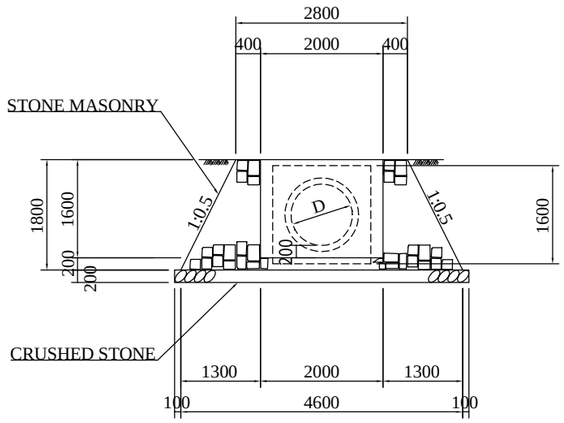
DRAINAGE STRUCTURE (3)

SCALE A3 1:100
A4 70.7%

CATCH PIT (A)

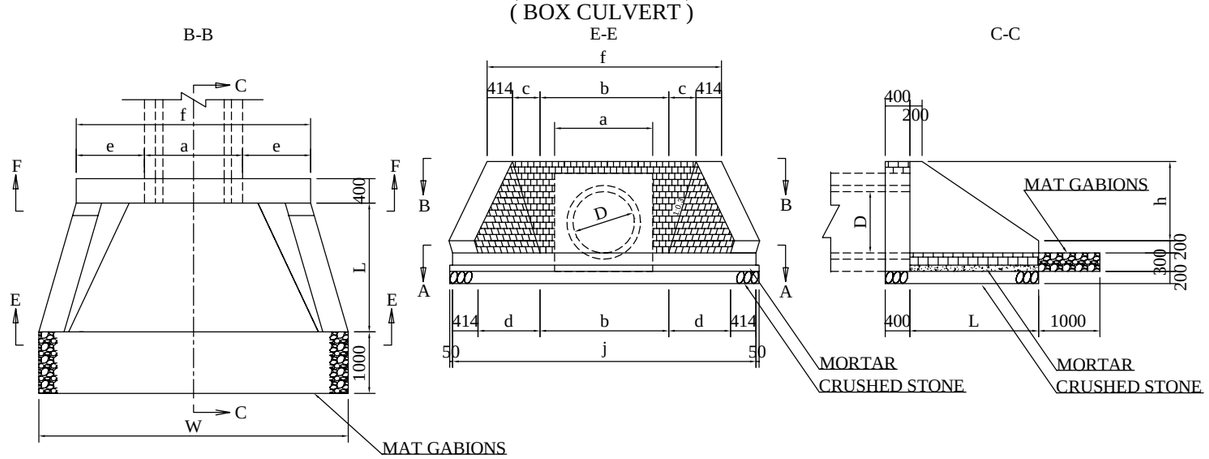


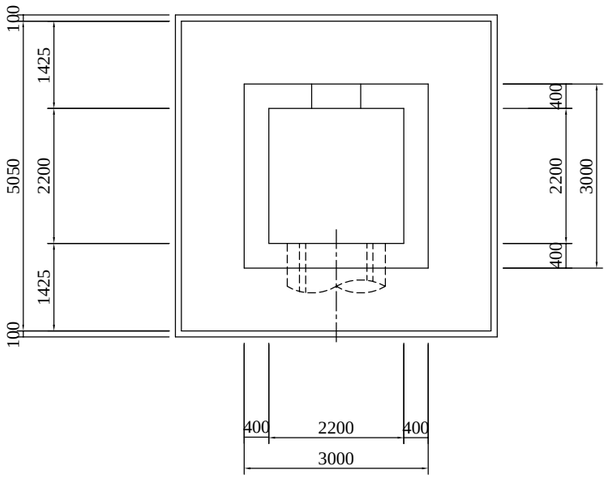
CATCH PIT (B)

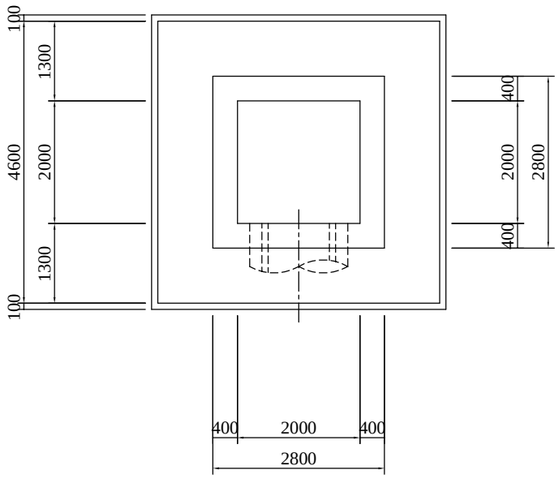


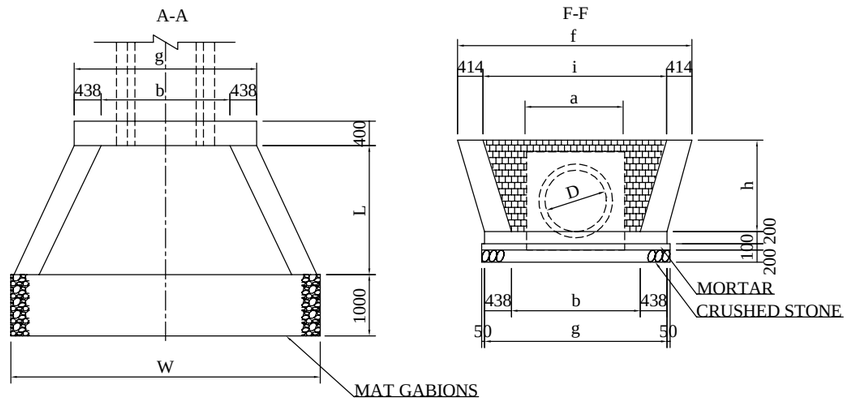
OUTLET－INLET

(PIPE CULVERT)
(BOX CULVERT)









DIMENSION LIST (PIPE CULVERT)

TYPE	D	a	b	c	d	e	f	g	h	i	j	L	W
D500	500	900	1400	297	618	961	2822	2276	790	1994	3465	1600	3565
D800	800	1340	1840	387	853	1051	3442	2716	1090	2614	4374	1900	4474
D1000	1000	1600	2100	447	1010	1111	3822	2976	1290	2994	4948	2100	5048

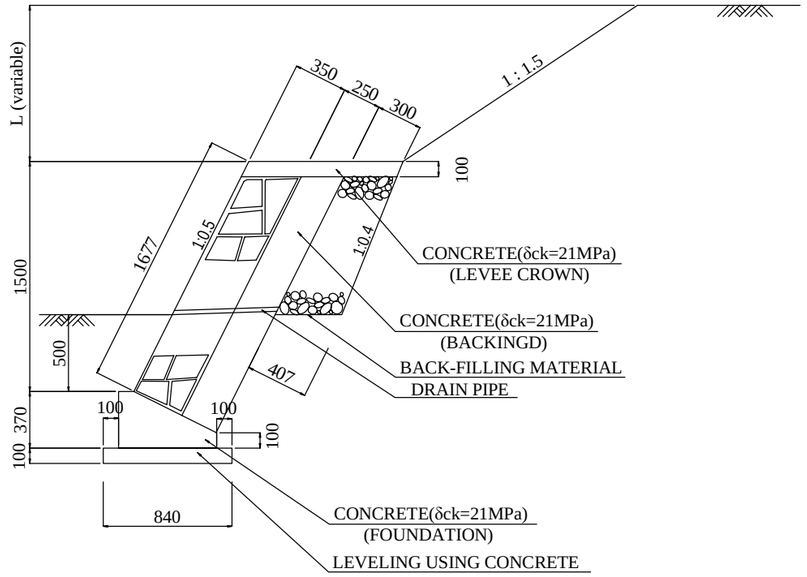
DIMENSION LIST (BOX CULVERT)

TYPE	a	b	c	d	e	f	g	h	i	j	L	W
1000×1500	1600	2100	600	1409	1264	4128	2976	1800	3300	5747	2600	5847
2000×1500	2800	3298	600	1409	1264	5328	4174	1800	4500	6946	2600	7046
2500×2000	3300	3800	750	1801	1414	6128	4676	2300	5300	8229	3100	8329

MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: DRAINAGE STRUCTURE (3)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－15

RETAINING WALL

SCALE A3 1:40
A4 70.7%

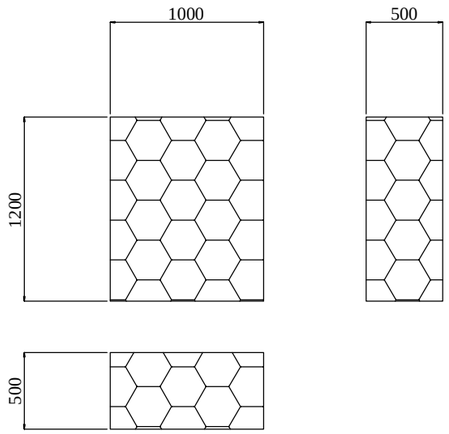


MATERIAL LIST PER m

ITEM	CONCRETE (cu.m)	FORM (sq.m)	FOUNDATION CONCRETE (cu.m)	FOUNDATION FORM (sq.m)	LEVEE CROWN CONCRETE (cu.m)	LEVEE CROWN FORM (sq.m)	STONE MASONRY (cu.m)	BACKINGD CONCRETE (cu.m)	BACK-FILLING MATERIAL (cu.m)
H=1.50m	0.16	0.47	0.08	0.20	0.10	0.22	0.58	0.45	0.44

MAT GABIONS

SCALE A3 1:40
A4 70.7%



MATERIAL LIST PER m

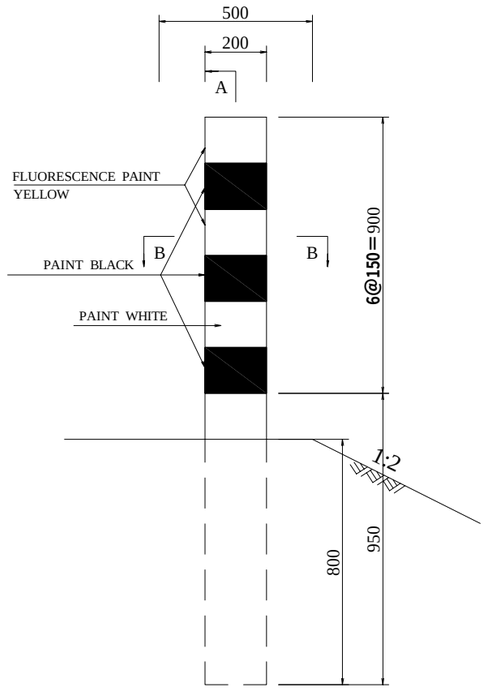
ITEM	MAT GABIONS (piece)	STONE (cu.m)
MAT GABIONS	1.00	0.60

MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE−DUSTI	DRAWING TITLE: RETAINING WALL MAT GABIONS	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD−16

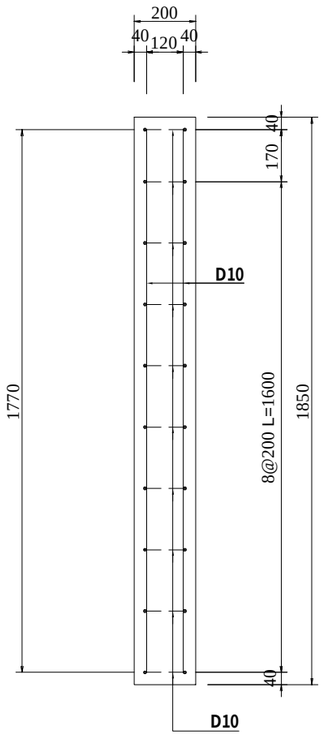
TRAFFIC SAFETY STRUCTURE (1) SCALE AS SHOWN

GUARD POST

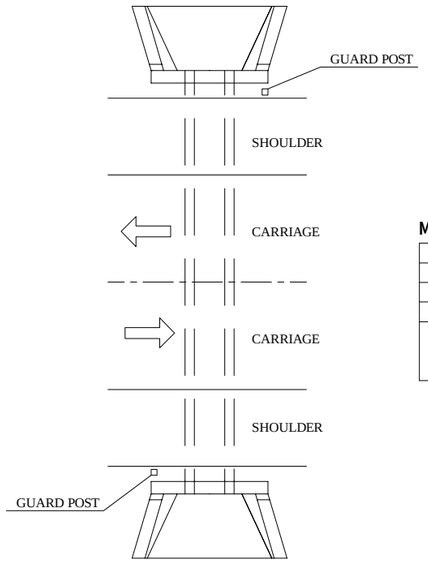
GENERAL VIEW SCALE A3 1:20 A4 70.7%



A-A SCALE A3 1:20 A4 70.7%



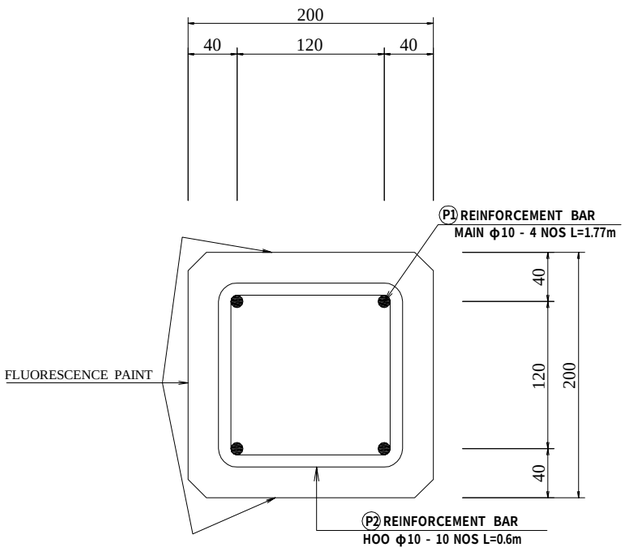
PLAN SCALE A3 1:200 A4 70.7%



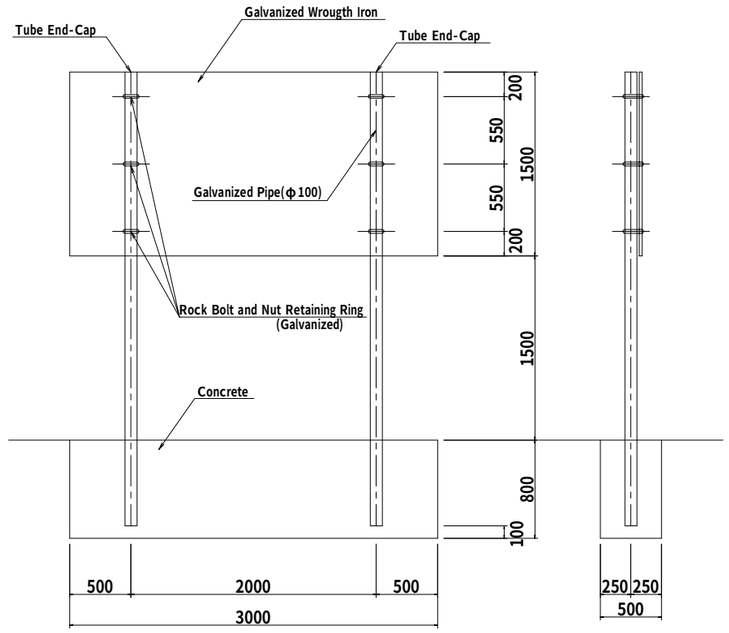
MATERIAL LIST PER 10 Nos.

TYPE	STANDARD	UNIT	QUANTITY	REMARKS
Concrete		cu.m	0.74	
Form		sq.m	14.80	
Reinforced	D10	kg	73.25	
Paint	White	sq.m	1.20	
	Yellow	sq.m	2.40	
	Black	sq.m	3.60	

B-B SCALE A3 1: 5 A4 70.7%



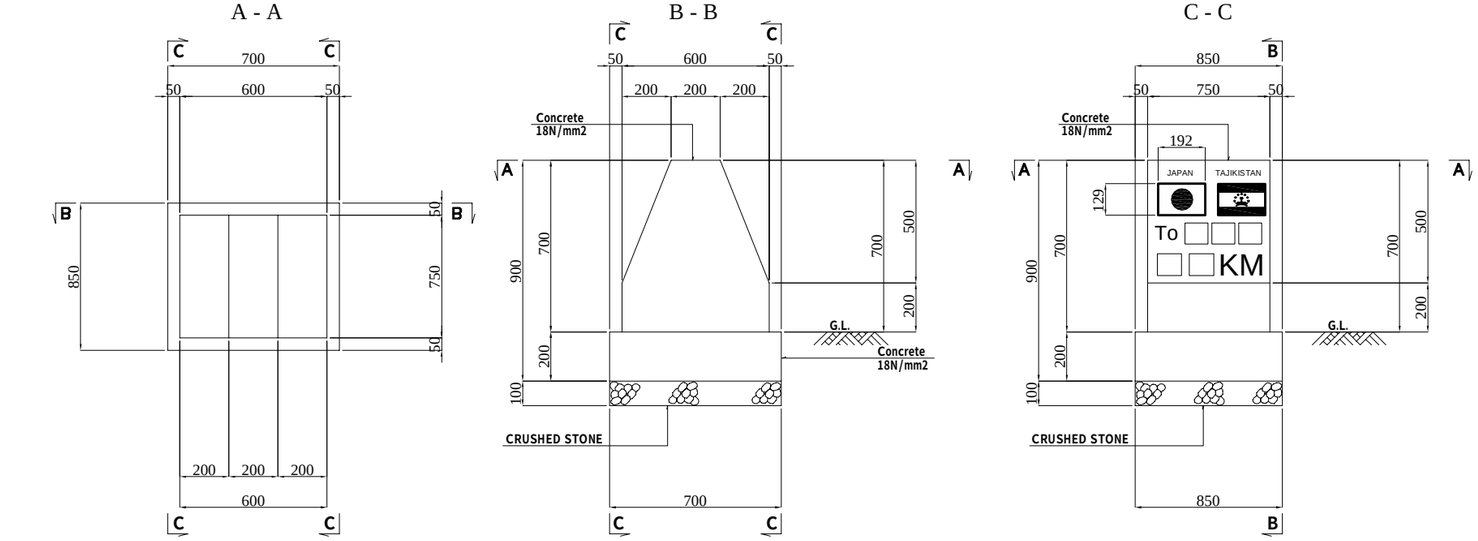
PROJECT PUBLIC BOARD SCALE A3 1:50 A4 70.7%

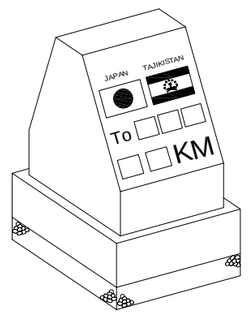


MATERIAL LIST per each

ITEM	STANDARD	UNIT	QUANTITY	REMARKS
Concrete	20MPa	cu.m	1.20	
Form		sq.m	5.60	
Sign Iron	Galvanized	nos.	1.00	
Pipe	〃	m	7.40	
Bolt-Nut	〃	nos.	6.00	
End-Cap	Tube	〃	2.00	

KILOMETER POST SCALE A3 1:25 A4 70.7%





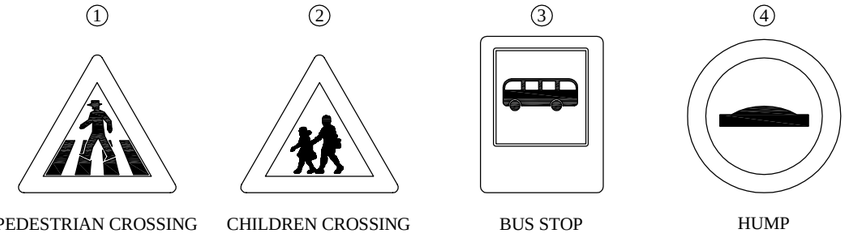
Note: Installation of kilopost shall be set alternately in each 1km

MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: TRAFFIC SAFETY STRUCTURE (1)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－17

TRAFFIC SAFETY STRUCTURE (2)

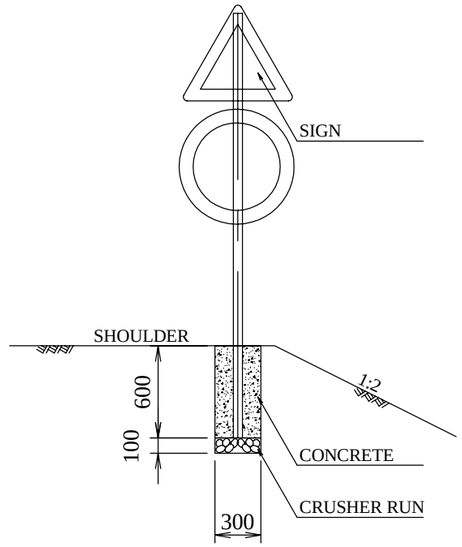
SCALE AS SHOWN

WARNING SIGNS



SIGN POST DETAILS

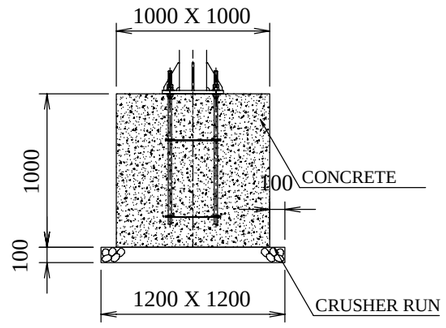
SCALE A3 1:40
A4 70.7%



Note: The size , shape and dimensions of Road Signs shall be in accordance to The Standard of Tajikistan

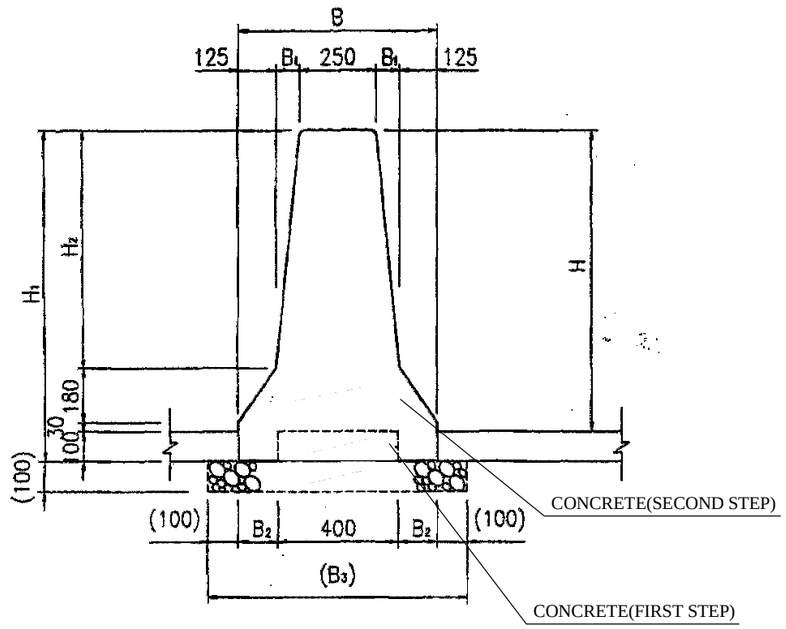
FOUNDATION OF TRAFFIC SIGNAL

SCALE A3 1:40
A4 70.7%



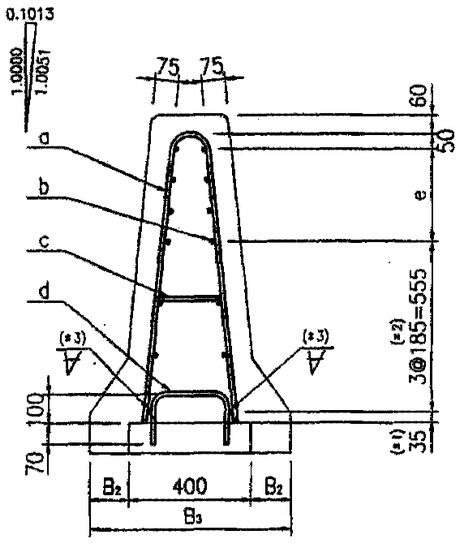
STIFF SAFETY FENCE GENERAL VIEW

SCALE A3 1:20
A4 70.7%



BAR ARRANGEMENT

SCALE A3 1:20
A4 70.7%



DIMENSION LIST

H	H1	H2	B	B1	B2	B3	L
1000	1100	790	660	80	130	(860)	2250

MATERIAL LIST

PER 100m

I T E M	STANDARD	UNIT	QUANTITY
CRUSHED STONE		cu.m	8.60
CONCRETE(FIRST STEP)		cu.m	4.00
CONCRETE(SECOND STEP)		cu.m	40.30
F O R M		m2	20.00
REINFORCING BAR	SD295A MESH (20SHEETS/100m)	kN	19.92
〃	SD295A ERECTION BAR	N	1389
CURING MATERIAL	ACRYLIC FIBER OR SILICA(0.1kg/m2)	N	292
JOINT FILLER	POLYURETHANE	L	(6.08)
JOINT FILLER A	t=10	sq.m	0.40
JOINT FILLER B	t=20	sq.m	(0.40)
SLIP BAR	Φ25x1000	pair	50

STIFFENER

PER EACH

I T E M	STANDARD	UNIT	QUANTITY
REINFORCING BAR	SD295A ERECTION BAR	N	172

REFERENCE WEIGHT

PER 1m

I T E M	STANDARD	UNIT	QUANTITY
REINFORCING BAR	SD295A ERECTION BAR	kN	10.42

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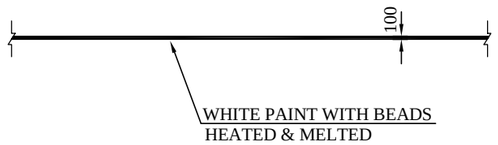
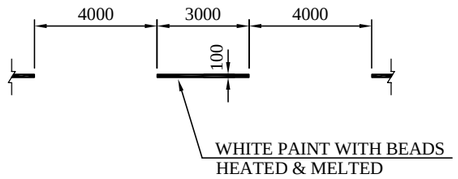
TRAFFIC MARKING SCALE AS SHOWN

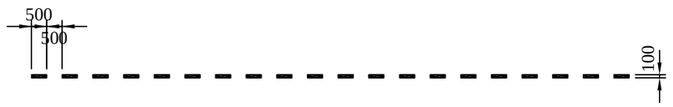
OUTER-BOUNDARY LINE SCALE A3 1:200 A4 70.7%



CENTER LINE SCALE A3 1:200 A4 70.7%

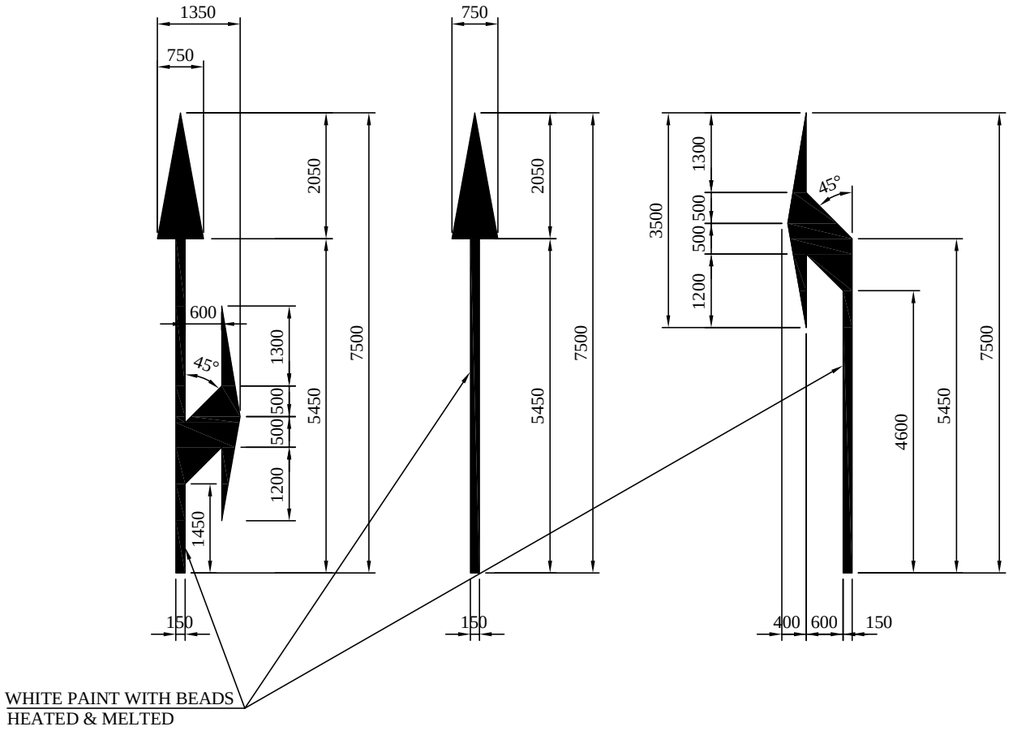


SHORT BROKEN LINE(ACCESS ROAD) SCALE A3 1:200 A4 70.7%

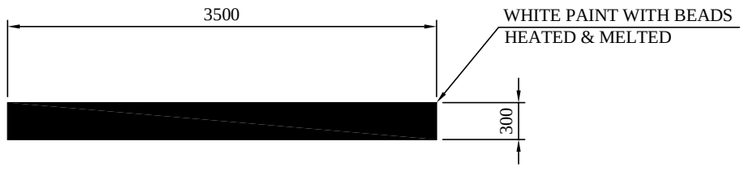


ARROW MARK SCALE A3 1:100 A4 70.7%

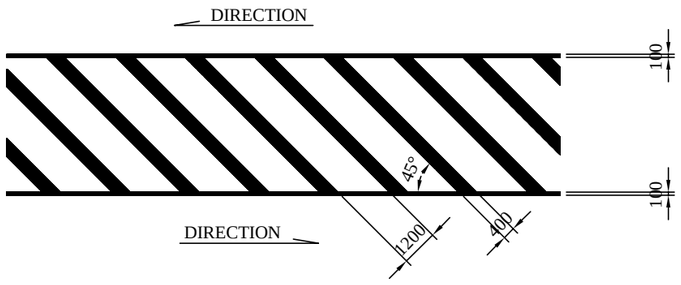
STRAIGHT-RIGHT-TURN STRAIGHT LEFT-TURN



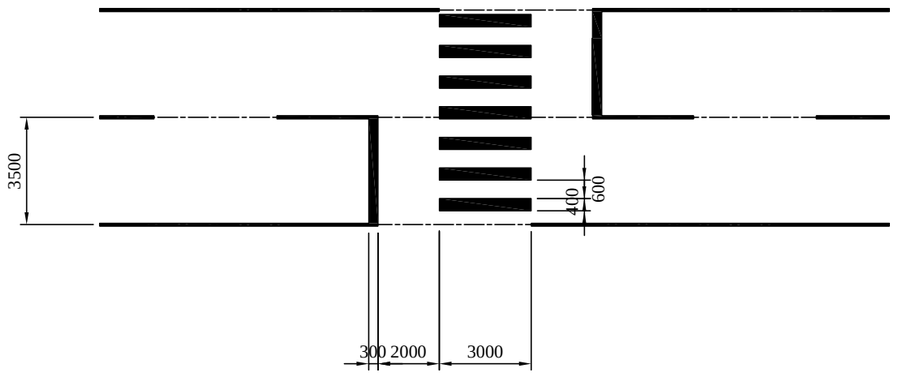
STOP LINE SCALE A3 1:50 A4 70.7%



ZEBRA MARKING SCALE A3 1:200 A4 70.7%



PEDESTRIAN MARKING SCALE A3 1:200 A4 70.7%



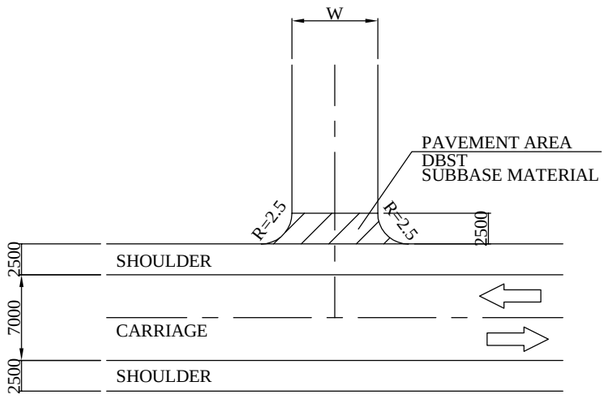
MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: TRAFFIC MARKING	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－19

ACCESS ROAD STRUCTURE

SCALE A3 1:500
A4 70.7%

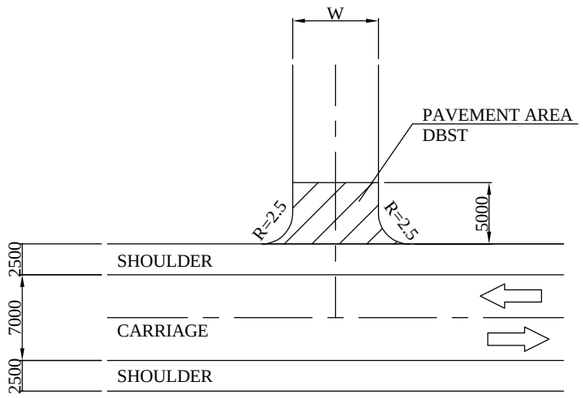
TYPE-1

GATE



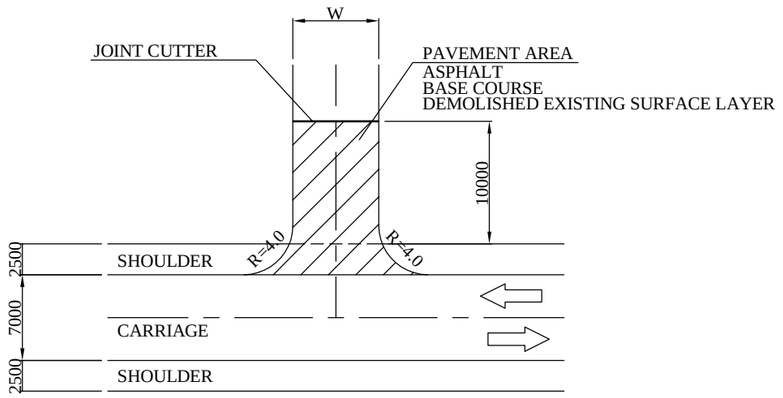
TYPE-2-2

ACCESS ROAD(URBAN AREA)



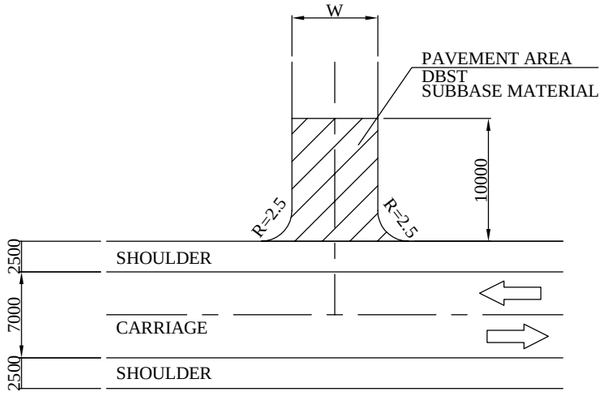
TYPE-4

ACCESS ROAD



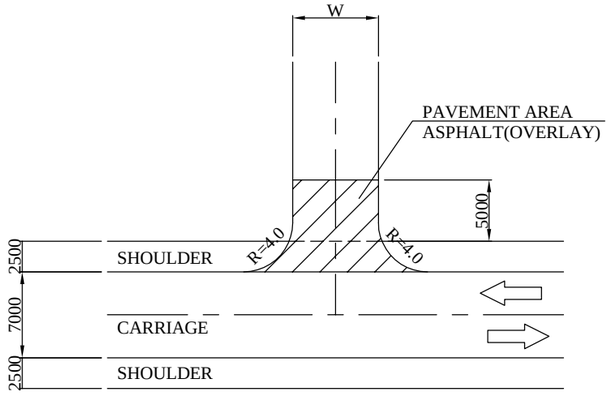
TYPE-2-1

ACCESS ROAD



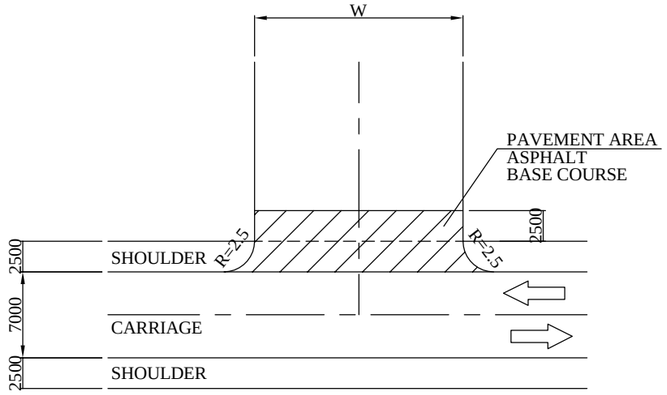
TYPE-3

ACCESS ROAD(URBAN AREA)



TYPE-5

GAS STATION



MATERIAL LIST

PER EACH

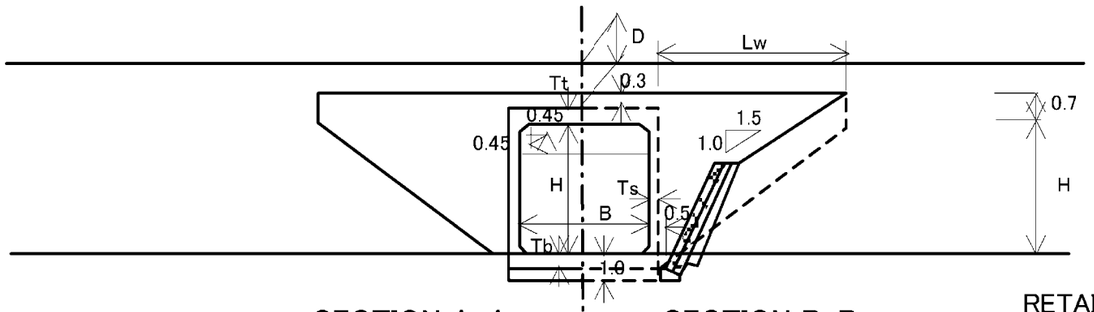
TYPE	W	ASPHALT t=50mm	BASE COURSE t=100mm	DBST t=30mm	SUBBASE MATERIAL t=250mm	DEMOLISHED EXISTING SURFACE LAYER t=50mm	JOINT CUTTER	REMARKS
TYPE-1	7.5	———	———	21.5	21.5	———	———	
TYPE-2-1	5.8	———	———	61.0	61.0	———	———	
TYPE-2-2	7.8	———	———	41.8	———	———	———	
TYPE-3	10.3	83.8	———	———	———	———	———	ASPHALT OVERLAY.
TYPE-4	8.8	116.7	116.7	———	———	116.7	8.8	
TYPE-5	42.1	212.9	212.9	———	———	———	———	

MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: ACCESS ROAD STRUCTURE	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－20

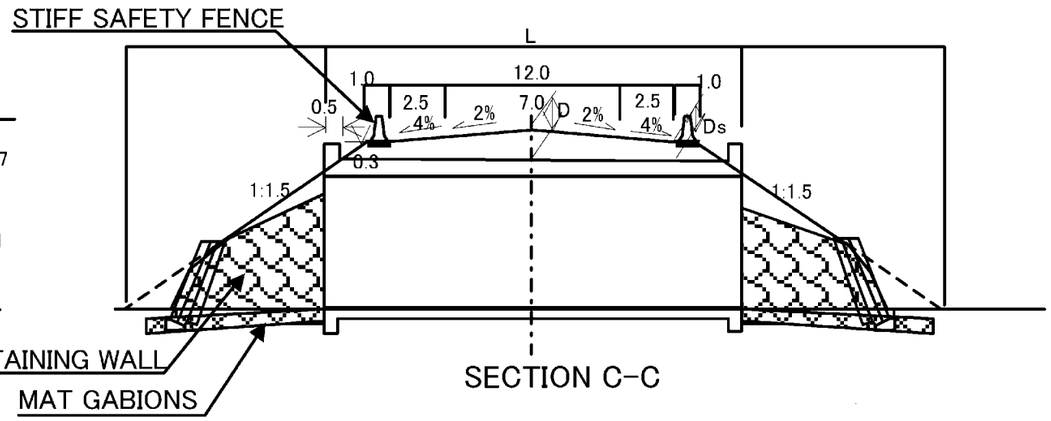
GENERAL VIEW OF BOX CULVERT (1)

SCALE A3 1:250
A4 70.7%

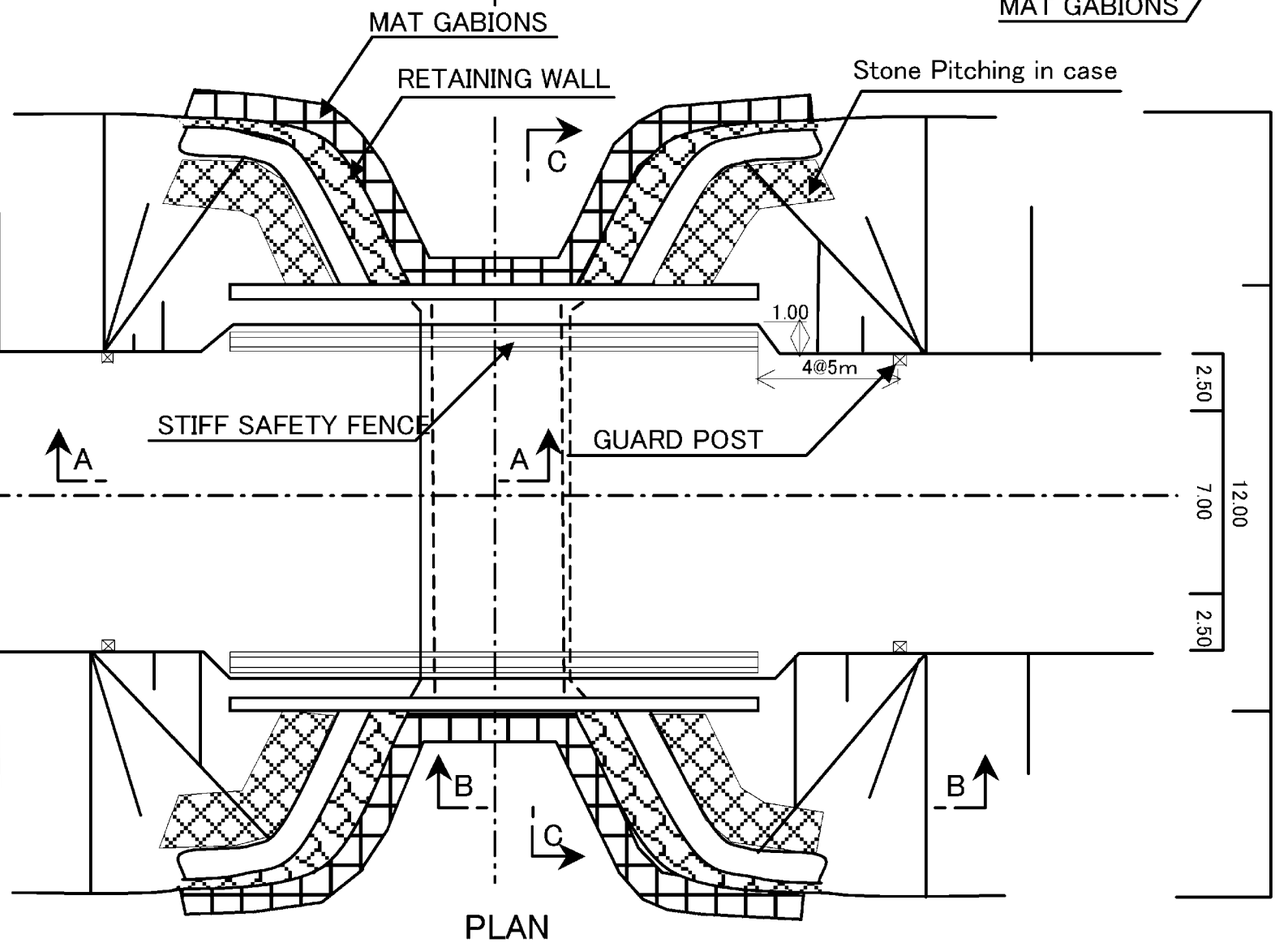
BOX CULVERT SCALE A3 1:250



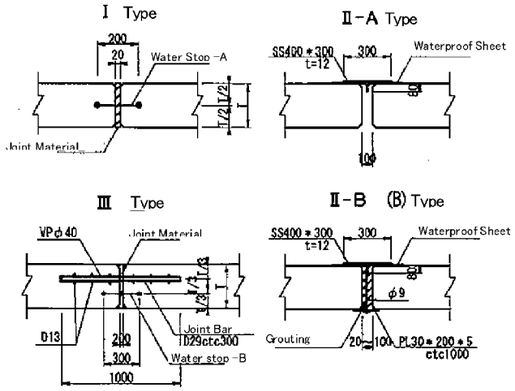
SECTION A-A SECTION B-B



SECTION C-C



PLAN



Dimension

No.	Sta.(Km)	L (m)	D (m)	B (m)	H (m)	Tt (m)
1	58.8200	28.030	0.95	5.00	2.40	0.40
4	46.3800	18.015	1.18	6.00	5.20	0.50
6	32.9040	19.373	1.05	3.00	4.50	0.40
8	30.0920	21.587	1.41	7.00	4.30	0.50
9	29.4448	18.999	1.50	8.00	4.70	0.50
12	13.4315	20.655	1.11	7.00	2.70	0.50

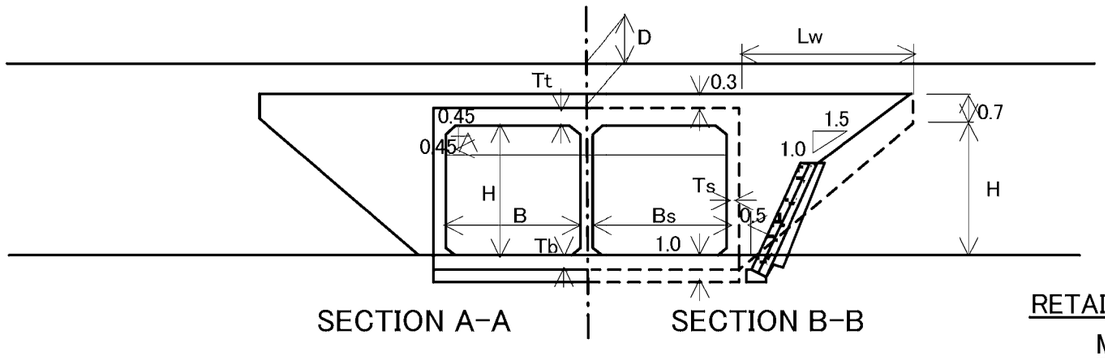
No.	Ts (m)	Tb (m)	Ds (m)	Lw (m)	Hw (m)
1	0.40	0.50	0.78	1.70	1.13
4	0.60	0.60	1.01	5.00	3.33
6	0.55	0.50	0.88	4.50	3.00
8	0.60	0.60	1.24	4.50	3.00
9	0.60	0.60	1.33	4.70	3.13
12	0.60	0.60	0.94	2.50	1.67

MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE−DUSTI	DRAWING TITLE: GENERAL VIEW OF BOX CULVERT (1)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD−21

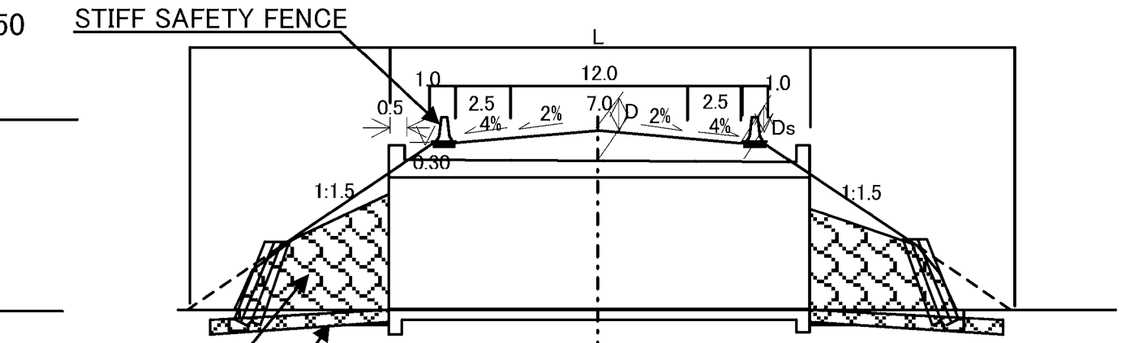
GENERAL VIEW OF BOX CULVERT (2)

SCALE A3 1:250
A4 70.7%

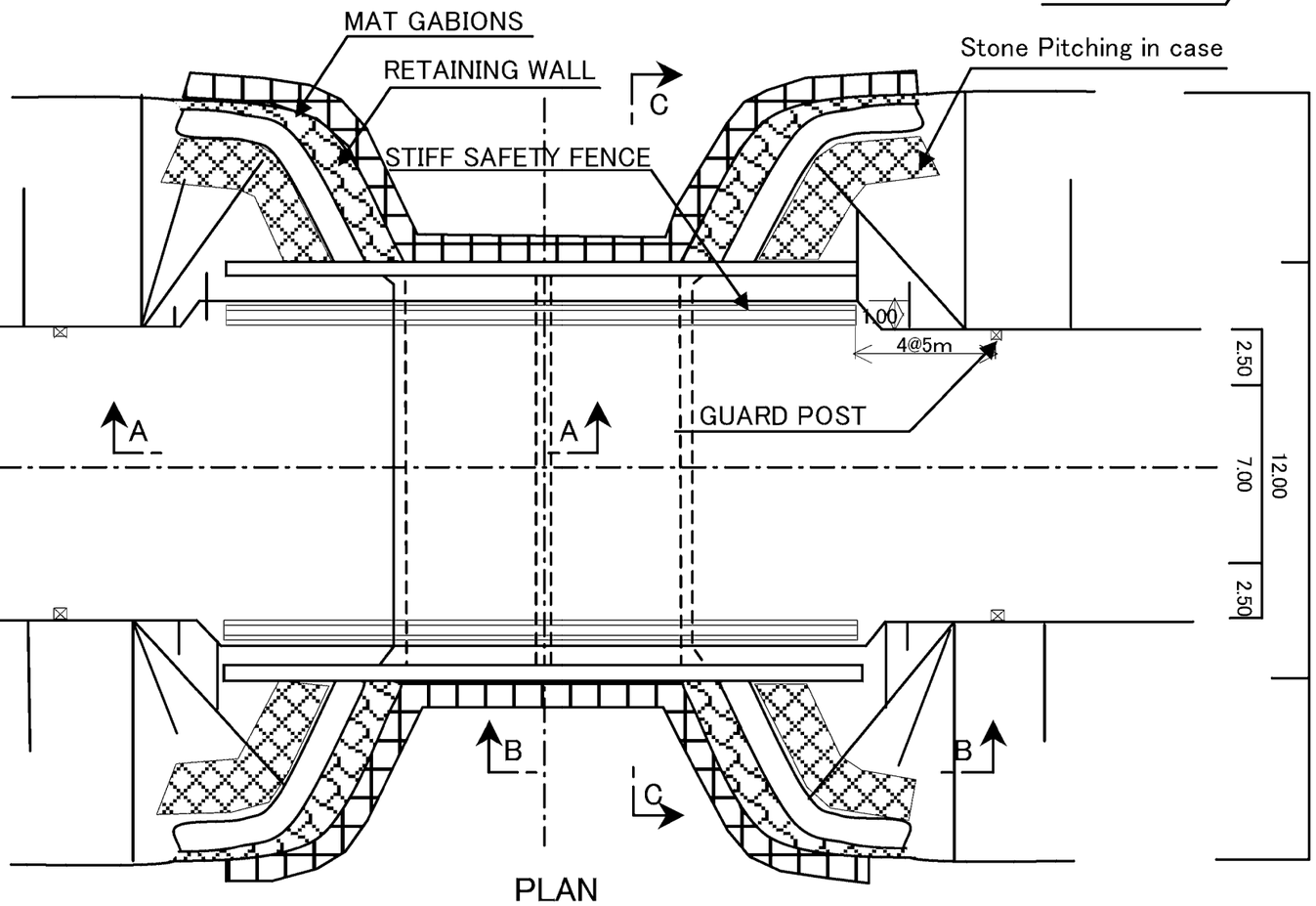
BOX CULVERT SCALE A3 1:250



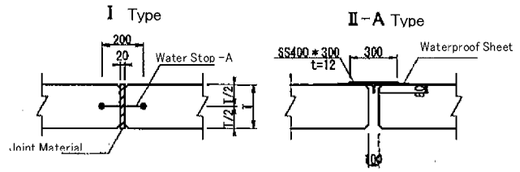
SECTION A-A　　SECTION B-B



SECTION C-C



PLAN



Dimension

No.	Sta.(Km)	L (m)	D (m)	B (m)
3	48.6000	17.433	0.98	4.50
5	45.1632	17.145	0.89	4.50
14	9.0960	18.279	0.97	5.00

No.	H (m)	Bs (m)	Tt (m)	Ts (m)
3	3.50	4.50	0.50	0.50
5	2.20	4.50	0.40	0.40
14	3.00	5.00	0.50	0.50

No.	Tb (m)	Ds (m)	Lw (m)	Hw (m)
3	0.60	0.81	5.30	3.53
5	0.60	0.72	3.60	2.40
14	0.50	0.80	5.40	3.60

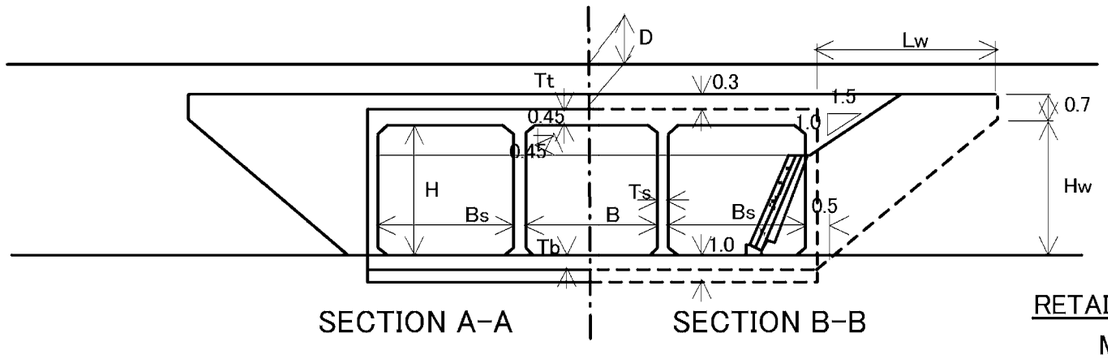
MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: GENERAL VIEW OF BOX CULVERT (2)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－22

GENERAL VIEW OF BOX CULVERT (3)

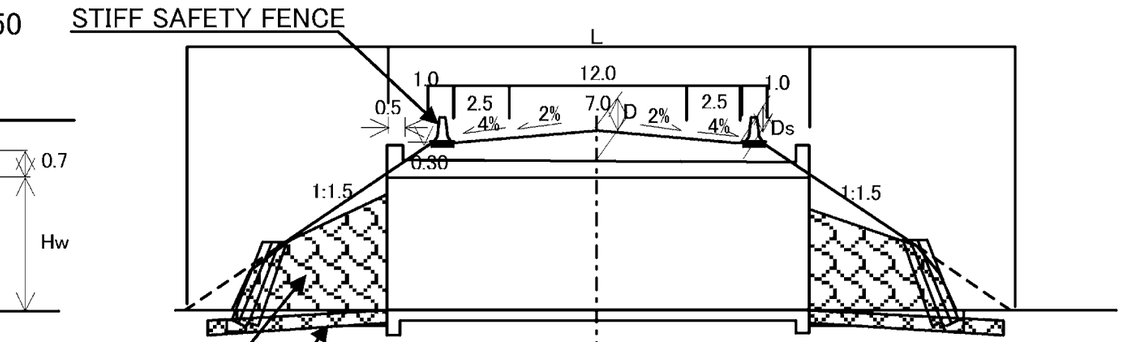
SCALE A3 1:250
A4 70.7%

BOX CULVERT

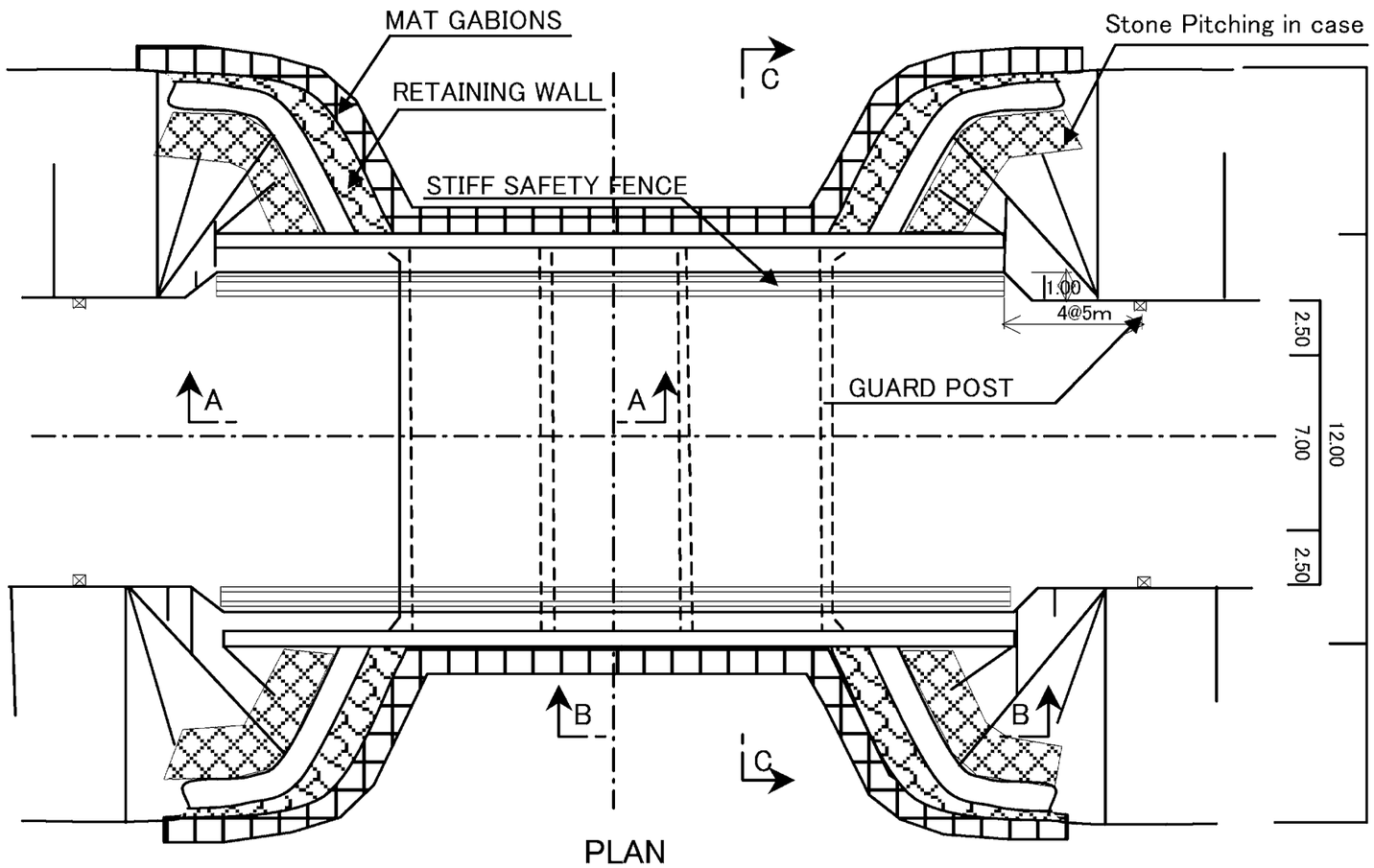
SCALE A3 1:250



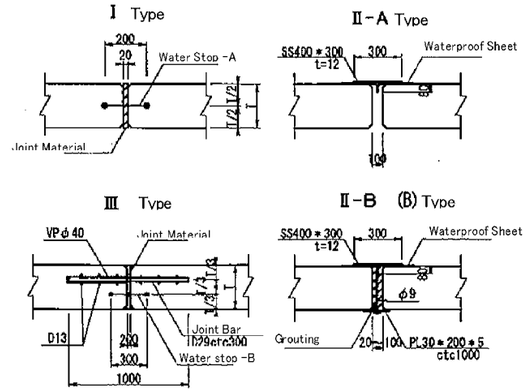
SECTION A-A　　SECTION B-B



SECTION C-C



PLAN



Dimension

No.	Sta.(Km)	L (m)	D (m)	B (m)
2	57.6770	24.438	2.33	7.00
10	29.2790	18.744	1.42	8.00
11	23.8590	18.285	1.27	7.50

No.	H (m)	Bs (m)	Tt (m)	Ts (m)
2	6.30	5.00	0.50	0.60
10	5.70	8.00	0.50	0.60
11	4.70	7.50	0.50	0.60

No.	Tb (m)	Ds (m)	Lw (m)	Hw (m)
2	0.70	2.16	3.00	2.00
10	0.60	1.25	2.40	1.60
11	0.60	1.10	3.00	2.00

MINISTRY OF TRANSPORT AND COMMUNICATION REPUBLIC OF TAJIKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: CONSTRUCTION PROJECT CONSULTANTS , INC. (CPC)	PROJECT NAME: BASIC DESIGN STUDY ON THE PROJECT FOR REHABILITATION OF KURGAN TYUBE－DUSTI	DRAWING TITLE: GENERAL VIEW OF BOX CULVERT (3)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : BD－23

2.2.4 Implementation Plan

2.2.4.1 Implementation Policies

The following implementation policies for the Project are adopted in view of the fact that the Project will be implemented within the framework of the grant aid scheme of the Government of Japan.

- Local engineers, workers, materials and equipment will be utilised to the maximum extent to contribute to the creation of employment opportunities, facilitation of the transfer of technology and vitalisation of the local economy.
- A close communication system involving the Government of Tajikistan, the consultant and the contractor will be established to ensure the smooth implementation of the Project.
- The construction methods and construction schedule will match such natural conditions as the climate, topography and geology of the project area.
- A realistic implementation plan will be prepared, taking the meteorological conditions and time required for the procurement of equipment and materials, etc. into consideration.
- Common and easy construction methods which do not require special equipment or skills will be employed.
- A suitable detour plan as well as on-site work schedule will be prepared to avoid any significant disruption to the present traffic flow and resulting inconvenience for all road users.

2.2.4.2 Implementation Conditions

The following principal conditions for the implementation of the Project will be observed.

(1) Observance of Labour Standards

The contractor will observe the laws in Tajikistan relating to construction and will respect the proper working conditions and established employment practices, avoid labour disputes and ensure the safety of workers.

(2) Environmental Conservation During the Construction Period

Measures to reduce the environmental load affecting general road users and residents along the route will be adopted during the construction period. The waste produced by the removal of the existing cross-drainage structures will be disposed of at a site (s) designated by the Government of Tajikistan.

(3) Means of Field Communication

As mobile phone facilities are available along the entire route, mobile phones will be issued to certain personnel involved in the Project. In addition, a communication system using vehicle-mounted radio equipment will also be established as part of the safety control system designed to ensure the safety of all project personnel involved in the construction work, general road users and residents along the route.

(4) Respect for Local Customs

Local customs as well as religious custom in Tajikistan will be respected in the planning of the implementation plan to determine the work schedule.

(5) Traffic Safety

An efficient as well as rational traffic detour plan will be formulated in view of the safe establishment of the necessary detours in accordance with the progress of the planned target road rehabilitation work.

(6) Customs Clearance

The implementation schedule will take the time required for importation, unloading and customs clearance, etc. into consideration.

(7) Land Acquisition

It will be confirmed that the Tajikistan side has properly secured the necessary consent in advance and has paid the required compensation.

(8) Schedule Adjustment

The progress situation of the work to be undertaken by the Tajikistan side will be properly checked and the project implementation schedule will be adjusted if necessary.

2.2.4.3 Scope of the Work

The undertakings of the Japanese side and the Tajikistan side for the implementation of the Project are outlined below.

(1) Scope of the Work of the Japanese Side

1) Construction Work

Rehabilitation of the existing paved road for a length of approximately 59.9 km

- Implementation of road work, including earthwork, sub-grade work, base/surface course work, cross-drainage structures and auxiliary facilities, and temporary work required to implement the road work
- Installation of temporary facilities (base camp, plant yard and warehouse, etc.)

2) Procurement of Equipment and Materials

Procurement of the construction equipment and materials for the road and structures

3) Safety Measures

Implementation of safety control and safety measures for the construction work

4) Consultancy Work

Implementation of the detailed design, preparation of the tender and contract documents, provision of assistance for the tender and work supervision

(2) Scope of Work for the Tajikistan Side

1) Obtaining of Work Permits

Obtaining of work permits for the Project by the MOTC prior to the tender for the construction work

2) Customs Clearance and Tax Exemption

Provision of all conveniences for customs clearance and tax exemption in Tajikistan based on the importation list of equipment and materials prepared prior to the commencement of the construction work

3) Land Acquisition

Acquisition of the necessary land for the base camp and other facilities as indicated in the implementation plan and securing of disposal sites for the construction waste and surplus soil

4) Relocation of Public Facilities

- Relocation of any obstructing objects (those related to electricity, water, gas, telephone and sewerage services)
- Deployment of MOTC supervisors and securing of the necessary funds for the relocation work

5) Others

- Provision of all conveniences for the entry of Japanese nationals working for the Project to Tajikistan and their stay therein

- Appointment of counterpart personnel and securing of the necessary funds to pay their expenses

2.2.4.4 Consultant Supervision

(1) Implementation Schedule for the Consultancy Work

A precondition for the implementation of the Project is the signing of the Exchange of Notes (E/N) by the Government of Japan and the Government of Tajikistan regarding the Japanese grant aid for the Project. Following the signing of the E/N, the consultant will conclude a consultancy agreement with the MOTC, which is the implementation organization for the Project on the Tajikistan side, in accordance with the scope and procedure of the grant aid scheme of the Government of Japan based on a letter of recommendation issued by the JICA. The conclusion of this agreement will be followed by the detailed design, assistance for the tender and work supervision stages. The main work included in the consultancy agreement is described below.

1) Detailed Design and Tender Document Preparation Stage

Based on the report for the Basic Design Study, the consultant will conduct the detailed deign, including the preparation of the design drawings for various facilities, and will prepare the tender documents for their approval by the MOTC.

2) Tender Stage

Assisted by the consultant, the MOTC will select a Japanese contractor through open tender. The representative of the Government of Tajikistan for this tender process, including the signing of the contractor agreement, must have the authority to approve the said agreement and must be capable of making competent judgements on technical issues. The assistance required of the consultant at the tender stage is listed below.

① Pre-qualification; ② announcement of the tender; ③ tender and evaluation of the bids; ④ signing of the contractor agreement

3) Work Supervision Stage (On-Site Supervision by the Consultant)

Following the signing of the contractor agreement, the consultant will issue an instruction to commence the work to the contractor to start its own work supervision. This work supervision will include the direct reporting of the progress situation of the construction work by the consultant to the MOTC and others while instructing on improvement measures as well as making recommendations to the contractor in regard to the progress, quality, safety and other aspects of the construction work and also payment for the work. The

consultant will also regularly report to the Japanese stakeholders (Embassy of Japan in Tajikistan and the JICA Tajikistan Office).

2.2.4.5 Quality Control Plan

To support the quality control system, a laboratory will be established at the base camp and equipment to conduct quality control testing of the soil, asphalt concrete paving and concrete structures will be procured. For this purpose, the appointment of a work supervision engineer (materials) is planned to assume overall responsibility for all tests. Tests which can be conducted by local public laboratories will be entrusted to such laboratories. The quality control plan for the construction work under the Project is outlined in Table 2-17.

Table 2-17 List of Quality Control Items

Item			Testing Method	Frequency
Sub-Grade (Crushed Stone)	Mixing Materials		Liquid limit; plasticity index	Each mixture
			Grain size distribution (of mixture)	
			Aggregate strength test	
			Aggregate density test	
			Maximum dry density (compaction test)	
	Laying		Density test (compaction rate)	Daily
Prime Coat; Tack Coat	Material	Bitumen	Certificate of quality	Each lot
			Storage and spray temperatures	Each delivery
Asphalt	Materials	Bitumen	Certificate of quality; constituent analysis sheet	Each lot
		Aggregate	Grain size distribution (of mixture)	Each mixture; monthly
			Coefficient of water absorption	Each lot
			Aggregate strength test	
	Mixture Test		Stability	Each mixture
			Flow value	
			Void ratio	
			Aggregate void ratio	
			Tensile strength (indirect)	
			Residual stability	
			Design asphalt value	
	Paving Work		Set temperature for mixing	As appropriate
			Temperature for shaping operation	Each delivery
			Sampling Marshall test	Approximately daily
Concrete	Materials	Cement	Certificate of quality; chemical and physical test results	Each lot
		Water	Constituent test results	Each lot
		Admixture	Certificate of quality; constituent analysis sheet	Each lot
		Fine Aggregate	Absolute dry specific gravity	Each lot
			Grain size distribution; fineness modulus	
			Clay lumps and ratio of soft minute particles	
		Coarse Aggregate	Absolute dry specific gravity	Each lot
			Grain size distribution	
	At Time of Mixture Test		Compressive strength test (specimen: cube)	Each lot
	At Time of Laying		Slump (concrete)	Each lot
			Air content	
			Temperature	
	Strength		Compressive strength test (7 days and 28 days)	Each lot
Reinforcing Bars	Material		Certificate of quality; tensile test results	Each lot

2.2.4.6 Procurement Plan

(1) Procurement of Construction Equipment and Materials

The procurement sources for the main construction equipment and materials are shown in Table 2-18.

Table 2-18 Equipment and Material Procurement Sources

	Item	Local Procurement	Japan/ Third Country	Remarks
1	Cement	○	○	- Only one manufacturer in Tajikistan and a stable supply poses a challenge. Procurement from a third country is considered.
2	Timber/Plywood/ Square Timber	○		- A stable supply is possible.
3	Aggregate	○		- Crushed stone from Sarband and Vakhsh can be used as the aggregate for the pavement and concrete.
4	Reinforcing Bars		○	- Reinforcing bars are not produced in Tajikistan. - Russian or Chinese reinforcing bars can be procured.
5	Fuel	○	○	- A fair quantity of diesel oil must be secured for the equipment/vehicles and industrial power plants and can be procured in Kurgan Tyube, Kolkhozabad and Dusti.
6	Bitumen		○	- Bitumen is not produced in Tajikistan. - Russian or Iranian bitumen can be procured.
7	Equipment	○	○	- Several type of equipment can be rented locally. - Most locally available equipment is the old Soviet models which are highly deteriorated.
Proportion		72.0%	28.0%	

The reasons for the selection of the procurement sources listed in Table 2-18 are explained below.

1) Banking Soil, Crushed Stone for Road and Aggregate (Sand and Aggregate) for Concrete

There are four candidate borrow pits not far from the target road stretching for some 60 km and the soil quality and procurable quantity were visually checked at each pit. In addition, a specimen was collected from each pit and the soil quality was checked by means of the CBR test and others.

It has also been confirmed that two quarries located an average of some 39 km from the target road can supply hard crushed stone suitable for use as the upper sub-grade, surface course and concrete aggregate material in terms of both quality and quantity.

2) Bitumen and Diesel Oil

As neither bitumen nor diesel oil are produced in Tajikistan, the standard practice is their import from Russia or Iran. The local price of these products is linked to the international price and a sufficient quantity is imported. In view of this situation, the possibility of the local procurement of imported bitumen and diesel oil was examined along with possible import from a neighbouring country specifically for the Project.

3) Cement and Ready-Mix Concrete

There is only one cement manufacturer in Tajikistan and its supply capacity is presumably limited, posing a possible limitation for local procurement. In view of this, the import of cement from a neighbouring country is examined.

In the case of ready-mix concrete, no local company specialises in this product. It is, therefore, planned to procure concrete plants for the Project to produce ready-mix concrete on site.

4) Reinforcing Bars

Reinforcing bars are not produced in Tajikistan and are regularly imported from Russia and China, etc. As the quality of Chinese reinforcing bars is inferior to that of Russian products, the import of Russian reinforcing bars is planned for the Project.

5) Others

The local procurement of ground sheets, expansion joints and joint sealing materials is difficult. These will be imported from Japan rather than a neighbouring country to ensure stable quality and reliable supply.

6) Surveying Equipment and Communication Equipment

These will be imported from Japan in consideration of the product quality, ease of use and post-procurement repair and maintenance.

(2) Construction Machinery

1) Procurement of Construction Machinery

There is no leasing company in Tajikistan which specialises in construction machinery. Machinery is often temporarily rented between construction companies, constituting a kind of rental system. Accordingly, it is possible to locally hire construction machinery except for very special machinery. While the MOTC possesses some construction machinery, the

types and quantities are quite limited. Moreover, most of the machinery is quite old. As this machinery is judged to be incapable of assuring smooth functioning during the project period, it will not be used for the Project.

As far as the construction machinery required for the Project is concerned, it is judged that it could be locally arranged through the use of machinery owned by local subcontractors. The procurement sources for the main construction machinery shown in Table 2-19 have been selected based on the general judgement of the prospect of the reliable supply of quality machinery in sufficient quantity, the rental cost and other relevant matters.

Table 2-19 Procurement Sources for the Main Construction Machinery

Machine	Specifications	Procurement Source	
		Local	Japan
Bulldozer	21 tons	○	
Backhoe	Flat loading (0.6 m^3)	○	
Wheel Loader	2.1 m^3		○
Dump Truck	10 tons	○	
Motor Grader	Blade width – 3.1 m		○
Road Roller	10 – 12 tons		○
Tyre Roller	8 – 20 tons		○
Vibration Roller	0.8 – 1.1 tons		○
Concrete Plant	30 m^3/hr		○
Agitator Truck	3.0 – 4.5 m^3		○
Asphalt Plant	60 tons/hr		○
Distributor	6,000 litres		○
Chip Spreader	Tailgate-type (0.25 m^3)	○	
Truck Crane	Hydraulic expendable jig-type (20 tons)	○	
Road Sweeper	Hopper capacity of 5.0 m^3	○	
Air Compressor	Portable; 7.5 m^3/min		○
Generator	10 KVA – 300 KVA		○
Proportion		24.2%	75.8%

2) Transportation of Construction Materials and Machinery

Construction equipment and materials which cannot be procured locally will be procured from third countries (Russia, China, Uzbekistan and Iran, etc.) and will be transported to the project site by land. In the case of machinery, etc. procured in Japan, this will be shipped from a Japanese port to Port Nakhodka in Russia and will be transported to Kurgan Tyube via the Trans-Siberian Railway. This will take some 70 days (travelling a distance of some 8,000 km), including packing, maritime transportation, customs clearance and inland transportation). The MOTC will provide all necessary conveniences for that construction equipment and materials to be imported in terms of customs clearance and tax exemption.

3) Electricity Supply

Although electricity supply can be arranged with a power corporation, the general supply shortage in the project area means frequent outages. Because of the problematic prospect of power supply by the grid, it has been decided to supply the entire electricity required for the basic camp and construction work by generators.

Table 2-20 Installation of Generators

Specifications	Location/Equipment	Purpose of Use
10 KVA	Concrete mixer (simple tilting type: 0.5 m^3)	Concrete production
20 KVA	At the site of a cross-drainage structure	Water drainage at a closing dyke
45 KVA	Office and accommodation	Security lighting and electrical appliances
100 KVA	Base camp (two units)	Laboratory, power winch, welder and equipment repair
100 KVA	Concrete plant (30 m^3/hr)	Concrete production
300 KVA	Asphalt plant (60 tons/hr)	Production of surface and base course material

4) Water Supply

It is inferred that the required water supply volume for the construction work and concrete production is available throughout the year using municipal water, river water and irrigation water.

5) Means of Communication

For communication, a mobile phone network catering for both domestic and international calls is available along the entire route.

2.2.4.7 Soft Component Plan

A road maintenance is systematically conducted by the MOTC, it is judged that the Project does not require a soft component.

2.2.4.8 Implementation Schedule

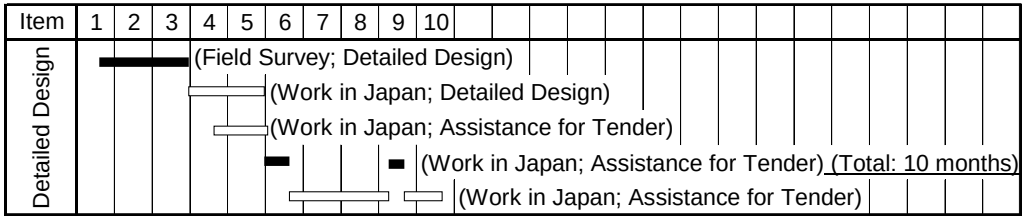
Table 2-21 shows the project implementation schedule (draft) prepared based on the procedure of Japan's grant aid scheme. In view of the diversity and scale of the planned work under the Project, a separate implementation plan and schedule are prepared for the road work and the cross-drainage work. The entire implementation period and schedule are determined taking such important matters as the different types of work and the coordination of different types of work into consideration.

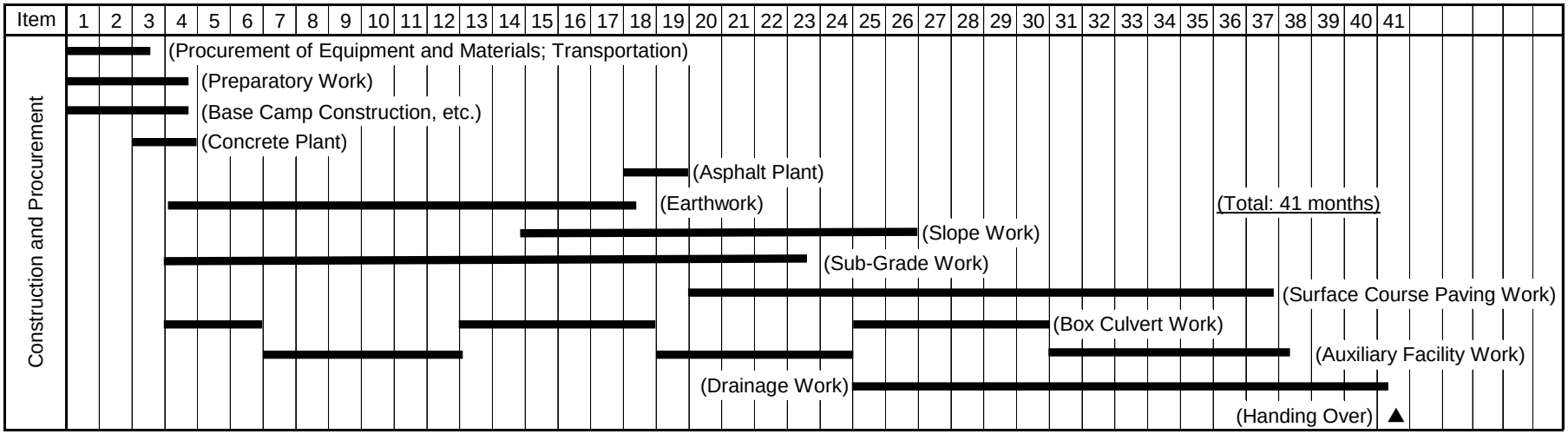
The factors affecting the construction schedule for the Project are explained below.

- It is assumed that the base camp, concrete plant and asphalt plant will be located near Kolkhozabad.
- The box culvert work will be conducted from November to April when the water level of the irrigation channels is low.

The project implementation schedule taking the various types of the planned work and the timing of their implementation into consideration is shown in Table 2-21.

Table 2-21 Project Implementation Schedule





Note: Some types of work, including the paving work, are restricted during a period of approximately two months in midwinter.

2.3 Obligations of the Recipient Country

2.3.1 General Issues Relating to the Grant Aid Scheme of the Government of Japan

The general undertakings of the Tajikistan side have already been confirmed in the Minutes of Discussions agreed by the two countries. The main undertakings are outlined below.

- Securing of the land for the road construction area for the Project
- Exemption of Japanese nationals from import tax, domestic taxes and other fiscal levies which may be imposed in Tajikistan in accordance with the implementation of the Project
- Provision of all necessary conveniences for Japanese nationals who enter Tajikistan and stay therein for the implementation of the Project

2.3.2 Specific Issues for the Project

In addition to the general undertakings of the recipient country which are necessary under the grant aid scheme of the Government of Japan, there are other issues which must be specifically undertaken by the Tajikistan side for the implementation of the Project.

(1) Acquisition of Road and Removal/Relocation of Existing Structures to Proceed with the Road Work

Table 2-22 lists the types of work required to clear the road space for the implementation of the Project and their respective costs. While it will be necessary for the Tajikistan side to arrange the budget to meet these costs, the MOTC should be able to comfortably appropriate the required funds which are equivalent to some 3% of its annual budget.

Table 2-22 Undertakings by the Tajikistan Side and Estimated Costs

Item	
(1) Relocation of Electric Cables	415,000 somoni (approx. ¥15.0 million)
(2) Relocation of Telephone Lines	128,000 somoni (approx. ¥ 4.6 million)
(3) Relocation of Water Pipes	310,000 somoni (approx. ¥11.2 million)
(4) Relocation of Sewer Pipes	107,000 somoni (approx. ¥ 3.9 million)
(5) Relocation of Gas Pipes	277,000 somoni (approx. ¥10.0 million)
(6) Acquisition of Land	71,000 somoni (approx. ¥ 2.6 million)
(7) Removal of Fences	75,000 somoni (approx. ¥ 2.7 million)
(8) Relocation of Roadside Trees	17,000 somoni (approx. ¥ 0.6 million)
(9) Banking Fees (A/P Fees)	102,000 somoni (approx. ¥ 3.7 million)
Total	1,502,000 somoni (approx. ¥54.3 million)

The existing structures along the road can be classified into electric cables and others which are easy to check because of their existence above ground and those which are installed underground. Some of the underground installations surface at bridge sections crossing irrigation channels. A large number of underground installations can be expected to exist in the urban areas of Kurgan Tyube and Kolkhozabad. The relocation of these existing structures/installations outside the existing ROW or within 1 – 2 m inside the edge of the existing ROW has been decided. In the case of the relocation of water pipes, as water leakage can considerably damage the road foundations, these pipes should be relocated as far as possible from the target road.

(2) Completion of Necessary Procedures and Obtaining of Permission for the Road Construction Work in Tajikistan

The various procedures relating to the road construction work (design review, procedures relating to the Project Implementation Unit (PIU) and construction permit, etc.) must be completed by the Tajikistan side along with budgetary appropriation to meet the expenses of the Tajikistan side.

(3) Necessary Procedure for the Introduction of Detours

The implementation of the road rehabilitation work under the Project will necessitate the introduction of a detour at some sections (partial traffic diversion to another route and/or the temporary closure of a section of the target road and diversion to a detour, etc.)

(4) Temporary Yard

It will be necessary for the Tajikistan side to secure the required land for the contractor to establish the following temporary facilities (presumably near Kolkhozabad).

- Temporary Yards
  ① Base camp (100 m x 100 m)
  ② Concrete plant yard (40 m x 75 m)
  ③ Asphalt plant yard (52 m x 80 m)
- Required Period : 4 years

(5) Meeting to Explain the Project to Residents Along the Target Road

Following the decision to implement the Project, it will be necessary for the MOTC to organize a meeting to explain the Project to local residents along the target road or their representatives.

(6) Traffic Safety

Road users and all organizations related to the Project should be properly informed that they must follow the instructions issued by the on-site traffic controllers during the construction period.

(7) Wide Publicity of Possible Inconvenience During the Work

As it is anticipated that vehicles using the target road will suffer some inconvenience during the construction period, all potential road users must be properly informed of any likely inconvenience in advance by means of radio and other media.

2.4 Maintenance Plan

The following types of work will be required for the maintenance of the target road after its rehabilitation under the Project.

(1) Routine Maintenance

The repair work and other types of maintenance work which should be conducted as required throughout the year to maintain the target road are listed below.

- Patching (filling of potholes) of the road surface
- Repair of the sub-grade as necessary
- Shaping of the road surface

For the maintenance of the facilities to be constructed under the Project, regular cleaning of the gutters and the cleaning and repair of the cross-drainage structures (such as the prevention of the propagation of plants, removal of any deposited sediment and leakage prevention, etc.) will be particularly important. Proper coordination of the work with the relevant bodies and the effective implementation of the work will be necessary.

(2) Periodic Maintenance

For the periodic maintenance of the target road, the types of work, including repair work, which are likely to be required some five year after the completion of the Project are listed below.

- Sub-grade repair as necessary
- Surface repair as necessary
- Repair of structures

At present, the maintenance work described in (1) and (2) above falls under the jurisdiction of the Khatlon Regional Office of the MOTC and three road maintenance state enterprises are

responsible for the management of the 15 km section in the Bokhtar District, the 30 km section in the Kholkhozabad District and the 15 km section in the Qumsangir District respectively. No problems are, therefore, anticipated as far as the maintenance system in place is concerned. Given the importance of the early repair of road damage and the prevention of standing water in the roadside gutters for the proper maintenance of the target road after the completion of the Project, routine inspection and patrols should be conducted without fail.

2.5 Project Cost Estimation

2.5.1 Initial Cost Estimation

The Tajikistan side is expected to fund certain costs described next as a condition for the implementation of the Project.

(1) Cost to be Borne by the Tajikistan Side

Based on 2.2.4.3-(2) – Scope of Work for the Tajikistan Side, it is estimated that the Tajikistan side will need to provide some 1.5 million somoni (approximately ¥5.4 million) to cover the cost of relocating obstructive items and securing the necessary land, etc.

2.5.2 Operation and Maintenance Cost

The main components of the maintenance work for the target road which will have been rehabilitated under the Project are shown in Table 2-23 and the total maintenance cost (converted to the average annual cost) during the expected service period is estimated to be approximately 240,000 somoni. This figure is equivalent to some 1.0% of the annual maintenance budget of the MOTC of approximately 209 million somoni in 2006 and should be comfortable met by the MOTC.

Table 2-23 Main Maintenance Items and Their Costs

(1 somoni = ¥36.12)

Type of Work	Cycle	Description	Specifications	Unit	Unit Cost (TJS)	Work Volume	Frequency	Total Cost (TJS)
Routine	Every Year	Patching	1% of the road surface area	m^2	22	4,200	9	837,209
		Sub-Grade Repair	1% of the road surface area	m^2	8	4,560	9	340,864
		Shoulder Repair	2% of the shoulder area	m^2	11	6,000	9	598,007
		Cleaning of Structures	25% of the total number	No.	111	19	9	19,186
		Sub-Total I				For 10 Year Period		1,795,266
						Each Year		179,527
Periodic	Every 5 Years	Sub-Grade Repair	2% of the total pavement area	m^2	22	8,400	1	186,047
		Overlay	2% of the total pavement area	m^2	8	9,120	1	75,748
		Shoulder Repair	4% of the shoulder area	m^2	11	12,000	1	132,890
		Repair of Structures	5% of the total number	No.	4,153	4	1	16,611
		Sub-Total II						411,296
Total of Routine and Periodic Maintenance Costs III (I + II)								2,206,561
Administration Cost			10% of III		-	-	1	220,656
Total								2,427,218
Annual Cost								242,722

2.6 Other Relevant Issues

The Tajikistan side must pay special attention to the following issues to ensure the smooth implementation of the Project and to sufficiently achieve and sustain the project effects.

- In view of the fact that the target road runs through residential areas, the project design and construction work are planned to minimise social and environmental impacts on local residents during the construction period. However, as some impacts (vibration, noise, dust and adverse impacts on traffic) cannot be avoided, the possible impacts of the road work must be properly explained to local residents in advance to obtain their understanding.

- The maintenance work for the rehabilitated road and new facilities after their completion must be properly conducted to maintain the proper functions of the target road and to improve the durability of various facilities.

- Once the existing traffic bottlenecks have been eliminated due to the rehabilitation of the target road, the vehicle travelling speed will increase. In addition, heavy vehicles will find it easier to use the road. In view of such a prospect, efforts should be made to ensure traffic safety by means of the early installation of traffic safety facilities and the provision of traffic safety information for road users as well as local residents.

CHAPTER 3

CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 3
PROJECT EVALUATION AND RECOMMENDATIONS

3.1 Project Effects

The implementation of the Project is expected to benefit the population of 6.62 million of Tajikistan as the conditions of the target road, which forms part of the trunk road network in Tajikistan, will be improved to provide better facilities for safe and smooth traffic. The expected effects of the Project are shown in Table 3-1.

Table 3-1 Project Effects

Present Situation and Problems	Improvement Measures with Japanese Assistance	Direct Effects and Degree of Improvement	Indirect Effects and Degree of Improvement
Despite the progressive deterioration of the road which was originally constructed in the former Soviet period, no rehabilitation work has been conducted. Moreover, there is no prospect of a rehabilitation plan.	Road rehabilitation	① The improved travellability and smooth traffic will increase the mean safe travelling speed on the route (excluding urban areas) from the present 30 km/hr or so to 73 km/hr and from the present 20 km/hr or so to 40 km/hr in urban areas. ② The front view (sight distance) when driving will improve from the current 10 m or so at weaving section to 140 m. ③ The introduction of proper shoulders will separate vehicle traffic from pedestrians and cyclists, improving the safety of the road in question.	① The shortened travelling time will reduce the transportation cost of agricultural products. ② The improved road conditions will contribute to an increase of the volume of inter-regional physical distribution. ③ The road will perform its function as a trunk road serving a wide area, prompting physical distribution and human traffic and vitalising socioeconomic activities. ④ The improved reliability of the road in terms of smooth travellability and the absence of road closures will contribute to regional development, rectification of the regional gap, expansion of the market area and improvement of the access to health care and educational facilities.

3.2 Recommendations

3.2.1 Recommendations for the Tajikistan Side

(1) Implementation of the Required Undertakings by the Tajikistan Side

The Tajikistan side must secure the ROW for the target road and complete all of the relevant procedures by the time that the construction of the facilities under the Project is due to be approved by the Japanese Cabinet so as not to hinder the implementation of the Project.

(2) Education on Traffic Safety

The improved road surface as a result of the rehabilitation work under the Project will increase the travelling speed of vehicles on the road. To avoid any increase of serious traffic accidents, the implementation of educational activities regarding traffic safety for drivers and local residents using the road is highly desirable.

(3) Continual Maintenance Work

Maintenance work, especially repair of the pavement and the removal of sediment and obstructive items from the drainage facilities, will be extremely important to maintain the road in good condition. Road maintenance work is necessary not only to maintain a high level of travellability but also to prolong the service life of the pavement and various structures. While the Tajikistan side is fully capable of conducting minor repairs, such as patching, the insufficient possession of maintenance equipment to conduct overlaying and other major repairs poses a problem. Moreover, proper and continual maintenance requires sufficient budgetary appropriation. Judging from the current situation of the road operation and maintenance budget in Tajikistan, the securing of the necessary funding for the maintenance of the road in question is believed to be highly feasible.

(4) Management of Irrigation Channels

At present, standing water in the gutters situated parallel to the road and water which has leaked from the irrigation channels have adverse impacts on the road in some places. Standing water near the road is a contributory factor to the degradation of the road surface. Serious discussions are required between the road administrator and those related to water resources and agriculture to formulate fundamental measures to solve this problem, including relocation of the roadside gutters currently used as irrigation channels, management of the water leaking from the irrigation channels and the introduction of criteria to determine the locations of irrigation channels.

3.2.2 Technical Cooperation and Collaboration with Other Donors

The Project aims at rehabilitating part of International Trunk Road No. 11 which is the subject of the Dusti – Nizhniy Pyandzh Road Rehabilitation Project, a grant aid project of the Government of Japan, and the Nizhniy Pyandzh Bridge Construction Project of the US. The former is currently in progress and the latter has been completed. Therefore, while there may not be any direct collaboration between the Project and these two other projects in terms of technical cooperation, etc., continual attention should be paid to the impacts of these two projects on traffic.