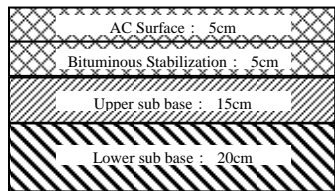


Pavement structure		Pavement structure number				
	Layer	Thickness D (inch)	Layer coefficient a	Drainage coefficient m	Structure number SN=Dam	
	AC Surface	5cm	1.968	0.390	—	0.768
	Bituminous Stabilization	5cm	1.968	0.390	—	0.591
	Upper sub base	15cm	5.906	0.135	1.0	0.797
	Lower sub base	20cm	7.874	0.108	1.0	0.850
	Total					3.006

Road shoulders have gravel pavement as the existing road.

The sub grade materials are adapted to crushed stone (60cm thickness) up to 1m depth due to frozen soil.

(3) Road marking

Side line is set on the approach roads and the bridge deck. Channelizing strip and reflector button are installed. Concrete posts, lighting and traffic sign are set on.

2.2.3 Basic Design Drawings

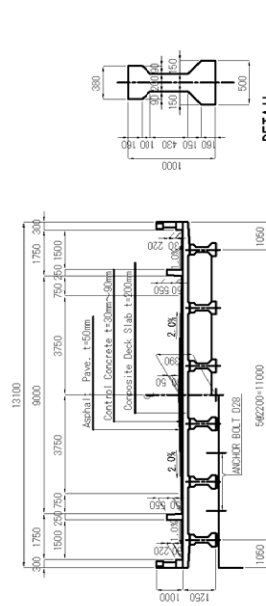
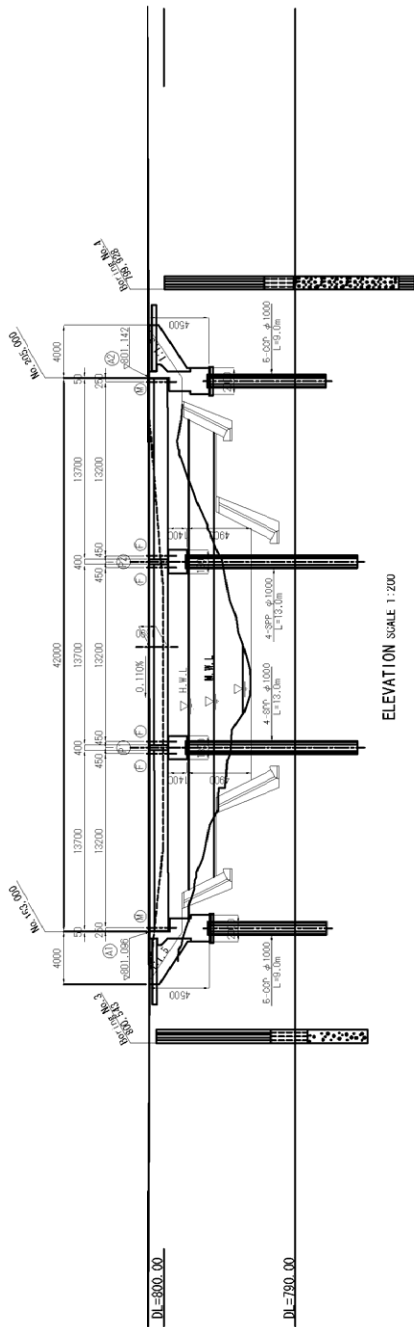
Summary of the facilities of this project are shown below.

		Alamedin bridge (Bridge No.1)	Ala-Archa bridge (Bridge No.2)	Keng-Burun bridge (Bridge No.14 Outbound)
Bridge Type		3-span Connected Composite PC I type girder	1-span Composite PC I type girder	1-span PC hollow girder
Bridge Length		42.0m	28.0m	23.4m
Width		Total Width : 13.1m Lane : 2-lane(3.75m+3.75m) Sidewalk : 1.75m each on both side	Total Width : 13.1m Lane : 2-lane (3.75m+3.75m) Sidewalk : 1.75m each on both side	Total Width : 11.8m Lane : 2-lane (3.50m+3.50m) Sidewalk : 1.50m on one side
Bridge Pavement		Asphalt Concrete (50mm)	Asphalt Concrete (50mm)	Asphalt Concrete (50mm)
Abutment Type		A1 Abutment : Small reversed T type (Cast in place concrete pile) A2 Abutment : Small reversed T type (Cast in place concrete pile)	A1 Abutment : Reversed T type (Cast in place concrete pile) A2 Abutment : Reversed T type (Cast in place concrete pile)	A1 Abutment : Small reversed T type (Cast in place concrete pile) A2 Abutment : Small reversed T type (Cast in place concrete pile)
Pier Type		Pile bent concrete multi-colum	Not applicable	Not applicable
Revetment		Wet masonry : 124.5m Gabion mat : 39.1m	Concrete leaning type retaining wall : 52.4m Wet masonry : 35.0m Gabion mat : 46.9m	Not applicable
Approach Road	Length	Left bank side : 30.0m Right bank side : 30.0m	Left bank side : 30.0m Right bank side : 30.0m	Left bank side : 51.0m Right bank side : 299.1m
	Width	Total Width : 14.0m Lane : 2-lane(3.75m+3.75m) Shoulder : 3.25m each on both side	Total Width : 14.0m Lane : 2-lane (3.75m+3.75m) Shoulder : 3.25m each on both side	Total Width : 13.5m Lane : 2-lane (3.50m+3.50m) Shoulder : 3.25m each on both side
	Pavement	Asphalt Concrete : 50mm	Asphalt Concrete : 50mm	Asphalt Concrete : 50mm

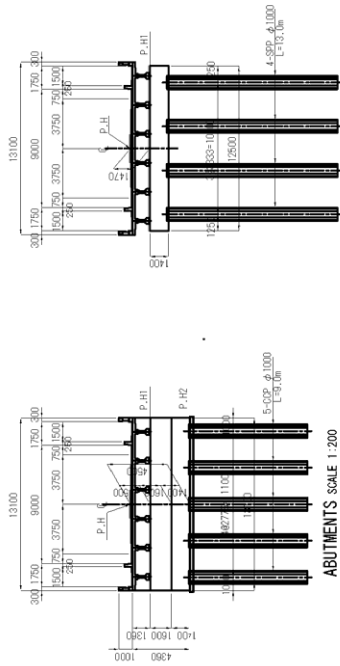
Basic design drawings listed below are shown in and from the next page.

No.	Drawing Name		No.	Drawing Name	
1	Alamedin bridge (Bridge No.1)	General View	11	Ala-Archa bridge (Bridge No.2)	Structure Drawing of A1 Abutment
2	Alamedin bridge (Bridge No.1)	General Drawing	12	Ala-Archa bridge (Bridge No.2)	Structure Drawing of A2 Abutment
3	Alamedin bridge (Bridge No.1)	Structure Drawing of Superstructure	13	Ala-Archa bridge (Bridge No.2)	Typical Cross Section of Road
4	Alamedin bridge (Bridge No.1)	Structure Drawing of A1 Abutment	14	Keng-Burun bridge (Bridge No.14 Outbound)	General View
5	Alamedin bridge (Bridge No.1)	Structure Drawing of A2 Abutment	15	Keng-Burun bridge (Bridge No.14 Outbound)	General Drawing
6	Alamedin bridge (Bridge No.1)	Structure Drawing of P1,P2 Pile Bent Pier	16	Keng-Burun bridge (Bridge No.14 Outbound)	Structure Drawing of Superstructure
7	Alamedin bridge (Bridge No.1)	Typical Cross Section of Road	17	Keng-Burun bridge (Bridge No.14 Outbound)	Structure Drawing of A1 Abutment
8	Ala-Archa bridge (Bridge No.2)	General View	18	Keng-Burun bridge (Bridge No.14 Outbound)	Structure Drawing of A2 Abutment
9	Ala-Archa bridge (Bridge No.2)	General Drawing	19	Keng-Burun bridge (Bridge No.14 Outbound)	Typical Cross Section of Road
10	Ala-Archa bridge (Bridge No.2)	Structure Drawing of Superstructure			

GENERAL VIEW OF ALAMEDIN (No. 1) BRIDGE

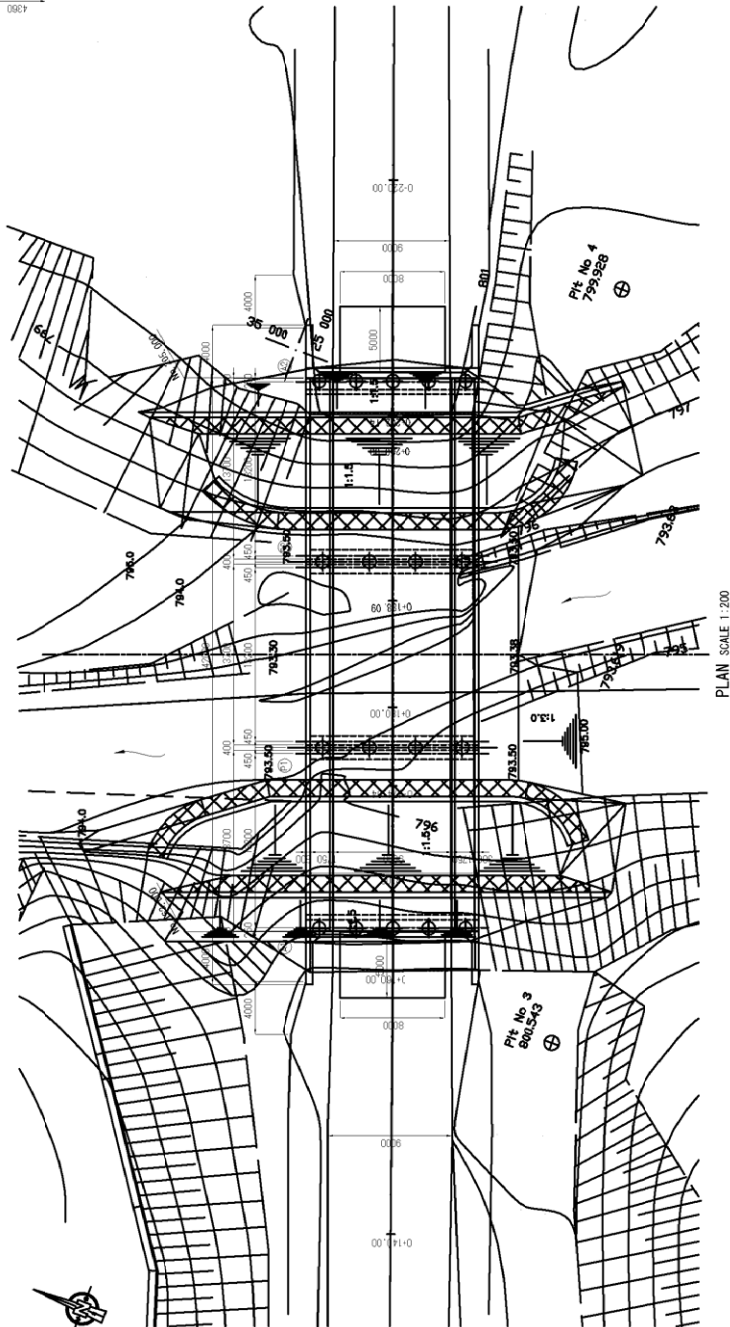
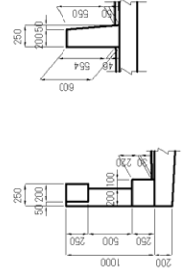


DETAIL SCALE 1:30



DIMENSION LIST

	A1	A2	P1	P2
P.H	801.086	801.142	801.111	801.127
P.HI	798.585	798.642	798.641	798.657
P.H2	798.645	798.647	---	---



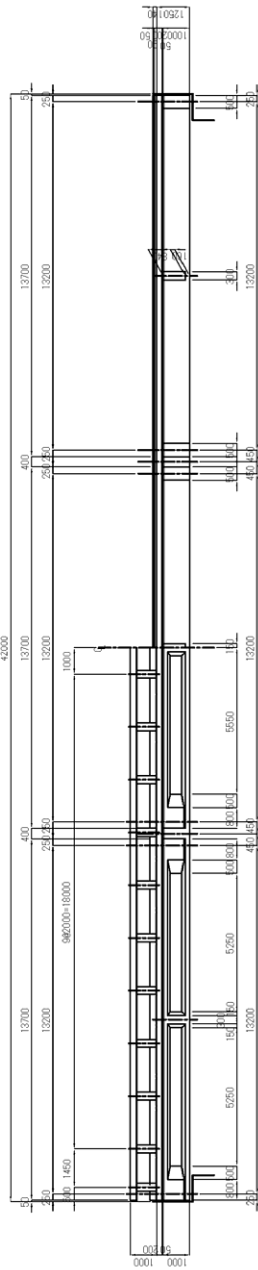
DESIGN CRITERIA

ROAD CLASS	NATIONAL ROAD
DESIGN SPEED	V=120km/h
TYPE OF SUPERSTRUCTURE	3-SPAN CONTINUOUS PC-COMPOSITE GIRDER
BRIDGE LENGTH	42,000m
SPAN LENGTH	13,900m+14,100m+13,900m
LIVE LOAD	TYPE-B AND HK-80
ROADWAY WIDTH	9,000m
SIDEWALK WIDTH	2 x 1,500m
CROSS SLOPE	2%
SEISMIC COEFFICIENT	K ₁ =0.100
GIRDER CON.	σ _{ck} =36N/mm ²
S LAB. CROSS	σ _{sk} =23N/mm ²
WIRE FOR PC	f _{yk} =1600N/mm ²
REINFORCEMENT	f _y =345N/mm ² (SD345)
DESIGN STANDARD	SPECIFICATION FOR HIGHWAY BRIDGES JAPAN ASSOCIATION I ~ V (MARCH-2002)

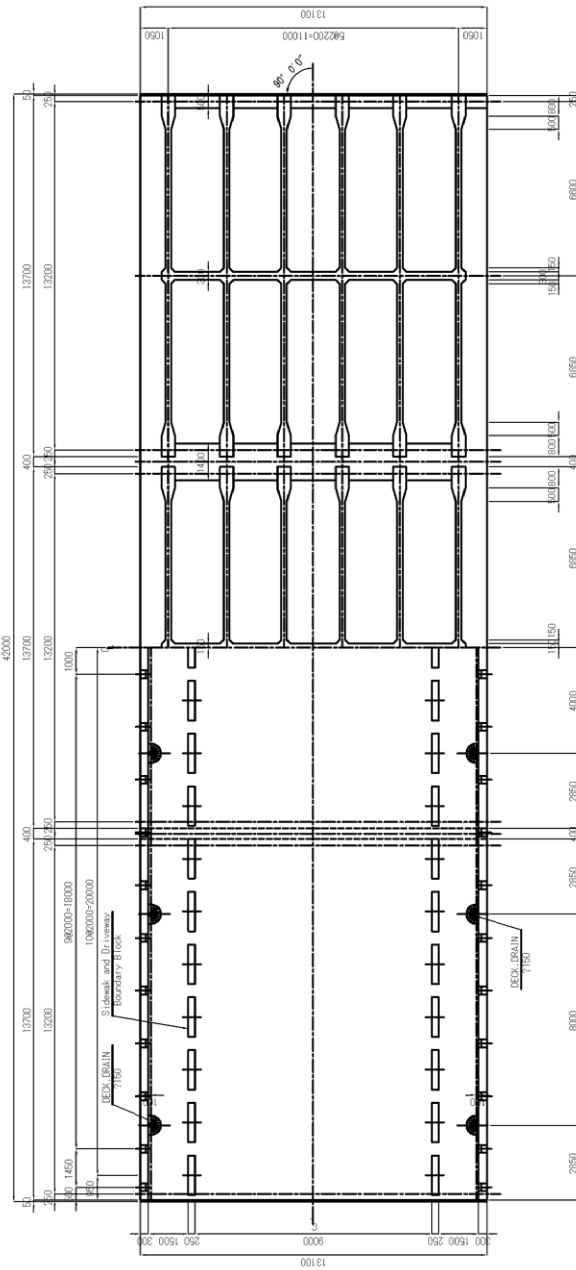
MAIN ROAD DEPARTMENT MINISTRY OF TRANSPORT AND COMMUNICATIONS KYRGYZ REPUBLIC	BASIC DESIGN ON THE PROJECT FOR RECONSTRUCTION OF BRIDGES IN CHUI OBLAST OF THE KYRGYZ REPUBLIC	JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL	TITLE: GENERAL VIEW OF ALAMEDIN (No. 1) BRIDGE	SCALE: S=1:200	DRAWING No: 1	Rv:
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STRUCTURE DRAWING OF SUPERSTRUCTURE SCALE 1:100

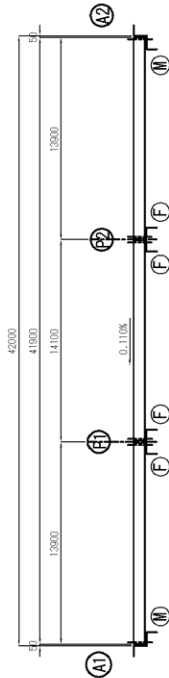
ELEVATION SCALE 1:100



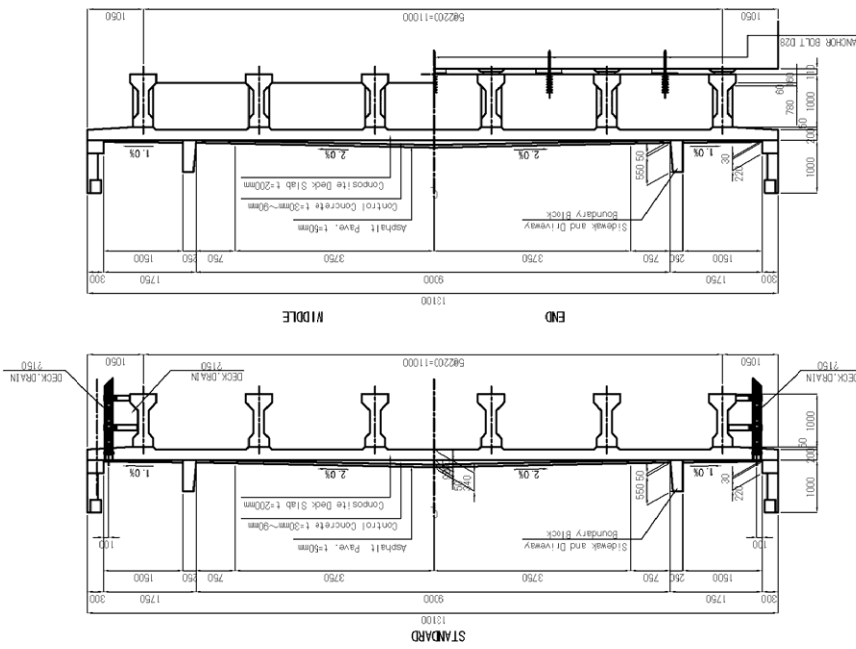
PLAN SCALE 1:100



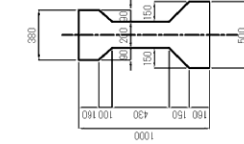
KEY PLAN



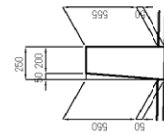
BRIDGE CROSS SECTION SCALE 1:50



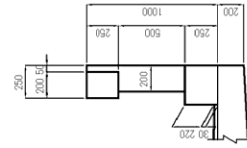
DETAILS SCALE 1:20



DETAILS SCALE 1:20



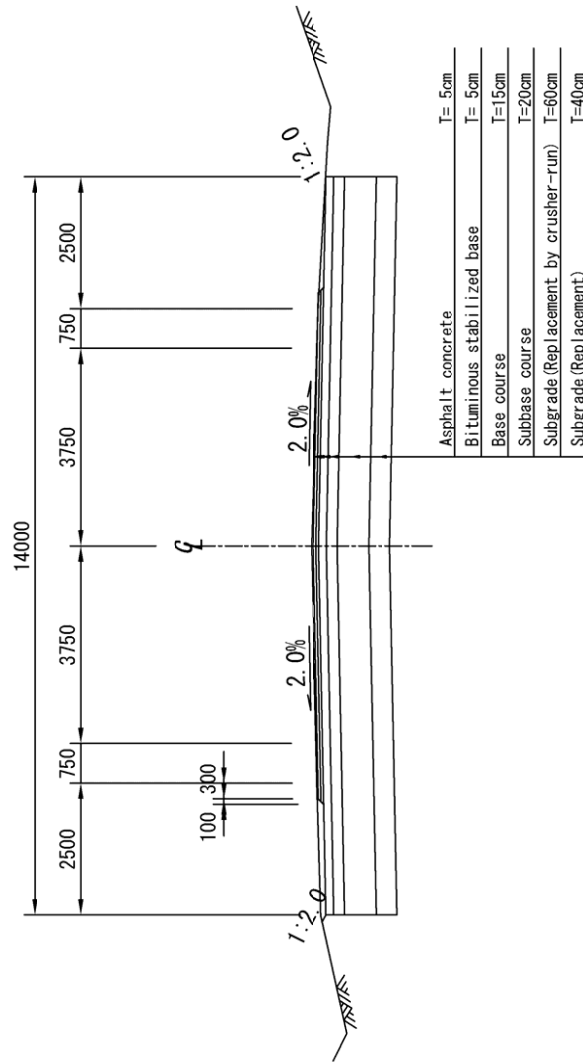
DETAILS SCALE 1:20



MAIN ROAD DEPARTMENT MINISTRY OF TRANSPORT AND COMMUNICATIONS KYRGYZ REPUBLIC	BASIC DESIGN ON THE PROJECT FOR RECONSTRUCTION OF BRIDGES IN CHUI OBLAST OF THE KYRGYZ REPUBLIC	JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL	TITLE: ALAMEDIN (NO.1) BRIDGE STRUCTURE DRAWING OF SUPERSTRUCTURE	SCALE:	DRAWING No:
				S=1:100	3

TYPICAL CROSS SECTION OF ROAD

SCALE 1:100



MAIN ROAD DEPARTMENT
MINISTRY OF TRANSPORT AND COMMUNICATIONS
KYRGYZ REPUBLIC

BASIC DESIGN ON THE PROJECT FOR
RECONSTRUCTION OF BRIDGES IN CHUI OBLAST
OF THE KYRGYZ REPUBLIC

JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL

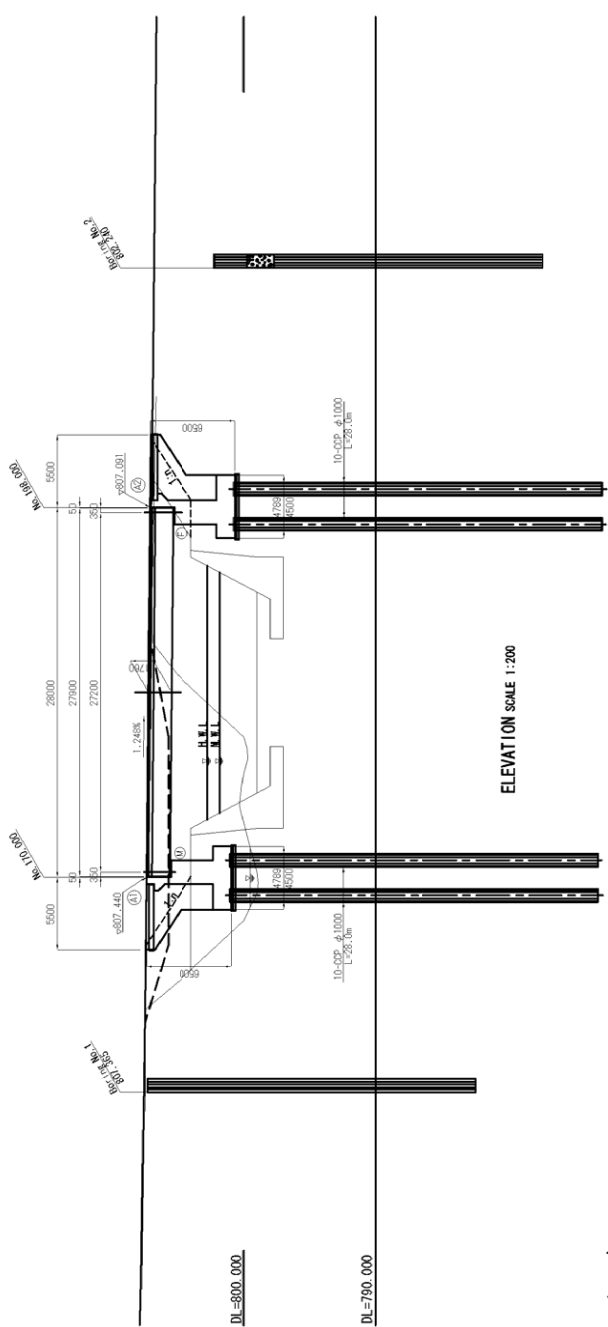
TITLE: ALAMEDIN (NO.1) BRIDGE
TYPICAL CROSS SECTION OF ROAD

SCALE :
S=1:100

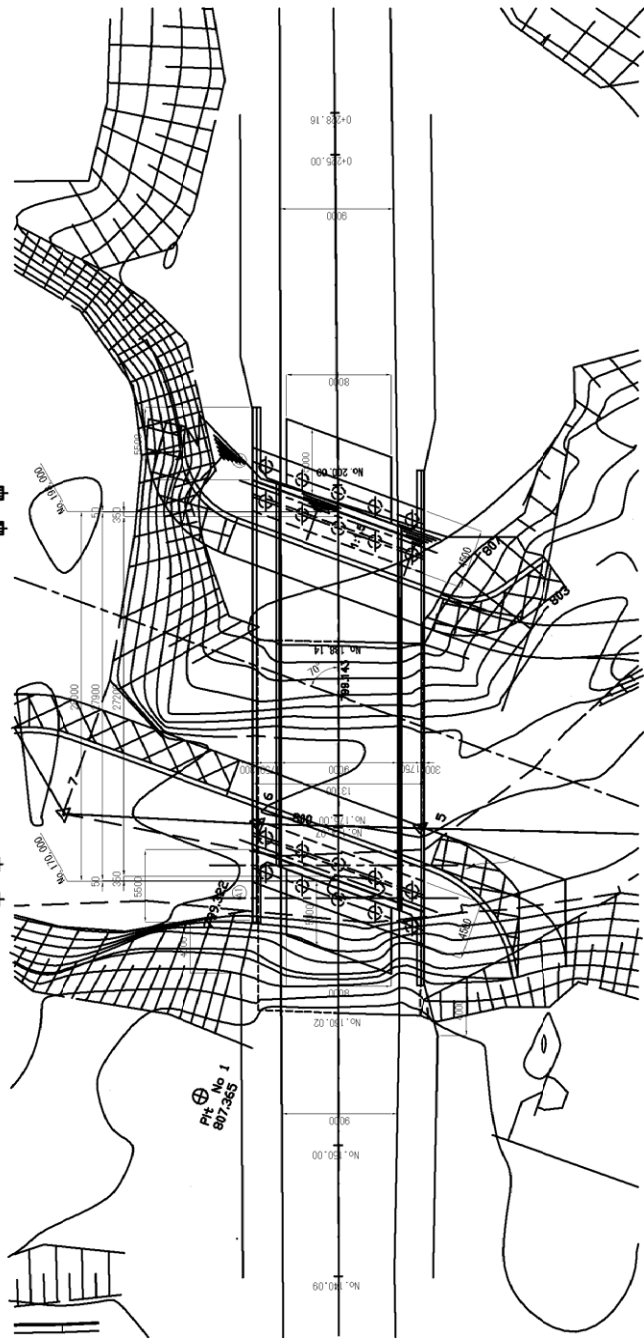
DRAWING No:
7

Rv

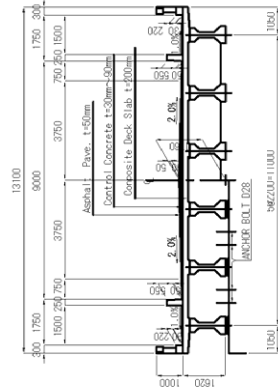
GENERAL VIEW OF ALA-ARCHA (No. 2) BRIDGE



ELEVATION SCALE 1:200

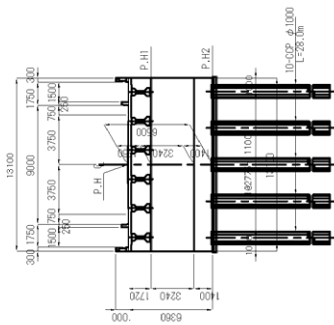
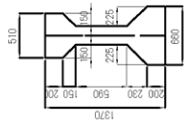


PLAN SCALE 1:200



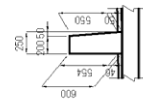
BRIDGE CROSS SECTION SCALE 1:100

DETAIL SCALE 1:30



ABUTMENTS SCALE 1:200

DETAIL SCALE 1:30



DIMENSION LIST

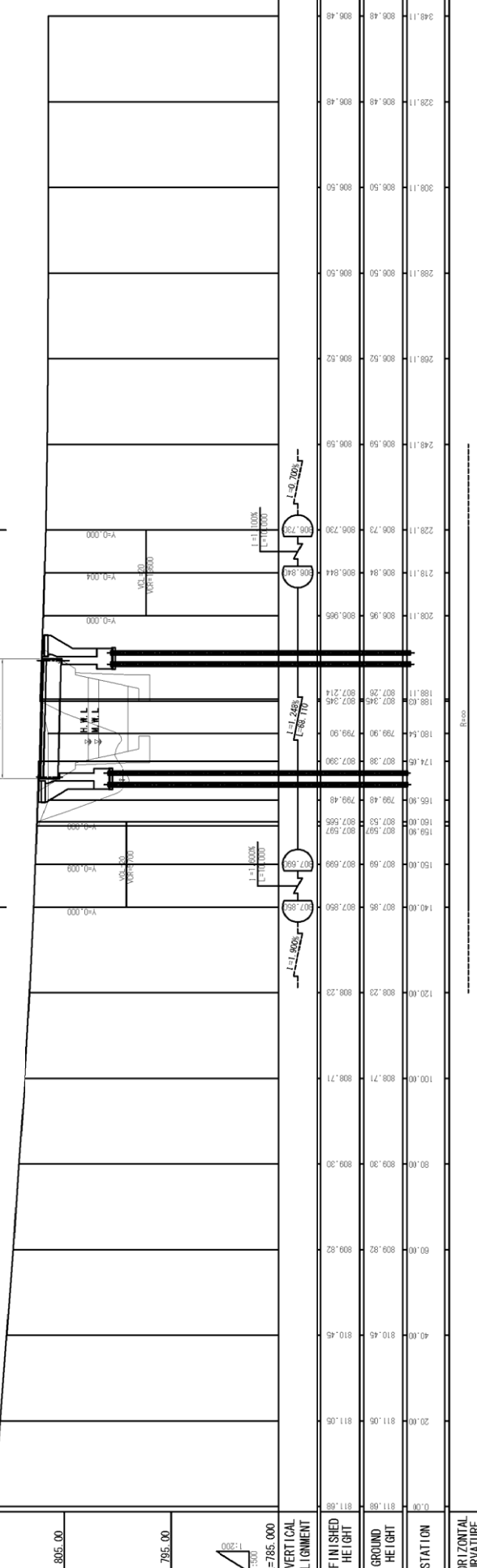
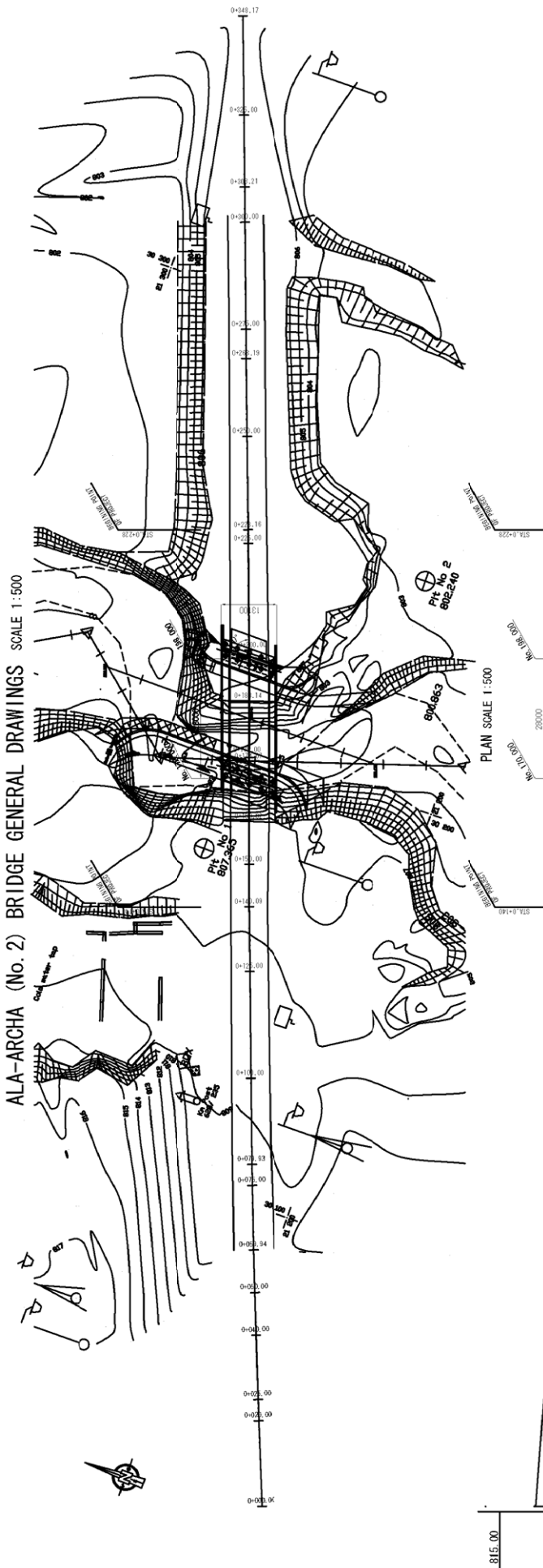
P-H	807.440	807.091
P-H1	805.090	805.231
P-H2	800.240	800.150

DESIGN CRITERIA

ROAD CLASS	NATIONAL ROAD
DESIGN SPEED	V=120km/h
TYPE OF SUPERSTRUCTURE	1-SPAN CONTINUOUS PC-COMPOSITE GIRDER
BRIDGE LENGTH	28.000m
SPAN LENGTH	28.000m
LIVE LOAD	LIVE LOAD TYPE-B AND HK-80
ROADWAY WIDTH	9.000m
SIDEWALK WIDTH	2 x 1.500m
GROSS SLOPE	2%
SEISMIC COEFFICIENT	kh=0.100
GIRDER CON.	$\sigma_{ck}=36N/mm^2$
SLAB, CROSS	$\sigma_{ck}=25N/mm^2$
WIRE FOR PC	$f_y=1600N/mm^2$
REINFORCEMENT	$f_y=345N/mm^2$ (SD345)
DESIGN STANDARD	SPECIFICATION FOR HIGHWAY BRIDGES JAPAN ASSOCIATION I ~ V (MARCH-2002)

MAIN ROAD DEPARTMENT MINISTRY OF TRANSPORT AND COMMUNICATIONS KYRGYZ REPUBLIC	BASIC DESIGN ON THE PROJECT FOR RECONSTRUCTION OF BRIDGES IN CHUI OBLAST OF THE KYRGYZ REPUBLIC	JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL	TITLE:	SCALE:	DRAWING No.
			GENERAL VIEW OF ALA-ARCHA (No.2) BRIDGE	S=1:200	8

ALA-ARCHA (No. 2) BRIDGE GENERAL DRAWINGS SCALE 1:500

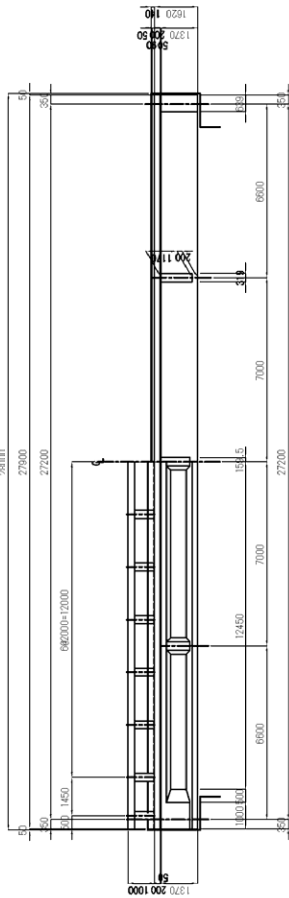


STATION	GROUND HEIGHT	FINISHED HEIGHT	HORIZONTAL CURVATURE
0+00.00	811.05	811.05	
20.00	810.45	810.45	
40.00	809.82	809.82	
60.00	809.30	809.30	
80.00	808.71	808.71	
100.00	808.23	808.23	
120.00	807.69	807.69	
140.00	807.14	807.14	
159.90	807.597	807.597	
160.00	807.53	807.53	
165.90	807.48	807.48	
174.40	807.38	807.38	
180.54	807.90	807.90	
188.00	807.345	807.345	
188.11	807.28	807.28	
208.11	806.96	806.96	
218.11	806.94	806.94	
228.11	806.73	806.73	
248.11	806.59	806.59	
268.11	806.52	806.52	
288.11	806.50	806.50	
308.11	806.50	806.50	
328.11	806.48	806.48	
348.11	806.48	806.48	

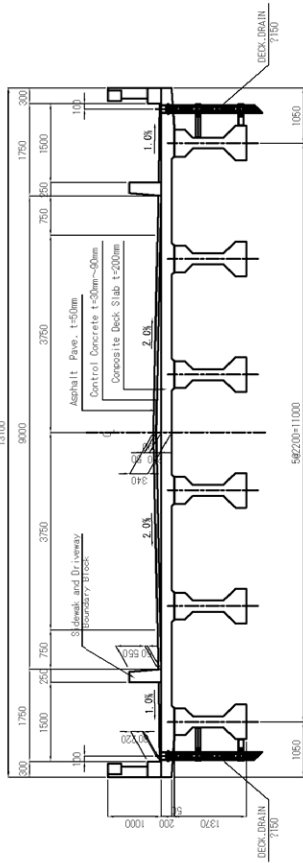
MAIN ROAD DEPARTMENT MINISTRY OF TRANSPORT AND COMMUNICATIONS KYRGYZ REPUBLIC	BASIC DESIGN ON THE PROJECT FOR RECONSTRUCTION OF BRIDGES IN CHUI OBLAST OF THE KYRGYZ REPUBLIC	JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL	TITLE: ALA-ARCHA (No. 2) BRIDGE GENERAL DRAWINGS	SCALE: S=1:500	DRAWING No: 9
				Rv	

STRUCTURE DRAWING OF SUPERSTRUCTURE SCALE 1:100

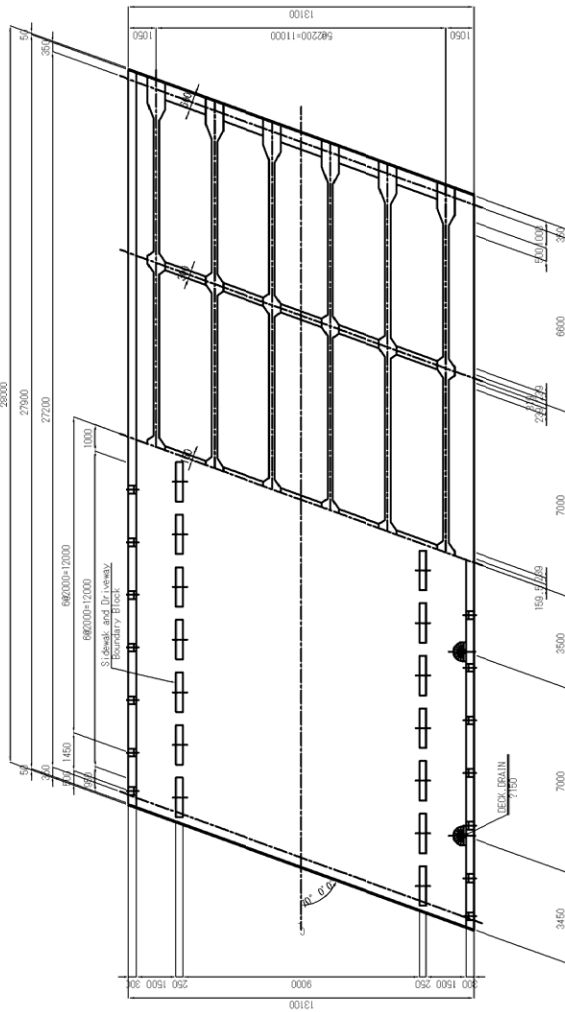
ELEVATION SCALE 1:100



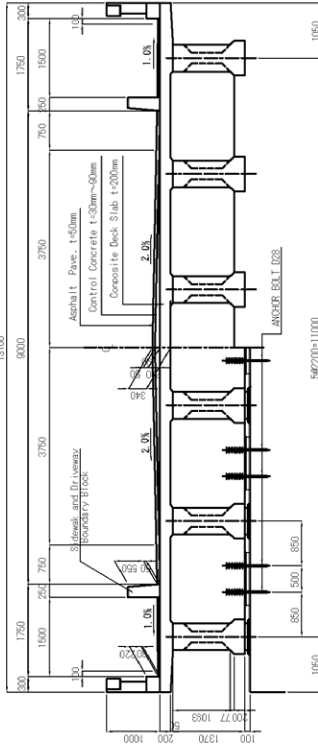
BRIDGE CROSS SECTION STANDARD SCALE 1:50



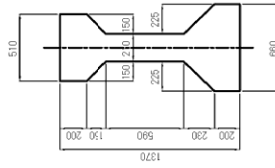
PLAN SCALE 1:100



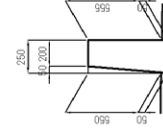
END MIDDLE



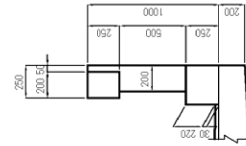
DETAILS SCALE 1:20



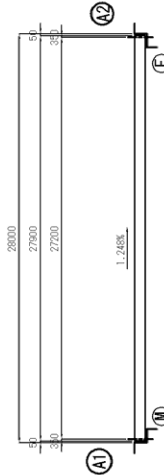
DETAILS SCALE 1:20



DETAILS SCALE 1:20



KEY PLAN



MAIN ROAD DEPARTMENT
MINISTRY OF TRANSPORT AND COMMUNICATIONS
KYRGYZ REPUBLIC

BASIC DESIGN ON THE PROJECT FOR
RECONSTRUCTION OF BRIDGES IN CHUI OBLAST
OF THE KYRGYZ REPUBLIC

JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL

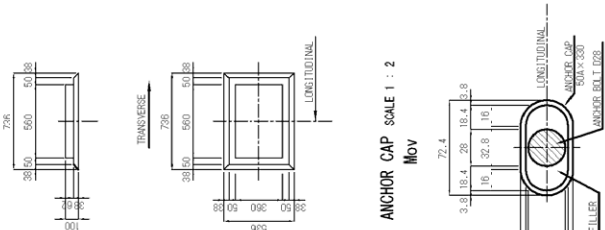
TITLE: ALA-ARCHA (NO.2) BRIDGE
STRUCTURE DRAWING OF SUPERSTRUCTURE

SCALE: S=1:100
DRAWING No: 10

RV

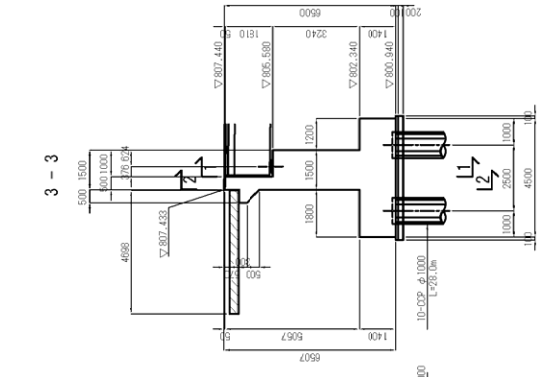
STRUCTURE DRAWING OF A1 ABUTMENT SCALE 1:100

DETAILS SCALE 1:20

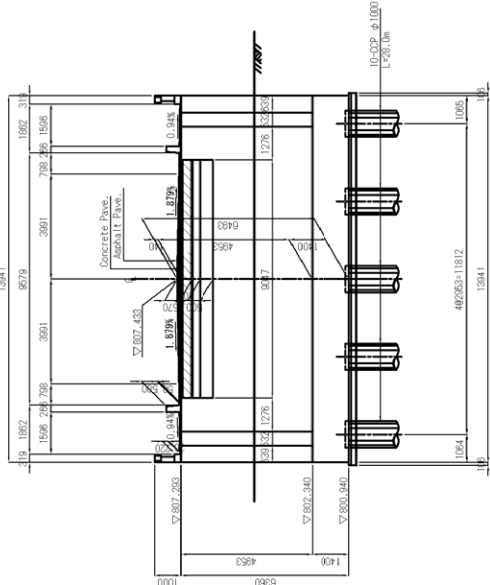


ANCHOR CAP SCALE 1:20

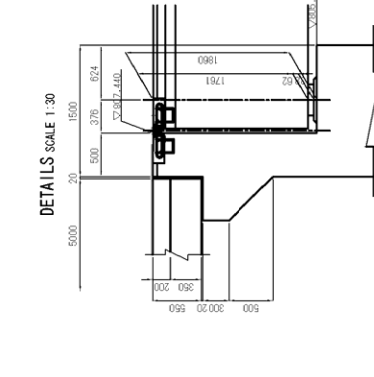
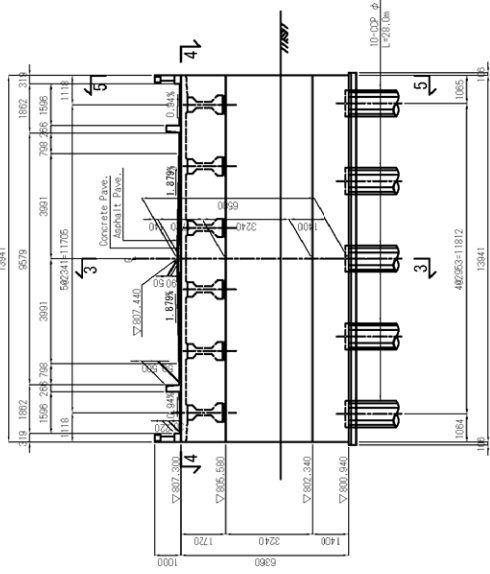
Nov



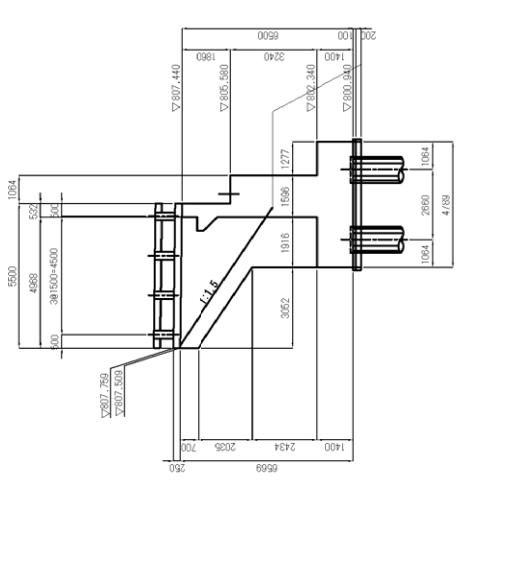
2 - 2



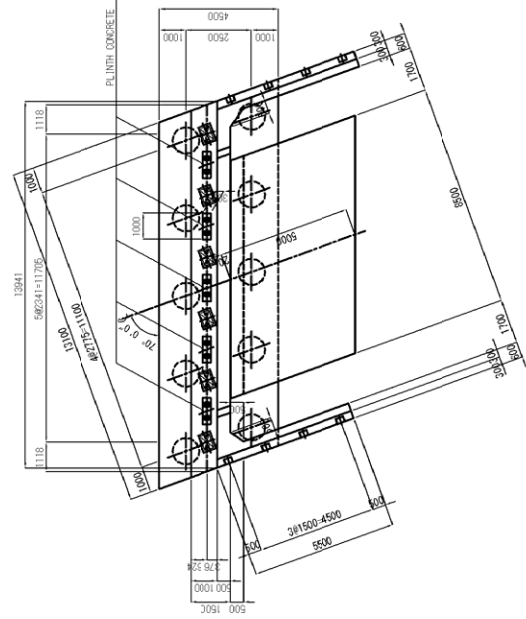
1 - 1



4 - 4



3 - 3



ANCHOR BOLT SCALE 1:30

DETAILS SCALE 1:30

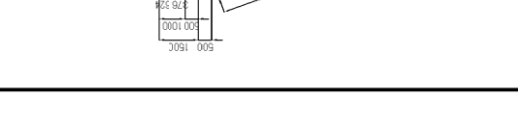
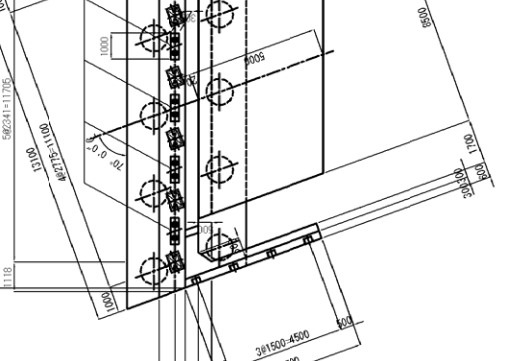
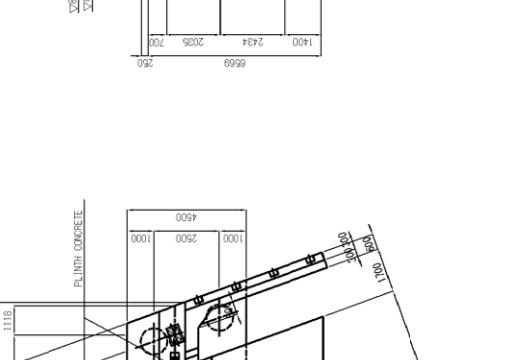
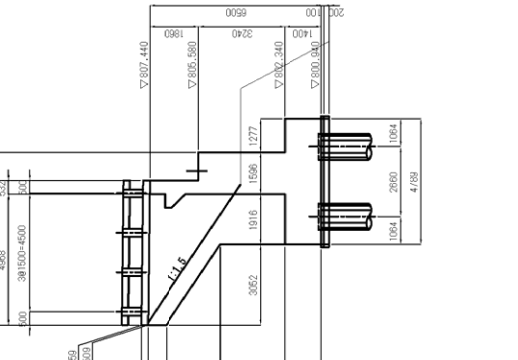
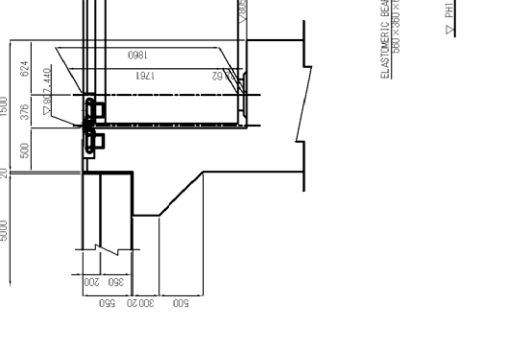
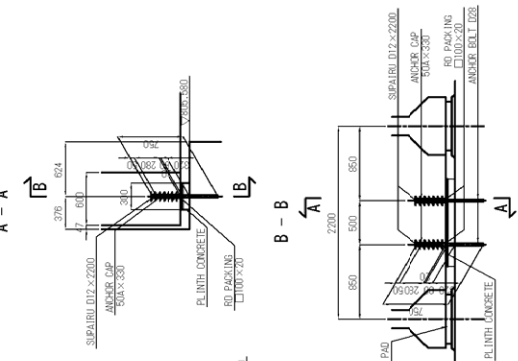
ANCHOR BOLT SCALE 1:30

DETAILS SCALE 1:30

DETAILS SCALE 1:30

DETAILS SCALE 1:30

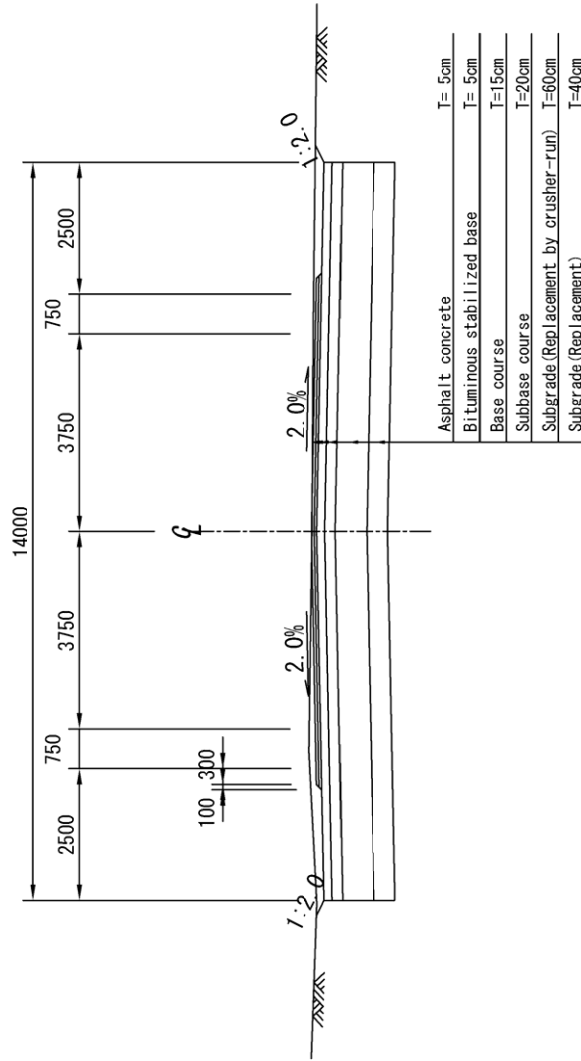
DETAILS SCALE 1:30



DRAWING No: 11	SCALE: S=1:100	TITLE: ALA-ARCHA (NO.2) BRIDGE STRUCTURE DRAWING OF A1 ABUTMENT	JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL	BASIC DESIGN ON THE PROJECT FOR RECONSTRUCTION OF BRIDGES IN CHUI OBLAST OF THE KYRGYZ REPUBLIC
RV:			MAIN ROAD DEPARTMENT MINISTRY OF TRANSPORT AND COMMUNICATIONS KYRGYZ REPUBLIC	

TYPICAL CROSS SECTION OF ROAD

SCALE 1:100



MAIN ROAD DEPARTMENT
MINISTRY OF TRANSPORT AND COMMUNICATIONS
KYRGYZ REPUBLIC

BASIC DESIGN ON THE PROJECT FOR
RECONSTRUCTION OF BRIDGES IN CHUI OBLAST
OF THE KYRGYZ REPUBLIC

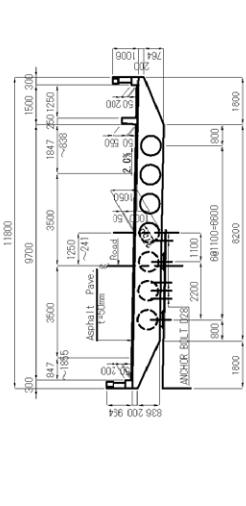
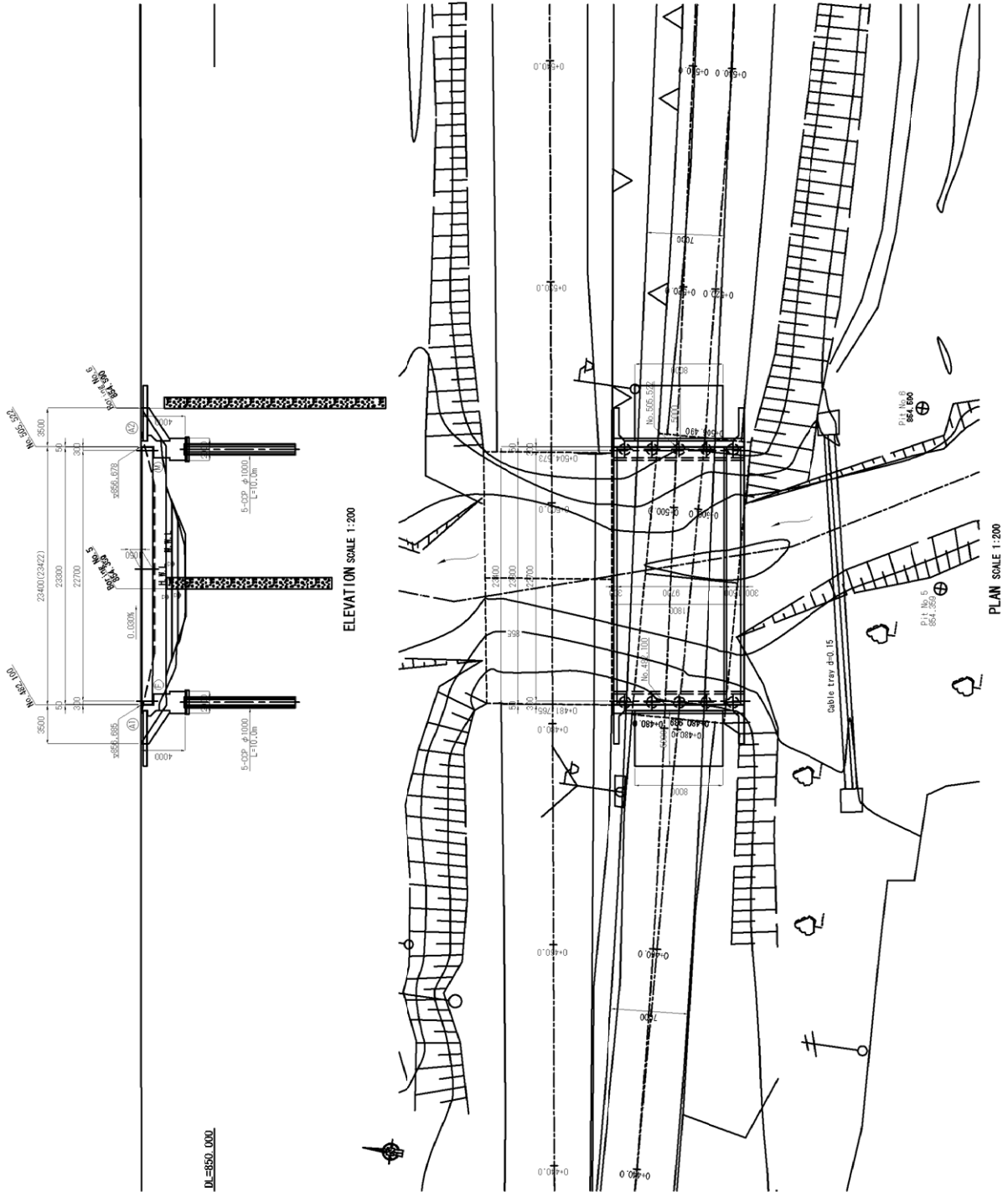
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL

TITLE: ALA-ARCHA (No.2) BRIDGE
TYPICAL CROSS SECTION OF ROAD

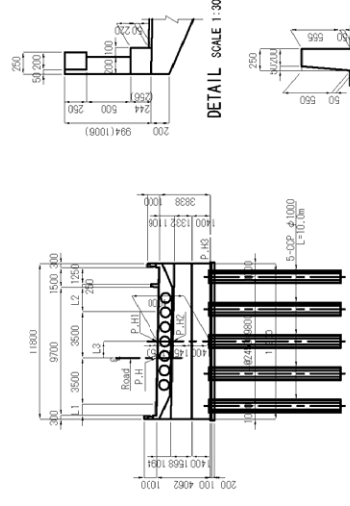
SCALE :
S=1:100

DRAWING No.
13
Rv.

GENERAL VIEW OF KENG-BULUNG (No14) BRIDGE



BRIDGE CROSS SECTION SCALE 1:100



ABUTMENTS SCALE 1:200

DETAIL SCALE 1:30

DIMENSION LIST

P.H.	P.H.1	P.H.2	P.H.3	L1	L2	L3
850.685	856.680	865.510	862.680	847	1847	1300
856.678	856.673	856.522	852.673	1655	838	241

DESIGN CRITERIA

ROAD CLASS	NATIONAL ROAD
DESIGN SPEED	V=100km/h
TYPE OF SUPERSTRUCTURE	1-SPAN CONTINUOUS PC-COMPOSITE GIRDER
BRIDGE LENGTH	28.000m
SPAN LENGTH	28.000m
LIVE LOAD	LIVE LOAD TYPE-B AND HK-80
ROADWAY WIDTH	9.000m
SIDEWALK WIDTH	2 x 1.500m
CROSS SLOPE	2%
SEISMIC COEFFICIENT	kh=0.100
GIRDER CON.	C ₁₀ =30N/mm ²
S LAB. CROSS	C ₁₀ =20N/mm ²
WIRE FOR PC	f _y =1600N/mm ²
REINFORCEMENT	f _y =345N/mm ² (SD345)
DESIGN STANDARD	SPECIFICATION FOR HIGHWAY BRIDGES JAPAN ASSOCIATION I ~ V (MARCH-2002)

MAIN ROAD DEPARTMENT
MINISTRY OF TRANSPORT AND COMMUNICATIONS
KYRGYZ REPUBLIC

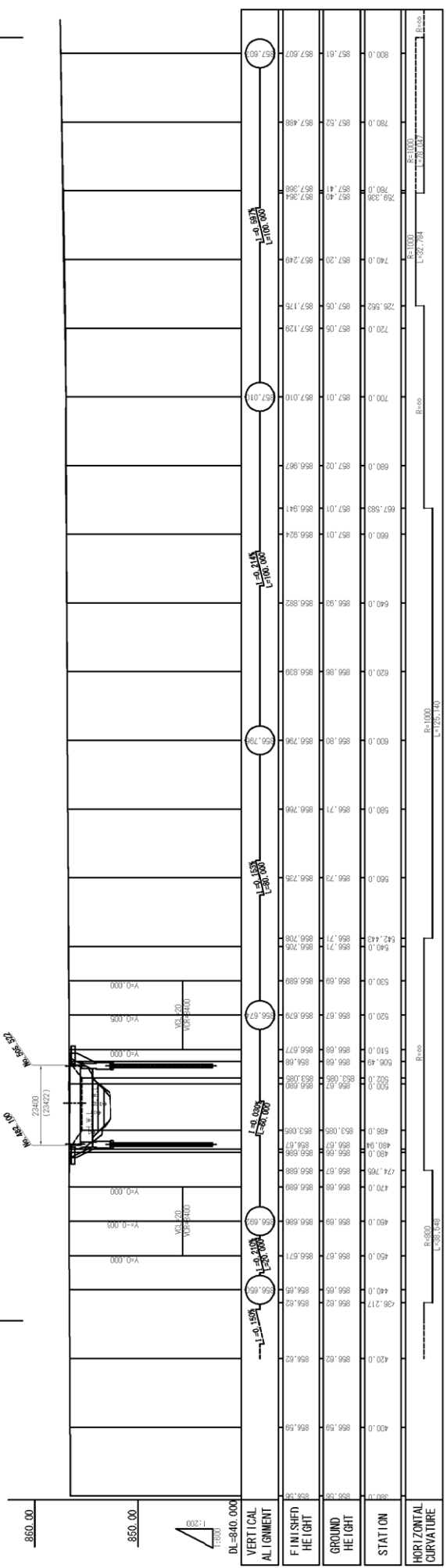
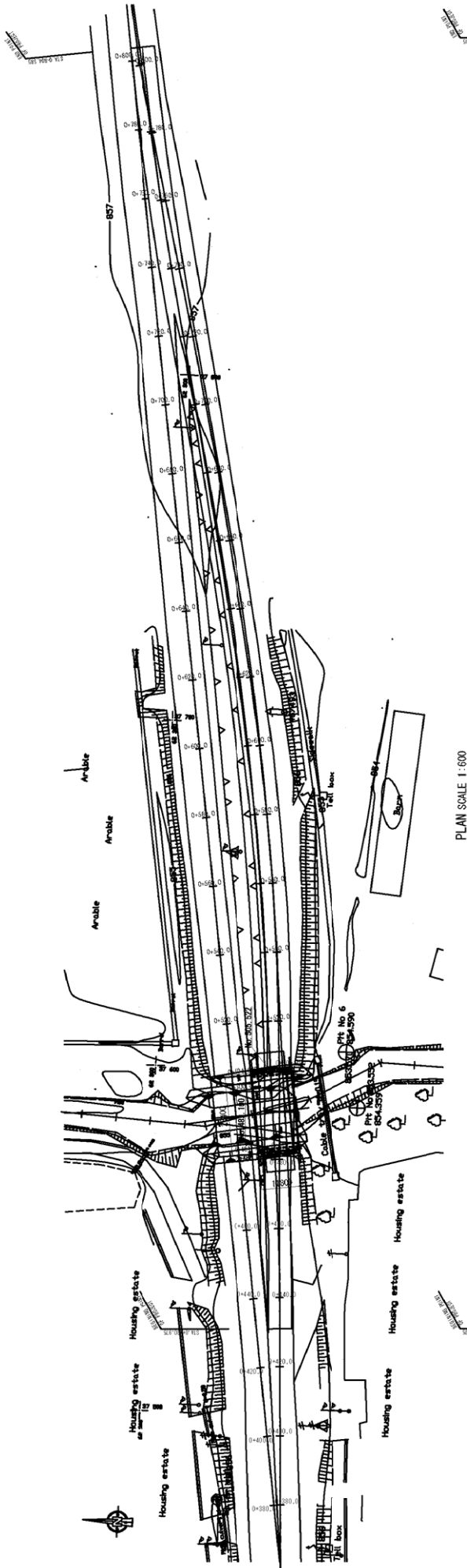
BASIC DESIGN ON THE PROJECT FOR
RECONSTRUCTION OF BRIDGES IN CHUI OBLAST
OF THE KYRGYZ REPUBLIC

JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL

GENERAL VIEW OF
KENG-BULUNG (No. 14) BRIDGE

TITLE:
SCALE:
DRAWING No:
Rv

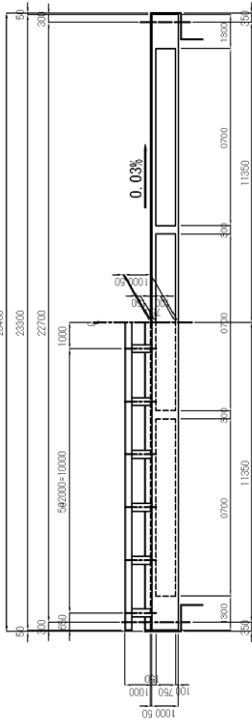
KENG-BULUNG (No. 14) BRIDGE GENERAL DRAWINGS SCALE 1:600



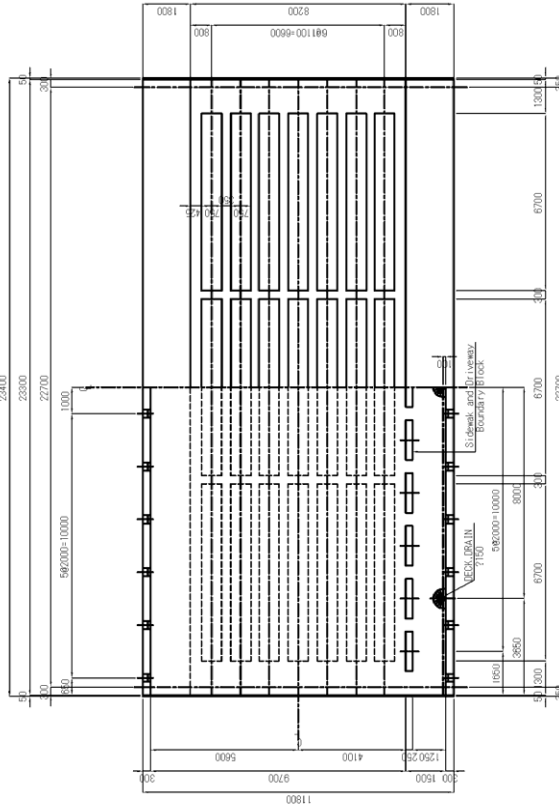
MAIN ROAD DEPARTMENT MINISTRY OF TRANSPORT AND COMMUNICATIONS KYRGYZ REPUBLIC	BASIC DESIGN ON THE PROJECT FOR RECONSTRUCTION OF BRIDGES IN CHUI OBLAST OF THE KYRGYZ REPUBLIC	JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL	TITLE: KENG-BULUNG (No.14) BRIDGE GENERAL DRAWINGS	SCALE:	DRAWING No:
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STRUCTURE DRAWING OF SUPERSTRUCTURE SCALE 1:100

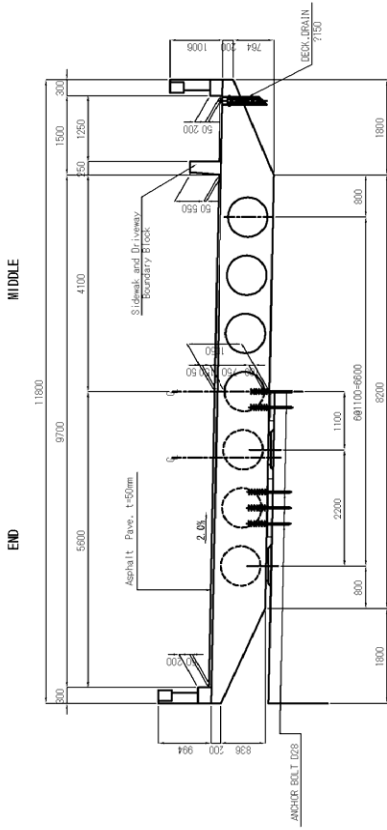
ELEVATION SCALE 1:100



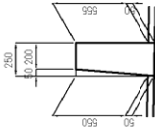
PLAN SCALE 1:100



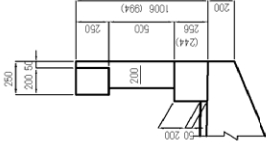
BRIDGE CROSS SECTION SCALE 1:50



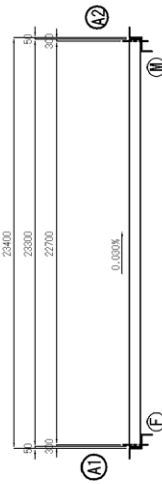
DETAILS SCALE 1:20



DETAILS SCALE 1:20



KEY PLAN



MAIN ROAD DEPARTMENT
MINISTRY OF TRANSPORT AND COMMUNICATIONS
KYRGYZ REPUBLIC

BASIC DESIGN ON THE PROJECT FOR
RECONSTRUCTION OF BRIDGES IN CHUI OBLAST
OF THE KYRGYZ REPUBLIC

JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL

TITLE: KENG-BULUNG (NO.14) BRIDGE
STRUCTURE DRAWING OF SUPERSTRUCTURE

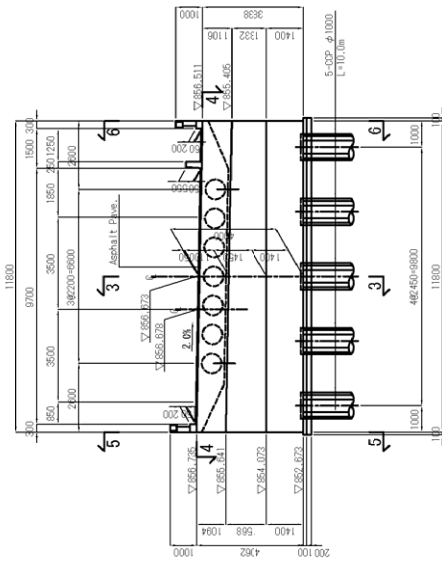
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DRAWING No: 16

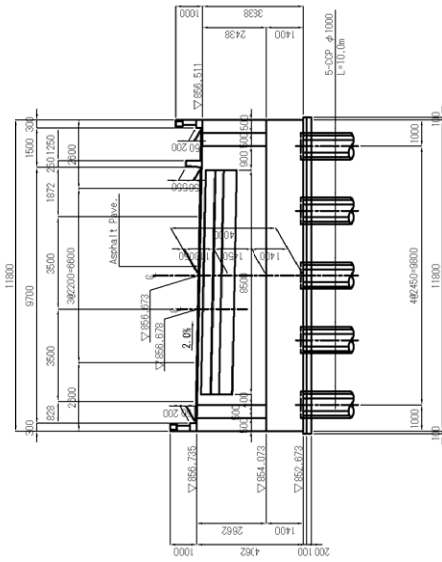
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STRUCTURE DRAWING OF A2 ABUTMENT SCALE 1:100

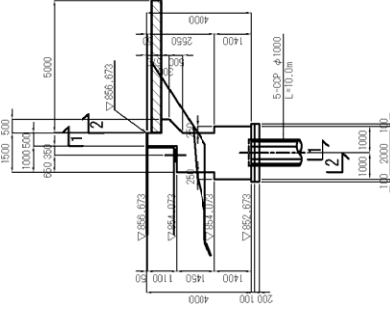
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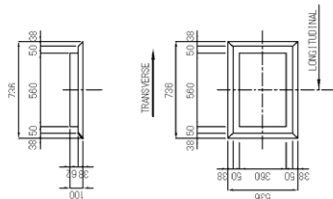
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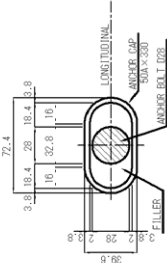
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DETAILS SCALE 1:20

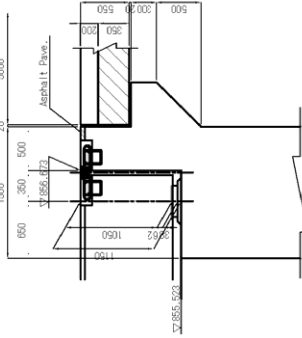


ANCHOR CAP SCALE 1:20
Mov



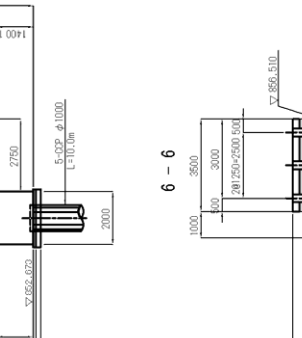
ANCHOR BOLT SCALE 1:30

A - A

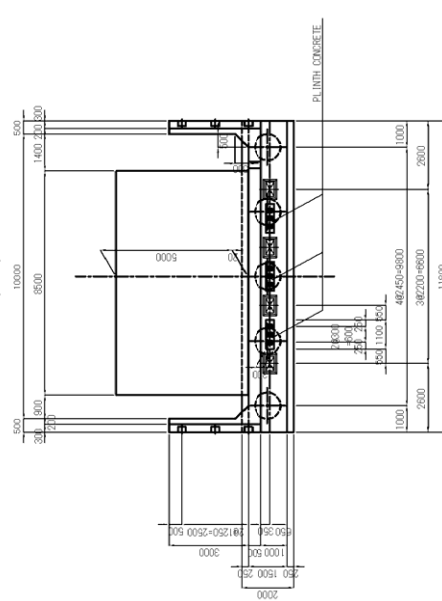


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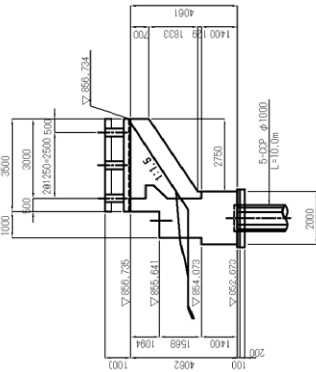
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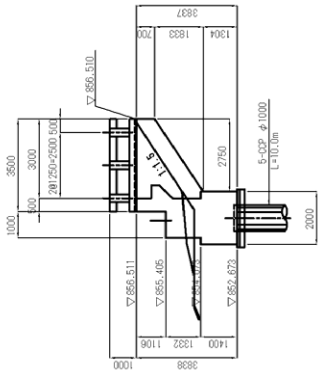
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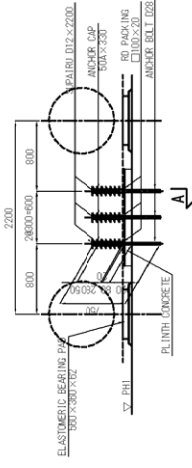
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6 - 6

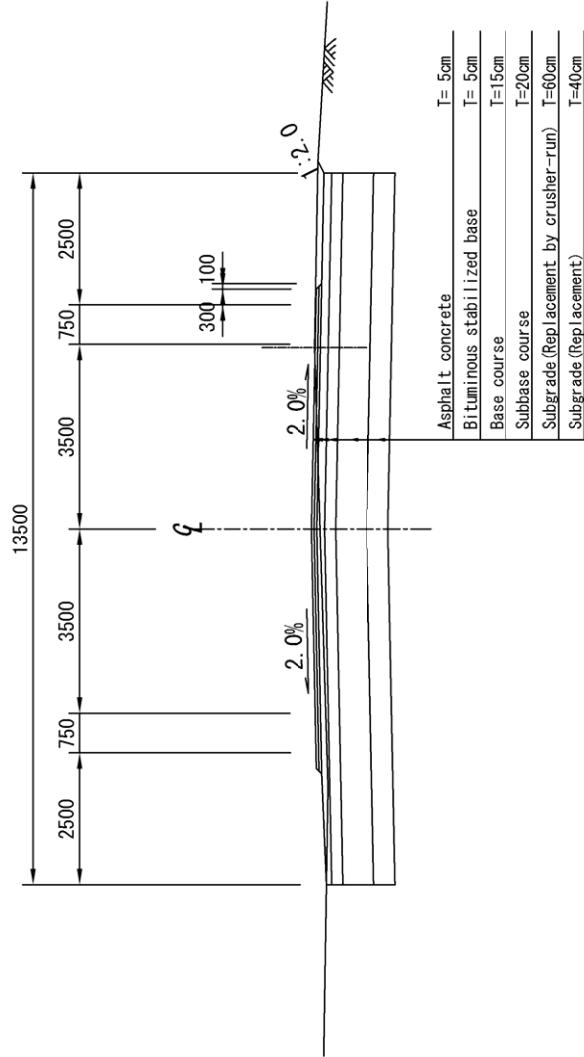


B - B



<p>MAIN ROAD DEPARTMENT MINISTRY OF TRANSPORT AND COMMUNICATIONS KYRGYZ REPUBLIC</p>	<p>BASIC DESIGN ON THE PROJECT FOR RECONSTRUCTION OF BRIDGES IN CHUI OBLAST OF THE KYRGYZ REPUBLIC</p>	<p>JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL</p>	<p>TITLE: KENG-BULUNG (NO.14) BRIDGE STRUCTURE DRAWING OF A2 ABUTMENT</p> <p>SCALE: S=1:100</p> <p>DRAWING No: 18</p> <p>RV</p>
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No. 14 TYPICAL CROSS SECTION OF ROAD SCALE 1:100



MAIN ROAD DEPARTMENT MINISTRY OF TRANSPORT AND COMMUNICATIONS KYRGYZ REPUBLIC	BASIC DESIGN ON THE PROJECT FOR RECONSTRUCTION OF BRIDGES IN CHUI OBLAST OF THE KYRGYZ REPUBLIC	JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL	TITLE:	SCALE :	DRAWING No.
			No. 14 TYPICAL CROSS SECTION OF ROAD	S=1:100	19
					Rv

2.2.4 Implementation Plan

2.2.4.1 Implementation Policy

Basic concepts for implementation of the Project are as follows:

- After both Governments of Japan and Kyrgyz agree and sign an exchange of note, the Project will be implemented in accordance with the guideline of Japan's Grant Aid.
- Ministry of Transportation and Communications, the Government of Kyrgyz is responsible for implementing the Project.
- Execution of detail design, assistance in tendering and construction supervision will be undertaken by a Japanese consulting firm in accordance with a contract between the Ministry and the consultant.
- A Japanese tendered who has award the contract by the Ministry will undertake the implementation of the Project.

Main concepts for the implementation are as follows:

- Materials and labors for the project are procured in Kyrgyz as many as possible. If required qualities and capacities are not enough, materials and labors can be procured effectively from third countries and/or Japan.
- Implementation method and schedule for the Project shall be planed based on meteorological, topographic and geologic conditions, and property of each project site's river.
- General and easy method without specific equipment and technology shall be planed.
- Proposing proper standards and specifications for construction, site organizations of both the contractor and consultant shall manage to apply the standards and specifications
- The safety management for the construction personals and third party under construction shall be secured.
- Protection for water pollution and flooding by the implementation shall be done in order to preserve environment. Also construction waste shall be treated to dump in a proper site specified by the Government of Kyrgyz.

2.2.4.2 Implementation Conditions

2.2.4.2.1 Consideration for the period of High and Low river water level

Planning of efficient construction schedule shall be considered to meteorological, topographic and geologic conditions, and river properties such as the period of high and low water of each project site's river. The river property of each project site and concerning items for implementation of construction are as follows:

2.2.4.2.2 Alamedin bridge (Bridge No.1) and Ala-Archa bridge (Bridge No.2)

- River properties

The low water period is 9 months of April from August. The river width is approximately 7m and the deepest river depth is approximately 0.7m in this period.

The high water period is 3 months of May from July. The maximum river width in ordinary year is approximately 24m and the deepest river depth is approximately 4.5~5.0m in this period.

- Concerning items for implementation of construction

Generally, to be completed the sub structure construction which is first work of bridge construction in the period of low water will be favorable for economy and early completion of the project. However if it will implement in the period of high water based on construction schedule, it is necessary that the economic methodology of securing the natural flow capacity of river such as the coffer dam by embankment or diversion of river flow shall be considered in the construction plan.

The election girders adopts the crane election methodology that is economic methodology.

2.2.4.2.3 Keng-Burun bridge (Bridge No.14 Out bound)

- River properties

The low water period is 9 months of April from August. The river width is approximately 12m and the deepest river depth is approximately 0.6m in this period.

The high water period is 3 months of May from July. The maximum river width in ordinary year is approximately 13m and the deepest river depth is approximately 1.6m in this period.

- Concerning items for implementation of construction

For construction of the sub structure will be able to adopt open excavation methodology which is the economical methodology even though construction period will be during high water period, because of this bridge is single span and abutments are designed by the small reversed type that can construct without excavation for foundations.

The super structure is designed by cast in situ PC hollow girder, therefore it should consider that the false work for PC hollow girder during construction will not interrupt the natural water flow in the statement of construction method.

2.2.4.2.4 Management for hard summer and winter season

The climate of Kyrgyz belongs to a typical continental climate that the average maximum temperature of August from June exceeds 35°C, and the minimum temperature of December and January are less than 3 °C.

In planning of the statement of construction method, it is necessary to concern the methodology of construction, selection of using material and so on for hard seasons. Especially for the concrete work, the proper methodology such as addition to the chemical admixture, transportation method, pouring concrete that accepted the situation and selection of curing method etc. should be planed for securing the endurance of concrete.

2.2.4.2.5 Secure the general traffic

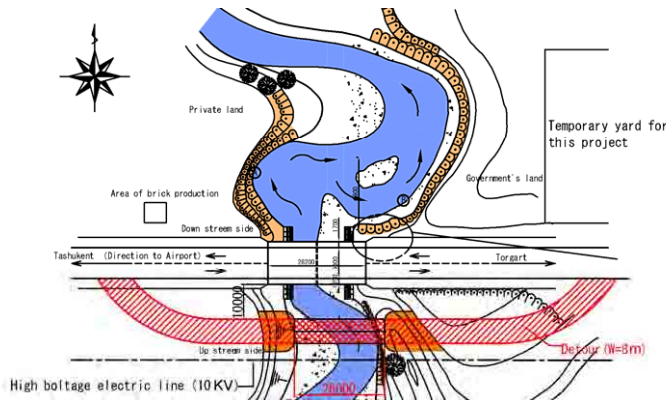
The object bridges are Alamedin bridge (Bridge No.1) and Ala-Archa bridge (Bridge No.2) that are located on Asian Highway No.5 (AH5) where connect to Almaty (Kazakhstan) – Kyrgyz – Tashkent (Uzbekistan). Keng-Burun bridge (Bridge No.14, out bound) is located on AH61 where connect to Kyrgyz and China. These international routes are the lifeline of physical distribution in Kyrgyz.

The general traffic should be secured during construction because of the all new bridges will be plan to construct existing bridge locations. Therefore the detours should be planed to place near in location beside of existing bridges due to no existing detours around there. Also the temporary bridges will be installed on the river portion to secure the smooth and safety of general traffic. Regards with Keng-Burun bridge (Bridge No.14, out bound), a two lanes existing bridge for in bound at the near of down stream side should be used as a detour by traffic control during construction.

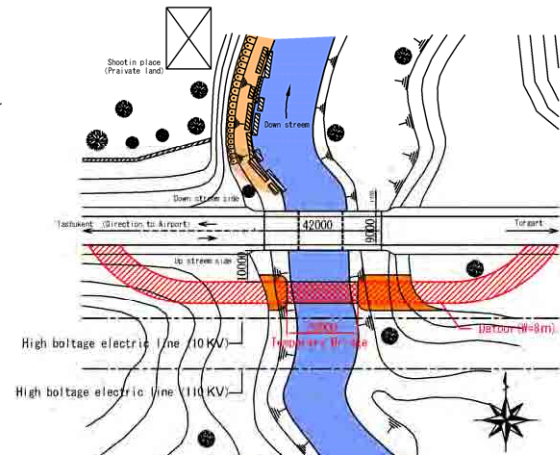
Existing situation of Ala-Archa bridge (Bridge No.2) and detour plans are as follows:



Existing situation of Ala-Archa bridge (Bridge No.2)
(Traffic volume : 12,700 vehicles from 7:00 to 9:00)



Detour plan for
Alamedin bridge (Bridge No.1)



Detour plan for
Ala-Archa bridge (Bridge No.2)

2.2.4.2.6 Safety management for third parties and construction personals

As previously mentioned, the construction works will be conducted under the condition of much traffic volume, so sufficient safety management for third parties and construction personals should be required.

Safety management for third parties

- Construction yards will be definitely separated by using security facilities such as construction signs, and the entry should be controlled.
- Revolving lights as the night indication in addition to sign such as under construction and detour should be installed to lead the third parties to detour.
- For the prevention accidents due to defect of facilities, the check of temporary bridges should be periodically conducted.
- Safety instruction to drivers or company of material supply should be conducted for the measurement for the prevention of traffic accidents.

Safety management for construction personals

- Proper scaffolding and facilities such as fence for prevention of fall from height under construction etc. should be installed for the prevention of fall accidents.
- Watch man for operated construction equipment should be placed for the prevention of collision because of much heavy equipment will operate.

2.2.4.2.7 Consideration for Environment

- The measurement for prevention of river water pollution due to an outflow of muddy water during a construction of bored piles should be considered method such as the installation of the proper facilities with securing spare one.

- Regards with the borrow pit and disposal place of wastes should be followed the requirement of implementation agency, endeavoring to mitigate the negative impact for environment around the sites.
- A construction method occurring vibration shall be avoided in the early morning and night time.
- Dust caused by the construction equipment shall be mitigated by spreading water.
- Information, notification and education of environment will be conducted to all parties concerned in the project. Especially the education of occupation safety and sanitation, environment and nature preservation and health (health care etc. in hard summer and winter seasons) will be conducted.

2.2.4.3 Scope of Works

Undertakings of both Governments, Japan and Kyrgyz, are listed in Table 2.2.4-1.

Table 2.2.4-1 Undertakings of both Governments

Items	Contents	Undertaken by		Remarks
		Japan	Kyrgyz	
Procurement of materials and equipment	Procurement	○		
	Customs clearance		○	
Temporary work	Right of way acquisition		○	Site office, stock yard, work shop, etc.
	Measurement of resettlement		○	No occurrence in this project
	Distribution of public electric to temporary yard		○	
	Borrow pit and disposal place securement		○	
	securement of wastes disposal place			
	Other work	○		
	Relocation of on the ground obstacles		○	
Obstacles demolition	Existing bridges demolition	○		
Main work	Improvement of the road	○		

2.2.4.4 Construction Supervision Plan

A Japanese consultant will carry out detailed design, assistance in tendering and construction supervision in accordance with the consultant contract agreed with both the Government of Kyrgyz and the consultant.

2.2.4.4.1 Detail design service

The contents of service of detail design which will carry out by consultant are as follows:

2.2.4.4.2 Detailed design

To conduct of the beginning negotiation with implementation agency of Kyrgyz and field survey.

- To conduct the detailed design and draw out the design drawing.

The period of detail design service is as follows:

- 3.5 months

2.2.4.4.3 Assistance in tendering

The following services in the period from tender notice to construction contract are as follows:

- Tender documents
- (This service will be conducted above mentioned detail design in parallel.)
- Tender notice
- Prequalification
- Tendering
- Tender evaluation
- Contract facilitation

The duration of assistance in tendering is as follows:

- 3.0 months

2.2.4.4.4 Construction supervision

The consultant will carry out supervision of the construction to be executed by a contractor according to the contract and implementation plan. Major work items are as follows:

- Inspections and approvals of site surveys
- Inspections and approvals of the statement of construction method
- Quality control
- Progress control
- Measurement of the work
- Inspection of safety aspects
- Final inspection and delivery

The duration of work periods are as follows:

- Phase 1: 11.5 months
- Phase 2: 15.5 months

One supervisor will be designated permanently for the construction supervision.

The construction of three bridges will be implemented at once. The construction supervision shall be carried out by employed one local engineer in addition to one Japanese resident engineer because of Alamedin bridge (Bridge No.1) and Ala-Archa bridge (Bridge No.2) approach it with 3.8km, but Keng-Burun bridge (Bridge No.14, out bound) is about 60km distant from them.

The construction supervision shall consider safety for all aspects of the construction

2.2.4.5 Quality Control Plan

Quality control plans for concrete work in Table 2.2.4-2 and for earthwork and pavement work are shown in Table 2.2.4-3.

Table 2.2.4-2 Quality control plan for concrete work

Item	Test item	Test method (Specification)	Frequently of tests
Cement	Physical property test	AASHTO M85	Once before trail mix; thence once in 500m ³ of concrete. Once if material source is changed
Fine aggregate	Physical property test	AASHTO M6	Once before trail mix; thence once in 500m ³ . Once if material source is changed.
	Sieve analysis	AASHTO T27	Once a month
Course aggregate	Physical property test	AASHTO M80	Once before trail mix; thence once in 500m ³ . Once if material source is changed (Data of procurement is confirmed).
	Sieve analysis	AASHTO T27	Once a month
Water	Quality test	AASHTO T26	Once before trail mix
Concrete	Slump test	AASHTO T119	Twice a day
	Air content test	AASHTO T121	Twice a day
	Compressive strength test	AASHTO T22	6 specimens in each concreting. Incase of large amount in each concreting, 6 specimens every 75 m ³ (3 for 7 day strength and 3 for 28 day strength)
	Temperature test	—	Twice a day
	Salinity test	—	Twice a day

Table 2.2.4-3 Quality control plan for earthwork and pavement work

Items	Test items	Test method (Specification)	Frequently of tests
Embankment	Density in-situ (Compaction)	AASHTO T191	Once 500 m ²
Base course/ Sub-base	Density in-situ (Compaction)	AASHTO T191	Once 1,000m ³
	Compaction and unconfirmed compression test	AASHTO T180	Once 1,000m ³
Asphalt concrete (surface/BTB)	Temperature of asphalt mixture	Temperatures while carrying, coating and rolling	5 times a day
	Abrasion test of aggregate	AASHTO T96	Once 1,500m ³ . Once if material source is changed (Data of procurement is confirmed)

2.2.4.6 Procurement Plan

2.2.4.6.1 Procurement plan of construction material

The main construction materials which will be able to procure in Kyrgyz are sand, aggregate, crash stone, ready mixed concrete, asphalt concrete, woods and so on. The other one should be imported.

Policy to procure material is as follows:

- The imported materials which have usually supplied in market should be procured.
- The main materials which will be not able to be supplied in Kyrgyz should procure from Japan or third countries with considering the quality, price, possibility of procurement and delivery.

Procurement plan of major material is shown in Table 2.2.4-4.

Table 2.2.4-4 Procurement plan of major material

Item	Procurement from			Remarks
	Kyrgyz	Japan	3 rd country	
Materials for Structure				
Crushed stone (For concrete)	○			Bishkek City and Tokmok Town
Cement	○			Bishkek City
Sand (For concrete)	○			Bishkek City and Tokmok Town
Bolder (For revetment)	○			-do-
Sub base and base course	○			-do-
Ready mixed concrete	○			Bishkek City and Kant Town
Asphalt concrete				-do-
Re-bar : D 6 ~ D 32	○			Bishkek City (Imported)
Admixture for concrete	○			-do-
PC materials		○		Japan
Bearing (For PC girder)		○		-do-
Expansion joint		○		-do-
PVC pipe : D = 50~200	○			Bishkek City
Traffic signboard	○			-do-
Traffic light	○			
Material for temporary work				
Timber for form	○			Bishkek City
Plywood for form (waterproof)	○			-do-
Support timber and log for scaffold	○			-do-
Steel materials	○			-do-
Temporary bridge		○		Japan
Covering plate		○		-do-
Fuel and publication	○			Near site (Imported)
Oxygen and acetylene	○			Bishkek City
Gas cutter	○			-do-

2.2.4.6.2 Procurement plan of construction equipment

Policy to procure equipment is as follows:

- Common construction equipment owned by Local contractors will be used. However in case of lease price is expensive, the procurement plan should be considered procurement from third country with estimation of using period in deciding whether it is economical procure.
- If local procurement is difficult, the equipment will be procured from Japan and/or third countries.
- Some kinds of equipment owned by Local contractors which mentioned below are mostly old type. These are not continuously workable and difficulty of quality sacrament because of frequent repairing. Therefore procurement of these kind of equipment should be planed to rent for free from MOTC property provided that the cost for transportation and consumed fuel during operation and operator will be beard by Japan side.
- The equipment except workable backhoes and dump trucks are leased from contractor of third country having its site office in Kyrgyz.

- (1) Road roller : one piece
 (2) Tire roller : one piece
 (3) Asphalt finisher : one piece

Major equipment procurement plan is shown in Table 2.2.4-5.

Table 2.2.4-5 Major equipment procurement plan

Equipment	Size	Lease/ Procurement/ Lease for free from MOTC	Procured from			Reason of procurement	Carriage
			Kyrgyz	Third country	Japan		
Backhoe	0.28m ³	Lease	○				
Backhoe	0.5m ³	Lease	○				
Backhoe	0.8m ³	Lease	○				
Bulldozer	15t	Lease	○				
Bulldozer	21t	Lease	○				
Motor grader	3.1 m	Lease	○				
Road roller	10-12t	Lease for free from MOTC	○				
Tire roller	8-20t	Lease for free from MOTC	○				
Vibration roller	0.5-0.6t	Lease	○				
Vibration roller	0.8-1.1t	Lease	○				
Wheel loader	2.3m ³	Lease	○				
Wheel loader	3.1m ³	Lease	○				
Asphalt finisher	2.4-6.0m	Lease for free from MOTC	○				
Sprinkler truck	6.0kl	Lease	○				
Dump truck	10 t	Lease	○				
Truck crane	4.8-4.9t	Lease	○				
Truck crane	20 t	Lease	○				
Truck crane	35 t	Lease	○				
Trailer truck	45t	Purchase (Hire)		○ (China)		Not available in Kyrgyz	Urumchi – Almaty - Bishkek
Trailer truck	120t	Purchase (Hire)		○ (China)		Not available in Kyrgyz	Urumchi – Almaty - Bishkek
Crawler crane	100t	Purchase (Hire)		○ (China)		Not available in Kyrgyz	Urumchi – Almaty - Bishkek
Crane truck	4t	Lease	○				
Trailer truck	20t	Lease	○				
Trailer truck	30t	Lease	○				
Reverse circulation drill (For Board pile)	-	Purchase (Hire)			○	Not available in Kyrgyz and no definite confirmation of record in neighboring country	Japan - LianYunGang – Urumchi - Bishkek
Slush tank	3,5,10m ³	Lease	○				
Generator	15KVA	Lease	○				
Generator	25KVA	Lease	○				
Water pump	150mm	Lease	○				
Water pump	100mm	Lease	○				
Hand breaker	20kg	Lease	○				
Compressor	3.5-3.7m ³	Lease	○				

2.2.4.7 Implementation Schedule

Implementation plan is scheduled as follows:

Implementation schedule is shown in Table 2.2.4-6.

Table 2.2.4-6 Implementation schedule

Work Item		Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16					
Detail design stage	Detail design	Site survey	■																				
		Design service	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
	Tendering service					■	■	■	■	■	■	■	■	■	■	■	■	■	■				
Implementation stage	Alamedin bridge (Bridge No.1)	Preparation	■	■																			
		Temporary work		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
		Sub structure work					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
		Super structure work			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
		Revetment work										■	■	■	■	■	■	■	■	■	■		
		Approach road work																					
		Site clearing																				■	
	Ala-Archa bridge (Bridge No.2)	Preparation																					
		Temporary work		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
		Sub structure work					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
		Super structure work			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
		Revetment work																				■	
		Approach road work																				■	
		Site clearing																					■
	Keng-Burun bridge (Bridge No.14, out bound)	Preparation			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
		Temporary work					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
		Sub structure work							■	■	■	■	■	■	■	■	■	■	■	■	■	■	
		Revetment and Approach road work																				■	
		Site clearing																					■

2.3 Obligations of Recipient Country

The Government of Kyrgyz will undertake the following measures on condition that the Grant Aid by the Government of Japan is extended to the Project.

- To provide data and information necessary for the Project.
- To secure the land necessary for the execution of the Project, such as the land for temporary offices, construction works, storage yards and others.
- To install the distribution facility of public electric to the temporary yard.
- To secure the land for borrow pit and disposal of wastes which is necessary for Keng-Burun bridge (Bridge No.14, out bound) construction
- To bear commissions to the bank in Japan for its banking service in connection with the Project.
- To ensure prompt tax exemption, customs clearance and effective inland transportation of material and equipment.
- To exempt Japanese nationals engaged in the Project customs duties for the supply of products and services necessary for the project.
- To measure the legislation to Japanese nationals for the entry and stay in Kyrgyz.
- To secure the required approvals, which are necessary to the project implementation such as EIA approvals from environmental agency, construction permission from construction and architectural agency, permission of regulation of traffic during construction from police office, and permission of nearness work to high voltage electric line during execution of detour, construction in the river and earth works from each administration office.
- To relocate all obstacle structures like electric poles, telephone cables, etc. to the project.
- To lease for free the road roller, tire roller and asphalt finisher.
- To arrange proper use and effective maintenance of bridges (include approach road) after the completion of the project.
- To coordinate and solve any issues related to the Project that may be risen from inhabitants or third parties.
- To bear all the expenses, other than those covered by the Japanese Grand Aid, necessary for the Project by the mutual agreement of both countries.
- To secure the safety measure around site during construction.

2.4 Project Operation and Maintenance Plan

(1) Organization for operation and maintenance

Road Management and Maintenance is in charge the 954 road management and maintenance office controlled by the first road management and maintenance department and the 39 road management and maintenance office controlled by the Bishkek – Naryn – Torgalt road management and maintenance department, which is the subordinate of MOTC.

The road management and maintenance works such as daily inspection and routine maintenance includes repair works have carried out under direct control by above mentioned offices. These offices are organized by about 60 personnel composed of about 6 administrators, chiefs of works, operators, workers and the necessary peaces of equipment for works which are distributed by each road management and maintenance office. It will not make technical problems to conduct the maintenance work by them because of the bridges constructed by this project are designed by concrete make, so the extensive repair works will not be appeared for time being. The management and maintenance will be able to conducted by previous organizations accordingly.

(2) Maintenance plan

Necessary maintenance is as follows:

- Daily maintenance: Routine inspection and cleaning of road surface, drainage facilities and bridge belongings etc.
- Repair for damaged part: Patching pavement, repaving of bridge surface pavement, repainting pavement marking, repairing of river revetment and other damaged parts.

(3) Present operations of maintenance and recommendations

Present operations of maintenance are as follows:

- Daily maintenance: Bridge and approach road are well cleaned.
- Repair: River revetments are repaired regularly; however the repair of bridge surface pavement and handrails are not enough.

It is important to achieve effective results from maintaining bridges and approach roads sufficiently for keeping good condition of traffic lanes and durability of facilities.

The following recommendations are necessary:

- To check facilities regularly for controlling their conditions.
- To clean facilities up, especially drainages, around bearing and bearing it's self.
- To secure necessary budget for maintenance.

2.5 Rough Project Cost

2.5.1 Rough Estimate of Project Cost

(1) Cost born by the Government of Japan

The total cost of the Project to be implemented in accordance with the Japan's Grant Aid scheme will be determined before concluding the Exchange of Notes (E/N) for the Project.

(2) Cost borne by Government of Kyrgyz 750,000 Som (approx. 2.2million Japanese Yen)

- | | |
|--|---|
| ① Advising Commission | 147,000 Som (approx. 0.4million Japanese Yen) |
| ② Payment Commission | 203,000 Som (approx. 0.6million Japanese Yen) |
| ③ Distribution of public electric to the construction temporary yard | 400,000 Som (approx. 1.2million Japanese Yen) |

(3) Conditions in the cost estimate

- ① Time of cost estimate: February 2007
- ② Exchange rate: US\$ 1.00 = 118.891 Japanese Yen 1 Som = 3.05 Japanese Yen
- ③ Construction period: As shown in the Implementation Schedule.
- ④ Others: The cost estimation of project in accordance with the system of Japan's Grant Aid.

2.5.2 Estimated Maintenance Cost

The following organization is in charge of maintenance for the bridges rehabilitated by the Project:

Alamedin bridge (Bridge No.1) and Ala-Archa bridge (Bridge No.2):

The 39 road management and maintenance office controlled by the Bishkek – Naryn – Torgalt road management and maintenance department.

Keng-Burun bridge (Bridge No.14, out bound):

The 954 road management and maintenance office controlled by the first road management and maintenance department

Annual maintenance cost necessary for Alamedin bridge (Bridge No.1) is estimated at 180,760 Som (US\$ 4,519.00), for Ala-Archa bridge (Bridge No.2) is estimated at 180,440 Som (US\$ 4,511.00) and for Keng-Burun bridge (Bridge No.14, out bound) is estimated at 198,200 Som (US\$4,955.00). The breakdown of them are shown in Table 2.5.2-1~Table 2.5.2-3.

Table 2.5.2-1 Maintenance work and annual cost for Alamedin bridge (Bridge No.1)

Unit : Som

1. Routine Inspection (Undertaken by the Bishkek – Naryn – Torgalt road management and maintenance department)

Facility	Inspection Item	Frequency	No. of staff	Equipment	Quantity	Cost (Som)
<u>Bridge</u>						
Pavement	Crack, deformation, pothole, etc.	12 times a year	2 persons	Scoop, hammer,	24 men-day/ year	14,400.0
Drainage	Existence of soil, obstacles			sickle, arricade,		
Road marking	Injury, deformation, stain, splitting					
Structure	Bridge surface, Abutment, Piers				12 veh-day/ year	
Revetment	Crack, damage, collapse, etc.			pick-up truck		24,000.0
Facility	Hanging facilities, damage of handrail					
<u>Approach road</u>						
Pavement	Crack, deformation, pothole, etc.					
Shoulder/slope	Rainwater erosion & collapse, etc.					
Road marking	Injury, deformation, stain, splitting					
	Damage					
					Total	38,400.0

2. Daily maintenance work (Undertaken by the Bishkek – Naryn – Torgalt road management and maintenance department)

Facility	Inspection Item	Frequency	No. of staff	Equipment	Quantity	Cost (Som)
<u>Cleaning</u>						
Drainage	Cleaning soil, obstacles	4 times a year	5 persons	Scoop, hammer,	80 men-day/ year	48,000.0
Pavement	Cleaning			sickle, barricade,		
Joint	Cleaning	4 days each time			8 veh-day/ year	
Shoulder	Cutting grass, cleaning			Pick-up truck		16,000.0
Box culvert	Cleaning					
Road marking	Cleaning					
					Total	64,000.0

Total of routine inspection and daily maintenance work cost 102,400

3. Repair (Undertaken by the Bishkek – Naryn – Torgalt road management and maintenance department)

Facility	Inspection Item	Frequency	No. of staff	Equipment	Quantity	Cost (Som)
<u>Bridge</u>						
Structure	Repairing damaged part	2 times a year	6 persons	Plat tamper	84 men-day/ year	50,400.0
Pavement	Shielding crack, patching pothole	7 days each time		Pick-up truck	14 veh-day /year, 7 veh-day/year	8,400.0 14,000.0
Drainage	Repairing damaged part					
Revetment	Repairing damaged part					
Facility	Partial painting handrail					
<u>Approach Road</u>						
Pavement	Shielding crack, patching pothole			Base course	6.0m ³ /year	2,160.0
Shoulder/slope	Repairing damaged part			Asphalt concrete	0.5t/year	1,000.0
Road marking	Repainting			Road making paint	30m/year	2,400.0
					Total	78,360.0

Grand total 180,760.0

Table 2.5.2-2 Maintenance work and annual cost for Ala-Archa bridge (Bridge No.2)

Unit : Som

1. Routine Inspection (Undertaken by the Bishkek – Naryn – Torgalt road management and maintenance department)

Facility	Inspection Item	Frequency	No. of staff	Equipment	Quantity	Cost (Som)
<u>Bridge</u>						
Pavement	Crack, deformation, pothole, etc.	12 times a year	2 persons	Scoop, hammer,	24 men-day/ year	14,400.0
Drainage	Existence of soil, obstacles			sickle, arricade,		
Road marking	Injury, deformation, stain, splitting					
Structure	Bridge surface, Abutment, Piers				12 veh-day/ year	
Revetment	Crack, damage, collapse, etc.			pick-up truck		24,000.0
Facility	Hanging facilities, damage of handrail					
<u>Approach road</u>						
Pavement	Crack, deformation, pothole, etc.					
Shoulder/slope	Rainwater erosion & collapse, etc.					
Road marking	Injury, deformation, stain, splitting					
	Damage					
					Total	38,400.0

2. Daily maintenance work (Undertaken by the Bishkek – Naryn – Torgalt road management and maintenance department)

Facility	Inspection Item	Frequency	No. of staff	Equipment	Quantity	Cost (Som)
<u>Cleaning</u>						
Drainage	Cleaning soil, obstacles	4 times a year	5 persons	Scoop, hammer,	80 men-day/ year	48,000.0
Pavement	Cleaning			sickle, barricade,		
Joint	Cleaning	4 days each time			8 veh-day/ year	
Shoulder	Cutting grass, cleaning			Pick-up truck		16,000.0
Box culvert	Cleaning					
Road marking	Cleaning					
					Total	64,000.0

Total of routine inspection and daily maintenance work cost 102,400

3. Repair (Undertaken by the Bishkek – Naryn – Torgalt road management and maintenance department)

Facility	Inspection Item	Frequency	No. of staff	Equipment	Quantity	Cost (Som)
<u>Bridge</u>						
Structure	Repairing damaged part	2 times a year	6 persons	Plat tamper	84 men-day/ year	50,400.0
Pavement	Shielding crack, patching pothole	7 days each time		Pick-up truck	14 veh-day /year, 7 veh-day/year	8,400.0 14,000.0
Drainage	Repairing damaged part					
Revetment	Repairing damaged part					
Facility	Partial painting handrail					
<u>Approach Road</u>						
Pavement	Shielding crack, patching pothole			Base course	6.0m ³ /year	2,160.0
Shoulder/slope	Repairing damaged part			Asphalt concrete	0.5t/year	1,000.0
Road marking	Repainting			Road making paint	26m/year	2,080.0
					Total	78,040.0

Grand total 180,440.0

**Table 2.5.2-3 Maintenance work and annual cost for Keng-Burun bridge
(Bridge No.14 Outbound)**

Unit : Som

1. Routine Inspection (Undertaken by the first road management and maintenance department)

Facility	Inspection Item	Frequency	No. of staff	Equipment	Quantity	Cost (Som)
<u>Bridge</u>						
Pavement	Crack, deformation, pothole, etc.	12 times a year	2 persons	Scoop, hammer,	24 men-day/ year	14,400.0
Drainage	Existence of soil, obstacles			sickle, arricade,		
Road marking	Injury, deformation, stain, splitting					
Structure	Bridge surface, Abutment, Piers				12 veh-day/ year	
Revetment	Crack, damage, collapse, etc.			pick-up truck		24,000.0
Facility	Hanging facilities, damage of handrail					
<u>Approach road</u>						
Pavement	Crack, deformation, pothole, etc.					
Shoulder/slope	Rainwater erosion & collapse, etc.					
Road marking	Injury, deformation, stain, splitting					
	Damage					
					Total	38,400.0

2. Daily maintenance work (Undertaken by Bishkek – Naryn – Torgalt road management and maintenance department)

Facility	Inspection Item	Frequency	No. of staff	Equipment	Quantity	Cost (Som)
<u>Cleaning</u>						
Drainage	Cleaning soil, obstacles	4 times a year	5 persons	Scoop, hammer,	80 men-day/ year	48,000.0
Pavement	Cleaning			sickle, barricade,		
Joint	Cleaning	4 days each time			20 veh-day/ year	
Shoulder	Cutting grass, cleaning			Pick-up truck		
Box culvert	Cleaning					16,000.0
Road marking	Cleaning					
					Total	64,000.0

Total of routine inspection and daily maintenance work cost

102,400

3. Repair (Undertaken by the first road management and maintenance department)

Facility	Inspection Item	Frequency	No. of staff	Equipment	Quantity	Cost (Som)
<u>Bridge</u>						
Structure	Repairing damaged part	2 times a year	6 persons	Plat tamper	84 men-day/ year	50,400.0
Pavement	Shielding crack, patching pothole	7 days each time		Pick-up truck	14 veh-day /year, 7 veh-day/year	8,400.0 14,000.0
Revetment	Repairing damaged part					
Facility	Partial painting handrail					
<u>Approach Road</u>						
Pavement	Shielding crack, patching pothole			Base course	30.0m ³ /year	10,800.0
				Asphalt concrete	0.5t/year	1,000.0
Shoulder/slope	Repairing damaged part			Road making	140m/year	11,200.0
Road marking	Repainting			paint		
Guide post	Repairing damaged part					
					Total	95,800.0

Grand total

198,200.0

The Bishkek – Naryn – Torgalt road management and maintenance department which will manage for Alamedin bridge (Bridge No.1) and Ala-Archa bridge (Bridge No.2) was newly established in year 2006. The maintenance budget and expense in year 2006 was 16.0 million Som. Maintenance budgets and expenses of the first road management and maintenance

department which will manage for Keng-Burun bridge (Bridge No.14, out bound) in last 5 years are shown in Table 2.5.2-4.

Table 2.5.2-4 Maintenance budgets and expenses of the first road management and maintenance department

Units: Million Som					
Years	2000	2003	2004	2005	2006
Budgets	52.1	62.8	56.5	48.9	37.8
Expenses	52.1	62.8	56.5	48.9	37.8

The necessary annual management and maintenance costs for each bridge are estimated for 180,760 Som for Alamedin bridge (Bridge No.1), 180,440 Som for Ala-Archa bridge (Bridge No.2) and Keng-Burun bridge (Bridge No.14, out bound). The above mentioned annual management and maintenance costs after completion of this project are only 2.2% for the budget of Bishkek – Naryn – Torgalt road management and maintenance department, as well as it is only 0.51 % for the budget of the first road management and maintenance department in year 2006. Hence it is most likely that the budget is financially acceptable.

2.6 Other Relevant Issues

To smoothly implement the project and fully realized and sustain the effects of the project, Kyrgyz shall be taken the following into consideration:

- Regards with the project, full attention was given in preparing the design and construction plan to minimize the environmental impacts during construction, but still impacts such as vibration, noise and influence on traffic, etc. are unavoidable to some extent. It is necessary to explain the possible impacts to the residents living around the construction sites prior to the commencement of the construction works and to get their understanding.
- The maintenance works such as routine inspection and daily maintenance work shall be adequately carried out to keep the facilities in good condition and to maintain their endurance after completion of the project.
- The traffic safety education and crackdown against overload shall adequately carried out to maintain the endurance of facilities.

Chapter 3 Project Evaluation and Recommendations

3.1 Project Effect

Direct and indirect effects of the project implementation are shown in below table.

Table 3.1-1 Direct and Indirect Effects of the Project

Present State and Problems	Countermeasures in the Project	Direct Effects and Improvement Level	Indirect Effects and Improvement Level
<p>All project object bridges of which it passed 40 to 50 years after the building are instable structurally and have a possibility of falling bridge because they are aging and erosion at their foundation is proceeding. And, Alamedin bridge (Bridge No.1) and Ala-Archa bridge (Bridge No.2) are bottlenecks with slow vehicle passing speed because their bridge surfaces are bumpy. It causes many traffic accidents that two bridges built separately to inbound and outbound are not parallel at Keng-Burun bridge (Bridge No.14).</p>	<p>Reconstruction of bridges</p>	<p>① Improvement of the safety and stability of the bridges due to the increase of the actual carrying load abilities of the bridges from 23.5 ~ 28.4 t to 40.9 t will remove the risk of bridge falling at usual time. (All bridges)</p> <p>② The flatness of the bridge will be improved and the speed of vehicle passing bridge of 5 ~ 10 km/h will increase to 60 km/h. (Alamedin bridge (Bridge No.1) and Ala-Archa bridge (Bridge No.2))</p> <p>③ Traffic capacity of 1,900-car/h will increase to 2,270-car/h, resulted from reconstruction of the outbound bridge, and road alignment and road safety facilities will be improved, and then, the factor of inducing traffic accident will be removed. (Keng-Burun bridge (Bridge No.14 Outbound))</p> <p>④ Holes on the sidewalk will be fixed and safe walk will be ensured. (Ala-Archa bridge (Bridge No.2))</p>	<p>⑤ It is expected that socio-economic activities will be active and the employment will be created in Kyrgyz because the existing bridges which have the possibility that they fall down will be reconstructed.</p> <p>⑥ Transportation will be smooth and the economic will develop in the central Asia because of the enhanced function as an international arterial road.</p> <p>⑦ It can be possible for the people living near the bridges to pass bridges safely and the stability of living road such as the improvement of the access to educational facilities will be realized.</p>

3.2 Recommendations

3.2.1 Recommendations for Addressing Problems of Kyrgyz

In order to fully develop and sustain the effects of the Project, addressing problems of Kyrgyz are shown as follows.

- ① The structure of the bridges is maintenance free but cleaning their drain facilities and shoes and their peripheries shall be done absolutely to protect them from early aging and extend their lives.
- ② Life cycle cost of structure of a bridge is from 50 to 100 years but revetments are easy to be damaged by every flood, accordingly, repair and reinforcement corresponding to its damage shall be done to protect them.
- ③ Properly carrying out the maintenance of not only the project bridges but also AH5 and AH61 on which the object bridges are located shall make the function and the rolls of the Project fulfilled.

3.2.2 Technical Assistance, Donor Cooperation

Most of Staff in Road Maintenance Center who carries out road maintenance is over 45 years old. They have a plenty of experience technologies concerning to road construction works including bridge constructions as a national project in Soviet period. However, they are carrying out routine maintenance works such as repair of pothole in spite of lack of fund and equipment, but in order to implement large scale repairs such as overlay using special equipment, restructure of maintenance system such as possession of enough number of equipment in good condition and rejuvenescence of an organization, technical assistances for technical education and donor cooperation on other donor's technical assistances are the urgent matters.