

Mongolia
Ministry of Roads and Transportation (MRT)
Ulaanbaatar City Government (UBC)

PREPARATORY SURVEY
FOR
THE CONSTRUCTION OF AJILCHIN FLYOVER PROJECT
IN
ULAANBAATAR CITY
FINAL REPORT
ANNEX – DRAWINGS

JUNE 2013

JAPAN INTERNATIONAL COOPERATION AGENCY

CTI ENGINEERING INTERNATIONAL CO., LTD.

CHODAI CO., LTD.

INFRASTRUCTURE DEVELOPMENT INSTITUTE - JAPAN

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CR(3)
13-174

Mongolia
Ministry of Roads and Transportation (MRT)
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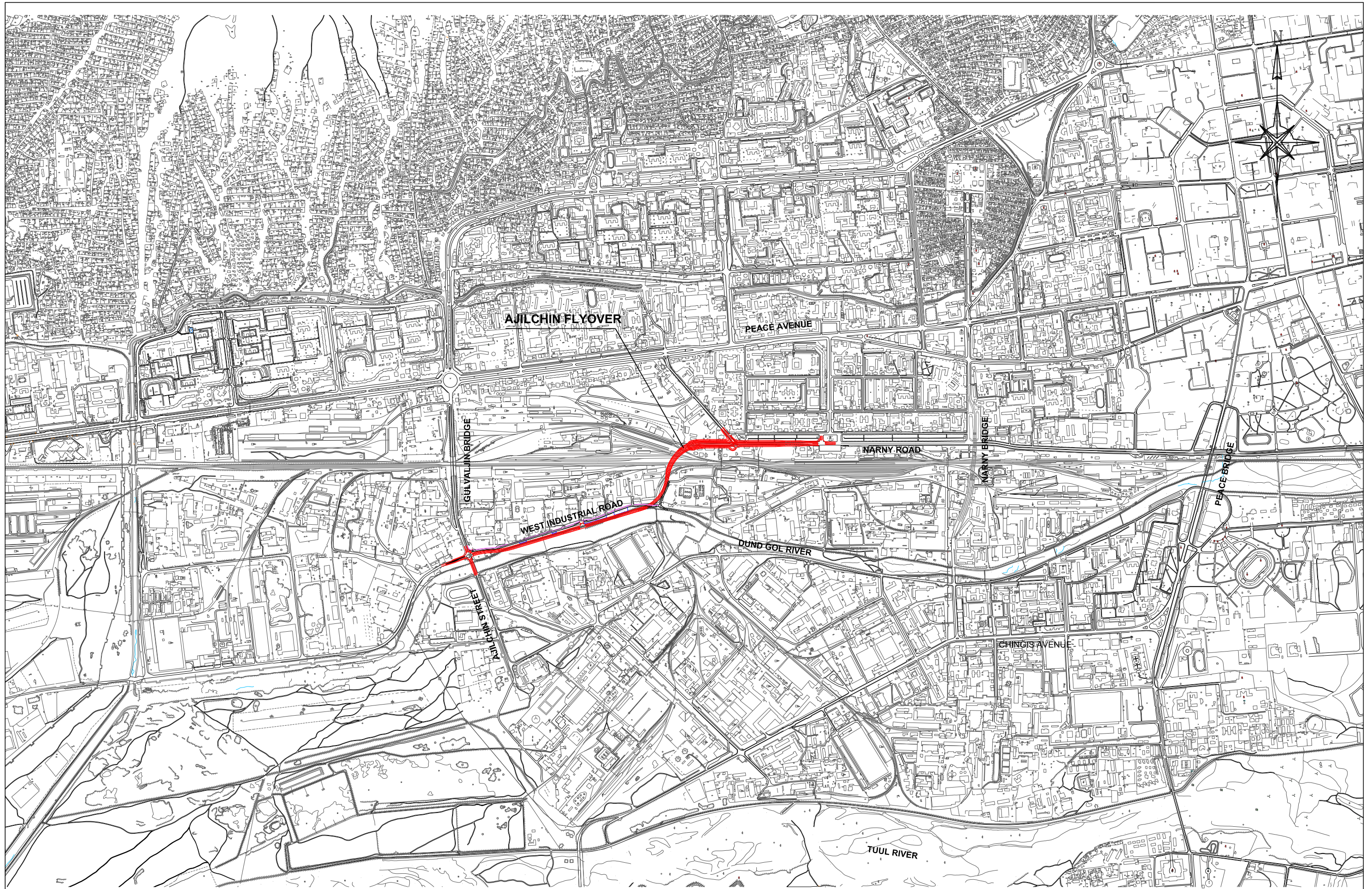
CTI ENGINEERING INTERNATIONAL CO., LTD.

CHODAI CO., LTD.

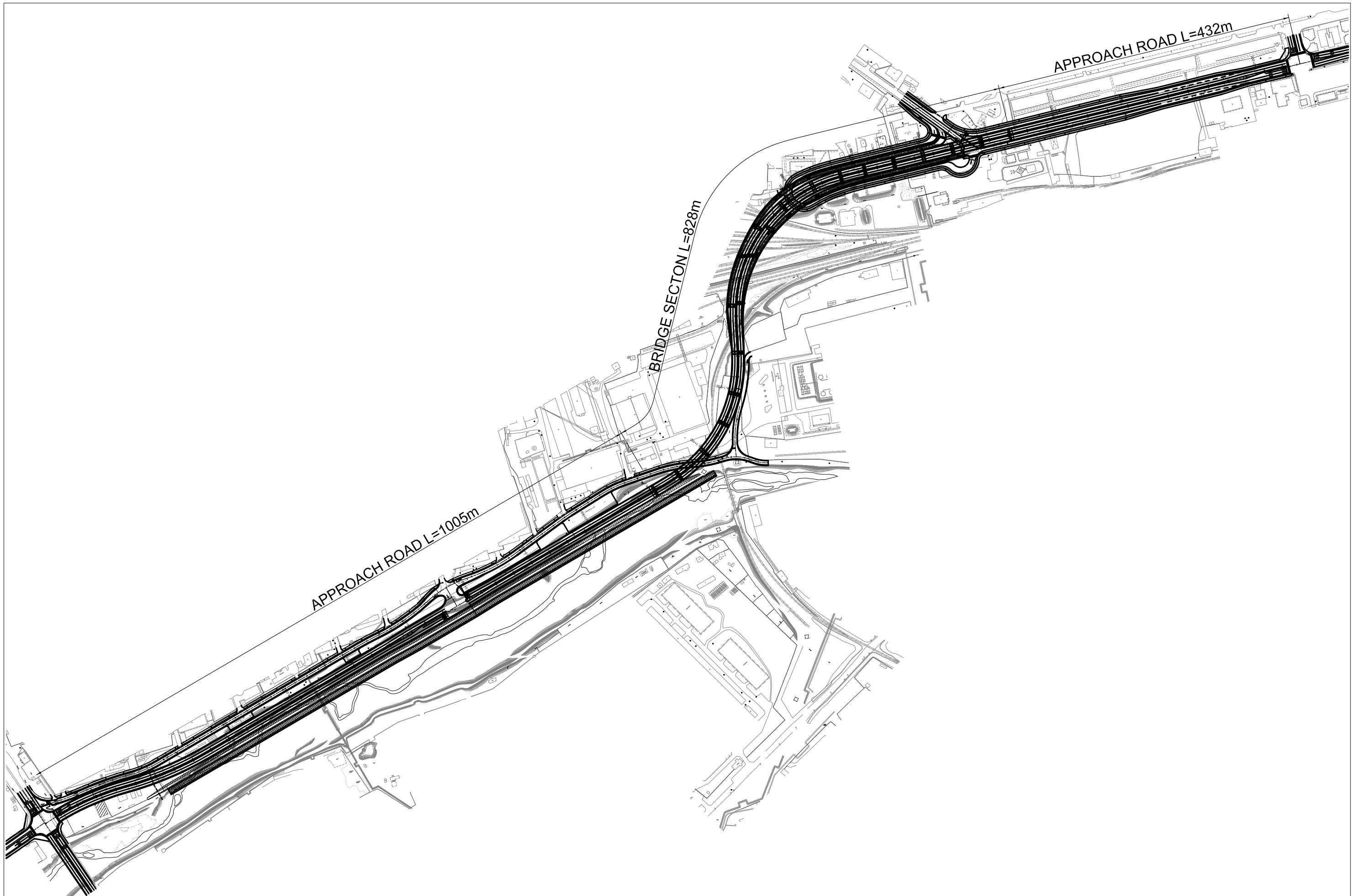
INFRASTRUCTURE DEVELOPMENT INSTITUTE - JAPAN

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	35	ERECTION PLANNING OF SUPER STRUCTURE(P8-P11 EAST)	1	1:500		UTILITY	129 ~ 132	COMMUNICATION CABLE	4	1:2000		
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	38	ERECTION PLANNING OF SUPER STRUCTURE(P11-A2 EAST)	1	1:500			141 ~ 144	HEATING PIPE	4	1:2000		
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41		DETAIL OF P1	1	1:200								
42		DETAIL OF P2-P3	1	1:200								
43		DETAIL OF P4	1	1:200								



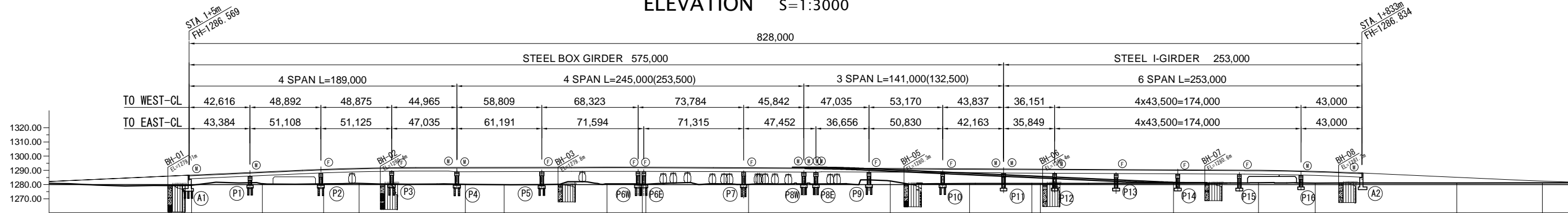
PROJECT TITLE ; THE PROJECT FOR CONSTRUCTION OF AJILCHIN FLY-OVER IN ULAANBAATAR CITY	DESIGNED BY ; CTI Engineering International Co., Ltd. Chodai Co., Ltd. International Development Institute	APPROVED BY ;	DRAWING TITLE ; PROJECT LOCATION MAP	SCALE S=1:20000	DRAWING No. 001	GENERAL
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<p>PROJECT TITLE ; THE PROJECT FOR CONSTRUCTION OF AJILCHIN FLY-OVER IN ULAANBAATAR CITY</p>	<p>DESIGNED BY ; CTI Engineering International Co., Ltd. Chodai Co., Ltd. International Development Institute</p>	<p>APPROVED BY ;</p>	<p>DRAWING TITLE ; PROJECT AREA MAP</p>	<p>SCALE S=1:5000</p>	<p>DRAWING No. 002</p>	<p>GENERAL</p>
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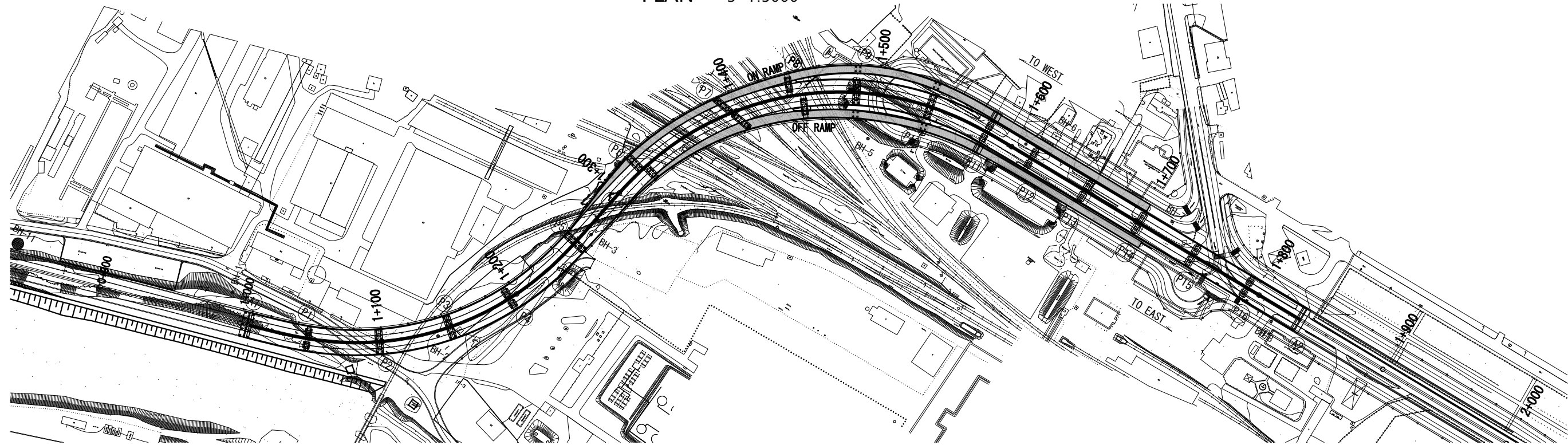
GENERAL VIEW OF BRIDGE (1)

ELEVATION S=1:3000



GRADIENT																																						
PROPOSED HEIGHT	1278.604	1279.070	1286.344	1286.569	1288.820	1291.884	1292.099	1292.152	1292.199	1292.222	1292.211	1292.207	1292.203	1291.139	1291.019	1290.409	1289.969	1288.109	1287.794	1285.094	1282.400																	
GROUND LEVEL	1281.12	1279.070	1279.13	1286.594	1280.64	1280.79	1279.88	1279.93	1282.01	1280.45	1280.39	1280.40	1280.39	1282.28	1280.72	1280.82	1280.99	1280.95	1281.05	1281.07	1281.12	1281.18																
DISTANCE	0.000	170.000	1000.000	1005.000	1048.000	1098.000	1125.000	1148.000	1227.453	1254.000	1277.453	1300.000	1322.000	1396.500	1438.000	1447.500	1465.000	1500.000	1537.000	1555.913	1569.500	1705.000	1746.500	1760.000	1790.000	1800.000	1833.000	1840.000	1900.000	1960.434								
ACC.DISTANCE	0.000	170.000	1000.000	1005.000	1048.000	1098.000	1125.000	1148.000	1227.453	1254.000	1277.453	1300.000	1322.000	1396.500	1438.000	1447.500	1465.000	1500.000	1537.000	1555.913	1569.500	1705.000	1746.500	1760.000	1790.000	1800.000	1833.000	1840.000	1900.000	1960.434								
STATION NUMBER	STA. 0+830	STA. 1+0	KA3-1	P1	KE3-1	P2	STA. 1+100	STA. 1+125	P3	P4	STA. 1+200	KE3-2	P5	KA3-2	STA. 1+300	PW	KA4-1	P7	STA. 1+400	P8W	P8E	P9	STA. 1+500	P10	KE4-2	P11	STA. 1+600	KA4-2	P12	P13	STA. 1+700	P14	P15	STA. 1+800	P16	STA. 1+900	KA4-3	STA. 1+960.434
CURVE BAND																																						
SUPER ELEVATION																																						

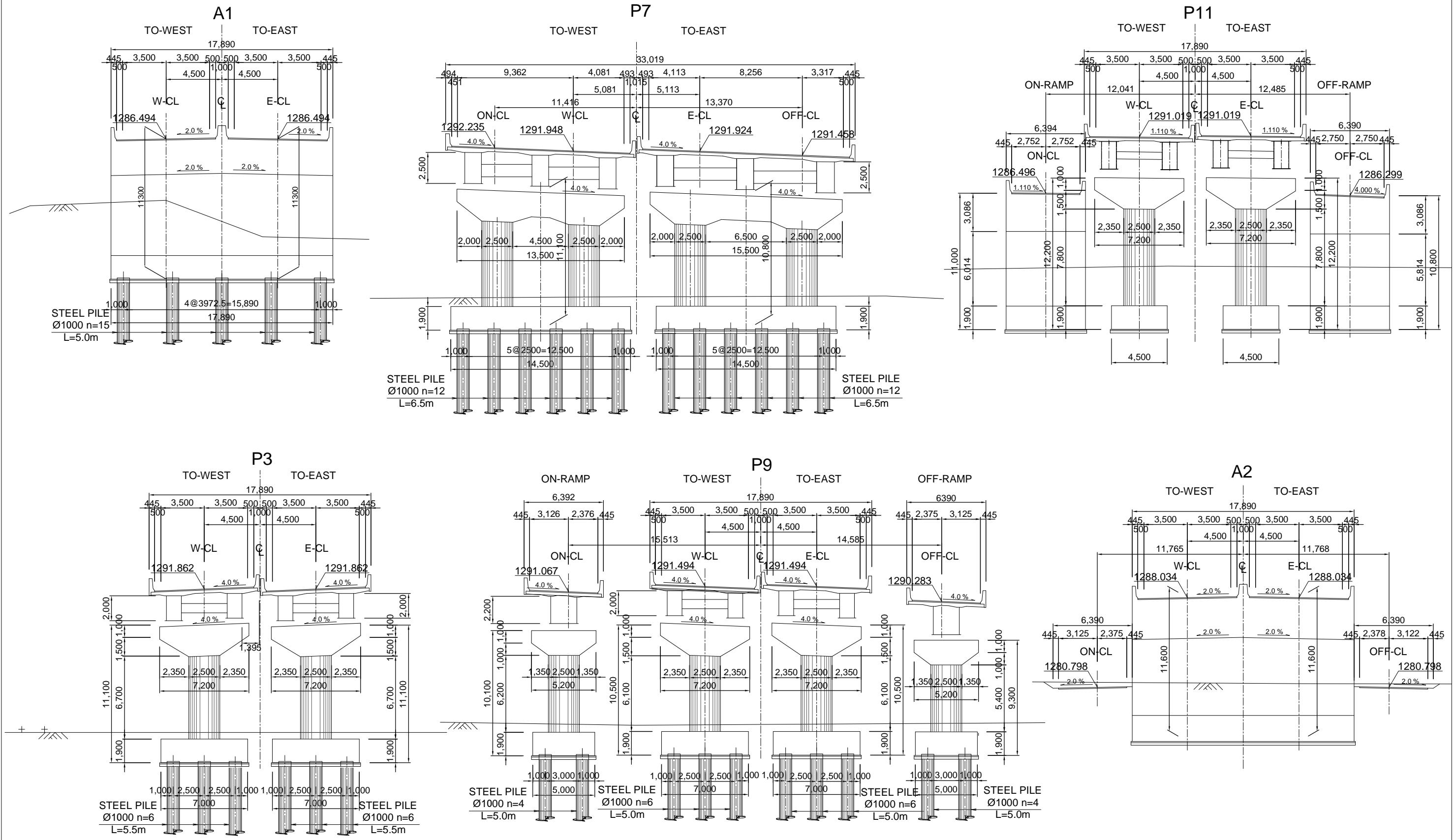
PLAN S=1:3000



PROJECT TITLE ; THE PROJECT FOR CONSTRUCTION OF AJILCHIN FLY-OVER IN ULAANBAATAR CITY	DESIGNED BY ; CTI Engineering International Co., Ltd. Chodai Co., Ltd. International Development Institute	APPROVED BY ;	DRAWING TITLE ; GENERAL VIEW OF BRIDGE (1)	SCALE S=1:3000	DRAWING No. 003	GENERAL
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GENERAL VIEW OF BRIDGE (2)

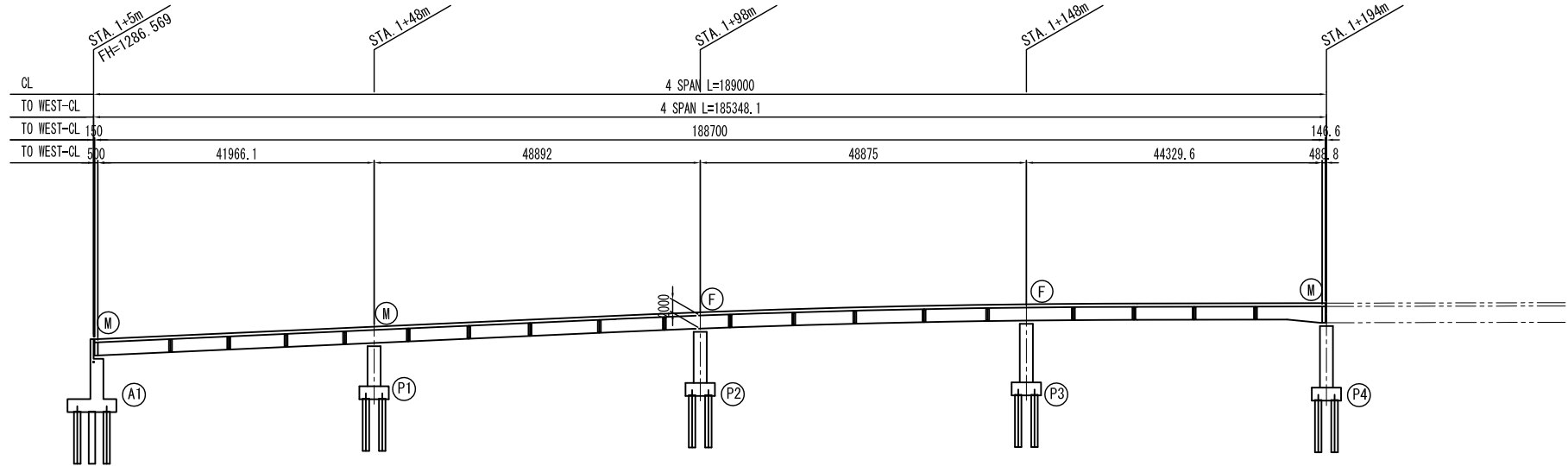
CROSS SECTION OF GIRDER S=1:300



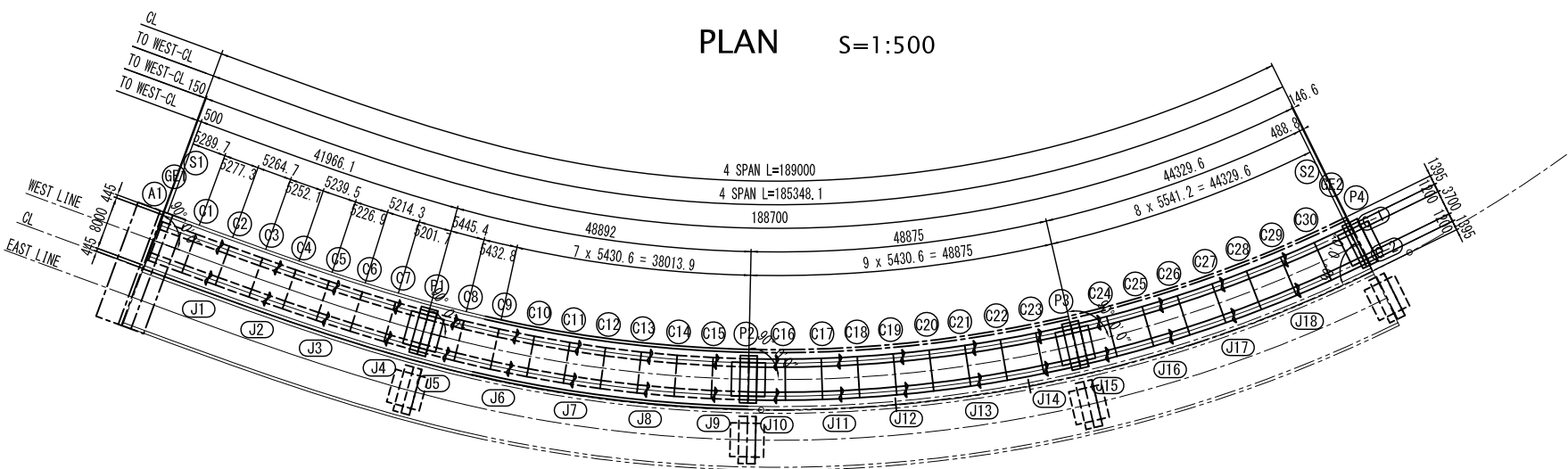
PROJECT TITLE ; THE PROJECT FOR CONSTRUCTION OF AJILCHIN FLY-OVER IN ULAANBAATAR CITY	DESIGNED BY ; CTI Engineering International Co., Ltd. Chodai Co., Ltd. International Development Institute	APPROVED BY ;	DRAWING TITLE ; GENERAL VIEW OF BRIDGE (2)	SCALE S=1:300	DRAWING No. 004	GENERAL
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DETAIL OF SUPER STRUCTURE (A1 -P4 WEST)

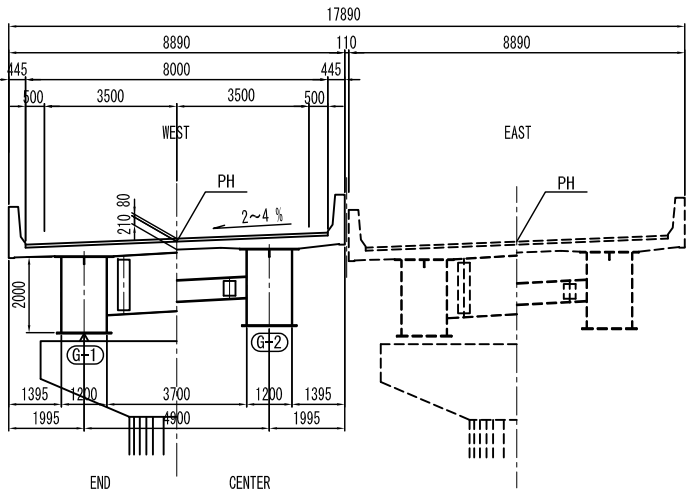
PROFILE S=1:500



PLAN S=1:500



CROSS SECTION S=1:100



DESIGN CONDITION	
BRIDGE TYPE	STEEL 2BOX GIRDER
BRIDGE LENGTH	189.000m (CL)
SPAN ARRANGEMENT	41.1966m + 48.892m + 48.875m + 44.330m
WIDTH	0.445m + 8.000m + 0.445m
HORIZONTAL ALIGNMENT	A=200.000m ~ R=200.000m
ANGLE OF SKEW	90-00-00
LONGITUDINAL SLOPE	4.5% → VCL=80 → 0.2%
CROSS SLOPE	-2.0% (BOTH INCLINES) ~ 4.0% (SUPERELEVATION)
PAVEMENT	ASPHALT PAVEMENT 80mm
DECK SLAB	COMPOSITE SLAB 210mm
STEEL MEMBERS	PLATE AND SHEET : SM490Y, SM400, SS400 REINFORCING BAR : SD345 OR EQUIVALENT
DESIGN CRITERIA	SPECIFICATIONS FOR HIGHWAY BRIDGES PART I-V (JRA)

PROJECT TITLE ;
THE PROJECT FOR CONSTRUCTION OF
AJILCHIN FLY-OVER IN ULAANBAATAR CITY

DESIGNED BY ;
CTI Engineering International Co., Ltd.
Chodai Co., Ltd.
International Development Institute

DRAWING TITLE ;
DETAIL OF SUPER STRUCTURE
(A1 -P4 WEST)

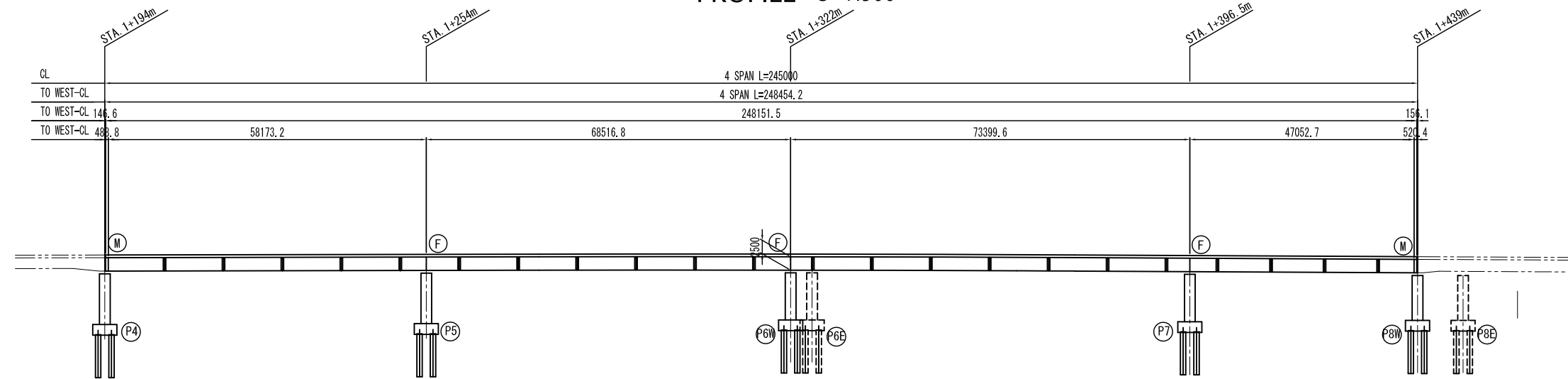
SCALE
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DRAWING No.
005

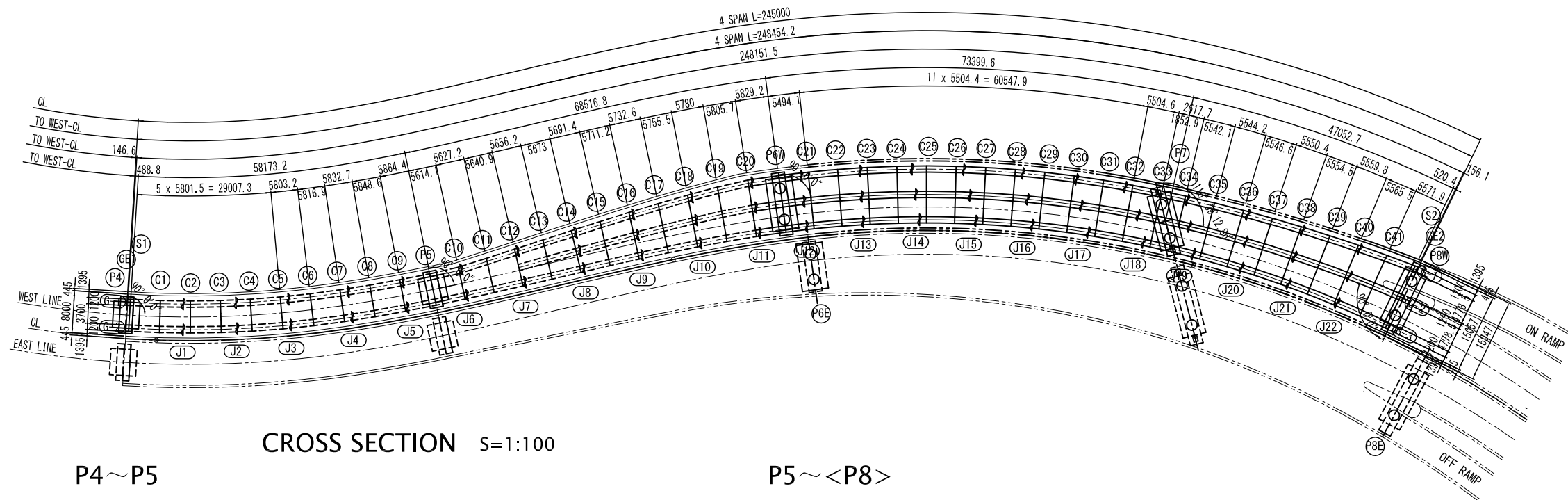
SUPER
STRUCTURE

DETAIL OF SUPER STRUCTURE (P4-P8 WEST)

PROFILE S=1:500



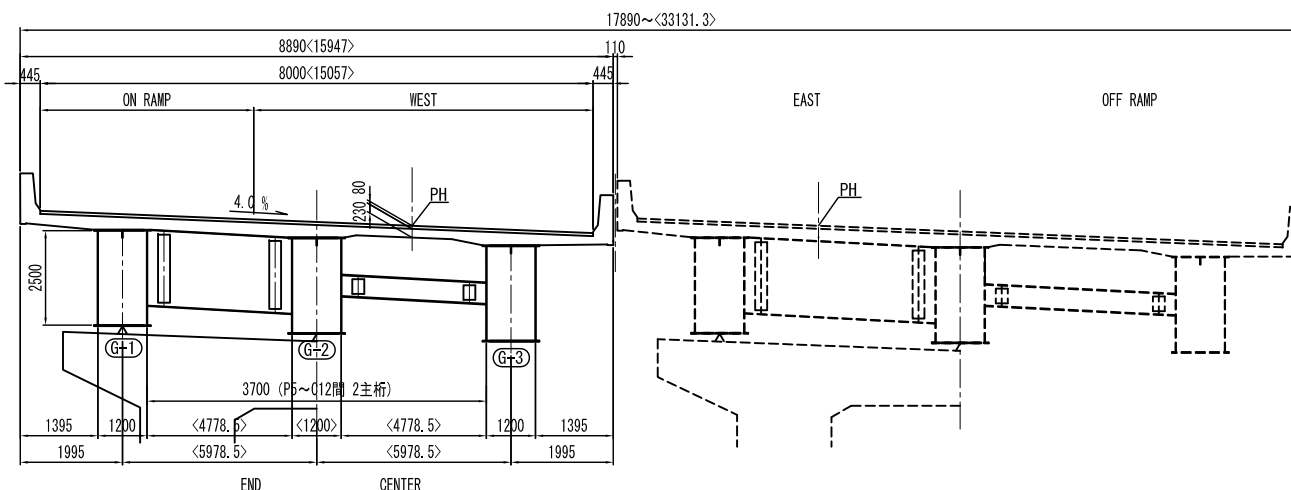
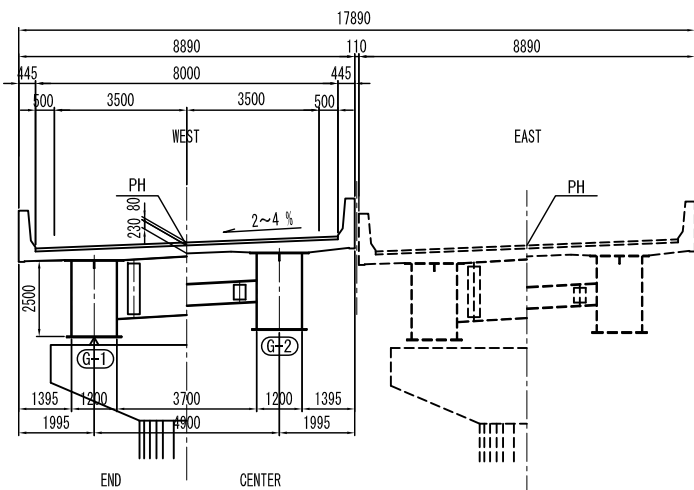
PLAN S=1:500



CROSS SECTION S=1:100

P4~P5

P5~<P8>



DESIGN CONDITION	
BRIDGE TYPE	STEEL 2BOX GIRDER
BRIDGE LENGTH	245.000m (CL)
SPAN ARRANGEMENT	58.273m + 68.517m + 73.400m + 47.053m
WIDTH	0.445m+8.000m+0.445m ~ 0.445m+16.283m+0.445m
HORIZONTAL ALIGNMENT	R=200.000m ~ A=200.000m ~ R=200.000m
ANGLE OF SKEW	P4~P6:90-00-00, P7:63-20-47, P8:87-45-18
LONGITUDINAL SLOPE	0.2%~VCL=100-0.5%
CROSS SLOPE	4.0% (SUPERELEVATION) ~ 4.0% (SUPERELEVATION)
PAVEMENT	ASPHALT PAVEMENT 80mm
DECK SLAB	COMPOSITE SLAB 230mm
STEEL MEMBERS	PLATE AND SHEET : SM490Y, SM400, SS400
	REINFORCING BAR : SD345 OR EQUIVALENT
DESIGN CRITERIA	SPECIFICATIONS FOR HIGHWAY BRIDGES PART I-V (JRA)

PROJECT TITLE ;
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DESIGNED BY ;
CTI Engineering International Co., Ltd.
Chodai Co., Ltd.
International Development Institute

DRAWING TITLE ;
DETAIL OF SUPER STRUCTURE
(P4-P8 WEST)

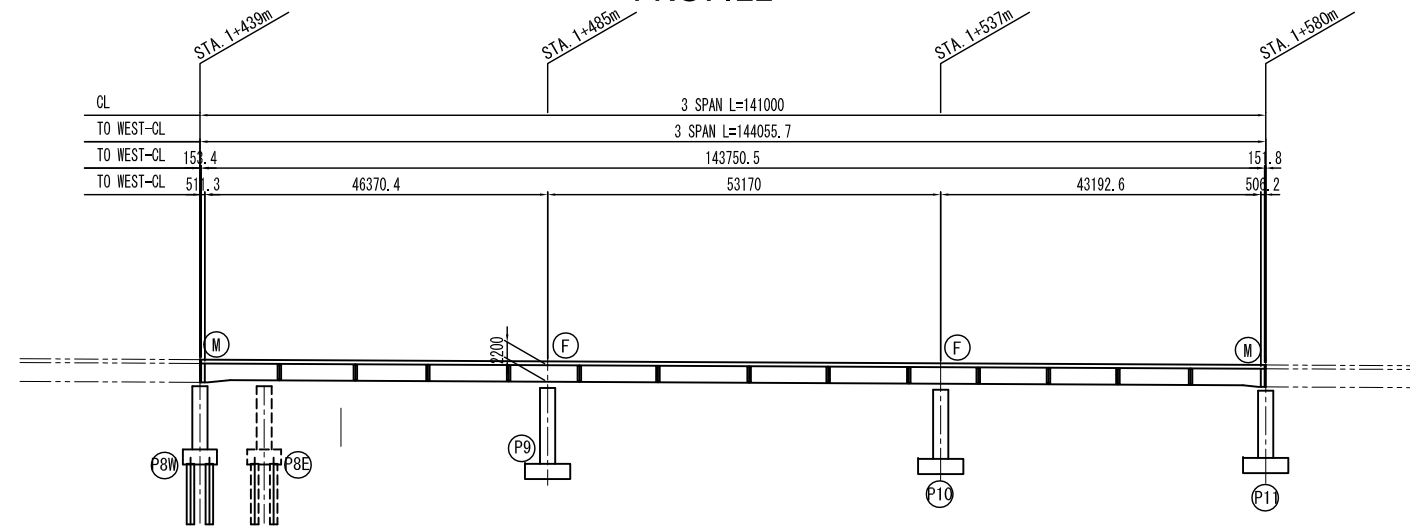
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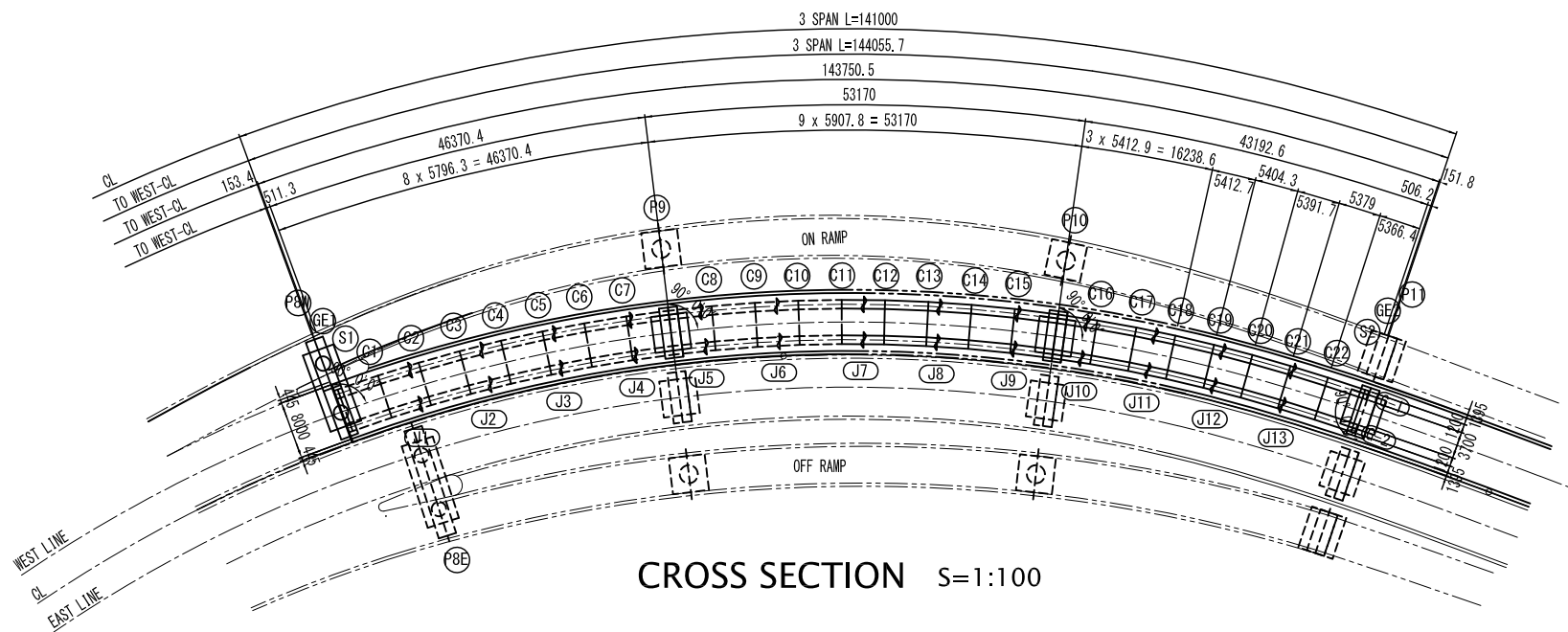
SUPER
STRUCTURE

DETAIL OF SUPER STRUCTURE (P8-P11 WEST)

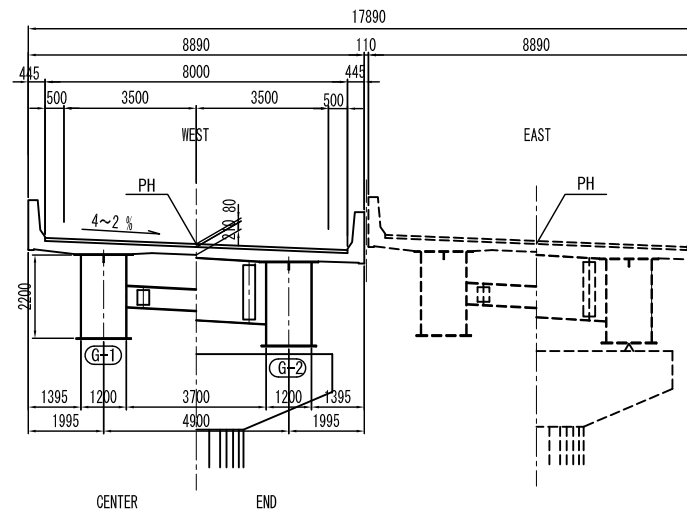
PROFILE S=1:500



PLAN S=1:500



CROSS SECTION S=1:100



DESIGN CONDITION	
BRIDGE TYPE	STEEL 2BOX GIRDER
BRIDGE LENGTH	141.000m (CL)
SPAN ARRANGEMENT	46.370m + 53.170m + 43.293m
WIDTH	0.445m + 8.000m + 0.445m
HORIZONTAL ALIGNMENT	R=200.000m ~ A=200.000m ~ R=∞
ANGLE OF SKEW	90-00-00
LONGITUDINAL SLOPE	0.5%
CROSS SLOPE	4.0% (SUPERELEVATION) ~ -2.0% (BOTH INCLINES)
PAVEMENT	ASPHALT PAVEMENT 80mm
DECK SLAB	COMPOSITE SLAB 210mm
STEEL MEMBERS	PLATE AND SHEET : SM490Y, SM400, SS400
	REINFORCING BAR : SD345 OR EQUIVALENT
DESIGN CRITERIA	SPECIFICATIONS FOR HIGHWAY BRIDGES PART I-V (JRA)

PROJECT TITLE ;
 THE PROJECT FOR CONSTRUCTION OF
 AJILCHIN FLY-OVER IN ULAANBAATAR CITY

DESIGNED BY ;
 CTI Engineering International Co., Ltd.
 Chodai Co., Ltd.
 International Development Institute

DRAWING TITLE ;
 DETAIL OF SUPER STRUCTURE
 (P8-P11 WEST)

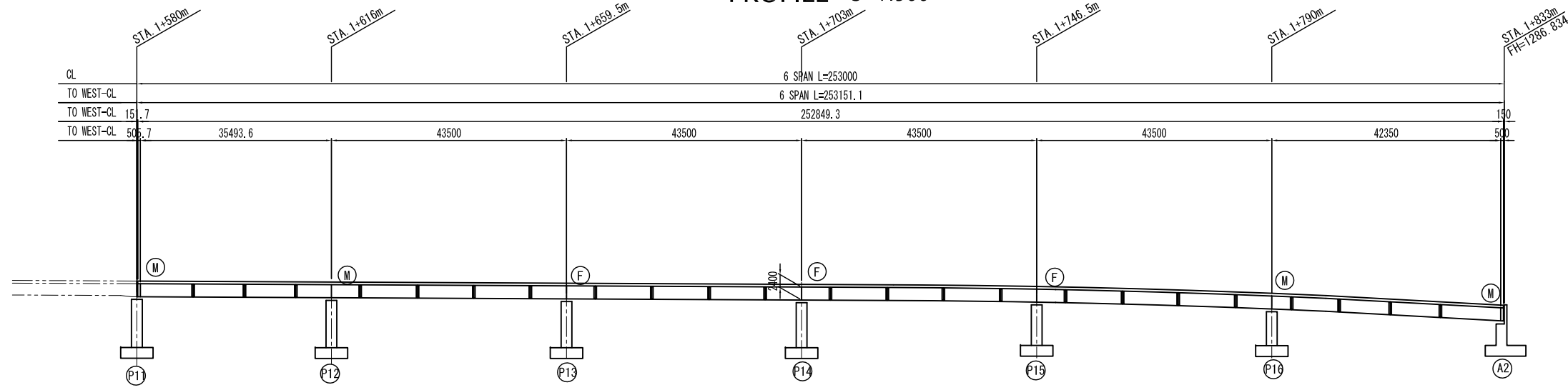
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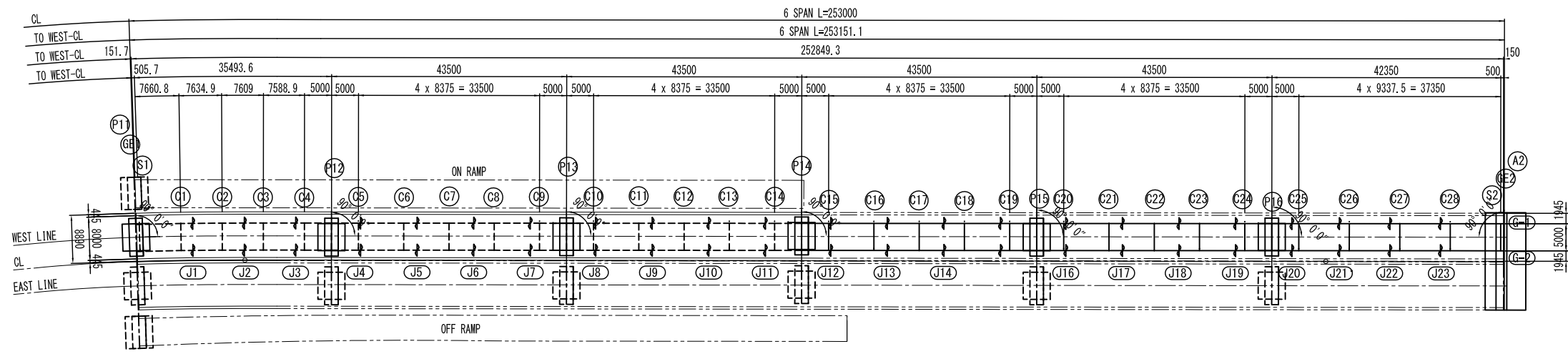
SUPER
 STRUCTURE

DETAIL OF SUPER STRUCTURE (P11-A2 WEST)

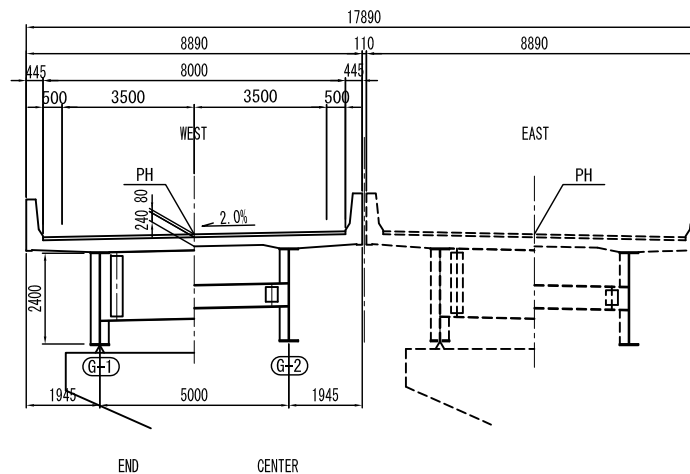
PROFILE S=1:500



PLAN S=1:500



CROSS SECTION S=1:100



DESIGN CONDITION	
BRIDGE TYPE	STEEL 21 GIRDER
BRIDGE LENGTH	253.000m (CL)
SPAN ARRANGEMENT	35.494m + 4x43.500m + 42.350m
WIDTH	0.445m + 8.000m + 0.445m
HORIZONTAL ALIGNMENT	A=100.000m ~ R=∞
ANGLE OF SKEW	90-00-00
LONGITUDINAL SLOPE	0.5% → VCL=80 → 4.5%
CROSS SLOPE	4.0% (SUPERELEVATION) ~ -2.0% (BOTH INCLINES)
PAVEMENT	ASPHALT PAVEMENT 80mm
DECK SLAB	COMPOSITE SLAB 240mm
STEEL MEMBERS	PLATE AND SHEET : SM490Y, SM400, SS400 REINFORCING BAR : SD345 OR EQUIVALENT
DESIGN CRITERIA	SPECIFICATIONS FOR HIGHWAY BRIDGES PART I-V (JRA)

PROJECT TITLE ;
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DESIGNED BY ;
CTI Engineering International Co., Ltd.
Chodai Co., Ltd.
International Development Institute

DRAWING TITLE ;
DETAIL OF SUPER STRUCTURE
(P11-A2 WEST)

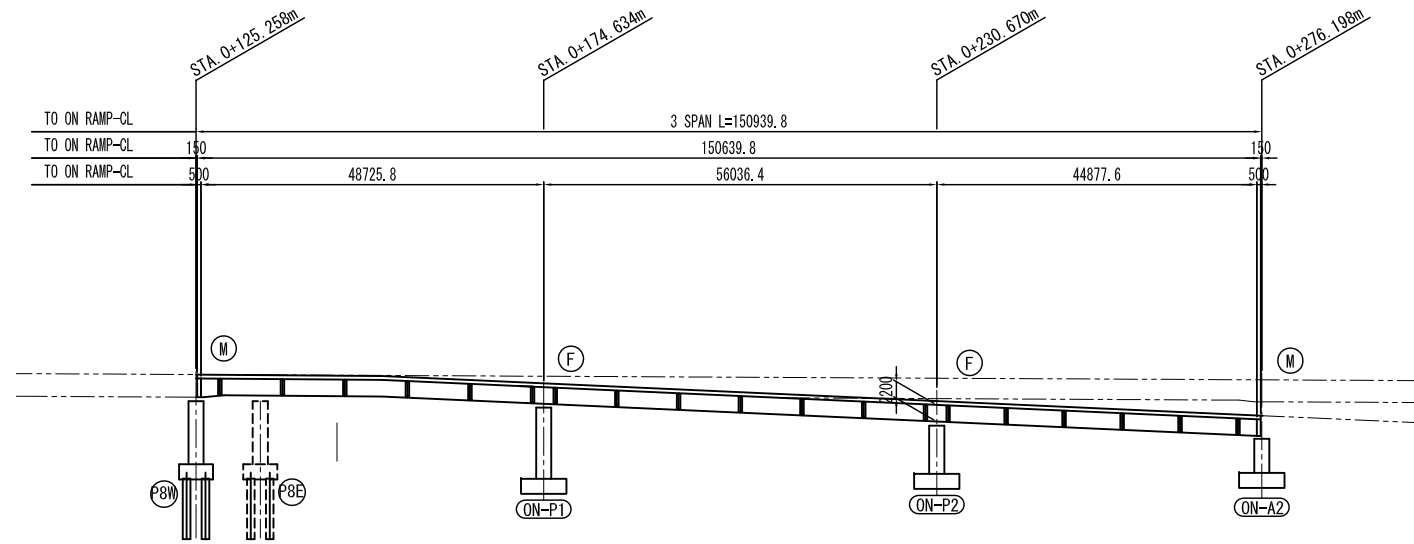
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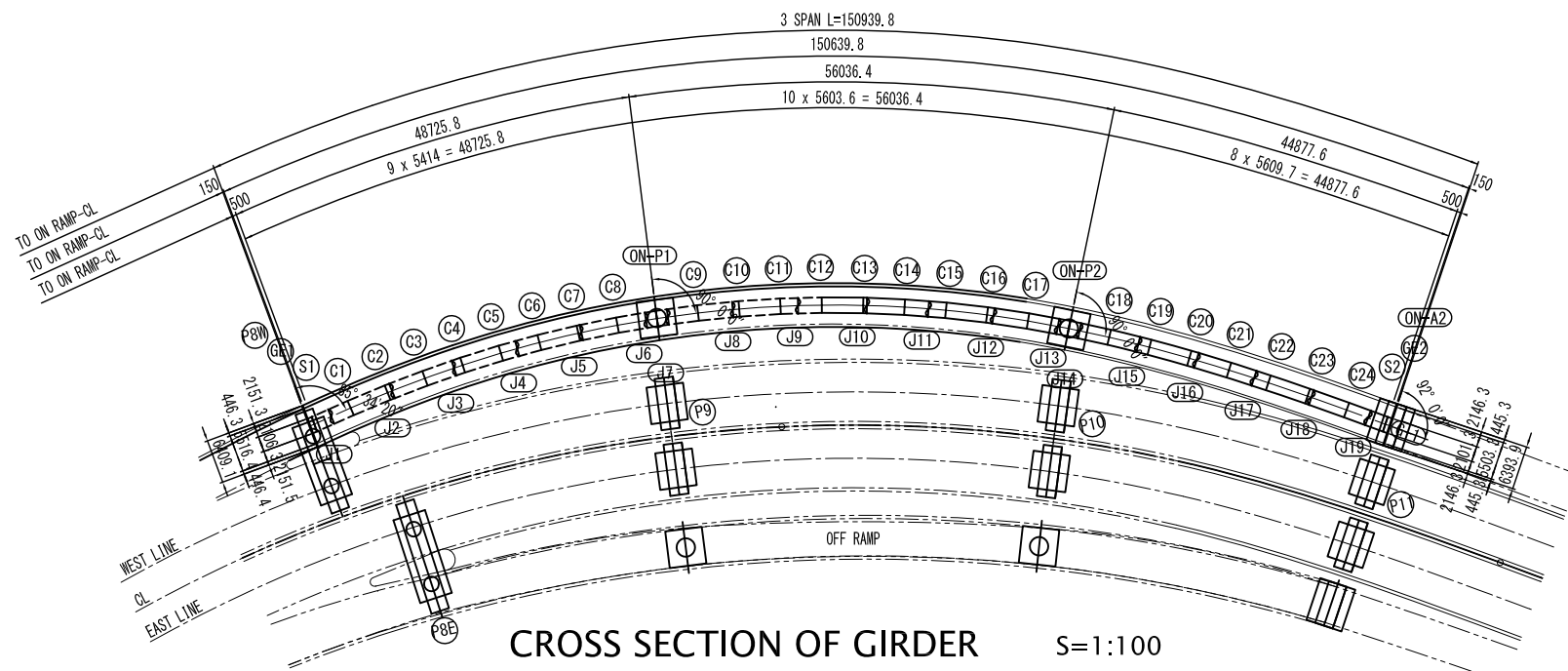
SUPER
STRUCTURE

DETAIL OF SUPER STRUCTURE (ON RAMP TO WEST)

PROFILE S=1:500

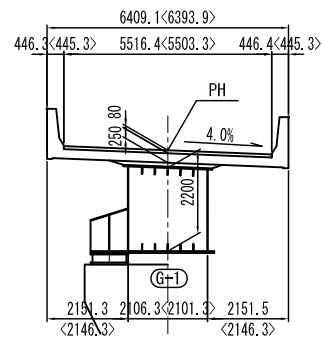


PLAN S=1:500



CROSS SECTION OF GIRDER S=1:100

P8 ~ <P11>



DESIGN CONDITION	
BRIDGE TYPE	STEEL IBOX GIRDER
BRIDGE LENGTH	150.940m (ON-CL)
SPAN ARRANGEMENT	48.726m + 56.036m + 44.878m
WIDTH	0.445m+5.500m+0.445m
HORIZONTAL ALIGNMENT	A=100.000m ~ R=160.000m ~ A=100.000m
ANGLE OF SKEW	P8:85-34-20 , P9-P10:90-00-00 , P11:88-00-00
LONGITUDINAL SLOPE	0.08%→VCL=40→4.5%
CROSS SLOPE	4.0% (SUPERELEVATION)
PAVEMENT	ASPHALT PAVEMENT 80mm
DECK SLAB	COMPOSITE SLAB 250mm
STEEL MEMBERS	PLATE AND SHEET : SM490Y, SM400, SS400 REINFORCING BAR : SD345 OR EQUIVALENT
DESIGN CRITERIA	SPECIFICATIONS FOR HIGHWAY BRIDGES PART I-V (JRA)

PROJECT TITLE ;
THE PROJECT FOR CONSTRUCTION OF
AJILCHIN FLY-OVER IN ULAANBAATAR CITY

DESIGNED BY ;
CTI Engineering International Co., Ltd.
Chodai Co., Ltd.
International Development Institute

DRAWING TITLE ;
DETAIL OF SUPER STRUCTURE
(ON RAMP WEST)

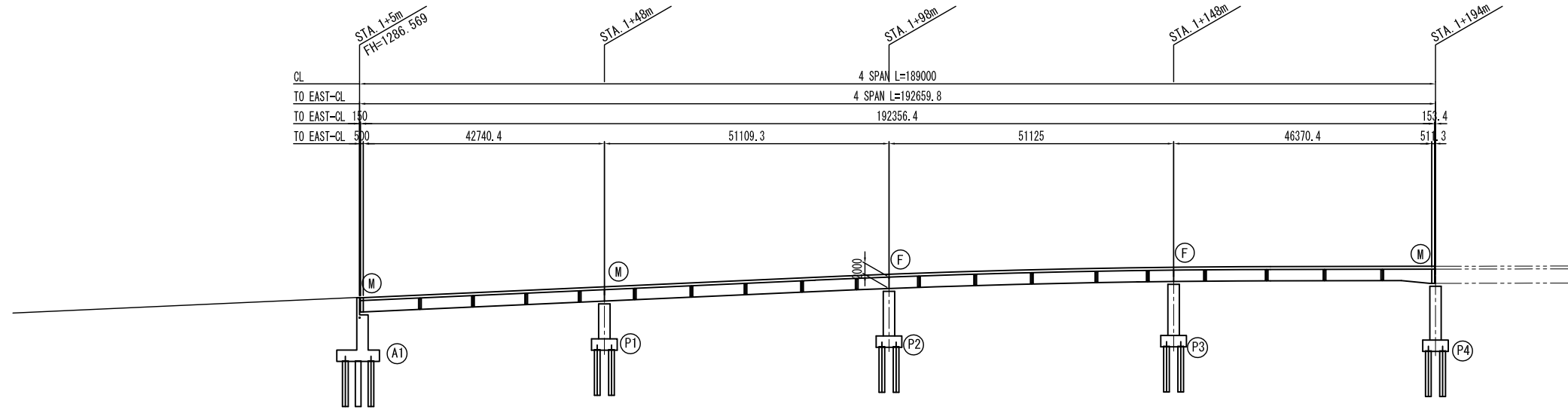
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DRAWING No.
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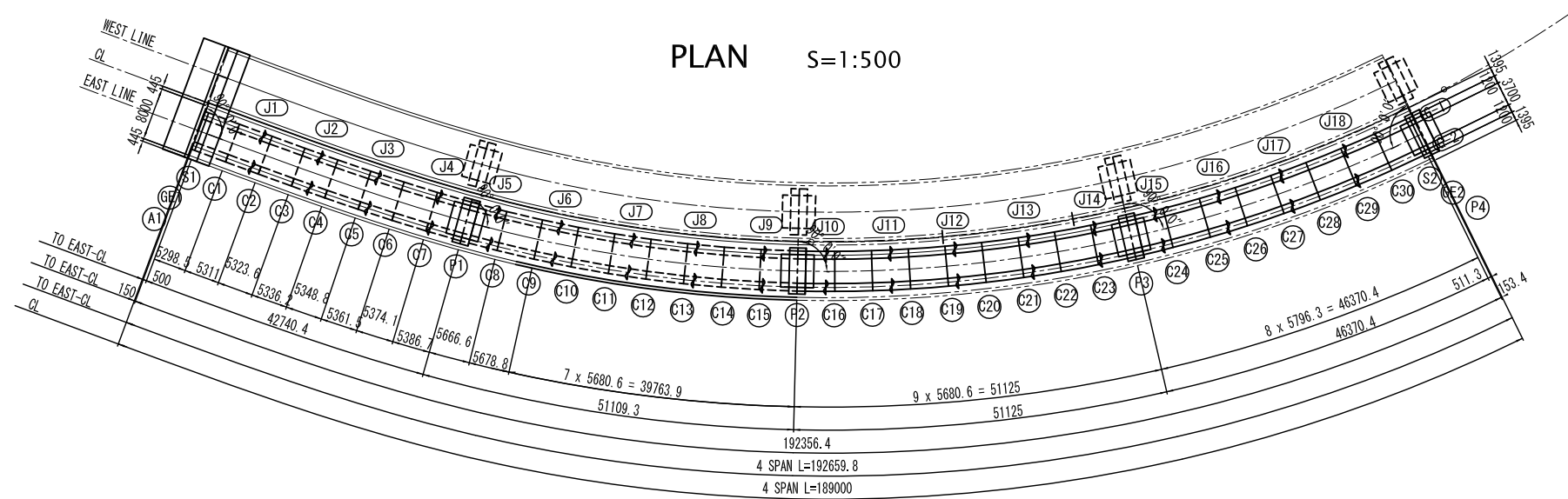
SUPER
STRUCTURE

DETAIL OF SUPER STRUCTURE (A1-P4 EAST)

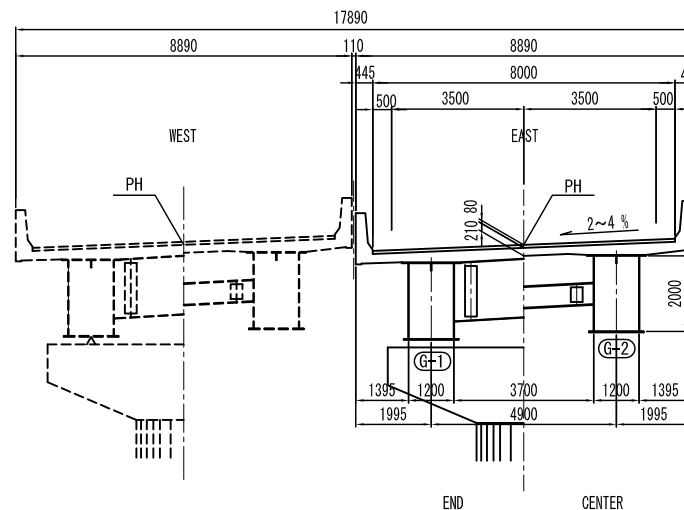
PROFILE S=1:500



PLAN S=1:500



CROSS SECTION S=1:100



DESIGN CONDITION	
BRIDGE TYPE	STEEL 2BOX GIRDER
BRIDGE LENGTH	189.000m (CL)
SPAN ARRANGEMENT	42.740m + 51.009m + 51.125m + 46.370m
WIDTH	0.445m + 8.000m + 0.445m
HORIZONTAL ALIGNMENT	A=200.000m ~ R=200.000m
ANGLE OF SKEW	90-00-00
LONGITUDINAL SLOPE	4.5%→VCL=80→0.2%
CROSS SLOPE	-2.0%(BOTH INCLINES) ~ 4.0%(SUPERELEVATION)
PAVEMENT	ASPHALT PAVEMENT 80mm
DECK SLAB	COMPOSITE SLAB 210mm
STEEL MEMBERS	PLATE AND SHEET : SM490Y, SM400, SS400 REINFORCING BAR : SD345 OR EQUIVALENT
DESIGN CRITERIA	SPECIFICATIONS FOR HIGHWAY BRIDGES PART I-V (JRA)

PROJECT TITLE ;
THE PROJECT FOR CONSTRUCTION OF
AJILCHIN FLY-OVER IN ULAANBAATAR CITY

DESIGNED BY ;
CTI Engineering International Co., Ltd.
Chodai Co., Ltd.
International Development Institute

DRAWING TITLE ;
DETAIL OF SUPER STRUCTURE
(A1-P4 EAST)

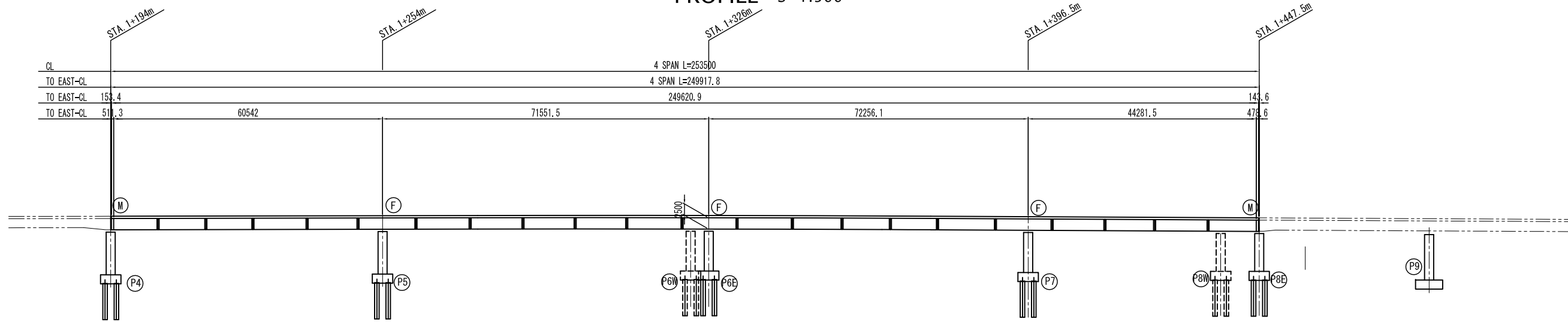
SCALE
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DRAWING No.
010

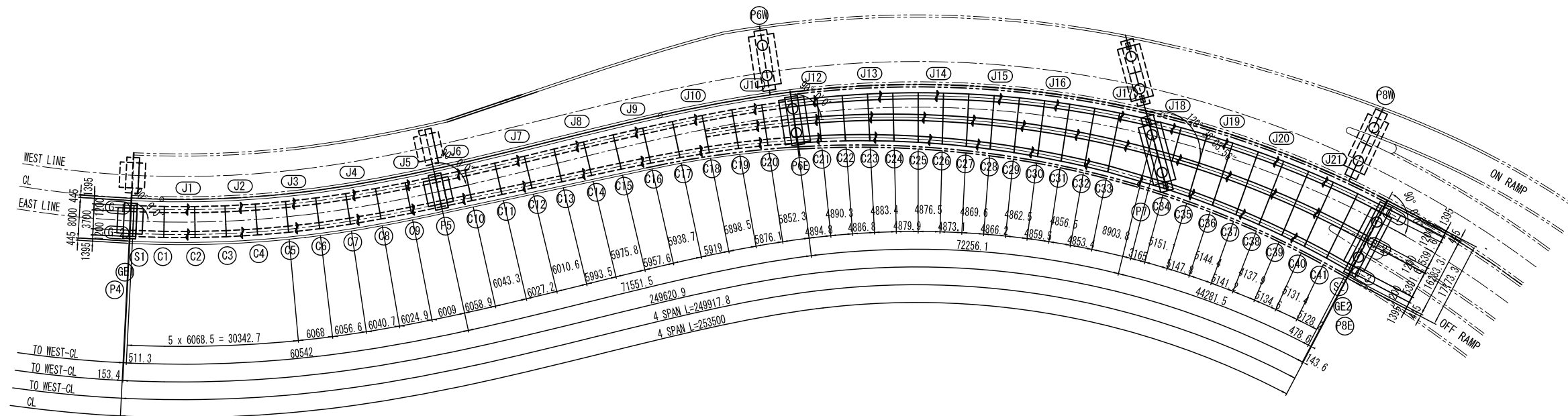
SUPER
STRUCTURE

DETAIL OF SUPER STRUCTURE (P4-P8 EAST)

PROFILE S=1:500



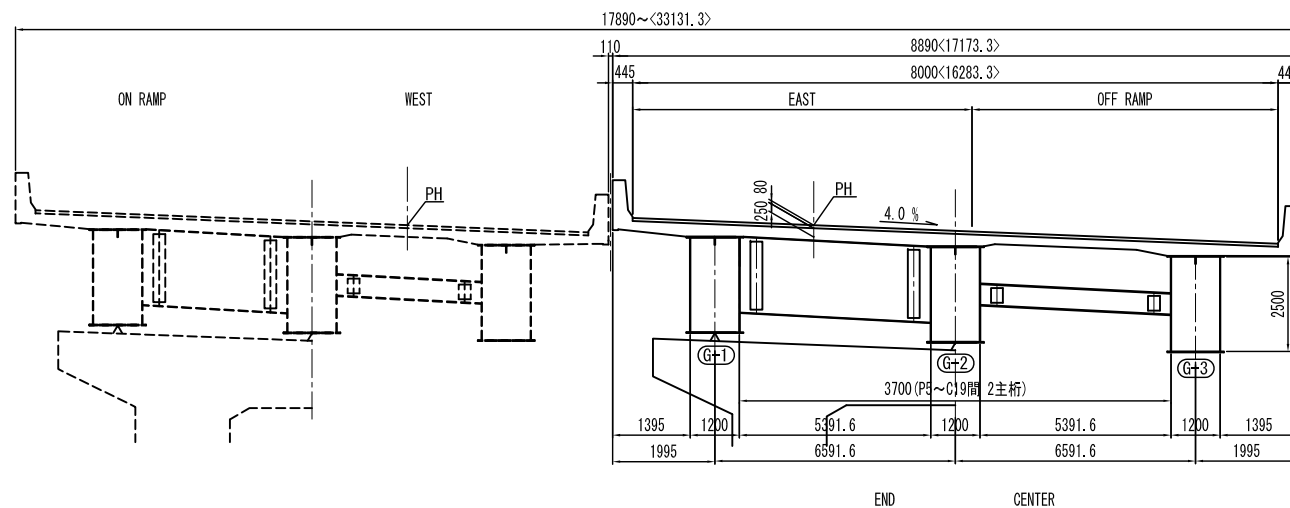
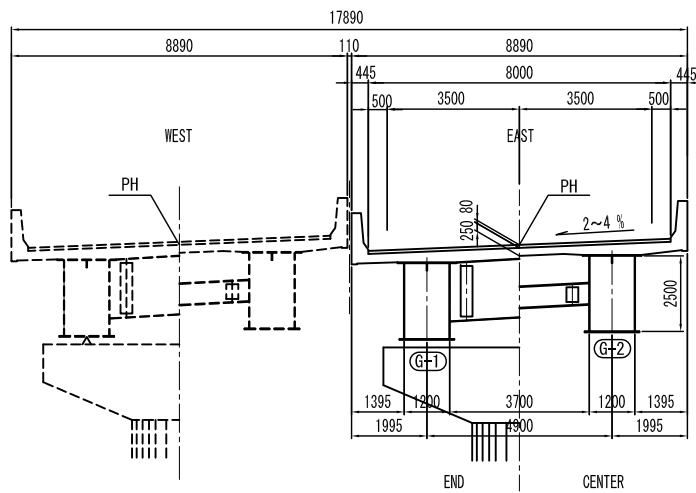
PLAN S=1:500



CROSS SECTION S=1:100

P4~P5

P5~<P8>



DESIGN CONDITION	
BRIDGE TYPE	STEEL 2BOX GIRDER
BRIDGE LENGTH	253.500m (CL)
SPAN ARRANGEMENT	60.542m + 71.552m + 72.256m + 44.282m
WIDTH	0.445m+8.000m+0.445m ~ 0.445m+15.057m+0.445m
HORIZONTAL ALIGNMENT	R=200.000m ~ A=200.000m ~ R=200.000m
ANGLE OF SKEW	P4~P5:90-00-00, P6:88-21-31, P7:59-23-56, P8:88-40-15
LONGITUDINAL SLOPE	0.2%→VCL=100-0.5%
CROSS SLOPE	4.0%(SUPERELEVATION) ~ 4.0%(SUPERELEVATION)
PAVEMENT	ASPHALT PAVEMENT 80mm
DECK SLAB	COMPOSITE SLAB 250mm
STEEL MEMBERS	PLATE AND SHEET : SM490Y, SM400, SS400
	REINFORCING BAR : SD345 OR EQUIVALENT
DESIGN CRITERIA	SPECIFICATIONS FOR HIGHWAY BRIDGES PART I-V (JRA)

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DRAWING TITLE ;
DETAIL OF SUPER STRUCTURE
(P4-P8 EAST)

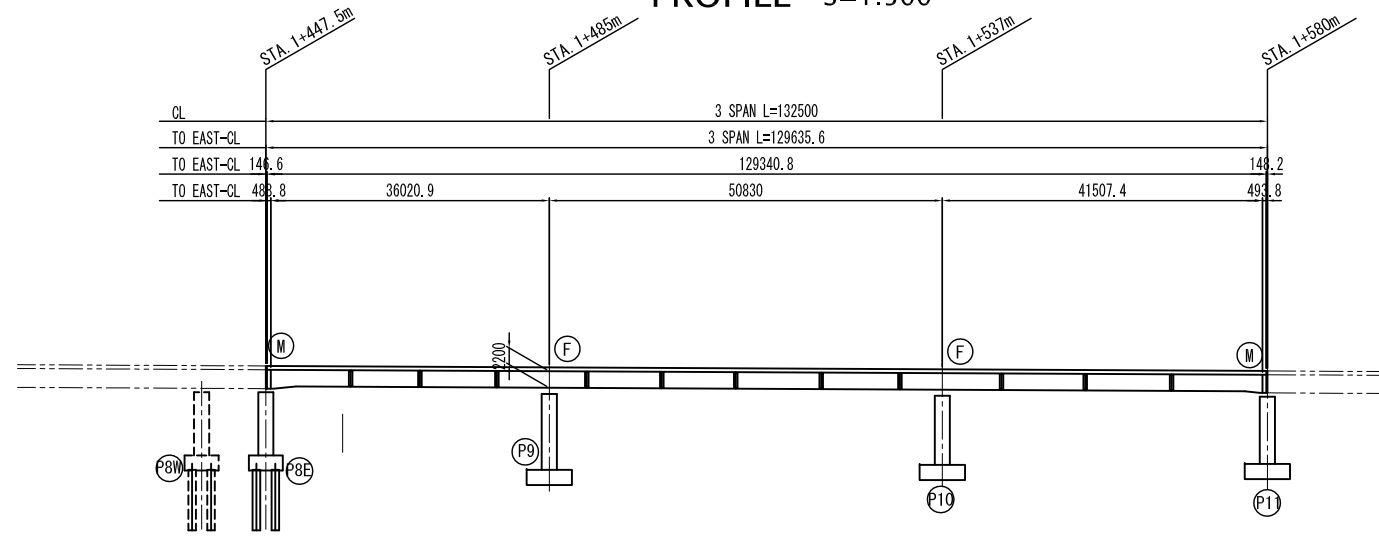
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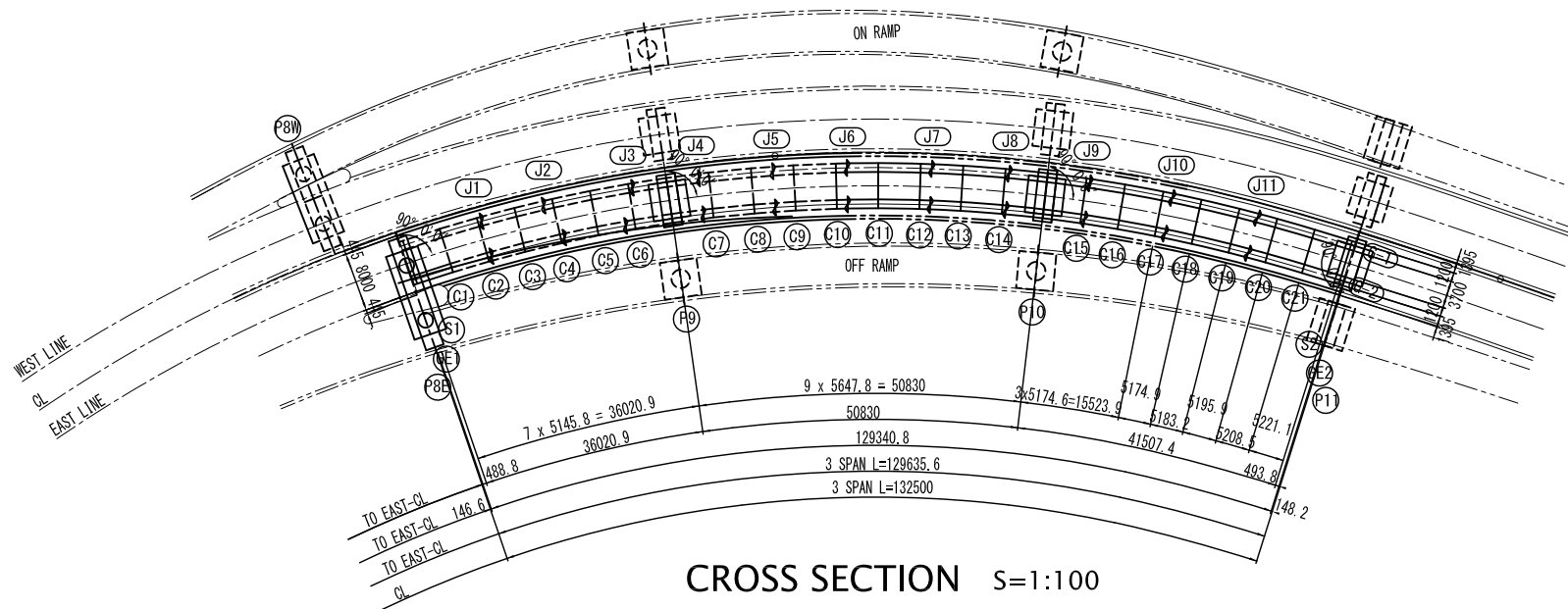
SUPER
STRUCTURE

DETAIL OF SUPER STRUCTURE (P8-P11 EAST)

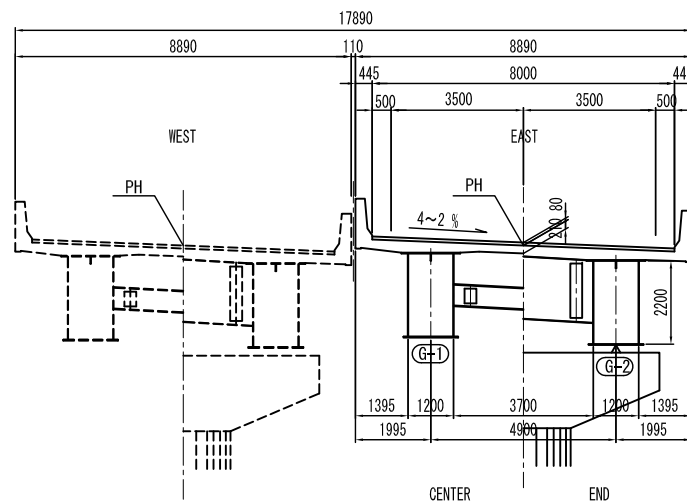
PROFILE S=1:500



PLAN S=1:500



CROSS SECTION S=1:100



DESIGN CONDITION	
BRIDGE TYPE	STEEL 2BOX GIRDER
BRIDGE LENGTH	132.500m (CL)
SPAN ARRANGEMENT	36.021m + 50.830m + 41.507m
WIDTH	0.445m + 8.000m + 0.445m
HORIZONTAL ALIGNMENT	R=200.000m ~ A=200.000m ~ R=∞
ANGLE OF SKEW	90-00-00
LONGITUDINAL SLOPE	0.5%
CROSS SLOPE	4.0% (SUPERELEVATION) ~ -2.0% (BOTH INCLINES)
PAVEMENT	ASPHALT PAVEMENT 80mm
DECK SLAB	COMPOSITE SLAB 210mm
STEEL MEMBERS	PLATE AND SHEET : SM490Y, SM400, SS400
	REINFORCING BAR : SD345 OR EQUIVALENT
DESIGN CRITERIA	SPECIFICATIONS FOR HIGHWAY BRIDGES PART I-V (JRA)

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DRAWING TITLE ;
DETAIL OF SUPER STRUCTURE
(P8-P11 EAST)

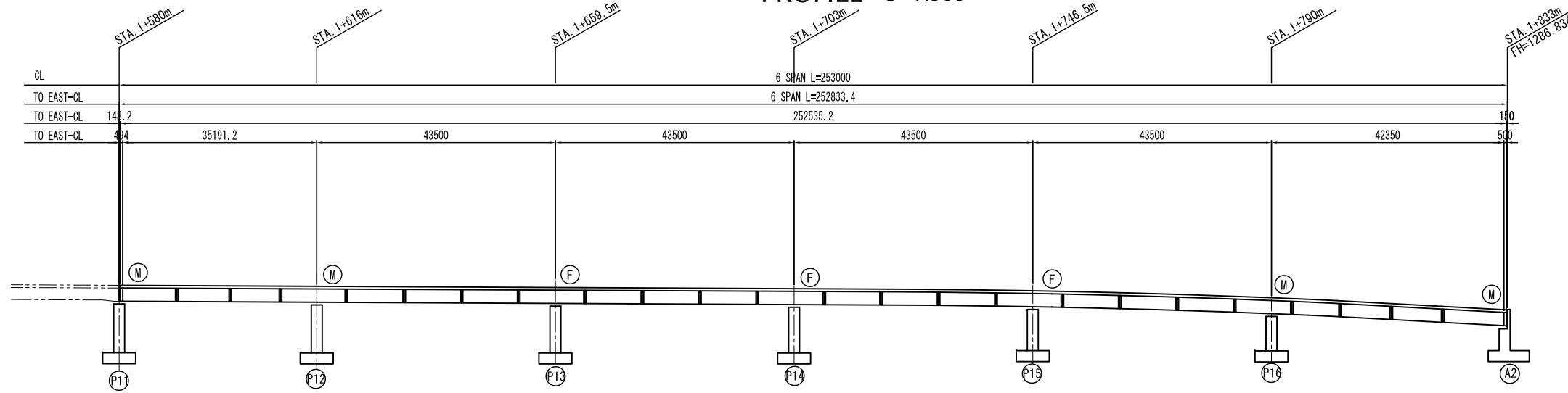
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DRAWING No.
012

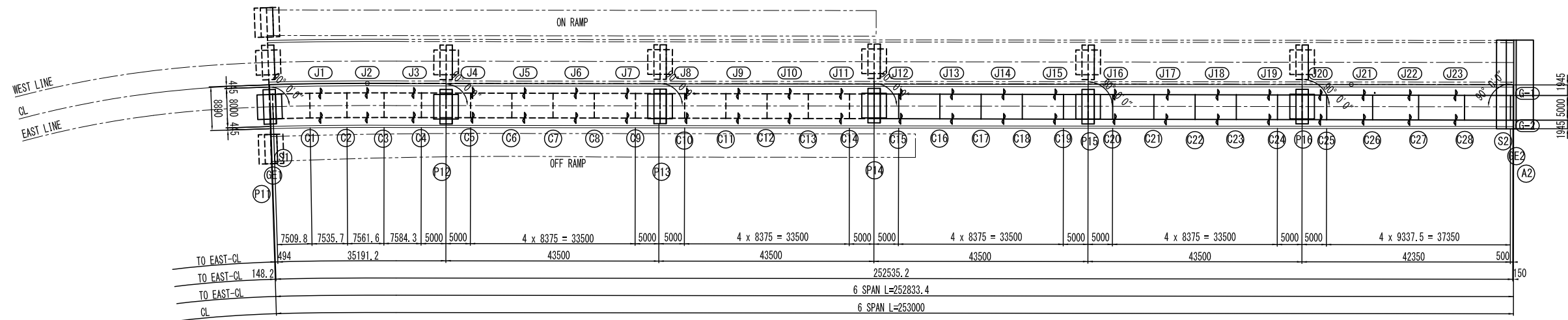
SUPER
STRUCTURE

DETAIL OF SUPER STRUCTURE (P11-A2 EAST)

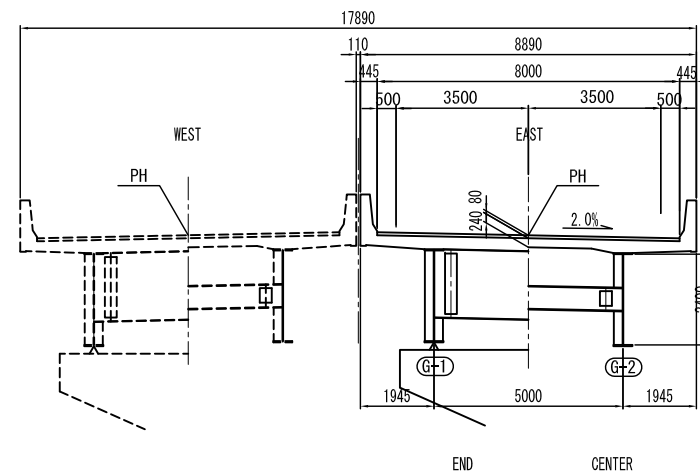
PROFILE S=1:500



PLAN S=1:500



CROSS SECTION S=1:100



DESIGN CONDITION	
BRIDGE TYPE	STEEL 21 GIRDER
BRIDGE LENGTH	253.000m (CL)
SPAN ARRANGEMENT	35.192m + 4x43.500m + 42.350m
WIDTH	0.445m + 8.000m + 0.445m
HORIZONTAL ALIGNMENT	A=100.000m ~ R=∞
ANGLE OF SKEW	90-00-00
LONGITUDINAL SLOPE	0.5% → VCL=80 → 4.5%
CROSS SLOPE	4.0% (SUPERELEVATION) ~ -2.0% (BOTH INCLINES)
PAVEMENT	ASPHALT PAVEMENT 80mm
DECK SLAB	COMPOSITE SLAB 240mm
STEEL MEMBERS	PLATE AND SHEET : SM490Y, SM400, SS400 REINFORCING BAR : SD345 OR EQUIVALENT
DESIGN CRITERIA	SPECIFICATIONS FOR HIGHWAY BRIDGES PART I-V (JRA)

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International Development Institute

DRAWING TITLE ;
DETAIL OF SUPER STRUCTURE
(P11-A2 EAST)

SCALE
S=1:500

DRAWING No.
013

SUPER
STRUCTURE