JAPAN INTERNATIONAL AGENCY (JICA)

MINISTRY OF INFRASTRUCTURE
AND DEPARTMENT OF ROADS
THE GOVERNMENT OF MONGOLIA

THE FEASIBILITY STUDY
ON
CONSTRUCTION OF EASTERN ARTERIAL ROAD
IN
MONGOLIA

FINAL REPORT

Vol. III: DRAWINGS

JUNE 2002

PACIFIC CONSULTANTS INTERNATIONAL
JAPAN OVERSEAS CONSULTANTS

DRAWING SCHEDULE

Title	Drawing No.
A. GENERAL	
1. Project Location Map	A - 01
2. Legend	A - 02
B. ROAD	
1. Typical Cross Section	B - 01
2. Plan and Profile	B - 02
C. STRUCTURE	
1. Project Bridges	
1.1 General View of KHUJIRT RIVER BRIDGE (B1)	C - 01
1.2 General View of KHUTSAA, NARIIN RIVER BRIDGE (B2)	C - 02
1.3 General View of KHERLEN RIVER BRIDGE (B3)	C - 03
1.4 General View of TSENKHER RIVER BRIDGE (B4)	C - 04
1.5 General View of URT VALLEY BRIDGE (B5)	C - 05
1.6 General View of MURUN RIVER BRIDGE (B6)	C - 06
1.7 General View of Pipe Culverts	C - 07
1.8 General View of Box Culverts	C - 08

Title	Drawing No.
2. General View for Standard Bridges	
2.1 Standard Bridge No.1: RC-T Girder Bridge (Bridge Length 15m)	C - 09
2.2 Standard Bridge No.2: RC-T Girder Bridge (Bridge Length 17.5m)	C - 10
2.3 Standard Bridge No.3: RC-T Girder Bridge (Bridge Length 35m)	C - 11
2.4 Standard Bridge No.4: RC-T Girder Bridge (Bridge Length 52.5m)	C - 12
2.5 Standard Bridge No.5: RC-T Girder Bridge (Bridge Length 70m)	C - 13
2.6 Standard Bridge No.6: PC-T Girder Bridge (Bridge Length 100m)	C - 14
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3. General View for Standard Box and Pipe Culverts	
3.1 General View of Standard Pipe Culverts	C - 16
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D. MISCELLANEOUS	
1. Road Signs	D - 01
2. Road Markings	D - 02
3. Guard Post and Kilometer Post	D - 03
4. Road Station (Sample)	D - 04
E. ALTERNATIVE ROUTE STUDY	E - 01

To Ulaanbaatar

Erdene Sum

Bayandelger Sum

Baganuur City

Tsenkhermandal Sum

Jargaltkhaan Sum

Murun Sum

Undurkhaan City

To Baruun-Urt

Tuv Province

Khentii Province

Govi -Sumber Province

Bayanjargalan

Delgerkhaan

Kherlen River

N

0 5 10 15 20 25 50 km

LEGEND

: Project Route

: Railway

: Province Boundary

: Province Center

: Sum Center

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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	DEPARTMENT OF ROADS, MINISTRY OF INFRASTRUCTURE, THE GOVERNMENT OF MONGOLIA	
PACIFIC CONSULTANTS INTERNATIONAL JAPAN OVERSEAS CONSULTANTS		
Drawing Title	Scale	No.
PROJECT LOCATION MAP	As Shown	A – 01

	SIMBOLS	DESCRIPTION
1	△	Intersection point
2	□	bench mark
3	⊗	Centerline point
4	1597.818	Surveying point
5	M	1 storied building
6		Statue, monument or memorial
7		Well for telecommunication
8		Telecommunication line above the ground
9		Tree
10		Low voltage electricity line on the concreted pole
11		High voltage electricity line on the concreted pole
12		Low voltage electricity line on the metal pole
13		Net fence with barbed wire
14		Wooden fence without chinks
15		Heaped up stones
16		Streetlight
17		Ger
18		Bank
19		Erosed or excavated earth
20		Advertising board
21		River
22		Telecommunication line under the ground
23		Contour line at every 1m
24	1340	Index contour line 5m

	SIMBOLS	DESCRIPTION
25		Railway
26		Hole
27		Slope of cutting or embankment
28		Bridge
29		Paved road
30		Earth road
31		Pipe culvert
32		Transformator
33		Shrubs
34		Pasture
35		Sand
36		Swamp
37		Spring
38	IP	Intersection point
39	BM	Bench mark
40	BP	Beginning point
41	EP	Ending point
42	bp	Beginning point of curve
43	ccp	Center point of curve
44	ep	Ending point of curve

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Drawing title	Scale	No.
Legend	Not Scale	A - 02

TYPICAL CROSS SECTION

EMBANKMENT SECTION

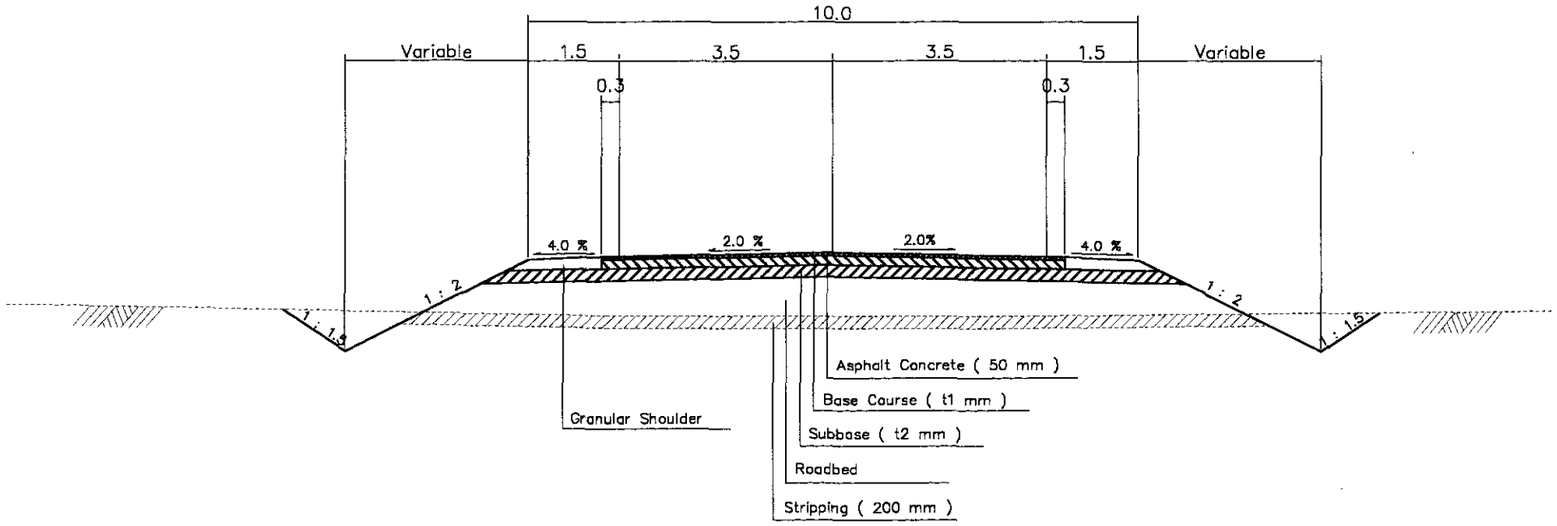
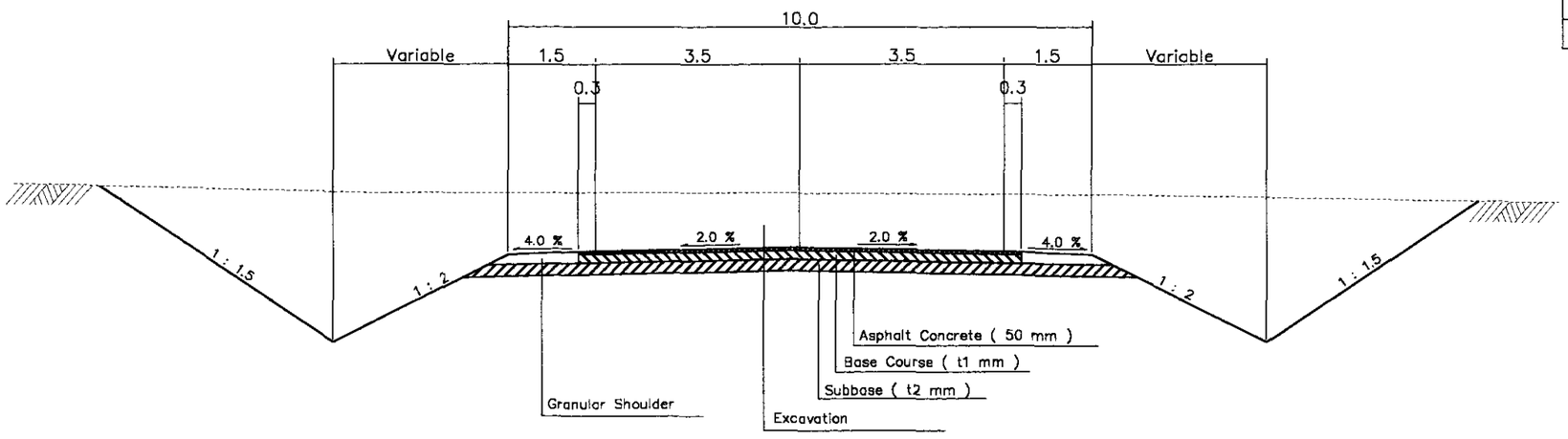


Table Representative CBR and Pavement Structure

Baganuur – Jargartkhaan			
	CBR = 8	CBR = 10	CBR = 12
Asphalt Concrete	50 mm	50 mm	50 mm
Base Course (t1)	150 mm	150 mm	100 mm
Subbase (t2)	260 mm	200 mm	220 mm
Total	460 mm	400 mm	370 mm
Jargartkhaan – Undrkhaan			
	CBR = 8	CBR = 10	CBR = 12
Asphalt Concrete	50 mm	50 mm	50 mm
Base Course (t1)	150 mm	100 mm	100 mm
Subbase (t2)	230 mm	240 mm	200 mm
Total	430 mm	390 mm	350 mm

CUT SECTION



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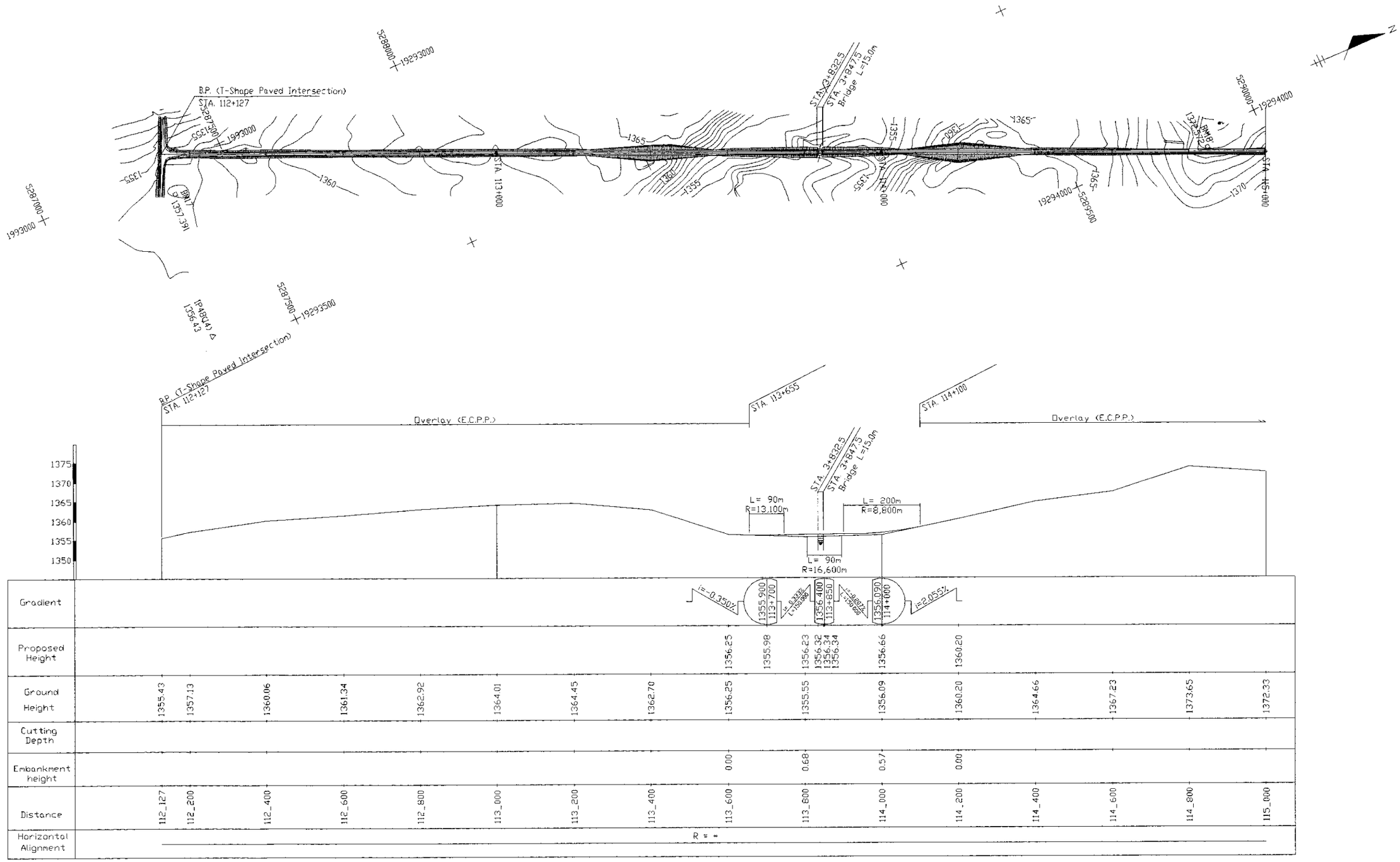
Drawing title	Scale	No.
TYPICAL CROSS SECTION	1:100	B – 01



112_127 - 115_000

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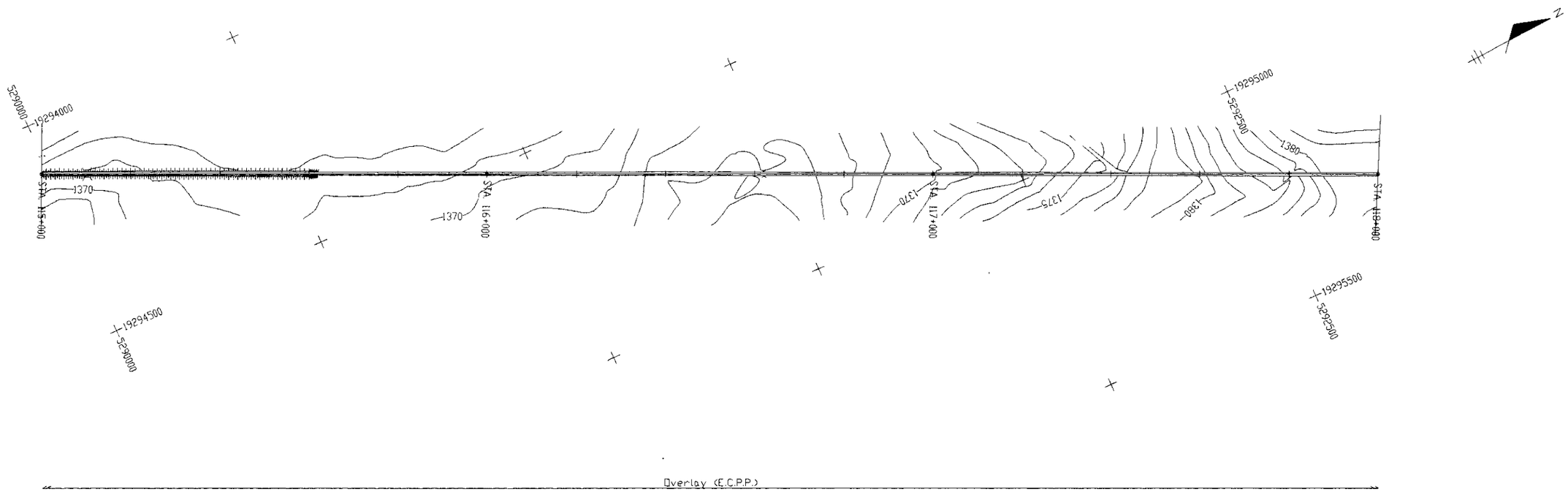
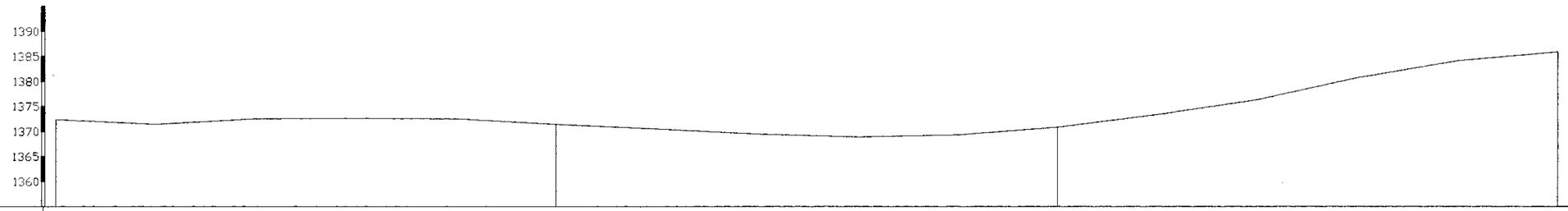
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	DEPARTMENT OF ROADS, MINISTRY OF INFRASTRUCTURE, THE GOVERNMENT OF MONGOLIA	
PACIFIC CONSULTANTS INTERNATIONAL JAPAN OVERSEAS CONSULTANTS		
Drawing title	Scale	No
PLAN AND PROFILE	H=1:10,000 V=1:1,000	B-02





Gradient															
Proposed Height															
Ground Height	1372.33	1371.48	1372.52	1372.60	1372.52	1371.46	1370.51	1369.45	1368.92	1369.29	1370.88	1373.35	1376.38	1380.80	1384.14	1385.88
Cutting Depth															
Embankment height															
Distance	115_000	115_200	115_400	115_600	115_800	116_000	116_200	116_400	116_600	116_800	117_000	117_200	117_400	117_600	117_800	118_000
Horizontal Alignment	R = ∞															

115_000 - 118_000

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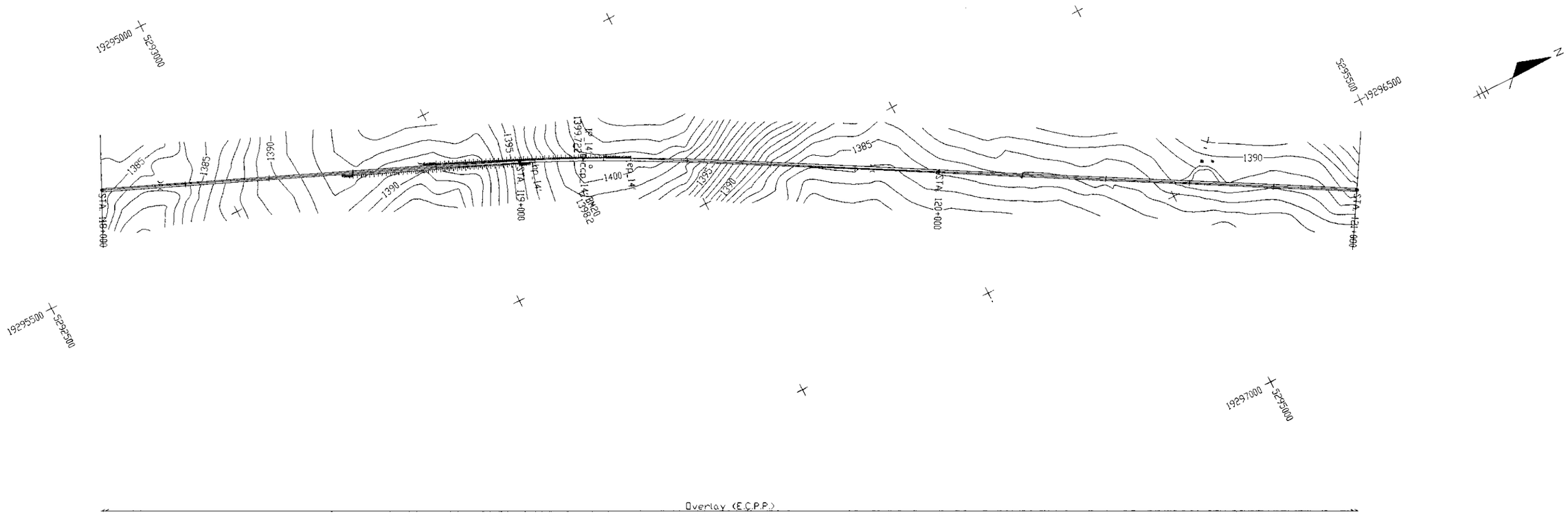
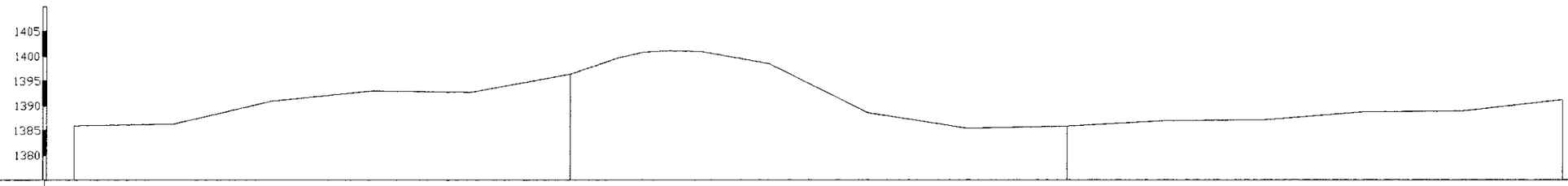
Drawing title	Scale	No.
PLAN AND PROFILE	H=1:10,000 V=1:1,000	B-03





Gradient																		
Proposed Height																		
Ground Height	1385.88	1386.25	1390.92	1392.94	1392.66	1396.32	1397.64	1400.79	1401.09	1400.90	1398.48	1388.52	1385.37	1385.83	1386.93	1387.13	1388.70	1388.89	1391.18
Cutting Depth																		
Embankment height																		
Distance	118_000	118_200	118_400	118_600	118_800	119_000	bp_14'	ccp_14'	119_200	ep_14'	119_400	119_600	119_800	120_000	120_200	120_400	120_600	120_800	121_000
Horizontal Alignment	R = ∞						R = 2000							R = ∞					

118_000 - 121_000

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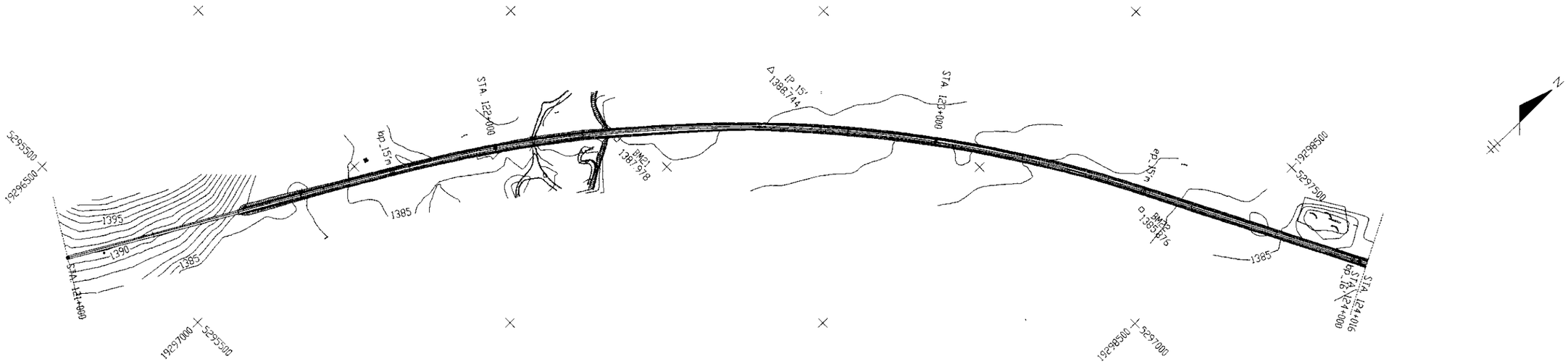
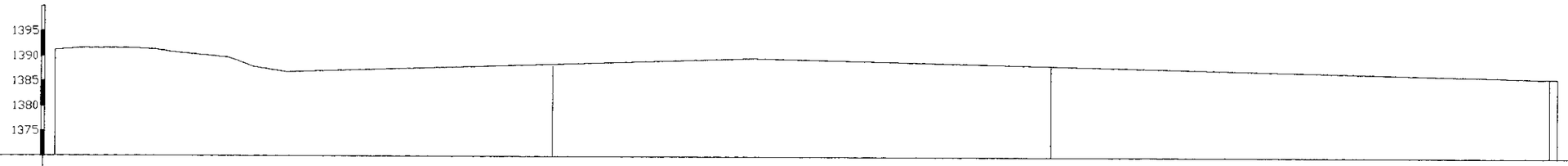
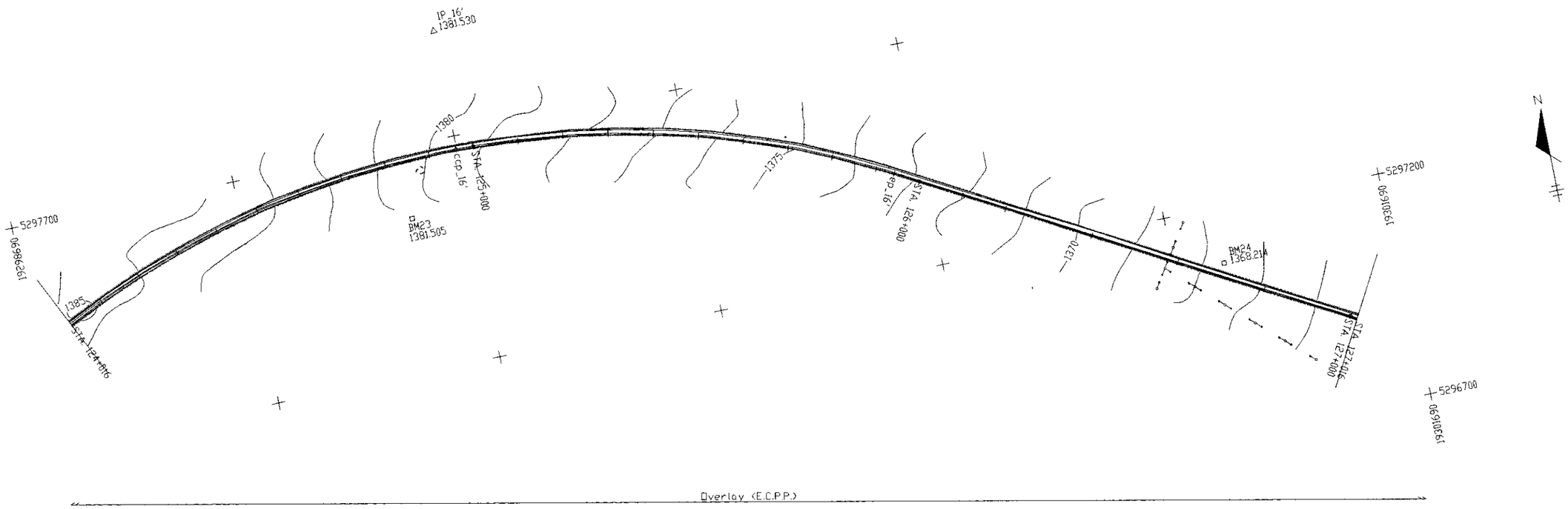
Drawing title	Scale	No.
PLAN AND PROFILE	H=1:10,000 V=1:1,000	B-04

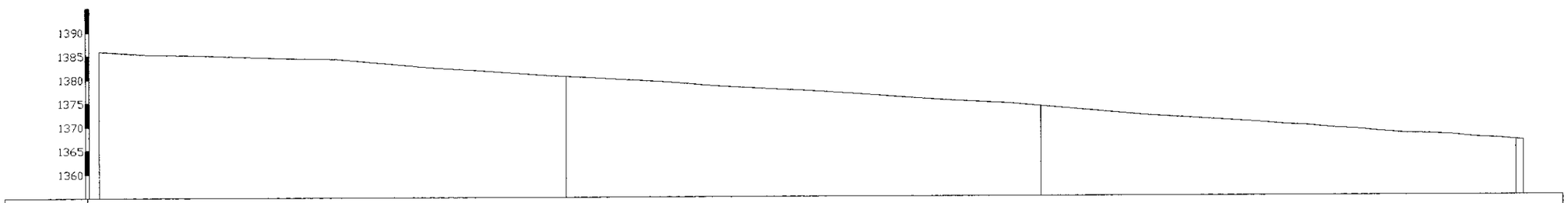


Overlay (E.C.P.P.)

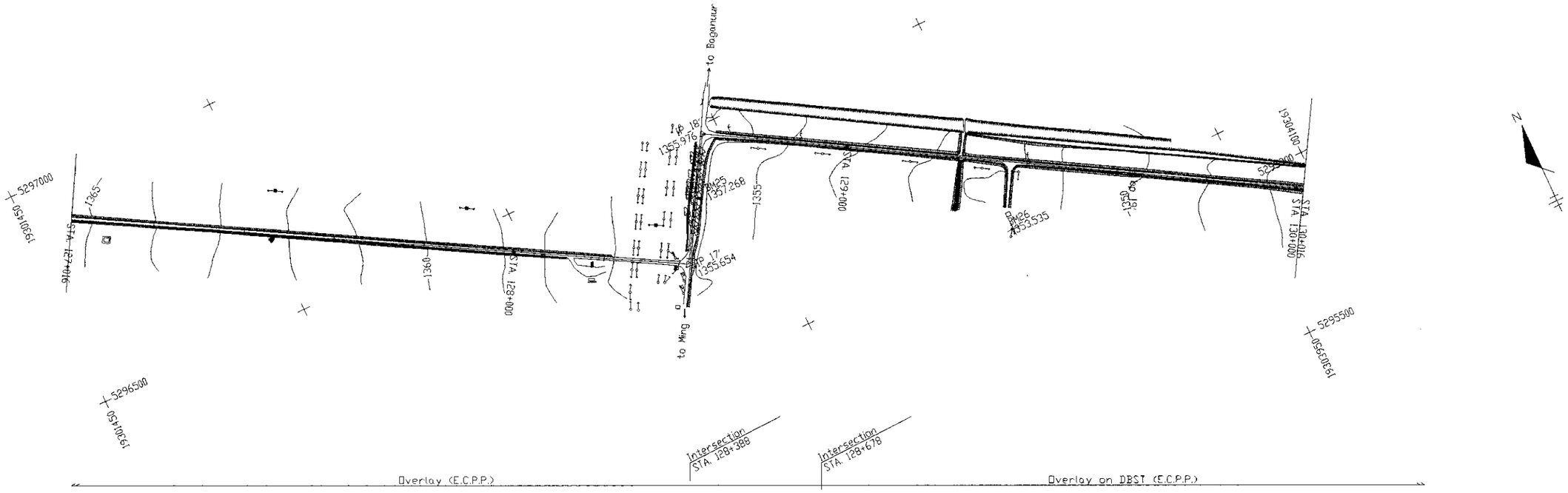


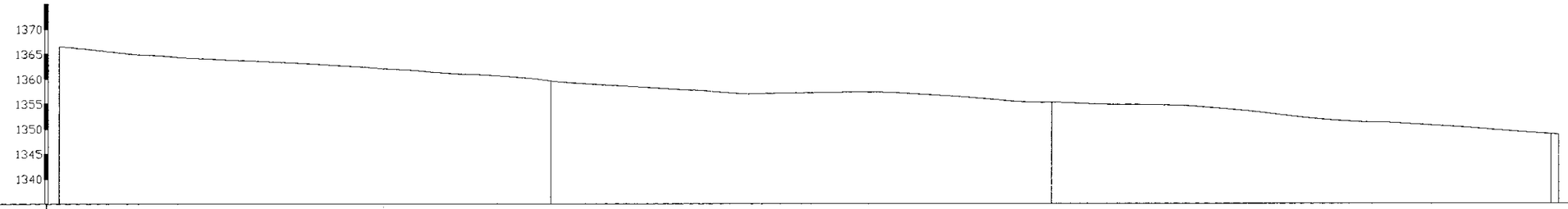
| | | |


IP_16'
1381.530
1380
1375
1370
1385
ccp_16'
STA. 125+000
BM23
1381.505
ep_16'
STA. 126+000
BM24
1368.214
STA. 124+016
STA. 127+000
5297700
5297200
5296700
N
Overlay (E.C.P.P.)


1390
1385
1380
1375
1370
1365
1360

| | | |





Gradient																														
Proposed Height																														
Ground Height	1366.51	1365.53	1364.62	1363.93	1363.54	1363.04	1362.41	1361.74	1361.03	1360.53	1359.43	1358.76	1358.16	1357.68	1356.97	1357.03	1357.36	1357.27	1356.40	1355.51	1355.23	1354.81	1354.75	1354.15	1353.33	1352.14	1351.39	1350.95	1350.30	1349.50	1348.80
Cutting Depth																														
Embankment height																														
Distance	127_016	127_200	127_400	127_600	127_800	128_000	128_200	IP_17'	128_400	128_600	IP_18'	128_800	129_000	129_200	129_400	129_600	129_800	130_000	130_016											
Horizontal Alignment	R = ∞								R = ∞						R = ∞															

127_016 - 130_016

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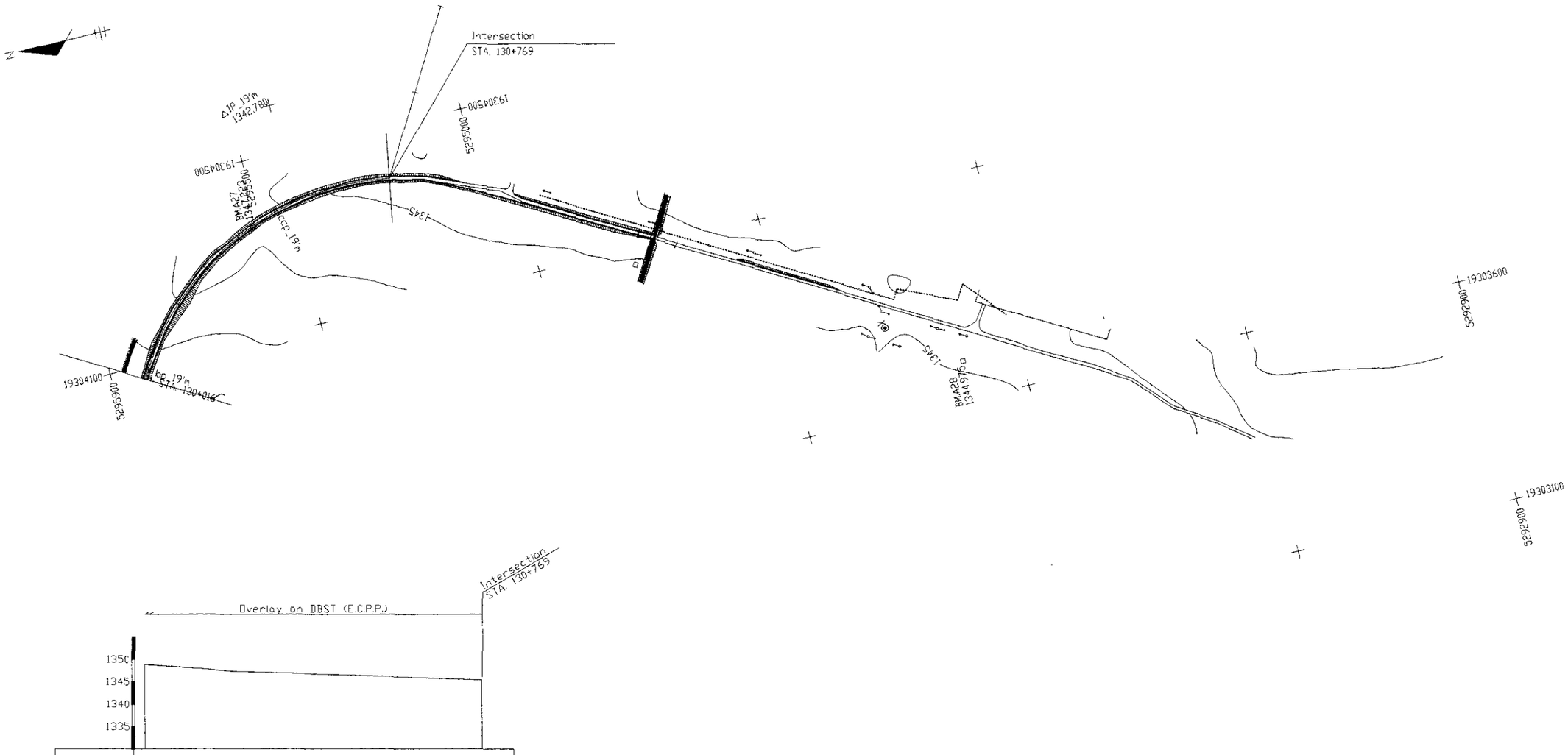
PACIFIC CONSULTANTS INTERNATIONAL JAPAN OVERSEAS CONSULTANTS		
Drawing title	Scale	No.
PLAN AND PROFILE	H=1:10,000 V=1:1,000	B-07



Gradient									
Proposed Height									1345.35
Ground Height	1348.80	1348.01	1347.30	1346.97	1346.63	1346.30	1345.92	1345.55	1345.35
Cutting Depth									
Embankment height									
Distance	130_016 bp_19m	130_100	130_200	130_300	130_400	130_500	130_600	130_700	130_769 ep_19m
Horizontal Alignment	R = ∞				R = 600				

130_016 - 130_769

THE FEASIBILITY STUDY ON CONSTRUCTION OF EASTERN ARTERIAL ROAD IN MONGOLIA		
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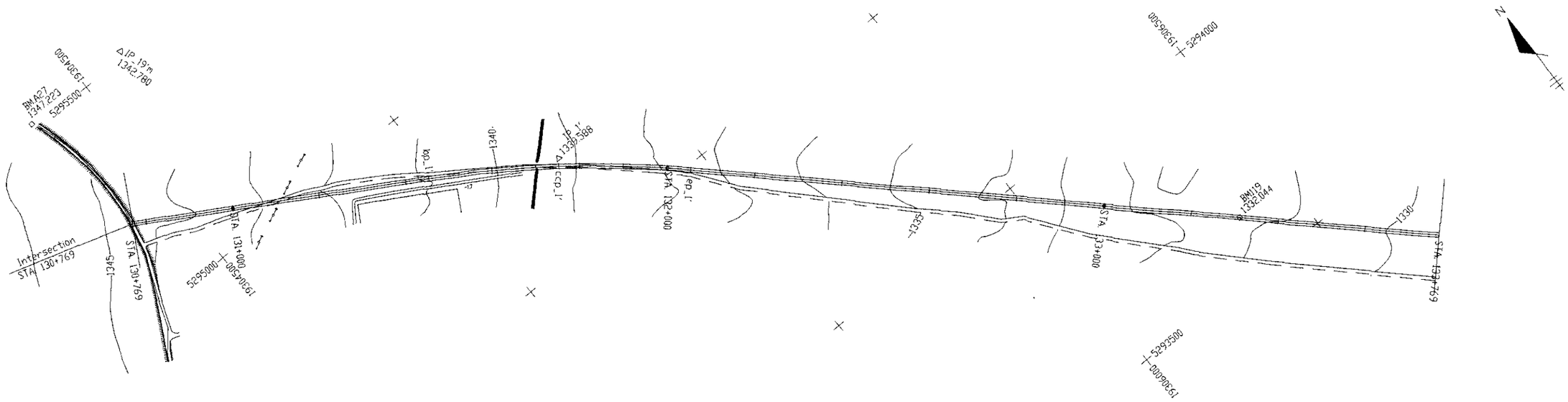
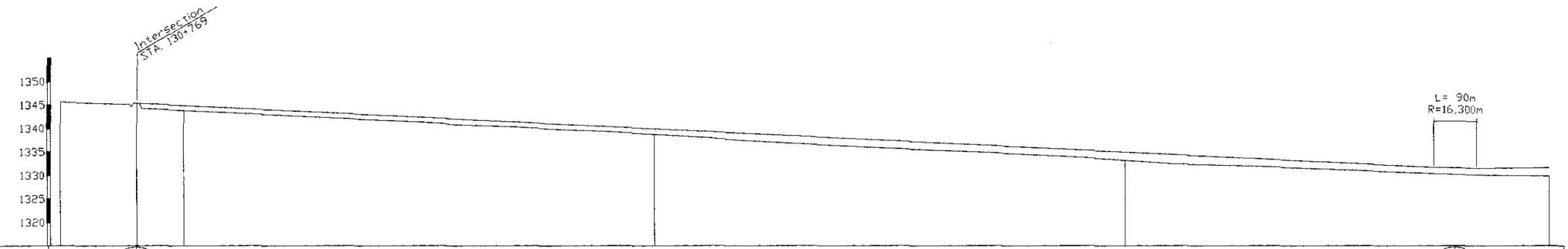
Drawing title	Scale	No.
PLAN AND PROFILE	H=1:10,000 V=1:1,000	B-08





Gradient	1345.350 130+769											i=-0.495 % L=2,801.000										1331.480 133+570	i=0.057 % L=670.000
Proposed Height		1345.35	1344.36	1343.37	1342.38		1341.39	1340.89	1340.40	1339.90	1339.41		1338.42	1337.43	1336.44	1335.45	1334.46	1333.47	1332.48	1331.54	1331.59		
Ground Height	1345.55	1344.56 1345.35 1344.26	1343.29	1342.30	1341.32	1340.78	1340.35	1339.77	1339.39 1339.31	1338.73	1338.16	1337.47	1336.74	1335.78	1334.90	1333.88	1332.43	1331.89	1331.05	1330.16	1329.80		
Cutting Depth																							
Embankment height			1.07	1.07	1.06		1.04	1.12	1.09	1.17	1.25		1.68	1.65	1.54	1.57	2.03	1.58	1.43	1.38	1.79		
Distance	130_769	130_800	131_000	131_200	131_400	bp_1'	131_600	131_700	ccp_1'	131_800	131_900	132_000	ep_1'	132_200	132_400	132_600	132_800	133_000	133_200	133_400	133_600	133_769	
Horizontal Alignment			R = ∞						R = 2500								R = ∞						

130_769 - 133_769

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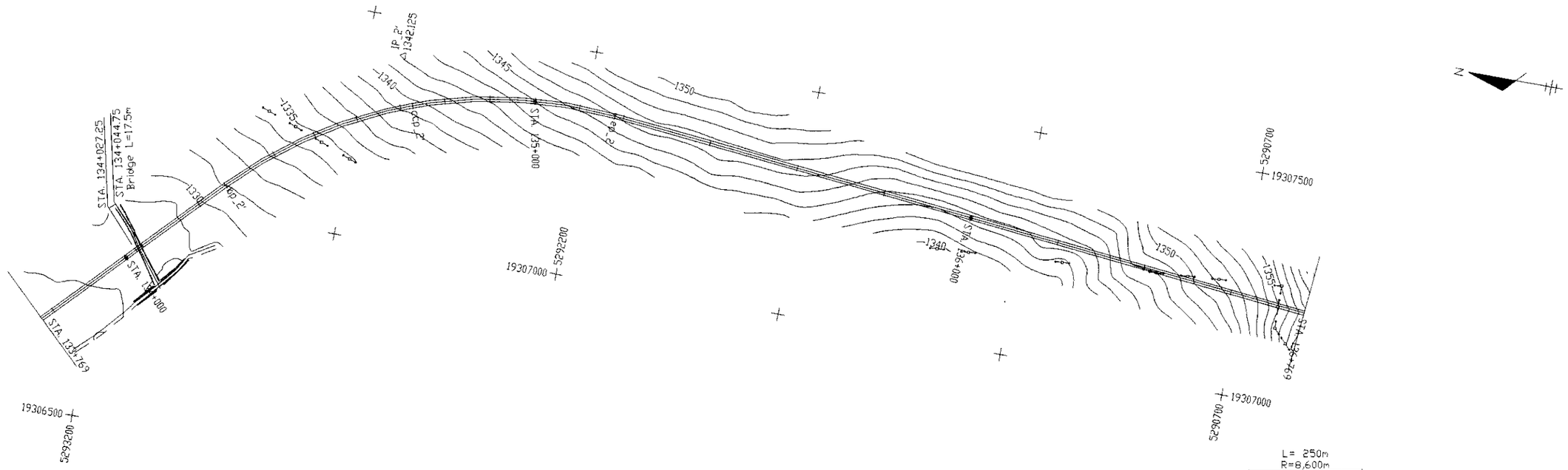
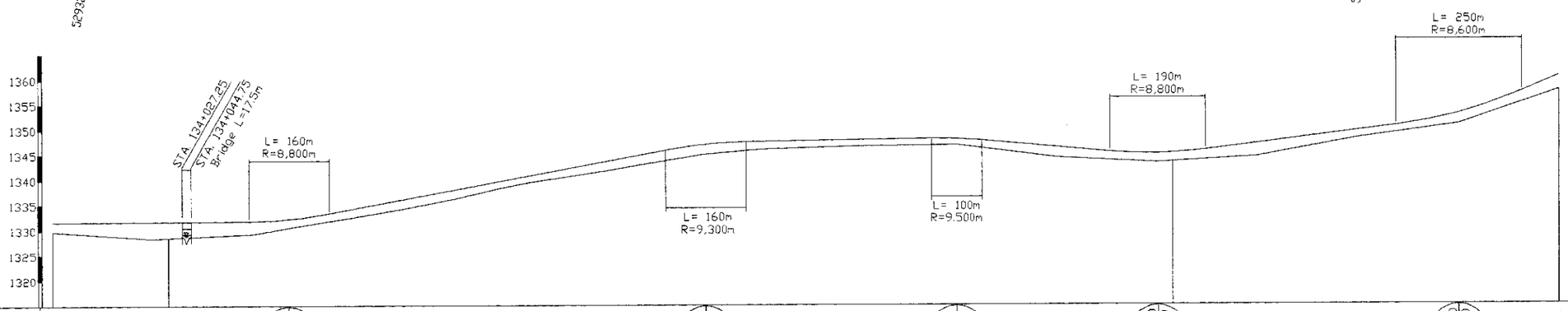
Drawing title	Scale	No.
PLAN AND PROFILE	H=1:10,000 V=1:1,000	B-09





Gradient	i = 0.057 % L=670.000				1331.860 134+240	i = 1.864 % L=830.000					1347.330 135+070	i = 0.154 % L=500.000		1348.100 135+570	i = -0.890 % L=400.000		1344.540 135+970	i = 1.248 % L=600.000			1352.030 136+570	i = 4.136 % L=530.000
Proposed Height	1331.59	1331.71	1331.74 1331.75	1331.82	1332.22	1334.26	1337.99	1341.72	1345.45	1346.99	1347.79	1347.97	1346.33	1345.05	1347.02	1349.52	1352.93	1360.26				
Ground Height	1329.80	1328.32	1328.64 1327.44 1328.66	1329.25	1332.57	1336.22	1339.58	1340.24	1343.45	1345.94	1346.51	1346.82	1344.29	1343.26	1344.44	1348.04	1350.74	1357.55				
Cutting Depth																						
Embankment height	1.79	3.39		2.57		1.69		1.77	1.48	2.00		1.28	1.15	2.04	1.79	2.58	1.48	2.19	2.71			
Distance	133_769	133_800	134_000	134_200	bp_2'	134_400	134_600	ccp_2'	134_800	135_000	ep_2' 135_200	135_400	135_600	135_800	136_000	136_200	136_400	136_600	136_769			
Horizontal Alignment	R = ∞					R = 1000									R = ∞							

133_769 - 136_769

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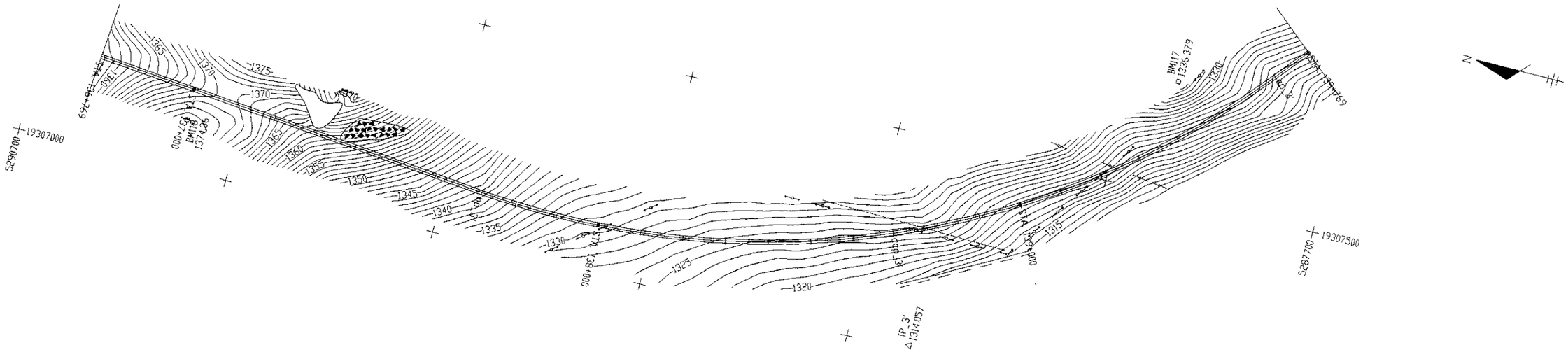
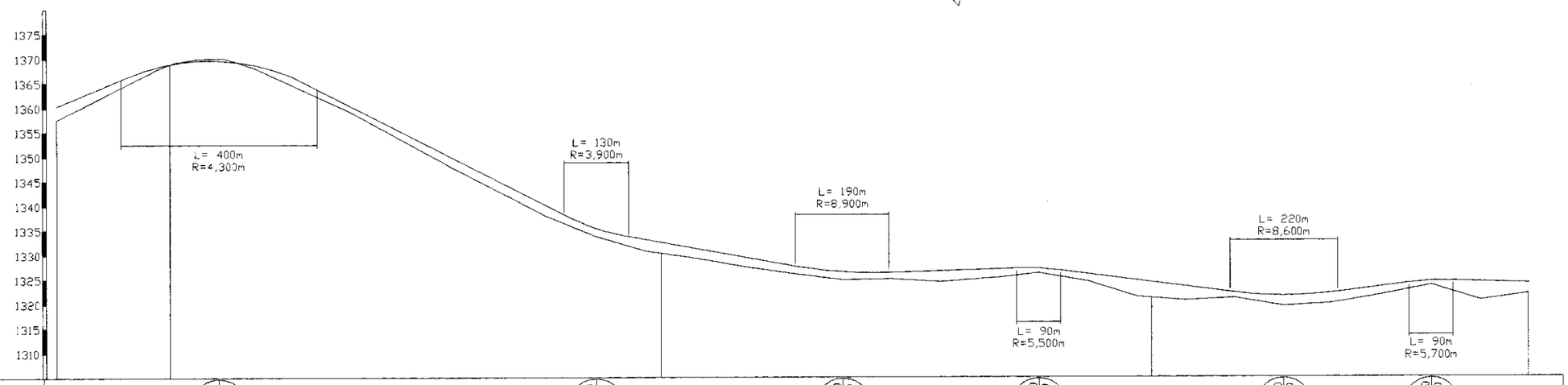
Drawing title	Scale	No.
PLAN AND PROFILE	H=1:10,000 V=1:1,000	B-10

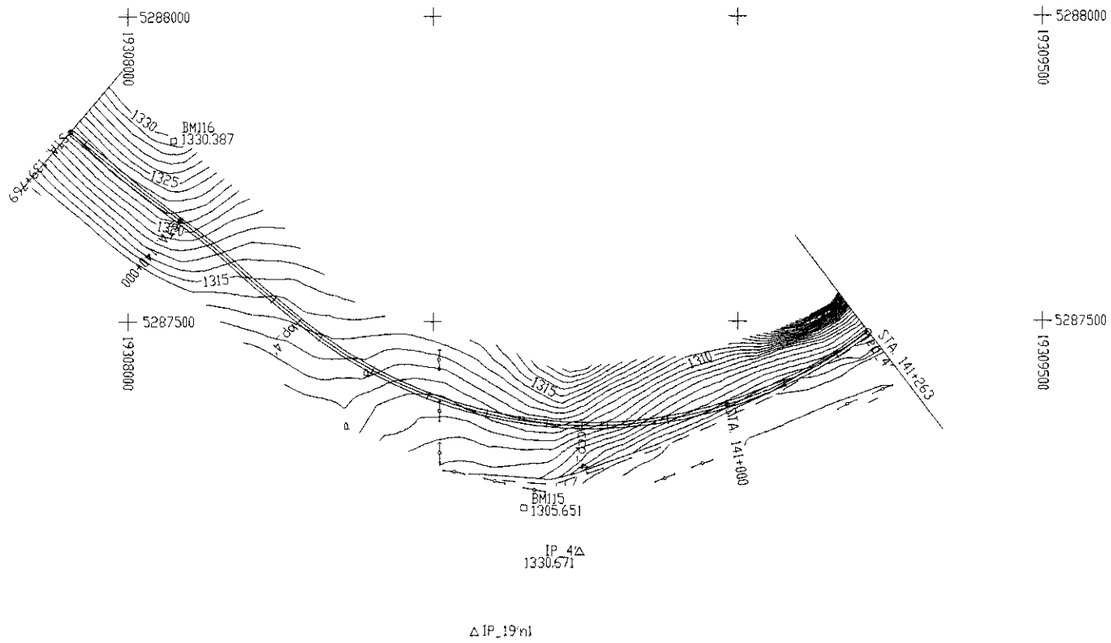


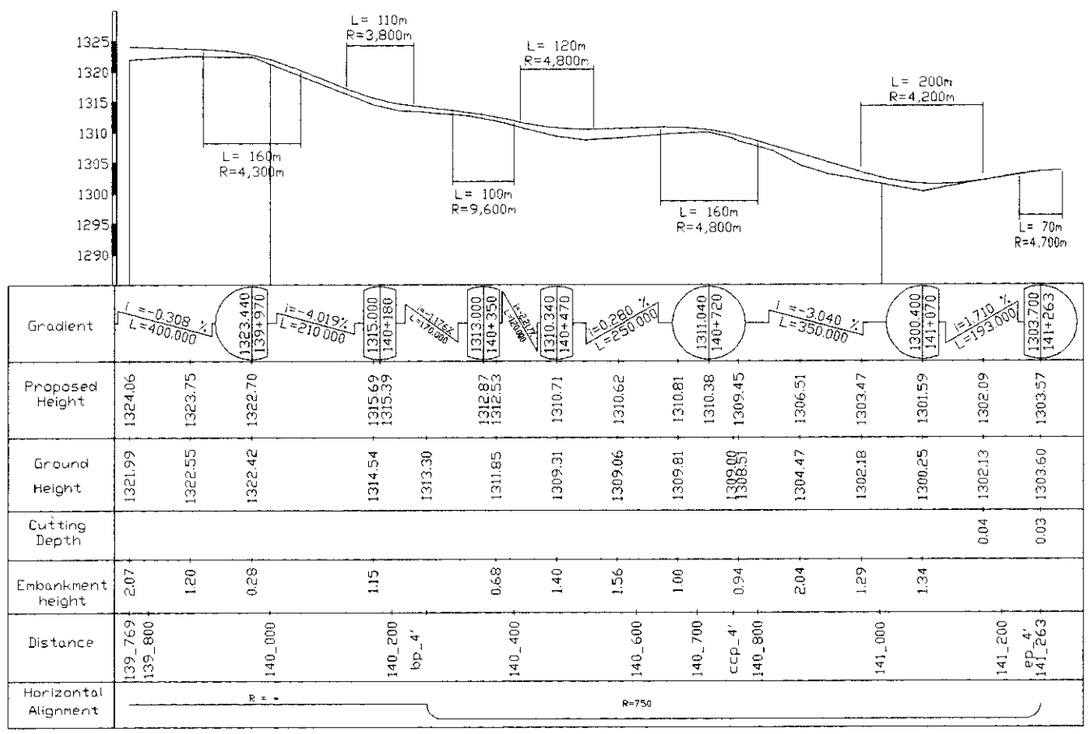


Gradient	i = 4.136 % L=530.000			1373.950 137+100	i = -5.071 % L=770.000				1334.900 137+870	i = -1.796 % L=500.000			1325.920 138+370	i = 0.335 % L=400.000			1327.260 138+770	i = -1.278 % L=500.000			1320.870 139+270	i = 1.267 % L=300.000		1324.670 139+570	i = -0.308 % L=400.000	
Proposed Height	1360.26	1364.40	1367.98	1369.35	1368.48	1360.31	1350.17	1340.02	1335.43	1333.12	1329.53	1327.73	1326.43	1326.25	1326.59		1327.08	1324.72		1322.17	1321.57	1322.13		1324.49		1324.06
Ground Height	1357.55		1367.56		1368.21	1359.08	1348.11	1340.56	1337.81	1330.75	1327.56	1326.12	1324.87	1325.05	1324.43	1325.35	1326.22	1321.39		1321.13		1320.03		1323.67	1320.65	1321.99
Cutting Depth																										
Embankment height	2.71		0.42		0.27	1.23	2.06		2.21	2.37	1.97	1.61	1.56	1.20	2.16		0.86	3.33		1.04		2.10		0.82		2.07
Distance	136_769 136_800		137_000		137_200	137_400	137_600	bp_3'	137_800	138_000	138_200		138_400		138_600	ccp_3'	138_800	139_000		139_200		139_400		139_600	ep_3'	139_769
Horizontal Alignment	R = ∞												R = 2000													R = ∞

136_769 - 139_769

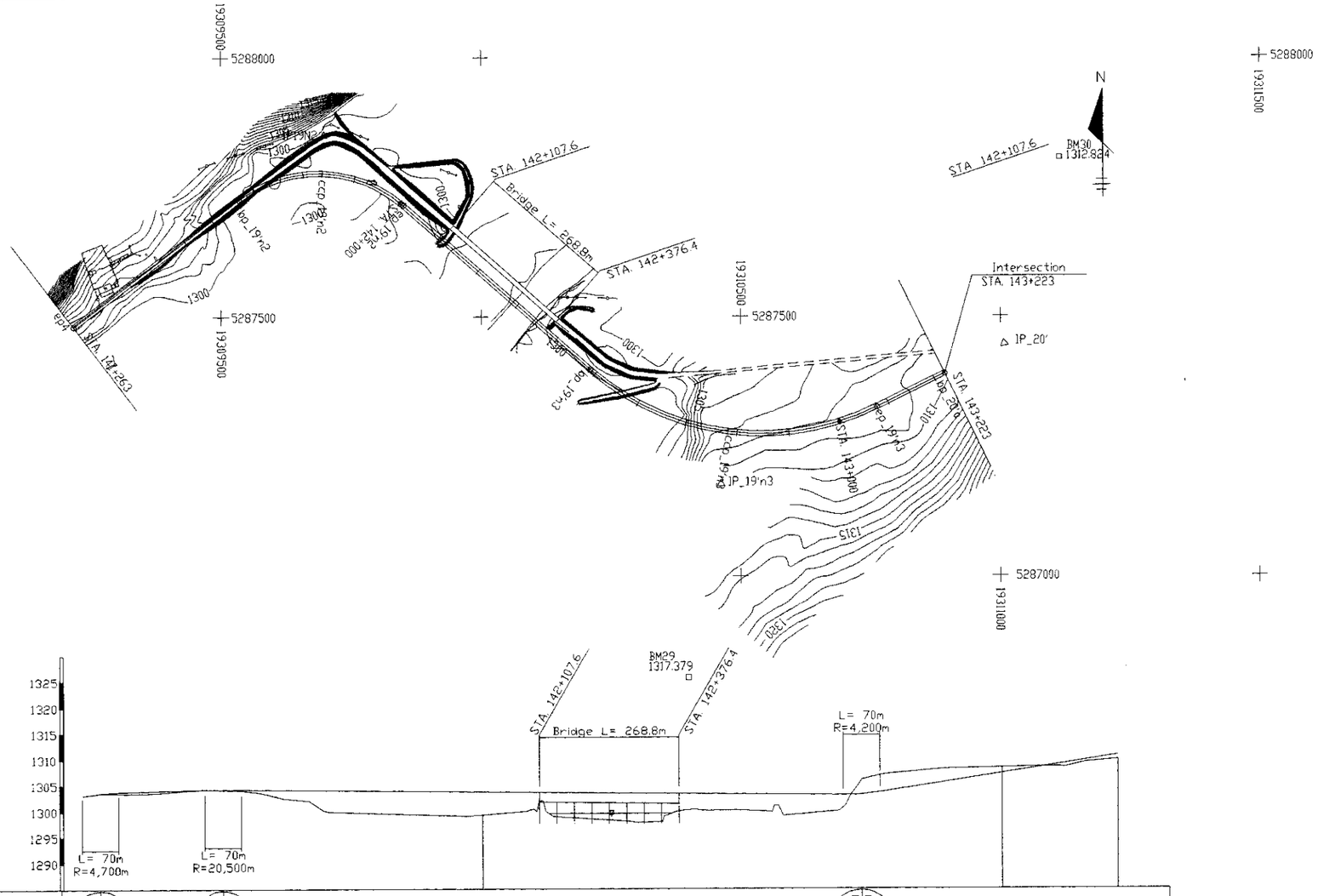
THE FEASIBILITY STUDY ON CONSTRUCTION OF EASTERN ARTERIAL ROAD IN MONGOLIA		
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	DEPARTMENT OF ROADS, MINISTRY OF INFRASTRUCTURE, THE GOVERNMENT OF MONGOLIA	
PACIFIC CONSULTANTS INTERNATIONAL, JAPAN OVERSEAS CONSULTANTS		
Drawing title	Scale	No.
PLAN AND PROFILE	H=1:10,000 V=1:1,000	B-11



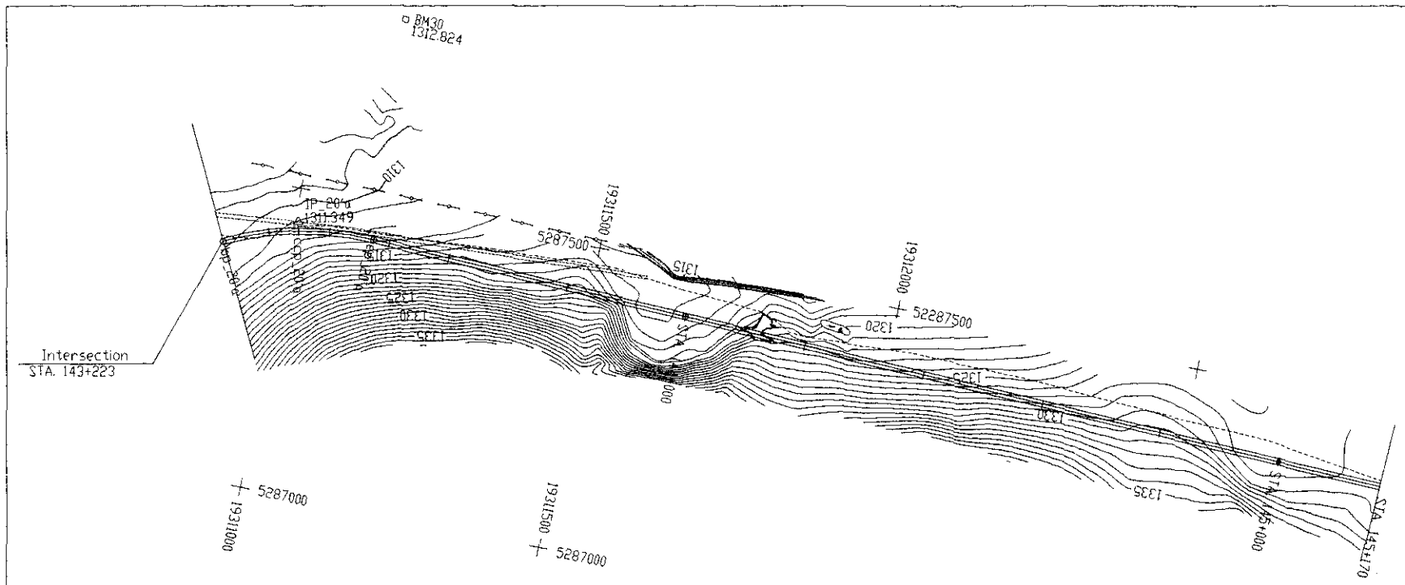


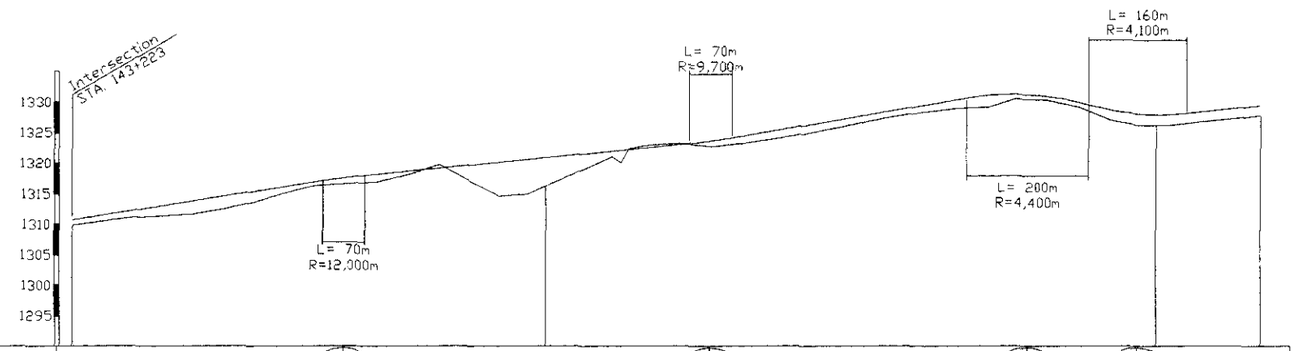
139_769 - 141_263

THE FEASIBILITY STUDY ON CONSTRUCTION OF EASTERN ARTERIAL ROAD IN MONGOLIA		
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	DEPARTMENT OF ROADS, MINISTRY OF INFRASTRUCTURE, THE GOVERNMENT OF MONGOLIA	
PACIFIC CONSULTANTS INTERNATIONAL JAPAN OVERSEAS CONSULTANTS		
Drawing title	Scale	No.
PLAN AND PROFILE	H=1:10,000 V=1:1,000	B-12


N
5288000
5287500
5287000
19309500
19310500
19311000
19311500
STA. 142+107.6
STA. 142+376.4
Bridge L= 268.8m
Intersection
STA. 143+223
BM30
1312.824
BM29
1317.379
IP_19'n3
IP_20'
1300
1315
1320
L= 70m
R=4,700m
L= 70m
R=20,500m
L= 70m
R=4,200m
1325
1320
1315
1310
1305
1300
1295
1290

| | | |



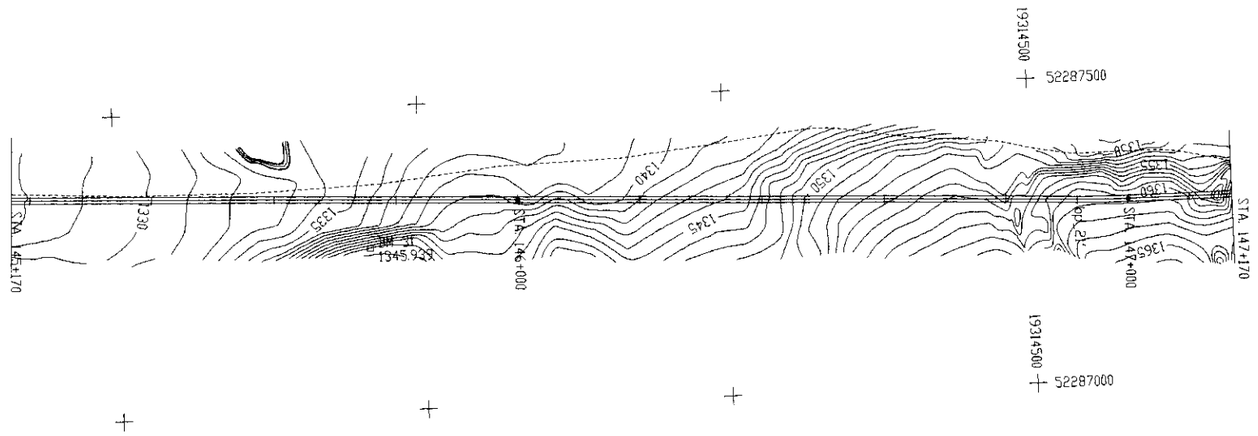


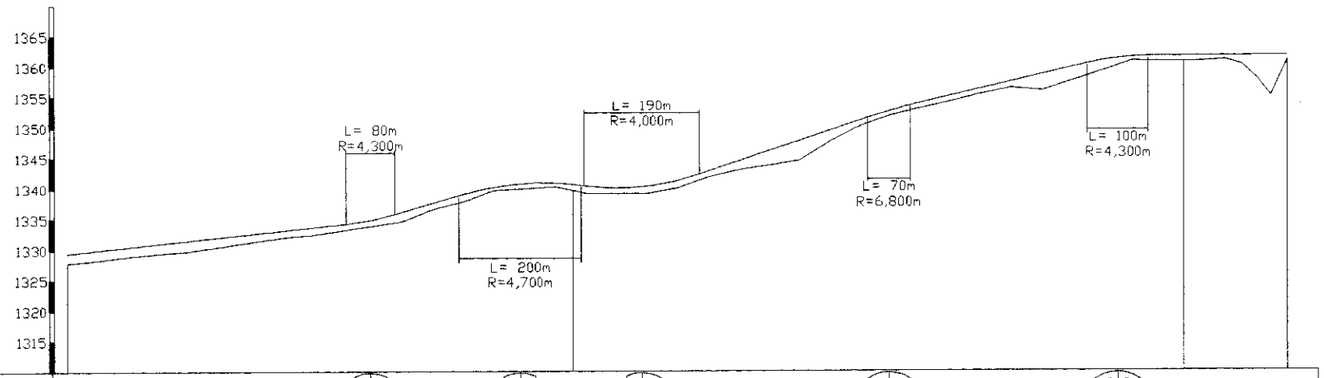
Gradient	i = 1.559 % L= 940.000				1317.630 143+670		i = 0.977 % L= 600.000					1323.490 144+270		i = 1.692% L= 520.000				1332.290 144+790	i = -2.782% L=380.000	1327.290 144+970	i = 1.050% L=700.000	
Proposed Height	1310.66	1312.22	1313.78	1315.34	1316.90	1317.58	1318.15	1318.61	1319.58	1320.56	1322.05	1322.51	1323.55	1325.18	1326.87	1328.57	1330.26	1331.24 1331.17	1330.02	1328.06	1328.34	1329.39
Ground Height	1309.85	1311.09	1311.58	1313.51	1316.21	1316.84	1318.14	1316.98	1314.88	1320.08	1322.96	1322.67	1323.85	1325.76	1327.63	1328.92	1330.48	1329.08	1326.18	1326.72	1327.79	
Cutting Depth											0.45											
Embankment height	0.81	1.13	2.20	1.83	0.69	1.31	0.47	2.60	5.68	1.97		0.88	1.33	1.11	0.94	1.34	0.76	0.94	1.88	1.62	1.60	
Distance	143_223 bp_20'a	143_300	143_400	ep_20'a	143_600		143_800		144_000		144_200		144_400		144_600		144_800		145_000		145_170	
Horizontal Alignment	R=500										R = ∞											

143_223 - 145_170

THE FEASIBILITY STUDY ON CONSTRUCTION OF EASTERN ARTERIAL ROAD IN MONGOLIA	
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	DEPARTMENT OF ROADS, MINISTRY OF INFRASTRUCTURE, THE GOVERNMENT OF MONGOLIA
PACIFIC CONSULTANTS INTERNATIONAL JAPAN OVERSEAS CONSULTANTS	

Drawing title	Scale	No.
PLAN AND PROFILE	H=1:10,000 V=1:1,000	B-14

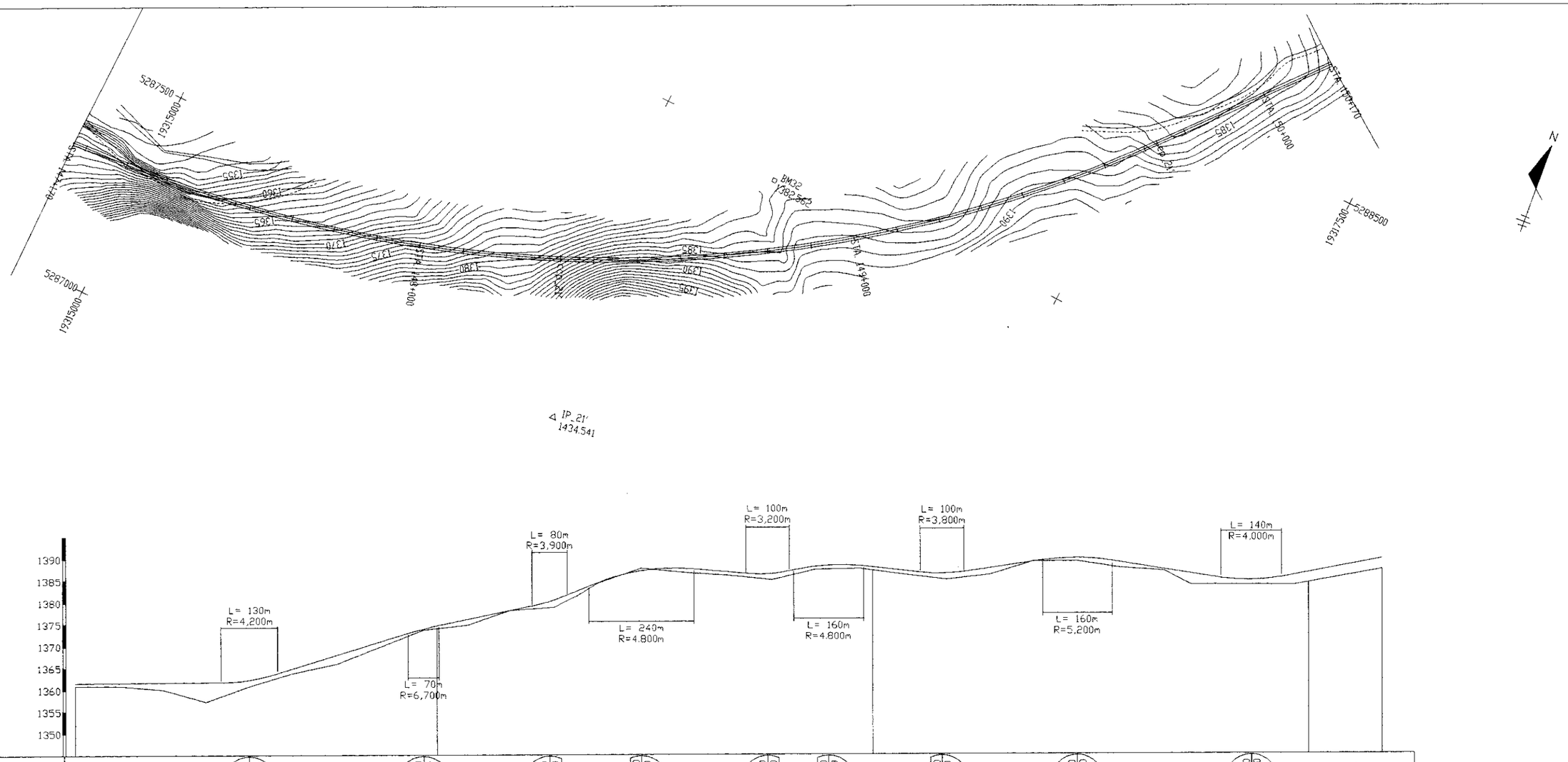




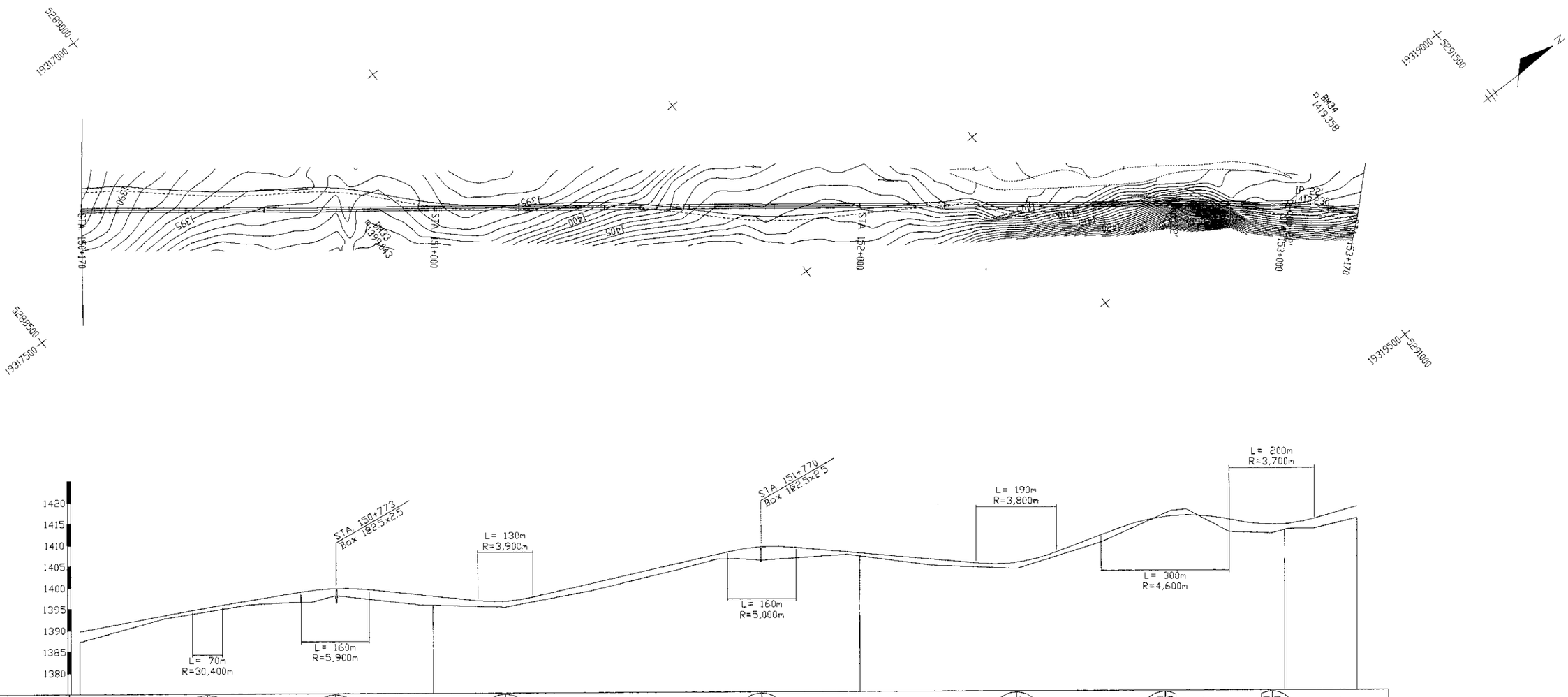
Gradient	i = 1.050 % L= 700.000			1334.640 145+670	i = 2.910 % L= 245.000	1341.770 145+915	i=-1.305% L=200.000	1339.160 146+115	i = 3.346 % L= 405.000			1352.710 146+520	i = 2.328% L= 375.000			1361.440 146+895	i = 0.044 % L= 675.000			
Proposed Height	1329.39	1331.49	1333.59	1334.83	1337.55	1340.72	1340.84	1340.26	1341.20	1347.69	1351.04	1352.62	1353.87	1356.20	1358.53	1360.79 1361.15	1361.47	1361.52	1361.56	
Ground Height	1327.79	1329.70	1332.31		1336.55		1340.25		1339.96	1344.42	1350.19		1353.04	1355.38	1355.89	1359.06	1360.69	1360.64	1360.86	1360.90
Cutting Depth																				
Embankment height	1.60	1.79	1.28		1.00		0.59		1.24	3.27	0.85		0.83	0.82	2.64	1.73	0.83		0.66	0.66
Distance	145_170 145_200	145_400	145_600		145_800		146_000		146_200	146_400			146_600		146_800	kp_21'	147_000		147_100	147_170
Horizontal Alignment	R = ∞																R=3000			

145_170 - 147_170

THE FEASIBILITY STUDY ON CONSTRUCTION OF EASTERN ARTERIAL ROAD IN MONGOLIA		
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	DEPARTMENT OF ROADS, MINISTRY OF INFRASTRUCTURE, THE GOVERNMENT OF MONGOLIA	
PACIFIC CONSULTANTS INTERNATIONAL JAPAN OVERSEAS CONSULTANTS		
Drawing title	Scale	No.
PLAN AND PROFILE	H=1:10,000 V=1:1,000	B-15


5287500
19315000
5287000
19315000
19317500
5288500
BM32
1382.965
IP_21'
1434.541
N
L= 130m
R=4,200m
L= 70m
R=6,700m
L= 80m
R=3,900m
L= 240m
R=4,800m
L= 100m
R=3,200m
L= 160m
R=4,800m
L= 100m
R=3,800m
L= 160m
R=5,200m
L= 140m
R=4,000m
1390
1385
1380
1375
1370
1365
1360
1355
1350

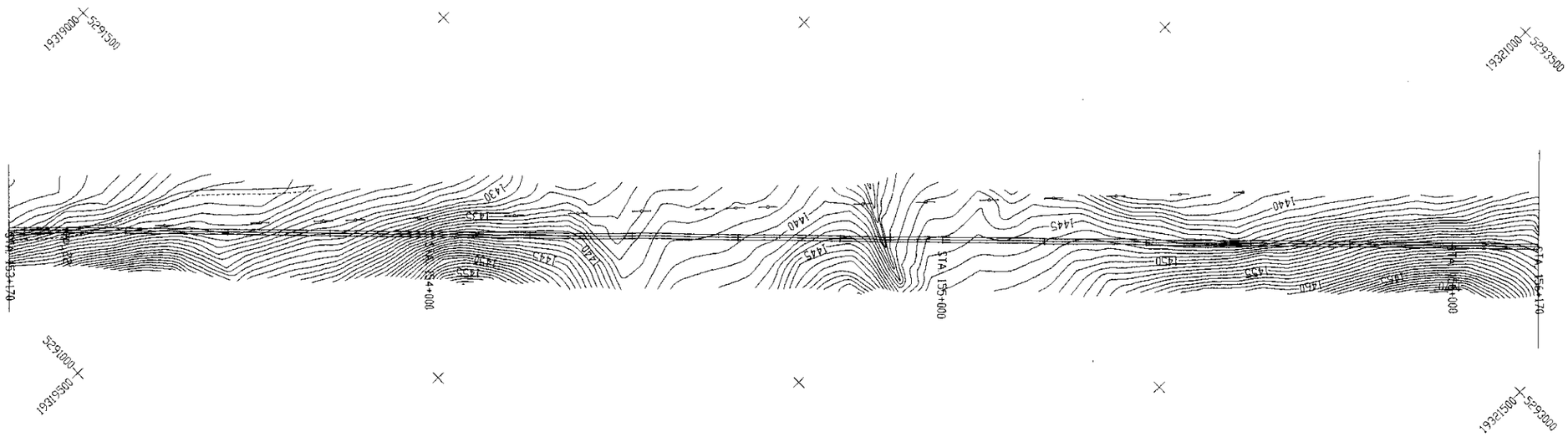
| | | |

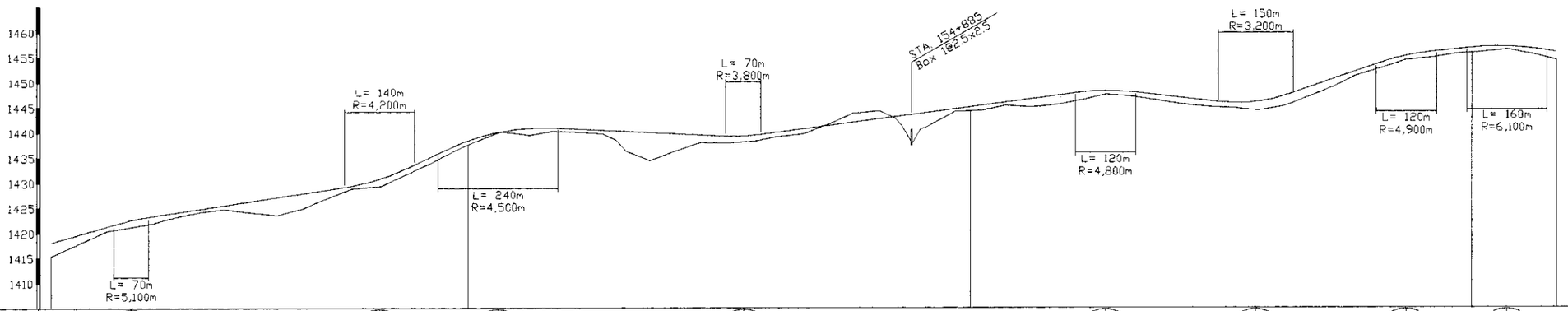


Gradient	i =1.860% L= 600.000	1395.310 150+470	i =1.630% L= 300.000	1400.200 150+770	i =-1.048% L= 400.000	1396.010 151+170	i =2.272% L= 600.000	1409.640 151+770	i =-0.912% L= 600.000	1404.170 152+370	i =4.057% L= 350.000	1418.370 152+720	i =-2.400% L= 250.000	1412.370 152+970	i =2.869% L= 360.000									
Proposed Height	1389.73	1393.45	1395.29	1396.94	1399.66 1399.67	1398.11	1396.55	1400.55	1405.10	1409.00	1407.82	1405.99	1405.35	1412.28	1415.95	1416.09	1414.77	1413.69	1415.24	1418.11				
Ground Height	1387.26	1392.70	1395.89	1397.99	1395.75	1395.18	1398.88	1403.59	1405.89	1407.20	1404.59	1403.74	1409.87	1417.24	1417.54	1412.14	1411.86	1412.86	1412.93	1415.42				
Cutting Depth															1.45									
Embankment height	2.47	0.75	1.05	1.67	2.36	1.37	1.67	1.51	3.11	0.62	1.40	1.61	2.41			2.63	1.83		2.31	2.69				
Distance	150_170 150_200	150_400	150_600	150_800	151_000	151_200	151_400	151_600	151_800	152_000	152_200	152_400	152_600	152_700 bp_22'	152_800	152_900	153_000 ccp_22'		153_100	153_170				
Horizontal Alignment	R = ∞														R=5000									

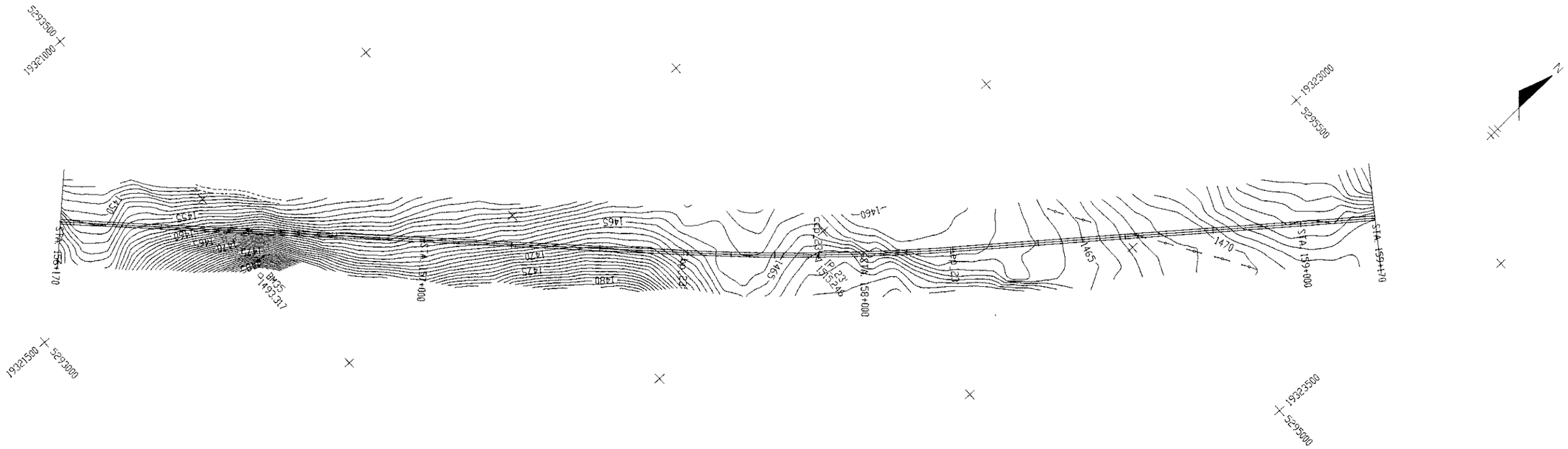
150_170 - 153_170

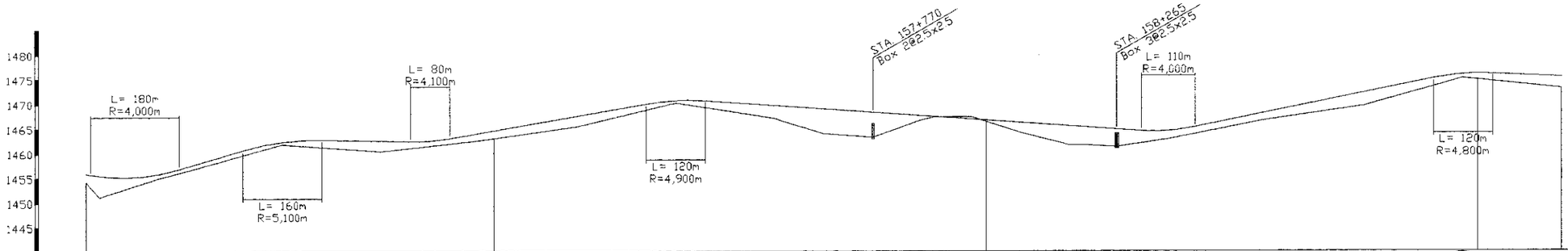
THE FEASIBILITY STUDY ON CONSTRUCTION OF EASTERN ARTERIAL ROAD IN MONGOLIA		
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	DEPARTMENT OF ROADS, MINISTRY OF INFRASTRUCTURE, THE GOVERNMENT OF MONGOLIA	
PACIFIC CONSULTANTS INTERNATIONAL JAPAN OVERSEAS CONSULTANTS		
Drawing title	Scale	No.
PLAN AND PROFILE	H=1:10,000 V=1:1,000	B-17


19319000
5291500
19321000
5293500
19319500
5291000
19321500
5293000
STA 153+170
STA 154+000
STA 155+000
STA 156+000
STA 156+170
1430
1435
1440
1445
1450
N


1460
1455
1450
1445
1440
1435
1430
1425
1420
1415
1410
L= 70m
R=5,100m
L= 140m
R=4,200m
L= 240m
R=4,500m
L= 70m
R=3,800m
STA 154+895
Box 1@2.5x2.5
L= 120m
R=4,800m
L= 150m
R=3,200m
L= 120m
R=4,900m
L= 160m
R=6,100m

| | | |

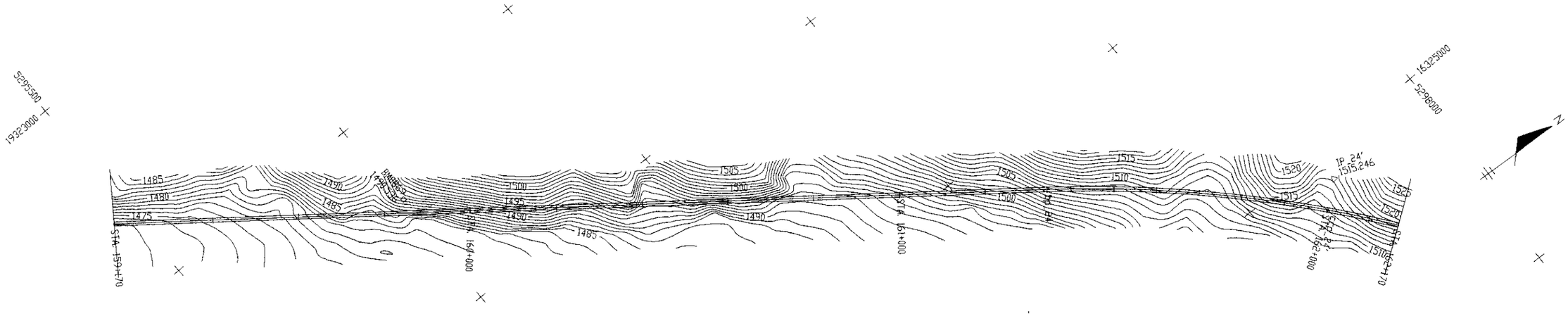


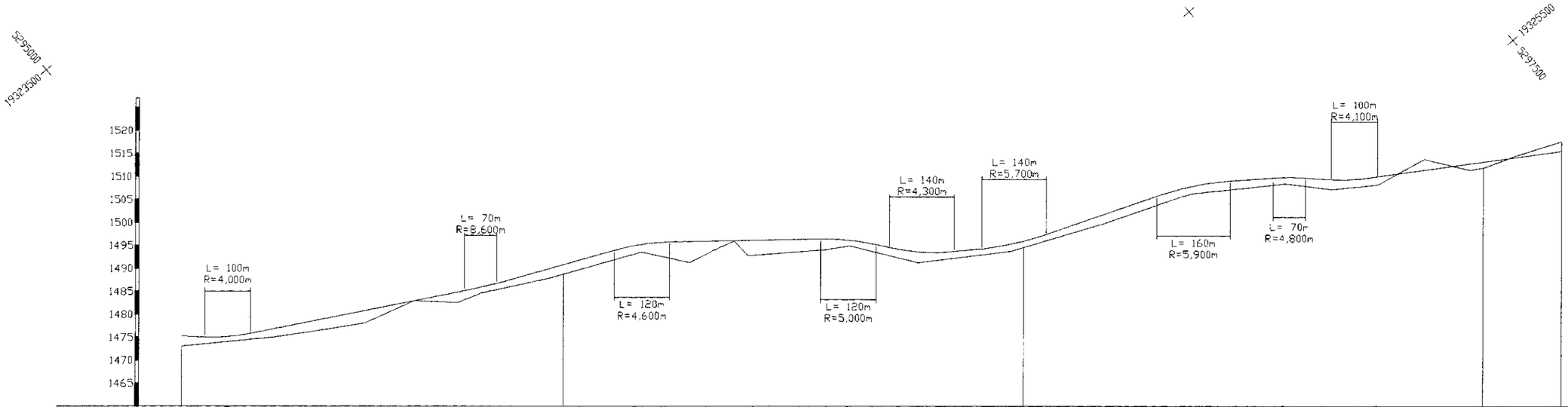


Gradient	i=-1.600% L=200.000	1454.290 156+270	i=2.883 % L=300.000	1462.940 156+570	i=-0.210 % 300.000	1462.310 156+870	i=1.736 % L=500.000	1470.990 157+370	i=-0.697 % 1000.000	1464.020 158+370	i=2.028 % L=600.000	1476.190 158+970	i=-0.463 % -900.000											
Proposed Height	1455.89	1455.30	1457.17	1462.32	1462.52	1462.50	1464.05	1467.52	1470.63	1469.60	1468.90	1468.20	1467.51	1466.81	1466.11	1465.41	1464.75	1464.39	1468.08	1472.13	1474.16	1475.82	1475.26	
Ground Height	1454.28		1456.32	1461.81	1460.40		1462.56	1465.36	1470.15	1466.98 1466.27	1463.89	1463.06	1466.64 1467.24	1467.23	1464.04	1461.48 1461.53		1462.69	1466.60	1469.44	1475.01		1473.01		
Cutting Depth														0.42							0.85			
Embankment height	1.61		0.85	0.51	2.12		1.49	2.16	0.48	2.62	5.01		0.87		2.07	3.93		1.70	1.48	2.69			2.25	
Distance	156_170	156_200	156_400	156_600	156_800		157_000	157_200	157_400	157_500	EP_23' 157_600	157_700	157_800	CCP_23' 157_900	158_000	158_100	158_200 EP_23'	158_400	158_600	158_800		159_000	159_170	
Horizontal Alignment	R = ∞										R=5000								R = ∞					

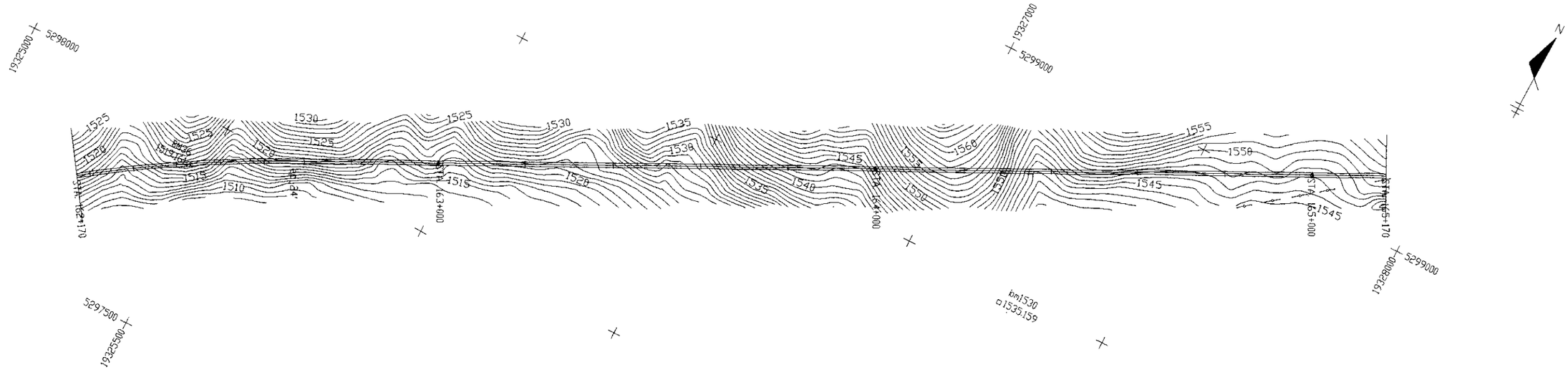
156_170 - 159_170

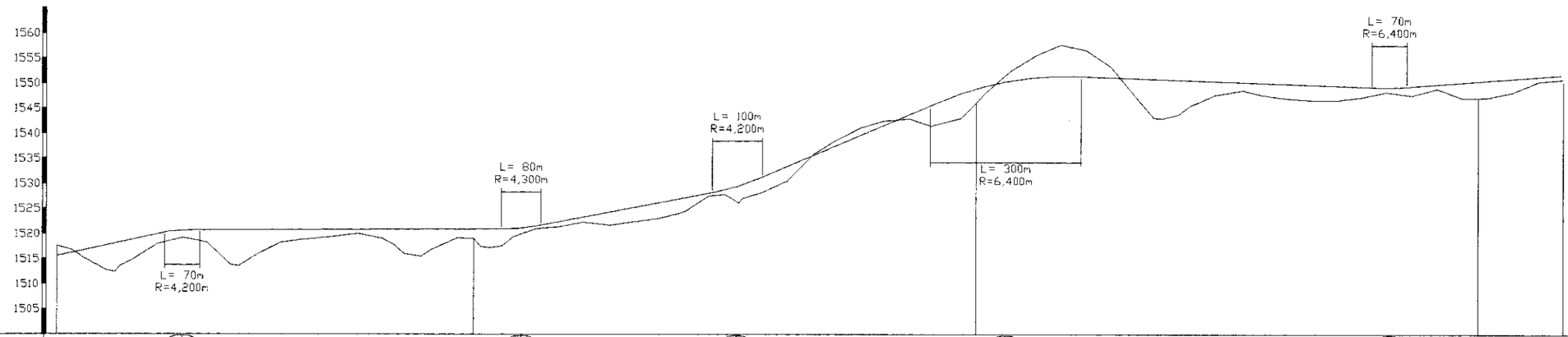
THE FEASIBILITY STUDY ON CONSTRUCTION OF EASTERN ARTERIAL ROAD IN MONGOLIA		
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	DEPARTMENT OF ROADS, MINISTRY OF INFRASTRUCTURE, THE GOVERNMENT OF MONGOLIA	
PACIFIC CONSULTANTS INTERNATIONAL JAPAN OVERSEAS CONSULTANTS		
Drawing title	Scale	No.
PLAN AND PROFILE	H=1:10,000 V=1:1,000	8-19


5295500
19323000
5298000
16325000
N
1475
1480
1485
1490
1495
1500
1505
1510
1515
1520
IP 24'
1515.246
STA 159+170
160+000
161+000
162+000
STA 163+170

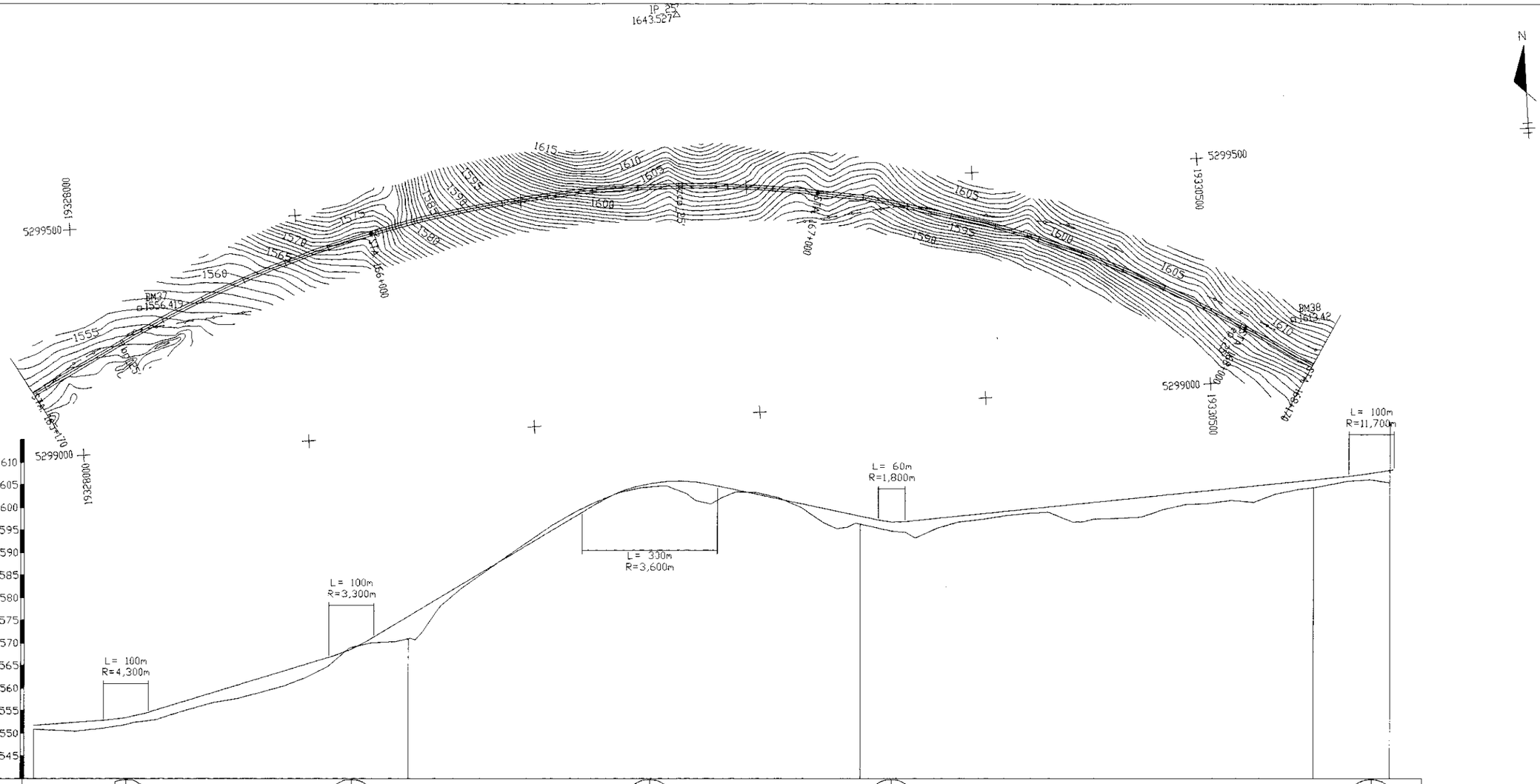

5295000
19323500
5297500
19325500
1520
1515
1510
1505
1500
1495
1490
1485
1480
1475
1470
1465
L= 100m
R=4,000m
L= 70m
R=8,600m
L= 120m
R=4,600m
L= 140m
R=4,300m
L= 120m
R=5,000m
L= 140m
R=5,700m
L= 160m
R=5,900m
L= 70m
R=4,800m
L= 100m
R=4,100m

| | | |

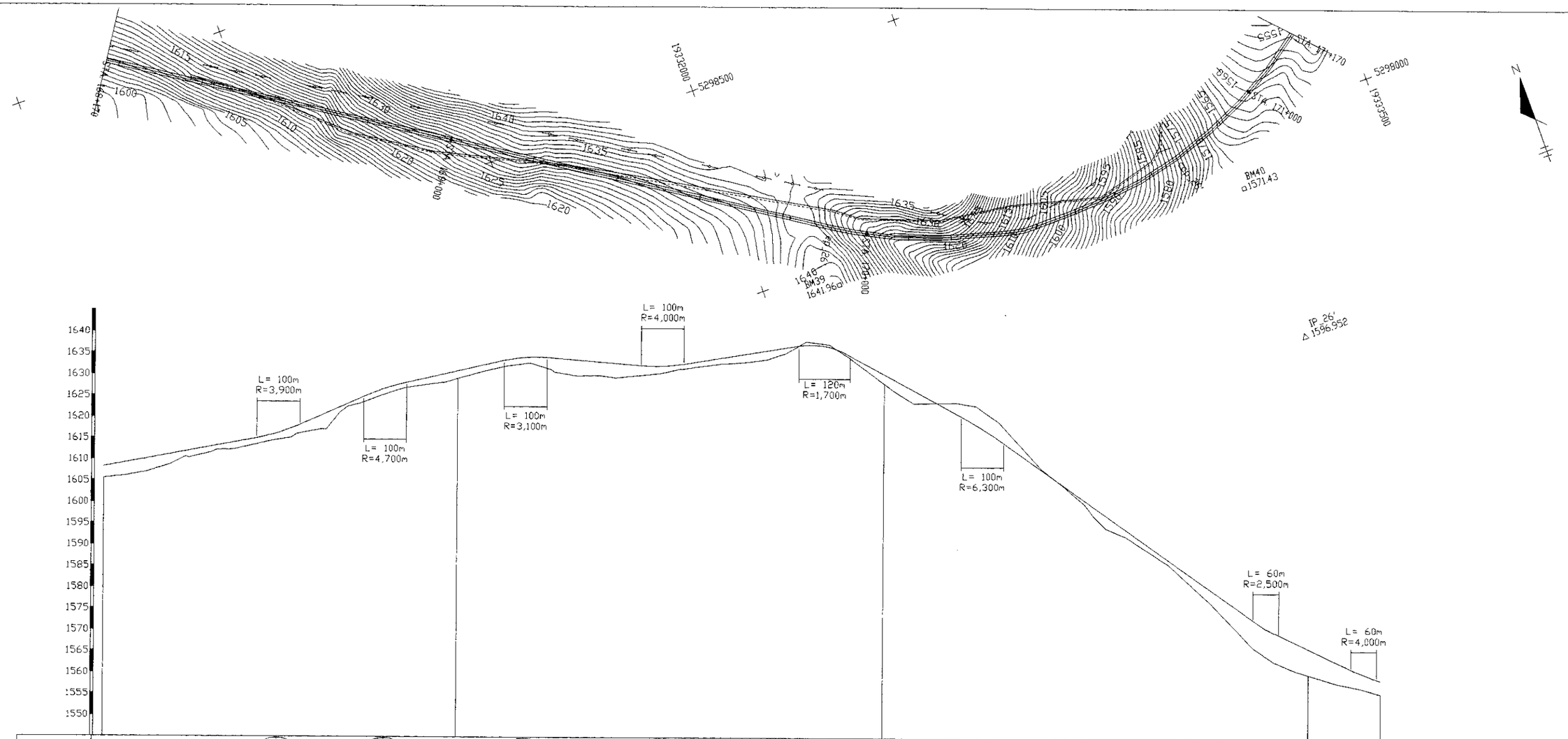

19325500
5298000
19327000
5299000
N
1525
1530
1535
1555
1550
1520
1528
1515
1510
1540
1545
1560
STA 162+170
STA 163+000
STA 164+000
STA 165+000
STA 165+170
19328000
5299000
5297500
19325500
bm1530
□1535.159


1560
1555
1550
1545
1540
1535
1530
1525
1520
1515
1510
1505
L= 70m
R=4,200m
L= 80m
R=4,300m
L= 100m
R=4,200m
L= 300m
R=6,400m
L= 70m
R=6,400m

| | | |


IP 25
1643.527
N
5299500
19328000
5299000
19330500
BM37
1556.415
BM38
1613.342
L= 100m
R=4,300m
L= 100m
R=3,300m
L= 330m
R=3,600m
L= 60m
R=1,800m
L= 100m
R=11,700m

| | | |

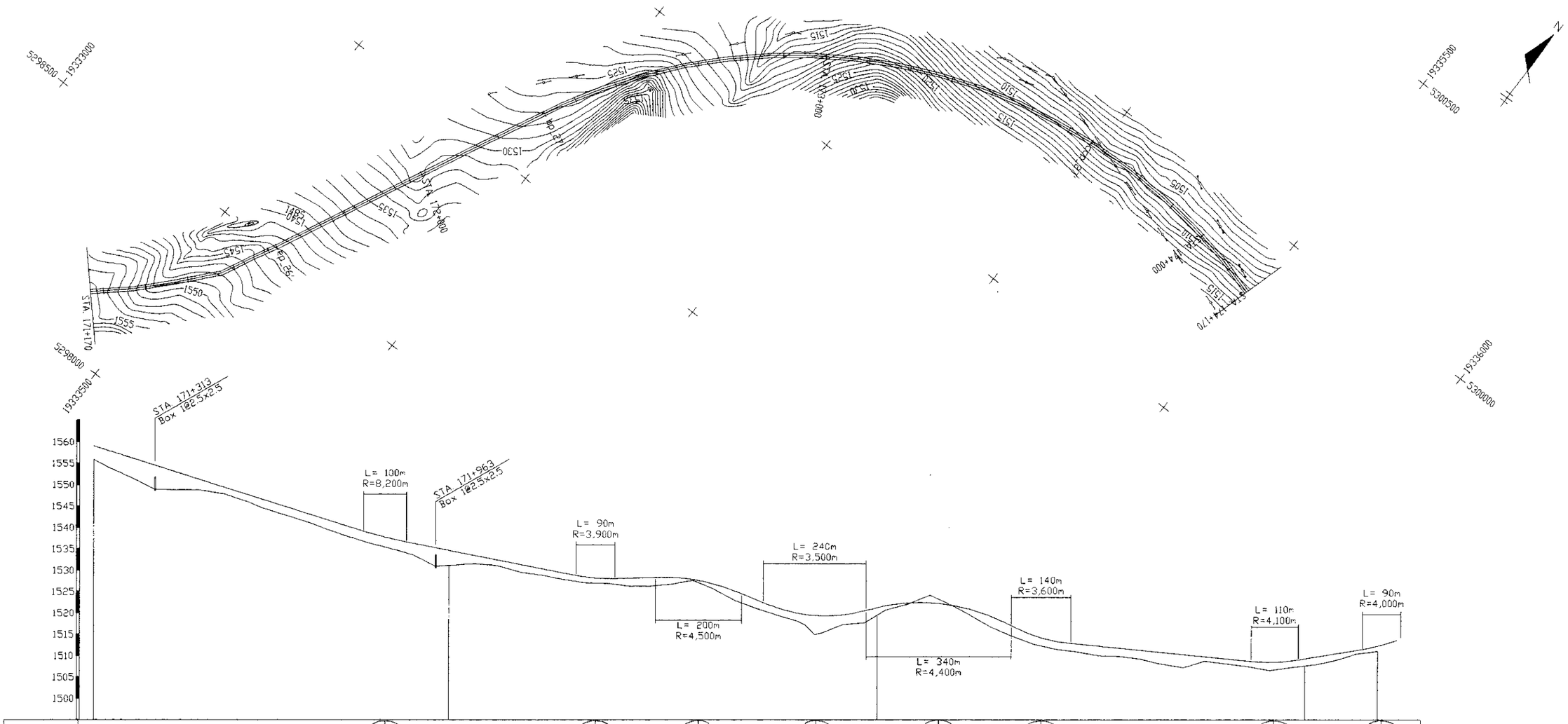


Gradient	i = 1.880 % L= 450.000					i = 4.392 % L= 250.000				i = 2.297 % L= 330.000				i = -0.828 % L= 320.000				i = 1.618 % L= 380.000				i = -5.432 % L= 370.000				i = -7.000 % L= 670.000				i = -4.657 % L= 230.000			
					1615.940 168+580				1626.920 168+830				1634.500 169+160				1631.850 169+480				1638.000 169+860				1617.900 170+230				1571.000 170+900				1560.290 171+130		
Proposed Height	1608.24	1610.11	1611.99	1613.87	1615.95 1616.25	1619.89	1624.28	1626.66	1627.83	1630.14	1632.43	1634.11 1634.17	1633.59	1632.76	1632.13 1632.16	1633.31	1634.93	1636.54	1636.94 1636.72	1632.02	1626.59	1621.16	1617.70	1615.09	1608.10	1601.10	1594.10	1587.10	1580.10	1573.10 1571.18	1567.74	1563.08	1560.40	1559.02
Ground Height	1605.49	1607.04	1610.37	1612.24	1614.47	1617.07	1623.15	1626.84	1628.16	1631.08	1632.77	1629.79	1629.42	1630.39	1632.13	1633.04	1635.24	1637.37	1630.48	1623.59	1623.75	1619.31	1608.28	1600.22	1592.55	1586.03	1577.07	1566.55	1561.17	1558.20	1555.84					
Cutting Depth																		0.65			2.59	4.22	0.18												
Embankment height	2.75	3.07	1.62	1.63	1.48	2.82	1.13	0.99	1.96	1.35	1.40	3.80	3.34	1.74	1.18	1.89	1.30		1.54	3.00						0.88	1.55	1.07	3.03	6.55	6.57	4.88	3.18		
Distance	168_170 168_200		168_400		168_600			168_800		169_000		169_200		169_400		169_600		169_800	IP_26'	170_000	170_100	170_200	170_300	170_400	170_500	170_600	170_700	CCP_26' 170_800	170_900	171_000	171_100	171_170			
Horizontal Alignment	R = ∞																			R = 1000															

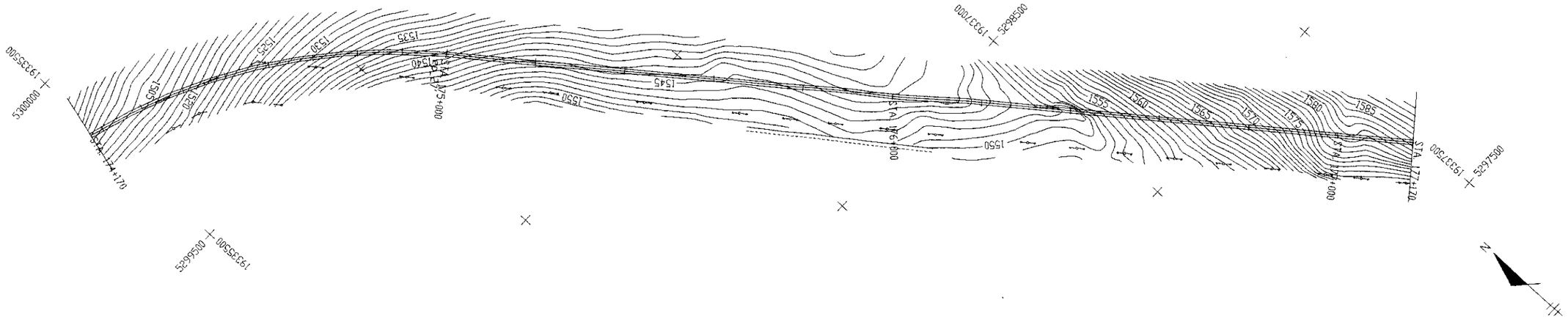
168_170-171_170

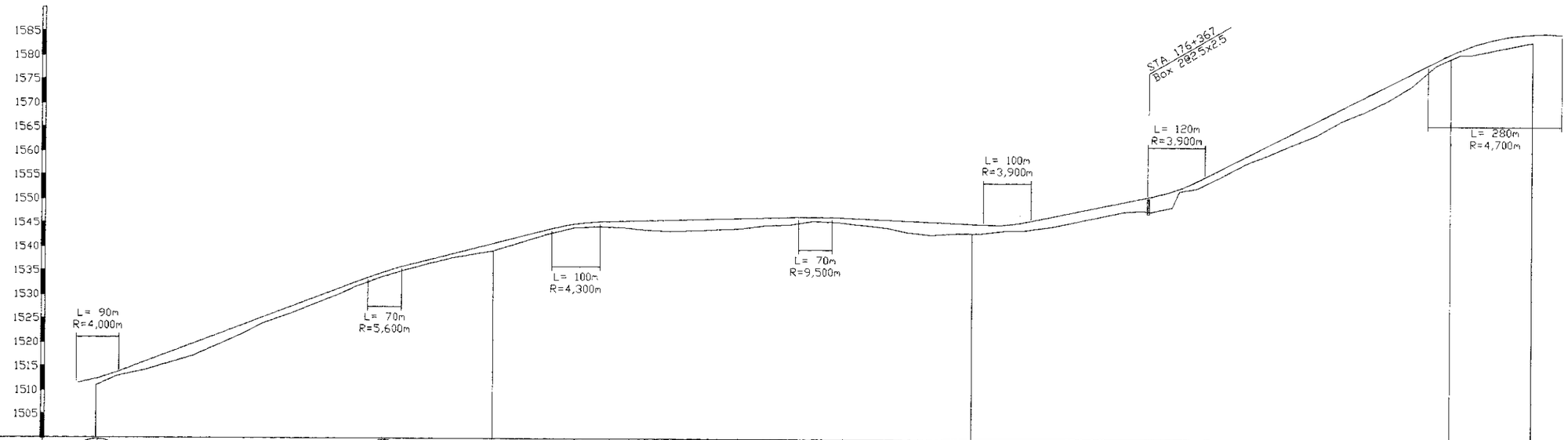
THE FEASIBILITY STUDY ON CONSTRUCTION OF EASTERN ARTERIAL ROAD IN MONGOLIA

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	DEPARTMENT OF ROADS, MINISTRY OF INFRASTRUCTURE, THE GOVERNMENT OF MONGOLIA	
PACIFIC CONSULTANTS INTERNATIONAL JAPAN OVERSEAS CONSULTANTS		
Drawing title	Scale	No.
PLAN AND PROFILE	H=1:10,000 V=1:1,000	B-23


5298500
19333000
19335500
5300500
5298000
19333500
19336000
5300000
N
STA 171+170
STA 174+170
STA 171+313
Box 1@2.5x2.5
STA 171+963
Box 1@2.5x2.5
L= 100m
R=8,200m
L= 90m
R=3,900m
L= 200m
R=4,500m
L= 240m
R=3,500m
L= 340m
R=4,400m
L= 140m
R=3,600m
L= 110m
R=4,100m
L= 90m
R=4,000m

| | | |

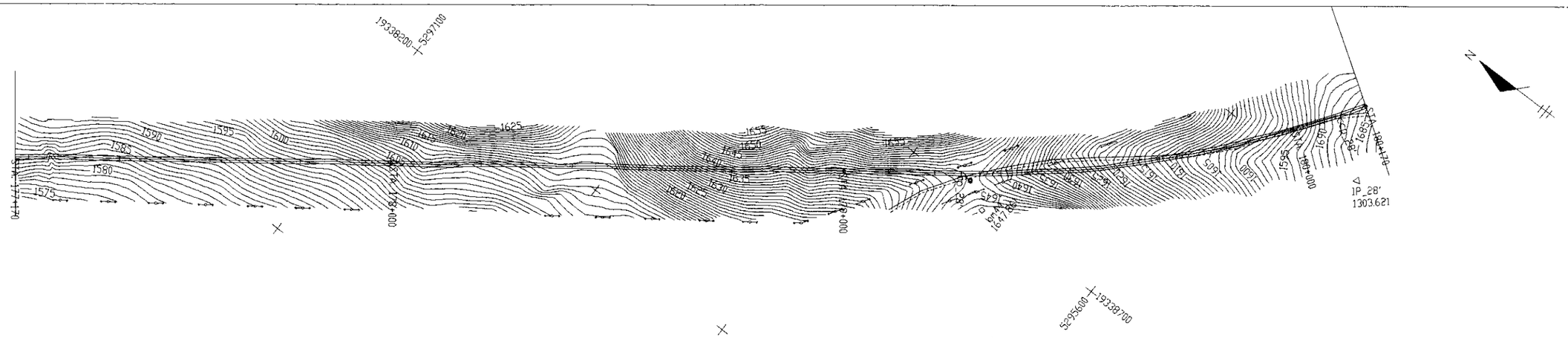


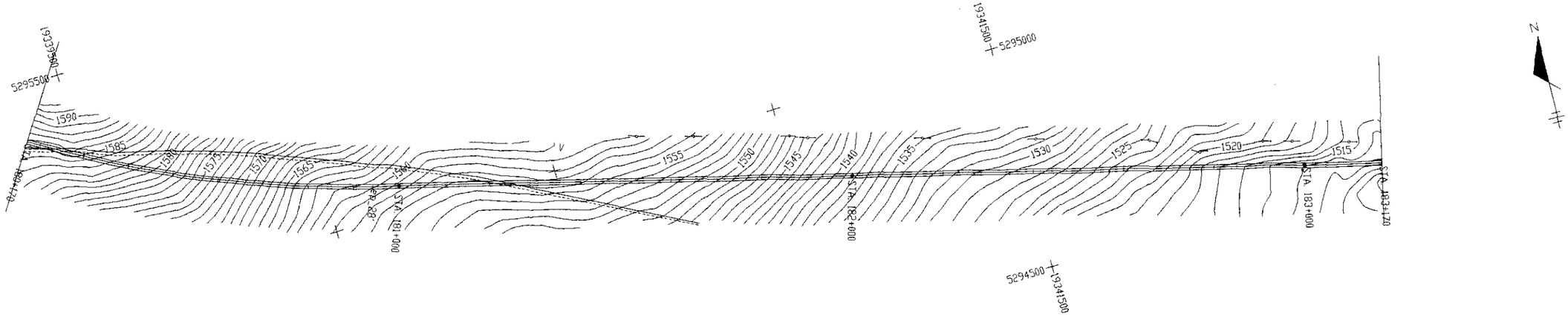


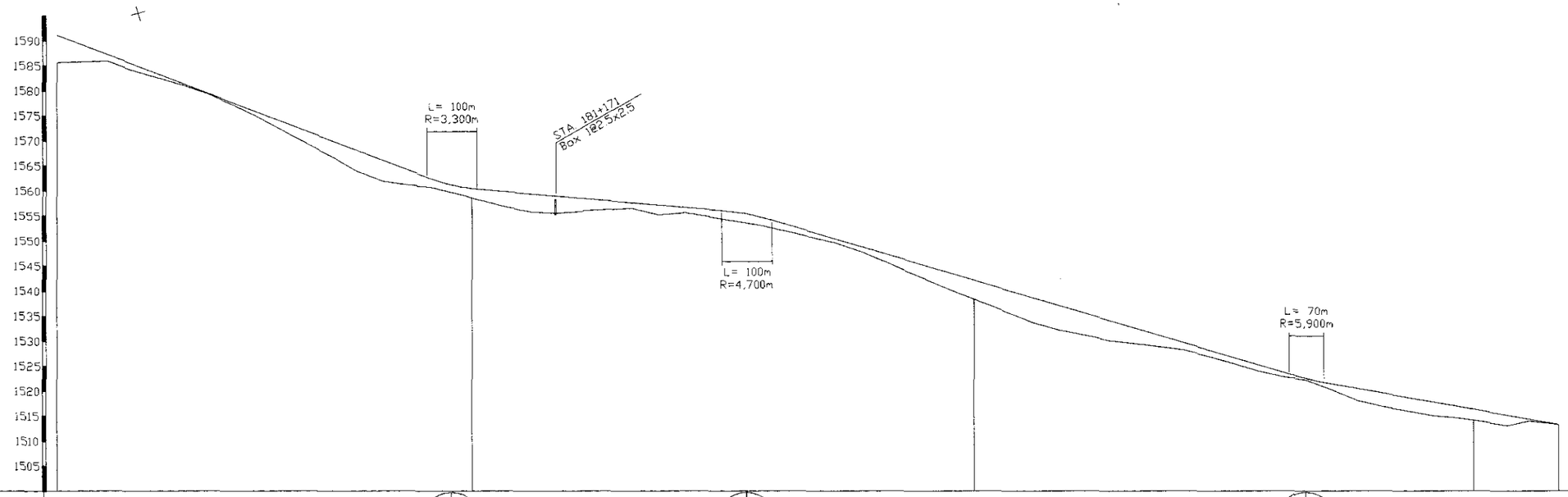
Gradient	1512.140 174+170	L= 3.807 % L= 600.000	1534.980 174+770	L= 2.570 % L= 400.000	1545.260 175+170	L= 0.278 % L= 500.000	1546.550 175+670	L= -0.455 % L= 400.000	1544.830 176+070	L= 2.051 % L= 355.000	1552.110 176+425	L= 5.077 % L= 665.000	1585.870 177+090	L= -0.757 % L= -280.000																	
Proposed Height	1512.39	1515.95	1519.75	1523.56	1527.37	1531.17	1534.87	1537.55	1540.89	1544.97	1545.82	1546.09	1546.37	1546.59	1546.20	1545.74	1545.29	1545.14	1546.88	1550.92	1550.99	1552.56	1554.42	1559.47	1564.55	1569.62	1574.70	1579.74	1583.83	1584.89	
Ground Height	1510.99	1514.05	1517.07	1521.43	1525.81	1529.73	1533.86	1536.71	1539.21	1544.12	1544.27	1543.49	1543.49	1544.70	1545.68	1544.88	1543.36	1543.24	1543.81	1544.72	1547.79	1552.79	1557.85	1561.95	1566.95	1571.29	1578.81	1583.65			
Cutting Depth																															
Embankment height	1.40	1.90	2.68	2.13	1.56	1.44	1.01	0.84	1.68	0.85	2.33	2.60	1.67	0.91	1.32	2.38	2.05	1.33	2.16	3.20	1.63	1.62	2.60	2.67	3.41	0.93	1.24				
Distance	174_170 174_200	174_300	174_400	174_500	174_600	174_700	174_800	175_000 EP_27	175_200	175_400	175_600	175_800	176_000	176_200	176_400	176_600	176_800	177_000	177_170												
Horizontal Alignment	R=1300																	R = ∞													

174_170-177_170

THE FEASIBILITY STUDY ON CONSTRUCTION OF EASTERN ARTERIAL ROAD IN MONGOLIA		
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	DEPARTMENT OF ROADS, MINISTRY OF INFRASTRUCTURE, THE GOVERNMENT OF MONGOLIA	
PACIFIC CONSULTANTS INTERNATIONAL JAPAN OVERSEAS CONSULTANTS		
Drawing title	Scale	No.
PLAN AND PROFILE	H=1:10,000 V=1:1,000	B-25


19338200
5297100
1575
1580
1585
1590
1595
1600
1605
1610
1615
1620
1625
1630
1635
1640
1645
1650
1655
1660
1665
1670
1675
1680
1685
1690
1695
1700
1705
1710
1715
1720
1725
1730
1735
1740
1745
1750
1755
1760
1765
1770

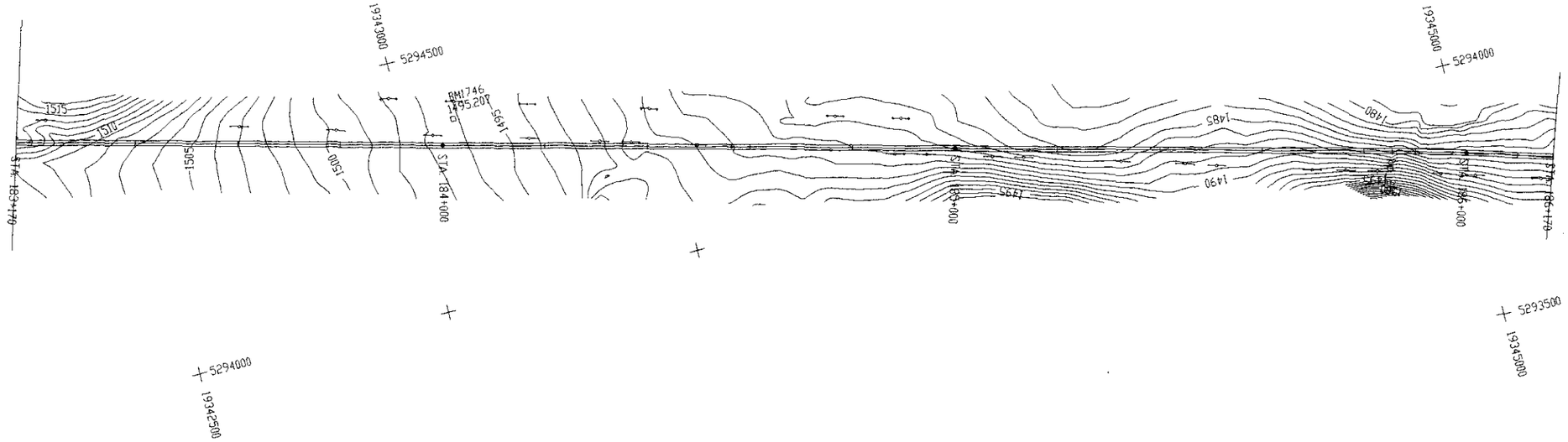


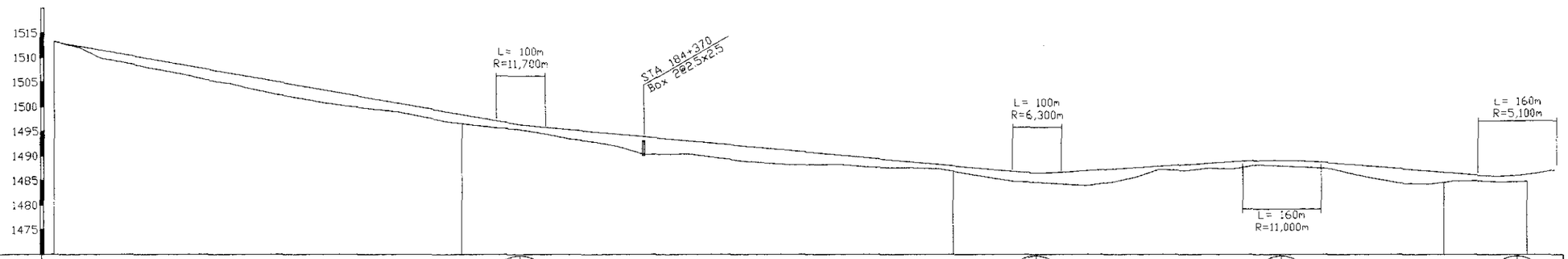


Gradient	i = -3.844 % L= 1110.000								1560.760 180+960	i = -0.864 % L= 590.000			1555.660 181+550	i = -2.974 % L= 1120.000					1522.350 182+670	i = -1.797 % L= 1450.000			
Proposed Height	1591.13	1587.28	1583.44	1579.60	1575.75	1571.91	1568.06	1564.22	1561.13	1560.91	1558.94	1557.22	1555.40	1554.97	1549.12	1543.17	1537.22	1531.27	1525.32	1522.45	1520.55	1516.96	1513.37
Ground Height	1585.69	1585.96	1582.66	1579.51	1574.92	1569.55	1563.93	1561.20	1560.09	1559.48	1555.56	1555.20	1553.15	1547.98	1539.54	1532.20	1528.87	1523.96		1518.02	1514.55	1513.31	
Cutting Depth																							
Embankment height	5.44	1.59	0.78	0.09	0.83	2.36	4.13	3.02	1.43			2.02	1.82	1.14	3.63	5.02	2.40	1.36		2.53	2.41	0.06	
Distance	180_170	180_200	180_300	180_400	180_500	180_600	180_700	180_800	ep_28'	181_000	181_200	181_400	181_600	181_800	182_000	182_200	182_400	182_600		182_800	183_000	183_170	
Horizontal Alignment	R = 2500													R = ∞									

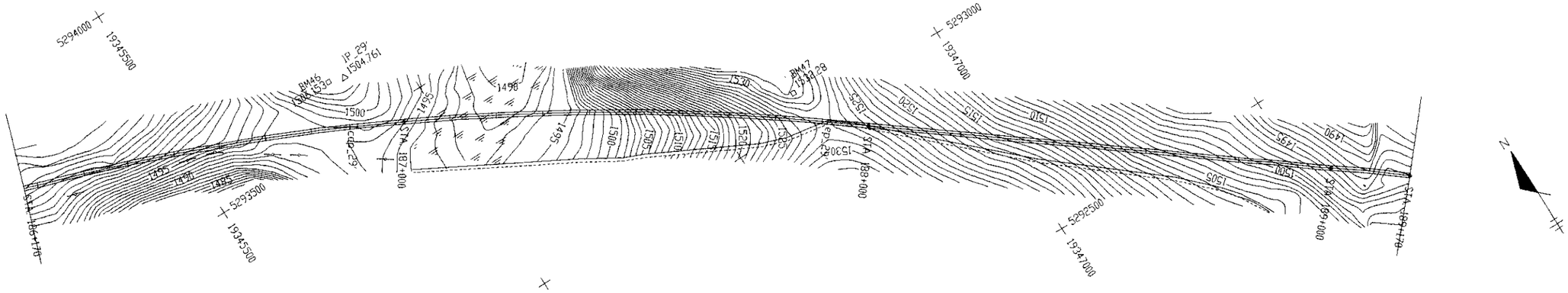
180_170-183_170

THE FEASIBILITY STUDY ON CONSTRUCTION OF EASTERN ARTERIAL ROAD IN MONGOLIA		
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	DEPARTMENT OF ROADS, MINISTRY OF INFRASTRUCTURE, THE GOVERNMENT OF MONGOLIA	
PACIFIC CONSULTANTS INTERNATIONAL JAPAN OVERSEAS CONSULTANTS		
Drawing title	Scale	No.
PLAN AND PROFILE	H=1:10,000 V=1:1,000	B-27


19343000
5294500
19345000
5294000
BM1746
1495.207
1515
1510
1505
1500
1495
1490
1485
1480
STA 183+170
STA 184+000
STA 185+000
STA 186+000
STA 186+170
5293500
19345000
5294000
19342500
N


1515
1510
1505
1500
1495
1490
1485
1480
1475
L= 100m
R=11,700m
STA 184+370
Box 222.5x2.5
L= 100m
R=6,300m
L= 160m
R=11,000m
L= 160m
R=5,100m

| | | |


5294000
19345500
BM46
1500.653
IP_29
1504.761
1496
1530
BM47
1499.28
5293000
19347000
1500
1495
1490
1485
1480
1475
1505
1510
1515
1520
1525
1530
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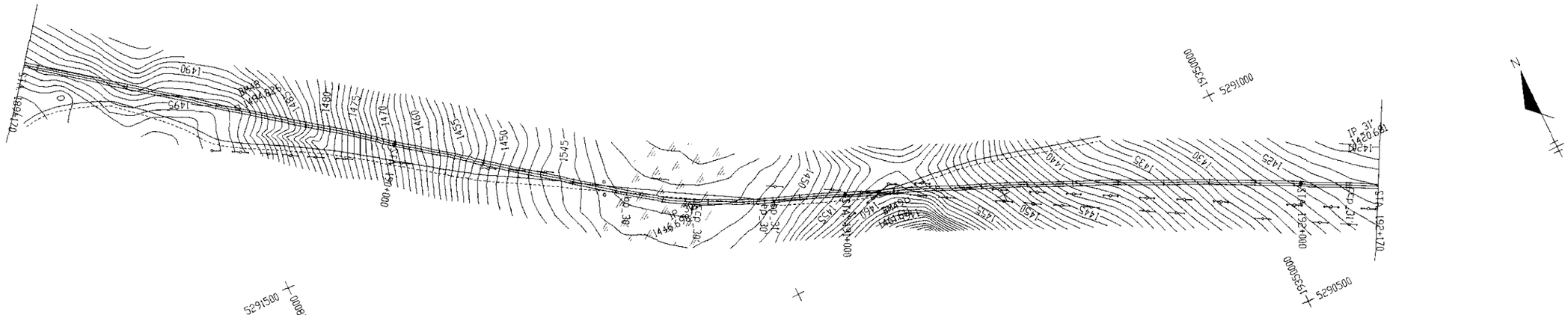
1545
1550
1555
1560
1565
1570
1575
1580
1585
1590
1595
1600
1605
1610
1615
1620
1625
1630
1635
1640
1645
1650
1655
1660
1665
1670
1675
1680
1685
1690
1695
1700


N
5291000
1935000
5290500
1935000
5291500
1934800
STA. 192+170
IP 31'
1420.69
1420.0
STA. 190+000
1446.67
1445.91
1445.30
1445.31
1445.30
1445.31
1445.30
1445.31