

K. BRIDGE

COLOMBO OUTER CIRCULAR HIGHWAY PROJECT

GENERAL NOTES

1. DESIGN CRITERIA

- Geometric Design Standards of Roads (1998), RDA
- Bridge Design Manual (1997), RDA
- Standard Specifications for Construction and Bridges (1998), RDA
- Bridge Construction Manual (1997), RDA
- British Standard BS 5400, BS 5911, BS 8002, BS 8004, BS 8007, BS EN 10025
- Specification of Highway Bridges (Japan Road Association, 1996)
- Design Manuals for Roads and Bridges (British Highway Agency)
- A Design Manual for Small Bridges (Transport and Road Research Laboratory, UK)
- A Guide to Design Loadings for Buried Rigid Pipes (Transport and Road Research Laboratory, UK)

2. LOADS

- Permanent Loads

Reinforced/Prestressed Concrete	: 25.0 kN/m ³
Plain Concrete	: 23.5 kN/m ³
Steel and Cast Steel	: 78.5 kN/m ³
Bituminous Wearing Surfaces	: 23.0 kN/m ³
Bridge Parapet	: 7.60 kN/m
Handrail for one side	: 0.50 kN/m
Compacted Soil	: 19.0 kN/m ³
Loose Soil	: 16.0 kN/m ³
- Live Load : HA Loading, 30 Units HB Loading, HA Single Wheel Loading
- Pedestrian Load : 3.0 kN/m²
- Basic Wind Load : 39.4 m/s
- Temperature Range : 25°C - 31°C
- Seismic Effect : No Consideration
- Vessel Collision Force : River Class III

3. MATERIALS

3-1 CONCRETE

- 1) Unless indicated otherwise, the characteristic cube strength of concrete (f_{cu}) shall be as follows:

Concrete Class	f _{cu} (MPa)	Typical Use
A	50	Cast-in-situ prestressed concrete box girder Precast prestressed concrete girder (PC I-Girder)
B	35	Crossbeam of PC I-Girder. Cast-in-place concrete deck slab, Precast reinforced concrete panel
C	30	Reinforced concrete pier (cantilever pier head, pier column and footing included) Reinforced concrete abutment (wing wall included) Reinforced concrete retaining wall, Box culvert
A'	40	For Kelani River Bridge, Viaduct 4, Ramps 1 & 2 (very severe condition). Crossbeam of PC I-Girder. Cast-in-place concrete deck slab, Precast reinforced concrete panel Reinforced concrete pier (cantilever pier head, pier column and footing included) Reinforced concrete abutment (wing wall included) Reinforced concrete retaining wall, Box culvert Cast-in-situ concrete pile Precast reinforced concrete pile Bridge parapet, Street lighting pole foundation
D-1	30	Cast-in-situ concrete pile
D-2	30	Precast reinforced concrete pile
D-3	30	Bridge parapet, Street lighting pole foundation
E	20	Approach Slab Pipe culvert bedding (Class A) Precast concrete curbs
F	15	Leveling concrete, Lean concrete

- 2) All exposed edges of concrete shall be chamfered 25*25 mm unless otherwise noted.
- 3) All construction joints are to be located as shown on the drawings or as approved by the Engineer.
- 4) Unless otherwise noted, concrete surface finish shall be as specified in the General Specifications.

3-2 REINFORCING BAR

- 1) Steel reinforcement shall be of Grade 460 (yield strength of 460 MPa), Type-2 deformed bar in accordance with Bs 4449:1997. Type deformed bar shall have the required ultimate anchorage bond stress in Table 15 of BS 5400-4:1990.
- 2) Scheduling, dimensioning, bending and cutting of steel reinforcement shall be in accordance with BS 4466:1989.
- 3) Minimum splice length shall be in accordance with BS 5400-4:1990.
- 4) Splices in adjacent bars shall be staggered except where noted on the Drawings. Splices other than those shown on the drawings may only be made with the approval of the Engineer.
- 5) Unless otherwise indicated on the drawings, the minimum cover to any reinforcement shall be as follows:

Bored Pile	: 75 mm
Pile Cap, Footing	: 50 mm
Pile Cap, Footing (bottom)	: 75 mm
Precast Pile, Abutment, Pier, Approach Slab	: 50 mm
Precast PC Girder	: 35 mm
Cast-in-situ Girder	: 40 mm
Retaining Wall, Box Culvert	: 50 mm

3-3. PRESTRESSING CABLE

- 1) Prestressing tendons to be used for the Project are specified as follows:

Utilization	Designation	Equivalent
Longitudinal Strand for PC I-Girder	12S 12.7	D12.7mm
	9S 12.7	D12.7mm
Strand for Cross Beam	1S 21.8	D21.8mm

- 2) Prestressing tendons 12.7mm shall be formed using 7-wire and 21.8mm using 19-wire low relaxation strands conforming to BS 4486 & 5896.
- 3) Properties of prestressing tendons are:
 Characteristic Strength : f_{pu}=1,860 MPa
 Modulus of Elasticity : E = 200,000 MPa
- 4) Jacking force used is 70% of the characteristic strength (f_{pu}).
- 5) Ducts for interval tendons shall be semi-grid galvanized sheathing, unless otherwise noted, and shall be rigidly supported at not greater than 500 mm intervals.
- 6) Tendon profiles are specified to the center of sheathing. Tendons are to be placed to smooth profiles passing through the specified points.
- 7) Anchorages shall be set at right angles to the tendon profiles. Each tendon shall be kept straight for a minimum length of 1,000 mm from anchorage face.
- 8) Grout points shall be provided at all crown points, sag points and anchorages.

3-4. STRUCTURAL STEEL

All structural steel shall conform to the requirements of BS or JRS as follows:

- a. Structural steel --- BS EN 10025, JIS 3106, JIS 3114
- b. High Strength Friction Grip Bolts --- BS 4395, BS 4604, JIS B 1186, JSS II 09-1996

4. WATERPROOFING

- 4-1 All reinforced concrete surfaces in contact with backfill shall be coated with coats of bituminous membrane.
- 4-2 The bridge deck shall be waterproof with parafor solo ponts or similar approved proprietary waterproofing system applied in accordance with manufacture's recommendation.

5. OTHERS

- 5-1 Unless otherwise noted on the Drawings, these notes are applicable to all structure drawings.
- 5-2 All coordinates and levels are given in meters. All dimension are given in millimeters unless otherwise noted on the drawings.
- 5-3 Levels are measured by National Level 1972 system (Sea Level datum at Hon Dau-Do Son).
- 5-4 Coordinates are measured by National Grid HN-72 with meridian of 106° 45'.
- 5-5 Where reference is made to proprietary component names, the Contractor may propose alternatives provided that they are equivalent and satisfy the requirements of the Specifications and Design Criteria.

6. CONSTRUCTION

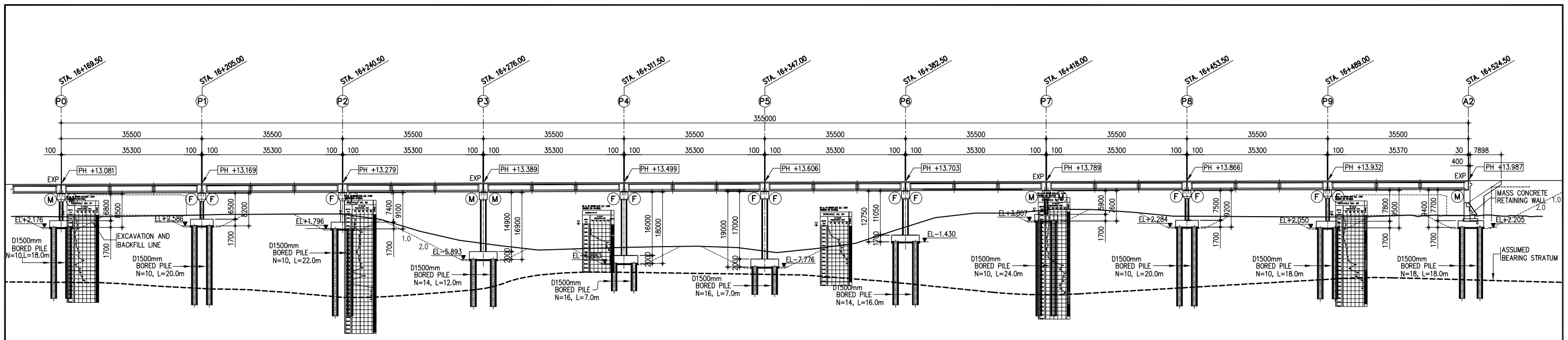
6-1 BORED PILING WORKS

- 1) The dimension and minimum length of bored piles shall be as shown on the plans. Bottom of bored piles shall be embedded at least two (2) pile diameter into the bearing stratum and shall be approved by the engineer.
- 2) Suitable pile boring equipment shall be used to properly drill into the bearing stratum.
- 3) Bentonite slurry or other form of slurry to be used shall be able to properly hold in place the vertical soil surface in contact with the cast-in-place reinforced concrete shaft.
- 4) Shaft concreting shall be carried out using tremie pipe that will reach the bottom of the shaft. The tremie pipe shall always be embedded into the fresh concrete at least 2.0m as it goes up displacing the slurry.
- 5) For the pile terminating depth, bearing stratum shall be confirmed and approved by the engineer before the piling work.

- 6-2 Spread footings shall be as shown on the plans embedded into the bearing stratum with a minimum allowable bearing capacity (serviceability limit state) of 450kPa. Footing bottom shall be at least 1.00m below the bearing stratum. If actual footing levels change the height of the substructure, piers/abutments shall be redesigned.

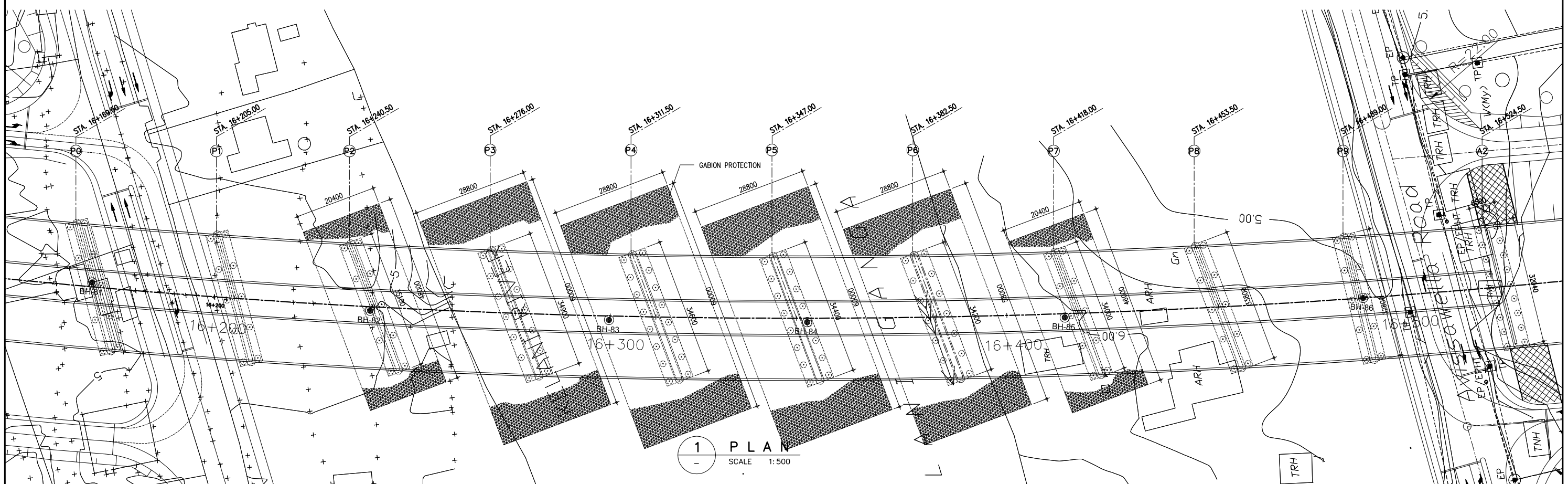
7. FUTURE EXPANSION

- For future expansion the inner portion of the slab (500mm wide) shall be chipped off to expose slab reinforcement for the required lap splice with the new rebars. All existing slab rebars shall be carefully straightened-up without damaging the rebars.
- Prestressing steel wires for the diaphragms shall be connected by mechanical devices(coupler). Provisions of these couplers shall be anticipated at the sides of the exterior girders (inner portion only). These connection points by couplers shall be protected against corrosion as per requirement of prestressing supplier.



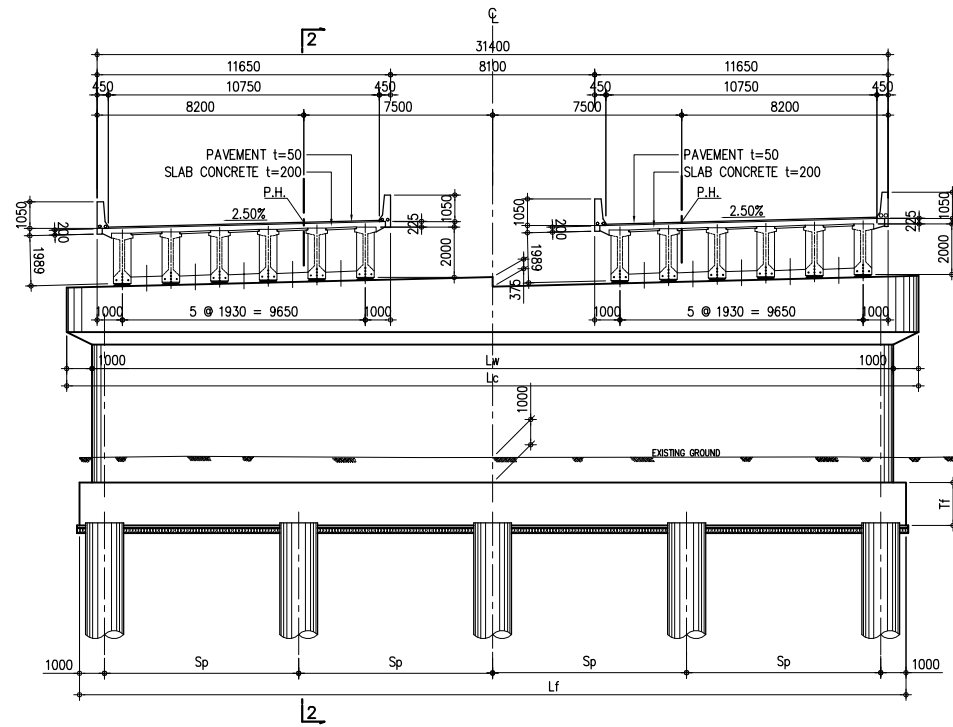
2 PROFILE
SCALE 1:500

GRADE															
FINISHED ROAD LEVELS	13.091	13.153	13.215	13.277	13.339	13.401	13.463	13.525	13.587	13.649	13.711	13.773	13.835	13.897	13.959
EXISTING GROUND LEVELS	4.911	5.271	5.511	5.981	6.241	6.389	6.463	6.659	6.889	7.139	7.377	7.615	7.853	8.091	8.329
STATION (km)	16180	16200	16220	16240	16260	16280	16300	16320	16340	16360	16380	16400	16420	16440	16460
CURVE BAND	R=2000 L=991.683 m														
SUPERELEVATION	+2.5 % -2.5 %														

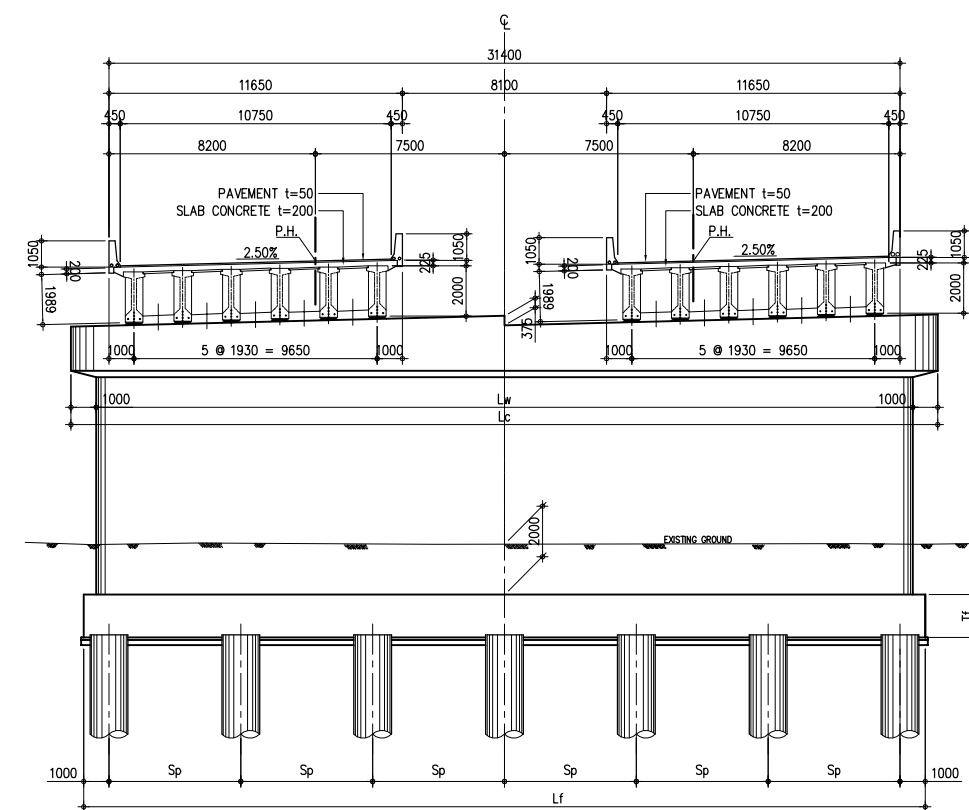


1 PLAN
SCALE 1:500

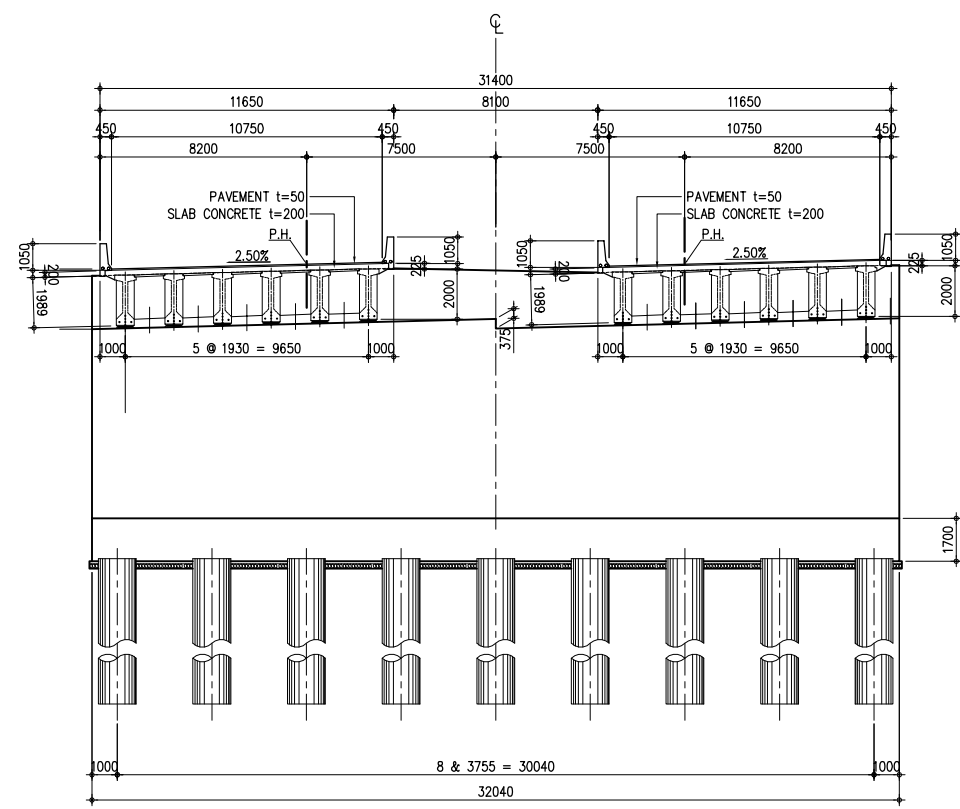
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF HIGHWAYS & ROAD DEVELOPMENT Road Development Authority	JICA JAPAN INTERNATIONAL COOPERATION AGENCY ORIENTAL CONSULTANTS COMPANY LIMITED in association with PACIFIC CONSULTANTS INTERNATIONAL		No	REVISION	DATE	COLOMBO OUTER CIRCULAR HIGHWAY PROJECT (NORTHERN SECTION 1) HIGHWAY BRIDGE NO.9 (H9) - KELANI RIVER CROSSING BRIDGE GENERAL VIEW - STA. 16+169.50-STA. 16+524.50	DESIGNED BY: CHECKED BY: APPROVED BY: DWG. NO. K01-00-A



2 TYPICAL CROSS SECTION OF PIER P0, P1, P2, P7, P8, & P9
SCALE 1:100



3 TYPICAL CROSS SECTION OF PIER P3, P4, P5 & P6
SCALE 1:100



1 CROSS SECTION OF ABUTMENT A2
SCALE 1:100

TABLE FOR P.H	
PIER NO.	P.H
P0	13.081
P1	13.169
P2	13.279
P3	13.389
P4	13.499
P5	13.606
P6	13.703
P7	13.789
P8	13.866
P9	13.932
ABUT-A2	13.987



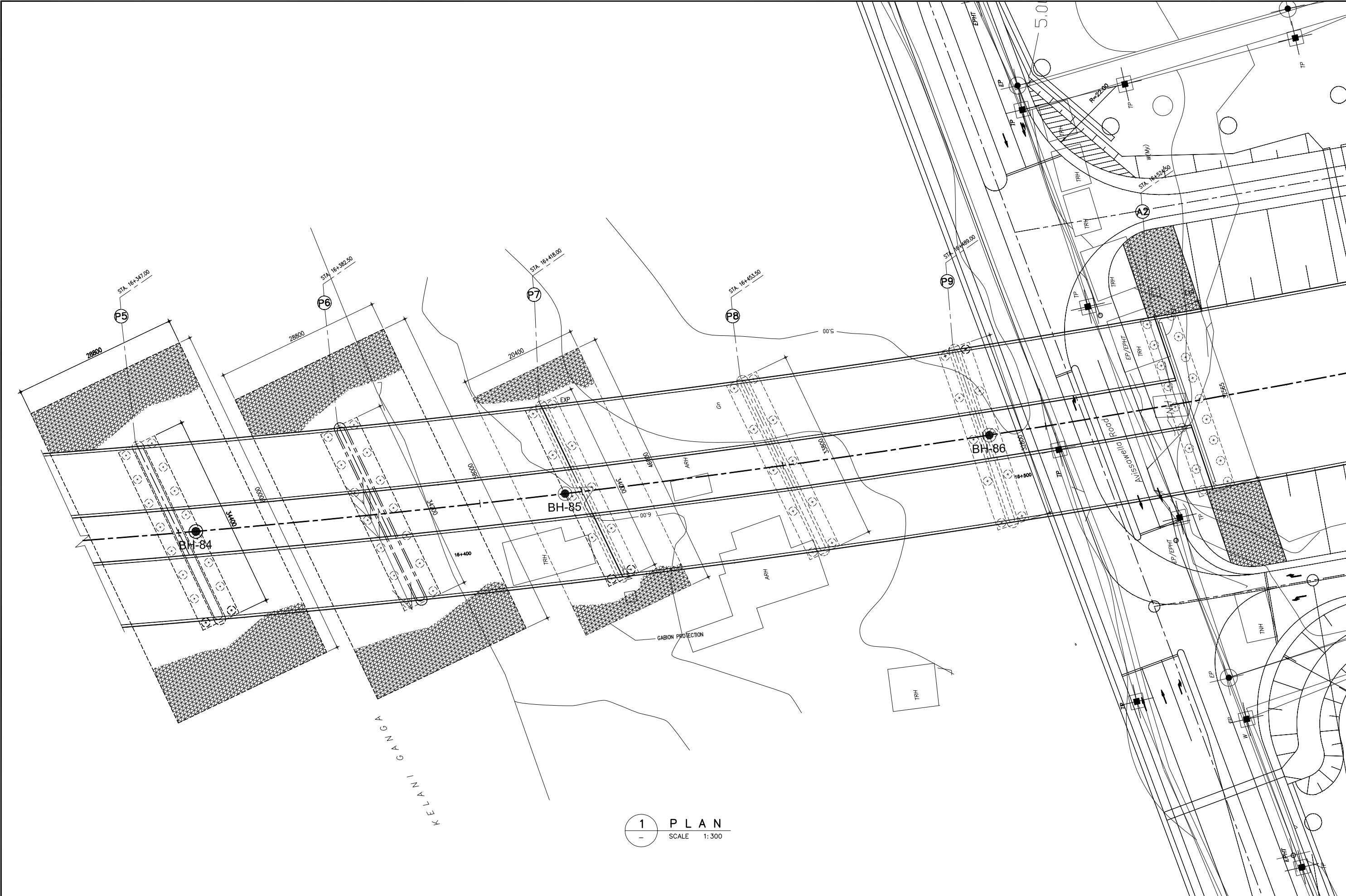
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
 MINISTRY OF HIGHWAYS & ROAD DEVELOPMENT
Road Development Authority

JICA JAPAN INTERNATIONAL COOPERATION AGENCY
ORICON **ORIENTAL CONSULTANTS COMPANY LIMITED**
 in association with
PACIFIC CONSULTANTS INTERNATIONAL

No	REVISION	DATE

COLOMBO OUTER CIRCULAR HIGHWAY PROJECT
 (NORTHERN SECTION 1)
 HIGHWAY BRIDGE NO.9 (H9) - KELANI RIVER CROSSING BRIDGE
 GENERAL VIEW - STA. 16+169.50 - STA. 16+524.50

DESIGNED BY:	
CHECKED BY:	
APPROVED BY:	
DWG. NO.	K01-00-C



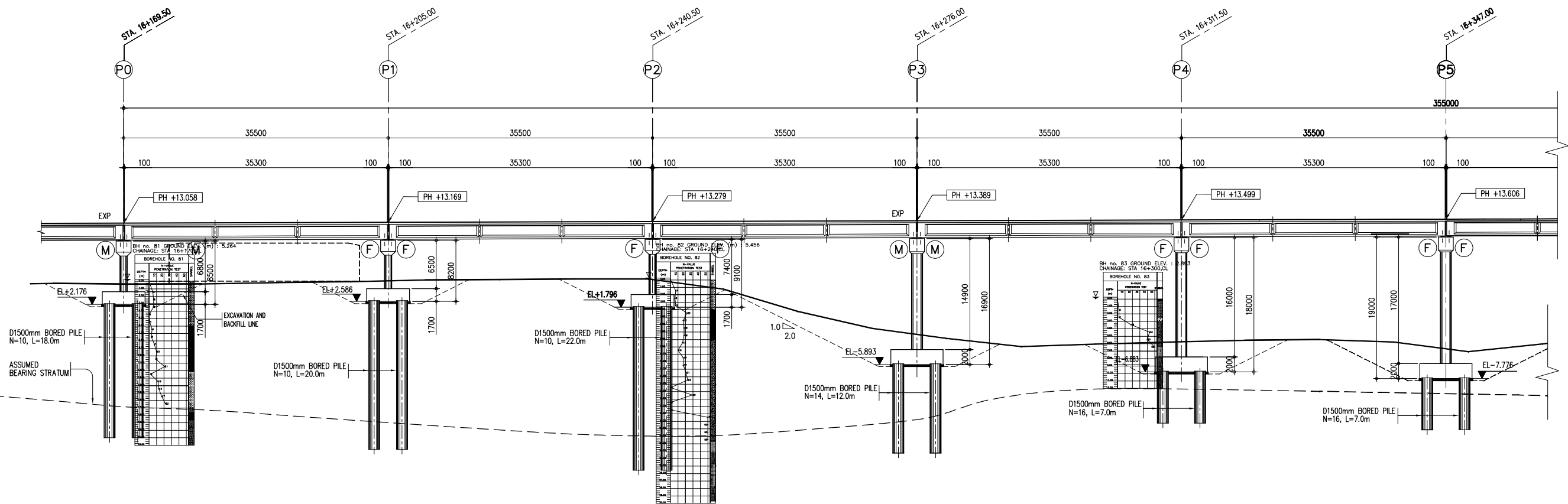
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
 MINISTRY OF HIGHWAYS & ROAD DEVELOPMENT
Road Development Authority

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No	REVISION	DATE

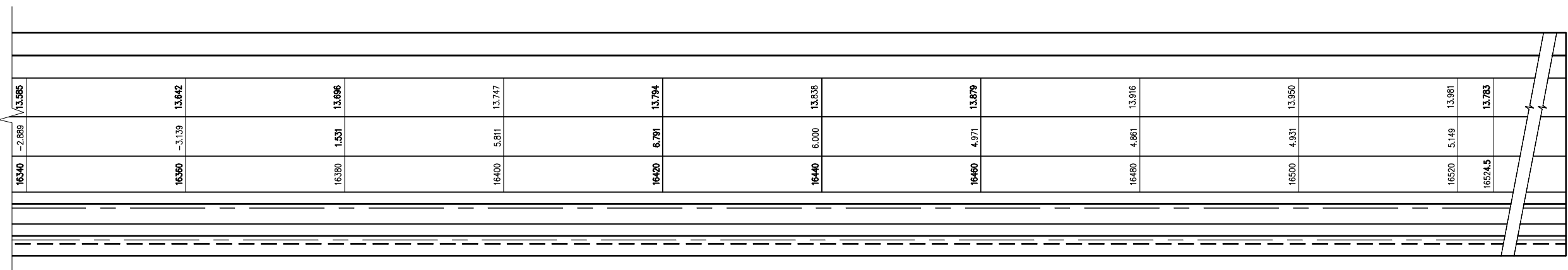
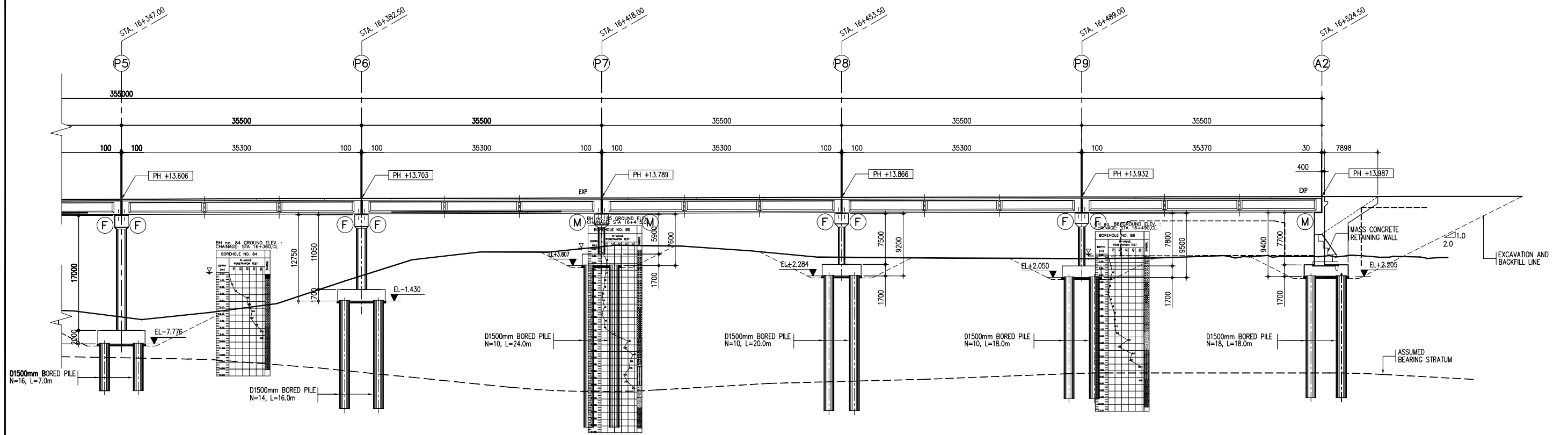
COLOMBO OUTER CIRCULAR HIGHWAY PROJECT
 (NORTHERN SECTION 1)
 HIGHWAY BRIDGE NO.9 (H9) - KELANI RIVER CROSSING BRIDGE
 GENERAL VIEW - STA. 16+169.50 - STA. 16+524.50

DESIGNED BY:	
CHECKED BY:	
APPROVED BY:	
DWG. NO.	K01-00-D



GRADE	0.310% L=1,200m										
FINISHED ROAD LEVELS	13.091	13.153	13.215	13.277	13.339	13.401	13.463	13.525	13.585	13.642	
EXISTING GROUND LEVELS	4.911	5.221	5.511	5.581	1.241	-2.389	-3.159	-2.659	-2.889	-3.139	
STATION (km)	16180	16200	16220	16240	16260	16280	16300	16320	16340	16360	
CURVE BAND	R=2000 L=991.683 m.										
SUPERELEVATION	+2.5 % -2.5 %										

1 PROFILE
SCALE 1:300

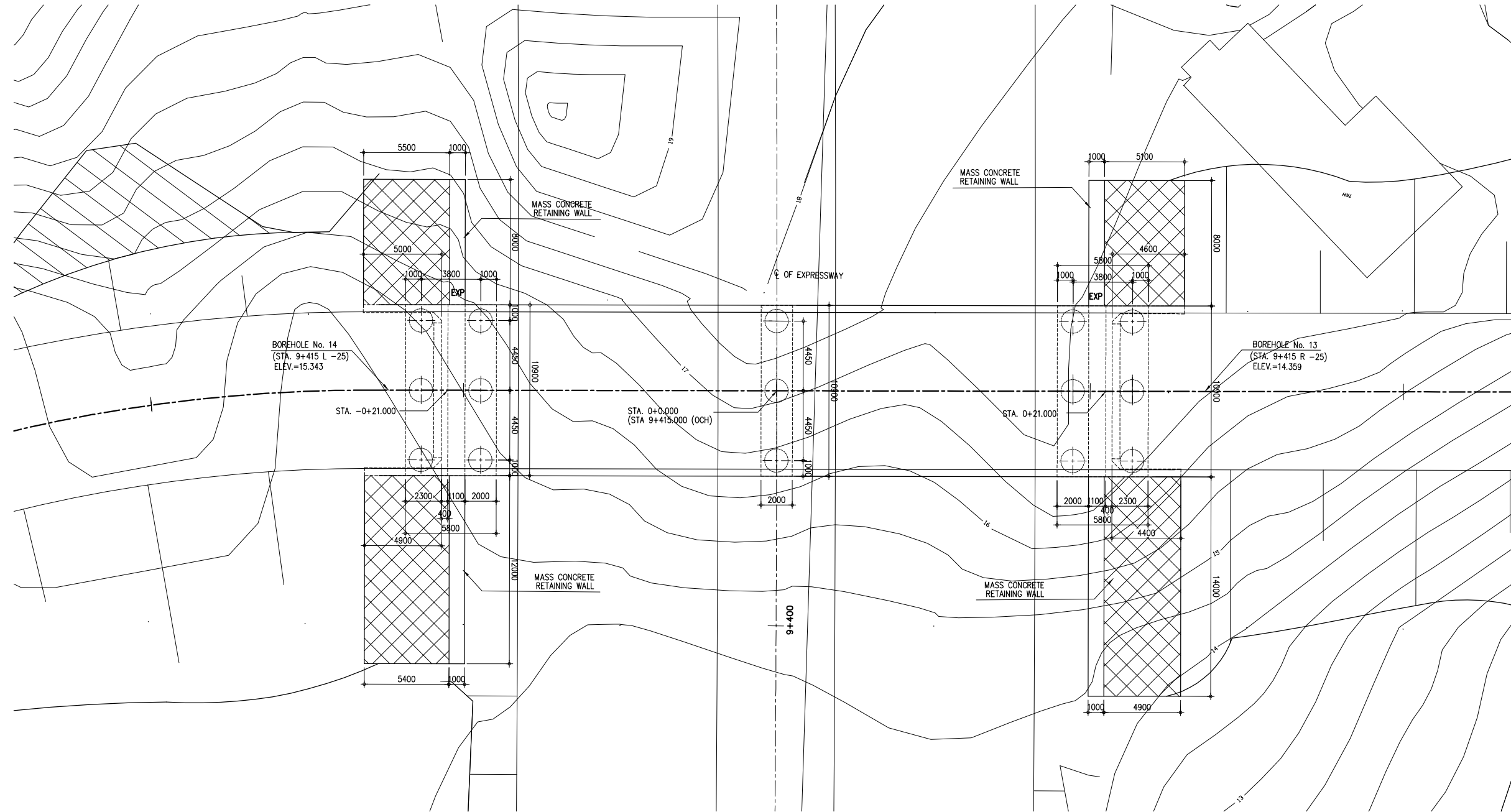


1 PROFILE
SCALE 1:300

No	REVISION	DATE

OVERPASS BRIDGE NO. 8 - GENERAL VIEW (1)

(STA. 9+415.00)

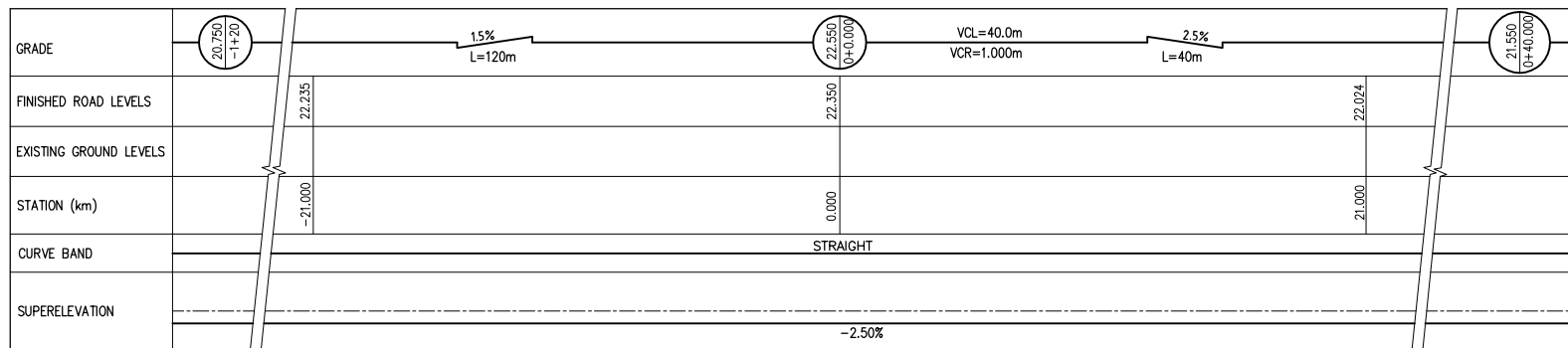
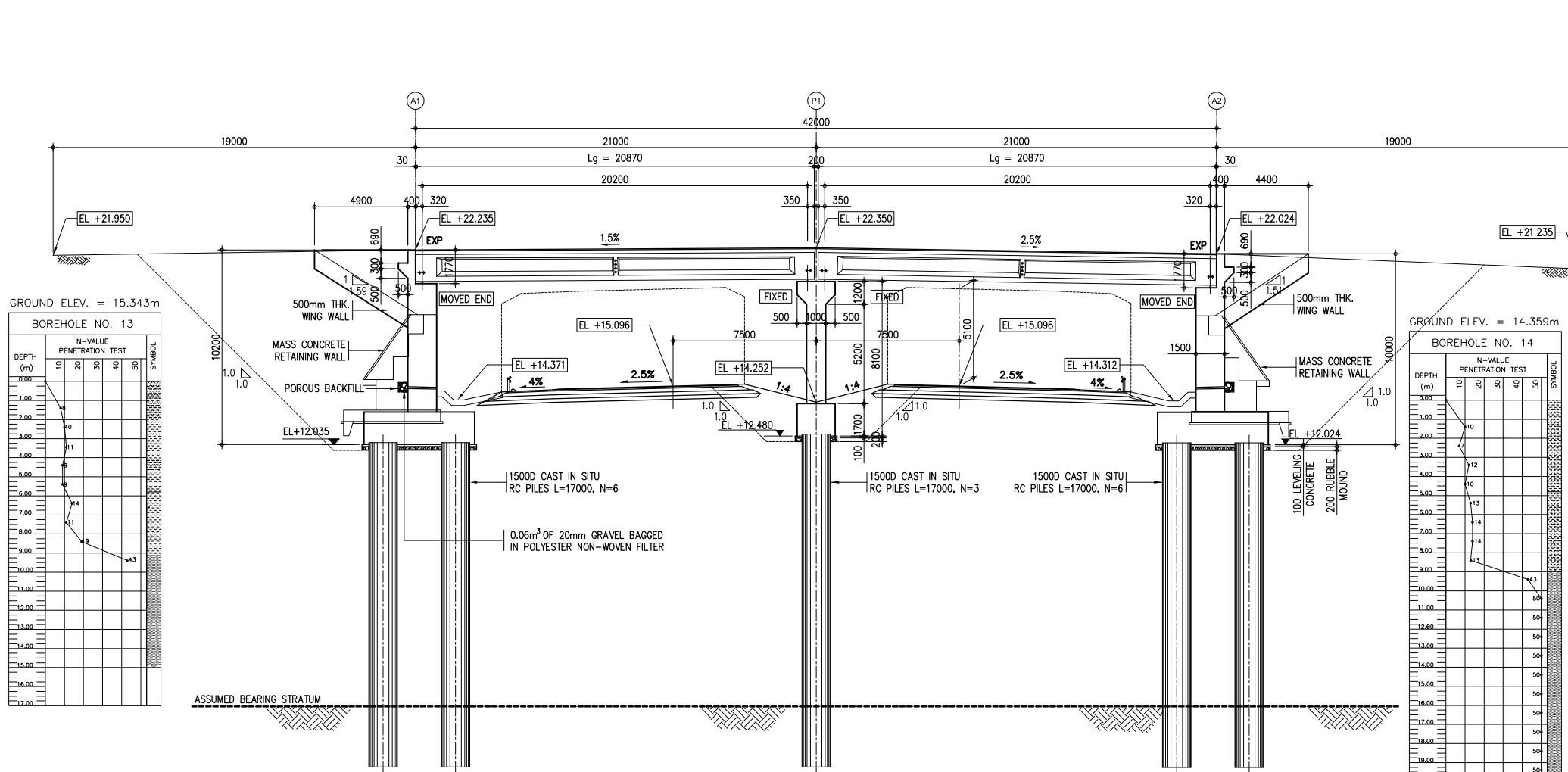


1 PLAN
SCALE 1:150

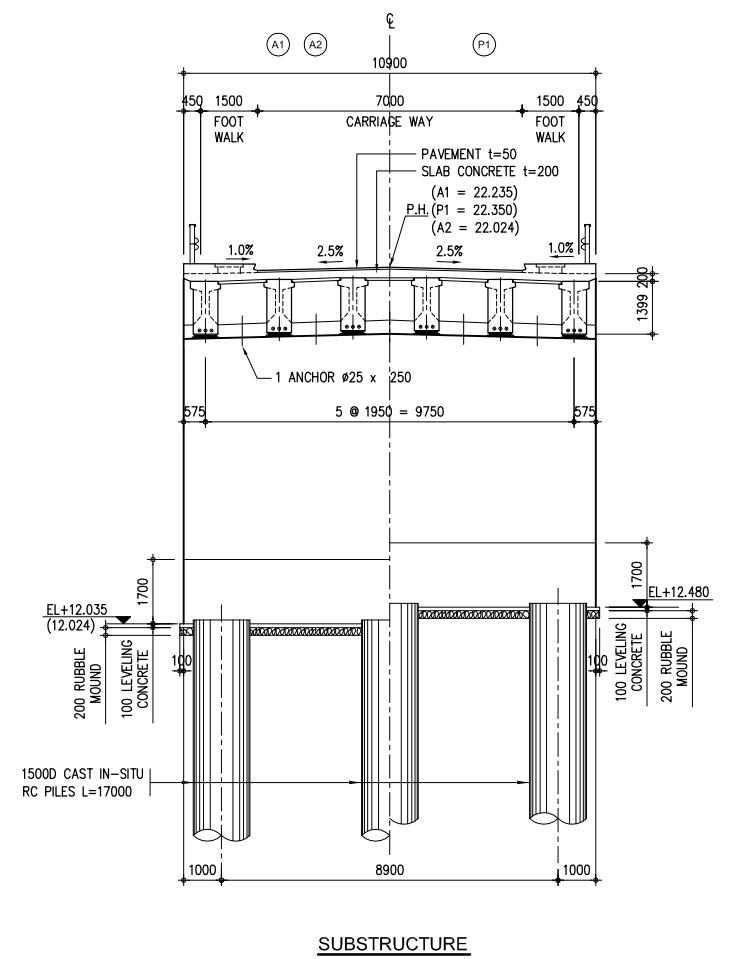
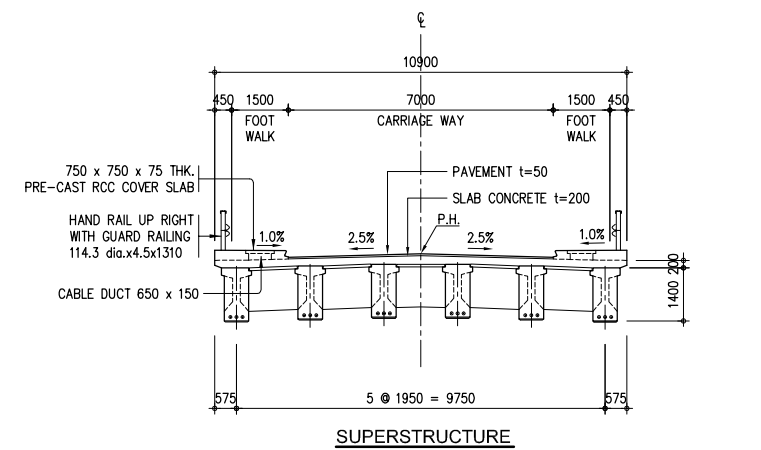
No	REVISION	DATE

OVERPASS BRIDGE NO. 8 - GENERAL VIEW (2)

(STA. 9+415.00)



2 PROFILE
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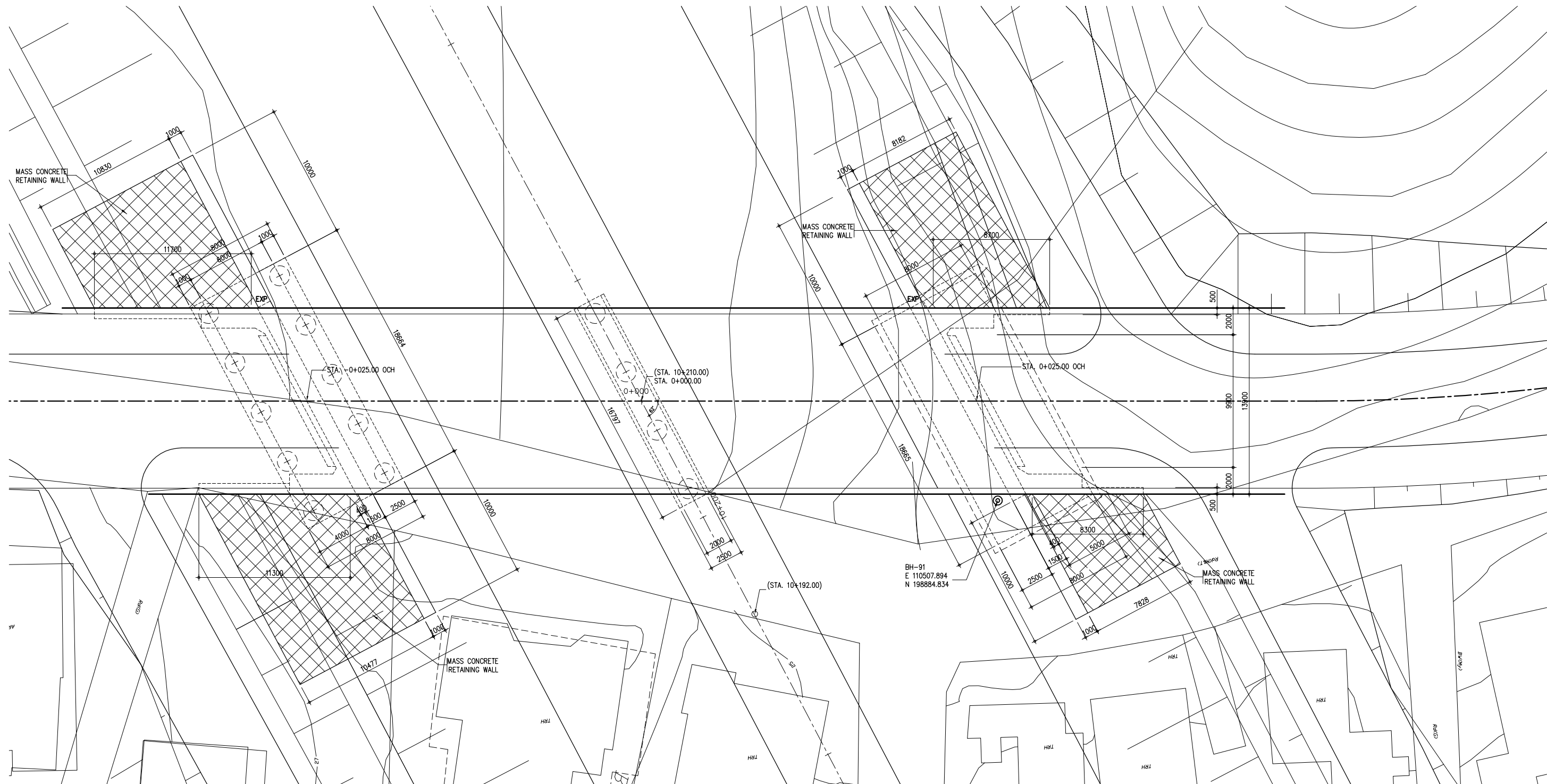


3 CROSS SECTION
SCALE 1:100

- NOTES :**
1. ALL DIMENSIONS ARE IN MILLIMETERS.
 2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE OTHER RELEVANT DRAWINGS.

OVERPASS BRIDGE NO. 9 - GENERAL VIEW (1)

(STA. 10+210.00)



2 PROFILE
SCALE 1:150

- NOTES :
1. ALL DIMENSIONS ARE IN MILLIMETERS.
 2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE OTHER RELEVANT DRAWINGS.

THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF HIGHWAYS & ROAD DEVELOPMENT



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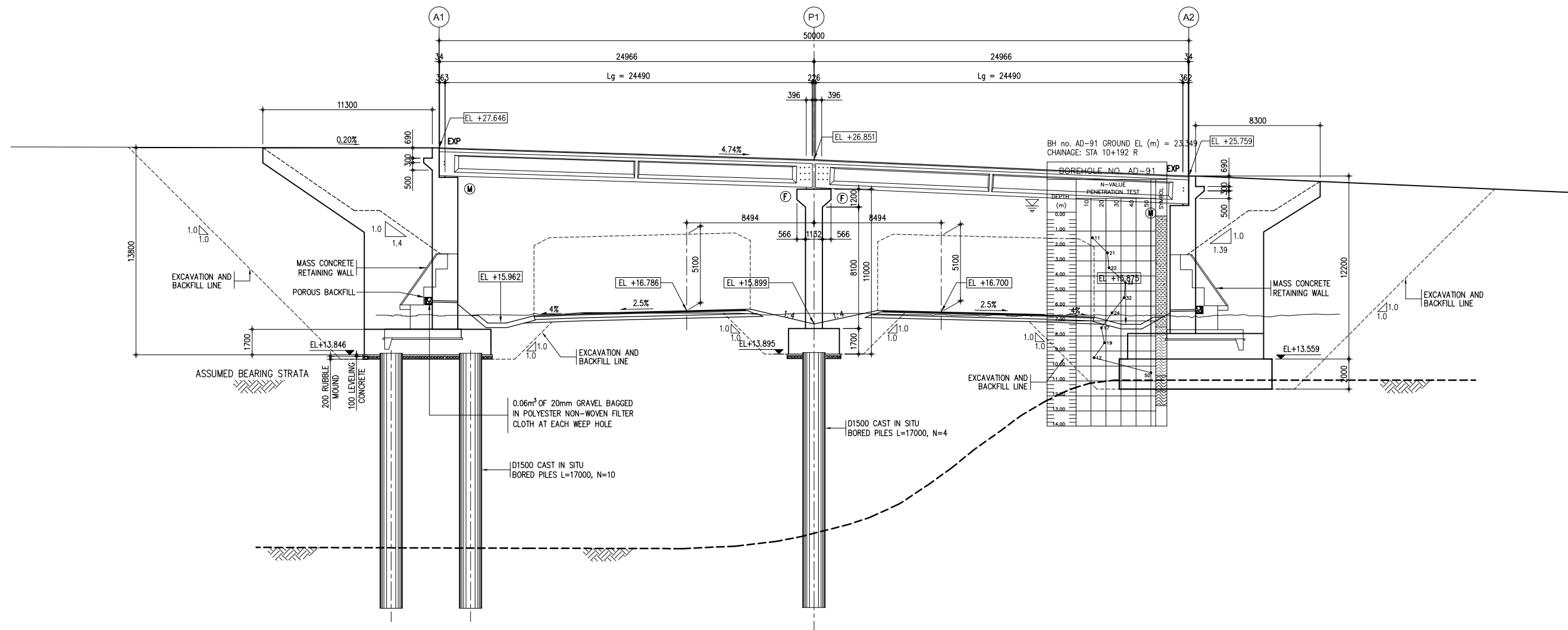
COLOMBO OUTER CIRCULAR HIGHWAY PROJECT
(NORTHERN SECTION 1)

OVERPASS BRIDGE NO. 9 - GENERAL VIEW (1)
STA. 10+210.000

DESIGNED BY:	
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DWG. NO.	K03-00-A

OVERPASS BRIDGE NO. 9 - GENERAL VIEW (2)

(STA. 10+210.000)



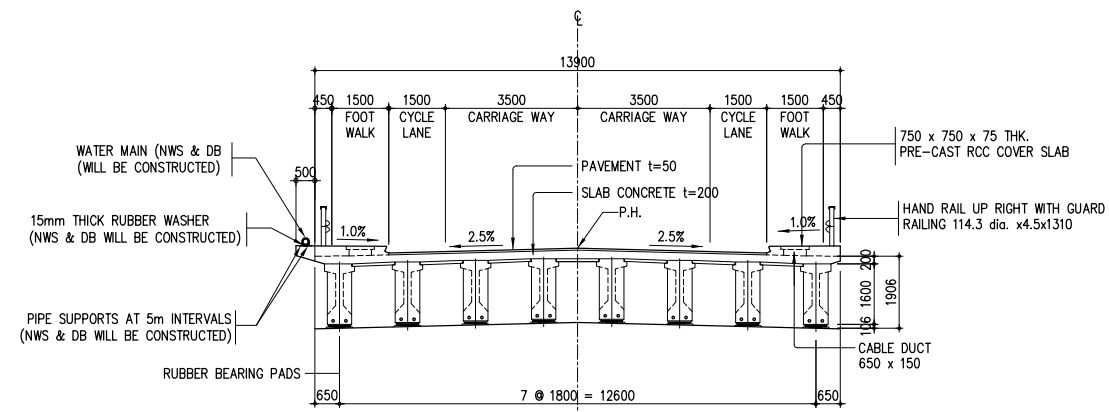
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FINISHED ROAD LEVELS		27.646	26.851	25.759
EXISTING GROUND LEVELS				
STATION (km)		-25.000	0.000	25.000
CURVE BAND		STRAIGHT		
SUPERELEVATION		-2.50%		

2 PROFILE
SCALE 1:150

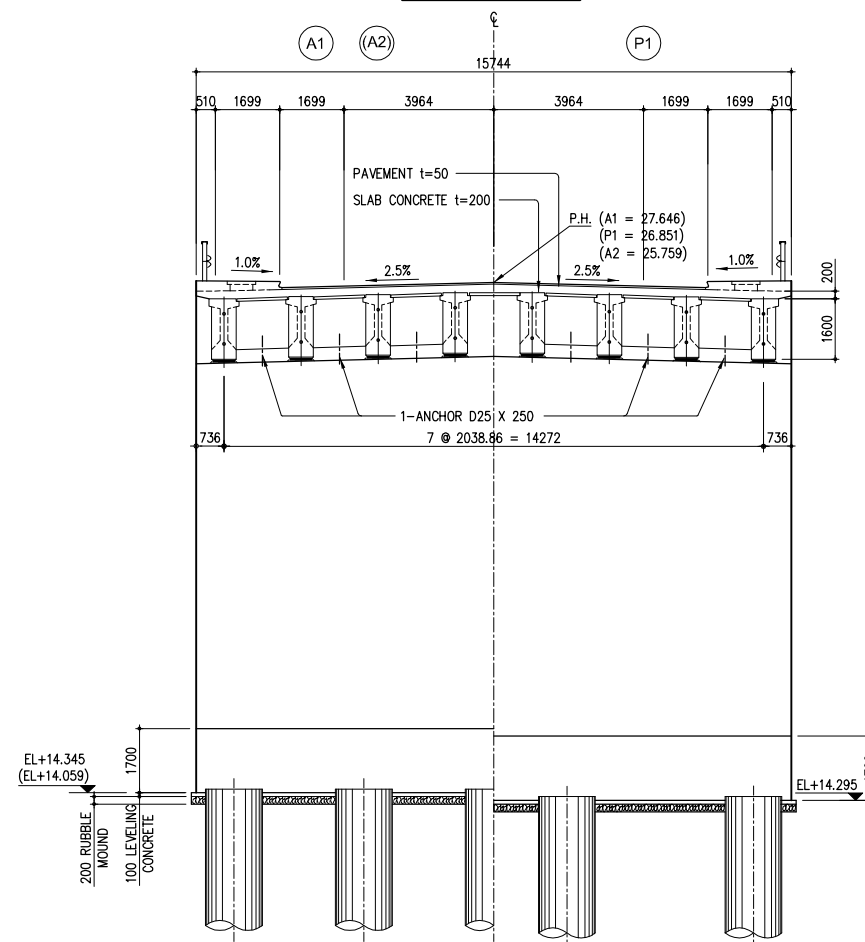
- NOTES :
1. ALL DIMENSIONS ARE IN MILLIMETERS.
 2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE OTHER RELEVANT DRAWINGS.

OVERPASS BRIDGE NO. 9 - GENERAL VIEW (3)

(STA. 10+210.000)



SUPERSTRUCTURE



SUBSTRUCTURE

3 CROSS SECTION
SCALE 1:100

- NOTES :
1. ALL DIMENSIONS ARE IN MILLIMETERS.
 2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE OTHER RELEVANT DRAWINGS.

No	REVISION	DATE

DESIGNED BY:	
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APPROVED BY:	
DWG. NO.	K03-00-C

OVERPASS BRIDGE NO. 10 - GENERAL VIEW (1)

(STA. 11+261.000)



1 PLAN
SCALE 1:150

NOTES :

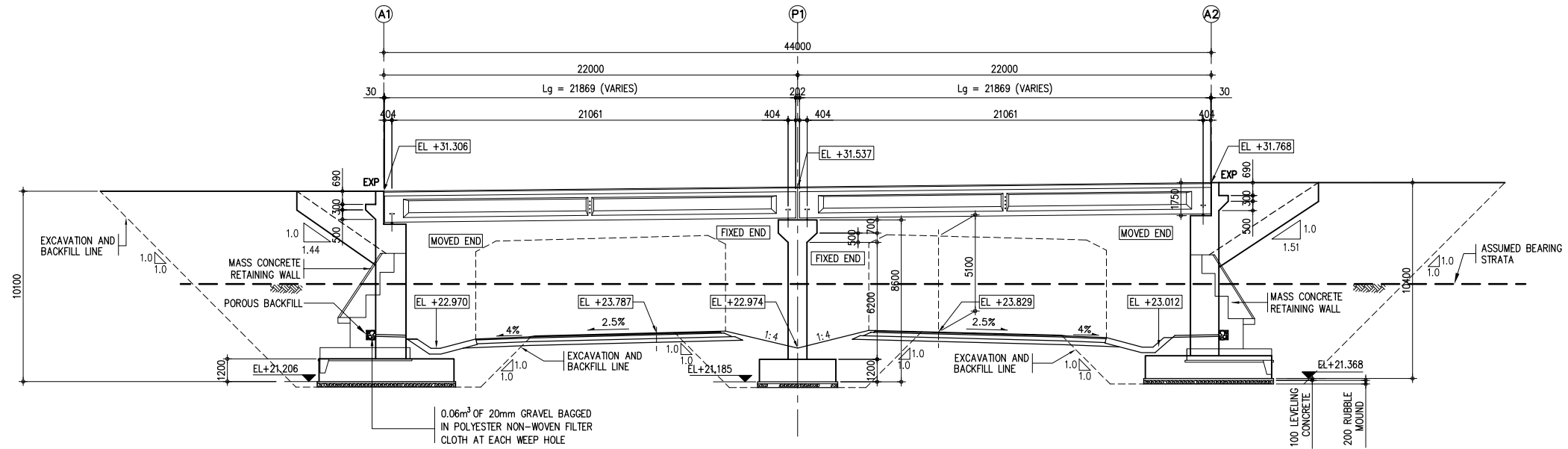
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2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE OTHER RELEVANT DRAWINGS.

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APPROVED BY:	
DWG. NO.	K04-00-A

OVERPASS BRIDGE NO. 10 - GENERAL VIEW (2)

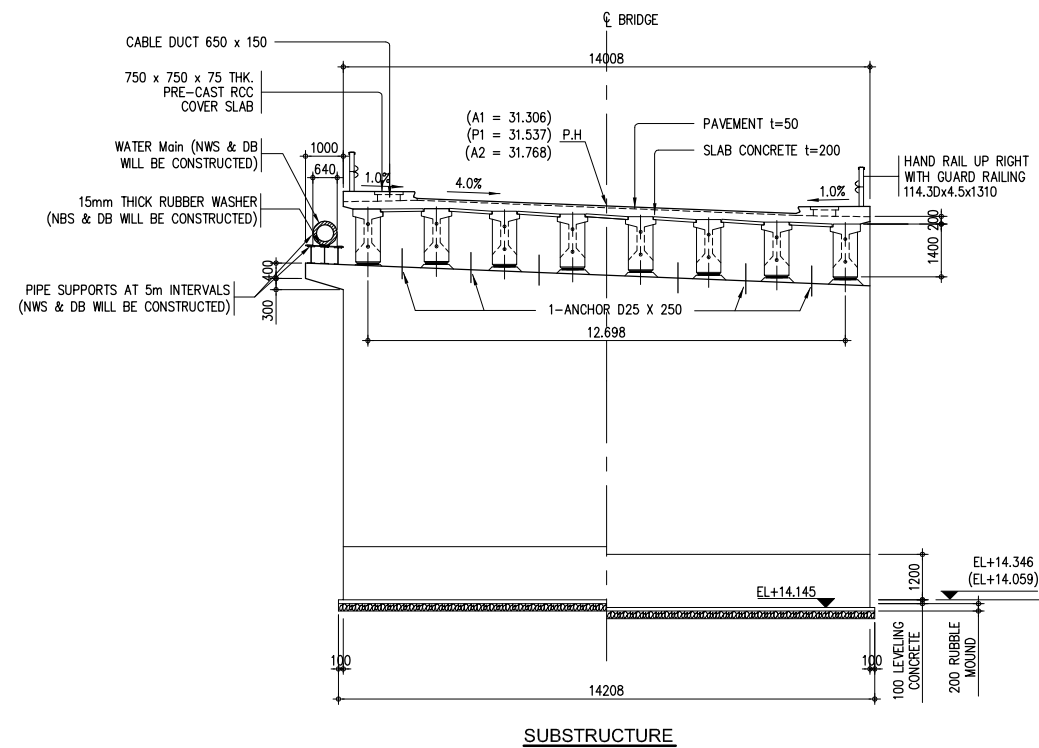
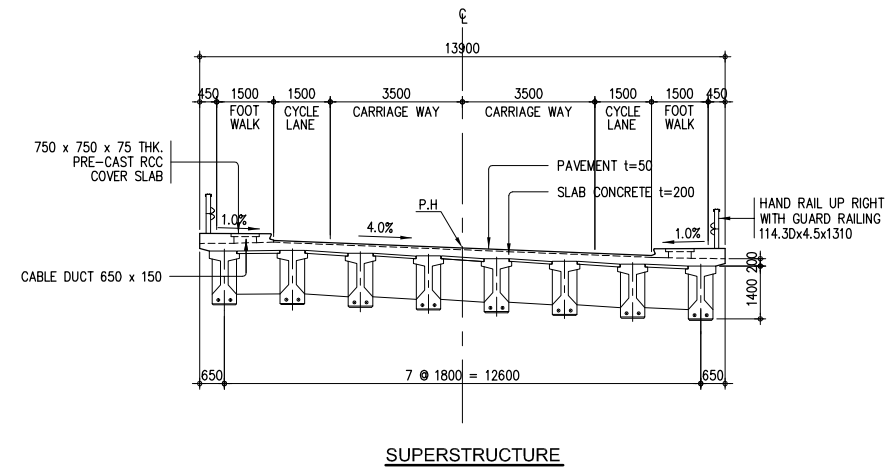
(STA. 11+261.000)



2 PROFILE
SCALE 1:150

OVERPASS BRIDGE NO. 10 - GENERAL VIEW (3)

(STA. 11+261.000)



3 CROSS SECTION
SCALE 1:100

NOTES :

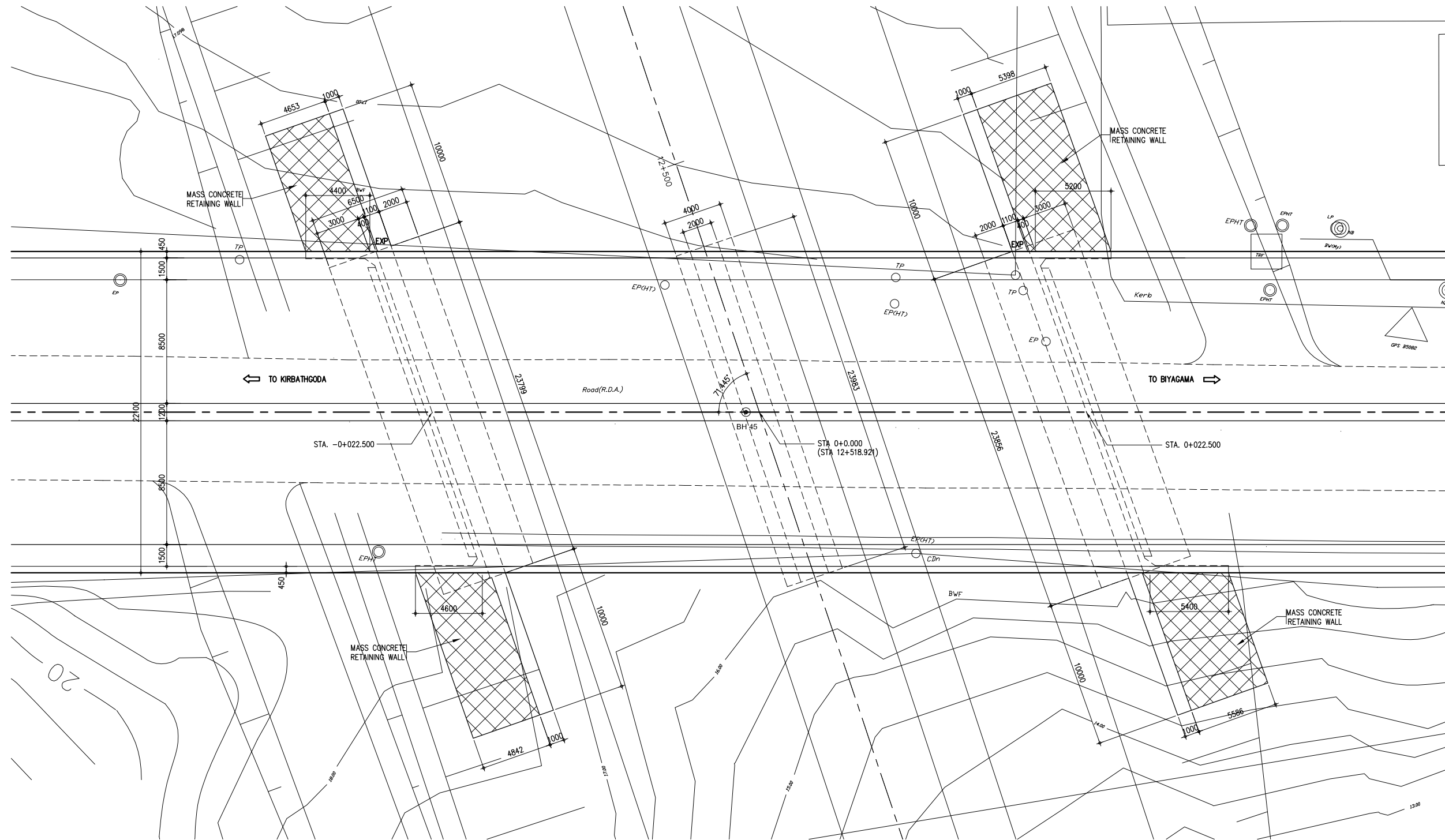
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2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE OTHER RELEVANT DRAWINGS.

No	REVISION	DATE

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APPROVED BY:	
DWG. NO.	K04-00-C

OVERPASS BRIDGE NO. 11 - GENERAL VIEW (1)

(STA. 12+518.921)



1 PLAN
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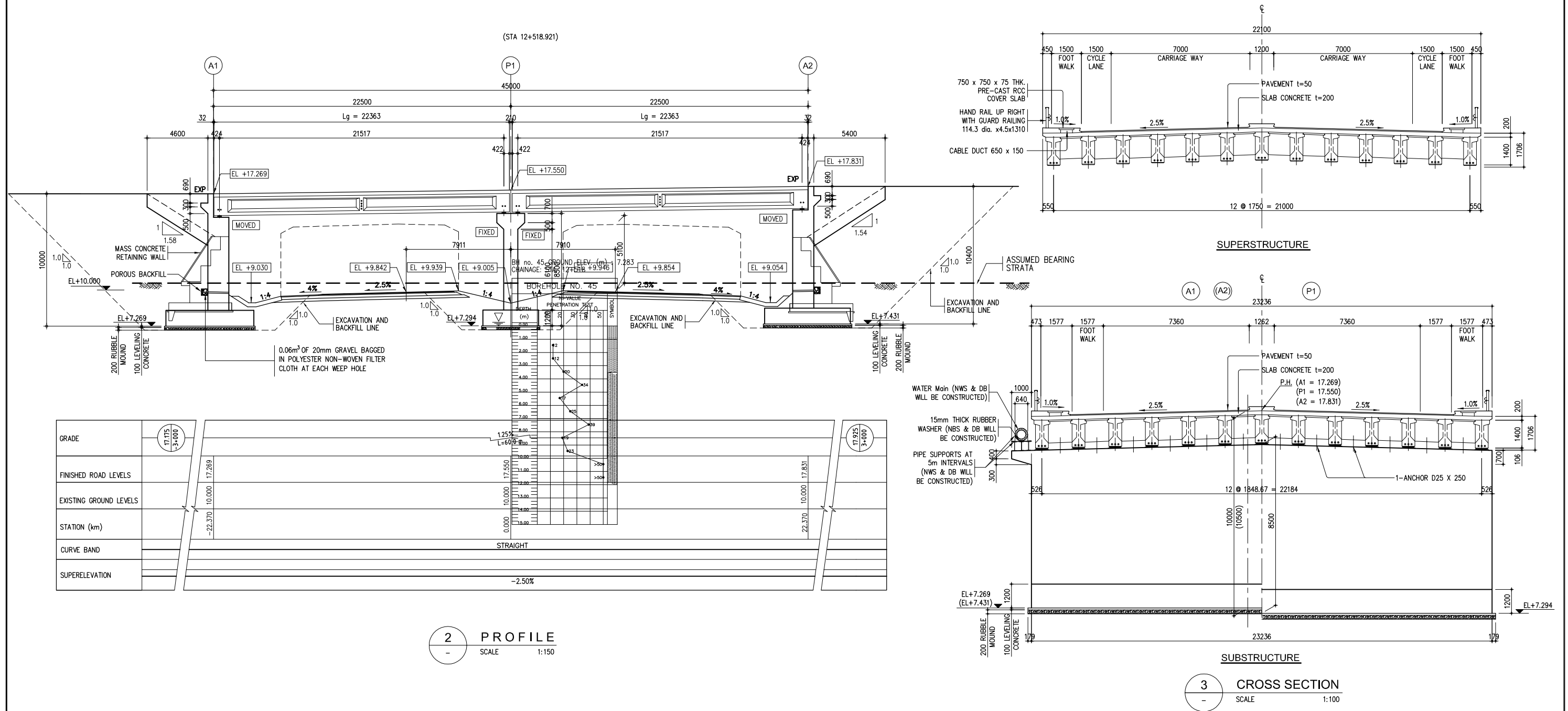
- NOTES :
1. ALL DIMENSIONS ARE IN MILLIMETERS.
 2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE OTHER RELEVANT DRAWINGS.

No	REVISION	DATE

DESIGNED BY:	
CHECKED BY:	
APPROVED BY:	
DWG. NO.	K05-00-A

OVERPASS BRIDGE NO. 11 - GENERAL VIEW (2)

(STA. 12+518.921)

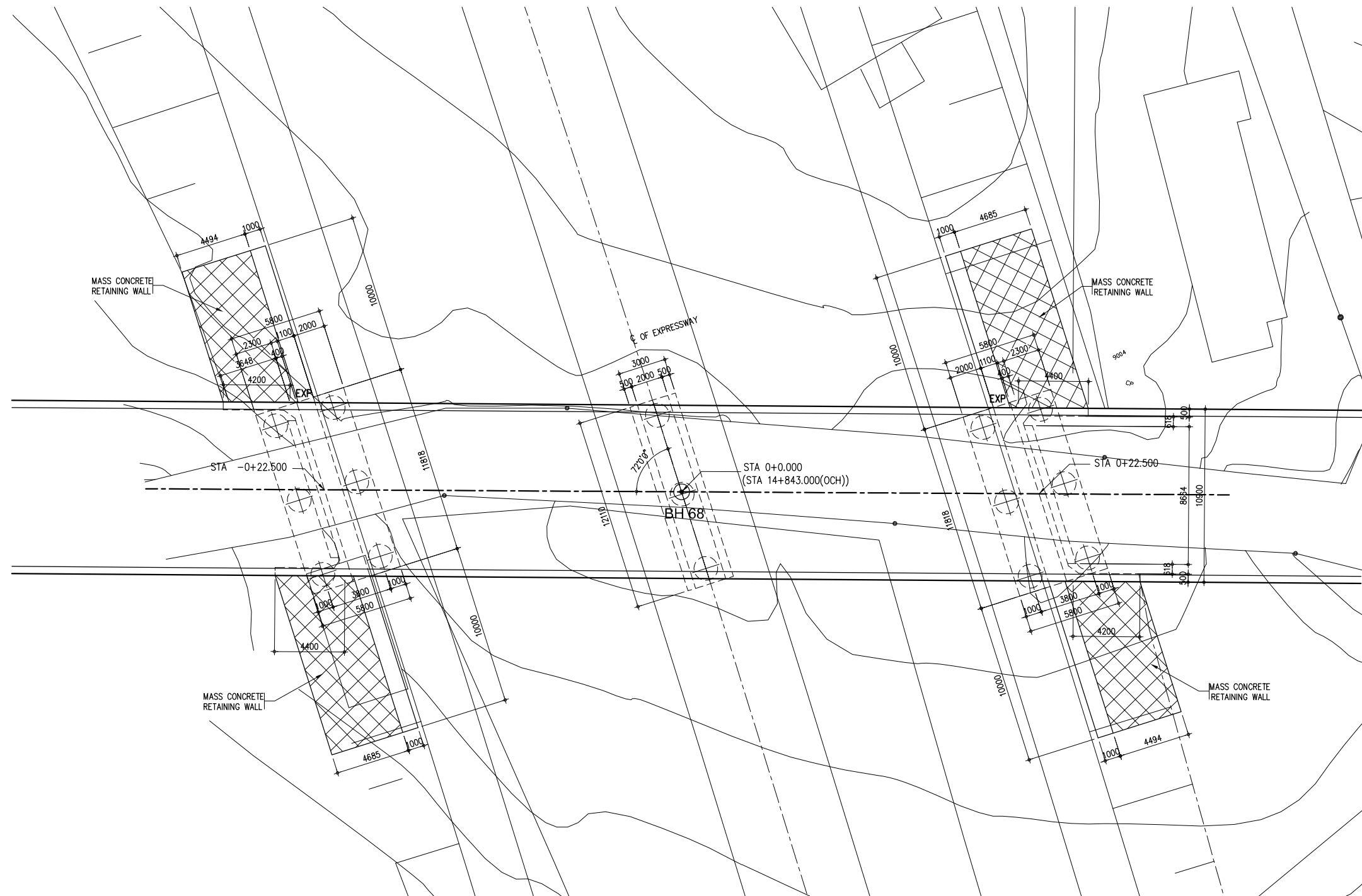


NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE OTHER RELEVANT DRAWINGS.

OVERPASS BRIDGE NO. 12 - GENERAL VIEW (1)

(STA. 14+843.00)



1 PLAN
SCALE 1:150

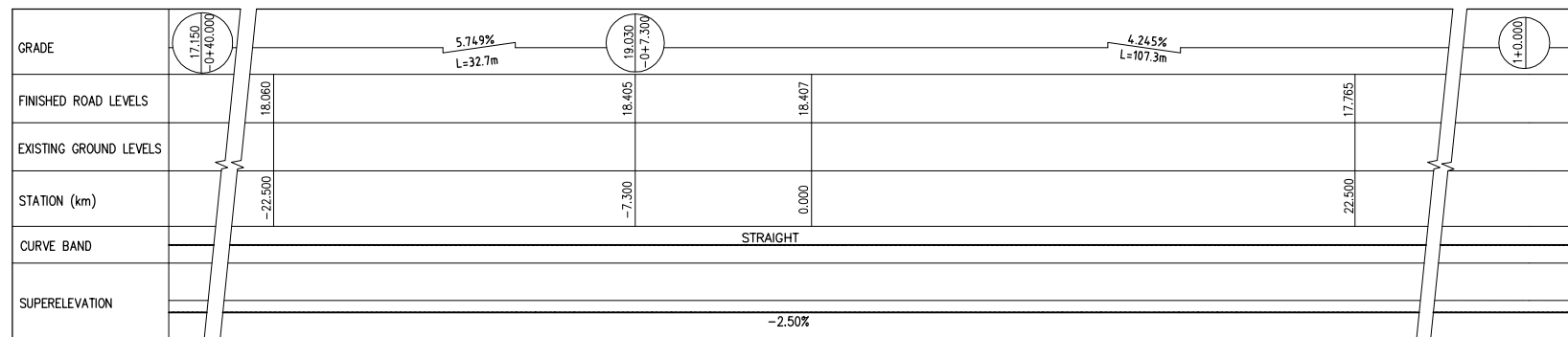
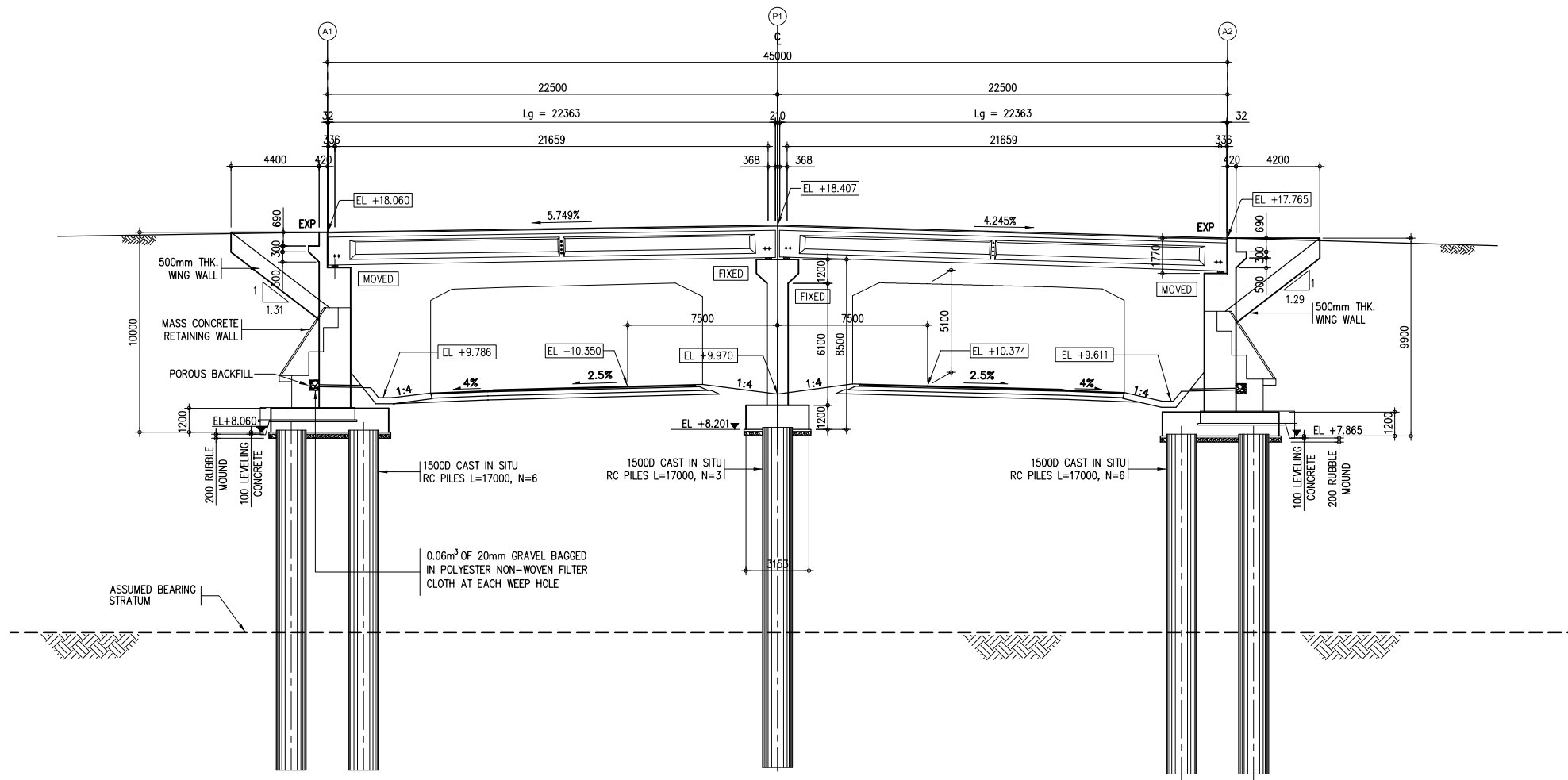
- NOTES :**
1. ALL DIMENSIONS ARE IN MILLIMETERS.
 2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE OTHER RELEVANT DRAWINGS.

No	REVISION	DATE

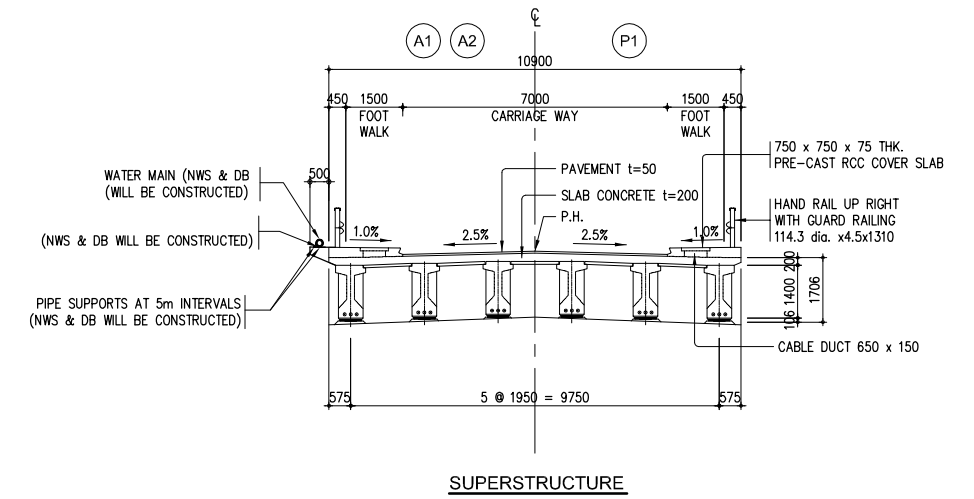
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APPROVED BY:	
DWG. NO.	K06-00-A

OVERPASS BRIDGE NO. 12 - GENERAL VIEW (2)

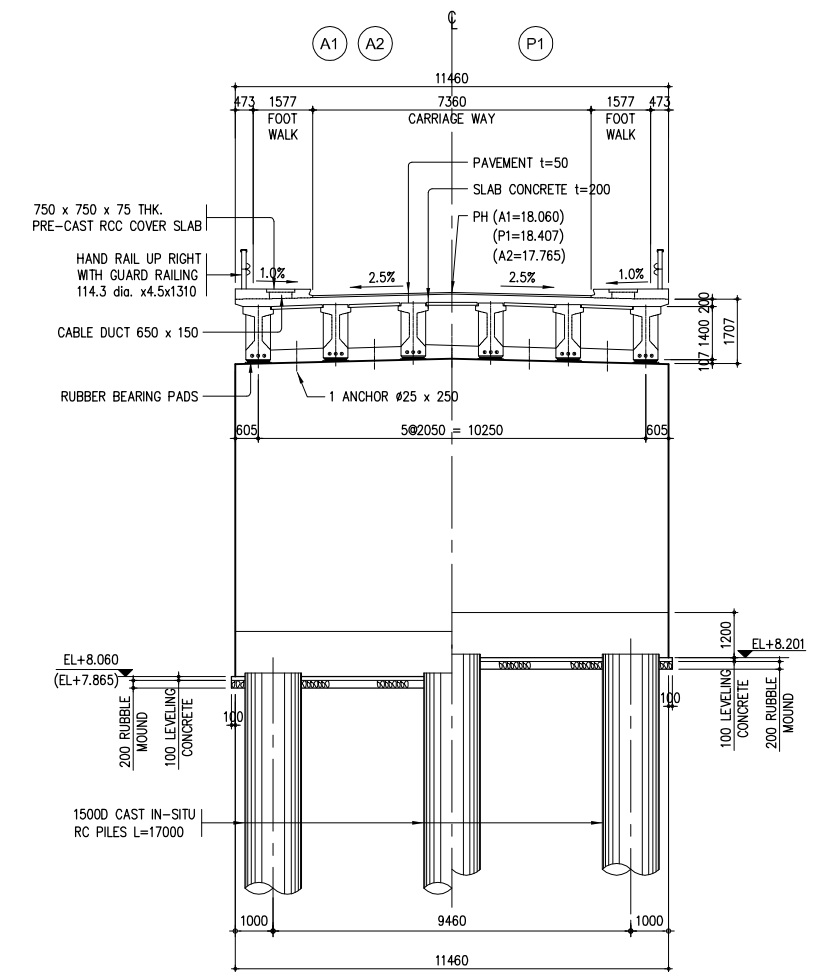
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2 PROFILE
SCALE 1:150



SUPERSTRUCTURE



SUBSTRUCTURE

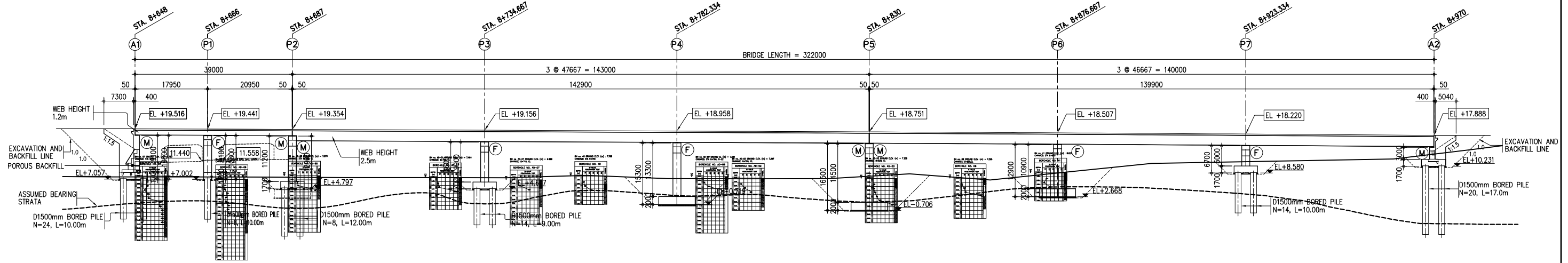
3 CROSS SECTION
SCALE 1:200

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE OTHER RELEVANT DRAWINGS.

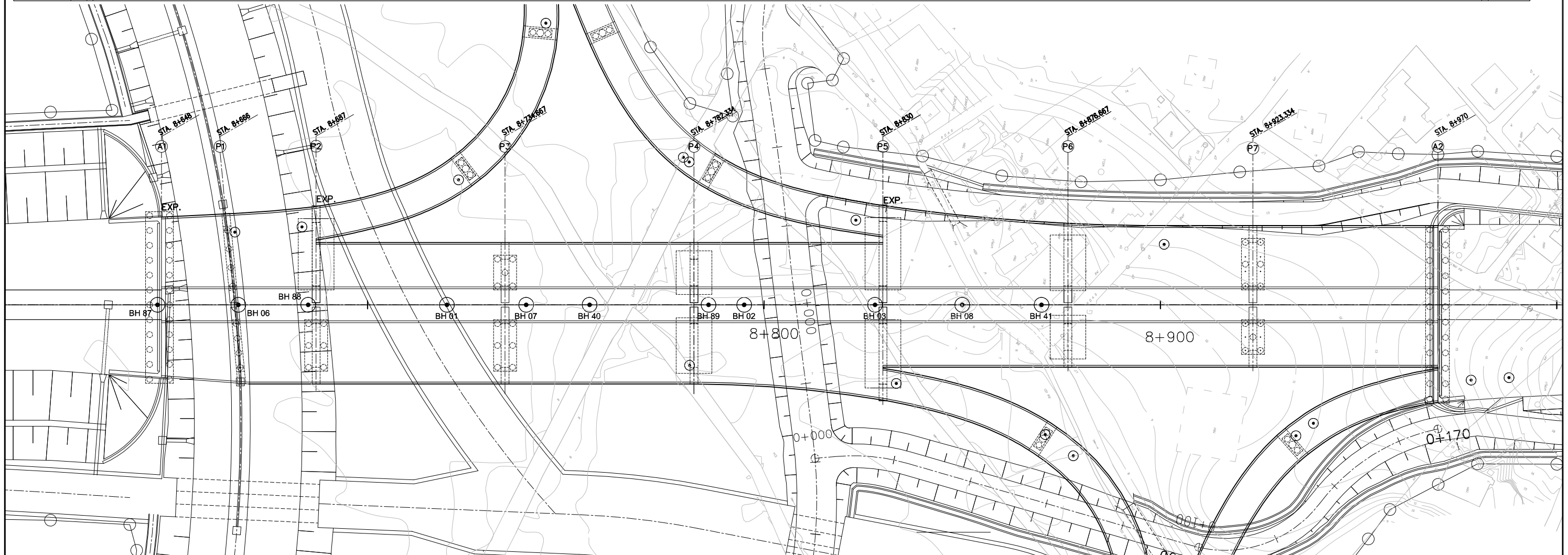
VIADUCT NO.1 (V1) A1 INTERCHANGE VIADUCT

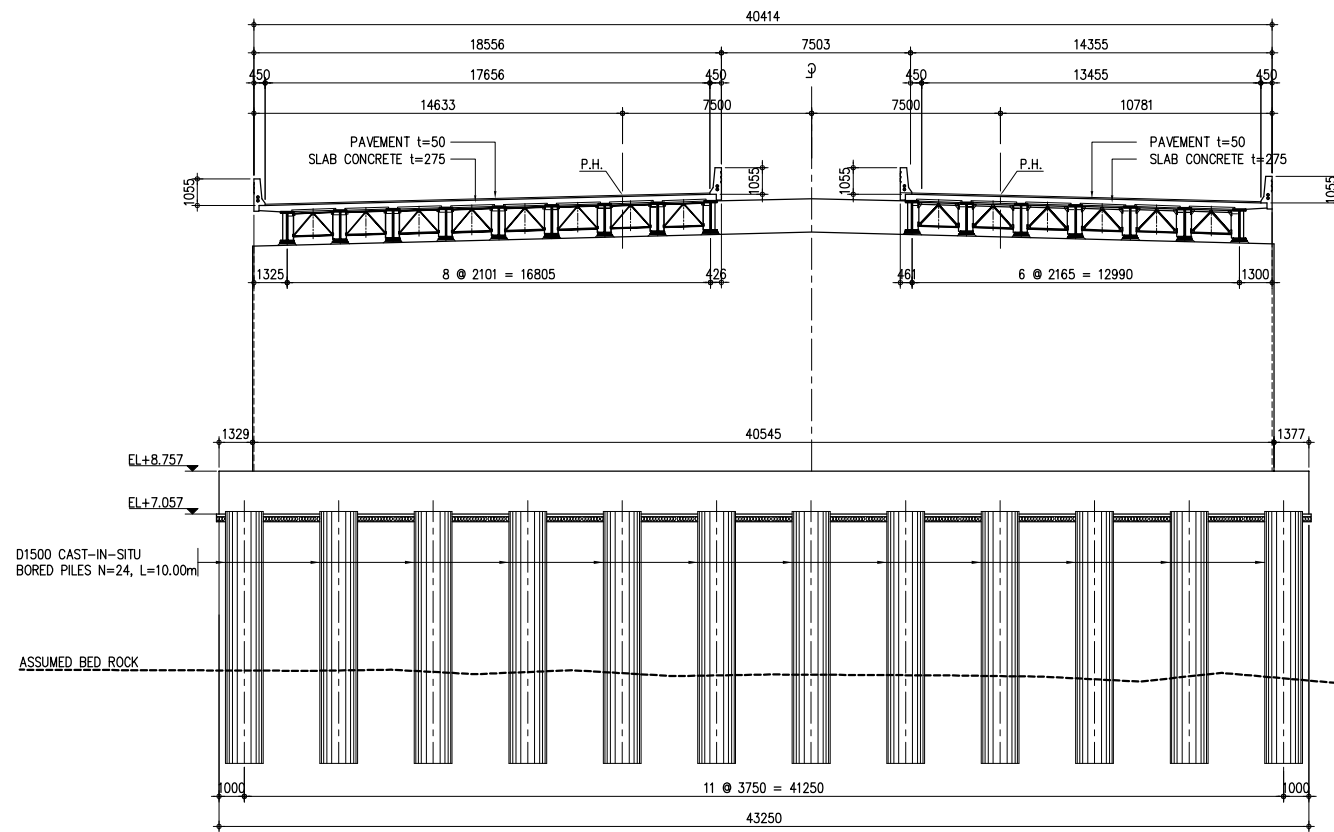
(STA. 8+648.00 - STA. 8+970.00)



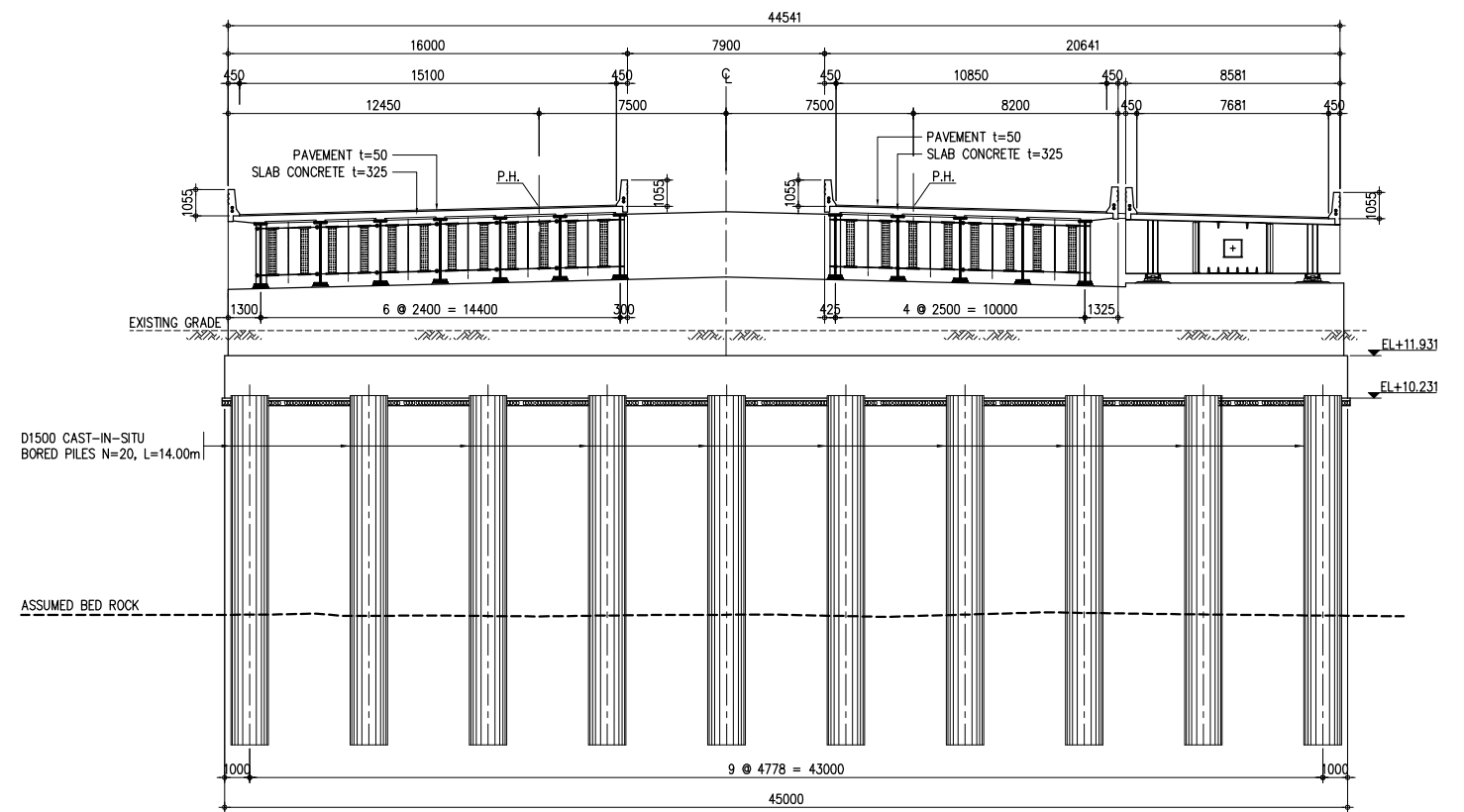
2 PROFILE
SCALE 1:500

GRADE																		
FINISHED ROAD LEVELS	19.549	19.466	19.383	19.300	19.217	19.134	19.051	18.968	18.885	18.802	18.719	18.633	18.548	18.465	18.382	18.299	18.216	18.133
EXISTING GROUND LEVELS	7.552	7.608	7.566	7.428	7.415	7.381	7.955	7.151	7.111	7.149	8.341	6.833	8.897	10.932	11.294	11.656	12.018	14.430
STATION (km)	8640	8660	8680	8700	8720	8740	8760	8780	8800	8820	8840	8860	8880	8900	8920	8940	8960	8980
CURVE BAND SUPERELEVATION																		

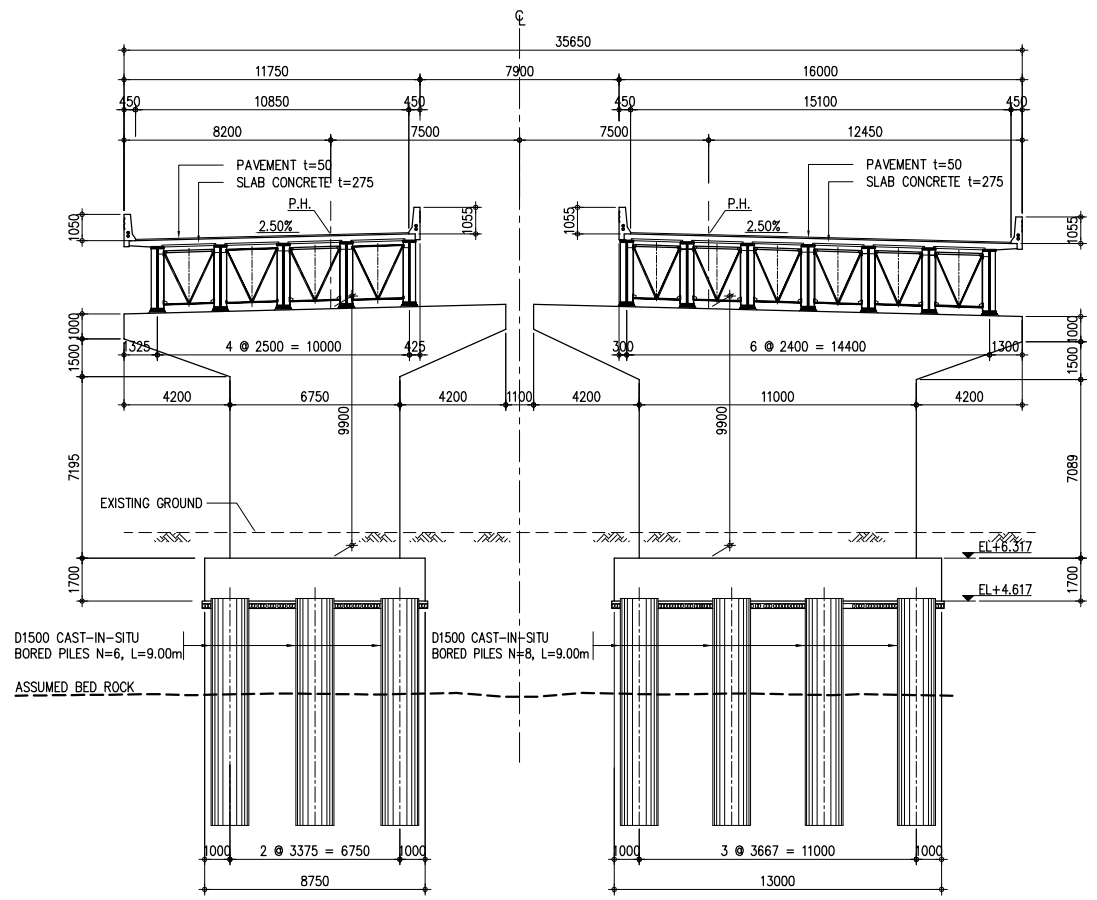




A CROSS SECTION OF ABUTMENT A1
SCALE 1:150



B CROSS SECTION OF ABUTMENT A2
SCALE 1:150

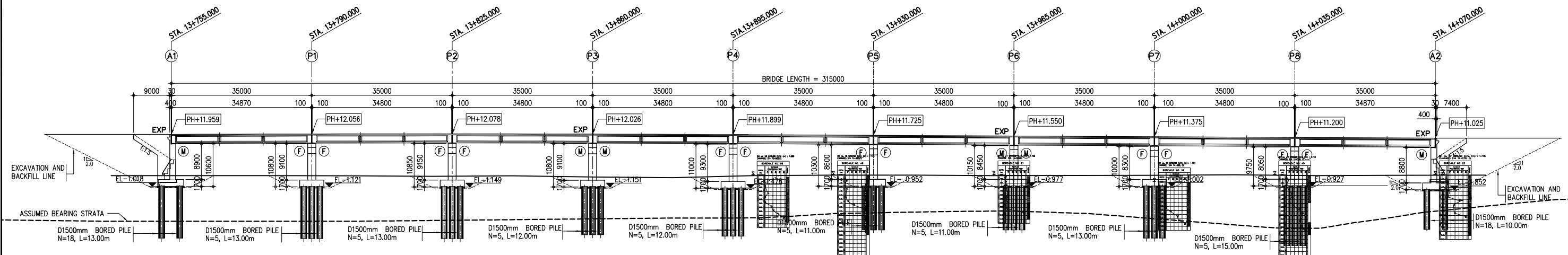


C TYPICAL CROSS SECTION OF PIER
SCALE 1:150

TABLE FOR P.H	
PIER NO.	P.H
P1	19.441
P2	19.354
P3	19.156
P4	18.958
P5	18.751
P6	18.507
P7	18.220
ABUT-A1	19.516
ABUT-A2	17.888

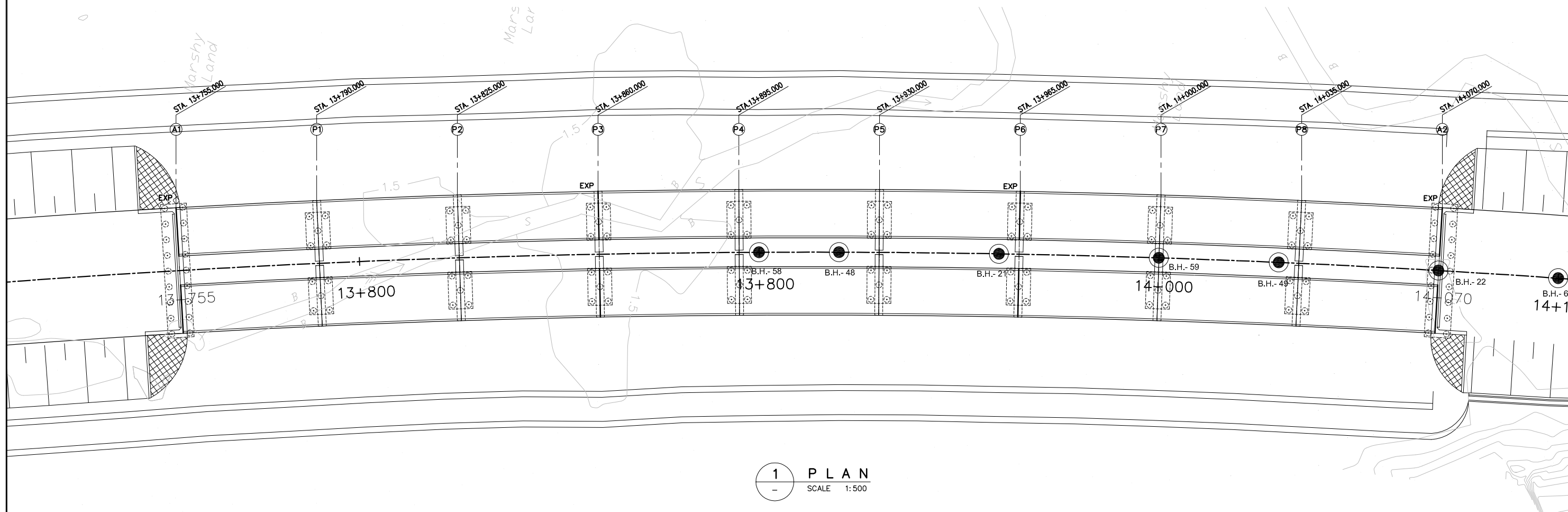
VIADUCT NO.2 (V2) - THE 1ST BIYAGAMA VIADUCT

(GENERAL VIEW - (STA. 13+755.00 - STA. 14+070.00))

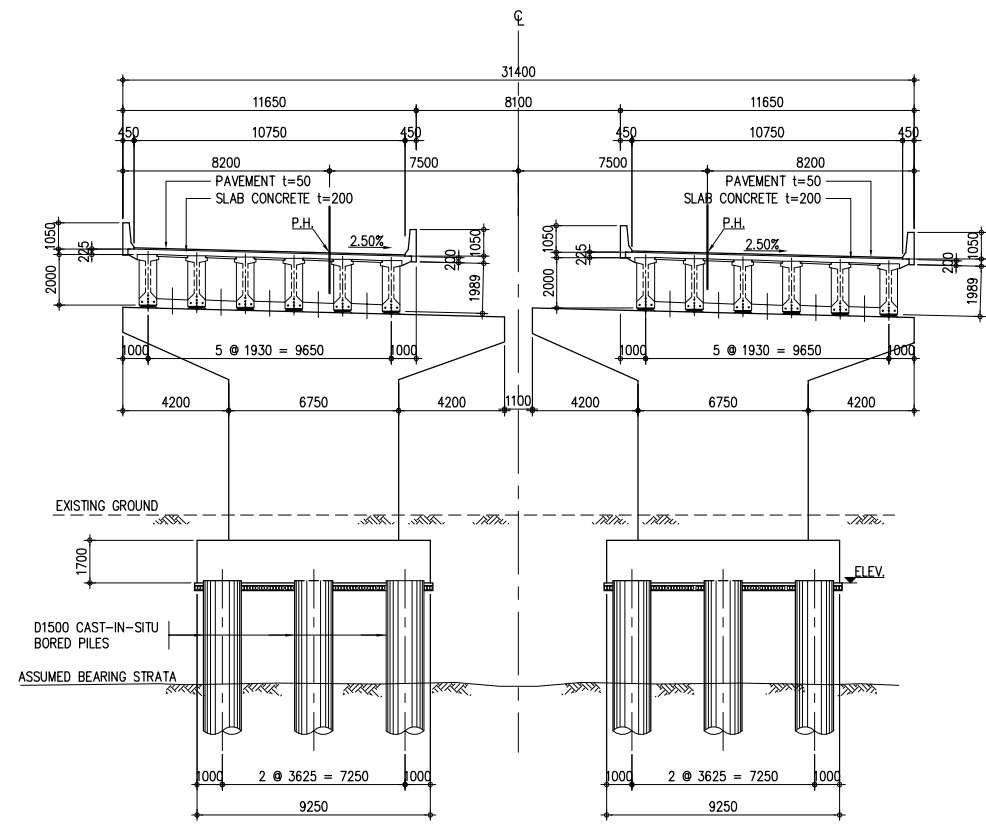


2 PROFILE
SCALE 1:500

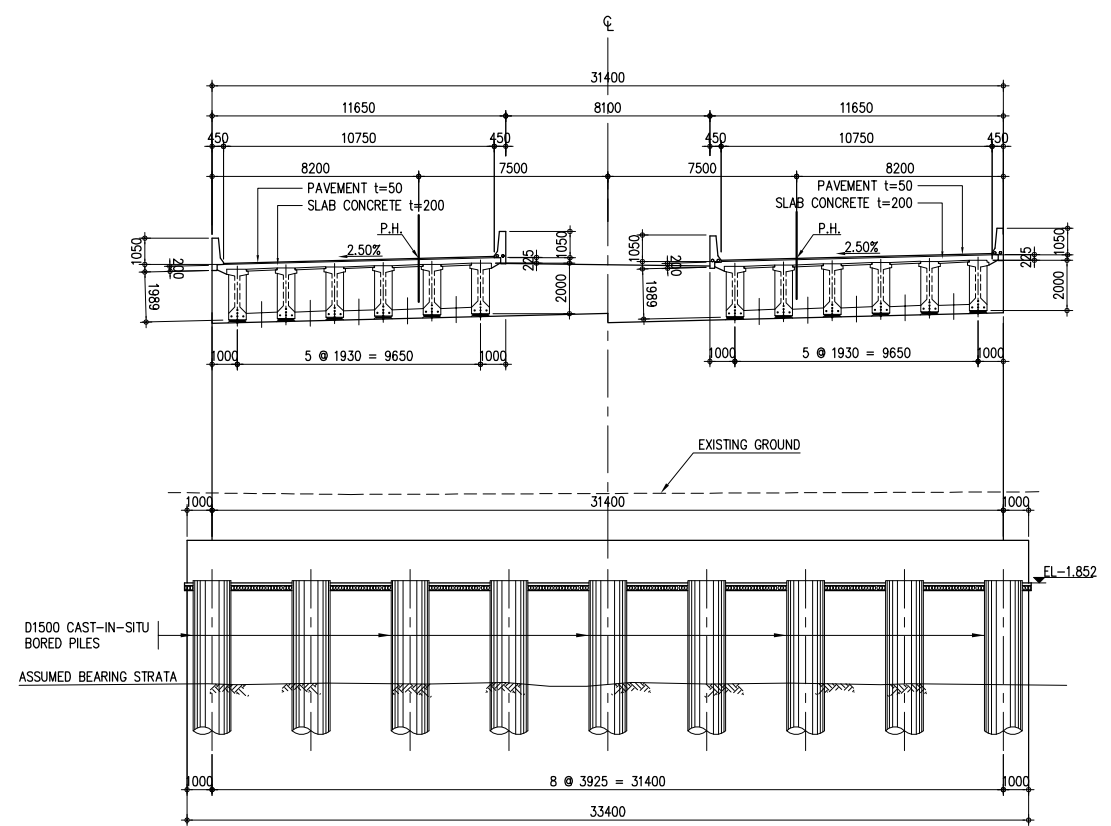
GRADE																	
FINISHED ROAD LEVELS	11.977	12.026	12.070	12.090	12.065	12.026	11.963	11.875	11.775	11.675	11.575	11.475	11.375	11.275	11.175	11.075	10.975
EXISTING GROUND LEVELS	1.665	1.683	1.614	1.501	1.641	1.353	1.164	1.690	1.783	1.789	1.666	1.733	1.792	1.863	1.663	1.736	1.818
STATION (km)	13760	13780	13800	13820	13840	13860	13880	13900	13920	13940	13960	13980	14000	14020	14040	14060	14080
CURVE BAND	R=2700 L=1849.755 m																
SUPERELEVATION	+2.5 % -2.5 %																



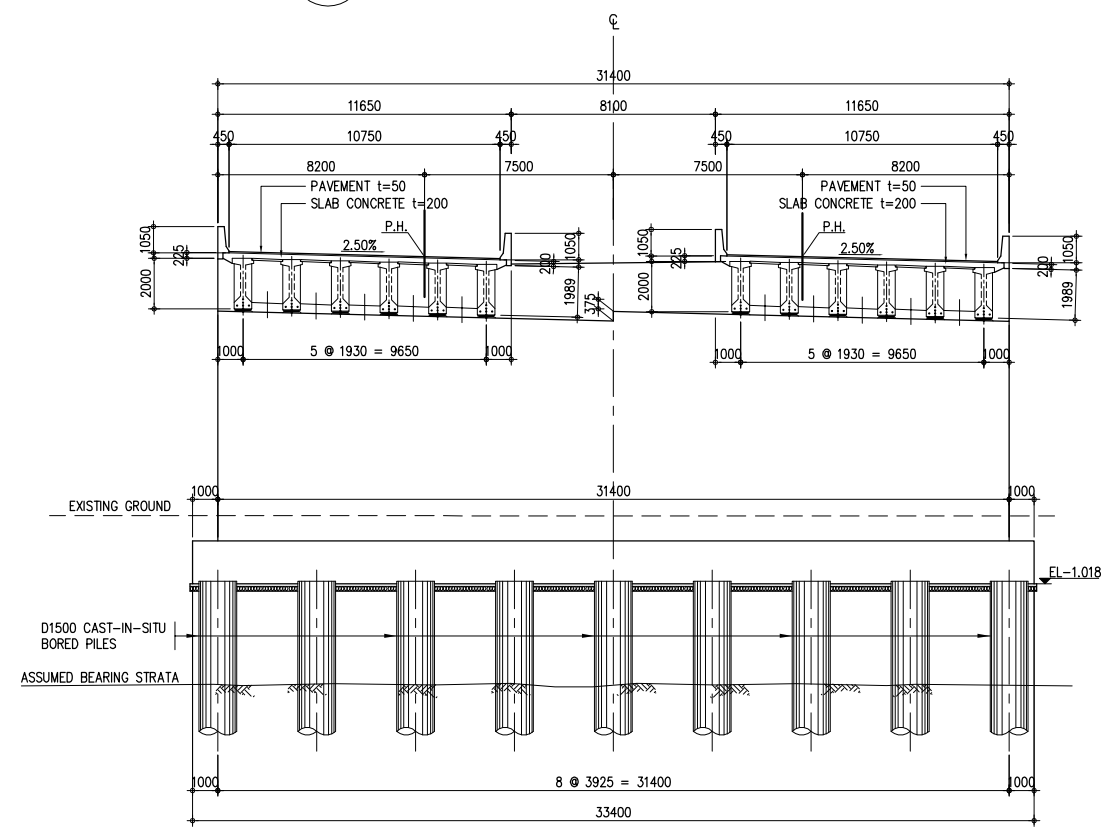
1 PLAN
SCALE 1:500



1 TYPICAL CROSS SECTION OF PIER 1-8
SCALE 1:150

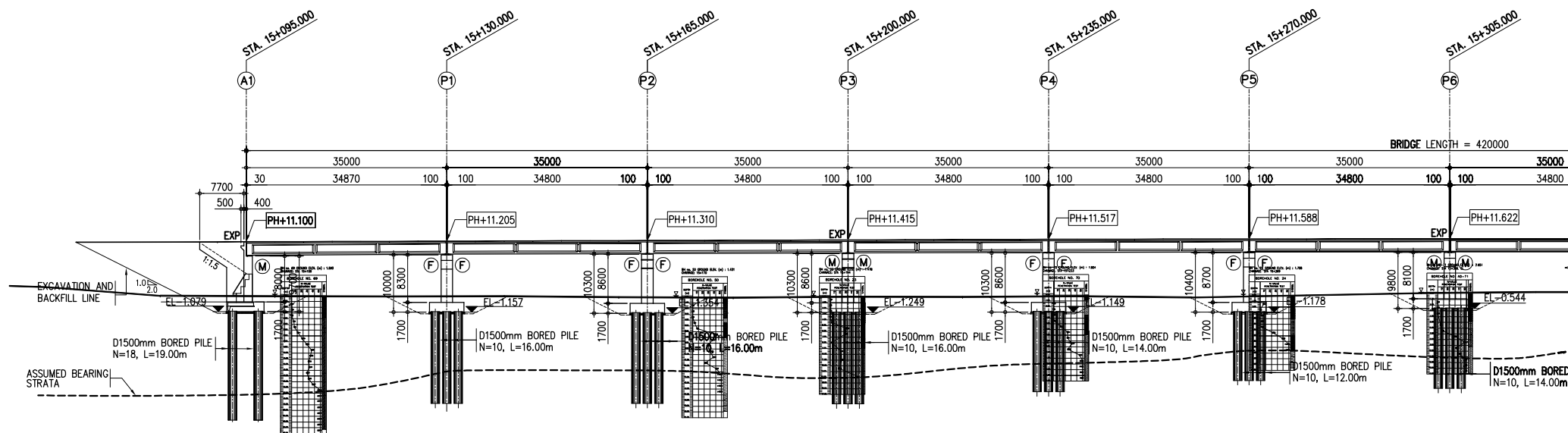


3 CROSS SECTION OF ABUTMENT A2
SCALE 1:150



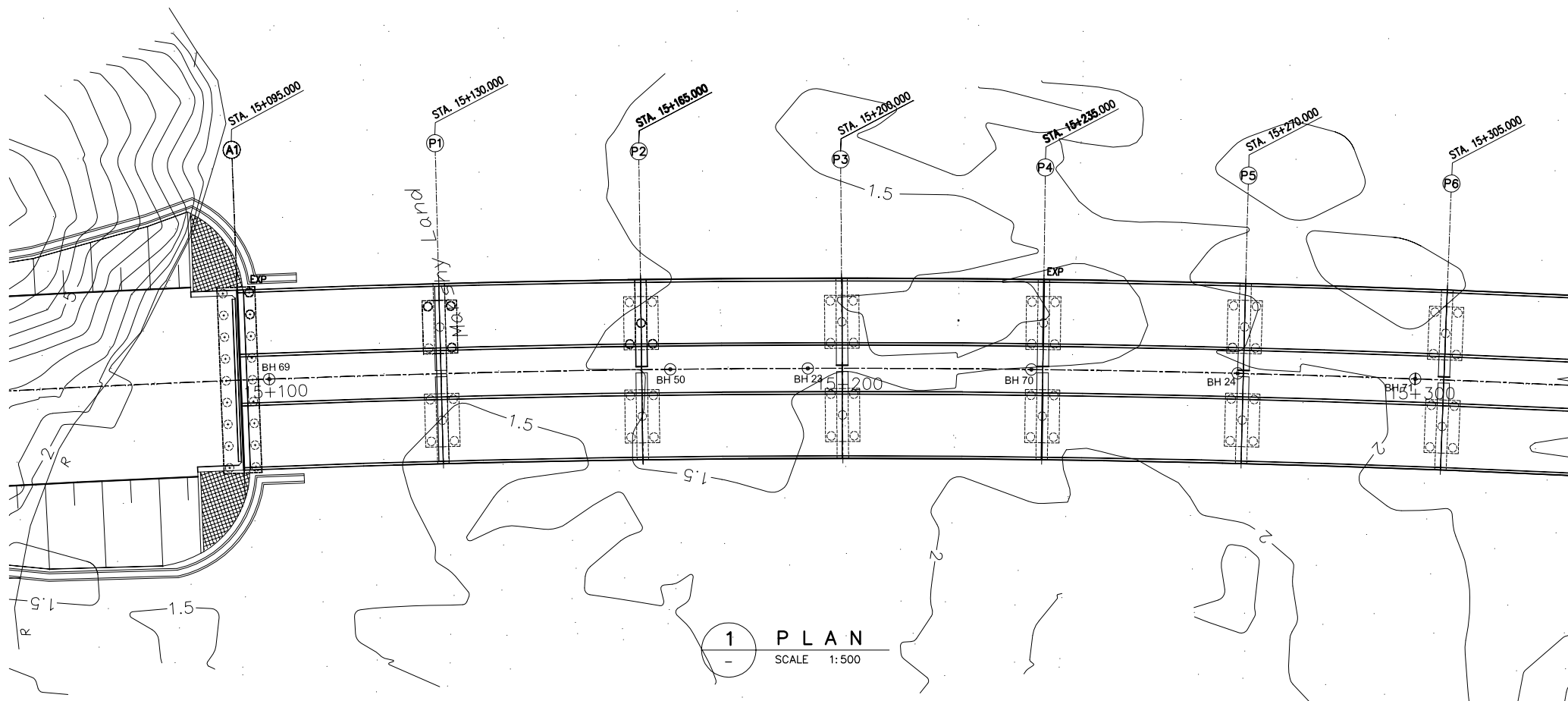
2 CROSS SECTION OF ABUTMENT A1
SCALE 1:150

TABLE FOR P.H.	
PIER NO.	P.H.
P-01	12.056
P-02	12.078
P-03	12.026
P-04	11.899
P-05	11.919
P-06	11.550
P-07	11.375
P-08	11.200
ABUT-A1	11.959
ABUT-A2	11.025

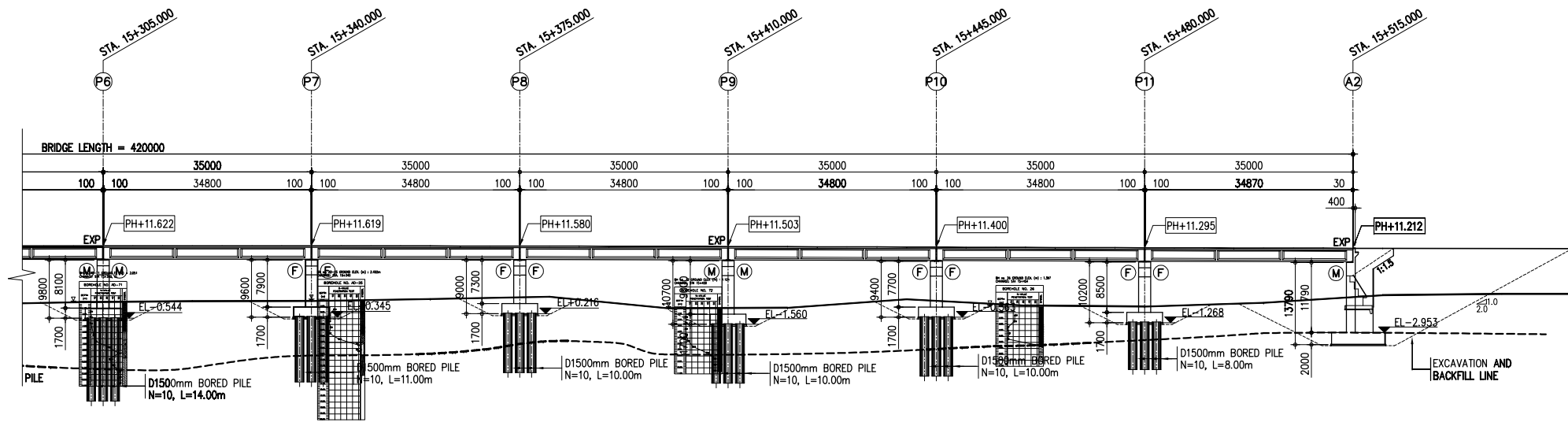


2 PROFILE
SCALE 1:500

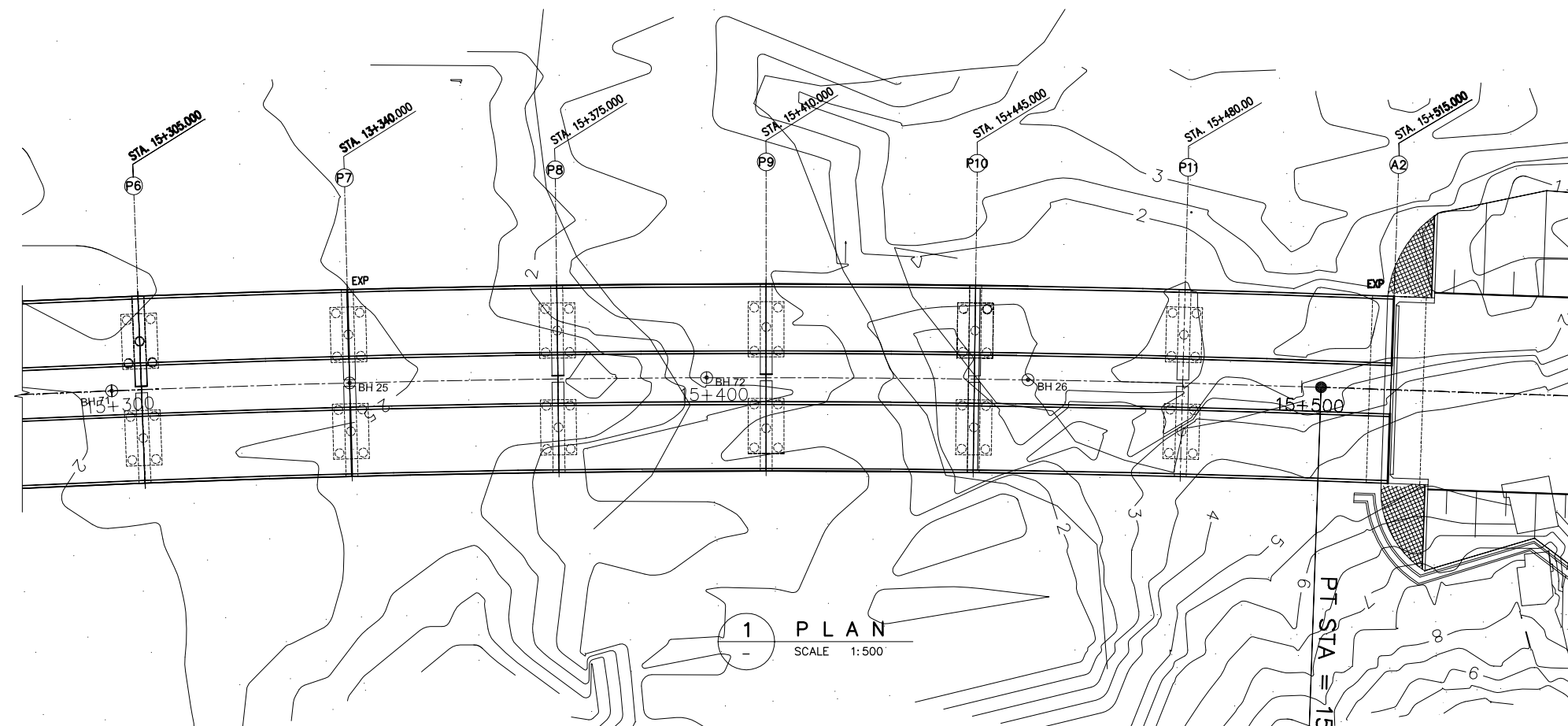
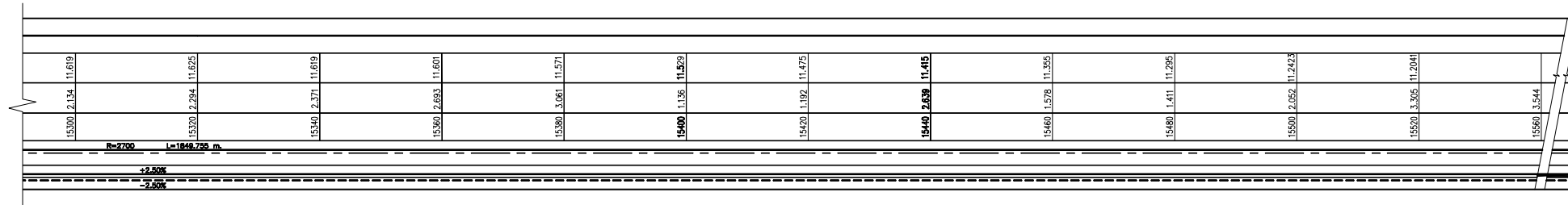
GRADE																				
FINISHED ROAD LEVELS		11.315	11.175	11.235	11.295	11.355	11.415	11.475	11.535	11.595	11.655	11.715	11.775	11.835	11.895	11.955	12.015	12.075	12.135	12.195
EXISTING GROUND LEVELS	1.682	1.593	1.569	1.607	1.443	1.353	1.504	1.454	1.684	1.614	1.884	1.814	1.747	1.601	1.334	1.294	1.294	1.294	1.294	1.294
STATION (km)	15095	15100	15130	15140	15160	15180	15200	15220	15240	15260	15280	15300	15320	15340	15360	15380	15400	15420	15440	15460
CURVE BAND																				
SUPERELEVATION																				

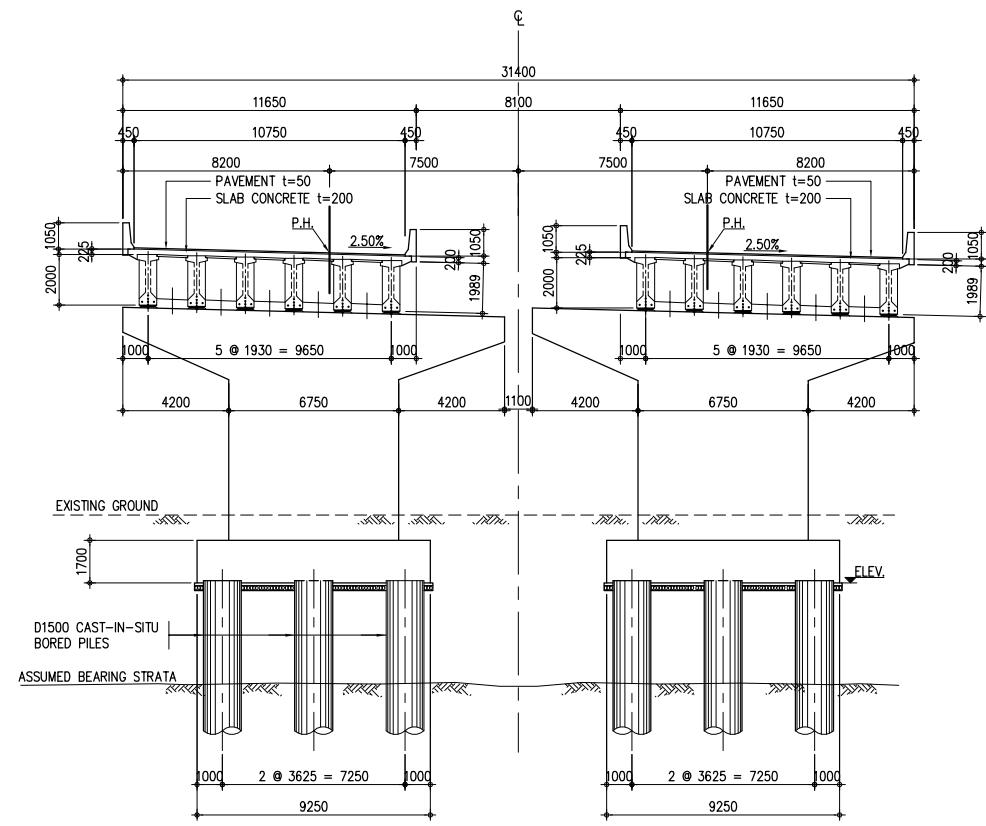


1 PLAN
SCALE 1:500

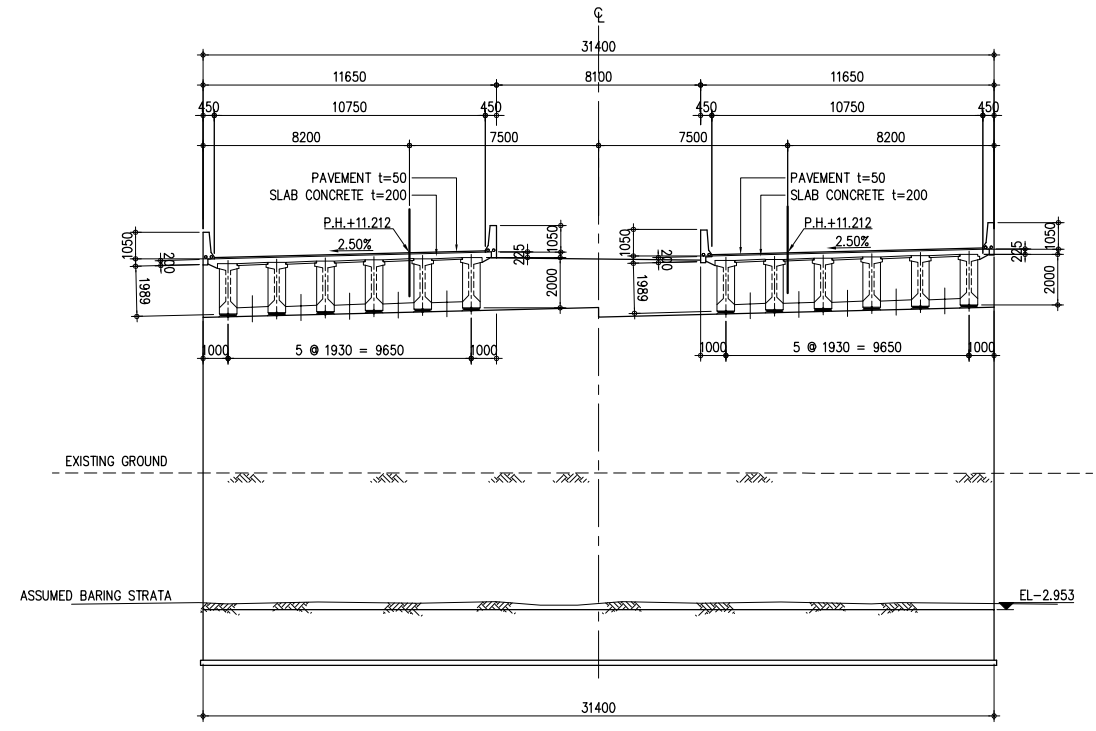


2 PROFILE
SCALE 1:500

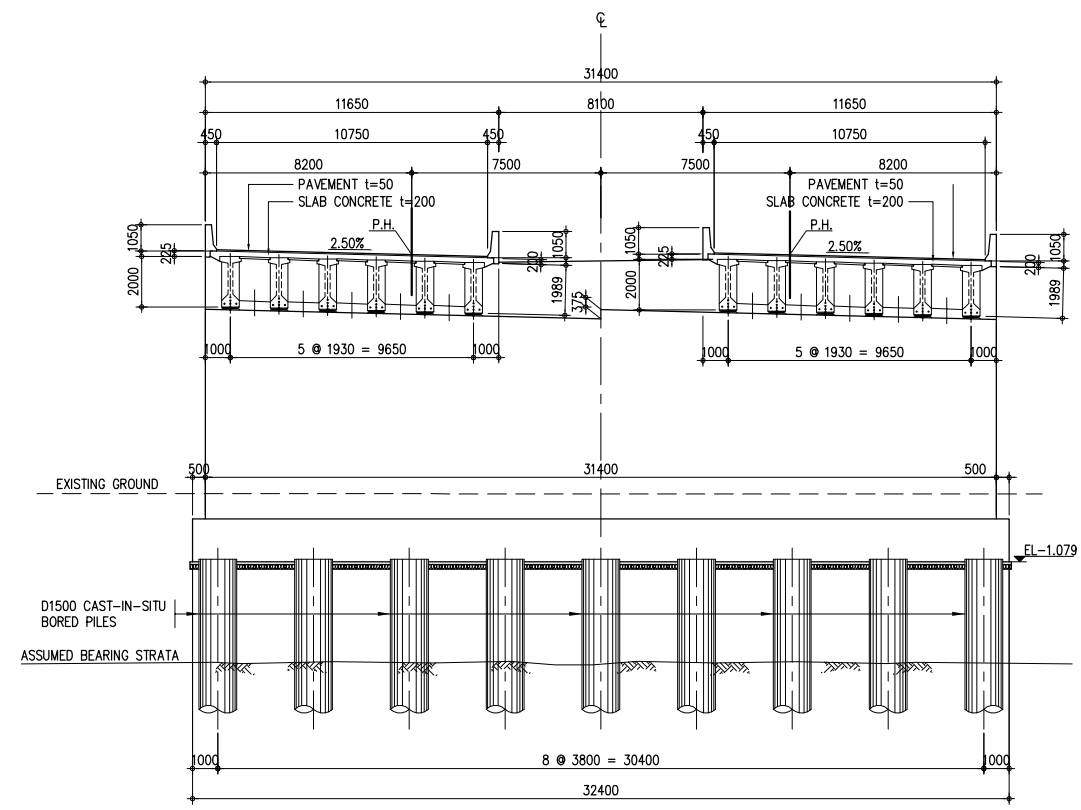




1 TYPICAL CROSS SECTION OF PIER 1-8
SCALE 1:150



3 CROSS SECTION OF ABUTMENT A2
SCALE 1:150

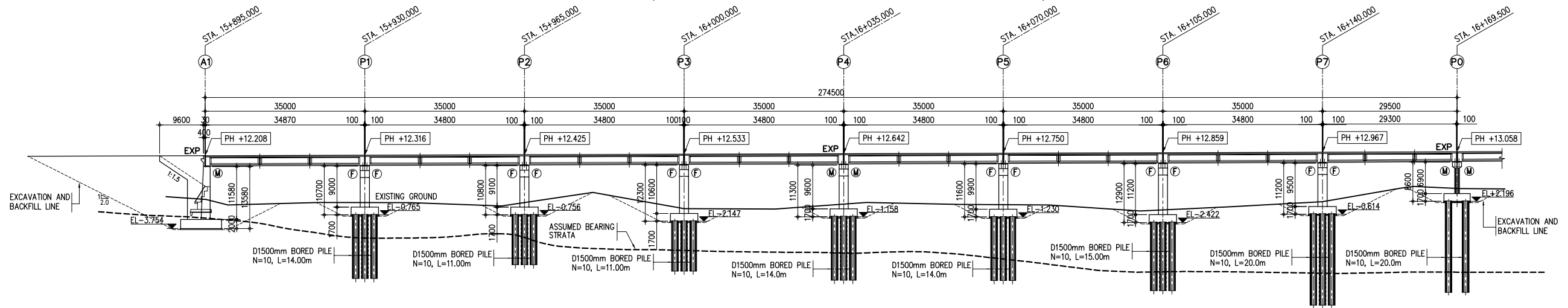


2 CROSS SECTION OF ABUTMENT A1
SCALE 1:150

TABLE FOR P.H.	
PIER NO.	P.H.
P1	11.205
P2	11.310
P3	11.415
P4	11.517
P5	11.588
P6	11.622
P7	11.619
P8	11.580
P9	11.503
P10	11.400
P11	11.295
ABUT-A1	11.100
ABUT-A2	11.212

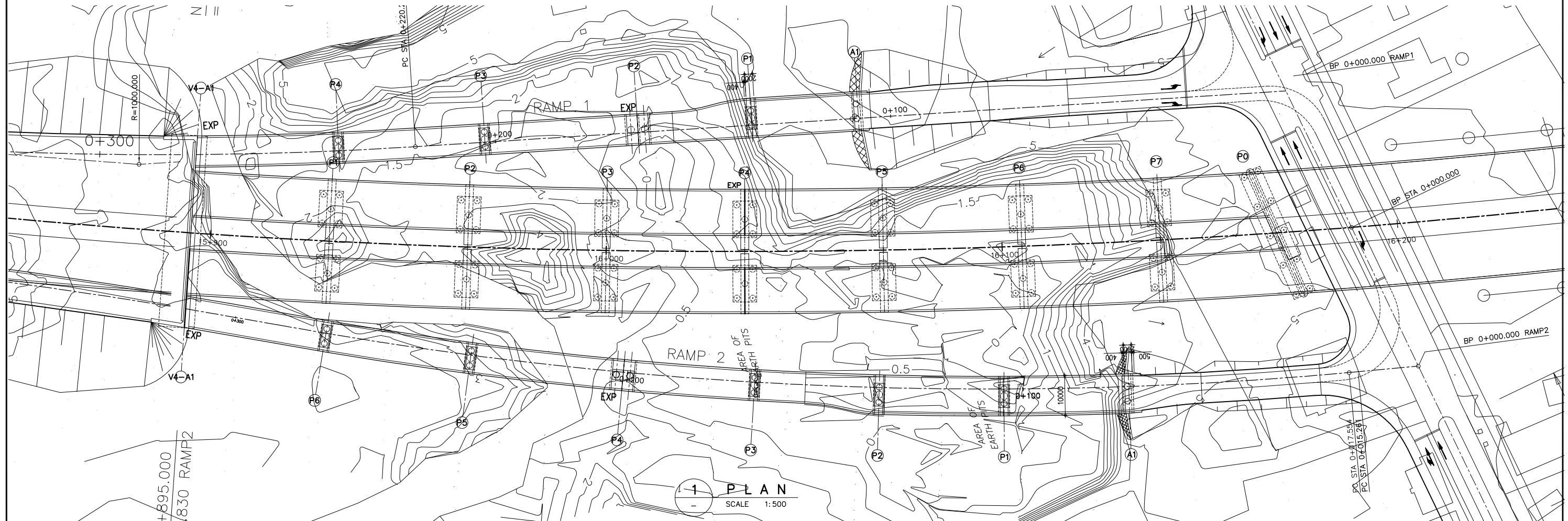
VIADUCT NO.4 (V4) - KELANI RIVER ACCES VIADUCT

(GENERAL VIEW STA. 15+895.00 - STA. 16+169.50)

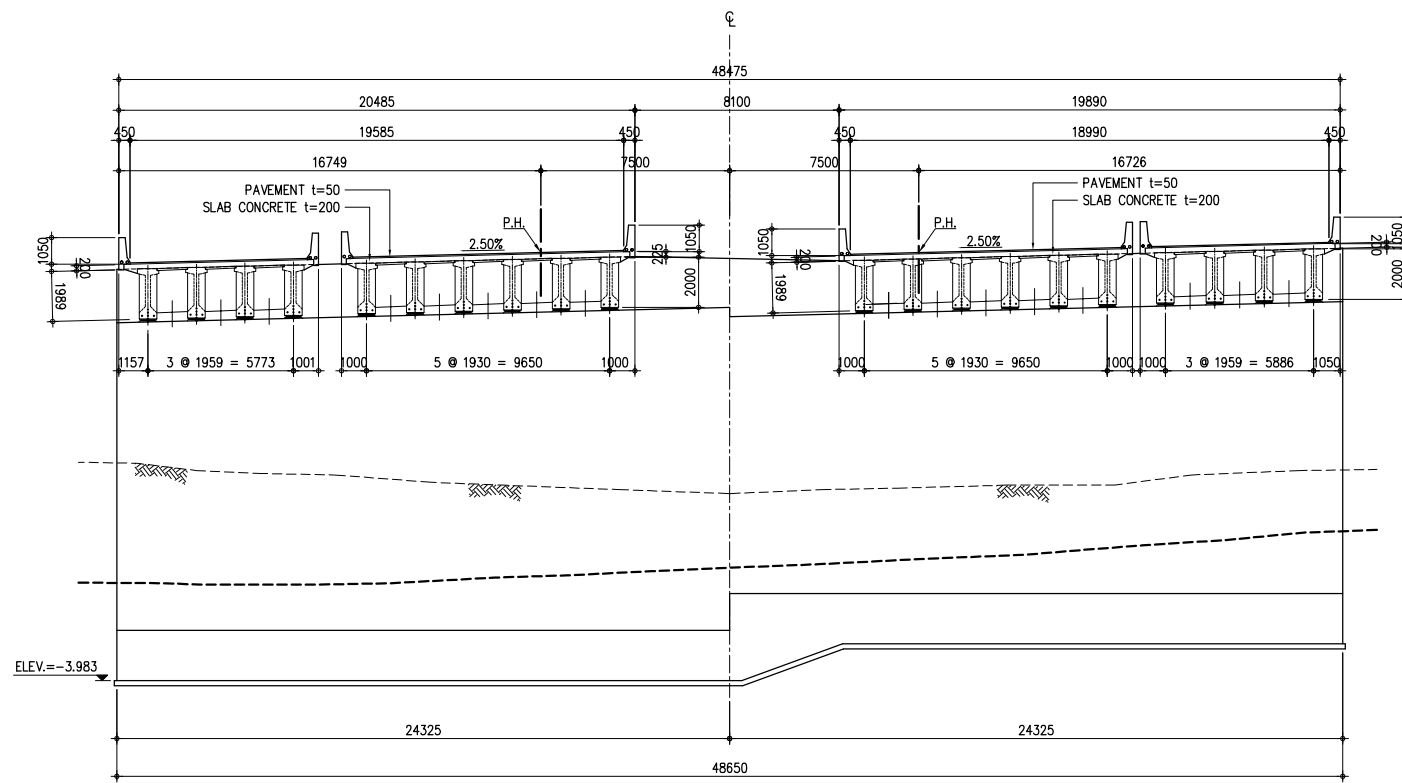


2 PROFILE
SCALE 1:500

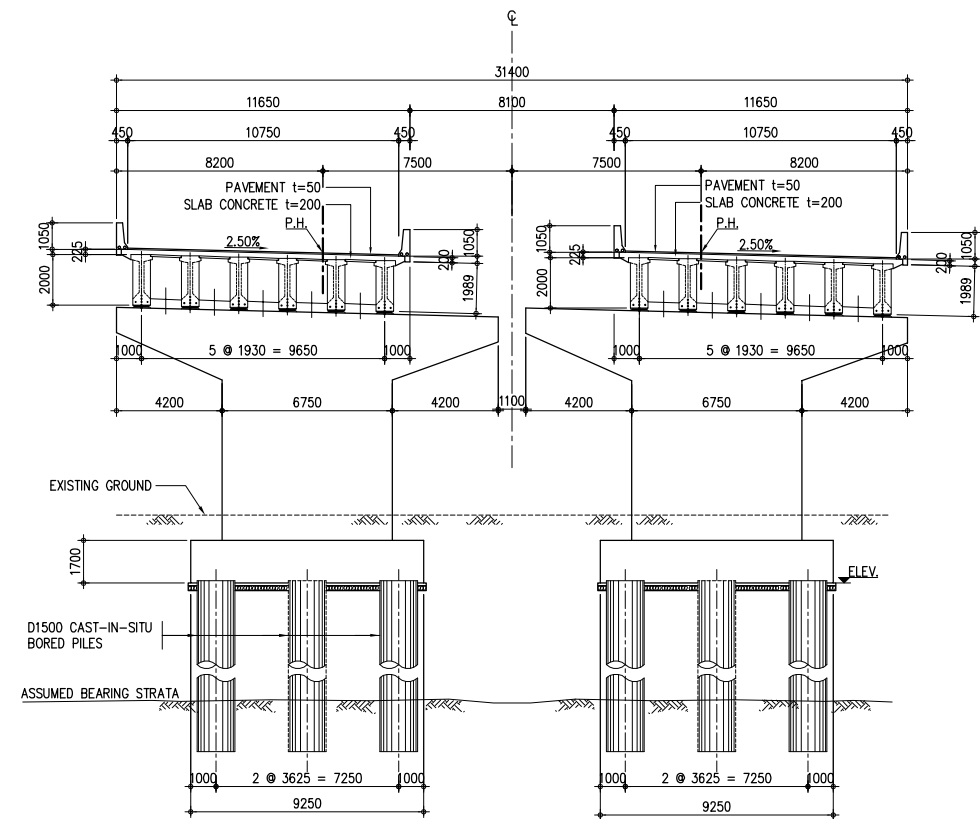
GRADE															
FINISHED ROAD LEVELS	12.223	12.285	12.347	12.409	12.471	12.533	12.595	12.657	12.719	12.781	12.843	12.905	12.967	13.029	13.091
EXISTING GROUND LEVELS	1.450	1.844	1.894	1.197	4.144	0.589	0.507	1.944	1.533	1.395	0.086	1.005	2.140	5.448	4.911
STATION (km)	15900	15920	15940	15960	15980	16000	16020	16040	16060	16080	16100	16120	16140	16160	16180
CURVE BAND	R=2000 L=991.683 m														
SUPERELEVATION	+2.5 % -2.5 %														



1 PLAN
SCALE 1:500



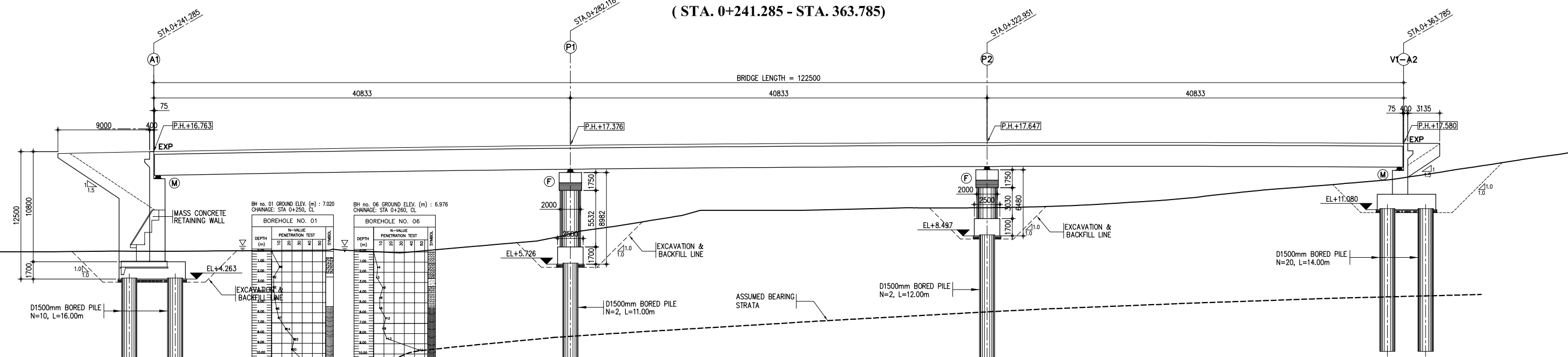
1 TYPICAL CROSS SECTION OF ABUTMENT
SCALE 1:150



2 TYPICAL CROSS SECTION OF PIER
SCALE 1:150

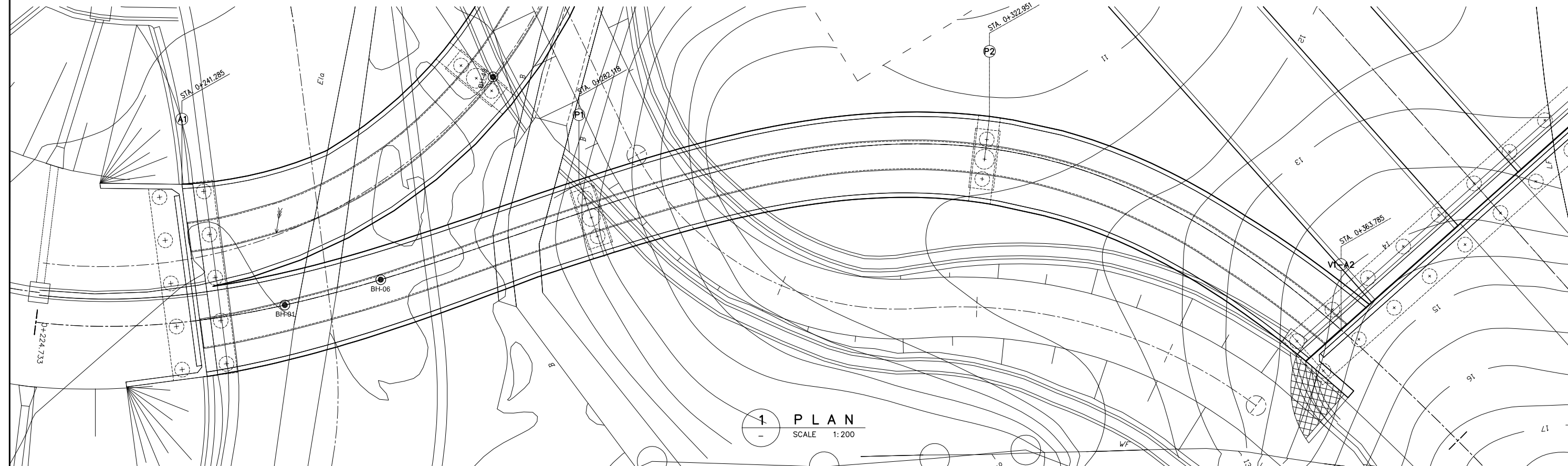
TABLE FOR P.H.	
PIER NO.	P.H.
P1	12.316
P2	12.425
P3	12.533
P4	12.642
P5	12.750
P6	12.859
P7	12.967
ABUT-A1	12.208
ABUT-A2	13.058

VIADUCT NO.5 (V5-R2) A1 INTERCHANGE VIADUCT (STA. 0+241.285 - STA. 363.785)

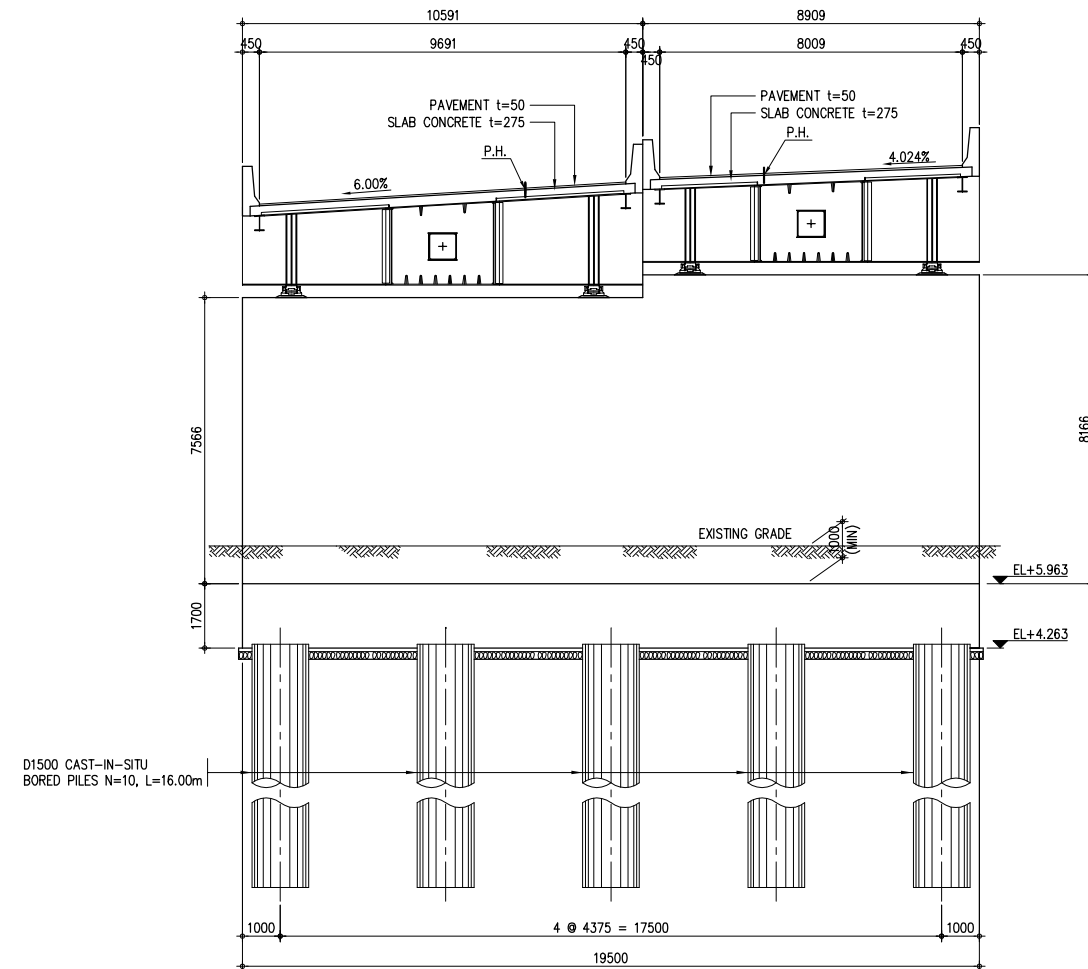


2 PROFILE
SCALE 1:200

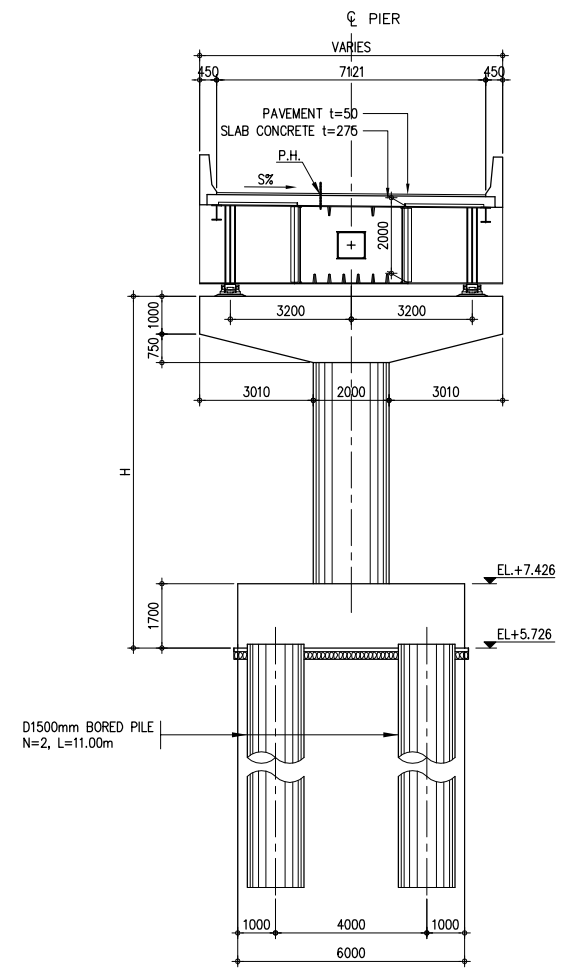
GRADE	FINISHED ROAD LEVELS	EXISTING GROUND LEVELS	STATION (km)	CURVE BAND	SUPERELEVATION
	16.738	7.00	0+240		+6.0%
	17.097	7.10	0+260		+6.0%
	17.353	8.23	0+280		
	17.537	11.00	0+300	A=50.916 L=50.000	+6.0%
	17.639	11.25	0+320		-6.0%
	17.659	11.98	0+340	A=92.916 L=50.000	
	17.997	13.81	0+360		+2.50%
					-7.50%



THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF HIGHWAYS & ROAD DEVELOPMENT Road Development Authority	JICA JAPAN INTERNATIONAL COOPERATION AGENCY ORICONSL ORIENTAL CONSULTANTS COMPANY LIMITED in association with PACIFIC CONSULTANTS INTERNATIONAL		No	REVISION	DATE
			COLOMBO OUTER CIRCULAR HIGHWAY PROJECT (NORTHERN SECTION 1) VIADUCT NO.5 (V5) - A1 IC RAMP-2 BRIDGE GENERAL VIEW (STA.0+241.285 - STA.0+363.785)		
DWG. NO. K11-00-A					



A CROSS SECTION OF ABUTMENT
SCALE 1:100

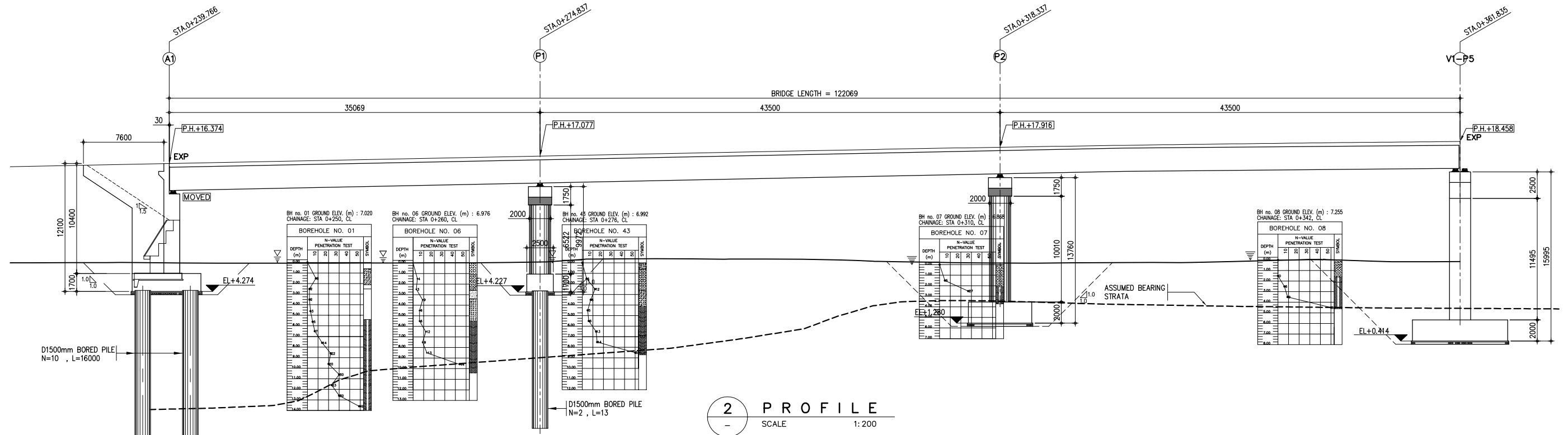


B TYPICAL CROSS SECTION OF PIER
SCALE 1:100

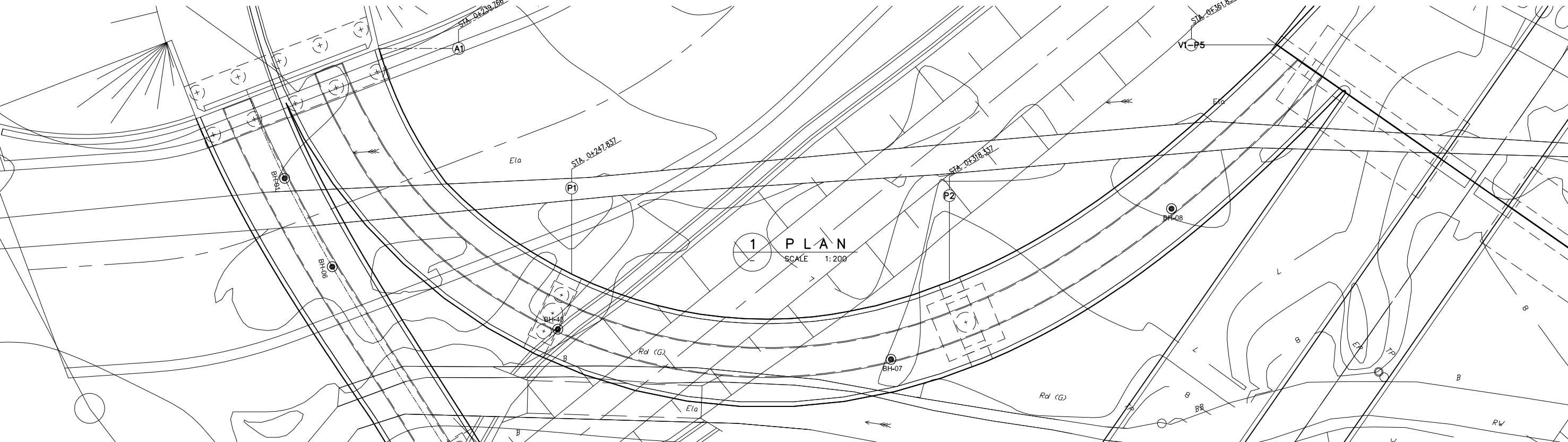
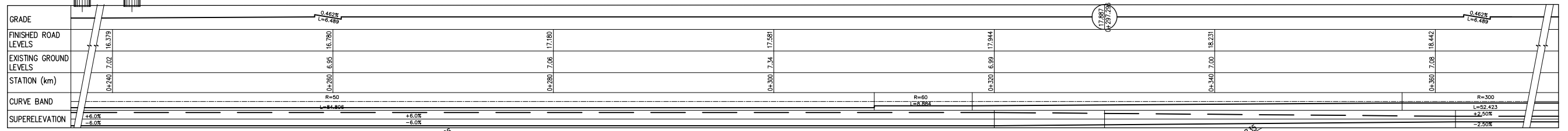
PIER NO.	P.H.
P1	17.376
P2	17.647
ABUT. A1	16.763
ABUT. V1-A2	17.580

VIADUCT NO.6 (V6-R3) A1 INTERCHANGE VIADUCT

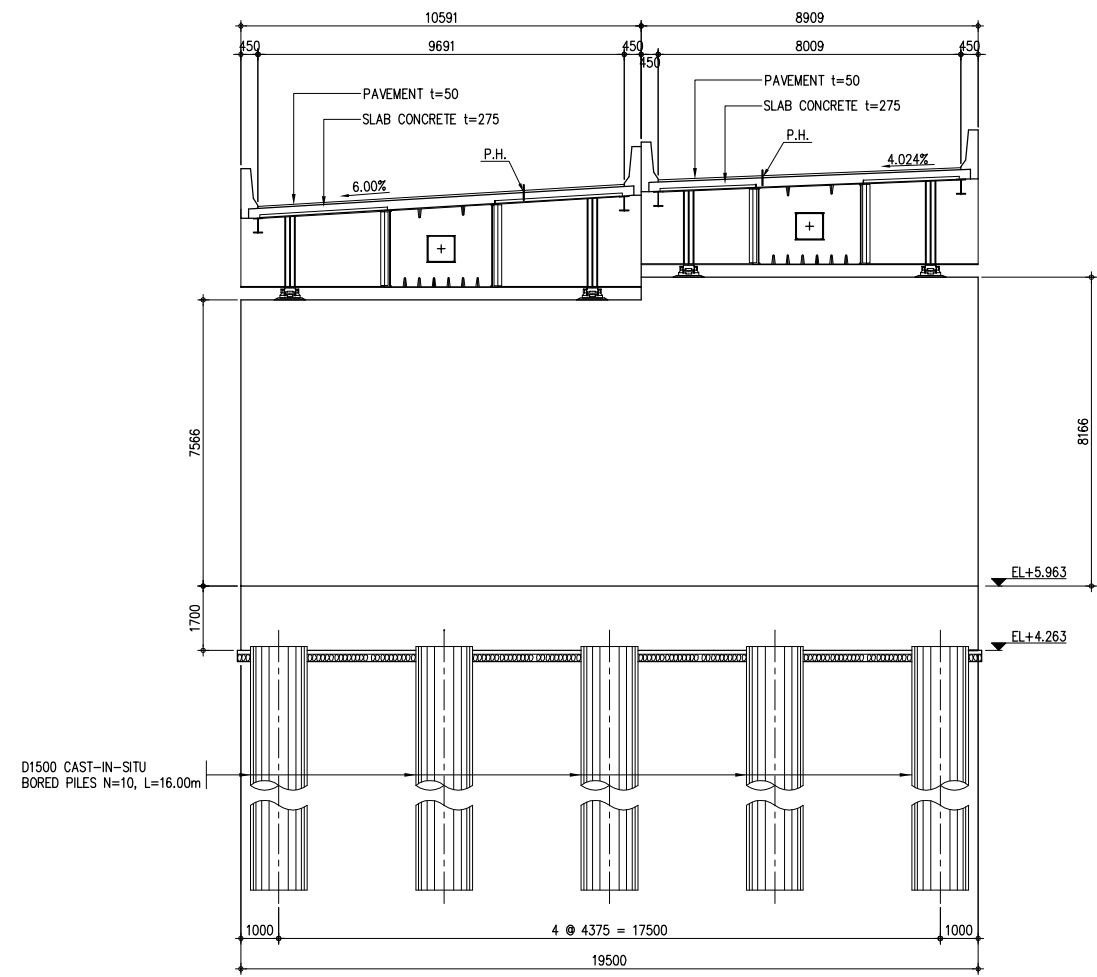
(STA. 0+239.766 - STA. 361.835)



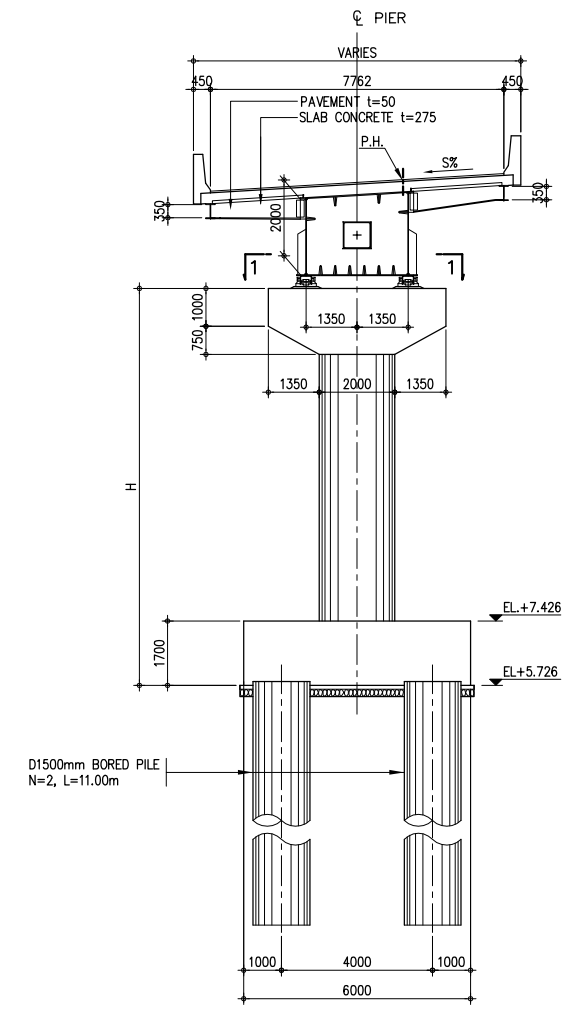
2 PROFILE
SCALE 1:200



1 PLAN
SCALE 1:200



A CROSS SECTION OF ABUTMENT
SCALE 1:100

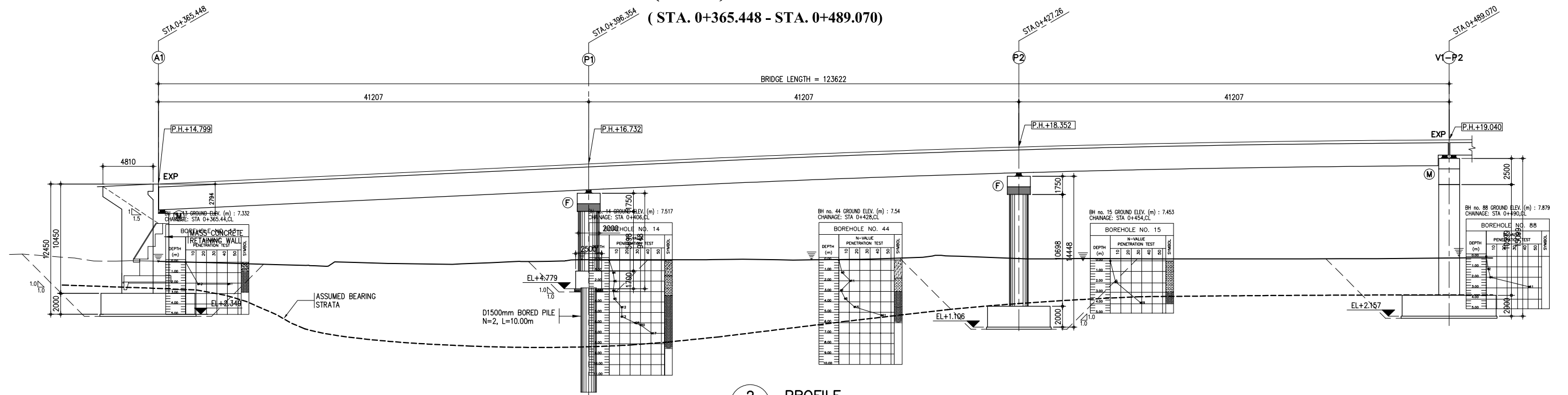


B TYPICAL CROSS SECTION OF PIER
SCALE 1:100

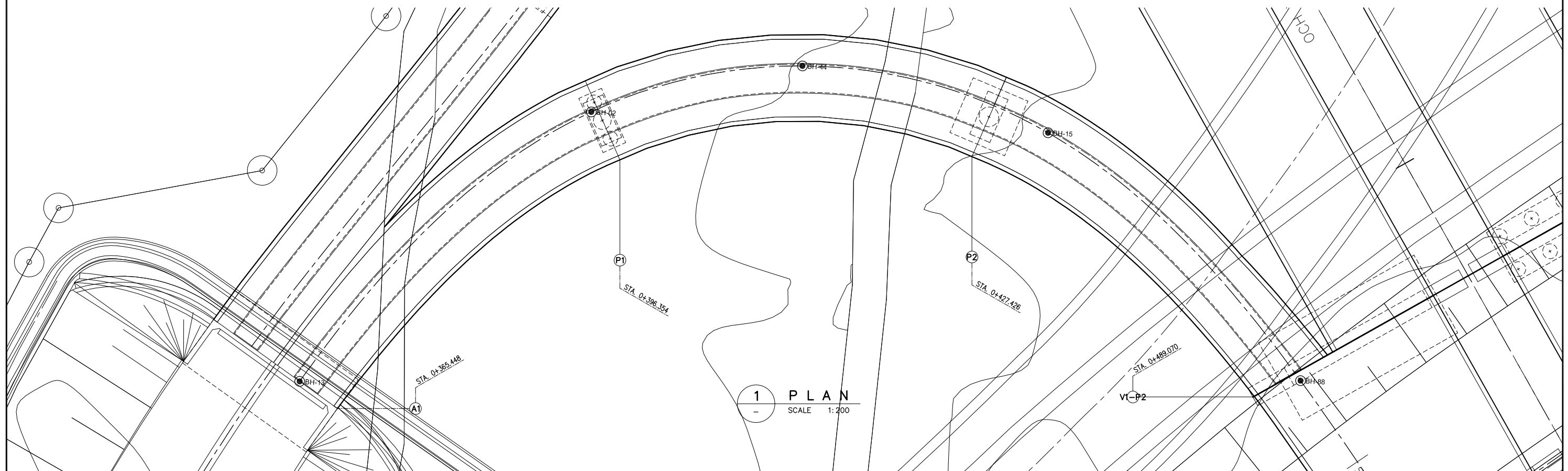
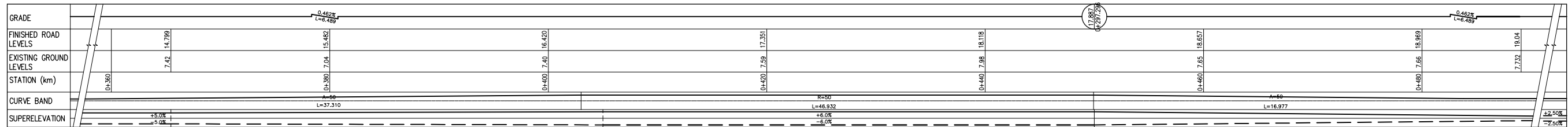
TABLE FOR P.H	
PIER NO.	P.H.
P1	17.077
P2	17.916
ABUT. A1	16.374
V1-P5	18.458

VIADUCT NO.7(V7-R5) A1 INTERCHANGE VIADUCT

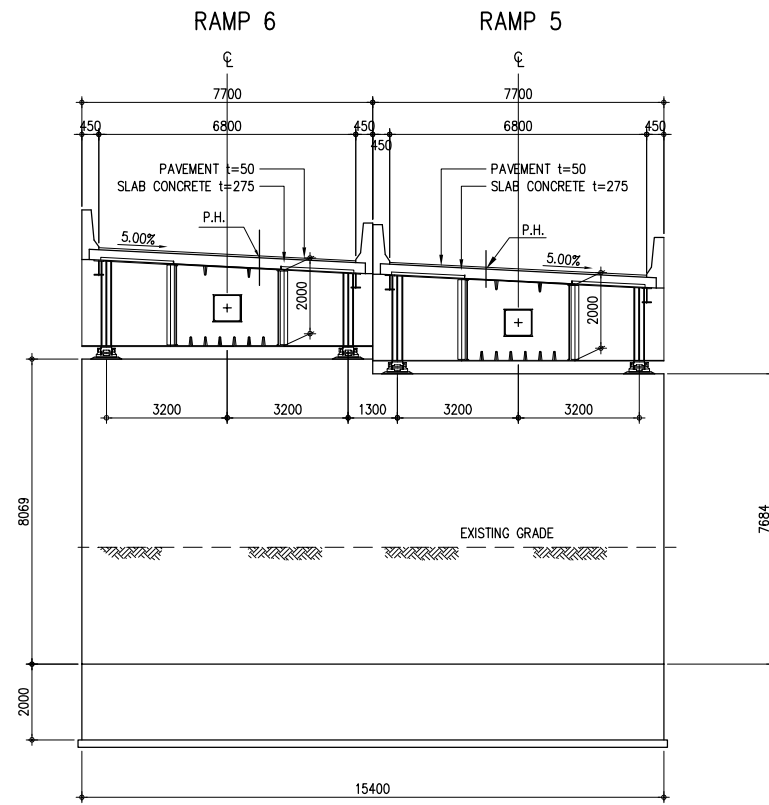
(STA. 0+365.448 - STA. 0+489.070)



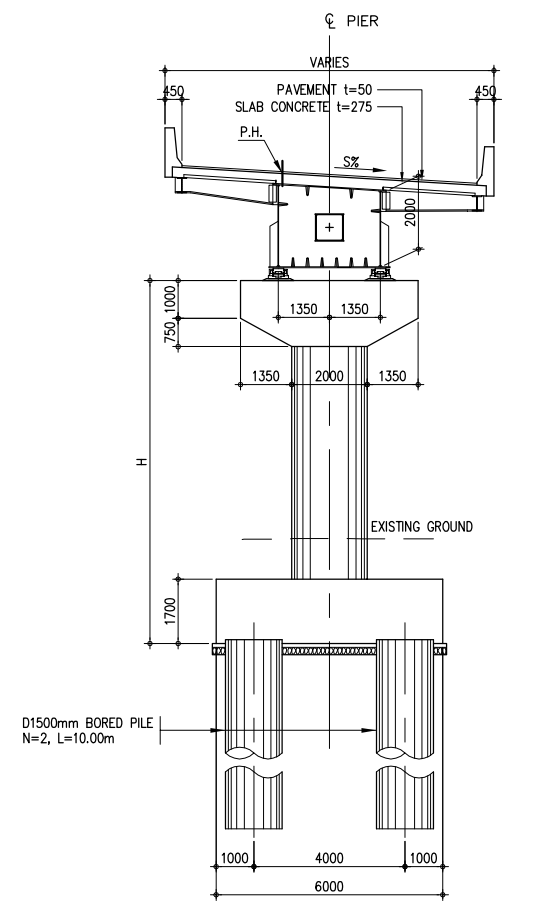
2 PROFILE
SCALE 1:200



1 PLAN
SCALE 1:200



B CROSS SECTION OF ABUTMENT
SCALE 1:100

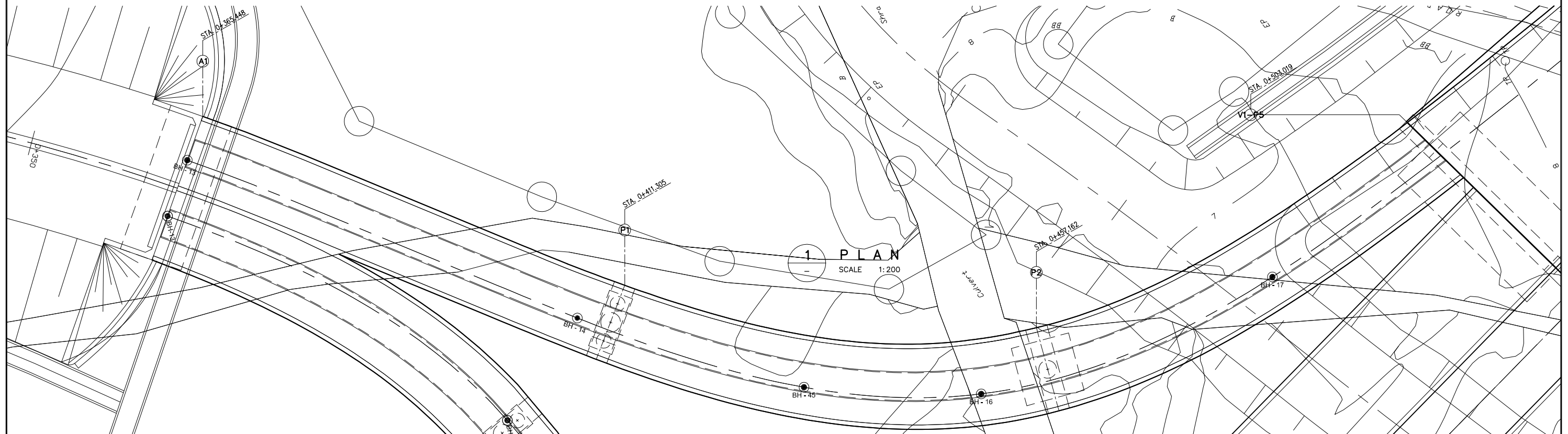
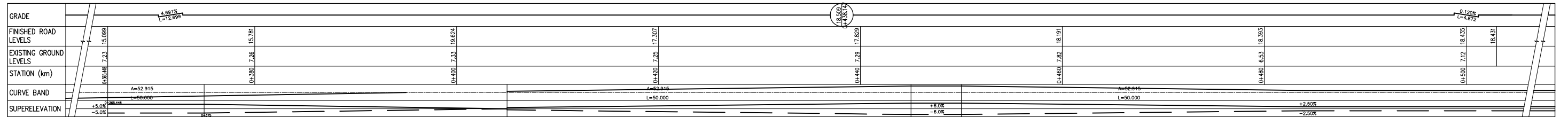
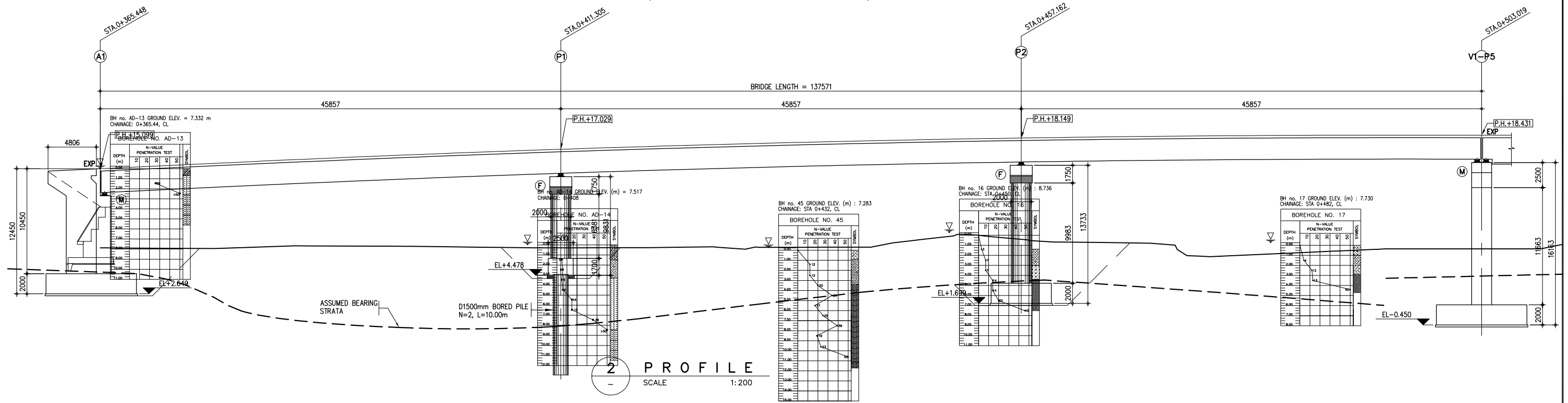


B TYPICAL CROSS SECTION OF PIER
SCALE 1:100

TABLE FOR P.H	
PIER NO.	P.H.
P1	16.732
P2	18.352
ABUT. A1	14.799
V1-P2	19.040

VIADUCT NO.8(V8-R6) A1 INTERCHANGE VIADUCT

(STA. 0+365.448 - STA. 0+503.019)



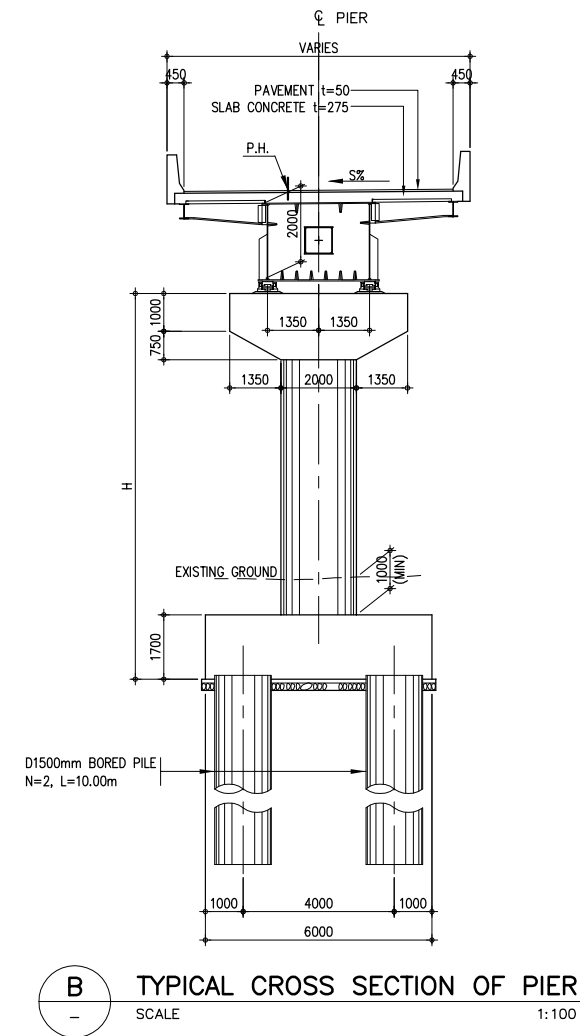
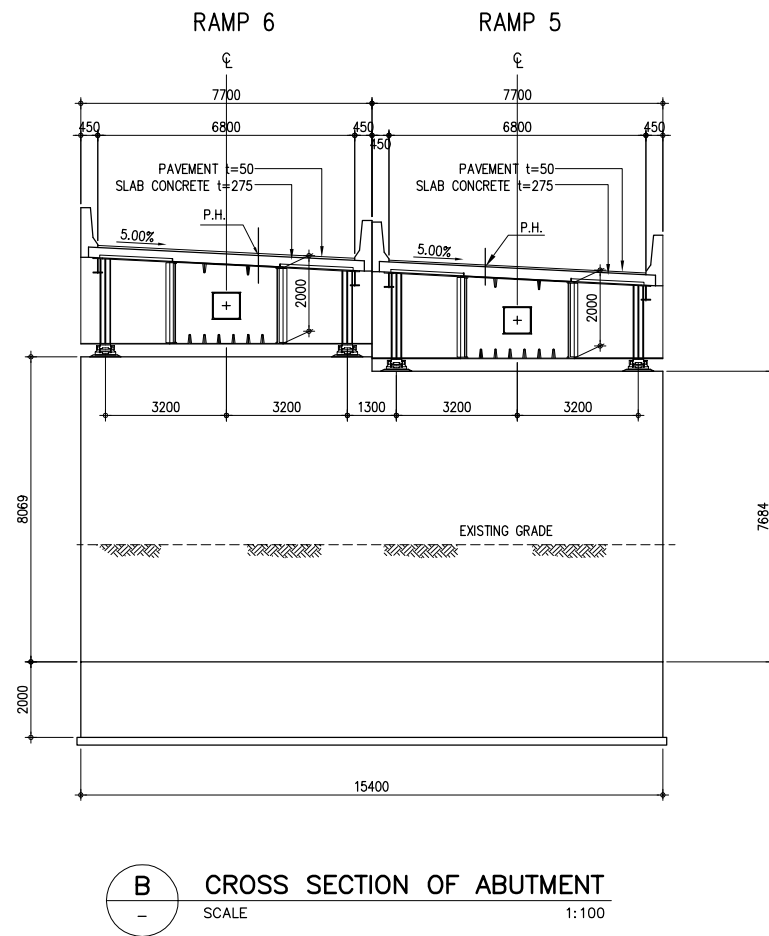
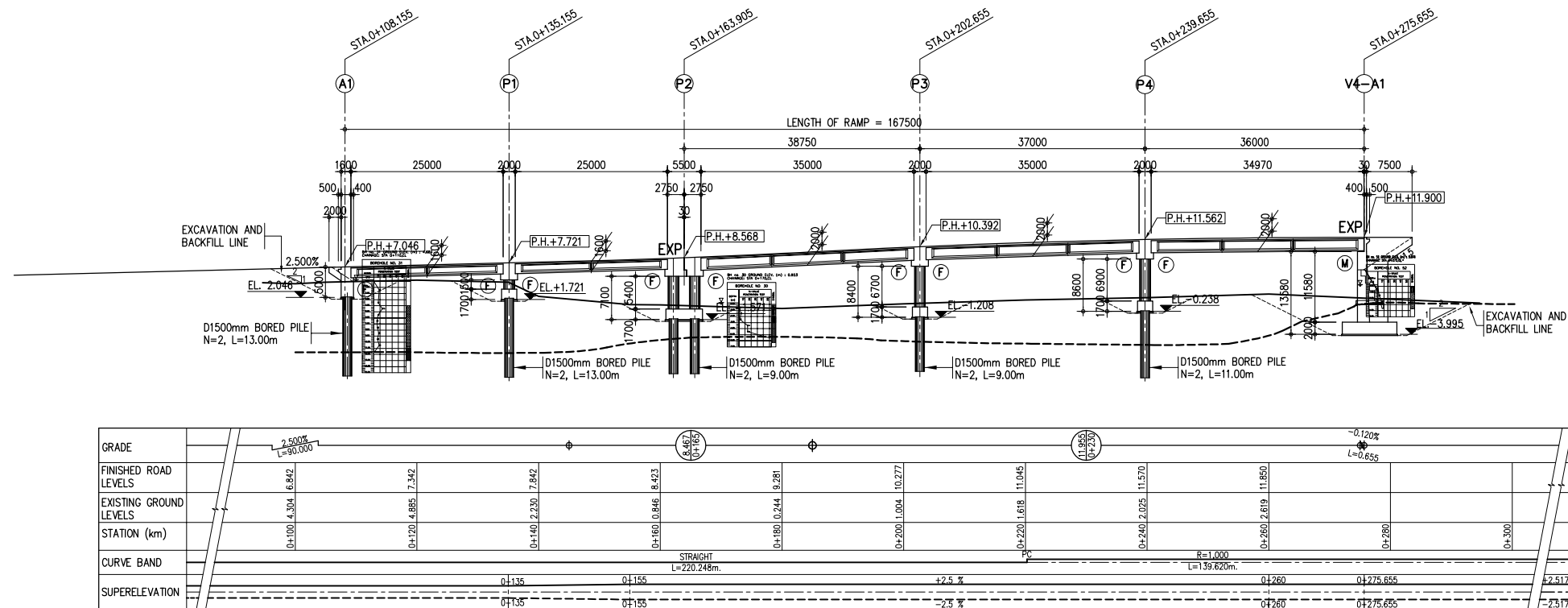


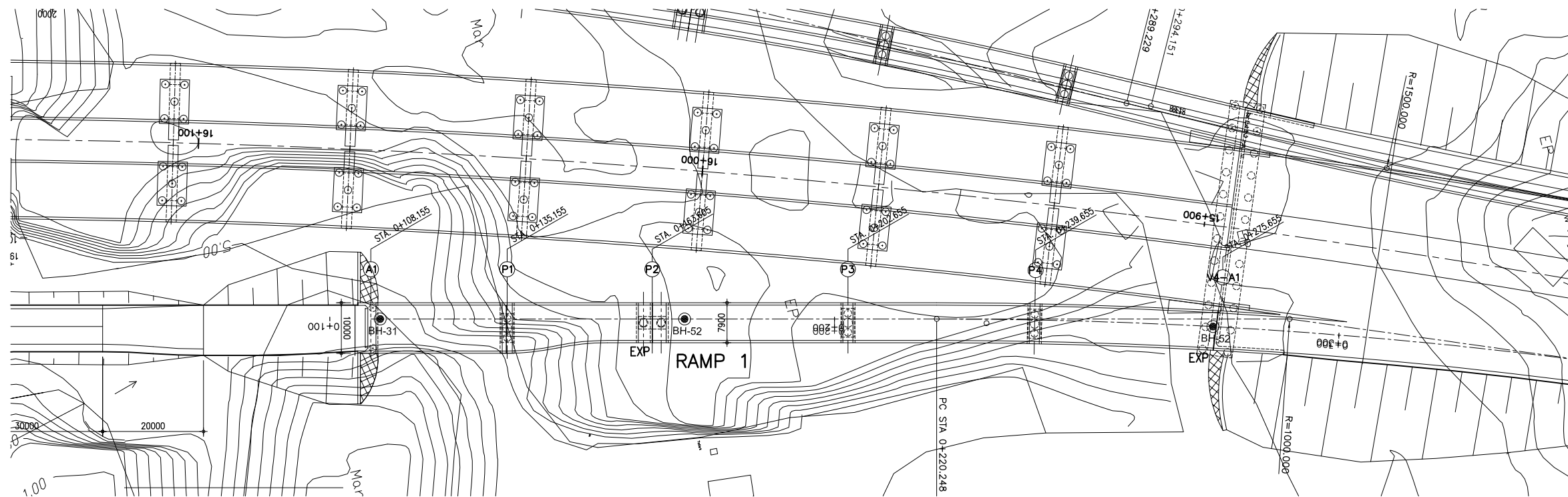
TABLE FOR P.H	
PIER NO.	P.H.
P1	17.029
P2	18.149
ABUT. A1	15.099
V1-P5	18.431

VIADUCT NO. 9 (V9) - B214 IC RAMP-1 BRIDGE

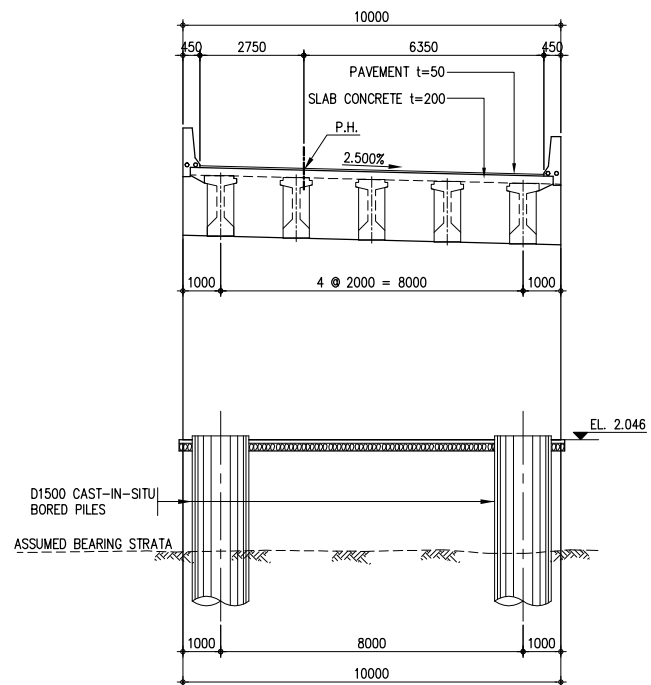
GENERAL VIEW (STA. 0+073.330 - STA. 0+312.830)



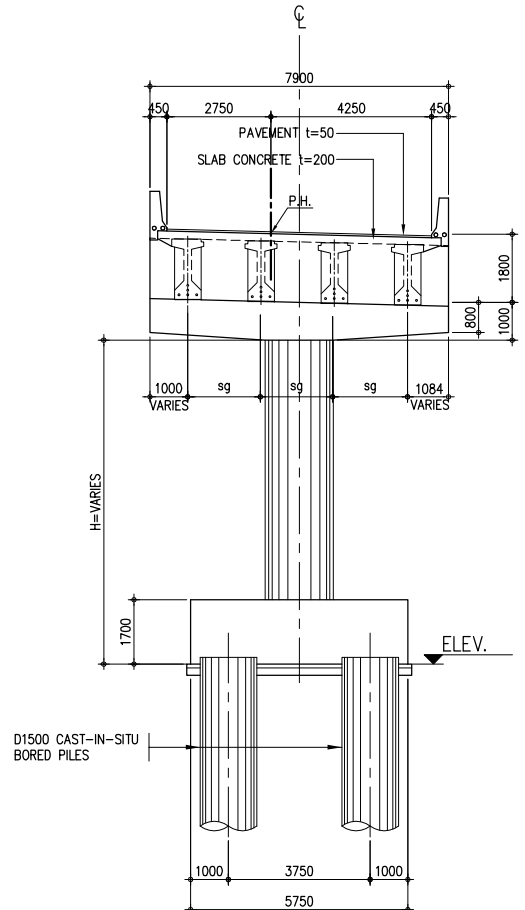
2 PROFILE OF RAMP 1
(STA. 0+108.155 - STA. 0+275.655)
SCALE 1:500



1 GENERAL PLAN OF RAMP 1
(STA. 0+108.155 - STA. 0+275.655)
SCALE 1:500



1 CROSS SECTION OF ABUTMENT
SCALE 1:100

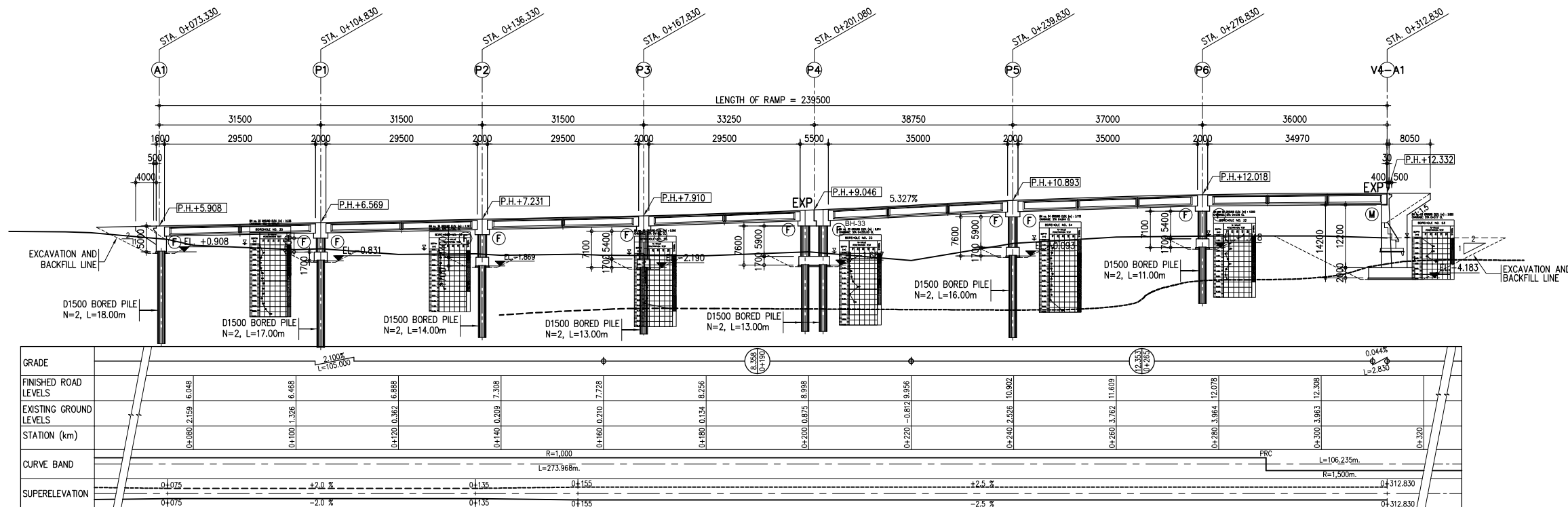


2 TYPICAL CROSS SECTION OF PIER
SCALE 1:100

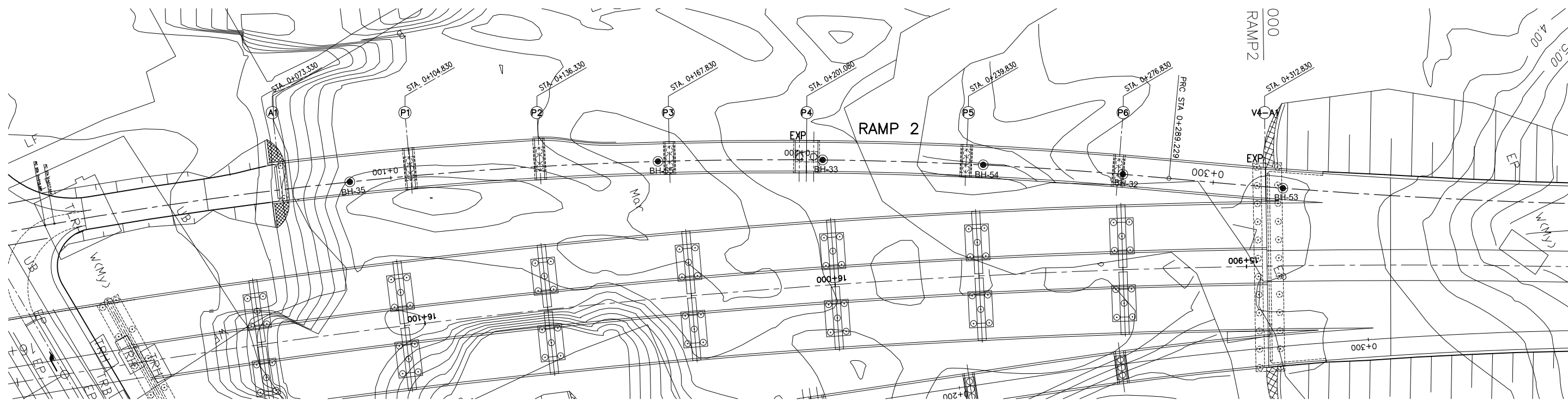
TABLE FOR P.H	
PIER NO.	P.H.
P1	7.721
P2	8.451
P3	10.392
P4	11.562
ABUT. A1	7.046
ABUT. V4-A1	11.900

VIADUCT NO. 10 (V10) - B214 IC RAMP-2 BRIDGE

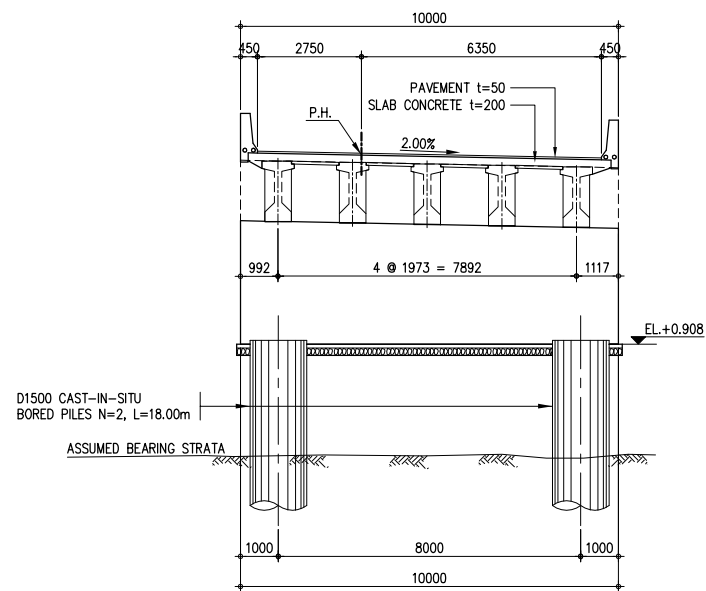
GENERAL VIEW (STA. 0+073.330 - STA. 0+312.830)



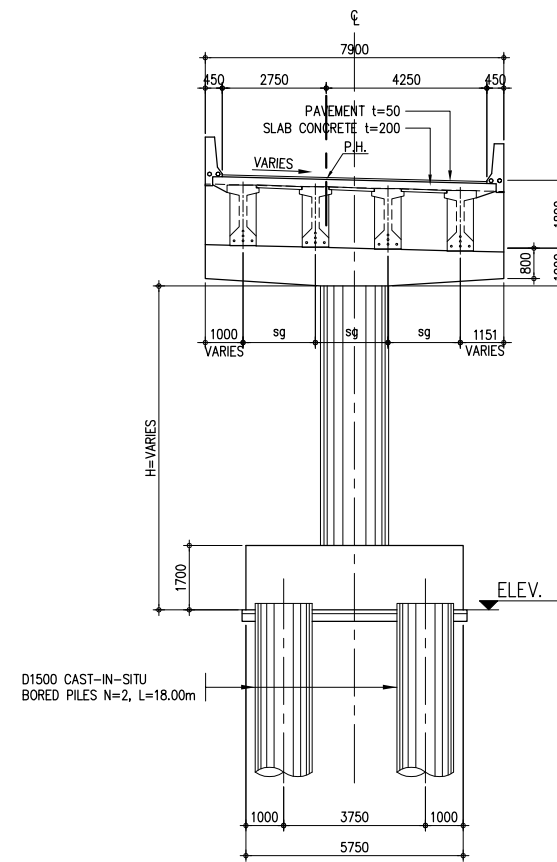
2 PROFILE OF RAMP 2 (STA. 0+073.330-STA. 0+312.830) SCALE 1:500



1 GENERAL PLAN OF RAMP 2 (STA. 0+073.330-STA. 0+312.830) SCALE 1:500



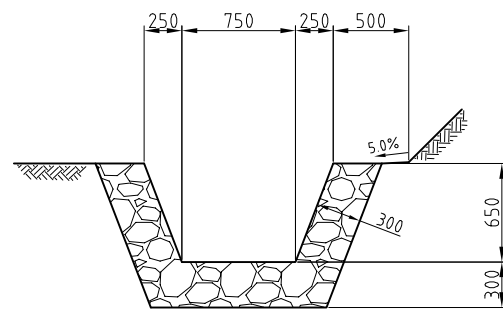
1 CROSS SECTION OF ABUTMENT
SCALE 1:100



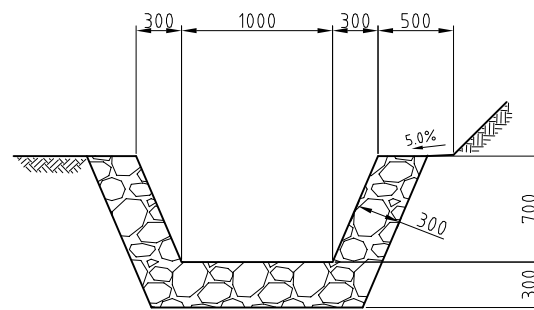
2 TYPICAL CROSS SECTION OF PIER
SCALE 1:100

TABLE FOR P.H	
PIER NO.	P.H.
P1	6.569
P2	7.231
P3	7.910
P4	8.913
P5	10.893
P6	12.018
ABUT. A1	5.908
ABUT. V4-A1	12.332

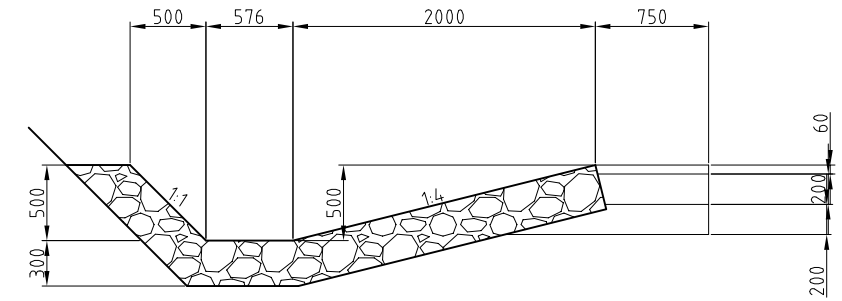
L. DRAINAGE FACILITIES



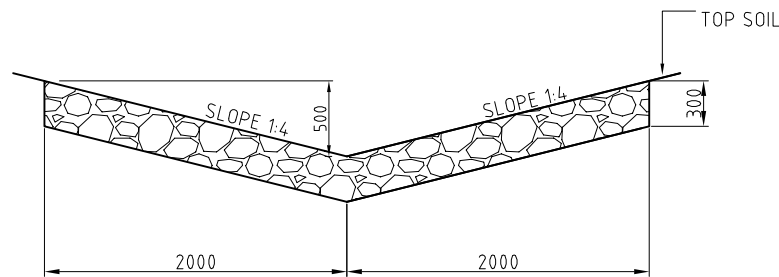
TYPE "DS (M)-A"
SIDE DITCH
SCALE - 1:25



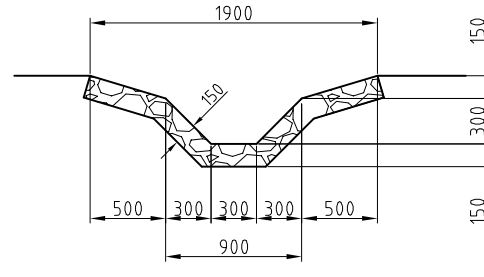
TYPE "DS (M)-B"
SIDE DITCH
SCALE - 1:25



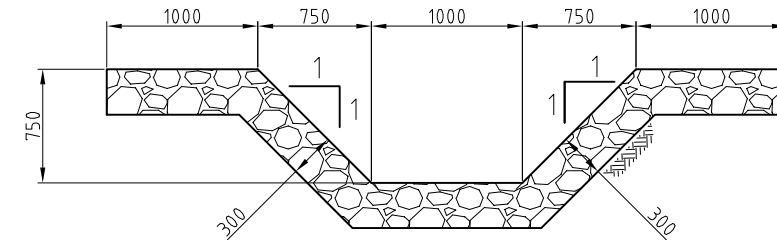
TYPE "DS (M)-C"
SIDE DITCH
SCALE - 1:25



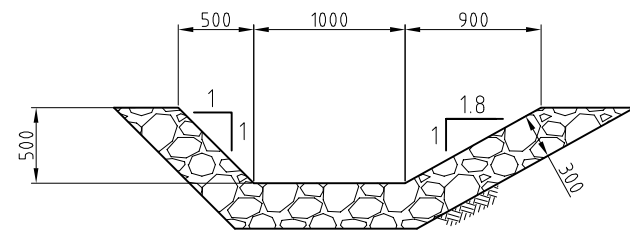
TYPE "DS (M)-D"
MEDIAN DITCH
SCALE - 1:25



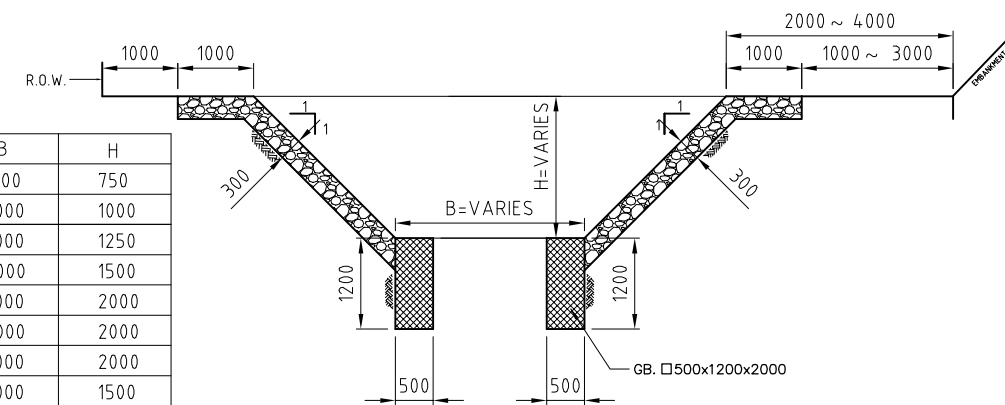
TYPE "DV (M)-E"
VERTICAL DITCH
SCALE - 1:25



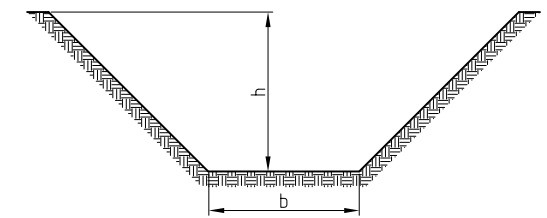
TYPE "DS (M)-H"
SIDE DITCH
SCALE - 1:25



TYPE "DS (M)-I"
SIDE DITCH
SCALE - 1:25



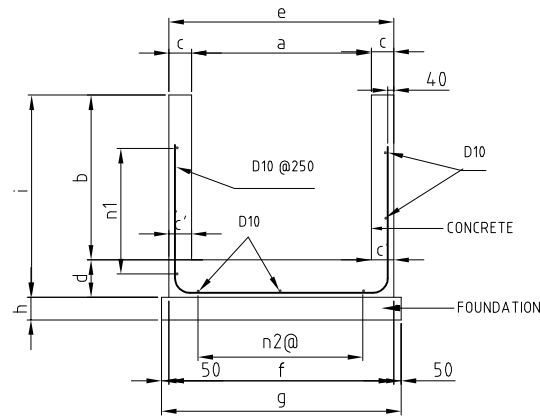
TYPE "DS (M)-G"
SIDE DITCH
SCALE - 1:50



TYPE "DS(E)"
EARTH DRAIN

TYPE	B	H
a	1500	750
b	2000	1000
c	3000	1250
d	4000	1500
e	5000	2000
f	6000	2000
g	7000	2000
h	8000	1500
i	10000	1500
j	21000	3100
k	15500	3700
l	6000	1500
m	2500	750
n	3500	1500
o	6000	2500
p	7000	2500
q	7500	1500
r	9000	1500
s	12000	1500
t	13000	1500
u	16000	2000

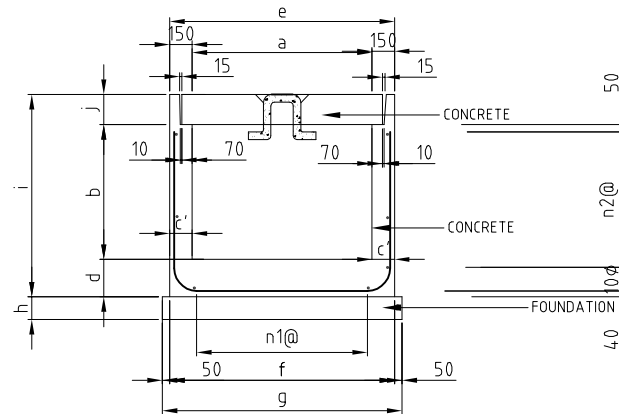
TYPE	SIZE b x h (mm)
DS(E)-A	500 x 500
DS(E)-B	700 x 600
DS(E)-C	1000 x 700
DS(E)-D	1200 x 800



CONCRETE TYPE
DS(C) - A
SCALE - 1:50

TYPE	ITEMS	DIMENSION (MM)									
		a	b	c	c'	d	e	f	g	h	i
a		300	300	120	120	120	540	540	640	100	420
b		450	450	120	120	120	690	690	790	100	570
c		600	600	150	150	150	900	900	1000	100	750
d		800	800	150	150	150	1100	1100	1200	150	950
e		1800	800	150	150	150	2100	2100	2200	150	950

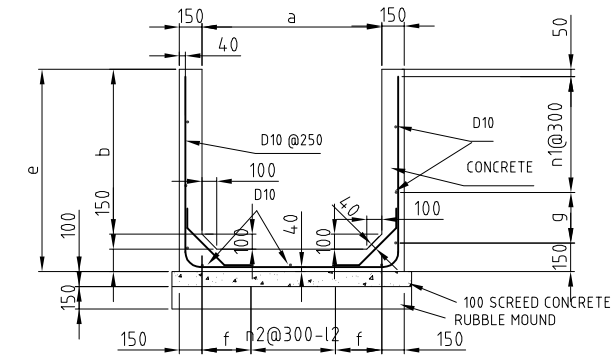
TYPE	ITEMS	DIMENSION (MM)									STEEL BAR			REMARKS
		a	b	R	n1	n2	L1	L2	L3	R1	R2	R3		
a		300	300	100	1	2	230	260	157	40-D10x1040	4-D10x10000	3-D10x10000	R1 c/c250	
b		450	450	100	2	2	380	410	157	40-D10x1490	6-D10x10000	3-D10x10000	c/c250	
c		600	600	100	3	3	560	620	157	40-D10x2060	8-D10x10000	4-D10x10000	c/c250	
d		800	800	130	3	4	730	760	204	50-D10x2660	6-D10x10000	5-D10x10000	c/c250	



CONCRETE TYPE
DS(C) - B
SCALE - 1:50

TYPE	ITEMS	DIMENSION (MM)										
		a	b	c	d	e	f	g	h	i	j	k
a		300	300	150	150	600	600	700	100	580	130	440
b		450	450	150	150	750	750	850	100	760	160	590
c		600	600	150	150	900	900	1000	100	930	180	740
d		800	800	150	150	1100	1100	1200	150	1150	200	940

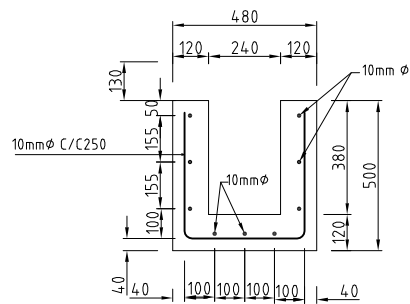
TYPE	ITEMS	DIMENSION (MM)									STEEL BAR			REMARKS
		a	b	R	n1	n2	L1	L2	L3	R1	R2	R3		
a		300	300	100	1	2	260	320	157	40-D10x1160	4-D10x10000	3-D10x10000	R1 c/c250	
b		450	450	100	2	2	380	410	157	40-D10x1610	6-D10x10000	3-D10x10000	c/c250	
c		600	600	100	3	3	560	620	157	40-D10x2060	8-D10x10000	4-D10x10000	c/c250	
d		800	800	100	3	4	730	820	204	50-D10x2660	8-D10x10000	5-D10x10000	c/c250	



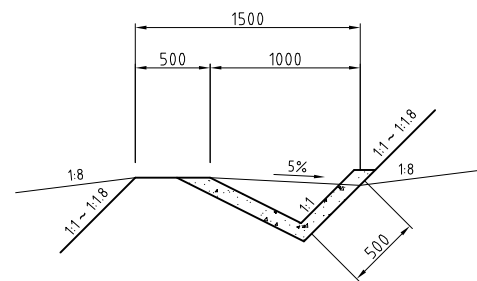
CONCRETE TYPE
DS(C) - C
SCALE - 1:50

TYPE	ITEMS	DIMENSION (MM)				
		a	b	c	d	e
a		1000	1000	1300	1400	1150
b		1200	1200	1500	1600	1350
c		1300	1300	1600	1700	1450
d		1500	1500	1800	1900	1650

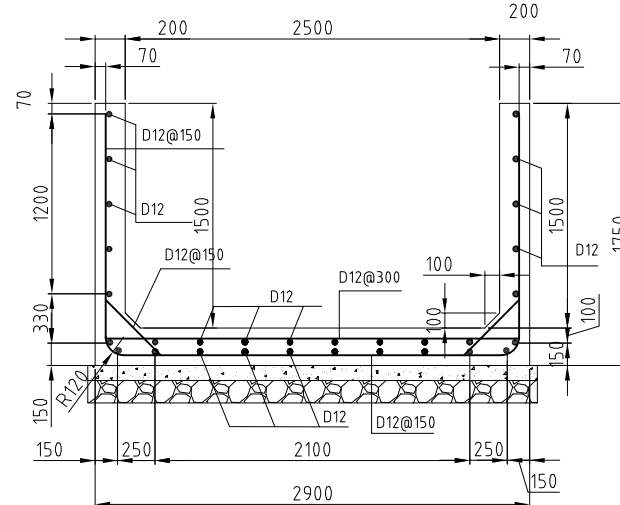
TYPE	ITEMS	DIMENSION (MM)											
		a	b	c	e	f	g	n1	l1	n2	l2		
a		1000	1000	1300	1150	200	350	2	600	2	600		
b		1200	1200	1500	1350	300	250	3	900	2	600		
c		1300	1300	1600	1450	200	350	3	900	3	900		
d		1500	1500	1800	1650	300	250	4	1200	3	900		



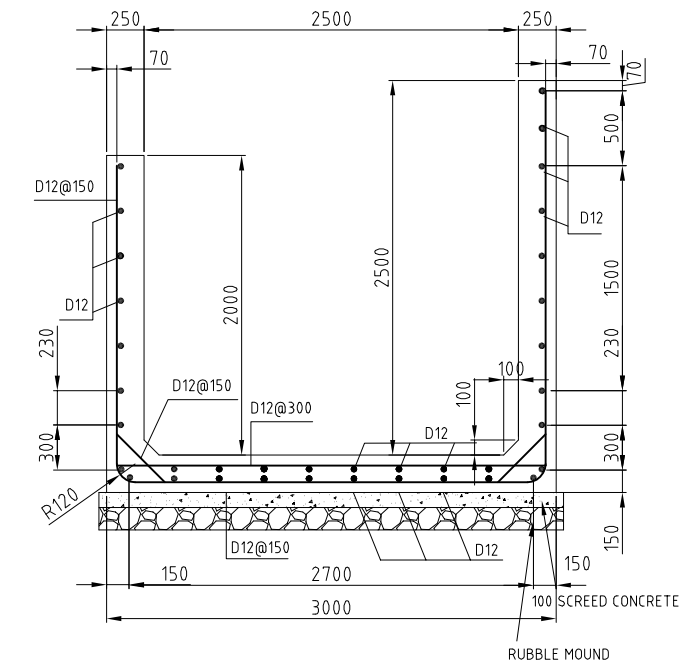
CONCRETE TYPE DS(C) - D
CENTER MEDIAN OF THE RAMP WAY
SCALE - 1:25



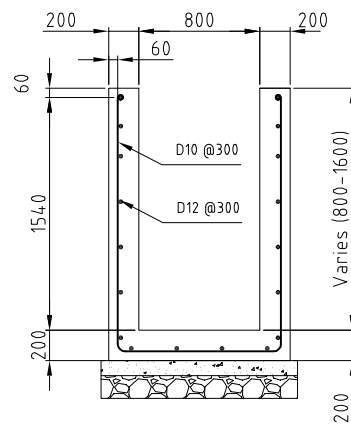
CONCRETE TYPE DS(C) - E
SCALE - 1:25



CONCRETE TYPE
DS(C) - F
SCALE - 1:25

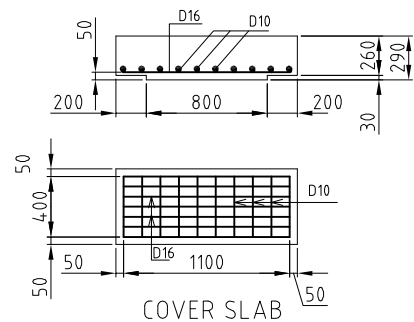


CONCRETE TYPE
DS(C) - G
SCALE - 1:25



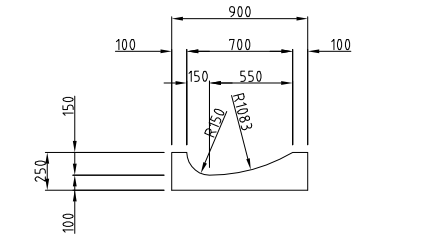
CONCRETE TYPE DS(C) - H

SCALE - 1:50



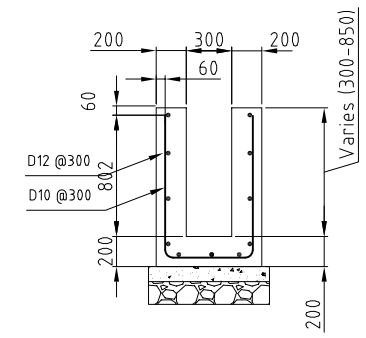
COVER SLAB RCV - H

SCALE - 1:25



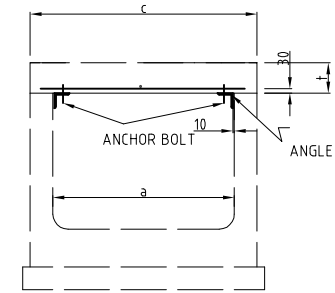
CONCRETE TYPE DS(C) - I
CENTER MEDIAN OF THE MAIN HIGHWAY

SCALE - 1:25



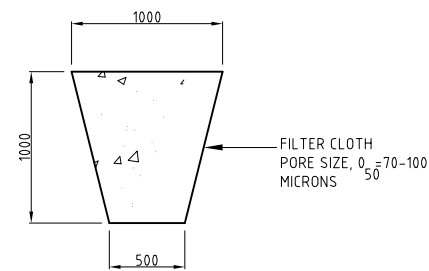
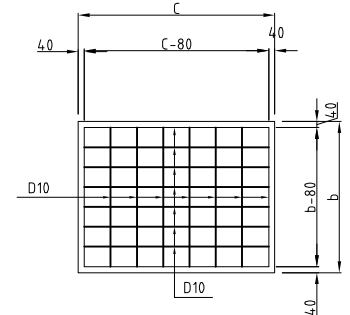
CONCRETE TYPE DS(C) - J

SCALE - 1:50



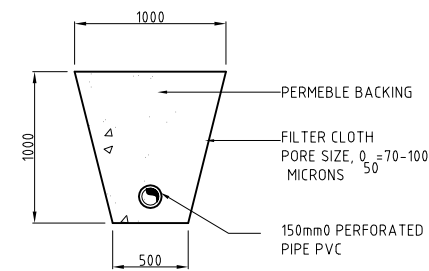
CONCRETE TYPE RCV

SCALE - 1:25



TYPE "DSS (G)-A" SUBSURFACE DRAIN

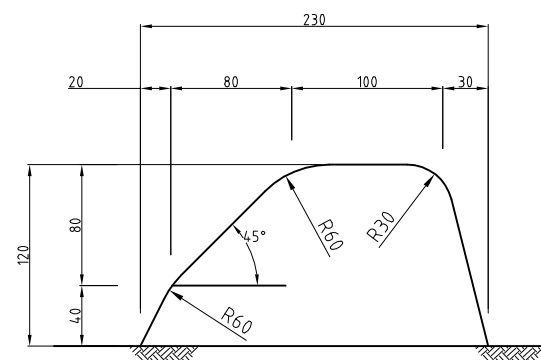
SCALE - 1:25



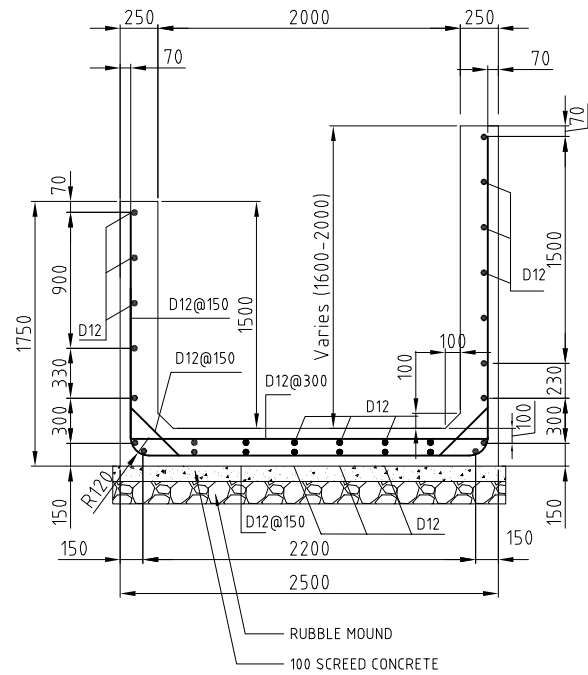
TYPE "DSS (G/P)-B" SUBSURFACE DRAIN

SCALE - 1:25

TYPE	ITEMS	DIMENSION (MM)			
		a	b	c	t
a		1000	1000	1300	110
b		1200	1000	1500	120
c		1300	1000	1600	120
d		1500	1000	1800	130

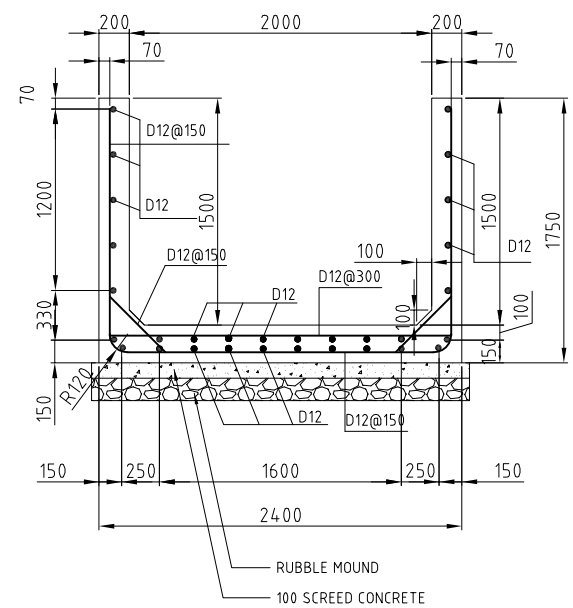


ASPHALT KERB DETAIL TYPE AS-CB



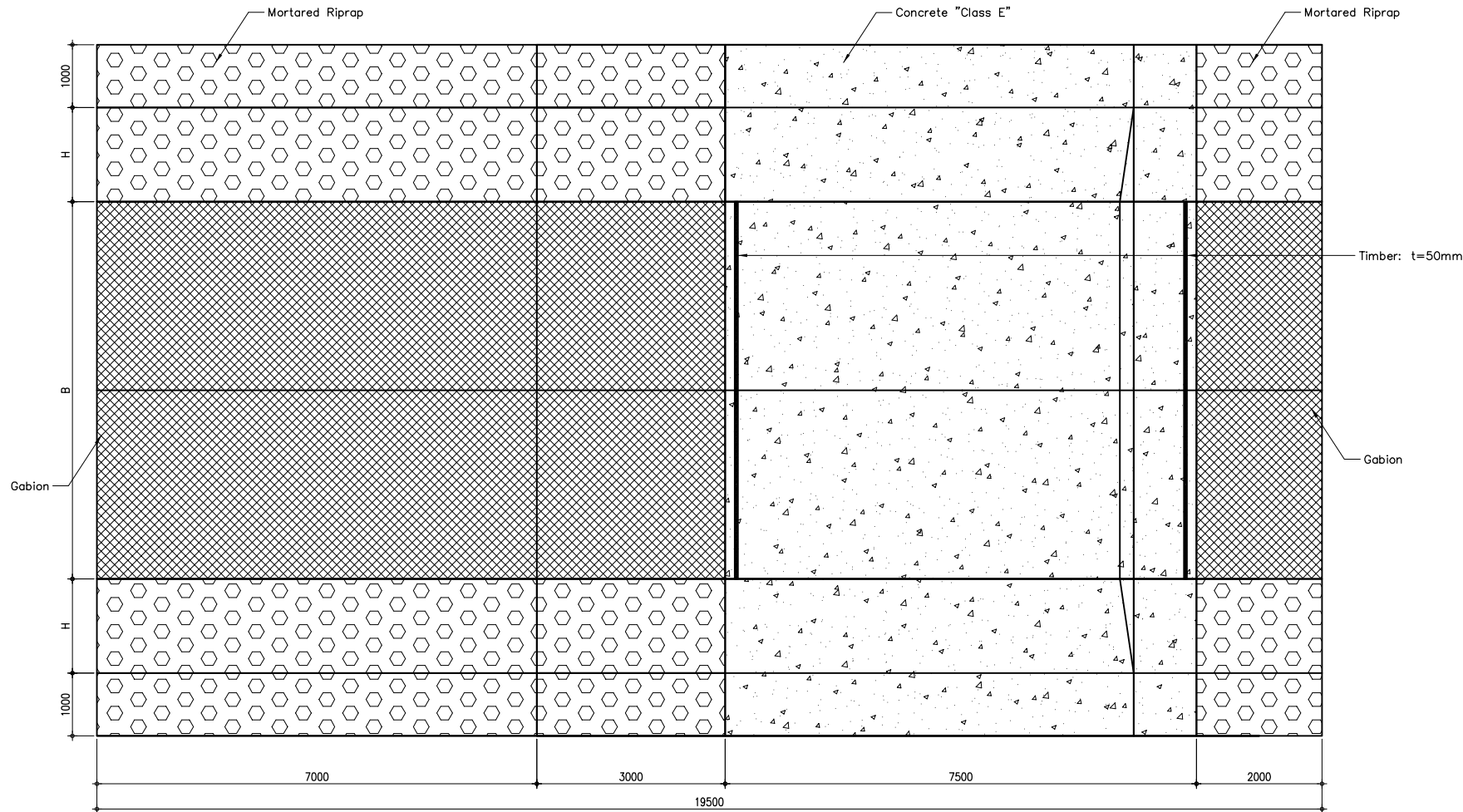
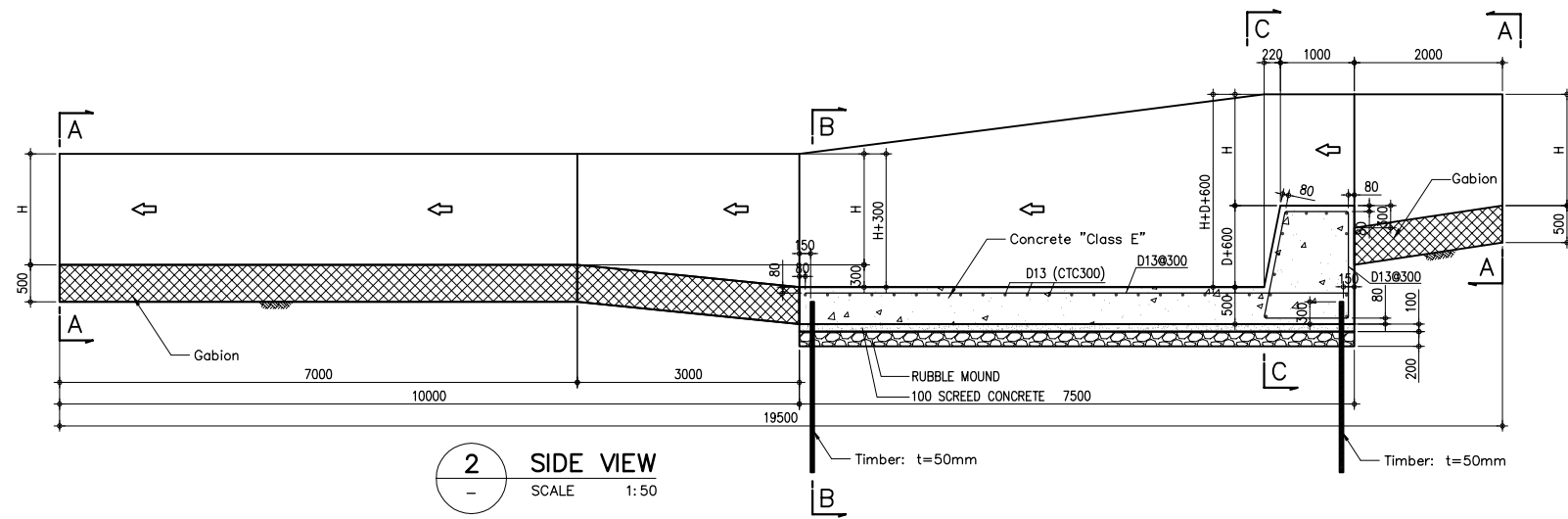
CONCRETE TYPE DS(C) - K

SCALE - 1:25



CONCRETE TYPE DS(C) - N

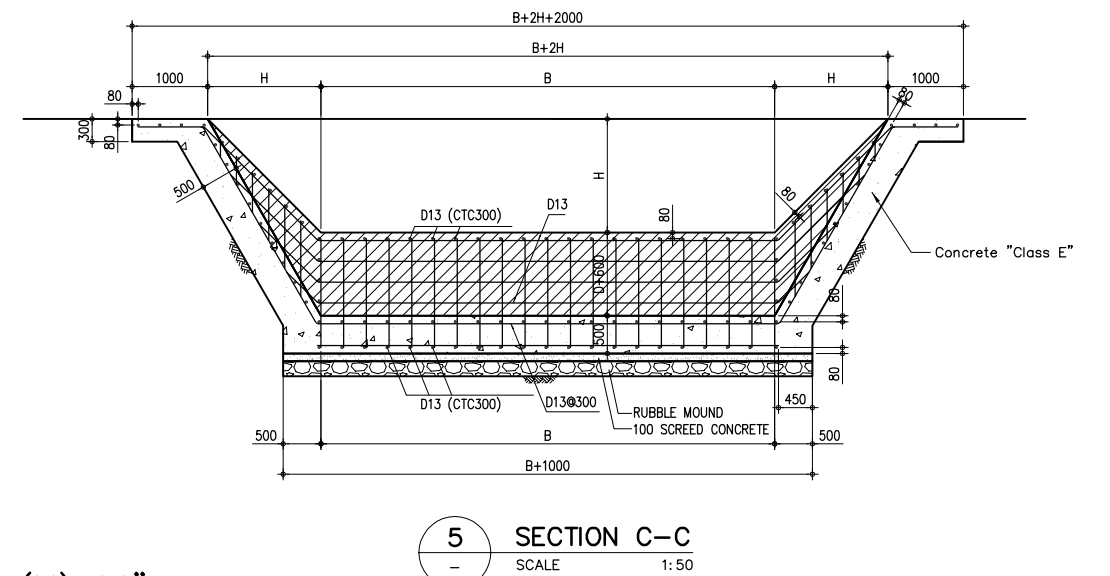
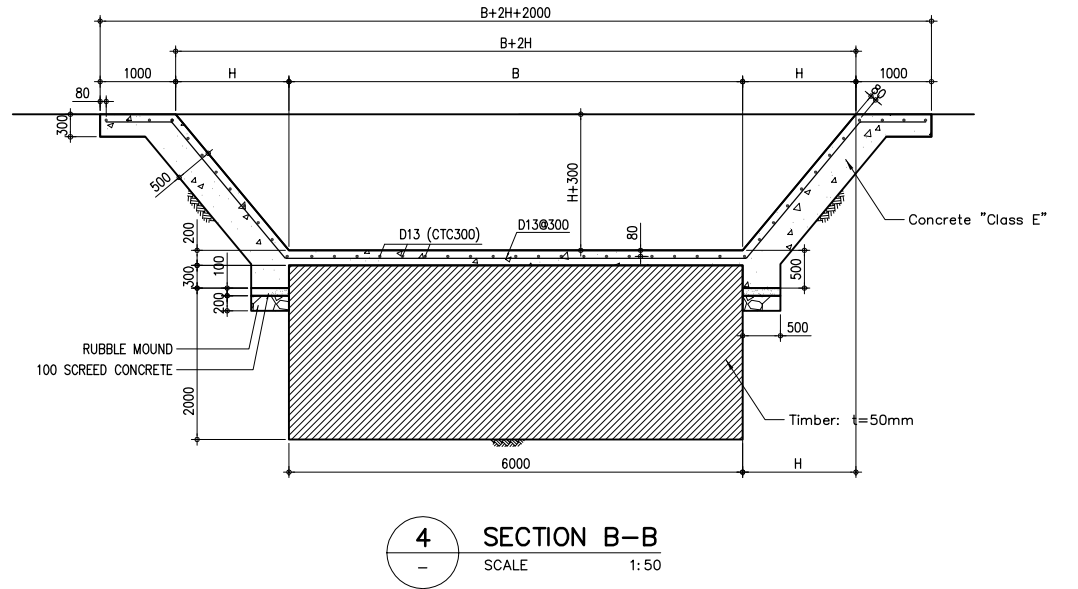
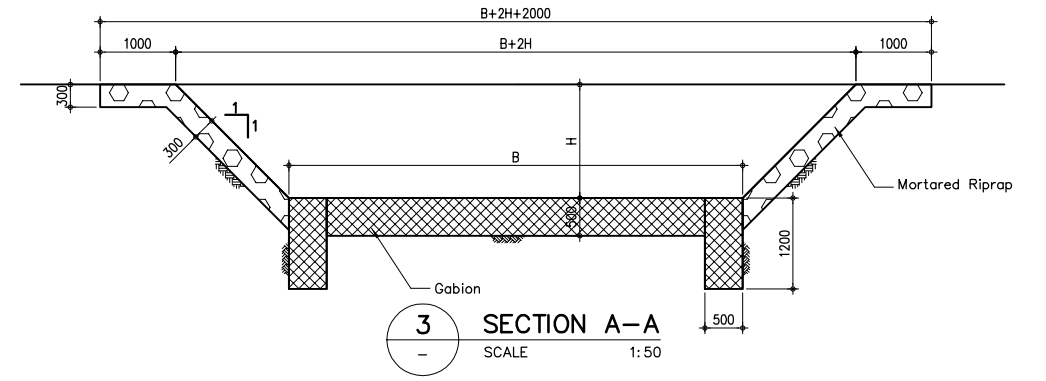
SCALE - 1:25



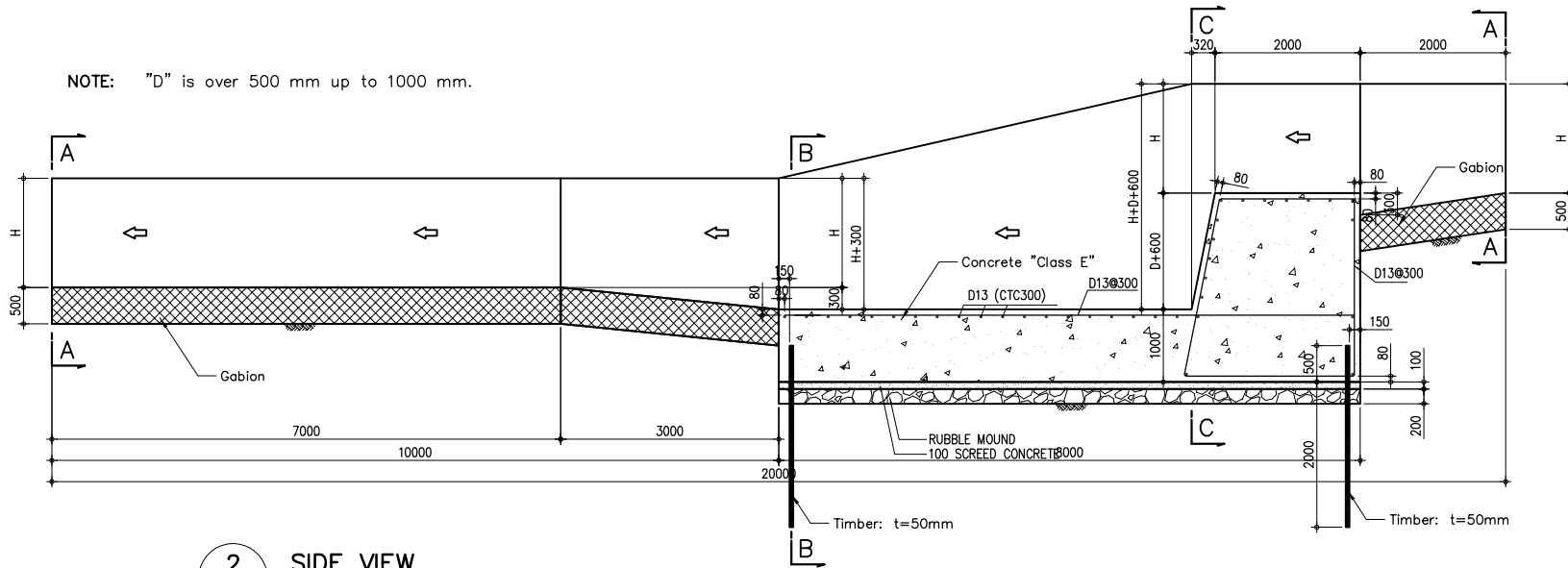
NOTE: "D" is up to 500 mm.

1 PLAN
SCALE 1:50

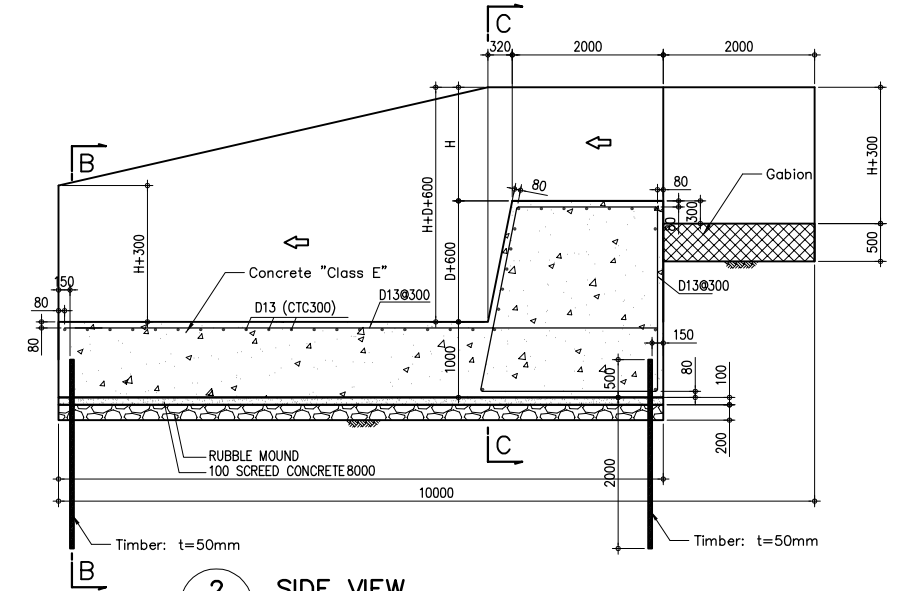
A TYPE "CDS (M)-L1"
SCALE AS SHOWN



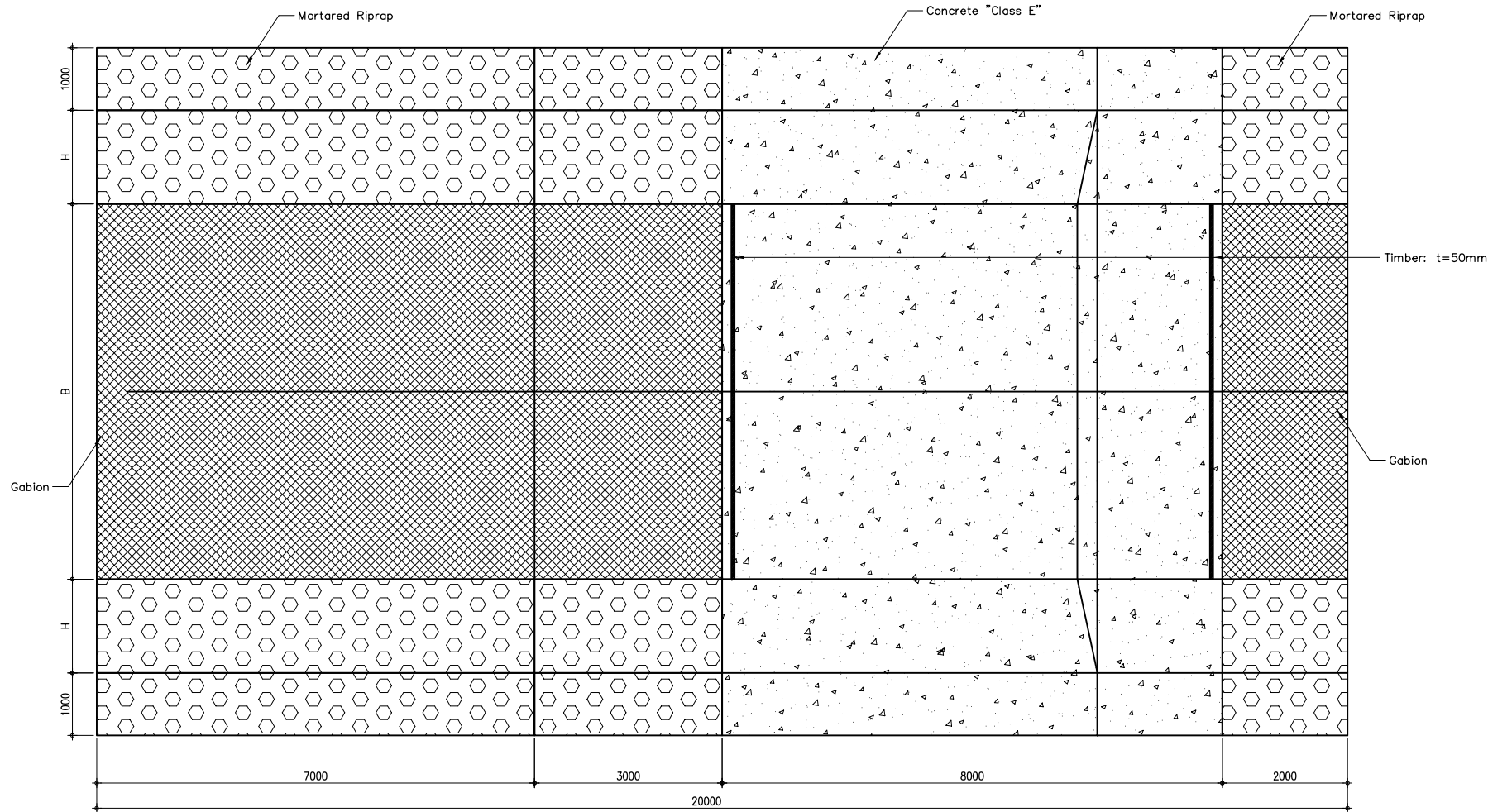
NOTE: "D" is over 500 mm up to 1000 mm.



2 SIDE VIEW
SCALE 1:50

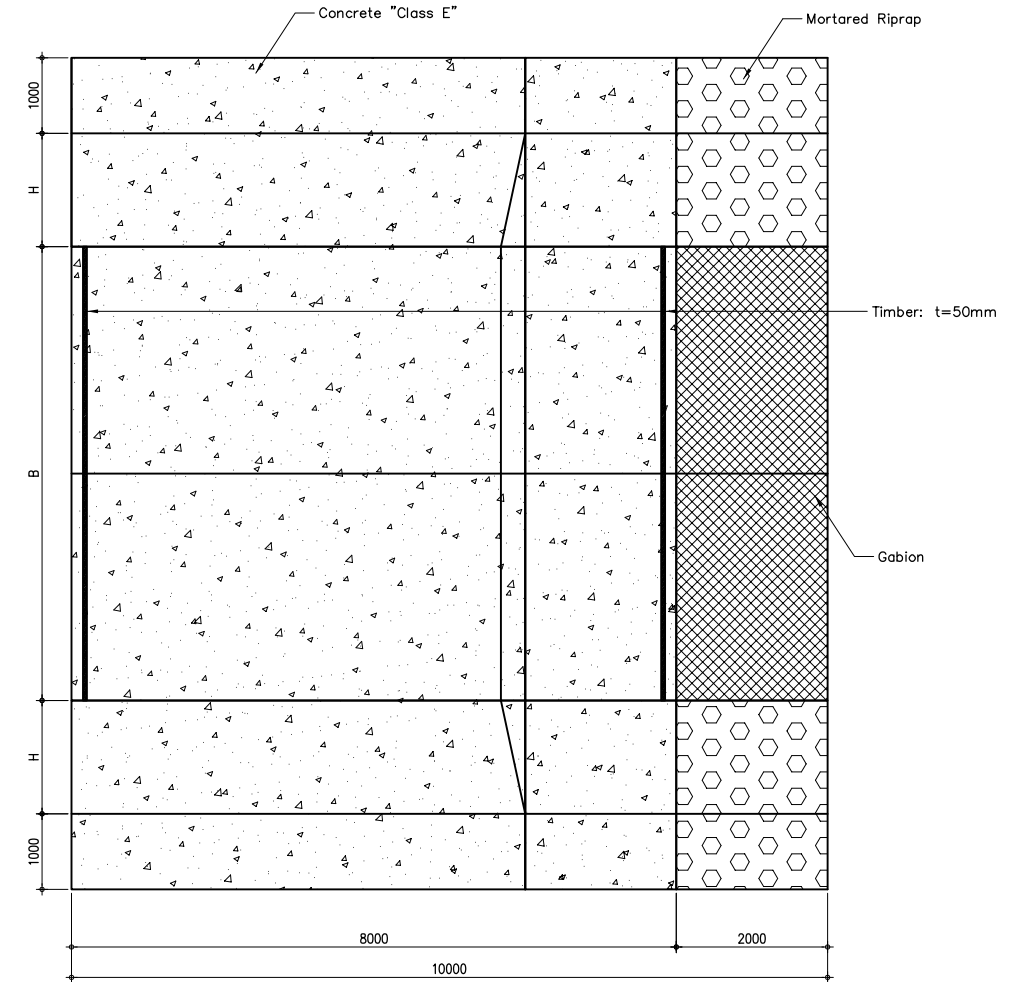


2 SIDE VIEW
SCALE 1:50



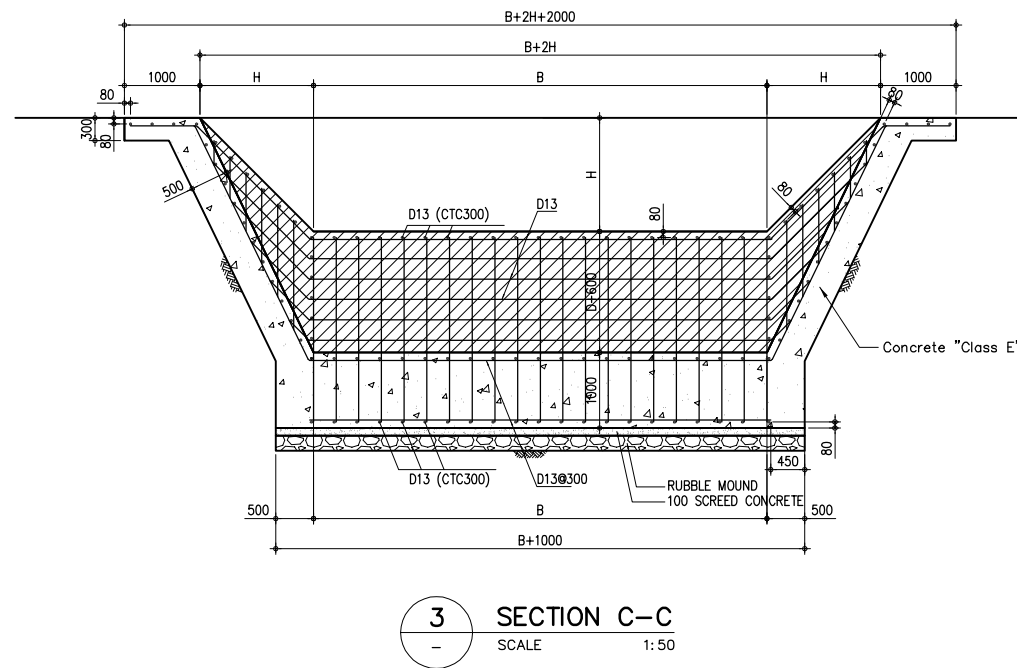
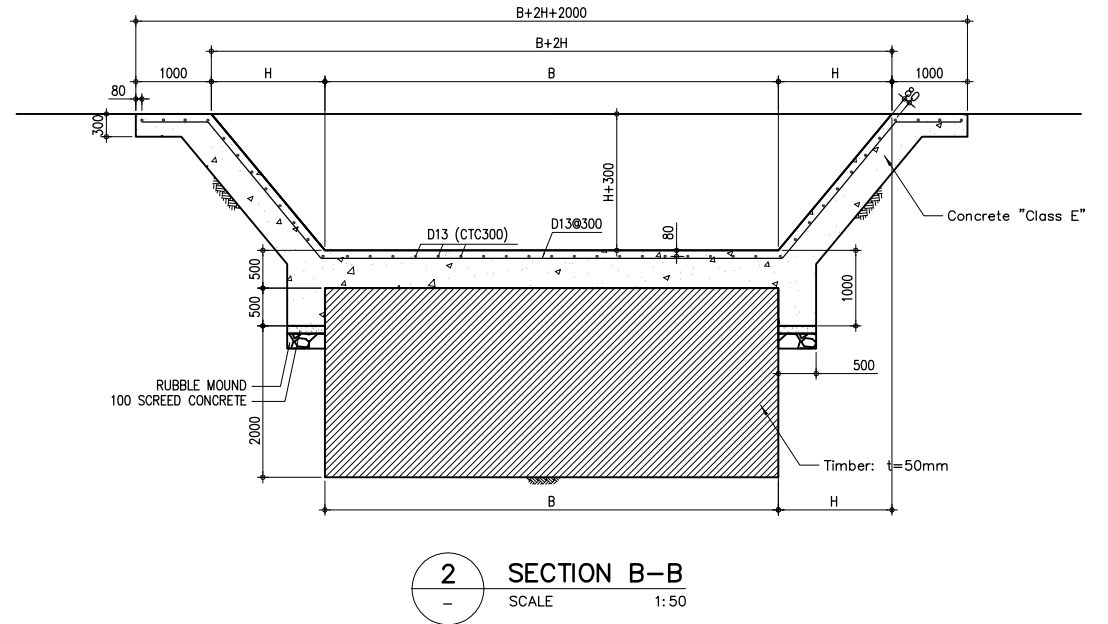
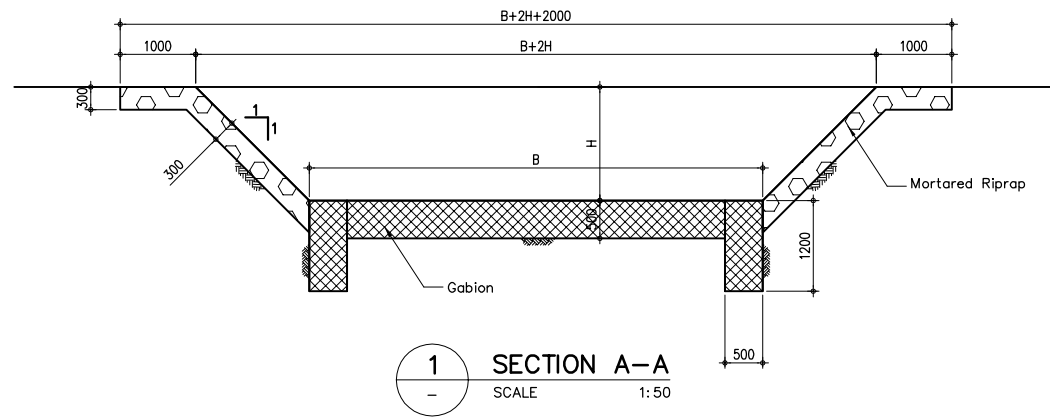
1 PLAN
SCALE 1:50

A TYPE "CDS (M)-H1"
SCALE AS SHOWN

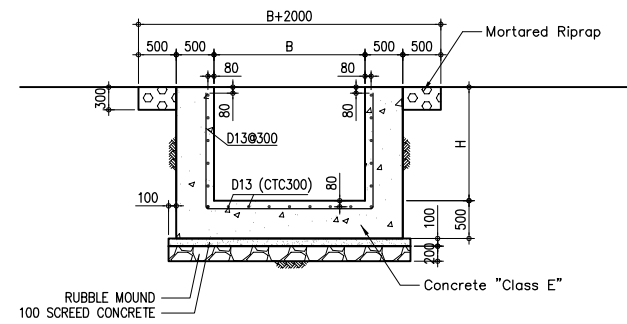


1 PLAN
SCALE 1:50

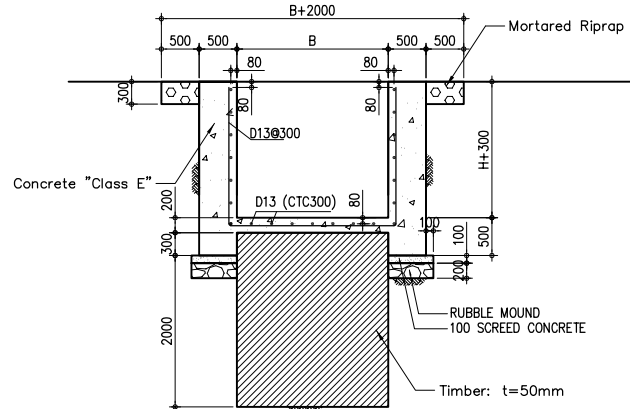
B TYPE "CDS (M)-H2"
SCALE AS SHOWN



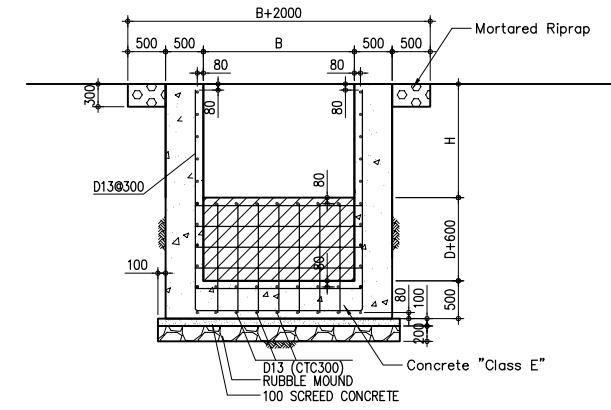
CROSS SECTION OF TYPE "CDS (M)-H"
SCALE AS SHOWN



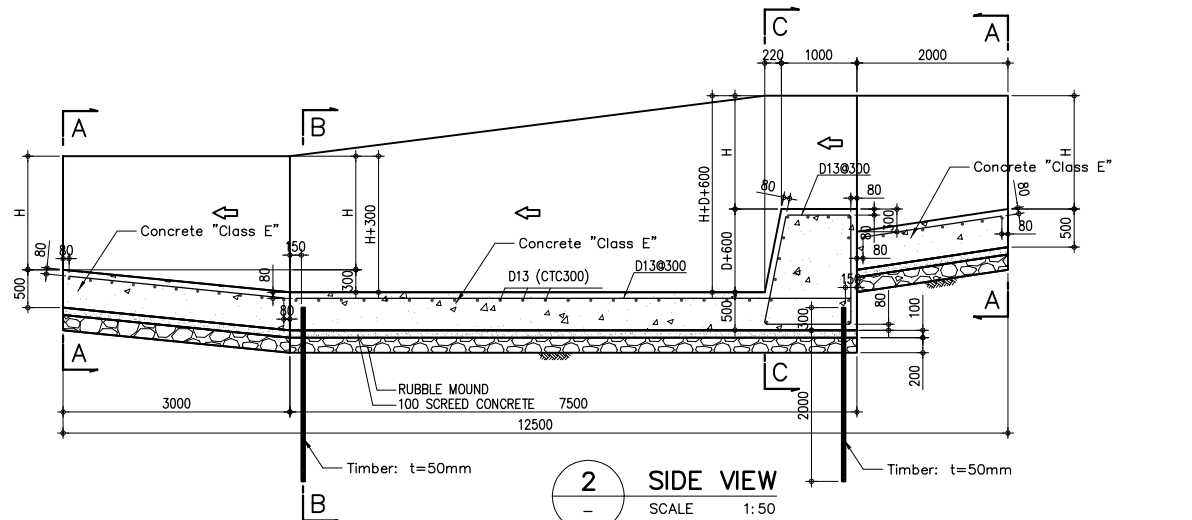
1 SECTION A-A
SCALE 1:50



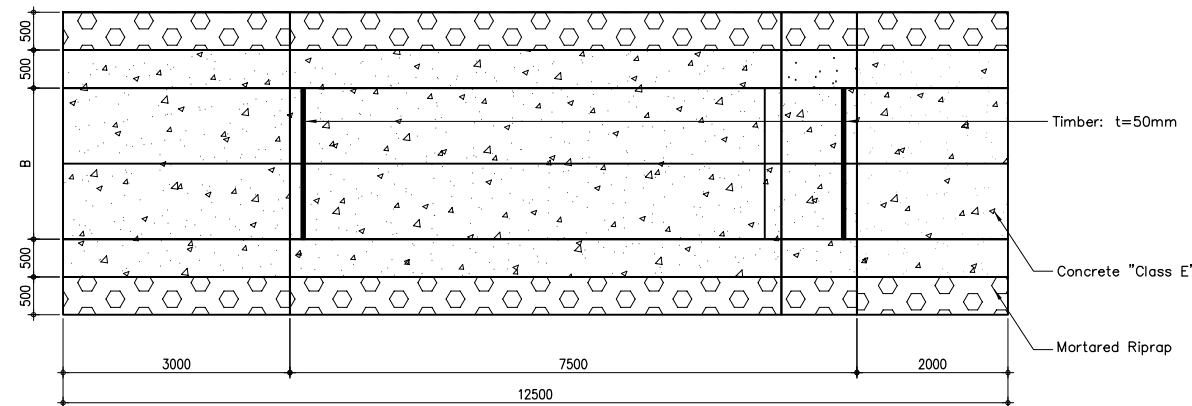
2 SECTION B-B
SCALE 1:50



3 SECTION C-C
SCALE 1:50



2 SIDE VIEW
SCALE 1:50



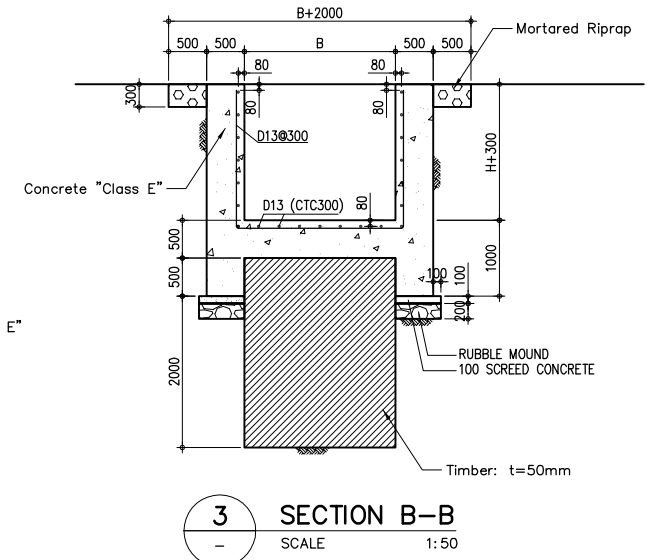
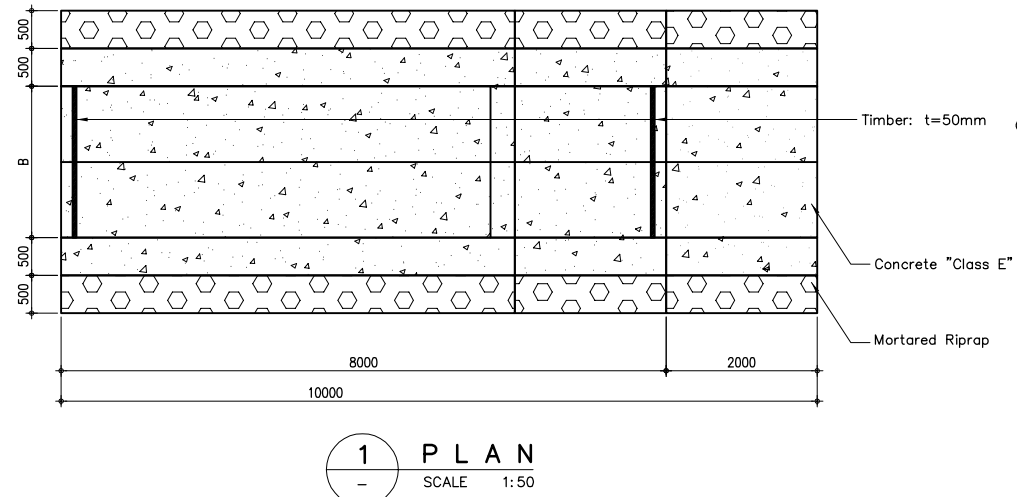
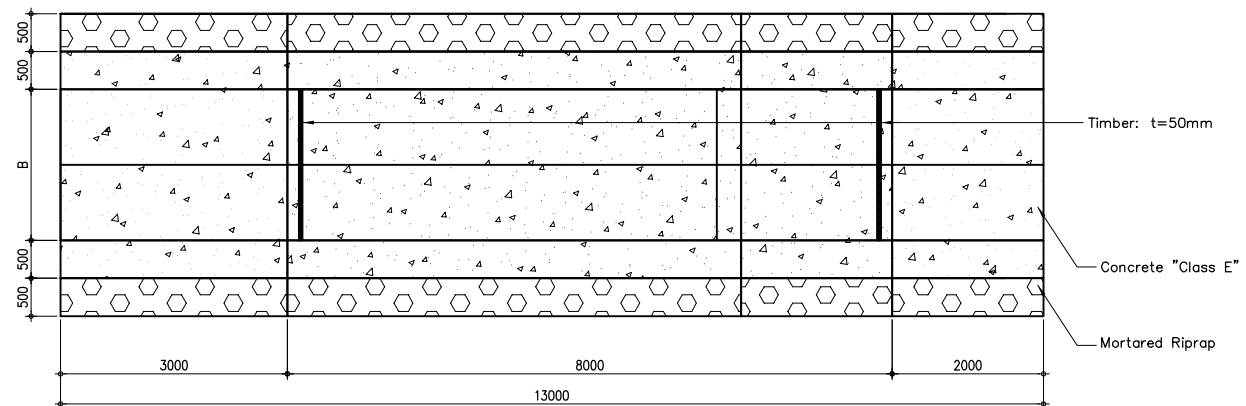
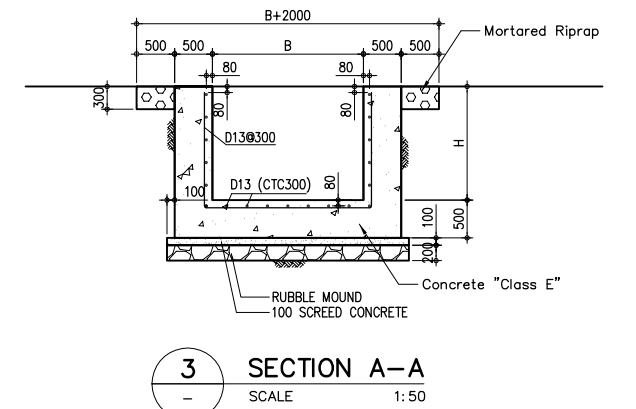
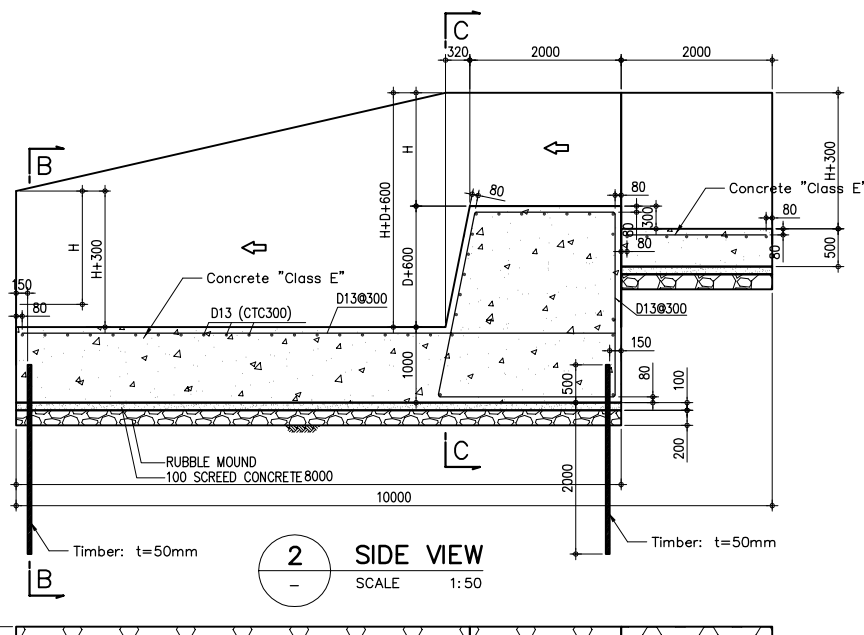
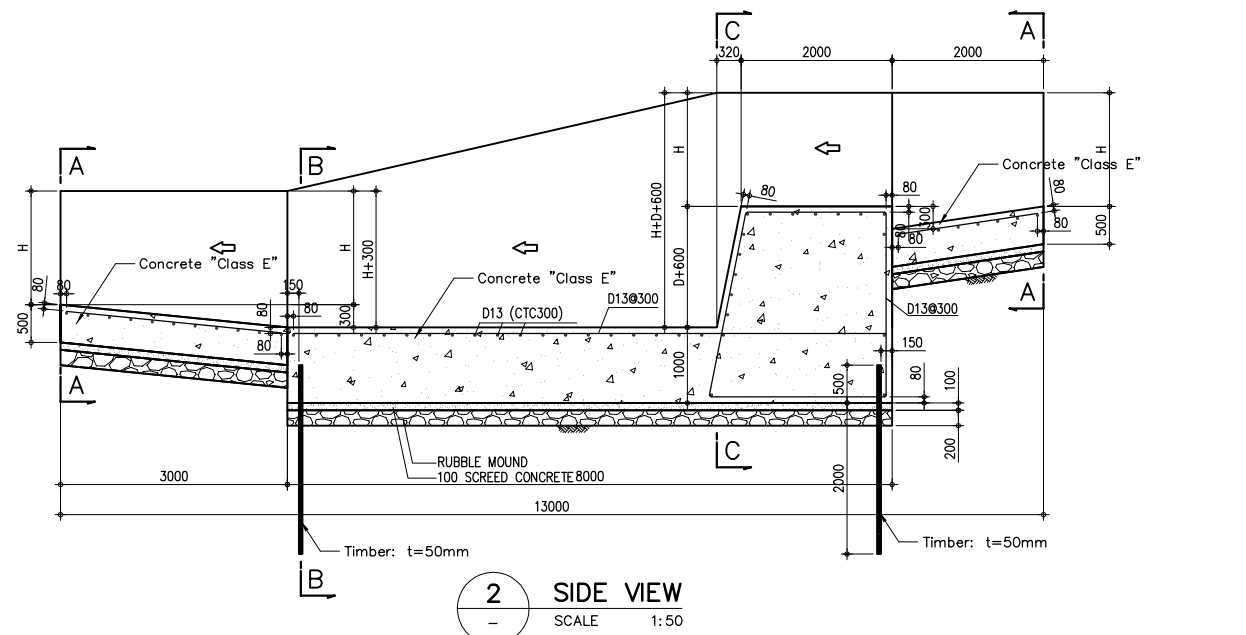
1 PLAN
SCALE 1:50

A TYPE "CDS (C)-L1"
SCALE AS SHOWN

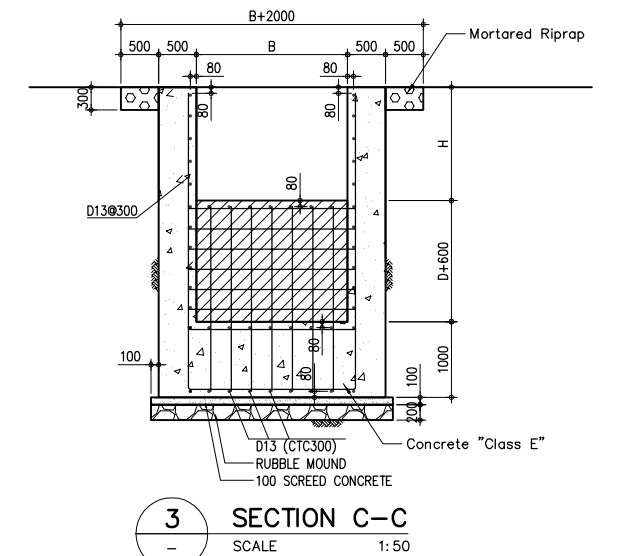
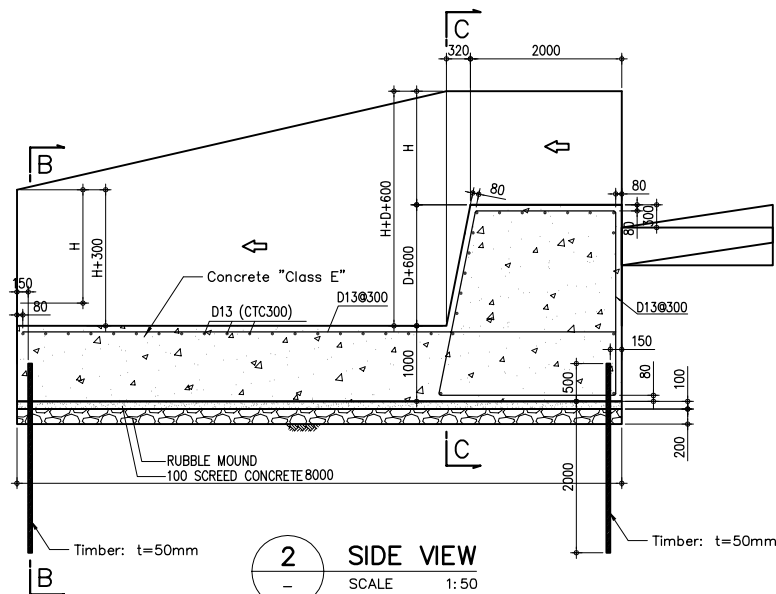
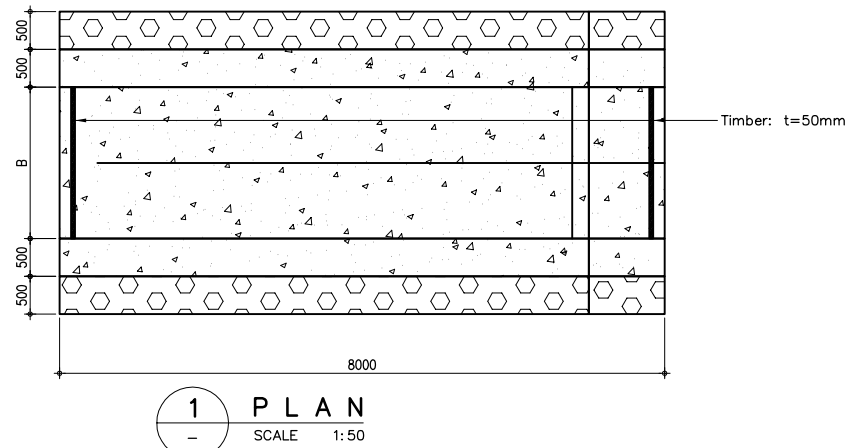
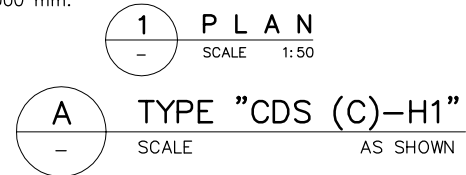
LIST OF CHANNEL DROP STRUCTURES FOR "DS(C)-F" & "DS(C)-N"

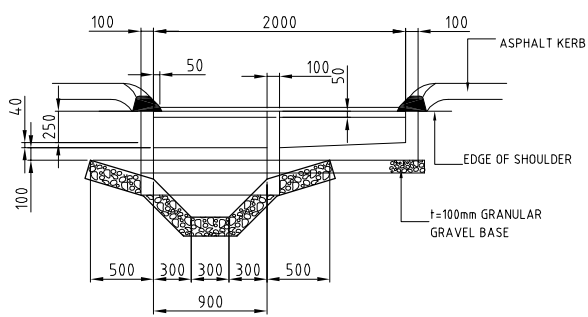
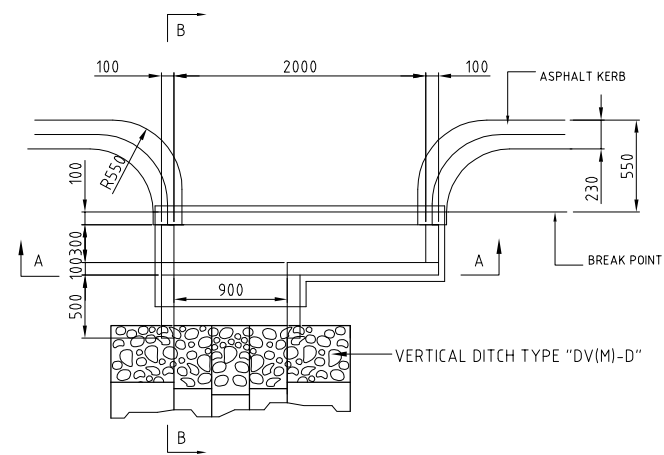
ALIGNMENT	RIGHT/LEFT	STATION	TYPE	B	H	D
A1 BYPASS	LEFT	0+140	CDS(C)-H1b	2000	1500	1000
A1 BYPASS	LEFT	0+160	CDS(C)-H2b	2000	1500	1000
A1 BYPASS	LEFT	0+170	CDS(C)-H2b	2000	1500	1000
A1 BYPASS	LEFT	0+180	CDS(C)-H1b	2000	1500	1000
A1 BYPASS	LEFT	0+200	CDS(C)-H3b	2000	1500	1000
A1 BYPASS	LEFT	0+207	CDS(C)-H3b	2000	1500	1000
A1 BYPASS	LEFT	0+214	CDS(C)-H3b	2000	1500	1000
A1 BYPASS	LEFT	0+220	CDS(C)-H2b	2000	1500	1000
A1 BYPASS	LEFT	0+230	CDS(C)-H2b	2000	1500	1000
A1 BYPASS	LEFT	0+240	CDS(C)-H1b	2000	1500	800
A1 BYPASS	LEFT	0+260	CDS(C)-H2b	2000	1500	900
A1 BYPASS	LEFT	0+270	CDS(C)-H1b	2000	1500	900
A1 BYPASS	LEFT	0+390	CDS(C)-H2b	2000	1500	600
A1 BYPASS	LEFT	0+400	CDS(C)-L1b	2000	1500	500
A1 BYPASS	LEFT	0+420	CDS(C)-L1b	2000	1500	500
A1 BYPASS	LEFT	0+460	CDS(C)-L1b	2000	1500	500
A1 BYPASS	LEFT	0+520	CDS(C)-L1b	2000	1500	464
A1 BYPASS	RIGHT	0+300	CDS(C)-L1a	2500	1500	500
A1 BYPASS	RIGHT	0+320	CDS(C)-L1a	2500	1500	500
A1 BYPASS	RIGHT	0+360	CDS(C)-L1a	2500	1500	500
A1 BYPASS	RIGHT	0+400	CDS(C)-L1a	2500	1500	500
A1 BYPASS	RIGHT	0+440	CDS(C)-L1a	2500	1500	500
Ramp-4, A1 Interchange	LEFT	0+300	CDS(C)-H1b	2000	1500	900

NOTE: "D" is up to 500 mm.

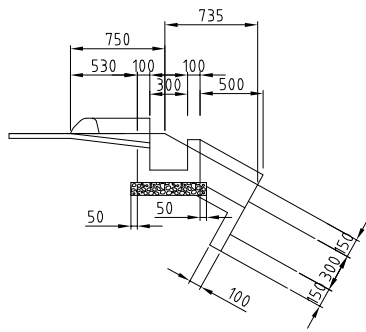


NOTE: "D" is over 500 mm up to 1000 mm.

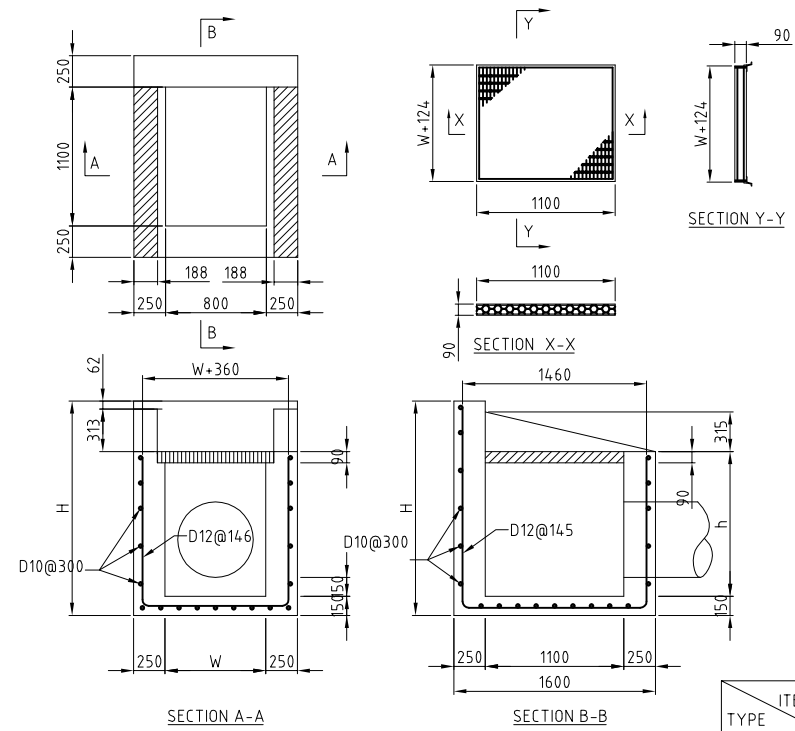




SECTION A-A
DETAILS OF CATCH BASIN TYPE "CB - A"



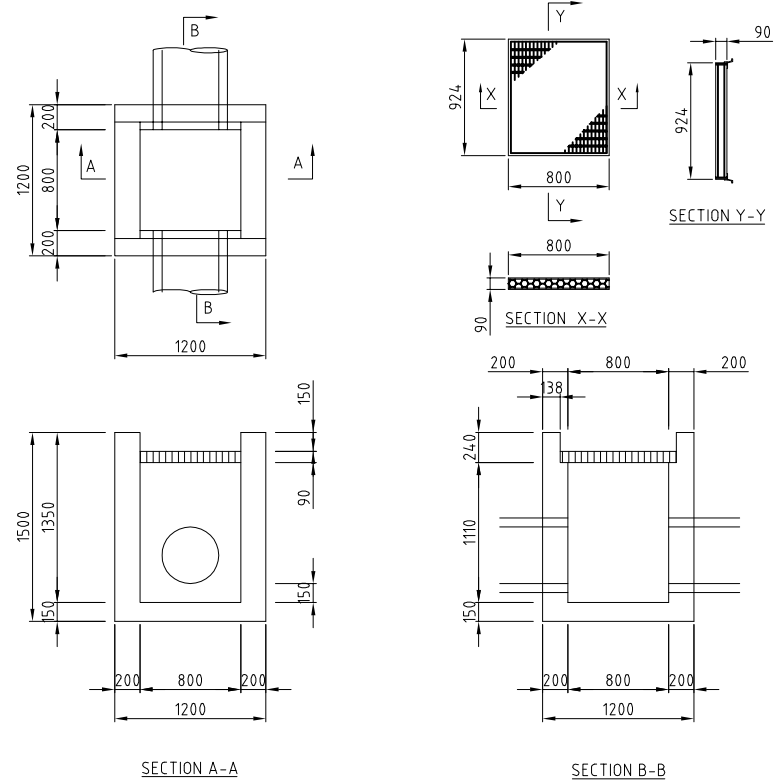
SECTION B-B



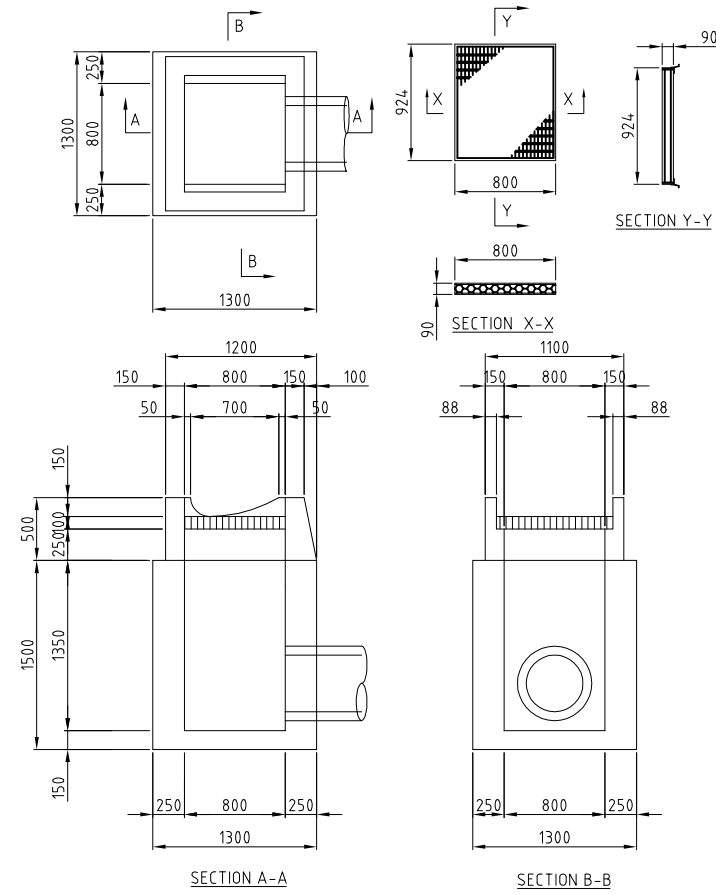
PLAN OF CATCH BASIN
TYPE "CB - B"
SCALE - 1:30

TYPE	ITEMS	DIMENSION (MM)		
		W	h	H
a		800	1150	1700
b		800	1450	2000
c		800	2100	2650
d		1200	1200	1750

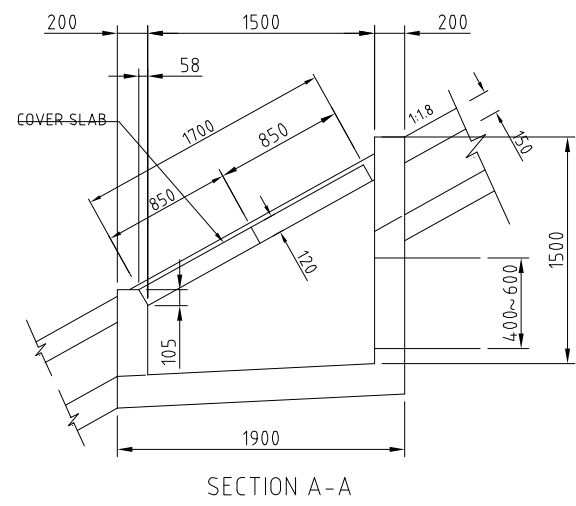
Note: Reinforcement will be required in Type b and c



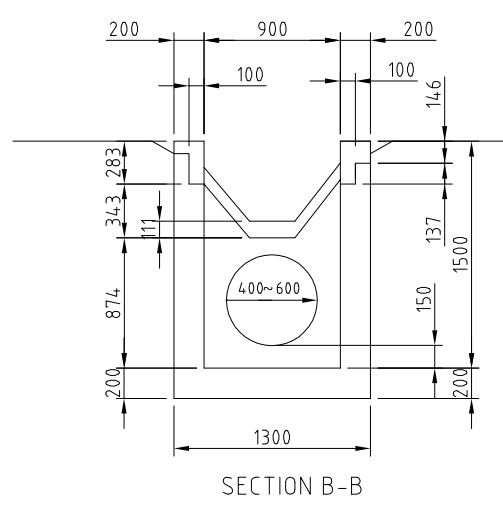
PLAN OF CATCH BASIN
TYPE "CB - I"
SCALE - 1:30



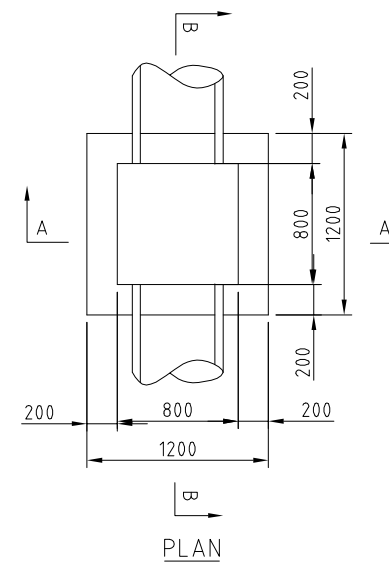
PLAN OF CATCH BASIN
TYPE "CB - J"
SCALE - 1:30



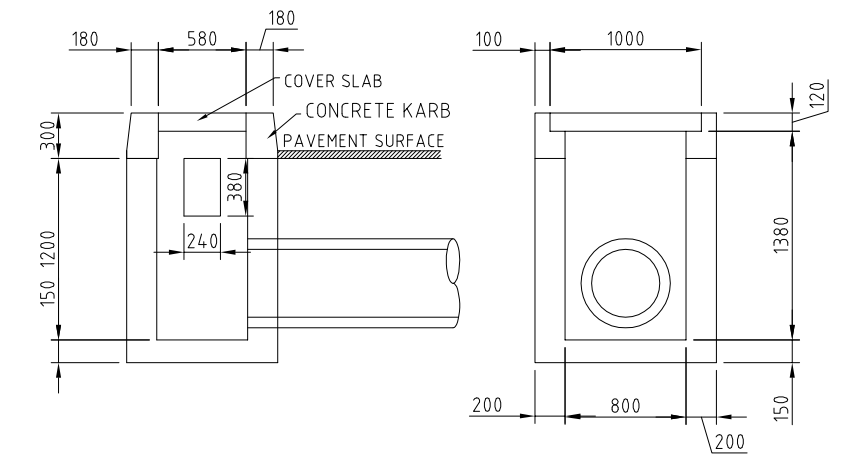
SECTION A-A



SECTION B-B

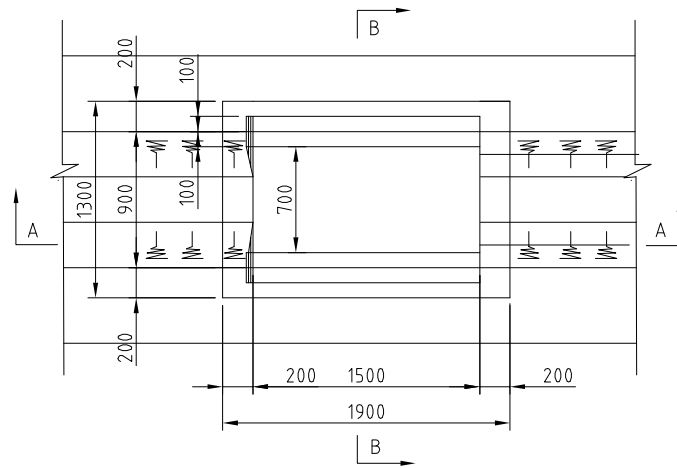


PLAN

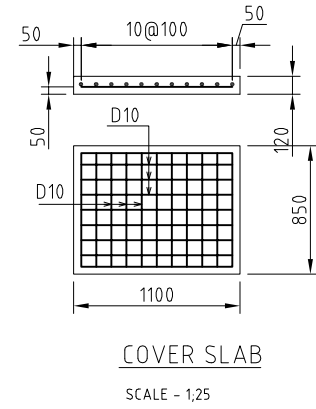


SECTION A-A

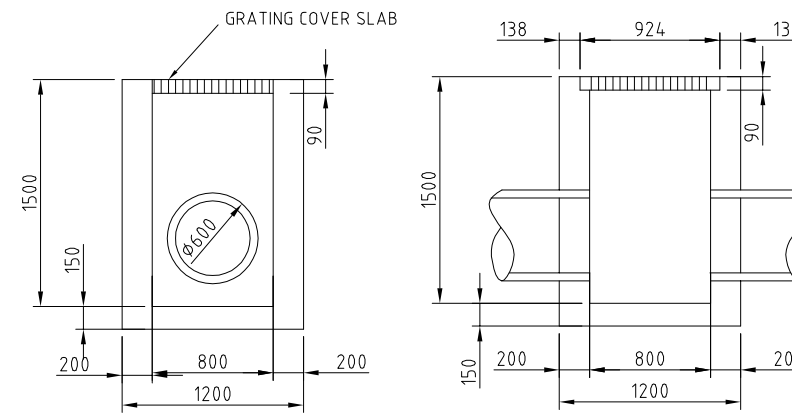
SECTION B-B



CATCH BASIN TYPE "CB - E"
SCALE - 1:25



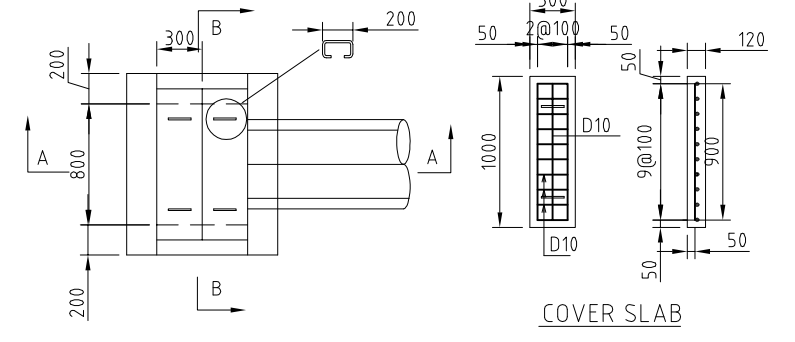
COVER SLAB
SCALE - 1:25



SECTION A-A

SECTION B-B

CATCH BASIN TYPE "CB - G"
SCALE - 1:25

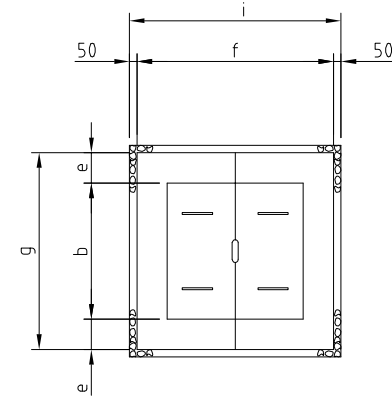
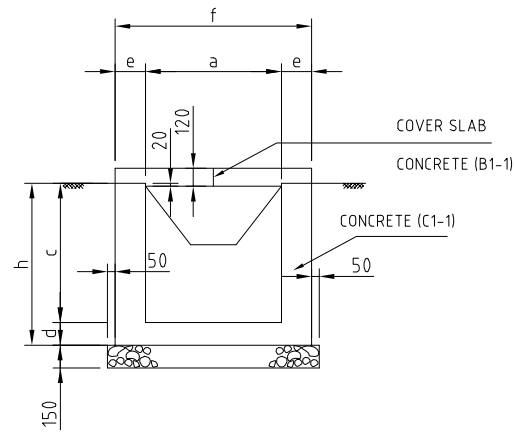


PLAN

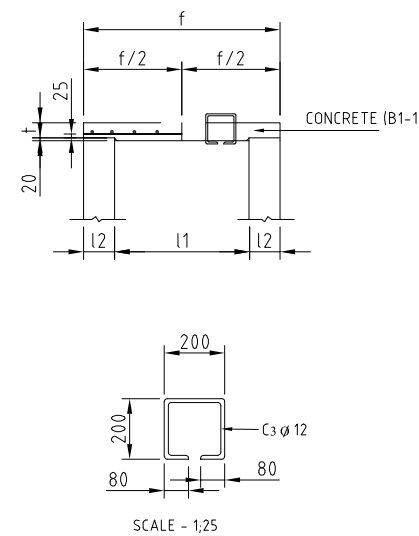
COVER SLAB

SCALE - 1:25

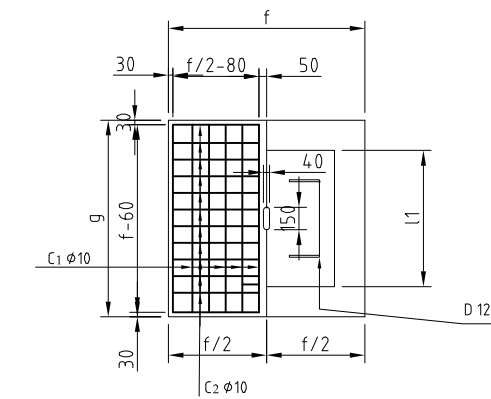
CATCH BASIN TYPE "CB - H"
SCALE - 1:25



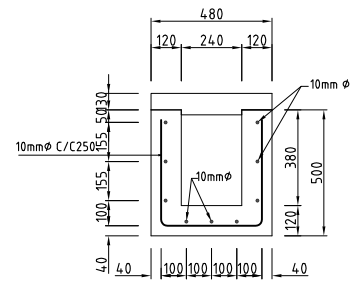
CATCH BASIN TYPE "CB - F"
SCALE - 1:25



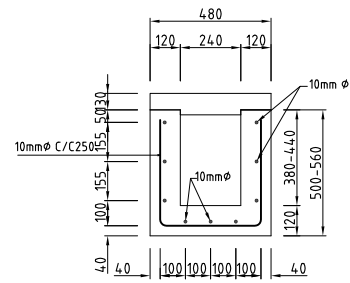
SCALE - 1:25



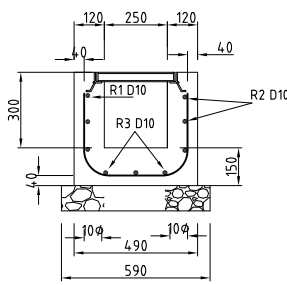
TYPE	ITEMS	DIMENSION (MM)										
		a	b	c	d	e	f	g	h	l1	l2	t
a		1000	1000	900	150	200	1300	1400	1050	890	205	100
b		1300	1000	1000	200	200	1700	1400	1200	1290	205	150
c		1300	1000	1300	200	250	1800	1500	1500	1290	255	150
d		1600	1000	1500	200	250	2100	1500	1700	No Cover Slab		
e		1800	1000	1800	200	250	2300	1500	2000	No Cover Slab		



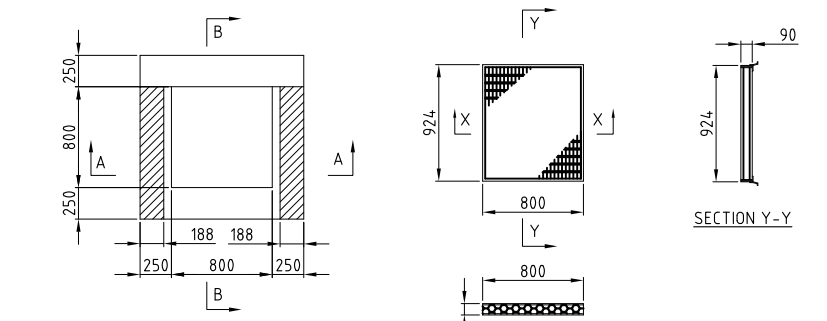
A-A



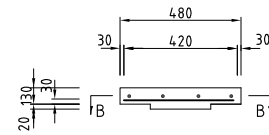
A-A



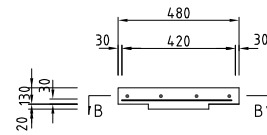
CONCRETE TYPE
DS(C) - M
SCALE - 130



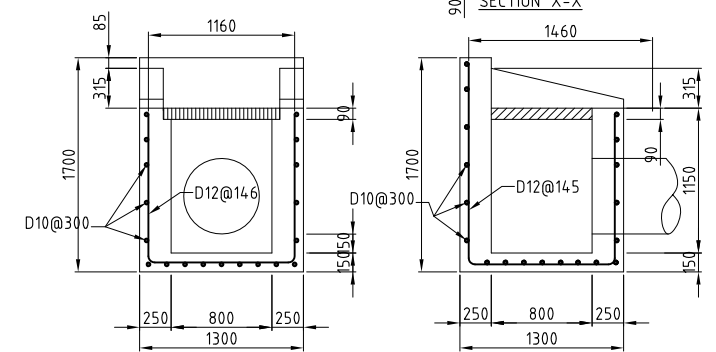
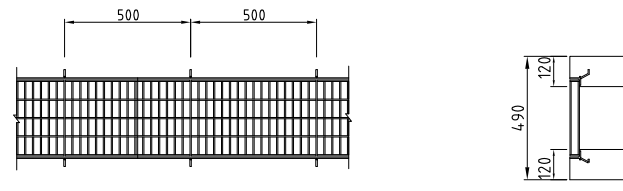
CATCH BASIN
TYPE "CB - M"
SCALE - 160



B-B



B-B

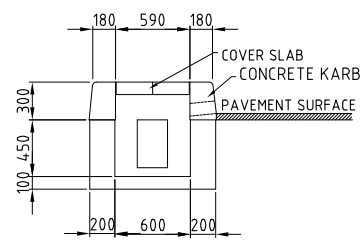


SECTION A-A

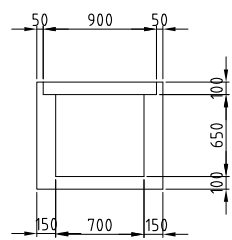
SECTION B-B

CONCRETE TYPE
DS(C) - La
SCALE - 130

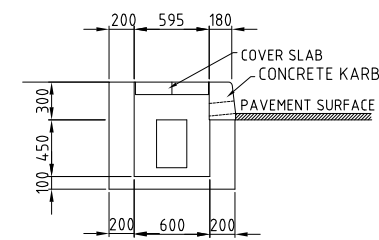
CONCRETE TYPE
DS(C) - Lb
SCALE - 130



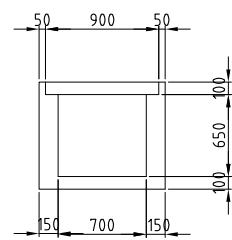
SECTION A-A



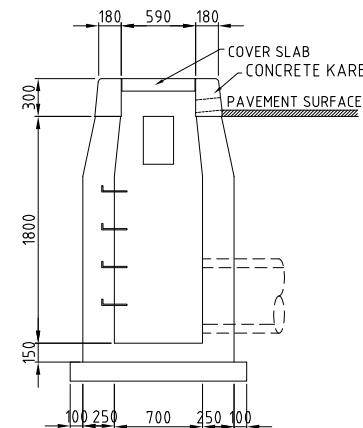
SECTION B-B



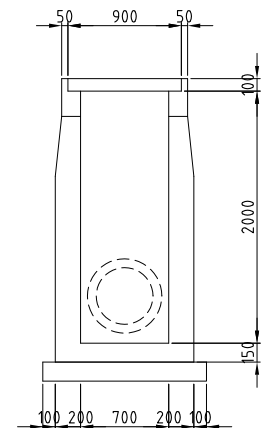
SECTION A-A



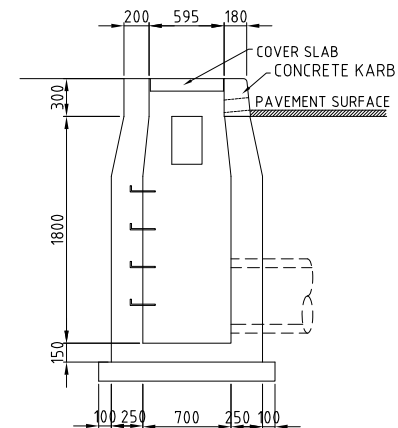
SECTION B-B



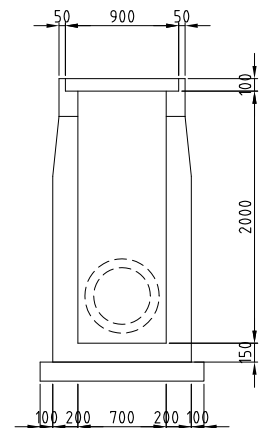
SECTION A-A



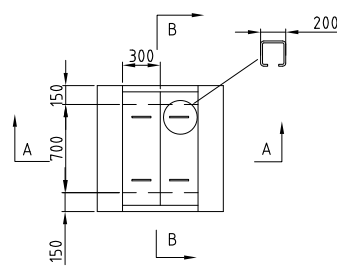
SECTION B-B



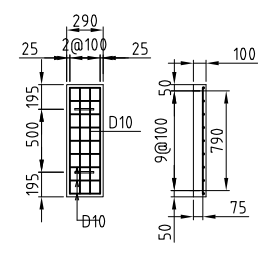
SECTION A-A



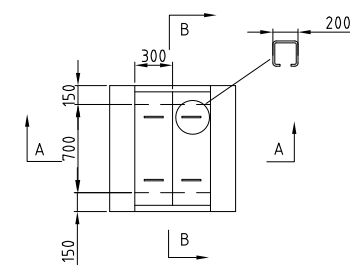
SECTION B-B



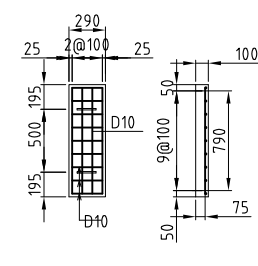
PLAN



COVER SLAB



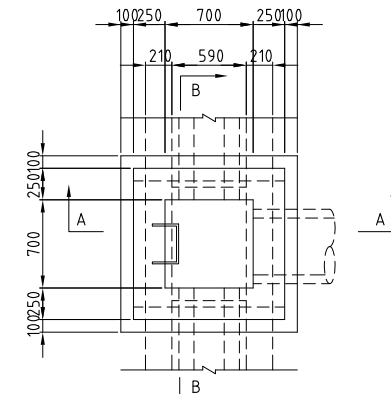
PLAN



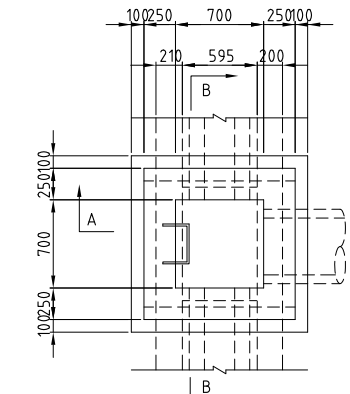
COVER SLAB

CATCH BASIN
TYPE "CB - Ka"
SCALE - 160

CATCH BASIN
TYPE "CB - Kb"
SCALE - 160



PLAN



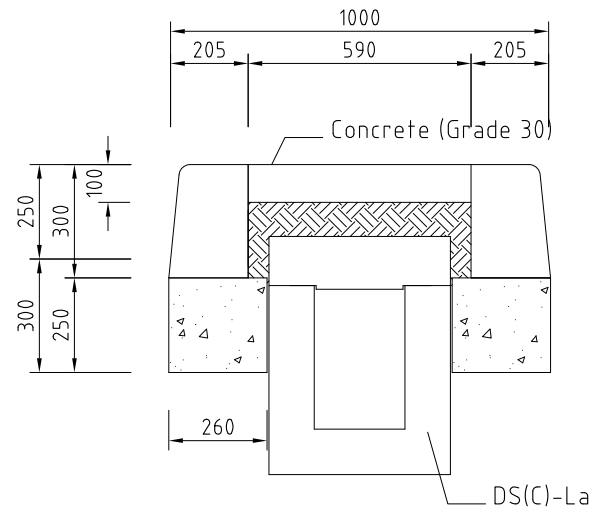
PLAN

CATCH BASIN
TYPE "CB - La"
SCALE - 160

CATCH BASIN
TYPE "CB - Lb"
SCALE - 160

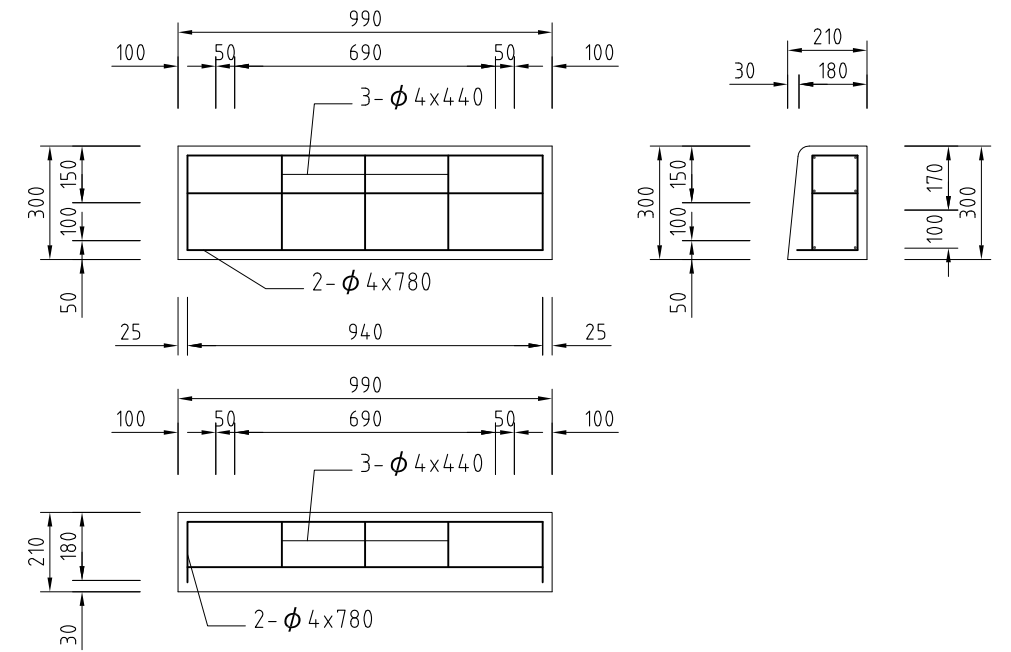
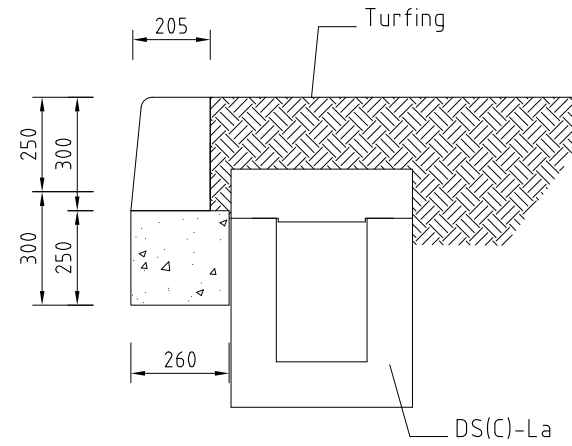
No.	REVISION	DATE

DESIGNED BY:	
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APPROVED BY:	
DWG. NO.	L-06



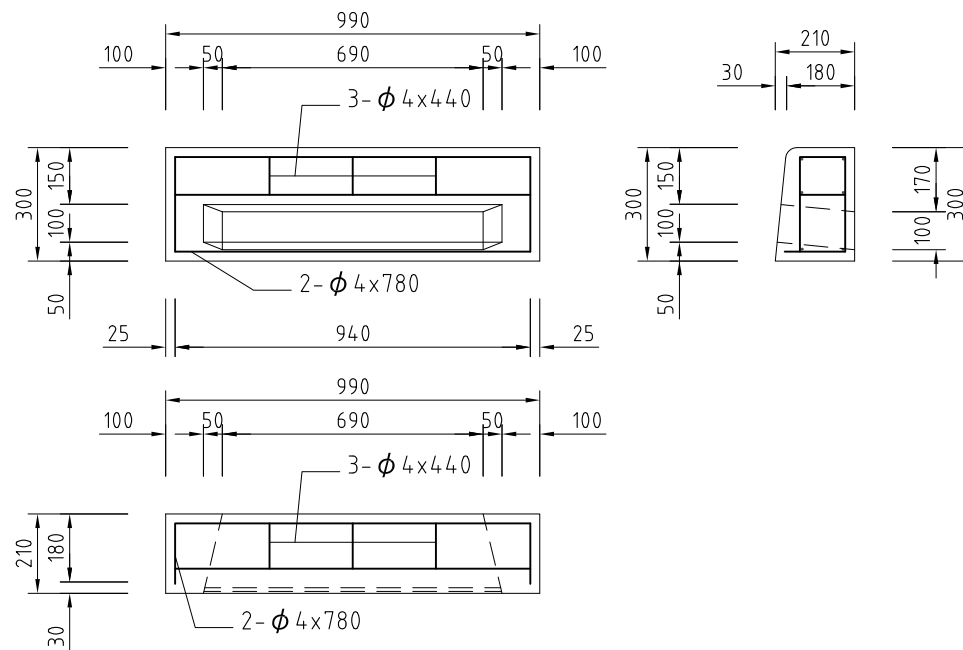
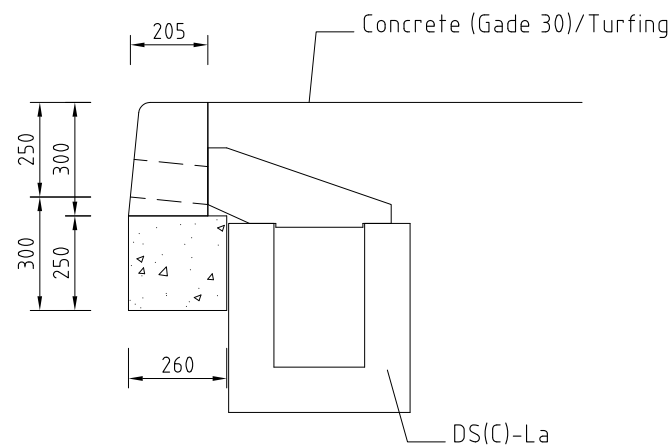
MEDIAN CONCRETE CURVE "PC - CB"

SCALE - 1:30



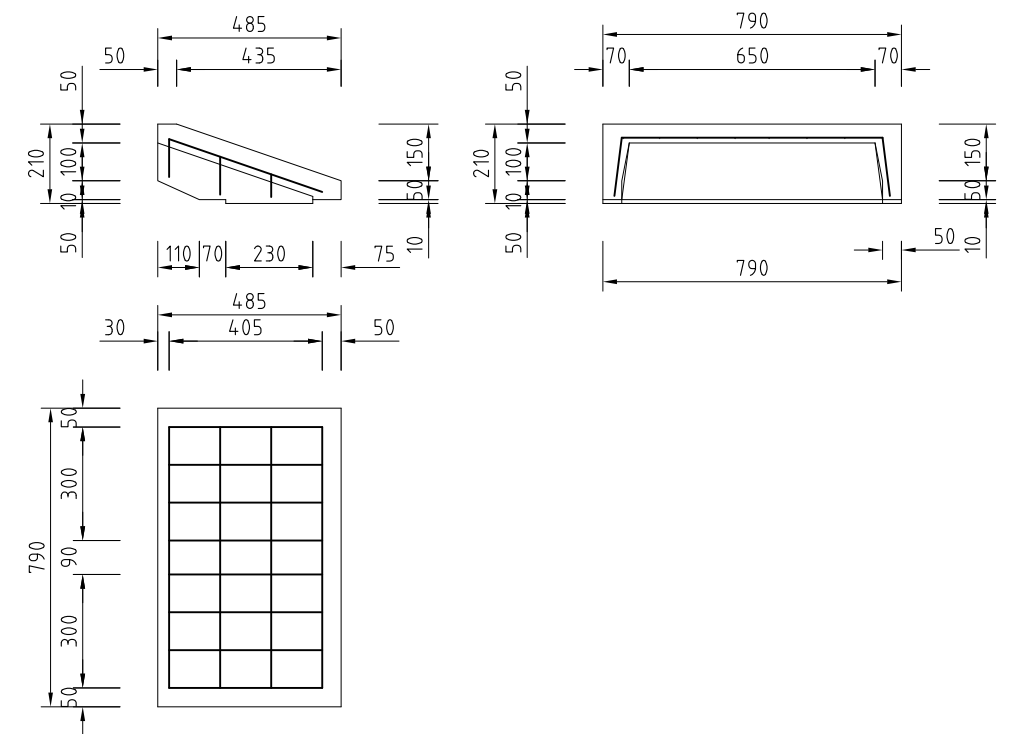
MEDIAN CONCRETE CURVE "PC - CBa"

SCALE - 1:30



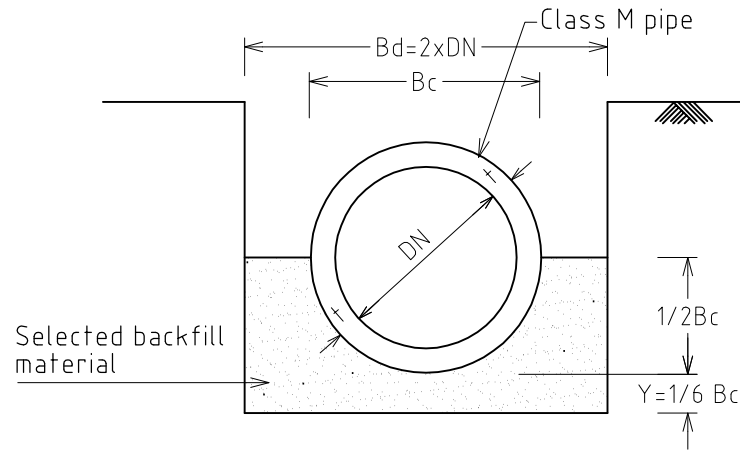
MEDIAN CONCRETE CURVE "PC - CBb"

SCALE - 1:30

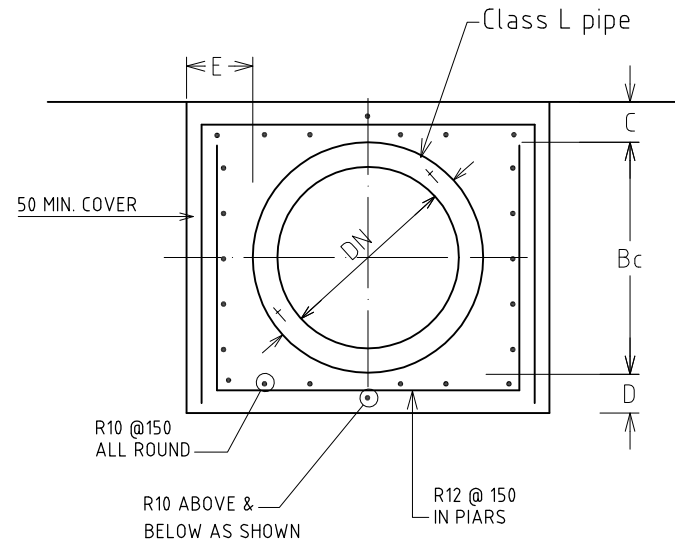


No	REVISION	DATE

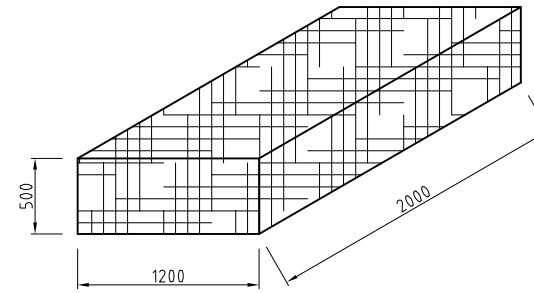
DESIGNED BY:	
CHECKED BY:	
APPROVED BY:	
DWG. NO.	L-07



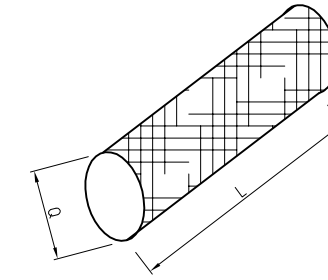
Class B bedding
TYPE "P-M (B)"



Class C-1 bedding
TYPE "P-L (C-1)"

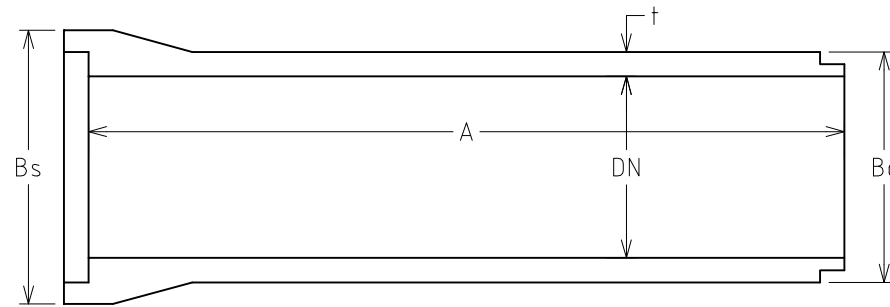


TYPE "GB"
GABIONS BOX

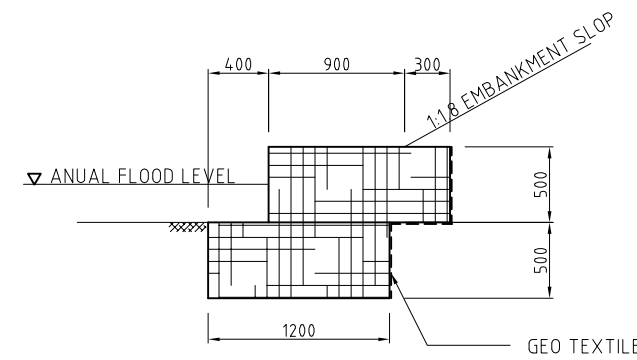


GABIONS CYLINDER
TYPE "GC-L"

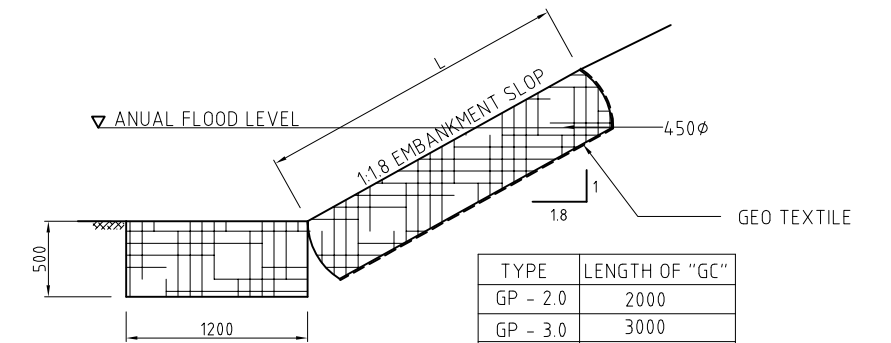
TYPE	Q
GCa	450
Gcb	600



PIPE DIMENSIONS (SAMPLE)



GABIONS PROTECTION
TYPE "GPa"



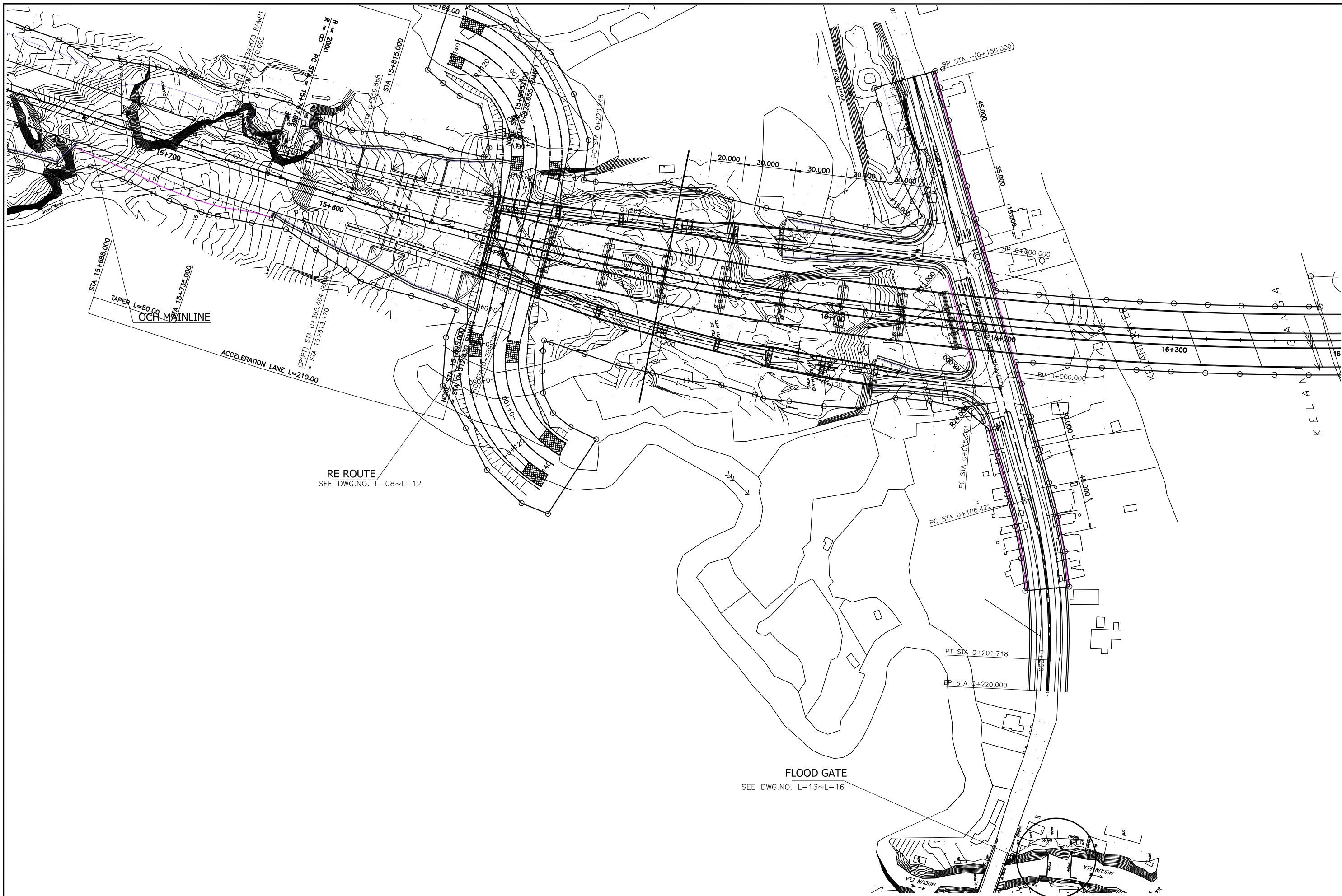
GABIONS PROTECTION
TYPE "GPb - L"

TYPE	LENGTH OF "GC"
GP - 2.0	2000
GP - 3.0	3000
GP - 4.0	4000
GP - 5.0	5000
GP - 6.0	6000
GP - 7.0	7000

DN	A	Bs	Bc	t
450	2500	697	590	70
600	2500	905	772	86
900	2500	1275	1160	130
1200	2500	1655	1450	125
1500	2500	1960	1740	120

DN (mm)	C (mm)	D (mm)	E (mm)
450	250	150	175
600	250	150	175
900	275	175	200
1200	300	200	225
1500	375	275	300

DIMENSIONS FOR REINFORCED &
UNREINFORCED CONCRETE



THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF HIGHWAYS & ROAD DEVELOPMENT



JICA JAPAN INTERNATIONAL COOPERATION AGENCY
ORIENTAL CONSULTANTS COMPANY LIMITED
in association with
PACIFIC CONSULTANTS INTERNATIONAL

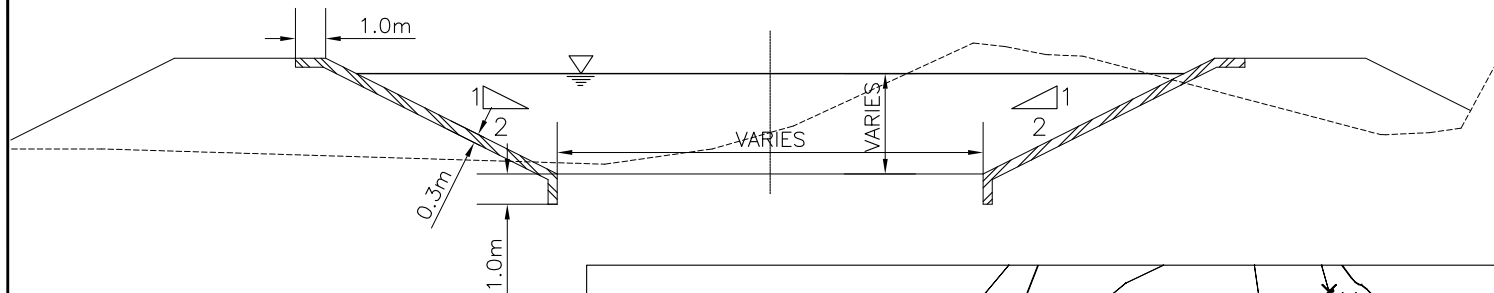


No	REVISION	DATE

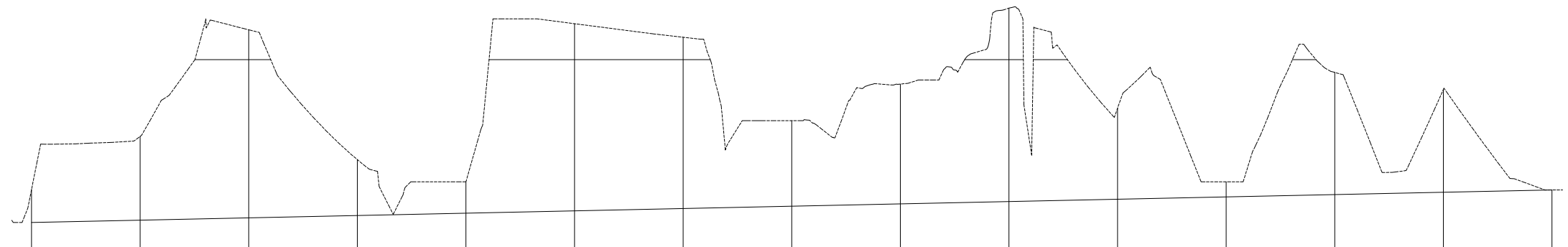
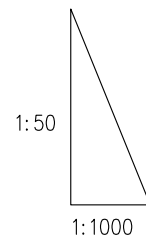
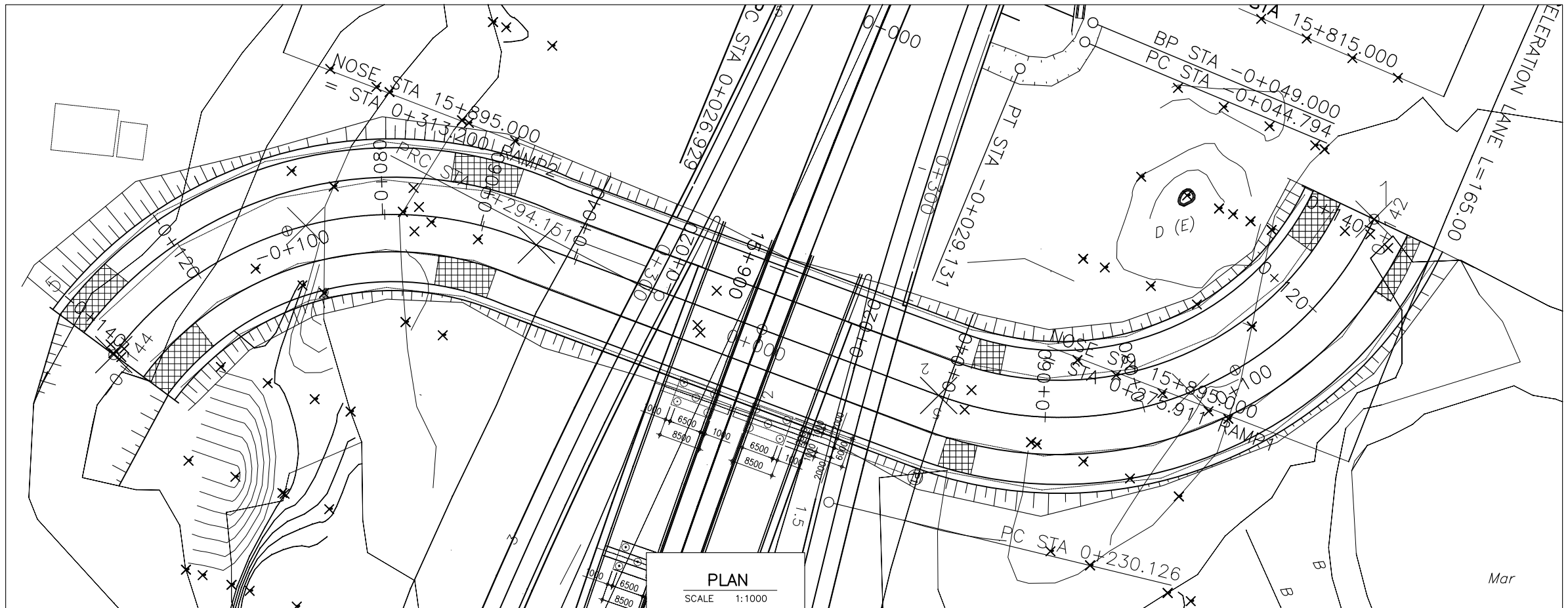
COLOMBO OUTER CIRCULAR HIGHWAY PROJECT
(NORTHERN SECTION 1)

DRAINAGE FACILITIES
LOCATION OF MUDUN ELA IMPROVEMENT PLAN

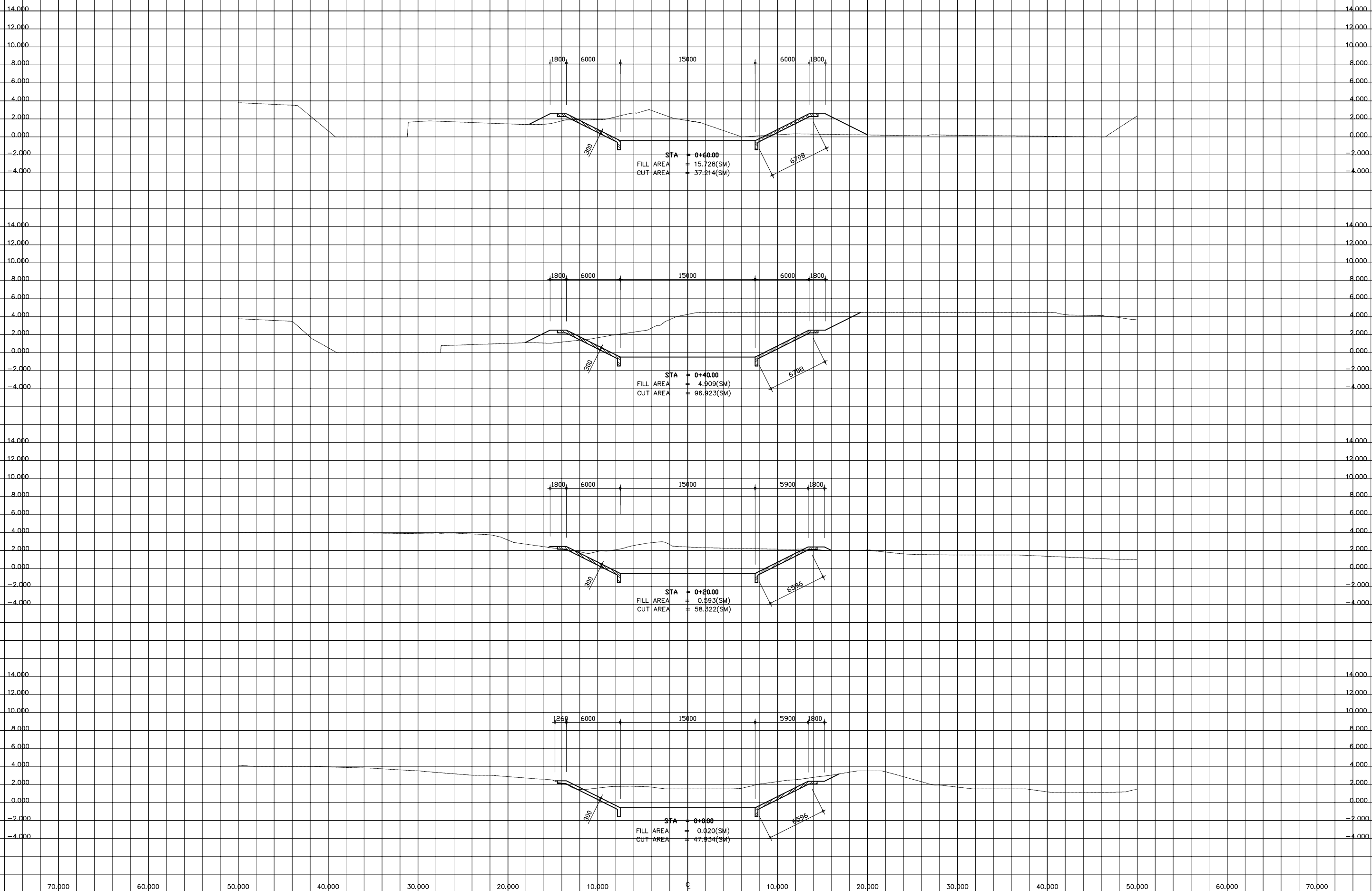
DESIGNED BY:	
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TYPICAL CROSS SECTION
FOR MUDUN ELA RE-ROUTE
SCALE 1:250

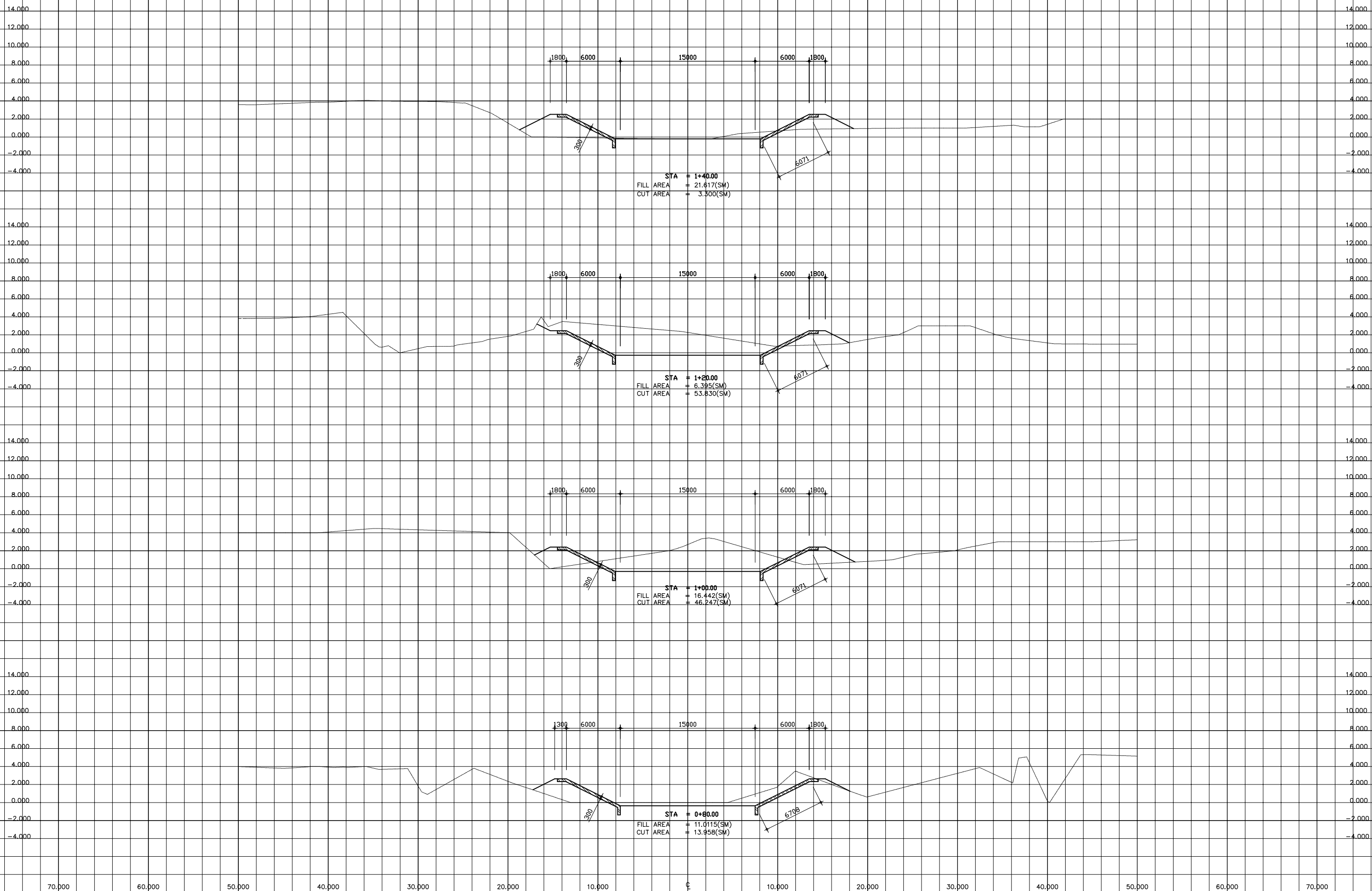


FINISH ROAD LEVELS	-0.999	-0.942	-0.885	-0.828	-0.771	-0.714	-0.657	-0.600	-0.543	-0.486	-0.429	-0.372	-0.315	-0.258	-0.201
EXISTING GROUND LEVELS	-0.185	1.114	3.731	0.544	0.000	3.881	3.548	1.500	2.398	4.264	1.805	0.000	2.685	2.262	-0.200
STATION (km)	-0+140	-0+120	-0+100	-0+080	-0+060	-0+040	-0+020	0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140

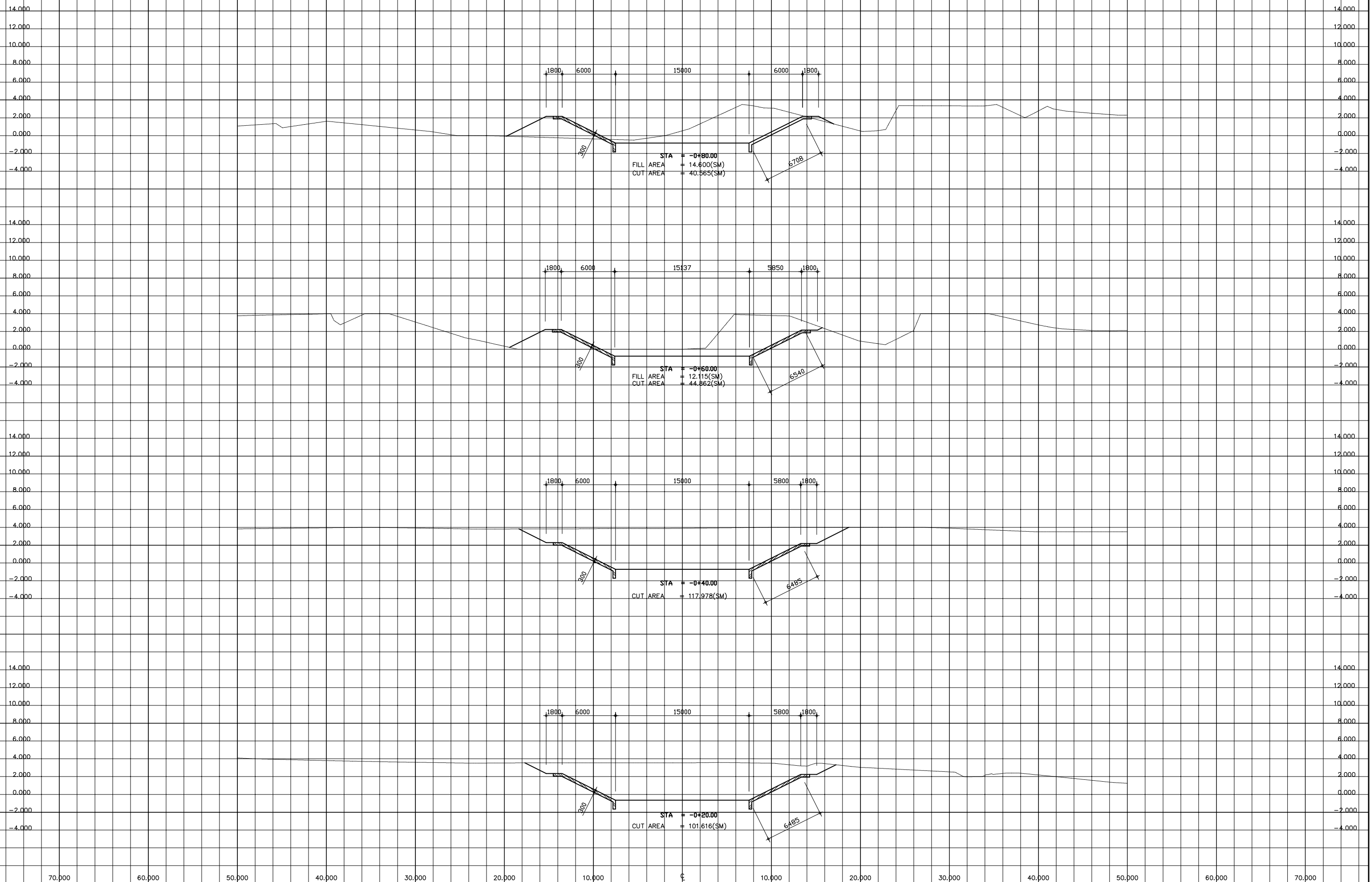


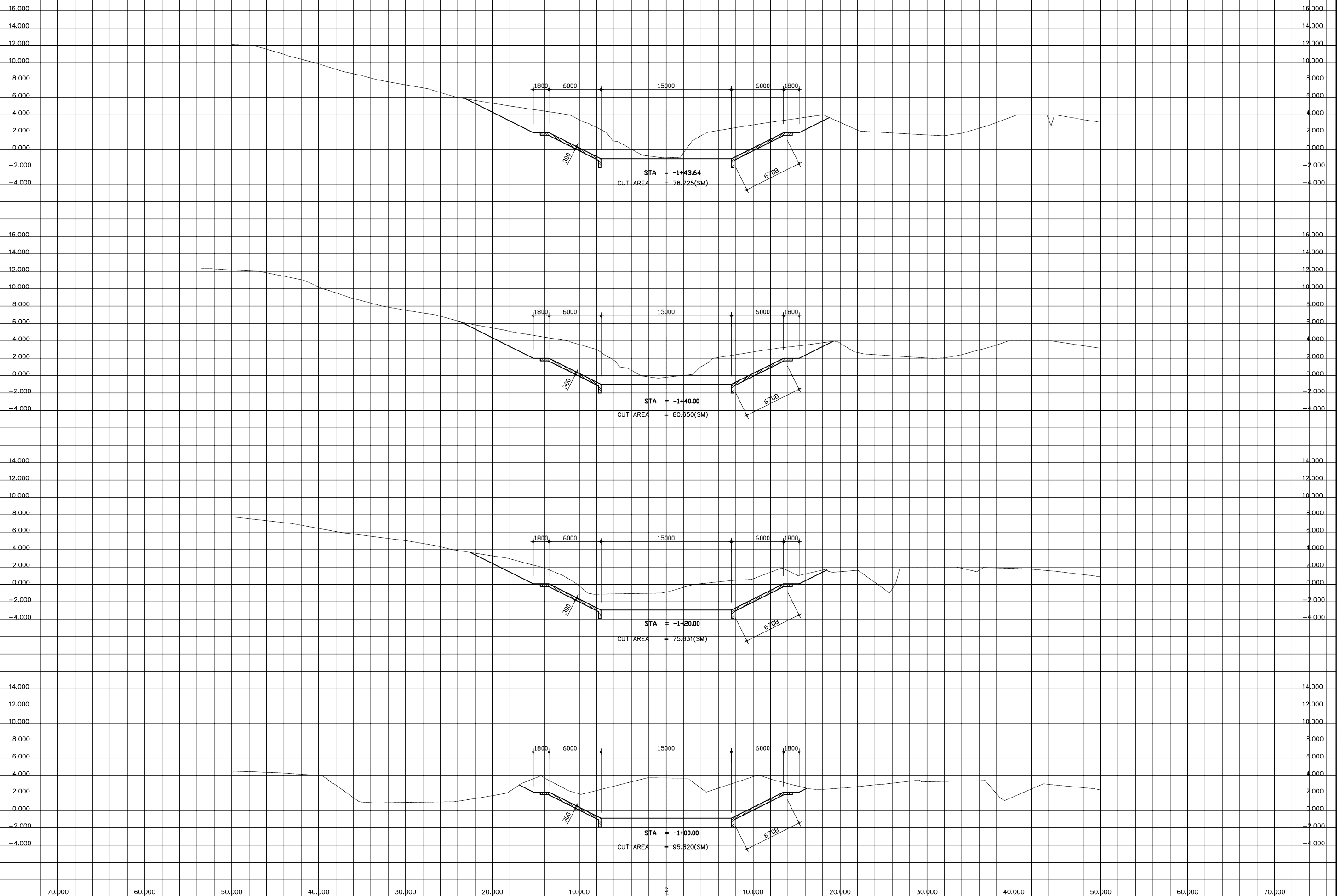
No	REVISION	DATE

DESIGNED BY:	
CHECKED BY:	
APPROVED BY:	
DWG. NO.	L-11



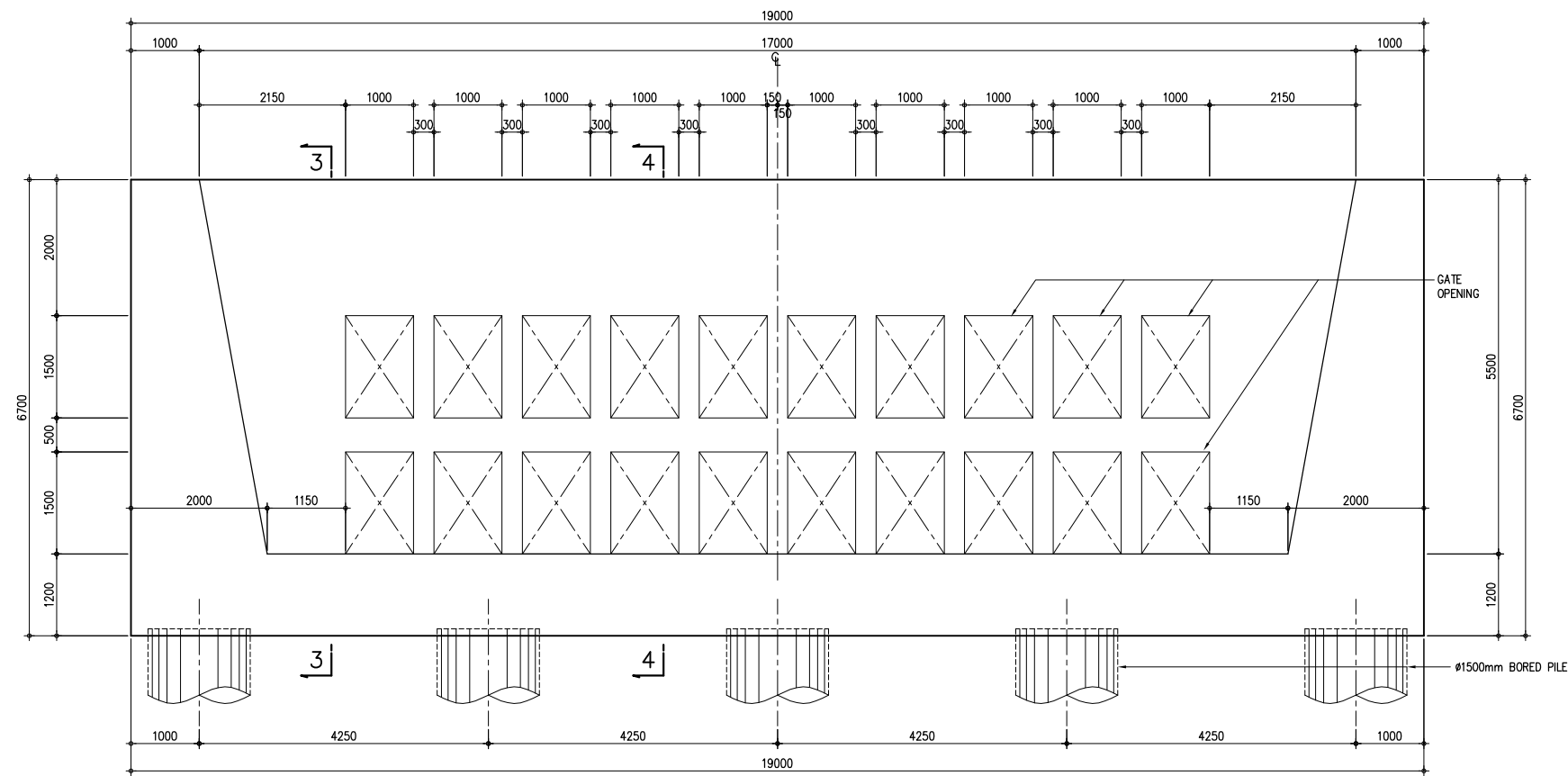
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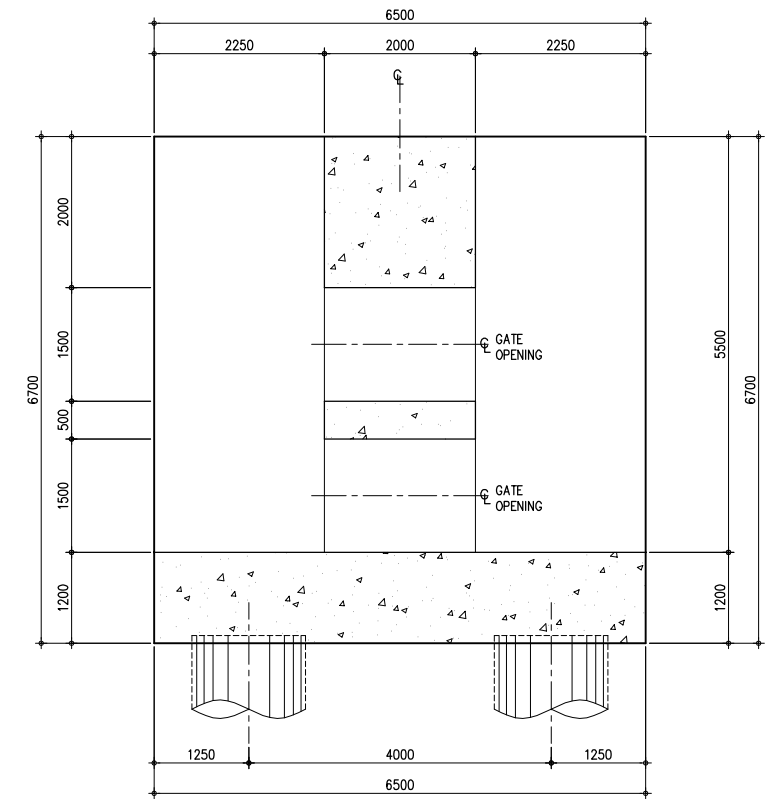


No	REVISION	DATE

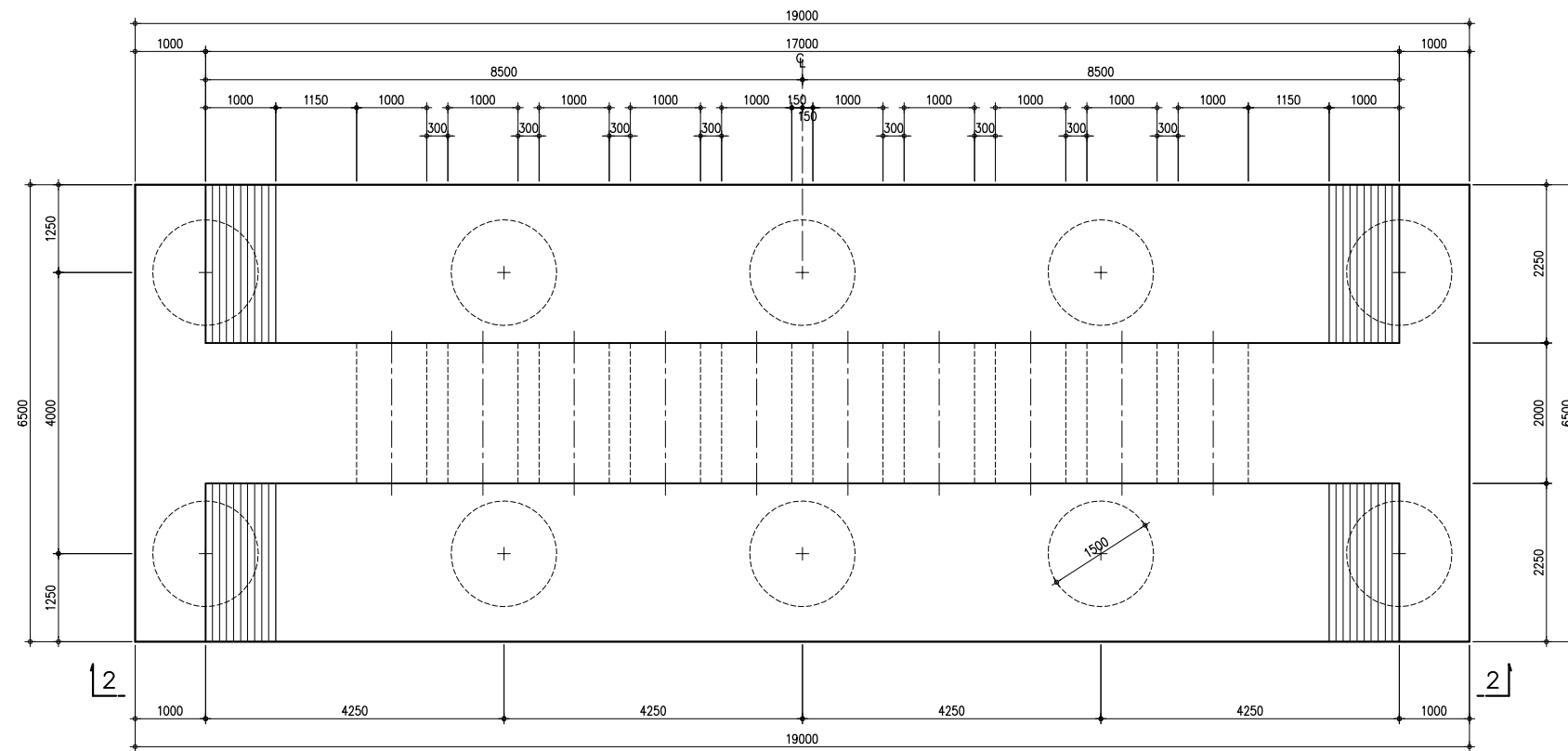
DESIGNED BY:	
CHECKED BY:	
APPROVED BY:	
DWG. NO.	L-14



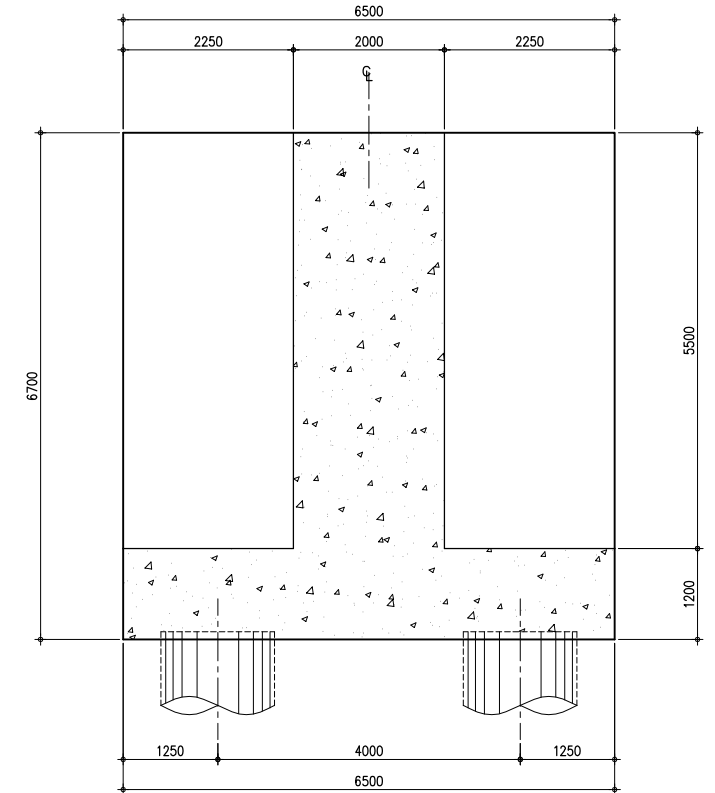
2 ELEVATION
SCALE 1:50



4 SECTION
SCALE 1:50



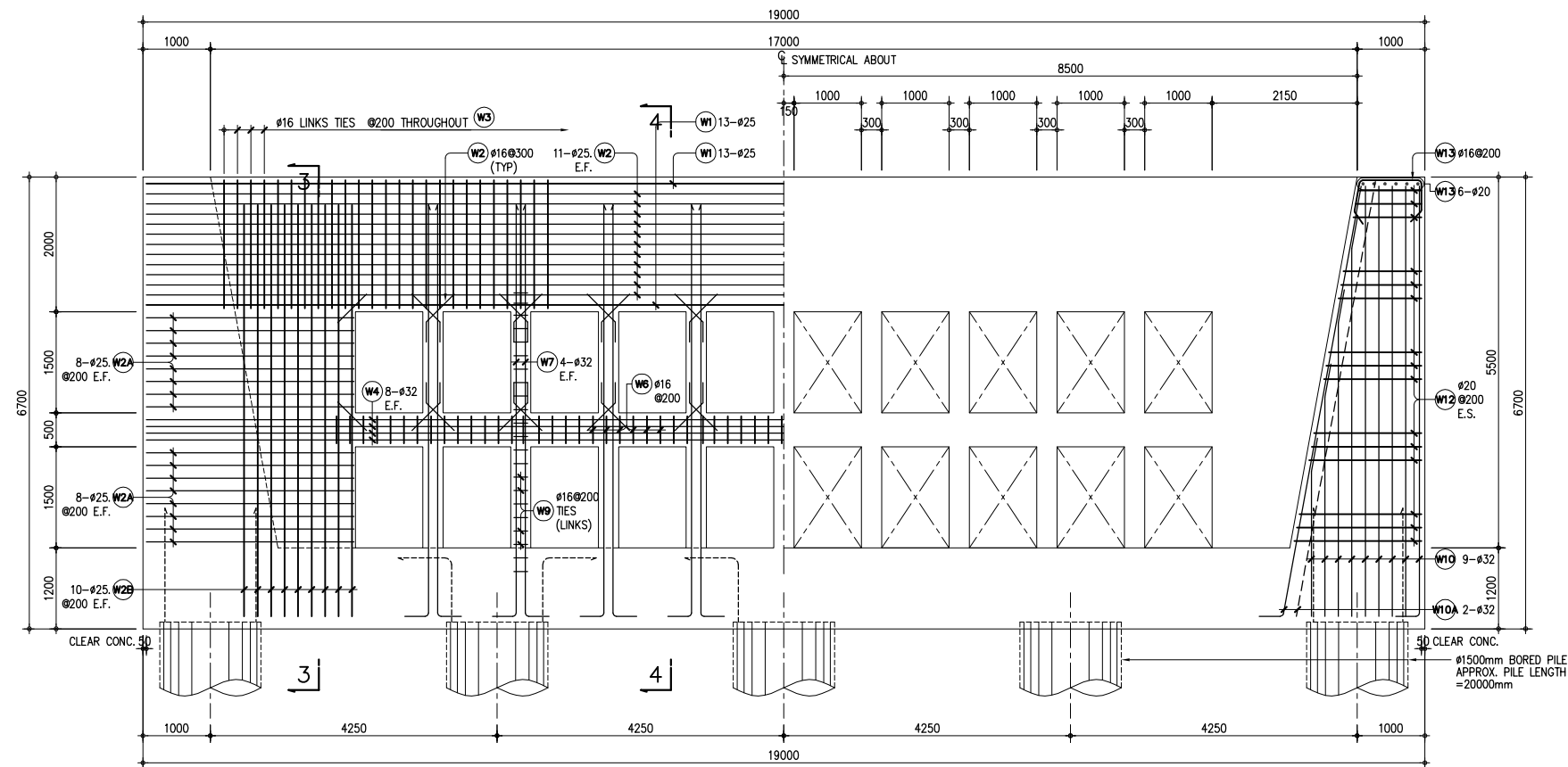
1 PLAN
SCALE 1:50



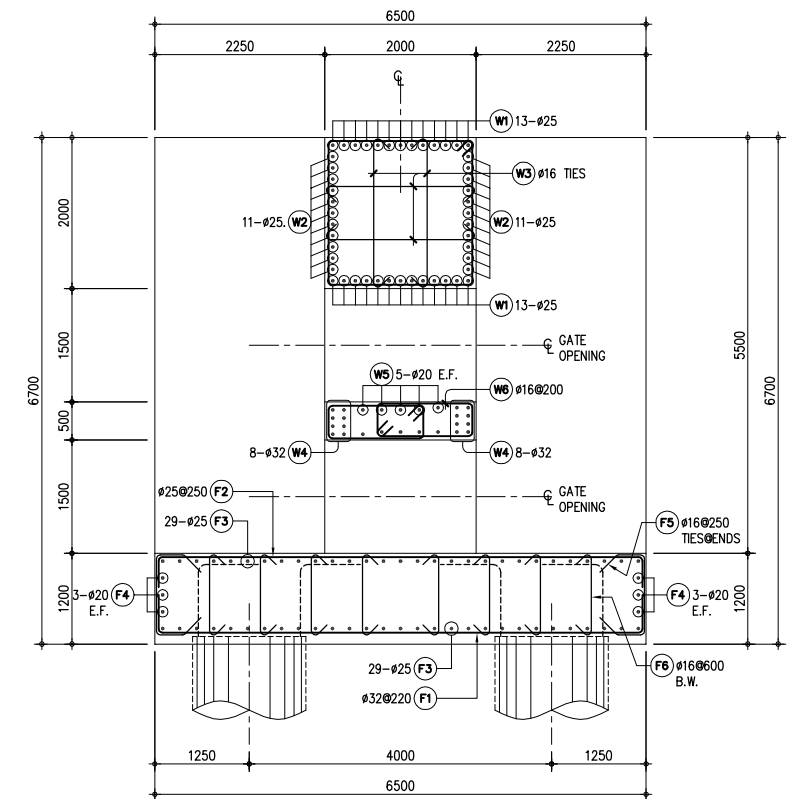
3 SECTION
SCALE 1:50

No	REVISION	DATE

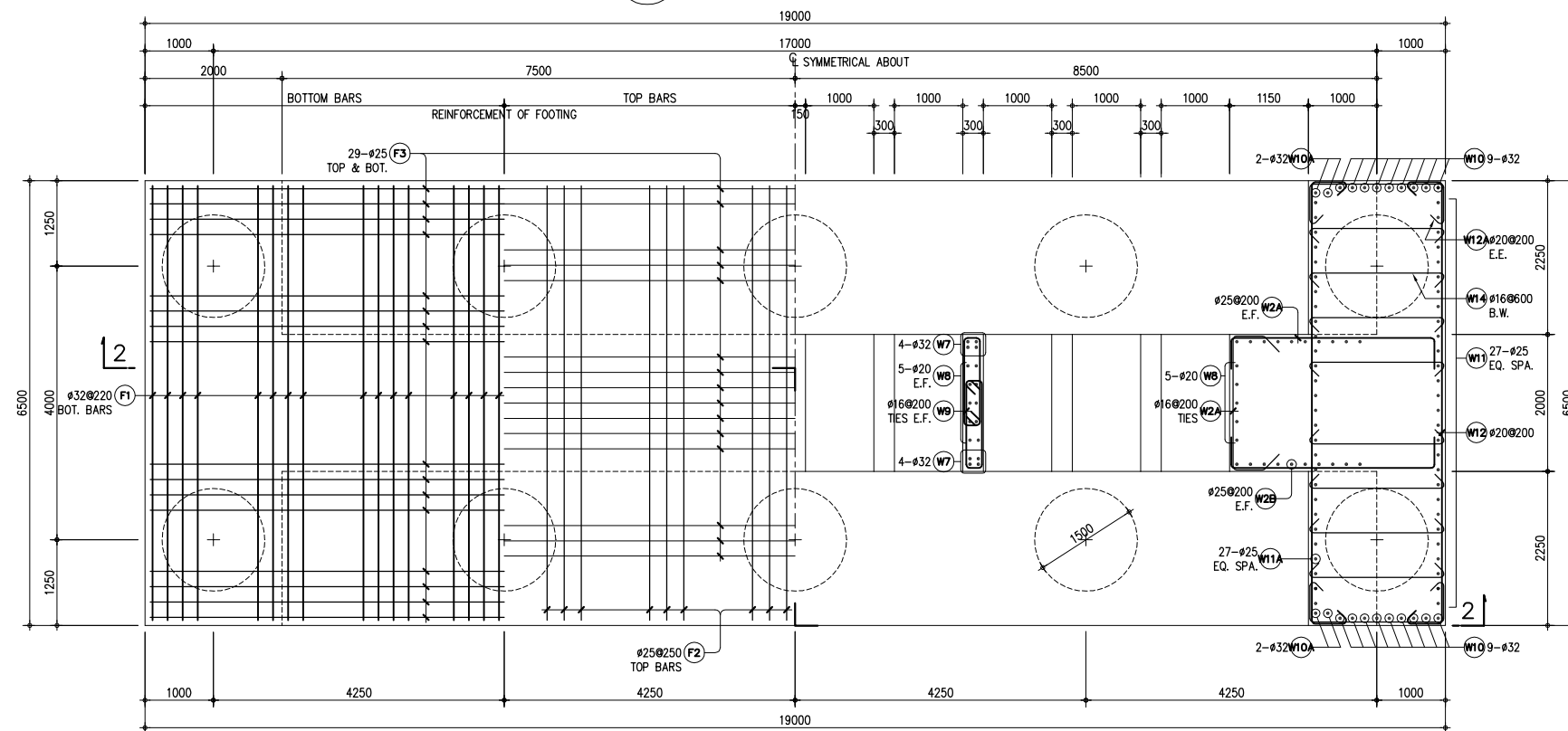
DESIGNED BY:	
CHECKED BY:	
APPROVED BY:	
DWG. NO.	L-15



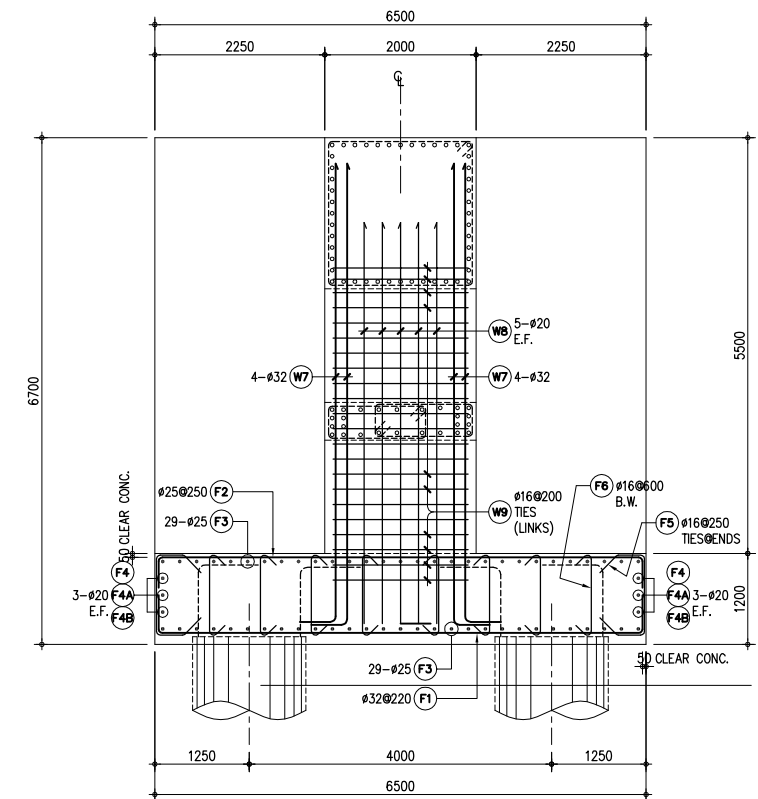
2 ELEVATION
SCALE 1:50



4 SECTION
SCALE 1:50

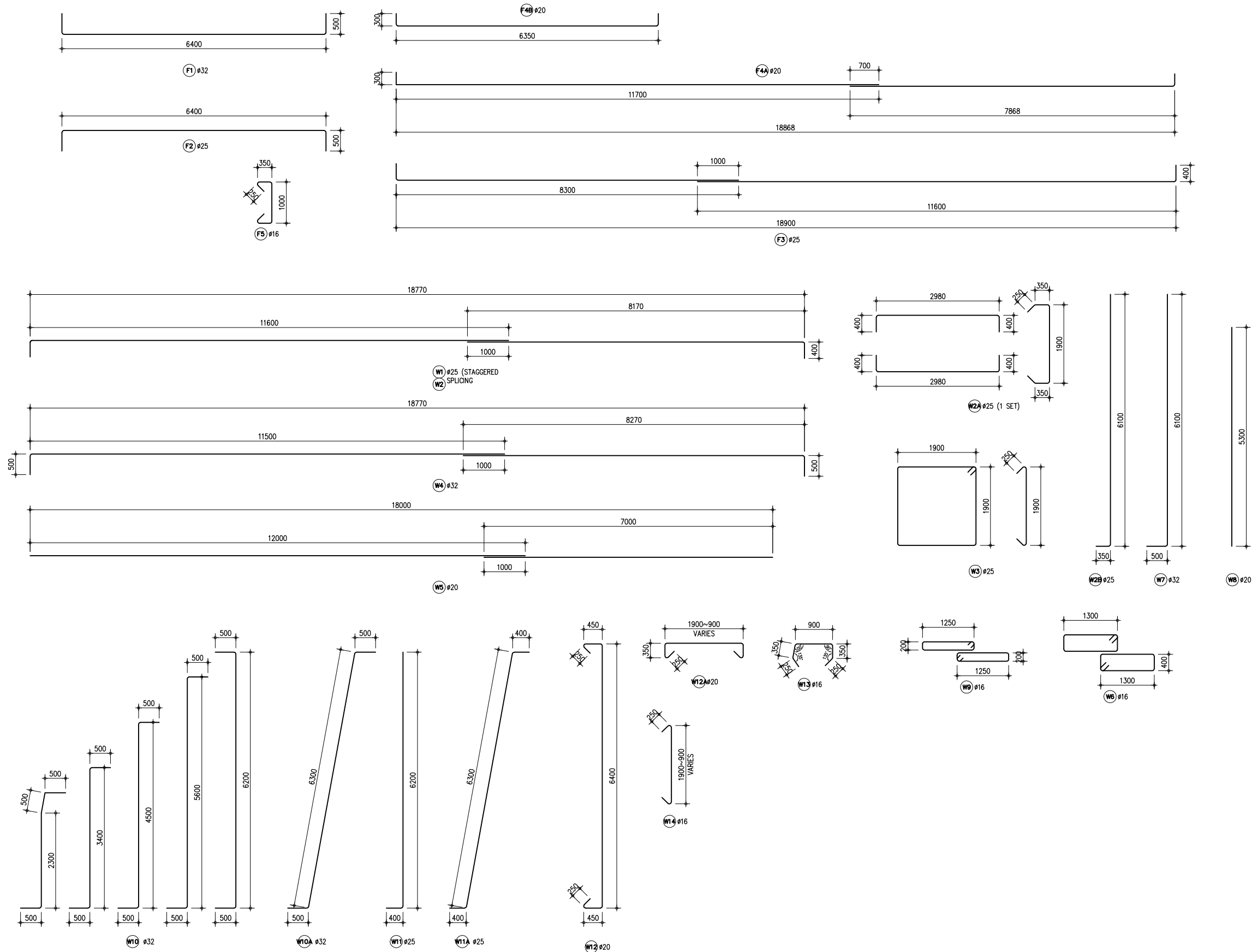


1 FOOTING REINFORCEMENT PLAN
SCALE 1:50



3 SECTION
SCALE 1:50

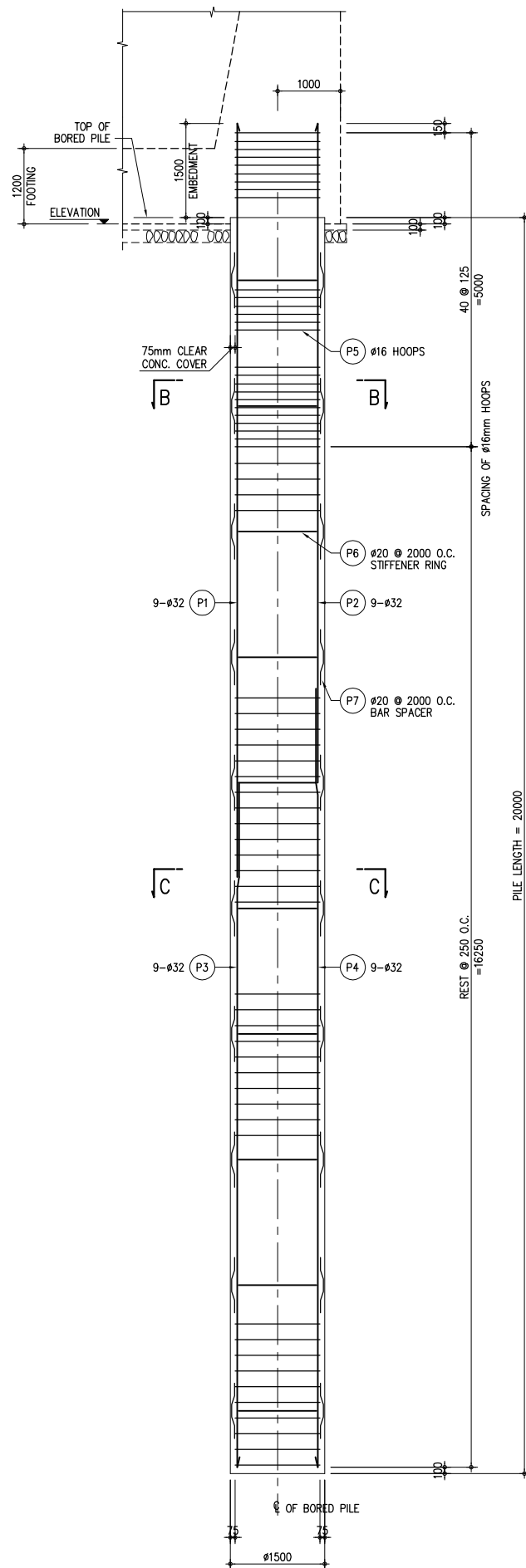
BAR BENDING DIAGRAM:



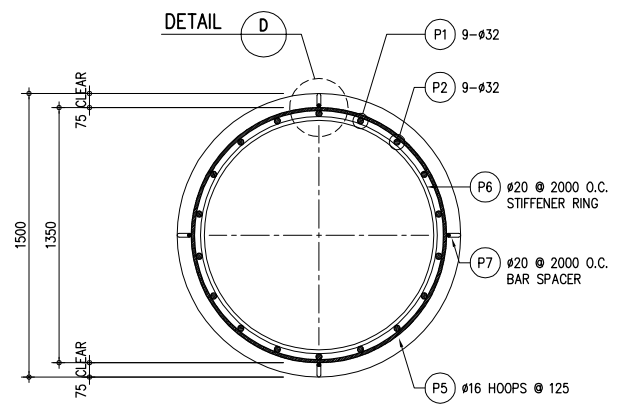
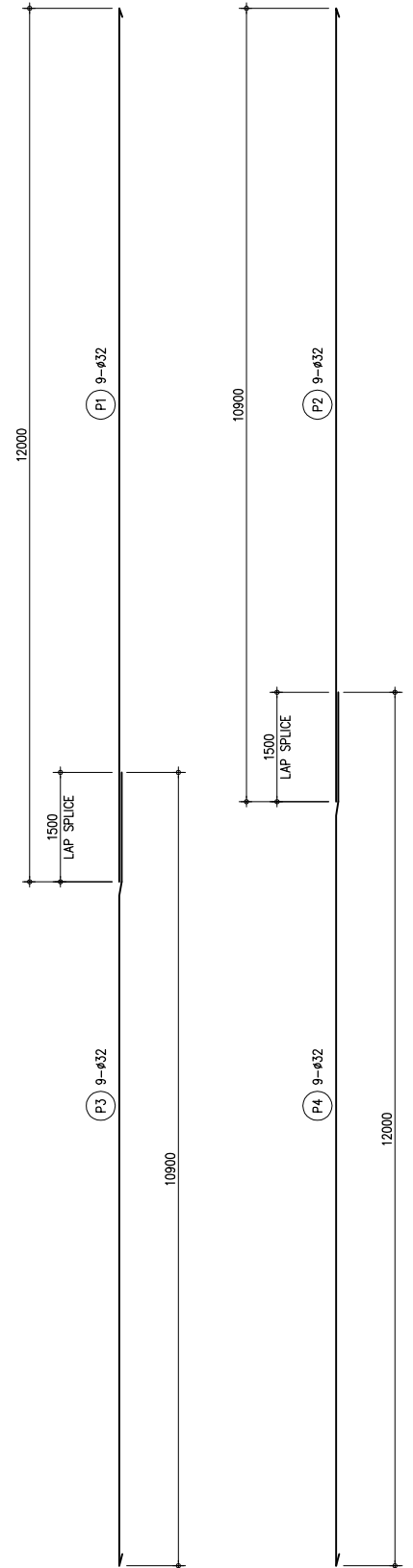
BAR BENDING DIAGRAM
SCALE 1:50

No	REVISION	DATE

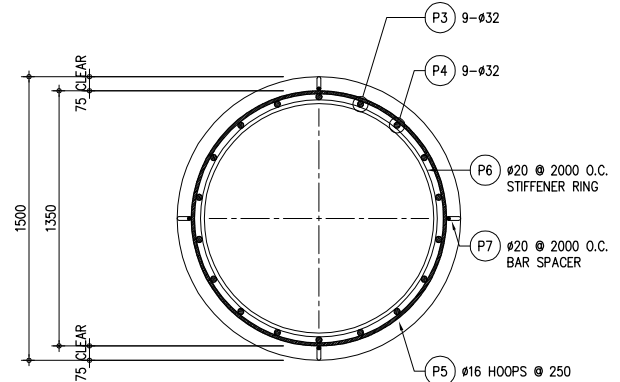
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CHECKED BY:	
APPROVED BY:	
DWG. NO.	L-17



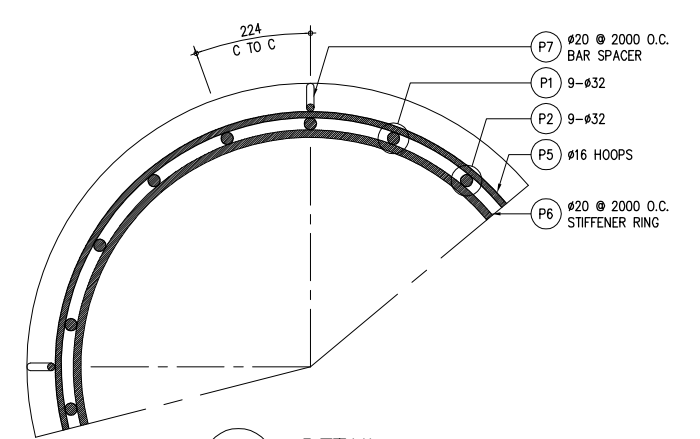
A TRANSVERSE ELEVATION
SCALE 1:50



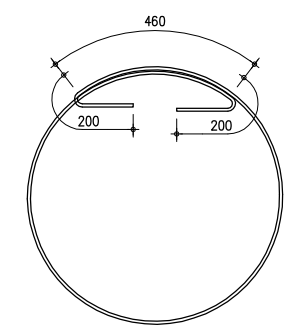
B SECTION
SCALE 1:20



C SECTION
SCALE 1:20



D DETAIL
SCALE 1:10



E HOOPS SPLICE DETAIL
SCALE NONE

REINFORCING BARS														CONCRETE		
BAR BENDING	LOCATION	BAR MARK	BAR SHAPE	SPACING (mm)	QTY	SIZE	DIMENSION (mm)					LENGTH PER BAR (m)	TOTAL LENGTH (m)	UNIT WEIGHT (kg/m)	TOTAL WEIGHT (kg)	VOLUME (m ³)
							a	b	c	d	e					
	BORED PILE	P1	1	224	9	#32	12000	-	-	-	-	12.00	108.00	6.313	681.80	35.34
		P2	1	224	9	9-#32	10900	-	-	-	-	10.90	98.10	6.313	619.31	
		P3	1	224	9	9-#32	10900	-	-	-	-	10.90	98.10	6.313	619.31	
		P4	1	224	9	9-#32	12000	-	-	-	-	12.00	108.00	6.313	681.80	
		P5	2	125/250	106	#16	1350	460	200	-	-	5.10	540.60	1.579	853.61	
		P6	3	2000	10	#20	1254	800	-	-	-	4.74	47.40	2.466	116.89	
		P7	4	2000	40	#20	200	140	200	140	200	0.88	35.20	2.466	86.80	
														3,659.52		

M. LIGHTING & EMEGENCY TELEPHONE

LIGHTING

ABBREVIATIONS AND GENERAL NOTES

GENERAL NOTES

THE FOLLOWINGS ELECTRICAL FACILITIES WORKS HEREIN SHALL BE EXECUTED IN ACCORDANCE WITH THE REQUIREMENTS STANDARDS OF THE PROCEEDINGS OF SRI LANKA CONSTRUCTION STANDARDS VOL. IV, V, VI AND BUILDING CODE OF SRI LANKA VOL. II AND JIS OR / AND LATEST EDITION RULES OR REGULATIONS OF THE LOCAL AUTHORITIES AND THE REQUIREMENTS OF THE CEYLON ELECTRICITY BOARD, BRITISH STANDARD BS 7671:2001.

1. MEDIUM VOLTAGE

AN ELECTRICAL POWER SUPPLY SYSTEM TO SUIT THE PROJECT SCOPE AND SUBSTATION SYSTEM REQUIREMENTS HAS BEEN PLANNED USING BRANCH CONNECTIONS FROM THE 33 KV NETWORKS.

THIS WILL ALSO INCLUDE THE MATERIALS, SUPPLY, INSTALLATIONS AND COMMISSIONING TEST TO A PERFORMANCE SPECIFICATIONS.

2. AC 400 VOLTS 3- PHASES, 4 - WIRES, 50 HZ, POWER RECEIVING POINT.

AC 400 VOLTS 3-PHASES POWER WILL BE CONNECTED FROM THE TERMINAL RECEIVING POINT OF CEYLON ELECTRICITY BOARD DISTRIBUTION LINE, WHERE IT WILL BE LOCATED OR TERMINATED AT AN OUTDOOR ON POLE INSTALLATION CONTROL METERING PANEL (SS) OF THE TRANSFORMER SECONDARY.

3. METHOD OF CABLING

THE MAIN FEEDER AND RELATED CABLES WILL BE TERMINATED AT THE MAIN DISTRIBUTION BOARD (MDB) FROM THE SS PANEL BY UNDERGROUND BURIED. SECTION, OR IN EMBED CONCRETE PARAPET ON THE BRIDGE SECTION FOR LIGHTING DISTRIBUTION BOARD (LDB) AND EACH LIGHTING POLES.

4. DISTRIBUTION CABLES

LUBRICANTS FOR ASSISTING IN THE PULLING OR WIRES SHALL BE THOSE SPECIFICALLY RECOMMENDED BY THE CABLE MANUFACTURER'S. DISTRIBUTION CABLE RUN, XLPE /SWA/ PVC/CU TYPE CABLES 1KV / 0.6 KV SHALL BE WIRE ARMoured TO BS 5467:1997. TERMINATIONS OF INSULATED LIGHTING CABLES SHALL BE PROTECTED ACCIDENTAL CONTACT, DETERIORATION OF COVERINGS AND MOISTURE BY THE USE OF TERMINATING DEVICES AND MATERIAL. TERMINATIONS SHALL BE MADE USING MATERIALS AND METHODS AS INDICATED OR SPECIFIED HEREIN OR AS DESIGNATED BY THE WRITTEN INSTRUCTION OF THE CABLE MANUFACTURER AND TERMINATION KIT MANUFACTURER. ALL ARMoured CABLES SHALL BE TERMINATE THROUGH TERMINAL BARS AND CABLE GLANDS.

5. LIGHTING SYSTEMS

LIGHTING EACH ITEMS AS SHOWN ON THE DRAWINGS SHALL CONSIST OF LIGHTING COLUMN, LIGHTING LANTERN, LAMPS, POWER DISTRIBUTION, ELECTRICAL CONTROL, BALLAST'S TIMING DEVICES AND MOUNTING ACCESSORIES, ENCLOSURE WITH MINIATURE CIRCUIT BREAKER INSIDE SERVICE COMPARTMENT. AS SHOWN IN SCOPE OF ITEMS.

6. SYSTEM GROUNDING FOR ELECTRICAL FACILITIES

THE SYSTEMS GROUNDING SHALL BE EXCAVATED THE GROUND TO A DEPTH OF 600 MM AFTER WHICH GROUNDING RODS SHALL BE DRIVEN NEAR TO LOCATION OF MDB, LDB & LIGHTING COLUMNS. THE DEPTH OF TOP OF THE PROTECTOR-GROUNDING ROD TO BE DRIVEN SHALL BE 2 METERS.

THE GROUNDING RESISTANCE SHALL BE MEASURED AT EACH GROUNDING ROD. WHERE THE REQUIRED GROUNDING RESISTANCE CANNOT BE OBTAINED AN ADDITIONAL GROUNDING ROD SHALL BE PROVIDED. THE DISTANCE BETWEEN GROUNDING RODS SHALL BE WIDER THAN THE LENGTH OF THE GROUNDING RODS. GROUNDING RODS SHALL BE PLACED AT LEAST 3.0 METER AWAY FROM EXISTING OR FUTURE STRUCTURE. CONCRETE LOCATION MARKER SHALL BE PLACED FOR GROUNDING RODS AS DETAILED ON THE DRAWINGS.

ERRTH RESISTANCE OF GROUNDING RODS SHALL BE SATISFIED AS PER THE BRITISH STANDARD.



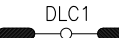







7. UNDERGROUND DUCT BANK OF CROSSING ROAD

UNDERGROUND DUCT LINES SHALL BE CONSTRUCTED OF INDIVIDUAL PVC CONDUITS ENCASED IN CONCRETE OR STEEL CONDUITS. DUCT SHALL NOT BE SMALLER THAN 100MM IN DIAMETER UNLESS OTHERWISE INDICATED. THE TOP OF THE CONCRETE ENVELOPE SHALL NOT BE LESS 450 MM BELOW GRADE, EXCEPT THAT UNDER CROSSING ROAD AND PAVEMENT, IT SHALL NOT BE LESS THAN 600 MM BELOW GRADE.

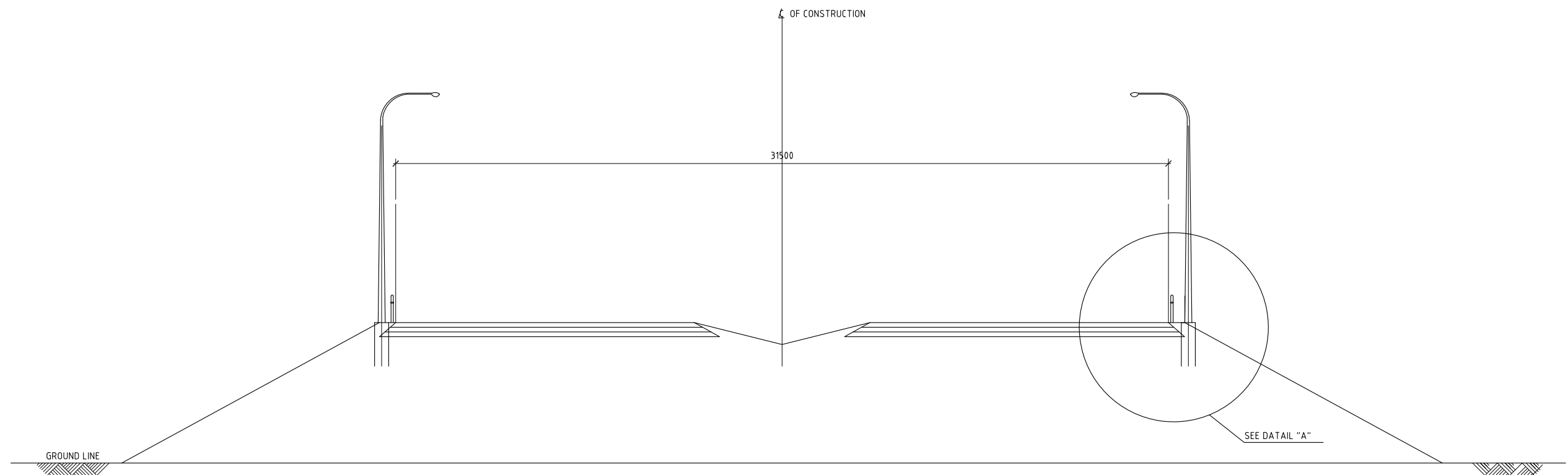
ABBREVIATION

SYMBOL

DESCRIPTION

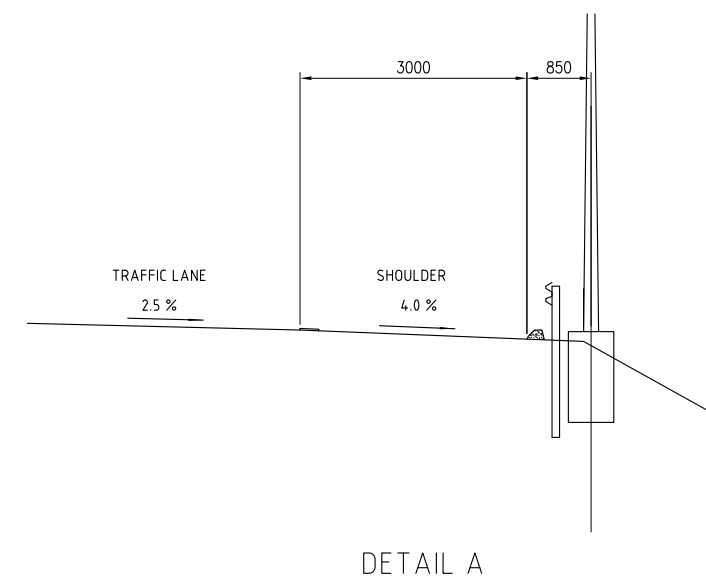
 <p>LC1</p>	<p>ROAD LIGHTING, SINGLE ARM TYPE. 250 WATTS HIGH PRESSURE SODIUM (SON-T) LUMINARY (SEMI CUT-OFF OR CUT-OFF), 12 M STEEL POLE WITH CONCRETE FOUNDATION AT GRADE.</p>
 <p>(OB) LC1</p>	<p>ROAD LIGHTING, SINGLE ARM TYPE. 250 WATTS HIGH PRESSURE SODIUM (SON-T) LUMINARY (SEMI CUT-OFF OR CUT-OFF), 12 M STEEL POLE WITH CONCRETE FOUNDATION ON BRIDGE CONCRETE SIDE WALL.</p>
 <p>DLC1</p>	<p>ROAD LIGHTING, DOUBLE ARM TYPE 250 WATTS HIGH PRESSURE SODIUM (SON-T) LUMINARY (SEMI CUT-OFF), 12 M STEEL POLE WITH CONCRETE FOUNDATION AT GRADE.</p>
 <p>ULC1</p>	<p>ROAD LIGHTING, SINGLE ARM TYPE 70 WATTS SOFIT MOUNTED LANTERN FOR UNDER PASS LIGHTING, WITH SETTING FRAME ON ABUTMENT WALL.</p>
 <p>MDB</p>	<p>MAIN DISTRIBUTION BOARD (MDB) OUT DOOR USED TYPE SELF STANDING WITH FOUNDATION</p>
 <p>LDB</p>	<p>LIGHTING DISTRIBUTION BOARD (LDB) OUT DOOR USED TYPE, SELF STANDING WITH FOUNDATION.</p>
 <p>JB</p>	<p>OVERGROUND JUNCTION BOX (JB)</p>
 <p>MH</p>	<p>MANHOLE TYPE</p>
	<p>PULL BOX 250mm x 250mm x 250mm</p>
	<p>CABLE XLPE/SWA/PVC/CU STEEL TAPE ARMoured TYPE, OUT DOOR USED. UNDERGROUND BURIAL DEPTH 0.8 METER</p>

LIGHTING PROFILE

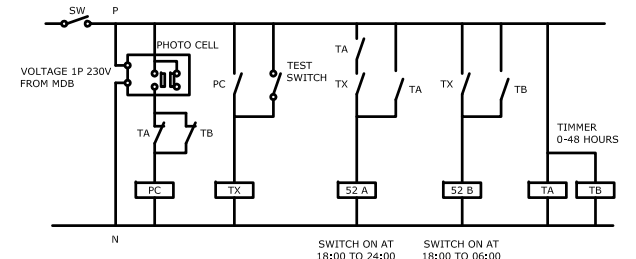
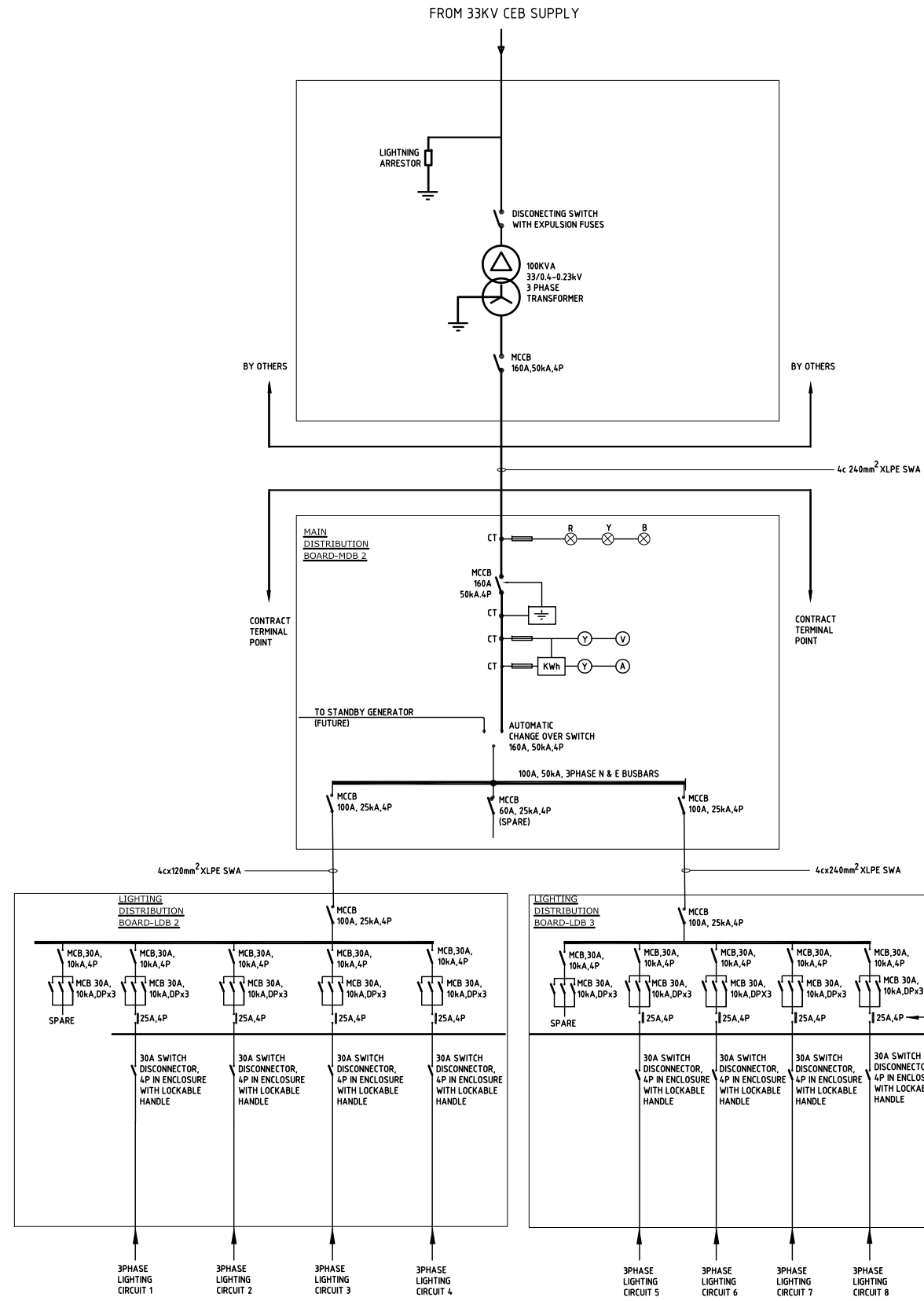
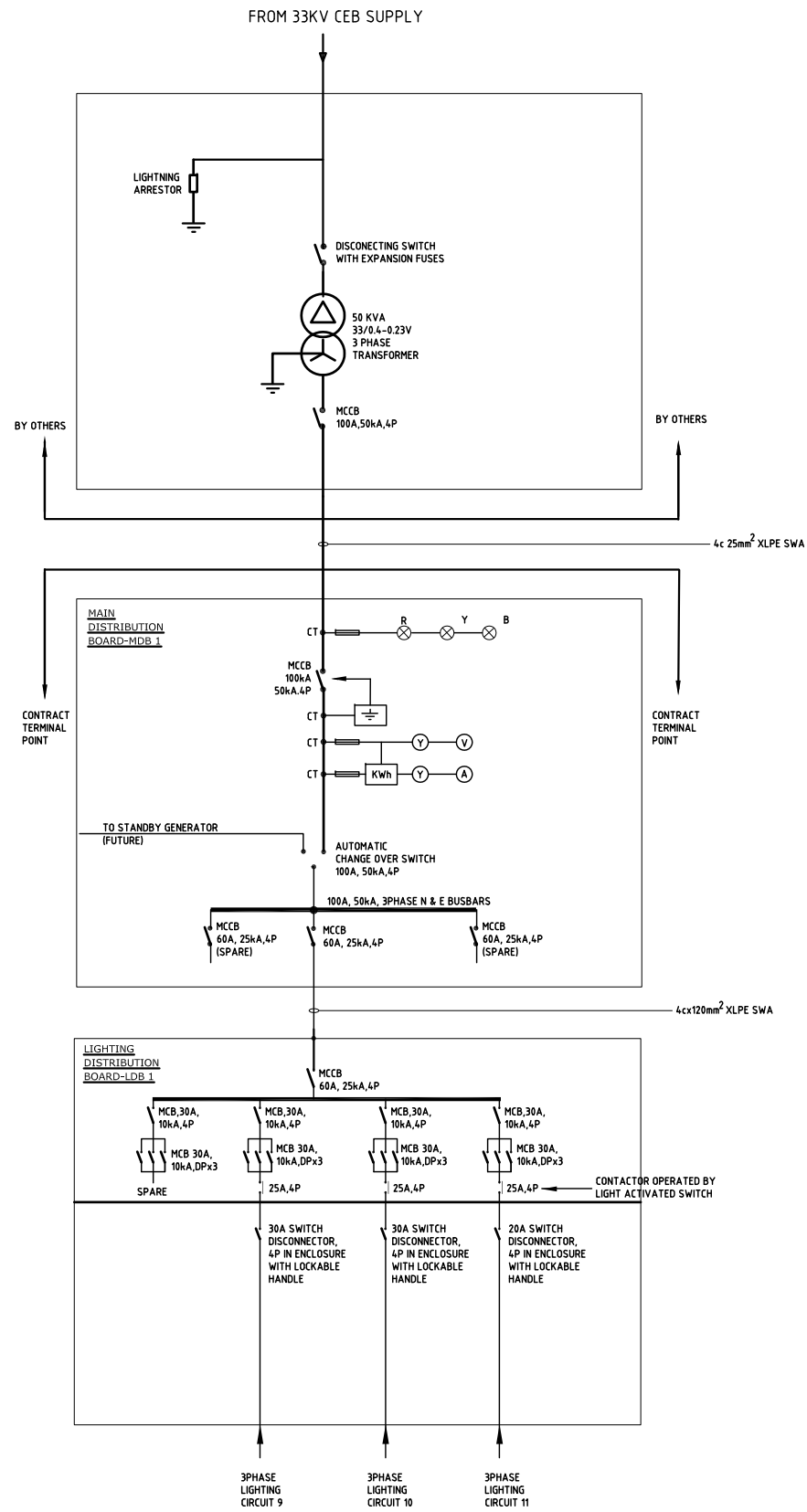


LIGHTING PROFILE

SCALE 1:200

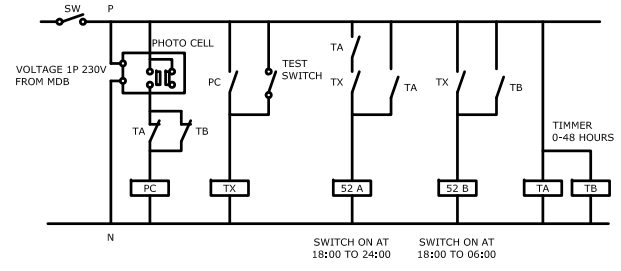
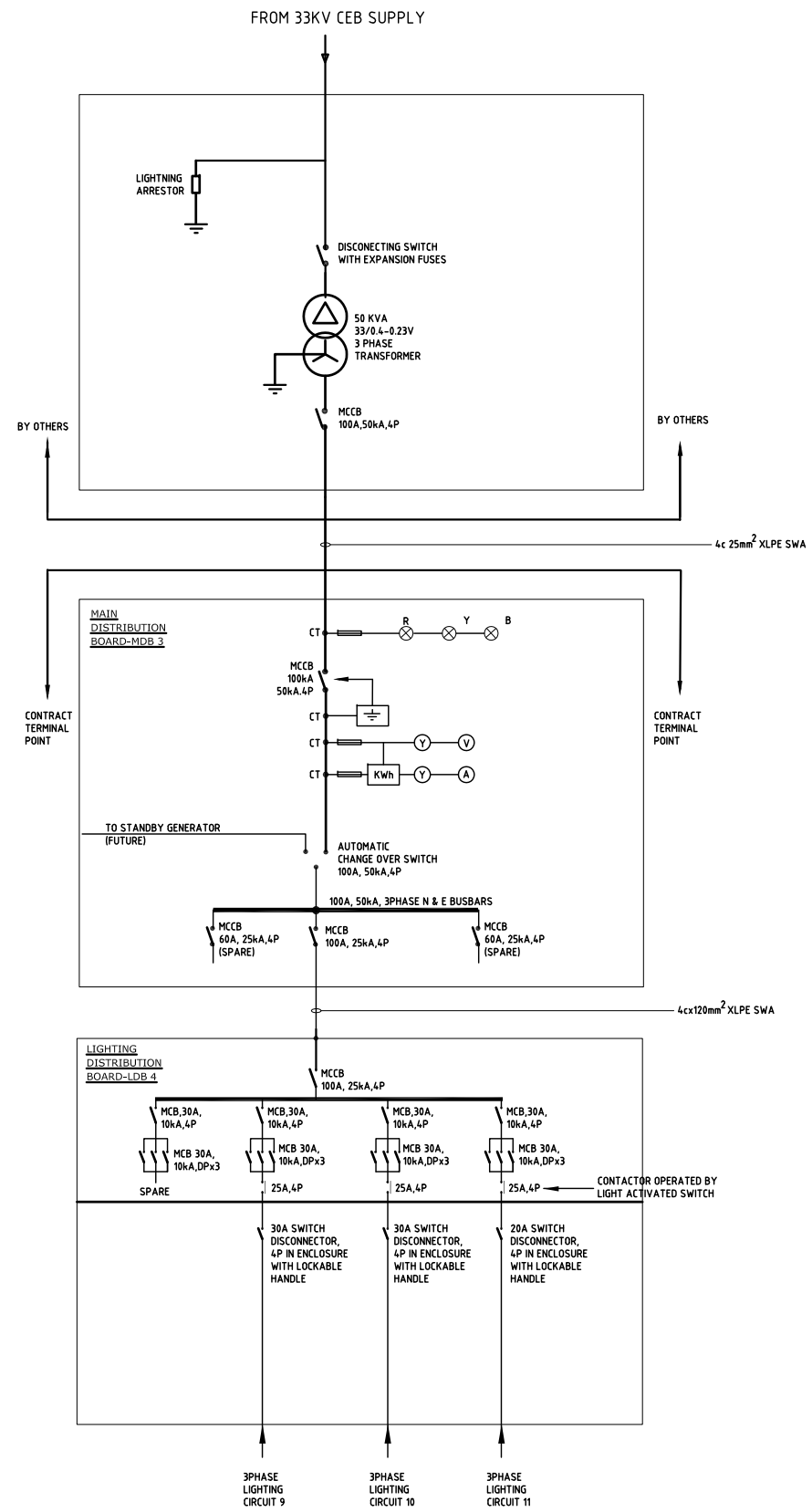


No	REVISION	DATE



SINGLE LINE DIAGRAM OF CONTROL CIRCUIT FOR LIGHT ACTIVATED SWITCH

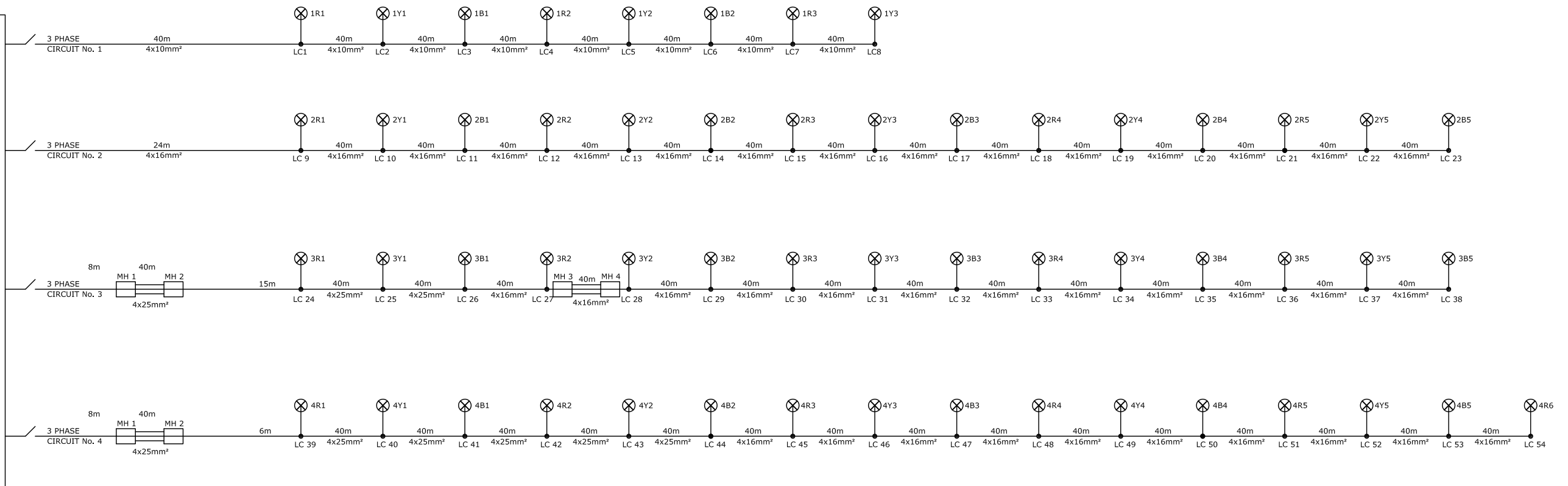
SINGLE LINE DIAGRAM OF POWER SUPPLY & DISTRIBUTION AT A1 INTERCHANGE



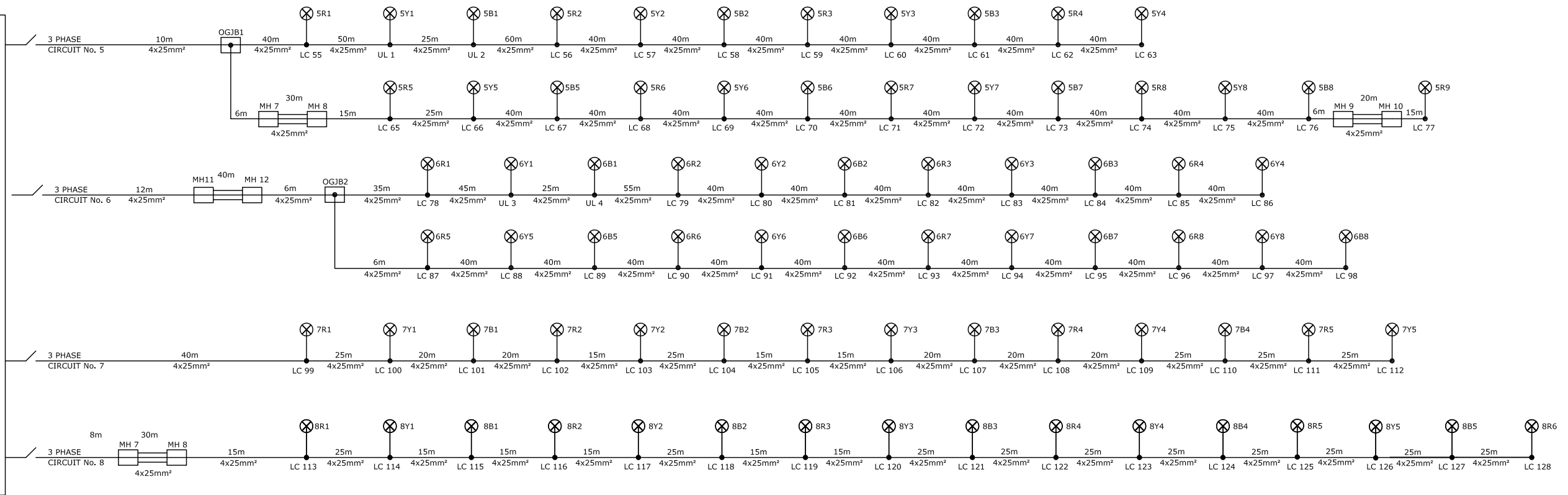
SINGLE LINE DIAGRAM OF CONTROL CIRCUIT FOR LIGHT ACTIVATED SWITCH

SINGLE LINE DIAGRAM OF POWER SUPPLY & DISTRIBUTION AT B214 INTERCHANGE

LDB 1



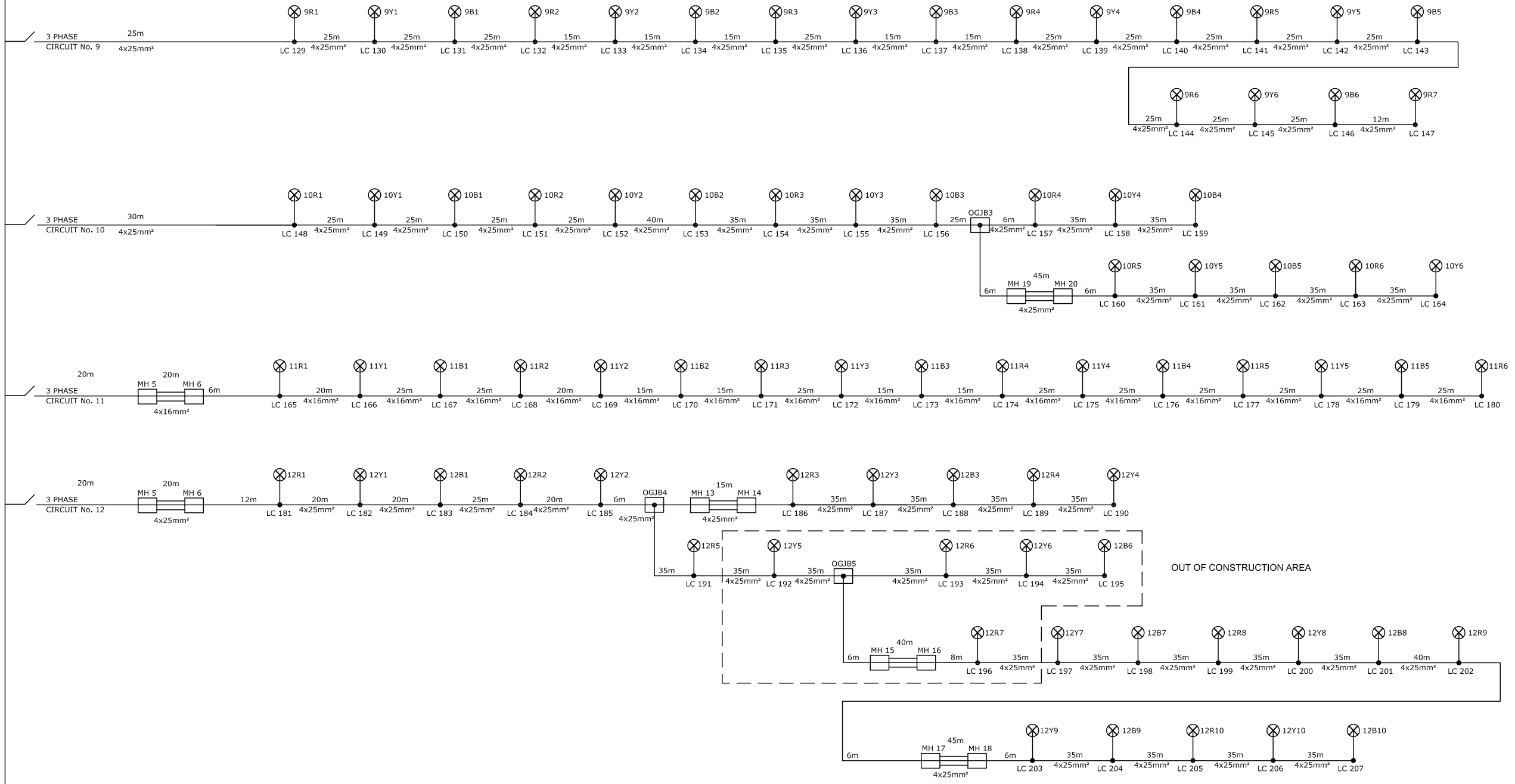
LDB 2



NOTE
01. NOT TO SCALE
02. PLEASE READ IN CONJUNCTION WITH DRAWING NOS.M-03 AND M-13A,B AND C

No	REVISION	DATE

DESIGNED BY:	
CHECKED BY:	
APPROVED BY:	
DWG. NO.	M-05

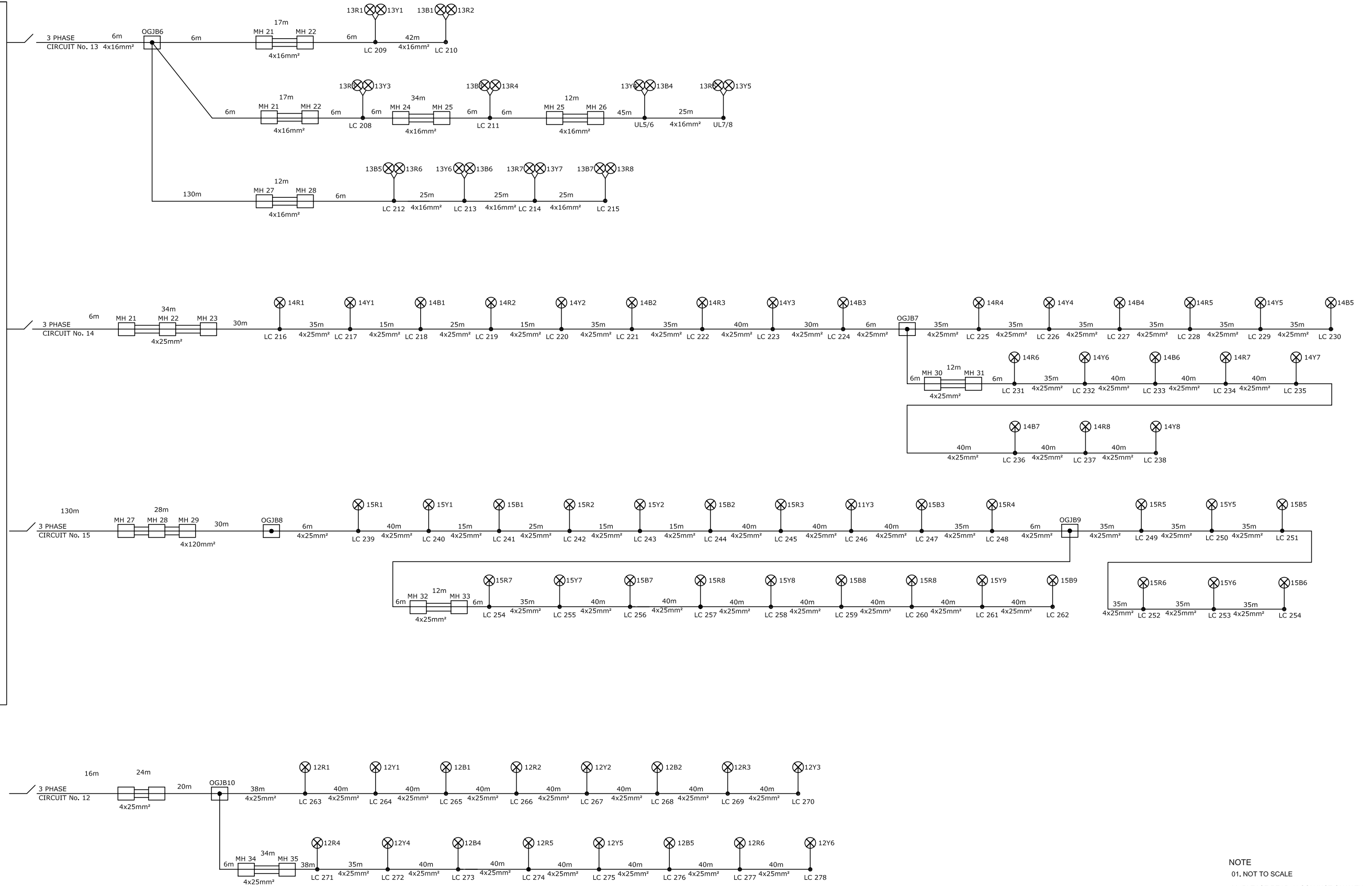


NOTE
 01. NOT TO SCALE
 02. PLEASE READ IN CONJUNCTION WITH
 DRAWING NOS. M-03 AND M-13A/B AND C

No	REVISION	DATE

DESIGNED BY:	
CHECKED BY:	
APPROVED BY:	
DWG. NO.	M-06

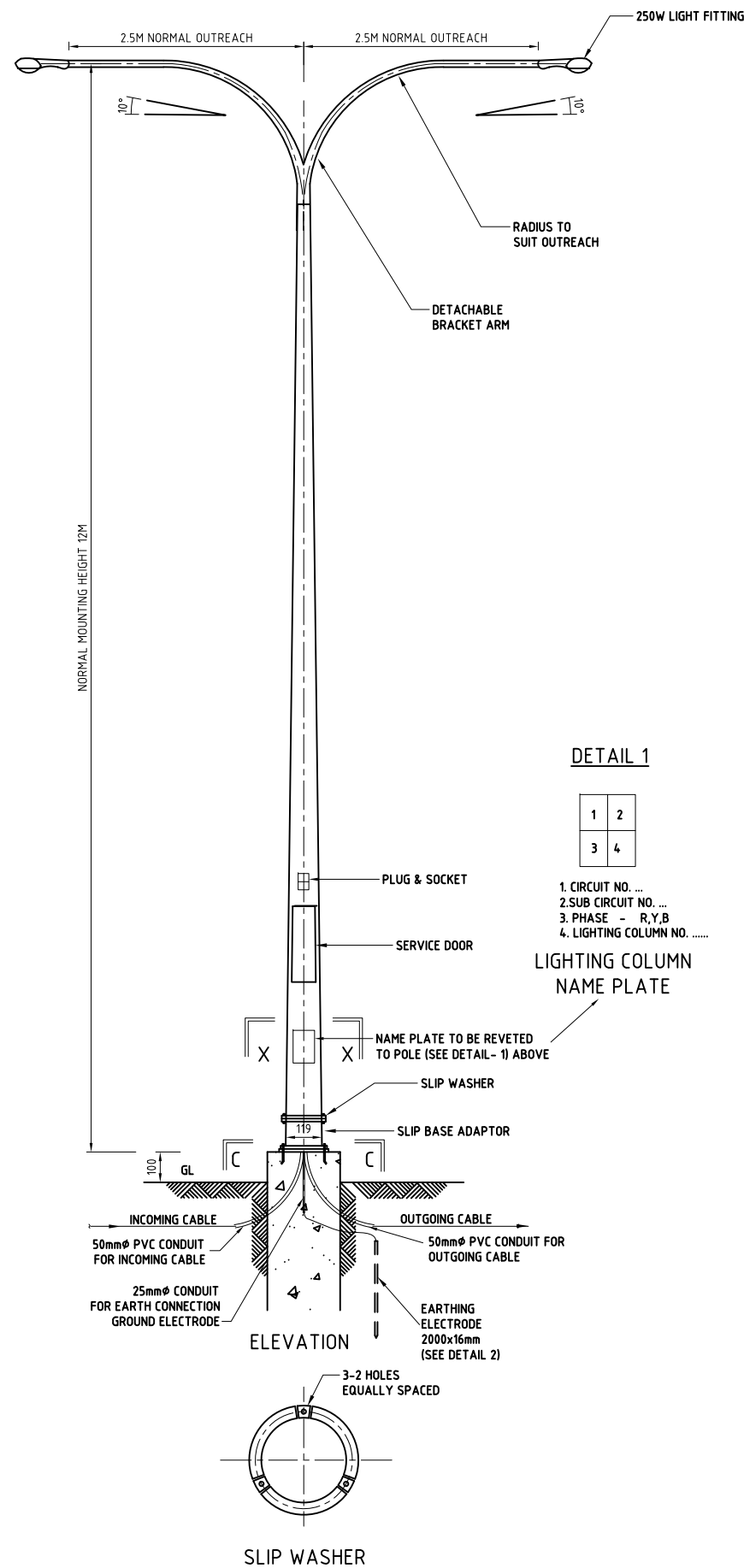
LDB 4



NOTE
 01. NOT TO SCALE
 02. PLEASE READ IN CONJUNCTION WITH
 DRAWING NOS.M-04 AND M-14A AND B

No	REVISION	DATE

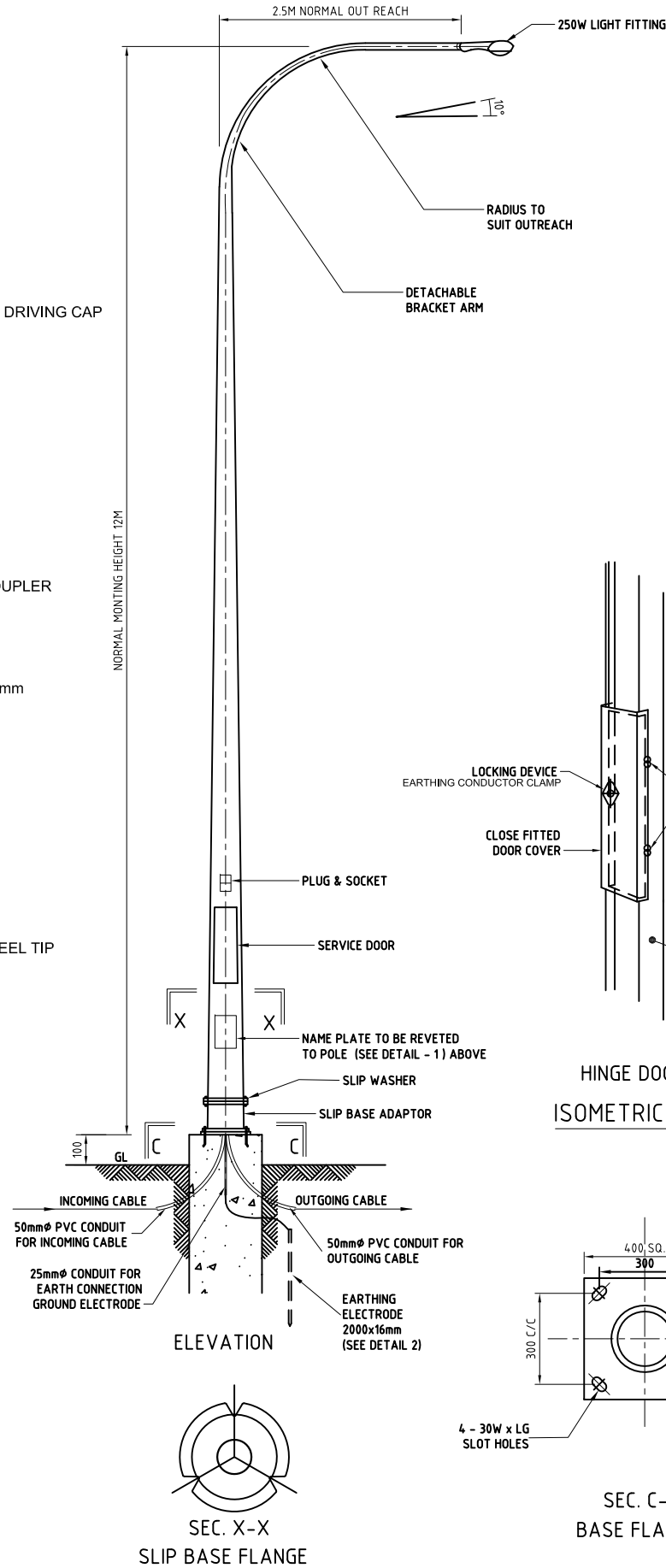
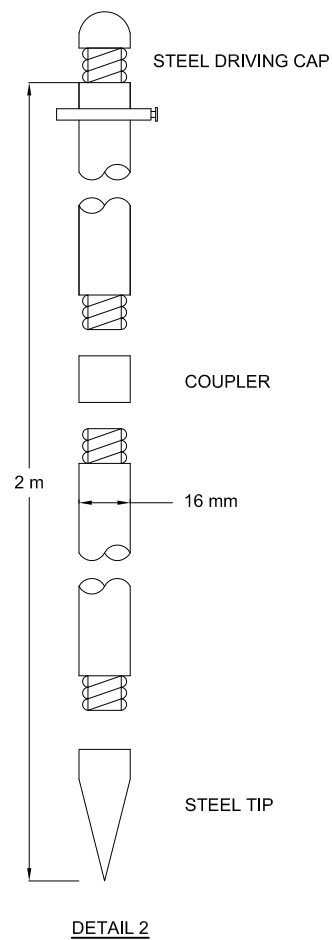
DESIGNED BY:	
CHECKED BY:	
APPROVED BY:	
DWG. NO.	M-07



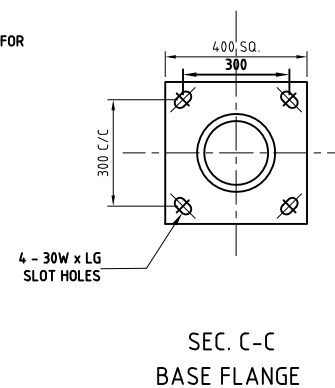
DETAIL 1

1	2
3	4

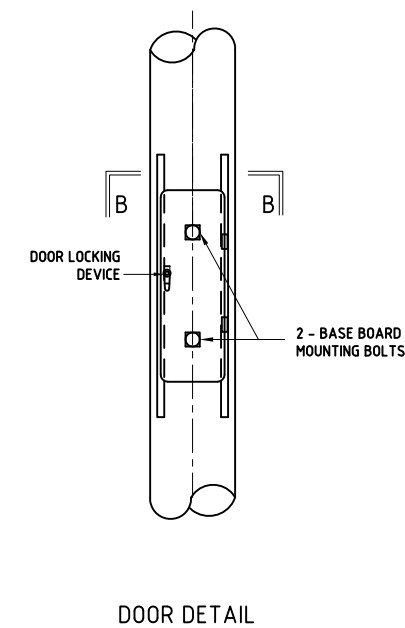
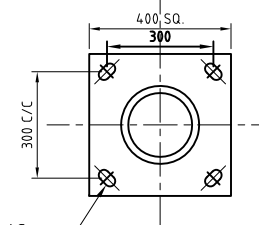
1. CIRCUIT NO. ...
 2. SUB CIRCUIT NO. ...
 3. PHASE - R, Y, B
 4. LIGHTING COLUMN NO.
- LIGHTING COLUMN NAME PLATE



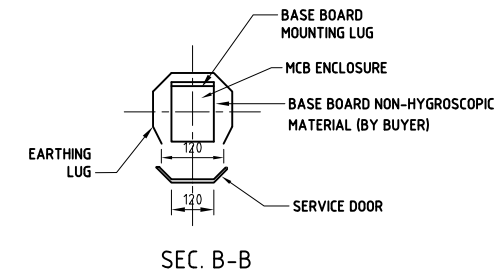
HINGE DOOR ISOMETRIC VIEW



SEC. C-C BASE FLANGE



DOOR DETAIL



SEC. B-B

TECHNICAL SPECIFICATION

1) DESIGN CONDITIONS

1.1 BASIC WIND SPEED : 35 m/s

2) STANDARDS

- 2.1 POLE DESIGN : BS 5649, CP3
- 2.2 MATERIAL : BS 4360 / JIS G3101 SS400
- 2.3 WELDING (ELECTRIC ARC WELDING) : BS 5135
- 2.4 GALVANIZING : BS 729

3) TESTING PROCEDURES

- : DIMENSIONAL VERIFICATION
- : GALVANIZING THICKNESSES
- : MATERIAL THICKNESSES
- : ULTRASONIC WELDING TESTS
- : TYPE TESTS : BS 5649 PT.8

4) QUALITY CONTROL PROCEDURES

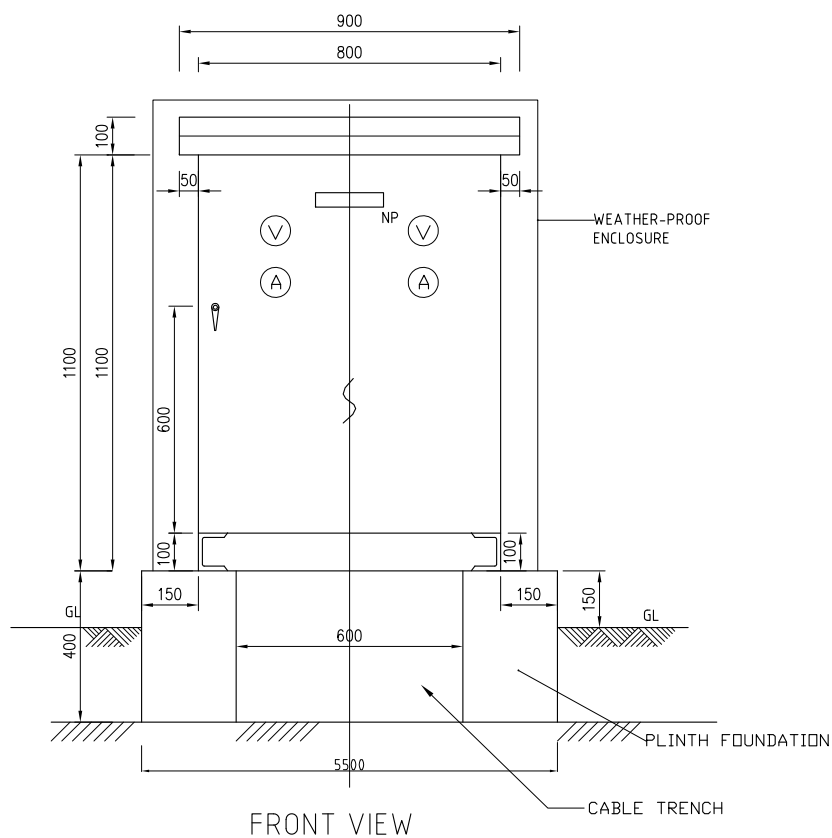
- : THE SUPER / MANUFACTURER AND GALVANIZER OF THE COLUMN SHALL BE ISO 9000 : 94 ACCREDITED.

No	REVISION	DATE

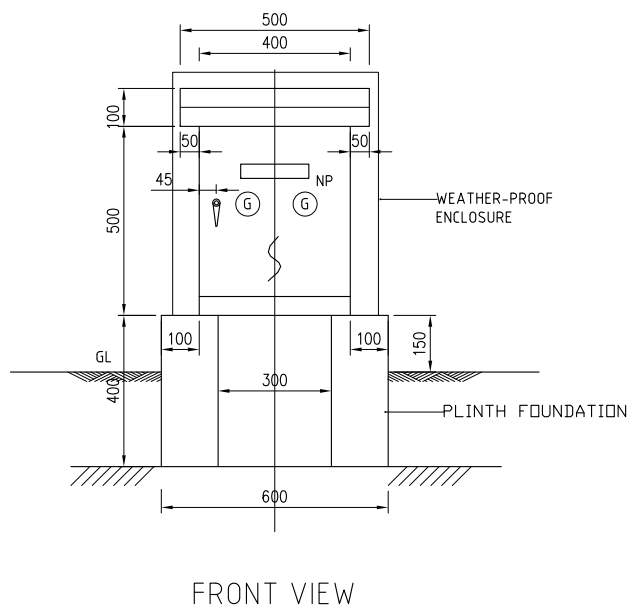
DESIGNED BY:	
CHECKED BY:	
APPROVED BY:	
DWG. NO.	M-08

DETAIL FOR DISTRIBUTION BOARDS (MDB,LDB & JB)

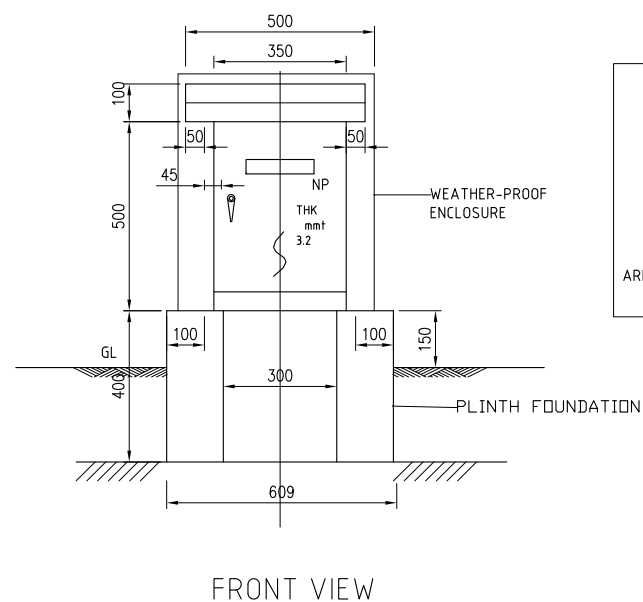
MAIN DISTRIBUTION BOARD (MDB)



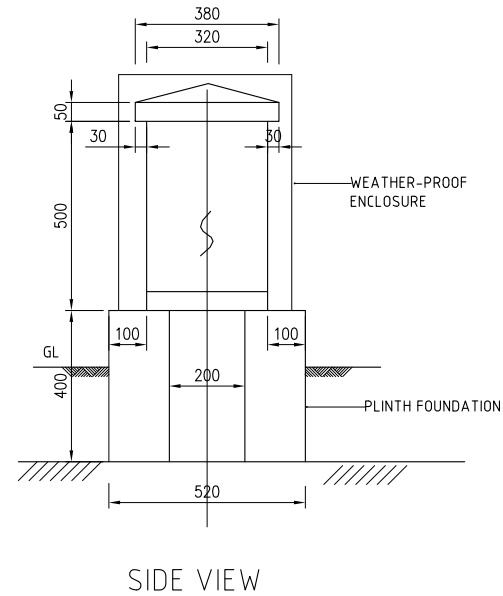
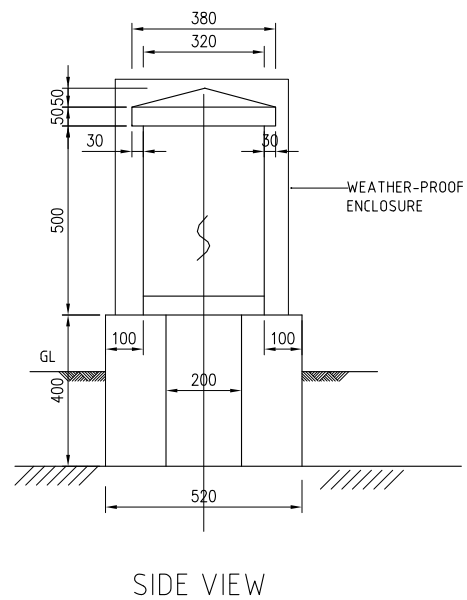
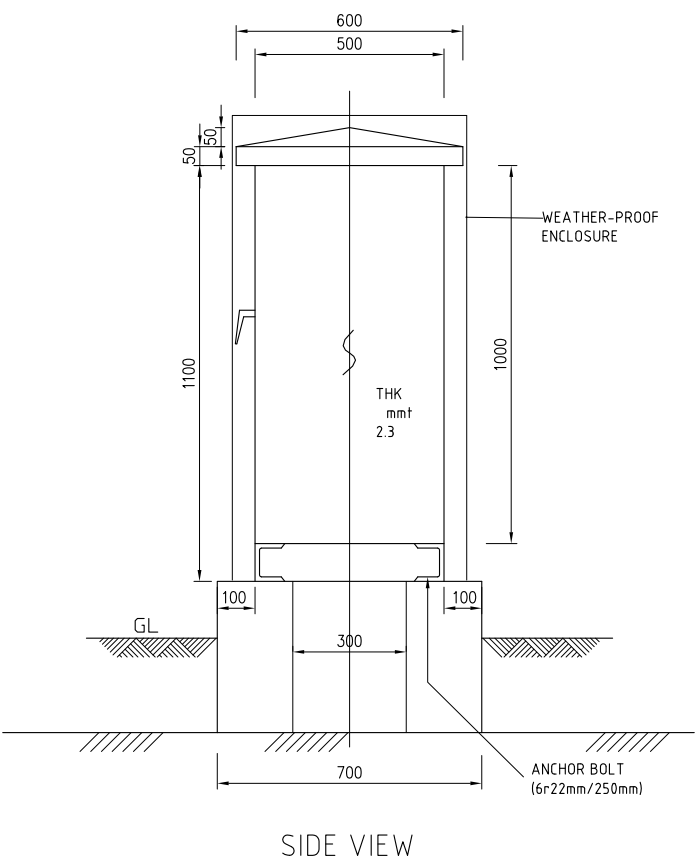
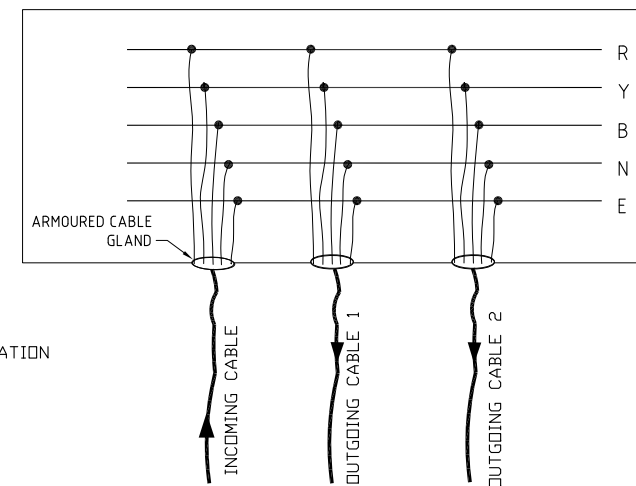
LIGHTING DISTRIBUTION BOARD (LDB)

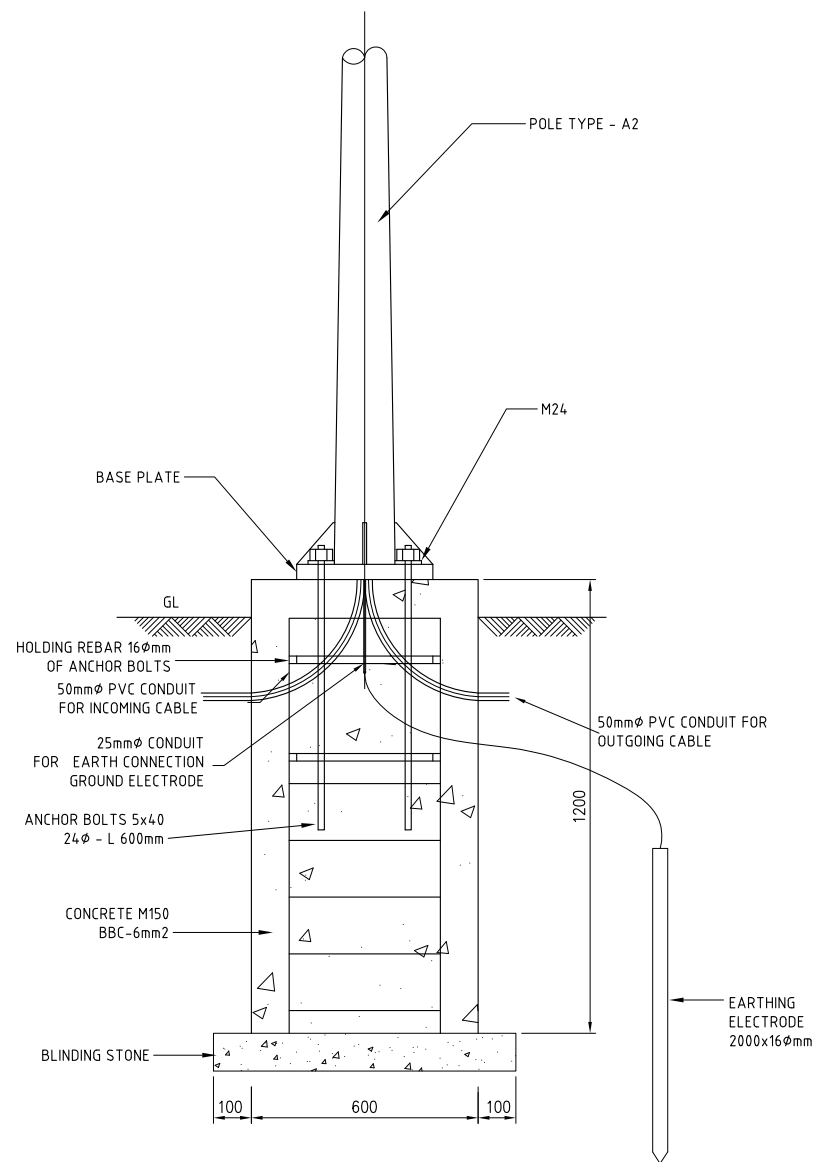


OVERGROUND JUNCTION BOX (JB)

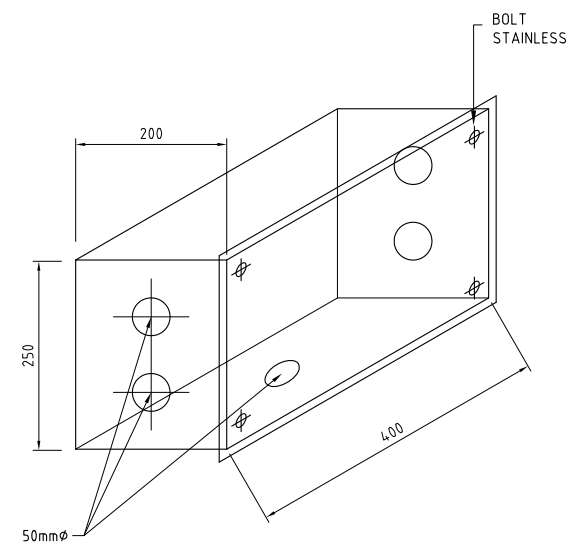


CONNECTION DETAIL FOR OVER GROUND JUNCTION BOX

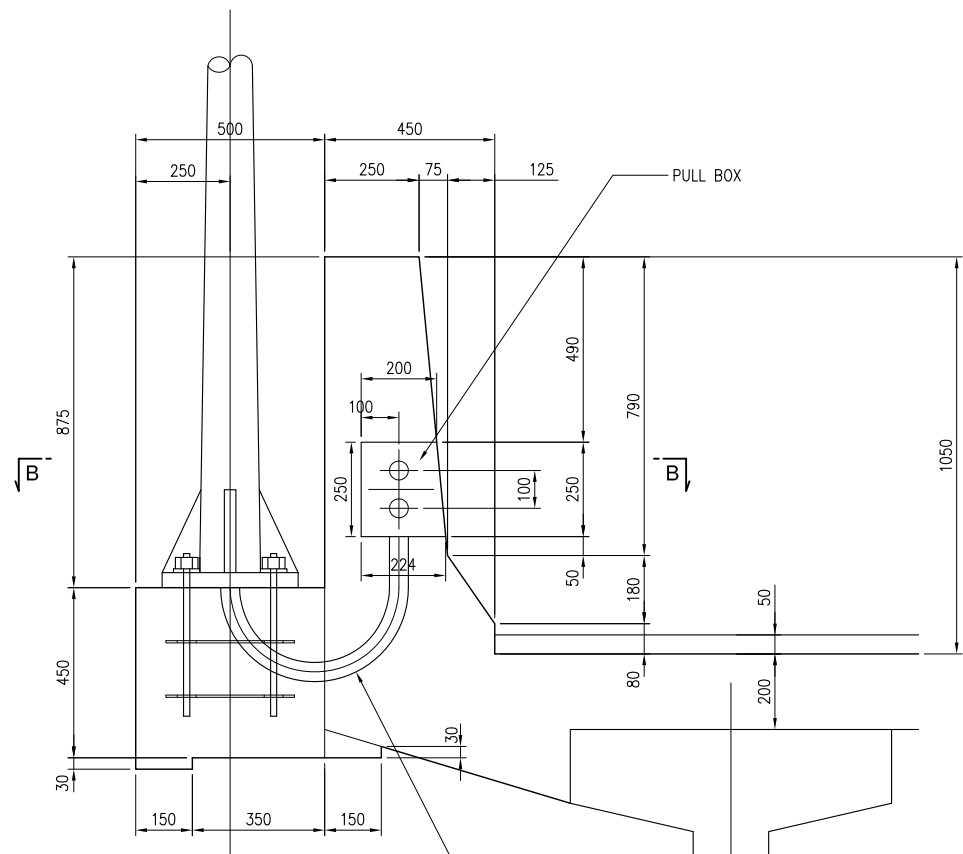




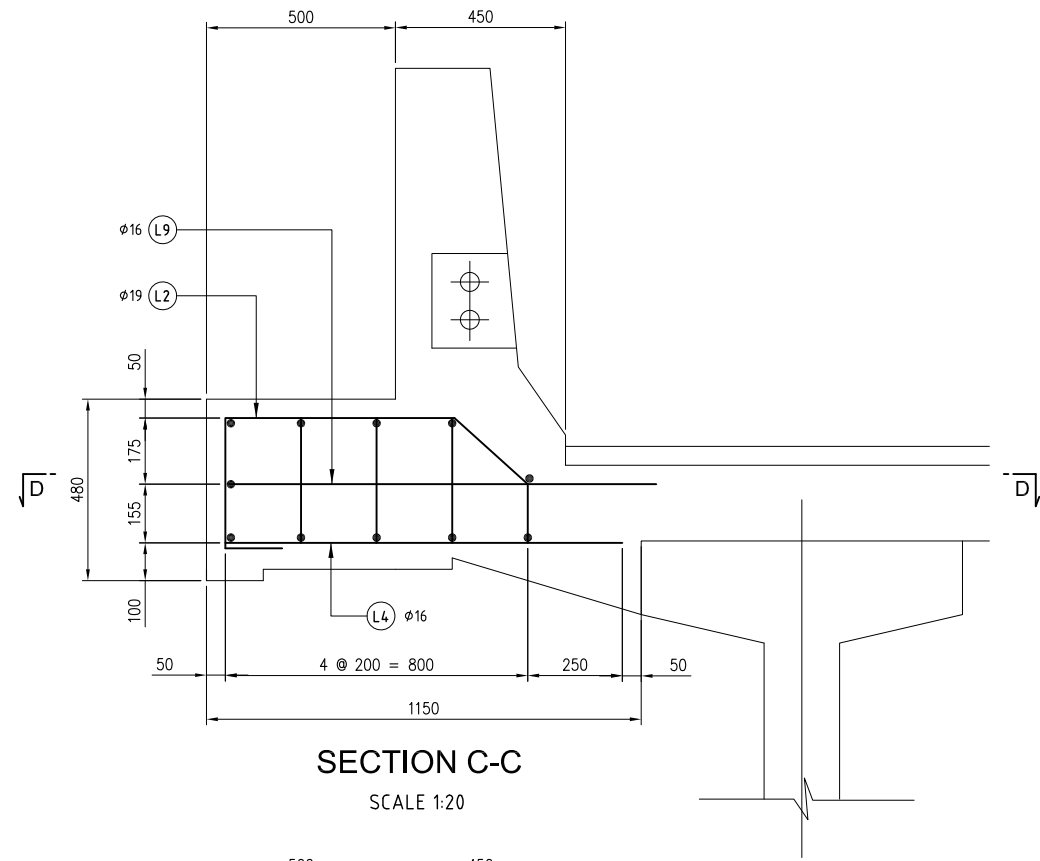
DETAIL OF POLE FOUNDATION
SCALE 1:20



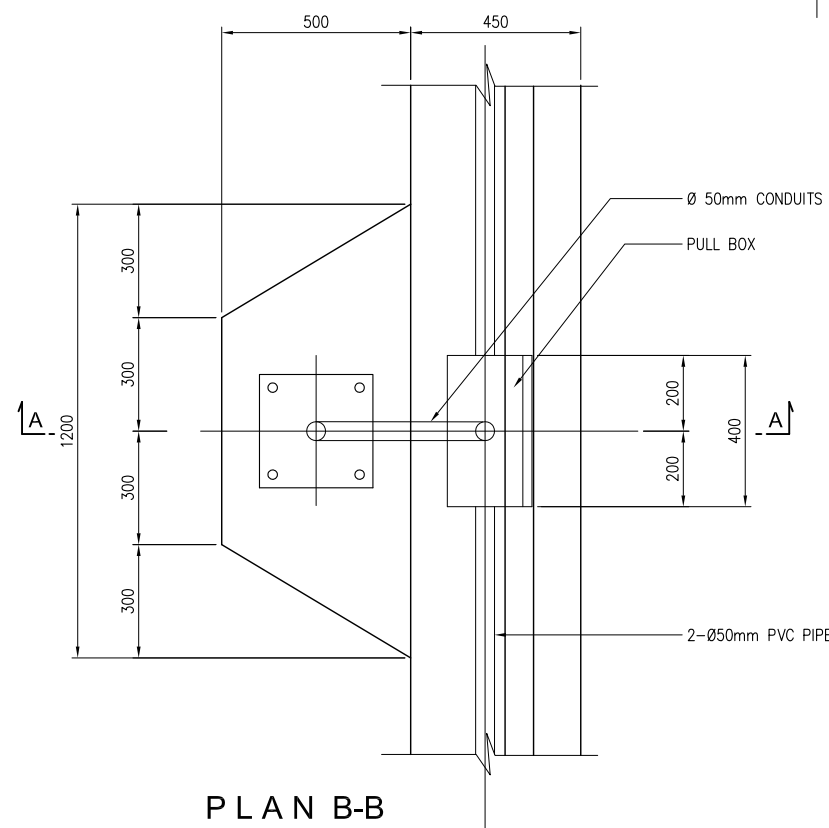
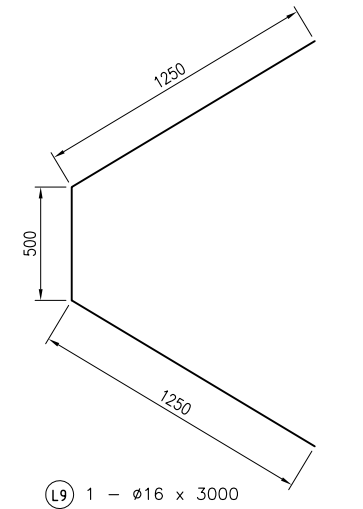
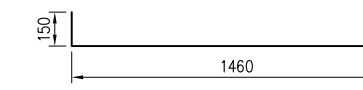
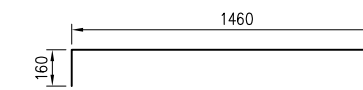
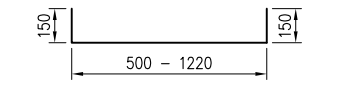
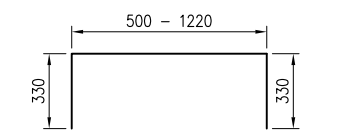
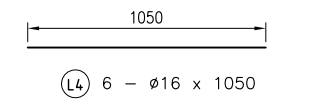
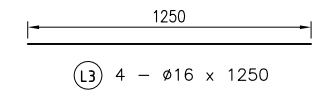
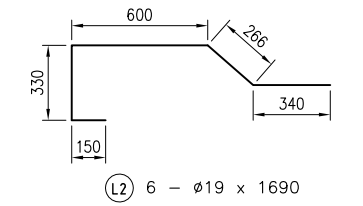
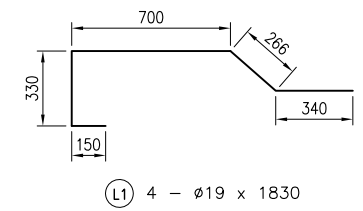
PULL BOX ON BRIDGE
SCALE 1:20



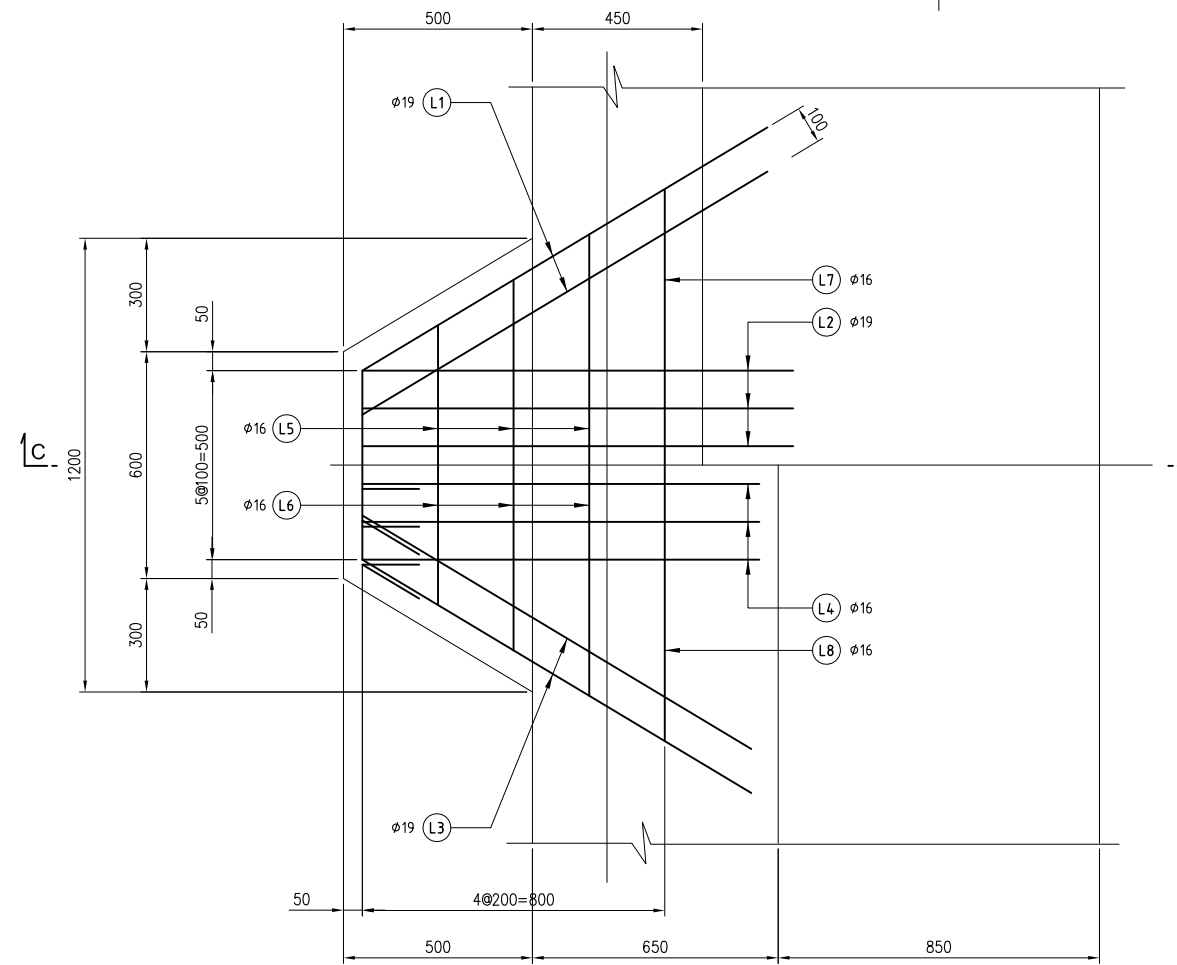
ELEVATION A-A
SCALE 1:20



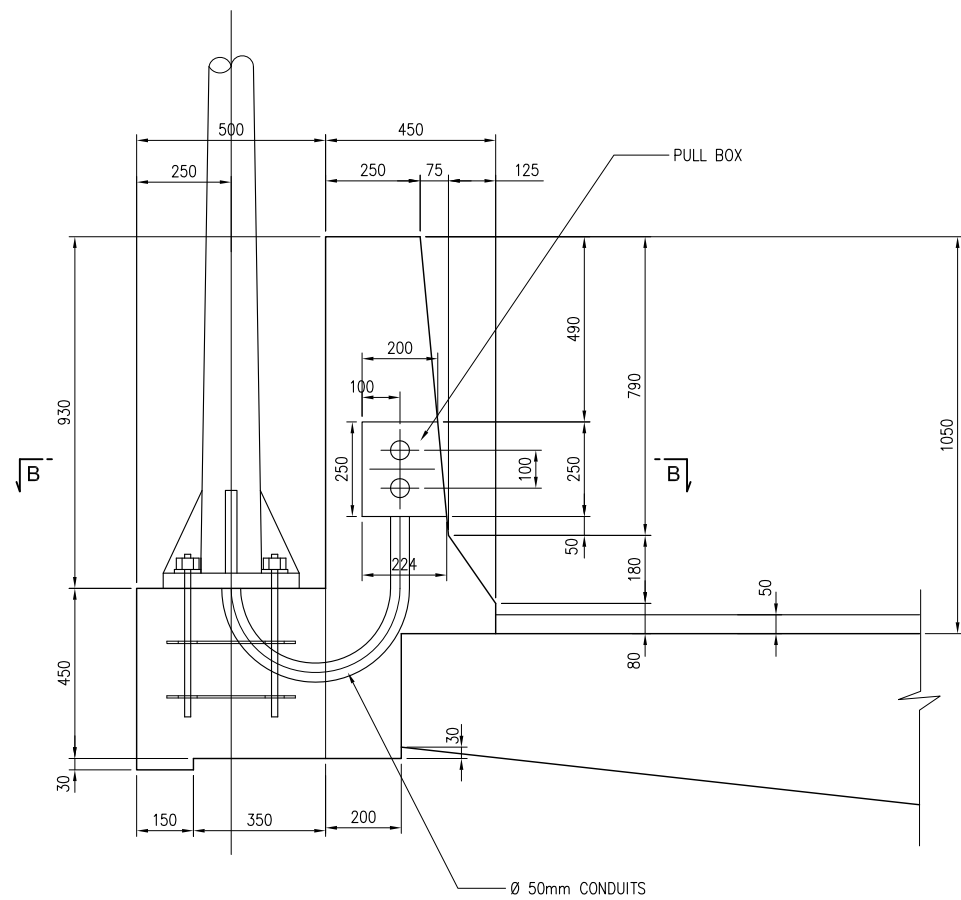
SECTION C-C
SCALE 1:20



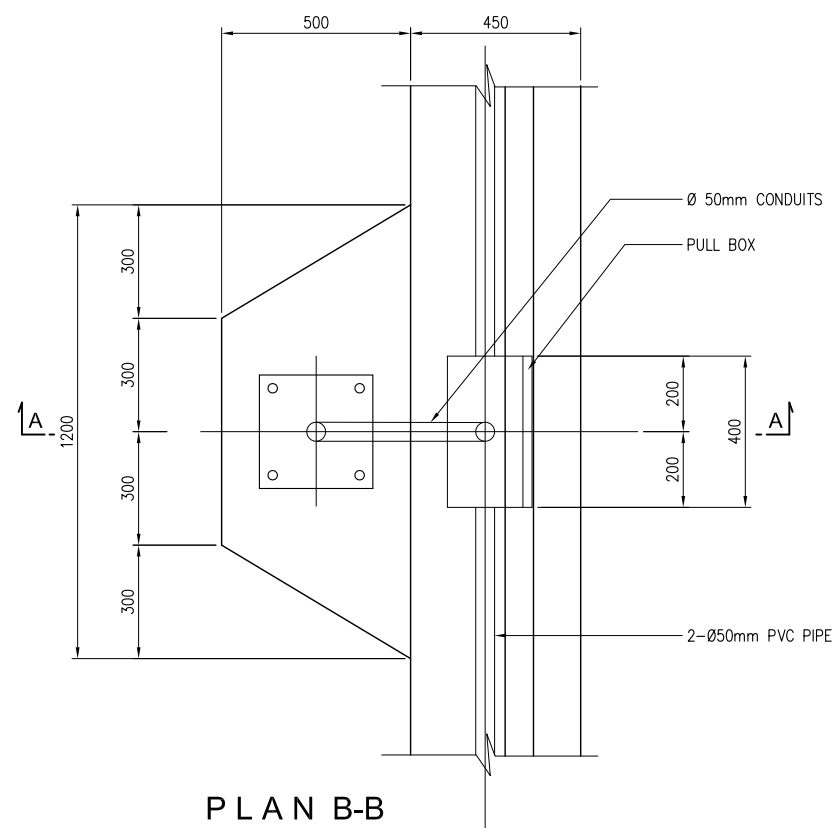
PLAN B-B
SCALE 1:20



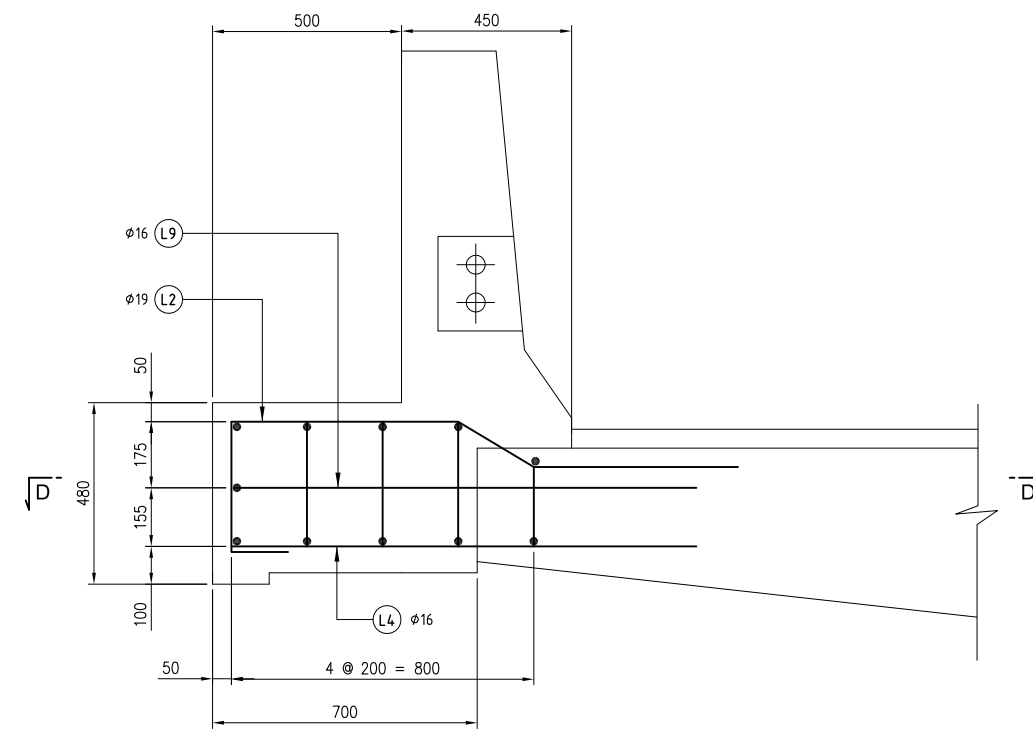
SECTION D-D
SCALE 1:20



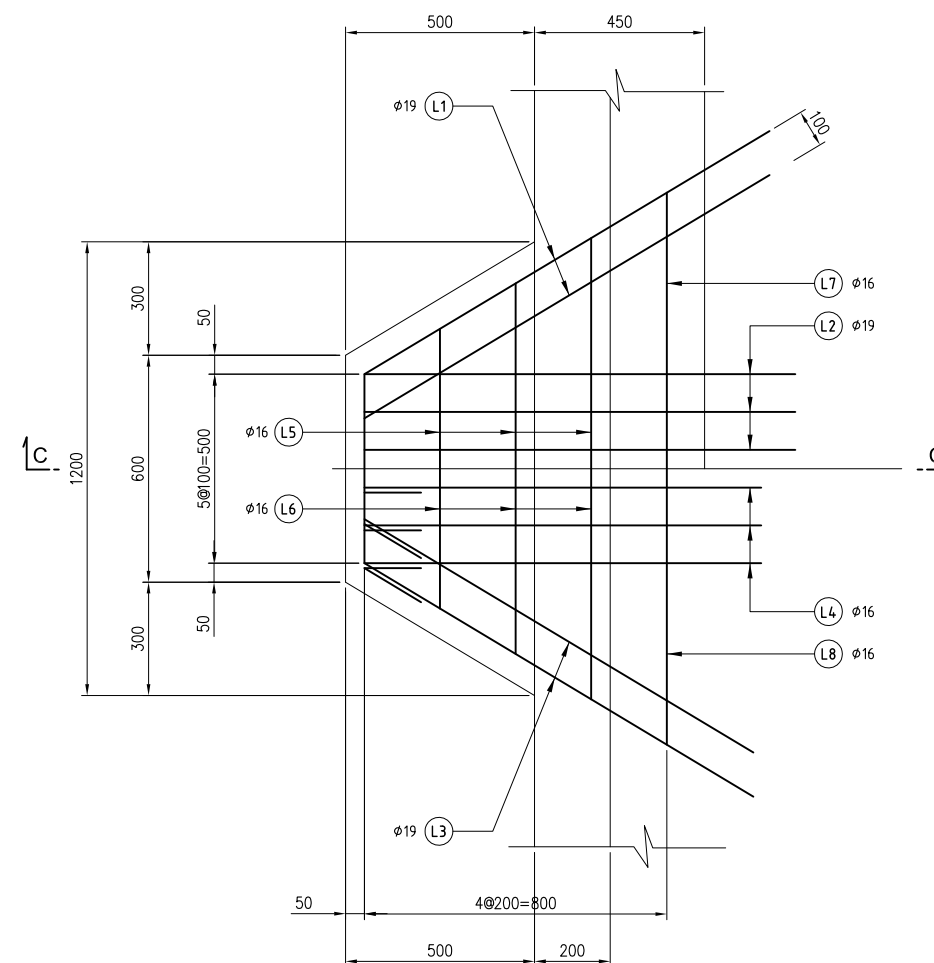
ELEVATION A-A
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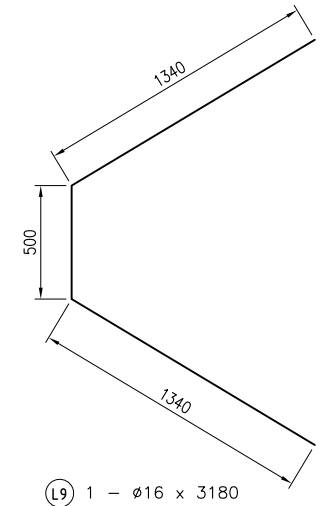
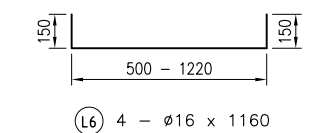
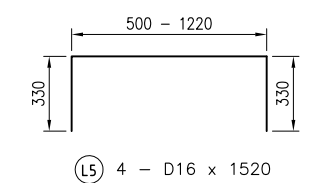
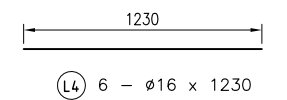
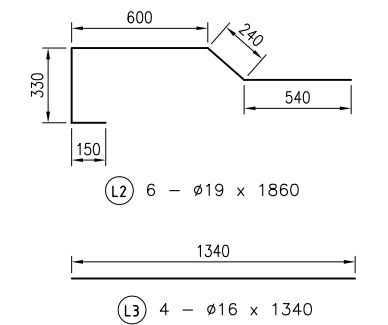
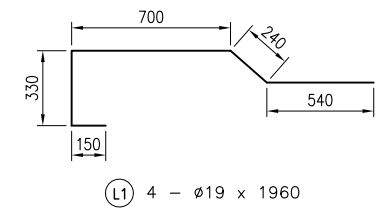
PLAN B-B
SCALE 1:20

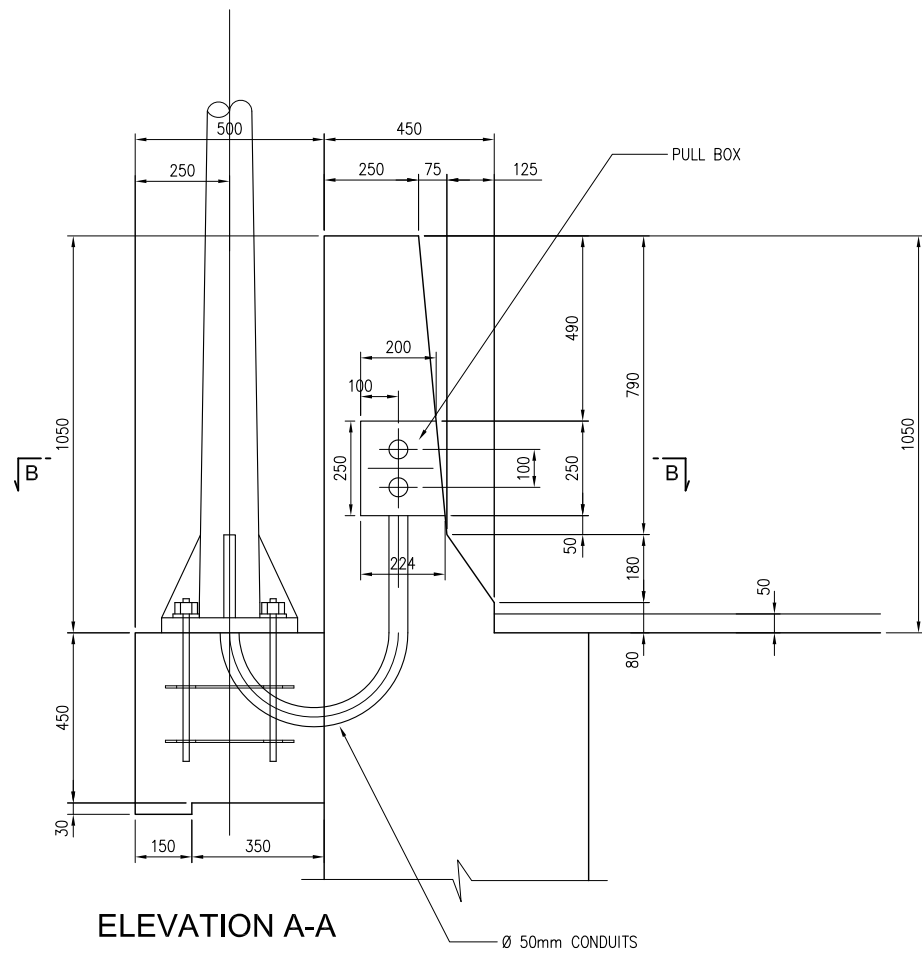


SECTION C-C
SCALE 1:20

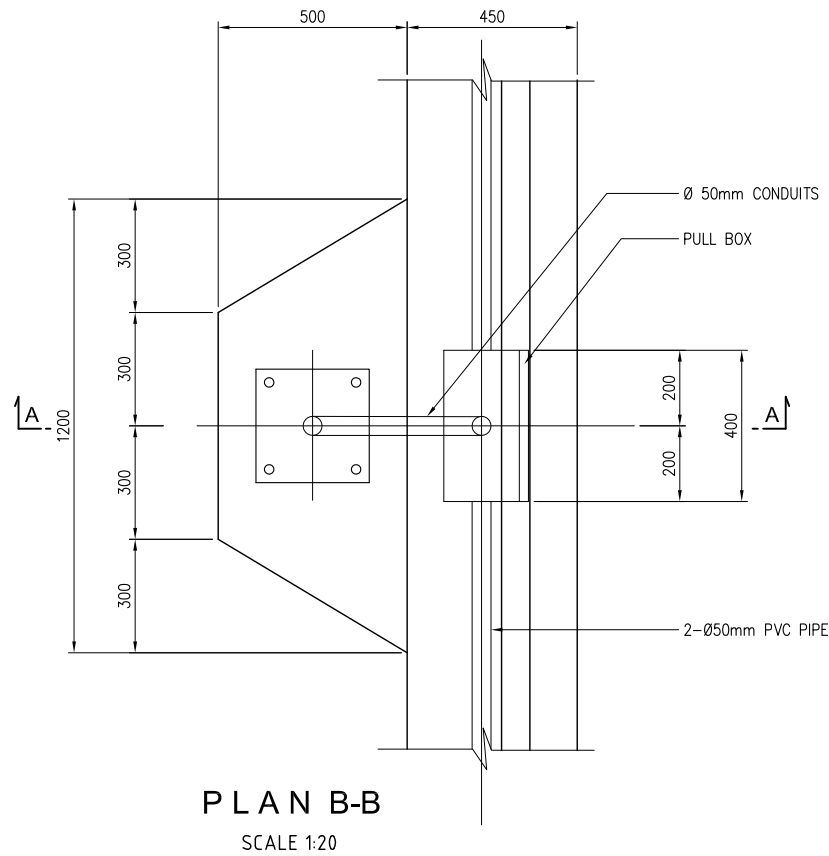


SECTION D-D
SCALE 1:20

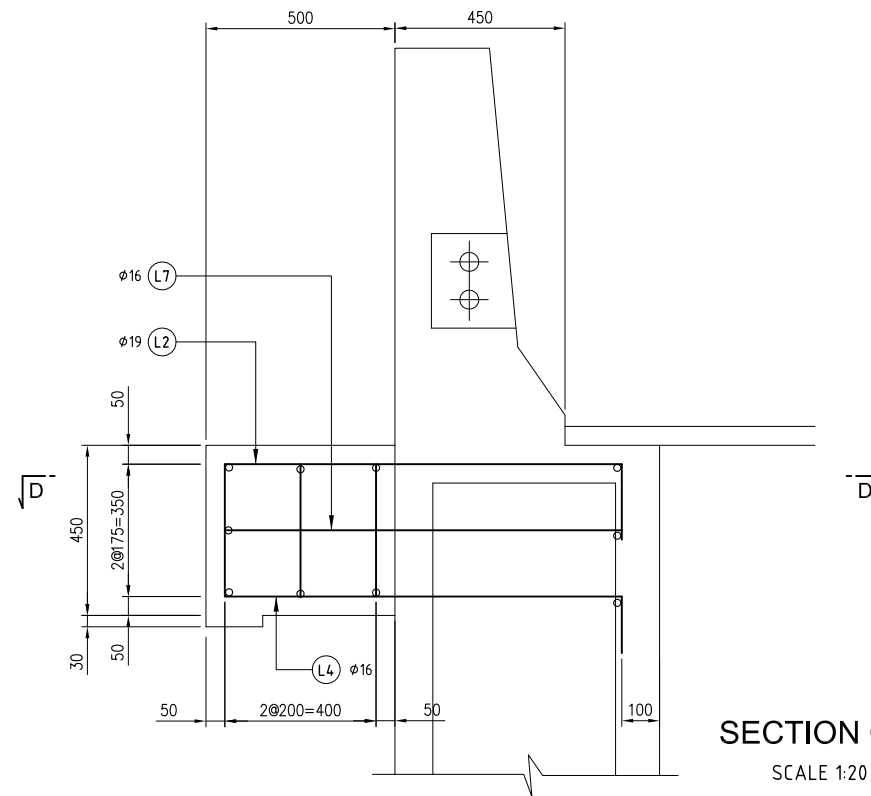




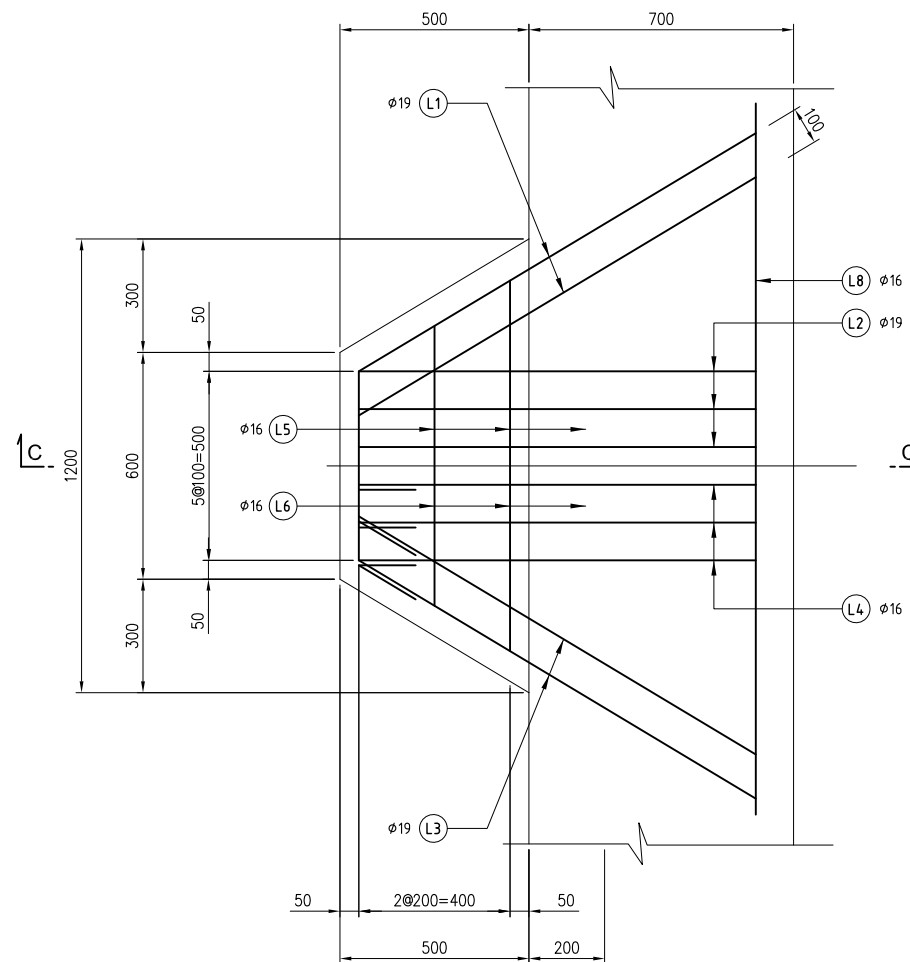
ELEVATION A-A
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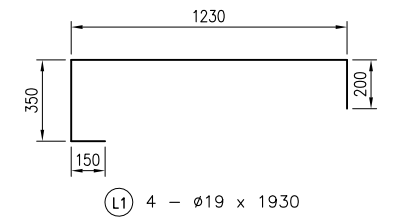
PLAN B-B
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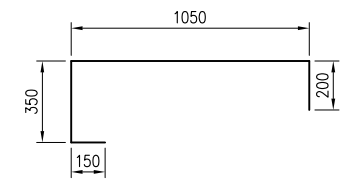
SECTION C-C
SCALE 1:20



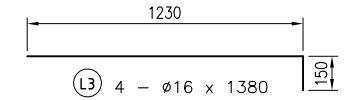
SECTION D-D
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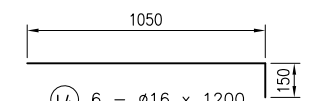
Ⓛ1 4 - Ø19 x 1930



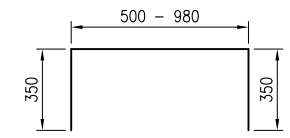
Ⓛ2 6 - Ø19 x 1750



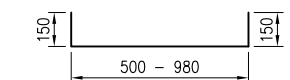
Ⓛ3 4 - Ø16 x 1380



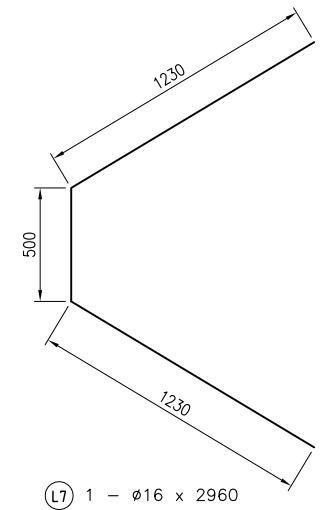
Ⓛ4 6 - Ø16 x 1200



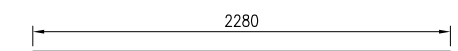
Ⓛ5 3 - D16 x 1440



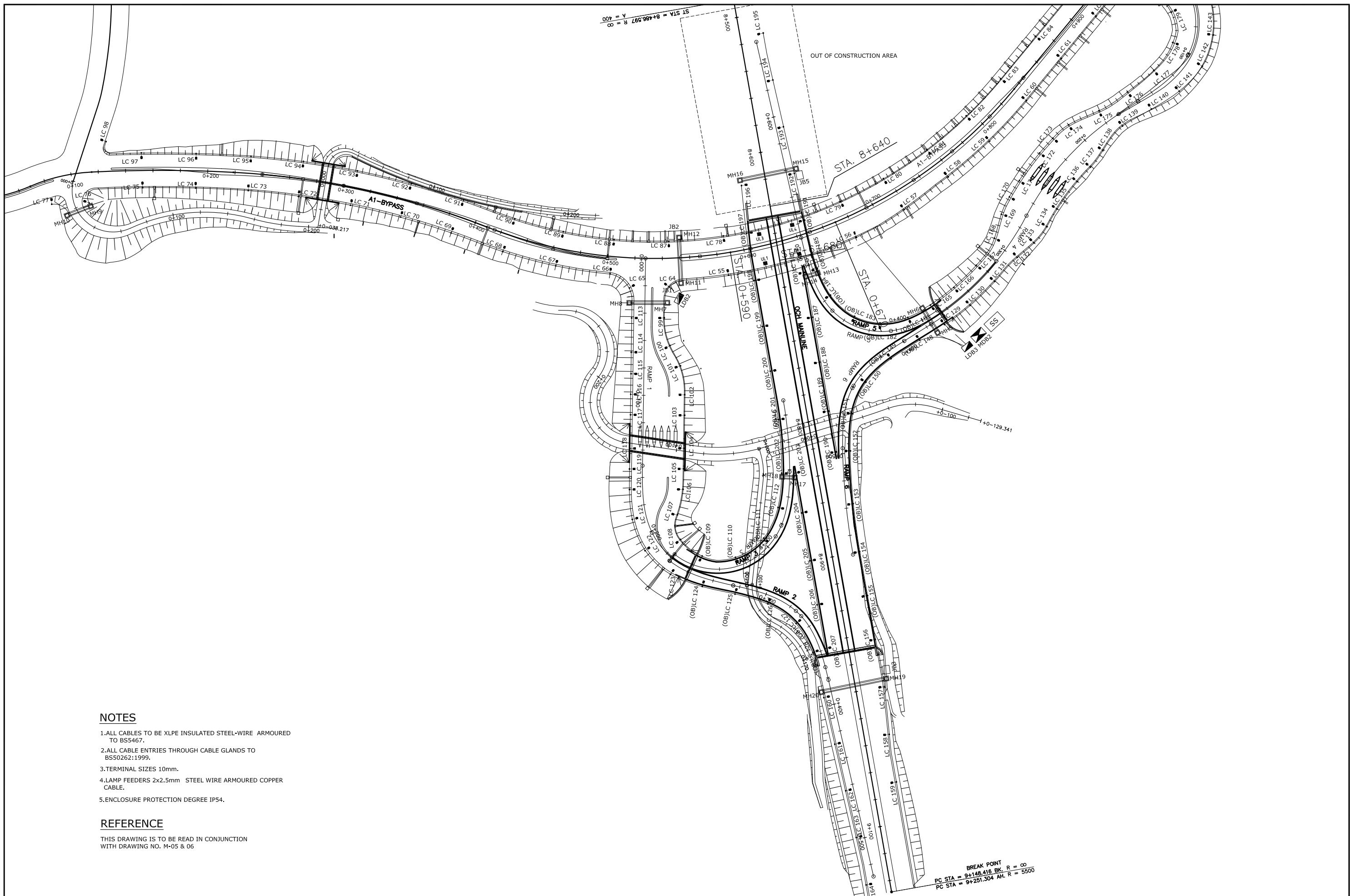
Ⓛ6 3 - Ø16 x 1040



Ⓛ7 1 - Ø16 x 2960



Ⓛ8 3 - Ø16 x 2000



NOTES

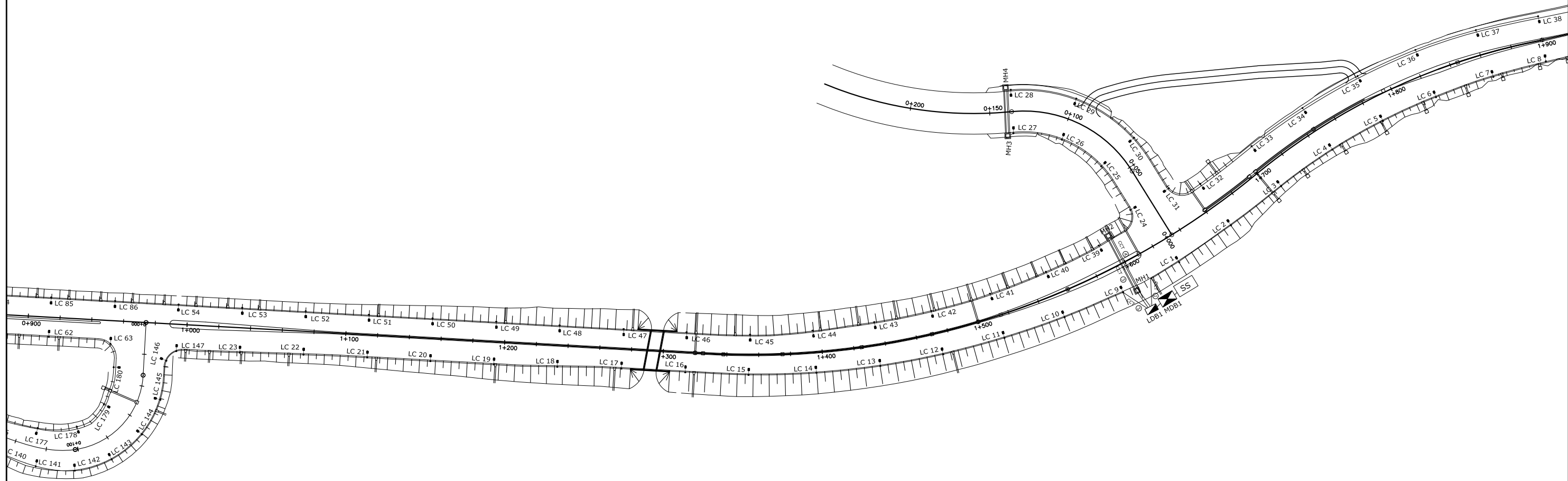
1. ALL CABLES TO BE XLPE INSULATED STEEL-WIRE ARMoured TO BS5467.
2. ALL CABLE ENTRIES THROUGH CABLE GLANDS TO BS50262:1999.
3. TERMINAL SIZES 10mm.
4. LAMP FEEDERS 2x2.5mm STEEL WIRE ARMoured COPPER CABLE.
5. ENCLOSURE PROTECTION DEGREE IP54.

REFERENCE

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRAWING NO. M-05 & 06

No	REVISION	DATE

DESIGNED BY:	
CHECKED BY:	
APPROVED BY:	
DWG. NO.	M-14



NOTES

1. ALL CABLES TO BE XLPE INSULATED STEEL-WIRE ARMoured TO BS5467.
2. ALL CABLE ENTRIES THROUGH CABLE GLANDS TO BS50262:1999.
3. TERMINAL SIZES 10mm.
4. LAMP FEEDERS 2x2.5mm STEEL WIRE ARMoured COPPER CABLE.
5. ENCLOSURE PROTECTION DEGREE IP54.

REFERENCE

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRAWING NO. M-05 & 06

THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF HIGHWAYS & ROAD DEVELOPMENT



JICA JAPAN INTERNATIONAL COOPERATION AGENCY

ORIENTAL CONSULTANTS COMPANY LIMITED
in association with
PACIFIC CONSULTANTS INTERNATIONAL

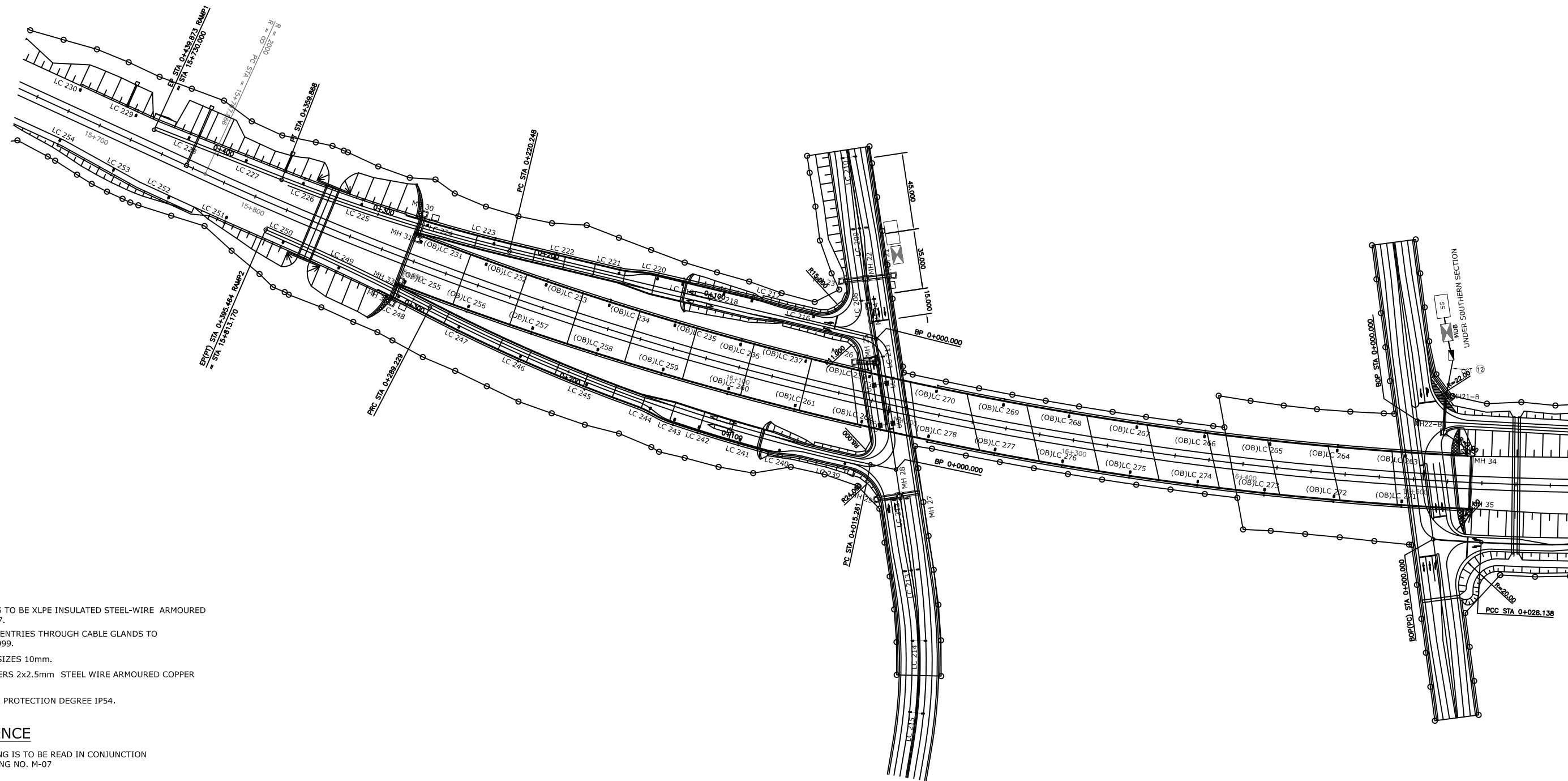


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COLOMBO OUTER CIRCULAR HIGHWAY PROJECT
(NORTHERN SECTION 1)

LIGHTING COLUMN LAYOUT
A-1 INTERCHANGE

DESIGNED BY:	
CHECKED BY:	
APPROVED BY:	
DWG. NO.	M-15

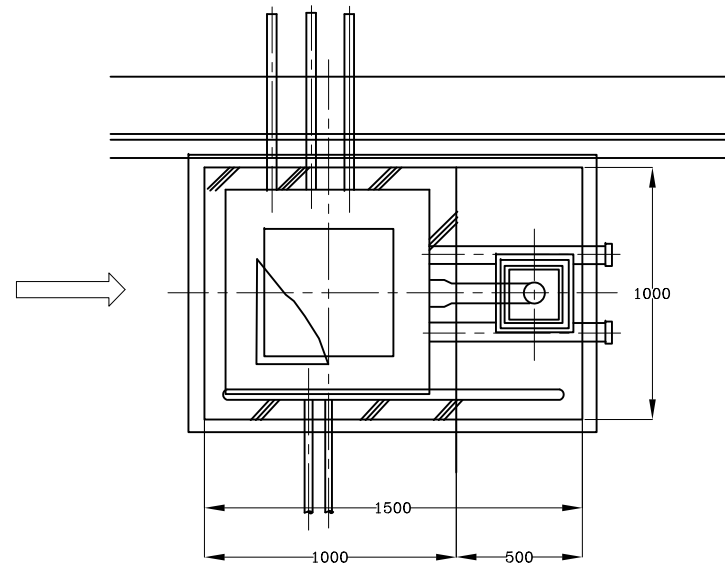


NOTES

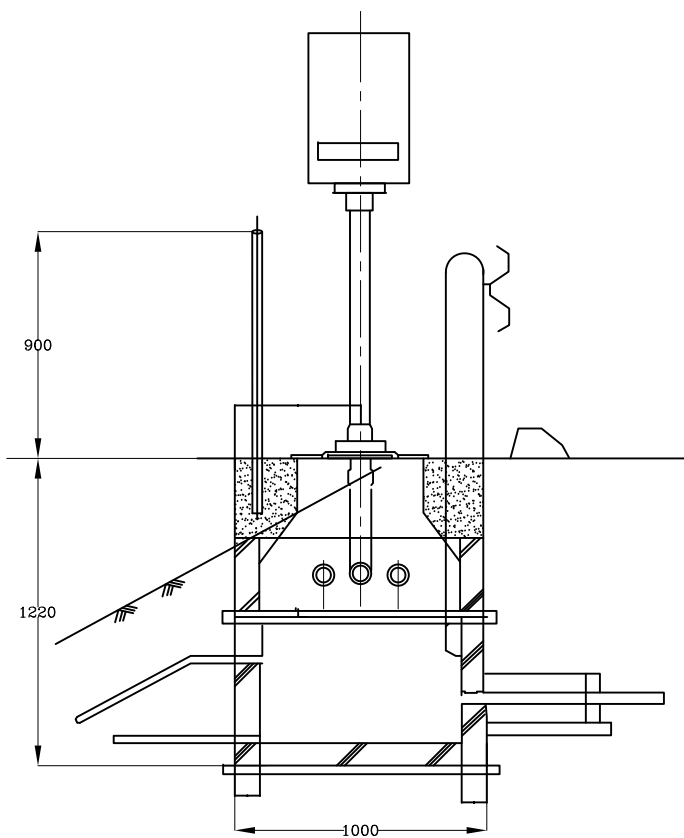
1. ALL CABLES TO BE XLPE INSULATED STEEL-WIRE ARMoured TO BS5467.
2. ALL CABLE ENTRIES THROUGH CABLE GLANDS TO BS50262:1999.
3. TERMINAL SIZES 10mm.
4. LAMP FEEDERS 2x2.5mm STEEL WIRE ARMoured COPPER CABLE.
5. ENCLOSURE PROTECTION DEGREE IP54.

REFERENCE

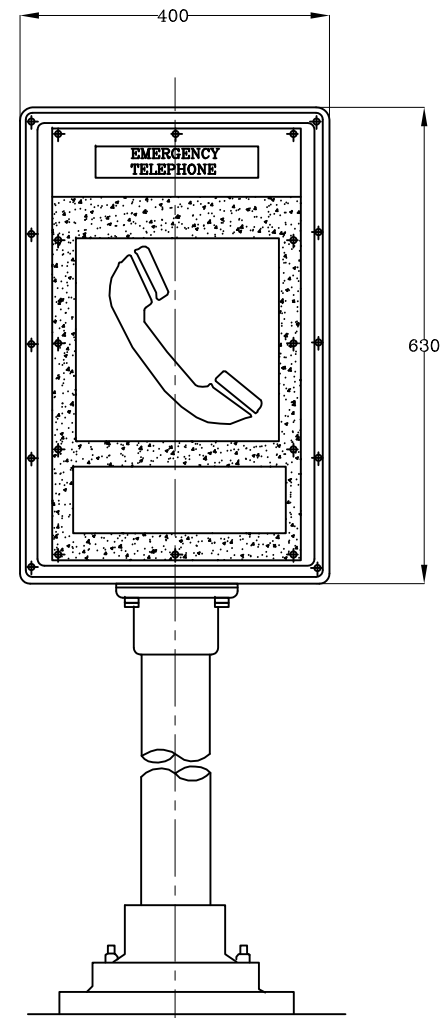
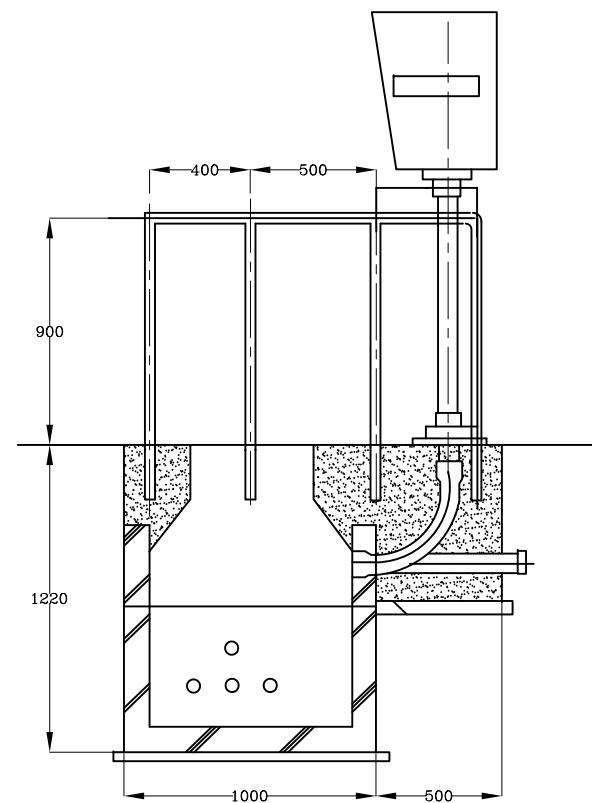
THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRAWING NO. M-07



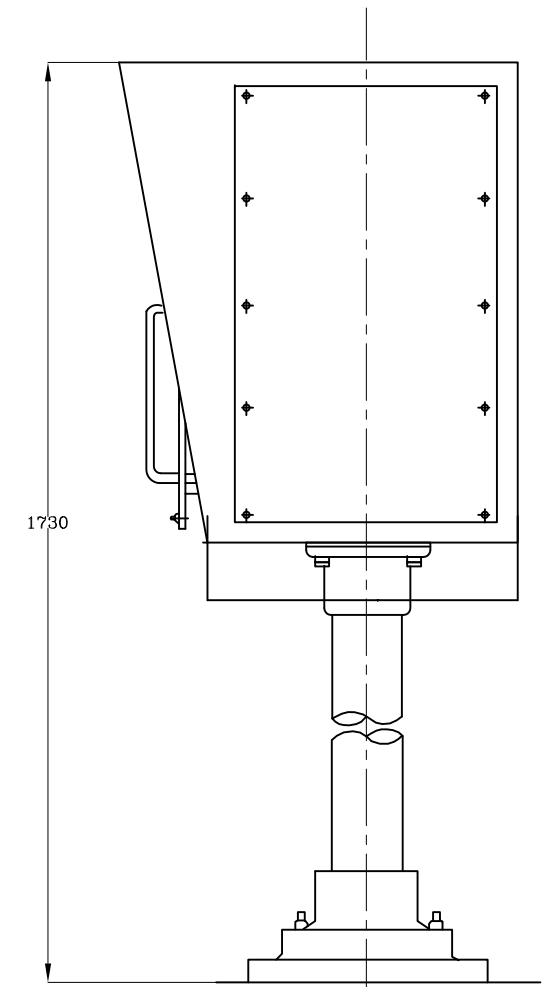
PLAN



FOUNDATION FOR EMERGENCY TELEPHONE UNIT



DETAIL OF EMERGENCY TELEPHONE UNIT

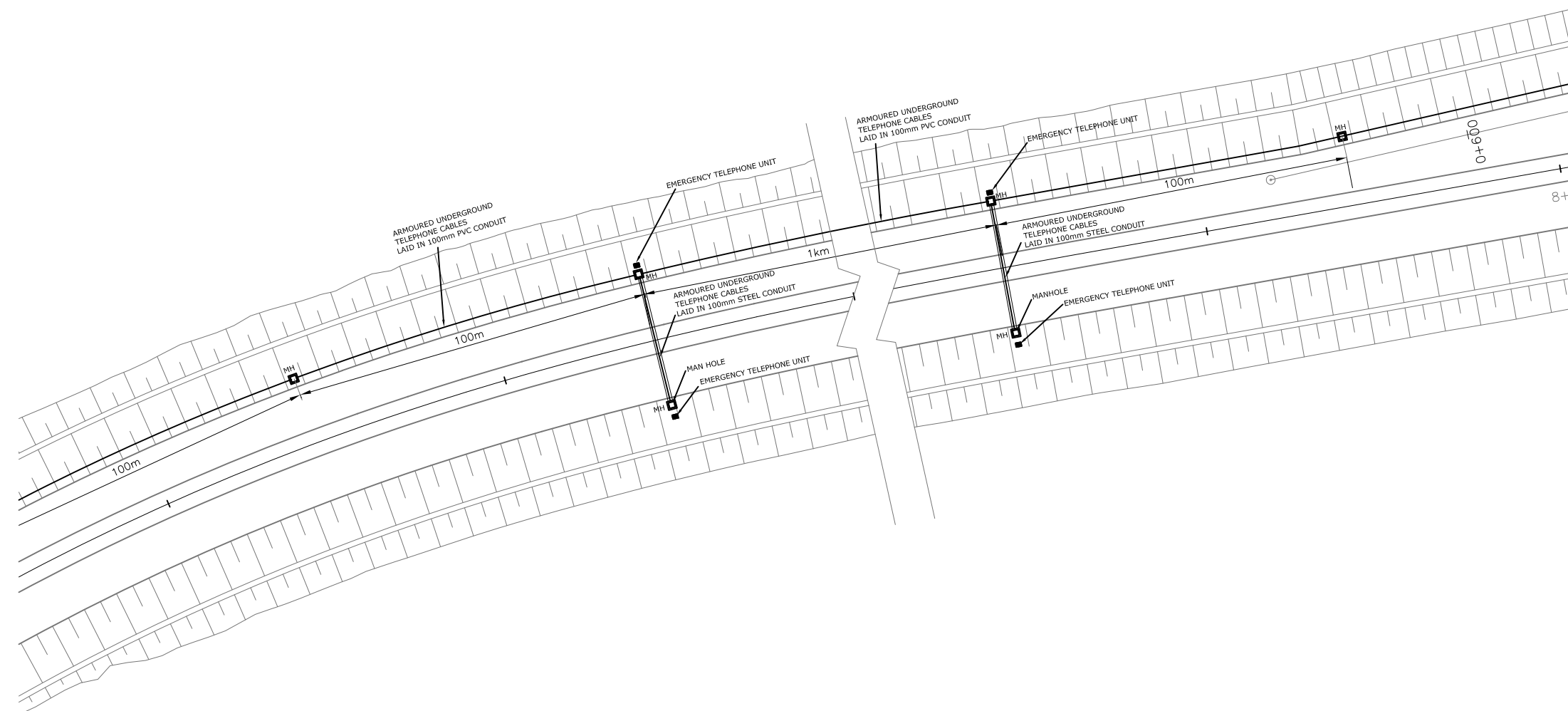


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DWG. NO.	M -17

EMERGENCY TELEPHONE POSITIONS

STATION	LEFT	RIGHT
9+300	1	1
10+000	1	1
11+000	1	1
12+000	1	1
13+000	1	1
14+100	1	1
15+000	1	1
15+600	1	1



**EMERGENCY TELEPHONE LAYOUT
DETAIL & TELEPHONE CABLE
ROUTE - TYPICAL ARRANGEMENT**

(NOT TO SCALE)

THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF HIGHWAYS & ROAD DEVELOPMENT



JICA JAPAN INTERNATIONAL COOPERATION AGENCY

ORIENTAL CONSULTANTS COMPANY LIMITED
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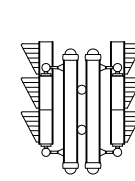
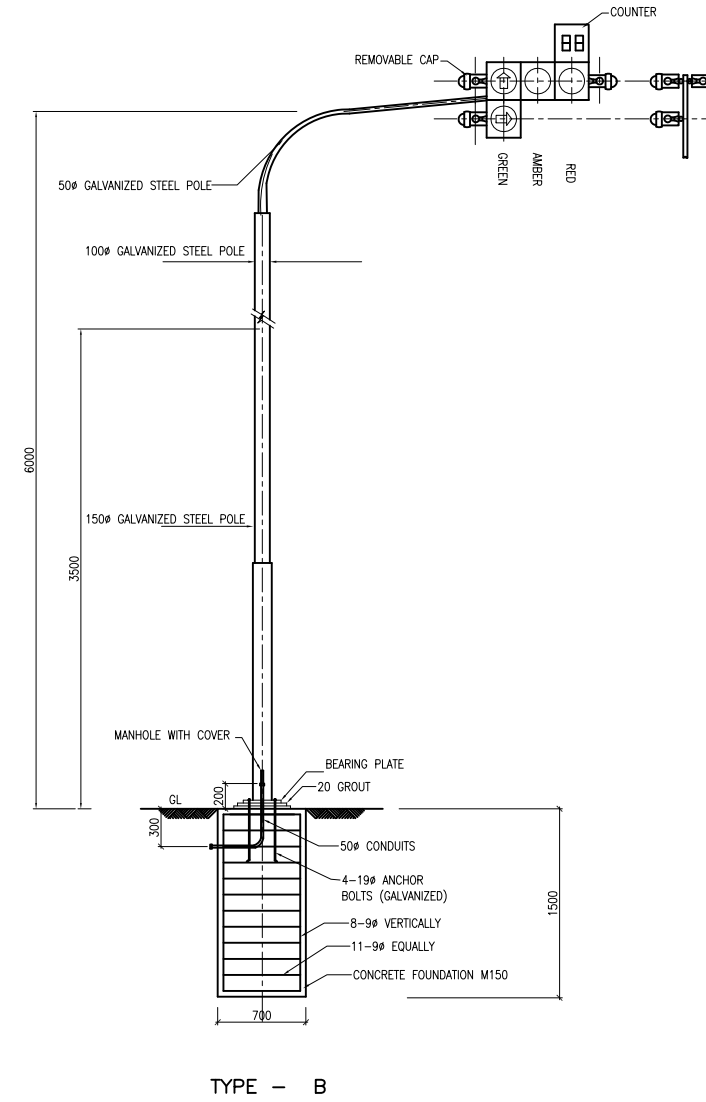
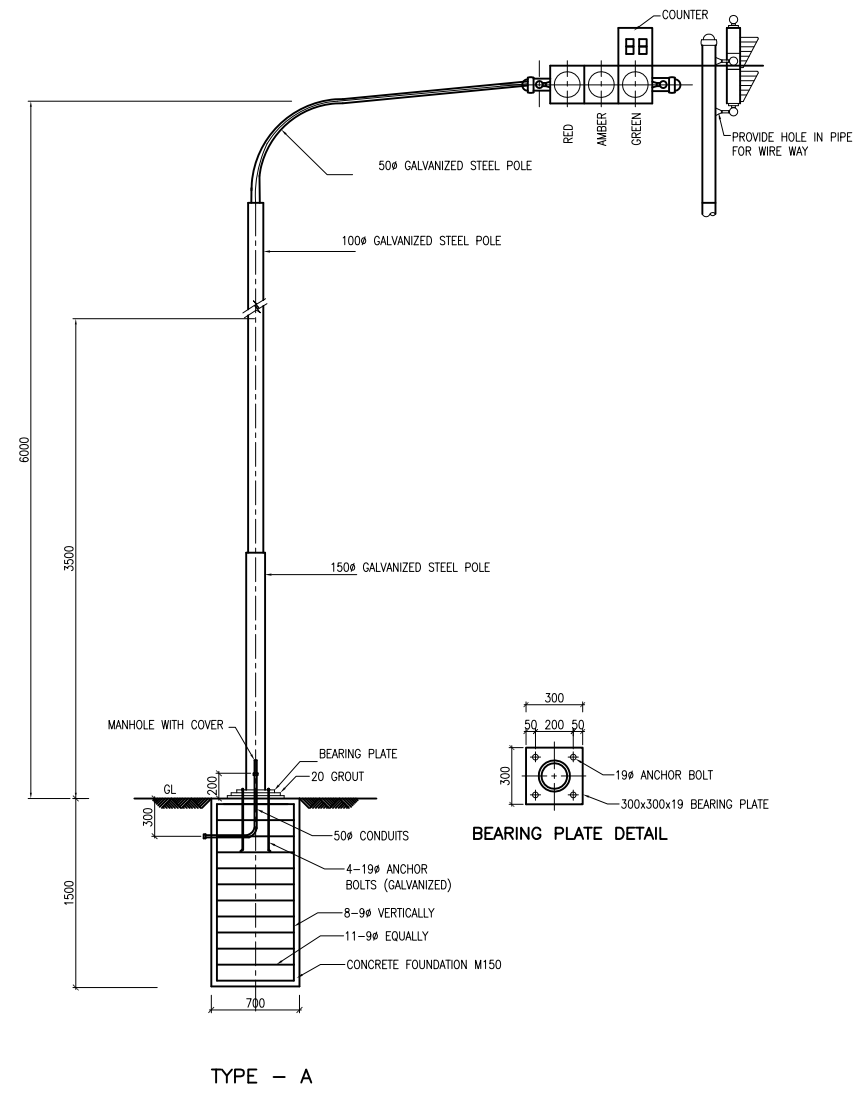
No	REVISION	DATE

**COLOMBO OUTER CIRCULAR HIGHWAY PROJECT
(NORTHERN SECTION 1)**

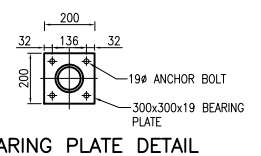
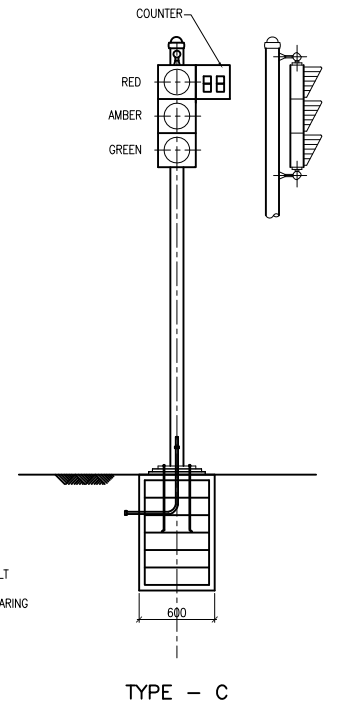
EMERGENCY TELEPHONE LAYOUT DETAIL

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APPROVED BY:	
DWG. NO.	M-18

TRAFFIC SIGNAL DETAILS



TRAFFIC SIGNAL EQUIPMENT

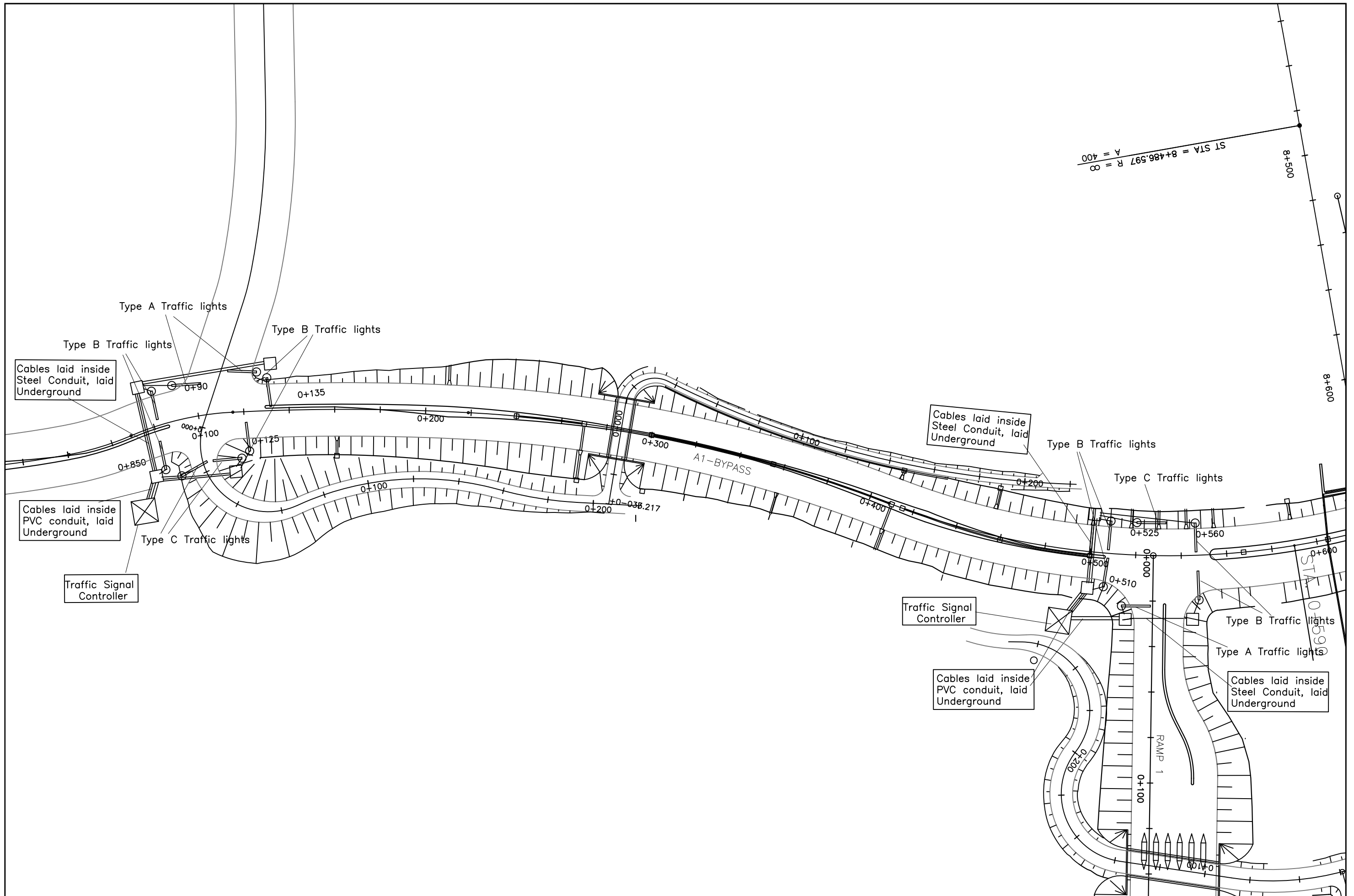


NOTES:

1. DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS INDICATED OTHERWISE
2. POLE BEARING PLATE AND MOUNTING COUPLINGS SHALL BE HOT GALVANIZATION AFTER FABRICATION

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DWG. NO.	M-19



THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF HIGHWAYS & ROAD DEVELOPMENT



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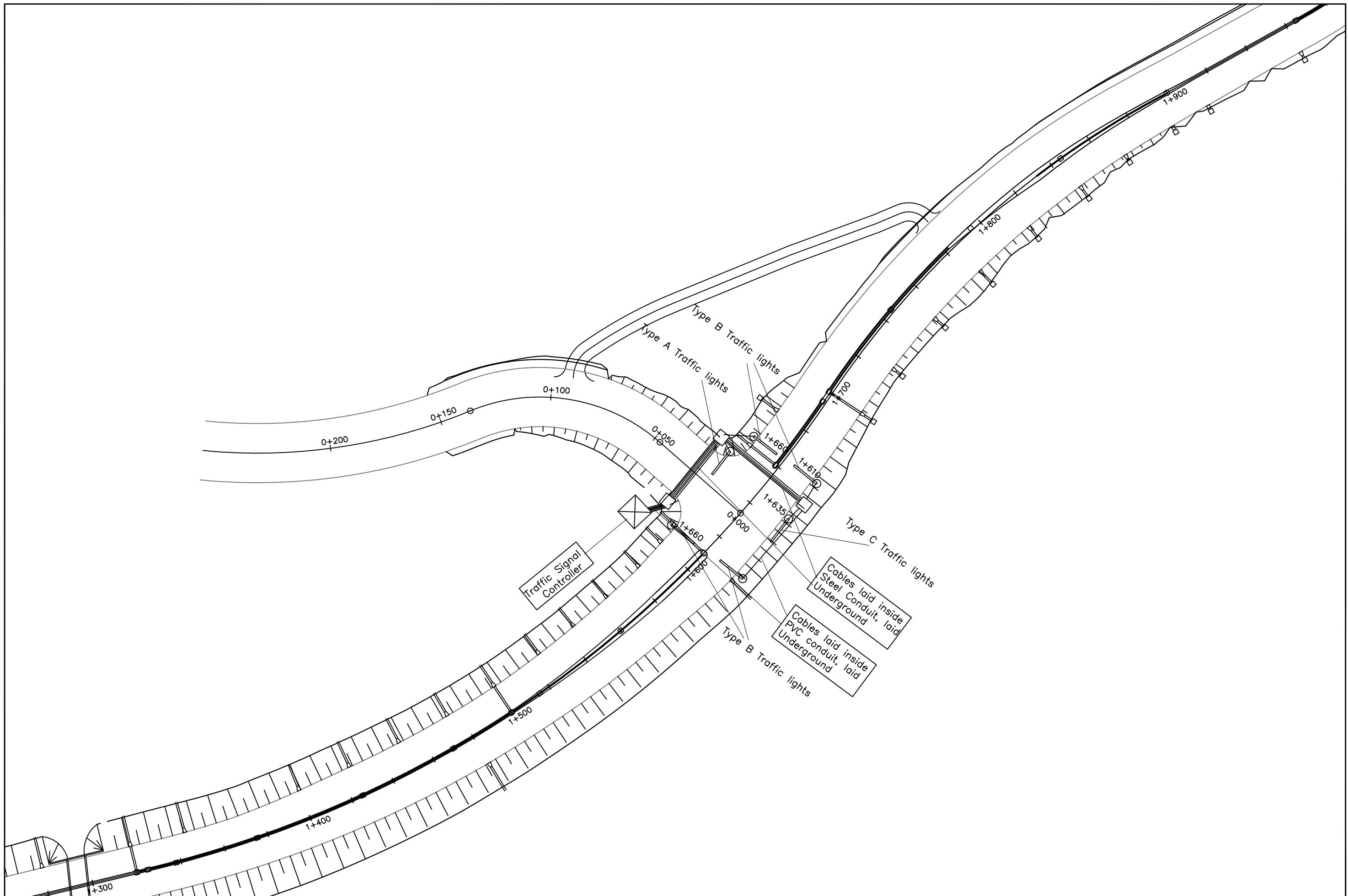


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COLOMBO OUTER CIRCULAR HIGHWAY PROJECT
(NORTHERN SECTION 1)

TRAFFIC LIGHTING LAYOUT
A-1 INTERCHANGE

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DWG. NO.	M-20



THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
 MINISTRY OF HIGHWAYS & ROAD DEVELOPMENT
Road Development Authority

JICA JAPAN INTERNATIONAL COOPERATION AGENCY
ORIENTAL CONSULTANTS COMPANY LIMITED
 in association with
PACIFIC CONSULTANTS INTERNATIONAL

No	REVISION	DATE

COLOMBO OUTER CIRCULAR HIGHWAY PROJECT
 (NORTHERN SECTION 1)
TRAFFIC LIGHTING LAYOUT
 A-1 INTERCHANGE

DESIGNED BY:	
CHECKED BY:	
APPROVED BY:	
DWG. NO.	M-22

