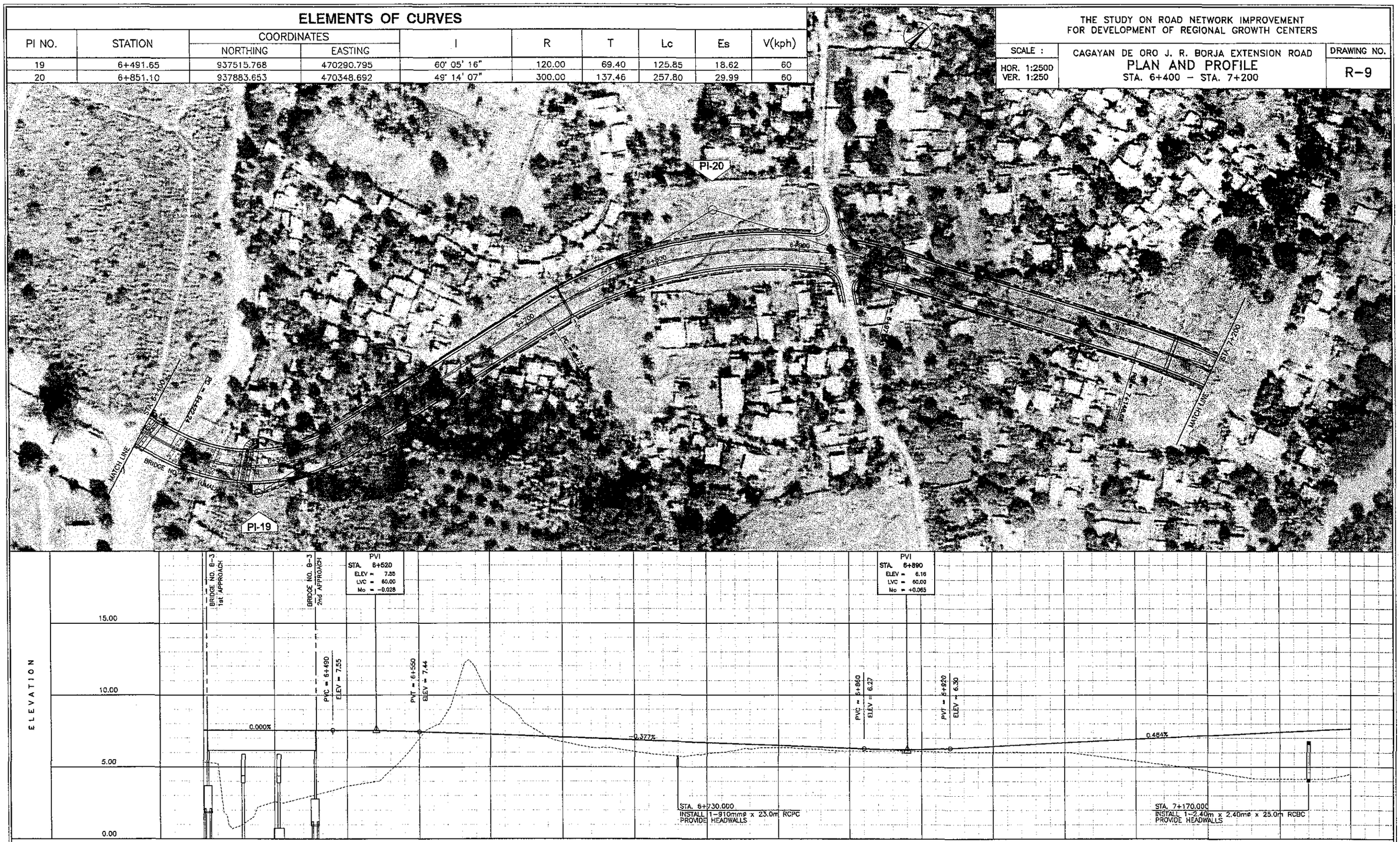
ELEMENTS OF CURVES

PI NO.	STATION	COORDINATES		I	R	T	Lc	Es	V(kph)
		NORTHING	EASTING						
19	6+491.65	937515.768	470290.795	60° 05' 16"	120.00	69.40	125.85	18.62	60
20	6+851.10	937883.653	470348.692	49° 14' 07"	300.00	137.46	257.80	29.99	60

THE STUDY ON ROAD NETWORK IMPROVEMENT
FOR DEVELOPMENT OF REGIONAL GROWTH CENTERS

SCALE :	CAGAYAN DE ORO J. R. BORJA EXTENSION ROAD	DRAWING NO.
HOR. 1:2500 VER. 1:250	PLAN AND PROFILE STA. 6+400 – STA. 7+200	R-9



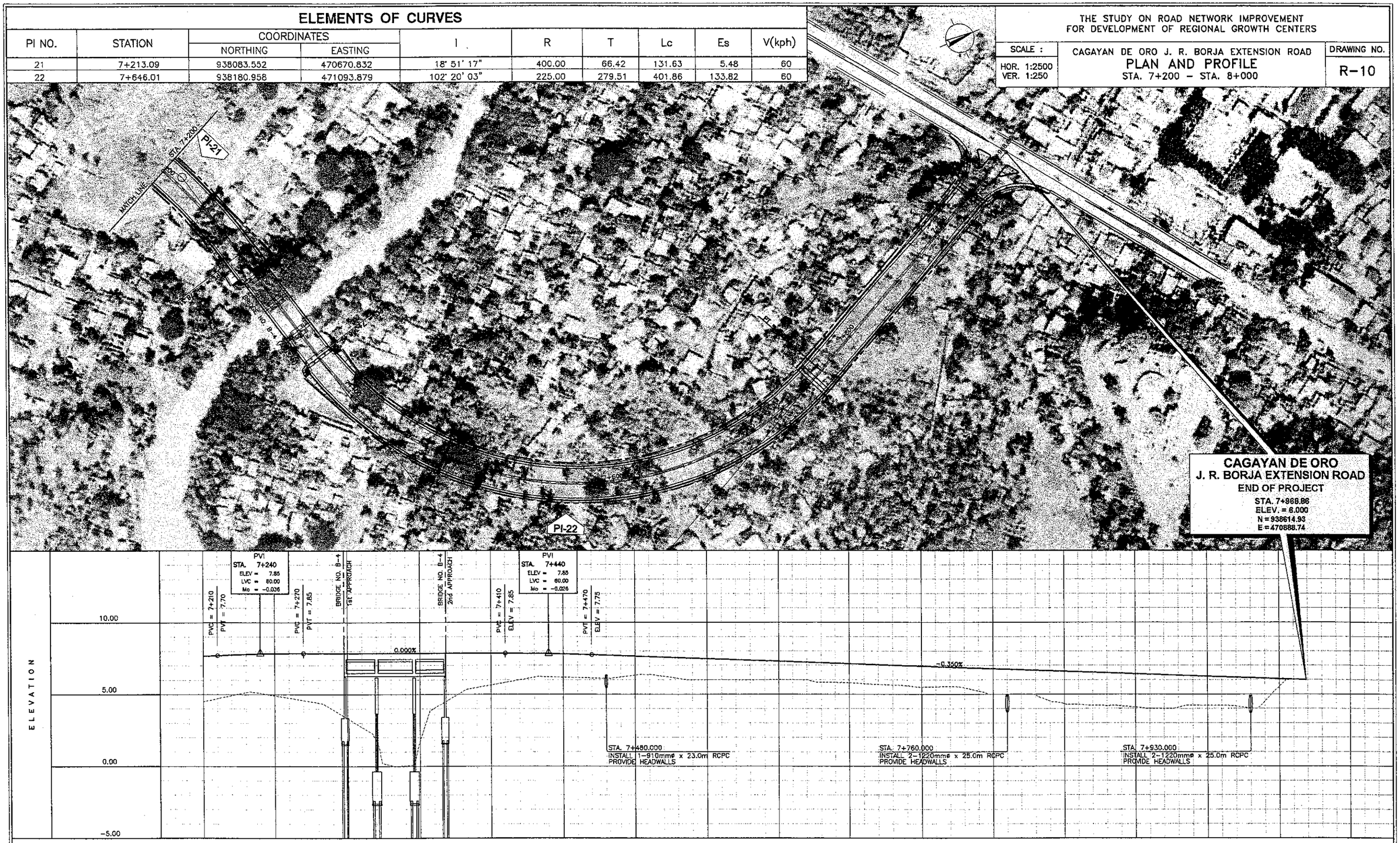
STATION	6+400	6+500	6+600	6+700	6+800	6+900	7+000	7+100	7+200
FINISHED GRADE	7.450	7.450	7.447	7.345	7.170	6.995	6.820	6.645	6.470	6.295	6.231	6.446	6.688	6.930	7.172	7.414	7.656
ORIGINAL GROUND	5.34	2.58	3.67	6.98	10.05	6.73	6.06	5.92	6.33	6.10	6.09	6.03	6.00	5.41	4.72	4.17	4.51
HORIZONTAL CURVATURE	PI-19	R = 150	R = α	PI – 20	R = 200	R = α	PI – 21										
VERTICAL CURVATURE	g = 0.000% L = 160.00 m		g = -0.377% L = 370.00 m		g = +0.484% L = 350.00 m				

ELEMENTS OF CURVES

PI NO.	STATION	COORDINATES		I	R	T	Lc	Es	V(kph)
		NORTHING	EASTING						
21	7+213.09	938083.552	470670.832	18° 51' 17"	400.00	66.42	131.63	5.48	60
22	7+646.01	938180.958	471093.879	102° 20' 03"	225.00	279.51	401.86	133.82	60

THE STUDY ON ROAD NETWORK IMPROVEMENT
FOR DEVELOPMENT OF REGIONAL GROWTH CENTERS

SCALE :	CAGAYAN DE ORO J. R. BORJA EXTENSION ROAD	DRAWING NO.
HOR. 1:2500 VER. 1:250	PLAN AND PROFILE STA. 7+200 – STA. 8+000	R–10



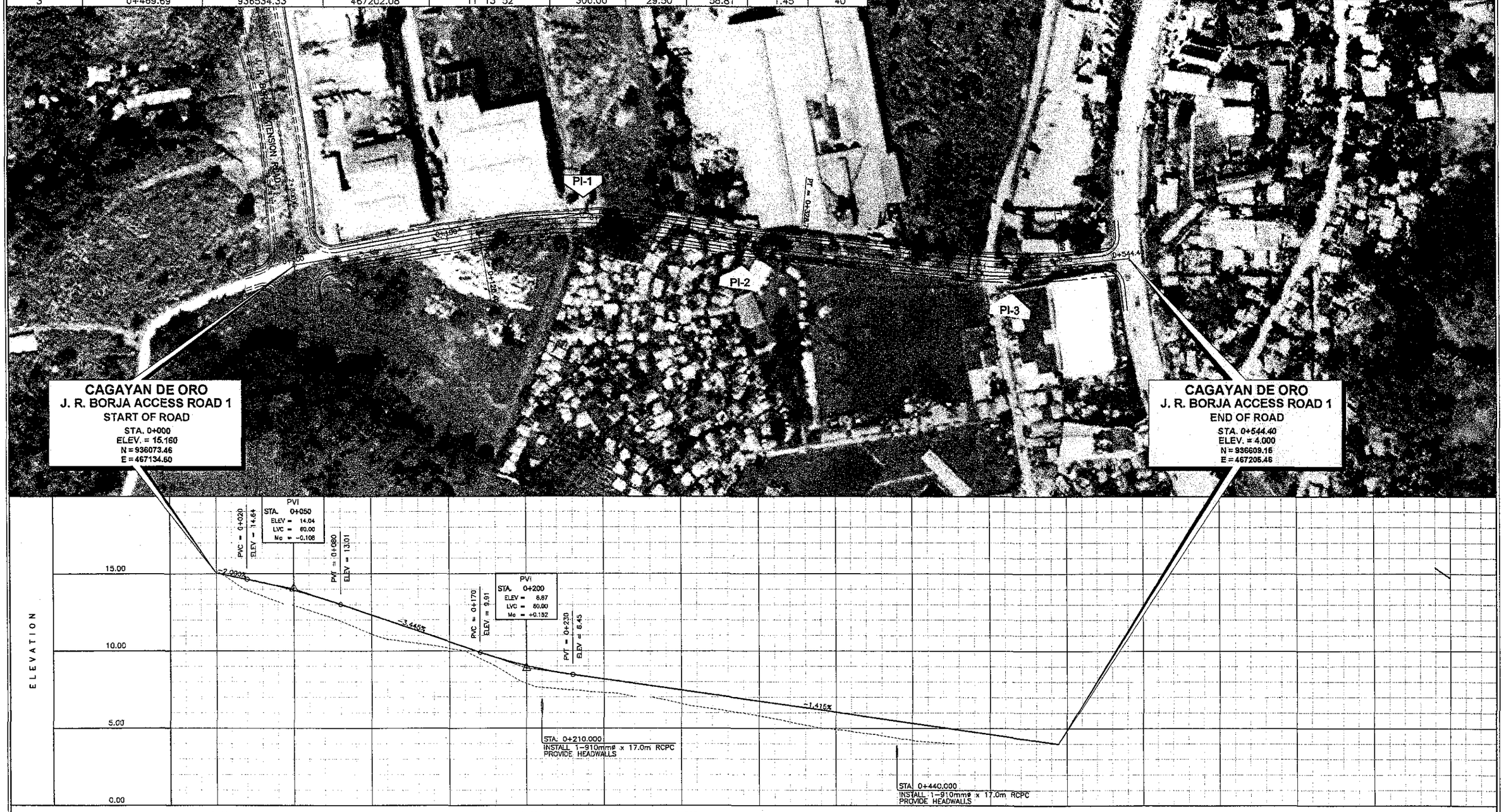
STATION	7+200	7+300	7+400	7+500	7+600	7+700	7+800	7+900	8+000
FINISHED GRADE	7.856	7.834	7.850	7.850	7.850	7.803	7.640	7.465	7.290	7.115	6.940	6.766	6.591	6.416	6.241	6.066	6.000
ORIGINAL GROUND	4.51	4.91	3.31	1.74	5.65	6.19	6.33	6.00	6.00	5.80	5.48	5.00	4.35	4.09	4.21	5.54	6.00
HORIZONTAL CURVATURE	R = 400	R = α	PI – 22	R = 225	R = α				
VERTICAL CURVATURE	g = 0.000% L = 200.00 m	g = -0.350% L = 560.00 m							

ELEMENTS OF CURVES

PI NO.	STATION	COORDINATES		I	R	T	Lc	Es	V(kph)
		NORTHING	EASTING						
1	0+190.27	936263.61	467127.93	19° 48' 51"	400.00	69.86	138.33	6.06	40
2	0+293.77	936363.48	467160.05	04° 00' 50"	1000.00	35.04	70.06	0.61	40
3	0+469.69	936534.33	467202.08	11° 13' 52"	300.00	29.50	58.81	1.45	40

THE STUDY ON ROAD NETWORK IMPROVEMENT
FOR DEVELOPMENT OF REGIONAL GROWTH CENTERS

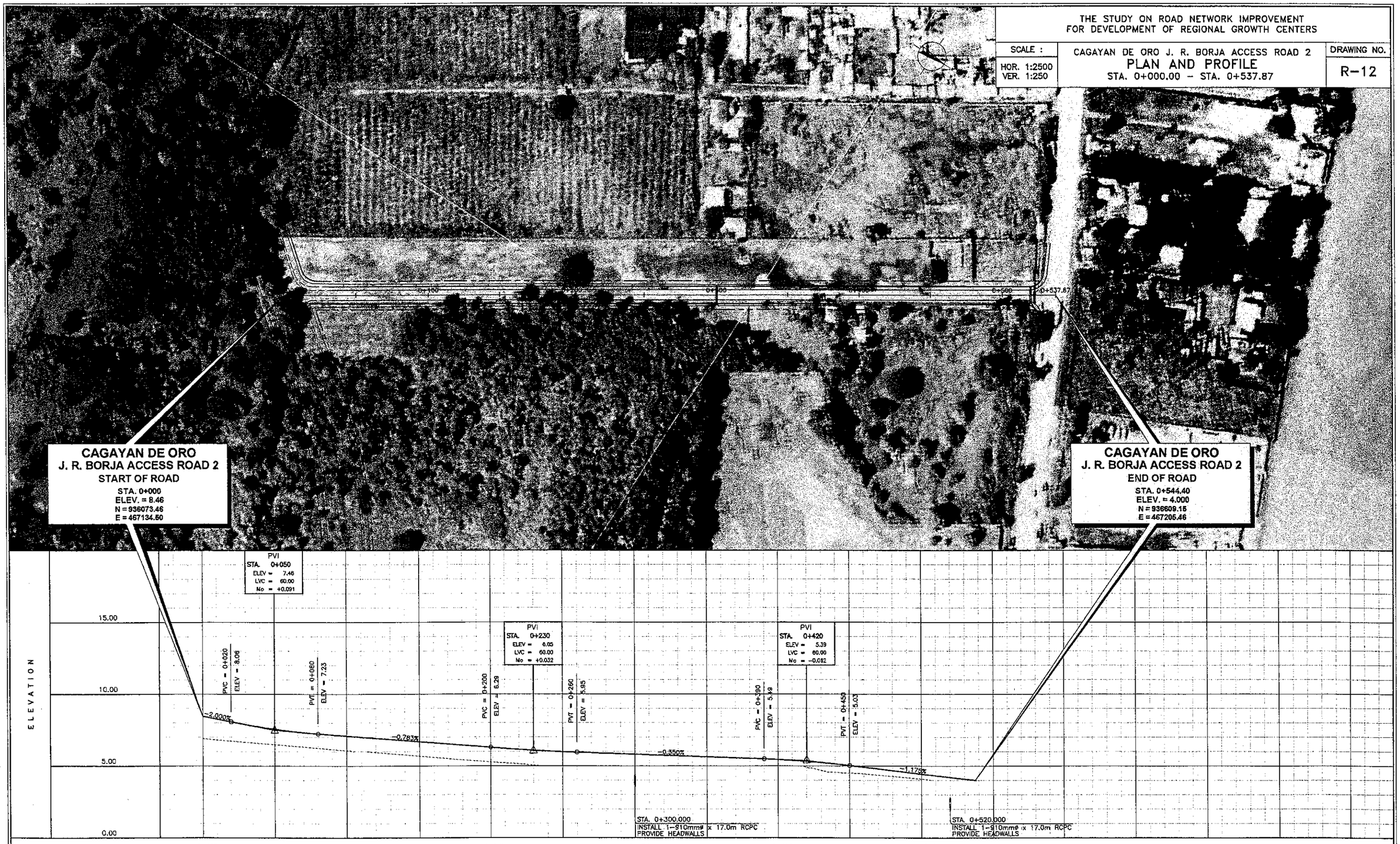
SCALE :	CAGAYAN DE ORO J. R. BORJA ACCESS ROAD 1	DRAWING NO.
HOR. 1:2500 VER. 1:250	PLAN AND PROFILE STA. 0+000.00 – STA. 0+544.40	R–11



STATION	0+000	0+100	0+200	0+300	0+400	0+500
FINISHED GRADE	15.041	13.933	12.319	10.596	9.026	8.166	7.459	6.751	6.004	5.336	4.628
ORIGINAL GROUND	15.20	12.94	11.08	10.17	7.87	7.29	6.58	5.80	4.92	4.22	4.00	4.00
HORIZONTAL CURVATURE	R = α	PI – 1	R = 400	PI – 2	R = 1000	R = α	PI – 3	R = 300	R = α
VERTICAL CURVATURE	g = -2.000% L = 50.00 m	g = -3.445% L = 150.00 m	g = -1.415% L = 344.40 m

THE STUDY ON ROAD NETWORK IMPROVEMENT
FOR DEVELOPMENT OF REGIONAL GROWTH CENTERS

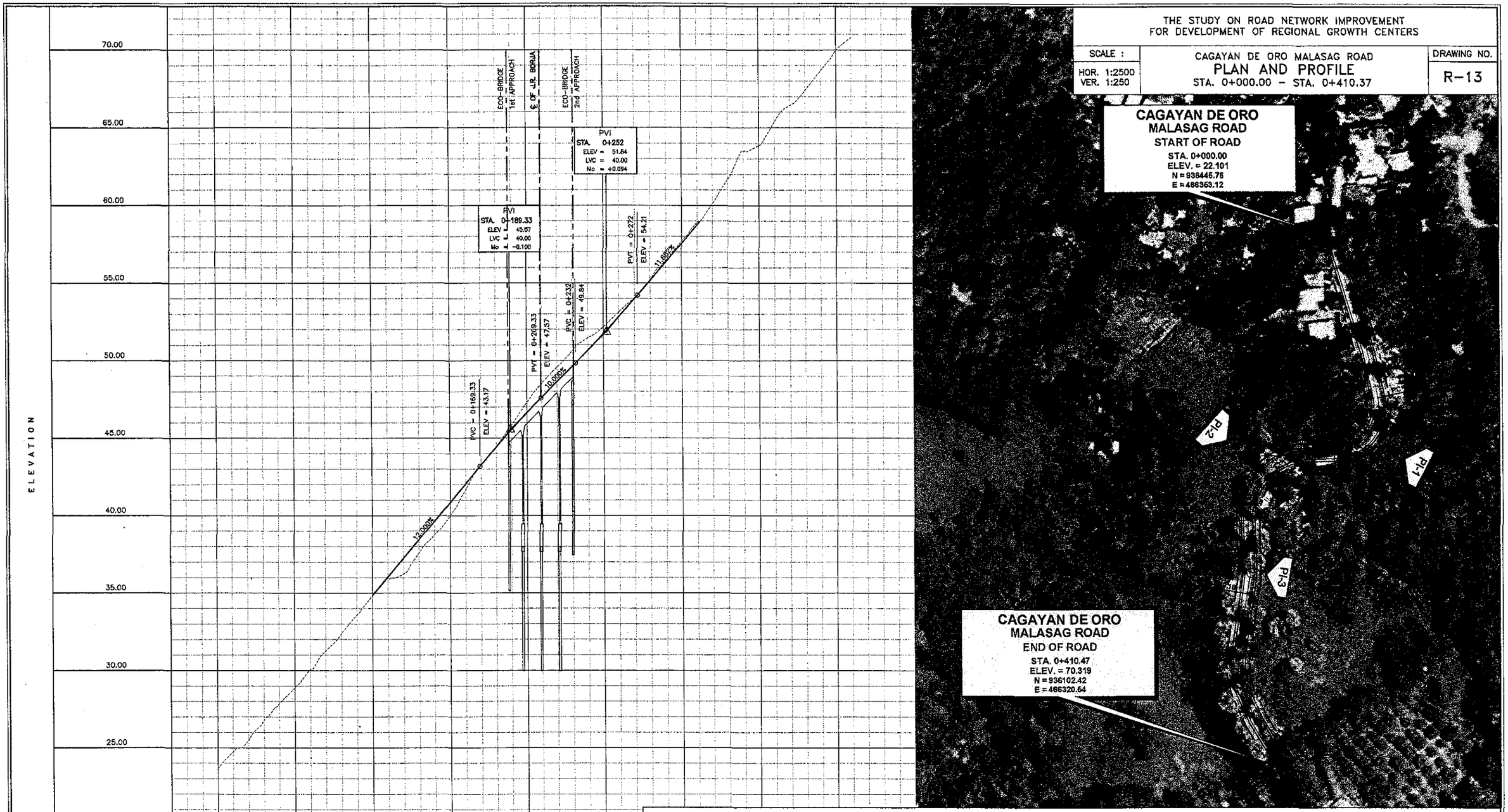
SCALE :	CAGAYAN DE ORO J. R. BORJA ACCESS ROAD 2	DRAWING NO.
HOR. 1:2500 VER. 1:250	PLAN AND PROFILE STA. 0+000.00 – STA. 0+537.87	R–12



STATION	0+000	0+100	0+200	0+300	0+400	0+500
FINISHED GRADE	8.460	7.551	7.068	6.677	6.285	5.984	5.805	5.630	5.448	5.033	4.445	4.000
ORIGINAL GROUND	6.89	6.48	6.06	5.67	5.27	5.00	5.00	5.00	5.00	4.50	4.08	4.00
HORIZONTAL CURVATURE	R = ∝											
VERTICAL CURVATURE	g = −2.000% L = 50.00 m		g = −0.783% L = 180.00 m		g = −0.350% L = 19.00 m		g = −1.175% L = 117.87 m					

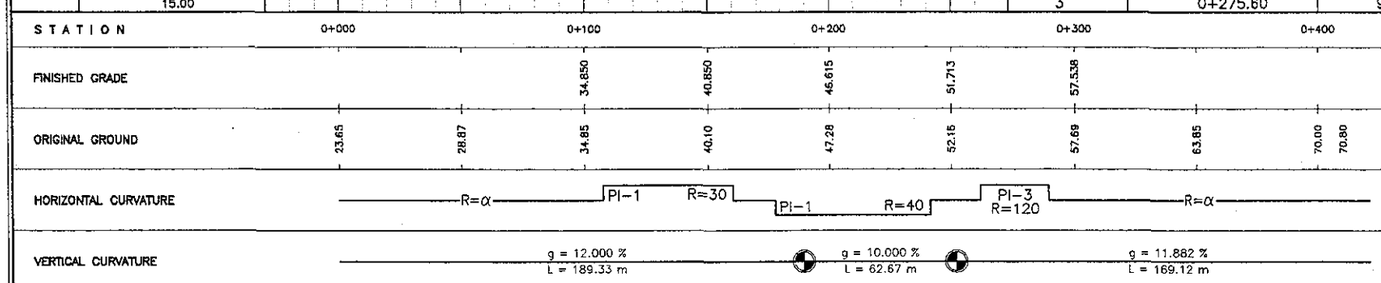
THE STUDY ON ROAD NETWORK IMPROVEMENT
FOR DEVELOPMENT OF REGIONAL GROWTH CENTERS

SCALE :	CAGAYAN DE ORO MALASAG ROAD	DRAWING NO.
HOR. 1:2500 VER. 1:250	PLAN AND PROFILE STA. 0+000.00 – STA. 0+410.37	R–13



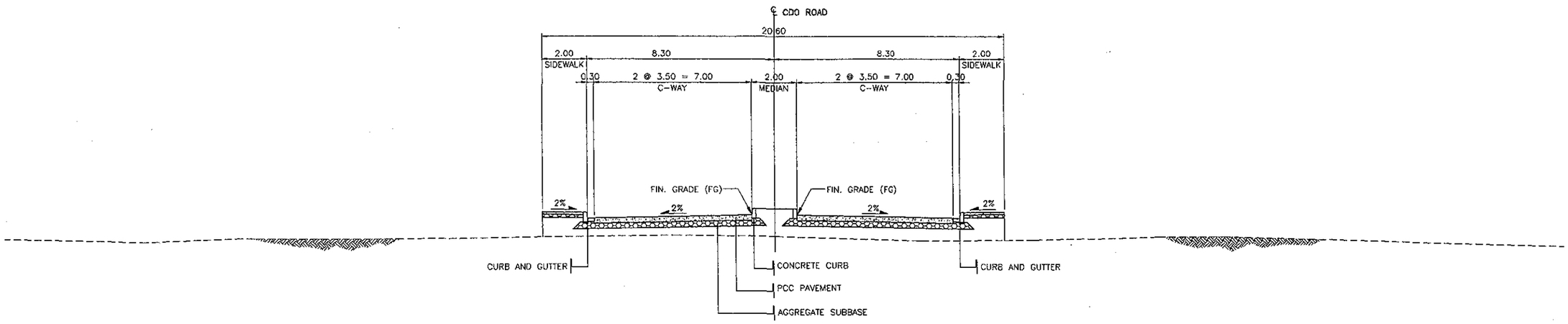
ELEMENTS OF CURVES

PI NO.	STATION	COORDINATES		I	R	T	Lc	Es	V(kph)
		NORTHING	EASTING						
1	0+143.59	936306.93	466389.34	100° 36' 40"	30.00	36.14	52.68	16.97	30
2	0+218.58	936304.23	466294.79	91° 27' 22"	40.00	41.03	63.85	17.30	30
3	0+275.60	936229.11	466298.84	13° 01' 48"	120.00	13.70	27.29	0.78	30

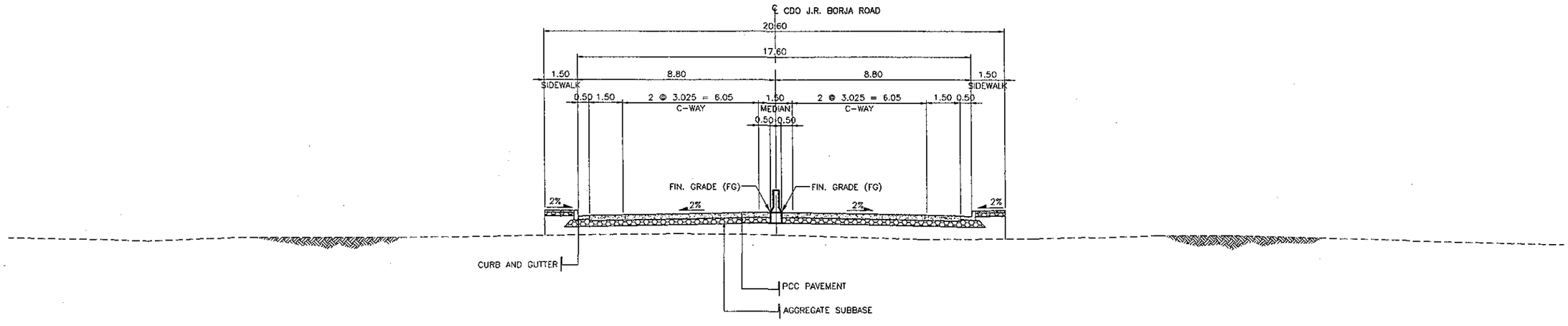


THE STUDY ON ROAD NETWORK IMPROVEMENT
FOR DEVELOPMENT OF REGIONAL GROWTH CENTERS

SCALE :	CAGAYAN DE ORO J.R. BORJA EXTENSION ROAD TYPICAL ROAD SECTION	DRAWING NO.
1:200		R-14



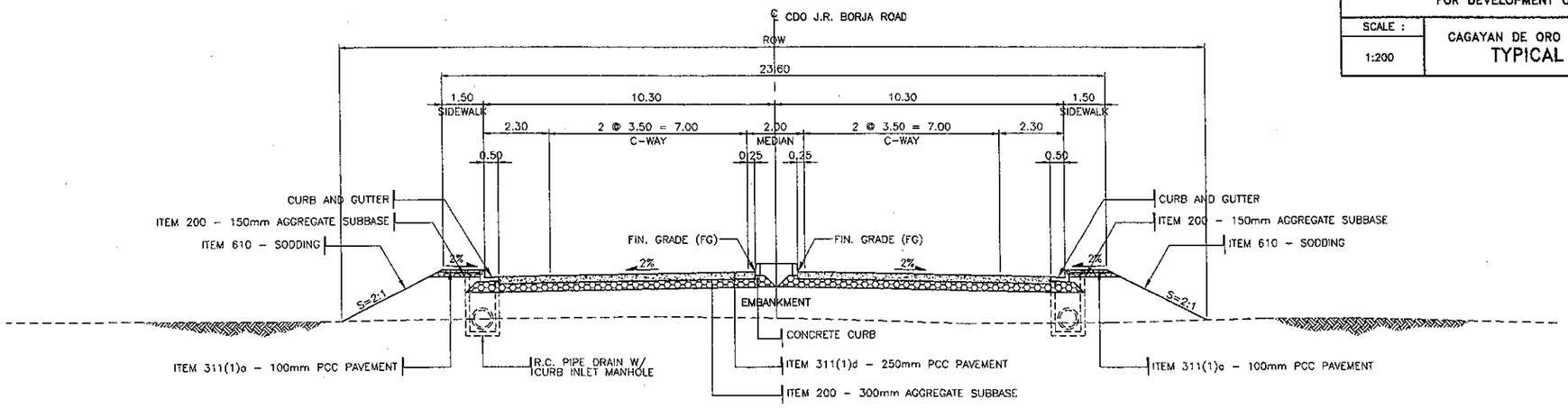
NORMAL SECTION – EXISTING ROAD



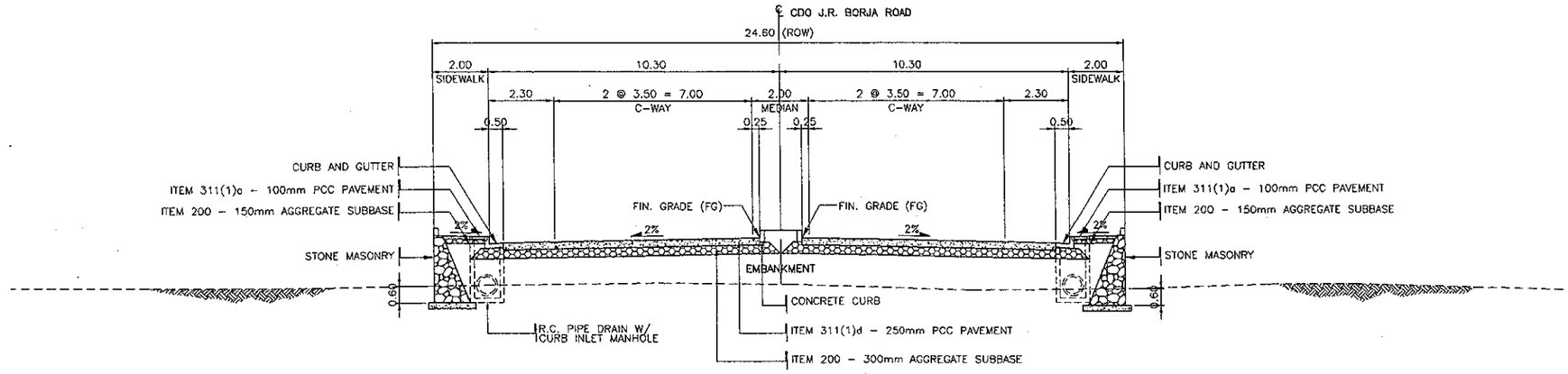
NORMAL SECTION – PROPOSED REVISION OF EXISTING ROAD

THE STUDY ON ROAD NETWORK IMPROVEMENT
FOR DEVELOPMENT OF REGIONAL GROWTH CENTERS

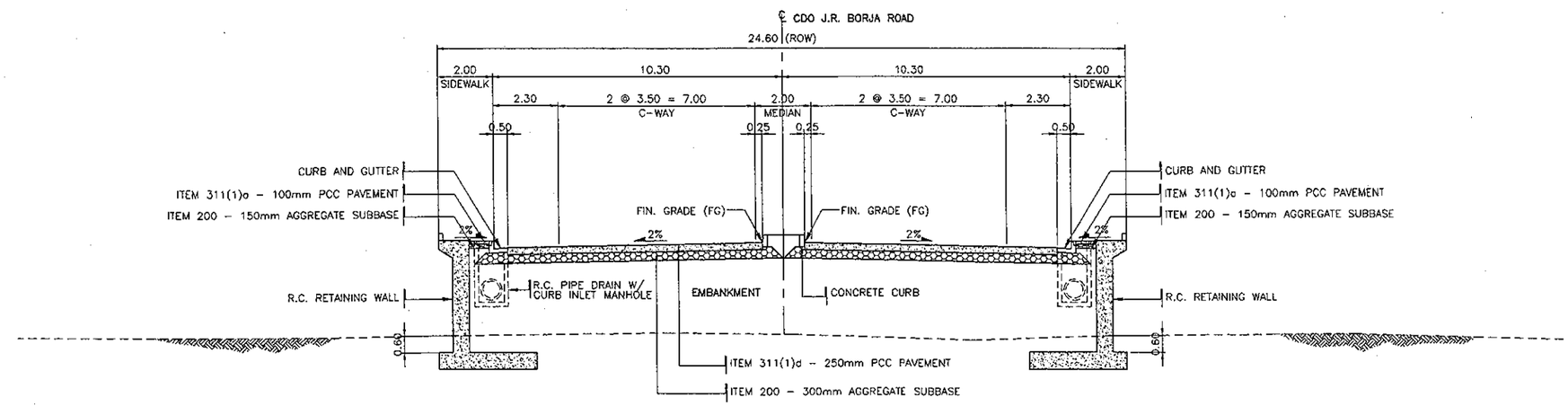
SCALE :	CAGAYAN DE ORO J.R. BORJA EXTENSION ROAD	DRAWING NO.
1:200	TYPICAL ROAD SECTION	R-15



NORMAL SECTION - EMBANKMENT (OPEN AREA)

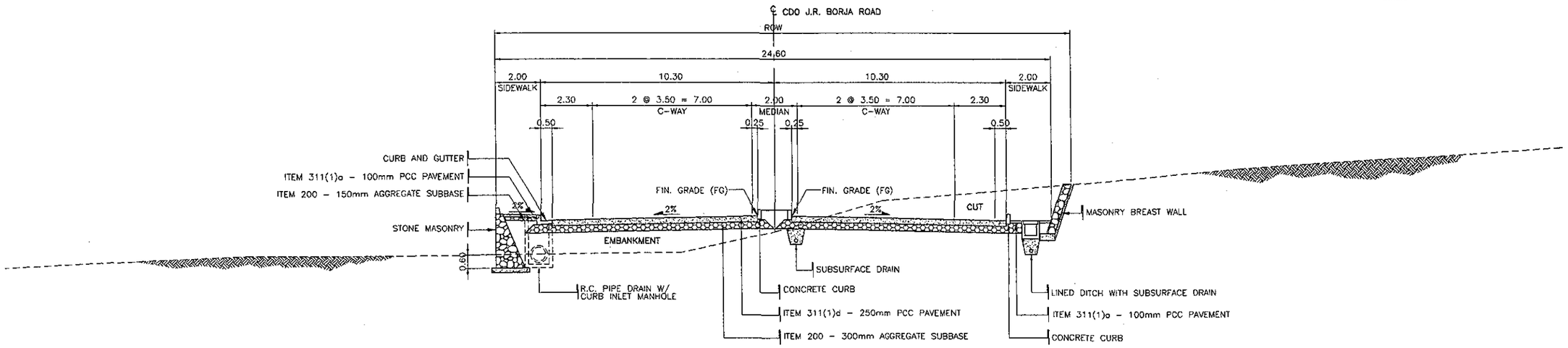


NORMAL SECTION - EMBANKMENT (RESIDENTIAL AREA)
MAX. HEIGHT OF EMBANKMENT = 3.00m

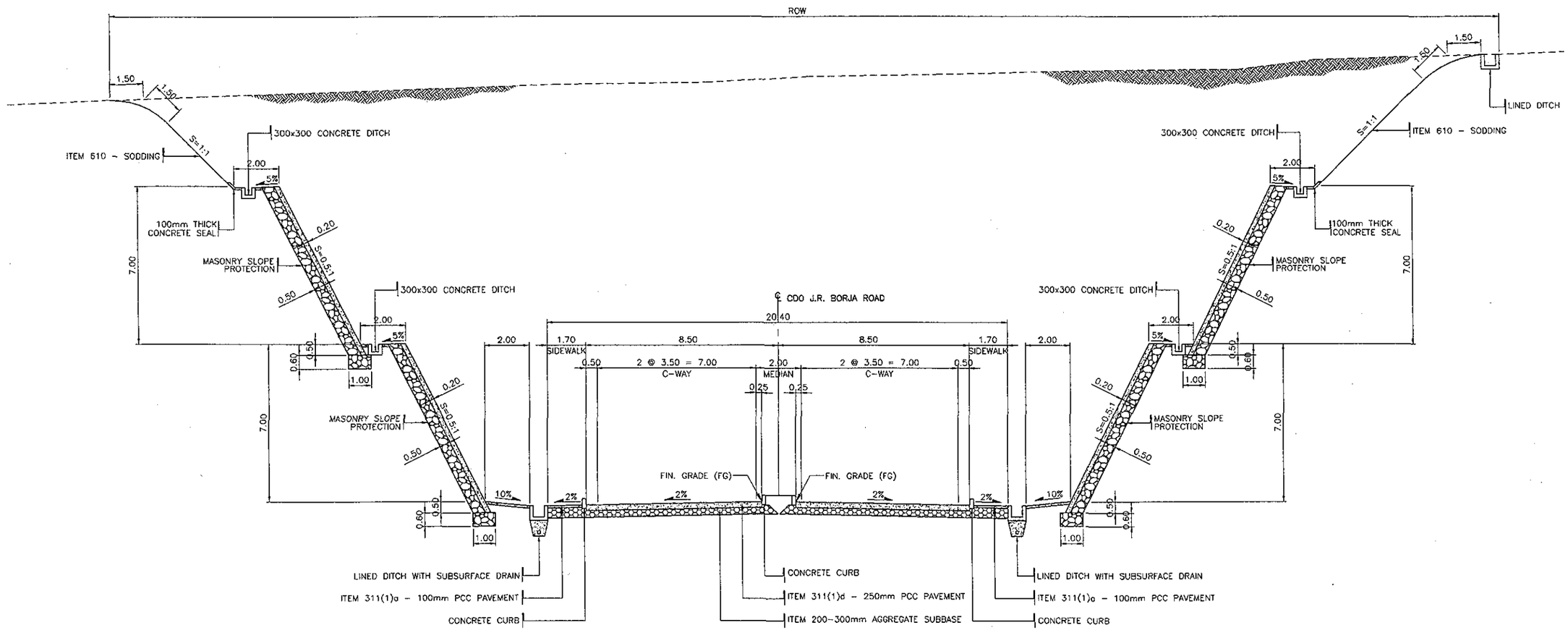


NORMAL SECTION - EMBANKMENT (RESIDENTIAL AREA)
HEIGHT OF EMBANKMENT = 3.00m TO 5.00m

THE STUDY ON ROAD NETWORK IMPROVEMENT FOR DEVELOPMENT OF REGIONAL GROWTH CENTERS		
SCALE : 1:200	CAGAYAN DE ORO J.R. BORJA EXTENSION ROAD TYPICAL ROAD SECTION	DRAWING NO. R-16



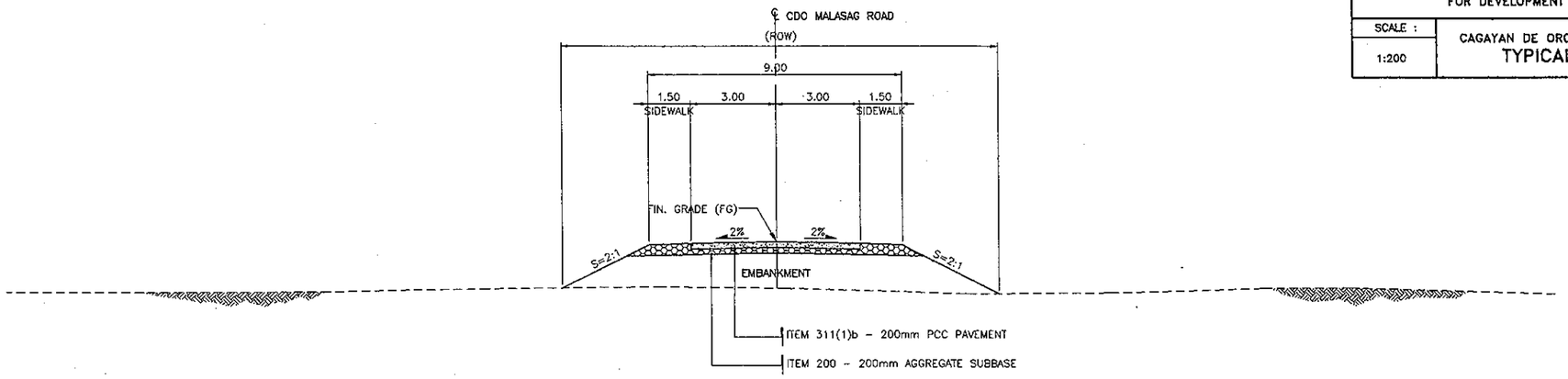
NORMAL SECTION – EMBANKMENT & CUT (RESIDENTIAL AREA)



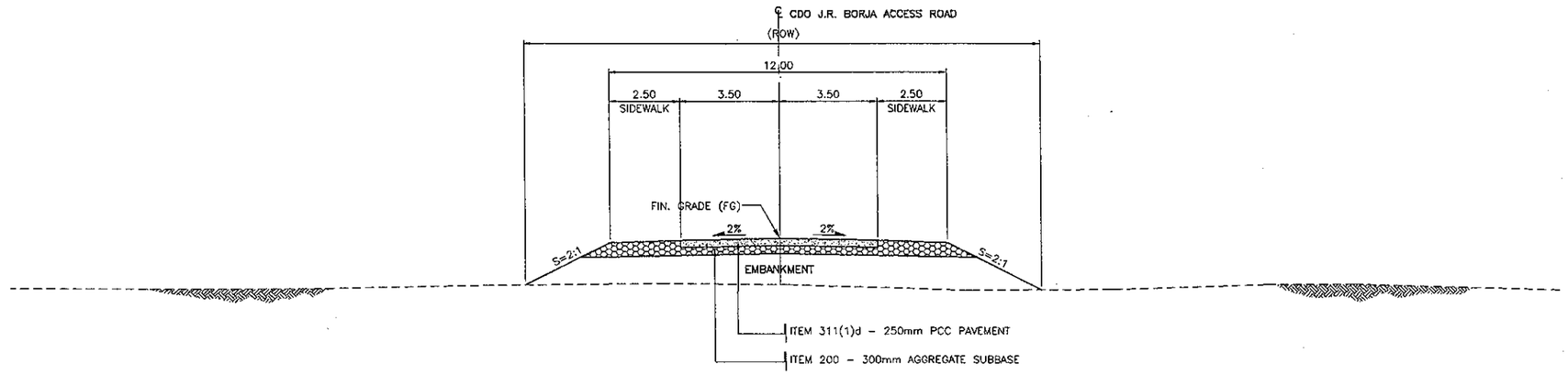
NORMAL SECTION – CUT

THE STUDY ON ROAD NETWORK IMPROVEMENT
FOR DEVELOPMENT OF REGIONAL GROWTH CENTERS

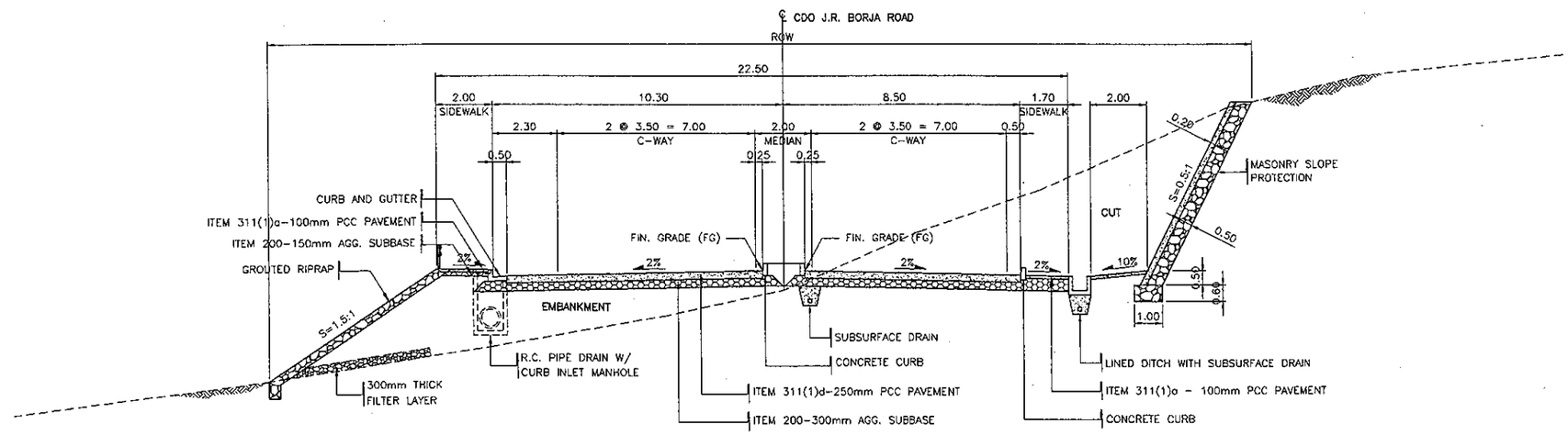
SCALE :	CAGAYAN DE ORO J.R. BORJA EXTENSION ROAD	DRAWING NO.
1:200	TYPICAL ROAD SECTION	R-17



MALASAG ROAD – TYPICAL SECTION



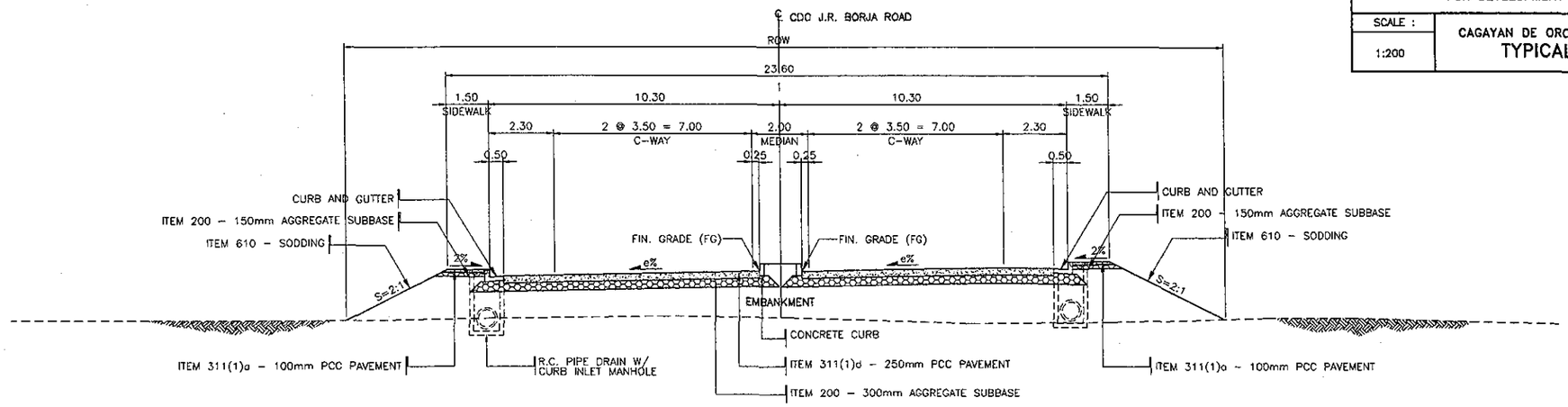
ACCESS ROAD(1 & 2) – TYPICAL SECTION



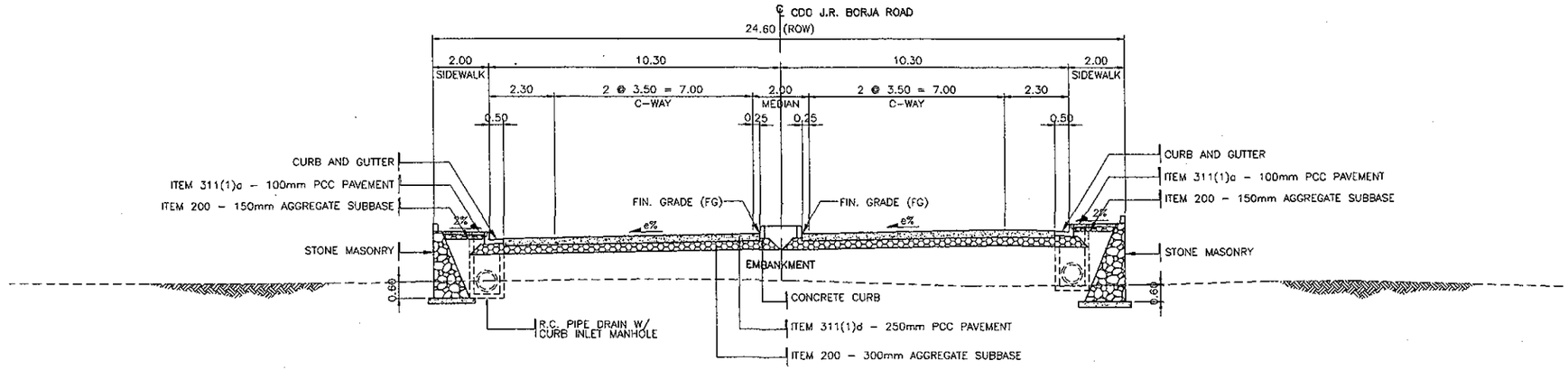
NORMAL SECTION – EMBANKMENT & CUT

THE STUDY ON ROAD NETWORK IMPROVEMENT
FOR DEVELOPMENT OF REGIONAL GROWTH CENTERS

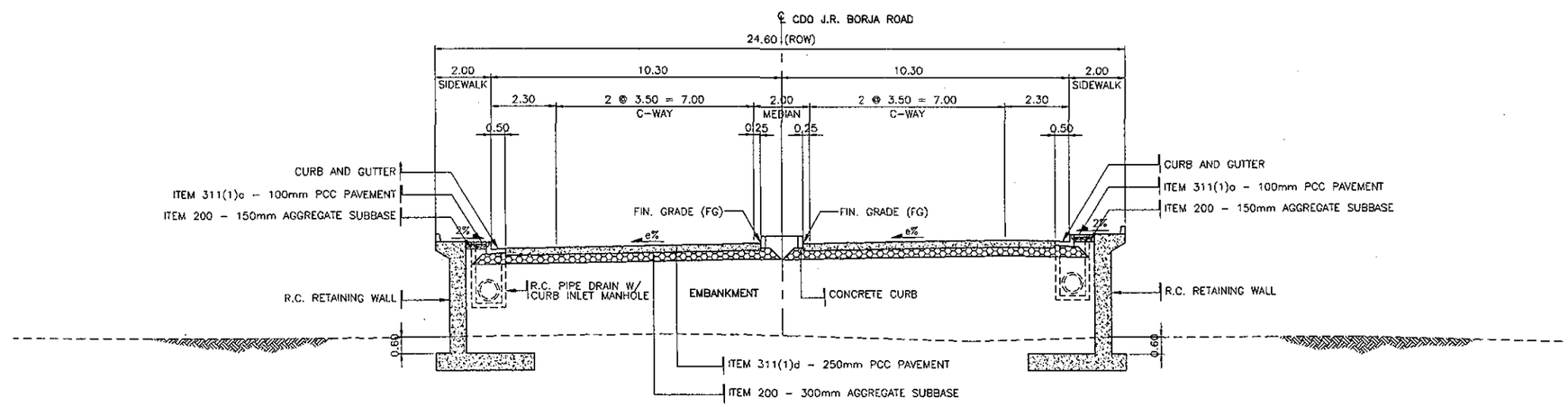
SCALE :	CAGAYAN DE ORO J.R. BORJA EXTENSION ROAD	DRAWING NO.
1:200	TYPICAL ROAD SECTION	R-18



SUPERELEVATED SECTION – EMBANKMENT (OPEN AREA)



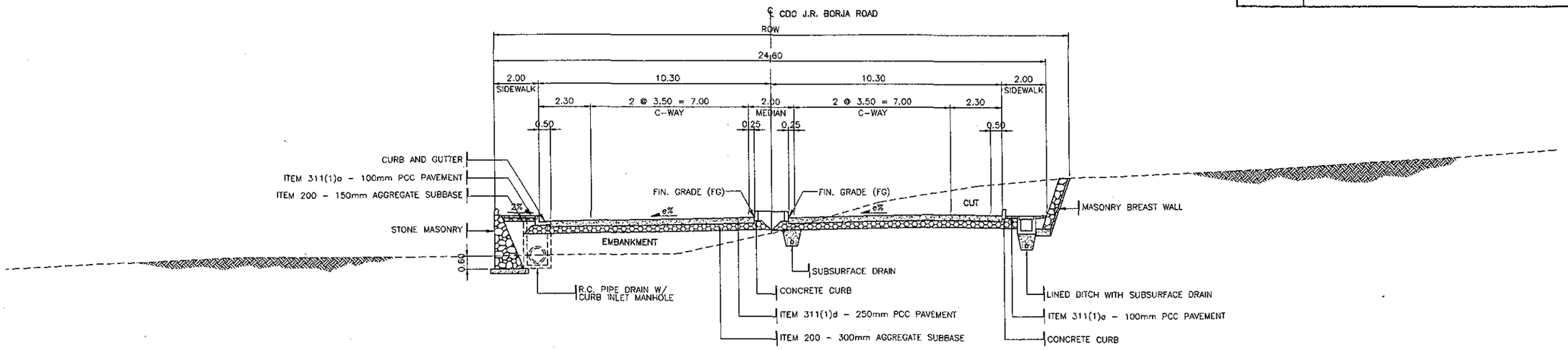
SUPERELEVATED SECTION – EMBANKMENT (RESIDENTIAL AREA)
MAX. HEIGHT OF EMBANKMENT = 3.00m



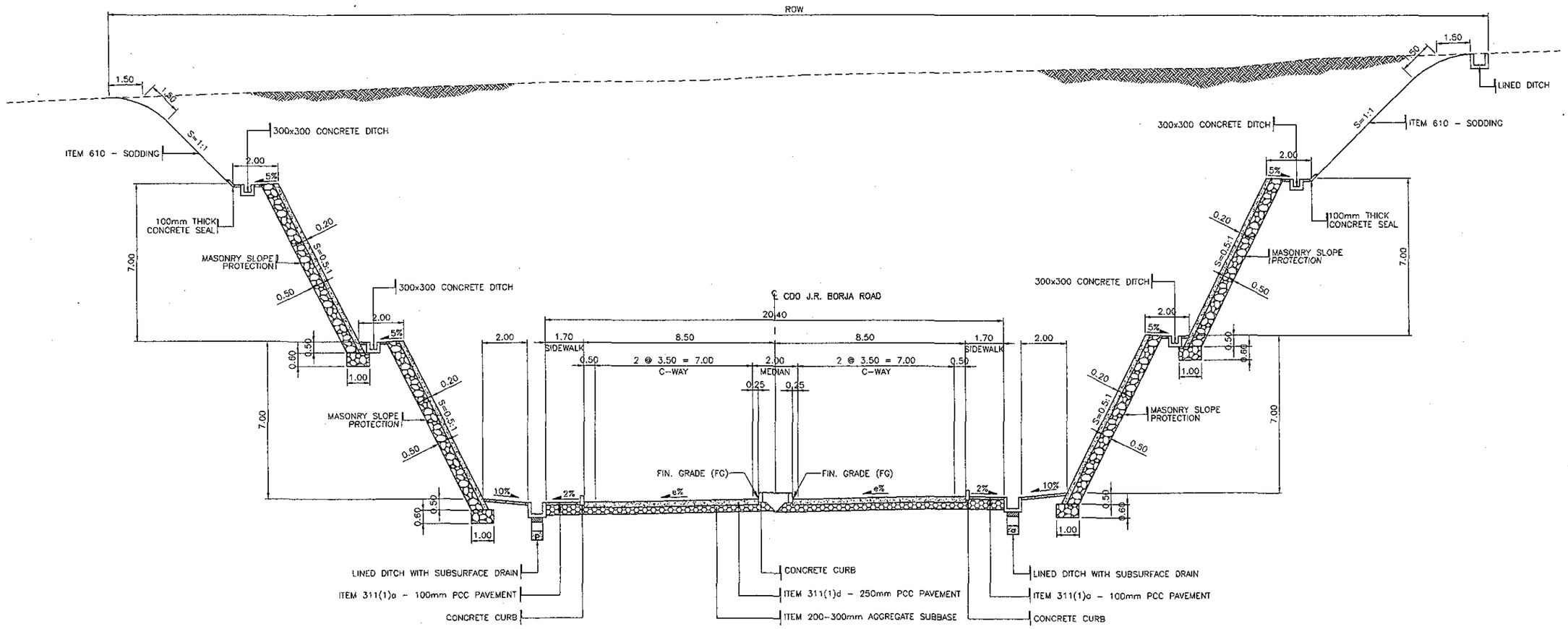
SUPERELEVATED SECTION – EMBANKMENT (RESIDENTIAL AREA)
HEIGHT OF EMBANKMENT = 3.00m TO 5.00m

THE STUDY ON ROAD NETWORK IMPROVEMENT
FOR DEVELOPMENT OF REGIONAL GROWTH CENTERS

SCALE :	CAGAYAN DE ORO J.R. BORJA EXTENSION ROAD	DRAWING NO.
1:200	TYPICAL ROAD SECTION	R-19



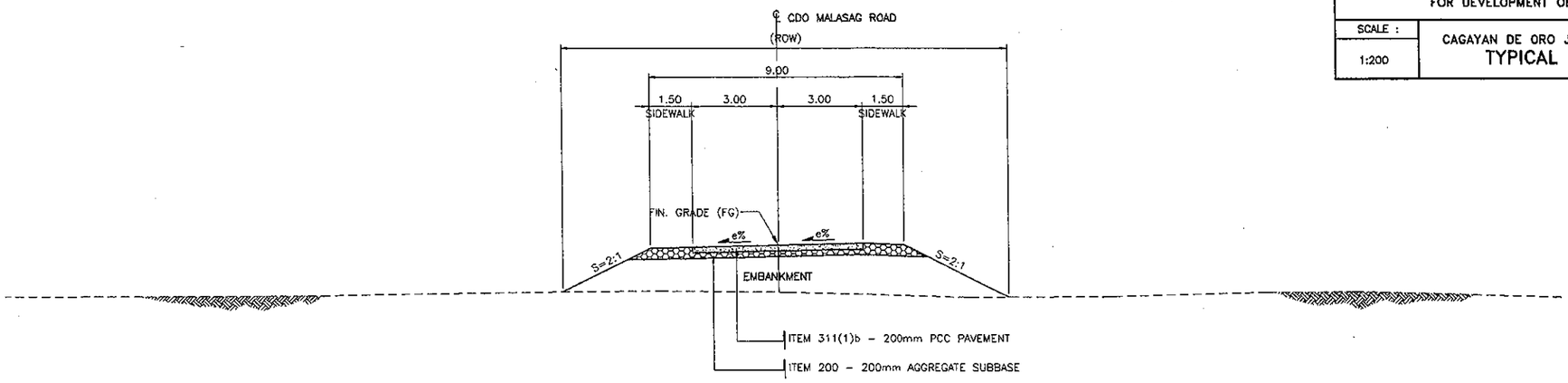
SUPERELEVATED SECTION – EMBANKMENT & CUT (RESIDENTIAL AREA)



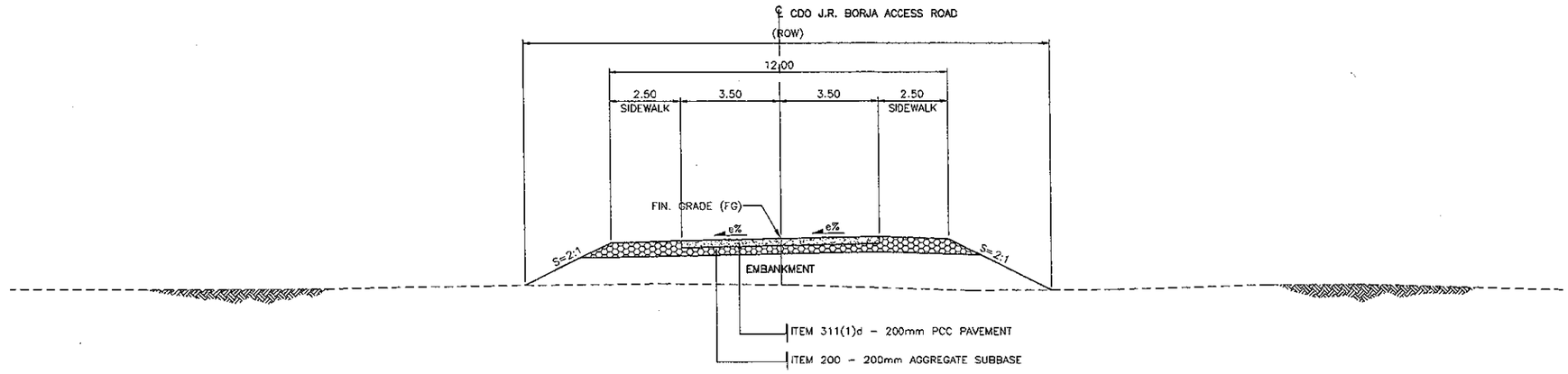
SUPERELEVATED SECTION – CUT

THE STUDY ON ROAD NETWORK IMPROVEMENT
FOR DEVELOPMENT OF REGIONAL GROWTH CENTERS

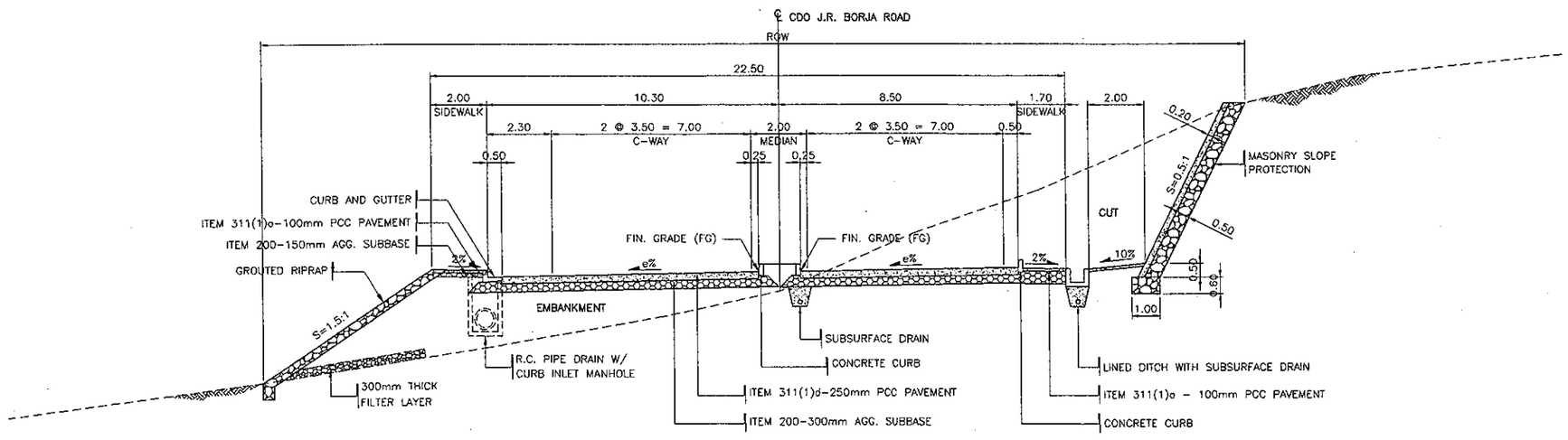
SCALE :	CAGAYAN DE ORO J.R. BORJA EXTENSION ROAD	DRAWING NO.
1:200	TYPICAL ROAD SECTION	R-20



MALASAG ROAD – SUPERELEVATED SECTION



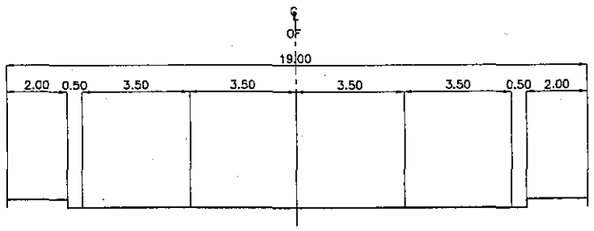
ACCESS ROAD(1 & 2) – SUPERELEVATED SECTION



SUPERELEVATED SECTION – EMBANKMENT & CUT

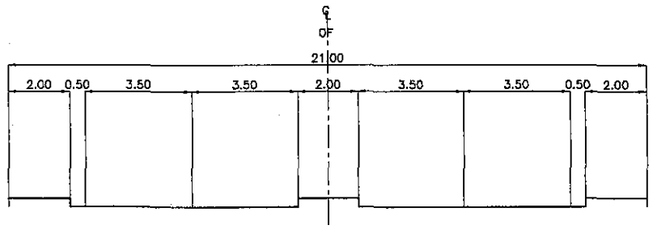
THE STUDY ON ROAD NETWORK IMPROVEMENT
FOR DEVELOPMENT OF REGIONAL GROWTH CENTERS

SCALE :	CAGAYAN DE ORO J.R. BORJA EXTENSION ROAD	DRAWING NO.
PLAN. 1:1000 SECTION.1:200	**INTERSECTION DETAILS** STA. 0+000.000	R−21



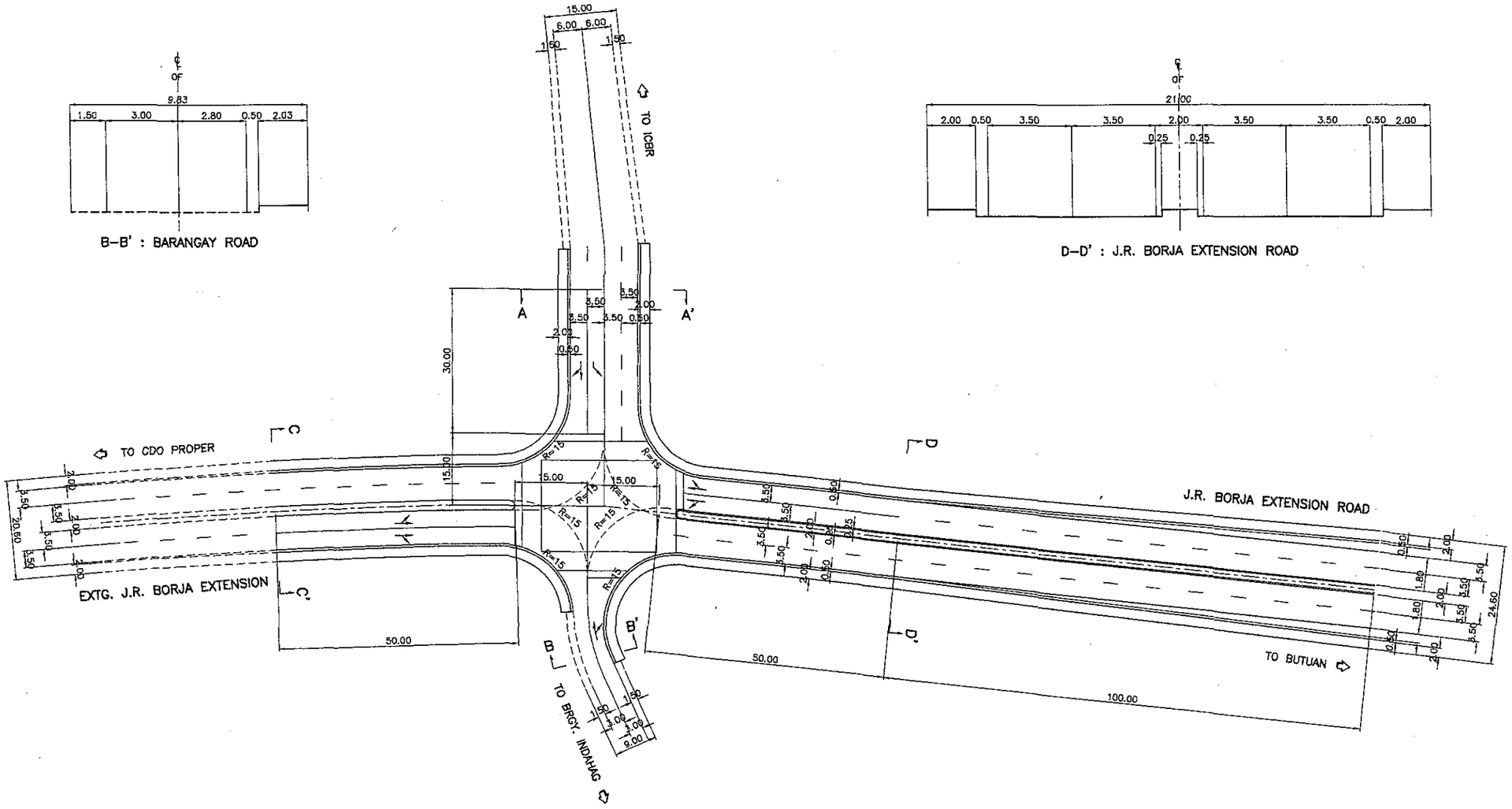
A–A' : CDO–BUTUAN ROAD

B–B' : BARANGAY ROAD



C–C' : EXTG. J.R. BORJA EXTENSION

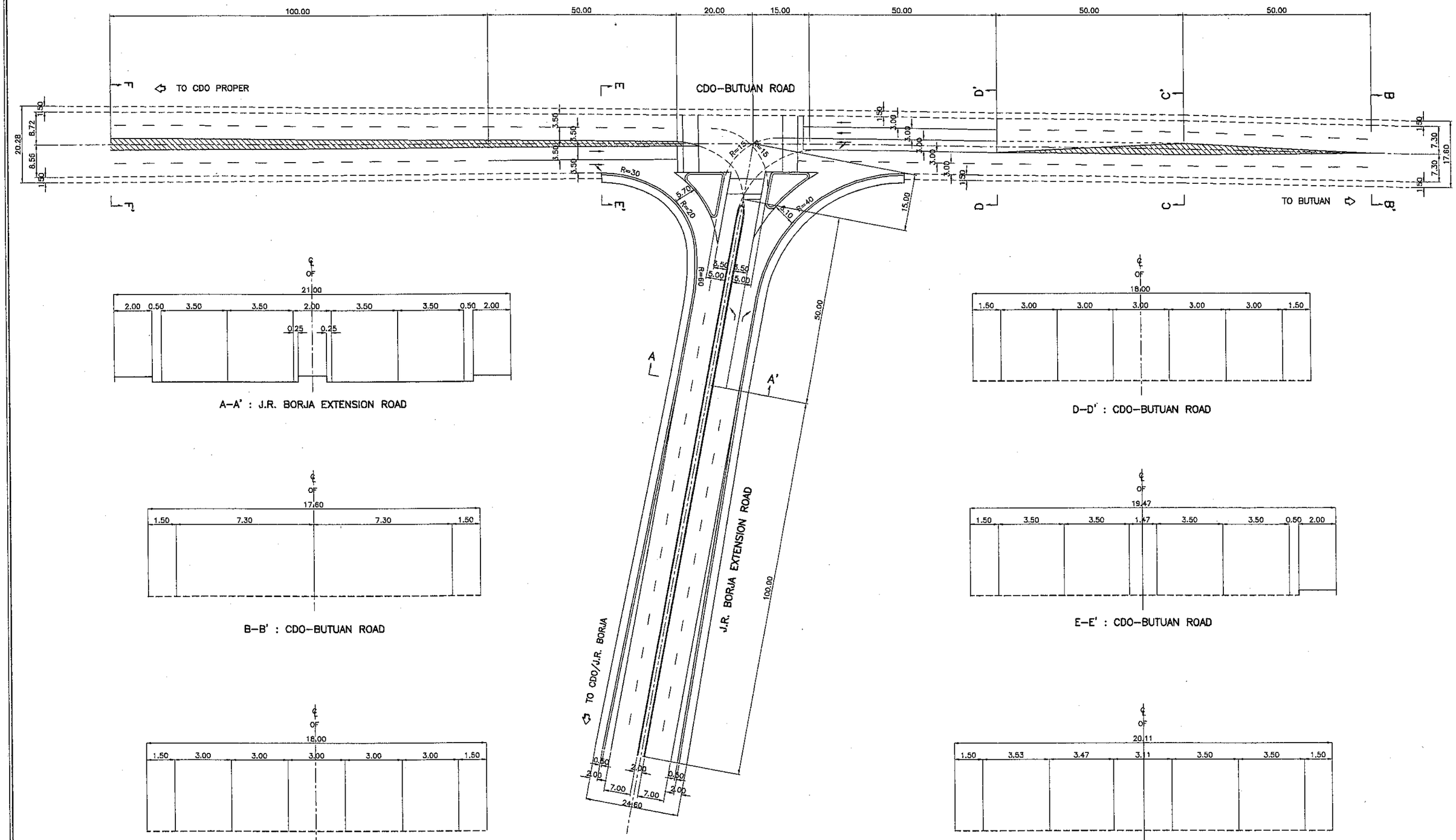
D–D' : J.R. BORJA EXTENSION ROAD



INTERSECTION WITH CDO-BUTUAN ACCESS ROAD
STA. 0+000.000, BEG. OF J.R. BORJA EXTENSION ROAD

THE STUDY ON ROAD NETWORK IMPROVEMENT
FOR DEVELOPMENT OF REGIONAL GROWTH CENTERS

SCALE :	CAGAYAN DE ORO J.R. BORJA EXTENSION ROAD	DRAWING NO.
PLAN. 1:1000 SECTION.1:200	INTERSECTION DETAILS STA. 7+968.860	R–22



A–A' : J.R. BORJA EXTENSION ROAD

D–D' : CDO–BUTUAN ROAD

B–B' : CDO–BUTUAN ROAD

E–E' : CDO–BUTUAN ROAD

C–C' : CDO–BUTUAN ROAD

F–F' : CDO–BUTUAN ROAD

INTERSECTION WITH CDO-BUTUAN
STA. 7+968.860, END OF J.R. BORJA EXTENSION ROAD