

DRAINAGE

SURFACE DRAINAGE SCHEDULE

LEFT SIDE					RIGHT SIDE				
STATION		LOCATION	LENGTH (m)	TYPE OF STRUCTURE	STATION		LOCATION	LENGTH (m)	TYPE OF STRUCTURE
FROM CIM	TO CIM				FROM CIM	TO CIM			
49+825	49+840	S	15	610 mm ϕ RCPC	49+825	49+840	S	15	610 mm ϕ RCPC
49+840		O & S		CIM	49+840		O & S		CIM
49+840		O TO S	6.5	460 mm ϕ RCPC	49+840		O TO S	6.5	460 mm ϕ RCPC
49+840		S	3	610 mm ϕ RCPC	49+840		S	3	610 mm ϕ RCPC
49+840	49+670	S	30	610 mm ϕ RCPC	49+840	49+670	S	30	610 mm ϕ RCPC
49+670		O & S		CIM	49+670		O & S		CIM
49+670		O TO S	6.5	460 mm ϕ RCPC	49+670		O TO S	6.5	460 mm ϕ RCPC
49+670	49+700	S	30	610 mm ϕ RCPC	49+670	49+700	S	30	610 mm ϕ RCPC
49+700		O & S		CIM	49+700		O & S		CIM
49+700		O TO S	6.5	460 mm ϕ RCPC	49+700		O TO S	6.5	460 mm ϕ RCPC
49+730	EXISTING 1-1070mm ϕ RCPC x 47.00m				49+730	EXISTING 1-1070mm ϕ RCPC x 47.00m			
49+730		O & S		CIM	49+730		O & S		CIM
49+730	49+770	S	40	610 mm ϕ RCPC	49+730	49+770	S	40	610 mm ϕ RCPC
49+770		O & S		CIM	49+770		O & S		CIM
49+770		O TO S	6.5	460 mm ϕ RCPC	49+770		O TO S	6.5	460 mm ϕ RCPC
49+840		O & S		CIM	49+840		O & S		CIM
49+840		O TO S	6.5	460 mm ϕ RCPC	49+840		O TO S	6.5	460 mm ϕ RCPC
49+840	49+870	S	30	610 mm ϕ RCPC	49+840	49+870	S	30	610 mm ϕ RCPC
49+870		O & S		CIM	49+870		O & S		CIM
49+870		O TO S	6.5	460 mm ϕ RCPC	49+870		O TO S	6.5	460 mm ϕ RCPC
49+870	49+900	S	30	610 mm ϕ RCPC	49+870	49+900	S	30	610 mm ϕ RCPC
49+900	EXISTING 1-1070mm ϕ RCPC x 48.00m				49+900	EXISTING 1-1070mm ϕ RCPC x 48.00m			
49+900		O & S		CIM	49+900		O & S		CIM
49+900	49+930	S	30	610 mm ϕ RCPC	49+900	49+930	S	30	610 mm ϕ RCPC
49+930		O & S		CIM	49+930		O & S		CIM
49+930		O TO S	6.5	460 mm ϕ RCPC	49+930		O TO S	6.5	460 mm ϕ RCPC
49+930	49+960	S	30	610 mm ϕ RCPC	49+930	49+960	S	30	610 mm ϕ RCPC
49+960		O & S		CIM	49+960		O & S		CIM
49+960		O TO S	6.5	460 mm ϕ RCPC	49+960		O TO S	6.5	460 mm ϕ RCPC
49+990		O & S		CIM	49+990		O & S		CIM
49+990		O TO S		460 mm ϕ RCPC	49+990		O TO S	6.5	460 mm ϕ RCPC
49+990		S	3	610 mm ϕ RCPC	49+990		S	3	610 mm ϕ RCPC
49+990	50+020	S	30	610 mm ϕ RCPC	49+990	50+020	S	30	610 mm ϕ RCPC
50+020		O & S		CIM	50+020		O & S		CIM
50+020		O TO S	6.5	460 mm ϕ RCPC	50+020		O TO S	6.5	460 mm ϕ RCPC
50+020	50+060	S	40	610 mm ϕ RCPC	50+020	50+060	S	40	610 mm ϕ RCPC
50+060		O & S		CIM	50+060		O & S		CIM
50+060		O TO S	6.5	460 mm ϕ RCPC	50+060		O TO S	6.5	460 mm ϕ RCPC
50+060	50+100	S	40	610 mm ϕ RCPC	50+060	50+100	S	40	610 mm ϕ RCPC
50+100		O & S		CIM	50+100		O & S		CIM
50+100		O TO S	6.5	460 mm ϕ RCPC	50+100		O TO S	6.5	460 mm ϕ RCPC
50+100	50+140	S	40	610 mm ϕ RCPC	50+100	50+140	S	40	610 mm ϕ RCPC
50+133	EXISTING 1-1070mm ϕ RCPC x 56.00m				50+133	EXISTING 1-1070mm ϕ RCPC x 56.00m			
50+140		O & S		CIM	50+140		O & S		CIM
50+140		O TO S	6.5	460 mm ϕ RCPC	50+140		O TO S	6.5	460 mm ϕ RCPC
50+140	50+180	S	40	610 mm ϕ RCPC	50+140	50+180	S	40	610 mm ϕ RCPC
50+180		O & S		CIM	50+180		O & S		CIM
50+180		O TO S	6.5	460 mm ϕ RCPC	50+180		O TO S	6.5	460 mm ϕ RCPC
50+290		O & S		CIM	50+290		O & S		CIM
50+290		O TO S	6.5	460 mm ϕ RCPC	50+290		O TO S	6.5	460 mm ϕ RCPC
50+290	50+330	S	40	610 mm ϕ RCPC	50+290	50+330	S	40	610 mm ϕ RCPC
50+330		O & S		CIM	50+330		O & S		CIM
50+330		O TO S	6.5	460 mm ϕ RCPC	50+330		O TO S	6.5	460 mm ϕ RCPC
50+330	50+370	S	40	610 mm ϕ RCPC	50+330	50+370	S	40	610 mm ϕ RCPC

LEFT SIDE					RIGHT SIDE				
STATION		LOCATION	LENGTH	TYPE OF STRUCTURE	STATION		LOCATION	LENGTH	TYPE OF STRUCTURE
FROM	TO		(m)		FROM	TO		(m)	
CIM	CIM					CIM		CIM	
50+355	EXISTING 1-910mm# RCPC x 55.00m				50+355	EXISTING 1-910mm# RCPC x 55.00m			
50+370		O & S		CIM	50+370		O & S		CIM
50+370		O TO S	6.5	460 mm # RCPC	50+370		O TO S	6.5	460 mm # RCPC
50+370	50+410	S	40	610 mm # RCPC	50+370	50+410	S	40	610 mm # RCPC
50+410		O & S		CIM	50+410		O & S		CIM
50+410		O TO S	6.5	460 mm # RCPC	50+410		O TO S	6.5	460 mm # RCPC
50+410		S	3	610 mm # RCPC	50+410		S	3	610 mm # RCPC
50+450		O & S		CIM	50+450		O & S		CIM
50+450		O TO S	6.5	460 mm # RCPC	50+450		O TO S	6.5	460 mm # RCPC
50+450	50+490	S	40	610 mm # RCPC	50+450	50+490	S	40	610 mm # RCPC
50+490		O & S		CIM	50+490		O & S		CIM
50+490		O TO S	6.5	460 mm # RCPC	50+490		O TO S	6.5	460 mm # RCPC
50+490	50+535	S	45	610 mm # RCPC	50+490	50+535	S	45	610 mm # RCPC
50+535	EXISTING 1-910mm# RCPC x 35.00m				50+535	EXISTING 1-910mm# RCPC x 35.00m			
50+535		O & S		CIM	50+535		O & S		CIM
50+535	50+580	S	45	610 mm # RCPC	50+535	50+580	S	45	610 mm # RCPC
50+580		O & S		CIM	50+580		O & S		CIM
50+580		O TO S	6.5	460 mm # RCPC	50+580		O TO S	6.5	460 mm # RCPC
50+610		O & S		CIM	50+610		O & S		CIM
50+610		O TO S	6.5	460 mm # RCPC	50+610		O TO S	6.5	460 mm # RCPC
50+610		S	3	610 mm # RCPC	50+610		S	3	610 mm # RCPC
50+610	50+650	S	40	610 mm # RCPC	50+610	50+650	S	40	610 mm # RCPC
50+650		O & S		CIM	50+650		O & S		CIM
50+650		O TO S	6.5	460 mm # RCPC	50+650		O TO S	6.5	460 mm # RCPC
50+735	EXISTING 1-910mm# RCPC x 48.00m				50+735	EXISTING 1-910mm# RCPC x 48.00m			
50+735		O & S		CIM	50+735		O & S		CIM
50+735	50+770	S	35	610 mm # RCPC	50+735	50+770	S	35	610 mm # RCPC
50+770		O & S		CIM	50+770		O & S		CIM
50+770		O TO S	6.5	460 mm # RCPC	50+770		O TO S	6.5	460 mm # RCPC
50+810		O & S		CIM	50+810		O & S		CIM
50+810		O TO S	6.5	460 mm # RCPC	50+810		O TO S	6.5	460 mm # RCPC
50+810		S	3	610 mm # RCPC	50+810		S	3	610 mm # RCPC
50+810	50+850	S	40	610 mm # RCPC	50+810	50+850	S	40	610 mm # RCPC
50+850		O & S		CIM	50+850		O & S		CIM
50+850		O TO S	6.5	460 mm # RCPC	50+850		O TO S	6.5	460 mm # RCPC
50+850	50+890	S	40	610 mm # RCPC	50+850	EXISTING 1-1220mm# RCPC x 48.00m			
50+890	EXISTING 1-1220mm# RCPC x 48.00m				50+890		O & S		CIM
50+890		O & S		CIM	50+890	50+920	S	30	610 mm # RCPC
50+890	50+920	S	30	610 mm # RCPC	50+920		O & S		CIM
50+920		O & S		CIM	50+920		O TO S	6.5	460 mm # RCPC
50+920		O TO S	6.5	460 mm # RCPC	50+920	50+960	S	40	610 mm # RCPC
50+920	50+960	S	40	610 mm # RCPC	50+960		O & S		CIM
50+960		O & S		CIM	50+960		O TO S	6.5	460 mm # RCPC
50+960		O TO S	6.5	460 mm # RCPC	50+960	51+000	S	40	610 mm # RCPC
50+960	51+000	S	40	610 mm # RCPC	51+000		O & S		CIM
51+000		O & S		CIM	51+000		O TO S	6.5	460 mm # RCPC
51+000		O TO S	6.5	460 mm # RCPC	51+000	51+040	S	40	610 mm # RCPC
51+000	51+040	S	40	610 mm # RCPC	51+040		O & S		CIM
51+040		O & S		CIM	51+040		O TO S	6.5	460 mm # RCPC
51+040		O TO S	6.5	460 mm # RCPC	51+080		O & S		CIM
51+080		O & S		CIM	51+080		O TO S	6.5	460 mm # RCPC
51+080		O TO S	6.5	460 mm # RCPC	51+080		S	3	610 mm # RCPC
51+080		S	3	610 mm # RCPC	51+080	51+120	S	40	610 mm # RCPC
51+080	51+120	S	40	610 mm # RCPC	51+120		S		CIM
51+120		O & S		CIM	51+120	51+160	S	40	610 mm # RCPC

LEGEND:

M — Center Median S — Sidewalk CIM — Catch Inlet Manhole
 O — Outer Separator RCPC — Reinforced Concrete Pipe Culvert MH — Manhole

 JICA JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS YACHIYO ENGINEERING CO., LTD.	DESIGNED	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :		
	CHECKED	9/20/01		BUREAU OF DESIGN				THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)				FULL SIZE A1 SCHEDULE OF SURFACE DRAINAGE (SHEET 1 OF 4)	DG-01
	SUBMITTED	10/16/01		OFFICE OF THE SECRETARY				PLARIDEL BYPASS - CONTRACT PACKAGE IV					
				Submitted By: DANILO C. TRAJANO (Project Director) Reviewed By: JOSEFINA M. ALAGAR (Chief, Highway Division) Recommended By: GILBERTO S. REYES (OIC, Director IV) Recommended By: MANUEL M. BONGAN (Undersecretary) Approved By: SIMEON A. DATUMANONG (Secretary)									

SURFACE DRAINAGE SCHEDULE

LEFT SIDE					RIGHT SIDE					LEFT SIDE					RIGHT SIDE				
STATION		LOCATION	LENGTH (m)	TYPE OF STRUCTURE	STATION		LOCATION	LENGTH (m)	TYPE OF STRUCTURE	STATION		LOCATION	LENGTH (m)	TYPE OF STRUCTURE	STATION		LOCATION	LENGTH (m)	TYPE OF STRUCTURE
FROM CIM	TO CIM				FROM CIM	TO CIM				FROM CIM	TO CIM				FROM CIM	TO CIM			
51+120		O TO S	6.5	460 mm # RCPC	51+160		O & S		CIM	51+880	51+920	S	40	610 mm # RCPC	52+000		O & S		CIM
51+120	51+160	S	40	610 mm # RCPC	51+160		O TO S	6.5	460 mm # RCPC	51+920		M,O,S		CIM	52+000		O TO S	6.5	460 mm # RCPC
51+160		O & S		CIM	51+160	51+200	S	40	610 mm # RCPC	51+920		M TO S	6.5	460 mm # RCPC	52+040		O & S		CIM
51+160		O TO S	6.5	460 mm # RCPC	51+200		O & S		CIM	51+920	51+960	S	40	610 mm # RCPC	52+040		O TO S	6.5	460 mm # RCPC
51+160	51+200	S	40	610 mm # RCPC	51+200		O TO S	6.5	460 mm # RCPC	51+960		M,O,S		CIM	52+040		S	3	610 mm # RCPC
51+200		O & S		CIM	51+240		O & S		CIM	51+960		M TO S	6.5	460 mm # RCPC	52+040	52+080	S	40	610 mm # RCPC
51+200		O TO S	6.5	460 mm # RCPC	51+240		O TO S	6.5	460 mm # RCPC	51+960	52+000	S	40	610 mm # RCPC	52+080		O & S		CIM
51+200	51+240	S	40	610 mm # RCPC	51+240	51+275	S	35	610 mm # RCPC	52+000		M,O,S		CIM	52+080		O TO S	6.5	460 mm # RCPC
51+240		O & S		CIM	EXISTING 2-1070mm# RCPC x 47.00m					52+000		M TO S	6.5	460 mm # RCPC	52+080	52+120	S	40	610 mm # RCPC
51+240		O TO S	6.5	460 mm # RCPC	51+275		O & S		CIM	52+040		M,O,S		CIM	52+120		O & S		CIM
51+275	EXISTING 2-1070mm# RCPC x 47.00m				51+275	51+320	S	45	610 mm # RCPC	52+040		M TO S	6.5	460 mm # RCPC	52+120		O TO S	6.5	460 mm # RCPC
51+275		O & S		CIM	51+320		O & S		CIM	52+040		S	3	610 mm # RCPC	52+120	52+160	S	40	610 mm # RCPC
51+275	51+320	S	45	610 mm # RCPC	51+320		O TO S	6.5	460 mm # RCPC	52+040	52+080	S	40	610 mm # RCPC	52+160		O & S		CIM
51+320		O & S		CIM	51+353	EXISTING 1-1070mm# RCPC x 47.00m				52+080		M,O,S		CIM	52+160		O TO S	6.5	460 mm # RCPC
51+320		O TO S	6.5	460 mm # RCPC	51+353		S		CIM	52+080	52+120	S	40	610 mm # RCPC	52+160	52+200	S	40	610 mm # RCPC
51+353	EXISTING 1-1070mm# RCPC x 47.00m				51+353	51+400	S	47	610 mm # RCPC	52+120		M,O,S		CIM	52+200		O & S		CIM
51+353		S		CIM	51+400		O & S		CIM	52+120		M TO S	6.5	460 mm # RCPC	52+200		O TO S	6.5	460 mm # RCPC
51+353	51+400	S	47	610 mm # RCPC	51+400		O TO S	6.5	460 mm # RCPC	52+120		M TO S	6.5	460 mm # RCPC	52+240		O & S		CIM
51+400		O & S		CIM	51+400	51+440	S	40	610 mm # RCPC	52+120	52+160	S	40	610 mm # RCPC	52+240		O TO S	6.5	460 mm # RCPC
51+400		O TO S	6.5	460 mm # RCPC	51+440		O & S		CIM	52+160		M,O,S		CIM	52+240		S	3	610 mm # RCPC
51+400	51+440	S	40	610 mm # RCPC	51+440		O TO S	6.5	460 mm # RCPC	52+160		M TO S	6.5	460 mm # RCPC	52+240	52+280	S	40	610 mm # RCPC
51+440		O & S		CIM	51+440	51+480	S	40	610 mm # RCPC	52+160	52+200	S	40	610 mm # RCPC	52+280		O & S		CIM
51+440		O TO S	6.5	460 mm # RCPC	51+480		O & S		CIM	52+200		M,O,S		CIM	52+280		O TO S	6.5	460 mm # RCPC
51+440	51+480	S	40	610 mm # RCPC	51+480		O TO S	6.5	460 mm # RCPC	52+200		M TO S	6.5	460 mm # RCPC	52+280	52+320	S	40	610 mm # RCPC
51+480		O & S		CIM	51+520		O & S		CIM	52+240		M,O,S		CIM	52+320		S		CIM
51+480		O TO S	6.5	460 mm # RCPC	51+520		O TO S	6.5	460 mm # RCPC	52+240		M TO S	6.5	460 mm # RCPC	52+320	52+360	S	40	610 mm # RCPC
51+520		O & S		CIM	51+520		S	3	610 mm # RCPC	52+240	52+280	S	40	610 mm # RCPC	52+360		S		CIM
51+520		O TO S	6.5	460 mm # RCPC	51+520	51+560	S	40	610 mm # RCPC	52+280		M,O,S		CIM	52+440		S		CIM
51+520		S	3	610 mm # RCPC	51+560		O & S		CIM	52+280		M TO S	6.5	460 mm # RCPC	52+440	52+480	S	40	610 mm # RCPC
51+560	51+560	O & S	40	610 mm # RCPC	51+560		O TO S	6.5	460 mm # RCPC	52+280	52+320	S	40	610 mm # RCPC	52+480		S		CIM
51+560		O TO S	6.5	460 mm # RCPC	51+560	51+600	S	40	610 mm # RCPC	52+320		M,O,S		CIM	52+480	52+520	S	40	610 mm # RCPC
51+560	51+600	S	40	610 mm # RCPC	51+600		O & S		CIM	52+320		M TO S	6.5	460 mm # RCPC	52+520		O & S		CIM
51+600		O & S		CIM	51+600	51+640	S	40	610 mm # RCPC	52+320	52+360	S	40	610 mm # RCPC	52+520		O TO S	6.5	460 mm # RCPC
51+600		O TO S	6.5	460 mm # RCPC	51+640		O & S		CIM	52+360		M,O,S		CIM	52+560		O & S		CIM
51+600	51+640	S	40	610 mm # RCPC	51+640		O TO S	6.5	460 mm # RCPC	52+360		M TO S	6.5	460 mm # RCPC	52+560		O TO S	6.5	460 mm # RCPC
51+640		O & S		CIM	51+640	51+680	S	40	610 mm # RCPC	52+440		M,O,S		CIM	52+560	52+600	S	40	610 mm # RCPC
51+640		O TO S	6.5	460 mm # RCPC	51+680		S		CIM	52+440		M TO S	6.5	460 mm # RCPC	52+600		O & S		CIM
51+680		O & S		CIM	51+680		S	3	610 mm # RCPC	52+440	52+480	S	40	610 mm # RCPC	52+600		O TO S	6.5	460 mm # RCPC
51+680		O TO S	6.5	460 mm # RCPC	51+680	51+720	S	40	610 mm # RCPC	52+480		M,O,S		CIM	52+600		S	3	610 mm # RCPC
51+680		S	3	610 mm # RCPC	51+720		S		CIM	52+480		M TO S	6.5	460 mm # RCPC	52+640		M,O,S		CIM
51+680	51+720	S	40	610 mm # RCPC	51+720	51+760	S	40	610 mm # RCPC	52+480	52+520	S	40	610 mm # RCPC	52+640		M TO S	6.5	460 mm # RCPC
51+720		M,O,S		CIM	51+760		S		CIM	52+520		M,O,S		CIM	52+640	52+680	S	40	610 mm # RCPC
51+720		M TO S	6.5	460 mm # RCPC	51+760	51+800	S	40	610 mm # RCPC	52+520		M TO S	6.5	460 mm # RCPC	52+680		O & S		CIM
51+720	51+760	S	40	610 mm # RCPC	51+800		S		CIM	52+520	52+560	S	40	610 mm # RCPC	52+680		O TO S	6.5	460 mm # RCPC
51+760		M,O,S		CIM	51+840		S		CIM	52+560		M,O,S		CIM	52+680	52+720	S	40	610 mm # RCPC
51+760		M TO S	6.5	460 mm # RCPC	51+840		S	3	610 mm # RCPC	52+560		M TO S	6.5	460 mm # RCPC	52+720		O & S		CIM
51+760	51+800	S	40	610 mm # RCPC	51+840	51+880	S	40	610 mm # RCPC	52+560	52+600	S	40	610 mm # RCPC	52+720		O TO S	6.5	460 mm # RCPC
51+800		M,O,S		CIM	51+880		S		CIM	52+600		M,O,S		CIM	52+720	52+760	S	40	610 mm # RCPC
51+800		M TO S	6.5	460 mm # RCPC	51+880	51+920	S	40	610 mm # RCPC	52+600		M TO S	6.5	460 mm # RCPC	52+760		O & S		CIM
51+840		M,O,S		CIM	51+920		S		CIM	52+600		S	3	610 mm # RCPC	52+760		O TO S	6.5	460 mm # RCPC
51+840		M TO S	6.5	460 mm # RCPC	51+920	51+960	S	40	610 mm # RCPC	52+640		M,O,S		CIM	52+760	52+800	S	40	610 mm # RCPC
51+840		S	3	610 mm # RCPC	51+960		O & S		CIM	52+640		M TO S	6.5	460 mm # RCPC	52+800		O & S		CIM
51+840	51+880	S	40	610 mm # RCPC	51+960		O TO S	6.5	460 mm # RCPC	52+640	52+680	S	40	610 mm # RCPC	52+800		O TO S	6.5	460 mm # RCPC
51+880		M,O,S		CIM	51+960	52+000	S	40	610 mm # RCPC	52+680		M,O,S		CIM	52+800		S	3	610 mm # RCPC
51+880		M TO S	6.5	460 mm # RCPC															

LEGEND:

M - Center Median S - Sidewalk CIM - Catch Inlet Manhole
 O - Outer Separator RCPC - Reinforced Concrete Pipe Culvert MH - Manhole

 JICA JAPAN INTERNATIONAL COOPERATION AGENCY	DATE: 9/28/02 DESIGNED: [Signature] CHECKED: [Signature] SUBMITTED: 10/16/02	 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS	PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE IV	SCALE : FULL SIZE A1	SHEET CONTENTS : SCHEDULE OF SURFACE DRAINAGE (SHEET 2 OF 4)	SHEET NO. : DG-02
KATAHIRA & ENGINEERS INTERNATIONAL YACHIYO ENGINEERING CO., LTD.		BUREAU OF DESIGN Submitted By: DANLO C. TRAJANO (Project Director) Reviewed By: JOSEFINA M. ALAGAR (Chief, Highway Division) Recommended By: GILBERTO S. REYES (OIC, Director IV) Approved By: MANUEL M. BONDAN (Undersecretary) Approved By: SIMEON A. DATUMANONG (Secretary)				

SURFACE DRAINAGE SCHEDULE

LEFT SIDE					RIGHT SIDE					LEFT SIDE					RIGHT SIDE				
STATION		LOCATION	LENGTH (m)	TYPE OF STRUCTURE	STATION		LOCATION	LENGTH (m)	TYPE OF STRUCTURE	STATION		LOCATION	LENGTH (m)	TYPE OF STRUCTURE	STATION		LOCATION	LENGTH (m)	TYPE OF STRUCTURE
FROM CIM	TO CIM				FROM CIM	TO CIM				FROM CIM	TO CIM				FROM CIM	TO CIM			
52+680		M TO S	6.5	460 mm # RCPC	52+840		O & S		CIM	53+330		M,O,S		CIM	53+490		O & S		CIM
52+680	52+720	S	40	610 mm # RCPC	52+840		O TO S	6.5	460 mm # RCPC	53+330		M TO S	6.5	460 mm # RCPC	53+490		O TO S	6.5	460 mm # RCPC
52+720		M,O,S		CIM	52+840	52+880	S	40	610 mm # RCPC	53+370		M,O,S		CIM	53+490	53+530	S	40	610 mm # RCPC
52+720		M TO S	6.5	460 mm # RCPC	52+880		O & S		CIM	53+370		M TO S	6.5	460 mm # RCPC	53+530		O & S		CIM
52+720	52+760	S	40	610 mm # RCPC	52+880		O TO S	6.5	460 mm # RCPC	53+370		S	3	610 mm # RCPC	53+530		O TO S	6.5	460 mm # RCPC
52+760		M,O,S		CIM	52+880	52+920	S	40	610 mm # RCPC	53+370	53+410	S	40	610 mm # RCPC	53+610		S		CIM
52+760		M TO S	6.5	460 mm # RCPC	52+920		O & S		CIM	53+410		M,O,S		CIM	53+610	53+650	S	40	610 mm # RCPC
52+760	52+800	S	40	610 mm # RCPC	52+920		O TO S	6.5	460 mm # RCPC	53+410		M TO S	6.5	460 mm # RCPC	53+650		S		CIM
52+800		M,O,S		CIM	52+920	52+960	S	40	610 mm # RCPC	53+410	53+450	S	40	610 mm # RCPC	53+650		S	3	610 mm # RCPC
52+800		M TO S	6.5	460 mm # RCPC	52+960		O & S		CIM	53+450		M,O,S		CIM	53+690		S		CIM
52+800		S	3	610 mm # RCPC	52+960		O TO S	6.5	460 mm # RCPC	53+450		M TO S	6.5	460 mm # RCPC	53+690	53+730	S	40	610 mm # RCPC
52+840		M,O,S		CIM	52+960	52+990	S	30	610 mm # RCPC	53+450	53+490	S	40	610 mm # RCPC	53+730		S		CIM
52+840		M TO S	6.5	460 mm # RCPC	52+990		O & S		CIM	53+490		M,O,S		CIM	53+730	53+775	S	45	610 mm # RCPC
52+840	52+880	S	40	610 mm # RCPC	52+990		O TO S	6.5	460 mm # RCPC	53+490		M TO S	6.5	460 mm # RCPC	53+775	EXISTING 2-910mm# RCPC x 48.00m			
52+880		M,O,S		CIM	52+990		S	3	610 mm # RCPC	53+490	53+530	S	40	610 mm # RCPC	53+775		S		CIM
52+880		M TO S	6.5	460 mm # RCPC	53+030		O & S		CIM	53+530		M,O,S		CIM	53+775	53+810	S	35	610 mm # RCPC
52+880	52+920	S	40	610 mm # RCPC	53+030		O TO S	6.5	460 mm # RCPC	53+530		M TO S	6.5	460 mm # RCPC	53+810		S		CIM
52+920		M,O,S		CIM	53+030	53+070	S	40	610 mm # RCPC	53+510		M,O,S		CIM	53+810	53+840	S	30	610 mm # RCPC
52+920		M TO S	6.5	460 mm # RCPC	53+070		O & S		CIM	53+510		M TO S	6.5	460 mm # RCPC	53+840		O & S		CIM
52+920	52+960	S	40	610 mm # RCPC	53+070		O TO S	6.5	460 mm # RCPC	53+510	53+550	S	40	610 mm # RCPC	53+840		O TO S	6.5	460 mm # RCPC
52+960		M,O,S		CIM	53+070	53+110	S	40	610 mm # RCPC	53+550		M,O,S		CIM	53+840	53+880	S	40	610 mm # RCPC
52+960		M TO S	6.5	460 mm # RCPC	53+110		O & S		CIM	53+550		M TO S	6.5	460 mm # RCPC	53+880		O & S		CIM
52+960	52+990	S	30	610 mm # RCPC	53+110		O TO S	6.5	460 mm # RCPC	53+550	53+590	S	40	610 mm # RCPC	53+880		O TO S	6.5	460 mm # RCPC
52+990		M,O,S		CIM	53+110	53+150	S	40	610 mm # RCPC	53+590		M,O,S		CIM	53+880	53+920	S	40	610 mm # RCPC
52+990		M TO S	6.5	460 mm # RCPC	53+150		O & S		CIM	53+590		M TO S	6.5	460 mm # RCPC	53+920		O & S		CIM
52+990		S	3	610 mm # RCPC	53+150		O TO S	6.5	460 mm # RCPC	53+590		S	3	610 mm # RCPC	53+920		O TO S	6.5	460 mm # RCPC
53+030		M,O,S		CIM	53+150	53+180	S	30	610 mm # RCPC	53+590		M,O,S		CIM	53+920	53+960	S	40	610 mm # RCPC
53+030		M TO S	6.5	460 mm # RCPC	53+180		O & S		CIM	53+590		M TO S	6.5	460 mm # RCPC	53+960		O & S		CIM
53+030	53+070	S	40	610 mm # RCPC	53+180		O TO S	6.5	460 mm # RCPC	53+590	53+630	S	40	610 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+070		M,O,S		CIM	53+180	53+210	S	30	610 mm # RCPC	53+630		M,O,S		CIM	53+960		O & S		CIM
53+070		M TO S	6.5	460 mm # RCPC	53+210		O & S		CIM	53+630		M TO S	6.5	460 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+070	53+110	S	40	610 mm # RCPC	53+210		O TO S	6.5	460 mm # RCPC	53+630	53+670	S	40	610 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+110		M,O,S		CIM	53+210		S	3	610 mm # RCPC	53+670		M,O,S		CIM	53+960		O & S		CIM
53+110		M TO S	6.5	460 mm # RCPC	53+240		O & S		CIM	53+670		M TO S	6.5	460 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+110	53+150	S	40	610 mm # RCPC	53+240		O TO S	6.5	460 mm # RCPC	53+670	53+710	S	40	610 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+150		M,O,S		CIM	53+240		S	3	610 mm # RCPC	53+710		M,O,S		CIM	53+960		O & S		CIM
53+150		M TO S	6.5	460 mm # RCPC	53+240	53+270	S	30	610 mm # RCPC	53+710		M TO S	6.5	460 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+150	53+180	S	30	610 mm # RCPC	53+270		O & S		CIM	53+710	53+750	S	40	610 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+180		M,O,S		CIM	53+270		O TO S	6.5	460 mm # RCPC	53+750		M,O,S		CIM	53+960		O & S		CIM
53+180		M TO S	6.5	460 mm # RCPC	53+270	53+300	S	30	610 mm # RCPC	53+750		M TO S	6.5	460 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+180	53+210	S	30	610 mm # RCPC	53+300		O & S		CIM	53+750	53+790	S	40	610 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+210		M,O,S		CIM	53+300		O TO S	6.5	460 mm # RCPC	53+790		M,O,S		CIM	53+960		O & S		CIM
53+210		M TO S	6.5	460 mm # RCPC	53+300	53+330	S	30	610 mm # RCPC	53+790		M TO S	6.5	460 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+210		S	3	610 mm # RCPC	53+330		O & S		CIM	53+790	53+830	S	40	610 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+235	EXISTING 1-2.40 x 1.80 RCBC x 48.50m				53+330		O TO S	6.5	460 mm # RCPC	53+830		M,O,S		CIM	53+960		O & S		CIM
53+240		M,O,S		CIM	53+370		O & S		CIM	53+830		M TO S	6.5	460 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+240		M TO S	6.5	460 mm # RCPC	53+370		O TO S	6.5	460 mm # RCPC	53+830		M,O,S		CIM	53+960		O TO S	6.5	460 mm # RCPC
53+240		S	3	610 mm # RCPC	53+370		S	3	610 mm # RCPC	53+830		M TO S	6.5	460 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+240	53+270	S	30	610 mm # RCPC	53+370	53+410	S	40	610 mm # RCPC	53+830		M TO S	6.5	460 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+270		M,O,S		CIM	53+410		O & S		CIM	53+830		M TO S	6.5	460 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+270		M TO S	6.5	460 mm # RCPC	53+410		O TO S	6.5	460 mm # RCPC	53+830		M TO S	6.5	460 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+270	53+300	S	30	610 mm # RCPC	53+410	53+450	S	40	610 mm # RCPC	53+830	53+870	S	40	610 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+300		M,O,S		CIM	53+450		O & S		CIM	53+870		M,O,S		CIM	53+960		O TO S	6.5	460 mm # RCPC
53+300		M TO S	6.5	460 mm # RCPC	53+450		O TO S	6.5	460 mm # RCPC	53+870		M TO S	6.5	460 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC
53+300	53+330	S	30	610 mm # RCPC	53+450	53+490	S	40	610 mm # RCPC	53+870	53+910	S	40	610 mm # RCPC	53+960		O TO S	6.5	460 mm # RCPC

LEGEND:

M - Center Median S - Sidewalk CIM - Catch Inlet Manhole
 O - Outer Separator RCPC - Reinforced Concrete Pipe Culvert MH - Manhole

 JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS YACHIO ENGINEERING CO., LTD.	DESIGNED: <i>[Signature]</i> CHECKED: <i>[Signature]</i> SUBMITTED: <i>[Signature]</i>	DATE: 9/28/02 SIGNATURE: <i>[Signature]</i> TEAM LEADER: <i>[Signature]</i>	 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN Submitted By: <i>[Signature]</i> Reviewed By: JOSEFINA M. ALAGAR Chief, Highway Division Recommended By: GILBERTO S. REYES D.C. Director IV Recommended By: MANUEL M. BONDAN Undersecretary Approved By: SIMEON A. DATUMANDONG Secretary	PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE IV	SCALE : FULL SIZE A1	SHEET CONTENTS : SCHEDULE OF SURFACE DRAINAGE (SHEET 3 OF 4)	SHEET NO. : DG-03
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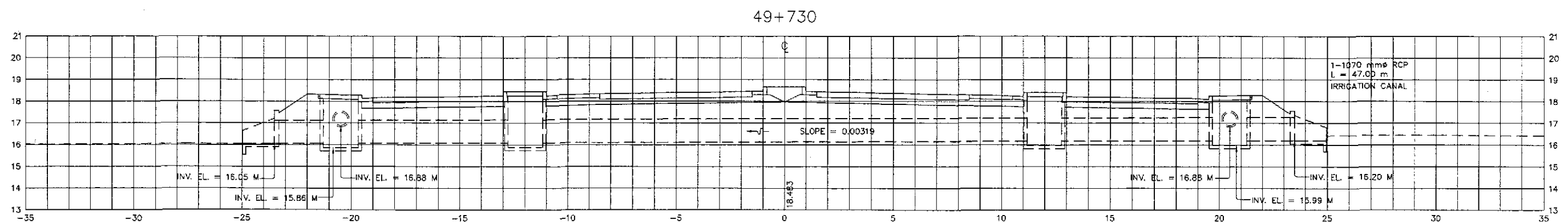
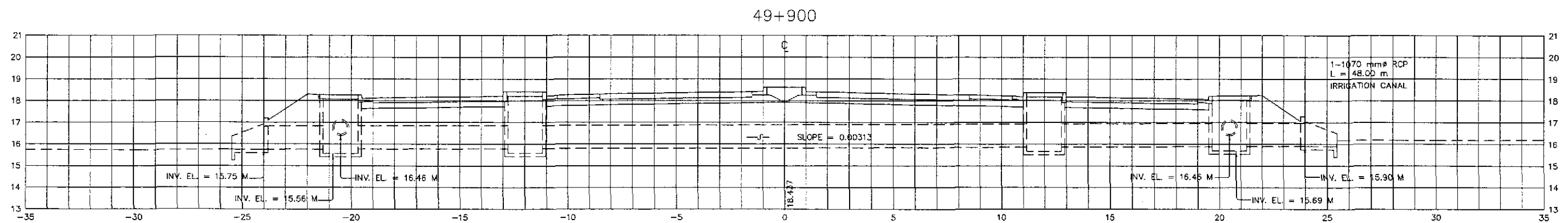
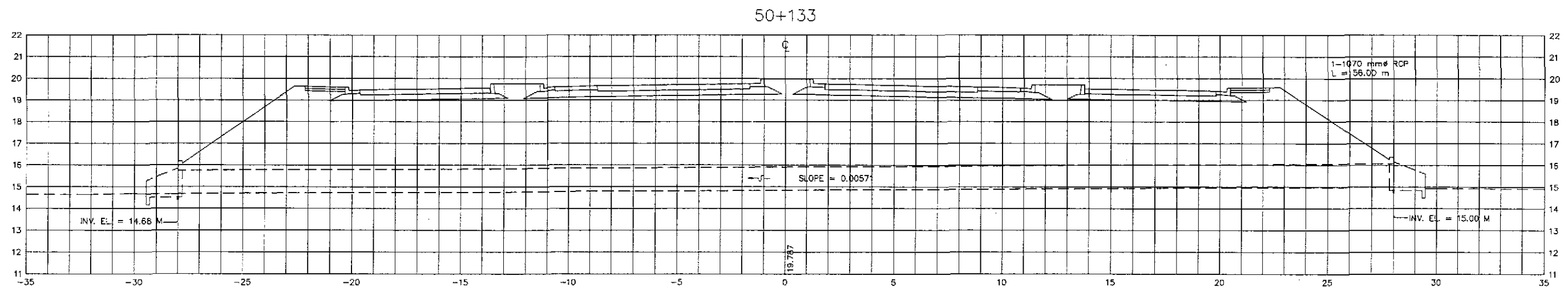
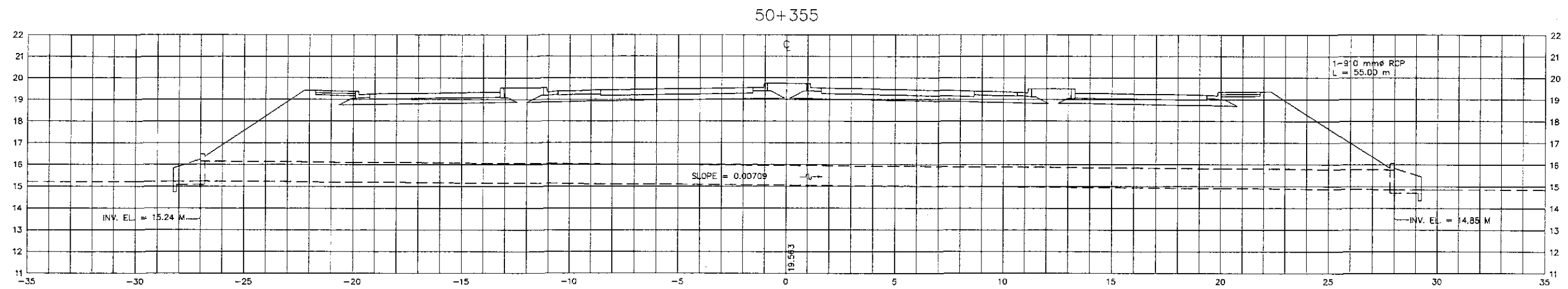
SURFACE DRAINAGE SCHEDULE

LEFT SIDE					RIGHT SIDE					LEFT SIDE					RIGHT SIDE				
STATION		LOCATION	LENGTH (m)	TYPE OF STRUCTURE	STATION		LOCATION	LENGTH (m)	TYPE OF STRUCTURE	STATION		LOCATION	LENGTH (m)	TYPE OF STRUCTURE	STATION		LOCATION	LENGTH (m)	TYPE OF STRUCTURE
FROM CIM	TO CIM				FROM CIM	TO CIM				FROM CIM	TO CIM				FROM CIM	TO CIM			
54+120		M.O.S		CIM	54+330	54+360	S	30	610 mm Ø RCPC	54+840		O TO S	6.5	460 mm Ø RCPC	55+140	55+180	S	40	610 mm Ø RCPC
54+120		M TO S	6.5	460 mm Ø RCPC	54+360		O & S		CIM	54+840	54+880	S	40	610 mm Ø RCPC	55+180		S		CIM
54+120	54+160	S	40	610 mm Ø RCPC	54+360		O TO S	6.5	460 mm Ø RCPC	54+880		O & S		CIM	55+180	55+210	S	30	610 mm Ø RCPC
54+160		M.O.S		CIM	54+360	54+400	S	40	610 mm Ø RCPC	54+880		O TO S	6.5	460 mm Ø RCPC	55+210		S		CIM
54+160		M TO S	6.5	460 mm Ø RCPC	54+400		O & S		CIM	54+880	54+920	S	40	610 mm Ø RCPC	55+210	55+240	S	30	610 mm Ø RCPC
54+160	54+200	S	40	610 mm Ø RCPC	54+400		O TO S	6.5	460 mm Ø RCPC	54+920		O & S		CIM	55+240		S		CIM
54+200		M.O.S		CIM	54+400	54+440	S	40	610 mm Ø RCPC	54+920		O TO S	6.5	460 mm Ø RCPC	55+240	55+280	S	40	610 mm Ø RCPC
54+200		M TO S	6.5	460 mm Ø RCPC	54+440		O & S		610 mm CIM Ø RCPC	54+920	54+960	S	40	610 mm Ø RCPC	55+280		S		CIM
54+200	54+240	S	40	610 mm Ø RCPC	54+440		O TO S	6.5	460 mm Ø RCPC	54+960		S		CIM					
54+240		M.O.S		CIM	54+440	54+475	S	35	610 mm Ø RCPC	54+960	54+990	S	30	610 mm Ø RCPC					
54+240		M TO S	6.5	460 mm Ø RCPC	54+475	EXISTING 1-1070mm Ø RCPC x 47.00m				54+990		S		CIM					
54+240	54+270	S	30	610 mm Ø RCPC	54+475		O & S		CIM	54+990	55+020	S	30	610 mm Ø RCPC					
54+270		M.O.S		CIM	54+520		O & S		CIM	55+020		O & S		CIM					
54+270		M TO S	6.5	460 mm Ø RCPC	54+520		O TO S	6.5	460 mm Ø RCPC	55+020		O TO S	6.5	460 mm Ø RCPC					
54+270	54+295	S	25	610 mm Ø RCPC	54+520	54+560	S	40	610 mm Ø RCPC	55+060		O & S		CIM					
54+295	EXISTING 1-1070mm Ø RCPC x 49.00m				54+560		O & S		CIM	55+060		O TO S	6.5	460 mm Ø RCPC					
54+295		M.O.S		CIM	54+560		O TO S	6.5	460 mm Ø RCPC	55+060	55+100	S	40	610 mm Ø RCPC					
54+330		M.O.S		CIM	54+560	54+600	S	40	610 mm Ø RCPC	55+100		O & S		CIM					
54+330		M TO S	6.5	460 mm Ø RCPC	54+600		O & S		CIM	55+100		O TO S	6.5	460 mm Ø RCPC					
54+330	54+360	S	40	610 mm Ø RCPC	54+600		O TO S	6.5	460 mm Ø RCPC	55+100		S	3	610 mm Ø RCPC					
54+360		M.O.S		CIM	54+600	54+640	S	40	610 mm Ø RCPC	55+140		S		CIM					
54+360		M TO S	6.5	460 mm Ø RCPC	54+640		O & S		CIM	55+140	55+180	S	40	610 mm Ø RCPC					
54+360	54+400	S	40	610 mm Ø RCPC	54+640		O TO S	6.5	460 mm Ø RCPC	55+180		S		CIM					
54+400		M.O.S		CIM	54+640		S	3	610 mm Ø RCPC	55+180	55+210	S	30	610 mm Ø RCPC					
54+400		M TO S	6.5	460 mm Ø RCPC	54+680		O & S		CIM	55+210		S		CIM					
54+400	54+440	S	40	610 mm Ø RCPC	54+680		O TO S	6.5	460 mm Ø RCPC	55+210	55+240	S	30	610 mm Ø RCPC					
54+440		O & S		CIM	54+680	54+720	S	40	610 mm Ø RCPC	55+240		S		CIM					
54+440		O TO S	6.5	460 mm Ø RCPC	54+720		O & S		CIM	55+240	55+280	S	40	610 mm Ø RCPC					
54+440	54+475	S	35	610 mm Ø RCPC	54+720		O TO S	6.5	460 mm Ø RCPC										
54+475	EXISTING 1-1070mm Ø RCPC x 47.00m				54+720	54+760	S	40	610 mm Ø RCPC										
54+475		O & S		CIM	54+760		O & S		CIM										
54+520		O & S		CIM	54+760		O TO S	6.5	460 mm Ø RCPC										
54+520		O TO S	6.5	460 mm Ø RCPC	54+760	54+795	S	35	610 mm Ø RCPC										
54+520	54+560	S	40	610 mm Ø RCPC	54+795	EXISTING 1-910mm Ø RCPC x 49.00m													
54+560		O & S		CIM	54+795		O & S		CIM										
54+560		O TO S	6.5	460 mm Ø RCPC	54+840		O & S		CIM										
54+560	54+600	S	40	610 mm Ø RCPC	54+840		O TO S	6.5	460 mm Ø RCPC										
54+600		O & S		CIM	54+880	54+880	O & S	40	610 mm CIM Ø RCPC										
54+600		O TO S	6.5	460 mm Ø RCPC	54+880		O TO S	6.5	460 mm Ø RCPC										
54+600	54+640	S	40	610 mm Ø RCPC	54+880	54+920	S	40	610 mm Ø RCPC										
54+640		O & S		CIM	54+920		O & S		CIM										
54+640		O TO S	6.5	460 mm Ø RCPC	54+920		O TO S	6.5	460 mm Ø RCPC										
54+640		S	3	610 mm Ø RCPC	54+920	54+960	S	40	610 mm Ø RCPC										
54+680		O & S		CIM	54+960		S		CIM										
54+680		O TO S	6.5	460 mm Ø RCPC	54+960	54+990	S	30	610 mm Ø RCPC										
54+680	54+720	S	40	610 mm Ø RCPC	54+990		S		CIM										
54+720		O & S		CIM	54+990	55+020	S	30	610 mm Ø RCPC										
54+720		O TO S	6.5	460 mm Ø RCPC	55+020		O & S		CIM										
54+720	54+760	S	40	610 mm Ø RCPC	55+020		O TO S	6.5	460 mm Ø RCPC										
54+760		O & S		CIM	55+060		O & S		CIM										
54+760		O TO S	6.5	460 mm Ø RCPC	55+060		O TO S	6.5	460 mm Ø RCPC										
54+760	54+795	S	35	610 mm Ø RCPC	55+060	55+100	S	40	610 mm Ø RCPC										
54+795	EXISTING 1-910mm Ø RCPC x 49.00m				55+100		O & S		CIM										
54+795		O & S		CIM	55+100		O TO S	6.5	460 mm Ø RCPC										
54+840		O & S		CIM	55+140		S		CIM										

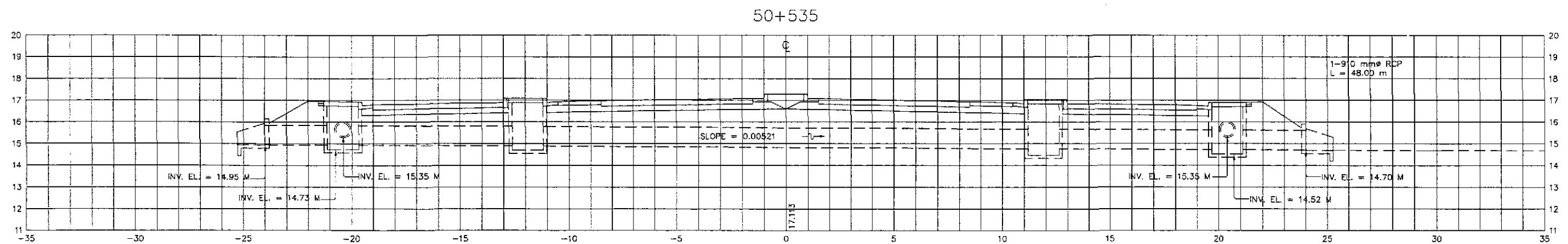
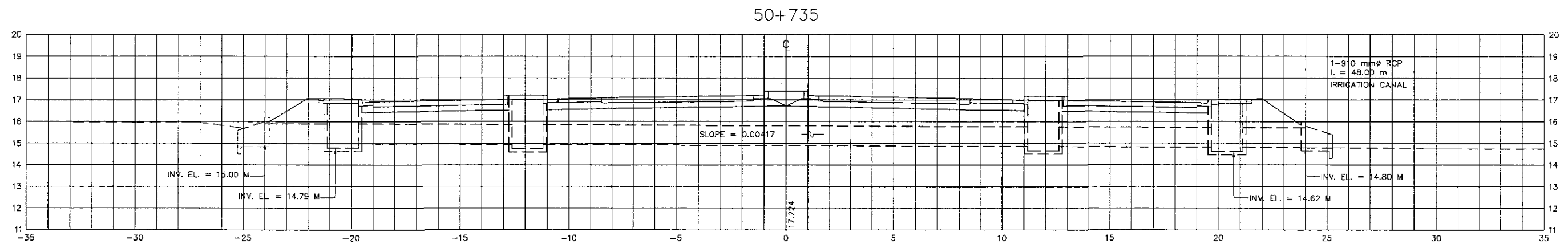
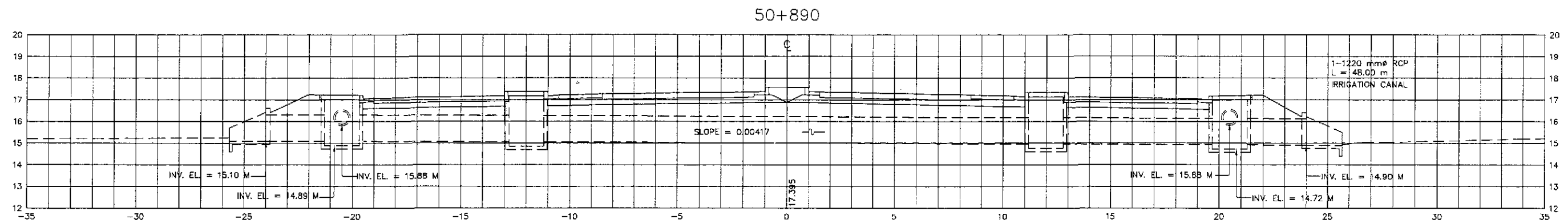
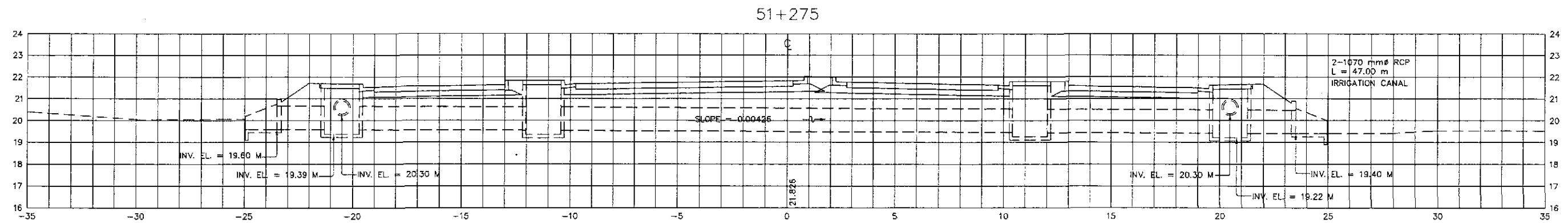
LEGEND:

M - Center Median S - Sidewalk CIM - Catch Inlet Manhole
 O - Outer Separator RCPC - Reinforced Concrete Pipe Culvert MH - Manhole

 JAPAN INTERNATIONAL COOPERATION AGENCY		 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS		PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)		SCALE : FULL SIZE A1		SHEET CONTENTS : SCHEDULE OF SURFACE DRAINAGE (SHEET 4 OF 4)		SHEET NO. : DG-04	
DESIGNED	DATE	SIGNATURE	P.W.H. - P.W.O. Submitted By:		BUREAU OF DESIGN Reviewed By:		OFFICE OF THE SECRETARY Recommended By:		Approved By:		
CHECKED	7/30/02	[Signature]	DANILLO C. TRAJANO Project Director		JOSEFINA M. ALAGAR Chief, Highway Division		GILBERTO S. REYES OIC, Director N		MANUEL M. BONDAN Undersecretary		
SUBMITTED	10/16/01	[Signature]									

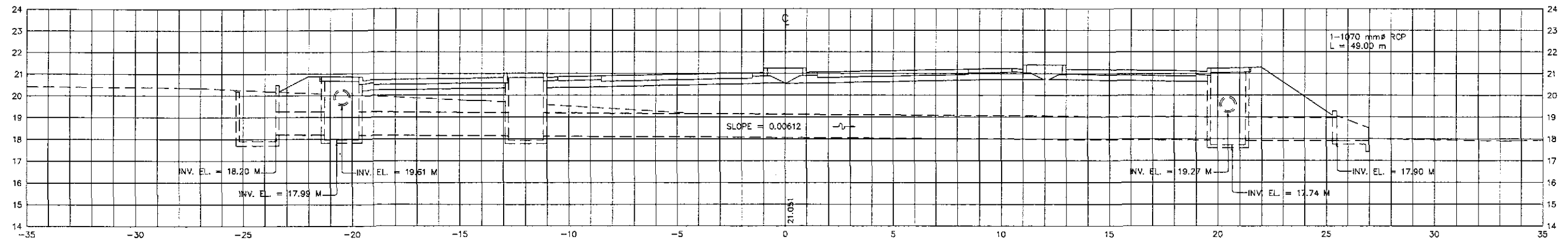


JICA JAPAN INTERNATIONAL COOPERATION AGENCY KAEI KATAHIRA & ENGINEERS INTERNATIONAL YEO YACHIYO ENGINEERING CO., LTD.	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :	
	DESIGNED	9/28/02	[Signature]	BUREAU OF DESIGN				THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE IV	1:100 FULL SIZE A1	DRAINAGE CROSS-SECTIONS ALONG BYPASS (ULTIMATE STAGE) STA. 49+730 - STA. 50+355	DC-01
	CHECKED	9/30/02	[Signature]	Submitted By:	Reviewed By:	Recommended By:	OFFICE OF THE SECRETARY				
	SUBMITTED	10/16/02	[Signature]	DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES DIO, Director IV	MANUEL M. BONOAN Undersecretary				

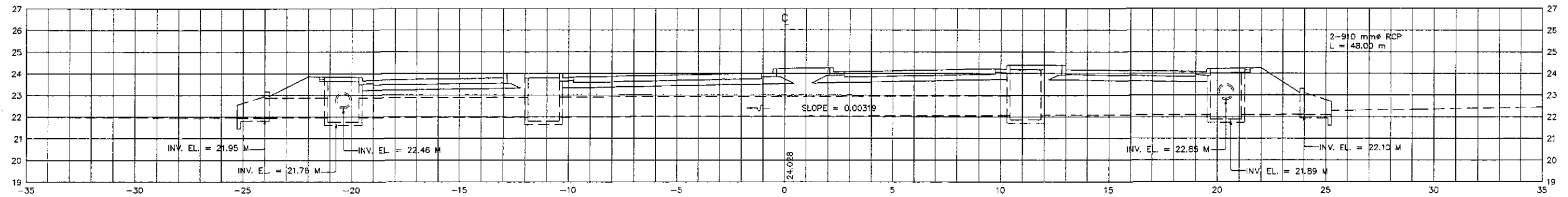


<p>JAPAN INTERNATIONAL COOPERATION AGENCY</p> <p> KATAHIRA & ENGINEERS YACHIYO ENGINEERING CO., LTD.</p>	DATE	SIGNATURE	<p>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</p>	PROJECT AND LOCATION :		SCALE :	SHEET CONTENTS :	SHEET NO. :	
	DESIGNED			<p>BUREAU OF DESIGN</p> <p>Submitted By: </p> <p>Reviewed By: </p> <p>Recommended By: </p> <p>Approved By: </p> <p>Secretary</p>	<p>THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)</p> <p>PLARIDEL BYPASS - CONTRACT PACKAGE IV</p>		1:100 FULL SIZE A1	<p>DRAINAGE CROSS-SECTIONS ALONG BYPASS (ULTIMATE STAGE) STA. 50+535 - STA. 51+275</p>	DC-02
	CHECKED								
	SUBMITTED								
		TEAM LEADER	DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV	MANUEL M. BONUAN Undersecretary			

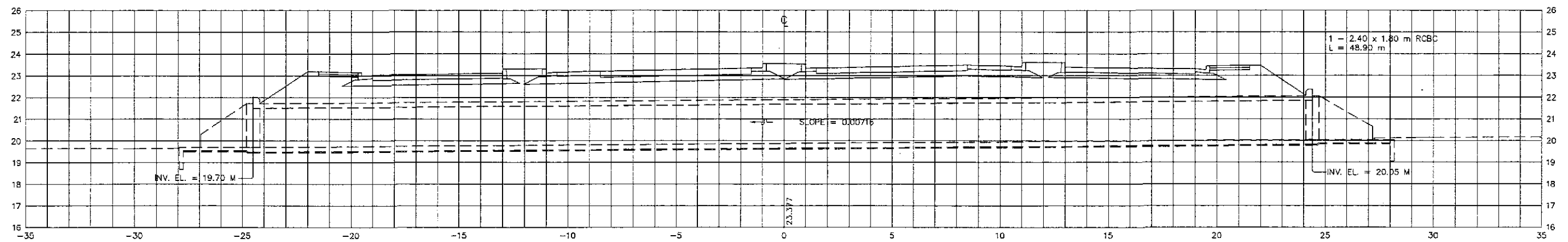
54+295



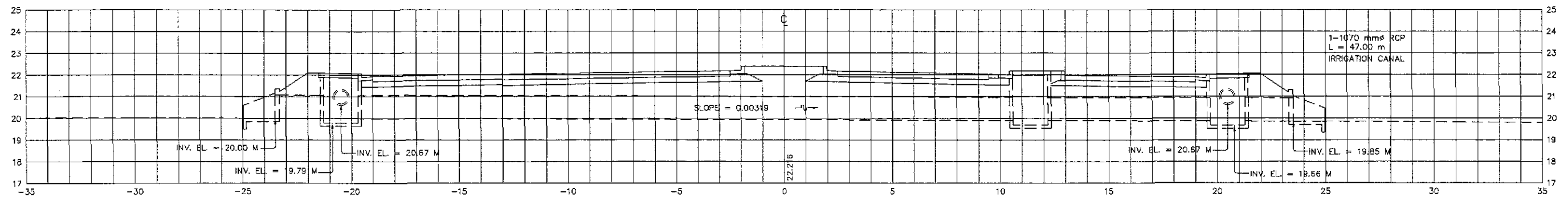
53+775



53+235

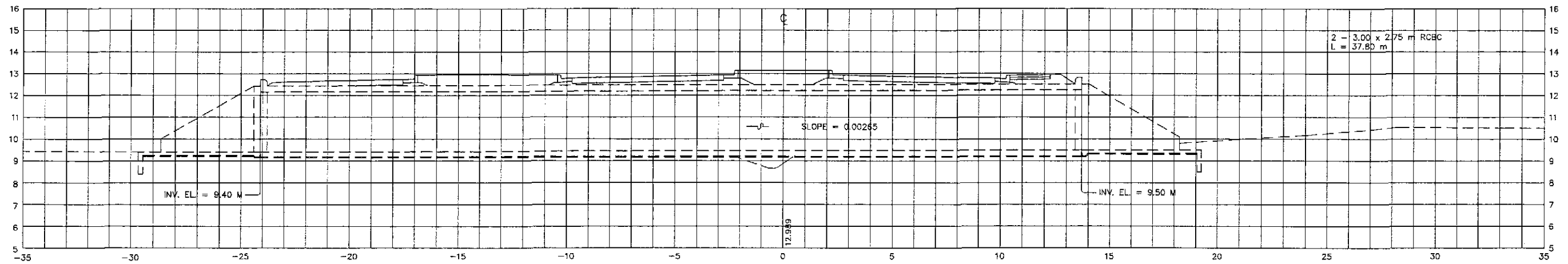


51+353

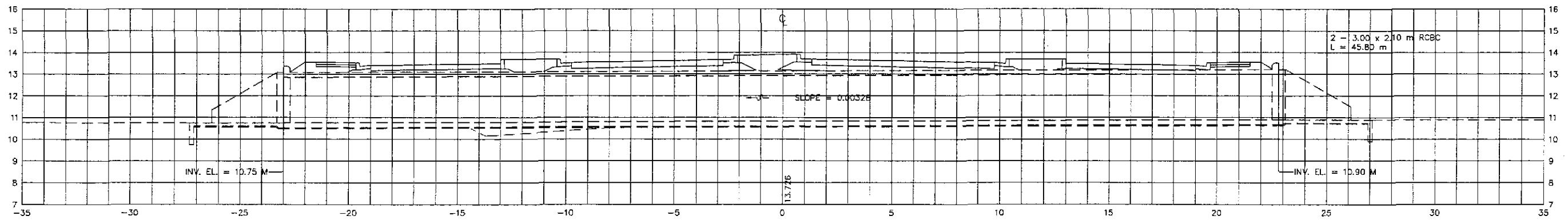


<p>JAPAN INTERNATIONAL COOPERATION AGENCY</p>		<p>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</p>		<p>PROJECT AND LOCATION :</p> <p>THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)</p>		<p>SCALE :</p> <p>1:100</p>	<p>SHEET CONTENTS :</p> <p>DRAINAGE CROSS-SECTIONS ALONG BYPASS (ULTIMATE STAGE) STA. 51+353 - STA. 54+295</p>	<p>SHEET NO. :</p> <p>DC-03</p>	
<p>DESIGNED</p> <p>9/25/12</p> <p>9/25/12</p> <p>9/25/12</p>	<p>SIGNATURE</p> <p>F. S. BARRIA</p> <p>A. HAKIM</p> <p>M. K. K. K.</p>	<p>Submitted By:</p> <p>DANILO C. TRAJANO</p>	<p>Reviewed By:</p> <p>JOSEFINA M. ALAGAR</p>	<p>Recommended By:</p> <p>GILBERTO S. REYES</p>	<p>Approved By:</p> <p>MANUEL M. BONDAN</p>	<p>PLARIDEL BYPASS - CONTRACT PACKAGE IV</p>			
<p>YACHIRO ENGINEERING CO., LTD.</p>		<p>Project Director</p>		<p>Chief, Highways Division</p>		<p>OC, Director IV</p>		<p>Secretary</p>	

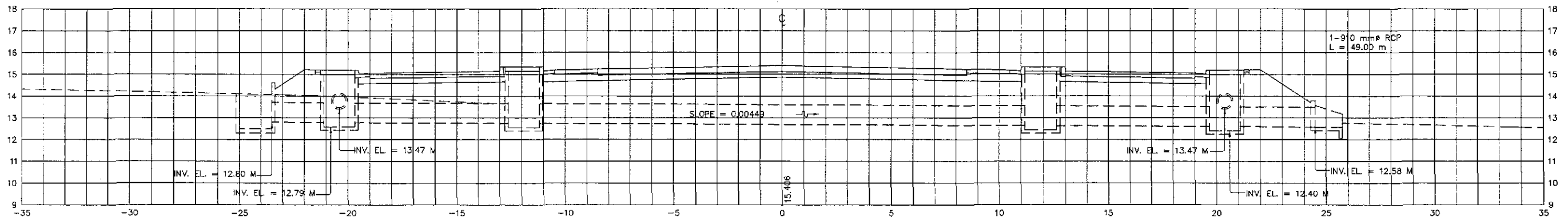
55+318



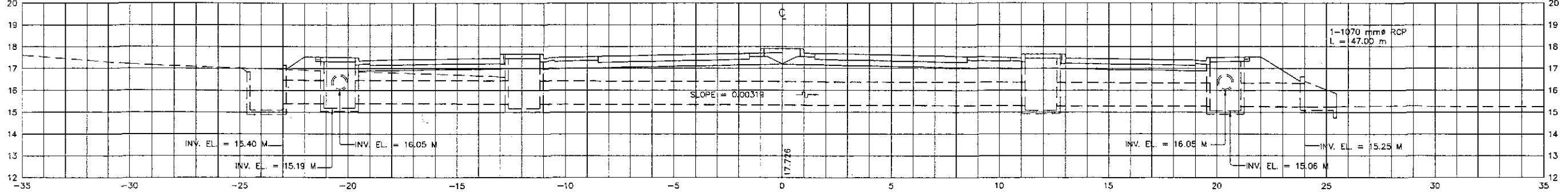
55+035



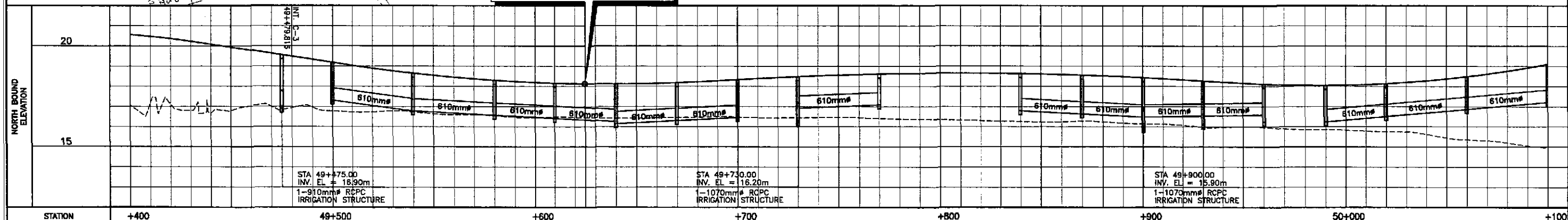
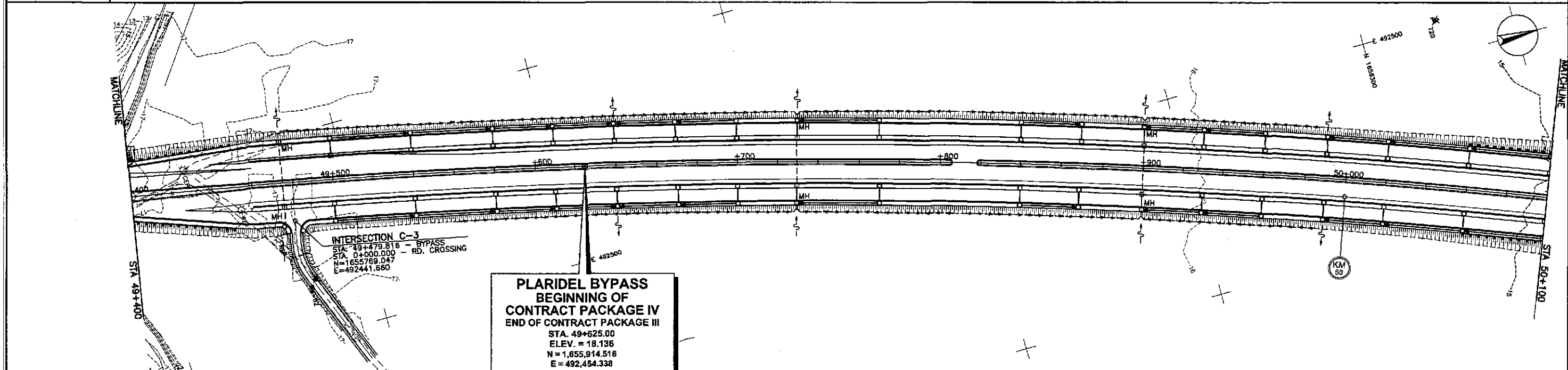
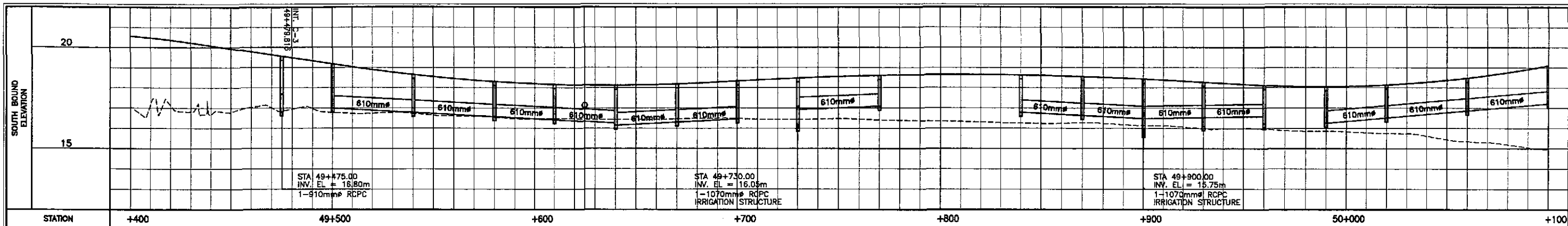
54+795



54+475

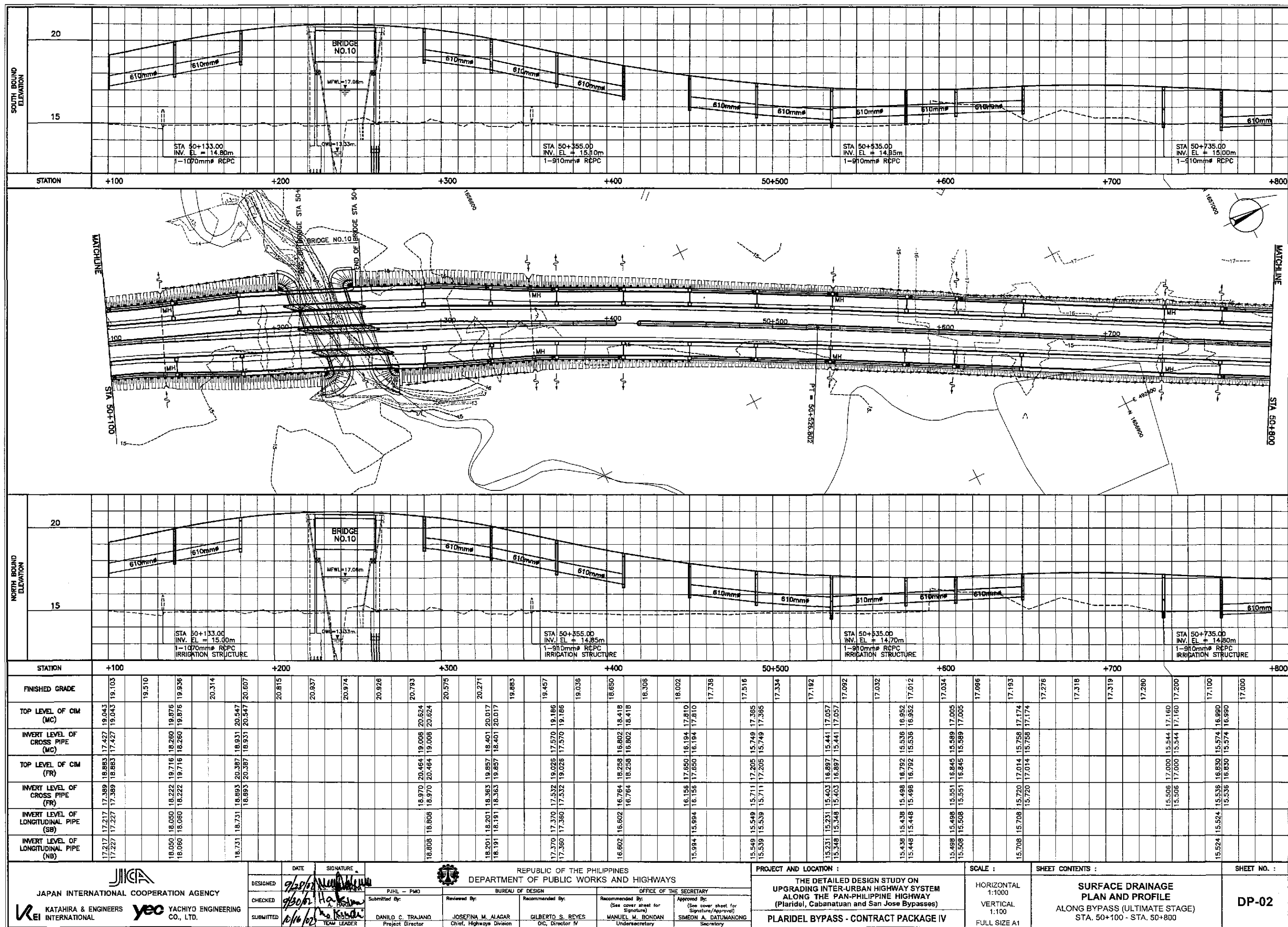


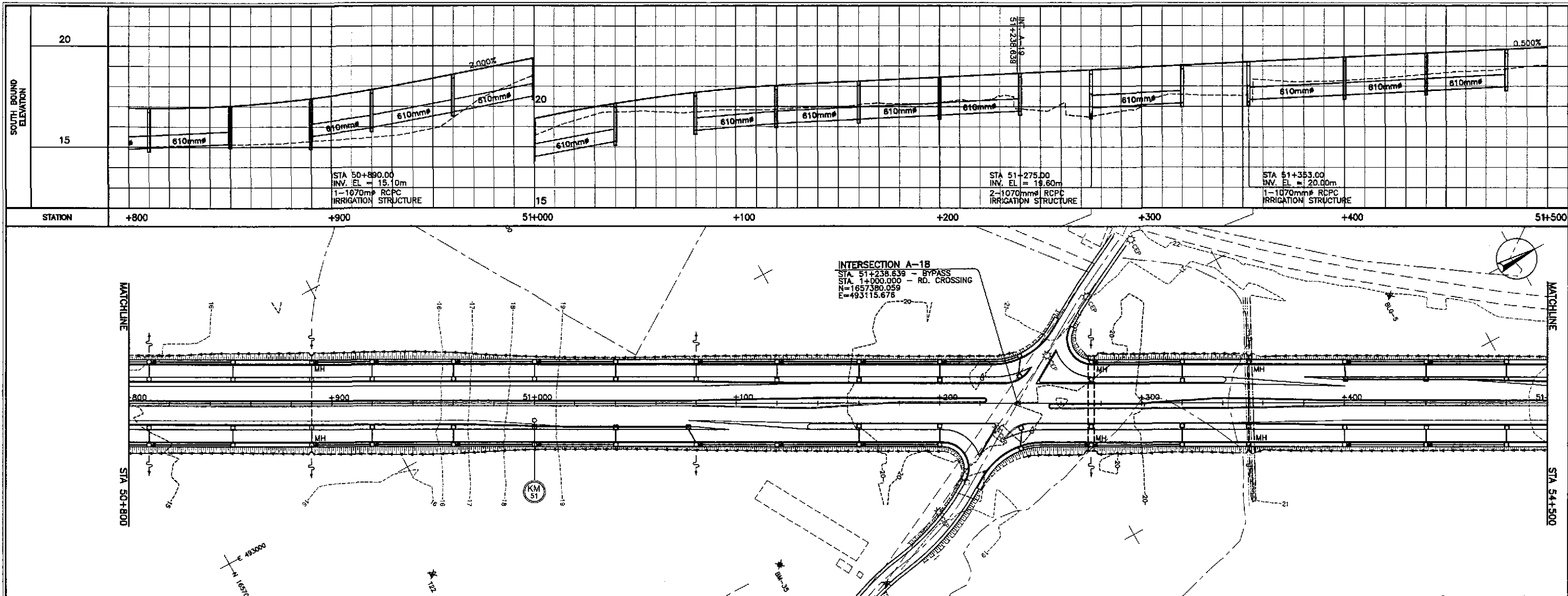
 JAPAN INTERNATIONAL COOPERATION AGENCY	DESIGNED	DATE	SIGNATURE	 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS	PROJECT AND LOCATION :			SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	7/20/02	[Signature]		THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)			1:100	DRAINAGE CROSS-SECTIONS ALONG BYPASS (ULTIMATE STAGE) STA. 54+475 - STA. 55+318	DC-04
	SUBMITTED	10/16/02	[Signature]		PLARIDEL BYPASS - CONTRACT PACKAGE IV			FULL SIZE A1		
	BUREAU OF DESIGN		OFFICE OF THE SECRETARY							
Submitted By: PUHL - PMD		Recommended By: (See cover sheet for Signature/Approval)								
Reviewed By: JOSEFINA M. ALAGAR, Chief, Highways Division		Recommended By: GILBERTO S. REYES, OIC, Director IV								
Project Director: DANILO C. TRAJANO		Undersecretary: MANUEL M. BONDAN								
Team Leader: [Signature]		Secretary: SIMEON A. DATUMANONG								



STATION	+400	49+500	+600	+700	+800	+900	50+000	+100
FINISHED GRADE	20.564	20.369	20.085	19.785	19.485	18.898	18.457	18.304
TOP LEVEL OF CIM (MC)								
INVERT LEVEL OF CROSS PIPE (MC)								
TOP LEVEL OF CIM (FR)								
INVERT LEVEL OF CROSS PIPE (FR)								
INVERT LEVEL OF LONGITUDINAL PIPE (SB)								
INVERT LEVEL OF LONGITUDINAL PIPE (NB)								

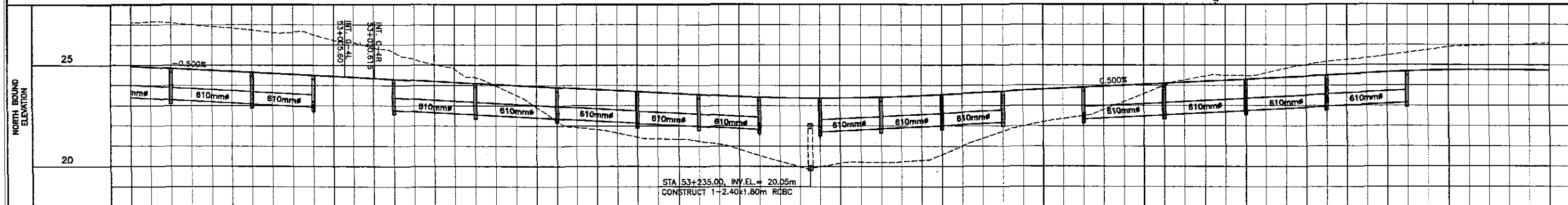
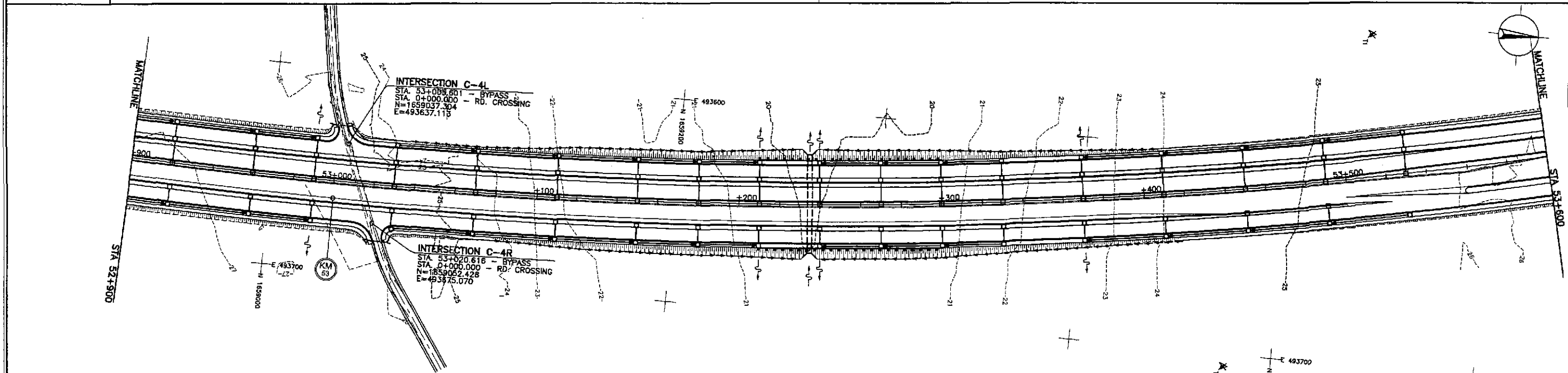
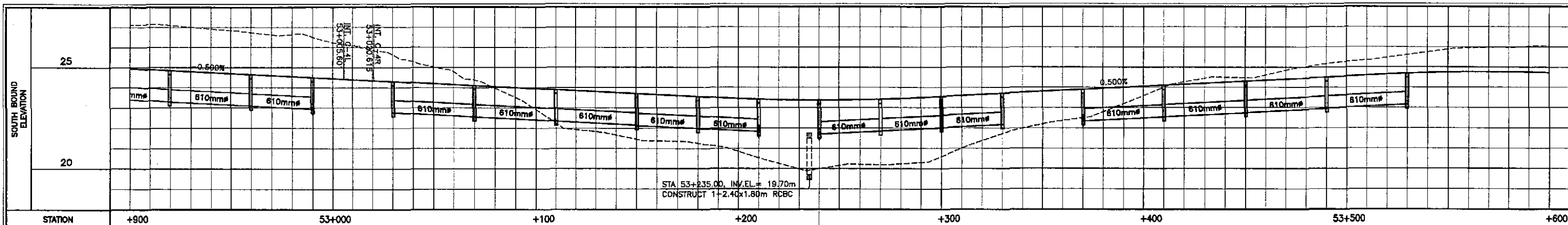
JICA JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL		YEO YACHIYO ENGINEERING CO., LTD.		DATE: 7/23/02 SIGNATURE: [Signature] DESIGNED: [Signature] CHECKED: [Signature] SUBMITTED: [Signature]		PROJECT AND LOCATION: THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE IV		SCALE: HORIZONTAL 1:1000 VERTICAL 1:100 FULL SIZE A1		SHEET CONTENTS: SURFACE DRAINAGE PLAN AND PROFILE ALONG BYPASS (ULTIMATE STAGE) STA. 49+625 - 50+100		SHEET NO.: DP-01			
REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN Submitted By: DANILLO C. TRAJANO, Project Director Reviewed By: JOSEFINA M. ALAGAR, Chief, Highways Division Recommended By: GILBERTO S. REYES, OIC, Director IV Recommended By: MANUEL M. BONGAN, Undersecretary Approved By: SIMEDON A. DATUMANONG, Secretary				PROJECT AND LOCATION: THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE IV				SCALE: HORIZONTAL 1:1000 VERTICAL 1:100 FULL SIZE A1				SHEET CONTENTS: SURFACE DRAINAGE PLAN AND PROFILE ALONG BYPASS (ULTIMATE STAGE) STA. 49+625 - 50+100		SHEET NO.: DP-01	





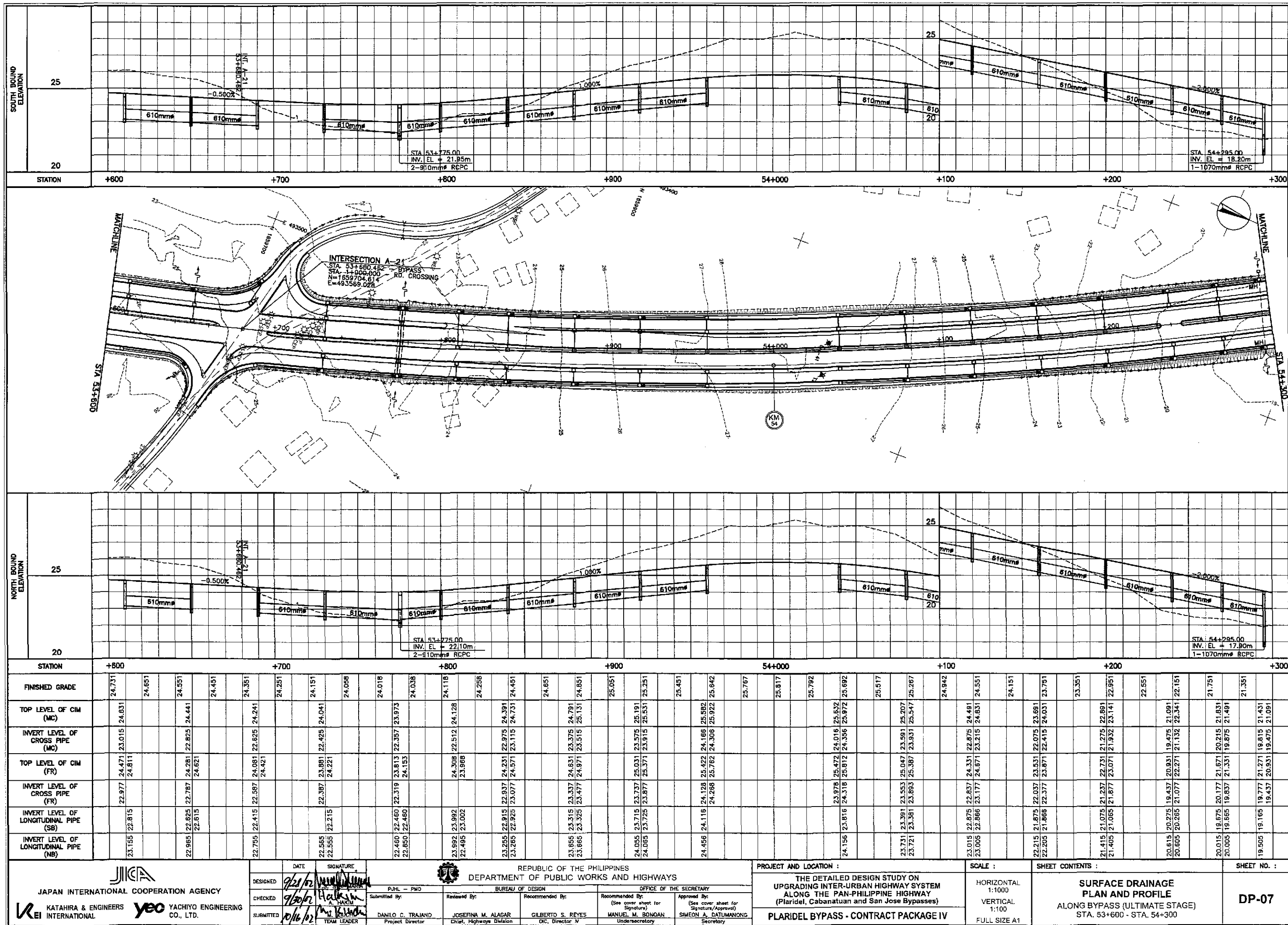
NORTH BOUND ELEVATION		STATION	+800	+900	51+000	+100	+200	+300	+400	51+500
20	15	FINISHED GRADE	16.931	16.925	16.981	17.100	17.281	17.525	17.832	18.200
		TOP LEVEL OF CIM (MC)	16.868	16.868	16.980	17.124	17.343	17.525	17.832	18.200
		INVERT LEVEL OF CROSS PIPE (MC)	15.252	15.252	15.364	15.364	15.364	15.364	15.364	15.364
		TOP LEVEL OF CIM (FR)	16.708	16.708	16.820	16.820	16.820	16.820	16.820	16.820
		INVERT LEVEL OF CROSS PIPE (FR)	15.214	15.214	15.326	15.326	15.326	15.326	15.326	15.326
		INVERT LEVEL OF LONGITUDINAL PIPE (SB)	14.945	14.945	15.164	15.164	15.164	15.164	15.164	15.164
		INVERT LEVEL OF LONGITUDINAL PIPE (NB)	14.945	14.945	15.164	15.164	15.164	15.164	15.164	15.164

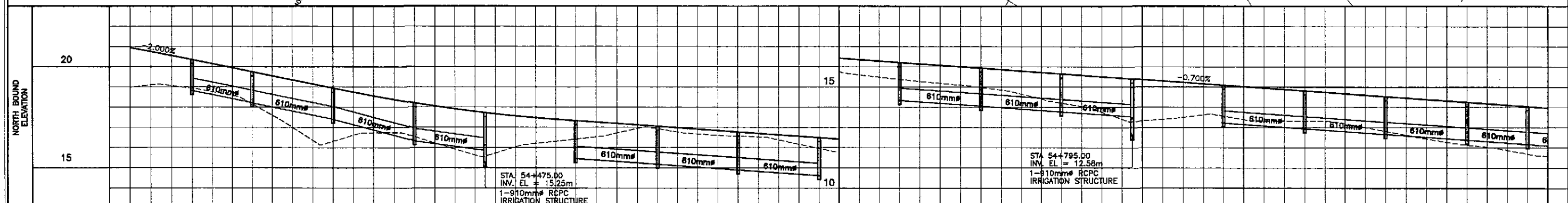
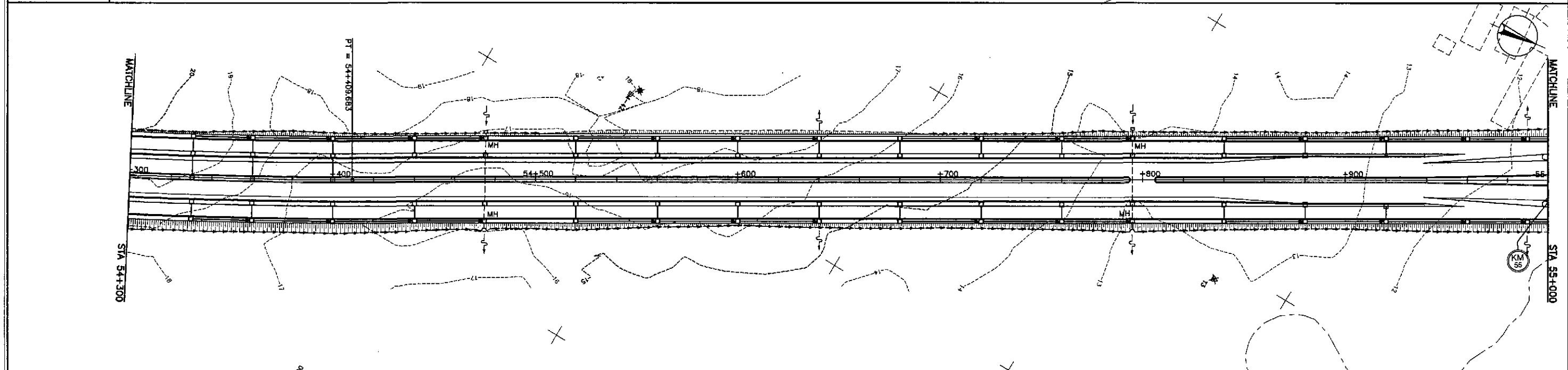
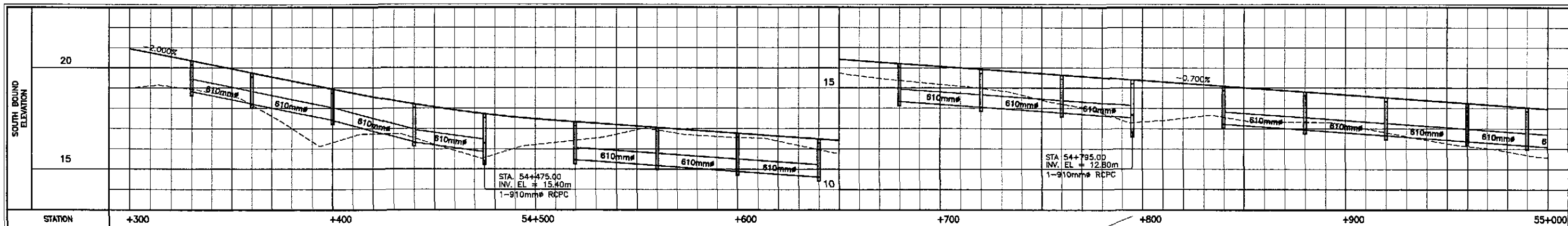
JICA JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL YEO YACHIYO ENGINEERING CO., LTD.		DATE: 7/25/2011 DESIGNED: [Signature] CHECKED: 7/30/11 [Signature] SUBMITTED: 10/16/11 [Signature]	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN OFFICE OF THE SECRETARY Submitted By: DANLO C. TRAJANO Reviewed By: JOSEFINA M. ALAGAR Recommended By: GILBERTO S. REYES Approved By: MANUEL M. BONOAN SIMEON A. DATUMANONG	PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE IV	SCALE : HORIZONTAL 1:1000 VERTICAL 1:100 FULL SIZE A1	SHEET CONTENTS : SURFACE DRAINAGE PLAN AND PROFILE ALONG BYPASS (ULTIMATE STAGE) STA. 50+800 - STA. 51+500	SHEET NO. : DP-03
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STATION	+900	53+000	+100	+200	+300	+400	53+500	+600
FINISHED GRADE	24.951	24.951	24.951	24.951	24.951	24.951	24.951	24.951
TOP LEVEL OF CIM (MC)								
INVERT LEVEL OF CROSS PIPE (MC)								
TOP LEVEL OF CIM (FR)								
INVERT LEVEL OF CROSS PIPE (FR)								
INVERT LEVEL OF LONGITUDINAL PIPE (SB)								
INVERT LEVEL OF LONGITUDINAL PIPE (NB)								

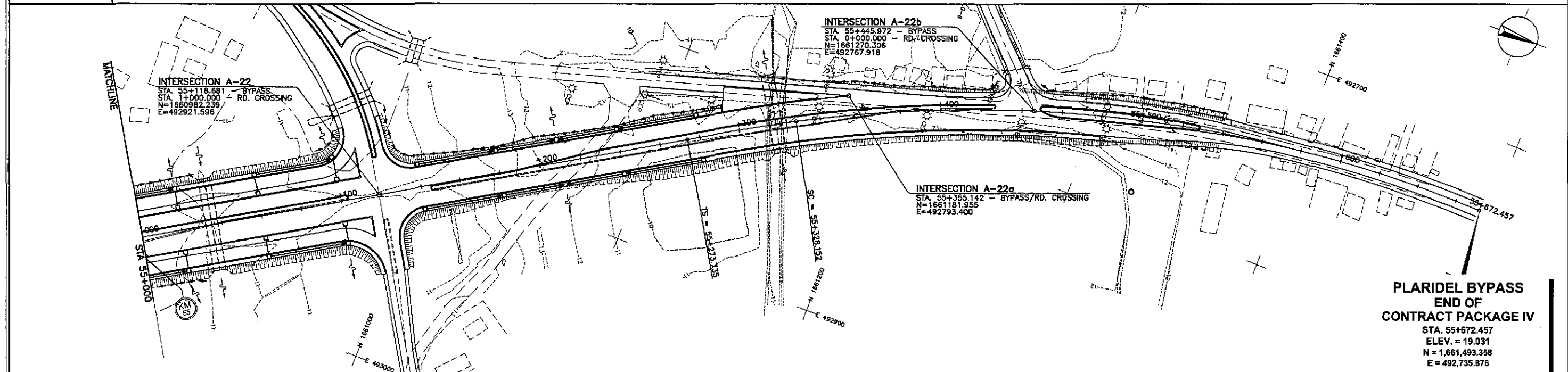
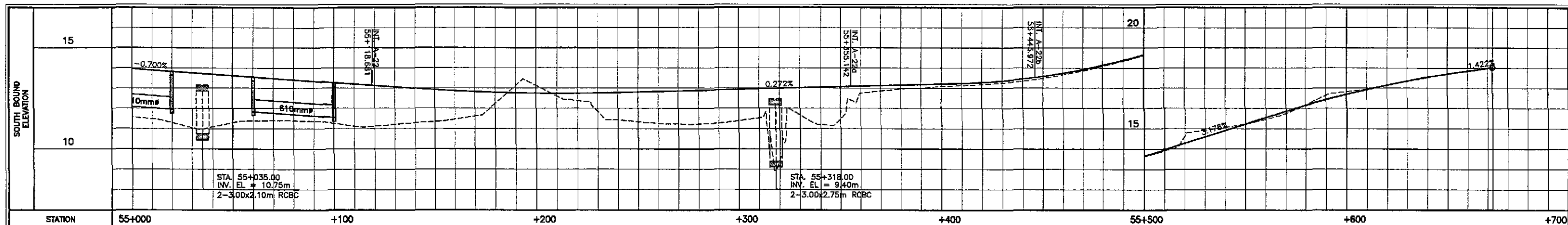
JICA JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS YEO YACHIYO ENGINEERING CO., LTD.		DATE: 9/28/11 DESIGNED: [Signature] CHECKED: [Signature] SUBMITTED: [Signature]		PUHL - PMO Submitted By: [Signature] DANILLO C. TRAJANO Project Director		BUREAU OF DESIGN Reviewed By: [Signature] JOSEFINA M. ALAGAR Chief, Highway Division		OFFICE OF THE SECRETARY Recommended By: [Signature] GILBERTO S. REYES D.C. Director IV		OFFICE OF THE SECRETARY Recommended By: [Signature] MANUEL M. BONGAN Undersecretary		OFFICE OF THE SECRETARY Approved By: [Signature] SIMEON A. DATUMANONG Secretary		PROJECT AND LOCATION: THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE IV		SCALE: HORIZONTAL 1:1000 VERTICAL 1:100 FULL SIZE A1		SHEET CONTENTS: SURFACE DRAINAGE PLAN AND PROFILE ALONG BYPASS (ULTIMATE STAGE) STA. 52+900 - STA. 53+600		SHEET NO.: DP-06	
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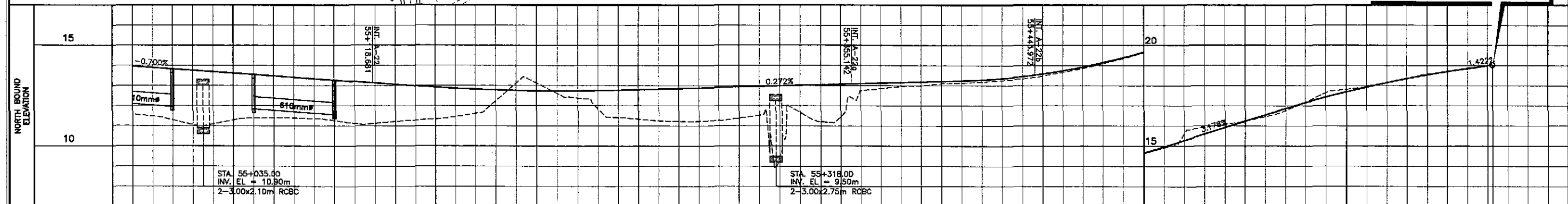


STATION	+300	+400	54+500	+600	+700	+800	+900	55+000
FINISHED GRADE	20.951	20.551	20.151	19.751	19.351	18.951	18.551	18.151
TOP LEVEL OF CIM (MC)	21.091	20.691	20.291	19.891	19.491	19.091	18.691	18.291
INVERT LEVEL OF CROSS PIPE (MC)	19.475	19.075	18.675	18.275	17.875	17.475	17.075	16.675
TOP LEVEL OF CIM (FR)	20.931	20.531	20.131	19.731	19.331	18.931	18.531	18.131
INVERT LEVEL OF CROSS PIPE (FR)	19.437	19.037	18.637	18.237	17.837	17.437	17.037	16.637
INVERT LEVEL OF LONGITUDINAL PIPE (SB)	18.815	18.415	18.015	17.615	17.215	16.815	16.415	16.015
INVERT LEVEL OF LONGITUDINAL PIPE (NB)	17.875	17.475	17.075	16.675	16.275	15.875	15.475	15.075

JICA JAPAN INTERNATIONAL COOPERATION AGENCY KAI KATAHIRA & ENGINEERS INTERNATIONAL YEC YACHIYO ENGINEERING CO., LTD.		DATE: 9/28/02 DESIGNED: [Signature] CHECKED: [Signature] SUBMITTED: 10/16/02				DATE: 9/28/02 SIGNATURE: [Signature] SUBMITTED: 10/16/02				REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN OFFICE OF THE SECRETARY Recommended By: [Signature] Approved By: [Signature]				PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE IV		SCALE : HORIZONTAL 1:1000 VERTICAL 1:100 FULL SIZE A1		SHEET CONTENTS : SURFACE DRAINAGE PLAN AND PROFILE ALONG BYPASS (ULTIMATE STAGE) STA. 54+300 - STA. 55+000		SHEET NO. : DP-08	
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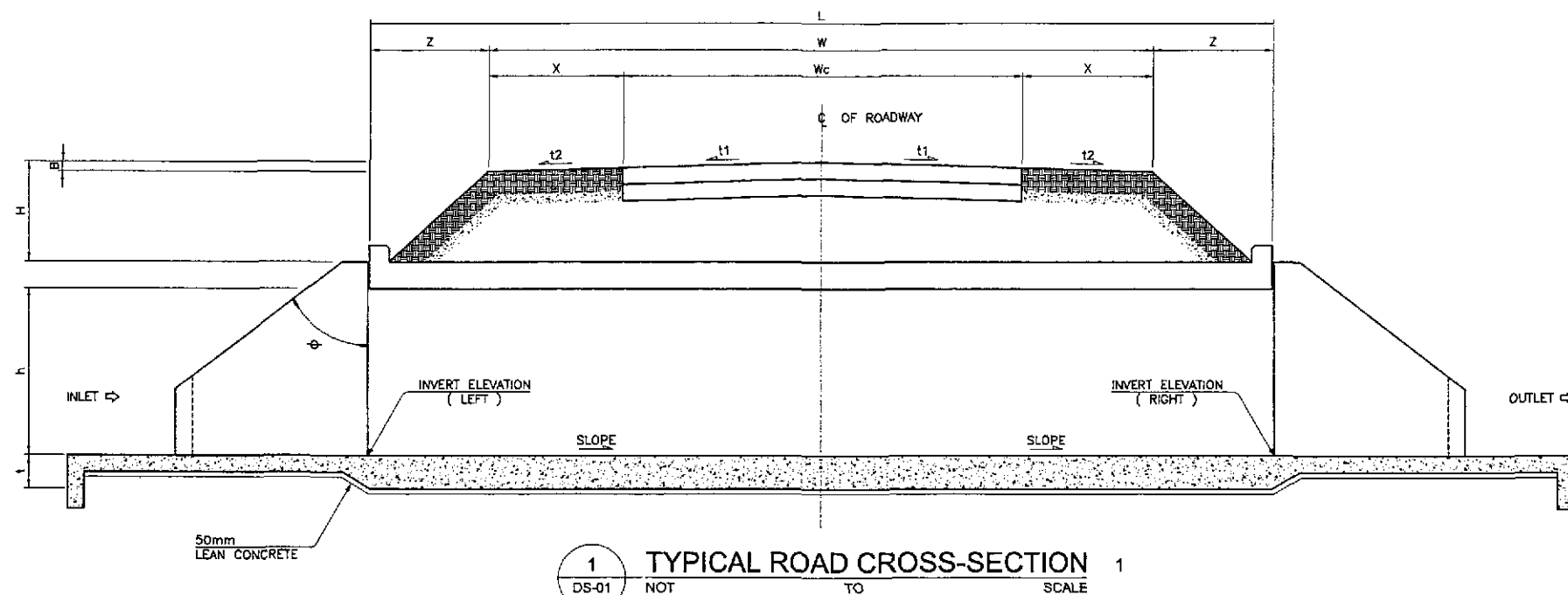


**PLARIDEL BYPASS
END OF
CONTRACT PACKAGE IV**
STA. 55+672.457
ELEV. = 19.031
N = 1,661,493.358
E = 492,735.876



STATION	55+000	+100	+200	+300	+400	55+500	+600	+700
FINISHED GRADE	13.971	13.831	13.691	13.551	13.411	13.271	13.131	12.991
TOP LEVEL OF CIM (MC)		13.771	13.631	13.491	13.351	13.211	13.071	12.931
INVERT LEVEL OF CROSS PIPE (MC)		12.155	12.155	12.155	12.155	12.155	12.155	12.155
TOP LEVEL OF CIM (FR)		13.611	13.471	13.331	13.191	13.051	12.911	12.771
INVERT LEVEL OF CROSS PIPE (FR)		12.117	12.117	12.117	12.117	12.117	12.117	12.117
INVERT LEVEL OF LONGITUDINAL PIPE (SB)	11.955	11.875	11.795	11.715	11.635	11.555	11.475	11.395
INVERT LEVEL OF LONGITUDINAL PIPE (NB)	11.955	11.875	11.795	11.715	11.635	11.555	11.475	11.395

JICA JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS YEC YACHIYO ENGINEERING CO., LTD.		DATE: 9/29/02 DESIGNED: [Signature] CHECKED: [Signature] SUBMITTED: [Signature]		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS PUHL - PMO Submitted By: [Signature] Project Director: DANILLO C. TRAJANO		BUREAU OF DESIGN Reviewed By: [Signature] Chief, Highway Division: JOSEFINA M. ALAGAR		OFFICE OF THE SECRETARY Recommended By: [Signature] Undersecretary: MANUEL M. BONDAN		PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE IV		SCALE : HORIZONTAL 1:1000 VERTICAL 1:100 FULL SIZE A1		SHEET CONTENTS : SURFACE DRAINAGE PLAN AND PROFILE ALONG BYPASS (ULTIMATE STAGE) STA. 55+000 - STA. 55+672.487		SHEET NO. : DP-09	
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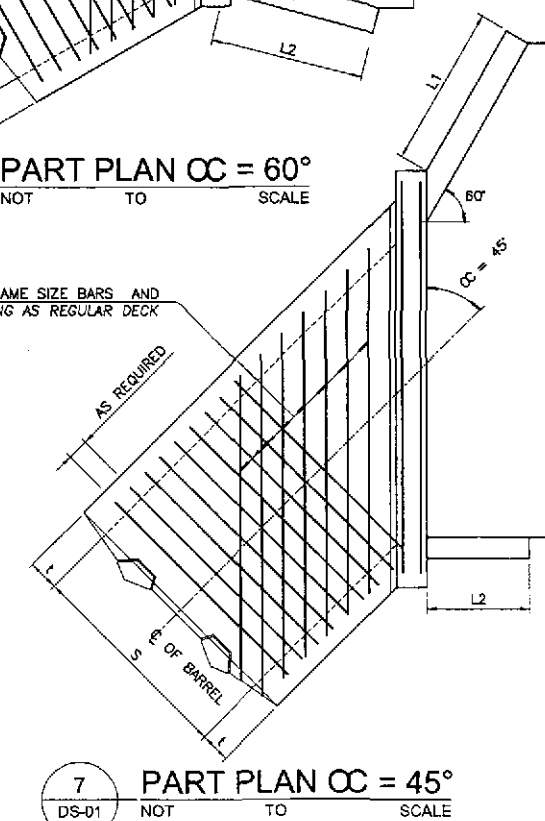
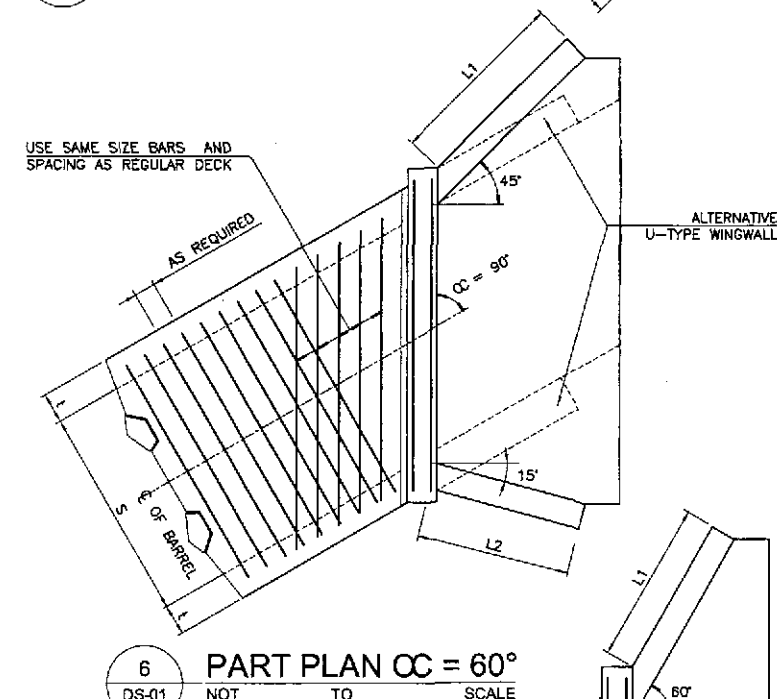
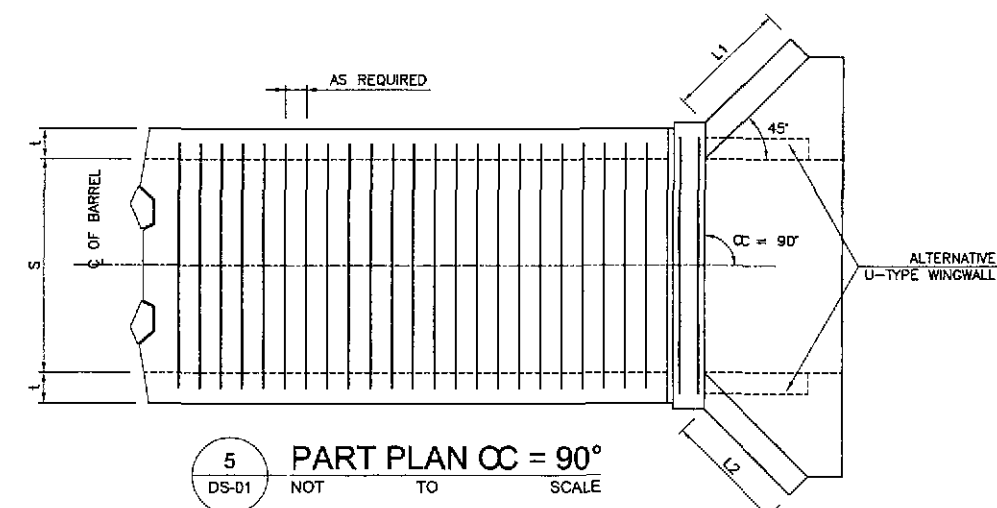
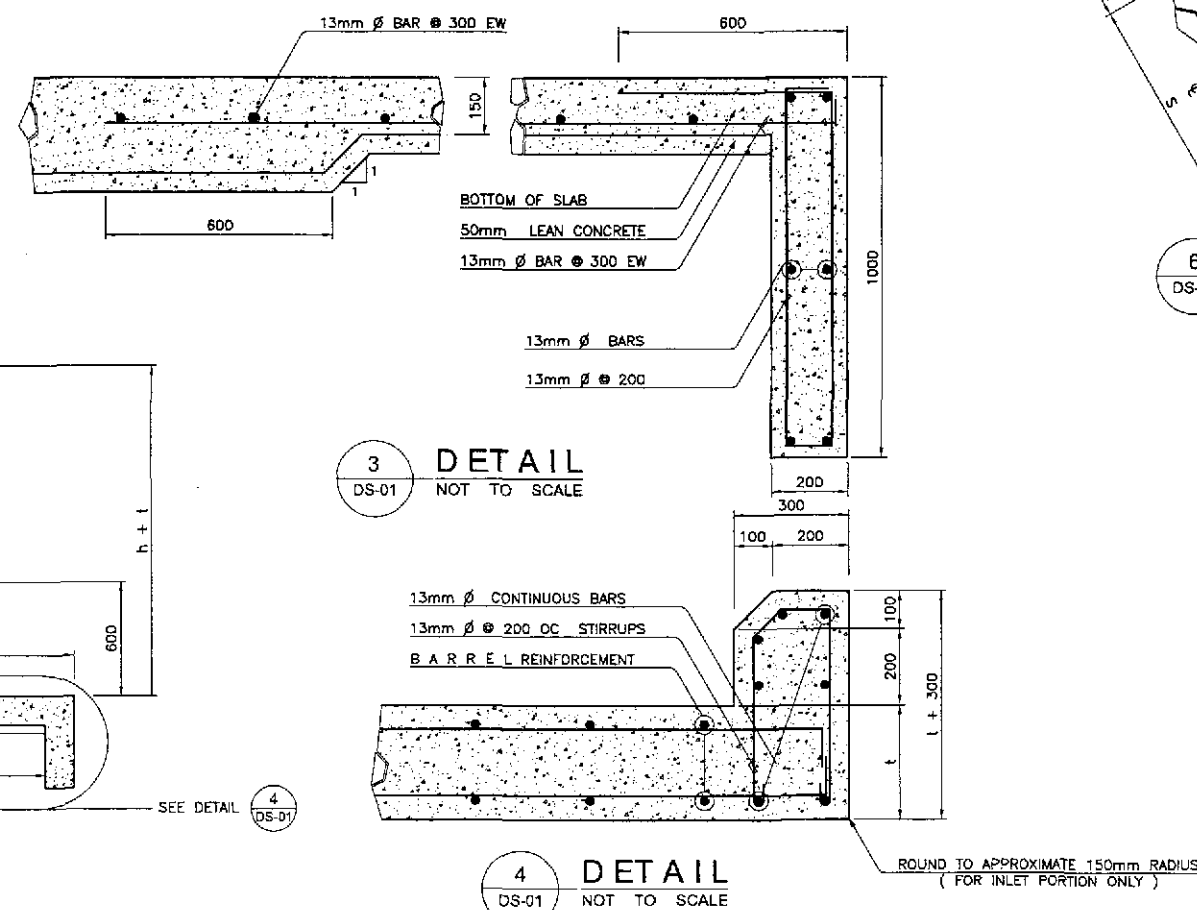
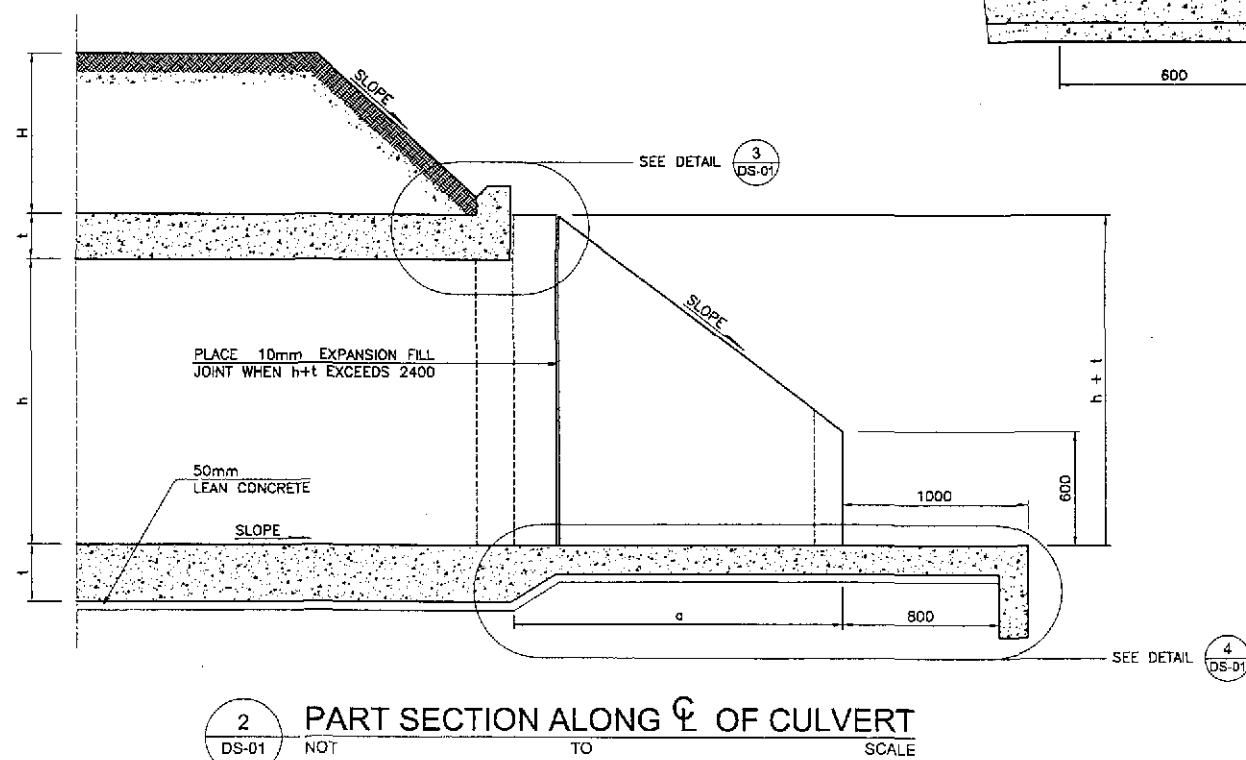
LEGEND :

W	—	WIDTH OF ROADWAY FORMATION
X	—	WIDTH OF SHOULDER
Wc	—	WIDTH OF CARRIAGEWAY
H	—	COVER ABOVE THE CULVERT
L	—	TOTAL LENGTH OF BARREL
t1	—	SLOPE OF CARRIAGEWAY
t2	—	SLOPE OF SHOULDER
Z	—	$\{(H+t) - (B+2D)\} \tan \phi$
B	—	$x_{t2} + 0.5t_2 W_c$
h	—	HEIGHT OF CULVERT OPENING
t	—	THICKNESS OF CULVERT WALL OR SLAB
ϕ	—	SLOPE OF EMBANKMENT
Θ	—	ANGLE OF SKFW

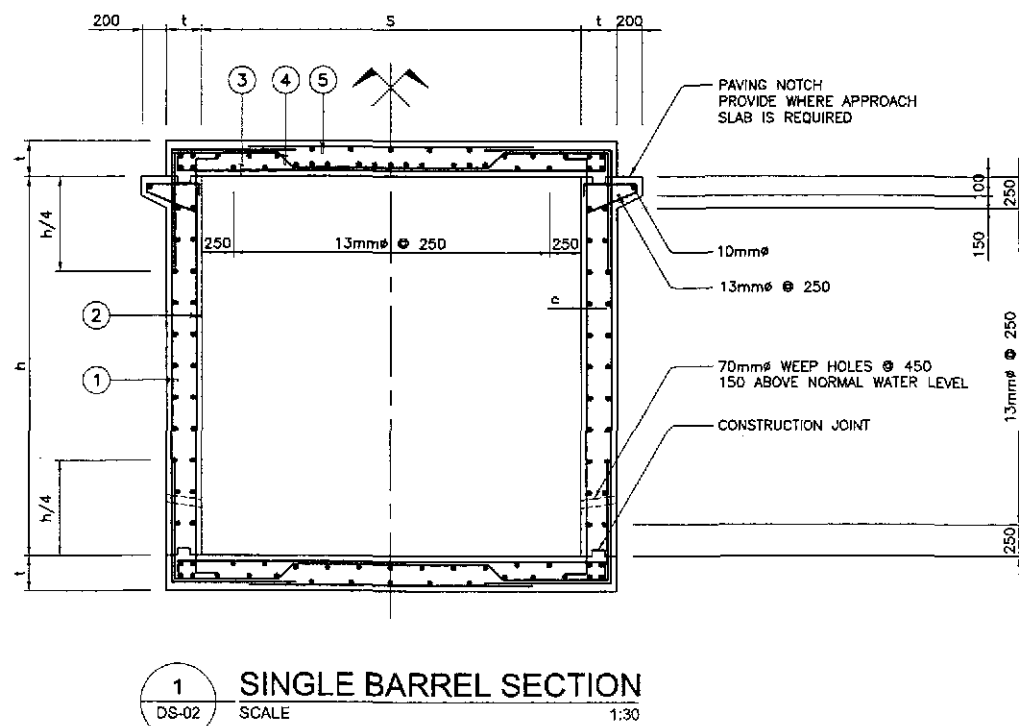
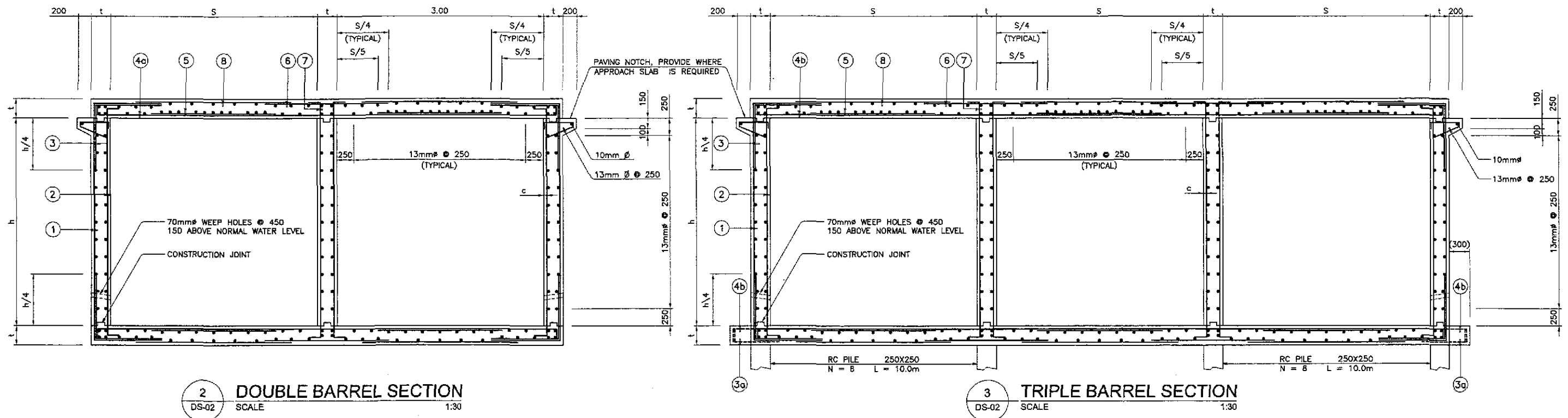
HORIZONTAL SKEW ANGLE α	L (mm)
90°	$W+2\alpha \div \{ (H+\alpha) - (B+200) \}$
60°	$1.1547 \{ W+2\alpha \div \{ (H+\alpha) - (B+200) \} \}$
45°	$1.4142 \{ W+2\alpha \div \{ (H+\alpha) - (B+200) \} \}$

NOTES:

3. MINIMUM CONCRETE COVER SHALL BE 40 CLEAR. WHEN HEIGHT OF FILL $H=0$ INCREASE COVER BY 30.



STANDARD DETAILS OF REINFORCED CONCRETE BOX CULVERT (RCBC)

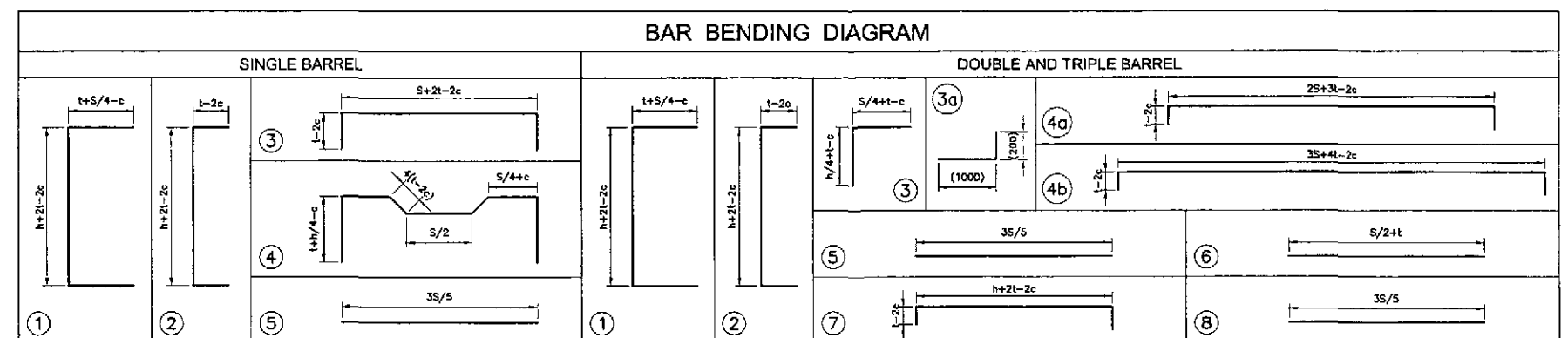


NOTE:

FOR WALL THICKNESS LESS THAN 240, STAGGER HORIZONTAL REINFORCEMENT AS SHOWN.

LEGEND:

c = CONCRETE CLEAR COVER (50mm)
o = ADDITIONAL REBARS IF FILL IS LESS THAN 600mm



CLEAR		SINGLE BARREL BOX CULVERT										DOUBLE AND TRIPLE BARREL BOX CULVERT																	
SPAN S	HEIGHT h	t	BAR 1		BAR 2		BAR 3		BAR 4		BAR 5		t	BAR 1		BAR 2		BAR 3		BAR 4		BAR 5		BAR 6		BAR 7		BAR 8	
			Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING		Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING
1250	1000	180	13	300	13	300	13	300	13	300	13	300	180	13	300	13	300	13	300	13	300	13	300	20	200	13	300	13	300
	1250	180	13	300	13	300	13	300	13	300	13	300	180	13	300	16	300	13	300	13	300	13	300	20	200	13	300	13	300
	1500	180	13	300	13	280	13	300	13	300	13	300	180	13	300	16	280	13	300	13	300	13	300	20	200	13	300	13	300
	1800	180	13	300	13	260	13	300	13	300	13	300	180	13	300	16	260	13	300	13	300	13	300	20	200	13	300	13	300
1500	1000	180	16	240	16	300	16	240	16	240	13	300	200	16	300	16	300	16	300	16	300	16	300	20	200	13	300	13	280
	1250	180	16	240	16	300	16	240	16	240	13	300	200	16	300	16	300	16	300	16	300	16	300	20	200	13	300	13	280
	1500	180	16	240	16	280	16	240	16	240	13	300	200	16	300	16	280	16	300	16	300	16	300	20	200	13	300	13	280
	1800	180	16	240	16	280	16	240	16	240	13	300	200	16	300	16	260	16	300	16	300	16	300	20	200	13	300	13	280
1800	1250	200	16	260	16	300	16	260	16	260	13	280	250	16	300	16	300	16	300	16	300	16	300	20	190	13	300	13	220
	1500	200	16	260	16	300	16	260	16	260	13	280	250	16	300	16	280	16	300	16	300	16	300	20	190	13	300	13	220
	1800	200	16	260	16	280	16	260	16	260	13	280	250	16	300	16	280	16	300	16	300	16	300	20	190	13	300	13	220
	2100	200	16	260	16	260	16	260	16	260	13	280	250	16	300	16	260	16	300	16	300	16	300	20	190	13	300	13	220
2400	1800	220	16	220	16	280	16	220	16	220	13	240	300	16	300	16	280	16	300	16	300	16	300	20	120	13	300	13	200
	2100	220	16	220	16	260	16	220	16	220	13	240	300	16	300	16	280	16	300	16	300	16	300	20	120	13	300	13	200
	2400	220	16	220	16	200	16	220	16	220	13	240	300	16	300	16	280	16	300	16	300	16	300	20	120	13	300	13	200
	2750	220	16	200	16	180	16	200	16	200	13	240	300	16	300	16	280	16	300	16	300	16	300	20	120	13	300	13	200
3000	2100	280	16	260	16	260	16	260	16	260	13	200	300	20	300	16	280	20	300	20	300	20	300	25	170	13	300	13	200
	2400	280	16	260	16	260	16	260	16	260	13	200	300	20	300	16	280	20	300	20	300	20	300	25	170	13	300	13	200
	2750	280	16	200	16	240	16	220	16	200	13	200	300	20	300	16	200	20	300	20	300	20	300	25	170	16	300	13	200
	3000	280	16	200	16	220	16	200	16	200	13	200	300	20	300	16	200	20	300	20	300	20	300	25	170	16	300	13	200

STANDARD DETAILS OF REINFORCED CONCRETE BOX CULVERT (RCBC) BARRELS

JICA JAPAN INTERNATIONAL COOPERATION AGENCY				PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)		SCALE : 1:30	SHEET CONTENTS : STANDARD DETAILS OF RCBC BARRELS	SHEET NO. : DS-02
DESIGNED : 9/25/02 K. KAKIM	CHECKED : 9/30/02 M. K. K.	SUBMITTED : 10/16/02 M. K. K.	DATE : 9/25/02 SIGNATURE : M. K. K.	PUBL. - PMO Submitted By:	Reviewed By:	Recommended By:	Approved By:	PLARIDEL BYPASS - CONTRACT PACKAGE IV
KATAHIRA & ENGINEERS Yachiyo Engineering Co., Ltd.		DANILLO C. TRAJANO Project Director		JOSEFINA M. ALAGAR Chief, Highways Division		GILBERTO S. REYES OIC, Director IV		MANUEL M. BONDAN Undersecretary

QUANTITIES FOR STANDARD BOX CULVERTS							
CLEAR		QUANTITY PER METER OF BARREL					
SPAN S	HEIGHT h	SINGLE		DOUBLE		TRIPLE	
		CONCRETE (m ³)	REINFORCEMENT (kg)	CONCRETE (m ³)	REINFORCEMENT (kg)	CONCRETE (m ³)	REINFORCEMENT (kg)
1250	1000	0.94	113.32	1.63	209.22	2.33	296.18
	1250	1.03	121.63	1.77	216.22	2.51	312.39
	1500	1.12	130.98	1.90	232.07	2.69	330.39
	1800	1.23	141.71	2.07	249.50	2.91	352.09
1500	1000	1.03	165.90	2.04	253.90	2.92	354.80
	1250	1.12	177.10	2.19	256.00	3.12	370.20
	1500	1.21	189.60	2.34	279.60	3.32	387.10
	1800	1.32	202.50	2.52	296.20	3.56	407.10
1800	1250	1.38	189.20	3.11	312.30	4.45	437.00
	1500	1.48	199.90	3.30	326.10	4.70	454.00
	1800	1.60	214.80	3.53	342.80	5.00	475.20
	2100	1.72	239.60	3.75	357.50	5.30	494.40
2400	1800	2.04	272.70	5.04	431.80	7.20	619.10
	2100	2.17	288.50	5.31	447.30	7.58	637.10
	2400	2.31	314.10	5.58	481.80	7.92	656.40
	2750	2.46	356.70	5.90	478.60	8.34	677.70
3000	2100	3.17	308.70	6.03	635.70	8.64	899.70
	2400	3.34	321.30	6.30	652.00	9.00	919.60
	2750	3.53	374.40	6.62	705.60	9.42	895.00
	3000	3.67	413.50	6.84	721.60	9.72	1015.40

QUANTITIES FOR STANDARD WINGWALLS								
m (meter)	h+t (meter)	L (meter)	QUANTITY PER WINGWALL AND APRON SLAB					
			SINGLE		DOUBLE		TRIPLE	
			CONCRETE (m ³)	REINFORCEMENT (kg)	CONCRETE (m ³)	REINFORCEMENT (kg)	CONCRETE (m ³)	REINFORCEMENT (kg)
1.37	1.18	1.23	2.41	150	2.94	180	3.48	220
1.75	1.43	1.76	3.48	220	4.08	265	4.72	300
2.12	1.68	2.29	4.66	300	5.36	350	6.06	395
2.57	1.98	2.93	6.22	405	7.01	450	7.80	500
1.37	1.18	1.23	2.50	140	3.26	180	3.88	220
1.75	1.43	1.76	3.69	210	4.42	250	5.16	290
2.12	1.68	2.29	4.78	270	5.73	320	6.56	360
2.57	1.98	2.93	6.35	350	7.42	410	8.37	460
1.78	1.45	1.80	3.81	210	4.98	280	5.90	330
2.15	1.70	2.33	5.03	280	6.33	350	7.36	400
2.60	2.00	2.97	6.48	360	8.09	450	9.26	510
3.05	2.30	3.61	8.37	460	10.00	550	11.31	620
2.63	2.02	3.01	7.08	390	9.14	500	10.71	590
3.08	2.32	3.65	9.28	510	11.61	640	13.37	740
3.53	2.62	4.28	11.42	630	13.98	770	15.92	880
4.06	2.97	5.03	14.17	780	17.90	990	19.15	1050
3.17	2.38	3.78	10.08	560	12.38	680	14.53	800
3.62	2.68	4.41	12.30	680	14.83	820	17.19	940
4.15	3.03	5.15	15.15	840	17.94	990	20.57	1130
4.52	3.28	5.68	17.34	960	20.33	1120	23.15	1270

GENERAL NOTES :

SPECIFICATION :

AASHTO STANDARD SPECIFICATION FOR HIGHWAY BRIDGES, 15th EDITION 1996.

DESIGN LOAD :

LIVE LOAD MS-18 (HS 20-44)

CONCRETE :

ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSION STRENGTH IN 28 DAYS OF $f'_c = 20.7 \text{ MPa}$ (3000psi). ALL EXPOSED CORNERS TO BE CHAMFERED 20 MINIMUM. NO CONSTRUCTION JOINT ARE TO BE MADE EXCEPT WHERE SHOWN. WHEN BOTTOM SLAB IS SUBJECT TO ABRASION ADD 25mm TO BOTTOM SLAB TO INCREASE COVERAGE ON STEEL.

STEEL REINFORCEMENT :

ALL REINFORCING STEEL TO BE INTERMEDIATE (GRADE 40) ASTM A-615 WITH DEFORMATIONS CONFORMING TO ASTM A-305.

GENERAL :

IN STATING CULVERT SIZE, GIVE SPAN BY HEIGHT (SPAN FIRST) WHEN HEIGHT OF FILL, $H=0$ THE TOP OF SURFACE OF THE UPPER SLAB SHALL FOLLOW THE CROWN OF THE FINISHED ROADWAY. THE BOX CULVERT SHALL BE CONSTRUCTED ON A LAYER OF LEAN CONCRETE 50mm MINIMUM THICKNESS.

LIVE LOAD DISTRIBUTION REINFORCEMENT :

WHEN THERE IS LESS THAN 600mm OF FILL ABOVE TOP SLAB OF CULVERT ADDITIONAL REINFORCEMENT TRANSVERSE TO THE MAIN REINFORCEMENT IS ADDED TO THE BOTTOM OF THE TOP SLAB IN ACCORDANCE WITH AASHTO 1.3.2.E.

HEIGHT OF FILL :

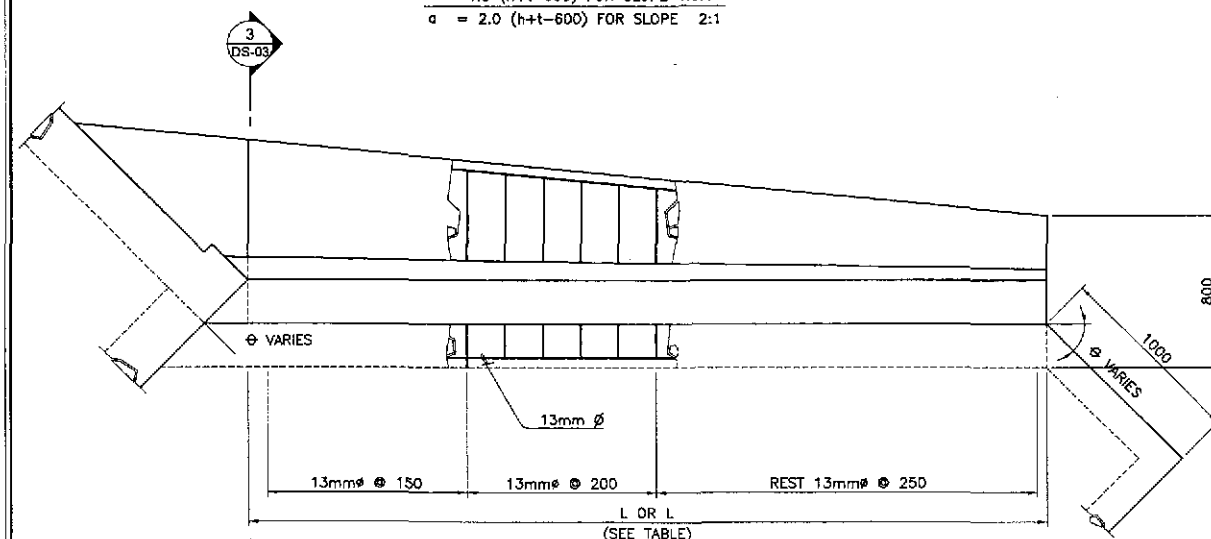
MAXIMUM HEIGHT OF FILL IS 3000mm ABOVE TOP SLAB, FOR HEIGHT OF FILL GREATER THAN 3000mm SPECIAL DESIGN OF BOX CULVERT SHOULD BE DONE.

HORIZONTAL SKEW ANGLE α	LENGTH OF WINGWALLS
90°	$L_1 = L_2 = 1.414a$
60°	$L_1 = 1.414a$ $L_2 = 1.035a$
45°	$L_1 = 2.000a$ $L_2 = a$

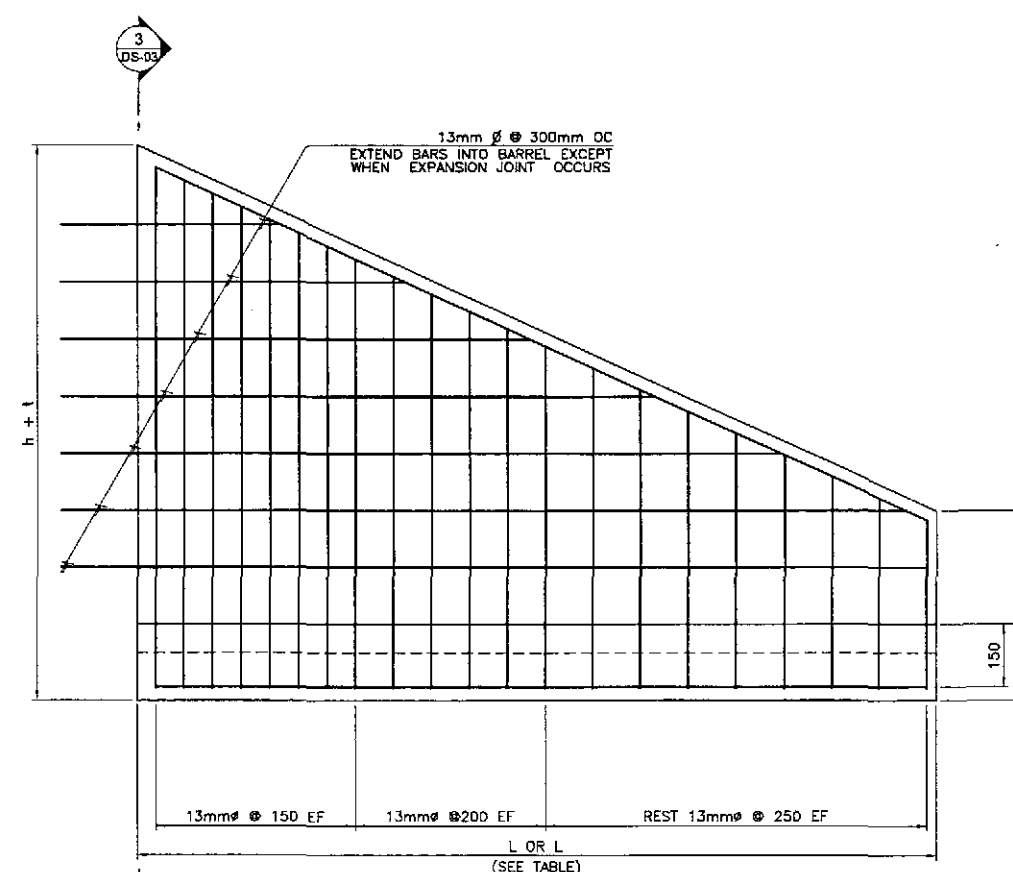
WHERE :

$a = 1.5 (h+t-600)$ FOR SLOPE 1.5:1

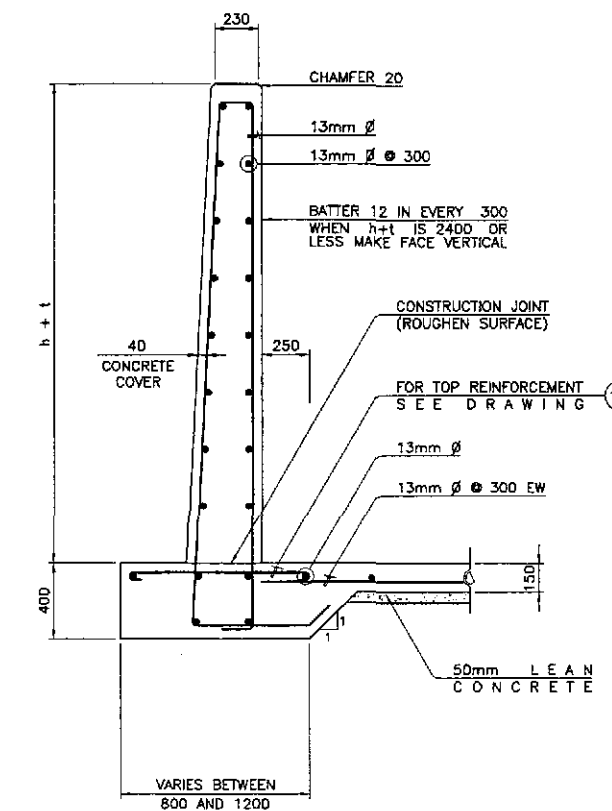
$a = 2.0 (h+t-600)$ FOR SLOPE 2:1



1 WINGWALL PLAN
SCALE 1:40



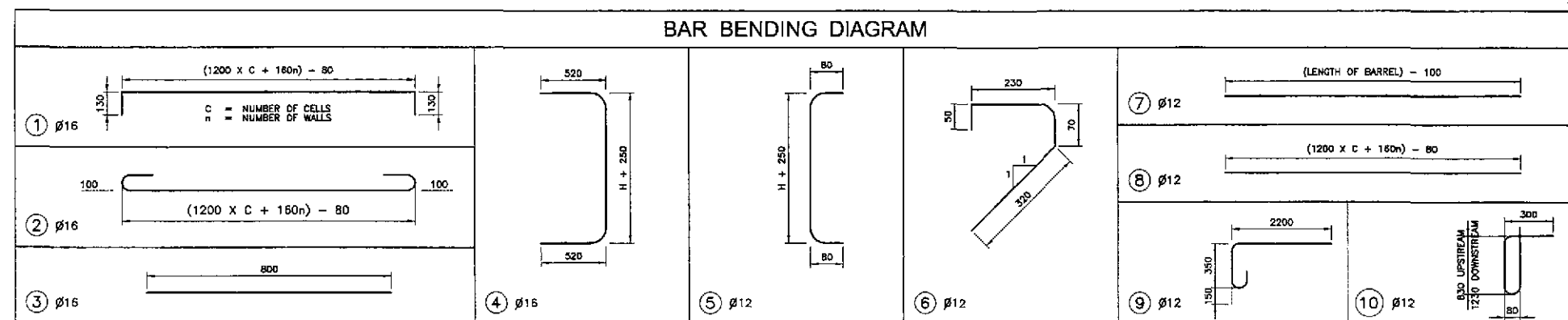
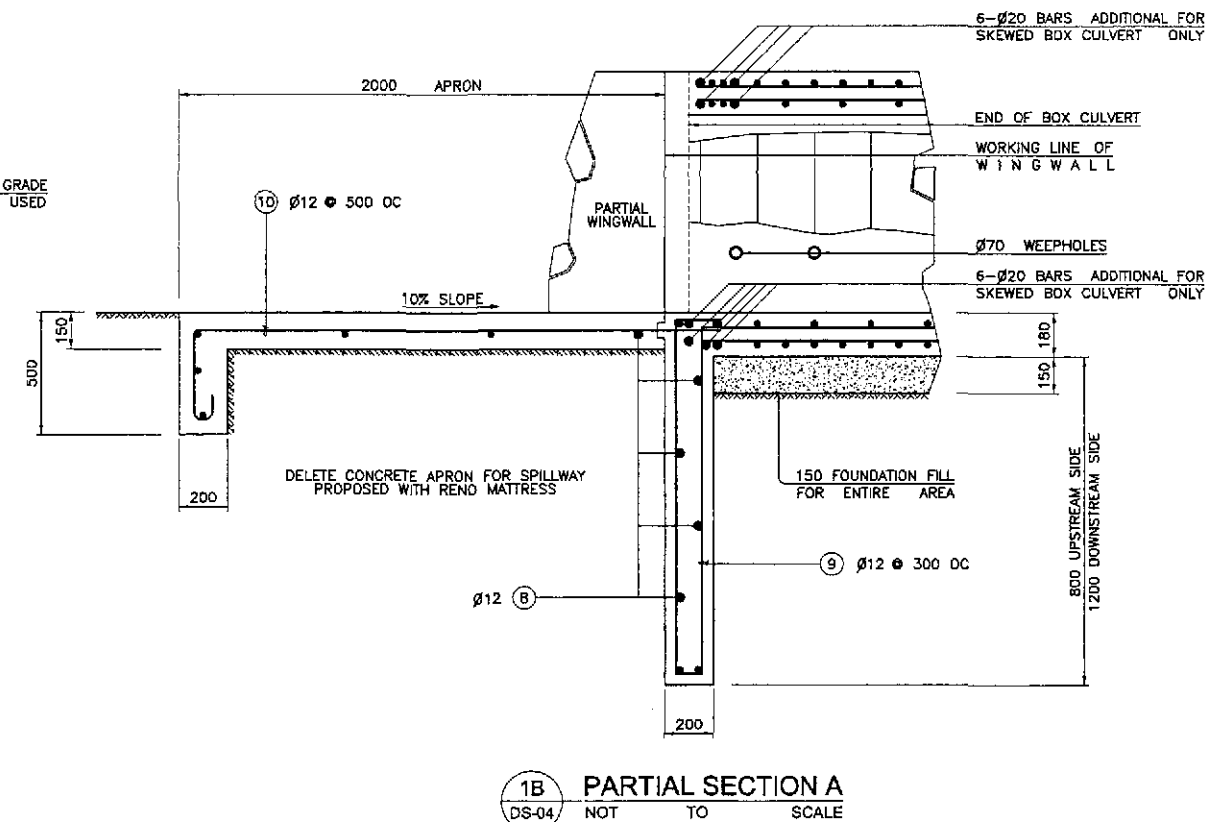
2 WINGWALL ELEVATION
SCALE 1:40



3 SECTION
SCALE 1:40

RCBC WINGWALL DETAILS

 JAPAN INTERNATIONAL COOPERATION AGENCY		 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS		PROJECT AND LOCATION :		SCALE :	SHEET CONTENTS :	SHEET NO. :
DESIGNED: 9/25/02 CHECKED: 9/25/02 SUBMITTED: 10/16/02		P.E.L. - P.M.D. Submitted By: DANILLO C. TRAJANO Project Director		THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)		1:40	STANDARD DETAILS OF RCBC WINGWALLS	DS-03
KATAHIRA & ENGINEERS YEO YACHIYO ENGINEERING CO., LTD.		BUREAU OF DESIGN Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division		OFFICE OF THE SECRETARY Recommended By: GILBERTO S. REYES OIC, Director IV		FULL SIZE A1		
PLARIDEL BYPASS - CONTRACT PACKAGE IV		Recommended By: MANUEL M. BONDAN Undersecretary		Approved By: SIMEON A. DATUMANONG Secretary				



ESTIMATE OF QUANTITIES (PER LINEAR METER OF LENGTH)

SINGLE BARREL					DOUBLE BARREL				TRIPLE BARREL			
HEIGHT OF CELL "H" (METER)	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)	FOUNDATION F I L L (m ³)	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)	FOUNDATION F I L L (m ³)	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)	FOUNDATION F I L L (m ³)
1.20	0.95	132.59	0.67	0.27	1.64	217.00	1.12	0.48	2.34	299.62	1.56	0.68
0.90	0.85	127.30	0.67	0.27	1.50	209.08	1.12	0.48	2.14	289.04	1.56	0.68
0.60	0.75	122.01	0.67	0.27	1.35	201.15	1.12	0.48	1.95	278.48	1.56	0.68

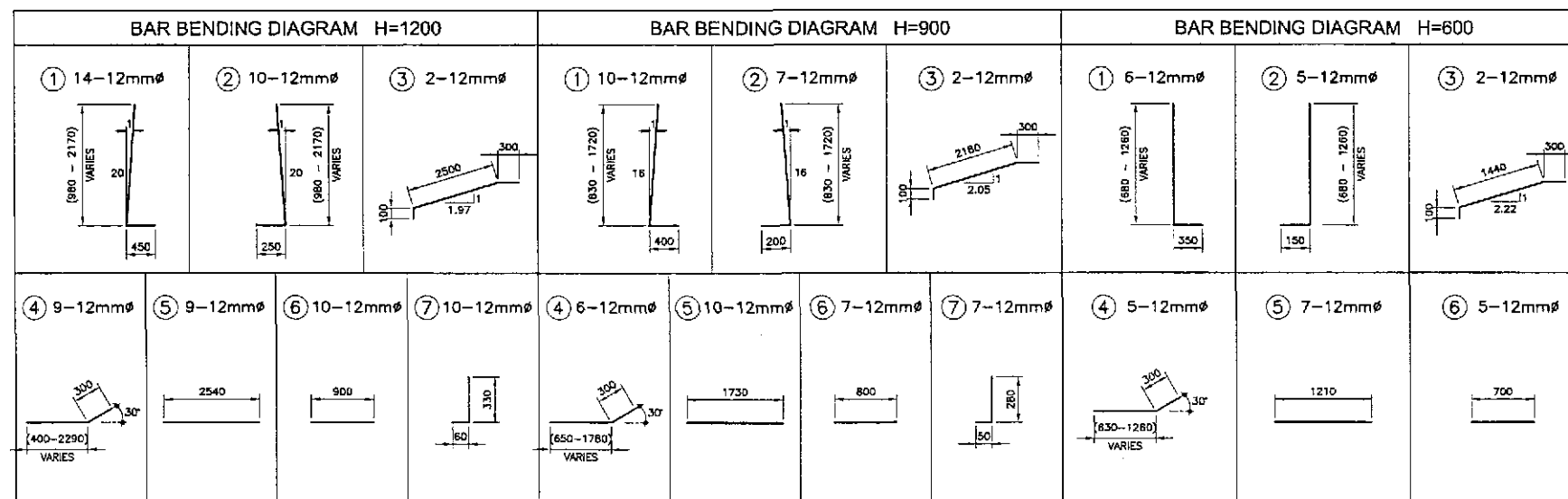
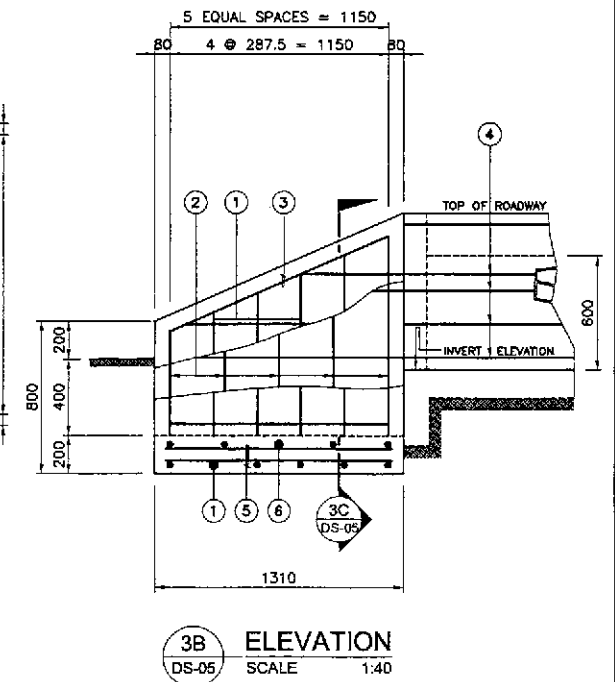
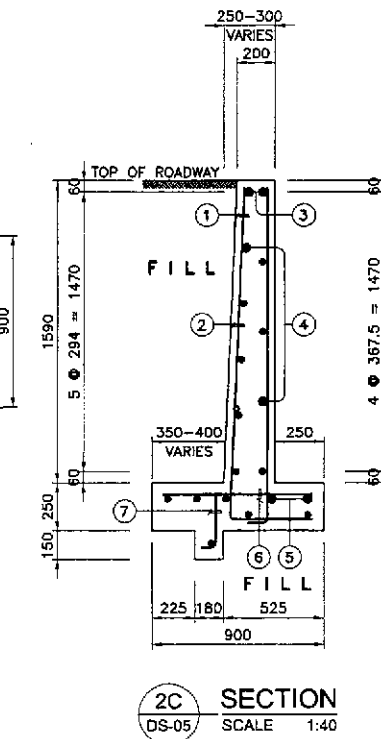
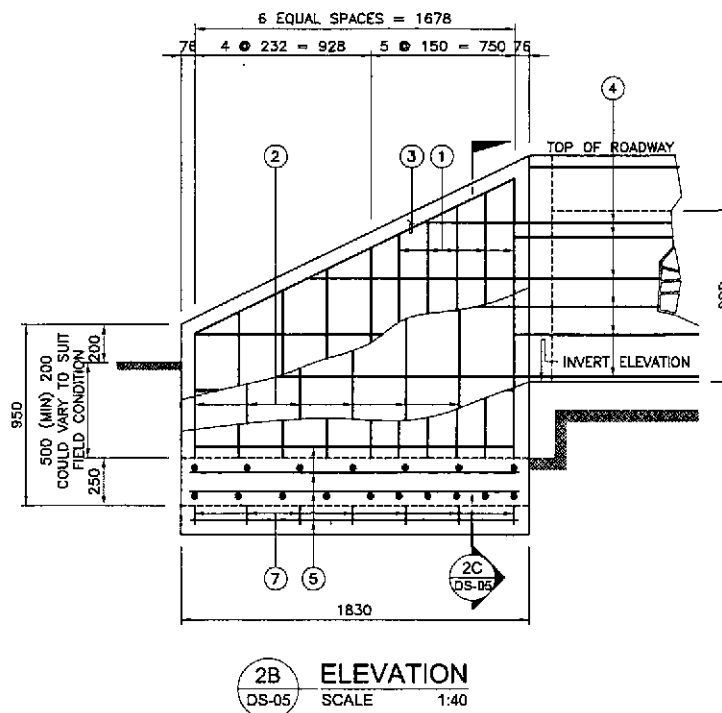
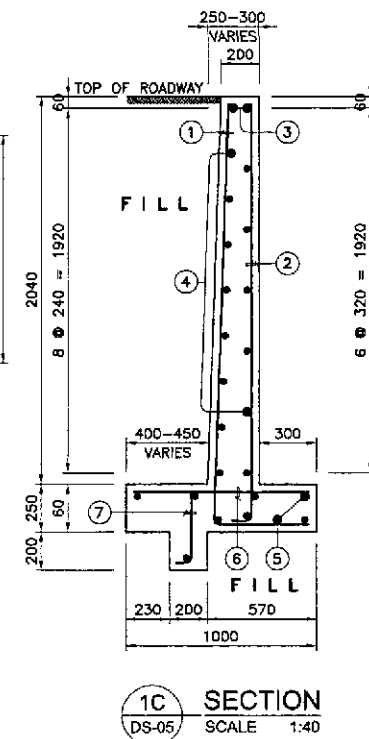
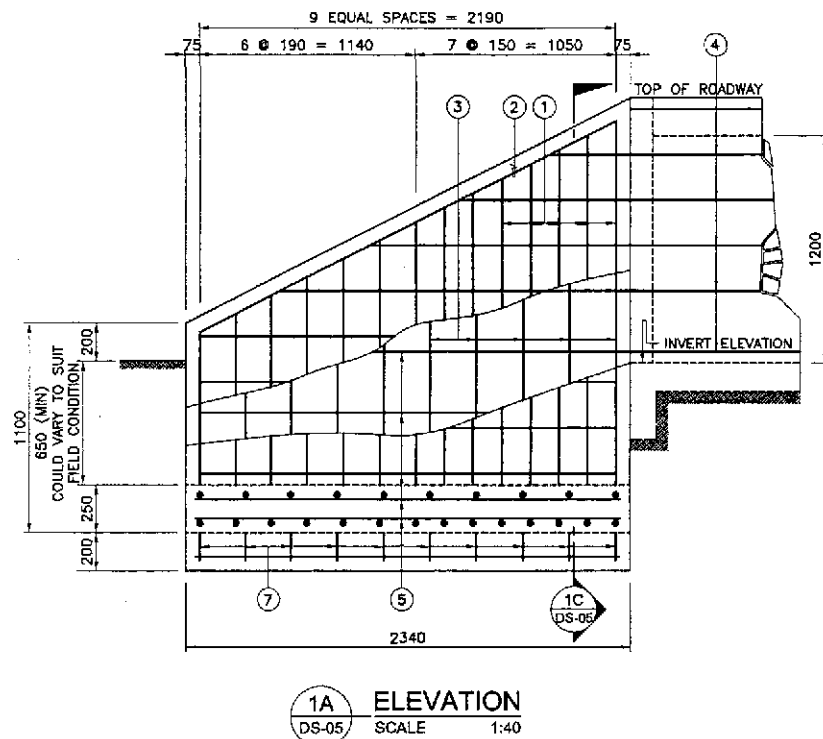
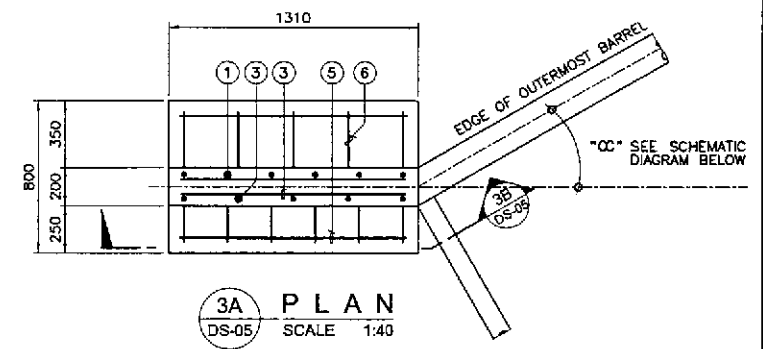
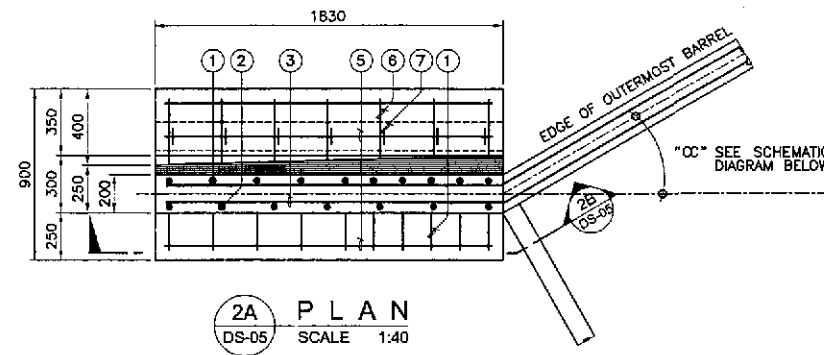
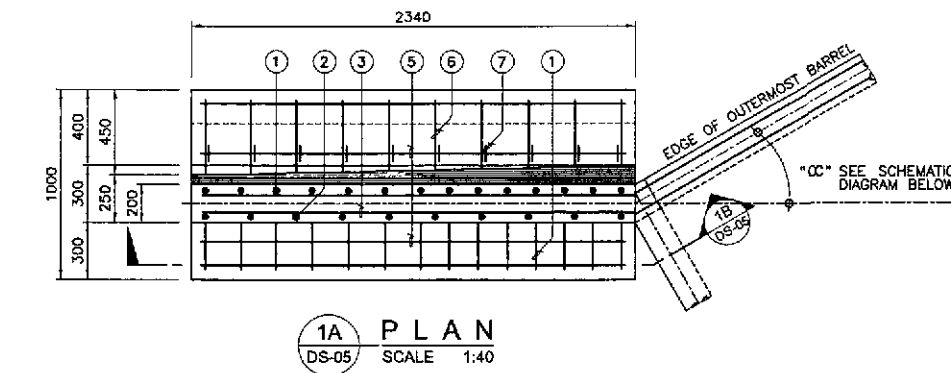
ADDITIONAL WEIGHT OF REINFORCEMENT PER END OF BOX CULVERT	
30' SKEW = 98.5 kgs.	30' SKEW = 46.5 kgs.
45' SKEW = 120.5 kgs.	45' SKEW = 57.0 kgs.

APRON AND END TOE FOR BOTH ENDS

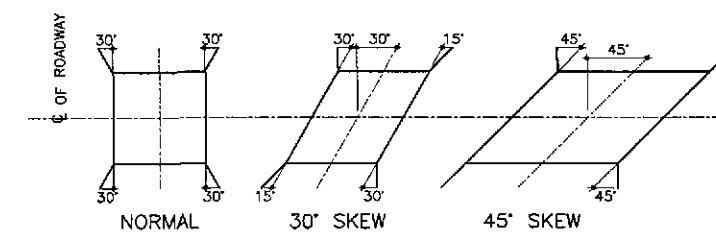
SINGLE BARREL				DOUBLE BARREL			TRIPLE BARREL		
COMMON TO ALL HEIGHT OF CELL	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)
	1.73	57.94	3.64	3.28	111.34	6.08	4.83	164.70	8.53

1 LOW DEPTH TYPE BOX CULVERT
DS-04 NOT TO SCALE

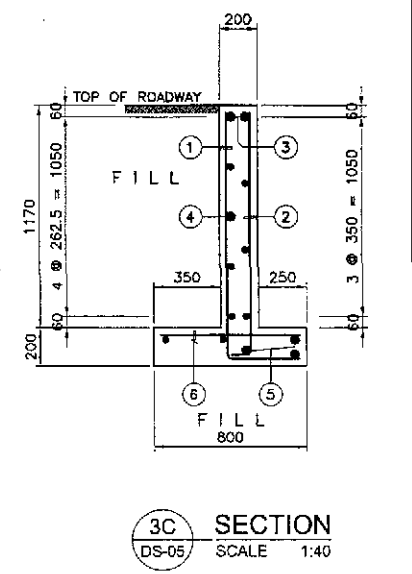
NOTE:
ALL OTHER REINFORCING BARS SHALL BE PERPENDICULAR OR PARALLEL
AS THE CASE MAYBE, TO BOX AXIS.



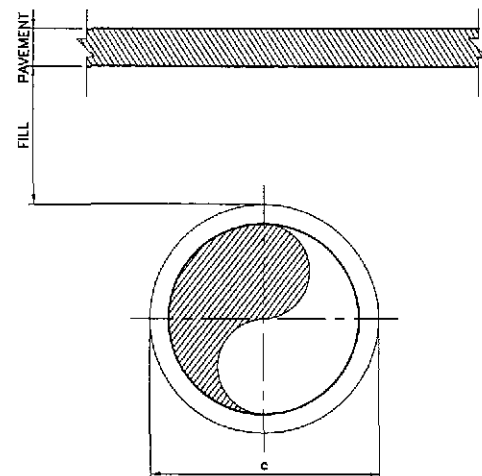
ESTIMATE OF QUANTITIES PER WINGWALL				
HEIGHT (m)	CONCRETE CLASS "A" (m³)	REINFORCEMENT (kg)	EXCAVATION (m³)	FOUNDATION FILL (m³)
1.20	2.96	102.89	5.78	0.30
0.90	1.90	57.68	3.53	0.22
0.60	0.88	31.43	1.97	0.15



4 DS-05 NOT TO SCALE

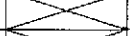
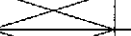
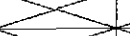
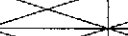
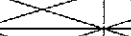
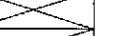
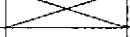
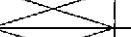
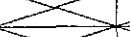
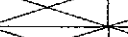
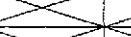

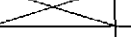
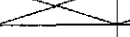
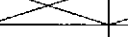
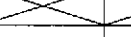
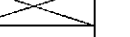


LOW DEPTH TYPE BOX CULVERT

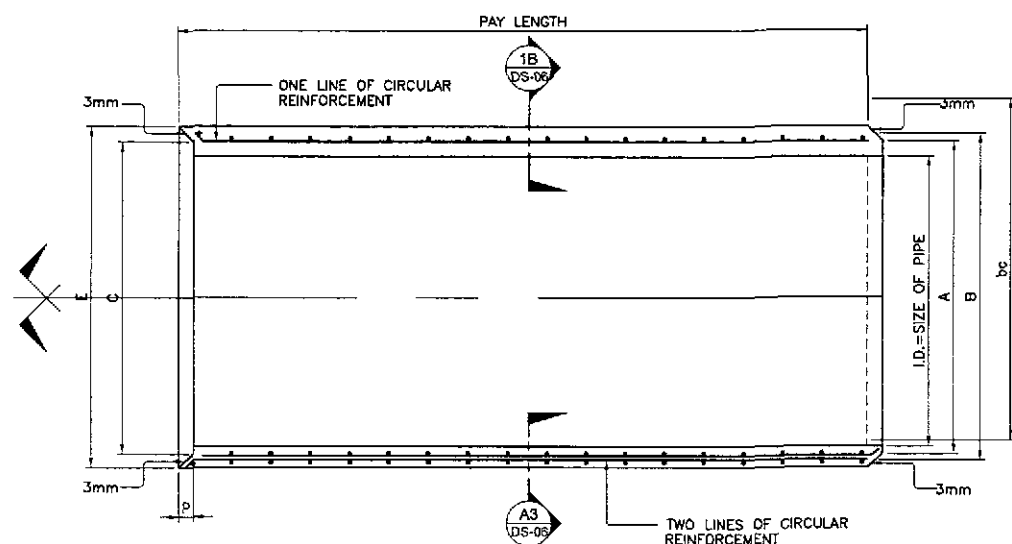


STANDARD STRENGTH PIPES:
FILL 1/2 E.D. FOR FLEXIBLE PAVEMENT OR MIN. OF 0.60 m
0.30 m FOR RIGID PAVEMENT
EXTRA STRENGTH PIPES:
FILL: 0.30 m FOR RIGID AND FLEXIBLE PAVEMENTS

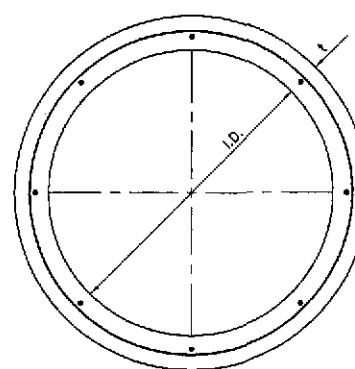
MINIMUM PIPE COVERING

DESIGN REQUIREMENT OF REINFORCED CONCRETE PIPE CULVERT																												
STANDARD STRENGTH REINFORCED CONCRETE PIPE CULVERTS																		EXTRA STRENGTH REINFORCED CONCRETE PIPE CULVERTS										
CONCRETE 247 kg/cm ² (3,500 lb/in ²)										CONCRETE 317 kg/cm ² (4,500 lb/in ²)						STRENGTH TEST REQUIREMENTS kg/m OF PIPE		CONCRETE 317 kg/cm ² (4,500 lb/in ²)						STRENGTH TEST REQUIREMENTS kg/m OF PIPE				
SIZE OF PIPE (mm)	WALL THICK- NESS (mm)	TONGUE (mm)		GROOVE (mm)		DEPTH (mm)	MINIMUM REINFORCEMENT cm ² /m OF PIPE		WALL THICK- NESS (mm)	TONGUE (mm)		GROOVE (mm)		DEPTH (mm)	MINIMUM REINFORCEMENT cm ² /m OF PIPE		THREE-EDGE-BEARING METHOD *		WALL THICK- NESS (mm)	TONGUE (mm)		GROOVE (mm)		DEPTH (mm)	MINIMUM REINFORCEMENT cm ² /m OF PIPE		THREE-EDGE-BEARING METHOD	
I.D.	t	A	B	C	E	P	CIRCULAR REINFORCEMENT	ELLIPTICAL REINFORCEMENT	t	A	B	C	E	P	CIRCULAR REINFORCEMENT	ELLIPTICAL REINFORCEMENT	0.00025mCRACK LOAD	ULTIMATE LOAD	t	A	B	C	E	P	CIRCULAR REINFORCEMENT	ELLIPTICAL REINFORCEMENT	0.00025mCRACK LOAD	LOAD ULTIMATE
300	57	344	363	351	370	44	1 LINE 1.48		51	495	514	502	521	44	1 LINE 1.69		3.355	5.218	---	---	---	---	---					
380	57	344	363	351	370	44	1 LINE 1.90		51	495	514	502	521	44	1 LINE 2.33		3.914	6.060	---	---	---	---	---					
460	64	508	527	514	534	44	1 LINE 2.54	1 LINE 2.12	51	495	514	502	521	44	1 LINE 2.96		4.473	6.709	---	---	---	---	---					
610	76	673	692	680	699	44	1 LINE 3.60	1 LINE 2.75	64	660	680	667	686	44	1 LINE 4.23	1 LINE 3.60	4.473	7.454	76	673	692	680	699	44	1 LINE 5.50	1 LINE 4.23	5.964	8.945
760	89	858	857	845	864	51	1 LINE 4.66	1 LINE 3.60	76	825	845	832	851	51	1 LINE 5.92	1 LINE 4.44	5.032	8.573	89	838	857	845	864	51	1 LINE 6.56	1 LINE 5.08	7.454	11.182
910	102	1003	1022	1010	1029	64	2 LINES EACH 3.81	1 LINE 3.81	86	988	1007	994	1013	64	2 LINES EACH 4.66	1 LINE 4.66	6.038	9.840	102	1003	1022	1010	1029	64	2 LINES EACH 5.92	1 LINE 5.92	8.945	13.418
1070	114	1168	1187	1175	1194	64	2 LINES EACH 4.44	1 LINE 4.44	95	1150	1165	1156	1175	64	2 LINES EACH 5.29	1 LINE 5.29	7.045	10.958	114	1168	1187	1175	1194	64	2 LINES EACH 6.98	1 LINE 6.98	10.436	15.655
1220	127	1334	1353	1340	1359	64	2 LINES EACH 5.29	1 LINE 5.29	108	1315	1334	1321	1340	64	2 LINES EACH 6.56	1 LINE 6.56	8.051	11.927	127	1334	1353	1340	1359	64	2 LINES EACH 8.04	1 LINE 8.04	11.927	17.891
1520	152	1664	1683	1670	1690	64	2 LINES EACH 6.98	1 LINE 6.98	127	1639	1658	1645	1664	64	2 LINES EACH 8.68	1 LINE 8.68	8.945	14.909	152	1664	1683	1670	1690	64	2 LINES EACH 10.58	1 LINE 10.58	13.418	22.364

* THE DISTANCE FROM CENTERLINE OF THE REINFORCEMENT TO THE NEAREST SURFACE OF THE CONCRETE HAS BEEN ASSUMED AS 32mm FOR PIPES WITH A SHELL THICKNESS OF 64mm OR MORE.
* TEST LOADS FOR SAND-BEARING TEST SHALL BE ONE AND ONE - HALF TIMES THOSE SPECIFIED IN THIS TABLE FOR THE THREE - EDGE BEARING TEST.

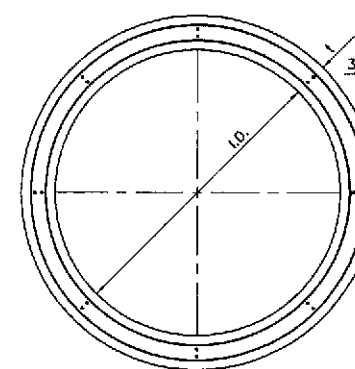


1A LONGITUDINAL SECTION
DS-06 NOT TO SCALE



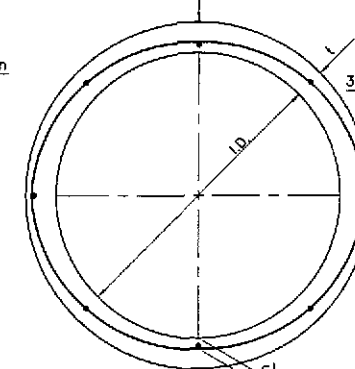
ONE LINE OF CIRCULAR REINFORCEMENT

1B SECTION
DS-06

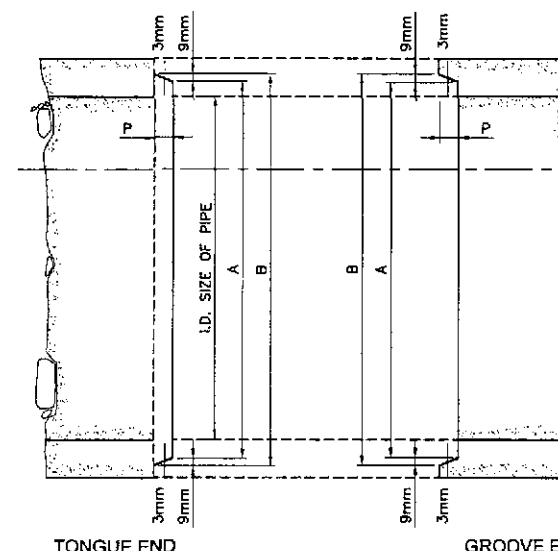


TWO LINES OF CIRCULAR REINFORCEMENT

1C SECTION
DS-06

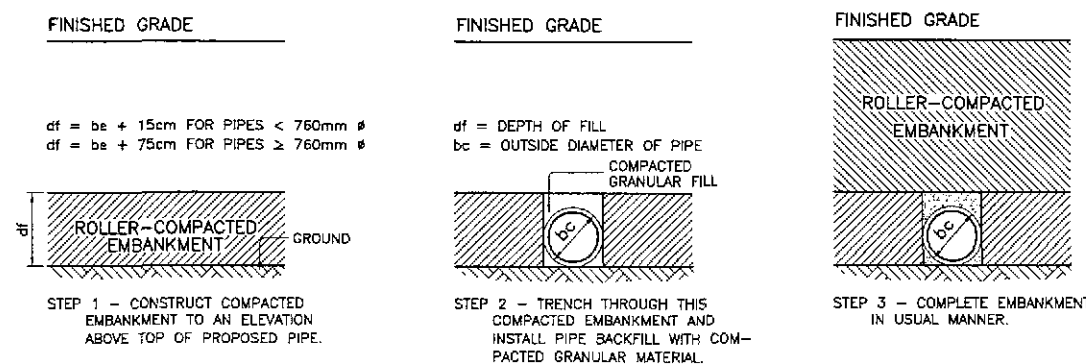


ONE LINE OF ELLIPTICAL REINFORCEMENT

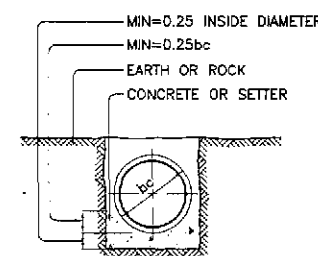


1D SECTION
DS-06

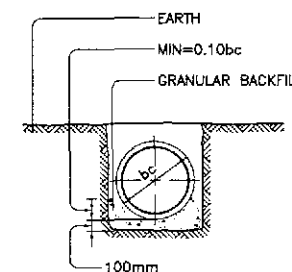
1 STANDARD REINFORCED CONCRETE PIPE CULVERTS
DS-06 SCALE AS SHOWN



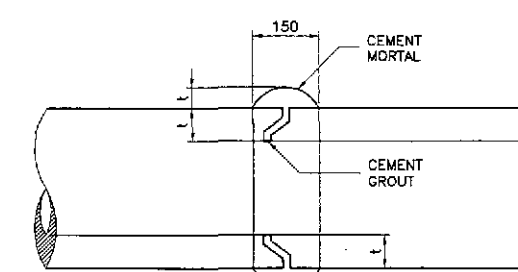
2 METHODS OF PIPE INSTALLATION
DS-06 NOT TO SCALE



CONCRETE CRADLE BEDDING



ORDINARY BEDDINGS



4 DETAIL OF PIPE COLLAR
DS-06 NOT TO SCALE

3 TYPICAL BEDDING FOR CONDUITS
DS-06 NOT TO SCALE

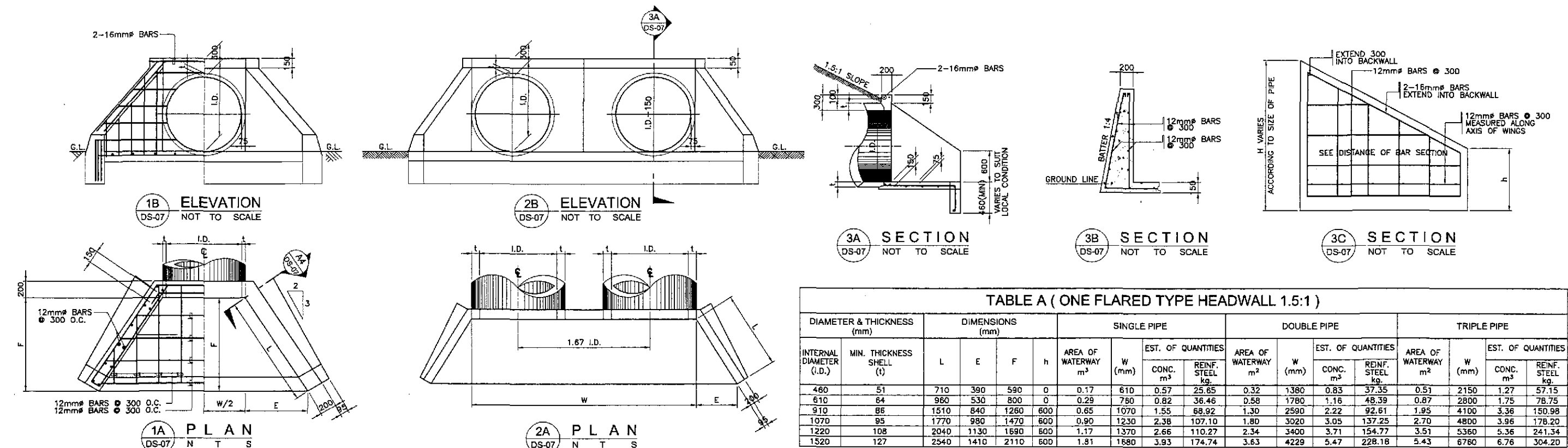


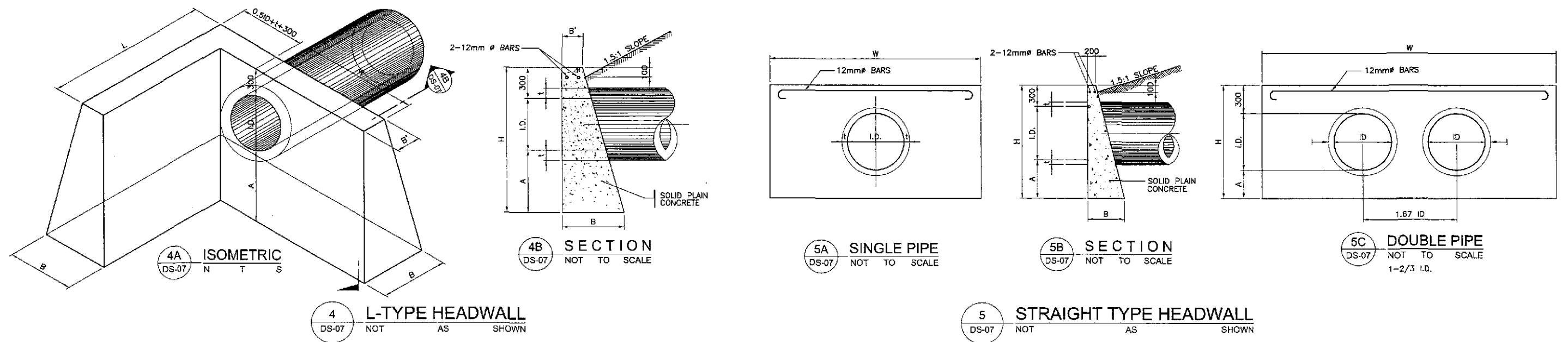
TABLE A (ONE FLARED TYPE HEADWALL 1.5:1)																	
DIAMETER & THICKNESS (mm)		DIMENSIONS (mm)				SINGLE PIPE				DOUBLE PIPE				TRIPLE PIPE			
INTERNAL DIAMETER (I.D.)	MIN. THICKNESS SHELL (t)	L	E	F	h	AREA OF WATERWAY m ³	W (mm)	EST. OF QUANTITIES		AREA OF WATERWAY m ²	W (mm)	EST. OF QUANTITIES		AREA OF WATERWAY m ²	W (mm)	EST. OF QUANTITIES	
								CONC. m ³	REINF. STEEL kg.			CONC. m ³	REINF. STEEL kg.			CONC. m ³	REINF. STEEL kg.
460	51	710	390	590	0	0.17	610	0.57	25.85	0.32	1380	0.83	37.35	0.51	2150	1.27	57.15
610	64	960	530	800	0	0.29	780	0.82	36.46	0.58	1780	1.16	48.39	0.87	2800	1.75	78.75
910	86	1510	840	1260	600	0.65	1070	1.55	68.92	1.30	2590	2.22	92.61	1.95	4100	3.36	150.98
1070	95	1770	980	1470	600	0.90	1230	2.38	107.10	1.80	3020	3.05	137.25	2.70	4800	3.96	178.20
1220	108	2040	1130	1690	600	1.17	1370	2.66	110.27	2.34	3400	3.71	154.77	3.51	5360	5.36	241.34
1520	127	2540	1410	2110	600	1.81	1680	3.93	174.74	3.63	4229	5.47	228.18	5.43	6760	6.76	304.20

1 FLARED TYPE HEADWALL (SINGLE PIPE)
DS-07 SCALE AS SHOWN

2 FLARED TYPE HEADWALL (DOUBLE PIPE)
DS-07 SCALE AS SHOWN

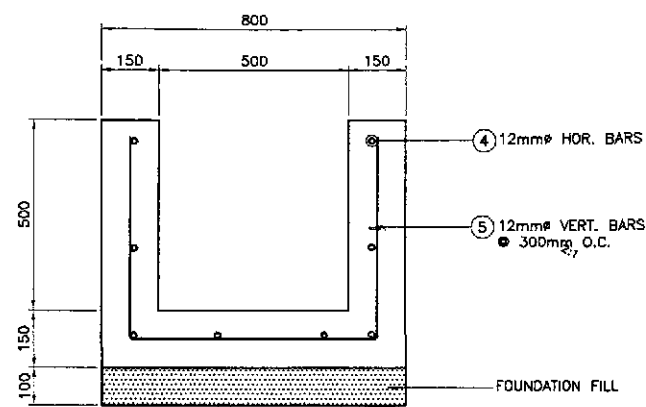
TABLE C (ONE L-TYPE HEADWALL)									
DIA. & THICKNESS (mm)		DIMENSIONS (mm)						SINGLE PIPE	
INTERNAL DIAMETER (I.D.)	MIN. THK. SHELL (t)	A	B	B'	H	W	L	CONCRETE m ³	REINF. STEEL kg.
460	51	310	350	200	1070	1070	1070	0.66	6
610	64	410	430	200	1320	1220	1220	1.06	8
910	86	610	610	200	1820	1820	1820	2.76	11
1070	95	710	780	300	2080	1970	VARIES	-	-
1220	108	810	870	300	2330	2120	VARIES	-	-
1520	127	1010	980	300	3030	2420	VARIES	-	-

TABLE C (ONE STRAIGHT TYPE HEADWALL)																
DIAMETER & THICKNESS (mm)		DIMENSIONS (mm)			SINGLE PIPE				DOUBLE PIPE				TRIPLE PIPE			
INTERNAL DIAMETER (I.D.)	MIN. THK. SHELL (t)	A	B	H	W (mm)	AREA OF WATERWAY m ²	CONCRETE m ³	REINF. STEEL kg.	W (mm)	AREA OF WATERWAY m ²	CONCRETE m ³	REINF. STEEL kg.	W (mm)	AREA OF WATERWAY m ²	CONCRETE m ³	REINF. STEEL kg.
							mm				mm				mm	
460	51	310	350	1070	1500	0.15	0.46	3.48	2600	0.33	0.63	4.90	3400	0.45	0.80	5.97
610	64	410	430	1320	2400	0.29	0.87	4.55	3500	0.58	1.20	6.50	4600	0.87	1.51	8.45
910	86	610	600	1820	3800	0.65	2.28	6.68	5200	1.30	3.16	9.52	6800	1.95	3.85	12.36
1070	95	710	780	2080	4300	0.90	3.84	7.57	6050	1.80	5.09	10.67	7900	2.70	6.43	13.96
1220	108	810	870	2330	4800	1.17	4.43	8.81	6900	2.34	6.70	12.54	9000	3.51	7.97	16.14
1520	127	1010	980	2830	6000	1.81	8.80	10.94	8600	3.63	11.93	15.56	11200	5.43	15.05	19.82



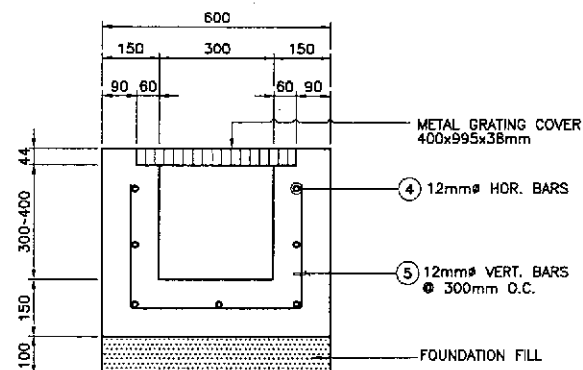
STANDARD REINFORCED CONCRETE HEADWALL FOR RCPC

<p>JAPAN INTERNATIONAL COOPERATION AGENCY</p>		<p>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</p>		<p>PROJECT AND LOCATION :</p> <p>THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)</p>		<p>SCALE :</p> <p>NOT TO SCALE</p>		<p>SHEET CONTENTS :</p> <p>STANDARD REINFORCED CONCRETE HEADWALL FOR RCPC</p>		<p>SHEET NO. :</p> <p>DS-07</p>	
DESIGNED	DATE	SIGNATURE	PJHL - PMO	BUREAU OF DESIGN	OFFICE OF THE SECRETARY						
CHECKED	7/30/02	H. K. H. K.	Submitted By:	Reviewed By:	Recommended By:						
SUBMITTED	10/16/02	M. K. K.	DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES CIC, Director IV						
			MANUEL M. BONDAN Undersecretary		SIMEON A. DATUMANONG Secretary						
			PLARIDEL BYPASS - CONTRACT PACKAGE IV								

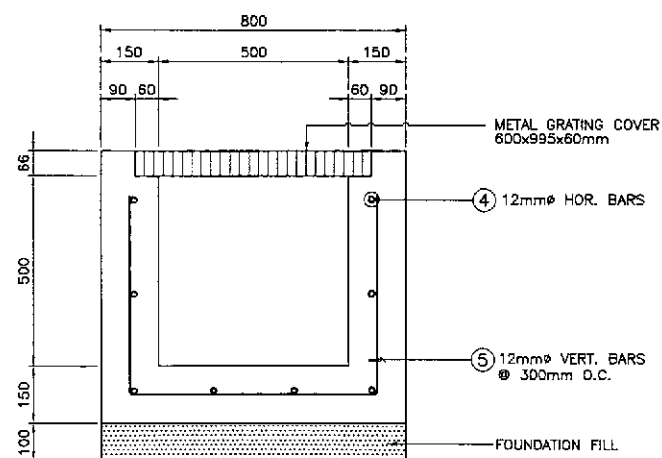


REINFORCED CONCRETE DITCH

2 TYPE U
DS-08 SCALE: 1:10

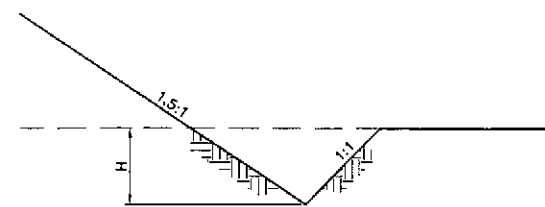


REINFORCED CONCRETE DITCH W/ COVER



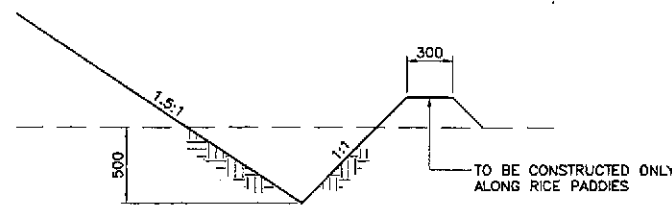
REINFORCED CONCRETE DITCH W/ COVER

1 TYPE LU
DS-08 SCALE: 1:10



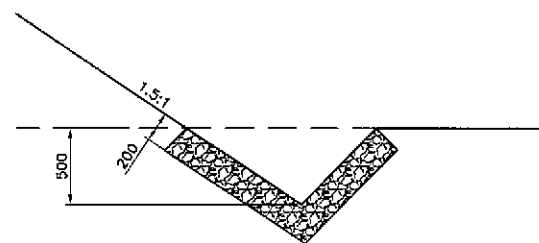
V-SHAPED UNLINED DITCH

TYPE E-4



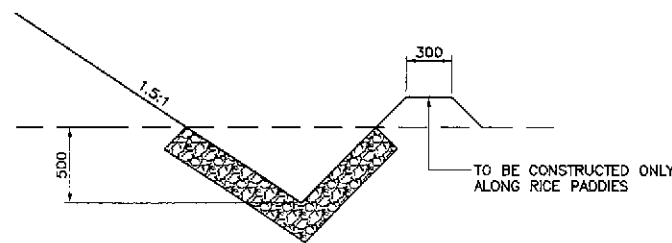
V-SHAPED UNLINED DITCH

TYPE E-3



V-SHAPED LINED DITCH

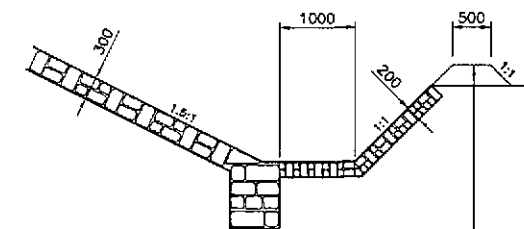
TYPE E-2



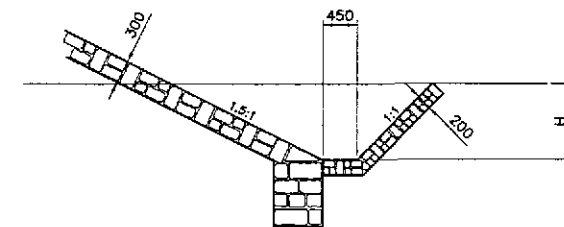
V-SHAPED UNLINED DITCH

TYPE E-1

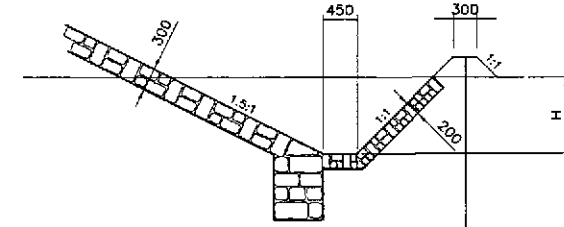
4 TYPE E
DS-08 SCALE: 1:25



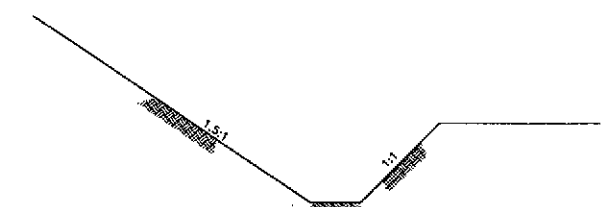
TYPE C-3



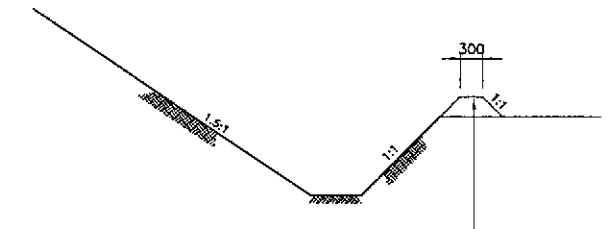
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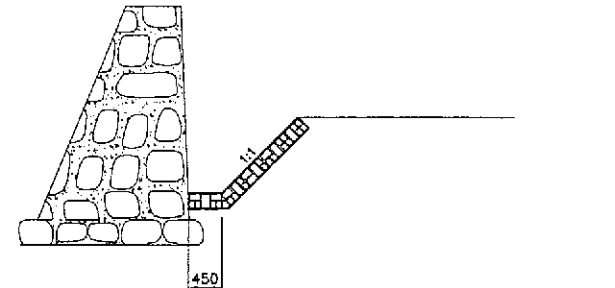
TYPE C-1



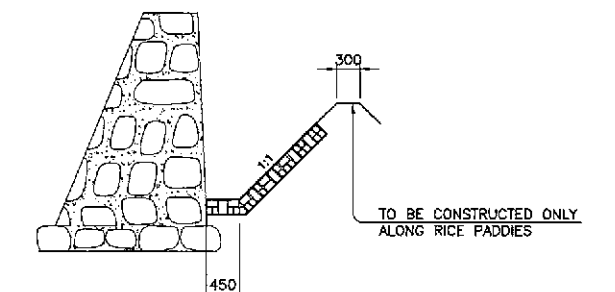
TYPE C-7



TYPE C-6


















TYPE C-5



TYPE C-4

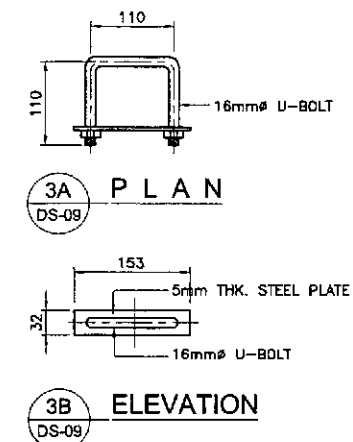
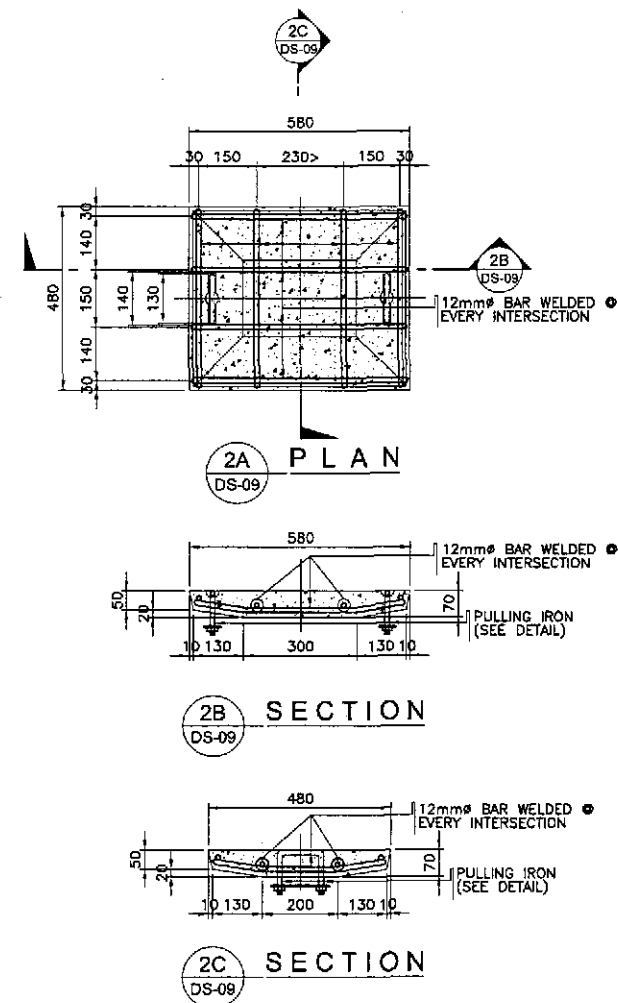
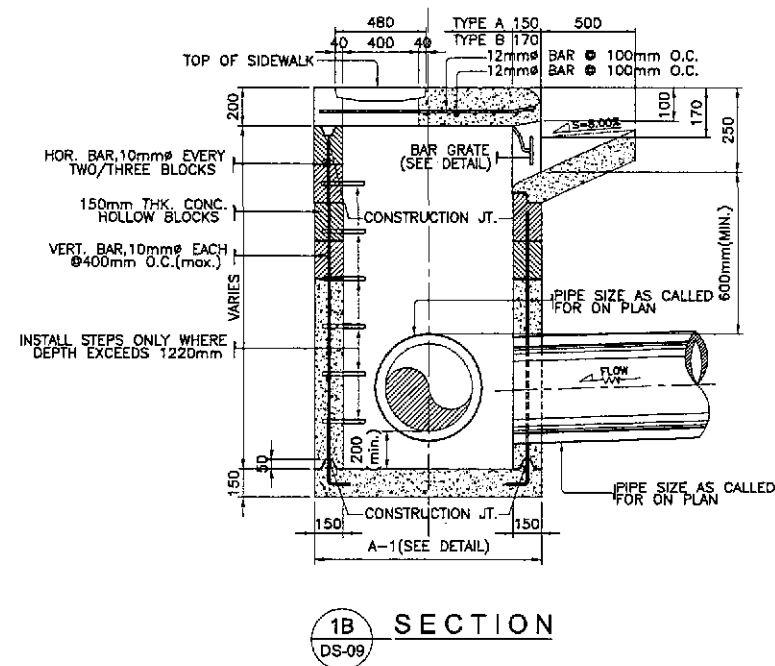
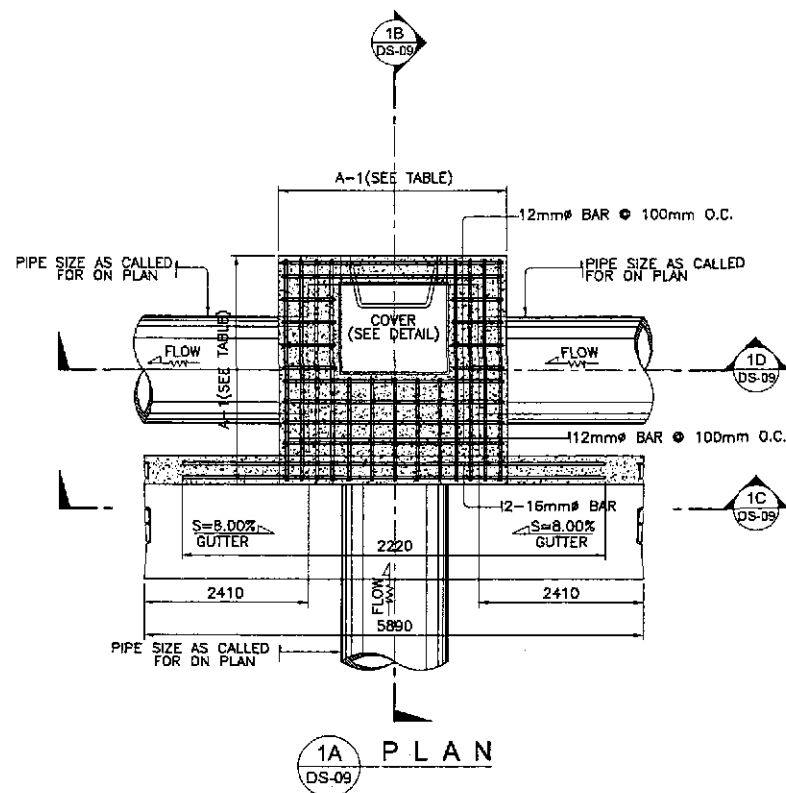
5 TYPE C
DS-08 NOT TO SCALE

STANDARD DRAINAGE DITCHES

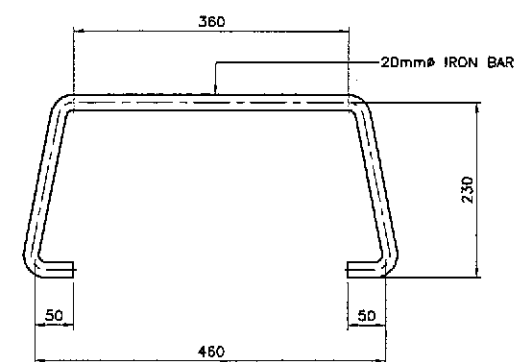
<div> JAPAN INTERNATIONAL COOPERATION AGENCY</div> <div> KATAHIRA & ENGINEERS INTERNATIONAL</div> <div> YACHYO ENGINEERING CO., LTD.</div>			<table><tr><td>DATE</td><td colspan="2">SIGNATURE</td><td colspan="4"><div> REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</div></td></tr><tr><td>DESIGNED</td><td>9/8/01</td><td></td><td colspan="2">PUHL - PMD</td><td colspan="3">BUREAU OF DESIGN</td></tr><tr><td>CHECKED</td><td>9/30/01</td><td></td><td colspan="2">Submitted By:</td><td>Reviewed By:</td><td>Recommended By:</td><td>OFFICE OF THE SECRETARY</td></tr><tr><td>SUBMITTED</td><td>9/14/01</td><td></td><td colspan="2">DANILO C. TRAJANO Project Director</td><td>JOSEFINA M. ALAGAR Chief, Highways Division</td><td>GILBERTO S. REYES OIC, Director IV</td><td>MANUEL M. BONDAN Undersecretary</td></tr><tr><td></td><td></td><td></td><td colspan="2"></td><td></td><td></td><td>Approved By:</td></tr><tr><td></td><td></td><td></td><td colspan="2"></td><td></td><td></td><td>(See cover sheet for Signature/Approval)</td></tr><tr><td></td><td></td><td></td><td colspan="2"></td><td></td><td></td><td>SIMEON A. DATUMANONG Secretary</td></tr></table>							DATE	SIGNATURE		<div> REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</div>				DESIGNED	9/8/01		PUHL - PMD		BUREAU OF DESIGN			CHECKED	9/30/01		Submitted By:		Reviewed By:	Recommended By:	OFFICE OF THE SECRETARY	SUBMITTED	9/14/01		DANILO C. TRAJANO Project Director		JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV	MANUEL M. BONDAN Undersecretary								Approved By:								(See cover sheet for Signature/Approval)								SIMEON A. DATUMANONG Secretary	PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)		SCALE : NOT TO SCALE	SHEET CONTENTS : STANDARD DRAINAGE DITCHES	SHEET NO. : DS-08
DATE	SIGNATURE		<div> REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</div>																																																																		
DESIGNED	9/8/01		PUHL - PMD		BUREAU OF DESIGN																																																																
CHECKED	9/30/01		Submitted By:		Reviewed By:	Recommended By:	OFFICE OF THE SECRETARY																																																														
SUBMITTED	9/14/01		DANILO C. TRAJANO Project Director		JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV	MANUEL M. BONDAN Undersecretary																																																														
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							SIMEON A. DATUMANONG Secretary																																																														
PLARIDEL BYPASS - CONTRACT PACKAGE IV										FULL SIZE A1																																																											

KATAHIRA & ENGINEERS
INTERNATIONAL

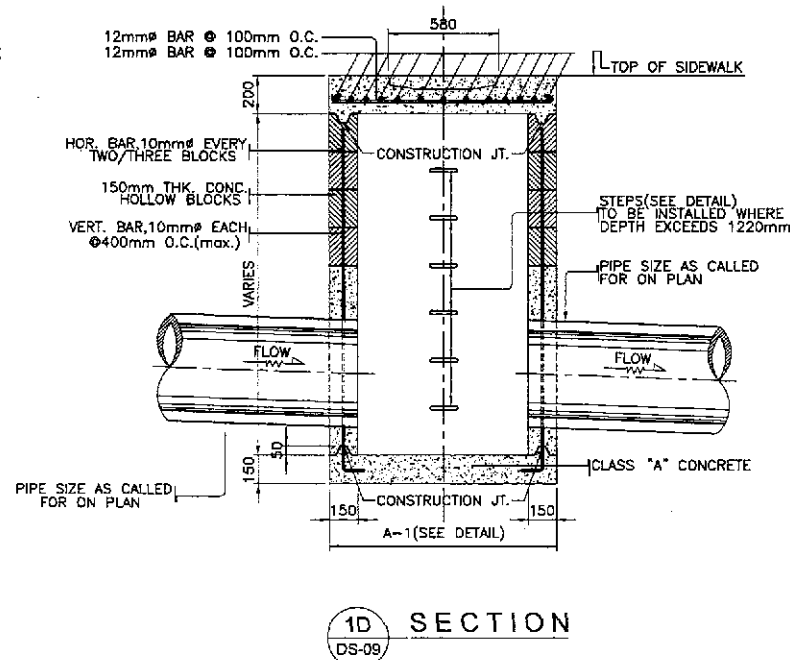
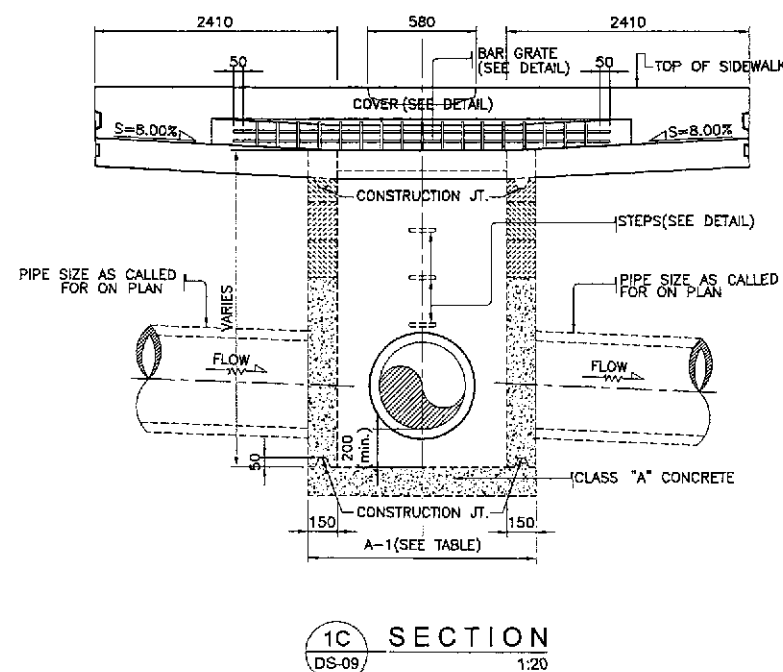
YACHIYO ENGINEERING
CO., LTD.



3 PULLING IRON DETAIL
DS-09 SCALE 1:5



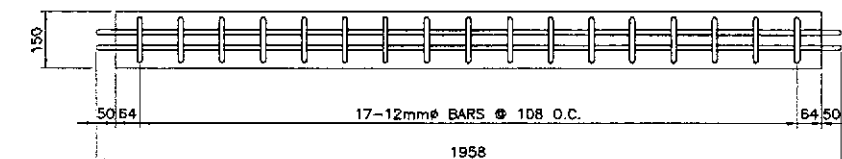
2 CONCRETE COVER DETAIL
DS-09 SCALE 1:10



1 CURB INLET MANHOLE
DS-09 SCALE 1:20

TABLE OF DIMENSION		
TYPE OF CIM	SIZE OF PIPE (mm)	A-1
T-1	300	1.12 M.
T-2	460	1.19 M.
T-3	610	1.37 M.
T-4	760	1.54 M.
T-5	910	1.73 M.
T-6	1070	1.90 M.
T-7	1220	2.08 M.
T-8	1520	2.43 M.

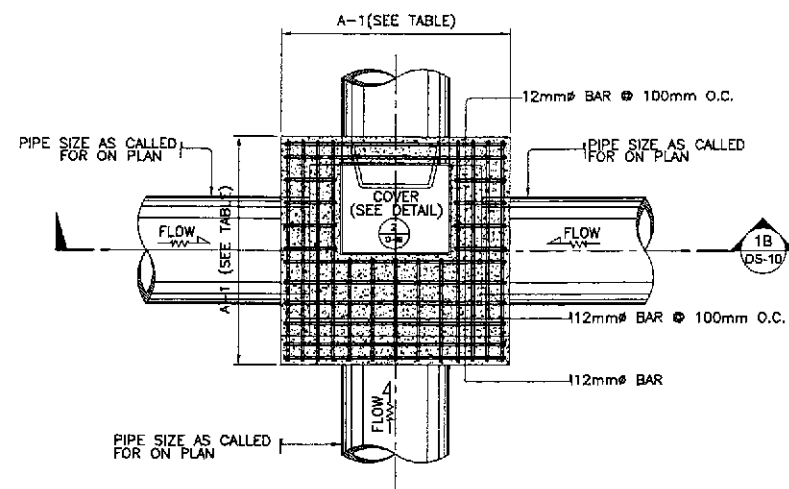
5 DETAIL OF BAR GRATE FOR OPENING OF CURB INLET
DS-09 SCALE 1:20



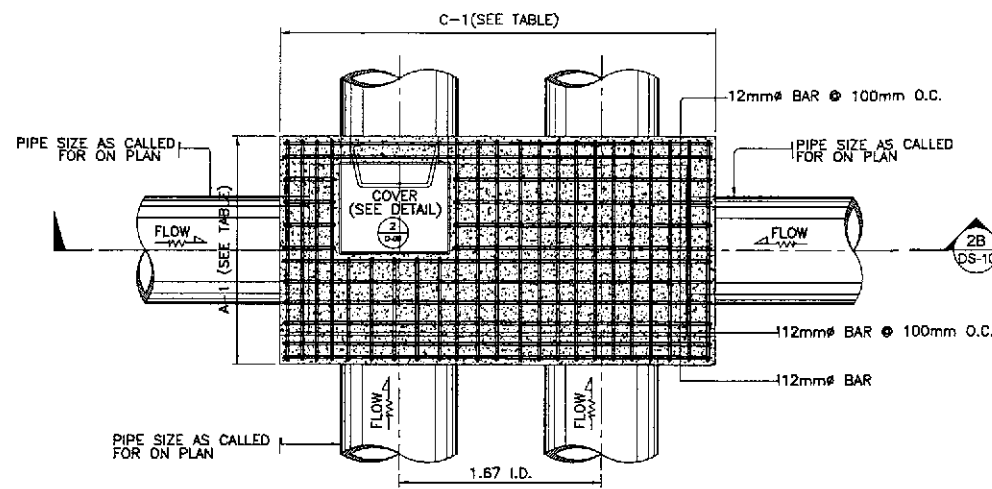
- NOTES:
- ALL CONCRETE SHALL BE CLASS "A". EXPOSED EDGES SHALL BE FINISHED WITH SUITABLE EDGER.
 - PULLING IRON, STEPS AND BAR GRATE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE.
 - CONSTRUCTION JOINTS SHALL CONFORM WITH THE GROOVES OF CONCRETE HOLLOW BLOCKS.
 - CONCRETE HOLLOW BLOCKS OR DRESSED ADOBE BLOCKS SHALL HAVE AN AVERAGE COMPRESSIVE STRENGTH OF 6.865MPa.
 - IN CONCRETE HOLLOW BLOCKS STRUCTURE, ALL HOLES SHALL BE FILLED WITH CEMENT MORTAR.
 - WHERE CONCRETE HOLLOW BLOCKS STRUCTURES ATTAIN A HEIGHT OF 1.20 METER, IT SHALL BE REINFORCED STEEL BARS SPACE AT NOT MORE THAN 0.60 M. O.C. BOTHWAYS.
 - INSTALL STEPS ONLY WHERE DEPTH EXCEEDS 1.22 METERS.

DETAILS OF COMBINATION CURB INLET MANHOLE

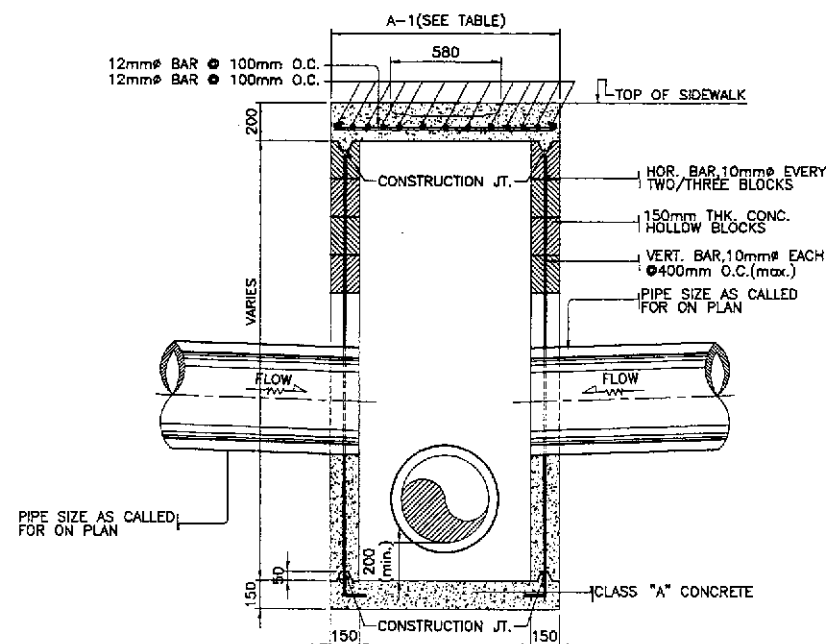
 JAPAN INTERNATIONAL COOPERATION AGENCY		 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS		PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)		SCALE : AS SHOWN	SHEET CONTENTS : STANDARD COMBINATION CURB INLET MANHOLE	SHEET NO. : DS-09
DESIGNED 7/28/01 CHECKED 7/30/01 SUBMITTED 8/16/01	DATE 7/28/01 SIGNATURE [Signature] TEAM LEADER	SUBMITTED BY DANILLO C. TRAJANO Project Director	REVIEWED BY JOSEFINA M. ALAGAR Chief, Highways Division	RECOMMENDED BY GILBERTO S. REYES OIC, Director IV	APPROVED BY MANUEL M. BONDAN Undersecretary	PLARIDEL BYPASS - CONTRACT PACKAGE IV		



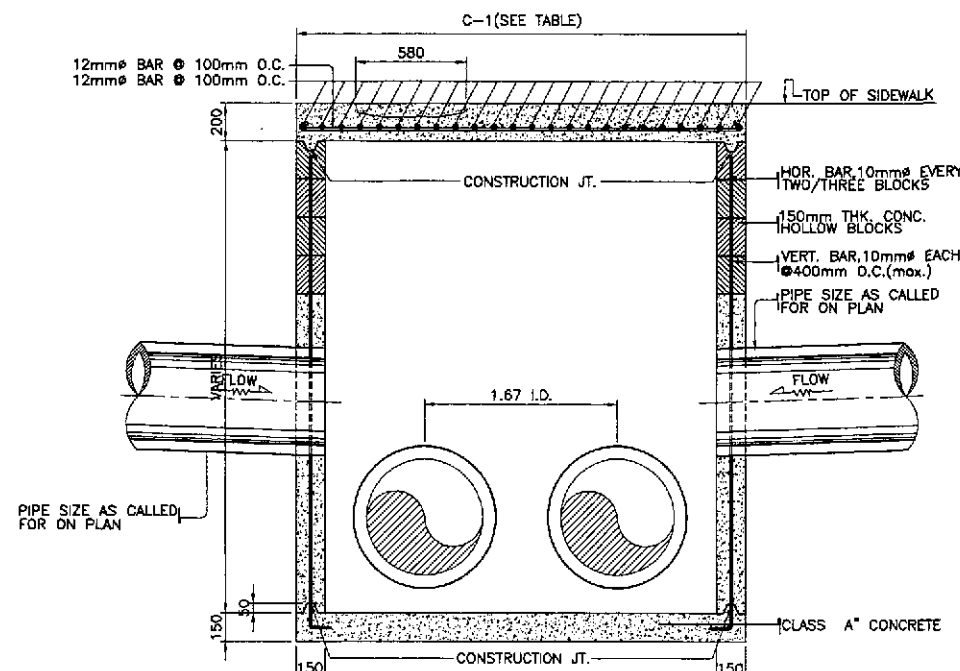
1A PLAN BOX-TYPE MANHOLE (SINGLE PIPE)
DS-10



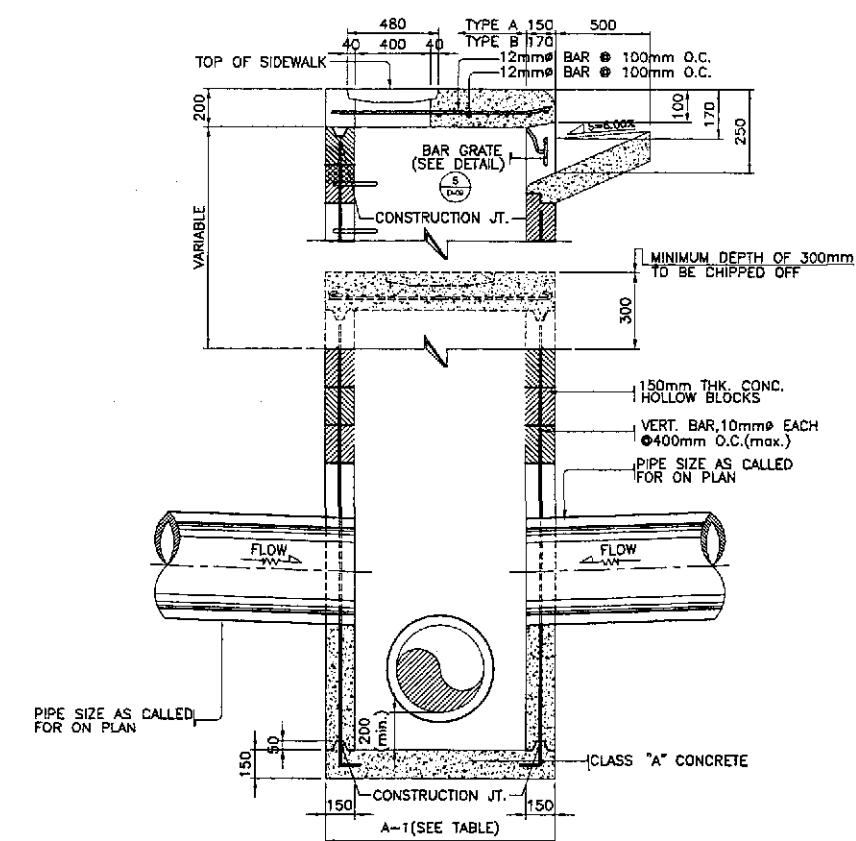
2A PLAN BOX-TYPE MANHOLE (DOUBLE PIPE)
DS-10



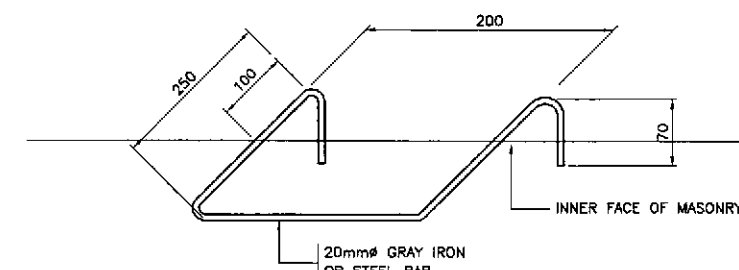
1B SECTION
DS-10



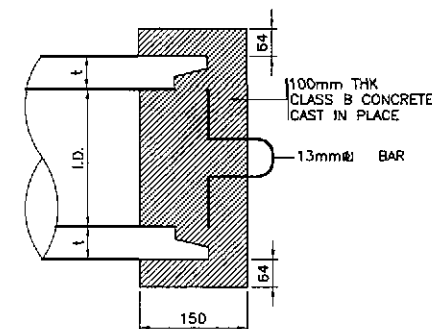
2B SECTION
DS-10



3 BOX-TYPE CONVERTED TO CURB INLET MANHOLE
DS-10



4 STD. STEP OR RUNG
DS-10



5 CONCRETE BLOCK PLUG @ SUBSURFACE PIPE
DS-10

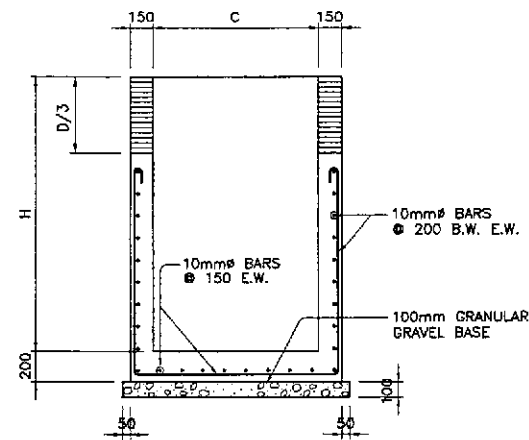
- NOTES:
- ALL CONCRETE SHALL BE CLASS "A", EXPOSED EDGES SHALL BE FINISHED WITH SUITABLE EDGER.
 - PULLING IRON, STEPS AND BAR GRATE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE.
 - CONSTRUCTION JOINTS SHALL CONFORM WITH THE GROOVES OF CONCRETE HOLLOW BLOCKS.
 - CONCRETE HOLLOW BLOCKS OR DRESSED ADOBE BLOCKS SHALL HAVE AN AVERAGE COMPRESSIVE STRENGTH OF 6.865MPa.
 - IN CONCRETE HOLLOW BLOCKS STRUCTURE, ALL HOLES SHALL BE FILLED WITH CEMENT MORTAR.
 - WHERE CONCRETE HOLLOW BLOCKS STRUCTURES ATTAIN A HEIGHT OF 1.20 METER, IT SHALL BE REINFORCED STEEL BARS SPACE AT NOT MORE THAN 0.60 M. O.C. BOTHWAYS.
 - INSTALL STEPS ONLY WHERE DEPTH EXCEEDS 1.22 METERS.
 - 150 mm BOTTOM SLAB THICKNESS FOR HEIGHT OF 1000 TO 4000mm. AND 200mm. FOR 5000 TO 8000mm IN HEIGHT.
 - FROM THE HEIGHT OF 3000 TO 8000mm. THE FIRST 2000mm. FROM THE TOP IS CHB WITH DETAILS FOR 2000mm HEIGHT.
 - REINFORCEMENT FOR BOTTOM SLAB ARE ALL 10mm @ 400 B.W.
 - VERTICAL BARS ARE CUT AT HALF POINT FOR EVERY OTHER BAR AT SOLID WALL.
 - INSIDE SURFACES AND OUTSIDE SURFACES OF ALL MASONRY SHALL HAVE A PLASTER COAT 1/2" THICK.
 - BOX TYPE MANHOLE SHALL NOT BE CONSTRUCTED WITHIN THE RIDING SURFACE.

TABLE OF MANHOLE					
(H) HEIGHT mm.	(T) THICKNESS OF WALL (mm)	VERTICAL BARS			HORIZONTAL BARS
		INSIDE EDGE	CENTER	OUTSIDE EDGE	
1000	150mm CHB	-	10mm @ 200	-	10mm @ 400
2000	150mm CHB	-	12mm @ 200	-	10mm @ 400
3000	180mm CONC.	20mm @ 300	-	32mm @ 300	10mm @ 400
4000	230mm CONC.	20mm @ 250	-	32mm @ 250	10mm @ 400
5000	280mm CONC.	20mm @ 225	-	32mm @ 225	10mm @ 400
6000	330mm CONC.	20mm @ 200	-	32mm @ 200	10mm @ 400
7000	380mm CONC.	20mm @ 175	-	32mm @ 175	10mm @ 400
8000	410mm CONC.	20mm @ 150	-	32mm @ 150	10mm @ 400

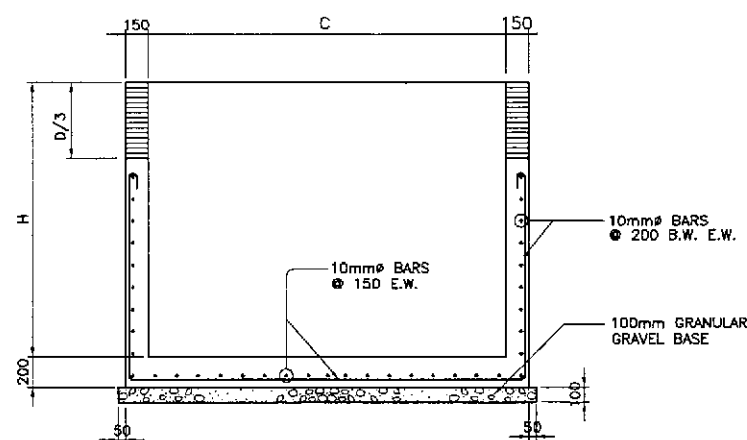
TABLE OF DIMENSION			
TYPE OF CIM	SIZE OF PIPE (mm)	A-1 (m)	C-1 (m)
T-1	300	1.12	1.92
T-2	460	1.19	2.26
T-3	610	1.37	2.69
T-4	760	1.54	3.11
T-5	910	1.73	3.55
T-6	1070	1.90	3.98
T-7	1220	2.08	4.42
T-8	1520	2.43	5.27

SPECIAL JUNCTION BOX MANHOLE

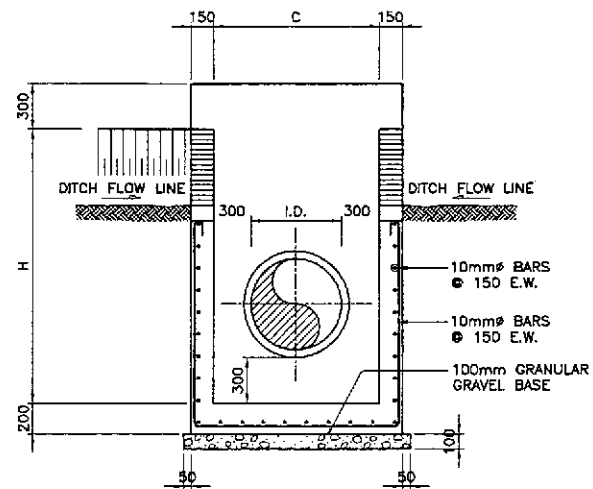
 JAPAN INTERNATIONAL COOPERATION AGENCY		 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS		PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)		SCALE : AS SHOWN	SHEET CONTENTS : SPECIAL JUNCTION BOX MANHOLE	SHEET NO. : DS-10
DESIGNED : 9/25/02 9/25/02 9/25/02	DATE : 9/25/02 9/25/02 9/25/02	SIGNATURE : [Signature] [Signature] [Signature]	P.J.H. - P.M.O. BUREAU OF DESIGN OFFICE OF THE SECRETARY	REVIEWED BY : JOSEFINA M. ALAGAR GILBERTO S. REYES MANUEL M. BONDAN SIMON A. DATUMANONG	PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	SCALE : AS SHOWN	SHEET CONTENTS : SPECIAL JUNCTION BOX MANHOLE	SHEET NO. : DS-10
KATAHIRA & ENGINEERS YACHIO ENGINEERING CO., LTD.		DANILLO C. TRAJANO Project Director		PLARIDEL BYPASS - CONTRACT PACKAGE IV		FULL SIZE A1		



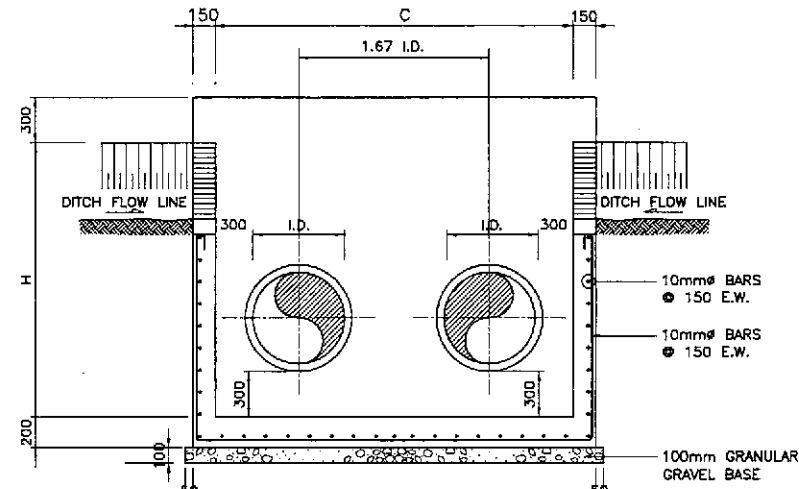
1C SECTION
DS-11



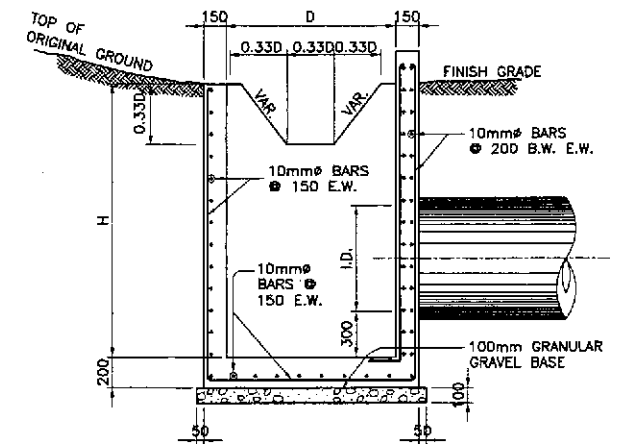
2C SECTION
DS-11



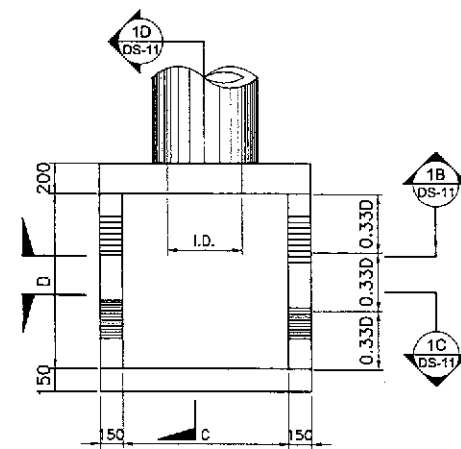
1B SECTION
DS-11



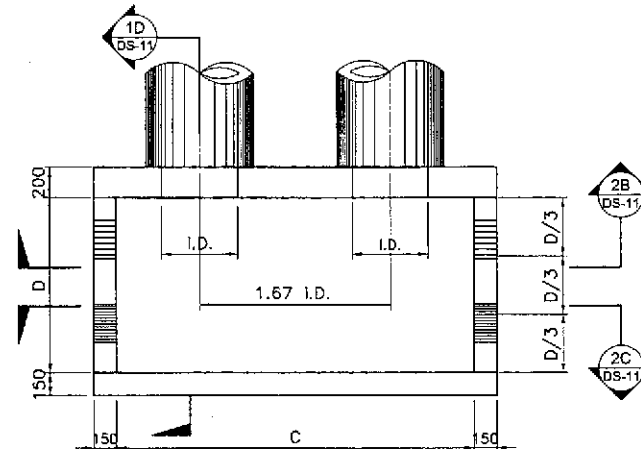
2B SECTION
DS-11



1C SECTION
DS-11



1A PLAN
D-11



2A PLAN
DS-11

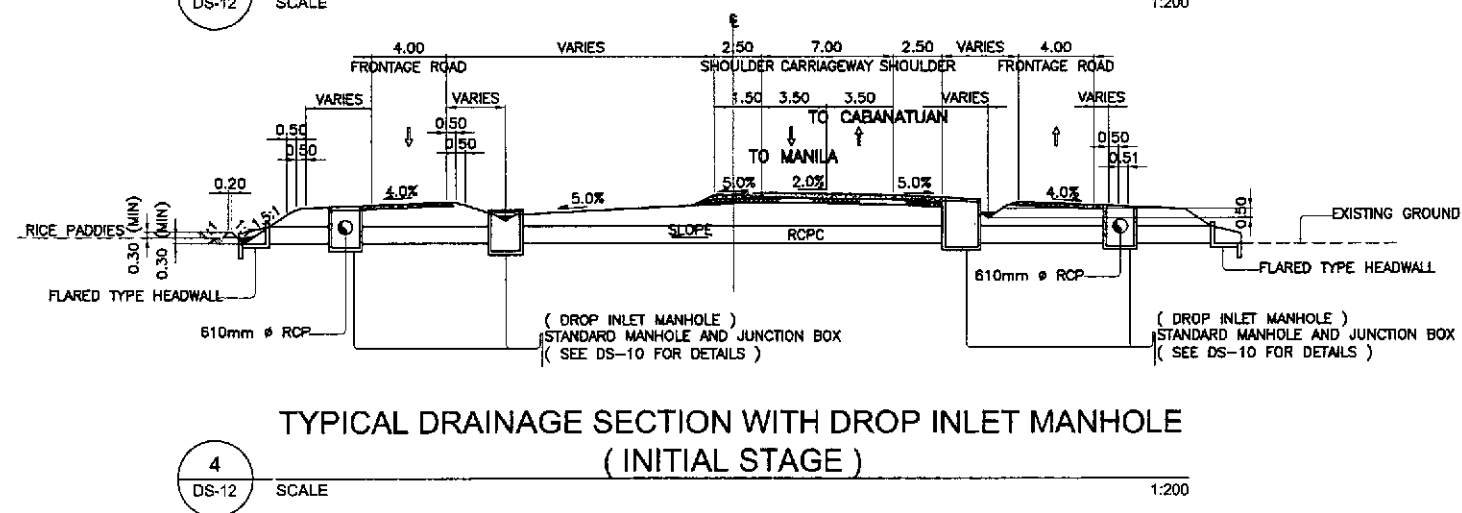
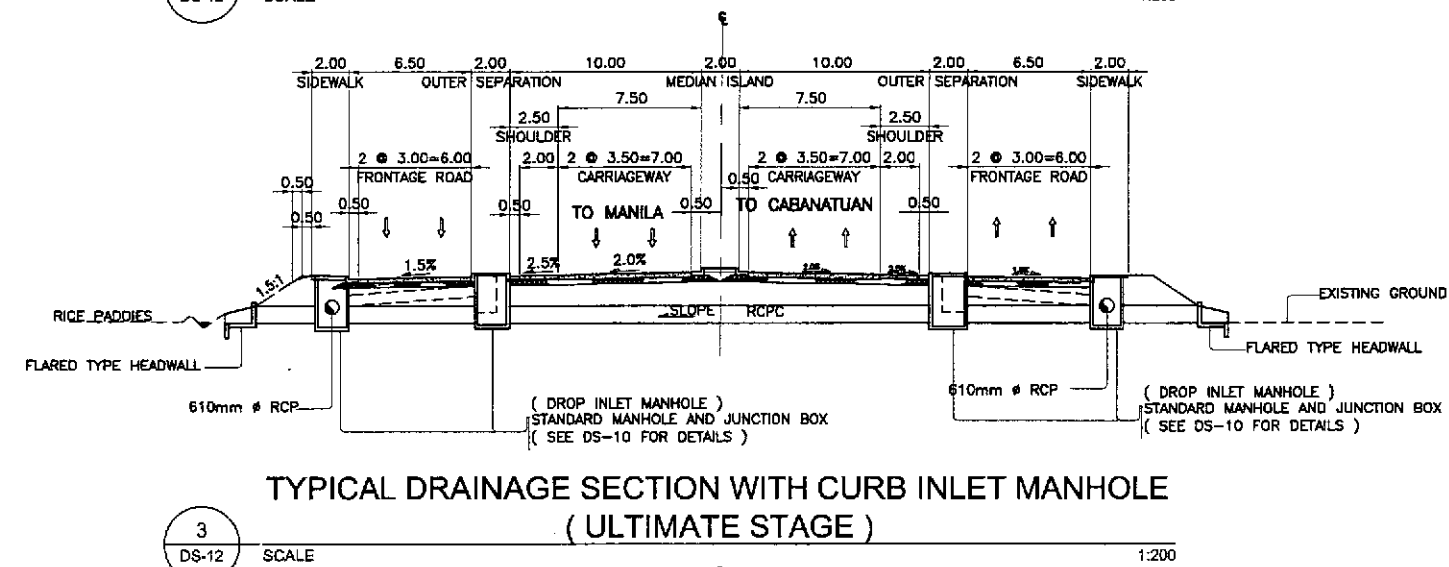
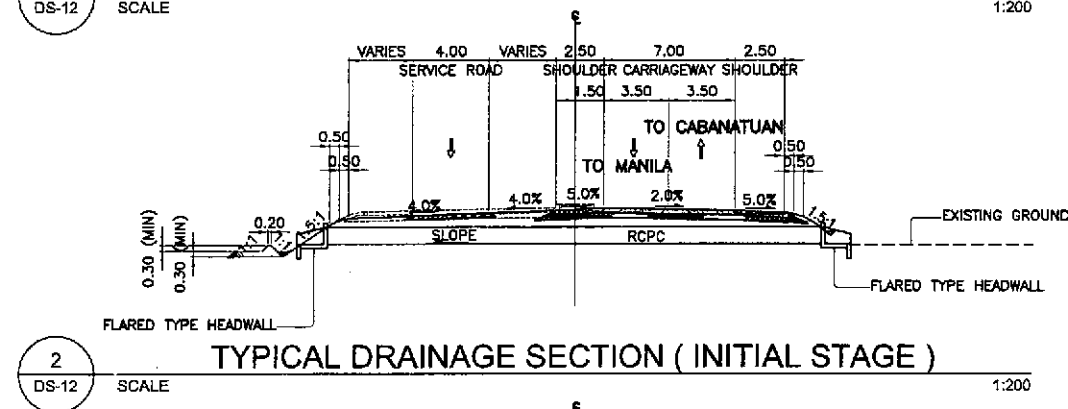
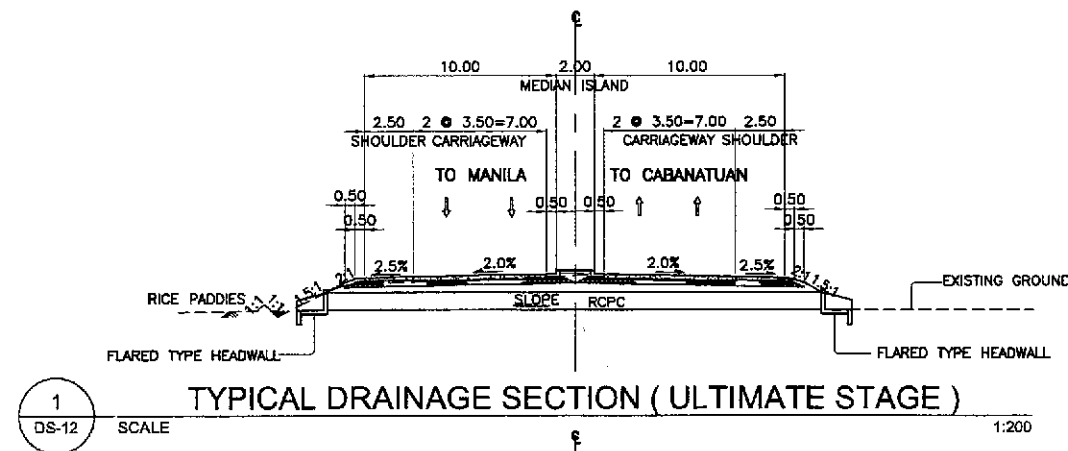
PIPE DIAMETER (mm)		610	910	1070	1220	1520
COMMON TO ALL NUMBER OF BARRELS	H	1.910	2.210	2.370	2.520	2.820
	D	1.200	1.500	1.650	1.800	2.100
SINGLE	C	1.210	1.510	1.670	1.820	2.120
DOUBLE	C	2.230	3.030	3.460	3.860	4.660
TRIPLE	C	3.250	4.550	5.240	5.890	7.120










1 CONCRETE CATCH BASIN (SINGLE PIPE)
DS-11 SCALE 1:25

2 CONCRETE CATCH BASIN (DOUBLE PIPE)
DS-11 SCALE 1:25

DETAILS OF REINFORCED CONCRETE CATCH BASIN FOR RCPC

 JAPAN INTERNATIONAL COOPERATION AGENCY		 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS		PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)		SCALE : 1:25	SHEET CONTENTS : STANDARD REINFORCED CONCRETE CATCH BASIN FOR RCPC	SHEET NO. : DS-11
DESIGNED : 9/20/12 KATAHIRA & ENGINEERS INTERNATIONAL	CHECKED : 9/20/12 YACHIO ENGINEERING CO., LTD.	SUBMITTED : 9/20/12 YACHIO ENGINEERING CO., LTD.	SUBMITTED BY : DANILLO C. TRAJAND Project Director	REVIEWED BY : JOSEFINA M. ALAGAR Chief, Highways Division	RECOMMENDED BY : GILBERTO S. REYES OIC, Director IV	RECOMMENDED BY : MANUEL M. BONDAN Undersecretary	APPROVED BY : SIMON A. DATUMANONG Secretary	FULL SIZE A1



<div> JICA JAPAN INTERNATIONAL COOPERATION AGENCY</div> <div> KATAHIRA & ENGINEERS INTERNATIONAL</div> <div> YEO YACHIYO ENGINEERING CO., LTD.</div>			<div><div>DATE</div><div>DESIGNED 7/28/02</div><div>CHECKED 9/20/02</div><div>SUBMITTED 10/16/02</div></div> <div><div>SIGNATURE</div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</div></div> <div><div><div>PAJHL - PMO</div><div>Submitted By: DANILO C. TRAJANO Project Director</div></div><div><div>BUREAU OF DESIGN</div><div>Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division</div></div><div><div>OFFICE OF THE SECRETARY</div><div>Recommended By: GILBERTO S. REYES OIC, Director IV</div></div><div><div>Approved By: MANUEL M. BONGAN Undersecretary</div><div>Approved By: SIMEON A. DATUMANONG Secretary</div></div></div>	<div>PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE IV</div>	<div>SCALE : NOT TO SCALE FULL SIZE A1</div>	<div>SHEET CONTENTS : TYPICAL DRAINAGE SECTIONS WITH MANHOLE (INITIAL and ULTIMATE STAGE)</div>	<div>SHEET NO. : DS-12</div>
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