



**DEPARTMENT OF PUBLIC  
WORKS AND HIGHWAYS  
REPUBLIC OF THE  
PHILIPPINES**



**JAPAN INTERNATIONAL  
COOPERATION AGENCY**

**THE DETAILED DESIGN  
OF  
PASIG-MARIKINA RIVER CHANNEL  
IMPROVEMENT PROJECT (PHASE III)**

**FINAL REPORT**

**VOLUME-IV-1**

**QUANTITY CALCULATION OF PASIG RIVER**

**FEBURUARY 2013**



**CTI Engineering International Co., Ltd.  
Consulting Engineers**

## COMPOSITION OF FINAL REPORT

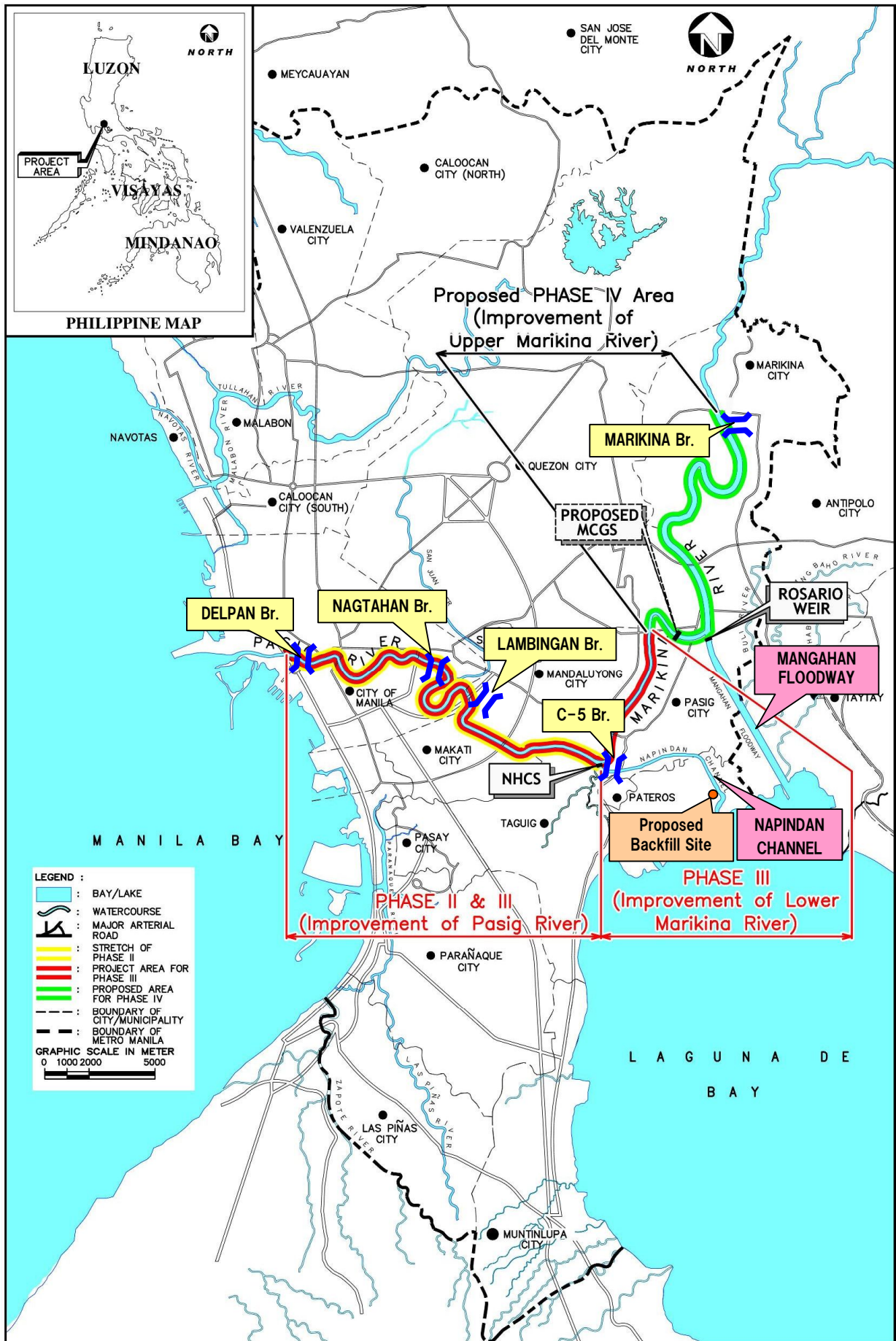
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### EXCHANGE RATES USED IN THE REPORT:

**PHP 1.00 = JPY 1.968**

**USD 1.00 = JPY 80.940 = PHP 41.123**

**(Monthly Average in November 2012 of Central Bank of the Philippines)**



**PROJECT LOCATION MAP**

**THE DETAILED DESIGN  
OF  
PASIG-MARIKINA RIVER CHANNEL  
IMPROVEMENT PROJECT (PHASE III)**

**DRAFT FINAL REPORT  
Vol.-IV-1 QUANTITY CALCULATION OF PASIG RIVER**

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## ABBREVIATIONS AND ACRONYMS

### Units of Measurement

mm	: millimeter
cm	: centimeter
m	: meter
km	: kilometer
g, gr	: gram
kg	: kilogram
t, ton	: metric ton
m <sup>2</sup>	: square meter
ha, has	: hectare, hectares
km <sup>2</sup>	: square kilometer
m <sup>3</sup>	: cubic meter
s, sec	: second
m, min.	: minute
h, hr	: hour
y, yr	: year
MW	: megawatt
mm/hr	: millimeter per hour
m/s	: meter per second
km/hr	: kilometer per hour
mg/l	: milligram per liter
m <sup>3</sup> /s	: cubic meter per second
m <sup>3</sup> /s/km <sup>2</sup>	: cubic meter per second per square kilometer
%	: percent
ppm	: parts per million
x x	: symbol of multiplication (times)
≤, ≥	: Inequality sign (e.g. A≤B means that value A is less than or equal to value B.)
<, >	: Inequality sign (e.g. A<B means that value A is less than value B.)
Y, ¥, JPY	: Japanese Yen
P, ₱, PHP	: Philippine Peso

## **CHAPTER 1 BILL OF QUANTITY**

Bill of quantity of lower Marikina River is indicated from the following page.

**BILL No. 1 - PRELIMINARY AND GENERAL**

Item No.	Description	Unit	Quantity	Unit Rates				Amounts			
				Peso	Yen	VAT	Total (Peso)	Peso	Yen	VAT	Total (Peso)
1.10/1	Mobilization and demobilization	LS	1								
1.11/1	Survey of ground profiles	LS	1								
1.13/1	Foundation investigation	m	960								
1.15/1	Traffic Management Plan	LS	1								
1.15/2	Implementation and operation of traffic management plan	mo	36								
1.16/1	Quality Management Plan	LS	1								
1.16/2	Implementation and operation of quality management plan	mo	36								
1.16/3	Provisional of laboratory equipment for Employer	LS	1								
1.17/1	Programming and reporting	LS	1								
1.18/1	Health and Safety Plan	LS	1								
1.18/2	Implementation and operation of health and safety plan	mo	36								
1.20/1	Progress photographs	mo	36								
1.22/1	Provision of office for Employer's Personnel	LS	1								
1.22/2	Maintenance of office for Employer's Personnel	mo	36								
1.23/4	Maintain Type A transportation item	mo	180								
1.23/5	Maintain Type B transportation item	mo	108								
1.23/6	Maintain Type C transportation item	mo	36								
1.24/1	Commemorative panels	no	8								
1.25/1	Site clean up	LS	1								
<b>SUB-TOTALS CARRIED TO SUMMARY</b>											

1.2

**BILL No. 2 - ENVIRONMENTAL**

Item No.	Description	Unit	Quantity	Unit Rates				Amounts			
				Peso	Yen	VAT	Total (Peso)	Peso	Yen	VAT	Total (Peso)
2.1/1	Contractor's environmental management	LS	1								
<b>SUB-TOTALS CARRIED TO SUMMARY</b>											

**BILL No. 4 - EXCAVATION AND EARTHWORKS**

Item No.	Description	Unit	Quantity	Unit Rates				Amounts			
				Peso	Yen	VAT	Total (Peso)	Peso	Yen	VAT	Total (Peso)
4.5/1-A	Demolition and removal of existing steel handrail	lm	392								
4.5/2-A	Removal of existing concrete debris	m <sup>3</sup>	2,505								
4.5/3-A	Removal and restoration of existing lighting post	no	112								
4.5/4-A	Removal of existing concrete blocks at Sta. 3+040	LS	1								
4.5/5-A	Removal and re-erection of fence support struts between Sta. 2+850 and 3+070	LS	1								
4.5/6-A	Demolition and removal of existing concrete stairs at Sta. 5+220	LS	1								
4.5/7-A	Demolition and removal of existing collapsed revetment	m <sup>3</sup>	1,242								
4.5/8-A	Temporary removal and reinstallation of steel dolphins	no	2								
4.5/9-A	Demolition and removal of existing collapsed wall and abandoned shanty at Sta. 5+550	LS	1								
4.5/10-A	Demolition and removal of existing steel fence	lm	820								
4.5/11-A	Demolition and removal of existing collapsed wall and abandoned shanty at Sta. 6+200	LS	1								
4.5/12-A	Removal of existing concrete blocks at Sta. 7+500	LS	1								
4.5/13-A	Demolition and removal of abandoned jetty at Sta. 8+500	LS	1								
4.5/14-A	Demolition and removal of existing concrete structure at Sta. 8+660	LS	1								
4.5/15-A	Demolition and removal of abandoned boat station	no	2								
4.5/16-A	Demolition and removal of existing wooden structure at Sta. 8+860	LS	1								
4.5/17-A	Demolition and removal of boat station at Sta. 8+930	LS	1								
4.5/18-A	Demolition and removal of boat station at Sta. 8+970	LS	1								
4.5/19-A	Removal of existing steel pipe at Sta. 8+890	LS	1								
4.5/20-A	Removal of existing sandbags at Sta. 8+950	LS	1								
4.5/21-A	Demolition and removal of existing collapsed wall and abandoned shanty at Sta. 9+060	LS	1								
4.5/22-A	Temporary removal and reinstallation of existing fence, bollards and canopy between Sta. 9+150 and 9+350	LS	1								
4.5/23-A	Demolition and removal of existing structure at Sta. 9+220	LS	1								
4.5/24-A	Removal of wooden dolphins	no	30								
4.5/25-A	Demolition and removal of existing concrete handrail	lm	1,507								
4.5/26-A	Demolition and removal of existing river wall between Sta. 9+720 and 9+750	LS	1								
4.5/27-A	Removal of abandoned boats at Sta. 9+740	LS	1								
4.5/28-A	Demolition and removal of existing river wall between Sta. 9+800 and 9+950	LS	1								
4.5/29-A	Demolition and removal of existing concrete structure between Sta. 10+140 and 10+179	LS	1								
4.5/30-A	Temporary removal and reinstallation of existing fence and lighting posts between Sta. 10+232 and 10+341	LS	1								
4.5/31-A	Temporary removal and reinstallation of existing fences	lm	495								
4.5/32-A	Temporary removal and reinstallation of existing bollards between Sta. 10+950 and 11+260	LS	1								
4.5/33-A	Remove wooden and steel dolphins between Sta. 11+050 and 11+15	LS	1								
4.5/34-A	Removal of existing steel sheet pile Sta. 11+150 and 11+263	LS	1								
4.5/35-A	Temporary removal and reinstallation of existing fence and handrail between Sta. 11+788 and 11+803	LS	1								
4.5/36-A	Demolition and removal of existing platform between Sta. 12+030 and 12+090	LS	1								
4.5/37-A	Demolition and removal of existing Brgy. outpost at Sta. 13+800	LS	1								
4.5/38-A	Demolition and removal of boat station at Sta. 13+740	LS	1								



**BILL No. 4 - EXCAVATION AND EARTHWORKS (continued)**

Item No.	Description	Unit	Quantity	Unit Rates				Amounts			
				Peso	Yen	VAT	Total (Peso)	Peso	Yen	VAT	Total (Peso)
4.5/39-A	Demolition and removal of existing river wall between Sta. 13+800 and 13+930	LS	1								
4.5/40-A	Demolition and removal of existing river wall between Sta. 14+070 and 14+100	LS	1								
4.5/41-A	Demolition and removal of boat station at Sta. 14+880	LS	1								
4.5/42-A	Removal of existing sandbags at Sta. 15+050	LS	1								
4.5/43-A	Demolition and removal of boat station at Sta. 15+290	LS	1								
4.5/44-A	Demolition and removal of boat station at Sta. 15+440	LS	1								
4.5/45-A	Demolition and removal of boat station at Sta. 16+150	LS	1								
4.5/46-A	Temporary removal and reinstallation of wooden dolphins	no	33								
4.5/47-A	Demolition and removal of portion of extended wall at Sta. 16+564	LS	1								
4.5/48-A	Demolition and removal of existing revetment	m <sup>3</sup>	6,266								
4.5/49-A	Demolition and restoration of existing sidewalks	m <sup>2</sup>	1,836								
4.5/50-A	Demolition and restoration of existing CHB wall	m <sup>2</sup>	3,842								
4.5/51-A	Temporary removal and re-installation of existing steel handrail	lm	195								
4.5/52-A	Restoration of existing revetment	m <sup>3</sup>	690								
4.7/1	River bank excavation	m <sup>3</sup>	33,200								
4.8/1	Excavation for manholes and junction manholes	m <sup>3</sup>	8,400								
4.8/2	Excavation for pipe culverts	m <sup>3</sup>	7,400								
4.8/3	Excavation for other structures	m <sup>3</sup>	6,700								
4.15/1	Free-draining backfill	m <sup>3</sup>	26,400								
4.16/1	Random backfill	m <sup>3</sup>	10,300								
4.17/1	Zone B pipe backfill	m <sup>3</sup>	1,900								
4.17/2	Zone C pipe backfill	m <sup>3</sup>	4,200								
<b>SUB-TOTALS CARRIED TO SUMMARY</b>											

**BILL No. 5 - CONCRETE**

Item No.	Description	Unit	Quantity	Unit Rates				Amounts				
				Peso	Yen	VAT	Total (Peso)	Peso	Yen	VAT	Total (Peso)	
5.11/1	Reinforcement Grade 275	t	795									
5.16/1	Precast concrete manhole and junction box covers	m <sup>3</sup>	41									
5.16/2	Precast concrete U-ditch covers	m <sup>3</sup>	32									
5.21/1	Anchor bars for concrete structures	kg	4,351									
5.22/1	Concrete in manholes, junction boxes and outlets	m <sup>3</sup>	1,277									
5.22/2	Concrete for pipe bedding	m <sup>3</sup>	53									
5.22/3	Concrete in box culverts	m <sup>3</sup>	148									
5.22/4	Concrete in sheet pile copings	m <sup>3</sup>	3,960									
5.22/5	Concrete in vertical walls VW	m <sup>3</sup>	936									
5.22/7	Concrete in parapet walls PW Type 2	m <sup>3</sup>	903									
5.22/8	Concrete in parapet walls PW Type 3	m <sup>3</sup>	863									
5.22/9	Concrete in parapet walls PW Type 4	m <sup>3</sup>	15									
5.22/10	Concrete in raised walls RW	m <sup>3</sup>	84									
5.22/11	Concrete in inclined walls IW	m <sup>3</sup>	1,954									
5.22/12	Concrete in stair-type inclined walls	m <sup>3</sup>	108									
5.22/13	Concrete in L type parapet walls	m <sup>3</sup>	673									
5.22/14	Concrete in handrail bases	m <sup>3</sup>	22									
5.22/15	Filler concrete (Class B)	m <sup>3</sup>	141									
5.22/16	Concrete in U-ditches	m <sup>3</sup>	786									
5.22/17	Concrete in repair Type R3	m <sup>3</sup>	63									
5.23/1	Levelling concrete	m <sup>3</sup>	460									
				<b>SUB-TOTALS CARRIED TO SUMMARY</b>								

**BILL No. 6 - PILING**

Item No.	Description	Unit	Quantity	Unit Rates				Amounts			
				Peso	Yen	VAT	Total (Peso)	Peso	Yen	VAT	Total (Peso)
6.4/1	Type IIIw U-shape	m	3,311								
6.4/2	Type Ivw U-shape	m	23,536								
6.4/3	Type VL U-shape	m	14,584								
6.4/4	Type VII U-shape	m	49,766								
6.4/7	Type 10H Hat-shape w/H-400x200x9x22	m	12,920								
6.4/8	Type 10H Hat-shape w/H-450x200x12x25	m	3,631								
6.4/9	Type 10H Hat-shape w/H-450x250x9x22	m	6,179								
6.4/10	Type 10H Hat-shape w/H-450x250x12x28	m	1,671								
6.4/11	Type 10H Hat-shape w/H-500x200x12x25	m	1,785								
6.4/12	Type 10H Hat-shape w/H-500x250x12x28	m	799								
6.4/13	Type 10H Hat-shape w/H-550x250x12x28	m	428								
6.4/14	Type 10H Hat-shape w/H-600x200x12x28	m	1,656								
6.4/15	Type 10H Hat-shape w/H-600x250x12x28	m	933								
6.4/16	Type 10H Hat-shape w/H-650x200x12x28	m	1,928								
6.4/17	Type 10H Hat-shape w/H-650x250x12x28	m	959								
6.4/18	Type 10H Hat-shape w/H-750x250x12x25	m	4,870								
6.4/19	Type 25H Hat-shape	m	1,276								
6.4/21	Type 25H Hat-shape w/H-850x250x16x28	m	271								
6.4/22	End Connection Type 1	no	43								
6.4/23	End Connection Type 2	no	14								
6.4/24	End Connection Type 3	no	13								
6.4/25	Extra-over cost of installing sheet piles beneath bridges and HV cables	m	950								
<b>SUB-TOTALS CARRIED TO SUMMARY</b>											

**BILL No. 7 - PROTECTION WORKS**

Item No.	Description	Unit	Quantity	Unit Rates				Amounts			
				Peso	Yen	VAT	Total (Peso)	Peso	Yen	VAT	Total (Peso)
7.4/1	Riprap Class B	m <sup>3</sup>	67,800								
7.5/1	Gravel bedding and backfill	m <sup>3</sup>	1,372								
7.6/1	Stone masonry repair Type R4	m <sup>2</sup>	1,080								
7.9/1	Sandbag riprap	m <sup>3</sup>	448								
<b>SUB-TOTALS CARRIED TO SUMMARY</b>											

**BILL No. 8 - DRAINAGE**

Item No.	Description	Unit	Quantity	Unit Rates				Amounts			
				Peso	Yen	VAT	Total (Peso)	Peso	Yen	VAT	Total (Peso)
8.4/1	Reinforced concrete pipe – 300 mm dia.	lm	105								
8.4/2	Reinforced concrete pipe – 460 mm dia.	lm	105								
8.4/3	Reinforced concrete pipe – 525 mm dia.	lm	1								
8.4/4	Reinforced concrete pipe – 610 mm dia.	lm	11								
8.4/5	Reinforced concrete pipe – 760 mm dia.	lm	21								
8.4/6	Reinforced concrete pipe – 910 mm dia.	lm	757								
8.4/7	Reinforced concrete pipe – 1070 mm dia.	lm	8								
8.4/8	Unreinforced concrete pipe – 200 mm dia.	lm	4								
8.4/9	Unreinforced concrete pipe – 250 mm dia.	lm	1								
8.6/1	FRP flap gate – 300 mm	no	3								
8.6/2	FRP flap gate – 910 mm	no	36								
8.9/1	PVC drainage pipes – 50 mm dia.	lm	19								
8.9/2	PVC drainage pipes – 100 mm dia.	lm	378								
8.9/3	PVC drainage pipes – 150 mm dia.	lm	542								
8.9/4	PVC drainage pipes – 200 mm dia.	lm	410								
8.9/5	PVC drainage pipes – 250 mm dia.	lm	44								
8.9/6	PVC drainage pipes – 300 mm dia.	lm	19								
8.10/1	Galvanised iron drainage pipes – 100 mm dia.	lm	6								
8.10/2	Galvanised iron drainage pipes – 150 mm dia.	lm	38								
8.10/3	Galvanised iron drainage pipes – 300 mm dia.	lm	19								
<b>SUB-TOTALS CARRIED TO SUMMARY</b>											

1.7

**BILL No. 15 - MISCELLANEOUS WORKS**

Item No.	Description	Unit	Quantity	Unit Rates				Amounts			
				Peso	Yen	VAT	Total (Peso)	Peso	Yen	VAT	Total (Peso)
15.2/1	Concrete block paving	m <sup>2</sup>	15,170								
15.3/1	Concrete railing – Type 1	lm	604								
15.3/2	Concrete railing – Type 2	lm	87								
15.3/3	Concrete railing – Type 3	lm	333								
15.4/1	Navigation warning signs	no	20								
15.5/1	Concrete curb	lm	5,433								
15.6/1	Replacement boat station at Sta. 8+930	LS	1								
15.6/2	Replacement boat station at Sta. 8+970	LS	1								
15.6/3	Replacement boat station at Sta. 13+740	LS	1								
15.6/4	Replacement boat station at Sta. 14+880	LS	1								
15.6/5	Replacement boat station at Sta. 15+290	LS	1								
15.6/6	Replacement boat station at Sta. 15+440	LS	1								
15.6/7	Replacement boat station at Sta. 16+150	LS	1								
15.7/1	Type III fencing	lm	341								
<b>SUB-TOTALS CARRIED TO SUMMARY</b>											

## **CHAPTER 2 RIVER STRUCTURE**

Quantity calculation of river structure is indicated from the following page.

**Pasig-Marikina River Channel Improvement Project (Phase III)**  
**Summary of Quantities of River Structures (Pasig River)**

<b>BILL No. 4 – EXCAVATION AND EARTHWORKS</b>			
Item No.	Description	Unit	Quantity
4.5/1-A	Demolition and removal of existing steel handrail	lm	392
4.5/2-A	Removal of existing concrete debris	m <sup>3</sup>	2,505
4.5/3-A	Removal and restoration of existing lighting post	no	112
4.5/4-A	Removal of existing concrete blocks at Sta. 3+040	LS	1
4.5/5-A	Removal and re-erection of fence support struts between Sta. 2+850 and 3+070	LS	1
4.5/6-A	Demolition and removal of existing concrete stairs at Sta. 5+220	LS	1
4.5/7-A	Demolition and removal of existing collapsed revetment	m <sup>3</sup>	1,242
4.5/8-A	Temporary removal and reinstallation of steel dolphins	no	2
4.5/9-A	Demolition and removal of existing collapsed wall and abandoned shanty at Sta. 5+550	LS	1
4.5/10-A	Demolition and removal of existing steel fence	lm	820
4.5/11-A	Demolition and removal of existing collapsed wall and abandoned shanty at Sta. 6+200	LS	1
4.5/12-A	Removal of existing concrete blocks at Sta. 7+500	LS	1
4.5/13-A	Demolition and removal of abandoned jetty at Sta. 8+500	LS	1
4.5/14-A	Demolition and removal of existing concrete structure at Sta. 8+660	LS	1
4.5/15-A	Demolition and removal of abandoned boat station	no	2
4.5/16-A	Demolition and removal of existing wooden structure at Sta. 8+860	LS	1
4.5/17-A	Demolition and removal of boat station at Sta. 8+930	LS	1
4.5/18-A	Demolition and removal of boat station at Sta. 8+970	LS	1
4.5/19-A	Removal of existing steel pipe at Sta. 8+890	LS	1
4.5/20-A	Removal of existing sandbags at Sta. 8+950	LS	1
4.5/21-A	Demolition and removal of existing collapsed wall and abandoned shanty at Sta. 9+060	LS	1
4.5/22-A	Temporary removal and reinstallation of existing fence, bollards and canopy between	LS	1
4.5/23-A	Demolition and removal of existing structure at Sta. 9+220	LS	1
4.5/24-A	Removal of wooden dolphins	no	30
4.5/25-A	Demolition and removal of existing concrete handrail	lm	1,507
4.5/26-A	Demolition and removal of existing river wall between Sta. 9+720 and 9+750	LS	1
4.5/27-A	Removal of abandoned boats at Sta. 9+740	LS	1
4.5/28-A	Demolition and removal of existing river wall between Sta. 9+800 and 9+950	LS	1
4.5/29-A	Demolition and removal of existing concrete structure between Sta. 10+140 and 10+179	LS	1
4.5/30-A	Temporary removal and reinstallation of existing fence and lighting posts between	LS	1
4.5/31-A	Temporary removal and reinstallation of existing fences	lm	495
4.5/32-A	Temporary removal and reinstallation of existing bollards between Sta. 10+950 and 11+260	LS	1
4.5/33-A	Remove wooden and steel dolphins between Sta. 11+050 and 11+150	LS	1
4.5/34-A	Removal of existing steel sheet pile Sta. 11+150 and 11+263	LS	1
4.5/35-A	Temporary removal and reinstallation of existing fence and handrail between Sta. 11+788 and	LS	1
4.5/36-A	Demolition and removal of existing platform between Sta. 12+030 and 12+090	LS	1
4.5/37-A	Demolition and removal of existing Brgy. outpost at Sta. 13+800	LS	1
4.5/38-A	Demolition and removal of boat station at Sta. 13+740	LS	1
4.5/39-A	Demolition and removal of existing river wall between Sta. 13+800 and 13+930	LS	1
4.5/40-A	Demolition and removal of existing river wall between Sta. 14+070 and 14+250	LS	1
4.5/41-A	Demolition and removal of boat station at Sta. 14+880	LS	1
4.5/42-A	Removal of existing sandbags at Sta. 15+050	LS	1
4.5/43-A	Demolition and removal of boat station at Sta. 15+290	LS	1
4.5/44-A	Demolition and removal of boat station at Sta. 15+440	LS	1
4.5/45-A	Demolition and removal of boat station at Sta. 16+150	LS	1
4.5/46-A	Temporary removal and reinstallation of wooden dolphins	no	33
4.5/47-A	Demolition and removal of portion of extended wall at Sta. 16+564	LS	1
4.5/48-A	Demolition and removal of existing revetment	m <sup>3</sup>	4,000
4.5/49-A	Demolition and restoration of existing sidewalks	m <sup>2</sup>	1,748

**Pasig-Marikina River Channel Improvement Project (Phase III)**  
**Summary of Quantities of River Structures (Pasig River)**

<b>BILL No. 4 – EXCAVATION AND EARTHWORKS (continued)</b>			
4.5/51-A	Temporary removal and re-installation of existing steel handrail	lm	195
4.7/1	River bank excavation	m <sup>3</sup>	31,592
4.8/3	Excavation for other structures	m <sup>3</sup>	5,654
4.15/1	Free-draining backfill	m <sup>3</sup>	25,057
4.16/1	Random backfill	m <sup>3</sup>	3,195

<b>BILL No. 5 – CONCRETE</b>			
Item No.	Description	Unit	Quantity
5.11/1	Reinforcement Grade 275	t	621
5.16/2	Precast concrete U-ditch covers	m <sup>3</sup>	9
5.21/1	Anchor bars for concrete structures	kg	4,144
5.22/4	Concrete in sheet pile copings	m <sup>3</sup>	3,771
5.22/5	Concrete in vertical walls VW	m <sup>3</sup>	891
5.22/7	Concrete in parapet walls PW Type 2	m <sup>3</sup>	860
5.22/8	Concrete in parapet walls PW Type 3	m <sup>3</sup>	822
5.22/9	Concrete in parapet walls PW Type 4	m <sup>3</sup>	14
5.22/10	Concrete in raised walls RW	m <sup>3</sup>	80
5.22/11	Concrete in inclined walls IW	m <sup>3</sup>	1,861
5.22/12	Concrete in stair-type inclined walls	m <sup>3</sup>	103
5.22/13	Concrete in L type parapet walls	m <sup>3</sup>	641
5.22/14	Concrete in handrail bases	m <sup>3</sup>	21
5.22/15	Filler concrete (Class B)	m <sup>3</sup>	82
5.22/16	Concrete in U-ditches	m <sup>3</sup>	584
5.22/17	Concrete in repair Type R3	m <sup>3</sup>	60
5.23/1	Levelling concrete	m <sup>3</sup>	357

<b>BILL No. 6 – PILING</b>			
Item No.	Description	Unit	Quantity
6.4/1	Type IIIw	m	3,246
6.4/2	Type IVw	m	23,075
6.4/3	Type VL	m	14,298
6.4/4	Type VII	m	48,790
6.4/7	Type 10H w/H-400x200x9x22	m	12,667
6.4/8	Type 10H w/H-450x200x12x25	m	3,560
6.4/9	Type 10H w/H-450x250x9x22	m	6,058
6.4/10	Type 10H w/H-450x250x12x28	m	1,638
6.4/11	Type 10H w/H-500x200x12x25	m	1,750
6.4/12	Type 10H w/H-500x250x12x28	m	783
6.4/13	Type 10H w/H-550x250x12x28	m	420
6.4/14	Type 10H w/H-600x200x12x28	m	1,624
6.4/15	Type 10H w/H-600x250x12x28	m	915
6.4/16	Type 10H w/H-650x200x12x28	m	1,890
6.4/17	Type 10H w/H-650x250x12x28	m	941
6.4/18	Type 10H w/H-750x250x12x25	m	4,775
6.4/19	Type 25H	m	1,251
6.4/21	Type 25H w/H-850x250x16x28	m	266
6.4/22	End Connection Type 1	no	43
6.4/23	End Connection Type 2	no	14
6.4/24	End Connection Type 3	no	13
6.4/25	Extra-over cost of installing sheet piles beneath bridges and HV cables	m	931

**Pasig-Marikina River Channel Improvement Project (Phase III)**  
**Summary of Quantities of River Structures (Pasig River)**

<b>BILL No. 7 – PROTECTION WORKS</b>			
Item No.	Description	Unit	Quantity
7.4/1	Riprap Class B	m <sup>3</sup>	64,571
7.5/1	Gravel bedding and backfill	m <sup>3</sup>	1,307
7.6/1	Stone masonry repair Type R4	m <sup>2</sup>	1,028
7.9/1	Sandbag riprap	m <sup>3</sup>	448

<b>BILL No. 15 – MISCELLANEOUS WORKS</b>			
Item No.	Description	Unit	Quantity
15.2/1	Concrete block paving	m <sup>2</sup>	14,442
15.3/1	Concrete railing – Type 1	lm	575
15.3/2	Concrete railing – Type 2	lm	82
15.3/3	Concrete railing – Type 3	lm	317
15.4/1	Navigation warning signs	no	20
15.5/1	Concrete curb	lm	5,174
15.6/1	Replacement boat station at Sta. 8+930	LS	1
15.6/2	Replacement boat station at Sta. 8+970	LS	1
15.6/3	Replacement boat station at Sta. 13+740	LS	1
15.6/4	Replacement boat station at Sta. 14+880	LS	1
15.6/5	Replacement boat station at Sta. 15+290	LS	1
15.6/6	Replacement boat station at Sta. 15+440	LS	1
15.6/7	Replacement boat station at Sta. 16+150	LS	1
15.7/1	Type III fencing	lm	341



**Quantity of Riprap, Free Draining Backfill, Riverbed Excavation, Filler Concrete, Concrete Block Paving and Demolition of Existing Revetment - Left Bank**

Stations				Length (m)	Total Length (m)	FREE DRAINING BACKFILL		RIPRAP (CLASS B)		RIVER BANK EXCAVATION		DEMOLITION OF EXISTING REVELTMENT		FILLER CONCRETE		CONCRETE BLOCK PAVING		
Item	From	To				AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	WIDTH	Ao	At (net)
1L	2+419	2+694	2+419	31.88	278.87	0.44		11.06		4.52				0.08				
			2+450			1.85	36.50	21.45	518.11	5.35	157.25			0.07	2.41			
			2+500			1.65	85.96	27.25	1196.07	5.43	264.63			0.07	3.39			
			2+550			1.32	87.38	19.78	1383.71	5.26	314.47			0.07	4.09			
			2+600			1.22	53.43	15.15	734.82	5.03	216.39			0.08	3.13			
			2+650			1.24	63.26	18.92	876.19	5.35	266.79			0.07	3.73			
			2+654			0.16	2.70	14.38	64.11	5.69	21.24	0.40	0.77		0.13	3.00	5.78	
			2+694			1.06	25.42	5.83	421.18	3.21	185.39	0.40	16.67		3.37	132.75		
2L	2+854	3+072	2+854	37.33	230.66	0.98		11.81		4.63						2.71		
			2+900			1.11	50.48	19.13	747.36	5.38	241.79	0.40	19.32		2.59	128.02		
			2+916			0.07	9.76	15.29	284.65	7.27	104.62	0.40	6.62		2.57	42.67		
			2+931			0.03	0.82	25.52	335.66	7.82	124.12	0.40	6.58		2.30	40.06		
			2+950			1.52	14.73	44.88	668.80	6.90	139.84	0.40	7.60		2.27	43.42		
			3+000			0.99	65.96	32.69	2038.54	6.33	347.68	0.40	21.02		2.39	122.46		
			3+050			0.54	40.96	11.69	1188.05	3.83	272.01	0.40	21.42		2.43	129.03		
			3+072			4.09	56.16	23.62	428.31	4.04	95.51	0.40	9.70		3.00	65.87		
3L	3+160	3+300	3+160	37.33	124.66	0.06		1.69		3.17				0.03				
			3+200			0.07	2.52	3.97	105.59	2.98	114.72	0.80	29.86	0.03	1.16			
			3+250			0.02	1.92	2.79	144.07	3.98	148.36	0.80	34.12	0.03	1.30			
			3+280			0.02	0.46	1.67	55.32	3.56	93.60	0.80	19.86	0.03	0.74			
			3+300			0.81	8.24	4.60	62.21	2.01	55.35	0.80	15.89	0.05	0.79			
4L	6+116	6+219	6+116	31.72	100.89	7.05		11.16		2.61						3.14		
			6+150			1.79	140.20	1.89	207.04	3.06	89.93	0.80	25.38		2.52	89.77		
			6+200			0.65	59.17	2.44	104.98	2.11	125.42	0.40	29.10		0.71	78.33		
			6+219			4.12	49.30	5.99	87.07	2.43	46.98	0.80	12.40		3.11	39.48		
5L	6+249	6+269	6+249	0.62	20.23	1.14		3.16		2.31				0.18				
			6+250			1.52	0.82	3.41	2.04	2.29	1.43			0.18	0.11			
			6+269			0.94	24.12	2.63	59.21	3.66	58.35			0.16	3.28			
6L	6+376	6+482	6+376	31.25	114.40	3.45		5.14		2.42		0.40				1.64		
			6+400			5.13	134.06	5.83	171.30	2.46	76.16	0.40	12.50		2.44	63.75		
			6+450			5.69	279.53	4.55	268.01	2.33	123.65	0.40	20.67		3.00	140.54		
			6+482			6.10	185.57	4.91	148.88	2.47	75.61	0.40	12.59		3.00	94.44		
7L	7+326	7+444	7+326	29.53	121.28	5.78		2.63		3.62		1.20				3.00		
			7+350			4.20	147.35	6.43	133.71	2.63	92.25	1.20	35.44		3.00	88.59		
			7+400			4.37	213.69	6.76	328.89	2.67	132.16	1.20	59.84		3.00	149.61		
			7+439			4.90	170.94	3.01	180.20	3.12	106.75	1.20	44.26		3.00	110.64		
8L	7+494	7+514	7+494	6.10	19.42	5.82		2.92	14.83	3.13	15.64	1.20	6.00		2.71	14.28		
			7+500			1.11		2.91		5.82		1.20			2.35			
			7+504			0.79	5.78	2.87	17.63	6.20	36.66	1.20	7.32		2.88	15.95		
			7+514			2.84	7.92	2.63	12.00	6.68	28.13	1.20	5.24		2.66	12.10		
9L	11+500	11+628	11+500	38.00	128.49	2.82	25.32	2.63	23.49	6.68	59.74	1.20	10.74		3.00	25.33		
			11+538			2.242		8.962		4.219		0.80		0.057				
			11+550			1.844	77.63	15.307	461.11	3.844	153.20	0.80	30.40	0.109	3.15			
			11+596			3.476	32.24	14.976	183.51	4.049	47.83	0.80	9.70		0.66			
			11+600			2.702	144.04	7.933	534.12	2.958	163.37	0.80	37.30					
			11+625			1.836	7.94	6.345	24.99	3.459	11.23	0.80	2.80					
			11+628			1.637	43.83	5.883	154.32	2.835	79.43	0.80	20.19					
10L	12+024	12+173	12+024	25.67	148.38	1.125	4.14	5.609	17.24	3.051	8.83	0.80	2.40					
			12+050			8.951		2.125		13.123		0.80		0.082		3.00		
			12+100			8.478	223.70	2.125	54.55	10.179	299.08	0.80	20.54	0.082	2.10	3.00	77.01	
			12+150			3.797	305.10	2.125	105.63	9.544	490.22	1.20	49.71	0.08	4.03	3.00	149.13	
			12+173			7.092	271.30	2.125	105.89	5.574	376.66	0.40	39.86	0.103	4.56	3.00	149.49	
			13+806			6.162	153.55	2.125	49.24	4.752	119.63	0.40	9.27		1.19	3.00	69.51	
			13+850			0.164		6.614		4.758		1.20				2.30		
11L	13+806	14+272	13+806	44.41	454.36	1.682	40.99	6.179	284.07	3.303	178.99	0.40	35.53		2.15	98.81		
			13+900			3.571	132.06	15.465	544.13	3.737	176.99	1.20	40.22		3.00	129.47		
			13+926			6.235	128.21	21.269	480.30	3.613	96.10	0.80	26.15		0.97	51.91		
			13+937			5.307	63.60	16.439	207.77	3.703	40.31	0.80	8.82		0.97	10.69		
			13+950			3.214	55.00	11.269	178.86	3.647	47.44	0.80	10.33		0.97	12.52		
			14+000			6.024	230.72	20.376	790.33	3.980	190.48	0.80	39.96		0.97	48.45		
			14+043			3.889	212.29	7.717	601.61	3.206	153.89	0.80	34.26		1.65	56.11		
			14+045			3.889	24.93	7.717	49.47	3.206	20.55	0.80	5.13		1.65	10.58		
			14+050			4.625	20.77	8.722	40.11	3.008	15.16	0.80	3.90		1.76	8.32		
			14+100			6.445	246.86	11.080	441.58	3.656	148.61	1.20	44.60		3.00	106.15		
			14+150			6.162	255.67	12.140	470.90	5.155	178.69	0.40	32.45		3.00	121.68		
			14+200			4.028	245.68	14.317	637.88	5.613	259.62	0.40	19.29		2.51	132.85		
			14+250			5.333	234.26	22.943	932.43	5.260	272.10	0.40	20.02		3.00	137.89		
			14+272			5.189	116.22	24.298	521.78	5.760	121.72	0.40	8.84		3.00	66.27		
12L	15+236	15+424	15+236	12.12	195.83	0.176		4.902		5.711		0.80				0.74		
			15+248			0.452	3.81	9.552	87.59	5.911	70.43	0.80	9.70		1.28	12.24		
			15+250			2.236	2.49	13.318	21.15	5.060	10.15	0.80	1.48		1.65	2.71		
			15+252			2.617	6.31	22.138	46.09	5.197	13.33	1.20	2.60		3.49	6.68		
			15+266			1.565	27.37	17.618	260.20	6.087	73.85	1.20	15.71		3.50	45.75		
			15+281			1.577	24.37	7.256	192.90	5.481	89.71	1.20	18.61		3.28	52.58		
			15+300			1.183	26.40	6.918	135.57	6.580	115.36	1.20	22.96		3.70	66.76		
			15+303			1.151	3.80	6.820	22.39	6.690	21.63	1.20	3.91		5.32	14.70		
			15+310			1.354	8.25	9.016	52.18	6.460	43.33	1.20	7.91		3.00	27.41		
			15+311			2.140	2.80	2.719	9.39	4.474	8.75	0.40	1.28		3.00	4.80		
			15+350			5.316	148.97	12.616	306.39	3.669	162.70	0.40	15.98		3.00	119.88		
13L	15+443	15+548	15+443	7.40	113.06	4.581	263.71	7.431	534.15	3.006	177.86	0.40	21.32		3.00	159.87		
			15+400			5.560	136.04	15.480	307.35	3.590	88.49	0.40	10.73		4.43	99.67		
			15+424			4.721		9.744		3.761		0.40			3.00			
			15+450			4.525	34.21	11.176	77.40	3.624	27.32	0.40	2.96		3.00	22.20		
			15+500			2.013	177.83	5.937	465.47	4.063	209.09	1.20	43.52		3.94	188.77		
15+548	4.018	154.57	5.615	296.08	2.670	172.57	0.40	41.01		4.61	219.14							

**Quantity of Riprap, Free Draining Backfill, Riverbed Excavation, Filler Concrete, Concrete Block Paving and Demolition of Existing Revetment - Left Bank**

Stations				Length (m)	Total Length (m)	FREE DRAINING BACKFILL		RIPRAP (CLASS B)		RIVER BANK EXCAVATION		DEMOLITION OF EXISTING REVTMENT		FILLER CONCRETE		CONCRETE BLOCK PAVING		
Item	From	To				AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	WIDTH	Ao	At (net)
14L	15+747	15+870	15+747		107.52	0.667		3.857		5.234		1.20				5.52		315.78
			15+750	4.21		0.048	1.51	3.127	14.70	6.684	25.09	1.20	5.05			3.00	17.93	
			15+800	41.48		0.479	10.93	3.127	129.71	6.769	279.02	1.20	49.78			3.00	124.44	
			15+850	44.39		3.389	85.85	4.911	178.40	4.197	243.39	0.80	44.39			3.00	133.17	
			15+870	17.44		0.615	34.91	4.298	80.30	5.112	81.17	1.20	17.44			3.00	52.32	
15L	15+965	16+564	15+965		614.95	1.727		3.836		4.509		1.20				3.00		1,617.92
			15+973	8.04		7.621	37.58	3.065	27.74	3.221	31.07	0.80	8.04			3.00	24.12	
			16+000	24.67		8.491	198.74	2.688	70.96	3.219	79.44	0.80	19.74			3.00	74.01	
			16+012	12.28		3.415	73.10	8.295	67.44	5.654	54.48	1.20	12.28			3.00	36.84	
			16+042	27.83		3.099	90.64	17.914	364.70	5.992	162.05	0.40	22.26			3.00	83.49	
			16+050	8.03		2.522	22.57	15.166	132.82	5.815	47.41	0.40	3.21			3.00	24.09	
			16+100	48.64		3.912	156.47	5.416	500.55	3.162	218.32	0.40	19.46			3.00	145.92	
			16+142	41.49		4.790	180.52	6.230	241.60	4.221	153.16	0.40	16.60			3.00	124.47	
			16+150	8.01		4.790	38.37	6.230	49.90	4.221	33.81	0.40	3.20			3.00	24.03	
			16+200	49.79		4.852	240.04	4.957	278.50	2.687	171.97	0.40	19.92			3.00	149.37	
			16+250	49.91		3.979	220.38	7.264	304.98	3.874	163.73	0.40	19.96			3.00	149.73	
			16+300	51.80		1.319	137.22	3.467	277.93	5.449	241.47	1.20	41.44			1.70	121.73	
			16+350	50.15		0.771	52.41	7.005	262.59	5.086	264.17	1.20	60.18			3.00	117.85	
			16+400	53.41		6.358	190.38	4.627	310.63	2.882	212.79	1.20	64.09			2.60	149.55	
			16+450	55.35		1.810	226.05	6.718	313.97	4.545	205.54	1.20	66.42			1.70	119.00	
			16+454	4.00		1.810	7.24	6.066	25.57	3.426	15.94	1.20	4.80			1.70	6.80	
			16+500	54.37		2.690	122.33	6.066	329.81	3.426	186.27	1.20	65.24			2.80	122.33	
			16+550	53.36		1.967	124.25	3.296	249.78	4.126	201.49	1.20	64.03			3.00	154.74	
			16+552	2.00		2.569	4.54	2.934	6.23	4.262	8.39	1.20	2.40			3.00	6.00	
			16+564	11.82		2.304	28.80	2.986	34.99	4.545	52.05	1.20	14.18			3.00	35.46	
						<b>8663.74</b>		<b>27951.98</b>		<b>12299.50</b>		<b>1906.87</b>		<b>39.97</b>		<b>5896.68</b>		

**Quantity of Riprap, Free Draining Backfill, Riverbed Excavation, Filler Concrete, Concrete Block Paving and Demolition of Existing Revetment - Right Bank**

Stations				Length	Total Length	FREE DRAINING BACKFILL		RIPRAP (CLASS B)		RIVER BANK EXCAVATION		DEMOLITION OF EXISTING REVETMENT		FILLER CONCRETE		CONCRETE BLOCK PAVING		
Item	From	To	(m)	(m)	AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	WIDTH	Ao	At (net)	
1R	2+283	2+334	2+283	56.75											2.17		172.77	
			2+287		4.64									2.17	10.07			
			2+300		14.50										3.13	38.43		
			2+334		37.61										3.77	129.75		
2R	3+649	3+753	3+649	98.89	1.532		2.125		4.601								116.28	
			3+650		1.29	1.076	1.68	2.125	2.74	2.768	4.75							
			3+700		48.93	1.441	61.58	2.125	103.98	9.59	302.34							
			3+750		45.15	0.869	52.15	2.125	95.94	10.797	460.24							
3R	5+046	5+223	5+046	153.69	0.842	3.01	2.125	7.48	12.083	40.27							139.85	
			5+046			0.424		3.391		3.316				0.03				
			5+050		4.71	0.964	3.27	4.113	17.67	2.948	14.75	0.80	1.88		0.07	1.31		3.09
			5+100		28.59	0.871	26.23	20.508	351.96	5.030	114.05	0.80	22.87			1.31		37.45
4R	5+262	5+414	5+262	170.84	2.751	34.21	14.251	328.30	4.235	87.51	0.80	15.11			4.59	55.73	423.42	
			5+262			0.051	19.26	2.875	117.74	5.481	66.80	0.80	11.00	0.03	0.21	31.56		
			5+150		12.23	0.155	1.26	5.689	52.37	5.068	64.51	0.80	9.78	0.037	0.41			
			5+200		52.98	0.155	8.21	9.696	407.55	5.187	271.65	0.80	42.38	0.036	1.93			
5R	5+545	5+639	5+223	103.27	0.101	2.89	6.084	177.84	6.124	127.47	0.80	18.03	0.042	0.88			3006.58	
			5+262			2.004		21.581		3.814				0.03				
			5+300		41.56	1.978	82.75	26.908	1007.60	2.223	125.45			0.032	1.29			
			5+350		55.74	1.938	109.14	26.621	1491.85	1.893	114.71			0.032	1.78			
6R	6+337	6+510	5+414	151.23	1.816	106.74	26.214	1502.36	4.133	171.35					0.033	1.85	1091.51	
			5+414		16.67	1.848	30.54	17.762	366.54	3.745	65.66			0.033	0.55			
			5+545			1.096		2.625		7.558			0.80			1.36		
			5+550		5.19	0.073	3.03	2.625	13.62	10.074	45.76	0.80	4.15			1.34		7.01
7R	8+222	9+341	5+639	1048.65	0.275	4.46	2.625	67.33	7.313	222.99	1.20	25.65			1.34	34.37	518.62	
			5+600		34.50	0.320	10.26	2.625	90.56	4.597	205.45	1.20	41.40			1.34		46.23
			5+602		2.11	1.334	1.74	2.625	5.54	5.413	10.56	0.80	2.11			1.50		3.00
			5+630		27.86	1.799	43.64	2.625	73.13	5.553	152.76	0.80	22.29			1.51		41.93
8R	9+814	9+947	5+639	380.67	1.076	11.44	2.625	20.90	7.669	52.62	0.80	6.37			1.50	11.98	518.62	
			6+337			0.804		10.919		4.412				0.132				
			6+350		9.85	0.012	4.02	8.982	98.01	6.636	54.41			0.03	0.80			
			6+396		28.30	0.030	0.59	21.263	427.97	6.808	190.23	0.80	11.32		0.42	0.35		4.95
9R	10+140	10+179	6+400	151.23	0.115	0.29	23.140	89.03	6.513	26.71	1.20	4.01			1.23	3.17	51.59	
			6+415		15.44	0.282	3.06	21.403	343.87	6.175	97.95	1.20	18.53			2.63		29.80
			6+450		33.00	2.322	42.97	26.715	793.95	5.721	196.28	0.40	26.40			1.47		67.65
			6+471		21.12	1.847	44.02	26.708	564.15	6.423	128.24	1.20	16.90			1.46		30.94
9R	10+140	10+179	6+497	151.23	22.667	327.02	34.340	814.38	5.415	157.92	1.20	32.02			15.70	228.91	51.59	
			6+500		3.03	24.963	72.16	32.796	101.71	5.417	16.41	1.20	3.64			7.84		35.66
			6+510		9.80	1.499	129.66	14.518	231.84	5.234	52.19		5.88			0.54		41.06
			8+222			5.043		7.208		2.806		0.40				3.00		
9R	10+140	10+179	8+250	1048.65	3.232	103.64	8.387	195.33	2.970	72.34	0.40	10.02			3.00	75.15	51.59	
			8+300		47.66	9.061	292.94	7.646	382.07	3.169	146.29	0.80	28.60			3.00		142.98
			8+350		48.83	3.855	315.34	2.625	250.77	3.821	165.78	1.20	48.83			3.00		146.49
			8+400		48.38	1.315	125.06	2.634	127.22	4.714	201.62	1.20	58.06			3.00		145.14
9R	10+140	10+179	8+450	1048.65	1.096	52.34	6.129	190.24	3.333	174.70	1.20	52.10			3.00	130.26	51.59	
			8+500		31.47	5.292	100.52	10.456	260.96	3.280	104.06	0.40	25.18			3.00		94.41
			8+510		8.31	2.037	30.45	12.841	96.80	3.223	27.02	0.40	3.32			3.00		24.93
			8+550		31.35	7.644	151.75	7.177	313.78	3.719	108.82	0.80	18.81			3.00		94.05
9R	10+140	10+179	8+600	1048.65	6.292	303.87	14.271	467.67	4.938	188.77	1.20	43.61			3.00	130.83	51.59	
			8+650		46.16	6.788	301.89	20.892	811.56	5.561	242.32	1.20	55.39			3.00		138.48
			8+700		47.54	5.218	285.38	11.769	776.35	4.453	238.03	1.20	57.05			3.00		142.62
			8+750		32.79	3.678	145.85	10.605	366.82	4.195	141.78	1.20	39.35			3.00		98.37
9R	10+140	10+179	8+800	1048.65	5.411	160.15	8.006	327.93	2.815	123.52	0.40	28.19			3.00	105.72	51.59	
			8+850		46.37	5.190	245.78	4.461	289.05	2.411	121.16	0.40	18.55			3.00		139.11
			8+900		49.19	4.935	249.02	10.089	357.86	3.371	142.21	0.40	19.68			3.00		147.57
			8+950		49.08	5.077	245.69	13.104	569.16	3.823	176.54	0.40	19.63			3.00		147.24
9R	10+140	10+179	9+000	380.67	6.552	290.55	12.976	651.61	4.054	196.81	0.40	19.99			3.00	149.91	51.59	
			9+050		51.91	4.638	290.44	15.243	732.42	5.317	243.22	0.40	20.76			3.00		155.73
			9+100		50.25	4.578	231.55	13.827	730.38	4.972	258.51	0.40	20.10			2.10		128.14
			9+150		51.00	3.483	205.56	2.375	413.15	6.989	289.71	0.80	30.60			3.00		130.05
9R	10+140	10+179	9+200	380.67	4.585	206.86	3.677	155.17	3.827	261.94		20.51			3.00	153.84	51.59	
			9+250		55.11	4.898	261.30	17.495	583.39	3.899	207.38	0.40	11.02			3.00		165.33
			9+300		53.09	5.945	287.83	16.003	889.20	3.564	192.80	0.40	21.24			3.00		159.27
			9+341		51.59	3.964	255.60	5.357	550.98	2.183	148.24	0.40	20.64			3.00		154.77
9R	10+140	10+179	9+430	380.67	4.368		6.945		2.814		0.40				3.00		51.59	
			9+450		20.08	5.717	101.25	5.275	122.69	2.592	54.28	0.40	8.03			3.00		60.24
			9+500		52.17	4.463	265.55	4.809	263.04	2.507	133.01	0.40	20.87			3.00		156.51
			9+550		52.66	3.932	221.04	3.823	227.28	2.481	131.33	1.20	42.13			2.70		150.08
9R	10+140	10+179	9+600	380.67	5.313	239.45	7.87	302.85	3.181	146.65	0.40	41.44			3.00	147.63	51.59	
			9+650		51.26	4.941	262.81	4.551	318.35	2.526	146.27	0.40	20.50			3.00		153.78
			9+700		50.38	4.835	246.26	6.336	274.24	2.983	138.77	0.40	20.15			3.00		151.14
			9+723		23.19	4.551	108.83	8.916	176.85	3.841	79.12	0.40	9.28			3.00		69.57
9R	10+140	10+179	9+735	380.67	19.72	146.84	14.319	140.57	5.205	54.73	0.80	7.26			3.00	36.30	51.59	
			9+745		10.20	5.593	129.10	31.901	235.72	7.811	66.38	0.40	6.12			3.00		30.60
			9+750		5.06	5.522	28.12	36.077	171.98	8.242	40.61	0.40	2.02			3.00		15.18
			9+770		20.99	7.974	141.64	24.271	633.35	6.057	150.07	0.40	8.40			3.00		62.97
9R	10+140	10+179	9+792	380.67	8.174	248.52	2.188	407.20	11.5	270.20	0.40	12.31			3.00	92.34	51.59	
			9															

**Quantity of Riprap, Free Draining Backfill, Riverbed Excavation, Filler Concrete, Concrete Block Paving and Demolition of Existing Revetment - Right Bank**

Stations				Length (m)	Total Length (m)	FREE DRAINING BACKFILL		RIPRAP (CLASS B)		RIVER BANK EXCAVATION		DEMOLITION OF EXISTING REVETMENT		FILLER CONCRETE		CONCRETE BLOCK PAVING			
Item	From	To				AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	WIDTH	Ao	At (net)	
10R	10+956	11+263	10+956		327.85	0.981		1.625		17.223		0.80				0.54		268.89	
			10+956	18.61		3.224	39.12	1.625	30.23	3.180	189.81		7.44				0.47		9.40
			11+000	43.67		4.181	161.69	4.038	123.65	1.963	112.30								10.26
			11+050	50.00		4.780	224.03	4.643	217.03	2.701	116.60								
			11+100	51.91		4.197	233.00	2.373	182.10	9.437	315.04								
			11+150	50.58		4.957	231.50	2.375	120.08	11.691	534.33						1.94		49.06
			11+200	49.99		3.981	223.41	2.375	118.73	13.256	623.55						1.94		96.98
			11+250	49.93		4.655	215.60	2.375	118.58	9.998	580.54						1.94		96.86
			11+263	13.16		3.701	54.98	2.375	31.26	14.495	161.16						1.02		19.48
11R	11+610	11+653	11+610			43.65	1.397		2.458		3.880		1.20						
			11+643	34.42	5.390		116.80	4.175	114.15	2.826	115.41	1.20	41.30			2.03	34.94		
			11+650	6.56	2.983		27.46	3.348	24.68	5.169	26.22	0.80	6.56			2.47	14.76		
			11+653	2.67	5.728		11.63	4.185	10.06	2.812	10.65	0.80	2.14			2.82	7.06		
12R	11+788	11+803	11+788		19.86	5.850		14.441		3.531		0.80				0.73		77.13	
			11+800	13.03		19.218	163.33	16.979	204.72	3.887	48.33	0.80	10.42			6.77	48.87		
			11+803	6.83	4.984	82.64	11.800	98.27	3.172	24.10	0.80	5.46			2.22	30.70			
13R	13+578	14+395	13+578		849.32	4.580		4.657		3.414		0.80				2.24		1,650.06	
			13+600	21.81		4.043	94.03	3.944	93.79	2.915	69.02	0.80	17.45			1.61	41.98		
			13+650	49.91		3.325	183.87	3.579	187.74	4.513	185.37	0.80	39.93			1.42	75.61		
			13+700	49.91		5.100	210.25	6.155	242.91	2.954	186.34		19.96			1.87	82.10		
			13+743	42.30		4.514	203.34	8.393	307.69	2.831	122.35					2.25	87.14		
			13+760	7.50		3.904	31.57	6.654	56.43	2.837	21.26					1.56	14.29		
			13+796	46.08		5.327	212.68	8.881	357.93	3.166	138.31					1.42	68.66		
			13+801	6.39		0.024	17.10	3.912	40.87	6.459	30.75	0.80	2.56				4.54		
			13+801	2.85		0.024	0.07	3.921	11.16	6.622	18.64	0.80	2.28						
			13+804			6.166		4.962		2.758		1.20				3.99			
			13+812	11.66		5.314	66.93	15.176	117.40	5.107	45.85		7.00			2.23	36.26		
			13+850	36.88		6.526	218.33	11.767	496.83	5.107	188.35					2.98	96.07		
			13+900	49.97		4.984	287.58	11.986	593.47	4.627	243.20					2.34	132.92		
			13+915	15.78		4.390	73.96	25.549	296.15	6.217	85.56					1.78	32.51		
			13+950	35.27		5.090	167.18	12.394	669.12	4.738	193.19	0.80	14.11			1.84	63.84		
			13+952	2.00		1.817	6.91	3.992	16.39	2.685	7.42	0.80	1.60			0.70	2.54		
			14+000	49.39		1.512	82.21	1.875	144.89	5.040	190.77		19.76			1.55	55.56		
			14+050	50.64		3.899	137.01	1.875	94.95	3.277	210.59	0.80	20.26			2.24	95.96		
			14+100	54.34		3.942	213.04	1.617	94.88	4.083	199.97		21.74			2.23	121.45		
			14+110	12.07		4.738	52.38	1.625	19.57	2.799	41.53					2.49	28.49		
			14+150	45.39		5.543	233.33	1.625	73.76	1.969	108.21	0.80	18.16			2.84	120.96		
			14+193	44.78		3.252	196.92	1.625	72.77	4.567	146.34	0.80	35.82			2.04	109.26		
			14+200	7.54		1.907	19.45	1.875	13.20	8.052	47.57	0.80	6.03			2.01	15.27		
			14+223	23.39		0.778	31.40	1.875	43.86	6.822	173.95		9.36			0.87	33.68		
			14+228	9.48		1.304	9.87	1.875	17.78	10.256	80.95					0.30	5.55		
			14+228			1.459		1.875		8.346						0.32			
			14+237	8.40		2.439	16.37	1.875	15.75	7.850	68.02	0.80	3.36			2.12	10.25		
			14+250	13.29		3.909	42.18	1.875	24.92	6.361	94.43	0.80	10.63			2.35	29.70		
			14+300	50.18		3.432	184.19	2.375	106.63	2.347	218.48	0.80	40.14			2.30	116.67		
			14+350	50.64		8.548	303.33	6.233	217.95	3.145	139.06	0.80	40.51			3.98	159.01		
			14+365	15.72	1.331	77.65	4.346	83.15	5.354	66.80		6.29			0.60	36.01			
			14+375	9.32	1.331	12.40	4.346	40.50	5.354	49.90					0.60	5.60			
			14+395	26.44	1.239	33.98	2.875	95.46	34.410	525.68					0.60	15.89			
14R	14+835	14+943	14+835		125.83	0.229		1.692		4.522		0.80				1.25		178.20	
			14+850	15.50		0.436	5.15	1.767	26.81	2.570	54.96	0.80	12.40			1.25	19.38		
			14+900	60.94		5.375	177.06	4.936	204.24	2.287	147.99	0.80	48.75			1.61	87.14		
			14+914	16.71		2.488	65.70	2.092	58.72	1.760	33.81	0.80	13.37			1.55	26.40		
			14+943	32.68		1.958	72.65	2.375	72.99	3.354	83.56	0.80	26.14			1.58	51.14		
			14+983			13.765		2.309		2.243		0.80				3.00			
15R	14+983	15+075	14+983		96.55	4.504	162.78	3.086	48.07	2.229	39.85	0.80	14.26			3.00	53.46	280.20	
			15+000	17.82		7.255	144.99	2.658	70.82	2.879	62.98	0.80	19.73			3.00	73.98		
			15+024	24.66		7.057	202.30	4.056	94.90	2.152	71.11	0.80	22.62			3.00	84.81		
			15+050	28.27		6.598	176.15	9.163	170.53	2.647	61.91	0.80	20.64			3.00	77.40		
			15+075	25.80		2.345		2.125		11.801		0.80				2.00			
16R	15+409	15+441	15+409		24.88	0.364	33.70	2.125	52.87	33.888	568.37	0.80	19.90			0.62	32.59	27.48	
			15+441	24.88		0.897		1.375		5.877		0.80				0.37			
17R	15+476	15+494	15+476		20.17			5.35	1.375	16.39	30.646	217.68	1.20	11.92		2.93	19.67	38.57	
			15+486	11.92				1.375	11.34	21.450	214.90	1.20	9.90			2.04	20.50		
			15+494	8.25				12.565		3.604		0.80				1.86			
18R	16+667	16+724	16+667		56.27	3.214		12.565		3.604		0.80						139.34	
			16+700	32.66		2.849	99.01	4.623	280.68	3.689	119.09	0.80	26.13			3.27	83.77		
			16+724	23.61		0.542	40.03	3.350	94.12	5.627	109.98	0.80	18.89			1.82	60.09		
19R	16+760	16+843	16+760		101.75	2.335		5.679		4.534		1.20				3.32		310.48	
			16+800	56.06		2.953	148.22	5.963	326.33	4.733	259.75	0.80	56.06			3.65	195.37		
			16+825	27.65		0.203	43.63	5.061	152.41	7.425	168.08	1.20	27.65			2.33	82.67		
			16+840	18.04		0.203	3.66	5.061	91.30	7.425	133.95	1.20	21.65			2.33	42.03		
						<b>16403.46</b>		<b>36618.61</b>		<b>19292.63</b>		<b>2086.86</b>		<b>10.19</b>			<b>8544.99</b>		

**QUANTITY OF STEEL SHEET PILE**

Stations			Length of Revetment (m)	File Size	S <sub>x</sub>		Length of Pile (m)	No. of Sheet Pile (sheet)	Total Length (m)	Area of Sheet Pile for Vibro Hammer		Width (m)	Height (m)	Area of Sheet Pile for Corrosion Protection (sq.m)	Weight (SP) (kg/sheet)	Weight (H-Beam) (kg/sheet)	Weight (SP+H-Beam) (t)	El. Of Riprap, MWL or Riverbed (m)	Top of Coping (m)
					SP (cu.cm.)	H-Beam (cu.cm.)				w/o water jet (sq.m)	w/ water jet (sq.m)								
1L	2+419	2+550	139.8	SP-IVw(295)	2,700		11.0	233.0	2563.0	1537.8		0.60	0.21	1069.5	1,166		271.7	8.5	12.40
2L	2+550	2+694	139.0	SP-IVw(295)	2,700		11.5	232.0	2668.0	1600.8		0.60	0.21	828.2	1,219		282.8	9.5	12.40
3L	2+854	2+950	100.3	FSP-VL(295)	3,150		12.0	201.0	2412.0	1206.0		0.50	0.20	759.8	1,260		253.3	8.8	12.40
4L	2+950	3+072	130.4	SP-IVw(295)	2,700		12.0	218.0	2616.0	1569.6		0.60	0.21	933.9	1,272		277.3	8.8	12.40
5L	3+160	3+300	124.7	SP-25H(295)	1,610		9.0	139.0	1251.0	1125.9		0.90	0.30	563.0	1,017		141.4	9.7	11.80
6L	6+116	6+219	100.9	SP-IIIw(295)	1,800		10.0	169.0	1690.0		1014.0	0.60	0.18	665.2	816		137.9	9.1	12.60
7L	6+249	6+269	20.3	FSP-VIL(295)	3,820		12.5	41.0	512.5		256.3	0.50	0.23	120.7	1,500		61.5	10.1	12.60
8L	6+376	6+482	114.4	FSP-VL(295)	3,150		11.0	229.0	2519.0		1259.5	0.50	0.20	618.3	1,155		264.5	10.3	12.70
9L	7+326	7+444	121.3	FSP-VIL(295)	3,820		12.0	243.0	2916.0		1458.0	0.50	0.23	623.3	1,440		349.9	10.6	12.70
10L	7+494	7+514	19.4	FSP-VIL(295)	3,820		12.0	39.0	468.0		234.0	0.50	0.23	100.0	1,440		56.2	10.6	12.70
11L	11+500	11+628	128.5	FSP-VL(295)	3,150		11.0	257.0	2827.0	1413.5		0.50	0.20	717.0	1,155		296.8	10.3	12.80
12L	12+024	12+173	148.4	10H-750x250x12x25	902	5,390	16.5	165.0	2722.5		2450.3	0.90	0.23	1054.7	1,426	2,656	673.5	8.7	12.80
13L	13+806	13+900	94.7	10H-450x250x9x22	902	2,490	13.0	106.0	1378.0	1240.2		0.90	0.23	504.6	1,123	1,450	272.8	9.9	12.80
14L	13+900	14+000	100.0	10H-600x200x12x28	902	3,630	14.5	112.0	1624.0	1461.6		0.90	0.23	715.9	1,253	1,960	359.8	8.7	12.80
15L	14+000	14+150	139.6	10H-450x200x12x25	902	2,320	12.5	156.0	1950.0	1755.0		0.90	0.23	763.8	1,080	1,404	387.5	9.8	12.80
16L	14+150	14+250	98.4	SP-IVw(295)	2,700		10.0	164.0	1640.0	984.0		0.60	0.21	585.5	1,060		173.8	9.9	12.80
17L	14+250	14+272	22.0	10H-400x200x9x22	902	1,760	11.5	25.0	287.5	258.8		0.90	0.23	122.4	994	1,049	51.1	9.8	12.80
18L	15+236	15+311	75.8	FSP-VIL(295)	3,820		11.0	152.0	1672.0		836.0	0.50	0.23	389.9	1,320		200.6	10.7	12.80
19L	15+311	15+424	120.1	FSP-VIL(295)	3,820		11.0	241.0	2651.0		1325.5	0.50	0.23	824.2	1,320		318.1	9.8	12.80
20L	15+443	15+548	113.1	10H-450x250x12x28	902	3,070	13.0	126.0	1638.0		1474.2	0.90	0.23	599.8	1,123	1,850	374.6	10.1	13.00
21L	15+747	15+870	107.5	10H-450x250x9x22	902	2,490	13.5	120.0	1620.0		1458.0	0.90	0.23	489.6	1,166	1,508	320.9	10.6	13.00
22L	15+965	16+150	179.0	10H-400x200x9x22	902	1,760	12.0	199.0	2388.0		2149.2	0.90	0.23	757.8	1,037	1,097	424.6	10.6	12.80
23L	16+150	16+200	49.8	10H-400x200x9x22	902	1,760	12.5	56.0	700.0	630.0		0.90	0.23	213.2	1,080	1,145	124.6	10.6	12.80
24L	16+200	16+300	101.7	10H-400x200x9x22	902	1,760	12.5	113.0	1412.5		1271.3	0.90	0.23	430.3	1,080	1,145	251.4	10.6	12.80
25L	16+300	16+450	158.9	10H-400x200x9x22	902	1,760	13.0	177.0	2301.0		2070.9	0.90	0.23	674.0	1,123	1,193	409.9	10.6	12.80
26L	16+450	16+552	113.7	10H-400x200x9x22	902	1,760	12.5	127.0	1587.5	1428.8		0.90	0.23	483.6	1,080	1,145	282.5	10.6	12.80
27L	16+552	16+564	11.8	25H-850x250x16x28	1,610	7,240	19.0	14.0	266.0	239.4		0.90	0.30	58.8	2,147	3,922	85.0	10.6	12.80
1R	3+649	3+753	98.9	SP-IVw(295)	2,700		11.0	165.0	1815.0	1089.0		0.60	0.21	521.7	1,166		192.4	10.1	12.60
2R	5+046	5+100	33.3	FSP-VL(295)	3,150		12.0	67.0	804.0	402.0		0.50	0.20	162.8	1,260		84.4	10.5	12.60
3R	5+100	5+223	120.4	FSP-VIL(295)	3,820		12.5	241.0	3012.5	1506.3		0.50	0.23	618.2	1,500		361.5	10.5	12.60
4R	5+262	5+340	87.2	FSP-VIL(295)	3,820		13.0	175.0	2275.0		1137.5	0.50	0.23	881.1	1,560		273.0	7.9	12.60
5R	5+340	5+414	83.7	FSP-VIL(295)	3,820		13.0	168.0	2184.0		1092.0	0.50	0.23	782.0	1,560		262.1	8.3	12.60
6R	5+545	5+639	103.3	10H-450x200x12x25	902	2,320	14.0	115.0	1610.0		1449.0	0.90	0.23	422.3	1,210	1,580	320.7	10.5	12.60
7R	6+337	6+510	151.2	FSP-VL(295)	3,150		12.0	303.0	3636.0		1818.0	0.50	0.20	1363.5	1,260		381.8	8.3	12.70
8R	8+222	8+250	25.1	10H-550x250x12x28	902	3,940	15.0	28.0	420.0	378.0		0.90	0.23	121.9	1,296	2,291	100.4	10.1	12.70
9R	8+250	8+400	144.9	FSP-VIL(295)	3,820		12.0	290.0	3480.0	1740.0		0.50	0.23	799.0	1,440		417.6	10.4	12.70
10R	8+400	8+510	83.2	10H-450x250x9x22	902	2,490	13.5	93.0	1255.5	1130.0		0.90	0.23	468.0	1,166	1,508	248.7	9.6	12.70
11R	8+510	8+650	121.1	FSP-VIL(295)	3,820		12.5	243.0	3037.5	1518.8		0.50	0.23	692.6	1,500		364.5	10.3	12.70
12R	8+650	8+800	115.6	10H-400x200x9x22	902	1,760	13.0	129.0	1677.0	1509.3		0.90	0.23	561.4	1,123	1,193	298.7	10.1	12.70
13R	8+800	8+900	95.6	FSP-VIL(295)	3,820		11.5	192.0	2208.0	1104.0		0.50	0.23	583.7	1,380		265.0	10.1	12.70

**QUANTITY OF STEEL SHEET PILE**

Stations			Length of Revetment (m)	File Size	S <sub>x</sub>		Length of Pile (m)	No. of Sheet Pile (sheet)	Total Length (m)	Area of Sheet Pile for Vibro Hammer		Width (m)	Height (m)	Area of Sheet Pile for Corrosion Protection (sq.m)	Weight (SP) (kg/sheet)	Weight (H-Beam) (kg/sheet)	Weight (SP+H-Beam) (t)	El. Of Riprap, MWL or Riverbed (m)	Top of Coping (m)
					SP (cu.cm.)	H-Beam (cu.cm.)				w/o water jet (sq.m)	w/ water jet (sq.m)								
14R	8+900	9+000	99.1	FSP-VIL(295)	3,820		12.0	199.0	2388.0	1194.0		0.50	0.23	586.1	1,440		286.6	10.2	12.70
15R	9+000	9+150	153.2	FSP-VIL(295)	3,820		12.0	307.0	3684.0	1842.0		0.50	0.23	1370.8	1,440		442.1	8.6	12.70
16R	9+150	9+200	51.3	10H-650x250x12x28	902	4,850	16.5	57.0	940.5	846.5		0.90	0.23	364.3	1,426	2,672	233.6	8.6	12.70
17R	9+200	9+341	159.8	SP-IVw(295)	2,700		10.5	267.0	2803.5	1682.1		0.60	0.21	1280.0	1,113		297.2	8.6	12.70
18R	9+430	9+550	124.9	FSP-VIL(295)	3,820		12.5	250.0	3125.0		1562.5	0.50	0.23	760.0	1,500		375.0	10.1	12.70
19R	9+550	9+650	103.1	FSP-VIL(295)	3,820		12.0	207.0	2484.0		1242.0	0.50	0.23	609.6	1,440		298.1	10.2	12.70
20R	9+650	9+723	73.6	FSP-VIL(295)	3,820		12.0	148.0	1776.0		888.0	0.50	0.23	407.7	1,440		213.1	10.4	12.70
21R	9+723	9+750	27.3	10H-400x200x9x22	902	1,760	12.5	31.0	387.5	348.8		0.90	0.23	147.6	1,080	1,145	69.0	9.8	12.70
22R	9+750	9+770	20.3	FSP-VIL(295)	3,820		12.0	41.0	492.0	246.0		0.50	0.23	183.1	1,440		59.0	8.6	12.70
23R	9+770	9+792	30.8	10H-600x250x12x28	902	4,390	15.5	35.0	542.5	488.3		0.90	0.23	223.7	1,339	2,430	131.9	8.6	12.70
24R	9+814	9+830	21.4	10H-600x250x12x28	902	4,390	15.5	24.0	372.0	334.8		0.90	0.23	153.4	1,339	2,430	90.5	8.6	12.70
25R	9+830	9+947	166.4	FSP-VIL(295)	3,820		12.0	333.0	3996.0	1998.0		0.50	0.23	1771.6	1,440		479.5	7.7	12.70
26R	10+956-A	11+050	112.3	10H-500x200x12x25	902	2,650	14.0	125.0	1750.0	1575.0		0.90	0.23	850.0	1,210	1,647	357.1	8.4	12.80
27R	11+050	11+150	102.5	10H-750x250x12x25	902	5,390	18.0	114.0	2052.0		1846.8	0.90	0.23	728.7	1,555	2,905	508.5	8.7	12.80
28R	11+150	11+263	113.1	10H-650x200x12x28	902	4,020	15.0	126.0	1890.0		1701.0	0.90	0.23	805.4	1,296	2,103	428.2	8.7	12.80
29R	11+610	11+653	43.7	SP-IVw(295)	2,700		11.0	73.0	803.0		481.8	0.60	0.21	208.5	1,166		85.1	10.6	12.80
30R	11+788	11+803-A	19.9	FSP-VIL(295)	3,820		11.5	40.0	460.0		230.0	0.50	0.23	140.6	1,380		55.2	9.7	12.80
31R	13+578	13+700	121.6	SP-IVw(295)	2,700		11.0	203.0	2233.0		1339.8	0.60	0.21	641.9	1,166		236.7	10.3	12.80
32R	13+700	13+801-B	105.1	SP-IVw(295)	2,700		10.0	176.0	1760.0		1056.0	0.60	0.21	646.3	1,060		186.6	9.8	12.80
33R	13+804-A	13+900	98.5	FSP-VIL(295)	3,820		11.5	197.0	2265.5		1132.8	0.50	0.23	673.7	1,380		271.9	9.8	12.80
34R	13+900	14+000	102.4	FSP-VIL(295)	3,820		12.0	205.0	2460.0		1230.0	0.50	0.23	662.2	1,440		295.2	10.0	12.80
35R	14+000	14+100	105.0	SP-IVw(295)	2,700		10.0	175.0	1750.0		1050.0	0.60	0.21	499.8	1,060		185.5	10.6	12.80
36R	14+100	14+200	109.8	SP-IIIw(295)	1,800		8.5	183.0	1555.5		933.3	0.60	0.18	491.9	694		126.9	10.6	12.80
37R	14+200	14+225	32.9	FSP-VL(295)	3,150		10.0	66.0	660.0	330.0		0.50	0.20	166.3	1,050		69.3	10.6	12.80
38R	14+234	14+300	71.9	FSP-VL(295)	3,150		10.0	144.0	1440.0	720.0		0.50	0.20	362.9	1,050		151.2	10.6	12.80
39R	14+300	14+350	50.6	10H-400x200x9x22	902	1,760	12.0	57.0	684.0	615.6		0.90	0.23	217.1	1,037	1,097	121.6	10.6	12.80
40R	14+350	14+395-A	51.5	10H-500x250x12x28	902	3,500	13.5	58.0	783.0	704.7		0.90	0.23	220.9	1,166	1,989	183.0	10.6	12.80
41R	14+835	14+943	125.8	SP-IVw(295)	2,700		10.0	210.0	2100.0		1260.0	0.60	0.21	599.8	1,060		222.6	10.6	12.80
42R	14+983	15+075	96.6	10H-400x200x9x22	902	1,760	11.5	108.0	1242.0		1117.8	0.90	0.23	514.1	994	1,049	220.6	9.9	12.80
43R	15+409	15+441	24.9	10H-450x250x9x22	902	2,490	11.5	28.0	322.0	289.8		0.90	0.23	106.6	994	1,276	63.5	10.6	12.80
44R	15+476	15+494	20.2	SP-IVw(295)	2,700		9.5	34.0	323.0	193.8		0.60	0.21	97.1	1,007		34.2	10.6	12.80
45R	16+667	16+724	56.3	FSP-VIL(295)	3,820		11.0	113.0	1243.0		621.5	0.50	0.23	311.3	1,320		149.2	10.5	12.80
46R	16+760	16+840	101.8	10H-450x250x9x22	902	2,490	13.0	114.0	1482.0		1333.8	0.90	0.23	434.1	1,123	1,450	293.3	10.6	12.80
			<b>6734.6</b>						<b>127,944.00</b>	<b>40,237.80</b>	<b>41,780.60</b>			<b>40,881.90</b>	<b>Total Weight</b>		<b>17895.9 (t)</b>		

**QUANTITY OF STEEL SHEET PILE BENEATH BRIDGES OR HV CABLES**

Stations			Length of Revetment (m)	Pile Size	S <sub>s</sub>		Length of Pile (m)	No. of Sheet Pile (sheet)	Total Length (m)	Area of Sheet Pile for Vibro Hammer		Width (m)	Height (m)	Area of Sheet Pile for Corrosion Protection (sq.m)	Weight (SP) (kg/sheet)	Weight (H-Beam) (kg/sheet)	Weight (SP+H-Beam) (t)	El. Of Riprap, MWL or Riverbed (m)	Top of Coping (m)
					SP (cu.cm.)	H-Beam (cu.cm.)				w/o water jet (sq.m)	w/ water jet (sq.m)								
1R	9+830	9+947	9.2	FSP-VIL(295)	3,820	0	12.0	19.0	228.0	114.0		0.50	0.23	48.7	1,440	0	27.4	10.6	12.70
2R	13+700	13+801-B	8.0	SP-IVw(295)	2,700	0	10.0	14.0	140.0		84.0	0.60	0.21	48.6	816	0	11.4	10.0	12.80
3R	14+350	14+395-A	18.5	10H-500x250x12x28	902	3,500	13.5	21.0	283.5	255.2		0.90	0.23	80.0	1,166	1,989	66.3	10.6	12.80
4R	14+983	15+075	8.0	10H-400x200x9x22	902	1,760	11.5	9.0	103.5		93.2	0.90	0.23	34.3	994	1,049	18.4	10.6	12.80
5R	16+667	16+724	8.0	FSP-VIL(295)	3,820	0	11.0	16.0	176.0		88.0	0.50	0.23	42.6	1,320	0	21.1	10.6	12.80
									931.0	369.15	265.15			254.09	Total Weight		144.55 (t)		

<b>SUMMARY OF SHEET PILES</b>		
<b>TYPE</b>	<b>LENGTH (m)</b>	<b>LENGTH OF SP BENEATH BRIDGES AND HV CABLES(m)</b>
SP-IIIw(295)	3245.50	
SP-IVw(295)	23074.50	140
FSP-VL(295)	14298.00	
FSP-VII(295)	48790.00	228
SP-25H(295)	1251.00	
10H-400x200x9x22	12667.00	103.5
10H-450x200x12x25	3560.00	176
10H-450x250x9x22	6057.50	
10H-450x250x12x28	1638.00	
10H-500x200x12x25	1750.00	
10H-500x250x12x28	783.00	283.5
10H-550x250x12x28	420.00	
10H-600x200x12x28	1624.00	
10H-600x250x12x28	914.50	
10H-650x200x12x28	1890.00	
10H-650x250x12x28	940.50	
10H-750x250x12x25	4774.50	
25H-850x250x16x28	266.00	
<b>TOTAL LENGTH</b>	<b>127944.00</b>	<b>931</b>



QUANTITY OF PILE COPING															
Station		Length of Revetment (m)	COPING												
			VOLUME (m <sup>3</sup> )	FORMWORKS (@10m)		WHOLE LENGTH		TOTAL	REBAR(@10m)		WHOLE LENGTH		TOTAL	Joint Sealant	Joint Filler
Start	End			A1(m <sup>2</sup> )	A2(m <sup>2</sup> )	A1(m <sup>2</sup> )	A2(m <sup>2</sup> )	At(m <sup>2</sup> )	W1(kg)	W2(kg)	W1(kg)	W2(kg)	Wt(kg)	l.m.	sq.m.
2+419	2+550	139.8	78.29	23.00	0.56	321.54	7.84	329.38	93.60	78.14	1308.46	1092.45	2400.91	23.80	7.84
2+550	2+694	139.0	77.84	23.00	0.56	319.70	7.84	327.54	93.60	78.14	1300.97	1086.20	2387.17	23.80	7.84
2+854	2+950	100.3	56.17	23.00	0.56	230.69	6.16	236.85	110.11	78.14	1104.42	783.78	1888.21	17.00	5.60
2+950	3+072	130.4	73.02	23.00	0.56	299.92	7.84	307.76	93.60	78.14	1220.48	1019.00	2239.48	22.10	7.28
3+160	3+300	124.7	69.83	23.00	0.56	286.81	7.28	294.09	93.60	78.14	1167.13	974.46	2141.59	20.40	6.72
6+116	6+219	100.9	56.50	23.00	0.56	232.07	6.16	238.23	93.60	78.14	944.38	788.47	1732.85	17.00	5.60
6+249	6+269	20.3	11.37	23.00	0.56	46.69	1.68	48.37	110.11	78.14	223.53	158.63	382.16	3.40	1.12
6+376	6+482	114.4	64.06	23.00	0.56	263.12	6.72	269.84	110.11	78.14	1259.68	893.97	2153.65	18.70	6.16
7+326	7+444	121.3	67.93	23.00	0.56	278.99	7.28	286.27	110.11	78.14	1335.66	947.89	2283.55	20.40	6.72
7+494	7+514	19.4	10.86	23.00	0.56	44.62	1.12	45.74	110.11	78.14	213.62	151.60	365.22	1.70	1.12
11+500	11+628	128.5	71.96	23.00	0.56	295.55	7.28	302.83	110.11	78.14	1414.94	1004.15	2419.09	20.40	7.28
12+024	12+173	148.4	83.10	23.00	0.56	341.32	8.40	349.72	93.60	78.14	1388.95	1159.66	2548.61	25.50	8.40
13+806	13+900	94.7	53.03	23.00	0.56	217.81	5.60	223.41	93.60	78.14	886.35	740.02	1626.37	15.30	5.04
13+900	14+000	100.0	56.00	23.00	0.56	230.00	5.60	235.60	93.60	78.14	935.95	781.44	1717.39	17.00	5.60
14+000	14+150	139.6	78.18	23.00	0.56	321.08	7.84	328.92	93.60	78.14	1306.59	1090.89	2397.48	23.80	7.84
14+150	14+250	98.4	55.10	23.00	0.56	226.32	5.60	231.92	93.60	78.14	920.98	768.94	1689.91	17.00	5.60
14+250	14+272	22.0	12.32	23.00	0.56	50.60	1.68	52.28	93.60	78.14	205.91	171.92	377.83	3.40	1.12
15+236	15+311	75.8	42.45	23.00	0.56	174.34	4.48	178.82	110.11	78.14	834.65	592.33	1426.98	11.90	3.92
15+311	15+424	120.1	67.26	23.00	0.56	276.23	7.28	283.51	110.11	78.14	1322.45	938.51	2260.95	20.40	6.72
15+443	15+548	113.1	63.34	23.00	0.56	260.13	6.72	266.85	93.60	78.14	1058.56	883.81	1942.37	18.70	6.16
15+747	15+870	107.5	60.20	23.00	0.56	247.25	6.16	253.41	93.60	78.14	1006.15	840.05	1846.20	18.70	6.16
15+965	16+150	179.0	100.24	23.00	0.56	411.70	10.08	421.78	93.60	78.14	1675.35	1398.78	3074.13	30.60	10.08
16+150	16+200	49.8	27.89	23.00	0.56	114.54	2.80	117.34	93.60	78.14	466.10	389.16	855.26	8.50	2.80
16+200	16+300	101.7	56.95	23.00	0.56	233.91	6.16	240.07	93.60	78.14	951.86	794.72	1746.59	17.00	5.60
16+300	16+450	158.9	88.98	23.00	0.56	365.47	8.96	374.43	93.60	78.14	1487.23	1241.71	2728.94	27.20	8.96
16+450	16+552	113.7	63.67	23.00	0.56	261.51	6.72	268.23	93.60	78.14	1064.18	888.50	1952.67	18.70	6.16
16+552	16+564	11.8	6.61	23.00	0.56	27.14	1.12	28.26	93.60	78.14	110.44	92.21	202.65	1.70	0.56
			0.00												0.00
3+649	3+753	98.9	55.38	23.00	0.56	227.47	5.60	233.07	93.60	78.14	925.66	772.84	1698.50	17.00	5.60
5+046	5+100	33.3	18.65	23.00	0.56	76.59	2.24	78.83	110.11	78.14	366.67	260.22	626.89	5.10	1.68
5+100	5+223	120.4	67.42	23.00	0.56	276.92	7.28	284.20	110.11	78.14	1325.75	940.85	2266.60	20.40	6.72
5+262	5+340	87.2	48.83	23.00	0.56	200.56	5.04	205.60	110.11	78.14	960.18	681.42	1641.59	13.60	5.04
5+340	5+414	83.7	46.87	23.00	0.56	192.51	5.04	197.55	110.11	78.14	921.64	654.07	1575.70	13.60	4.48
5+545	5+639	103.3	57.85	23.00	0.56	237.59	6.16	243.75	93.60	78.14	966.84	807.23	1774.07	17.00	5.60
6+337	6+510	151.2	84.67	23.00	0.56	347.76	8.96	356.72	110.11	78.14	1664.89	1181.54	2846.43	25.50	8.40
8+222	8+250	25.1	14.03	23.00	0.56	57.62	1.68	59.30	93.60	78.14	234.46	195.75	430.21	3.40	1.12
8+250	8+400	144.9	81.14	23.00	0.56	333.27	8.40	341.67	110.11	78.14	1595.52	1132.31	2727.83	23.80	8.40
8+400	8+510	83.2	46.59	23.00	0.56	191.36	5.04	196.40	93.60	78.14	778.71	650.16	1428.87	13.60	4.48
8+510	8+650	121.1	67.82	23.00	0.56	278.53	7.28	285.81	110.11	78.14	1333.46	946.32	2279.78	20.40	6.72
8+650	8+800	115.6	64.74	23.00	0.56	265.88	6.72	272.60	93.60	78.14	1081.96	903.34	1985.31	20.40	6.72
8+800	8+900	95.6	53.54	23.00	0.56	219.88	5.60	225.48	110.11	78.14	1052.67	747.06	1799.73	15.30	5.04
8+900	9+000	99.1	55.50	23.00	0.56	227.93	5.60	233.53	110.11	78.14	1091.21	774.41	1865.62	15.30	5.60
9+000	9+150	153.2	85.79	23.00	0.56	352.36	8.96	361.32	110.11	78.14	1686.92	1197.17	2884.08	25.50	8.40
9+150	9+200	51.3	28.73	23.00	0.56	117.99	3.36	121.35	93.60	78.14	480.14	400.88	881.02	8.50	2.80
9+200	9+341	159.8	89.49	23.00	0.56	367.54	8.96	376.50	93.60	78.14	1495.65	1248.74	2744.39	27.20	8.96
9+430	9+550	124.9	69.94	23.00	0.56	287.27	7.28	294.55	110.11	78.14	1375.30	976.02	2351.32	20.40	7.28
9+550	9+650	103.1	57.74	23.00	0.56	237.13	6.16	243.29	110.11	78.14	1135.25	805.66	1940.92	17.00	5.60
9+650	9+723	73.6	41.22	23.00	0.56	169.28	4.48	173.76	110.11	78.14	810.42	575.14	1385.56	11.90	3.92
9+723	9+750	27.3	15.29	23.00	0.56	62.79	1.68	64.47	93.60	78.14	255.51	213.33	468.85	3.40	1.12
9+750	9+770	20.3	11.36	23.00	0.56	46.67	1.68	48.35	110.11	78.14	223.42	158.55	381.97	3.40	1.12
9+770	9+792	30.8	17.25	23.00	0.56	70.84	2.24	73.08	93.60	78.14	288.27	240.68	528.96	5.10	1.68
9+814	9+830	21.4	11.98	23.00	0.56	49.22	1.68	50.90	93.60	78.14	200.29	167.23	367.52	3.40	1.12
9+830	9+947	166.4	93.18	23.00	0.56	382.72	9.52	392.24	110.11	78.14	1832.26	1300.32	3132.58	27.20	9.52
10+956-A	11+050	112.3	62.89	23.00	0.56	258.29	6.72	265.01	93.60	78.14	1051.07	877.56	1928.63	18.70	6.16
11+050	11+150	102.5	57.40	23.00	0.56	235.75	6.16	241.91	93.60	78.14	959.35	800.98	1760.33	17.00	5.60
11+150	11+263	113.1	63.34	23.00	0.56	260.13	6.72	266.85	93.60	78.14	1058.56	883.81	1942.37	18.70	6.16
11+610	11+653	43.7	24.47	23.00	0.56	100.51	2.80	103.31	93.60	78.14	409.01	341.49	750.50	6.80	2.24

QUANTITY OF PILE COPING															
Station		Length of Revetment (m)	COPING												
			VOLUME (m <sup>3</sup> )	FORMWORKS (@10m)		WHOLE LENGTH		TOTAL	REBAR(@10m)		WHOLE LENGTH		TOTAL	Joint Sealant	Joint Filler
Start	End			A1(m <sup>2</sup> )	A2(m <sup>2</sup> )	A1(m <sup>2</sup> )	A2(m <sup>2</sup> )	At(m <sup>2</sup> )	W1(kg)	W2(kg)	W1(kg)	W2(kg)	Wt(kg)	l.m.	sq.m.
11+788	11+803-A	19.9	11.14	23.00	0.56	45.77	1.12	46.89	110.11	78.14	219.12	155.51	374.63	1.70	1.12
13+578	13+700	121.6	68.10	23.00	0.56	279.68	7.28	286.96	93.60	78.14	1138.12	950.23	2088.35	20.40	6.72
13+700	13+801-B	105.1	58.86	23.00	0.56	241.73	6.16	247.89	93.60	78.14	983.69	821.29	1804.98	17.00	5.60
13+804-A	13+900	98.5	55.16	23.00	0.56	226.55	5.60	232.15	110.11	78.14	1084.60	769.72	1854.32	15.30	5.60
13+900	14+000	102.4	57.34	23.00	0.56	235.52	6.16	241.68	110.11	78.14	1127.55	800.19	1927.74	17.00	5.60
14+000	14+100	105.0	58.80	23.00	0.56	241.50	6.16	247.66	93.60	78.14	982.75	820.51	1803.26	17.00	5.60
14+100	14+200	109.8	61.48	23.00	0.56	252.49	6.16	258.65	93.60	78.14	1027.49	857.86	1885.35	18.70	6.16
14+200	14+225	32.9	18.41	23.00	0.56	75.60	2.24	77.84	110.11	78.14	361.94	256.86	618.80	5.10	1.68
14+234	14+300	71.9	40.24	23.00	0.56	165.28	4.48	169.76	110.11	78.14	791.26	561.54	1352.81	11.90	3.92
14+300	14+350	50.6	28.36	23.00	0.56	116.47	3.36	119.83	93.60	78.14	473.97	395.72	869.69	8.50	2.80
14+350	14+395-A	51.5	28.84	23.00	0.56	118.45	3.36	121.81	93.60	78.14	482.02	402.44	884.46	8.50	2.80
14+835	14+943	125.8	70.45	23.00	0.56	289.34	7.28	296.62	93.60	78.14	1177.43	983.05	2160.48	22.10	7.28
14+983	15+075	96.6	54.10	23.00	0.56	222.18	5.60	227.78	93.60	78.14	904.13	754.87	1659.00	17.00	5.60
15+409	15+441	24.9	13.93	23.00	0.56	57.22	1.68	58.90	93.60	78.14	232.86	194.42	427.29	3.40	1.12
15+476	15+494	20.2	11.31	23.00	0.56	46.46	1.68	48.14	93.60	78.14	189.06	157.85	346.91	3.40	1.12
16+667	16+724	56.3	31.53	23.00	0.56	129.49	3.36	132.85	110.11	78.14	619.93	439.95	1059.88	8.50	2.80
16+760	16+840	101.8	57.01	23.00	0.56	234.14	6.16	240.30	93.60	78.14	952.80	795.51	1748.31	17.00	5.60
			<b>3771.30</b>					<b>15888.56</b>					<b>120.05</b>	<b>1115.20</b>	<b>372.40</b>

QUANTITY OF INCLINED WALL - LOWER PASIG																															
STATION		BANK	CROSS SECTIONAL AREA (m <sup>2</sup> )		LENGTH (m)	VOLUME (m <sup>3</sup> )	Hw (m)	H (m)	GRAVEL FILL (m <sup>3</sup> )		FORMWORKS (@10m)		WHOLE LENGTH		TOTAL (m <sup>3</sup> )	REBAR(@10m)						WHOLE LENGTH						TOTAL (kg)	Joint Sealant l.m.	Joint Filler sq.m.	Weephole pcs
START	END		A1 (MIN.)	A2 (MAX.)					@10m	TOTAL (m <sup>3</sup> )	A1(m <sup>2</sup> )	A2(m <sup>2</sup> )	A1(m <sup>2</sup> )	A2(m <sup>2</sup> )		W1(kg)	W2(kg)	W3(kg)	W4(kg)	W5(kg)	W6(kg)	W1(kg)	W2(kg)	W3(kg)	W4(kg)	W5(kg)	W6(kg)				
6+376	6+482		LEFT	0.30					0.30	114.40	34.32	0.32	0.82	1.30		14.82	21.45	0.30	245.33	1.80	247.13	56.83	39.07	35.27	9.77	190.97	39.07				
7+326	7+444	LEFT	0.29	0.29	121.28	35.17	0.27	0.77	1.12	13.62	20.33	0.29	246.53	2.03	248.56	56.83	39.07	35.27	9.77	183.91	39.07	689.26	473.87	427.77	118.47	2230.51	473.87	4413.74	31.24	1.74	61
7+494	7+514	LEFT	0.29	0.29	19.42	5.63	0.27	0.77	1.12	2.18	20.33	0.29	39.48	0.29	39.77	56.83	39.07	35.27	9.77	183.91	39.07	110.37	75.88	68.50	18.97	357.16	75.88	706.75	3.91		10
8+222	9+341	RIGHT	0.30	0.31	1,048.65	319.84	0.35	0.85	1.40	146.81	22.12	0.31	2319.19	16.17	2335.36	56.83	39.07	35.27	9.77	195.20	39.07	5959.69	4097.29	3698.73	1024.32	20470.16	4097.29	39347.47	290.78	16.12	525
9+430	9+792	RIGHT	0.32	0.32	380.67	121.81	0.40	0.90	1.58	60.00	23.23	0.32	884.45	6.40	890.85	56.83	39.07	35.27	9.77	202.26	39.07	2163.42	1487.35	1342.67	371.84	7699.50	1487.35	14552.14	109.99	6.08	191
9+814	9+947	RIGHT	0.32	0.32	187.85	60.11	0.41	0.91	1.61	30.28	23.46	0.32	440.65	3.20	443.85	56.83	39.07	35.27	9.77	203.67	39.07	1067.59	733.97	662.57	183.49	3826.00	733.97	7207.59	53.96	2.88	94
<b>TOTAL</b>					<b>1,872.27</b>	<b>576.89</b>					<b>267.72 (m3)</b>				<b>4205.52 (m2)</b>													<b>70.47 (t)</b>	<b>519.75</b>	<b>28.32 (m2)</b>	<b>939</b>

QUANTITY OF INCLINED WALL - UPPER PASIG																															
STATION		BANK	CROSS SECTIONAL AREA (m <sup>2</sup> )		LENGTH (m)	VOLUME (m <sup>3</sup> )	Hw (m)	H (m)	GRAVEL FILL (m <sup>3</sup> )		FORMWORKS (10m)		WHOLE LENGTH		TOTAL (m <sup>3</sup> )	REBAR(@10m)						WHOLE LENGTH						TOTAL (kg)	Joint Sealant l.m.	Joint Filler sq.m.	Weephole pcs
START	END		A1 (MIN.)	A2 (MAX.)					@10m	TOTAL (m <sup>3</sup> )	A1(m <sup>2</sup> )	A2(m <sup>2</sup> )	A1(m <sup>2</sup> )	A2(m <sup>2</sup> )		W1(kg)	W2(kg)	W3(kg)	W4(kg)	W5(kg)	W6(kg)	W1(kg)	W2(kg)	W3(kg)	W4(kg)	W5(kg)	W6(kg)				
11+500	11+628		LEFT	0.32					0.32	128.49	41.18	0.42	0.92	1.65		21.17	23.68	0.32	304.28	2.24	306.52	56.83	39.07	35.27	9.77	205.08	39.07				
12+024	12+173	LEFT	0.33	0.33	148.38	48.52	0.45	0.95	1.76	26.04	24.35	0.33	361.33	2.62	363.95	56.83	39.07	35.27	9.77	209.32	39.07	843.27	579.75	523.36	144.94	3105.87	579.75	5776.94	43.59	2.30	75
13+806	14+043	LEFT	0.35	0.35	237.55	83.38	0.55	1.05	2.12	50.36	26.59	0.35	631.60	4.21	635.81	56.83	39.07	35.27	9.77	223.43	58.61	1350.04	928.16	837.87	232.04	5307.63	1392.23	10047.97	75.90	3.87	238
14+043	14+045	LEFT	0.35	0.58	6.41	2.97	1.06	1.56	4.14	2.65	37.99	0.46	24.35	0.46	24.82	56.83	39.07	35.27	9.77	295.41	78.14	36.43	25.05	22.61	6.26	189.36	50.09	329.79	2.19		12
14+045	14+272	LEFT	0.58	0.58	210.40	121.40	1.56	2.06	6.37	133.96	49.17	0.58	1034.57	6.35	1040.92	113.66	39.07	70.54	9.77	731.96	117.22	2391.49	822.07	1484.22	205.52	15400.43	2466.22	22769.96	115.25	5.78	424
15+236	15+310	LEFT	0.59	0.59	74.15	44.01	1.63	2.13	6.70	49.67	50.74	0.59	376.21	2.37	378.59	113.66	39.07	70.54	9.77	751.72	136.75	842.82	289.72	523.07	72.43	5573.99	1014.02	8316.05	39.51	1.78	152
15+310	15+311	LEFT	0.51	0.59	1.60	0.88	1.43	1.93	5.76	0.92	46.26	0.55	7.40	0.55	7.95	56.83	39.07	35.27	9.77	347.63	117.22	9.09	6.25	5.64	1.56	55.62	18.75	96.93			3
15+311	15+424	LEFT	0.51	0.51	120.08	60.64	1.23	1.73	4.87	58.45	41.79	0.51	501.85	3.54	505.38	56.83	39.07	35.27	9.77	319.40	97.68	682.44	469.18	423.54	117.29	3835.41	1172.94	6700.80	57.00	3.03	183
15+443	15+548	LEFT	0.44	0.44	113.06	49.58	0.94	1.44	3.64	41.14	35.31	0.44	399.20	2.63	401.83	56.83	39.07	35.27	9.77	278.48	78.14	642.54	441.75	398.78	110.44	3148.44	883.50	5625.44	45.12	2.20	114
15+747	15+870	LEFT	0.44	0.44	107.52	47.63	0.96	1.46	3.72	40.01	35.76	0.44	384.44	2.66	387.10	56.83	39.07	35.27	9.77	281.30	78.14	611.06	420.10	379.24	105.03	3024.52	840.20	5380.14	43.54	2.22	108
15+965	15+973	LEFT	0.51	0.60	8.04	4.48	1.47	1.97	5.95	4.78	47.16	0.56	37.92	0.56	38.47	56.83	39.07	35.27	9.77	353.28	117.22	45.69	31.41	28.36	7.85	284.04	94.24	491.60	2.64		15
15+973	16+142	LEFT	0.51	0.52	162.94	83.75	1.28	1.78	5.09	82.89	42.91	0.51	699.19	4.63	703.81	56.83	39.07	35.27	9.77	326.46	97.68	926.02	636.64	574.71	159.16	5319.37	1591.60	9207.50	77.79	4.12	246
16+142	16+150	LEFT	0.43	0.52	8.01	3.77	1.08	1.58	4.22	3.38	38.44	0.47	30.79	0.47	31.26	56.83	39.07	35.27	9.77	298.23	97.68	45.52	31.30	28.25	7.82	238.89	78.24	430.02	2.21		15
16+150	16+450	LEFT	0.43	0.43	310.41	132.86	0.89	1.39	3.44	106.65	34.19	0.43	1061.30	6.85	1068.15	56.83	39.07	35.27	9.77	271.42	78.14	1764.12	1212.83	1094.86	303.21	8425.10	2425.67	15225.79	123.69	6.45	312
16+450	16+454	LEFT	0.39	0.43	4.00	1.63	0.80	1.30	3.08	1.23	32.18	0.41	12.87	0.41	13.28	56.83	39.07	35.27	9.77	258.72	58.61	22.73	15.63	14.11	3.91	103.49	23.44	183.31			4
16+454	16+552	LEFT	0.39	0.39	109.73	42.30	0.70	1.20	2.69	29.48	29.94	0.39	328.55	2.31	330.87	56.83	39.07	35.27	9.77	244.60	58.61	623.62	428.74	387.03	107.18	2684.02	643.11	4873.70	37.43	1.93	110
16+552	16+564	LEFT	0.39	0.52	11.82	5.35	1.00	1.50	3.89	4.59	36.65	0.45	43.32	0.45	43.77	56.83	39.07	35.27	9.77	286.94	78.14	67.18	46.18	41.69	11.55	339.17	92.37	598.13	4.24		12
10+956-A	11+263	RIGHT	0.32	0.32	327.85	104.09	0.38	0.88	1.51	49.36	22.79	0.32	747.07	5.40	752.46	56.83	39.07	35.27	9.77	199.44	39.07	1863.24	1280.98	1156.37	320.24	6538.61	1280.98	12440.41	92.61	5.12	164
11+610	11+653	RIGHT	0.32	0.32	43.65	14.06	0.41	0.91	1.61	7.04	23.46	0.32	102.39	0.97	103.36	56.83	39.07	35.27	9.77	203.67	39.07	248.07	170.55	153.96	42.64	889.03	170.55	1674.80	11.67	0.65	22
11+788	11+803-A	RIGHT	0.32	0.32	20.46	6.62	0.42	0.92	1.65	3.37	23.68	0.32	48.45	0.65	49.10	56.83	39.07	35.27	9.77	205.08	39.07	116.28	79.94	72.17	19.99	419.60	79.94	787.91	5.88	0.32	11
13+804-A	14+225-A	RIGHT	0.35	0.35	448.58	157.90	0.56	1.06	2.16	96.76	26.81	0.35	1202.71	8.10	1210.81	56.83	39.07	35.27	9.77	224.84	58.61	2549.37	1752.69	1582.20	438.17	10086.03	2629.04	19037.51	144.72	7.79	450
14+234-A	14+365	RIGHT	0.35	0.35	138.22	48.65	0.57	1.07	2.19	30.33	27.04	0.35	373.68	2.46	376.14	56.83	39.07	35.27	9.77	226.25	58.61	785.53	540.05	487.52	135.01	3127.30	810.08	5885.49	44.21	2.12	140
14+835	14+943	RIGHT	0.36	0.37	125.83	45.80	0.61	1.11	2.34	29.49	27.93	0.36	351.44	2.55	353.99	56.83	39.07	35.27	9.77	231.90	58.61	715.12	491.64	443.82	122.91	2918.00	737.46	5428.96	42.05	2.19	126
14+943	15+075	RIGHT	0.37	0.37	96.55	35.34	0.62	1.12	2.38	22.99	28.15	0.37	271.82	1.83	273.65	56.83	39.07	35.27	9.77	233.31	58.61	548.71	377.24	340.54	94.31	2252.62	565.86	4179.29	32.17	1.47	98
15+409	15+441	RIGHT	0.59	0.59	25.10	14.91	1.64	2.14	6.75	16.94	50.96	0.59	127.91	1.19	129.10	113.66	39.07	70.54	9.77	754.54	136.75	285.30	98.07	177.06	24.52	1893.90	343.25	2822.09	14.17	0.59	52
15+476	15+494	RIGHT	0.37	0.37	20.17	7.49	0.64	1.14	2.46	4.96	28.60	0.37	57.69	0.74	58.43	56.83	39.07	35.27	9.77	236.13	58.61	114.63	78.81	71.14	19.70	476.28	118.21	878.78	6.86	0.37	22
16+667	16+724	RIGHT	0.39	0.39	56.26	21.83	0.71	1.21	2.72	15.33	30.17	0.39	169.71	1.16	170.88	56.83	39.07	35.27	9.77	246.01	58.61	319.74	219.82	198.44	54.95	1384.07	329.73	2506.75	19.73	0.78	58
16+760	16+801	RIGHT	0.52	0.53	56.06	29.38	1.32	1.82	5.27	29.52	43.81	0.52	245.57	1.57	247.14	56.83	39.07	35.27	9.77	332.11	97.68	318.60	219.04	197.73	54.76	1861.79					

QUANTITY OF VERTICAL WALL - LOWER PASIG																									
STATION		BANK	LENGT H (m)	VOLUME (m <sup>3</sup> )	HANDRAIL (m <sup>3</sup> )	VOLUME NET(m <sup>3</sup> )	H (m)	Hs (m)	FORMWORKS (@10m)		WHOLE LENGTH		TOTAL (m <sup>2</sup> )	REBAR(@10m)				WHOLE LENGTH				TOTAL (kg)	Joint Sealant l.m.	Joint Filler sq.m.	Water Stop l.m.
START	END								A1(m <sup>2</sup> )	A2(m <sup>2</sup> )	A1(m <sup>2</sup> )	A2(m <sup>2</sup> )		W1(kg)	W2(kg)	W3(kg)	W4(kg)	W1(kg)	W2(kg)	W3(kg)	W4(kg)				
2+392	2+419	LEFT	26.49	5.30		5.30	0.83	0.27	16.64	0.20	44.08	0.40	44.48	65.24	26.64	26.71	78.14	172.81	70.57	70.76	207.00	521.15	9.32	0.20	2.49
2+419	2+694	LEFT	278.87	52.99		52.99	0.78	0.27	15.64	0.19	436.12	2.61	438.73	61.50	26.64	26.71	78.14	1715.03	742.91	744.89	2179.20	5382.03	97.01	2.42	11.70
2+854	3+072	LEFT	230.66	48.44		48.44	0.88	0.28	17.64	0.21	406.98	2.58	409.55	68.98	26.64	26.71	78.14	1591.01	614.48	616.12	1802.47	4624.07	90.36	2.36	11.44
6+376	6+482	LEFT	114.40	12.58		12.58	0.50	0.00	10.03	0.11	114.69	0.68	115.36	40.56	26.64	26.71	58.61	464.05	304.76	305.57	670.48	1744.86	26.46	0.56	3.50
7+326	7+444	LEFT	121.28	30.32		30.32	1.00	0.00	20.05	0.25	243.17	1.75	244.92	77.95	26.64	26.71	78.14	945.36	323.09	323.95	947.73	2540.13	52.92	1.50	8.00
7+494	7+514	LEFT	19.42	4.86		4.86	1.00	0.00	20.05	0.25	38.94	0.25	39.19	77.95	26.64	26.71	78.14	151.38	51.73	51.87	151.76	406.74	6.62	0.00	2.00
7+514	7+580	LEFT	56.35	6.76		6.76	0.52	0.00	10.43	0.12	58.75	0.35	59.10	42.06	26.64	26.71	58.61	237.00	150.12	150.52	330.26	867.89	13.67	0.24	2.08
5+545	5+602	RIGHT	67.45	21.58		21.58	1.22	0.22	24.46	0.32	164.99	1.27	166.26	94.40	26.64	26.71	97.68	636.71	179.69	180.17	658.85	1655.42	34.40	0.96	6.10
6+396	6+510	RIGHT	113.18	40.74		40.74	1.34	0.37	26.87	0.36	304.08	2.15	306.23	103.37	26.64	26.71	117.22	1169.95	301.51	302.32	1326.65	3100.42	63.51	1.79	9.38
8+222	9+341	RIGHT	1,048.65	262.16		262.16	1.00	0.00	20.05	0.25	2102.54	13.25	2115.79	77.95	26.64	26.71	78.14	8174.08	2793.60	2801.05	8194.57	21963.31	460.85	13.00	54.00
9+430	9+792	RIGHT	380.67	95.17		95.17	1.00	0.00	20.05	0.25	763.24	5.00	768.24	77.95	26.64	26.71	78.14	2967.27	1014.10	1016.81	2974.71	7972.89	167.58	4.75	21.00
9+814	9+947	RIGHT	187.85	46.96		46.96	1.00	0.00	20.05	0.25	376.64	2.50	379.14	77.95	26.64	26.71	78.14	1464.27	500.43	501.77	1467.94	3934.40	81.59	2.25	11.00
<b>TOTAL</b>						<b>627.86</b>							<b>5087.01 (m2)</b>									<b>54.71 (t)</b>	<b>1,104.27</b>	<b>30.03</b>	<b>142.69</b>

QUANTITY OF VERTICAL WALL - UPPER PASIG																									
STATION		BANK	LENGT H (m)	VOLUME (m <sup>3</sup> )	HANDRAIL (m <sup>3</sup> )	VOLUME NET(m <sup>3</sup> )	H (m)		FORMWORKS (10m)		WHOLE LENGTH		TOTAL (m <sup>2</sup> )	REBAR(@10m)				WHOLE LENGTH				TOTAL (kg)	Joint Sealant l.m.	Joint Filler sq.m.	Water Stop l.m.
START	END								A1(m <sup>2</sup> )	A2(m <sup>2</sup> )	A1(m <sup>2</sup> )	A2(m <sup>2</sup> )		W1(kg)	W2(kg)	W3(kg)	W4(kg)	W1(kg)	W2(kg)	W3(kg)	W4(kg)				
12+024	12+173	LEFT	148.38	37.10		37.10	1.00	0.00	20.05	0.25	297.50	2.00	299.50	77.95	26.64	26.71	78.14	1156.60	395.28	396.34	1159.50	3107.73	63.95	1.75	9.00
13+806	14+043	LEFT	237.55	59.39		59.39	1.00	0.00	20.05	0.25	476.29	3.00	479.29	77.95	26.64	26.71	78.14	1851.67	632.83	634.52	1856.31	4975.33	103.64	2.75	13.00
14+043	14+045	LEFT	6.41	0.71		0.71	0.50	0.00	10.03	0.11	6.43	0.11	6.54	40.56	26.64	26.71	58.61	26.00	17.08	17.12	37.57	97.77	1.20	0.00	1.00
15+310	15+311	LEFT	1.60	0.06	0.02	0.05	0.20	0.00	4.01	0.04	0.64	0.04	0.68	18.13	26.64	26.71	39.07	2.90	4.26	4.27	6.25	17.69	0.00	0.00	0.40
15+311	15+424	LEFT	120.08	10.81	2.32	8.49	0.40	0.00	8.02	0.09	96.30	0.62	96.92	33.09	26.64	26.71	39.07	397.31	319.89	320.75	469.18	1507.12	24.05	0.53	3.20
15+443	15+548	LEFT	113.06	12.44	2.73	9.70	0.50	0.00	10.03	0.11	113.34	0.68	114.02	40.56	26.64	26.71	58.61	458.61	301.19	302.00	662.62	1724.42	26.46	0.56	3.50
15+747	15+870	LEFT	107.52	11.83	2.60	9.23	0.50	0.00	10.03	0.11	107.79	0.68	108.46	40.56	26.64	26.71	58.61	436.14	286.43	287.20	630.15	1639.93	25.25	0.56	3.50
15+965	15+973	LEFT	8.04	0.32	0.08	0.24	0.20	0.00	4.01	0.04	3.22	0.04	3.27	18.13	26.64	26.71	39.07	14.58	21.42	21.48	31.41	88.89	0.60	0.00	0.40
15+973	16+142	LEFT	162.94	14.66	3.15	11.51	0.40	0.00	8.02	0.09	130.68	0.79	131.47	33.09	26.64	26.71	39.07	539.12	434.07	435.23	636.64	2045.06	32.06	0.70	4.00
16+142	16+150	LEFT	8.01	1.12	0.23	0.89	0.60	0.00	12.03	0.14	9.64	0.14	9.77	48.04	26.64	26.71	58.61	38.48	21.34	21.40	46.95	128.16	1.40	0.00	1.20
16+150	16+450	LEFT	310.41	58.98		58.98	0.80	0.00	16.04	0.19	497.90	3.07	500.97	62.99	26.64	26.71	78.14	1955.42	826.93	829.14	2425.67	6037.16	111.85	2.88	13.60
16+450	16+454	LEFT	4.00	0.88		0.88	0.90	0.00	18.05	0.22	7.22	0.22	7.44	70.47	26.64	26.71	78.14	28.19	10.66	10.68	31.26	80.79	0.00	0.00	1.80
16+454	16+552	LEFT	109.73	27.43		27.43	1.00	0.00	20.05	0.25	220.01	1.50	221.51	77.95	26.64	26.71	78.14	855.33	292.32	293.10	857.47	2298.23	46.31	1.25	7.00
16+552	16+564	LEFT	11.82	1.89	0.40	1.49	0.70	0.00	14.04	0.16	16.59	0.16	16.75	55.52	26.64	26.71	58.61	65.62	31.49	31.57	69.27	197.96	3.21	0.00	1.40
14+365	14+395-A	RIGHT	35.76	9.66		9.66	1.08	1.08	21.65	0.27	77.43	0.55	77.98	83.93	26.64	26.71	97.68	300.13	95.26	95.52	349.30	840.22	16.56	0.27	3.24
14+983	15+075	RIGHT	96.55	24.14		24.14	1.00	0.00	20.05	0.25	193.58	1.25	194.83	77.95	26.64	26.71	78.14	752.59	257.21	257.90	754.48	2022.18	41.90	1.00	6.00
16+801	16+840	RIGHT	45.69	4.11	0.88	3.23	0.40	0.00	8.02	0.09	36.64	0.26	36.91	33.09	26.64	26.71	39.07	151.17	121.72	122.04	178.52	573.45	9.02	0.18	1.60
<b>TOTAL</b>						<b>263.11</b>							<b>2306.32 (m2)</b>									<b>27.38 (t)</b>	<b>507.44</b>	<b>12.44</b>	<b>73.84</b>

**QUANTITY OF PARAPET WALL (TYPE-2) - LOWER PASIG**

STATION		BANK	LENGTH (m)	VOLUME (m³)	H (m)	H' (m)	B (m)	D (m)	n (pcs)	FORMWORKS (@10m)		WHOLE LENGTH		TOTAL (m²)	REBAR(@10m)		WHOLE LENGTH		TOTAL WT.	LEVELING CONCRETE (@10m)	WHOLE LENGTH	EXCAVATION (@10m)	WHOLE LENGTH	BACKFILL (@10m)	WHOLE LENGTH	WASTE (@10m)	WHOLE LENGTH	Joint Sealant	Joint Filler	Water Stop	Restoration of Sidewalks
START	END									A1(m²)	A2(m²)	A1(m²)	A2(m²)		W1(kg)	W2(kg)	W1(kg)	W2(kg)													
3+069	3+100	RIGHT	30.60	54.56	1.48	1.50	1.60	0.70	23	43.90	1.78	134.32	3.56	137.88	148.81	156.10	455.36	477.67	933.03	0.85	2.60	22.31	68.28	10.26	31.40	12.05	36.87	19.74	1.78	4.44	
3+649	3+753	RIGHT	98.89	60.64	0.82	0.90	0.75	0.40	12	24.56	0.61	242.91	3.05	245.96	75.36	81.44	745.25	805.40	1550.65	0.43	4.20	0.00	0.00	0.00	0.00	0.00	37.17	2.44	4.92		
5+602		RIGHT	1.91	2.36	1.22	1.30	1.20	0.60	21	36.64	1.23	7.00	1.23	8.23	117.90	142.53	22.52	27.22	49.74	0.65	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.44		
6+396		RIGHT	1.16	1.48	1.30	1.30	1.20	0.60	21	38.26	1.28	4.44	1.28	5.72	120.96	142.53	14.03	16.53	30.56	0.65	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.60		
<b>TOTAL</b>			<b>182.56</b>	<b>119.05</b>										<b>897.79</b>					<b>2.56 (Q)</b>	<b>7.00</b>		<b>68.28</b>		<b>81.40</b>		<b>36.87</b>	<b>66.91</b>	<b>4.22</b>	<b>14.40</b>		

**QUANTITY OF PARAPET WALL (TYPE-2) - UPPER PASIG**

STATION		BANK	LENGTH (m)	VOLUME (m³)	H (m)	H' (m)	B (m)	D (m)	n (pcs)	FORMWORKS (10m)		WHOLE LENGTH		TOTAL (m²)	REBAR(@10m)		WHOLE LENGTH		TOTAL WT.	LEVELING CONCRETE (@10m)	WHOLE LENGTH	EXCAVATION (@10m)	WHOLE LENGTH	BACKFILL (@10m)	WHOLE LENGTH	WASTE (@10m)	WHOLE LENGTH	Joint Sealant	Joint Filler	Water Stop	Restoration of Sidewalks
START	END									A1(m²)	A2(m²)	A1(m²)	A2(m²)		W1(kg)	W2(kg)	W1(kg)	W2(kg)													
10+232	10+325	LEFT	92.93	103.06	1.20	1.20	1.10	0.55	19	35.24	1.11	327.49	5.55	333.04	110.85	128.95	1030.11	1198.36	2228.47	0.60	5.58	14.40	133.82	7.75	72.02	6.65	61.80	49.03	4.44	7.20	
10+325	10+341	LEFT	17.27	5.28	0.60	0.60	0.45	0.20	10	16.12	0.31	27.84	0.31	28.15	45.98	67.87	79.41	117.21	196.63	0.28	0.47	3.94	6.80	2.76	4.77	1.18	2.03	4.54	0.00	1.20	
10+425	10+434	LEFT	9.44	9.33	1.10	1.10	0.95	0.50	18	32.22	0.93	30.42	0.93	36.29	98.64	122.17	93.11	115.32	235.43	0.53	0.50	12.24	11.55	6.96	6.57	5.28	4.98	2.52	0.00	2.20	
10+467	10+477	LEFT	10.37	10.33	1.10	1.10	0.95	0.50	18	32.22	0.93	33.41	0.93	40.57	98.64	122.17	102.29	126.69	261.08	0.53	0.54	12.24	12.69	6.96	7.22	5.28	5.47	5.04	0.00	2.20	
11+500	11+625	LEFT	123.49	92.86	1.00	1.00	0.85	0.40	16	28.20	0.74	353.88	5.18	359.06	86.43	108.59	1084.60	1362.72	2447.32	0.48	5.96	0.00	0.00	0.00	0.00	0.00	58.00	4.44	8.00		
11+625	11+628	LEFT	3.00	2.22	1.00	1.00	0.85	0.40	16	28.20	0.74	8.46	0.74	9.20	86.43	108.59	25.93	32.58	58.51	0.48	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00		
12+024		LEFT	4.30	3.18	1.00	1.00	0.85	0.40	16	28.20	0.74	12.13	0.74	12.87	86.43	108.59	37.16	46.69	83.86	0.48	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00		
10+140	10+179	RIGHT	15.68	24.49	1.34	1.40	1.40	0.70	21	41.07	1.56	64.39	1.56	65.95	135.07	142.53	211.79	223.48	435.28	0.75	1.18	20.81	32.63	10.26	16.09	10.55	16.54	9.02	0.00	2.68	
10+956-A	10+956	RIGHT	14.37	10.63	1.00	1.00	0.85	0.40	16	28.20	0.74	40.52	0.74	41.26	86.43	108.59	124.20	156.05	280.25	0.48	0.68	0.00	0.00	0.00	0.00	0.00	4.64	0.00	2.00		
10+956	11+055	RIGHT	102.91	76.15	1.00	1.00	0.85	0.40	16	28.20	0.74	290.21	4.44	294.65	86.43	108.59	889.44	1117.52	2006.96	0.48	4.89	0.00	0.00	0.00	0.00	0.00	46.40	3.70	7.00		
11+150	11+263	RIGHT	113.08	82.65	0.98	1.00	0.85	0.40	16	27.80	0.73	314.32	4.38	318.70	85.67	108.59	968.71	1227.96	2196.67	0.48	5.37	0.00	0.00	0.00	0.00	0.00	50.15	3.65	6.86		
11+610	11+643	RIGHT	33.63	24.70	0.97	1.00	0.85	0.40	16	27.59	0.73	92.80	1.46	97.34	85.28	108.59	286.81	365.19	674.22	0.48	1.60	9.34	31.40	5.46	18.37	3.88	13.03	13.56	0.73	2.91	
11+643	11+653	RIGHT	21.22	8.47	0.67	0.70	0.50	0.20	12	17.53	0.35	37.21	0.70	46.00	50.75	81.44	107.70	172.82	329.22	0.30	0.64	4.06	2.76	5.86	1.30	2.76	6.61	0.35	2.01		
11+788	11+800	RIGHT	15.60	12.07	0.98	1.00	0.85	0.40	16	27.80	0.73	43.36	0.73	49.14	85.67	108.59	133.64	169.40	338.76	0.48	0.74	9.34	14.57	5.46	8.52	3.88	6.05	6.84	0.00	1.96	
15+411		RIGHT	3.10	0.63	0.38	0.40	0.38	0.20	8	11.68	0.20	3.62	0.20	3.82	34.65	54.30	10.74	16.83	27.57	0.24	0.07	3.76	1.17	2.76	0.86	1.00	0.31	0.00	0.00	0.76	
15+494	16+086	RIGHT	606.87	142.77	0.45	0.50	0.40	0.20	8	13.09	0.24	794.39	7.44	801.83	38.16	54.30	2315.75	3295.06	5610.82	0.25	15.17	3.81	231.37	2.76	167.65	1.05	63.72	146.29	7.20	14.40	622.04
16+095	16+472	RIGHT	363.82	130.61	0.70	0.70	0.50	0.20	12	18.14	0.36	659.97	6.84	666.81	51.90	81.44	1888.21	2963.10	4851.31	0.30	10.91	4.06	147.80	2.76	100.51	1.30	47.30	123.41	6.48	14.00	372.92
16+789		RIGHT	5.80	1.23	0.40	0.40	0.38	0.20	8	12.08	0.21	7.01	0.21	7.22	35.41	54.30	20.54	31.49	52.03	0.24	0.14	3.76	2.18	2.76	1.60	1.00	0.58	1.11	0.00	0.80	
<b>TOTAL</b>			<b>1568.88</b>	<b>740.87</b>										<b>8211.88</b>					<b>22.31 (Q)</b>	<b>54.79</b>		<b>684.09</b>		<b>410.04</b>		<b>224.56</b>	<b>527.16</b>	<b>30.99</b>	<b>80.18</b>	<b>994.96</b>	

**QUANTITY OF PARAPET WALL (TYPE-3) - LOWER PASIG**

STATION		BANK	LENGTH (m)	VOLUME (m³)	H (m)	H' (m)	B (m)	D (m)	n (pcs)	FORMWORKS (@10m)		WHOLE LENGTH		TOTAL (m²)	REBAR(@10m)		WHOLE LENGTH		TOTAL WT.	LEVELING CONCRETE (@10m)	WHOLE LENGTH	EXCAVATION (@10m)	WHOLE LENGTH	BACKFILL (@10m)	WHOLE LENGTH	WASTE (@10m)	WHOLE LENGTH	ANCHOR BAR (@10m)	WHOLE LENGTH	CONCRTE CHIPPING (@10m)	WHOLE LENGTH	Joint Sealant	Joint Filler	Water Stop	FILLER CONCRETE (@10m)	WHOLE LENGTH	Restoration of Sidewalks
START	END									A1(m²)	A2(m²)	A1(m²)	A2(m²)		W1(kg)	W2(kg)	W1(kg)	W2(kg)																			
7+516	8+219	RIGHT	612.65	627.97	1.27	1.30	1.20	0.60	18.00	28.85	1.03	1767.50	31.78	1799.27	133.26	122.17	8164.17	7484.75	15648.92	0.49	30.02	10.35	634.09	4.28	262.21	6.07	371.88	21.46	1314.75	9.20	563.64	315.37	30.75	40.64	0.49	30.02	505.44
<b>TOTAL</b>			<b>612.65</b>	<b>627.97</b>										<b>1799.27</b>					<b>15.65 (Q)</b>	<b>80.02</b>		<b>684.09</b>		<b>262.21</b>		<b>371.88</b>		<b>1,314.75</b>		<b>563.64</b>	<b>315.37</b>	<b>30.75</b>	<b>40.64</b>	<b>0.49</b>	<b>30.02</b>	<b>505.44</b>	

**QUANTITY OF PARAPET WALL (TYPE-3) - UPPER PASIG**

STATION		BANK	LENGTH (m)	VOLUME (m³)	H (m)	H' (m)	B (m)	D (m)	n (pcs)	FORMWORKS (@10m)		WHOLE LENGTH		TOTAL (m²)	REBAR(@10m)		WHOLE LENGTH		TOTAL WT.	LEVELING CONCRETE (@10m)	WHOLE LENGTH	EXCAVATION (@10m)	WHOLE LENGTH	BACKFILL (@10m)	WHOLE LENGTH	WASTE (@10m)	WHOLE LENGTH	ANCHOR BAR (@10m)	WHOLE LENGTH	CONCRTE CHIPPING (@10m)	WHOLE LENGTH	Joint Sealant	Joint Filler	Water Stop	Restoration of Sidewalks
START	END									A1(m²)	A2(m²)	A1(m²)	A2(m²)		W1(kg)	W2(kg)	W1(kg)	W2(kg)																	
10+405	10+425	LEFT	20.74	15.88	1.08	1.10	0.95	0.50	18	26.82	0.77	55.62	1.53	57.15	113.40	122.17	235.19	253.37	488.56	0.35	0.73	7.08	14.69	3.48	7.22	3.60	7.47	21.46	44.51	8.50	17.63	9.93	0.77	3.24	
11+055	11+150	RIGHT	97.49	58.99	0.97	1.00	0.85	0.40	14	23.59	0.61	230.02	3.03	233.04	97.74	95.02	952.91	926.33	1879.25	0.30	2.92	5.23	51.00	2.73	26.63	2.50	24.37	21.46	209.21	7.50	78.12	42.93	2.42	5.82	
11+788		RIGHT	4.00	0.90	0.55	0.60																													

QUANTITY OF LPW - LOWER PASIG																																				
STATION		BANK	LENGTH (m)	VOLUME (m <sup>3</sup> )	H (m)	D (m)	B (m)	n1	n2	FORMWORKS (@10m)		WHOLE LENGTH		TOTAL (m <sup>3</sup> )	REBAR(@10m)					WHOLE LENGTH					TOTAL WT. (kg)	LEVELING CONCRETE (@10m)	WHOLE LENGTH	EXCAVATION (@10m)	WHOLE LENGTH	BACKFILL (@10m)	WHOLE LENGTH	WASTE (@10m)	WHOLE LENGTH	Joint Sealant	Joint Filler	Water Stop
START	END									A1(m <sup>2</sup> )	A2(m <sup>2</sup> )	A1(m <sup>2</sup> )	A2(m <sup>2</sup> )		W1(kg)	W2(kg)	W3(kg)	W4(kg)	W5(kg)	W1(kg)	W2(kg)	W3(kg)	W4(kg)	W5(kg)												
2+283	2+334	RIGHT	62.45	35.28	0.95	0.50	1.35	10	12	30.24	0.57	188.85	2.26	191.11	110.11	103.01	107.45	117.22	33.71	687.65	643.28	671.01	732.01	210.51	2944.47	0.73	4.53	14.44	90.16	9.96	62.22	4.48	27.95	48.89	1.70	4.75
<b>TOTAL</b>			<b>62.45</b>	<b>35.28</b>									<b>191.11</b>										<b>2.94 (t)</b>		<b>4.53</b>		<b>90.16</b>		<b>62.22</b>		<b>27.95</b>	<b>48.89</b>	<b>1.70</b>	<b>4.75</b>		

QUANTITY OF LPW-SE - LOWER PASIG																																				
STATION		BANK	LENGTH (m)	VOLUME (m <sup>3</sup> )	H (m)	D (m)	B (m)	n1	n2	FORMWORKS (@10m)		WHOLE LENGTH		TOTAL (m <sup>3</sup> )	REBAR(@10m)					WHOLE LENGTH					TOTAL WT. (kg)	LEVELING CONCRETE (@10m)	WHOLE LENGTH	EXCAVATION (@10m)	WHOLE LENGTH	BACKFILL (@10m)	WHOLE LENGTH	WASTE (@10m)	WHOLE LENGTH	Joint Sealant	Joint Filler	Water Stop
START	END									A1(m <sup>2</sup> )	A2(m <sup>2</sup> )	A1(m <sup>2</sup> )	A2(m <sup>2</sup> )		W1(kg)	W2(kg)	W3(kg)	W4(kg)	W5(kg)	W1(kg)	W2(kg)	W3(kg)	W4(kg)	W5(kg)												
3+062	3+072	LEFT	11.27	2.45	0.16	0.40	0.50	4	6	12.44	0.22	14.02	0.22	14.24	46.89	42.62	48.84	58.61	33.71	52.84	48.04	55.04	66.05	37.99	259.96	0.28	0.31	5.01	5.64	2.88	3.25	2.13	2.39	2.89	0.00	
6+376	6+482	LEFT	114.64	26.94	0.25	0.40	0.50	6	6	14.24	0.24	163.25	1.41	164.66	53.28	42.62	68.38	58.61	33.71	610.80	488.64	783.86	671.88	386.43	2941.62	0.28	3.15	5.01	57.39	2.88	33.03	2.13	24.36	35.73	1.18	
5+571	5+602	RIGHT	36.61	10.58	0.52	0.40	0.50	8	6	19.64	0.29	71.90	0.58	72.48	72.46	42.62	87.91	58.61	33.71	265.28	156.05	321.85	214.56	123.41	1081.14	0.28	1.01	5.01	18.33	2.88	10.55	2.13	7.78	15.15	0.29	
8+222	9+341	RIGHT	1,042.57	245.00	0.25	0.40	0.50	6	6	14.24	0.24	1,484.62	12.46	1,497.07	53.28	42.62	68.38	58.61	33.71	5,554.81	4,443.85	7,128.68	6,110.29	3,514.34	26,751.98	0.28	28.67	5.01	521.94	2.88	300.39	2.13	221.55	337.79	12.22	
9+430	9+792	RIGHT	380.90	110.84	0.53	0.40	0.50	8	6	19.84	0.29	755.71	5.82	761.53	73.17	42.62	87.91	58.61	33.71	2,787.09	1,623.55	3,348.57	2,232.38	1,283.96	11,275.54	0.28	10.47	5.01	190.69	2.88	109.75	2.13	80.94	165.98	5.53	
9+814	9+947	RIGHT	195.01	78.59	0.84	0.40	0.75	10	8	26.04	0.40	507.81	4.03	511.84	179.77	114.04	107.45	78.14	93.61	3,505.78	2,223.82	2,095.34	1,523.89	1,825.48	11,174.30	0.40	7.80	6.13	119.57	3.38	65.94	2.75	53.63	119.11	3.63	
<b>TOTAL</b>			<b>1,781.00</b>	<b>474.40</b>									<b>3,021.81</b>											<b>63.48 (t)</b>		<b>51.42</b>		<b>918.65</b>		<b>622.90</b>		<b>390.65</b>	<b>676.65</b>	<b>22.84</b>	<b>0.00</b>	

QUANTITY OF LPW - UPPER PASIG																																				
STATION		BANK	LENGTH (m)	VOLUME (m <sup>3</sup> )	H (m)	D (m)	B (m)	n1	n2	FORMWORKS (@10m)		WHOLE LENGTH		TOTAL (m <sup>3</sup> )	REBAR(@10m)					WHOLE LENGTH					TOTAL WT. (kg)	LEVELING CONCRETE (@10m)	WHOLE LENGTH	EXCAVATION (@10m)	WHOLE LENGTH	BACKFILL (@10m)	WHOLE LENGTH	WASTE (@10m)	WHOLE LENGTH	Joint Sealant	Joint Filler	Water Stop
START	END									A1(m <sup>2</sup> )	A2(m <sup>2</sup> )	A1(m <sup>2</sup> )	A2(m <sup>2</sup> )		W1(kg)	W2(kg)	W3(kg)	W4(kg)	W5(kg)	W1(kg)	W2(kg)	W3(kg)	W4(kg)	W5(kg)												
11+800	11+803	RIGHT	3.07	1.75	0.97	0.50	1.35	10	12	30.64	0.57	9.41	0.57	9.98	111.53	103.01	107.45	117.22	33.71	34.24	31.62	32.99	35.99	10.35	145.18	0.73	0.22	14.44	4.43	9.96	3.06	4.48	1.37	0.00	0.00	1.94
14+914	14+943	RIGHT	32.88	23.84	1.30	0.50	1.80	12	14	37.24	0.73	122.45	1.45	123.90	134.98	134.98	126.98	136.75	33.71	443.80	443.80	417.52	449.64	110.83	1,865.60	0.95	3.12	16.91	55.61	11.31	37.20	5.60	18.41	31.34	0.73	3.90
15+483	15+494	RIGHT	10.35	5.87	0.96	0.50	1.35	10	12	30.44	0.57	31.51	0.57	32.07	110.82	103.01	107.45	117.22	33.71	114.70	106.61	111.21	121.32	34.89	488.73	0.73	0.75	14.44	14.94	9.96	10.31	4.48	4.63	8.19	0.00	1.92
<b>TOTAL</b>			<b>46.80</b>	<b>31.45</b>									<b>165.94</b>											<b>2.50 (t)</b>		<b>4.10</b>		<b>74.98</b>		<b>50.57</b>		<b>24.42</b>	<b>39.53</b>	<b>0.73</b>	<b>7.76</b>	

QUANTITY OF LPW-SE - UPPER PASIG																																				
STATION		BANK	LENGTH (m)	VOLUME (m <sup>3</sup> )	H (m)	D (m)	B (m)	n1	n2	FORMWORKS (@10m)		WHOLE LENGTH		TOTAL (m <sup>3</sup> )	REBAR(@10m)					WHOLE LENGTH					TOTAL WT. (kg)	LEVELING CONCRETE (@10m)	WHOLE LENGTH	EXCAVATION (@10m)	WHOLE LENGTH	BACKFILL (@10m)	WHOLE LENGTH	WASTE (@10m)	WHOLE LENGTH	Joint Sealant	Joint Filler	Water Stop
START	END									A1(m <sup>2</sup> )	A2(m <sup>2</sup> )	A1(m <sup>2</sup> )	A2(m <sup>2</sup> )		W1(kg)	W2(kg)	W3(kg)	W4(kg)	W5(kg)	W1(kg)	W2(kg)	W3(kg)	W4(kg)	W5(kg)												
13+806	13+926	LEFT	121.54	25.64	0.13	0.40	0.50	4	6	11.84	0.21	143.90	1.48	145.38	44.76	42.62	48.84	58.61	33.71	543.95	518.05	593.60	712.32	409.69	2,777.62	0.28	3.34	5.01	60.85	2.88	35.02	2.13	25.83	33.22	1.27	
14+072	14+272	LEFT	180.39	45.28	0.33	0.40	0.50	6	6	15.84	0.25	285.74	2.51	288.25	58.96	42.62	68.38	58.61	33.71	1,063.64	768.89	1,233.43	1,057.23	608.07	4,731.26	0.28	4.96	5.01	90.31	2.88	51.97	2.13	38.33	64.22	2.26	
16+152	16+203	LEFT	50.76	10.81	0.14	0.40	0.50	4	6	12.04	0.21	61.12	0.64	61.75	45.47	42.62	48.84	58.61	33.71	230.78	216.36	247.91	297.49	171.10	1,163.65	0.28	1.40	5.01	25.41	2.88	14.63	2.13	10.79	14.04	0.43	
16+516	16+564	LEFT	51.38	10.94	0.14	0.40	0.50	4	6	12.04	0.21	61.86	0.64	62.50	45.47	42.62	48.84	58.61	33.71	233.60	219.00	250.94	301.13	173.19	1,177.87	0.28	1.41	5.01	25.72	2.88	14.80	2.13	10.92	14.04	0.43	
10+140	10+179	RIGHT	29.31	7.59	0.37	0.40	0.50	6	6	16.64	0.26	48.77	0.52	49.29	61.80	42.62	68.38	58.61	33.71	181.15	124.93	200.41	171.78	98.80	777.07	0.28	0.81	5.01	14.67	2.88	8.44	2.13	6.23	9.32	0.26	
<b>TOTAL</b>			<b>483.88</b>	<b>100.27</b>									<b>607.17</b>											<b>10.68 (t)</b>		<b>11.92</b>		<b>216.96</b>		<b>124.87</b>		<b>92.09</b>	<b>134.84</b>	<b>4.64</b>	<b>0.00</b>	

QUANTITY OF REPAIR (TYPE-R3) - LOWER PASIG																											
STATION		BANK	LENGTH (m)	VOLUME (m <sup>3</sup> )	H (m)	W (m)	LEVELING CONCRETE (@10m)	WHOLE LENGTH	CONCRTE CHIPPING (@10m)	WHOLE LENGTH	FORMWORKS (@10m)		TOTAL (m <sup>3</sup> )	REBAR(@10m)			WHOLE LENGTH			TOTAL WT. (kg)	ANCHOR BAR (@10m)	WHOLE LENGTH	Joint Sealant	Joint Filler	Water Stop		
START	END										V1(m <sup>3</sup> )	Vt(m <sup>3</sup> )		A1(m <sup>2</sup> )	At(m <sup>2</sup> )	A1(m <sup>2</sup> )	A2(m <sup>2</sup> )	At(m <sup>2</sup> )	W1(kg)							W2(kg)	W3(kg)
2+392	2+419	LEFT	26.49	19.80	1.33	1.00	0.34	0.89	6.71	17.77	23.30	0.75	63.22	112.33	42.88	88.23	297.57	113.59	233.72	644.88	26.04	68.97	16.15	0.75	0.60		
7+514	7+580	LEFT	56.37	39.94	1.20	1.00	0.34	1.90	5.41	30.50	22.00	0.71	126.14	106.56	42.88	81.44	600.68	241.71	459.10	1,301.49	26.04	146.77	34.10	1.42	0.80		
<b>TOTAL</b>			<b>82.86</b>	<b>59.74</b>				<b>2.79</b>		<b>48.27</b>			<b>189.36</b>												<b>1.40</b>		

REPAIR (TYPE-R4)						
STATION		BANK	WIDTH (m)		LENGTH (m)	SURFACE AREA (m <sup>2</sup> )
START	END		W1 (MIN.)	W2 (MAX.)		
3+325	3+400	LEFT	3.44	3.97	68.55	253.98
STA.A	STA.C	RIGHT	3.53	4.85	37.33	156.41
3+410	3+492	RIGHT	3.16	3.44	88.24	291.20
TOTAL					194.12	701.59

REPAIR (TYPE-R4)						
STATION		BANK	WIDTH (m)		LENGTH (m)	SURFACE AREA (m <sup>2</sup> )
START	END		W1 (MIN.)	W2 (MAX.)		
10+310	10+323	LEFT	2.21	2.21	12.04	26.62
10+405	10+406	LEFT	3.74	3.74	1.34	5.02
10+406	10+412	LEFT	0.60	0.60	5.22	3.13
10+436	10+443	LEFT	1.20	1.50	7.46	10.06
10+459	10+467	LEFT	1.00	1.00	8.18	8.18
10+467	10+477	LEFT	1.20	1.20	10.51	12.62
10+477	10+497	LEFT	2.98	5.18	18.84	76.85
14+287		LEFT	-	-	1.70	3.43
14+300		LEFT	-	-	8.87	20.08
14+328		LEFT	-	-	14.04	56.43
14+355		LEFT	-	-	14.50	51.75
14+370		LEFT	-	-	4.85	12.83
14+394		LEFT	-	-	7.52	27.24
14+423		LEFT	-	-	2.32	3.19
14+426		LEFT	-	-	2.10	2.90
14+440		LEFT	-	-	1.63	6.45
TOTAL					121.12	326.78

QUANTITY OF CURB STONE - LOWER PASIG																					
STATION		BANK	Lc (m)	Lp (m)	Ave. Width of Paving Block (m)	Lt (m)	VOLUME (m <sup>3</sup> )	H (m)	FORMWORKS (@10m)		WHOLE LENGTH		TOTAL (m <sup>3</sup> )	REBAR(@10m)		WHOLE LENGTH		TOTAL WT. (kg)	LEVELING CONCRET E (@10m) V1(m <sup>3</sup> )	WHOLE LENGTH Vt(m <sup>3</sup> )	Joint Filler sq.m.
START	END								A1(m <sup>2</sup> )	A2(m <sup>2</sup> )	A1(m <sup>2</sup> )	A2(m <sup>2</sup> )		W1(kg)	W2(kg)	W1(kg)	W2(kg)				
2+654	2+694	LEFT	43.12	41.68	3.19	75.02	2.81	0.25	5.00	0.04	37.51	0.15	37.66	7.55	13.57	56.63	101.83	158.46	0.13	0.94	0.11
2+854	3+072	LEFT	221.11	230.66	2.53	342.55	12.85	0.25	5.00	0.04	171.28	0.68	171.95	7.55	13.57	258.56	464.98	723.53	0.13	4.28	0.64
6+116	6+219	LEFT		100.89	2.37	52.14	1.96	0.25	5.00	0.04	26.07	0.11	26.18	7.55	13.57	39.36	70.77	110.13	0.13	0.65	0.08
6+376	6+482	LEFT		114.40	2.52	60.48	2.27	0.25	5.00	0.04	30.24	0.15	30.39	7.55	13.57	45.65	82.10	127.75	0.13	0.76	0.11
7+326	7+444	LEFT	115.73	115.73	2.94	189.23	7.10	0.25	5.00	0.04	94.62	0.38	94.99	7.55	13.57	142.83	256.86	399.69	0.13	2.37	0.34
7+494	7+514	LEFT	18.86	19.42	2.72	32.46	1.22	0.25	5.00	0.04	16.23	0.08	16.31	7.55	13.57	24.50	44.06	68.56	0.13	0.41	0.04
2+283	2+334	RIGHT		56.75	2.81	36.53	1.37	0.25	5.00	0.04	18.27	0.08	18.34	7.55	13.57	27.57	49.59	77.16	0.13	0.46	0.04
5+046	5+135	RIGHT		65.94	1.44	21.60	0.81	0.25	5.00	0.04	10.80	0.08	10.88	7.55	13.57	16.30	29.32	45.62	0.13	0.27	0.04
5+545	5+639	RIGHT	30.92	103.27	1.41	61.94	2.32	0.25	5.00	0.04	30.97	0.15	31.12	7.55	13.57	46.75	84.08	130.83	0.13	0.77	0.11
6+396	6+510	RIGHT	125.01	113.08	3.90	218.61	8.20	0.25	5.00	0.04	109.31	0.41	109.72	7.55	13.57	165.01	296.74	461.75	0.13	2.73	0.38
8+222	9+341	RIGHT		1,048.65	2.96	624.56	23.42	0.25	5.00	0.04	312.28	1.20	313.48	7.55	13.57	471.42	847.78	1319.20	0.13	7.81	1.16
9+430	9+792	RIGHT		380.67	2.98	232.44	8.72	0.25	5.00	0.04	116.22	0.45	116.67	7.55	13.57	175.45	315.51	490.96	0.13	2.91	0.41
9+814	9+947	RIGHT		187.85	2.86	111.54	4.18	0.25	5.00	0.04	55.77	0.23	56.00	7.55	13.57	84.19	151.40	235.59	0.13	1.39	0.19
						<b>2,069.10</b>	<b>77.22</b>						<b>1,083.68</b>					<b>4.35</b>		<b>25.74</b>	<b>3.64</b>

QUANTITY OF CURB STONE - UPPER PASIG																					
STATION		BANK	Lc (m)	Lp (m)	Ave. Width of Paving Block (m)	Lt (m)	VOLUME (m <sup>3</sup> )	H (m)	FORMWORKS (@10m)		WHOLE LENGTH		TOTAL (m <sup>3</sup> )	REBAR(@10m)		WHOLE LENGTH		TOTAL WT. (kg)	LEVELING CONCRET E (@10m) V1(m <sup>3</sup> )	WHOLE LENGTH Vt(m <sup>3</sup> )	Joint Filler sq.m.
START	END								A1(m <sup>2</sup> )	A2(m <sup>2</sup> )	A1(m <sup>2</sup> )	A2(m <sup>2</sup> )		W1(kg)	W2(kg)	W1(kg)	W2(kg)				
12+024	12+173	LEFT	147.01	148.38	3.00	240.01	9.00	0.25	5.00	0.04	120.01	0.49	120.49	7.55	13.57	181.16	325.79	506.95	0.13	3.00	0.45
13+806	14+272	LEFT	153.98	454.36	2.06	343.50	12.88	0.25	5.00	0.04	171.75	0.68	172.43	7.55	13.57	259.27	466.27	725.54	0.13	4.29	0.64
15+236	15+424	LEFT	183.96	195.83	3.03	308.19	11.56	0.25	5.00	0.04	154.10	0.60	154.70	7.55	13.57	232.62	418.34	650.96	0.13	3.85	0.56
15+443	15+548	LEFT	113.70	113.06	3.64	201.06	7.54	0.25	5.00	0.04	100.53	0.41	100.94	7.55	13.57	151.76	272.92	424.68	0.13	2.51	0.38
15+747	15+870	LEFT	105.04	107.52	3.50	185.54	6.96	0.25	5.00	0.04	92.77	0.38	93.15	7.55	13.57	140.05	251.85	391.90	0.13	2.32	0.34
15+965	16+564	LEFT	514.22	614.95	2.78	858.94	32.21	0.25	5.00	0.04	429.47	1.61	431.08	7.55	13.57	648.33	1165.93	1814.25	0.13	10.74	1.58
10+140	10+179	RIGHT	9.09	40.70	1.45	23.59	0.88	0.25	5.00	0.04	11.80	0.08	11.87	7.55	13.57	17.81	32.02	49.83	0.13	0.29	0.04
10+956	11+263	RIGHT		309.24	1.46	91.98	3.45	0.25	5.00	0.04	45.99	0.19	46.18	7.55	13.57	69.43	124.85	194.28	0.13	1.15	0.15
11+610	11+653	RIGHT	43.35	43.65	1.83	61.65	2.31	0.25	5.00	0.04	30.83	0.15	30.98	7.55	13.57	46.53	83.68	130.22	0.13	0.77	0.11
11+788	11+803-A	RIGHT		19.86	3.24	16.20	0.61	0.25	5.00	0.04	8.10	0.04	8.14	7.55	13.57	12.23	21.99	34.22	0.13	0.20	
13+578	14+395-A	RIGHT		849.32	1.86	318.06	11.93	0.25	5.00	0.04	159.03	0.60	159.63	7.55	13.57	240.07	431.73	671.81	0.13	3.98	0.56
14+835	14+943	RIGHT		125.83	1.45	39.15	1.47	0.25	5.00	0.04	19.58	0.08	19.65	7.55	13.57	29.55	53.14	82.69	0.13	0.49	0.04
14+983	15+075	RIGHT	96.88	96.55	3.00	159.88	6.00	0.25	5.00	0.04	79.94	0.30	80.24	7.55	13.57	120.68	217.02	337.70	0.13	2.00	0.26
15+409	15+441	RIGHT		24.88	1.31	7.86	0.29	0.25	5.00	0.04	3.93	0.04	3.97	7.55	13.57	5.93	10.67	16.60	0.13	0.10	
15+476	15+494	RIGHT		20.17	1.78	10.68	0.40	0.25	5.00	0.04	5.34	0.04	5.38	7.55	13.57	8.06	14.50	22.56	0.13	0.13	
16+667	16+724	RIGHT	56.27	56.27	2.32	86.43	3.24	0.25	5.00	0.04	43.22	0.19	43.40	7.55	13.57	65.24	117.32	182.56	0.13	1.08	0.15
16+760	16+840	RIGHT	97.77	101.75	2.91	161.79	6.07	0.25	5.00	0.04	80.90	0.34	81.23	7.55	13.57	122.12	219.61	341.73	0.13	2.02	0.30
						<b>3,114.51</b>	<b>116.79</b>						<b>1,563.44</b>					<b>6.58</b>		<b>38.93</b>	<b>5.55</b>



U-DITCH																									
STATION		BANK	AVE.CROSS SECTIONAL AREA (m <sup>2</sup> )	LENGTH (m)	LENGTH OF COVER (m)	VOLUME OF COVER (m <sup>3</sup> )	FORMWORKS (m <sup>2</sup> )	REBAR OF COVER (kg)	VOLUME OF U-DITCH (m <sup>3</sup> )	FORMWORKS			REBAR(@10m)		WHOLE LENGTH		TOTAL WT. (kg)	LEVELING CONCRETE (@10m) V1(m <sup>3</sup> )	WHOLE LENGTH Vt(m <sup>3</sup> )	EXCAVATION (@10m) V1(m <sup>3</sup> )	WHOLE LENGTH Vt(m <sup>3</sup> )	BACKFILL (@10m) V1(m <sup>3</sup> )	WHOLE LENGTH Vt(m <sup>3</sup> )	WASTE (@10m) V1(m <sup>3</sup> )	WHOLE LENGTH Vt(m <sup>3</sup> )
START	END									A1	A2	TOTAL	W1(kg)	W2(kg)	W1(kg)	W2(kg)									
2+654	2+694	LEFT	0.14	43.17					6.04	86.34	0.42	86.76	42.27	47.51	182.47	205.10	387.57	0.28	1.21	6.90	29.79	3.88	16.75	3.02	13.04
2+854	3+072	LEFT	0.14	232.57					32.56	465.14	1.68	466.82	42.27	47.51	983.05	1104.92	2087.96	0.28	6.51	6.90	160.47	3.88	90.24	3.02	70.24
6+376	6+482	LEFT	0.14	114.74					16.06	229.48	0.84	230.32	42.27	47.51	484.99	545.12	1030.11	0.28	3.21	6.90	79.17	3.88	44.52	3.02	34.65
7+326	7+444	LEFT	0.14	115.72					16.20	231.44	0.84	232.28	42.27	47.51	489.13	549.77	1038.91	0.28	3.24	6.90	79.85	3.88	44.90	3.02	34.95
7+494	7+514	LEFT	0.14	43.17					6.04	86.34	0.42	86.76	42.27	47.51	182.47	205.10	387.57	0.28	1.21	6.90	29.79	3.88	16.75	3.02	13.04
5+545	5+602	RIGHT	0.14	67.34					9.43	134.68	0.56	135.24	42.27	47.51	284.64	319.93	604.56	0.28	1.89	6.90	46.46	3.88	26.13	3.02	20.34
6+396	6+510	RIGHT	0.14	125.09					17.51	250.18	0.98	251.16	42.27	47.51	528.74	594.29	1123.03	0.28	3.50	6.90	86.31	3.88	48.53	3.02	37.78
8+222	9+341	RIGHT	0.14	1042.16	104.22	3.65	75.56	519.00	145.90	2084.32	7.42	2091.74	42.27	47.51	4405.09	4951.20	9356.28	0.28	29.18	6.90	719.09	3.88	404.36	3.02	314.73
9+430	9+792	RIGHT	0.14	380.69	38.07	1.33	27.60	189.58	53.30	761.38	2.8	764.18	42.27	47.51	1609.13	1808.62	3417.75	0.28	10.66	6.90	262.68	3.88	147.71	3.02	114.97
9+814	9+947	RIGHT	0.14	195.28	19.53	0.68	14.16	97.25	27.34	390.56	1.4	391.96	42.27	47.51	825.43	927.76	1753.18	0.28	5.47	6.90	134.74	3.88	75.77	3.02	58.97
<b>TOTAL</b>				<b>2359.93</b>	<b>161.81</b>	<b>5.66</b>	<b>117.31</b>	<b>0.81</b>	<b>330.39</b>			<b>4737.22</b>					<b>21.19</b>		<b>66.08</b>		<b>1628.35</b>		<b>915.65</b>		<b>712.70</b>

U-DITCH																									
STATION		BANK	AVE.CROSS SECTIONAL AREA (m <sup>2</sup> )	LENGTH (m)	LENGTH OF COVER (m)	VOLUME OF COVER (m <sup>3</sup> )	FORMWORKS (m <sup>2</sup> )	REBAR OF COVER (kg)	VOLUME OF U-DITCH (m <sup>3</sup> )	FORMWORKS			REBAR(@10m)		WHOLE LENGTH		TOTAL WT. (kg)	LEVELING CONCRETE (@10m) V1(m <sup>3</sup> )	WHOLE LENGTH Vt(m <sup>3</sup> )	EXCAVATION (@10m) V1(m <sup>3</sup> )	WHOLE LENGTH Vt(m <sup>3</sup> )	BACKFILL (@10m) V1(m <sup>3</sup> )	WHOLE LENGTH Vt(m <sup>3</sup> )	WASTE (@10m) V1(m <sup>3</sup> )	WHOLE LENGTH Vt(m <sup>3</sup> )
START	END									A1	A2	TOTAL	W1(kg)	W2(kg)	W1(kg)	W2(kg)									
10+232	10+269	LEFT	0.14	36.14					5.06	72.28	0.28	72.56	42.27	47.51	152.76	171.70	324.46	0.28	1.01	6.90	24.94	3.88	14.02	3.02	10.91
10+285	10+325	LEFT	0.14	38.97					5.46	77.94	0.28	78.22	42.27	47.51	164.72	185.14	349.86	0.28	1.09	6.90	26.89	3.88	15.12	3.02	11.77
12+024	12+173	LEFT	0.14	146.74					20.54	293.48	1.12	294.6	42.27	47.51	620.25	697.15	1317.40	0.28	4.11	6.90	101.25	3.88	56.94	3.02	44.32
13+806	14+272	LEFT	0.14	455.67					63.79	911.34	3.22	914.56	42.27	47.51	1926.06	2164.84	4090.91	0.28	12.76	6.90	314.41	3.88	176.80	3.02	137.61
15+311	15+424	LEFT	0.14	118.12					16.54	236.24	0.84	237.08	42.27	47.51	499.28	561.18	1060.46	0.28	3.31	6.90	81.50	3.88	45.83	3.02	35.67
15+443	15+548	LEFT	0.14	113.70					15.92	227.4	0.84	228.24	42.27	47.51	480.60	540.18	1020.77	0.28	3.18	6.90	78.45	3.88	44.12	3.02	34.34
15+747	15+870	LEFT	0.14	105.04					14.71	210.08	0.84	210.92	42.27	47.51	443.99	499.03	943.03	0.28	2.94	6.90	72.48	3.88	40.76	3.02	31.72
15+965	16+564	LEFT	0.14	616.41	61.64	2.16	44.69	306.97	86.30	1232.82	4.34	1237.16	42.27	47.51	2605.49	2928.50	5533.99	0.28	17.26	6.90	425.32	3.88	239.17	3.02	186.16
10+140	10+179	RIGHT	0.14	41.96					5.87	83.92	0.42	84.34	42.27	47.51	177.36	199.35	376.71	0.28	1.17	6.90	28.95	3.88	16.28	3.02	12.67
14+983	15+024	RIGHT	0.14	42.48	42.48	1.49	30.80	211.55	5.95	84.96	0.42	85.38	42.27	47.51	179.56	201.82	381.38	0.28	1.19	6.90	29.31	3.88	16.48	3.02	12.83
15+024	15+075	RIGHT	0.14	54.42					7.62	108.84	0.42	109.26	42.27	47.51	230.03	258.54	488.57	0.28	1.52	6.90	37.55	3.88	21.11	3.02	16.43
16+801	16+838	RIGHT	0.14	43.30					6.06	86.6	0.42	87.02	42.27	47.51	183.02	205.71	388.74	0.28	1.21	6.90	29.88	3.88	16.80	3.02	13.08
<b>TOTAL</b>				<b>1812.95</b>	<b>104.12</b>	<b>3.64</b>	<b>75.49</b>	<b>0.52</b>	<b>253.81</b>			<b>3639.34</b>					<b>16.28</b>		<b>50.76</b>		<b>1250.94</b>		<b>703.42</b>		<b>547.51</b>

<b>QUANTITY OF HANDRAIL (TYPE-1)</b>				
STATION		BANK	HEIGHT (m)	LENGTH (m)
START	END			
15+310	15+424	LEFT	0.50	121.68
15+443	15+548	LEFT	0.40	113.06
15+747	15+870	LEFT	0.40	107.52
15+965	15+150	LEFT	0.50	178.98
16+556	16+564	LEFT	0.50	8.00
16+801	16+840	RIGHT	0.50	45.69
TOTAL				574.93

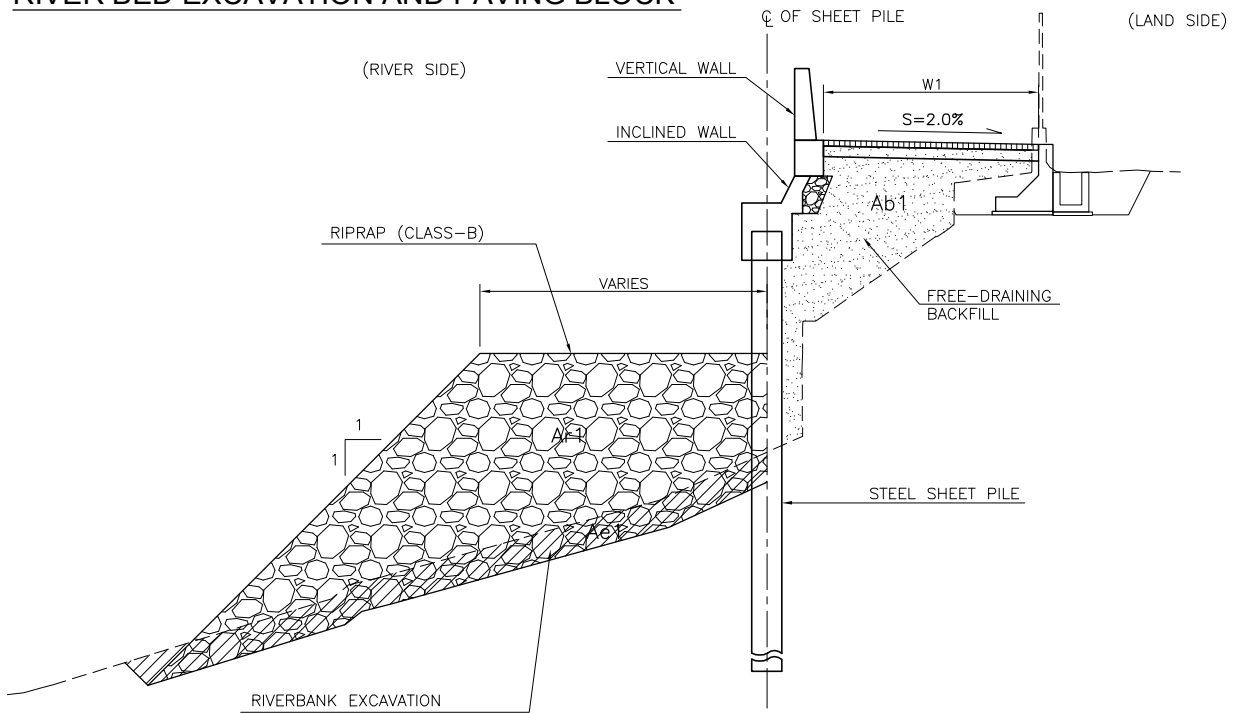
<b>QUANTITY OF HANDRAIL (TYPE-2)</b>					No. of Holes(@10.0m)= (4x10/0.65)	
STATION		BANK	HEIGHT (m)	LENGTH (m)	NO. OF HOLES (@10m)	WHOLE LENGTH
START	END					
					pcs	pcs
6+245	6+323	LEFT	0.70	82.27	61.54	507.00
TOTAL				82.27		507.00

<b>QUANTITY OF HANDRAIL (TYPE-3) AND BASE</b>										
STATION		BANK	HEIGHT (m)	LENGTH (m)	BASE		FORMWORKS			WEEPHOLES
START	END				AREA	VOLUME	A1	A2	TOTAL	PCS
14+045	14+272	LEFT	0.70	210.40	0.067	14.12	84.16	0.74	84.90	
15+236	15+310	LEFT	0.70	74.15	0.067	4.98	29.66	0.27	29.93	38.00
14+914	14+943	RIGHT	0.70	32.88	0.067	2.21	13.152	0.13	13.29	
TOTAL				317.43		21.30			128.11	

<b>Quantity of Stairs (note: Values are already included in Parapet Wall)</b>			
<b>Station</b>	<b>Concrete Volume (cu.m)</b>	<b>Formworks (sq.m)</b>	<b>Rebar (kg)</b>
10+430L	0.59	4.94	26.99
10+467L	0.72	6.23	32.11
11+643R	0.32	3.08	22.22
11+653R	1.13	8.09	48.70
11+788R	0.68	5.04	35.72
13+743R	0.97	5.94	50.20
	<b>4.405</b>	<b>33.323</b>	<b>215.940</b>

<b>Additional Random Backfill and Filler Concrete</b>		
<b>Station</b>	<b>Random Backfill (cu.m)</b>	<b>Filler Concrete (cu.m)</b>
11+538L	11.000	1.050
11+597L	11.000	1.050
	<b>22.000</b>	<b>2.100</b>

**QUANTITY OF RIPRAP, FREE DRAINING BACKFILL,  
RIVER BED EXCAVATION AND PAVING BLOCK**

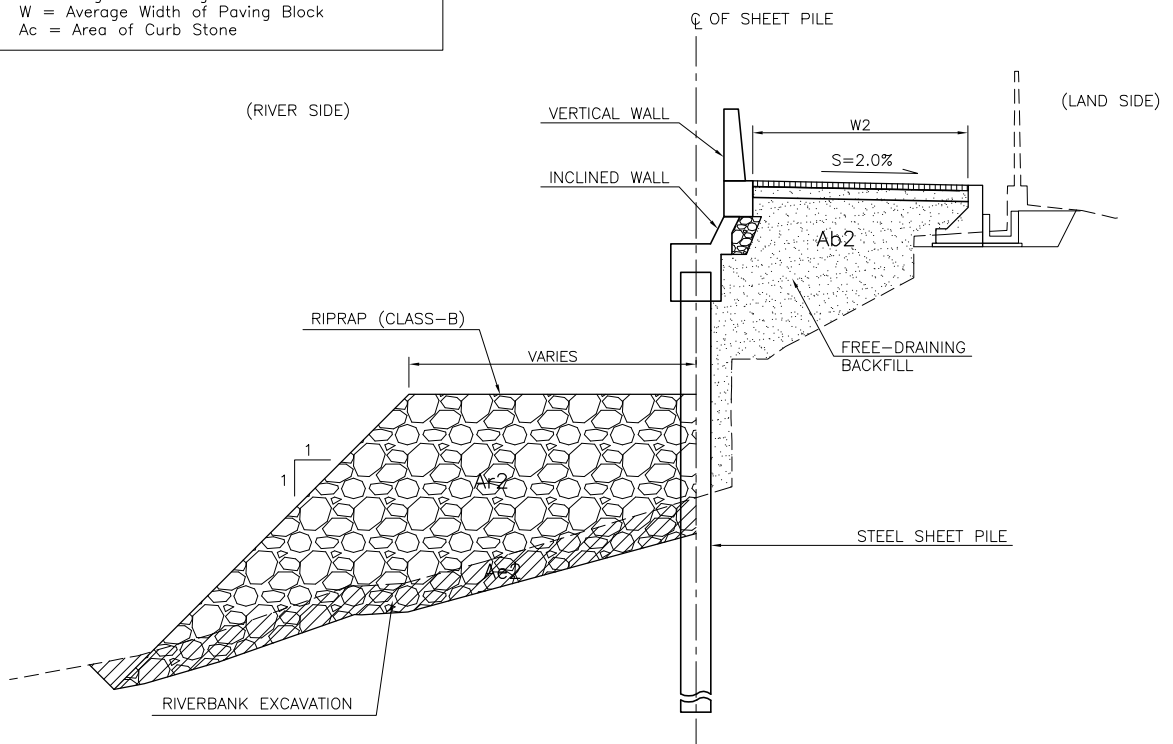


**START SECTION**

**VOLUME AND AREA COMPUTATION**

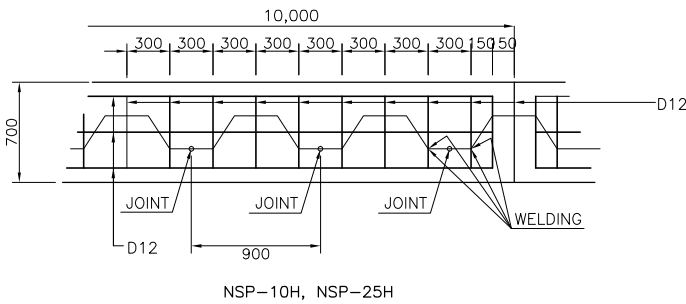
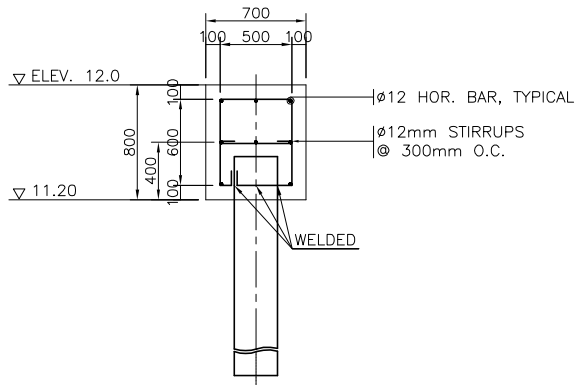
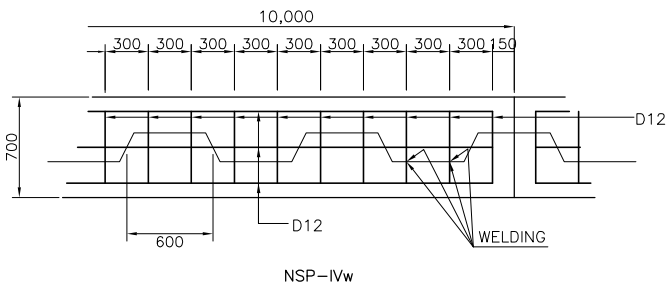
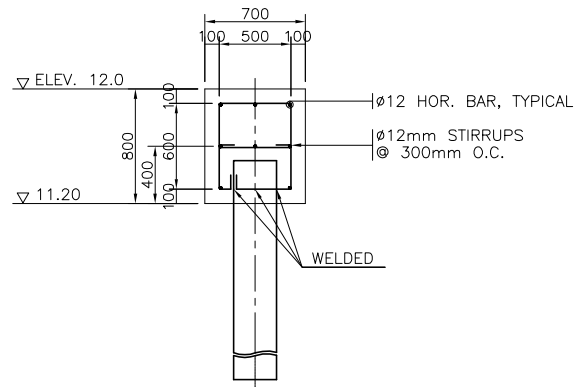
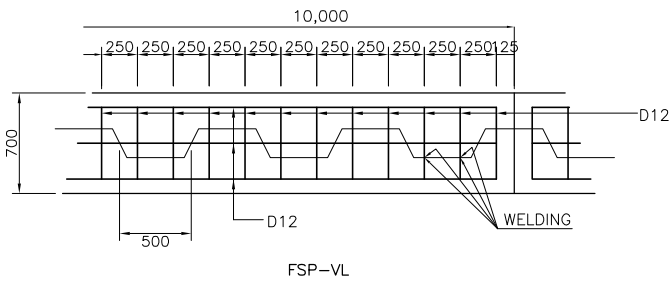
Volume of Riprap	=	$0.5(Ar1 + Ar2) \times L$
Volume of Free Draining Backfill	=	$0.5(Ab1 + Ab2) \times L$
Volume of Riverbed Excavation	=	$0.5(Ae1 + Ae2) \times L$
Area of Paving block	=	$Ao - Ac$

$Ao = L \times W$
$Ac = \text{roundup}((L/5,0) + 1) \times 0.15 \times W$
$L = \text{Longitudinal Length}$
$W = \text{Average Width of Paving Block}$
$Ac = \text{Area of Curb Stone}$



**END SECTION**

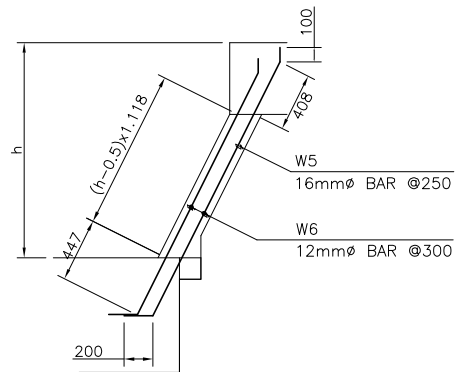
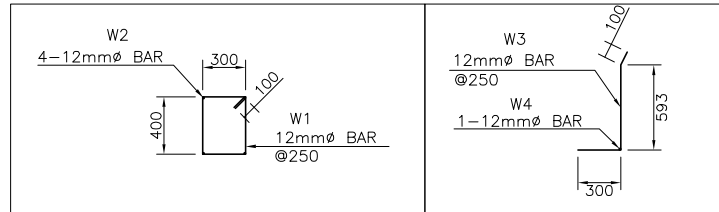
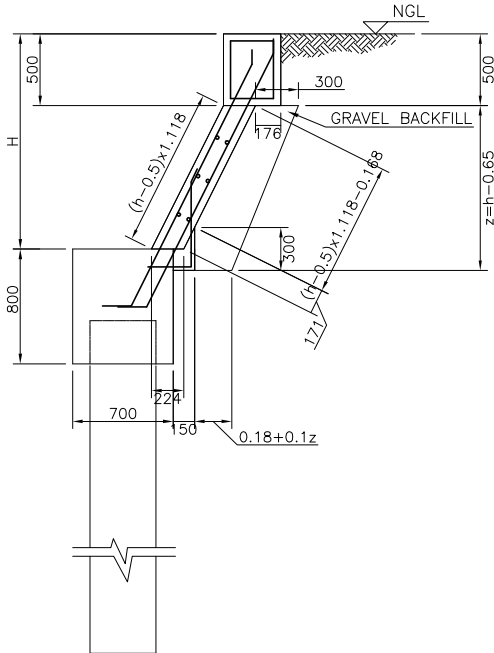
# QUANTITY OF COPING CONCRETE



<p>QUANTITY OF PILE CAP (@10M) : SP-10H, SP-25H, SP-IVw</p> <p>CONCRETE  <math>V = (0.7 \times 0.8) \times 10m = 5.6 \text{ m}^3</math></p> <p>FORM WORK  <math>A1 = (0.7 + 0.8 + 0.8) \times 10m = 23.00 \text{ m}^2</math>  <math>A2 = 0.56 \times 1 \text{ place} = 0.56 \text{ m}^2</math>                  Total A = 23.56 m<sup>2</sup></p> <p>REINFORCING BAR  <math>W1 = (0.6+0.6+0.5+0.5+0.5+0.4) \times 34 \text{ place} \times 0.888 \text{ kg/m} = 93.60 \text{ kg}</math>  <math>W2 = 8 \text{ pcs} \times 10m \times 110\% \times 0.888 \text{ kg/m} = 78.14 \text{ kg}</math>                  Total W = 171.74 kg</p>
<p>QUANTITY OF PILE CAP (@10M) : SP-VL</p> <p>CONCRETE  <math>V = (0.7 \times 0.8) \times 10m = 5.6 \text{ m}^3</math></p> <p>FORM WORK  <math>A1 = (0.7 + 0.8 + 0.8) \times 10m = 23.00 \text{ m}^2</math>  <math>A2 = 0.56 \times 1 \text{ place} = 0.56 \text{ m}^2</math>                  Total A = 23.56 m<sup>2</sup></p> <p>REINFORCING BAR  <math>W1 = (0.6+0.6+0.5+0.5+0.5+0.4) \times 40 \text{ place} \times 0.888 \text{ kg/m} = 110.11 \text{ kg}</math>  <math>W2 = 8 \text{ pcs} \times 10m \times 110\% \times 0.888 \text{ kg/m} = 78.14 \text{ kg}</math>                  Total W = 188.25 kg</p>

## QUANTITY OF INCLINED WALL

H= 0.5 ~ 2.0m



### QUANTITY OF INCLINED WALL (@10m)

#### BACKFILL

$$V = 0.50 \times ((0.60+0.10z) \times z + (0.48+0.20z) \times 0.30) \text{m}^2 \times 10\text{m} = \text{XXX.xx m}^3$$

#### CONCRETE

$$V = (\text{Aver. Area})\text{m}^2 \times 10\text{m} = \text{XXX.xx m}^3$$

#### FORM WORK

$$A1 = (0.5 \times 2 + 0.30 + 0.176 + (h-0.5) \times 1.118 \times 2 - 0.171) \times 10\text{m} = \text{XXX.xx m}^2$$

$$A2 = (\text{Aver. Area})\text{m}^2 \times 1\text{place} = \text{XXX.xx m}^2 \text{ (NOTE: for every 20m)}$$

$$\text{Total} = \text{XXX.xx m}^2$$

#### REINFORCING BAR

$$W1 = (0.30 \times 2 + 0.40 \times 2 + 0.2) \times 40 \times 0.888\text{kg/m} = 56.83\text{kg}$$

$$W2 = 4\text{pcs} \times 10\text{m} \times 110\% \times 0.888\text{kg/m} = 39.07\text{kg}$$

$$\text{Sub Total} = 95.90 \text{ kg}$$

$$W3 = (0.30 + 0.593 + 0.1) \times 40 \times 0.888\text{kg/m} = 35.27\text{kg}$$

$$W4 = 1\text{pcs} \times 10\text{m} \times 110\% \times 0.888\text{kg/m} = 9.77\text{kg}$$

$$\text{Sub Total} = 45.04 \text{ kg}$$

$$W5 = ((0.20 + 0.447 + (h-0.5) \times 1.118 + 0.508) \times 2 \times 40 \times 1.578\text{kg/m} = \text{XXX.xx kg}$$

$$W6 = (\text{roundup}(h-0.5) \times 1.118 / 0.3, 0) \times 2 \text{ pcs} \times 10\text{m} \times 110\% \times 0.888\text{kg/m} = \text{XXX.xx kg}$$

$$\text{Sub Total} = \text{XXX.xx kg}$$

$$\text{Total} = \text{XXX.xx kg}$$

#### WEEPHOLE

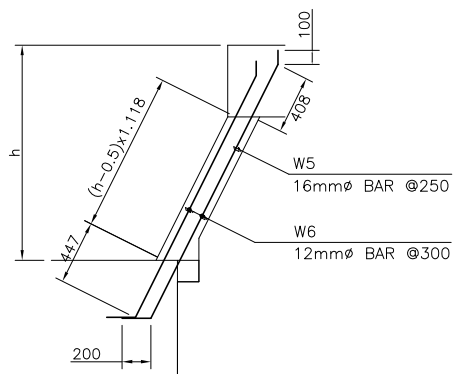
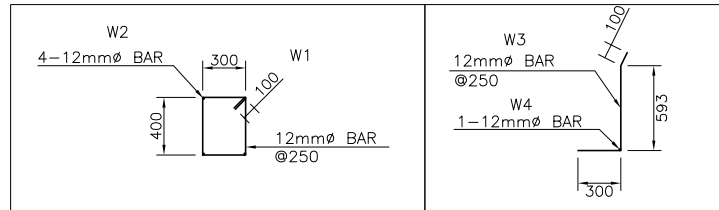
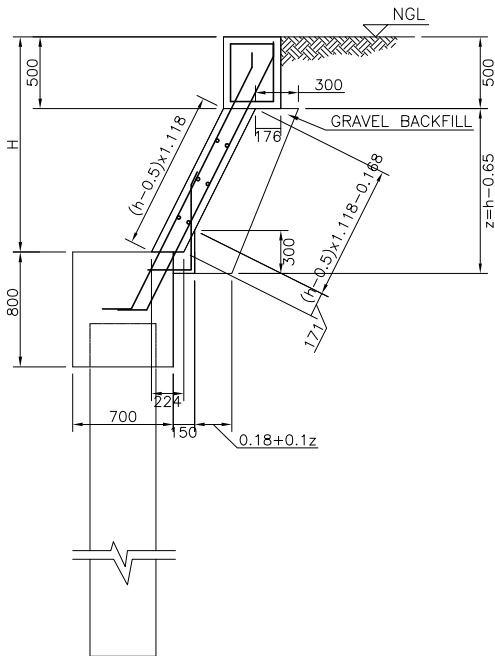
$$N = 10/2 = 5\text{pcs}$$

#### FILTER CLOTH

$$A = 0.2 \times 0.2 \times 5 = 0.2\text{m}^2$$

## QUANTITY OF INCLINED WALL

H= 2.0 ~ 3.0m



### QUANTITY OF INCLINED WALL (@10m)

#### BACKFILL

$$V = 0.50 \times ((0.60+0.10z) \times z + (0.48+0.20z) \times 0.30)) \text{m}^2 \times 10\text{m} = \text{XXX.xx m}^3$$

#### CONCRETE

$$V = (\text{Aver. Area}) \text{m}^2 \times 10\text{m} = \text{XXX.xx m}^3$$

#### FORM WORK

$$A1 = (0.5 \times 2 + 0.30 + 0.176 + (h-0.5) \times 1.118 \times 2 - 0.171) \times 10\text{m} = \text{XXX.xx m}^2$$

$$A2 = (\text{Aver. Area}) \text{m}^2 \times 1 \text{ place} = \text{XXX.xx m}^2 \quad (\text{NOTE: for every 20m})$$

$$\text{Total} = \text{XXX.xx m}^2$$

#### REINFORCING BAR

$$W1 = (0.30 \times 2 + 0.40 \times 2 + 0.2) \times 80 \times 0.888 \text{kg/m} = 113.66 \text{kg}$$

$$W2 = 4 \text{ pcs} \times 10\text{m} \times 110\% \times 0.888 \text{kg/m} = 39.07 \text{kg}$$

$$\text{Sub Total} = 152.73 \text{ kg}$$

$$W3 = (0.30 + 0.593 + 0.1) \times 80 \times 0.888 \text{kg/m} = 70.54 \text{kg}$$

$$W4 = 1 \text{ pcs} \times 10\text{m} \times 110\% \times 0.888 \text{kg/m} = 9.77 \text{kg}$$

$$\text{Sub Total} = 80.31 \text{ kg}$$

$$W5 = ((0.20 + 0.447 + (h-0.5) \times 1.118 + 0.508) \times 2 \times 80 \times 1.578 \text{kg/m} = \text{XXX.xx kg}$$

$$W6 = (\text{roundup}((h-0.5) \times 1.118 / 0.3, 0) \times 2 \text{ pcs} \times 10\text{m} \times 110\% \times 0.888 \text{kg/m} = \text{XXX.xx kg}$$

$$\text{Sub Total} = \text{XXX.xx kg}$$

$$\text{Total} = \text{XXX.xx kg}$$

#### WEEPHOLE

$$N = 10/2 = 5 \text{ pcs}$$

#### FILTER CLOTH

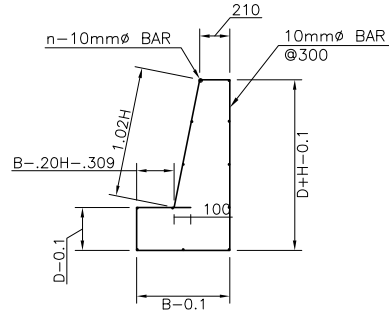
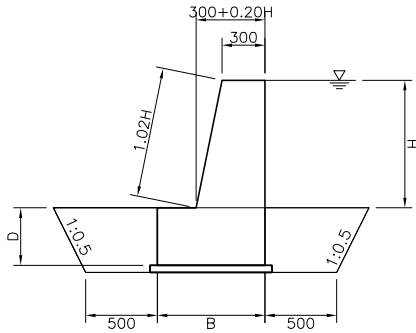
$$A = 0.2 \times 0.2 \times 5 = 0.2 \text{m}^2$$





## QUANTITY OF PARAPET WALL (TYPE-2)

H = Varies

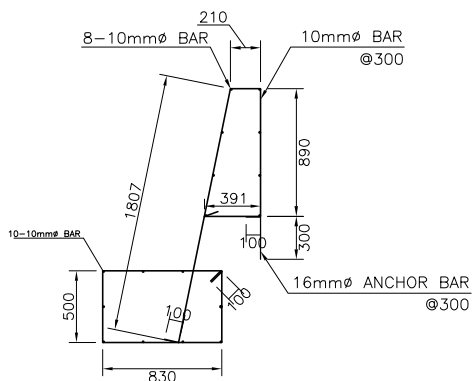
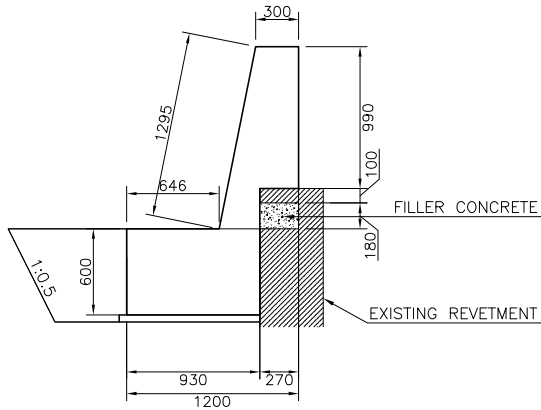


QUANTITY OF PARAPET WALL (@10m)	
EXCAVATION	
$V_e = (2.05+2B+D) \times (0.025+0.5D) \times 10m = \text{XXX.xx m}^3$	
LEVELING	
$V_l = (0.05B+0.005) \times 10m = \text{XXX.xx m}^3$	
BACKFILL	
$V_b = (V_e - V_l) - (B \times D \times 10m) = \text{XXX.xx m}^3$	
CONCRETE	
$V_c = (H(0.3+0.10H) + (B \times D)m^2) \times 10m = \text{XXX.xx m}^3$	
FORM WORK	
$A_1 = (2.02H + 2D) \times 10m = \text{XXX.xx m}^2$	
$A_2 = (H(0.3+0.10H) + (B \times D)m^2) \times 1\text{place} = \text{XXX.xx m}^2$	
(NOTE: for every 20m)	
Total = XXX.xx m <sup>2</sup>	
REINFORCING BAR	
$W_1 = (1.82H + 2D + 2B - 0.20) \times 34\text{place} \times 0.617\text{kg/m} = \text{XXX.xx kg}$	
$W_2 = (n)\text{pcs} \times 10m \times 110\% \times 0.617\text{kg/m} = \text{XXX.xx kg}$	
Total = XXX.xx kg	

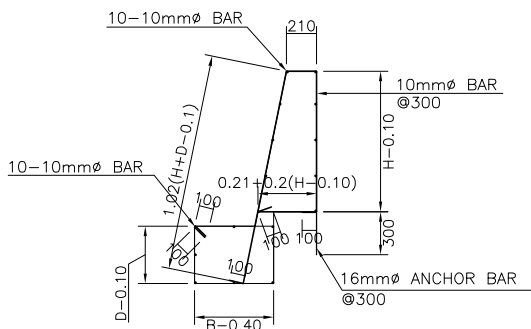
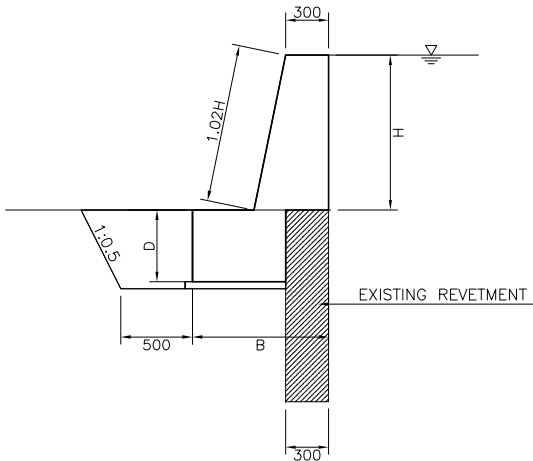
HEIGHT (m)	n
0 - 0.5	8
0.5 < h < 0.6	10
0.6 < h < 0.9	12
0.9 < h < 1.0	16
1.0 < h < 1.1	18
1.1 < h < 1.2	19
1.2 < h < 1.3	21
1.3 < h < 1.4	21
1.4 < h < 1.5	23

## QUANTITY OF PARAPET WALL (TYPE-3)

H = 1.27m



H = VARIES



### QUANTITY OF PARAPET WALL (@10m)

#### EXCAVATION

$$V = 1.025\text{m}^2 \times 10\text{m} = 10.25 \text{ m}^3$$

#### BACKFILL

$$V = 0.428\text{m}^2 \times 10\text{m} = 4.28 \text{ m}^3$$

#### LEVELING CONCRETE

$$V = 0.049\text{m}^2 \times 10\text{m} = 0.49 \text{ m}^3$$

#### CONCRETE

$$V = 1.025\text{m}^2 \times 10\text{m} = 10.25 \text{ m}^3$$

#### FILLER CONCRETE

$$V = 0.049\text{m}^2 \times 10\text{m} = 0.49 \text{ m}^3$$

#### FORM WORK

$$A1 = (0.99 + 1.295 + 0.60) \times 10\text{m} = 28.85 \text{ m}^2$$

$$A2 = 1.025\text{m}^2 \times 1\text{place} = 1.025 \text{ m}^2 \text{ (NOTE: for every 20m)}$$

$$\text{Total} = 29.88 \text{ m}^2$$

#### REINFORCING BAR

$$W1 = (3.497 + 2.760) \times 34\text{place} \times 0.617\text{kg/m} = 133.26\text{kg}$$

$$W2 = (18)\text{pcs} \times 10\text{m} \times 110\% \times 0.617\text{kg/m} = 122.17\text{kg}$$

$$\text{Total} = 255.43 \text{ kg}$$

#### ANCHOR BAR ( $\phi 16$ )

$$W_a = (0.40) \times 34\text{place} \times 1.578\text{kg/m} = 21.46\text{kg}$$

#### CONCRETE CHIPPING

$$A = (0.27 + 0.65)\text{m} \times 10\text{m} = 9.2\text{m}^2$$

HEIGHT (m)	n
0 - 0.5	10
0.5 <h< 0.6	10
0.6 <h< 0.7	10
0.7 <h< 0.8	14
0.8 <h< 0.9	14
0.9 <h< 1.0	14
1.0 <h< 1.1	18

### QUANTITY OF PARAPET WALL (@10m)

#### EXCAVATION

$$V_e = (0.425 + 2B + 0.5D) \times (0.025 + 0.5D) \times 10\text{m} = \text{XXX.xx} \text{ m}^3$$

#### LEVELING CONCRETE

$$V_l = (0.05B - 0.0125) \times 10\text{m} = \text{XXX.xx} \text{ m}^3$$

#### BACKFILL

$$V = (V_e - V_l) - ((B - 0.30) \times D \times 10\text{m}) = \text{XXX.xx} \text{ m}^3$$

#### CONCRETE

$$V = (H(0.3 + 0.10H) + ((B - 0.30) \times D) \times 10\text{m}) = \text{XXX.xx} \text{ m}^3$$

#### FORM WORK

$$A1 = (2.02H + D) \times 10\text{m} = \text{XXX.xx} \text{ m}^2$$

$$A2 = (H(0.3 + 0.10H) + ((B - 0.30) \times D) \times 1\text{place}) = \text{XXX.xx} \text{ m}^2$$

$$\text{(NOTE: for every 20m)}$$

$$\text{Total} = \text{XXX.xx} \text{ m}^2$$

#### REINFORCING BAR

$$W1 = (2.22H + 3.02D + 2B - 0.402) \times 34\text{place} \times 0.617\text{kg/m} = \text{XXX.xx} \text{ kg}$$

$$W2 = (n)\text{pcs} \times 10\text{m} \times 110\% \times 0.617\text{kg/m} = \text{XXX.xx} \text{ kg}$$

$$\text{Total} = \text{XXX.xx} \text{ kg}$$

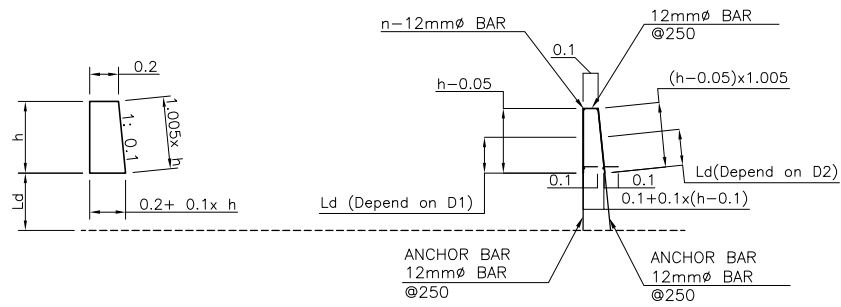
#### ANCHOR BAR ( $\phi 16$ )

$$W_a = (0.40) \times 34\text{place} \times 1.578\text{kg/m} = 16.10\text{kg}$$

#### CONCRETE CHIPPING

$$A = (0.35 + D)\text{m} \times 10\text{m} = \text{XXX.xx} \text{ m}^2$$

## QUANTITY OF PARAPET WALL (TYPE-4)



### QUANTITY OF VERTICAL WALL (@10m)

#### CONCRETE

$$V = ((0.2 + 0.2 + 0.1 \times h) \times h / 2) \times 10m = \text{XXX.xx m}^3$$

#### FORM WORK

$$A1 = (h + 1.005 \times h) \times 10m = \text{XXX.xx m}^2$$

$$A2 = ((0.2 + 0.2 + 0.1 \times h) \times h / 2) \times 10m \times 1\text{place} = \text{XXX.xx m}^2 \text{ (NOTE: for every 20m)}$$

$$\text{Total} = \text{XXX.xx m}^2$$

#### REINFORCING BAR

$$W1 = (2.005h + 0.10) \times 40 \text{ place} \times 0.888 \text{ kg/m} = \text{XXX.xx kg}$$

$$W2 = n(\text{Depend on } h)\text{pcs} \times 10m \times 110\% \times 0.888 \text{ kg/m} = \text{XXX.xx kg}$$

$$n = 2 \times (\text{roundup}((h - 0.05) / 0.30, 0) + 1)$$

$$\text{Total} = \text{XXX.xx kg}$$

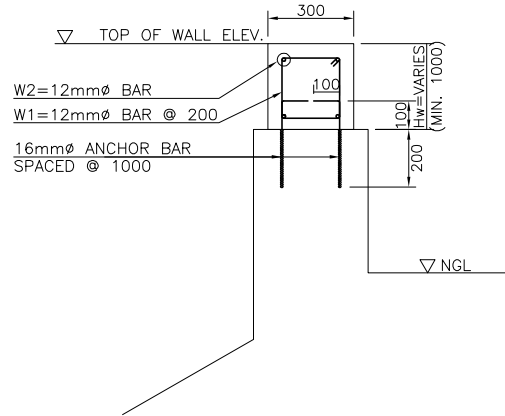
#### ANCHOR BAR

$$W_a = 2 \times (0.70) \times 40 \text{ place} \times 0.888 \text{ kg/m} = 49.72 \text{ kg}$$

#### CONCRETE CHIPPING

$$A = (0.2 + 0.10h) \times 10m = \text{XXX.xx m}^2$$

## QUANTITY OF RAISED WALL



### QUANTITY OF RAISED WALL (@10M)

#### CONCRETE

$$V = 0.30 \times h \times 10\text{m} = \text{XXX.xx m}^3$$

#### FORM WORK

$$A1 = 2h \times 10\text{m} = \text{XXX.xx m}^2$$

$$A2 = 0.30 \times h \times 1 \text{ place} = \text{XXX.xx m}^2 \text{ (NOTE: for every 20m)}$$

$$\text{TOTAL A} = \text{XXX.xx m}^2$$

#### REINFORCING BAR

$$W1 = (2(0.20) + 2(h-0.10) + 0.20) \times 50 \text{ place} \times 0.888 \text{ kg/m} = \text{XXX.xx kg}$$

$$W2 = 4 \text{ pcs} \times 10\text{m} \times 110\% \times 0.888 \text{ kg/m} = 39.07 \text{ kg}$$

$$\text{TOTAL W} = \text{XXX.xx kg}$$

#### ANCHOR BAR ( $\phi 16\text{mm}$ )

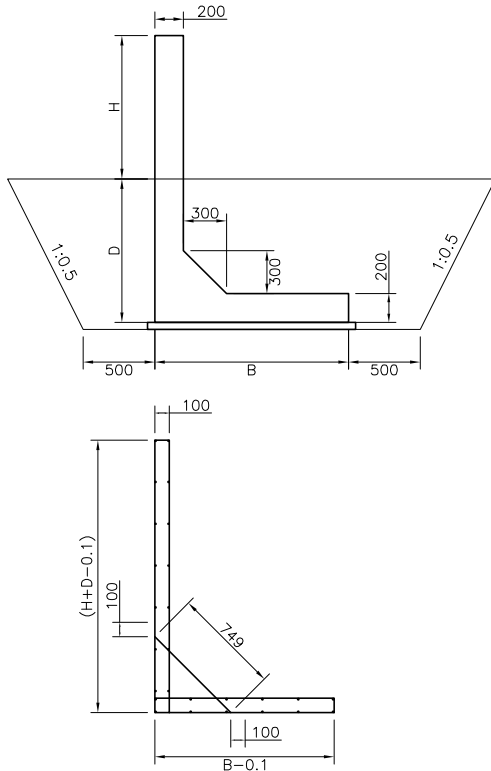
$$W_a = (0.3+0.1) \times 2 \times 10 \text{ place} \times 1.578 \text{ kg/m} = 12.62\text{kg}$$

#### CONCRETE CHIPPING

$$A = 0.3 \times 10\text{m} = 3.0 \text{ m}^2$$

## QUANTITY OF L-TYPE PARAPET WALL

LPW (H= 0 ~ 1.30m)



### QUANTITY OF L-TYPE PARAPET WALL (@10m)

#### EXCAVATION

$$Ve = (2.05+2B+D) \times (0.025+0.5D) \times 10m = XXX.xx \text{ m}^3$$

#### LEVELING CONCRETE

$$Vl = (0.05B+0.005) \times 10m = XXX.xx \text{ m}^3$$

#### BACKFILL

$$Vb = (Ve-Vl)-((0.2B+0.2D+.005) \times 10m) = XXX.xx \text{ m}^3$$

#### CONCRETE

$$Vc = (0.2H+0.2B+0.2D+.005) \times 10m = XXX.xx \text{ m}^3$$

$$\text{Total} = XXX.xx \text{ m}^3$$

#### FORM WORK

##### LPW

$$A1 = (2D+2H+0.124) \times 10m = XXX.xx \text{ m}^2$$

$$A2 = (0.2H+0.2B+0.2D+.005)m^2 \times 1\text{place} = XXX.xx \text{ m}^2$$

(NOTE: for every 20m)

#### REINFORCING BAR

##### LPW

$$W1-1 = (H+D+0.10) \times (s)\text{place} \times (w)\text{kg/m} = XXX.xx \text{ kg}$$

$$W1-2 = (H+D+0.10) \times (s)\text{place} \times (w)\text{kg/m} = XXX.xx \text{ kg}$$

$$W2-1 = (B+0.10) \times (s)\text{place} \times (w)\text{kg/m} = XXX.xx \text{ kg}$$

$$W2-2 = (B+0.10) \times (s)\text{place} \times (w)\text{kg/m} = XXX.xx \text{ kg}$$

$$W3 = (n1+1)\text{pcs} \times 10m \times 110\% \times 0.888\text{kg/m} = XXX.xx \text{ kg}$$

$$W4 = (n2)\text{pcs} \times 10m \times 110\% \times 0.888\text{kg/m} = XXX.xx \text{ kg}$$

$$W5 = 0.949 \times (s)\text{place} \times (w)\text{kg/m} = XXX.xx \text{ kg}$$

$$s = \text{roundup}(10m/\text{spacing},0)$$

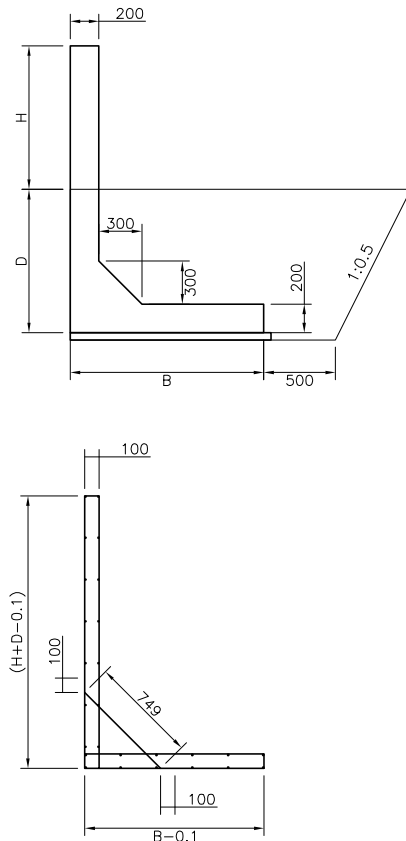
$$w = \text{unit weight}$$

$$n1 = 2 \times (\text{roundup}((D+H-0.3)/0.30,0)+1)$$

$$n2 = 2 \times (\text{roundup}((B-0.1)/0.3,0)+1)$$

$$\text{Total} = XXX.xx \text{ kg}$$

LPW-SE (H= 0 ~ 1.10m)



### QUANTITY OF L-TYPE PARAPET WALL (@10m)

#### EXCAVATION

$$Ve = (1.025+2B+0.5D) \times (0.025+0.5D) \times 10m = XXX.xx \text{ m}^3$$

#### LEVELING CONCRETE

$$Vl = (0.05B+0.0025) \times 10m = XXX.xx \text{ m}^3$$

#### BACKFILL

$$Vb = (Ve-Vl)-((0.2B+0.2D+.005) \times 10m) = XXX.xx \text{ m}^3$$

#### CONCRETE

$$Vc = (0.2H+0.2B+0.2D+.005) \times 10m = XXX.xx \text{ m}^3$$

$$\text{Total} = XXX.xx \text{ m}^3$$

#### FORM WORK

##### LPW

$$A1 = (2D+2H+0.124) \times 10m = XXX.xx \text{ m}^2$$

$$A2 = (0.2H+0.2B+0.2D+.005)m^2 \times 1\text{place} = XXX.xx \text{ m}^2$$

(NOTE: for every 20m)

#### REINFORCING BAR

##### LPW

$$W1-1 = (H+D+0.10) \times (s)\text{place} \times (w)\text{kg/m} = XXX.xx \text{ kg}$$

$$W1-2 = (H+D+0.10) \times (s)\text{place} \times (w)\text{kg/m} = XXX.xx \text{ kg}$$

$$W2-1 = (B+0.10) \times (s)\text{place} \times (w)\text{kg/m} = XXX.xx \text{ kg}$$

$$W2-2 = (B+0.10) \times (s)\text{place} \times (w)\text{kg/m} = XXX.xx \text{ kg}$$

$$W3 = (n1+1)\text{pcs} \times 10m \times 110\% \times 0.888\text{kg/m} = XXX.xx \text{ kg}$$

$$W4 = (n2)\text{pcs} \times 10m \times 110\% \times 0.888\text{kg/m} = XXX.xx \text{ kg}$$

$$W5 = 0.949 \times (s)\text{place} \times (w)\text{kg/m} = XXX.xx \text{ kg}$$

$$s = \text{roundup}(10m/\text{spacing},0)$$

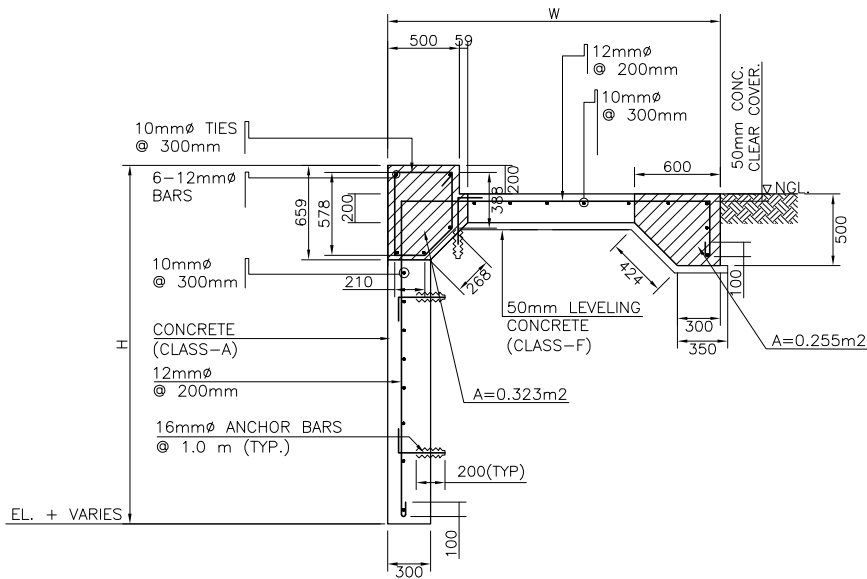
$$w = \text{unit weight}$$

$$n1 = 2 \times (\text{roundup}((D+H-0.3)/0.30,0)+1)$$

$$n2 = 2 \times (\text{roundup}((B-0.1)/0.3,0)+1)$$

$$\text{Total} = XXX.xx \text{ kg}$$

## QUANTITY OF REPAIR TYPE-3



### QUANTITY OF R3(@10M)

#### LEVELING CONCRETE

$$V = (W - 0.5 - 0.6 + 0.424 + 0.35) \times 0.05 \times 10m = (W - 0.326) \times 0.05 \times 10m = \text{XXX.xx m}^3$$

#### CONCRETE

$$V = ((H - 0.659) \times 0.3 + (W - 1.159) \times 0.2 + 0.323 + 0.255) \times 10m = \text{XXX.xx m}^3$$

#### FORM WORK

$$A1 = (H + 1.0) \times 10m = \text{XXX.xx m}^2$$

$$A2 = ((H - 0.659) \times 0.3 + (W - 1.159) \times 0.2 + 0.323 + 0.255) \times 1 \text{ place} = \text{XXX.xx m}^2$$

$$\text{TOTAL A} = \text{XXX.xx m}^2$$

#### REINFORCING BAR

$$W1 = (H + W + 0.2) \times 50 \text{ place} \times 0.888 \text{ kg/m} = \text{XXX.xx kg}$$

$$W2 = (2.044) \times 34 \text{ place} \times 0.617 \text{ kg/m} = 42.88 \text{ kg}$$

$$W3 = (9 + (\text{roundup}((W - 1.159)/0.3, 0) + 1) + (\text{roundup}((H - 0.709)/0.3, 0) + 1)) \text{ pcs} \times 10m \times 110\% \times 0.617 \text{ kg/m} = \text{XXX.xx kg}$$

$$\text{TOTAL W} = \text{XXX.xx kg}$$

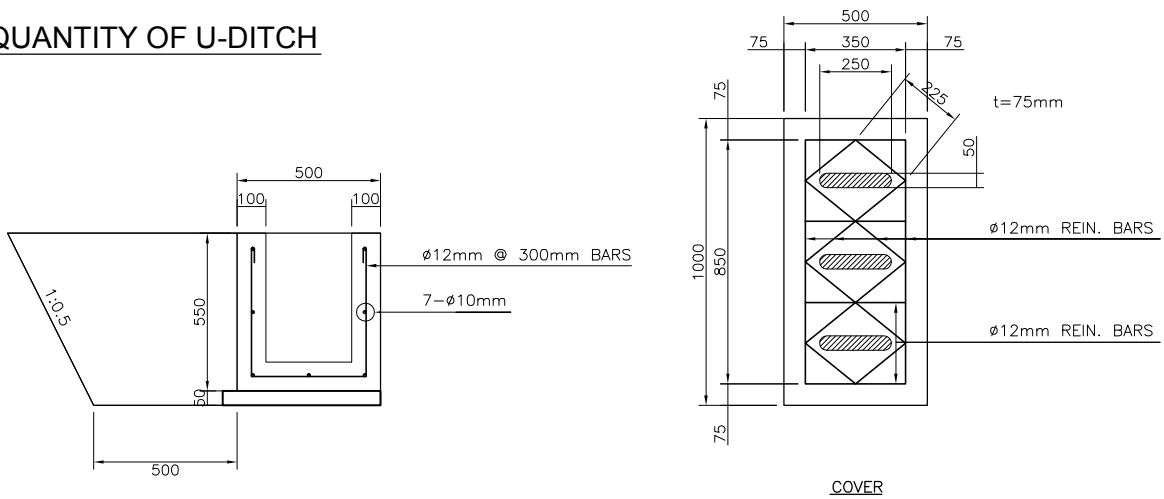
#### ANCHOR BAR ( $\phi 16\text{mm}$ )

$$W_a = 0.55m \times 3 \text{ pcs.} \times 10 \text{ place} \times 1.578 \text{ kg/m} = 26.037 \text{ kg}$$

#### CONCRETE CHIPPING

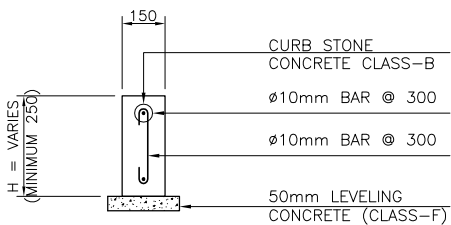
$$A = (H - 0.659) \times 10m = \text{XXX.xx m}^2$$

## QUANTITY OF U-DITCH



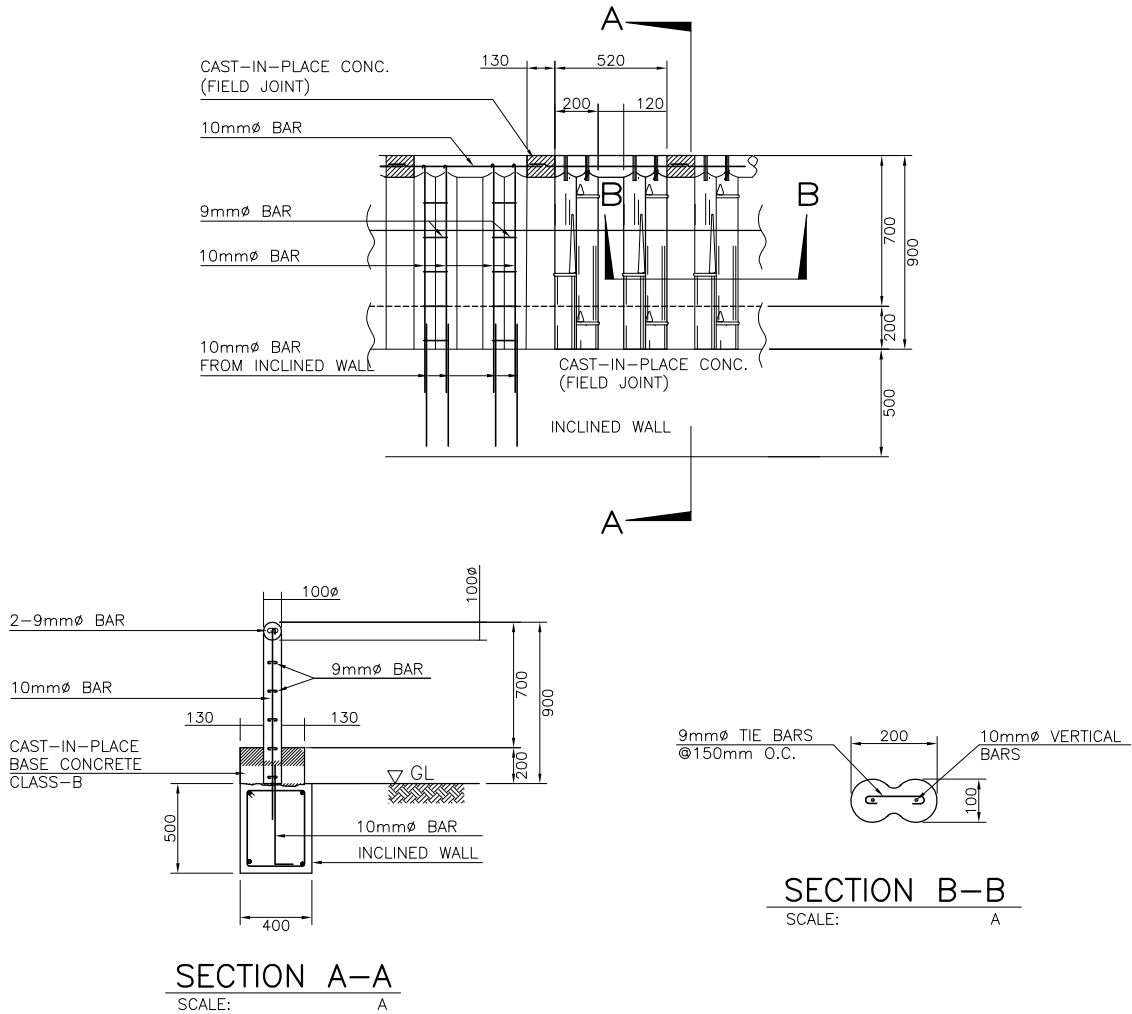
QUANTITY OF U-DITCH (@10m)	
EXCAVATION	$V = 0.690\text{m}^2 \times 10\text{m} = 6.90 \text{ m}^3$
BACKFILL	$V = 0.388\text{m}^2 \times 10\text{m} = 3.88 \text{ m}^3$
LEVELING CONCRETE	$V = 0.028\text{m}^2 \times 10\text{m} = 0.28 \text{ m}^3$
CONCRETE	$V = 0.14\text{m}^2 \times 10\text{m} = 1.40 \text{ m}^3$
FORM WORK	$A1 = 2.00 \times 10\text{m} = 20.00 \text{ m}^2$ $A2 = 0.14\text{m}^2 \times 1\text{place} = 0.14 \text{ m}^2$ (NOTE: for every 20m)
REINFORCING BAR	$W1 = (1.40) \times 34\text{place} \times 0.888\text{kg/m} = 42.27\text{kg}$ $W2 = (7)\text{pcs} \times 10\text{m} \times 110\% \times 0.617\text{kg/m} = 47.51\text{kg}$ Total = 89.78 kg
COVER (@ 1.0m)	
CONCRETE	$V_c = ((0.50 \times 1.00) - 3 \times (0.25 \times 0.05))\text{m}^2 \times 0.075\text{m} = 0.035 \text{ m}^3$
FORM WORK	$A_c = (0.50 \times 1.0) + (((2 \times 1.0) + (2 \times 0.50)) \times 0.075) = 0.725 \text{ m}^2$
REINFORCING	$W_c = ((2 \times 0.35) + (2 \times 0.85) + (12 \times 0.225)) \times 1.10 \times 0.888\text{kg/m} = 4.98\text{kg}$

## QUANTITY OF CURB STONE



QUANTITY OF CURB STONE (@10m)	
CONCRETE	$V = (h \times 0.15)\text{m}^2 \times L_t(\text{total length}) = \text{XXX.xx} \text{ m}^3$ $L_t = L_c + (\text{roundup}(L_p/5,0) \times \text{Average Width of Paving Block})$ $L_c = \text{Longitudinal Length of Curb Stone}$ $L_p = \text{Longitudinal Length of Paving Block}$
FORM WORK	$A1 = (2h) \times 10\text{m} = \text{XXX.xx} \text{ m}^2$ $A2 = (h \times 0.15)\text{m}^2 \times 1\text{place} = \text{XXX.xx} \text{ m}^2$ (NOTE: for every 20m) Total = XXX.xx m <sup>2</sup>
REINFORCING BAR	$W1 = h \times 34 \text{ place} \times 0.888 \text{ kg/m} = \text{XXX.xx} \text{ kg}$ $W2 = 2\text{pcs} \times 10\text{m} \times 110\% \times 0.888 \text{ kg/m} = \text{XXX.xx} \text{ kg}$ Total = XXX.xx kg
LEVELING CONCRETE	$V = 0.013\text{m}^2 \times 10\text{m} = 0.13 \text{ m}^3$

# QUANTITY OF HANDRAIL (TYPE-3)

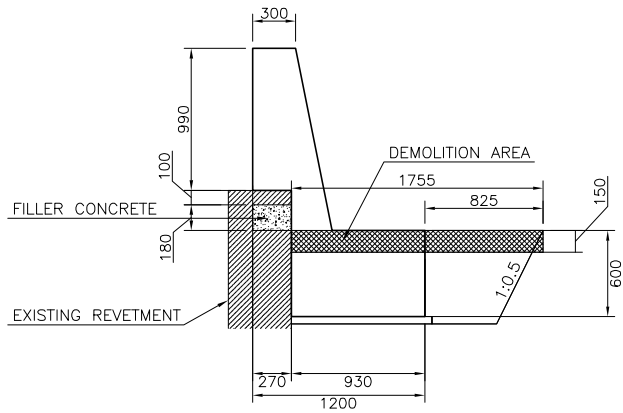


QUANTITY OF BASE CONCRETE (@10m)	
<p>CONCRETE</p> $V = (0.2 \times 0.36 \times 10m) - 0.016 \times 0.2 \times 15.38 \text{ pcs} \times 4 = 0.671 \text{ m}^3$	$A=0.016 \text{ m}^2$
<p>FORM WORK</p> $A1 = 0.2 \times 2 \text{ faces} \times 10m = 4.0 \text{ m}^2$ $A2 = 0.2 \times 0.36 \times 15.38 \text{ pcs} = 1.107 \text{ m}^2$ <p>Total = 5.107 m<sup>2</sup></p>	
QUANTITY OF HANDRAIL (@10m)	
<p>CONCRETE</p> $V1 = 0.016 \text{ m}^2 \times 0.9m \times 15.38 \text{ pcs} = 0.221 \text{ m}^3$ $V2 = 0.05 \times 0.05 \times 3.14 \times 0.13 \times 15.38 \text{ pcs} = 0.016 \text{ m}^3 \text{ (Cast-in-place)}$ <p>Total = 0.237 m<sup>3</sup></p>	
<p>FORM WORK</p> $A1 = 0.537 \text{ m} \times 0.8 \times 15.38 \text{ pcs} = 6.607 \text{ m}^2$ $A2 = 2 \times 3.14 \times 0.05 \times 0.52 \times 15.38 \text{ pcs} = 2.513 \text{ m}^2$ <p>Total = 9.120 m<sup>2</sup></p> $A3 = 2 \times 3.14 \times 0.05 \times 0.13 \times 15.38 \text{ pcs} = 0.628 \text{ m}^2 \text{ (Cast-In-Place)}$ <p>GrandTotal = 9.748 m<sup>2</sup></p>	$L=0.537 \text{ m}^2$
<p>REINFORCING BAR</p> $W1 = 1.15 \text{ m} \times 4 \text{ pcs} \times 0.616 \text{ kg/m} \times 15.38 \text{ pcs} = 43.581 \text{ kg}$ $W2 = 0.21 \text{ m} \times 5 \text{ pcs} \times 2 \text{ plcs} \times 0.394 \text{ kg/m} \times 15.38 \text{ pcs} = 12.725 \text{ kg}$ $W3 = 10 \text{ m} \times 110\% \times 0.616 \text{ kg/m} = 6.776 \text{ kg}$ $W4 = 0.55 \text{ m} \times 4 \text{ pcs} \times 0.616 \text{ kg/m} \times 15.38 \text{ pcs} = 20.843 \text{ kg}$ <p>Total = 83.925 kg</p>	
<p>Painting (like Bamboo)</p> <p>Same Area as Form Work</p> <p>GrandTotal = 9.748 m<sup>2</sup></p>	



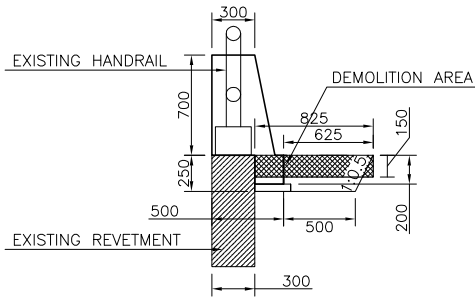
**QUANTITY OF DEMOLITION & RESTORATION OF SIDEWALKS**

STA. 7+516 ~ 8+219 RIGHT BANK  
 L= 612.65m  
 H= 1.27m



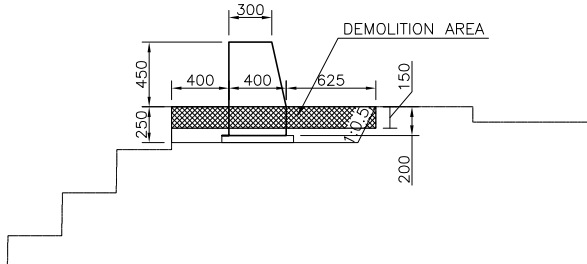
QUANTITY OF DEMOLITION & RESTORATION OF SIDEWALKS	
DEMOLITION	
A =	1.755m x 612.65m = 1075.20 m <sup>2</sup>
V =	1075.20m <sup>2</sup> x 0.15m = 161.28 m <sup>3</sup>
RESTORATION	
A =	0.825m x 612.65m = 505.44 m <sup>2</sup>
V =	505.44m <sup>2</sup> x 0.15m = 75.82 m <sup>3</sup>

STA. 13+804-A ~ 14+193 RIGHT BANK  
 L= 396.92m  
 H= 0.70m



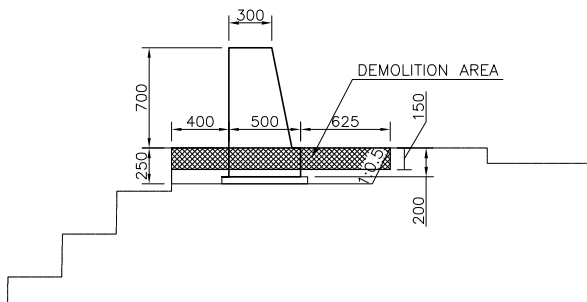
QUANTITY OF DEMOLITION & RESTORATION OF SIDEWALKS	
DEMOLITION	
A =	0.825m x 396.92m = 327.46 m <sup>2</sup>
V =	327.46m <sup>2</sup> x 0.15m = 49.12 m <sup>3</sup>
RESTORATION	
A =	0.625m x 396.92m = 248.08 m <sup>2</sup>
V =	248.08m <sup>2</sup> x 0.15m = 37.21 m <sup>3</sup>

STA. 15+494 ~ 16+806 RIGHT BANK  
 L= 606.87m  
 H= 0.45m

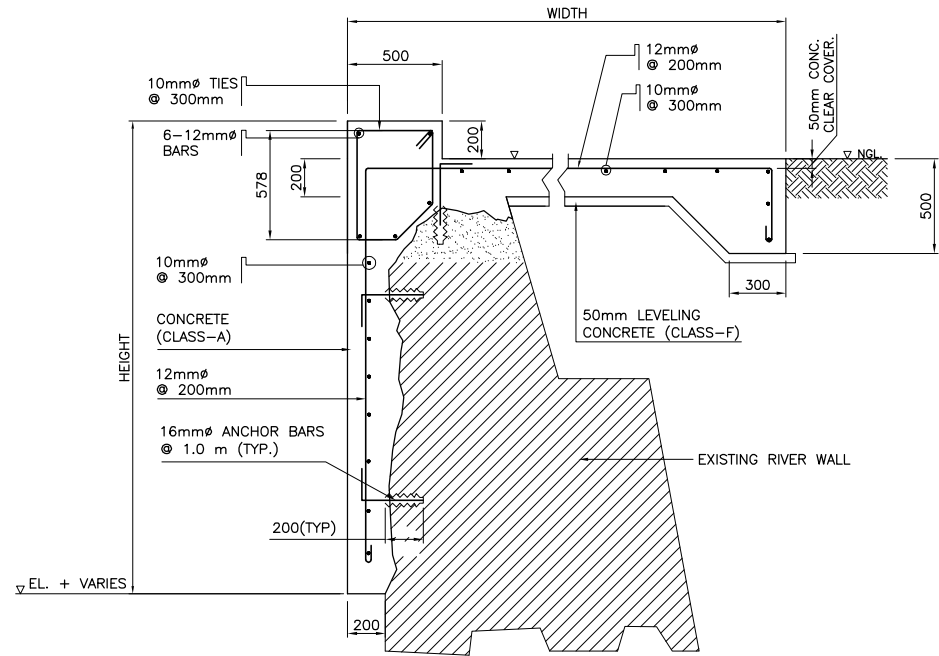


QUANTITY OF DEMOLITION & RESTORATION OF SIDEWALKS	
DEMOLITION	
A =	1.425m x 606.87m = 864.79 m <sup>2</sup>
V =	864.79m <sup>2</sup> x 0.15m = 129.72 m <sup>3</sup>
RESTORATION	
A =	1.025m x 606.87m = 622.04 m <sup>2</sup>
V =	622.04m <sup>2</sup> x 0.15m = 93.31 m <sup>3</sup>

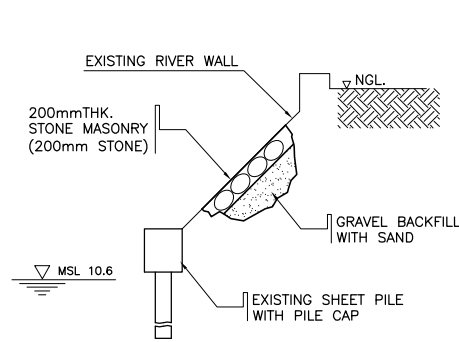
STA. 16+095 ~ 16+472 RIGHT BANK  
 L= 363.82m  
 H= 0.70m



QUANTITY OF DEMOLITION & RESTORATION OF SIDEWALKS	
DEMOLITION	
A =	1.525m x 363.82m = 554.83 m <sup>2</sup>
V =	554.83m <sup>2</sup> x 0.15m = 83.22 m <sup>3</sup>
RESTORATION	
A =	1.025m x 363.82m = 372.92 m <sup>2</sup>
V =	372.92m <sup>2</sup> x 0.15m = 55.94 m <sup>3</sup>



**DETAIL OF REPAIR R3**  
SCALE: A



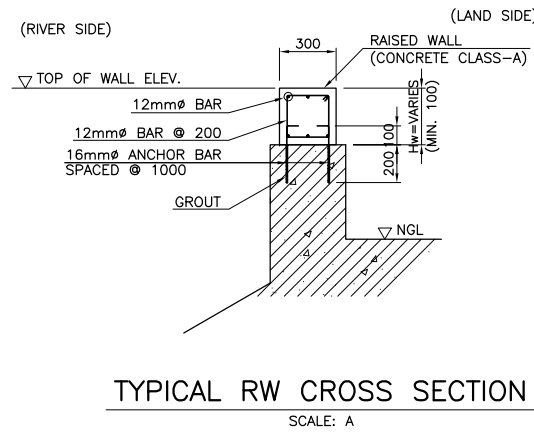
**DETAIL OF REPAIR-R4**

**SCHEDULE OF REPAIR R3**

STATIONS	HEIGHT (m)	WIDTH (m)	LENGTH (m)	BANK	REMARKS
START	END				
2+392	2+419	1.33	1.00	26.49	LEFT
7+514	7+580	1.20	1.00	56.37	LEFT

**SCHEDULE OF REPAIR R4**

STATIONS	BANK	NO. OF LOCATION	SURFACE AREA	REMARKS	
START	END				
3+325	3+400	LEFT	1	254.00	HOSPICIO
10+310	10+323	LEFT	1	27.00	
10+405	10+497	LEFT	3	116.00	
14+287	14+440	LEFT	9	184.00	
3+410	3+492	RIGHT	1	291.00	HOSPICIO
STA. A	STA. C	RIGHT	1	157.00	QUINTA CHANNEL



**TYPICAL RW CROSS SECTION**  
SCALE: A

**SCHEDULE OF RAISED WALL LOCATIONS AND DIMENSIONS**

STATIONS	BANK	Hw (m)	LENGTH (m)	REMARKS	
START	END				
6+245	6+323	LEFT	0.20~0.20	82.27	WITH HANDRAIL
10+439	10+467	LEFT	0.11~0.11	30.45	
2+334	STA. A	RIGHT	0.32~0.37	187.94	
STA. D	3+069	RIGHT	0.11~0.42	594.85	
14+835	14+914	RIGHT	0.20~0.21	94.32	

**SCHEDULE OF HANDRAIL LOCATIONS AND DIMENSIONS (TYPE-1)**

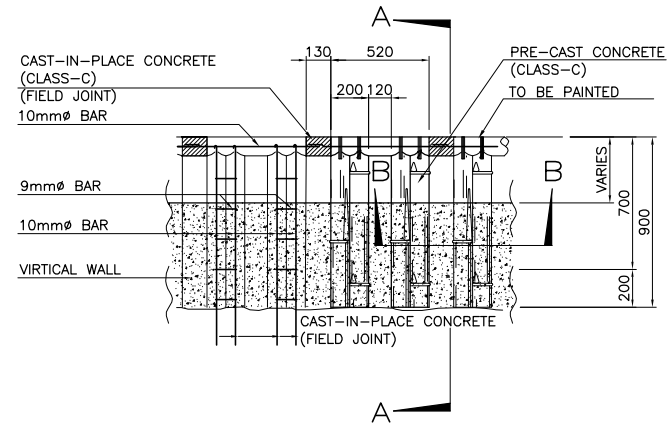
STATIONS	RANGE	BANK	REMARKS	
START	END	HEIGHT	LENGTH (m)	
15+310	15+424	0.50	121.68	LEFT
15+443	15+548	0.40	113.06	LEFT
15+747	15+870	0.40	107.52	LEFT
15+965	16+150	0.50	178.98	LEFT
16+556	16+564	0.50	8.00	LEFT
16+801	16+840	0.50	45.69	RIGHT

**SCHEDULE OF HANDRAIL LOCATIONS AND DIMENSIONS (TYPE-2)**

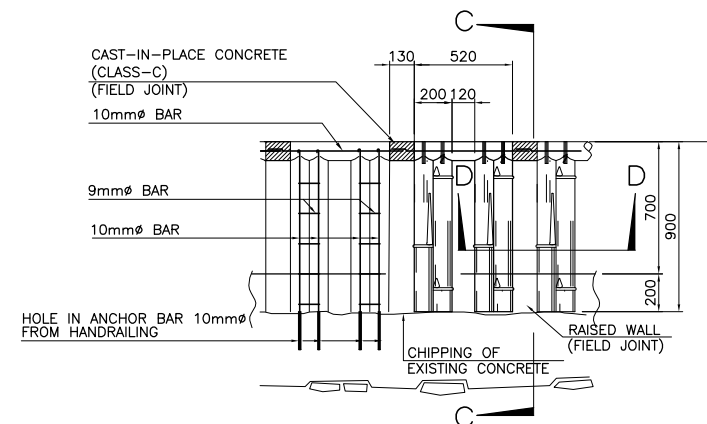
STATION	RANGE	BANK	REMARKS	
START	END	HEIGHT	LENGTH (m)	
6+245	6+323	0.70	82.27	LEFT

**SCHEDULE OF HANDRAIL LOCATIONS AND DIMENSIONS (TYPE-3)**

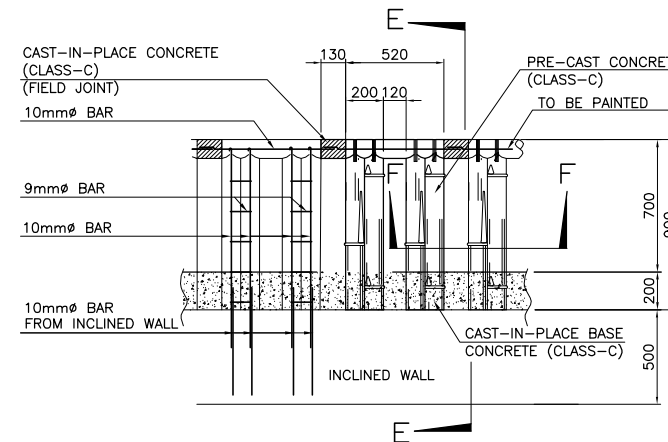
STATION	RANGE	BANK	REMARKS		
START	END	HEIGHT	LENGTH (m)		
14+045	14+272	0.70	210.40	LEFT	
15+236	15+310	0.70	74.15	LEFT	W/ 50mm WEEPHOLES @ 2.0m
14+914	14+943	0.70	32.88	RIGHT	



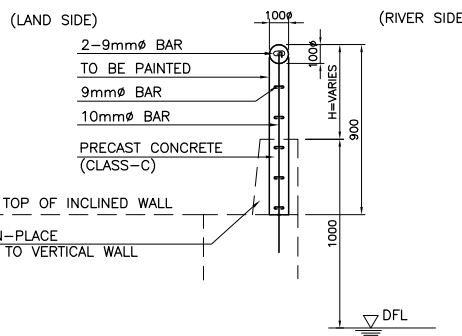
**DETAIL OF PRECAST CONCRETE HANDRAILS TYPE-1**  
SCALE: A



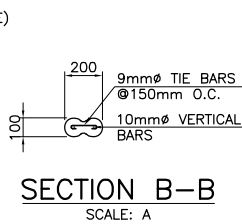
**DETAIL OF PRECAST CONCRETE HANDRAILS TYPE-2 (INSTALLED IN EXISTING REVETMENT)**  
SCALE: A



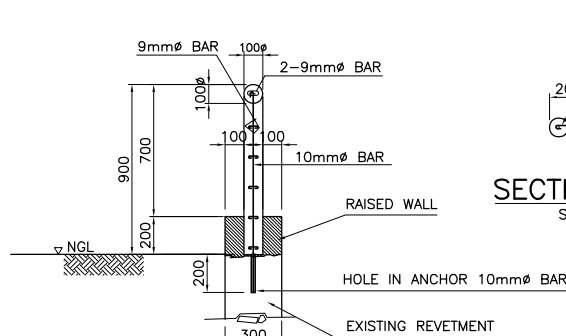
**DETAIL OF PRECAST CONCRETE HANDRAILS TYPE-3 (INSTALLED IN INCLINED WALL)**  
SCALE: A



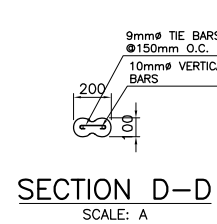
**SECTION A-A**  
SCALE: A



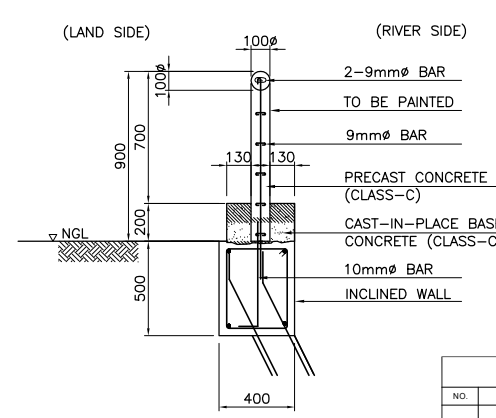
**SECTION B-B**  
SCALE: A



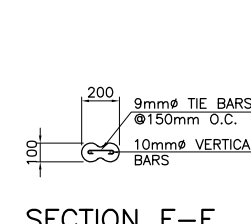
**SECTION C-C**  
SCALE: A



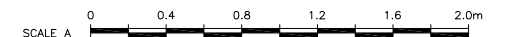
**SECTION D-D**  
SCALE: A



**SECTION E-E**  
SCALE: A



**SECTION F-F**  
SCALE: A



**REVISIONS**

NO.	DESCRIPTION	APPROVED	DATE

**NOTE:**  
PURSUANT TO SECTION 4 OF ANNEX 'A' OF THE REVISED IMPLEMENTING RULES AND REGULATIONS OF R.A. 9184, APPROVAL BY THE AUTHORIZED DPWH OFFICIALS OF DETAILED ENGINEERING SURVEYS AND DESIGN UNDERTAKEN BY CONSULTANTS NEITHER DIMINISHES THE RESPONSIBILITY OF THE LATTER FOR THE TECHNICAL INTEGRITY OF THE SURVEYS AND DESIGN NOR TRANSFER ANY PART OF THAT RESPONSIBILITY TO THE APPROVING OFFICIALS.

SHUJI KAKU  
TEAM LEADER

JICA CONSULTANT FOR DETAILED ENGINEERING DESIGN



DESIGNED BY: EIJI MOKI  
STRUCTURAL ENGINEER I

CHECKED BY: TOSHIKI KAWAKAMI  
THE CHECKER

SUBMITTED BY: SHUJI KAKU  
TEAM LEADER



REPUBLIC OF THE PHILIPPINES  
DEPARTMENT OF PUBLIC WORKS  
AND HIGHWAYS

REPUBLIC OF THE PHILIPPINES

REVIEWED BY: PERFECTO L. ZAPLAN, JR.  
CHIEF, HYDRAULIC DIVISION, BOD

RECOMMENDING APPROVAL: PATRICK B. GATAN  
PROJECT DIRECTOR  
PMO - MFCP

GILBERTO S. REYES  
DIRECTOR  
BOD

SEE COVER SHEET FOR THE SIGNATURE OF THE UNDERSECRETARY  
RAUL C. ASIS  
UNDERSECRETARY FOR TECHNICAL SERVICES

APPROVED BY: ROGELIO L. SINGSON  
SECRETARY

PROJECT & LOCATION

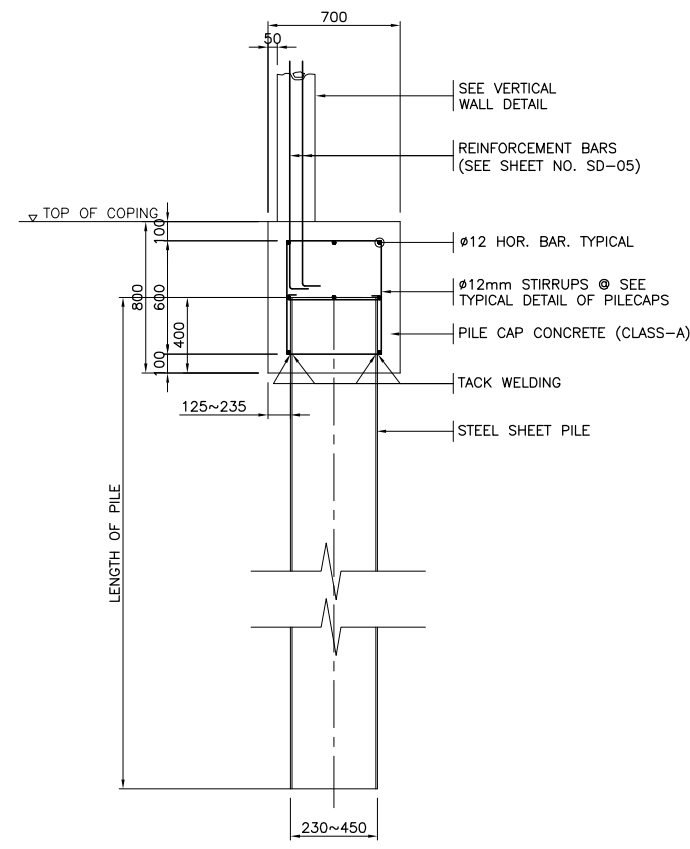
PASIG-MARIKINA RIVER CHANNEL IMPROVEMENT PROJECT (PHASE III), METRO MANILA

SHEET CONTENTS

TABLES AND DETAILS OF REPAIR OF R3, R4, RW, & HANDRAILS (TYPE 1,2&3)

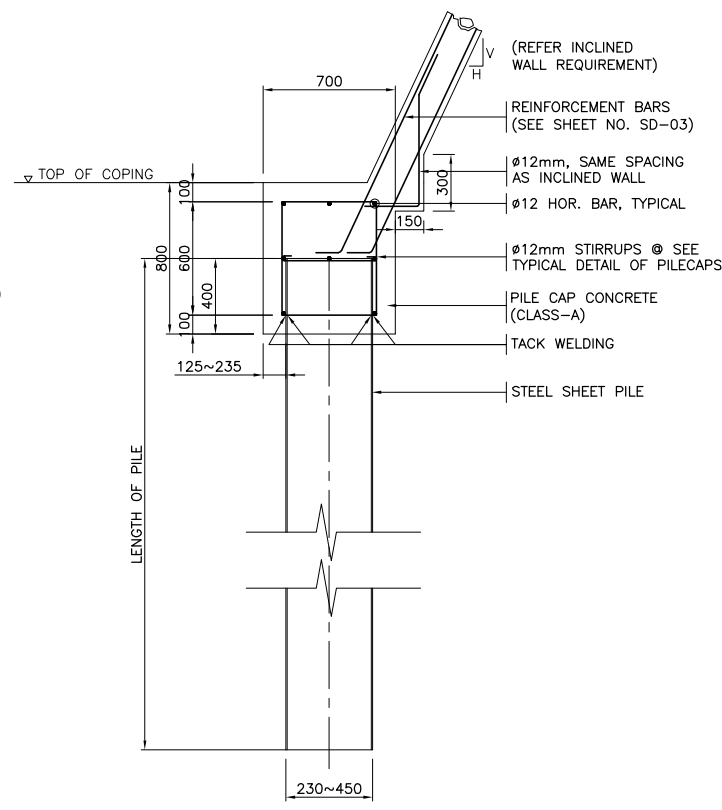
SHEET NO.

PR-GE  
SD 01



DETAIL OF STEEL SHEET PILE WITH VERTICAL WALL

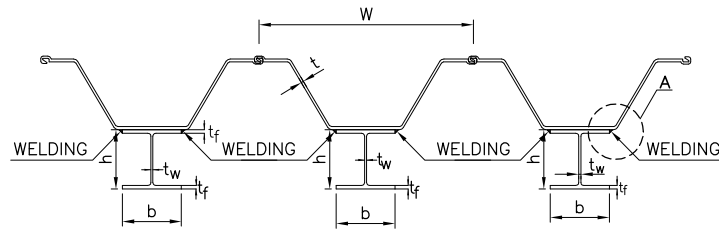
SCALE: A



DETAIL OF STEEL SHEET PILE WITH INCLINED WALL

SCALE: A

\*NOTE:  
EXPANSION JOINTS SHALL BE PROVIDED AT 20M INTERVAL FOR BOTH VERTICAL AND INCLINED WALL

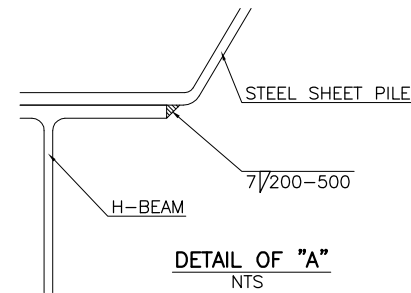


CROSS SECTION OF SP WITH H-BEAM REFER TO [SCHEDULE OF COMBINED PILES (SP with H-BEAM)]

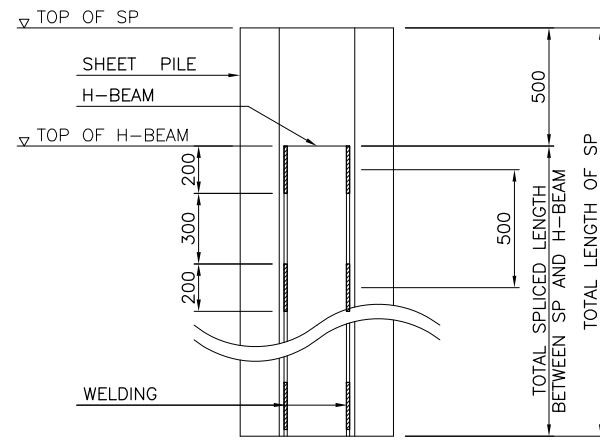
SCALE: A

PROPERTIES OF H-BEAM

SECTION	h mm	b mm	t <sub>w</sub> mm	t <sub>f</sub> mm	S <sub>x</sub> cm <sup>3</sup>
1	400	200	9	22	1760
2	450	200	12	25	2320
3	450	250	9	22	2490
4	450	250	12	28	3070
5	500	200	12	25	2650
6	500	250	12	28	3500
7	550	250	12	28	3940
8	600	200	12	28	3630
9	600	250	12	28	4390
10	650	200	12	28	4020
11	650	250	12	28	4850
12	750	250	12	25	5390
13	850	250	16	28	7240



DETAIL OF "A" NTS

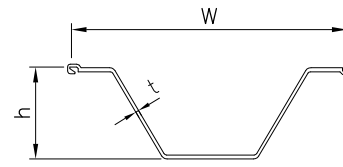


DETAIL OF WELDING BETWEEN SP AND H-BEAM

SCALE: A

SCHEDULE OF STEEL SHEET PILES (SP)

STATIONS		SECTION MODULUS	ESTIMATED LENGTH OF PILE (m)	BANK	LENGTH OF REVETMENT (m)	REMARKS
START	END					
2+419	2+550	SP S <sub>x</sub> =2700cm <sup>3</sup> /m	11.00	LEFT	139.80	
2+550	2+694	SP S <sub>x</sub> =2700cm <sup>3</sup> /m	11.50	LEFT	139.00	
2+854	2+950	SP S <sub>x</sub> =3150cm <sup>3</sup> /m	12.00	LEFT	100.30	
2+950	3+072	SP S <sub>x</sub> =2700cm <sup>3</sup> /m	12.00	LEFT	130.40	
3+160	3+300	SP S <sub>x</sub> =1610cm <sup>3</sup> /m	9.00	LEFT	124.70	
6+116	6+219	SP S <sub>x</sub> =1800cm <sup>3</sup> /m	10.00	LEFT	100.90	
6+249	6+269	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	12.50	LEFT	20.30	
6+376	6+482	SP S <sub>x</sub> =2700cm <sup>3</sup> /m	11.00	LEFT	114.40	
7+326	7+444	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	12.00	LEFT	121.30	
7+494	7+514	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	12.00	LEFT	19.40	
11+500	11+628	SP S <sub>x</sub> =3150cm <sup>3</sup> /m	11.00	LEFT	128.50	
14+150	14+250	SP S <sub>x</sub> =2700cm <sup>3</sup> /m	10.00	LEFT	98.40	
15+236	15+311	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	11.00	LEFT	75.80	
15+311	15+424	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	11.00	LEFT	120.10	
3+649	3+753	SP S <sub>x</sub> =2700cm <sup>3</sup> /m	11.00	RIGHT	98.90	
5+046	5+100	SP S <sub>x</sub> =3150cm <sup>3</sup> /m	12.00	RIGHT	33.30	
5+100	5+223	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	12.50	RIGHT	120.40	
5+262	5+340	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	13.00	RIGHT	87.20	
5+340	5+414	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	13.00	RIGHT	83.70	
6+337	6+510	SP S <sub>x</sub> =3150cm <sup>3</sup> /m	12.00	RIGHT	151.20	
8+250	8+400	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	12.00	RIGHT	144.90	
8+510	8+650	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	12.50	RIGHT	121.10	
8+800	8+900	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	11.50	RIGHT	95.60	
8+900	9+000	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	12.00	RIGHT	99.10	
9+000	9+150	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	12.00	RIGHT	153.20	
9+200	9+341	SP S <sub>x</sub> =2700cm <sup>3</sup> /m	10.50	RIGHT	159.80	
9+430	9+550	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	12.50	RIGHT	124.90	
9+550	9+650	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	12.00	RIGHT	103.10	
9+650	9+723	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	12.00	RIGHT	73.60	
9+750	9+770	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	12.00	RIGHT	20.30	
9+830	9+947	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	12.00	RIGHT	166.40	L=9.2m, SPLICED SP INTO 5 SEGMENTS NEAR STA.9+943
11+610	11+653	SP S <sub>x</sub> =2700cm <sup>3</sup> /m	11.00	RIGHT	43.70	
11+788	11+803-A	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	11.50	RIGHT	19.90	
13+578	13+700	SP S <sub>x</sub> =2700cm <sup>3</sup> /m	11.00	RIGHT	121.60	
13+700	13+801-B	SP S <sub>x</sub> =2700cm <sup>3</sup> /m	10.00	RIGHT	105.10	L=8.0m, SPLICED SP INTO 4 SEGMENTS NEAR STA.13+772
13+804-A	13+900	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	11.50	RIGHT	98.50	
13+900	14+000	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	12.00	RIGHT	102.40	
14+000	14+100	SP S <sub>x</sub> =2700cm <sup>3</sup> /m	10.00	RIGHT	105.00	
14+100	14+200	SP S <sub>x</sub> =1800cm <sup>3</sup> /m	8.50	RIGHT	109.80	
14+200	14+225-A	SP S <sub>x</sub> =3150cm <sup>3</sup> /m	10.00	RIGHT	32.90	
14+234-A	14+300	SP S <sub>x</sub> =3150cm <sup>3</sup> /m	10.00	RIGHT	71.90	
14+835	14+943	SP S <sub>x</sub> =2700cm <sup>3</sup> /m	10.00	RIGHT	125.80	
15+476	15+494	SP S <sub>x</sub> =2700cm <sup>3</sup> /m	9.50	RIGHT	20.20	
16+667	16+724	SP S <sub>x</sub> =3820cm <sup>3</sup> /m	11.00	RIGHT	56.30	L=8.0m, SPLICED SP INTO 2 SEGMENTS NEAR STA.16+700

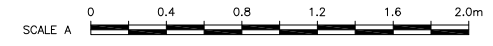


CROSS SECTION OF STEEL SHEET PILE NTS

PROPERTIES OF STEEL SHEET PILES

TYPE	W mm (nominal)	h mm (nominal)	t mm (nominal)	Section Modulus cm <sup>3</sup> /m	
SP-III <sub>w</sub>	U-shape	600	180	13.4	1800
SP-IV <sub>w</sub>	U-shape	600	210	18.0	2700
SP-V <sub>l</sub>	U-shape	500	200	24.3	3150
SP-V <sub>l</sub>	U-shape	500	225	27.6	3820
SP-10H	Hat-shape	900	230	10.8	902
SP-25H	Hat-shape	900	300	13.2	1610

PILE LENGTHS ARE FOR ESTIMATES ONLY. ACTUAL LENGTHS SHALL BE INSTRUCTED BY THE ENGINEER BASED ON THE RESULTS OF THE ADDITIONAL FOUNDATION INVESTIGATION TO BE CARRIED OUT BY THE CONTRACTOR.



NOTE:  
PURSUANT TO SECTION 4 OF ANNEX "A" OF THE REVISED IMPLEMENTING RULES AND REGULATIONS OF R.A. 9184, APPROVAL BY THE AUTHORIZED DPWH OFFICIALS OF DETAILED ENGINEERING SURVEYS AND DESIGN UNDERTAKEN BY CONSULTANTS NEITHER DIMINISHES THE RESPONSIBILITY OF THE LATTER FOR THE TECHNICAL INTEGRITY OF THE SURVEYS AND DESIGN NOR TRANSFER ANY PART OF THAT RESPONSIBILITY TO THE APPROVING OFFICIALS.

SHUJI KAKU  
TEAM LEADER

SCHEDULE OF COMBINED PILES (SP with H-BEAM)

STATIONS		SECTION MODULUS	ESTIMATED LENGTH OF PILE (m)	BANK	LENGTH OF REVETMENT (m)	REMARKS
START	END					
12+024	12+173	SP S <sub>x</sub> =902cm <sup>3</sup> /m	16.50	LEFT	148.40	
		H-BEAM S <sub>x</sub> =5390cm <sup>3</sup>	16.00			
13+806	13+900	SP S <sub>x</sub> =902cm <sup>3</sup> /m	13.00	LEFT	94.70	
		H-BEAM S <sub>x</sub> =2490cm <sup>3</sup>	12.50			
13+900	14+000	SP S <sub>x</sub> =902cm <sup>3</sup> /m	14.50	LEFT	100.00	
		H-BEAM S <sub>x</sub> =3630cm <sup>3</sup>	14.00			
14+000	14+150	SP S <sub>x</sub> =902cm <sup>3</sup> /m	12.50	LEFT	139.60	
		H-BEAM S <sub>x</sub> =2320cm <sup>3</sup>	12.00			
14+250	14+272	SP S <sub>x</sub> =902cm <sup>3</sup> /m	11.50	LEFT	22.00	
		H-BEAM S <sub>x</sub> =1760cm <sup>3</sup>	11.00			
15+443	15+548	SP S <sub>x</sub> =902cm <sup>3</sup> /m	13.00	LEFT	113.10	
		H-BEAM S <sub>x</sub> =3070cm <sup>3</sup>	12.50			
15+747	15+870	SP S <sub>x</sub> =902cm <sup>3</sup> /m	13.50	LEFT	107.50	
		H-BEAM S <sub>x</sub> =2490cm <sup>3</sup>	13.00			
15+965	16+150	SP S <sub>x</sub> =902cm <sup>3</sup> /m	12.00	LEFT	179.00	
		H-BEAM S <sub>x</sub> =1760cm <sup>3</sup>	11.50			
16+150	16+200	SP S <sub>x</sub> =902cm <sup>3</sup> /m	12.50	LEFT	49.80	
		H-BEAM S <sub>x</sub> =1760cm <sup>3</sup>	12.00			
16+200	16+300	SP S <sub>x</sub> =902cm <sup>3</sup> /m	12.50	LEFT	101.70	
		H-BEAM S <sub>x</sub> =1760cm <sup>3</sup>	12.00			
16+300	16+450	SP S <sub>x</sub> =902cm <sup>3</sup> /m	13.00	LEFT	158.90	
		H-BEAM S <sub>x</sub> =1760cm <sup>3</sup>	12.50			
16+450	16+552	SP S <sub>x</sub> =902cm <sup>3</sup> /m	12.50	LEFT	113.70	
		H-BEAM S <sub>x</sub> =1760cm <sup>3</sup>	12.00			
16+552	16+564	SP S <sub>x</sub> =1610cm <sup>3</sup> /m	19.00	LEFT	11.80	
		H-BEAM S <sub>x</sub> =7240cm <sup>3</sup>	18.50			
5+545	5+639	SP S <sub>x</sub> =902cm <sup>3</sup> /m	14.00	RIGHT	103.30	
		H-BEAM S <sub>x</sub> =2320cm <sup>3</sup>	13.50			
8+222	8+250	SP S <sub>x</sub> =902cm <sup>3</sup> /m	15.00	RIGHT	25.10	
		H-BEAM S <sub>x</sub> =3940cm <sup>3</sup>	14.50			
8+400	8+510	SP S <sub>x</sub> =902cm <sup>3</sup> /m	13.50	RIGHT	83.20	
		H-BEAM S <sub>x</sub> =2490cm <sup>3</sup>	13.00			
8+650	8+800	SP S <sub>x</sub> =902cm <sup>3</sup> /m	13.00	RIGHT	115.60	
		H-BEAM S <sub>x</sub> =1760cm <sup>3</sup>	12.50			
9+150	9+200	SP S <sub>x</sub> =902cm <sup>3</sup> /m	16.50	RIGHT	51.30	
		H-BEAM S <sub>x</sub> =4850cm <sup>3</sup>	16.00			
9+723	9+750	SP S <sub>x</sub> =902cm <sup>3</sup> /m	12.50	RIGHT	27.30	
		H-BEAM S <sub>x</sub> =1760cm <sup>3</sup>	12.00			
9+770	9+792	SP S <sub>x</sub> =902cm <sup>3</sup> /m	15.50	RIGHT	30.80	
		H-BEAM S <sub>x</sub> =4390cm <sup>3</sup>	15.00			
9+814	9+830	SP S <sub>x</sub> =902cm <sup>3</sup> /m	15.50	RIGHT	21.40	
		H-BEAM S <sub>x</sub> =4390cm <sup>3</sup>	15.00			
10+956-A	11+050	SP S <sub>x</sub> =902cm <sup>3</sup> /m	14.00	RIGHT	112.30	
		H-BEAM S <sub>x</sub> =2650cm <sup>3</sup>	13.50			
11+050	11+150	SP S <sub>x</sub> =902cm <sup>3</sup> /m	18.00	RIGHT	102.50	
		H-BEAM S <sub>x</sub> =5390cm <sup>3</sup>	17.50			
11+150	11+263	SP S <sub>x</sub> =902cm <sup>3</sup> /m	15.00	RIGHT	113.10	
		H-BEAM S <sub>x</sub> =4020cm <sup>3</sup>	14.50			
14+300	14+350	SP S <sub>x</sub> =902cm <sup>3</sup> /m	12.00	RIGHT	50.60	
		H-BEAM S <sub>x</sub> =1760cm <sup>3</sup>	11.50			
14+350	14+395-A	SP S <sub>x</sub> =902cm <sup>3</sup> /m	13.50	RIGHT	51.50	L=18.5m, SPLICED SP INTO 3 SEGMENTS NEAR STA.14+395
		H-BEAM S <sub>x</sub> =3500cm <sup>3</sup>	13.00			
14+983	15+075	SP S <sub>x</sub> =902cm <sup>3</sup> /m	11.50	RIGHT	96.60	L=8.0m, SPLICED SP INTO 2 SEGMENTS NEAR STA.15+021
		H-BEAM S <sub>x</sub> =1760cm <sup>3</sup>	11.00			
15+409	15+441	SP S <sub>x</sub> =902cm <sup>3</sup> /m	11.50	RIGHT	24.90	
		H-BEAM S <sub>x</sub> =2490cm <sup>3</sup>	11.00			
16+760	16+840	SP S <sub>x</sub> =902cm <sup>3</sup> /m	13.00	RIGHT	101.80	
		H-BEAM S <sub>x</sub> =2490cm <sup>3</sup>	12.50			

JICA CONSULTANT FOR DETAILED ENGINEERING DESIGN



DESIGNED BY: EJI MOKI STRUCTURAL ENGINEER I	CHECKED BY: TOSHIKI KAWAKAMI THE CHECKER	SUBMITTED BY: SHUJI KAKU TEAM LEADER
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REPUBLIC OF THE PHILIPPINES  
DEPARTMENT OF PUBLIC WORKS  
AND HIGHWAYS

REPUBLIC OF THE PHILIPPINES

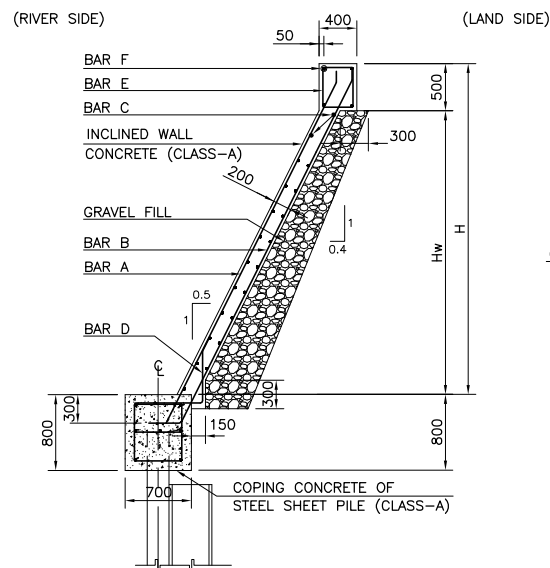
REVIEWED BY: PERFECTO L. ZAPLAN, JR. CHIEF, HYDRAULIC DIVISION, BOD	RECOMMENDING APPROVAL: PATRICK B. GATAN PROJECT DIRECTOR PMO - MFCP	GILBERTO S. REYES DIRECTOR BOD
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APPROVED BY: RAUL C. ASIS UNDERSECRETARY FOR TECHNICAL SERVICES	ROGELIO L. SINGSON SECRETARY
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PROJECT & LOCATION  
PASIG-MARIKINA  
RIVER CHANNEL  
IMPROVEMENT  
PROJECT (PHASE III),  
METRO MANILA

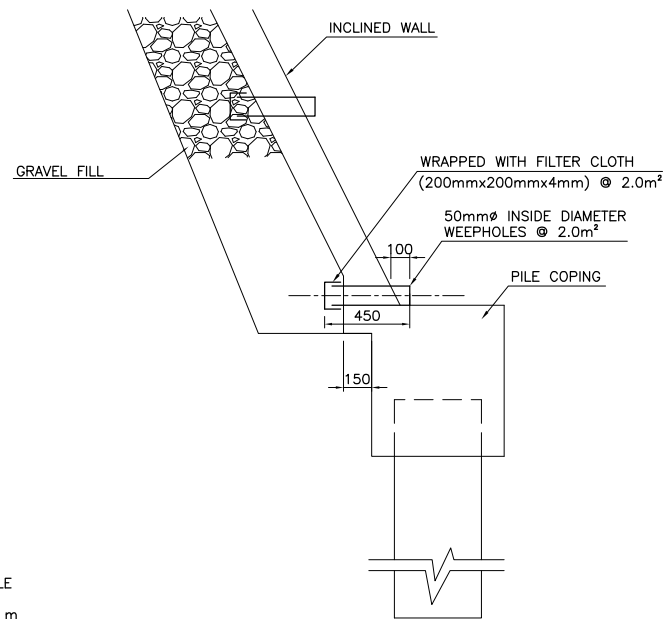
SHEET CONTENTS  
TABLES AND DETAILS  
OF STEEL PILES FOR  
REVTMENT

SHEET NO.  
PR-GE  
SD 02

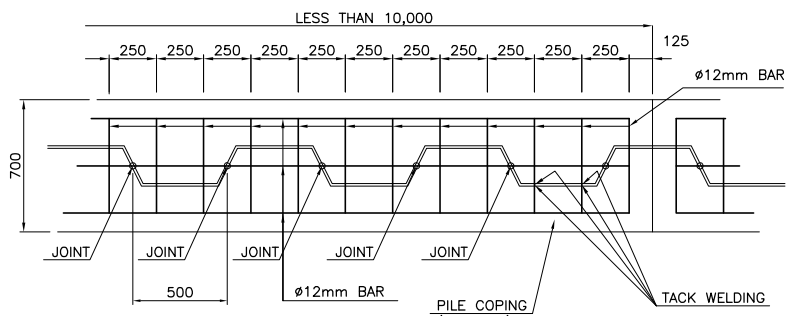


- NOTE:
- HORIZONTAL BARS SHALL BE 2- $\phi$ 12mm @ 300mm SPACING
  - REFER TO INCLINED WALL DESIGN TABLE
  - INTERVAL OF EXPANSION JOINTS: 20.0 m
  - INTERVAL OF CONTRACTION JOINTS: 5.0 m

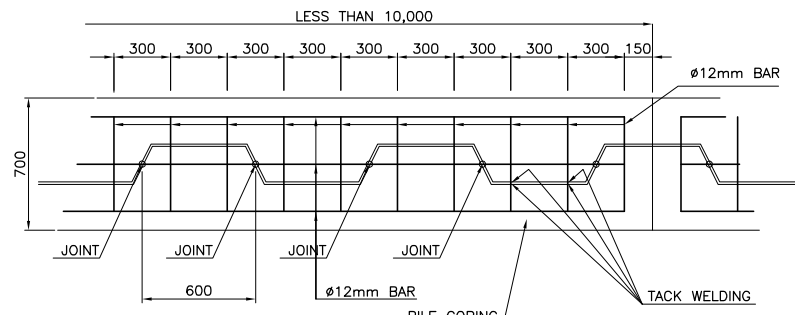
TYPICAL DETAIL OF INCLINED WALL  
SCALE: A



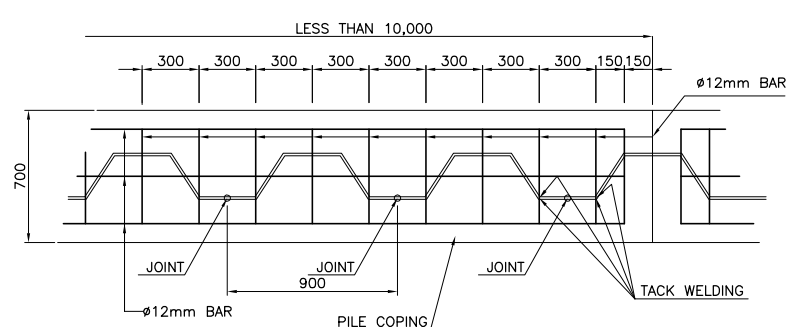
WEEPHOLE DETAIL  
SCALE: A



U-SHAPE STEEL SHEET PILE W/ SSP WIDTH=0.5M

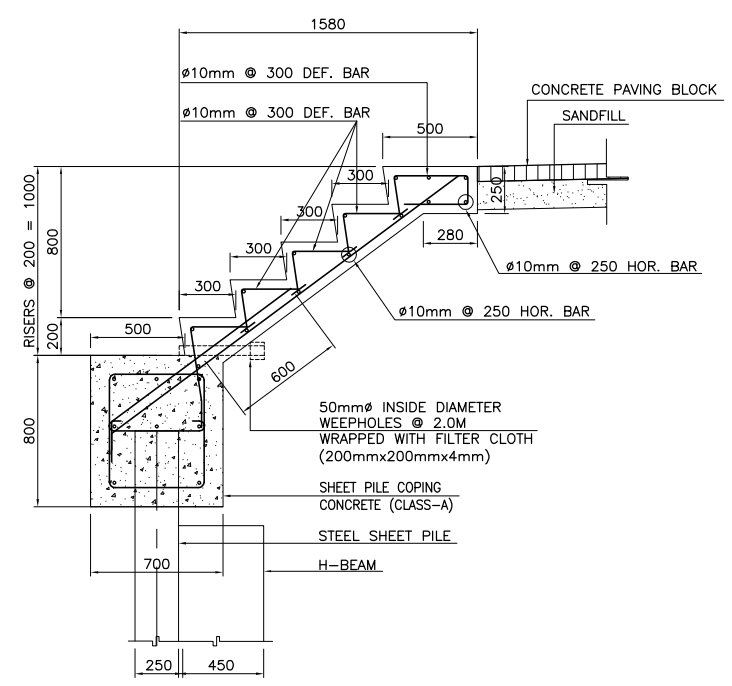


U-SHAPE STEEL SHEET PILE W/ SSP WIDTH=0.6M

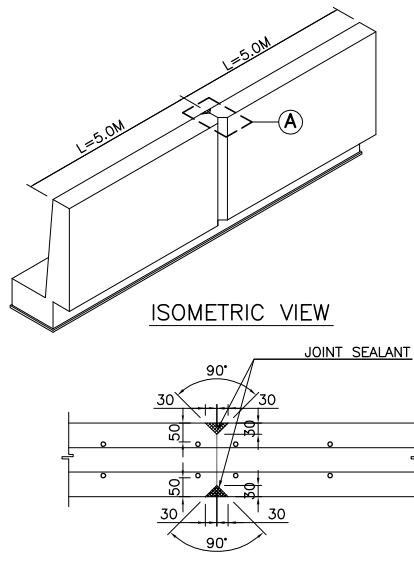


HAT-SHAPE / H-BEAM / SSP WIDTH=0.9M

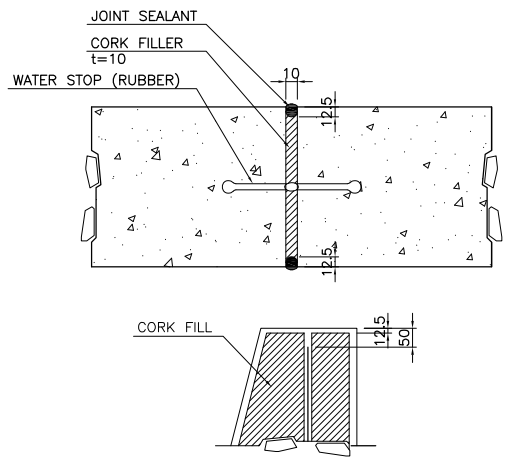
TYPICAL DETAIL OF PILE COPING  
SCALE: B



TYPICAL DETAIL OF INCLINED WALL (STAIR TYPE)  
SCALE: B



TYPICAL CONTRACTION JOINT DETAIL  
SCALE: C



TYPICAL EXPANSION JOINT DETAIL  
SCALE: C

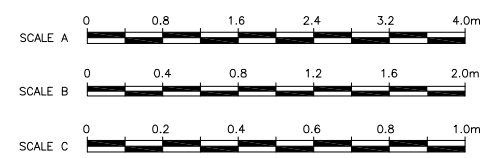
SCHEDULE OF INCLINED WALL LOCATIONS AND DIMENSIONS

STATIONS		RANGE		SLOPE OF BACKWALL H:V	ADJOINING MEMBERS		BANK	REMARKS
FROM	TO	Hw, (m)	L(m)		TOP	BOTTOM		
6+376	6+482	0.32~0.32	114.40	0.5:1	VW,SW	PC	LEFT	
7+326	7+444	0.26~0.27	121.28	0.5:1	VW,SW	PC	LEFT	
7+494	7+514	0.27~0.27	19.42	0.5:1	VW,SW	PC	LEFT	
11+500	11+628	0.41~0.42	128.49	0.5:1	PW,FC	PC	LEFT	
12+024	12+173	0.44~0.45	148.38	0.5:1	VW,SW	PC	LEFT	
13+806	14+043	0.54~0.55	237.55	0.5:1	VW,SW	PC	LEFT	
14+043	14+045	0.55~1.56	6.41	0.5:1	RL,SW	PC	LEFT	
14+045	14+272	1.56~1.56	210.40	0.5:1	RL,SW	PC	LEFT	
15+236	15+310	1.63~1.63	74.15	0.5:1	RL,SW	PC	LEFT	
15+310	15+311	1.23~1.63	1.60	0.5:1	RL,SW	PC	LEFT	
15+311	15+424	1.23~1.23	120.08	0.5:1	VW,SW	PC	LEFT	
15+443	15+548	0.94~0.94	113.06	0.5:1	VW,SW	PC	LEFT	
15+747	15+870	0.95~0.96	107.52	0.5:1	VW,SW	PC	LEFT	
15+965	15+973	1.27~1.67	8.04	0.5:1	VW,SW	PC	LEFT	
15+973	16+142	1.27~1.28	162.94	0.5:1	VW,SW	PC	LEFT	
16+142	16+150	1.28~0.88	8.01	0.5:1	VW,SW	PC	LEFT	
16+150	16+450	0.88~0.90	310.41	0.5:1	VW,SW	PC	LEFT	
16+450	16+454	0.70~0.90	4.00	0.5:1	VW,SW	PC	LEFT	
16+454	16+552	0.70~0.70	109.73	0.5:1	VW,SW	PC	LEFT	
16+552	16+564	0.70~1.30	11.82	0.5:1	VW,SW	PC	LEFT	
8+222	9+341	0.31~0.38	1048.65	0.5:1	VW,SW	PC	RIGHT	
9+430	9+792	0.39~0.40	380.67	0.5:1	VW,SW	PC	RIGHT	
9+814	9+947	0.41~0.41	187.85	0.5:1	VW,SW	PC	RIGHT	
10+956-A	11+263	0.37~0.39	327.85	0.5:1	PW,SW	PC	RIGHT	
11+610	11+653	0.41~0.41	43.65	0.5:1	SW	PC	RIGHT	
11+788	11+803-A	0.42~0.42	20.46	0.5:1	SW	PC	RIGHT	
13+578	13+801-B	1.03~1.04	226.75	1.0:0.7	SW	PC	RIGHT	STAIR TYPE
13+804-A	14+225-A	0.54~0.56	448.58	0.5:1	SW	PC	RIGHT	
14+234-B	14+365	0.56~0.57	138.22	0.5:1	SW	PC	RIGHT	
14+835	14+943	0.60~0.61	125.83	0.5:1	SW	PC	RIGHT	
14+983	15+075	0.61~0.62	96.55	0.5:1	VW,SW	PC	RIGHT	
15+409	15+441	1.64~1.64	25.10	0.5:1	SW	PC	RIGHT	
15+476	15+494	0.64~0.64	20.17	0.5:1	SW	PC	RIGHT	
16+667	16+724	0.71~0.71	56.26	0.5:1	SW	PC	RIGHT	
16+760	16+801	1.32~1.32	56.06	0.5:1	SW	PC	RIGHT	
16+801	16+840	1.32~1.32	45.69	0.5:1	VW,SW	PC	RIGHT	

- \*ADJOINING MEMBERS:
- VW - VERTICAL WALL
  - PW - PARAPET WALL
  - SW - SIDEWALK (CONCRETE BLOCK PAVING)
  - PC - PILE COPING
  - RL - RAILING
  - FC - FILLER CONCRETE
  - EPC - EXISTING PILE CAP

SCHEDULE OF INCLINED WALL REINFORCEMENT

HEIGHT RANGE		REINFORCEMENT											
HW (m)	H (m)	BAR A		BAR B		BAR C		BAR D		BAR E		BAR F	
		DIA (mm)	SPACING (mm)	DIA (mm)	SPACING (mm)	DIA (mm)	SPACING (mm)	DIA (mm)	SPACING (mm)	DIA (mm)	SPACING (mm)	DIA (mm)	SPACING (mm)
0.0~1.5	0.5~2.0	16	250	16	250	12	300	12	250	12	250	12	-
1.5~2.5	2.0~3.0	16	125	16	125	12	300	12	125	12	125	12	-
2.5~2.75	3.0~3.25	16	125	16	125	12	300	12	125	12	125	12	-
2.75~3.0	3.25~3.5	20	125	20	125	12	300	12	125	12	125	12	-

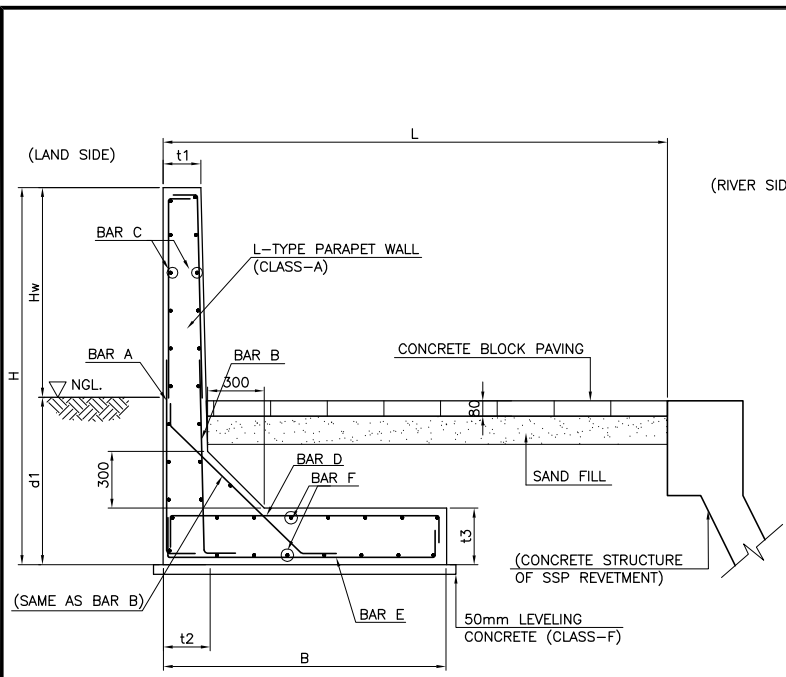


REVISIONS			
NO.	DESCRIPTION	APPROVED	DATE

NOTE:  
PURSUANT TO SECTION 4 OF ANNEX 'A' OF THE REVISED IMPLEMENTING RULES AND REGULATIONS OF R.A. 9184, APPROVAL BY THE AUTHORIZED DPWH OFFICIALS OF DETAILED ENGINEERING SURVEYS AND DESIGN UNDERTAKEN BY CONSULTANTS NEITHER DIMINISHES THE RESPONSIBILITY OF THE LATTER FOR THE TECHNICAL INTEGRITY OF THE SURVEYS AND DESIGN NOR TRANSFER ANY PART OF THAT RESPONSIBILITY TO THE APPROVING OFFICIALS.

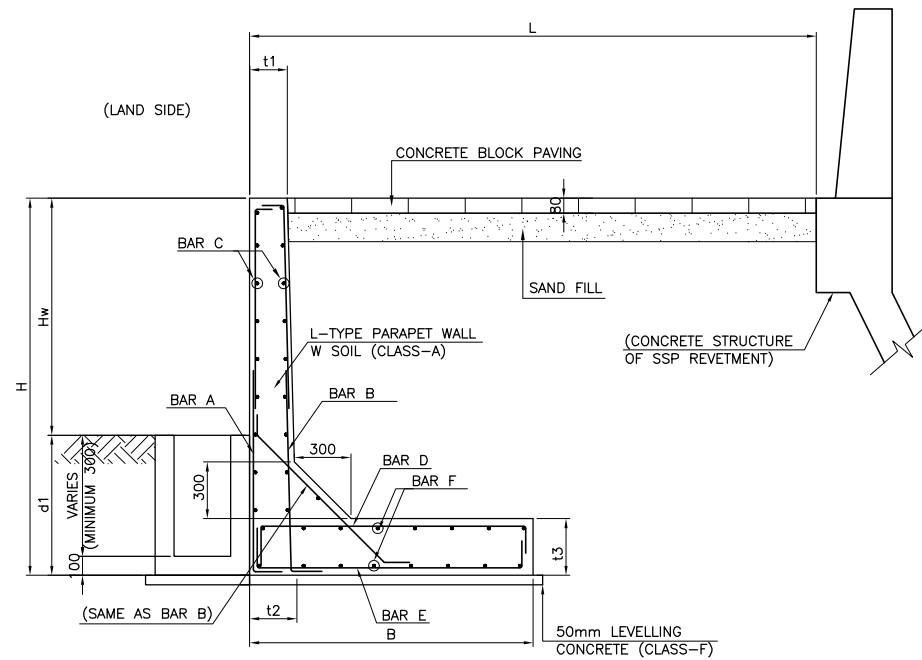
SHUJI KAKU  
TEAM LEADER

JICA CONSULTANT FOR DETAILED ENGINEERING DESIGN			REPUBLIC OF THE PHILIPPINES			PROJECT & LOCATION		SHEET CONTENTS		SHEET NO.
	DESIGNED BY:	CHECKED BY:	SUBMITTED BY:	REVIEWED BY:	RECOMMENDING APPROVAL:	APPROVED BY:		PASIG-MARIKINA RIVER CHANNEL IMPROVEMENT PROJECT (PHASE III), METRO MANILA	TABLES AND DETAILS OF INCLINED WALL, WEEPHOLE, PILE CAPS, & EXPANSION JOINT	
	EIJI MOKI STRUCTURAL ENGINEER I	TOSHIKI KAWAKAMI THE CHECKER	SHUJI KAKU TEAM LEADER	PERFECTO L. ZAPLAN, JR. CHIEF, HYDRAULIC DIVISION, BOD	PATRICK B. GATAN PROJECT DIRECTOR PMO - MFCP	GILBERTO S. REYES DIRECTOR BOD	SEE COVER SHEET FOR THE SIGNATURE OF THE UNDERSECRETARY RAUL C. ASIS UNDERSECRETARY FOR TECHNICAL SERVICES			



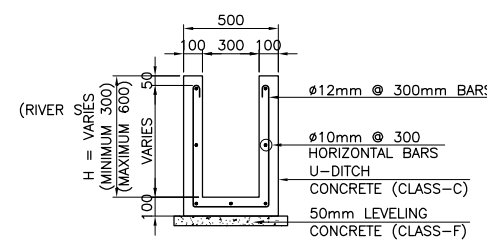
DETAIL OF L TYPE PARAPET WALL (LPW)

SCALE: A



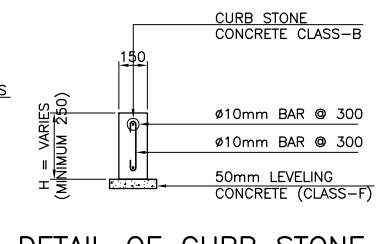
DETAIL OF L TYPE PARAPET WALL W/ SOIL (LPW-SE)

SCALE: A



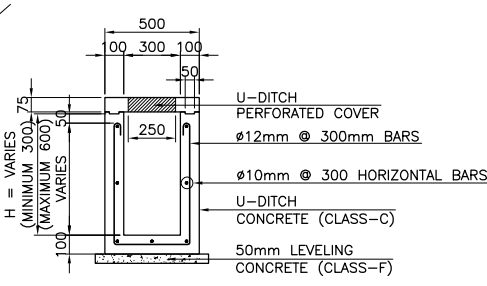
DETAIL OF U-DITCH

SCALE: A



DETAIL OF CURB STONE

SCALE: A



DETAIL OF U-DITCH W/ COVER

SCALE: A

STATION	RANGE	LENGTH (m)	BANK	REMARKS
2+654	2+694	43.17	LEFT	
2+854	3+072	232.57	LEFT	
6+376	6+482	114.74	LEFT	
7+326	7+444	115.72	LEFT	
7+494	7+514	18.86	LEFT	
10+232	10+269	36.14	LEFT	
10+285	10+325	38.97	LEFT	
12+024	12+173	146.74	LEFT	
13+806	14+272	455.67	LEFT	
15+311	15+424	118.12	LEFT	
15+443	15+548	113.70	LEFT	
15+747	15+870	105.04	LEFT	
15+965	16+564	616.41	LEFT	
5+545	5+602	67.34	RIGHT	
6+396	6+510	125.09	RIGHT	
8+222	9+341	1042.16	RIGHT	
9+430	9+792	380.69	RIGHT	
9+814	9+947	195.28	RIGHT	
10+140	10+179	41.96	RIGHT	
14+983	15+024	42.48	RIGHT	W/ COVER
15+024	15+075	54.42	RIGHT	
16+801	16+838	43.30	RIGHT	

SCHEDULE OF LPW SIZE AND REINFORCEMENT (CASE OF L > 2.0m)

HT. FROM SOIL TO TOP OF WALL, Hw (m)	B. BASE (m)	EMBEDMENT, d1	t1	t2	t3	REINFORCEMENTS												
						LANDSIDE				RIVERSIDE				TOPSIDE		BOTTOMSIDE		BAR F
						BAR A		BAR B		BAR C		BAR D		BAR E				
						DIA	SPACING	DIA	SPACING	DIA	SPACING	DIA	SPACING	DIA	SPACING	DIA	SPACING	
0.00~0.50	1.00	0.50	0.20	0.20	0.20	12	250	12	250	12	300	12	250	12	250	12	300	
0.51~1.00	1.35	0.50	0.20	0.20	0.20	12	250	12	250	12	300	12	250	12	250	12	300	
1.01~1.10	1.50	0.50	0.20	0.20	0.20	12	250	12	250	12	300	12	250	12	250	12	300	
1.11~1.20	1.65	0.50	0.20	0.20	0.20	12	250	12	250	12	300	12	250	12	250	12	300	
1.21~1.30	1.80	0.50	0.20	0.20	0.20	12	250	12	250	12	300	12	250	12	250	12	300	
1.31~1.40	1.90	0.50	0.20	0.20	0.20	12	250	16	250	12	300	16	250	12	250	12	300	
1.41~1.50	2.05	0.50	0.20	0.20	0.20	12	250	16	250	12	300	16	250	12	250	12	300	
1.51~1.60	2.20	0.50	0.20	0.20	0.20	12	250	16	250	12	300	16	250	12	250	12	300	
1.61~1.70	2.35	0.50	0.20	0.20	0.20	12	250	12	125	12	300	12	125	12	250	12	300	
1.71~1.80	2.45	0.50	0.20	0.20	0.20	12	250	20	250	12	300	20	250	12	250	12	300	
1.81~1.90	2.60	0.50	0.20	0.20	0.20	12	250	20	250	12	300	20	250	12	250	12	300	
1.91~2.00	2.75	0.50	0.20	0.20	0.20	12	250	16	125	12	300	16	125	12	250	12	300	

SCHEDULE OF LPW-SE SIZE AND REINFORCEMENTS

HT. FROM SOIL TO TOP OF WALL, Hw (m)	B. BASE (m)	EMBEDMENT, d1	t1	t2	t3	REINFORCEMENTS												
						LANDSIDE				RIVERSIDE				TOPSIDE		BOTTOMSIDE		BAR F
						BAR A		BAR B		BAR C		BAR D		BAR E				
						DIA	SPACING	DIA	SPACING	DIA	SPACING	DIA	SPACING	DIA	SPACING	DIA	SPACING	
0.00~0.50	0.50	0.40	0.20	0.20	0.20	12	250	12	250	12	300	12	250	12	250	12	300	
0.51~0.60	0.50	0.40	0.20	0.20	0.20	12	250	12	250	12	300	12	250	12	250	12	300	
0.61~0.70	0.55	0.40	0.20	0.20	0.20	12	250	16	250	12	300	16	250	12	250	12	300	
0.71~0.80	0.65	0.40	0.20	0.20	0.20	12	250	16	250	12	300	16	250	12	250	12	300	
0.81~0.90	0.75	0.40	0.20	0.20	0.20	12	250	20	250	12	300	20	250	12	250	12	300	
0.91~1.00	0.85	0.40	0.20	0.20	0.20	12	250	16	125	12	300	16	125	12	250	12	300	
1.01~1.10	0.95	0.40	0.20	0.20	0.20	12	250	25	250	12	300	25	250	12	250	12	300	
1.11~1.20	1.00	0.40	0.20	0.30	0.30	12	250	20	250	12	300	20	250	12	250	12	300	
1.21~1.30	1.15	0.40	0.20	0.30	0.30	12	250	16	125	12	300	16	125	12	250	12	300	
1.31~1.40	1.25	0.40	0.20	0.30	0.30	12	250	25	250	12	300	25	250	12	250	12	300	
1.41~1.50	1.35	0.40	0.20	0.30	0.30	12	250	20	125	12	300	20	125	12	250	12	250	
1.51~1.60	1.45	0.40	0.20	0.35	0.35	16	250	20	125	12	250	20	125	16	250	12	250	

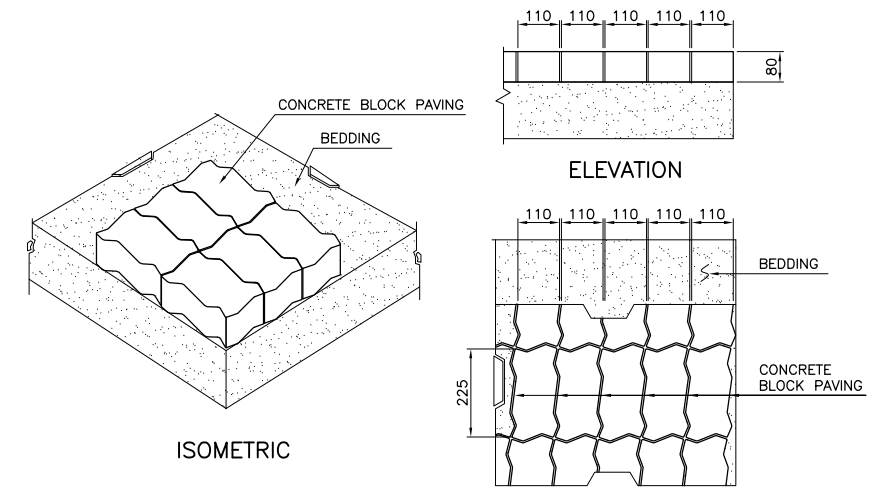
NOTE:  
HORIZONTAL ALIGNMENTS OF L-TYPE PARAPET WALLS WAS BASED ON THE ALIGNMENT OF EXISTING RIVER SHORELINE AND OFFSET DISTANCE SHOWN IN THE DRAWINGS ARE FOR ESTIMATES ONLY. ACTUAL ALIGNMENT SHALL BE CONFIRMED BY THE ENGINEER DURING CONSTRUCTION.

SCHEDULE OF L TYPE PARAPET WALL (LPW) LOCATIONS AND DIMENSIONS

STATION	RANGE	ADJOINING MEMBERS	WIDTH OF SIDEWALK (m)	BANK	REMARKS			
						START	END	HEIGHT, Hw (m)
2+283	2+334	0.94~0.96	62.45	-	SIDEWALK	VARIES	RIGHT	
11+800	11+803	0.96~0.98	3.07	-	SIDEWALK	VARIES	RIGHT	
14+914	14+943	1.30~1.30	32.88	SIDEWALK	SIDEWALK	VARIES	RIGHT	WITH HANDRAIL
15+483	15+494	0.96~0.96	10.35	-	SIDEWALK	VARIES	RIGHT	

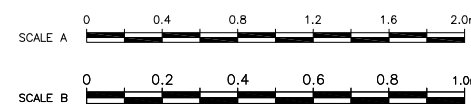
SCHEDULE OF L TYPE PARAPET WALL WITH SOIL EMBANKMENT (LPW-SE) LOCATION AND DIMENSIONS

STATION	RANGE	ADJOINING MEMBERS	WIDTH OF SIDEWALK (m)	BANK	REMARKS			
						START	END	HEIGHT, Hw (m)
3+062	3+072	0.00~0.32	11.27	U-DITCH	SIDEWALK	VARIES	LEFT	
6+376	6+482	0.00~0.50	114.64	U-DITCH	SIDEWALK	VARIES	LEFT	
13+806	13+926	0.00~0.26	121.54	U-DITCH	SIDEWALK	VARIES	LEFT	
14+072	14+272	0.18~0.48	180.39	U-DITCH	SIDEWALK	3.00	LEFT	
16+152	16+203	0.00~0.28	50.76	U-DITCH	SIDEWALK	3.00	LEFT	
16+516	16+564	0.00~0.27	51.38	U-DITCH	SIDEWALK	3.00	LEFT	
5+571	5+602	0.46~0.57	36.61	U-DITCH	SIDEWALK	VARIES	RIGHT	
8+222	9+341	0.00~0.50	1042.57	U-DITCH	SIDEWALK	3.00	RIGHT	
9+430	9+792	0.23~0.82	380.90	U-DITCH	SIDEWALK	3.00	RIGHT	
9+814	9+947	0.58~1.10	195.01	U-DITCH	SIDEWALK	3.00	RIGHT	
10+140	10+179	0.35~0.39	29.31	U-DITCH	SIDEWALK	VARIES	RIGHT	



DETAIL SECTION OF CONCRETE BLOCK PAVING

SCALE: B



NO.	DESCRIPTION	APPROVED	DATE

NOTE:  
PURSUANT TO SECTION 4 OF ANNEX 'A' OF THE REVISED IMPLEMENTING RULES AND REGULATIONS OF R.A. 9184, APPROVAL BY THE AUTHORIZED DPWH OFFICIALS OF DETAILED ENGINEERING SURVEYS AND DESIGN UNDERTAKEN BY CONSULTANTS NEITHER DIMINISHES THE RESPONSIBILITY OF THE LATTER FOR THE TECHNICAL INTEGRITY OF THE SURVEYS AND DESIGN NOR TRANSFER ANY PART OF THAT RESPONSIBILITY TO THE APPROVING OFFICIALS.

SHUJI KAKU  
TEAM LEADER

JICA CONSULTANT FOR DETAILED ENGINEERING DESIGN



DESIGNED BY:	CHECKED BY:	SUBMITTED BY:
EIJI MOKI STRUCTURAL ENGINEER I	TOSHIKI KAWAKAMI THE CHECKER	SHUJI KAKU TEAM LEADER



REPUBLIC OF THE PHILIPPINES  
DEPARTMENT OF PUBLIC WORKS  
AND HIGHWAYS

REPUBLIC OF THE PHILIPPINES

REVIEWED BY:	RECOMMENDING APPROVAL:	APPROVED BY:
PEDRECTO L. ZAPLAN, JR. CHIEF, HYDRAULIC DIVISION, BOD	PATRICK B. GATAN PROJECT DIRECTOR PMO - MFCP	GILBERTO S. REYES DIRECTOR BOD
SEE COVER SHEET FOR THE SIGNATURE OF THE UNDERSECRETARY	SEE COVER SHEET FOR THE SIGNATURE AND APPROVAL OF THE SECRETARY	SEE COVER SHEET FOR THE SIGNATURE AND APPROVAL OF THE SECRETARY
RAUL C. ASIS UNDERSECRETARY FOR TECHNICAL SERVICES	ROGELIO L. SINGSON SECRETARY	

PROJECT & LOCATION

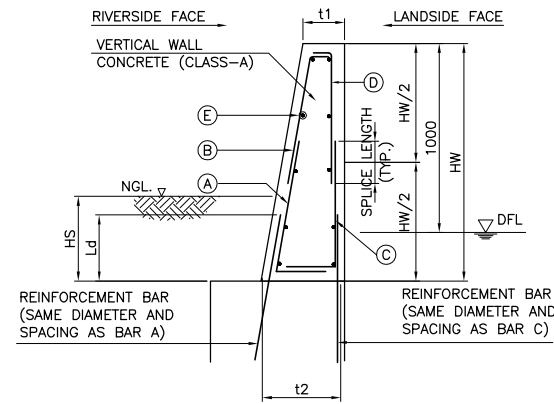
PASIG-MARIKINA RIVER CHANNEL IMPROVEMENT PROJECT (PHASE III), METRO MANILA

SHEET CONTENTS

TABLES AND DETAILS OF LPW, LPW-SE AND U-DITCH

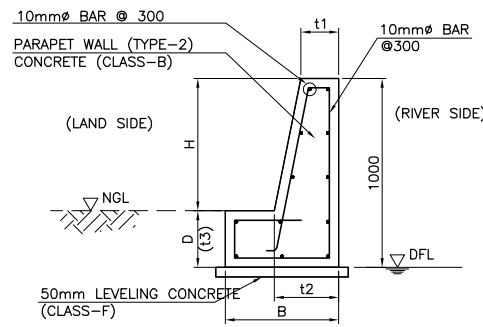
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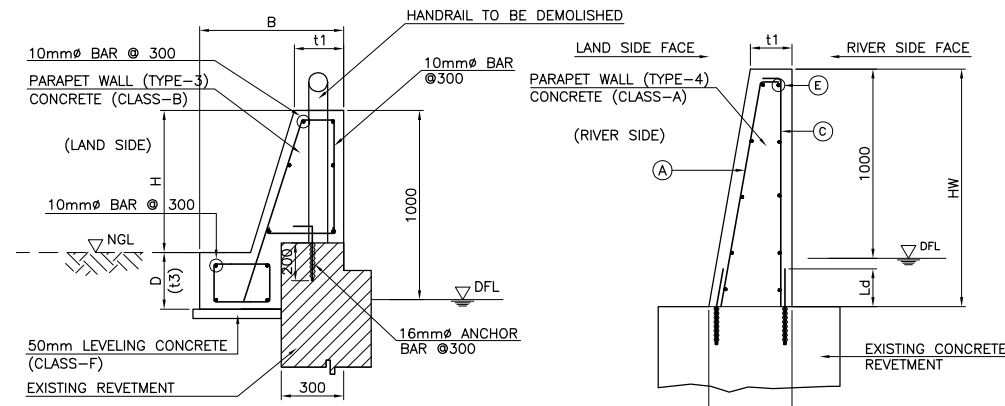


DETAIL OF VERTICAL WALL (VW)

SCALE: A

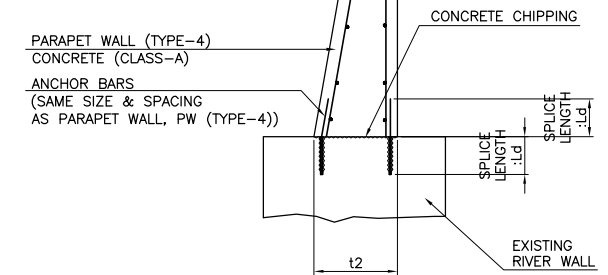


PW TYPE-2



PW TYPE-3

PW TYPE-4



DETAIL OF PARAPET WALL (PW TYPE-4) CONNECTION TO EXISTING STRUCTURE

SCALE: A

SCHEDULE OF VERTICAL WALL AND PARAPET WALLS TYPE 4 THICKNESS AND REINFORCEMENT (REFER DRAWING DETAIL OF VERTICAL WALL AND DETAIL OF PARAPET WALL TYPE-4 PW)

HEIGHT RANGE		THICKNESS		REINFORCEMENT									
WALL HEIGHT (m)	SOIL HEIGHT (m)	t1 (mm)	t2 (mm)	BAR A		BAR B		BAR C		BAR D		BAR E	
				DIA (mm)	SPACING (mm)	DIA (mm)	SPACING (mm)	DIA (mm)	SPACING (mm)	DIA (mm)	SPACING (mm)	DIA (mm)	SPACING (mm)
0.5~1.5	0~0.1	0.2	t1+H*0.1	12	250	12	250	12	250	12	250	12	300
0.5~1.5	0.11~1.0	0.2	t1+H*0.1	12	250	12	250	12	250	12	250	12	300
0.5~1.5	1.2~1.5	0.2	t1+H*0.1	12	250	12	250	12	250	12	250	12	300
1.51~1.6	0~0.1	0.2	t1+H*0.1	12	250	12	250	16	250	12	250	12	300
1.51~1.6	1.2~1.6	0.2	t1+H*0.1	16	250	12	250	12	250	12	250	12	300
1.61~2.0	0~0.1	0.2	t1+H*0.1	12	250	12	250	20	250	12	250	12	300
1.61~2.0	0.11~0.5	0.2	t1+H*0.1	12	250	12	250	20	250	12	250	12	300
1.61~2.0	1.01~1.5	0.2	t1+H*0.1	16	250	12	250	12	250	12	250	12	300
1.61~2.0	1.51~2.0	0.2	t1+H*0.1	20	250	12	250	12	250	12	250	12	300
2.11~2.5	0~0.5	0.2	t1+H*0.1	12	250	12	250	20	125	12	250	12	300
2.11~2.5	0.51~1.0	0.2	t1+H*0.1	12	250	12	250	20	125	12	250	12	300
2.11~2.5	1.51~2.0	0.2	t1+H*0.1	20	250	12	250	12	250	12	250	12	300
2.51~2.6	0~0.50	0.2	t1+H*0.1	12	250	12	250	20	125	12	250	12	300
2.51~2.6	0.51~1.0	0.2	t1+H*0.1	12	250	12	250	20	125	12	250	12	300
2.51~2.6	1.01~1.5	0.2	t1+H*0.1	16	250	12	250	20	250	12	250	12	300
2.61~3.0	0~0.50	0.2	t1+H*0.1	16	250	12	250	20	125	12	250	12	300
2.61~3.0	0.51~1.0	0.2	t1+H*0.1	16	250	12	250	20	125	12	250	12	300
2.61~3.0	1.01~1.5	0.2	t1+H*0.1	16	250	12	250	20	125	12	250	12	300

SCHEDULE OF PARAPET WALL LOCATION, HEIGHTS AND LENGTH (TYPE-2)

STATIONS		RANGE		BANK	REMARKS
START	END	WALL HEIGHT Hw	LENGTH (m)		
10+232	10+341	0.60~1.40	110.20	LEFT	
10+425	10+434	1.00~1.20	9.44	LEFT	WITH STEPS
10+467	10+477	1.10~1.10	10.37	LEFT	WITH STEPS
11+500	11+628	1.00~1.00	128.49	LEFT	
12+024		1.00~1.00	4.30	LEFT	CLOSURE WALL
3+069	3+100	0.27~1.48	30.60	RIGHT	
3+649	3+753	0.81~0.83	98.89	RIGHT	
5+602		1.22~1.22	1.91	RIGHT	CLOSURE WALL
6+396		1.30~1.30	1.16	RIGHT	CLOSURE WALL
10+140	10+179	1.34~1.34	15.68	RIGHT	
10+956-A	11+055	1.00~1.00	117.28	RIGHT	
11+150	11+263	0.96~0.99	113.08	RIGHT	
11+610	11+643	0.95~0.99	33.63	RIGHT	
11+643	11+653	0.67~0.67	21.22	RIGHT	
11+788	11+800	0.96~0.99	15.60	RIGHT	
15+411		0.38~0.38	3.10	RIGHT	
15+494	16+086	0.30~0.60	606.87	RIGHT	
16+095	16+472	0.60~0.80	363.82	RIGHT	
16+789		0.40~0.40	5.80	RIGHT	WITH STEPS

SCHEDULE OF VERTICAL WALL LOCATION, HEIGHTS AND LENGTH

STATIONS		RANGE		BANK	REMARKS
START	END	WALL HEIGHT Hw	SOIL HEIGHT Hs		
2+392	2+419	0.82~0.83	0.09~0.27	26.49	LEFT
2+419	2+694	0.76~0.80	0.0~0.27	278.87	LEFT
2+854	3+072	0.86~0.89	0.0~0.28	230.66	LEFT
6+376	6+482	0.47~0.53	0.0	114.40	LEFT
7+326	7+444	1.00~1.00	0.0	121.28	LEFT
7+494	7+514	1.00~1.00	0.0	19.42	LEFT
7+514	7+580	0.47~0.56	0.0	56.35	LEFT
12+024	12+173	1.00~1.00	0.0	148.38	LEFT
13+806	14+043	1.00~1.00	0.0	237.55	LEFT
14+043	14+045	0.00~1.00	0.0	6.41	LEFT
15+310	15+311	0.00~0.40	0.0	1.60	LEFT
15+311	15+424	0.40~0.40	0.0	120.08	LEFT
15+443	15+548	0.50~0.50	0.0	113.06	LEFT
15+747	15+870	0.50~0.50	0.0	107.52	LEFT
15+965	15+973	0.00~0.40	0.0	8.04	LEFT
15+973	16+142	0.40~0.40	0.0	162.94	LEFT
16+142	16+150	0.40~0.80	0.0	8.01	LEFT
16+150	16+450	0.80~0.80	0.0	310.41	LEFT
16+450	16+454	0.80~1.00	0.0	4.00	LEFT
16+454	16+552	1.00~1.00	0.0	109.73	LEFT
16+552	16+564	0.40~1.00	0.0	11.82	LEFT
5+545	5+602	1.21~1.22	0.21~0.22	67.45	RIGHT
6+396	6+510	1.30~1.37	0.30~0.37	113.18	RIGHT
8+222	9+341	1.00~1.00	0.0	1048.65	RIGHT
9+430	9+792	1.00~1.00	0.0	380.67	RIGHT
9+814	9+947	1.00~1.00	0.0	187.85	RIGHT
14+365	14+395-A	1.07~1.08	1.07~1.08	35.76	RIGHT
14+983	15+075	1.00~1.00	0.0	96.55	RIGHT
16+801	16+840	0.40~0.40	0.0	45.69	RIGHT

SCHEDULE OF PARAPET SIZE (TYPE-2 & TYPE-3)

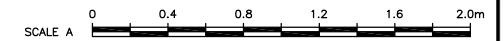
H	B	D	t1	t2	t3
0.30	0.36	0.20	0.30	0.36	0.20
0.40	0.38	0.20	0.30	0.38	0.20
0.50	0.40	0.20	0.30	0.40	0.20
0.60	0.45	0.20	0.30	0.42	0.20
0.70	0.50	0.20	0.30	0.44	0.20
0.80	0.60	0.30	0.30	0.46	0.30
0.90	0.75	0.40	0.30	0.48	0.40
1.00	0.85	0.40	0.30	0.50	0.40
1.10	0.95	0.50	0.30	0.52	0.50
1.20	1.10	0.55	0.30	0.54	0.55
1.30	1.20	0.60	0.30	0.56	0.60
1.40	1.40	0.70	0.30	0.58	0.70
1.50	1.60	0.70	0.30	0.60	0.70

SCHEDULE OF PARAPET WALL LOCATION, HEIGHTS AND LENGTH (TYPE-4)

STATIONS		RANGE		BANK	REMARKS
START	END	WALL HEIGHT Hw	LENGTH (m)		
7+326-A	7+326	0.57~0.57	6.72	LEFT	
10+140	10+179	1.37~1.40	27.80	RIGHT	
11+788		0.55~1.00	4.00	RIGHT	
16+086	16+095	0.56~0.56	8.95	RIGHT	
16+840	16+843	0.89~0.89	2.85	RIGHT	

SCHEDULE OF PARAPET WALL LOCATION, HEIGHTS AND LENGTH (TYPE-3)

STATIONS		RANGE		BANK	REMARKS
START	END	WALL HEIGHT Hw	LENGTH (m)		
10+405	10+425	1.08~1.08	20.74	LEFT	
7+516	8+219	1.08~1.46	612.65	RIGHT	
11+055	11+150	0.96~0.98	97.49	RIGHT	
11+788		0.55~0.55	4.00	RIGHT	WITH STEPS
13+804-A	14+193	0.59~0.81	396.92	RIGHT	



NOTE: PURSUANT TO SECTION 4 OF ANNEX 'A' OF THE REVISED IMPLEMENTING RULES AND REGULATIONS OF R.A. 9184, APPROVAL BY THE AUTHORIZED DPWH OFFICIALS OF DETAILED ENGINEERING SURVEYS AND DESIGN UNDERTAKEN BY CONSULTANTS NEITHER DIMINISHES THE RESPONSIBILITY OF THE LATTER FOR THE TECHNICAL INTEGRITY OF THE SURVEYS AND DESIGN NOR TRANSFER ANY PART OF THAT RESPONSIBILITY TO THE APPROVING OFFICIALS.

REVISIONS			
NO.	DESCRIPTION	APPROVED	DATE

JICA CONSULTANT FOR DETAILED ENGINEERING DESIGN



DESIGNED BY:	CHECKED BY:	SUBMITTED BY:
ELJI MOKI STRUCTURAL ENGINEER I	TOSHIKI KAWAKAMI THE CHECKER	SHUJI KAKU TEAM LEADER



REPUBLIC OF THE PHILIPPINES  
DEPARTMENT OF PUBLIC WORKS  
AND HIGHWAYS

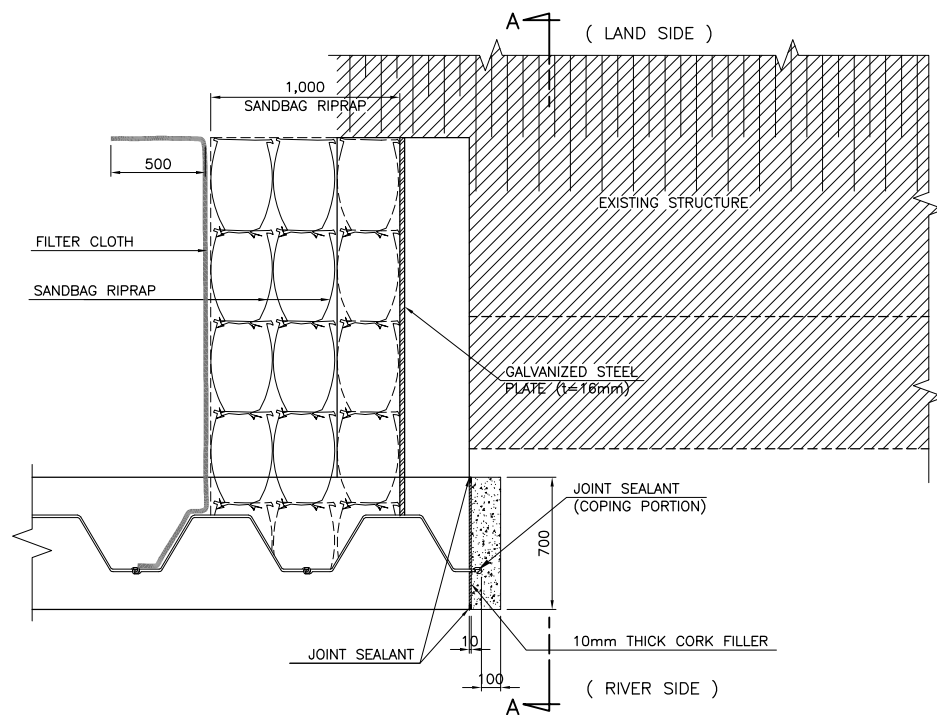
REPUBLIC OF THE PHILIPPINES

REVIEWED BY:	RECOMMENDING APPROVAL:	APPROVED BY:
PERFECTO L. ZAPLAN, JR. CHIEF, HYDRAULIC DIVISION, BOD	PATRICK B. GATAN PROJECT DIRECTOR PMD - MFCP	GILBERTO S. REYES DIRECTOR BOD
SEE COVER SHEET FOR THE SIGNATURE OF THE UNDERSECRETARY	SEE COVER SHEET FOR THE SIGNATURE OF THE UNDERSECRETARY	SEE COVER SHEET FOR THE SIGNATURE OF THE SECRETARY
RAUL C. ASIS UNDERSECRETARY FOR TECHNICAL SERVICES	ROGELIO L. SINGSON SECRETARY	

PROJECT & LOCATION  
PASIG-MARIKINA RIVER CHANNEL IMPROVEMENT PROJECT (PHASE III), METRO MANILA

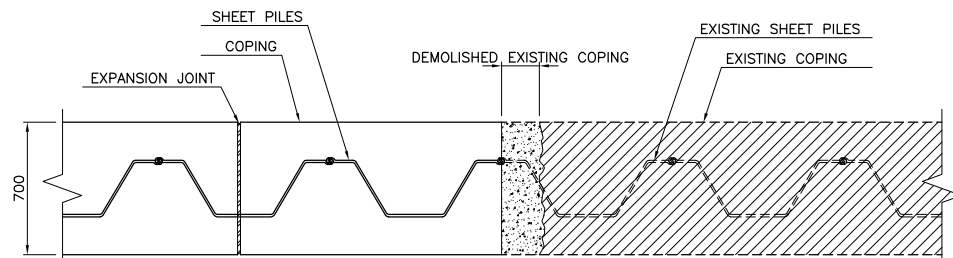
SHEET CONTENTS  
TABLES AND DETAILS OF VW AND PW

SHEET NO.  
PR-GE  
SD 05  
2/42



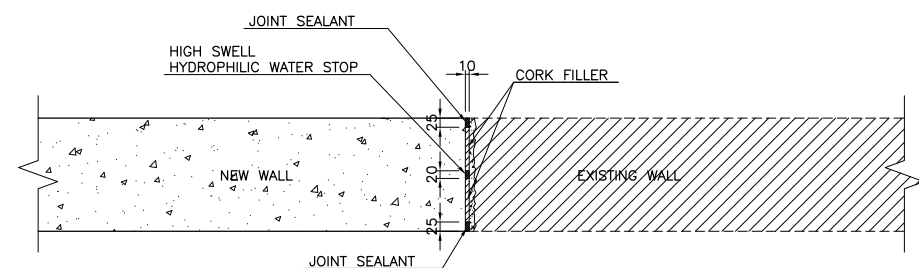
TYPICAL SHEET PILE  
END CONNECTION DETAIL (TYPE-1)

SCALE: A



TYPICAL SHEET PILE  
END CONNECTION DETAIL (TYPE-2)

SCALE: A



TYPICAL DETAIL OF WALL  
END CONNECTION TO EXISTING WALL

SCALE: B

SCHEDULE OF SHEET PILES END CONNECTION (TYPE-1)

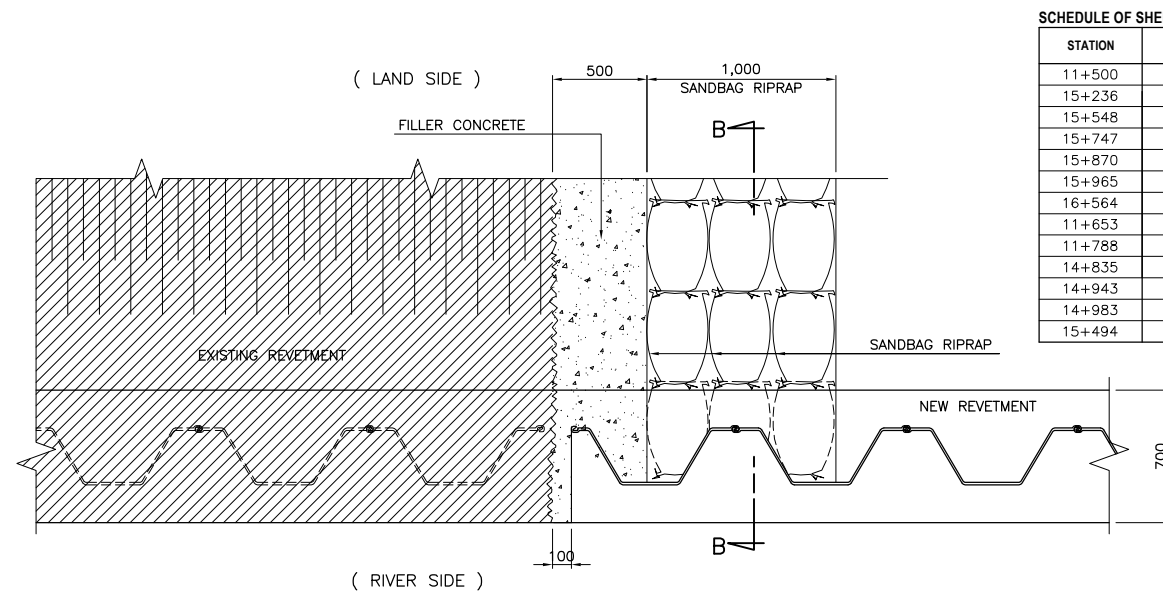
STATION	BANK	REMARKS
2+419	LEFT BANK	
3+072	LEFT BANK	
3+160	LEFT BANK	
3+300	LEFT BANK	
6+116	LEFT BANK	
6+249	LEFT BANK	
6+269	LEFT BANK	
7+326	LEFT BANK	
7+514	LEFT BANK	
12+173	LEFT BANK	
13+806	LEFT BANK	
14+272	LEFT BANK	
15+424	LEFT BANK	
15+443	LEFT BANK	
3+753	RIGHT BANK	
5+046	RIGHT BANK	
5+223	RIGHT BANK	
5+262	RIGHT BANK	
5+414	RIGHT BANK	
5+639	RIGHT BANK	
6+337	RIGHT BANK	
6+510	RIGHT BANK	
8+222	RIGHT BANK	
9+341	RIGHT BANK	
9+430	RIGHT BANK	
9+792	RIGHT BANK	
9+814	RIGHT BANK	
9+947	RIGHT BANK	
10+956-A	RIGHT BANK	
11+803-A	RIGHT BANK	
13+801-B	RIGHT BANK	
13+804-A	RIGHT BANK	
14+225-A	RIGHT BANK	
14+234-A	RIGHT BANK	
14+395-A	RIGHT BANK	
15+075	RIGHT BANK	
15+409	RIGHT BANK	
15+441	RIGHT BANK	
15+476	RIGHT BANK	
16+667	RIGHT BANK	
16+724	RIGHT BANK	
16+760	RIGHT BANK	
16+840	RIGHT BANK	

SCHEDULE OF SHEET PILES END CONNECTION (TYPE-2)

STATION	BANK	REMARKS
2+694	LEFT BANK	
2+854	LEFT BANK	
6+219	LEFT BANK	
6+376	LEFT BANK	
6+482	LEFT BANK	
7+444	LEFT BANK	
7+494	LEFT BANK	
11+628	LEFT BANK	
12+024	LEFT BANK	
3+649	RIGHT BANK	
5+545	RIGHT BANK	
11+263	RIGHT BANK	
11+610	RIGHT BANK	
13+578	RIGHT BANK	

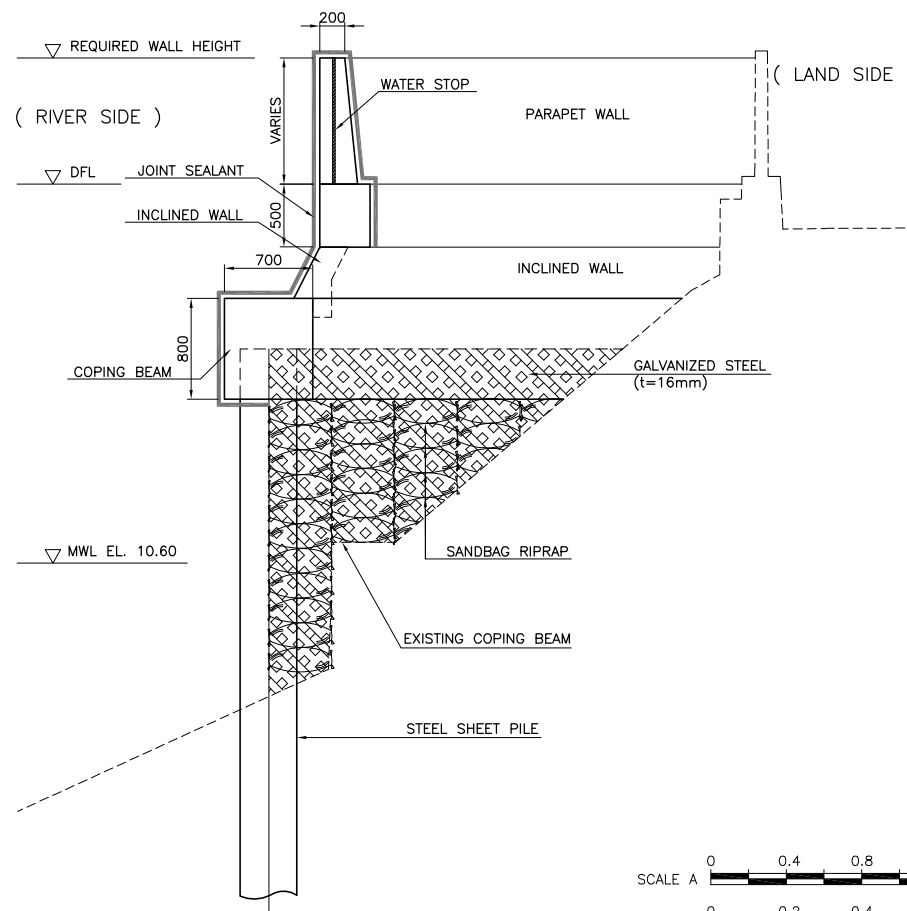
SCHEDULE OF WALL END CONNECTION (RCF)

STATION	BANK	REMARKS
2+392	LEFT BANK	
7+326-A	LEFT BANK	
7+580	LEFT BANK	
10+232	LEFT BANK	
10+341	LEFT BANK	
10+405	LEFT BANK	
10+434	LEFT BANK	
10+467	LEFT BANK	
10+477	LEFT BANK	
2+283	RIGHT BANK	
STA. A	RIGHT BANK	QUINTA CHANNEL
STA. D	RIGHT BANK	QUINTA CHANNEL
3+100	RIGHT BANK	
7+516	RIGHT BANK	
8+219	RIGHT BANK	
10+140	RIGHT BANK	
10+179	RIGHT BANK	
16+472	RIGHT BANK	
16+843	RIGHT BANK	



TYPICAL SHEET PILE  
END CONNECTION DETAIL (TYPE-3)

SCALE: A

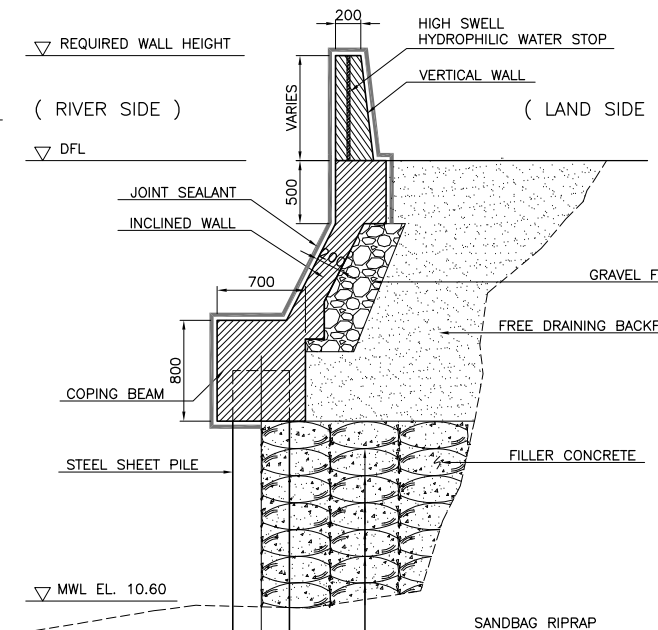


SECTION A-A

SCALE: C

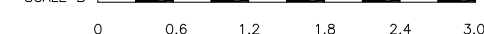
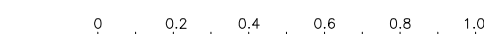
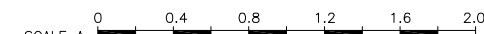
SCHEDULE OF SHEET PILES END CONNECTION (TYPE-3)

STATION	BANK	REMARKS
11+500	LEFT BANK	
15+236	LEFT BANK	
15+548	LEFT BANK	
15+747	LEFT BANK	
15+870	LEFT BANK	
15+965	LEFT BANK	
16+564	LEFT BANK	
11+653	RIGHT BANK	
11+788	RIGHT BANK	
14+835	RIGHT BANK	
14+943	RIGHT BANK	
14+983	RIGHT BANK	
15+494	RIGHT BANK	



SECTION B-B

SCALE: C



REVISIONS			
NO.	DESCRIPTION	APPROVED	DATE

NOTE:  
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SHUJI KAKU  
TEAM LEADER

JICA CONSULTANT FOR DETAILED ENGINEERING DESIGN



DESIGNED BY:	CHECKED BY:	SUBMITTED BY:
EIJI MOKI STRUCTURAL ENGINEER I	TOSHIKI KAWAKAMI THE CHECKER	SHUJI KAKU TEAM LEADER



REPUBLIC OF THE PHILIPPINES  
DEPARTMENT OF PUBLIC WORKS  
AND HIGHWAYS

REPUBLIC OF THE PHILIPPINES

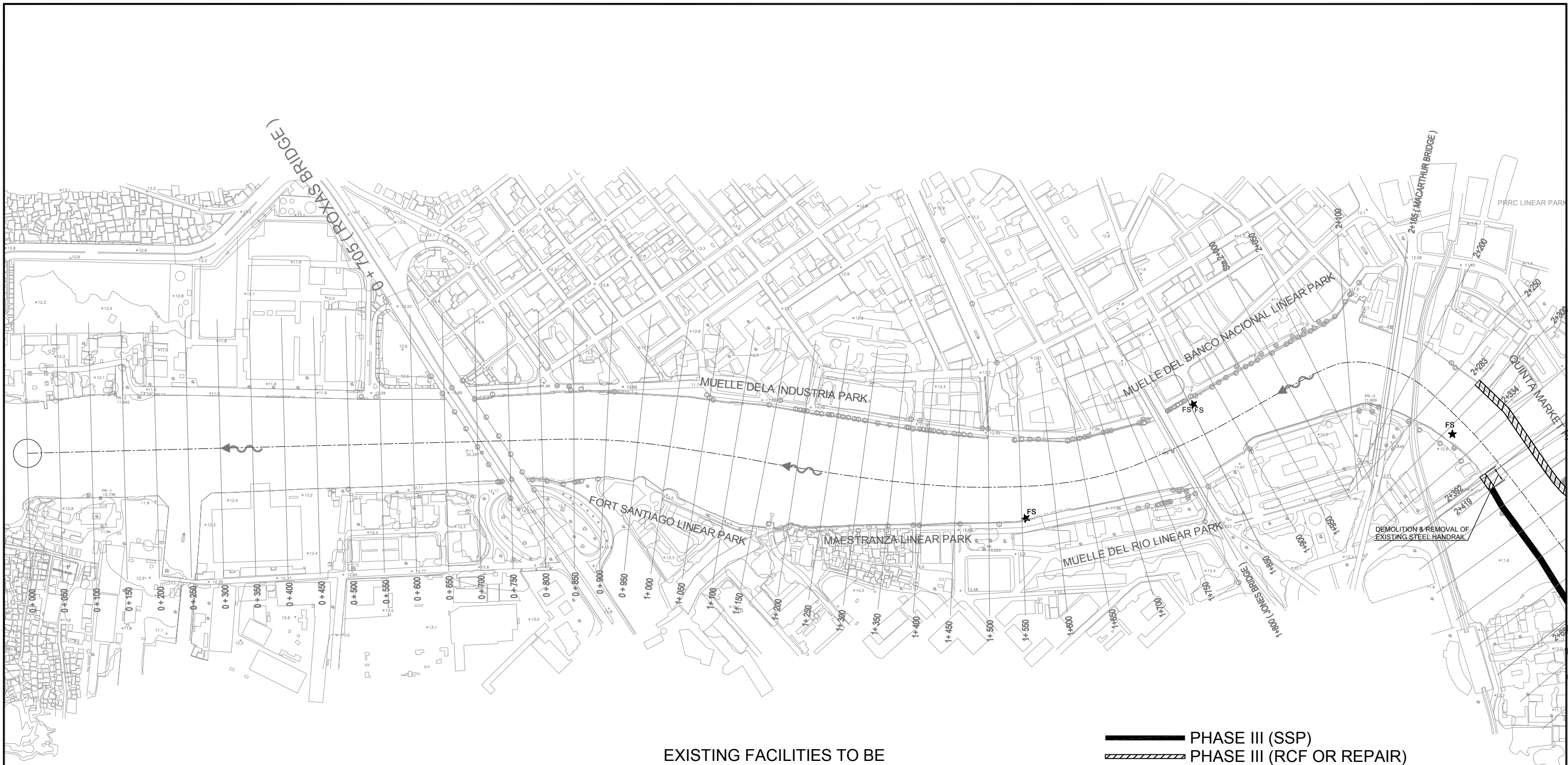
REVIEWED BY:	RECOMMENDING APPROVAL:	APPROVED BY:
PERFECTO L. ZAPLAN, JR. CHIEF, HYDRAULIC DIVISION, BOD	PATRICK B. GATAN PROJECT DIRECTOR PMO - MFCP	GILBERTO S. REYES DIRECTOR BOD
SEE COVER SHEET FOR THE SIGNATURE OF THE UNDERSECRETARY	SEE COVER SHEET FOR THE SIGNATURE OF THE UNDERSECRETARY	SEE COVER SHEET FOR THE SIGNATURE AND APPROVAL OF THE SECRETARY
RAUL C. ASIS UNDERSECRETARY FOR TECHNICAL SERVICES	ROGELIO L. SINGSON SECRETARY	

PROJECT & LOCATION  
PASIG-MARIKINA RIVER CHANNEL IMPROVEMENT PROJECT (PHASE III), METRO MANILA

SHEET CONTENTS  
TABLES & TYPICAL SHEET PILE END CONNECTION DETAILS  
LOWER & UPPER PASIG

SHEET NO.  
PR-GE  
SD 06  
2 43

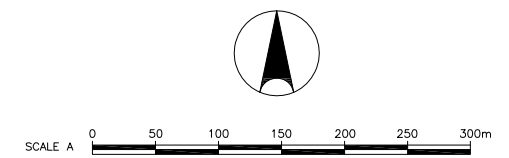




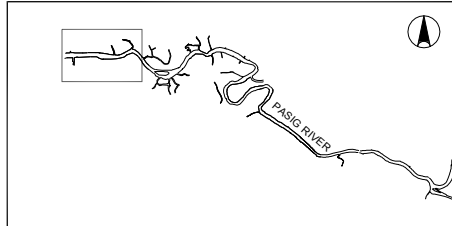
EXISTING FACILITIES TO BE REMOVED AND/ OR RELOCATED

PHASE III (SSP)  
 PHASE III (RCF OR REPAIR)

SCALE A



KEY PLAN



LEGEND:

- FERRY STATION/COAST GUARD
- BOAT/BANCA STATION

NOTE:

- \*1 - ALL STATIONS ARE RECKONED AT C OF RIVER
- \*2 - LENGTHS SHOWN ARE LINEAR METRES UNLESS OTHERWISE SPECIFIED
- \*3 - FIGURES GOVERN OVER SCALED DIMENSIONS

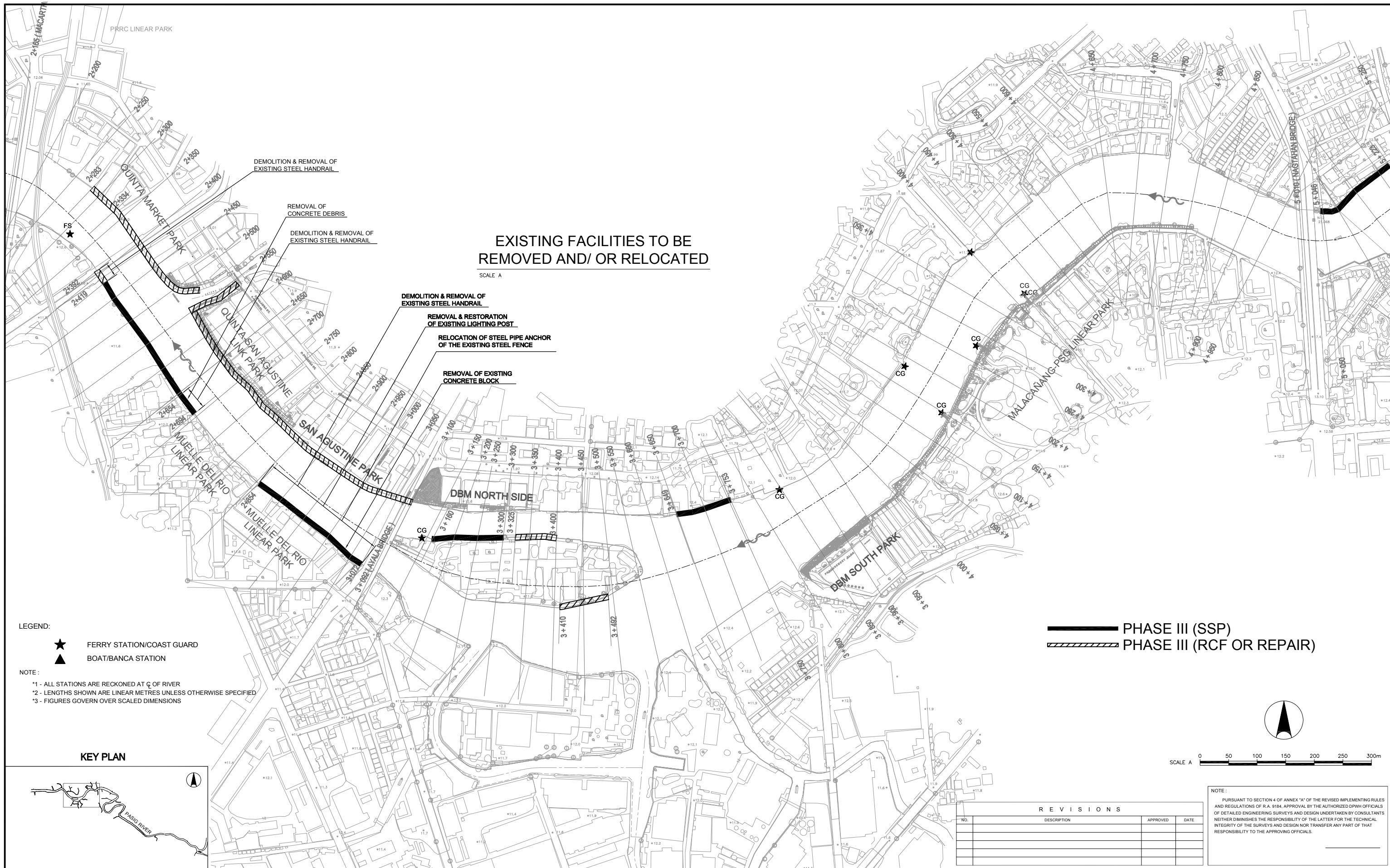
REVISIONS

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JICA CONSULTANT FOR DETAILED ENGINEERING DESIGN			REPUBLIC OF THE PHILIPPINES					PROJECT & LOCATION		SHEET CONTENTS		SHEET NO.
<b>CTI ENGINEERING INTERNATIONAL CO., LTD.</b>	DESIGNED BY:	CHECKED BY:	SUBMITTED BY:	<b>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</b>	REVIEWED BY:	RECOMMENDING APPROVAL:		APPROVED BY:		PASIG-MARIKINA RIVER CHANNEL IMPROVEMENT PROJECT (PHASE III), METRO MANILA	EXISTING FACILITIES TO BE REMOVED AND/ OR RELOCATED	
	EJI MOKI <small>STRUCTURAL ENGINEER I</small>	TOSHIKI KAWAKAMI <small>THE CHECKER</small>	SHUJI KAKU <small>TEAM LEADER</small>		PERFECTO L. ZAPLAN, JR. <small>CHIEF, HYDRAULIC DIVISION, BOD</small>	PATRICK B. GATAN <small>PROJECT DIRECTOR PMO - MFCP I</small>	GILBERTO S. REYES <small>DIRECTOR BOD</small>	RAUL C. ASIS <small>UNDERSECRETARY FOR TECHNICAL SERVICES</small>	ROGELIO L. SINGSON <small>SECRETARY</small>			





**EXISTING FACILITIES TO BE REMOVED AND/ OR RELOCATED**

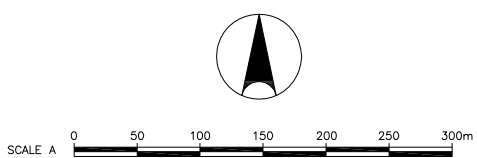
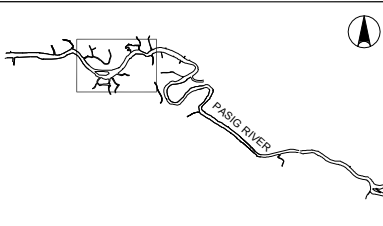
SCALE A

- LEGEND:**
- ★ FERRY STATION/COAST GUARD
  - ▲ BOAT/BANCA STATION

- NOTE:**
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- PHASE III (SSP)
- ▨ PHASE III (RCF OR REPAIR)

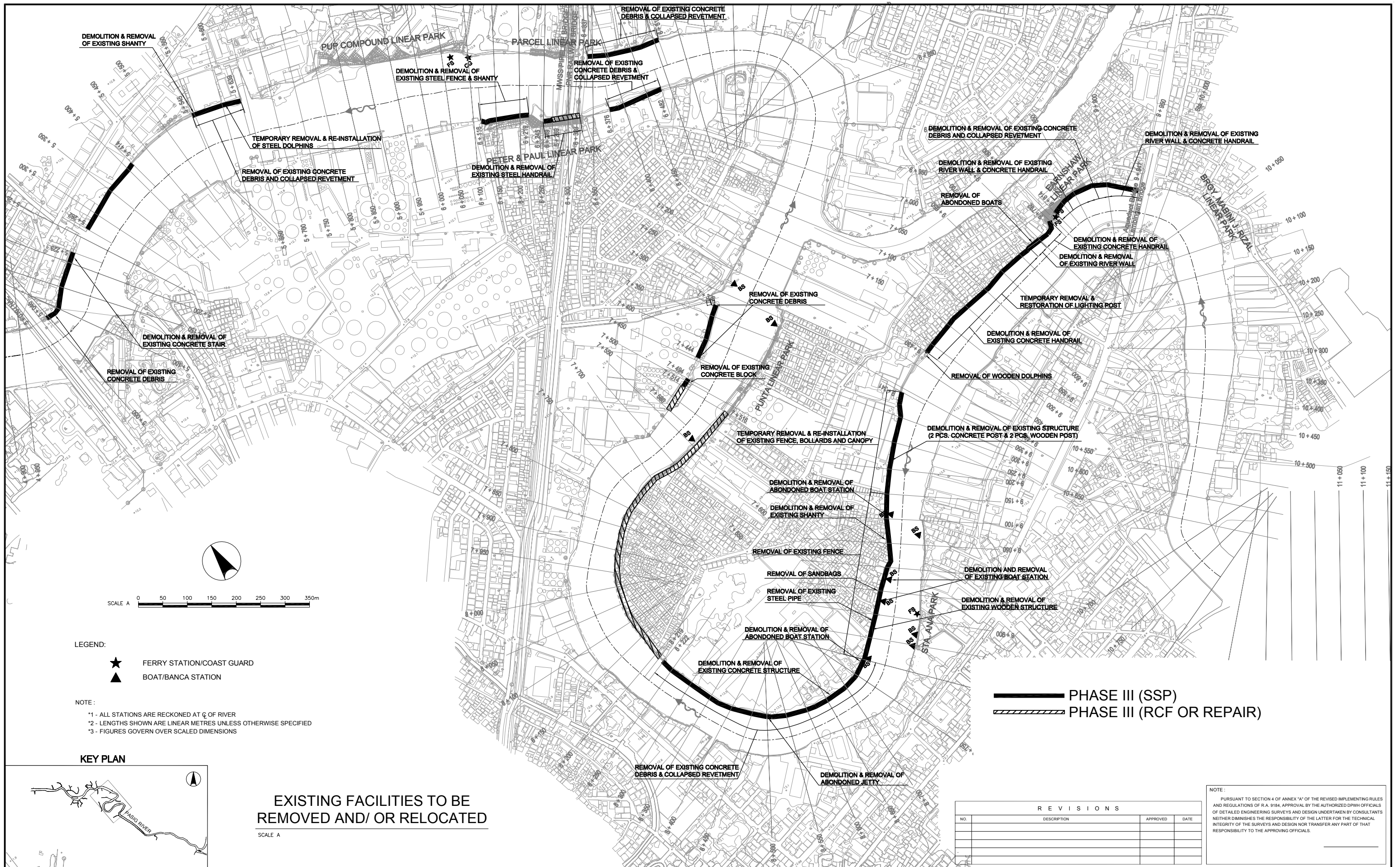
**KEY PLAN**



REVISIONS			
NO.	DESCRIPTION	APPROVED	DATE

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<b>CTI ENGINEERING INTERNATIONAL CO., LTD.</b>	DESIGNED BY:	CHECKED BY:	SUBMITTED BY:	REVIEWED BY:	RECOMMENDING APPROVAL:	APPROVED BY:	PASIG-MARIKINA RIVER CHANNEL IMPROVEMENT PROJECT (PHASE III), METRO MANILA	EXISTING FACILITIES TO BE REMOVED AND/ OR RELOCATED		
	EIJI MOKI STRUCTURAL ENGINEER I	TOSHIKI KAWAKAMI THE CHECKER	SHUJI KAKU TEAM LEADER	PERFECTO L. ZAPLAN, JR. CHIEF, HYDRAULIC DIVISION, BOD	PATRICK B. GATAN PROJECT DIRECTOR PMO - MFCP I	GILBERTO S. REYES DIRECTOR BOD				RAUL C. ASIS UNDERSECRETARY FOR TECHNICAL SERVICES
<b>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</b>										



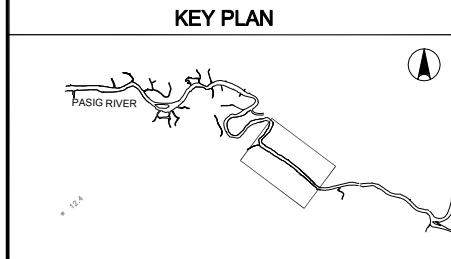
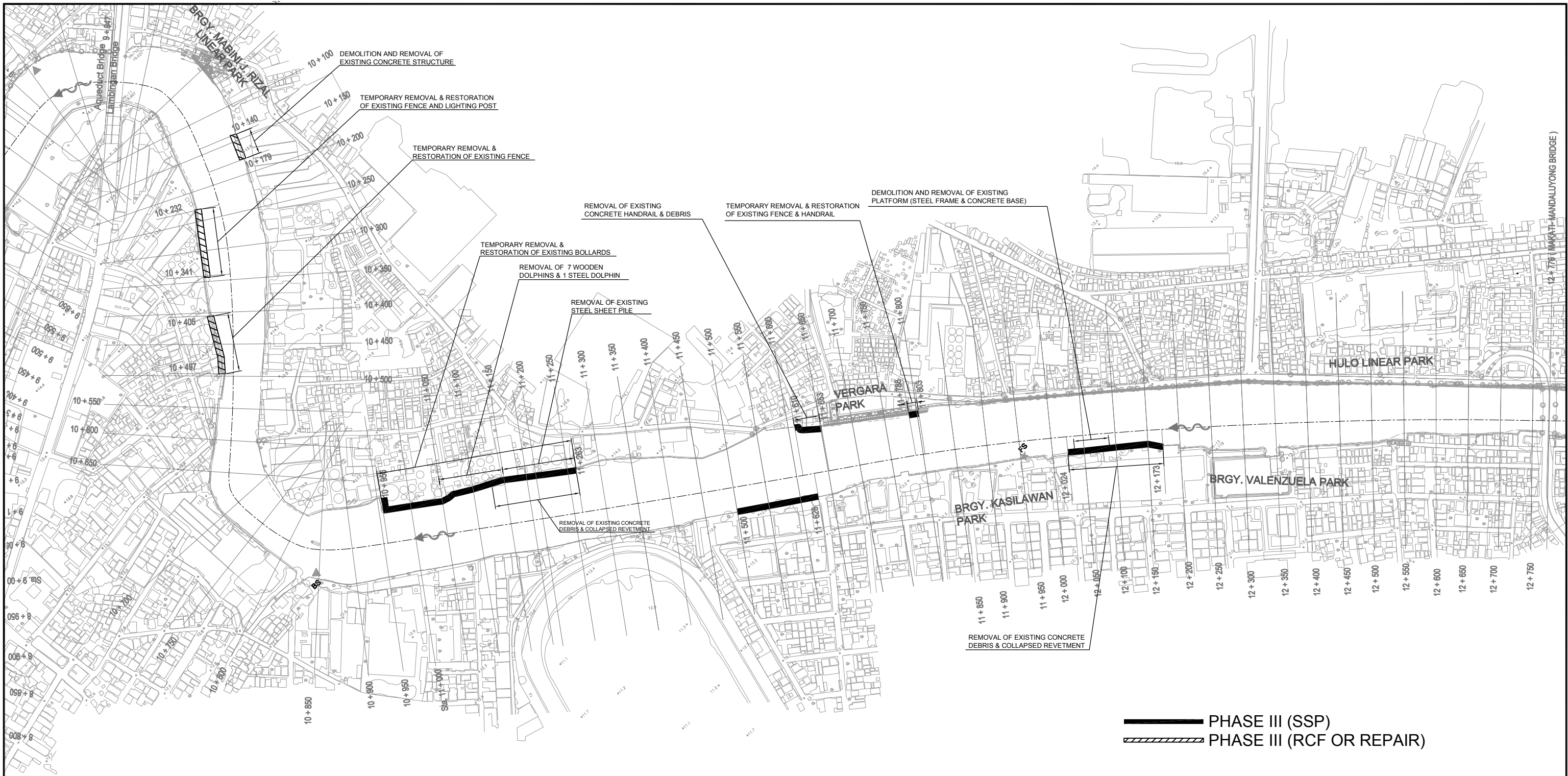
**EXISTING FACILITIES TO BE REMOVED AND/ OR RELOCATED**

SCALE A

REVISIONS			
NO.	DESCRIPTION	APPROVED	DATE

JICA CONSULTANT FOR DETAILED ENGINEERING DESIGN			REPUBLIC OF THE PHILIPPINES				PROJECT & LOCATION	SHEET CONTENTS	SHEET NO.
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	EIJI MOKI STRUCTURAL ENGINEER I	TOSHIKI KAWAKAMI THE CHECKER	SHUJI KAKU TEAM LEADER	PERFECTO L. ZAPLAN, JR. CHIEF, HYDRAULIC DIVISION, BOD	PATRICK B. GATAN PROJECT DIRECTOR PMO - MFCPI	GILBERTO S. REYES DIRECTOR BOD			





**LEGEND:**

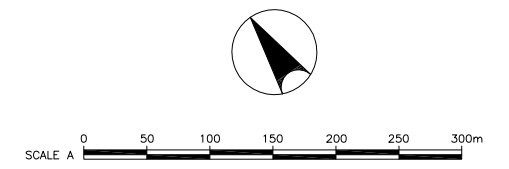
- ★ FERRY STATION/COAST GUARD
- ▲ BOAT/BANCA STATION

**NOTE:**

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**EXISTING FACILITIES TO BE REMOVED AND/ OR RELOCATED**

SCALE A

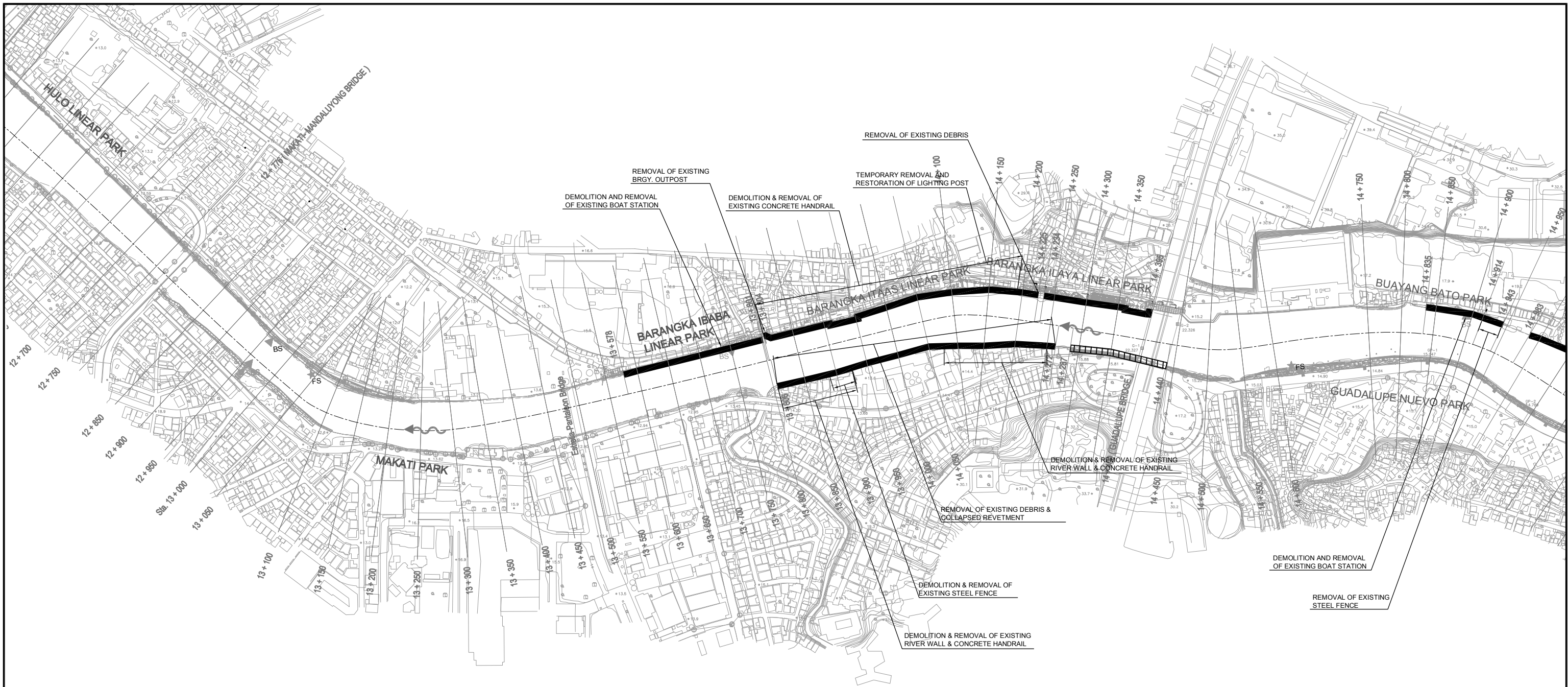


R E V I S I O N S			
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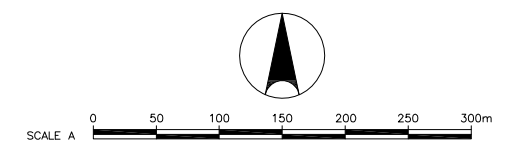
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	EJI MOKI STRUCTURAL ENGINEER I	TOSHIKI KAWAKAMI THE CHECKER	SHUJI KAKU TEAM LEADER		PERFECTO L. ZAPLAN, JR. CHIEF, HYDRAULIC DIVISION, BOD	PATRICK B. GATAN PROJECT DIRECTOR PMO - MFCP I	GILBERTO S. REYES DIRECTOR BOD	RAUL C. ASIS UNDERSECRETARY FOR TECHNICAL SERVICES	ROGELIO L. SINGSON SECRETARY	2 47		



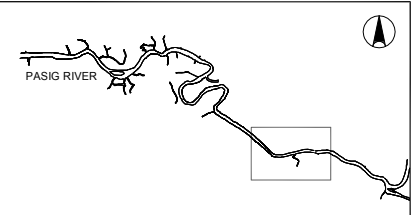
PHASE III (SSP)  
 PHASE III (RCF OR REPAIR)

**EXISTING FACILITIES TO BE REMOVED AND/ OR RELOCATED**

SCALE A



**KEY PLAN**



**LEGEND:**

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2 / 48										

