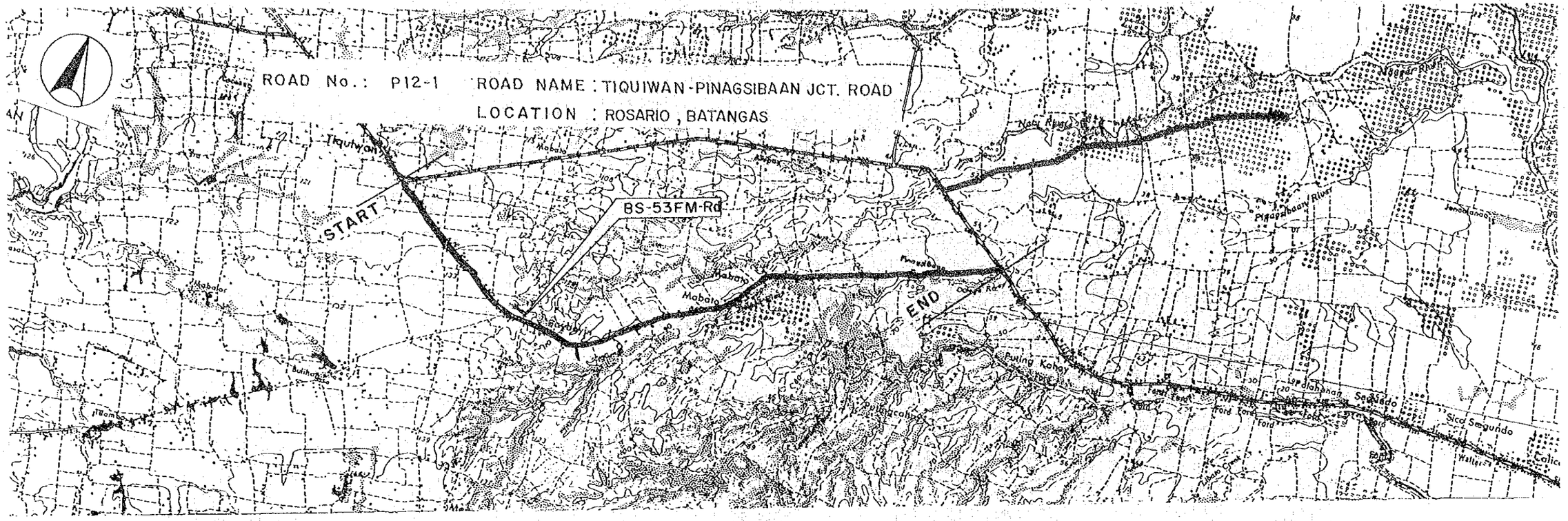
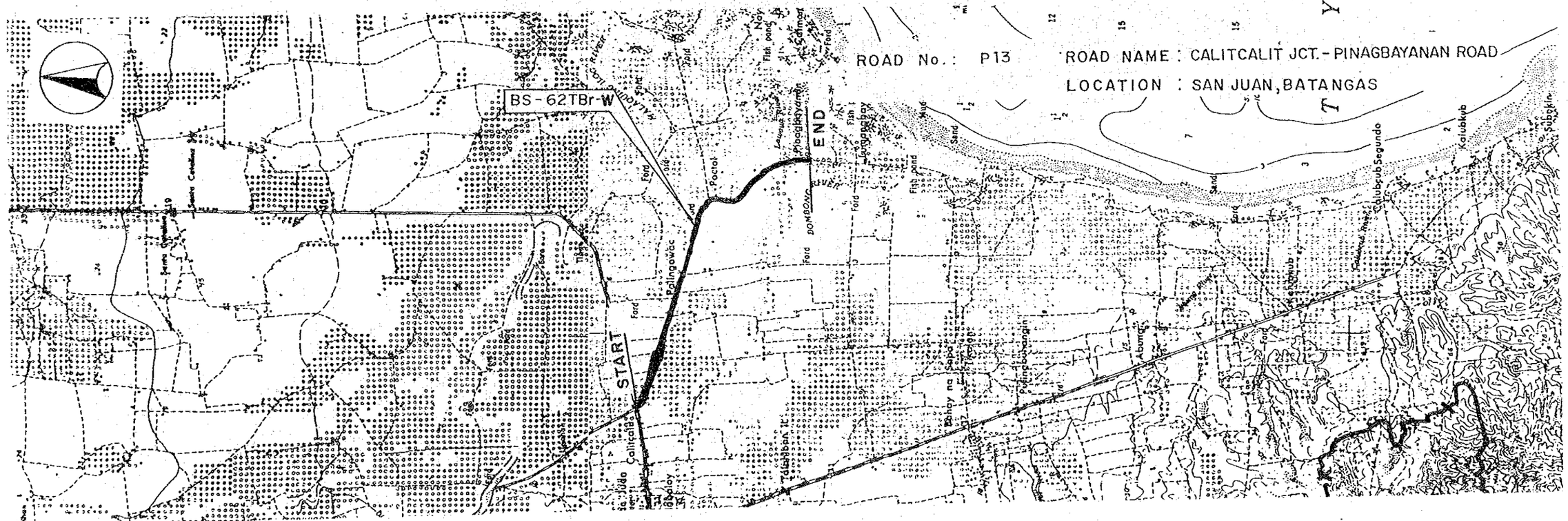
LOCATION OF SELECTED SPOTS IN BATANGAS (7/8)

Scale	Drawing No.
1:50,000	74





LOCATION OF SELECTED SPOTS IN BATANGAS (8/8)

Scale	Drawing No.
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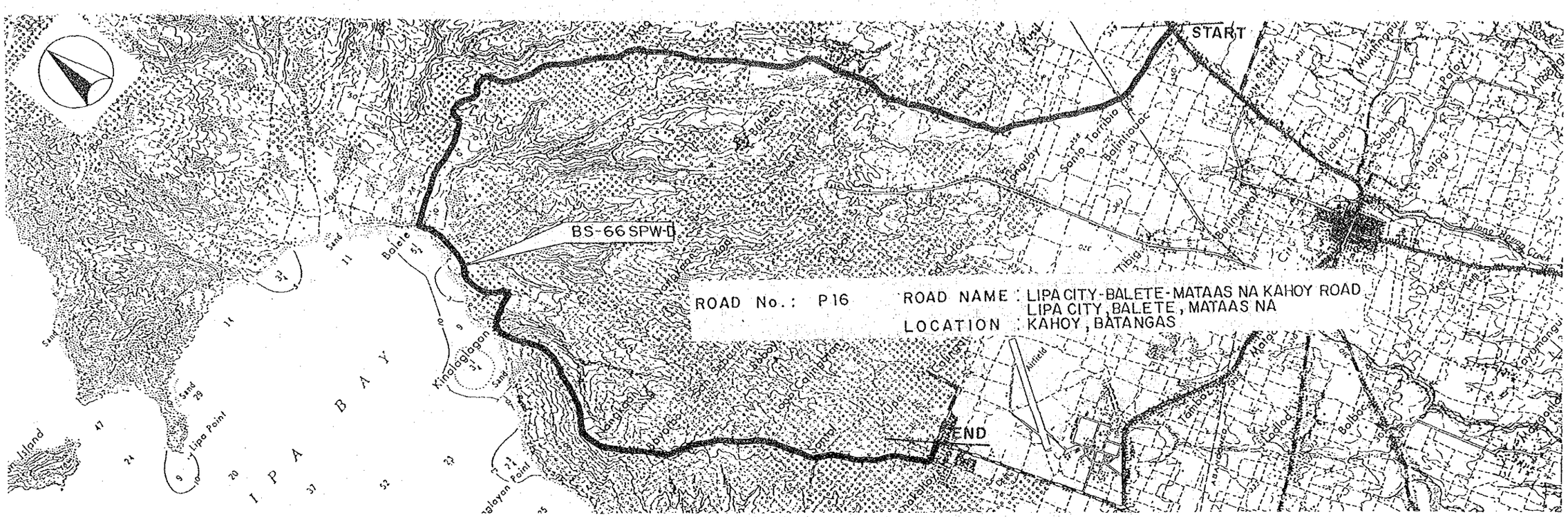


TABLE OF RESTORATION MEASURE APPLIED TO EACH SPOT IN BATANGAS

DRAWING NO. 76

TYPE OF RESTORATION MEASURE					SPOT NUMBER	3	6	8	12	14	28	30	33	36	42	43	45	48	50	51	53	62	66
					TYPE OF DISASTER	E-F	PBr-D	SW-D	FALL	FM-Rd	E-F	FALL	PBr-A	C-F	CLV-D	CLV-D	RD-D	PBr-D	TBr-D	SW-D	FM-Rd	TBr-W	SPW-D
UNIT			U1-1	Removal of Deposit Materials					○			○		○									
	U1	Earthwork	U1-2	Removal of Unstable Materials					○			○											
			U1-4	Refilling / Embankment	○						○					○	○		○	○			
			U1-5	Selected Material Fill																			○
	U2	Surface Drainage	U2-2	Temporary Side Ditch																			
	U3	Slope Protection	U3-2	Sand Bag Covering	○						○					○	○						
	U4	Retaining Work	U4-1	Sand Bag Wall			○								○					○			
			U4-2	Gabion Wall															○				○
			U4-3	Wooden Fence			○				○									○			
	U5	Foot Protection	U5-1	Gabion Foot Protection		○																	
	U6	Bridge	U6-2	H-Pile Bent									○									○	
			U6-3	Bailey Bridge									○									○	
	U7	Pavement Work	U7-1	Gravel Surfacing						○													
PERMANENT	P1	Earthwork	P1-1	Recutting								○		○									
			P1-3	Refilling / Embankment	○						○								○		○	○	
	P2	Surface Drainage	P2-2	Side Ditch						○				○							○		
			P2-4	Culvert							○				○						○		○
			P2-5	Catch Basin						○													
	P4	Slope Protection by Vegetation	P4-6	Pick Hole Seeding										○									
			P4-8	Wattling								○											
	P6	Retaining Wall	P6-2	Grouted Riprap	○						○			○	○	○	○					○	
			P6-4	Gravity Type Stone Masonry Wall			○																
			P6-5	Gravity Type Concrete Wall																○			
			P6-6	Supported Type Concrete Wall					○														○
			P6-9	Gabion Wall					○		○		○						○				
			P6-10	Sheet Pile Wall														○					
	P8	Catch Work	P8-2	Catch Gabion Wall				○				○											
	P14	Consolidation	P14-2	Gabion Consolidation		○																	
	P15	Bridge	P15-1	Concrete Bridge									○									○	
	P16	Foot Protection	P16-1	Concrete Foot Protection		○												○					
			P16-2	Gabion Foot Protection														○				○	
			P16-3	Grouted Riprap Apron	○				○	○					○	○	○						
	P17	Spurdike	P17-2	Gabion Spurdike									○										
	P18	Spillway	P18-1	Concrete Spillway					○														
	P19	Pavement Work	P19-1	Gravel Surfacing				○													○	○	
			P19-3	Concrete Pavement																			○

DESCRIPTION AND DESIGN OF RESTORATION MEASURES FOR EACH DISASTER SPOT (BATANGAS)

PROVINCE: BATANGAS SPOT No. : Bs-3(1/2)	NAME OF ROAD : MAHAYAHAY JCT.-PAYAPA ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER : EMBANKMENT SLOPE FAILURE	DRAWING NO. 77

Batangas Spot No. 3 (BS-3)

1) General Situation

- Disaster Classification: E-F
- Road Name: Mahayahay Jct. - Payapa Road
- Location : km. 5+700 from Mahayahay Jct. to Calaca ;
- Road Class/Office Concerned: National Secondary Road/1st Engineering District

- Municipalities/Barangays connected:

The section is a major road connecting Barangays Payapa and Mahayahay in the town of Lemery.

- Road Width/Pavement Width: 7.0m/3.3m
- Pavement Type: AC
- Surface Condition: Fair
- Detour: Available (Calaca - Laurel, Balayan - Tuy - Laurel)

2) Damage Identified

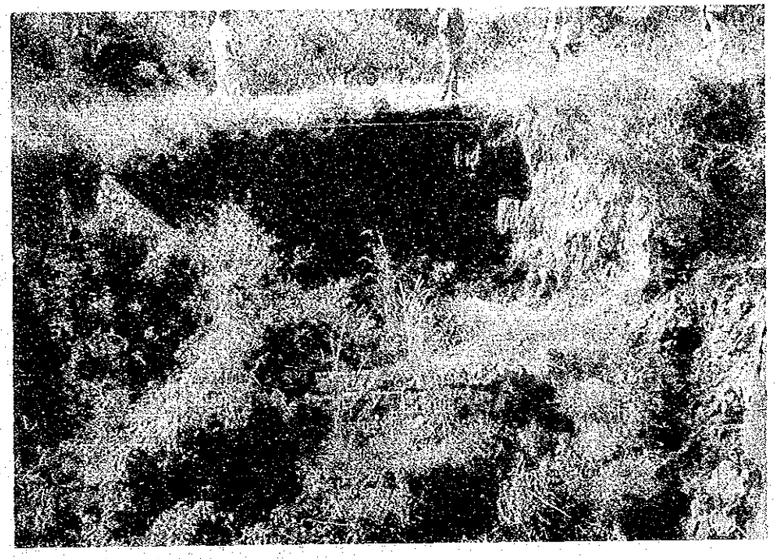
- Type of Disaster: Collapsed Grouted Riprap and Shoulder Erosion
- Magnitude of Damage: 12.0m W. x 2.5m H
- Date Noticed:
- Degree/Period of Traffic Interruption: Medium and One lane still passable
- Description of Disaster:

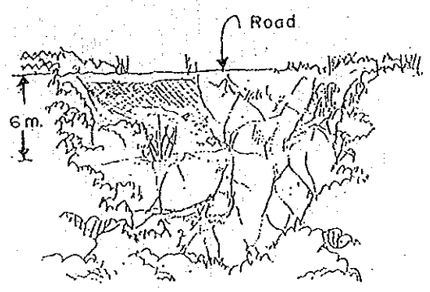
For this particular spot, the retaining wall was constructed without any foundation to hold the structure firmly. It is laid on a relatively erodable material of unconsolidated volcanic ashes and sands. The top and the toe of the retaining wall have been constantly disturbed by movement of water along the side drain from higher vertical alignment of the road. Direct erosion at the shoulder of the road and at the toe of the retaining wall is then occuring when soil particles are loosened and transported by water. The said phenomena led to the caving-in of the natural slope materials and eventual collapse of the retaining wall. To date continuous scouring has further damaged the road embankment which has already encroached half of the road section making it highly dangerous to traffic.

3) Causes of Damage

The damages are due to the following reasons:

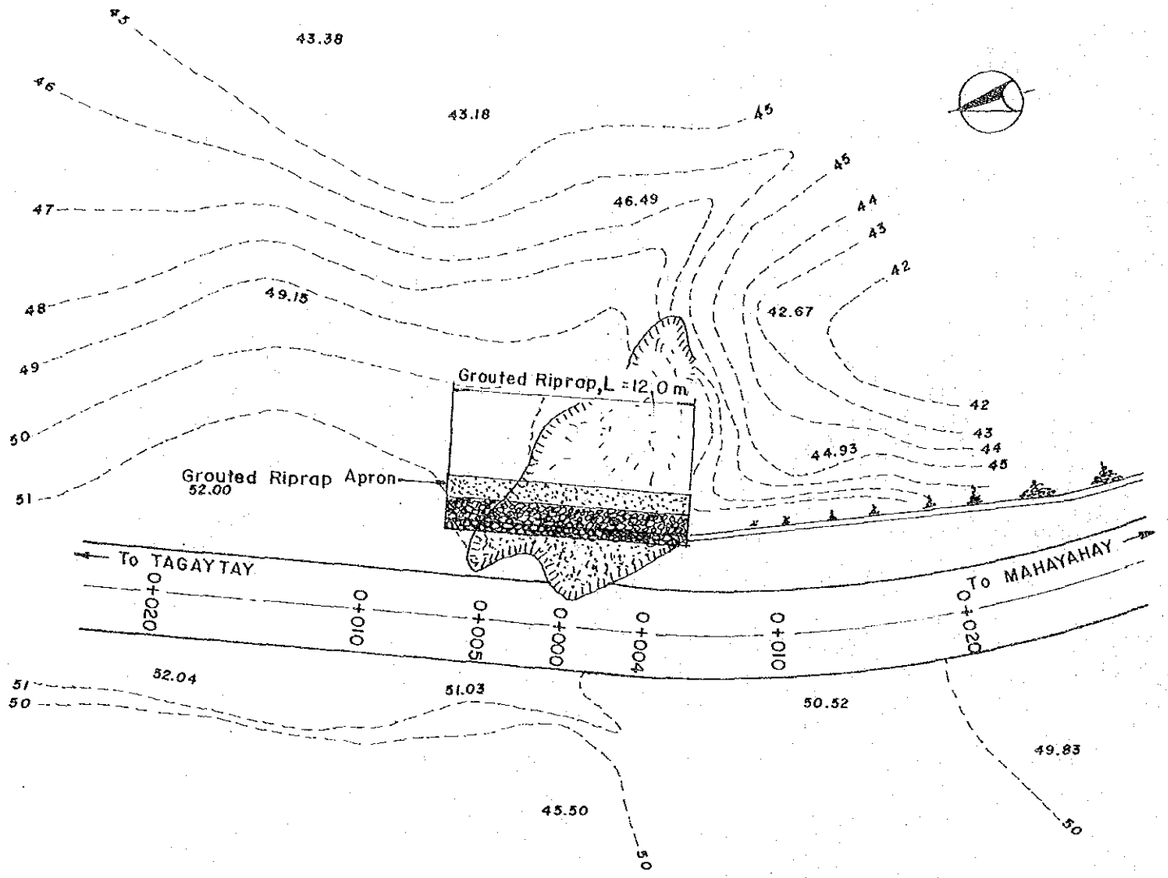
- Poor drainage system (silted and vegetated).
- The natural slope (valley side) consist of volcanic ashes and sand which is highly erodable materials.
- The caving-in of natural slope materials created a hallow portion behind the structure protecting it.
- The erosion of soil behind the retaining wall had progressed deeper to the toe of the structure thus created a cantilevered condition which eventually collapsed due to its own weight.
- No weep holes and foundation were provided.



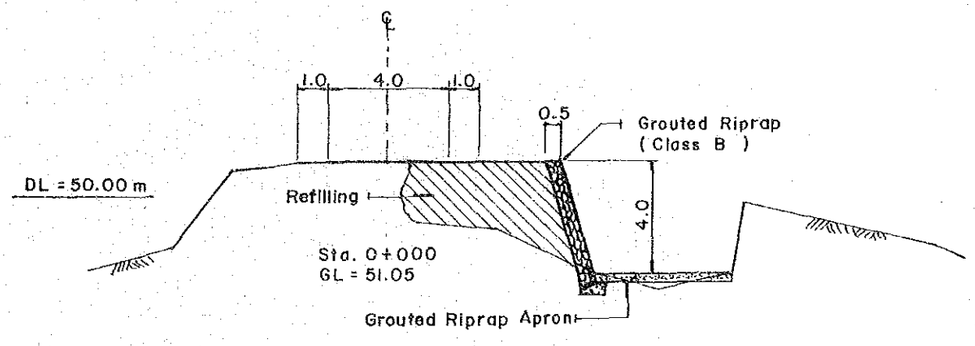


VIEW

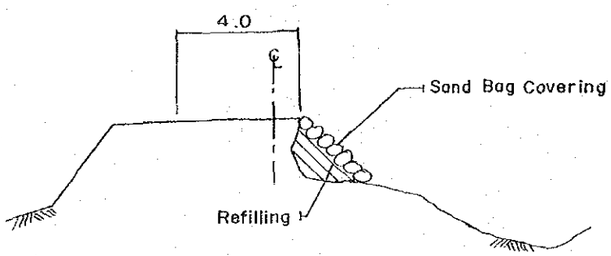
PROVINCE: BATANGAS SPOT No. : Bs - 3(2/2)	NAME OF ROAD : MAHAYAHAY JCT. – PAYAPA ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER : EMBANKMENT SLOPE FAILURE	DRAWING NO. 78



P L A N
SCALE: 1:300



CROSS SECTION
SCALE: 1:200



CROSS SECTION FOR URGENT RESTORATION
SCALE: 1:200

SUMMARY OF QUANTITY

TYPE OF WORK		UNIT	TOTAL
PERMANENT RESTORATION			
P 1-3	REFILLING / EMBANKMENT	CU. M.	120
P6-2	GROUTED RIPRAP (CLASS "B")	CU. M.	26
P16-3	GROUTED RIPRAP APRON	CU. M.	11
URGENT RESTORATION			
U 1-4	REFILLING / EMBANKMENT	CU.M.	25
U3-2	SAND BAG COVERING	SQ.M.	30

PROVINCE: BATANGAS SPOT No. : Bs - 6(1/2)	NAME OF ROAD : CALACA - TAAL ROAD ROAD CLASSIFICATION : NATIONAL TERTIARY ROAD	TYPE OF DISASTER : PERMANENT BRIDGE OTHER DAMAGE	DRAWING NO. 79

Batangas Spot No. 6 (BS-6)

1) General Situation

- Disaster Classification: PBr-D
- Road Name: Calaca - Mahayahay Jct.
- Location : 4+300 from Jct. Calaca to Town Proper
- Road Class/Office Concerned: National Primary Road/1st Engineering District
- Municipalities/Barangays connected:

  The section is a major road connecting Calaca Town Proper and Barangay Mahayahay to Lemery Town.

- Road Width/Pavement Width: 12.0m/7.1m
- Pavement Type: AC
- Surface Condition: Very Good
- Detour: Available

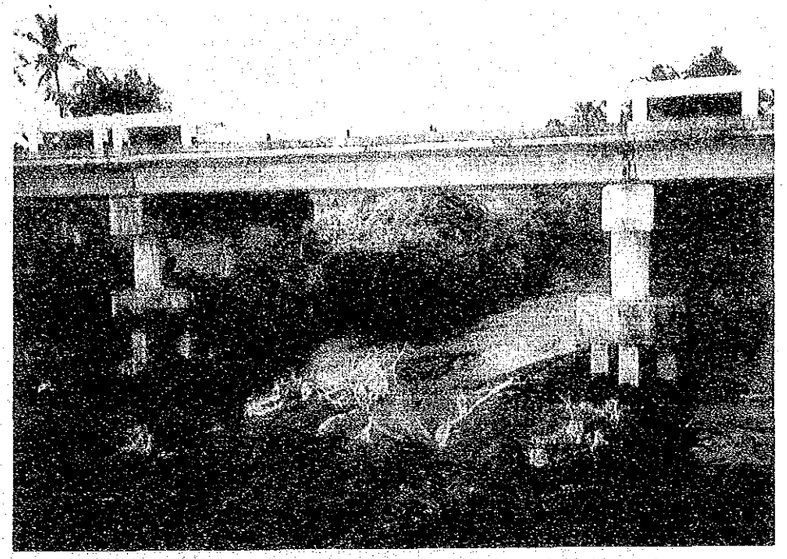
2) Damage Identified

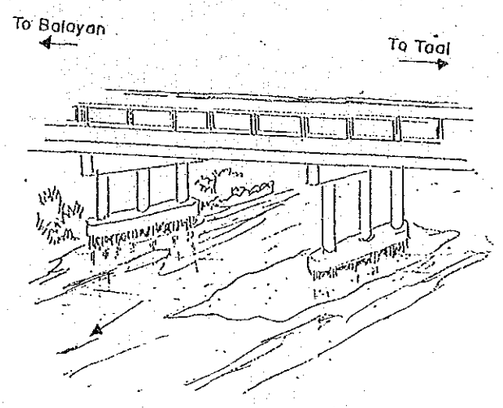
- Type of Disaster: Permanent Bridge Damage (Expose of Pile)
- Magnitude of Damage: Two pier foundations are exposed, scouring depth is 2.0 meters at pier 1 and 1.5 meters at pier 2.
- Date Noticed: 1985
- Degree/Period of Traffic Interruption: Low
- Description of Disaster:

The existing Sinisian Bridge is 3 spans at 12.0m,2-lane RCDG structure. Scouring of the river bed materials at the footing of the bridge was noticed in 1985. During its construction in 1983, pier footings were placed below the river bed, however, the river bed is presently lowered by 2.0 meters below the bottom of footing at pier 1 and 1.5m at pier 2 which has severely exposed the foundation footings. Gabion mat at the lower portion of the abutment protection was partly sagging due to the lowering of original river bed. Retaining wall was constructed in 1989, adjacent to the structure at the downstream portion, to protect the river bank from scouring and the feeder road and neighboring houses from overflooding.

3) Causes of Damage

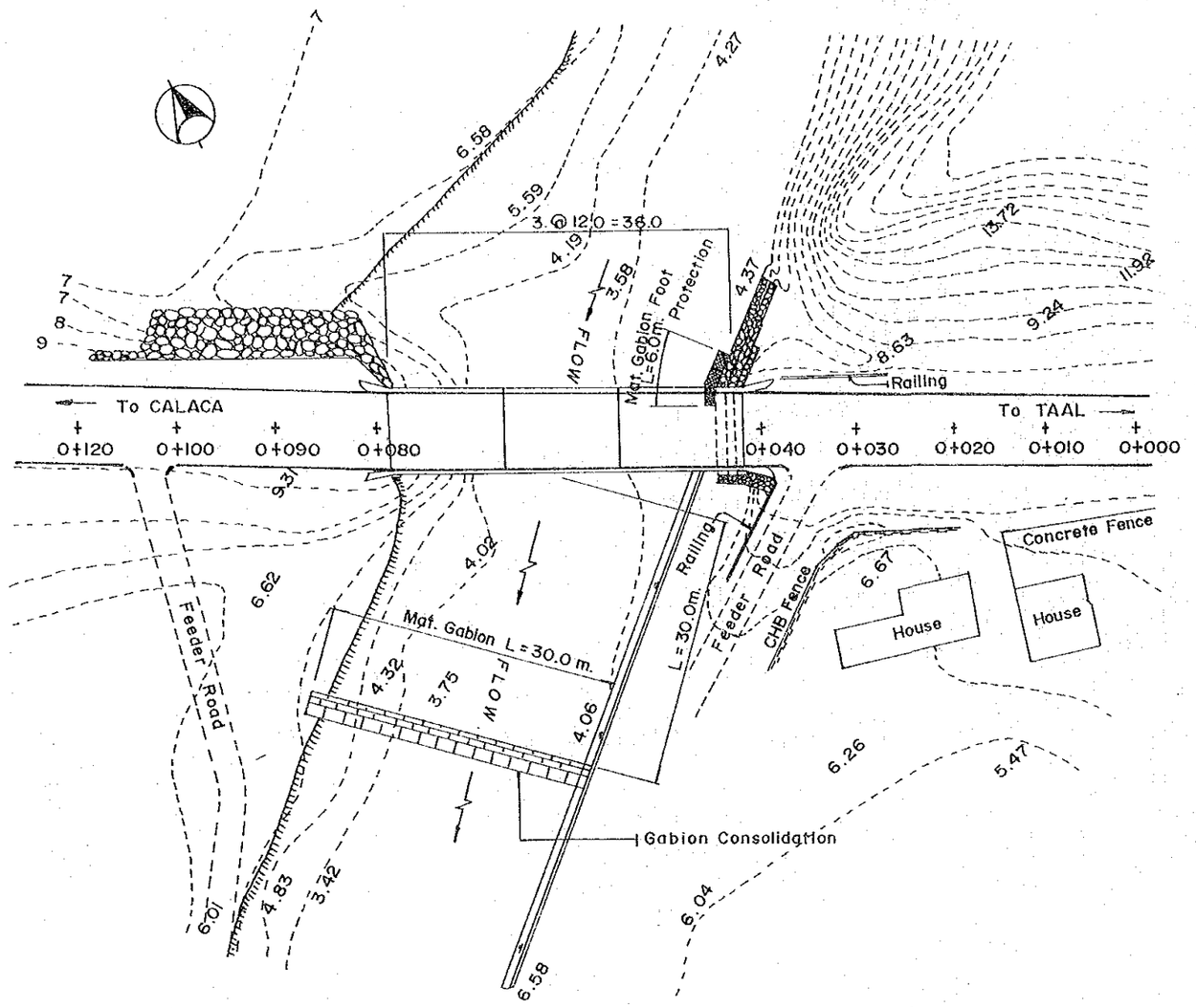
Generally in this case, scouring occured primarily due to the continuous quarrying of sand and gravel downstream, 100m away from the structure. The scouring was further aggravated during heavy rains due to strong velocity of water.



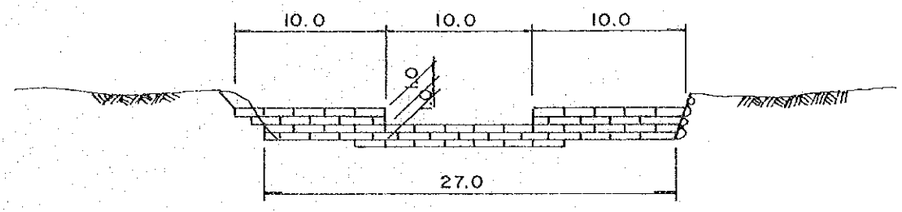


VIEW

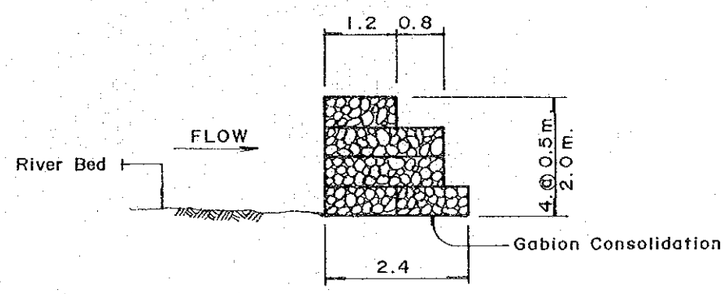
PROVINCE : BATANGAS SPOT No. : Bs - 6(2/2)	NAME OF ROAD : CALACA - TAAL ROAD ROAD CLASSIFICATION : NATIONAL PRIMARY ROAD	TYPE OF DISASTER : PERMANENT BRIDGE OTHER DAMAGE	DRAWING NO. 80



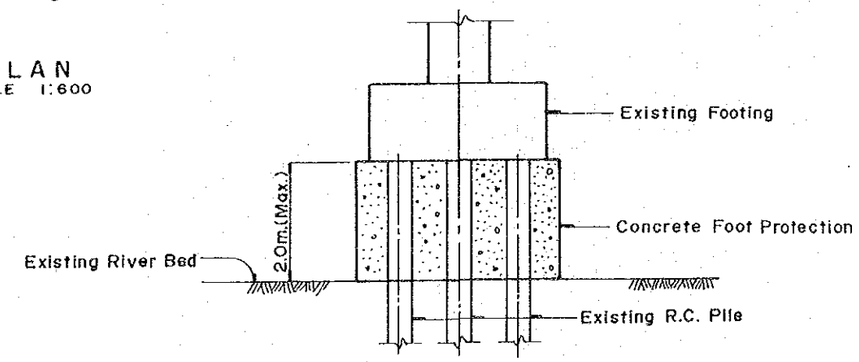
PLAN
SCALE 1:600



DEVELOPMENT
SCALE 1:400



CROSS SECTION
SCALE 1:100



CROSS SECTION OF EXISTING PIER
SCALE 1:100

SUMMARY OF QUANTITY

TYPE OF WORK		UNIT	TOTAL
PERMANENT RESTORATION			
P14-2	GABION CONSOLIDATION	CU.M.	114
P16-1	CONCRETE FOOT PROTECTION	CU.M.	66
URGENT RESTORATION			
U5-1	GABION FOOT PROTECTION	CU.M.	4

PROVINCE: BATANGAS SPOT No. : Bs-8(1/2)	NAME OF ROAD : MABINI-TALAGA-MALIMATOK ROAD ROAD CLASSIFICATION : NATIONAL TERTIARY ROAD	TYPE OF DISASTER : SEA WALL DAMAGE	DRAWING NO. 81

Batangas Spot No. 8 (BS-8)

1) General Situation

- Disaster Classification: SW-D
- Road Name: Mabini Jct. - Malimatok
- Location : 2+850 from Jct. Mabini to Solo
- Road Class/Office Concerned: National Secondary Road/1st Engineering District

- Municipalities/Barangays connected:

  The section is a major road connecting Mabini Town Proper and Brgy. Malimatok.

- Road Width/Pavement Width: 7.3m/5.3m
- Pavement Type: AC
- Surface Condition: Very Bad
- Detour: None

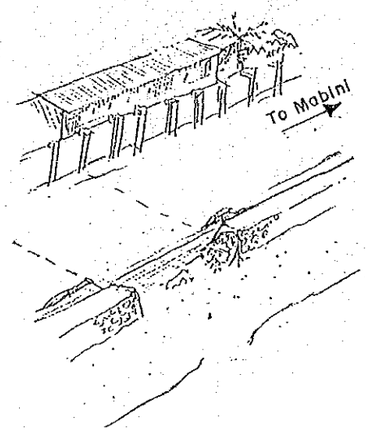
2) Damage Identified

- Type of Disaster: Seawall Damage
- Magnitude of Damages: At one end 3.0m, and other end 1.5m long
- Date Noticed: Occured 1990
- Degree/Period of Traffic Interruption: Low/None
- Description of Disaster:

  The original 52.0m length of the seawall was just cut short to the existing length of about 32.0m due to fund constraints. The seawall was constructed with the dimension of 0.8m top width, base width of 1.8m and 1.3m in height. The primary purpose of constructing this seawall was to protect the opposite school building from seawaves. However, damage with an extent of 3.0 meters long at one end adjacent to the spillway and 1.5m long at the other end infront the gate of the school building occured during the 1990 typhoon.

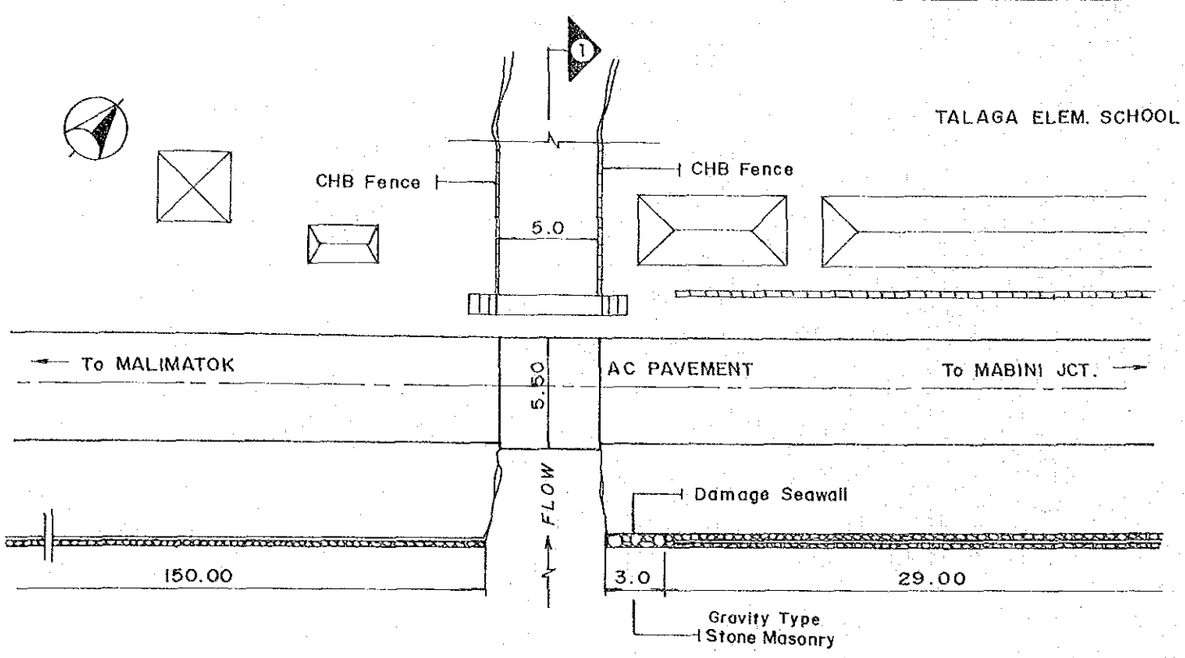
3) Causes of Damage

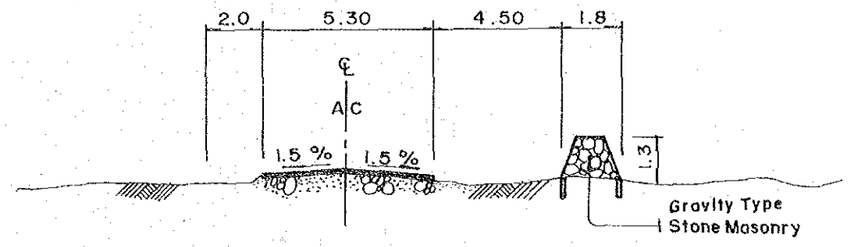
The damage was caused by the backwash wave action at both ends of the seawall during the typhoon. This could also be attributed to the poor construction method and workmanship wherein insufficient amount and poor quality of mortar was applied only along the side of the structure, and no grout was used inside the structure as shown in the picture above.



VIEW

PROVINCE : BATANGAS SPOT No. : Bs - 8(2/21)	NAME OF ROAD : MABINI - TALAGA - MALIMATOK ROAD ROAD CLASSIFICATION : NATIONAL TERTIARY ROAD	TYPE OF DISASTER : SEAWALL DAMAGE	DRAWING NO. 82





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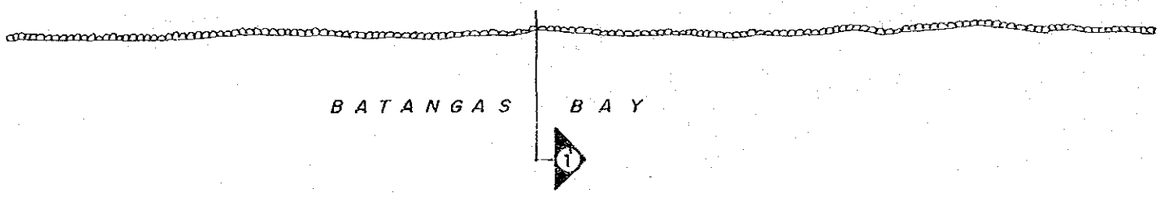
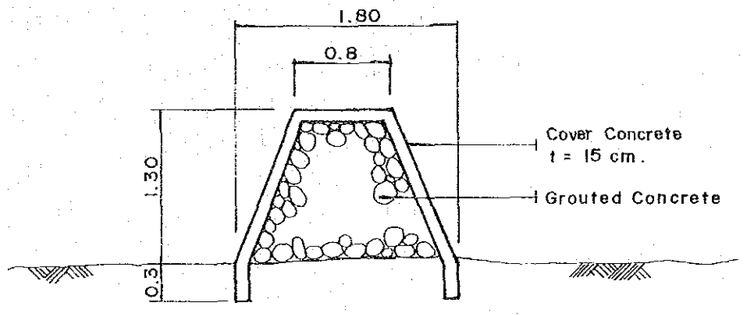
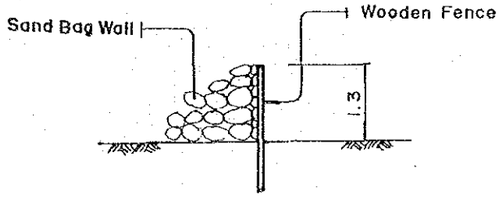
CROSS SECTION
SCALE 1:200



PLAN
SCALE 1:300



GRAVITY TYPE STONE MASONRY
CROSS SECTION
SCALE 1:50



CROSS SECTION FOR URGENT RESTORATION
SCALE 1:100

SUMMARY OF QUANTITY

TYPE OF WORK		UNIT	TOTAL
PERMANENT RESTORATION			
P6-4	GRAVITY TYPE STONE MASONRY WALL	CU.M.	3
URGENT RESTORATION			
U4-1	SAND BAG WALL	SQ.M.	6
U4-3	WOODEN FENCE	LM.	3

PROVINCE: BATANGAS SPOT No. : Bs - 12(1/2)	NAME OF ROAD : MABINI - ANILAO-SAN TEODORO ROAD ROAD CLASSIFICATION : NATIONAL TERTIARY ROAD	TYPE OF DISASTER : ROCK FALL/DEBRIS FALL	DRAWING NO. 83

Batangas Spot No. 12 (BS-12)

1) General Situation

- Disaster Classification: Fall
- Road Name: Mabini Jct. - Anilao - Solo Road
- Location : 3+500 from Mabini Jct. to Malimatok
- Road Class/Office Concerned: National Secondary Road/1st Engineering District

- Municipalities/Barangays connected:

  The section is a major road connecting Mabini Town Proper and Barangay Solo.

- Road Width: 8.0m
- Pavement Type: Gravel
- Surface Condition: Bad
- Detour: Available (Bauan - San Luis, Bauan - Batangas)

2) Damage Identified

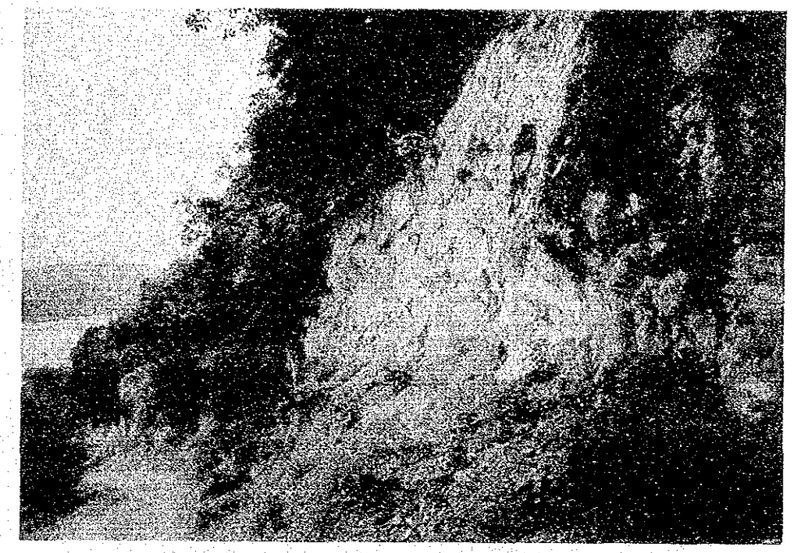
- Type of Disaster: Rockfall
- Magnitude of Damage: 7.0m in height x 70m in length
- Date Noticed: Once a year
- Degree/Period of Traffic Interruption: High/5 days/year
- Description of Disaster:

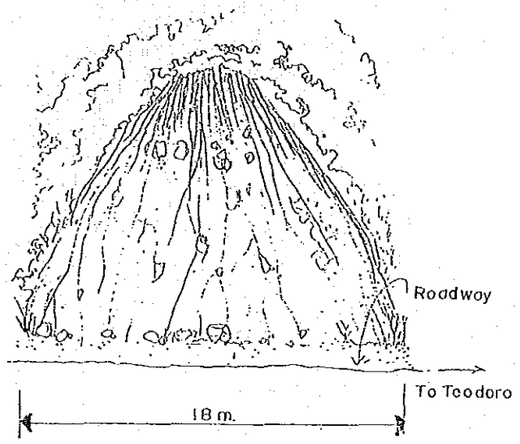
  This failure occurs at least once a year. The height of disaster dimension varies from 3.5 - 7.0m in height and 150m long, but due to continuous rockfall and sliding of top soils damaged area is increasing year by years. The falling rocks and debris block the whole width of the road, resulting in a total closure of traffic for about 5 days, thus impact to the road is very high.

3) Causes of Damage

Causes of damage are due to the following reasons:

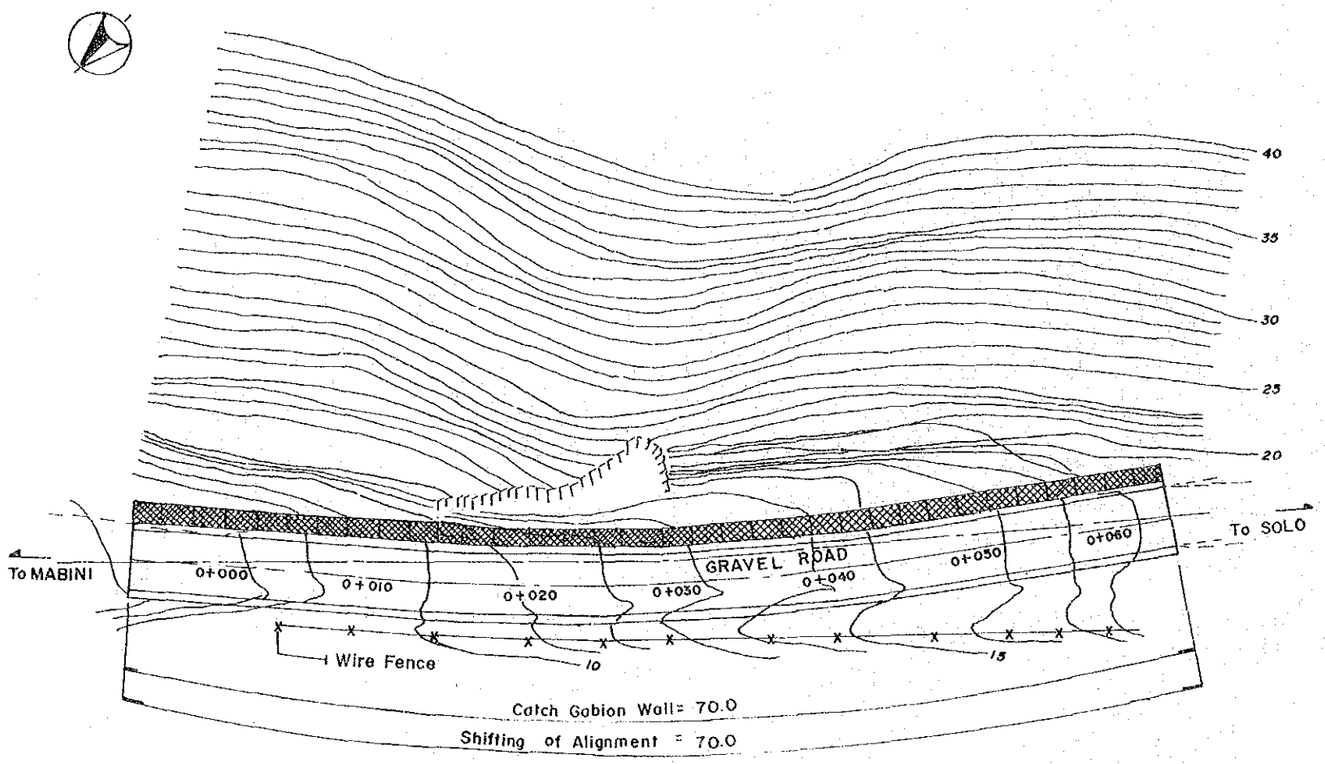
- Major failure occurs along the developed joints.
- Due to orientation of joints which incline towards the road, rockfalls are most likely to occur along these joints during heavy rains.



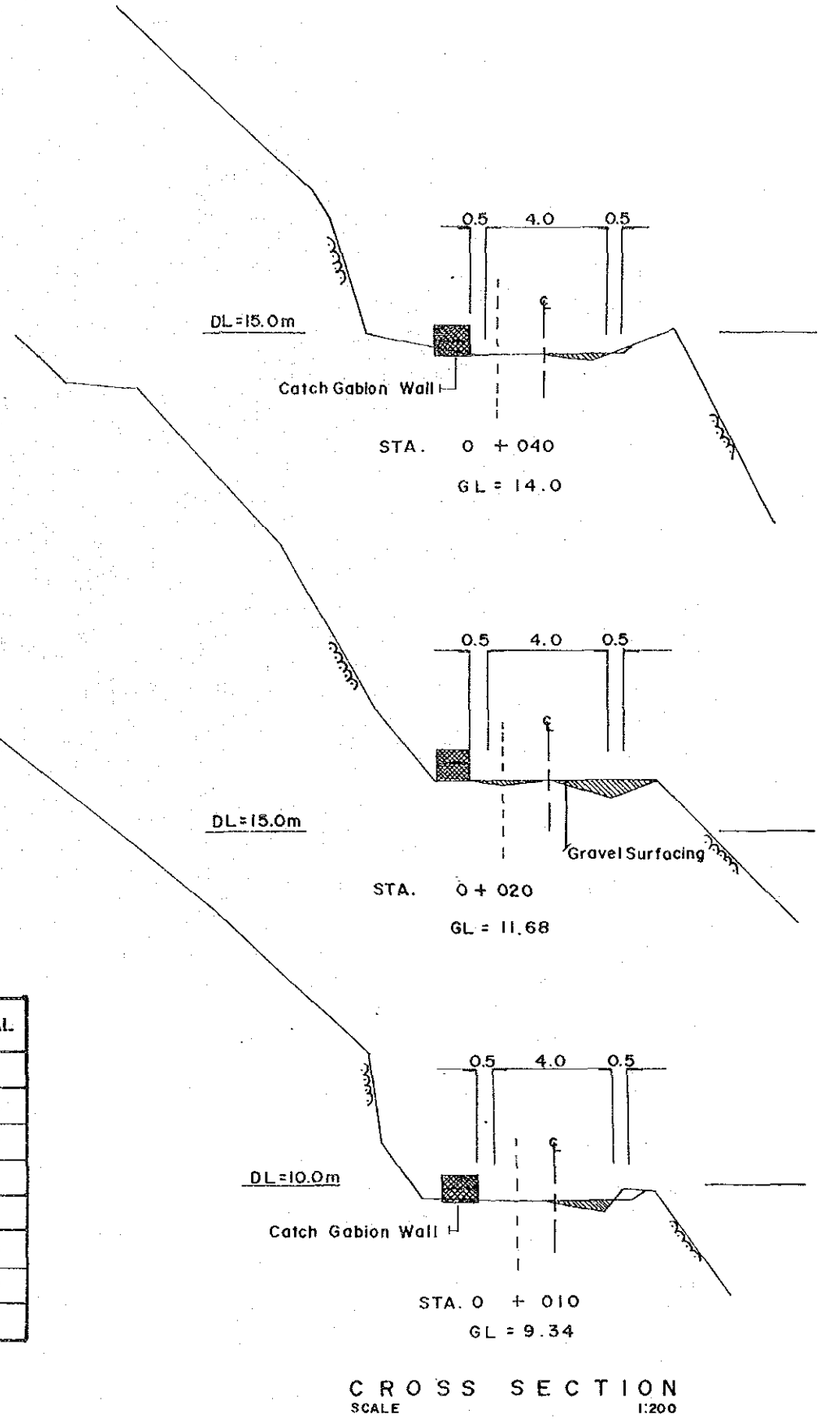


VIEW

PROVINCE : BATANGAS SPOT No. : Bs - 12(2/2)	NAME OF ROAD : MABINI-ANILAO-SAN TEODORO ROAD ROAD CLASSIFICATION : NATIONAL TERTIARY ROAD	TYPE OF DISASTER : ROCK FALL / DEBRIS FALL	DRAWING NO. 84



P L A N
SCALE 1:400



C R O S S S E C T I O N
SCALE 1:200

SUMMARY OF QUANTITY

TYPE OF WORK		UNIT	TOTAL
PERMANENT RESTORATION			
P8-2	CATCH GABION WALL	CU.M	84
P19-1	GRAVEL SURFACING	SQ.M.	80
URGENT RESTORATION			
U1-1	REMOVAL OF DEPOSIT MATERIALS	CU.M.	140
U1-2	REMOVAL OF UNSTABLE MATERIALS	CU.M.	10

Urgent Restoration

* Removal of deposit materials
* Removal of unstable Materials

PROVINCE : BATANGAS SPOT No. : Bs-14(1/2)	NAME OF ROAD : MABINI – ANILAO-SAN TEODORO ROAD ROAD CLASSIFICATION : NATIONAL TERTIARY ROAD	TYPE OF DISASTER : FLOODED/MUDDY ROAD SURFACE	DRAWING NO. 85

Batangas Spot No. 14 (BS-14)

1) General Situation

- Disaster Classification: FM-Rd.
- Road Name: Mabini Jct. - Anilao - Solo Road
- Location : 3+800 from Mabini Jct. to Malimatok
- Road Class/Office Concerned: National Secondary Road/1st Engineering District

- Municipalities/Barangays connected:

  The section is a major road connecting Mabini Town Proper and Brgy. Solo

- Road Width: 7.0m
- Pavement Type: Gravel
- Surface Condition: F/B
- Detour: None

2) Damage Identified

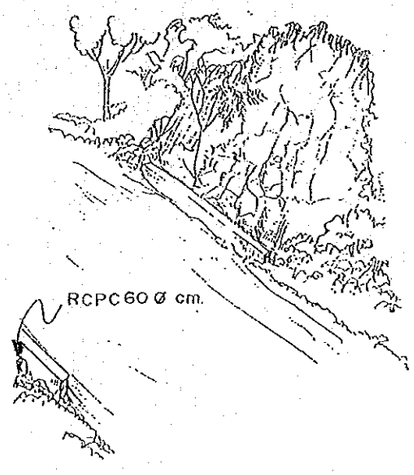
- Type of Disaster: Floody/Muddy Road
- Magnitude of Damage: 42m long along the roadway
- Date Noticed: During rainy season
- Degree/Period of Traffic Interruption: Low
- Description of Disaster:

  The existing pipe culvert 0.60m Ø was laid 42.0m away from the lowest portion of the roadway. It is observed that the pipe culvert entrance is partly clogged with rocks and other debris and has insufficient capacity to discharge the rain water. No side ditches were provided/constructed, so at every heavy rain the water coming from the gullies and spring is rather confined in the roadway therefore road surface resulted to a floody/muddy road.

3) Causes of Damage

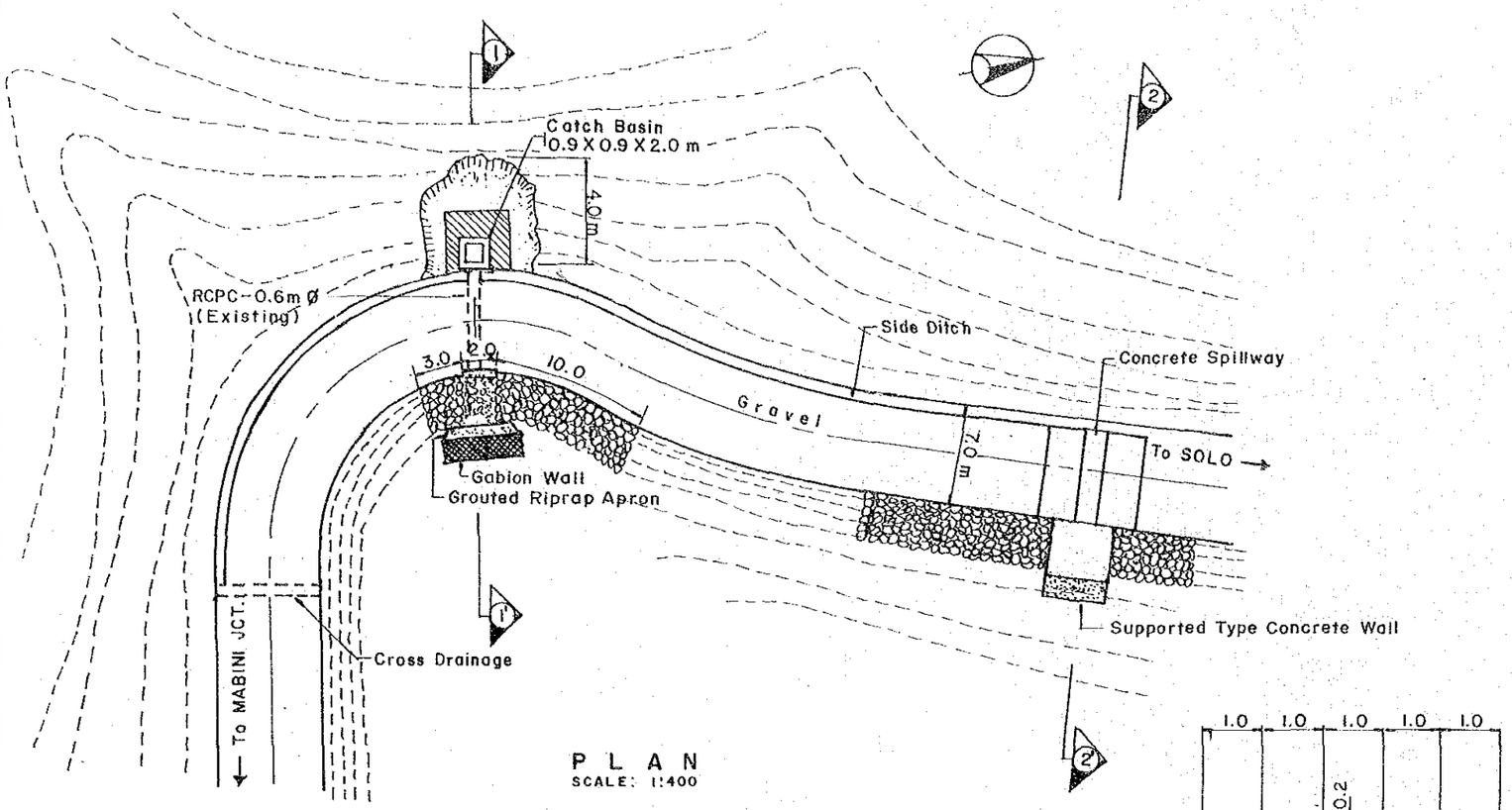
The damages are due to the following reasons:

- Improper location of pipe culvert.
- Culvert pipe diameter incorrect.
- Partial obstruction of culverts by rocks and natural debris and other materials.
- No side drain.

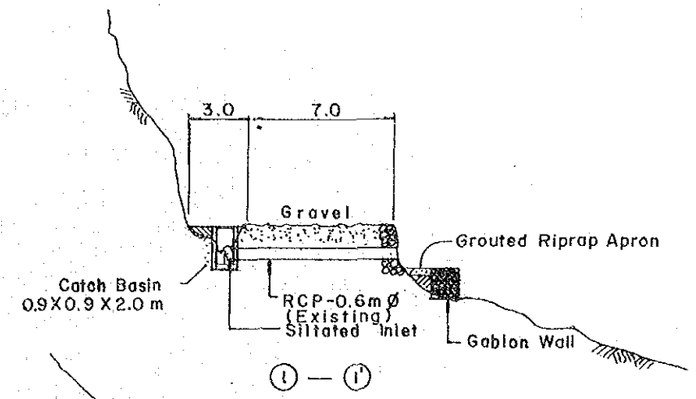


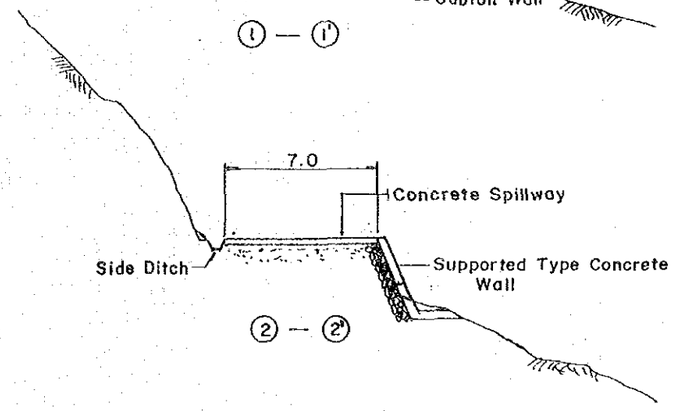
VIEW

PROVINCE: BATANGAS SPOT No. : Bs - 14(2/2)	NAME OF ROAD : MABINI-ANILAO-SAN TEODORO ROAD ROAD CLASSIFICATION : NATIONAL TERTIARY ROAD	TYPE OF DISASTER : FLOODED / MUDDY ROAD SURFACE	DRAWING NO. 86



PLAN
SCALE: 1:400



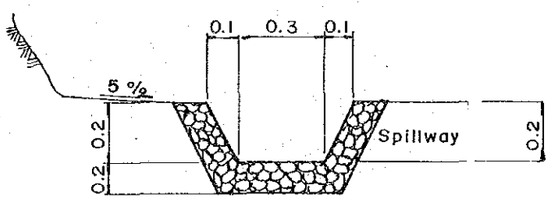


CROSS SECTION
SCALE: 1:300

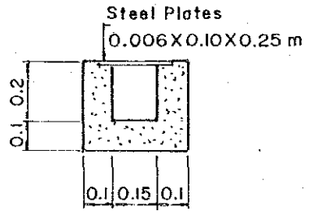
SPILLWAY CROSS SECTION
SCALE: 1:100

SUMMARY OF QUANTITY

TYPE OF WORK		UNIT	TOTAL
PERMANENT RESTORATION			
P2-2	SIDE DITCH	L.M.	83
P2-5	CATCH BASIN	EA.	1
P6-6	SUPPORTED TYPE CONCRETE WALL	CU.M.	4
P6-9	GABION WALL	CU.M.	4
P10-3	GROUTED RIPRAP APRON	CU.M.	2
P18-1	CONCRETE SPILLWAY	L.M.	5
URGENT RESTORATION			
U2-2	TEMPORARY SIDE DITCH	L.M.	72
U7-1	GRAVEL SURFACING	CU.M.	11



SIDE DITCH CROSS SECTION
SCALE: 1:20



DRAINAGE CROSS SECTION
SCALE: 1:20

URGENT RESTORATION
- Gravel surfacing of flooded muddy road portion
- Temporary side ditch

PROVINCE: BATANGAS SPOT No. : Bs-28(1/2)	NAME OF ROAD : MAPOLO-LOBO ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER : EMBANKMENT SLOPE FAILURE	DRAWING NO. 87

Batangas Spot No. 28 (BS-28)

1) General Situation

- Disaster Classification: E-F
- Road Name: Dagatan Jct. - Lobo Road
- Location : km. 0+600 from Dagatan Jct. to Taysan
- Road Class/Office Concerned: National Secondary Road/2nd Engineering District
- Municipalities/Barangays connected:

  The section is a major road connecting Brgy. Dagatan, Taysan and Lobo Proper.

- Road Width/Pavement Width: 11.2m/6.2m
- Pavement Type: AC
- Surface Condition: Very Bad
- Detour: None

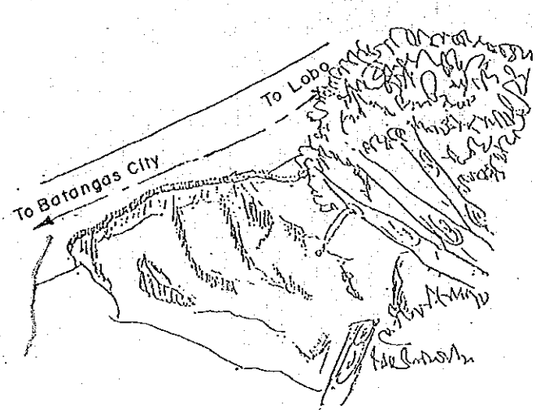
2) Damage Identified

- Type of Disaster: Erosion of embankment protection and almost half of the roadway.
- Magnitude of Damage: 16m. long and 3.0m. in height
- Date Noticed:
- Degree/Period of Traffic Interruption: Medium
- Description of Disaster:

  This spot was affected by strong current of water from the adjacent lateral canal during heavy rains. First, the toe of the embankment protection was slowly eroded that led to its eventual collapse. It was also aggravated by the earthquake that happened last July 16, 1990.

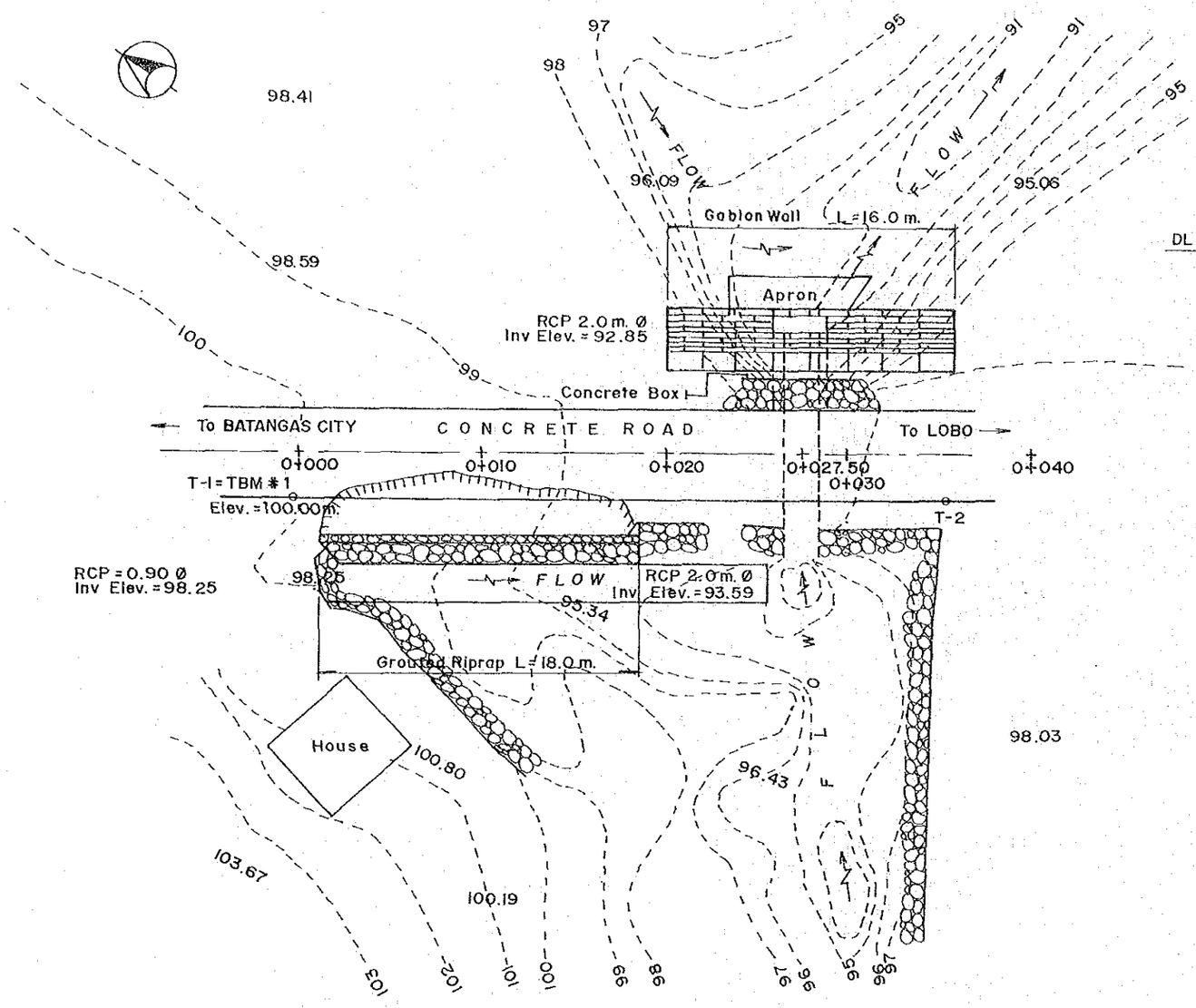
3) Causes of Damage

The damage was due to the seeping of water at the toe of the embankment protection. It was also caused by absence of base foundation and weepholes. Weak embankment protection was also one of the causes of damage.

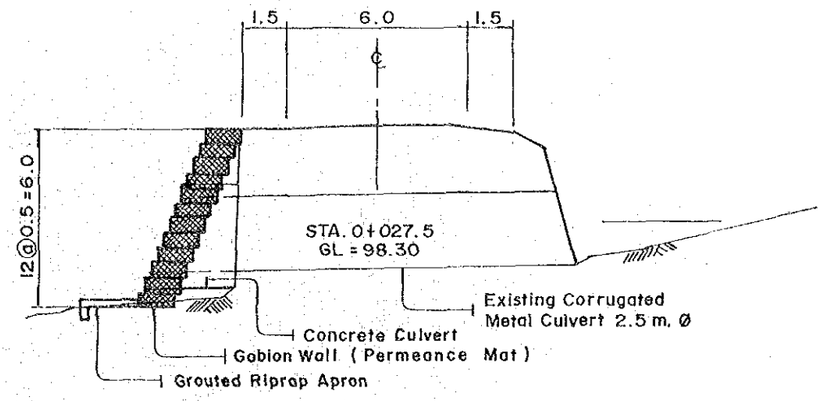


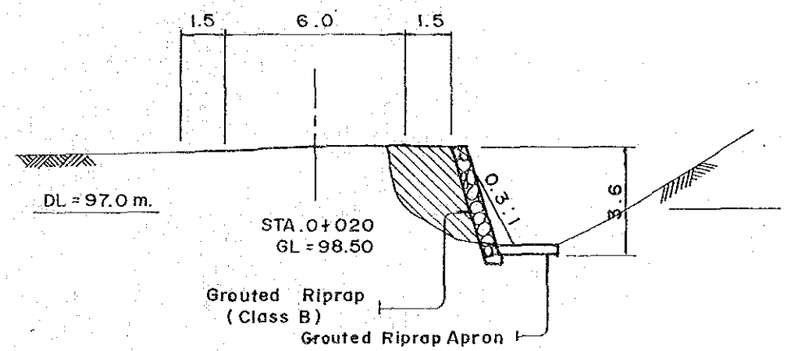
VIEW

PROVINCE: BATANGAS SPOT No. : Bs - 28 (2/2)	NAME OF ROAD : MAPOLO - LOBO ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER : EMBANKMENT SLOPE FAILURE	DRAWING NO. 88

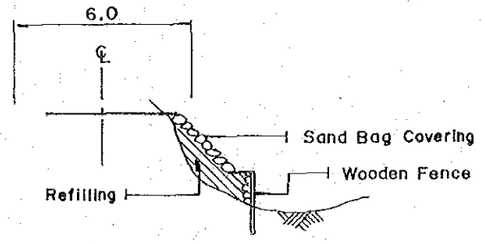


PLAN
SCALE 1:300





CROSS SECTION
SCALE 1:200



CROSS SECTION FOR URGENT RESTORATION
SCALE 1:200

SUMMARY OF QUANTITY

TYPE OF WORK		UNIT	TOTAL
PERMANENT RESTORATION			
P1-3	REFILLING/EMBANKMENT	CU.M.	80
P2-4	CONCRETE CULVERT 2.5m Ø	L.M	3
P5-2	GROUTED RIPRAP CLASS "B"	CU.M.	38
P6-9	GABION WALL	CU.M.	115
P18-3	GROUTED RIPRAP APRON	CU.M.	11
URGENT RESTORATION			
U1-4	REFILLING/EMBANKMENT	CU.M.	27
U3-2	SAND BAG COVERING	SQ.M.	54
U4-3	WOODEN FENCE	L.M.	18

PROVINCE: BATANGAS SPOT No. : Bs - 30(1/2)	NAME OF ROAD : MAPOLO - LOBO ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER : ROCK FALL/DEBRIS FALL	DRAWING NO. 89

Batangas Spot No. 30 (BS-30)

1) General Situation

- Disaster Classification: Fall
- Road Name: Dagatan Jct. - Lobo Road
- Location : km. 6+500 from Dagatan Jct. to Taysan
- Road Class/Office Concerned: National Secondary Road/2nd Engineering District

- Municipalities/Barangays connected:

  The section is a major road connecting Brgy. Dagatan, Taysan and Lobo Town Proper.

- Road Width/Pavement Width: 8.0m/5.5m
- Pavement Type: AC
- Surface Condition: Very Bad
- Detour: None

2) Damage Identified

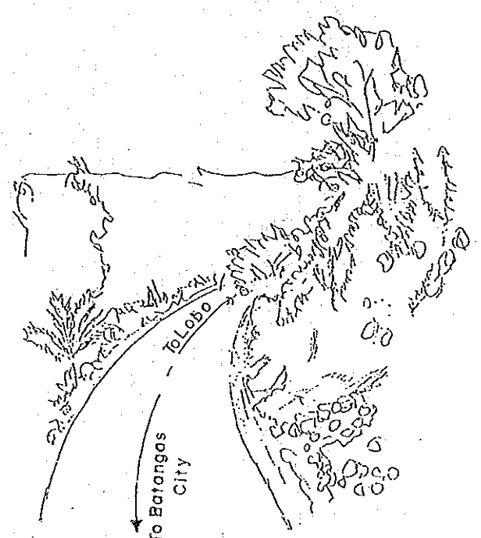
- Type of Disaster: Rock Fall/Debris Fall
- Magnitude of Damage: 42m long x 20m high
- Date Noticed: Rainy Season/dry season/earthquake
- Degree/Period of Traffic Interruption: Low/None
- Description of Disaster:

  The spot is located on a sharp curve. Two damaged portions are observed, one is situated at Dagatan side which is composed of highly weathered andesite rocks and the other is located at Lobo side which is also composed of highly weathered tuff. The dimension of damage was about 32.0 meters long and 20.0 meters in height. In the whole area of tuff type, rockfall, fallen debris and sliding of the top soil are expected to occur regardless of weather condition. Effect of rockfall and fallen debris is hazardous to the commuters because of its location.

3) Causes of Damage

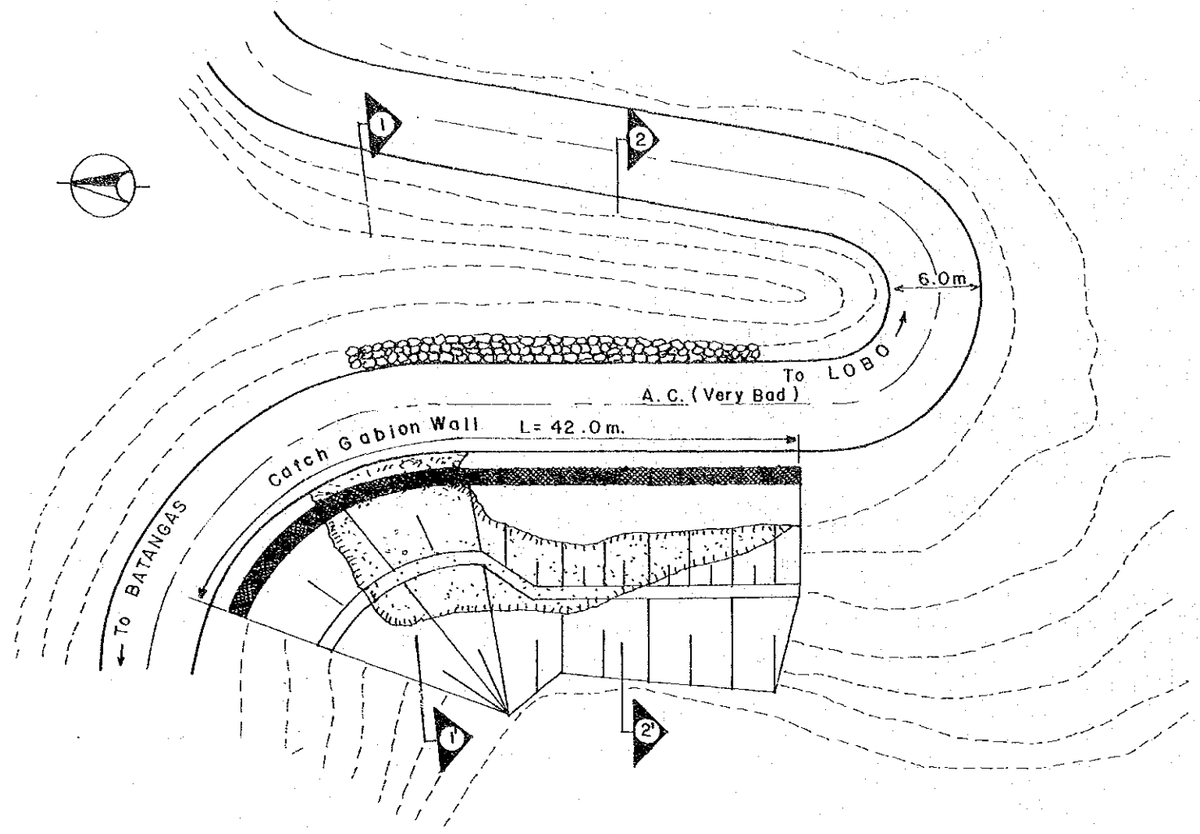
Causes of damage are due to the following reasons:

- the rocks are highly weathered and fractured.
- fall is triggered by water pressure on open joints (andesite).
- intense weathering on the tuff joints which are filled with clay minerals.
- instability of the former slope which is almost vertical.

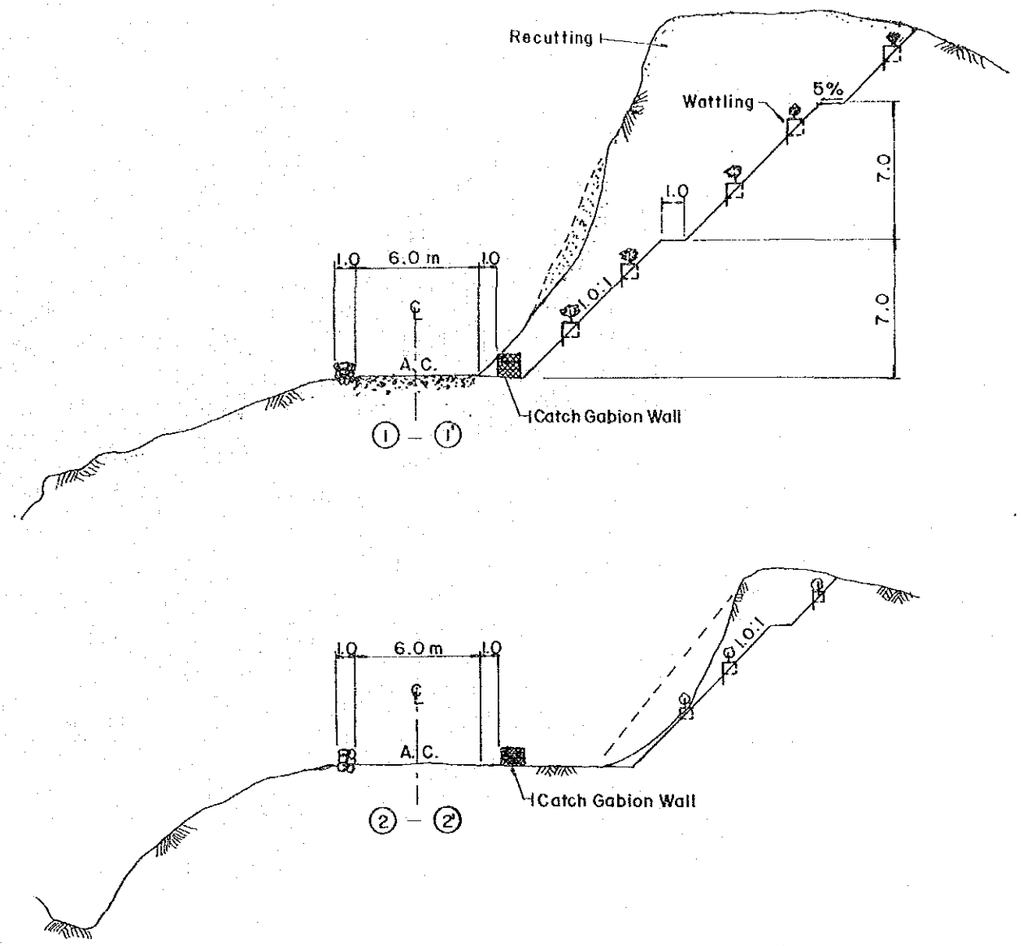


VIEW

PROVINCE: BATANGAS SPOT No. : Bs - 30 (2/2)	NAME OF ROAD : MAPOLO – LOBO ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER ROCK FALL / DEBRIS FALL	DRAWING NO. 90



P L A N
SCALE: 1:400



CROSS SECTION
SCALE: 1:300

SUMMARY OF QUANTITY

TYPE OF WORK		UNIT	TOTAL
PERMANENT RESTORATION			
P1-1	RECUTTING	CU.M.	1940
P4-8	WATTLING	LM.	210
P8-2	CATCH GABION WALL	CU.M.	50
URGENT RESTORATION			
U1-1	REMOVAL OF DEPOSIT MATERIALS	CU.M.	200
U1-2	REMOVAL OF UNSTABLE MATERIALS	CU.M.	10

URGENT RESTORATION

- Removal of deposit materials
- Removal of unstable materials

PROVINCE: BATANGAS SPOT No. : Bs – 33(1/3)	NAME OF ROAD : MAPOLO – LOBO ROAD ROAD CLASSIFICATION : NATIONAL, SECONDARY ROAD	TYPE OF DISASTER : PERMANENT BRIDGE APPROACH WASHOUT	DRAWING NO. 91

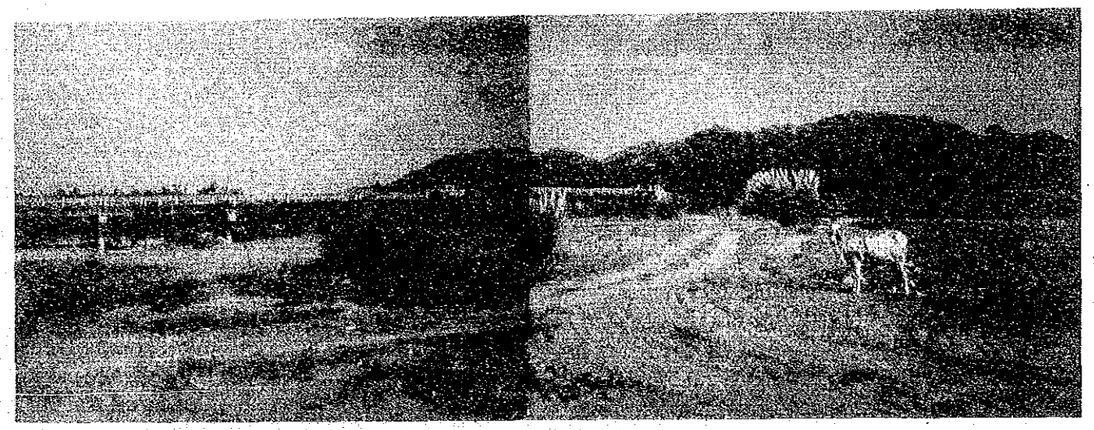
Batangas Spot No. 33 (BS-33)

1) General Situation

- Disaster Classification: PBr-AW
- Road Name: Dagatan Jct. – Lobo Road
- Location : km. 18+500 Dagatan Jct. to Taysan
- Road Class/Office Concerned: National Secondary Road/2nd Engineering District
- Municipalities/Barangays connected:

  The section is a major road connecting Brgy. Dagatan, Taysan and Lobo Town Proper.

- Road Width/Pavement Width: 6.0m/5.0m
- Pavement Type: AC
- Surface Condition:
- Detour: Available



2) Damage Identified

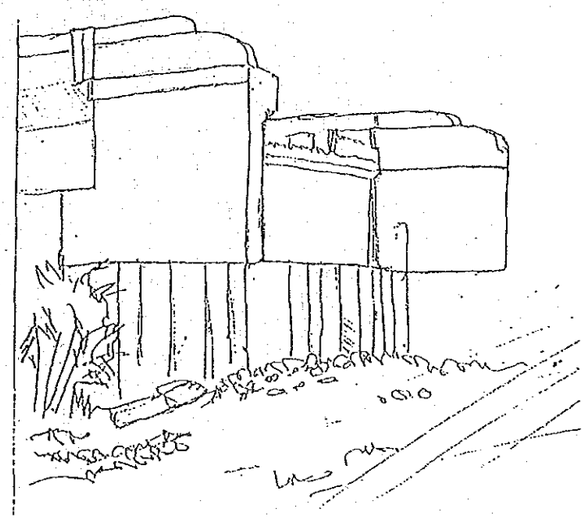
- Type of Disaster: End approach washed-out due to meandering of river
- Magnitude of Damage:
- Date Noticed: 1986
- Degree/Period of Traffic Interruption: High/Abandoned
- Description of Disaster:

  The RCDB Lobo Bridge with a total length of 122 meters/8-span (span length = 15.24m) was completed in 1984. In 1986, the Malabrigo side bridge approach started to be scoured due to the meandering of Lobo river. The Bridge was totally closed to traffic in January 16, 1988 due to the damage at the end approach caused by typhoon "Sisang" which directly hit the Province of Batangas. It must be mentioned that water did not overtop the bridge but debris especially coconut tree trunks longer than the 15m length bridge span created serious obstructions that changed/shifted the course of the river at a considerable distance of about 120m.

3) Causes of Damage

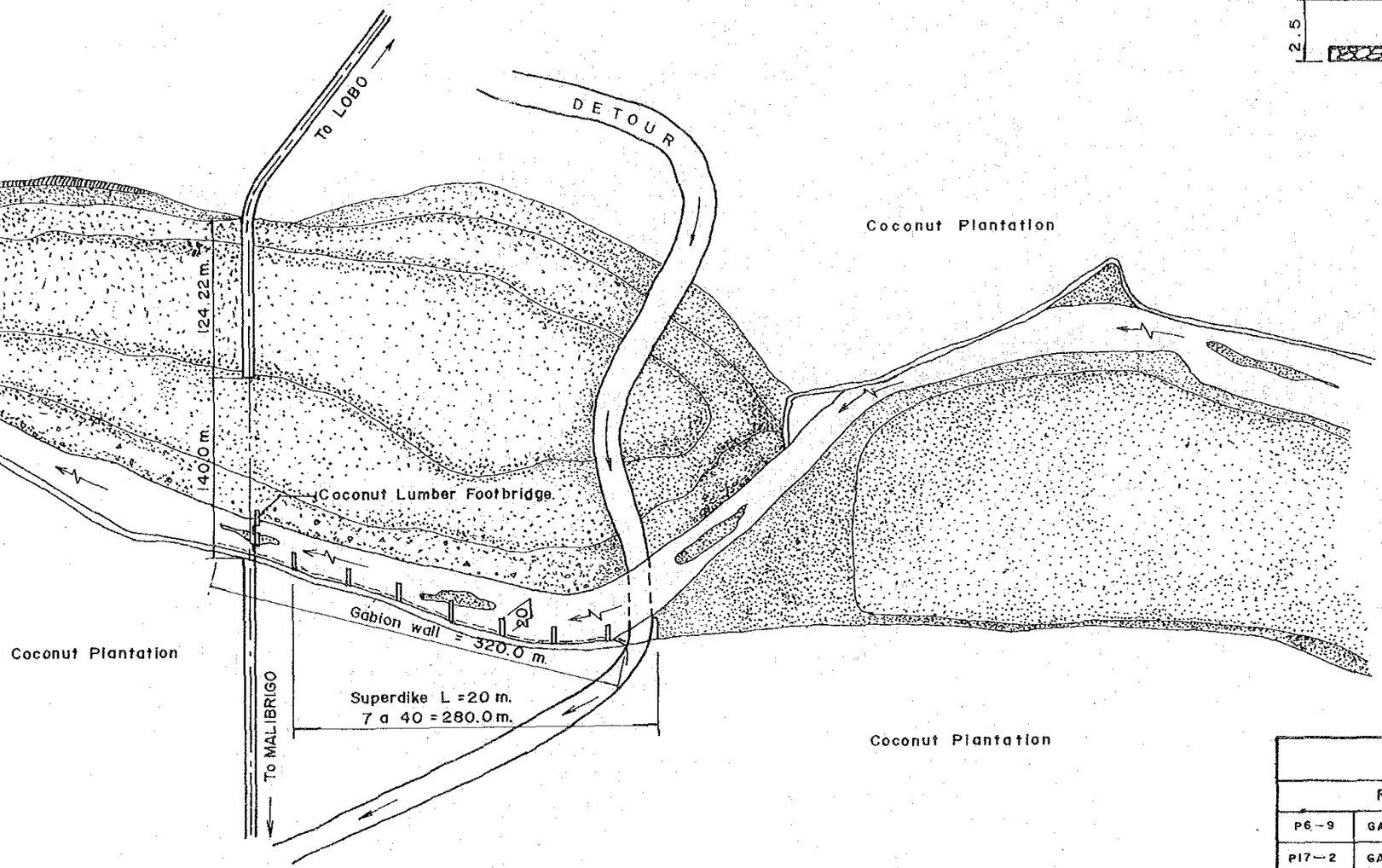
The damages are due to the following reasons:

- River bank control protection was not considered in the design.
- No immediate remedial measure/provisions for river control to prevent further shifting of the course of the river was instituted after the meandering phenomena was noticed in 1986.

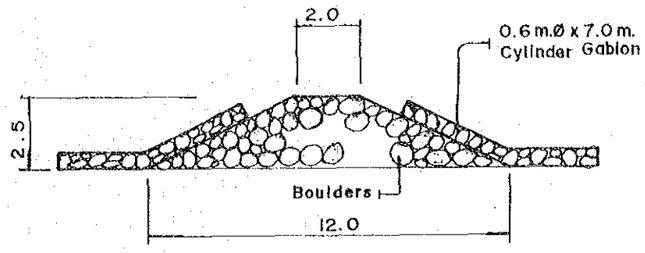


VIEW

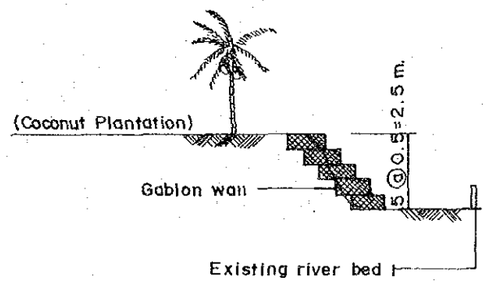
PROVINCE : BATANGAS SPOT No. : Bs-33(2/3)	NAME OF ROAD : MAPOLO-LOBO ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER : PERMANENT BRIDGE APPROACH WASH OUT	DRAWING NO. 92



PLAN
SCALE 1:4000



DETAIL OF SPURDIKE
SCALE 1:200

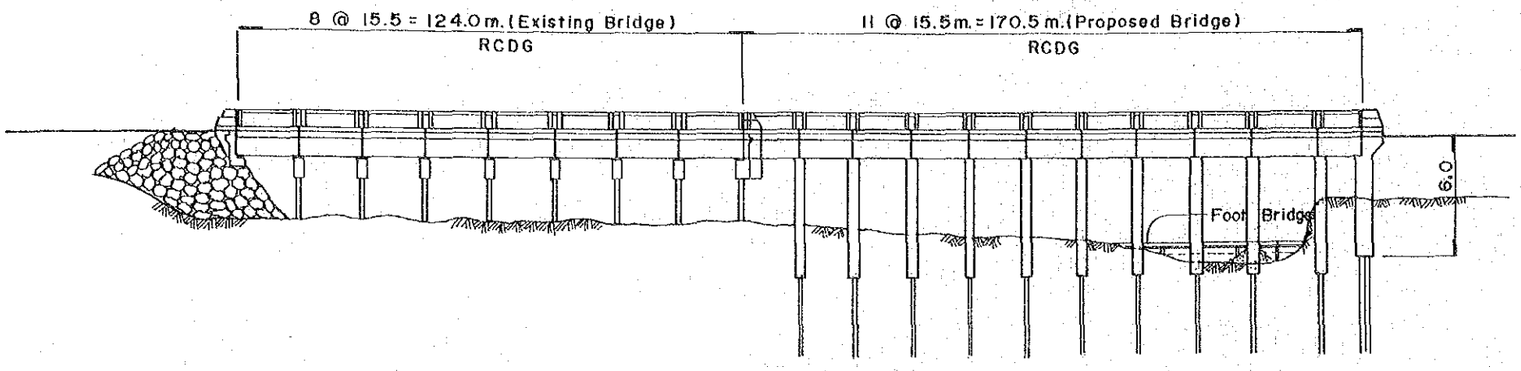


CROSS SECTION FOR URGENT RESTORATION
SCALE 1:200

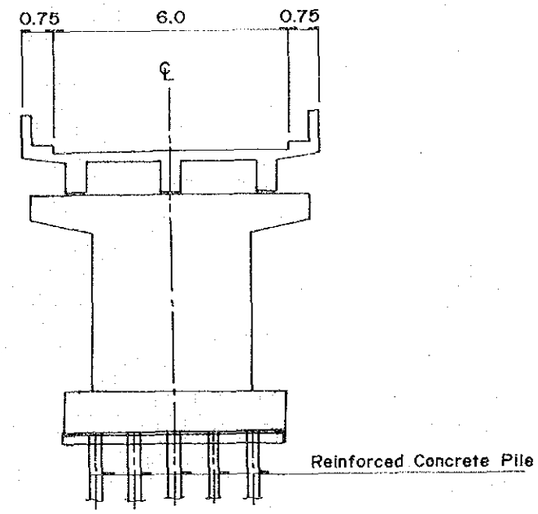
SUMMARY OF QUANTITY

TYPE OF WORK		UNIT	TOTAL
PERMANENT RESTORATION			
P6-9	GABION WALL	CU. M.	960
P17-2	GABION SPURDIKE	CU.M.	3840
URGENT RESTORATION			

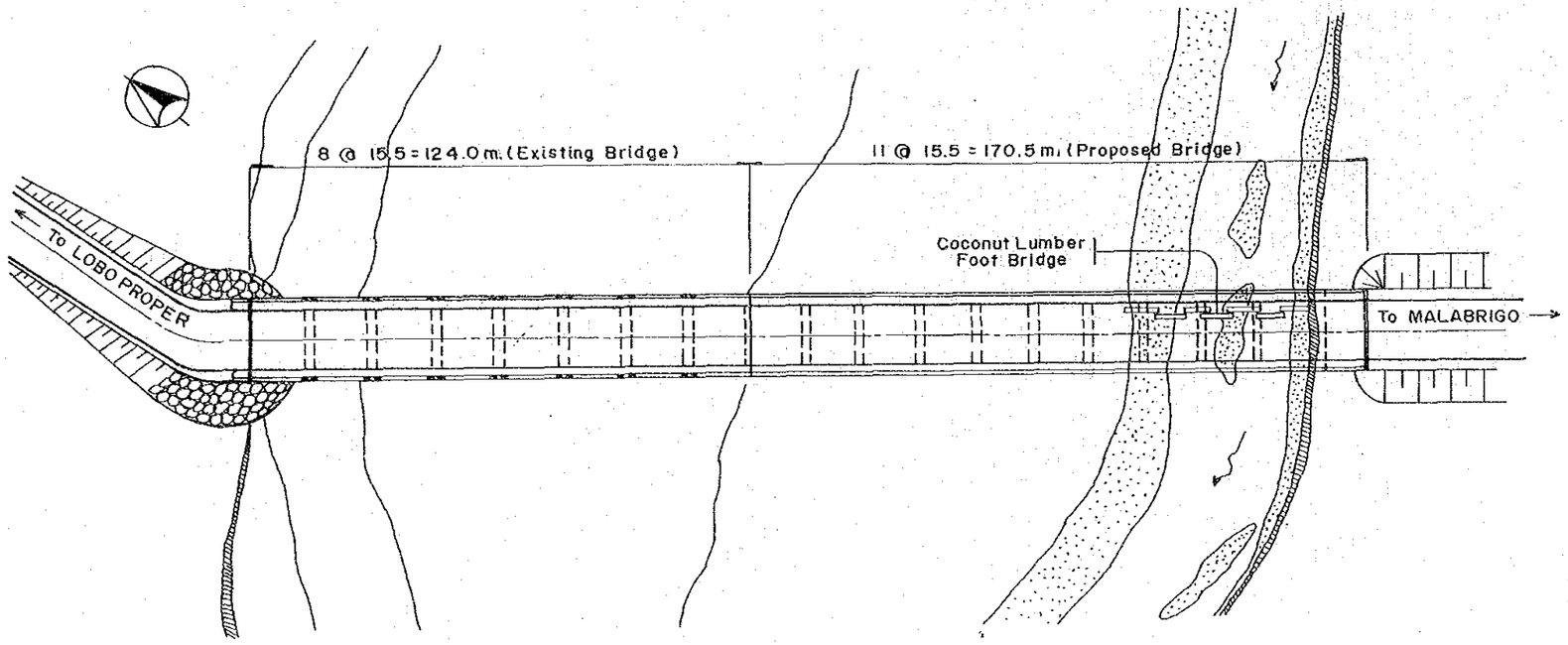
PROVINCE: BATANGAS SPOT No. : Bs-33(3/3)	NAME OF ROAD : MAPOLO-LOBO ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER : PERMANENT BRIDGE APPROACH WASH OUT	DRAWING NO. 93



E L E V A T I O N
SCALE H=1:1500 V=1:300



CROSS SECTION OF PIER
SCALE 1:150



P L A N
SCALE H=1:1500 V=1:750

SUMMARY OF QUANTITY

TYPE OF WORK		UNIT	TOTAL
PERMANENT RESTORATION			
P15-1	CONCRETE BRIDGE	L.M	171
URGENT RESTORATION			
U6-2	H-PILE BENT	L.M.	1005
U6-3	BAILEY BRIDGE	L.M.	171

URGENT RESTORATION

- Construction of bailey bridge as superstructure with continuous H pile bent pier.

PERMANENT RESTORATION

- Construct new RCDG bridge on RC pile

PROVINCE: BATANGAS SPOT No. : Bs - 36(1/2)	NAME OF ROAD : BANGA JCT.- TAGAYTAY ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER : CUT SLOPE FAILURE	DRAWING NO. 94

Batangas Spot No. 36 (BS-36)

1) General Situation

- Disaster Classification: C-F
- Road Name: Banga Jct. - Tagaytay Bdry. Road
- Location : km. 1+100 from Banga Jct. to Laurel
- Road Class/Office Concerned: National Secondary Road/2nd Engineering District

- Municipalities/Barangays connected:

  The section is a major road connecting Brgys. Banga and Miranda in the town of Talisay.

- Road Width/Pavement Width: 10.0m/4.0m
- Pavement Type: AC
- Surface Condition: Fair
- Detour: Available

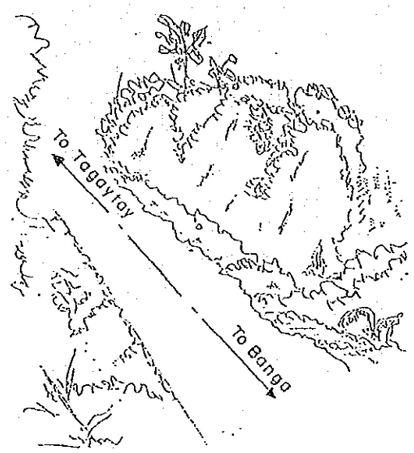
2) Damage Identified

- Type of Disaster: Cut Slope Failure
- Magnitude of Damage: 5.0-8.0m in width x 50m long
- Date Noticed: Every rainy season
- Degree/Period of Traffic Interruption: Low/None
- Description of Disaster:

  The spot is located on a cut slope section. Almost horizontal stratification is noticeable on the left side slope towards Tagaytay and the opposite cut slope shows deep weathering almost dry and devoid of vegetation and stratification is hardly visible. The damage dimension varies from 5.0m - 8.0m in height and 50 meters long only at the right side towards Tagaytay Road. Only small scale failure is expected to occur, considering rock joints are not present, thus less possibility of water infiltration.

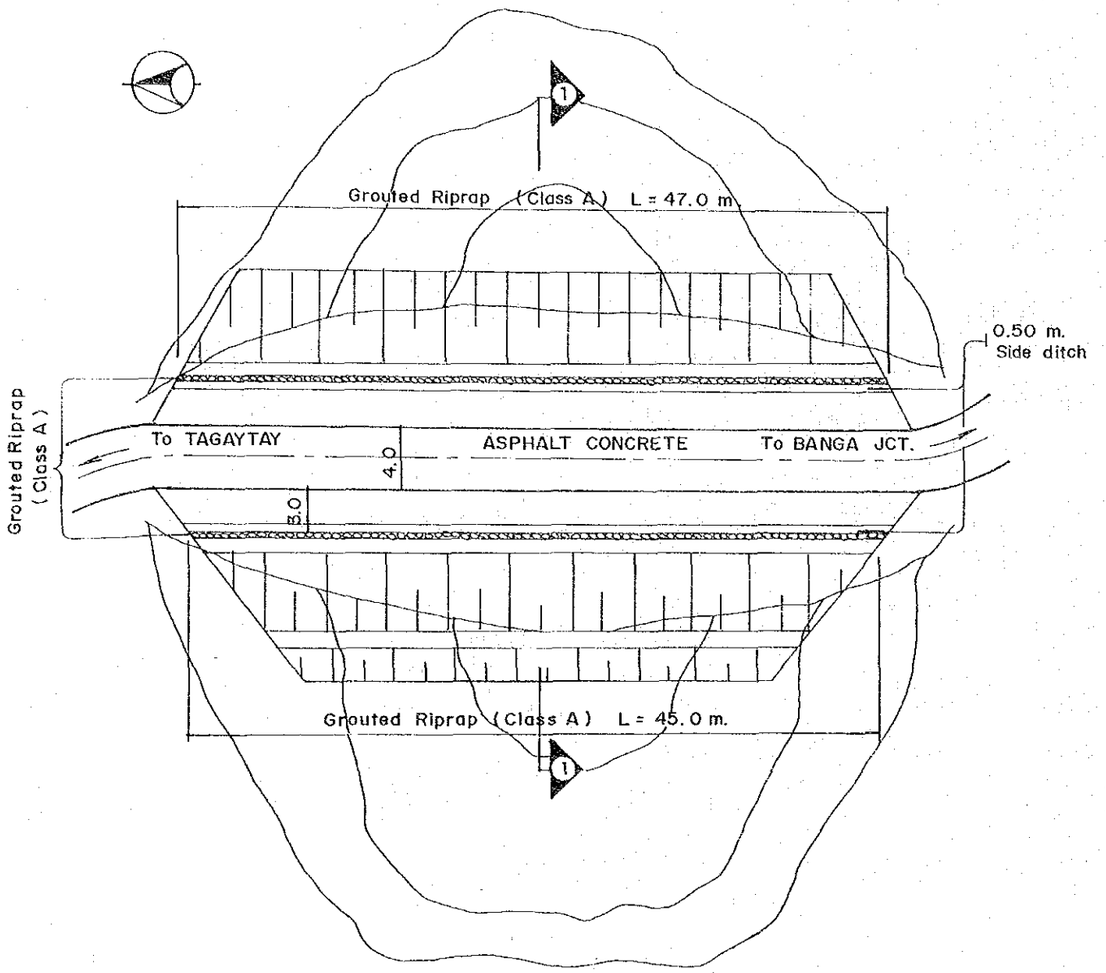
3) Causes of Damage

For this case, the wearing-off of tuff kind of rock due to weathering action, the steep gradient and the absence of vegetation activated the material to fall easily causing small scale of slide.



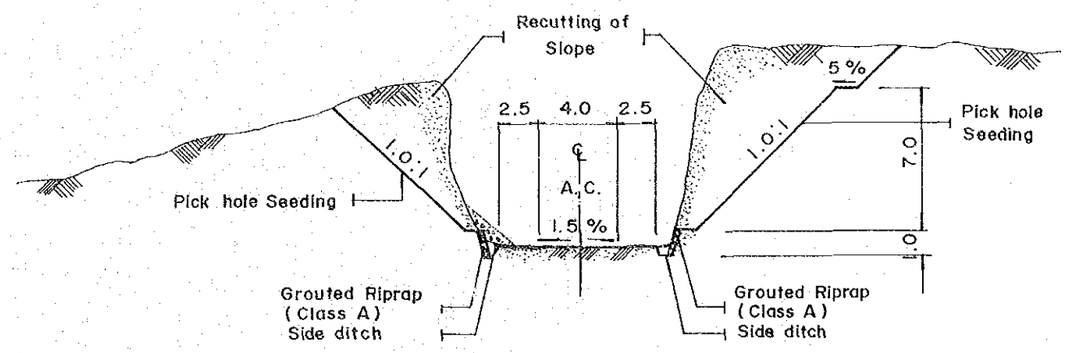
VIEW

PROVINCE: BATANGAS SPOT No. : Bs-36(2/2)	NAME OF ROAD : BANGA JCT.- TAGAYTAY ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER : CUT SLOPE FAILURE	DRAWING NO. 95

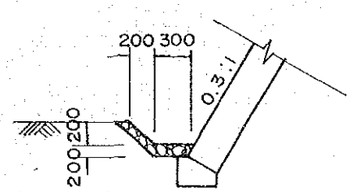


PLAN
SCALE 1:400

1 - 1



CROSS SECTION
SCALE 1:300



DETAIL OF SIDE DITCH
SCALE 1:50

Urgent Restoration
* Removal of deposit materials

SUMMARY OF QUANTITY

TYPE OF WORK		UNIT	TOTAL
PERMANENT RESTORATION			
P1-1	RE-CUTTING	CU.M.	2850
P2-2	SIDE DITCH	L.M.	92
P4-6	PICK HOLE SEEDING	SQ.M.	870
P6-2	GROUTED RIPRAP	CU.M.	37
URGENT RESTORATION			
U1-1	REMOVAL OF DEPOSIT MATERIALS	CU.M.	105

PROVINCE: BATANGAS SPOT No. : Bs-42(1/2)	NAME OF ROAD : CALOOCAN JCT.-LAUREL ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER : CULVERT DAMAGE	DRAWING NO. 96

Batangas Spot No. 42 (BS-42)

1) General Situation

- Disaster Classification: CLV-D
- Road Name: Caloocan Jct. - Laurel
- Location : km. 54+000 from Jct. Caloocan to Tagaytay Bdry.
- Road Class/Office Concerned: National Secondary Road/2nd Engineering District
- Municipalities/Barangays connected:

  The section is a major road connecting Brgy. Caloocan, Talisay and Laurel Town Proper.

- Road Width/Pavement Width: 11.4m/6.0m
- Pavement Type: AC
- Surface Condition: Good
- Detour: None

2) Damage Identified

- Type of Disaster: Collapsed pipe culvert at the downstream portion
- Magnitude of Damage: 5.5m long, 4.8m wide and 2.5m height
- Date Noticed: Sudden collapse
- Degree/Period of Traffic Interruption: Medium
- Description of Disaster:

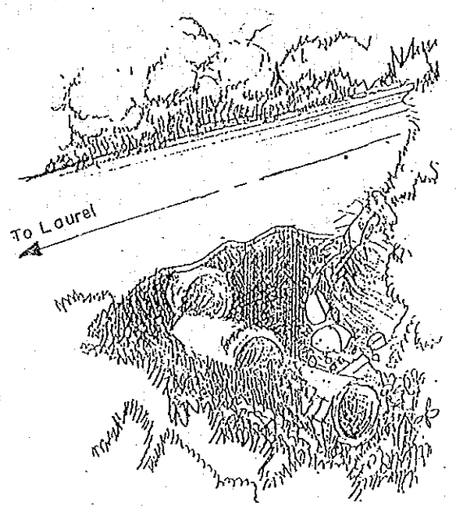
  For this particular spot, pipe culvert has a diameter of 0.9m, two adjoining creeks drain into the pipe culvert where the water does not directly flow towards the inlet but is obstructed or bended by the wingwall then finally to the pipe. During heavy rains, large volume of water carrying debris could not be accomodated in the pipe culvert clogging its entrance and the tendency is to overflow on the roadway. Overflowing had caused the gradual erosion at the base of the apron of the outlet until most of the materials at the wingwall had been eaten up, creating a gaping hole. This gaping hole served as the passage of eroded materials and running water.

  This continuous process eventually widened the hole, eroding further the materials around the pipes which led to its eventual collapse. Damage had already reached almost half of the roadway and is considered highly dangerous to travelers especially during night traffic.

3) Causes of Damage

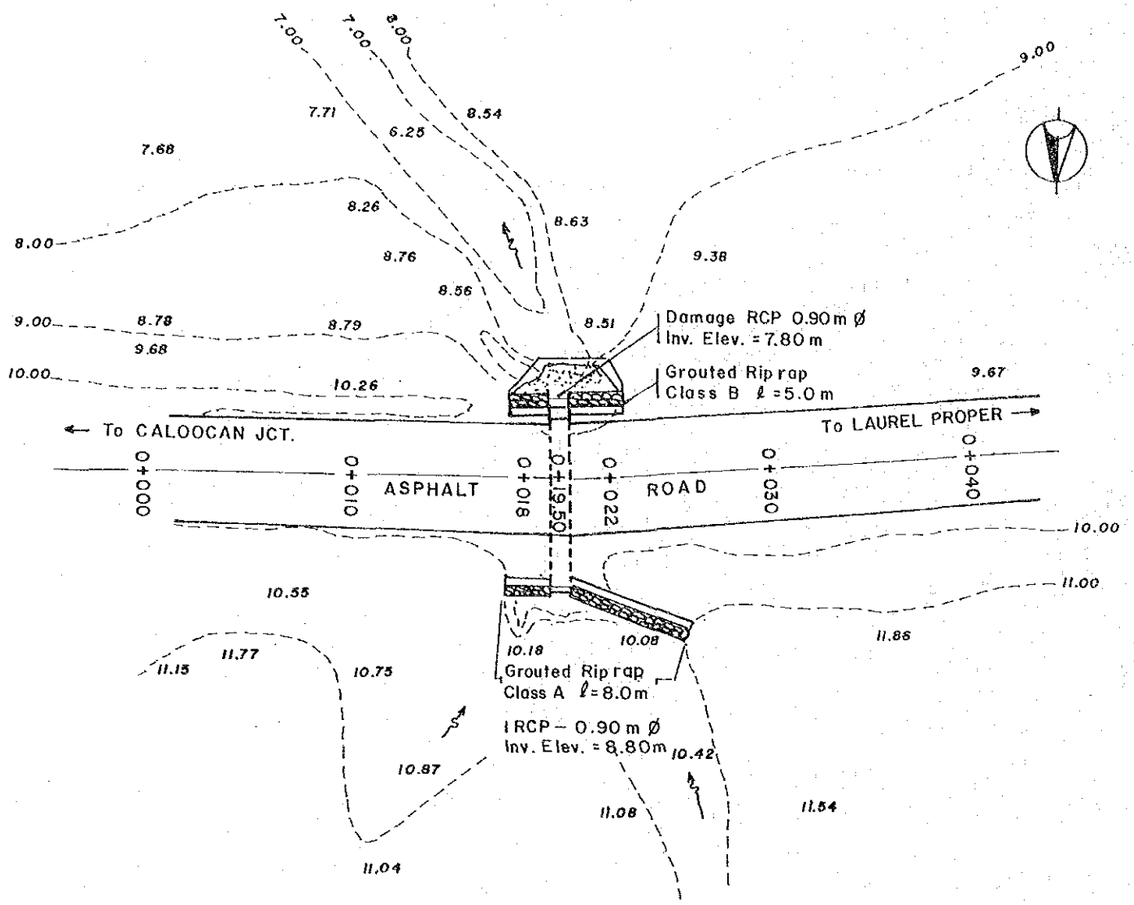
The damage is due to the following reasons:

- Improper location of pipe culvert.
- Diminished bearing capacity of foundation layers and settlement of soils under foundation.
- Erosive action around structure.
- Settlement with subsequent cracking in headwall, wingwall and culvert structure.
- Heavy concentration of whirling water had further encroached the pipes and removed the surrounding soils resulting to its collapse.

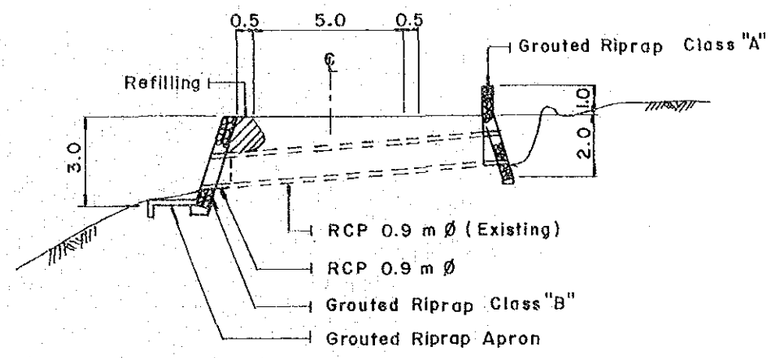


VIEW

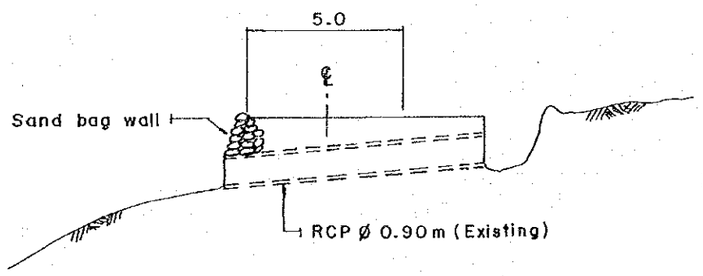
PROVINCE: BATANGAS SPOT No. : Bs-42(2/2)	NAME OF ROAD : CALOOCAN JCT. – LAUREL ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER : CULVERT DAMAGE	DRAWING NO. 97



PLAN
SCALE :: 300



CROSS SECTION
SCALE 1 : 200



CROSS SECTION FOR URGENT RESTORATION
SCALE 1 : 200

SUMMARY OF QUANTITY

TYPE OF WORK		UNIT	TOTAL
PERMANENT RESTORATION			
P2-4	RCPC 0.9 m Ø	L.M.	1
P6-2	GROUTED RIPRAP	CU.M.	16
P16-3	GROUTED RIPRAP APRON	CU.M.	2
URGENT RESTORATION			
U4-1	SAND BAG WALL	SQ.M.	10

PROVINCE: BATANGAS SPOT No. : Bs-43(1/2)	NAME OF ROAD : CALOOCAN JCT. - LAUREL ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER : CULVERT DAMAGE	DRAWING NO. 98

Batangas Spot No. 43 (BS-43)

1) General Situation

- Disaster Classification: CLV-D
- Road Name: Caloocan Jct. - Laurel
- Location : km. 5+500 from Jct. Caloocan to Tagaytay Bdry.
- Road Class/Office Concerned: National Secondary Road/2nd Engineering District

- Municipalities/Barangays connected:

  The section is a major road connecting Brgy. Caloocan, Talisay and Laurel Town Proper.

- Road Width/Pavement Width: 10.0m/6.0m
- Pavement Type: AC
- Surface Condition: Good
- Detour: None

2) Damage Identified

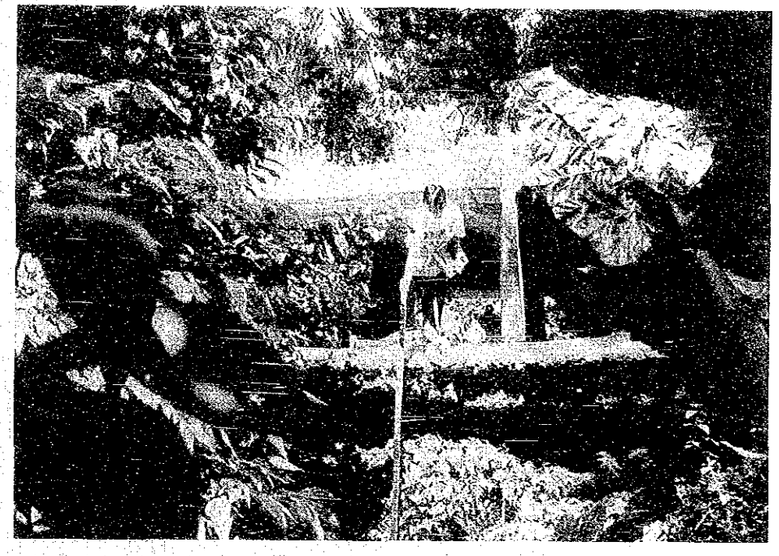
- Type of Disaster: Scoured riverbed at the downstream portion
- Magnitude of Damage: 1.5m height, 8.4m long, 1.0m wide
- Date Noticed:
- Degree/Period of Traffic Interruption: Low/None
- Description of Disaster:

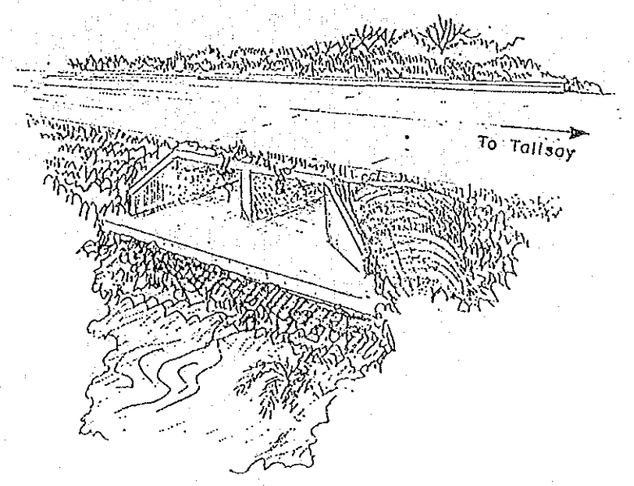
  The situation is similar to Spot No. 42 but instead of pipe, a box culvert was installed which consists of two cells with a dimension of 2.6m and 2.8m wide, 10m long and 1.7m in height. Two adjoining creeks drain into it where the flow is not directly towards it. During heavy rains, floodwaters hit the wingwall first and then to the box entrance. The mouth of the culvert is just enough to accomodate the volume of water from the creeks, however, the flow of water coming out had eroded the riverbed of about 1.5m high of sediments causing the apron to hang and is in danger of collapsing. If not maintained, the open hole underneath the apron might encroach to the main structure and might possibly induce damage.

  Similarly, it was observed that the creek channel and banks were heavily eroded/scoured due to the cascading action of floodwaters hitting the wingwall before it enters the inlet.

3) Causes of Damage

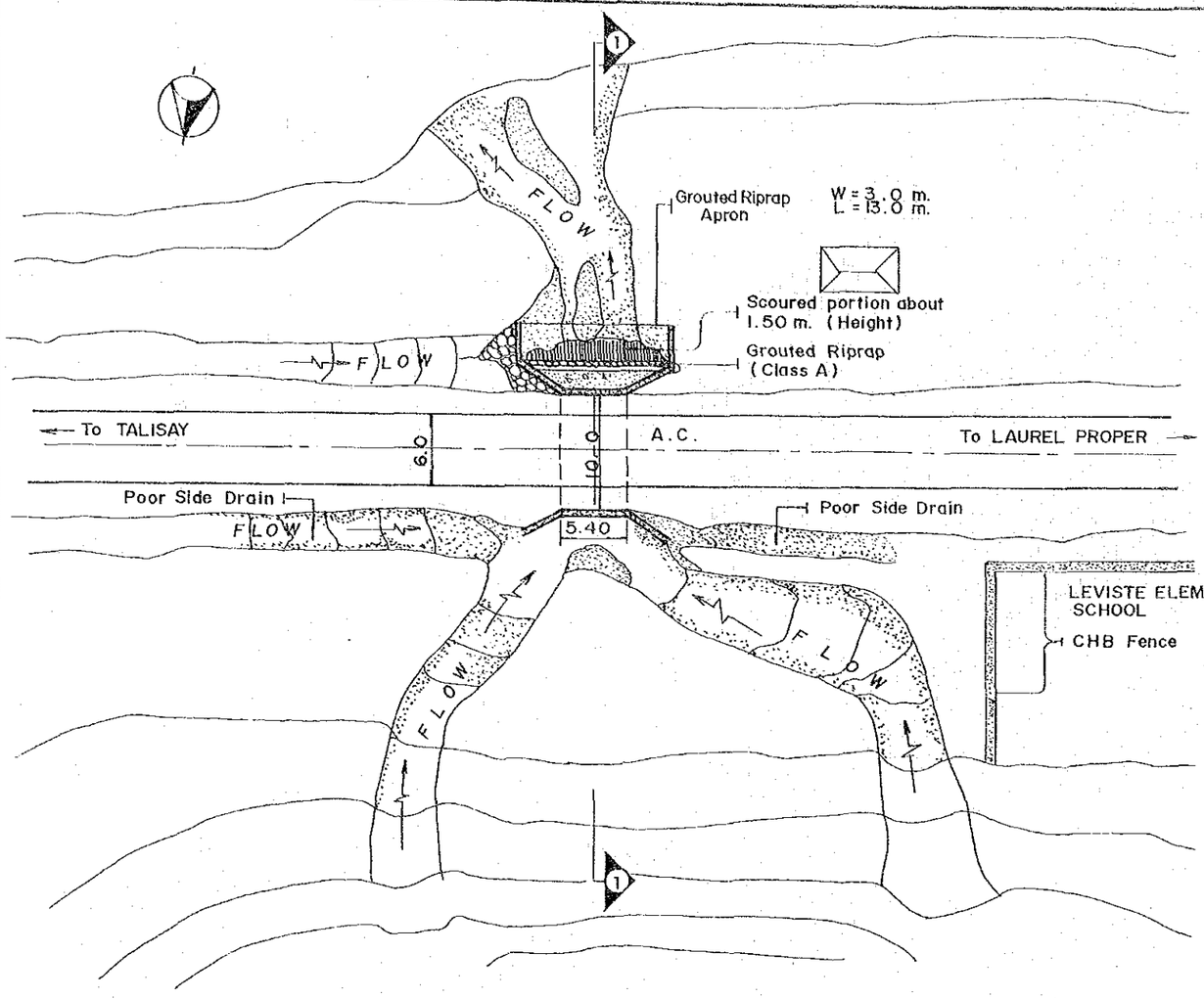
  The material for this particular spot is characterized as volcanic sand with gravel easily to accelerate and erode. Due to strong flow of water during heavy rains, the riverbed from the foot of the apron started to scour carrying the deposited sediments and causing the apron to be in its hanging condition which is expected to damage further the main structure if no countermeasure will be taken into consideration immediately.



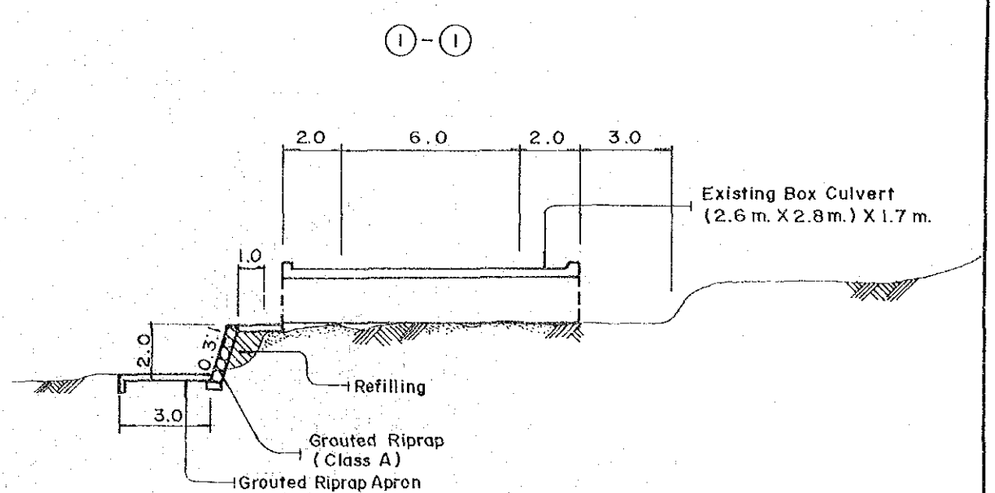


VIEW

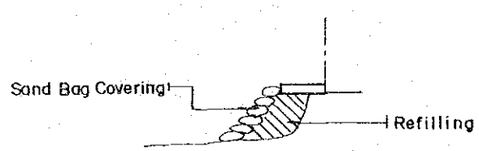
PROVINCE : BATANGAS SPOT No. : Bs-43(2/2)	NAME OF ROAD : CALOOCAN JCT. - LAUREL ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER : CULVERT DAMAGE	DRAWING NO. 99



PLAN
SCALE 1:500



CROSS SECTION
SCALE 1:200



CROSS SECTION OF URGENT RESTORATION
SCALE 1: 200

SUMMARY OF QUANTITY

TYPE OF WORK		UNIT	TOTAL
PERMANENT RESTORATION			
P6-2	GROUTED RIPRAP CLASS "A"	CU.M.	9
P16-3	GROUTED RIPRAP APRON	CU.M.	8
URGENT RESTORATION			
U1-4	REFILLING	CU.M.	29
U3-2	SAND BAG COVERING	SQ.M.	26

PROVINCE: BATANGAS SPOT No. : Bs-45(1/2)	NAME OF ROAD : AGONCILLO JCT.-LAUREL ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER : SCOUR/WASHOUT OF ROADBED	DRAWING NO. 100

Batangas Spot No. 45 (BS-45)

1) General Situation

- Disaster Classification: Rd-D
- Road Name: Agoncillo Jct. - Laurel
- Location : km. 2+650 from Agoncillo Jct. to Pansipit
- Road Class/Office Concerned: National Secondary Road/2nd Engineering District

- Municipalities/Barangays connected:

  The section is a major road connecting Agoncillo and Laurel towns.

- Road Width/Pavement Width: 7.0m/5.0m
- Pavement Type: PCC
- Surface Condition: Good/Fair
- Detour: None

2) Damage Identified

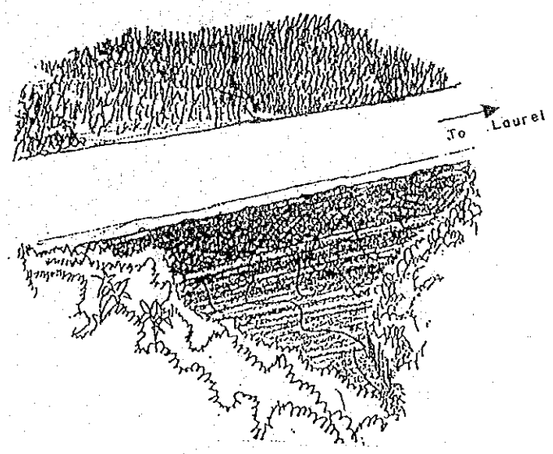
- Type of Disaster: Scouring of Natural Roadbed and shoulder erosion.
- Magnitude of Damage: 12.0m long, 1.5m wide, 1.4m height
- Date Noticed:
- Degree/Period of Traffic Interruption: High/Closed to traffic
- Description of Disaster:

  The spot is situated along the coast of Taal Lake in Barangay Subic which virtually connects the town of Agoncillo and Laurel.

  At this particular spot, the road shoulder as well as the natural roadbed materials were totally scoured and has a magnitude of damage of about 12.0m long, 1.5m wide and 1.4m in height, causing the PCC pavement to hang. The scoured portion had already reached a width of 1.5m and a slight sagging on PCC pavement was observed. The hanging pavement is considered dangerous when subjected to heavy load. Immediately beside this failure is a lagoon which is enclosed by deposit of sand dunes which presently acts as a barrier from further scouring of the affected area.

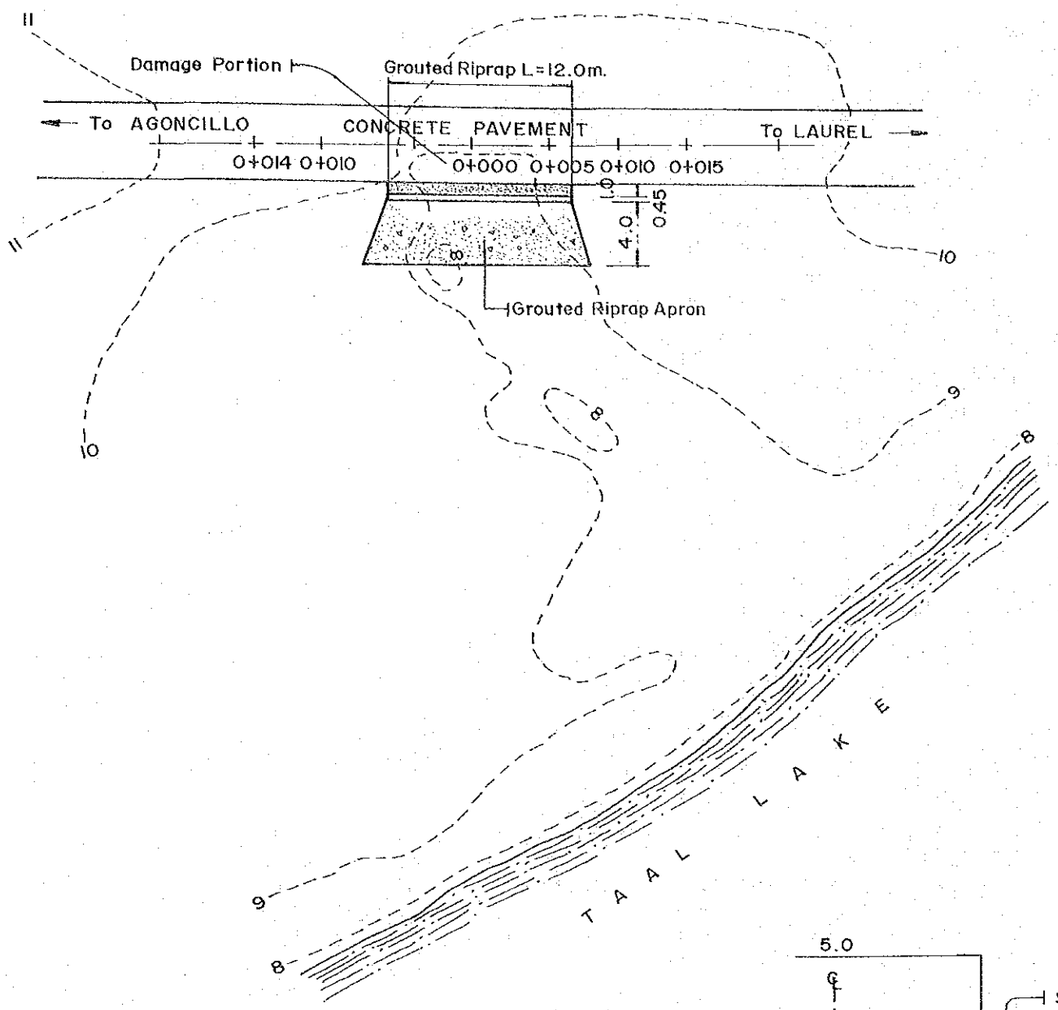
3) Causes of Damage

As the embankment protection was not constructed in this particular spot and the road was just about 45m away from the shore line of Taal Lake, this damage was triggered mainly by wave action during high tides that directly hits the embankment/natural road slope. Failure was also aggravated by the flow of big volume of running water coming from the mountain slope which directly drains into this section during heavy rains.

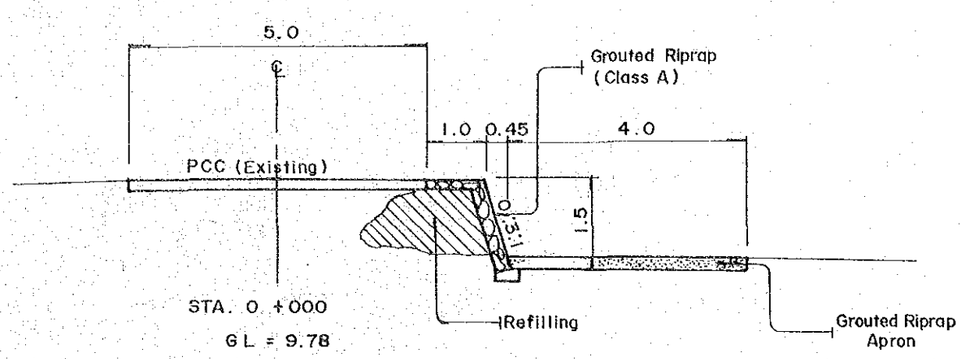


VIEW

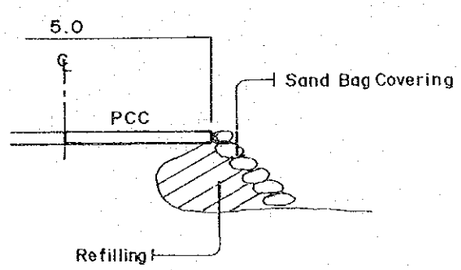
PROVINCE : BATANGAS SPOT No. : Bs-45(2/2)	NAME OF ROAD : AGONCILLO JCT. – LAUREL ROAD ROAD CLASSIFICATION : NATIONAL SECONDARY ROAD	TYPE OF DISASTER : SCOUR / WASHOUT OF ROADBED	DRAWING NO. 101



PLAN
SCALE 1:400



CROSS SECTION
SCALE 1:100



CROSS SECTION FOR URGENT RESTORATION
SCALE 1:100

SUMMARY OF QUANTITY

TYPE OF WORK		UNIT	TOTAL
PERMANENT RESTORATION			
P6-2	GROUTED RIPRAP CLASS "A"	CU.M.	9
P16-3	GROUTED RIPRAP APRON	CU.M.	10
URGENT RESTORATION			
U1-4	REFILLING / EMBANKMENT	CU.M.	15
U3-2	SAND BAG COVERING	SQ.M.	18