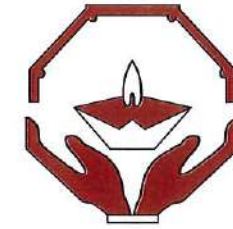


DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
STATE MINISTRY OF NATIONAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT



NATIONAL BUILDING RESEARCH ORGANISATION



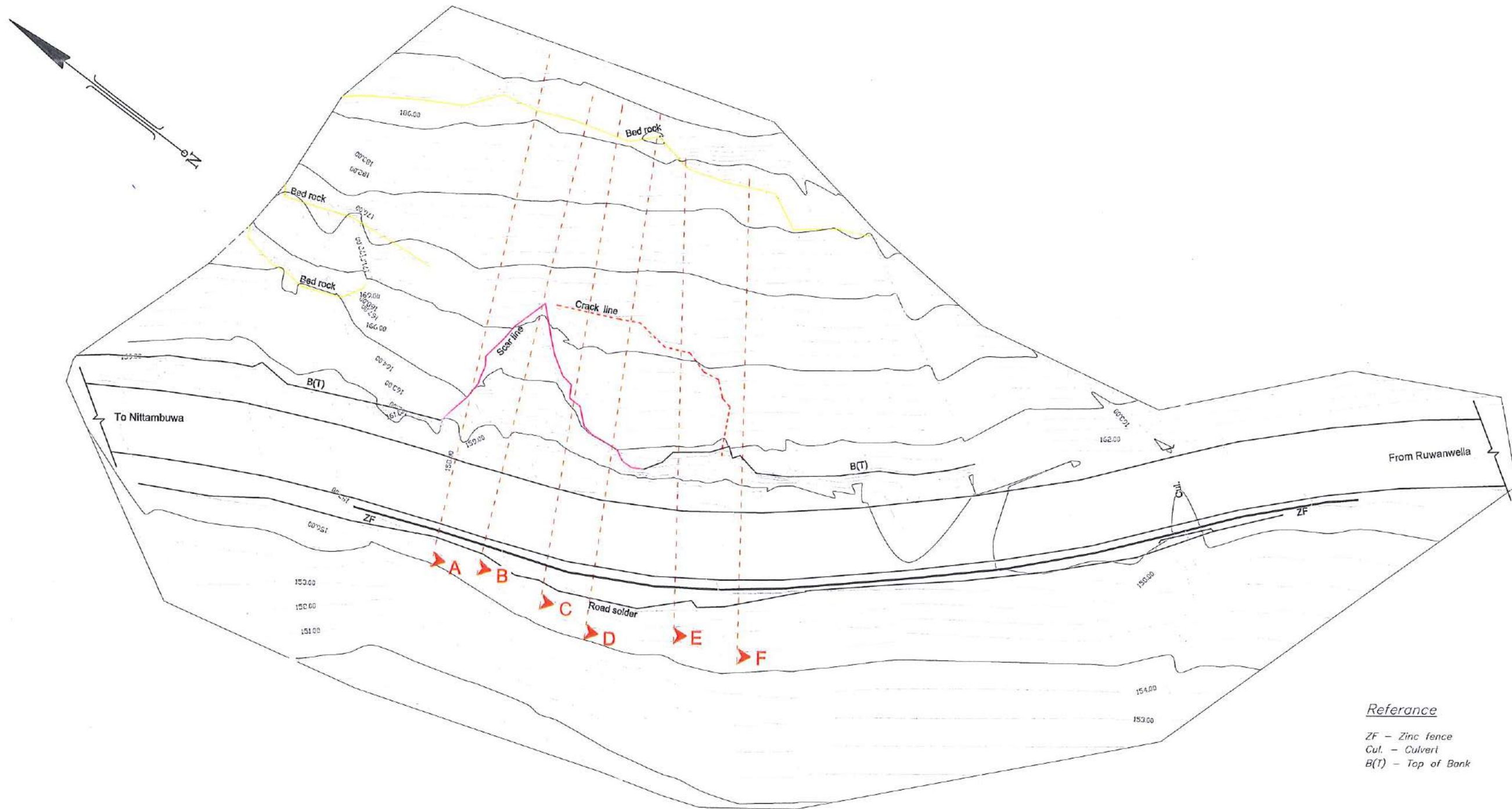
REDUCTION OF LANDSLIDE VULNERABILITY  
BY MITIGATION MEASURES

LAND SLIDE MITIGATION WORKS IN LANDSLIDE MITIGATION WORKS  
IN COLOMBO, GAMPAHA, KEGALLE & KURUNEGALA DISTRICTS



PACKAGE NO: RLVMMMP/WORKS/04A

DETAILED DESIGN DRAWINGS

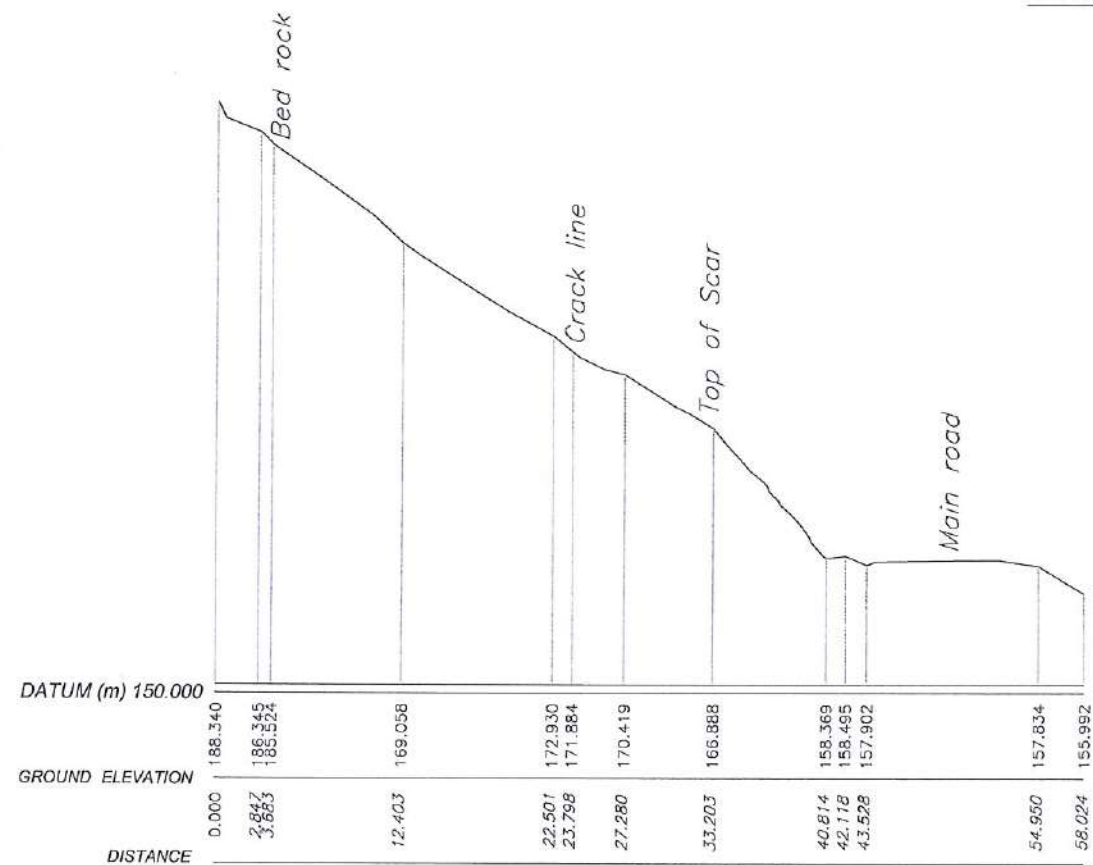
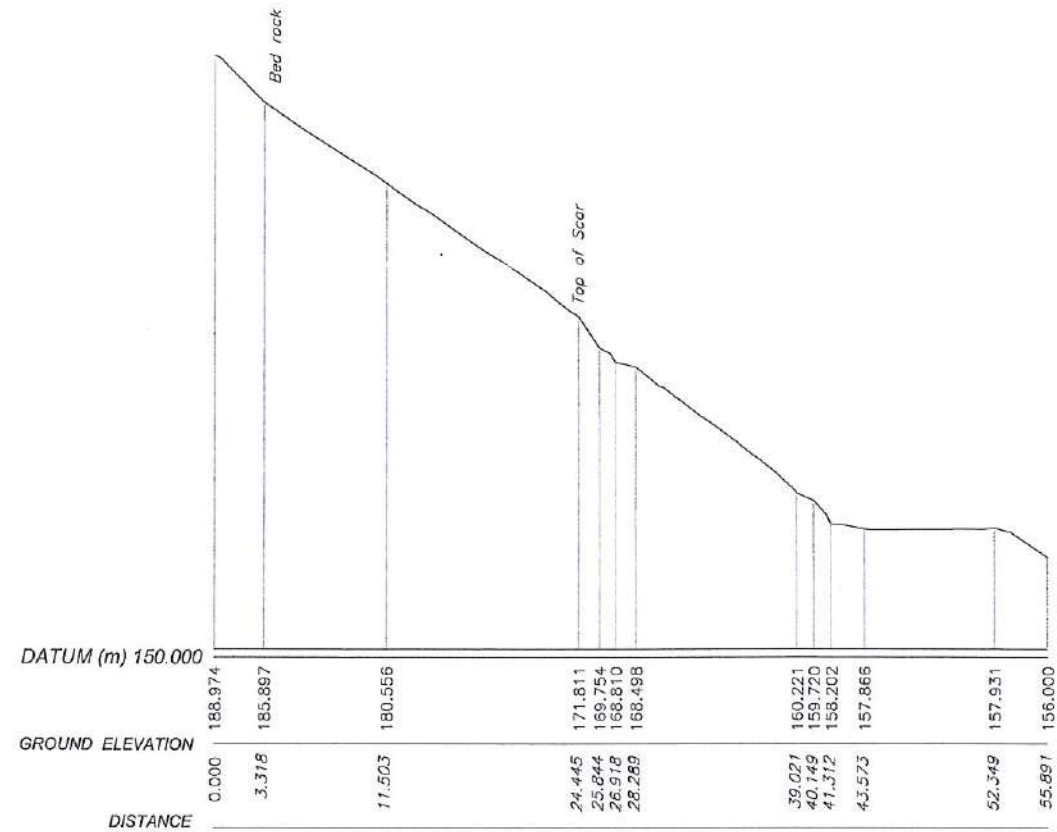
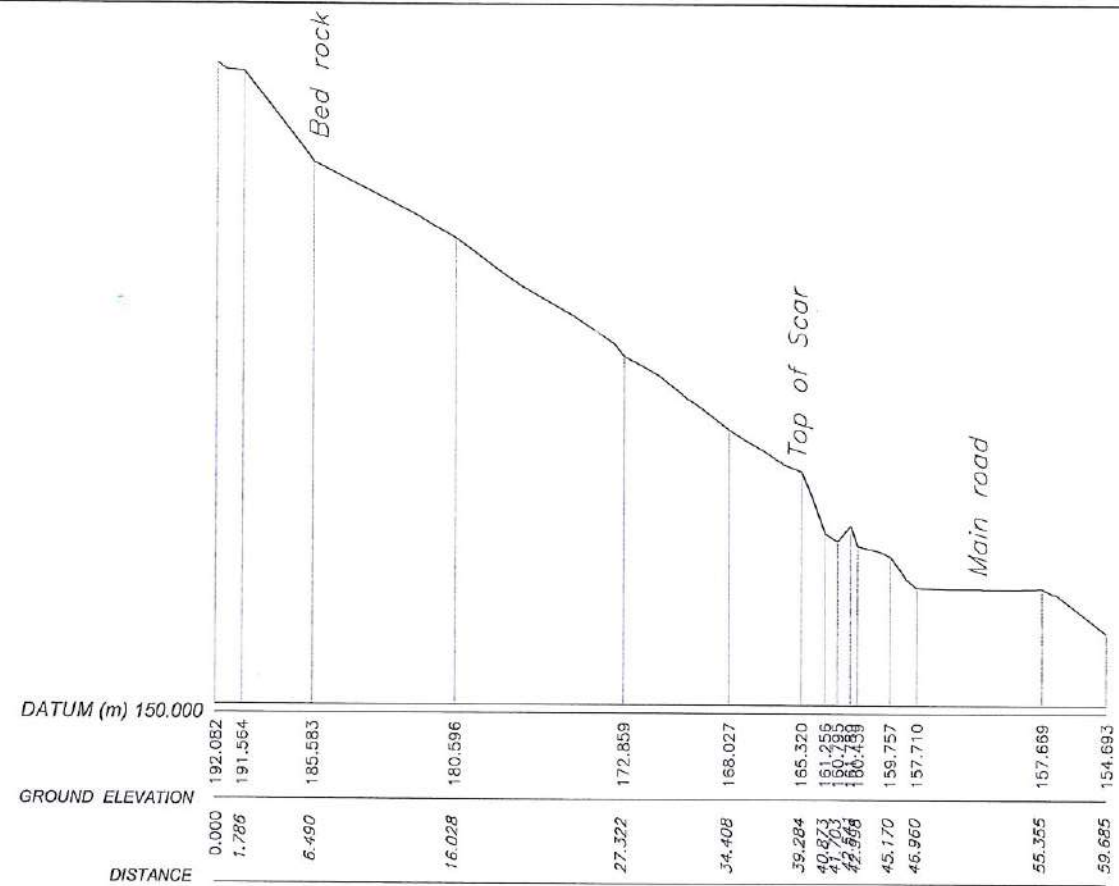
2021




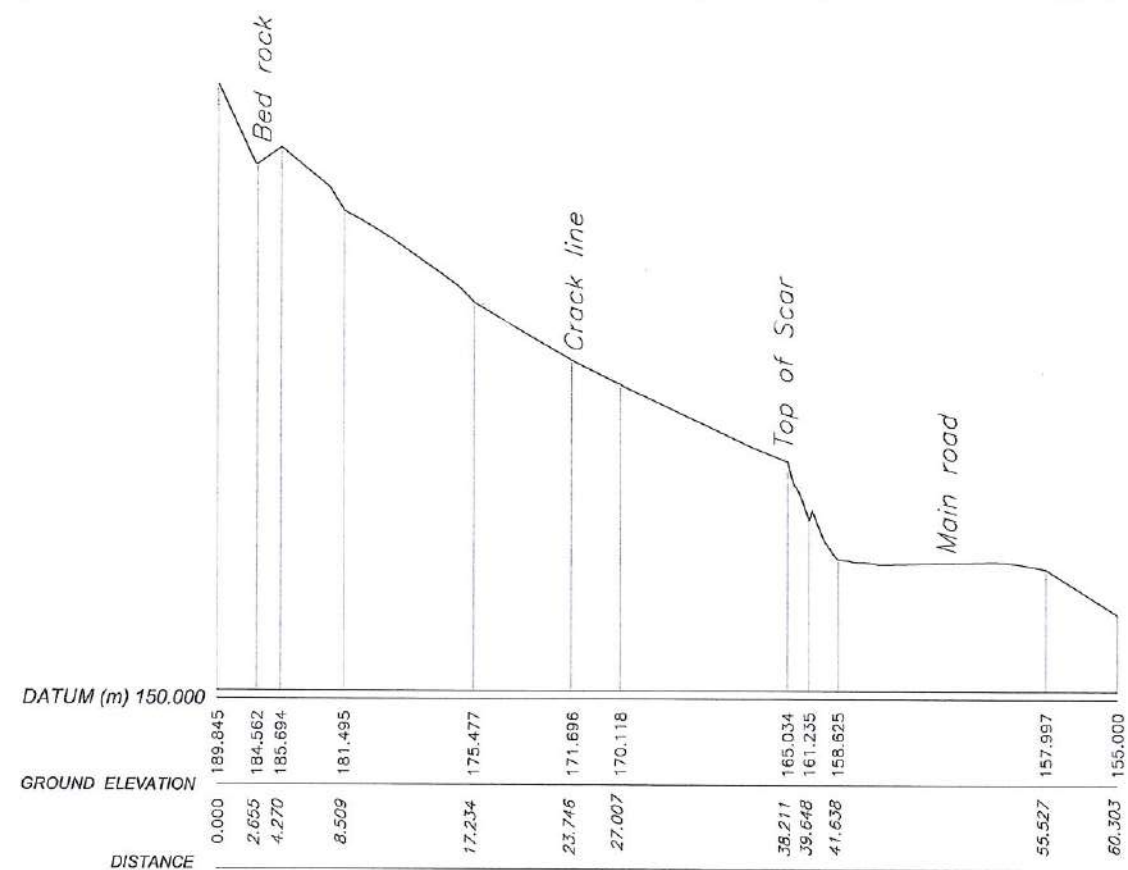
Reference  
 ZF - Zinc fence  
 Cul. - Culvert  
 B(T) - Top of Bank

<div>EMPLOYER</div> <div><div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div><div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT</div><div>NATIONAL BUILDING RESEARCH ORGANIZATION</div><div>No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div>	<div>DESIGNER</div> <div><div>DESIGN UNIT</div><div>NATIONAL BUILDING RESEARCH ORGANIZATION</div><div>No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES BETWEEN Ch 15+740 - Ch 15+790 VEYANGODA - RUWANWELLA ROAD</div>	<div>TITLE</div> <div>CONTOUR SURVEY PLAN</div>	DESCRIPTION	NAME	SIGNATURE
								SURVEYED	KAMAL DESHAPRIYA	
								CHECKED	V.G.D. GANGANI	
						SCALE	1:500	DATE	03.10.2018	
						PROJECT / DRAWING No. RLVMMP/WORKS/NCB/04A/05-VR/DR-01		REVISION	00	

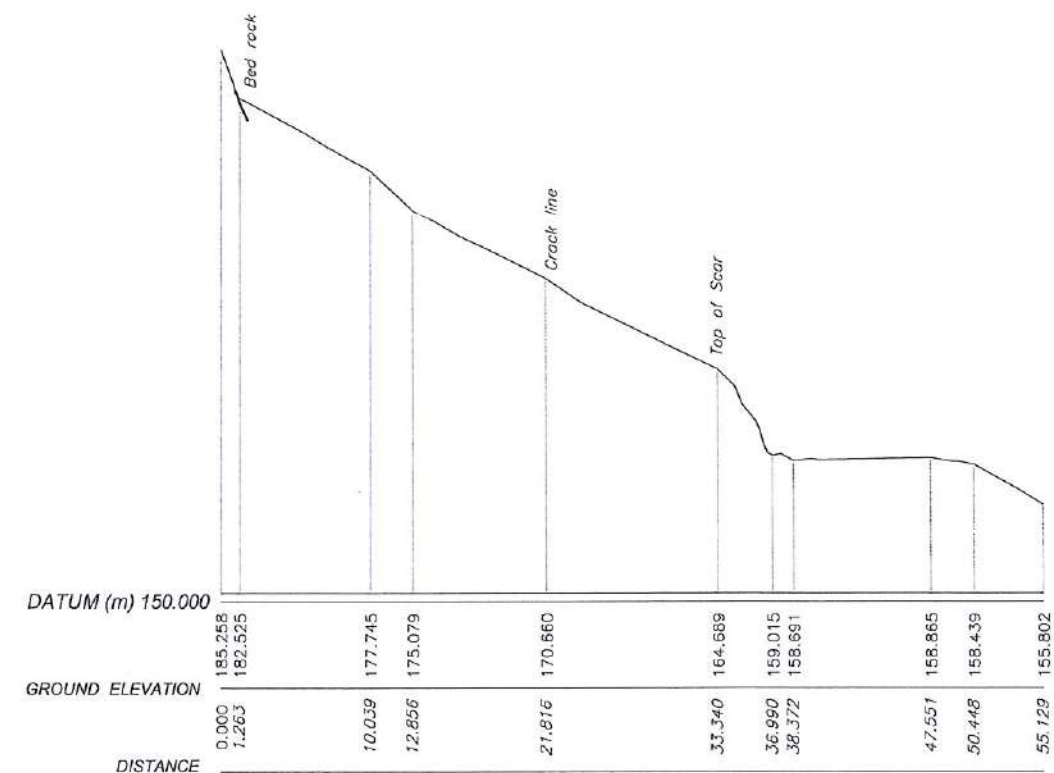




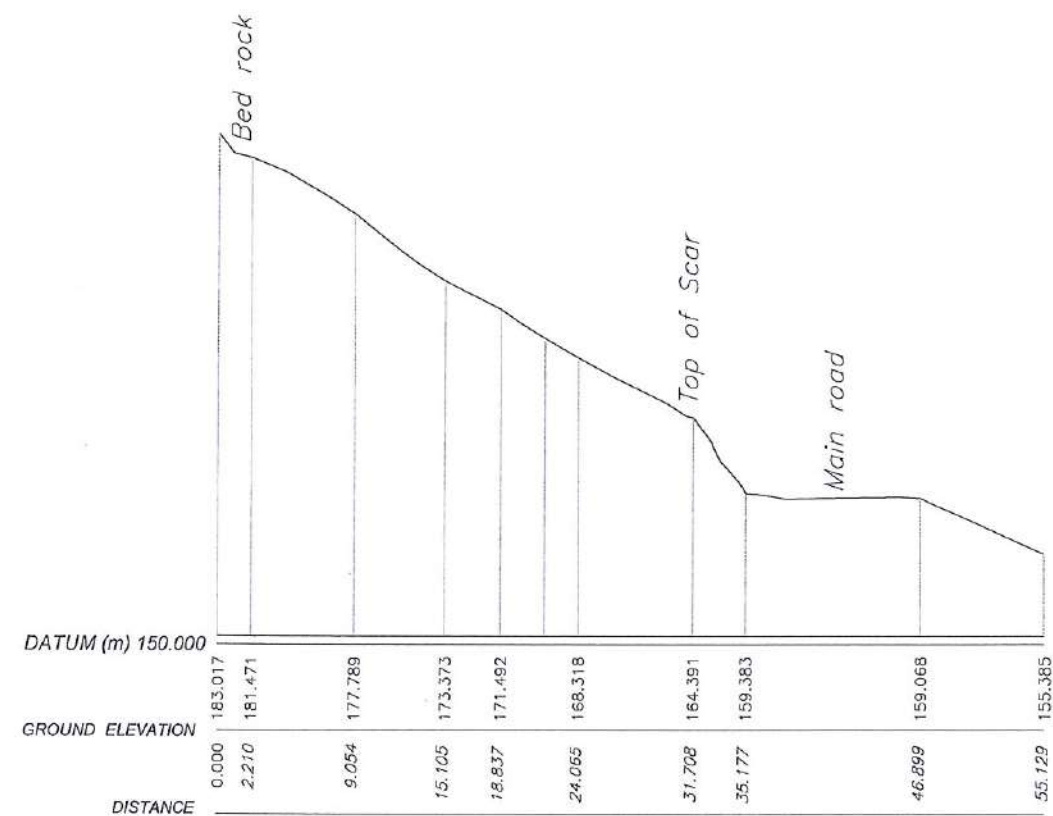
<div>EMPLOYER</div> <div></div> <div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div> <div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT</div> <div>NATIONAL BUILDING RESEARCH ORGANIZATION</div> <div>No. 99/1, JAWATTA ROAD</div> <div>COLOMBO - 05</div>	<div>DESIGNER</div> <div></div> <div>DESIGN UNIT</div> <div>NATIONAL BUILDING RESEARCH ORGANIZATION</div> <div>No. 99/1, JAWATTA ROAD</div> <div>COLOMBO - 05</div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE</div> <div>VULNERABILITY BY MITIGATION MEASURES</div> <div>BETWEEN Ch 15+740 - Ch 15+790</div> <div>VEYANGODA - RUWANWELLA ROAD</div>	<div>TITLE</div> <div>EXISTING CROSS SECTIONS</div>			DESCRIPTION	NAME	SIGNATURE	
									</				




SECTION-D



SECTION-E








SECTION-F

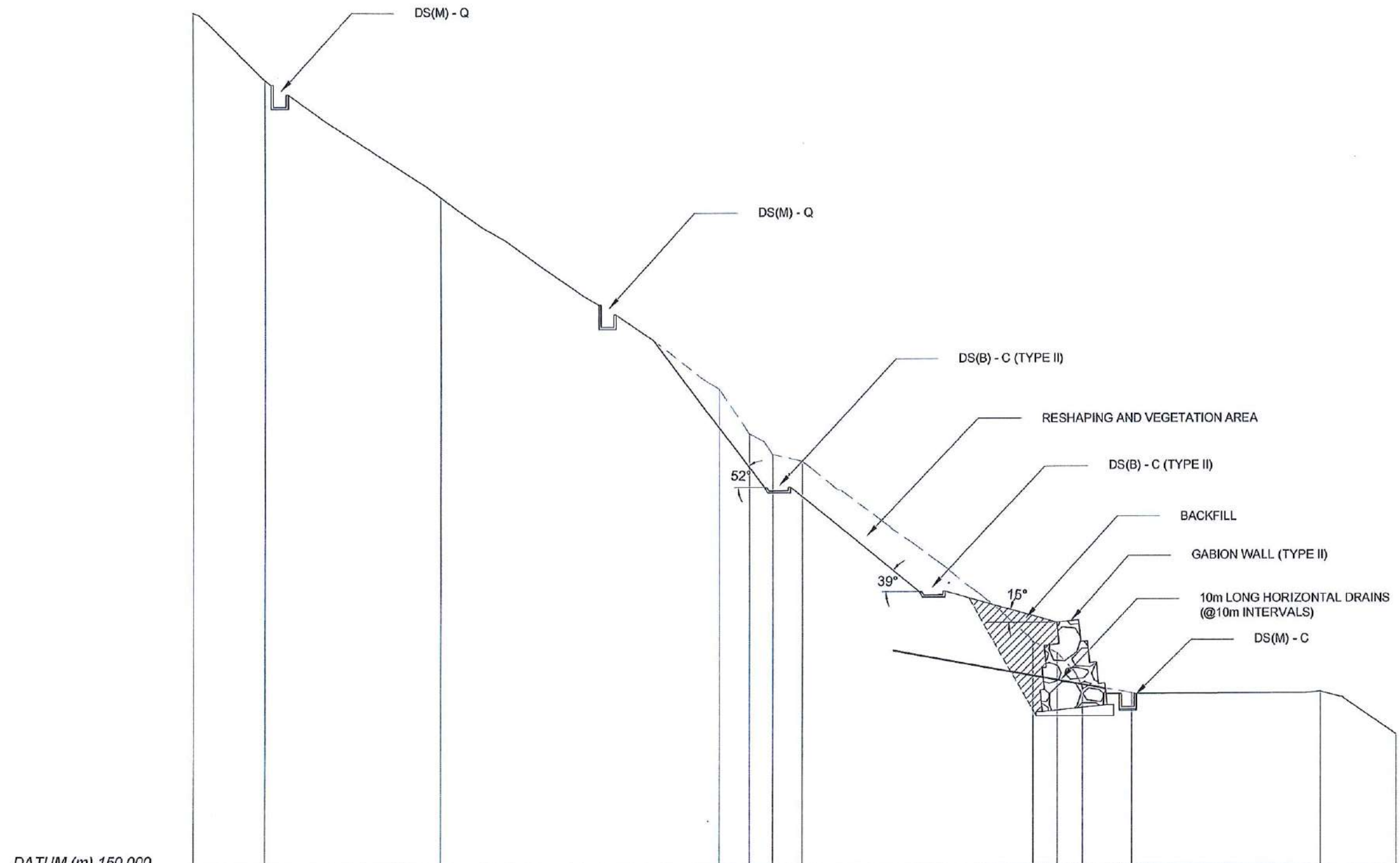
<b>EMPLOYER</b>  DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05	<b>DESIGNER</b>  DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05	REV	DATE	REVISION DESCRIPTION	APPROVAL	<b>PROJECT TITLE</b> REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES BETWEEN Ch 15+740 - Ch 15+790 VEYANGODA - RUWANWELLA ROAD	<b>TITLE</b> EXISTING CROSS SECTIONS	DESCRIPTION	NAME	SIGNATURE
								SURVEYED	KAMAL DESHAPRIYA	
								CHECKED	V.G.D. GANGANI	
						SCALE	1:500	DATE	03.10.2018	
						PROJECT / DRAWING No.	RLVMMP/WORKS/NCB/04A/05-VR/DR-02b	REVISION	00	





<div>EMPLOYER</div> <div></div> <div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div> <div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT</div> <div>NATIONAL BUILDING RESEARCH ORGANIZATION</div> <div>No. 99/1, JAWATTA ROAD</div> <div>COLOMBO - 05</div>	<div>DESIGNER</div> <div></div> <div>DESIGN UNIT</div> <div>NATIONAL BUILDING RESEARCH ORGANIZATION</div> <div>No. 99/1, JAWATTA ROAD</div> <div>COLOMBO - 05</div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE</div> <div>VULNERABILITY BY MITIGATION MEASURES</div> <div>BETWEEN Ch 15+740 - Ch 15+790</div> <div>VEYANGODA - RUWANWELLA ROAD</div>	<div>TITLE</div> <div>PLAN VIEW OF</div> <div>PROPOSED MITIGATION MEASURES</div>	DESCRIPTION	NAME	SIGNATURE
								DRAWN	B.V.S. PATTRISHIYA	
								DESIGNER	V.G.D. GANGANI	
								CHECKED	J.P. SAMARANAYAKA	
								RECOMMENDED	PROF. S.A.S. KULATHILAKA	
								APPROVED	K.N. BANDARA	
							SCALE 1:300	DATE 06.11.2020		
							PROJECT / DRAWING No.	REVISION		











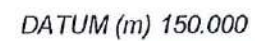


DATUM (m) 150.000



GROUND ELEVATION(m)	188.974	185.897		180.556		171.811	169.754	168.810	168.498		160.221	159.720	158.202	157.866		157.931	156.000
DISTANCE (m)	0.000	3.318		11.503		24.445	25.844	26.918	28.289		39.021	40.149	41.312	43.573		52.349	55.891

### SECTION-1

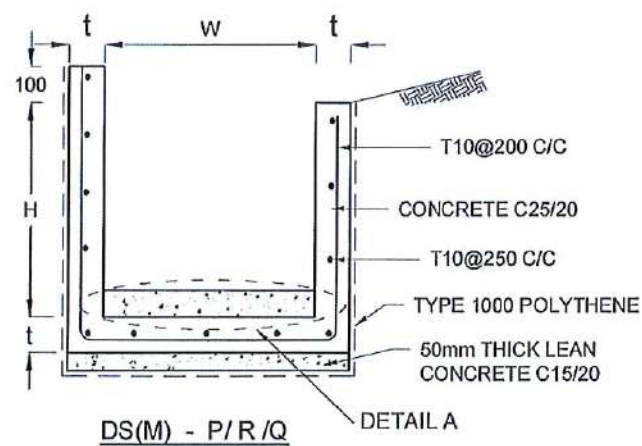
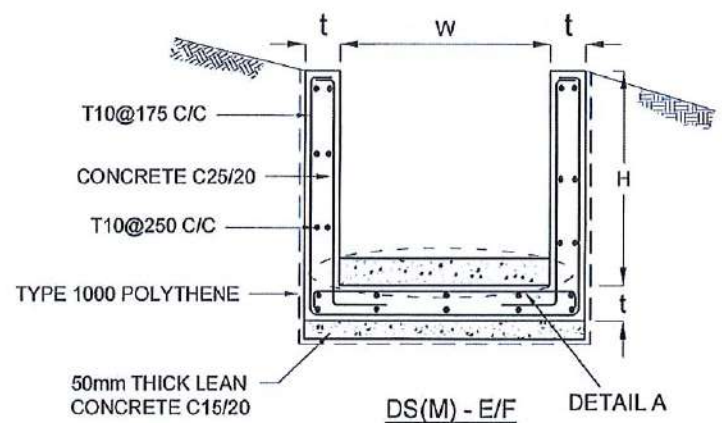
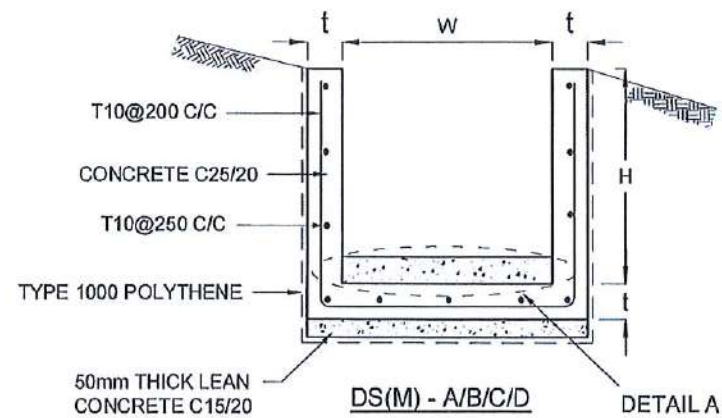
<div>EMPLOYER</div> <div><div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div><div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT</div><div>NATIONAL BUILDING RESEARCH ORGANIZATION</div><div>No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div> <div></div>	<div>DESIGNER</div> <div><div>DESIGN UNIT</div><div>NATIONAL BUILDING RESEARCH ORGANIZATION</div><div>No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES BETWEEN Ch 15+740 - Ch 15+790 VEYANGODA - RUWANWELLA ROAD</div>	<div>TITLE</div> <div>CROSS SECTIONS OF PROPOSED MITIGATION MEASURES</div>			DESCRIPTION	NAME	SIGNATURE
		DRAWN	B.V.S. PATTRISHIYA									
		DESIGNER	V.G.D. GANGANI									
		CHECKED	J.P. SAMARANAYAKA									
		RECOMMENDED	PROF. S.A.S. KULATHILAKA									
		APPROVED	K.N. BANDARA									
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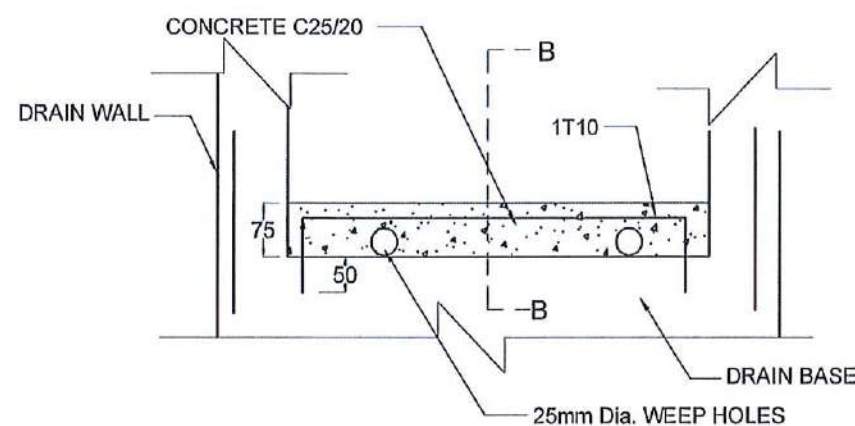
## SECTION-2

 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05	 DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE  REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES BETWEEN Ch 15+740 - Ch 15+790 VEYANGODA - RUWANWELLA ROAD	TITLE  CROSS SECTIONS OF PROPOSED MITIGATION MEASURES		DESCRIPTION	NAME	SIGNATURE					
									DRAWN	B.V.S. PATTRISHIYA						
									DESIGNER	V.G.D. GANGANI						
									CHECKED	J.P. SAMARANAYAKA						
										SCALE	1:200	DATE	06.11.2020	RECOMMENDED	PROF. S.A.S. KULATHILAKA	
										PROJECT / DRAWING No.	RLVMMP/WORKS/NCB/04/A/05-VR/DR-04b	REVISION	00	APPROVED	K.N. BANDARA	

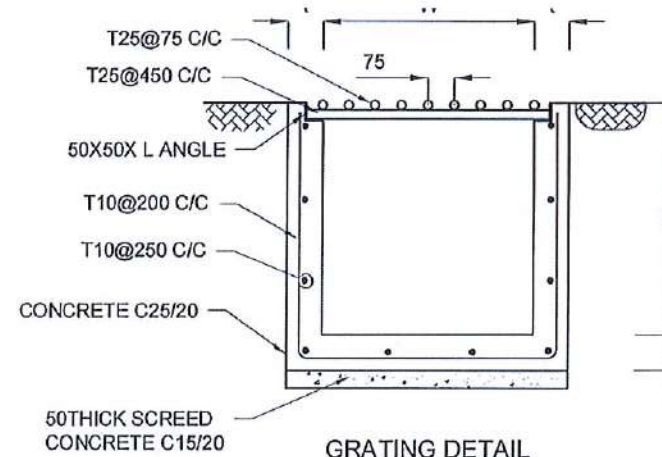




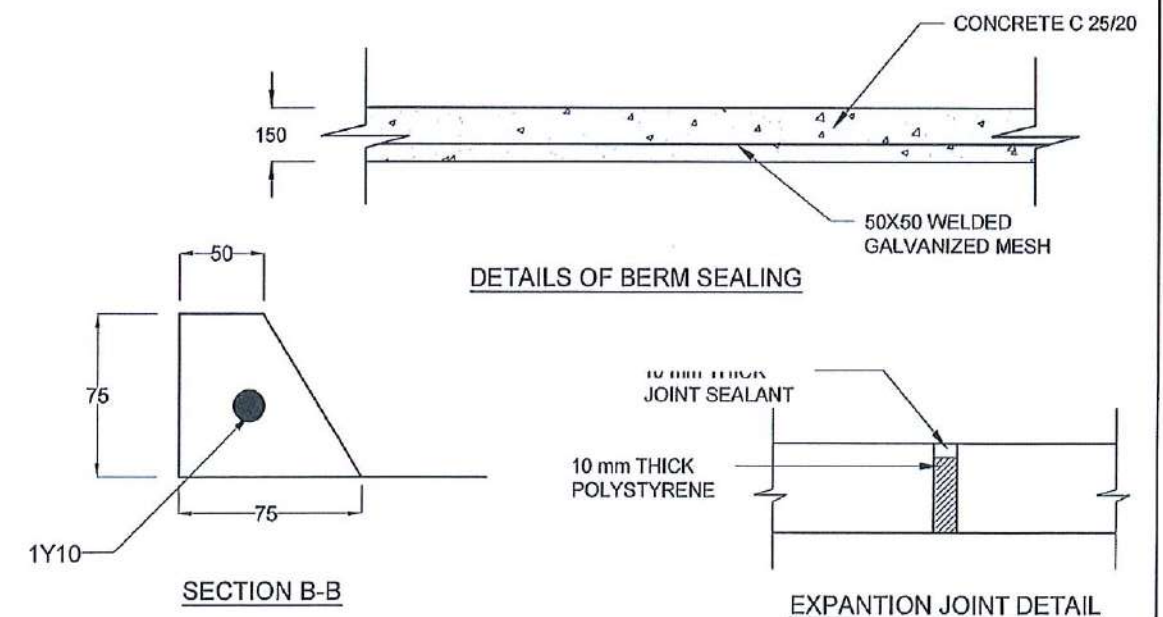
DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (M) - A/P	300	300	100
DS (M) - B/R	450	450	100
DS (M) - C/Q	600	600	100
DS (M) - D	750	750	125
DS (M) - E	900	900	150
DS (M) - F	1000	1000	150



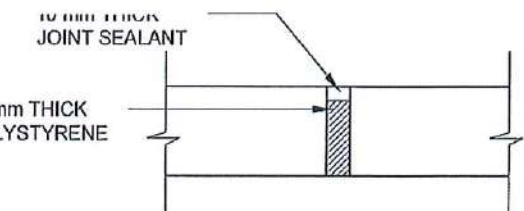
DETAIL A - (ENERGY BREAKER AT 3M)



GRATING DETAIL



SECTION B-B



EXPANTION JOINT DETAIL

#### NOTES

1. DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS
2. STEPS SHALL BE CONSTRUCTED AT SURFACE DRAIN ON SLOPING GROUND ACCORDING TO THE SITE CONDITIONS AS INSTRUCTED BY THE ENGINEER.
3. ENERGY BREAKERS SHALL BE CONSTRUCTED AT THE STEEP DRAIN SEGMENTS AS PER THE INSTRUCTIONS OF THE ENGINEER.
4. DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
5. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
6. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.

#### CONCRETE

7. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
  - [a] SCREED - C. 15/20
  - [b] WALLS / BASE / ENERGY BREAKERS - C. 25/20

#### REINFORCEMENT

8. ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm<sup>2</sup>.
9. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 50 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
10. ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
11. REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
12. COVER TO REINFORCEMENT
  - [a] BURIED FACES AND DRAIN INVERTS - 40 mm
  - [b] ALL OTHER FACES - 25 mm

EMPLOYER  
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS  
AND DISASTER MANAGEMENT  
NATIONAL BUILDING RESEARCH ORGANIZATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

DESIGNER  
DESIGN UNIT  
NATIONAL BUILDING RESEARCH ORGANISATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

REV	DATE	REVISION DESCRIPTION	APPROVAL

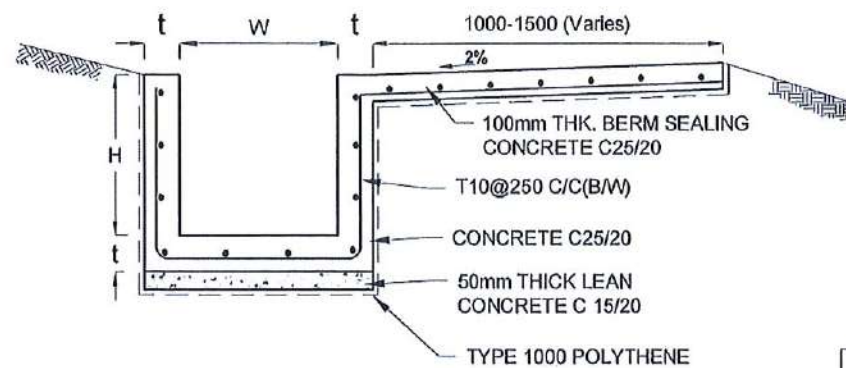
REDUCTION OF LANDSLIDE  
VULNERABILITY BY MITIGATION MEASURES  
BETWEEN Ch 15+740 - Ch 15+790  
VEYANGODA - RUWANWELLA ROAD

TITLE  
DETAILS OF DRAINS  
(SURFACE DRAIN - 1 OF 2)

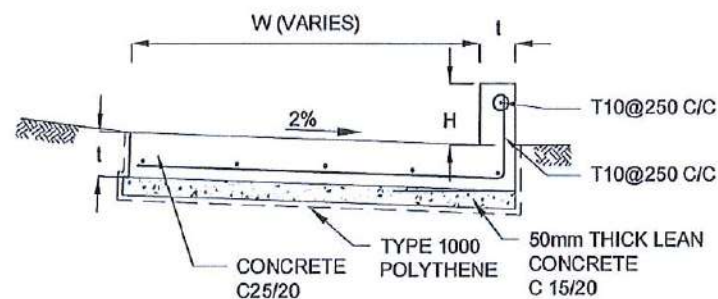
SCALE: N.T.S. DATE: 06.11.2020  
PROJECT / DRAWING No. RLVMMP/WORKS/NCB/04A/05-VR/DR-05a REVISION: 00

DESCRIPTION	NAME	SIGNATURE
DRAWN	B.V.S. PATRISHIVA	<i>[Signature]</i>
DESIGNER	V.G.D. GANGANI	<i>[Signature]</i>
CHECKED	J.P. SAMARANAYAKA	<i>[Signature]</i>
RECOMMENDED	PROF. S.A.S. KULATHILAKA	<i>[Signature]</i>
APPROVED	K.N. BANDARA	<i>[Signature]</i>

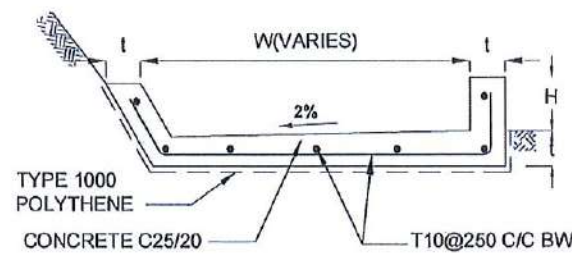




DS (B) - (TYPE I)

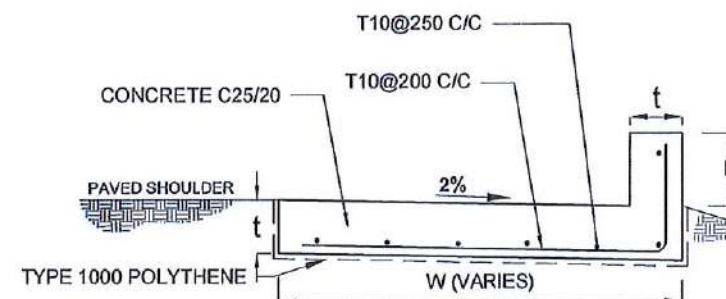


DS (K) - TYPE I

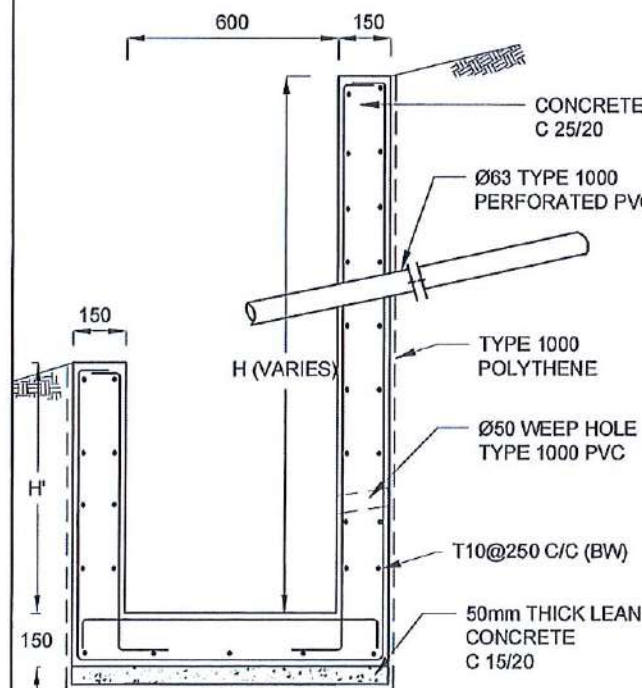


DS (B) - (TYPE II)

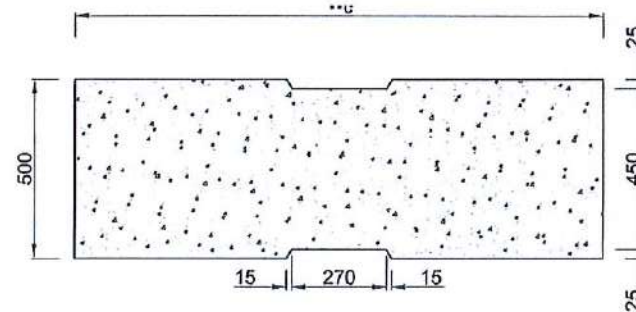
DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (K) - A	1000	200	100
DS (K) - B	1000	300	100
DS (K) - C	1150	200	200



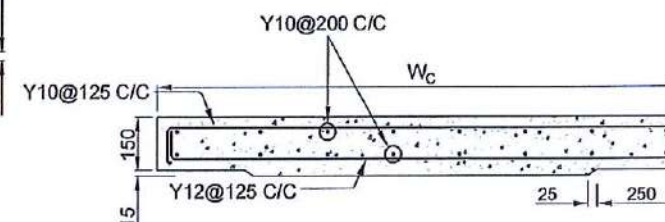
DS (K) - TYPE II



DS (M) - L



PLAN VIEW OF COVER SLAB



ACCESS & HEAVY DUTY COVER SLAB  
SECTION OF (W<sub>c</sub> x 500 x 150mm)

DS (M) - L	W (mm)	H' (mm)	t (mm)
TYPE I	600	600	150
TYPE II	800	800	150

DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (B) - A	300	300	100
DS (B) - B	450	450	100
DS (B) - C	1000	150	100

#### NOTES

- DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
- STEPS SHALL BE CONSTRUCTED AT SURFACE DRAIN ON SLOPING GROUND ACCORDING TO THE SITE CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- ENERGY BREAKERS SHALL BE CONSTRUCTED AT THE STEEP DRAIN SEGMENTS AS PER THE INSTRUCTIONS OF THE ENGINEER.
- DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- COVER SLABS NEED TO BE PROVIDED ONLY FOR THE REGIONS AS INSTRUCTED BY THE ENGINEER.
- COVER SLAB WIDTH (W<sub>c</sub>) SHOULD BE TAKEN AS THE SUM OF DRAIN WIDTH AND 2x DRAIN WALL THICKNESS. [W<sub>c</sub> = W+2x t]
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
- 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.

#### CONCRETE

- USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
 

[a]	SCREED	- C. 15/20
[b]	WALLS / BASE / ENERGY BREAKERS	- C. 25/20

#### REINFORCEMENT

- ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm<sup>2</sup>.
- BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 50 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
- ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
- REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
- COVER TO REINFORCEMENT
 

[a]	BURIED FACES AND DRAIN INVERTS	- 40 mm
[b]	ALL OTHER FACES	- 25 mm

EMPLOYER  
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS  
AND DISASTER MANAGEMENT  
NATIONAL BUILDING RESEARCH ORGANIZATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

DESIGNER  
DESIGN UNIT  
NATIONAL BUILDING RESEARCH ORGANISATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE

REDUCTION OF LANDSLIDE  
VULNERABILITY BY MITIGATION MEASURES  
BETWEEN Ch 15+740 - Ch 15+790  
VEYANGODA - RUWANWELLA ROAD

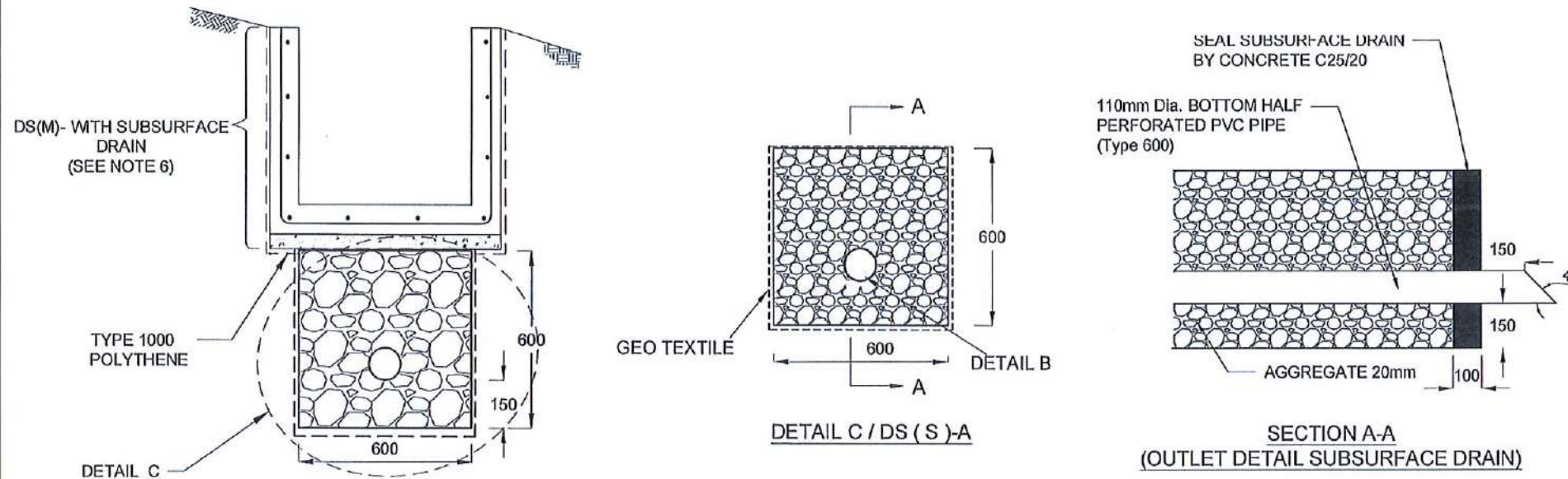
TITLE  
DETAILS OF DRAINS  
(SURFACE DRAIN - 2 OF 2)

SCALE: N.T.S.  
PROJECT / DRAWING No.  
RLVMM/WORKS/NCB/04/05-VR/DR-05b

DATE: 06.11.2020  
REVISION: 00

DESCRIPTION	NAME	SIGNATURE
DRAWN	B.V.S. PATRISHIYA	<i>[Signature]</i>
DESIGNER	V.G.D. GANGANI	<i>[Signature]</i>
CHECKED	J.P. SAMARANAYAKA	<i>[Signature]</i>
RECOMMENDED	PROF. S.A.S. KULATHILAKA	<i>[Signature]</i>
APPROVED	K.N. BANDARA	<i>[Signature]</i>





#### NOTES

1. W,H,t; SHALL BE THE SAME AS RESPECTIVE DRAIN SECTION.
2. CP - R SHALL BE USED WHERE  $H \geq 900\text{mm}$
3. DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
4. DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
5. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.
6. DETAILS OF SURFACE DRAIN PORTION OF THE SUBSURFACE DRAINS SHALL BE AS PER DS(M), DS(B), DS(K) OR DS(C) SECTIONS ACCORDINGLY.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.

#### CONCRETE

8. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
  - [a] SCREED - C. 15/20
  - [b] WALLS / BASE / ENERGY BREAKERS - C. 25/20

#### REINFORCEMENT

9. ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN  $460\text{N/mm}^2$ .
10. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPEI FOR A LENGTH OF  $50 \times \text{BAR DIA.}$  AND LAPPING SHOULD BE STAGGERED.
11. ANCHORAGE LENGTH SHOULD BE  $40 \times \text{BAR DIA.}$
12. REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
13. COVER TO REINFORCEMENT
  - [a] BURIED FACES AND DRAIN INVERTS - 40 mm
  - [b] ALL OTHER FACES - 25 mm

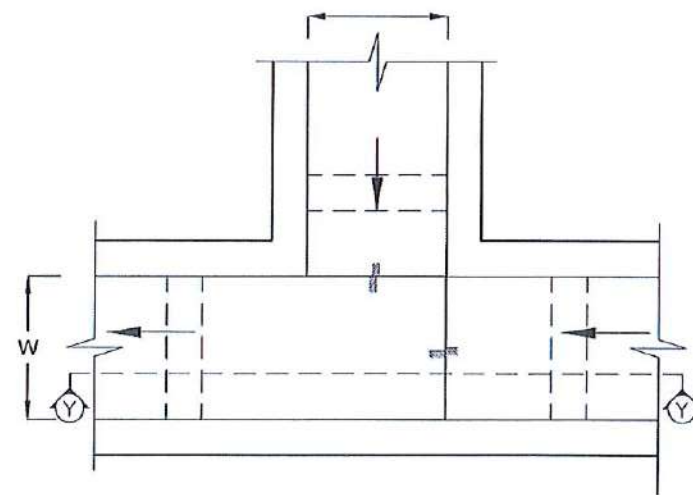
SUBSURFACE DRAIN  
[DS (S) - A]

100mm x 5mm  
Groove

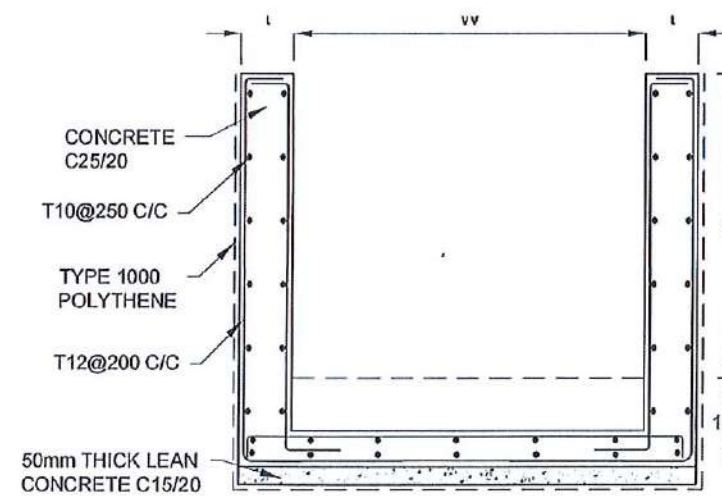
SECTION Y - Y

DETAIL - B (PERFORATED PIPE FOR SUB-SURFACE DRAINS)

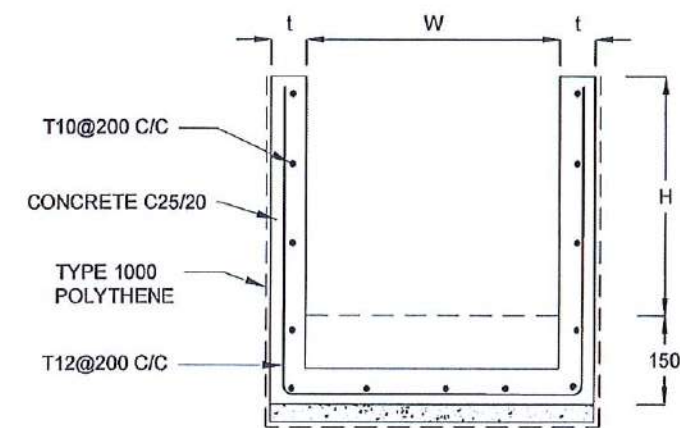
PLAN VIEW





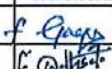




PLAN VIEW OF CATCH PIT (CP)



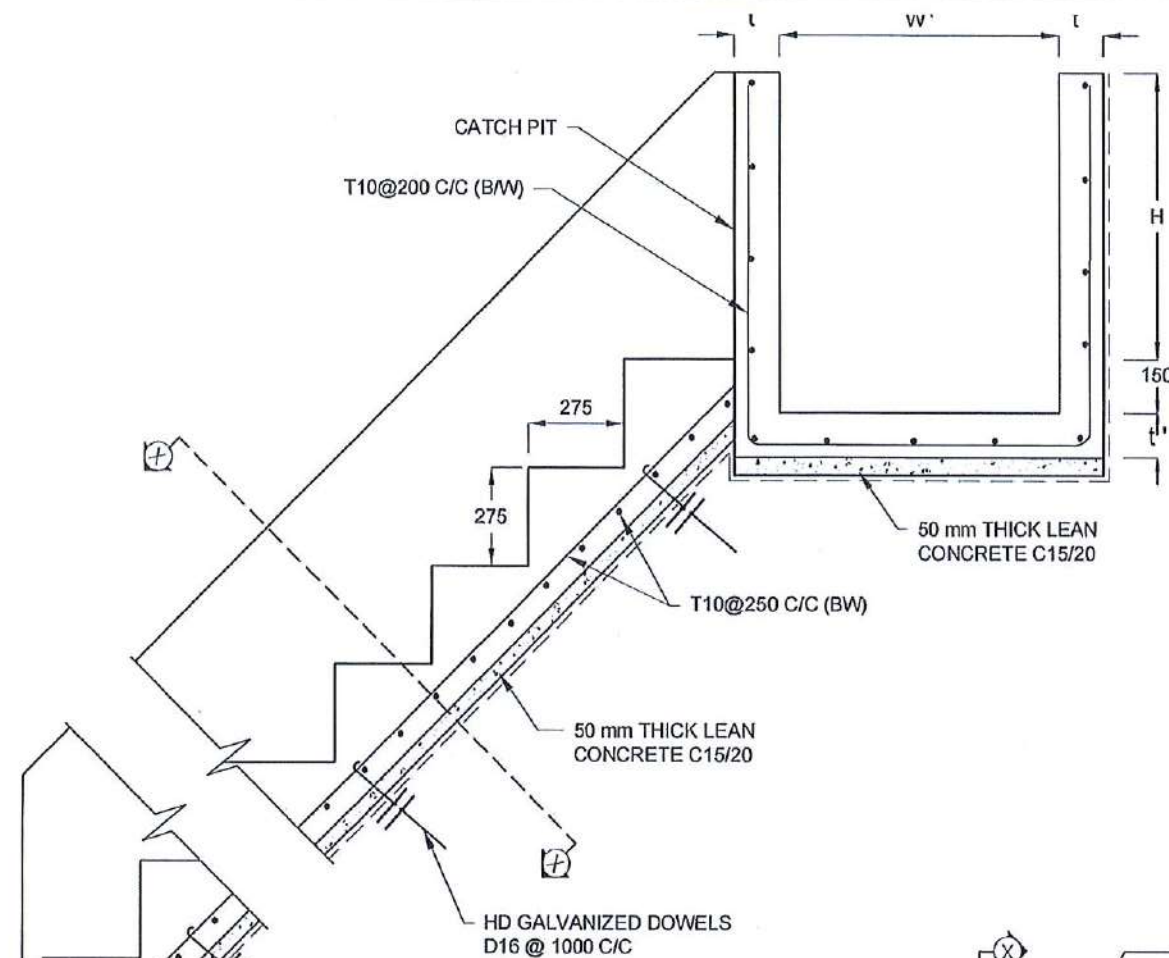
SECTION Y-Y (CP-R)



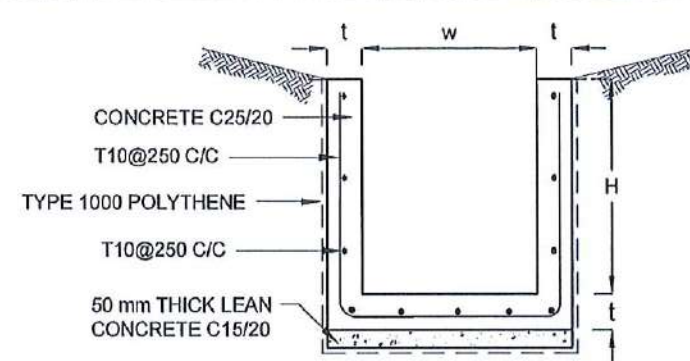
SECTION Y - Y

EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05	 DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05					REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES BETWEEN Ch 15+740 - Ch 15+790 VEYANGODA - RUWANWELLA ROAD	DETAILS OF DRAINS (SUBSURFACE DRAIN AND CATCHPIT)	DRAWN	B.V.S. PATRISHIYA	
								DESIGNER	V.G.D. GANGANI	
								CHECKED	J.P. SAMARANAYAKA	
								RECOMMENDED	PROF. S.A.S. KULATHILAKA	
								APPROVED	K.N. BANDARA	
							SCALE	N.T.S.	DATE	06.11.2020
							PROJECT / DRAWING No.	RLV/MMP/WORKS/NCB/04A/05-VR/DR-05c	REVISION	00

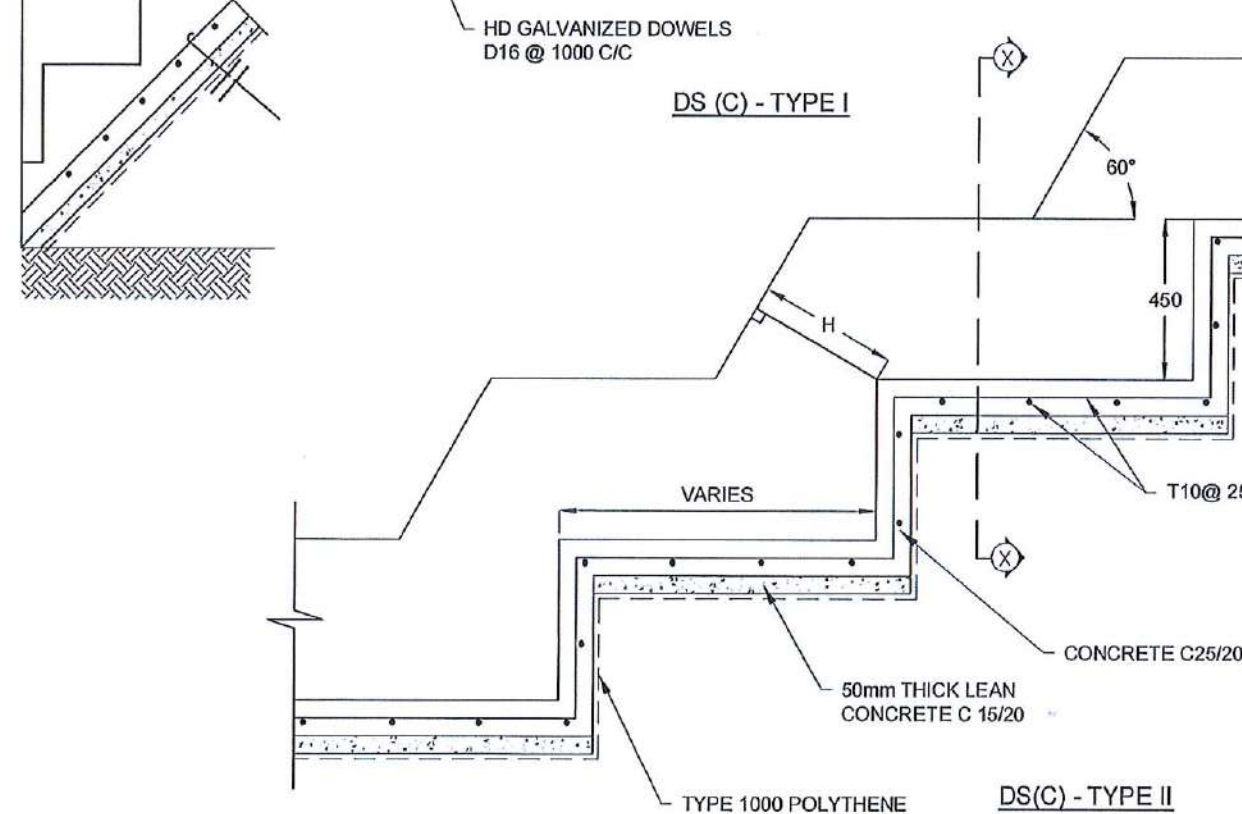




DS (C) - TYPE I



SECTION X-X



DS(C) - TYPE II

#### NOTES

- USE EITHER TYPE I OR TYPE II CASCADE DRAIN ACCORDING TO THE ACTUAL GROUND CONDITION AS INSTRUCTED BY THE ENGINEER.
- LENGTH OF THE STEPS OF CASCADE WILL BE VARIED ACCORDING TO THE SITE CONDITIONS.
- DEPTH OF EXCAVATION SHALL BE VARIED ACCORDING TO SITE CONDITIONS.
- DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.

#### CONCRETE

- USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
 

[a]	SCREED	- C. 15/20
[b]	WALLS / BASE / ENERGY BREAKERS	- C. 25/20

#### REINFORCEMENT

- ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm<sup>2</sup>.
- BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 50 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
- ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
- REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
- COVER TO REINFORCEMENT
 

[a]	BURIED FACES AND DRAIN INVERTS	- 40 mm
[b]	ALL OTHER FACES	- 25 mm

DRAIN TYPE	W (mm)	H (mm)	t (mm)	W' (mm)	t' (mm)
DS (C) - A	450	450	100	600	100
DS (C) - B	450	600	100	750	100
DS (C) - C	600	600	100	800	100
DS (C) - D	750	750	100	800	100
DS (C) - E	800	800	125	1000	125
DS (C) - F	1000	750	125	1200	125

EMPLOYER  
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS  
AND DISASTER MANAGEMENT  
NATIONAL BUILDING RESEARCH ORGANIZATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

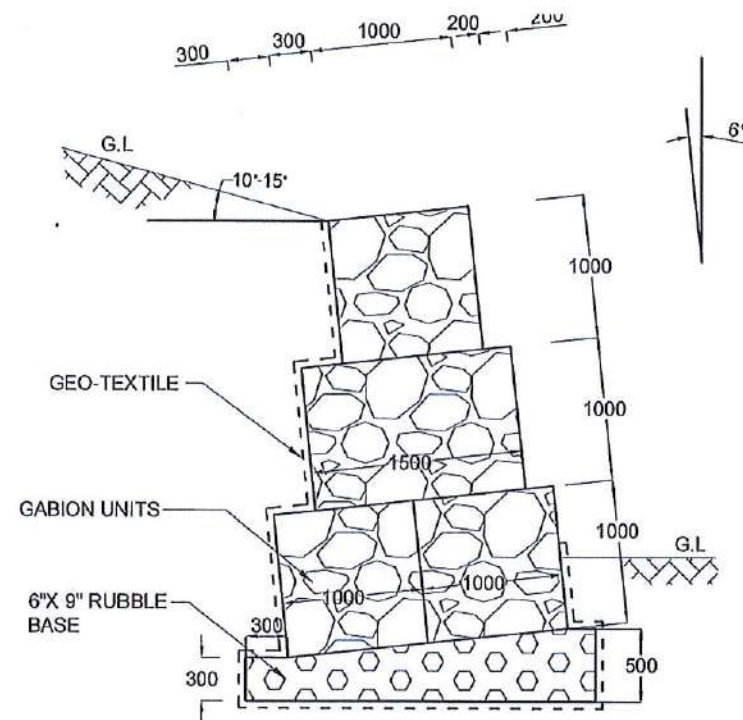
DESIGNER  
DESIGN UNIT  
NATIONAL BUILDING RESEARCH ORGANISATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

REV	DATE	REVISION DESCRIPTION	APPROVAL

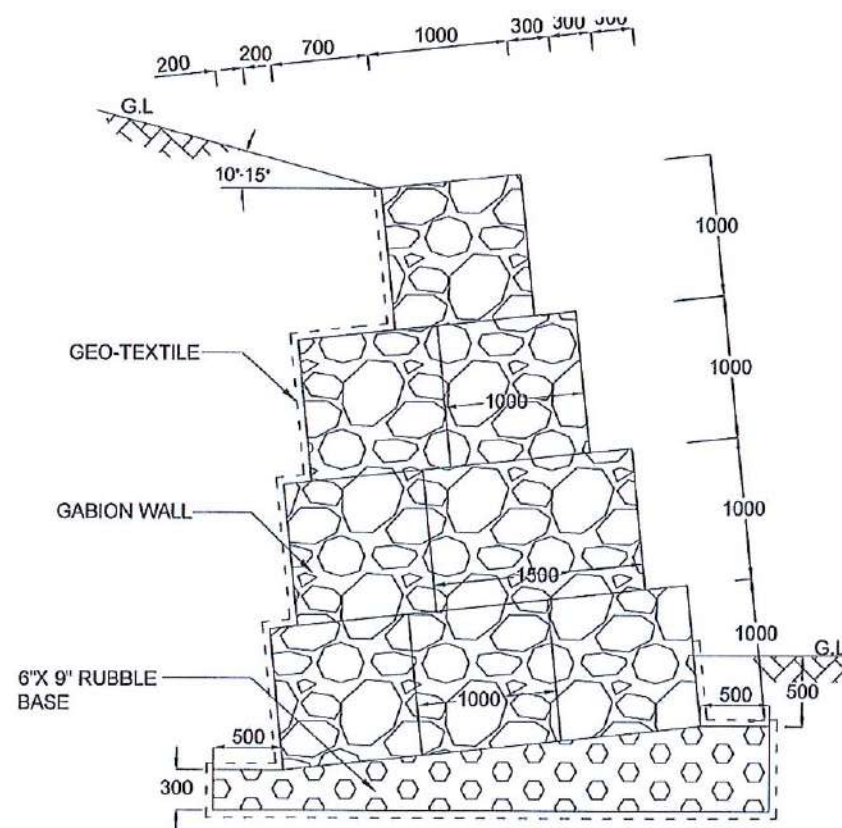
PROJECT TITLE  
REDUCTION OF LANDSLIDE  
VULNERABILITY BY MITIGATION MEASURES  
BETWEEN Ch 15+740 - Ch 15+790  
VEYANGODA - RUWANWELLA ROAD

TITLE	DESCRIPTION	NAME	SIGNATURE
DETAILS OF DRAINS (CASCADE DRAIN)	DRAWN	B.V.S. PATTRISHIYA	<i>[Signature]</i>
	DESIGNER	V.G.D. GANGANI	<i>[Signature]</i>
	CHECKED	J.P. SAMARANAYAKA	<i>[Signature]</i>
	RECOMMENDED	PROF. S.A.S. KULATHILAKA	<i>[Signature]</i>
SCALE: N.T.S.	DATE: 06.11.2020	REVISION: 00	APPROVED: K.N. BANDARA

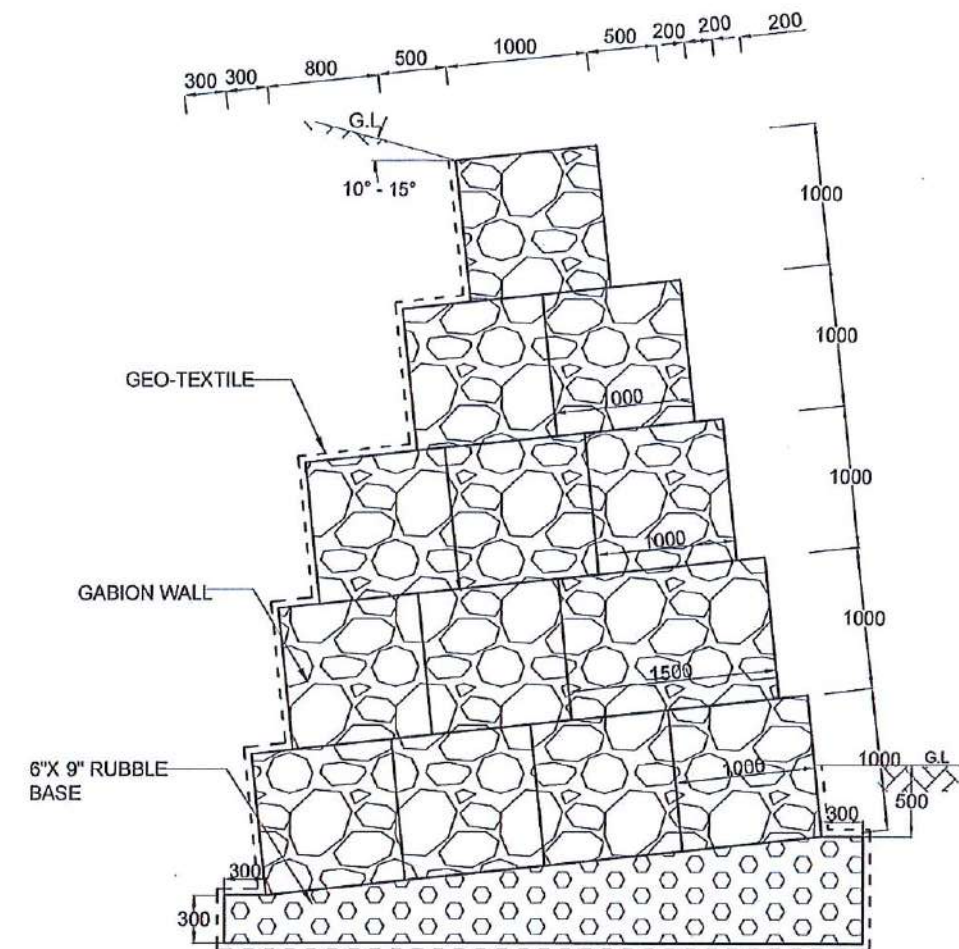




GABION WALL  
TYPE I




















GABION WALL  
TYPE II



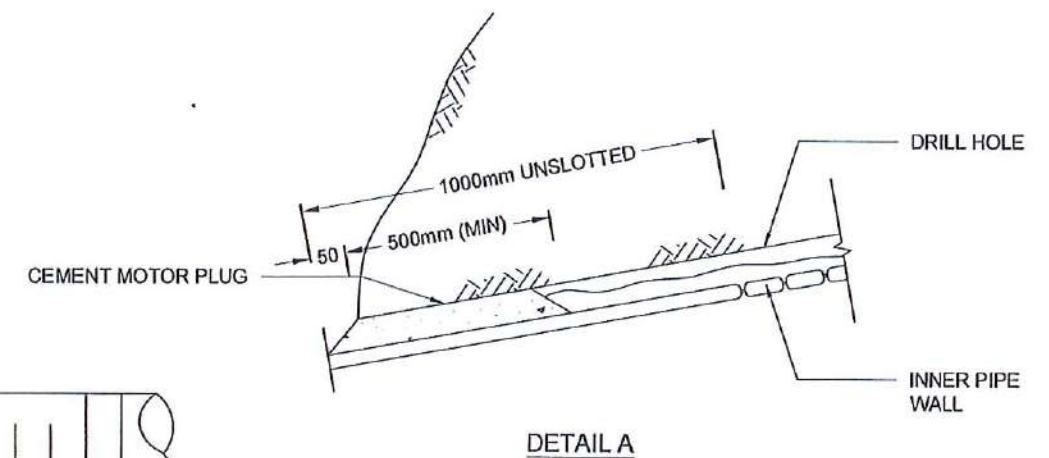
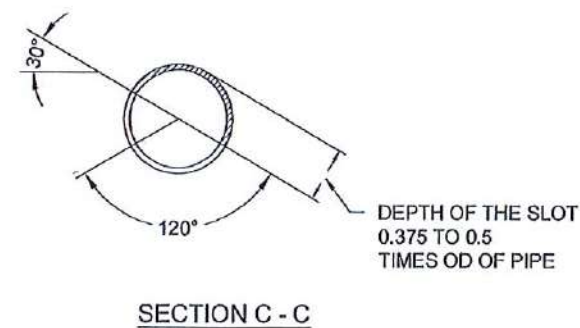
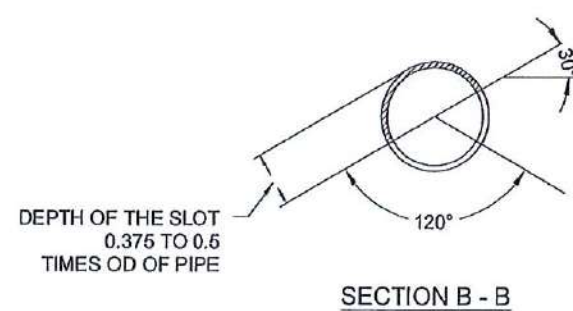
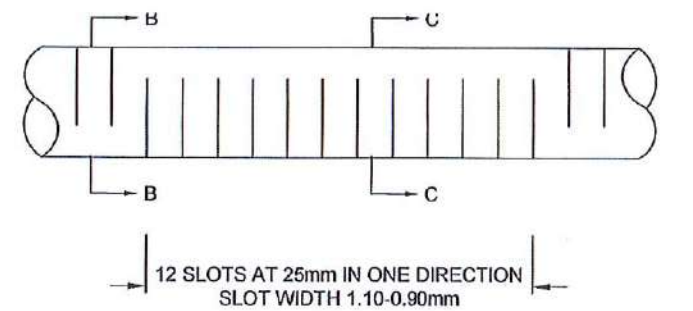
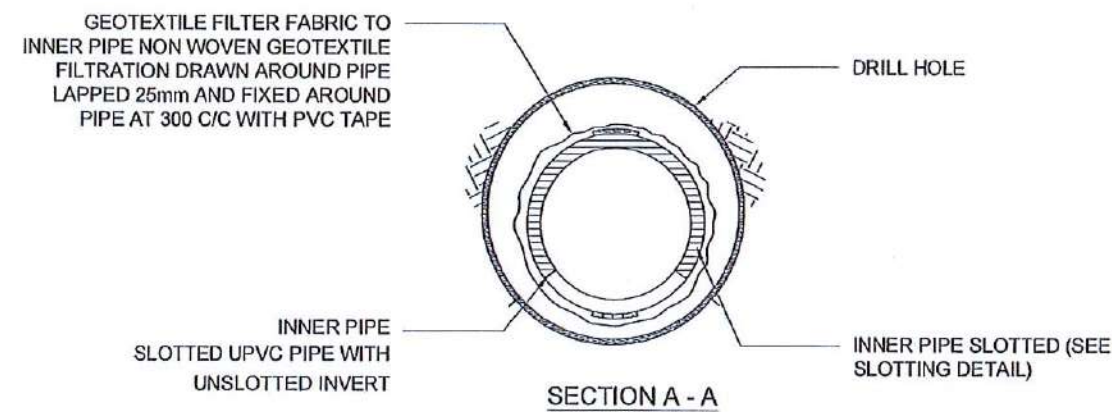
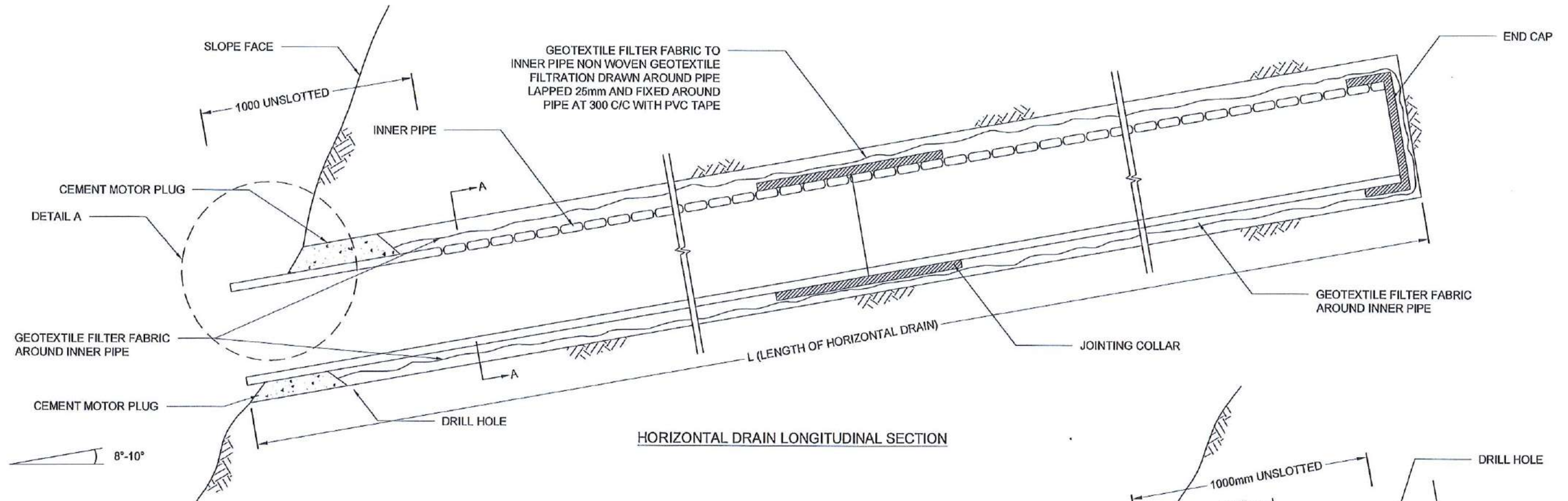
GABION WALL  
TYPE III

# NOTES

- ALL DIMENSIONS ARE IN MILLIMETERS.




<div>EMPLOYER</div> <div><div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div>		<div>DESIGNER</div> <div><div>DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div>		<table><tr><th>REV</th><th>DATE</th><th>REVISION DESCRIPTION</th><th>APPROVAL</th></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></table>		REV	DATE	REVISION DESCRIPTION	APPROVAL																													<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES BETWEEN Ch 15+740 - Ch 15+790 VEYANGODA - RUWANWELLA ROAD</div>		<div>TITLE</div> <div>DETAILS OF GABION WALL</div> <table><tr><td>SCALE</td><td>N.T.S.</td><td>DATE</td><td>06.11.2020</td></tr><tr><td colspan="2">PROJECT / DRAWING No. RLVMPP/WORKS/NCB/04/05-VR/DR-06</td><td>REVISION</td><td>00</td></tr></table>				SCALE	N.T.S.	DATE	06.11.2020	PROJECT / DRAWING No. RLVMPP/WORKS/NCB/04/05-VR/DR-06		REVISION	00	<table><tr><th>DESCRIPTION</th><th>NAME</th><th>SIGNATURE</th></tr><tr><td>DRAWN</td><td>B.V.S. PATTRISHIYA</td><td></td></tr><tr><td>DESIGNER</td><td>V.G.D. GANGANI</td><td></td></tr><tr><td>CHECKED</td><td>J.P. SAMARANAYAKA</td><td></td></tr><tr><td>RECOMMENDED</td><td>PROF. S.A.S. KULATHILAKA</td><td></td></tr><tr><td>APPROVED</td><td>K.N. BANDARA</td><td></td></tr></table>		DESCRIPTION	NAME	SIGNATURE	DRAWN	B.V.S. PATTRISHIYA		DESIGNER	V.G.D. GANGANI		CHECKED	J.P. SAMARANAYAKA		RECOMMENDED	PROF. S.A.S. KULATHILAKA		APPROVED	K.N. BANDARA	
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#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. PIPE DIAMETERS, ANGLE & LENGTHS AS SPECIFIED IN DRAWINGS.
3. ALL MATERIALS SHALL CONFORM TO PROJECT SPECIFICATION

<div>EMPLOYER</div> <div><div></div><div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1 ,JAWATTA ROAD COLOMBO - 05</div><div></div></div>		<div>DESIGNER</div> <div><div></div><div>DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1 ,JAWATTA ROAD COLOMBO - 05</div><div></div></div>		<table><tr><th>REV</th><th>DATE</th><th>REVISION 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NOTE: Heights are based on an arbitrary datum.  
Contour Interval - 1.0m  
Area surveyed 0.86 Hectares

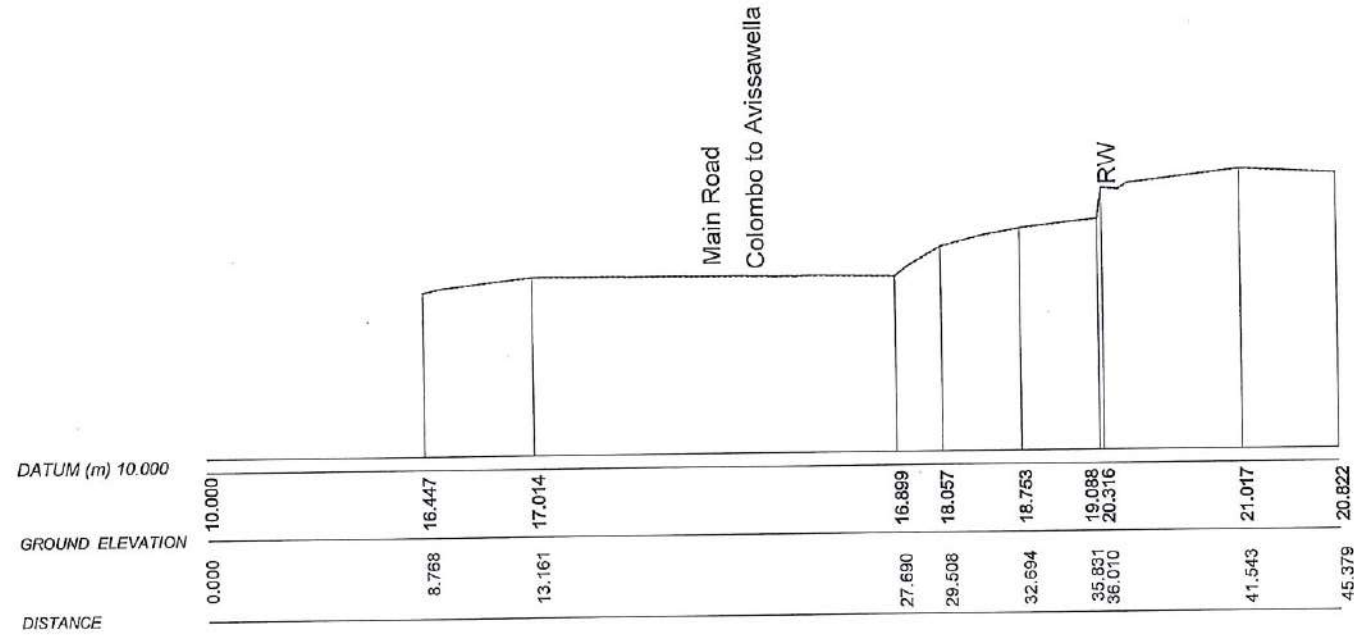
LEVEL PLAN NO:  
2017/L/Colombo/LRRMD-34



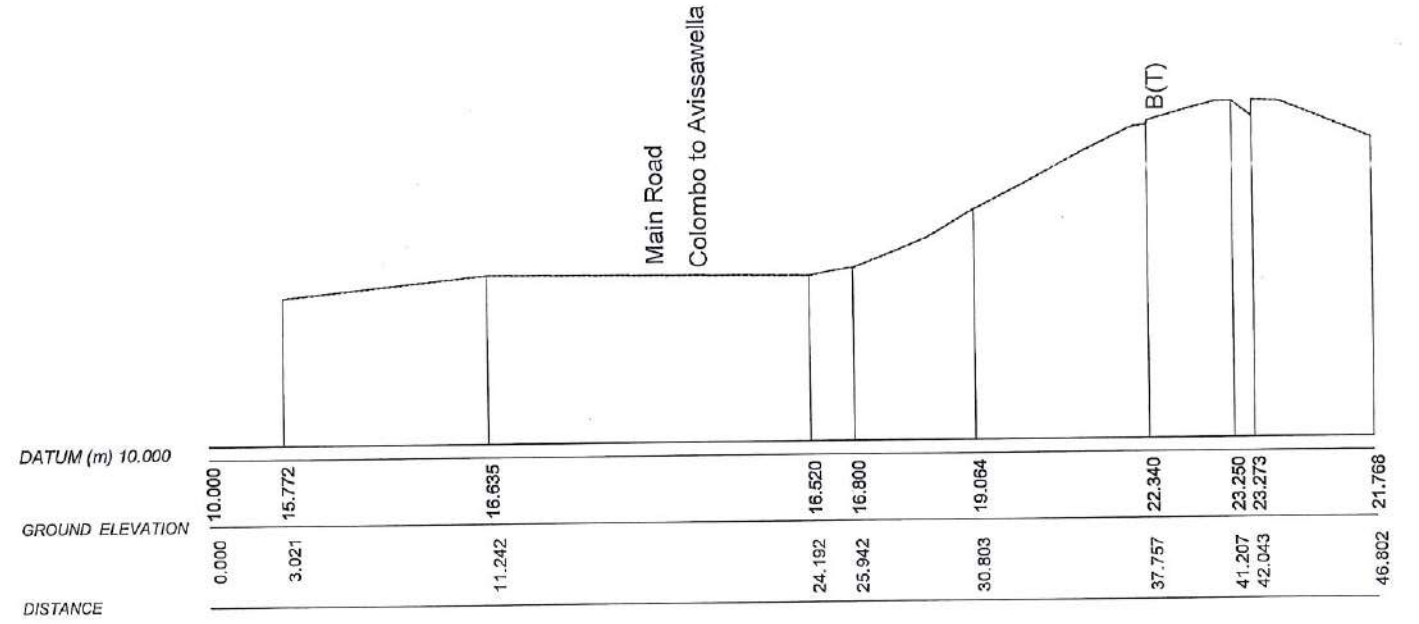
REFERENCE

- B(T) - Top of Bank
- B(B) - Bottom of Bank
- P - Permanent building
- Cdn - Concrete Drain
- EP - Electricity Pole
- Edn - Earth Drain
- MW - Masonry Well
- RW - Retaining Wall
- BW - Boundary Wall
- G - Gate
- CUL - Culvert

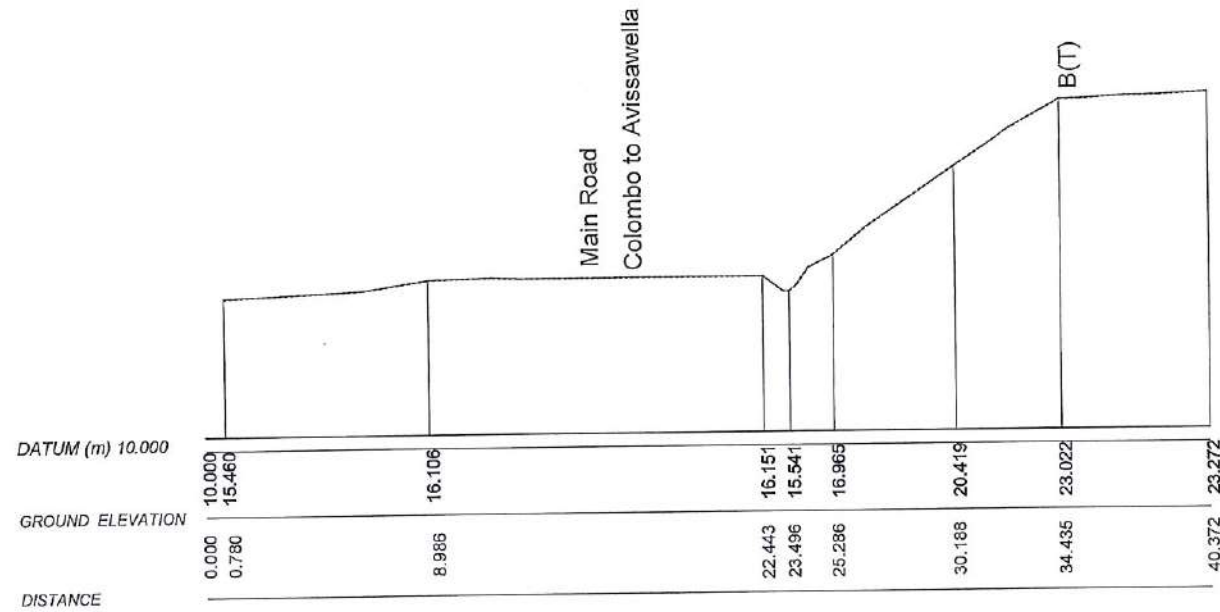
<div>EMPLOYER</div> <div></div> <div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div> <div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS</div> <div>AND DISASTER MANAGEMENT</div> <div>NATIONAL BUILDING RESEARCH ORGANISATION</div> <div>No. 99/1, JAWATTA ROAD</div> <div>COLOMBO - 05</div>	<div>DESIGNER</div> <div></div> <div>DESIGN UNIT</div> <div>NATIONAL BUILDING RESEARCH ORGANISATION</div> <div>No. 99/1, JAWATTA ROAD</div> <div>COLOMBO - 05</div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
REDUCTION OF LANDSLIDE						CONTOUR SURVEY PLAN				
VULNERABILITY BY MITIGATION MEASURES										
KALUAGGALA JUNCTION										
SCALE							N.T.S	DATE	12.11.2020	
PROJECT / DRAWING No.							RLVMM/WORKS/NCB/04A/12-KA/DR-1	REVISION	00	



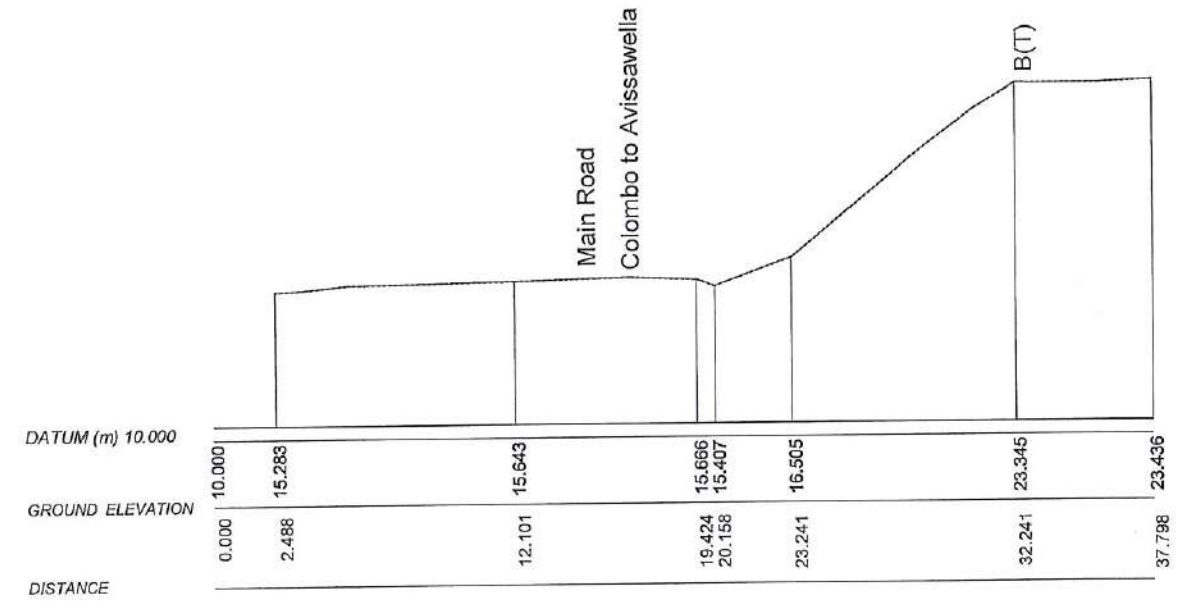
SECTION-A



SECTION-B



SECTION-C



SECTION-D



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS  
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NATIONAL BUILDING RESEARCH ORGANISATION  
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COLOMBO - 05



DESIGNER  
NATIONAL BUILDING RESEARCH ORGANISATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

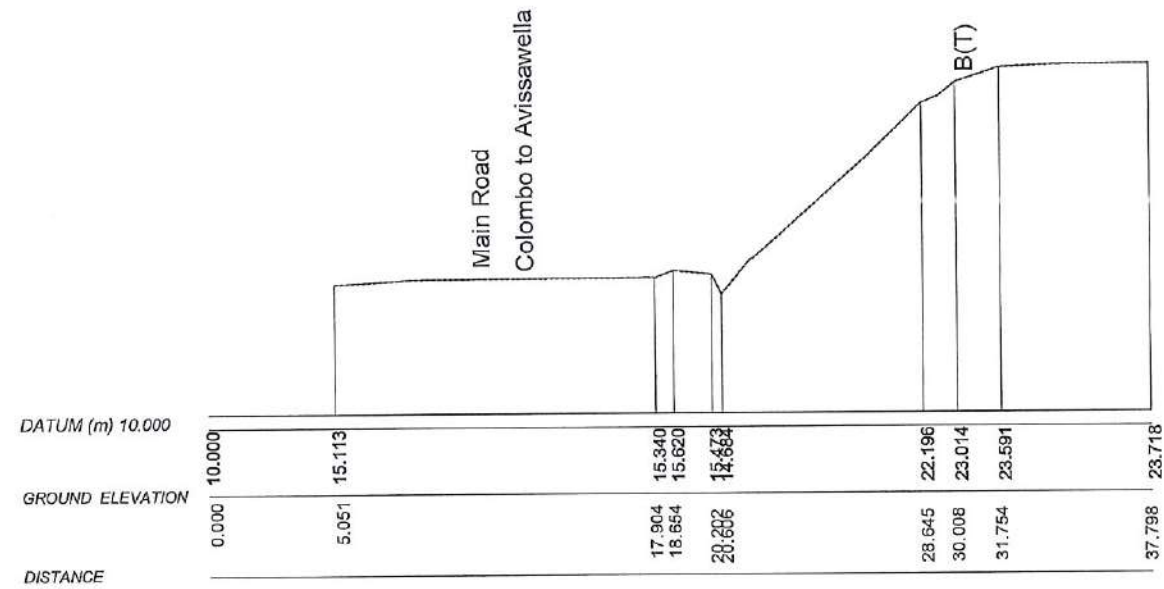


REV	DATE	REVISION DESCRIPTION	APPROVAL

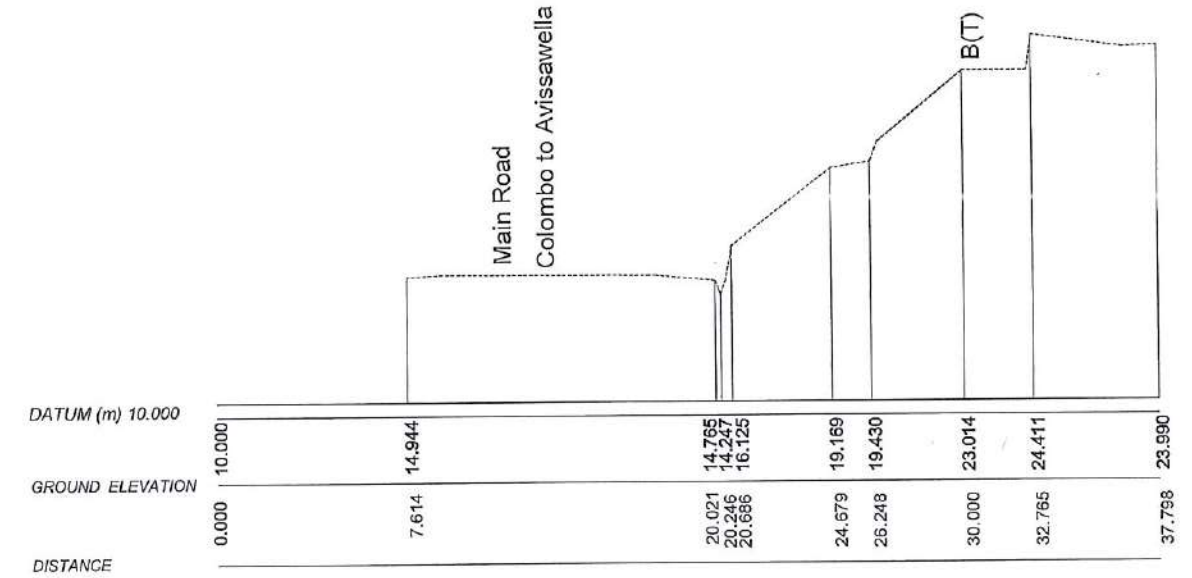
PROJECT TITLE  
REDUCTION OF LANDSLIDE  
VULNERABILITY BY MITIGATION MEASURES  
KALUAGGALA JUNCTION

TITLE			DESCRIPTION	NAME	SIGNATURE
CONTOUR CROSS SECTIONS			SURVEYED	KAMAL DESHAPRIYA	
			CHECKED	S.O.A.D.M. LAKRUWAN	
SCALE 1:300			DATE	12.11.2020	
PROJECT / DRAWING No. RLVMP/WORKS/NCB/04A/12-KA/DR-2a			REVISION	00	

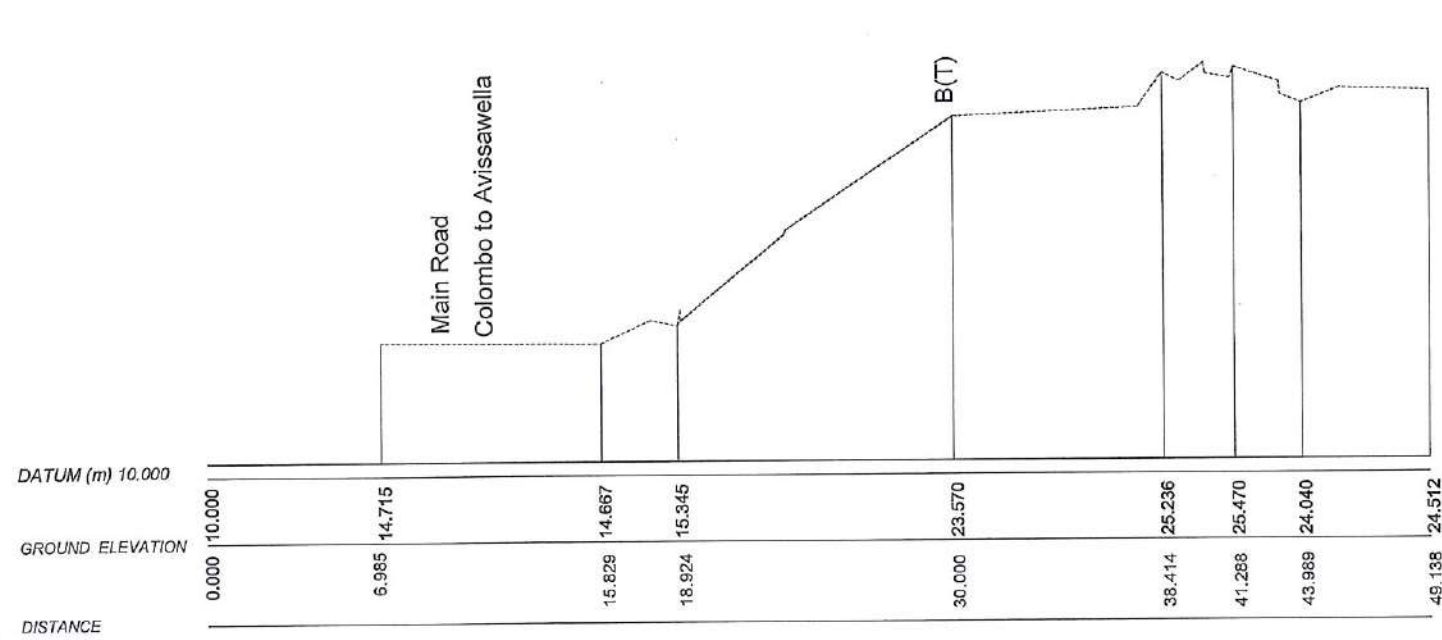




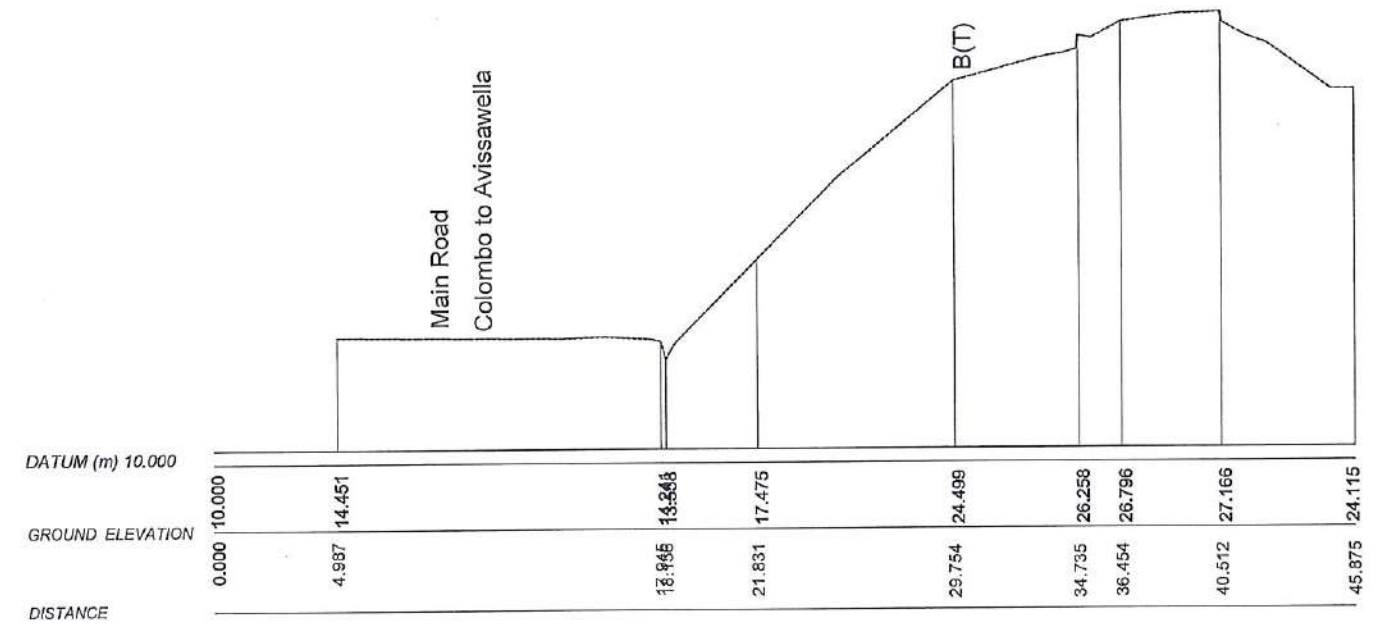
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SECTION-F



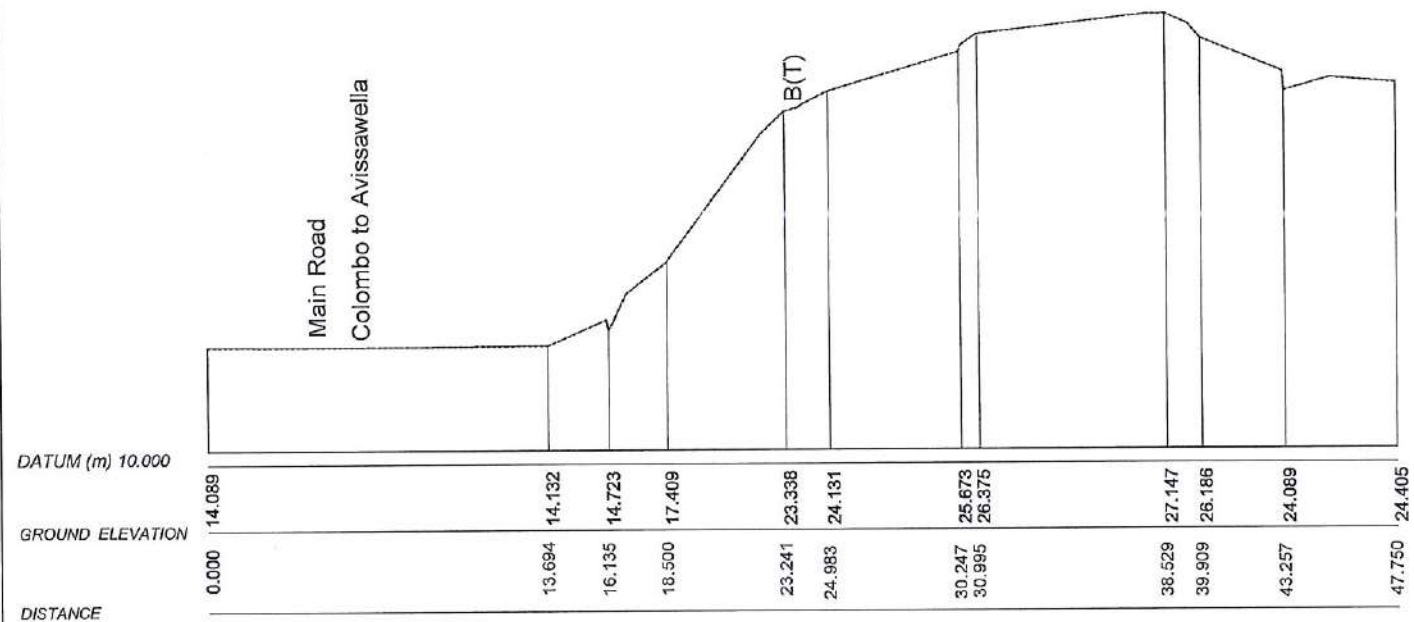
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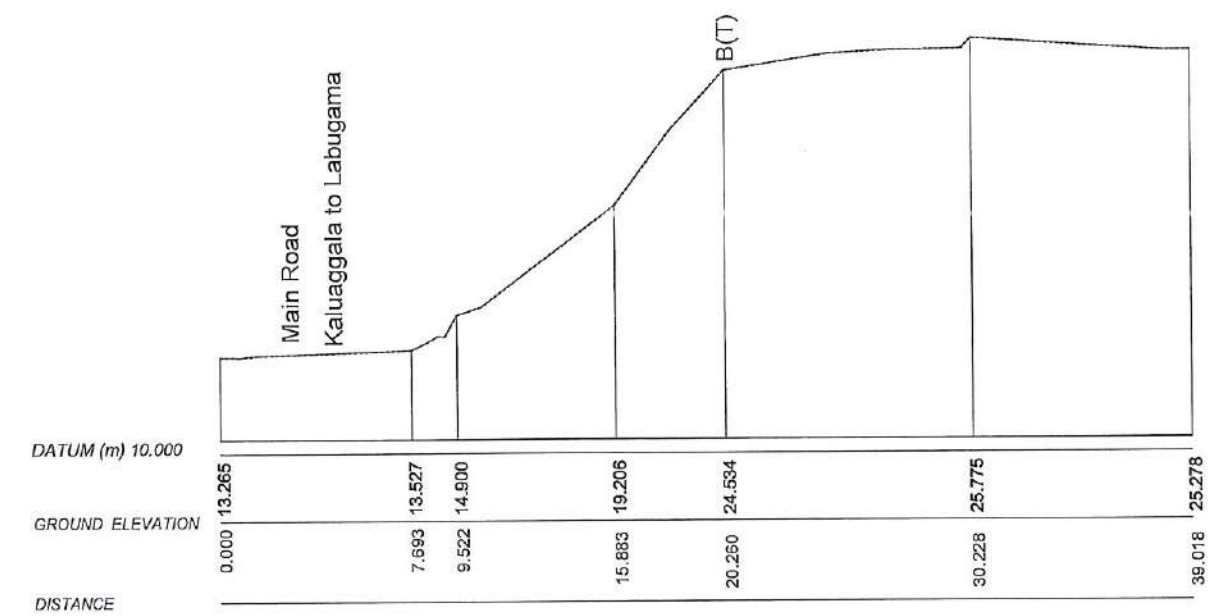
SECTION-H

<b>EMPLOYER</b>  DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05	<b>DESIGNER</b>  DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05	REV	DATE	REVISION DESCRIPTION	APPROVAL	<b>PROJECT TITLE</b> REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES KALUAGGALA JUNCTION	<b>TITLE</b> CONTOUR CROSS SECTIONS	DESCRIPTION	NAME	SIGNATURE
							SCALE 1:300	DATE 12.11.2020		
							PROJECT / DRAWING No. RLVMM/WORKS/NCB/04A/12-KA/DR-2b	REVISION 00		

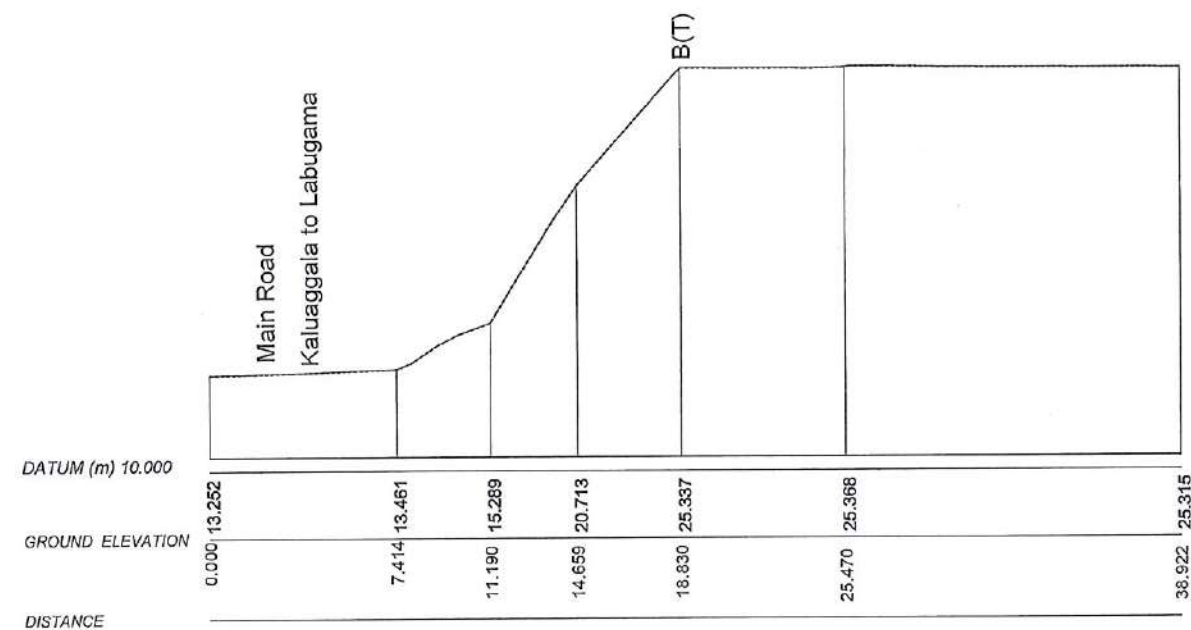




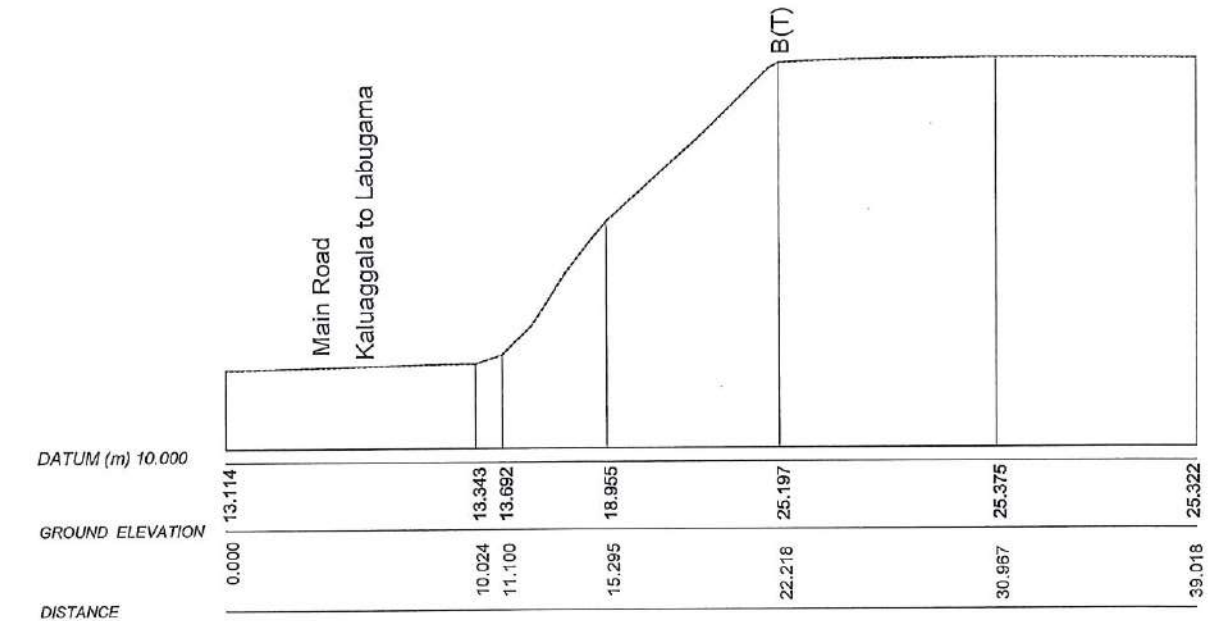
SECTION-I



SECTION-M



SECTION-N



SECTION-O

EMPLOYER



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS  
AND DISASTER MANAGEMENT  
NATIONAL BUILDING RESEARCH ORGANISATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

DESIGNER



DESIGN UNIT  
NATIONAL BUILDING RESEARCH ORGANISATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

REDUCTION OF LANDSLIDE  
VULNERABILITY BY MITIGATION MEASURES  
KALUAGGALA JUNCTION

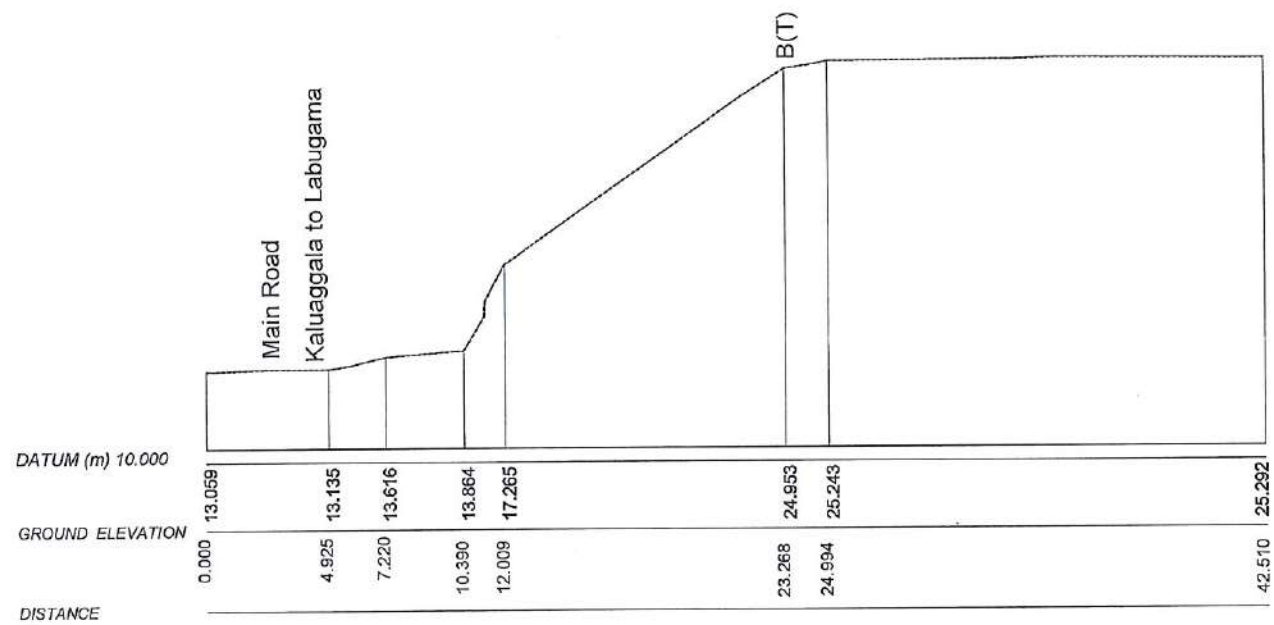
TITLE

CONTOUR CROSS SECTIONS

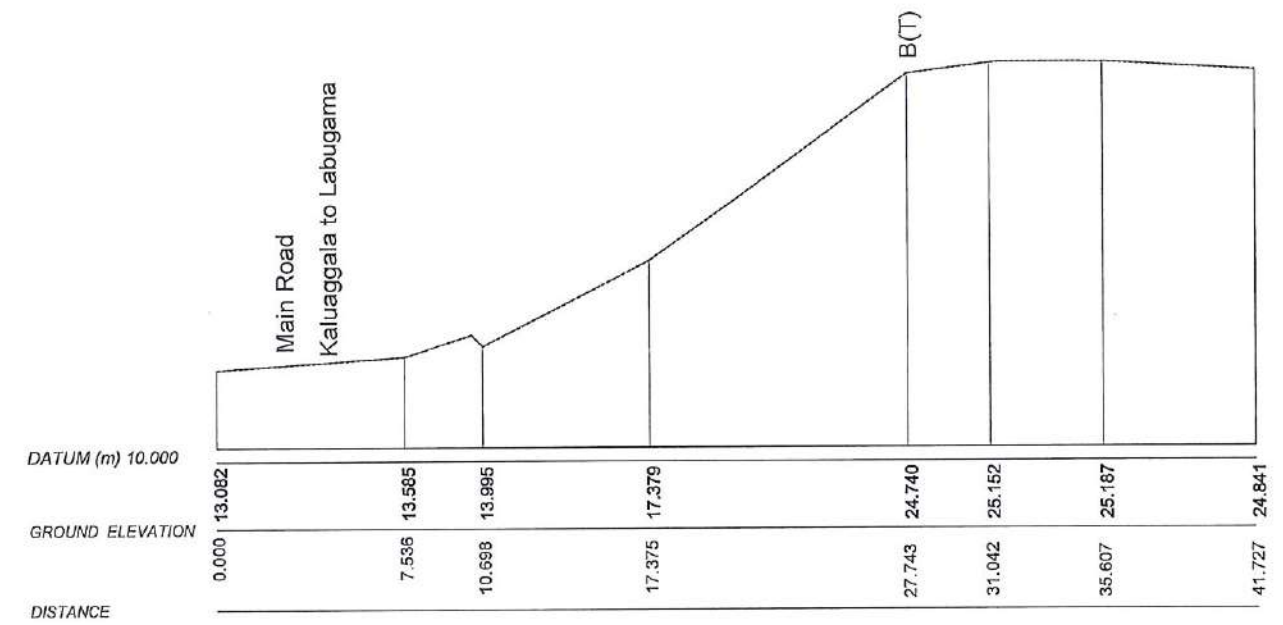
SCALE 1:300 DATE 12.11.2020  
PROJECT / DRAWING No. RLVMM/WORKS/NCB/04A/12-KA/DR-2c REVISION 00

DESCRIPTION	NAME	SIGNATURE
SURVEYED	KAMAL DESHAPRIYA	
CHECKED	S.O.A.D.M. LAKRUWAN	







SECTION-P



SECTION-Q

<b>EMPLOYER</b>  DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05	<b>DESIGNER</b>  DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05	REV	DATE	REVISION DESCRIPTION	APPROVAL	<b>PROJECT TITLE</b> REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES KALUAGGALA JUNCTION	<b>TITLE</b> CONTOUR CROSS SECTIONS	DESCRIPTION	NAME	SIGNATURE
								SURVEYED	KAMAL DESHAPRIYA	
								CHECKED	S.O.A.D.M. LAKRUWAN	
						SCALE	1:300	DATE	12.11.2020	
						PROJECT / DRAWING No.	RLVMMP/WORKS/NCB/04A/12-KA/DR-2d	REVISION	00	








LEVEL PLAN NO:  
2017/L/Colombo/LRRMD-34



### REFERENCE



B(T) - TOP OF BANK  
B(B) - BOTTOM OF BANK  
P - PERMANENT BUILDING  
Cdn - CONCRETE DRAIN  
EP - ELECTRICITY POLE  
Edn - EARTH DRAIN  
MW - MASONRY WELL  
RW - RETAINING WALL  
BW - BOUNDARY WALL  
G - GATE  
Cul. - CULVERT

### DESIGN NOTATION

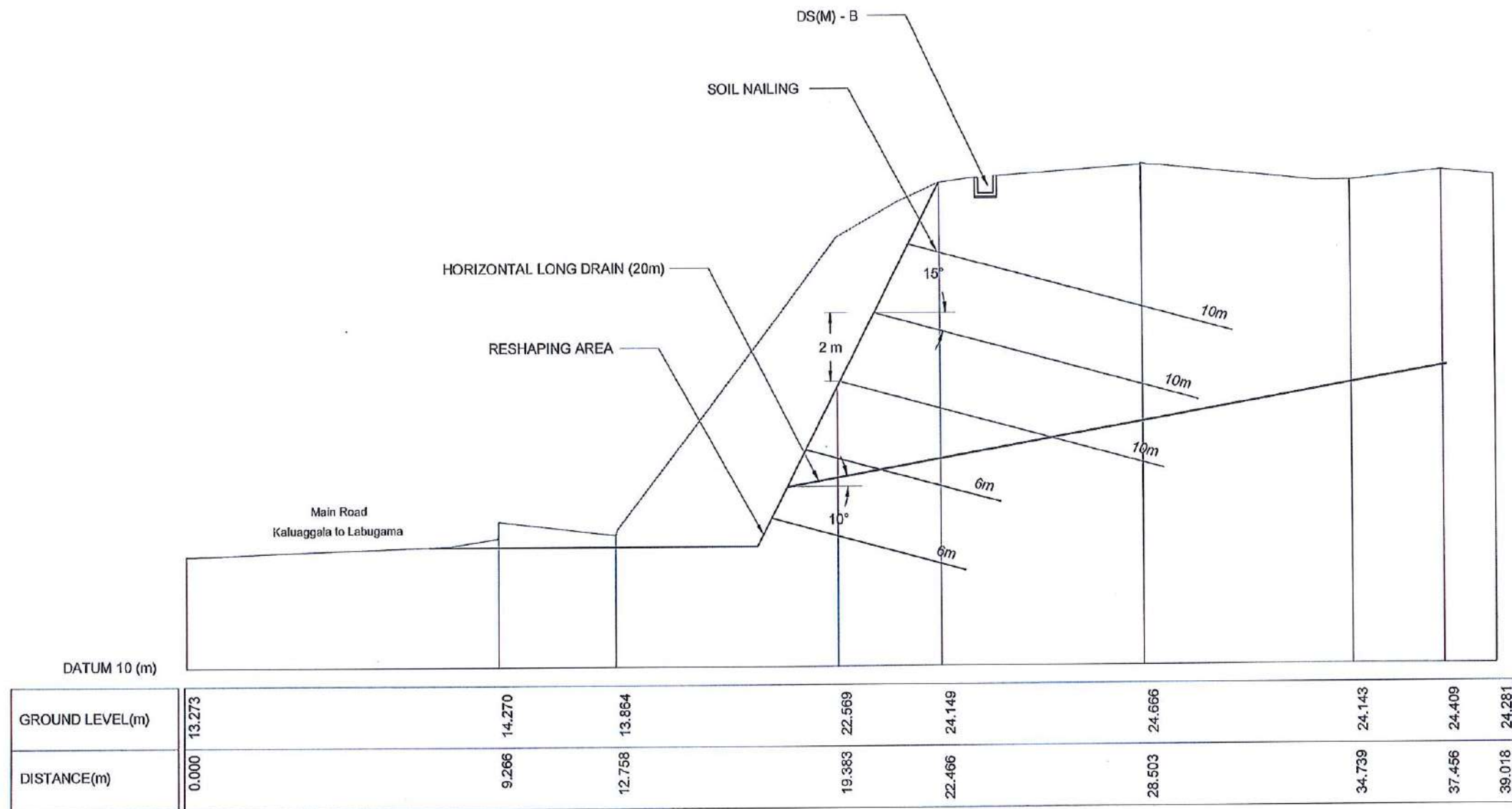
 TURFING AREA  
 NAILING AREA  
 DS (M) - B  
 DS (C) - F  
 CATCHPIT

### NOTE

1. LOCATION, LENGTH AND NUMBER OF SOIL NAILS MIGHT BE VARIED ACCORDING TO ACTUAL SITE CONDITION.
2. ANGLE, LOCATION, LENGTH AND NUMBER OF HORIZONTAL DRAIN MIGHT BE VARIED ACCORDING TO THE ACTUAL SITE CONDITION.
3. SURFACE / SUBSURFACE DRAIN LOCATIONS (PATHS) CASCADE DRAINS LOCATIONS (PATH) & LENGTH MIGHT BE VARIED ACCORDING TO THE ACTUAL SITE CONDITION.
4. LOCATION OF THE CATCHPITS MIGHT BE VARIED ACCORDING TO THE ACTUAL SITE CONDITION.

<div>EMPLOYER</div> <div></div> <div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div>	<div>DESIGNER</div> <div></div> <div>DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE  REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES KALUAGGALA JUNCTION	TITLE  PAL VIEW OF PROPOSED MITIGATION MEASURES				DESCRIPTION	NAME	SIGNATURE				
											SCALE	1:400	DATE	12.11.2020	RECOMMENDED	PROF. S.A.S. KULATHILAKA	
											PROJECT / DRAWING No. RLVMP/WORKS/NCB/04A/12-KA/DR-3			REVISION 00	APPROVED	K.N. BANDARA	












SECTION - K

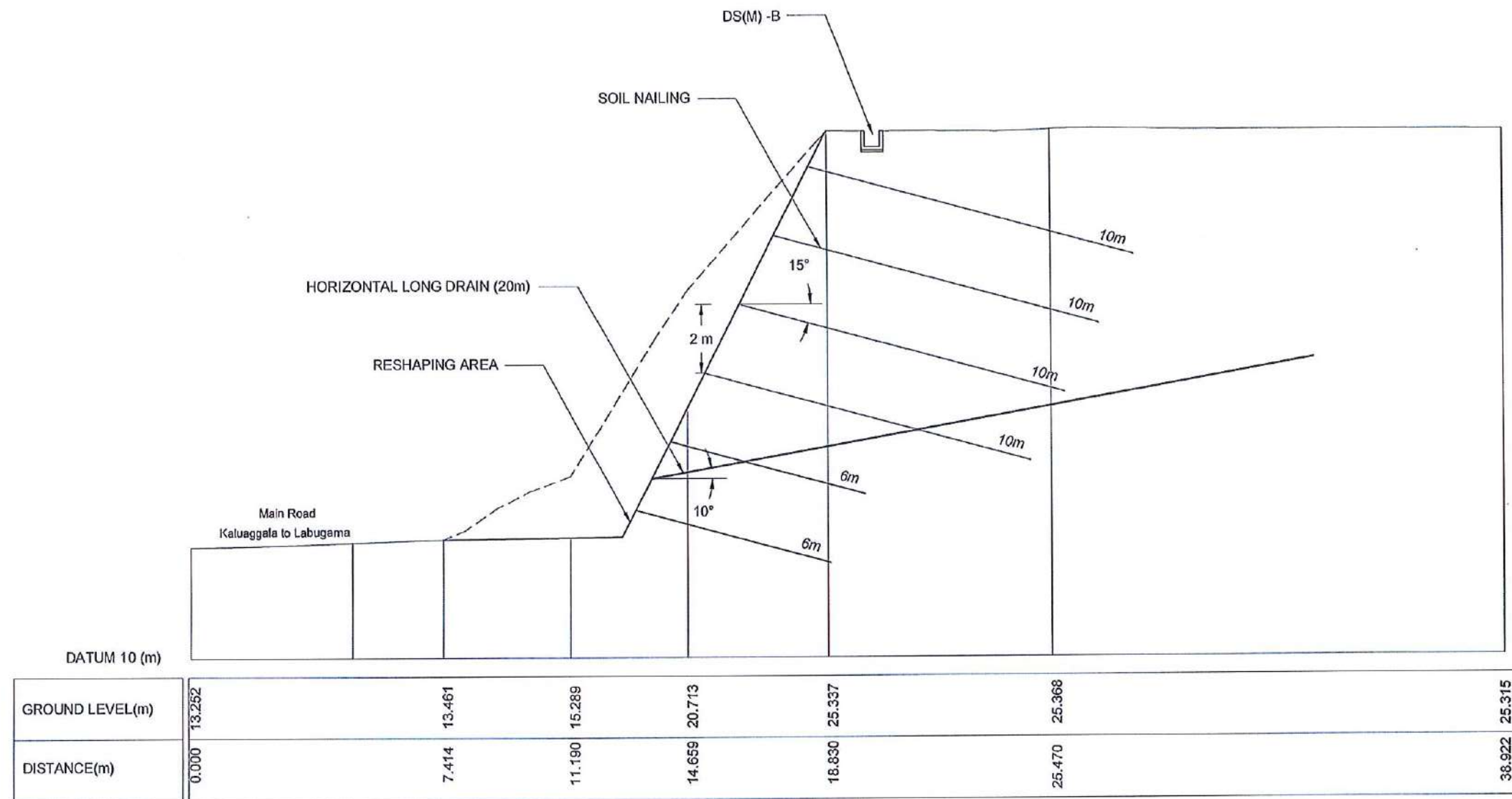
NOTE:

1. LOCATION, LENGTH AND NUMBER OF SOIL NAILS MIGHT BE VARIED ACCORDING TO THE SITE CONDITION ENCOUNTERED DURING CONSTRUCTION.
2. ANGLE, LOCATION, LENGTH AND NUMBER OF HORIZONTAL DRAINS MIGHT BE VARIED ACCORDING TO THE SITE CONDITION ENCOUNTERED DURING CONSTRUCTION.

<div>EMPLOYER</div> <div></div> <div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div> <div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS</div> <div>AND DISASTER MANAGEMENT</div> <div>NATIONAL BUILDING RESEARCH ORGANISATION</div> <div>No. 99/1, JAWATTA ROAD</div> <div>COLOMBO - 05</div>	<div>DESIGNER</div> <div></div> <div>DESIGN UNIT</div> <div>NATIONAL BUILDING RESEARCH ORGANISATION</div> <div>No. 99/1, JAWATTA ROAD</div> <div>COLOMBO - 05</div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE</div> <div>VULNERABILITY BY MITIGATION MEASURES</div> <div>KALUAGGALA JUNCTION</div>	<div>TITLE</div> <div>CROSS SECTION OF</div> <div>PROPOSED MITIGATION MEASURES</div>			DESCRIPTION	NAME	SIGNATURE
										DRAWN	B.V.S. PATTRISHIYA	
										DESIGNER	S.O.A.D.M. LAKRUWAN	
										CHECKED	J.P. SAMARANAYAKA	
										RECOMMENDED	PROF. S.A.S. KULATHILAKA	
										APPROVED	K.N. BANDARA	

SCALE	1:150	DATE	12.11.2020
PROJECT / DRAWING No.	RLVMM/WORKS/INCB/04A/12-KA/DR-4a	REVISION	00













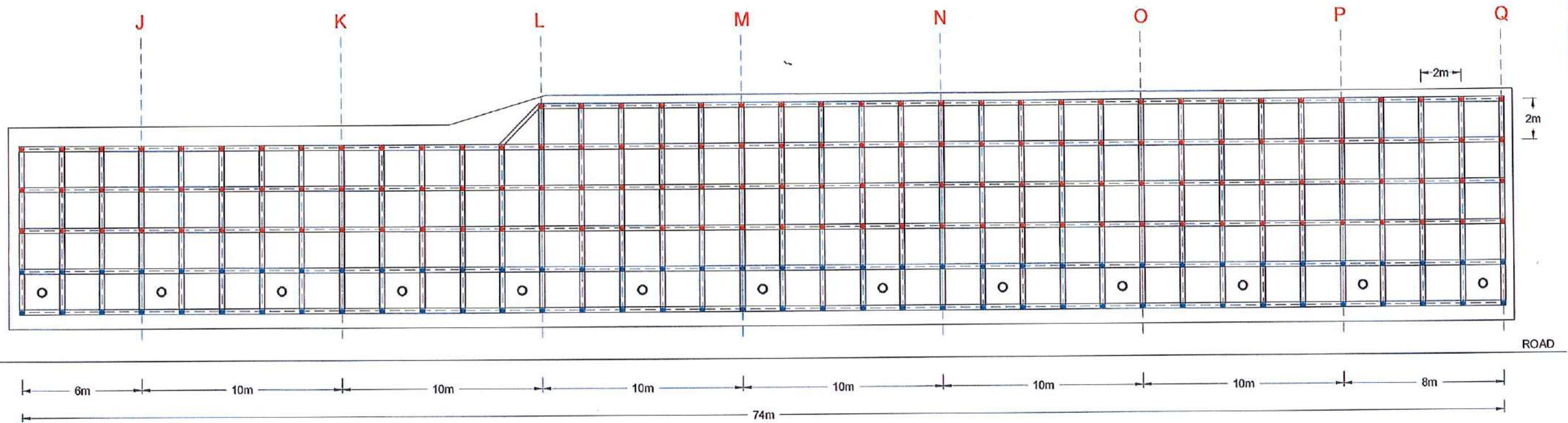
SECTION - O

NOTE:


1. LOCATION, LENGTH AND NUMBER OF SOIL NAILS MIGHT BE VARIED ACCORDING TO THE SITE CONDITION ENCOUNTERED DURING CONSTRUCTION.
2. ANGLE, LOCATION, LENGTH AND NUMBER OF HORIZONTAL DRAINS MIGHT BE VARIED ACCORDING TO THE SITE CONDITION ENCOUNTERED DURING CONSTRUCTION.


<div>EMPLOYER</div> <div> DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1 ,JAWATTA ROAD COLOMBO - 05</div> <div></div>	<div>DESIGNER</div> <div> DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1 ,JAWATTA ROAD COLOMBO - 05</div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE  REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES KALUAGGALA JUNCTION	TITLE  CROSS SECTION OF PROPOSED MITIGATION MEASURES				DESCRIPTION	NAME	SIGNATURE			
											DRAWN	B.V.S. PATTRISHIYA				
											DESIGNER	S.O.A.D.M. LAKRUWAN				
											CHECKED	J.P. SAMARANAYAKA				
										SCALE	1:150	DATE	12.11.2020	RECOMMENDED	PROF. S.A.S. KULATHILAKA	
										PROJECT / DRAWING No. RLVMMP/WORKS/NCB/04A/12-KA/DR-4b		REVISION 00	APPROVED	K.N. BANDARA		












FRONT ELEVATION OF PROPOSED SOIL NAILING PATTERN

-  SOIL NAILING - DESIGN NAIL LENGTH = 6m  
 NO'S OF NAILS = 76  
 REINFORCEMENT DIAMETER = 32mm  
 DIAMETER OF THE BOREHOLE = 125mm
-  SOIL NAILING - DESIGN NAIL LENGTH = 10m  
 NO'S OF NAILS = 139  
 REINFORCEMENT DIAMETER = 32mm  
 DIAMETER OF THE BOREHOLE = 125mm

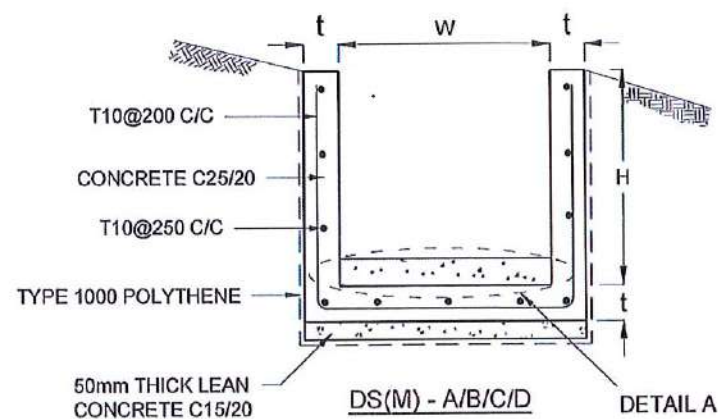
-  HORIZONTAL LONG DRAINS - DRAIN LENGTH = 20m  
 NO'S OF DRAINS = 13  
 DIAMETER = 75mm

**NOTE**

1. LOCATION, LENGTH AND NUMBER OF SOIL NAILS MIGHT BE VARIED ACCORDING TO THE SITE CONDITION ENCOUNTERED DURING CONSTRUCTION.
2. ANGLE, LOCATION, LENGTH AND NUMBER OF HORIZONTAL DRAINS MIGHT BE VARIED ACCORDING TO THE SITE CONDITION ENCOUNTERED DURING CONSTRUCTION.

<div>EMPLOYER</div> <div></div> <div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div> <div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT</div> <div>NATIONAL BUILDING RESEARCH ORGANISATION</div> <div>No. 99/1, JAWATTA ROAD</div> <div>COLOMBO - 05</div>	<div>DESIGNER</div> <div></div> <div>DESIGN UNIT</div> <div>NATIONAL BUILDING RESEARCH ORGANISATION</div> <div>No. 99/1, JAWATTA ROAD</div> <div>COLOMBO - 05</div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	FRONT ELEVATION OF PROPOSED MITIGATION MEASURES	DESCRIPTION	NAME	SIGNATURE
									DRAWN	B.V.S. PATTRISHIYA	
									DESIGNER	S.O.A.D.M. LAKRUWAN	
									CHECKED	J.P. SAMARANAYAKA	
									RECOMMENDED	Prof. S.A.S. KULATHILAKA	
									APPROVED	K.N.BANDARA	
REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES KALUAGGALA JUNCTION							SCALE	1:200	DATE	12.11.2020	
							PROJECT / DRAWING No.		REVISION	00	
							RLVMMPM/WORKS/NCB/04/A/12-KA/DR-5				





DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (M) - A/P	300	300	100
DS (M) - B/R	450	450	100
DS (M) - C/Q	600	600	100
DS (M) - D	750	750	125
DS (M) - E	900	900	150
DS (M) - F	1000	1000	150

#### NOTES

1. DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
2. STEPS SHALL BE CONSTRUCTED AT SURFACE DRAIN ON SLOPING GROUND ACCORDING TO THE SITE CONDITIONS AS INSTRUCTED BY THE ENGINEER.
3. ENERGY BREAKERS SHALL BE CONSTRUCTED AT THE STEEP DRAIN SEGMENTS AS PER THE INSTRUCTIONS OF THE ENGINEER.
4. DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
5. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
6. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.

#### CONCRETE

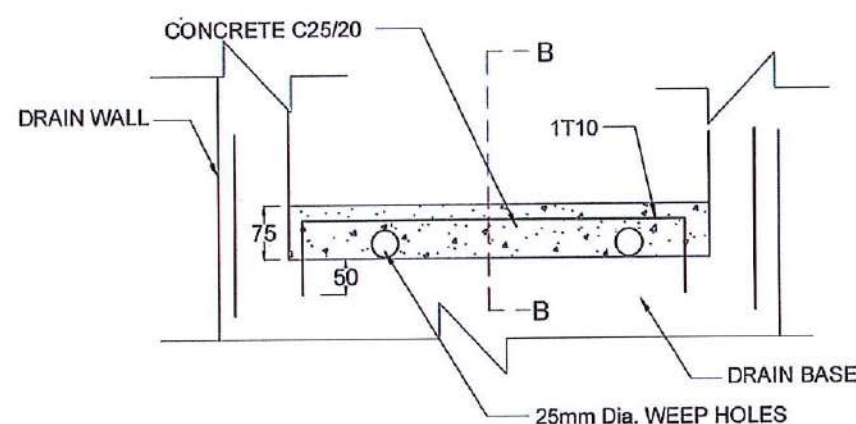
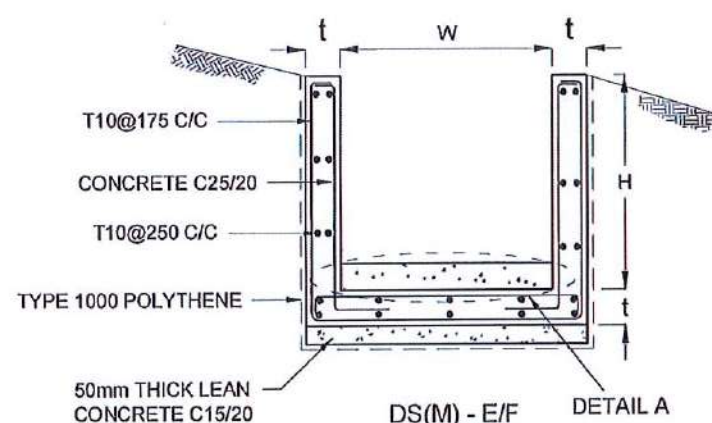
7. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
 

[a]	SCREED	- C. 15/20
[b]	WALLS / BASE / ENERGY BREAKERS	- C. 25/20

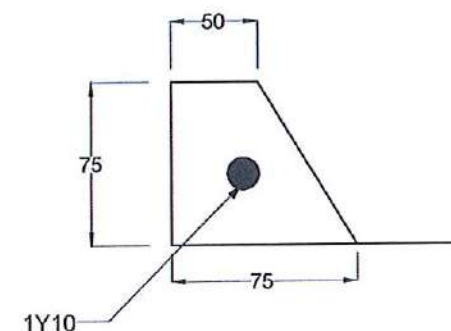
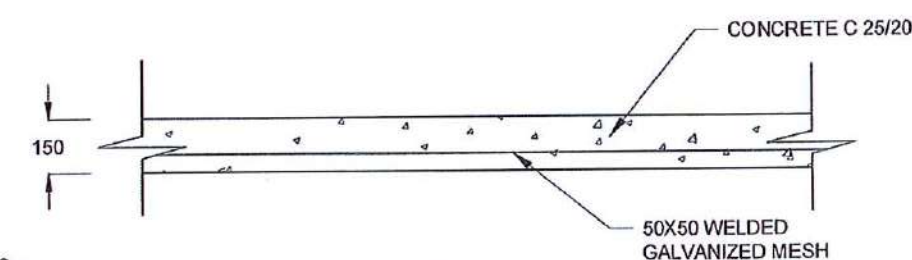
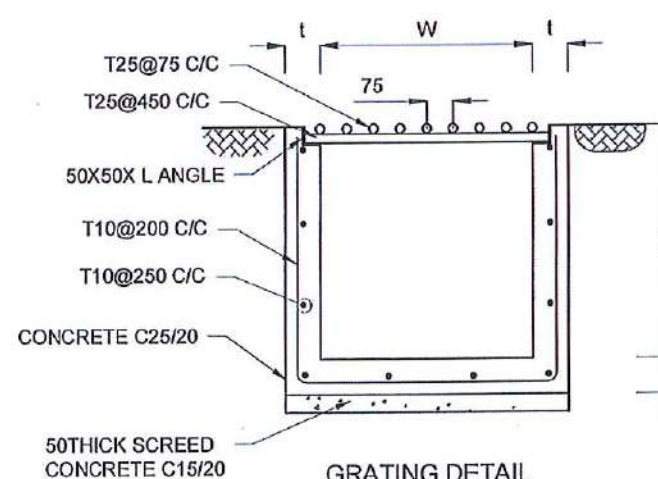
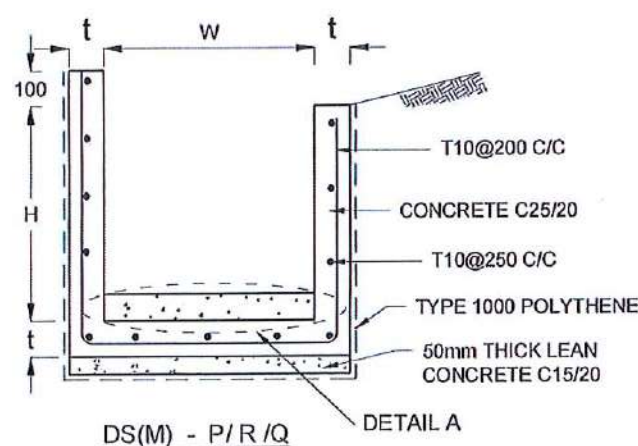
#### REINFORCEMENT

8. ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm<sup>2</sup>.
9. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 50 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
10. ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
11. REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
12. COVER TO REINFORCEMENT
 

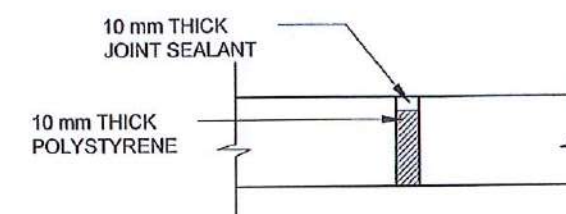
[a]	BURIED FACES AND DRAIN INVERTS	- 40 mm
[b]	ALL OTHER FACES	- 25 mm










DETAIL A - (ENERGY BREAKER AT 3M)



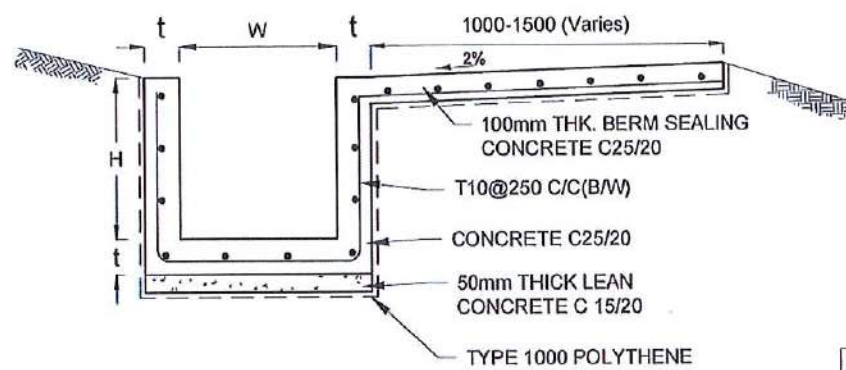
SECTION B-B



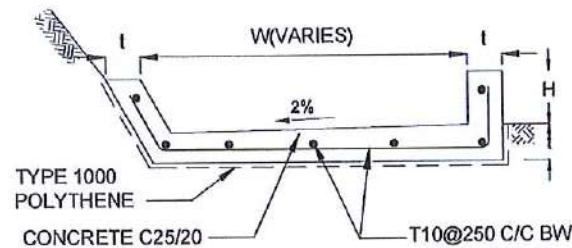
EXPANSION JOINT DETAIL

<div>EMPLOYER</div> <div></div> <div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div> <div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT</div> <div>NATIONAL BUILDING RESEARCH ORGANIZATION</div> <div>No. 99/1, JAWATTA ROAD</div> <div>COLOMBO - 05</div>	<div>DESIGNER</div> <div></div> <div>DESIGN UNIT</div> <div>NATIONAL BUILDING RESEARCH ORGANISATION</div> <div>No. 99/1, JAWATTA ROAD</div> <div>COLOMBO - 05</div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES KALUAGGALA JUNCTION	TITLE				DESCRIPTION	NAME	SIGNATURE
									DETAILS OF DRAINS (SURFACE DRAIN -1 OF 2)	DRAWN	B.V.S. PATTRISHIYA			
									DESIGNER	S.O.A.D.M. LAKRUWAN				
									CHECKED	J.P. SAMARANAYAKA				
									RECOMMENDED	PROF. S.A.S. KULATHILAKA				
									APPROVED	K.N. BANDARA				
									SCALE	N.T.S.	DATE	12.11.2020		
									PROJECT / DRAWING No.		REVISION	00		
									RLVMMP/WORKS/INCB/04/12-KA/DR-05a					





DS (B) - (TYPE I)



DS (B) - (TYPE II)

DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (B) - A	300	300	100
DS (B) - B	450	450	100
DS (B) - C	1000	150	100

#### NOTES

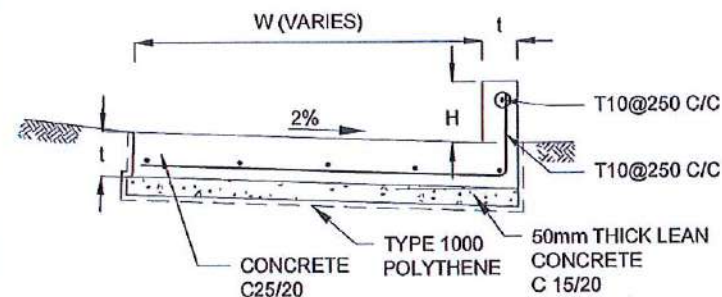
- DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
- STEPS SHALL BE CONSTRUCTED AT SURFACE DRAIN ON SLOPING GROUND ACCORDING TO THE SITE CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- ENERGY BREAKERS SHALL BE CONSTRUCTED AT THE STEEP DRAIN SEGMENTS AS PER THE INSTRUCTIONS OF THE ENGINEER.
- DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- COVER SLABS NEED TO BE PROVIDED ONLY FOR THE REGIONS AS INSTRUCTED BY THE ENGINEER.
- COVER SLAB WIDTH ( $W_c$ ) SHOULD BE TAKEN AS THE SUM OF DRAIN WIDTH AND  $2 \times$  DRAIN WALL THICKNESS. [ $W_c = W + 2 \times t$ ]
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
- 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.

#### CONCRETE

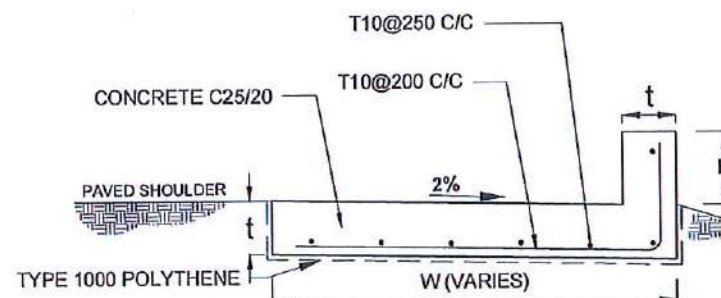
- USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
  - SCREED - C. 15/20
  - WALLS / BASE / ENERGY BREAKERS - C. 25/20

#### REINFORCEMENT

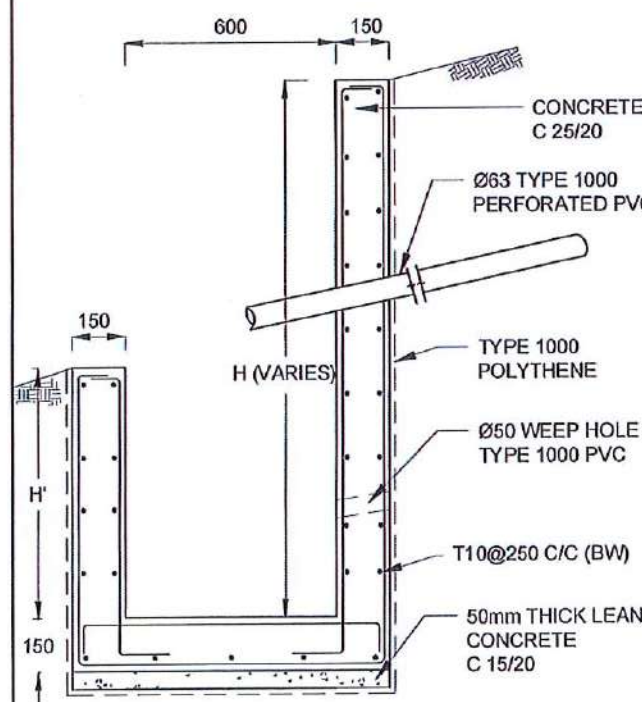
- ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN  $460 \text{ N/mm}^2$ .
- BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF  $50 \times$  BAR DIA. AND LAPPING SHOULD BE STAGGERED.
- ANCHORAGE LENGTH SHOULD BE  $40 \times$  BAR DIA.
- REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
- COVER TO REINFORCEMENT
  - BURIED FACES AND DRAIN INVERTS - 40 mm
  - ALL OTHER FACES - 25 mm



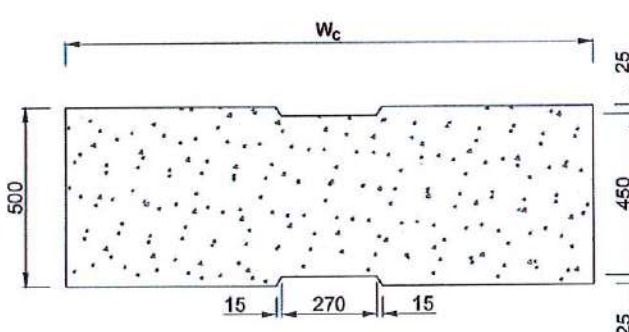
DS (K) - TYPE I



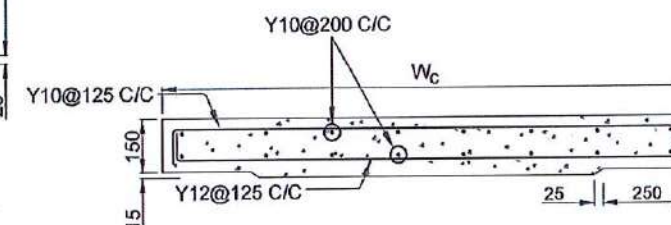
DS (K) - TYPE II



DS (M) - L



PLAN VIEW OF COVER SLAB



ACCESS & HEAVY DUTY COVER SLAB  
SECTION OF ( $W_c \times 500 \times 150 \text{ mm}$ )

DRAIN TYPE	W (mm)	H' (mm)	t (mm)
DS (M) - L			
TYPE I	600	600	150
TYPE II	800	800	150

EMPLOYER  
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS  
AND DISASTER MANAGEMENT  
NATIONAL BUILDING RESEARCH ORGANIZATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

DESIGNER  
DESIGN UNIT  
NATIONAL BUILDING RESEARCH ORGANISATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE

REDUCTION OF LANDSLIDE  
VULNERABILITY BY MITIGATION MEASURES  
KALUAGGALA JUNCTION

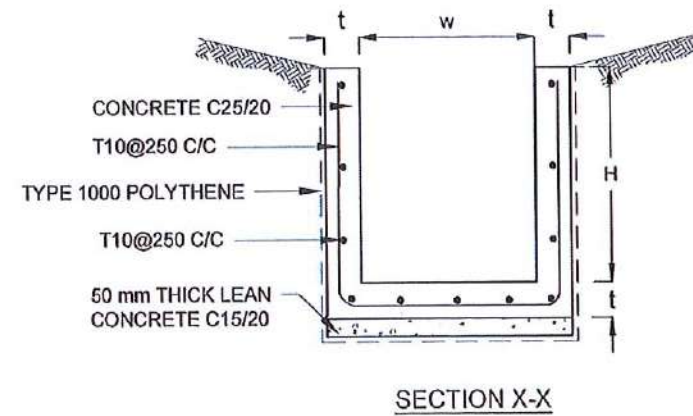
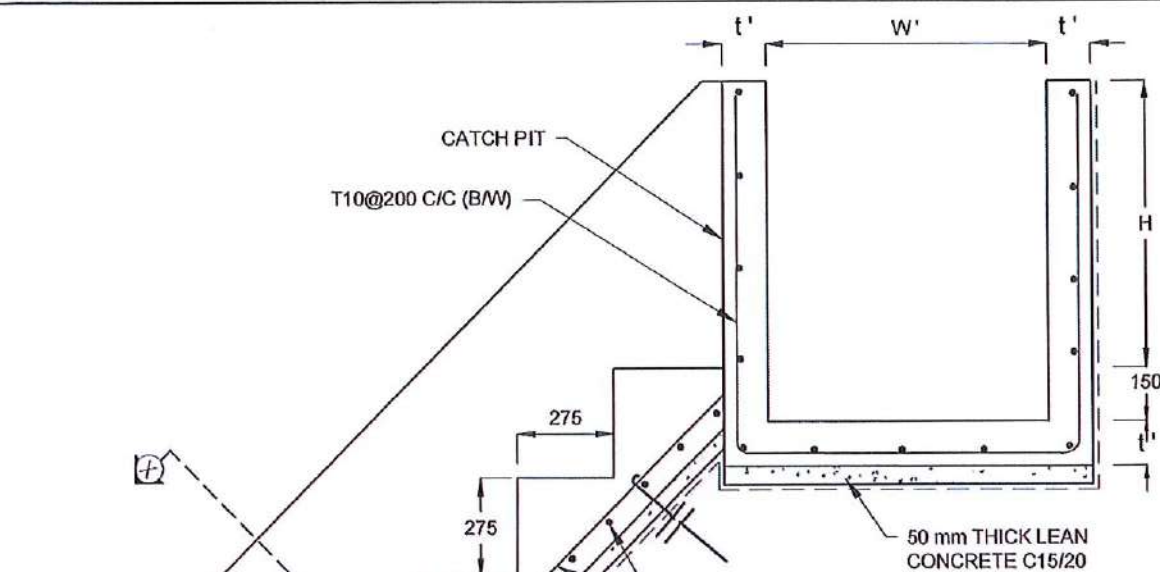
TITLE	DESCRIPTION	NAME	SIGNATURE
DETAILS OF DRAINS (SURFACE DRAIN -2 OF 2)	DRAWN	B.V.S. PATRISHIYA	
	DESIGNER	S.O.A.D.M. LAKRUWAN	
	CHECKED	J.P. SAMARANAYAKA	
	RECOMMENDED	PROF. S.A.S. KULATHILAKA	
	APPROVED	K.N. BANDARA	

SCALE	N.T.S.	DATE	12.11.2020
PROJECT / DRAWING No.	RLVMMP/WORKS/INC/04A/12-KA/DR-00b	REVISION	00









#### NOTES

1. USE EITHER TYPE I OR TYPE II CASCADE DRAIN ACCORDING TO THE ACTUAL GROUND CONDITION AS INSTRUCTED BY THE ENGINEER.
2. LENGTH OF THE STEPS OF CASCADE WILL BE VARIED ACCORDING TO THE SITE CONDITIONS.
3. DEPTH OF EXCAVATION SHALL BE VARIED ACCORDING TO SITE CONDITIONS.
4. DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
5. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.

#### CONCRETE

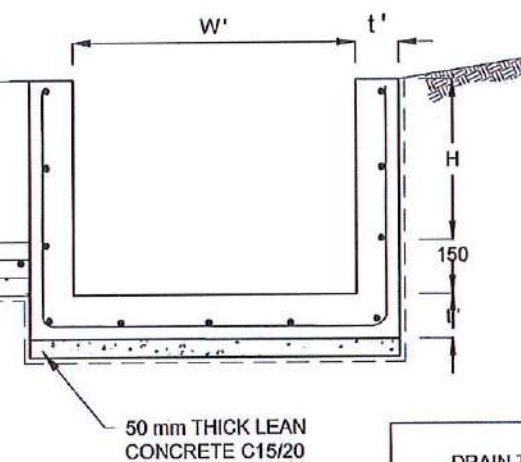
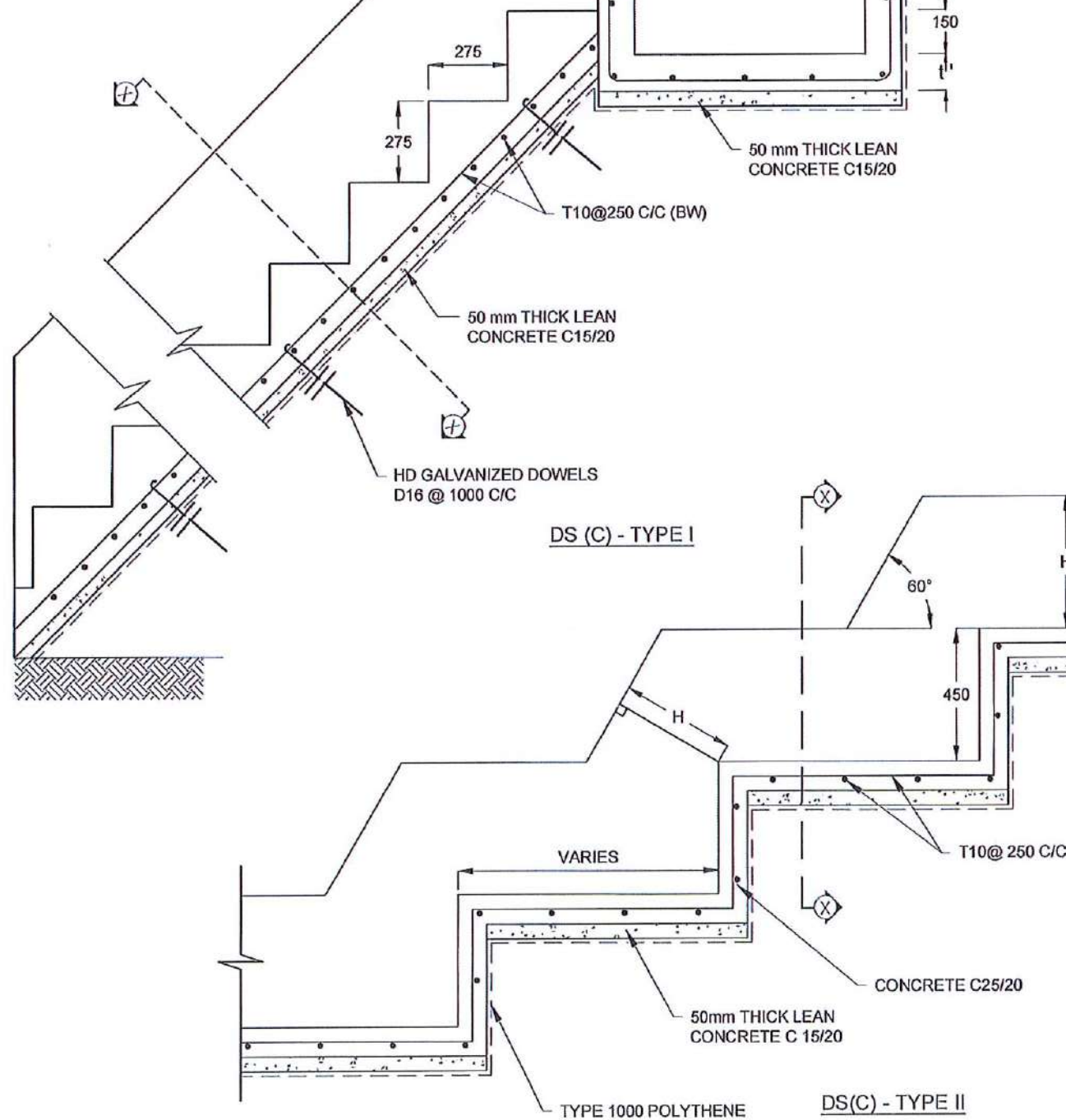
7. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
 

[a]	SCREED	- C. 15/20
[b]	WALLS / BASE / ENERGY BREAKERS	- C. 25/20




#### REINFORCEMENT

8. ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm<sup>2</sup>.
9. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 50 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
10. ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
11. REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
12. COVER TO REINFORCEMENT
 

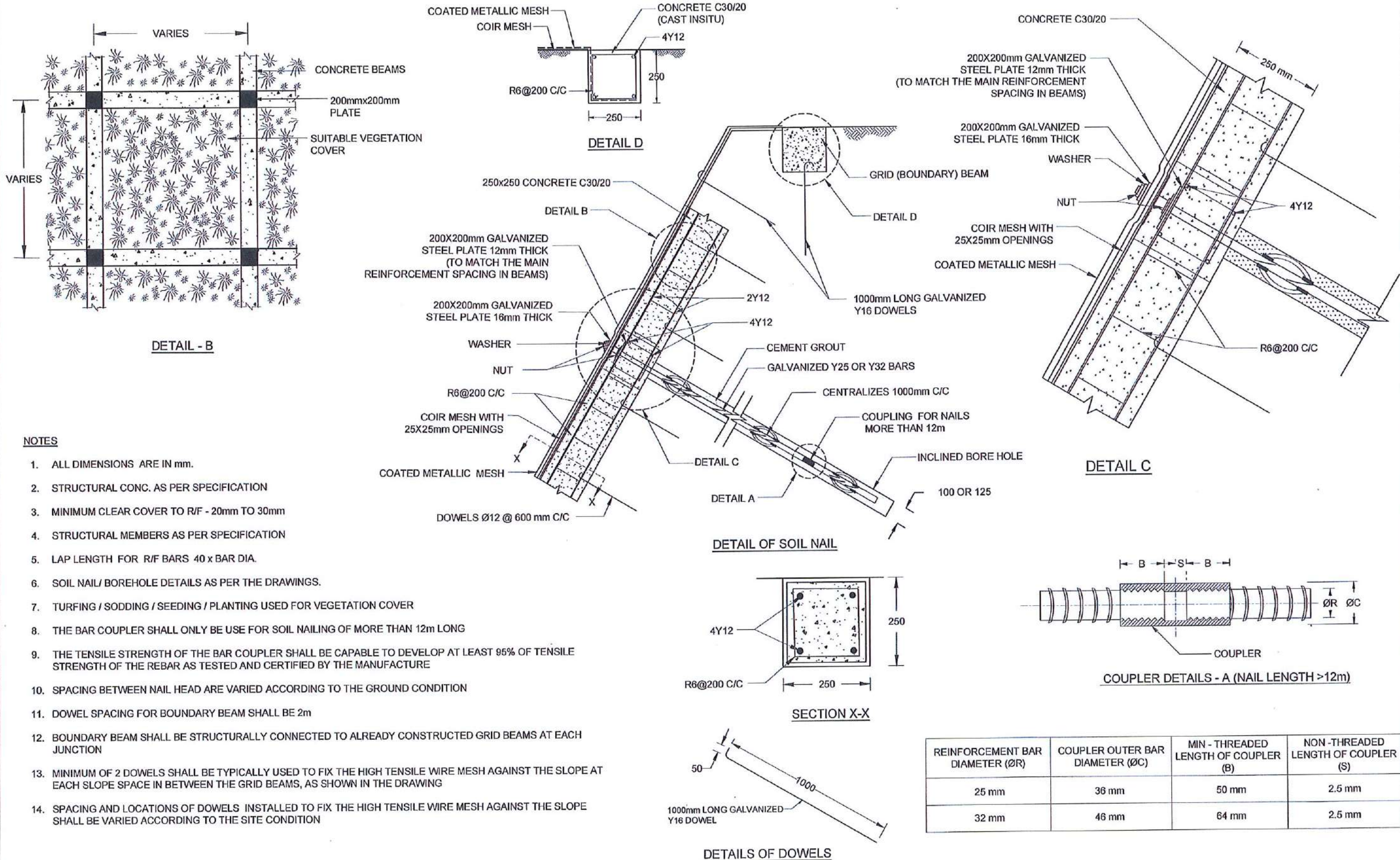
[a]	BURIED FACES AND DRAIN INVERTS	- 40 mm
[b]	ALL OTHER FACES	- 25 mm










DRAIN TYPE	W (mm)	H (mm)	t (mm)	W' (mm)	t' (mm)
DS (C) - A	450	450	100	600	100
DS (C) - B	450	600	100	750	100
DS (C) - C	600	600	100	800	100
DS (C) - D	750	750	100	800	100
DS (C) - E	800	800	125	1000	125
DS (C) - F	1000	750	125	1200	125

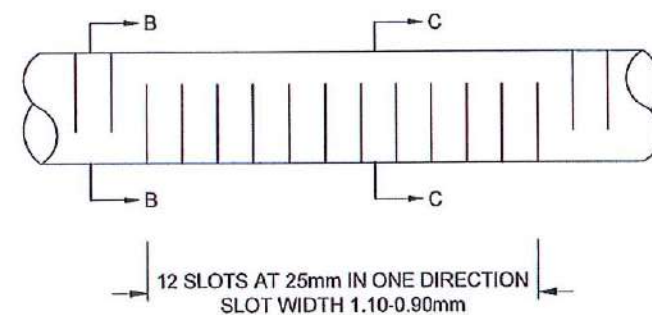
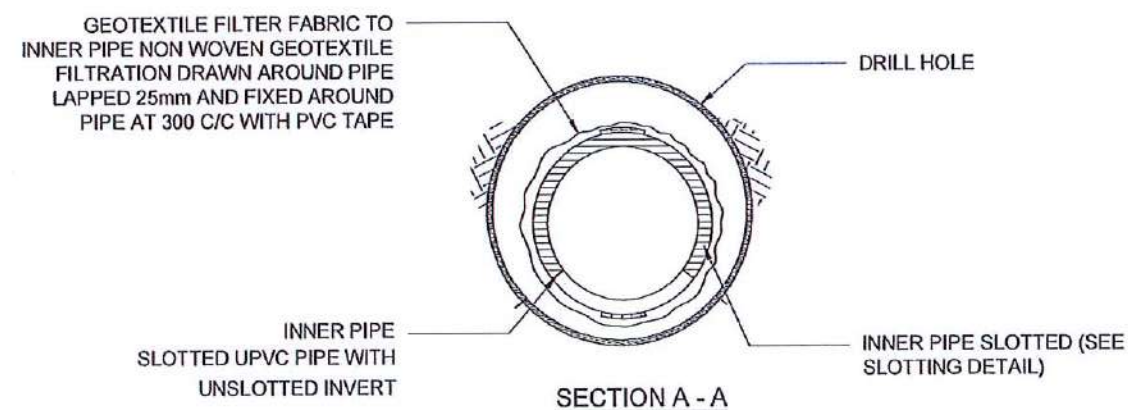
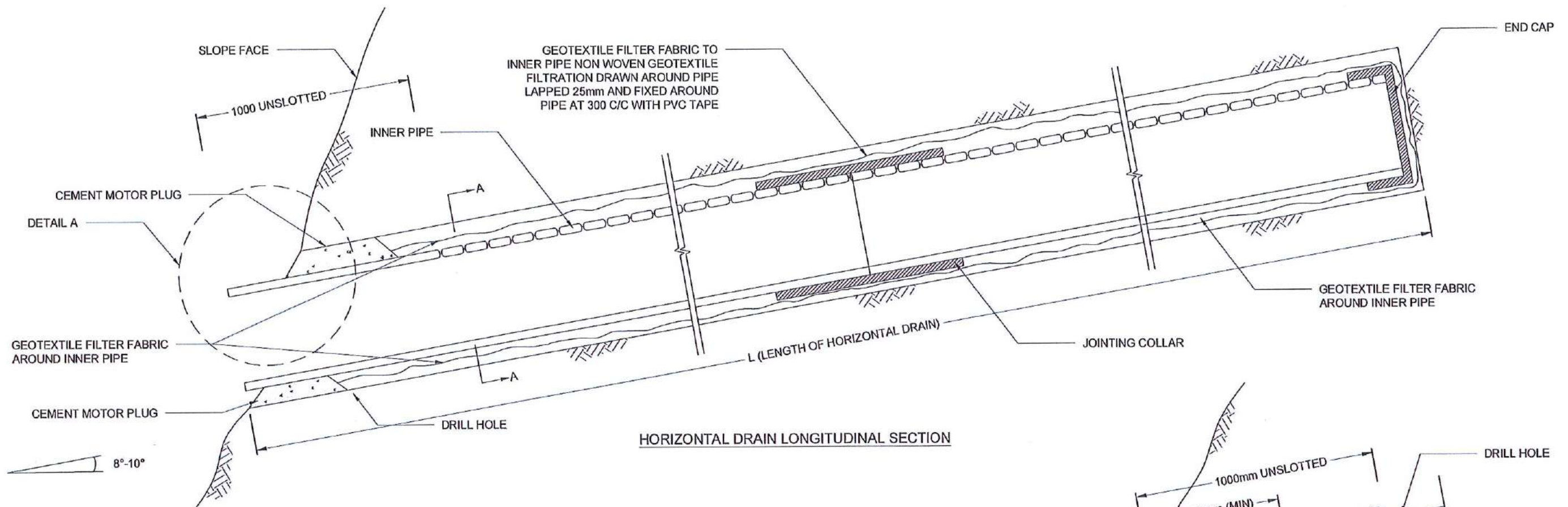
<div>EMPLOYER</div> <div></div> <div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div> <div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT</div> <div>NATIONAL BUILDING RESEARCH ORGANIZATION</div> <div>No. 99/1, JAWATTA ROAD COLOMBO - 05</div>	<div>DESIGNER</div> <div></div> <div>DESIGN UNIT</div> <div>NATIONAL BUILDING RESEARCH ORGANISATION</div> <div>No. 99/1, JAWATTA ROAD COLOMBO - 05</div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES KALUAGGALA JUNCTION	TITLE	DETAILS OF DRAINS (CASCADE DRAIN)	DESCRIPTION	NAME	SIGNATURE
										DRAWN	B.V.S. PATTRISHIYA	
										DESIGNER	S.O.A.D.M. LAKRUWAN	
										CHECKED	J.P. SAMARANAYAKA	
										RECOMMENDED	PROF. S.A.S. KULATHILAKA	
										APPROVED	K.N. BANDARA	
<div>SCALE</div> <div>N.T.S.</div> <div>DATE</div> <div>12.11.2020</div> <div>PROJECT / DRAWING No.</div> <div>RLVMP/WORKS/NCB/04/12-KA/DR-00d</div> <div>REVISION</div> <div>00</div>												



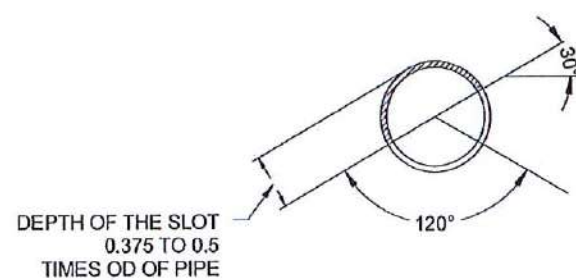


EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
 <p>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05</p>	 <p>DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05</p>					REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES KALUAGGALA JUNCTION	DETAILS OF SOIL NAILING WITH GRID BEAM	DRAWN	B.V.S. PATTRISHIYA	
								DESIGNER	S.O.A.D.M. LAKRUWAN	
								CHECKED	J.P. SAMARANAYAKA	
								RECOMMENDED	PROF. S.A.S. KULATHILAKA	
								APPROVED	K.N. BANDARA	
							SCALE	N.T.S.	DATE	12.11.2020
							PROJECT / DRAWING No.	RLVMM/WORKS/NCB/04A/12-KA/DR-07	REVISION	00

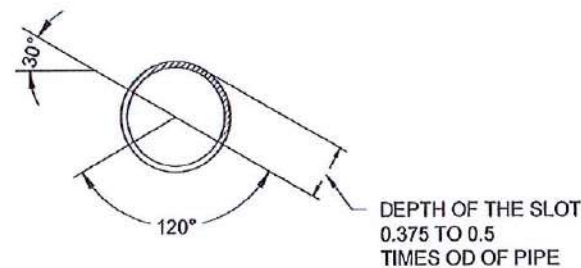




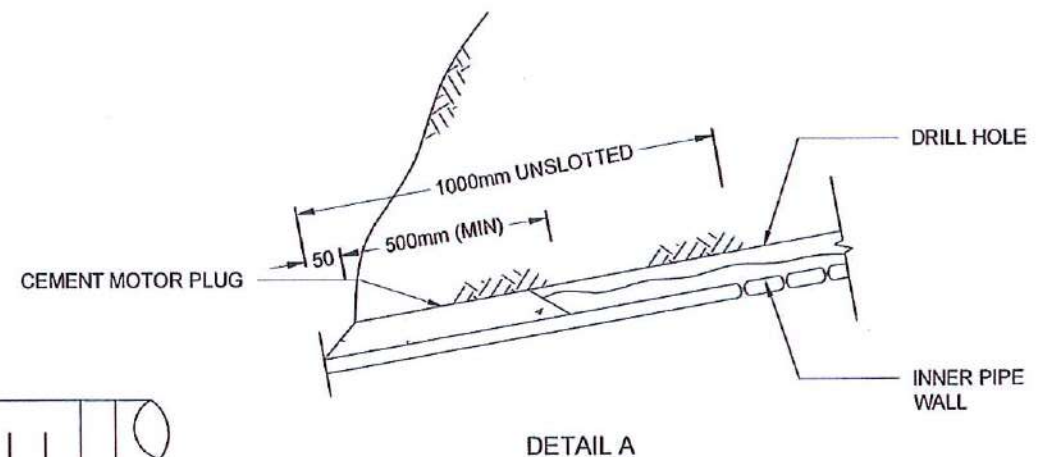
INNER AND OUTER PIPE SLOTTING DETAIL (TOP VIEW)



SECTION B - B



SECTION C - C



DETAIL A

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. PIPE DIAMETERS, ANGLE & LENGTHS AS SPECIFIED IN DRAWINGS.
3. ALL MATERIALS SHALL CONFORM TO PROJECT SPECIFICATION

EMPLOYER  
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS  
AND DISASTER MANAGEMENT  
NATIONAL BUILDING RESEARCH ORGANIZATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

DESIGNER  
DESIGN UNIT  
NATIONAL BUILDING RESEARCH ORGANISATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE  
REDUCTION OF LANDSLIDE  
VULNERABILITY BY MITIGATION MEASURES  
KALUAGGALA JUNCTION

TITLE				DESCRIPTION	NAME	SIGNATURE
DETAILS OF HORIZONTAL DRAIN SECTIONS				DRAWN	B.V.S. PATRISHIYA	
				DESIGNER	S.O.A.D.M. LAKRUWAN	
				CHECKED	J.P. SAMARANAYAKA	
				RECOMMENDED	PROF. S.A.S. KULATHILAKA	
SCALE	N.T.S.	DATE	12.11.2020	APPROVED	K.N. BANDARA	
PROJECT / DRAWING No.		REVISION				
RLVMP/WORKS/NCB/04A/12-KA/DR-08		00				



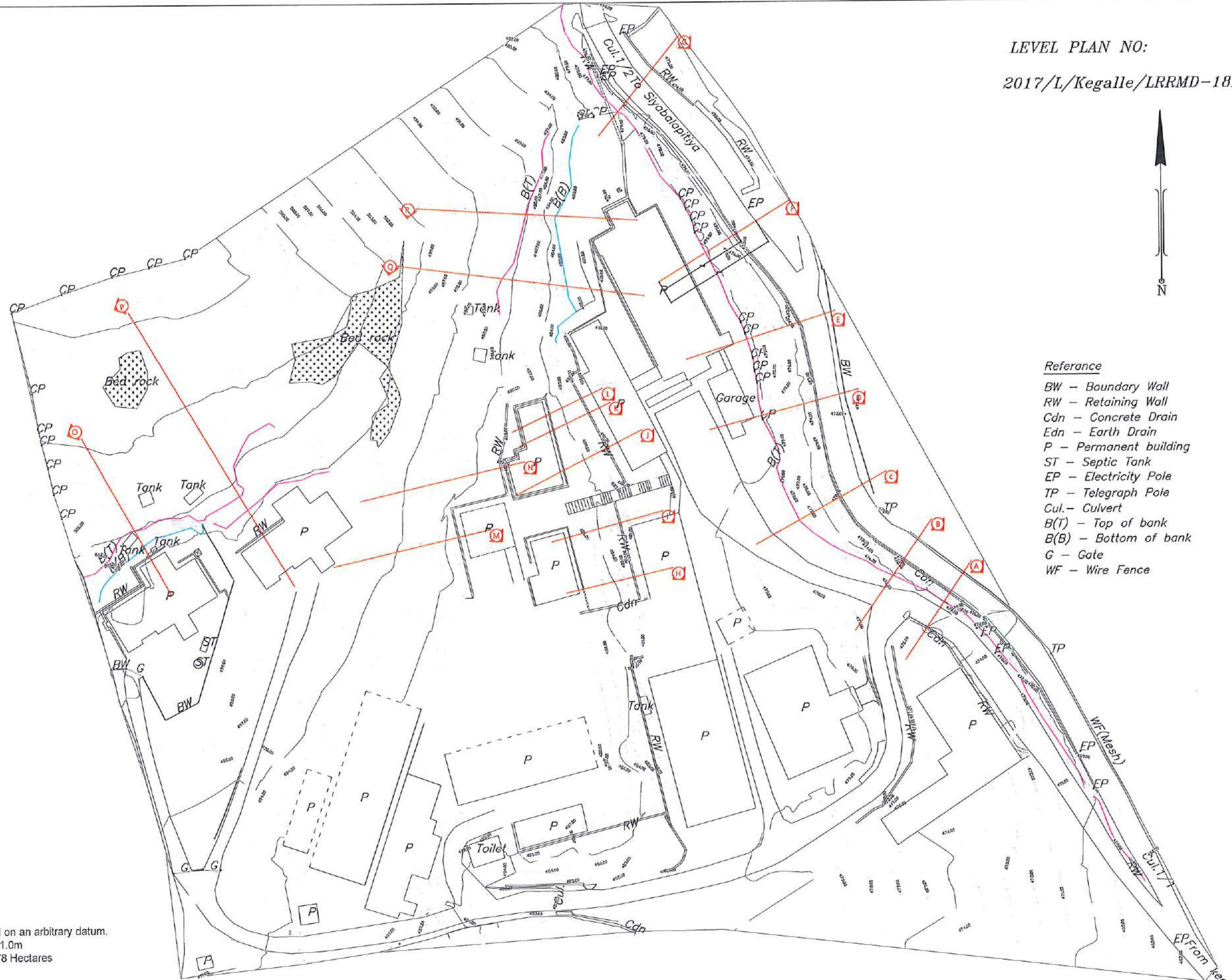
LEVEL PLAN NO:  
2017/L/Kegalle/LRRMD-18Re.





Reference

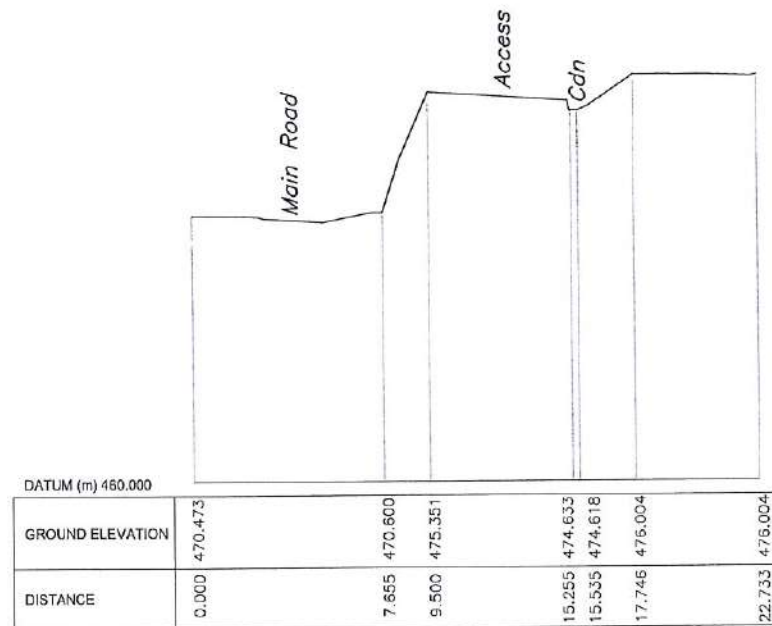
BW - Boundary Wall  
RW - Retaining Wall  
Cdn - Concrete Drain  
Edn - Earth Drain  
P - Permanent building  
ST - Septic Tank  
EP - Electricity Pole  
TP - Telegraph Pole  
Cul - Culvert  
B(T) - Top of bank  
B(B) - Bottom of bank  
G - Gate  
WF - Wire Fence

NOTE:  
Heights are based on an arbitrary datum.  
Contour Interval - 1.0m  
Area surveyed 1.78 Hectares

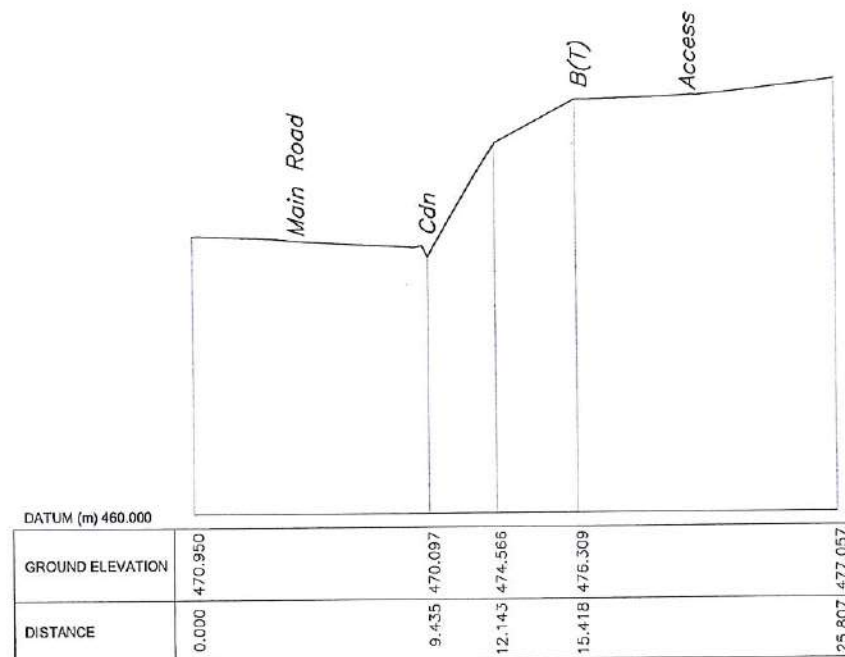


<div>EMPLOYER</div> <div></div> <div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div> <div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS</div> <div>AND DISASTER MANAGEMENT</div> <div>NATIONAL BUILDING RESEARCH ORGANISATION</div> <div>No. 99/1, JAWATTA ROAD</div> <div>COLOMBO - 05</div>	<div>DESIGNER</div> <div></div> <div>DESIGN UNIT</div> <div>NATIONAL BUILDING RESEARCH ORGANISATION</div> <div>No. 99/1, JAWATTA ROAD,</div> <div>COLOMBO - 05</div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	CONTOUR SURVEY PLAN	SCALE	1: 750	DATE	02.11.2020	PROJECT / DRAWING No.	RLVMM/WORKS/NCB/04A/20-De/DR-01	REVISION	00	SURVEYED	KAMAL DESHAPRIYA	

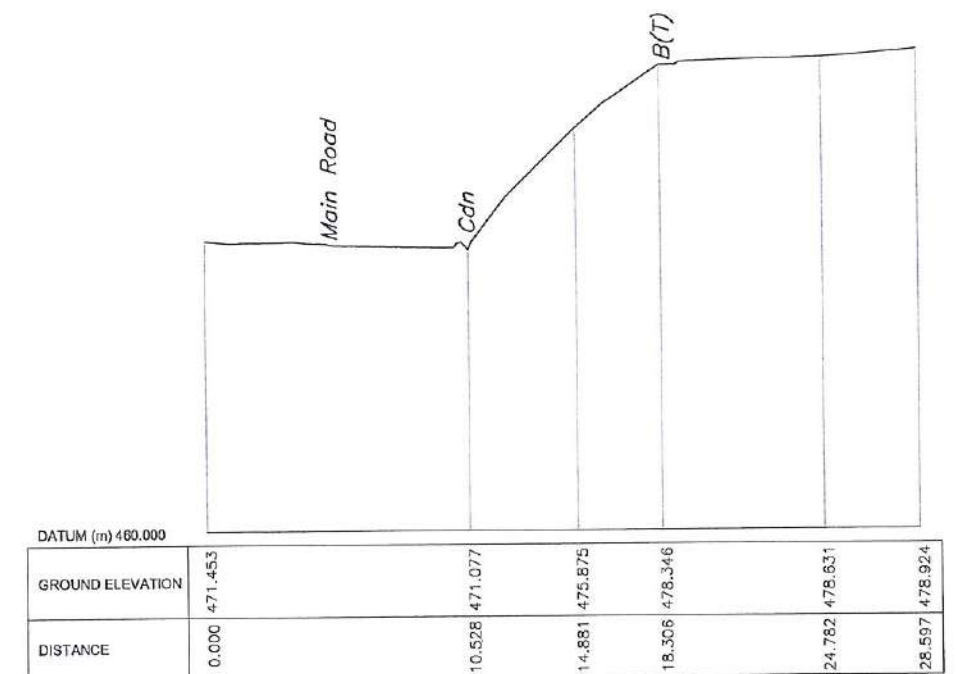




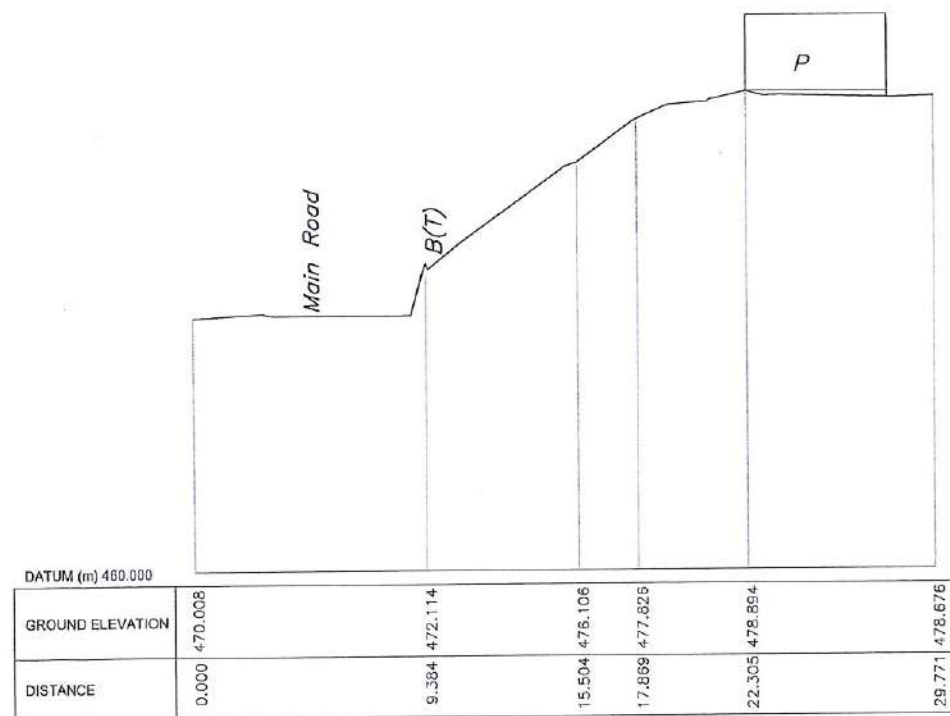
SECTION-A



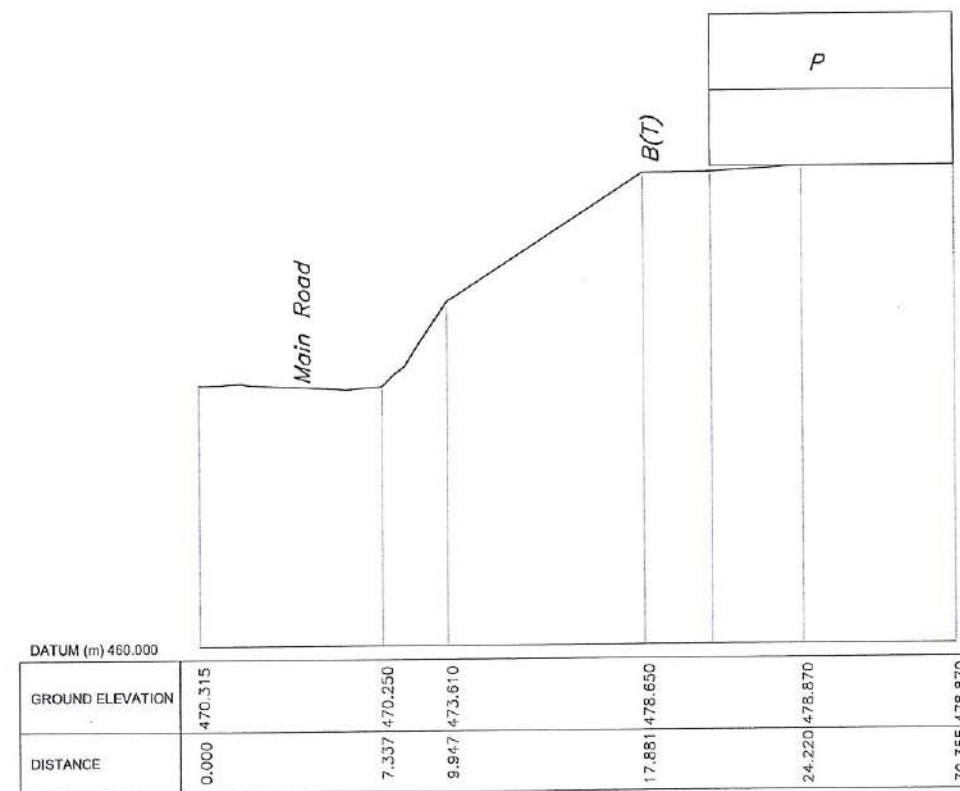
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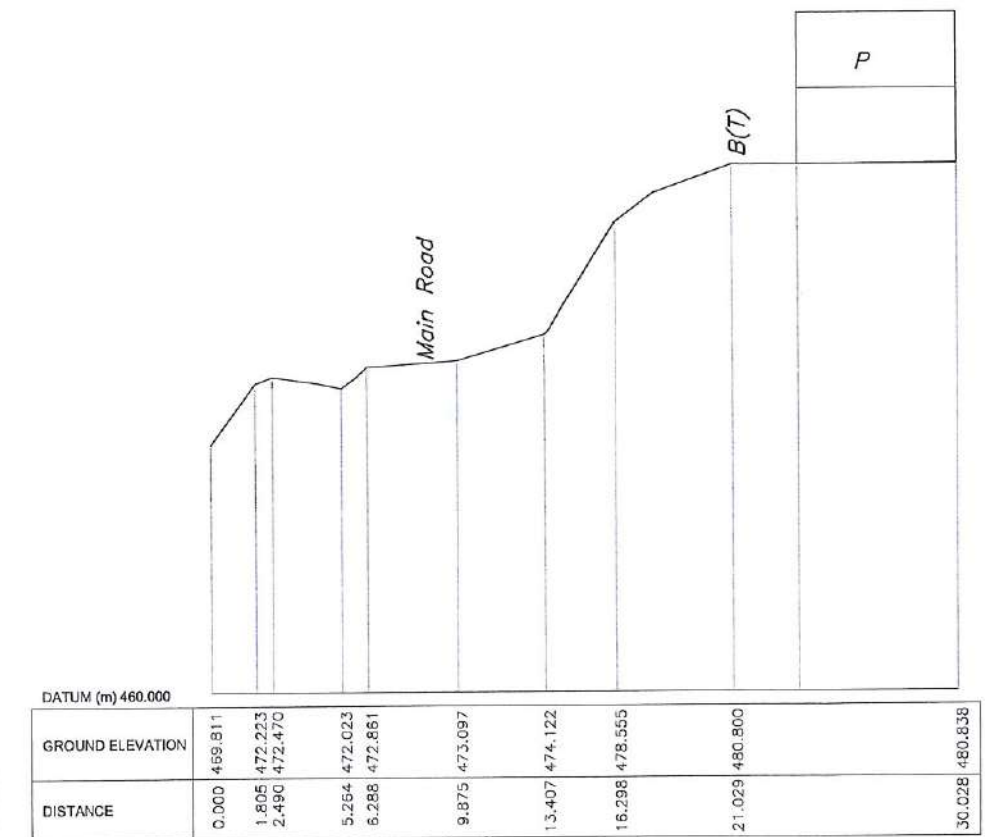
SECTION-C



SECTION-D

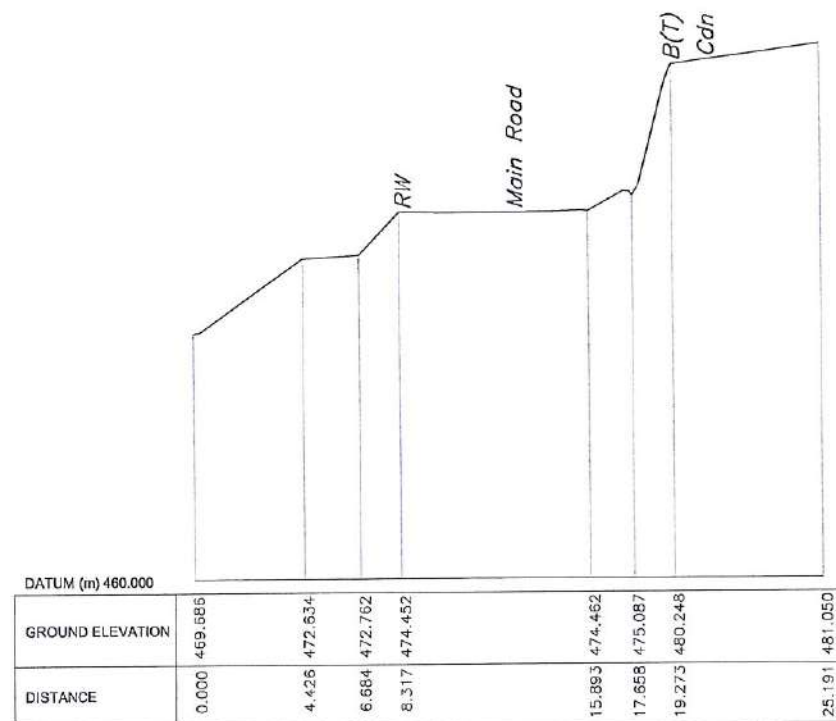


SECTION-E

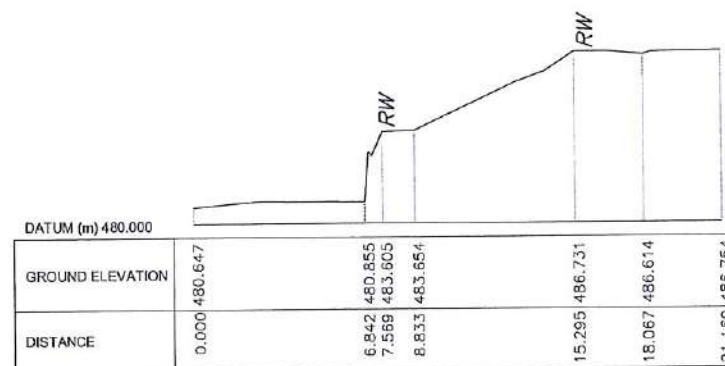


SECTION-F

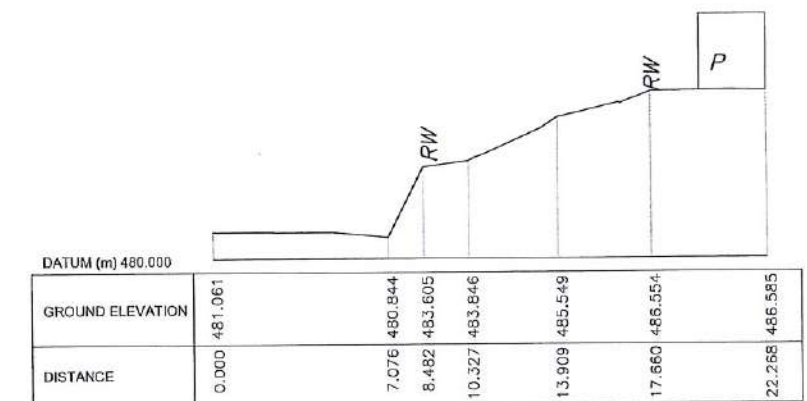




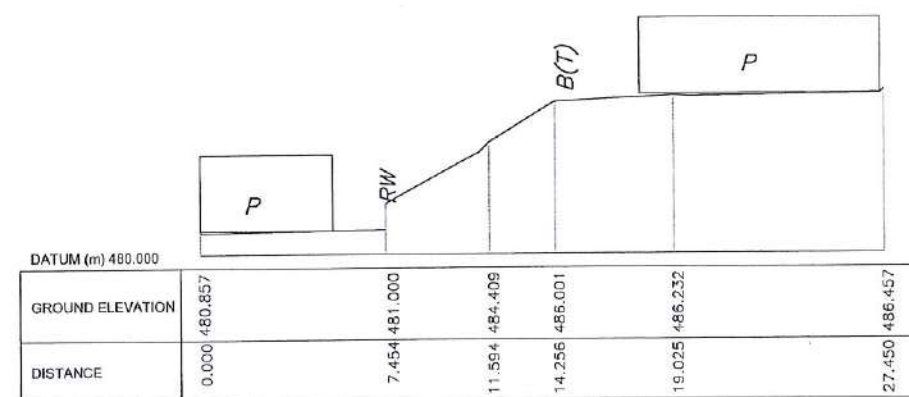
SECTION-G



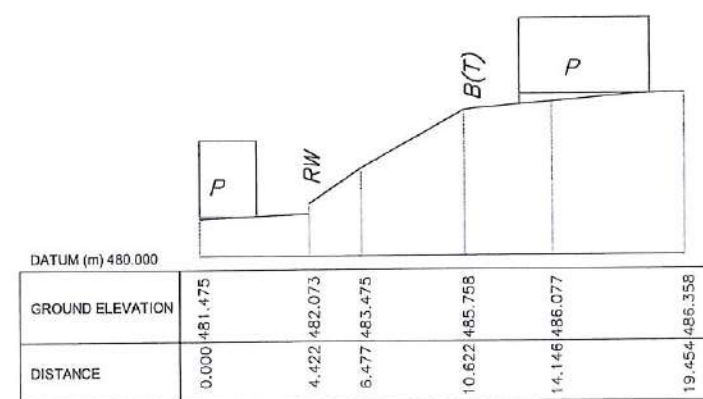
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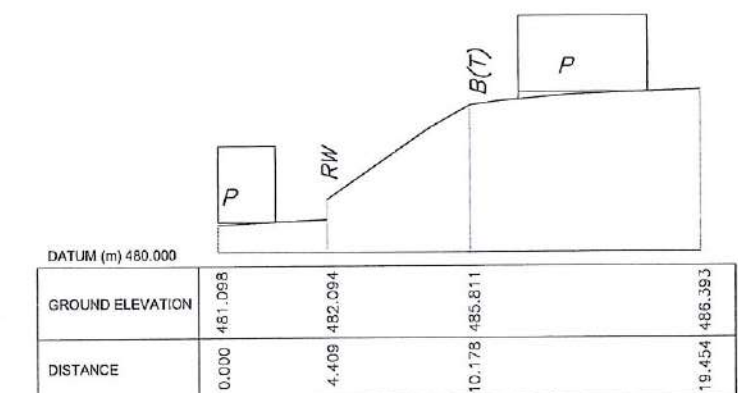
SECTION-I





SECTION-J



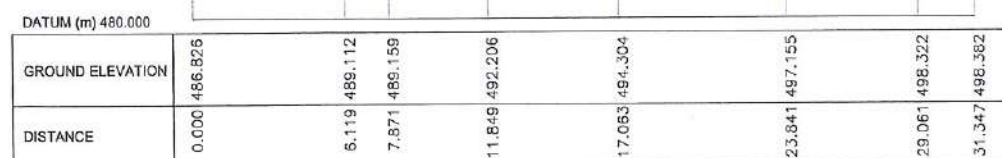
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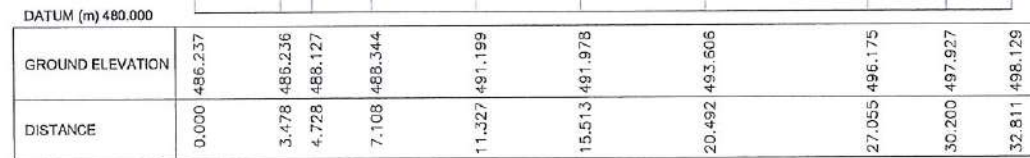
SECTION-L

<b>EMPLOYER</b>  DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05	<b>DESIGNER</b>  DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD, COLOMBO - 05	<b>REV</b> 1 2 3 4 5 6 7 8 9 10	<b>DATE</b> 01.11.2020 02.11.2020 03.11.2020 04.11.2020 05.11.2020 06.11.2020 07.11.2020 08.11.2020 09.11.2020 10.11.2020	<b>REVISION DESCRIPTION</b> 1. Initial Design 2. Revised Design 3. Revised Design 4. Revised Design 5. Revised Design 6. Revised Design 7. Revised Design 8. Revised Design 9. Revised Design 10. Revised Design	<b>APPROVAL</b> 1 2 3 4 5 6 7 8 9 10	<b>PROJECT TITLE</b> REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES DISTRICT COURT COMPLEX, KEGALLE	<b>TITLE</b> SURVEY CROSS SECTIONS	<b>DESCRIPTION</b> SURVEYED DRAWN	<b>NAME</b> KAMAL DESHAPRIYA M. H. M. HARSHANI	<b>SIGNATURE</b>          
		<b>SCALE</b> 1:300 <b>DATE</b> 02.11.2020 <b>PROJECT / DRAWING No.</b> RLVMM/WORKS/NCB/04A/20-D&DR-02b <b>REVISION</b> 00								

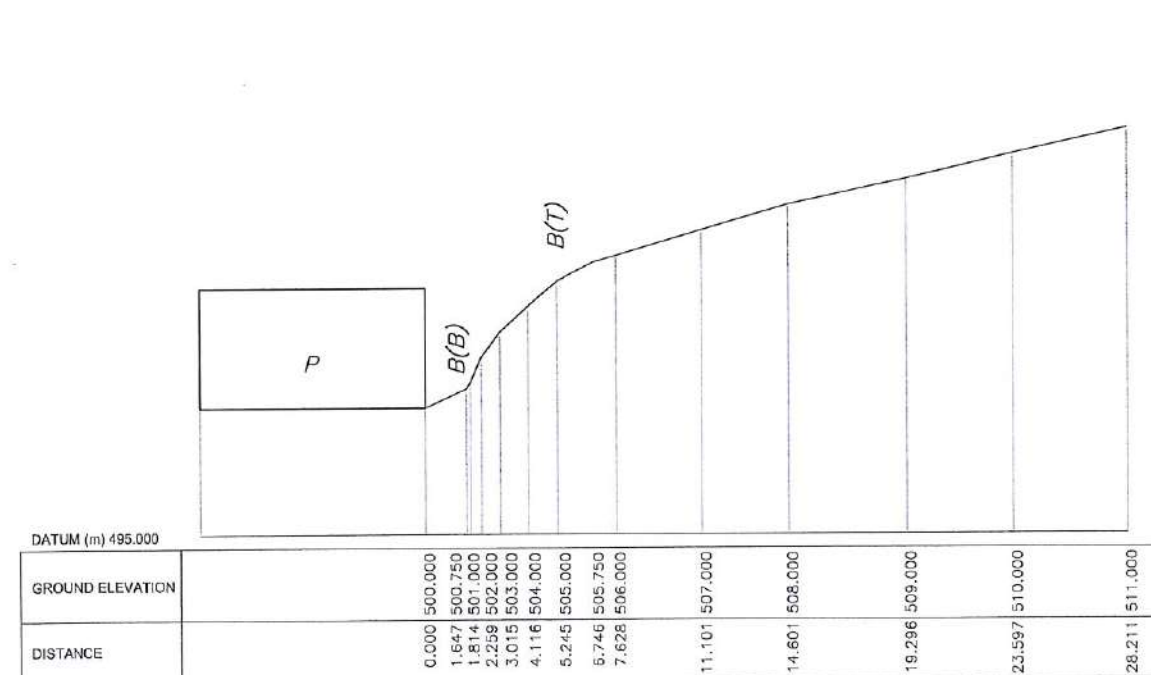




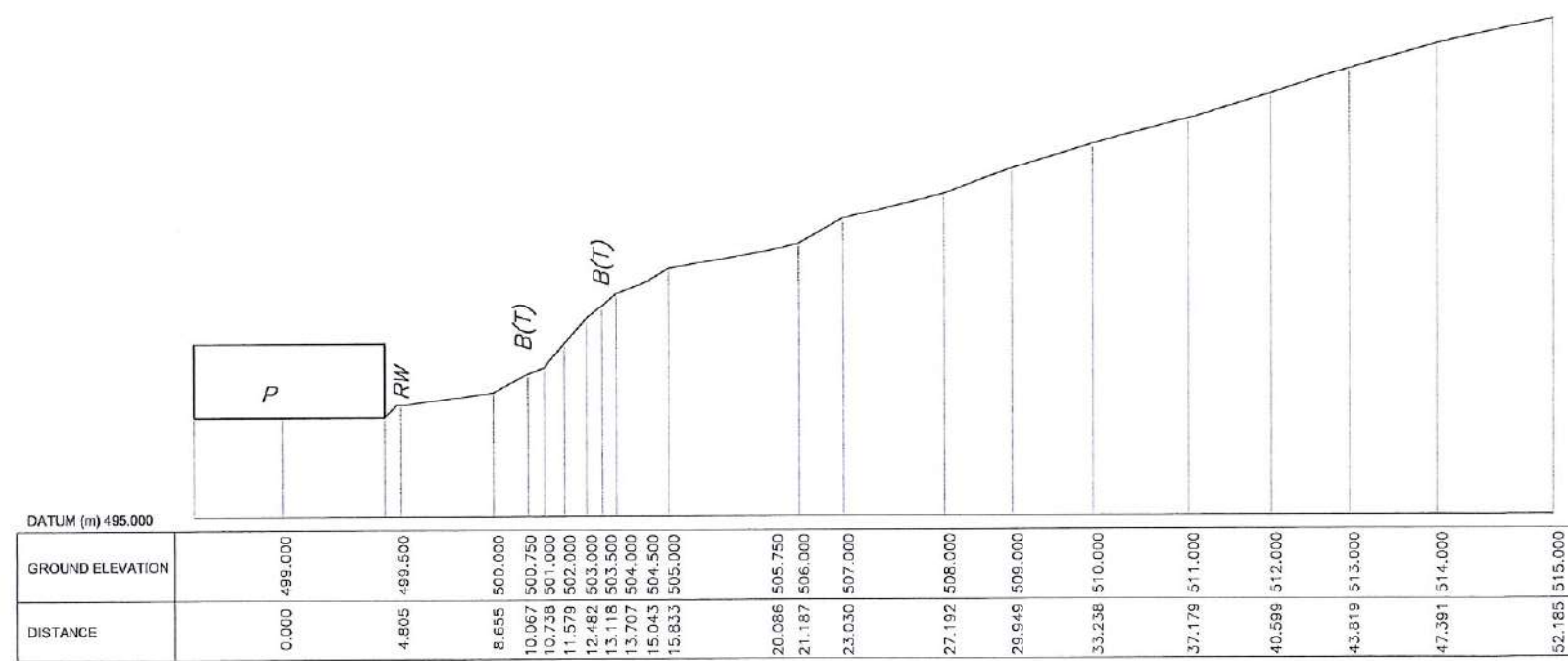
## SECTION-M



SECTION-N

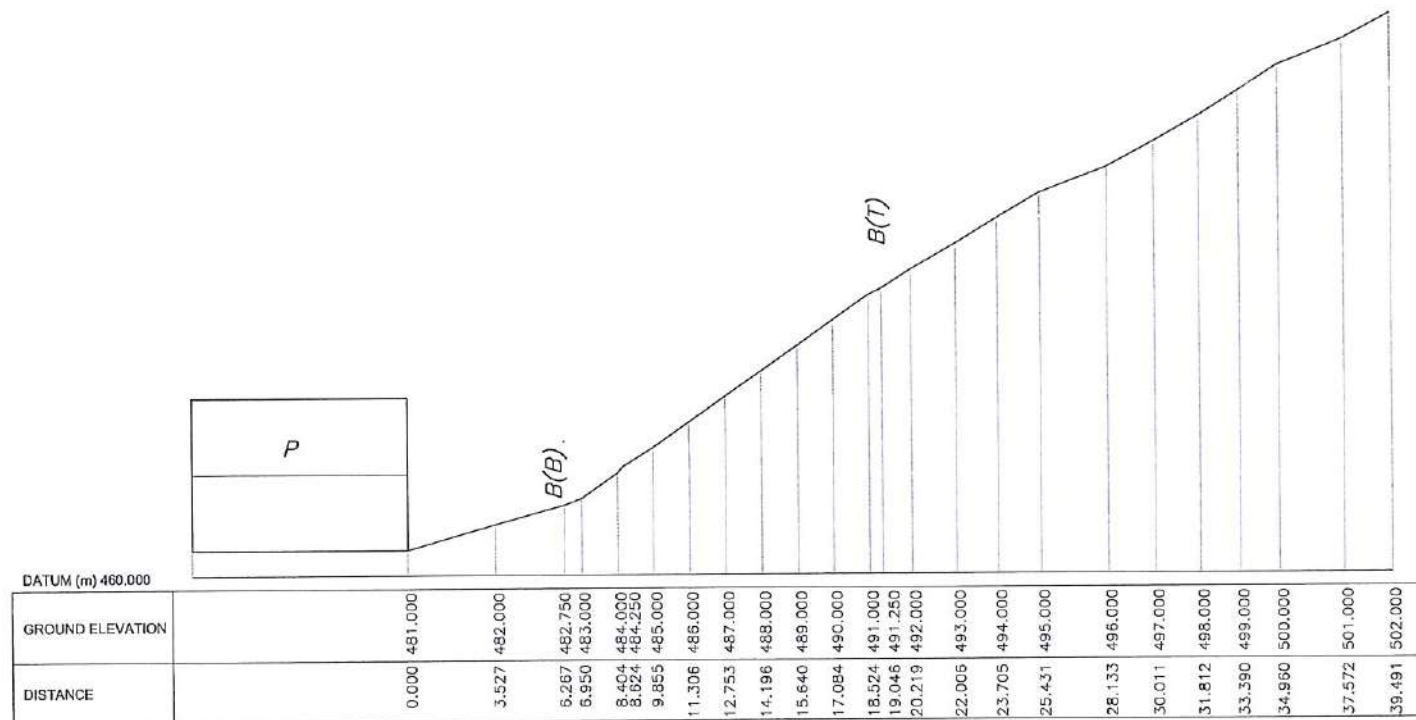


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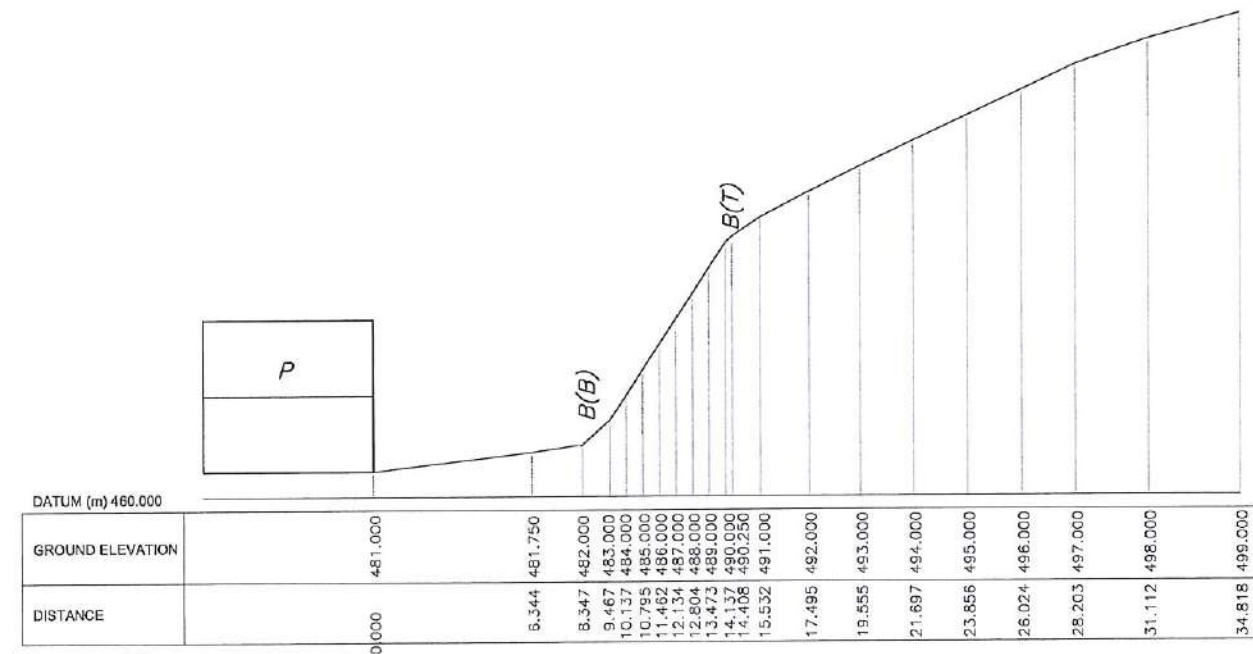


SECTION-P







SECTION-Q



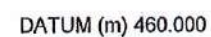
SECTION-R

EMPLOYER  DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05	DESIGNER  DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD, COLOMBO - 05	REV DATE REVISION DESCRIPTION APPROVAL	PROJECT TITLE REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES DISTRICT COURT COMPLEX, KEGALLE	TITLE SURVEY CROSS SECTIONS	DESCRIPTION SURVEYED DRAWN	NAME KAMAL DESHAPRIYA M. H. M. HARSHANI	SIGNATURE
		SCALE 1:300 PROJECT / DRAWING No. RLVMMP/WORKS/NCB/04A/20-Dc/DR-02d	DATE 02.11.2020 REVISION 00				



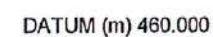






DATA (m) 400.000	
GROUND ELEVATION	471.453
DISTANCE	0.000
	10.528
	14.881
	18.306
	24.782
	28.597

SECTION-C





DATA ON (July 4, 1966)	
GROUND ELEVATION	470.008
DISTANCE	0.000
	9.384
	15.504
	17.869
	22.305
	28.771
	478.676

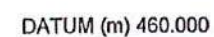
### SECTION-D

NOTE

1. LENGTH OF THE SOIL NAILS, LENGTH & LOCATION OF HORIZONTAL DRAINS MIGHT BE VARIED ACCORDING TO THE ACTUAL SOIL PROFILE OR SITE CONDITION.

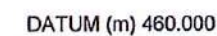
 <p>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05</p>	 <p>DESIGNER  DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD, COLOMBO - 05</p>	REV	DATE	REVISION DESCRIPTION	APPROVAL	<p>PROJECT TITLE</p> <p>REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES DISTRICT COURT COMPLEX , KEGALLE</p>	<p>TITLE</p> <p>CROSS SECTIONS OF PROPOSED MITIGATION MEASURES</p>			DESCRIPTION	NAME	SIGNATURE			
										SCALE	1: 200	DATE	02.11.2020		
PROJECT / DRAWING No.								REVISION							
RLVMMP/WORKS/NCB/04A/20-Dr/DR-04a								00							
								RECOMMENDED	PROF. S.A.S. KULATHILAKA						
								APPROVED	K.N. BANDARA						





DATA (m) 460.000	
GROUND ELEVATION	470.315
	7.337 470.250
	9.947 473.610
	17.881 478.650
	24.220 478.870
	30.355 478.870

SECTION-E










DATUM (m) 466.000	
GROUND ELEVATION	469.811
	472.223
	472.470
	472.023
	472.861
	473.097
	474.122
	478.555
	480.800
	480.838
DISTANCE	0.000
	1.805
	2.490
	5.264
	6.283
	9.875
	13.407
	16.298
	21.029
	30.028

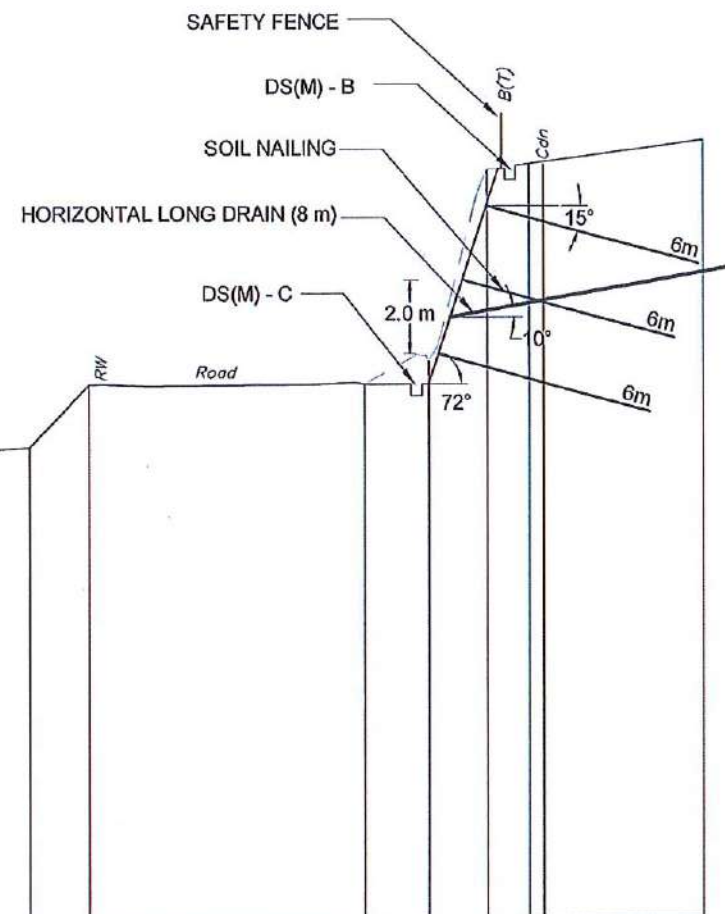
SECTION-F

NOTE

1. LENGTH OF THE SOIL NAILS, LENGTH & LOCATION OF HORIZONTAL DRAINS MIGHT BE VARIED ACCORDING TO THE ACTUAL SOIL PROFILE OR SITE CONDITION.

<b>EMPLOYER</b>  DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 89/1, JAWATTA ROAD COLOMBO - 05	<b>DESIGNER</b>  DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD, COLOMBO - 05	REV	DATE	REVISION DESCRIPTION	APPROVAL	<b>PROJECT TITLE</b>  REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES DISTRICT COURT COMPLEX , KEGALLE	<b>TITLE</b>  CROSS SECTIONS OF PROPOSED MITIGATION MEASURES				DESCRIPTION	NAME	SIGNATURE
											DRAWN	B.V.S. PATTRISHIYA	
											DESIGNER	M. H. M. HARSHANI	
											CHECKED	J.P. SAMARANAYAKA	
										RECOMMENDED	PROF. S.A.S. KULATHILAKA		
										APPROVED	K.N. BANDARA		
		SCALE 1: 200 DATE 02.11.2020 PROJECT / DRAWING No. RLVMP/WORKS/NCB/04A/20-D/DR-04b REVISION 00											

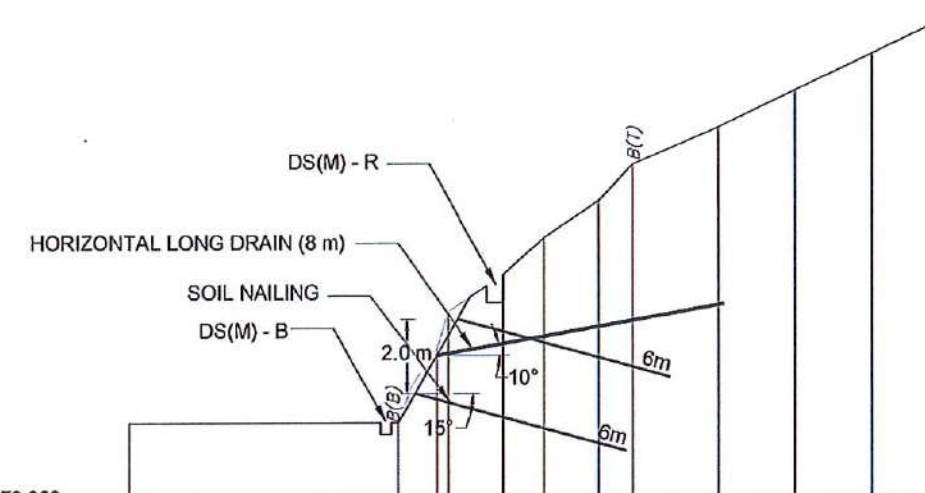




DATUM (m) 460.000

GROUND ELEVATION	469.686	472.634	472.762	474.452		474.462	475.087	480.248	481.050
DISTANCE	0.000	4.426	6.684	8.317		15.893	17.658	19.273	25.191

SECTION-G




DATUM (m) 479.000

GROUND ELEVATION	481.000	481.000	483.000	484.000	485.000	486.000	487.000	488.000	489.000	490.000	491.000	492.000
DISTANCE	0.000	7.390	8.460	8.780	10.290	11.420	12.910	13.860	16.230	18.340	20.430	22.600

SECTION-S

NOTE

1. LENGTH OF THE SOIL NAILS, LENGTH & LOCATION OF HORIZONTAL DRAINS MIGHT BE VARIED ACCORDING TO THE ACTUAL SOIL PROFILE OR SITE CONDITION.

EMPLOYER  
  
 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
 STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS  
 AND DISASTER MANAGEMENT  
 NATIONAL BUILDING RESEARCH ORGANISATION  
 No. 99/1, JAWATTA ROAD  
 COLOMBO - 05

DESIGNER  
  
 DESIGN UNIT  
 NATIONAL BUILDING RESEARCH ORGANISATION  
 No. 99/1, JAWATTA ROAD,  
 COLOMBO - 05

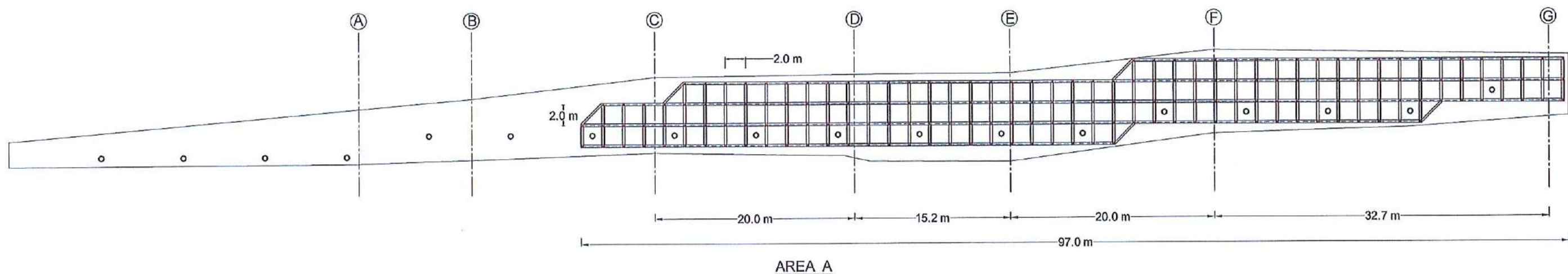
REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE  
 REDUCTION OF LANDSLIDE  
 VULNERABILITY BY MITIGATION MEASURES  
 DISTRICT COURT COMPLEX, KEGALLE

TITLE  
 CROSS SECTIONS OF PROPOSED  
 MITIGATION MEASURES  
 SCALE 1: 200  
 PROJECT / DRAWING No.  
 RLVMMP/WORKS/NCB/04A/20-Dd/DR-04c  
 DATE 02.11.2020  
 REVISION 00


DESCRIPTION	NAME	SIGNATURE
DRAWN	B.V.S. PATTRISHIYA	
DESIGNER	M. H. M. HARSHANI	
CHECKED	J.P. SAMARANAYAKA	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	K.N. BANDARA	

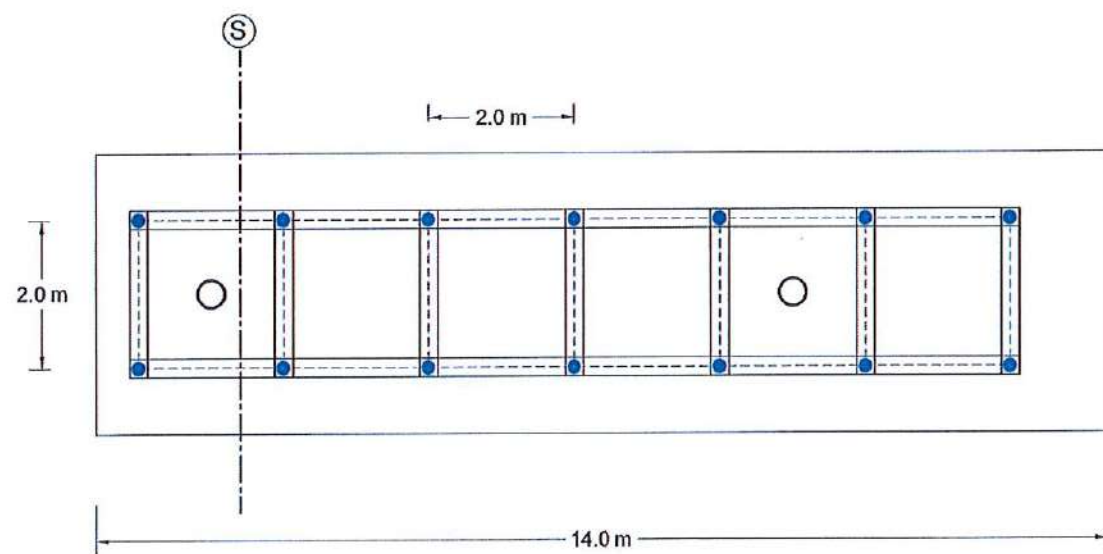




#### LEGEND


 SOIL NAILING - TOTAL NAIL LENGTH = 6 m  
 NO'S OF NAIL = 183  
 SOIL NAIL DIAMETER = 32 mm  
 DIAMETER OF THE DRILLED HOLE = 125 mm  
 NAIL SPACING = 2.0 m

 HORIZONTAL LONG DRAIN - HORIZONTAL LONG DRAIN LENGTH = 8 m  
 NO'S OF LONG DRAIN = 18  
 DIAMETER = 90 mm




















#### LEGEND

 SOIL NAILING - TOTAL NAIL LENGTH = 6 m  
 NO'S OF NAIL = 14  
 SOIL NAIL DIAMETER = 32 mm  
 DIAMETER OF THE DRILLED HOLE = 125 mm  
 NAIL SPACING = 2.0 m

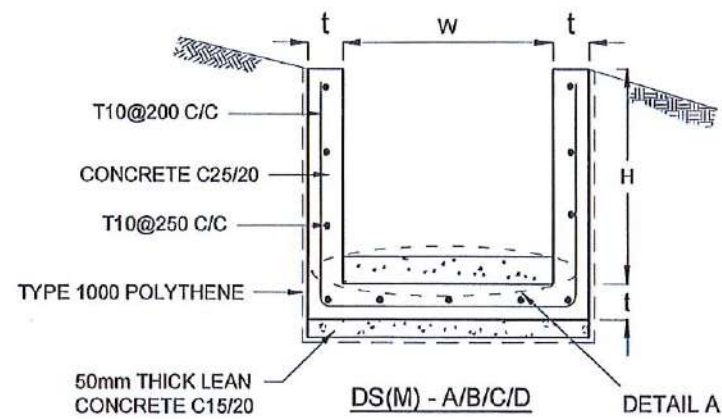
 HORIZONTAL LONG DRAIN - HORIZONTAL LONG DRAIN LENGTH = 8 m  
 NO'S OF LONG DRAIN = 02  
 DIAMETER = 90 mm

#### NOTE

1. INSTALLED LENGTHS OF THE SOIL NAILS MIGHT BE VARIED ACCORDING TO THE ACTUAL SOIL PROFILE OR SITE CONDITION.
2. LOCATION AND LENGTH OF THE HORIZONTAL LONG DRAINS WILL BE DECIDED ACCORDING TO THE ACTUAL SITE CONDITION.
3. SOIL NAIL SLOPE NEAR SECTION C SHALL END WITH SMOOTH TRANSITION TO MATCH WITH EXISTING SLOPE.

<div>EMPLOYER</div> <div><div></div><div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div><div></div></div>		<div>DESIGNER</div> <div><div></div><div>DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD, COLOMBO - 05</div><div></div></div>		<table><tr><th>REV</th><th>DATE</th><th>REVISION DESCRIPTION</th><th>APPROVAL</th></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></table>		REV	DATE	REVISION DESCRIPTION	APPROVAL																																	<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES DISTRICT COURT COMPLEX, KEGALLE</div>		<div>TITLE</div> <div>FRONT ELEVATION OF PROPOSED MITIGATION MEASURES</div> <div><table><tr><td>SCALE</td><td>1:400 / 1:100</td><td>DATE</td><td>02.11.2020</td></tr><tr><td colspan="2">PROJECT / DRAWING No.</td><td>REVISION</td><td>00</td></tr><tr><td colspan="4">RLVMM/MP/YORKS/NCB/04A/20-Dcd/DR-05</td></tr></table></div>		SCALE	1:400 / 1:100	DATE	02.11.2020	PROJECT / DRAWING No.		REVISION	00	RLVMM/MP/YORKS/NCB/04A/20-Dcd/DR-05				<table><tr><th>DESCRIPTION</th><th>NAME</th><th>SIGNATURE</th></tr><tr><td>DRAWN</td><td>B.V.S. PATTRISHIYA</td><td></td></tr><tr><td>DESIGNER</td><td>M. H. M. HARSHANI</td><td></td></tr><tr><td>CHECKED</td><td>J.P. SAMARANAYAKA</td><td></td></tr><tr><td>RECOMMENDED</td><td>PROF. S.A.S. KULATHILAKA</td><td></td></tr><tr><td>APPROVED</td><td>K.N. BANDARA</td><td></td></tr></table>		DESCRIPTION	NAME	SIGNATURE	DRAWN	B.V.S. PATTRISHIYA		DESIGNER	M. H. M. HARSHANI		CHECKED	J.P. SAMARANAYAKA		RECOMMENDED	PROF. S.A.S. KULATHILAKA		APPROVED	K.N. BANDARA	
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APPROVED	K.N. BANDARA																																																																												





DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (M) - A/P	300	300	100
DS (M) - B/R	450	450	100
DS (M) - C/Q	600	600	100
DS (M) - D	750	750	125
DS (M) - E	900	900	150
DS (M) - F	1000	1000	150

#### NOTES

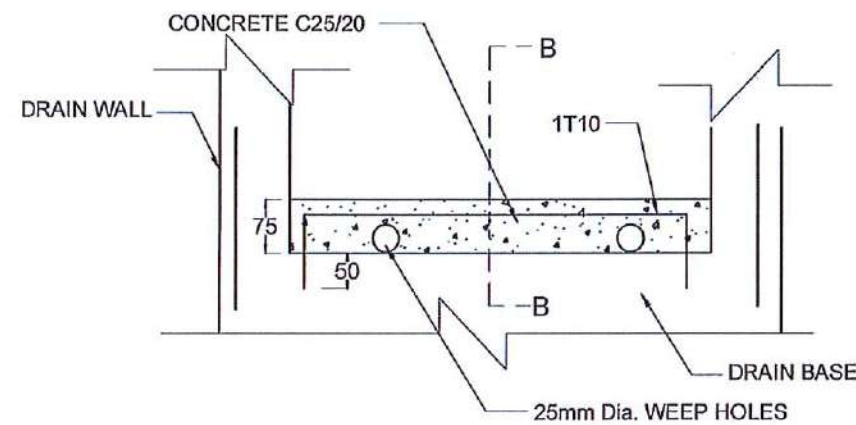
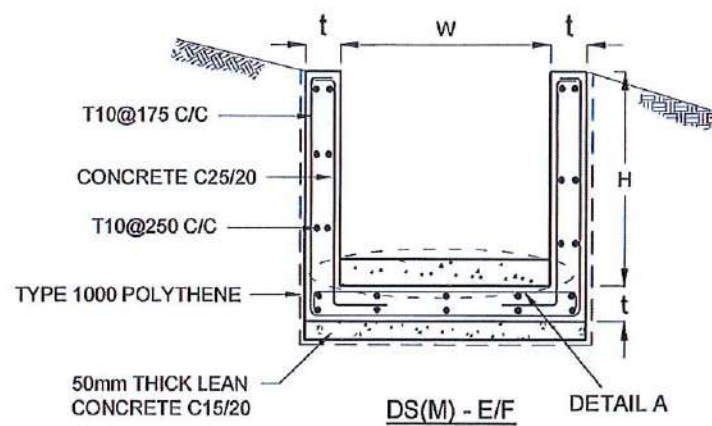
- DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
- STEPS SHALL BE CONSTRUCTED AT SURFACE DRAIN ON SLOPING GROUND ACCORDING TO THE SITE CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- ENERGY BREAKERS SHALL BE CONSTRUCTED AT THE STEEP DRAIN SEGMENTS AS PER THE INSTRUCTIONS OF THE ENGINEER.
- DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
- 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.

#### CONCRETE

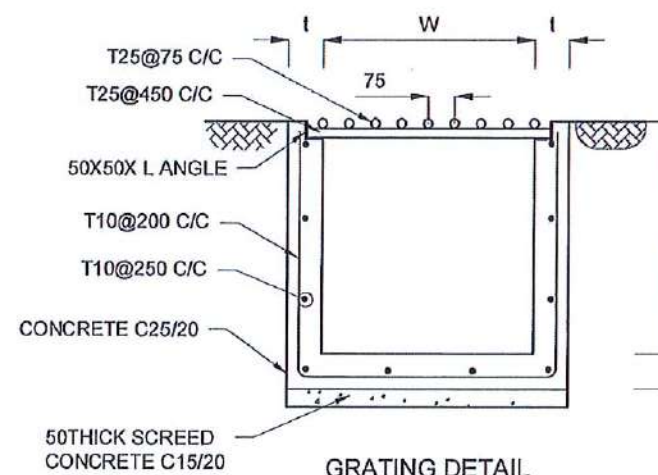
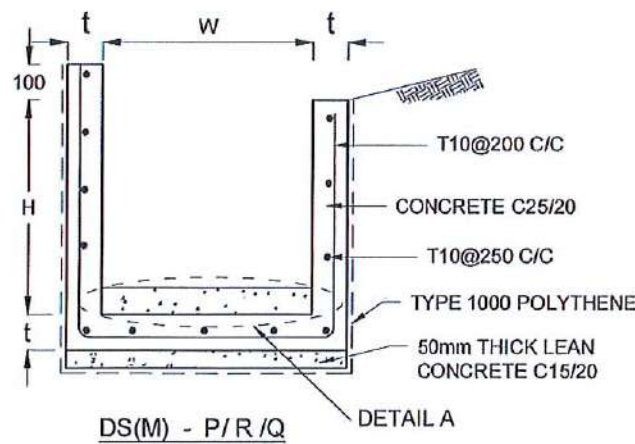
- USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
  - SCREED - C. 15/20
  - WALLS / BASE / ENERGY BREAKERS - C. 25/20

#### REINFORCEMENT

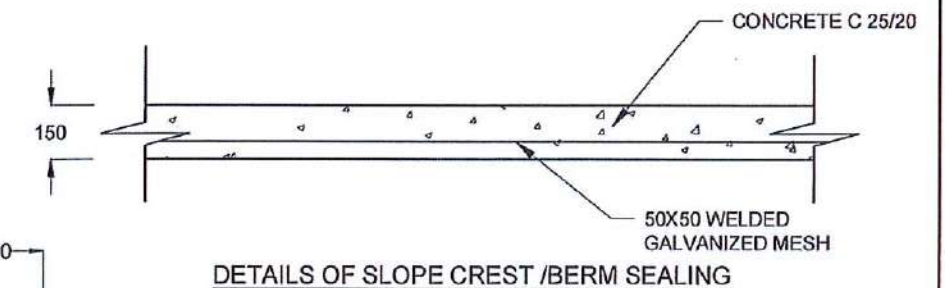
- ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm<sup>2</sup>.
- BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 50 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
- ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
- REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
- COVER TO REINFORCEMENT
  - BURIED FACES AND DRAIN INVERTS - 40 mm
  - ALL OTHER FACES - 25 mm



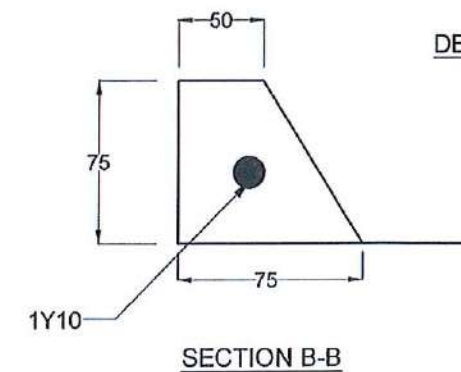
DETAIL A - (ENERGY BREAKER AT 3M)



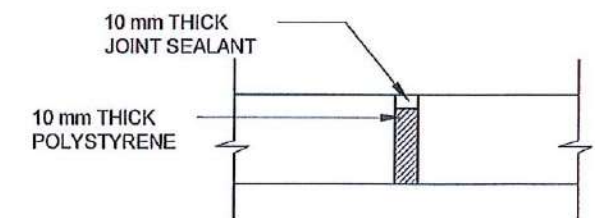
GRATING DETAIL





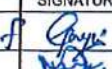




DETAILS OF SLOPE CREST /BERM SEALING



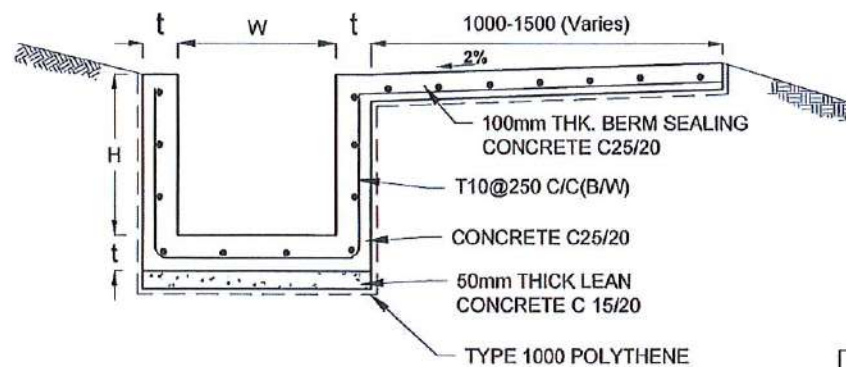
SECTION B-B



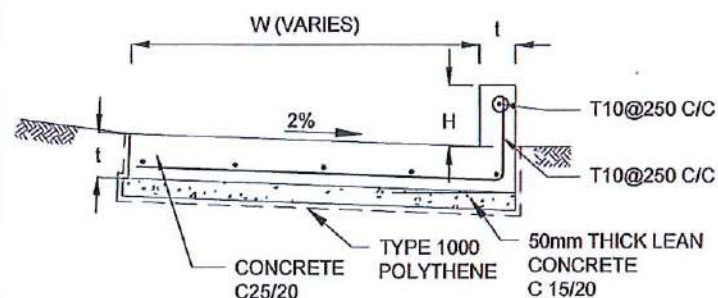
EXPANSION JOINT DETAIL

EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05	 DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05					REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES DISTRICT COURT COMPLEX, KEGALLE	DETAILS OF DRAINS (SURFACE DRAIN -1 OF 2)	DRAWN	B.V.S. PATRISHIYA	
								DESIGNER	M. H. M. HARSHANI	
								CHECKED	J.P. SAMARANAYAKA	
								RECOMMENDED	PROF. S.A.S. KULATHILAKA	
								APPROVED	K.N. BANDARA	

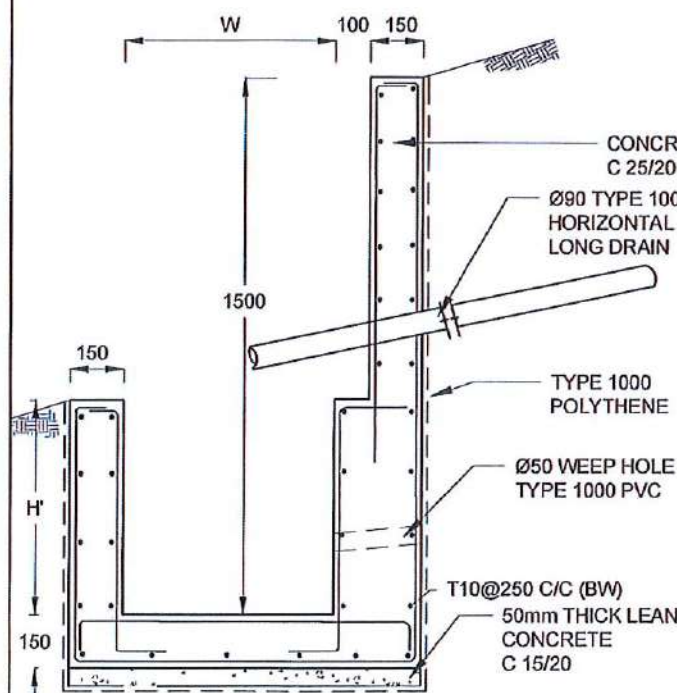




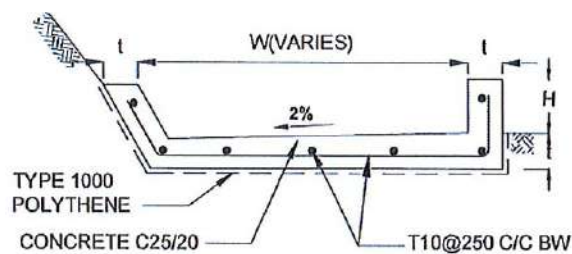
DS (B) - (TYPE I)



DS (K) - TYPE I

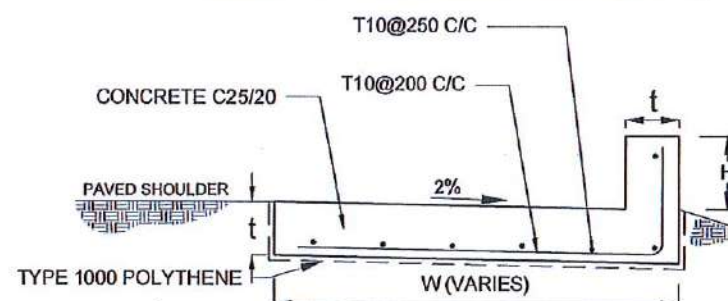


DS (M) - L

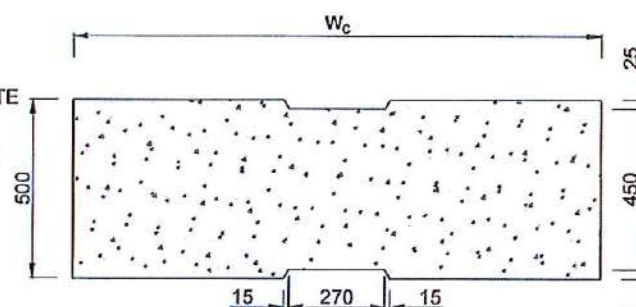


DS (B) - (TYPE II)

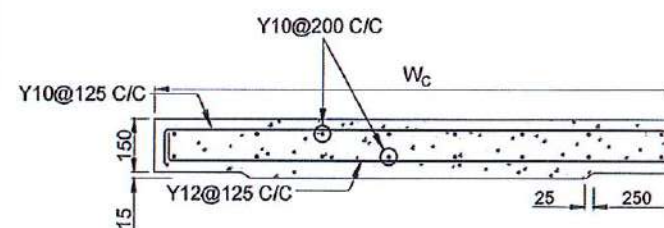
DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (K) - A	1000	200	100
DS (K) - B	1000	300	100
DS (K) - C	1150	200	200



DS (K) - TYPE II



PLAN VIEW OF COVER SLAB



ACCESS & HEAVY DUTY COVER SLAB

SECTION OF (W<sub>c</sub> x 500 x 150mm)

DS(M) - L	W (mm)	H' (mm)	t (mm)
TYPE I	600	600	150
TYPE II	800	800	150

DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (B) - A	300	300	100
DS (B) - B	450	450	100
DS (B) - C	1000	150	100

#### NOTES



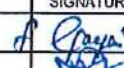




- DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
- STEPS SHALL BE CONSTRUCTED AT SURFACE DRAIN ON SLOPING GROUND ACCORDING TO THE SITE CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- ENERGY BREAKERS SHALL BE CONSTRUCTED AT THE STEEP DRAIN SEGMENTS AS PER THE INSTRUCTIONS OF THE ENGINEER.
- DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- COVER SLABS NEED TO BE PROVIDED ONLY FOR THE REGIONS AS INSTRUCTED BY THE ENGINEER.
- COVER SLAB WIDTH (W<sub>c</sub>) SHOULD BE TAKEN AS THE SUM OF DRAIN WIDTH AND 2x DRAIN WALL THICKNESS. [W<sub>c</sub> = W+2xt]
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
- 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.

#### CONCRETE

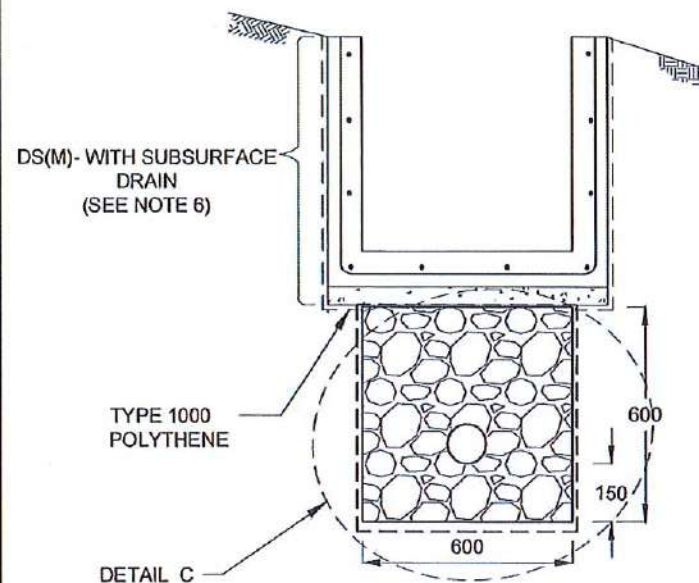
- USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
  - SCREED - C. 15/20
  - WALLS / BASE / ENERGY BREAKERS - C. 25/20

#### REINFORCEMENT

- ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm<sup>2</sup>.
- BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 50 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
- ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
- REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
- COVER TO REINFORCEMENT
  - BURIED FACES AND DRAIN INVERTS - 40 mm
  - ALL OTHER FACES - 25 mm

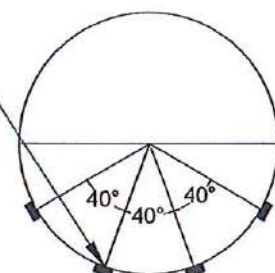
EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05	 DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05					REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES DISTRICT COURT COMPLEX, KEGALLE	DETAILS OF DRAINS (SURFACE DRAIN - 2 OF 2)	DRAWN	B.V.S. PATTRISHIYA	
								DESIGNER	M. H. M. HARSHANI	
								CHECKED	J.P. SAMARANAYAKA	
								RECOMMENDED	PROF. S.A.S. KULATHILAKA	
								APPROVED	K.N. BANDARA	



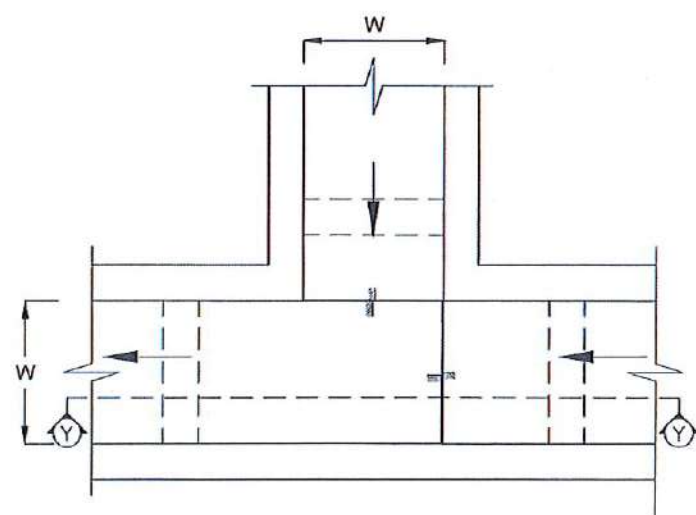


SUBSURFACE DRAIN  
[DS (S) -A]

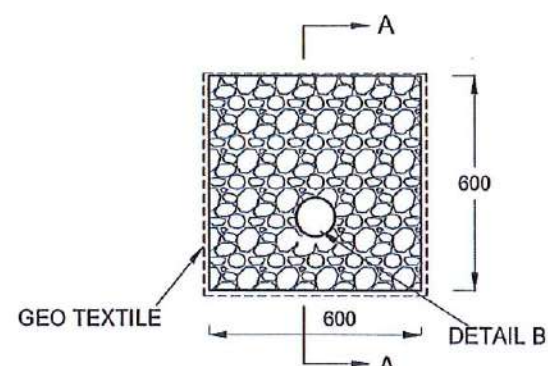
100mm x 5mm  
Groove



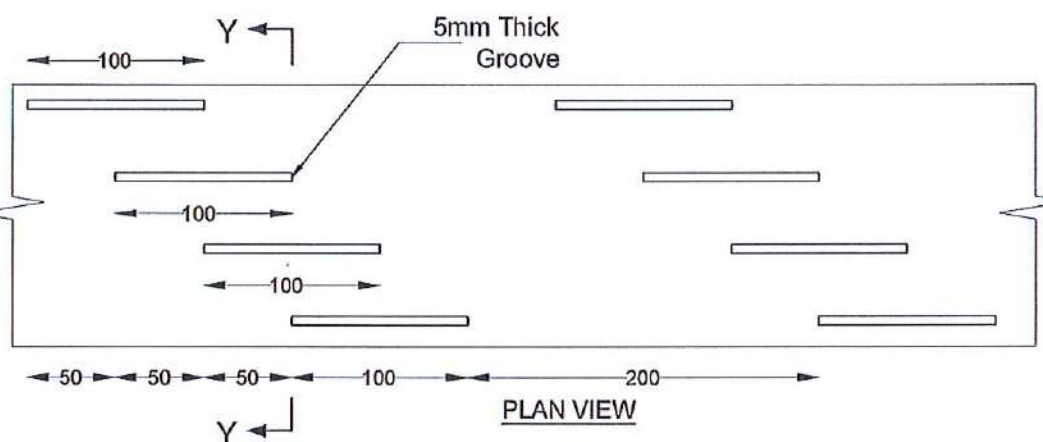
SECTION Y - Y



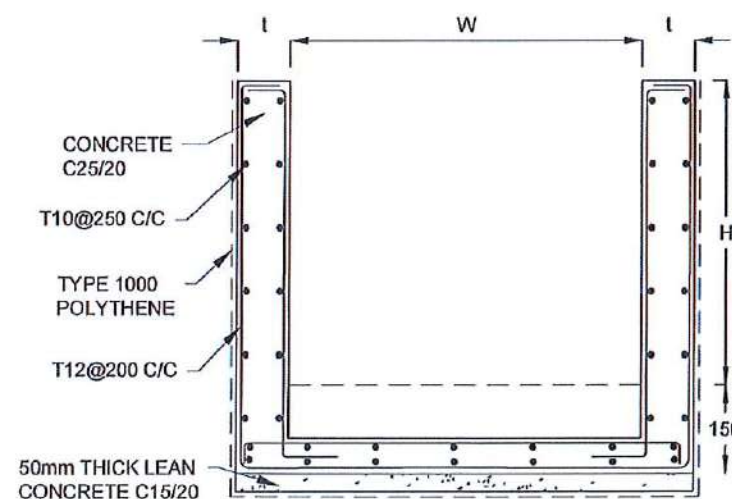
PLAN VIEW OF CATCH PIT (CP)



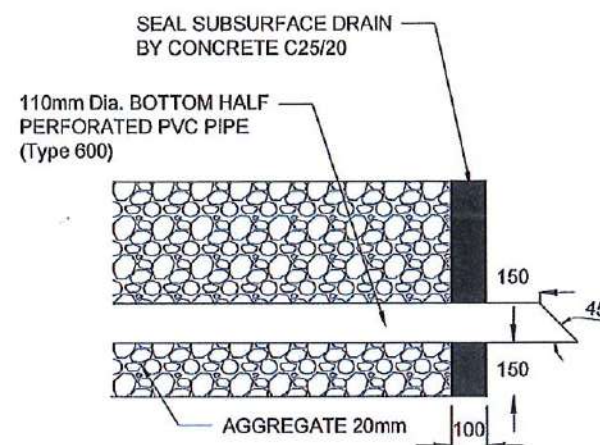
DETAIL C / DS (S) - A



DETAIL - B (PERFORATED PIPE FOR SUB-SURFACE DRAINS)



SECTION Y-Y (CP-R)



SECTION A-A  
(OUTLET DETAIL SUBSURFACE DRAIN)

## NOTES

1. W,H,t; SHALL BE THE SAME AS RESPECTIVE DRAIN SECTION.
2. CP - R SHALL BE USED WHERE  $H \geq 900\text{mm}$
3. DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
4. DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
5. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.
6. DETAILS OF SURFACE DRAIN PORTION OF THE SUBSURFACE DRAINS SHALL BE AS PER DS(M), DS(B), DS(K) OR DS(C) SECTIONS ACCORDINGLY.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.

## CONCRETE

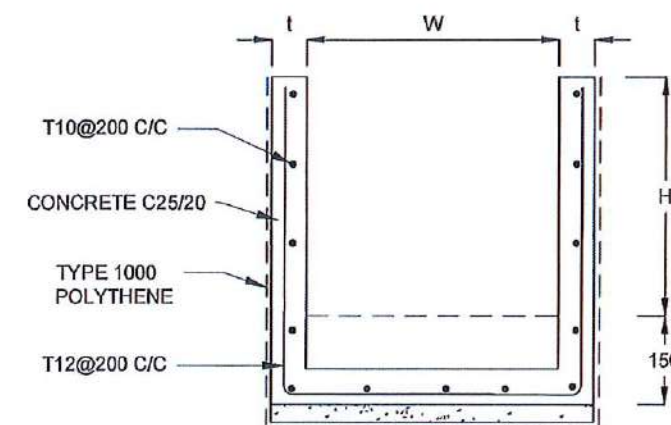
8. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
 

[a]	SCREED	- C. 15/20
[b]	WALLS / BASE / ENERGY BREAKERS	- C. 25/20


## REINFORCEMENT

9. ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN  $460\text{N/mm}^2$ .
10. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF  $50 \times \text{BAR DIA.}$  AND LAPPING SHOULD BE STAGGERED.
11. ANCHORAGE LENGTH SHOULD BE  $40 \times \text{BAR DIA.}$
12. REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
13. COVER TO REINFORCEMENT
 

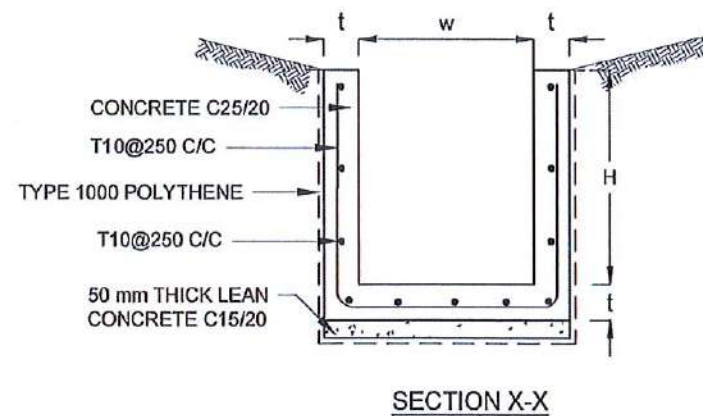
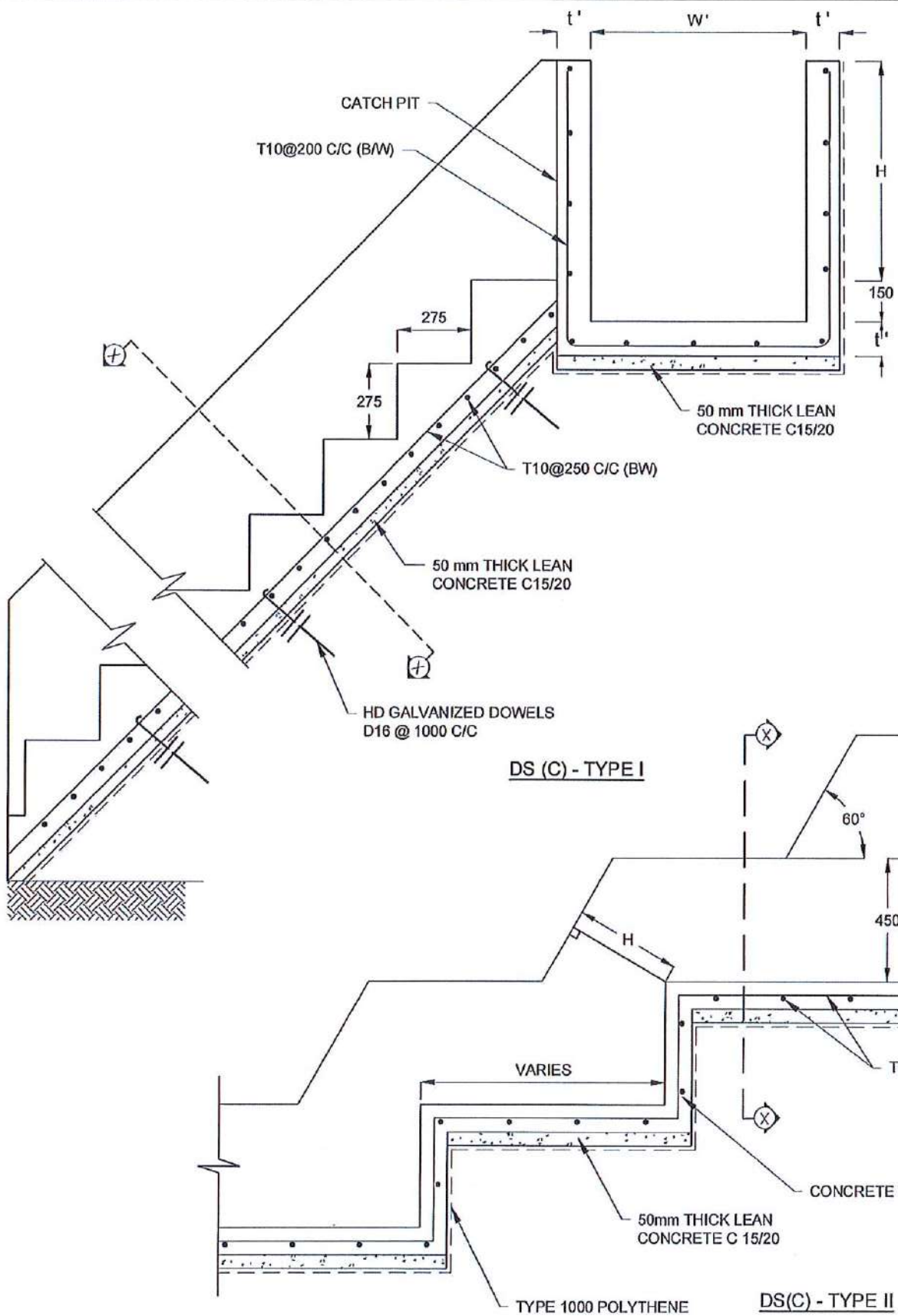
[a]	BURIED FACES AND DRAIN INVERTS	- 40 mm
[b]	ALL OTHER FACES	- 25 mm



SECTION Y - Y

<div>EMPLOYER</div> <div><div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div><div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT</div><div>NATIONAL BUILDING RESEARCH ORGANISATION</div><div>No. 99/1 ,JAWATTA ROAD</div><div>COLOMBO - 05</div></div> <div></div>	<div>DESIGNER</div> <div><div>DESIGN UNIT</div><div>NATIONAL BUILDING RESEARCH ORGANISATION</div><div>No. 99/1 ,JAWATTA ROAD</div><div>COLOMBO - 05</div></div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES DISTRICT COURT COMPLEX , KEGALLE</div>	<div>TITLE</div> <div>DETAILS OF DRAINS (SUBSURFACE DRAIN AND CATCHPIT)</div>				DESCRIPTION	NAME	SIGNATURE
											DRAWN	B.V.S. PATTRISHIYA	
											DESIGNER	M. H. M. HARSHANI	
											CHECKED	J.P. SAMARANAYAKA	
										RECOMMENDED	PROF. S.A.S. KULATHILAKA		
										APPROVED	K.N. BANDARA		





#### NOTES

1. USE EITHER TYPE I OR TYPE II CASCADE DRAIN ACCORDING TO THE ACTUAL GROUND CONDITION AS INSTRUCTED BY THE ENGINEER.
2. LENGTH OF THE STEPS OF CASCADE WILL BE VARIED ACCORDING TO THE SITE CONDITIONS.
3. DEPTH OF EXCAVATION SHALL BE VARIED ACCORDING TO SITE CONDITIONS.
4. DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
5. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.









#### CONCRETE

7. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
  - [a] SCREED - C. 15/20
  - [b] WALLS / BASE / ENERGY BREAKERS - C. 25/20

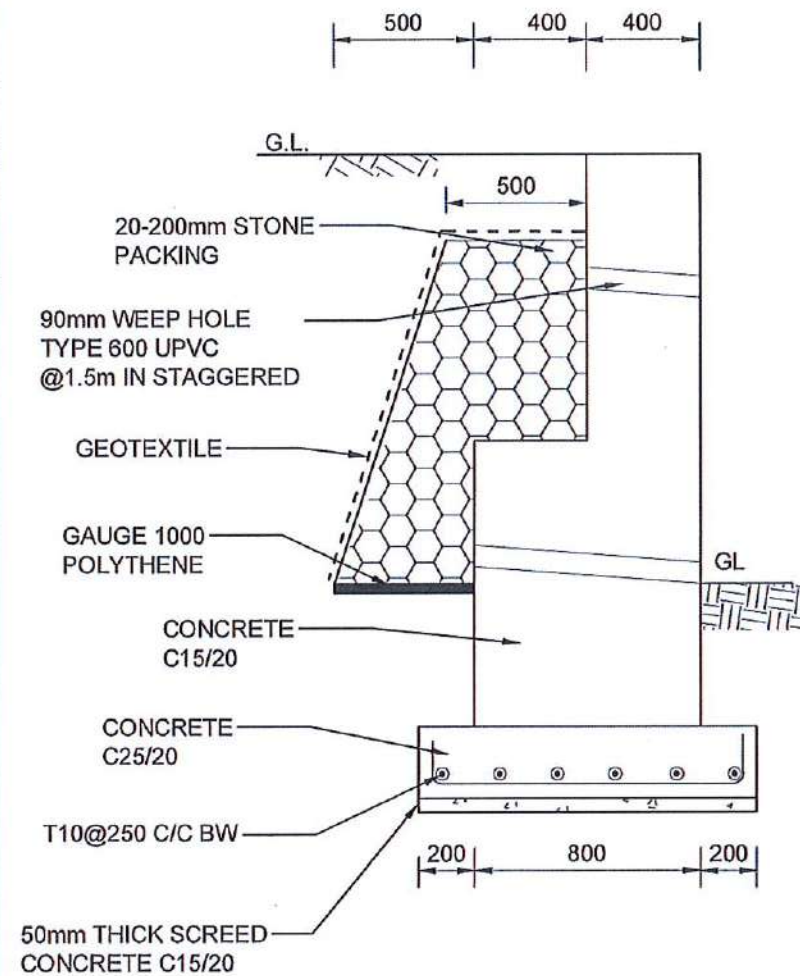
#### REINFORCEMENT

8. ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm<sup>2</sup>.
9. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 50 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
10. ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
11. REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
12. COVER TO REINFORCEMENT
  - [a] BURIED FACES AND DRAIN INVERTS - 40 mm
  - [b] ALL OTHER FACES - 25 mm

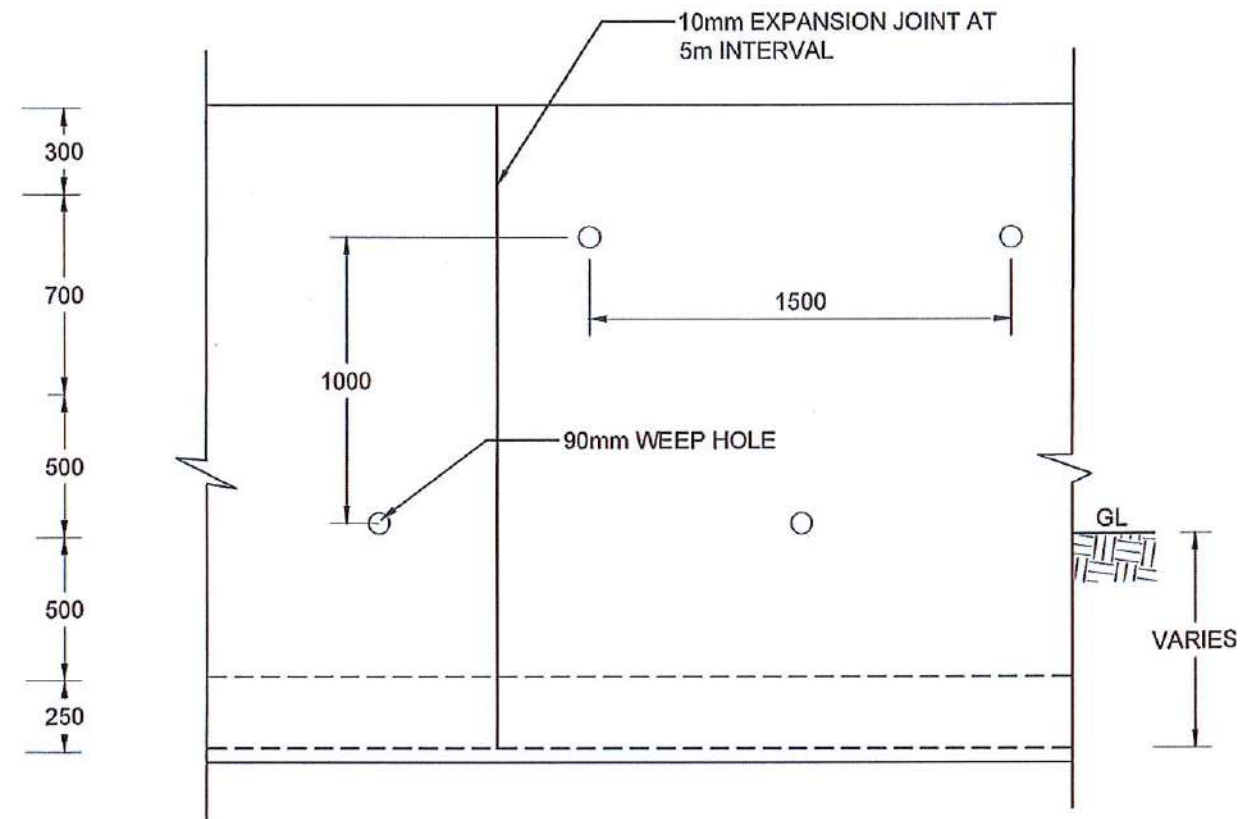
DRAIN TYPE	W (mm)	H (mm)	t (mm)	W' (mm)	t' (mm)
DS (C) - A	450	450	100	600	100
DS (C) - B	450	600	100	750	100
DS (C) - C	600	600	100	800	100
DS (C) - D	750	750	100	800	100
DS (C) - E	800	800	125	1000	125
DS (C) - F	1000	750	125	1200	125

<div><div></div><div>EMPLOYER</div><div></div><div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div>	<div><div></div><div>DESIGNER</div><div></div><div>DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div>	<table><tr><th>REV</th><th>DATE</th><th>REVISION DESCRIPTION</th><th>APPROVAL</th></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></table>	REV	DATE	REVISION DESCRIPTION	APPROVAL																																					<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES DISTRICT COURT COMPLEX , KEGALLE</div>	<div>TITLE</div> <div>DETAILS OF DRAINS (CASCADE DRAIN)</div> <div><table><tr><td>SCALE</td><td>N.T.S.</td><td>DATE</td><td>02.11.2020</td></tr><tr><td colspan="3">PROJECT / DRAWING No.</td><td>REVISION</td></tr><tr><td colspan="3">RLVMMP/WORKS/NCB/04A/20-Dc/DR-06d</td><td>00</td></tr></table></div>	SCALE	N.T.S.	DATE	02.11.2020	PROJECT / DRAWING No.			REVISION	RLVMMP/WORKS/NCB/04A/20-Dc/DR-06d			00	<table><tr><th>DESCRIPTION</th><th>NAME</th><th>SIGNATURE</th></tr><tr><td>DRAWN</td><td>B.V.S. PATTRISHIYA</td><td></td></tr><tr><td>DESIGNER</td><td>M. H. M. HARSHANI</td><td></td></tr><tr><td>CHECKED</td><td>J.P. SAMARANAYAKA</td><td></td></tr><tr><td>RECOMMENDED</td><td>PROF. S.A.S. KULATHILAKA</td><td></td></tr><tr><td>APPROVED</td><td>K.N. BANDARA</td><td></td></tr></table>	DESCRIPTION	NAME	SIGNATURE	DRAWN	B.V.S. PATTRISHIYA		DESIGNER	M. H. M. HARSHANI		CHECKED	J.P. SAMARANAYAKA		RECOMMENDED	PROF. S.A.S. KULATHILAKA		APPROVED	K.N. BANDARA	
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SECTION



FRONT ELEVATION

NOTES

- [a] ALL DIMENSION ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED
- [b] POROUS BACKFILL ALONG THE ENTIRE LENGTH OF THE WALL AS INDICATED.
- [c] WEEP HOLES TO BE PROVIDED AT 1.5m C/C STAGGERED USING 90mm DIA UPVC PIPES.(TYPE 600)

CONCRETE







- [d] USE FOLLOWING CONCRETE GRADES FOR STRUCTURES
  - [a] SCREED / WALL - C 15/20
  - [b] FOUNDATION BASE - C 25/20

REINFORCEMENTS

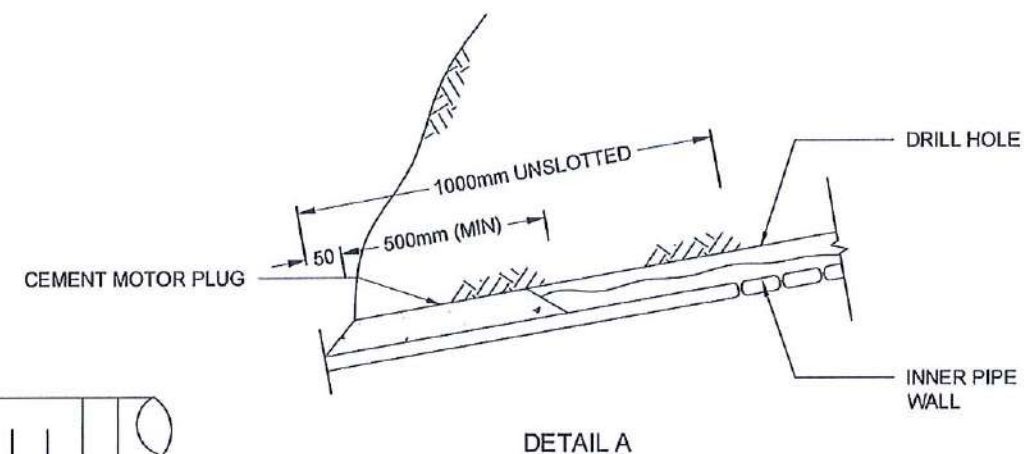
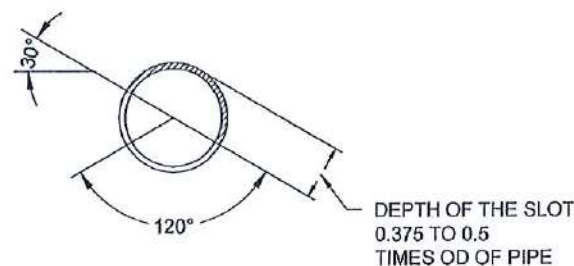
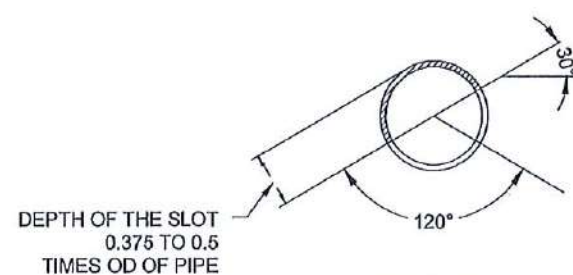
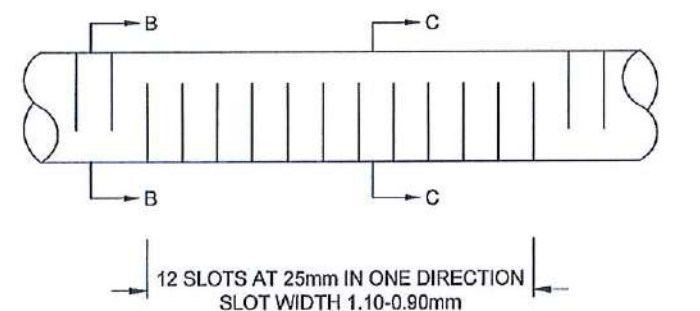
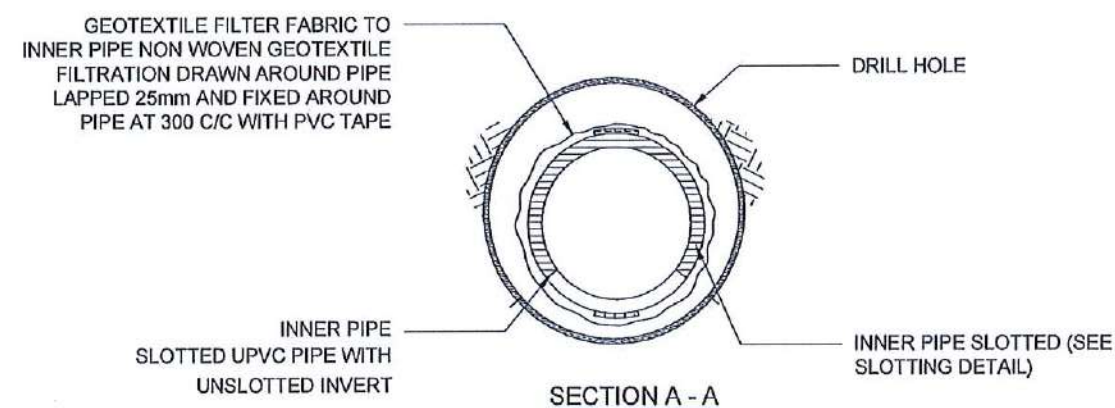
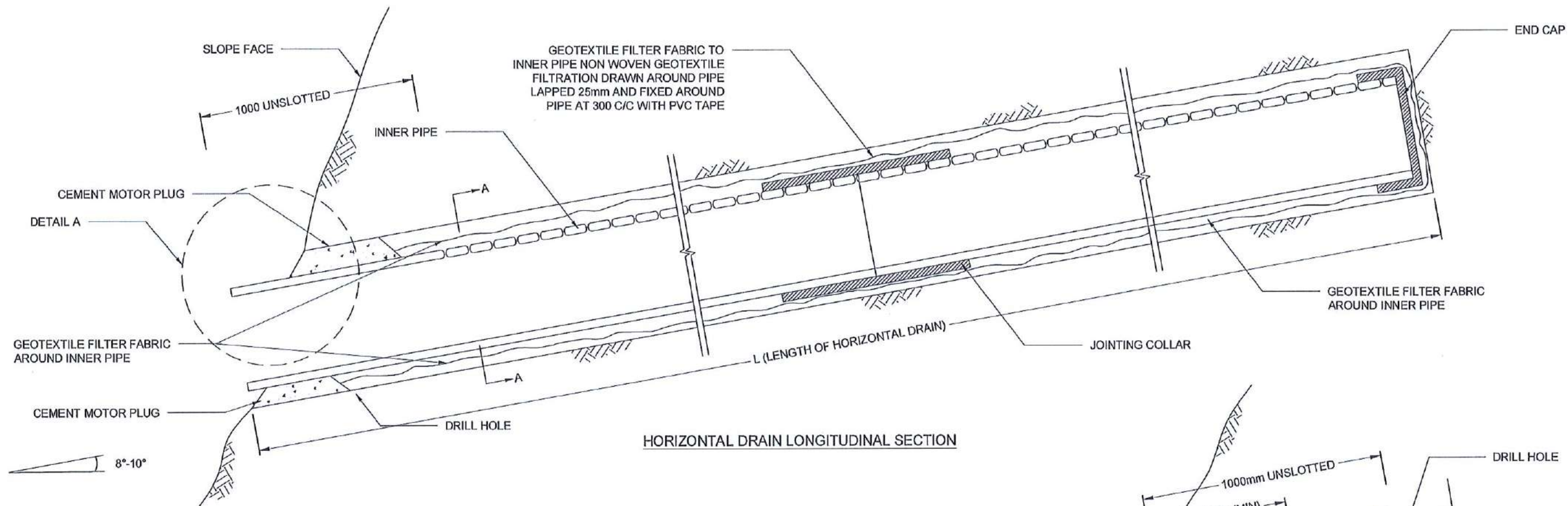
- [e] ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm<sup>2</sup>.
- [f] BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED WITH LENGTH OF 50Ø, WHERE Ø IS THE DIAMETER. LAPPINGS SHOULD BE STAGGERED
- [g] REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
- [h] CLEAR CONCRETE COVER FOR THE REINFORCEMENT BELLOW GROUND LEVEL SHALL BE 50mm.

SPECIAL NOTE

- [i] ALLOWABLE BEARING CAPACITY OF THE GROUND IS 150kPa.
- [j] EXPANSION JOINTS SHALL BE PROVIDED AT 5m SPACES WITH APPROVED MATERIAL.


















<div>EMPLOYER</div> <div><div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div>	<div>DESIGNER</div> <div><div>DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES DISTRICT COURT COMPLEX , KEGALLE</div>	<div>TITLE</div> <div>DETAILS OF CONCRETE GRAVITY RETAINING WALL</div>				DESCRIPTION	NAME	SIGNATURE
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											DESIGNER	M. H. M. HARSHANI	
											CHECKED	J.P. SAMARANAYAKA	
										RECOMMENDED	PROF. S.A.S. KULATHILAKA		
										APPROVED	K.N. BANDARA		



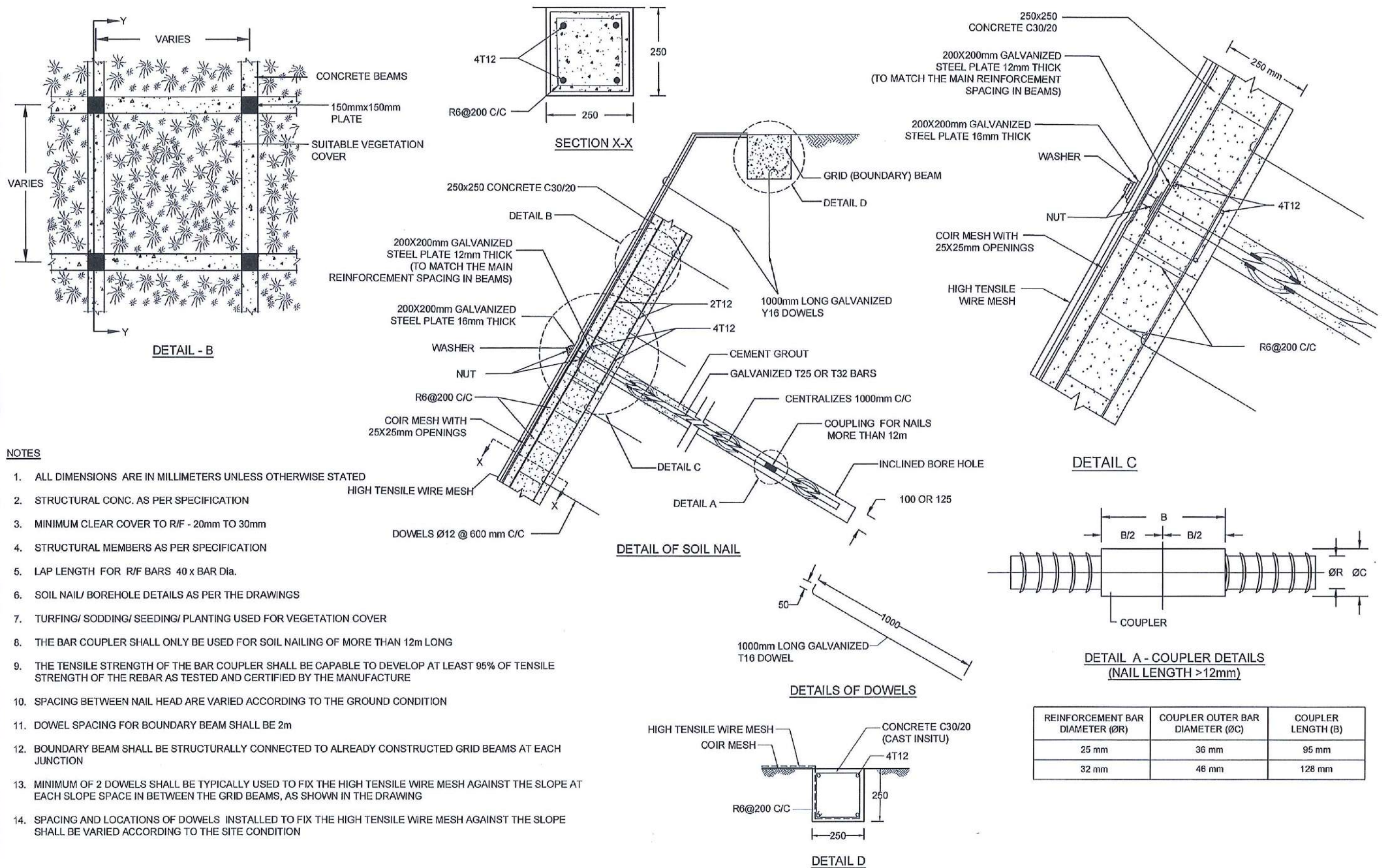


#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. PIPE DIAMETERS, ANGLE & LENGTHS AS SPECIFIED IN DRAWINGS.
3. ALL MATERIALS SHALL CONFORM TO PROJECT SPECIFICATION


















<div>EMPLOYER</div> <div><div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div>		<div>DESIGNER</div> <div><div>DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div>		<table><thead><tr><th>REV</th><th>DATE</th><th>REVISION DESCRIPTION</th><th>APPROVAL</th></tr></thead><tbody><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></tbody></table>		REV	DATE	REVISION DESCRIPTION	APPROVAL																																	<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES DISTRICT COURT COMPLEX, KEGALLE</div>		<div>TITLE</div> <div>DETAILS OF HORIZONTAL DRAIN SECTIONS</div> <table><tr><td>SCALE</td><td>N.T.S.</td><td>DATE</td><td>02.11.2020</td></tr><tr><td colspan="2">PROJECT / DRAWING No. RLVMP/WORKS/NCB/04/20-DG/DR-8</td><td>REVISION</td><td>00</td></tr></table>				SCALE	N.T.S.	DATE	02.11.2020	PROJECT / DRAWING No. RLVMP/WORKS/NCB/04/20-DG/DR-8		REVISION	00	<table><thead><tr><th>DESCRIPTION</th><th>NAME</th><th>SIGNATURE</th></tr></thead><tbody><tr><td>DRAWN</td><td>B.V.S. PATTRISHIYA</td><td></td></tr><tr><td>DESIGNER</td><td>M. H. M. HARSHANI</td><td></td></tr><tr><td>CHECKED</td><td>J.P. SAMARANAYAKA</td><td></td></tr><tr><td>RECOMMENDED</td><td>PROF. S.A.S. KULATHILAKA</td><td></td></tr><tr><td>APPROVED</td><td>K.N. BANDARA</td><td></td></tr></tbody></table>			DESCRIPTION	NAME	SIGNATURE	DRAWN	B.V.S. PATTRISHIYA		DESIGNER	M. H. M. HARSHANI		CHECKED	J.P. SAMARANAYAKA		RECOMMENDED	PROF. S.A.S. KULATHILAKA		APPROVED	K.N. BANDARA	
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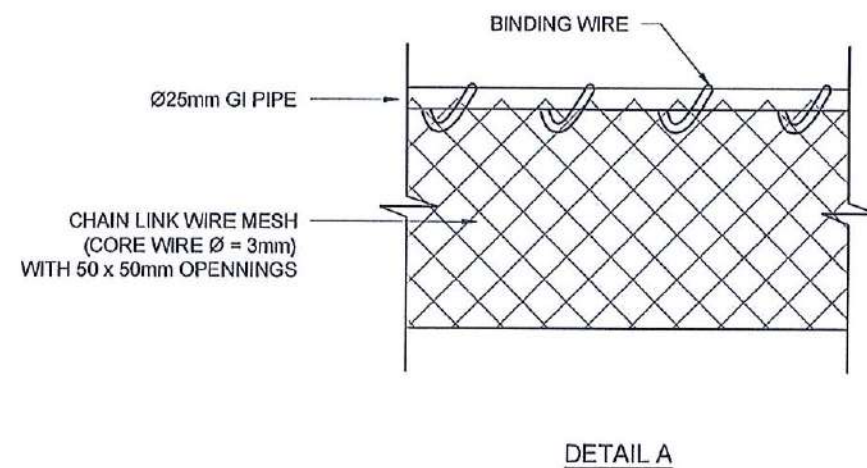
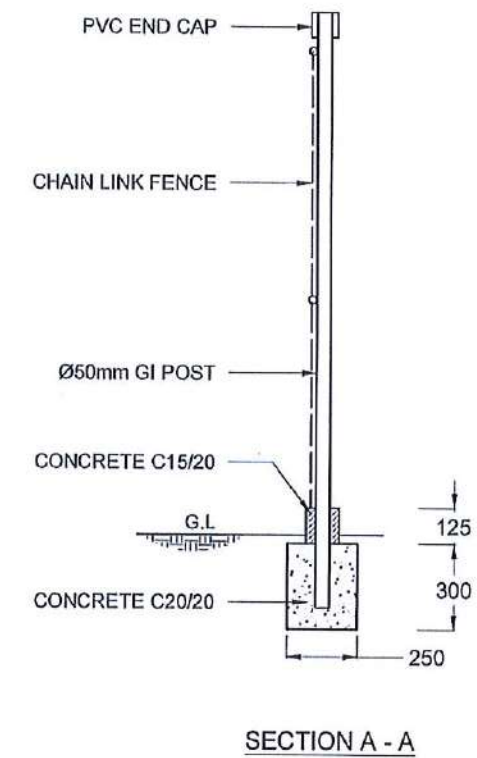
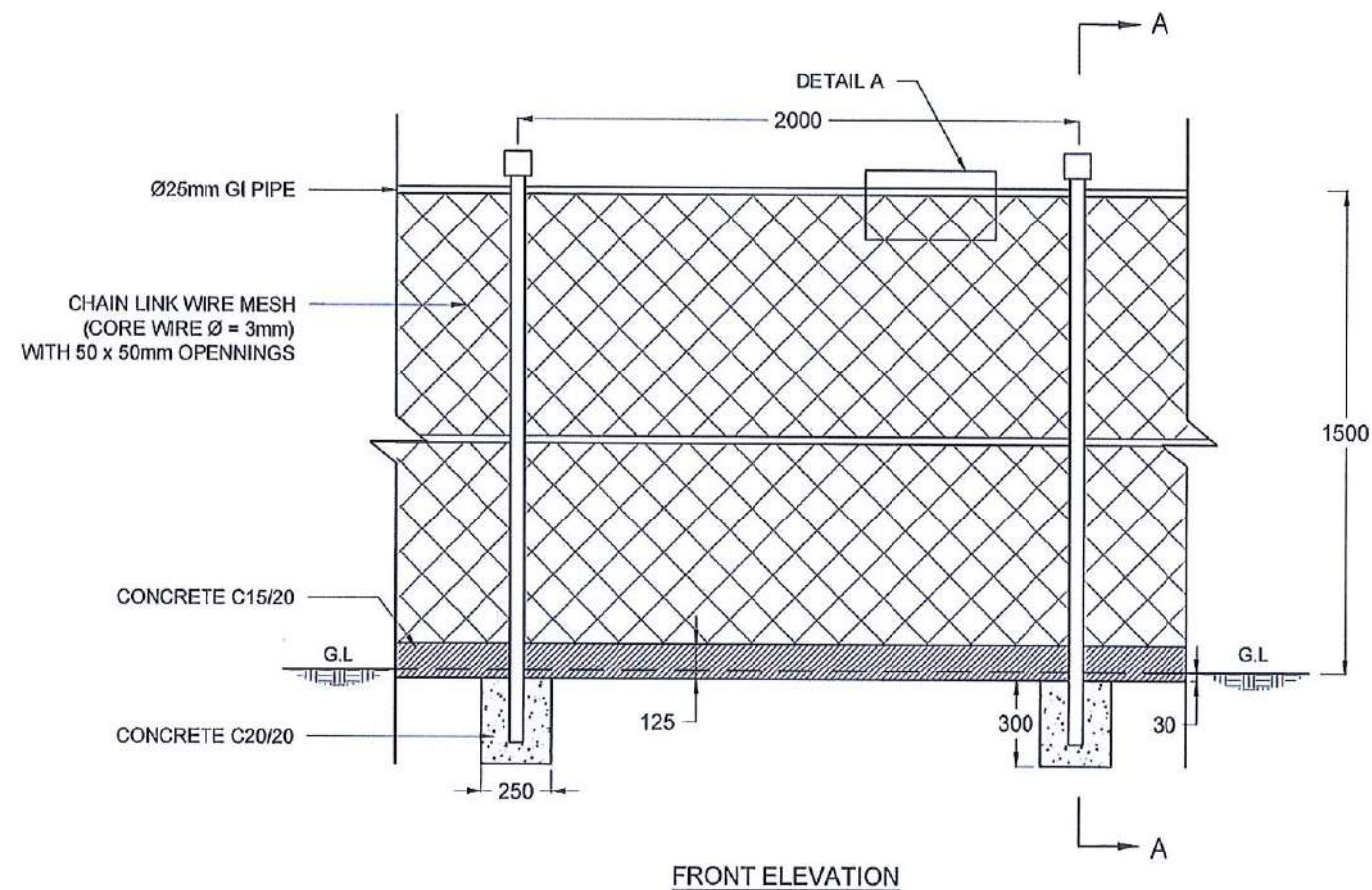


#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED
2. STRUCTURAL CONC. AS PER SPECIFICATION
3. MINIMUM CLEAR COVER TO R/F - 20mm TO 30mm
4. STRUCTURAL MEMBERS AS PER SPECIFICATION
5. LAP LENGTH FOR R/F BARS 40 x BAR Dia.
6. SOIL NAIL/ BOREHOLE DETAILS AS PER THE DRAWINGS
7. TURFING/ SODDING/ SEEDING/ PLANTING USED FOR VEGETATION COVER
8. THE BAR COUPLER SHALL ONLY BE USED FOR SOIL NAILING OF MORE THAN 12m LONG
9. THE TENSILE STRENGTH OF THE BAR COUPLER SHALL BE CAPABLE TO DEVELOP AT LEAST 95% OF TENSILE STRENGTH OF THE REBAR AS TESTED AND CERTIFIED BY THE MANUFACTURE
10. SPACING BETWEEN NAIL HEAD ARE VARIED ACCORDING TO THE GROUND CONDITION
11. DOWEL SPACING FOR BOUNDARY BEAM SHALL BE 2m
12. BOUNDARY BEAM SHALL BE STRUCTURALLY CONNECTED TO ALREADY CONSTRUCTED GRID BEAMS AT EACH JUNCTION
13. MINIMUM OF 2 DOWELS SHALL BE TYPICALLY USED TO FIX THE HIGH TENSILE WIRE MESH AGAINST THE SLOPE AT EACH SLOPE SPACE IN BETWEEN THE GRID BEAMS, AS SHOWN IN THE DRAWING
14. SPACING AND LOCATIONS OF DOWELS INSTALLED TO FIX THE HIGH TENSILE WIRE MESH AGAINST THE SLOPE SHALL BE VARIED ACCORDING TO THE SITE CONDITION


















<div><div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div>	<div><div>DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div>	<table><tr><th>REV</th><th>DATE</th><th>REVISION DESCRIPTION</th><th>APPROVAL</th></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></table>	REV	DATE	REVISION DESCRIPTION	APPROVAL																																	<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES DISTRICT COURT COMPLEX, KEGALLE</div>	<div>TITLE</div> <div>DETAILS OF SOIL NAILING WITH GRID BEAM &amp; HYDROSEEDING</div> <div><table><tr><td>SCALE</td><td>N.T.S.</td><td>DATE</td><td>02.11.2020</td></tr><tr><td colspan="2">PROJECT / DRAWING No. RLV/MMP/WORKS/NCB/04A/20-De/DR-09</td><td>REVISION</td><td>00</td></tr></table></div>	SCALE	N.T.S.	DATE	02.11.2020	PROJECT / DRAWING No. RLV/MMP/WORKS/NCB/04A/20-De/DR-09		REVISION	00	<table><tr><th>DESCRIPTION</th><th>NAME</th><th>SIGNATURE</th></tr><tr><td>DRAWN</td><td>B.V.S. PATTRISHIYA</td><td></td></tr><tr><td>DESIGNER</td><td>M. H. M. HARSHANI</td><td></td></tr><tr><td>CHECKED</td><td>J.P. SAMARANAYAKA</td><td></td></tr><tr><td>RECOMMENDED</td><td>PROF. S.A.S. KULATHILAKA</td><td></td></tr><tr><td>APPROVED</td><td>K.N. BANDARA</td><td></td></tr></table>	DESCRIPTION	NAME	SIGNATURE	DRAWN	B.V.S. PATTRISHIYA		DESIGNER	M. H. M. HARSHANI		CHECKED	J.P. SAMARANAYAKA		RECOMMENDED	PROF. S.A.S. KULATHILAKA		APPROVED	K.N. BANDARA	
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#### NOTES

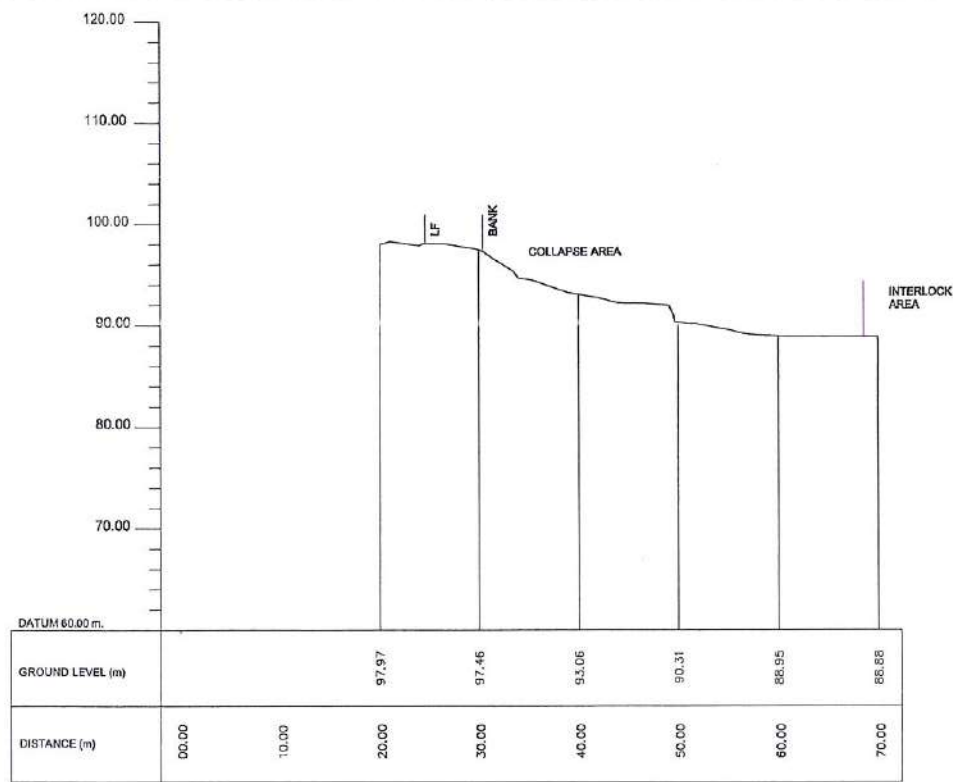
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED
2. GI POST SHOULD BE COVERED WITH GREEN COLOUR ANTI-CORROSIVE PAINT
3. PRIOR APPROVAL IS REQUIRED FOR CHAIN LINK WIRE MESH, GI POST AND PVC CAP

<div>EMPLOYER</div> <div><div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div><div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT</div><div>NATIONAL BUILDING RESEARCH ORGANISATION</div><div>No. 99/1, JAWATTA ROAD</div><div>COLOMBO - 05</div></div>		<div>DESIGNER</div> <div><div>DESIGN UNIT</div><div>NATIONAL BUILDING RESEARCH ORGANISATION</div><div>No. 99/1, JAWATTA ROAD</div><div>COLOMBO - 05</div></div>		<table><thead><tr><th>REV</th><th>DATE</th><th>REVISION DESCRIPTION</th><th>APPROVAL</th></tr></thead><tbody><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></tbody></table>		REV	DATE	REVISION DESCRIPTION	APPROVAL																													<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE</div> <div>VULNERABILITY BY MITIGATION MEASURES</div> <div>DISTRICT COURT COMPLEX, KEGALLE</div>		<table><thead><tr><th colspan="4">TITLE</th><th>DESCRIPTION</th><th>NAME</th><th>SIGNATURE</th></tr></thead><tbody><tr><td colspan="4" rowspan="5">DETAILS OF CHAIN LINK FENCE</td><td>DRAWN</td><td>B.V.S. PATTRISHIYA</td><td></td></tr><tr><td>DESIGNER</td><td>M. H. M. HARSHANI</td><td></td></tr><tr><td>CHECKED</td><td>J.P. SAMARANAYAKA</td><td></td></tr><tr><td>RECOMMENDED</td><td>PROF. S.A.S. KULATHILAKA</td><td></td></tr><tr><td>APPROVED</td><td>K.N. BANDARA</td><td></td></tr></tbody></table> <table><thead><tr><th>SCALE</th><th>N.T.S.</th><th>DATE</th><th>02.11.2020</th></tr></thead><tbody><tr><td colspan="2">PROJECT / DRAWING No.</td><td>REVISION</td><td>00</td></tr><tr><td colspan="4">RLVMMP/WORKS/NCB/04A/20-De/DR-10</td></tr></tbody></table>				TITLE				DESCRIPTION	NAME	SIGNATURE	DETAILS OF CHAIN LINK FENCE				DRAWN	B.V.S. PATTRISHIYA		DESIGNER	M. H. M. HARSHANI		CHECKED	J.P. SAMARANAYAKA		RECOMMENDED	PROF. S.A.S. KULATHILAKA		APPROVED	K.N. BANDARA		SCALE	N.T.S.	DATE	02.11.2020	PROJECT / DRAWING No.		REVISION	00	RLVMMP/WORKS/NCB/04A/20-De/DR-10			
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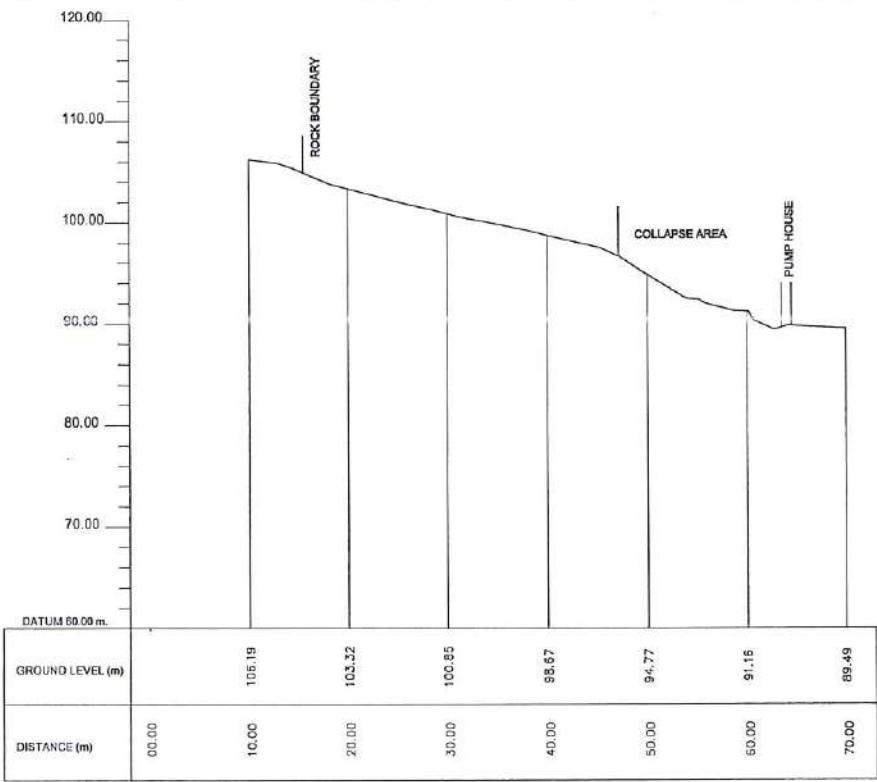




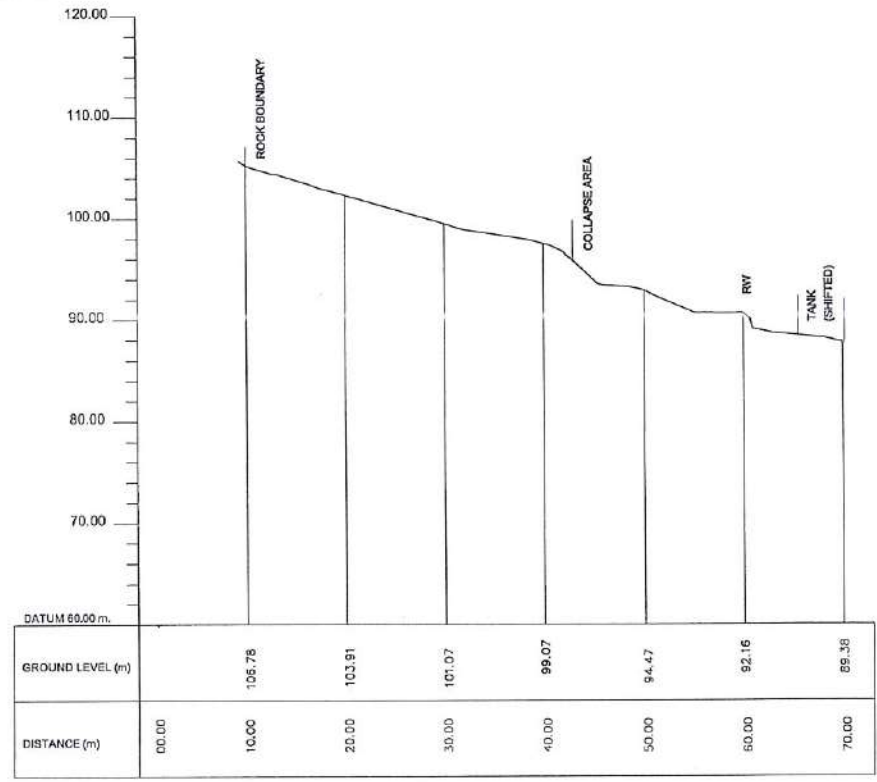




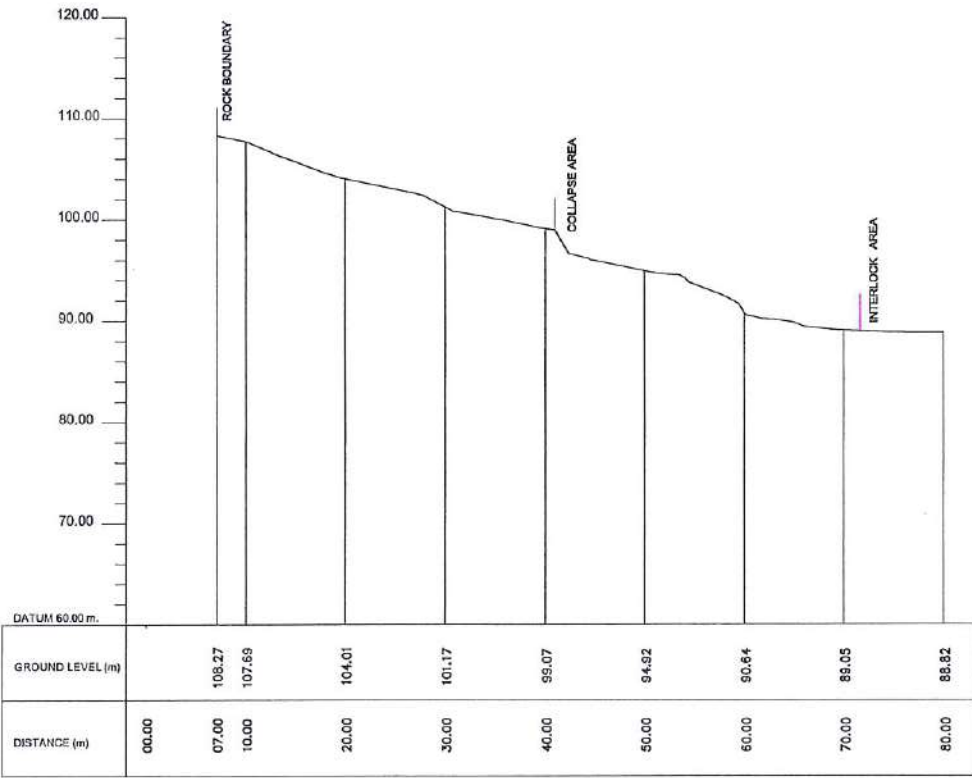
SECTION 01



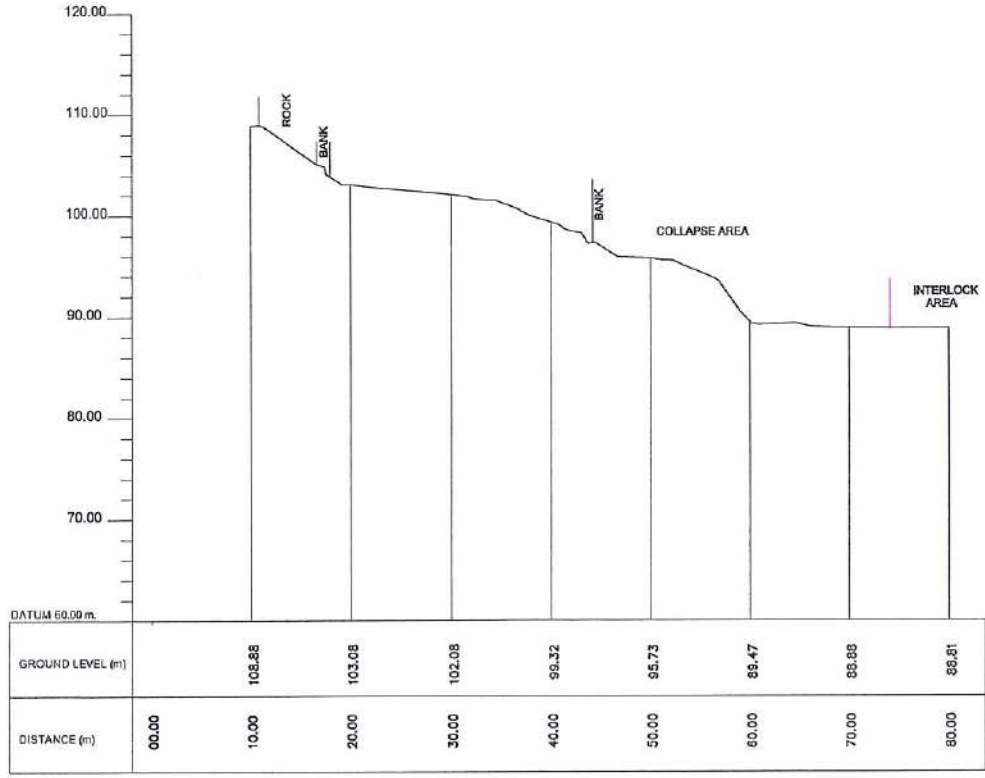
SECTION 02



SECTION 03



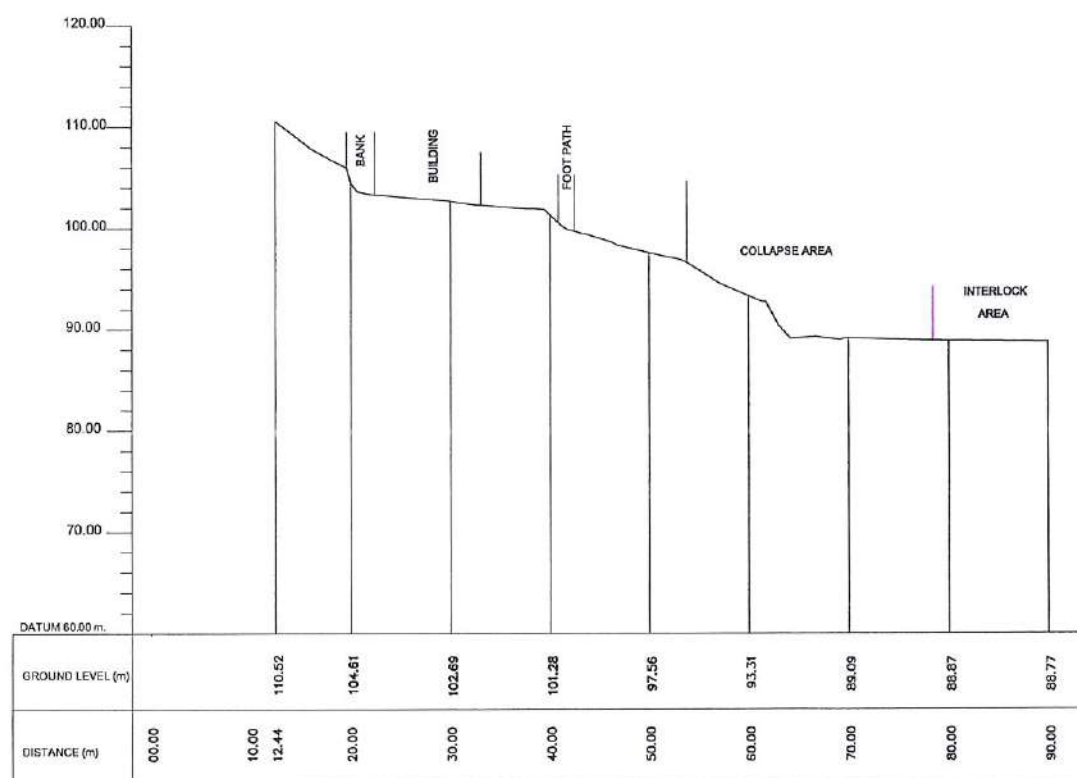
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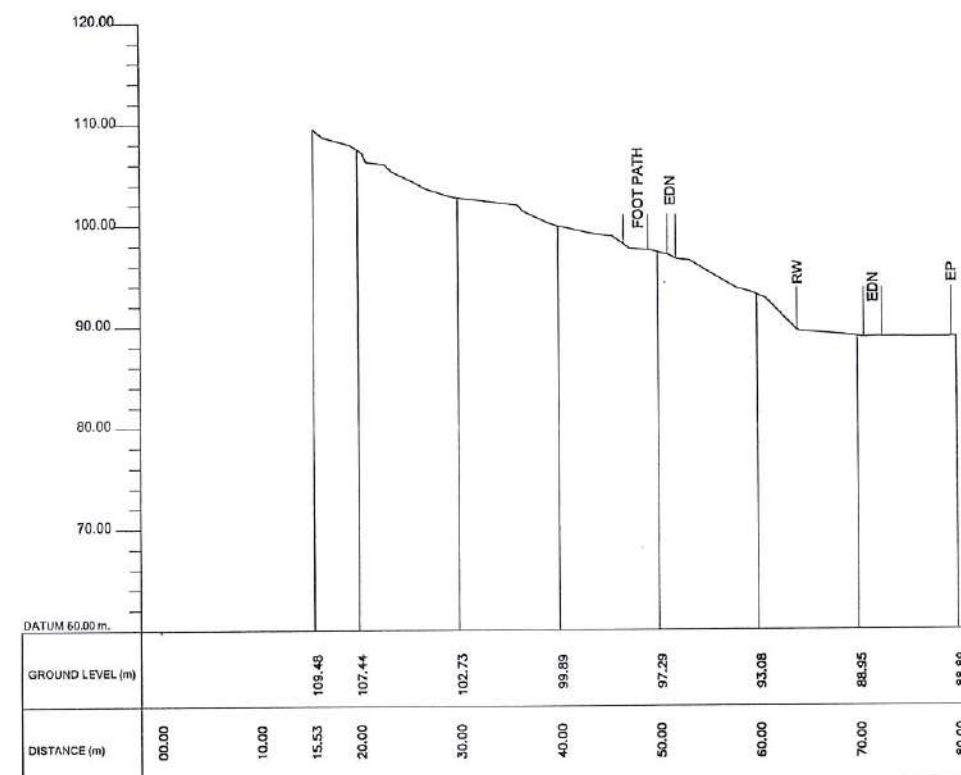
SECTION 05

 EMPLOYER DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05	 DESIGNER DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE  REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES POLGAHAWELA BUS STAND	TITLE  SURVEY CROSS SECTIONS		DESCRIPTION	NAME	SIGNATURE
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							CHECKED	B.I. KUMARAGE			
						SCALE	1:750	DATE	12.11.2020		
						PROJECT / DRAWING No. RLVMP/WORKS/NCB/04A/07-PL/DR- 02a		REVISION 00			





SECTION 06



SECTION 07

EMPLOYER



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS  
AND DISASTER MANAGEMENT  
NATIONAL BUILDING RESEARCH ORGANISATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05



DESIGNER

DESIGN UNIT  
NATIONAL BUILDING RESEARCH ORGANISATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

REDUCTION OF LANDSLIDE  
VULNERABILITY BY MITIGATION MEASURES  
POLGAHAWELA BUS STAND

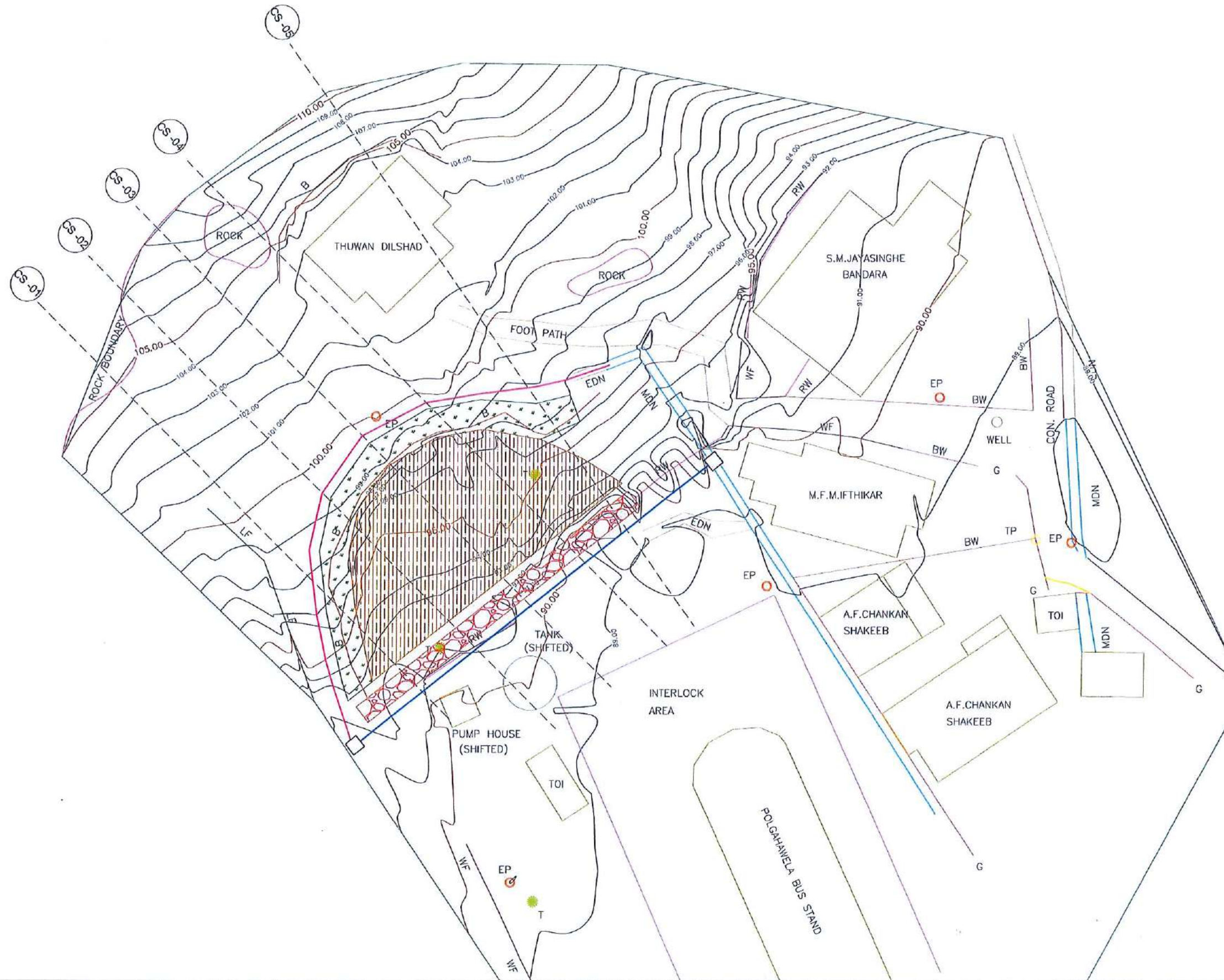
TITLE

SURVEY CROSS SECTIONS

SCALE 1 : 750 DATE 12.11.2020  
PROJECT / DRAWING No. RLVM/MP/WORKS/NCB/04A/07-PL/DR- 02b REVISION 00

DESCRIPTION	NAME	SIGNATURE
SURVEYED	LANKA G.P.S. (PVT) LTD	
CHECKED	B.I. KUMARAGE	























#### EXISTING FEATURES

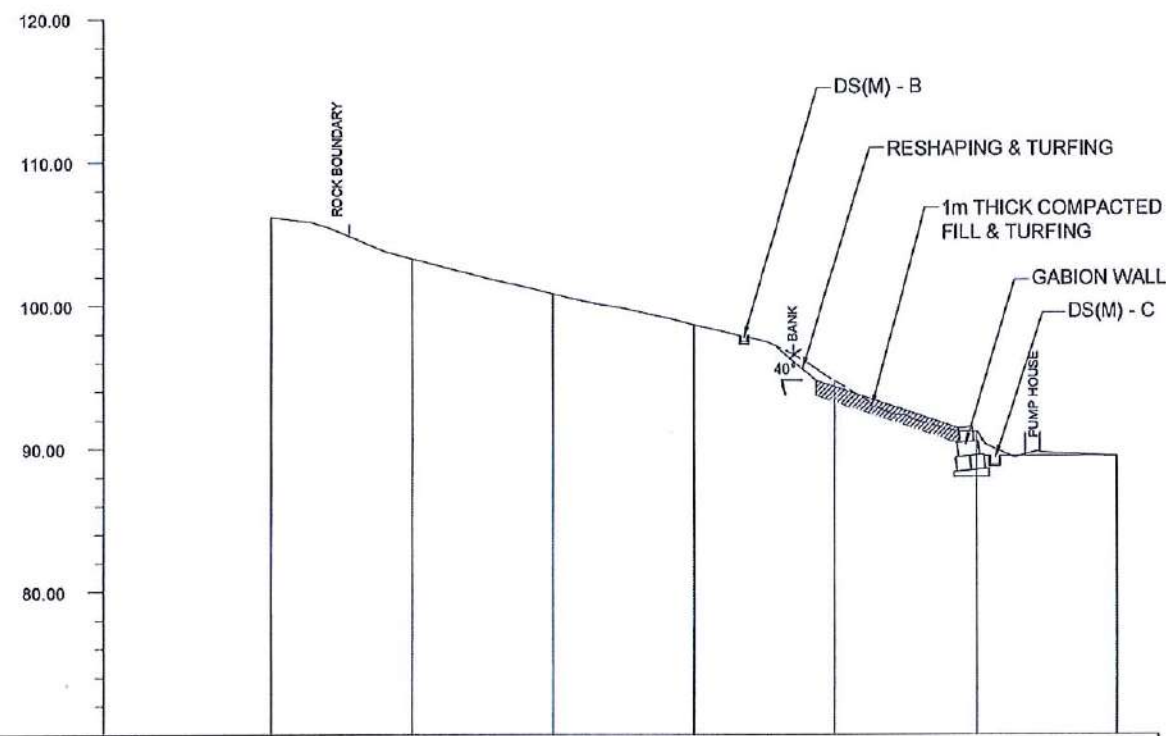
B	BANK
BD	BUILDING
BW	BOUNDARY WALL
CUL	CULVERT
G	GATE
LF	LIVE FENCE
MDN	MASONRY DRAIN
EDN	EARTH DRAIN
RW	RETAINING WALL
TOI	TOILET
WF	WIRE FENCE

#### DESIGN NOTATION

	COMPACTED FILL & TURFING
	GABION WALL - TYPE I
	RESHAPING & TURFING
	DS (M) - B
	DS (M) - C
	CATCH-PIT

<div>EMPLOYER</div> <div><div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1 ,JAWATTA ROAD COLOMBO - 05</div></div>		<div>DESIGNER</div> <div><div>DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1 ,JAWATTA ROAD COLOMBO - 05</div></div>		<table><thead><tr><th>REV</th><th>DATE</th><th>REVISION DESCRIPTION</th><th>APPROVAL</th></tr></thead><tbody><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></tbody></table>		REV	DATE	REVISION DESCRIPTION	APPROVAL																																					<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES POLGAHAWELA BUS STAND</div>		<div>TITLE</div> <div>PROPOSED RECTIFICATION PLAN</div>		<table><thead><tr><th>DESCRIPTION</th><th>NAME</th><th>SIGNATURE</th></tr></thead><tbody><tr><td>DRAWN</td><td>B.V.S. PATTRISHIYA</td><td></td></tr><tr><td>DESIGNER</td><td>S.O.A.D.M. LAKRUWAN</td><td></td></tr><tr><td>CHECKED</td><td>J.P. SAMARANAYAKA</td><td></td></tr><tr><td>RECOMMENDED</td><td>PROF. S.A.S. KULATHILAKA</td><td></td></tr><tr><td>APPROVED</td><td>K.N. BANDARA</td><td></td></tr></tbody></table>		DESCRIPTION	NAME	SIGNATURE	DRAWN	B.V.S. PATTRISHIYA		DESIGNER	S.O.A.D.M. LAKRUWAN		CHECKED	J.P. SAMARANAYAKA		RECOMMENDED	PROF. S.A.S. KULATHILAKA		APPROVED	K.N. BANDARA	
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DATUM 70.00 m.

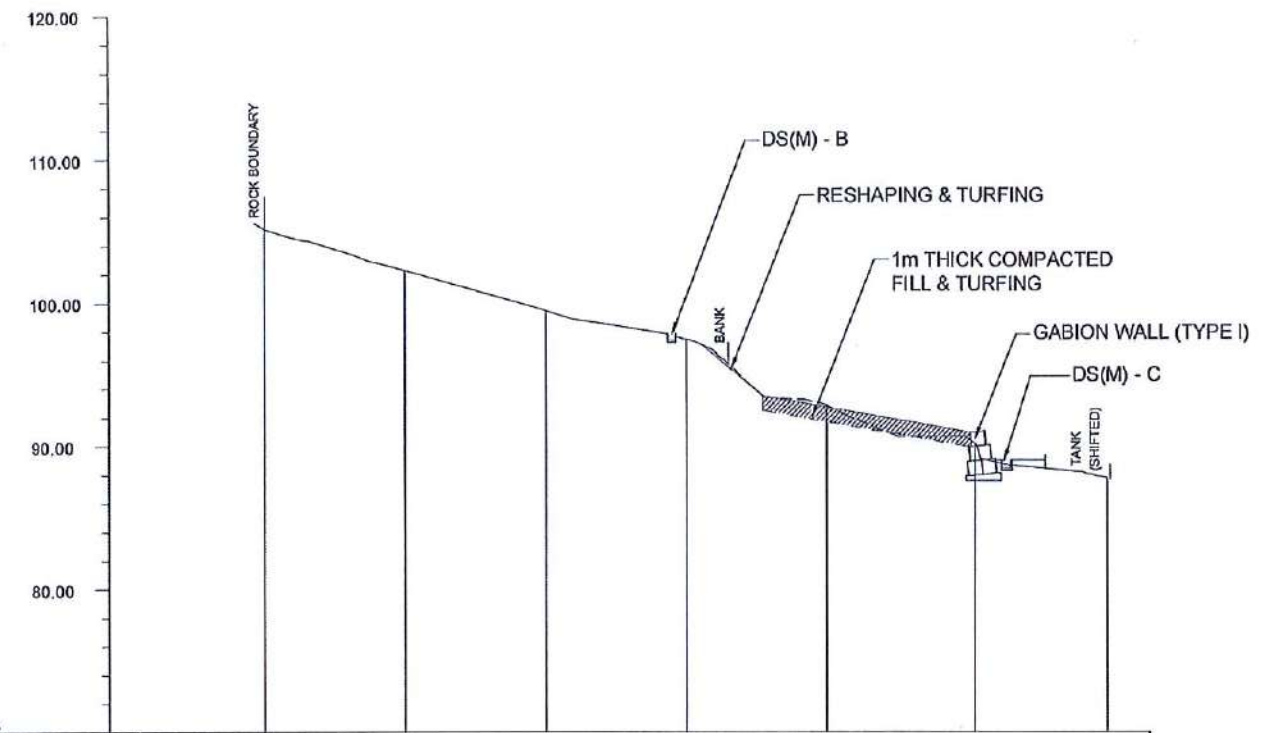
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HORIZONTAL DISTANCE (m)

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CS - 01



DATUM 70.00 m.



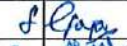

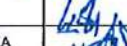


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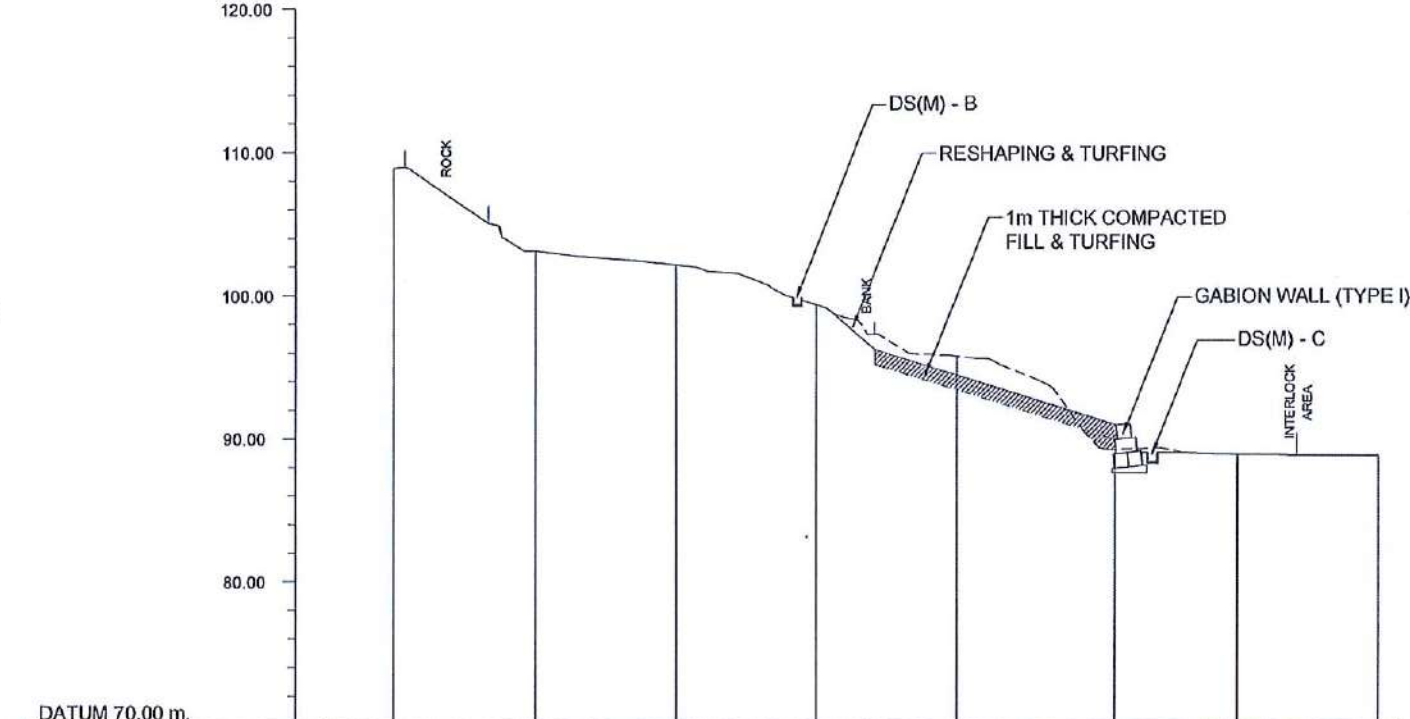
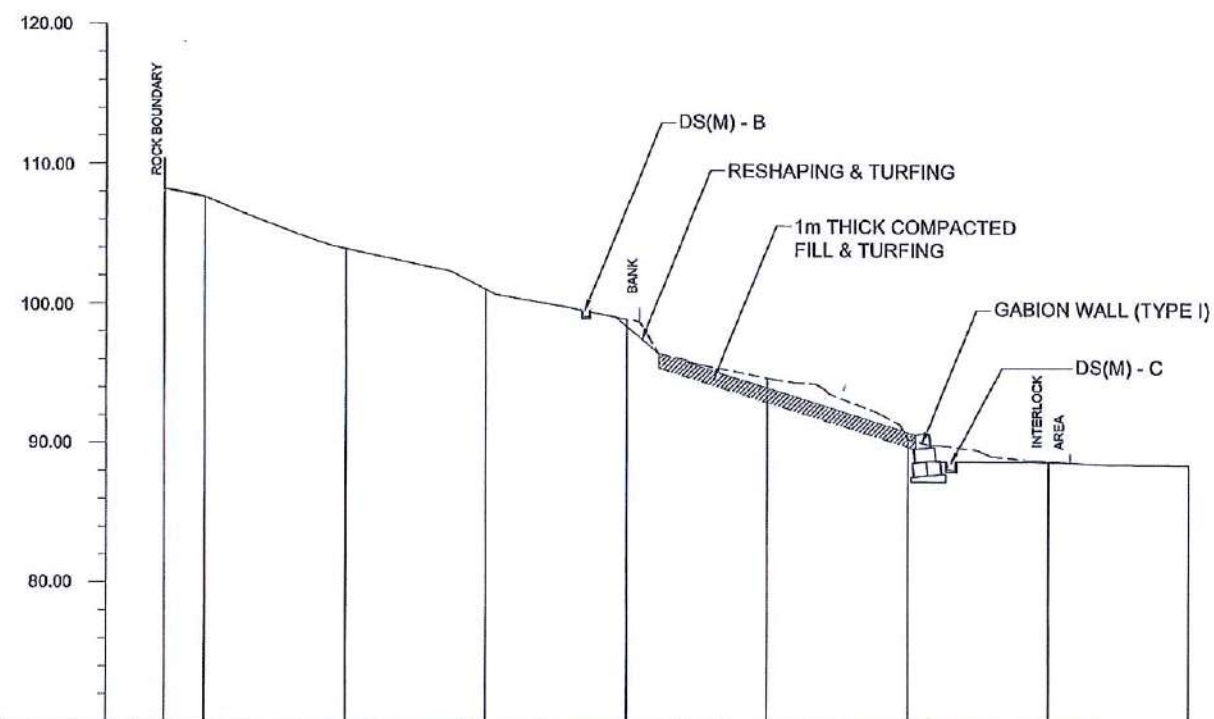
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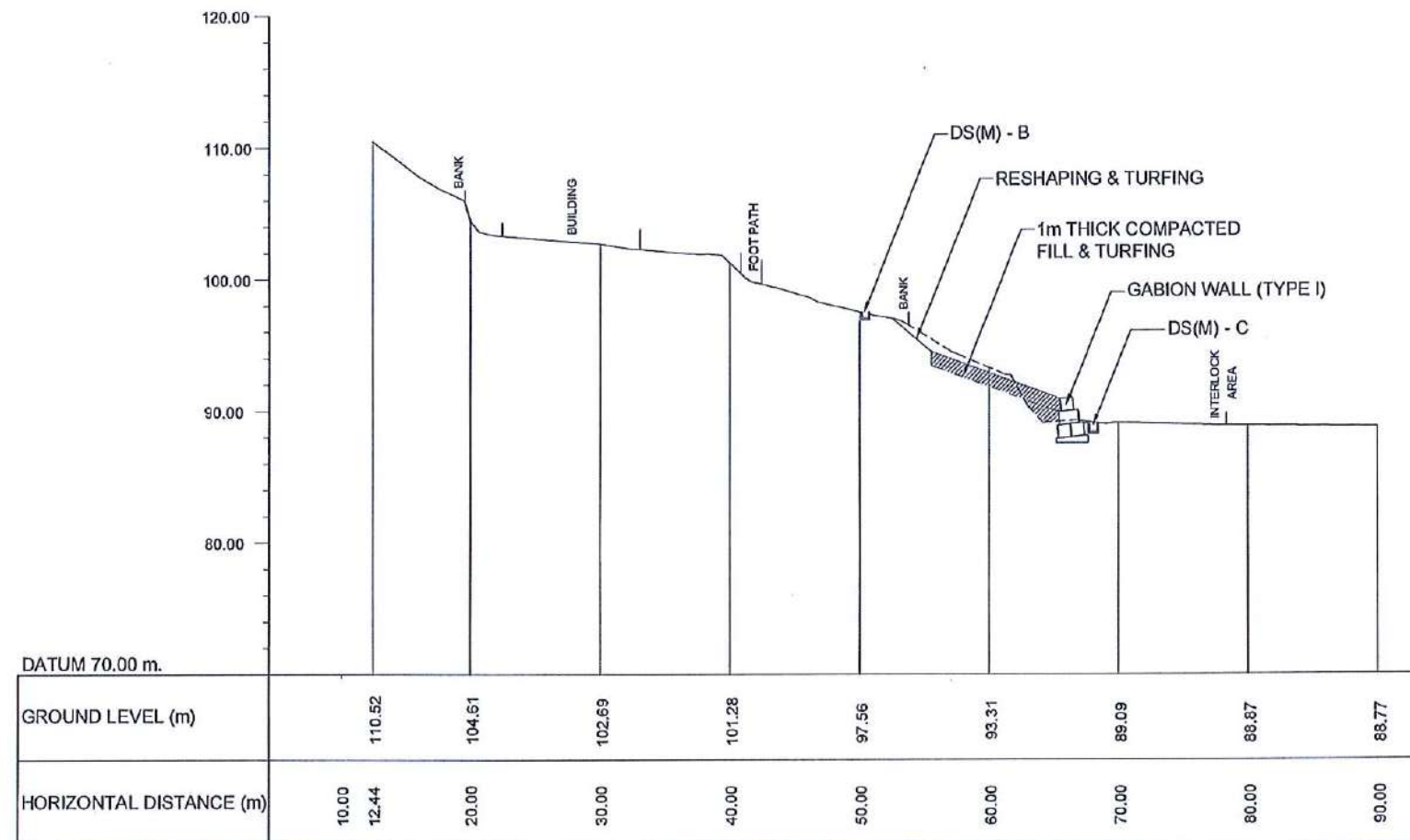
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												CHECKED	J.P. SAMARANAYAKA	
												RECOMMENDED	PROF. S.A.S. KULATHILAKA	
												APPROVED	K.N. BANDARA	
										SCALE	1 : 500	DATE	12.11.2020	
										PROJECT / DRAWING No.		REVISION	00	
										RLVMM/WORKS/NCB/04A/07-PL/DR- 026				










<div>EMPLOYER</div> <div><div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div>		<div>DESIGNER</div> <div><div>DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div></div>		<table><thead><tr><th>REV</th><th>DATE</th><th>REVISION 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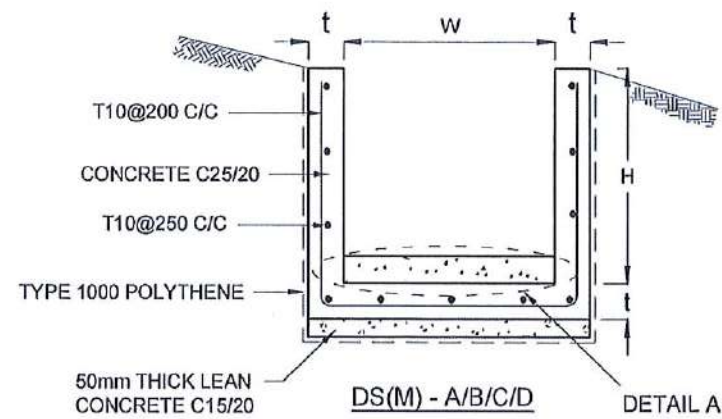




CS - 05

EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05	 DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05					REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES POLGAHAWELA BUS STAND	DESIGN CROSS SECTIONS	DRAWN	B.V.S. PATTRISHIYA	
								CHECKED	J.P. SAMARANAYAKA	
								RECOMMENDED	PROF. S.A.S. KULATHILAKA	
							SCALE 1 : 500 PROJECT / DRAWING No. RLVMMP/WORKS/NCB/04A/07-PL/DR- 02d	DATE 12.11.2020 REVISION 00	APPROVED	K.N. BANDARA





DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (M) - A /P	300	300	100
DS (M) - B/R	450	450	100
DS (M) - C/Q	600	600	100
DS (M) - D	750	750	125
DS (M) - E	900	900	150
DS (M) - F	1000	1000	150

#### NOTES

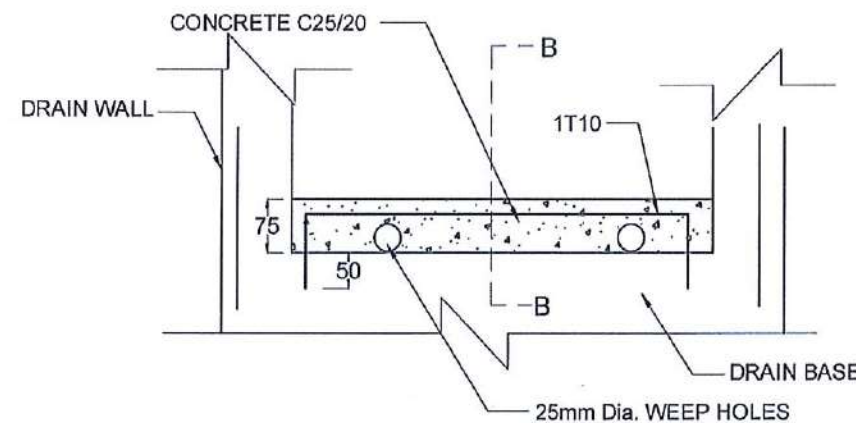
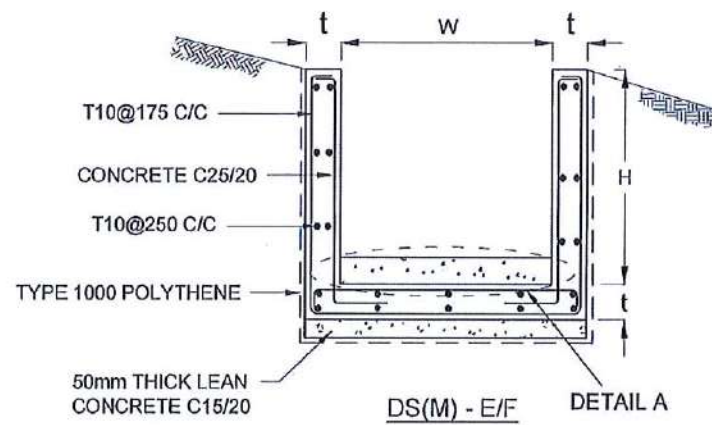
- DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
- STEPS SHALL BE CONSTRUCTED AT SURFACE DRAIN ON SLOPING GROUND ACCORDING TO THE SITE CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- ENERGY BREAKERS SHALL BE CONSTRUCTED AT THE STEEP DRAIN SEGMENTS AS PER THE INSTRUCTIONS OF THE ENGINEER.
- DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
- 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.

#### CONCRETE

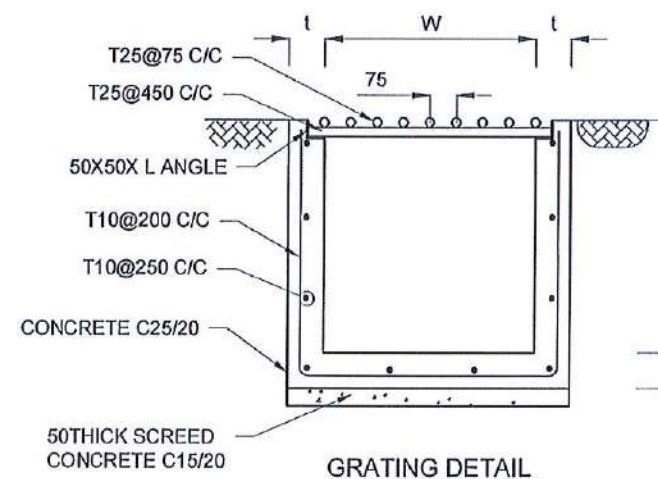
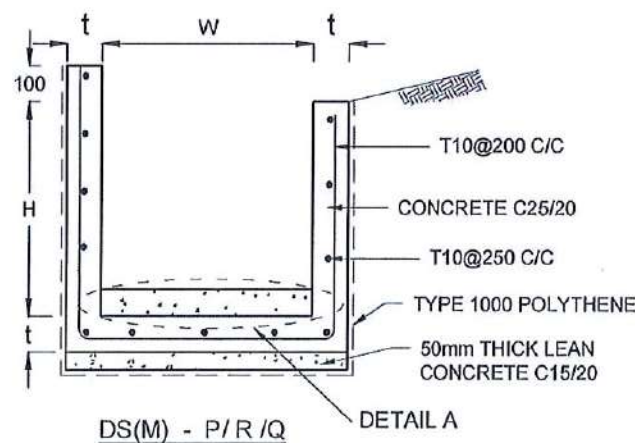
- USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
  - SCREED - C. 15/20
  - WALLS / BASE / ENERGY BREAKERS - C. 25/20

#### REINFORCEMENT

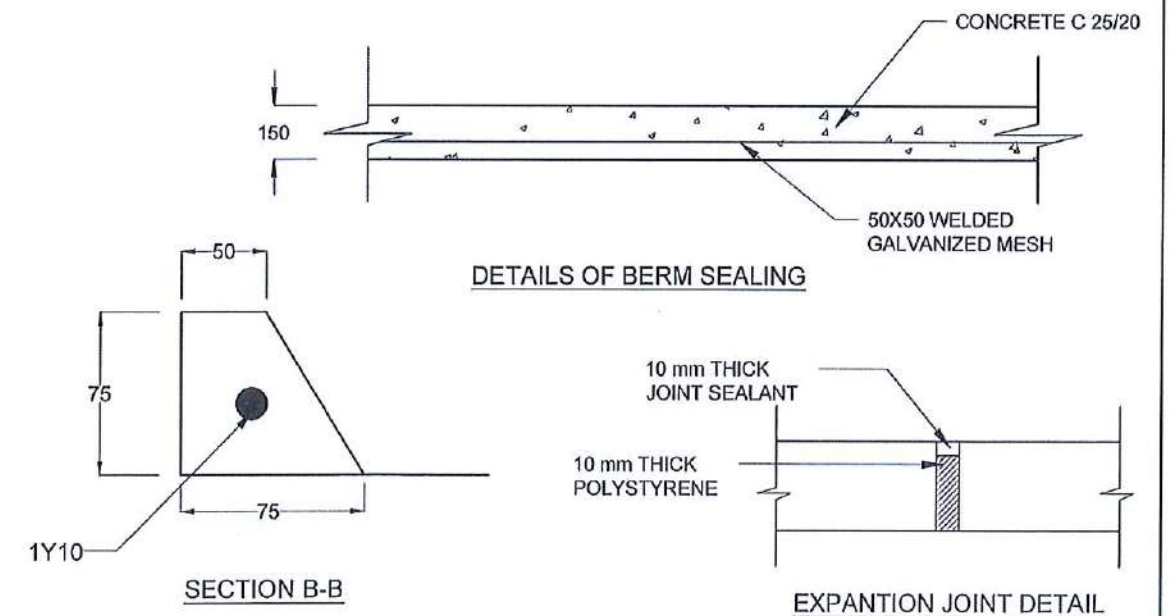
- ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm<sup>2</sup>.
- BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 50 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
- ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
- REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
- COVER TO REINFORCEMENT
  - BURIED FACES AND DRAIN INVERTS - 40 mm
  - ALL OTHER FACES - 25 mm



DETAIL A - (ENERGY BREAKER AT 3M)










GRATING DETAIL



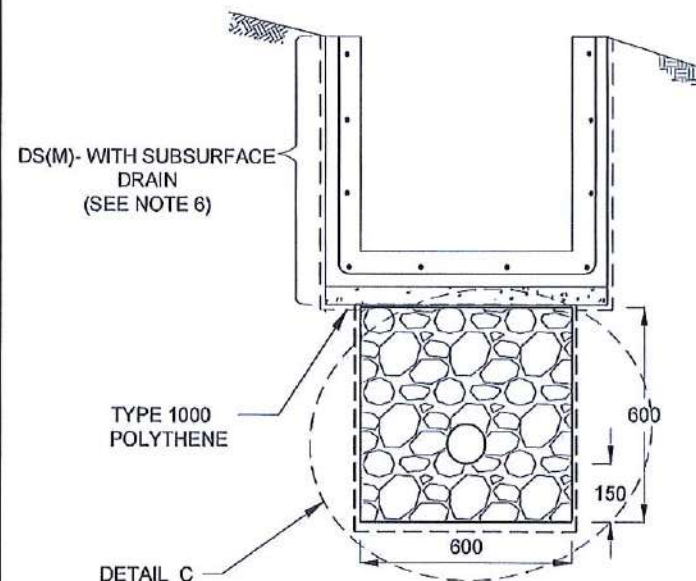
DETAILS OF BERM SEALING

SECTION B-B

EXPANSION JOINT DETAIL

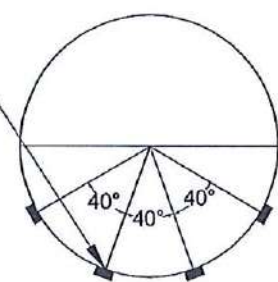
EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05	 DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05					REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES POLGAHAWELA BUS STAND	DETAILS OF DRAINS (SURFACE DRAIN -1 OF 2)	DRAWN	B.V.S. PATRISHIYA	
								DESIGNER	S.O.A.D.M. LAKRUWAN	
								CHECKED	J.P. SAMARANAYAKA	
								RECOMMENDED	PROF. S.A.S. KULATHILAKA	
								APPROVED	K.N. BANDARA	



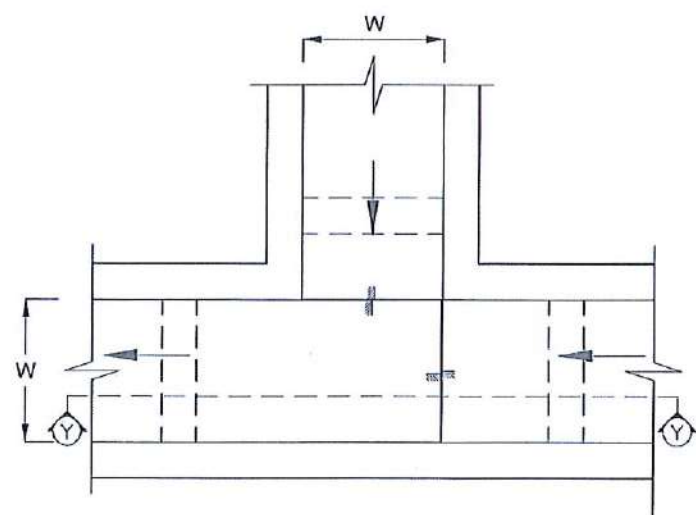


SUBSURFACE DRAIN  
[DS (S) -A]

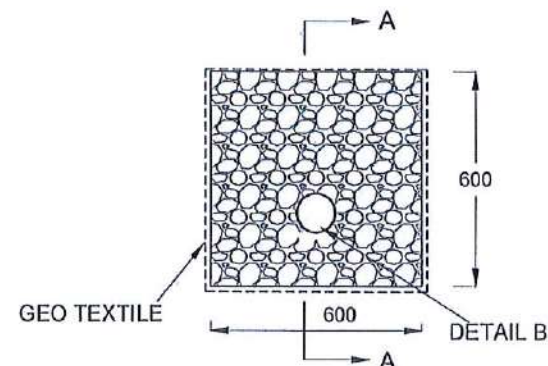
100mm x 5mm  
Groove



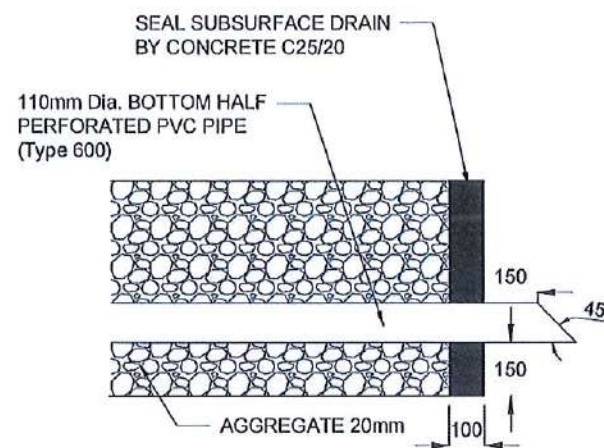
SECTION Y - Y



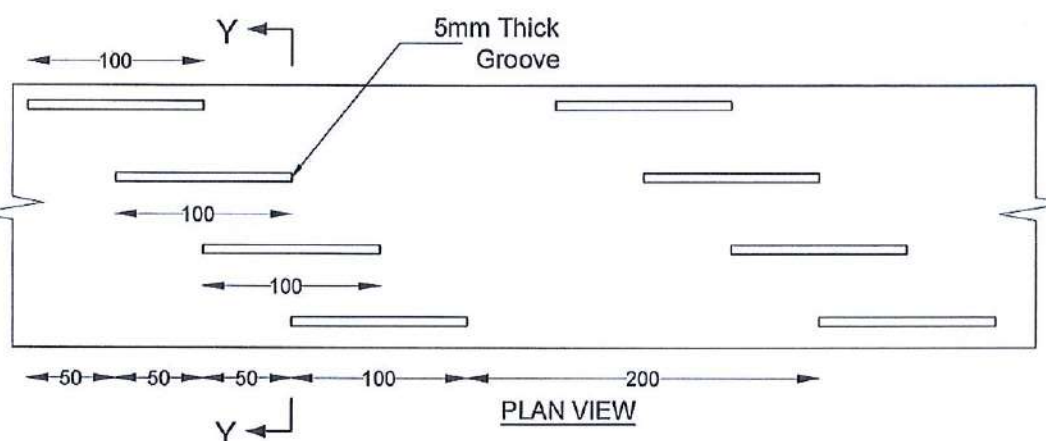
PLAN VIEW OF CATCH PIT (CP)



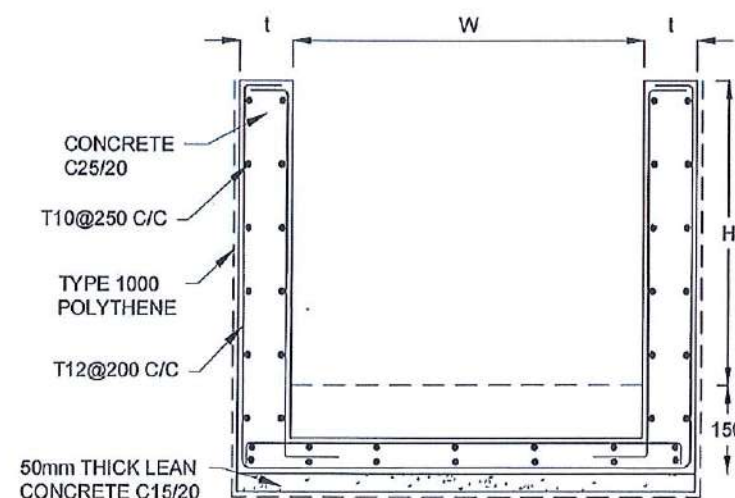
DETAIL C / DS (S) -A



SECTION A-A  
(OUTLET DETAIL SUBSURFACE DRAIN)



DETAIL - B (PERFORATED PIPE FOR SUB-SURFACE DRAINS)



SECTION Y-Y (CP-R)

#### NOTES

1. W,H,I ; SHALL BE THE SAME AS RESPECTIVE DRAIN SECTION.
2. CP - R SHALL BE USED WHERE  $H \geq 900$ mm
3. DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
4. DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
5. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.
6. DETAILS OF SURFACE DRAIN PORTION OF THE SUBSURFACE DRAINS SHALL BE AS PER DS(M), DS(B), DS(K) OR DS(C) SECTIONS ACCORDINGLY.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.

#### CONCRETE

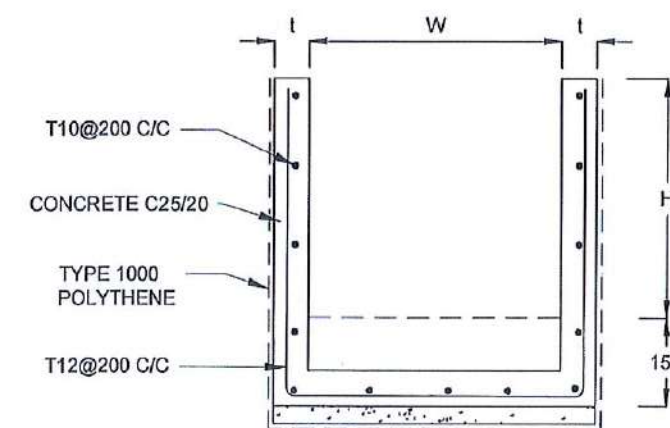
8. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
 

[a]	SCREED	- C. 15/20
[b]	WALLS / BASE / ENERGY BREAKERS	- C. 25/20



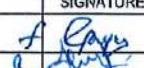

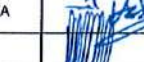

#### REINFORCEMENT

9. ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm<sup>2</sup>.
10. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 50 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
11. ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
12. REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
13. COVER TO REINFORCEMENT
 

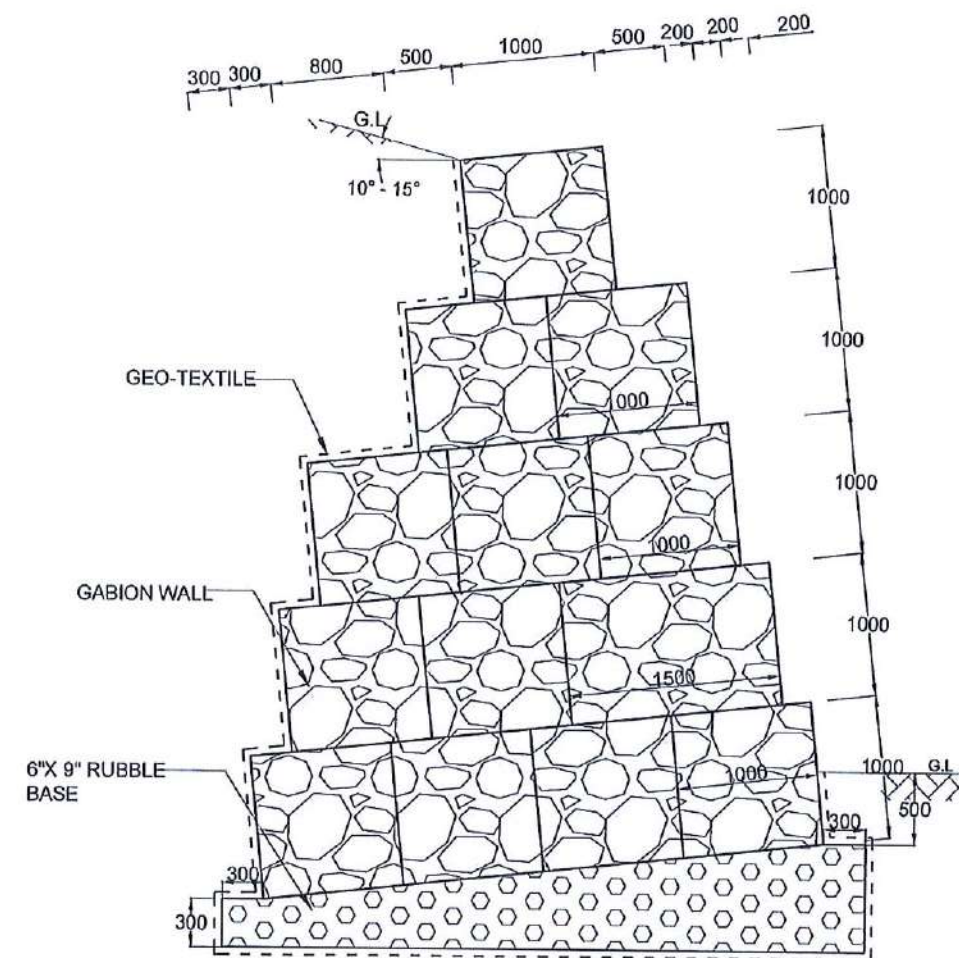
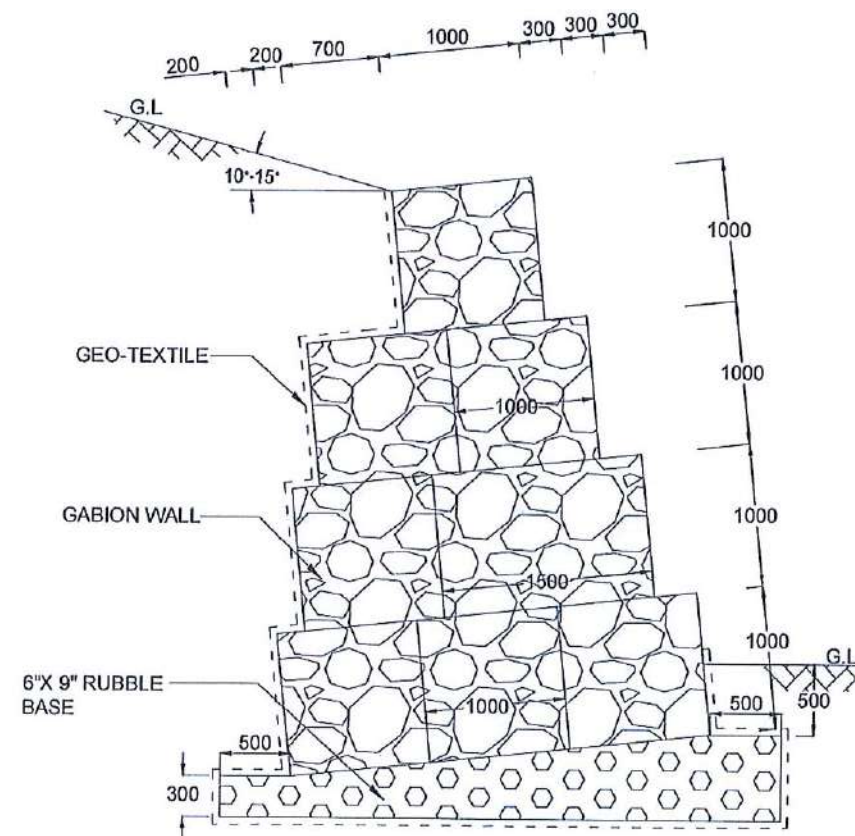
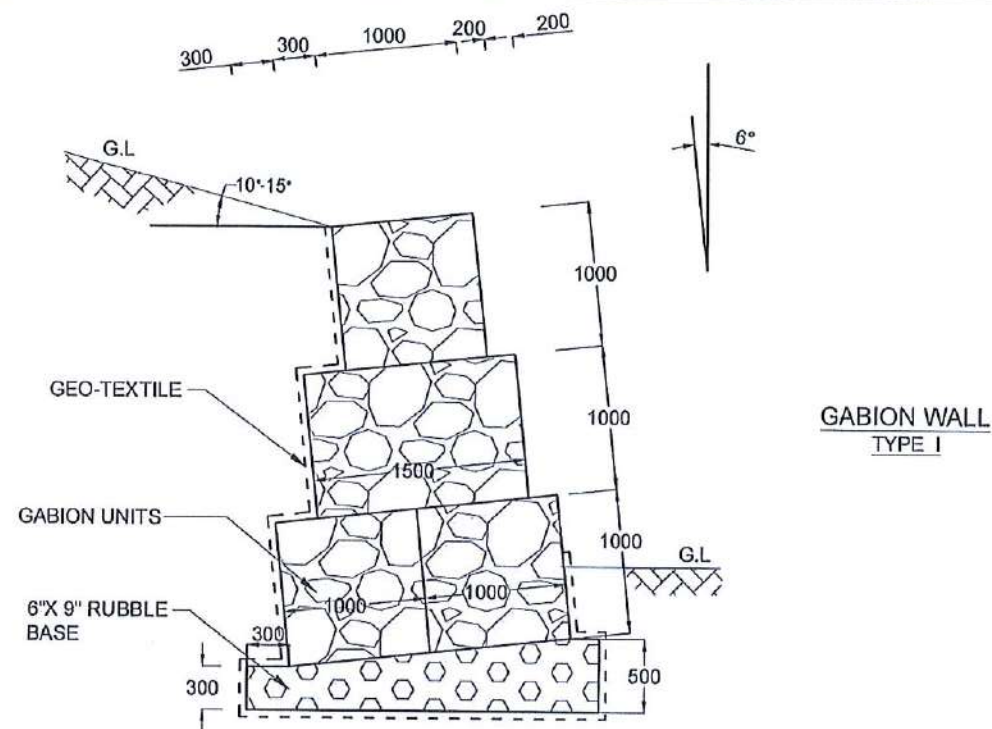
[a]	BURIED FACES AND DRAIN INVERTS	- 40 mm
[b]	ALL OTHER FACES	- 25 mm



SECTION Y - Y

EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05	 DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05					REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES POLGAHAWELA BUS STAND	DETAILS OF DRAINS (SUBSURFACE DRAIN AND CATCHPIT)	DRAWN	B.V.S. PATTRISHIYA	
								CHECKED	J.P. SAMARANAYAKA	
								RECOMMENDED	PROF. S.A.S. KULATHILAKA	
								APPROVED	K.N. BANDARA	
							SCALE	N.T.S.	DATE	12.11.2020
							PROJECT / DRAWING No.	RLVMMP/WORKS/NCB/04A/07-PL/DR- 03b	REVISION	00





#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS.

EMPLOYER



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS  
AND DISASTER MANAGEMENT  
NATIONAL BUILDING RESEARCH ORGANISATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

DESIGNER



DESIGN UNIT  
NATIONAL BUILDING RESEARCH ORGANISATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

REDUCTION OF LANDSLIDE  
VULNERABILITY BY MITIGATION MEASURES  
POLGAHAWELA BUS STAND

TITLE

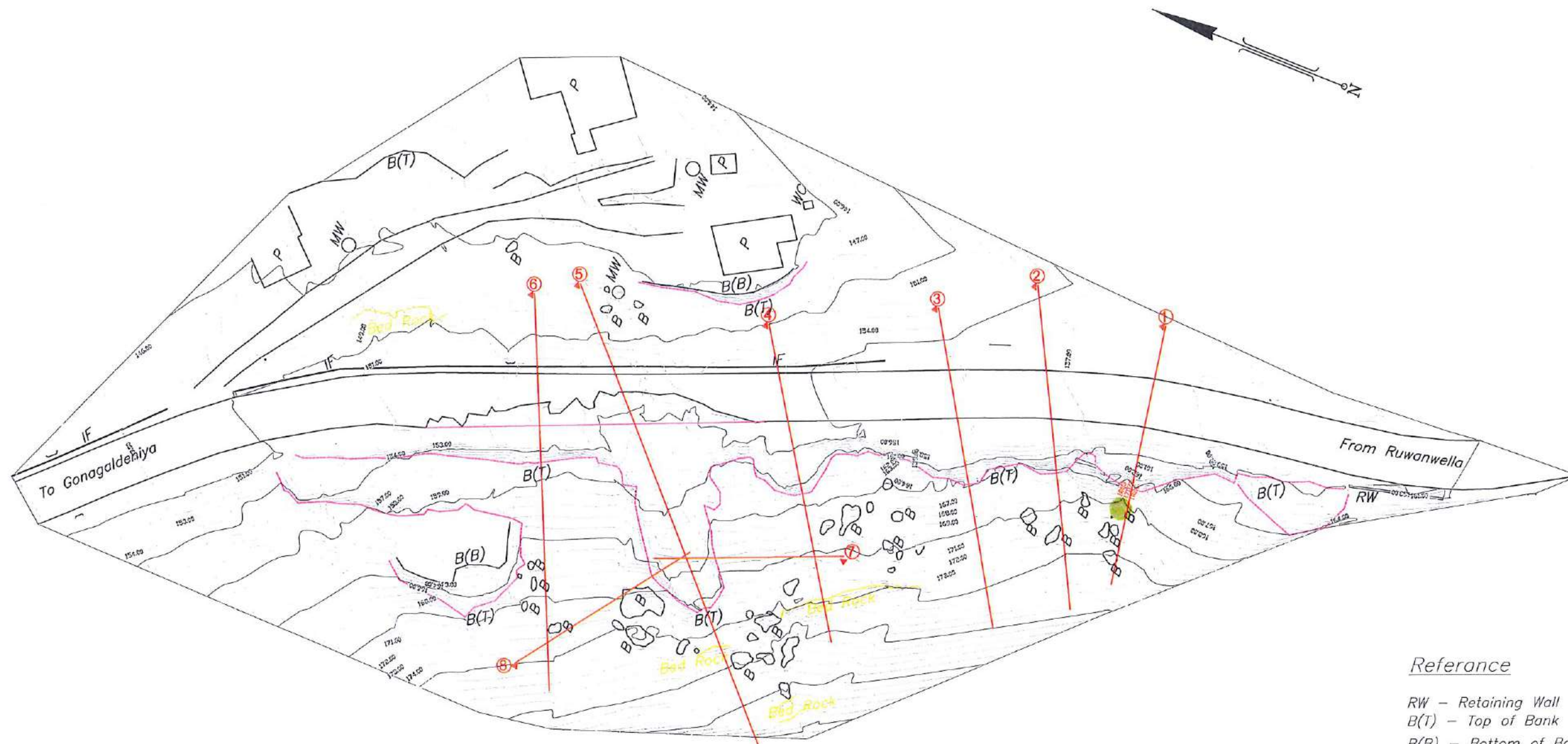
DETAILS OF GABION WALL

SCALE N.T.S. DATE 12.11.2020  
PROJECT / DRAWING No. RLVMM/WORKS/NCB/04/A07-PL/DR- 04 REVISION 00

DESCRIPTION	NAME	SIGNATURE
DRAWN	B.V.S. PATTRISHIYA	
DESIGNER	S.O.A.D.M. LAKRUWAN	
CHECKED	J.P. SAMARANAYAKA	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	K.N. BANDARA	



LEVEL PLAN NO:  
2017/L/Kegalle/LRRMD-23




NOTE: HEIGHTS ARE BASED ON AN ARBITRARY DATUM.  
CONTOUR INTERVAL - 1.0M  
AREA SURVEYED 1.44 HECTARES

SCALE :-  
0 5 10

#### Reference

RW - Retaining Wall  
B(T) - Top of Bank  
B(B) - Bottom of Bank  
P - Permanent building  
WC - Water Closet  
MW - Masonry Well  
EP - Electricity Pole  
IF - Iron Fence  
B - Boulder

EMPLOYER  
  
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS  
AND DISASTER MANAGEMENT  
NATIONAL BUILDING RESEARCH ORGANIZATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

DESIGNER  
  
DESIGN UNIT  
NATIONAL BUILDING RESEARCH ORGANIZATION  
No. 99/1, JAWATTA ROAD  
COLOMBO - 05

REV	DATE	REVISION DESCRIPTION	APPROVAL

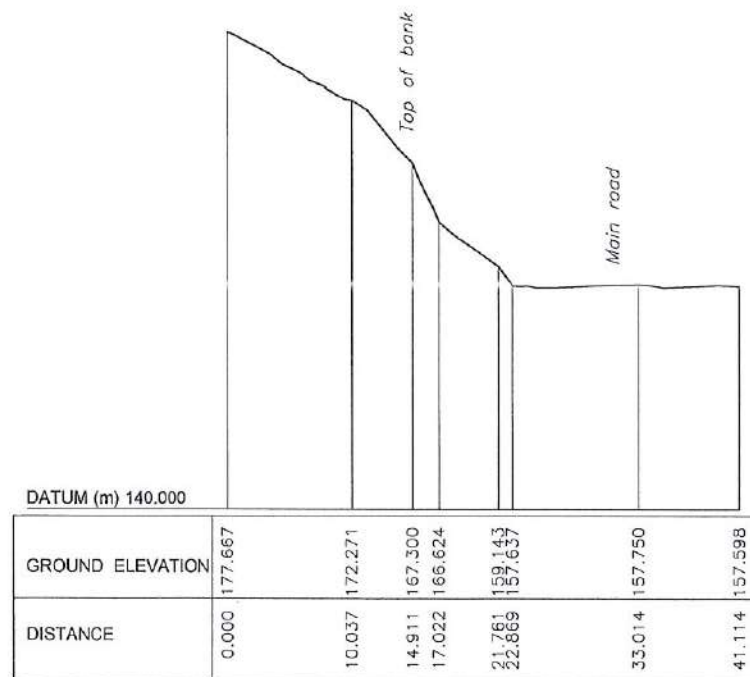
PROJECT TITLE  
REDUCTION OF LANDSLIDE VULNERABILITY  
BY MITIGATION MEASURES  
VEYANGODA-RUWANWELLA ROAD (B445) -  
LOCATION 01 (CH. 23+100 - CH 23+210 RHS)

TITLE  
CONTOUR SURVEY PLAN

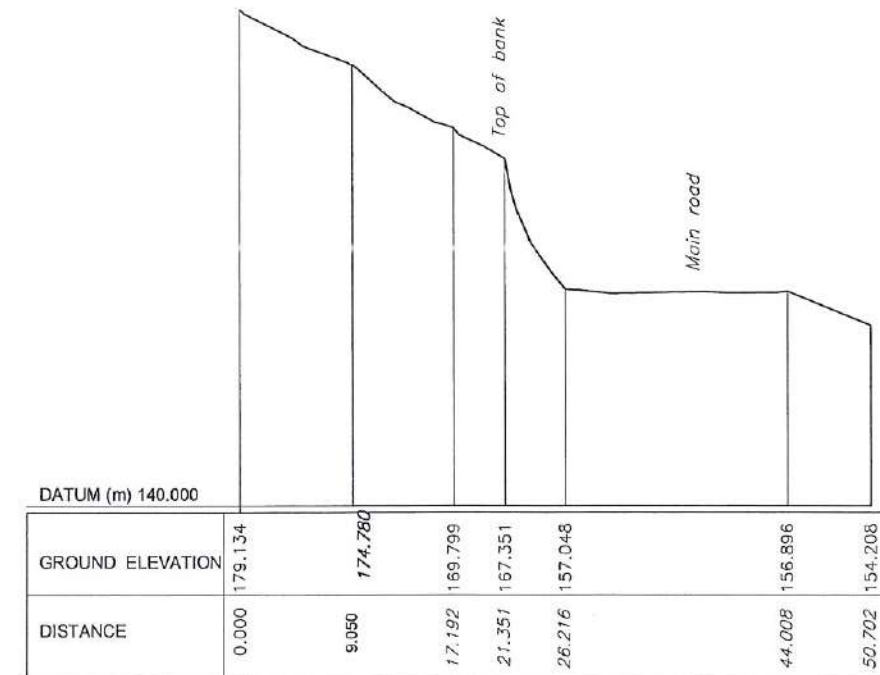
SCALE	1:750	DATE	05.11.2020
PROJECT / DRAWING No.	RLVMMP/WORKS/NCB/04A/25-Ru/DR - 01	REVISION	00

DESCRIPTION	NAME	SIGNATURE
SURVEYED	KAMAL DESHAPRIYA	
CHECKED	M. H. M. HARSHANI	

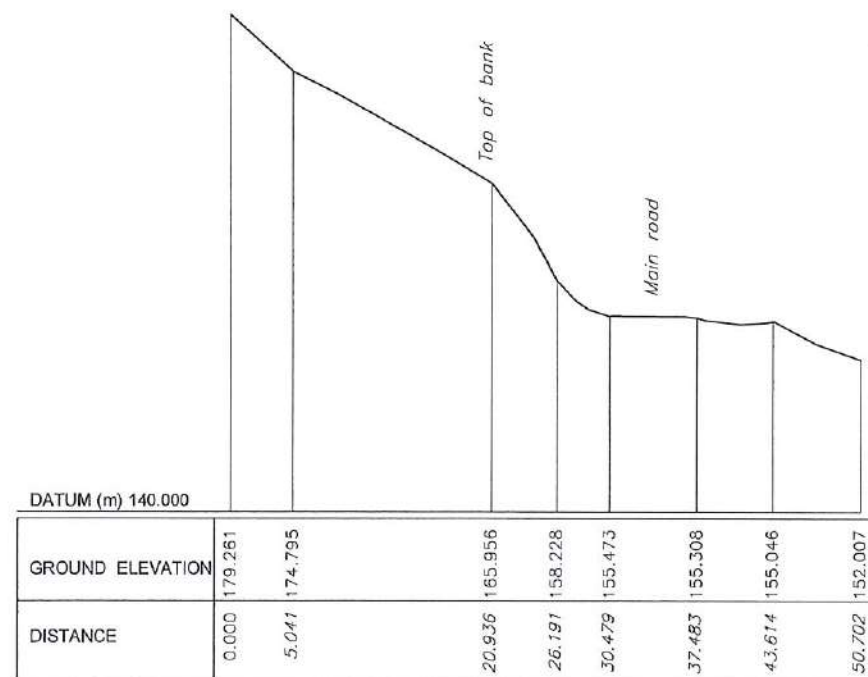




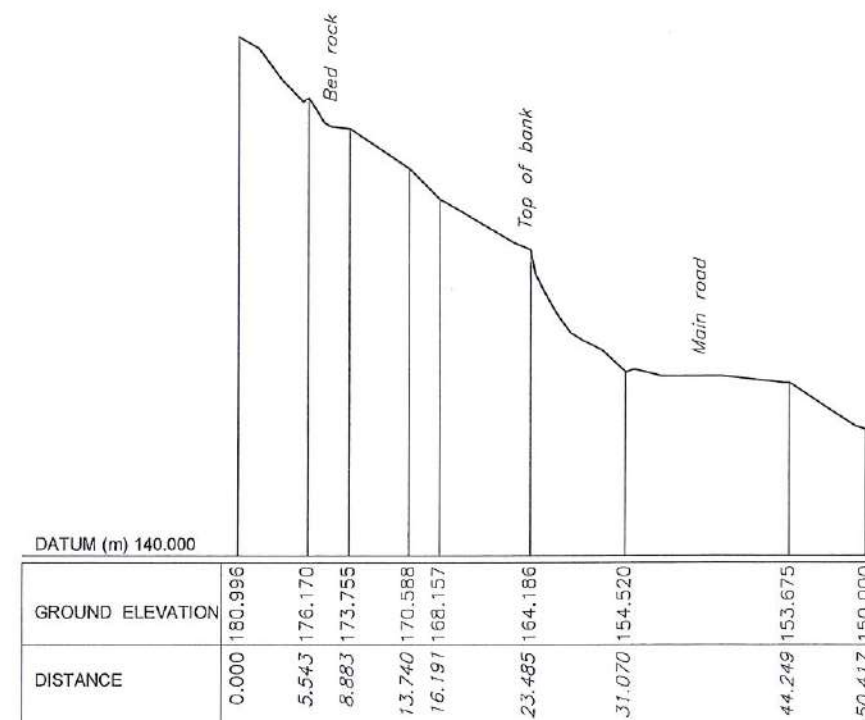
SECTION-1





SECTION-2



SECTION-3



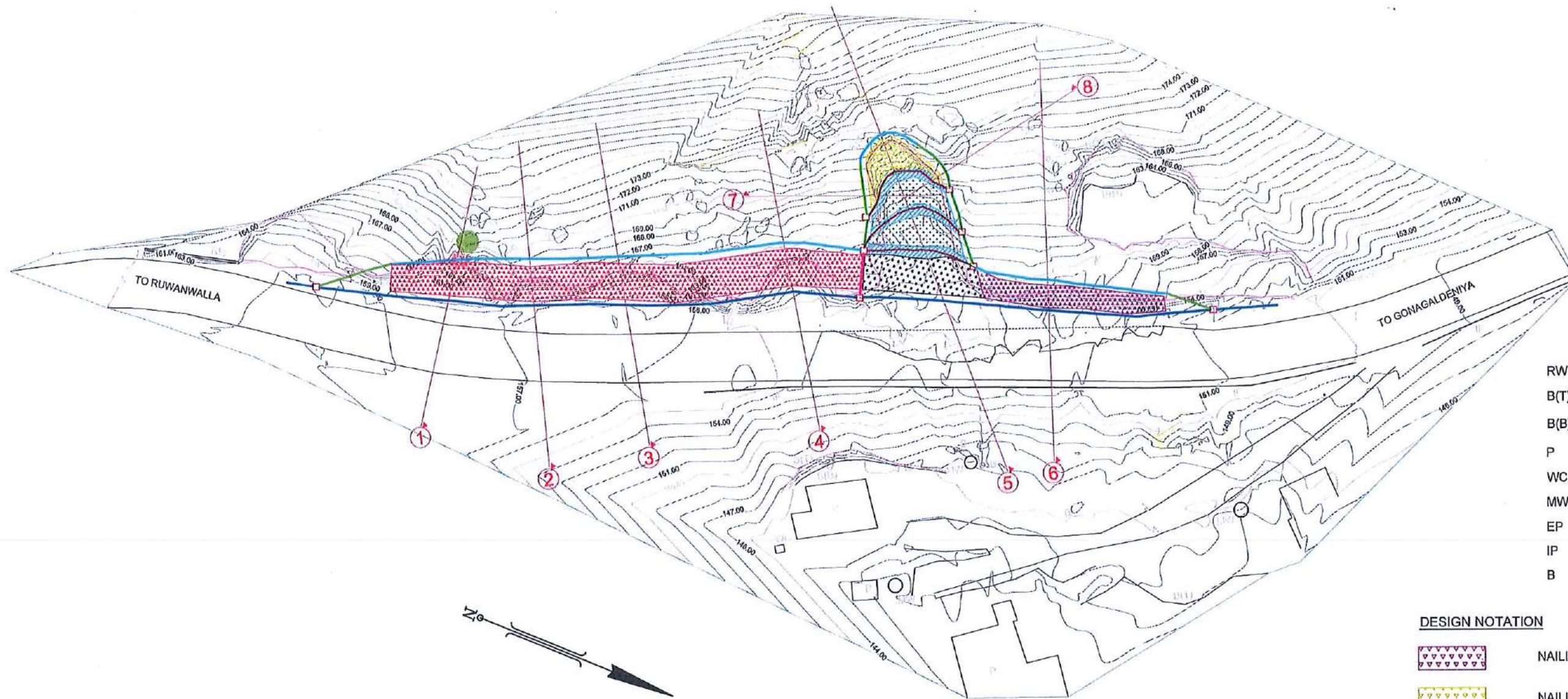
SECTION-4

<b>EMPLOYER</b>  DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05	<b>DESIGNER</b>  DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05	REV	DATE	REVISION DESCRIPTION	APPROVAL	<b>PROJECT TITLE</b> REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES VEYANGODA-RUWANWELLA ROAD (B445) - LOCATION 01 (CH. 23+100 - CH 23+210 RHS)	<b>TITLE</b> SURVEY CROSS SECTIONS SCALE: 1:750 DATE: 05.11.2020 PROJECT / DRAWING No. RLVMP/WORKS/NCB/04/V25-Ru/DR - 02a REVISION: 00			DESCRIPTION	NAME	SIGNATURE	









#### REFERENCE

RW	-	RETAINING WALL
B(T)	-	TOP OF BANK
B(B)	-	BOTTOM OF BANK
P	-	PERMANENT BUILDING
WC	-	WATER CLOSET
MW	-	MASONARY WALL
EP	-	ELECTRICITY POST
IP	-	IRON FENCE
B	-	BOULDER

#### DESIGN NOTATION

	NAILING AREA A
	NAILING AREA B
	NAILING AREA C
	RESHAPING AND TURFING AREA
	DEBRIS REMOVAL
	BERM AREA
	DS(B) - A TYPE I
	DS(M) - B
	DS(M) - C WITH COVER SLAB
	DS(M) - R
	DS(C) - B
	CATCH PIT

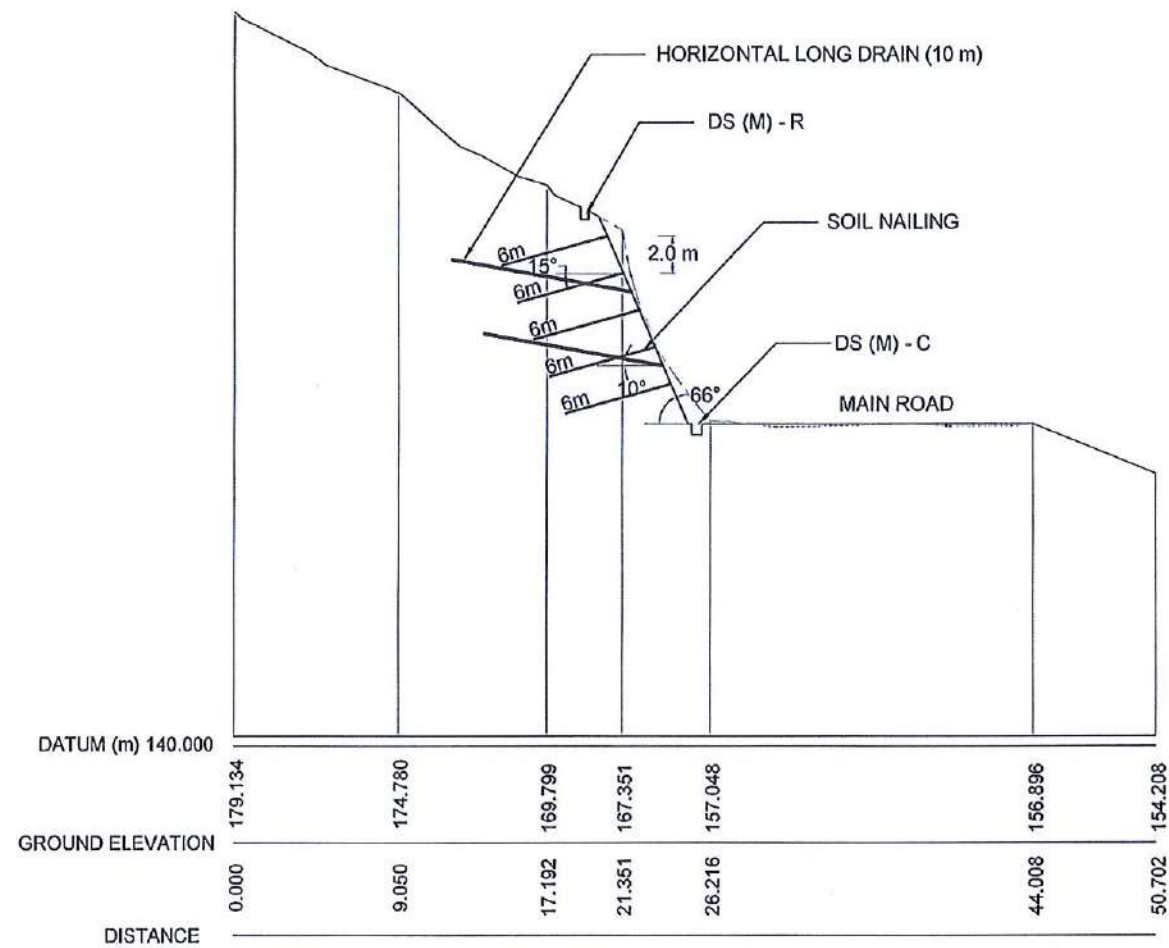
#### NOTE:

1.SURFACE AND CASCADE DRAIN LOCATIONS (PATH OF THE DRAINS) AND LENGTH MIGHT BE VARIED ACCORDING TO ACTUAL SITE CONDITIONS.

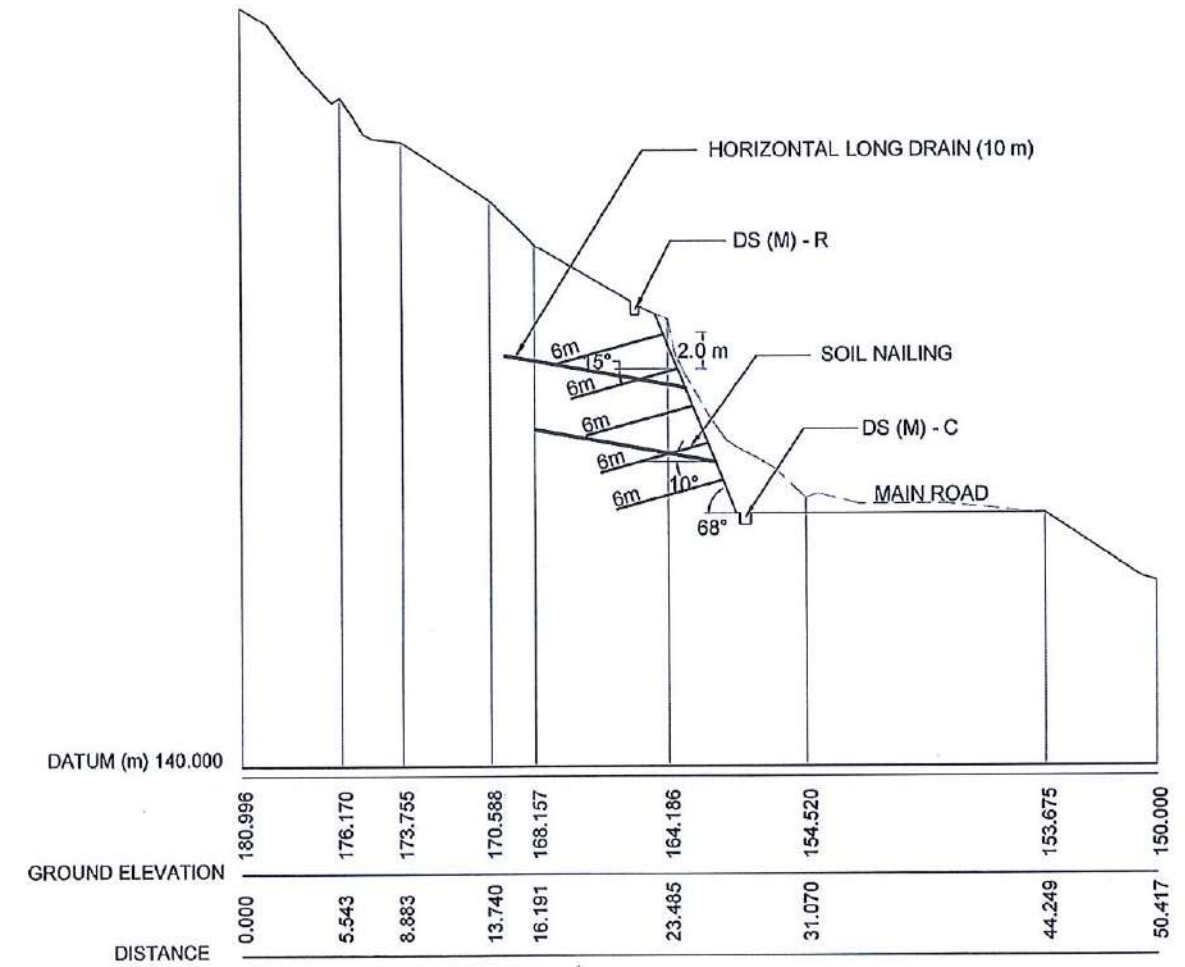
2.LOCATIONS OF THE CATCH PITS MIGHT BE VARIED ACCORDING TO THE ACTUAL SITE CONDITIONS.

EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05	 DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05					REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES VEYANGODA-RUWANWELLA ROAD (B445) - LOCATION 01 (CH. 23+100 - CH 23+210 RHS)	PLAN VIEW OF PROPOSED MITIGATION MEASURES	DRAWN	S.A.G.D. SENANAYAKA	
								DESIGNER	M. H. M. HARSHANI	
								CHECKED	J.P. SAMARANAYAKA	
								RECOMMENDED	PROF. S.A.S. KULATHILAKA	
								APPROVED	K.N. BANDARA	
							SCALE 1:750 PROJECT / DRAWING No. RLVMP/WORKS/NCB/04A/25-Ru/DR - 03	DATE 05.11.2020 REVISION 00		













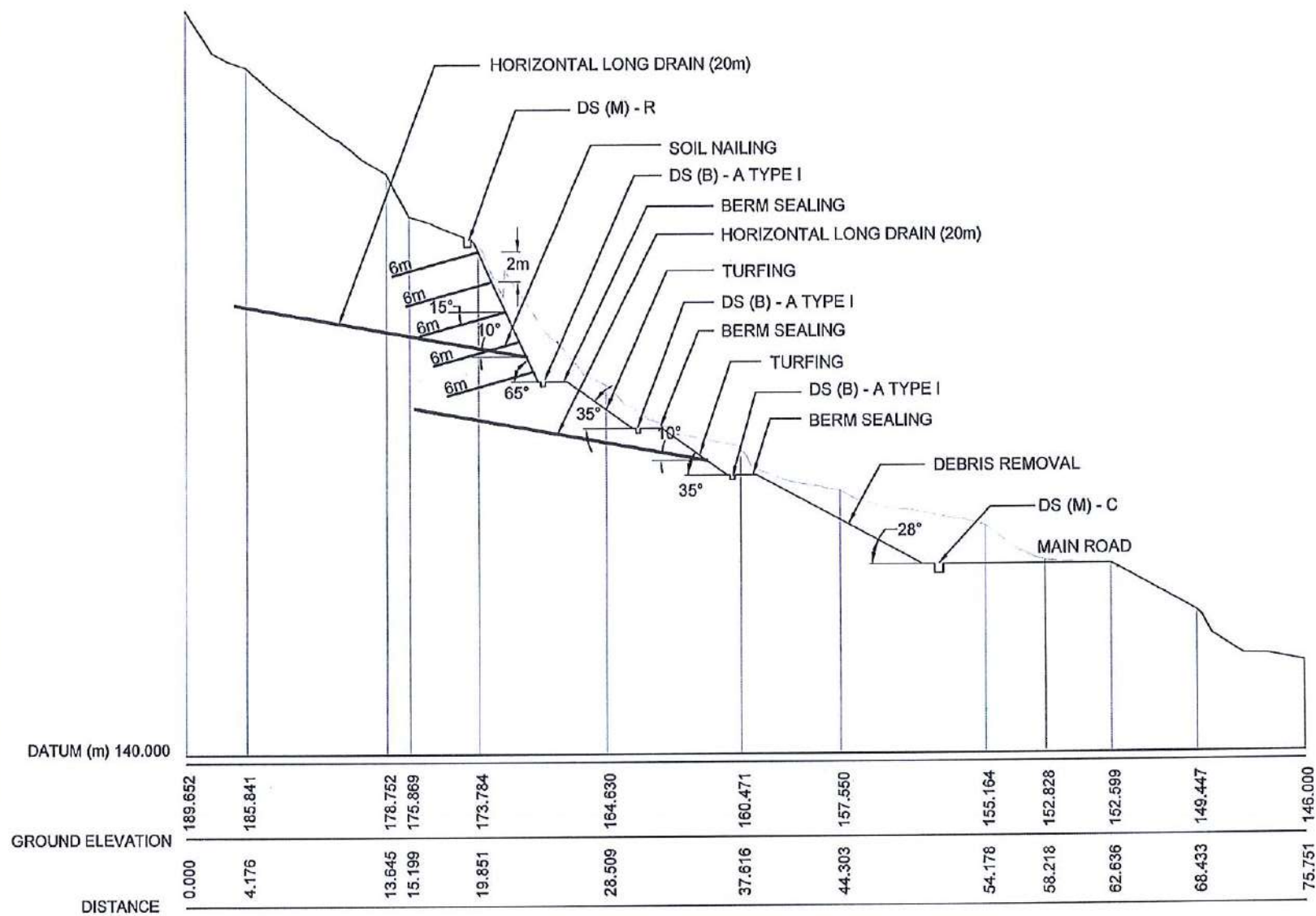
SECTION-2



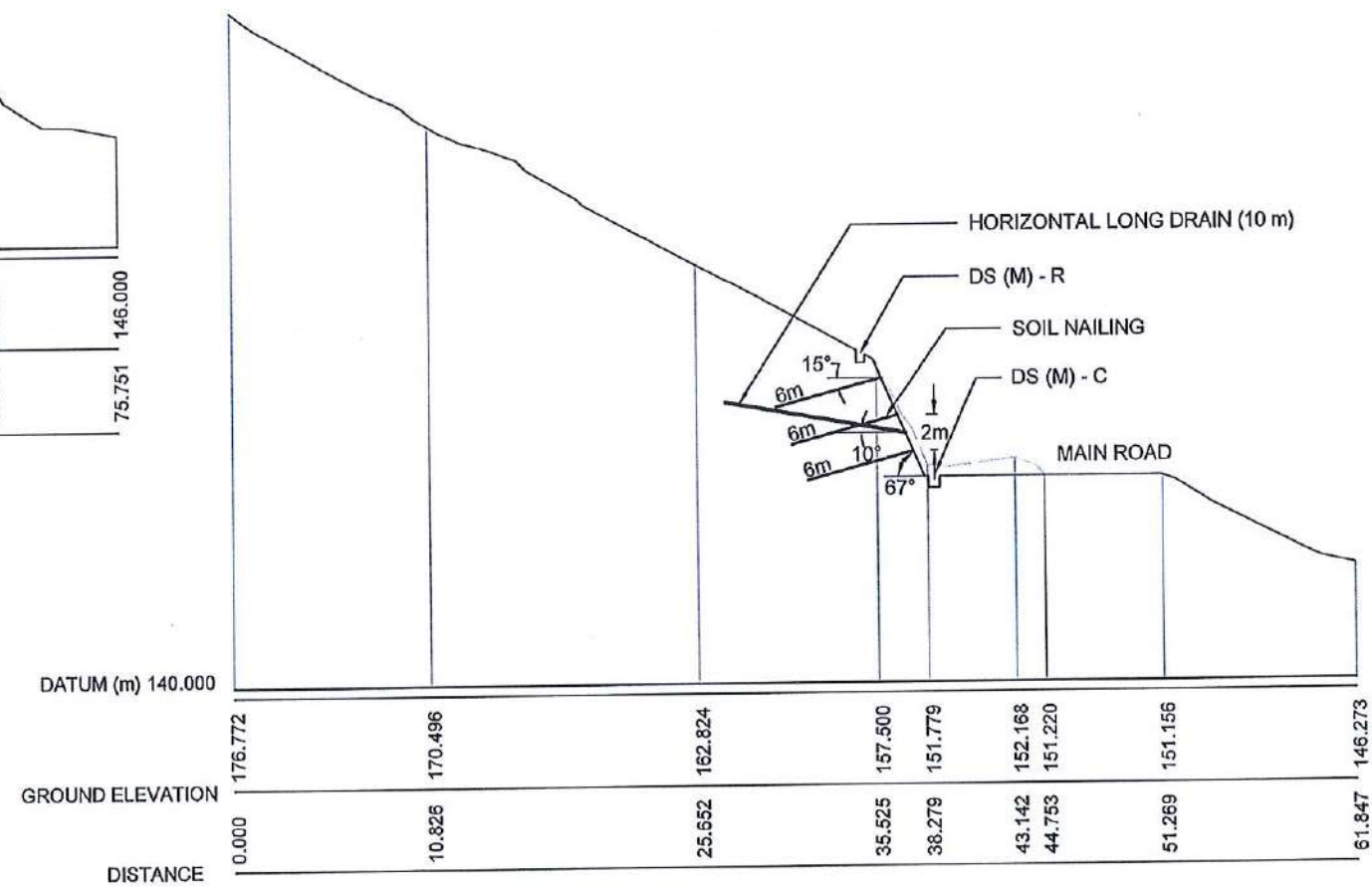
SECTION-4

<div>EMPLOYER</div> <div></div> <div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div> <div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT</div> <div>NATIONAL BUILDING RESEARCH ORGANIZATION</div> <div>No. 99/1 ,JAWATTA ROAD</div> <div>COLOMBO - 05</div>	<div>DESIGNER</div> <div></div> <div>DESIGN UNIT</div> <div>NATIONAL BUILDING RESEARCH ORGANIZATION</div> <div>No. 99/1 ,JAWATTA ROAD</div> <div>COLOMBO - 05</div>	<div>REV</div> <div>DATE</div> <div>REVISION DESCRIPTION</div> <div>APPROVAL</div>	<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES</div> <div>VEYANGODA-RUWANWELLA ROAD (B445) - LOCATION 01 (CH. 23+100 - CH 23+210 RHS)</div>	<div>TITLE</div> <div>CROSS SECTIONS OF PROPOSED MITIGATION MEASURES</div> <div>SCALE 1:400</div> <div>DATE 05.11.2020</div> <div>PROJECT / DRAWING No. RLVMMP/WORKS/NCB/04A/25-Ru/DR - 04a</div> <div>REVISION 00</div>	<div>DESCRIPTION</div> <div>NAME</div> <div>SIGNATURE</div>	
					<div>DRAWN</div> <div>S.A.G.D. SENANAYAKA</div> <div></div>	
					<div>DESIGNER</div> <div>M. H. M. HARSHANI</div> <div></div>	
					<div>CHECKED</div> <div>J.P. SAMARANAYAKA</div> <div></div>	
					<div>RECOMMENDED</div> <div>PROF. S.A.S. KULATHILAKA</div> <div></div>	
					<div>APPROVED</div> <div>K.N. BANDARA</div> <div></div>	










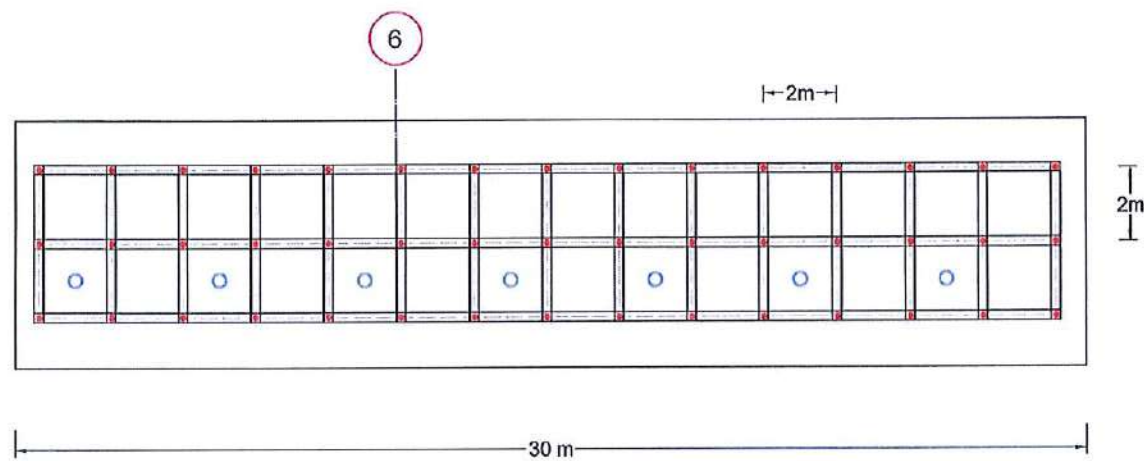
SECTION-5



SECTION-6

<div></div> <div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div> <div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT</div> <div>NATIONAL BUILDING RESEARCH ORGANIZATION</div> <div>No. 99/1 ,JAWATTA ROAD COLOMBO – 05</div>	<div></div> <div>DESIGN UNIT</div> <div>NATIONAL BUILDING RESEARCH ORGANIZATION</div> <div>No. 99/1 ,JAWATTA ROAD COLOMBO – 05</div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE		
								REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES	CROSS SECTIONS OF PROPOSED MITIGATION MEASURES	DRAWN	S.A.G.D. SENANAYAKA	
								VEYANGODA-RUWANWELLA ROAD (B445) -		DESIGNER	M. H. M. HARSHANI	
								LOCATION 01 (CH. 23+100 - CH 23+210 RHS)		CHECKED	J.P. SAMARANAYAKA	
										RECOMMENDED	PROF. S.A.S. KULATHILAKA	
										APPROVED	K.N. BANDARA	
							SCALE 1:400	DATE 05.11.2020				
							PROJECT / DRAWING No. RLVMPP/WORKS/NCB/04A/25-Ru/DR - 04	REVISION 00				





AREA A

LEGEND

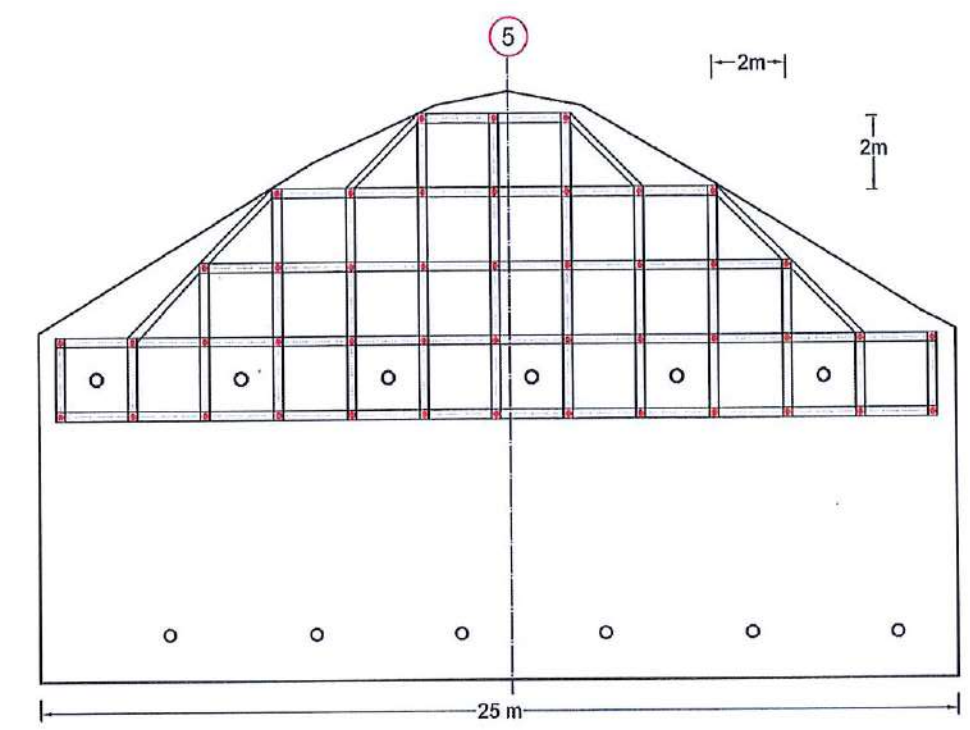
- SOIL NAILING -
 

TOTAL NAIL LENGTH= 6 m  
 NO'S OF NAIL = 45  
 REINFORCEMENT DIAMETER =32 mm  
 DIAMETER OF THE DRILLED HOLE =125 mm  
 NAIL SPACING = 2.0 m
- HORIZONTAL LONG DRAINAGE -
 

HORIZONTAL LONG DRAIN LENGTH =10 m  
 NO' S OF LONG DRAIN= 7  
 DIAMETER = 90 mm

NOTES

1. LENGTH OF THE SOIL NAILS,LENGTH & LOCATION OF HORIZONTAL DRAINS  
MIGHT BE VARIED ACCORDING TO THE ACTUAL SOIL PROFILE OR SITE CONDITION.










AREA B

LEGEND

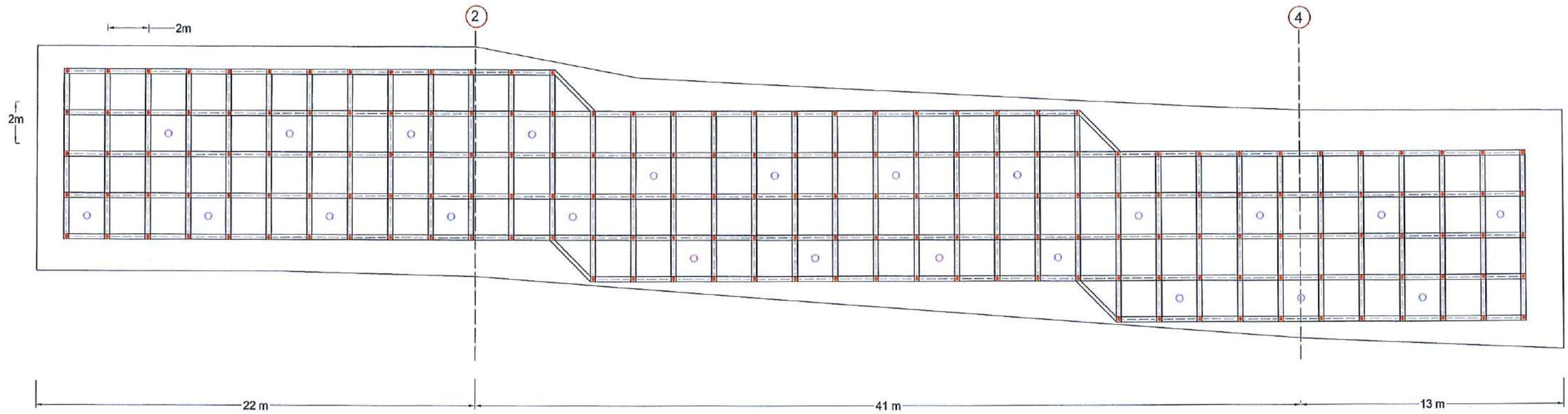
- SOIL NAILING -
 

TOTAL NAIL LENGTH= 6 m  
 NO'S OF NAIL = 45  
 REINFORCEMENT DIAMETER =32 mm  
 DIAMETER OF THE DRILLED HOLE =125 mm  
 NAIL SPACING = 2.0 m
- HORIZONTAL LONG DRAINAGE -
 

HORIZONTAL LONG DRAIN LENGTH =20 m  
 NO' S OF LONG DRAIN= 12  
 DIAMETER = 90 mm

<div></div> <div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div> <div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT</div> <div>NATIONAL BUILDING RESEARCH ORGANIZATION</div> <div>No. 99/1 ,JAWATTA ROAD</div> <div>COLOMBO – 05</div>	<div></div> <div>DESIGN UNIT</div> <div>NATIONAL BUILDING RESEARCH ORGANIZATION</div> <div>No. 99/1 ,JAWATTA ROAD</div> <div>COLOMBO – 05</div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	FRONT ELEVATION OF PROPOSED MITIGATION MEASURES AREA A & B	DESCRIPTION	NAME	SIGNATURE			
									REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES	SCALE 1:200	DATE 05.11.2020	DRAWN	S.A.G.D. SENANAYAKA	
									VEYANGODA-RUWANWELLA ROAD (B445) -	PROJECT / DRAWING No.	REVISION	DESIGNER	M. H. M. HARSHANI	
									LOCATION 01 (CH. 23+100 - CH 23+210 RHS)	RLVMPP/WORKS/NCB/04A/25-Ru/DR - 05a	00	CHECKED	J.P. SAMARANAYAKA	
												RECOMMENDED	PROF. S.A.S. KULATHILAKA	
												APPROVED	K.N. BANDARA	





AREA C

### LEGEND

SOIL NAILING -



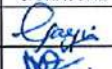



HORIZONTAL LONG DRAINAGE -

TOTAL NAIL LENGTH= 6 m  
NO'S OF NAIL = 185  
REINFORCEMENT DIAMETER =32 mm  
DIAMETER OF THE DRILLED HOLE =125 mm  
NAIL SPACING = 2.0 m

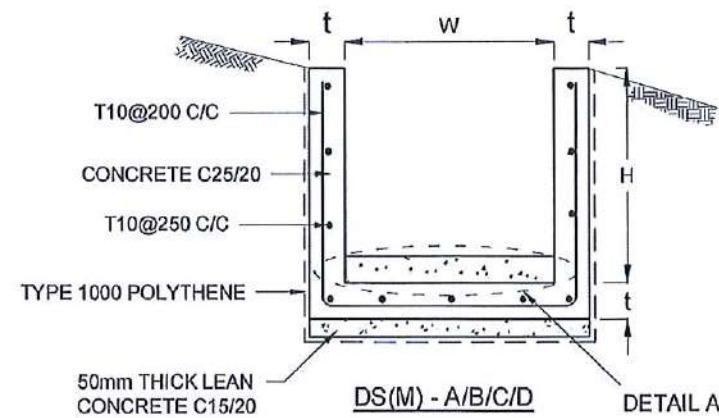
HORIZONTAL LONG DRAIN LENGTH =10 m  
NO' S OF LONG DRAIN = 24  
DIAMETER = 90 mm

### NOTES

1. LENGTH OF THE SOIL NAILS,LENGTH & LOCATION OF HORIZONTAL DRAINS  
MIGHT BE VARIED ACCORDING TO THE ACTUAL SOIL PROFILE OR SITE CONDITION.

EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05	 DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05					REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES VEYANGODA-RUWANWELLA ROAD (B445) - LOCATION 01 (CH. 23+100 - CH 23+210 RHS)	FRONT ELEVATION OF PROPOSED MITIGATION MEASURES AREA C	DRAWN	S.A.G.D. SENANAYAKA	
								DESIGNER	M. H. M. HARSHANI	
								CHECKED	J.P. SAMARANAYAKA	
								RECOMMENDED	PROF. S.A.S. KULATHILAKA	
								APPROVED	K.N. BANDARA	





DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (M) - A /P	300	300	100
DS (M) - B/R	450	450	100
DS (M) - C/Q	600	600	100
DS (M) - D	750	750	125
DS (M) - E	900	900	150
DS (M) - F	1000	1000	150

#### NOTES

1. DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
2. STEPS SHALL BE CONSTRUCTED AT SURFACE DRAIN ON SLOPING GROUND ACCORDING TO THE SITE CONDITIONS AS INSTRUCTED BY THE ENGINEER.
3. ENERGY BREAKERS SHALL BE CONSTRUCTED AT THE STEEP DRAIN SEGMENTS AS PER THE INSTRUCTIONS OF THE ENGINEER.
4. DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
5. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
6. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.

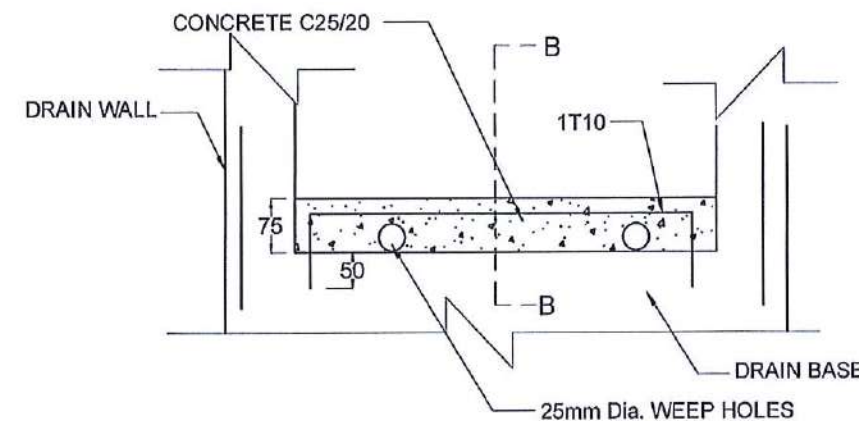
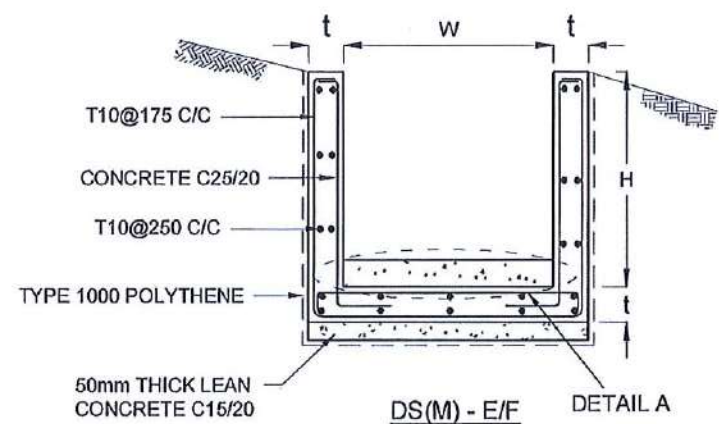
#### CONCRETE

7. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE

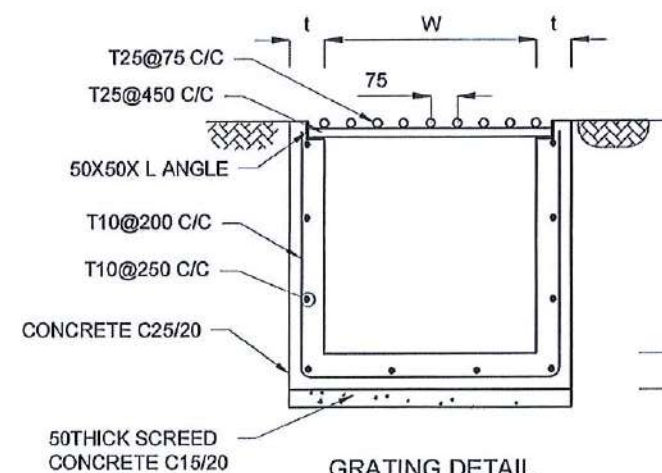
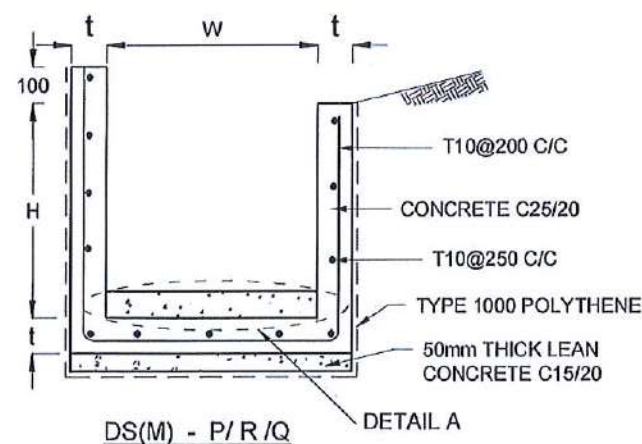
- [a] SCREED - C. 15/20  
[b] WALLS / BASE / ENERGY BREAKERS - C. 25/20

#### REINFORCEMENT

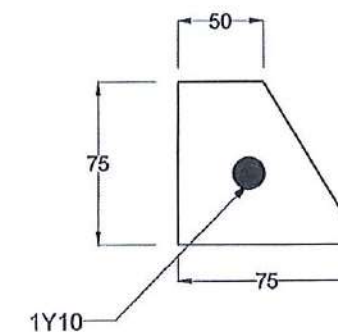
8. ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm<sup>2</sup>.
9. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 50 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
10. ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
11. REINFORCEMENT BARS SHALL BE BENT ACCORDANCE WITH STANDARD SPECIFICATIONS.
14. COVER TO REINFORCEMENT
  - [a] BURIED FACES AND DRAIN INVERTS - 40mm
  - [b] ALL OTHER FACES - 25mm.



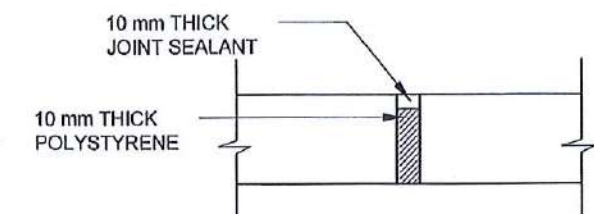
DETAIL A - (ENERGY BREAKER AT 3M)










GRATING DETAIL



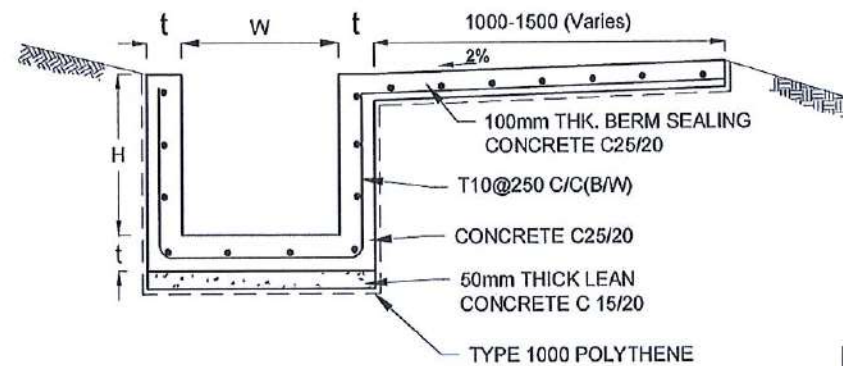
SECTION B-B



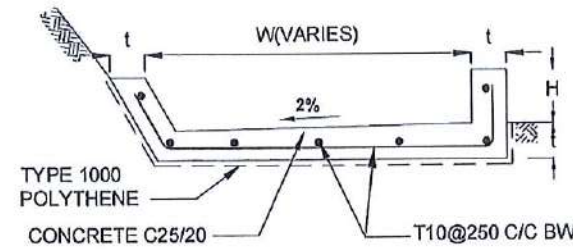
EXPANSION JOINT DETAIL

EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD, COLOMBO - 05	 DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD, COLOMBO - 05					REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES VEYANGODA-RUWANWELLA ROAD (B445) - LOCATION 01 (CH. 23+100 - CH 23+210 RHS)	DETAILS OF DRAINS (SURFACE DRAIN -1 OF 2)	DRAWN	S.A.G.D. SENANAYAKA	
								DESIGNED	M. H. M. HARSHANI	
								CHECKED	J.P. SAMARANAYAKA	
								RECOMMENDED	PROF. S.A.S. KULATHILAKA	
								APPROVED	K.N. BANDARA	
							SCALE N.T.S. DATE 05.11.2020 PROJECT / DRAWING No. RLVMM/WORKS/NCB/01A/25-RU/DR - 06a-1 REVISION 00			





DS (B) - (TYPE I)



DS (B) - (TYPE II)

DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (B) - A	300	300	100
DS (B) - B	450	450	100
DS (B) - C	1000	150	100

#### NOTES

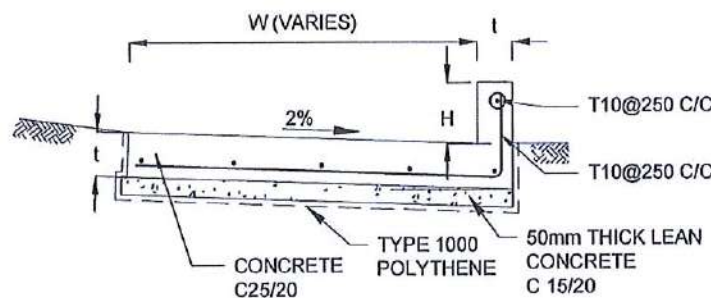
- DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
- STEPS SHALL BE CONSTRUCTED AT SURFACE DRAIN ON SLOPING GROUND ACCORDING TO THE SITE CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- ENERGY BREAKERS SHALL BE CONSTRUCTED AT THE STEEP DRAIN SEGMENTS AS PER THE INSTRUCTIONS OF THE ENGINEER.
- DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- COVER SLABS NEED TO BE PROVIDE ONLY FOR THE REGIONS AS INSTRUCTED BY THE ENGINEER.
- COVER SLAB WIDTH ( $W_c$ ) SHOULD BE TAKEN AS THE SUM OF DRAIN WIDTH AND  $2x$  DRAIN WALL THICKNESS. [ $W_c = W + 2x$ ]
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OR OTHERWISE STATED.
- 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCE IN EVERY 5m INTERVAL.

#### CONCRETE

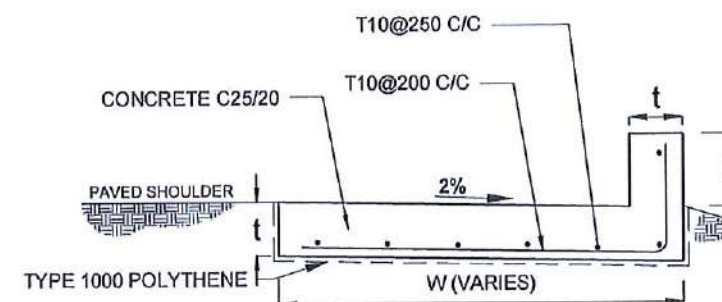
- USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
  - [a] SCREED - C. 15/20
  - [b] WALLS / BASE / ENERGY BREAKERS - C. 25/20

#### REINFORCEMENT

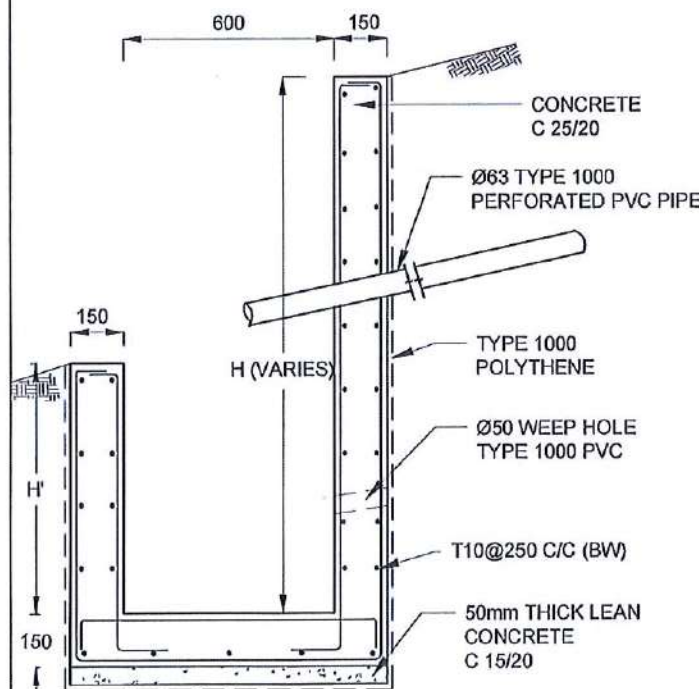
- ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN  $460N/mm^2$ .
- BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF  $50 \times$  BAR DIA. AND LAPPING SHOULD BE STAGGERED.
- ANCHORAGE LENGTH SHOULD BE  $40X$  BAR DIA.
- REINFORCEMENT BARS SHALL BE BENT ACCORDANCE WITH STANDARD SPECIFICATIONS.
- COVER TO REINFORCEMENT
  - [a] BURIED FACES AND DRAIN INVERTS - 40mm
  - [b] ALL OTHER FACES - 25mm.



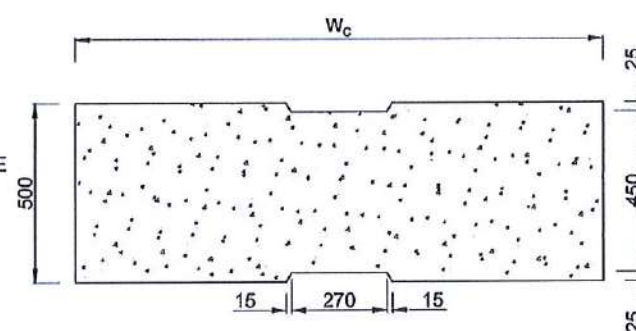
DS (K) - TYPE I



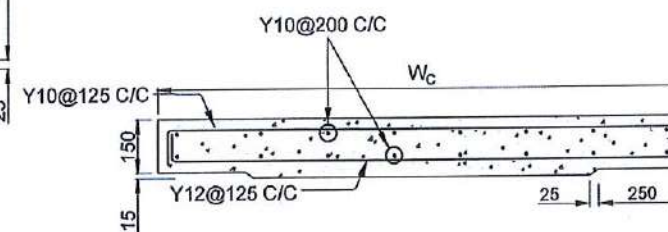
DS (K) - TYPE II



DS (M) - L



PLAN VIEW OF COVER SLAB



ACCESS & HEAVY DUTY COVER SLAB  
SECTION OF ( $W_c \times 500 \times 150mm$ )

DS (M) - L	W (mm)	H' (mm)	t (mm)
TYPE I	600	600	150
TYPE II	800	800	150

EMPLOYER  
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS  
AND DISASTER MANAGEMENT  
NATIONAL BUILDING RESEARCH ORGANIZATION  
No. 99/1, JAWATTA ROAD,  
COLOMBO - 05

DESIGNER  
DESIGN UNIT  
NATIONAL BUILDING RESEARCH ORGANIZATION  
No. 99/1, JAWATTA ROAD,  
COLOMBO - 05

REV	DATE	REVISION DESCRIPTION	APPROVAL

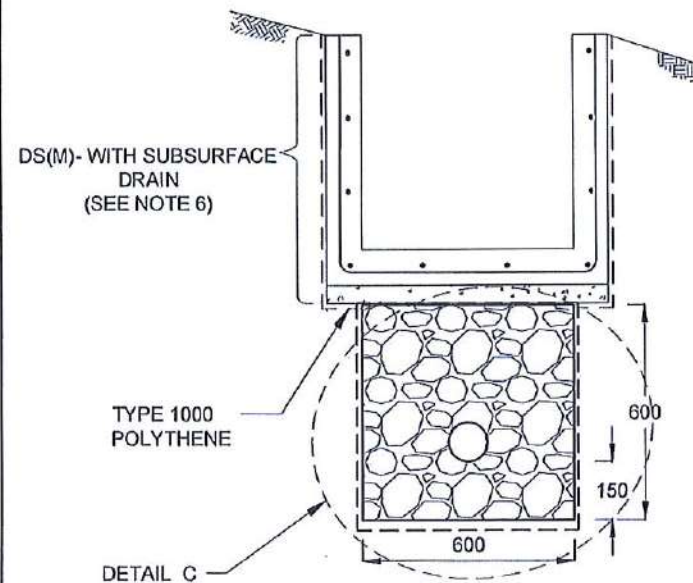
PROJECT TITLE  
REDUCTION OF LANDSLIDE VULNERABILITY  
BY MITIGATION MEASURES  
VEYANGODA-RUWANWELLA ROAD (B445) -  
LOCATION 01 (CH. 23+100 - CH 23+210 RHS)

TITLE	DESCRIPTION	NAME	SIGNATURE
DETAILS OF DRAINS (SURFACE DRAIN - 2 OF 2)	DRAWN	S.A.G.D. SENANAYAKA	
	DESIGNED	M. H. M. HARSHANI	
	CHECKED	J.P. SAMARANAYAKA	
	RECOMMENDED	PROF. S.A.S. KULATHILAKA	
	APPROVED	K.N. BANDARA	

SCALE N.T.S.  
PROJECT / DRAWING No.  
RLVMMP/WORKS/NCB/04/25-Ru/DR - 06a-II

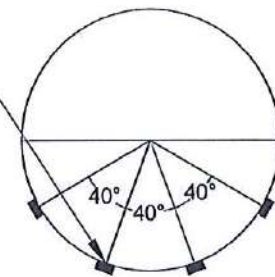
DATE 05.11.2020  
REVISION 00



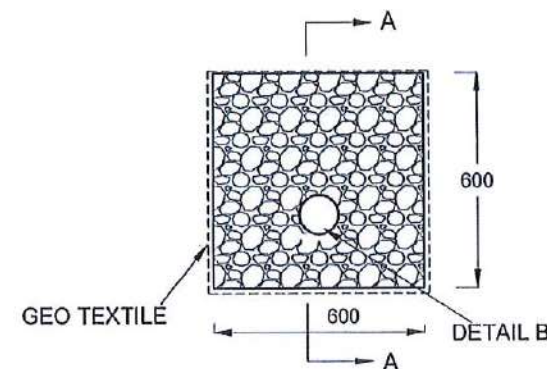


SUBSURFACE DRAIN  
[DS (S) -A]

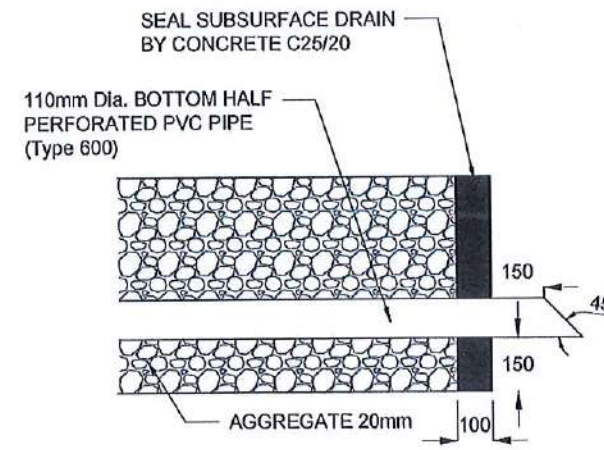
100mm x 5mm  
Groove



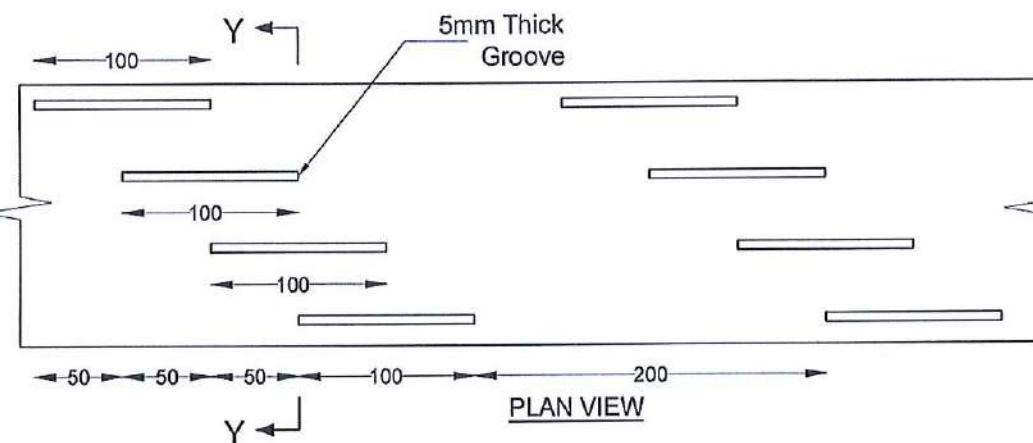
SECTION Y - Y



DETAIL C / DS (S) -A

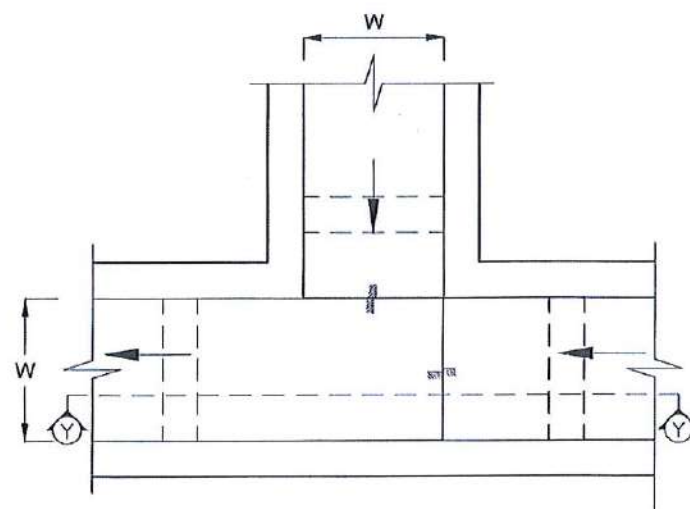


SECTION A-A  
(OUTLET DETAIL SUBSURFACE DRAIN)

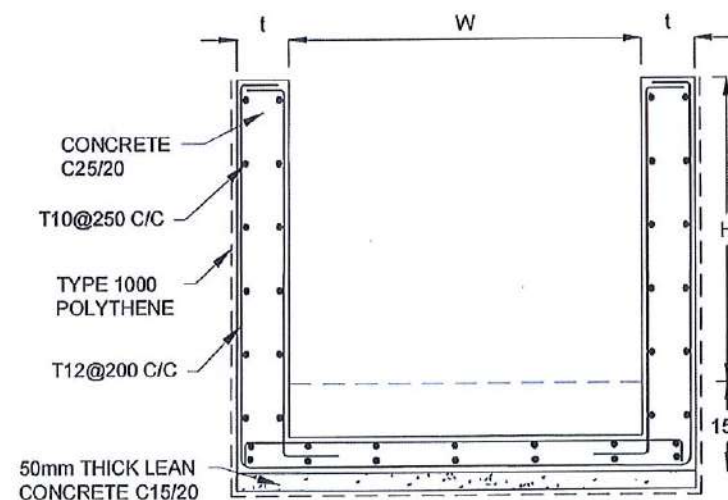


PLAN VIEW

DETAIL - B (PERFORATED PIPE FOR SUB-SURFACE DRAINS)



PLAN VIEW OF CATCH PIT (CP)



SECTION Y-Y (CP - R)

#### NOTES

1. W,H,t ; SHALL BE THE SAME AS RESPECTIVE DRAIN SECTION.
2. CP - R SHALL BE USED WHERE  $H \geq 900\text{mm}$
3. DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
4. DOWELS WILL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
5. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.
6. DETAILS OF SURFACE DRAIN PORTION OF THE SUBSURFACE DRAINS SHALL BE AS PER DS(M), DS(B), DS(K) OR DS(C) SECTIONS ACCORDINGLY.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.

#### CONCRETE

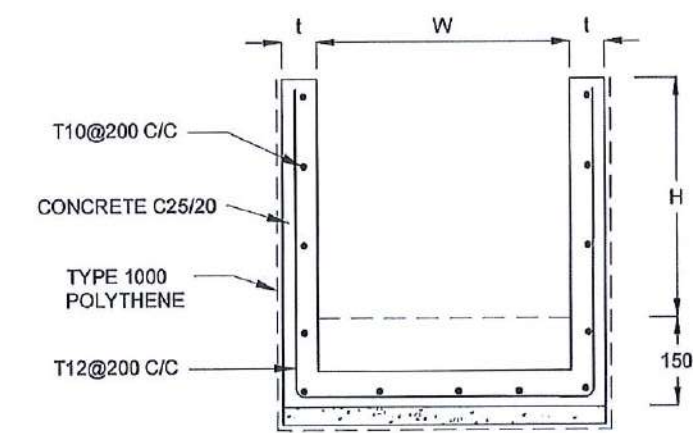
8. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE

- |                                    |            |
|------------------------------------|------------|
| [a] SCREED                         | - C. 15/20 |
| [b] WALLS / BASE / ENERGY BREAKERS | - C. 25/20 |

#### REINFORCEMENT

9. ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN  $460\text{N/mm}^2$ .
10. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF  $50 \times \text{BAR DIA.}$  AND LAPPING SHOULD BE STAGGERED.
11. ANCHORAGE LENGTH SHOULD BE  $40 \times \text{BAR DIA.}$
12. REINFORCEMENT BARS SHALL BE BENT ACCORDANCE WITH STANDARD SPECIFICATIONS.
14. COVER TO REINFORCEMENT
 

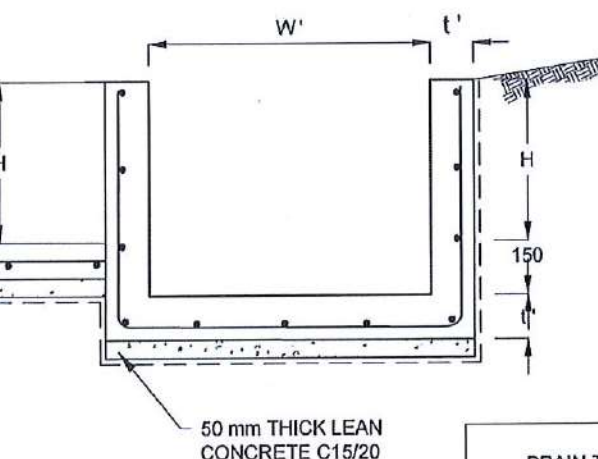
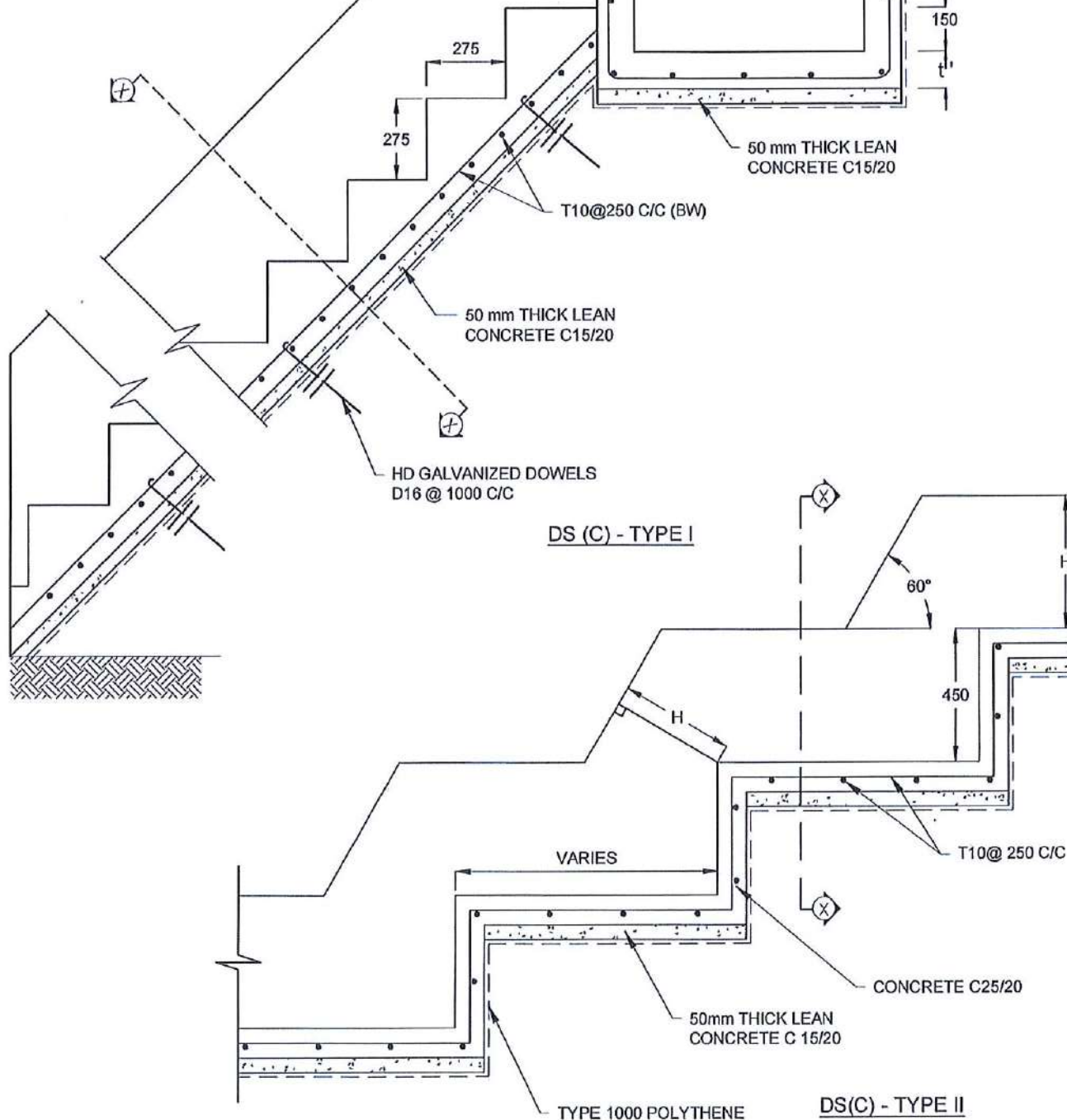
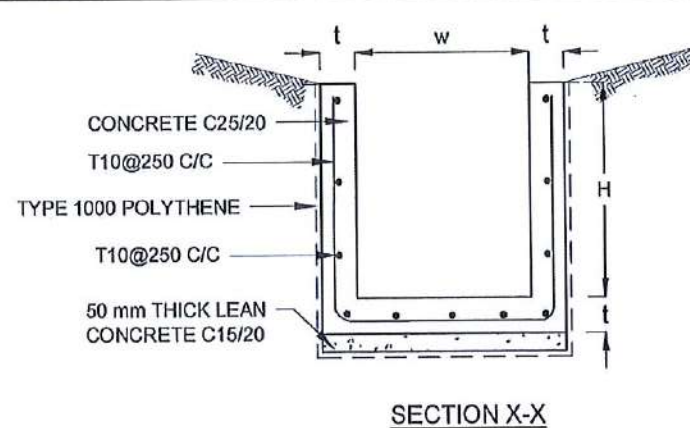
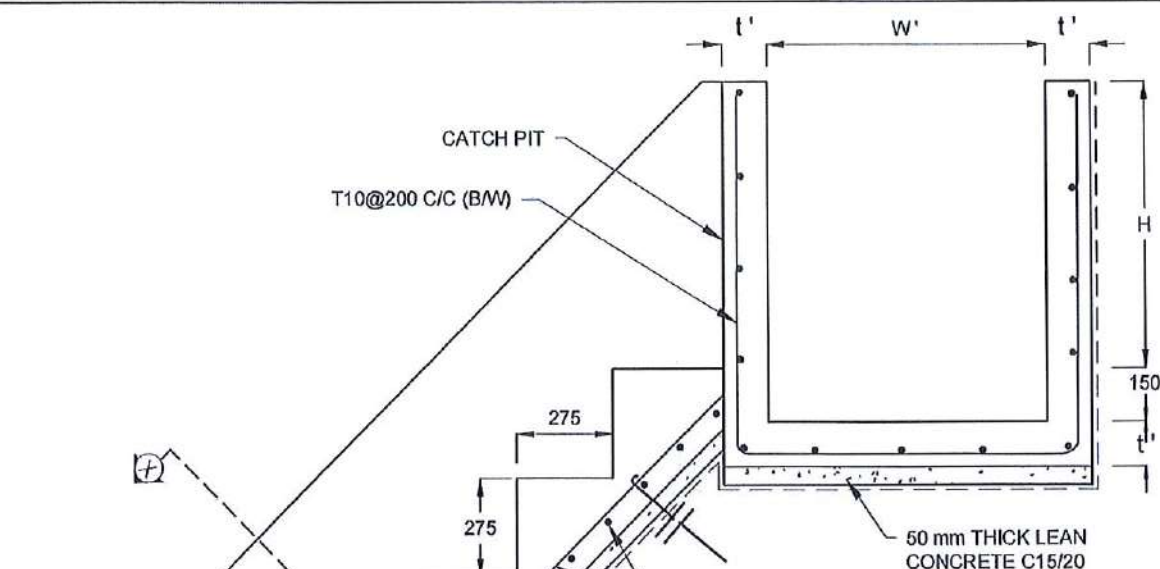
[a] BURIED FACES AND DRAIN INVERTS	- 40mm
[b] ALL OTHER FACES	- 25mm.



SECTION Y - Y

EMPLOYER		DESIGNER		REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD, COLOMBO - 05		DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD, COLOMBO - 05						REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES VEYANGODA-RUWANWELLA ROAD (B445) - LOCATION 01 (CH. 23+100 - CH 23+210 RHS)	DETAILS OF DRAINS (SUBSURFACE DRAIN AND CATCHPIT)	DRAWN	S.A.G.D. SENANAYAKA	
										DESIGNED	M. H. M. HARSHANI	
										CHECKED	J.P. SAMARANAYAKA	
										RECOMMENDED	PROF. S.A.S. KULATHILAKA	
										APPROVED	K.N. BANDARA	
SCALE N.T.S. PROJECT / DRAWING No. RLVMP/WORKS/NCB/04/25-Ru/DR - 06b										DATE	05.11.2020	
										REVISION	00	





# NOTES

- USE EITHER TYPE I OR TYPE II CASCADE DRAIN ACCORDING TO THE ACTUAL GROUND CONDITION AS INSTRUCT BY THE ENGINEER.
- LENGTH OF THE STEPS OF CASCADE WILL BE VARIED ACCORDING TO THE SITE CONDITIONS.
- DEPTH OF EXCAVATION SHALL BE VARIED ACCORDING TO SITE CONDITIONS.
- DOWELS WILL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCE IN EVERY 5m INTERVAL.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OR OTHERWISE STATED.

## CONCRETE

- USE FOLLOWING CONCRETE GRADES FOR STRUCTURE

- [a] SCREED - C. 15/20  
[b] WALLS / BASE / ENERGY BREAKERS - C. 25/20

## REINFORCEMENT

- ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm<sup>2</sup>.
- BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 50 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
- ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
- REINFORCEMENT BARS SHALL BE BENT ACCORDANCE WITH STANDARD SPECIFICATIONS.
- COVER TO REINFORCEMENT  
[a] BURIED FACES AND DRAIN INVERTS - 40mm  
[b] ALL OTHER FACES - 25mm.

DRAIN TYPE	W (mm)	H (mm)	t (mm)	W' (mm)	t' (mm)
DS (C) - A	450	450	100	600	100
DS (C) - B	450	600	100	750	100
DS (C) - C	600	600	100	800	100
DS (C) - D	750	750	100	800	100
DS (C) - E	800	800	125	1000	125
DS (C) - F	1000	750	125	1200	125

EMPLOYER  
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS  
AND DISASTER MANAGEMENT  
NATIONAL BUILDING RESEARCH ORGANIZATION  
No. 99/1, JAWATTA ROAD,  
COLOMBO - 05

DESIGNER  
DESIGN UNIT  
NATIONAL BUILDING RESEARCH ORGANIZATION  
No. 99/1, JAWATTA ROAD,  
COLOMBO - 05

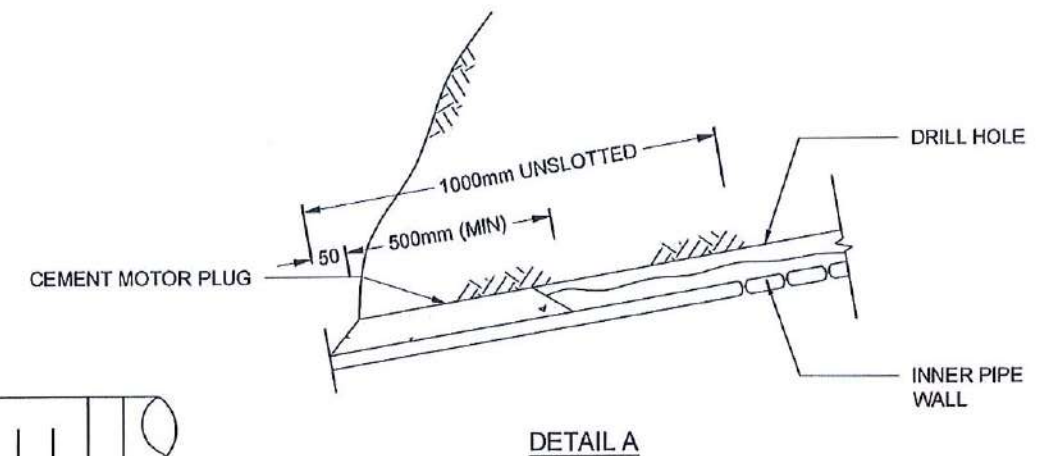
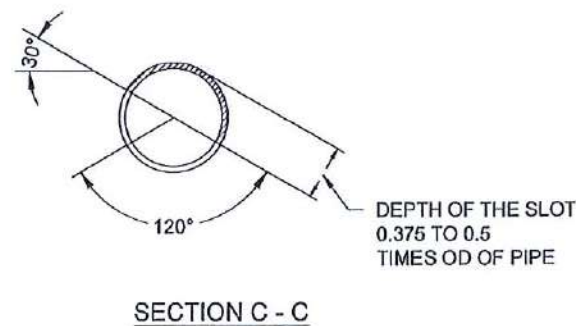
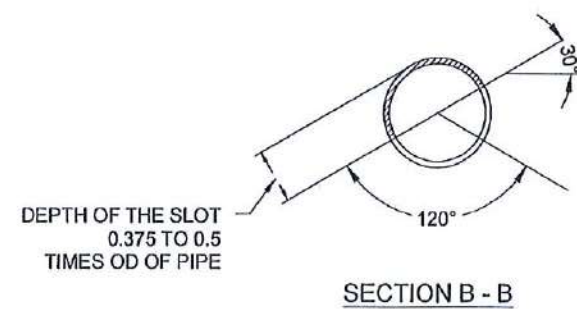
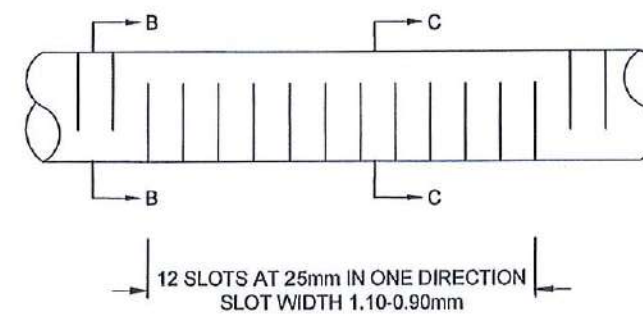
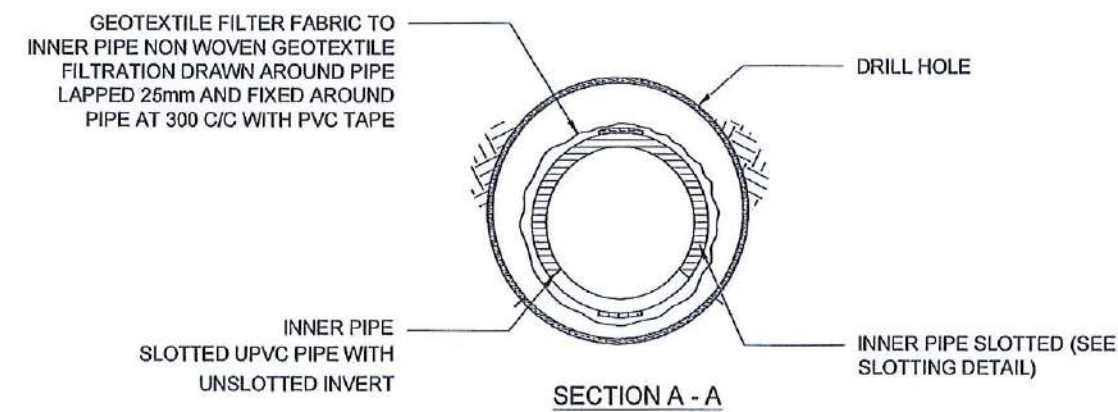
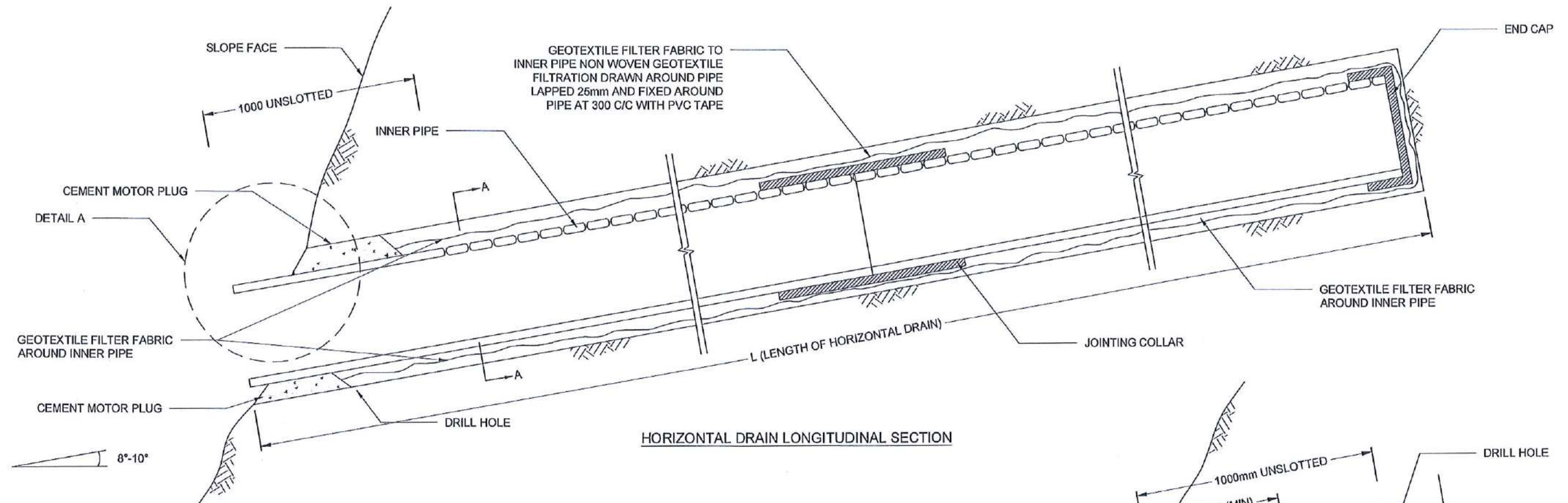
REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE  
REDUCTION OF LANDSLIDE VULNERABILITY  
BY MITIGATION MEASURES  
VEYANGODA-RUWANWELLA ROAD (B445) -  
LOCATION 01 (CH. 23+100 - CH 23+210 RHS)

TITLE  
DETAILS OF DRAINS  
(CASCADE DRAIN)  
SCALE | N.T.S. | DATE | 05.11.2020  
PROJECT / DRAWING No. | REVISION | 00  
RLVMP/WORKS/NCB/04/25-Ru/DR - 06c

DESCRIPTION	NAME	SIGNATURE
DRAWN	S.A.G.D. SENANAYAKA	
DESIGNED	M. H. M. HARSHANI	
CHECKED	J.P. SAMARANAYAKA	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	K.N. BANDARA	



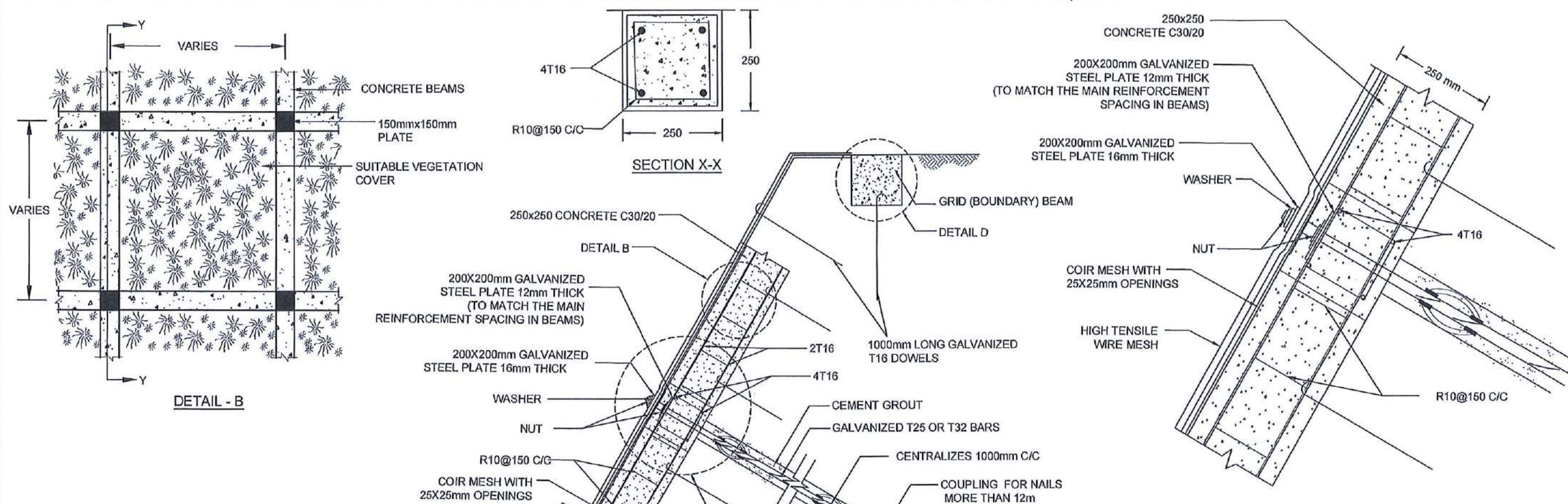


#### NOTES



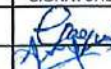




1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. PIPE DIAMETERS, ANGLE & LENGTHS AS SPECIFIED IN DRAWINGS.
3. ALL MATERIALS SHALL CONFORM TO PROJECT SPECIFICATION

<div>EMPLOYER</div> <div> DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD, COLOMBO - 05</div> <div></div>	<div>DESIGNER</div> <div> DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD, COLOMBO - 05</div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES VEYANGODA-RUWANWELLA ROAD (B445) - LOCATION 01 (CH. 23+100 - CH 23+210 RHS)</div>	<div>TITLE</div> <div>DETAILS OF HORIZONTAL DRAIN SECTIONS</div>				DESCRIPTION	NAME	SIGNATURE
								DRAWN	S.A.G.D. SENANAYAKA				
								DESIGNED	M. H. M. HARSHANI				
								CHECKED	J.P. SAMARANAYAKA				
								RECOMMENDED	PROF. S.A.S. KULATHILAKA				
								APPROVED	K.N. BANDARA				
								SCALE	N.T.S.	DATE	05.11.2020		
								PROJECT / DRAWING No. RLVMM/WORKS/NCB/04A/25-Ru/DR - 07				REVISION	00





- NOTES**
1. ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE STATED
  2. STRUCTURAL CONC. AS PER SPECIFICATION
  3. MINIMUM CLEAR COVER TO R/F - 20mm TO 30mm
  4. STRUCTURAL MEMBERS AS PER SPECIFICATION
  5. LAP LENGTH FOR R/F BARS 40 x BAR Dia.
  6. SOIL NAIL/ BOREHOLE DETAILS AS PER THE DRAWINGS
  7. TURFING/ SODDING/ SEEDING/ PLANTING USED FOR VEGETATION COVER
  8. THE BAR COUPLER SHALL ONLY BE USED FOR SOIL NAILING OF MORE THAN 12m LONG
  9. THE TENSILE STRENGTH OF THE BAR COUPLER SHALL BE CAPABLE TO DEVELOP AT LEAST 95% OF TENSILE STRENGTH OF THE REBAR AS TESTED AND CERTIFIED BY THE MANUFACTURE
  10. SPACING BETWEEN NAIL HEAD ARE VARIED ACCORDING TO THE GROUND CONDITION
  11. DOWEL SPACING FOR BOUNDARY BEAM SHALL BE 2m
  12. BOUNDARY BEAM SHALL BE STRUCTURALLY CONNECTED TO ALREADY CONSTRUCTED GRID BEAMS AT EACH JUNCTION
  13. MINIMUM OF 2 DOWELS SHALL BE TYPICALLY USED TO FIX THE HIGH TENSILE WIRE MESH AGAINST THE SLOPE AT EACH SLOPE SPACE IN BETWEEN THE GRID BEAMS, AS SHOWN IN THE DRAWING
  14. SPACING AND LOCATIONS OF DOWELS INSTALLED TO FIX THE HIGH TENSILE WIRE MESH AGAINST THE SLOPE SHALL BE VARIED ACCORDING TO THE SITE CONDITION



EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD, COLOMBO - 05	 DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD, COLOMBO - 05					REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES VEYANGODA-RUWANWELLA ROAD (B445) - LOCATION 01 (CH. 23+100 - CH 23+210 RHS)	DETAILS OF SOIL NAILING WITH GRID BEAM & HYDROSEEDING	DRAWN	S.A.G.D. SENANAYAKA	
								DESIGNED	M. H. M. HARSHANI	
								CHECKED	J.P. SAMARANAYAKA	
								RECOMMENDED	PROF. S.A.S. KULATHILAKA	
								APPROVED	K.N. BANDARA	



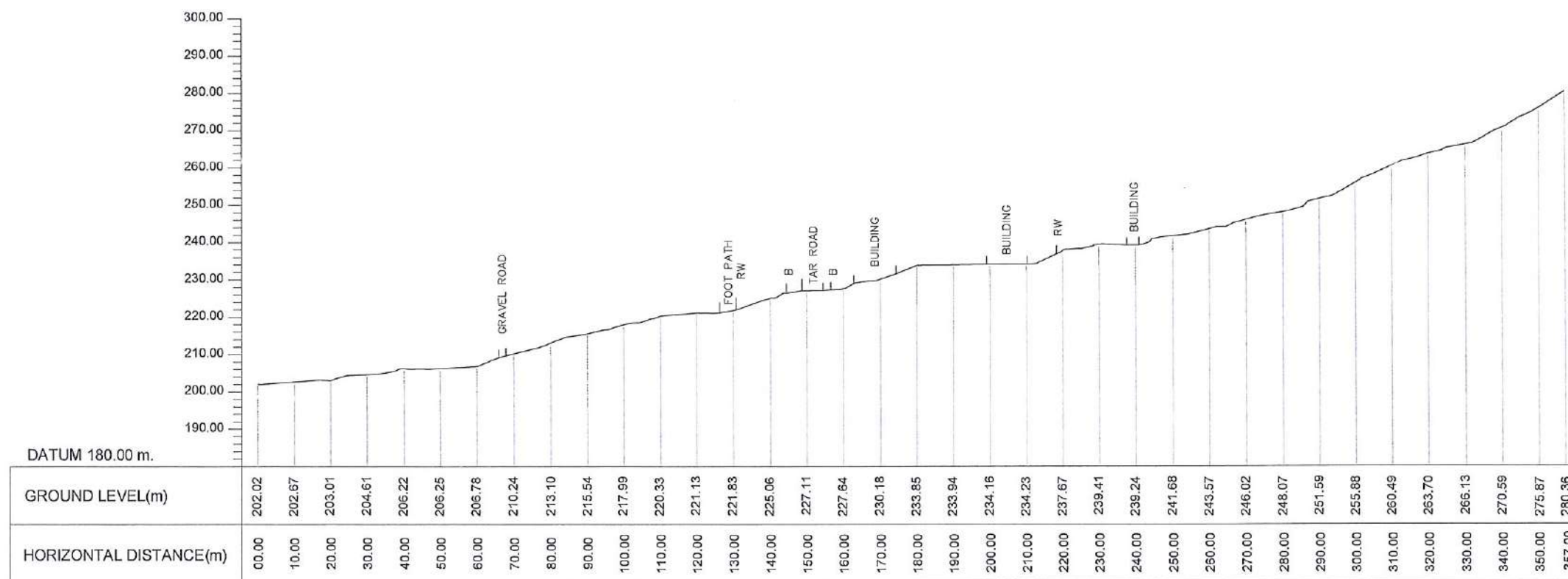


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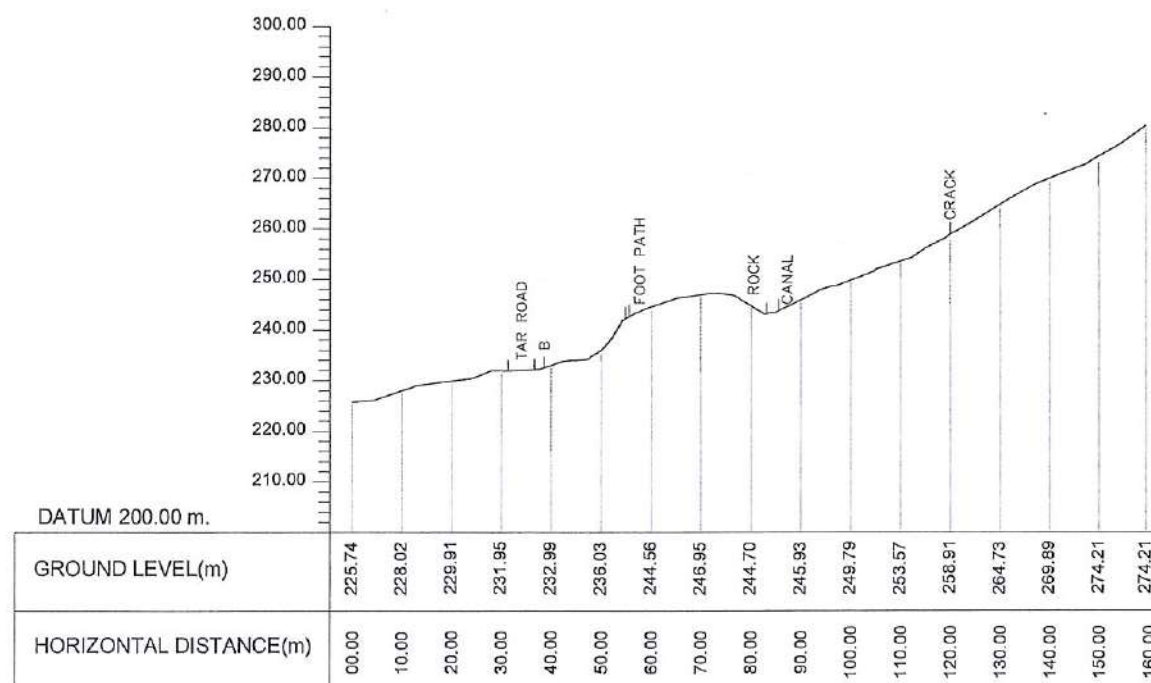
- B - BANK
- BD - BUILDING
- BW - BOUNDARY WALL
- CUL - CULVERT
- EDN - EARTH DRAIN
- GR - GRAVEL ROAD
- LF - LIVE FENCE
- MDN - MASONRY DRAIN
- RW - RETAINING WALL
- TOI - TOILET
- WF - WIRE FENCE
- TP - TELEPHONE POST
- EP - ELECTRIC POST
- BUC - BUILDING UNDER CONSTRUCTION
- SB - SIGN BOARD
- SC - STAIR CASE
- Rock - ROCK
- Can - CANAL
- FP - FOOT PATH
- TR - TRANSFORMER
- Con. R - CONCRETE ROAD

<div>EMPLOYER</div> <div> DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div>	<div>DESIGNER</div> <div> DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05</div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE  REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES BULATHKOHUPITIYA	TITLE  SURVEY CONTOUR PLAN				DESCRIPTION	NAME	SIGNATURE		
											SURVEYED	LANKA G P S (PVT) LTD			
											CHECKED	S.O.A.D.M. LAKRUWAN			
								SCALE   N.T.S.   DATE   06.11.2020							
								PROJECT / DRAWING No. RLVMP/WORKS/NCB/04A/09-BUL/DR-01				REVISION 00			







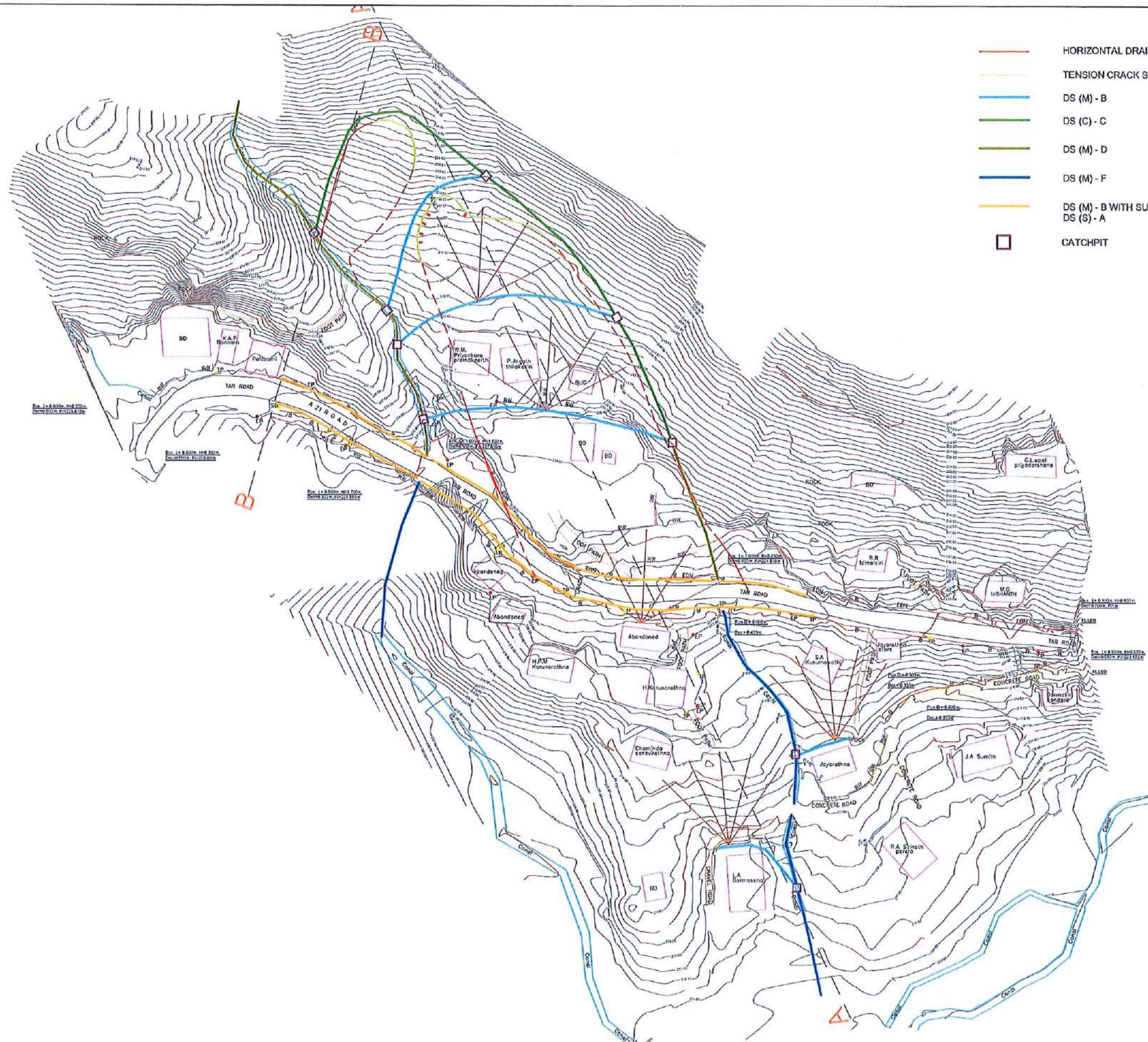
SECTION A - A



SECTION B - B




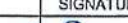




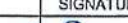




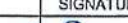




<b>EMPLOYER</b>  DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05	<b>DESIGNER</b>  DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05	REV	DATE	REVISION DESCRIPTION	APPROVAL	<b>PROJECT TITLE</b>  REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES  BULATHKOHUPITIYA	<b>TITLE</b>  SURVEY CROSS SECTIONS			DESCRIPTION	NAME	SIGNATURE		
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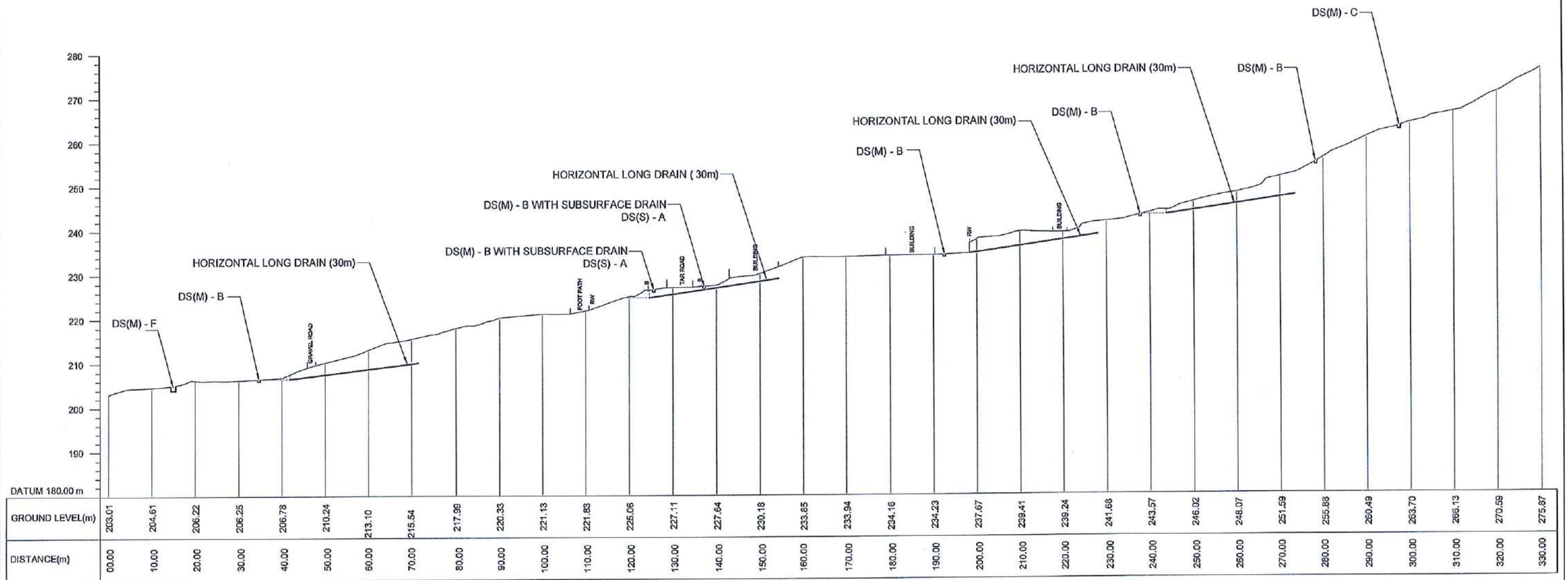


# REFERENCE

- B - BANK
- BD - BUILDING
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<div>EMPLOYER</div> <div><div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div><div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT</div><div>NATIONAL BUILDING RESEARCH ORGANISATION</div><div>No. 99/1, JAWATTA ROAD</div><div>COLOMBO - 05</div></div> <div></div>		<div>DESIGNER</div> <div><div>DESIGN UNIT</div><div>NATIONAL BUILDING RESEARCH ORGANISATION</div><div>No. 99/1, JAWATTA ROAD</div><div>COLOMBO - 05</div></div>		<table><tr><th>REV</th><th>DATE</th><th>REVISION DESCRIPTION</th><th>APPROVAL</th></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></table>				REV	DATE	REVISION DESCRIPTION	APPROVAL																									<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES BULATHKOHUPITIYA</div>		<table><tr><th colspan="4">TITLE</th></tr><tr><td colspan="4">PLAN VIEW OF PROPOSED MITIGATION MEASURES</td></tr><tr><td>SCALE</td><td>N.T.S.</td><td>DATE</td><td>12.11.2020</td></tr><tr><td colspan="2">PROJECT / DRAWING No. RLVM/MP/WORKS/NCB/01A/09-BUL/DR-03</td><td>REVISION</td><td>00</td></tr></table>				TITLE				PLAN VIEW OF PROPOSED MITIGATION MEASURES				SCALE	N.T.S.	DATE	12.11.2020	PROJECT / DRAWING No. RLVM/MP/WORKS/NCB/01A/09-BUL/DR-03		REVISION	00	<table><tr><th>DESCRIPTION</th><th>NAME</th><th>SIGNATURE</th></tr><tr><td>DRAWN</td><td>B.V.S. PATTRISHIYA</td><td></td></tr><tr><td>DESIGNER</td><td>S.O.A.D.M. LAKRUWAN</td><td></td></tr><tr><td>CHECKED</td><td>J.P. SAMARANAYAKA</td><td></td></tr><tr><td>RECOMMENDED</td><td>PROF. S.A.S. KULATHILAKA</td><td></td></tr><tr><td>APPROVED</td><td>K.N. BANDARA</td><td></td></tr></table>			DESCRIPTION	NAME	SIGNATURE	DRAWN	B.V.S. PATTRISHIYA		DESIGNER	S.O.A.D.M. LAKRUWAN		CHECKED	J.P. SAMARANAYAKA		RECOMMENDED	PROF. S.A.S. KULATHILAKA		APPROVED	K.N. BANDARA	
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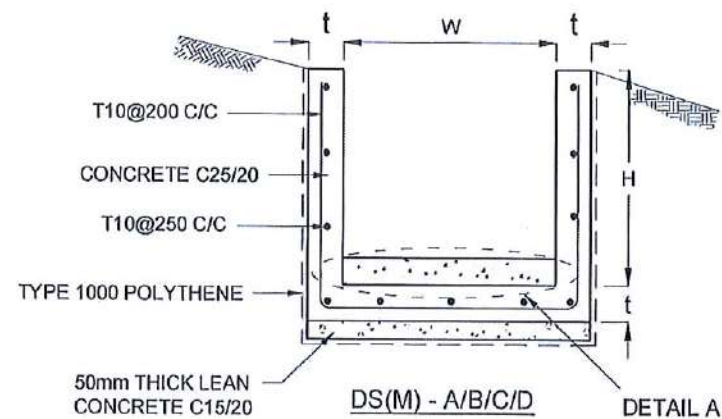
SECTION A - A

NOTE:

1. LOCATION AND LENGTH OF HORIZONTAL LONG DRAINS MIGHT BE VARIED ACCORDING TO THE ACTUAL SOIL PROFILE AND SITE CONDITION.

EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05	DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANIZATION No. 99/1, JAWATTA ROAD COLOMBO - 05					REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES BULATHIKOHUPITIYA	DESIGN CROSS SECTION OF PROPOSED MITIGATION MEASURES	DRAWN	B.V.S. PATTRISHIYA	
								DESIGNER	S.O.A.D.M. LAKRUWAN	
								CHECKED	J.P. SAMARANAYAKE	
								RECOMMENDED	PROF. S. A. S. KULATHILAKA	
								APPROVED	K.N. BANDARA	





DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (M) - A /P	300	300	100
DS (M) - B/R	450	450	100
DS (M) - C/Q	600	600	100
DS (M) - D	750	750	125
DS (M) - E	900	900	150
DS (M) - F	1000	1000	150

#### NOTES

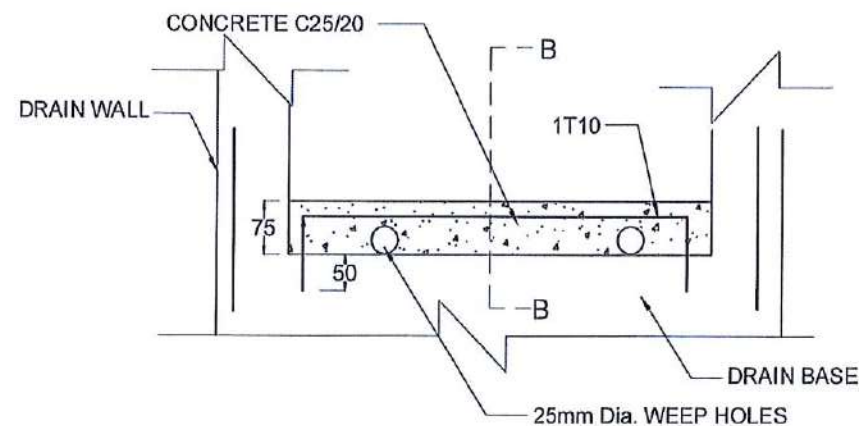
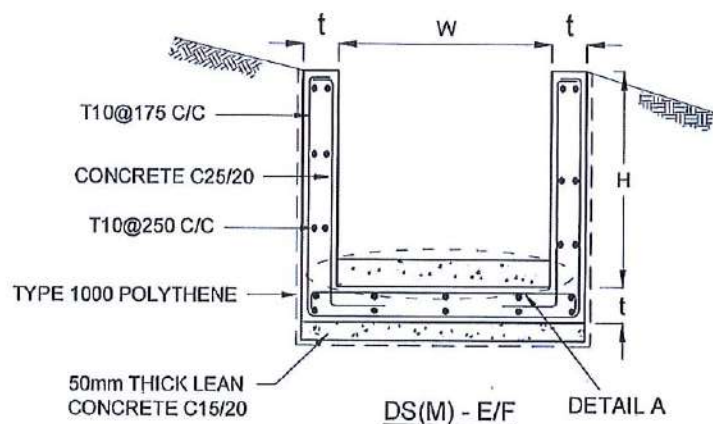
- DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
- STEPS SHALL BE CONSTRUCTED AT SURFACE DRAIN ON SLOPING GROUND ACCORDING TO THE SITE CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- ENERGY BREAKERS SHALL BE CONSTRUCTED AT THE STEEP DRAIN SEGMENTS AS PER THE INSTRUCTIONS OF THE ENGINEER.
- DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
- 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.

#### CONCRETE

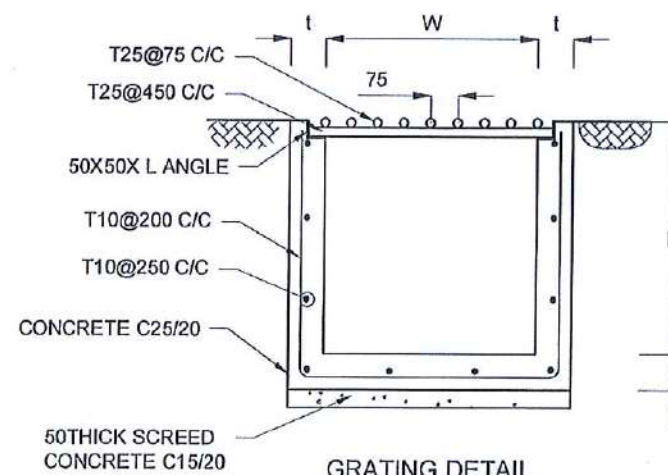
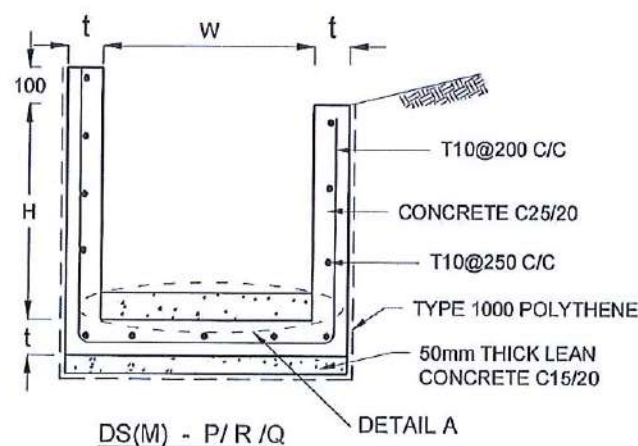
- USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
  - SCREED - C. 15/20
  - WALLS / BASE / ENERGY BREAKERS - C. 25/20

#### REINFORCEMENT

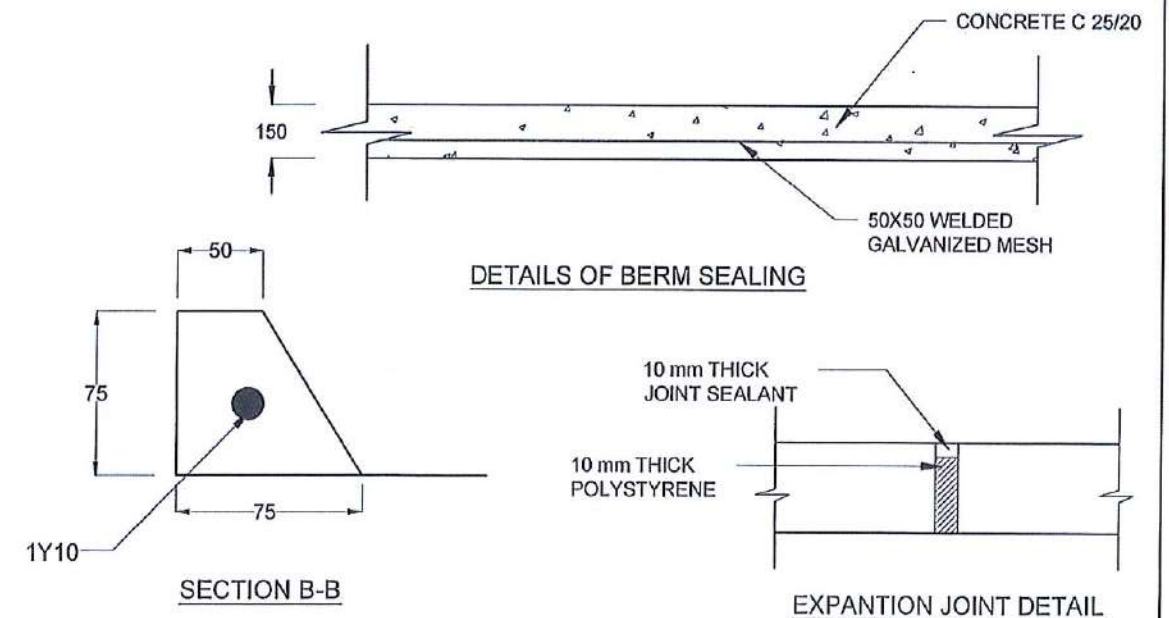
- ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm<sup>2</sup>.
- BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 50 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
- ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
- REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
- COVER TO REINFORCEMENT
  - BURIED FACES AND DRAIN INVERTS - 40 mm
  - ALL OTHER FACES - 25 mm



DETAIL A - (ENERGY BREAKER AT 3M)



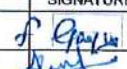






GRATING DETAIL

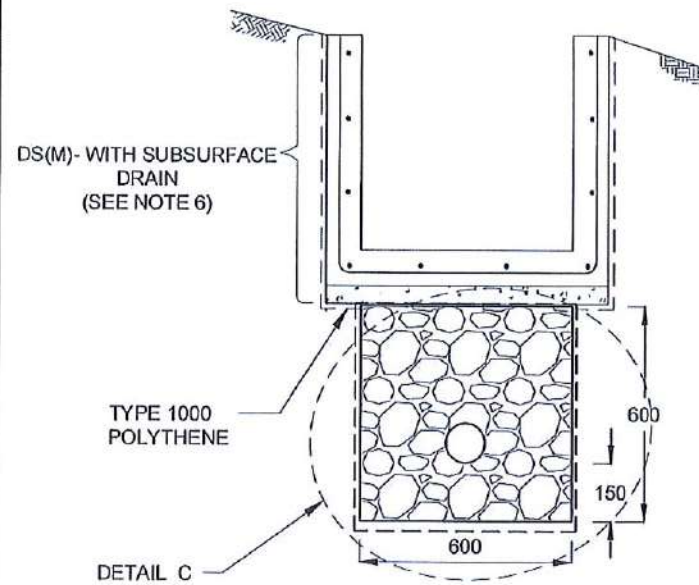


SECTION B-B

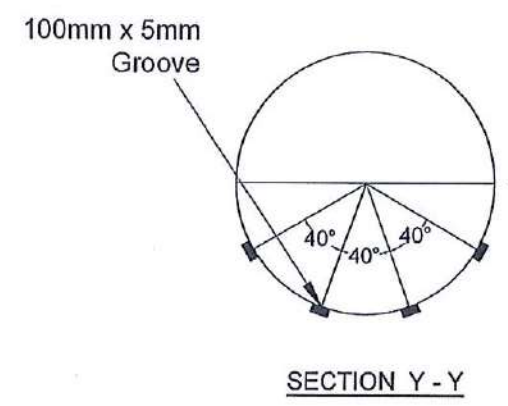
EXPANTION JOINT DETAIL

EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05	 DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05					REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES BULATHKOHUPITIYA	DETAILS OF DRAINS (SURFACE DRAIN)	DRAWN	B.V.S. PATTRISHIYA	
								DESIGNER	S.O.A.D.M. LAKRUWAN	
								CHECKED	J.P. SAMARANAYAKA	
								RECOMMENDED	PROF. S.A.S. KULATHILAKA	
								APPROVED	K.N. BANDARA	

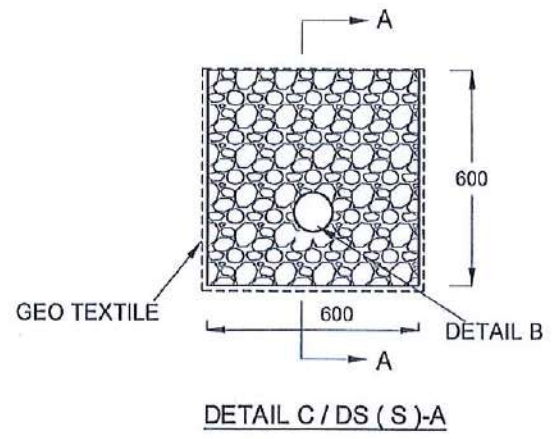




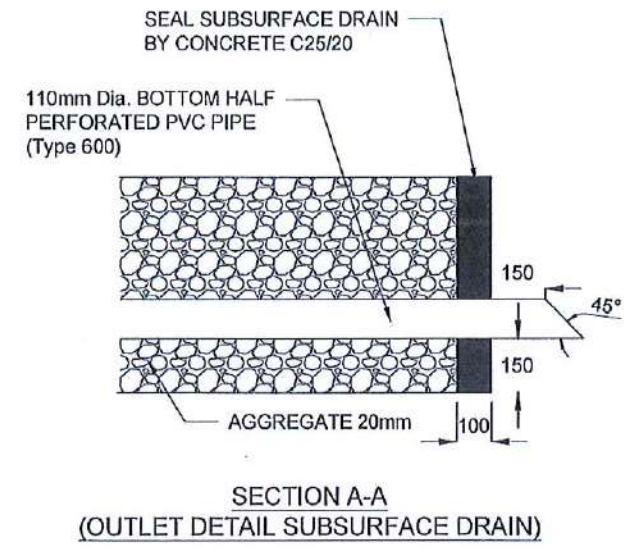
SUBSURFACE DRAIN  
[DS (S) -A]



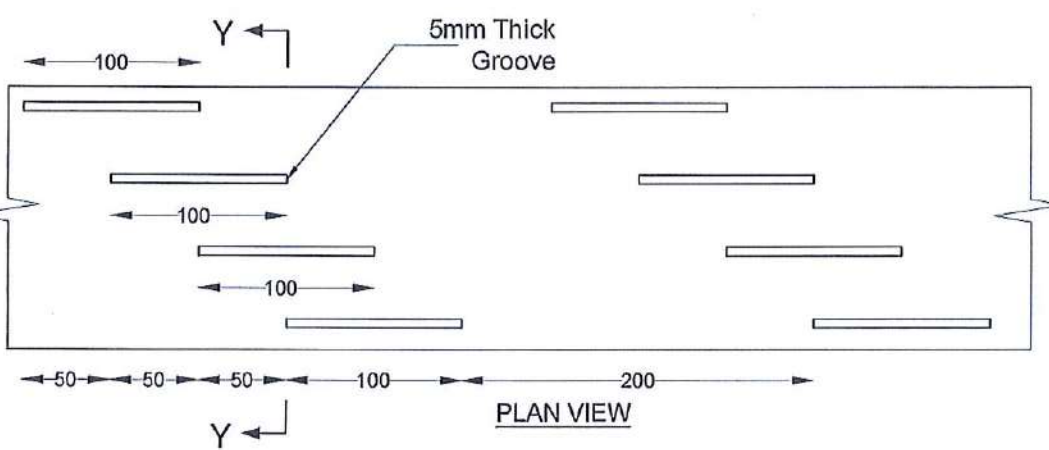
SECTION Y - Y



DETAIL C / DS (S) -A

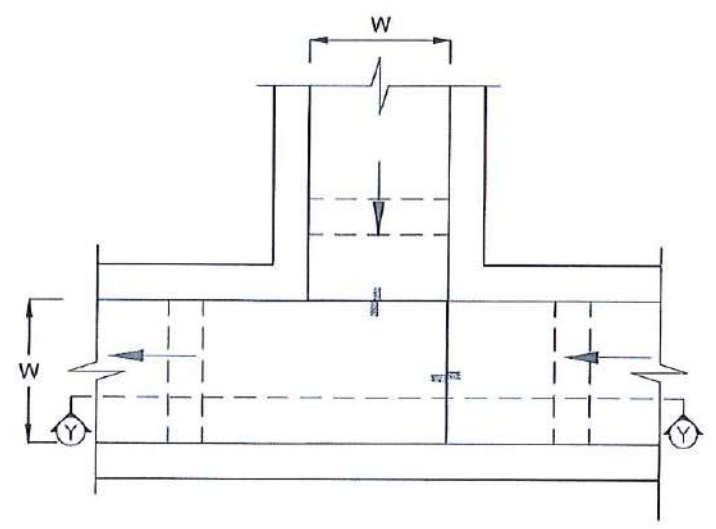


SECTION A-A  
(OUTLET DETAIL SUBSURFACE DRAIN)

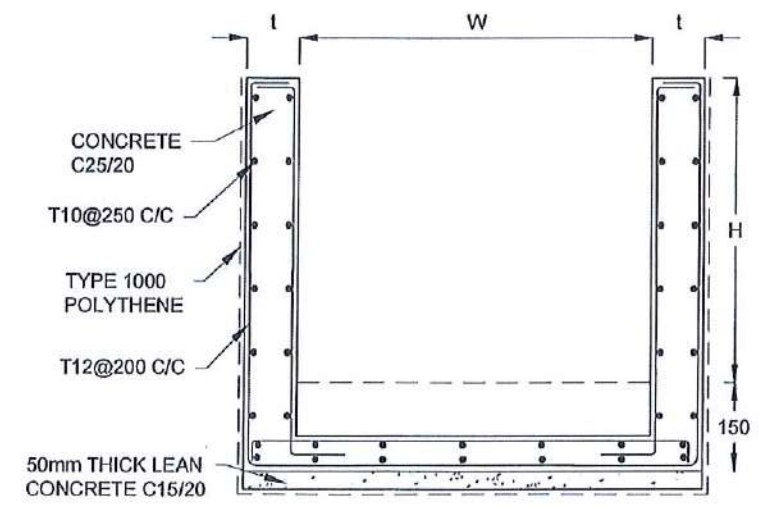


PLAN VIEW

DETAIL - B (PERFORATED PIPE FOR SUB-SURFACE DRAINS)



PLAN VIEW OF CATCH PIT (CP)



SECTION Y-Y (CP - R)

### NOTES

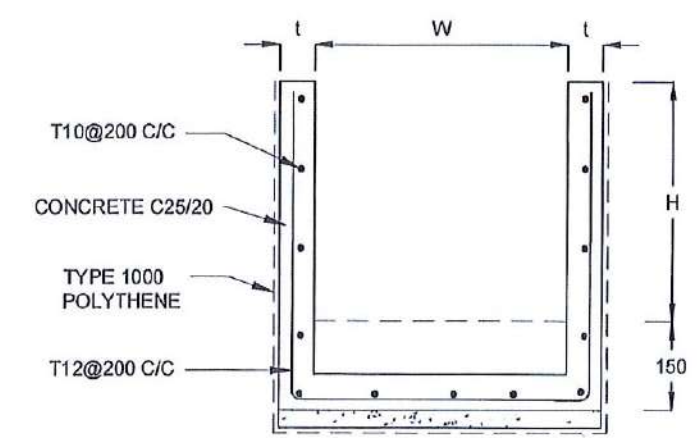
1. W,H,t; SHALL BE THE SAME AS RESPECTIVE DRAIN SECTION.
2. CP - R SHALL BE USED WHERE  $H \geq 900\text{mm}$
3. DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
4. DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
5. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.
6. DETAILS OF SURFACE DRAIN PORTION OF THE SUBSURFACE DRAINS SHALL BE AS PER DS(M), DS(B), DS(K) OR DS(C) SECTIONS ACCORDINGLY.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.

### CONCRETE



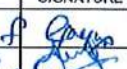




8. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
  - [a] SCREED - C. 15/20
  - [b] WALLS / BASE / ENERGY BREAKERS - C. 25/20

### REINFORCEMENT

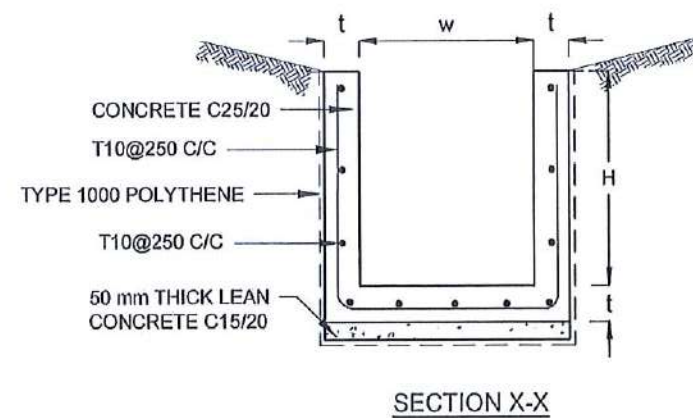
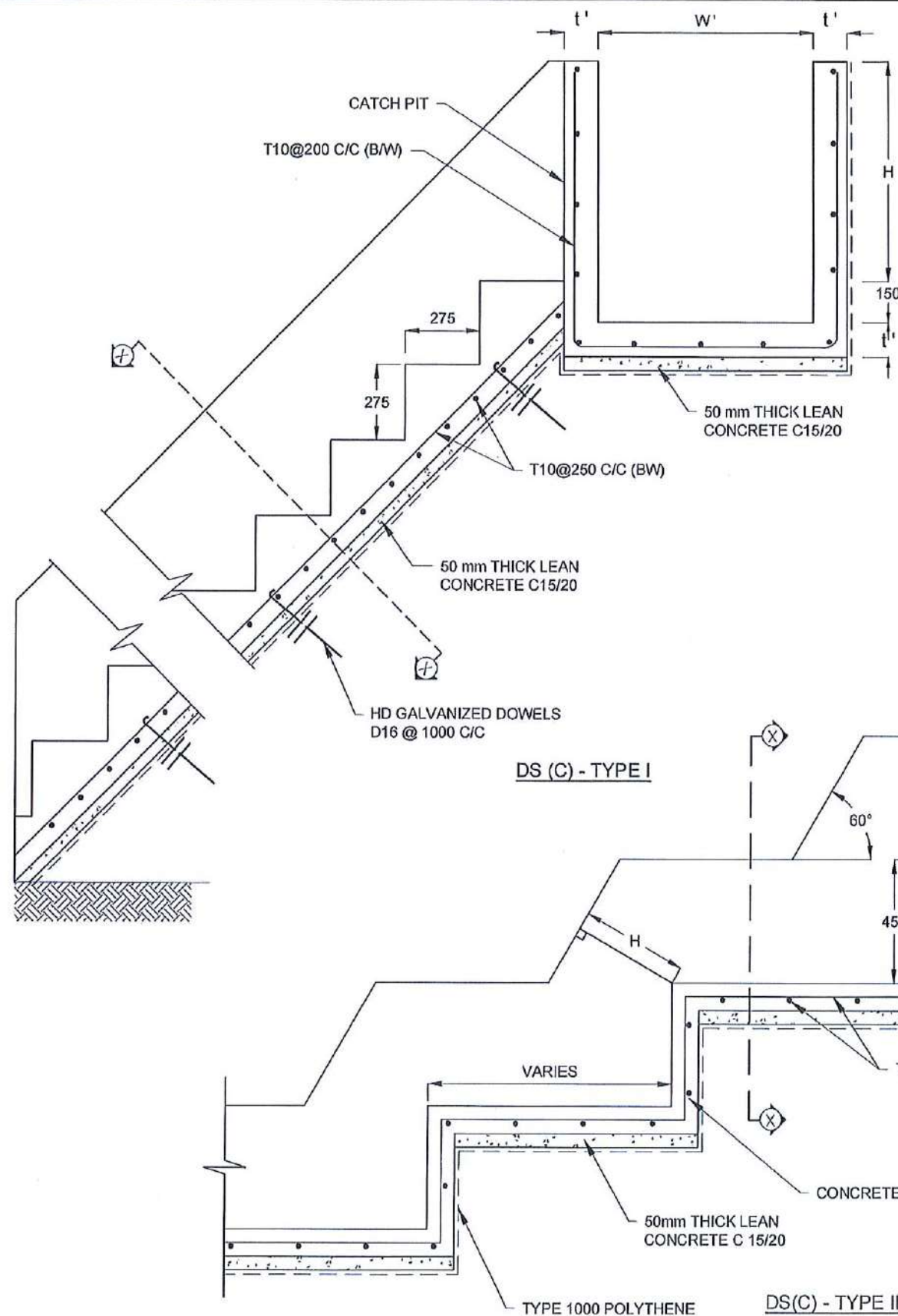
9. ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN  $460\text{N/mm}^2$ .
10. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF  $50 \times \text{BAR DIA.}$  AND LAPPING SHOULD BE STAGGERED.
11. ANCHORAGE LENGTH SHOULD BE  $40 \times \text{BAR DIA.}$
12. REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
13. COVER TO REINFORCEMENT
  - [a] BURIED FACES AND DRAIN INVERTS - 40 mm
  - [b] ALL OTHER FACES - 25 mm



SECTION Y - Y

EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE	DESCRIPTION	NAME	SIGNATURE
 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05	 DESIGN UNIT NATIONAL BUILDING RESEARCH ORGANISATION No. 99/1, JAWATTA ROAD COLOMBO - 05					REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES BULATHKOHUPITIYA	DETAILS OF DRAINS (SUBSURFACE DRAIN AND CATCHPIT)	DRAWN	B.V.S. PATTRISHIYA	
								DESIGNER	S.O.A.D.M. LAKRUWAN	
								CHECKED	J.P. SAMARANAYAKA	
								RECOMMENDED	PROF. S.A.S. KULATHILAKA	
								APPROVED	I.C.N. BANDARA	
							SCALE	N.T.S.	DATE	12.11.2020
							PROJECT / DRAWING No.	RLVMP/WORKS/NCB/04/A09-BUL/DR-051	REVISION	00





#### NOTES

1. USE EITHER TYPE I OR TYPE II CASCADE DRAIN ACCORDING TO THE ACTUAL GROUND CONDITION AS INSTRUCTED BY THE ENGINEER.
2. LENGTH OF THE STEPS OF CASCADE WILL BE VARIED ACCORDING TO THE SITE CONDITIONS.
3. DEPTH OF EXCAVATION SHALL BE VARIED ACCORDING TO SITE CONDITIONS.
4. DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
5. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.

#### CONCRETE

7. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
 

[a]	SCREED	- C. 15/20
[b]	WALLS / BASE / ENERGY BREAKERS	- C. 25/20

#### REINFORCEMENT

8. ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm<sup>2</sup>.
9. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 50 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
10. ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
11. REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
12. COVER TO REINFORCEMENT
 

[a]	BURIED FACES AND DRAIN INVERTS	- 40 mm
[b]	ALL OTHER FACES	- 25 mm

DRAIN TYPE	W (mm)	H (mm)	t (mm)	W' (mm)	t' (mm)
DS (C) - A	450	450	100	600	100
DS (C) - B	450	600	100	750	100
DS (C) - C	600	600	100	800	100
DS (C) - D	750	750	100	800	100
DS (C) - E	800	800	125	1000	125
DS (C) - F	1000	750	125	1200	125

EMPLOYER  
 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
 STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS  
 AND DISASTER MANAGEMENT  
 NATIONAL BUILDING RESEARCH ORGANISATION  
 No. 99/1, JAWATTA ROAD  
 COLOMBO - 05

DESIGNER  
 DESIGN UNIT  
 NATIONAL BUILDING RESEARCH ORGANISATION  
 No. 99/1, JAWATTA ROAD  
 COLOMBO - 05

REV	DATE	REVISION DESCRIPTION	APPROVAL

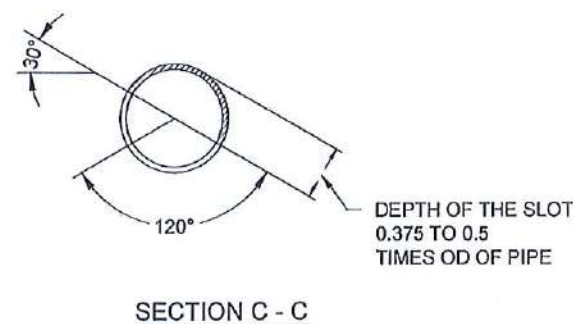
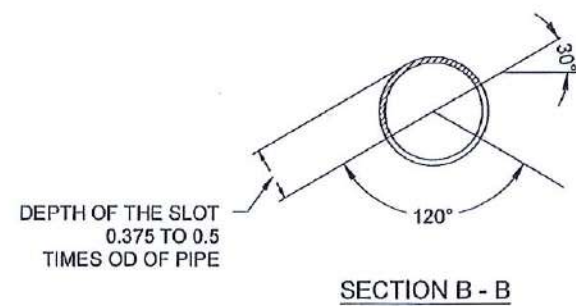
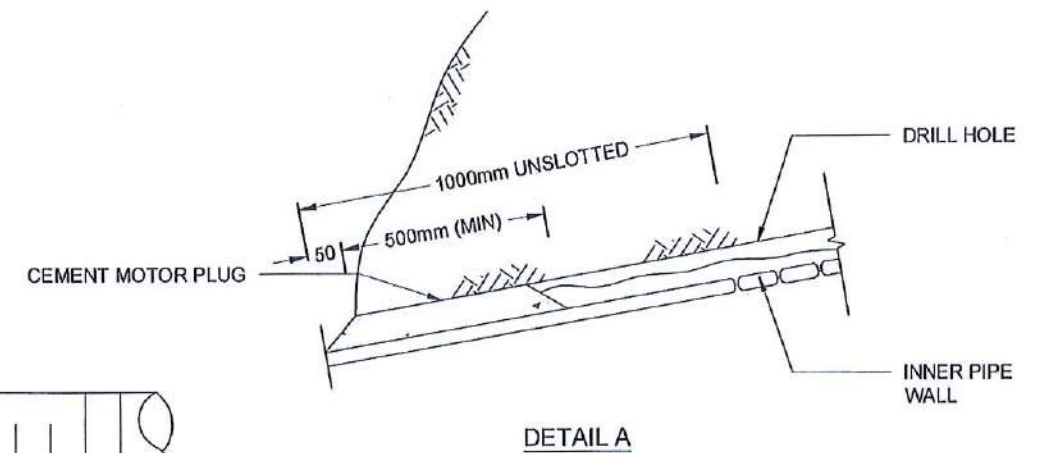
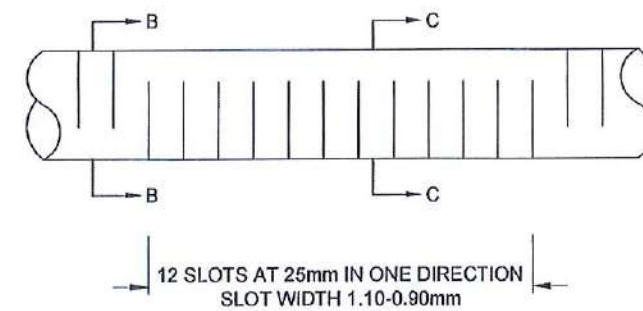
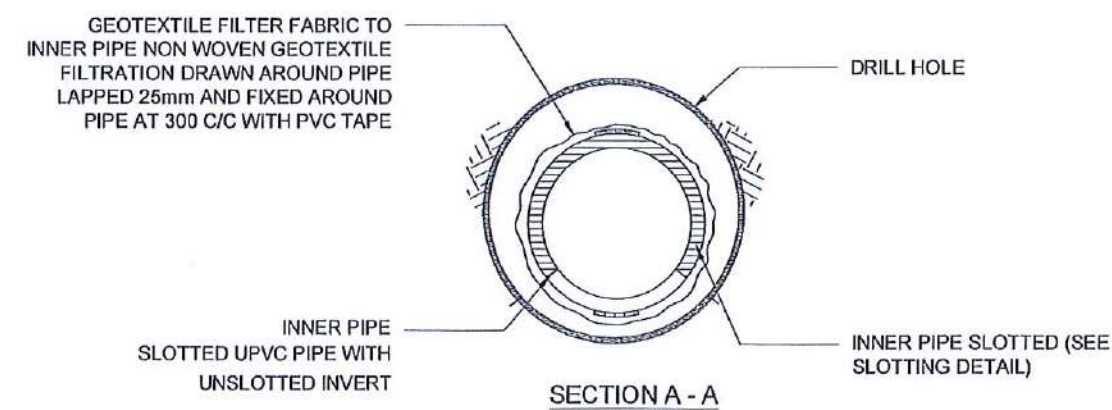
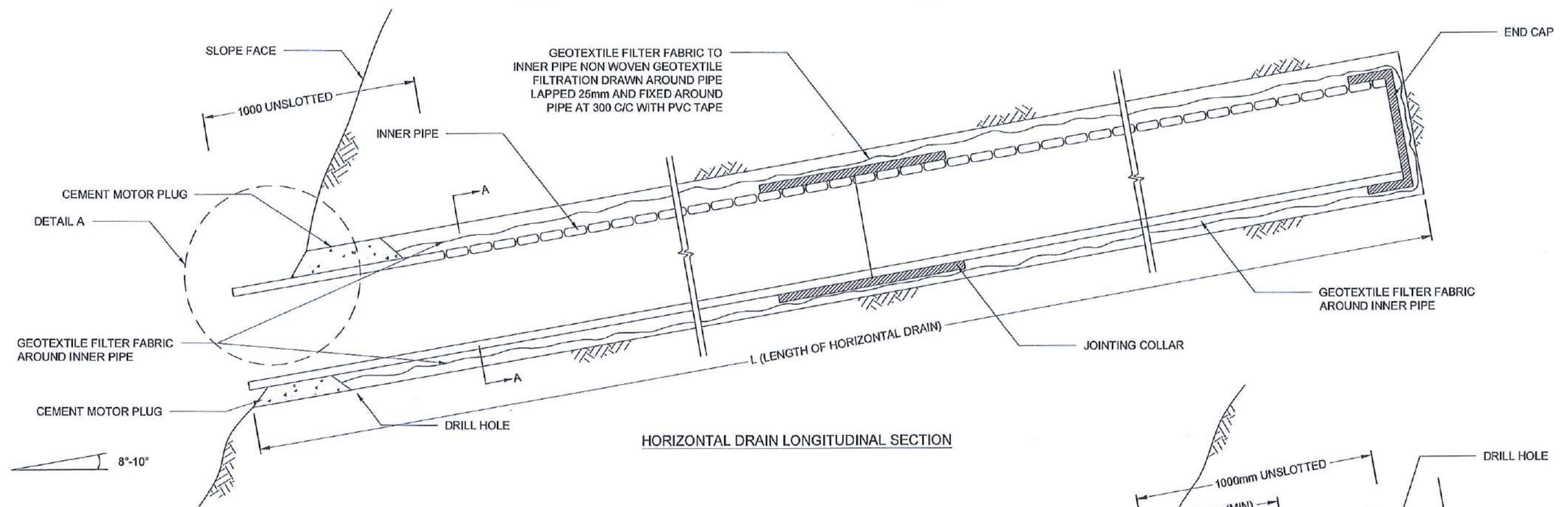
PROJECT TITLE  
 REDUCTION OF LANDSLIDE  
 VULNERABILITY BY MITIGATION MEASURES  
 BULATHKOHUPITIYA

TITLE  
 DETAILS OF DRAINS  
 (CASCADE DRAIN)

SCALE N.T.S. DATE 12.11.2020  
 PROJECT / DRAWING No. RLVMP/WORKS/NCB/04/A/09-BUL/DR-050 REVISION 00








DESCRIPTION	NAME	SIGNATURE
DRAWN	B.V.S. PATRISHIYA	<i>[Signature]</i>
DESIGNER	S.O.A.D.M. LAKRUWAN	<i>[Signature]</i>
CHECKED	J.P. SAMARANAYAKA	<i>[Signature]</i>
RECOMMENDED	PROF. S.A.S. KULATHILAKA	<i>[Signature]</i>
APPROVED	K.N. BANDARA	<i>[Signature]</i>





#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. PIPE DIAMETERS, ANGLE & LENGTHS AS SPECIFIED IN DRAWINGS.
3. ALL MATERIALS SHALL CONFORM TO PROJECT SPECIFICATION

<div>EMPLOYER</div> <div></div> <div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</div> <div>STATE MINISTRY OF INTERNAL SECURITY, HOME AFFAIRS AND DISASTER MANAGEMENT</div> <div>NATIONAL BUILDING RESEARCH ORGANISATION</div> <div>No. 99/1, JAWATTA ROAD</div> <div>COLOMBO - 05</div>	<div>DESIGNER</div> <div></div> <div>DESIGN UNIT</div> <div>NATIONAL BUILDING RESEARCH ORGANISATION</div> <div>No. 99/1, JAWATTA ROAD</div> <div>COLOMBO - 05</div>	REV	DATE	REVISION DESCRIPTION	APPROVAL	<div>PROJECT TITLE</div> <div>REDUCTION OF LANDSLIDE</div> <div>VULNERABILITY BY MITIGATION MEASURES</div> <div>BULATHKOHUPITIYA</div>	<div>TITLE</div> <div>DETAILS OF HORIZONTAL DRAIN SECTIONS</div>				DESCRIPTION	NAME	SIGNATURE
											DRAWN	B.V.S. PATTRISHIYA	
											DESIGNER	S.O.A.D.M. LAKRUWAN	
											CHECKED	J.P. SAMARANAYAKA	
							RECOMMENDED	PROF. S.A.S. KULATHILAKA					
							APPROVED	K.N. BANDARA					
										SCALE	N.T.S.	DATE	12.11.2020
							PROJECT / DRAWING No.		REVISION				
							RLVMMP/WORKS/NCB/04A/09-BUL/DR-06		00				