Democratic Socialist Republic of Sri Lanka

Ministry of Defence

National Building Research Institute (NBRI)

Reduction of Landslide Vulnerability by Mitigation Measures Project (RLVMMP)

funded by Asian Infrastructure Investment Bank (AIIB)

(Loan No: L0124A)

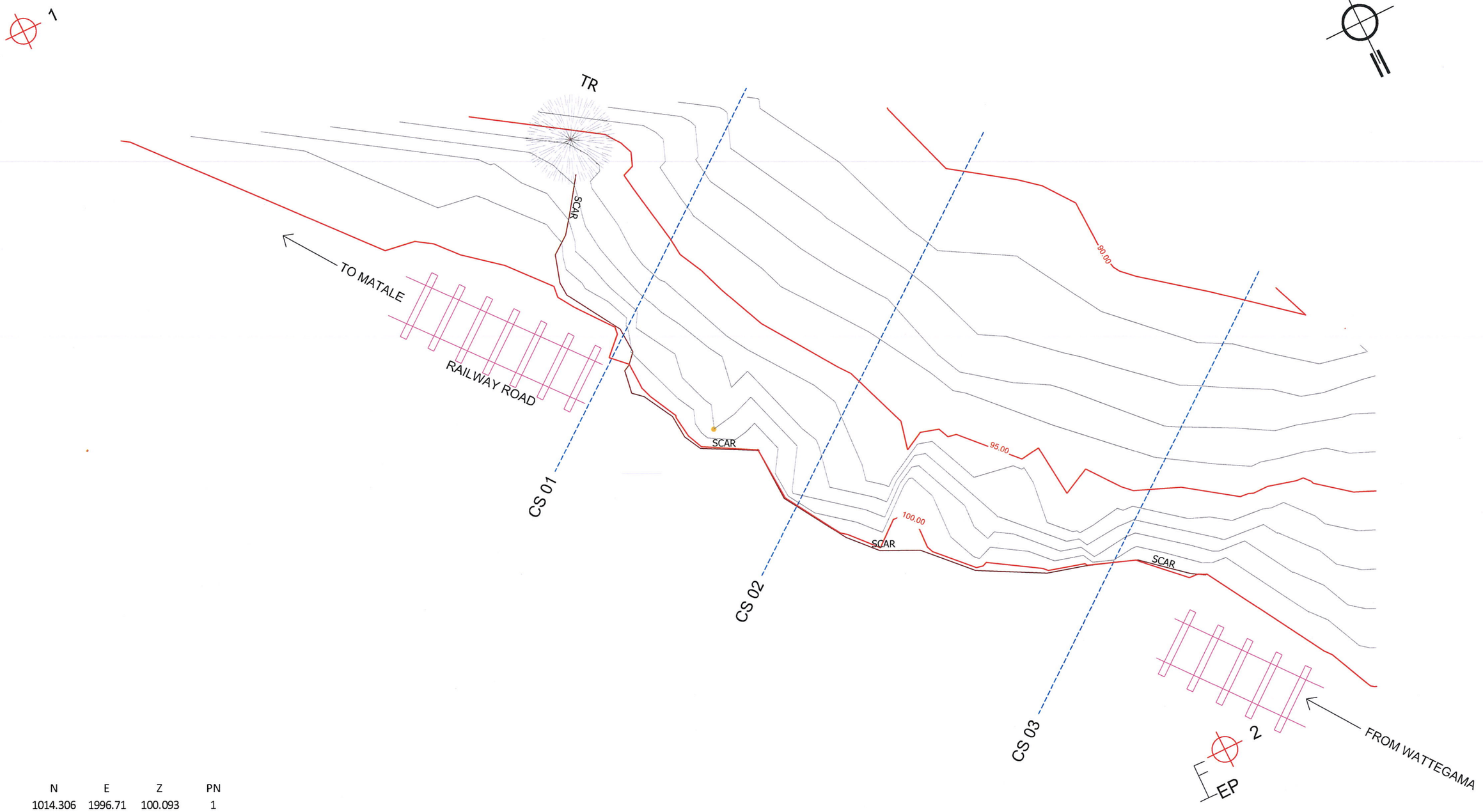
DRAWINGS

Mitigation Design for Failure Locations along Main Line Due to 'Ditwah' Cyclone Line (From Wattegama to Ukuwela) at 04 Locations in Matale District (Site No. 250, 251, 252, 253) Under Package 10V of Reduction of Landslide Vulnerability by Mitigation Measures Project (RLVMMP)

Contract No: RLVMMP/WORKS/10V

October 2026

SITE NO 250



N	E	Z	PN
1014.306	1996.71	100.093	1
968.731	2026.407	100.511	2

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 11M-76CH

TITLE

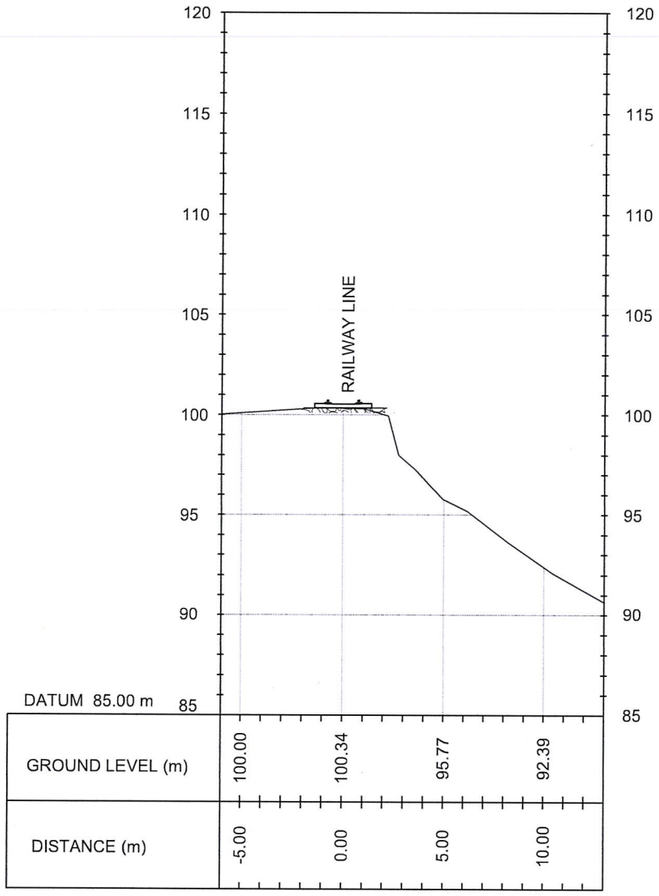
SURVEY PLAN

SCALE N.T.S. DATE 15.06.2026

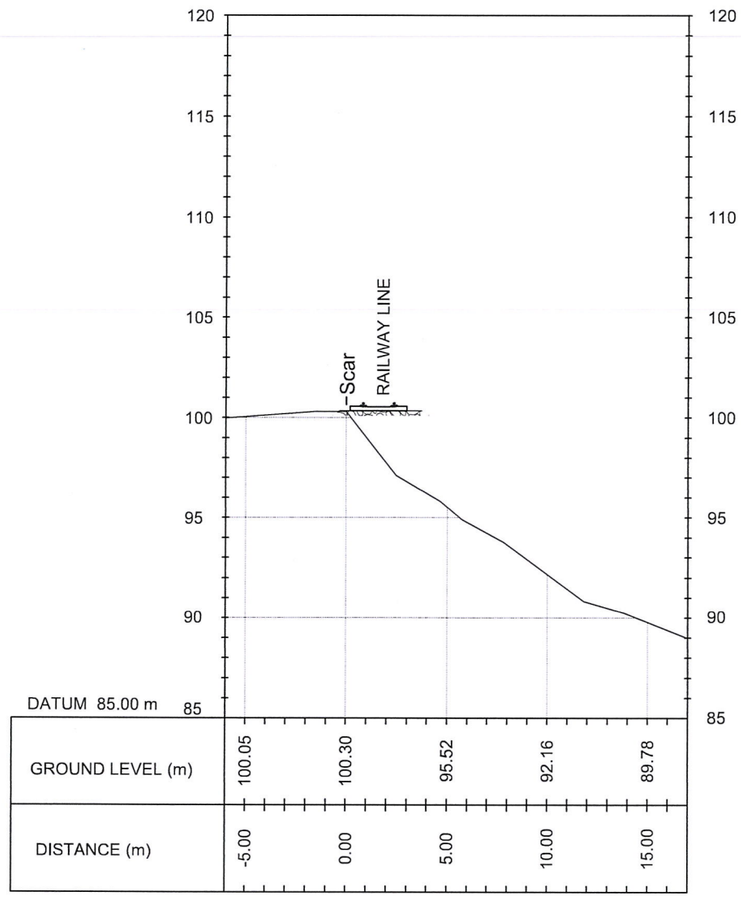
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/11M-76CH/DR 01

REVISION 00

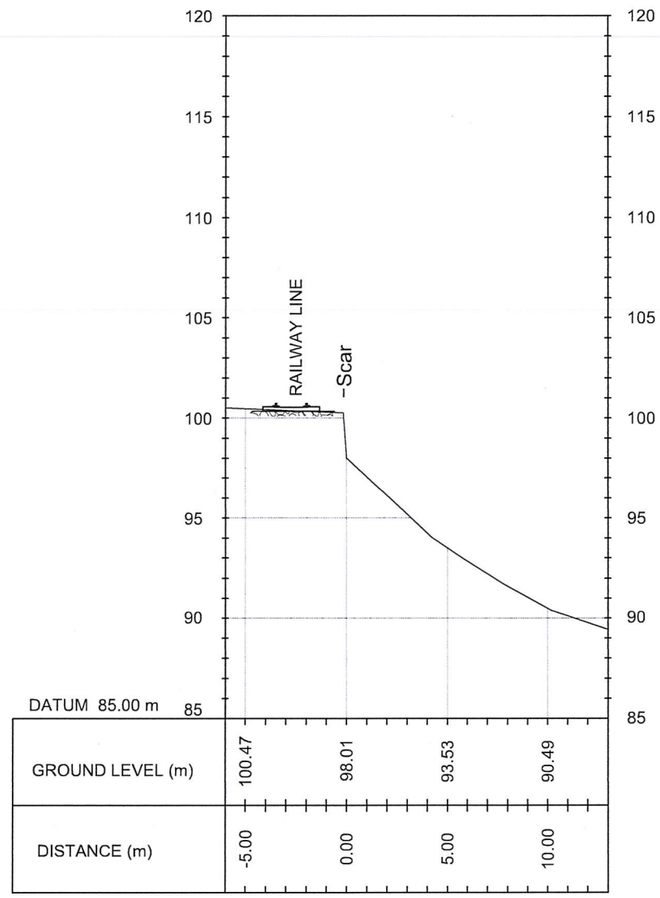
DESCRIPTION	NAME	SIGNATURE
SURVEYOR	HSPTD-NBRI	
CHECKED	ENG. G.G.R.KALHARA	



CS - 01



CS - 02



CS - 03

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 11M-76CH

CROSS SECTIONAL VIEWS

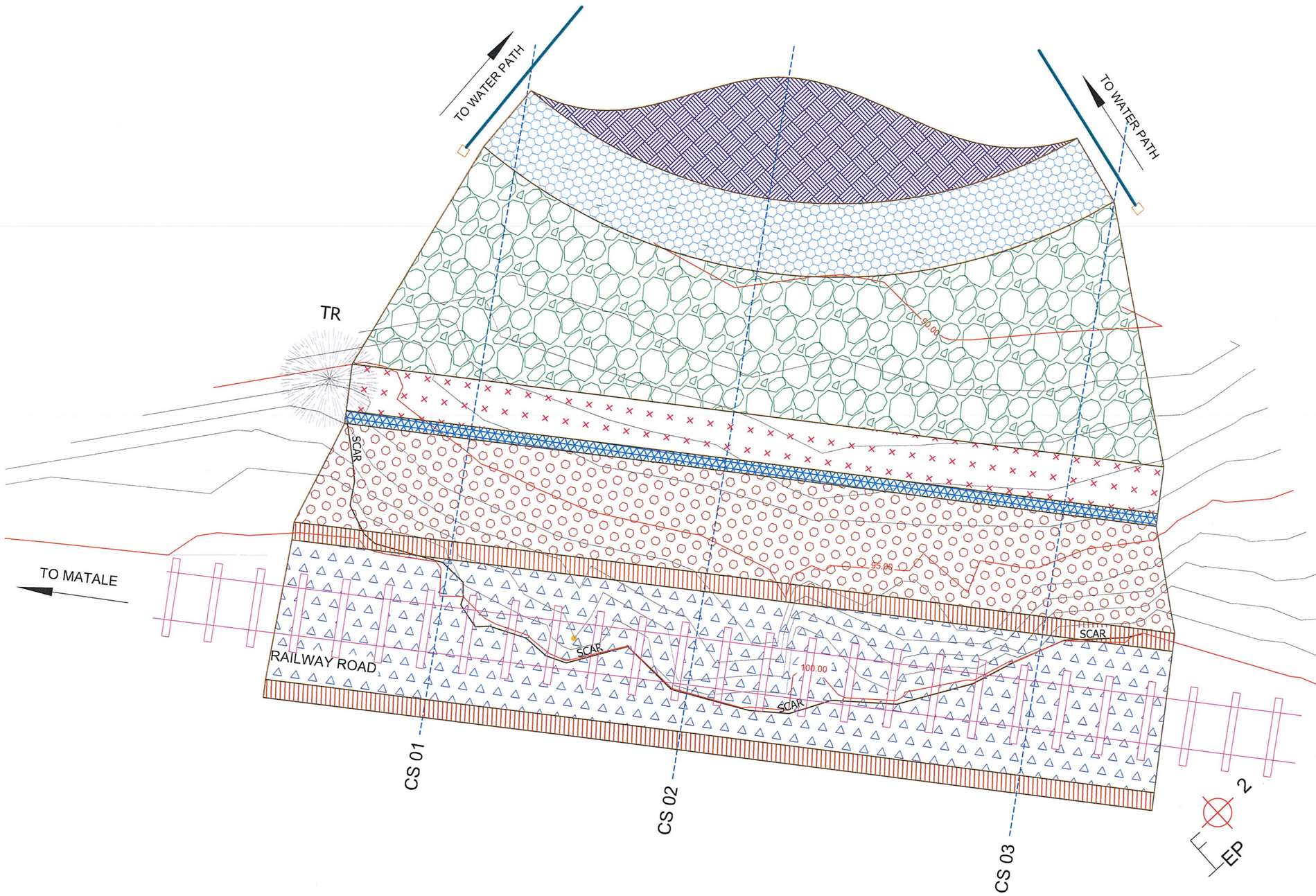
SCALE N.T.S. DATE 15.06.2026

PROJECT / DRAWING No. NBRI/GED/2026/30/28584/11M-76CH/DR 02

REVISION 00

DESCRIPTION	NAME	SIGNATURE
SURVEYOR	HSPTD-NBRI	
CHECKED	ENG. G.G.R.KALHARA.	

SITE NO 250





DESIGN NOTATION

- DS(M) - A DRAIN
- HORIZONTAL LONG DRAIN
- BALLAST
- ABC FILL
- RUBBLE PITCHING (500mm THICK)
- 500mm THICK AGGREGATE FILL (20 - 40mm)
- GABION FACING
- ROCK FILL
- GABION WALL (3m Height)
- SOIL FILL
- CATCH PIT

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 11M-76CH

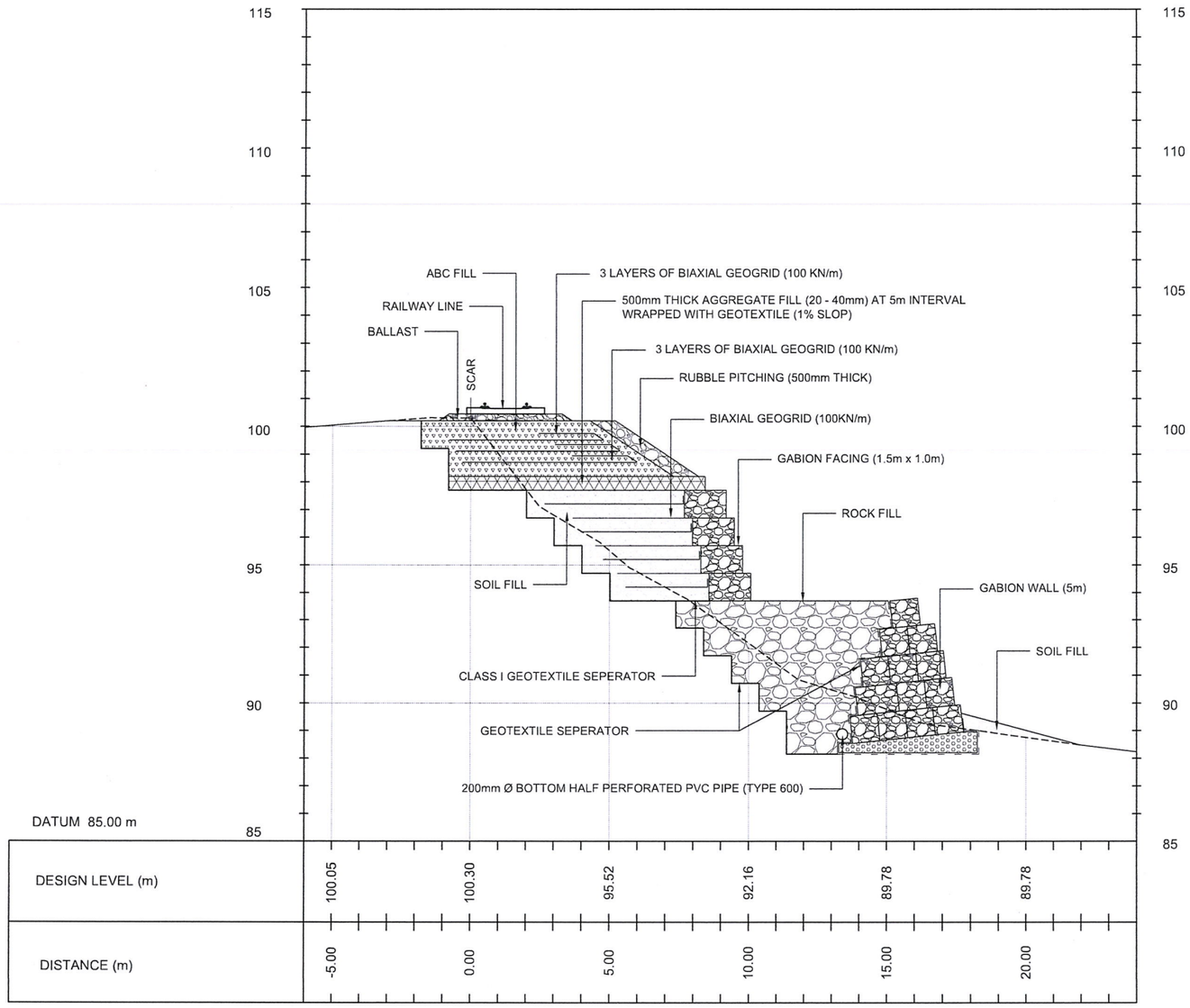
TITLE

DESIGN PLAN

SCALE N.T.S. | DATE 15.06.2026

PROJECT / DRAWING No. NBRI/GED/2026/30/28584/11M-76CH/DR 03 | REVISION 00

DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. G.G.R.KALHARA.	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



CS - 02

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. BEARING CAPACITY OF GABION WALL BASE SHALL BE CHECKED AND VERIFIED. IF IT IS NOT WITHIN THE ACCEPTABLE RANGE, GROUND IMPROVEMENT SHALL BE CARRIED OUT AS INSTRUCTED BY THE ENGINEER.
5. DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
6. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.

CONCRETE

8. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
   [a] SCREED - C15(20)
   [b] WALLS / BASE / ENERGY BREAKERS - C25(20)

REINFORCEMENT

9. ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm².
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

ROCK FILL EMBANKMENT

14. THE ROCK SHALL BE DUMPED AND SPREAD IN TO POSITION IN APPROXIMATELY HORIZONTAL LAYERS NOT EXCEEDING IN THICKNESS THE APPROXIMATE AVERAGE SIZE OF THE LAGER ROCKS (500MM).
15. THE PLACING OF INDIVIDUAL ROCKS AND BOULDERS GREATER THAN 500 MM IN DIAMETER WILL BE PERMITTED PROVIDE THAT WHEN PLACED, THEY DO NOT EXCEED 1M IN HEIGHT AND PROVIDE THEY ARE CAREFULLY DISTRIBUTED, WITH THE INTERSTICES FILLED WITH FINER MATERIAL TO FROM A DENSE AND COMPACTED MASS.
16. ROCK SHALL BE PLACED IN A MANNER TO PRODUCE A REASONABLY HOMOGENEOUS STABLE FILL THAT CONTAINS NO SEGREGATED POCKETS OF LARGE OR SMALL FRAGMENTS OR LARGE UNFILLED SPACES CAUSED BY BRIDGING OF THE LARGER ROCK FRAGMENTS
17. THE MATERIAL SHALL BE COMPRISED OF WELL-GRADED LARGER PARTICLES, INTERMEDIATE, AND SMALLER PARTICLES CONTAINING ONLY A SMALL NUMBER OF FINE PARTICLES WHICH WHEN PLACED AND COMPACTED.
18. DISTRIBUTE SPALLS AND FINER ROCK FRAGMENTS TO LEVEL AND SMOOTH EACH LIFT.
19. COMPACT EACH LAYER OF THE EMBANKMENT UNTIL THE COMPACTION EQUIPMENT (PREFERABLY STEEL DRUM ROLLER WITH VIBRATION) ACHIEVES NO FURTHER SIGNIFICANT MOVEMENT OR CONSOLIDATION.

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

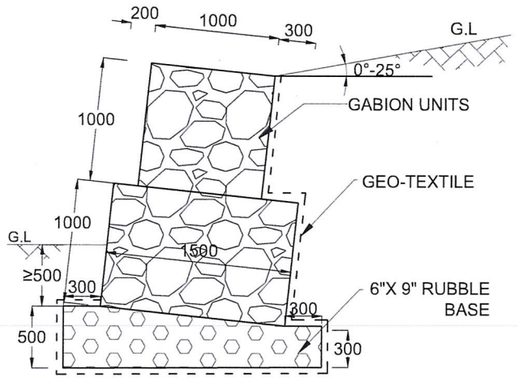
REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 11M-76CH

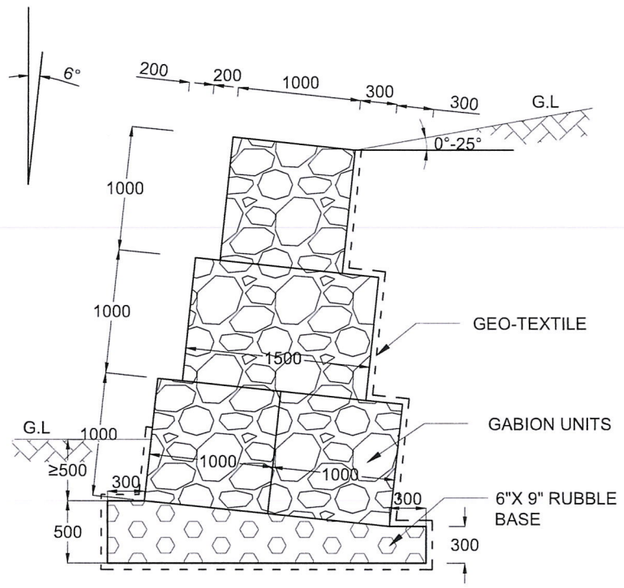
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AT CS - 02

SCALE: N.T.S. | DATE: 15.06.2026
PROJECT / DRAWING No.: NBRI/GED/2026/30/28584/11M-76CH/DR 04 | REVISION: 00

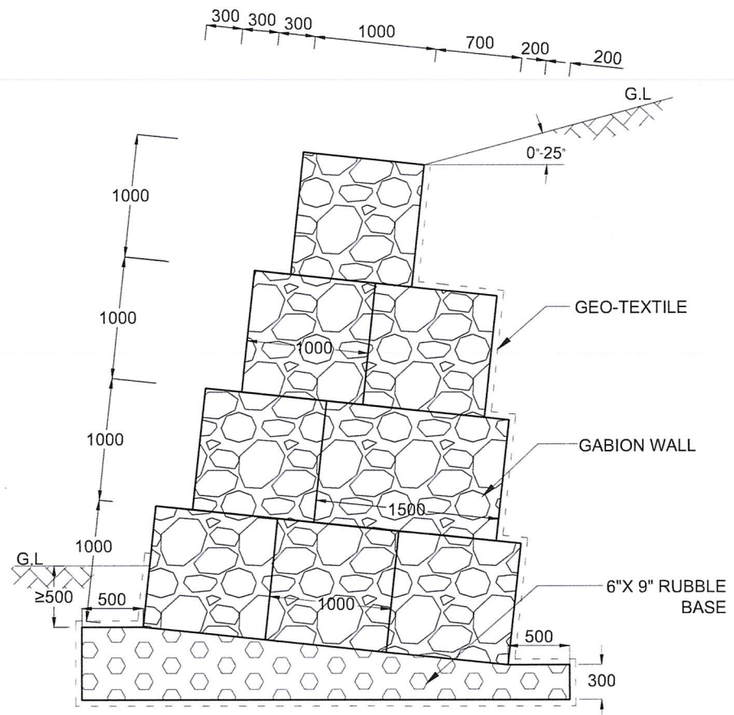
DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. G.G.R.KALHARA.	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



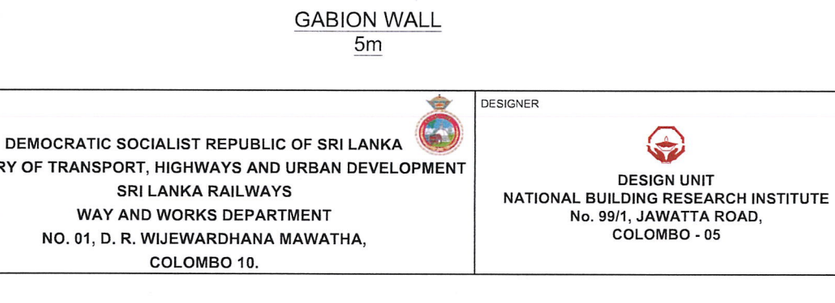
GABION WALL
2m



GABION WALL
3m



GABION WALL
4m



GABION WALL
5m

NOTES

1. ALL DIMENSION ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. BACKSLOPE ANGLE, LEVEL AND FORM MAY VARY AS PER THE DESIGN AT EACH SITE.

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 11M-76CH

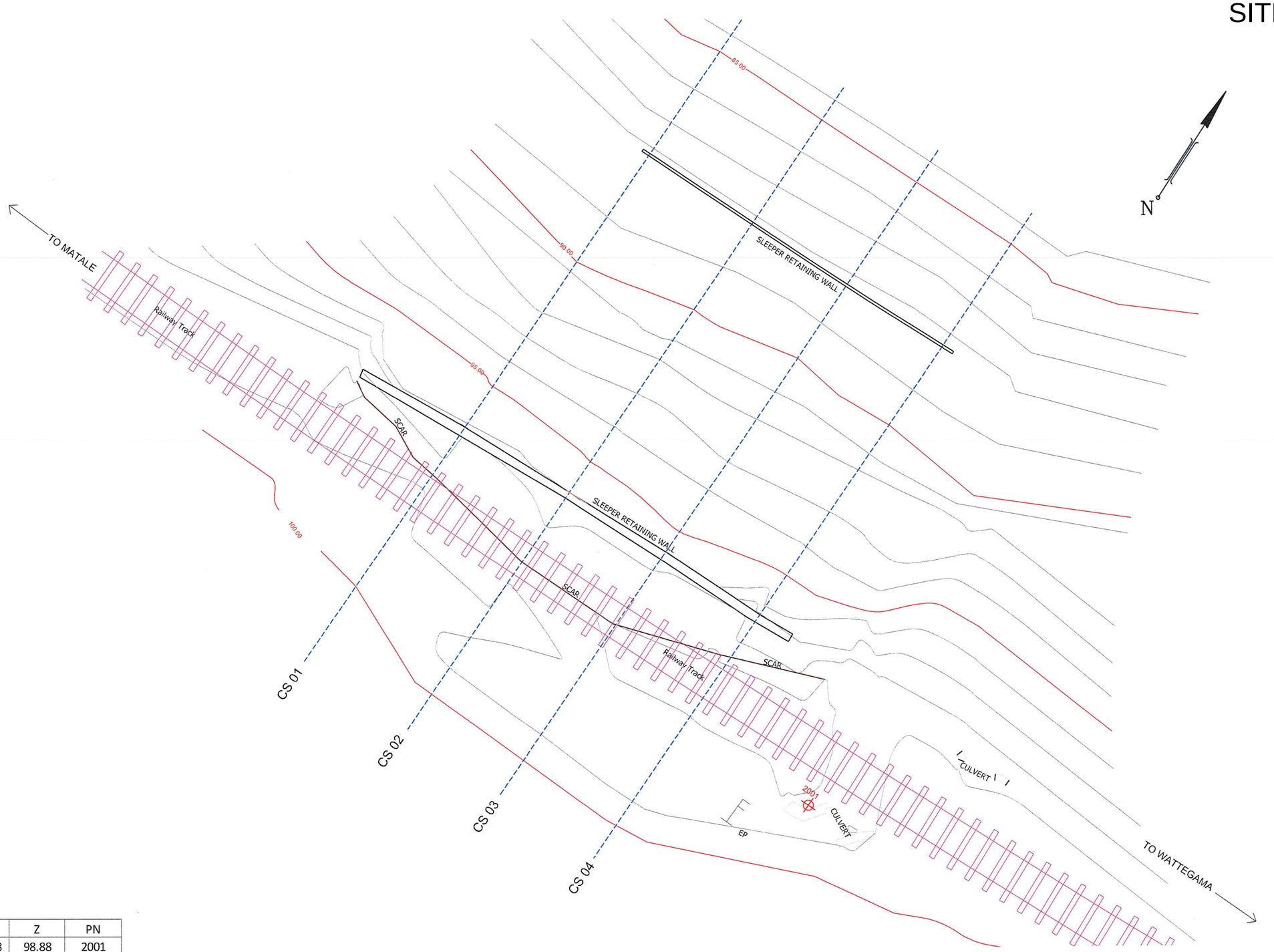
TITLE

DETAILS OF GABION WALL

SCALE	N.T.S.	DATE	15.06.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/11M-76CH/DR 05		REVISION	00

DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. G.G.R.KALHARA	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	

SITE NO 251



N	E	Z	PN
993.63	2001.58	98.88	2001
994.09	1923.69	99.18	2002

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-46CH

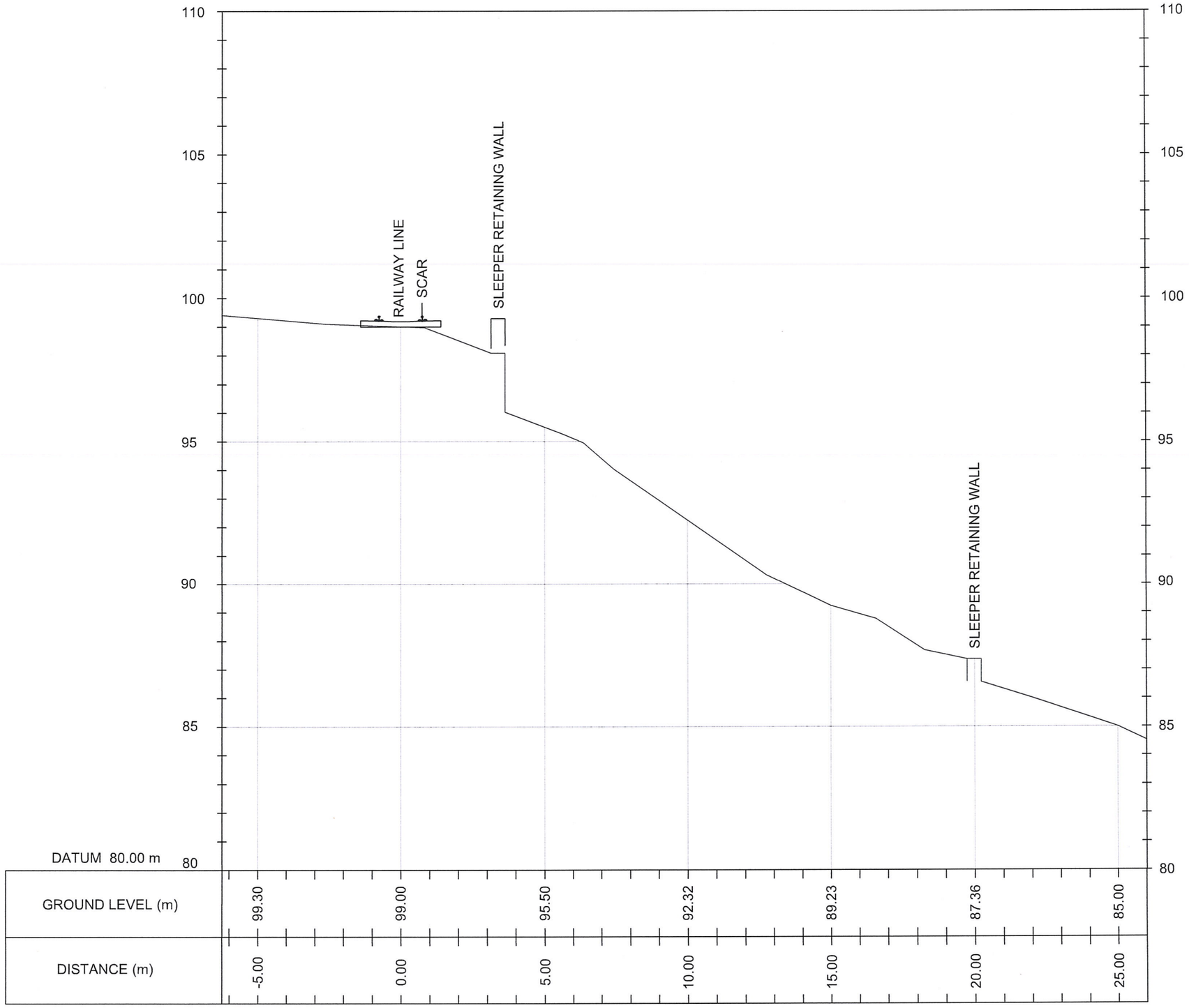
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SURVEY PLAN

SCALE N.T.S. | DATE 23.07.2026

PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-46CH/DR 01 | REVISION 00

DESCRIPTION	NAME	SIGNATURE
SURVEYOR	NBRI	
CHECKED	ENG. U.G.E.B. ABEYWARDENA	



CS - 01

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

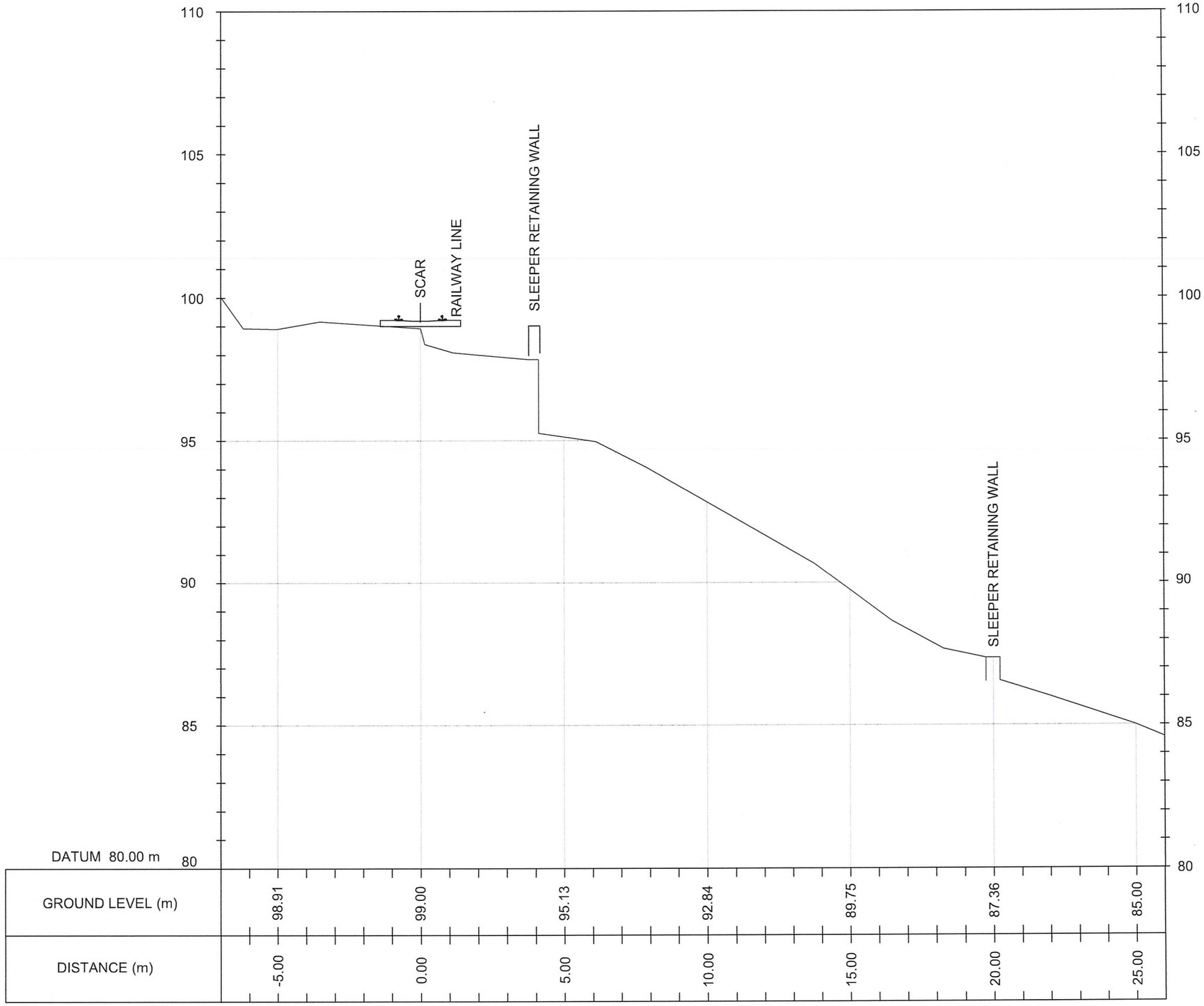
REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-46CH

CROSS SECTIONAL VIEWS
AT CS - 01

SCALE: N.T.S. | DATE: 23.07.2026
PROJECT / DRAWING No.: NBRI/GED/2026/30/28584/12M-46CH/DR 02a | REVISION: 00

DESCRIPTION	NAME	SIGNATURE
SURVEYOR	NBRI	
CHECKED	ENG. U.G.E.B. ABEYWARDENA	



CS - 02

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

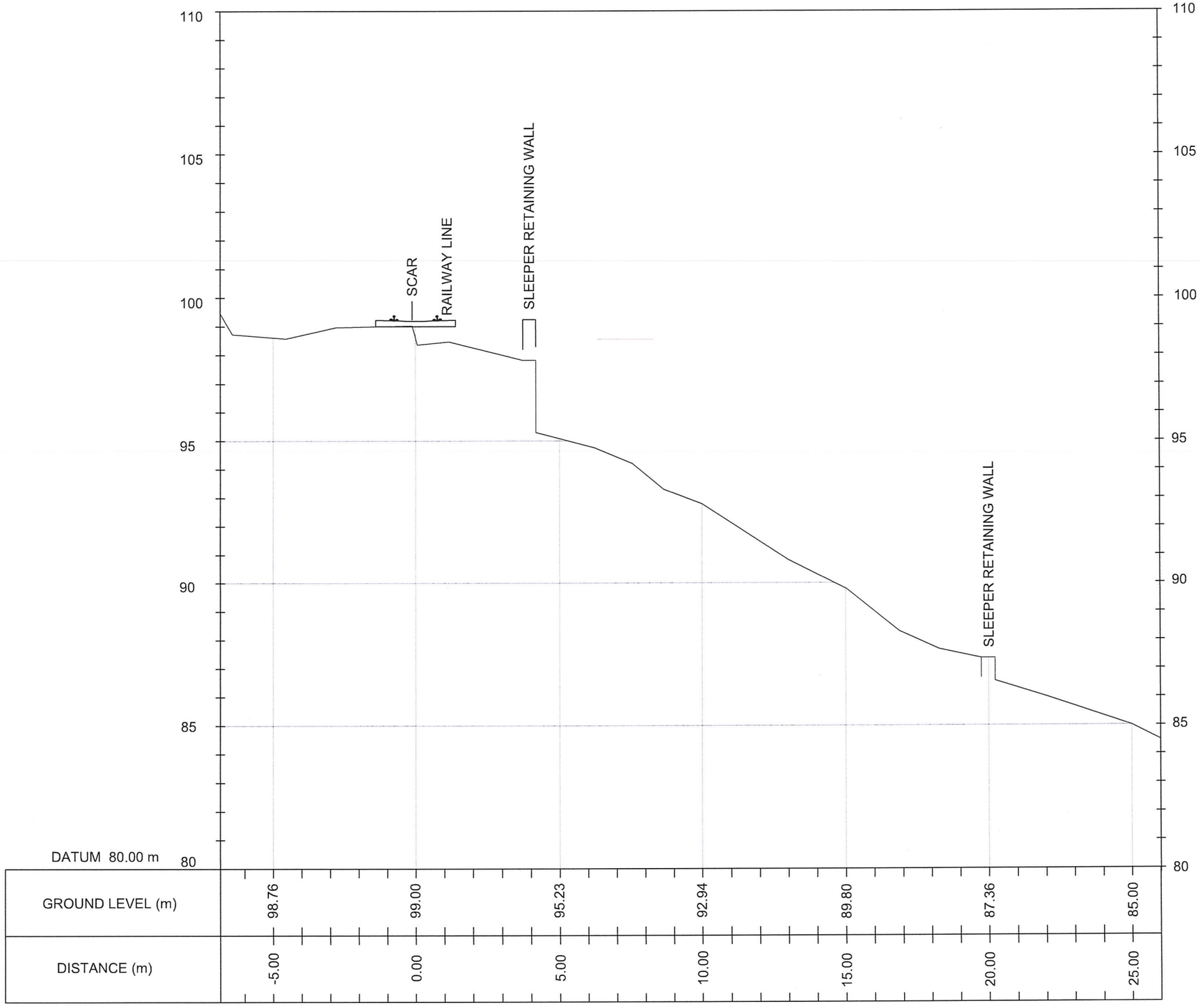
REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-46CH

CROSS SECTIONAL VIEWS
AT CS - 02

SCALE	N.T.S.	DATE	23.07.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-46CH/DR 02b		REVISION	00

DESCRIPTION	NAME	SIGNATURE
SURVEYOR	NBRI	
CHECKED	ENG. U.G.E.B. ABEYWARDENA	



CS - 03

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

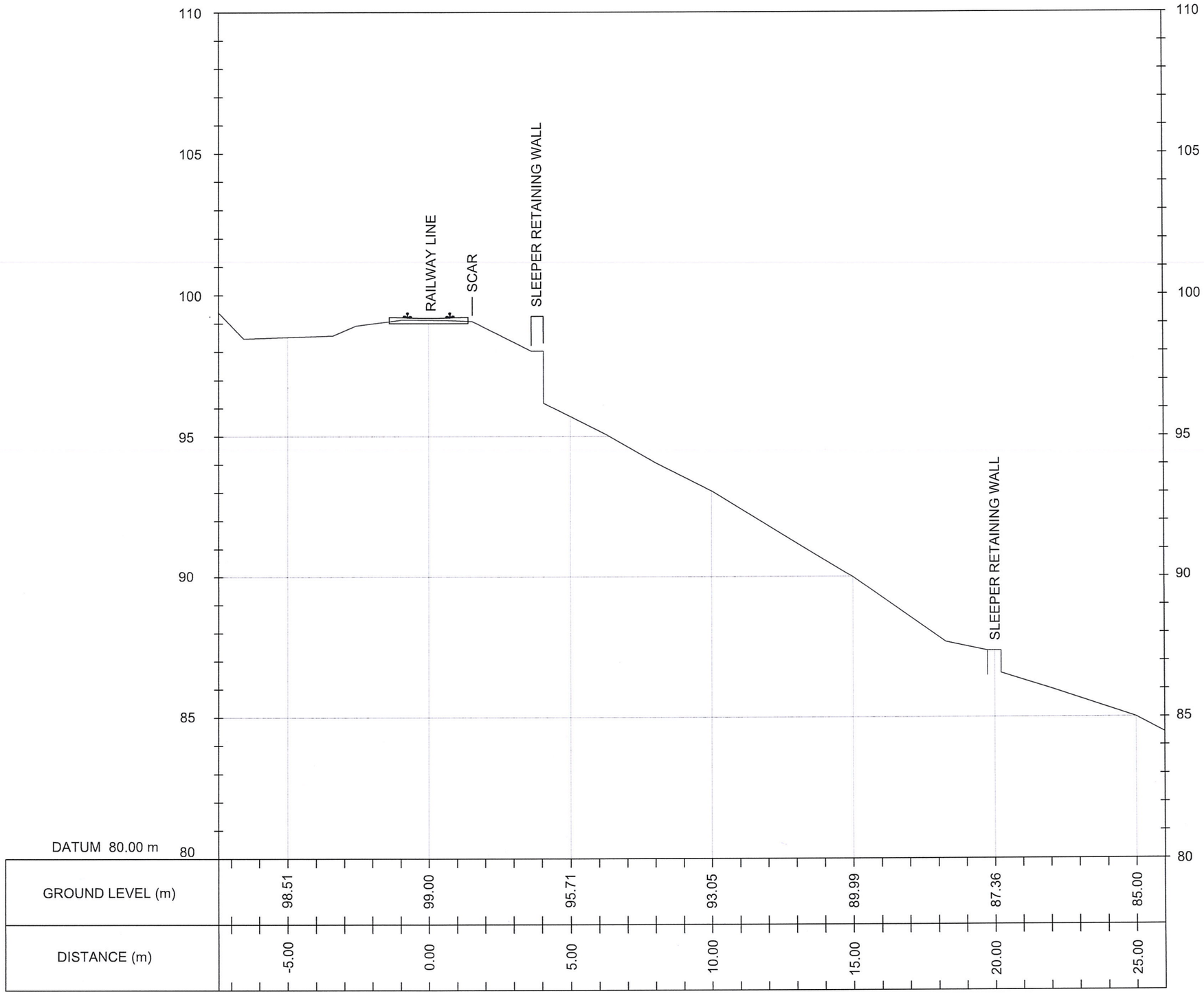
REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-46CH

CROSS SECTIONAL VIEWS
AT CS - 03

SCALE	N.T.S.	DATE	23.07.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-46CH/DR 02c		REVISION	00

DESCRIPTION	NAME	SIGNATURE
SURVEYOR	NBRI	
CHECKED	ENG. U.G.E.B. ABEYWARDENA	



CS - 04

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

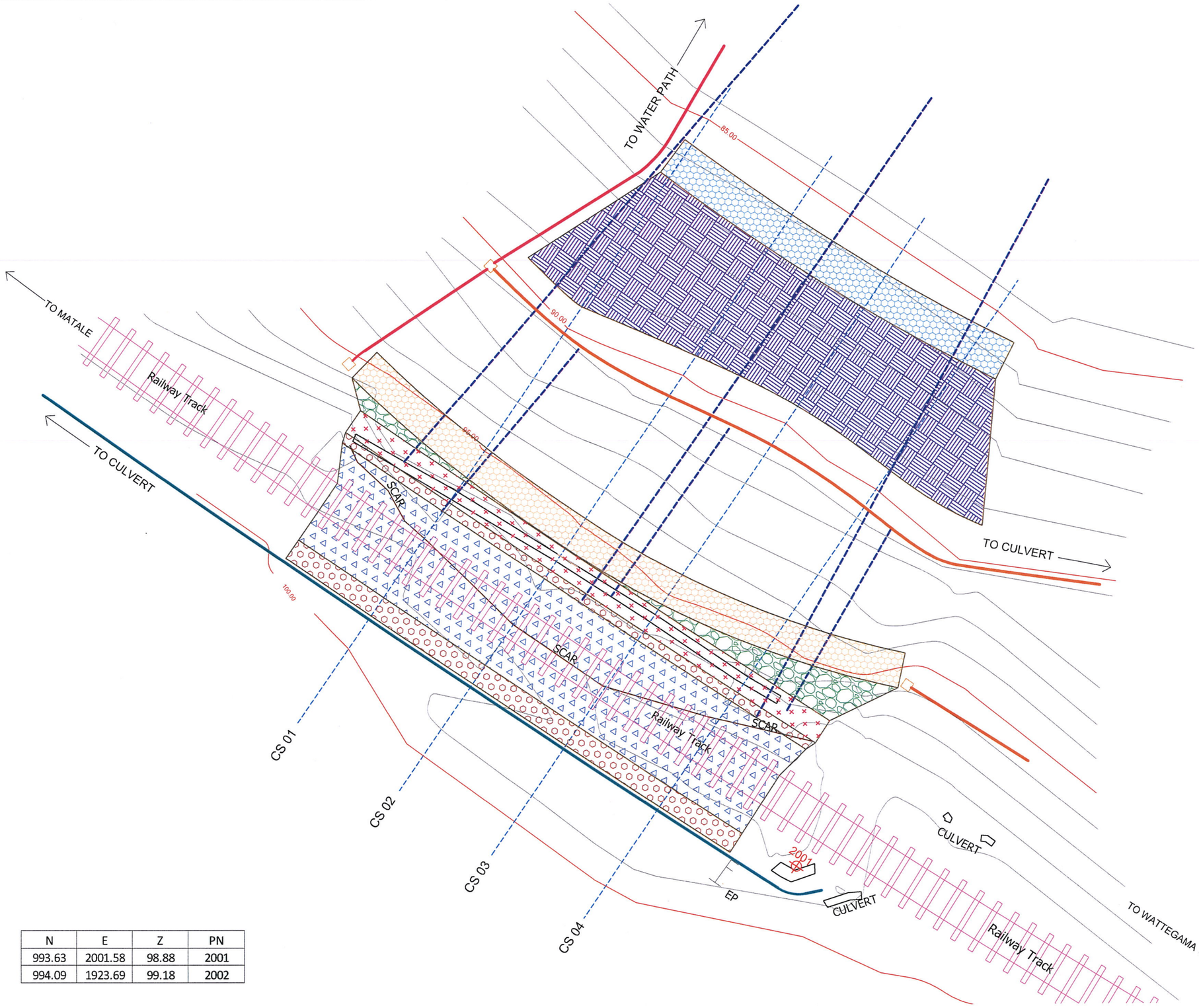
MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-46CH

CROSS SECTIONAL VIEWS
AT CS - 04

SCALE N.T.S. | DATE 23.07.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-46CH/DR 02d | REVISION 00

DESCRIPTION	NAME	SIGNATURE
SURVEYOR	NBRI	
CHECKED	ENG. U.G.E.B. ABEYWARDENA	

SITE NO 251



N

DESIGN NOTATION

- DS(M) - A DRAIN
- DS(M) - B WITH SUBSURFACE DRAIN
- DS(C) - A TYPE II DRAIN
- HORIZONTAL LONG DRAIN
- BALLAST
- ABC FILL
- GABION FACING
- ROCK FILL
- SOIL FILL
- GABION WALL (3m Height)
- GABION WALL (2m Height)
- CATCH PIT

N	E	Z	PN
993.63	2001.58	98.88	2001
994.09	1923.69	99.18	2002

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-46CH

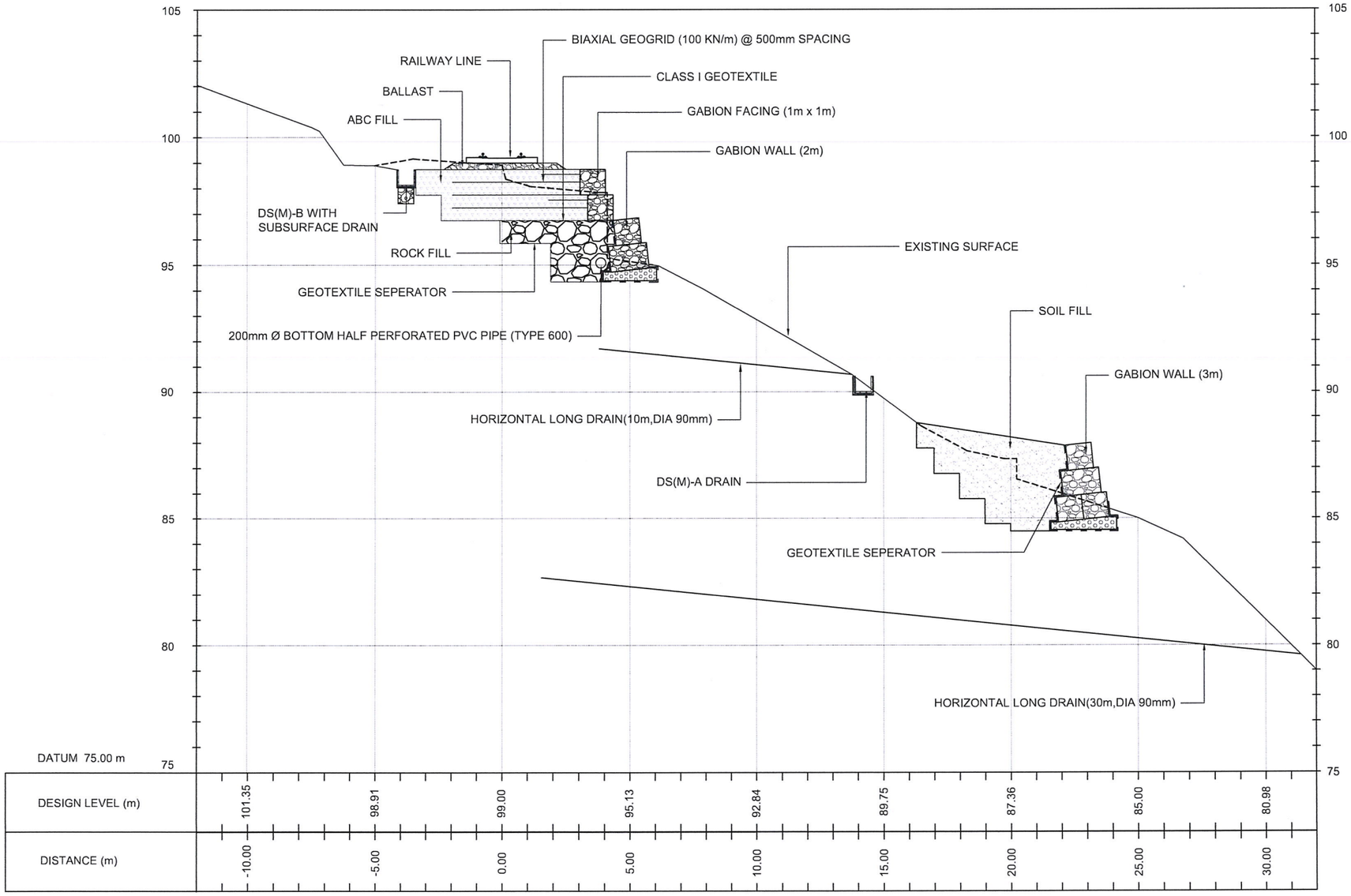
TITLE

DESIGN PLAN

SCALE N.T.S. | DATE 23.07.2026

PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-46CH/DR 03 | REVISION 00

DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. U.G.E.B. ABEYWARDENA	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



CS - 02

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. BEARING CAPACITY OF GABION WALL BASE SHALL BE CHECKED AND VERIFIED. IF IT IS NOT WITHIN THE ACCEPTABLE RANGE, GROUND IMPROVEMENT SHALL BE CARRIED OUT AS INSTRUCTED BY THE ENGINEER.
5. DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
6. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.

CONCRETE

8. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
   [a] SCREED - C15(20)
   [b] WALLS / BASE / ENERGY BREAKERS - C25(20)

REINFORCEMENT

9. ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm².
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

ROCK FILL EMBANKMENT

14. THE ROCK SHALL BE DUMPED AND SPREAD IN TO POSITION IN APPROXIMATELY HORIZONTAL LAYERS NOT EXCEEDING IN THICKNESS THE APPROXIMATE AVERAGE SIZE OF THE LAGER ROCKS (500MM).
15. THE PLACING OF INDIVIDUAL ROCKS AND BOULDERS GREATER THAN 500 MM IN DIAMETER WILL BE PERMITTED PROVIDE THAT WHEN PLACED, THEY DO NOT EXCEED 1M IN HEIGHT AND PROVIDE THEY ARE CAREFULLY DISTRIBUTED, WITH THE INTERSTICES FILLED WITH FINER MATERIAL TO FROM A DENSE AND COMPACTED MASS.
16. ROCK SHALL BE PLACED IN A MANNER TO PRODUCE A REASONABLY HOMOGENEOUS STABLE FILL THAT CONTAINS NO SEGREGATED POCKETS OF LARGE OR SMALL FRAGMENTS OR LARGE UNFILLED SPACES CAUSED BY BRIDGING OF THE LARGER ROCK FRAGMENTS
17. THE MATERIAL SHALL BE COMPRISED OF WELL-GRADED LARGER PARTICLES, INTERMEDIATE, AND SMALLER PARTICLES CONTAINING ONLY A SMALL NUMBER OF FINE PARTICLES WHICH WHEN PLACED AND COMPACTED.
18. DISTRIBUTE SPALLS AND FINER ROCK FRAGMENTS TO LEVEL AND SMOOTH EACH LIFT.
19. COMPACT EACH LAYER OF THE EMBANKMENT UNTIL THE COMPACTION EQUIPMENT (PREFERABLY STEEL DRUM ROLLER WITH VIBRATION) ACHIEVES NO FURTHER SIGNIFICANT MOVEMENT OR CONSOLIDATION.

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

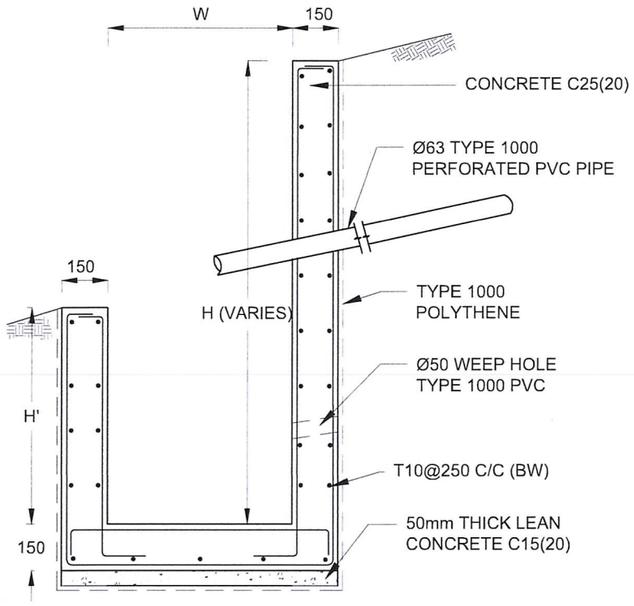
REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-46CH

DESIGN SECTION
AT CS - 01

SCALE N.T.S. | DATE 23.07.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-46CH/DR 04a | REVISION 00

DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. U.G.E.B. ABEYWARDENA	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



DS (M) - L

DS(M) - L	W (mm)	H' (mm)
TYPE I	600	600
TYPE II	800	800

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

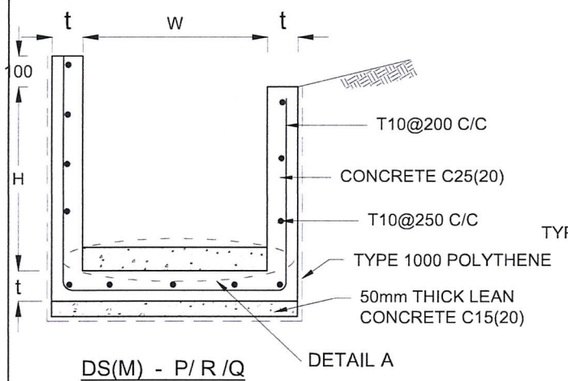
1. DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
2. STEPS SHALL BE CONSTRUCTED AT SURFACE DRAIN ON SLOPING GROUND ACCORDING TO THE SITE CONDITIONS AS INSTRUCTED BY THE ENGINEER.
3. ENERGY BREAKERS SHALL BE CONSTRUCTED AT THE STEEP DRAIN SEGMENTS AS PER THE INSTRUCTIONS OF THE ENGINEER.
4. 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

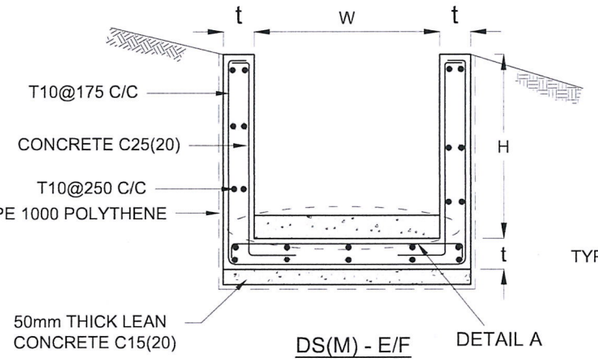
7. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
   [a] SCREED - C15(20)
   [b] WALLS / BASE / ENERGY BREAKERS - C25(20)

REINFORCEMENT

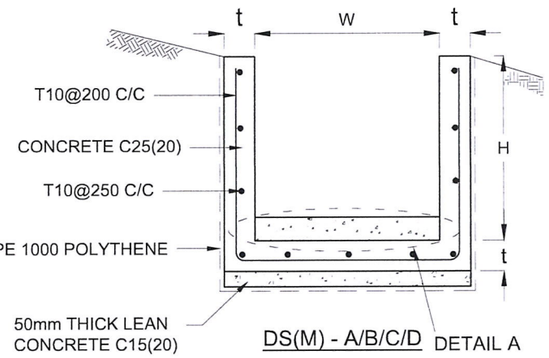
8. HIGH YIELD REINFORCEMENT BARS DENOTED BY "T" SHALL CONFORM TO THE REQUIREMENTS OF TYPE 2 OF BS 4449 AND HAVE A CHARACTERISTIC TENSILE STRENGTH OF 460N/mm².
9. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 40 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
10. ANCHORAGE 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



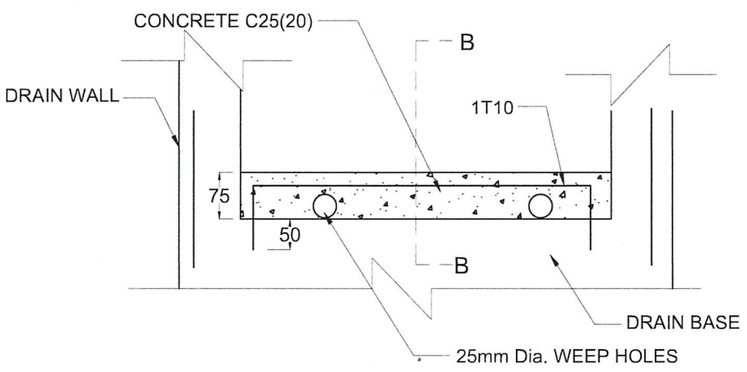
DS(M) - P/ R /Q



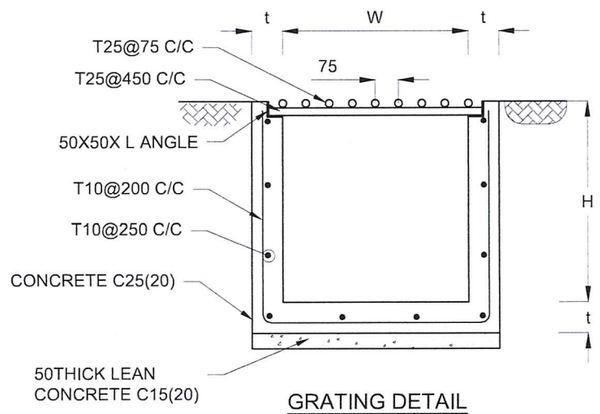
DS(M) - E/F



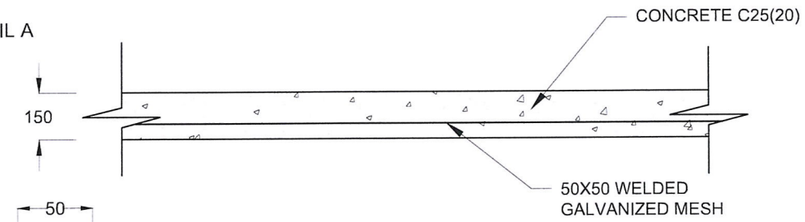
DS(M) - A/B/C/D



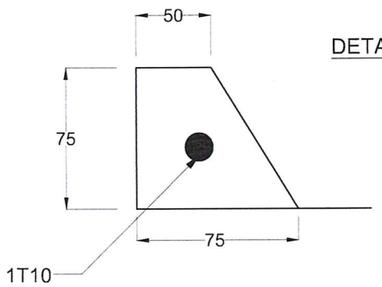
DETAIL A - (ENERGY BREAKER AT 3M)



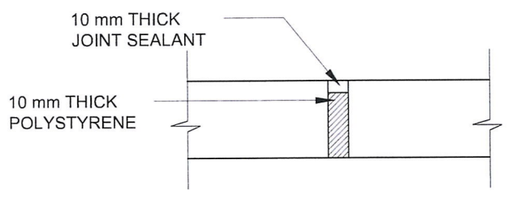
GRATING DETAIL



DETAILS OF BERM SEALING



SECTION B-B



EXPANTION JOINT DETAIL

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

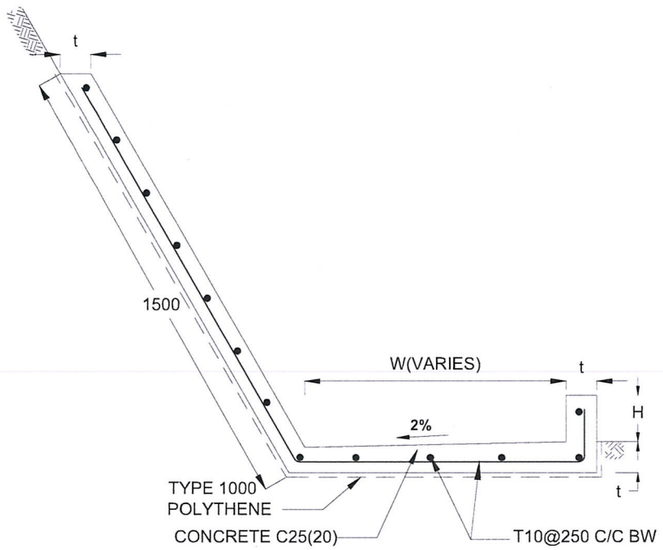
REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-46CH

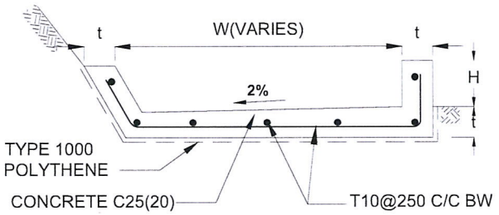
DETAILS OF DRAINS
(SURFACE DRAIN -1 OF 2)

SCALE N.T.S. | DATE 23.07.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-46CH/DR 05a | REVISION 00

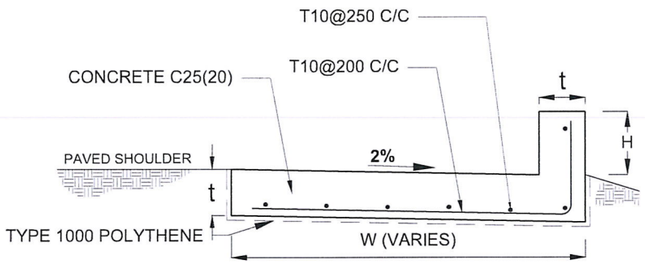
DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. U.G.E.B. ABEYWARDENA	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



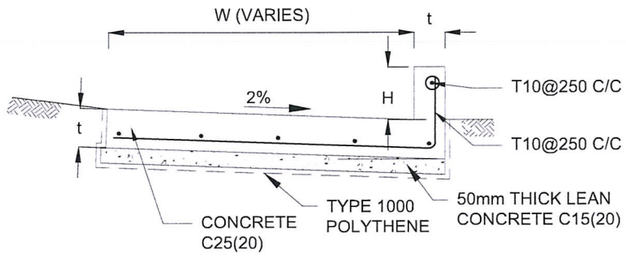
DS (B) - (TYPE I)



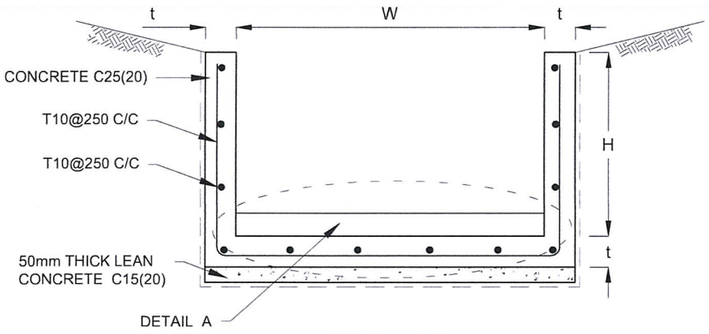
DS (B) - (TYPE II)



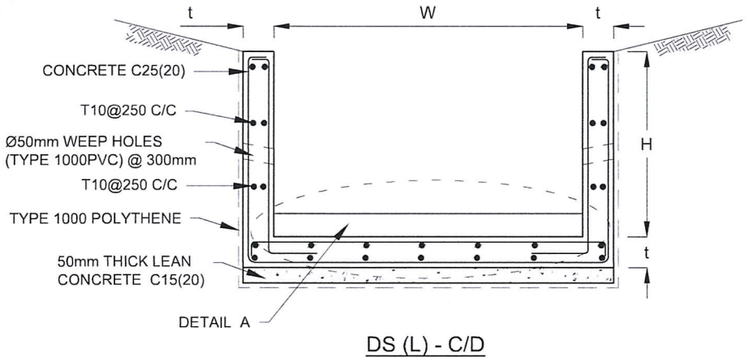
DS (K) - TYPE II



DS (K) - TYPE I



DS (L) - A/B



DS (L) - C/D

DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (B) - A	500	150	100
DS (B) - B	1000	150	100
DS (B) - C	1500	150	100
DS (B) - D	2000	150	100

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

DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (L) - A	1000	600	100
DS (L) - B	1000	800	125
DS (L) - C	1000	1000	125
DS (L) - D	2000	2000	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 IN STAGGERED PATTERN 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. COVER SLABS NEED TO BE PROVIDED ONLY FOR THE REGIONS AS INSTRUCTED BY THE ENGINEER.
6. COVER SLAB WIDTH (W_C) SHOULD BE TAKEN AS THE SUM OF DRAIN WIDTH AND 2x DRAIN WALL THICKNESS. [W_C = W+2xt]
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
8. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.

CONCRETE

9. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
   [a] SCREED - C15(20)
   [b] WALLS / BASE / ENERGY BREAKERS - C25(20)

REINFORCEMENT

10. HIGH YIELD REINFORCEMENT BARS DENOTED BY "T" SHALL CONFORM TO THE REQUIREMENTS OF TYPE 2 OF BS 4449 AND HAVE A CHARACTERISTIC TENSILE STRENGTH OF 460N/mm².
11. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 40 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
12. ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
13. REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
14. COVER TO REINFORCEMENT
    [a] BURIED FACES AND DRAIN INVERTS - 40 mm
    [b] ALL OTHER FACES - 25 mm

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

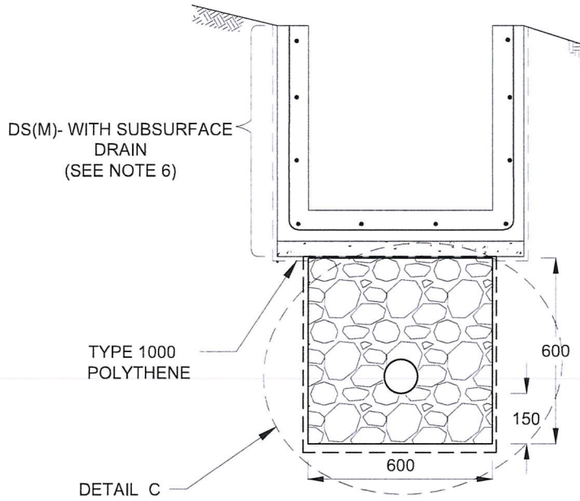
REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-46CH

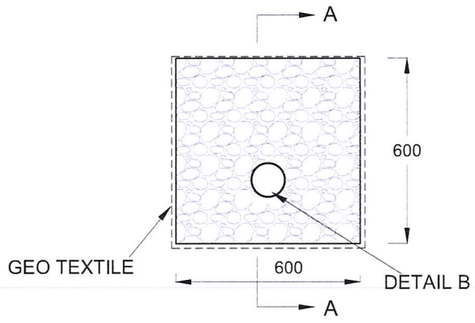
DETAILS OF DRAINS
(SURFACE DRAIN -2 OF 2)

SCALE N.T.S. | DATE 23.07.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-46CH/DR 05b | REVISION 00

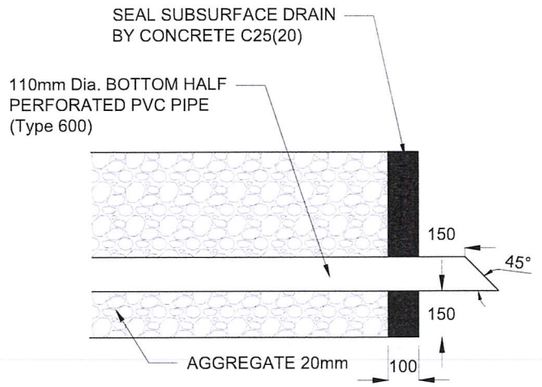
DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. U.G.E.B. ABEYWARDENA	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



SUBSURFACE DRAIN
[DS (S) -A]



DETAIL C / DS (S)-A



SECTION A-A
(OUTLET DETAIL SUBSURFACE DRAIN)

NOTES

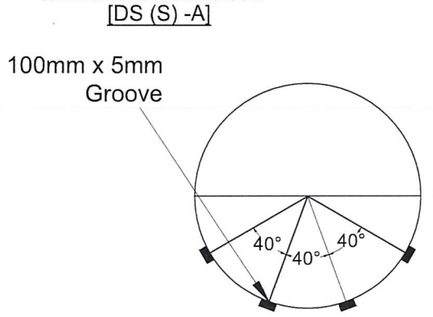
1. W,H,t ; SHALL BE THE SAME AS RESPECTIVE DRAIN SECTION.
2. CP - R SHALL BE USED WHERE H > = 900mm
3. DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
4. DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
5. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED 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

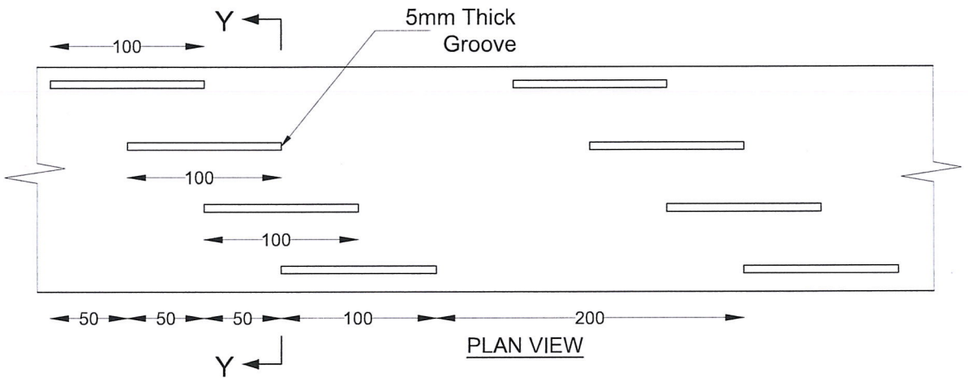
8. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
   [a] SCREED - C15(20)
   [b] WALLS / BASE / ENERGY BREAKERS - C25(20)

REINFORCEMENT

9. HIGH YIELD REINFORCEMENT BARS DENOTED BY "T" SHALL CONFORM TO THE REQUIREMENTS OF TYPE 2 OF BS 4449 AND HAVE A CHARACTERISTIC TENSILE STRENGTH OF 460N/mm².
10. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 40 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

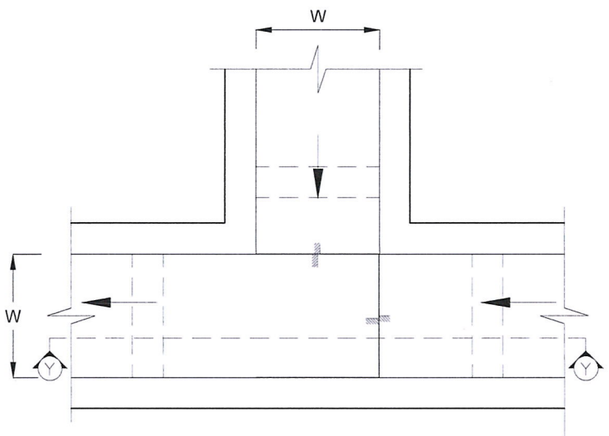


SECTION Y - Y

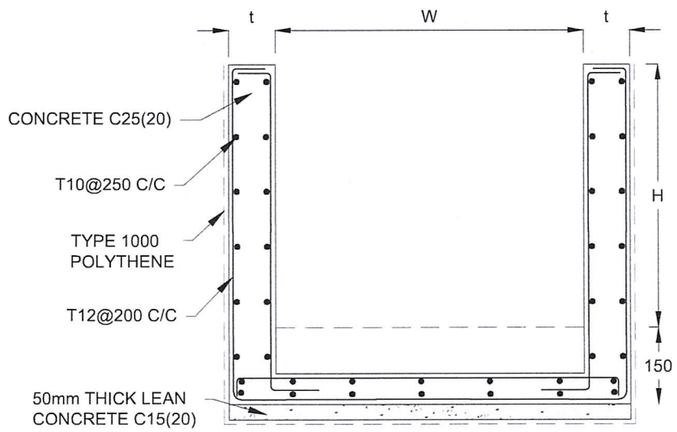


PLAN VIEW

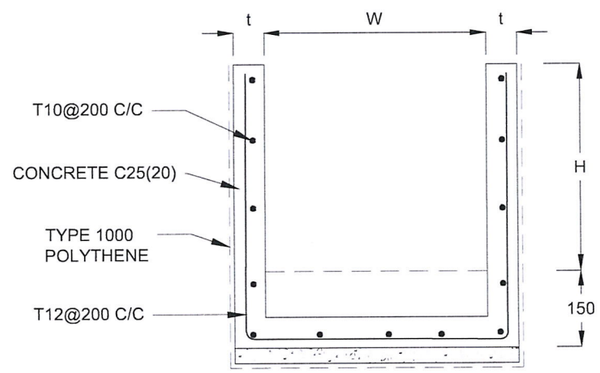
DETAIL - B (PERFORATED PIPE FOR SUB-SURFACE DRAINS)



PLAN VIEW OF CATCH PIT (CP)



SECTION Y-Y (CP- R)



SECTION Y - Y

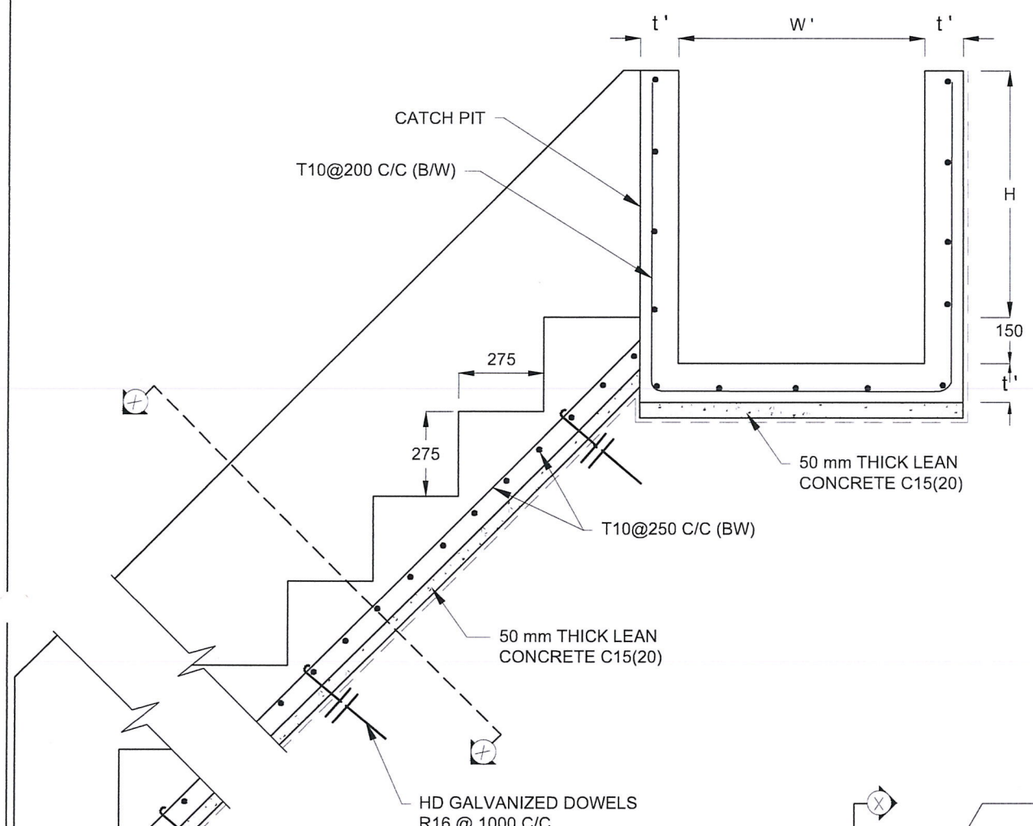
EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT SRI LANKA RAILWAYS WAY AND WORKS DEPARTMENT NO. 01, D. R. WIJEWARDHANA MAWATHA, COLOMBO 10.	DESIGN UNIT NATIONAL BUILDING RESEARCH INSTITUTE No. 99/1, JAWATTA ROAD, COLOMBO - 05				

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-46CH

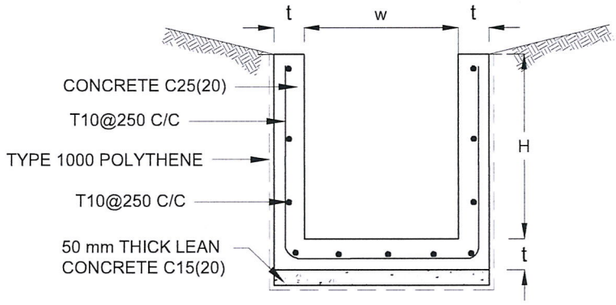
DETAILS OF DRAINS
(SUBSURFACE DRAIN AND CATCHPIT)

SCALE N.T.S. | DATE 23.07.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-46CH/DR 05c | REVISION 00

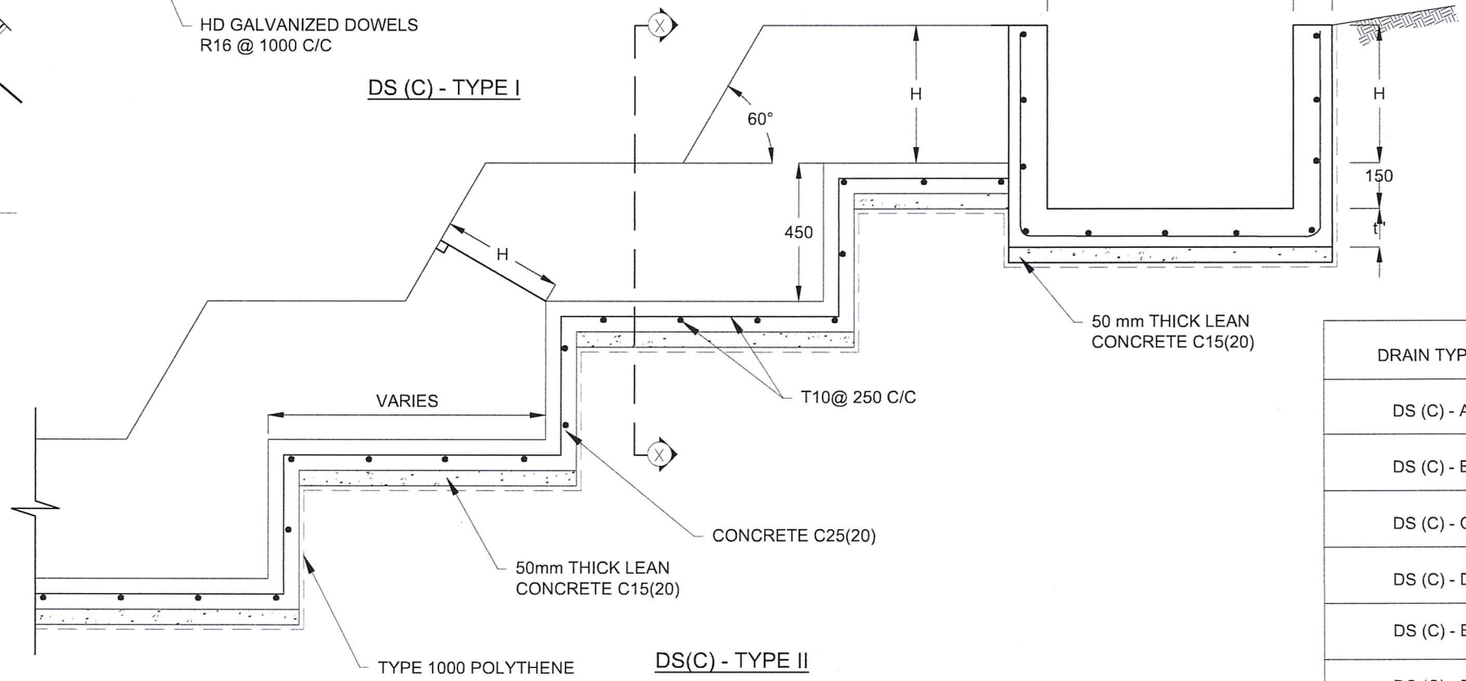
DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. U.G.E.B. ABEYWARDENA	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



DS (C) - TYPE I



SECTION X-X



DS(C) - TYPE II

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 - C15(20)
   [b] WALLS / BASE / ENERGY BREAKERS - C25(20)

REINFORCEMENT

8. HIGH YIELD REINFORCEMENT BARS DENOTED BY "T" SHALL CONFORM TO THE REQUIREMENTS OF TYPE 2 OF BS 4449 AND HAVE A CHARACTERISTIC TENSILE STRENGTH OF 460N/mm².
9. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 40 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
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

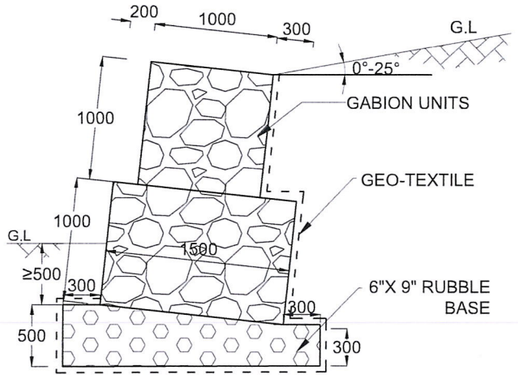
REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-46CH

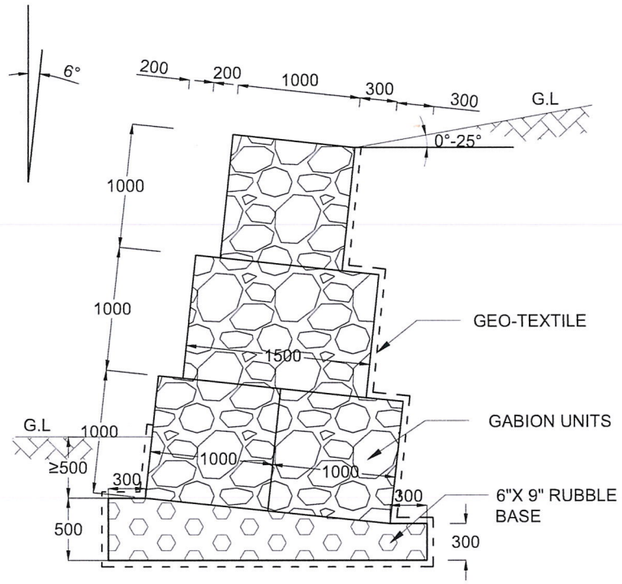
DETAILS OF DRAINS
(CASCADE DRAIN)

SCALE N.T.S. DATE 23.07.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-46CH/DR 05d
REVISION 00

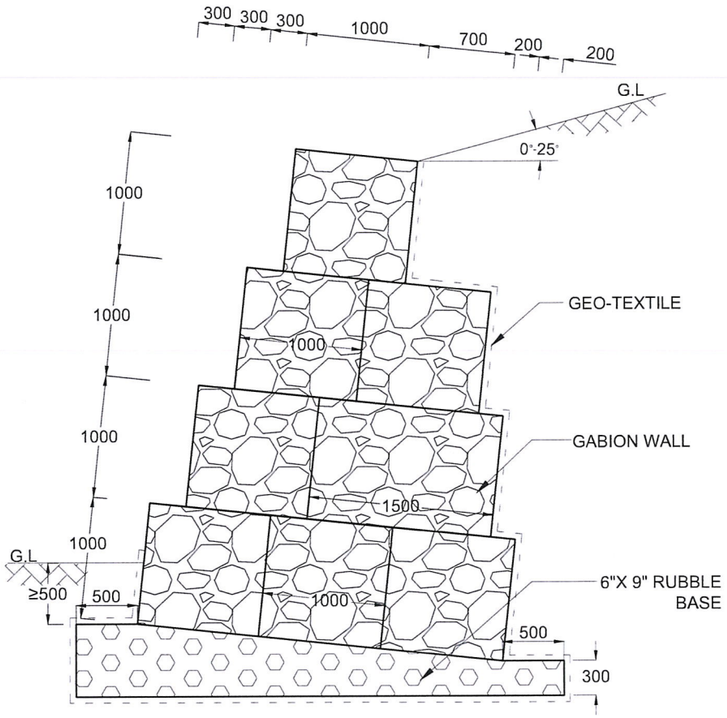
DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. U.G.E.B. ABEYWARDENA	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



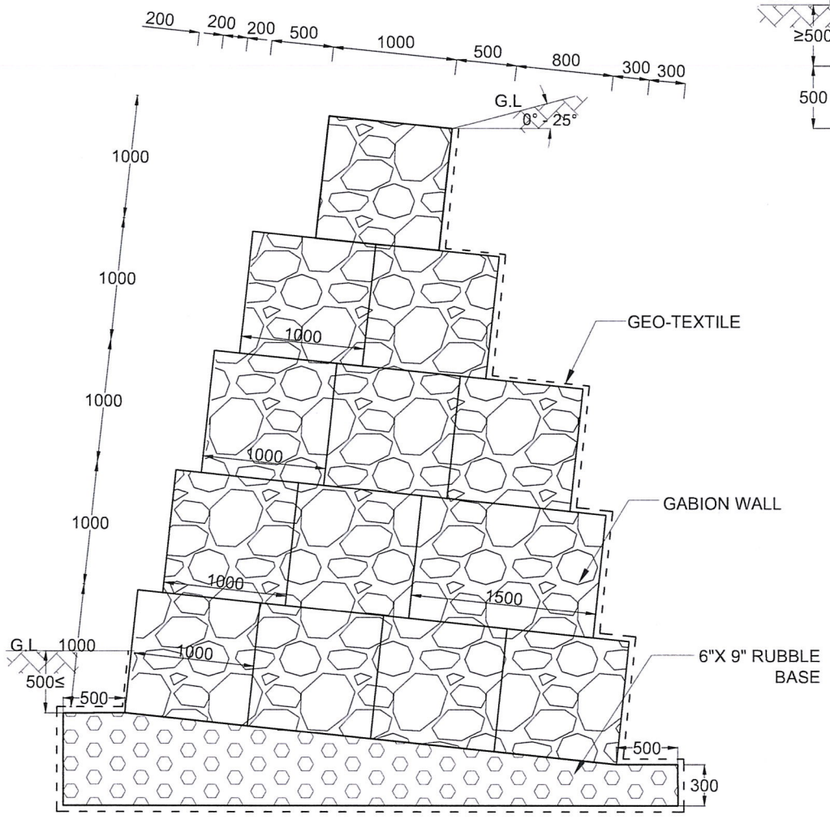
GABION WALL
2m



GABION WALL
3m



GABION WALL
4m



GABION WALL
5m

NOTES

1. ALL DIMENSION ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. BACKSLOPE ANGLE, LEVEL AND FORM MAY VARY AS PER THE DESIGN AT EACH SITE.

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-46CH

TITLE

DETAILS OF GABION WALL

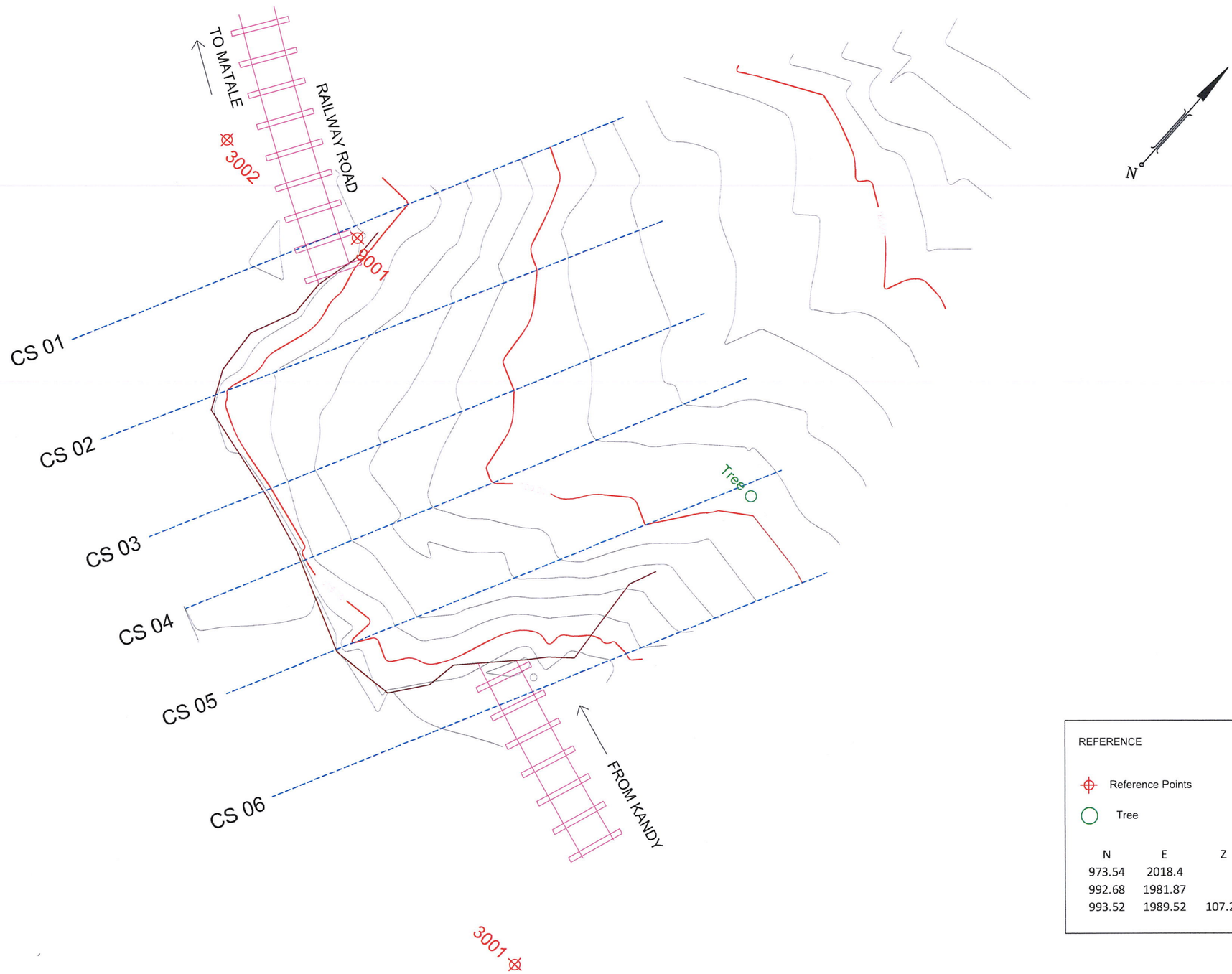
SCALE	N.T.S.	DATE	23.07.2026

PROJECT / DRAWING No.
NBRI/GED/2026/30/28584/12M-46CH/DR 05e

REVISION 00

DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. U.G.E.B. ABEYWARDENA	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	

SITE NO 252



REFERENCE

Reference Points

Tree

N	E	Z	PN
973.54	2018.4		3001
992.68	1981.87		3002
993.52	1989.52	107.29	9001

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
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DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-50CH

TITLE

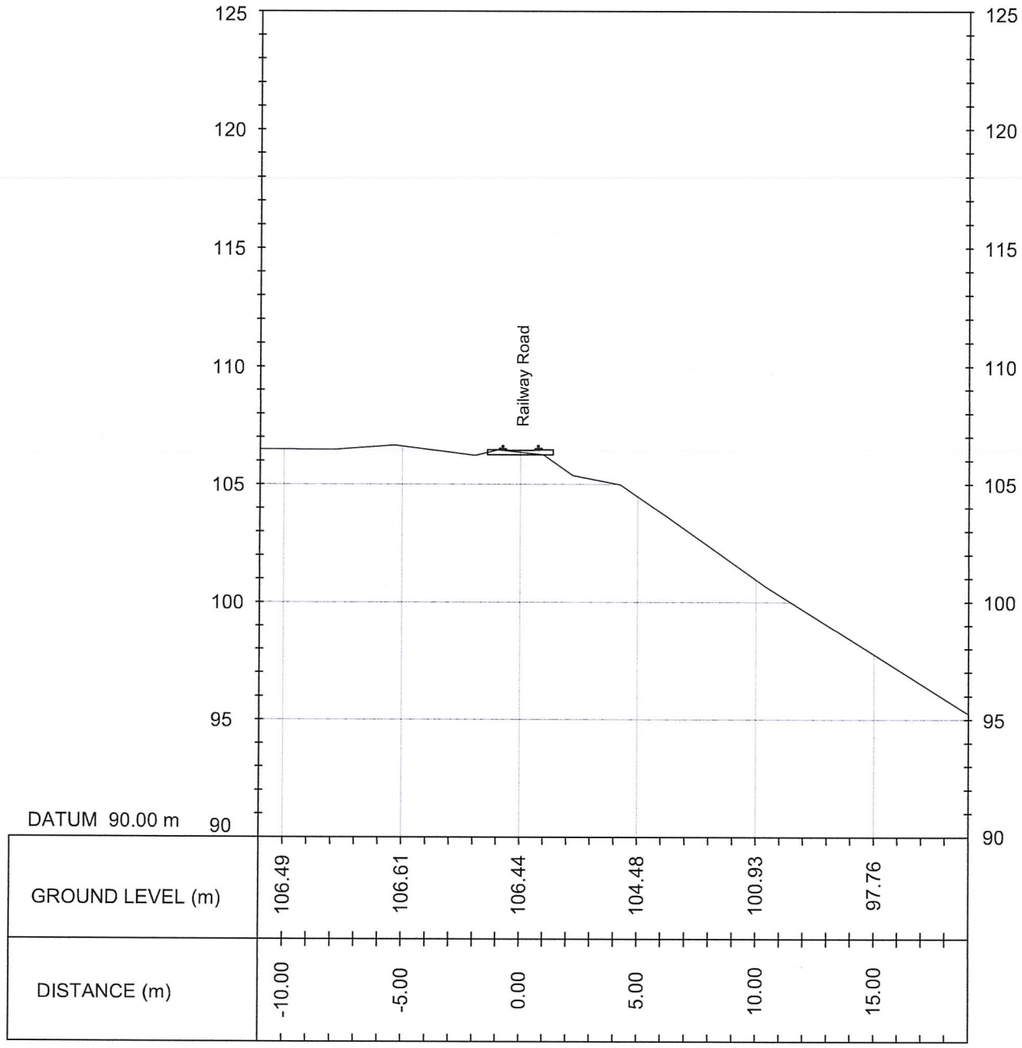
SURVEY PLAN

SCALE N.T.S. DATE 19.06.2026

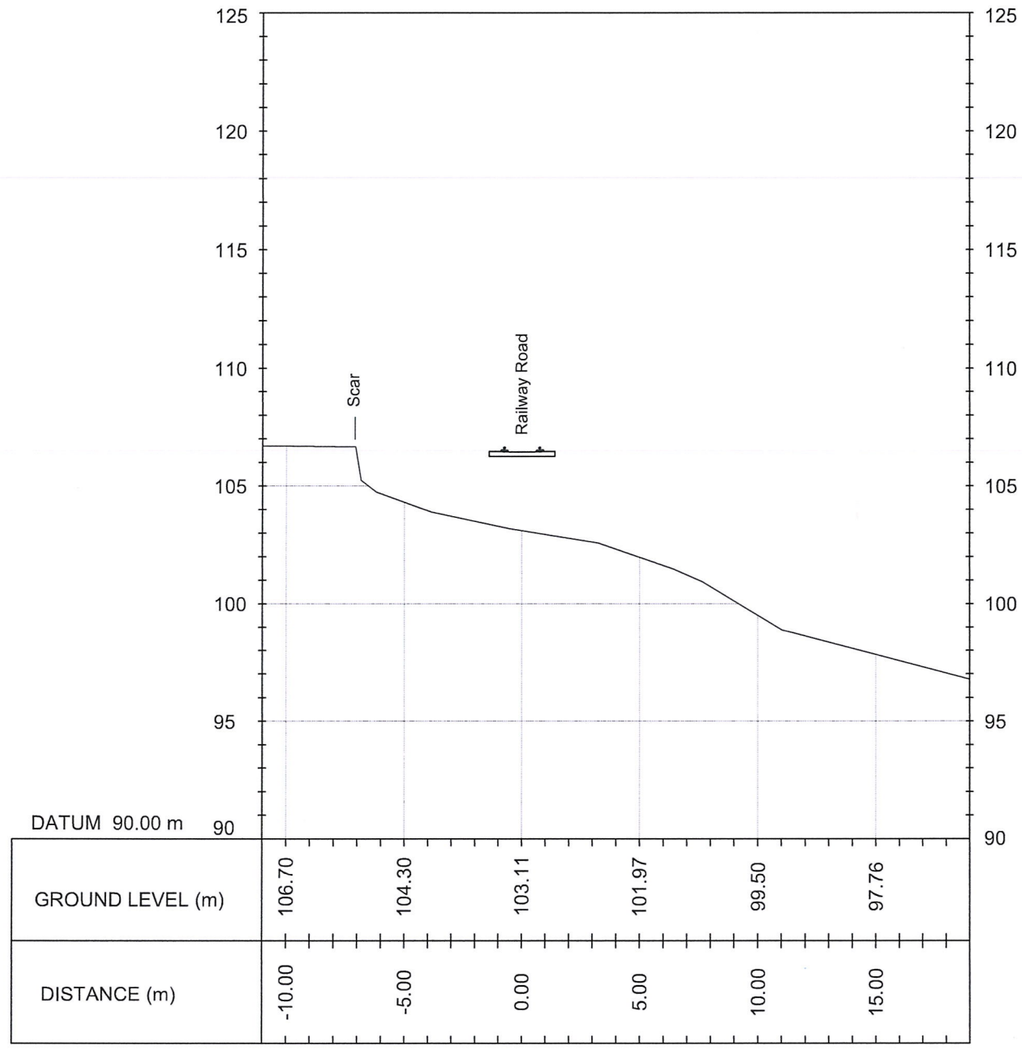
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-50CH/DR 01

REVISION 00

DESCRIPTION	NAME	SIGNATURE
SURVEYOR	HSPTD-NBRI	
CHECKED	ENG. G.G.R.KALHARA	



CS - 01



CS - 02

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-50CH

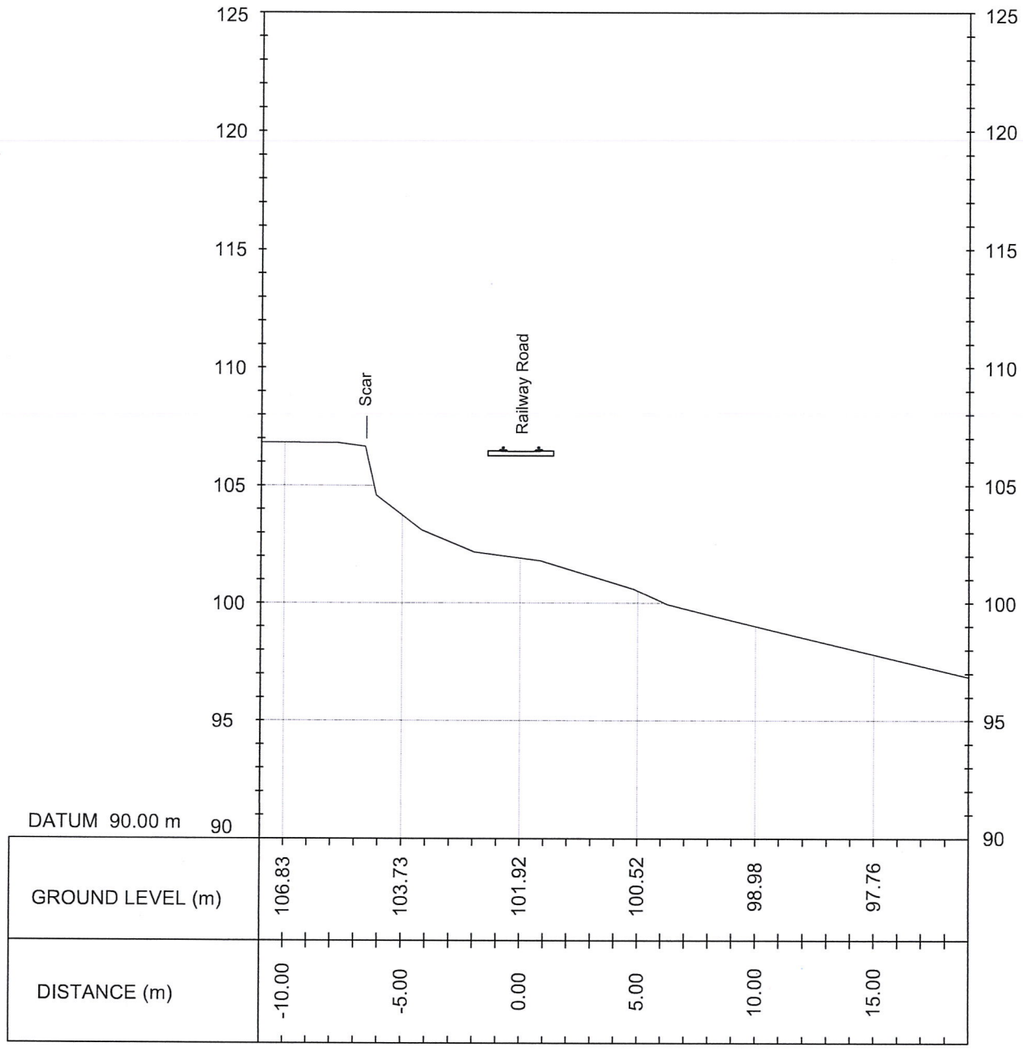
CROSS SECTIONAL VIEWS
AT CS - 01 & CS - 02

SCALE: N.T.S. | DATE: 19.06.2026

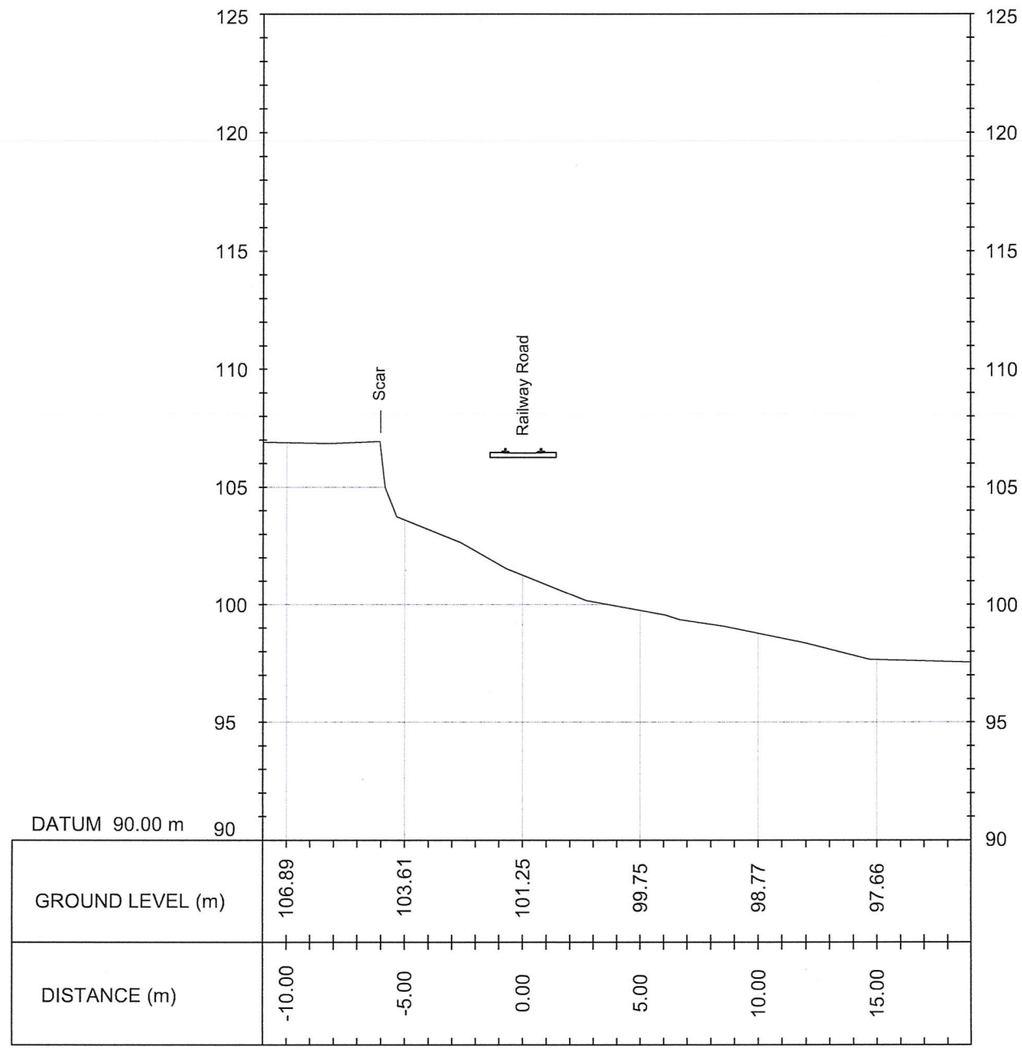
PROJECT / DRAWING No.: NBRI/GED/2026/30/28584/12M-50CH/DR 02a

REVISION: 00

DESCRIPTION	NAME	SIGNATURE
SURVEYOR	HSPTD-NBRI	
CHECKED	ENG. G.G.R.KALHARA.	



CS - 03



CS - 04

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-50CH

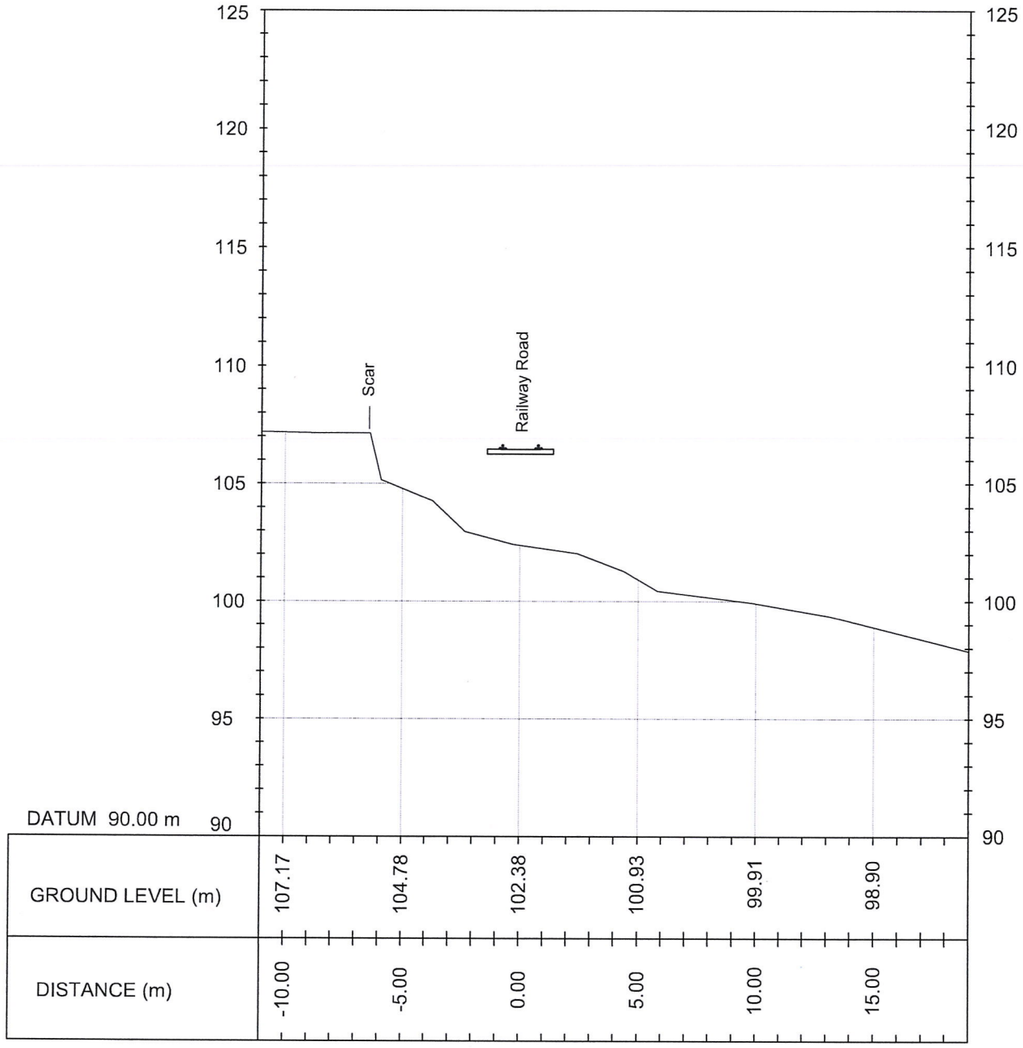
CROSS SECTIONAL VIEWS
AT CS - 03 & CS - 04

SCALE N.T.S. DATE 19.06.2026

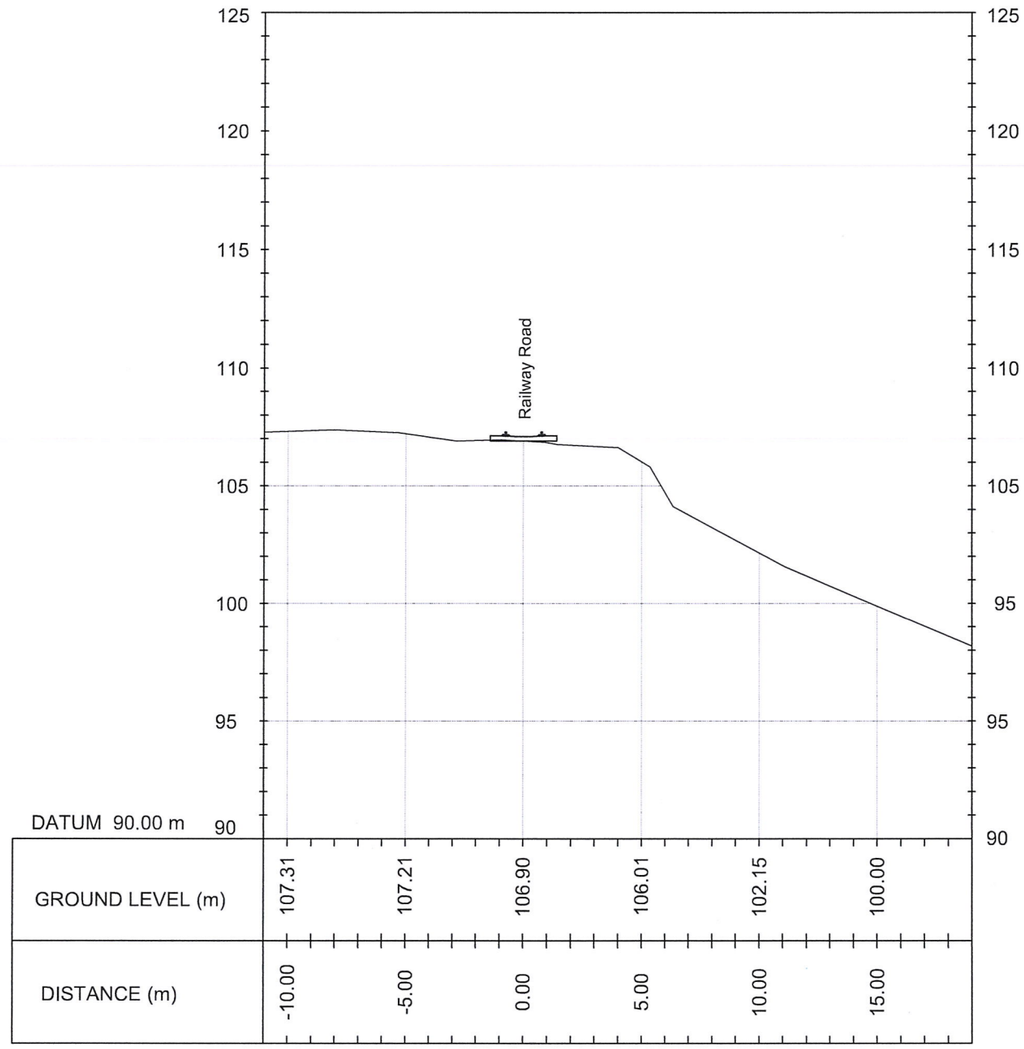
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-50CH/DR 02b

REVISION 00

DESCRIPTION	NAME	SIGNATURE
SURVEYOR	HSPTD-NBRI	
CHECKED	ENG. G.G.R.KALHARA.	



CS - 05



CS - 06

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

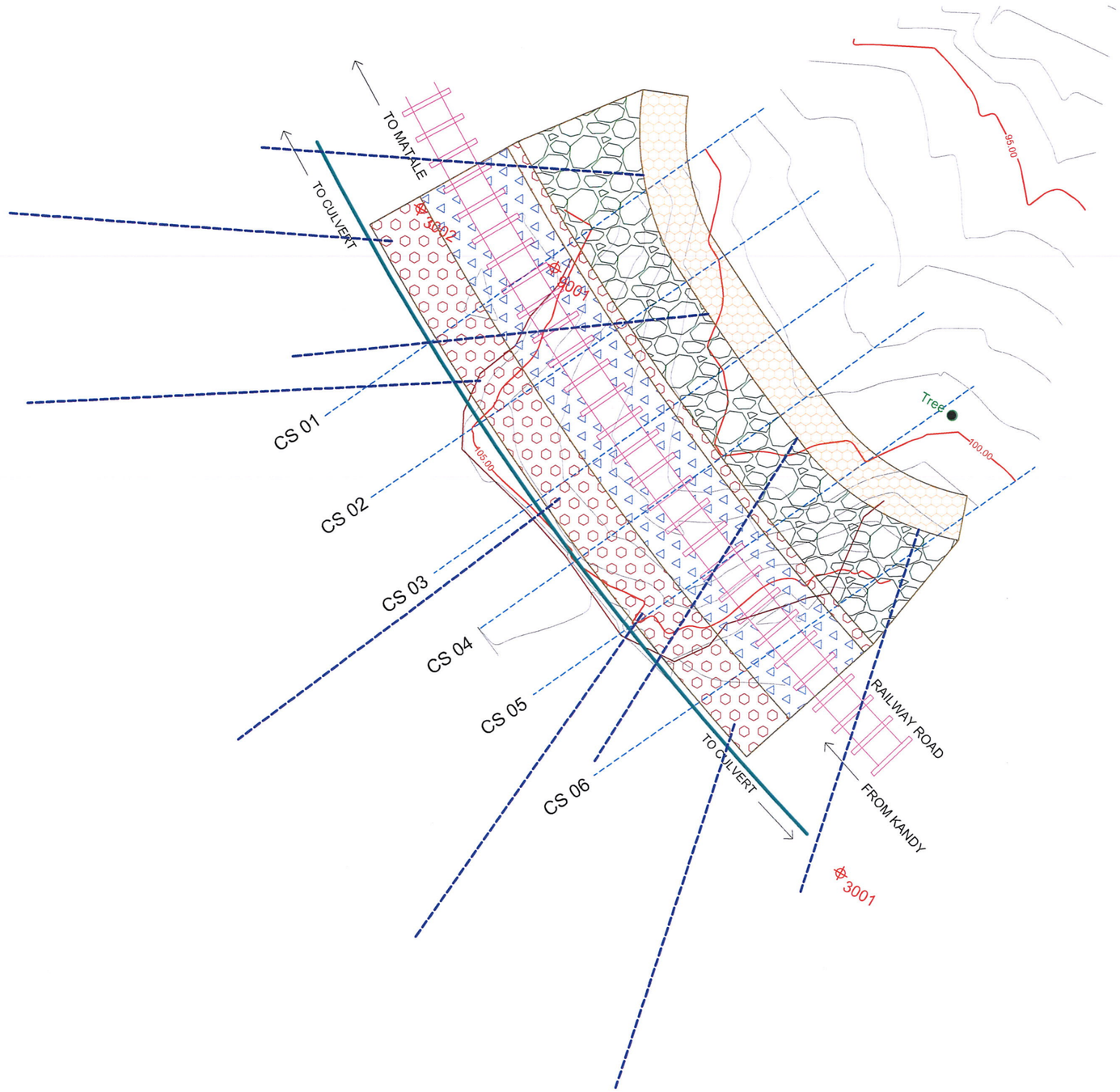
MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-50CH

CROSS SECTIONAL VIEWS
AT CS - 05 & CS - 06

SCALE	N.T.S.	DATE	19.06.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-50CH/DR 02c		REVISION	00

DESCRIPTION	NAME	SIGNATURE
SURVEYOR	HSPTD-NBRI	
CHECKED	ENG. G.G.R.KALHARA.	

SITE NO 252



N

DESIGN NOTATION

- DS(M) - B SUBSURFACE DRAIN
- HORIZONTAL LONG DRAIN (20m)
- GABION WALL (5m Height)
- BALLAST
- RUBBLE PITCHING (500mm THICK)
- ABC FILL
- CATCH PIT

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-50CH

TITLE

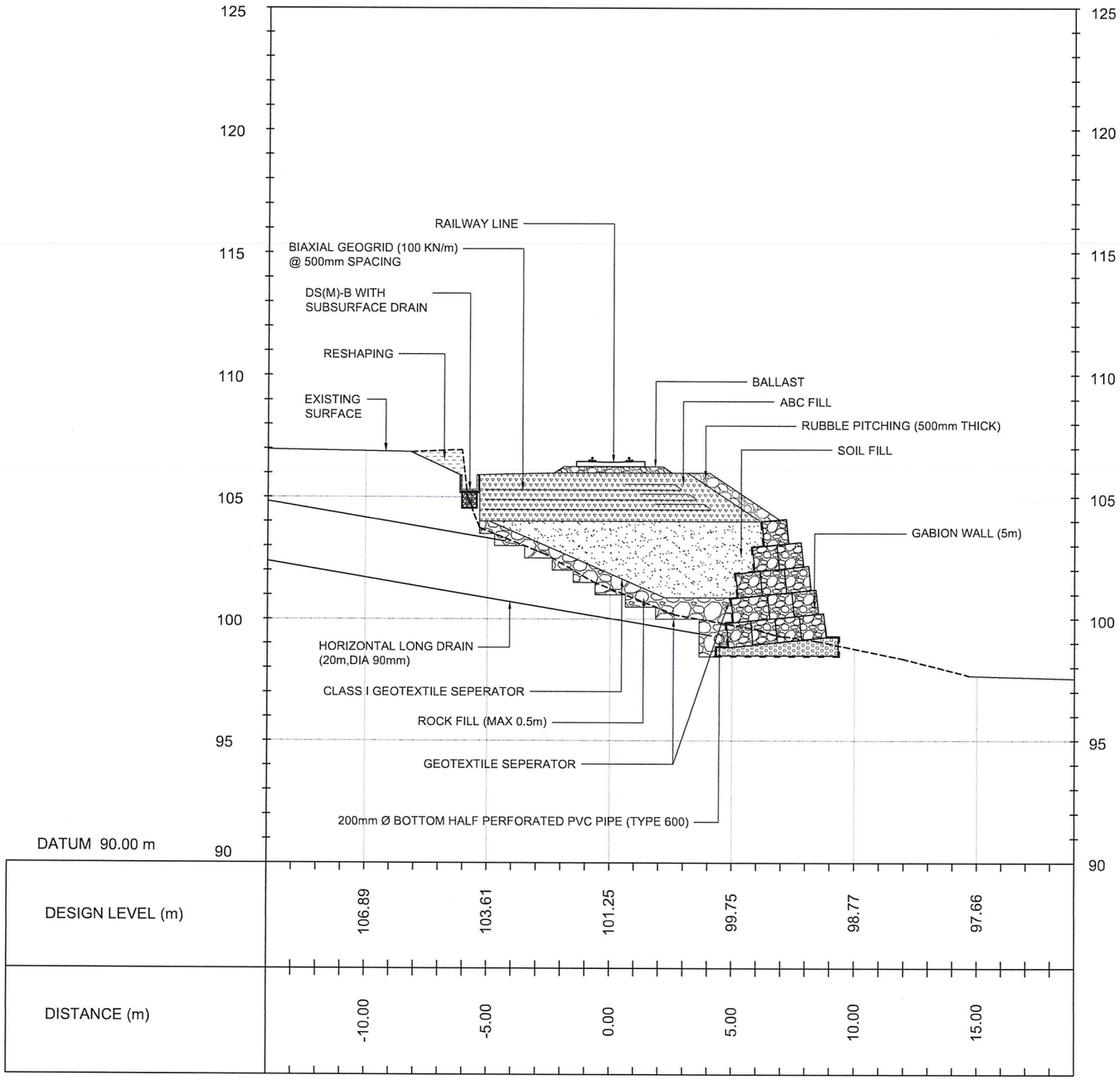
DESIGN PLAN

SCALE N.T.S. DATE 19.06.2026

PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-50CH/DR 03

REVISION 00

DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. G.G.R.KALHARA.	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



CS - 04

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. BEARING CAPACITY OF GABION WALL BASE SHALL BE CHECKED AND VERIFIED. IF IT IS NOT WITHIN THE ACCEPTABLE RANGE, GROUND IMPROVEMENT SHALL BE CARRIED OUT AS INSTRUCTED BY THE ENGINEER.
5. DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
6. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.

CONCRETE

8. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
   [a] SCREED - C15(20)
   [b] WALLS / BASE / ENERGY BREAKERS - C25(20)

REINFORCEMENT

9. ALL BARS MARKED "T" SHALL BE HIGH YIELD DEFORMED BARS OF YIELD STRENGTH NOT LESS THAN 460N/mm².
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

ROCK FILL EMBANKMENT

14. THE ROCK SHALL BE DUMPED AND SPREAD IN TO POSITION IN APPROXIMATELY HORIZONTAL LAYERS NOT EXCEEDING IN THICKNESS THE APPROXIMATE AVERAGE SIZE OF THE LAGER ROCKS (500MM).
15. THE PLACING OF INDIVIDUAL ROCKS AND BOULDERS GREATER THAN 500 MM IN DIAMETER WILL BE PERMITTED PROVIDE THAT WHEN PLACED, THEY DO NOT EXCEED 1M IN HEIGHT AND PROVIDE THEY ARE CAREFULLY DISTRIBUTED, WITH THE INTERSTICES FILLED WITH FINER MATERIAL TO FROM A DENSE AND COMPACTED MASS.
16. ROCK SHALL BE PLACED IN A MANNER TO PRODUCE A REASONABLY HOMOGENEOUS STABLE FILL THAT CONTAINS NO SEGREGATED POCKETS OF LARGE OR SMALL FRAGMENTS OR LARGE UNFILLED SPACES CAUSED BY BRIDGING OF THE LARGER ROCK FRAGMENTS
17. THE MATERIAL SHALL BE COMPRISED OF WELL-GRADED LARGER PARTICLES, INTERMEDIATE, AND SMALLER PARTICLES CONTAINING ONLY A SMALL NUMBER OF FINE PARTICLES WHICH WHEN PLACED AND COMPACTED.
18. DISTRIBUTE SPALLS AND FINER ROCK FRAGMENTS TO LEVEL AND SMOOTH EACH LIFT.
19. COMPACT EACH LAYER OF THE EMBANKMENT UNTIL THE COMPACTION EQUIPMENT (PREFERABLY STEEL DRUM ROLLER WITH VIBRATION) ACHIEVES NO FURTHER SIGNIFICANT MOVEMENT OR CONSOLIDATION.

EMPLOYER
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

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

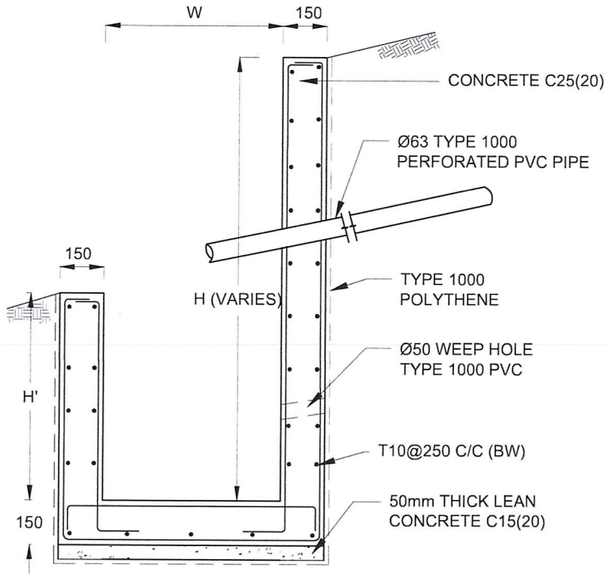
REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-50CH

DESIGN SECTION
AT CS - 04

SCALE N.T.S. | DATE 19.06.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-50CH/DR 04 | REVISION 00

DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. G.G.R.KALHARA.	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



DS (M) - L

DS(M) - L	W (mm)	H' (mm)
TYPE I	600	600
TYPE II	800	800

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

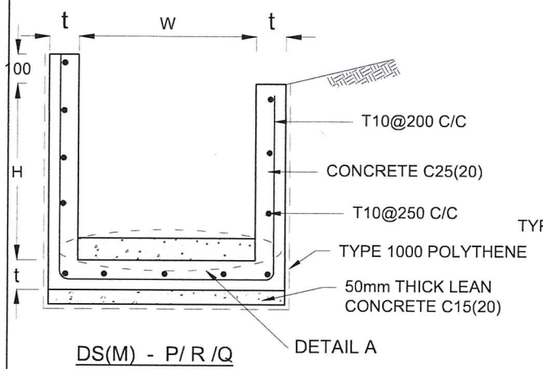
1. DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
2. STEPS SHALL BE CONSTRUCTED AT SURFACE DRAIN ON SLOPING GROUND ACCORDING TO THE SITE CONDITIONS AS INSTRUCTED BY THE ENGINEER.
3. ENERGY BREAKERS SHALL BE CONSTRUCTED AT THE STEEP DRAIN SEGMENTS AS PER THE INSTRUCTIONS OF THE ENGINEER.
4. 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

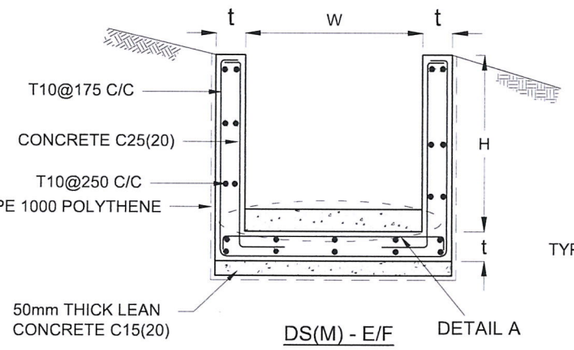
7. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
   [a] SCREED - C15(20)
   [b] WALLS / BASE / ENERGY BREAKERS - C25(20)

REINFORCEMENT

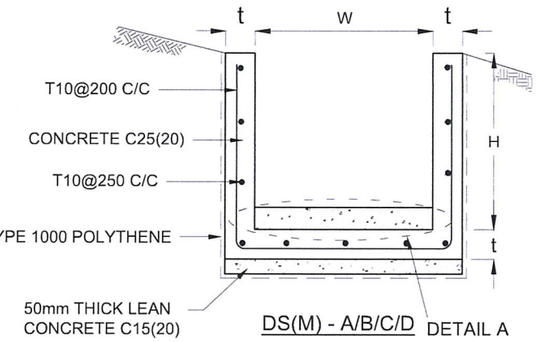
8. HIGH YIELD REINFORCEMENT BARS DENOTED BY "T" SHALL CONFORM TO THE REQUIREMENTS OF TYPE 2 OF BS 4449 AND HAVE A CHARACTERISTIC TENSILE STRENGTH OF 460N/mm².
9. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 40 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
10. ANCHORAGE 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



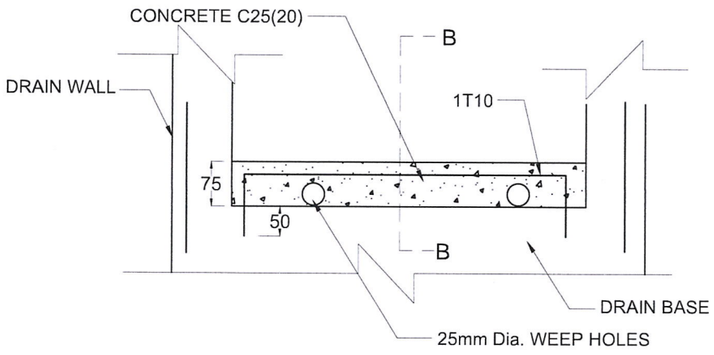
DS(M) - P/ R /Q



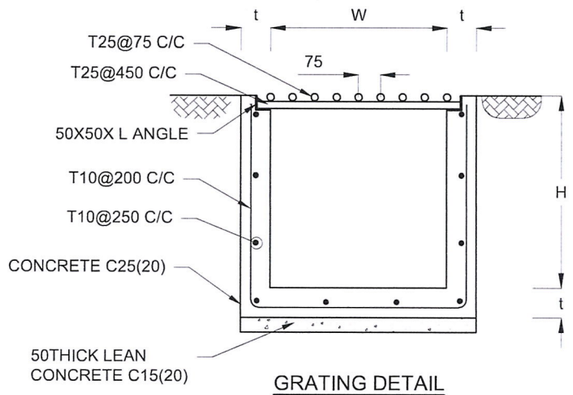
DS(M) - E/F



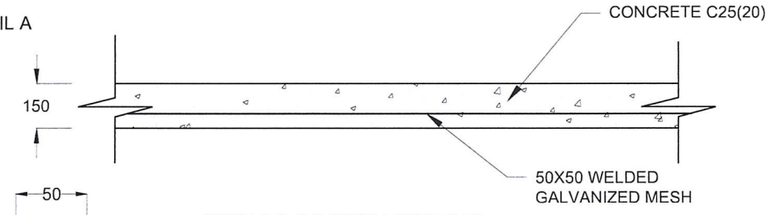
DS(M) - A/B/C/D



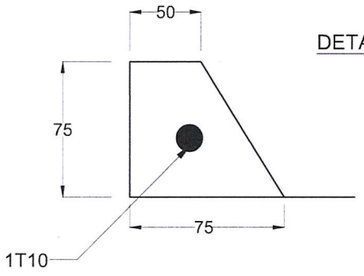
DETAIL A - (ENERGY BREAKER AT 3M)



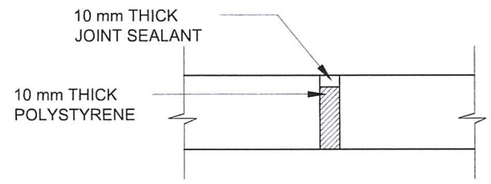
GRATING DETAIL



DETAILS OF BERM SEALING



SECTION B-B



EXPANTION JOINT DETAIL

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

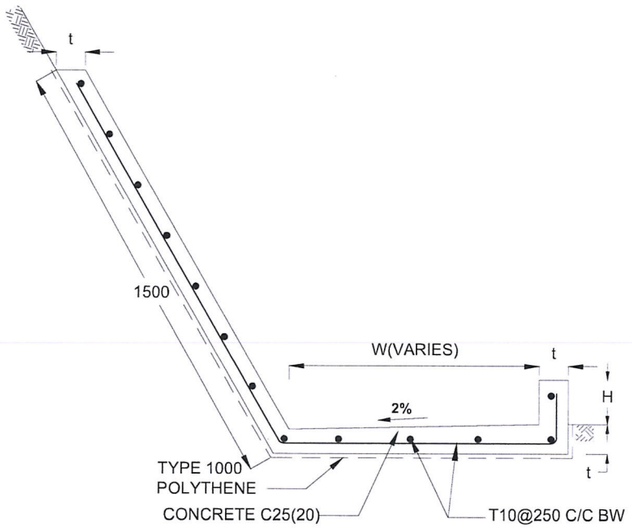
REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-50CH

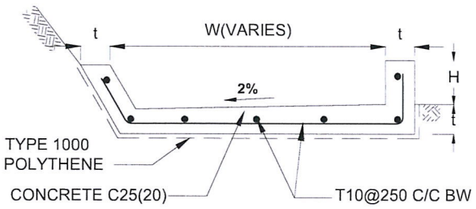
DETAILS OF DRAINS
(SURFACE DRAIN -1 OF 2)

SCALE N.T.S. | DATE 19.06.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-50CH/DR 05a | REVISION 00

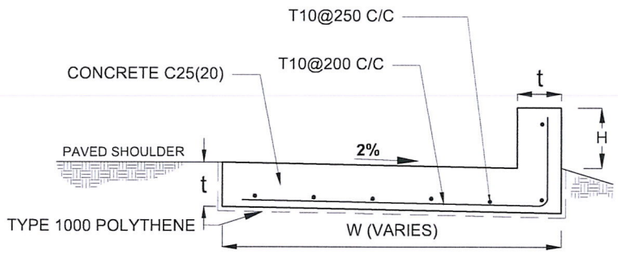
DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. G.G.R.KALHARA.	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



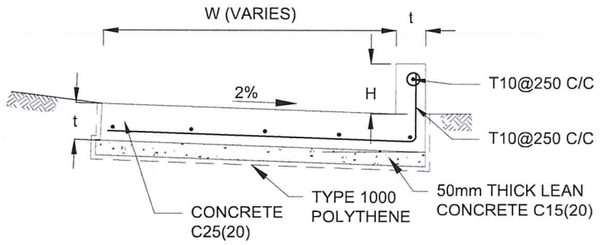
DS (B) - (TYPE I)



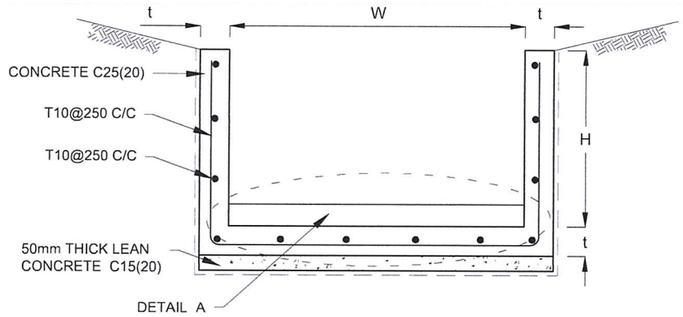
DS (B) - (TYPE II)



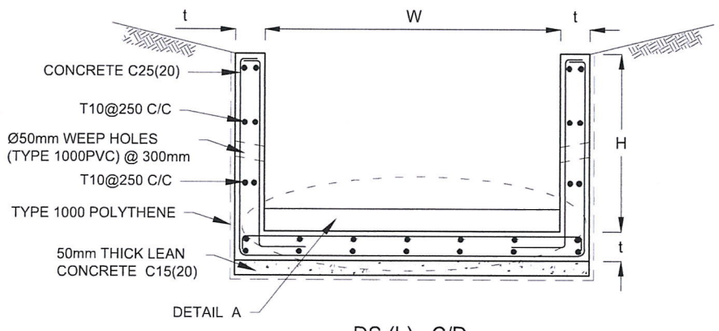
DS (K) - TYPE II



DS (K) - TYPE I



DS (L) - A/B



DS (L) - C/D

DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (B) - A	500	150	100
DS (B) - B	1000	150	100
DS (B) - C	1500	150	100
DS (B) - D	2000	150	100

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

DRAIN TYPE	W (mm)	H (mm)	t (mm)
DS (L) - A	1000	600	100
DS (L) - B	1000	800	125
DS (L) - C	1000	1000	125
DS (L) - D	2000	2000	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 IN STAGGERED PATTERN 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. COVER SLABS NEED TO BE PROVIDED ONLY FOR THE REGIONS AS INSTRUCTED BY THE ENGINEER.
6. COVER SLAB WIDTH (W_C) SHOULD BE TAKEN AS THE SUM OF DRAIN WIDTH AND 2x DRAIN WALL THICKNESS. [W_C = W+2xt]
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
8. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED IN EVERY 5m INTERVAL.

CONCRETE

9. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
   [a] SCREED - C15(20)
   [b] WALLS / BASE / ENERGY BREAKERS - C25(20)

REINFORCEMENT

10. HIGH YIELD REINFORCEMENT BARS DENOTED BY "T" SHALL CONFORM TO THE REQUIREMENTS OF TYPE 2 OF BS 4449 AND HAVE A CHARACTERISTIC TENSILE STRENGTH OF 460N/mm².
11. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 40 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
12. ANCHORAGE LENGTH SHOULD BE 40X BAR DIA.
13. REINFORCEMENT BARS SHALL BE BENT IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
14. COVER TO REINFORCEMENT
    [a] BURIED FACES AND DRAIN INVERTS - 40 mm
    [b] ALL OTHER FACES - 25 mm

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

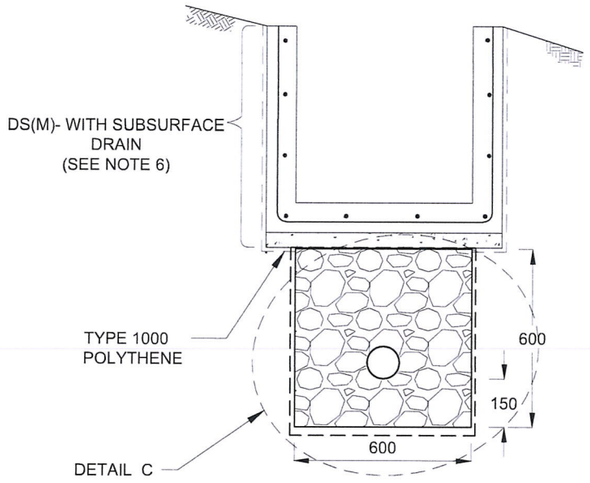
REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-50CH

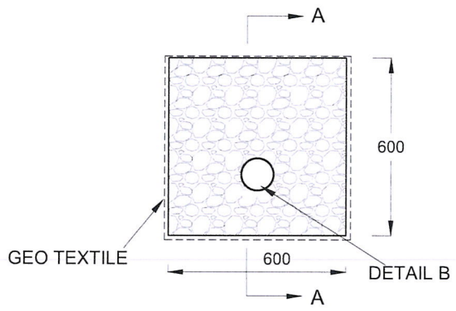
DETAILS OF DRAINS
(SURFACE DRAIN -2 OF 2)

SCALE N.T.S. | DATE 19.06.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-50CH/DR 05b | REVISION 00

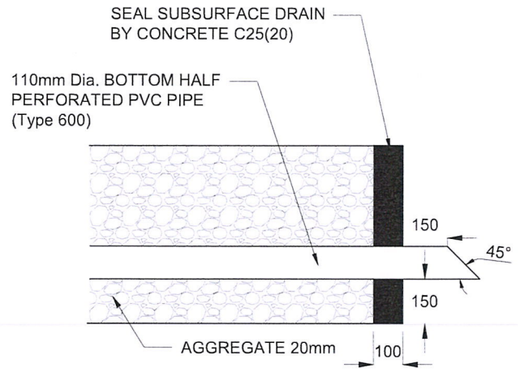
DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. G.G.R.KALHARA.	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



SUBSURFACE DRAIN
[DS (S) -A]



DETAIL C / DS (S)-A



SECTION A-A
(OUTLET DETAIL SUBSURFACE DRAIN)

NOTES

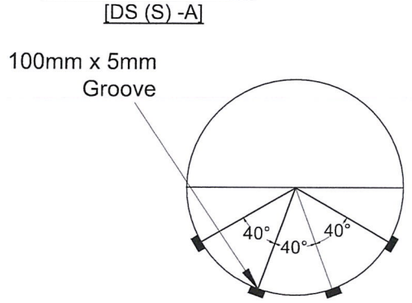
1. W,H,t ; SHALL BE THE SAME AS RESPECTIVE DRAIN SECTION.
2. CP - R SHALL BE USED WHERE H > = 900mm
3. DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
4. DOWELS SHALL BE INSTALLED ACCORDING TO THE GROUND CONDITIONS AS INSTRUCTED BY THE ENGINEER.
5. 10 mm THICK EXPANSION JOINT SHALL BE INTRODUCED 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

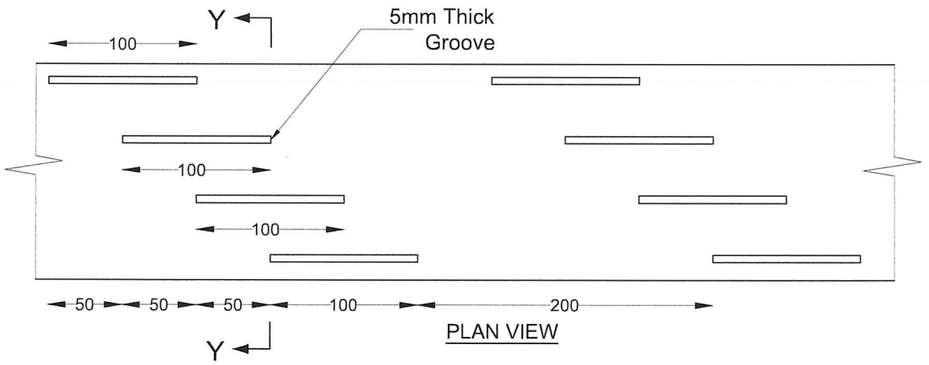
8. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
   [a] SCREED - C15(20)
   [b] WALLS / BASE / ENERGY BREAKERS - C25(20)

REINFORCEMENT

9. HIGH YIELD REINFORCEMENT BARS DENOTED BY "T" SHALL CONFORM TO THE REQUIREMENTS OF TYPE 2 OF BS 4449 AND HAVE A CHARACTERISTIC TENSILE STRENGTH OF 460N/mm².
10. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 40 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

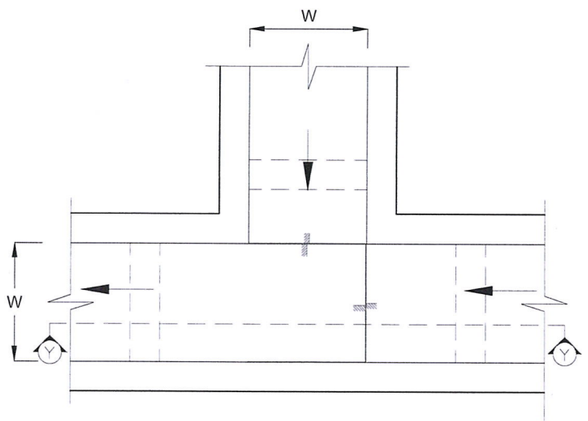


SECTION Y - Y

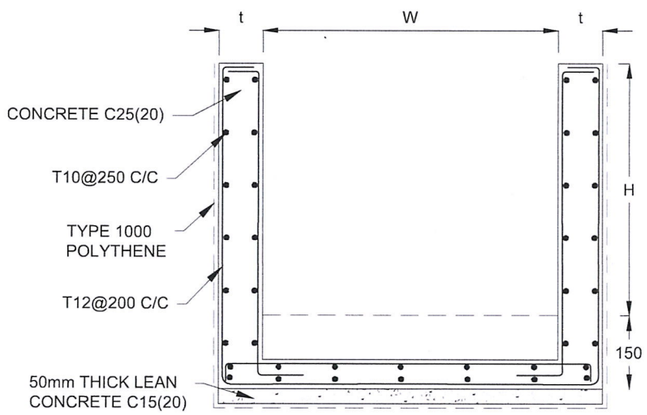


PLAN VIEW

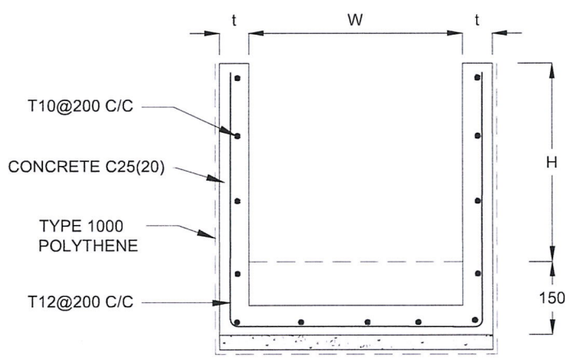
DETAIL - B (PERFORATED PIPE FOR SUB-SURFACE DRAINS)



PLAN VIEW OF CATCH PIT (CP)



SECTION Y-Y (CP- R)

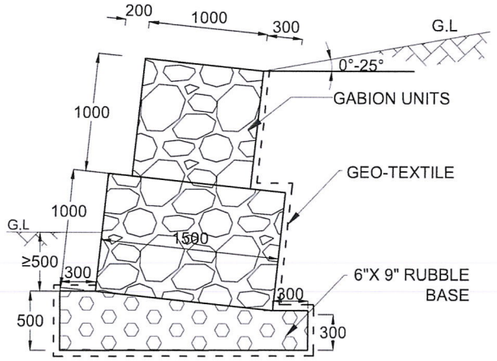


SECTION Y - Y

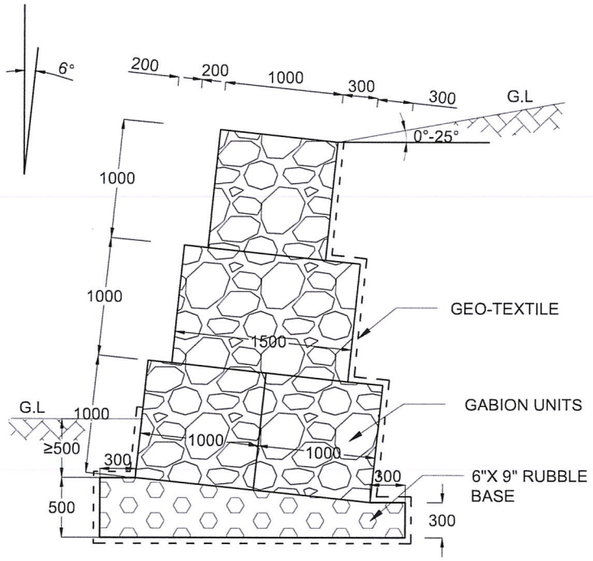
EMPLOYER	DESIGNER	MITIGATION DESIGN FOR FAILURE LOCATIONS ALONG MAIN LINE DUE TO 'DITWAH' CYCLONE MAIN LINE (FROM WATTEGAMA - TO UKUWELA) MILEAGE - 12M-50CH	DETAILS OF DRAINS (SUBSURFACE DRAIN AND CATCHPIT)
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT SRI LANKA RAILWAYS WAY AND WORKS DEPARTMENT NO. 01, D. R. WIJEWARDHANA MAWATHA, COLOMBO 10.	DESIGN UNIT NATIONAL BUILDING RESEARCH INSTITUTE No. 99/1, JAWATTA ROAD, COLOMBO - 05		SCALE N.T.S. DATE 19.06.2026 PROJECT / DRAWING No. NBRI/GED/2026/30/28584/12M-50CH/DR 05c REVISION 00

REV	DATE	REVISION DESCRIPTION	APPROVAL

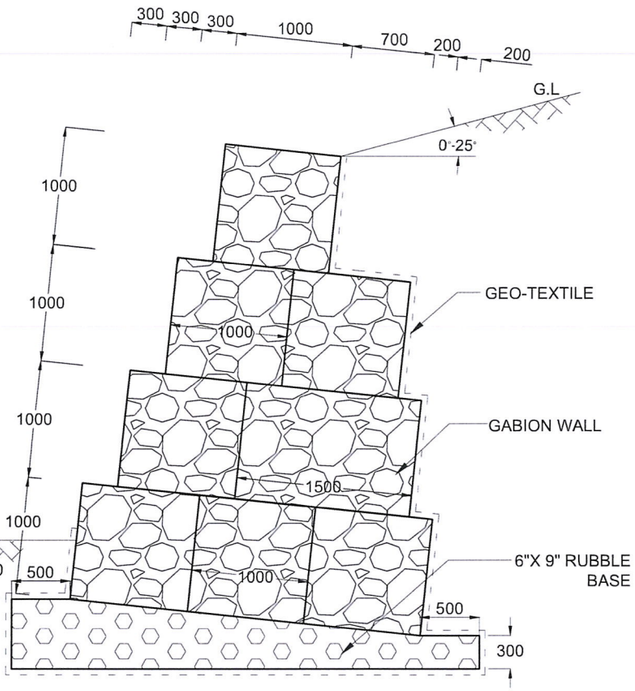
DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. G.G.R.KALHARA.	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



GABION WALL
2m



GABION WALL
3m



GABION WALL
4m

GABION WALL
5m

NOTES

1. ALL DIMENSION ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. BACKSLOPE ANGLE, LEVEL AND FORM MAY VARY AS PER THE DESIGN AT EACH SITE.

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 12M-50CH

TITLE

DETAILS OF GABION WALL

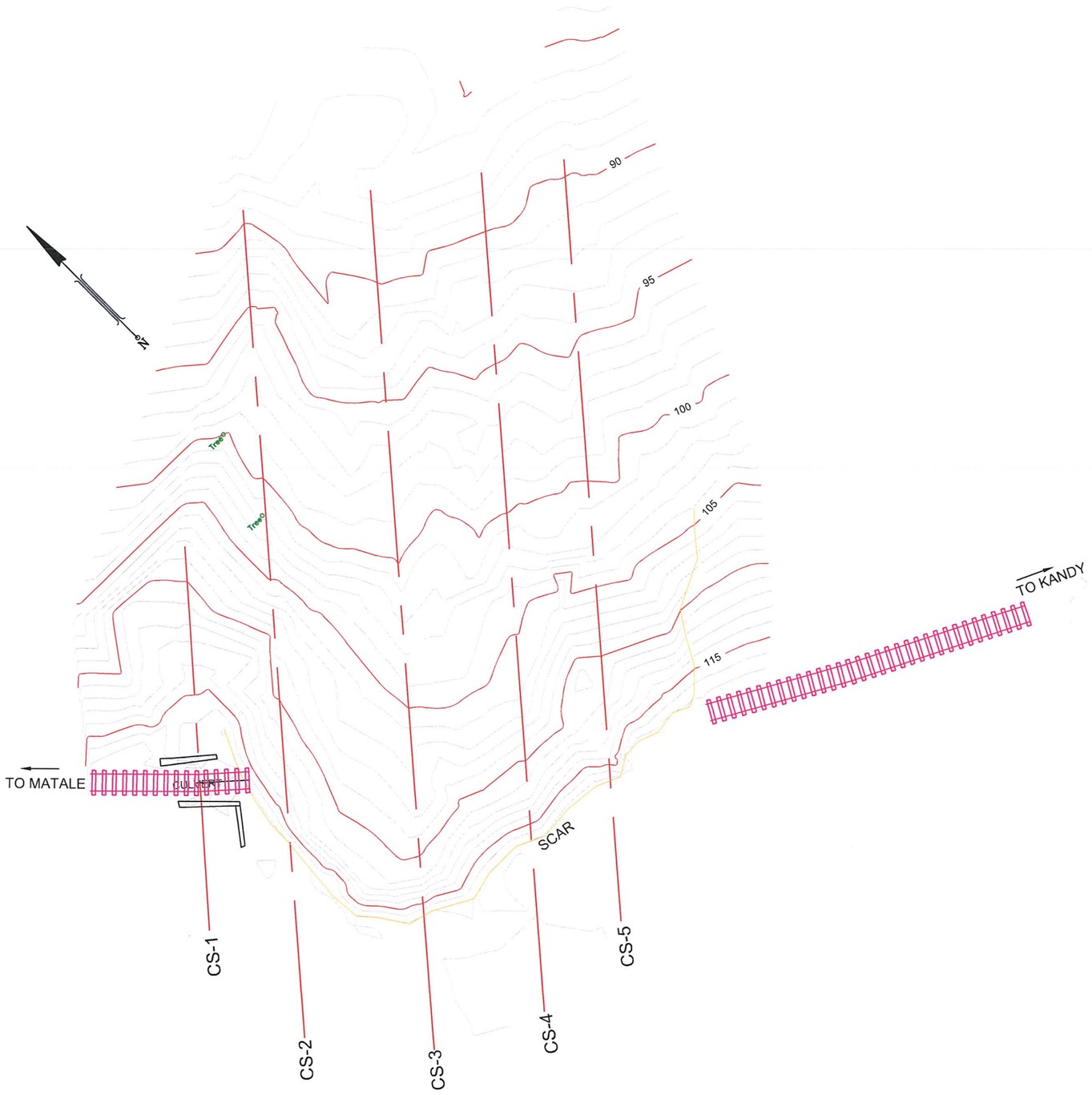
SCALE N.T.S. | DATE 19.06.2026

PROJECT / DRAWING No.
NBRI/GED/2026/30/28584/12M-50CH/DR 05e

REVISION 00

DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. G.G.R.KALHARA	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	

SITE NO 253



EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MATALE LINE (FROM WATTEGAMA - TO UKUWELLA)
MILEAGE - 13M 10CH

TITLE

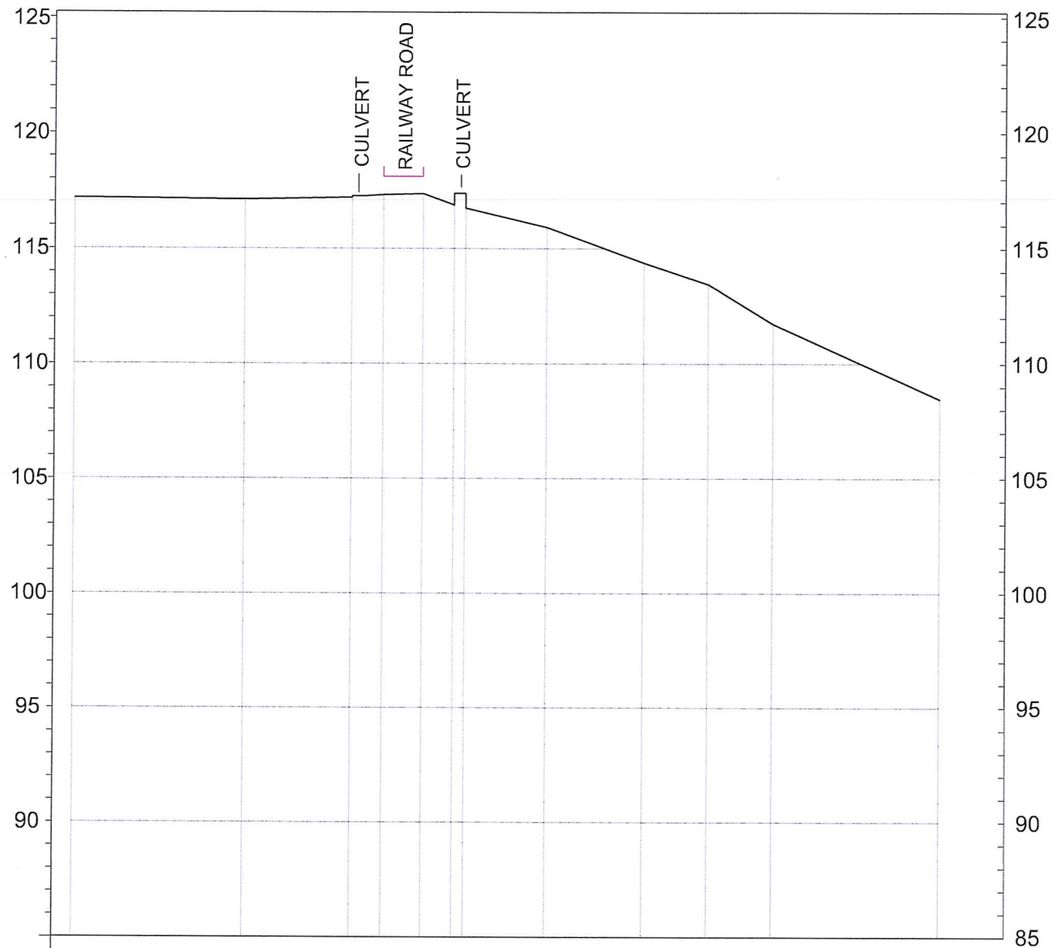
SURVEY PLAN

SCALE: N.T.S. | DATE: 19.06.2026

PROJECT / DRAWING No.: NBRI/GED/2026/30/28584/13M-10CH/DR 01

REVISION: 00

DESCRIPTION	NAME	SIGNATURE
SURVEYED	NBRI	
CHECKED	ENG.G.G.R.KALHARA	



DATUM 85 (m)

GROUND LEVEL (m)	117.170	117.110	117.190	117.310	117.360	116.870	117.370	116.730	115.910	114.380	113.440	111.730	108.480
DISTANCE (m)	0.000	7.417	12.076	13.455	15.158	16.524	17.026	17.026	20.529	24.773	27.577	30.388	37.654

CS - 01

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MATALE LINE (FROM WATTEGAMA - TO UKUWELLA)
MILEAGE - 13M 10CH

TITLE

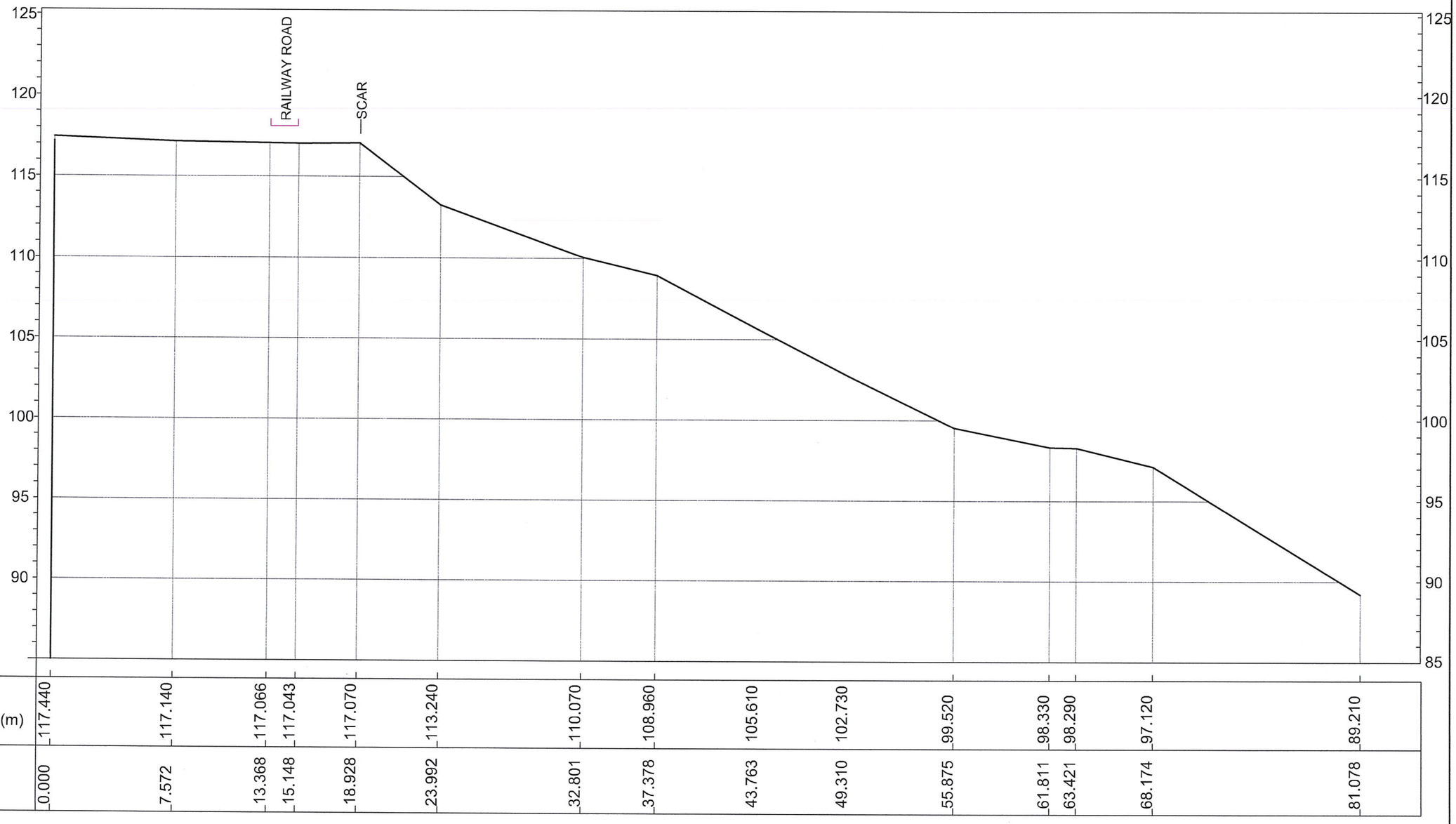
CROSS SECTIONAL VIEW
AT CS - 01

SCALE N.T.S. DATE 19.06.2026

PROJECT / DRAWING No.
NBRI/GED/2026/30/28584/13M-10CH/DR 02a

REVISION 00

DESCRIPTION	NAME	SIGNATURE
SURVEYED	NBRI	
CHECKED	ENG.G.G.R.KALHARA	



DATUM 85 (m)

GROUND LEVEL (m)	117.440	117.140	117.066	117.043	117.070	113.240	110.070	108.960	105.610	102.730	99.520	98.330	98.290	97.120	89.210
DISTANCE (m)	0.000	7.572	13.368	15.148	18.928	23.992	32.801	37.378	43.763	49.310	55.875	61.811	63.421	68.174	81.078

CS - 02

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MATALE LINE (FROM WATTEGAMA - TO UKUWELLA)
MILEAGE - 13M 10CH

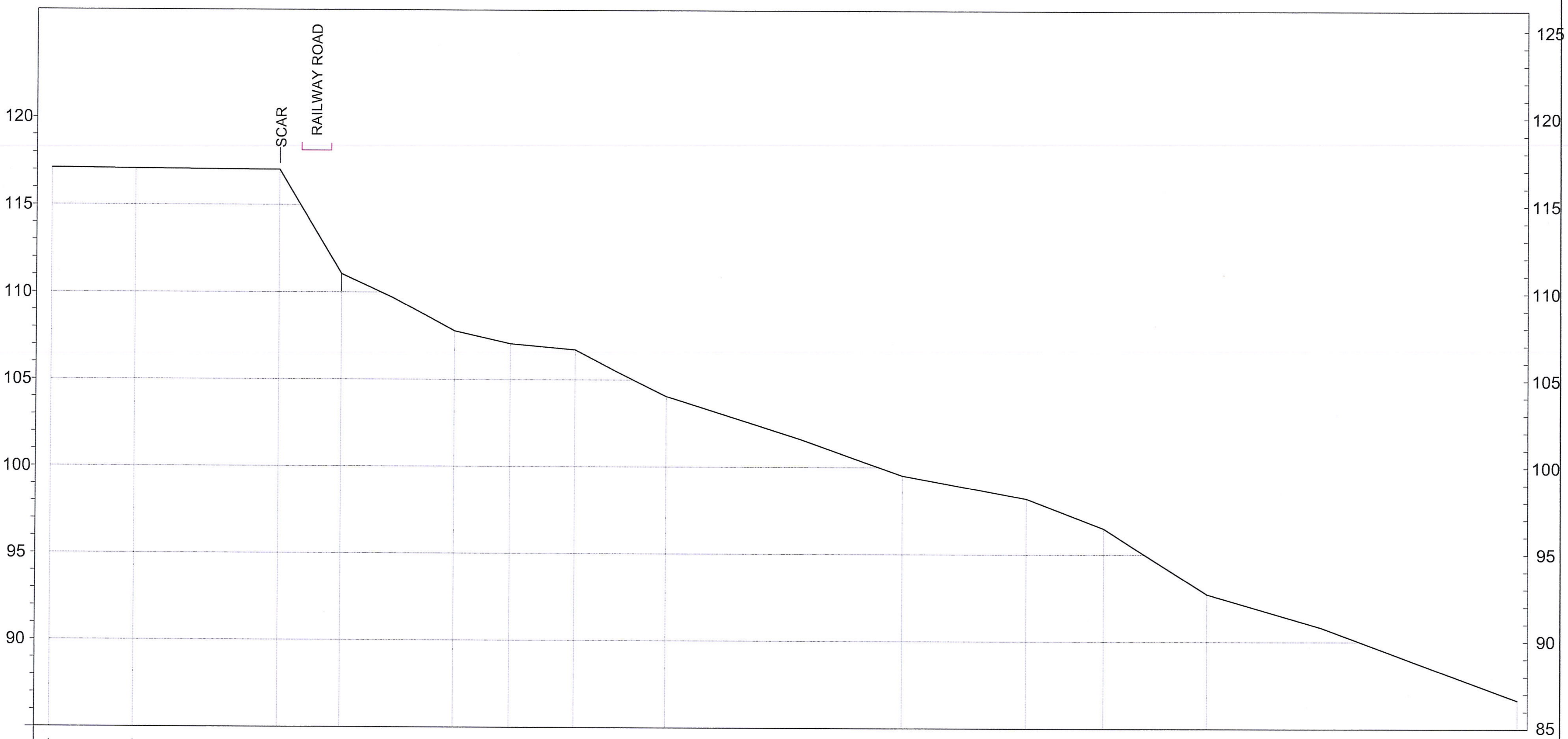
TITLE

CROSS SECTIONAL VIEW
AT CS - 02

SCALE: N.T.S. | DATE: 19.06.2026

PROJECT / DRAWING No.: NBRI/GED/2026/30/28584/13M-10CH/DR 02b | REVISION: 00

DESCRIPTION	NAME	SIGNATURE
SURVEYED	NBRI	
CHECKED	ENG.G.G.R.KALHARA	



DATUM 85 (m)

GROUND LEVEL (m)	117.110	117.060	117.010	116.000	112.916	111.050	107.790	107.070	106.730	105.550	104.060	99.530	98.210	96.500	92.730	86.640
DISTANCE (m)	0.000	4.781	13.077	13.680	15.527	16.644	23.144	26.366	30.088	32.334	35.311	48.904	55.991	60.459	66.383	84.198

CS - 03

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA, COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MATALE LINE (FROM WATTEGAMA - TO UKUWELLA)
MILEAGE - 13M 10CH

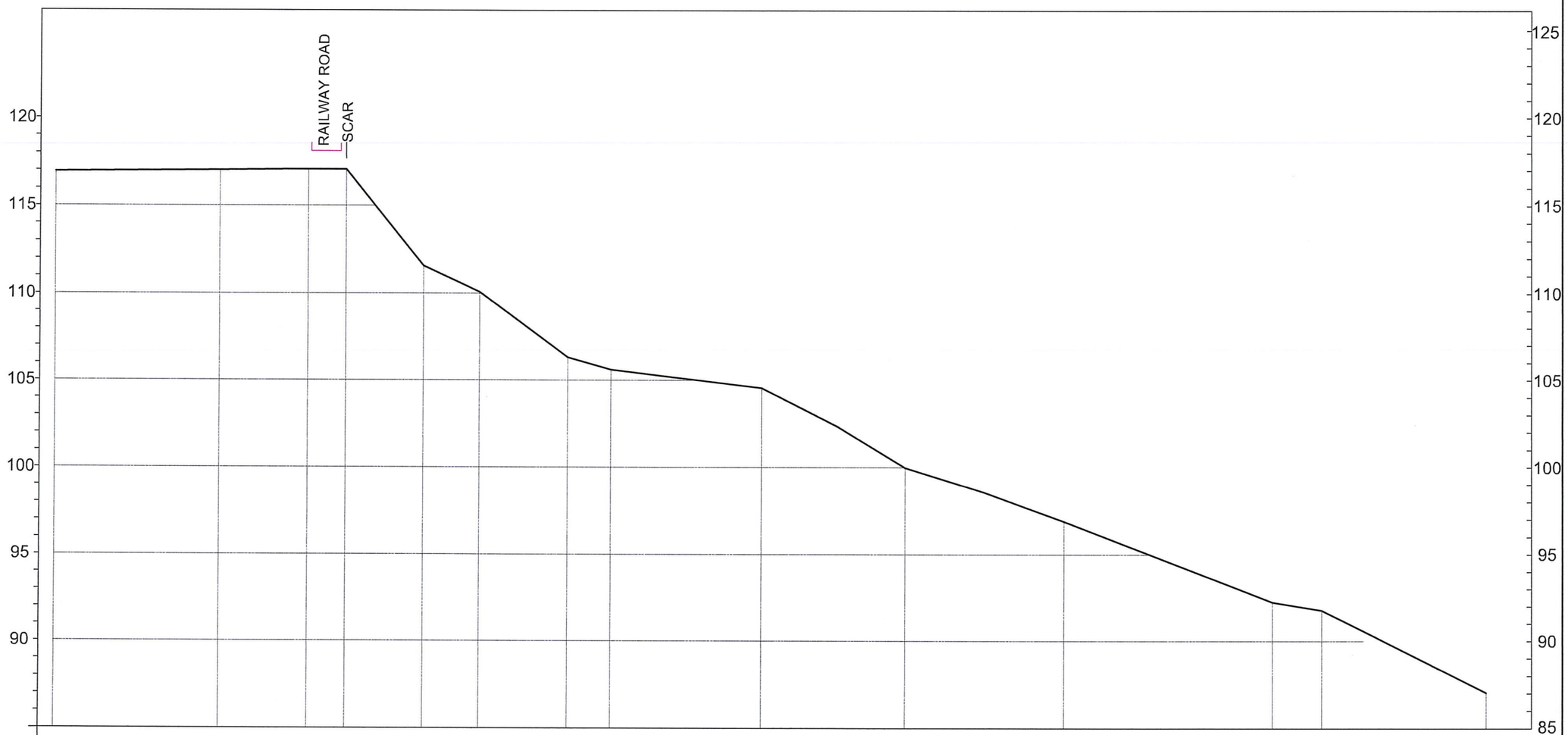
TITLE

CROSS SECTIONAL VIEW
AT CS - 03

SCALE: N.T.S. | DATE: 19.06.2026

PROJECT / DRAWING No.: NBRI/GED/2026/30/28584/13M-10CH/DR 02c | REVISION: 00

DESCRIPTION	NAME	SIGNATURE
SURVEYED	NBRI	
CHECKED	ENG.G.G.R.KALHARA	[signature]



DATUM 85 (m)

GROUND LEVEL (m)	116.930	117.000	117.053	117.060	111.560	110.070	106.320	105.610	104.560	102.340	99.980	98.580	96.890	92.240	91.780	87.060
DISTANCE (m)	0.000	9.443	14.511	16.472	21.151	24.362	29.451	31.916	40.562	44.953	48.859	53.355	57.963	69.945	72.763	82.191

CS - 04

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MATALE LINE (FROM WATTEGAMA - TO UKUWELLA)
MILEAGE - 13M 10CH

TITLE

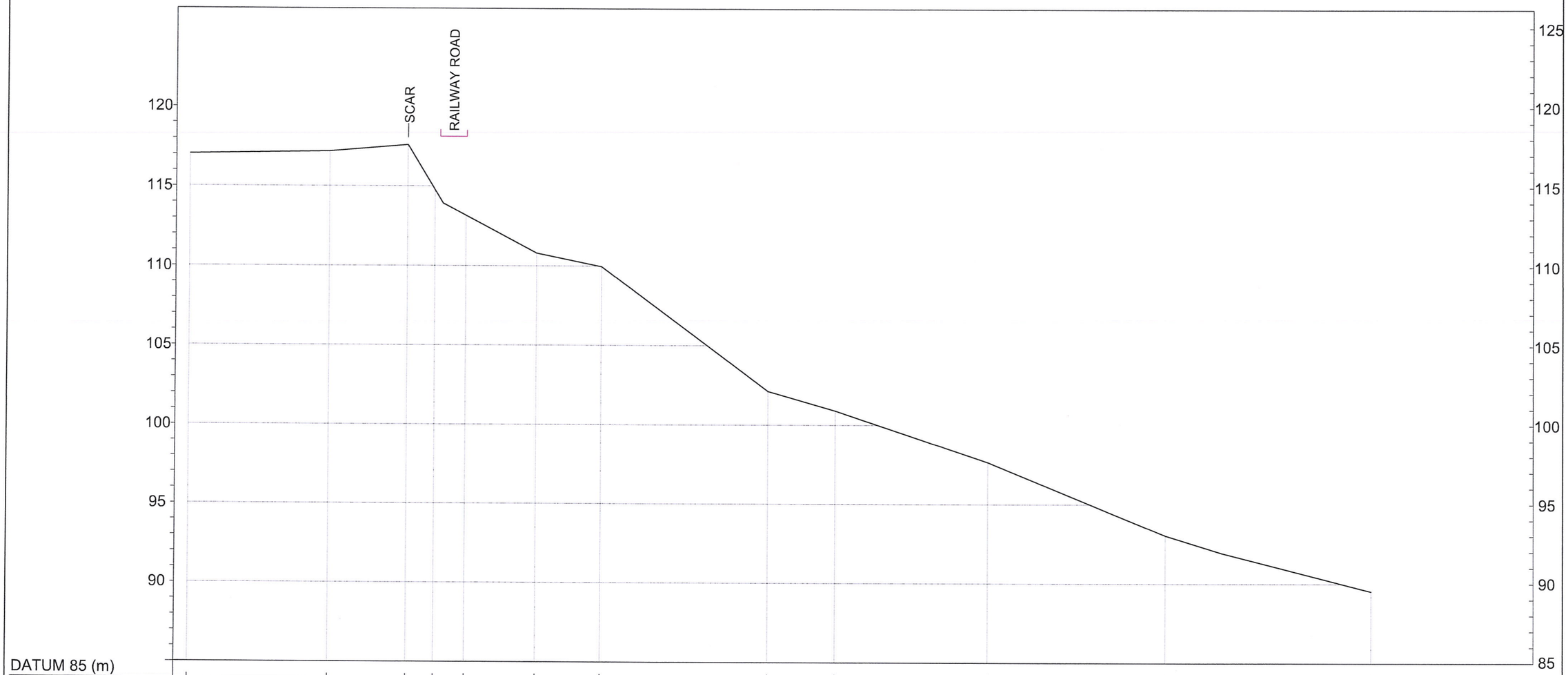
CROSS SECTIONAL VIEW
AT CS - 04

SCALE N.T.S. DATE 19.06.2026

PROJECT / DRAWING No. NBRI/GED/2026/30/28584/13M-10CH/DR 02c

REVISION 00

DESCRIPTION	NAME	SIGNATURE
SURVEYED	NBRI	
CHECKED	ENG.G.G.R.KALHARA	



DATUM 85 (m)

GROUND LEVEL (m)	117.020	117.180	117.590	113.920	114.773	110.810	109.970	102.120	100.910	97.660	93.050	91.950	89.530
DISTANCE (m)	0.000	8.830	13.735	15.463	17.423	21.904	26.009	36.524	40.773	50.410	61.619	65.134	74.620

CS - 05

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MATALE LINE (FROM WATTEGAMA - TO UKUWELLA)
MILEAGE - 13M 10CH

TITLE

CROSS SECTIONAL VIEW
AT CS - 05

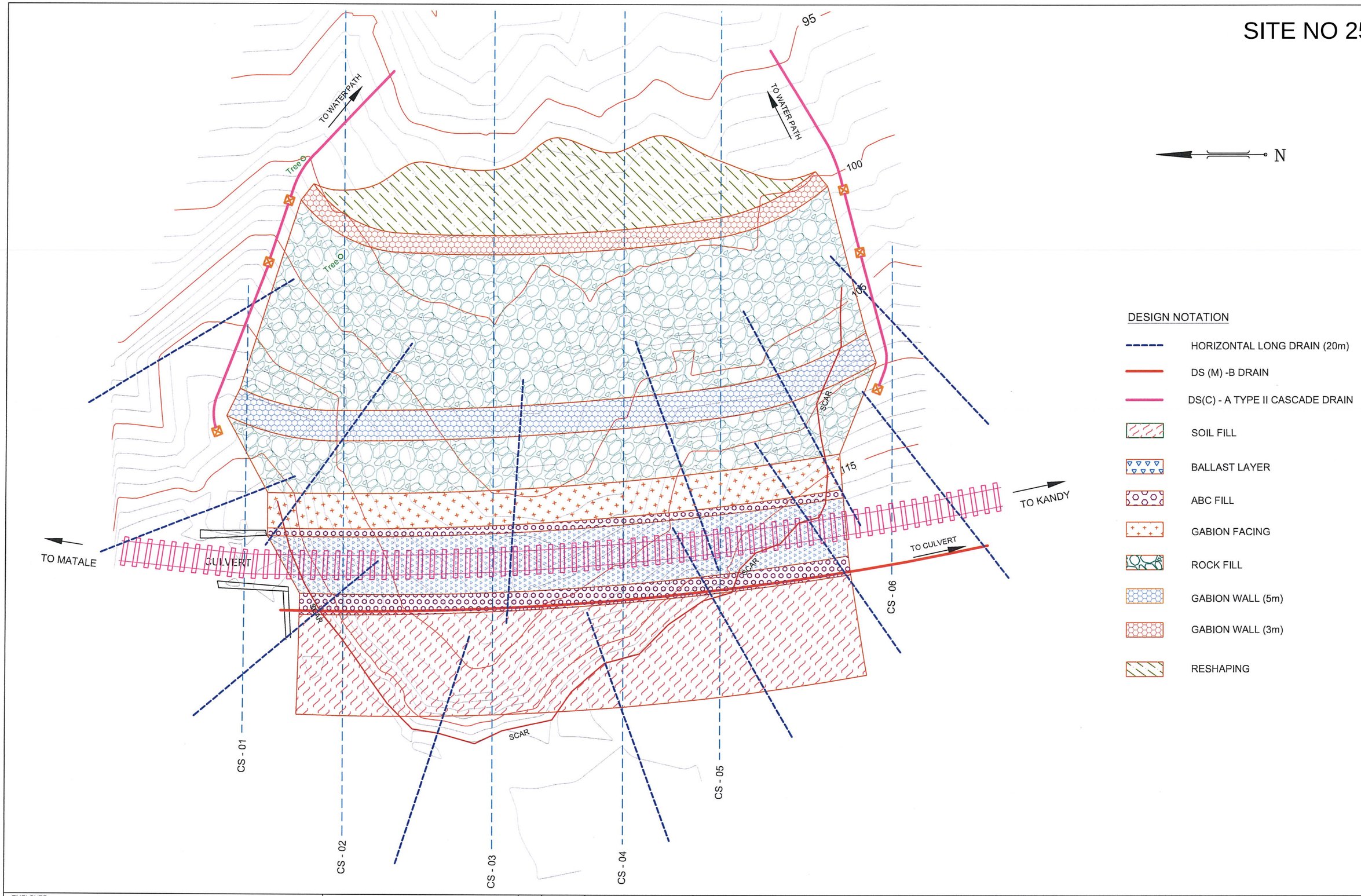
SCALE N.T.S. DATE 19.06.2026

PROJECT / DRAWING No. NBRI/GED/2026/30/28584/13M-10CH/DR 02e

REVISION 00

DESCRIPTION	NAME	SIGNATURE
SURVEYED	NBRI	
CHECKED	ENG.G.G.R.KALHARA	

SITE NO 253



DESIGN NOTATION

- HORIZONTAL LONG DRAIN (20m)
- DS (M) -B DRAIN
- DS(C) - A TYPE II CASCADE DRAIN
- SOIL FILL
- BALLAST LAYER
- ABC FILL
- GABION FACING
- ROCK FILL
- GABION WALL (5m)
- GABION WALL (3m)
- RESHAPING

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

PROJECT TITLE

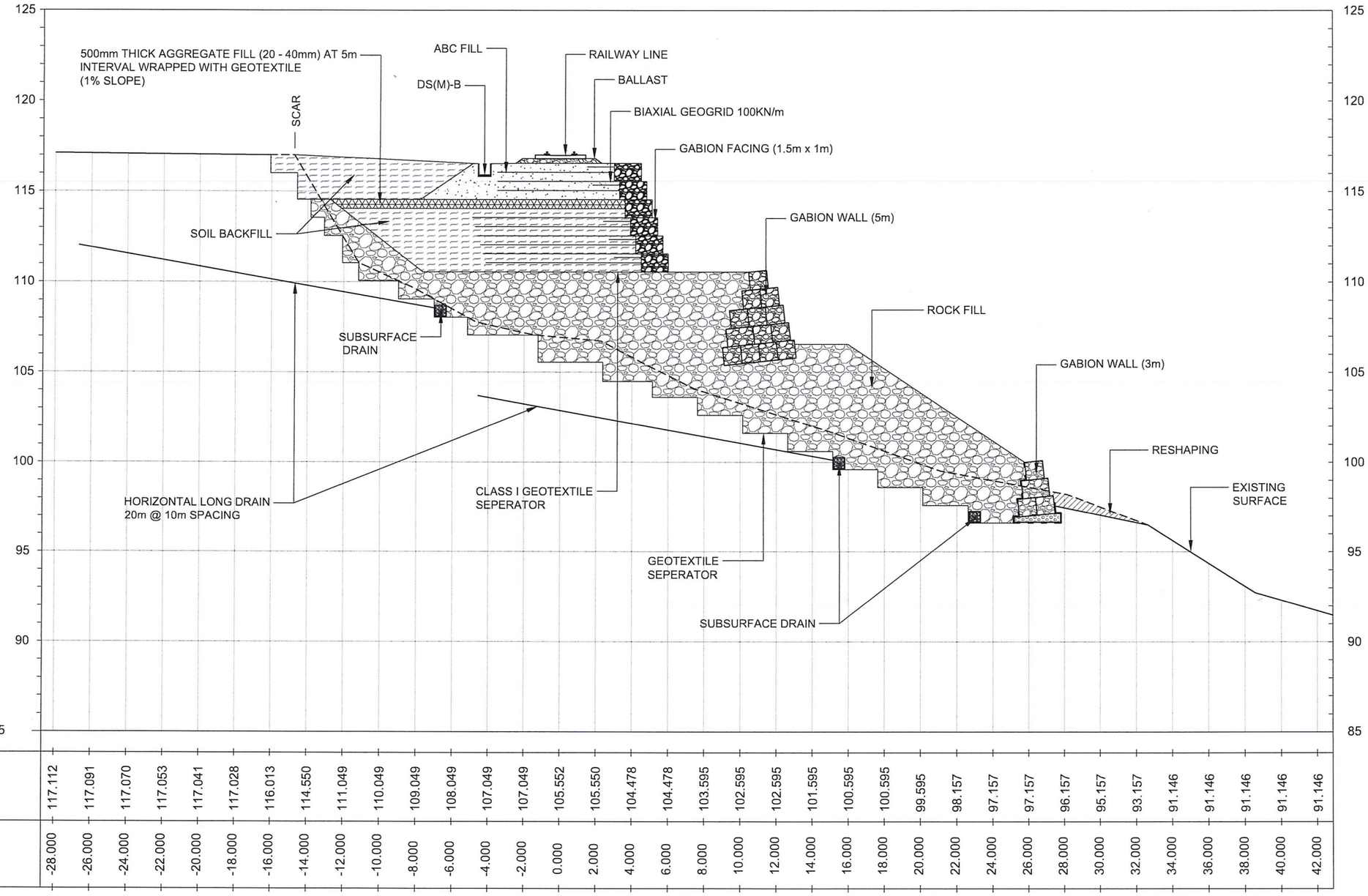
MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 13M 10CH

TITLE

DESIGN PLAN

SCALE	N.T.S.	DATE	19.06.2026
PROJECT / DRAWING No.	NBRI/GED/2026/30/28584/13M 10CH /DR 03	REVISION	00

DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. G.G.R.KALHARA	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



DATUM ABOVE (m) : 85

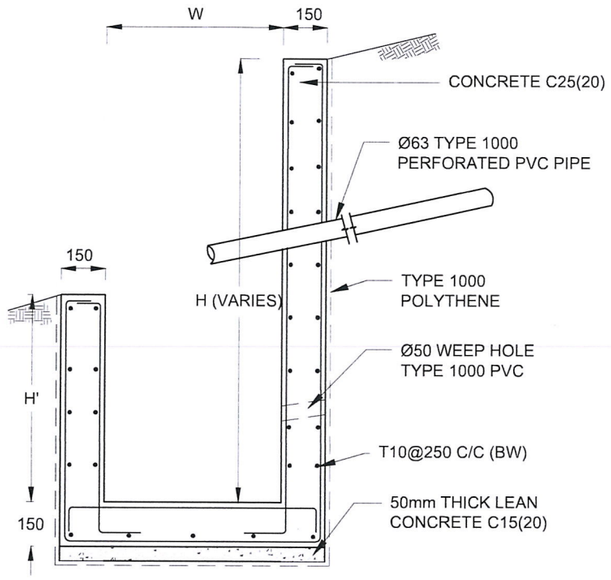
DESIGN LEVEL (m)	117.112	117.091	117.070	117.053	117.041	117.028	116.013	114.550	111.049	110.049	109.049	108.049	107.049	107.049	105.552	105.550	104.478	104.478	103.595	102.595	102.595	102.595	101.595	100.595	100.595	99.595	98.157	97.157	97.157	96.157	95.157	93.157	91.146	91.146	91.146	91.146	91.146
DISTANCE (m)	-28.000	-26.000	-24.000	-22.000	-20.000	-18.000	-16.000	-14.000	-12.000	-10.000	-8.000	-6.000	-4.000	-2.000	0.000	2.000	4.000	6.000	8.000	10.000	12.000	14.000	16.000	18.000	20.000	22.000	24.000	26.000	28.000	30.000	32.000	34.000	36.000	38.000	40.000	42.000

CS - 03

EMPLOYER	DESIGNER	REV	DATE	REVISION DESCRIPTION	APPROVAL	PROJECT TITLE	TITLE
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT SRI LANKA RAILWAYS WAY AND WORKS DEPARTMENT NO. 01, D. R. WIJEWARDHANA MAWATHA, COLOMBO 10.	DESIGN UNIT NATIONAL BUILDING RESEARCH INSTITUTE No. 99/1, JAWATTA ROAD, COLOMBO - 05					MITIGATION DESIGN FOR FAILURE LOCATIONS ALONG MAIN LINE DUE TO 'DITWAH' CYCLONE MAIN LINE (FROM WATTEGAMA - TO UKUWELA) MILEAGE - 13M 10CH	DESIGN SECTION AT CS - 03

SCALE	N.T.S.	DATE	19.06.2026
PROJECT / DRAWING No.	NBRI/GED/2026/30/28584/13M 10CH /DR 04	REVISION	00

DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. G.G.R.KALHARA	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



DS (M) - L

DS(M) - L	W (mm)	H' (mm)
TYPE I	600	600
TYPE II	800	800

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

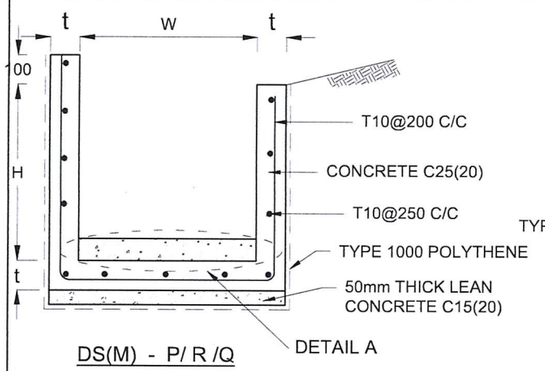
1. DEPTH OF EXCAVATION MAY VARY ACCORDING TO SITE CONDITIONS.
2. STEPS SHALL BE CONSTRUCTED AT SURFACE DRAIN ON SLOPING GROUND ACCORDING TO THE SITE CONDITIONS AS INSTRUCTED BY THE ENGINEER.
3. ENERGY BREAKERS SHALL BE CONSTRUCTED AT THE STEEP DRAIN SEGMENTS AS PER THE INSTRUCTIONS OF THE ENGINEER.
4. 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

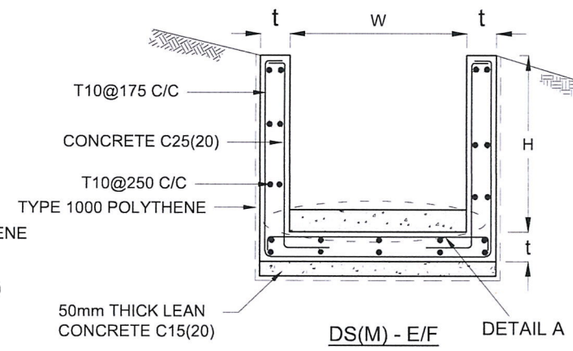
7. USE FOLLOWING CONCRETE GRADES FOR STRUCTURE
   [a] SCREED - C15(20)
   [b] WALLS / BASE / ENERGY BREAKERS - C25(20)

REINFORCEMENT

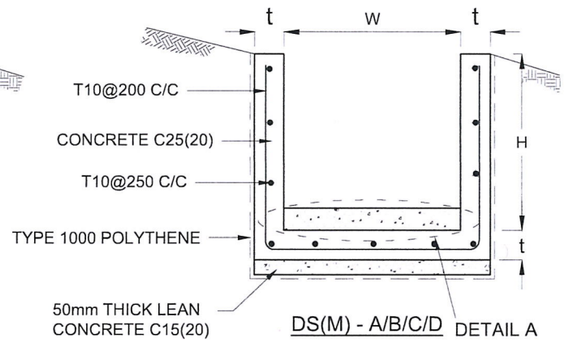
8. HIGH YIELD REINFORCEMENT BARS DENOTED BY "T" SHALL CONFORM TO THE REQUIREMENTS OF TYPE 2 OF BS 4449 AND HAVE A CHARACTERISTIC TENSILE STRENGTH OF 460N/mm².
9. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 40 x BAR DIA. AND LAPPING SHOULD BE STAGGERED.
10. ANCHORAGE 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



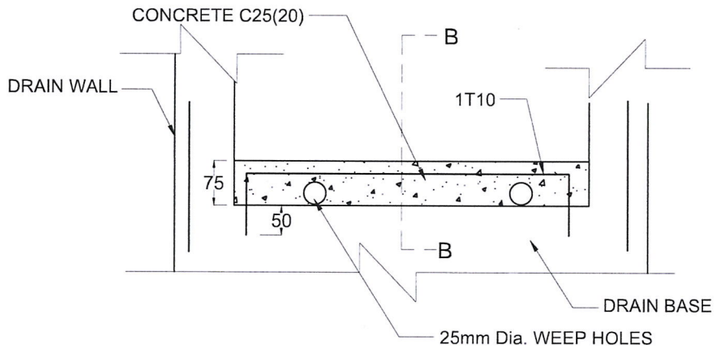
DS(M) - P/ R /Q



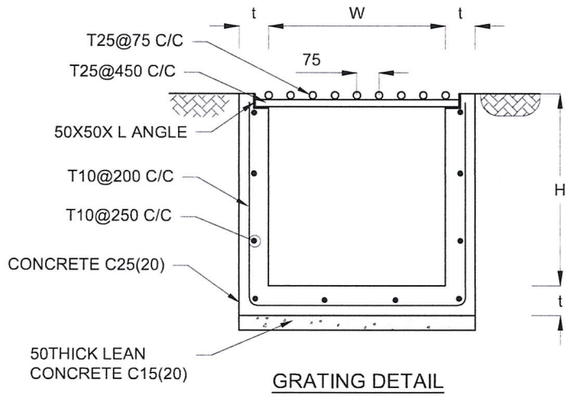
DS(M) - E/F



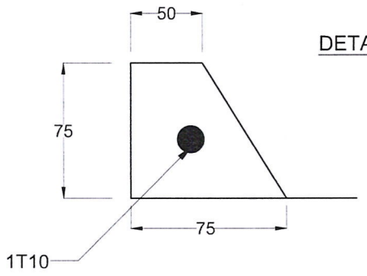
DS(M) - A/B/C/D



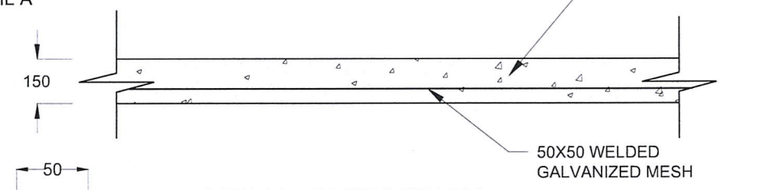
DETAIL A - (ENERGY BREAKER AT 3M)



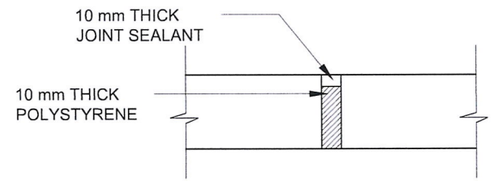
GRATING DETAIL



SECTION B-B



DETAILS OF BERM SEALING



EXPANTION JOINT DETAIL

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

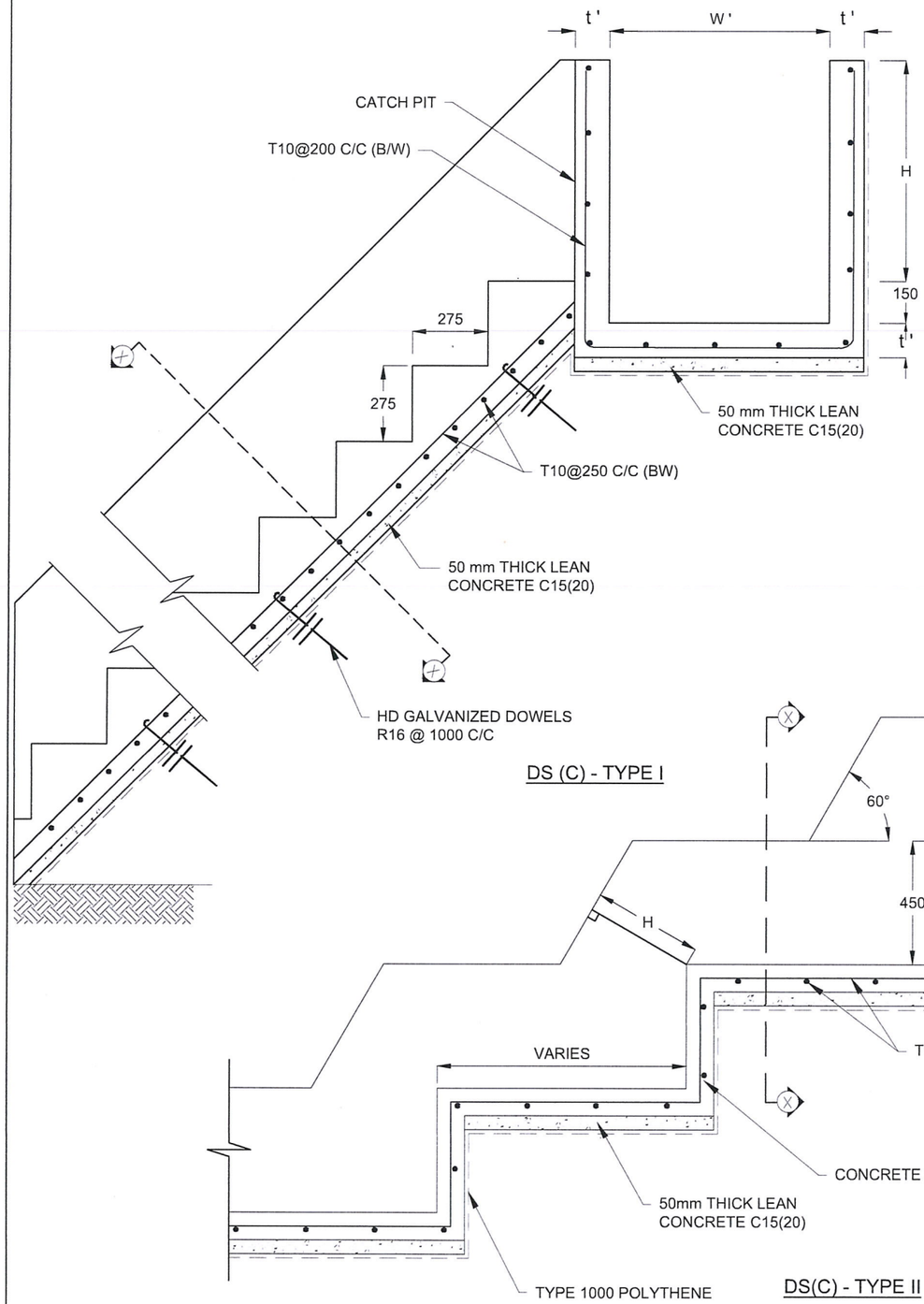
REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 13M 10CH

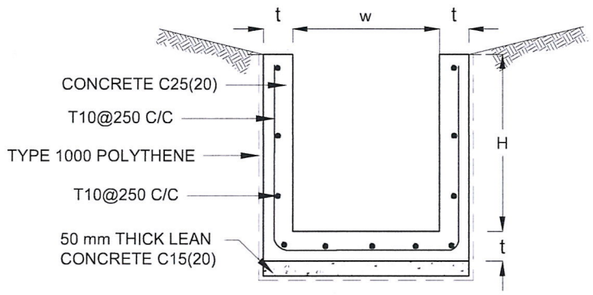
DETAILS OF DRAINS
(SURFACE DRAIN -1 OF 2)

SCALE N.T.S. DATE 19.06.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/13M-10CH/DR 05a
REVISION 00

DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. G.G.R.KALHARA.	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



DS (C) - TYPE I



SECTION X-X

DS(C) - TYPE II

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 - C15(20)
   [b] WALLS / BASE / ENERGY BREAKERS - C25(20)

REINFORCEMENT

8. HIGH YIELD REINFORCEMENT BARS DENOTED BY "T" SHALL CONFORM TO THE REQUIREMENTS OF TYPE 2 OF BS 4449 AND HAVE A CHARACTERISTIC TENSILE STRENGTH OF 460N/mm².
9. BARS OF CUT LENGTH LARGER THAN THE SUPPLIED LENGTH TO BE LAPPED FOR A LENGTH OF 40 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
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

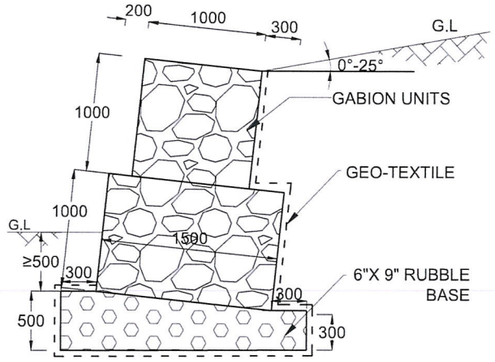
REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 13M 10CH

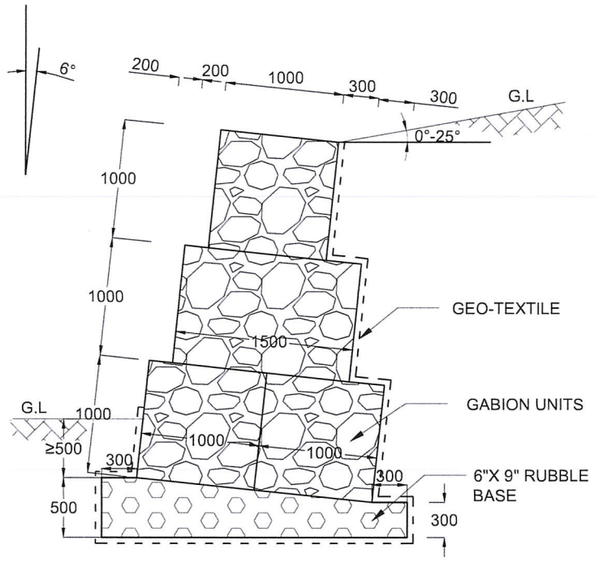
DETAILS OF DRAINS
(CASCADE DRAIN)

SCALE N.T.S. DATE 19.06.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/13M-10CH/DR 05d
REVISION 00

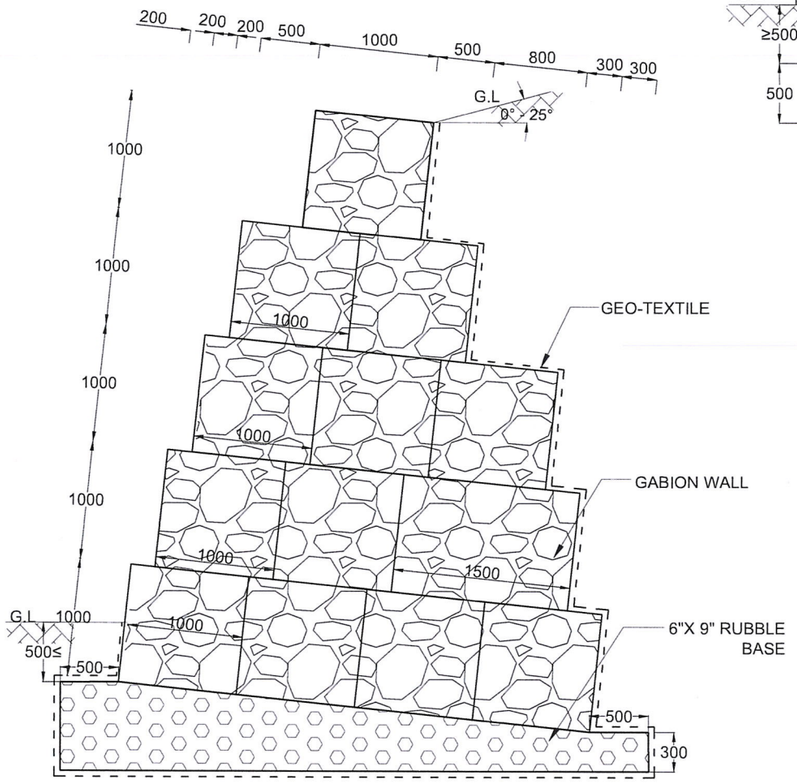
DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. G.G.R.KALHARA.	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	



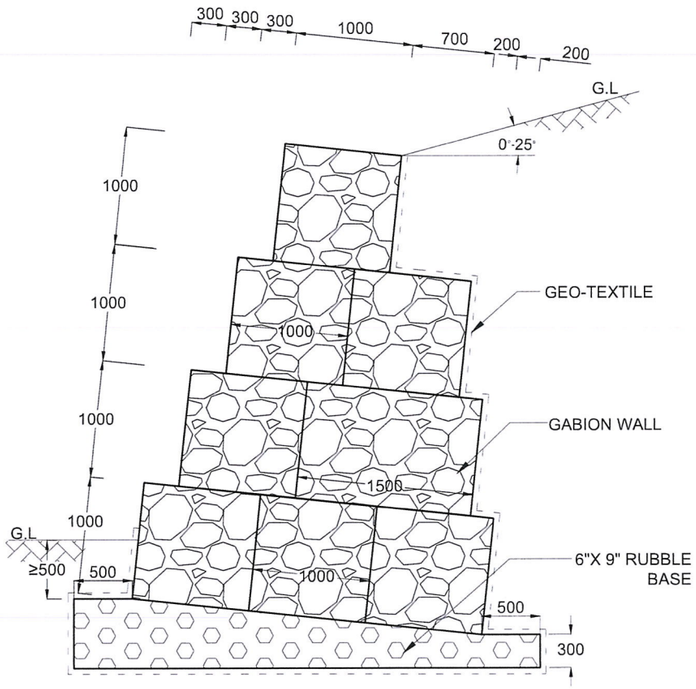
GABION WALL
2m



GABION WALL
3m



GABION WALL
5m



GABION WALL
4m

NOTES

1. ALL DIMENSION ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. BACKSLOPE ANGLE, LEVEL AND FORM MAY VARY AS PER THE DESIGN AT EACH SITE.

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF TRANSPORT, HIGHWAYS AND URBAN DEVELOPMENT
SRI LANKA RAILWAYS
WAY AND WORKS DEPARTMENT
NO. 01, D. R. WIJEWARDHANA MAWATHA,
COLOMBO 10.

DESIGNER

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

REV	DATE	REVISION DESCRIPTION	APPROVAL

MITIGATION DESIGN FOR
FAILURE LOCATIONS ALONG MAIN LINE
DUE TO 'DITWAH' CYCLONE
MAIN LINE (FROM WATTEGAMA - TO UKUWELA)
MILEAGE - 13M 10CH

TITLE

DETAILS OF GABION WALL

SCALE	N.T.S.	DATE	19.06.2026
PROJECT / DRAWING No. NBRI/GED/2026/30/28584/13M-10CH/DR 05e		REVISION	00

DESCRIPTION	NAME	SIGNATURE
DRAWN	G.H.R.YASAPALA	
DESIGNER	ENG. G.G.R.KALHARA	
CHECKED	ENG. (DR.) SANCHITHA JAYAKODY	
RECOMMENDED	PROF. S.A.S. KULATHILAKA	
APPROVED	ENG. (DR.) ASIRI KARUNAWARDENA	