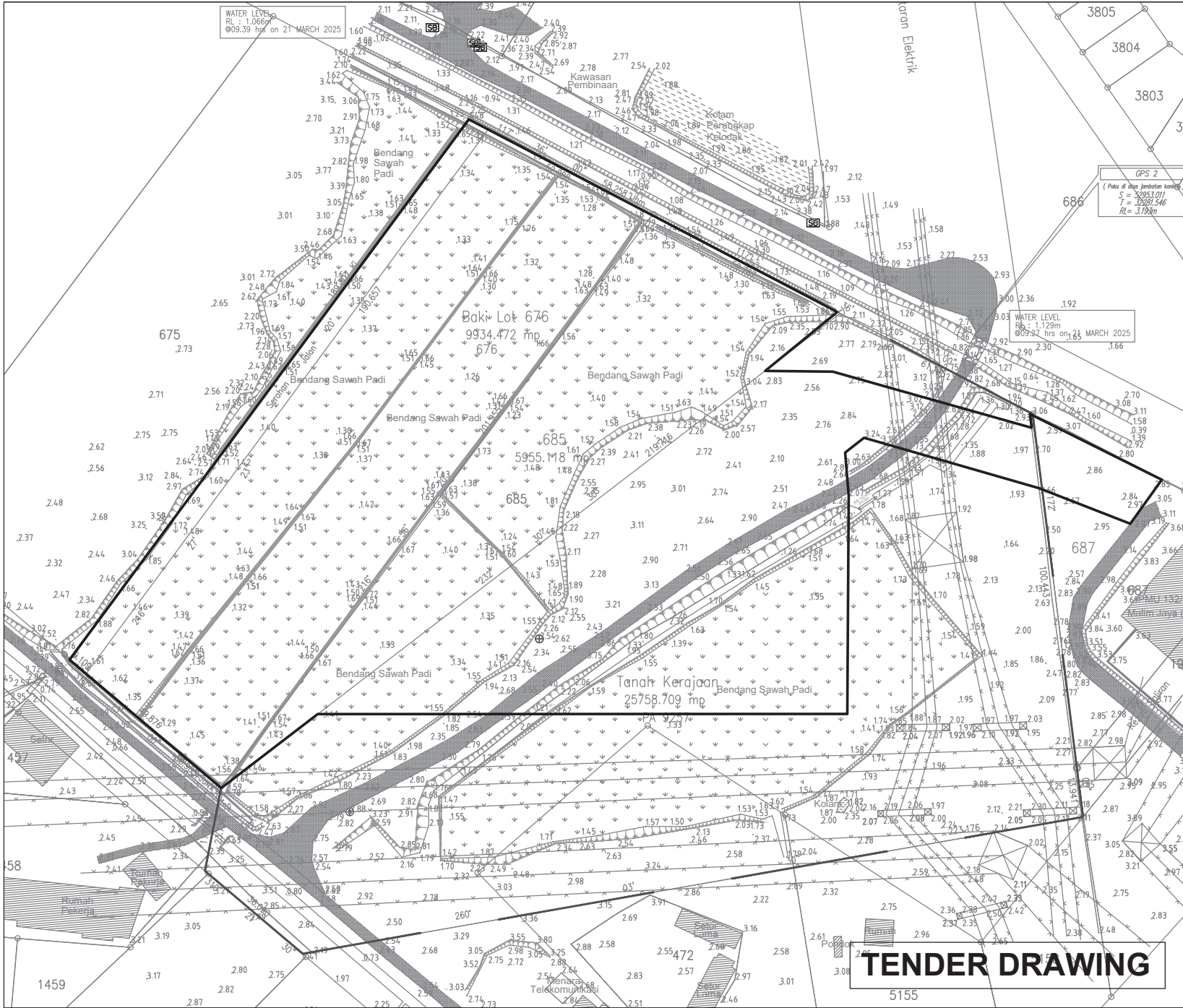




PROJEK

PMU 132/11KV MALIM JAYA REHAB (GROUND IMPROVEMENT WORKS)

TAJUK

GENERAL LAYOUT PLAN OF GROUND IMPROVEMENT PMU 132/11 KV MALIM JAYA REHAB

NOTES:

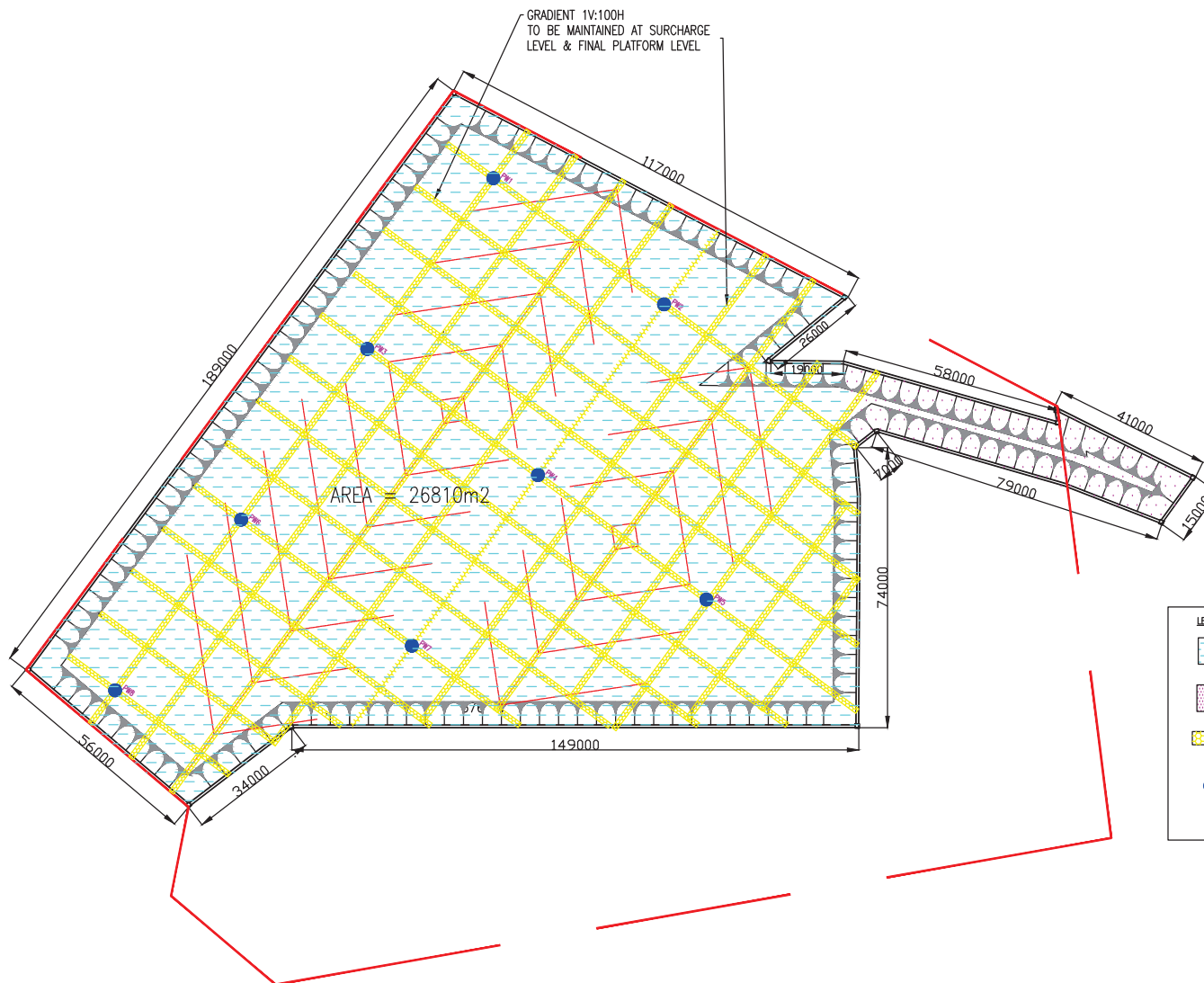
P E N U K A R A N			
BIL.	TARIKH	NAMA	NOTA



TENAGA NASIONAL

NAMA	
DILUKIS OLEH :	MOHD IZZUDDIN BIN HASAN
DISEMAK OLEH :	K. DALIA UTAMA BINTI ZULNISTAWY
DIPERAKUKAN OLEH :	EN. WAN ANJUL AZLAN BIN AHMAD
DILULUS OLEH :	EN. AZLIMA ABDUL RASID
SKALA :	NTS
TARIKH :	12/05/2025

NO. LUKISAN	NO. ACAD
TNB/GD1919a / D1	SLOPE



TENDER DRAWING

PROJEK
PMU 132/11KV MALIM JAYA REHAB (GROUND
IMPROVEMENT WORKS)

TAJUK

PREFABRICATED VERTICAL DRAIN
LAYOUT WITH SUBSOIL DETAILS

NOTES:

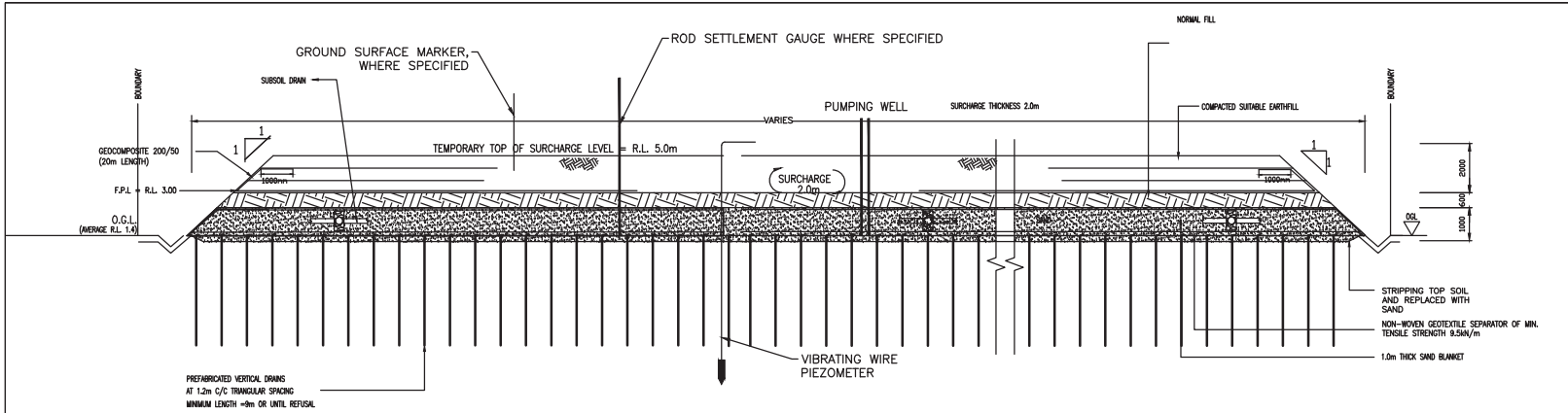
P E N U K A R A N

BIL.	TARIKH	NAMA	NOTA

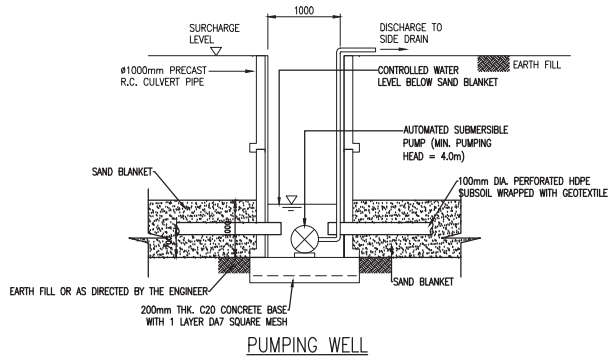
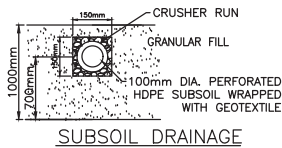
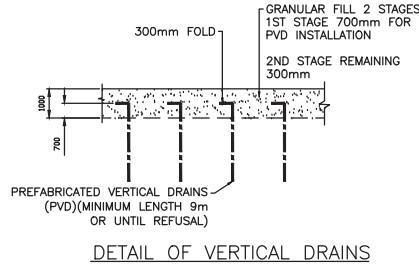
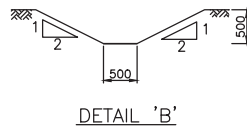
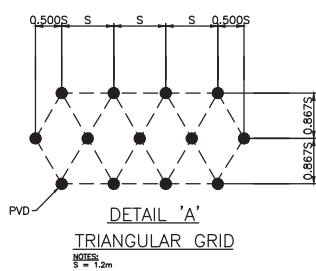


NAMA	
DILUKIS	Oleh : MOHD IZZUDDIN BIN HASAN
DISEMAK	Oleh : K. DALIA UTAMA BINTI ZULNISYAM
DIPERAKUKAN	Oleh : EN. IMAN ANJUL AZLAN BIN AHMAD
DILULUS	Oleh : EN. AZLIMA ABDUL RASID
SKALA	NTS
TARIKH	12/05/2025

NO. LUKISAN TNB/GD1919a/D2	NO. ACAD SLOPE
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PREFABRICATED VERTICAL DRAIN



GENERAL NOTES:

1. ALL DIMENSION MUST BE CHECKED AND VERIFIED ON SITE, ANY DISCREPANCY MUST BE NOTIFIED TO THE S.O. IMMEDIATELY.

GROUND TREATMENT WORK NOTES:

1. CLEAR THE EXISTING GROUND OF ALL VEGETATION, EXCAVATE BELOW EXISTING GROUND TO REQUIRED LEVEL.
2. LAY A LAYER OF NON WOVEN GEOTEXTILE SEPARATOR TS30, FOLLOWED BY 700mm THICK GRANULAR FILL.
3. GRANULAR FILL ABOVE STANDING WATER LEVEL IN DRY CONDITION SHALL BE COMPACTED TO 90% MAXIMUM DRY DENSITY (BS1377:PART 4:1990 METHOD 3.5 OR 3.6).
4. THE SUITABLE FILL MATERIAL FOR BOTH EMBANKMENT AND SETTLEMENT COMPENSATION LAYER SHALL BE COMPACTED TO 90% MAXIMUM DRY DENSITY (BS1377:PART 4:1990 METHOD 3.5 OR 3.6).
5. ADEQUATE GRADIENT SHALL BE PROVIDED ALONG THE TEMPORARY PERIMETER DRAIN TO ENABLE THE COLLECTED WATER TO BE DISCHARGED TO THE NEARBY POND/STREAM. THE TEMPORARY DRAIN SHALL BE MAINTAINED UNTIL THE COMPLETION OF THE EMBANKMENT FILLING AND WAITING PERIOD.
6. THE DRAINAGE BLANKET TOWARDS THE TOES OF THE EMBANKMENT SHALL BE MAINTAINED FREE OF CONTAMINATION AND EROSION TO ENABLE THE PORE WATER FROM THE PVD TO BE EFFECTIVELY DRAINED AWAY FROM THE TOE OF EMBANKMENT BY DRAINAGE DITCHES FOR OTHER SUITABLE MEANS.
7. THE SPECIALIST CONTRACTOR SHALL SUBMIT METHOD OF PREFABRICATED VERTICAL DRAIN WORK TO THE S.O./ENGINEER FOR REVIEW AND APPROVAL PRIOR TO THE COMMENCEMENT OF INSTALLATION WORK. THE METHOD STATEMENT SHALL INCLUDE, BUT NOT LIMITED TO SHOP DRAWINGS SHOWING THE PREFABRICATED VERTICAL DRAIN LAYOUT IN PLAN VIEW, LONGITUDINAL PROFILE AND CROSS SECTION.
8. INSTALL PREFABRICATED VERTICAL DRAINS TO MINIMUM LENGTH (9.00m) OR UNTIL REFUSAL AND AT THE SPACING IN TRIANGULAR GRID (1.2m C/C) AS SPECIFIED. AFTER INSTALLATION, CUT OFF THE PREFABRICATED VERTICAL DRAINS WITH 300mm FOLD.
9. BALANCE 300mm GRANULAR FILL SHALL FOLLOW UPON PVD INSTALLATION.
10. FOR THE EARTHFILL, THE RATE OF FILLING SHALL NOT EXCEED 0.3m PER WEEK. CARRY OUT COMPACTION OF EARTHFILL LAYERS NOT EXCEEDING 300mm UP TO THE FINISHED EARTH PROFILE.
11. ROD SETTLEMENT GAUGE, VIBRATING WIRE PIEZOMETER, INCLINOMETER SHALL BE INSTALLED AT SPECIFIED AREA. THE ROD SETTLEMENT GAUGE, VIBRATING WIRE PIEZOMETER, INCLINOMETER SHALL BE INSTALLED UPON COMPLETION OF PREFABRICATED VERTICAL DRAINS INSTALLATION AND PRIOR TO EARTH FILLING.
12. GROUND SURFACE MARKER SHALL BE INSTALLED WHERE SPECIFIED OVER THE SURCHARGE LEVEL.
13. 100mm DIAMETER PERFORATED HDPE PIPE WRAPPED WITH NON-WOVEN GEOTEXTILE AND CRUSHER RUN ENCLOSURE AS SHOWN IN DRAWING, AT EVERY 20m C/C INTERVAL BOTHWAY PRIOR TO 300mm SANDFILL.
14. PUMPING WELL SHALL BE INSTALLED INTO THE SAND BLANKET WITH DETAILS AS SHOWN. THE PUMPING WELL SHALL BE INSTALLED AT LOCATIONS AS SHOWN IN DRAWING. THE WATER PUMPING SHALL BE BY AUTOMATED SUBMERSIBLE PUMP DURING THE SURCHARGING PERIOD.
15. THE CONTRACTOR SHALL SAFEGUARD THE FUNCTIONALITY OF THE PUMPING WELL. IN THE EVENT THE PUMPING WELL IS DAMAGED OR CLOGGED, REPLACEMENT WELL SHALL BE PROVIDED.
16. TEMPORARY SURFACE EARTH DRAIN SHALL BE PROVIDED TO DRAIN THE PUMPED WATER AWAY FROM THE FILLED EMBANKMENT. THE SURFACE EARTH DRAIN SHALL BE MAINTAINED (i.e DEEPEN) DURING THE SURCHARGING PERIOD TO ENSURE PROPER DISCHARGE OF WATER.
17. UPON COMPLETION OF PVD WORKS WITH SURCHARGE, MECHANICAL STABILISE WALL (MSW) ARE TO BE INSTALLED ALONG THE EDGE OF FILLING TOWARDS THE POND.
18. SURCHARGE PERIOD IS ESTIMATED AT 10 MONTHS OR SUBJECT TO MONITORING RESULTS.

TENDER DRAWING

PROJEK
PMU 132/11KV MALIM JAYA REHAB (GROUND
IMPROVEMENT WORKS)

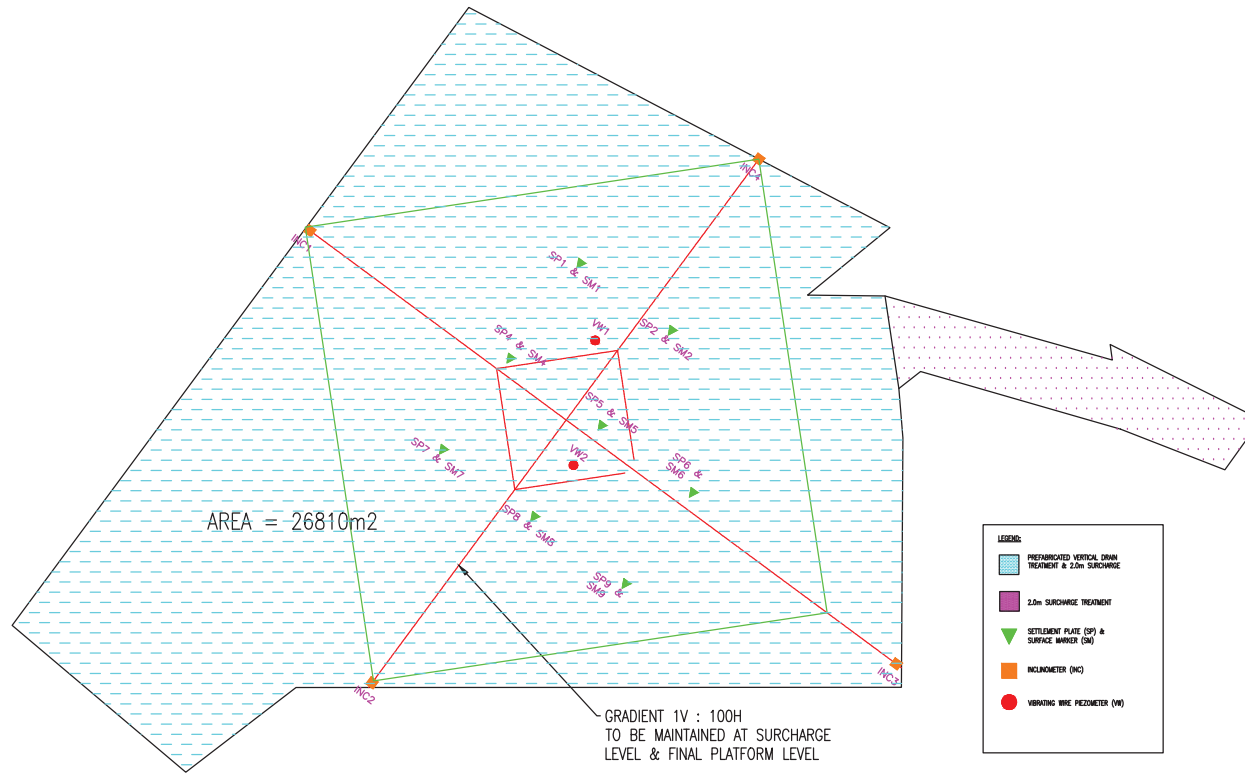
TAJUK

PREFABRICATED VERTICAL DRAIN &
EMBANKMENT FILLING DETAILS

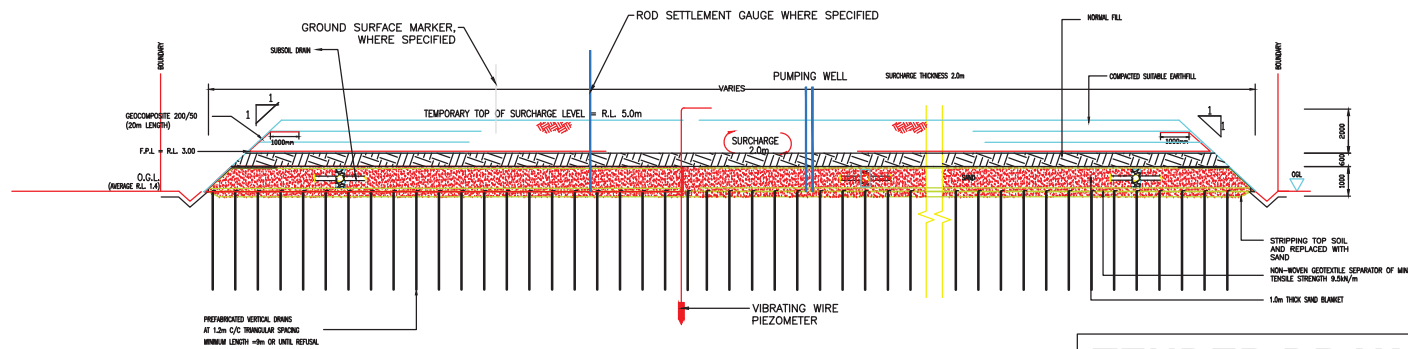
NOTES:

P E N U K A R A N			
BIL.	TARIKH	NAMA	NOTA

		NAMA	
		DILUKIS OLEH :	MOHD IZZUDDIN BIN HASAN
DISEMAK OLEH :	H. DALIA UTAMA BRITI ZULNISTAM	DIPERAKUKAN OLEH :	EN. WAN ANUL AZLAN BIN AHMAD
		DILULUS OLEH :	EN. AZLIMA ABDUL RASID
SKALA :	NTS	TARIKH :	12/05/2025
NO. LUKISAN		NO. ACAD	
TNB/GD1919a/D3		SLOPE	



LOCATION PLAN OF INSTRUMENTATION



TYPICAL INSTRUMENTATION DETAILING

TENDER DRAWING

PROJEK
PMU 132/11KV MALIM JAYA REHAB (GROUND
IMPROVEMENT WORKS)

TAJUK
INSTRUMENTATION PLAN & SECTION

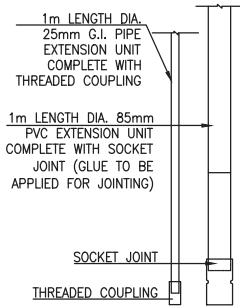
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P E N U K A R A N			
BIL.	TARIKH	NAMA	NOTA

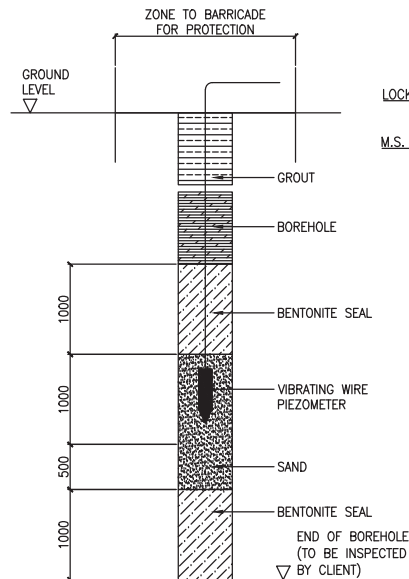
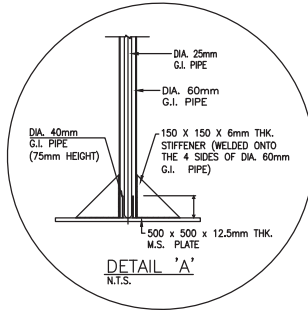
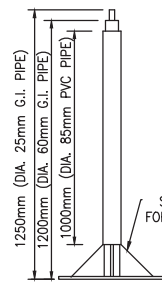


NAMA	
DILUKIS OLEH :	MOHD IZZUDDIN BIN HASAN
DISEMAK OLEH :	W. DALIA UTAMA BINTI ZULNISYAM
DIPERAKUKAN OLEH :	EN. WAN ANJUL AZLAN BIN AHMAD
DILULUS OLEH :	EN. AZLIMA ABDUL RASID
SKALA :	NTS
TARIKH :	12/05/2025

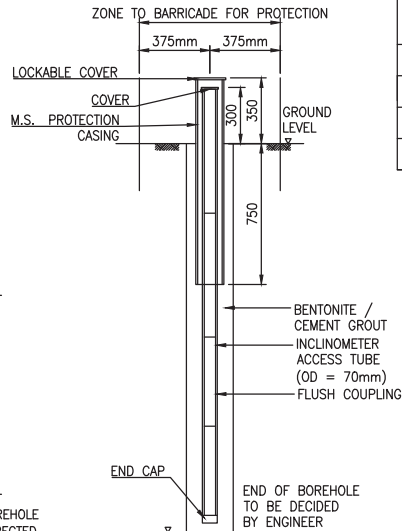
NO. LUKISAN TNB/GD1919a/D4	NO. ACAD SLOPE
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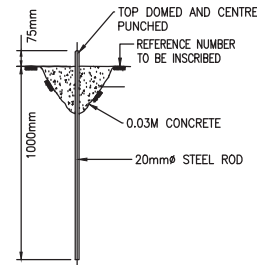
SETTLEMENT PLATE
N.T.S.



VIBRATING WIRE PIEZOMETER
N.T.S.



INCLINOMETER
N.T.S.



SURFACE MARKER
N.T.S.

GENERAL NOTES :

1. ALL NECESSARY PRECAUTIONARY MEASURES SHALL BE IMPLEMENTED DURING THE CONSTRUCTION WORKS TO PROTECT AND MINIMISE DISTURBANCE OF GROUND, BUILDING, STRUCTURES, SLOPE, WALL AND UNDERGROUND UTILITIES.
2. CONTRACTOR SHALL USE SUITABLE METHODS FOR PROTECTING THE INSTRUMENTS DURING AND AFTER INSTALLATION.
3. ALL INSTALLATIONS SHALL BE PERMANENTLY LABELLED WITH INDIVIDUAL IDENTIFYING MARKS OR NUMBERS.
4. THE CONTRACTOR SHALL CARRY OUT ALL THE NECESSARY PRECAUTIONARY MEASURES AND PROTECTION WORKS FOR ALL THE INSTRUMENTS DURING THE MONITORING PERIOD. A CONTINGENCY PLAN/ REMEDIAL WORKS FOR DAMAGED/ MALFUNCTIONED/ ERRONEOUS INSTRUMENTS SHALL BE SUBMITTED FOR ENGINEER APPROVAL PRIOR TO THE INSTALLATION. ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DAMAGED INSTRUMENTS SHALL BE PROMPTLY REPLACED OR REINSTATED AS PER AGREED CONTINGENCY PLAN/ REMEDIAL WORKS AT THE CONTRACTOR OWN COST AND TIME WITHIN ONE (1) DAY FROM OBSERVATION. THE CONTRACTOR SHALL HAVE FULL RESPONSIBILITY ON ANY CONSEQUENCES CAUSED BY THE DELAY OF INSTRUMENT INSTALLATION.
5. DETAILS OF SETTING OUT CONTROL POINTS, BENCHMARKS AND TEMPORARY BENCHMARKS SHALL BE SUBMITTED TO ENGINEER FOR AGREEMENT PRIOR TO THE START OF SURVEY WORKS.
6. THE LEVEL OF A DEEP DATUM SHALL BE ESTABLISHED BY STANDARD LEVELLING TECHNIQUES FROM AGREED BENCH MARKS IN THE VICINITY. LEVELLING SHALL BE CLOSED BACK TO THE TEMPORARY BENCH MARKS TO CHECK THE ACCURACY WITH ACCEPTABLE SURVEY STANDARDS FOR THE INTENDED WORKS. THE LEVEL SHALL BE MEASURED THREE TIMES SOON AFTER INSTALLATION OF THE DATUM, AND SHALL BE CHECKED AT INTERVALS TO BE ESTABLISHED BY PDP.
7. PRECISE LEVELLING EQUIPMENT COMPRISING AUTOMATIC DIGITAL PRECISE LEVELS AND INVAR STAFF SHALL BE USED TO SURVEY THE DEEP LEVELLING DATUM. DEEP LEVELLING DATUM SHALL BE CHECKED AT REGULAR INTERVALS FOR SIGNS OF MOVEMENT/ INSTABILITY.
8. ALL INSTRUMENTATION AND MONITORING WORKS SHALL BE IN RIGOROUS ADHERENCE TO ACCEPTED FIELD WORK.
9. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
10. THE EXACT COORDINATES OF INSTRUMENTATION TO BE INSTALLED SHALL BE CONFIRMED ON SITE AND AGREED WITH ENGINEER PRIOR TO INSTALLATION.
11. WHERE INSTRUMENTATION IS OBSTRUCTED BY CONSTRUCTION WORKS, PUBLIC, TRAFFIC, OR OTHER OBSTRUCTION, AN ALTERNATIVE LOCATION SHALL BE AGREED BY ENGINEER.
12. FOR STANDPIPES & INCLINOMETERS, THE TENTATIVE INSTALLATION LEVELS (TIP LEVELS, SENSOR LEVELS AND DRILLHOLE BOTTOM LEVELS) SHALL BE PREDETERMINED BY ENGINEER.
13. THE CONTRACTOR SHALL SUBMIT THE METHOD STATEMENTS FOR ALL THE PROPOSED INSTRUMENT INCLUDING INSTALLATION METHOD, SPECIFICATION OF INSTRUMENT, PRODUCT INFORMATION AND SAMPLES (IF NECESSARY) TO ENGINEER FOR APPROVAL.
14. ALL PRECISE LEVELLING DATA SHALL BE CRITICALLY ANALYSED PRIOR TO SUBMISSION TO ENGINEER TO ELIMINATE SUPPLY OF INCORRECT, CONFUSING OR CONFLICTING INFORMATION.
15. SETTLEMENT PLATE, INCLINOMETER, VIBRATING WIRE PIEZOMETER SHALL BE INSTALLED UPON COMPLETION OF SAND BLANKET AND PREFABRICATED VERTICAL DRAIN AT THE SAND BLANKET PLATFORM. SETTLEMENT MARKER TO BE INSTALLED AT THE SURCHARGE LEVEL.
16. THE FREQUENCY OF MONITORING SHALL BE AS FOLLOW.

FREQUENCY OF MONITORING

INSTRUMENT	PRIOR TO FILLING WORKS	MONITORING FREQUENCY		
		DURING FILLING WORKS	DURING SURCHARGE REST PERIOD	THEREAFTER
1) SETTLEMENT PLATE	NA	WEEKLY	3 DAYS INTERVAL	MONTHLY
2) SURFACE MARKER	NA	NA	3 DAYS INTERVAL	MONTHLY
3) INCLINOMETER	NA	WEEKLY	WEEKLY	MONTHLY
4) VIBRATING WIRE PIEZOMETER	NA	NA	WEEKLY	MONTHLY

17. THE MONITORING DEVICES AS ABOVE SHALL ALSO BE USED DURING THE SURCHARGING FILLING. THE FOLLOWING CRITERIA SHALL BE FOLLOWED:
- (i) CHANGE OF PORE WATER PRESSURE / INCREASE IN EMBANKMENT PRESSURE > 0.7
 - (ii) MAXIMUM LATERAL MOVEMENT / MAXIMUM VERTICAL SETTLEMENT > 0.5
 - (iii) MAXIMUM SURFACE HEAVE / MAXIMUM VERTICAL SETTLEMENT > 0.2

PROJEK
PMU 132/11KV MALIM JAYA REHAB (GROUND IMPROVEMENT WORKS)

TAJUK

INSTRUMENTATION DETAILING

NOTES:

P E N U K A R A N

BIL.	TARIKH	NAMA	NOTA



NAMA	
DILUKIS OLEH :	MOHD IZZUDDIN BIN HASAN
DISEMAK OLEH :	W. DALIA UTAMA BINTI ZULNIDYAN
DIPERAKUKAN OLEH :	EN. WAN ANJUL AZLAN BIN AHMAD
DILULUS OLEH :	EN. AZLIMA ABDUL RASID
SKALA :	NTS
TARIKH :	12/05/2025

NO. LUKISAN
TNB/GD1919a/D5

NO. ACAD
SLOPE

TENDER DRAWING