SLOPE GEOLOGY AND ROCK PROFORMA (SGRP)

FILL IN THE BOXES OR CIRCLE CORRECT ANSWER

SGRP Rev/2021

STEP 3 GEOLOGY AND STRUCTURAL

3.1 ROCK TYPE

A) MAJOR

Igneous	Sedimentary	Metamorphic

B) ROCK NAME

3.2 WEATHERING GRADE (SCALE I TO VI)

Grade I	Grade II	Grade III
Grade IV	Grade V	Grade VI

3.3 GEOLOGICAL FEATURE

Jointed (Jt)	Faulted (Ft)	Unconformity (Uc)	Schistosity (Sc)	Instrusion Zone (It)	Sheared/crushed zone (Sp)	Foliation (Fo)
Bedding (Bd)	Folded (Fd)	Cleavage (Cl)	Overhang (Oh)	Tension crack (Tc)	Raveiling (heavily jointed & fragile material) (Rv)	Fissure (Fi)

3.4 ADVERSE GEOLOGICAL FEATURES/ EVIDENCE OF DISTRESS

1	No evidence of surficial loosening
2	Localised surficial loosening, or small overhanging blocks
3	Evidence of a fault line, bedding, fracture planes, daylighting joints or tension cracks exist along crest of slope
4	Surficial loosening and small overhanging blocks in several areas of slope
5	Large overhanging blocks with potential release surfaces visibles

3.5 EVIDENCE OF PAST FAILURE

1	No recorded or observed evidence of past instability
2	Observed evidence of past instability (rock blocks and fragments accumulated at toe of slope)
3	Documented evidence of past instability – Minor failure (volume < 50m3)
4	Documented evidence of past instability – Moderate failure (50m3≤Volume≤500m3)
5	Documented evidence of past instability – Moderate failure (Volume≥500m3)

STEP 4 DISCONTINUITY INFORMATION (50 reading/100m slope length)

* Note: please Indicate Chainaging (horizontal distance from Slope ID Marker)

Spacing size (mm)		**Persistence**		**Termination**		**Roughness**		**Seepage**		**Infilled**	
EC	<20	VL	<1	X	Outside exposure	R	Rough	1	Not possible	In	Infill
VC	20-60	L	1-3	R	Within exposure	S	Smooth	2	Dry	V	Veneer
C	60-200	M	3-10	D	Against another	P	Polished	3	Dry but show evidence	S	Stain
M	200-600	H	10-20	**Shape**		K	Slickensided	4	Damp	Cm	Cemented
W	600-2000	VH	>20	P	Planar	**Infilled strength**		5	Dipping (Litre/min)	T	Trace
VW	2000-6000			S	Stepped	W	Weak Material	6	Flowing (Litre/min)	Cn	Clean
EW	>6000			U	Undulating	S	Intact Materrial				

DISCONTINUITY INFORMATION (Use additional paper if necessary)

No.	Feature Type (see 3.3)	Dip/Dip Direction	Chainaging	Spacing	Persistence	Termination	Shape	Aperture Range (mm)	Roughness	Seepage**	Infilled/ Strength	Remarks
SCAN LINE 1 (Height = m from Finish Road Level)												
1												
2												
3												
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8												

DISCONTINUITY INFORMATION (Use additional paper if necessary)

No.	Feature Type (see 3.3)	Dip/Dip Direction	Chainaging	Spacing	Persistence	Termination	Shape	Aperture Range (mm)	Roughness	Seepage**	Infilled/ Strength	Remarks
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STEP 5 FAILURE POTENTIAL

5.1 POTENTIAL FAILURE

High	Medium	Low

a) Field Observation

b) Kinematic

Planar	Topple	Wedge	Circular	Rockfall	Other
Planar	Topple	Wedge	Circular	Rockfall	Other

5.2 LIKELY SCALE OF FAILURE

1	Individual Blocks (Volume <5m^3)
2	Minor (>5m^3, <50m^3)
3	Moderate (>50m^3, ≤500m^3)
4	Major (Volume > 500m^3)

STEP 6 GENERAL COMMENTS, SITE SKETCH and PHOTOGRAPH REFERENCE

6.1 GENERAL COMMENTS (e.g. Are maintenance required? If so, What type?)
(Also, If an item cannot be correctly classified in the proforma, give step number and describe problem. Use additional paper if necessary) – PLEASE INDICATE THE SLOPE ID MARKER

6.2 GEOLOGY SKETCH OF SITE (Please draw plan and cross-section. Use additional paper if necessary)

6.3 PHOTOGRAPH REFERENCE OF THE SITE

STEP 7 QUALITY ASSURANCE

7.1 CHECK LIST:

	YES	DATE	NAME	INITIAL	
COMPLETION CHECK UNDERTAKEN					TO BE COMPLETED IN THE FIELD
TRANSFER TO SOFTCOPY					TO BE COMPLETED IN FIELD OFFICE

STEP 8 MALAYSIA ROCK SLOPE HAZARD RATING SYSTEM (MRHRS)

8.1 GENERAL INFORMATION

A) SLOPE ID _____ B) DATE _____ C) TIME _____

C) ROUTE NAME _____

D) DISTRICT _____ E) STATE _____

8.2 ROCK SLOPE HAZARD RATING SYSTEM

Category	Rating criteria by score				
	Points 3	**Points 9**	**Points 27**	**Points 81**	**Hazard Score**
Slope Height	7.5 m - 15.0 m	15.0 m - 22.5 m	22.5 m - 30.0 m	> 30.0 m	
Slope Angle	35°-45°	46°-55°	56°-65°	> 66°	
Geological structural condition	Discontinuous joints, favourable orientation	Discontinuous joints, random orientation	Discontinuous joints, adverse orientation	Continuous joints, adverse orientation	
Face Irregularities	Smooth	Moderate	High	Very High	
Block size	Completely crushed (<0.3 m)	Very blocky (0.3-0.8m)	Blocky (0.8-1.5 m)	Massive (>1.5 m)	
Presence of water on slope	Dry	Damp	Dripping	Flowing	
Rockfall history	Few falls	Occasional falls	Many falls	Constant falls	
Weathering Grade	Fresh (Weathering Grade I)	Surface staining (Weathering Grade II)	Slightly altered (Weathering Grade III)	Weathered (Weathering Grade IV)	
Erosional features	Few differential erosion features	Occasional erosion features	Many erosion features	Major erosion features	
Difference in erosion rates	Small	Moderate	Large	Extreme	

(Tf)	**Point 1**	**Points 2**	**Points 3**	
Rainfall	< 2388.27mm	2388.28mm - 2993.07mm	> 2933.08mm	
			TOTAL SCORE	

RSH=[0.3299 (Presence of Water) + 0.2422 (Slope Angle) + 0.2195 (Geological Structural Condition) + 0.1195 (Different Erosion Rates) + 0.0414 (Face Irregularities) + 0.0362 (Rockfall History) + 0.0066 (Erosional Features) + 0.0038 (Slope Height) + 0.0007 (Weathering Factor) + 0.0002 (Block Size)] + $(X_{rf} * W_{rf})$

Xrf	***Wrf***
1	0.2398
2	0.5672
3	0.1930

A) HAZARD CATEGORY _____ TOTAL SCORE _____

B) FILLED BY _____

C) INSPECTED BY _____

Total Score	**Hazard**
< 10.3333	Very Low
10.3334 - 19.4453	Low
19.4454 - 28.5935	Moderate
28.5936 - 38.9134	High
> 38.9135	Very High