

Duration: 30 min

Consulting

Professional

ACES & ACEM

LESSONS LEARNT FROM WORK-SITE INCIDENT AT TANJUNG BUNGAH

Ir. Liew Shaw Shong



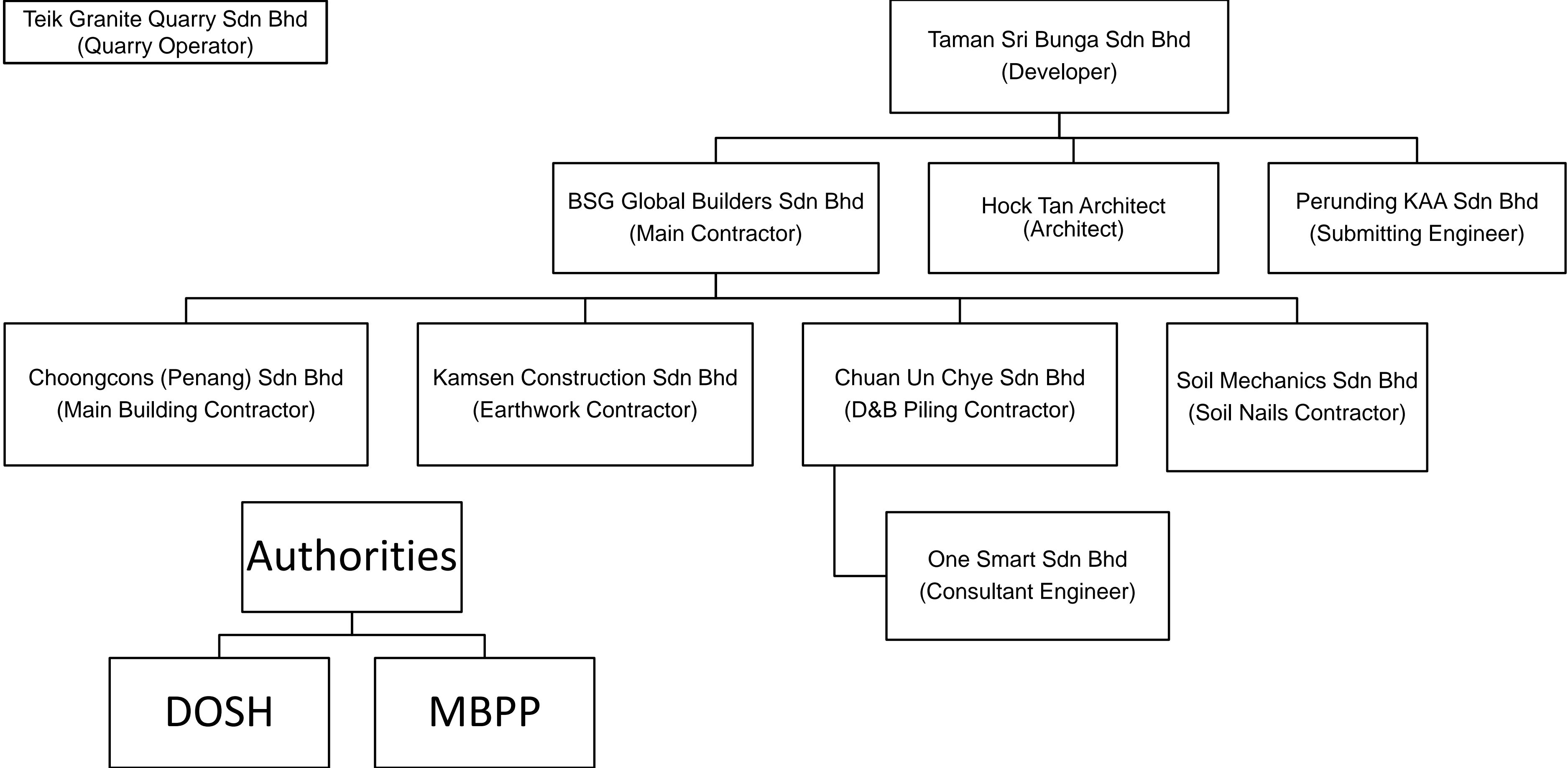
The Hearing

Duration : 26 days within 6 months

Personnel Involved : 28 witnesses including 6 experts from local and overseas.



Parties Involved

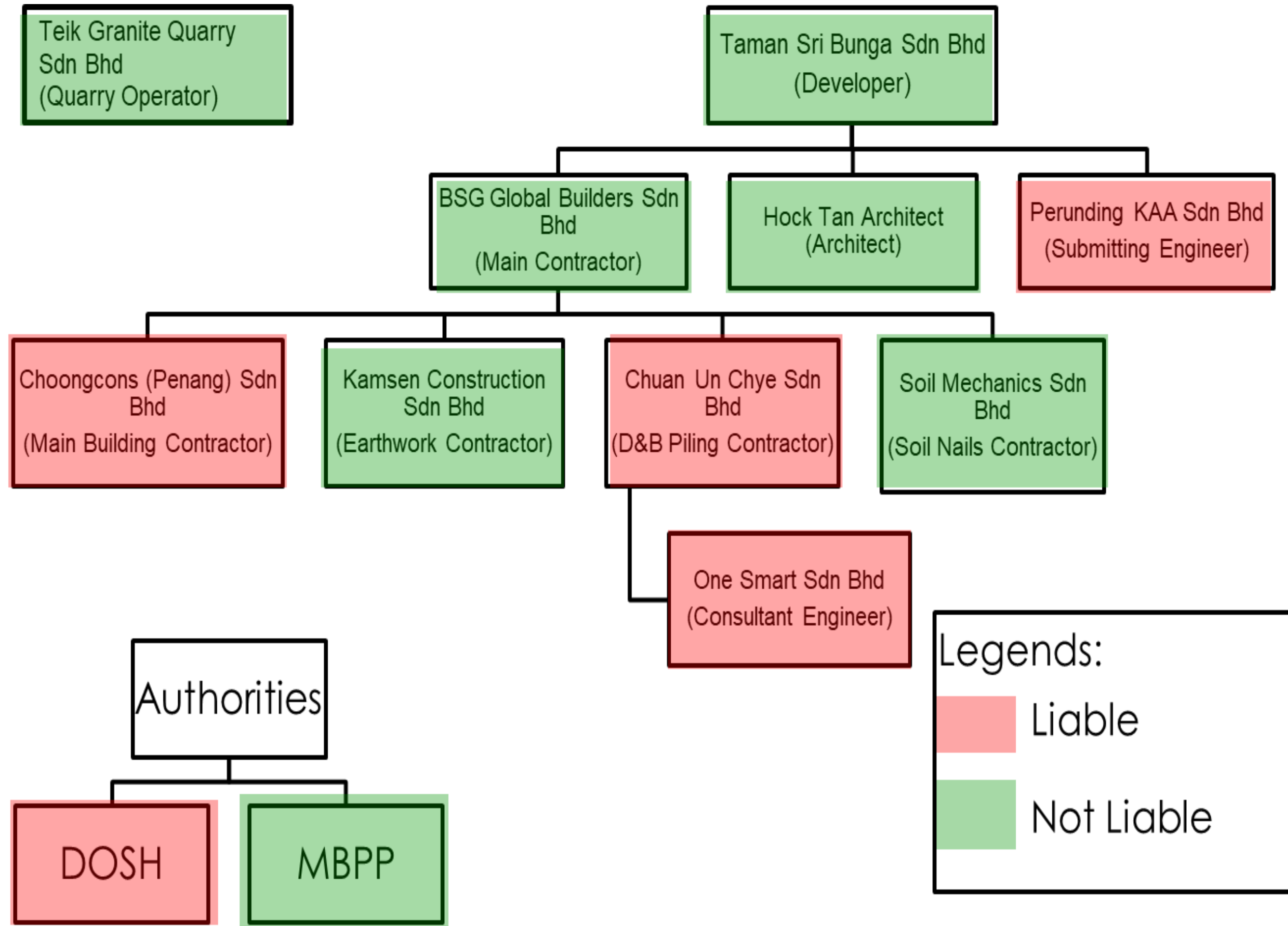


The Report & Commission Outcome

REPORT OF THE COMMISSION OF ENQUIRY
INTO THE WORK-SITE INCIDENT
AT TANJUNG BUNGAH
IN THE STATE OF PENANG



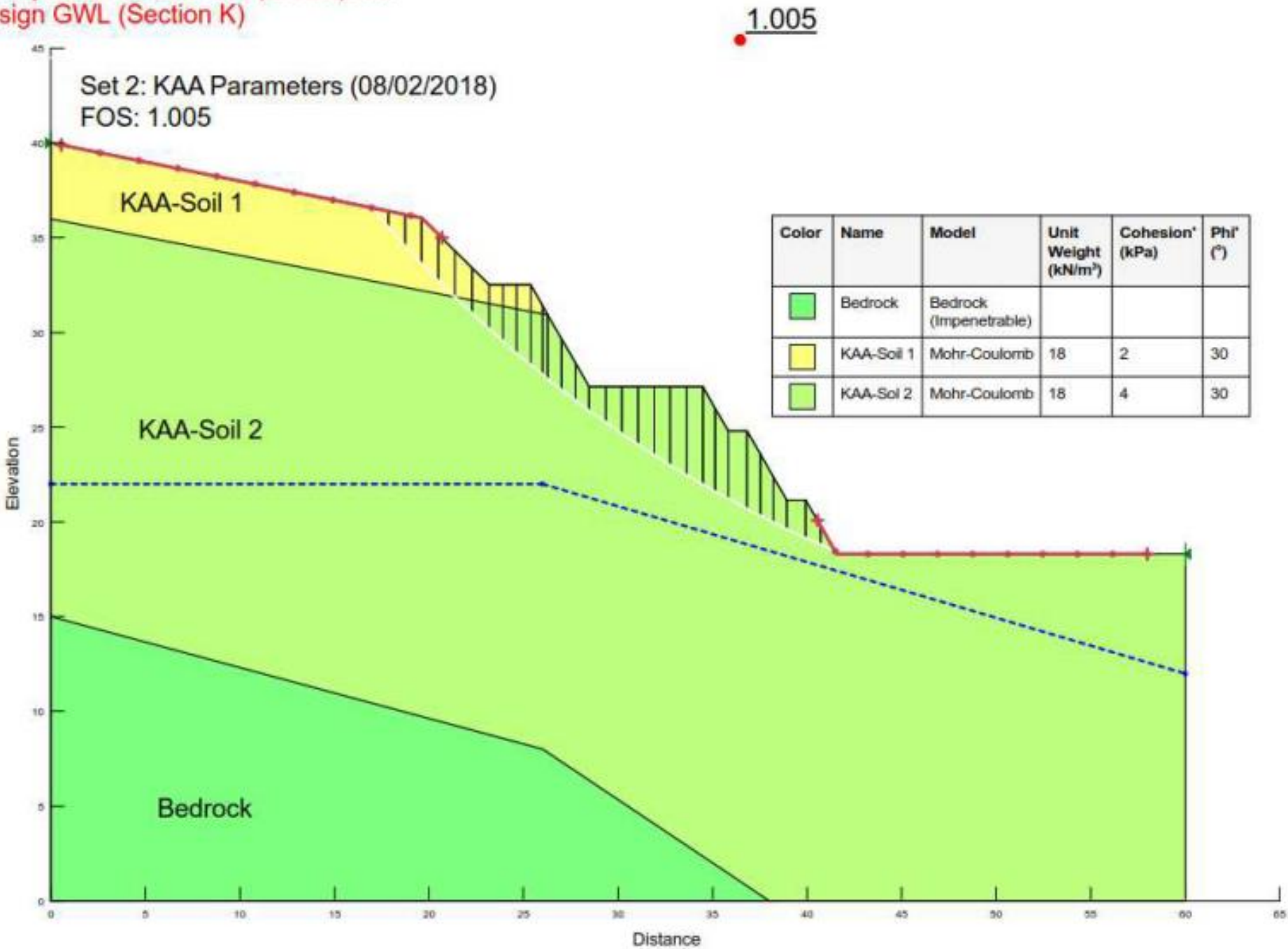
22nd July 2019



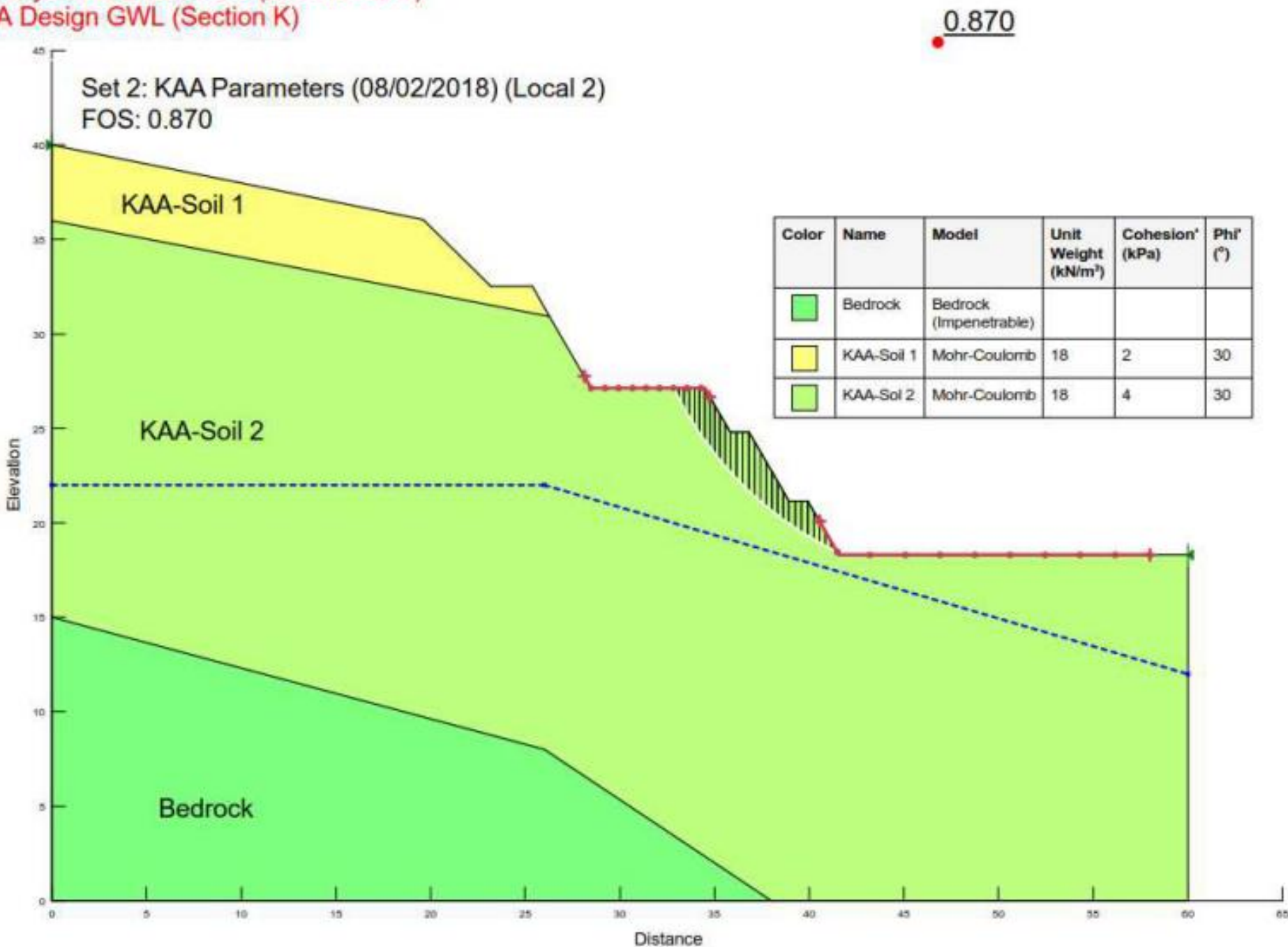
Responsible Parties

Ir. Khoo K. T. of Perunding KAA Sdn Bhd
Initial design : Inadequate (Global) and unsafe (Local) -> 'blind-folded'
Site incident : 2 minors + 1 major landslips

Set 1b (RL18.3m)
Slope Analysis for Section 9-9 (Global) with
KAA Design GWL (Section K)



Set 1b (RL18.3m)
Slope Analysis for Section 9-9 (Local-bottom)
with KAA Design GWL (Section K)



Responsible Parties

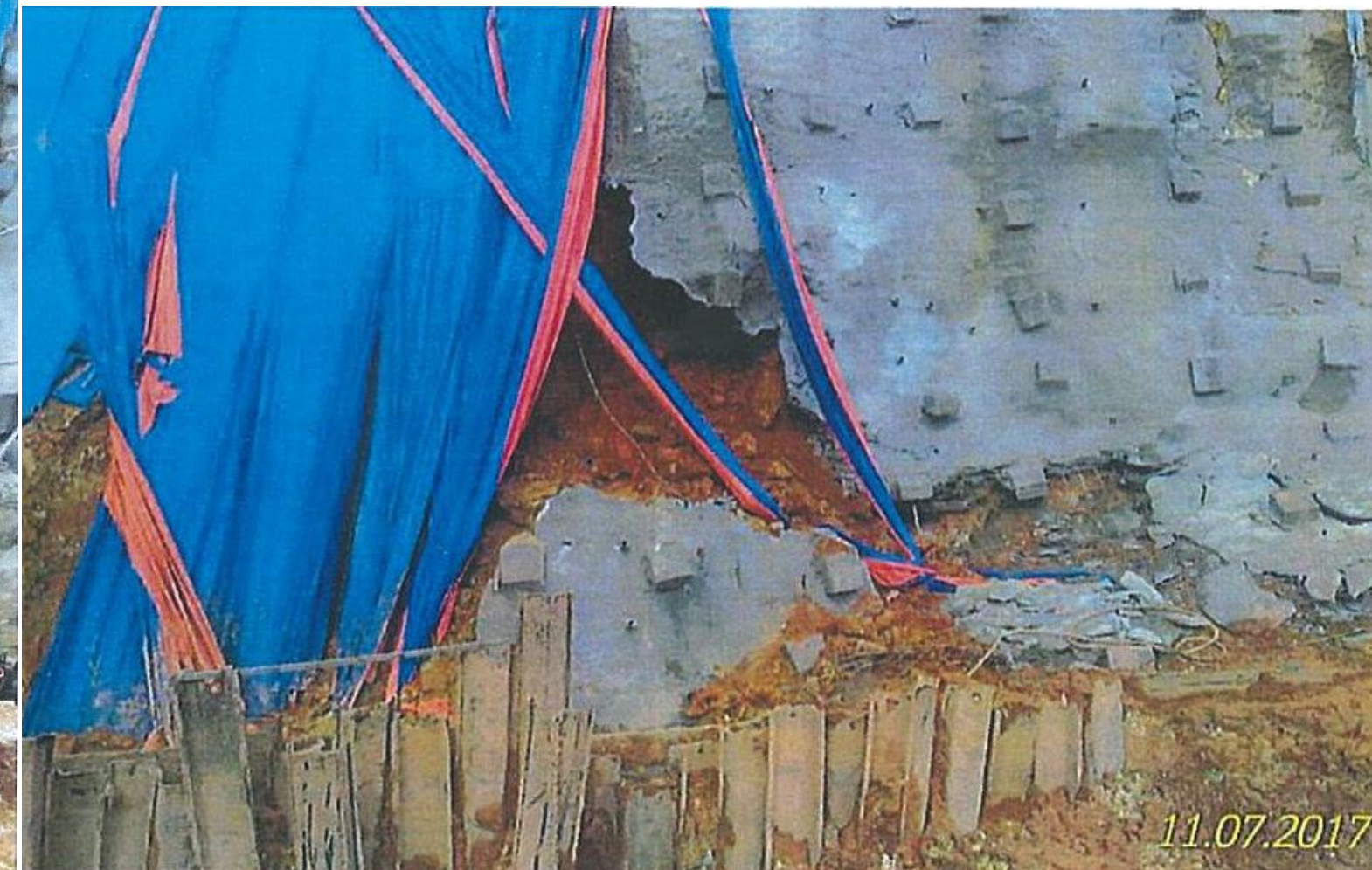
First Slip 8th August 2016 (1st Slip)



Instability During Soil Nail Installation 5th May 2017- (2nd Slip)

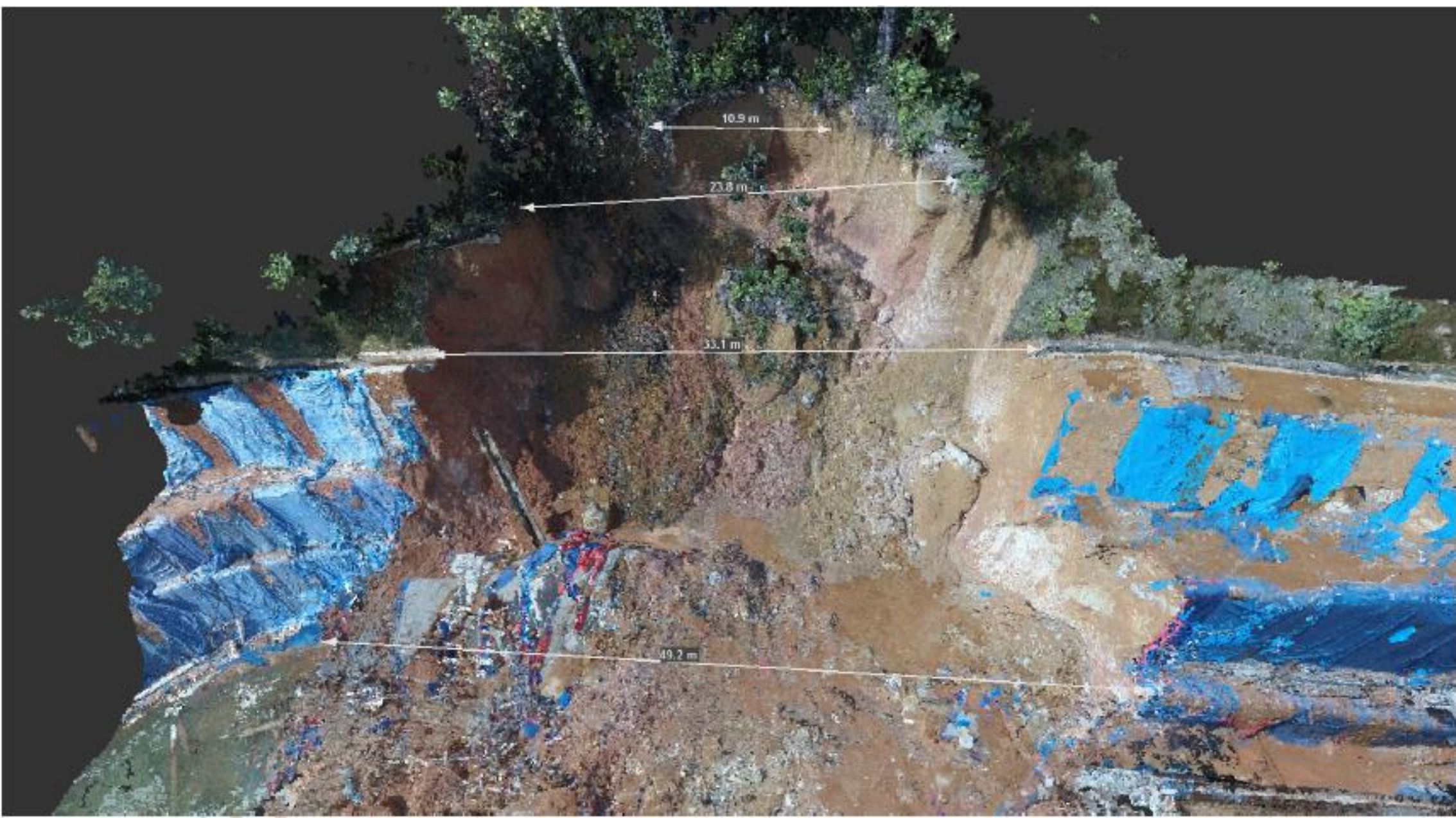


Slope Instability with Damage to Gunite and Soil Nails (3rd Slip) 11 July 2017

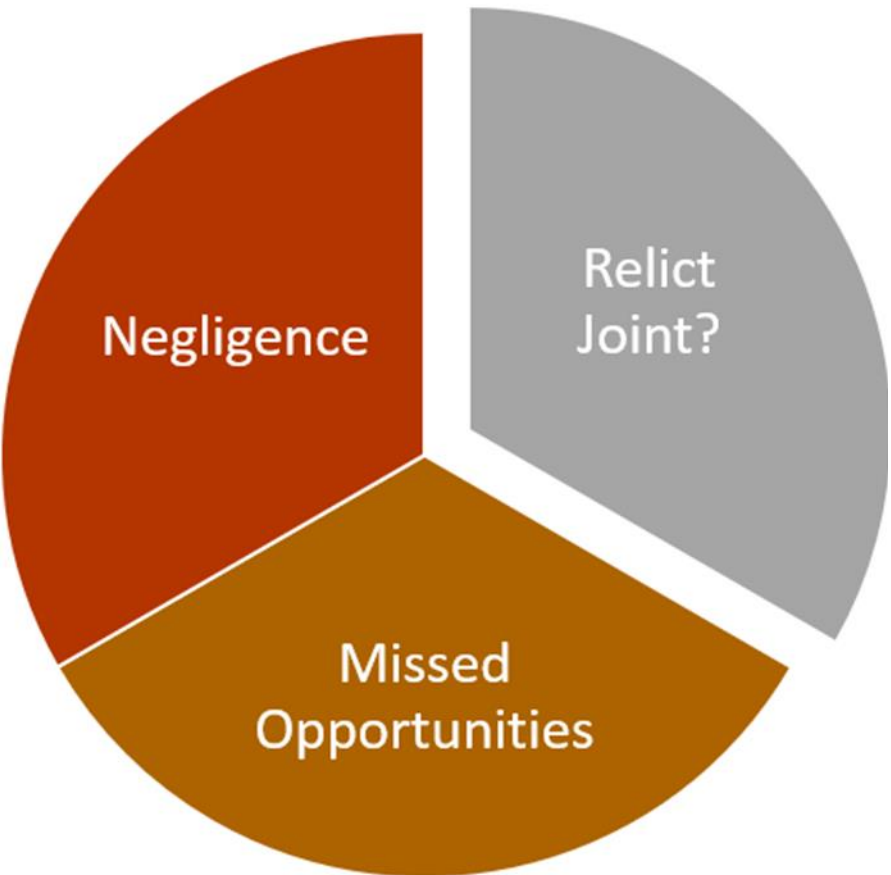


What factors contributed to these landslips?

Extract of Photogrammetric Model



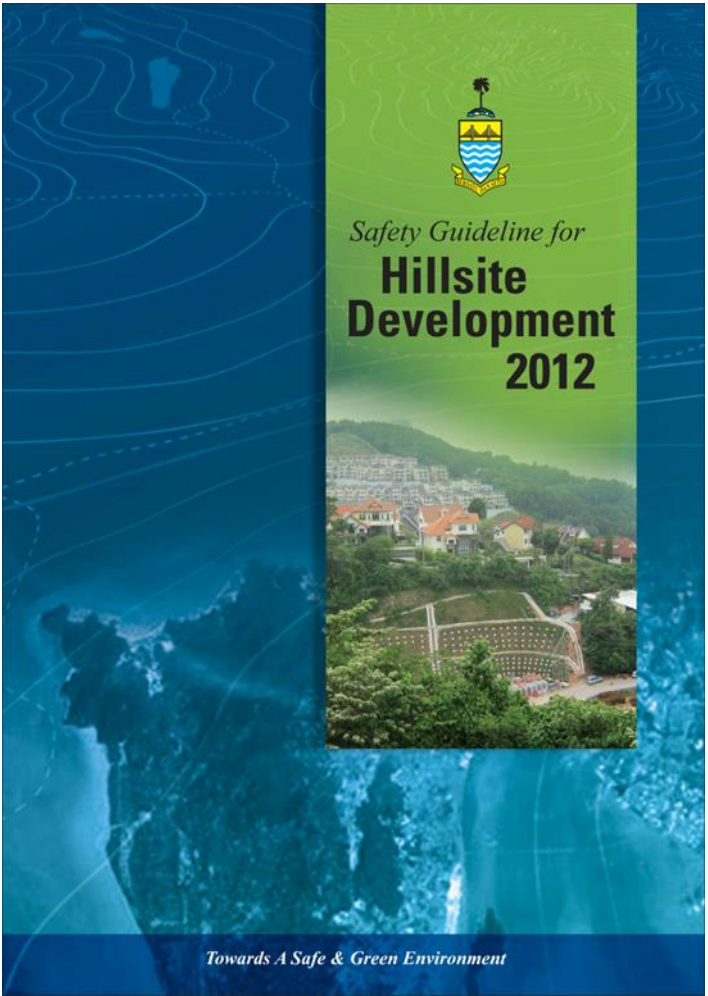
Orthorectified Photo of the Landslide Scar



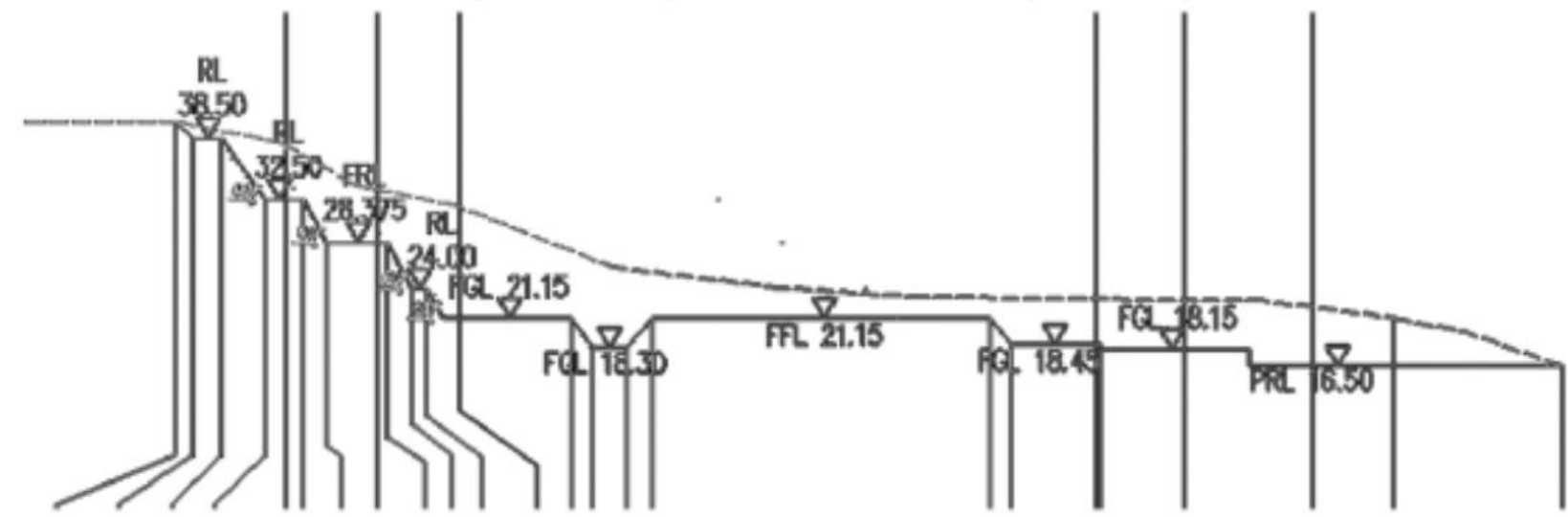
Negligence

15 negligent acts were identified!

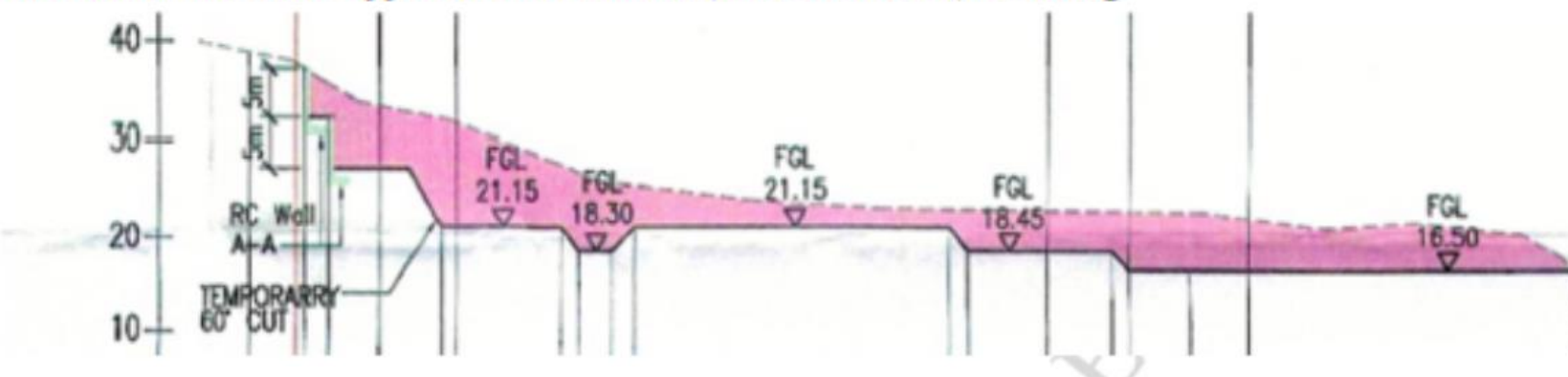
- 1. Overlooked Hillside Guideline - Not applicable for temporary slope?
- 2. Commenced work w/o RE - For 1 year
- 3. Remote control supervision (via messaging apps)
- 4. No calculation for slope cutting
- 5. Further excavation from RL18.3m to RL14.65m w/o calculation.



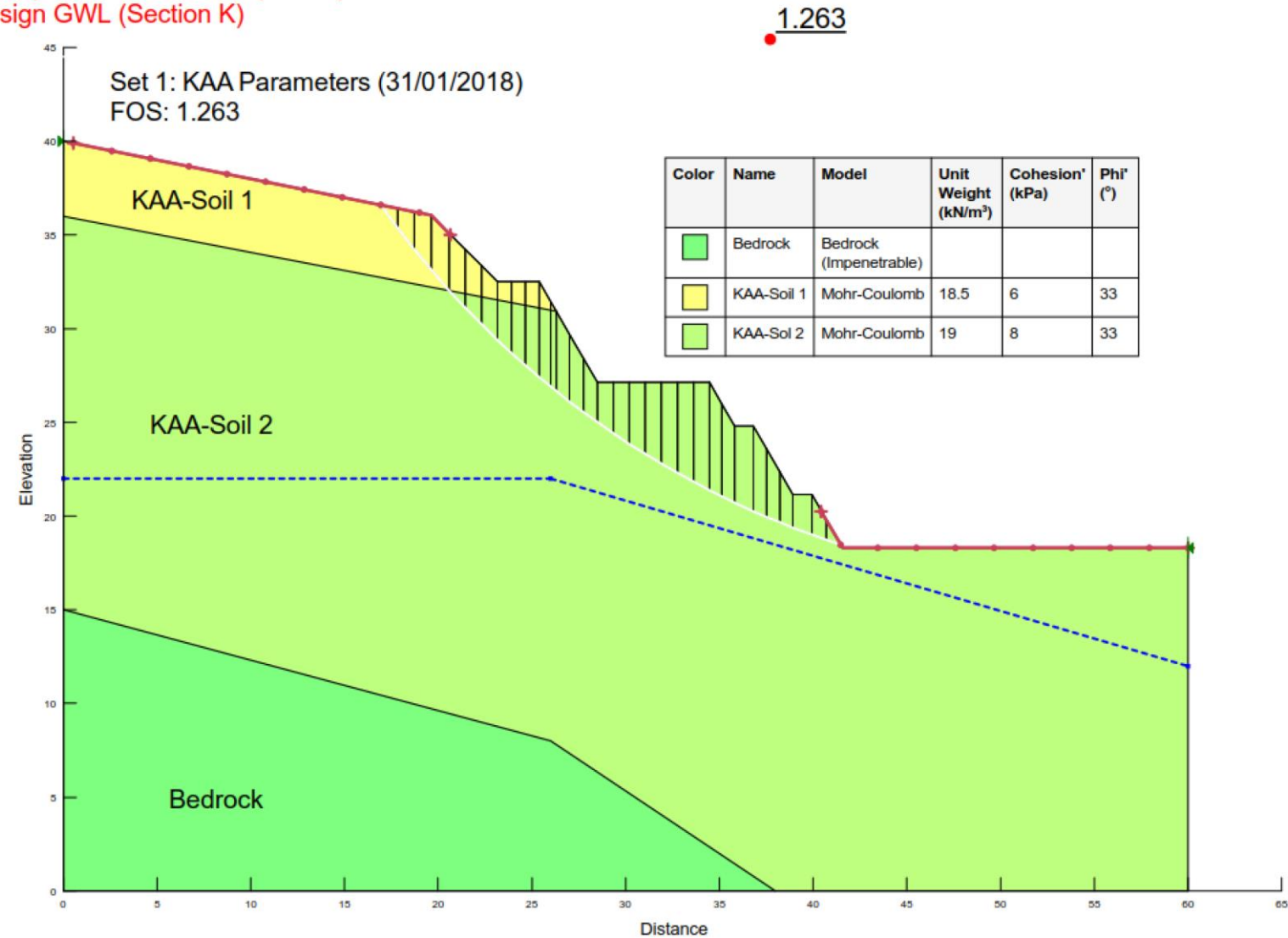
Extract from Site Formation (Earthworks) Contract Document (Section 1)



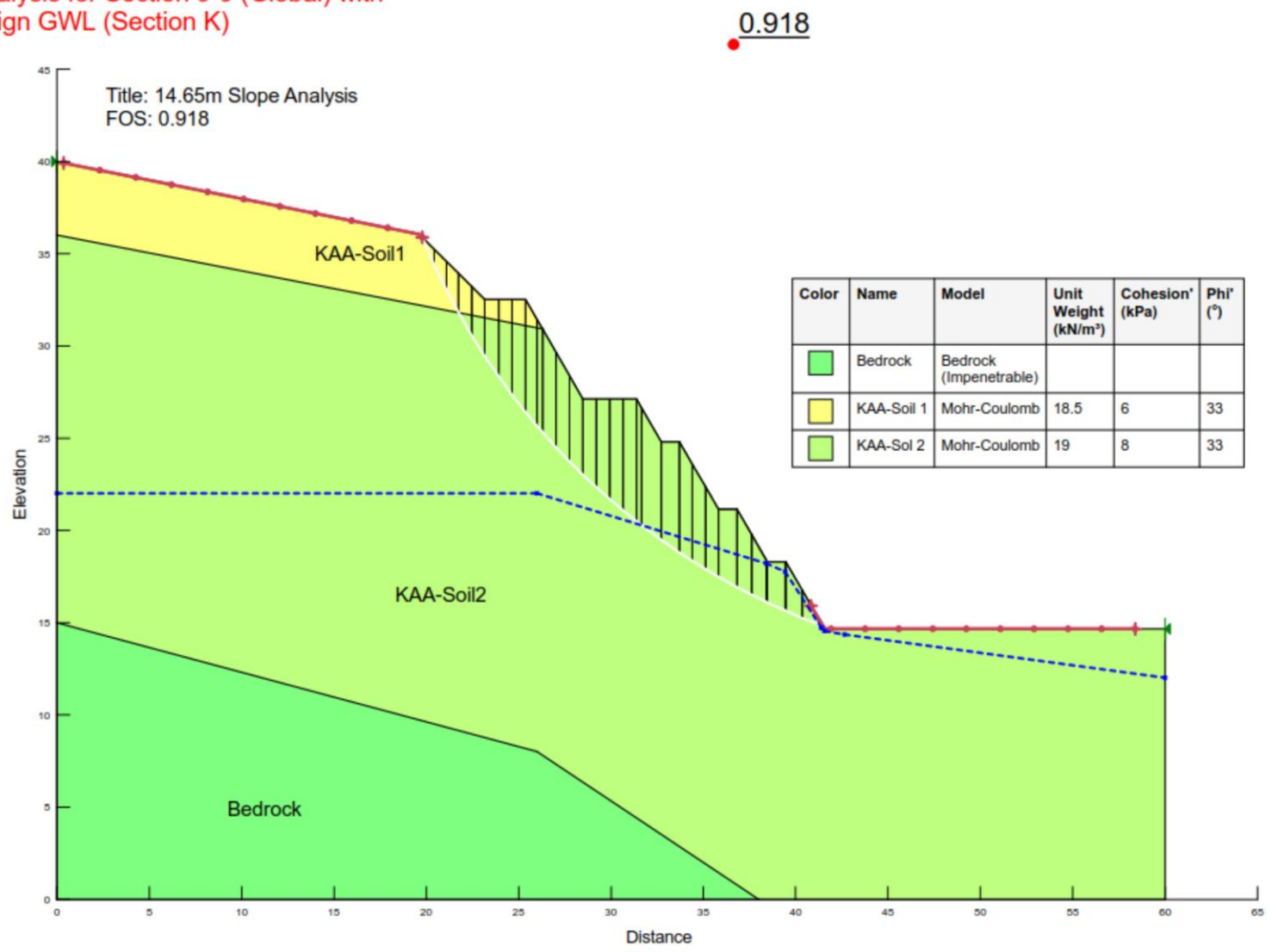
Extract from MBPP Approved Earthworks (Site Formation) Drawing



Set 1a (RL 18.3m)
Slope Analysis for Section 9-9 (Global) with
KAA Design GWL (Section K)



Set 2 (RL 14.65m)
Slope Analysis for Section 9-9 (Global) with
KAA Design GWL (Section K)

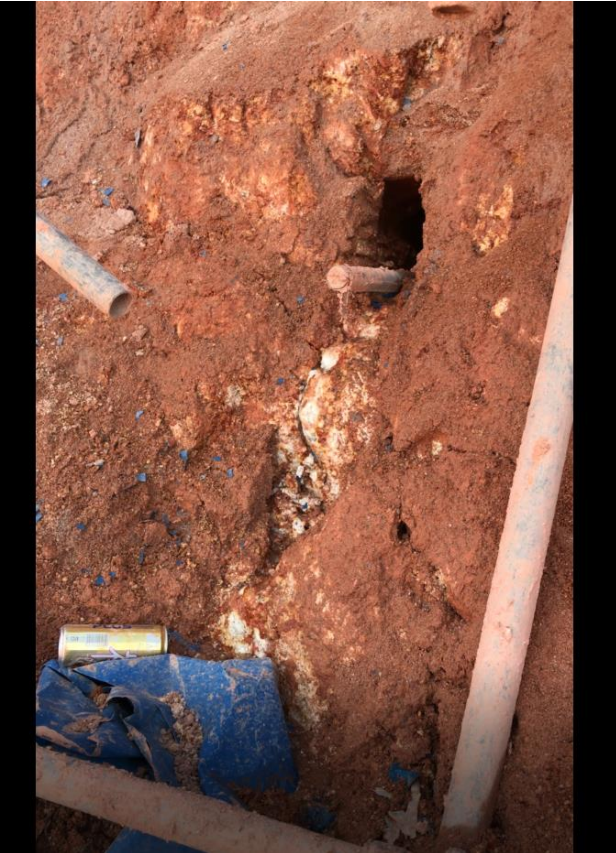


Negligence

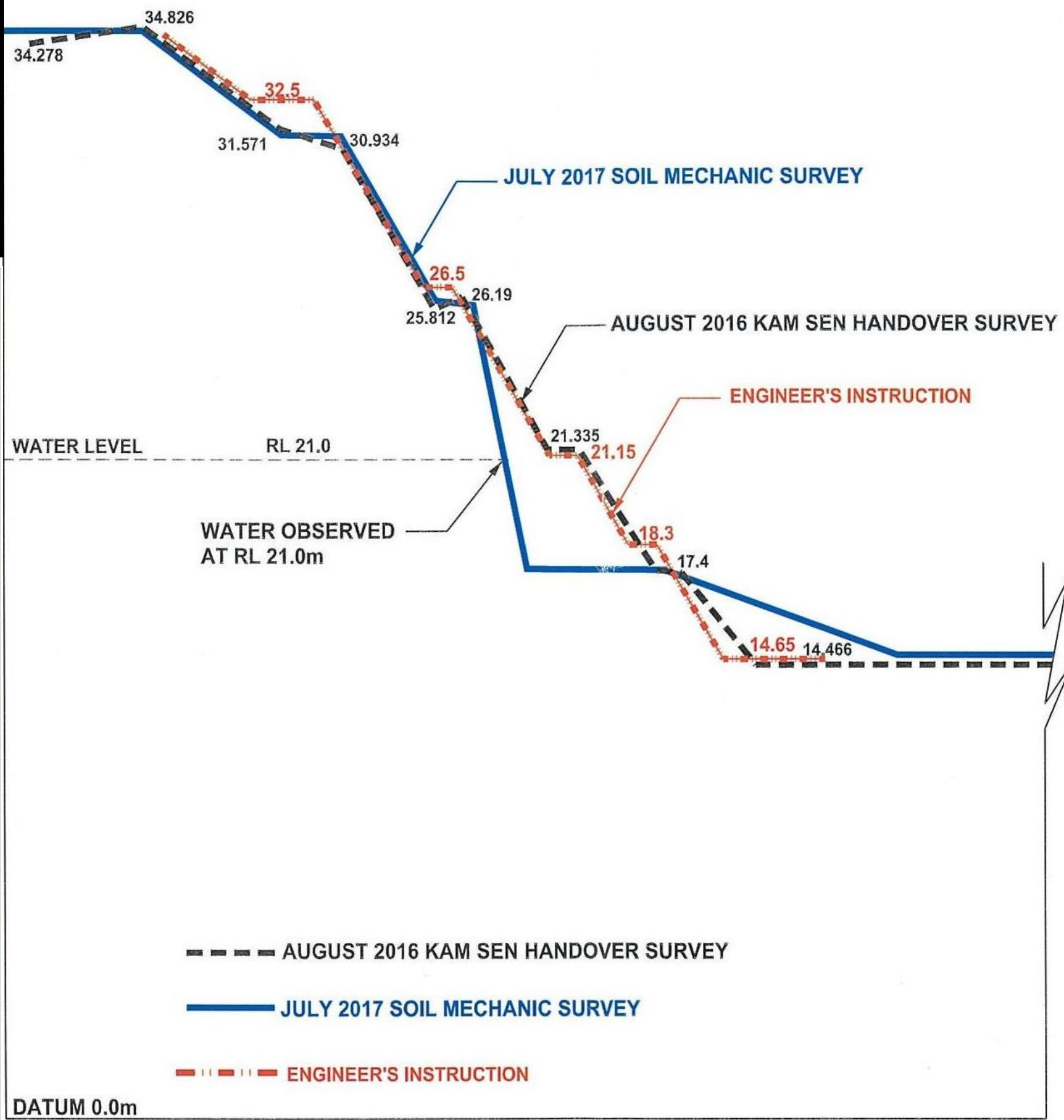
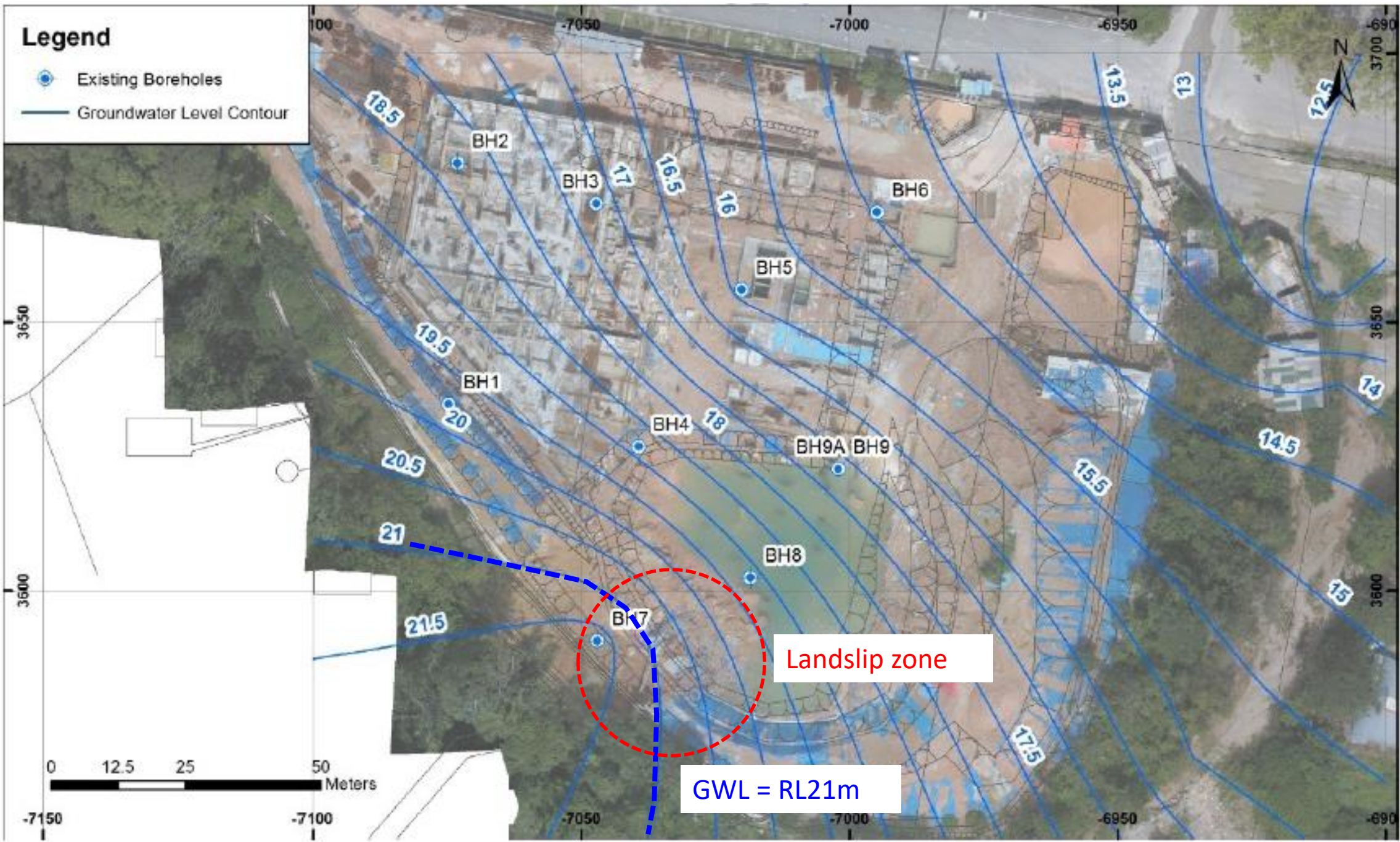
15 negligent acts were identified!

6. Underestimate GW level

Groundwater seeping at RL21m, extracted from Exhibit 53 (Video)



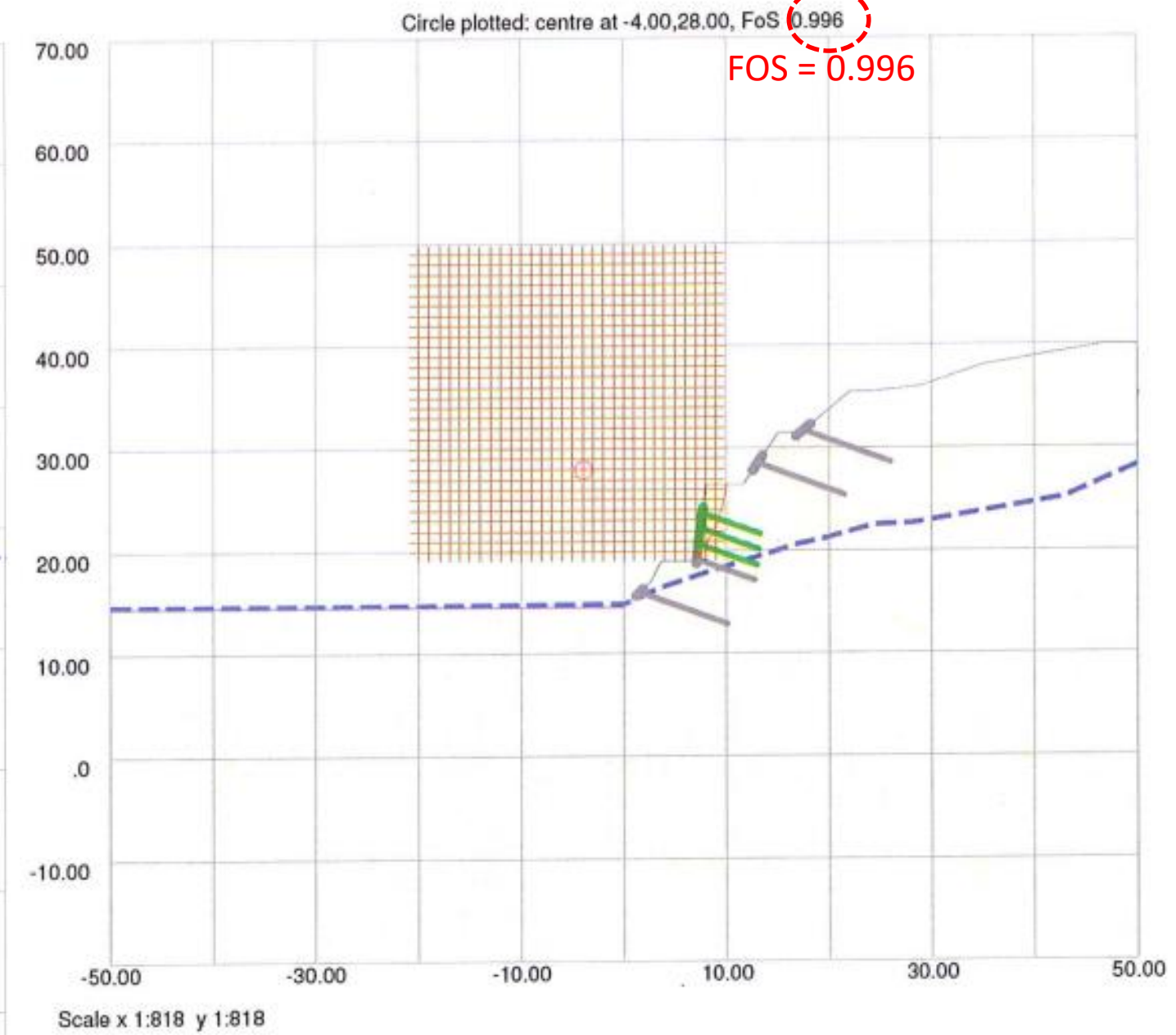
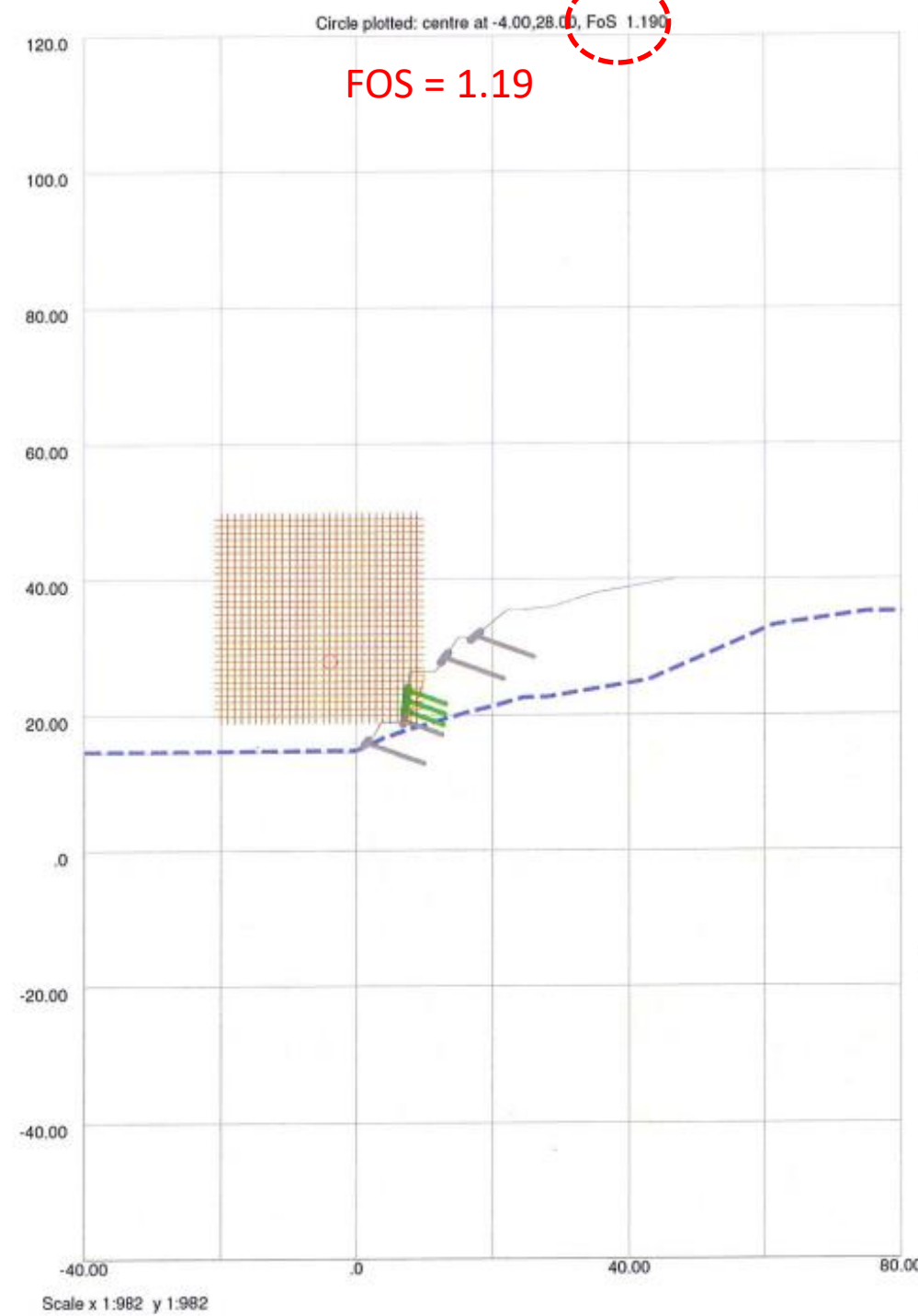
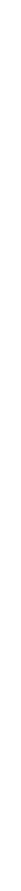
Contour Plan of Anticipated Dry-Season Groundwater Levels



Negligence

15 negligent acts were identified!

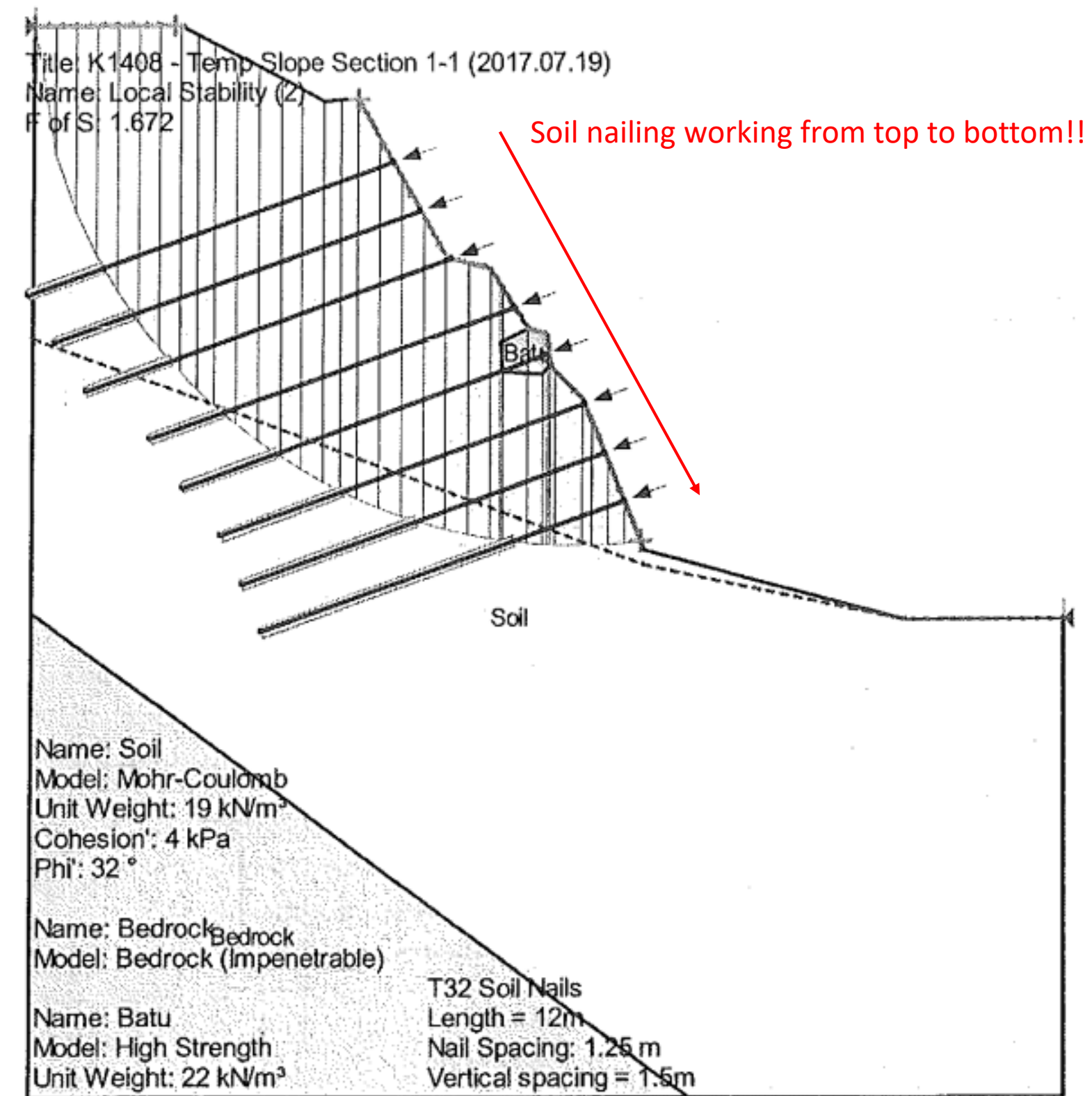
7. No review on design after each landslide!
8. Slow in response to crisis - **Ir Khoo took couple months to look for cheapest slope strengthening work from contractor!**
9. Reduction of 87 soil nail to 49 soil nails w/o calculation!
10. Strengthen slope with adding 6 more nails w/o calculation!



Negligence

15 negligent acts were identified!

11. No pull-out test for installed soil nails
12. Decision making → **Commercialism > Professionalism!**
13. Allow contractor to excavate 2.7m for pilecap, cut slope become more unsafe!
14. Failed to protect workers in soil nail installation
15. Never making sure workers staying away from partially failed-slope.



Missed Opportunities to Intercept Incident



Relict Joints

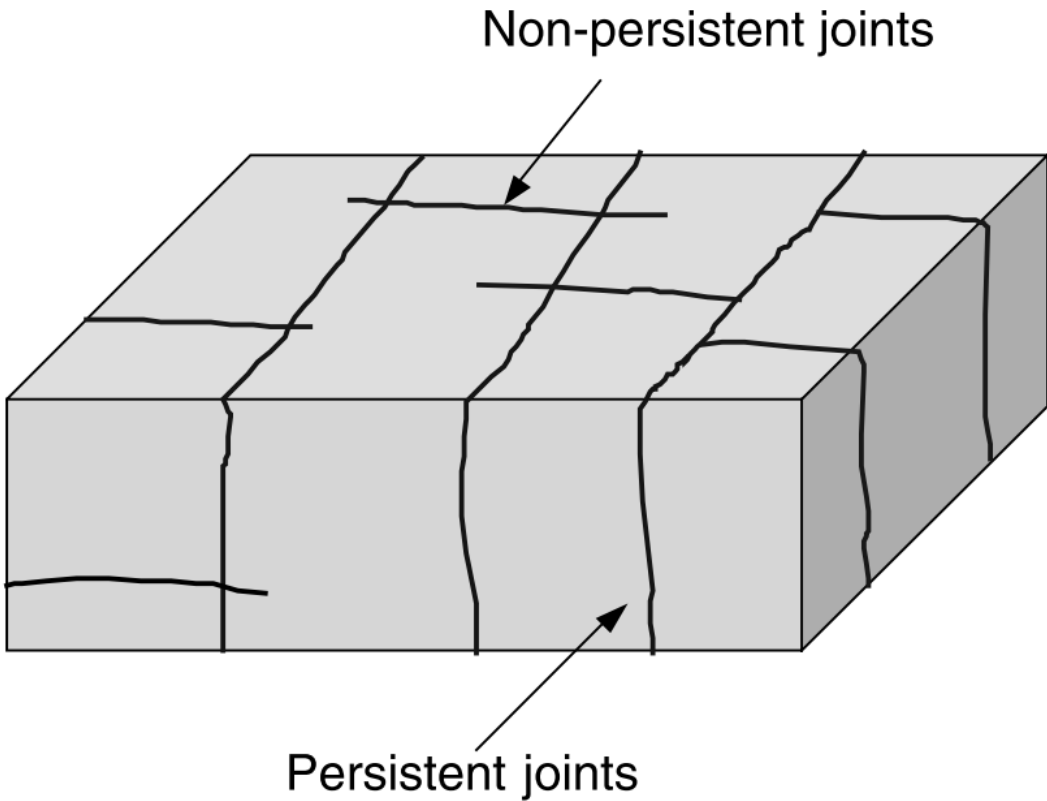
Relict Joint Dominant
landslide

Predominatly
sub-horizontal

Persistent

Extensive +
thick infill

Consist weaker
clayer material



No evidence of presence of
these 4 requisite factors



Photo 3: Site observation and field work



Photo 6: Decomposed feldspar and mica infilling in the relict joint



Photo 7: Identified relict joint

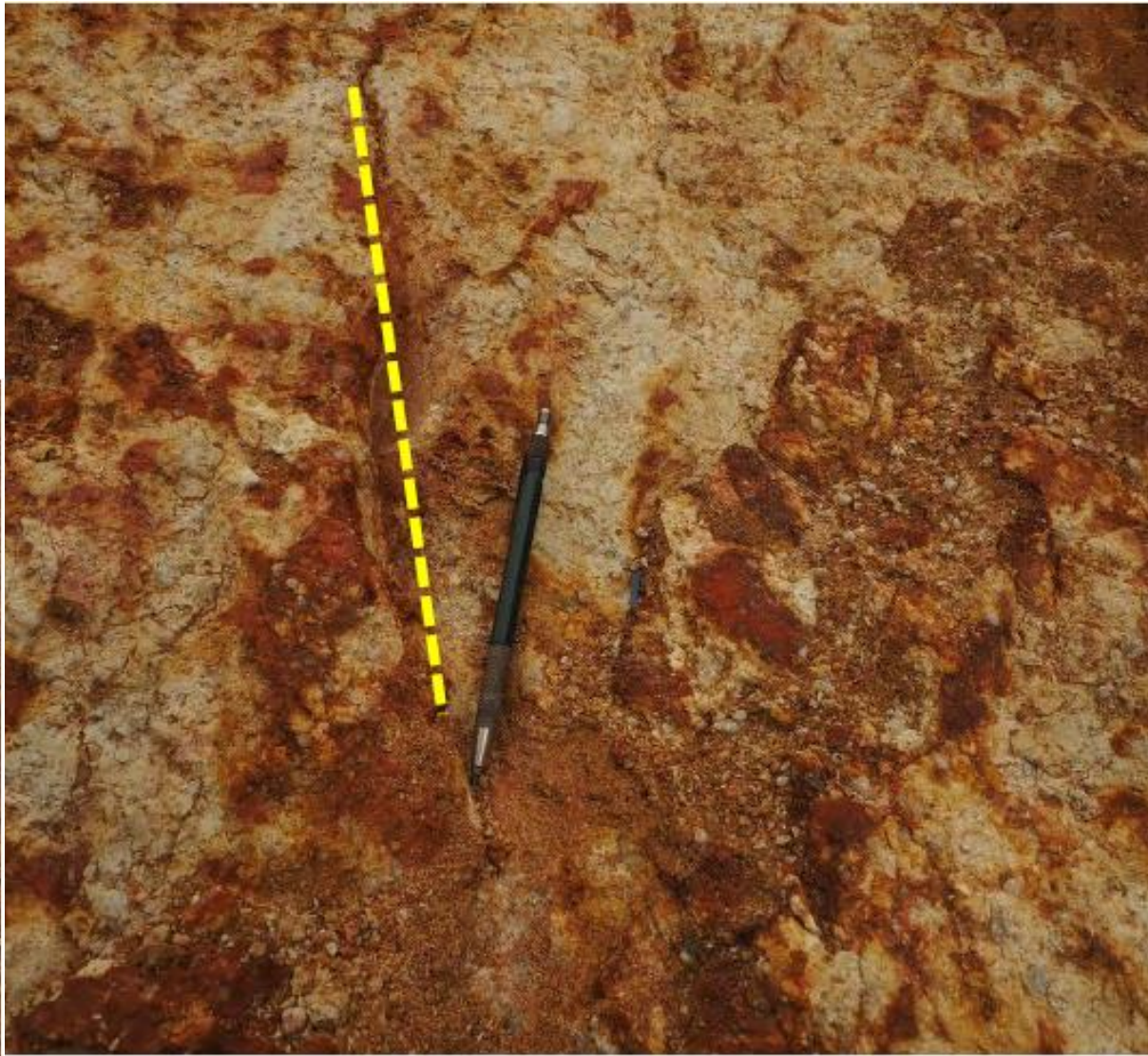


Photo 4: One of the spatial orientation readings of the relict structure

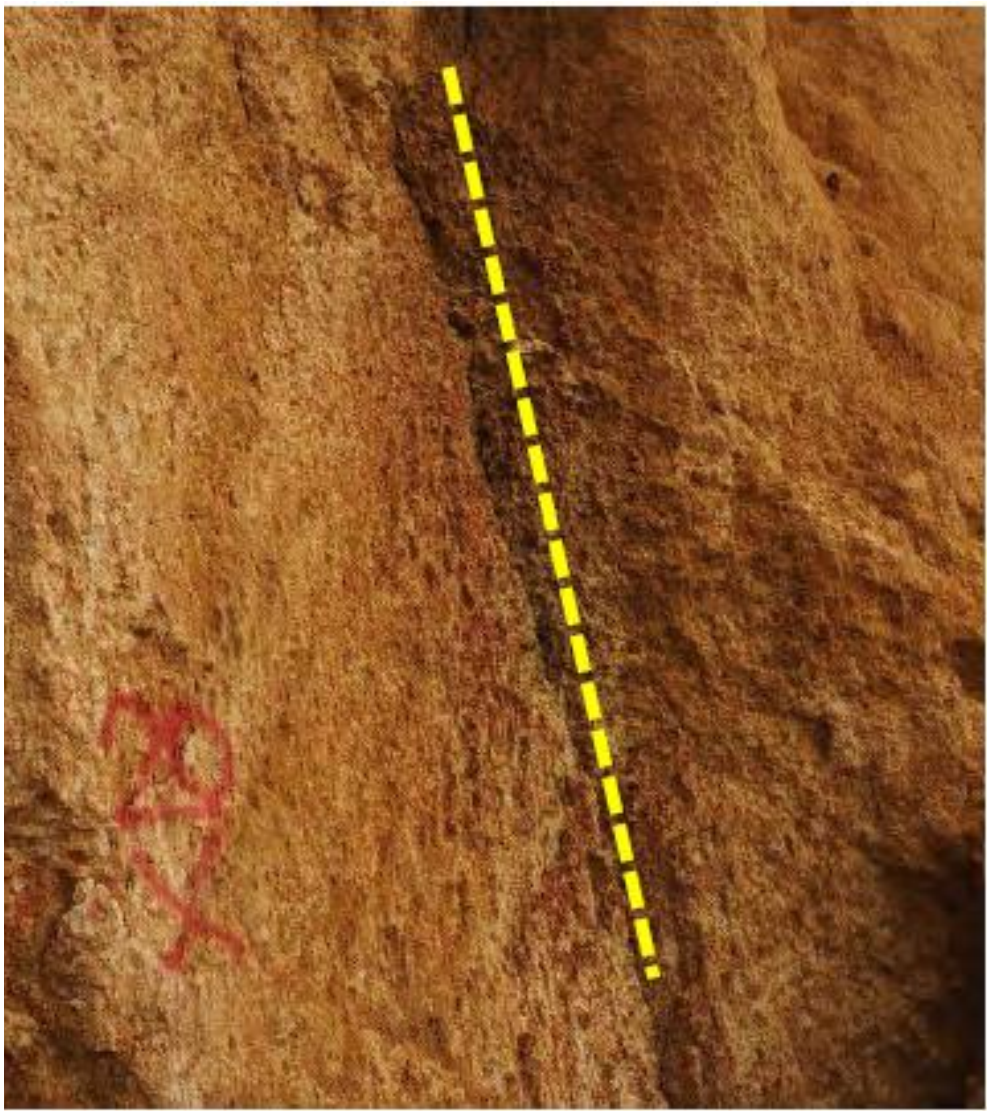
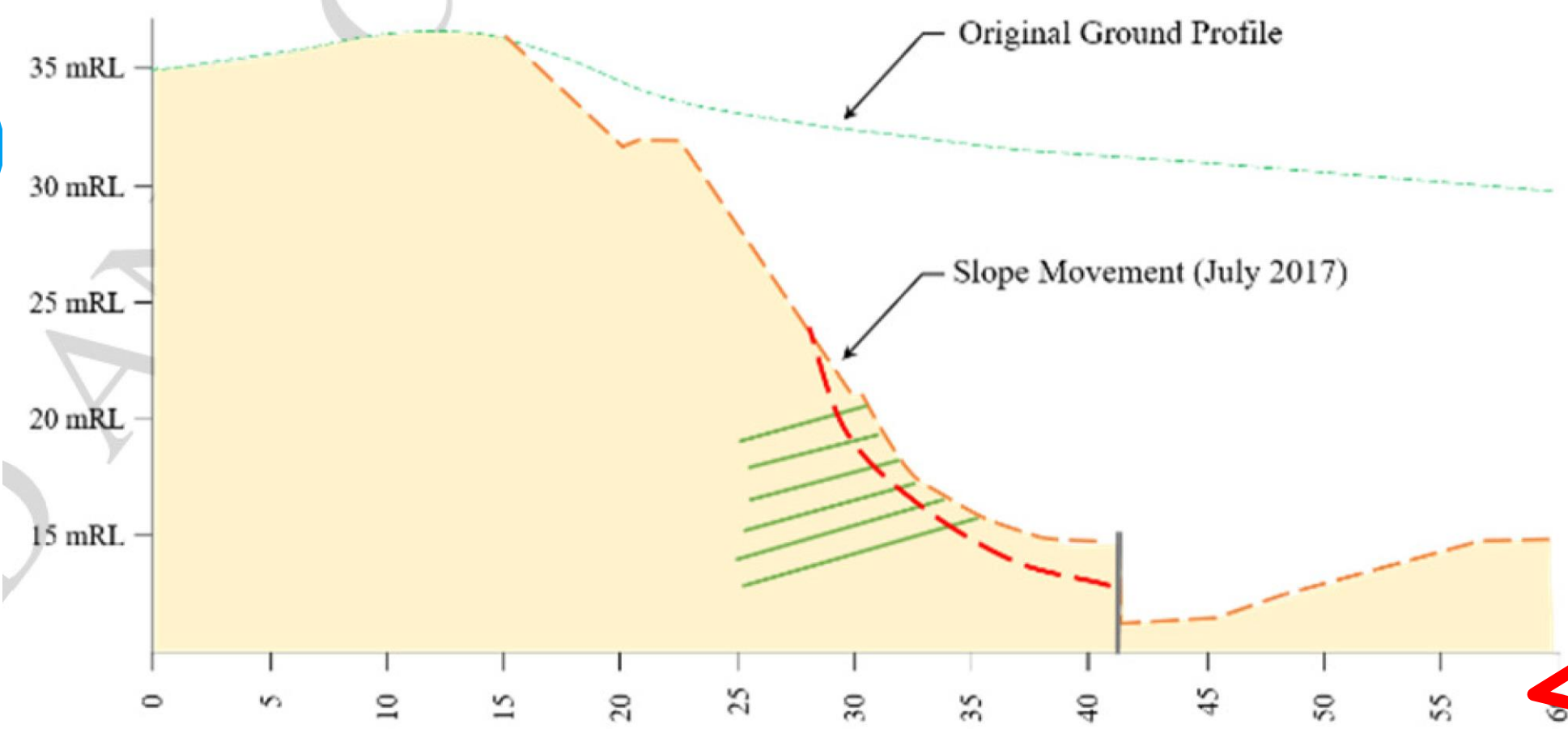


Photo 5: Plane surface of one of the relict joints

Other Responsible Parties



- 1. No shoring for 2.7m pilecap excavation
- 2. Installed sheet piles
- 3. Sheet Pile Displacement and Slope Movement in July 2017

Ir. Victor Ong (One Smart)

Design Engineer for D&B Piling Works

What he did wrong?

To Sign Form G3
even without
supervise the
works!

Never check or design
on method of
constructing pilecap

Failed to supervise
the execution of
works he designed



Other Responsible Parties

- 1. Choongcons was pleaded guilty to a charge under section 12(2)(b) of the Occupational Safety & Health Act 1994
- 2. DOSH should promptly issue a Prohibition notice after the visit !!!

Choongcons

What they did wrong?

Negligent in taking care of workers safety even though safety officer sounded alarm unsafe slope

DOSH

Received memo from Choongcons' safety officer

Attending site visit and issue an Improvement Notice

AKTA KESELAMATAN DAN KESIHATAN PEKERJAAN 1994 (AKTA 514)
NOTIS PERBAIKAN
(SEKSYEN 48, 49 DAN 50)

BAHAGIAN A
Kepada, Pengurus, Choongcons (Penang) Sdn Bhd, 17, Merican Road, 10600 Penang
Noor Azah Mohamed Yusoff

1. Saya, Rajkumar, Ketua Pengarah/Timbalan Ketua Pengarah/Pegawai* Jabatan Keselamatan dan Kesihatan Pekerjaan yang diberi kuasa untuk mengeluarkan notis ini kepada pihak tuan berpendapat bahawa:

(a) tempat kerja/lajid/bahan/proses* ini:
Cadangan membina 1 blok rumah mamp
untuk 50 orang 1/10/17
P.P. 17/10/17

(b) yang telah dijalankan oleh/di bawah kawalan* pihak tuan di:
sebalah lot 165/101 lorong lembah
permai 3, Mukim 18, D.T.C
Pulau Pinang

(c) aka ada mungkin akan menjadi bahaya/menyebabkan kecederaan badan/menjadi risiko yang serius kepada kesihatan mana-mana orang/menyebabkan kerosakan kepada mana-mana harta,* atas sebab-sebab seperti berikut:
Cerun (slope) perca di selang-sela
dinding, bali dan selamat kepada
pekerja

(d) yang mengakibatkan/mungkin mengakibatkan* pelanggaran peruntukan undang-undang di bawah:
Seksyen 13(1) Akta Keselamatan
Dan Kesihatan Pekerjaan 1994

2. Saya dengan ini:
(a) mengarahkan bahawa tempat kerja/lajid/bahan/proses* itu tidak boleh digunakan atau dikendalikan selepas tempoh tamat notis sehingga bahaya itu telah dihapuskan atau kecacatan itu diperbaiki sehingga saya berpuas hati; dan

(b) mengarahkan pihak tuan supaya mengambil langkah-langkah sewajarnya/langkah-langkah yang diperitahkan dalam Jadual yang dilampirkan bersama dengan notis ini* untuk menghapuskan apa-apa bahaya atau kemungkinan bahaya serta-merta kepada nyawa dan harta yang notis ini berhubung dengannya dan memperbetulkan apa-apa tindakan atau ketinggalan yang melanggar atau mungkin menyebabkan pelanggaran peruntukan undang-undang yang tersebut di atas, mengikut mana-mana yang berkenaan sebelum 8/11/17

Tarikh: 18/12/17
Masa: 10.00 am

Tandatangan: [Signature]
Cop: [Stamp]

BAHAGIAN B
Saya, Rajkumar, Pengarah/Pengurus/Setiausaha/Pegawai* yang mana tempat kerja/lajid/bahan/proses* yang dinyatakan di dalam notis ini yang telah dijalankan oleh/mungkin akan dijalankan oleh/terletak di bawah kawalan* saya dengan sesungguhnya mengakui menerima notis ini.

Tarikh: 18/12/17
Masa: 10.00 pm
830204 07 5697

Tandatangan: [Signature]
Cop syarikat: [Stamp]
(SITE:.....)

BAHAGIAN C
Saya, [Signature], Ketua Pengarah/Timbalan Ketua Pengarah/Pegawai* Jabatan Keselamatan dan Kesihatan Pekerjaan dengan ini berpuas hati dan mengesahkan bahawa apa-apa bahaya, kemungkinan bahaya, risiko, perkara-perkara atau aktiviti-aktiviti yang notis ini berhubung dengannya telah dihapuskan dan apa-apa tindakan atau ketinggalan yang melanggar atau mungkin menyebabkan pelanggaran peruntukan undang-undang yang tersebut di dalam notis ini, mengikut mana-mana yang berkenaan telah diperbetulkan pada/...../20.....

Tarikh: 15/12/17
Masa: 15.00
Majikan is for Majikan

Tandatangan: [Signature]
Cop Jabatan: [Stamp]

* Potong yang mana tidak berkenaan

Non-Responsible Party

Taman Sri Bunga
Sdn Bhd
(Developer)

Not liable

More mindful on site safety and
not insist that cost minimization

Commission's Recommendations

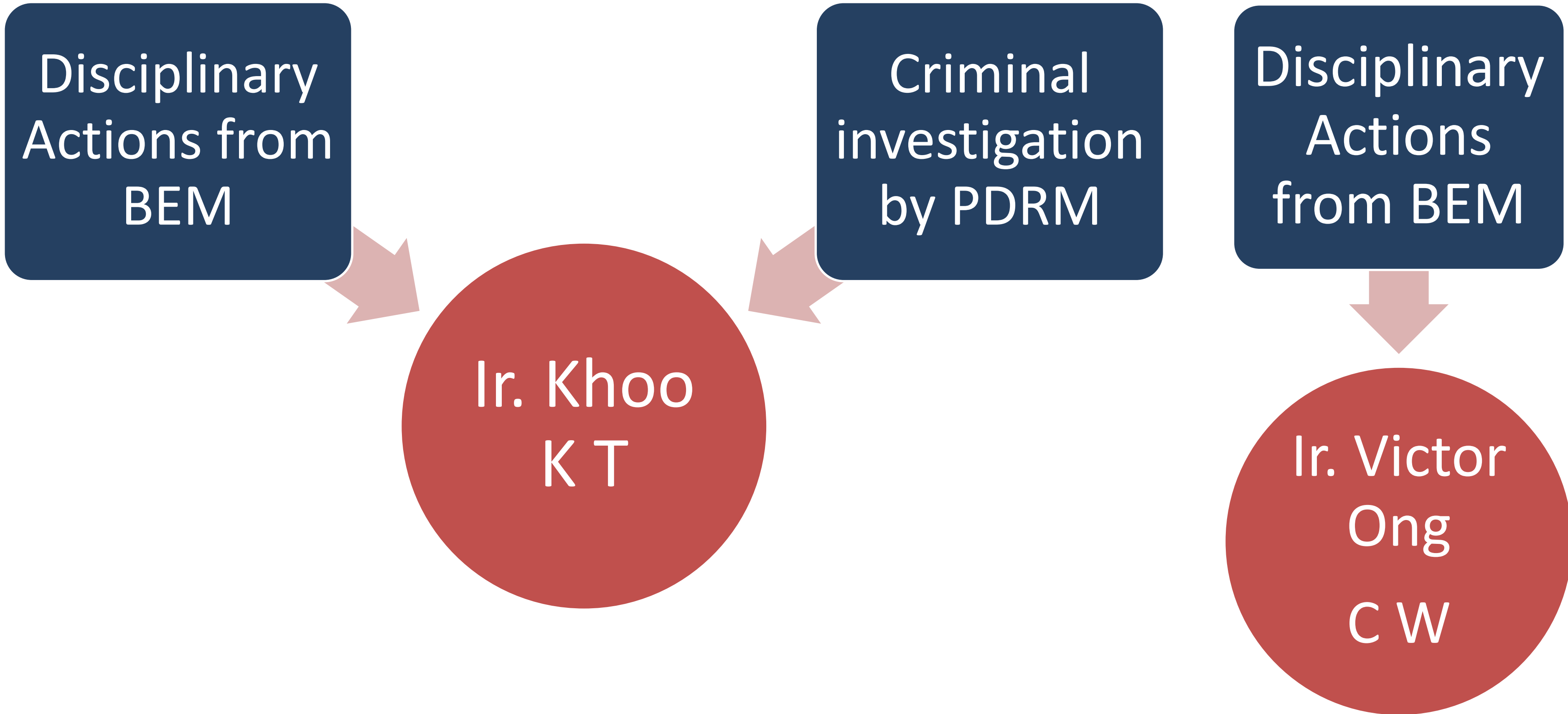
Disciplinary
Actions from
BEM

Criminal
investigation
by PDRM

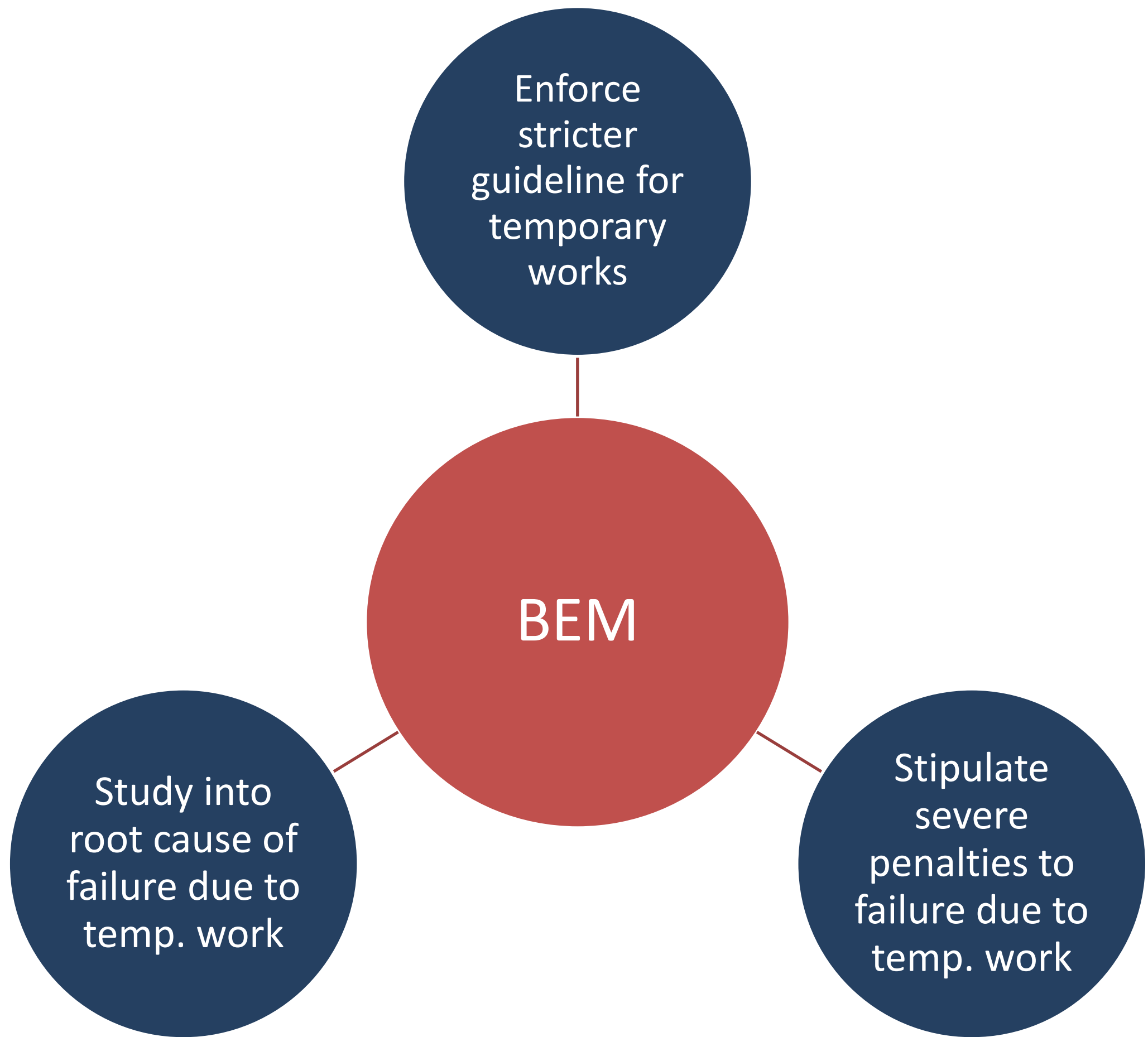
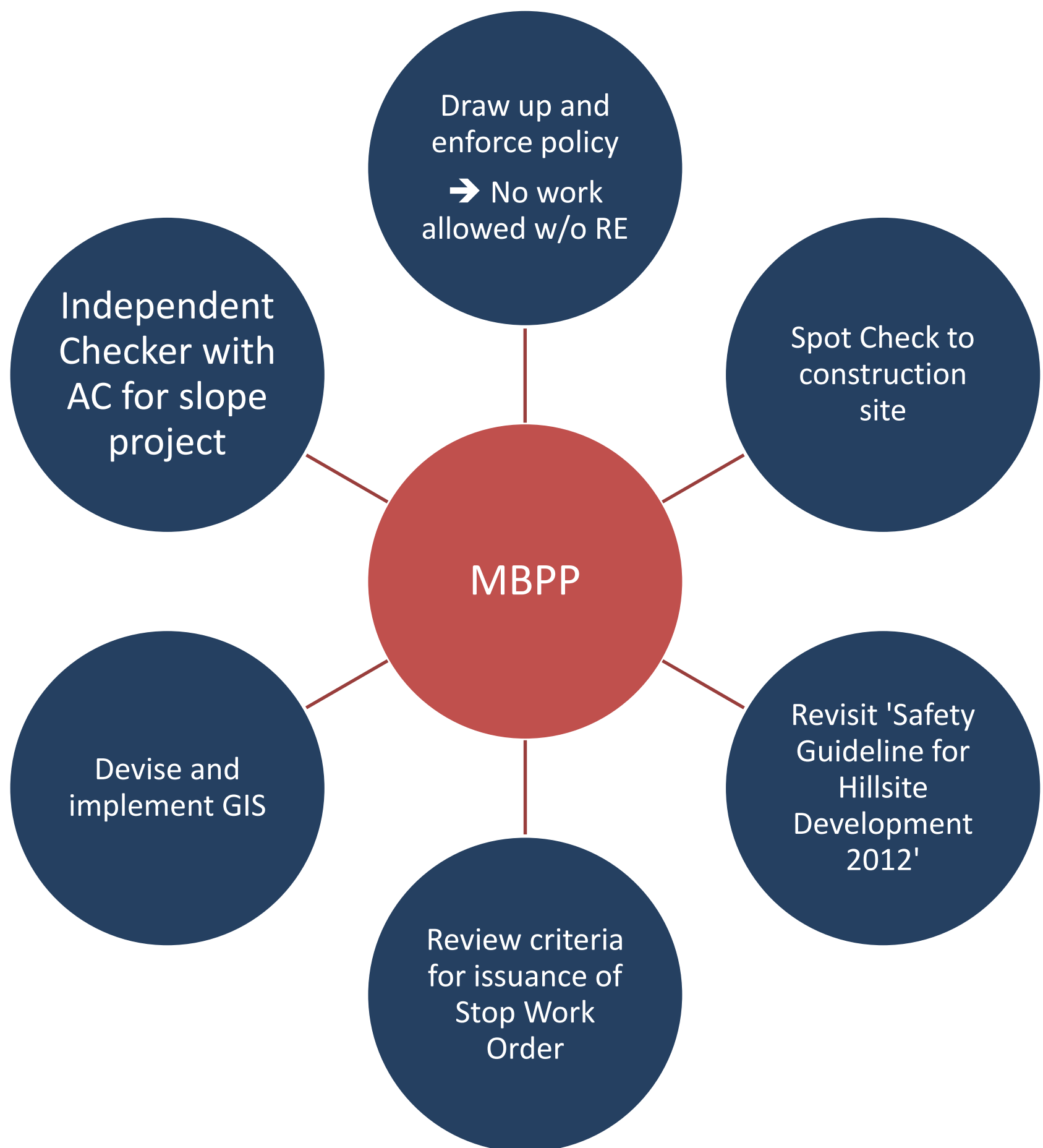
Disciplinary
Actions
from BEM

Ir. Khoo
K T

Ir. Victor
Ong
C W



Commission's Recommendations



Commission's Recommendations



Regular site visit is a MUST!!

Site team/supervisor informs Project Engineer immediately for site irregularities.

Stand firm on **SAFETY** when dealing with cost issue.

SAFETY shall be treated with **URGENCY**.

Site reconnaissance before detail design stage

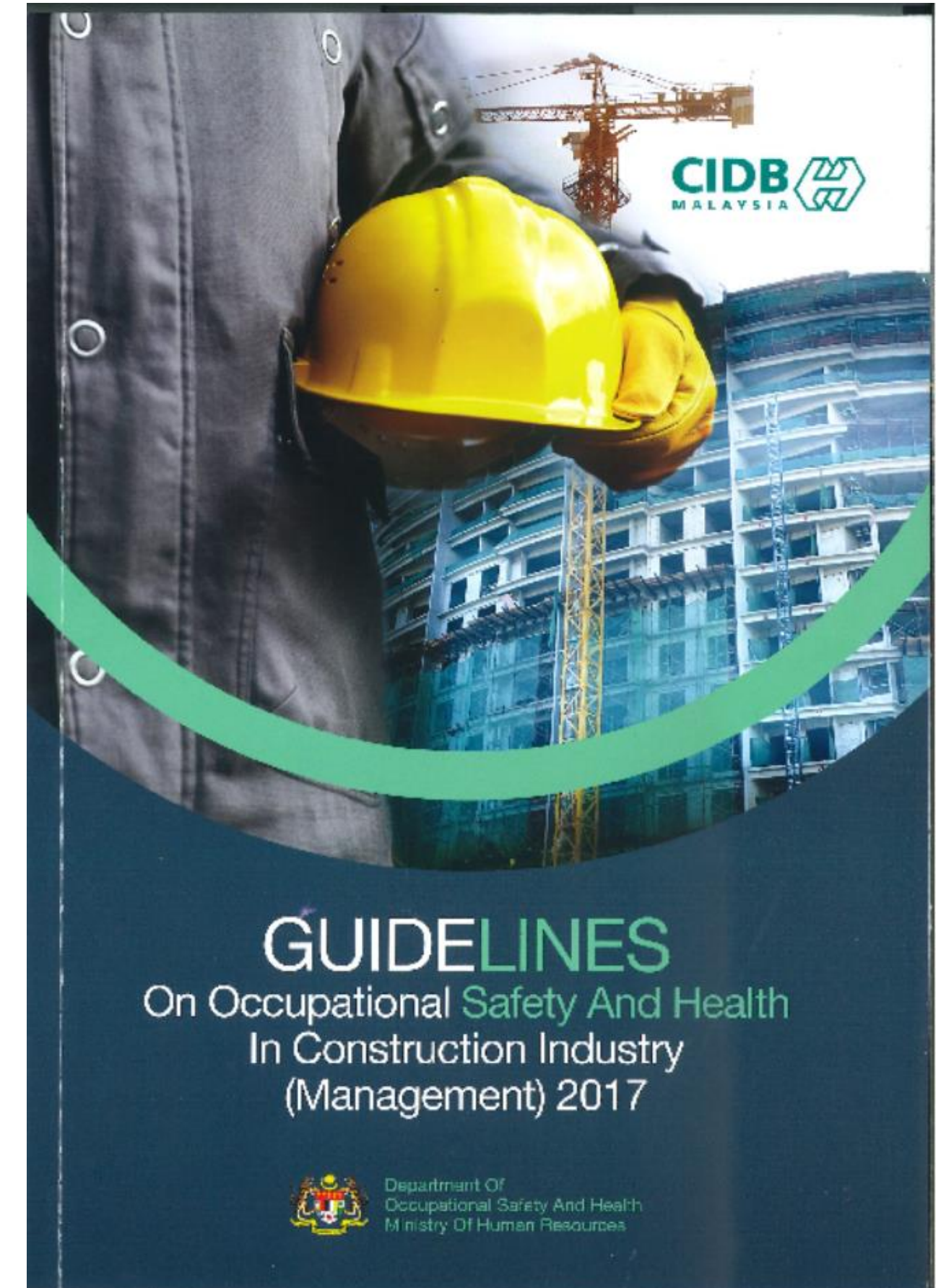
4,000 years ago, King Hammurabi of Babylon, Mesopotamia, laid out the first sets of construction laws, designed to align the incentives of builder and occupant to ensure that builders created safe homes:

- If a builder builds a house for a man and does not make its construction firm, and the house which he has built collapses and causes the **death of the owner** of the house, that **builder shall be put to death**.
- If it causes the **death of the son of the owner** of the house, they shall put to **death a son of that builder**.
- If it causes the **death of a slave of the owner** of the house, he shall give to the owner of the house **a slave of equal value**.
- If it destroys property, he shall **restore whatever it destroyed**, and because he did not make the house which he builds firm and it collapsed, he shall **rebuild the house** which collapsed **at his own expense**.
- If a builder builds a house for a man and does not make its construction meet the requirements and a wall falls in, that builder shall **strengthen the wall at his own expense**.

Ancient laws emphasise on Permanent Works!

OSHCIM Guidelines for Designers

Modern laws cover both Permanent Works
and Temporary Works!



Thanks for your patience & attention

