



**PEPERIKSAAN PERKHIDMATAN
PENOLONG JURUUKUR BAHAN
2023
UKUR BAHAN**

KOD : PJU011
SUBJEK : PENGUKURAN KUANTITI
TARIKH : 13 MAC 2023
MASA : 9.00 PAGI – 12.00 TGH

**DILARANG MEMBUKA KERTAS SOALAN
SEHINGGA DIARAHKAN**

ARAHAN KEPADA CALON

1. **Tuliskan angka giliran serta nombor kad pengenalan anda dengan terang pada setiap helaian kertas jawapan yang digunakan. Jangan sekali-kali menulis nama anda pada kertas jawapan.** Kertas jawapan yang mengandungi nama calon akan dianggap tidak sah.
2. Pastikan anda mendapat kertas soalan yang lengkap.
3. **Jawab dalam Bahasa Malaysia sahaja.** Istilah-istilah teknikal yang tiada terjemahannya atau sukar diterjemahkan boleh dikekalkan dalam bahasa asalnya. Jawapan yang tidak mematuhi syarat ini tidak akan diberi markah.
4. **Jawab secukup soalan sahaja** mengikut arahan dalam kertas soalan. Jawapan bagi soalan lebih tidak akan diberi markah.
5. Semua perkiraan untuk mendapatkan jawapan hendaklah ditunjukkan. Jawapan yang betul tetapi tiada menunjukkan perkiraan tidak akan diberi markah.
6. Calon-calun digalakkan membuat lakaran untuk menjelaskan jawapan di mana yang sesuai.
7. **Calon-calun dilarang merujuk kepada buku atau sebarang bahan rujukan** melainkan yang dibenarkan mengikut arahan yang tercatat dalam permulaan kertas soalan.
8. Penggunaan mesin pengira elektronik tanpa kemudahan program adalah dibenarkan melainkan jika dinyatakan sebaliknya di dalam kertas jawapan.
9. Bagi subjek peperiksaan di mana masa rehat diberi (misalnya, subjek LUKISAN), calon-calun adalah dilarang membawa kertas soalan keluar dari dewan peperiksaan pada bila-bila masa sehingga keseluruhan peperiksaan untuk subjek berkenaan tamat.
10. Semua kertas jawapan mesti disusun dan diikat dengan sempurna.
11. Calon-calun dilarang mengambil kertas jawapan kosong yang telah disediakan keluar dari dewan peperiksaan pada bila-bila masa.
12. **Calon-calun tidak dibenarkan keluar dari dewan peperiksaan dalam tempoh masa 30 minit** dari mulanya peperiksaan.
13. **Tindakan tatatertib akan diambil terhadap calon-calun yang menyerahkan kertas jawapan kosong (tanpa sebarang jawapan) sekiranya mereka tidak mempunyai sebab yang munasabah.**
14. **Calon-calun yang didapati meniru/menipu semasa menduduki peperiksaan akan dikenakan tindakan tatatertib.**
15. **Tindakan tatatertib akan diambil terhadap calon yang mengingkari arahan Ketua Pengawas semasa di dalam dewan peperiksaan.**

PERKARA : PJU011 – PENGUKURAN KUANTITI

ARAHAN KEPADA CALON

*Kertas ini mengandungi dua (2) bahagian. Bahagian A mengandungi satu (1) soalan dan Bahagian B mengandungi dua (2) soalan .
Jawab **semua** soalan.*

Calon tidak dibenarkan membawa sebarang bahan rujukan. Naskah SMM2 disediakan untuk rujukan semasa peperiksaan.

BAHAGIAN A

SOALAN 1

- a) Terangkan tujuan penggunaan braket (*bracket*) dalam kertas pengukuran tradisional.

(5 markah)

- b) Terangkan **lima (5)** kesilapan yang sering lakukan semasa membuat kerja-kerja pengukuran kuantiti (*taking off*).

(10 markah)

- c) Berdasarkan lukisan No. JKR/CKAS/P-KK5/03/26/PEL14/005/XRAY/ (12/16), bagi kerja-kerja papak aras bumbung (*reinforced concrete flat roof*), sediakan perkara-perkara berikut:

- i) Senarai Pengukuran Kerja (*Taking Off List*).

(5 markah)

- ii) Pengukuran kuantiti (*taking off*) dengan menggunakan *taking off sheet* yang disediakan.

Berikan senarai pertanyaan (*query list*) berserta andaian (*assumption*) anda jika diperlukan.

(25 markah)

- iii) Senarai kuantiti (*bill of quantities*) dengan menggunakan kertas *billing* yang disediakan.

(5 markah)

BAHAGIAN B

SOALAN 1

a) Berdasarkan lukisan No. JKR/CKAS/07/26/B20/89/KT/1[3], JKR/CKAS/07/26/B20/89/KT/3[3], JKR/CKAS/P-KT/BKA/30/PEL18/(1/2), JKR.CKG.BKA.600/2/1/24/1-1 dan JKR.CKG.BKA.600/2/1/24/1-2 bagi kerja-kerja *retaining wall*, sediakan perkara-perkara berikut:

i) Senarai Pengukuran Kerja (*Taking Off List*).

(5 markah)

ii) Senarai kuantiti (*bill of quantities*) tanpa kuantiti dengan menggunakan kertas *billing* yang disediakan.

Berikan senarai pertanyaan (*query list*) berserta andaian (*assumption*) anda jika diperlukan.

(20 markah)

b) Berdasarkan lukisan No. JKR/CKAS/07/26/B20/89/SS/1[7], sediakan Senarai Pengukuran Kerja (*Taking Off List*) bagi kerja-kerja *surface water drainage*.

(10 markah)

SOALAN 2

a) Salah satu perkara asas yang perlu diketahui sebelum pengukuran dibuat ke atas model *BIM* adalah *Level of Detail (LOD)*. Nyatakan kelima-lima *Level of Detail (LOD)* tersebut:

i) *LOD*

ii) *LOD*

iii) *LOD*

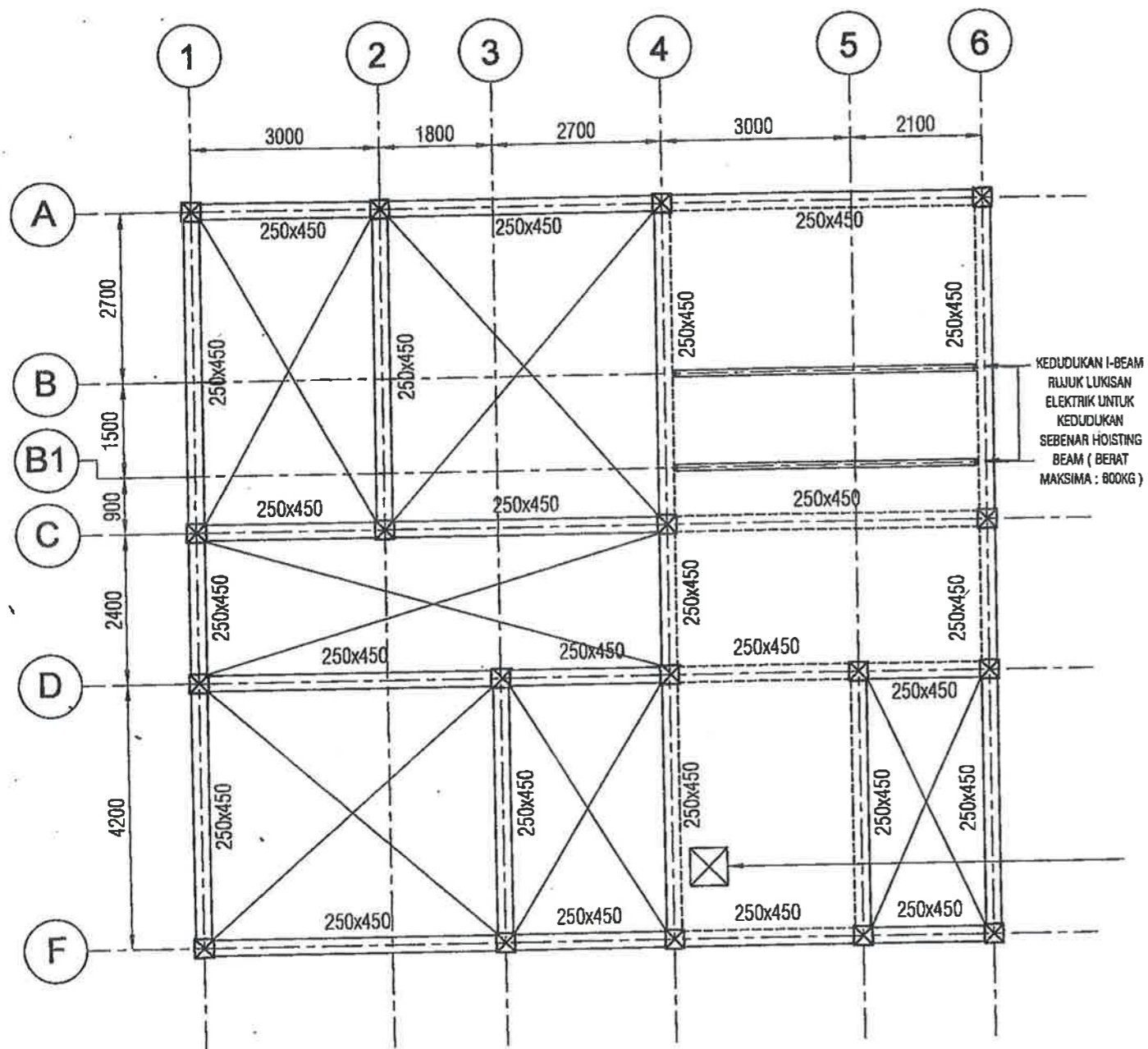
iv) *LOD*

v) *LOD*

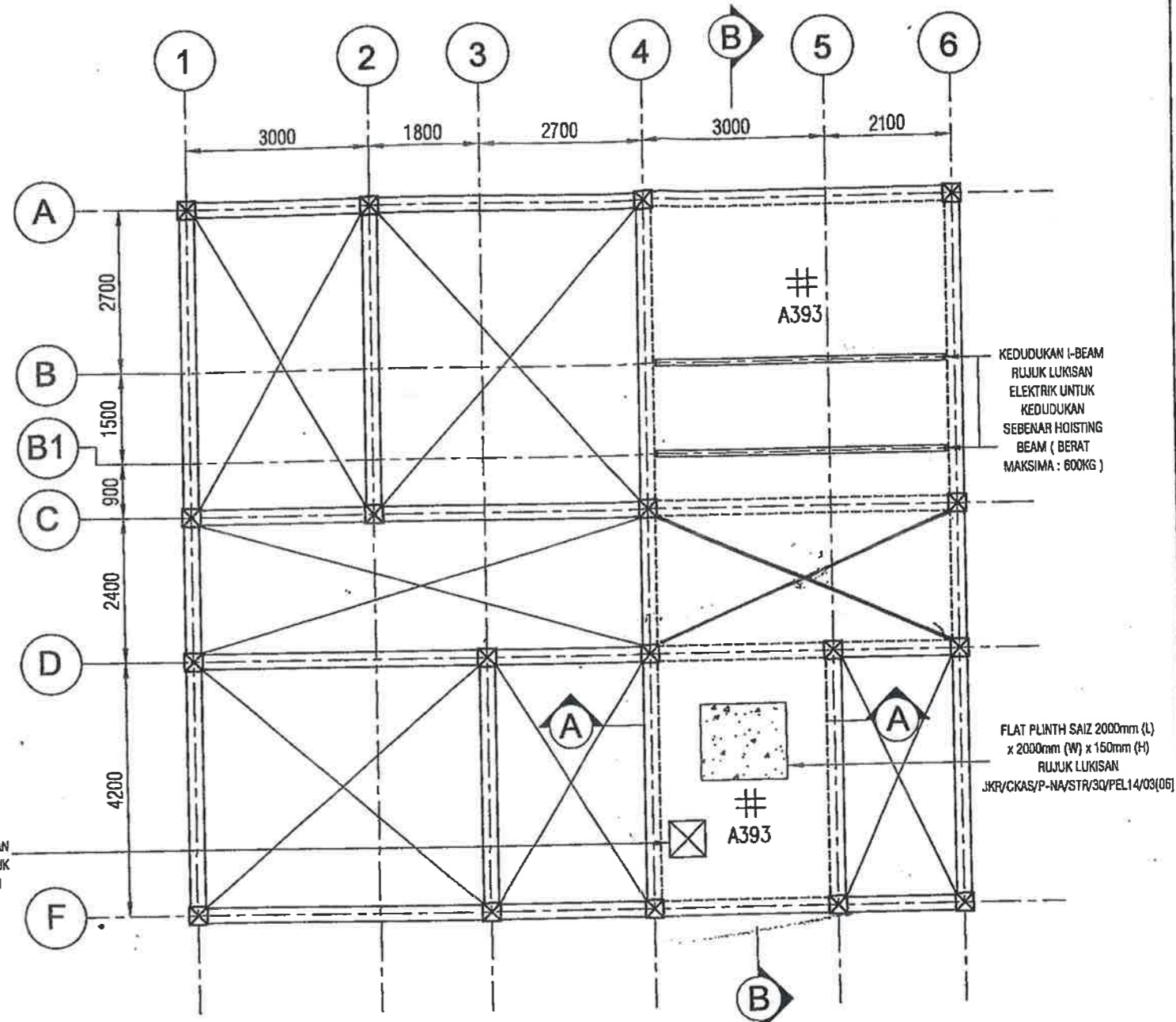
(5 markah)

b) Selaras dengan perkembangan teknologi terkini, para professional industri pembinaan di Malaysia telah mengguna pakai teknologi *BIM* dalam pelaksanaan projek. Senaraikan **lima (5)** kebaikan penggunaan teknologi *BIM* bagi projek pembinaan.

(10 markah)



PELAN KUNCI RASUK ARAS BUMBUNG



PELAN KUNCI PAPAK ARAS BUMBUNG

B/Q DRAWING
TARIKH DI TERIMA
02 MAR 2021

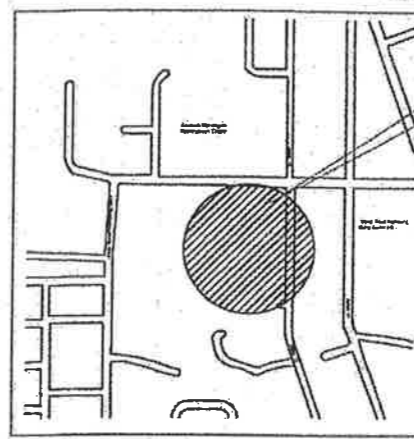
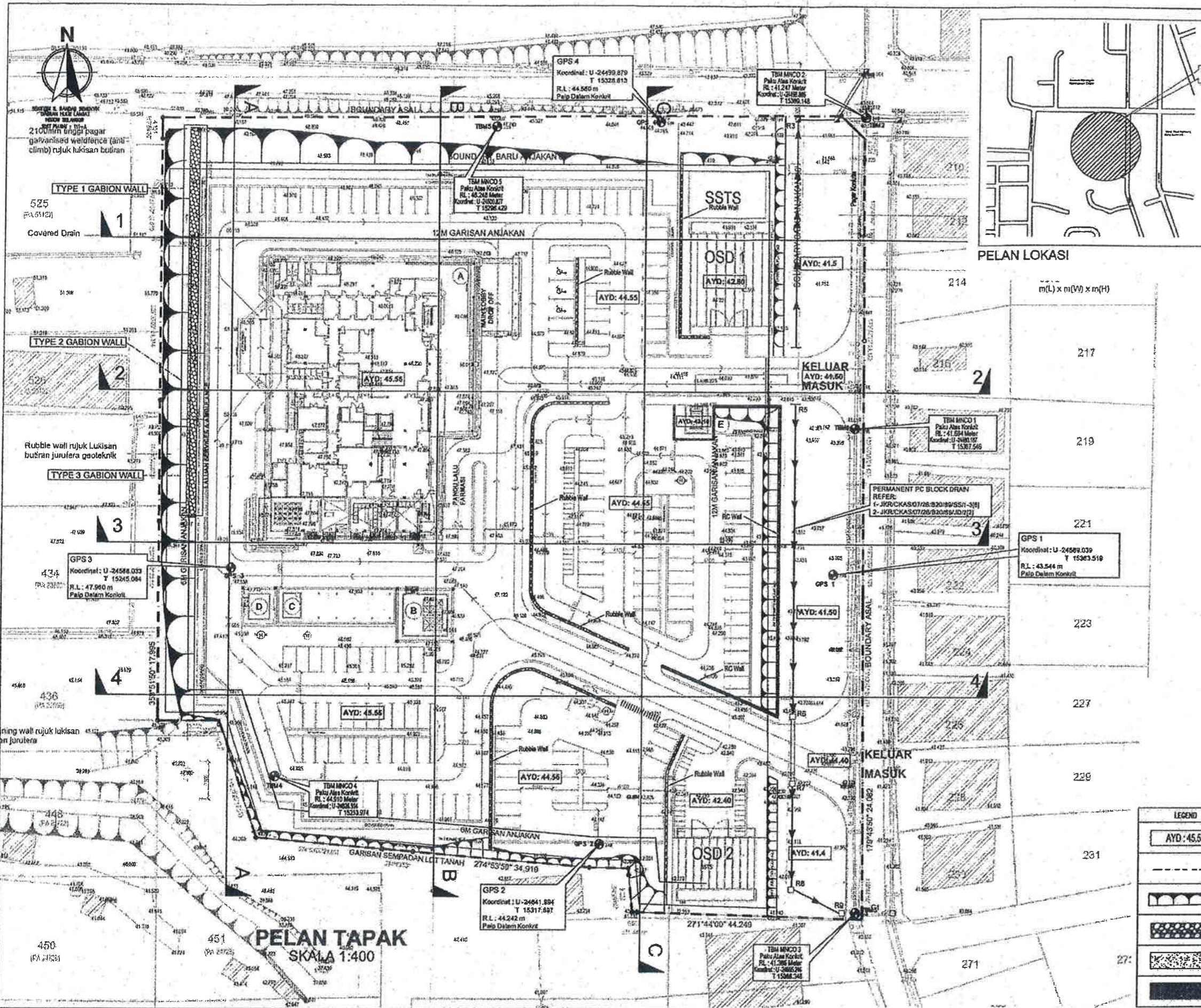
- NOTA :**
- PELAN INI PERLU DIBACA BERSAMA LUKISAN PELAN LANTAI ARKITEK/MEKANIKAL/ELEKTRIKAL
 - PELAN INI PERLU DIBACA BERSAMA DENGAN LUKISAN NOTA AM STRUKTUR DAN BUTIRAN TIPIKAL BAGI MANA-MANA YANG BERKAITAN.
 - JIKA TIDAK DITUNJUKKAN JARAK OFFSET, GRIDLINES BERADA DI TEPI ATAU DI TENGAH-TENGAH RASUK.
 - SEMUA TIANG ADALAH BERSAIZ 300mm x 300mm KECUALI DINYATAKAN BERLAINAN.
 - TEBAL PAPAK ADALAH 150mm KECUALI DINYATAKAN BERLAINAN.
 - TETULANG FABRIK YANG DIGUNAKAN ADALAH A393 ATAS DAN BAWAH (fyk=500 N/mm²) KECUALI YANG DINYATAKAN BERLAINAN.
 - BUTIRAN BUKAAN RUJUK BUTIRAN TIPIKAL BUKAAN PADA STRUKTUR LANTAI (NO LUKISAN JKR/CKAS/P-NA/STR/30/PEL/14/02[05]



CAWANGAN KEJURUTERAHAN AWAM DAN STRUKTUR
 BAHAGIAN STRUKTUR (KESIHATAN)
 TINGKAT 4-10, BLOK G,
 IBU PEJABAT JKR MALAYSIA
 NO. 6 JALAN SULTAN SALAHUDDIN
 50480 KUALA LUMPUR.
 (NO. TEL: 03-26100171 & NO. FAKS 03-26100155)

DIREKABENTUK : KHARZA BINTI ABDUL KADIR	PENGAHAR KANAN: Ir. Dr. LIM CHAR CHING	HURUF PEMUNJUK	PINDAAN	TARIKH	TANDA TANGAN
DISEMAK : MOHAMMAD HAZMIN BIN ZAKARIA	PENGAHAR KHIDMAT REKABENTUK : Ir. Hjh. ATRIAH BINTI ABDUL HAMID				
DILUKIS : MOHD SULHI BIN ZAKARIA / RADHAN BINTI ROZMAN	JURUTERA AWAM PENGUASA KANAN : Ir. AHMAD RIDZUAN BIN ABU BAKAR				
SKALA : 1:100	JURUTERA AWAM KANAN : Ir. NURHIDAYAH BINTI ANUAR				
NO. FABL. PROJEK : JKR/CKAS/03.500/080/LN/18	TARIKH : MARCH 2021				

NAMA PROJEK :	PRE-APPROVED PLAN KLINIK KESIHATAN JENIS 5 STELLA (BORNEO) -BLOK X-RAY
TAJUK LUKISAN :	PELAN KUNCI RASUK DAN PAPAK ARAS BUMBUNG
NO. LUKISAN :	JKR/CKAS/P-KK5/03/26/PEL14/005/XRAY/(12/16)



- NOTES**
- All dimensions are in millimetres unless otherwise shown on the drawings.
 - These drawings shall be read in conjunction with architectural and survey drawings.
 - If there is any discrepancy between two sets of drawings, it must be brought to the attention of the S.O.
 - All survey levels shown are in metres unless otherwise stated.
 - Site clearing shall be carried out in stages to suit Environmental Management Plan (EMP)/Erosion & Sediment Control Plan (ESCP).
 - All fill platforms are to be well compacted and comply with the JKR Specification.
 - All imported fill materials shall be tested and comply with the JKR Specification.
 - Standard Proctor test (2.5 kg rammer) shall be carried out on all backfilling materials.
 - The compaction requirements of backfilling materials shall be as follows:
Road and drain ≥ 90% Standard Proctor maximum dry density for cohesive materials and 95% for cohesionless materials
Building area ≥ 90% Standard Proctor maximum dry density
Open area ≥ 90% Standard Proctor maximum dry density
 - All gradients for cut slopes shall be a minimum of 1:1.5 and fill slopes shall be a minimum of 1:2 unless otherwise shown on the drawings. All unprotected slope shall be close turfed immediately after the embankment is constructed to prevent erosion. All level ground shall be spot turfed unless otherwise stated.
 - Soil erosion control measures shall be implemented before earthwork commences.
 - The contractor shall lay and compact a minimum of 200 mm thickness crusher run on the temporary road access to the site.
 - The contractor shall ensure that the works caused no silting, ponding and flooding to the neighbouring properties. The contractor shall be solely responsible to make good of all damages and pay any claims in the event of such silting and flooding occurs.

LEGEND	
	AYD: 45.55 PLATFORM LEVEL
	BOUNDARY
	SLOPE
	RUBBLE WALL (TYPE 1) (REFER DRAWING NO. JKR/CKAS/P-K1/BKA/20/PEL16/(1/2))
	RC WALL (REFER TO GEOTECHNICAL DETAILS)
	GABION (REFER TO GEOTECHNICAL DETAILS)

TANDATANGAN DAN COP KELULUSAN PIHAK BERKUASA TEMPATAN :

KEMENTERIAN KESIHATAN MALAYSIA
 BAGIAN PEMBANGUNAN
 IBU PEJABAT KEMENTERIAN KESIHATAN MALAYSIA ARAS 7,
 BLOK E6, KOMPLEKS E,
 PUSAT PENTABITAN KERAMAM PERSEKUTUAN, 62500
 PUTRAJAYA, WILAYAH PERSEKUTUAN,
 PUTRAJAYA, MALAYSIA.

TANDATANGAN JURUTERA PROFESIONAL :
 "I hereby certify that these works have been designed by me in accordance with sound engineering practice and that I take full responsibility for the design and proper performance of the same"



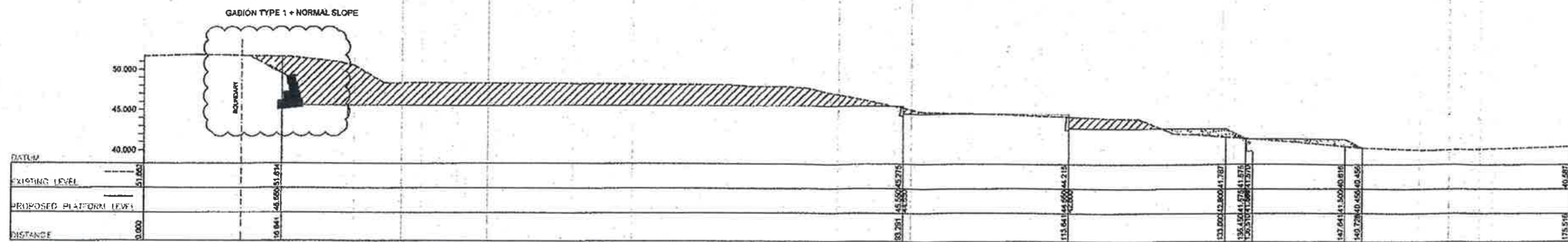
JABATAN KERJA RAYA MALAYSIA
 CAWANGAN KEJURUTERAAN AWAM DAN STRUKTUR
 BAGIAN KEJURUTERAAN AWAM (KESELAMATAN DAN BANGUNAN AWAM)
 IBU PEJABAT JKR MALAYSIA
 TINGKAT 9, BLOK G, NO. 6
 JALAN SULTAN SALAHUDDIN
 50480 KUALA LUMPUR.

DIREKTORENJENKUR :
 ZULHISAM BIN SAPEJAY
 DISKAJIK :
 I. WAN MOHD NAWAZUL HADI BIN WAN ISMAIL
 DIJURUS :
 NURFARAH BINTI ISMAIL
 NO. PANE PROJEK :
 JKR/CKAS/07/26/B20/B9
 SKALA :
 1 : 400
 TARIKH :
 Feb 2022

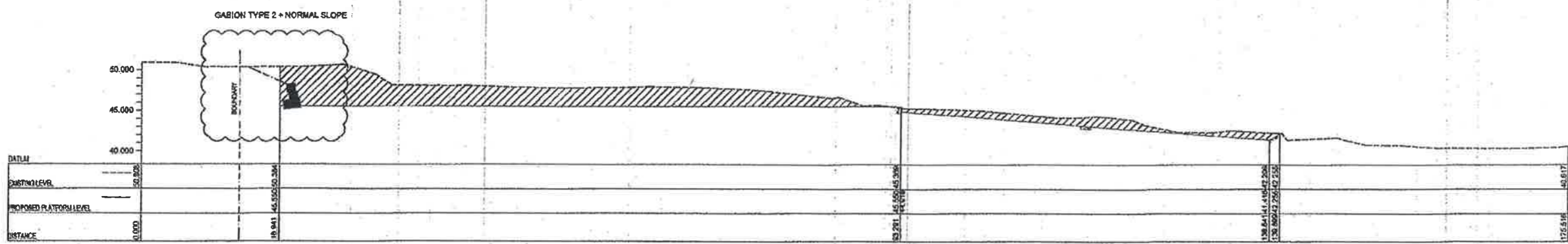
PENGARAH KAMPAH :
 I. HJ. BADIOEZAMAN BIN ABU KHALIK
 PENGARAH KENDALAT REKABENTUK :
 I. MOHD KHAR BIN NORON
 JURUTERA AWAM PENGUKUSA KAMPAH :
 I. DR. ZURADA BINTI ZAHRI RAJAL
 JURUTERA AWAM KAMPAH :
 I. SANISAH BINTI SULAMMAN

HURUF PETUNJUK :
 PINDAAN :
 TARIKH :
 TAMBAH TUNJANG :
 NAMA PROJEK :
 KLINIK KESIHATAN (JENIS 2) SEMENYIH
 TAJUK LUKISAN :
 PELAN KERJA TANAH
 NO. LUKISAN :
 JKR/CKAS/07/26/B20/B9/KT/1[3]

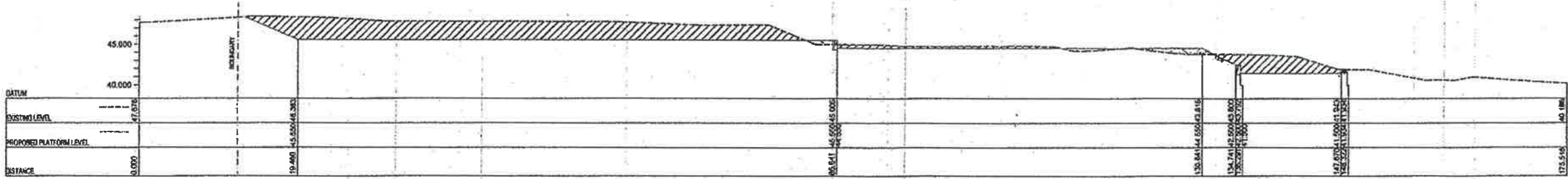
TANDATANGAN DAN COP KELULUSAN
PIHAK BERKUALA TEMPATAN :



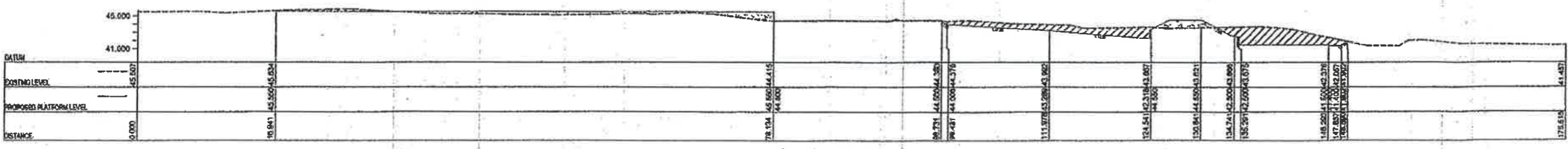
Section 1 - 1



Section 2 - 2




Section 3 - 3



Section 4 - 4

■ Cut Area
■ Fill Area

PEMILIK

KEMENTERIAN KESIHATAN MALAYSIA
BAHAGIAN PERENCANAAN
IBU PEJABAT KEMENTERIAN KESIHATAN MALAYSIA ARAS 7,
BLOK E6, KOMPLEKS E,
PUSAT PENTADBIRAN KERAJAAN PERSEKUTUAN, 62500
PUTRAJAYA, WILAYAH PERSEKUTUAN,
PUTRAJAYA, MALAYSIA.
TANDATANGAN & COP PELANGGAN

TANDATANGAN JURUTERA PROFESIONAL :
"I hereby certify that these works have been designed
by me in accordance with sound engineering practice and
that I take full responsibility for the design and proper
performance of the same"

NOTA



CAWANGAN KEJURUTERAAN AWAM DAN STRUKTUR
BAHAGIAN KEJURUTERAAN AWAM (KESELAMATAN DAN BANGUNAN AWAM)
IBU PEJABAT JKR MALAYSIA
TINGKAT 9, BLOK G, NO. 6
JALAN SULTAN SALAHUDDIN
50480 KUALA LUMPUR.

DIREKABENTUK :
ZULHISAM BIN SAPEQAY
DISEMAM :
Ir. WAH MOHD MASRUA, HADI BIN WAN ISMAIL
DILIKOS :
NURFARAHIN BINTI ISMAIL
NO. FAIL PROJEK :
JKR/KKAS/07/26/B20/89/KT/3[3]
SKALA :
1 : 300
TARIKH :
Feb 2022

PENGARAH KAWAN :
Ir. HJ. BADIOZAMAN BIN AB. KHALIK
PENCARAH KHIDMAT REKABENTUK :
Ir. NIKO KHAR BIN NORDIN
JURUTERA AWAM PENJAJA KAWAN :
Ir. Dr. ZURADA BINTI ZAMRI RIZAL
JURUTERA AWAM KAWAN :
Ir. SANISAH BINTI SULAMAN

HURUF PETALUK	PINDAAN	TARIKH	TANDA TAMBAH

NAMA PROJEK :
KLINIK KESIHATAN (JENIS 2)
SEMENYIH
TARIKH LUKSAS :
KERATAN KERJA TANAH
- SECTION 1 - 1, 2 - 2, 3 - 3 & 4 - 4
NO. LUKSAS :
JKR/KKAS/07/26/B20/89/KT/3[3]

TANDATANGAN & COP PELANGGAN

TANDATANGAN JURUTERA PROFESIONAL:
I hereby certify that these works have been designed by me in accordance with sound engineering practice and that I take full responsibility for the design and proper performance of the same.



JABATAN KERJA RAYA MALAYSIA
BAHAGIAN KEJURUTERAAN AWAM
CAWANGAN KEJURUTERAAN AWAM DAN STRUKTUR
IBU PEJABAT JKR MALAYSIA

PENGARAH KANAN:

Ir. HJ. MOHAMAD ZULKEFLY BIN SULAIMAN

PENGARAH KHIDMAT REKABENTUK:

Ir. HJ. BADIDEZAMAN BIN AB. KHALIK

JURUTERA AWAM PENGUASA KANAN:

CHOW WAH

JURUTERA AWAM PENGUASA:

JURUTERA AWAM KANAN:

MUR FARHANA BINTI MOHD SALIM

DIREKABENTUK:

IZWAN SHAH/WARDA BINTI ABDUL RASHID

DISEMAK:

Ir. MAZZURAN BIN HJ. MOHD DAH

DILUKIS:

MURHAYATI BINTI ABD KARIM

NOMBOR FAIL LUKISAN PIHAK:

JKR/CKAS/01.700/100/11

SKALA:

TANPA SKALA

TARIKH:

SEPTEMBER 2018

PERKARA:

LUKISAN PIAWAI

KERJA TANAH

TAJUK LUKISAN:

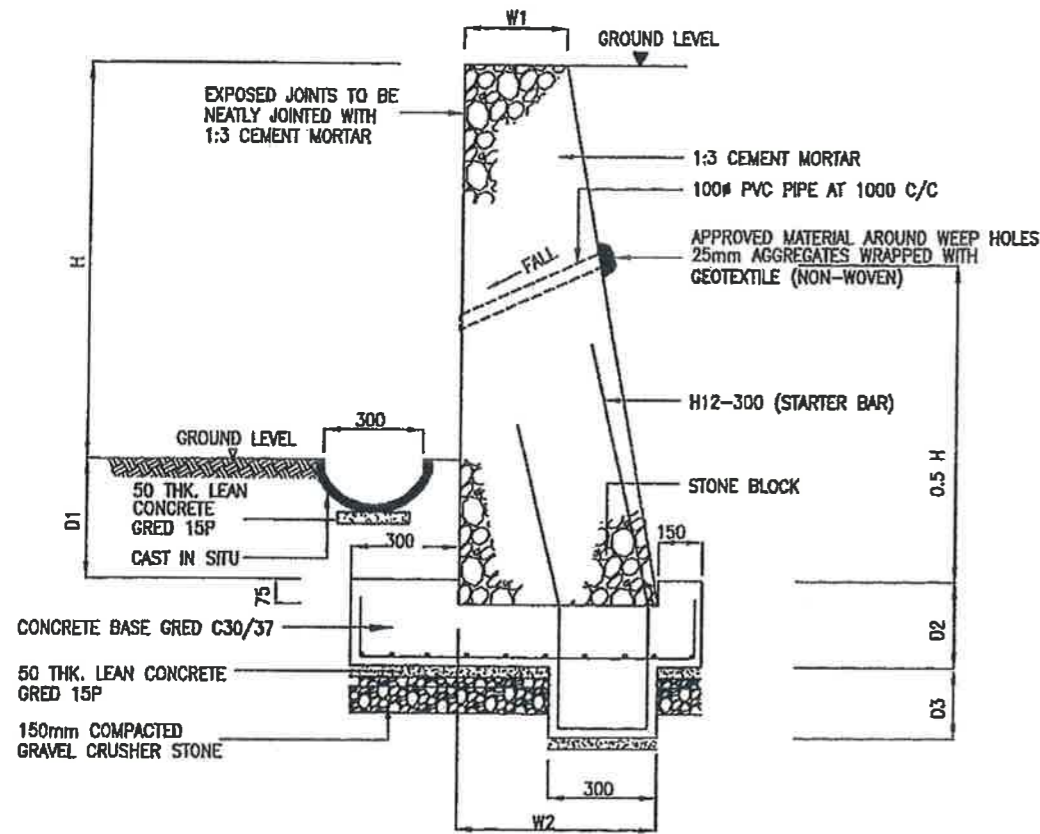
TYPICAL RUBBLE RETAINING

WALL TYPE 1, TYPE 2 &

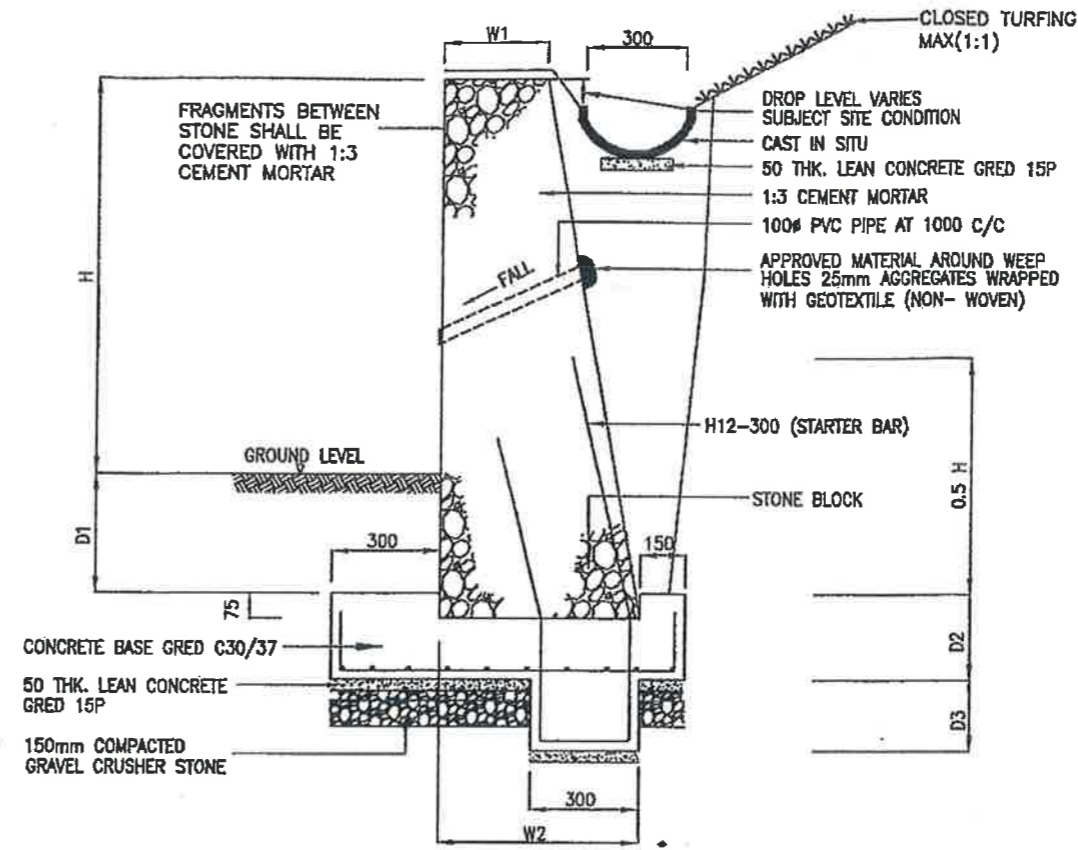
RUBBLE PICHTING

NO. LUKISAN:

JKR/CKAS/P-KT/BKA/30/PEL18/(1/2)



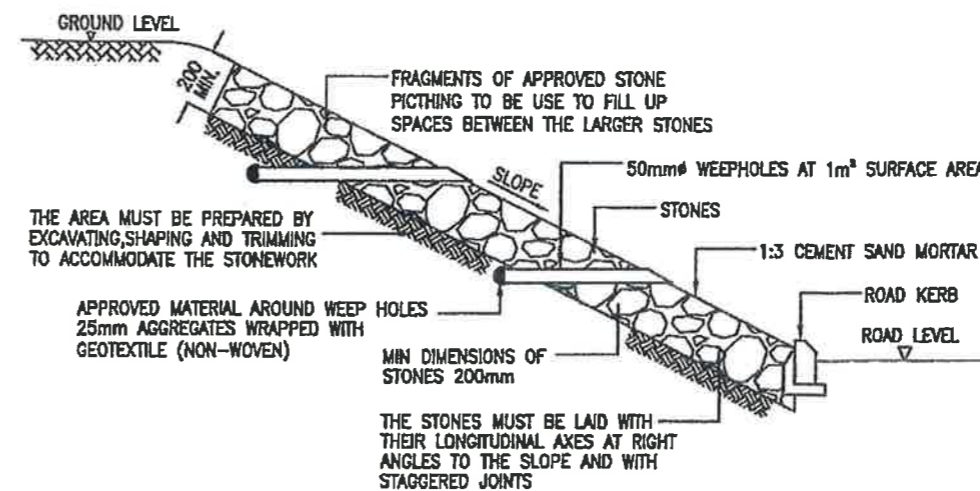
RUBBLE WALL DETAIL
TYPE 1



RUBBLE WALL DETAIL
TYPE 2

H	W1	W2	D1	D2	D3	BAR	SOIL BEARING CAPACITY REQUIREMENT KN/m ₂
0 to 600	225	400	400	250	200	T10 - 300	30 KN/m ₂
601 to 900	225	450	400	250	200	T10 - 300	30 KN/m ₂
901 to 1200	250	600	400	250	200	T10 - 250	60 KN/m ₂
1201 to 1500	250	700	400	250	200	T10 - 250	85 KN/m ₂
1501 to 1800	250	800	400	250	200	T10 - 225	110 KN/m ₂
1801 to 2100	300	900	400	275	250	T10 - 225	140 KN/m ₂
2101 to 2400	300	1000	400	275	250	T10 - 200	160 KN/m ₂
2401 to 2700	300	1200	400	275	250	T10 - 200	170 KN/m ₂
2701 to 3000	300	1300	400	275	250	T10 - 200	200 KN/m ₂

TABLE 1 RUBBLE WALL DIMENSION



RUBBLE PICHTING

NOTES :

A. GENERAL

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. DIMENSIONS SHALL NOT BE OBTAINED BY SCALL MEASUREMENT ON THE DRAWINGS.
3. THE WORKS SHALL BE CARRIED OUT IN ACCORDANCE TO STANDARD SPECIFICATION FOR BUILDING WORKS 2020 - SECTION U.
4. DETAIL METHOD OF STATEMENT FOR GABION SHALL BE SUBMITTED TO THE S.O. FOR APPROVAL PRIOR TO COMMENCEMENT OF WORK.
5. CONCRETE BLINDING SHALL BE GRADE C12/15.
6. CONFIRMATORY PROBE SHALL BE CARRIED OUT AT EVERY INTERVAL OF 6M AND READING OF PROBE SHALL BE AS FOLLOW :

TYPES OF WALL	MINIMUM ALLOWABLE BEARING CAPACITY	MINIMUM REQUIRED JKR PROBE BLOW COUNT / 300mm
TYPE 1	110 kN/m ²	44
TYPE 2	75 kN/m ²	30
TYPE 3	50 kN/m ²	20

7. SOIL LAYER UNDERNEATH THE WALL BASE WHICH DOES NOT ACHIEVED THE REQUIRED BLOW COUNT SHALL BE REMOVED AND REPLACED WITH COMPACTED HARD CORE PRIOR TO CONCRETE BLINDING.
8. SUITABLE TEMPORARY PROTECTION SYSTEM SHALL BE PROVIDED (IF NECESSARY) DURING EXCAVATION WORK OF GABION WALL.
9. MINIMUM EMBEDDED DEPTH OF GABION SHALL BE 500mm FROM PROPOSED PLATFORM LEVEL.

B. NON-WOVEN GEOTEXTILE

1. NON-WOVEN GEOTEXTILE AS SPECIFIED IN THE DRAWINGS AND APPROVED BY S.O. SHALL BE PLACED AT THE BACK OF EACH GABION BOX TO PREVENT MIGRATION OF FILLS.
2. THE NON WOVEN GEOTEXTILE PROPERTIES SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATION FOR BUILDING WORKS 2020 - SECTION V.

C. PVC COATED WIRE MESH GABIONS

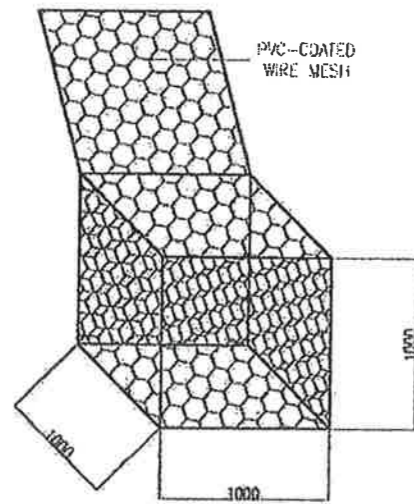
1. GABIONS SHALL BE RECTANGULAR BASKETS OF REQUIRED DIMENSIONS AS SHOWN ON THE DRAWINGS OR ORDER BY S.O.
2. THE GALVANISED WIRE MESH PROPERTIES SHALL BE IN ACCORDANCE WITH SPECIFICATIONS SHOWN IN THE TABLE BELOW.

TYPE OF WIRE	DIAMETER MINIMUM
SELVEGE (PERIMETER) WIRE	3.50
MESH WIRE	2.70
TYPING AND CONNECTING WIRE	2.20

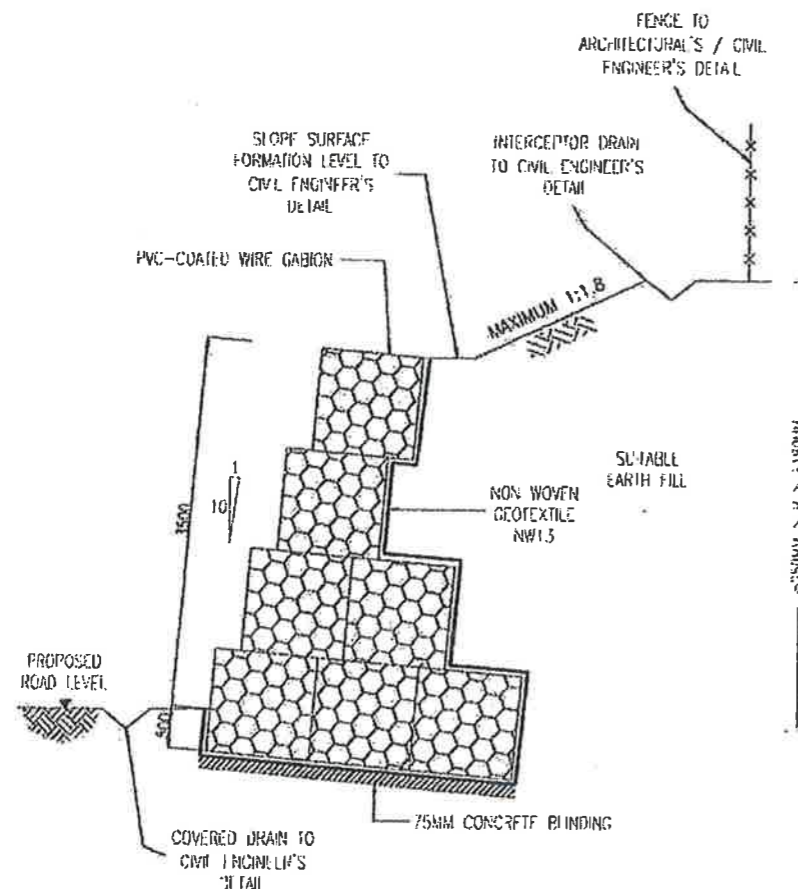
DIAMETER OF WIRE (mm)	WEIGHT OF COATING (g/m ²)
3.50	275
2.70	260
2.20	240

D. STONE

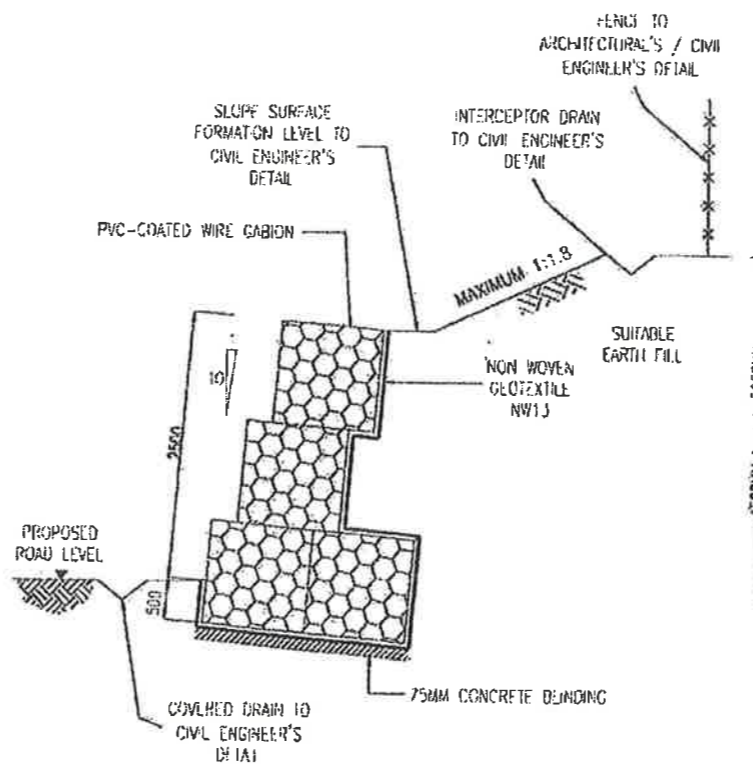
1. THE MATERIAL USED FOR GABION FILL SHALL BE CLEAN, HARD, DENSE, DURABLE, ROUNDED AND ANGULAR SHAPE.
2. STONE SHALL HAVE LEAST DIMENSIONS NOT LESS THAN 20mm LARGER THAN THE GABION MESH OPENINGS AND GREATEST DIMENSIONS NOT MORE THAN 250mm.
3. THE MATERIAL USE SHALL BE APPROVED BY THE S.O.



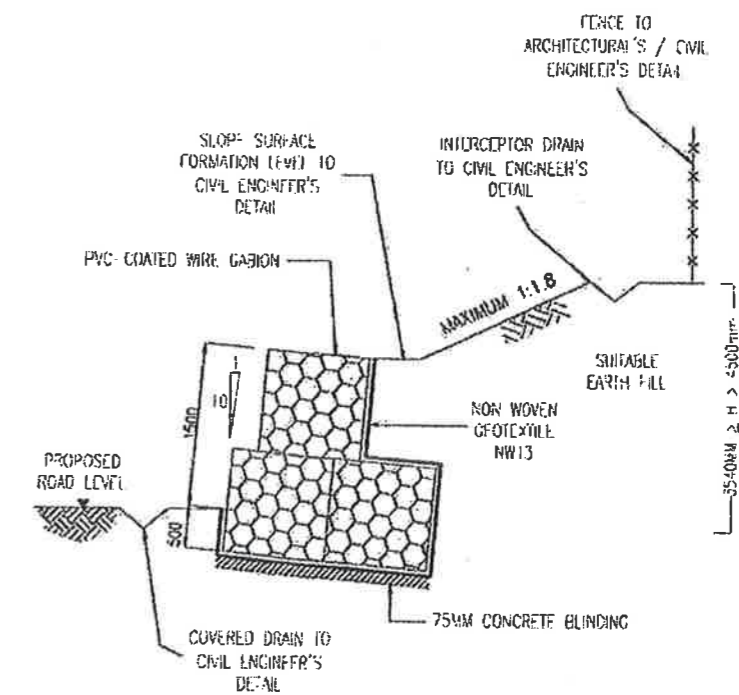
TYPICAL BOX OF GABION
1000mm x 1000mm x 1000mm



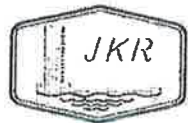
GABION WALL TYPE 1
MIN. ALLOWABLE BEARING CAPACITY 110 kN/m²



GABION WALL TYPE 2
MIN. ALLOWABLE BEARING CAPACITY 75 kN/m²



GABION WALL TYPE 3
MIN. ALLOWABLE BEARING CAPACITY 50 kN/m²



CAWANGAN KEJURUTERAAN GEOTEKNIK
JABATAN KERJA RAYA MALAYSIA
BAHAGIAN REKABENIHUK GEOTEKNIK 2 (KEJURUTERAAN STRUKTUR ASAS)
CAWANGAN KEJURUTERAAN GEOTEKNIK
RUE PIJAHAI JKR MALAYSIA
TINGKAP 25A & 26, MINARA PLO
NO 50 JALAN SUNGAI RAYAK
50400 KUALA UMPUR
(No. TEL : 03 4051 8815 & No. FAX : 03 4051 8781)

PENYAJI CAWANGAN:
P.N. SUHAIMI BIN JAMALUDIN
JURUTERA AWAM PILOQUASA KANAN
P. LIDAYU BINI SALLEH @ AMAN
JURUTERA AWAM PILOQUASA
Y. ENG BOON CHENG

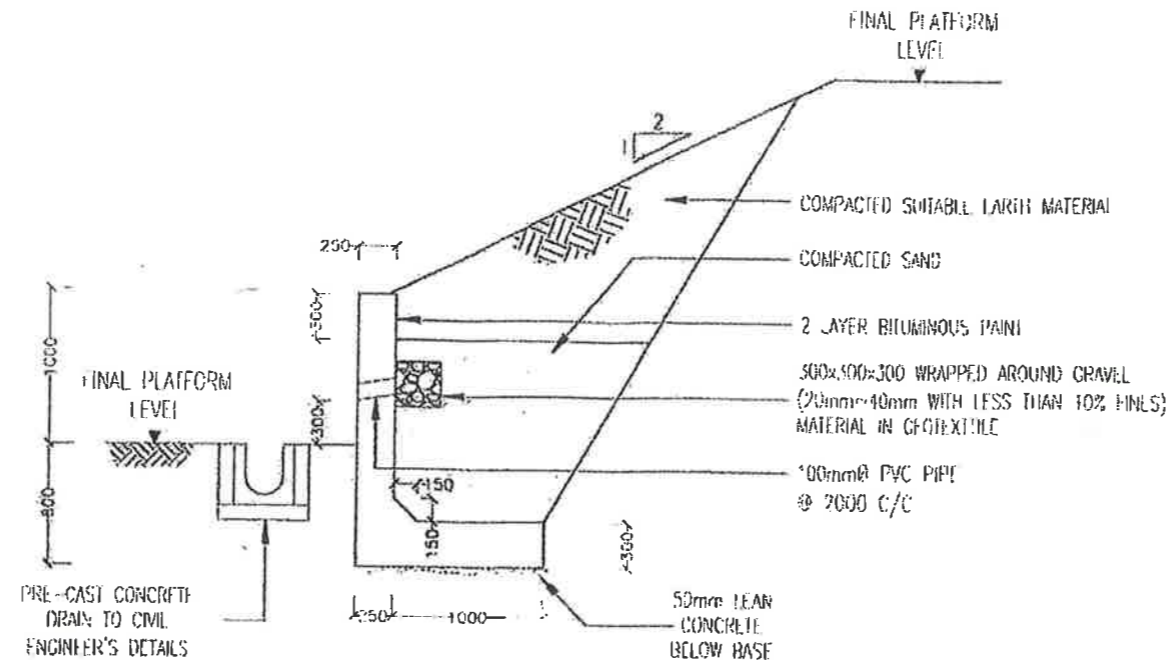
BARU
PINDAAN
TARIKH 1.1

SKALA : NIS
TARIKH : MAC 2022
DIREKTOR : MOHAMMAD YUSUF ALI FID YUSOFF
DIREKTOR TEKNIK : MOHAMMAD YUSUF ALI FID YUSOFF
DISYOROK : Y. ENG BOON CHENG

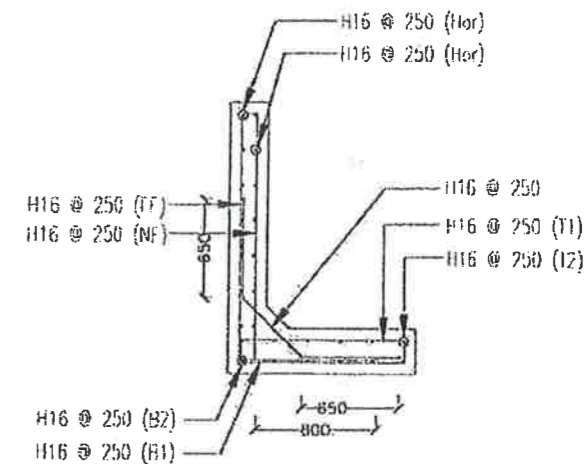
PROJEK :
REINK RESEBALAN (JRS 2) S-MINILI
TAJUK :
GABION WALL DESIGN
No. SURATAN : JKR.CKG.BKA.600/2/1/24/1-1

NOTA

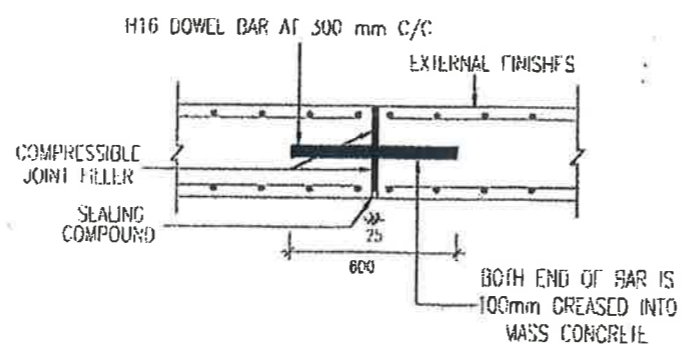
1. THIS DRAWING SHALL BE READ WITH ARCHITECT, CIVIL AND STRUCTURAL DRAWING. ANY DISCREPANCIES SHALL BE REPORT TO S.O.
2. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
3. FILLING BEHIND THE RC WALL ONLY CAN BE STARTED AFTER THE FILLING IN FRONT OF RC WALL HAS BEEN COMPLETED.
4. CONCRETE GRADE FOR RC WALL SHALL BE C30/37.
5. CONCRETE GRADE FOR LEAN CONCRETE SHALL BE C12/15.
6. COVER FOR REINFORCEMENT BAR SHALL BE 75MM.
7. ACTUAL LOCATION AND LENGTH OF RC WALL SHALL BE VERIFIED AND APPROVED BY S.O.
8. CONFIRMATORY PROBE SHALL BE CARRIED OUT AT EVERY INTERVAL OF 6M OR AS PER S.O. INSTRUCTION.
9. MINIMUM PROBE READING FOR DESIGN ALLOWABLE BEARING CAPACITY IS 30 BLOWS/300MM. SOIL LAYER UNDERNEATH THE WALL BASE WHICH DOES NOT ACHIEVED THE REQUIRED BLOW COUNT SHALL BE REMOVED AND REPLACED WITH COMPACTED HARDWARE.
10. SUITABLE TEMPORARY PROTECTION SYSTEM SHALL BE PROVIDED (IF NECESSARY) DURING EXCAVATION WORK OF RC WALL.
11. PRIOR CONSTRUCTION, COORDINATION SHALL BE MADE BETWEEN OTHER UTILITIES WHICH CROSSING THE RC WALL SUCH AS SEWERAGE LINE, ELECTRICAL CABLE AND ETC.
12. EXPANSION JOINT SHALL BE PROVIDED FOR EVERY 20M LENGTH OF RC WALL.



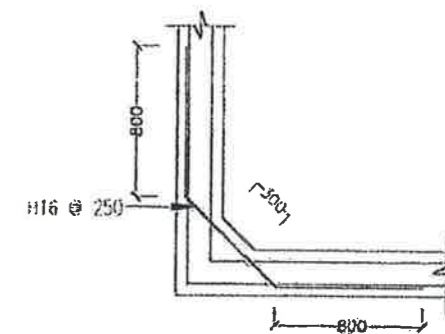
REINFORCED CONCRETE WALL SECTION



REINFORCED CONCRETE WALL STRUCTURAL DETAILS



EXPANSION JOINT DETAIL (PLAN VIEW) (NOT TO SCALE)



TYPICAL DETAILS FOR CORNER RETAINING WALL (PLAN VIEW)



CAWANGAN KEJURUTERAAN GEOTEKNIK
 JABATAN KERJA RAYA MALAYSIA
 BAHAGIAN REKA-DISEKAIN GEOTEKNIK 2 (KEJURUTERAAN STRUKTUR ASAS)
 CAWANGAN KEJURUTERAAN GEOTEKNIK
 1011 PEJABAT JKR MALAYSIA
 LINGKUNGAN 23A & 26, MENARA PUJ
 NO 50 JALAN TUN RAZAK
 50400 KUALA LUMPUR
 (No. TEL : 03 4051 8815 & No. FAX : 03 4051 8781)

PENGARAI CAWANGAN
 I. H. SUHAMI BIN JAMALUDDIN
 JURUTERA AWAM PENGUASA KAWAN :
 Ir. DAYU BINTI SALEH @ AMAN
 JURUTERA AWAM PENGUASA :
 Ir. ENG HOON CHING

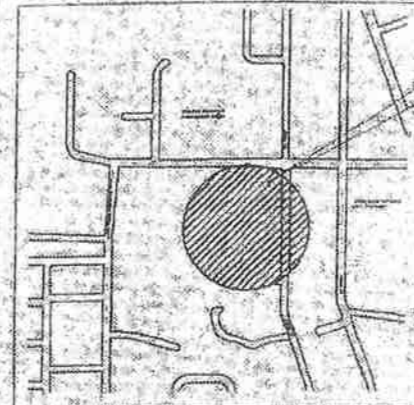
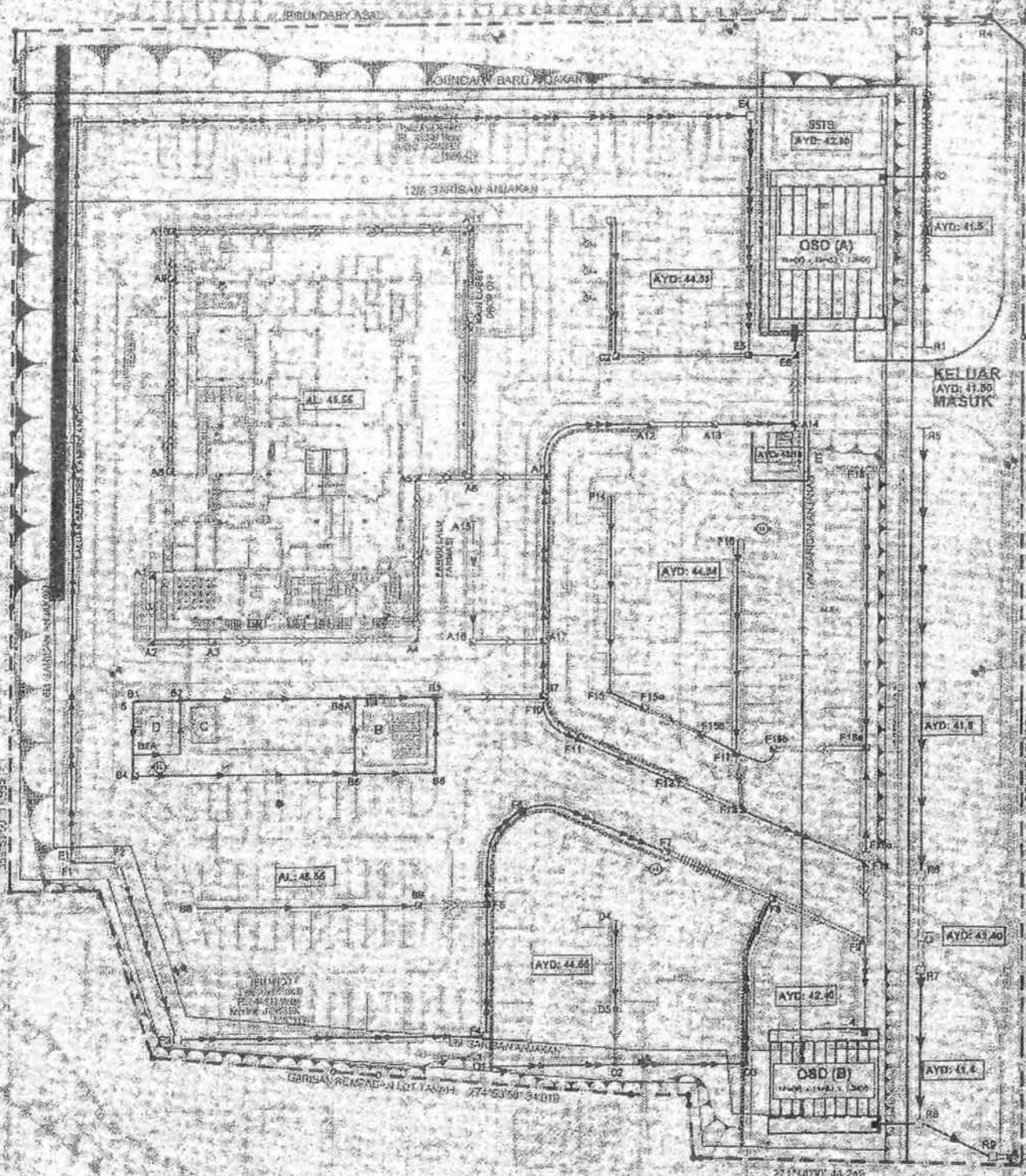
TURGI
 PLTUNJUK
 HINJAN
 TARIKH : 11

SKALA : 1:50
 TARIKH : MAC 2022
 DISEKUIS : MOHAMMAD YUSUF ALFIQ YUSOFF
 DOKUMENTER : MOHAMMAD YUSUF ALFIQ YUSOFF
 DISEKUIS : Ir. ENG HOON CHING

PROJEK :
 ALINK KESIHATAN (JEJAS 2) SIMPANG
 DAJUK :
 JM 2110-KC10 CONCRETE WALL
 No. LUKISAN : JKR.CKG.BKA.600/2/1/24/1-2



BUKUKAN SEBUAH SURUT
MATAH BAYU
DAPAT MELAKUKAN
TUGAS MATAH BAYU
DAPAT MELAKUKAN TUGAS
MATAH BAYU (KUALITI BUKUKAN)



PELAN LOKASI












PELAN KUNCI

TAMBATAN DAN COP KELUASAN
PELAKU BERTAJUK TEMPAHAN

PEMBUKU

KEMENTERIAN KESIHATAN MALAYSIA
BUKUKAN SURUT MATAH BAYU
DAPAT MELAKUKAN TUGAS MATAH BAYU (KUALITI BUKUKAN)

- NOTA:
- All dimensions are in millimetres unless otherwise shown on the drawings.
 - These drawings shall be read in conjunction with architectural and survey drawings.
 - Drainage works shall be constructed to the lines, levels, grades and cross-sections shown on the drawings or as directed by the S.O.
 - Final discharge point shall be identified and approved by the S.O. where necessary. Existing drainage system shall be upgraded to be fully functional as a drainage system on their own or as part of the new drainage system.
 - The contractor shall notify the S.O. sufficiently in advance before beginning of any excavation. The excavation works shall be carried out so as not to cause any danger or obstruction to the traffic or public. All excavation shall be inspected and approved by the S.O. prior to further works being carried out.
 - Excavation of drain trenches shall be to a depth of 150 mm less than the depths indicated or shown on the drawings. The remaining excavation shall be carried out immediately prior to the placing of bedding material.
 - Drainage trenches shall be backfilled immediately after the completion of drain laying or installation of culverts as soon as the S.O. has inspected and given his approval.
 - Backfilling with approved fill materials shall be placed evenly in layers not exceeding 150 mm thickness in order to provide uniform support. Loose thickness of fill materials on both sides of the drain shall be thoroughly compacted with mechanical rammer. This procedure shall be followed for the whole depth of the drain section.
 - Invert level is measured from proposed formation level to the interior base of drain. The location and level of the drainage system indicated on the drawings shall be checked and rectified if required to suit actual site condition by the S.O.
 - All perimeter drains shall have minimum gradient of 1:150 unless otherwise stated or directed by the S.O.
 - The maximum allowable side wall slopes for concrete, brickwork and blockwork lined drains shall be vertical slope piling lined drains shall be 1:1.5 and grassed / vegetated, rock and rip lined drains shall be 1:2.
 - All pipe drains that run under roads and hardstanding shall be encased with concrete grade 20P with a minimum thickness of 150 mm.
 - Precast concrete pipe shall comply with MS EN 1316:2011, respectively or other equivalent standards as approved by the S.O.
 - Precast concrete box culvert shall comply with MS 1293, BS EN 1346:2002 + A1:2005, BS EN 1801-1-2:2008, or any equivalent standards acceptable or approved by the S.O. The minimum concrete cube strength shall be 30MPa.
 - Cast-in-situ concrete drain and precast concrete block drain section shall be of grade 20P concrete unless otherwise stated on the drawings.
 - Reinforced concrete slabs shall be provided for all drain side walls exceeding 1 metre height. Keyholes shall be provided for open drains with more than 1.5 metres depth.
 - Where possible drains or not provided scupper pipes or drains shall be installed at road kerbs where practicable, to the drainage system nearby at 5 metres c/c or other suitable intervals as approved by the S.O.

LEGEND	
	600mm x 300mm BOX CULVERT WITH DWF TO MANUFACTURER'S DETAIL (SUMP OPENING @ 6M C/C)
	300mm HRGV DRAIN (WIDTH 300mm) with R.C. SLAB COVER - TYPE 1
	300mm HRGV DRAIN (WIDTH 450mm) with R.C. SLAB COVER - TYPE 2
	300mm HRGV DRAIN (WIDTH 600mm) with R.C. SLAB COVER - TYPE 3
	300mm x 300mm PC BLOCK DRAIN - TYPE 4
	600mm x 600mm DRAIN SUMP
	750mm x 750mm DRAIN SUMP
	900mm x 900mm DRAIN SUMP
	600mm dia. PIPE CULVERT CLASS H



CAWANGAN KEJURUTERAAN AWAN DAN STRUKTUR
BAGIAN KEJURUTERAAN AWAN (KESELATANAN DAN BANGUNAN AW)
IBU PEKAT, JKR MALAYSIA
TINGKAT 9, BLOK 9, NO. 8,
JALAN SULTAN SALAHUDIN,
50480 KUALA LUMPUR

DIREKTORITUK :
ZULHISAM BIN SAPEON
DISERAMK :
P. HAN MOHD NURUL HADI BIN HAN ISMAE
DILUKIS :
NURFAWAZ BIN ISMAE
NO. RAL PROJEK :
M070007202302A

PEMERIKHA KAWAN :
S. HE BACHDEZAMAN BIN AB. RAHUL
PENGARAH KHIDMAT REKABENTUK :
K. NED KAMAR BIN NORDIN
JURUTERA AWAN PENYUSAHA KAWAN :
D. DR. ZURUDA BINI ZAMR KAMAR
JURUTERA AWAN KAWAN :
S. SANJANI BINI SULHAMAN

TARikh: 15.02.2022
TANGGA: 15.02.2022
MAMA: PROJEK :
KLINIK KESIHATAN (JENIS 2)
SEMENYIH
TANUK LUKUSAN :
PELAN SUSUNAN TUKUR SISTEM SALIRAN
NO. LUKUSAN :
JKR/CKAS/07/26/B20/89/SS/1[7]