DEPARTMENT OF BUILDING

UNIVERSITI TEKNOLOGI MARA

(PERAK)

EARTHWORK AND PILING WORKS

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DEPARTMENT OF BUILDING

FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING

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DECEMBER 2018

by

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accepted in partial fulfillment of the requirement for obtaining the Diploma In Building.

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STUDENT'S DECLARATION

I hereby declare that this report is my own work, except for extract and summaries for which the original references are stated herein, prepared during a practical training session that I underwent at NH ARIES SDN BHD for duration of 14 weeks starting from 3 September 2018 and ended on 7 December 2018. It is submitted as one of the prerequisite requirements of DBG307 and accepted as a partial fulfillment of the requirements for obtaining the Diploma in Building.

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Date : 7 December 2018

ACKNOWLEDGEMENT

Bismillahirohmanirohim,

On this opportunity, I would like thanked to all staff of NH Aries sdn bhd that involved in project Pejabat Kesihatan Daerah Jeli for their advice, guidance and help throughtout the period of my practical training. First and foremost, with great pleasure I would like to thank to En. Nasrul Hakim Bin Kamarulzaman, my project manager and also my boss for giving this gold opportunity to me to conduct my practical training in his company and site project. Also, I will not get much knowledge during my practical training period without help from a very professional and sporting team that comprising of Cik Nor Zahiriah bt Zakeri, En. Mohd Shidki bin Ali, En. Mohd Nordin bin Abdullah and Cik Norazlin binti Abdullah. They had taught me a lot and develop my understanding, knowledge and the theory involved in earthwork, structures and buildings. It is an honour for me to have this gold opportunity to cooperate with this amazing team.

Next, not forgotten to thanks to all lecturers in UiTM cawangan Seri Iskandar for teaching our "ANAK BANGSA" and supply to us knowledge to face the challenge in the future, also special thanks to lecturers that involved in practical training. To Dr Wan Abdullah Wan Alwi, Supervising Lecturer, En. Muhammad Naim Mahyuddin, Practical Training Coordinator, Dr Ida Nianti Binti Mohd Zin, Programme Coordinator

Last but not least, to my beloved parent, special thanks from them for supporting me over the years and keep motivate, sacrificed and supporting me from behind. Without my parent, I will not able to reach this stage.

Thank you.

ABSTRACT

Earthwork would involve the removal of overburden to reach structurally capable earth or soil, excavation for basements and other underground structures, and to make structural fills to support floors. Also the piling works need to be done to act as a steady support for structures built on top of it. The objective of this report is to explain how the earthwork and piling work has been done at site Pejabat Kesihatan Daerah Jeli, Kelantan.

CONTENTS **PAGE NO**

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1.0

INTRODUCTION

1.1 Background and Scope of Study

This practical training report has been made base on observation that I has made throughout the period of my practical training at site project of Pejabat Kesihatan Daerah Jeli, Kelantan. This report will focus on earthwork and piling work. In period I doing my practical training I had studies the method of conducting earthwork also the machineries that has been used for conducting earthwork. While for the piling work, I can identify the type of machine and knew the procedure of piling and methods that had used for this project.

Figure 1.1 Surrounding area of site PKD Jeli

1.2 Objective

- To identify the method that carried out to conduct the earthwork (site clearing) and machineries involved in earthwork.
- To explain the piling work including the installation, type of piling machine, work procedure and area piling.

1.3 Method of Study

1. Observation –

   I observed the situation at site record all the observation by written a note, and taking picture. I do the observation all time in period of my practical training.

2. Interview –

   I do have conduct an interview with my supervisor, site engineer and project manager. First, I do interview with my supervisor at time I doing observation. Second, I do interview my site engineer when I checking site drawings, and ask her for more explain about the drawings. Finally, I interview project manager when I doing my work and ask him for information.

3. Document review-

   I refer to construction drawing about the earthwork plan, site diary, monthly progress report and picture that supervisor have.

CHAPTER 2.0

COMPANY BACKGROUND

2.1 Introduction of company

NH ARIES SDN BHD is a contractor company that have experience in construction field about 11 years. They have completed various of projects, most of the project that they had completed is inside Kelantan. The status of this company is Bumiputera company and already registered with Lembaga Pembangunan Industri Pembinaan Malaysia, Ministry of Financial and had a Sijil Perolehan Kerja Kerajaan.

Date of incorporation is 31st August 2007. NH ARIES SDN BHD lead by Mr Nasrul Hadi Bin Kamarulzaman that had over 5 years experience in Construction, Engineering, Consultant and Manufacturing office operation within fast-paced environments and Quality Management System. Ability to lead employees, familiar with aspects of daily business operations including: Human Resources and Administration, Safety & Health Management, ISO 9001:2008 QMS, Personnel, Contract Negotiation, Payroll, and numerous administrative functions.

2.2 Company Profile

Corporate Name	NH ARIES SDN BHD
Registration No.	787182-W
Date of Incorporation	31st August 2007
Shareholders / BOD	Nasrul Hadi bin Kamaruzaman (58%) Khairul Hafizan bin Mohd Zahari (02%) Mohd Nasir bin Ismail (40%)
Authorised Capital	RM 10,000,000.00
Paid-up Capital	RM 5,000,000.00
Registered Address	PT1987-A, Tingkat Bawah Bandar Baru Bukit Bunga 17510 Tanah Merah, Kelantan Darul Naim
Tel/Fax	
Branch Address	No. 38, Tingkat Bawah, Jalan 2A/27A Seksyen 1, Wangsa Maju 53300 Kuala Lumpur
Tel/Fax	
Email	nh.aries@yahoo.com
Main Financing Bank	Bank Muamalat Malaysia Berhad Affin Islamic Bank Berhad
Company Secretary	UKKB Management No. 2002A, Bangunan AAC, Tingkat 1 Jalan Sultan Yahya Petra 15100 Kota Bharu, Kelantan Darul Naim
Corporate Auditor	Wan Nazir & Co
Legal Advisor	Messr Noraini Rosnita & Co 322, 3rd Floor, FAS Business Avenue Jalan Perbandaran Kelana Jaya 47301 Petaling Jaya, Selangor Darul Ehsan
Company Status	Bumiputera
Registration	Sijil Perolehan Kerja Kerajaan Lembaga Pembangunan Industri Pembinaan Kementerian Kewangan Malaysia

2.3 Organizational Chart

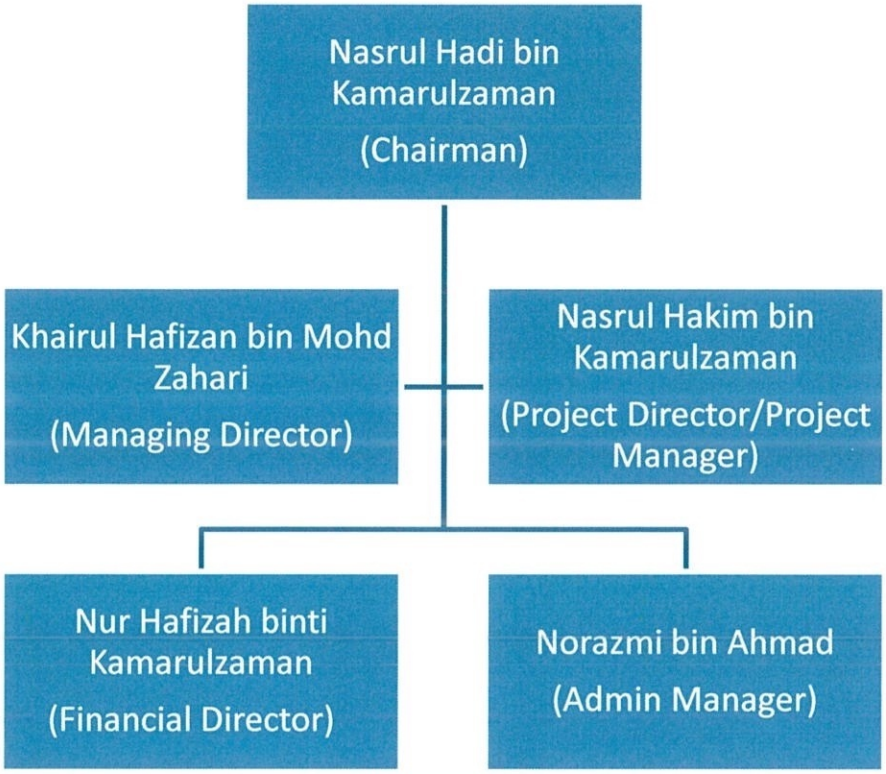


Figure 2.1 Organizational chart

Administration	Razwa Nasuha Binti Muhamad Fadzlullah
	Idris Bin Abd Rahman
	Norshidki Bin Ali
	Nur Hidayah binti Kamaruzaman
Technical	Nor Zahiriah Binti Zakeri
	Mohd Aniq bin Hamdan
	Siti Nor Lida Binti Mustapha
	Haris bin Mat Jusoh
	Mohd Marzudi bin Mat Jusoh
	Amirol Ariff bin Azlam
	Shahrul Azuan bin Muhamad Nor
Sales & Operation	Wan Mohd Nor Shaliman Bin Wan Ali
	Mohd Nordin Bin Abdullah

2.4 List of Project

2.4.1 Completed Projects

No	Project Name / Project Description	Client	Amount Contract (RM)	Year Completed
1	Membina Dan Menyiapkan Sebuah Bangunan Perpustakaan Desa Desa Satu (1) Tingkat Serta Kerja-kerja Berkaitan Di Kg Gemang, Jeli, Kelantan	JKR Jeli	179,005.00 VO 11,912.36	2007
2	Menaiktaraf Dan Membaikpulih Masjid Bandar Jeli Serta Kerja-kerja Berkaitan Di Jeli, Kelantan	JPPK	940,000.00	2008
3	Menaiktaraf / Membina Semula Gerai / Kedai Sedia Ada Bersebelahan Pasar Jeli, Majlis Daerah Jeli (MDJ), Jeli, Kelantan	JPPK	1,754,300.00	2009
4	Menaiktaraf Dewan MDJ (Dewan Belora) Jeli, Majlis Daerah Jeli Jeli, Kelantan	JPPK	493,410.00	2009
5	Kerja-kerja Menaiktaraf Masjid Batu 11 Serta Kerja-kerja Berkaitan di Tanah Merah, Kelantan	FAU Arkitek	800,000.00	2009
6	Projek Menaiktaraf Kemudahan Pelancongan Di Pintu Masuk CIQ Bukit Bunga, Tanah Merah Kelantan Darul Naim	KPL	1,349,169.00	2013
7	Cadangan Ubahsuai Dan Bina Semula Masjid Besar Ayer Lanas Jeli, Kelantan Darul Naim	FAU Arkitek	1,500,000.00	2013
8	Cadangan Ubahsuai Dan Naiktaraf Bangunan Sekolah Menengah Sri Murni, Hulu Langat, Selangor Darul Ehsan	PD Sdn Bhd	7,610,030.00	2013
9	Pejabat Kesihatan Daerah Jeli, Kelantan	JKR	15,993,459.14	Ongoing

Table 2.4.1 list of completed projects and on-going project by NH ARIES SDN BHD

CHAPTER 3.0

CASE STUDY (EARTHWORK AND PILING WORKS AT BLOCK PEJABAT KESIHATAN)

3.1 Introduction to case study

Pejabat Kesihtan Daerah Jeli is a project by Ministry of Health (Malaysia), which is government project. Tender for this project issued by Jabatan Kerja Raya (JKR). This project that worth RM16 Million is among the Mega project that had be conducted in Jeli, Kelantan.The project started on 13 May 2018 and expected the completion date is 11 January 2020. Since the site still on early stage so the activities on site is just earthwork then piling works at block pejabat kesihatan.

The location of the site is near to highway Jeli- Gerik, the latitude and longitude for the site location is 5.704846, 101.847268. The site surrounding by government office such as RISDA and Jabatan Pertanian, also near to villager house, school and Zink Factory. Even the current site location is rubber tree farm. The current activities carried out at the site are earthworks and piling work at block Pejabat Kesihatan Daerah.

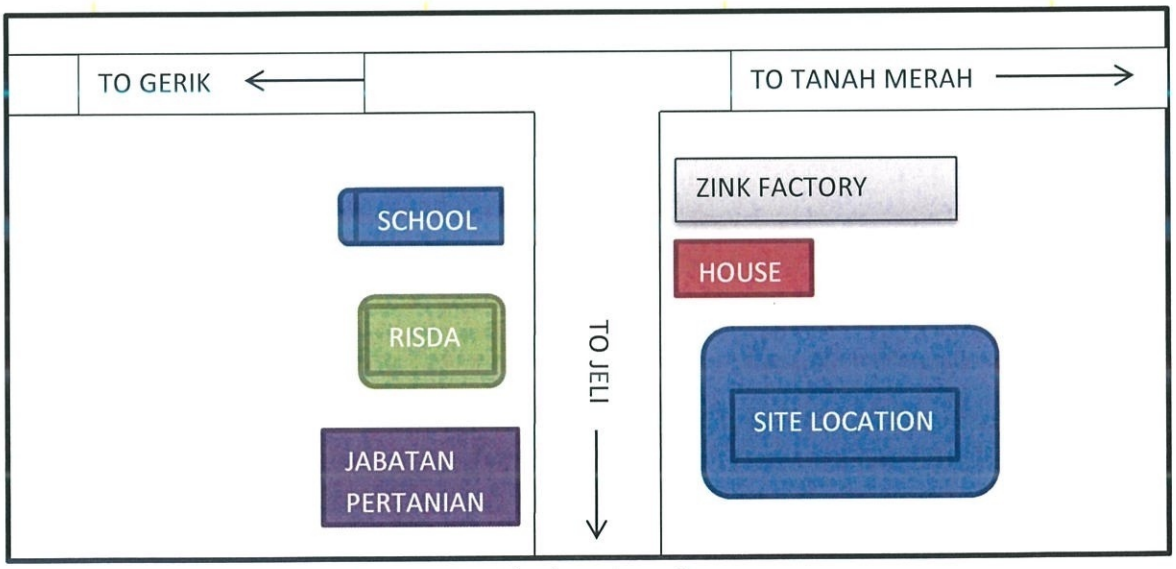


Figure 3.1 Site location plan

Figure 3.2 site location based on google maps

Source: www.google.com/maps

3.2 Earthwork (formatting the platform level to 90.00m)

METHOD USED

- MACHINERIES

PROBLEM

3.2.1 Method used (REFER APPENDIX A,B,C,D,E,F)

For the site of Project Pejabat Kesihatan Daerah Jeli, the area of the site is hilly. The site area needed to be flat to perform a construction at that area. So the method that had been used for this site is "Cut and Fill". The contractor will refer to 90.00m to set the platform level as stated on drawing that has been given by JKR.

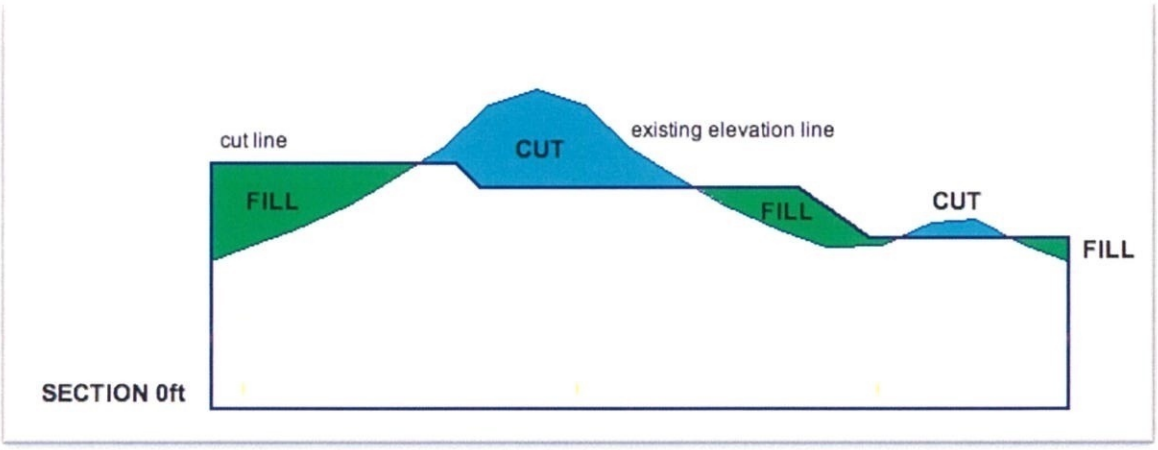


Figure 3.3 Example of Cut and Fill Method

Source: Google Image

To get 90.00m platform level, contractor will hire a surveyor to mark the RL 90.00m platform level. The surveyor will take read start from the nearest Temporary Bench Mark (TBM) to the site area. For this site situation, the nearest TBM is located at front of Sekolah Menengah Agama Nahdatul Ulum which is the RL = 82.614m. The distance between site location and the school location is not too far/long.

After taking read from the TBM, surveyor will mark pegs as many as requested by contractor then the surveyor will mark on the pegs the current RL. So the contractor will refer to the pegs that had be mark by the surveyor to create the RL = 90.00m platform.

Figure 3.4 Surveyor taking read on RL level

Figure 3.5 Peg level that has been marked by surveyor

Figure 3.6 Current RL that had been marked by surveyor

Next, to start filling works, the area will be clear from any bush and disposal the topsoil. Then, the filling work can start which every layer cannot exceed 300mm after compact with roller compacter. The Field Density Test (FDT) needed to be conduct on every layer. To comfirmed the filling area strength are able to hold building load that will be build on that area.

Figure 3.7 Disposal topsoil at filling area

Figure 3.8 Dump soil at filling area

Figure 3.9 Compacting filling area

Figure 3.10 Conduct FDT test

3.2.2 Machineries

To clearing the site and making the RL= 90.00m platform there will have machineries that involved, it impossible to make it without machineries. So many machinery that has being used to conducted this work. Below are the machineries that involved in earthwork at site Pejabat Kesihatan Daerah Jeli (PKD Jeli):

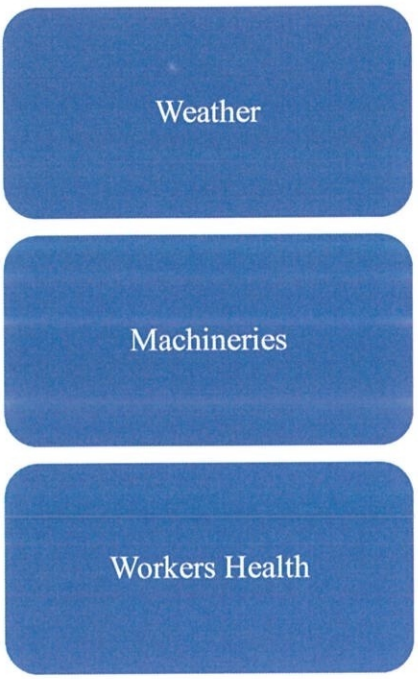
Machine	Function
 Bulldozer	A bulldozer is a crawler equipped with a substantial metal plate used to push large quantities of soil, sand, rubble, or other such material during construction or conversion work and typically equipped at the rear with a claw-like device to loosen densely compacted materials.
 Excavator	Excavators are heavy construction equipment consisting of a boom, dipper, bucket and cab on a rotating platform known as the "house". The house sits atop an undercarriage with tracks or wheels. In PKD site it being used for excavated soil and put it on tipper lorry. Also used for making slope.
 Roller Compactor	A road roller is a compactor type engineering vehicle used to compact soil in the construction of foundations. Similar rollers are used also at landfills or in agriculture.

 Tipper Lorry	also as a **dumper truck** or **tipper truck** is used for transporting loose material (such as sand, gravel, or demolition waste) for construction. A typical dump truck is equipped with an open-box bed, which is hinged at the rear and equipped with hydraulic rams to lift the front, allowing the material in the bed to be deposited ("dumped") on the ground behind the truck at the site of delivery.
 Back pusher	This machine has similar function as bulldozer. But, this machine can only make it in small quantities not large as bulldozer can do.

Table 3.2.1 Table of machineries involved in earthwork at site PKD Jeli

3.2.3 Problems

Every site will facing the problem while doing any work no matter on earthwork or structure work.



3.2.3.1 Weather and site condition

Weather may affect the work. This is because we can't expect the weather to be fine all time. If rain at site could cause the work at site delayed. Tipper lorry can't operate on rainy day, if they moving on rainy day it may cause them to stucked.

Raining day will cause the site condition stagnant with rain water and the soil at site became too soft and harming the machineries such as tipper lorry.

Figure 3.11 Site condition after rain

Figure 3.12 Machineries cannot being operate due to bad site condition

3.2.3.2 Machineries

Machineries problem also can affect the work progress. At site PKD Jeli, all the machineries are rented. So if any machine breakdown contractor need to wait until the mechanic of rental machine to came to fix the machine. If the machine having a simple problem, probability to machine operate again on same day are high. But, if machine having a critical problem it will take time to mechanic to fix the machine. The factors that cause the machine breakdown are not service on time, old machine and unskilled operator.

Figure 3.13 Machine breakdown

Figure 3.14 Mechanic repair bulldozer

3.2.3.3 Workers Health

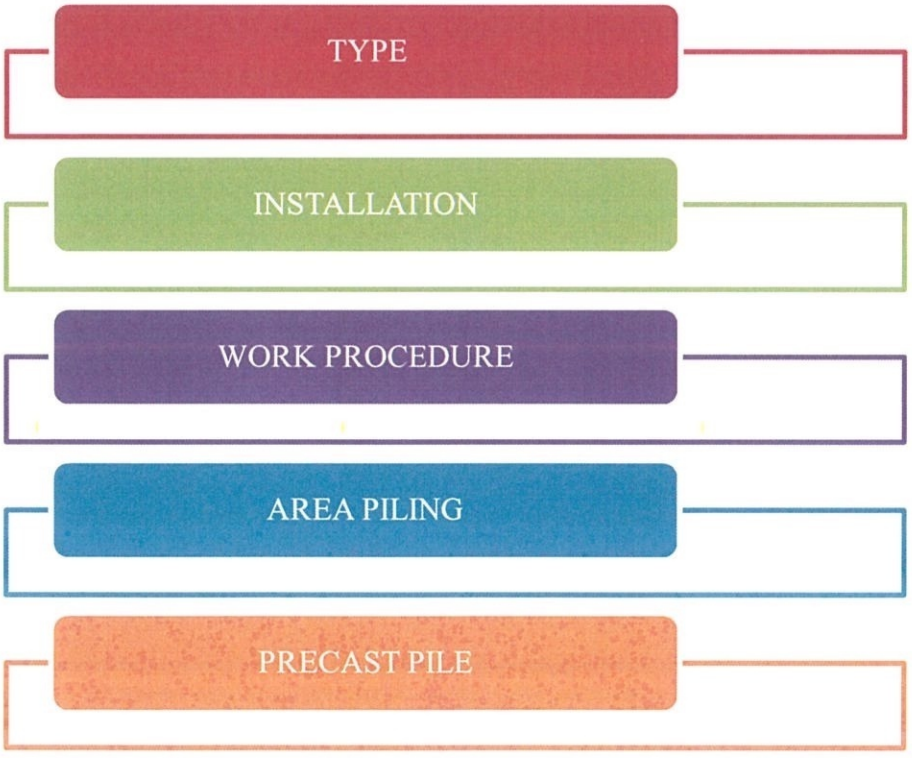
Workers health is one of the factors that have to be considered. Without sufficient workers, the site progress cannot move smoothly. Because workers is the key to make works at site running smoothly. As example if excavator operator is not fit to work, that mean one excavator can't operate that day. As contractor we cannot force workers to work if the not in good condition or unfit.

3.3 Piling Work at Block A Pejabat Kesihatan Daerah. REFER APPENDIX

For the piling works contractor has appointed Kelpile Sdn Bhd as sub-con to handling the piling works at PKD Jeli site. This site currently has 103 piling points, which per point will be jack-in pile 12m with extension 6m so total depth pile will be jacked in is 18m (12m+6m).

At site Pejabat Kesihatan Daerah Jeli, there are 12 buildings will be build. Total building that need to piling is one, Block A Pejabat Kesihatan Daerah Jeli. Block A is a double- storey building and the biggest building in this site. This building location is really at the middle of this site area.

The reason why piling is conducted is to ensure strong foundations and prevent the risk of any future subsidence or ground movement.



3.3.1 Type

Piling machine type that had been used for this site is jacked in piling or hydraulic static pile driver. Meanwhile, the model for this pile machine is ZYC600B-B Pile driver. A machine imported from China.

The factor of choosing this type of pile machine is site location is near to home of villagers, government offices, school and hospital.

The benefits of jacked in piling are this machine will not make noisy sound like hammer pile drive. With this type of pile machine, it can guarantee that the peace of surrounding people will not affect. Next, jacked in pile machine can drive a pile faster than other type of piling machine. Finally, it can save budget because this machine also could conduct the Maintain Load Test (MLT).

Figure 3.15 Hydraulic static pile driver

3.3.2 Installation

First and foremost, this Jack-In pile machine came from Kuantan site. This machine has been transport by loader truck and total truck that involved to transporting this machine is 6-unit of truck.

To lifting and installing this machine components one mobile crane 45 tan used. Firstly, a pair of long boat being setting up at ground to give support to the machine to stand.

Figure 3.16 Placing long boat at ground

Next, after placing the long boat, main body of machine will be install by the loader truck that bring main body be at inside between the long boat to connect the main body and long boat.

Figure 3.17 Placing main body

Then the supporting legs will be installed, the supporting legs function as to lifting and descending the machine also to move the machine forward and backward. There is 4 unit of supporting legs will be installed.

Figure 3.18 Installing supporting legs

After that, a pair of short boat will be installed under the machine. To installing the short boat, mobile crane will just placing the short boat at front and back of the machine then the machine will moving forward to make sure the short boat be under the machine and the short boat will be installed.

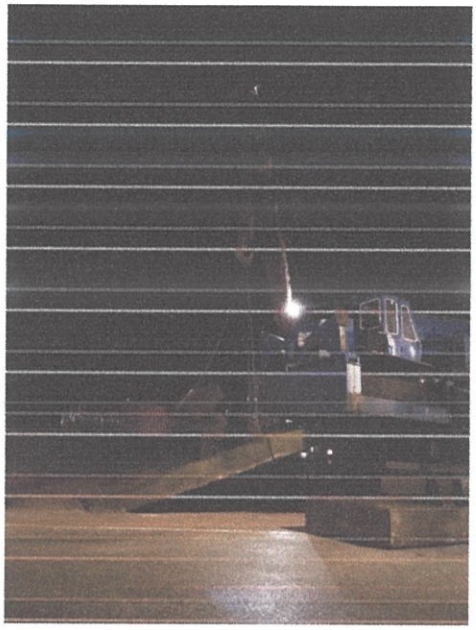


Figure 3.19 Placing the short boat

Figure 3.20 installing short boat under the machine

Settle the critical parts, next is installing the other components of the machine. This machine is powered by an generator, a 220kva generator has be apply to the machine to give electrical power to machine. The next component is a pair of crossbeam for pile driving. This component will be installed at middle of the machine. Started at this part the component will be lift by the machine crane and no more mobile crane needed.

Figure 3.21 Installing crossbeam

Figure 3.22 220kva generator placed on machine

The final components are side piling counterweight beam and counterweight. There are two types of counterweight, F- counterweight and square counterweight. But for this machine, only F- counterweight used. Counterweight used to increase the load of the machine and to give a pressure when driving a pile. All counterweight beam and F-counterweight will be place at side of machine.

Figure 3.23 Counterweight beam and F-counterweight

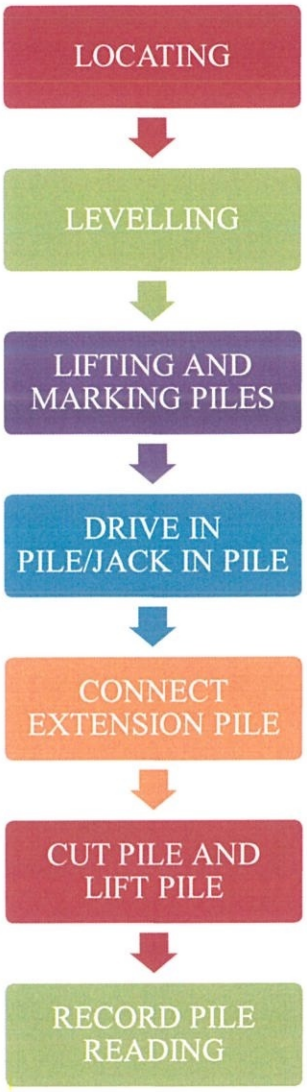
Figure 3.24 Lifting counterweight beam

Figure 3.25 Placing counterweight beam

Figure 3.26 Lifting F-counterweight

Figure 3.27 Placing F-counterweight

3.3.3 Work procedure



3.3.3.1 Locating

First thing to do before start the piling works is locating the points. Usually pile machine operate will double marking on pile point to prevent the point lost after being stepped by machine. Operator's usually marking the point using welding rod.

Then, the machine will move to the piling point until locating the exact position of piles to be driven in.

Figure 3.28 Pile machine moving to piling point

3.3.3.2 Levelling

In order to drive piles vertically, the operator will stable the machine. Operator will refer to the spirit level on the machine, operators will stable the machine until the spirit level shows 0 for all direction or the bubble being at centre of the spirit level.

Figure 3.29 Centering spirit level bubble

3.3.3.3 Lifting pile and marking piles

Lifting the pile will be conducted by pile machine crane. Piles will tied up using wire rod, the crane will lift the piles to the pile clamping box. Before the piles lifting by crane operator will mark the distance to take the reading on how depth piles being driven in.

Figure 3.30 Markings the piles

Figure 3.31 Lifting piles

3.3.3.4 Drive in pile/ Jack in pile

After pile putting the pile into pile clamp box, operator will clamp the pile. Then operator will make sure the pile starter be exact to the point. The pile will jack in to the point a bit. The operator's will check the pile whether the pile has been straight vertically using spirit level. Then, if the pile has being confirmed operator will continue jack in pile until done.

Figure 3.32 Positioning the pile to the point

Figure 3.33 Checking pile stable using spirit level

Figure 3.34 Jacked in pile

3.3.3.5 Connect extension pile

Done jacked in starter pile (12m pile), operator will join the extension pile (6m pile). The extension pile will be connected to the starter pile, operator will make sure the steel bar from the extension pile inserted to the hole on top of starter pile. To make sure the extension pile be in straight line same as the starter. Then operator's will welding at steel part of the pile to make sure the extension pile attached to starter pile. Finally, the operator will paint bitumen on welded area.

Figure 3.35 Jointed extension piles

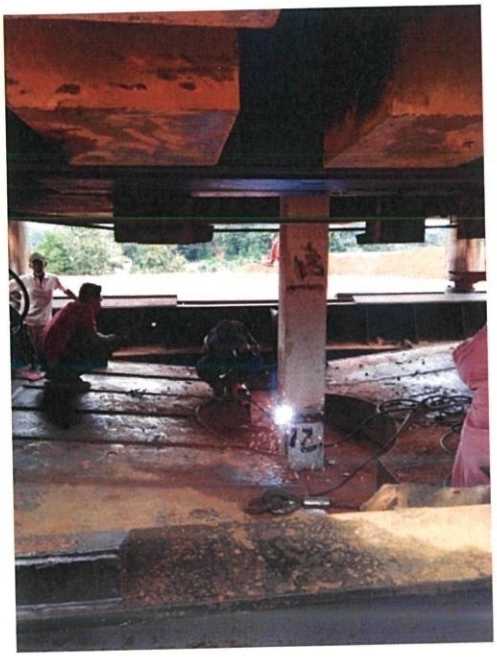


Figure 3.36 Welding extension pile

Figure 3.37 Paint bitumen on pile

3.3.3.6 Cut and lift pile

If the pile jacked in not reaching the 18m even jacked in with extra pressure, so operator will cut the pile. The pile will be cut and crane will lift it out from the machine. The pile will be cut using a grinder.

Figure 3.38 Grinder used to cut piles

Figure 3.39 Cutting pile

3.3.3.7 Record pile reading

While pile jacked in operator will taking read and fill the reading into a form. Then, mark a line using graf paper at piles. There are 3 lines that will be taken first line is after the finish jacked in pile, second line is taken while machine jack in and maintain the pressure at 10 second, third line taken after no pressure pressing pile.

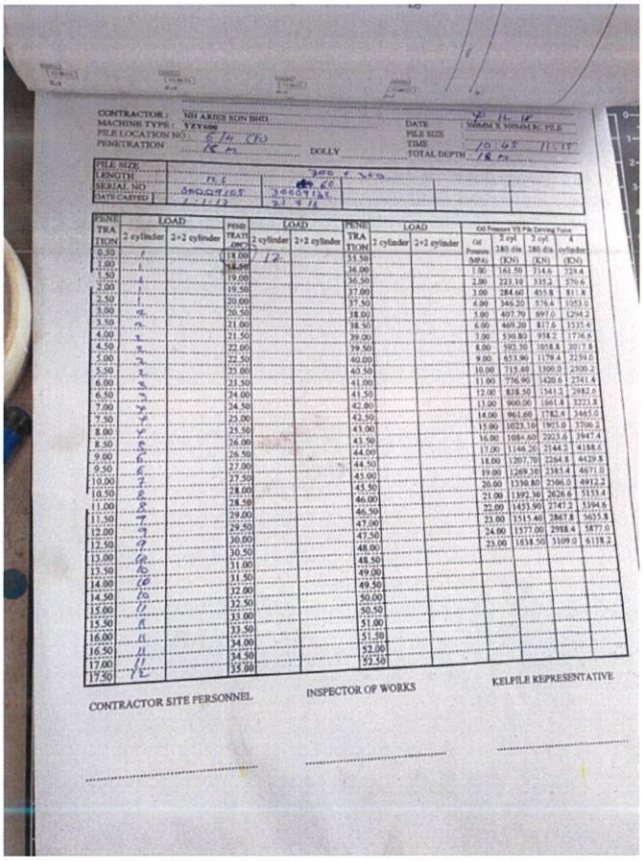


Figure 3.40 Example record piling

3.3.4 Area piling (REFER APPENDIX G)

Area of piling conducted is only at Block A Pejabat Kesihatan Daerah Jeli. Total piling point at Block A is 103 point.

3.3.5 Precast Pile

The precast pile is taken from API. The stock came from API Factory at Besut, Terengganu. API is the leading precast manufacturer with a mission to provide total customer satisfaction through timely delivery, quality products and highest level of services.

API has factories throughout Malaysia including Amanjaya, Rawang, Rasa, Ulu Yam, Besut and Kulai. Their factories are incorporated with innovative and high-tech production system which enable them to produce high quality and durable precast concrete products through rigid quality control and strict monitoring system.

Figure 3.41 Precast pile API arrived at site

Figure 3.42 Tag on piles

CHAPTER 4.0

CONCLUSION

4.1 Conclusion

Earthwork is the process that involving excavate, transported, filling and compacted the surface of the earth at another location. There are five main process in earth that are excavate, transportation, filling and compacting that must be conduct at needed area such as hilly area.

Next, pile are often used because adequate bearing capacity cannot be found at shallow enough depths to support the structural loads. It is important to understand that piles get support from both end bearing and skin friction. The proportion of carrying capacity generated by either end bearing or skin friction depends on the soil conditions. Piles can be used to support various different types of structural load.

After these work done, then the others structural work may be start. It mean these earthwork and piling works are important before starting the structural work.

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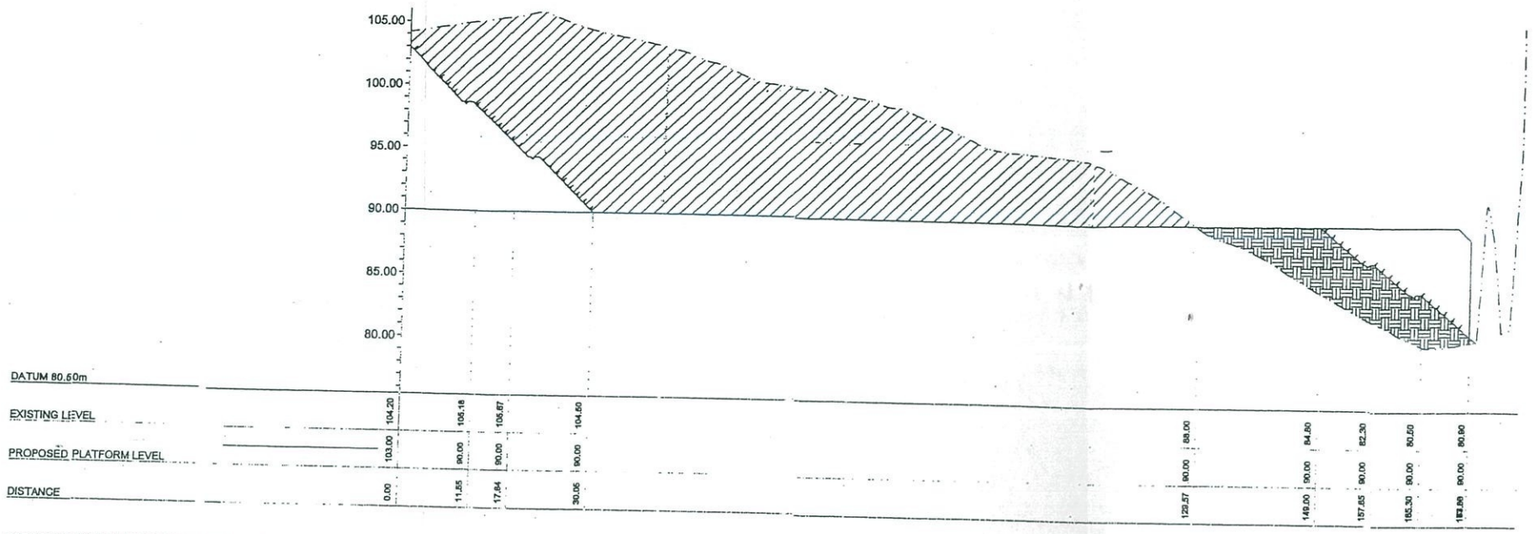
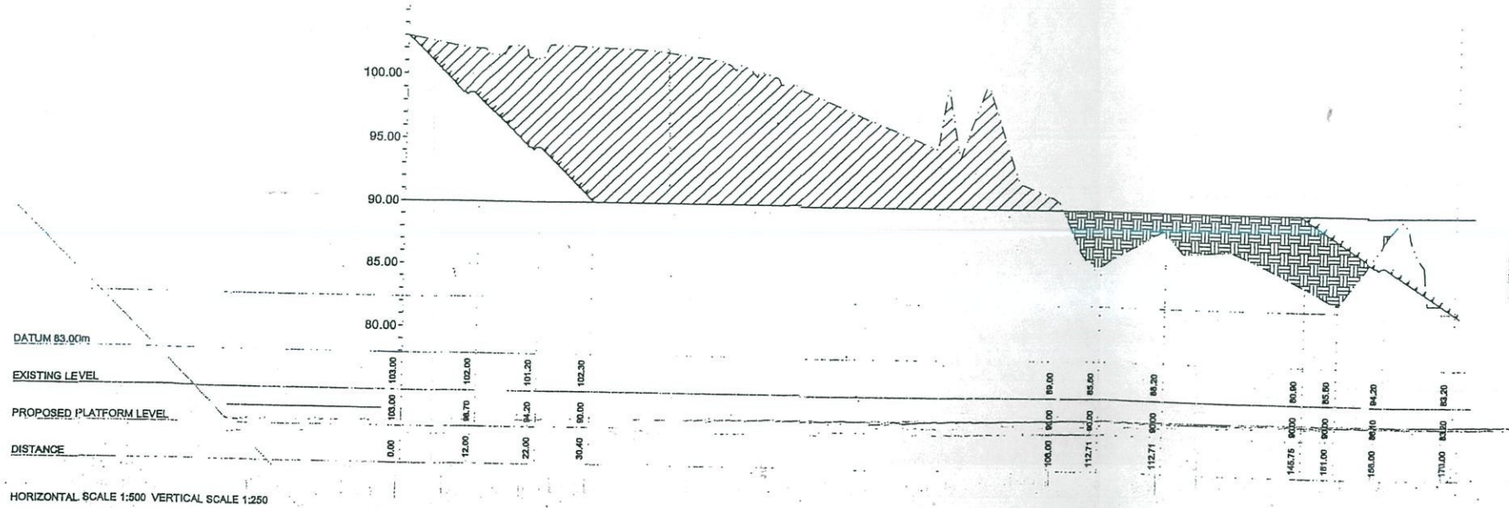
APPENDICES



HORIZONTAL SCALE 1:500 VERTICAL SCALE 1:250

KERATAN 5



HORIZONTAL SCALE 1:500 VERTICAL SCALE 1:250

KERATAN 6

NO.	SYMBOL	DESCRIPTION
1		Close Turfing
2		Contour Line
3		Fill
4		Cutting
5		Berm Drain / Toe Drain

NOTES:

1. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ARCHITECTURAL AND SURVEY DRAWINGS.
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3. ALL LEVELS SHOWN ARE IN METRE UNLESS OTHERWISE STATED.
4. ALL FILL GROUND PLATFORMS ARE TO BE WELL COMPACTED AS PER RELEVANT SPECIFICATION.
5. SOIL EROSION CONTROL MEASURES SHALL BE ERECTED BEFORE EARTHWORKS COMMENCES.
6. THE CONTRACTOR SHALL REGULARLY MAINTAIN THE ACCESS ROADS TO S.O. SATISFACTION.
7. ALL SILT TRAP, EARTHDRAINS AND PERIMETER EARTHDYKES SHALL BE TEMPORARY AND REMOVED/BACKFILLED AFTER EARTHWORKS ARE COMPLETED AND PROPER DRAINAGE CONSTRUCTED.
8. ALL UNPROTECTED SLOPE SHALL BE CLOSE TURFED IMMEDIATELY AFTER THE EMBANKMENT IS CONSTRUCTED TO PREVENT EROSION.
9. SEDIMENTS FROM SILT BASINS SHALL BE REMOVED AND DEPOSITED AT DESIGNATED AREA AS APPROVED BY S.O. WHENEVER REACHING THE SPECIFIED DEPTH.
10. THE CONTRATOR SHALL ENSURE THAT NO SILTING AND FLOODING TO THE NEIGHBOURING PROPERTIES. ALL DAMAGES SHALL BE MADE GOOD TO THE SATISFACTION OF S.O. AND SUCH COST AND CLAIMS ARISE ARE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.
11. REPAIR ALL DAMAGES CAUSED BY SOIL EROSION OR CONSTRUCTION EQUIPMENT AT OR BEFORE THE END OF EACH WORKING DAY.
12. SITE CLEARING SHALL BE CARRIED OUT IN STAGES TO SUIT ENVIRONMENTAL MANAGEMENT PLAN (EMP)/EROSION & SEDIMENT CONTROL PLAN (ESCP).
13. ALL GRADIENT FOR CUT SLOPE SHALL BE A MINIMUM OF 1:1.5 AND FILL SLOPE SHALL BE A MINIMUM OF 1:2 UNLESS OTHERWISE SHOWN IN THE DRAWING.
14. ALL RUBBISH, STRUCTURE AND TEMPORARY BUILDING DEMOLISHED ON SITE SHALL BE CARTED OFF SITE UNLESS OTHERWISE INSTRUCTED BY S.O.
15. ACTUAL WASH TROUGH LOCATION(S) SHALL BE DECIDED BY S.O.
16. ALL OPEN AREA SHALL BE SPOT TURFED UNLESS OTHERWISE STATED.
17. PROCTOR TES (4.5 KG RAMMER) SHALL BE CARRIED OUT ON ALL BACKFILLING MATERIAL.
18. COMPACTION OF BACKFILLING MATERIAL SHALL BE AS FOLLOWS:
    UNDER ROAD AND DRAIN - 95% OF DRY DENSITY
    BUILDING AREA - 90% OF DRY DENSITY
    OPEN AREA - 90% OF DRY DENSITY
19. ALL IMPORTED FILL MATERIAL SHALL BE TESTED AND COMPLY WITH SPECIFICATION.

Huruf Petunjuk	Pindaan	Tarikh	Tanda Tangan

Pengesahan Pelanggan/Pemilik :
PIHAK KAMI MENGESAHKAN PELAN YANG DIKEMUKAKAN ADALAH MENGIKUT KEHENDAK DAN KEPERLUAN BRIF PROJEK.
KEMENTERIAN KESIHATAN MALAYSIA

Nama/Tandatangan

Cap Rasmi Jabatan

JKR KELANTAN

BAHAGIAN REKABENTUK SIVIL & STRUKTUR)

IBU PEJABAT JKR KELANTAN

Pengarah :

DATO' Ir. TUAN NI. RAZANI BIN AB. LAZIO

Disemak Oleh :
Ir.FAIZUL IZUAN BIN SHAIMI

Projek :
PEJABAT KESIHATAN DAERAH JELI, KELANTAN.

Tajuk Lukisan :
BUTIRAN KERATAN 5 & 6

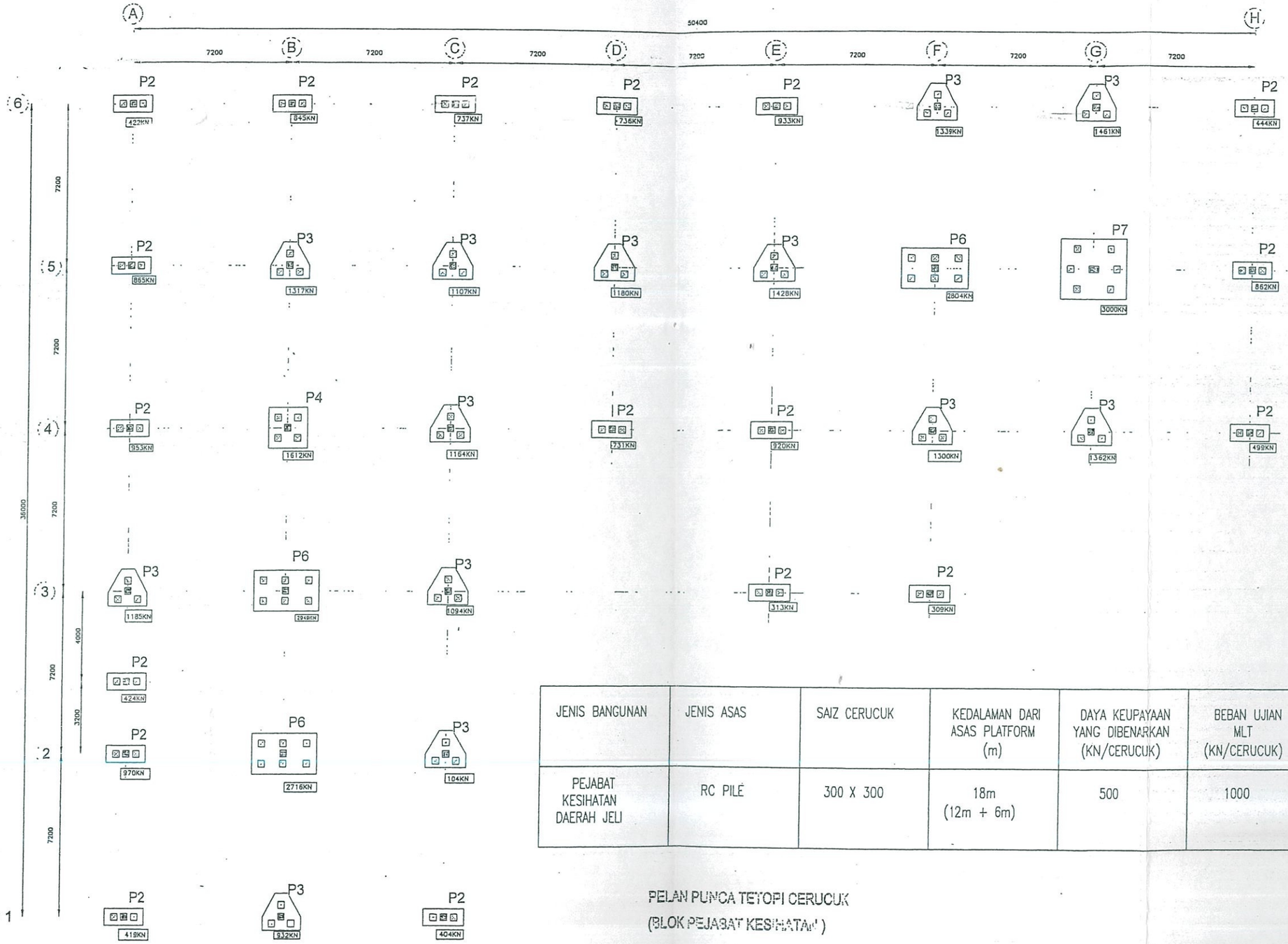
Ukuran : 1:500	Tarikh : Jun 2017
Diukis : Wee	Disemak : Faizul

Fail Projek : JKR/D.C&S/678/529/332 (JELI)

Fail ACAD : D : PKD JELI 2017

No. Lukisan : JKR/BRSS/01/26/D17/PKT/987/04

LUKISAN PEMBINAAN



JENIS BANGUNAN	JENIS ASAS	SAIZ CERUCUK	KEDALAMAN DARI ASAS PLATFORM (m)	DAYA KEUPAYAAN YANG DIBENARKAN (KN/CERUCUK)	BEBAN UJIAN MLT (KN/CERUCUK)	CATATAN
PEJABAT KESIHATAN DAERAH JELI	RC PILE	300 X 300	18m (12m + 6m)	500	1000	CERUCUK PERLU DITANAM SEHINGGA SET

PELAN PUNCA TETOPI CERUCUK
(BLOK PEJABAT KESIHATAN)

LUKISAN PEMBINAAN

JKR

BAHAGIAN REKABENTUK (SIVIL & STRUKTUR)
JABATAN KERJA RAYA KELANTAN

TINGKAT 3 BLOK B ,
JABATAN KERJA RAYA NEGERI KELANTAN,
15050 JALAN KUALA KRAI,
KOTA BHARU , KELANTAN.

HURUF PETUNJUK	PINDAAN	TARIKH	T.T.

SKALA
1: 100
1: 30

PENGARAH
Ir. HJ. RAZANI BIN ABD LAZID

DISEMAK / PEREKA :
FAIZUL IZUAN BIN SHAIMI

DI LUKIS :
TN LAH

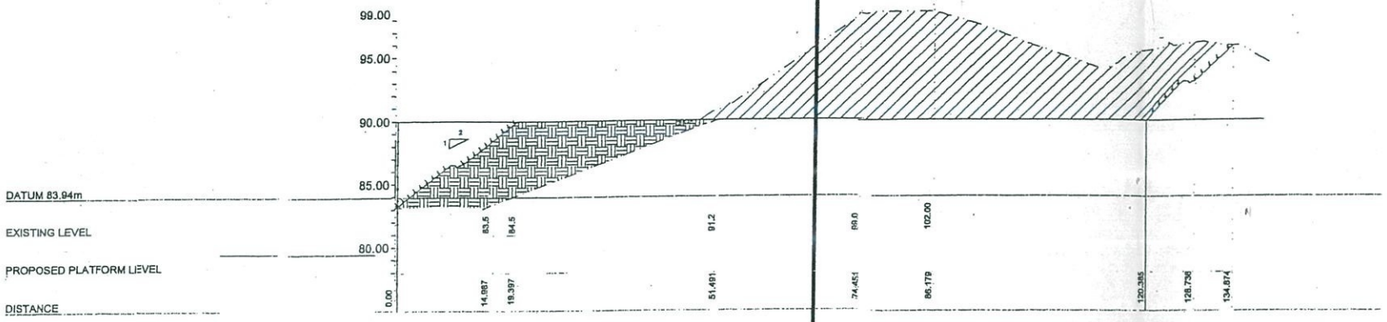
NO: FAIL:
JKR.D.C&S/B78/529/332(JELI)

TARIKH :
SEPT 2017

PROJEK :
CADANGAN MEMBINA DAN MENYIAPKAN PEJABAT KESIHATAN DAERAH JELI , KELANTAN DARUL NAIM

TAJUK : PELAN TETOPI CERUCOK

No. LUKISAN : JKR / BRSS / 01/26/D17/TCBP/987/03



DATUM 83.94m

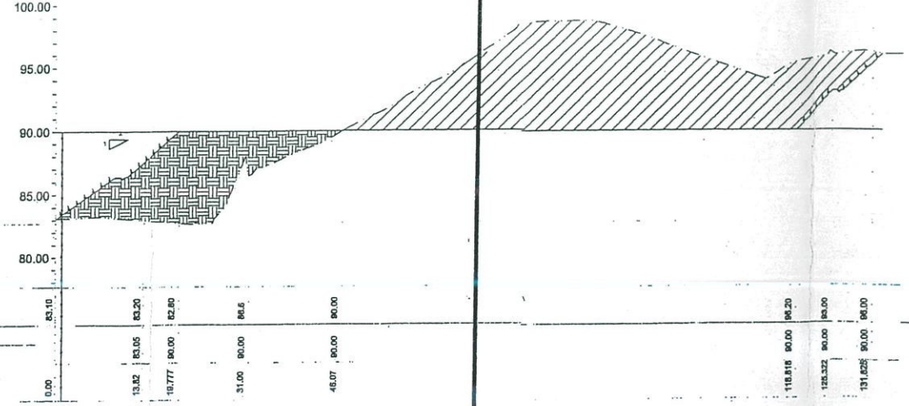
EXISTING LEVEL

PROPOSED PLATFORM LEVEL

DISTANCE

HORIZONTAL SCALE 1:500 VERTICAL SCALE 1:250

KERATAN 1



DATUM 77.63m

EXISTING LEVEL

PROPOSED PLATFORM LEVEL

HORIZONTAL SCALE 1:500 VERTICAL SCALE 1:250

KERATAN 2

NO.	SYMBOL	DESCRIPTION
1		Close Turfing
2		Contour Line
3		Fill
4		Cutting
5		Berm Drain / Toe Drain

NOTES:

1. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ARCHITECTURAL AND SURVEY DRAWINGS.
2. ANY DISCREPANCY BETWEEN TWO SETS OF DRAWINGS MUST BE BROUGHT TO THE ATTENTION OF THE S.O.
3. ALL LEVELS SHOWN ARE IN METRE UNLESS OTHERWISE STATED.
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16. ALL OPEN AREA SHALL BE SPOT TURFED UNLESS OTHERWISE STATED.
17. PROCTOR TEST (4.5 KG RAMMER) SHALL BE CARRIED OUT ON ALL BACKFILLING MATERIAL.
18. COMPACTION OF BACKFILLING MATERIAL SHALL BE AS FOLLOWS:
    UNDER ROAD AND DRAIN – 85% OF DRY DENSITY
    BUILDING AREA – 90% OF DRY DENSITY
    OPEN AREA – 90% OF DRY DENSITY
19. ALL IMPORTED FILL MATERIAL SHALL BE TESTED AND COMPLY WITH SPECIFICATION.

Huruf Petunjuk	Pindaan	Tarikh	Tanda Tangan

Pengesahan Pelanggan/Pemilik :
PIHAK KAMI MENGESAHKAN PELAN YANG DIKEMUKAKAN ADALAH MENGIKUT KEHENDAK DAN KEPERLUAN BRIF PROJEK. KEMENTERIAN KESIHATAN MALAYSIA

Nama/Tandatangan

Cop Rasmi Jabatan

JKR KELANTAN

BAHAGIAN REKABENTUK SIVIL & STRUKTUR)

IBU PEJABAT JKR KELANTAN

Pengarah :

IR. TUAN HJ. RAZANI BIN AB. LAZID

Juruters Awam Kanan:

Ir.FAIZUL IZUAN BIN SHAIMI

Projek :

PEJABAT KESIHATAN DAERAH JELI, KELANTAN.

Tajuk Lukisan :

BUTIRAN KERATAN 1 & 2

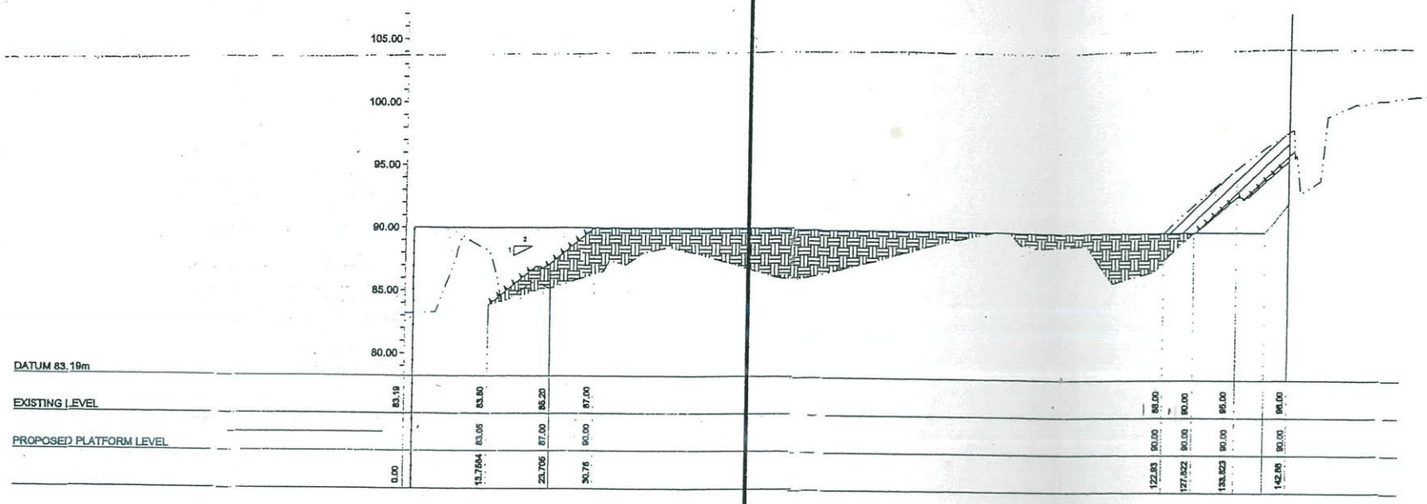
Ukuran : 1:500	Tarikh : Jun 2017
Diukur : Wee	Disemak : Faizul

Fail Projek : JKR/B.C&S/878/529/332 (JELI)

Fail ACAD : D : PKD JELI 2017

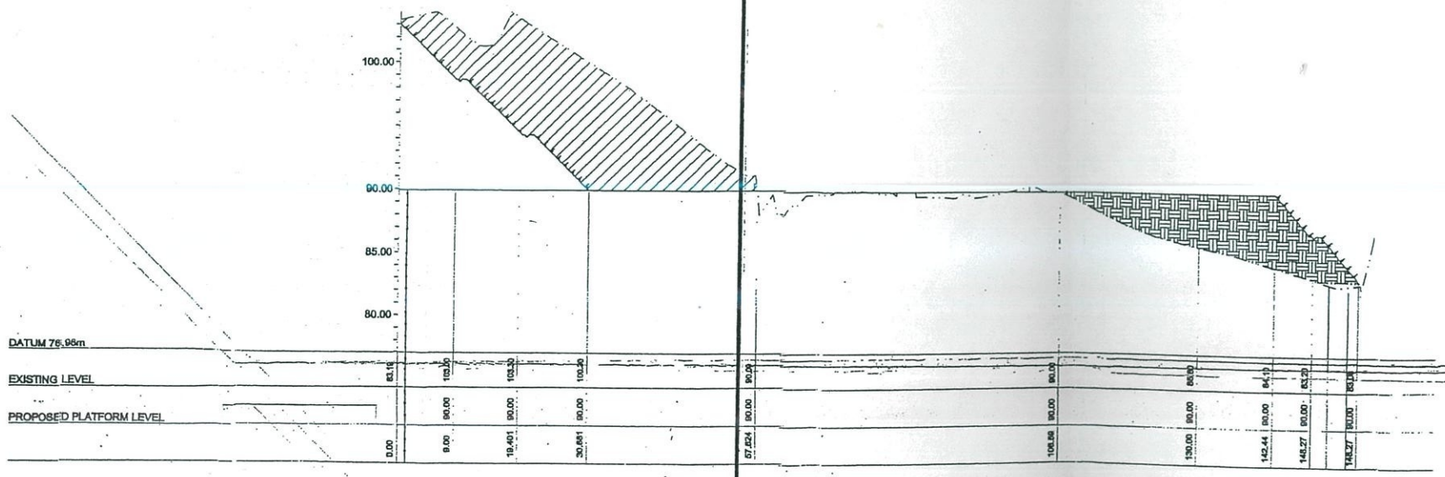
No. Lukisan : JKR/BRSS/01/26/D17/PKT/987/02

LUKISAN PEMBINAAN



HORIZONTAL SCALE 1:500 VERTICAL SCALE 1:250

KERATAN 3



HORIZONTAL SCALE 1:500 VERTICAL SCALE 1:250

KERATAN 4

NO	SYMBOL	DESCRIPTION
1		Close Turfing
2		Contour Line
3		Fill
4		Cutting
5		Berm Drain / Toe Drain

NOTES:

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16. ALL OPEN AREA SHALL BE SPOT TURFED UNLESS OTHERWISE STATED.
17. PROCTOR TEST (4.5 KG RAMMER) SHALL BE CARRIED OUT ON ALL BACKFILLING MATERIAL.
18. COMPACTION OF BACKFILLING MATERIAL SHALL BE AS FOLLOWS:
    UNDER ROAD AND DRAIN – 95% OF DRY DENSITY
    BUILDING AREA – 90% OF DRY DENSITY
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19. ALL IMPORTED FILL MATERIAL SHALL BE TESTED AND COMPLY WITH SPECIFICATION.

Huruf Petunjuk	Pindaan	Tarikh	Tanda Tangan

Pengesahan Pelanggan/Pemilik :
BIHAK KAMI MENGESAHKAN PELAN YANG DIKEMUKAKAN ADALAH MENGIKUT KEHENDAK DAN KEPERLUAN BRIF PROJEK.
KEMENTERIAN KESIHATAN MALAYSIA

Nama/Tandatangan | Cap Rasmi Jabatan

JKR KELANTAN

BAHAGIAN REKABENTUK SIVIL & STRUKTUR)

IBU PEJABAT JKR KELANTAN

Pengarah :

Juruteru Awam Kanan:
Ir.FAZUL IZUAN BIN SHAMI

Projek :
PEJABAT KESIHATAN DAERAH JELI, KELANTAN.

Tajuk Lukisan :
BUIRAN KERATAN 3 & 4

Ukuran : 1:500	Tarikh : Jun 2017
Diluklis : Wee	Disemak : Fazul

Fail Projek : JKR/D.C&S/878/529/332 (JELI)
Fail ACAD : D : PKD JELI 2017
No. Lukisan : JKR/BRSS/01/26/D17/PKT/987/03

LUKISAN PEMBINAAN

TRANSMISSION LINE

20.000

TANAH PROJEK

PELAN KUNCI
TANPA SKALA

PELAN LOKASI
TANPA SKALA

TYPICAL SECTION OF EARTH DRAIN WITH CHECK DAM EVERY 10m

TYPICAL SECTION OF TEMPORARY SUMP

TEMPAT PENGUMPULAN SAMPAH

GARDU AMBULAN

TANGGA BENDERA

POS PENGAWAL

CASCADE DRAIN

CRUSHER RUN 300mm Thickness

SILT TRAP REFER DRAWING

EXISTING EARTH DRAIN/ROAD SIDE DRAIN TO BE REALIGN / NEW CONSTRUCT BEFORE COMMENCEMENT OF EARTHWORKS. REFER DRAWING:

1) NEW CULVERT TO BE CONSTRUCT BEFORE COMMENCEMENT OF EARTHWORK. REFER TO DRAWING

2) LOCATION OF CULVERT TO BE ADJUSTED ACCORDINGLY AND APPROVED BY THE S.O.

A.Y.D 091.00

PETUNJUK :

- WORKING BOUNDARY
- HOARDING
- SILT FENCE
- TEMPERARY EARTH DRAIN
- WASH TROUGH
- STOCKPILE AREA
- SITE DETENSION POND
- TEMPORARY SUMP
- CRUSHER RUN (15m(L)X20m(W)X0.3m(THK)
- CASCADE DRAIN

SAIZ SILT TRAP

CATCHMENT AREA (HACTARE)	DIMENSION (m) (L x W)	DEPTH (m) (H)	DEPTH OF CLEANOUT LEVEL (m)	SPILLWAY Base width (m)	SPILLWAY HEIGHT (mm)	SPILLWAY Effective Head (mm)	SPILLWAY Csp Coefficient	SPILLWAY Capacity (m3/s)
2.0	23 x 11	1.0	0.3	3	400	300	1.48	1.12

LUKISAN PEMBINAAN

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    BUILDING AREA - 90% OF DRY DENSITY
    OPEN AREA - 90% OF DRY DENSITY
19. ALL IMPORTED FILL MATERIAL SHALL BE TESTED AND COMPLY WITH SPECIFICATION.

Huruf Petunjuk	Pindaan	Tarikh	Tanda Tangan

Pengesahan Pelanggan/Pemilik :
PIHAK KAMI MENGESAHKAN PELAN YANG DIKEMUKAKAN ADALAH MENGIKUT KEHENDAK DAN KEPERLUAN BRIF PROJEK.
KEMENTERIAN KESIHATAN MALAYSIA

Nama/Tandatangan | Cop Rasmi Jabatan

JKR KELANTAN
BAHAGIAN REKABENTUK (SIVIL & STRUKTUR)
IBU PEJABAT JKR KELANTAN

Pengarah :
DATO' ir. TUAN HJ. RAZANI BIN AB. LAZIO

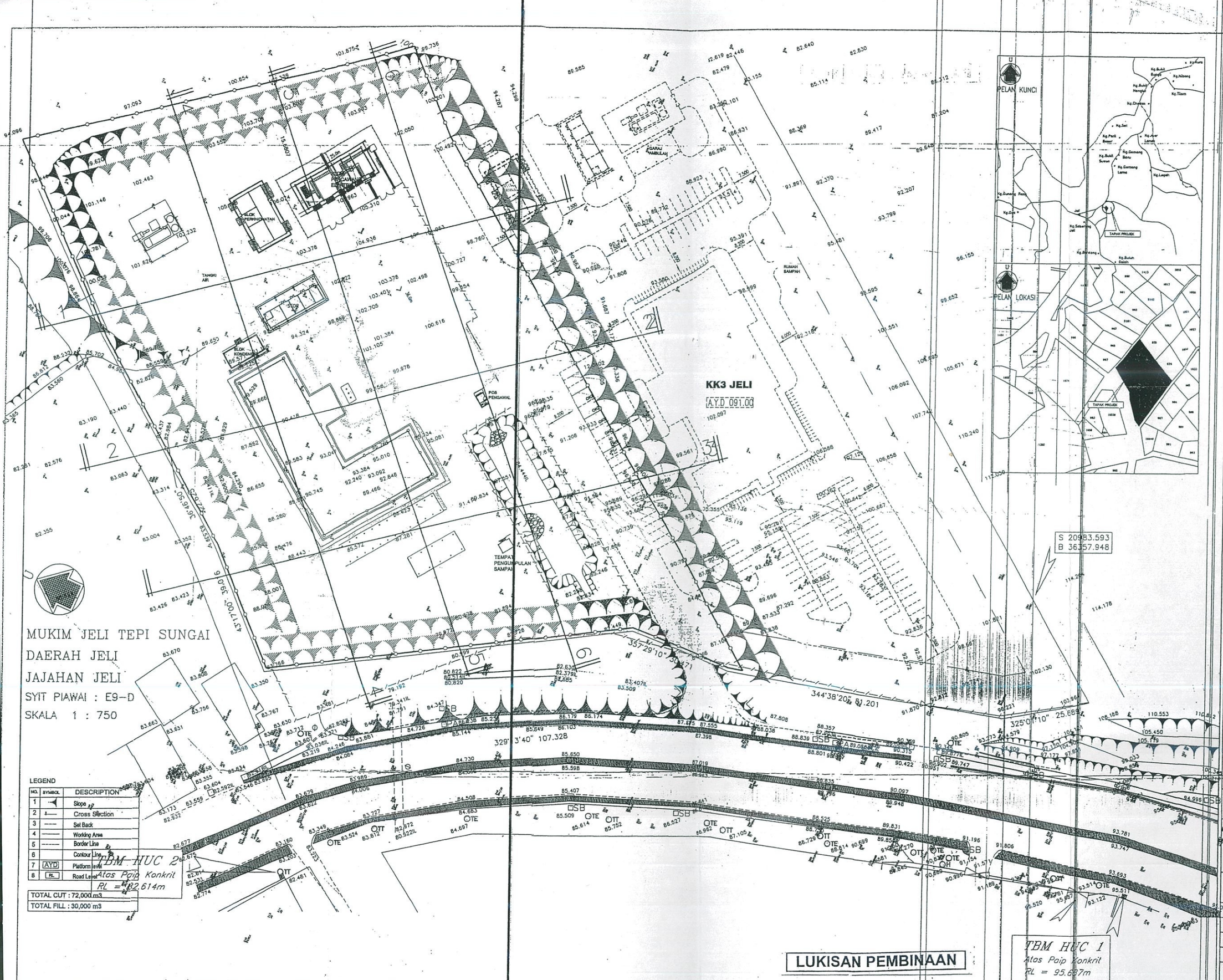
Jurutera Awam Kanan:
Ir.FAIZUL IZUAN BIN SHAIMI

Projek :
PEJABAT KESIHATAN DAERAH JELI, KELANTAN.

Tajuk Lukisan :
PELAN KAWALAN HAKISAN & KELADAK (ESCP)

Ukuran :	Tarikh :
1:500	Jun 2017
Diluluk : Wazifzi	Disemak : Faizul

Fail Projek : JKR.10.C&S/B78/529/332 (JELI)
Fail ACAD : D : PKD JELI 2017
No. Lukisan : JKR/BRSS/01/26/D17/ESCP/987/01



LEGEND

NO.	SYMBOL	DESCRIPTION
1		Slope
2		Cross Sllection
3		Set Back
4		Working Area
5		Border Line
6		Contour Line
7	AYD	Platform level
8	RL	Road Level

TOTAL CUT : 72,000 m3	
TOTAL FILL : 30,000 m3	

NOTES :

1. ALL DIMENSIONS ARE IN METER UNLESS OTHERWISE STATED.
2. APPROPRIATE AND SUFFICIENT ROAD MARKING/SIGNAGE SHALL BE PROVIDED DURING CONSTRUCTION.
3. ALL ROAD MARKINGS SHALL BE IN REFLECTIVE THERMOPLASTIC PAINT AND APPLICATION SHALL BE IN ACCORDANCE TO THE SPECIFICATION.
4. ALL ROAD MARKINGS SHALL BE IN ACCORDANCE TO JKR'S ARAHAN TEKNIK JALAN 2D/85 "MANUAL ON TRAFFIC CONTROL DEVICES-ROAD MARKINGS AND DELINEATORS" UNLESS OTHERWISE STATED.
5. ALL TRAFFIC SIGNS AND SIGN BOARDS SHALL BE IN ACCORDANCE TO JKR'S ARAHAN TEKNIK JALAN 2B/85 "MANUAL ON TRAFFIC CONTROL DEVICES-TRAFFIC SIGN APPLICATION".

Huruf Petunjuk	Pindaan	Tarikh	Tanda Tangan

Pengesahan Pelanggan/Pemilik :

PIHAK KAMI MENGESAHKAN PELAN YANG DIKEMUKAKAN ADALAH MENGIKUT KEHENDAK DAN KEPERLUAN BRIF PROJEK. KEMENTERIAN KESIHATAN MALAYSIA

Nama/Tandatangan | Cop Rasmi Jabatan

JKR KELANTAN

BAHAGIAN REKABENTUK (SIVIL & STRUKTUR)

IBU PEJABAT JKR KELANTAN

Pengarah :

DATO' Ir. TUAN HJ. RAZANI BIN AB. LAZID

Jurutera Awam Kanan:

Ir.FAIZUL IZUAN BIN SHAIMI

PEJABAT KESIHATAN DAERAH JELI, KELANTAN.

Tajuk Lukisan :

PELAN KERJA TANAH

Ukuran : 1:500	Tarikh : Jun 2017
Diluklis : Wee	Disemak : Faizul

Fail Projek : JKR/D.C65/878/529/332 (JELI)

Fail ACAD : D : PKD JELI 2017

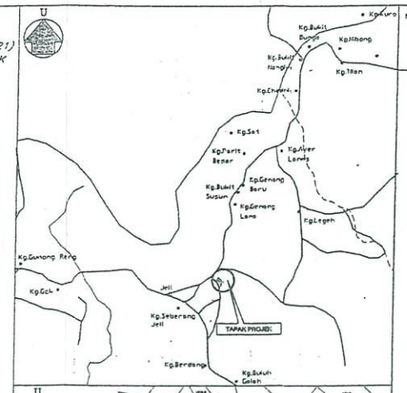
No. Lukisan : JKR/BRSS/01/26/D17/PKT/987/01

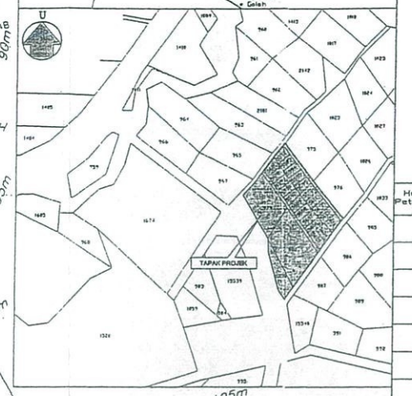
NOTA :

SEMUA TITIK ARAS ADALAH BERDASARKAN DARIPADA BM NO. D 0438 (RL=98.321) YANG TERLETAK DI KIRI JALAN TANAH MERAH-JELI, DI TEPI PINTU PAGAR MASUK KE SEKOLAH KEBANGSAAN GEMANG.

PETUNJUK :

OH	PILI BOMBA
OTE	TIANG ELEKTRIK
OTT	TIANG TELEFON
OTL	TIANG LAMPU
DSB	PAPAN TANDA
OTG	TUGU
OMH	MANHOLE
RK	RUMAH KAYU (Papan)
RKE	RUMAH KEDAI
OPA	PENANDA PAIP LINE
DS	SUMP
UL	UKUR LUJUR
IL	INVERT LEVEL
	POKOK
	PINTU PAGAR
	PAGAR DAWAI
	JALAN TAR/TANAH





Nota :

KONTRAKTOR HENDAKLAH MENGIKUT DIMENSI YANG ADA DI DALAM RAJAH, SEGALA DIMENSA HENDAKLAH DIPERIKSA DI TEMPAT ITU JUGA. SEGALA SELISIHAN YANG TERDAPAT HENDAKLAH DIRUJUK KEPADA ARKITEK.

Huruf Petunjuk	Pindaan	Tarikh	Tanda Tangan

S 20678.729
B 36378.887

DINDING PAGAR BATU BATA BESERTA DENGAN DAWAI BERANGKAI RUJUK LUKISAN BUTIRAN

S 20983.593
B 36357.948

TEMBOK PAGAR HIASAN

160MM Ø HDPE PN.12.5 BEKALAN DISAMBUNG DARI PAIP UTAMA AKSB MENGIKUT KELULUSAN AKSB

CADANGAN LOKASI METER AIR

CADANGAN JALAN BERTURAP & BERKECERUNAN 1 : 8

GARISAN ANJAKAN BANGUNAN 12 METER

GARISAN ANJAKAN BANGUNAN 12 METER

PAGARDAWAI RANGKAI

GARISAN SEMPADAN

RUMAH KAYU (RK)

TEMBOK PAGAR HIASAN

PETUNJUK :

	BLOK BANGUNAN
	TANDAC
	ON SITE DETANSION POND (OSD)
	PAVING BLOCK
	RUMPUT TANAH TOMPOK
	RUMPUT TANAH RAPAT
A.Y.D 0.00	ARAS YANG DIBERITUK
	PAGAR KESELAMATAN DAWAI RANGKAI DGN PVC COATED rujk. lkh. no. PP(M)3/P/PKS/1356
	PAGAR DAWAI RANGKAI rujk. lkh. no. PP(M)3/2/P/PKS/134
	TEMBOK PAGAR HIASAN rujk. lkh. no. PKR(P--e)CKK/E-PP1/3
	GALVANISED WELDFENCE rujk. lkh. no. PKR(P--e)CKK/E-P2/1
	PINTU PAGAR YG SETARA
	KERENGGA JALAN KONKRET
(H)	PILI BOMBA

RUJUKAN LUKISAN :-

	PERKARA	BIL. BLOK	BIL. TINGKAT	BIL. UNIT	NO. LUKISAN
A.	PEJABAT KESIHATAN DAERAH JELI	1	2	1	JP(PAR)14/PK/PEJ/001/U1
B.	BLOK PENCAWANG ELEKTRIK	1	1	1	CA/10/28/B13/056-TNB/1sirl
C.	GARAU KENDERAAN JABATAN			1	JP(PAR)14/PK/PC/001/G/01
D.	TEMPAT LETAK KERETA PEGAWAI BERBUMBUNG			1	JP(PAR)14/PK/PC/001/TLK/01
E.	POS PENGAWAL	1	1	1	PKR(P--B)CKK/A--P4/2
F.	TIANG BENDERA			1	PKR(P--e)CKK/E--TB1/1
G.	STOR	1	1	1	JP(PAR)14/PK/PC/001/ST1/02
H.	BLOK KONDENSER	1	1	1	JP(PAR)14/PK/PC/001/CD/01
I.	TEMPAT PENGUMPULAN SAMPAH	1	1	1	DM(4)200/J1/1
J.	SEWERAGE TREATMENT PLAN (S.T.P)			1	rujuk lukisan jurutera
K.	BLOK PERKHIDMATAN	1	1	1	JP(PAR)11/KD/001/TNB-S3/00
L.	MENARA TANGKI AIR (4400 GALLONS)	1			rujuk lukisan jurutera
M.	PINTU PAGAR MASUK UTAMA -CELANGSAR			1	PKR(P--e)CKK/E--P1/1
N.	PINTU PAGAR "WELDFENCE" 4200mm LEBAR			2	CA/P--E/10/28/PM1/2 sirl

PARKING	JUMLAH
TEMPAT LETAK KERETA AWAM	33
TEMPAT LETAK MOTOR AWAM	16
TEMPAT LETAK KENDERAAN OKU	2
JUMLAH	51

CATATAN

1. Ceruk rujuk lukisan jurutera.
2. Semua petak letak kereta berukuran 2500 x 5000
3. Semua petak letak motosikal berukuran 2000 x 1000
4. Semua petak letak kereta OKU berukuran 2600 x 5400 Bebendul jalan konkrit di sekeliling jalan dan tempat letak kereta dan motosikal

PELAN TAPAK

MUKIM JELI TEPI SUNGAI
DAERAH JELI
JAJAHAN JELI

TBM HUC 2
Atas Paip Konkrit
RL = 82.614m

TBM HUC 1
Atas Paip Konkrit
RL = 95.697m

Pengesahan Pelanggan/Pemilik :

PIHAK KAMI MENGESAHKAN PELAN YANG DIKEMUKAKAN ADALAH MENGIKUT KEHENDAK DAN KEPERLUAN BRIF PROJ

KEMENTERIAN KESIHATAN MALAYSIA

Tandatangan sebagai pemilik projek untuk tujuan kelulusan Pihak Berkuasa Tempatan bukan untuk tuntutan pengesahan pelan

Nama, Jawatan/Pegangan | Cop Rasmi Jabatan

Kementerian Kesihatan Malaysia

JKR KELANTAN

BAHAGIAN ARKITEK

IBU PEJABAT JKR KELANTAN

Pengarah

DATO' IR. TUAN HJ. HAZANI BIN AB. LAZID, D.P.S.K. (kelantan)

Arkitek Kanan

Ar. MOHD BUKHARI BIN AB. RAZAK

Arkitek

MUSTAFA KAMAL BIN ZAHARI @ ANNUAR

Projek :

PEJABAT KESIHATAN DAERAH JELI KELANTAN.

Tajuk Lukisan :

PELAN TAPAK

Pen. Pegawai Senibina Gred JA36 :
ROZSITA @ ROZITA BINTI MOHAMED

Penolong Pegawai Senibina Gred JA29 :
NORMALA BINTI GHAZALI

Ukuran :	Tarikh :
1:500	NOVEMBER 2017
Dilukis :	Disemak :
LA GREEN	MUSTAFA

Fail Projek :
JKR/D/SB/698/378/14

Fail ACAD :
D : PKD JELI 2017

No. Lukisan :
A.KN: 987/1/32-2017

CLIENT :
CONSULTANTS :
CONTRACTOR :

PRINSIP CITRA SERVICES
(CA 0198721-D)

Section :
Location :
Offset :
Tested by :
Date Tested :

FIELD DENSITY TEST

(Sand Replacement Test)

Description of Soil : Maximum Dry Density : Mg/m_3

Depth of Hole Excavated : 150mm Optimum Moisture Content : %

Bulk Density of Calibrating Sand (P3) : Mg/m_3

Chainage :								
Layer :								
Ogl.(M) :								
Wt. Of Soil from Hole (W_3) g								
Wt. Of Sand before Pouring (S_1) g								
Wt. Of Sand after Pouring (S_4) g								
Wt. Sand in Cone (S_2) g								
Wt. Sand in Hole ($Sb=S_1-S_4-S_2$) g								
Bulk Density $P = \frac{W3 \times P3}{Sb}$ Mg/m3								

MOISTURE CONTENT

Container No. :								
Wt. of Wet Soil + Container (M_2) g								
Wt. of Dry Soil + Container (M_3) g								
Wt. of Container (M_1) g								
Wt. of Moisture $C1=(M_2 - M_3)$ g								
Wt. of Dry Soil $C2=(M_3 - M_1)$								
Moisture Content $W = \frac{C1 \times 100}{C2}$ g								
Dry Density $Pd = \frac{(100*P)}{(100 + W)}$ Mg/m_3								
Compaction (Pd/MDD x 100) %								
Specification Requirements %								
JKR Ref. No.								
Lot No.	Results :	Passed		Failed				

Remarks :

Tested By : ..... Witnessed By : ..... Approved By : .....

KELPILE SDN BHD

JACKED IN PILING RECORD

PROJECT : PEJABAT KESIHATAN DAERAH JELI

CONTRACTOR : NH ARIES SDN BHD
MACHINE TYPE : YZY600 DATE : 300MM X 300MM RC PILE
PILE LOCATION NO : PILE SIZE :
PENETRATION DOLLY TIME :
TOTAL DEPTH

PILE SIZE					
LENGTH					
SERIAL NO					
DATE CASTED					

PENETRATION	LOAD		PENETRATION	LOAD		PENETRATION	LOAD	
	2 cylinder	2+2 cylinder		2 cylinder	2+2 cylinder		2 cylinder	2+2 cylinder
0.50			18.00			35.50		
1.00			18.50			36.00		
1.50			19.00			36.50		
2.00			19.50			37.00		
2.50			20.00			37.50		
3.00			20.50			38.00		
3.50			21.00			38.50		
4.00			21.50			39.00		
4.50			22.00			39.50		
5.00			22.50			40.00		
5.50			23.00			40.50		
6.00			23.50			41.00		
6.50			24.00			41.50		
7.00			24.50			42.00		
7.50			25.00			42.50		
8.00			25.50			43.00		
8.50			26.00			43.50		
9.00			26.50			44.00		
9.50			27.00			44.50		
10.00			27.50			45.00		
10.50			28.00			45.50		
11.00			28.50			46.00		
11.50			29.00			46.50		
12.00			29.50			47.00		
12.50			30.00			47.50		
13.00			30.50			48.00		
13.50			31.00			48.50		
14.00			31.50			49.00		
14.50			32.00			49.50		
15.00			32.50			50.00		
15.50			33.00			50.50		
16.00			33.50			51.00		
16.50			34.00			51.50		
17.00			34.50			52.00		
17.50			35.00			52.50		

Oil Pressure VS Pile Driving Force			
Oil Pressure (MPA)	2 cyl 280 dia (KN)	2 cyl 280 dia (KN)	4 cylinder (KN)
1.00	161.50	214.6	329.4
2.00	223.10	335.2	570.6
3.00	284.60	455.8	811.8
4.00	346.20	576.4	1053.0
5.00	407.70	697.0	1294.2
6.00	469.20	817.6	1535.4
7.00	530.80	938.2	1776.6
8.00	592.30	1058.8	2017.8
9.00	653.90	1179.4	2259.0
10.00	715.40	1300.0	2500.2
11.00	776.90	1420.6	2741.4
12.00	838.50	1541.2	2982.6
13.00	900.00	1661.8	3223.8
14.00	961.60	1782.4	3465.0
15.00	1023.10	1903.0	3706.2
16.00	1084.60	2023.6	3947.4
17.00	1146.20	2144.2	4188.6
18.00	1207.70	2264.8	4429.8
19.00	1269.30	2385.4	4671.0
20.00	1330.80	2506.0	4912.2
21.00	1392.30	2626.6	5153.4
22.00	1453.90	2747.2	5394.6
23.00	1515.40	2867.8	5635.8
24.00	1577.00	2988.4	5877.0
25.00	1638.50	3109.0	6118.2

CONTRACTOR SITE PERSONNEL

INSPECTOR OF WORKS

KELPILE REPRESENTATIVE