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It is recommended that the report of this practical training provided

By

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Entitle

**Installation of Anchor Vertical Block**

Accepted in partial fulfillment of requirement for obtaining Diploma in Building

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**MAY 2014**

**STUDENT'S DECLARATION**

I hereby declare that this report is my own work, except for extract and summaries for which the original references stated herein, prepared during a practical training session that I underwent at Jati Kenali Trading Sdn Bhd for duration of 5 months starting from 12 May and ended 29 September 2014. It is submitted as one of the prerequisite requirements of DBN307 and accepted as a partial fulfilment of the requirement for obtaining the Diploma in Building.

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Thank you very much

## **ABSTRACT**

This report briefly describes the processes and methods involved in the construction of slope protection for the "Projek Cadangan Pelebaran Jalan di Seksyen 35.30-35.90 (berhampiran jambatan sungai nerus), laluan ft 247, jalan sungai tong – kuala berang, Setiu Terengganu" by using anchor vertical block (AVB) to make retaining wall. This report is divided into several sections and begins with an introduction, objectives, background and the background of the construction project. The title of the report is the installation of a vertical anchor block used for slope protection. Background construction projects will be discussed and explained in detail that describes the selected topic and all the resources that are only available from the project site. All information obtained from observations, questions and actions that have been made for five months. This report, the authors have described in detail the installation of vertical anchor block. It is observed that this type of wall construction method is actually easier and faster in the construction period shall be held sooner. In conclusion, it is hoped that this report will be explained in more detail for the reader of the statement or the method of installation of anchor vertical block assembly.

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## LIST OF ABBREVIATIONS

AVB	Anchor Vertical Block
UiTM	University Teknologi Mara
M	Meter
Mm	Millimeter
JKTSB	Jati Kenali Trading Sdn Bhd

## CHAPTER 1

### INTRODUCTION

#### 1.1. Introduction

Practical Training (DBN 307) is one of most important subject created and introduced by the Department of Building, Faculty of Architecture, Planning And Surveying, UiTM for all the students under this course in order to expose them to the real working experience as a supervisor. As all we know, some of the knowledge cannot being learned in the lecture class except by experience it by ourselves in order to understand on how things will work outside. Here, all the teaching and knowledge gathered during the studies need to be use and applied during the training receive in order to pass the subject.

In order to graduate from the university and acquire the diploma in this programmer, the entire student is compulsory to register and pass the subject. The duration of the training was around five months starting from 12<sup>nd</sup> May 2014 till 30<sup>th</sup> September 2014 and the placement of the training was chosen by the students themselves. First, the student contacted the company that they interested in and asked for their permission and approval to do the practical training there. Then, upon the eligibility, a formal letter will be send to the company and the students may proceed with their selection after application approved formally by that particular company.

Thus, the placement for my training is at the Jati Kenali Trading Sdn Bhd where I spent five months learned and experienced to complete my practical training.

## **1.2. Objectives**

Objective of this case study or known as in my industrial training are ;

- I. To identify the materials and machineries used in installation.
- II. To determine process installation of anchor vertical block (AVB).
- III. To identify the problem and its solution that may occurs related during the installation of anchor vertical block (AVB).

## **1.3. Scope of study**

The scope of the study in the training industry is mostly about the installation of anchor vertical block (AVB) "Cadangan Pelebaran Jalan Di Seksyen 35.30-35.90 (Berhampiran Jambatan Sungai Nerus), Laluan FT 247, Jalan Sungai Tong, Kuala Berang, Setiu Terengganu". Therefore, a more detailed briefing about the installation of anchor vertical block for retaining wall.

## **1.4. Method of study**

Numerous methods have been used to get accurate evidence such as from the internet, observation, data record and consultation. These four methods are described as below:

### **I. Internet**

As well as reading books and journaling, internet is one of my methods in order to understand more about the topic that need to focus and from here also to find more details regarding the topics for this report such as the information about the companies, their consultants, sub – contractors and others. Through internet, it provides more and wider information and also specific details.

### **II. Observation**

Another method is observation which observes at the project site. This one of very good method because clearly brief and explained on how the process works and the installation for the construction.

### **III. Data record**

In order not to overlook from the data's obtained, requirements such as pictures for data record or evidence to show about the current progress of the construction from time to time. These are needed for references during the industrial training. The records can also be in drawing papers, layout plans, and many more which can be obtained from the site office.

### **IV. Consultation**

Interviews people in order to get more information about some of the installations, procedures, materials used, and many more from the supervisor or even the skilled and unskilled workers that always there at the construction site which always helpful to give more guides and helps.

## CHAPTER 2

### 2.0 COMPANY BACKGROUND

#### 2.1 INTRODUCTION

Jati Kenali Trading Sdn Bhd is a contractor's firm located at Kg. Tok Jiring, Kuala Terengganu. This firm has been created and involved in this field since early 90's and has been registered under class D at that particular of time. After some time and long hard work, on 3<sup>rd</sup> April 2007 the company has successfully being upgraded and now has been registered under class A. Nowadays, the company can be regarded as one of the most successful and known contracting company in Kuala Terengganu.

#### 2.2 COMPANY PROFILE

Table 2.1 Company Profile

Company name, logo and address	 <p>: JATI KENALI TRADING SDN BHD</p>
Registration no	: 653469 – D
Allowable capital	: RM 1,000,000.00
Paid capital	: RM 999,996.00
Date of establish	: 22 <sup>nd</sup> May 2004

Office No	:
Fax No	:
PKK Registration	: Class A- (1104 A 2007 0153)
CIDB Registration	: G7 – (0120070424 – TR 113353)

Source : Company profile JKTSB

### 2.3 ORGANIZATION CHART

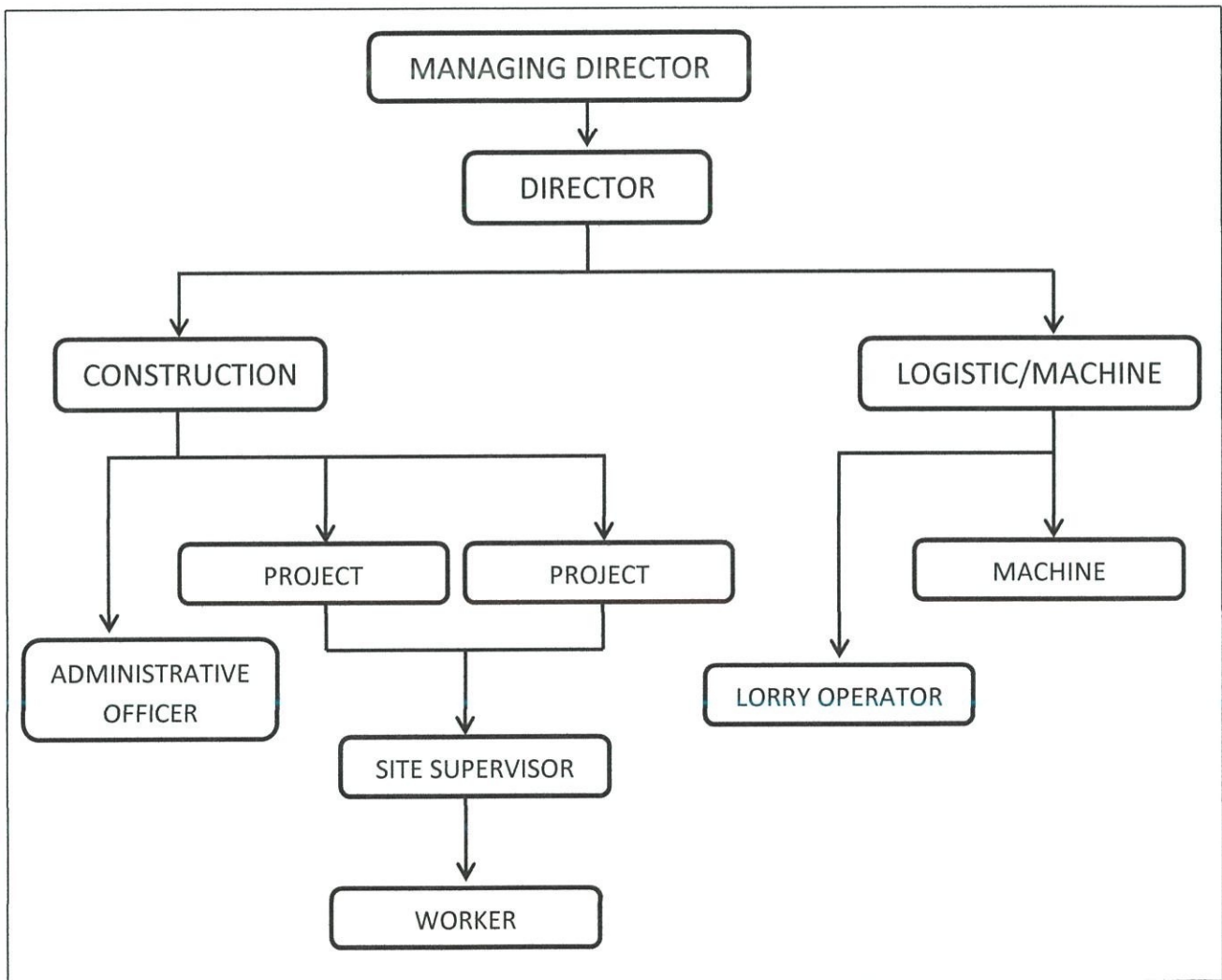


Figure 2.1 Company organization chart

### 2.3.1. The Personnel

**Table 2.2** The Personal

No	Name	Position	Academic Level	Experience
1	Azaiz Bin Abdullah	Managing Director	Sijil peperiksaan Malaysia ( SPM )	More than 30 years involvement in construction industry. Project management and contractual work.
2	Rohani Binti Abdullah	Director	Sijil peperiksaan Malaysia ( SPM )	More than 15 years experience in company management, clerk work and office affairs.
3	Mohammed Tajali Bin Yusof	Project Manager	- Bachelor of Building (UTM) - Diploma of Quantity Surveying (UTM)	- 2009 (Project Manager of Jati Kenali) - 2006-2009 (Open his own business on Construction Contractual and Aluminium, Steel and Stainless Steel Work Workshop) - 2001-2005 (Work at contractor's firm as Site Agent ) - 1995-2000 (Work at contractor's firm Quantity Surveyor)
4	Azaman @ Azman Bin Jusoh	Project Manager	Bachelor of Engineering (UM)	-2009 (Project Manager of Jati Kenali) -2007 (Construction of 'Masjid Kota Darulnaim Kota Bharu, Kelantan') -2006 (Construction of '100 unit Rumah Pasang Siap Di Penempatan Transil Kg Panji Kota Bharu, Kelantan')

				-2003 (Construction of 'Asrama SK Kuala Sungai Gua Musang, Kelantan') -2001 (Construction of 102 Terrace House, 30 unit Bungalow and 28 unit of Semi-D at Badang Kota Bharu, Kelantan)
5	Sheikh Mohd Indera Shahri Bin Alias	Project Engineer	- Bachelor of Construction Management (UITM) - Diploma of Building (UITM)	-2009 (Project Engineer of Jati Kenali) -2004-2009 (Engineer at Daum Engineering Sdn Bhd) -Cadangan Membina dan Menyiapkan Kawasan Rekreasi Merempuh Halangan Untuk Tetuan UITM Shah Alam
6	Roslina Binti Abdul Rasyid	Quantity Surveyor	Bachelor of Civil Engineering (UTHM)	-2006 (Site Clerk under MME Realty and Management Sdn Bhd) -2010-2012 (Quantity Surveyor at Delta Con Sdn Bhd) -2012 (Quantity Surveyor at Jati Kenali)
7	Abd Razak Bin Yatin	Site Supervisor	Sijil Pelajaran Malaysia (SPM)	-15 years experience in construction industry and as site supervisor.

Source : Company Profile JKTSB



### **2.3.2. ORGANISATION ACTIVITY**

Among the activities that being carried out are:

- i. Construction and maintenance of City Infrastructure
- ii. Construction and maintenance of housing and road
- iii. Maintenance of primary road and state road
- iv. Maintenance of plant, equipment and vehicle
- v. Construction and preparation of infrastructure at rural area and road maintenance
- vi. Responsible to give infrastructure facility through communication

### **2.3.3. MISSION AND VISION**

Among the firm's mission and vision are:

- i. To make sure the company become one of the leading organization in construction industry
- ii. To make sure that the company produce and maintain high level of profit, efficiency, and productivity in construction industry
- iii. Produce and prepare a group of people that efficient, transparent and skillful in accordance with country vision to become one of the developed country towards year 2020
- iv. Introduce the concept of 'umbrella' in construction industry for the development of Bumiputera contractor

## 2.4. List of Project

### 2.4.1. Completed projects

**Table 3.3** List of work done

No	Project	The tenderer * Responsible	Date Owned Site	Completion of Contract	Perce ntage ready
1	Menbina dan Menyiapkan Perhentian Bas, Bandar Almuktafibilah shah Dungun Terengganu	RM2,015,000.00	10/07/2008	04/05/2010	100%
2	Cadangan Jalan Pusat Bandar Almuktafibilah shah Dungun Terengganu	RM74,371,500	01/01/2009	22/04/2009	100%
3	Cadangan Membina Dan Menyiapkan Sebuah Bangunan Arked 2 Tingkat Di Atas Lot 3928 Mukim Kuala Dungun Terengganu.	RM1,528,265.90	02/11/2006	07/11/2007	100%
4	Menbekal, Memasang Dan Menguji Paip 200mm G.P UPVC Kelas D Dan Lain-lain Kerja Berkaitan Dengannya Di Jalan Tengku Mohamad, Kuala Terengganu, Terengganu	RM837,624.00	17/09/2006	28/03/2007	100%
5	Menbina dan Menyiapkan system perparitan sekitar jalan kampung kalam Kuala Terengganu	RM535,806.00	26/06/2006	14/12/2006	100%

Source : Company profile JKTSB

## 2.4.2. Project in progress

**Table 2.4** Project in progress

No	Project	Price of the project	Date owner project	Completion of contract	Perce ntages ready
1	Cadangan merekabentuk, membina dan menyiapkan 500 unit rumah teres mampu milik dan kerja-kerja berkaitan dengannya di kampung Batu 7, Mukin Sura Daerah Dungun Terengganu.	RM53,585,000.00	15/11/2011	13/05/2015	80%
2	Cadangan pelebaran jalan di seksyen 35.30- 35.90 (Berhampiran jabatan sungai nerus), laluan ft 247, Jalan Sungai Tong – Kuala Berang, Setiu, Terengganu.	RM4,450,000.00	10/03/2014	8/09/2015	75%
3	Menaiktaraf jalan Gong Badak ke Bukit Berangan Kuala Terengganu.	RM924,895,100	01/03/2014	18/03/2015	90%
4	Projek pembinaan infrastruktur bagi pesawat helicopter di pangkalan udara TUDM : pakej II – Pangkalan udara TUDM Butterworth, subang dan Gong Kedak ( Tender Semula )	RM6,890,343.94	04/02/2014	06/10/2014	80%
5	Kerja-kerja membina dan menyiapkan sistem rawatan air, sistem rawatan kumbahan dan kerja-kerja berkaitan untuk pembangunan kenyir trade Center di Pulau Bayas Tasik Kenyir, Hulu Terengganu.	RM13,283,094.80	23/10/2014	20/10/2014	85%

Source : Company profile JKT SB

## CHAPTER 3

### 3.0 ANCHOR VERTICAL BLOCK

#### 3.1 INTRODUCTION

In modernity now, the construction industry in our country is expanding rapidly, for the construction of slope protection, there are many types to be used for this method. Each type of slope protection has its own advantages and disadvantages. For this project, the architect chose to use anchor vertical block (AVB) as a suitable method for this area. ( Najma, D (2014). Anchor Vertical Block)

Normally, using the AVB project which is a restricted area and a small area of the construction site. for a small area, type of slope protection can be used. Cost for this project, requires skill labor to install AVB, while unskill labor was needed to do the work assigned. ( Najma, D (2014). Anchor Vertical Block)

Installations that do not use cement to last longer than other types. Using geo-grid as a block by block holders among others, in addition to the soil of the compact from collapsed or damaged. In addition to using the textile to be used to aggregate 20mm. Avb filters can also be cost effective as well as long-lasting quality and advice with insurance. ( Najma, D (2014). Anchor Vertical Block)

According Gray and Leiser (1982), properly designed slope protection and stabilization has to include two components: a vegetational-biological and a mechanical-structural component. For maximum effect, both components must be integrally planned prior to road construction. ( Najma, D (2014). Anchor Vertical Block)

Properly designed and planted vegetative covers play a significant role in preventing surface erosion and shallow mass failures. The function of root systems of live plants on shallow soils on steep slopes is that of a binder for individual soil particles or aggregates. They act in several ways to increase slope stability: (1) they bond unstable soil mantles

to stable subsoils or substrata, (2) they provide a cover of a laterally strong fine root systems close to the surface, and (3) they provide localized centers of reinforcement in the vicinity of individual trees where embedded stems act like a buttress pile or arch-abutment on a slope. ( Najma, D (2014). Anchor Vertical Block)

The structural-mechanical component can consist of conventional retaining walls, either the gravity or cantilever type, or a reinforced earth structure. Structural-mechanical stabilization techniques are called for in cases where the potential for deep-seated slope movement or high, lateral earth stresses exists. ( Najma, D (2014). Anchor Vertical Block)

A simplified flow chart is shown in Figure 3.1 which indicates the appropriate combination of methods to either maintain or achieve a stable and erosion-free slope. Implicit in any slope stability discussion is the effect of water and the importance of proper drainage. In addition to mechanical controls, however, vegetation can provide a form of "biological" drainage through plant transpiration. Root systems can effectively dewater soil mantles during their active growing season, but often the periods of most danger from slope failure and erosion do not coincide with peak transpiration periods. ( Najma, D (2014). Anchor Vertical Block)

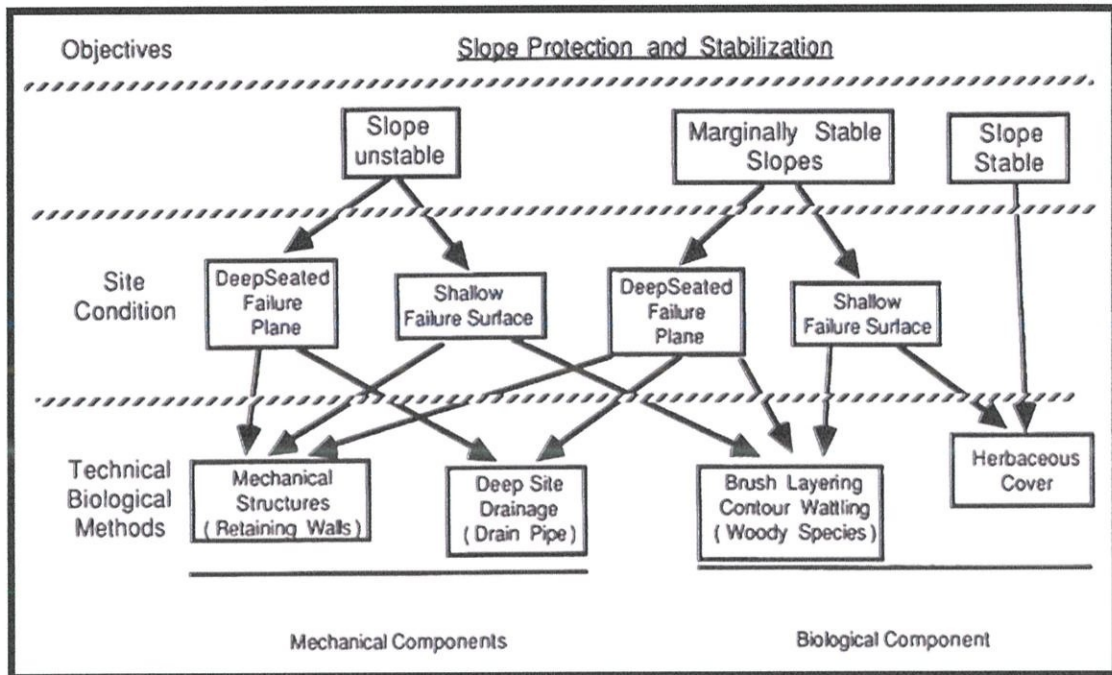


Figure 3.1 Slope Protection

Source : <http://www.fao.org/docrep/006/t0099e/t0099e05.htm>

### 3.2 PROJECT BACKGROUND

Al-Alif Sdn. Bhd. development project is Cadangan Pelebaran Jalan Di Seksyen 35.30-35.90 (Berhampiran Jambatan Sungai Nerus), Laluan FT 247, Jalan Sungai Tong, Kuala Berang, Setiu, Terengganu. The contract number for this project is JKRNT(T)S/7/2014 which is value of RM 4,450,000.00.

The date of commencement of this project is 10 March 2014 and believed to complete on 8 September 2015 which is involve 78 weeks (15 months). The project is under Terengganu Government and controlled by Dato' Pengarah Kerja Raya Terengganu.

**Table 3.1** List of Sub-contractor

No.	Consultant	Scope of Works
1	Prototech Sdn. Bhd.	Supplier of raw materials
2	Noya Jaya Sdn. Bhd.	Machinery Works
3	Leong Yin Construction and Trading	Installation of Anchor Vertical Block (AVB)



Source : Report site meeting

### 3.3 CASE STUDY




#### 3.3.1 Material

In the installation of slope protection Anchor Vertical Block (AVB), there are many related component in the success of every construction. Each component used shall have the detail of their own, and how they support each construction. Table 3.2 below further explained about the materials used for this project. The supplier for this project is Prototech Sdn Bhd. According to Lie Eong Kwang(2014).

**Table 3.2** Material of construction

No	Material	Definition
1.	Vertical block 	<ul style="list-style-type: none"> <li>-Approximate Dimensions is 200mm x 450mm x 300mm</li> <li>-weights is 40kg</li> <li>-coverage 1.0 sq. ft.</li> <li>-setback/ Batter 50mm / 4'</li> <li>- Price RM 8-10 per block</li> <li>- To block the soil movement.</li> </ul>
2.	Cap 	<ul style="list-style-type: none"> <li>-Approximate Dimensions is 100mm x 435mm x 260mm</li> <li>-Weights is 18kg</li> <li>-coverage 1.22 linear ft.</li> <li>-Price RM 7 per cap</li> <li>- As a surface layer for vertical block.</li> </ul>



3.	<p>Corner</p> 	<ul style="list-style-type: none"> <li>- Approximate Dimensions is 200mm x 450mm x 228mm</li> <li>- Weights is 45kg</li> <li>-Price RM 10-12 per block</li> <li>- As a corner after vertical block.</li> </ul>
4.	<p>Geo-grip</p> 	<ul style="list-style-type: none"> <li>- High quality, high tenacity polymer coated geo-grid manufactured from high strength polyester yarns. Excellent creep and construction damage resistance.</li> <li>-wall and slope reinforcement.</li> <li>-reinforcement under paving block.</li> <li>-to increase the strength of vertical block.</li> </ul>
5.	<p>Geotextile</p> 	<ul style="list-style-type: none"> <li>- Manufactured from multilayers of UV stabilized polypropylene filaments needed to form a tough homogeneous sheet specifically designed to provide optimum filtration of fine silt soils and withstand robust installation and hydraulic stress.</li> <li>-Filters under riprap and spillways of earth dams and reservoirs.</li> </ul>

Source : Catalog from prototech sdn. Bhd

### 3.3.2 Machinery

Machinery is very important in the construction industry. Such as this project, machinery is an important component in the installation of Anchor Vertical Block (AVB). All machinery used shall have the scope of work of their own. Of machinery used are: -

#### I. Excavator



**Photo 3.1** Excavator

An excavator is a machine used for construction activities. The excavator consists of a house, undercarriage, boom, stick and bucket. The undercarriage has a motor and gears which aid in movement of the equipment. The house contains an engine, oil and fuel cylinders. The house connects to the under carriage through a cylindrical casket enabling it to revolve freely at a 360 degrees angle. A boom attaches to a stick which is used to lift the bucket. Ancient excavators consisted of long counter

weights that were situated at the back of the machine to enhance digging and lifting. This was not suitable for areas with limited space.

**Table 3.3** Detail Excavator

Model	Operating Weight	Power	Travel Speeds	Max Lift Capacity	Grade Ability	Force
EX200LC	45,000 lb (20 400 kg)	132 HP (98 kW)	0-3.4 mph (0-5.5 kph)	20,900 lb (9 480 kg)	35' (70%)	38,100 lb (17 300 kg)

Source : <http://hitachiconstruction.com>

Scope of work for excavator is to do site clearance to begin construction of Vertical Anchor Block (AVB). Next cut slope and excavation base foundation, besides, excavator also do side work which include soil, sand, crusher run, 20mm aggregate, sand and stone lifting (AVB). Working side depending on working conditions.

## II. Backhoe



**Photo 3.2** Backhoe

The backhoe is one of the most commonly seen pieces of construction equipment because of its adaptability. The front-end loader, is also a smaller piece of equipment that has a broad bucket like the one on the front of the backhoe for hauling soil, debris, and materials, and lifting them up into trucks.

The backhoe's standard equipment is a narrow bucket on the rear end and a loader on the front. The operator effectively makes either device the working end by simply rotating his chair and operating a different set of controls. Typically, if the bucket is being used, the flat front end of the loader is set down on the ground to stabilize the vehicle. ( John,D (2006). Backhoe machinery )

Backhoe work side by excavator machinery, such as fill sand, aggregate 20mm, crusher run, and lift Vertical Anchor Block (AVB). Besides, the main work backhoe is leveling, carrying sand and aggregate 20mm and crusher run to the excavator.

### III. Truck



**Photo 3.3** Truck

Scope of work truck, carrying about waste materials from site clearance, carrying sand from the river close to the construction site. For this project, only two trucks only allocated for this project, but because they want to launch a job, the machinery sub-contractor has provided two more trucks additional and total of truck is four.

Capacity in the transport truck that brought uncertainty, as the weather factors that play a role in filling material on the truck, when it rains, the road used trucks will silt up, and causing the truck to be easy to get caught in the mud. So the work load depends on the weather. The time to transport the sand to site is 5 minutes.

IV. Roller Compactor 2 ton



**Photo 3.4** Roller Compactor 2 ton

Named roller compactor 2 ton because of its ability to compact the soil weighs 2 tons. For each 2 layers Anchor Vertical Block (AVB), the sand will be included and will be using a roller compactor to compact. Easy to handle and suitable for small work areas. All workers can handle this roller compactor.

## V. Pay loader



**Photo 3.5** 507 Pay loader

505 and 507 were developed after conducting market research. Based on the findings that small models with a bucket capacity of 0.6m<sup>3</sup> and 0.8m<sup>3</sup> were in a high demand. While other Pay loaders for the domestic market were developed with International Harvester based on a technical partnership, Komatsu developed these two models on its own with their original design.

Especially common in warehouses and other large storage facilities, pay loader serve the needs of various industries. Some allow the operator to sit while driving and operating the machine; others require the operator to stand. Some are powered by on-board batteries; others use different kinds of fuel. Regardless of the type, however, all forklifts and pay loader perform the same basic functions. Demand Media (1999-2014). ( Michle, J (2011). Function pay loader )

Scope of work for the pay loader is, carrying Anchor Vertical Block (AVB), Geo-grid, geotextile and from the storage site to the construction site. When new stock arrives, pay loader, carrying this material also from the trailer to the storage facility. Capabilities heavy lifting compared with forklift.

### 3.3.3 Working at site

a) The works that have been made while on site are

i) Site clearance



**Photo 3.6** Loading of waste on truck

The photo 3.6 shows the distribution of debris & unsuitable materials which consist of trees that have been cut using the excavator. This waste product will be transported using trucks, while the excavator only put this waste product on the truck. The filling of waste product on the truck takes only 4 to 7 minutes.





**Photo 3.7** Landfill

Upon of the completion of filling the waste products onto the truck, the truck will be heading to landfills, not far from the construction site, to complete the removal and disposal work. Photo 3.7 shows a truck that had arrived at the landfill and waste disposal activities are carried out. Distance between landfill and construction site about 600m and take between 6 to 8 minutes to reach there.

ii) Excavation



**Photo 3.8** Excavation work

Photo 3.8 shows the excavation work for the foundation base. Excavation work is done in stages, between 30m to 40m for each of excavation. The hole of 1m x 1m size will act as the foundation to cover the wall to be built. Each excavation is carried out in stages to avoid landslides, refer appendix C.

The time taken for excavator machinery to dig in is about 20 minutes for every 5m. It requires a worker to measure the level of depth that has been dug up, and to make sure the holes are dug 1m x 1m meet readings.



**Photo 3.9** Base 1m x 1m

Photo 3.9 shows the finished excavated of hole size 1m x 1m. The distance between the hole and the road is 5m.

iii) Leveling pad

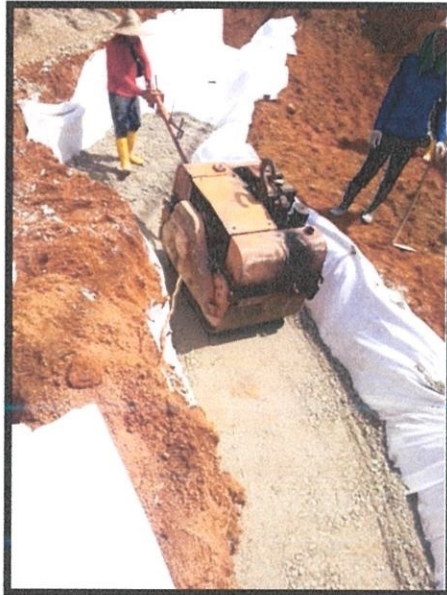


**Photo 3.10** Insertion of Geotextile into the base

By the completion excavation, Geotextile is placed in that hole to protect this soil from sliding in and to form a basis of  $\frac{3}{4}$  stone which will be inserted. The placed Geotextile was cut to 4.5m. To prevent the Geotextile from falling in the hole when the work of entering crusher run in the hole later, the small wood which has been cut is used. It takes about 15 minutes and three workers were needed to complete the work of inserting the Geotextile.



**Photo 3.11** Insert crusher run



**Photo 3.12** Compactor work

After laying down the Geotextile into the hole, crusher run was inserted using the Machinery Case. Crusher run shall not exceed 1m level. It took 20 minutes to enter the crusher run over 10m. (Photo 3.11)

When the crusher run is entered, a worker will measure the depth of crusher run which has inserted, after enough 1m level, crusher run will be compressed using the Compactor Machinery. The purpose of compaction of crusher run is to strengthen the bonds of this base. This is because the base of a foundation which will cover the load of the wall to be erected thereon. (Photo 3.12)

iv) Base cour



(a)



(b)

**Photo 3.13** Base for first layer

After the compaction completed, the remaining of Geotextile will be packed like photo 3.13 (a), the purpose of which was wrapped crusher run earlier in the compact is to strengthen the base of it, this is because the crusher run inside the package as being tied.

After that, the remainder of the crusher run just now is sprinkled on textile package to facilitate arrangement of anchor vertical block (AVB). For the first layer, the AVB in arrange in one layer only. AVB installation work for this layers takes about 15 minutes for 5m and requires a skilled worker to bring AVB and some skilled workers for helping him. A string is used to be as a guide to make arrangement of AVB straight



**Photo 3.14** Base for side

For base in the initial construction, corner vertical anchor block used to be head of the arrangement of in the future, and a hammer is used to correct the corner of AVB which is weighing to 45kg. This job requires a skilled and takes 10 minutes to complete the construction of the vertex angle, refer appendix A.





(a)

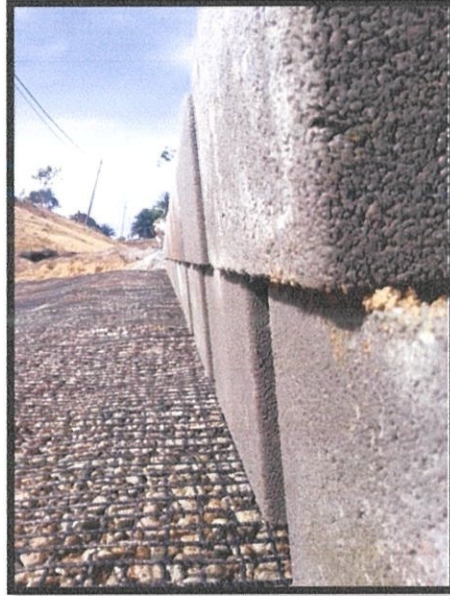


(b)

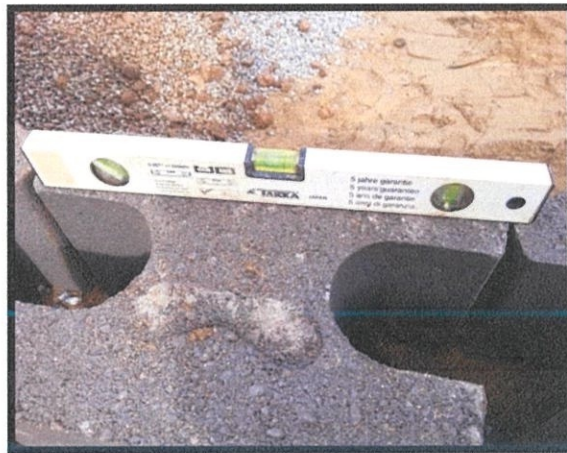
**Photo 3.15** Insert sand & Geotextile

After base of the vertical Anchor block (AVB) is installed, the sand is inserted in the wall, refer photo 3.15(a). And photo 3.15(b) show Geo-grid is suspended for a first layer. Geo-grid is cut to size of 3.5m. The sand is put by using backhoe machinery, and installation of Geo-grid is carried out by the workers of installation of AVB. Overall this work took about 20 minutes.

v) Continuity of the laying blocks



(a)



(b)

**Photo 3.16** Arrange anchor vertical block for 2 layer

For further installation it is requires two layers of anchor vertical block (AVB). Photo 3.16(a) shows the angle of AVB conditions that have been compiled, and the arrangement of this work requires 3 workers.

To ensure AVB is compiled correctly, the spirit level is used by the workers. This tool can measure the stability AVB correctly by make sure the water point is located in the center of the tool. This tool only used by the expert, refer to Photo 3.16(b).



**Photo 3.17** Insert geotextile

Geotextile is placed on the anchor vertical block (AVB), as shown in photo 3.17. The Geotextile is cut into 800mm wide. By not using the machine, only a worker needs to put this Geotextile. This job takes about 5 minutes for 30m.



(a)



(b)

**Photo 3.18** Insert sand & compact

After Geotextile is placed, the sand is inserted as shown photo 3.18(a), the sand is obtained at near the river, estimated 800m from the construction site, a trucks is used

to deliver the sand, while the excavator was used to carry the sand to the level of construction. When the wall gets higher, the excavator no longer be used to lift the sand, but the Case is used to lifting and leveling the sand. This job takes about 20 minutes to 40m.

After inserted sand meets the level of the two pieces of anchor vertical block (AVB), compactor machines is used to compress the sand. When sand or soil compacted, the strength of the wall being built is safe for other users. Photo 3.18(b) show the completed sand after compacter. A total of 4 workers is required to do this work. This work takes between 20 to 30 minutes.



**Photo 3.19** Insert aggregate 20mm

After sand compacted, aggregate 20mm is put on Geotextile which was suspended earlier, the purpose of 20mm aggregate is placed and packed with Geotextile is used as channels for water to flow from the top to the ground level. 20mm aggregate Geotextile is used as wrapper to prevent the occurrence of dirt wall.

For further installation work it is also use the same way, only the bottom base is arranged in one layer. The construction work in the area will be stopped if it has reached the desired height.

vi) Capping a wall

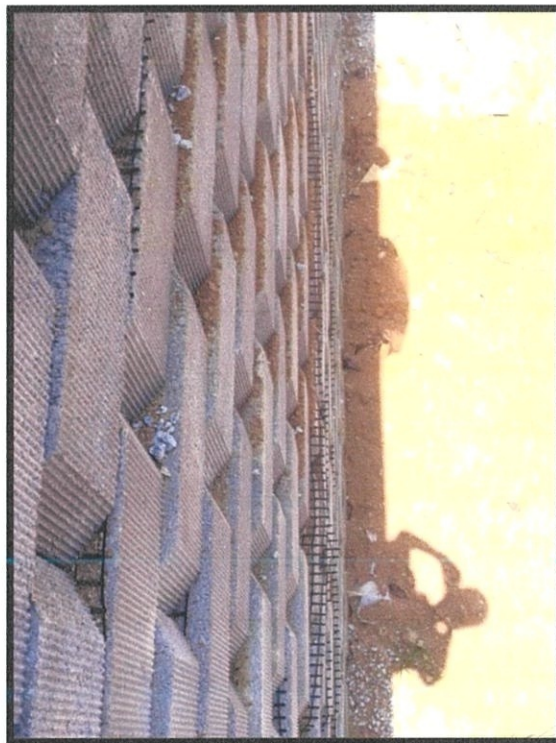


**Photo 3.20** Capping top wall

Photo 3.20 show the last step for installation of the anchor vertical block (AVB) is to install a cap on the construction block. When the cap is installed, it indicates that the installation of AVB is reach to the end.

Only 5 employees are required to do this work. The capping the wall work is different with installation of AVB, because installation of cap requires mixing cement to seal the cap with the other cap. The work only takes 30 minutes for 30m.

vii) Site cleaning and restoration



**Photo 3.21** Cleaning side wall

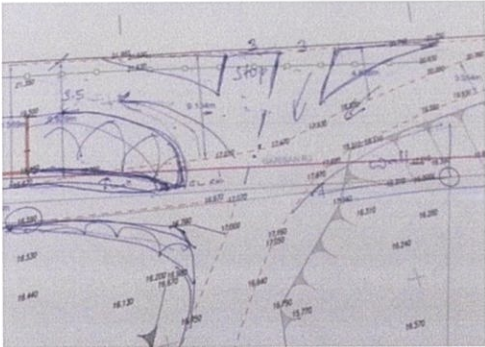
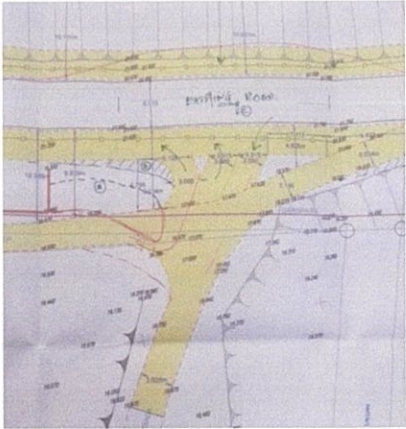
After all installation work has been completed, the cleaning of the area where the work is done is cleaned by cutting the excess of Geo-grid installed. If not removed, it can be unsightly and show that the work is done improperly. It is important to maintain a good relationship with the residents of this village because all the works is done openly. The cleaning process will be done by all the installation workers of AVB. It takes 1 day to complete all the cleaning process for some areas.



### 3.3.4 Problem and solution

Surely every living being will certainly die, and every creature will not run away from commit mistakes, and as long as we complacent from avoid the occurrence of the problem, the problem will still be there. In doing construction work, the problem is common and inevitable, therefore, the solutions is the thing that may distinguish between people who are operating a project.

**Table 3.4** Problem and solution at site

No	Problem	Solution
1	Underground pipe leak in the construction area, the stronger the force of the load trucks and machinery from the ground, has caused the pipe is easy to leak.	To avoid continuous leaks, plumbing maintenance work done and new pipes repaired planted deeper than the depth of the original, because the underground pipes at the construction site often leak,
2	Exit at junction 275 CH dangerous toroad users to cross the road, 	The JKR has proposed how junction exit CH 275 must be re-designed, Project manager has the padding modify the original plan, as required by JKR. According to Tajali(2014) 

3	Problem payments from sub-contractor to the main contractor, which has led to the sub-contractor to stop work, while receiving payment.	Therefore, a solution was determined through discussion, suggested that foundation excavation is reduced, from four (AVB) is embedded now reduced to only two. With regard to strength, the soil was used to prevent the block from falling down.
4	Problem payments from sub-contractor to the main contractor, which has led to the sub-contractor to stop work, while receiving payment.	Project managers have had several discussions with the sub-contractor in respect of the fees demanded, through the explanation given to both parties, the payment will be paid within a week, construction work temporarily unavailable,

Source : Interview Project Manager Mr Tajali (2014)

## 4.0 CONCLUSION AND RECOMMENDATION

### 4.1 CONCLUSION

From this study, it can be concluded that the anchor vertical block (AVB) for slope protection is appropriate to provide good support for this slope protection. The objectives shown in chapter 1, the authors found that all three objectives must be carefully investigated and have been largely achieved.

It only involves a few skilled workers to do the installation AVB and some unskilled workers to helping skilled workers. The work starts with building safety statistics to facilitate employees to do the work that has been given by the boss. This is to ensure the security and safety of workers can reduce exposure to hazards volume.

AVB Construction is a process that is very quick and easy, but still needs to be done correctly to avoid any mistake. The authors found that this method is very suitable for slope protection for this area, this is because the installation of a relatively limited area and type of land suitable for use AVB. AVB installation requires the assistance of machinery, most of the work will involve machinery. Therefore, all machinery used shall have the scope of his own, so I was researching related to machinery.

Installation, selection of materials used for a project that is very important, this is because it would involve the quality of the construction. each material used has a distinctive character for the support contractor to choose the materials. due to the selection of materials is very important, I took the option to describe the materials used in installation.

For the Industrial Training program organized by the Universiti Teknologi Mara Perak (UiTM) is very good and it helpful student to know the real situation in construction industry. This program should be continued because it useful for help the student. This program should continue because it helps students to better understand the course

taken and give students new knowledge where it can add to the knowledge of students other than those learned in college.

Another than that student also more exposed to real work at course that has taken. The experience that gets in construction sites can help the student know much what they learn compared to what they have learned in the classroom. On the site, we will be more clearly understood and can learn directly on construction site. With the industrial training students will be better understood the situation they will face before they enter the work environment.

Lastly the industrial training also helps the student solve the work problem and make the student confident their self to make some decision to solve their own problem. This program should be continuing because it helps students adapt with construction industry work. At the same time, it give useful experience and useful when student work.

#### **4.1 RECOMMENDATION**

During the construction industry in Malaysia, will continue to grow because there are many potential areas for development and has yet to be explored. Anchor vertical block (AVB) use in industry is very useful for slope protection and the many advantages that can be described, which saves cost, space-saving, does not require many workers, stand strong, and quick construction. For areas that do not have ready a lot of space, use of AVB is the right choice to solve the problem of the narrow space.

To work on a installation site, all employees must prioritize safety during the installation of AVB doing. Comply and wear safety set, it seeks to avoid unwanted accidents happen. Familiarity does not put the safety of workers who have been prescribed. In addition, put signs employed by the wayside, so that road users do not feel the danger and can avoid traffic jams. surely it is better to prevent than cure.

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Mr Lie Eong Kwang, sub contractor at Berjaya bina sdn. bhd

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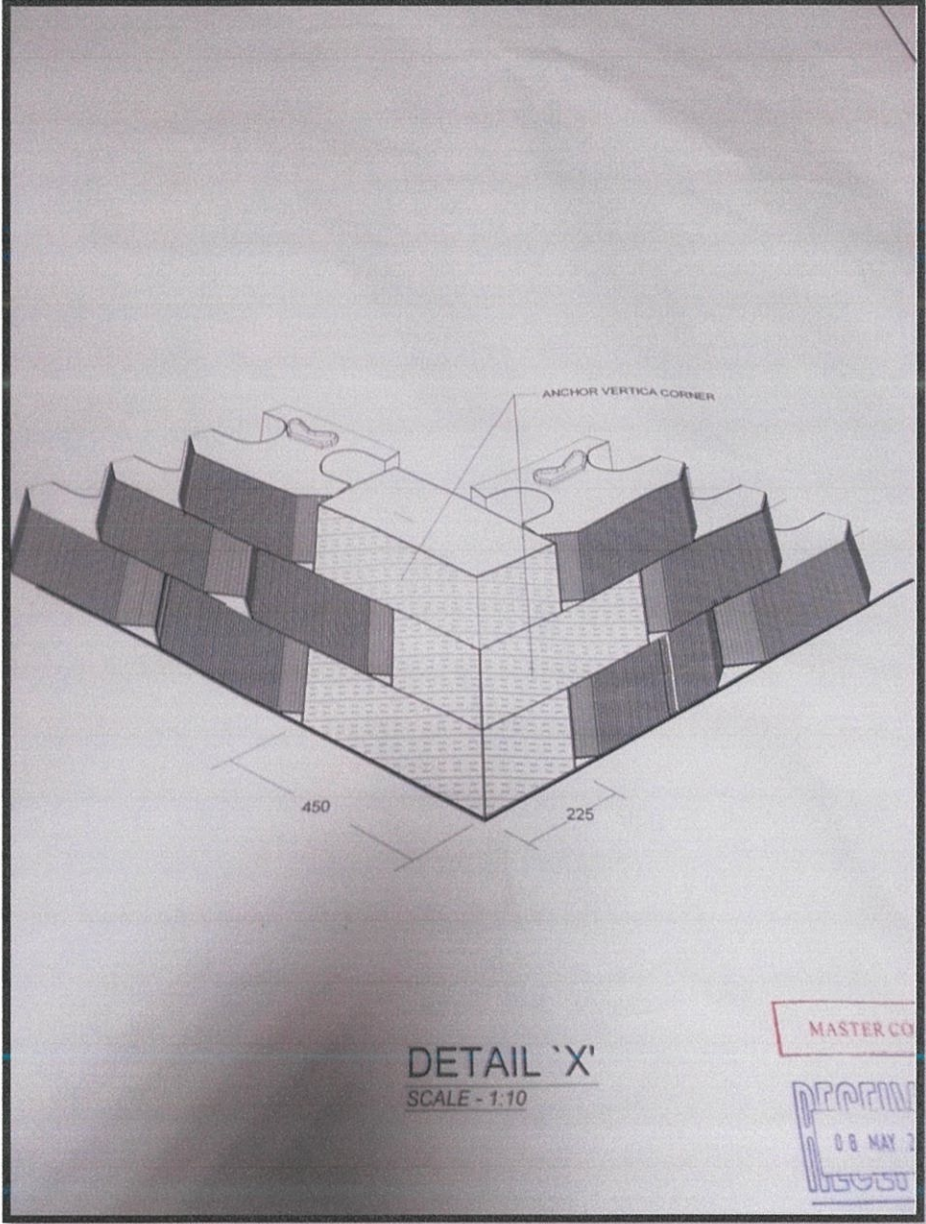
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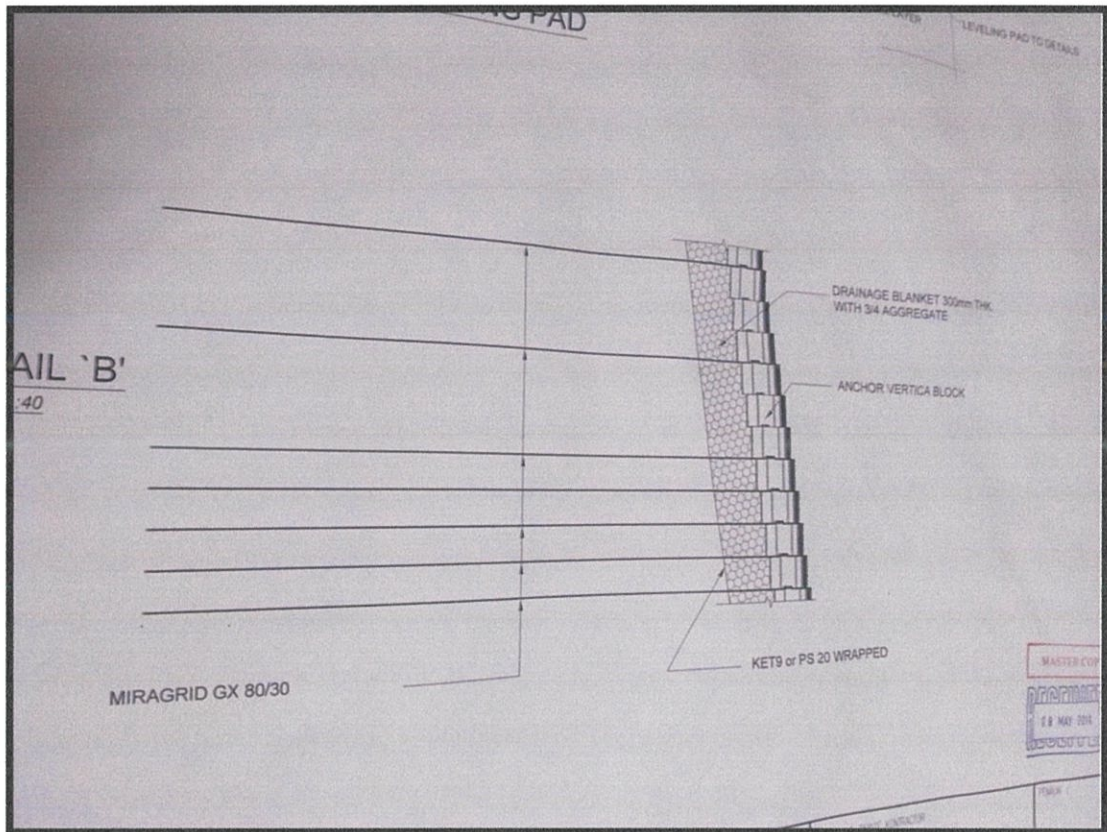
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APPENDIX A Detail X

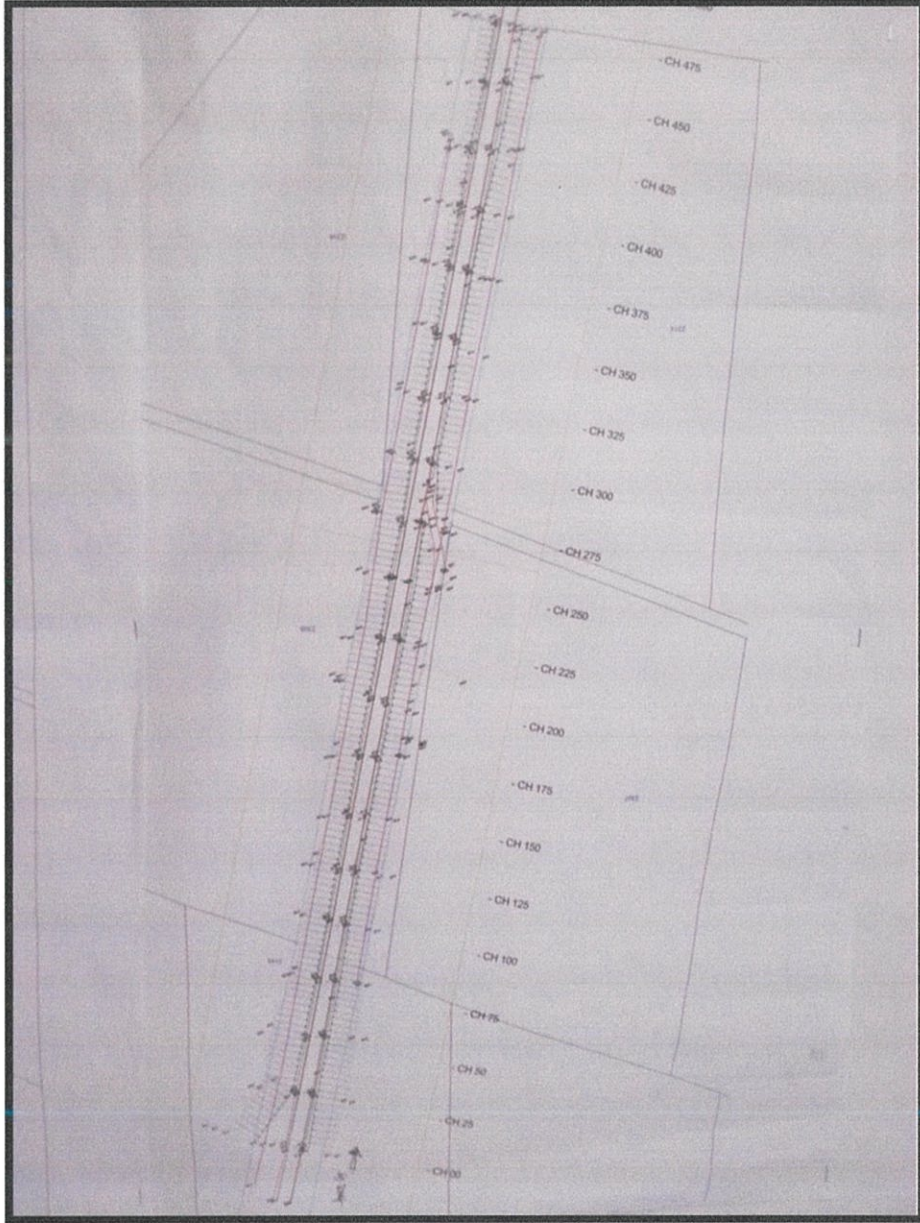


APPENDIX B Detail B

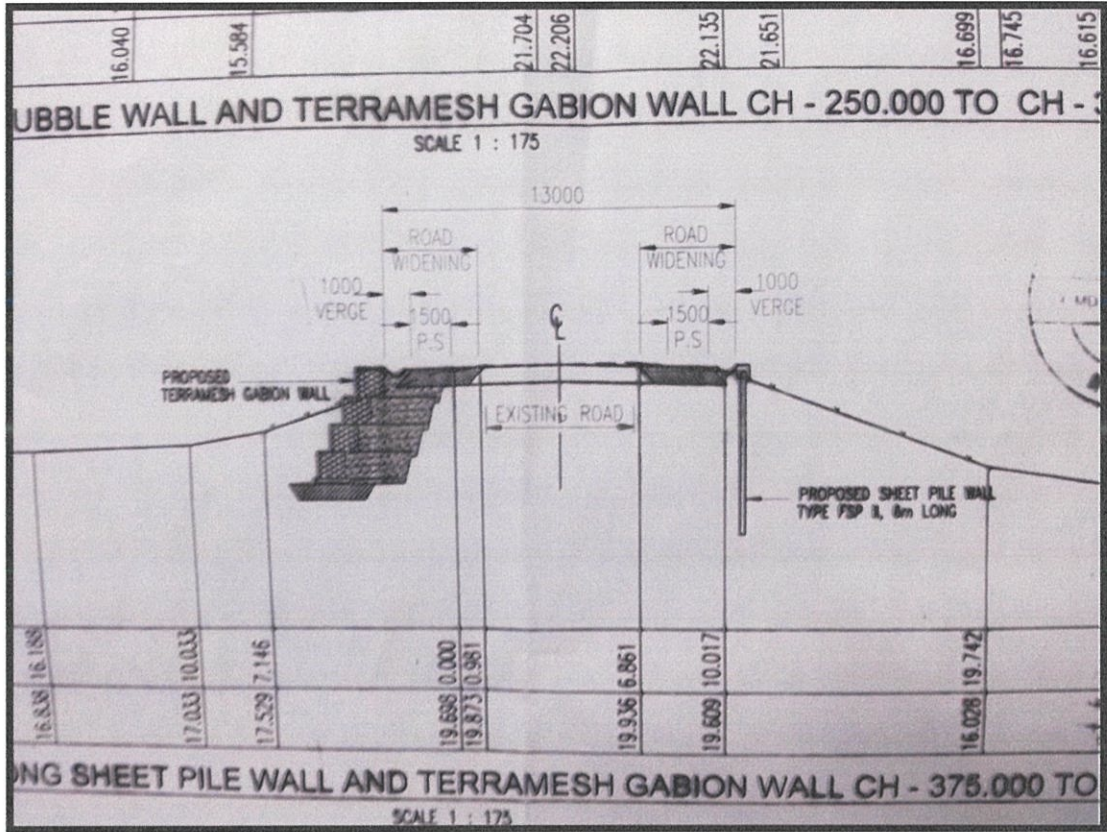





### APPENDIX C Plan layout



APPENDIX D Cross section X-X



APPENDIX E License PKK

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<b>NAMA DAN ALAMAT BERDAFTAR</b> JATI KENALI TRADING SDN. BHD 129, KAMPUNG TOK JERING 21060 KUALA TERENGGANU		
<b>PEGAWAI SYARIKAT YANG DETAULIAHKAN</b> AZAIZ BIN ABDULLAH RUHANU BINTI ABDULLAH *****	<b>NO. K/P</b> *****	<b>JAWATAN</b> PENGARAH URUSAN PENGARAH *****

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<b>GRAD</b>	<b>KATEGORI</b>
G7	B (Pembinaan Bangunan)
G7	CE (Pembinaan Kejuruteraan Awam)

<b>PEGAWAI SYARIKAT YANG DITAUHIAHKAN</b>	<b>NO. K/P</b>	<b>Jenisan</b>
AZAZ BIN ABDULLAH ROHANI BINTI ABDULLAH		PENGARAH URUSAN PENGARAH

[ AHMAD FARRIN BIN MOKHTAR ]  
b.p. Ketua Eksekutif  
bertarikh: 24 SEP 2012



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	016190 A
<b>PERAKUAN PENDAFTARAN</b>	
Adalah dengan ini diperakui bahawa kontraktor yang dinyatakan di bawah ini telah berdaftar dengan Lembaga mengikut Bahagian VI Akta Lembaga Pembangunan Industri Pembinaan Malaysia 1994. Pendaftaran ini adalah tertakluk kepada syarat-syarat yang telah ditetapkan di belakang Perakuan ini	
No Pendaftaran:	
Nama Kontraktor:	JATI KEMALI TRADING SDN. BHD.
Alamat Berdaftar:	129, KAMPUNG TOK JERING 21060 KUALA TERENGGANU TERENGGANU
Grade, kategori dan penghujusan berdaftar	
G7 B	B04
G7 CE	CE21
Tarikh Mulai Berkuatkuasa:	03 SEP 2012
Tarikh Habis Tempoh Perakuan:	02 SEP 2014*
*Perakuan ini hendaklah diperbaharu sekurang-kurangnya 60 hari sebelum tarikh habis tempoh	
STATUS : <b>AKTIF</b> - Kontraktor yang diawarkan projek semasa perakuan pendaftaran ini dikeluarkan.	
( AJIBAD FARRIN BIN MOHTAR ) S.p. Ketua Eksekutif Berakhir: 24 SEP 2012	
	