DEPARTMENT OF BUILDING SURVEYING
FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING
UNIVERSITI TEKNOLOGI MARA
PERAK

TITLE:
INSTALLATION OF RETAINING WALL AT 3 STOREY HOUSE AT TANJUNG BUNGAH

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2010739445
DIPLOMA IN BUILDING SURVEYING

PRACTICAL TRAINING REPORT
JUN 2013 – SEPTEMBER 2013

ABSTRACT

This report will describes about the installation of retaining wall at Tanjung Bungah, Penang. all the procedure and equipment, and any related method must be apply on that site. Other than that there are few types of retaining wall which have different used. Retaining wall is a part of structure at this site because the soil condition that nearby the hill is so dangerous if they do not use this structure. We as a client and developer need to supervise on that site to avoid failure or bad thing. This report will let us know how to install the retaining wall and types of retaining wall. Our company have to archive the following goals :

1. Public Participation
2. Project design and management
3. Project financing
4. Project entitlement

If there any fails from the above, the project will got a big problem. Our company need to be hardworking and work in teamwork to give cooperate while handle each job. Result from this method of installation, we can learn many about the strength of retaining wall, the depth of base retaining wall, rock blasting method that apply on our site. Other than that, we can learn about the strategy to solve the problem at site. Lastly, I found the problem at site and give my opinion to solve this problem.

TABLE OF CONTENT

CHAPTER 1

INTRODUCTION

1.1 COMPANY BACKGROUND

Oriental Interest Berhad ("OIB" or "the Company") was incorporated in Malaysia on 3 August 1993 under the Companies Act, 1965 as a private limited company under the name of Oriental Interest Sdn. Bhd. The Company was converted to a public limited company on 22 December 1993 and adopted its present name. The principal activities of the Company are investment holding and provision of management services.

Over the past 26 years, OIB Group has completed numerous construction and property development projects totaling over RM1.715 billion in value and has established itself as a leading housing developer, having completed approximately 21,419 units of houses since 1985.

OIB Group has gained the confidence of house buyers and is well-known as a reliable housing developer due to its good reputation in consistently delivering houses ahead of development schedule.

The Company is an investment holding company for the OIB Group. The OIB Group, which comprises of OIB, 8 subsidiary companies and 12 sub-subsidiary companies, is actively involved in the businesses of commercial and residential property development, general construction and the manufacture of rubber wood products.

(Sources： www.oibgroup.com)

1.2 COMPANY INFORMATION

Company name	:	oriental interest berhad
Registered address:		2nd Floor, Wisma OIB, No 1 & 2, Jalan Bank 08000 Sungai Petani, Kedah Darul Aman
Telephone number	:	04-4213352
Fax	:	04-4233352
Company registered no:		272144-M
Email address	:	oibgroup.gmail.com
Website	:	www.oibgroup.com

1.3 MISSION AND VISSION

1.3.1 Vision

We envision OIBgroup to be a leading developer of world-class residences in the north region in malaysian, uplifting malays lifestyles into one that is convenient, upscale yet affordable, and environment friendly.

1.3.2 Mission

- Ensuring that its homebuyers enjoy the best value for their investment with an upscale lifestyle, generous amenities, and a safe, secure, and friendly neighborhood.
- Providing an excellent after-sales and maintenance service that will preserve and enhance the long-term value of its residences.
- Delivering sustainable long-term growth and increasing shareholder value by exercising prudence in resource management based on the principles of good corporate governance.
- Becoming an employer of choice, offering comprehensive opportunities for career growth and enhancement.
- Assisting and nurturing the communities in which it operates by progressively building on its role as a responsible corporate citizen.

(Sources: www.oibgroup.com)

1.4 SUBSIDIARY COMPANY

Figure 1.0 show the subsidiary company of OIB groups

(Sources: www.oibgroup.com)

1.5 CURRENT PROJECT 2013

No	Project description	Client/owner
1	Project 2 storey housing(18 units) and 2 storey housing semi D(2units) at taman rhu kulim kedah	Oib groups
2	Project Low cost housing(30 units) and 2storey housing semi D (22 units) at taman air merah kulim kedah	Oib groups
3	Project semi D housing (60 unit) at taman angsana 2 kulim kedah	Oib groups
4	Air merah school at kulim kedah	Ministry of education
5	Project shop houses(22 units) at taman selasih kulim kedah	Oib groups
6	2 storey houses (43 units) at padang serai 2 kulim kedah	Oib groups
7	3 storey bungalow semi D (26units) and 3storey single house(1 unit) at taman permai tanjung bungah penang	Oib groups

Table 1.0 shows the current project 2013

1.6 SCOPE OF WORK

Project Design and Management

Development entity will be responsible for development of a specific, detailed timeline identifying all design and development components through project completion; development of concept board drawings for developer improvements including materials, color board, building elevations, preliminary landscape plans, a traffic and circulation plan, and a rendered perspective; and management of the architectural and construction contracts. In the event of an RFP phase, selected developers will be required to submit a draft timeline and concept renderings as applicable.

1.6.1 Project Financing

The developer will be expected to secure financing for the project's hard-cost and soft-cost categories including, but not limited to, possible land acquisition, deconstruction of existing improvements, soils testing, design, site planning, entitlements, permits, site clearance, grading, and construction of both off-site and on-site improvements, and etc. selected developers will be required to submit a comprehensive project analysis and pro-forma, assuming a property acquisition cost based on lot square footage and market rate pricing (or developer may order a property appraisal). Project analysis and pro-forma must provide all assumptions and be submitted as an excel file with active formulas.

1.6.2 Project Entitlements

The developer will be responsible for securing entitlements for the development of the Site. These entitlements include, but are not limited to project-level environmental review, site plan review, completion of building plan check process, acquisition of all required permits, and payment of all applicable fees.

1.6.3 Public Participation

The developer will be required to conduct community outreach as a part of the process to ensure the best possible development is achieved. The community generally plays an active role in local decision-making, thus outreach is expected to potentially include public and/or community meetings, coordination with the Chamber of Commerce, and distribution of information. Exact scope of outreach will be mutually agreed to by the City and the developer.

1.6.4 Site Clearance.

The developer will be responsible for the deconstruction of existing improvements on the Site as applicable.

1.7 ORGANISATIONAL CHART

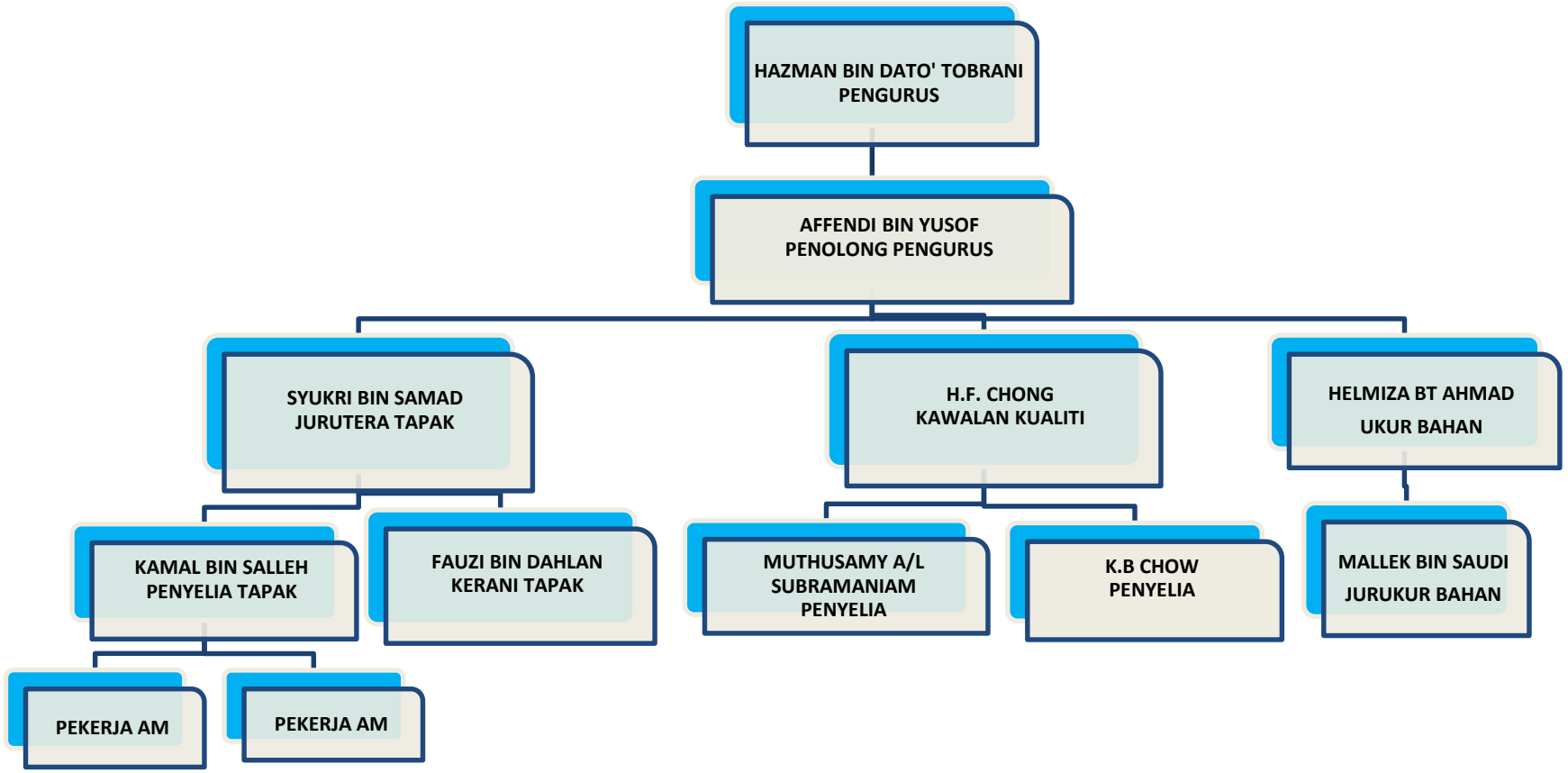


Chart 1.0 show the organizational chart of OIB groups

1.8 ROLES OF DUTIES

1.8.1 Manager

A manager's prime responsibility is to the success of the company. His actions should all be poised toward business growth. Companies hire managers to run daily operations, coach employees, maintain quality control and ensure that its products and services are fulfilling customer needs. Managers must constantly review the company's financial, budgetary and production goals. If the company is falling short of its goals, it is up to the manager to make the necessary adjustments to get back on track. A manager's duty is to lead the organization to success.

1.8.2 Assistant manager

Assistant Construction Managers work closely with Construction Managers throughout productions, from the planning process through to the end of shoots. Their key responsibility is to monitor the construction of sets and stages, in order to ensure that they are built to the standards of safety and quality demanded by Production Designers, and that they are completed on schedule and within budget. Assistant Construction Managers contribute to the development of construction schedules, and provide cost estimates for the work required.

1.8.3 Site engineer

Site engineers perform a technical, organizational and supervisory role on construction projects, setting out and determining the location for above and underground infrastructural installations involved in construction operations. Site engineers apply designs and plans to mark out the site and can be involved in projects ranging from small scale to multi-million pound ventures. This may include civil, road, rail and other infrastructure projects. A site engineer works as part of the site management team liaising with and working alongside architects, engineers, construction managers, supervisors, planners, surveyors and subcontractors.

1.8.4 Quality control

Quality control need to Provide written daily QC reports that reinforce activities that are being constructed in conformance with each specific project's established standard and constructively confronts non-conformances to produce the desired outcome in a timely manner. Conduct preparatory, initial and follow up meetings to establish an understanding of the standards of care desired for each definable feature of work. Verify that checklists are being used and signed off prior to the placement of concrete, steel and other similar items of work. Verify and document that all materials received for the project are in conformance with the approved submittal, are handled and stored appropriately and are acceptable for use in the project.

1.8.5 Quantity survey

The preparation of Bills and Schedules of Quantities of materials, labour and services required in the construction and equipment of building, or engineering works. Preparation of specifications when required so to do, Undertaking costs analysis for repair and maintenance project work. Preparing and analyzing costing for tenders. Advising on procurement strategy, Identifying, analyzing and developing responses to commercial risks. Allocating work to subcontractors.

CHAPTER 2:

LITERATURE REVIEW

(THE INSTALLATION OF RETAINING WALL)

2.1 INTRODUCTION

Retaining walls are structures designed to restrain soil to unnatural slopes. They are used to bound soils between two different elevations often in areas of terrain possessing undesirable slopes or in areas where the landscape needs to be shaped severely and engineered for more specific purposes like hillside farming or roadway overpasses. It is an important thing to prevent building that build on the high level from collapse.

2.2 DEFINITION

A retaining wall is a structure designed and constructed to resist the lateral pressure of soil when there is a desired change in ground elevation that exceeds the angle of repose of the soil. A basement wall is thus one kind of retaining wall. But the term usually refers to a cantilever retaining wall, which is a freestanding structure without lateral support at its top. These are cantilevered from a footing and rise above the grade on one side to retain a higher level grade on the opposite side. The walls must resist the lateral pressures generated by loose soils or, in some cases, water pressures.

Every retaining wall supports a “wedge” of soil. The wedge is defined as the soil which extends beyond the failure plane of the soil type present at the wall site, and can be calculated once the soil friction angle is known. As the setback of the wall increases, the size of the sliding wedge is reduced. This reduction lowers the pressure on the retaining wall.

The most important consideration in proper design and installation of retaining walls is to recognize and counteract the tendency of the retained material to move down slope due to gravity. This creates lateral earth pressure behind the wall which depends on the angle of internal friction and the cohesive strength of the retained material, as well as the direction and magnitude of movement the retaining structure undergoes.

Earth pressures will push the wall forward or overturn it if not properly addressed. Also, any groundwater behind the wall that is not dissipated by a drainage system causes hydrostatic pressure on the wall. The total pressure or thrust may be assumed to act at one-third from the lowest depth for lengthwise stretches of uniform height.

Unless the wall is designed to retain water, It is important to have proper drainage behind the wall in order to limit the pressure to the wall's design value. Drainage materials will reduce or eliminate the hydrostatic pressure and improve the stability of the material behind the wall. Dry stone retaining walls are normally self-draining.

2.3 THE USED OF RETAINING WALL

a) To prevent from collapse.
b) to keep soil, rocks, and water in place
c) to keep the landscape and dirt from sliding down the embankment causing less structural issues with homes due to flooding and mudslides from overexposed dirt in front homes.
d) to keep dirt in its proper place so it doesn't become washed away from rain
e) keep the upper area from crumbling down onto the lower lying area in the park

2.4 TYPES OF RETAINING WALL

There are different types of retaining wall and each type have their own uses to hold the soil from collapse. The chosen of retaining wall is very important to be adapted with the condition and suitability of soil. There are several type of retaining wall:

2.4.1 Sheet piling

Sheet pile retaining walls are usually used in soft soils and tight spaces. Sheet pile walls are made out of steel, vinyl or wood planks which are driven into the ground. For a quick estimate the material is usually driven 1/3 above ground, 2/3 below ground, but this may be altered depending on the environment. Taller sheet pile walls will need a tie-back anchor, or "dead-man" placed in the soil a distance behind the face of the wall, that is tied to the wall, usually by a cable or a rod. Anchors are then placed behind the potential failure plane in the soil.

Figure 2.1 show the excavation of base retaining wall

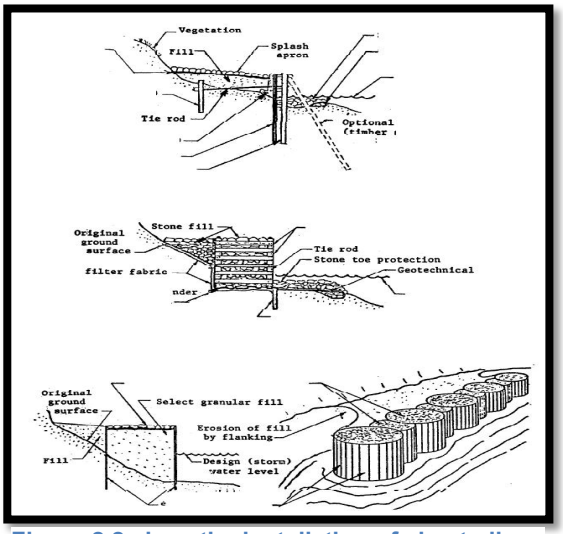


Figure 2.2 show the installation of sheet pile

2.4.2 Cantilever

Cantilevered retaining walls are made from an internal stem of steel-reinforced, cast-in-place concrete or mortared masonry (often in the shape of an inverted T). These walls cantilever loads (like a beam) to a large, structural footing, converting horizontal pressures from behind the wall to vertical pressures on the ground below. Sometimes cantilevered walls are buttressed on the front, or include a counter fort on the back, to improve their strength resisting high loads. Buttresses are short wing walls at right angles to the main trend of the wall. These walls require rigid concrete footings below seasonal frost depth. This type of wall uses much less material than a traditional gravity wall.

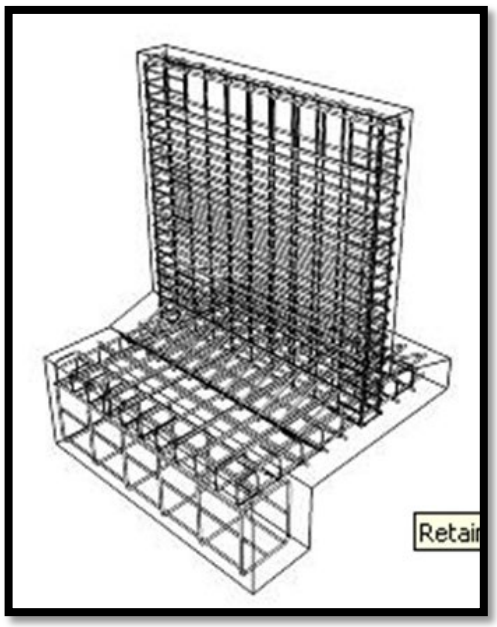


Figure 2.3 show the shape of cantilever retaining wall

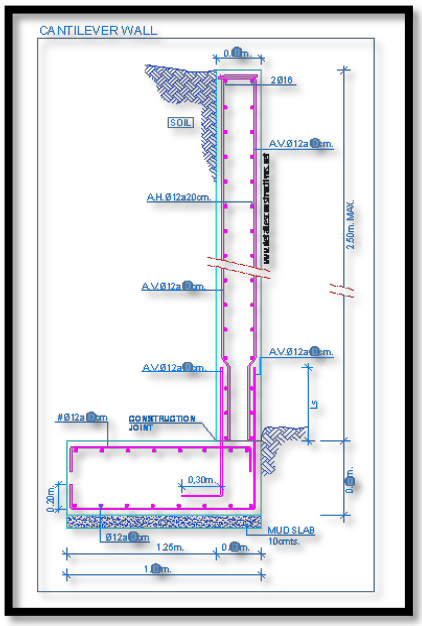


Figure 2.4 show the diagram of cantilever type

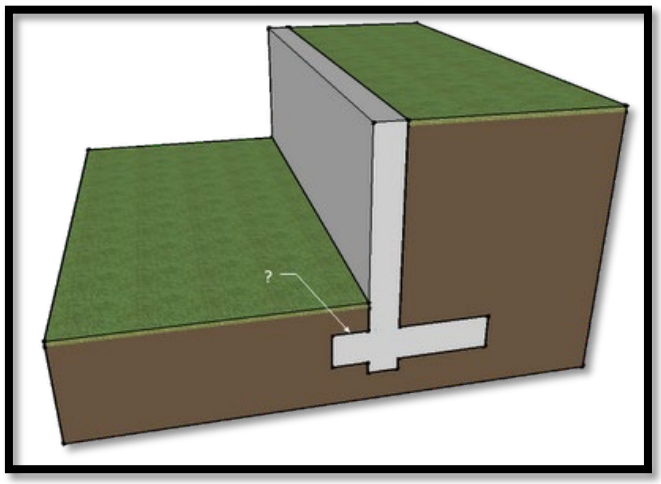


Figure 2.5 shows the back filling on that retaining wall

2.4.3 Gravity

Gravity walls depend on their mass (stone, concrete or other heavy material) to resist pressure from behind and may have a 'batter' setback to improve stability by leaning back toward the retained soil. For short landscaping walls, they are often made from mortar less stone or segmental concrete units (masonry units). Dry-stacked gravity walls are somewhat flexible and do not require a rigid footing in frost areas. Home owners who build larger gravity walls that do require a rigid concrete footing can make use of the services of a professional excavator, which will make digging a trench for the base of the gravity wall much easier. Earlier in the 20th century, taller retaining walls were often gravity walls made from large masses of concrete or stone. Today, taller retaining walls are increasingly built as composite gravity walls such as: geosynthetics such as Geoweb cellular confinement earth retention or with precast facing; gabions (stacked steel wire baskets filled with rocks); crib walls (cells built up log cabin style from precast concrete or timber and filled with soil); or soil-nailed walls (soil reinforced in place with steel and concrete rods)

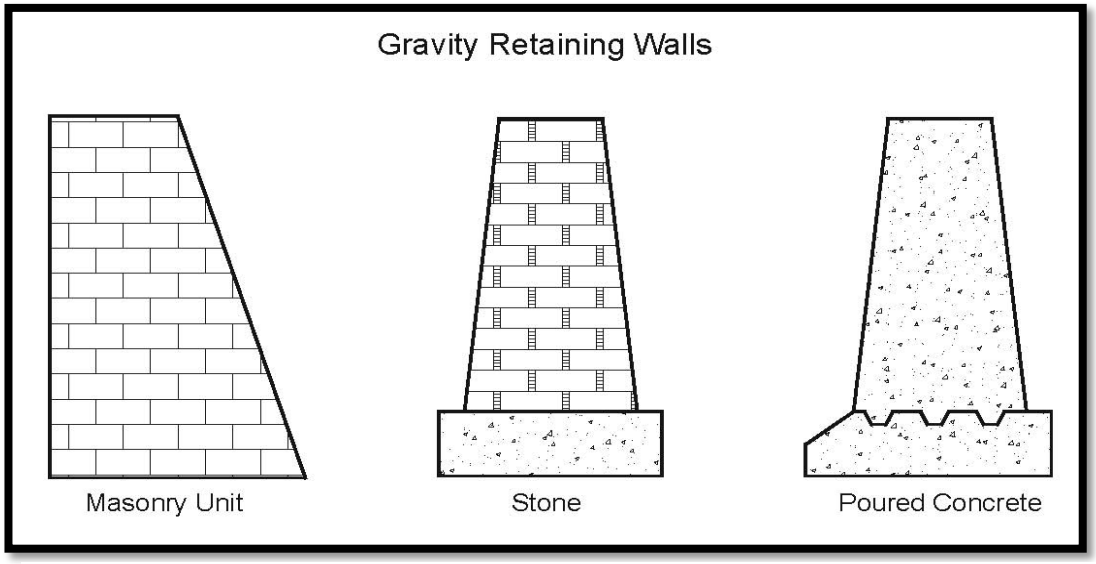


Figure 2.6 show the shape of gravity retaining wall

Figure 2.7 show the face of retaining wall

Figure 2.8 show the type of gravity retaining wall

2.4.4 Anchored

An anchored retaining wall can be constructed in any of the aforementioned styles but also includes additional strength using cables or other stays anchored in the rock or soil behind it. Usually driven into the material with boring, anchors are then expanded at the end of the cable, either by mechanical means or often by injecting pressurized concrete, which expands to form a bulb in the soil. Technically complex, this method is very useful where high loads are expected, or where the wall itself has to be slender and would otherwise be too weak.

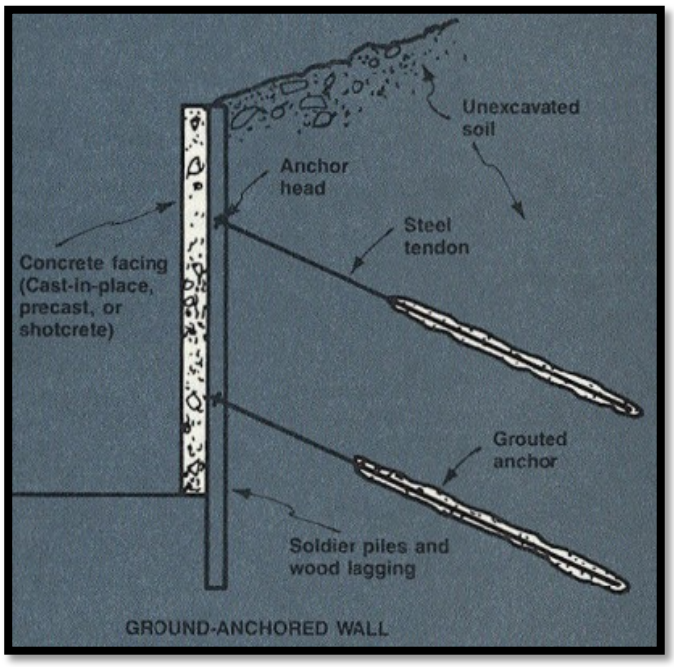


Figure 2.9 show the anchor wall type

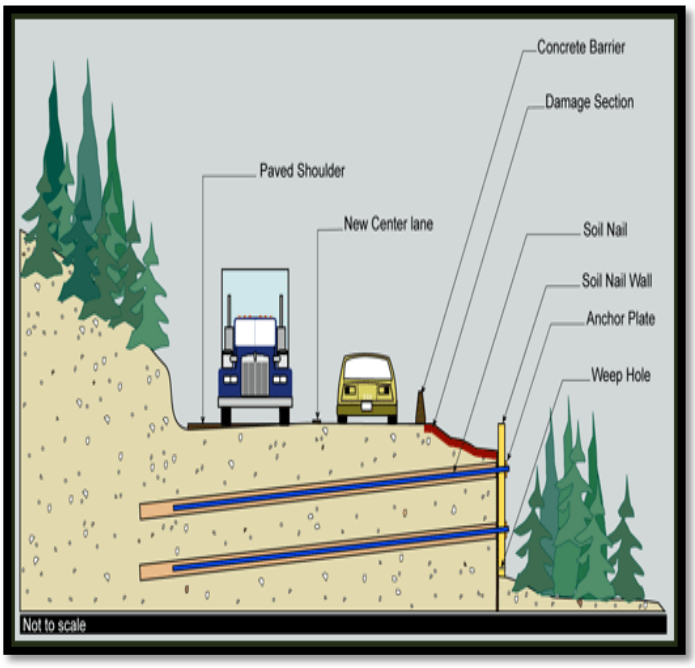


Figure 2.10 show the elevation of anchor wall

CHAPTER 3:

CASE STUDY

(THE INSTALLATION OF RETAINING WALL)

3.1 INTRODUCTION

Retaining wall is the most important thing before the building will construct at project 26 units bungalow 3 storey at Tanjung Bungah. There are many type of retaining wall in construction such as gravity, sheet piling, cantilever, and anchored. Retaining wall will choose depend on soil condition. In project 26 units bungalow 3 storey at Tanjung Bungah, project team has made a decision to use cantilever type. It is because the condition of soil such as sloop and different level of house that planned on site.

Other than that, this type of retaining wall will used as water pond and sewage plant. This type is commonly use in construction because it strength to hold the soil from collapse.

3.2 LOCATION OF CASE STUDY PROJECT

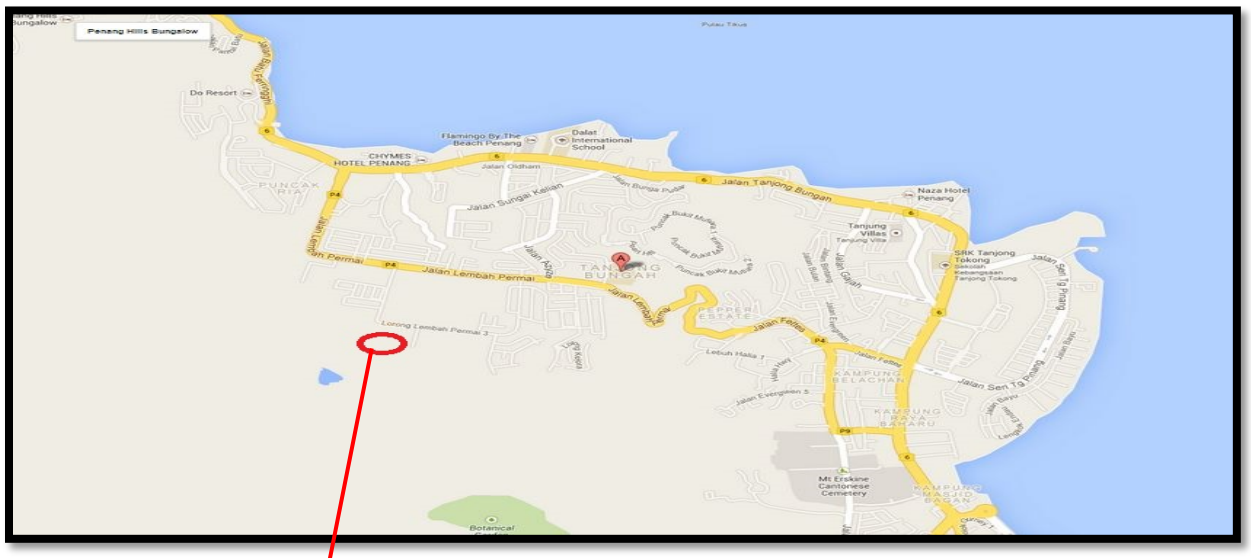


Figure 3.1 show the key plan

Figure 3.2 show the location plan

3.3 THE CONSTRUCTION SITE PLAN

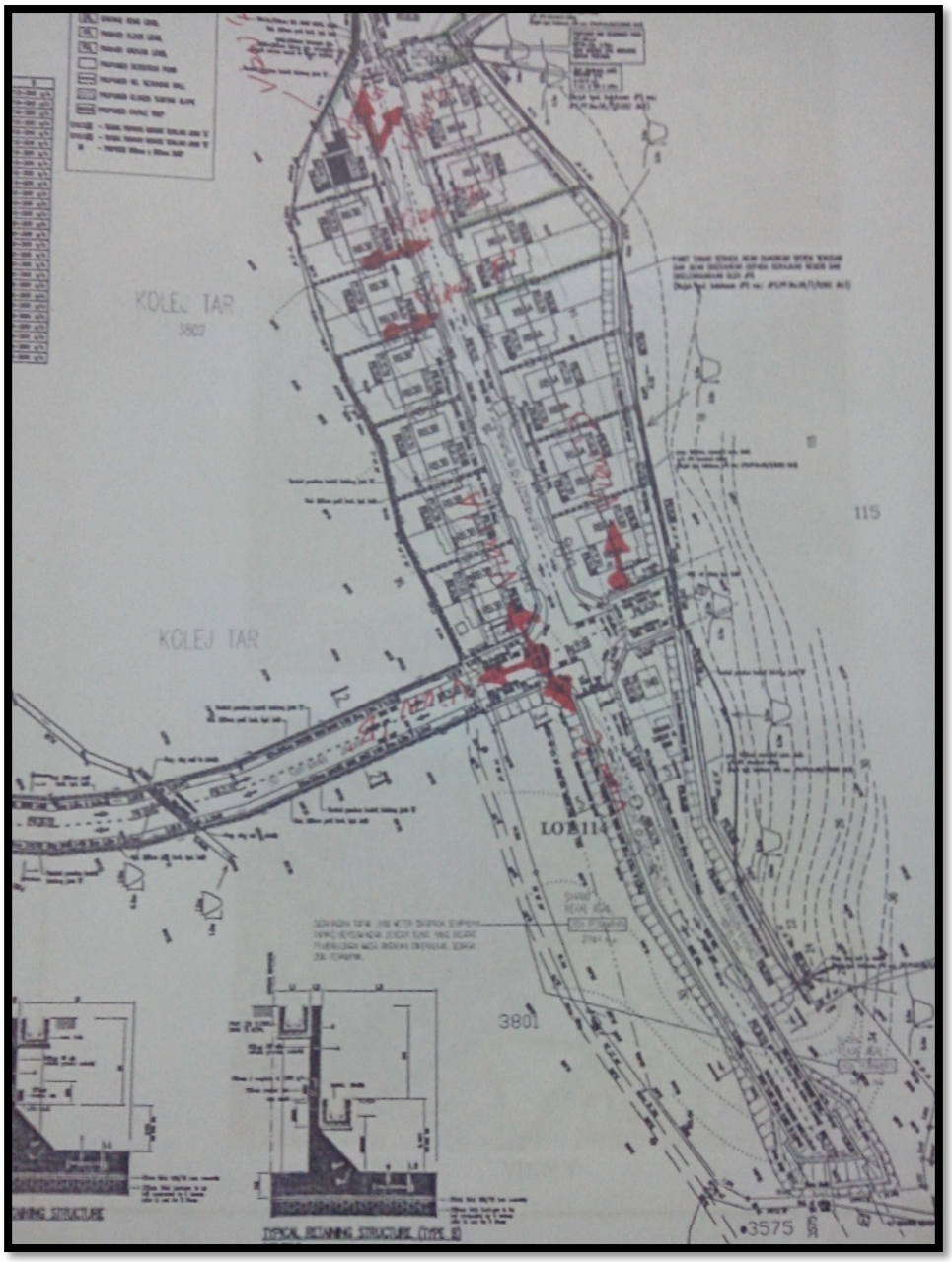


Figure 3.3 show the drawing plan

3.4 TYPE OF RETAINING WALL USED

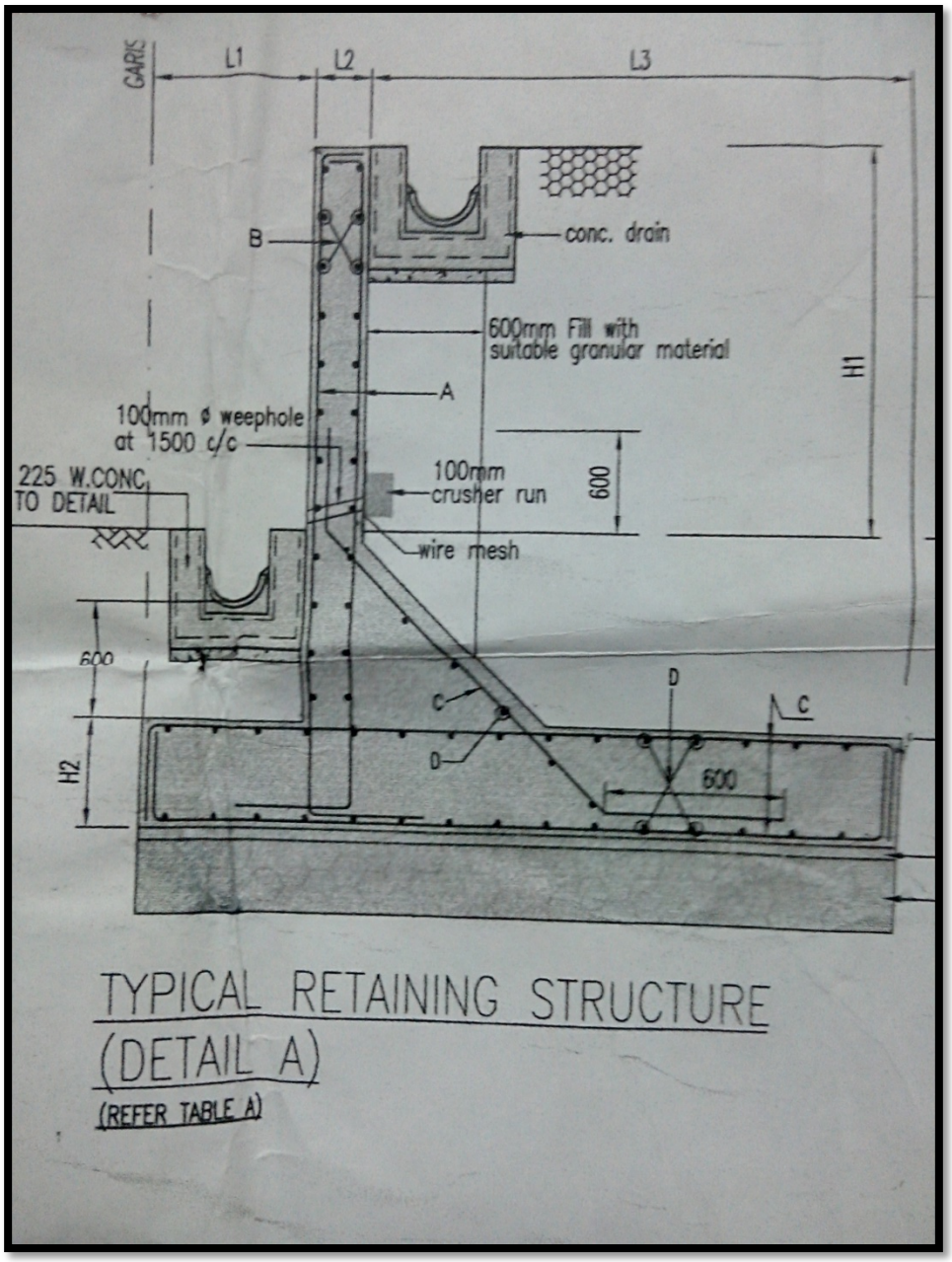


Figure 3.4 show the type of retaining wall use at the project

3.6 METHOD OF INSTALLATION

3.5.1 Site clearance

1. Ensure that the site conditions and the retaining wall installation layout are as indicated on the construction drawings.

2. Ensure that all specified materials and components are delivered to the site.

3. Cleaning all the rubbish, grubbing and removing all trees, shrubs, vegetation, and butts

4. Removing all structures above ground level such as buildings, walls, fences and other obstruction within the site which have been designated to be demolished or removed.

Figure 3.5 show the rock and trees on site

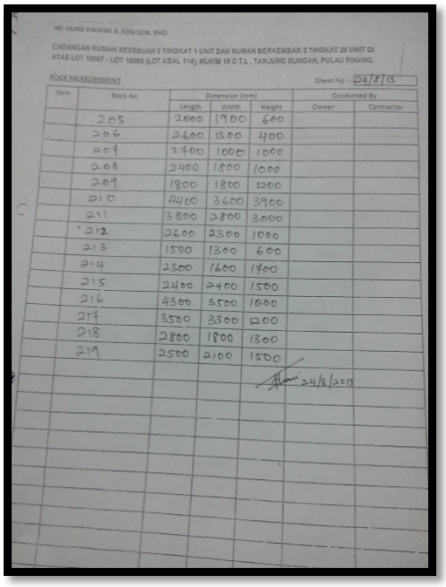
Figure 3.6 show the beam that have been demolish

3.5.2 Excavation work

Excavation work need to be do at site. In this site have 3 excavator to excavate the soil. The depth level of retaining wall base need to be measured as shown at drawing plan.

1. Water pump needed to remove all the water inside this area to easily lean concrete.
2. The excavation shall be executed in such a manner and order as approve by the S.O.
3. Excavate all the soil and rock founded and remove it from that area.
4. Every rock found must be measured by the S.O and record on rock measurement form for claim by rock blaster.

Figure 3.7 show the excavation work



ROCK MEASUREMENT

Item	Rock No	Dimension (mm) Length	Width	Height	Confirmed By Owner	Contractor
	205	2000	1900	600		
	206	2600	1500	400		
	207	2700	1005	1000		
	208	2400	1800	1000		
	209	1800	1800	1200		
	210	4400	3600	3900		
	211	3800	2800	3000		
	212	2600	2300	1000		
	213	1500	1300	600		
	214	2300	1600	1700		
	215	2400	2400	1500		
	216	4300	5500	1600		
	217	3500	2300	1200		
	218	2800	1800	1800		
	219	2500	2100	1500		

24/8/2017

Figure 3.8 show the excavation of rock

Figure 3.9 show the measure rock record

3.5.3 Rock blasting

At this site, there are many rock founded on the ground soil because the site is nearby to the hill. So, the solution is they need to blast the rock founded to become small and easily remove. Blasting work need to supervise at all the time to prevent any dangerous.

1. Firstly, the rock must be digging and make a hole for insert the dynamite. After that, the dynamite will cut to 2 pieces and insert an electric detonator and put together in 1 plastic tube with seed that mix with diesel.
2. The mix of dynamite will put inside the rock hole and the excavator will fill the rock with soil.
3. The soil needed to fill up on rock because it can prevent from flying rock caused by the blasting work.
4. Lastly, the explosive will detonated by the blasting specialist and excavator will remove the rock that have been detonated.

Material use: dynamite, drilling machine, seed, blasting machine, electric detonator.

Figure 3.10 show the material use for rock blasting

Figure 3.13 show the rock have been blasting

Figure 3.11 show the blasting work

Figure 3.12

show the drilling rock

Figure 3.14 show the rock have been measured

Figure 3.15 show the rock have been found

3.5.4 Hardcore and lean concrete

Hardcore is use to make the ground soil more strength to support the retaining wall and soil. The method of putting the hardcore is,

1. They need to make a formwork follow by dimension that state on base retaining wall as shown in drawing plan.

2. After the formwork has been finish, the hardcore can be filling inside the formwork at least 300mm thick and to be well compacted 6 times by 6 ton roller.

3. Lastly, lean concrete must be put on the top of hardcore and the thickness is about 50mm.

Figure 3.16 show filling of hardcore

Figure 3.17 show the lean concrete on base retaining wall

3.5.5 Steel bar

Steel bar is important part in making of retaining wall. It is because the strength of wall and basement are depending on the size and quantity of steel bar.

1. Firstly, the leader will determine the size and spacing between the steel.

2. After that, the lean concrete must be clean and remove all the dirt such as soil, rubbish etc.

3. Steel bar will tie up with the actual spacing and size of bar.

4. Small brick will tie on both side of steel to make the concrete fully covered the steel.

5. The bar bender need to make sure the site clean and the steel must be in good alignment before install the formwork.

Figure 3.18 show the installation of steel bar

Figure 3. 19 show the spacing of steel bar

Calculation :

Example: finished ground level(FGL) – finished floor level(FFL) = H1

H1= 17-14.5 = 2.5m

= < 2700

T 16 – 125 c/c = is mean size of steel must be Y16mm and maximum spacing between the steel bar is 125mm

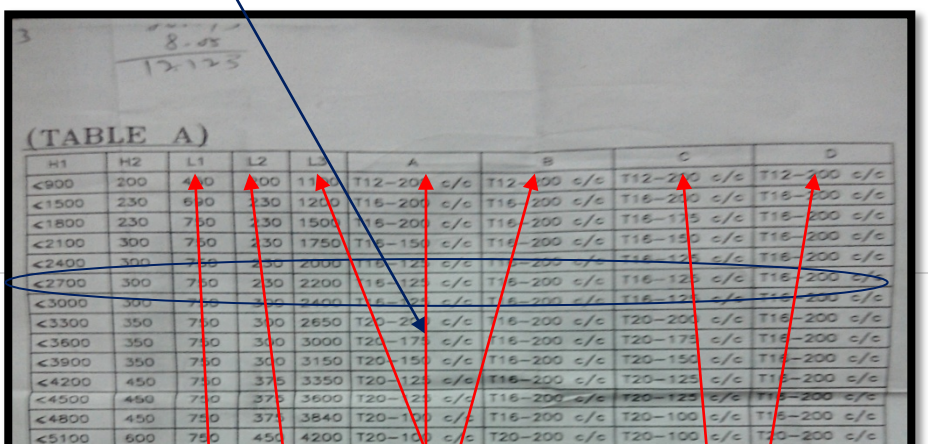


Table 3.1 show the refer table for retaining wall

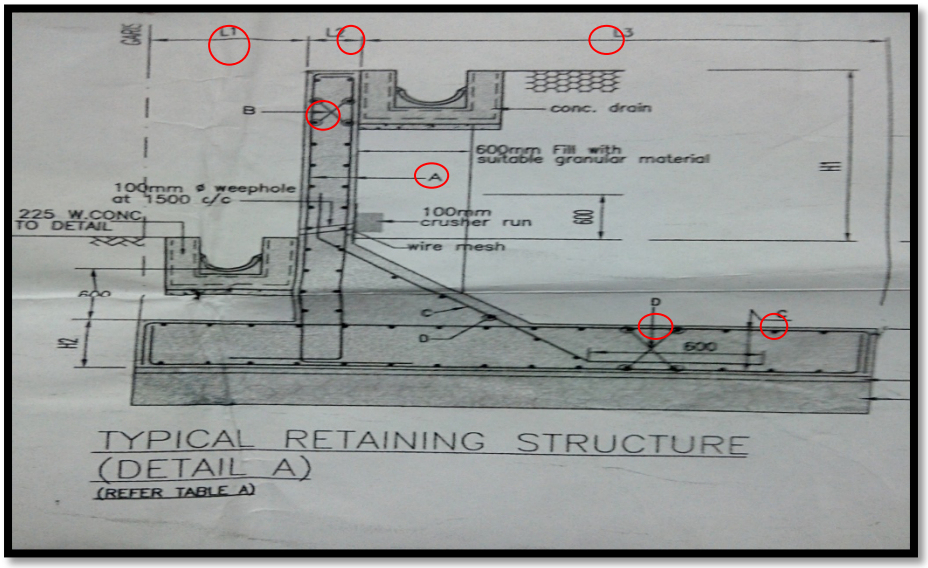


Figure 3.20 show the typical retaining wall structure

3.5.6 Weep hole

Weep holes use to passing the water through outside of wall to prevent the trap water inside the wall. Weep holes should be made into the wall so than any excess water behind the wall can drain.

1. Weep hole with diameter 100Ø usually install with spacing about 1500mm in the whole of the retaining wall.

2. Steel bar will be insert on weep hole and been locked to prevent from move away from the axis.

3. After that concrete will be fill from the top of formwork.

4. After concrete has been filled, remove the steel and the weep hole has been fixed on that retaining wall.

Figure 3.21 show the spacing between pipe

Figure 3.22 show the installation of weep hole

3.5.7 Formwork

Formwork is a part of form the shape of concrete. It will ensure the size and volume of concrete. It usually use to make the concrete form with the actual needed.

1. Firstly, measure the size of concrete state on plan and create the formwork that actually make by carpenter.

2. Put the oil or wastage oil on the facing formwork to easily open after concrete has made.

3. Make sure have spacing between steel bar and formwork when it was install to prevent from visible steel bar on the surface of wall.

4. After that, tie up with steel weep hole and locked it.

5. Ensure that the alignment of formwork follow by the drawing plan.

6. Finally, cast the concrete from above and use a vibrator to mix the concrete.

Figure 3.23 show the installation of formwork

Figure 3.24 show formwork on base retaining wall

3.5.8 Concrete

Concrete is a mixture of sand, cement, and crushing rock. For retaining wall, it will use grade 25 because the load of retaining wall is very high. Concrete will mix and produce by the plant nearby the site. It will be transport maximum 7 meter cube per lorry. Every delivery concrete must be record on delivery order or known as D/O form.

1. Firstly, determine the volume of concrete needed and make an order.

2. Before the concrete will be cast, it must be properly inspected by quality control department by inspection on steel bar, spacing of formwork and steel bar, size of formwork and soon.

3. Order must be made early to rolled out the concrete wall.

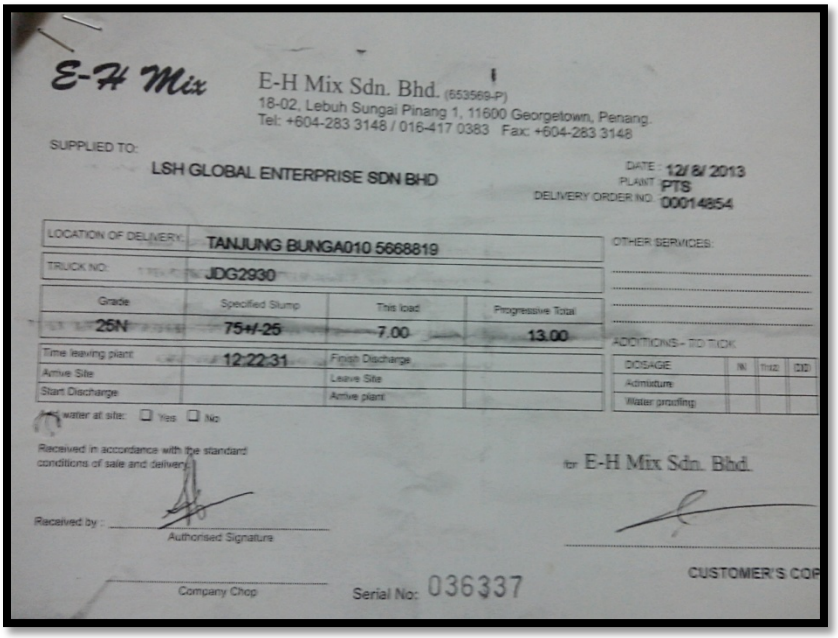
4. Use a crane or excavator to cast the concrete to the formwork.

5. Use a vibrator to mix the concrete and prevent from hollow cavity inside the formwork.

6. After cast the concrete, leveling surface on the top of concrete must be done.

7. Cube test and slump test at site.

Estimate calculation = height x length x width


E-H Mix

E-H Mix Sdn. Bhd. (653569-P)
18-02, Lebuh Sungai Pinang 1, 11600 Georgetown, Penang.
Tel: +604-283 3148 / 016-417 0383 Fax: +604-283 3148

SUPPLIED TO:
LSH GLOBAL ENTERPRISE SDN BHD

DATE: 12/ 6/ 2013
PLANT: PTS
DELIVERY ORDER NO.: 00014854

LOCATION OF DELIVERY: TANJUNG BUNGA010 5668819
TRUCK NO: JDG2930

Grade	Specified Slump	This load	Progressive Total
25N	75+/-25	7.00	13.00

Time leaving plant	12:22:31	Finish Discharge	
Arrive Site		Leave Site	
Start Discharge		Arrive plant	

OTHER SERVICES:

ADDITIONS - TO TICK

DOSAGE	IN	THIS	OUT
Admixture			
Water proofing			

Add water at site: ☐ Yes ☐ No

Received in accordance with the standard conditions of sale and delivery.

Received by :
Authorised Signature

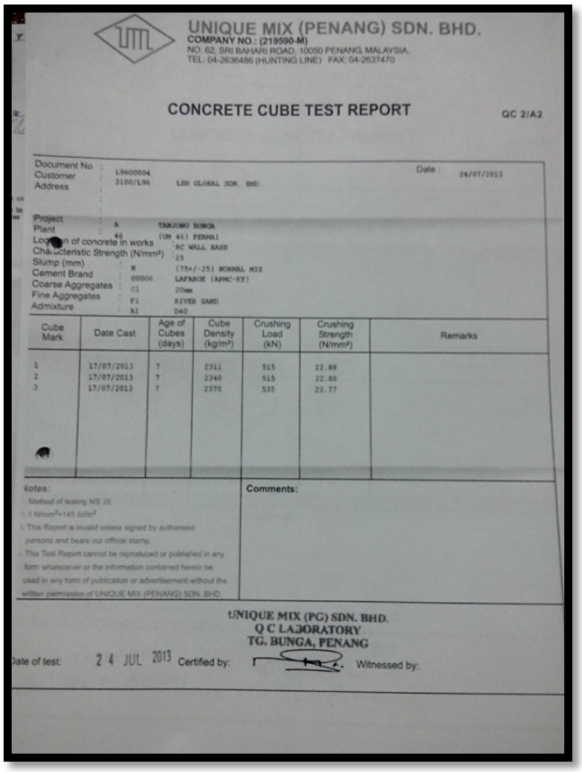
for E-H Mix Sdn. Bhd.

Company Chop

Serial No: 036337

CUSTOMER'S COP

Figure 3.25 show the delivery order receipt



UNIQUE MIX (PENANG) SDN. BHD.
COMPANY NO.: (219590-M)
NO. 62, SRI BAHANI ROAD, 10050 PENANG, MALAYSIA.
TEL: 04-2636486 (HUNTING LINE) FAX: 04-2637470

CONCRETE CUBE TEST REPORT

QC 2/A2

Document No : L/9600004
Customer : 3100/L96 LSH GLOBAL SDN. BHD.
Address
Date : 24/07/2013
Project : A TANJONG BUNGA
Plant : 46 (UM 46) PENAI
Location of concrete in works : RC WALL BASE
Characteristic Strength (N/mm²) : 25
Slump (mm) : N (75+/-25) NORMAL MIX
Cement Brand : 00006 LAFARGE (APMC-KT)
Coarse Aggregates : C1 20mm
Fine Aggregates : F1 RIVER SAND
Admixture : A1 D40

Cube Mark	Date Cast	Age of Cubes (days)	Cube Density (kg/m³)	Crushing Load (kN)	Crushing Strength (N/mm²)	Remarks
1	17/07/2013	7	2311	515	22.88	
2	17/07/2013	7	2340	515	22.88	
3	17/07/2013	7	2370	535	23.77	

Notes:
Method of testing MS 26
1 N/mm²=145 lb/in²
This Report is invalid unless signed by authorised persons and bears our official stamp.
This Test Report cannot be reproduced or published in any form whatsoever or the information contained herein be used in any form of publication or advertisement without the written permission of UNIQUE MIX (PENANG) SDN. BHD.

Comments:

UNIQUE MIX (PG) SDN. BHD.
Q C LABORATORY
TG. BUNGA, PENANG

Date of test: 24 JUL 2013 Certified by: Witnessed by:

Figure 3.26 show c

Figure 3.27 show the concrete test report

Figure 3.28 show the cast con

Figure 3.29 show cast concrete on wall

3.5.9 Formwork removing

Formwork removing is a part of work during installation of retaining wall. It need to be remove after the concrete is really dry enough.

1. Firstly, pull out the nail from the plywood.

2. After that, remove the steel bar that lock onto weep hole.

3. Make sure that concrete dry enough and then remove the formwork.

4. When removing formwork it is important to avoid damage to the surface of the concrete and particularly to edges and corners.

Figure 3.30 show the removing formwork

Figure 3.31 show the retaining wall that have been complete remove with formwork

3.5.10 Install

crusher run bag

This crusher run was install to prevent soil from get through with the water inside the pipeline. The material use is wire mesh, crusher run and nails.

1. Firstly, crusher will be packing in a wire mesh.

2. After that, the bag that fill with crusher run will be insert on the weep hole to prevent from soil to get through onto the weep hole.

3. Lastly, stick it on the hole and nailed around the weep hole.

Figure 3.32 show the pack of crusher run bag

Figure 3.33 show the installation of crusher run on weep hole

3.5.11 Backfilled

A portion of the excavated material shall be returned, filled around walls, columns and the like in 225mm layers and each layer thoroughly compacted using hammers or mechanical compactors as the s.o. may approve, until compaction is complete. However, only suitable and approved fill materials shall be returned for backfilling. The surplus excavated materials shall be deposited, spread and leveled on site or elsewhere as approved.

1. Firstly, use an excavator to fill the soil around the wall with the level needed.

2. If the soil is not enough, the contractor should export the soil from outside.

3. Only suitable material such as medium stiff clay, clayey sand or other approved soils shall be used for filling.

4. Material from swamps, peats or top soil and other highly organic clay or silt, materials containing logs, stumps or boulder, which are susceptible to combustion shall not be used for filling.

5. Lastly, after filled soil around the retaining wall, use a compactor minimum 6ton to compact that area.

Figure 3.34 show the backfilling on the retaining wall

Figure 3.35 show the cut and fill work

CHAPTER 4 : PROBLEM AND RECOMMENDATION

4.1 Problem

There are few problem happen on this site 3storey bungalow semi D (26 units) and 3storey bungalow single lot (1 unit). Most of the problem due to whether condition, site condition, less of machineries. This problem will effect on completion date of project.

4.1.1 Whether condition

There were too many rainy on that site, In example on September, most of the day was heavy raining even in the night. If rain come on the night, it will make the soil condition too flaccid and muddy. It will effect on machineries such as roller compactor, lorry, excavator, and backhoe to do their work.

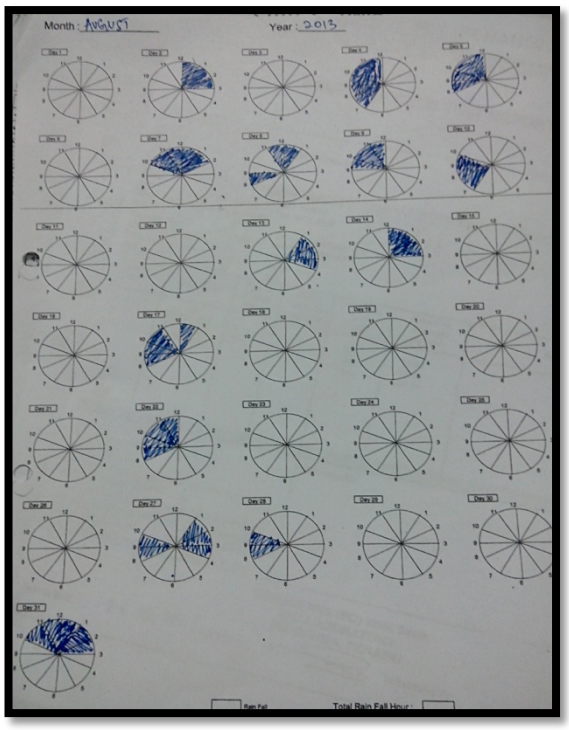


Figure 4.1 show the water trap on that site

Figure 4.2 show the whether chart on site

4.1.2 Site condition

On this site, it were too many rock found below the ground level because the site is nearby the rock hill. It will effect on the completion date because take a lot of time to blasting that rock. Excavator also will be damage if need to moving the rock from the site. The cost will rise because blasting rock is very expensive and also may take a big risk when flying rock happen on that site. Other than that, the soil condition is also at high risk because the site is on the downhill and got too many water inside the soil.

Figure 4.3 show the breakdown of excavator

Figure 4.4 show the rock was found too many

4.1.3 Less of machineries

On the sunny day, they need to use more machinery to faster complete their job on time because the weather is uncertain. In example, they use a excavator to casting concrete at site. It will take a lot of time compare with the crane. Use of 2 lorry on site is not enough because 4 excavator running the job on that site. It will delay the completion date of the project.

4.2 Recommendation

Based on problem happen, I got a several idea to develop on this matter. Firstly, all of team project need to visit the site minimum twice a week to alert on work that has be taken on that site. It easily to correcting the errors that occured on that site and smooth the work progress.

For the weather condition, the project manager need to alert with meteorologists department update to estimate total rain hour per day and month. It is because they can get ready on what will happen. In example, if they predict rain will due in the evening so they can faster

casting concrete on the morning time. Other than that, the need to fill crusher run on temporary access to make the lorry did not stuck on their way.

Site condition in this site was really poor due to heavy raining. Other that that, the size of rock that very bigger will breakdown the machineries and raise the cost. So, to overcome this problem, use a hydraulic machine and 6 tones minimum weight of excavator to move out the rock founded. The excavator need to be drive carefully to avoid breakdown on site due to the hard rock. The contractor need to appoint experience and expert driver to handle that machines.

Less of machineries is also a problem because it will effect on date of completion. Contractor should add more machineries to complete the work on the completion date. They need to buy a quality machineries to prevent from damage and breakdown but not too expensive.

CHAPTER 5: CONCLUSION

5.1 Conclusion

The above report has briefly about some of the construction of retaining wall done by all the project team at Tanjung Bungah Penang. Retaining wall is aspect that need to be more attention to prevent any failure on that site. It is because the condition of soil and load of each house that need to be support strongly. To meet the completion date, contractor need to generate some idea to overcome any problem that happen on site at 3storey bungalow at Tanjung Bungah. The client also need to continuously supervise work on site. Its to important to make an inspection to avoid failure or prevent any dangerous situation on that site.

In other hand, the project manager need to manage their worker to be more attention on method of installation of retaining wall because it could effect on quality standard of the wall. The teamwork of every worker must be apply on work and can meet the completion date.

Reference

1. www.oibgroup.com
2. Interview with Mr. H. F. Chong (QC department)
3. http://en.wikipedia.org/wiki/Retaining_wall
4. http://www.brighthubengineering.com/