



**DEPARTMENT OF BUILDING
UNIVERSITI TEKNOLOGI MARA
(PERAK)**

**Construction for structure of single storey terrace house
(Slabs, ground beam, roof beam and columns)**

Prepared by:

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(PERAK)

December 2018

It is recommended that the report of this practical training provided

by

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entitled

Practical Report Title

Structure for one storey terrace house

(Slabs, column, ground beam, and roof beam)

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

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(PERAK)**

**MARCH 2018
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 LCS Development Sdn Bhd for a 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.

Name :MUHAMMAD IRFAN SYARQAWI BIN SULAIMAN

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Date :

ACKNOWLEDGEMENT

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I would also like to thank ALL the UiTM lecturers that have taught and nurtured me in becoming a better student and person. I would also like to extend my deepest appreciation to the lecturers who are directly involved during my training stint. To Miss Azizah Binti Talkis Supervising Lecturer ,Encik Noor Azam Bin Yahaya, Practical Training Coordinator En Muhammad Naim bin Mahyuddin and Coordinator, I value the time, effort, encouragement and ideas that they have contributed towards the successful completion of my training, this report and the valuable knowledge that have been shared over the last few semesters.

Last but not least, my special thanks to my beloved parents for their sacrifices over the years.

Thank you so much.

ABSTRACT

Structure is a very important element in a building. Therefore this report will discuss about structure for the single storey terrace house. This report was conducted for the single storey terrace house at Taman Mutiara Saujana . The objective of this report is to explain about method in constructing structure of single storey terrace house. Other than that, is to observe the problem and during the construction process. Data collection has been made by observation , interview, and documents available in the site office.it is found that the real construction method is slightly different compared to the technical knowledge learned in the class room. In conclusion, the practical training can give more experience to the student for the real construction world.

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CHAPTER 1.0

INTRODUCTION

1.1 Background and Scope of Study

Structure is an arrangement and organization of interrelated elements in a material object or system, or the object or system so organized. Material structures include man-made objects such as buildings and machines and natural objects such as biological organisms, minerals and chemicals. Structure is the main elements in a building. If there is no structure in building the building will easily collapse. Structure is like the back bone to the human body. So the construction for the structure is very vital to make the building safe to life. There are many factors to determine in the construction of structure. Some of the factors are the types of the building, size of the building, the weather and the purposes of the building.

The structure is made in many types of materials that is hard, durable, and strong to withstand the load on the building. Some materials that used for structure are concrete, steel and woods. The most commonly used materials to make structure nowadays is concrete. The chosen of concrete as the main materials is because it is strong to withstand load. Then it is durable in any weather. Lastly it is easy to get supply to make concrete. The reason steel not widely use as the structure is it can be rust if it exposed to the air and water. So that it has to be coated with another materials to make its last long. Other than that, is because the cost to make the structure using steel is higher than using concrete.

The aim of this report is to explain the construction of the ground beam, column, floor slab and the roof beam for single storey terrace house.

1.2 Aim :

- I. The aim of this report is to explain the construction of the ground beam, column, floor slab and the roof beam for single storey terrace house.

1.3 Objectives :

- I. To investigate the method of construction for ground beam, floor slabs, column and roof beam.
- II. To identify the problem occur in construction and solution taken .

Methods of study

The method of study used to complete this report as shown below:

1. Observation

Based on the observation during daily works at site about the construction of the terrace house and how to handle worker.

2. Interview

Interviewing to the person at site to get the information. Usually asking to the site supervisor, sub-contractor and the worker

3. Internet

To study some terms in construction that is new and to get the specific size of some materials.

4. Books and journal

Refer some of the books to gain more knowledge about the terms in construction.

5. Approved document

Gain data from the document and plan that available in the site office

CHAPTER 2.0

COMPANY BACKGROUND

2.1 Introduction of Company

LCS Development SDN BHD is a leading construction related company in the Pahang region, headquartered in Temerloh. Today, in the dynamic business environment, LCS a diversified Malaysian company with operations in ready-mix concrete, asphalt, precast, trading, quarrying, construction and logistic services.

For more than 30 years, LCS has been contributing to the construction industry around Temerloh, Bera, Jerantut, Bentong, Raub, Jengka, Lanchang, Bukit Mendi, Pekan, Johor and Kuantan district. Today, the company has factories and plants located at Pahang & Johor strategically to serve Malaysian market.

LCS has built its solid leadership position and strong business reputation based upon principles and dignity, hard work, respect, confidence and commitment to the future. With continuing, holding an outstanding in its area of activity in terms of marketing, operation, production and logistics aided by the support of continually-trained employees and brand names that are highly value by consumers.

LCS Development Sdn Bhd incorporated on 18th July 1996. The principal activity of the company is as housing developer that is engaged in activities of, develop residential houses shop lots or buildings. It was a dormant company for pass few years however currently the company is engaged in residential houses development project located in Temerloh, which is still under construction.

LCS Development is a fast growing company, grown from a local player to one of the top company in the same industry in Pahang state.

2.2 Company Profile

Company name: LCS Development SDN BHD
Date established: 18th July 1996
Company no: 394592-U
Address : LCS Head office25, Jalan Industri 1/1, 28400
Mentakab, Pahang Darul Makmur.
Email: lcs@lcs.com.my
Tel:
Fax:
Business Hour: Monday-Friday: 9am - 5pm
Saturday: 9am - 1pm

2.3 Organization Chart

This is the organization chart for the Taman Mutiara Saujana Project:

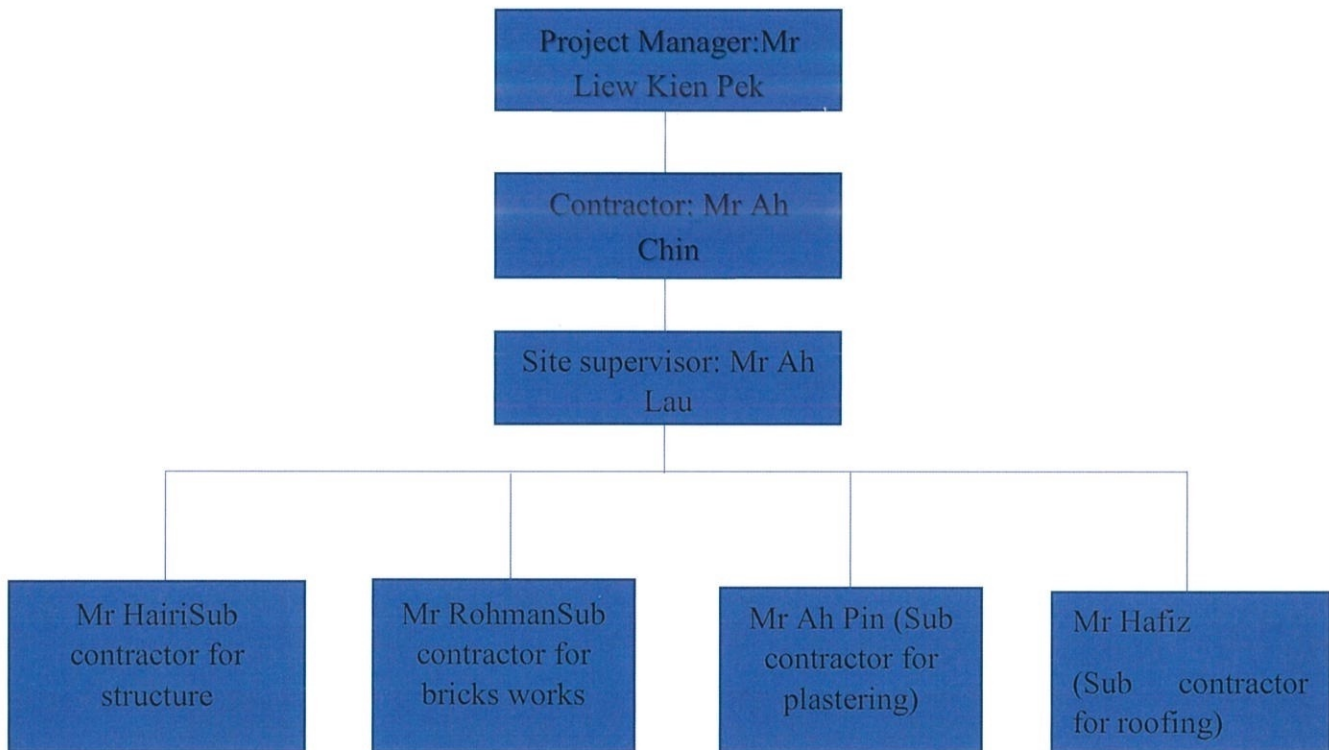


Figure 2.1: Organisation chart

2.4 List of Project

Completed project:

| Projects | Date complete | Total |
|---|----------------------|--------------|
| Taman Jerna Indah, Bera | Completed 08/2016 | RM 2,700,000 |
| Project For 3 storey 27 units Shoplots, Shopping Mall & Hotels at Raub, Pahang D.M. | Completed 5/2016 | RM 1,000,000 |
| Project For Pahang-Selangor Raw Water Transfer Project at Lot 1-2, Kelau Dam And Related Works, Pahang D.M. | Completed 5/2017 | RM 4,000,000 |
| Housing Project at Taman Rimba, Mentakab, Pahang Darul Makmur. | Completed 6/2017 | RM 2,500,000 |
| Project For Pahang-Selangor Raw-Water Transfer at Lot 1-3B Semantan Pipeline, Pahang D.M. | Completed 5/2016 | RM 2,558,520 |

Table 2.1 List of completed project

2.5 Ongoing projects

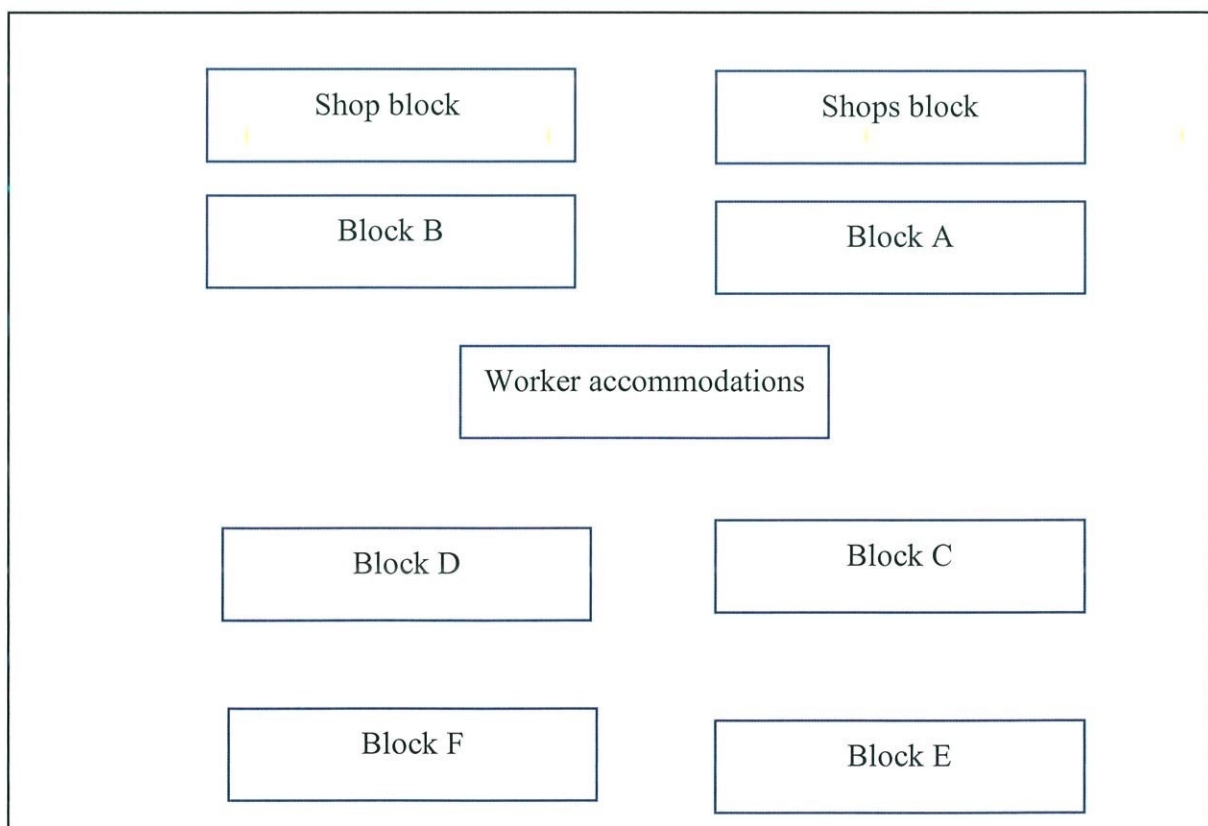
| Projects | Date start |
|---|------------|
| Taman Mutiara Saujana, Mentakab, Pahang | Jun 2017 |
| Taman Mutiara Impian, Housing in Bera, Pahang | May 2018 |
| Construction of futsal court and badminton court at Taman Saga Mentakab Pahang. | Jun 2018 |

Table 2.2 List of ongoing project

CHAPTER 3.0 CASE STUDY

3.1. Introduction to Case Study

This is the project construction of single storey terrace house at Lot 422 and Lot 423 Jalan Karak, Mentakab Pahang. This project developer is LCS Development SDN BHD. The location is showed in appendixes. There is 65 units of single storey terrace house and 18 units of double storeys shops. There are six blocks of terrace house and two blocks of shops. The construction has begun early in this year. The works is expected to finish in 2019. The completed works for the house is about 65%. This project is done by Klimax Builders SDN BHD. The contractor for this project is Mr Ah Chin. The project manager is my supervisor that is Mr Liew Kien Pek.



The location of this site is very specific because it near to the petrol station. It also located nearby the city of Mentakab. The target customer to buy this house is the family that just married and to the average income family. The size of this house is 24478mm × 6096mm including car porch. It has one master bedroom, two bedrooms, two toilets, one kitchen, one living room and one dining room. This house is very good and affordable for the buyer.

During my practical training, there are some work that have been done in the site such as bricks laying, plastering, construction of structure, piping, roofing, tiling, wiring and, main hole construction. This works is done by a few group of worker which has their own specialities to make the works. As examples the plastering works is done by the group of worker that have specialities in plastering. All the works is under the subs contractor.

Even though there are many works that is done in the sites I only want to focus on the construction of ground beam, slabs, columns and roof beam. That is because I can see and observe the construction. Other than that, I also get more explanation and lesson about the construction. The explanation is given by my supervisor, contractor and the sub-contractor of structure. So I had got many information for that construction.

3.2 Subtopic

3.2.1 Ground beam

Firstly, is the methods to construct the ground beam. Ground beam is the first things to construct. The function of the grounds beam is to transfer load from above to the grounds. The construction is done by the sub-contractor for the structure. The worker is arounds 25. The worker is including the carpenter, bartender and labours.

The first work done by the worker is preparing the formwork for the ground beams. The formwork is form using the good and high quality woods. The woods are cut and shape in the beam size to easily install the formworks. The surface of the woods is covered with the oil to make the woods can be used many times.



Figure 3.1 The worker is spreading the oil to the formworks.

During the carpenter prepared for the formworks the other worker marks the location of the grounds beam using the strings and nails based on the plans. The worker also prepared the reinforcement for the grounds beam. For ground beams they used six Y10 as the main bar and R6 as the girth. The sizes of the columns is 125mm × 300mm. The reinforcement is makes and will located into the formworks when formwork is done. The steel bar is being cut and bend using the machine. The links and girth is made by hands.



Figure 3.2 Bar bender bending the steel bar

After the formwork is done it is located at the points where it been marked. The worker use the small wood to stands the ground beam. The wood is nailed from outside of formworks to stand the formworks. It is important to support the ground beams because it can fall during the concreting works. Next the worker brings the reinforcement using the JCB.



Figure 3.3 Formwork for the ground beams.

After that the reinforcement bar is located into the formworks. Then the worker use the tying wire to tie the reinforcement bar to the starter bar.

Then the concreting works is done. Before that the site supervisor has to check the reinforcement. He has to make sure the reinforcement is at the right place and the girth is tied. After the inspection is done the concreting works is done. The concreting works is done in 1 days for one block. This method is used to make sure the strength for the house is same. The worker move the concrete to the formwork using the mobile crane. Then the concrete is compacted using the vibrator. The compacting works is important to make the honey combs at the ground beam is

less. Based on supervisor he only wants the honey combs not more than 15% of the beam. The concrete used is grade 25 and the supplier is LCS Mix SDN BHD.

The worker started to open the formworks after 10 days of the concreting. At that time the concrete has set but not achieve its strength. The works to open the formworks was done by 5 workers and done in 2 days. The worker has to open the formwork carefully and make sure the formwork is not damaged because it wants to be used for next construction.

3.2.2 Slabs

Next is the construction of slabs. Concrete slab is a common structural element of modern buildings. The construction of slab is done after the ground beam. Slabs usually been finished by many types of materials. As examples for this site the finishes for the slabs is tiles. The finishes are important to get aesthetic value and make the building beautiful. It also has its own function.

For the construction of slab the worker have put the aggregate. The aggregate is laid evenly. Then they laid the BRC reinforcement on the aggregate. The spacer bar is putted below the BRC to make sure the concrete can be covered all the BRC. The BRC is tied between it layer to make the connection stronger. This works take about 3 days to finish. Then the worker make the marking for the thickness of the slab that want to be concreted. Before the concreting is done the supervisor make the inspection to the BRC and marking.



Figure 3.4 The BRC for floor slabs

Next the concreting work is done. The work is done in one day only. The grade used for the slabs is grade 25. The amount of workers involved is 10 workers. There are workers to pour the concrete and workers to make compacting. The concrete must be compacted carefully. Then other workers will spread the concrete to get an even surface. The concrete is left to cure for around 7 days.



Figure 3.5 Concreting work of slabs

3.2.3 Column

After the slabs is done the worker continued the construction of column. Column is the structural element that transmits the load from above to the below elements. Column is very important for the building. The building is more stable when there is column. For this site, it uses the concrete column. The size of the column is 300mm × 300mm. The height of the column is 3352mm from ground floor.

For the first work the carpenter prepared the formwork for the column. The formwork is surface is spread with the oil to make sure the concrete not stick to the formwork and to make the work to open the formwork easier. Meanwhile the worker prepared the steel bar for the column. They make the cutting and bending works using machineries. The links is made by hands. The steel bar used is Y12 and for the links is R8.

After the reinforcement bar is ready the worker brings the steel to the point and tied the bar to the existing steel bar from the footing. Then the worker tied the links to the steel bars because worker only tied a few links before it attached to the point. Then the carpenter start the installation of the formwork for the column. They use the wood strut to make sure the column is 90degree stand. The worker use the spirit level to check the column. This works take 7 days to complete.

Then the supervisor start to make inspection to the column. The supervisor don want the formwork have hole because the concrete can go out of the hole. Then the column should be parallel to each other.

Next the concreting works is done by the worker. It used the mobile crane to pour the concrete from above. The mobile crane is rented by the contractor. They also use the vibrator to compact the concrete. The concrete used is grade 25. The concrete used is ready mic concrete order from LCS Mix SDN BHD. This works also done in one day only.

Lastly is the curing work for the column. The worker started to remove the strut after 3 days. Them they opened all the formwork after 7 days. The formwork is opened carefully because the wood want to be used again.



Figure 3. 6 The columns that have finishes.

3.2.4 Roof beam

Lastly is the construction of the of the roof beam. Roof beam is the upper structure to transfers the load from above to the column. Roof beam also be the part to put the structure for the roof. For this project the roof beam is constructed with the roof slab for the porch. So, the construction for the roof beam take the longest time to finish.

Firstly, the carpenter started to install the wood as the cap at the end of the columns. Then the worker started to install the base for the roof beam. They use the staging to reinforce the base. After that they put the strut below the beam to reinforce the beam. The strut is important to make sure the beam does not collapse during the process of curing. For one column, it need about five to seven strut to reinforce the beam. Then they start to put formwork at the edge of the beam according to its size. The size for the roof beam is 125mm ×300mm.

Then the worker make the steel bar for the beam. They make the bending and cutting of steel bar using machineries. The steel bar used is Y10 and for the girth is R6. After the reinforcement is done the worker bring the steel into the formwork and tied it neatly. The steel is tied to the column. The space bar is located below the reinforcement to make sure the concrete can fully cover the steel.



Figure 3.7 The BRC laid on the spacer block

For the roof slab the BRC is used to reinforce the slabs. The BRC is laid beside to each other than at the middle the worker one more BRC and tied to the other two BRC. The size of BRC used is A7. The block spacer also putted below the BRC. This work take 15 days to finish.

Then the supervisor will make inspection on the BRC and the formwork for roof beam. The BRC should be tied at every piece edge. The location of the reinforcement also has to be in the middle of the formworks. the connection between the beam reinforcement and columns should be made to get more strength.

After the inspection is done the concreting can begin. The concrete used for the roof beam is grade 25. The supplier for the concrete is LCS Mix SDN BHD. The concrete is pour from the above by using mobile crane. The mobile crane is rent by the contractor. This work take one day to finish. After the concrete is poured the worker use the vibrator to compact the concrete.



Figure 3.8 The worker is concreting the Beam.

After three days of concreting works the worker can remove the formwork at sides of the beam because the concrete is set. Then after 7 days the worker can remove half of the strut but cannot remove all because the concrete not achieve it strength yet. After 12 day the worker can remove all the formwork and the works is done.

3.3.1. The problem occurs in construction.

In construction, there will be many problems from the beginning and ending of the construction. All of the problems can be solved in many ways. For my report, I focus on the problems during and after the construction. The problem occurs because of many factors.

One of the factors for the problem in construction is weather. The weather in Malaysia is quite well to make the construction. But during the end of the year the weather in Malaysia is raining. So, every place in construction in Malaysia will face the rain that will make their work being delayed. The raining weather also can make damage to the site. So, that the construction company has to be prepared to face raining weather.

Second factor is the supplier factors. The most important thing to do in construction is the supply to make the construction as an example the supply of the cement. All the supply must arrive at the site according to its order. Because of the late delivery, the works can be delayed. The effect also can make the construction late.

Then is the factor of the human. Most commonly the factor of the worker. Sometime the worker does not follow the standard size of the beam as required. This is normal because all the human beings will do the mistake. Even though the mistake is usual but the major mistake can make the company lose a huge amount of money.

Other problem is the raining season during the ends of the year. The worker at the site cannot do the concreting work during the rain. In addition, the concrete is wet and more rain water gets into the concrete. The over limits of water can give damage to the concrete. So, that the concrete cannot achieve its strength. If the problem is not being solved the company will lose a lot of money because the concrete cannot be used.

Next problem is the supply for the concrete is late to arrive at site. This will make the concreting works delayed. As an example in my sites the concrete is delayed after the five trucks have sent to the sites. This makes the older concrete harden and not mix with the new concrete. This can make the risk of the crack on the structure. If

there is crack the company must hack and make the new structure. So, that the company will lose money. In addition, the worker also must be paid for their overtime works.

Lastly is the problem when the worker read the plan wrong. In my cases the beam in one house has misplace about 300mm because the worker make mistake during reading the plans. Because of that the column need to be hacked. The effect of the mistake in reading the plan can be the major mistake in the construction. It is vital to read the plan carefully.

3.3.2 Solution for the problem during construction

There is many solution can be made to solve the problem. When there is the problem there is the way to recover it

For the first problem, the company can buy the plastics cover to cover the concrete during the rain. The plastics cover should be laid on the concrete that is still wet. This can stop the rain water to get into the concrete so that there is no problem of over water in concrete. It also can save the concrete from damage.

The next problem can be solved by the site supervisor. He has to order the concrete earlier and he have to manage the time of work wisely. The supplier also has to alert about the customer order. The order that have been made for the concrete must be in exact amount for concreting works. This can avoid the delayed works.

For the problem during reading the plans. The worker should make the double check for the plan before begin the works. He should make revision for every section of the plan. If the worker has read the plan carefully the result of construction will be nice.

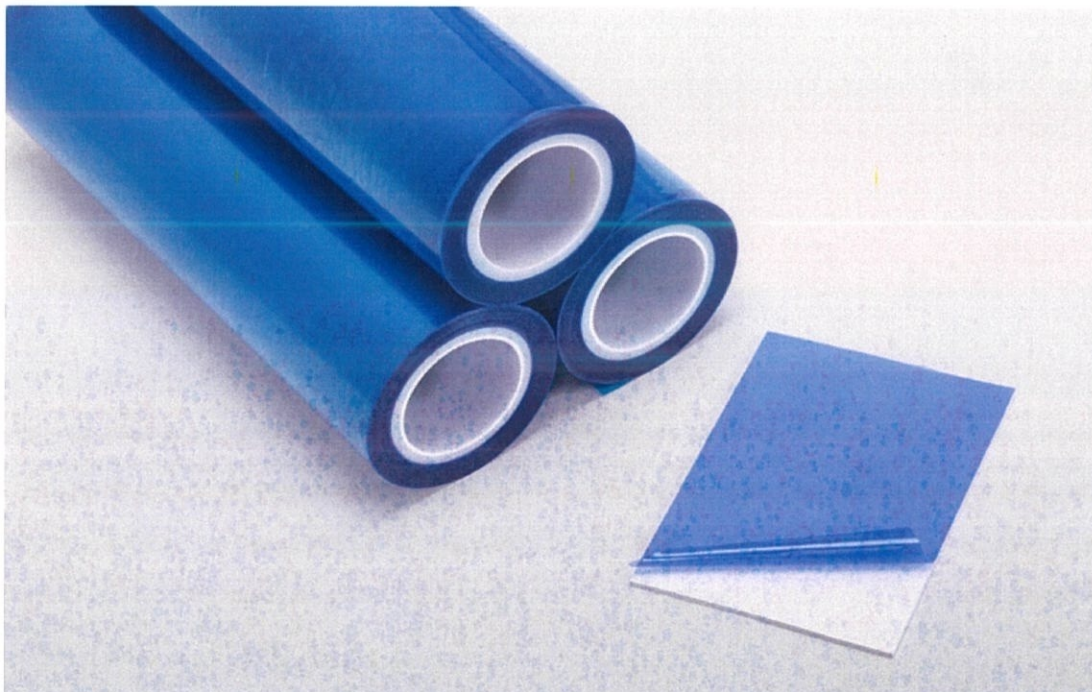


Figure 3.9 Plastic cover to cover the concrete

For the next problem, the worker has to made the mortar to cover up the air hole. Those of the air hole can be covered by mortar. If the air hole is too much the worker must hack the beam or column and have to construct the new one.

The next problem need to hack the edge of the beam. The over concrete need to be hacked by the worker. The worker use the machine to hack the edge of the beam. He only need to hack the edge not all of the beams.

Lastly the misplace of the beam. In this case the only solution is to hack the beam that misplaced and built the new one. This process will be a bit late because the worker need to hack the beam. The company also loss the cost for this section. The construction also take more time.



Figure 3.10 The worker hack the edge of beam.

CHAPTER 4.0

4.1 Conclusion

In conclusion, the construction method for the structure is not easy. It need the skills and must be done according to it flow. The construction of those element also very important for a building to make sure it safe to use. There also many methods used to make the different structure. It also based on the worker skills. As though in the class the method used is same. There only a few different methods used.

About the problem there is the problem that easy to solve and the problem that hard to solve. It according to it problems. Some problem can be solved easily because the worker can do it. But some problem can make the loss to the company. The solution also can be made for all the problem. The solution is important to satisfy the customer.

In the nutshell in construction there will be many methods to build the great building. There is also the problem and the solving.

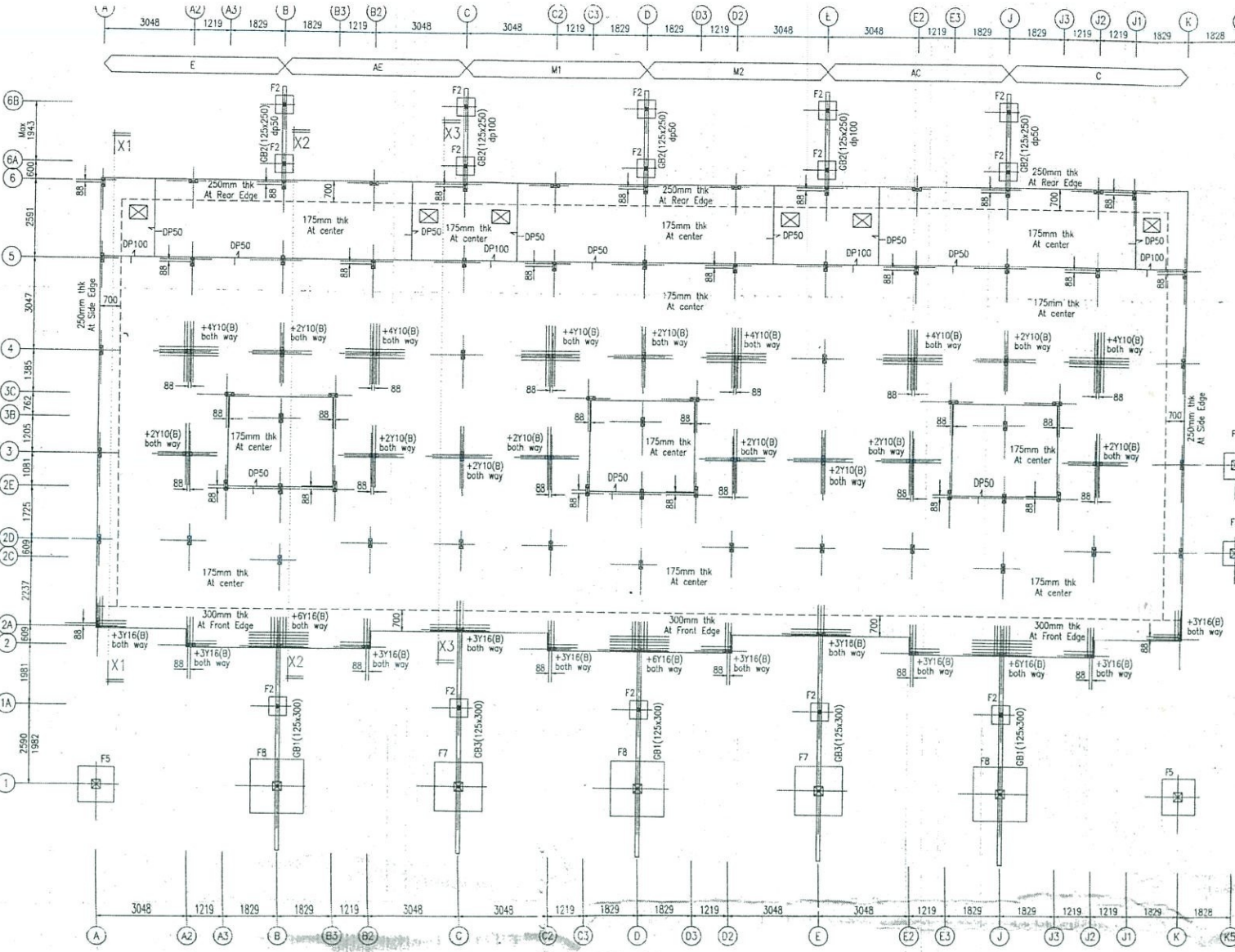
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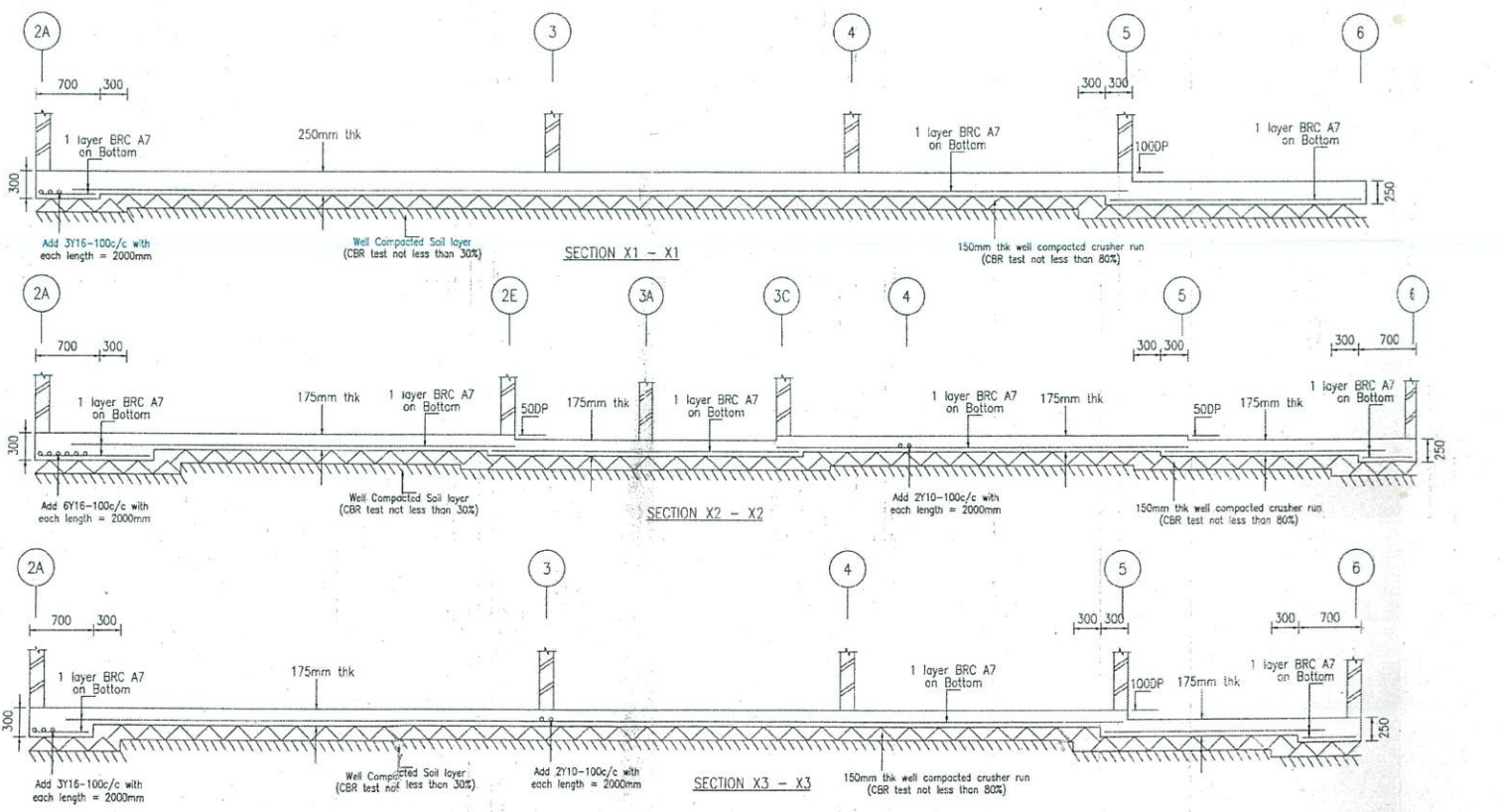
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3. http://spppoly.com/wp-content/uploads/2016/04/SURFACE_PROTECT_FILM-3.jpg

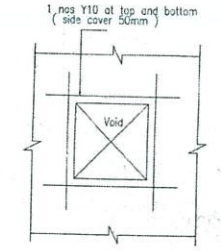


(TYPICAL GROUND SLAB THICKNESS = 175mm THK at center, 300mm at front edge and 250mm thk at others edge with 1 layer BRC A7 on bottom sit on 150mm thk crusher run)
 (Additional bar Y10 and Y16 should be added as shown in plan with each bar length min 1.0m from column center to bar end at bottom)
 Note: All service manhole (TNB, Telekom, electrical earth box, sewerage, rwd, cold water pipe, etc) shall be pre-installed before cast the raft foundation

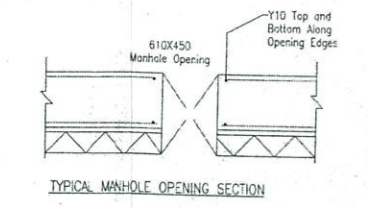
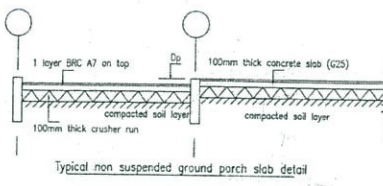
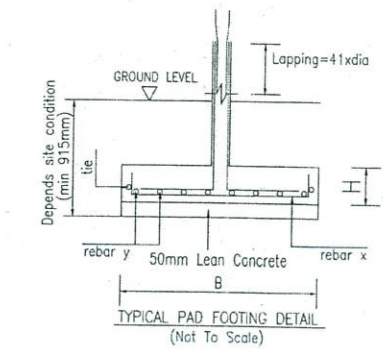


| MARK | PAD FOOTING DIMENSIONS | | | REINFORCEMENT | | |
|------|------------------------|------|------|---------------|---------|-------|
| | B,mm | L,mm | H,mm | XDIRBAR | YDIRBAR | TIES |
| F2 | 600 | 600 | 200 | Y10-125 | Y10-125 | Y1Y10 |
| F3 | 800 | 800 | 200 | Y10-125 | Y10-125 | Y1Y10 |
| F5 | 1200 | 1200 | 200 | Y10-125 | Y10-125 | Y1Y10 |
| F7 | 1600 | 1600 | 400 | Y10-100 | Y10-100 | Z1Y10 |
| F8 | 1800 | 1800 | 400 | Y10-100 | Y10-100 | Z1Y10 |

FOUNDATION REINFORCEMENT SCHEDULE

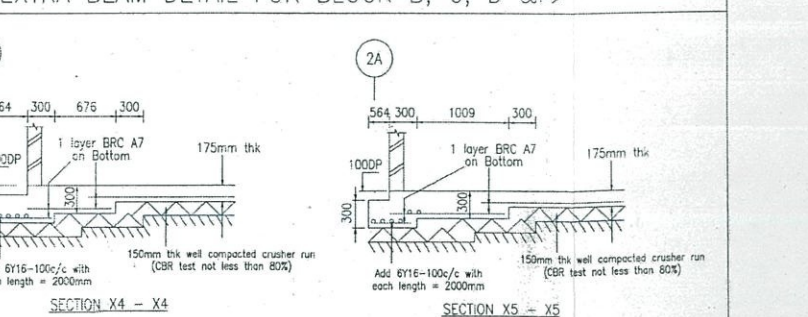
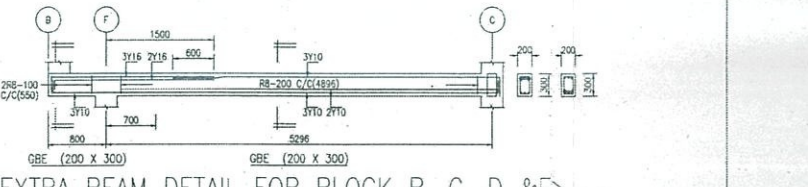
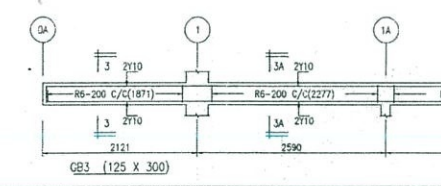
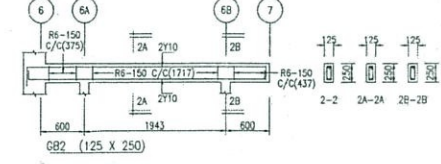
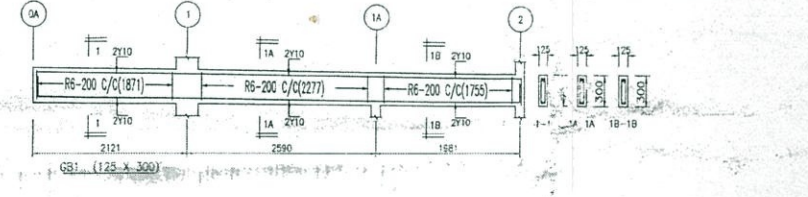


ADDITIONAL BAR FOR OPENNING



| FLOOR | COLUMN MARK | All Internal Column | | All External Column | | Party Fence Wall Slump | Porch End Unit Slump |
|---------------------------|-------------|---------------------|-----------|---------------------|-----------|------------------------|----------------------|
| | | MAIN BAR | TIES | MAIN BAR | TIES | | |
| Stiffness (to stiff roof) | | 8Y10 | R6-100 | | | | |
| | | COL SIZE | 125 X 300 | | | | |
| | | | | | | | |
| Floor GB-RB | | 8Y10 | 8Y12 | | | | |
| | | TIES | R6-100 | R6-125 | | | |
| | | COL SIZE | 125 X 300 | 300 X 300 | | | |
| Slump | | 8Y12 | 4Y10 | 6Y16 | | | |
| | | TIES | R6-125 | R6-100 | R6-125 | | |
| | | COL SIZE | 300 X 300 | 125 X 125 | 450 X 200 | | |

COLUMN REINFORCEMENT SCHEDULE



PROJECT :
 CADANGAN PEMBANGUNAN SKIM PERUMAHAN YANG MENDUNDIRI:
 18 UNIT KEDAI/PEJABAT 2 TINGKAT DAN 65 UNIT RUMAH TERES 1 TINGKAT,
 DIATAS LOT NO.PT 18532-PT18576),
 lot asal 422(GM 1672), & LOT NO.PT 18384-PT 18422)
 lot asal 423(GM 1671), MUKIM MENTAKAB,
 DAERAH TEMERLOH, PAHANG DARUL MAKMUR.

OWNER :
 LCS DEVELOPMENT SDN.BHD.
 S.K.W No : 835/2016
 No.25, Jalan Industri 1/1,
 Taman Perindustrian Temerloh,
 28400 Mentakab, Pahang D.M
 No Tel :

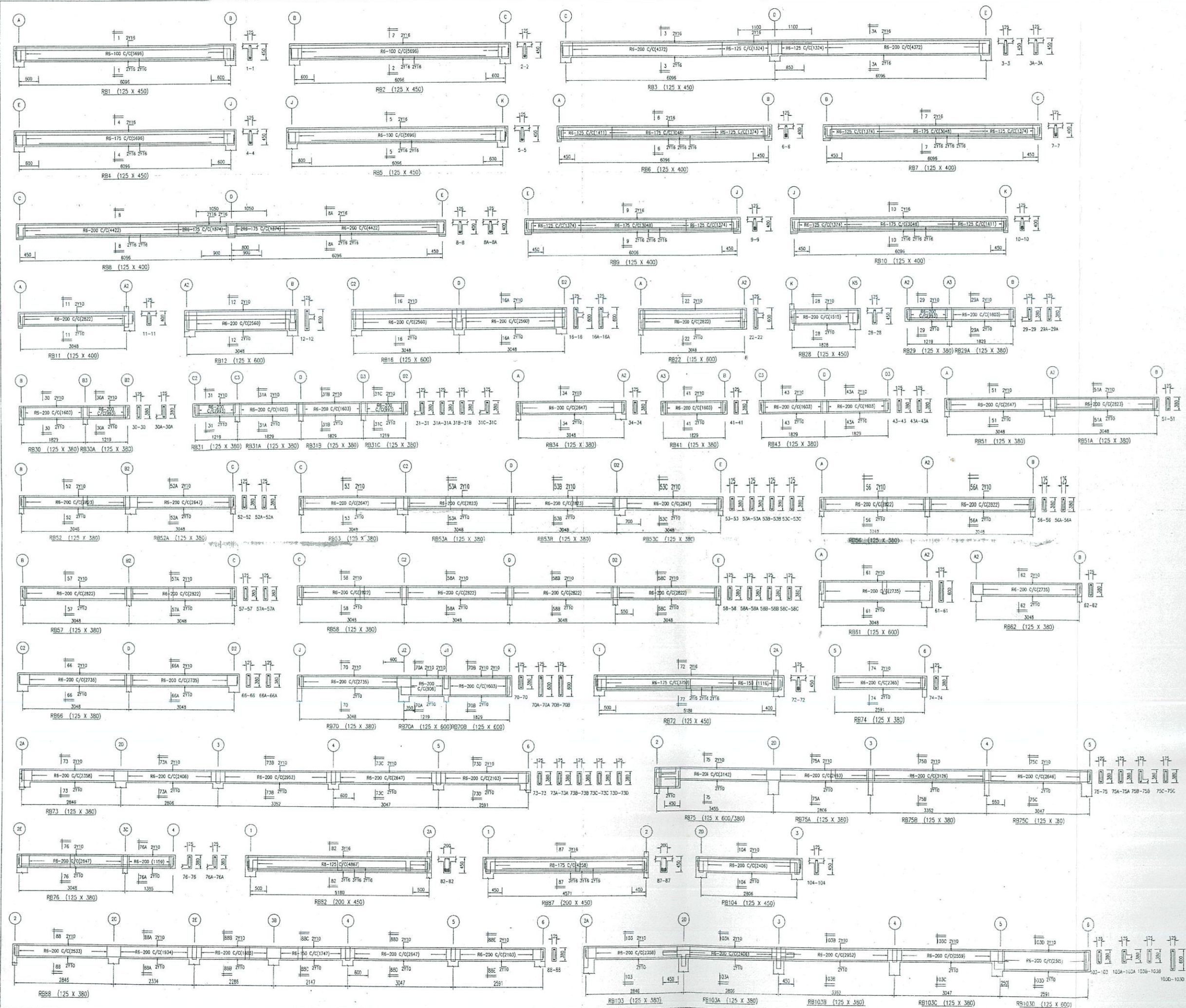
- NOTE :**
- NOTE: CONTRACTOR SHALL FULLY STUDY ON THE DRAWING AND REFER TO CONSULTANT FOR ANY DISCREPANCY/ERROR/INQUIRY ELSE THE DRAWING SHALL BE DEEMED FULLY UNDERSTOOD AS PER CONSULTANT IDEAL AND INSTRUCTION.
 - OTHER RELEVANT DRAWINGS.
 - THESE STRUCTURAL DETAILS ARE TO BE READ IN CONJUNCTION WITH ARCHITECTURAL, M&E AND OTHER RELEVANT DRAWINGS.
 - THE FOUNDATION DESIGN IS BASED ON SOIL BEARING CAPACITY = 75 N/m²
 - CONCRETE GRADE 25 SHALL BE USED (UNLESS OTHERWISE) AND COMPLIANCE TO BS 8110 1985
 - MINIMUM DEPTH OF 50mm (2") LEAN CONCRETE SHALL BE PROVIDED TO ALL STRUCTURES IN CONTACT WITH THE GROUND, LE AT SOFFIT OF FOOTINGS, PILE CAP/GROUND BEAM, GROUND SLAB, ETC. WHETHER OR NOT SHOWN IN THE DRAWINGS.
 - 125mm X 25mm (5" X 1") LATERAL BEAM (REIN: Z1Y10 TOP & BOTTOM/LONGS R6-150/C) TO BE PROVIDED OVER OPENING OR 400mm WALL FOR SPAN UP TO 3 METRE (10'-0") LONG, AND 125mm X 300mm (5" X 12") LATERAL BEAM (REIN: Z1Y10 TOP & BOTTOM/LONGS R6-150/C) TO BE PROVIDED OVER OPENING OR 400mm WALL FOR SPAN UP TO 6 METRE (20'-0") LONG.
 - ALL DIMENSIONS IN mm UNLESS SPECIFIED OTHERWISE.
 - CONCRETE CLEAR COVER : a) PILE CAPS/FOOTING : 50mm
 b) BEAMS : 25mm
 c) STUMPS & COLUMNS : 25mm
 d) RE DIRECT EXPOSE TO GROUND : 35mm
 e) SLABS : 25mm
 - THE YIELD STRESSES FOR REINFORCEMENT STEEL SHALL BE AS FOLLOW:
 - HIGH YIELD STEEL (H) : 460 N/mm²
 - MILD YIELD STEEL (M) : 250 N/mm²
 - STEEL FABRIC : 485 N/mm²
 - FOR SETTING OUT TO REFER ARCHITECTURE BUILDING PLAN AND PRE-COM PLAN
 - ALL BRICKWORK MUST HAVE A MIN. CRUSHING STRENGTH OF 20N/mm² with 1:1.5 CEMENT-LIME-SAND MORTAR MIX.
 - ALL BRICKMALL MUST HAVE RC STIFFNESS (WALL THK X 225) WITH 4Y10 & LINK R6-100/C WITHIN SPACING NOT MORE THAN 6 METRE C/C IN ACCORDANCE WITH THE SPECIFICATION.
 - ALL NOT-ROLLED STEEL PLATES AND SECTIONS SHALL COMPLY WITH THE RELEVANT BRITISH STANDARD (MATERIAL BS 4360, BS EN 10025-PROFILES BS 4, BS 4846) AND SHALL BE GRADE SA OR SB AS INDICATED ON THE DRAWINGS.)
 - ALL BOLTS, NUTS AND WASHERS SHALL COMPLY WITH BS 3692, BS 4395 OR BS 4190 AS APPROPRIATE AND SHALL BE HOT DIPPED GALVANIZED. TENSIONED BOLTING WHERE SPECIFIED (TYPE TB OR IT) SHALL COMPLY WITH BS 4624 (REFER BOLTING NOTE BELOW)
 - THE DESIGN STRENGTH FOR STEEL STRUCTURES SHALL BE 275 N/mm²
 - ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE WORK.

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

DETAIL : SINGLE TERRACE (LOT 422 & 423)
 Raft Foundation Plan
 External Column Footing & Column Schedule
 Typical Non Suspended Porch Slab Detail
 Raft Foundation Cut Section
 Ground Beam For Party Wall Fence
 Extra Raft Foundation Cut Section For Block A
 Extra Ground Beam Detail For Block B, C, D & F

Plan Status:
 Preliminary_ Submission_ Construction_
 Information_ Tender_ Amend_

Rev No: _____ Scale: 1:100 & 1:50 Date: JAN 2016
 NBC/LCS/422&423MTR/ST/RC-01



PROJECT :
 CADANGAN PEMBANGUNAN SKIM PERUMAHAN YANG MENDUNGKI:
 18 UNIT KEDAI/PEJABAT 2 TINGKAT DAN
 65 UNIT RUMAH TERES 1 TINGKAT,
 DIATAS LOT NO.PT 18532-PT18576),
 lot asal 422(GM 1672), & LOT NO.PT 18384-PT 18422)
 lot asal 423(GM 1671), MUKIM MENTAKAB,
 DAERAH TEMERLOH, PAHANG DARUL MAKMUR.

OWNER :
 LCS DEVELOPMENT SDN.BHD.
 S.K.W No : 835/2016
 No.25, Jalan Industri 1/1,
 Taman Perindustrian Temerloh,
 28400 Mentakab, Pahang D.M
 No Tel :

- NOTE :**
- CONTRACTOR SHALL FULLY STUDY ON THE DRAWING AND REFER TO CONSULTANT FOR ANY DISCREPANCY/ERROR/INQUIRY ELSE THE DRAWING SHALL BE DEEMED FULLY UNDERSTOOD AS PER CONSULTANT IDEAL AND INSTRUCTION
 - THESE STRUCTURAL DETAILS ARE TO BE READ IN CONJUNCTION WITH ARCHITECTURAL, M&E AND OTHER RELEVANT DRAWINGS.
 - THE FOUNDATION DESIGN IS BASE ON SOIL BEARING CAPACITY = 75 kN/m²
 - CONCRETE GRADE 25 SHALL BE USED (UNLESS OTHERWISE) AND COMPLIANCE TO BS 8110 1995
 - A MIN. DEPTH OF 50mm (2") LEAN CONCRETE SHALL BE PROVIDED TO ALL STRUCTURES IN CONTACT WITH THE GROUND, IE AT SOFFIT OF FOOTINGS, PILE CAPS/GROUND BEAM, GROUND SLAB, ETC. WHETHER OR NOT SHOWN IN THE DRAWINGS
 - 125mm x 225mm (5" x 9") LARVA BEAM (REF: 2112 TOP & BOTTOM) LKS-150(c) TO BE PROVIDED OVER OPENING OR 4M HIGH WALL FOR SPAN UP TO 3 METRE (10'-0") LONG AND 125mm x 300mm (5" x 12") LARVA BEAM FROM 2116 TOP & BOTTOM LKS-150(c) TO BE PROVIDED OVER OPENING OR 1M HIGH WALL FOR SPAN UP TO 6 METRE (20'-0") LONG
 - ALL DIMENSIONS IN MM UNLESS SPECIFIED OTHERWISE.
 - CONCRETE CLEAR COVER:
 - a) PILE CAPS/FOOTING: 50mm
 - b) BEAMS: 25mm
 - c) STAMPS & COLUMNS: 25mm
 - d) RC DIRECT EXPOSE TO GROUND: 75mm
 - e) SLABS: 20mm
 - THE YIELD STRESS FOR REINFORCEMENT STEEL SHALL BE AS FOLLOWS:
 - HIGH YIELD STEEL (H): 460 N/mm²
 - MID YIELD STEEL (M): 235 N/mm²
 - STEEL FABRIC: 455 N/mm²
 - FOR SETTING OUT TO REFER ARCHITECTURE BUILDING PLAN AND PRE-COM PLAN
 - ALL BRICKWORK MUST HAVE A MIN. CRUSHING STRENGTH OF 20N/mm² with 1:1:6 CEMENT-LIME-SAND MORTAR MIX.
 - ALL BRICKWORK MUST HAVE RC STIFFNESS (WALL THK X 225) WITH 4Y10 & LINK RS-100C/C WITHIN SPACING NOT MORE THAN 6 METRE C/C
 - ALL STEEL WORK SHALL COMPLY WITH BS 5950 : PART 2: 2000 AND AS MODIFIED IN ACCORDANCE WITH THE SPECIFICATION.
 - ALL HOT-ROLLED STEEL PLATES AND SECTIONS SHALL COMPLY WITH THE RELEVANT BRITISH STANDARD (BSEN) BS 4360, BS EN 10025, PROFILES BS 4, BS 4446 AND SHALL BE GRADE A36 OR S36 AS INDICATED ON THE DRAWINGS.
 - ALL BOLTS, NUTS AND WASHERS SHALL COMPLY WITH BS 3602, BS 4325 OR BS 4130 AS APPROPRIATE AND SHALL BE HOT DIPPED GALVANIZED. TENSIONED BOLTING WHERE SPECIFIED (TYPE TB OR BF) SHALL COMPLY WITH BS 4624 (REFER BOLTING NOTE BELOW)
 - THE DESIGN STRENGTH FOR STEEL STRUCTURES SHALL BE 275 N/mm²
 - ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE WORK.

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

DETAIL : SINGLE TERRACE (LOT 422 & 423)
 Roof Beam Detail

Plan Status:

Preliminary_ Submission_ Construction_
 Information_ Tender_ Amend_

Date: 14/03/2016 Scale: 1:100 No: 100/011
 NBC/LCS/422&423MTK/ST/RC-03