

CHAPTER 3.0 PROJECT ACTIVITIES

3.1 INTRODUCTION

This chapter will discuss the relevant project activities that will take place should this project be allowed to proceed. The main purpose of the identification of these activities is to enable a more comprehensive study on the potential impacts of the activities towards the existing environment. Specific mitigation measures to minimize adverse impacts from these activities can also be formulated early in the development phase. The project activities involved can be categorized into 3 main groups namely:

- Pre-development (pre construction) phase;
- Development phase (construction) and;
- Post - development (post construction) phase.

Pre Construction Stage involves preliminary survey and data collection activities which include Environmental Impact Assessment, geophysical survey, soil investigation and other related site investigation / data collection. Later stage of pre construction would involve design activities by architects, civil, mechanical and electrical engineers.

Construction Stage involves actual physical construction of structures and substructures. Environmental protection measures such as preparation of sediment/silt traps, earth drain and all BMPs will also be prepared at this stage of development.

Post Construction Stage starts after all constructions are completed, and the proposed project commence. This stage involves operation processes and maintenance of the proposed development.

Methods for assessment of impacts are given below and will be discuss in Chapter 5: Potential Environmental Impact:-

Impacts	Methods of Assessment
Soil Erosion, Geology and Minerals	Annual Load Pollutant Modified Soil Loss Equation (MSLE)
Floods	Urban Storm water Management Manual for Malaysia, published by the Department of Irrigation and Drainage (DID). Surface Run-off Calculation
Water Quality	BOD sag and DO Sag Modeling is carried out based on the Streeter-Phelps model (1925). (Normal Case Scenario and Worst Case Scenario if STP failure)
Noise	Noise Impact from Traffic – during construction
Transportation	Traffic generation and flows models (TIA report analysis)
Land use	Map overlay technique, compare with evaluation against structure/local plan.
Ecology	Comparative evaluation
Socio-economic	Judgmental assessment
Aesthetic	Judgmental assessment

3.2 PRE-DEVELOPMENT PHASE

Pre-development phase involves preliminary survey and data collection activities which include site survey/investigation, collection of primary and secondary data, soil investigation, traffic impact assessment, environmental impact assessment and other related preliminary activities. The later stage of this phase would involve design activities by civil and structure engineers or other specialist consultant.

3.2.1 Reconnaissance Survey, Site Inspection and Data Collection

A study on available information enables the study team to select feasible alignment based on existing and future land use, hydrological characteristics of water catchments areas, terrain characteristics and ground condition. After the routes have been identified from available maps, aerial photographs and topographic sheets, field reconnaissance survey was conducted. The survey will observe the following:

- Existing road and highway network
- Road Inventory
- Existing encumbrances
- Existing land use and development
- Social sensitive areas; eg schools, religious facilities, ancestral lands etc.
- Environmental sensitive areas; eg wetland areas, water catchments areas etc.

During the site investigation stage, the activities involved are site visit, land survey, planning/conceptual design of the proposed development and soil investigation. However, work at this stage does not involve any comprehensive earthwork. Thus, this stage would not bring about any adverse impact to the surrounding environment.

3.2.2 Topographic survey

Topographic Survey is carried out before the design stage to determine the proper alignment and distance involved in the project. It is also for the purpose of converting physical data to digital form so that accurate maps and plans can be produced for engineering design/ construction purposes. Land surveyors will responsible in carrying out survey works on the ground. For this development plan, survey plan was prepared by **Jurukur Bakti Sdn. Bhd.** Data such as bearing, distance and height of existing level are useful in the overall planning especially for design proposed level of the site.

The detailed survey plan shown reading for spot heights area is between **8.1m – 138.4m**. Observations at the project site found some areas show the effect of runoff and soil erosion is minimal. This has no impact on the planning and the environment. (Refer **Figure 3.1: Demarcation Survey** and **Figure 3.2: Survey Plan- Appendix E**)

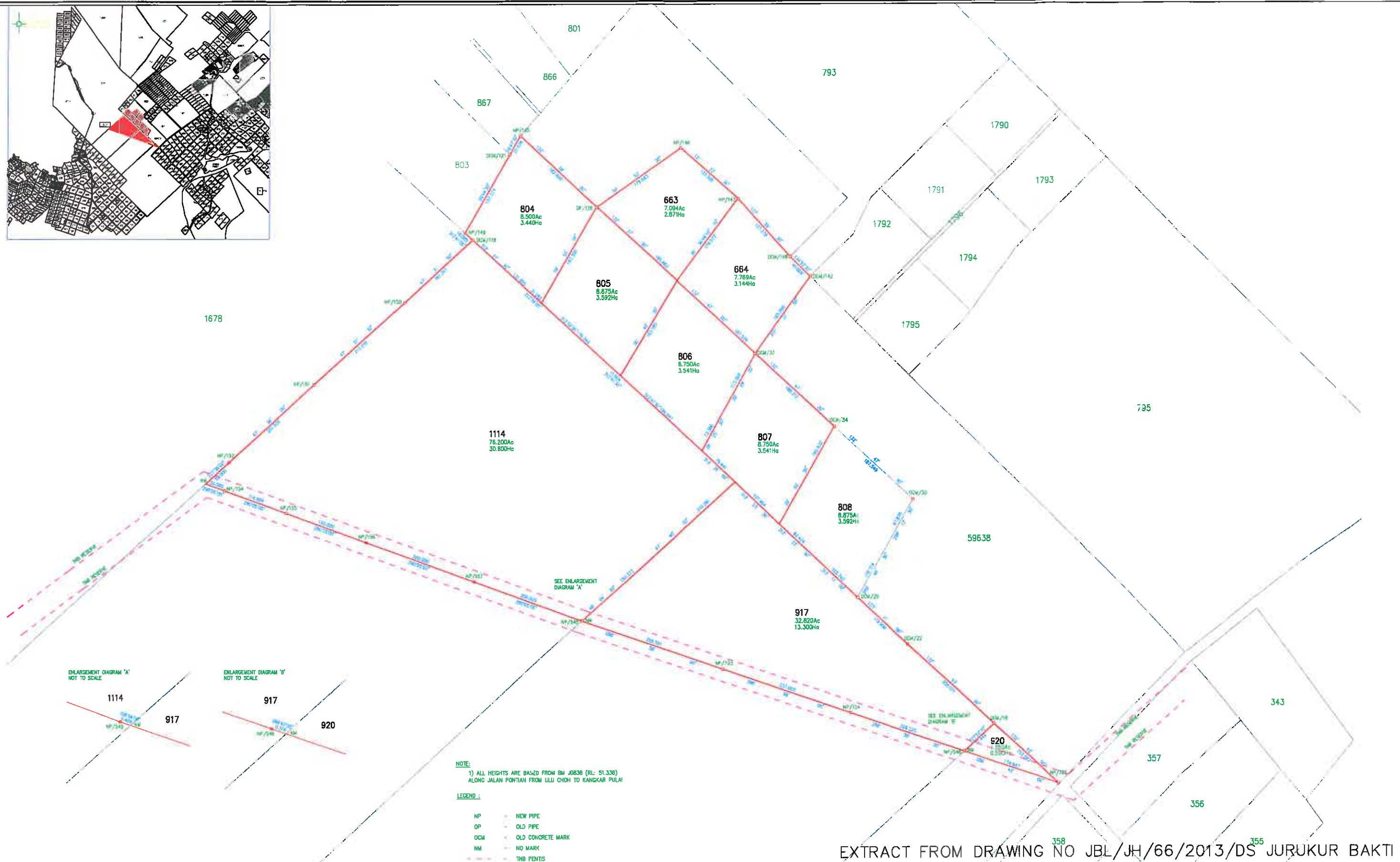


Figure 3.1 :

DEMARCATIION SURVEY

Environmental Consultant :

UEP Perunding UEP SDN. BHD. 631621A

36A, Jalan Impian Emas 7,
Taman Impian Emas, 81300 Skudai,
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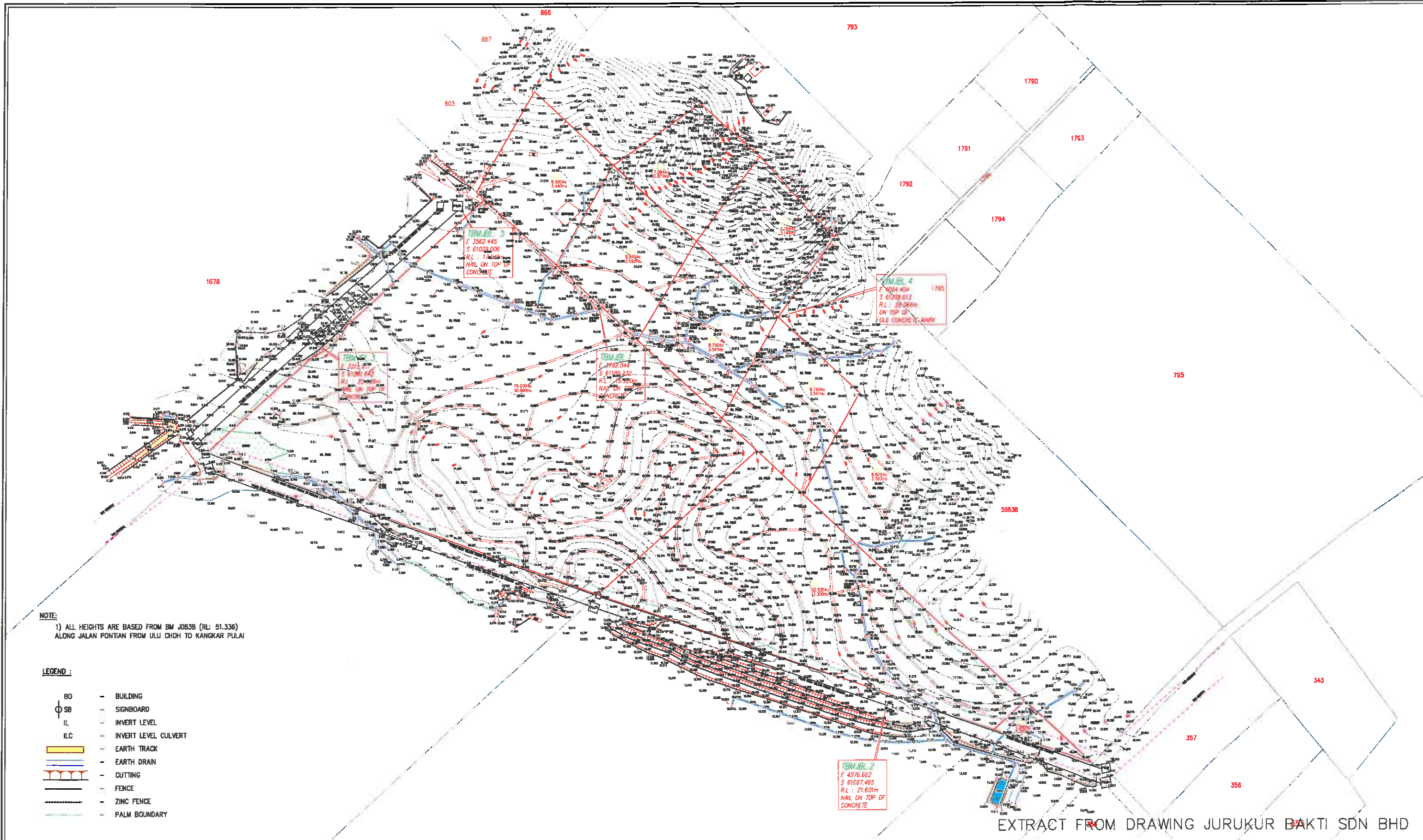


Figure 3.2

SURVEY PLAN

Environmental Consultant

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3.2.3 Soil Investigation

Soil investigation will be obtained to the required geotechnical engineering data, which are crucial to ensure proper design of sub-surface and structure for the proposed sites. The information required from soil investigation falls broadly into three main classes:

- Information affecting the design of the building and the infrastructure such as the shear strength and compressibility of the soil
- Information affecting the construction works such as the foundation of the substructure.
- Information on ground water conditions including the level and seasonal variation of the water table, the pressures in the soil water, and the permeability of the soil.

The site investigation works were carried out in accordance with the client's specifications and instructions. Three (3) numbers of boreholes has been proposed at site. The S.I work was conducted by **Kumpulan Ikram Sdn Bhd**. The drilling works had started on 9th November 2013 and successfully completed on 13th November 2013. (Refer Appendix F: Soil Investigation Report by Kumpulan Ikram Sdn Bhd)

The scope of works comprises the following:-

- Explored the subsoil condition at the proposed site by seven deep boreholes.
- Carried out Standard Penetration Test.
- Obtained Undisturbed and disturbed samples.
- Performed Laboratory test on selected samples.

The laboratory tests were carried out in accordance with the procedures in BS. 1377 on selected samples at various penetration, where applicable for Classification Test, test for Mechanical Properties comprising one dimensional consolidation test & shear Strength Test and Chemical Test.

Table 3.1: Summary of Deep Boreholes

BH No.	Depth	BH Depth	Casing Depth m	Water Level	Type of soil	
	m			m		
5	0.00 -16.645	16.65m	16.50	3.20	0.00m-16.645m	SILT
6	0.00-18.135	18.14m	18.00	3.00	0.00m-18.14m	SILT
7	0.00-15.13	15.13m	15.00	3.00	0.00m-15.13m	SILT

Source: Soil Investigation Report by Kumpulan Ikram Sdn, 2013

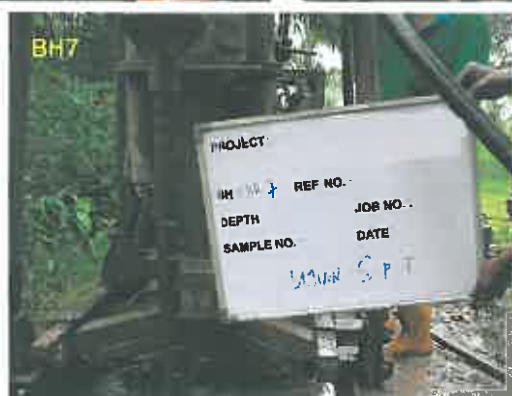
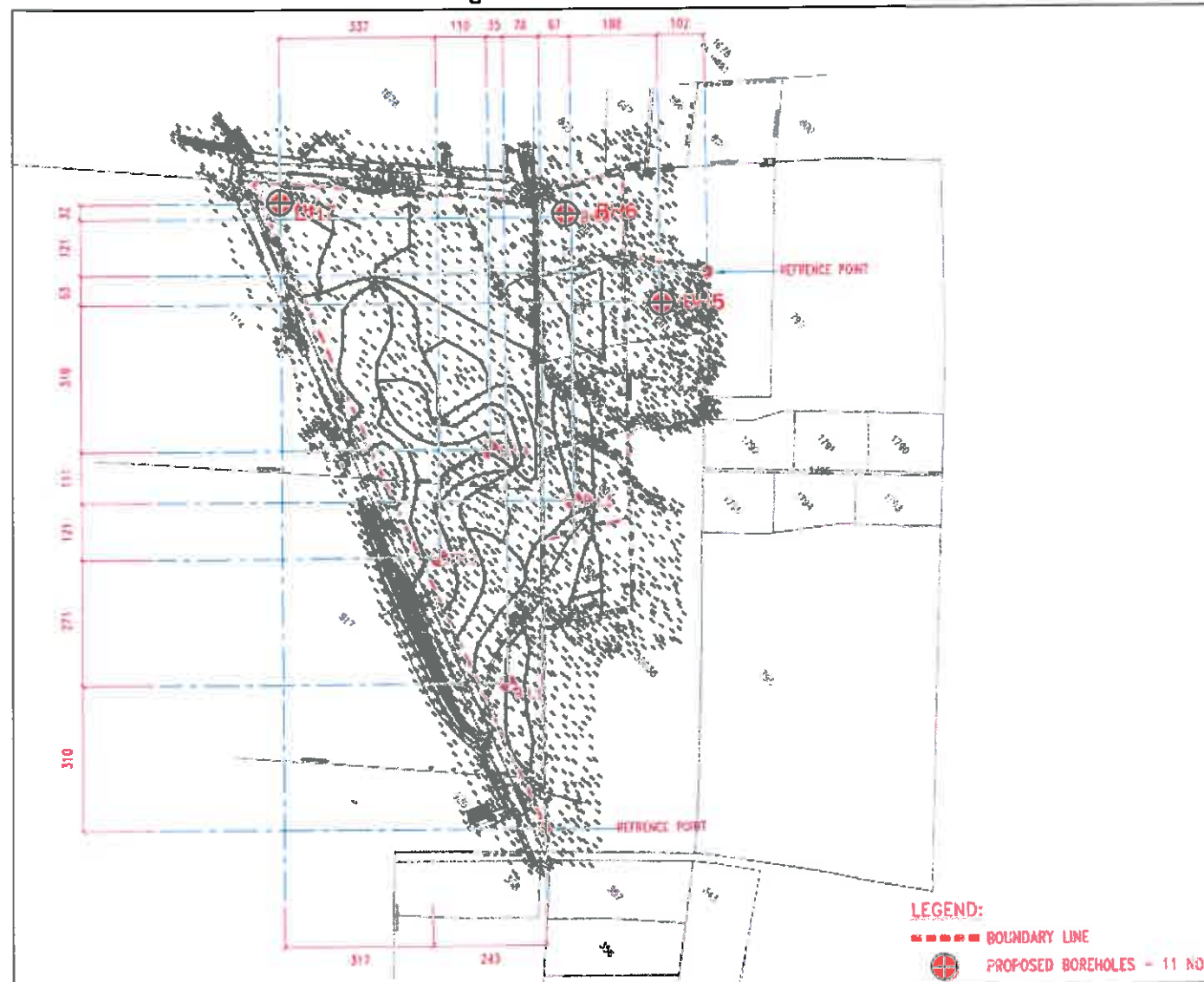


Figure 3.3: Location of Boreholes



Source: Soil Investigation Report by Kumpulan Ikram Sdn, 2013

3.2.4 Geotechnical Assessment¹

Kumpulan IKRAM Sdn. Bhd. has been appointed by Firstwide Plus Sdn Bhd to carry out geotechnical assessment for the proposed development. This geotechnical assessment is based on:

- Preliminary Site Investigation Report (reference no.: KISB(S)/2013/SI(87)/PF(91)/J-JB dated 21st November 2013) prepared by Kumpulan IKRAM Sdn Bhd.
- Topographical Survey Drawing (reference no.: BH/L-01 dated October 2013) prepared by Jurukur Bakti Sdn Bhd.
- Gelang Patah Layout Plan from Firstwide Plus Sdn Bhd

a) Site Topography

Topographical survey drawing shows the varieties of elevations and landforms for both natural and man-made features. The elevation on a topographical survey drawing represents by the contour lines and not only shows the contour lines but also any significant streams, forest, built-up areas or individual buildings, roads and other features. Colors in topographic map can be used to indicate a classification such as an elevation.

Based on the topographical survey drawing, the existing site topography had hilly terrain, mandmade slope, gentle slopes and flat area from Eastern to Western part of the proposed development area, where the elevation is from RL. 8.0m (Northern part-left side) to RL. 150.0m (Northern part-right side).

In general, the proposed site location is near to Parcel 2A development area and Setia Eco Garden residential area. At site, there is a bit of secondary forest, bushes and small crops at some locations. The site feature involved both natural land and manmade slope at some part of proposed development area.

Table 3.2: Details of Existing Site Topography

Direction	Details
North	Existing power transmission line (pylon) & pond
South	Existing roadway & pond
East	Hilly terrains
West	Existing power transmission line (pylon) & roadway

b) Site Geology

- Based on the Geology Map of Peninsular Malaysia (1985), the lithology of proposed development area was formed by Sedimentary Rock Formation. This formation formed by the accumulation of
- sediments. The formation are consist of many type of rocks such as Sandstone, Siltstone and Shale.

c) Site Investigations

Site investigation works was carried out by contractor, Kumpulan IKRAM Sdn Bhd that is appointed by developer from 9th November 2013 to 16th November 2013 (based on 3 nos. of boreholes sunk on site) at proposed development area to identify the soil profile for analisation and proposed suitable design at site. Furthermore, site investigation works is to know the lithology of rock, subsurface geology, weathering grade, thickness of residual soil (if any) and bedrock.

The scope of works is:

- Three (3) numbers of borehole (BH-5, BH-6 & BH-7) has been sunk at site, while BH-3 was in progress. Ground water level was measured in these proposed development areas. Soil samples were collected in the form of undisturbed or disturbed samples. Standard Penetration Test (SPT) were carried out at 1.0m interval for the first 6.0m and 1.5m interval thereafter.
- Based on three (3) numbers of borehole data, maximum termination depth is at Borehole 6 (BH-6) at depth 18.135m.

Summary of Boreholes Information as shown in below table:-

¹ Geotechnical Assessment Report Preliminary Environmental Impact Assessment (Peia) For Pembangunan Bercampur Di Atas Lot 663, Lot 664, Lot 804 - Lot 807, 1114, 917 & 920, Mukim Pulau, Daerah Johor Bahru, Johor By Kumpulan Ikram Sdn Bhd -

Table 3.3: Summary of Boreholes Information

Borehole	Hard Layer N=50 (m.b.g.l.)	Rock Level (m.b.g.l.)	Rock Type/Sample	Termination Depth (m.b.g.l.)	* Ground Water Level (m.b.g.l.)
BH5	10.50	-	-	16.645	3.20
BH6	12.00	-	-	18.135	3.00
BH7	7.50	-	-	15.130	3.00

Note : m b.g.l denotes meter below ground level (*readings for ground water level during site investigation works)

d) Sub-Surface Profile

The sub-surface investigation has been carried out by Kumpulan IKRAM Sdn Bhd. Based on site investigations works and laboratory result, the sub-surface profile is as follow:

Table 3.4: Summary of Sub-surface Profile based on Boreholes Information

Layer	Thickness	Description	Type of Soil
1	5.0m - 8.0m	Firm to Stiff Sandy SILT	Residual Soil
2	3.0m	Very Stiff Sandy SILT	
3	6.0m	Hard Sandy SILT	

***There is no bedrock layer identified during site investigation works.

e) GROUND WATER LEVEL MONITORING

During site investigation works, the minimum ground water level is at 3.00m below ground level based on topography. Installation of standpipe piezometer for monitoring of ground water level is proposed to carry out at site with minimum of two (2) weeks after site investigation works finish. This is to ensure the record is more accurate for slope stability analysis.

f) Slope Stability

Based on the Interim Final Site Investigation Report prepared by Kumpulan IKRAM Sdn Bhd, it will assist to identify the sub-surface profile for slope stability analysis. The analysis presented is based on 'Hong Kong Geotechnical Slope Manual'. The minimum Factor of Safety (F.O.S) adopted in the slope stability analysis is 1.40.

g) CUT SLOPE

The proposed cut slope design should be as follow:

- Slope Gradient is based on 1V: 1.5H scale with maximum slope height of 6.0m.
- Proposed installation of horizontal drains to lower the ground water level and proper drainage system on the slope.
- Closed turving on slope surface to prevent erosion.

Regular maintenance on cut slope

should be carried out by developer to ensure no blockage on drainage system.

h) Fill Slope

The proposed fill slope design should be as follow:

- Slope Gradient is based on 1V: 2H scale with maximum slope height of 6.0m.
- Proposed installation of horizontal drains to lower the ground water level and proper drainage system on the slope (cutoff drain, berm drain & cascade drain).
- Closed turving on slope surface to prevent erosion.

Protection on fill slope surface is necessary to prevent gully erosion. Top soil, small crops, branches and unsuitable materials should be removed from the site to built the fill slope.

Only suitable fill soil materials will be used and filled at site. Compaction test should be carried out until reach 90% of standard compaction to prevent settlement. If the filling works at valley, drain or water flow area, culvert will be proposed to install to allow water flow.

All bared soil slope surface should be protect with Hydroseeding or Closed Turfing method to prevent erosion. Slope maintenance works also should be carried out regularly (scheduled).

i) Slope Stability Analysis

Slope stability design is based on Geotechnical Manual for Slope produced by Hong Kong Geotechnical Engineering Office that fixed the factor of safety must be more than 1.40 (FOS>1.40) for identification of high risk slope to life and property. The purpose of these analyses is to evaluate the potential instability of the slopes in the area.

The slope stability analysis should take into consideration all aspects such as stability of the overall and localized slope. The slope stability analysis for proposed slope profile performed using SLOPE/W software, which adopts Morgenstern-Price's method, satisfying both the force and moment requirements. Based on the Site Investigation Report, the actual effective strength parameter for slope analysis at proposed development area has been used. Below table showing the parameter for soil strength:-

Table 3.5: Effective Strength Parameter

Soil Layer	Unit Weight, γ' (kN/m ³)	Angle of Friction, ϕ' (deg.)	Effective cohesion, c' (kPa)
<i>Firm to Stiff Sandy SILT</i>	18.5	29	4
<i>Very Stiff Sandy SILT</i>	19.0	30	5
<i>Hard Sandy SILT</i>	19.0	30	7

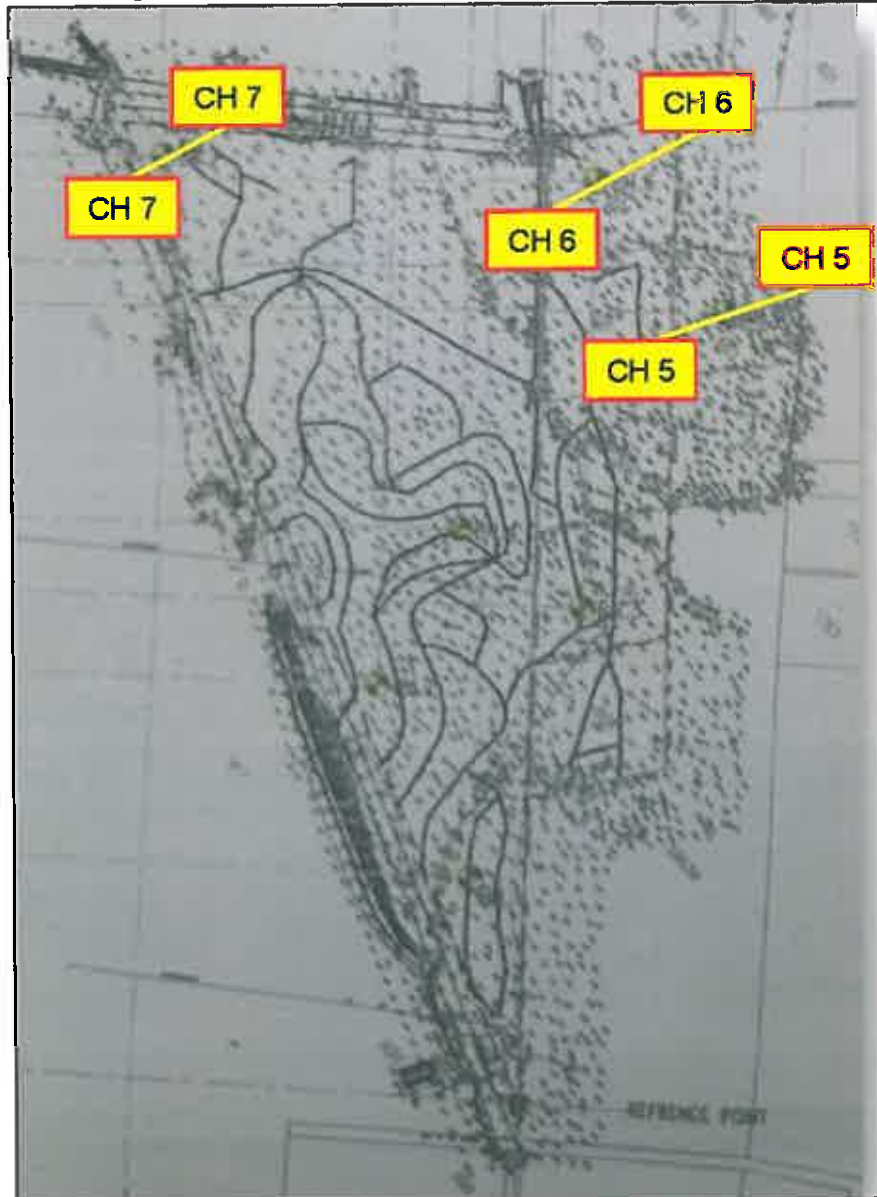
Below table showing the summary of slope stability analysis results. For this area, it can be proposed to carry out regular maintenance on drainage system and slope surface protection to prevent erosion occurred.

Table 3.6: Summary of Slope Stability Analysis

Cross-section	Case	Analysis Result (F.O.S)	Figure	Note
CH 5-5	Global	0.641	3	<i>FOS less than 1.4. Therefore, not satisfactory.</i>
	Local	0.668	4	
CH 6-6	Global	1.297	5	
	Local	1.088	6	
CH 7-7	Global	13.392	7	<i>FOS greater than 1.4. Therefore, satisfactory.</i>
	Local	18.221	8	

Source: Geotechnical Assessment Report by Kumpulan Ikram Sdn, 2013

Figure 3.4: Cross-Section Layout For Slope Stability Analysis



Source: Geotechnical Assessment Report by Kumpulan Ikram Sdn, 2013

Figure 3.5: Cross Section - CH 5 (Global). Minimum Factor of Safety (FOS=0.641)

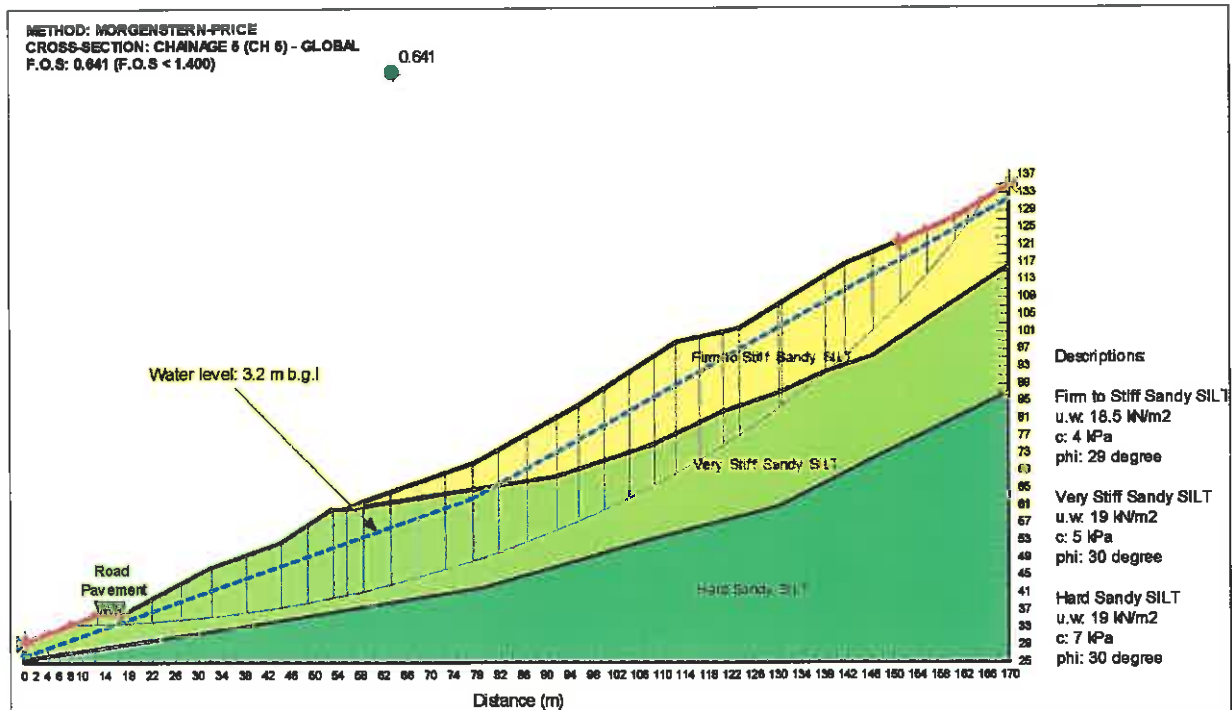
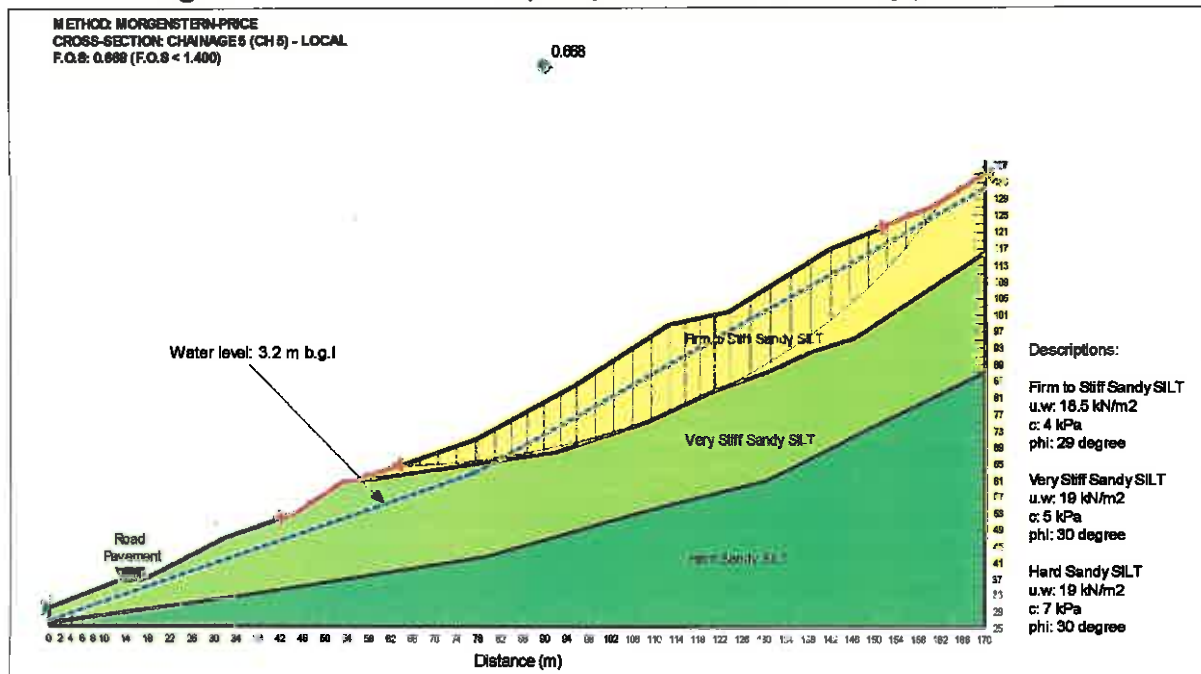


Figure 3.6: Cross Section - CH 5 (Local). Minimum Factor of Safety (FOS=0.668)



Source: Geotechnical Assessment Report by Kumpulan Ikram Sdn, 2013

Figure 3.7: Cross Section - CH 6 (Global). Minimum Factor of Safety (FOS=1.297)

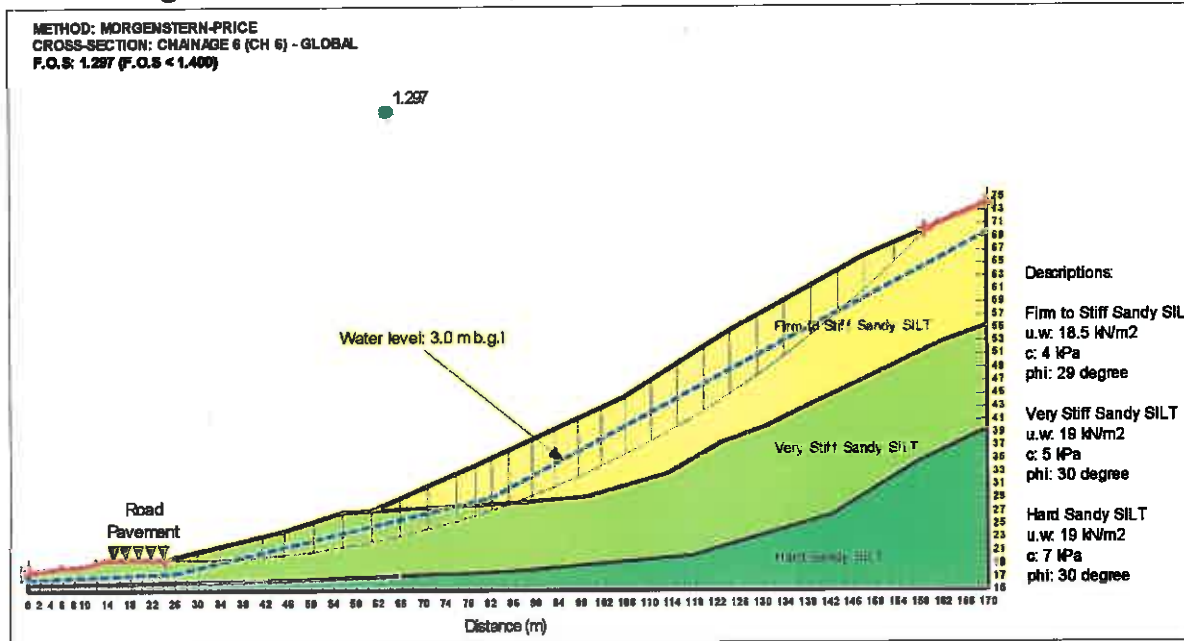
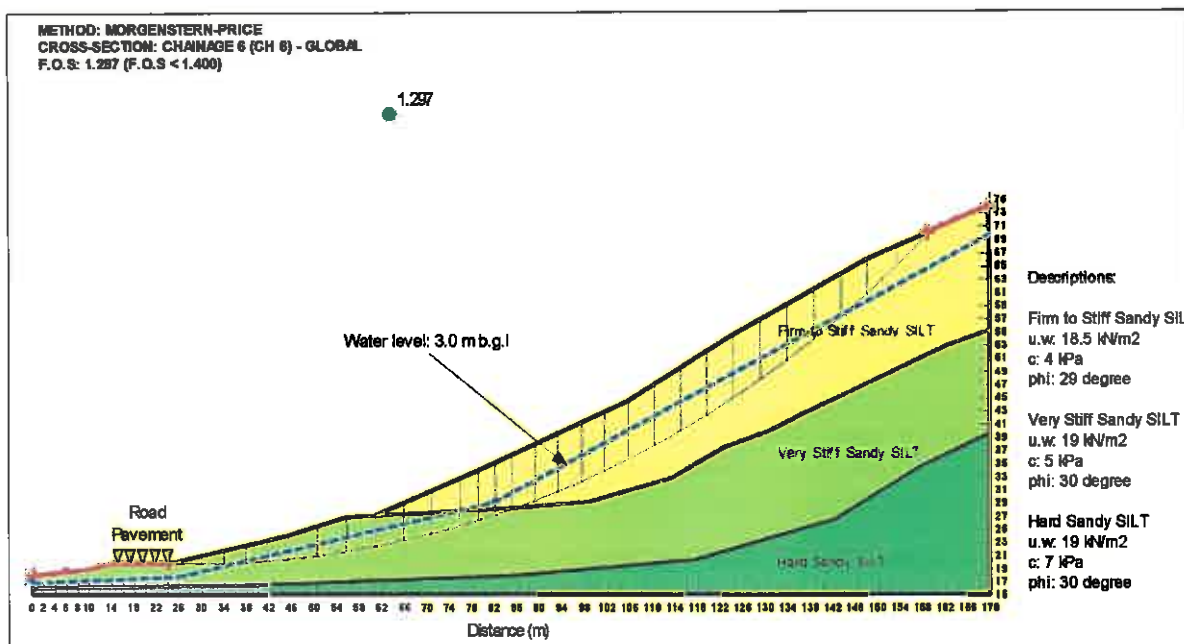


Figure 3.8: Cross Section - CH 6 (Local). Minimum Factor of Safety (FOS=1.088)



Source: Geotechnical Assessment Report by Kumpulan Ikram Sdn, 2013

Figure 3.9: Cross Section - CH 7 (Global). Minimum Factor of Safety (FOS=13.392)

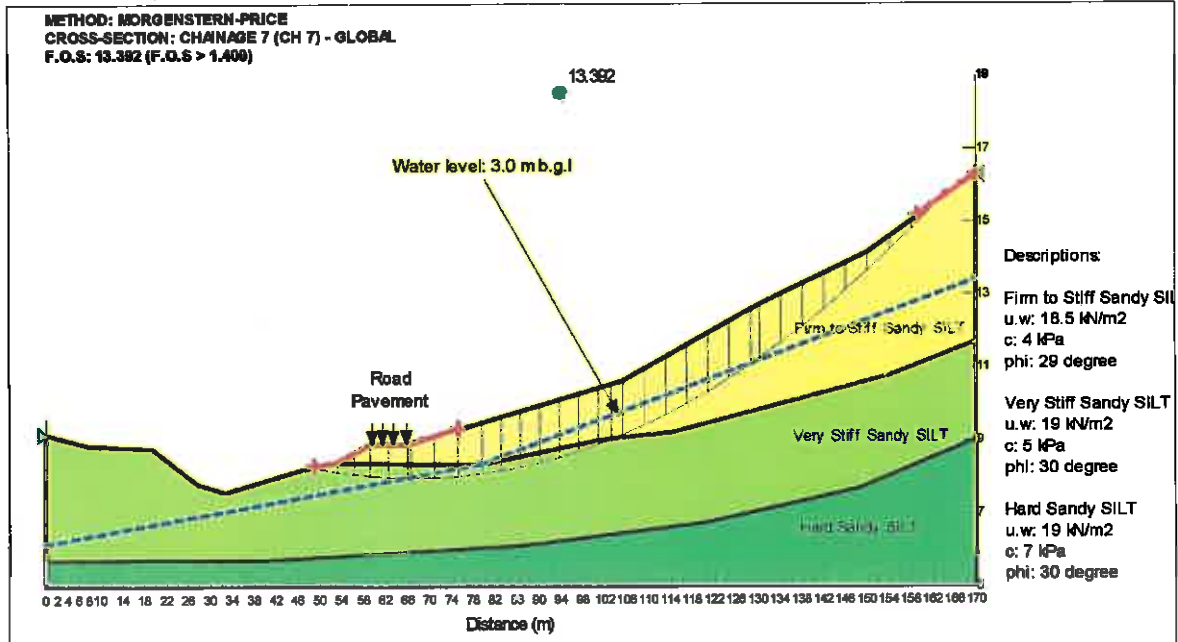
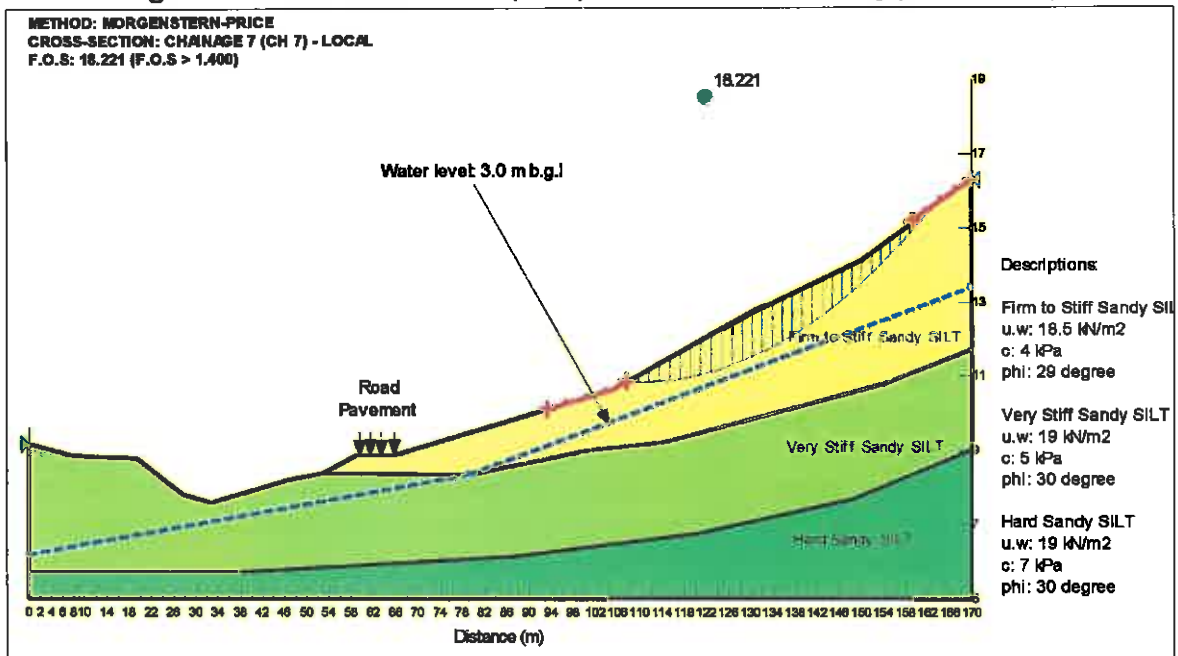


Figure 3.10: Cross Section - CH 7 (Local). Minimum Factor of Safety (FOS=18.221)



Source: Geotechnical Assessment Report by Kumpulan Ikram Sdn, 2013

3.2.5 Traffic Impact Assessment²

Traffic impact assessment shall be carried out to project for future loads on the existing and the proposed road systems by specialist road and traffic engineers. This assessment includes comprehensive field data collection and traffic modeling. Based on data, road circulation will be designed so that traffic flow at the newly proposed site will be optimal and congestions can be minimized or eliminated. The project proponent had engaged specialist traffic engineer to study these impacts, and proposed for the best mitigating measures to solve the potential problems. The Traffic Impact Assessment (TIA) will take into account the frequency, types of transport, time factor (peak-off peak hours), land use activities and other activities that are significant to the traffic flow. Suitable and efficient traffic flow system will be designed to ensure smooth flow of traffic circulation with the project site. For more detailed impact of the traffic, refer to the **Traffic Impact Assessment Report (TIA)** by **Perunding Trafik Klasik Sdn Bhd. (Appendix G)**

This study would broadly comprise of establishing the additional traffic that would be generated and attracted by the proposed development. Following which the impact of the additional traffic on the road network of the locality would be investigated and analyzed. Finally, mitigation measures to ameliorate any possible traffic issues in the future would be recommended, if necessary. Thus, this report presents the results of an impact study to fulfill the objectives outlined below:

- to compile an inventory of the existing traffic conditions in the vicinity,
- to analyze the existing traffic condition of the proposed study area in terms of traffic circulation pattern and surrounding road network capacity,
- to ascertain traffic demand and estimate trip generation by the development,
- to distribute the generated and attracted traffic to the relevant arterial by conducting traffic assignment,
- to appraise adequacy and identify deficiencies of the road network,
- to investigate the necessity of further improvement to junctions in the vicinity due to the additional trips generated by the development,
- to suggest improvements necessary to maintain acceptable junction performance criteria.

Existing Road Network

The proposed development will be accessible mainly via the 2nd Link Highway and Jalan Gelang Patah in future (2026).

Traffic Surveys and Classifications

Traffic count surveys were carried out from 7:00 a.m. to 10:00 a.m. and from 4:00 p.m. to 7:00 p.m. on the **30th of July 2013** until **1st of August 2013** at 15-minute intervals. These six hours were chosen as the morning and evening peak hours are expected within these periods. The dates of traffic survey are as listed below:

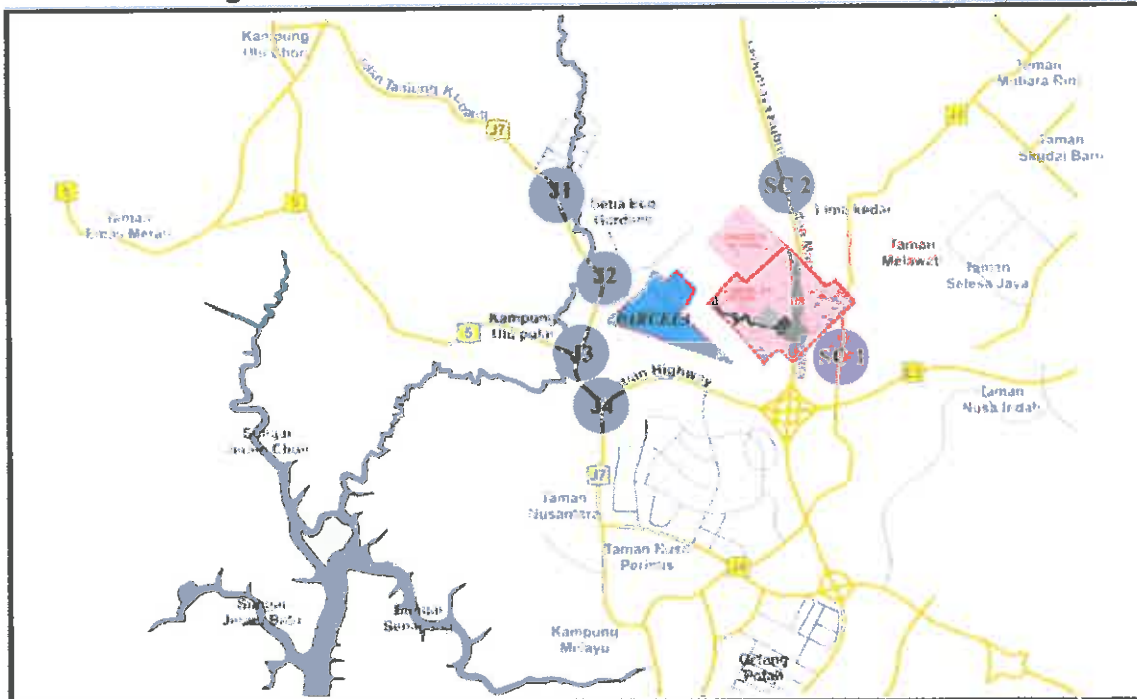
- a) J1 to J4 - 8th and 9th of July 2013
- b) S1 and S2 - 7th and 8th of November 2013

Surveys were conducted at 4 junctions for traffic count survey and at 2 locations for screenline survey, which is expected to be the main access routes of the development-based traffic, due to their proximity to the development. The location of the junction and screenline surveys are:

²Source: Extracted From Traffic Impact Assessment Study For Pembangunan Bercampur Di Atas Lot 663, Lot 664, Lot 804 – Lot 807, Lot 1114, Lot 917 & Lot 920, Mukim Pulau, Daerah Johor Bahru, Johor By Perunding Trafik Klasik Sdn Bhd, 2013

- J1 - Jalan Tanjung Kupang-Persisiran Laman Setia 7
- J2 - Jalan Tanjung Kupang-Laman Setia Utama
- J3 - Jalan Tanjung Kupang (Junction to Federal Road 5)
- J4 - Jalan Tanjung Kupang-Lebuhraya Pontian
- S1 - Along Jalan Gelang Patah
- S2 - Along 2nd Link Highway

Figure 3.11: Location Where the Traffic Surveys Were Conducted



Source: Extracted From Traffic Impact Assessment Study For Pembangunan Bercampur Di Atas Lot 663, Lot 664, Lot 804 - Lot 807, Lot 1114, Lot 917 & Lot 920, Mukim Pulau, Daerah Johor Bahru, Johor By Perunding Trafik Klasik Sdn Bhd, 2013

Based on the traffic survey results, the daily profile of traffic flow is established and the peak hour traffic was determined. The peak hour traffic in the locality as shown in the traffic profile are:

Table 3.7: Peak Hour Traffic Surrounding Area

Period	Time
Morning peak hour	8:30 am to 9:30 am
Evening peak hour	6:00 pm to 7:00 pm

Existing traffic profile shows that AM and PM peak hours is the highest traffic demand. Therefore the traffic analysis is based on the AM and PM peak hours. The traffic upgrading and improvement that is able to sufficiently cater for this maximum flows, will obviously be able to meet the traffic demand during the non-peak hours.

3.2.6 Preliminary Environmental Impact Assessment

The environmental impact assessment (EIA) is one of the most widely used tools for identifying and mitigating adverse ecological effects of the development proposals. Environmental impact assessment (EIA) is generally defined as a process which consists of identifying and predicting the impacts of proposed projects and programs on the bio-geophysical environment and social well being and interpreting information about such impacts in a manner which can be utilized by the initiator or decision maker.

3.2.7 Design Stage

The overall master layout planning and renowned architecture can capitalize on this unique prospect to everyone's benefit. The list of goals below gives shape and guidance to this endeavour. The civil and structural engineers are responsible for engineering design and analysis. The engineers would be responsible for the structural design and integrity of an entire system, such as a building, bridge and infrastructure work design such as pipeline engineering, water and sewer line network, and road and drainage design. The engineers must ensure their designs satisfy given design criteria, predicated on safety or serviceability and performance. Designers have specific responsibilities under the safety and health legislation to, as far as practicable, eliminate or control hazards during the construction phase and use and occupation of a building or structure. For this development civil and structural drawing was prepared by **Jurutera JRK Sdn. Bhd.**

3.3 DEVELOPMENT PHASE

Development phase involves actual physical construction of earthwork, cutting and filling to the required level, transportation of material and culvert etc. Environmental protection measures such as silt traps, and wetting of access roads will also be implemented at this stage of development. The activities involve provision of internal access roads, earthworks, disposal of site clearing spoils and construction debris. The potential environmental impacts in the form of water pollution, air pollution, noise pollution, soil erosion and sedimentation, increase of surface runoff, socio-economic, transportation problem and biological impact is expected. During the construction stage, it is expected that there will be an increase of surface runoff, solid wastes and the disturbance of traffic flow to the proposed development.

3.3.1 Site Clearing

The project site is located adjacent to agriculture/plantation land (palm oil plantation) and housing area (Setia Eco Garden and Nusa Bayu). Most of the surrounding land was under palm oil, orchards and plantations. In general, any land use that located adjacent to the proposed area is likely not to be affected because minor activity area are located adjacent the site.

Site clearing at required places will be carried out right before construction activities started. Site clearance means removing all the buildings and facilities from a site. It might also include ground remediation where soil has been contaminated radiologically or by other agents. It will involve removal of growth and all foreign items that would obstruct the construction process. The unsuitable materials could also be found under the ground level and, thus need to be removed before the construction commences.

However, the impact might not necessarily negative since it may generate economic activities as well as social development at surrounding.

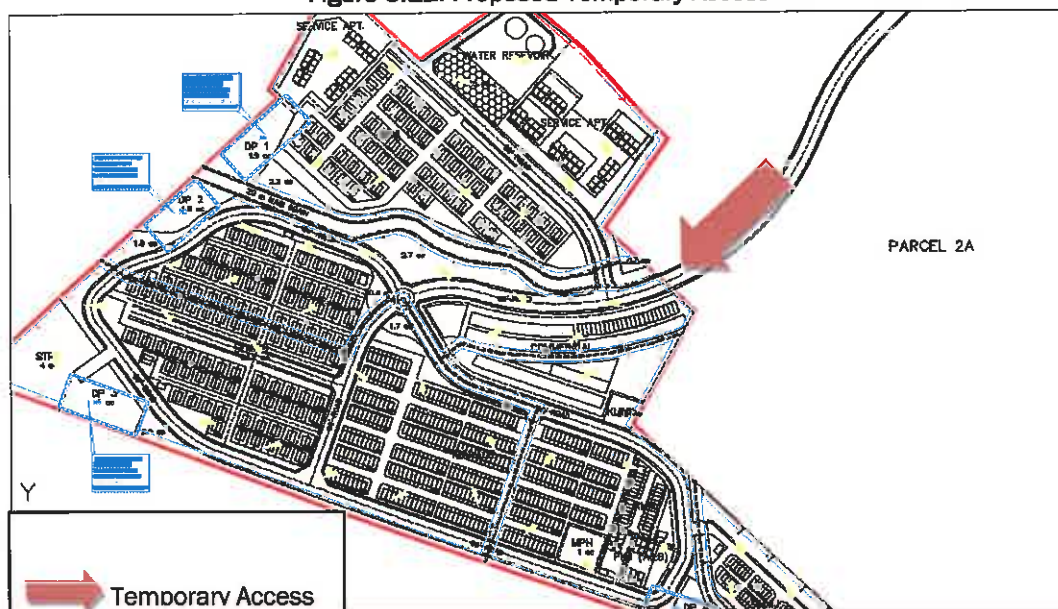


3.3.2 Construction of Temporary Access Roads

Temporary access roads are essential to provide working areas for machinery and workers. Therefore, this activity should be carried out fast in order not to leave the land bare and susceptible to erosion. As such, temporary access roads will need to be constructed in order to enable machinery to reach the certain stretch of road alignment. The construction of temporary access roads will create access too previously in accessible areas. The earthworks activities will involves machinery and vehicles entering the project area.

For this proposed project, there is one proposed entrances for temporary access road is located along the Coastal Highway. These temporary linkages shall be signalized and controlled with road signage, markings and flagmen. Wash through shall constructed and operated at each exit point, to ensure that the existing roads are maintained free from earth. Currently, the traffic volume at this stretch is moderate and we do not expect any traffic impact at the internal access road to the site due to the fact that there were not much traffic plying this access.

Figure 3.12: Proposed Temporary Access



Source: Extract from Drawing No. ESCP/L-01, Jurutera JRK Sdn. Bhd

3.3.3 Transportation of Construction Materials and Machinery

Construction materials such as additional earth, aggregates, piles, cement, and bricks are transported using trucks to the project site. Due to the nature of the project site and slow speed of machinery, some heavy machinery such as excavators needs to be transported to the designated area within the project site. This activity will see an influx of heavy vehicles and thus increase in vehicular activities along the proposed project. As the construction activity progresses, construction material such as earth, sand, bricks, concrete and piles will be transported to the site. The activities involve direct movement of heavy vehicles to the project site and surroundings.

3.3.4 Construction Of Site Office, Workshop and Worker's Quarters

The office buildings are required to ensure smooth implementation of the project. The site office and workshops are sometime established as to facilitate daily management and repairing works on the machineries. This is to save time, as transporting of machinery to any workshops is a time consuming. Contractors and sub-contractors engaged for the project would normally provide accommodation to their workers. It is often that these buildings are non-permanent in nature for easier demolished or remove upon completion of the project. The location of these buildings has yet to be determined at this stage. Water supply, electricity, toilets and places for disposal of solid waste will be provided at the site office. It

is often that these buildings are non-permanent in nature for easier demolished or remove upon completion of the project.

3.3.5 Earthworks

The earthworks for the development site shall consist of the following:

- a. Cut and Filling of the site to required level
- b. Provision of sediment basin, single layer of silt curtain, temporary drainage system, slope protection and other erosion control devices. (Erosion, sediment control plan-ESCP)

a) Cut and Filling of the site to required level

Earthworks will bring about major physical change to the existing height and slope configuration of the proposed site. There is **1,459,674.04 m³** excessive earth estimated generate from cutting activities. It would be exported to the site owned by developer. Earthworks would involve topping the cleared land with suitable fill materials up to the designed platform level. Excavated earth sometimes used to fill any low areas to the required construction platform. The total estimated earthwork volumes are balance as follow:

The total estimated earthwork volumes are balance as follow:

Volume of Cut = 3,632,456.21 m³

Volume of Fill = 2,172,782.16 m³

Net Exported Earth = 1,459,674.04 m³

Platform Level = 16m – 80m

Earthworks Volume Summary	
DTM Method	
Soil Swell Factor	1.00
Soil Shrink Factor	1.00
Bank Cut	3,632,456.21 m ³
Expanded Cut	3,632,456.21 m ³
Bank Fill	2,172,782.16 m ³
Volume Needed Before Compacted Fill	2,172,782.16 m ³
Export/Import	1,459,674.04 m ³
Total Platform Plane Area	648,209.44 m ²

Source: Jurutera JRK Sdn. Bhd. (Earthworks Volume Summary, 2013)

The Earthworks quantity for the project area mostly will be cut area. The cut earth will be filled up to leveling the project area with the existing low ground and extra earth will be export out from the project area.

The above estimations of volumes are based on data provided by Jurutera JRK Sdn. Bhd. Refer **Figure 3.3: Survey Plan** and **Figure 3.8: Erosion & Soil Control Plan**.

b) Provision erosion and Sediment Control Devices (Sediment Basin, temporary drainage, slope protection, hoarding and other)

The Erosion, Sediment and Control Plan will be prepared by the engineer and must be implemented by the contractor during the construction work. The perimeter temporary drain will be construct along the site and the sediment basin will be construct at final discharge of the diversion channel and will be maintained at regular period. All surface runoff water from interface area shall be channelled out to the sediment basin via perimeter drain. All perimeters drain shall be maintained regularly especially during monsoon season to prevent water pollution and flooding at the downstream and around the works area.

The Erosion and Sediment Control Plan (ESCP) for this proposed project should include:-

- i. Temporary Hoarding Board Line
- ii. Stockpile Area
- iii. Vehicle and Equipment Area
- iv. Materials Storage Area
- v. Sediment Basin
- vi. Check Dam
- vii. Temporary Waterway Crossing

EROSION AND SEDIMENT CONTROL PLAN (ESCP)³

Temporary earth drain may be necessary during the construction / installation of culverts to protect land from erosion and control the sediment to flow to the existing waterway. The Erosion, Sediment and Control Plan (ESCP) will be prepared by the engineer and must be implemented by the contractor during the construction work. The perimeter temporary earth drain will be constructing along the site and the sediment basin will be constructing at final discharge of the diversion channel and will be maintained at regular period. All surface runoff water from interface area shall be channeled out to the sediment basin via perimeter drain. All perimeters drain shall be maintained regularly especially during monsoon season to prevent water pollution and flooding at the downstream and around the works area.

WET SEDIMENT BASIN

- a) The entire project area will be designed and constructed with five number of wet sediment basin.
- b) This wet sediment basin is designed to have construction period of not less than two(2) years and three(3) months ARI.
- c) The wet sediment basin will have a minimum settling zone and sediment storage zone of 0.6m.
- d) The outlet pipe of the wet sediment basin is controlled by a 900mm diameter perforated outlet pipe riser.
- e) The calculation shows the number of offices evenly spaced around the outlet pipe riser.
- f) When emergency of spilling occur, an emergency spillway size was calculated in the calculation.
- g) The emergency spillway is designed to ten(10) years ARI flood rainfall intensity

Table 3.8: Proposed Sediment Basin Size

Sediment Basin	Catchment Area	Side Slope	Total Depth	Area		Sediment Zone		Emergency Spillway	
	(ha)	(H):(V)	(m)	W(m)	L (m)	y1 (m)	y2 (m)	8 (m)	Hp (m)
SB1	17.69	2(H):1(V)	2.10	35.00	75.00	0.60	0.85	3.50	0.50
SB2	11.51	2(H):1(V)	2.00	70.00	140.00	0.80	0.80	8.00	0.60
SB3	18.96	2(H):1(V)	2.10	75.00	150.00	0.80	0.80	8.50	0.60
SB4	10.36	2(H):1(V)	2.10	50.00	100.00	0.75	0.75	4.50	0.60
SB5	4.32	2(H):1(V)	2.00	65.00	130.00	0.80	0.80	8.00	0.60

Source: Laporan Erosion and Sediment Control Plan (ESCP), Permohonan Kebenaran Merancang Mengikut Seksyen 21, Akta Perancang Bandar Dan Desa 1976 (Akta 172) Bagi Cadangan Pembangunan Bercampur Di atas Lot 663, Lot 664, Lot 804-807, 1114, 914 & 920, Mukim Pulau, Daerah Johor Bahru, Johor Darul Takzim Untuk Tetuan Firstwide Plus Sdn Bhd.Jurutera JRK Sdn. Bhd., 2013

³ Source: Laporan Erosion and Sediment Control Plan (ESCP), Permohonan Kebenaran Merancang Mengikut Seksyen 21, Akta Perancang Bandar Dan Desa 1976 (Akta 172) Bagi Cadangan Pembangunan Bercampur Di atas Lot 663, Lot 664, Lot 804-807, 1114, 914 & 920, Mukim Pulau, Daerah Johor Bahru, Johor Darul Takzim Untuk Tetuan Firstwide Plus Sdn Bhd.Jurutera JRK Sdn. Bhd., 2013.

GENERAL CONTRIBUTION CONDITIONS

- The ESCP will be read with the engineering plans or written instruction that may be issued in relation to development at the subject site.
- Contractors will ensure that all erosion and sediment control works are undertaken as instructed in this specifications and constructed in the accordance with the Urban Storm water Management Manual for Malaysia, 2011.
- All contractors will be informed of their responsibilities in minimizing the potential for soil erosion and pollution of down slope areas.
- Where practicable, the soil and erosion hazard of the site will be kept as low as possible by limiting land disturbance as follows:

Land use	Limitation	Comments
Construction	Limited to 5m (preferably All site workers will clearly 2m) from the edge of any essential construction activity as shown on the engineering plans	All site workers will clearly 2m) recognize these areas that, where appropriate, are identified with barrier fencing (upslope) and sediment fencing (downslope), or similar materials.
Access area	Limited to a max width of 5m	The supervising Engineer will determine and mark the location of these zones on site. They can vary in position so as to best conserve existing vegetation and protect downstream areas while being considerate of efficient works activities. All site workers will clearly recognize these boundaries.
Remaining Lands	Entry prohibited except for essential management works	Thinning of growth might be necessary, for example, for fire reduction.

EROSION CONTROL CONDITIONS

- Clearly visible barrier fencing will be installed as shown on the plan
- and elsewhere at the discretion of the Supervision Engineer to ensure traffic control and prohibit unnecessary site disturbance. Vehicular access to the site will be limited to only that essential for construction work and all vehicles shall enter the site only through the established site access point.
- Soil material will be replaced in the same order they are removed from the ground. It is particular important that all sub soils are buried and top soils remain on the surface at the completion of the works.
- Where practicable, the construction programme will be schedule so that the time from starting land disturbance activities to stabilization is less than six months, weather permitting.
- Notwithstanding this, works will be schedule so that the duration from the conclusion of land shaping to completion of final stabilization is less than 20 working days.
- Lands recently stabilized with grass species will be watered regularly until an effective cover has properly established and plants are growing vigorously. Further application of seed might be necessary later in area of inadequate vegetation establishment.
- Where practical, foot and vehicular traffic will be kept away from all recently stabilized area. Earth batters will be constructed with as low a gradient as practical, but not steeper than:

Slope Length (m)	Batter Slope
<7	2(H):1(V)
7 to 10	2.5(H):1(V)
10 to 12	3 (H):1(V)
12 to 18	4(V):1(V)
18 to 27	5(H):1(V)
>27	6(H):1(V)

- Slope length may be shortened by using low flow earth banks as catch drains.
- h) Topsoil stockpiles will be located as shown on plan
 - i) All earthworks, including waterways, drains and spillways and their outlets, will be constructed to be stable in at least the design storm event.
 - j) During windy weather, large, unprotected area will be kept moist (not wet) by sprinkling with water keep dust under control in the event water is not available in sufficient quantities, soil binders and/or dust retardants will be used or the surface will be in a cloddy state that resists removal by wind.
 - k) Notwithstanding condition 1.4.2.h, stockpile will not be located within 5m of hazards areas, including the likely area of high velocity flows such as waterways, paved area and driveways
 - l) Water will be prevented from directly entering the permanent drainage system unless it is relatively sediment free (i.e. the catchments area has been permanently landscaped and/or any likely sediment has been treated in an approved device). Nevertheless, storm water inlets will be protected.
 - m) Temporary erosion and sediment control structures will be removed only after the land they are protecting are stabilized.

SEDIMENT FENCES WILL:

- a) be installed at the discretion of the Supervising Engineer to contain the coarse sediment fraction (including aggregate fines) as near as possible to their source.
- b) have a catchments area not exceeding 0.4 hectares, a length not exceeding 30m, or a total outflow not exceeding 50 l/s for a 1 year ARI
- c) provide a return of 1.5m upslope at intervals along the fence to satisfy the criteria in (b) above

THE SEDIMENT BASIN WILL:

- a) be constructed where shown on plan. It will be designed with the procedures given in the Urban Storm water Management Manual for Malaysia, 2011, based on a design event of 3 months ARI.
- b) be flocculated before discharge occurs (unless the design event is exceeded)
- c) have one or more pegs placed on the floor to clearly indicate the level at which design capacity occurs and when sediment will need to be removed.

The stored contents of the sediment basin will be treated with gypsum or their flocculating agents where they contain more than 50mg/l of suspended solids. Treatment will be as follows:

- a) lower suspended solids to less than 50mg/l within 24 hours of fillings
- b) the basin will then be allowed to stand 36 to 48 hours for flocculated particles to settle.
- c) The basin will then be drained so that full storage capacity is regained without discharging sediment from the site.
- d) Sediment removed from any trapping device will be disposed of in locations where further erosion and consequent pollution to down slope lands and waterways will be occur.

SITE INSPECTION AND MAINTENANCE

- a) A self-auditing programme will be established based on an Inspection Checklist. A site inspection using checklist will be made by the Supervising Engineer.
 - at least weekly (on Monday)
 - immediately before site closure
 - immediately following any rainfall event that has caused runoff
- b) The self audit will include records of:
 - the condition of every BMP used
 - maintenance requirements (if any) for each BMP
 - rainfall depths, duration and times
 - time, date, volume and type of flocculants added to the sediment basin
 - recording the site where sediment is disposed
 - forwarding a signed duplicated of the completed inspection Checklist to the project manager/developer for their information.
- c) In addition, a suitably qualified person will be required to oversee the installation and maintenance of all erosion and sediment control measures on the site. The person will be required to spend a minimum of two hours on site each fortnight and to provide a short monthly written report. The responsible person will ensure that:
 - the ESCP is being implemented properly
 - repairs are undertaken as required
 - Essential modifications are made to the ESCP is and when necessary.

The report shall include certification that the works have been carried out in accordance with the approval plans.

- d) Waste storage bins will be emptied as necessary. Disposal of waste will be in manner approved by the Supervising Engineer and in accordance with local regulations.
- e) Proper drainage of the site will be maintained. To this end, drains (including inlet and outlet works) will be checked to ensure that they are operating as intended, especially that:
 - no low points exist which can overtop in a large storm event
 - areas of erosion are repaired (e.g lined with a suitable material) and/or velocity or flow is reduced appropriately through the construction of small check dams or installing earth banks and/or diversion drains upslope
 - blockage are cleared (these might occur because of sediment pollution, sand/soil/spoil being deposited in or too close to them or breach by vehicle wheels, etc.)
- f) Sand/soil/spoil materials placed closer than 2m from hazards areas will be removed. Such hazards area include any areas of high velocity water flows (e.g. open drains and gutters), paved area, and driveways.
- g) Recently stabilized and will be checked to ensure that the erosion hazards has been effectively reduced. Any repairs will be initiate as appropriate.
- h) Excessive vegetation growth will be controlled through slashing or moving.

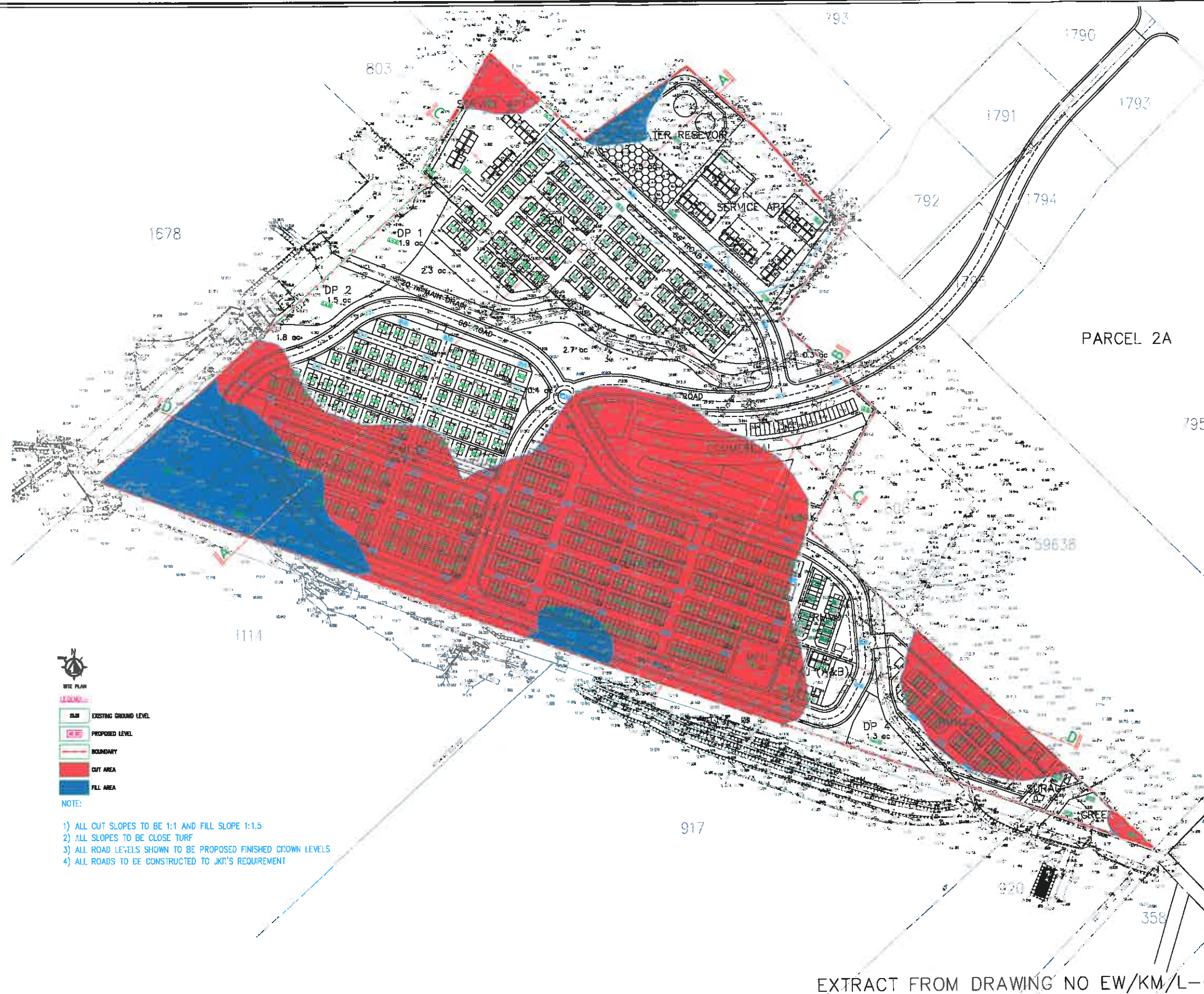


Figure 3.13 :

EARTHWORK LAYOUT

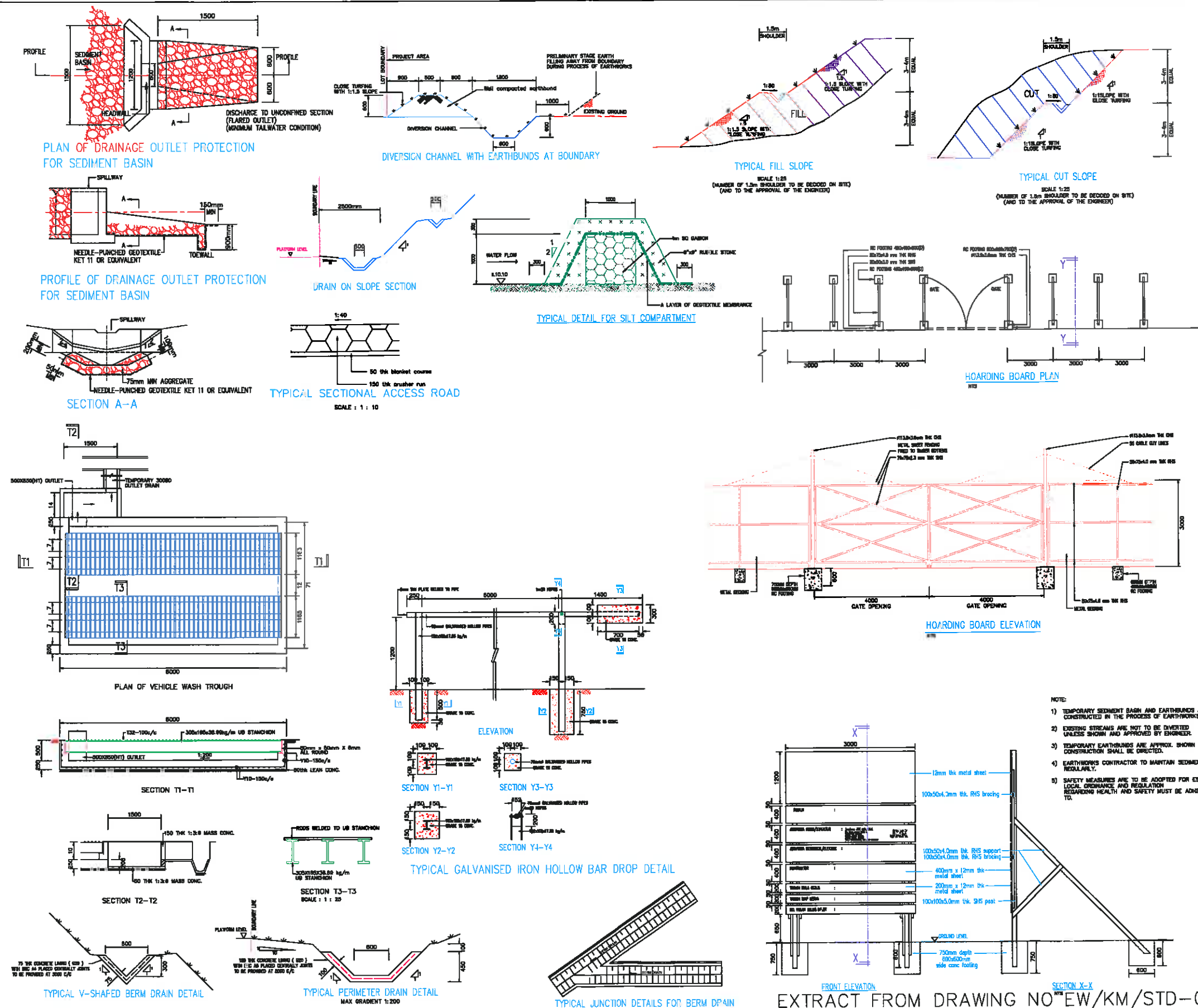
Environmental Consultant :

UEP Perunding UEP SDN. BHD. 631821A

36A, Jalan Impian Emas 7,
Taman Impian Emas, 81300 Skudai,
Johor Darul Takzim

Tel : 07-5573987 Fax : 07-5572987

Email: peruepsb@yahoo.com



EXTRACT FROM DRAWING NO EW/KM/STD-01 JURUTERA JRK SDN BHD

Figure 3.14 :

DETAIL OF BERM DRAIN, WASH TROUGH, HOARDING BOARD & TYPICAL GALVANISED IRON BAR DROP

Environmental Consultant :

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 Taman Impian Emas, 81300 Skudai,
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 Email: peruepsb@yahoo.com



EXTRACT FROM DRAWING NO ESCP/KM/L-01 JURUTERA JRK SDN BHD.

Figure 3.15 :

EROSION & SOIL CONTROL PLAN

Environmental Consultant :

UEP Perunding UEP SDN. BHD. 631621A

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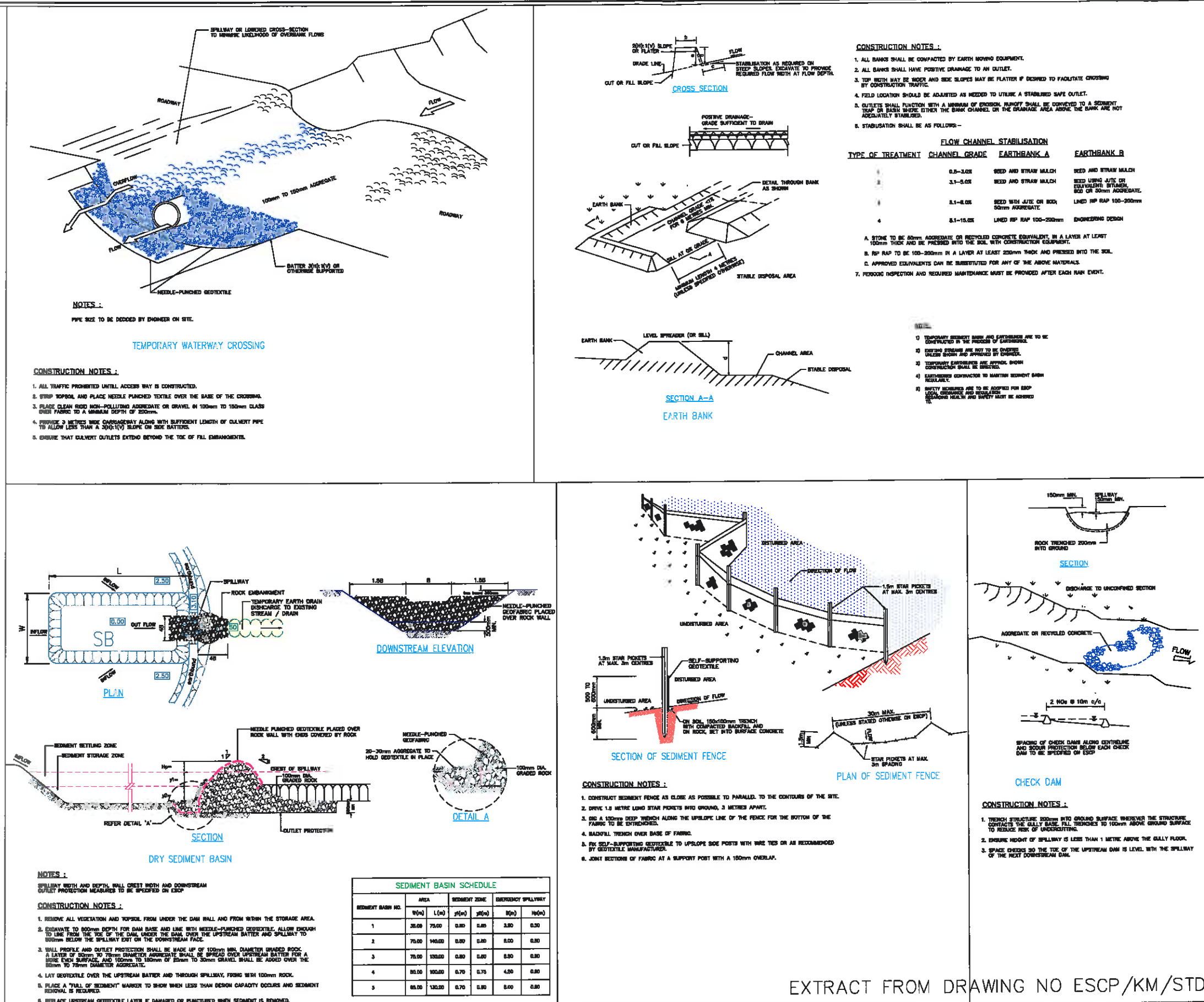


Figure 3.16 :
EROSION & SEDIMENT CONTROL DETAILS (ESCP)

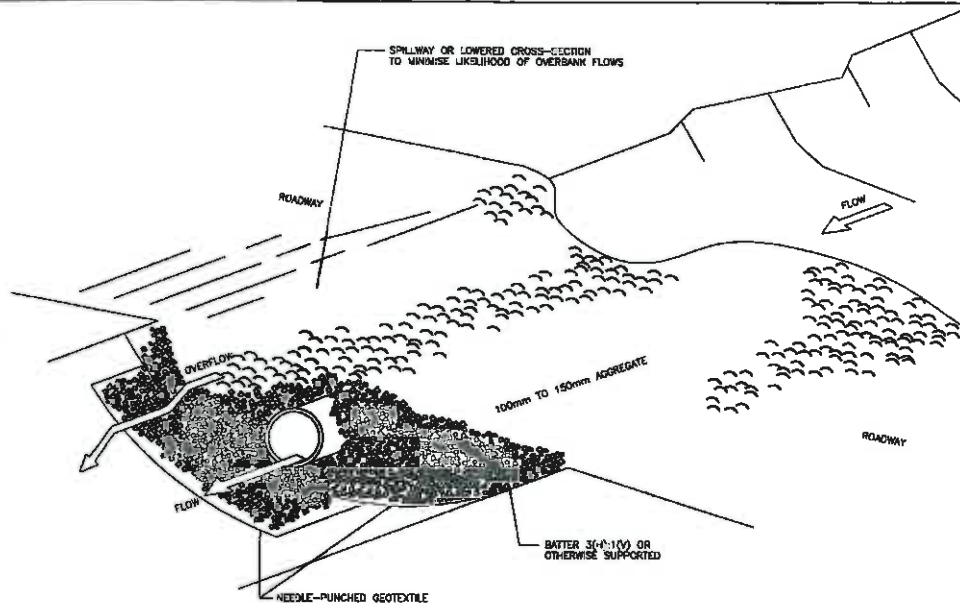
EXTRACT FROM DRAWING NO ESCP/KM/STD-01 JURUTERA JRK SDN BHD

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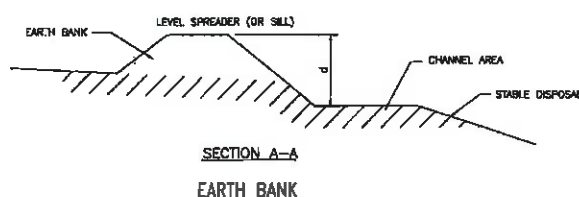
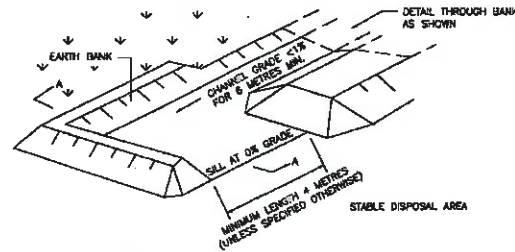
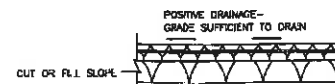
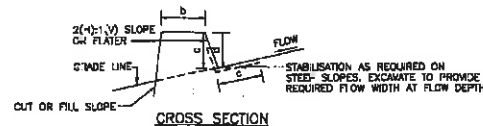
NOTES :

PIPE SIZE TO BE DECIDED BY ENGINEER ON SITE.

TEMPORARY WATERWAY CROSSING

CONSTRUCTION NOTES :

1. ALL TRAFFIC PROHIBITED UNTIL ACCESS WAY IS CONSTRUCTED.
2. STRIP TOPSOIL AND PLACE NEEDLE PUNCHED TEXTILE OVER THE BASE OF THE CROSSING.
3. PLACE CLEAN RIGID NON-POLLUTING AGGREGATE OR GRAVEL IN 100mm TO 150mm CLASS OVER FABRIC TO A MINIMUM DEPTH OF 200mm.
4. PROVIDE 3 METRES WIDE CARRIAGEWAY ALONG WITH SUFFICIENT LENGTH OF CULVERT PIPE TO ALLOW LESS THAN A 3:1 (H:V) SLOPE ON SIDE BATTERS.
5. ENSURE THAT CULVERT OUTLETS EXTEND BEYOND THE TOE OF FILL EMBANKMENTS.



CONSTRUCTION NOTES :

1. ALL BANKS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
2. ALL BANKS SHALL HAVE POSITIVE DRAINAGE TO AN OUTLET.
3. TOP WIDTH MAY BE WIDER AND SIDE SLOPES MAY BE FLATTER IF DESIRED TO FACILITATE CROSSING BY CONSTRUCTION TRAFFIC.
4. FIELD LOCATION SHOULD BE ADJUSTED AS NEEDED TO UTILISE A STABILISED SAFE OUTLET.
5. OUTLETS SHALL FUNCTION WITH A MINIMUM OF EROSION. RUNOFF SHALL BE CONVEYED TO A SEDIMENT TRAP OR BASIN WHERE EITHER THE BANK CHANNEL OR THE DRAINAGE AREA ABOVE THE BANK ARE NOT ADEQUATELY STABILISED.
6. STABILISATION SHALL BE AS FOLLOWS:-

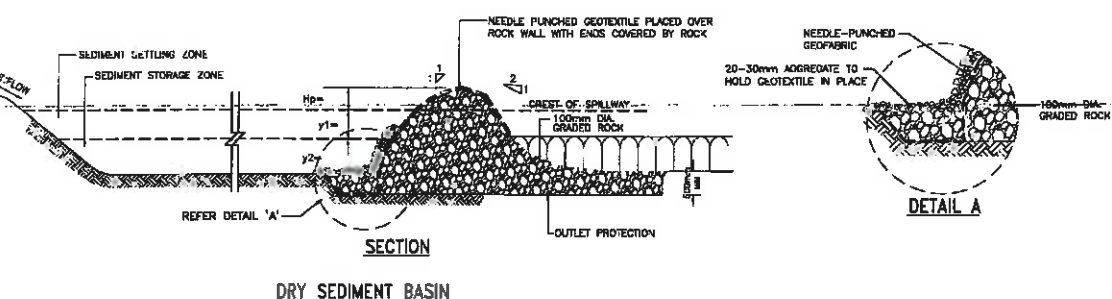
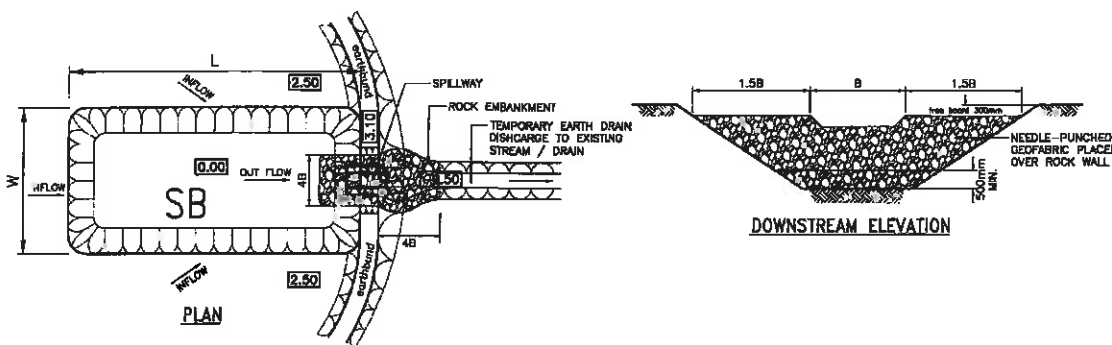
FLOW CHANNEL STABILISATION

TYPE OF TREATMENT	CHANNEL GRADE	EARTHBANK A	EARTHBANK B
1	0.5-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1-5.0%	SEED AND STRAW MULCH	SEED USING JUTE OR EQUIVALENT, STABILISED, SOD OR 50mm AGGREGATE.
3	5.1-8.0%	SEED WITH JUTE OR SOD, 50mm AGGREGATE	LINED RPP RAP 100-200mm
4	8.1-15.0%	LINED RPP RAP 100-200mm	ENGINEERING DESIGN

- A. STONE TO BE 50mm AGGREGATE OR RECYCLED CONCRETE EQUIVALENT, IN A LAYER AT LEAST 100mm THICK AND BE PRESSED INTO THE SOIL WITH CONSTRUCTION EQUIPMENT.
- B. RPP RAP TO BE 100-200mm IN A LAYER AT LEAST 250mm THICK AND PRESSED INTO THE SOIL.
- C. APPROVED EQUIVALENTS CAN BE SUBSTITUTED FOR ANY OF THE ABOVE MATERIALS.
7. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

NOTE:

- 1) TEMPORARY SEDIMENT BASIN AND EARTHWORKS ARE TO BE CONSTRUCTED IN THE PROCESS OF CONSTRUCTION.
- 2) EXISTING BARRIERS ARE NOT TO BE CREATED UNLESS SHOWN AND APPROVED BY ENGINEER.
- 3) TEMPORARY EARTHWORKS ARE APPROX. SHOWN CONSTRUCTION SHALL BE DIRECTED.
- 4) EARTHWORKS CONTRACTOR TO MAINTAIN SEDIMENT BASIN REGULARLY.
- 5) SAFETY MEASURES ARE TO BE ADOPTED FOR ESCP LOCAL ORDINANCE AND REGULATION REGARDING HEALTH AND SAFETY MUST BE ADHERED TO.



NOTES :

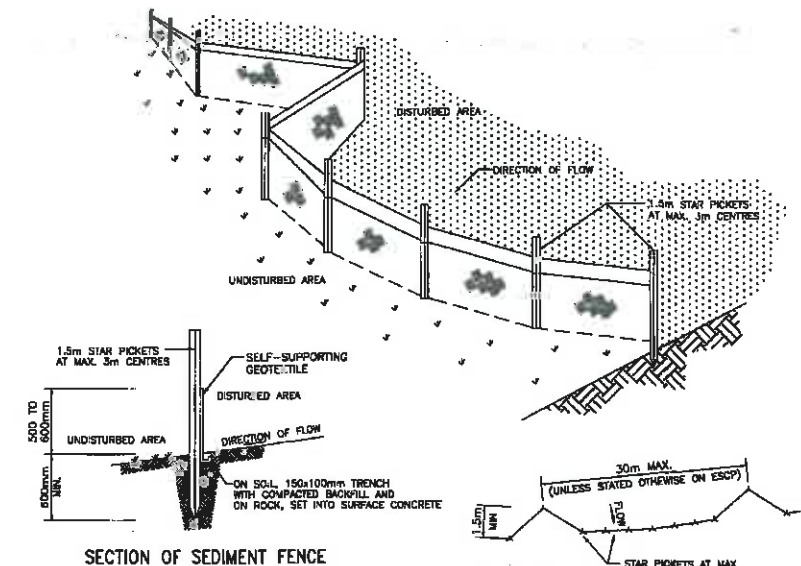
SPILLWAY WIDTH AND DEPTH, WALL CREST WIDTH AND DOWNSTREAM OUTLET PROTECTION MEASURES TO BE SPECIFIED ON ESCP

CONSTRUCTION NOTES :

1. REMOVE ALL VEGETATION AND TOPSOIL FROM UNDER THE DAM WALL AND FROM WITHIN THE STORAGE AREA.
2. EXCAVATE TO 500mm DEPTH FOR DAM BASE AND LINE WITH NEEDLE-PUNCHED GEOTEXTILE. ALLOW ENOUGH TO LINE FROM THE TOE OF THE DAM, UNDER THE DAM, OVER TO 2' UPSTREAM BATTER AND SPILLWAY TO 500mm BELOW THE SPILLWAY OUT ON THE DOWNSTREAM FACE.
3. WALL, PROTECTOR AND OUTLET PROTECTION SHALL BE MADE UP OF 100mm MIN. DIAMETER GRADED ROCK. A LAYER OF 50mm TO 75mm DIAMETER AGGREGATE SHALL BE SPREAD OVER UPSTREAM BATTER FOR A MORE EVEN SURFACE, AND 100mm TO 150mm OF 20mm TO 30mm GRAVE. SHALL BE ADDED OVER THE 50mm TO 75mm DIAMETER AGGREGATE.
4. LAY GEOTEXTILE OVER THE UPSTREAM BATTER AND THROUGH SPILLWAY, FIXING WITH 100mm ROCK.
5. PLACE A "FULL OF SEDIMENT" MARKER TO SHOW WHEN LESS THAN DESIGN CAPACITY OCCURS AND SEDIMENT REMOVAL IS REQUIRED.
6. REPLACE UPSTREAM GEOTEXTILE LAYER IF DAMAGED OR PUNCTURED WHEN SEDIMENT IS REMOVED.

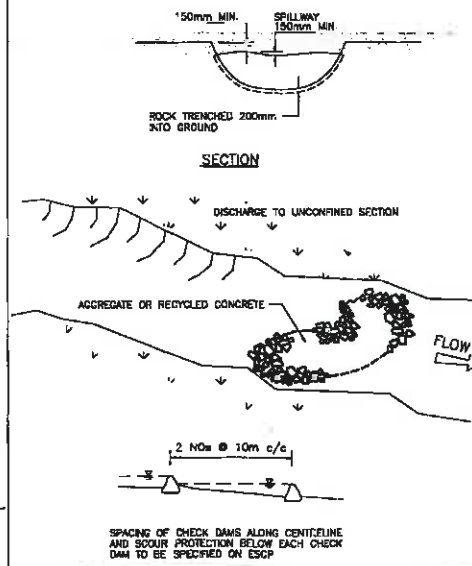
SEDIMENT BASIN SCHEDULE

SEDIMENT BASIN NO.	AREA		SEDIMENT ZONE		EMERGENCY SPILLWAY	
	W(m)	L(m)	y1(m)	y2(m)	B(m)	H2(m)
1	35.00	75.00	0.60	0.80	3.50	0.50
2	70.00	140.00	0.80	0.80	8.00	0.80
3	75.00	150.00	0.80	0.80	8.00	0.80
4	50.00	100.00	0.70	0.70	4.50	0.80
5	65.00	130.00	0.70	0.80	8.00	0.80



CONSTRUCTION NOTES :

1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SOIL.
2. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND, 3 METRES APART.
3. DIG A 100mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE EXTENDED.
4. BACKFILL TRENCH OVER BASE OF FABRIC.
5. FIX SELF-SUPPORTING GEOTEXTILE TO UPLOPE SIDE POSTS WITH WIRE TIES OR AS RECOMMENDED BY GEOTEXTILE MANUFACTURER.
6. JOINT SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.



CONSTRUCTION NOTES :

1. TRENCH STRUCTURE 200mm INTO GROUND SURFACE WHEREVER THE STRUCTURE CONTACTS THE GULLY BASE. FILL TRENCHES TO 100mm ABOVE GROUND SURFACE TO REDUCE RISK OF UNDERCUTTING.
2. ENSURE HEIGHT OF SPILLWAY IS LESS THAN 1 METRE ABOVE THE GULLY FLOOR.
3. SPACE CHECKS SO THE TOE OF THE UPSTREAM DAM IS LEVEL WITH THE SPILLWAY OF THE NEXT DOWNSTREAM DAM.

REV. REMARK INITIAL DATE

PEMAJU / PEMEGANG PA :

FIRSTWIDE PLUS SDN. BHD.
LOT PTB 228/2,
TELUK ANGA,
PERSARAN ABU BAKAR SULTAN,
80200 JOHOR BAHRU,
JOHOR DARUL TAKZIM.

PROJECT
PERMOHONAN KEBENARAN MERANCANG DI BAWAH
SEKSYEN 21, AKTA PERANCANG BANDAR DAN
DESA 1976 (AKTA 172), BAGI CADANGAN
PEMBANGUNAN BERCAMPUR DI ATAS LOT
663, LOT 664, LOT 804-L0T 807, 1114, 917 &
820, MUKIM PULAI, DAERAH JOHOR BAHRU,
JOHOR DARUL TAKZIM

UNTUK
TETUAN FIRSTWIDE PLUS SDN BHD

TITLE

EROSION & SEDIMENT CONTROL DETAILS (ESCP)

jurutera JRK sdn bhd
(Co. No. 54472-1)
Civil & Structural Engineers

183A, Jalan Karpis Seta,
Taman Sri Telok,
80200 Johor Bahru,
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DESIGNED	SAJIN	SCALE	AS SHOWN
DRAWN		DATE	NOV 2013
CHECKED	IR. SOH BOON SIEW	IS/UE	
JOB NO.		DRAWING NO.	
LSK 13027		ESCP/KM/STD-01	

3.3.6 Construction of Sub-Structure and Super-Structure

The proposed basement and substructure designs are holistic, combining the interaction of the walls, piles, dewatering and construction sequence controls. Top down construction/basement was used on this car park as a practical method for a restricted site especially for high end water front development. Demand for space within our cities often makes it cost-effective to use space below buildings for parking, deliveries, storage and plant rooms. Key issues of basement and excavation work include supporting the excavation sides, controlling ground movements outside the site perimeter, controlling groundwater flows during excavation, protecting against water penetration into the completed facility and protecting archaeological remains in the ground. The building design team will minimize the hazards, obtaining the ground investigation data necessary to select the substructure for support or act as foundation to the building/structure.

Construction of building and structure for this project involves the erection of main structure for villa, apartment, hotel, commercial buildings and other buildings. These buildings and structures may be built in phases. However, the impacts generated may significantly pose a threat to the environment and safety of public if no mitigation measures implemented.

3.3.7 Construction of Infrastructure and Utilities Development.

The proposed development will need the supply of utilities for the consumption of its residential and commercial area. The utilities will be supplied by the various agencies from the nearby tapping mains. Infrastructure and utility development will include the following components and activities concerned generally follow upon completion of earthworks. Infrastructure and utility development will include the following components and activities concerned generally follow upon completion of earthworks:-

- i. Roads
- ii. Drainage systems. (Main drain and Detention Pond)
- iii. Sewerage Reticulation System and Sewage Treatment Plant
- iv. Water Reticulation System
- v. Electrical Power Distribution
- vi. Telecommunications Systems

The following table outlines the activities involved in such infrastructure development:-

Table 3.9: Project Activities during Infrastructure and Utilities Development

Infrastructure and Utility	Major Activities Envisaged
Roads	<ol style="list-style-type: none"> i. Excavation and laying of subgrade ii. Turfing of Slopes iii. Compaction of Road Sub-layer iv. Laying of various road shoulder/binder and wearing course v. Turfing of road shoulder/exposed surfaces vi. Roadside drainage
Drains/Flood Mitigating Measure	<ol style="list-style-type: none"> i. Trench excavation for drains/channels ii. Lining of drains/use of precast section iii. Construction of sumps and culverts iv. Construction of Maindrain and detention pond
Sewerage Reticulation System and Sewage Treatment Plant	<ol style="list-style-type: none"> i. Construction of buildings and structures such as STP.
Piped or ducted utilities including sewerage, water supply, electrical and telecommunication systems	<ol style="list-style-type: none"> i. Trench excavation ii. Laying of pipes and ducts iii. Backfilling and compaction

Table 3.10: Estimated Utilities Demand and Waste Generated during the Operational Phase of the Proposed Project

Sector	Estimated Demand / Peak Output Daily	
Population Equivalent (P.E.)	26,426	PE
Domestic Wastewater	5,946	m ³ /day
Water Demand	1,428,023	gallon/day
	6,492	m ³ /day
Solid Waste	13,345	kg/day
Electricity	51,471	kVA/day

Source:

- i. Load demand, J Roger Preston (Malaysia) Sdn Bhd, 2013.
- ii. Laporan Kejuruteraan Sistem Pembentungan, (SSA/PDC 1), Permohonan Kebenaran Merancang Mengikut Seksyen 21, Akta Perancang Bandar Dan Desa 1976 (Akta 172) Bagi Cadangan Pembangunan Bercampur Di atas Lot 663, Lot 664, Lot 804-807, 1114, 914 & 920, Mukim Pulau, Daerah Johor Bahru, Johor Darul Takzim Untuk Tetuan Firstwide Plus Sdn Bhd. Jurutera JRK Sdn. Bhd., 2013. – Appendix H
- iii. Perunding UEP Sdn. Bhd., 2013 (Janaan PE & Utilities) – Appendix I

i. Construction of Roads/Traffic

All construction projects are designed to a certain lifespan, in which after that the buildings or infrastructure needs to be refurbished or in the case of roads; resurfaced. Road surfacing is necessary to maintain its required service level. It includes repairing potholes and painting works on the roads after resurfacing. Temporary road diversion might be necessary to divert existing traffic as to facilitate maintenance works. The main concern of the road structure is water. Therefore the water must quickly and efficiently be rid away from the road structure. This means that the chamber of the surface, the slope of the shoulders, the side drains and cross drainage structures need not only to be constructed effectively but also need to be constructed effectively. It shall keep in a condition that will permit the free run off the water away from the road. This means that the road once constructed has to be looked after on a regular basis. This is why maintenance is so important and is the core of a functional road network

Proper road maintenance contributes to reliable transport at reduced cost, as there is a direct link between road condition and vehicle operating costs. An improper maintained road can also represent an increased safety hazard to the user, leading to more accidents, with their associated human and property costs. The road maintenance activities can be subdivided into three main categories, namely routine works, periodic works, and emergency works. This activity involves the general maintenance works that are carried out for the convenience of traffic users such as cutting of roadside grass (if any), maintaining signage and road furniture (barriers, street light etc). Contractors are normally engaged for this activity and minimal disturbance to the traffic can be anticipated. The proposed road network will be planned to the proposed road hierarchy to adequately carry the projected traffic volume and with space allocation for utilities and other infrastructure. Upgrading of existing roads will be carried as per the recommendations of the Traffic Impact Assessment. The roads shall be designed to the road standards complying with the requirements of **Jabatan Kerja Raya (JKR)** and **Majlis Perbandaran Johor Bahru Tengah (MPJBT)**.

ii. Drainage systems⁴

The road drainage design is basically concerned with selecting a design storm, estimating the likely run-off from that storm from the design catchments area, and deciding how to collect and channel the water to a suitable discharge point. Therefore, the road drainage must be working effective without failure to avoid any waste (rubbish, plastic, wood and others) trapped at the drainage pipeline. Culverts must be maintained to ensure normal flow passes through the culvert consistent with its design specifications. This typically includes dredging of a ditch adjacent to culvert openings and occasional cleaning-out of the culvert interior. Cleaning is usually performed through the use of high-pressure water, mechanical dredging or by hand. Repair or replacement is necessary when incidental damage occurs to the culvert that would prevent optimum water flow or an unsafe crossing situation. As required by JPS, the development shall control the discharge from the proposed development prior

⁴ Laporan Kejuruteraan (Maindrain & Detention Pond), Permohonan Kebenaran Merancang Mengikut Seksyen 21, Akta Perancang Bandar Dan Desa 1976 (Akta 172) Bagi Cadangan Pembangunan Bercampur Di atas Lot 663, Lot 664, Lot 804-807, 1114, 914 & 920, Mukim Pulau, Daerah Johor Bahru, Johor Darul Takzim Untuk Tetuan Firstwide Plus Sdn Bhd. Jurutera JRK Sdn. Bhd., 2013.

releases into river/main drain. The Detention Pond and main drain provided is sufficient to cater for the storm water discharge from the proposed development and contribute zero peak flow into the downstream. Therefore the drainage system is to comply MSMA II requirements.

Detention Pond

Based on the catchment area, only 4 detention ponds (DP1, DP2, DP3, DP4) involve to cater the surface runoff under this submission. The Detention Pond was designed based on Urban Storm management Manual for Malaysia (Manual Saliran Mesra Alam Malaysia II) which published by department of irrigation and Drainage Malaysia (DID) in year 2011.

Table 3.11: Detention pond size

Detention Pond	Detention Pond						Outlet Pipe	Weir	
	Depth	Invert	D1 (Q100)	D2 (Q50)	D3 (Q5)	D4 (Major Outlet)		Depth	Length
DP1	2.1	16	2.078	1.895	1.295	1.345	4 Nos ø 450 2 Nos ø 450	600	3500
DP2	2	16	2.413	2.221	1.568	1.618	2 Nos ø 450 2 Nos ø 450	500	3000
DP3	2.1	10	2.328	2.109	1.323	1.373	4 Nos ø 450 2 Nos ø 450	600	4000
DP4	2.1	22	2.362	2.165	1.473	1.523	3 Nos ø 450 1 Nos ø 450	500	3000

Source: Jurutera JRK Sdn. Bhd., 2013

Main Drainage System

These developments have 5 Main Drain (MD1, MD2, MD 3a, MD 3b, MD4 and MD5) to cater the surface runoff. The Main drain was designed based on catchment area within the development. Since the total catchment area and main drain reserve for the proposed amended development in this submission does not have any changes, thus, it will used the approved main drain design with the same catchment area. It should be able to cater the surface runoff for the proposed development. The Main Drainage design calculation is referred to "Urban Storm management Manual for Malaysia (Manual Saliran Mesra Alam Malaysia II) which published by department of irrigation and Drainage Malaysia (DID) in year 2011.

Table 3.12: Main drain size

MD	Pt	BW1	TW1	TW2	yt	GRADIENT	DRAIN RESERVE
1	A-C	3000	11000	9800	2000	1 : 400	15m
2	B-C	2000	8000	6800	1500	1 : 400	18m
3a	C-D	4000	12000	11800	2000	1 : 400	20m
3b	D-E	5000	14200	13000	2300	1 : 400	20m
4	F-G	3000	11000	9800	2000	1 : 400	18m
5	H-I	3000	10200	9000	1800	1 : 400	18m

Source: Jurutera JRK Sdn. Bhd., 2013

iii. Sewage Treatment Plant/Sewerage Reticulation System

Domestic waste water produce by population need to be processed in sewage treatment plant designed follow certain capacity. Sewage treatment plant will operate all the time to ensure effluent comply A's standards before being discharged to river. However, if that plant is unable operating nicely, disconcerting smell will producing apart from giving effect bad to population health and aquatic life in river nearby. The proposed developments will be provided with integrated sewerage reticulation systems, which shall consist of gravity pipelines, manholes and sewerage treatment plant.

Conceptual Sewerage System⁵

A proposed sewerage treatment plant (STP) will be constructed to cater the above development. The raw sewerage will flow gravitationally to the STP provided.

- The proposed development would accommodate a population equivalent of about **26,426 PE** and the estimation for wastewater volume is **5,946 m³/day**.
- The proposed sewer reticulation system for the project will be discharge to the proposed Sewerage Treatment Plant with design capacity **27,000 PE**.

Construction of proposed sewerage treatment system intended to improve the quality of effluent discharging into the public drainage system and open water, thus achieving the aim of protecting surrounding environment. It is therefore, a beneficial project for the community and the environment.

iv. Water Reticulation System, Electrical Power Distribution and Telecommunications Systems

Water Reticulation Plan

The water consumption for the whole new development is estimated to be approximately **1,428,023 gallon/day (6,492 m³/day)**. Water supply for this development will provided by R.C. Tank with full capacity 1,500,000 gallon, suction tank (1/3) – 500,000 gallon and suction tank(2/3) – 1,000,000 gallon.

Electricity Supply

Refer Electrical Loading Summary of the electric supply and telephone lines breakdown for the development based on the TNB Guidelines. The estimated maximum load demand for the development based on the TNB Guidelines is **51,471 kVA/day**.

Telecommunication

The telecommunication system proposed for this development shall have the capability to support the State of Art telecommunication services, wireless services and information technology applications. It is proposed that all transmission media shall be fibre optics, micro wave or copper depending on the design development criteria.

⁵ Laporan Kejuruteraan Sistem Pembentungan, (SSA/PDC 1), Permohonan Kebenaran Merancang Mengikut Seksyen 21, Akta Perancang Bandar Dan Desa 1976 (Akta 172) Bagi Cadangan Pembangunan Bercampur Di atas Lot 663, Lot 664, Lot 804-807, 1114, 914 & 920, Mukim Pulau, Daerah Johor Bahru, Johor Darul Takzim Untuk Tetuan Firstwide Plus Sdn Bhd. Jurutera JRK Sdn. Bhd., 2013.

Table 3.13: Summary of Population Equivalent (PE)

Type of Development	PE Rates	Parcel 3			
		Assumption	Unit	Area (acre)	Total
Perumahan					
Double Storey Terrace House (22'x75')	5 /Unit		280		1,400
Semi Detached House (40'x80')	5 /Unit		260		1,300
PKJ A	5 /Unit		45		225
PKJ B	5 /Unit		90		450
RMMJ	5 /Unit		180		900
Service Apartment	5 /Unit		2500		12,500
Jumlah kecil					16,775
Perniagaan					
Single Storey Shop House	5 /Unit		45		225
Commercial Lot	3 /100m ²	5 Plot Ratio		15.00	9,106
Jumlah Kecil					9,331
Kemudahan					
Multi Purpose Hall	0.2 /person	1000 persons	1		200
Surau	0.2 /person	300 persons	1		60
Clinic	3 /100m ²			0.50	61
Jumlah Kecil					321
JUMLAH KESELURUHAN					26,426
PE CAPACITY					27,000

Source: Laporan Kejuruteraan Sistem Pembentukan, (SSA/PDC 1), Permohonan Kebenaran Merancang Mengikut Seksyen 21, Akta Perancang Bandar Dan Desa 1976 (Akta 172) Bagi Cadangan Pembangunan Bercampur Di atas Lot 663, Lot 664, Lot 804-807, 1114, 914 & 920, Mukim Pulai, Daerah Johor Bahru, Johor Darul Takzim Untuk Tetuan Firstwide Plus Sdn Bhd. Jurutera JRK Sdn. Bhd., 2013.

Table 3.14: Summary of Water Demand Calculation

Overall Water Table

No.	Type of Development	Master Layout				
		Units	Assumption	Area (ac)	Rate(gpd)	Total (gpd)
1	Double Storey Terrace House (22'x75')	280			350	98,000
2	Semi Detached House (40'x80')	260			400	104,000
3	PKJ A	45			250	11,250
4	PKJ B	90			300	27,000
5	RMMJ	180			300	54,000
6	Serviced Apartment	2,500			350	875,000
7	Single Storey Shop House	45			600	27,000
8	Commercial Lot	1	5 Plot Ratio	15.00	264/100m ²	801,306
9	Multi Purpose Hall	1	1000 Students		12/Student	12,000
10	Surau	1	300 Persons		3/person	900
11	Clinic	1	300 Persons		3/person	900
	TOTAL				TOTAL	2,011,356

Demand Water Table (Consider 1/3 Capacity for Serviced Apartment)

No.	Type of Development	Master Layout				
		Units	Assumption	Area (ac)	Rate(gpd)	Total (gpd)
1	Double Storey Terrace House (22'x75')	280			350	98,000
2	Semi Detached House (40'x80')	260			400	104,000
3	PKJ A	45			250	11,250
4	PKJ B	90			300	27,000
5	RMMJ	180			300	54,000
6	Serviced Apartment	2,500	33% Capacity		350	291,667
7	Single Storey Shop House	45			600	27,000
8	Commercial Lot	1	5 Plot Ratio	15.00	264/100m ²	801,306
9	Multi Purpose Hall	1	1000 Students		12/Student	12,000
10	Surau	1	300 Persons		3/person	900
11	Clinic	1	300 Persons		3/person	900
	TOTAL				TOTAL	1,428,023

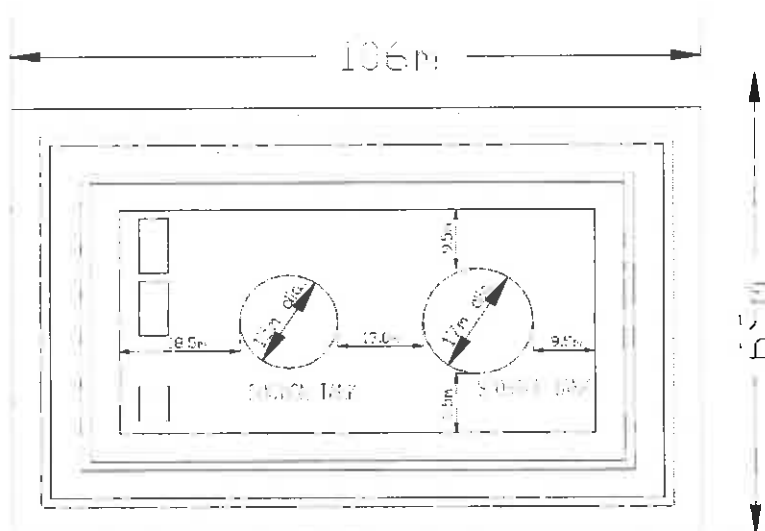
Source: Jurutera JRK Sdn. Bhd., 2013

Table 3.15: Reserved Area Tabulation for Water Tank

TYPE OF SERVICES	TYPE OF TANK	TOTAL WATER DEMAND	AREA NEEDED	AREA IN THE LAYOUT	REMARKS
WATER TANK	R.C TANK	Full Capacity = 1,500,000 gall Suction Tank Capacity = 500,000 gall 2/3 Capacity = 1,000,000 gall	* Suction Tank • Tank Height = 3 Meters • Volume Required = 500,000 gall = 2,273 m ³ • Area Required = 2,273 / 3 = 758 m ² • Diameter Tank = 16 Meters * Storage Tank • Tank Height = 5 Meters • Volume Required = 1,000,000 gall = 4,546 m ³ • Area Required = 4,546 / 5 = 909 m ² • Diameter Tank = 17 Meters * Reserved Area • Area required for slope = 16.5m each boundary • 18.5m required at one side for utilities • 9.5m required for access road • Reserved area needed complete with 9.5m setback and slope = 69m x 106m = 1.81 Acres	9.00 Acres	Subject to Pressure test from SAJH

Source: Jurutera JRK Sdn. Bhd., 2013

Figure 3.17: Area for Water Tank



Source: Jurutera JRK Sdn. Bhd., 2013

Table 3.16: Summary of Load Demand

Item	Type	Unit	Unit Load (kW)	Total (kW)	Total (kVA)	Built Up (sqft)
1	Residential					
	a) 2 storey terrace house	280	5	1,400	1,647	
	b) semi detached house	260	10	2,600	3,059	
	c) bungalow	0	15	0	0	
2	Affordable Housing					
	a) PKJ (Jenis A)	45	3	135	159	
	b) PKJ (Jenis B)	90	3	270	318	
	c) RMMJ	180	5	900	1,059	
	d) Medium Cost Shop	45	5	225	265	
3	Commercial					
	a) Shopping Mall	0	34,033	0	0	3,403,342
	b) office block	1	36,800	36,800	43,294	4,600,000
	c) serviced apartment	2,500	5	12,500	14,706	
4	Amenities					
	a) STP	1	50	50	59	
	b) School	1	500	500	588	
	TOTAL			55,380	65,153	
	DF			0.79	0.79	
	TOTAL MD			43,750	51,471	

Source: J Roger Preston (Malaysia) Sdn Bhd, 2013

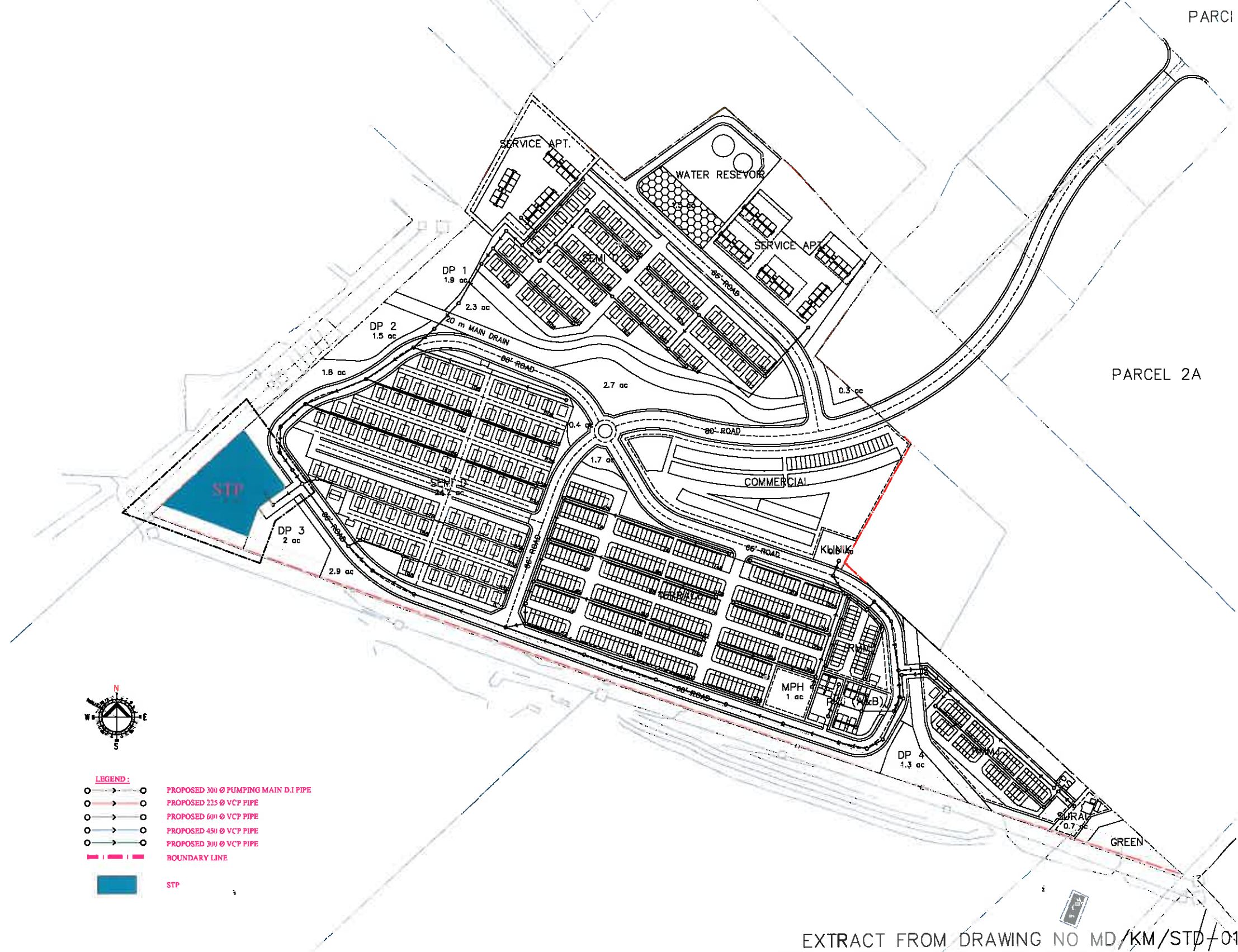


Figure 3.18 :

SEWERAGE LAYOUT PLAN

Environmental Consultant :



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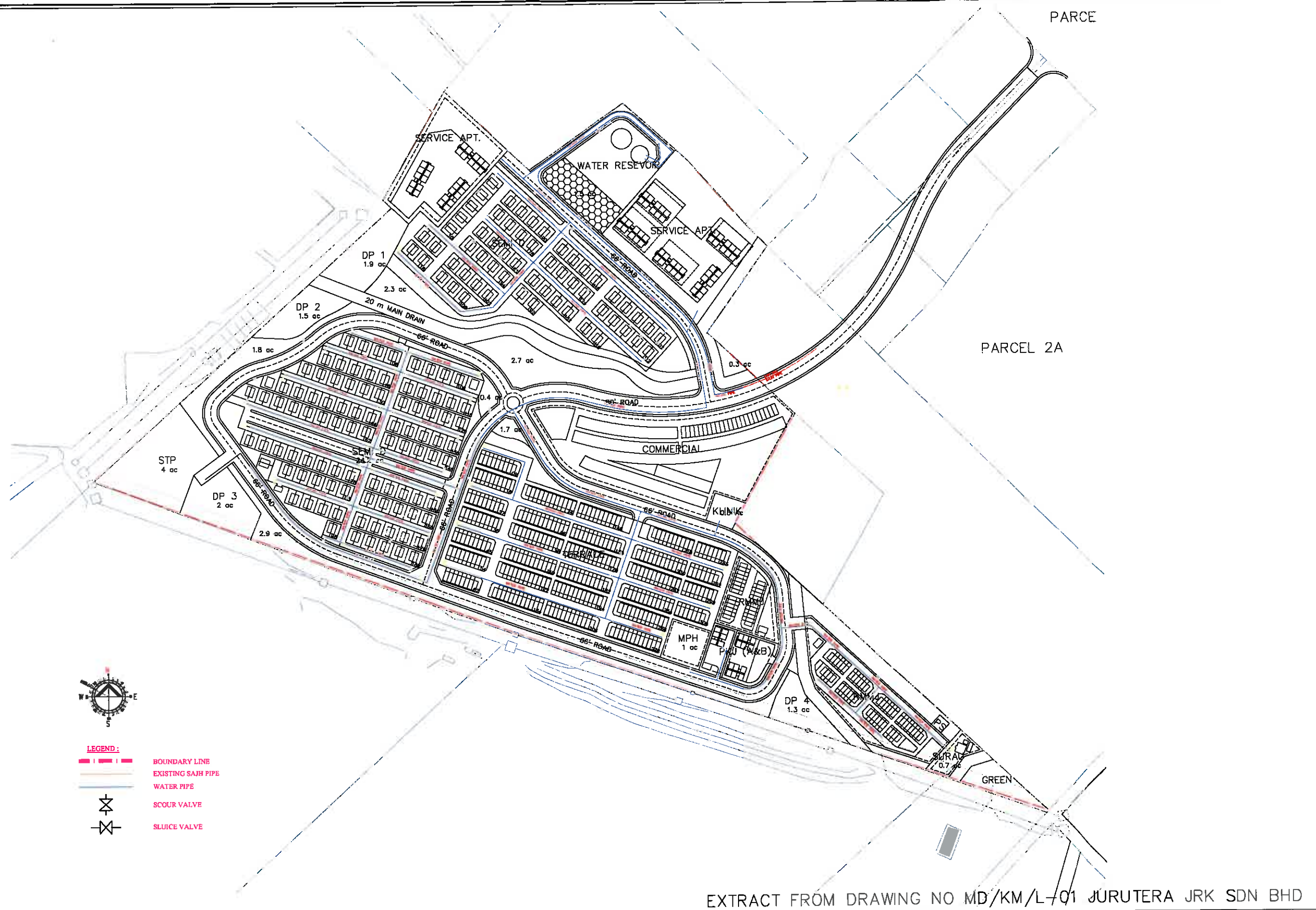
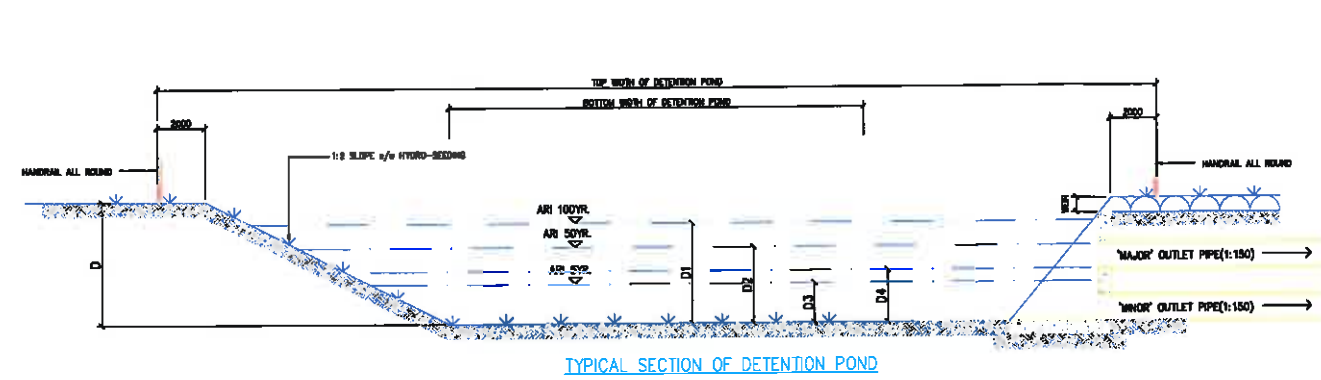


Figure 3.19 :

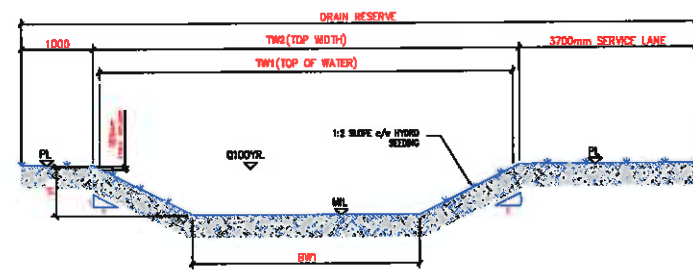
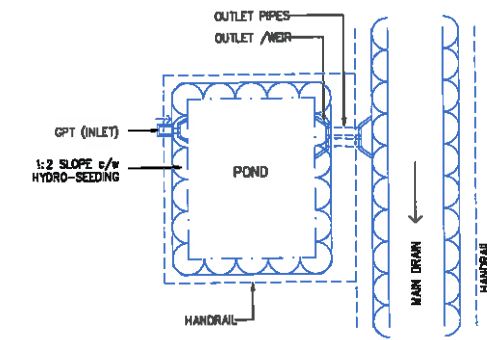
WATER RETICULATION LAYOUT

Environmental Consultant :

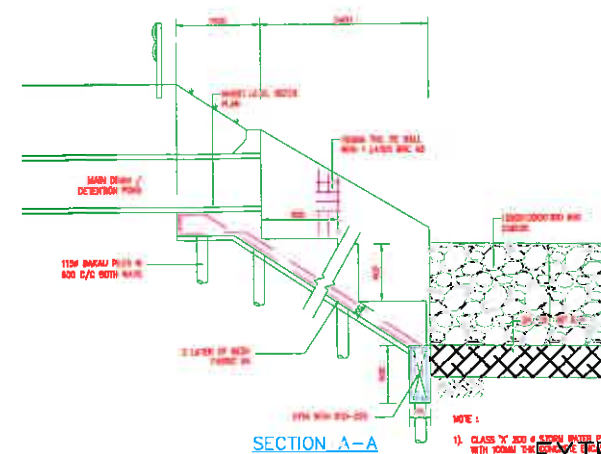
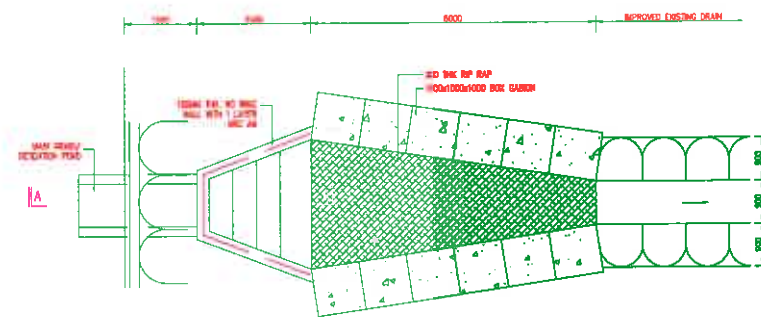
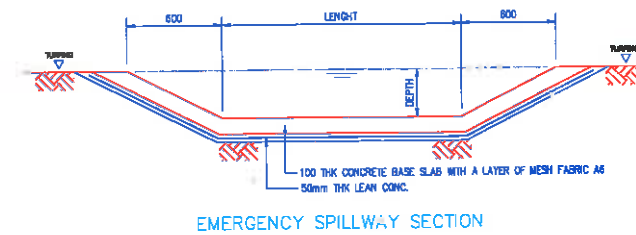
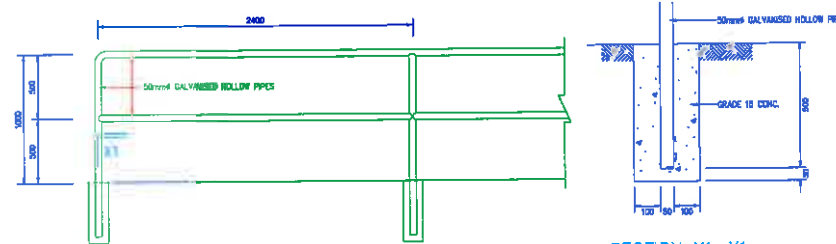
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DETENTION POND						OUTLET PIPE		WEIR	
NO.	DEPTH (D)	DE (mm)	DE (mm)	DE (mm)	DE (mm)	NO.	DEPTH (D)	DE (mm)	DE (mm)
1	2500	2,576	1,806	1,200	1,340	4	4000	4,076	2,800
2	2800	2,876	2,221	1,568	1,616	5	4500	4,576	3,000
3	2800	2,876	2,108	1,423	1,373	6	5000	5,076	3,500
4	2700	2,762	2,100	1,473	1,523	7	5500	5,576	4,000



MD	PL.	DRAIN RESERVE	EW1	TW1	TW2	Y1	GRADIENT
1	A-C	15m	3000	11000	9800	2000	1:400
2	B-C	18m	2000	8000	6800	1500	1:400
3a	C-D	20m	4000	12000	11800	2000	1:400
3b	D-E	20m	5000	14200	13000	2300	1:400
4	F-G	18m	3000	11000	9800	2000	1:400
5	H-I	18m	3000	10200	9000	1800	1:400



EXTRACT FROM DRAWING NO MD/KM/STD-01 JURUTERA JRK SDN BHD

Figure 3.21 :

TYPICAL MAIN DRAIN SECTION,
TYPICAL DETENTION POND SECTION,
TYPICAL OUTLET STRUCTURE &
TYPICAL DETAILS

Environmental Consultant :

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3.3.8 Disposal of Construction Wastes

Construction wastes such as cut off piles, leftover cement, cut off steel bars and wood work trimmings should be collected and disposed of properly at approved disposal sites. Contractors and sub-contractors are normally required to tidy up the site and clear any construction wastes before handing over the project or any part of the project to the client.

Scheduled Waste:

Oil and grease, paint drum and spent lubricant oil will be the main forms of scheduled waste. These wastes will be generated from maintenance of machineries. However, maintenance of equipment and machineries will be carried out by service contractor and will be not done at site. Therefore contamination due to scheduled waste is unlikely to happen.

3.3.9 Abandonment

The project has been designed for the tourism centre as specified in the previous chapter. As the project is expected to operate in perpetuity, project abandonment during construction or operation phase is most likely not to occur within the foreseeable future.

However, if there is a considerable downturn in the economy, the construction of the development will cease and the labour force will be retrenched. The worst scenario is that the site will be totally abandoned leaving neglected structures and overgrows vegetation, which will be detrimental to the aesthetics of the area. If in any case the project proponent decided not to proceed with the development, it must be done at the earliest stages. This is to ensure that no damages are done to the existing environment. Any abandonment after the commencement of the project will leave serious or negatives impacts on the environment.

3.4 POST- DEVELOPMENT PHASE

Post development phase is when all construction activities are completed and the proposed project starts its intended function. Most of the activities involves at this phase were mainly related to maintenance works such as resurfacing of roads, drainage, landscaping and monitoring works.

3.4.1 Landscaping

Once upon completion of the structures, and finishing structures, the proposed site will be landscape and beautified to increased the aesthetic value and become a noise/dust barrier. The green consideration is very important factor for this proposed project.

3.4.2 Solid Waste Disposal

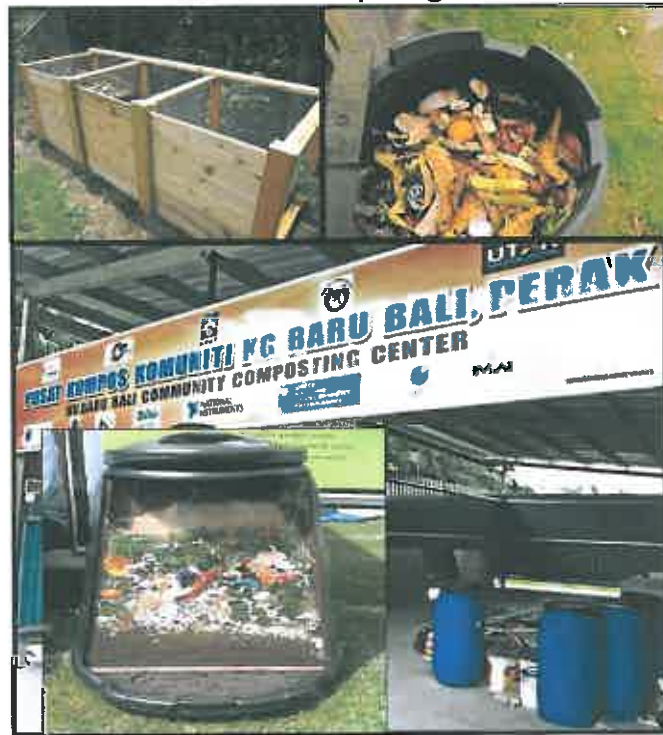
The total solid waste generation upon completion of the development has been estimated to be about **13,345 kg/day**. The operational stage will produce some high quantity of solid wastes and the disposal methods and locations are important. This relates to on-time collection to avoid the spread of diseases by vectors, etc. The storage and collection strategies for large communities with high population densities are different from those suitable for the relatively small communities with low population densities. The collection of waste has to be disposed off at approval landfill or other approved facilities by Southern Waste Management.

These includes the innovative way to reduce waste by promoting the recycling and reuse of waste, which eventually will reduce the waste generated. It will start with the implementation of composting method during the earthwork and vegetation clearing, where all organic materials such as leaves, grass, clippings, branches and sawdust (if any) collected and composed. The composted material is re-used for landscaping works. Any unsuitable materials or waste generated will coordinate with the concession company (Southern Waste Management Sdn. Bhd.) for collection and disposal at the approved disposal site or sanitary landfill.

3R (Reduce, Reuse & Recycle) is part of the integrated solid waste management. **Recycling Programs (3R)** around the communities can maximize the amount of waste that is diverted from disposal recycling projects can be encouraged to make this entire development a more environmental friendly and sustainable. The other alternative are to dispose the solid waste is to

provide **Centralized Composting Park**. The recycle centre community can be located same with composting park. Composting is nature's way of recycling organic materials and it's reducing the amount of waste you create in your yard and kitchen by converting it into a useable soil amendment.

Centralized Composting Park



3R Program



3.4.3 General maintenance (Infrastructure and Utilities)

When the construction of the project has been completed, the next stage is the operational and maintenance. The daily operation and maintenance of the sewage treatment plant that is constructed will need to be taken care of. This is because the plant will not be handed over to the authorities and is classified as an independent private plant. Sewage and sullage will be channeled to the sewage treatment plant for treatment up to the stipulated standard before discharging into the waterways.

The general maintenance works that are carried out for the convenience of traffic users side such as cutting of roadside grass (if any), maintaining signage and road furniture (barriers, street light etc). Contractors are normally engaged for this activity and minimal disturbance to the traffic can be anticipated. The drainage along road upgrading must be on maintenance regularly. Therefore, the road drainage must be working effective without failure to avoid any waste (rubbish, plastic, wood and others) trapped at the drainage pipeline.